

IO-390-D Series Engine Illustrated Parts Catalog

April 2020

PC-IO-390-D



652 Oliver Street
Williamsport, PA 17701

IO-390-D Series Engine Illustrated Parts Catalog

Lycoming Part Number: PC-IO-390-D

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Record of Revisions

NOTICE: Service Documents with a later release date than this parts catalog override parts information in this document.

Rev No.	Revision Changes	Issue Date
New	Initial Release	April 2020

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Roller Tappets

As a product improvement, Lycoming is installing roller tappets on its aircraft engines. Wide deck engines with roller tappets are identified with an “E” suffix after the serial number dash number (Example – L-*****-48E.) On rebuilt and Lycoming overhauled wide deck engines with roller tappets, the letter “A” suffix is replaced with the letter “E” suffix on the engine serial number.

The new parts include roller tappet body assembly, crankcase, camshaft, shorter push rods, shroud tubes and shroud tube seal. The engines use the same hydraulic units and the dry tappet clearance does not change. Refer to Reference 618 in the Table of Limits (SSP-1776) for dry tappet clearance values.

At this time, roller tappets are not installed in narrow deck engines.

ROLLER TAPPET PARTS ARE NOT INTERCHANGEABLE WITH CURRENT FLAT FACED TAPPETS.

If it is necessary to remove the roller tappet bodies prior to overhaul, they **must be reinstalled in the same location in the crankcase**. The roller tappets are indexed with flats in the new crankcase. It is possible to assemble the roller tappet bodies in two different orientations 180 degrees apart. Either orientation is acceptable while reinstalling. Lubricate all tappet bores, cam lobes and roller tappets with engine oil mixture only. (Refer to the latest revision of Service Instruction No. 1059.) Install the shroud tube seal in the crankcase, then install the shroud tube.

THE ROLLER TAPPETS ARE NOT FIELD REPAIRABLE AND NO DISASSEMBLY IS ALLOWED. THEREFORE, MAGNAFLUX OR ZYGLO INSPECTIONS ARE NOT ALLOWED. A VISUAL INSPECTION FOR INTEGRITY AND FREE ROTATION OF THE ROLLER ACTION IS ACCEPTABLE TO RETURN AN IN-USE ROLLER TAPPET TO SERVICE; HOWEVER, IT IS MANDATORY TO REPLACE ROLLER TAPPETS AT OVERHAUL.

Vendor Accessories

Parts coverage of Vendor Accessories used on Lycoming engines are found in the applicable Vendor’s Parts Catalog. A list of vendors’ addresses is included in the latest revision of Lycoming Service Letter No. L114.

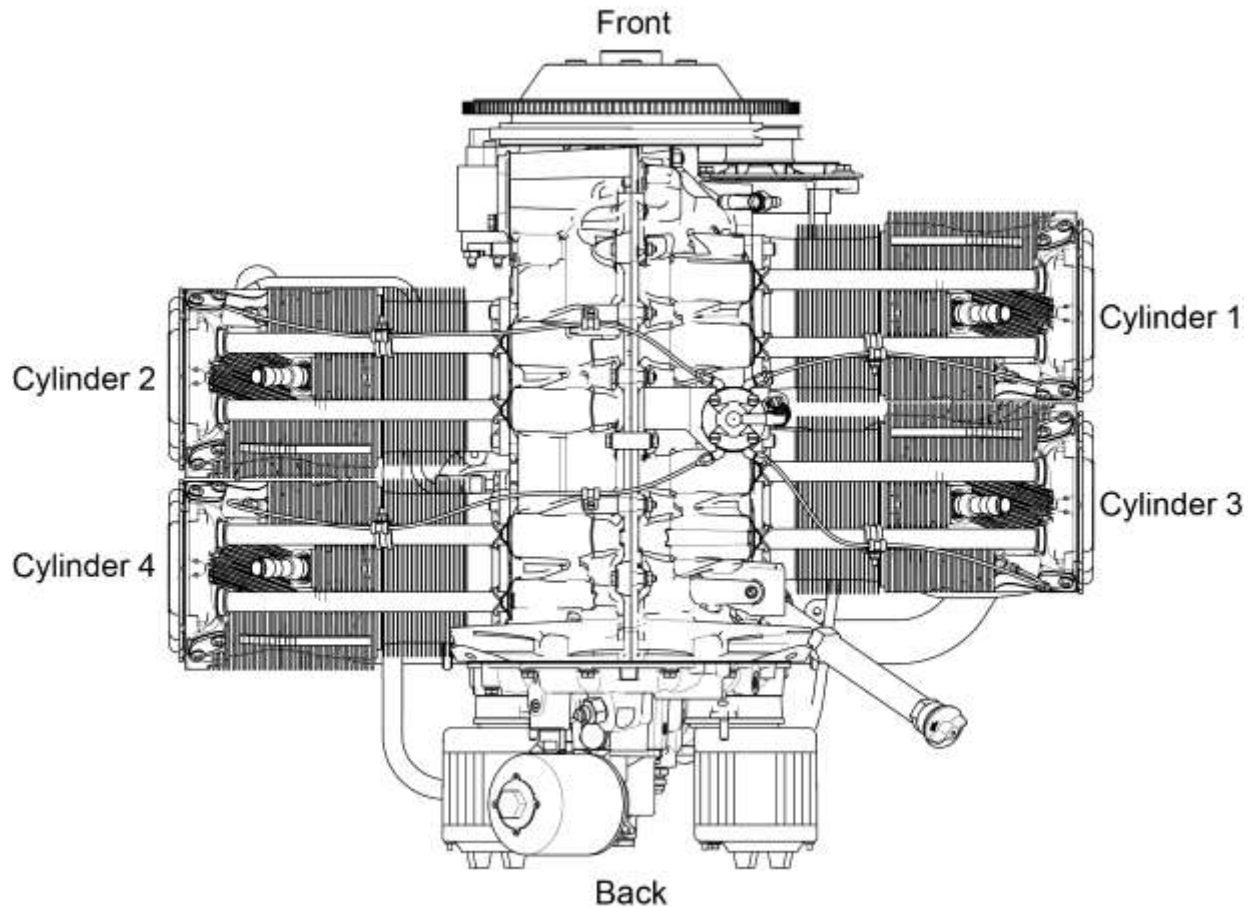
Any reference in this document to the supplier’s/part manufacturer’s product, by name, trademark, part number or other description is solely for the purpose of identification and does not indicate or infer that Lycoming accepts responsibility for quality control and/or airworthiness of parts, which do not pass through the Lycoming quality control system.

Environmental Compliance

Lycoming is concerned with preserving the environment. Lycoming strongly urges engine owners and repair/overhaul personnel to observe and comply with all federal, state, and local environmental regulations when solvents, paint, fuel, oil, chemicals, or other consumables are used in operating, maintaining, or overhauling an engine component. Please share our concern for and commitment to a clean earth, clean water, and especially clean air for succeeding generations of flyers.

Perspective of References

In this manual, all references to locations of various components will be designated as if viewing the engine from the rear (or anti-propeller) end. The front of the engine is the propeller end and the oil sump is on the bottom of the engine. Cylinders are numbered from front to rear with the odd-numbered cylinders on the right-hand side. The firing order for this four-cylinder engine is 1-3-2-4.



Top View of Engine

How to Order Parts and Publications

An Oversize and Undersize Parts List is included in the front section of this catalog to aid in ordering parts as necessary during maintenance or overhaul.

To order parts:

1. Contact an authorized Lycoming Distributor <https://www.lycoming.com/distributors>:
2. Give the model and serial number of your engine.
3. Give the part number, nomenclature, and quantity.

To supply any comments, suggestions, or corrections to this parts catalog, go online to the Lycoming Engines website <https://www.lycoming.com/>.

Recently released and frequently requested publications are available to download from <https://www.lycoming.com/contact/knowledge-base/publications>. For the complete library of Lycoming publications contact one of the publication distributors listed on page 1 of the latest revision of Service Letter No. L114.

NOTE:

Lycoming recommends that owners of this manual sign up for email notification on the Technical Publications page of our website <https://www.lycoming.com/contact/knowledge-base/publications>. By submitting your email address, you will receive notification whenever Lycoming publishes a new or revised technical publication, including any revisions to this parts catalog.

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Abbreviations and Acronyms

A	
AR	As Required
Assy.	Assembly
ATA	Air Transport Association
C	
Cyl.	Cylinder
E	
EIS	Electronic Ignition System
F	
Fill.	Fillister
H	
Hd.	Head
Hex.	Hexagon
I	
I.D.	Inside Diameter
in.	Inch
IPC	Illustrated Parts Catalog
M	
mm	Millimeter
N	
No.	Number
NPT	National Pipe Taper (thread)
O	
O.D.	Outside Diameter
P	
P	Lycoming Proprietary Part
P/N	Part Number
Qty.	Quantity
R	
RF	Reference
RT	Roller Tappet
S	
SB	Service Bulletin
SI	Service Instruction
SSP	Special Service Publication

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Oversize and Undersize Parts Listing

PART NO.	DESCRIPTION	OVERSIZE (IN.)					UNDERSIZE (IN.)	
		P05 .005	P10 .010	P20 .020	P30 .030	P50 .050	M03 .003	M06 .006
18B23885	BEARING, Front Crankshaft						X	X
18E23886	BEARING, Crankshaft						X	X
18M23887	BEARING, Connecting Rod						X	X
71903-A ❖	BUSHING, Counterweight Dynamic	--	--	--	--	--	--	--
72155-S	BUSHING, Prop Flange	X						
75656-S	BUSHING, Prop Flange	X						
79024-S	BUSHING, Prop Flange	X						
75657-S	BUSHING, Prop Flange	X						
66670	BUSHING, Rocker Shaft Inner		X					
STD-1065	DOWEL, Crankshaft		X					
66713	GUIDE, Intake Valve				X			
75838	GUIDE, Exhaust Valve				X			
69260	INSERT, Spark Plug		X					
72212	SEAT, Intake Valve			X				
16T19468	SEAT, Exhaust Valve			X				
LW-15628	SEAL, Crankshaft Oil					X		
❖ 71903-A is the undersize part number. When ordering, do not specify an undersize code letter								

NOTICE: When ordering oversize and undersize parts, be sure to specify the required oversize and undersize dimension along with the proper part number. For example, to order bearing Part Number (P/N) 18B23885 bearing in 0.003 in. undersize, order P/N 18B23885-M03. Undersize code letter is "M" while oversize code letter is "P". These letters are then followed by the number designating the size in thousandths of an inch.

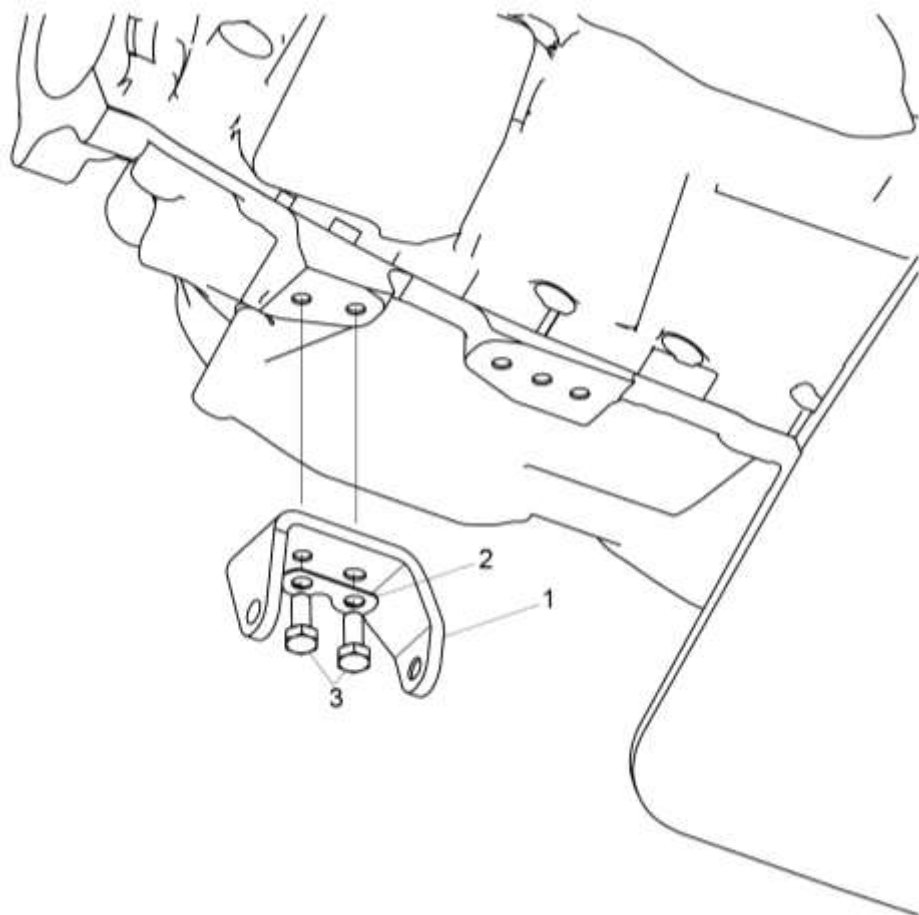


Figure 1
Alternator Attaching Parts

AC GENERATION**Figure 1 - Alternator Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		07A21443	BRACKET, Alternator	1
2		73383	LOCKPLATE, 5/16 bolt x 1.00 spacing	1
3		LW-31-0.94	BOLT, 5/16-18 x 15/16 long, hex. head	2

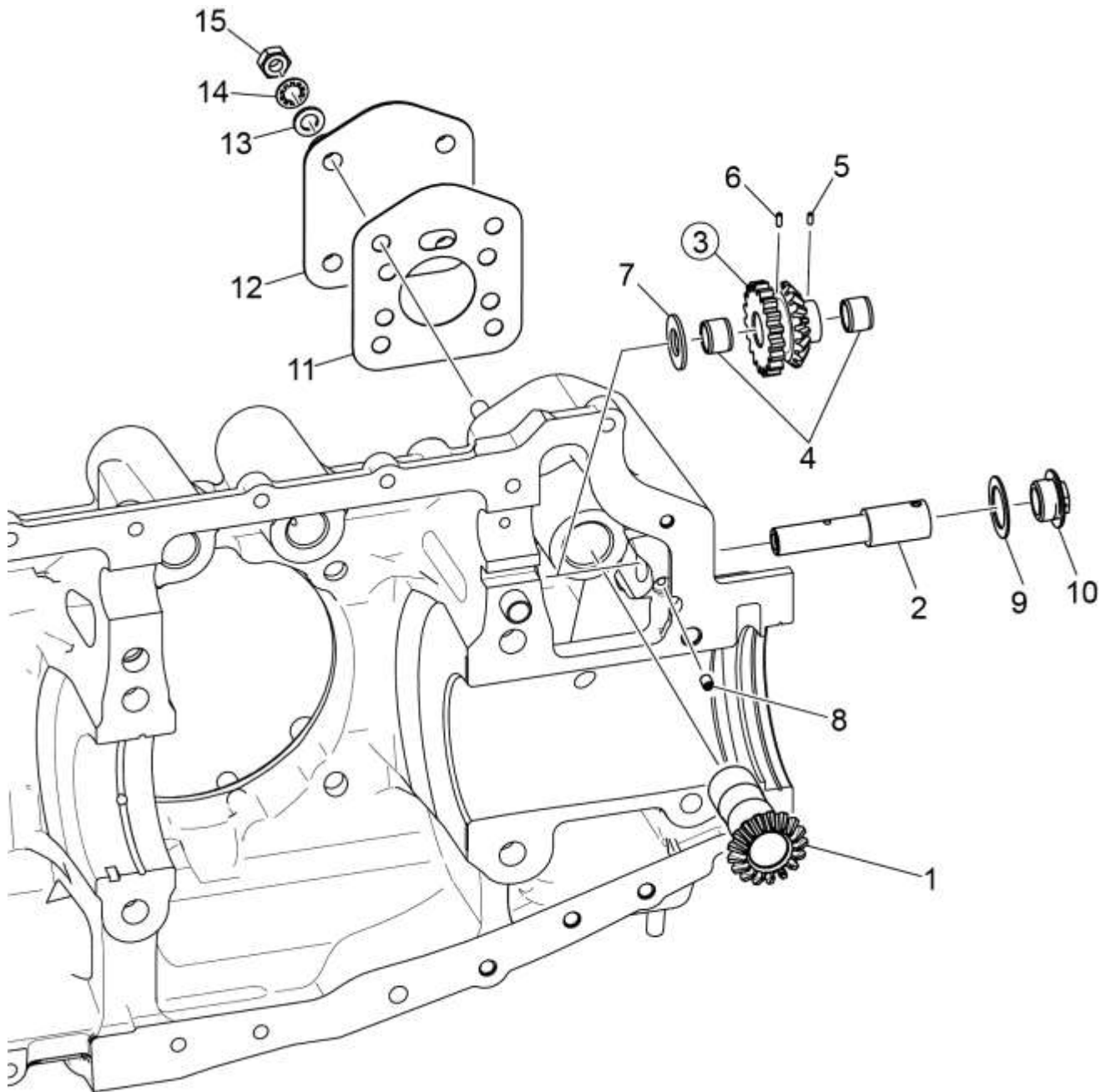


Figure 2
Propeller Governor Drive and Attaching Parts

FRONT SECTION**Figure 2 – Propeller Governor Drive and Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		77875	GEAR, Propeller governor driven			1	1
2		LW-14021	SHAFT, Propeller governor idler gear			1	1
3		77874	GEAR ASSEMBLY, Propeller governor idler			1	1
4		77872	BUSHING, Propeller governor idler gear			2	2
5		STD-19	DOWEL, 3/32 diameter x 7/32 long			1	1
6		STD-798	DOWEL, 3/32 diameter x 9/32 long			1	1
7		73249	WASHER, Thrust (0.0585 - 0.0595 thick)			AR	AR
		73250	WASHER, Thrust (0.062 - 0.063 thick)			AR	AR
		73251	WASHER, Thrust (0.0655 - 0.0665 thick)			AR	AR
		73252	WASHER, Thrust (0.069 - 0.070 thick)			AR	AR
		01L21418	WASHER, Thrust (0.055 - 0.056 thick)			AR	AR
8		AN565B1032H5	SET SCREW, No. 10-32 x 5/16 long			1	1
9		70455	GASKET, 25/32 I.D. x 1-1/8 O.D. x 1/32 thick			1	1
10		LW-13896	PLUG, 3/4-16 hex. head			1	1
11		72053	GASKET, Governor			1	1
12		72378	COVER, Governor drive			1	1
13		STD-35	WASHER, 5/16 plain			4	4
14		STD-475	WASHER, 5/16 lock, internal teeth			4	4
15		STD-1410	NUT, 5/16-18 plain			4	4
AR as required							

