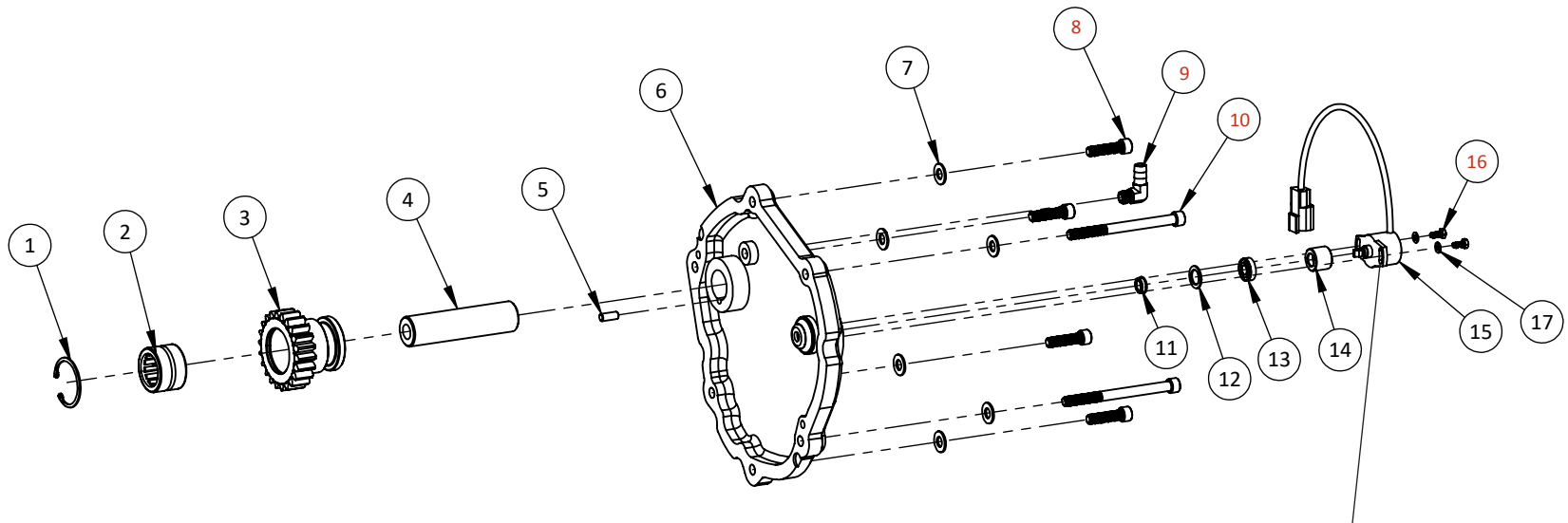
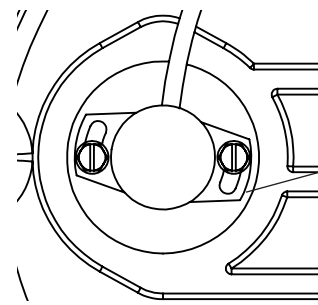


# WEDDLE S4/S5 FRONT COVER GEN 3 EXPLODED VIEW



**IMPORTANT:** When installing potentiometer, the wire loom points up, and the dimple on the spade points down.



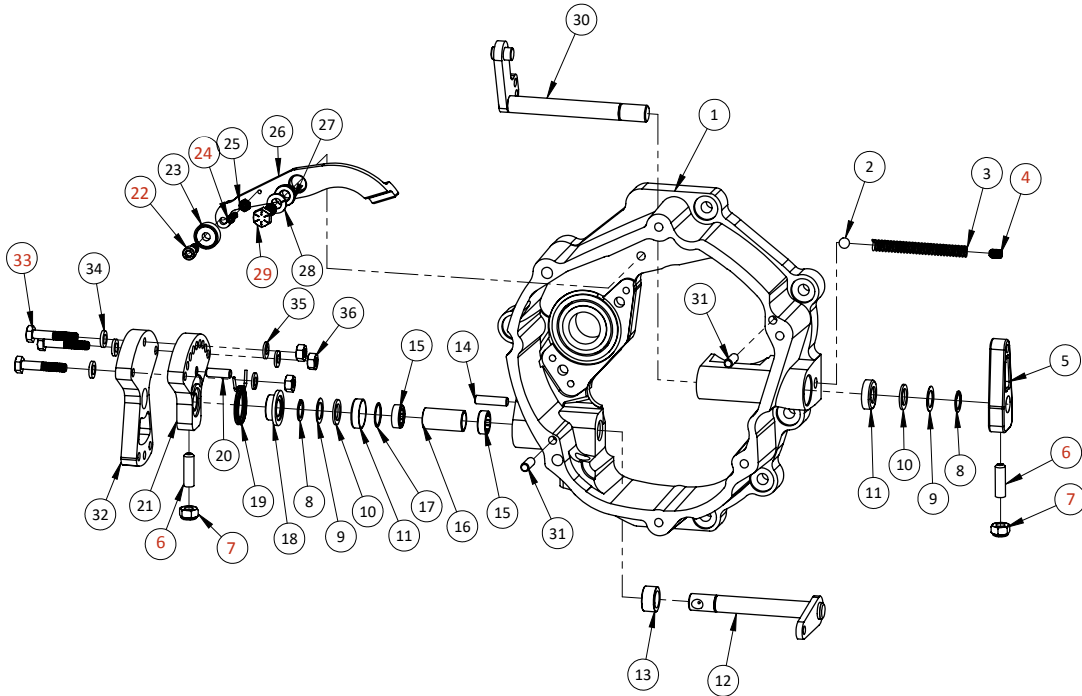
ITEM	PART NO.	DESCRIPTION	QTY
1	S45-987	Circlip for Bearing in Reverse Intermediate Idler	1
2	S45-411	Reverse Intermediate Idler Bearing	1
3	WS-RI	Reverse Intermediate Idler	1
4	S45-960	Reverse Idler Shaft	1
5	H-D140625	Dowel Pin for Reverse Idler Shaft	1
6	S45-606-46A	Front Cover for Gen 3 Shift Housing Assembly	1
7	H-WM8-17	8mm Flat Washer, 17.6mm O.D.	6
8	H-B516181250SH	5/16-18 X 1.250" Socket Head Bolt <i>Torque to 18 ft.lb. with Loctite 243 (blue)</i>	4
9	H-VENT-18PX38B-90	1/8" NPT X 3/8", 90 Degree Vent <i>Use 3-bond or equivalent sealant on threads</i>	1
10	H-B516184000SH	5/16-18 X 4.000" Socket Head Bolt <i>Torque to 18 ft.lb. with Loctite 243 (blue)</i>	2
11	S45-606-47	Support bearing for ratchet shaft	1
12	S45-606-49	Retaining washer	1
13	S45-606-51	Seal for Indicator Shaft	1
14	S45-606-52	Potentiometer Guide	1
15	ST6-20850	Contactless potentiometer	1
16	H-BM4X10SH	6X10mm Cap Screw <i>Use Loctite 243 (blue)</i>	2
17	H-WM4	M4 Flat Washer	2



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Drawing No: S45-EXP-605-GEN3  
Drawing Name: S45 Front Cover Exploded View  
Drawn By: DL  
Revised: 3/18/2022

# WEDDLE S4/S5 GEN 3 SHIFT LINKAGE ASSEMBLY



ITEM	PART NO.	DESCRIPTION	QTY
01	S45-606-00	Shift Housing, Bare	1
02	H-BALL-03125	Reverse Detent Ball	1
03	S45-606-10	Reverse Detent Spring	1
04	MD2D-607-2	Reverse Detent Plug Seal with 3-BOND	1
05	S45-606-37	Reverse Shift Arm	1
06	HV2-846	Set Screw for External Shift Lever Arm Torque 12 ft. lb. with LT 243 (blue)	2
07	H-NLM8	M8 X 1.25 Nyloc Nut for Set Screw Torque 18 ft. lb. with LT 243 (blue)	2
08	S45-606-04	Circlip for S4/S5 Selector Shafts	2
09	S45-606-29	Shim for Shift Shafts	2
10	S45-606-22	1/2" Nylon Flat Washer, .060" thick	2
11	S45-606-02	Seal for Selector Shafts	2
12	S45-606-31A	Selector Shaft for Forward Gears	1
13	S45-606-30A	Forward Gear Selector Shaft Spacer	1
14	H-D141000	1" Dowel for Return Spring	1
15	S45-606-34	Needle Bearing for Selector Shaft	2
16	S45-606-35	Bearing Spacer for Selector Shaft	1
17	S45-606-33	Spiral lock for Selector Shaft	1
18	S45-606-45	Collar for Return Spring	1
19	S45-606-08A	Return Spring	1
20	H-D140750	3/4" Dowel for Return Spring	1
21	S45-606-36A	External Shift Arm	1
22	H-B14280500SH	Socket Head Bolt for Reverse Lockout Roller Torque 75 in. lb. with LT 272 (red)	1
23	S45-606-16	Ball Bearing for Reverse Lockout Arm	1
24	H-B6320500SH	Socket Head Bolt for Reverse Lockout Spring Posts Loctite 272 (red) locate bolt head .425" above surface	1
25	H-JN632	6-32 Jam Nut for Reverse Lockout Spring Posts	1
26	S45-606-06	Reverse Lockout Arm	1
27	S45-606-15	Pivot Bushing for Reverse Lockout Arm	1
28	H-WM8-SPL	M8 Split Lock Washer	1
29	H-B516181000H	Hex Head Bolt for Reverse Lockout Arm Bushing Torque 18 ft. lb. with LT 243 (blue)	1
30	S45-606-38	Selector Shaft for Reverse	1
31	H-D140750	3/4" Dowel Pin	2
32	S45-606-53	Mid Engine Shift Arm	1
33	H-142013750H	1/4"-20 x 1 3/4" Socket Head Bolt for Mid Engine Fan Torque 18 ft. lb. with LT 243 (Blue)	3
34	H-WM6	M6 Flat Washer	3
35	H-WM6-SPL	M6 Split Lock Washer	3
36	H-N1420	Nut For Mid Engine Shift Fan	3



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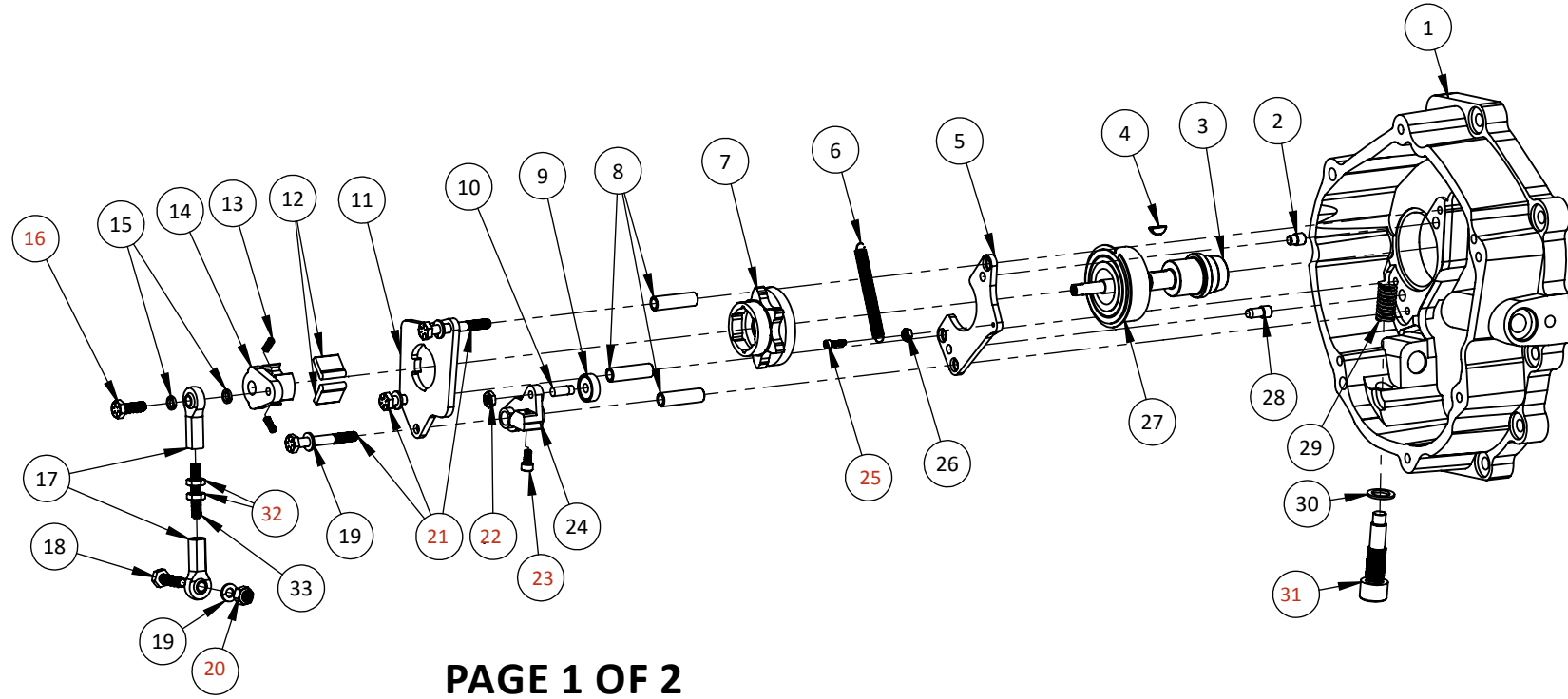
Drawing No: S45-EXP-606-L-GEN3  
Drawing Name: S45 Shift Assembly Ext View  
Drawn By: DL  
Revised: 3/21/2021



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Drawing No: S45-EXP-606-R-GEN3  
Drawing Name: S45 Shift Assembly Int View  
Drawn By: DL  
Revised: 3/21/2022

# WEDDLE GEN 3 S4/S5 RATCHET MECHANISM



**PAGE 1 OF 2**

ITEM	PART NO.	DESCRIPTION	QTY
1	S45-606-00	Shift Housing, Bare	1
2	S45-606-44	Short Dowel for Bearing Retainer Plate	1
3	S45-606-26A	Ratchet Shaft, Gen 3	1
4	S45-606-32	Woodruff Key for Ratchet Wheel	1
5	S45-606-40	Bearing Retainer Plate for Ratchet Assembly	1
6	S45-606-11	Spring for Reverse Lockout Arm	1
7	S45-606-25A	Gen 3 Ratchet wheel	1
8	S45-606-41	Post For Cam Plate	3
9	S45-606-17	Detent Roller, Ball Bearing, 6 X 19 X 6mm	1
10	S45-606-19	M6 X 1.0 X 12mm Hex Bolt, modified to hold Detent Bearing	1
11	S45-606-42A	Cam Plate, Gen 3	1

