



E N G I N E S

**ILLUSTRATED  
PARTS CATALOG  
MODEL CM502XL**

SERIAL NUMBER 88765 AND ABOVE



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**"TYPICAL VIEWS ARE SHOWN"**

**ENGINE ROTATION:**

Engine Rotation is identified as "RH" or "LH" with the engine model number. Rotation always is determined from the flywheel end looking toward the front of the engine. In some instances, propeller shaft rotation may be opposite to that of the engine.

When ordering a replacement engine, production block or parts for the engine, be certain to check engine rotation. **DO NOT rely on propeller rotation in determining engine rotation.**

**LEFT-HAND ROTATION is STANDARD ROTATION.**

(Flywheel turns counterclockwise when viewed from flywheel end of engine.)

**RIGHT-HAND ROTATION is OPPOSITE ROTATION.**

(Flywheel turns clockwise when viewed from flywheel end of engine.)

**HOW TO READ THIS PARTS BOOK:**

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This parts book is designed to be read in the following manner:

1. **Item Number** ..... 24  
(Reference number corresponds with number in exploded view)
2. **Part Number** ..... 30248  
(Part number for assembly or individual part)
3. **Part Description** ..... **Bolt**, front cover  
(Description explains application of part)
4. **Quantity Used** ..... 10  
(Quantity shows number of parts used)

=====

Symbols shown throughout parts list are defined here or on bottom of individual parts list page.

- AR = As Required
- OPT= Optional
- NSS= Not Sold Separately
- NA = Not Available
- SS = Single Station Control
- DS = Dual Station Control
- OS = Over Size
- US = Under Size

=====

**REPLACEMENT PARTS:**



**WARNING :**

Electrical, ignition and fuel system components on Crusader Engines are designed and manufactured to comply with U. S. Coast Guard rules and regulations to minimize risks of fire or explosion.

Use of replacement electrical, ignition and fuel system components which do not comply with these rules and regulations could result in a fire or explosion hazard and should be avoided.

**GASKET AND DECAL KIT NUMBERS:**

	<u>Part Number</u>
★ Complete Overhaul Gasket Set (See Note) .....	22926
▲ Valve Grind Gasket Set .....	22927
Oil Pan Gasket .....	31138
Intake Manifold Gasket Set .....	31135
■ Gasket and Decal Set (production block) .....	22928