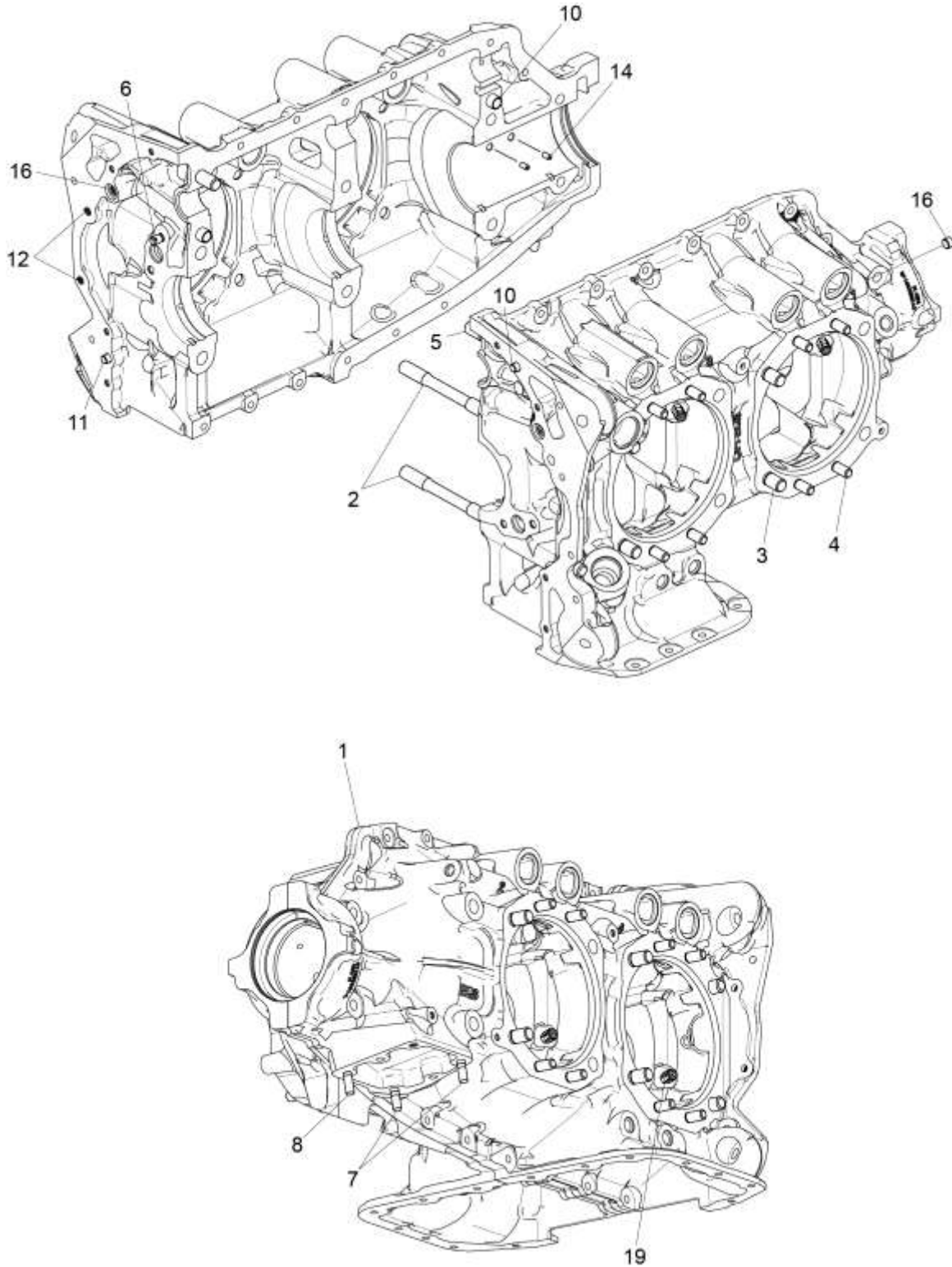


Figure 3A
Crankcase Assembly - D1A6 and D3A6

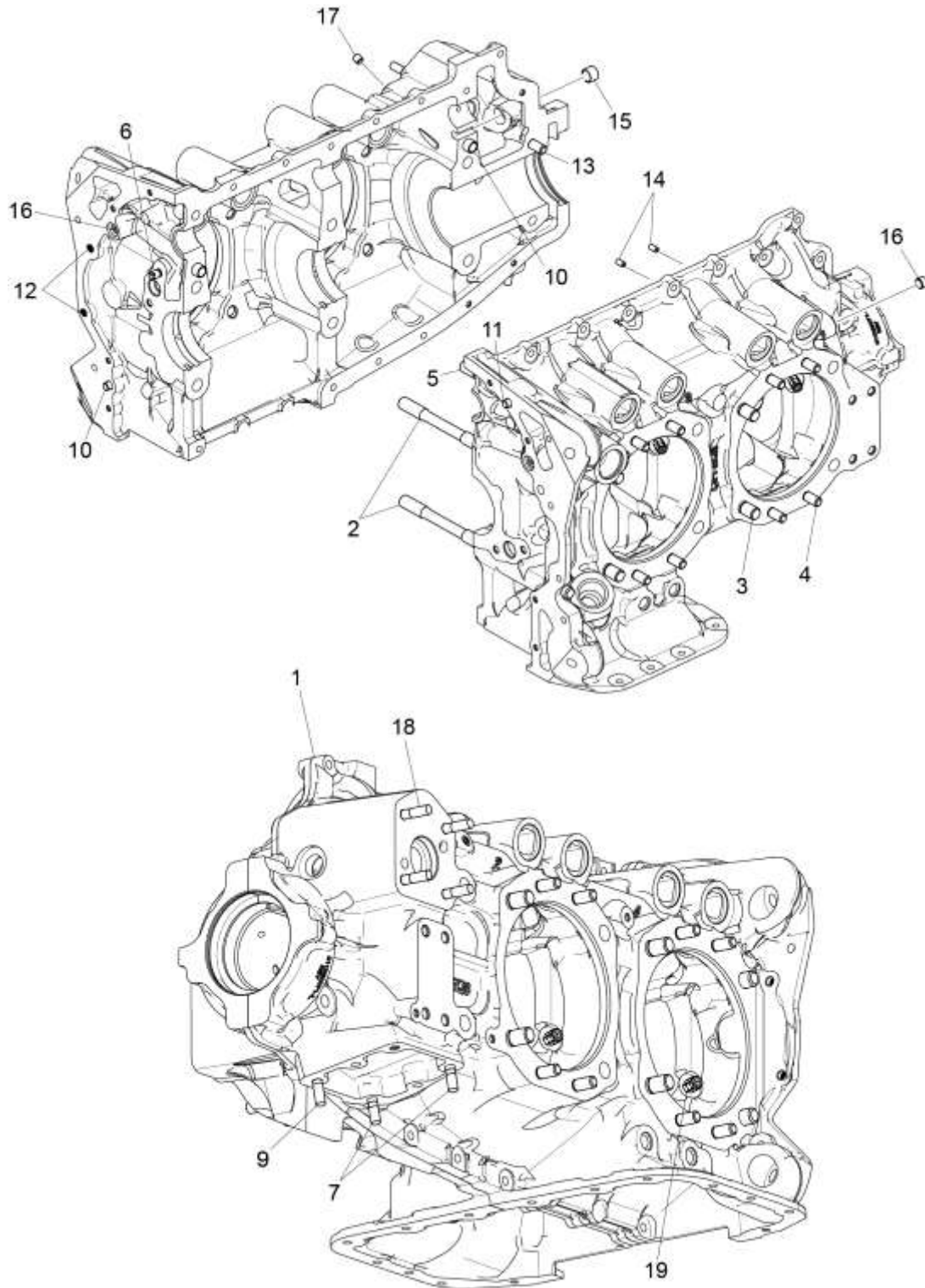


Figure 3B
Crankcase Assembly - D1B6 and D3B6

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POWER SECTION**Figure 3A/3B - Crankcase Assembly**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		11U20391-3S	CRANKCASE ASSEMBLY	1	1		
		11U28750-3S	CRANKCASE ASSEMBLY			1	1
2		01A23544	STUD, 1/2-13 x 9-27/32 long	2	2	2	2
3		50-15	STUD, 1/2-13 x 1-7/8 long	8	8	8	8
4		38-13	STUD, 3/8-16 x 1-5/8 long	16	16	16	16
5		38D-17	STUD, 3/8-16 x 2-1/8 long, drilled	1	1	1	1
6		LW-13793	STUD, 5/16-18 x 15/16 long, drilled	1	1	1	1
7		31C-12	STUD, 5/16-18 x 1-1/2 long	2	2	2	2
8		31C-13	STUD, 5/16-18 x 15/16 long	1	1	1	1
9		31C-14	STUD, 5/16-18 x 1-3/4 long			1	1
10		STD-557	DOWEL, 1/2 diameter x 11/16 long, hollow	2	2	2	2
11		STD-514	DOWEL, 5/16 diameter x 1/2 long	2	2	2	2
12		STD-1623	INSERT, 1/4-20 UNC x 3/8 long	2	2	2	2
13		38-22	STUD, 3/8-16 x 2-3/4 long			1	1
14		69796	DOWEL, Crankshaft bearing	1	1	2	2
15		72158	BUSHING, Governor drive idler shaft			1	1
16		1102	PLUG, 1/8-27 NPT, Allen head	1	1	5	5
17		STD-1339	PLUG, 1/16-27 NPT, Allen head			1	1
18		31C-17	STUD, 5/16-18 x 2.00 long			4	4
19		12E23021	NOZZLE ASSEMBLY, Piston cooling	4	4	4	4

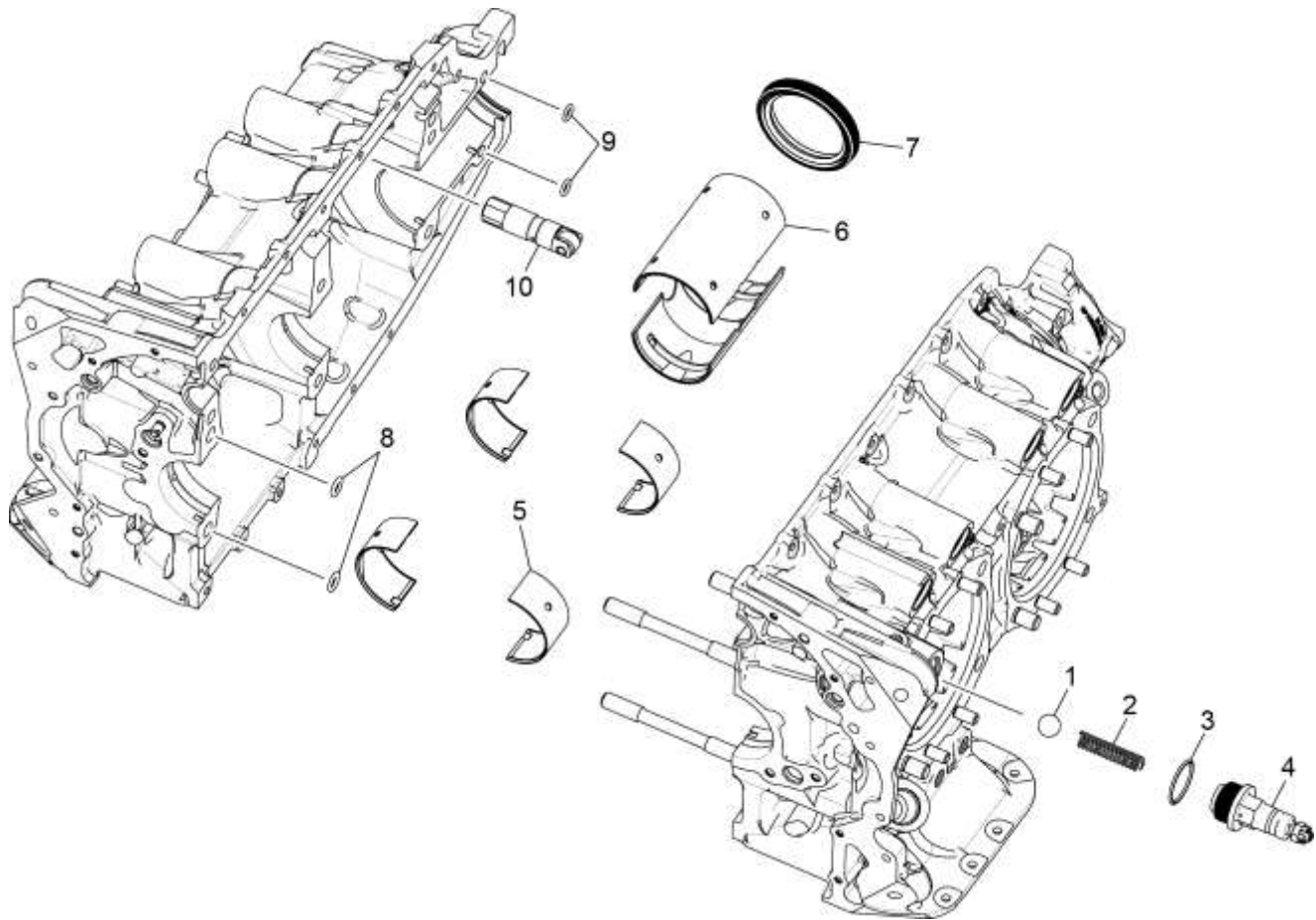


Figure 4
Crankcase Related Parts

POWER SECTION**Figure 4 - Crankcase Related Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		1028-B	BALL, 11/16 diameter	1
2	❖	61084	SPRING, Oil pressure relief valve	1
	❖	68668	SPRING, Oil pressure relief valve	1
	❖	77467	SPRING, Oil pressure relief valve	1
	❖	LW-11713	SPRING, Oil pressure relief valve	1
	❖	LW-18085	SPRING, Oil pressure relief valve	1
3		06E19769-1.25	GASKET, 1-1/4 I.D. x 1-1/2 O.D. x 3/32 annular	1
4		77808	VALVE ASSEMBLY, Oil pressure relief valve	1
5		18E23886	BEARING, Crankshaft	4
6		18B23885	BEARING, Crankshaft, front	2
7	▲	LW-15628	SEAL, Crankshaft, Oil	1
8		72075	SEAL, Oil, 3/32 section x 7/16 I.D.	2
9		72091	RING, Oil seal, 23/64 I.D. x 1/10 diameter	2
10	●	LRT23381	BODY ASSEMBLY, Hydraulic roller tappet	8

❖ Select spring to give a minimum of three threads exposed on adjusting screw to allow field adjustment. Reference latest revision of Lycoming Table of Limits SSP-1776, Part I for spring identification.

▲ Refer to latest revision of Lycoming Service Instruction No. 1324 for installation.

● Sold as exchange part only.

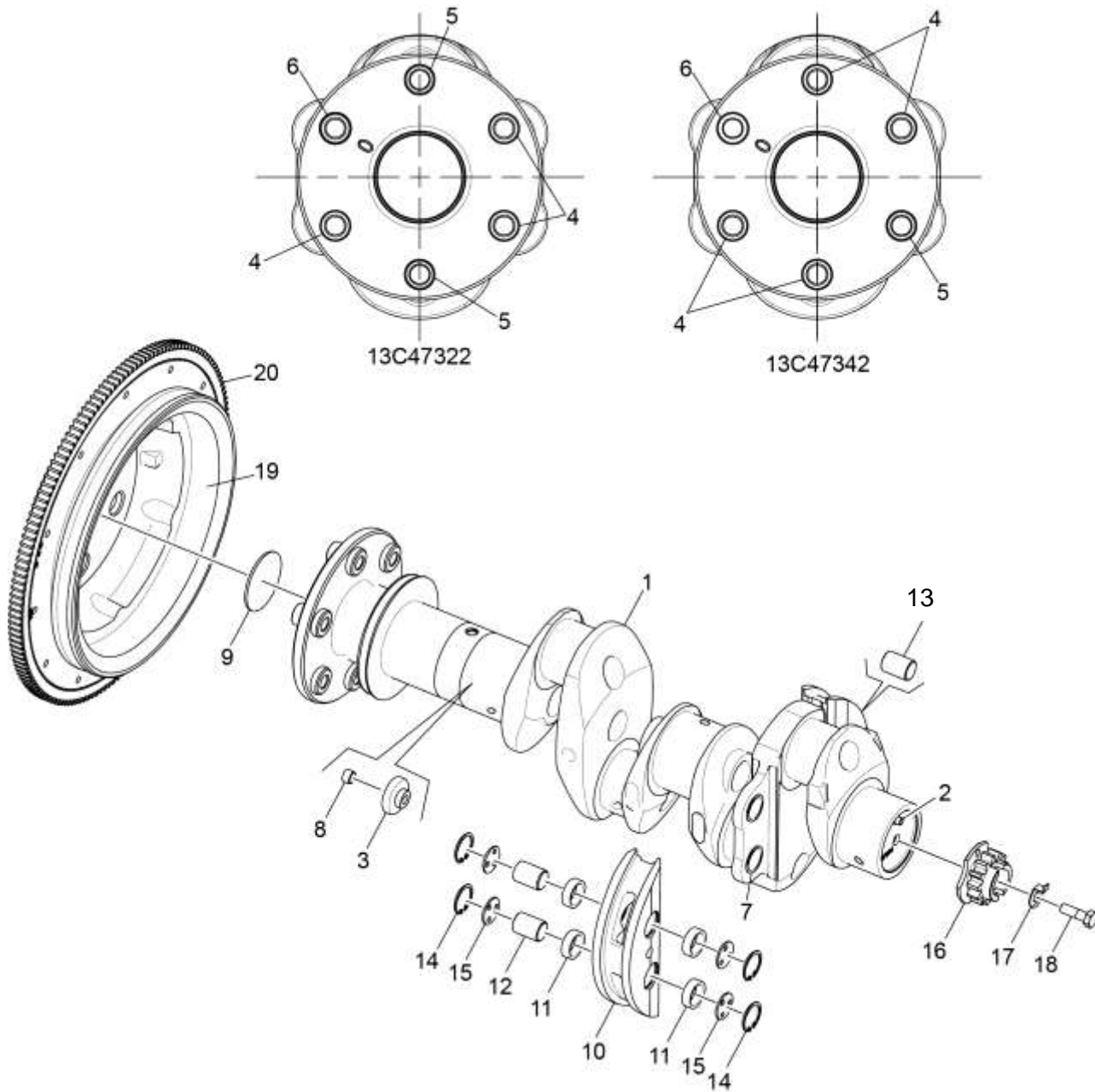


Figure 5
Crankshaft and Counterweight Assembly and Related Parts

POWER SECTION**Figure 5 - Crankshaft and Counterweight Assembly and Related Parts**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		13C47322	CRANKSHAFT AND BUSHING ASSEMBLY	1		1	
		13C47342	CRANKSHAFT AND BUSHING ASSEMBLY		1		1
2		STD-1065	DOWEL, Stepped, 5/16 & 1/4 diameter	1	1	1	1
3		74711	PLUG, 1-1/4	1	1	1	1
4		75656-S	BUSHING, Prop flange, long	3	4	3	4
5		72155-S	BUSHING, Prop flange, short	2	1	2	1
6		79024-S	BUSHING, Propeller flange, indexing	1		1	
		75657-S	BUSHING, Propeller flange, indexing		1		1
7		73810	BUSHING, Crankshaft counterweight	4	4	4	4
8		1102	PLUG, 1/8-27 NPT, Allen head	1	1	1	1
9		LW-14529	PLUG, 2-1/16 diameter expansion	1	1	1	1
10		LW-19227	COUNTERWEIGHT ASSY	2	2	2	2
11		71903-A	BUSHING, Dynamic counterweight	8	8	8	8
12		14W21696	ROLLER, Dynamic counterweight	2	2	2	2
13		72797	ROLLER, Dynamic counterweight, 6.3 order	2	2	2	2
14		LW-14820	RING, Internal retaining	8	8	8	8
15		71907	WASHER, Counterweight	8	8	8	8
16	❖	13S19646	GEAR, Crankshaft	1	1	1	1
17		LW-18639	LOCKPLATE, Crankshaft gear	1	1	1	1
18		STD-2246	BOLT, 5/16-24 x 1.00 long	1	1	1	1
19		LW-16471	SUPPORT ASSEMBLY, Starter ring gear	1	1	1	1
20		72566	GEAR, Starter ring, 12/14 pitch	1	1	1	1

❖ Refer to the latest revision of Service Bulletin No. 475 for proper installation.