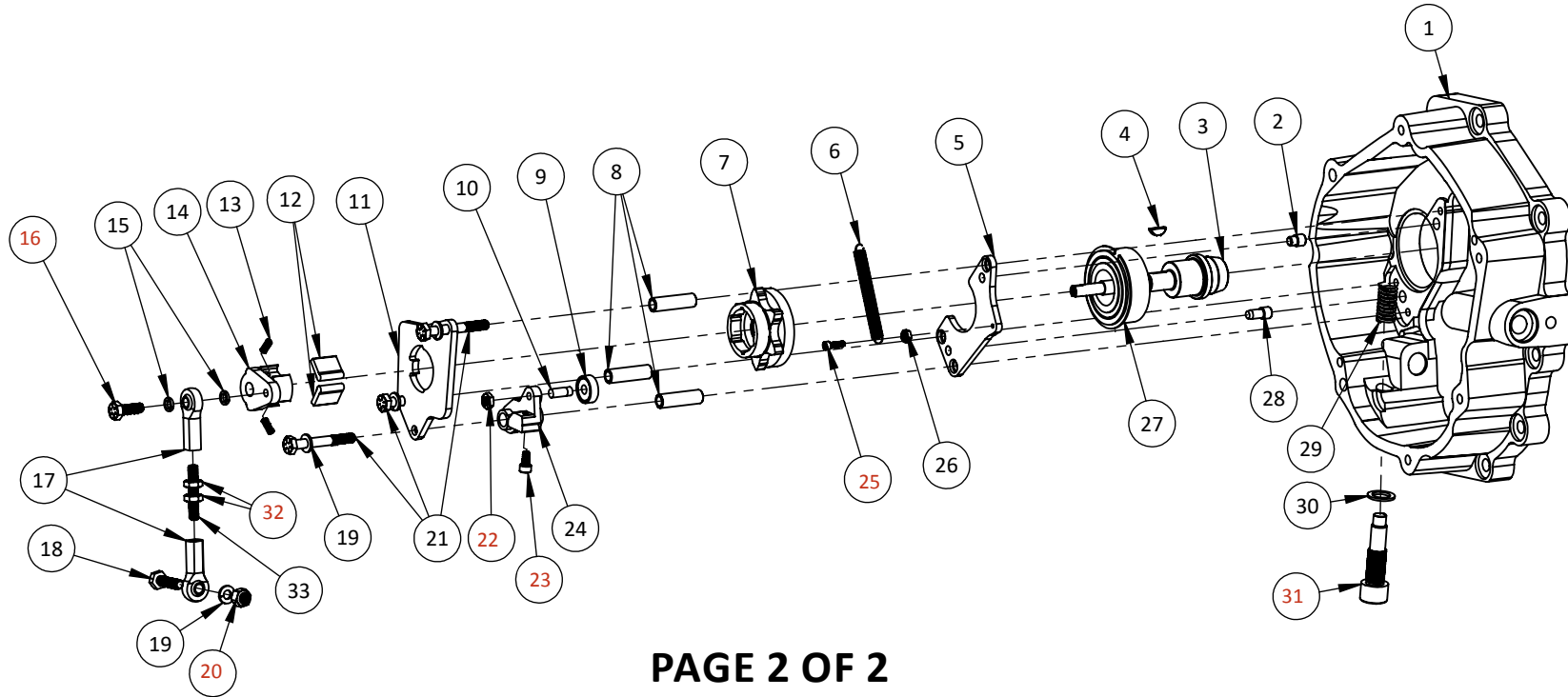
ITEM	PART NO.	DESCRIPTION	QTY
12	S45-606-28A	Shift Pawl, Gen 3	2
13	S45-606-12A	Shift Pawl Spring, Gen 3	2
14	S45-606-27A	Ratchet Driver, Gen 3	1
15	S45-606-14	1/4" High Collar Lock Washer for Upper Heim	2
16	H-B14280781H	1/4-28 X .781" bolt for Upper Heim with 5/16" long shoulder <b>Torque 130 in. lb. with Loctite 272 (red)</b>	1
17	S45-606-13	Rod End	2
18	H-B14281031H	1/4-28 X1.031" Bolt for Lower Heim with 9/16" long shoulder	1
19	H-WM6-SPL	M6 Split Lock Washer	4
20	H-NL1428	1/4-28 Nyloc Nut for Lower Heim <b>Torque 150 in. lb. with Loctite 272 (red)</b>	1
21	H-B14202000H	1/4-20 X 2.000" Hex Bolt <b>Torque 85 in. lb. with Loctite 243 (Blue)</b>	3



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Drawing No: S45-EXP-606-R-GEN3  
Drawing Name: S45 Shift Assembly Int View  
Drawn By: DL  
Revised: 3/21/2022

# WEDDLE GEN 3 S4/S5 RATCHET MECHANISM

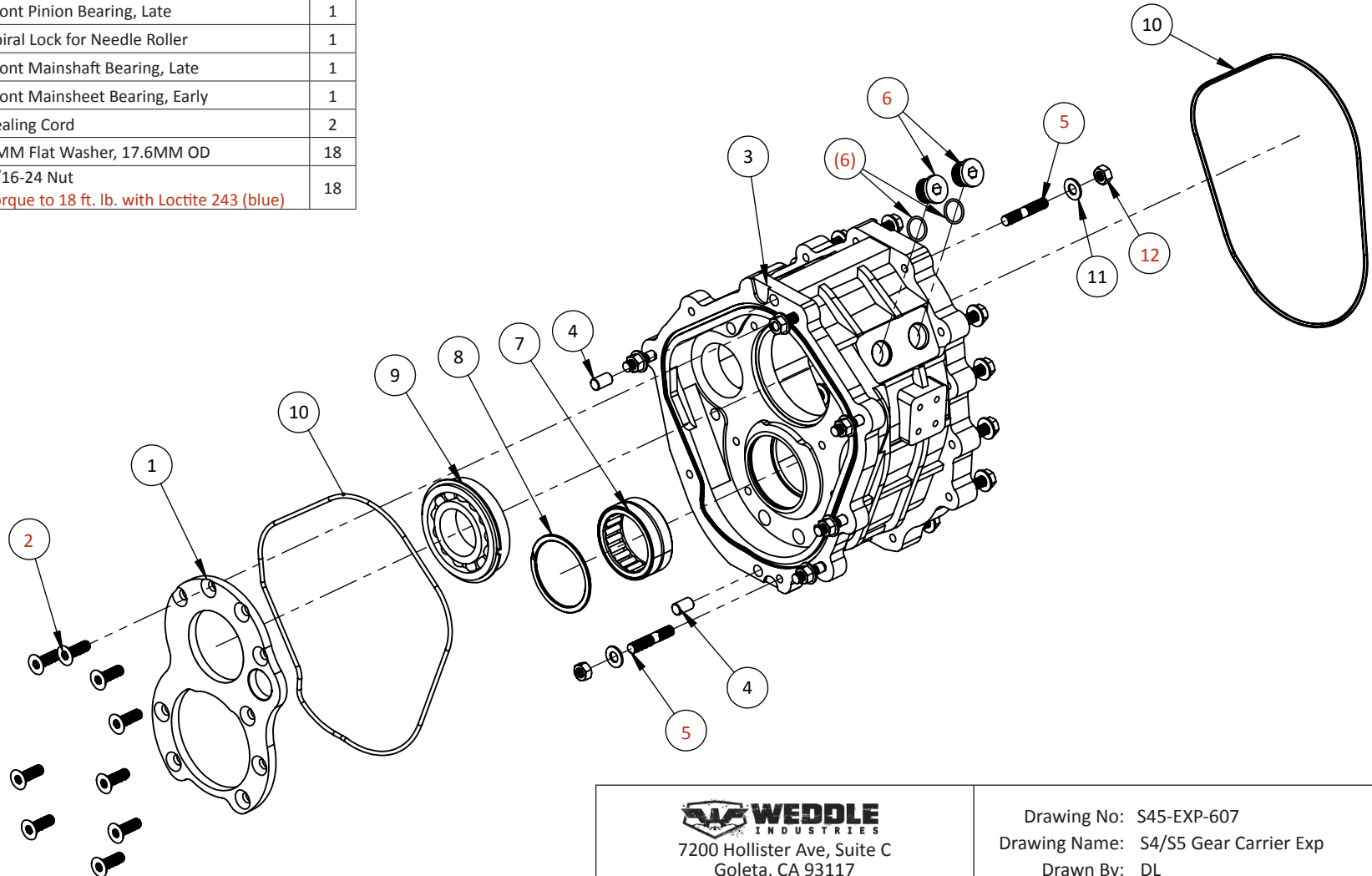


PAGE 2 OF 2

ITEM	PART NO.	DESCRIPTION	QTY
22	H-JNM6	M6 X 1.0 Jam Nut Torque 65 in. lb. with Loctite 272 (red)	1
23	H-B10240375SH	10-24 X 3/8" Socket Head Bolt for Detent Arm Torque 80 in. lb. with Loctite 272 (red)	1
24	S45-606-18	Detent Arm for Ratchet Assy	1
25	H-B6320500SH	Socket Head Bolt for Reverse Lockout Spring Posts Loctite 272 (red) locate bolt head .425" above surface	1
26	H-JN632	6-32 Jam Nut for Reverse Lockout Spring Posts	1
27	S45-606-39	Bearing for Ratchet Shaft, with Circlip	1
28	CL-DOWEL-FW	Dowel for Bearing Retainer Plate	1
29	S45-606-09	Spring for Detent Arm	1
30	S45-606-22	1/2" Nylon Flat Washer, .060" thick	1
31	S45-606-21	Detent Spring Seat, Modified 1/2-20 Socket Head Bolt Torque 25 ft. lb. with 3-BOND sealant	1

ITEM	PART NO.	DESCRIPTION	QTY
1	S45-915A	Front Mainshaft Bearing Retainer Plate	1
2	S45-916	Bolt for Mainshaft Bearing Retainer Plate <i>Torque to 18 ft.lb. with Loctite 243 (blue)</i>	9
3	S45-607	Gear Housing	1
4	H-D380625	3/8 X .625" Hardened Dowel Pin	2
5	S45-9SGH175	5/16 X 1-3/4" Stud <i>Install with Loctite 272 (red)</i>	18
6	AGB-00109-A	3/4-16 Steel Plug w/O-Ring <i>Torque 40 ft. lb. lube o-ring</i>	2
(6)	H-OR34	Replacement O-Ring for 3/4" UNF Fitting	2
7	S45-415A	Front Pinion Bearing, Late	1
8	S45-988	Spiral Lock for Needle Roller	1
9	S45-425A	Front Mainshaft Bearing, Late	1
(9)	S45-425	Front Mainsheet Bearing, Early	1
10	S45-902	Sealing Cord	2
11	H-WM8-17	8MM Flat Washer, 17.6MM OD	18
12	H-N51624	5/16-24 Nut <i>Torque to 18 ft. lb. with Loctite 243 (blue)</i>	18

## WEDDLE S4/S5 GEAR CARRIER EXPLODED VIEW



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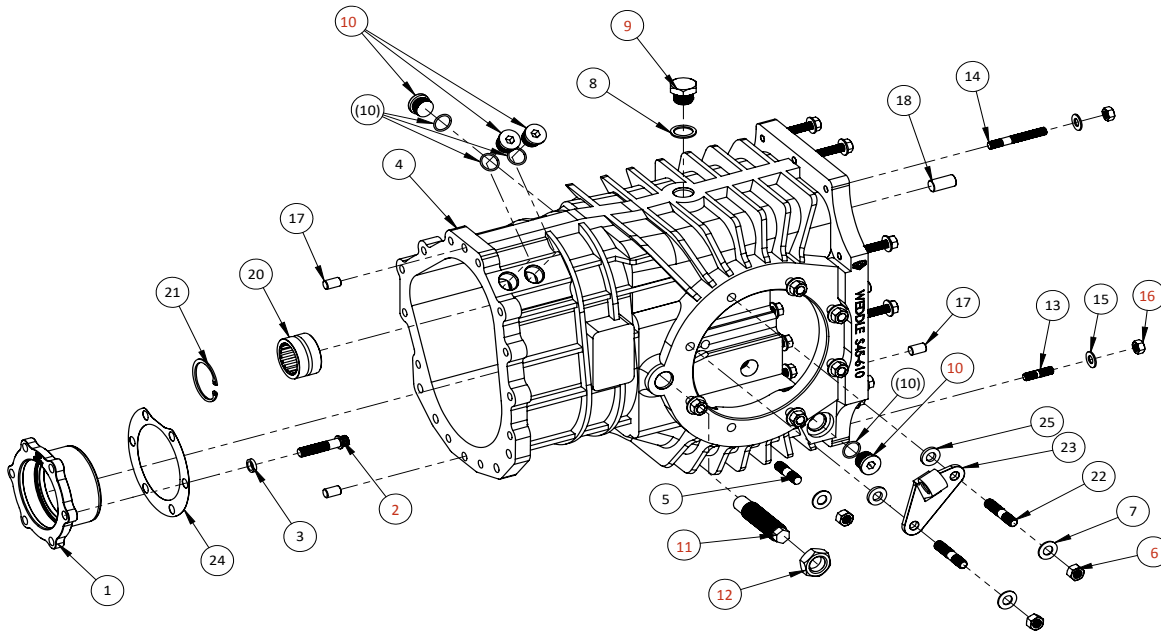
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Drawing Name: S4/S5 Gear Carrier Exp  
Drawn By: DL  
Revised: 4/7/2025



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Drawing No: S45-EXP-610  
Drawing Name: S4/S5 Main Case Exp View  
Drawn By: DL  
Revised: 4/7/2025

# S4/S5 MAIN CASE EXP VIEW



**Note:** All Studs - Loctite 272 going into housing

ITEM	PART NO.	DESCRIPTION	QTY
1	S45-402	S4/S5 Pinion Bearing Carrier	1
2	H-B38241750FC	Pinion Retainer Bolt <i>Torque to 38 ft. lb. with Loctite 272 (red)</i>	6
3	MD-956	Lock Washer for Pinion Retainer Bolts	6
4	S45-610	S4/S5 Main Case	1
5	MD-9SCS150	1.5" Sidecover Stud Quantity 16 with LS bell housing	14
6	H-N3824	3/8"-24 Hex Nut <i>Torque to 28 ft. lb. with Loctite 243 (blue)</i>	16
7	H-WM10	10mm Flat Washer	16
8	H-WM19-SEAL	Copper Sealing Washer	1
9	H-PLUG-34UNFH	3/4-16 Fill Plug <i>Torque to 40 ft. lb. with Loctite 243 (blue)</i>	1
10	AGB-00109-A	Steel Plug with O-Ring <i>Torque to 40 ft. lb. lube o-ring</i>	4
(10)	H-OR34	Replacement O-Ring for 3/4" UNF Fitting	4
11	MD-945	Bronze Load Bolt <i>Seal threads with 3-Bond sealant or equivalent</i>	1
12	H-JN3416	3/4-16 Jam Nut for Load Bolt <i>Torque to 60 ft. lb.</i>	1
13	S45-9SBH125	1-1/4" Bellhousing Stud Quantity 15 with LS bell housing	8
14	S45-9SBH250	2-1/2" Bellhousing Stud Not used with LS bell housing	7
15	H-WM8-17	8mm Flat Washer for Bell housing	15
16	H-N51624	5/16-24 Nut for Bellhousing <i>Torque to 18 ft. lb. with Loctite 243 (blue)</i>	15
17	H-D380625	3/8 X .625" Hardened Dowel Pin	4
18	H-D121000	1/2" X 1.000" Hardened Dowel Pin	4
20	S45-430	Rear Mainshaft Bearing	1
21	S45-991	Circlip for Rear Mainshaft Bearing	1
22	MD-9SCS200	2.0" Sidecover Stud for Clutch Cable Guide Not used with LS bell housing	2
23	MD-940	Clutch Cable Guide Not used with LS bell housing	1
24	S45-9###	Pinion Depth Shim .003"-.007" (### denotes size)	1-3
25	MD-941	Spacer for Clutch Cable Guide Not used with LS bell housing	2