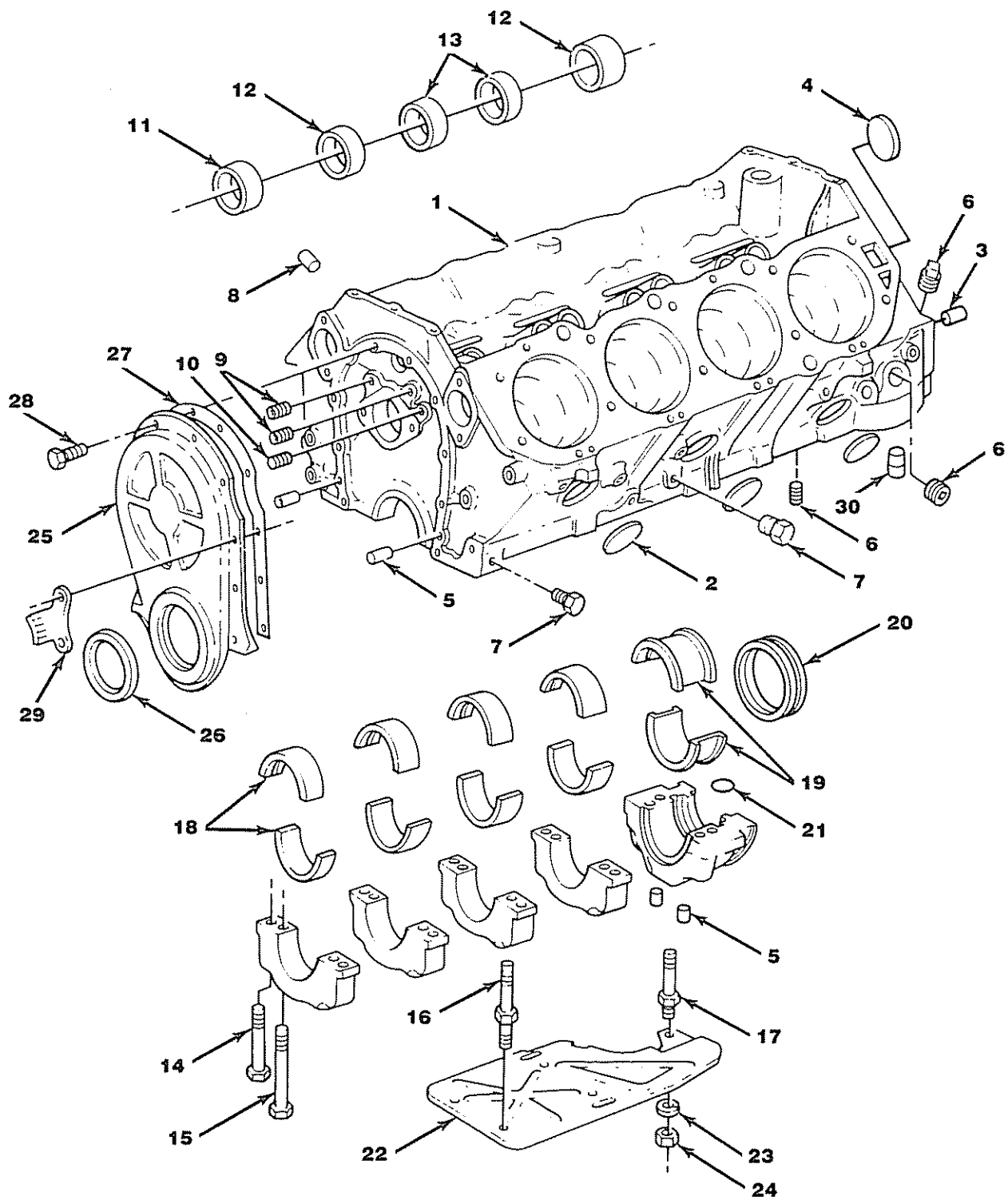
**BORG-WARNER MARINE TRANSMISSIONS:**

Crusader Engines are equipped with Borg-Warner Transmissions and "V"-drives. If Borg-Warner parts are required, contact your dealer or closest Crusader Parts Distributor for required parts.

Parts books and overhaul manuals are available through Crusader Distributors or you may contact Borg-Warner at the address below for the name and address of the Borg-Warner Distributor servicing your area.

Borg-Warner Automotive, Inc.  
 Marine & Industrial U.S.A.  
 Theodore Rice Boulevard  
 Industrial Park  
 New Bedford, MA 02745  
 Telephone: (508) 995-1805

MODEL CM502XL PARTS BOOK  
CYLINDER BLOCK ASSEMBLY – FIGURE 1



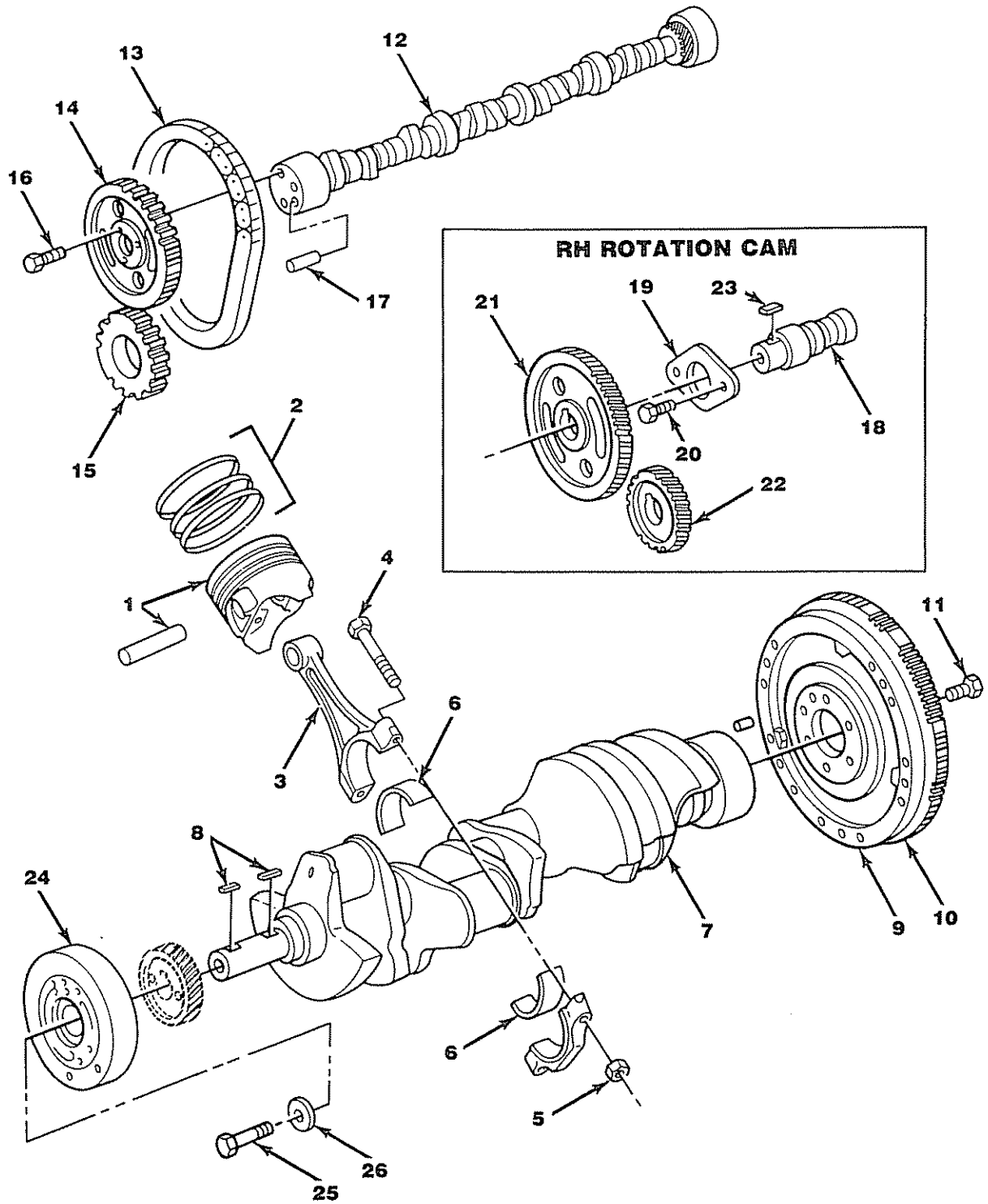
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MODEL CM502XL PARTS BOOK  
CYLINDER BLOCK ASSEMBLY – FIGURE 1