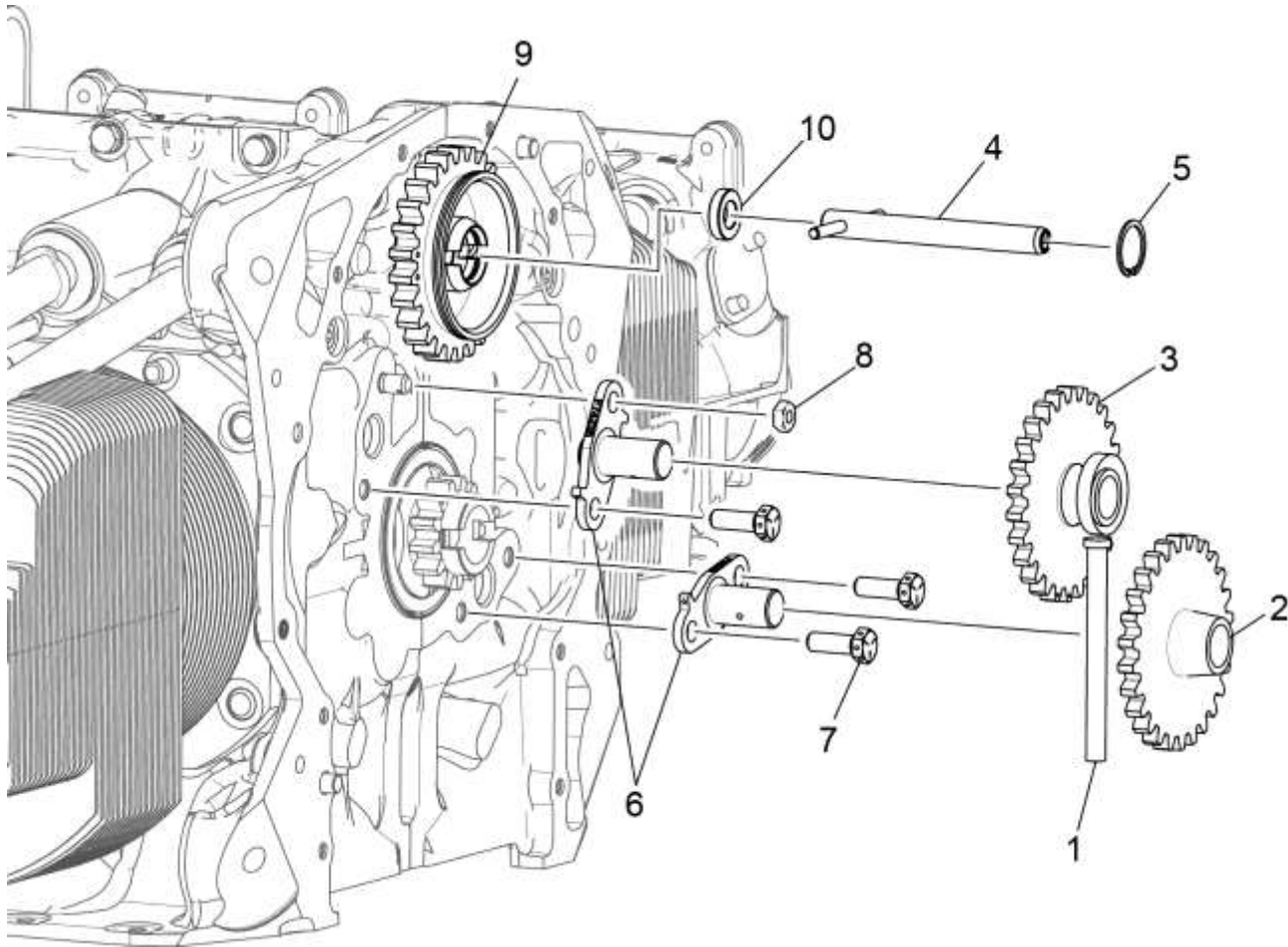


Figure 6
Crankshaft Idler Gears, Tachometer Drive, and Camshaft

POWER SECTION

Figure 6 - Crankshaft Idler Gears, Tachometer Drive, and Camshaft

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		23D26777	PLUNGER, Fuel pump, long	1	1	1	1
2		74996	GEAR ASSEMBLY, Crankshaft idler, plain	1	1	1	1
3		75072	GEAR ASSEMBLY, Crankshaft idler	1	1	1	1
4		76121	SHAFT ASSEMBLY, Tachometer	1	1		
5		STD-2231	RING, Internal retaining	1	1		
6		LW-13796	SHAFT, Crankshaft idler gear	1	1	2	2
7		LW-31H0.88	BOLT, 5/16-18 x 7/8 long, hex. head, drilled	1	1	3	3
8		STD-2168	NUT, 5/16-18 NC-3 slotted shear	1	1	1	1
9		15M23452	CAMSHAFT ASSEMBLY	1	1		
		15M23456	CAMSHAFT ASSEMBLY			1	1
10		76118	SPACER, Tachometer shaft centering	1	1	1	1

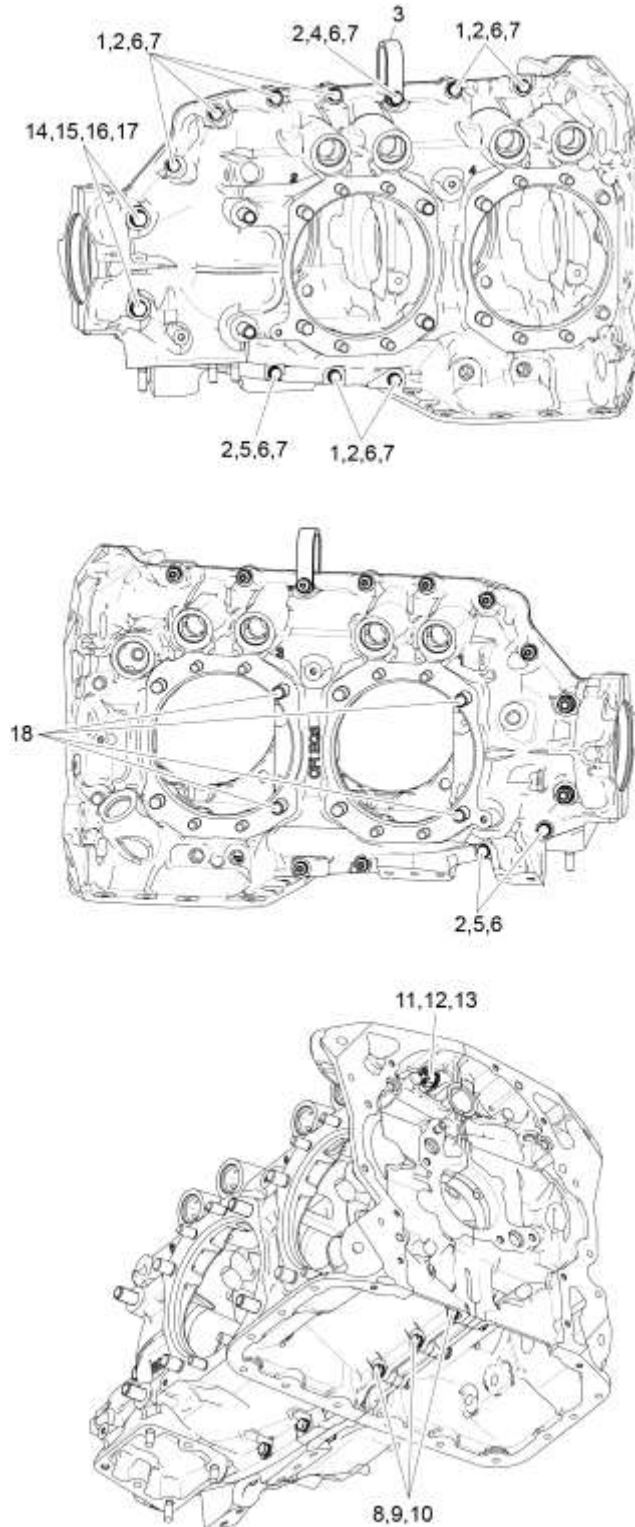


Figure 7A
Crankcase Attaching Parts (D1A6 and D3A6)

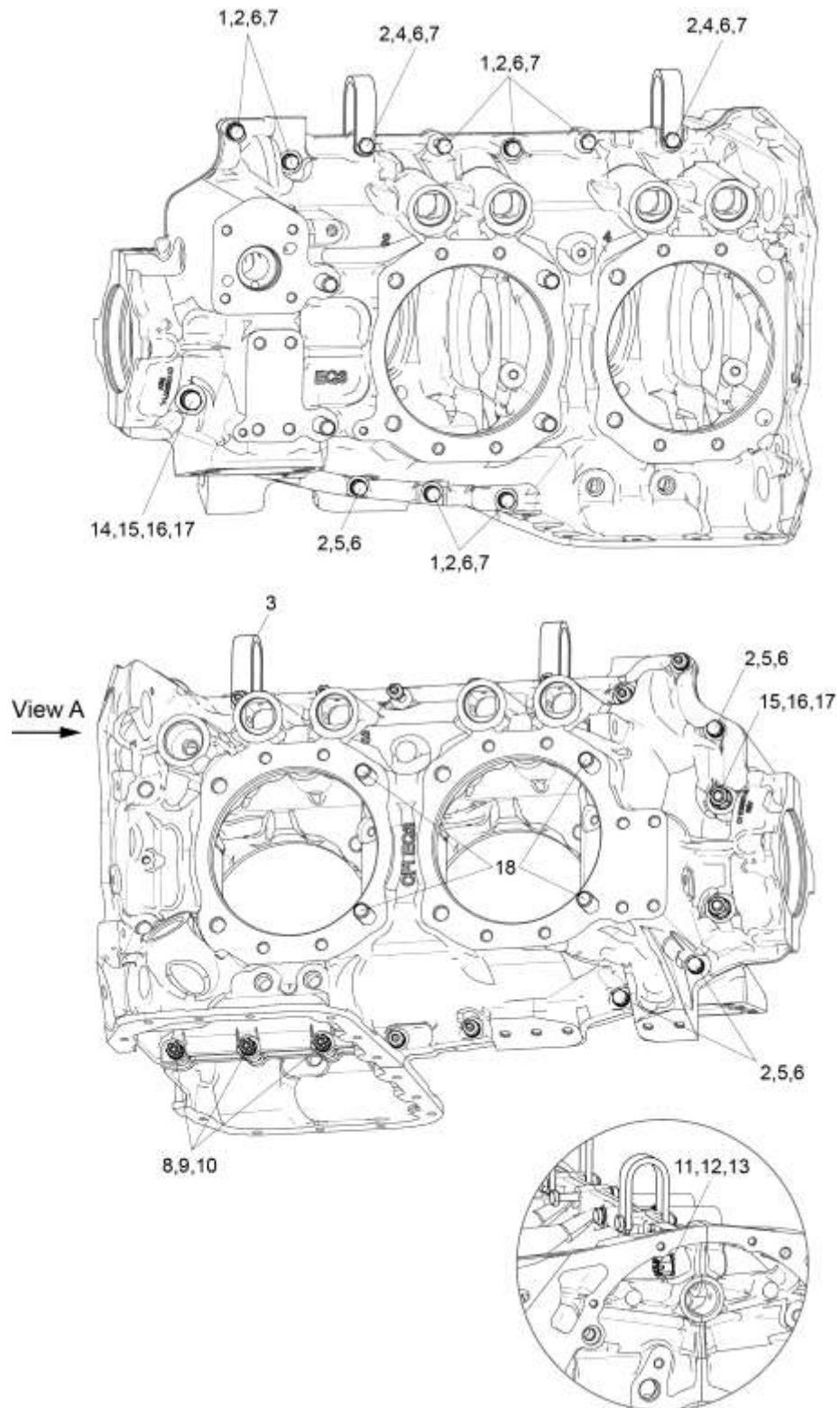


Figure 7B
Crankcase Attaching Parts (D1B6 and D3B6)

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POWER SECTION**Figure 7A and 7B - Crankcase Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		LW-25-1.50	BOLT, 1/4-20 x 1-1/2 long, hex. head	7	7	8	8
2		STD-8	WASHER, 1/4 plain	20	20	20	20
3		60803	STRAP, Lifting	2	2	1	1
4		LW-25-1.75	BOLT, 1/4-20 x 1-3/4 long, hex. head	2	2	2	2
5		LW-25-1.13	BOLT, 1/4-20 x 1-1/8 long, hex. head	4	4	4	4
6		STD-160	WASHER, 1/4 lock, internal teeth	12	12	13	13
7		STD-1411	NUT, 1/4-20 plain	9	9	9	9
8		LW-25S1.50	BOLT, 1/4-20 x 1-1/2 long, hex. head, drilled	3	3	3	3
9	AR	STD-8	WASHER, 1/4 plain	9	9	9	9
10		STD-2249	NUT, 1/4-20 slotted	3	3	3	3
11	AR	STD-33	WASHER, 3/8 plain	1	1	1	1
12	AR	AN960-616L	WASHER, 3/8 plain, thin	1	1	1	1
13		STD-872	NUT, 3/8-24 slotted	1	1	1	1
14		AN6-34A	BOLT, 3/8-24 x 3-37/64 long, hex. head	2	2	1	1
15		STD-33	WASHER, 3/8 plain	2	2	3	3
16		STD-678	WASHER, 3/8 lock, internal teeth	2	2	2	2
17		STD-596	NUT, 3/8-24 plain	2	2	2	2
18		01A22453	STUD, 1/2-20 x 10-1/2 long	4	4	4	4
AR as required							

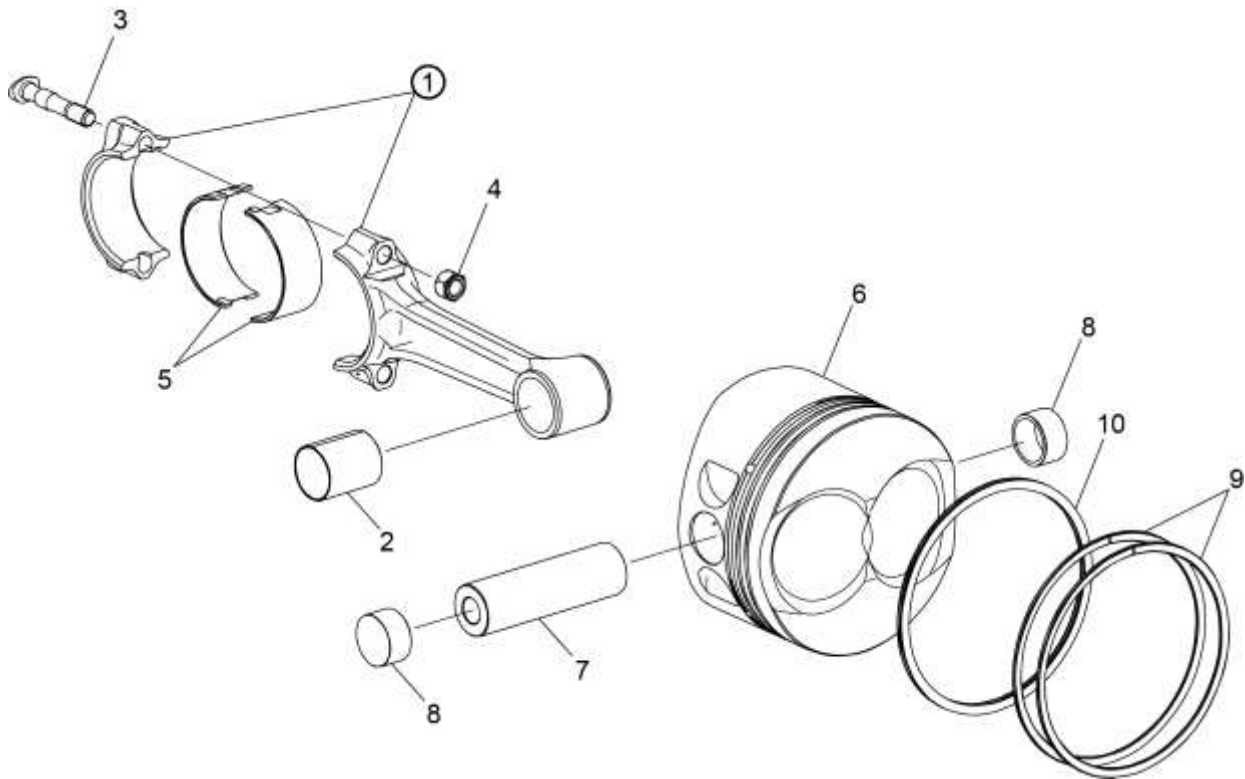


Figure 8
Connecting Rods, Pistons, and Ring Assemblies

CYLINDER SECTION**Figure 8 - Connecting Rods, Pistons, and Ring Assemblies**

Figure Item	Code	Part Number	Description	Units per Assembly
1		77450	CONNECTING ROD ASSEMBLY	4
2	❖	01K28983	BUSHING, Connecting rod, upper	4
3		75060	BOLT, Connecting rod	8
4		LW-12186	NUT, Connecting rod bolt	8
5		18M23887	BEARING, Connecting rod	8
6		14E23911	PISTON, Compression ratio 8.90:1	4
7	▲	14J22048	PIN, Piston	4
8		72198	PLUG, Piston pin	8
9		14G22050	RING, Piston compression	8
10		14H23148	RING, Piston oil regulating, expander type	4
❖ Refer to the latest revision of Lycoming Service Instruction No. 1575.				
▲ Refer to the latest revision of Lycoming Service Instruction No. 1267.				