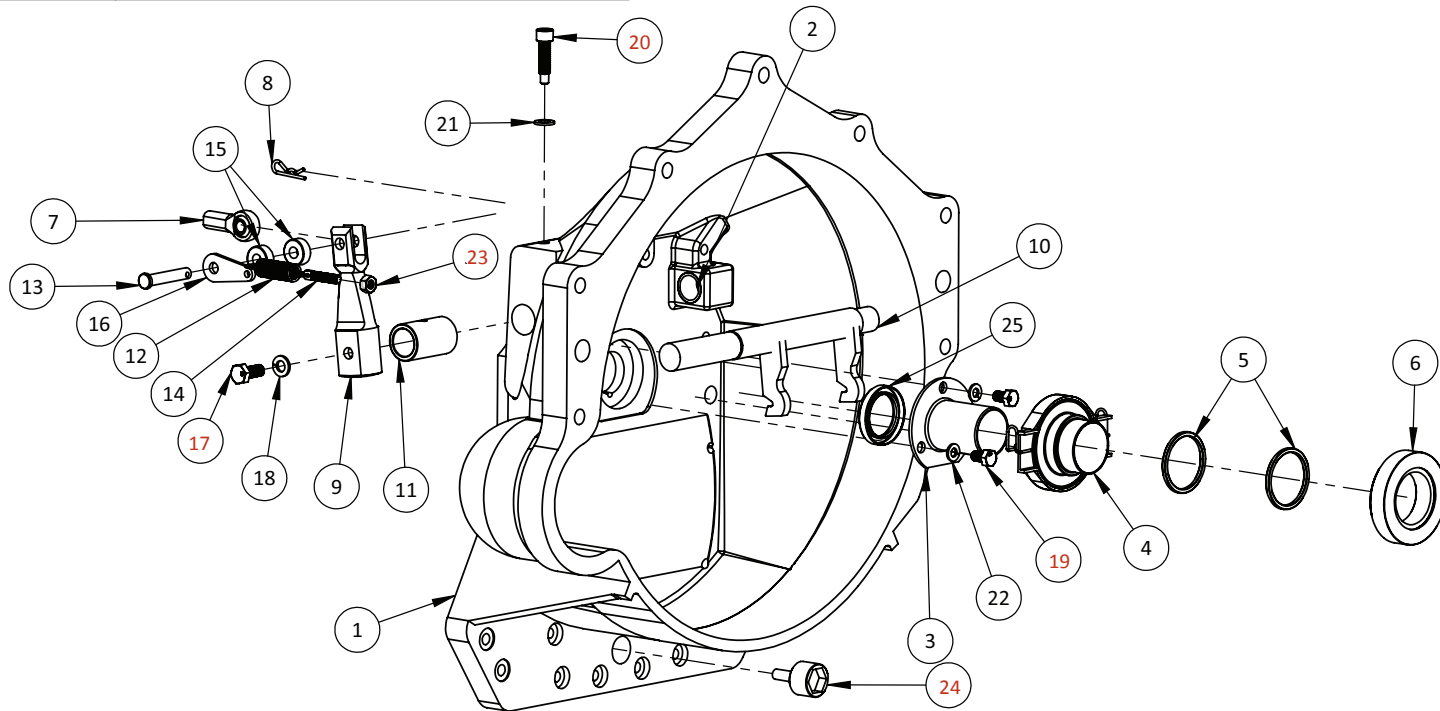




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Drawing No: S45-EXP-615CM  
Drawing Name: S45 PBS Bellhousing Exp View  
Drawn By: DY  
Revised: 3/21/2022

# S45 PBS BELLHOUSING EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	ZS45-615-PBS	Large Diameter Chevy Bellhousing	1
2	S45-615-PBS-06	Bushing for Small End of Cross Shaft, Press into Bellhousing	1
3	S45-906	T/O Bearing Guide Sleeve	1
4	CL-165B-1236	12mm Extender for T/O Bearing	1
5	SC-00331	Spacers for T/O Bearing, Use as needed with clutch kit	0-2
6	SC-00170A	Flat Face T/O Bearing	1
(6)	SC-00170	Convex Face T/O Bearing	1
7	091-141-701-K-1	Heim for Clutch Cross Shaft	1
8	091-141-701-K-3	Cotter Pin	1
9	091-141-701-K-4	Cross Shaft Arm	1
10	091-141-701-K-5	Cross Shaft	1
11	9025	Cross Shaft Bushing	1
12	S45-615-PBS-09	Clutch Arm Return Spring	1
13	S45-615-PBS-12	Clevis Pin	1

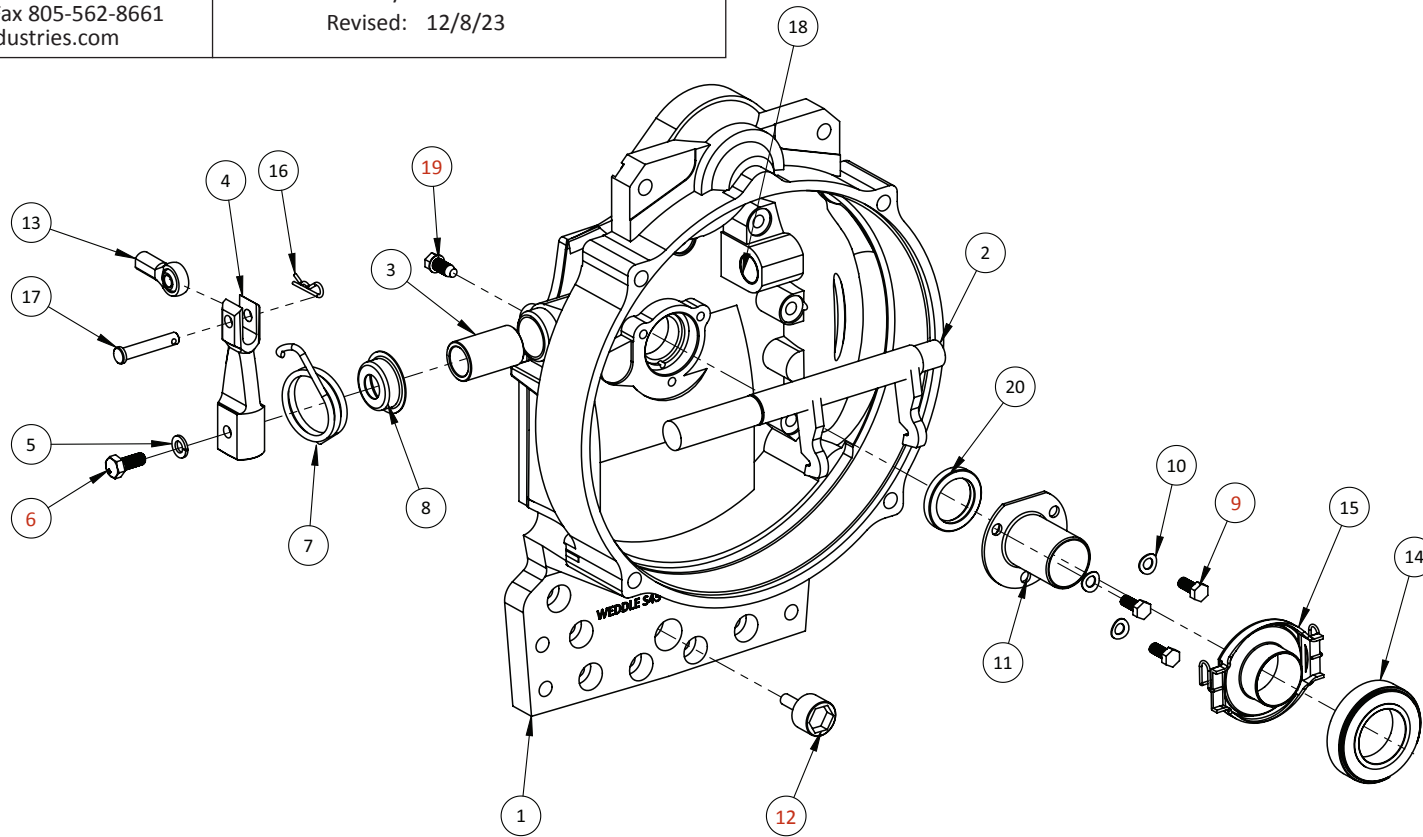
ITEM	PART NO.	DESCRIPTION	QTY
14	S45-615-PBS-13	Threaded Anchor for Return Spring	1
15	S45-615-PBS-14	Alignment Spacer	2
16	S45-615-PBS-10	Bracket for Return Spring	1
17	H-BM8X20H	8mm Bolt for Cross Shaft Arm <i>Torque to 18 ft.lb. with Loctite 243 (Blue)</i>	1
18	H-WM8-SPL	M8 Split Lock Washer	1
19	H-BM7X15H	7mm Bolt for T/O Bearing Guide Sleeve <i>Torque to 14 ft.lb. with Loctite 243 (Blue)</i>	3
20	S45-615-PBS-07	Locating Bolt for Cross Shaft Bushing <i>Torque to 18 ft.lb. with Loctite (Blue)</i>	1
21	H-WM8-14	8mm flat washer plated 14.3mm OD	1
22	H-WM7-WAVE	7mm Wave Washer	3
23	H-N1420	Jam Nut for Spring Set Screw <i>Torque to 9 ft.lb. with Loctite 243 (Blue)</i>	1
24	091-301-141-A	Drain Plug with Magnet <i>Torque to 35 ft.lb. with Loctite 243 (Blue)</i>	1
25	S45-9113	Input Shaft Seal	1



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Drawing No: S45-EXP-615VT  
Drawing Name: S45 VW Bellhousing Exp View  
Drawn By: RX  
Revised: 12/8/23

# S45 VW BELLHOUSING EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	S45-615VT	Top Start Volkswagen Bellhousing	1
2	091-141-701-K-5	Cross Shaft	1
3	9025	Cross Shaft Bushing	1
4	091-141-701-K-4	Cross Shaft Arm	1
5	H-WM8-SPL	M8 Split Lock Washer	1
6	H-BM8X20H	8mm Bolt for Cross Shaft Arm <b>Torque to 18 ft.lb. with Loctite 243 (Blue)</b>	1
7	113-141-723-D	Clutch Arm Return Spring	1
8	111-141-727-A	Collar for Clutch Arm Return Spring	1
9	H-BM7X16H	7mm Bolt for T/O Bearing Guide Sleeve <b>Torque to 14 ft.lb. with Loctite 243 (Blue)</b>	3
10	H-WM7-WAVE	7mm Wave Washer	3
11	S45-906	T/O Bearing Guide Sleeve	1

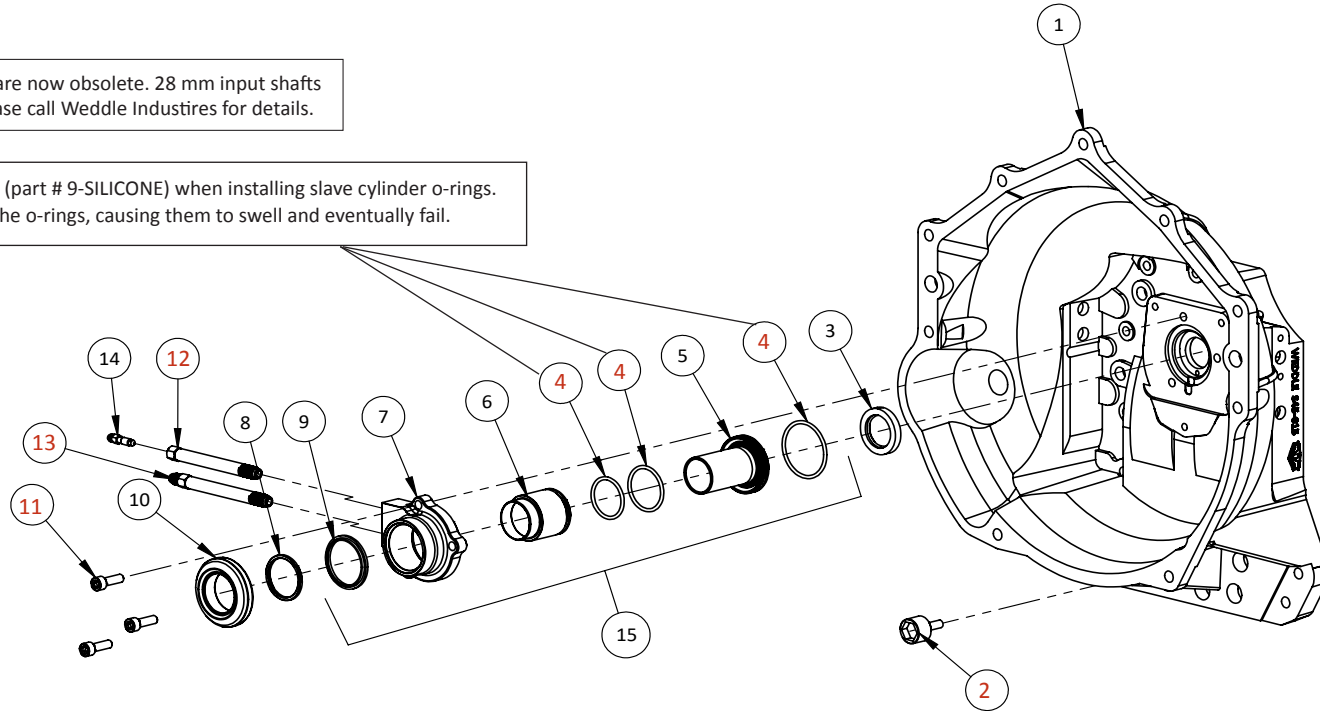
ITEM	PART NO.	DESCRIPTION	QTY
12	091-301-141-A	Drain Plug with Magnet <b>Torque to 35 ft.lb. with Loctite 243 (Blue)</b>	1
13	091-141-701-K-1	Heim for Clutch Cross Shaft	1
14	SC-00170A	Flat Face T/O Bearing	1
(14)	SC-00170	Convex Face T/O Bearing	1
15	CL-165	T/O Bearing Adaptor	1
16	091-141-701-K-3	Cotter Pin	1
17	091-141-701-K-2	Clevis Pin	1
18	113-141-711-A	Bushing for Small End of Clutch Cross Shaft, Press Into Bell Housing	1
19	113-311-141	Locating Bolt for Cross Shaft Bushing <b>Torque to 18 ft.lb. with Loctite 243 (Blue)</b>	1
20	S45-9113	Input Shaft Seal	1



# S45/S45D CHEVY BELLHOUSING EXPLODED VIEW

Note 1: Early Weddle 28 mm input shafts are now obsolete. 28 mm input shafts should be converted to 30 mm shafts, please call Weddle Industries for details.