ITEM	PART NO.	DESCRIPTION	QUANTITY	
			LH	RH
*	23214	<b>Production Block Assembly (LH ROT)</b>	1	
*	23215	<b>Production Block Assembly (RH ROT)</b>		1
1	NSS	<b>Cylinder Case Assembly</b>	1	1
2	91330	<b>Core Plug (1-1/4")</b>	6	6
3	30152	<b>Pin, dowel – aligning</b>	2	2
4	30038	<b>Plug, camshaft bearing hole</b>	1	1
5	30157	<b>Pin, dowel – aligning</b>	4	4
6	444782	<b>Plug, pipe (3/8")</b>	5	5
7	127951	<b>Plug, pipe (1/4")</b>	4	4
8	30151	<b>Dowel, cylinder head aligning</b>	4	4
9	361997	<b>Plug, oil vent</b>	2	2
10	444776	<b>Plug, pipe</b>	1	1
11	30026	<b>Cam Bearing #1</b>	1	1
12	30027	<b>Cam Bearing #2 &amp; 5</b>	2	2
13	30028	<b>Cam Bearing #3 &amp; 4</b>	2	2
14	31109	<b>Bolt, main bearing cap (Short)</b>	10	10
15	31108	<b>Bolt, main bearing cap (Long)</b>	6	6
16	31158	<b>Stud, main bearing cap</b>	4	4
17	30008	<b>Stud, oil pump attaching</b>	1	1
18	31106	<b>Bearing, crankshaft main (STD)</b>	4	4
	30054	<b>Bearing, crankshaft main (.010 US)</b>	AR	AR
	30055	<b>Bearing, crankshaft main (.020 US)</b>	AR	AR
19	31105	<b>Bearing, rear main (STD)</b>	1	1
	30059	<b>Bearing, rear main (.010 US)</b>	AR	AR
	30060	<b>Bearing, rear main (.020 US)</b>	AR	AR
20	31153	<b>Oil Seal, rear main (LH ROT)</b>	1	
20	31154	<b>Oil Seal, rear main (RH ROT)</b>		1
21	31152	<b>O-Ring, oil seal – rear main cap</b>	1	1
22	31131	<b>Baffle Assembly, oil pan</b>	1	1
23	120394	<b>Washer, baffle mounting stud</b>	5	5
24	33124	<b>Nut, baffle mounting stud</b>	5	5
25	31123	<b>Cover, crankcase front (LH ROT)</b>	1	
26	30036	<b>Oil Seal, front cover ★</b>	1	
25A	31122	<b>Cover, crankcase front (RH ROT)</b>		1
26A	30036	<b>Oil Seal, front cover ★</b>		1
27	31139	<b>Gasket, front cover ★</b>	1	1
28	20790	<b>Bolt, front cover</b>	10	10
29	30174	<b>Pointer, timing (RH ROT)</b>		1
30	98173	<b>Valve, pressure relief</b>	1	1

**NOTE:** Production block assemblies include all internal parts, cylinder heads, intake manifold, flywheel, and circulating pump.