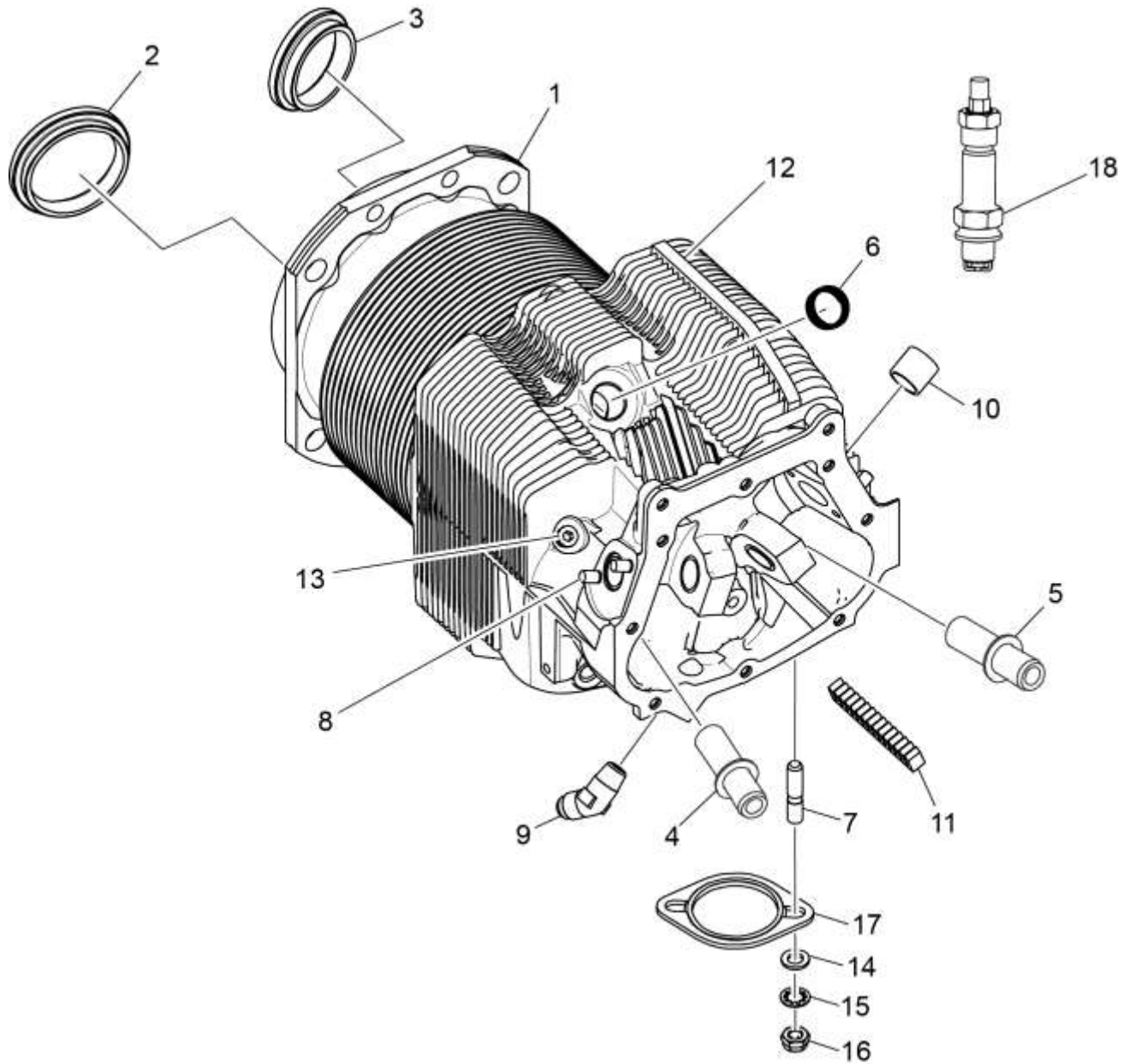


Figure 9
Cylinder Assembly and Spark Plugs

CYLINDER SECTION**Figure 9 - Cylinder Assembly and Spark Plugs**

Figure Item	Code	Part Number	Description	Units per Assembly
1		16G30180-0201	CYLINDER AND HEAD ASSEMBLY	4
2		72212	SEAT, Intake valve	4
3		16T19468	SEAT, Valve, exhaust	4
4		LW-11956	GUIDE, Valve, intake	4
5		LW-11958	GUIDE, Valve, exhaust	4
6		69260	INSERT, Spark plug, 18-1.5 MM	8
7		31C-13	STUD, 5/16-18 x 1-5/8 long	8
8		25C-8	STUD, 1/4-20 x 1.00 long	16
9		MS20823-6D	ELBOW, 45°, 3/8 flared tube	4
10		66670	BUSHING, Rocker shaft, inner	16
11		72343	STABILIZER, Cylinder head fins, 15 teeth	4
12		72344	STABILIZER, Cylinder head fins, 26 teeth	4
13		1102	PLUG, 1/8-27 NPT, Allen head	4
14		STD-35	WASHER, 5/16 plain	8
15		STD-475	WASHER, 5/16 lock, internal teeth	8
16		STD-1410	NUT, 5/16-18 plain	8
17	❖	77611	GASKET, Exhaust flange	4
18	V ▲	1182-G7	SPARK PLUG, Champion REB37E	8

❖ This part is shipped loose with the engine.
V Vendor Prime Manufacturer part
▲ Refer to the latest revision of Lycoming Service Instruction No. 1042 for a complete listing of all approved spark plugs.

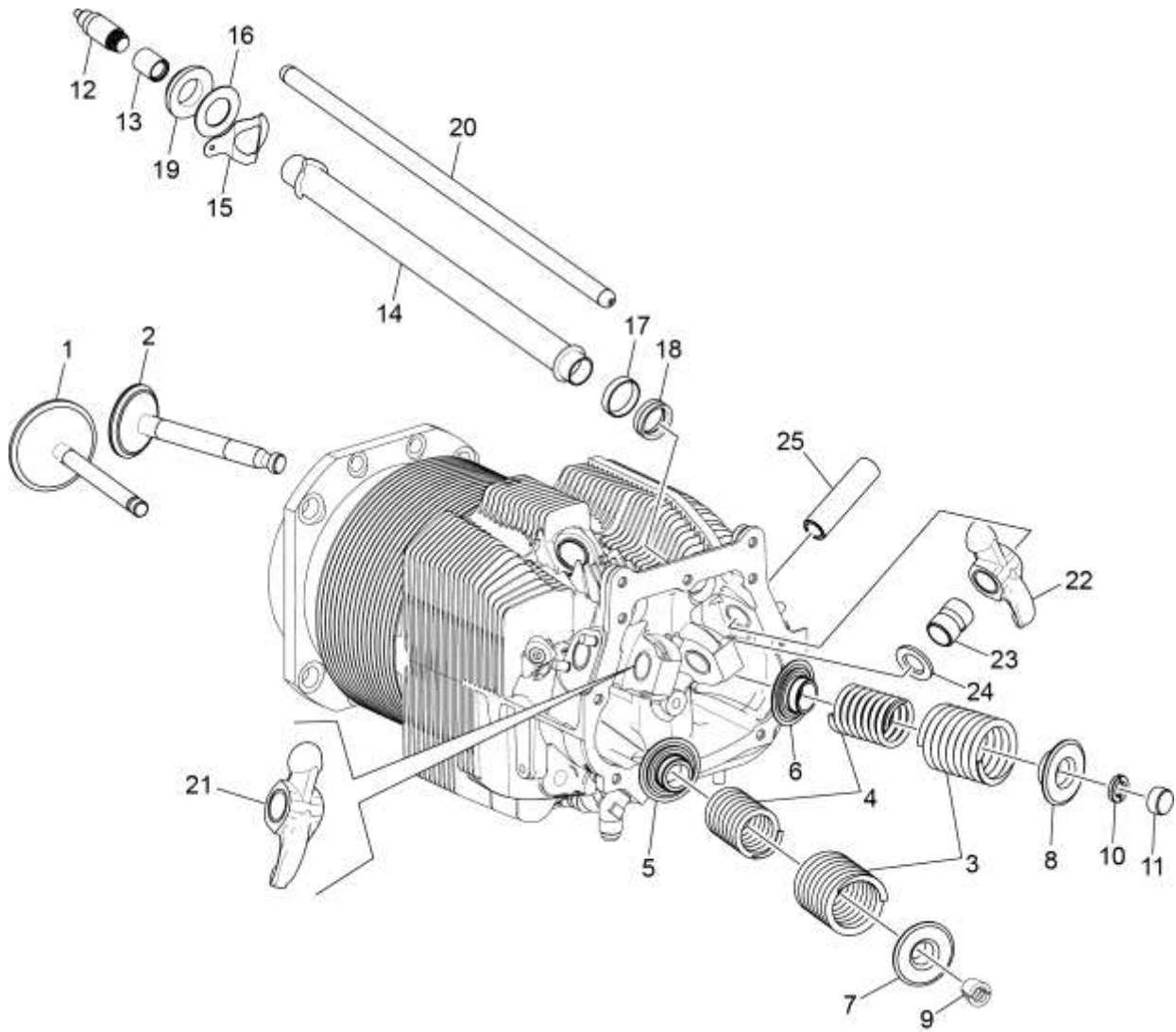


Figure 10
Valve Assembly and Related Parts

CYLINDER SECTION

Figure 10 – Valve Assembly and Related Parts

Figure Item	Code	Part Number	Description	Units per Assembly
1		17A23946	VALVE, Intake	4
2		17B23935	VALVE, Exhaust	4
3		LW-11796	SPRING, Valve, outer	8
4		LW-11797	SPRING, Valve, inner	8
5		LW-13321	SEAT, Valve spring, lower intake	4
6		LW-13322	SEAT, Valve spring, lower exhaust	4
7		LW-10077	SEAT, Valve spring, upper intake	4
8		LW-16475	SEAT, Valve spring, upper exhaust	4
9		60009	KEY, Valve, intake	8
10		17C21191	KEY, Valve, exhaust	8
11		17C19386	CAP, Valve stem, exhaust	4
12		15B26066	PLUNGER ASSEMBLY, Hydraulic tappet	8
13		15B21319	SOCKET, Hydraulic tappet	8
14		15G23462	SHROUD TUBE ASSEMBLY, Push rod	8
15		15H21201	SPRING, Shroud tube	16
16		01L23459	WASHER, 3/4 I.D. x 1-3/8 O.D. x 1/32	8
17		61503	SLEEVE, Shroud tube	8
18		LW-18661	SEAL, Shroud tube	8
19		06A23493	SEAL, Shroud tube	8
20	❖	15F28835-51	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28835-52	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28835-53	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28835-54	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28835-55	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28835-56	ROD ASSEMBLY, Push (A total of 8 required)	AR
AR As Required ❖ See latest revision of Service Instruction No. 1060 for complete push rod application				

(continued on next page)

CYLINDER SECTION
Figure 10– Valve Assembly and Related Parts (Cont.)

Figure Item	Code	Part Number	Description	Units per Assembly
20	❖	15F28864-17	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28864-18	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28864-19	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28864-20	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28864-21	ROD ASSEMBLY, Push (A total of 8 required)	AR
	❖	15F28864-22	ROD ASSEMBLY, Push (A total of 8 required)	AR
21	▲	17F21188	ROCKER ASSEMBLY, Valve, intake	4
22	▲	17F21187	ROCKER ASSEMBLY, Valve, exhaust	4
23		74389	BUSHING, Valve rocker	8
24		71549	WASHER, Thrust, valve rocker	8
25		72626	SHAFT, Valve rocker	8
AR As Required ❖ See latest revision of Service Instruction No. 1060 for complete push rod application ▲ Due to the size of the area where the part number is stamped, the last five digits (21188) could be all that is shown of the part number.				

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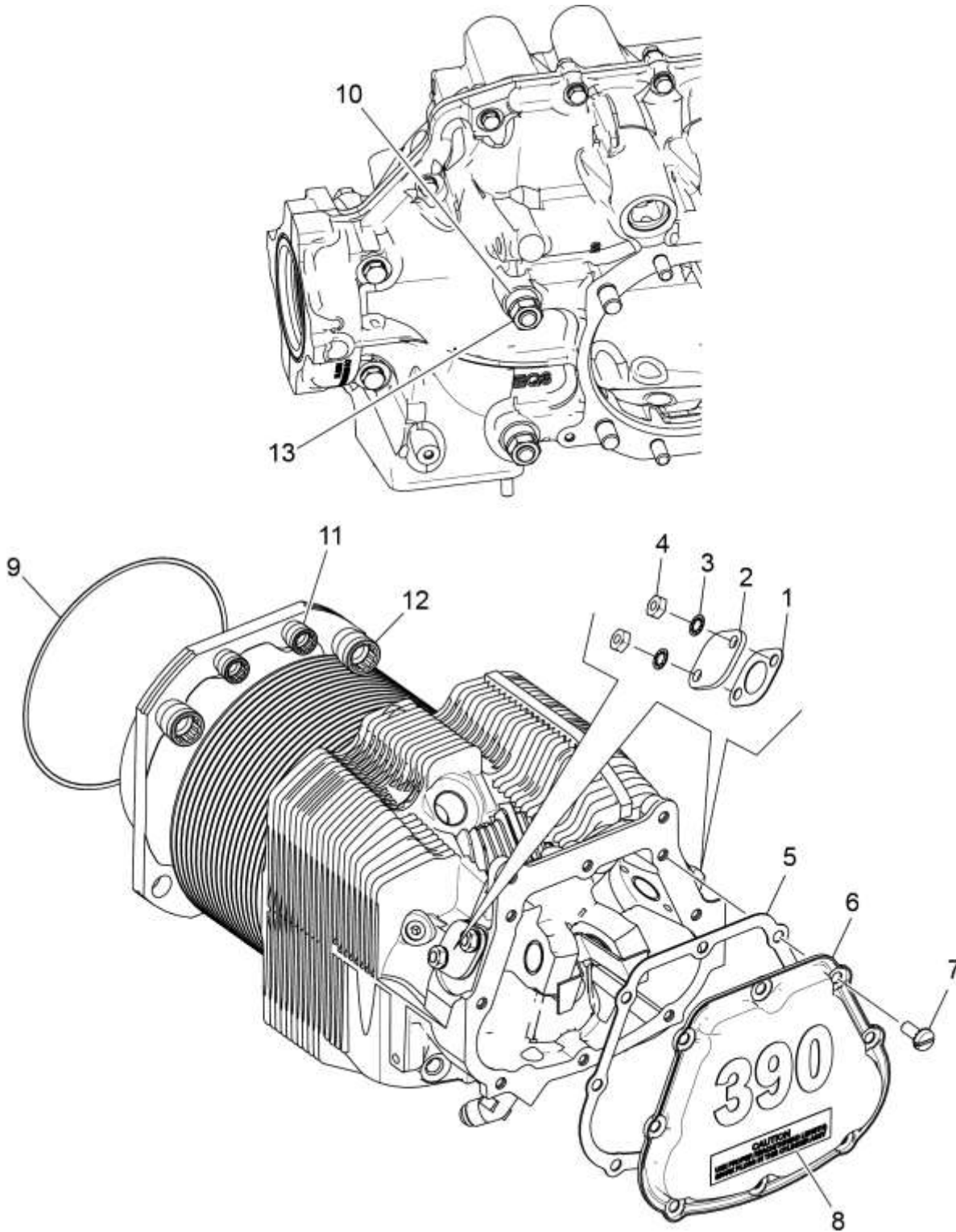


Figure 11
Cylinder Related Parts

CYLINDER SECTION**Figure 11 - Cylinder Related Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		66732	GASKET, Valve rocker shaft cover	8
2		17H28668	COVER, Valve rocker shaft	8
3		STD-160	WASHER, 1/4 lock, internal teeth	16
4		STD-1411	NUT, 1/4-20 plain	16
5		06B26811	GASKET, Rocker box cover, silicone	4
6		17J28667	COVER ASSEMBLY, Rocker box	4
7		STD-1925	SCREW, 1/4-20 x 5/8 long, pan hd., self-locking	32
8		74494	PLATE, Spark plug reach caution	4
9		71481	RING, Oil seal, 3/32 diameter x 4-27/32 long	4
10		74887	SPACER, 33/64 I.D. x 7/8 O.D. x 3/8 thick	2
11		71134	NUT, 3/8-24 NF-3	16
12		71133	NUT, 1/2-20 NF-3	16
13		STD-2090	NUT, 1/2-20 plain	2

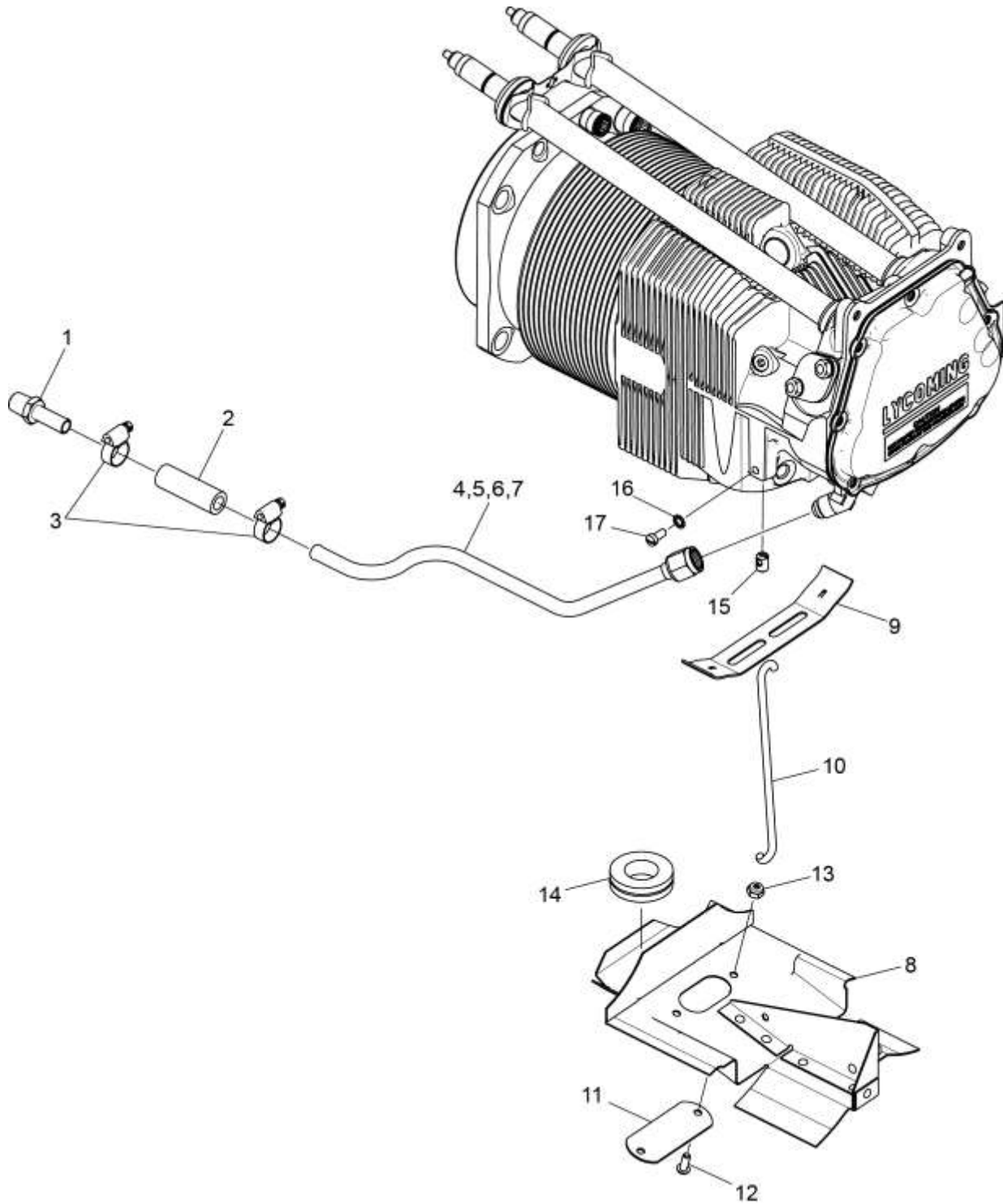


Figure 12
Cylinder Head Drain Tubes and Intercylinder Cooling Baffles

CYLINDER SECTION**Figure 12 - Cylinder Head Drain Tubes and Intercylinder Cooling Baffles**