**IMPORTANT:** Use only silicone-based lube (part # 9-SILICONE) when installing slave cylinder o-rings. Petroleum-based grease or oil will attack the o-rings, causing them to swell and eventually fail.



ITEM	PART NO.	DESCRIPTION	QTY
1	S45-615CH	Bell Housing for S4/S5	1
(1)	S45D-615CH	Bell Housing for S4D/S5D	1
2	091-301-141-A	Drain Plug, Long Magnet <b>Torque to 35 ft.lb. with Loctite 243 (Blue)</b>	1
3	S45-9113H	Input Seal for Hydraulic T/O Bearing Assembly (Use with S45-9106-CH-30/S45D-9106-CH-30)	1
(3)	AGB-00133	AGB Input Shaft Seal (Use with S45-9106-CH-28/S45D-9106-CH-28) (See Note 1)	1
4	SC-00243	O-Ring Kit for Slave Cylinder <b>See lubrication note on diagram</b>	1
5	SC-24896	Center Support for Slave Cylinder	1
6	SC-05084	36.4mm Piston for Slave Cylinder	1
(6)	SC-20866	OPTION 31.0mm Piston Slave Cylinder	1
(6)	SC-05738	OPTION 41.2mm Piston for Slave Cylinder	1
7	SC-05072	Slave Cylinder Housing	1
(7)	SC-05072A	OPTION Shortened AGB/HV Slave Cylinder Housing	1
(8)	SC-00331	OPTIONAL 3mm Spacer for Throw Out Bearing	1
9	SC-05075	Piston Wiper for Slave Cylinder	1

ITEM	PART NO.	DESCRIPTION	QTY
10	SC-00170A	Flat Face T/O Bearing	1
(10)	SC-00170	Convex Face T/O Bearing	1
11	H-BM8X25SH	M8x25mm Socket Head Cap Bolt <b>Torque 18 ft. lb. with LT-243 (blue)</b>	3
12	SC-00165A	Fitting for Bleeder Screw <b>Torque 26 ft. lb. with LT-243 (blue)</b>	1
13	SC-00166A	Inlet Fitting for Slave Cylinder <b>Torque 26 ft. lb. with LT-243 (blue)</b>	1
14	SC-00167	M7x1.0mm Bleeder Screw	1
15	SC-A1-310	Complete Slave Cylinder Assembly 31.0mm	1
(15)	SC-A1-364	Complete Slave Cylinder Assembly 36.4mm	1



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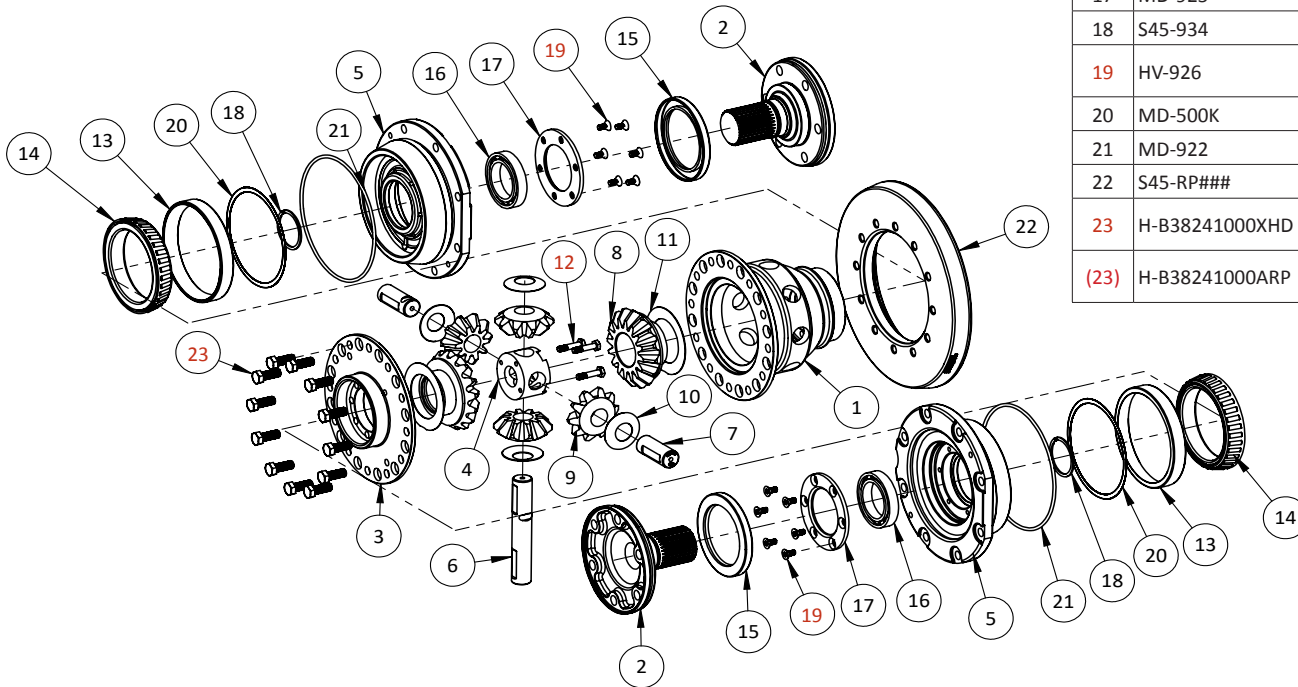
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Drawing Name: S45/S45D Chevy Bellhousing  
Drawn By: RX  
Revised: 10/24/2024



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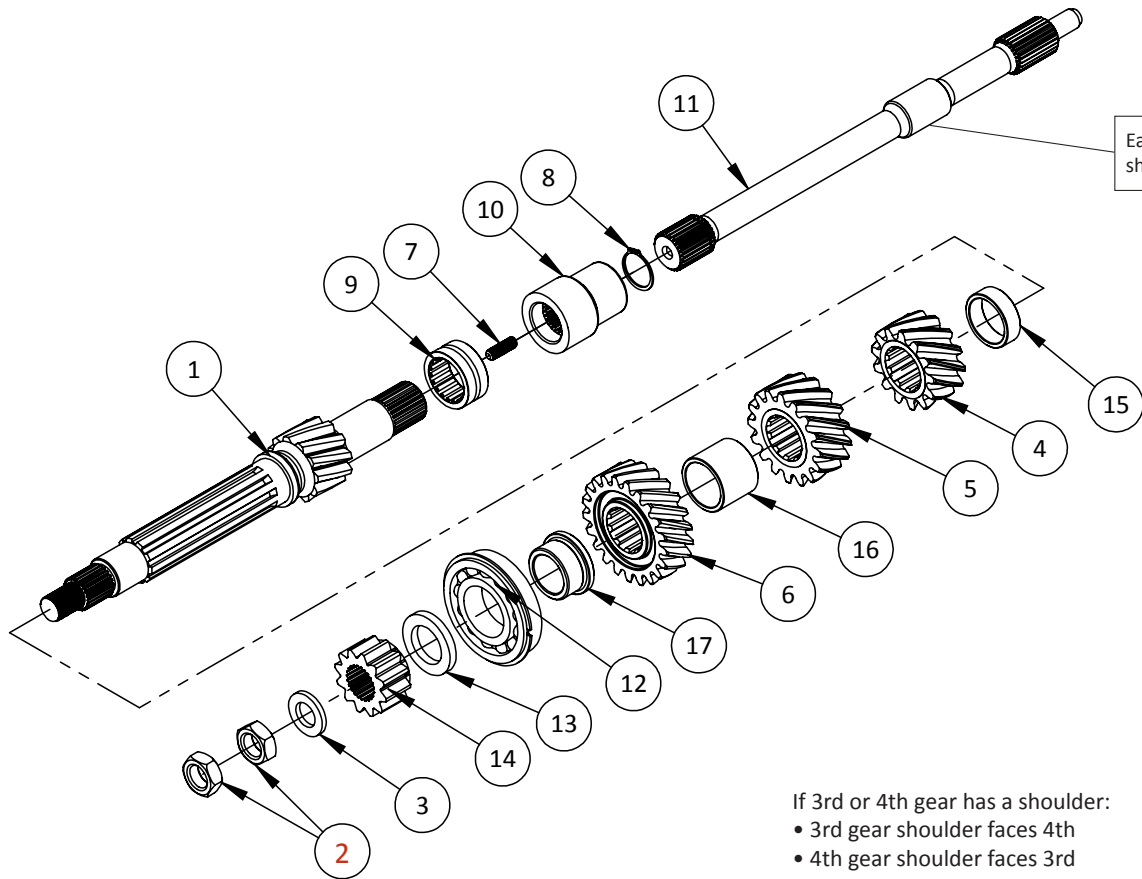
Drawing No: S45-EXP-DIFF  
 Drawing Name: Weddle S45 Diff Assembly  
 Drawn By: DL  
 Revised: 4/7/2025

## WEDDLE S4/S5 DIFF EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
01	S45-535	Diff Housing	1
02	S45-5934	934 Drive Flange	2
03	S45-530	Diff Cover	1
04	S45-540B	Diff Center Block	1
05	S45-6934	Side Cover	2
06	S45-538B	Long Differential Cross Shift	1
07	S45-539B	Short Differential Cross Shaft	2
08	S45-545	Side Gear	2
09	S45-550	Spider Gear	4
10	S45-551	Spider Gear Thrust Washer	4
11	S45-552-025	Side Gear Thrust Washer	2
12	H-B14281156H	Hex Bolt for "B-Style" Diff Cross Shafts <b>Torque 10 ft. lb. with LT-243 (blue)</b>	3
13	MD-420	Diff Bearing Cup for HV, MD, LQ, S4, S5 trans	2
14	MD-421	Diff Bearing Cone for HV, MD, LQ, S4, S5 trans	2
15	MD-920	FD Seal for HV, MD, S4, S5 trans	2
16	S45-422	Final Drive Support Bearing	2
17	MD-925	Final Drive Flange Bearing Retainer Plate	2
18	S45-934	Final Drive Flange Spiral Lock	2
19	HV-926	Torx bolt for bearing retainer plate <b>Torque 8 ft. lb. with LT-243 (blue)</b>	12
20	MD-500K	Diff Shim Kit (selection of sizes )	1
21	MD-922	Side Cover O-Ring	2
22	S45-RP###	S45 ring and pinion ( ### denotes ratio )	1
23	H-B38241000XHD	3/8-24X1.00" XHD Ring Gear Bolt <b>Torque 55 ft. lb. with LT-272 (red)</b>	12
(23)	H-B38241000ARP	ARP Ring Gear Bolt (clearance case for bolt head) <b>Torque 55 ft. lb. with LT-272 (red)</b>	12


# WEDDLE S4/S4D MAIN SHAFT EXPLODED VIEW



Early Weddle 28 mm input shafts are now obsolete. 28 mm input shafts should be converted to 30 mm shafts, please call Weddle Industries for details.

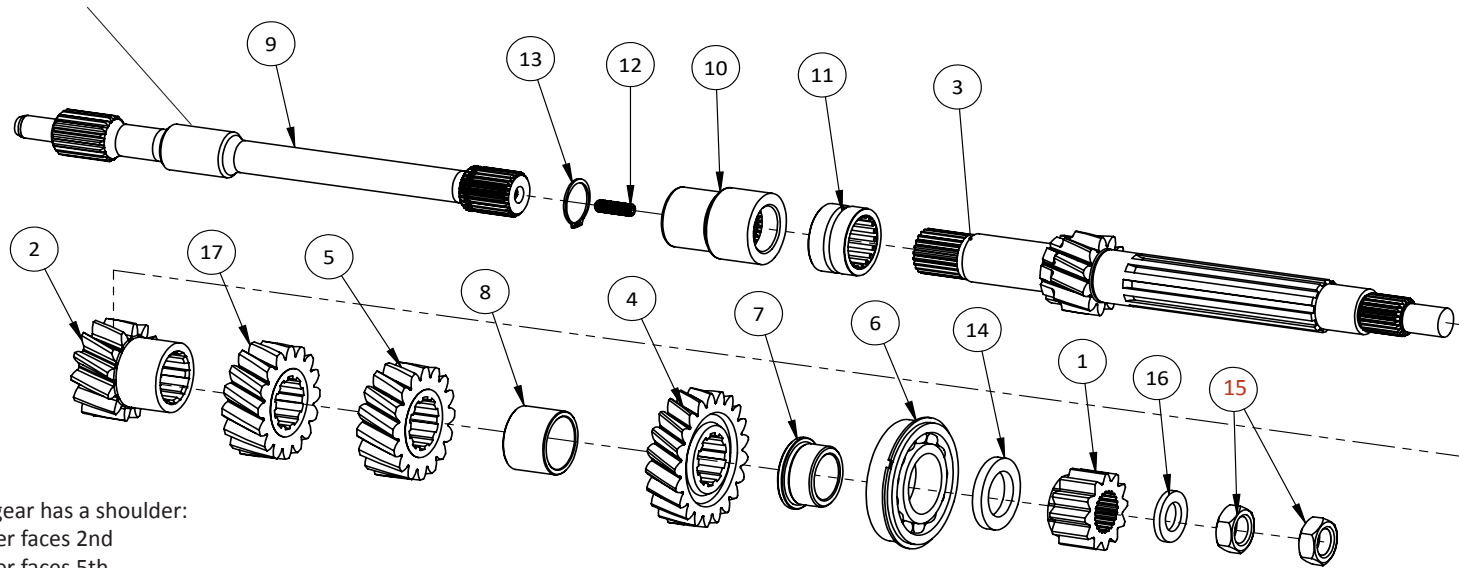
If 3rd or 4th gear has a shoulder:  
 • 3rd gear shoulder faces 4th  
 • 4th gear shoulder faces 3rd

ITEM	PART NO.	DESCRIPTION	QTY
1	WS4-###MS	S4/S4D Mainshaft (### denotes ratio)	1
2	H-JN3416	3/4-16 Jam Nut, Plated <b>Torque to 120 ft.lb. with Loctite 272 (red)</b>	2
3	S45-918	Washer for Mainshaft Nut	1
4	WS4-###S	2nd Gear Splined (### denotes ratio)	1
5	WS4-###S	3rd Gear Splined (### denotes ratio)	1
6	WS4-###S	4th Gear Splined (### denotes ratio)	1
7	H-S516241000CPS	Input Shaft to Mainshaft Connector Stud	1
8	S45-992	Input Shaft Snap Ring	1
9	S45-430	Rear Mainshaft Bearing (presses into case)	1
10	S45-340	Input Coupler	1
11	S45-9106-VW	Input Shaft, VW Bell Housing (Chrysler Hemi—18 spline)	1
(11)	S45-9106-CH-30	Input Shaft for Chevy Bell Housing Use with S45-9113H Input Shaft Seal	1
(11)	S45D-9106-CH-30	Input Shaft for Chevy Bell Housing Use with S45-9113H Input Shaft Seal	1
(11)	S45D-9106-SDC	Input Shaft for Early Chevy Bell Housing for Small Diameter Clutch, 18 Spline	1
12	S45-425A	Front Mainshaft Bearing, Late	1
(12)	S45-425	Front Mainshaft Bearing, Early	1
13	S45-917	Spacer for Reverse Gear on Mainshaft	1
14	WS-RM	Reverse Gear on Mainshaft	1
15	S4-901A	Spacer Sleeve for 2nd	1
16	S4-903	3-4 Spacer Sleeve	1
17	S4-952	Inner Sleeve for Front Mainshaft Bearing	1

 7200 Hollister Ave, Suite C Goleta, CA 93117 Ph 805-562-8600 • Fax 805-562-8661 info@weddleindustries.com	Drawing No: S45-EXP-MS4
	Drawing Name: S4/S4D Mainshaft Exp
	Drawn By: DY
	Revised: 1/11/24

# WEDDLE S5/S5D MAIN SHAFT EXPLODED VIEW

Early Weddle 28 mm input shafts are now obsolete. 28 mm input shafts should be converted to 30 mm shafts, please call Weddle Industries for details.