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CRANKSHAFT, CAM AND PISTON ASSEMBLY – FIGURE 2



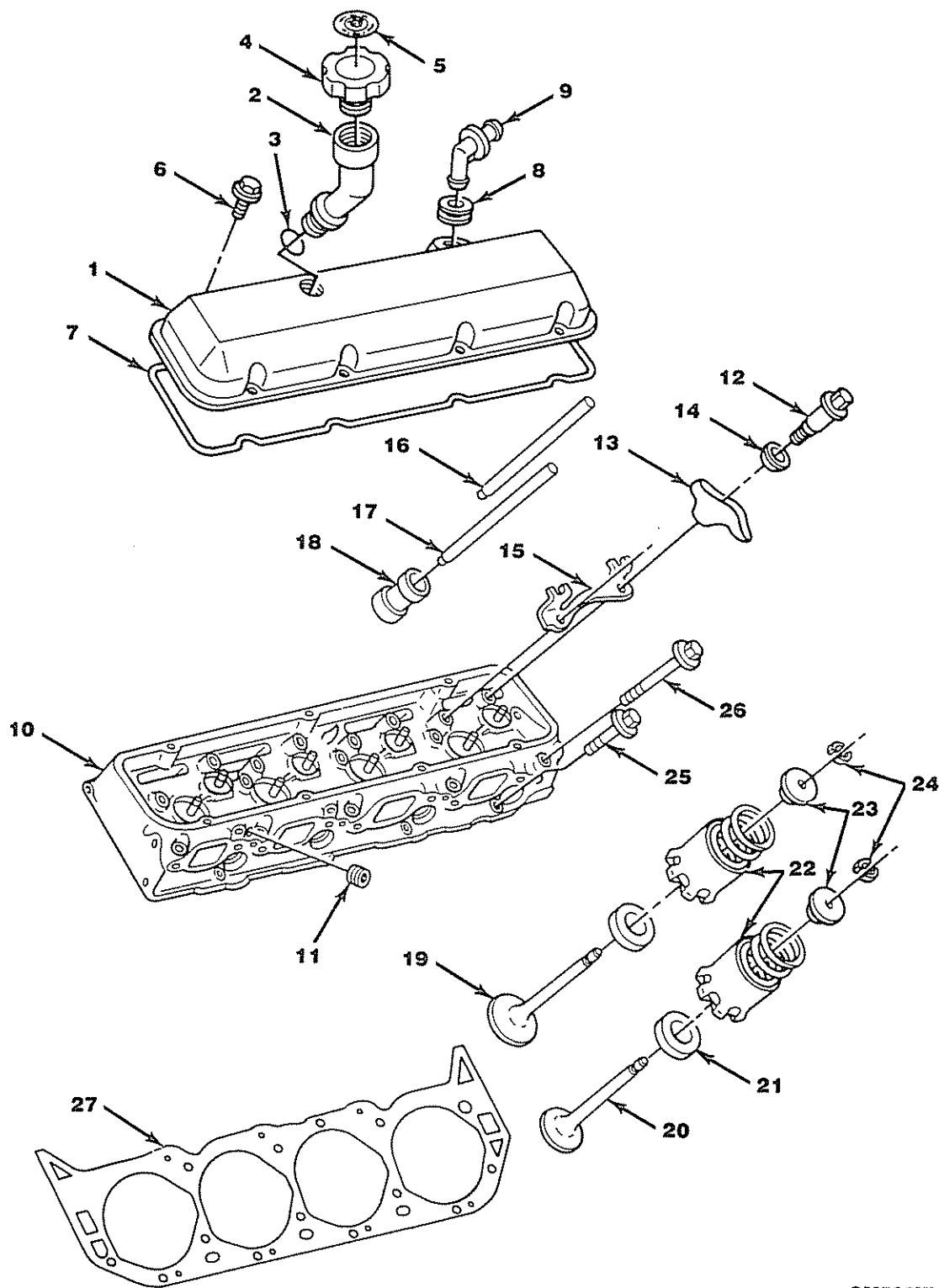
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MODEL CM502XL PARTS BOOK  
CRANKSHAFT, CAM AND PISTON ASSEMBLY – FIGURE 2

ITEM	PART NO.	DESCRIPTION	QUANTITY	
			LH	RH
1	31036	<b>Piston and Pin Assembly (STD)</b>	8	8
1	31037	<b>Piston and Pin Assembly (.030 OS)</b>	AR	AR
2	31028	<b>Ring Set, piston (STD)</b>	8	8
2	31027	<b>Ring Set, piston (.030 OS)</b>	AR	AR
3	31006	<b>Connecting Rod Assembly</b>	8	8
4	31007	<b>Bolt, connecting rod cap</b>	16	16
5	31008	<b>Nut, connecting rod cap</b>	16	16
6	31104	<b>Bearing Set, connecting rod (STD)</b>	8	8
	30069	<b>Bearing Set, connecting rod (.010 US)</b>	AR	AR
	30070	<b>Bearing Set, connecting rod (.020 US)</b>	AR	AR
7	31126	<b>Crankshaft Assembly (LH ROT)</b>	1	
7	31127	<b>Crankshaft Assembly (RH ROT)</b>		1
8	31143	<b>Key, timing gear and balancer</b>	2	2
9	31133	<b>Flywheel Assembly (14")</b>	1	1
10	33264	<b>Ring Gear, flywheel</b>	1	1
11	839756	<b>Bolt, flywheel to crankshaft</b>	6	6
12	31031	<b>Camshaft Assembly (LH ROT)</b>	1	
		<b>[Early Design – Double-Row Chain]</b>		
13	30163	<b>Chain, camshaft timing</b>	1	
14	30164	<b>Sprocket, camshaft timing</b>	1	
15	30165	<b>Sprocket, crankshaft timing</b>	1	
		<b>[Late Design – Single-Row Chain]</b>		
13	31120	<b>Chain, camshaft timing</b>	1	
14	31156	<b>Sprocket, camshaft timing</b>	1	
15	31157	<b>Sprocket, crankshaft timing</b>	1	
16	33698	<b>Bolt, sprocket to cam (3/4")</b>	3	
17	30157	<b>Pin, camshaft sprocket</b>	1	
18	31032	<b>Camshaft Assembly (RH ROT)</b>		1
19	30140	<b>Camshaft Thrust Plate</b>		1
20	30248	<b>Bolt, thrust plate retainer</b>		2
21	30180	<b>Gear, camshaft timing</b>		1
22	30061	<b>Gear, crankshaft timing</b>		1
23	30062	<b>Key, camshaft timing gear</b>		1
24	31005	<b>Harmonic Balancer</b>	1	1
25	31107	<b>Bolt, balancer to crankshaft</b>	1	1
26	30175	<b>Washer, harmonic balancer bolt</b>	1	1

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CYLINDER HEAD ASSEMBLY – FIGURE 3