Figure Item	Code	Part Number	Description	Units per Assembly
1		STD-684	NIPPLE, Straight, 3/8 I.D. hose	4
2		STD-2180	HOSE, 3/8 x 1-13/16 long	4
3		LW-15592-5-04	CLAMP, Hose	8
4		72702	TUBE ASSEMBLY, Cyl. head oil drain, cyl. No. 1	1
5		72703	TUBE ASSEMBLY, Cyl. head oil drain, cyl. No. 2	1
6		74808	TUBE ASSEMBLY, Cyl. head oil drain, cyl. No. 3	1
7		73027	TUBE ASSEMBLY, Cyl. head oil drain, cyl. No. 4	1
8	❖	75338	BAFFLE ASSEMBLY, Intercylinder	1
	▲	75337	BAFFLE ASSEMBLY, Intercylinder	1
9		71611	RETAINER, Intercylinder baffle	2
10		17M23284	HOOK, Intercylinder baffle retainer	2
11		72834	COVER, Baffle ignition cable hole	2
12		STD-692	SCREW, No. 10-32 x 1/2 long, round head	4
13		STD-670	LOCK NUT, No. 10-32	4
14	▲	MS35489-20X	GROMMET	1
15		65614	PLUG, Baffle attaching	4
16		STD-251	WASHER, No. 10, internal lock	4
17		STD-1686	SCREW, No. 10-32 x 7/16 long	4
❖ Install on left side cylinders No. 2 and 4				
▲ Install on right side between cylinders No. 1 and 3				

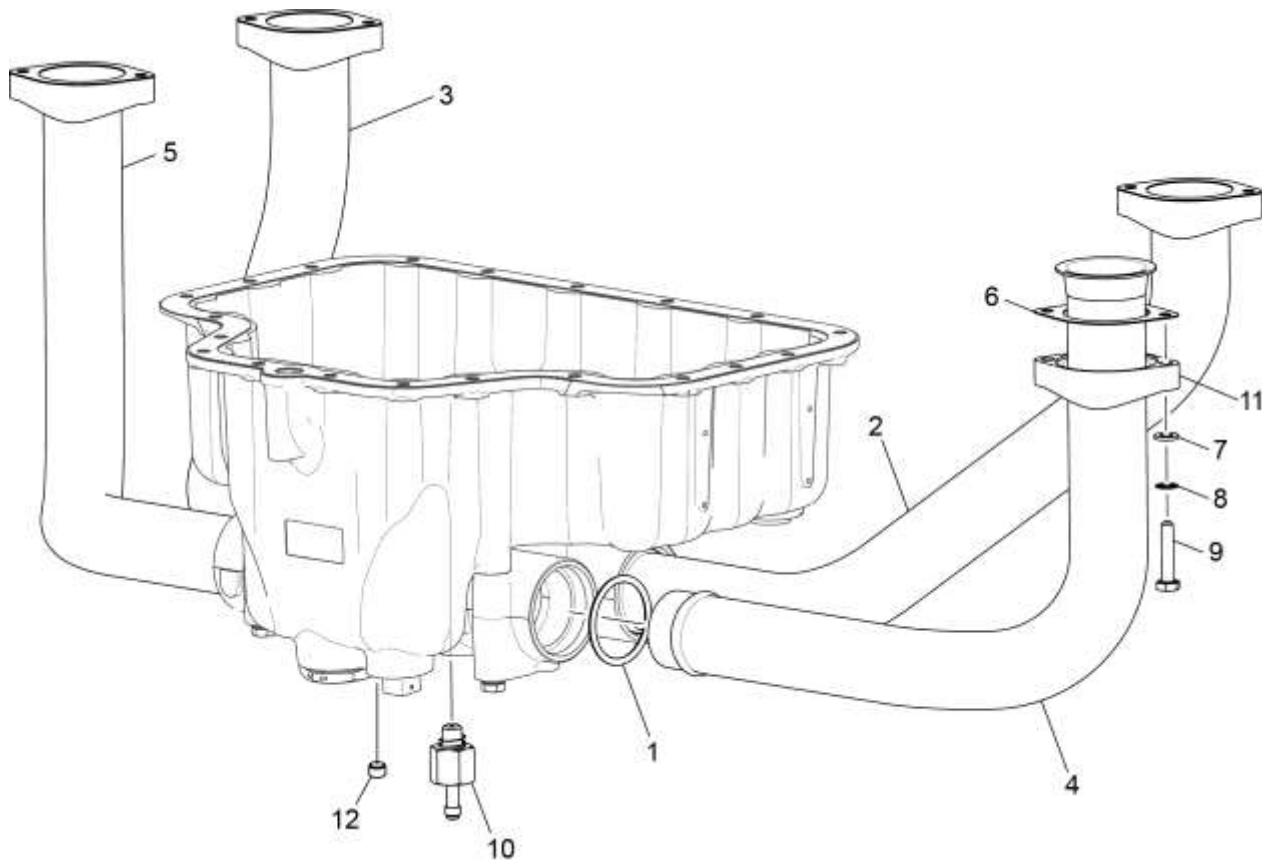


Figure 13
Intake Pipes Assembly

CYLINDER SECTION**Figure 13 – Intake Pipes Assembly**

Figure Item	Code	Part Number	Description	Units per Assembly
1		72711	SEAL, Intake pipe	4
2		42E28520	PIPE, Intake, cylinder No. 1	1
3		42E28521	PIPE, Intake, cylinder No. 2	1
4		42E28711	PIPE, Intake, cylinder No. 3	1
5		42E28523	PIPE, Intake, cylinder No. 4	1
6		71973	GASKET, 2 bolt flange, 1-3/4 I.D.	4
7		STD-8	WASHER, 1/4 plain	8
8		STD-160	WASHER, 1/4 lock, internal teeth	8
9		LW-25-1.25	BOLT, 1/4-20 x 1-1/4 long, hex. head	8
10		LW-13807	ADAPTER ASSEMBLY, Fuel drain valve	1
11		74360	FLANGE, Intake pipe, upper	4
12		1102	PLUG, 1/8-27 NPT, Allen head	2

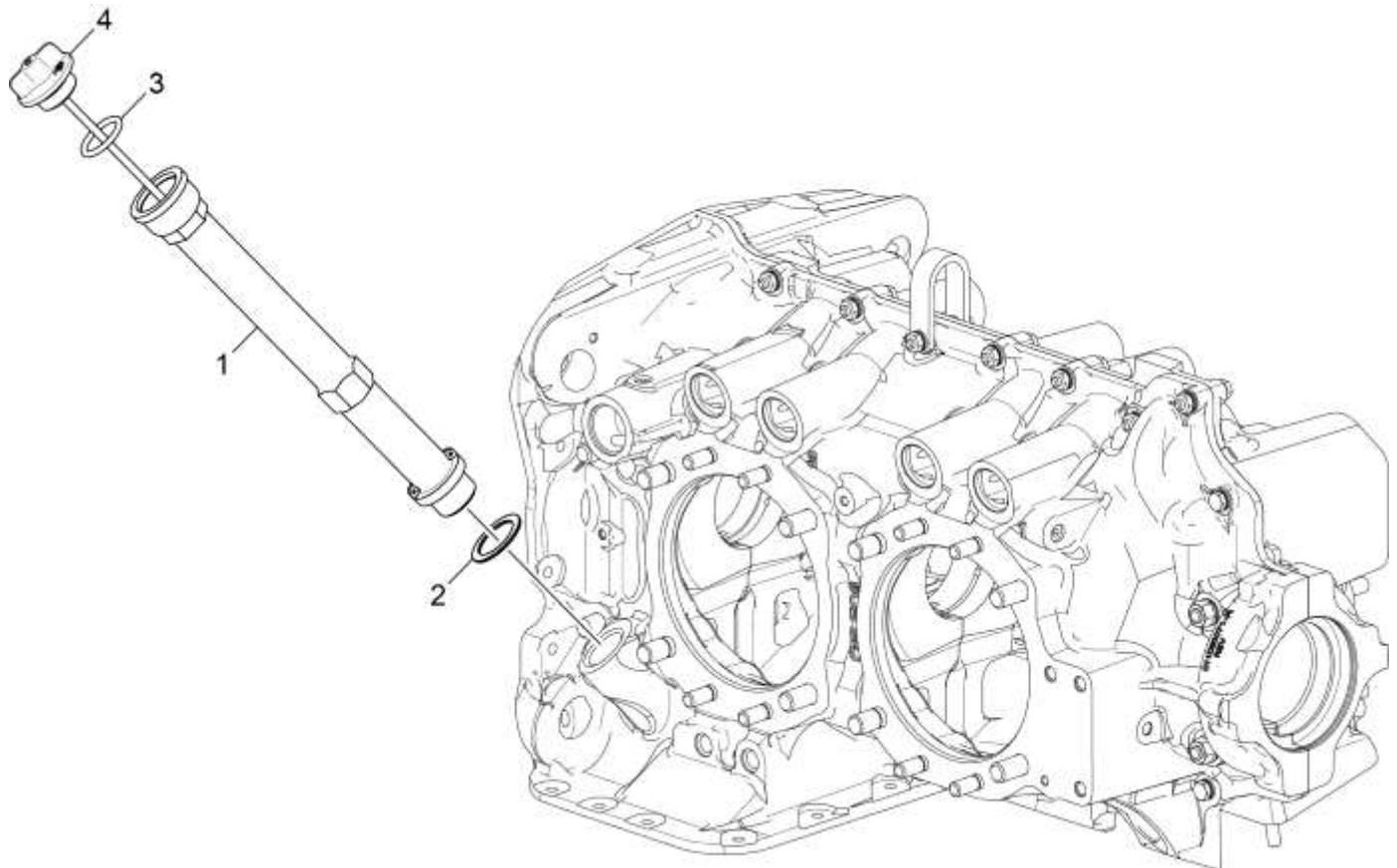


Figure 14
Oil Level Gage

LUBRICATION SYSTEM**Figure 14 - Oil Level Gage**

Figure Item	Code	Part Number	Description	Units per Assembly
1		75736	TUBE, Oil level gage	1
2		72059	GASKET, Oil level gage	1
3		74068	O-RING, Oil level gage	1
4		56C23681	GAGE ASSEMBLY, Oil level	1

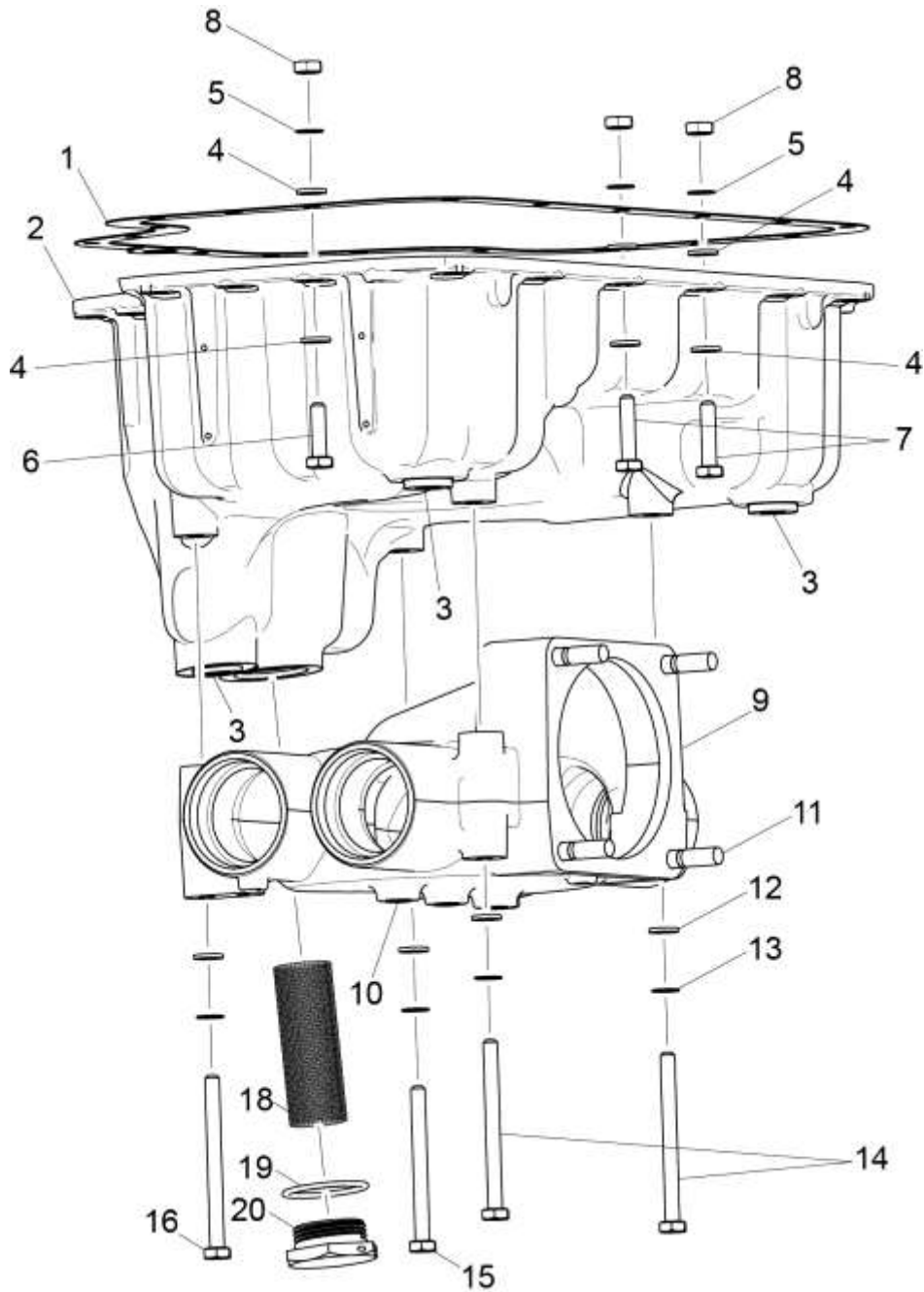


Figure 15
Oil Sump Assembly and Oil Suction Screen

LUBRICATION SYSTEM**Figure 15 – Oil Sump Assembly and Oil Suction Screen**

Figure Item	Code	Part Number	Description	Units per Assembly
1		LW-13353	GASKET, Oil sump	1
2		56B28543	SUMP ASSEMBLY, Oil	1
3		STD-2229	PLUG, 1/2 NPT, Allen head	3
4		STD-8	WASHER, 1/4 plain	32
5		STD-160	WASHER, 1/4 lock, internal teeth	20
6		LW-25-0.94	BOLT, 1/4-20 x 15/16 long, hex. head	18
7		LW-25-1.13	BOLT, 1/4-20 x 1-1/8 long, hex. head	2
8		STD-1411	NUT, 1/4-20 plain	12
9		42A28545	HOUSING ASSEMBLY, Induction	1
10		1102	PLUG, 1/8-27 NPT, Allen head	2
11		31C-14	STUD, 5/16-18 x 1-3/4 long	4
12		STD-8	WASHER, 1/4 plain	4
13		STD-160	WASHER, 1/4 lock, internal teeth	4
14		LW-25-2.94	BOLT, 1/4-20 x 2-15/16 long, hex. head	2
15		LW-25-2.69	BOLT, 1/4-20 x 2-11/16 long, hex. head	1
16		LW-25-3.00	BOLT, 1/4-20 x 3.00 long, hex. head	1
17		73152	BRACKET, Support clamp	6
18		61378	SCREEN, Oil suction	1
19		06E19769-1.25	GASKET, Annular, 1-1/4 I.D.	1
20		61358	PLUG, 1-1/2 hex. x 1-1/4-12	1

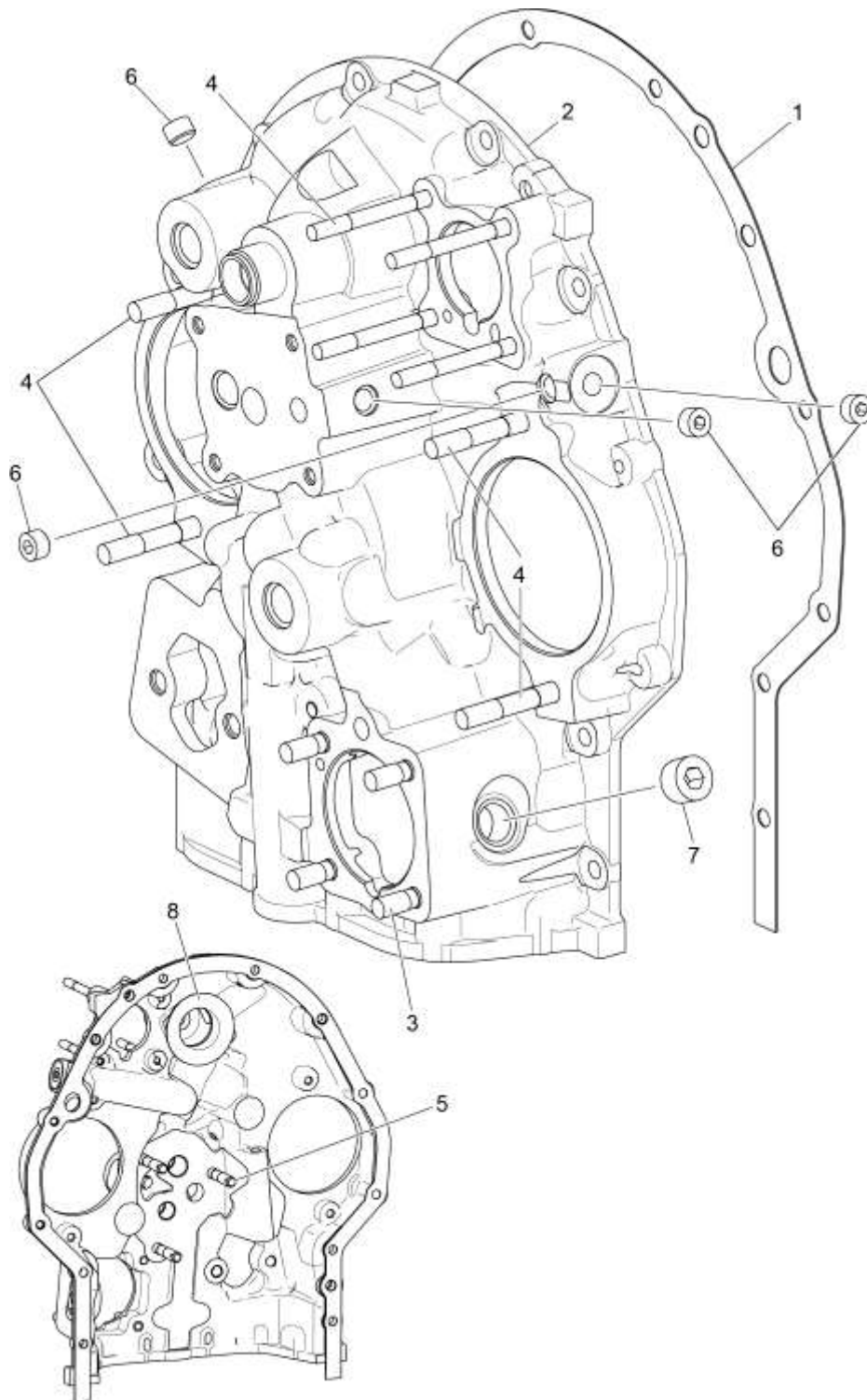


Figure 16A
Accessory Housing Assembly (D1A6 and D3A6)