If 3rd, 4th or 5th gear has a shoulder:

- 3rd gear shoulder faces 2nd
- 4th gear shoulder faces 5th
- 5th gear shoulder faces 4th

ITEM	PART NO.	DESCRIPTION	QTY
01	WS-RM	Reverse Gear on Mainshaft	1
02	WS5-###S	2nd Gear, Splined ( ### denotes ratio )	1
03	WS5-###MS	Mainshaft with 1st Gear ( ### denotes ratio )	1
04	WS5-###S	5th Gear, Splined ( ### denotes ratio )	1
05	WS5-###S	4rd Gear, Splined ( ### denotes ratio )	1
06	S45-425A	S45 Front Mainshaft Bearing, Late	1
(06)	S45-425	S45 Front Mainshaft Bearing, Early	1
07	S5-952	Inner Sleeve for Front Mainshaft Bearing	1
08	S5-903	Spacer Sleeve for 3rd and 4th Gear	1
09	S45-9106-VW	Input Shaft, VW Bell Housing (Chrysler Hemi—18 spline)	1
(09)	S45-9106-CH-30	Input Shaft, Chevy Bell Housing (GM—26 spline) Use with S45-9113H	1
(09)	S45D-9106-CH30	Input Shaft, Chevy Bell Housing (GM—26 spline) Use with S45-9113H	1

ITEM	PART NO.	DESCRIPTION	QTY
(09)	S45D-9106-SDC	Input Shaft for Early Chevy Bell Housing for Small Diameter Clutch, 18 spline	1
10	S45-340	Input Coupler	1
11	S45-430	Rear Mainshaft Bearing (presses into case)	1
12	H-S516241000CPS	Input Shaft to Mainshaft Connector Stud	1
13	S45-992	Input Shaft Snap Ring	1
14	S45-917	Spacer for Reverse on Mainshaft	1
15	H-JN3416	3/4"-16 Jam Nut, Plated <b>Torque 120 ft. lb. with LT-272 (red)</b>	2
16	S45-918	Washer for Mainshaft Nut	1
17	WS5-###S	3rd Gear, Splined ( ### denotes ratio )	1

  
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 Goleta, CA 93117  
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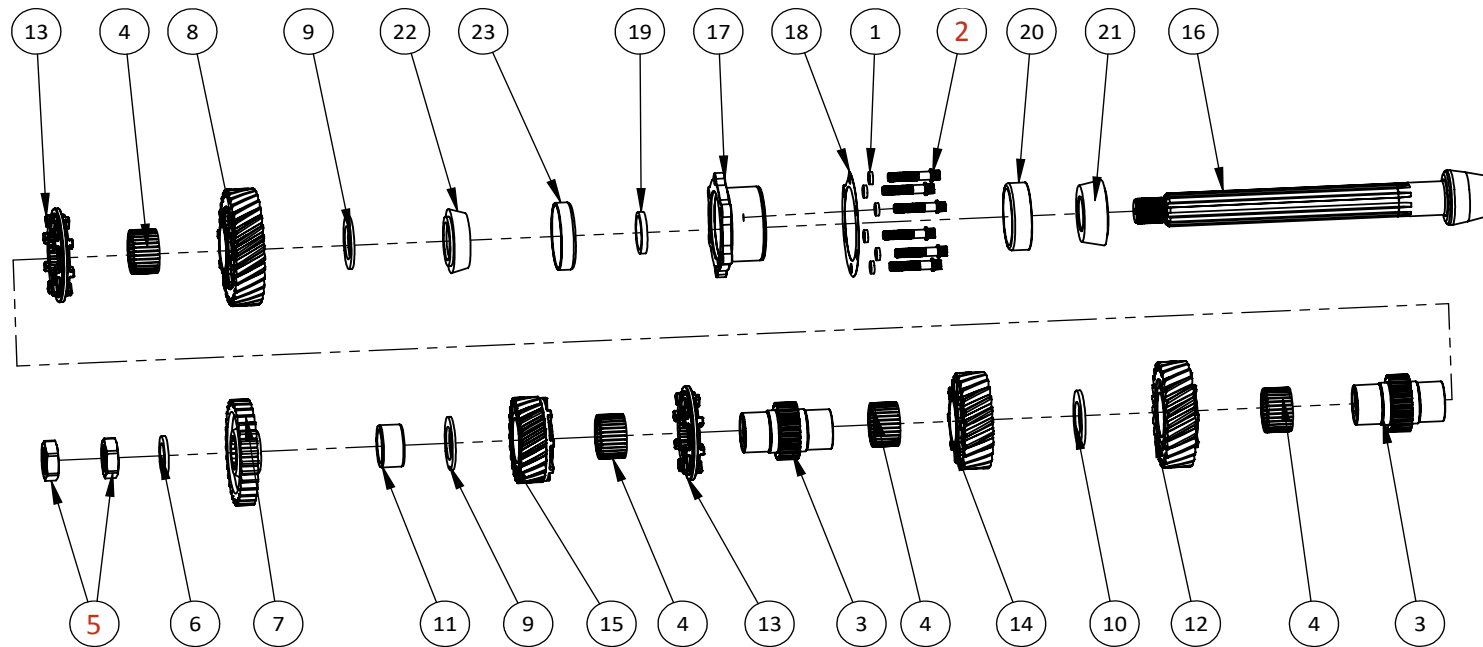
Drawing No: S45-EXP-MS5  
 Drawing Name: S5/S5D Mainshaft Exp  
 Drawn By: RX  
 Revised: 1/11/24



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Drawing No: S45-EXP-PS4  
Drawing Name: S4 Pinion Shaft Exp View  
Drawn By: DY  
Revised: 4/7/2025

# S4 PINION SHAFT EXP VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	MD-956	3/8" High Collar Lock Washer	6
2	H-B38241750FC	3/8-24 X 1 3/4" Bolt, 12 Point <b>Torque to 38 ft.lb. with Loctite 272 (red)</b>	6
3	S4-843A	Slider Hub, 30 spline. 32 spline hubs are now	2
4	4-455027	Needle Bearing for S4 1st-4th or S5 2nd-5th	4
5	S45-910	Jam Nut for End of Pinion Shaft (LH Thread) <b>Torque to 200 ft.lb. with Loctite 272 (red)</b>	2
6	S45-939	Washer for Nut on End of Pinion Shaft	1
7	WS-RP	Reverse Gear on Pinion Shaft	1
8	WS4-####	1st Gear Idler (### denotes ratio)	1
9	S45-925	.125" Pinion Shaft Thrust Washer	2
10	S4-956	.156" Thick Thrust Washer	1
11	S4-416A	Front Pinion Bearing Inner Race	1
12	WS4-####	2nd Gear Idler (### denotes ratio)	1
13	S4-8SL8-30W	S4 8-Dog Slider, 30 spline. 32 spline sliders are now	2

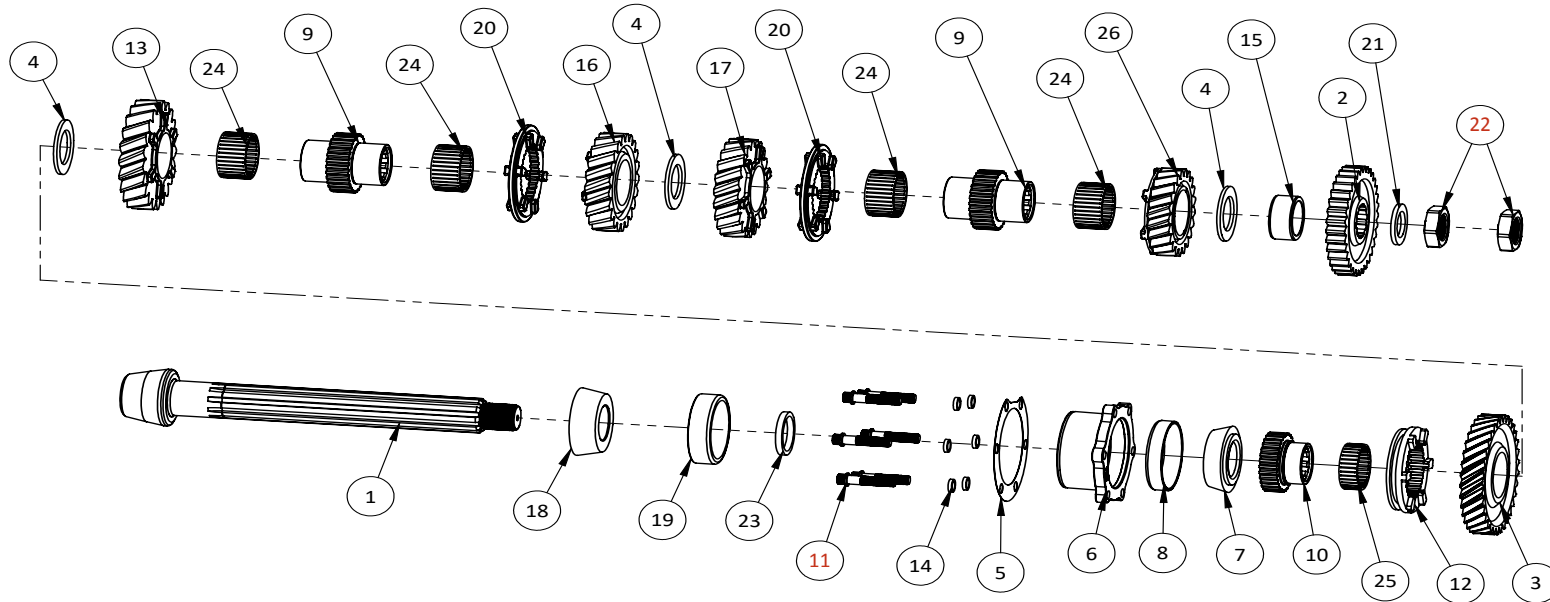
ITEM	PART NO.	DESCRIPTION	QTY
(13)	S4-8SL8-30A	S4 8-dog slider, 30 spline, early gear to late gear	2
14	WS4-####	3rd Gear Idler (### denotes ratio)	1
15	WS4-####	4th Gear Idler (### denotes ratio)	1
16	S45-RP###	S45 R&P ( ### denotes ratio )	1
17	S45-402	Pinion Bearing Carrier	1
18	S45-9###	Pinion Depth Shim, (### denotes thickness)	1-3
19	MD-407-###	Pinion Bearing Preload Spacer, (### denotes size)	1
20	MD-406	Pinion Bearing Cup, Large	1
21	MD-405	Pinion Bearing Cone, Large	1
22	MD-403	Pinion Bearing Cone, Small	1
23	MD-404	Pinion Bearing Cup, Small	1



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Goleta, CA 93117  
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Drawing No: S45-EXP-PS5  
Drawing Name: Weddle S5 Pinion Shaft Exploded View  
Drawn By: TS  
Revised: 4/7/2025

# WEDDLE S5 PINION SHAFT EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
01	S45-RP###	S45 R&P ( ### denotes ratio )	1
02	WS-RP	Reverse Gear on Pinion Shaft	1
03	WS5-####	S5 1st Gear Idler ( ### denotes ratio )	1
04	S45-925	.125" Pinion Shaft Thrust Washer	3
05	S45-9###	Pinion Depth Shim, (### denotes thickness)	1
06	S45-402	Pinion Bearing Carrier	1
07	MD-403	Pinion Bearing Cone, Small	1
08	MD-404	Pinion Bearing Cup, Small	1
09	S5-843A	S5 2nd-3rd/4th-5th Slider Hub	2
10	S5-841	S5 1st Gear Slider Hub	1
11	H-B38241750FC	3/8-24 X 1 3/4" Bolt, 12 Point Torque 38 ft. lb. with LT-272 (red)	6
12	S5-8SL1	1st Gear Slider	1
13	WS5-####	S5 2nd Gear Idler ( ### denotes ratio )	1

ITEM	PART NO.	DESCRIPTION	QTY
14	MD-956	3/8" High Collar Lock Washer	6
15	S5-416A	S5 Inner Race for Pinion Roller Bearing	1
16	WS5-####	S5 3rd Gear Idler ( ### denotes ratio )	1
17	WS5-####	S5 4th Gear Idler ( ### denotes ratio )	1
18	MD-405	Pinion Bearing Cone, Large	1
19	MD-406	Pinion Bearing Cup, Large	1
20	S5-8SL6	S5 2nd-3rd/4th-5th Slider	2
21	S45-939	Washer for Nut on End of Pinion Shaft	1
22	S45-910	Jam Nut For End of Pinion Shaft ( LH Thread ) Torque 200 ft. lb. with LT-272 (red)	2
23	MD-407-###	Pinion Bearing Pre-load Spacer ( ### denotes size )	1
24	4-455027	Needle Bearing for S4 1st-4th or S5 2nd-5th	4
25	S5-414	1st Gear Needle Bearing	1
26	WS5-####	S5 5th Gear Idler ( ### denotes ratio )	1