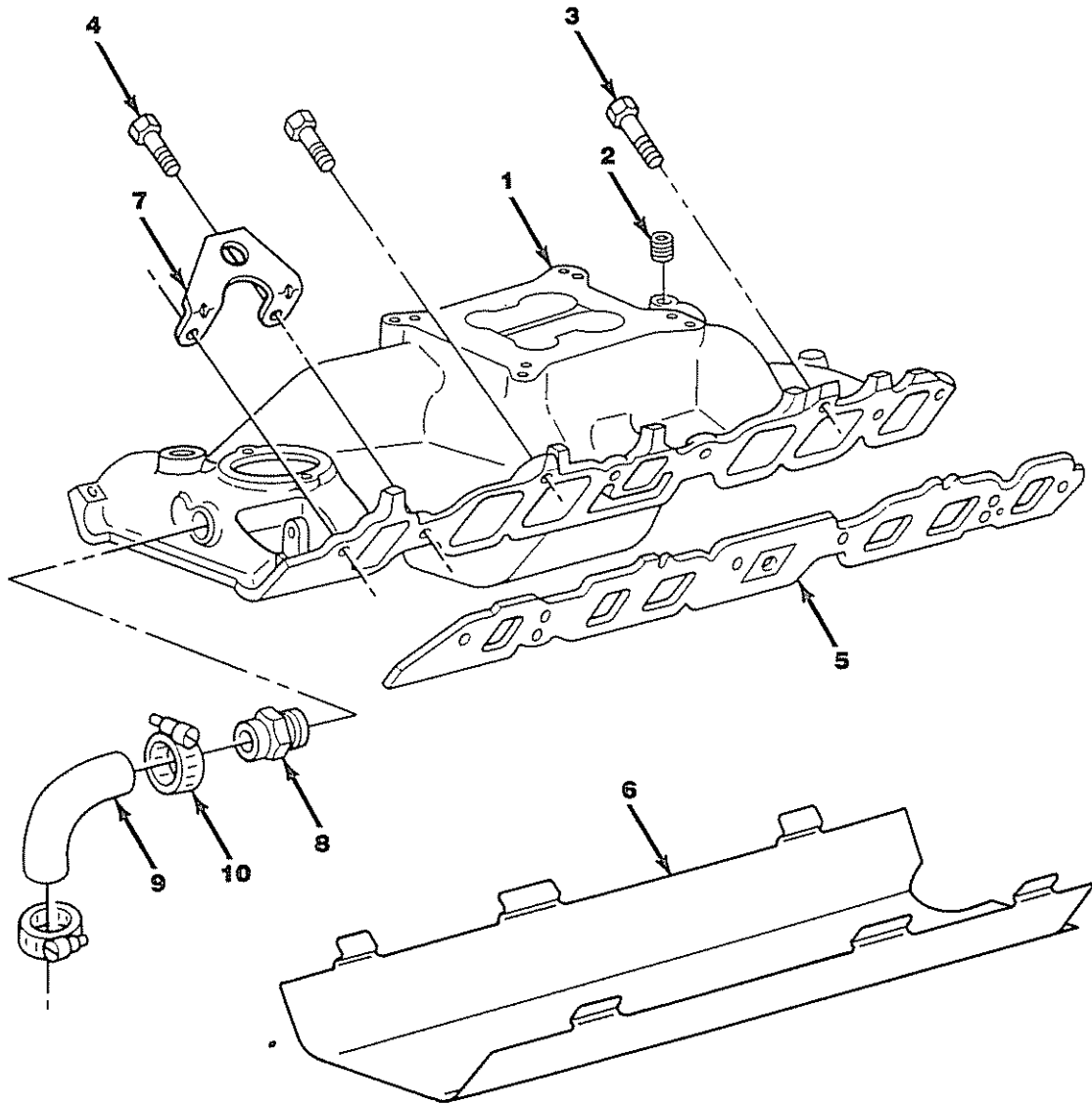


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CYLINDER HEAD ASSEMBLY – FIGURE 3

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	31121	<b>Cover, rocker</b>	2
2	98198	<b>Riser, oil fill</b>	2
3	22844	<b>O-Ring, oil fill riser seal</b>	2
4	31118	<b>Cap, oil fill</b>	2
5	22742	<b>Decal, oil fill cap</b>	2
6	31114	<b>Bolt, rocker cover retaining</b>	14
7	31140	<b>Gasket, valve cover</b>	2
8	98214	<b>Grommet, valve cover</b>	2
9	98219	<b>Elbow, crankcase vent</b>	2
10	31130	<b>Cylinder Head Assembly</b>	2
11	444705	<b>Plug, pipe (1/2")</b>	2
12	31115	<b>Bolt, rocker arm attaching</b>	16
13	31101	<b>Rocker Arm, valve</b>	16
14	31103	<b>Ball, rocker arm</b>	16
15	31142	<b>Guide, push rod</b>	8
16	31149	<b>Push Rod, exhaust (Long)</b>	8
17	31150	<b>Push Rod, intake (Short)</b>	8
18	31020	<b>Valve Lifter, hydraulic</b>	16
19	31015	<b>Valve, intake (STD)</b>	8
20	31029	<b>Valve, exhaust (STD)</b>	8
21	31018	<b>Shim, valve spring</b>	16
22	31040	<b>Valve Spring Assembly</b>	16
23	31039	<b>Cap and Seal Assembly</b>	16
24	20209	<b>Retainer, valve stem</b>	32
25	31034	<b>Bolt, cylinder head to block (Short)</b>	8
26	31035	<b>Bolt, cylinder head to block (Long)</b>	24
27	31137	<b>Gasket, cylinder head ★ ▲</b>	2