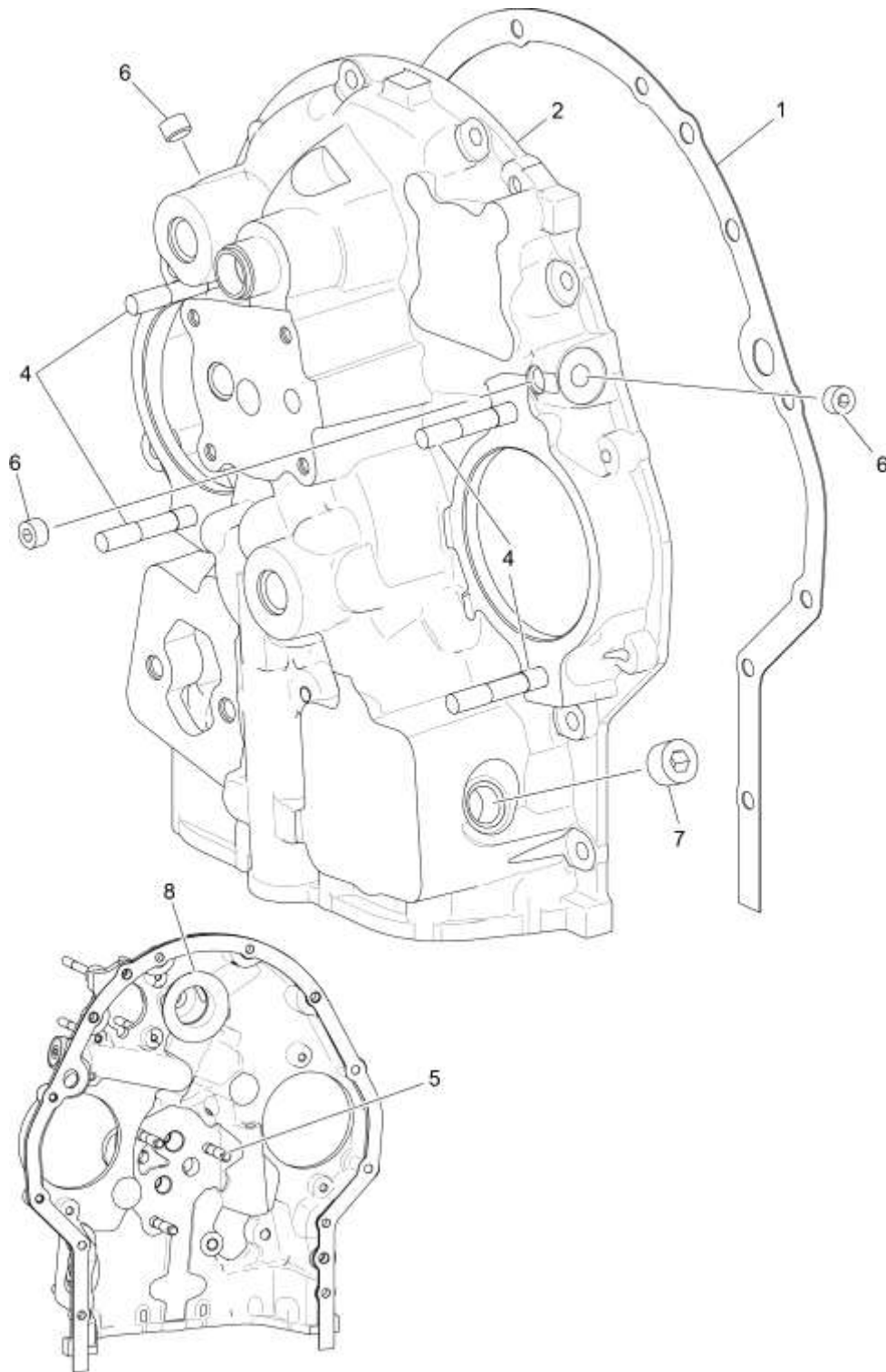


Figure 16B
Accessory Housing Assembly (D1B6 and D3B6)

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ACCESSORY DRIVES
Figure 16A and 16B – Accessory Housing Assembly

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		73818	GASKET, Accessory housing	1	1	1	1
2		21A29093-01	ACCESSORY HOUSING ASSEMBLY, Studding			1	1
	❖	21A21533-30	ACCESSORY HOUSING ASSEMBLY, Studding	1	1		
3	❖	61400	STUD, 1/4-20 x 1-3/16 long	4	4		
4		31C-12	STUD, 5/16-18 x 1-1/2 long	8	8	4	4
5		31CD-17	STUD, 5/16-18 x 2-1/8 long drilled	3	3	3	3
6		1102	PLUG, 1/8-27 NPT, Allen head	4	4	3	3
7		STD-784	PLUG, 3/8-18 NPT, Allen head	1	1	1	1
8		76119	SHIELD, Accessory breather oil	1	1	1	1
❖ Accessory Housing with optional accessory drive pads							

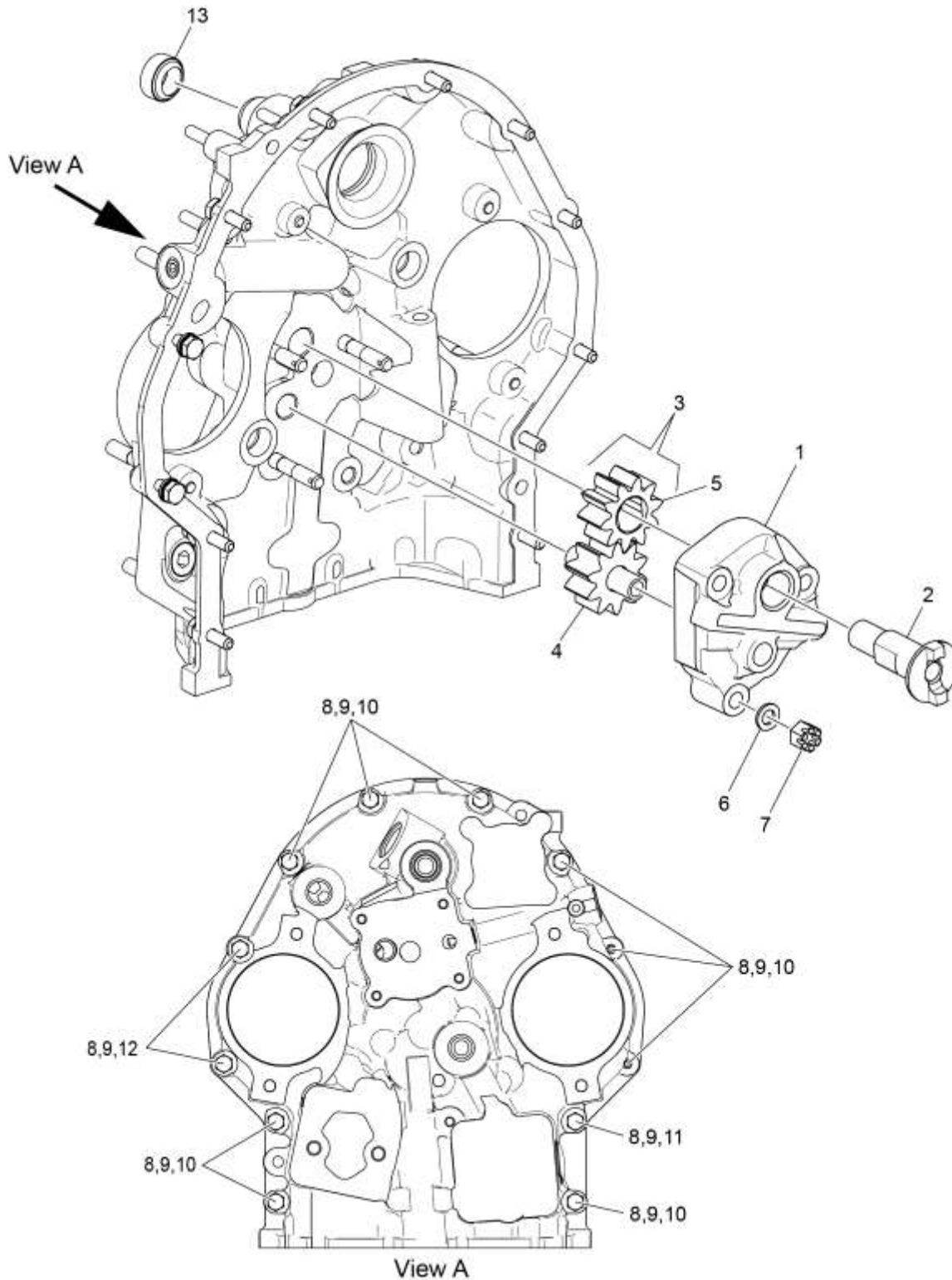


Figure 17
Oil Pump Assembly and Accessory Housing Attaching Parts

ACCESSORY DRIVES**Figure 17 – Oil Pump Assembly and Accessory Housing Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		51F28531	BODY ASSEMBLY, Oil pump	1
2		61174	SHAFT, Oil pump drive	1
3		05K19423-S	IMPELLER KIT	1
4		LW-18110	IMPELLER ASSEMBLY, Oil pump driven	1
5		LW-18109	IMPELLER, Oil pump driven	1
6		STD-35	WASHER, 5/16 plain	3
7		STD-1420	NUT, 5/16-18 slotted	3
8		STD-8	WASHER, 1/4 plain	12
9		STD-160	WASHER, 1/4 lock, internal teeth	12
10		LW-25-0.94	BOLT, 1/4-20 x 15/16 long, hex. head	9
11		LW-25-1.13	BOLT, 1/4-20 x 1-1/8 long, hex. head	1
12		LW-25-1.44	BOLT, 1/4-20 x 1-7/16 long, hex. head	2
13	❖	LW-14260	SEAL, Tachometer drive, oil	1
❖ Accessory Housing configured for optional tachometer shaft				

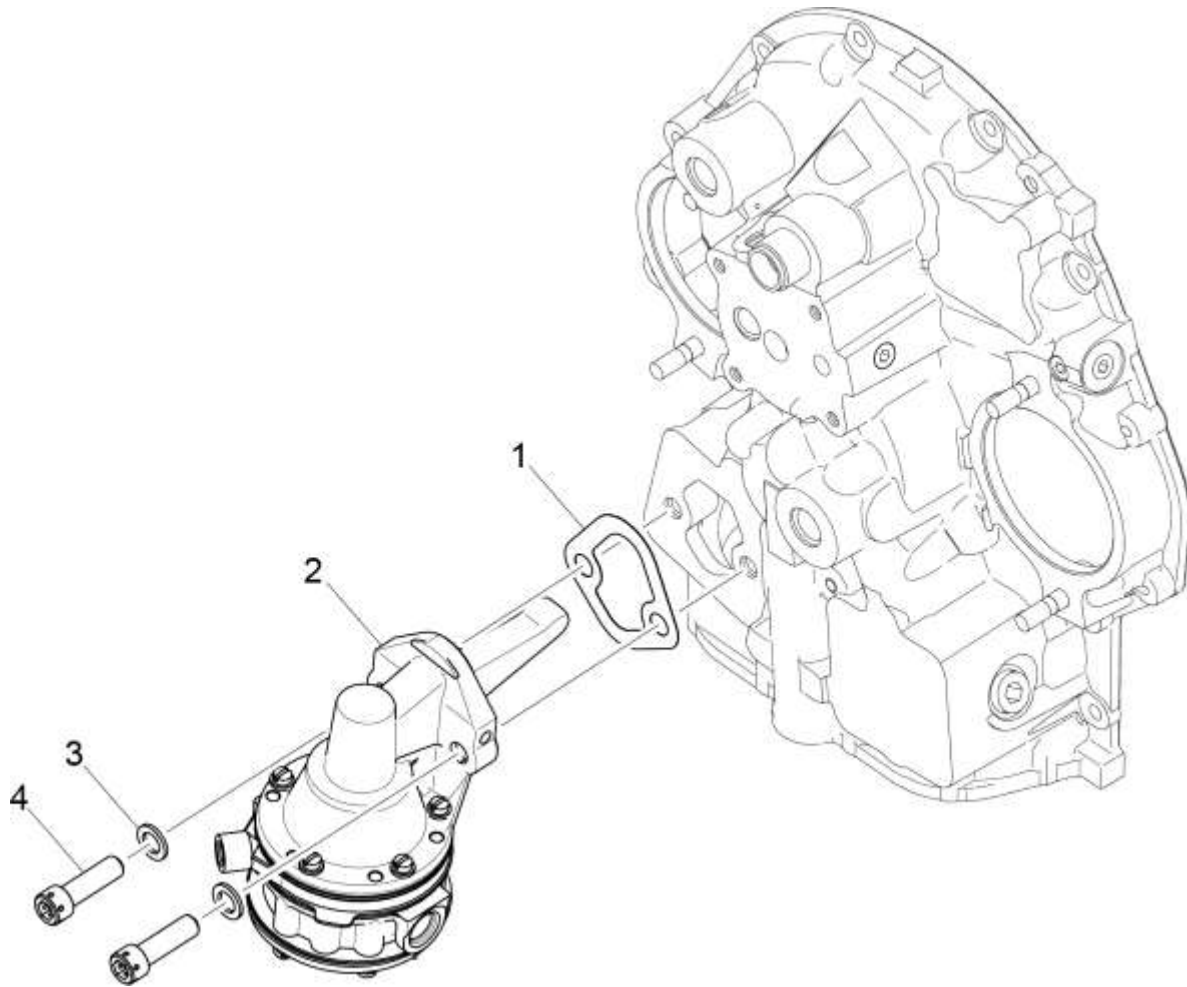


Figure 18
Fuel Pump and Attaching Parts

ACCESSORY DRIVES**Figure 18 - Fuel Pump and Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		60096	GASKET, Fuel pump	1
2		62B26931	FUEL PUMP, High Pressure	1
3		STD-33	WASHER, 3/8 plain	2
4		STD-1882	SCREW, 3/8-16 x 1-9/32 long, socket head, drilled	2

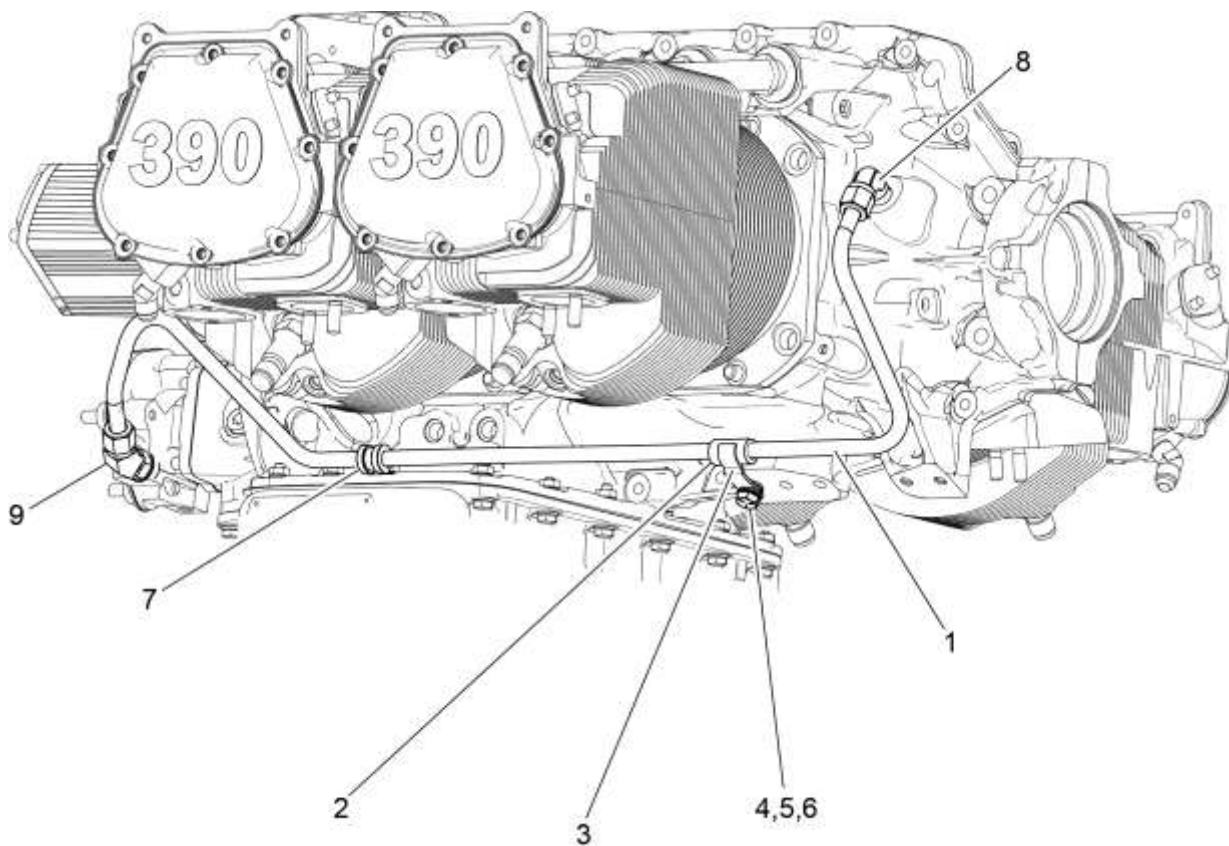


Figure 19
Propeller Governor Oil Line Tube Assembly and Attaching Parts

ACCESSORY DRIVES**Figure 19 - Propeller Governor Oil Line Tube Assembly and Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		75167	TUBE ASSEMBLY, Propeller governor oil line	1	1		
2		STD-1930	HOSE, 3/8 I.D. x 1.00 long	1	1		
3		75165	CLIP, Propeller governor oil line support	1	1		
4		STD-35	WASHER, 5/16 plain	3	3		
5		STD-475	WASHER, 5/16 lock, internal teeth	1	1		
6		LW-31-0.94	BOLT, 5/16-18 x 15/16 long, hex. head	1	1		
7		LW-16266-25-38	CLAMP, 3/8 I.D. x 1/4 diameter screw	1	1		
8		MS20822-6	ELBOW, 1/4 NPT to 3/8 flared tube, 90°	1	1		
9		74070	ELBOW, 3/8 flared tube and 9/16-18	1	1		