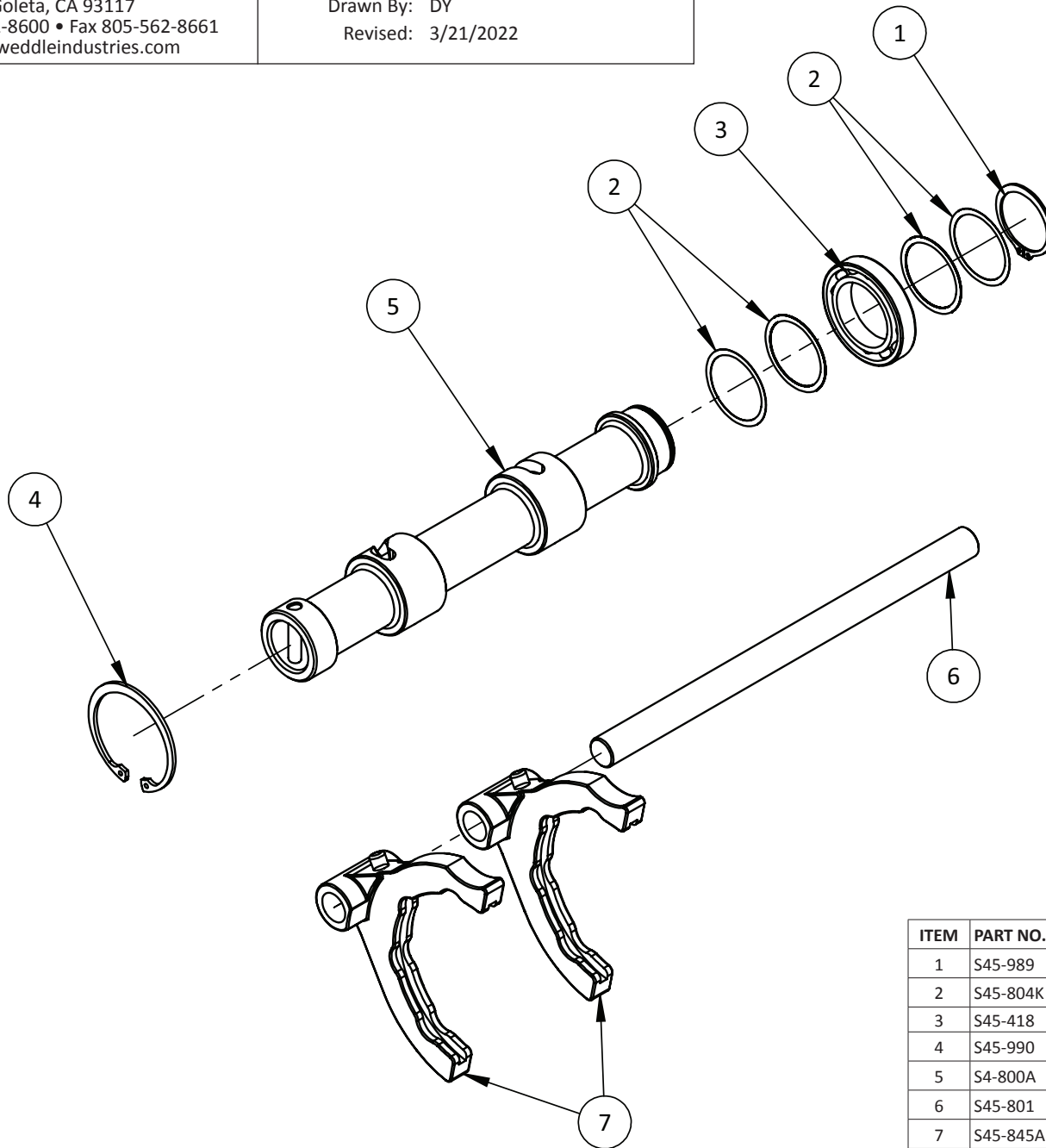




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 Goleta, CA 93117  
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Drawing No: S45-EXP-SHIFT-4  
 Drawing Name: S4/S4D Shift Fork Exp View  
 Drawn By: DY  
 Revised: 3/21/2022

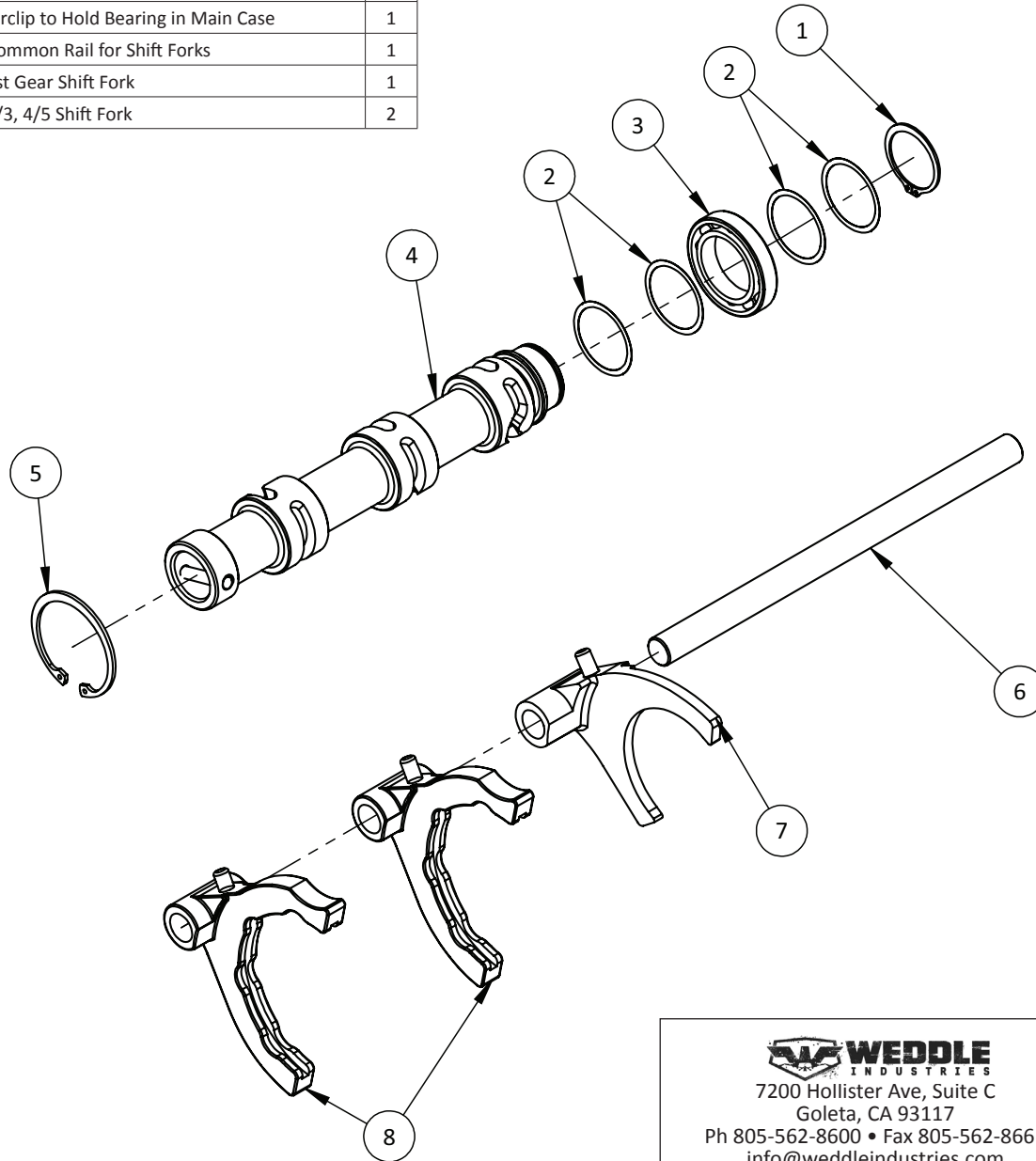
# S4/S4D SHIFT FORK EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	S45-989	Circlip to Hold Bearing on Shift Drum	1
2	S45-804K	Shift Drum Shim Kit, use to adjust drum location	1
3	S45-418	Ball Bearing for Shift Drum	1
4	S45-990	Circlip to Hold Bearing in Main Case	1
5	S4-800A	Shift Drum for S4/S4D	1
6	S45-801	Common Rail for Shift Forks	1
7	S45-845AL	2/3, 4/5 Shift Fork	2

ITEM	PART NO.	DESCRIPTION	QTY
1	S45-989	Circlip to Hold Bearing on Shift Drum	1
2	S45-804K	Shift Drum Shim Kit, use to adjust drum location	1
3	S45-418	Ball Bearing for Shift Drum	1
4	S5-800A	Shift Drum for S5/S5D	1
5	S45-990	Circlip to Hold Bearing in Main Case	1
6	S45-801	Common Rail for Shift Forks	1
7	S5-845AL	1st Gear Shift Fork	1
8	S45-845AL	2/3, 4/5 Shift Fork	2

## S5/S5D SHIFT FORK EXPLODED VIEW



  
**WEDDLE**  
 INDUSTRIES  
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 Goleta, CA 93117  
 Ph 805-562-8600 • Fax 805-562-8661  
 info@weddleindustries.com

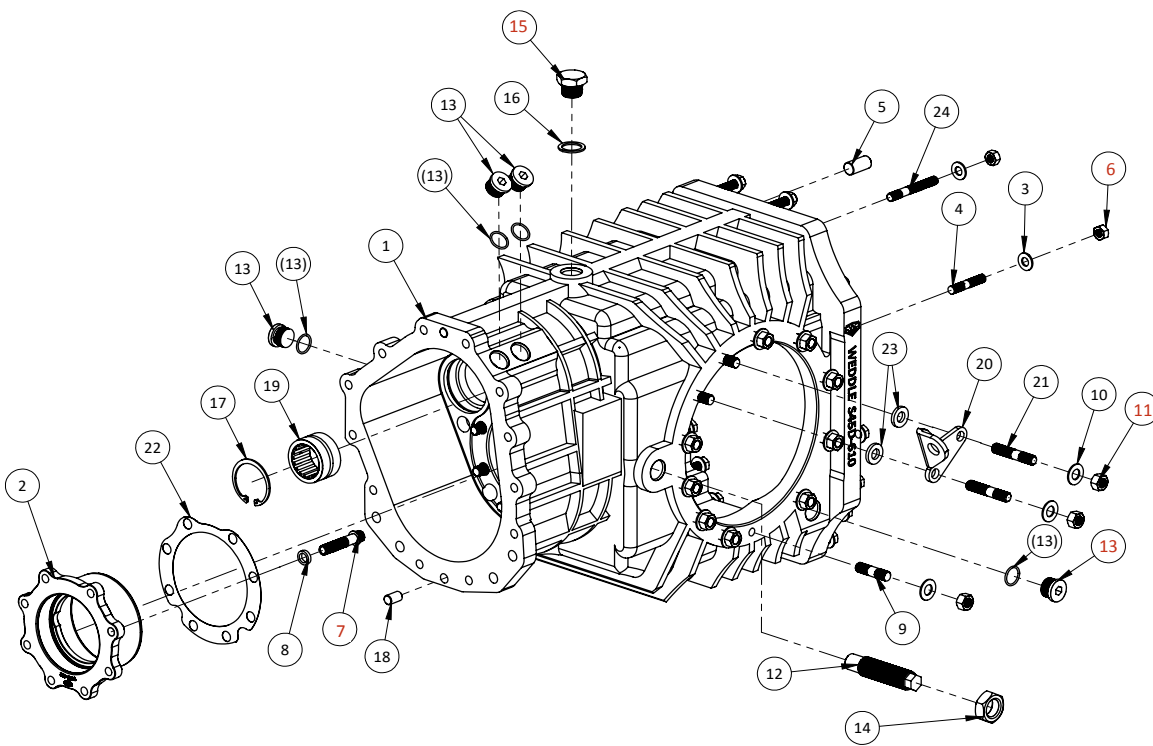
Drawing No: S45-EXP-SHIFT-5  
 Drawing Name: S5/S5D Shift Fork Exp View  
 Drawn By: DY  
 Revised: 3/21/2022



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Goleta, CA 93117  
Ph 805-562-8600 • Fax 805-562-8661  
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Drawing No: S45D-EXP-610-PBS  
Drawing Name: S4D/S5D Main Case Exp View  
Drawn By: DY  
Revised: 4/7/2025

# S4D/S5D MAIN CASE EXP VIEW PBS BELL HOUSING



ITEM	PART NO.	DESCRIPTION	QTY
1	S45D-610	S4D/S5D Main Case	1
2	S45D-402	Pinion Bearing Carrier	1
3	H-WM8-17	8mm Flat Washer, 17.6mm O.D.	27
4	S45-9SBH175	5/16 coarse / fine stud, 1 3/4" long	12
5	H-D121000	1/2" X 1.000" Hardened Dowel Pin	6
6	H-N51624	5/16"-24 Hex Nut <b>Torque to 18 ft. lb. with Loctite 243 (blue)</b>	27
7	H-B38241750FC	Pinion Retainer Bolt <b>Torque to 38 ft. lb. with Loctite 272 (red)</b>	8
8	MD-956	3/8" High Collar Lock Washer	8
9	MD-9SCS150	Sidecover Stud, 1.5"	22
10	H-WM10	10mm Flat Washer, Hardened	24
11	H-N3824	3/8"-24 Hex Nut <b>Torque to 28 ft. lb. with Loctite 243 (blue)</b>	24
12	MD-945	Bronze Load Bolt Seal threads with 3-Bond sealant or equivalent	1
13	AGB-00109-A	3/4-16 Steel Plug with O-Ring <b>Torque to 40 ft. lb. lube o-ring</b>	4
(13)	H-OR34	Replacement O-Ring for 3/4" UNF Fitting	4
14	H-JN3416	3/4-16 Jam Nut, Plated	1
15	H-PLUG-34UNFH	3/4-16 Fill Plug, Steel <b>Torque to 40 ft. lb. with Loctite 243 (blue)</b>	1
16	H-WM19-SEAL	Copper Sealing Washer for Fill Plug	1
17	S45-991	Circlip for Rear Mainshaft Bearing	1
18	H-D380625	3/8 X .625" Hardened Dowel Pin	2
19	S45-430	Rear Mainshaft Bearing (presses into case)	1
20	S45-940	Clutch Cable Guide	1
21	MD-9SCS200	Sidecover Stud, 2" for Clutch Cable Bracket	2
22	S45D-9###	Pinion Depth Shim .003"-.007" (### denotes size)	1-3
23	MD-941	Spacer for Clutch Cable Guide	2
24	S45-9SBH250	Bell Housing Stud, 2-1/2" Long	3

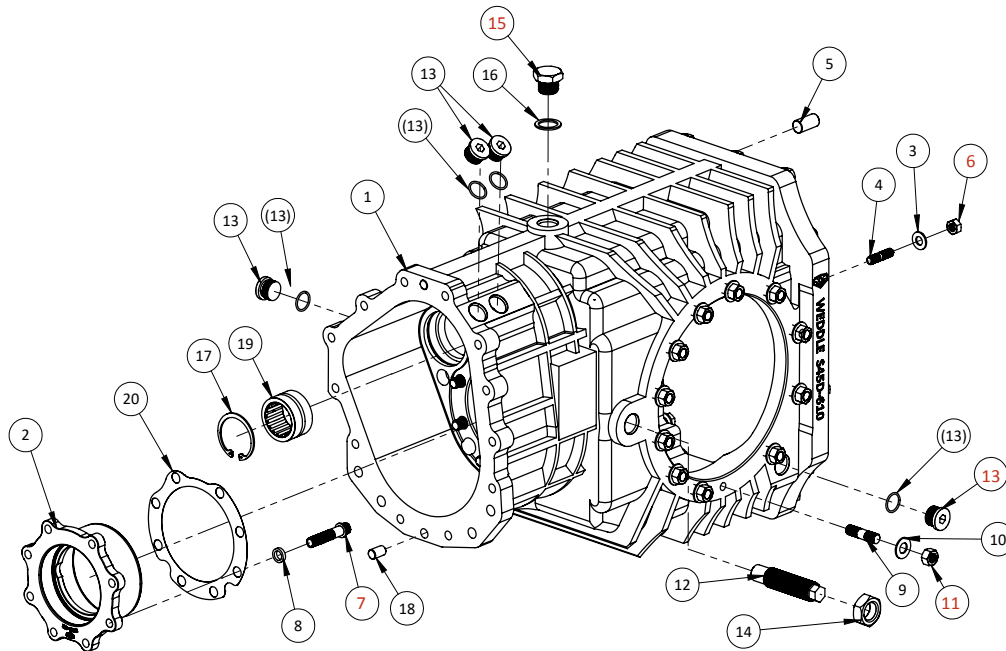
**Note:** All Studs - Loctite 272 going into housing