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INTAKE MANIFOLD ASSEMBLY – FIGURE 4



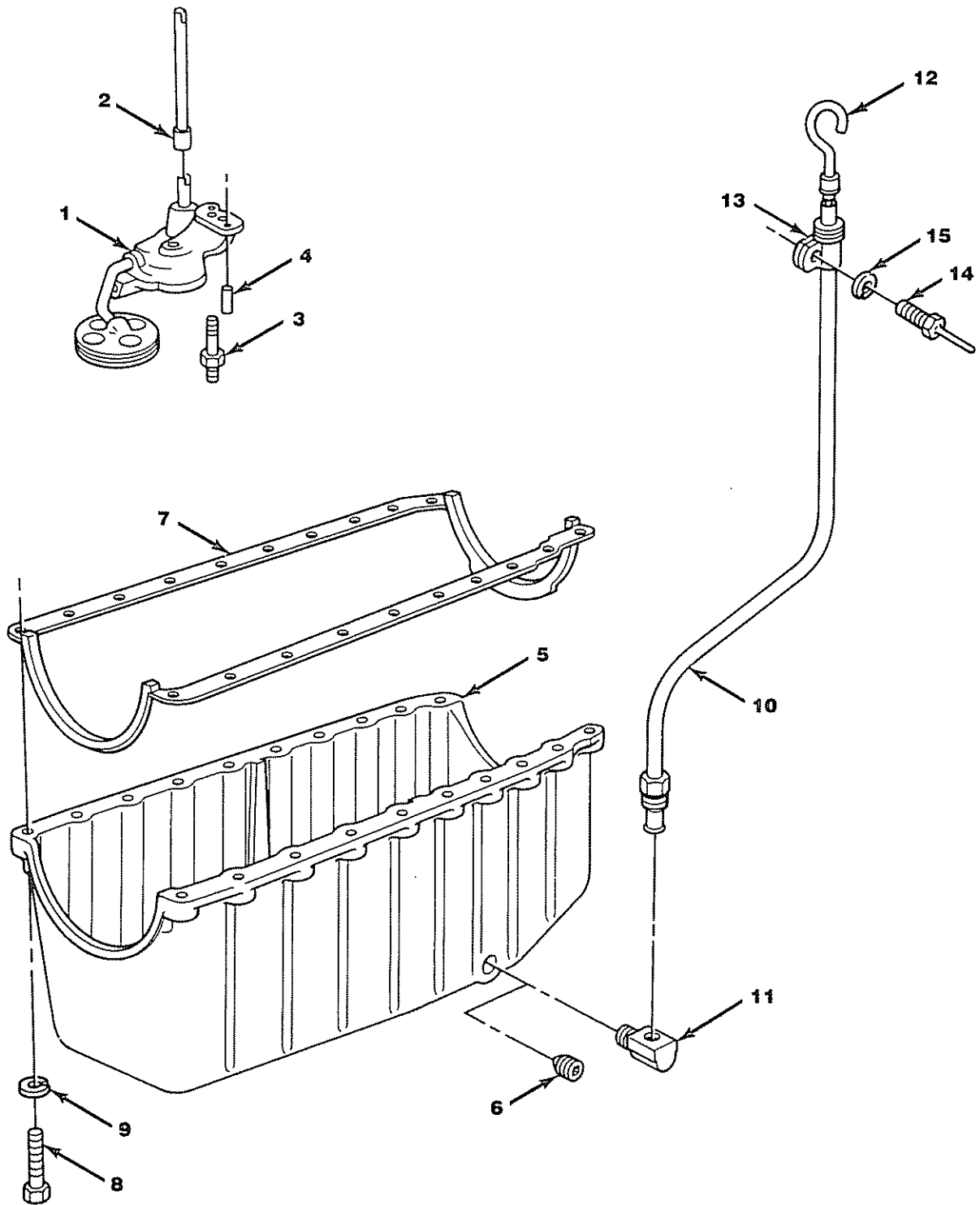
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MODEL CM502XL PARTS BOOK  
 INTAKE MANIFOLD ASSEMBLY – FIGURE 4

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	31014	<b>Intake Manifold</b>	1
2	444868	<b>Plug, 3/8" NPT</b>	1
3		<b>Bolt, intake mounting (1-1/4")</b>	12
4		<b>Bolt, intake mounting (1-3/4")</b>	4
5	31135	<b>Gasket, intake manifold ★ ▲</b>	1
6	31038	<b>Guard, oil splash – lifter</b>	1
7	31116	<b>Eye, lifting</b>	1
8	30177	<b>Fitting, block bypass hose</b>	1
9	30178	<b>Hose, block bypass</b>	1
10	20226	<b>Clamp, bypass hose</b>	2

**Sealants Required:**  
 22594 Sealer, Red RTV (intake manifold)

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OIL PAN AND OIL PUMP ASSEMBLY – FIGURE 5