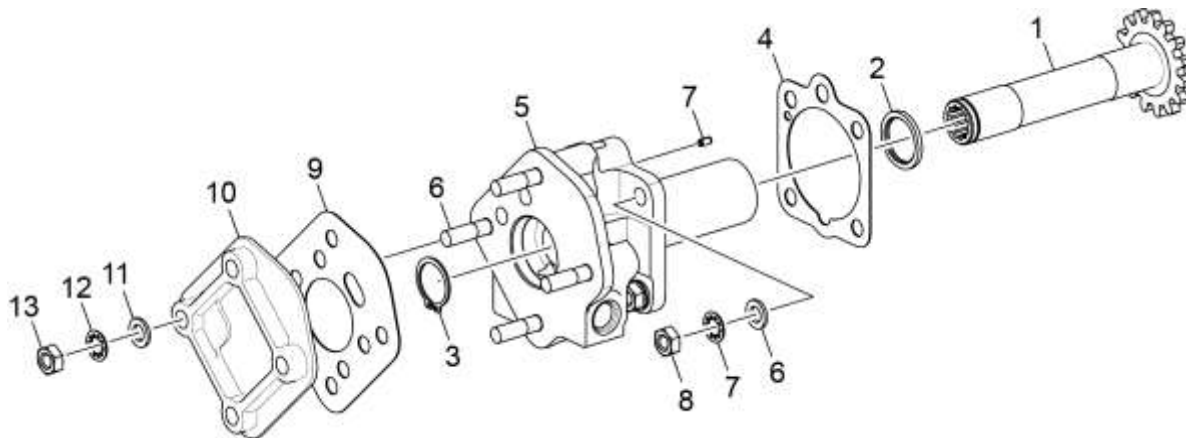


Figure 20
Propeller Governor Drive (Rear) and Cover

ACCESSORY DRIVES**Figure 20 – Propeller Governor Drive (Rear) and Cover**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		68317	SHAFTGEAR, Propeller Governor Drive	1	1		
2		71596	WASHER, Accessory drive gear	1	1		
3		STD-1221	RING, 13/16 diameter x 1/32 thick	1	1		
4		68315	GASKET, Accessory drive adapter	1	1		
5		75153	ADAPTER ASSY., Propeller gov. drive (with studs)	1	1		
6		STD-35	WASHER, 5/16 plain	4	4		
7		STD-475	WASHER, 5/16 lock, internal teeth	4	4		
8		STD-1410	NUT, 5/16-18 plain	4	4		
9		72053	GASKET, Governor	1	1		
10		72378	COVER, Governor drive	1	1		
11		STD-35	WASHER, 5/16 plain	4	4		
12		STD-475	WASHER, 5/16 lock, internal teeth	4	4		
13		STD-1410	NUT, 5/16-18 plain	4	4		

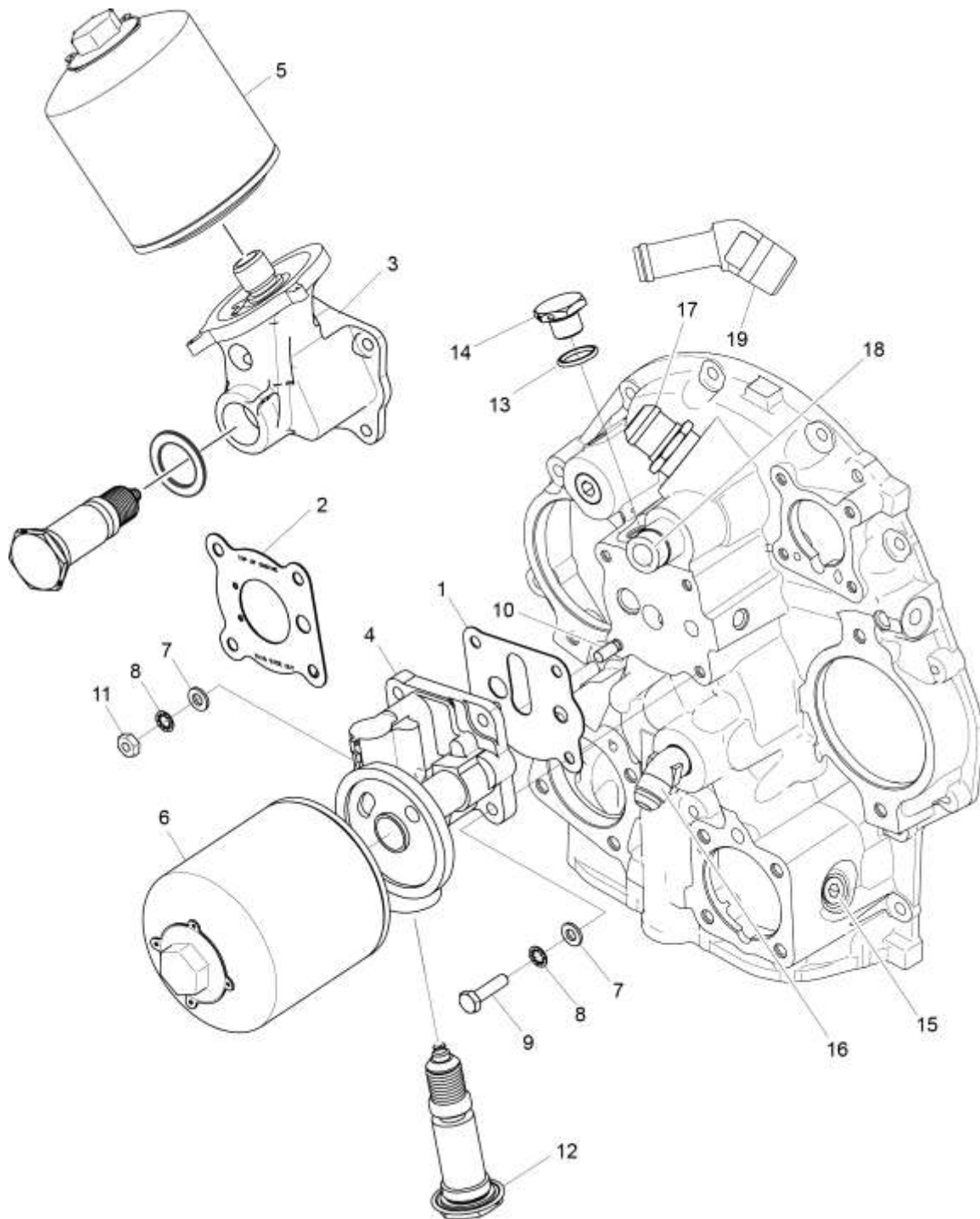


Figure 21
Oil Filter Assembly, Oil Cooler Bypass Valve, and Fittings

ACCESSORY DRIVES**Figure 21 – Oil Filter Assembly, Oil Cooler Bypass Valve, and Fittings**

Figure Item	Code	Part Number	Description	Units per Assembly			
				D 1 A 6	D 3 A 6	D 1 B 6	D 3 B 6
1		61173	GASKET, Oil pressure housing				1
2	*	06B23862	GASKET, Oil filter adapter	2	2	2	
3		54B28395	OIL FILTER ADAPTER BASE ASSEMBLY				1
4		77852	OIL FILTER BASE ASSEMBLY	1	1	1	
5		54D28353	OIL FILTER, Short, CH48108-1				1
6		LW-13215	OIL FILTER, Short, CH48110-1	1	1	1	
7		STD-8	WASHER, 1/4 plain	4	4	4	4
8		STD-160	WASHER, 1/4 lock, internal teeth	4	4	4	4
9		LW-25-1.00	BOLT, 1/4-20 x 1.00 long, hex. head	3	3	3	4
10		25C-10	STUD, 1/4-20 x 1-1/4 long	1	1	1	
11		STD-1411	NUT, 1/4-20 plain	1	1	1	
12		53E22144	VALVE ASSEMBLY, Temp. control, oil cooler	1	1	1	1
13		06E19769-0.63	GASKET, Annular, 5/8 I.D.				1
14		62417	PLUG, Oil cooler bypass	1	1	1	1
15		STD-784	PLUG, 3/8-18 NPT, allen head	1	1	1	
16		MS20823-8	ELBOW, 3/8 NPT, 1/2 flared tube	1	1	1	
17		MS20823-8D	ELBOW, 1/2 flared tube and 3/8				1
18		AN816-8D	NIPPLE, 3/8 ANPT to 1/2 tube				1
19		AN844-10D	ELBOW, Pipe	1	1	1	

* One of the oil filter adapter gaskets P/N 06B23862 is shipped loose with the engine.

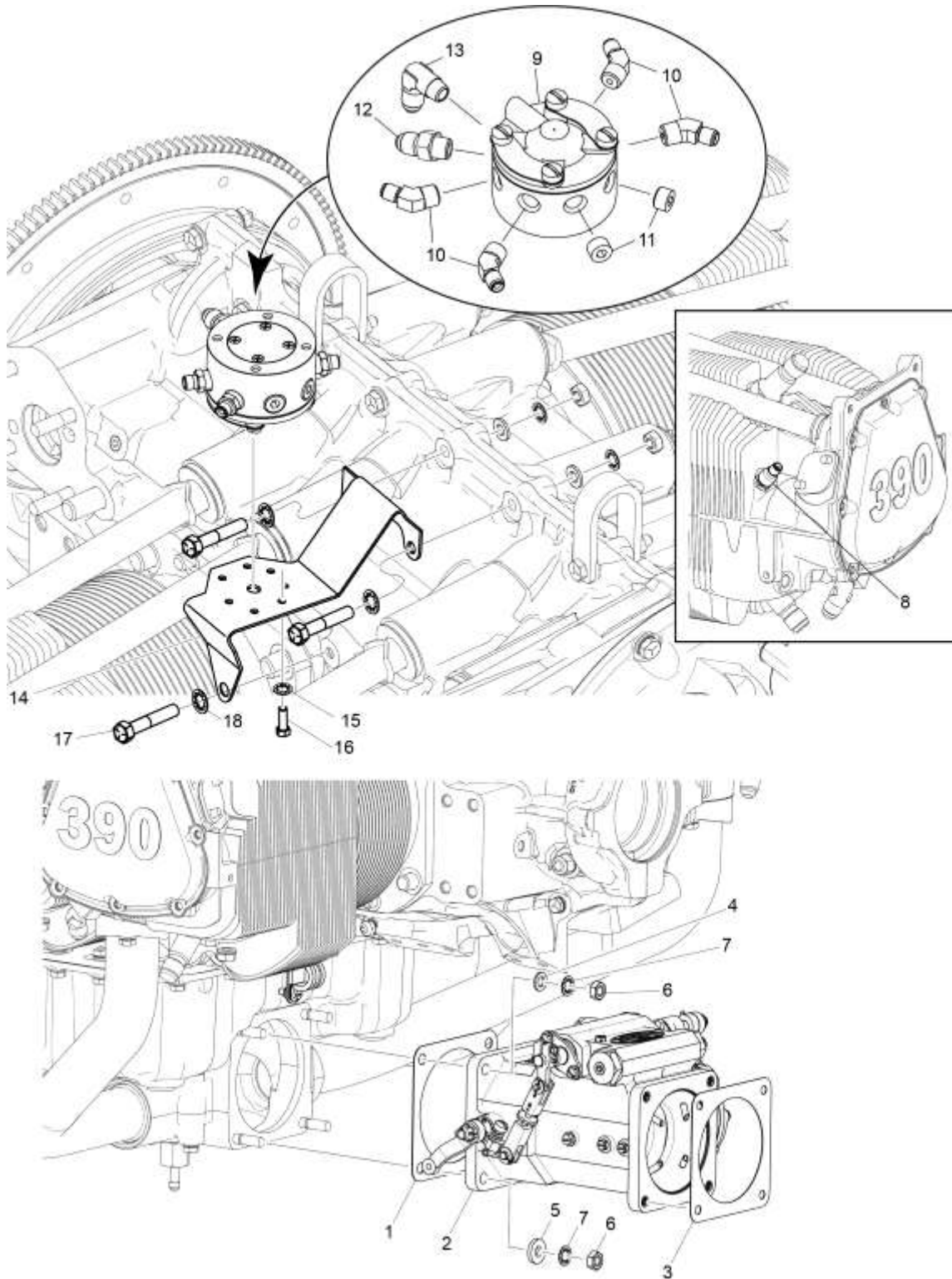


Figure 22
Fuel Injector, Fuel Manifold Assembly, and Brackets

FUEL DISTRIBUTION**Figure 22 – Fuel Injector, Fuel Manifold Assembly, and Brackets**

Figure Item	Code	Part Number	Description	Units per Assembly
1		73032	GASKET, Air Inlet housing	1
2		61M29432	FUEL INJECTOR, LFR-NNSM10	1
3		06B28651	GASKET, Air Inlet housing	1
4		STD-35	WASHER, 5/16 plain	2
5		STD-1727	WASHER, Plain, 0.33 ID X 3/4 OD	2
6		STD-1410	NUT, 5/16-18 plain	4
7		STD-475	WASHER, 5/16 lock, internal teeth	4
8		63C26450	NOZZLE, Injection, low, AV 2524864-2	4
9		63B26702	MANIFOLD ASSEMBLY, Fuel	1
10		AN791-2	NIPPLE, 1/8 NPT to 1/4 tube	4
11		1102	PLUG, 1/8-27 NPT, Allen head	2
12		02G21382	NIPPLE, Nozzle pressure gage	1
13		MS20822-4	ELBOW, 1/8 NPT to 1/4 tube, 90°	1
14		75009	BRACKET, Fuel manifold	1
15		STD-251	WASHER, No. 10, internal lock	4
16		STD-82	SCREW, No. 10-24 x 1/2 long, fill. head	4
17		LW-25-0.50	BOLT-.250-20 X 1/2 LONG HEX	1
18		STD-160	WASHER-.250 LOCK INT.TEETH	1

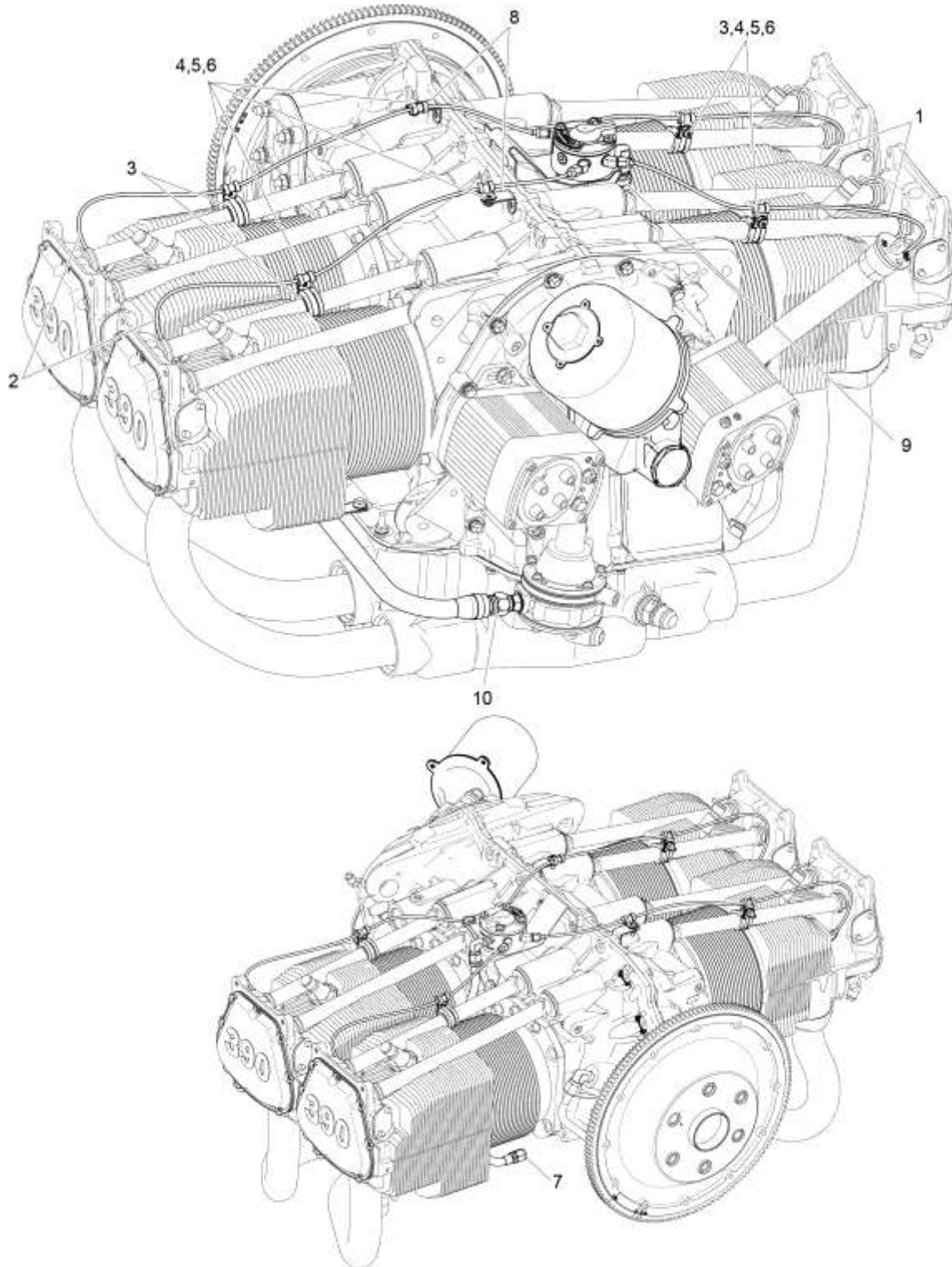
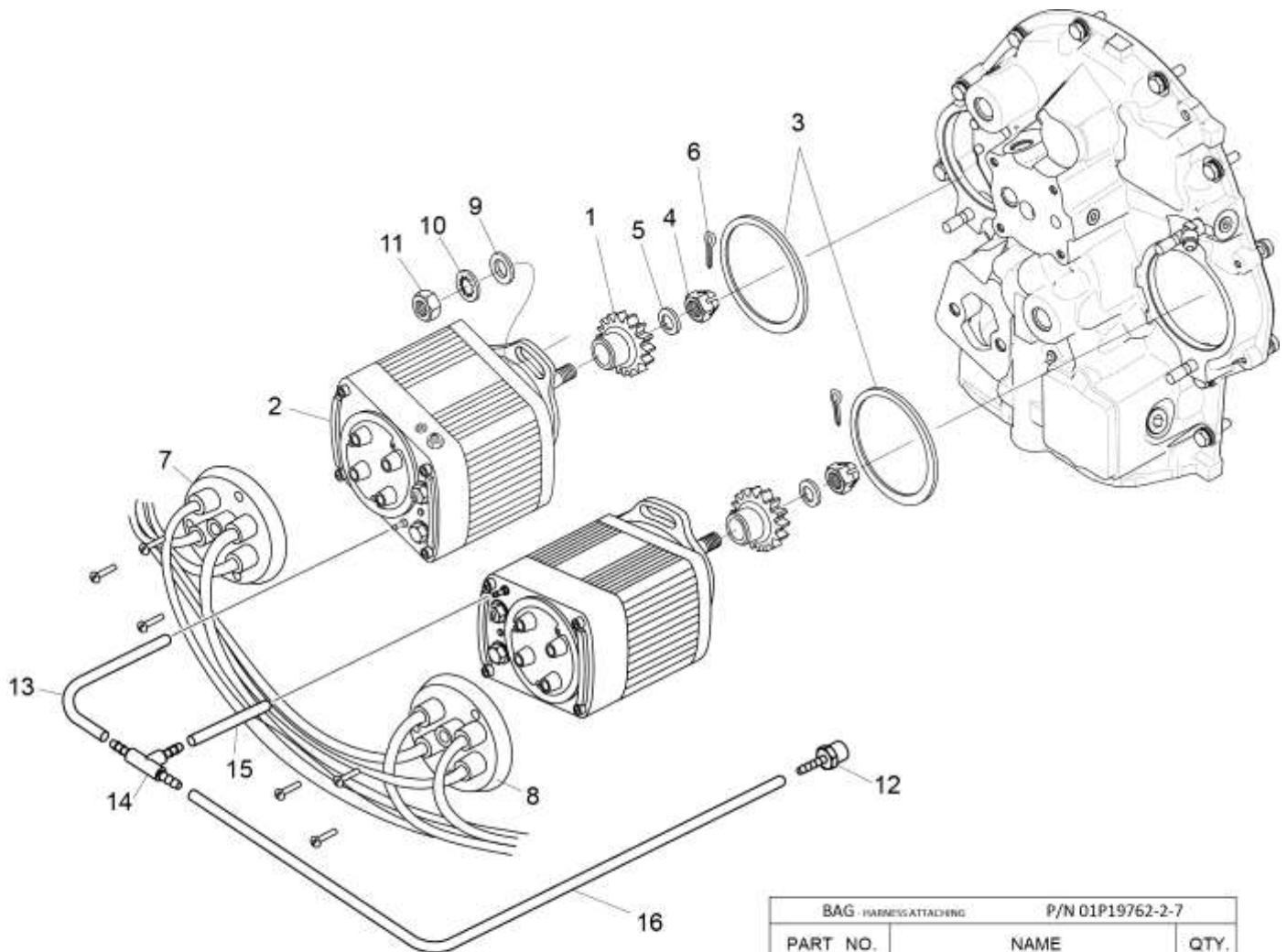