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Drawing No: S45D-EXP-610-WCH  
 Drawing Name: S4D/S5D Main Case Exp View  
 Drawn By: DY  
 Revised: 4/7/2025

## S4D/S5D MAIN CASE EXP VIEW WEDDLE BELL HOUSING

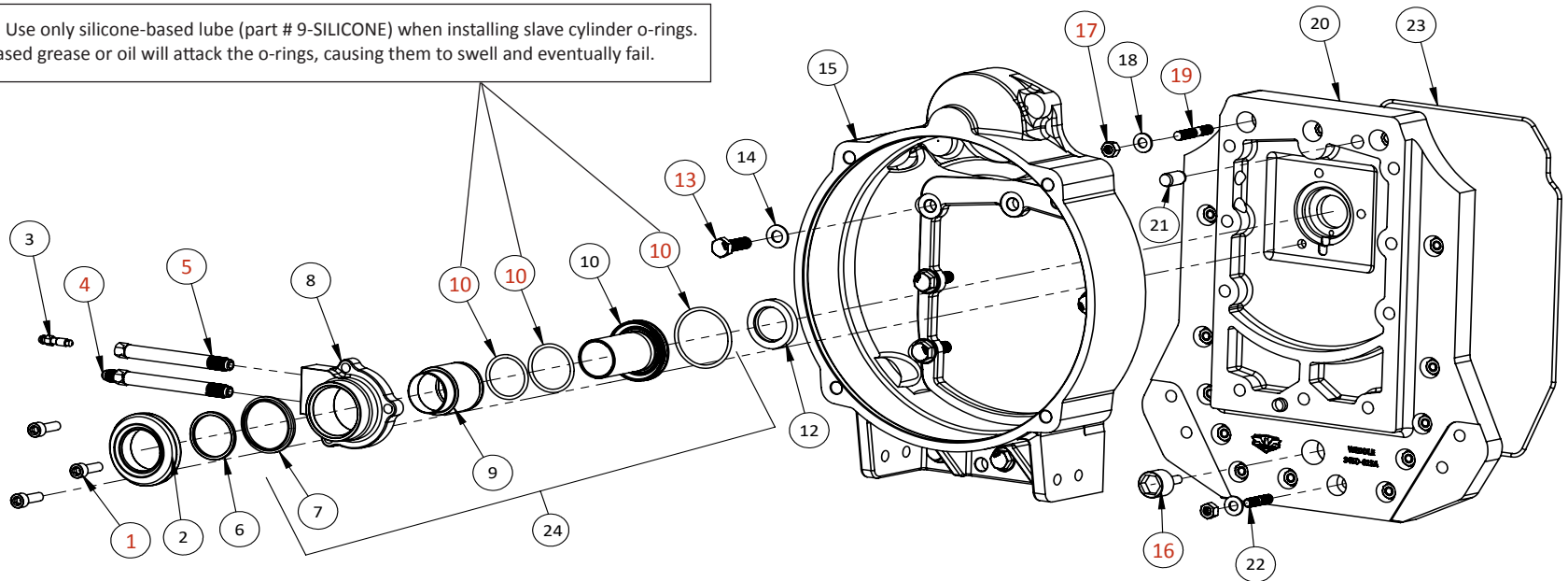


ITEM	PART NO.	DESCRIPTION	QTY
1	S45D-610	S4D/S5D Main Case	1
2	S45D-402	Pinion Bearing Carrier	1
3	H-WM8-17	8mm Flat Washer, 17.6mm O.D.	27
4	S45-9SBH125	1-1/4" Stud	15
5	H-D121000	1/2" X 1.000" Hardened Dowel Pin	6
6	H-N51624	5/16"-24 Hex Nut <b>Torque to 18 ft. lb. with Loctite 243 (blue)</b>	27
7	H-B38241750FC	Pinion Retainer Bolt <b>Torque to 38 ft. lb. with Loctite 272 (red)</b>	8
8	MD-956	3/8" High Collar Lock Washer	8
9	MD-9SCS150	Sidecover Stud, 1.5"	24
10	H-WM10	10mm Flat Washer, Hardened	24
11	H-N3824	3/8"-24 Hex Nut <b>Torque to 28 ft. lb. with Loctite 243 (blue)</b>	24
12	MD-945	Bronze Load Bolt Seal threads with 3-Bond sealant or equivalent	1
13	AGB-00109-A	3/4-16 Steel Plug with O-Ring <b>Torque to 40 ft. lb. lube o-ring</b>	4
(13)	H-OR34	Replacement O-Ring for 3/4" UNF Fitting	4
14	H-JN3416	3/4-16 Jam Nut, Plated	1
15	H-PLUG-34UNFH	3/4-16 Fill Plug, Steel <b>Torque to 40 ft. lb. with Loctite 243 (blue)</b>	1
16	H-WM19-SEAL	Copper Sealing Washer for Fill Plug	1
17	S45-991	Circlip for Rear Mainshaft Bearing	1
18	H-D380625	3/8 X .625" Hardened Dowel Pin	2
19	S45-430	Rear Mainshaft Bearing (presses into case)	1
20	S45D-9###	Pinion Depth Shim .003"-.007" (### denotes size)	1-3

**Note:** All Studs - Loctite 272 going into housing

# VW BELLHOUSING WITH ADAPTER PLATE EXPLODED VIEW

**IMPORTANT:** Use only silicone-based lube (part # 9-SILICONE) when installing slave cylinder o-rings. Petroleum-based grease or oil will attack the o-rings, causing them to swell and eventually fail.



ITEM	PART NO.	DESCRIPTION	QTY
1	H-BM8X25SH	M8x25mm Socket Head Cap Bolt <i>Torque 18 ft. lb. with LT-243 (blue)</i>	3
2	SC-00170A	Flat Face T/O Bearing	1
(2)	SC-00170	Convex Face T/O Bearing	1
3	SC-00167	M7x1.0mm Bleeder Screw	1
4	SC-00166A	Inlet Fitting for Slave Cylinder <i>Torque 26 ft. lb. with LT-243 (blue)</i>	1
5	SC-00165A	Fitting for Bleeder Screw <i>Torque 26 ft. lb. with LT-243 (blue)</i>	1
(6)	SC-00331	OPTIONAL 3mm Spacer for Throw Out Bearing	1
7	SC-05075	Piston Wiper for Slave Cylinder	1
8	SC-05072	Slave Cylinder Housing	1
(8)	SC-05072A	OPTION Shortened AGB/HV Slave Cylinder Housing for 31.0mm piston	1
9	SC-05084	36.4mm Piston for Slave Cylinder	1
(9)	SC-20866	OPTION 31.0mm Piston Slave Cylinder	1
(9)	SC-05738	OPTION 41.2mm Piston for Slave Cylinder	1
10	SC-00243	O-Ring Kit for Slave Cylinder <i>See lubrication note on diagram</i>	1
11	SC-24896	Center Support for Slave Cylinder	1
12	S45-9113H	Input Seal for Hydraulic T/O Bearing Assembly	1
13	H-BM10X32H	M10X32 Hex Bolt, Class 10.9 <i>Torque 32 ft. lb. with LT-243 (Blue)</i>	1

ITEM	PART NO.	DESCRIPTION	QTY
14	H-WM10	10mm Flat Washer, Hardened	9
15	AGB-00101-A	Bell Housing, VW Style	1
16	091-301-141-A	Drain Plug, Long Magnet <i>Torque to 35 ft.lb. with Loctite 243 (Blue)</i>	1
17	H-N51624	5/16"-24 Hex Nut <i>Torque to 18 ft. lb. with Loctite 243 (Blue)</i>	15
18	H-WM8-17	8mm Flat Washer, 17.6mm O.D.	15
19	S45-9SGH175	5/16 X 1-3/4" Stud <i>Install with Loctite 272 (red)</i>	3
20	S45D-615A	Bellhousing Adapter Plate	1
21	H-DM12X25	M12X25 Dowel, Hardened Steel	2
22	S45-9SBH125	1-1/4" Stud	12
23	S45-902	Sealing Cord	1
24	SC-A1-310	Complete Slave Cylinder Assembly 31.0mm	1
(24)	SC-A1-364	Complete Slave Cylinder Assembly 36.4mm	1



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Goleta, CA 93117  
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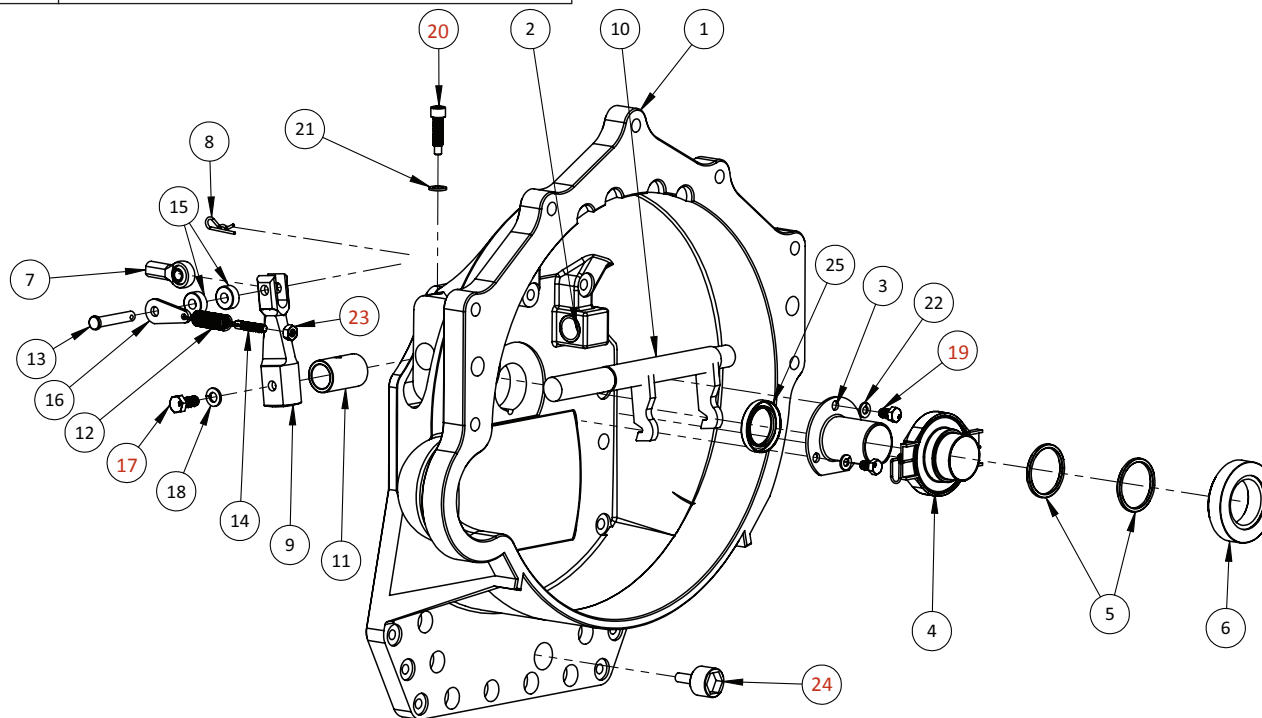
Drawing No: S45D-EXP-615A  
Drawing Name: S45D Bellhousing Adaptor  
Drawn By: RX  
Revised: 12/8/23



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Goleta, CA 93117  
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info@weddleindustries.com

Drawing No: S45D-EXP-615CM  
Drawing Name: S45D PBS BH Exp View  
Drawn By: DY  
Revised: 3/21/22

# S45D PBS BELLHOUSING EXPLODED VIEW

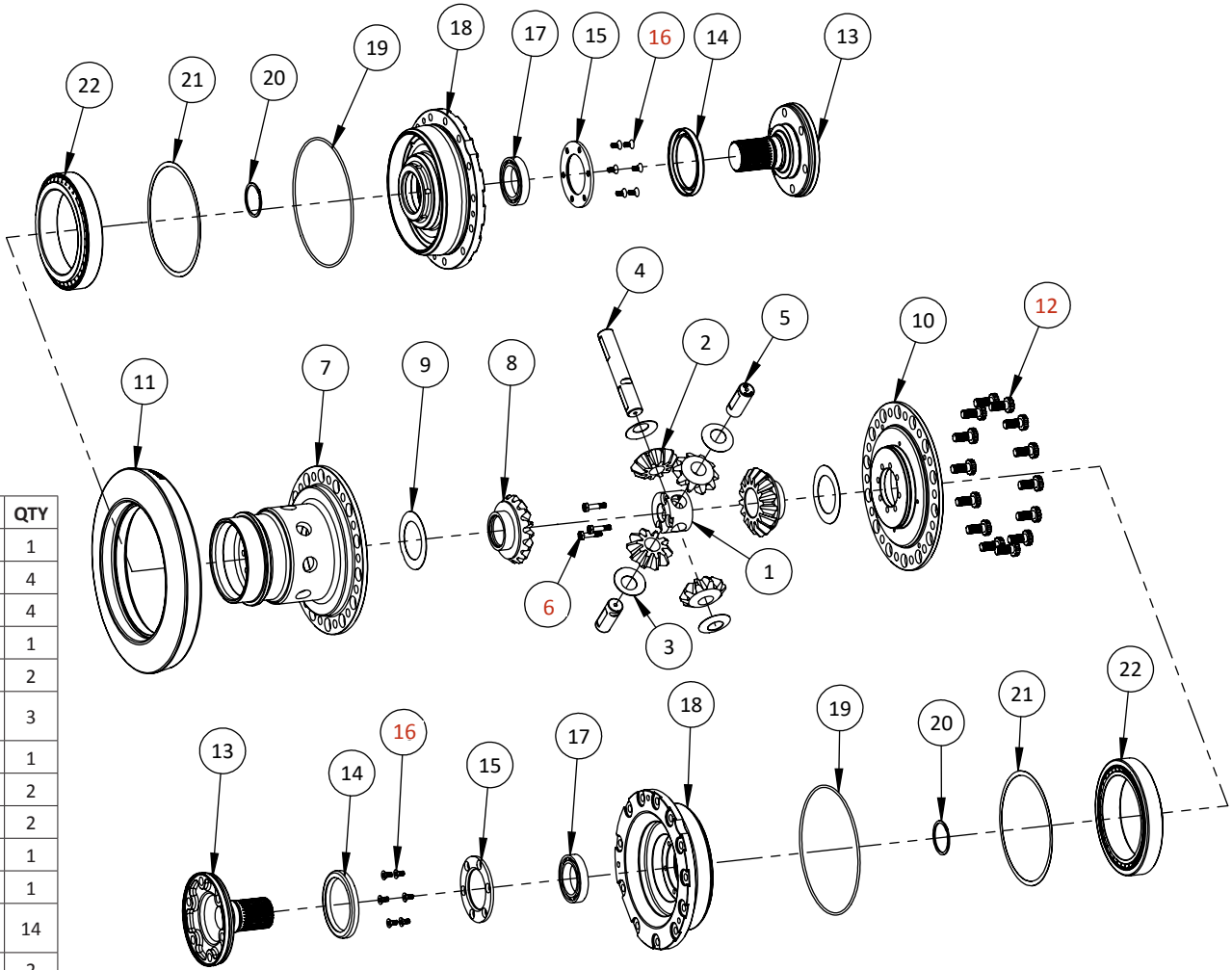


ITEM	PART NO.	DESCRIPTION	QTY
1	S45D-615CM	Large Diameter Chevy Bellhousing	1
2	S45-615-PBS-06	Bushing for Small End of Cross Shaft, Press into Bellhousing	1
3	S45-906	T/O Bearing Guide Sleeve	1
4	CL-165B-1236	12mm Extender for T/O Bearing	1
5	SC-00331	Spacers for T/O Bearing, Use as needed with clutch kit	0-2
6	SC-00170A	Flat Face T/O Bearing	1
(6)	SC-00170	Convex Face T/O Bearing	1
7	091-141-701-K-1	Heim for Clutch Cross Shaft	1
8	091-141-701-K-3	Cotter Pin	1
9	091-141-701-K-4	Cross Shaft Arm	1
10	091-141-701-K-5	Cross Shaft	1
11	9025	Cross Shaft Bushing	1
12	S45-615-PBS-09	Clutch Arm Return Spring	1
13	S45-615-PBS-12	Clevis Pin	1