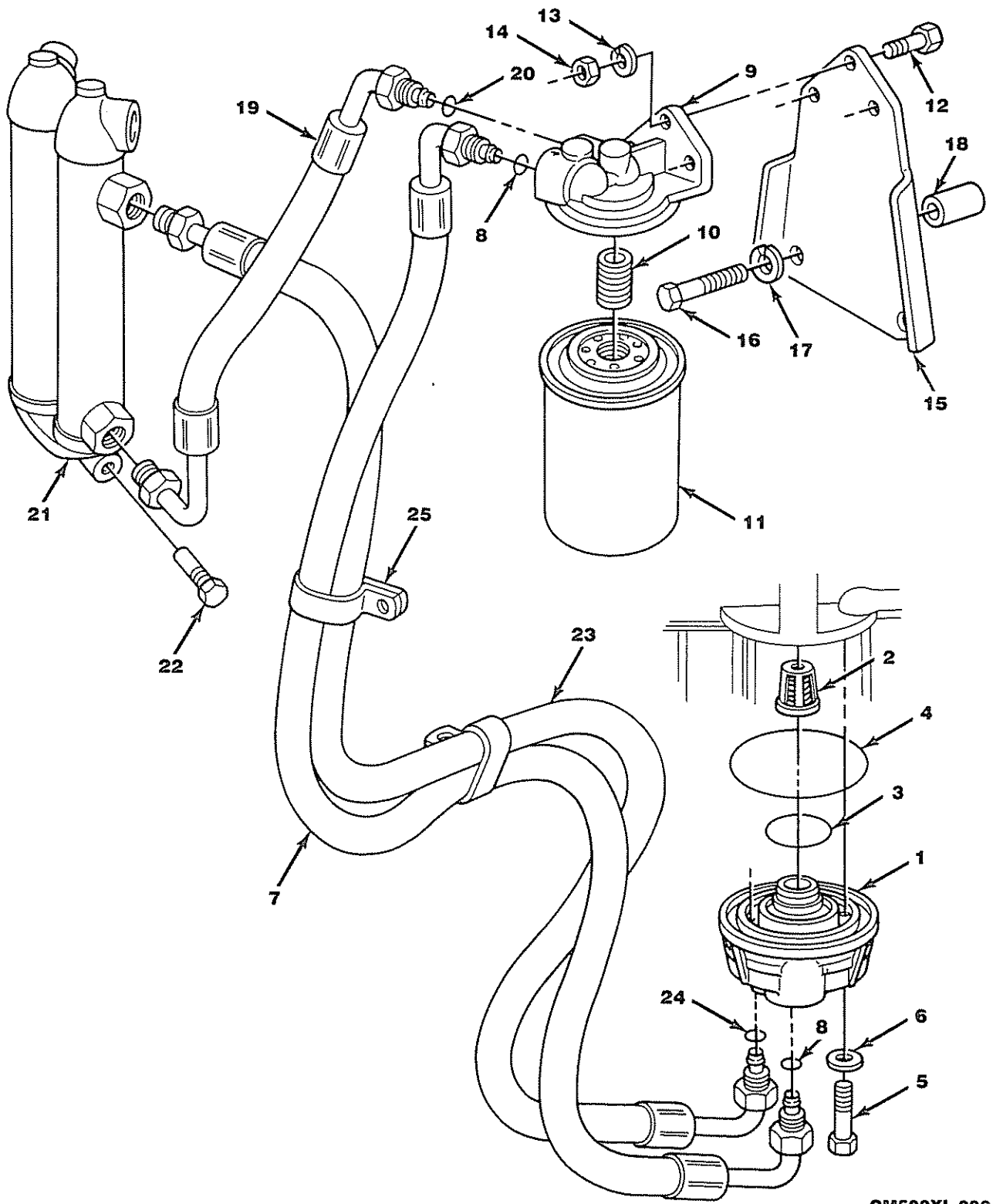


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MODEL CM502XL PARTS BOOK  
OIL PAN AND OIL PUMP ASSEMBLY – FIGURE 5

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	31148	<b>Oil Pump Assembly</b>	1
2	30046	<b>Shaft</b> , oil pump to distributor	1
3	30008	<b>Stud</b> , oil pump to block	1
4	30157	<b>Pin</b> , dowel	2
5	98098	<b>Oil Pan</b> , cast aluminum	1
6	444868	<b>Plug</b> , 3/8" brass	1
7	31138	<b>Gasket</b> , oil pan ★ ■	1
8	179822	<b>Bolt</b> , oil pan to block (1-1/2")	20
9	9417953	<b>Lockwasher</b> , oil pan bolt	20
10	98108	<b>Dipstick Tube</b> (All Installations)	1
11	137423	<b>Elbow</b> , dipstick tube to oil pan	1
12	98109	<b>Dipstick</b> , oil level	1
13	2000147	<b>Clamp</b> , dipstick tube	1
14	98235	<b>Bolt</b> , clamp attaching	1
15	103321	<b>Lockwasher</b> , attaching bolt	1

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REMOTE OIL FILTER ASSEMBLY – FIGURE 6