Figure 23
Fuel Lines, Fuel Hoses, and Attaching Parts

FUEL DISTRIBUTION**Figure 23 – Fuel Lines, Fuel Hoses, and Attaching Part**

Figure Item	Code	Part Number	Description	Units per Assembly
1		LW-12098-0-140	TUBE ASSEMBLY, Fuel	2
2		LW-12098-0-210	TUBE ASSEMBLY, Fuel injector line	2
3		LW-16266-10-75	CLAMP	4
4		LW-16266-10-13	CLAMP, 1/8 diameter for No.10 screw	6
5		STD-860	SCREW, No. 10-32 x 5/8 long, fill. head	6
6		STD-670	LOCK NUT, No. 10-32	6
7		LW-16561	NIPPLE, 3/8 flared tube, 9/16-18	1
8		73136	BRACKET, Extension, fuel injector	2
9		02M28686-4S230	HOSE ASSY, Teflon 1/4 hose, 90 el. w/ str. fit.	1
10		LW-16562	NIPPLE, 3/8 flared tube, 9/16-18	2



BAG - HARNESS/ATTACHING		P/N 01P19762-2-7
PART NO.	NAME	QTY.
LW-18266-25-25	CLAMP - ONE WIRE	4
LW-14060	CLIP - TWO WIRE	4
STD-8	WASHER - .250 PLAIN	8
STD-1874	SCREW - .250-20 X .81 LG. FIL. FILL.	4
76734	ZIP STRAP	12
LW-18266-25-50	CLAMP	3
STD-1411	NUT - .250-20 PLAIN	1
STD-606	WASHER - .250 PLAIN (THIN)	4
STD-1916	SCREW - .250-20 X 1.13 LG. FIL. HD.	1
STD-1925	SCREW - .250-20 X .63 LG. PAN. HD.	2
72815	BRACKET - SUPPORT CLAMP - 90 DEGRE.	3
73152	BRACKET - SUPPORT CLAMP	2
STD-692	SCREW - #10-32 X .50 LG. RD. HD.	5
STD-425	WASHER - #10 PLAIN	5
STD-670	LOCK NUT - #10-32	5
LW-M-2375	SET OF 2 PLATES - SPARK PLUG CABLE - 2 WIRE	2

Figure 24
Electronic Ignition System (EIS), Magneto Drives, and Harnesses,

DISTRIBUTION**Figure 24 – Electronic Ignition System (EIS), Magneto Drives, and Harnesses**

Figure Item	Code	Part Number	Description	Units per Assembly
1		68C19622	GEAR, Magneto	2
2		66K4A3SN-04	EIS, 4-cyl, variable, angle head	2
3		AS3582-150	O-RING, EIS	2
4		AN310-6	NUT, 3/8-24n NF-3 (castellated)	2
5		MS15795-813B	WASHER, 3/8 ID X 7/8 OD X 0.083, blk. oxide	2
6		MS24665-283	COTTER PIN, 3/32 diameter x 3/4 long	2
7	V	67P20413	HARNESS ASSEMBLY, Slick, Left, V M4019	1
8	V	67P20412	HARNESS ASSEMBLY, Slick, Right, V M4020	1
9		STD-1727	WASHER, Plain, 0.33 ID X 3/4 OD	4
10		STD-475	WASHER, 5/16 lock, internal teeth	4
11		STD-1410	NUT, 5/16-18 plain	4
12	▲	02A26993-CT	FITTING, barbed, adapter, 1/8 OD X 1/8 NPTF	1
13		02M29149	HOSE, EIS map, 1/8 ID X 1/4 OD X 7 length	1
14		02A26993-CT	FITTING, tee, barbed, 1/8 OD, brass	1
15		02M29149	HOSE, EIS map, 1/8 ID X 1/4 OD X 3-1/4	1
16		02M29149	HOSE, EIS map, 1/8 ID X 1/4 OD X 20 length	1
	❖	01P19762-2-7	BAG, Harness attaching	1
❖ See Figure for a breakdown of individual parts contained in the harness attaching parts bag. These parts to be attached by customer per engine line drawing included in each bag. ▲ Installed in cylinder #3				

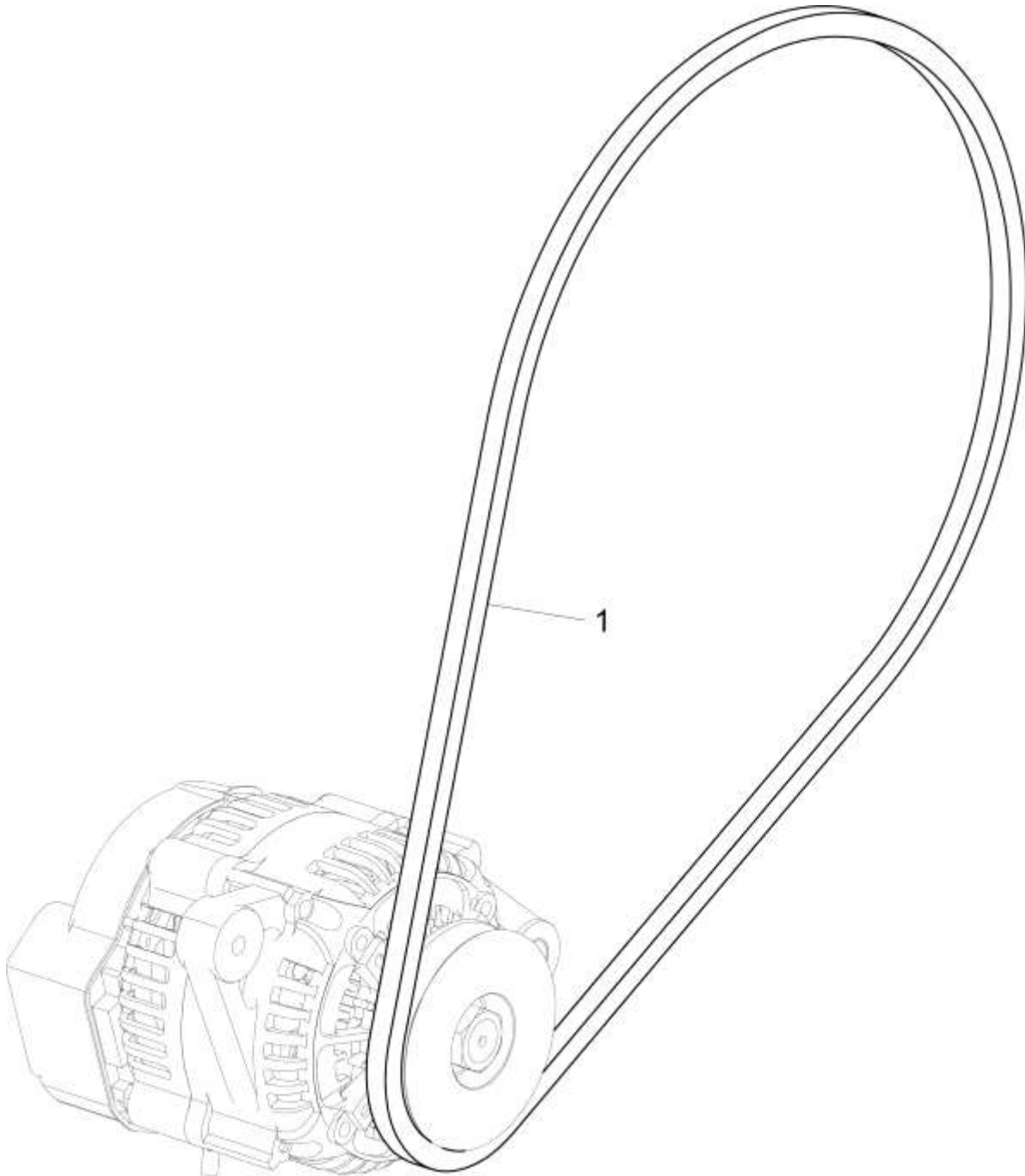


Figure 25
Alternator Belt



DISTRIBUTION

Figure 25 -Alternator Belt

Figure Item	Code	Part Number	Description	Units per Assembly
1		37A19773-376	BELT, Alternator drive, 3/8 wide	1
<p><u>NOTICE:</u> Refer to the latest revision of Service Instruction No. 1154 for complete listing of FAA-approved starters, alternators, generators, regulators and relays.</p>				

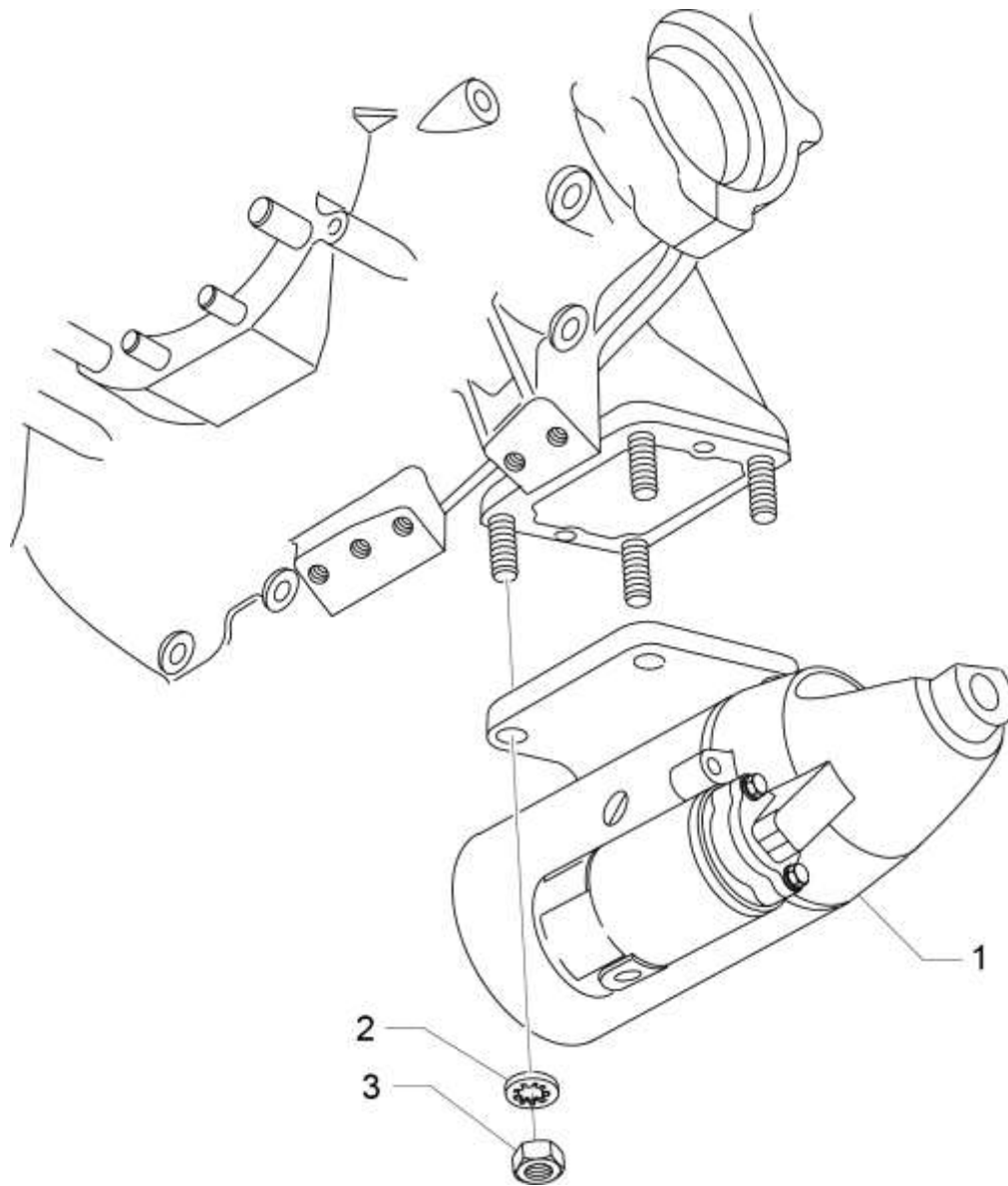


Figure 26
Starter Motor and Attaching Parts

CRANKING**Figure 26 - Starter Motor and Attaching Parts**

Figure Item	Code	Part Number	Description	Units per Assembly
1		31A22104	STARTER, Sky-Tec (149-12LS)	1
2		STD-475	WASHER, 5/16 lock, internal teeth	4
3		STD-1410	NUT, 5/16-18 plain	4
NOTICE: Refer to the latest revision of Service Instruction No. 1154 for complete listing of FAA-approved starters, alternators, generators, regulators and relays.				

Service Kit Section
Seal and Gasket Set

Part No.	Part Name	Qty.
05K28818	KIT - SEAL AND GASKET SET	1
AN901-8A	GASKET, Metal tube connect seal	1
LW-12681	GASKET, Magneto	2
LW-13353	GASKET, Oil sump	1
LW-14260	SEAL, Tachometer	1
LW-15628	SEAL, Crankshaft, oil	1
LW-18639	LOCKPLATE, Crankshaft gear	1
LW-18661	SEAL, Shroud tube	8
06A19956	SEAL, OIL 7/8 I.D. x 1-1/2 O.D. x 5/16	1
06A23493	SEAL, Shroud tube	8
06B23862	GASKET, Oil filter adapter	2
06E19769-0.63	GASKET, Annular, 5/8 I.D.	1
06E19769-1.00	GASKET-ANNULAR, 1.00 I.D.	1
06E19769-1.25	GASKET, 1-1/4 I.D. x 1-1/2 O.D. x 3/32 annular	1
8313	GASKET, Vacuum	1
60096	GASKET, Fuel pump	1
61183	GASKET, Accessory Adapter	1
66224	GASKET, Carburetor	1
66732	GASKET, Valve Rocker Shaft Cover	8
06B26811	GASKET, Rocker box cover	4
68315	GASKET-Accessory Drive Adapter	1
71481	RING, Oil seal, 4-27/32 I.D. x 3/32 diameter section	4
71973	GASKET, 2 bolt flange, 1-3/4 I.D.	4
72053	GASKET, Governor	1
72059	GASKET, Oil level gage	1
72075	SEAL, Oil, 3/32 section x 7/16 I.D.	2
72091	RING, Oil seal, 0.36 I.D. x 0.10 diameter	2
73818	GASKET, Accessory Housing	1
74068	RING, Oil level gage plug	1
75118	GASKET-Exhaust flange	4
77611	GASKET, Exhaust flange	4
72711	RING, Seal Intake pipes	4
73032	GASKET, Air inlet housing	1
77504	GASKET-Fuel injector	1
77569	RING, Seal, intake pipe	4
MS28775-015	"O" RING, 0.551 I. D x 0.07 O.D.	1
06B28651	GASKET, Air inlet housing	1
SSP-115	STICKER	1

Cylinder, Piston and Ring Assembly

Part No.	Part Name	Qty.
05K26625	KIT - CYLINDER, PISTON AND RING ASSEMBLY	1
16A26081	CYLINDER AND HEAD ASSEMBLY	1
14E23911	PISTON, Compression ratio 8.90:1	1
14G22050	RING, Piston, compression	2
14H23148	RING- Piston oil regulating (expander type)	1
71481	RING, Oil seal, 3/32 diameter x 4-27/32 I.D.	1
14J22048	PIN, Piston	1
72198	PLUG, Piston pin	2
66732	GASKET, Valve rocker shaft cover	2
06B26811	GASKET, Rocker box cover (silicone)	1
71973	GASKET, 2 bolt flange, 1-13/16 I.D.	1
06A23493	SEAL, Shroud tube	2
75118	GASKET, Exhaust flange	2
77569	RING, Seal-intake pipe	1
LW-18661	SEAL, Shroud tube	2
1102	PLUG, 1/8-27 NPT, Allen head	1
SSP-115	STICKER	1

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