ITEM	PART NO.	DESCRIPTION	QTY
14	S45-615-PBS-13	Threaded Anchor for Return Spring	1
15	S45-615-PBS-14	Alignment Spacer	2
16	S45-615-PBS-10	Bracket for Return Spring	1
17	H-BM8X20H	8mm Bolt for Cross Shaft Arm <b>Torque to 18 ft.lb. with Loctite 243 (Blue)</b>	1
18	H-WM8-SPL	M8 Split Lock Washer	1
19	H-B14200500H	1/4" Bolt for T/O Bearing Guide Sleeve <b>Torque to 14 ft.lb. with Loctite 243 (Blue)</b>	3
20	S45-615-PBS-07	Locating Bolt for Cross Shaft Bushing <b>Torque to 18 ft.lb. with Loctite (Blue)</b>	1
21	H-WM8-14	8mm flat washer plated 14.3mm OD	1
22	H-WM7-WAVE	7mm Wave Washer	3
23	H-N1420	Jam Nut for Spring Set Screw <b>Torque to 9 ft.lb. with Loctite 243 (Blue)</b>	1
24	091-301-141-A	Drain Plug with Magnet <b>Torque to 35 ft.lb. with Loctite 243 (Blue)</b>	1
25	S45-9113	Input Shaft Seal	1



# S4D/S5D DIFF EXP VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	S45-540B	Diff Center Block	1
2	S45-550	Spider Gear	4
3	S45-551	Spider Gear Thrust Washer	4
4	S45-538B	Long Differential Cross Shift	1
5	S45-539B	Short Differential Cross Shaft	2
6	H-B14281156H	Hex Bolt for "B-Style" Diff Cross Shafts <i>Torque to 10 ft.lb. with Loctite 243 (Blue)</i>	3
7	S45D-535	Diff Housing	1
8	S45-545	Sidegear	2
9	S45-552-025	Sidegear Thrust Washer, .025" Thick	2
10	S45D-530	Diff Cover	1
11	S45D-RP###	R&P Set (### denotes ratio)	1
12	H-B71620100XHD	Ring Gear Bolt <i>Torque to 95 ft.lb. with Loctite 272 (Red)</i>	14
13	S45-5934	934 Drive Flange	2
14	S45D-920	Final Drive Seal	2
15	MD-925	Output Bearing Retainer Plate	2
16	HV-926	Torx Bolt for Output Bearing Plate <i>Torque to 8 ft.lb. with Loctite 243 (Blue)</i>	12
17	S45-422	Final Drive Support Bearing	2
18	S45D-6934	Sidecover	2
19	S45D-922	O-ring for Sidecover	2
20	S45-934	Final Drive Flange Spiral Lock	2
21	S45D-500K	Diff Shim Kit (selection of sizes)	2
22	S45D-420	Diff Bearing Cup & Cone	2

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S45-INST S45.32

  
**WEDDLE INDUSTRIES**  
 7200 Hollister Ave, Suite C  
 Goleta, CA 93117  
 Ph 805-562-8600 • Fax 805-562-8661  
 info@weddleindustries.com

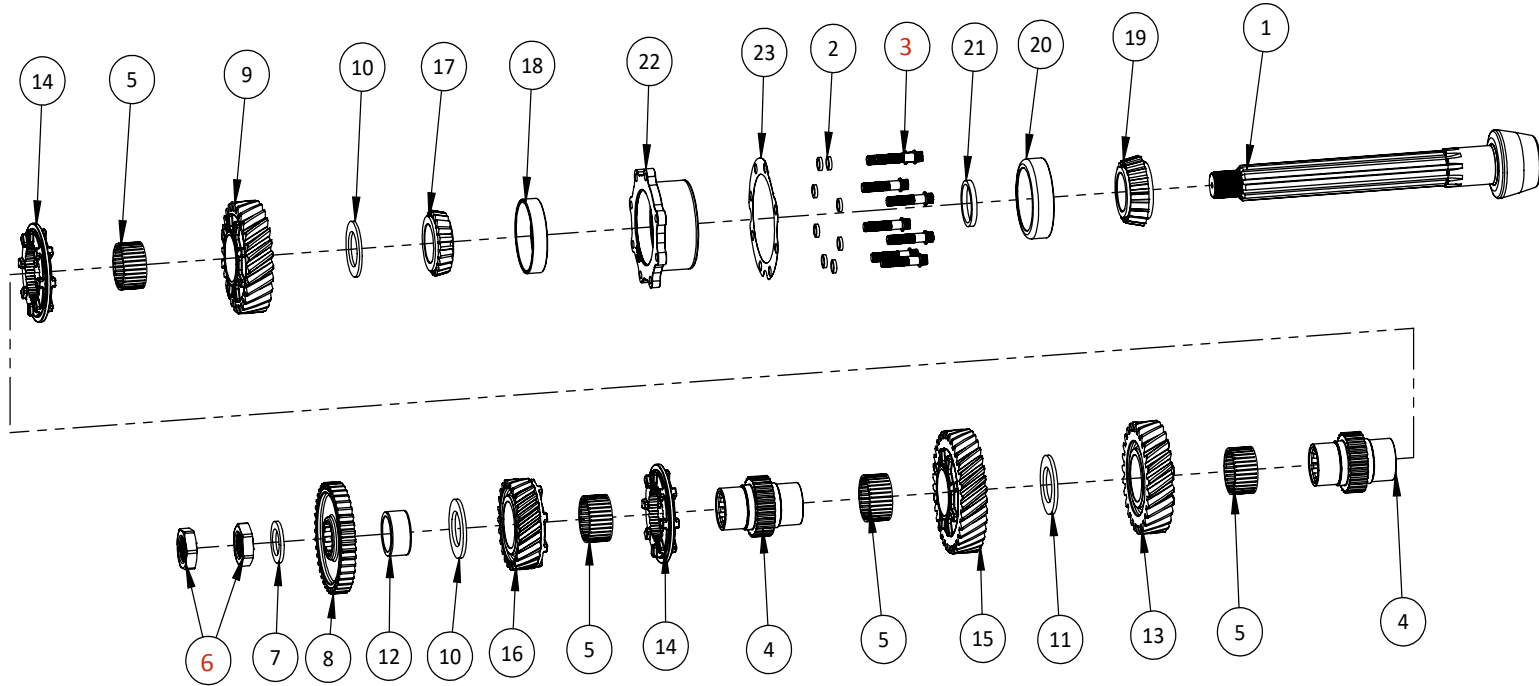
Drawing No: S45D-EXP-DIFF  
 Drawing Name: S4D/S5D Diff Exploded View  
 Drawn By: DL  
 Revised: 3/21/2022



7200 Hollister Ave, Suite C  
Goleta, CA 93117  
Ph 805-562-8600 • Fax 805-562-8661  
info@weddleindustries.com

Drawing No: S45D-EXP-PS4  
Drawing Name: S4D Pinion Shaft Exp View  
Drawn By: DY  
Revised: 4/7/2025

# S4D PINION SHAFT EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	S45D-RP###	Pinion Shaft (### denotes ratio)	1
2	MD-956	3/8" High Collar Lock Washer	8
3	H-B38241750FC	3/8"-24 X 1 3/4" Bolt, 12 Point <i>Torque to 38 ft.lb with Loctite 272 (red)</i>	8
4	S4-843A	Slider Hub, 30 spline. 32 spline hubs now	2
5	4-455027	Needle Bearing for 1st-4th or S5 2nd-5th	4
6	S45-910	Jam Nut for End of Pinion Shaft (LH Thread) <i>Torque to 200 ft.lb with Loctite 272 (red)</i>	2
7	S45-939	Washer for Nut on End of Pinion Shaft	1
8	WS-RP	Reverse Gear, Pinion Shaft Half	1
9	WS4-###I	1st Gear Idler (### denotes ratio)	1
10	S45-925	.125" Thick Thrust Washer	2
11	S4-956	.156" Thick Thrust Washer	1
12	S4-416A	Front Pinion Bearing Inner Race	1
13	WS4-###I	2nd Gear Idler (### denotes ratio)	1

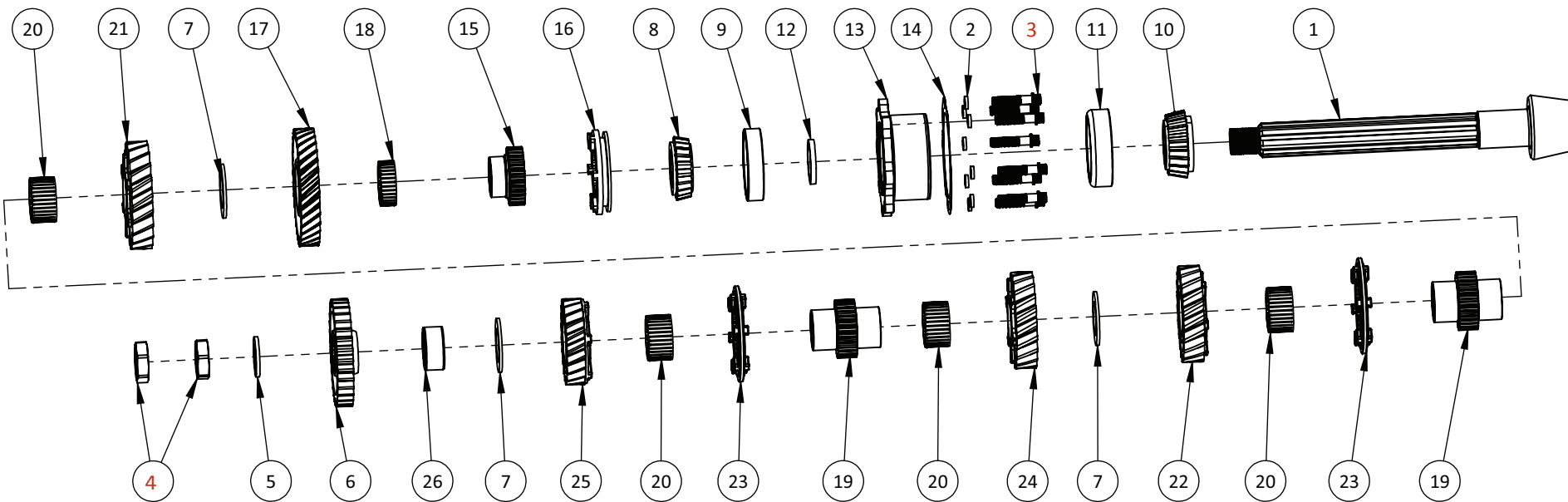
ITEM	PART NO.	DESCRIPTION	QTY
14	S4-8SL8-30W	S4 8-Dog Slider, 30 spline	2
(14)	S4-8SL8-30A	S4 8 dog slider, 30 spline, for early gear to late gear	2
15	WS4-###I	3rd Gear Idler (### denotes ratio)	1
16	WS4-###I	4th Gear Idler (### denotes ratio)	1
17	S45D-403	Pinion Bearing Cone, Small	1
18	S45D-404	Pinion Bearing Cup, Small	1
19	S45D-405	Pinion Bearing Cone, Large	1
20	S45D-406	Pinion Bearing Cup, Large	1
21	S45D-407-###	Pinion Bearing Preload Spacer	1
22	S45D-402	Pinion Bearing Carrier (### denotes size)	1
23	S45D-9###	Pinion Depth Shim .003" - .007" (### denotes size)	1-3



7200 Hollister Ave, Suite C  
Goleta, CA 93117  
Ph 805-562-8600 • Fax 805-562-8661  
info@weddleindustries.com

Drawing No: S45D-EXP-PS5  
Drawing Name: S5D Pinion Shaft Exp View  
Drawn By: DY  
Revised: 4/7/2025

# S5D PINION SHAFT EXPLODED VIEW



ITEM	PART NO.	DESCRIPTION	QTY
1	S45D-RP###	Pinion Shaft (### denotes ratio)	1
2	MD-956	3/8" High Collar Lock Washer	8
3	H-B38241750FC	3/8"-24 X 1 3/4" Bolt, 12 Point <i>Torque to 38 ft.lb with Loctite 272 (red)</i>	8
4	S45-910	Jam Nut for End of Pinion Shaft (LH Thread) <i>Torque to 200 ft.lb with Loctite 272 (red)</i>	2
5	S45-939	Washer for Nut on End of Pinion Shaft	1
6	WS-RP	Reverse Gear on Pinion Shaft	1
7	S45-925	.125" Thick Thrust Washer	3
8	S45D-403	Pinion Bearing Cone, Small	1
9	S45D-404	Pinion Bearing Cup, Small	1
10	S45D-405	Pinion Bearing Cone, Large	1
11	S45D-406	Pinion Bearing Cup, Large	1
12	S45D-407-###	Pinion Bearing Preload Spacer (### denotes size)	1
13	S45D-402	Pinion Bearing Carrier	1

ITEM	PART NO.	DESCRIPTION	QTY
14	S45D-9###	Pinion Depth Shim 003"-.007" (### denotes size)	1-3
15	S5-841	1st Gear Slider Hub	1
16	S5-8SL1	1st Gear Slider	1
17	WS5-###I	1st Gear Idler (### denotes ratio)	1
18	S5-414	1st Gear Needle Bearing	1
19	S5-843A	2nd-5th Slider Hub	2
20	4-455027	Needle Bearing for 1st-4th or S5 2nd-5th	4
21	WS5-###I	2nd Gear Idler (### denotes ratio)	1
22	WS5-###I	3rd Gear Idler (### denotes ratio)	1
23	S5-8SL6	2nd-5th Slider	2
24	WS5-###I	4th Gear Idler (### denotes ratio)	1
25	WS5-###I	5th Gear Idler (### denotes ratio)	1
26	S5-416A	S5 Inner Race for Pinion Roller Bearing	1