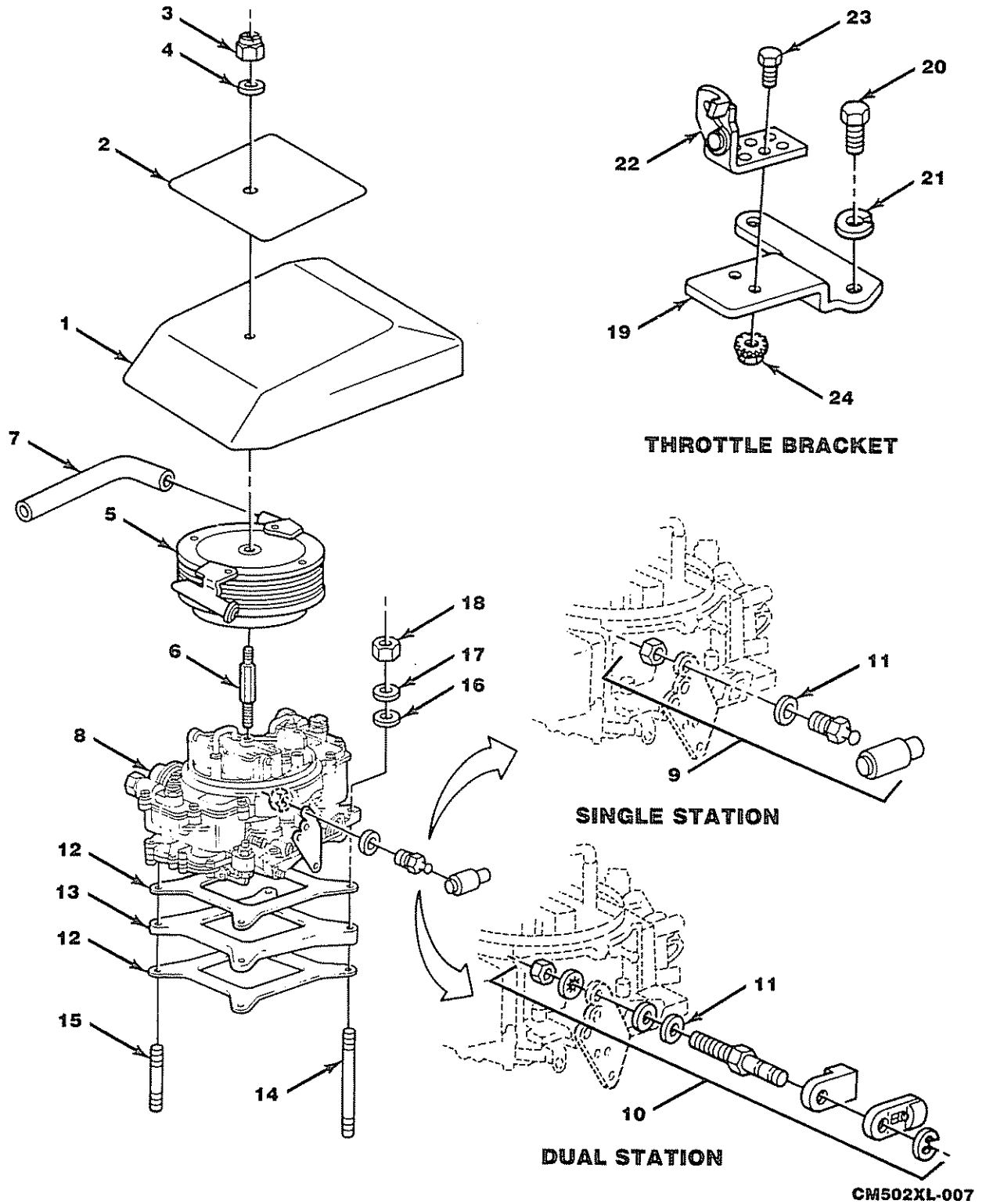
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MODEL CM502XL PARTS BOOK  
REMOTE OIL FILTER ASSEMBLY – FIGURE 6

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98105	<b>Adaptor</b> , remote filter to cylinder block	1
2	98173	<b>Valve</b> , oil pressure relief	1
3	22802	<b>O-Ring</b> , adaptor to block (Small) ★ ■	1
4	22654	<b>O-Ring</b> , adaptor to block (Large) ★ ■	1
5	179824	<b>Bolt</b> , adaptor to cylinder block (1-3/4")	2
6	22226	<b>Washer</b> , adaptor bolt, copper	2
7	18100	<b>Hose Assembly</b> , adaptor to filter header (40")	1
8	22897	<b>O-Ring</b> , oil line ★ ■	2
9	98106	<b>Oil Filter Header</b>	1
10	97292	<b>Nipple</b> , header filter adaptor	1
11	22679	<b>Oil Filter Element</b>	1
12	9418918	<b>Bolt</b> , header to bracket (1")	3
13	9417953	<b>Lockwasher</b> , header mounting bolt	3
14	9413583	<b>Nut</b> , header mounting bolt	3
15	98057	<b>Bracket</b> , filter mounting	1
16	179847	<b>Bolt</b> , bracket to cylinder head (2")	2
17	103321	<b>Lockwasher</b> , bracket bolt	2
18	98183	<b>Spacer</b> , filter mounting bracket	1
19	18102	<b>Hose Assembly</b> , filter header to cooler (18")	1
20	22897	<b>O-Ring</b> , oil line ★ ■	1
21	98123	<b>Oil Cooler Assembly</b>	1
22	10335	<b>Zinc</b> , sacrificial	1
23	18101	<b>Hose Assembly</b> , oil cooler to adaptor (47")	1
24	22897	<b>O-Ring</b> , oil line ★ ■	1
25	22121	<b>Clamp</b> , oil line mounting	2

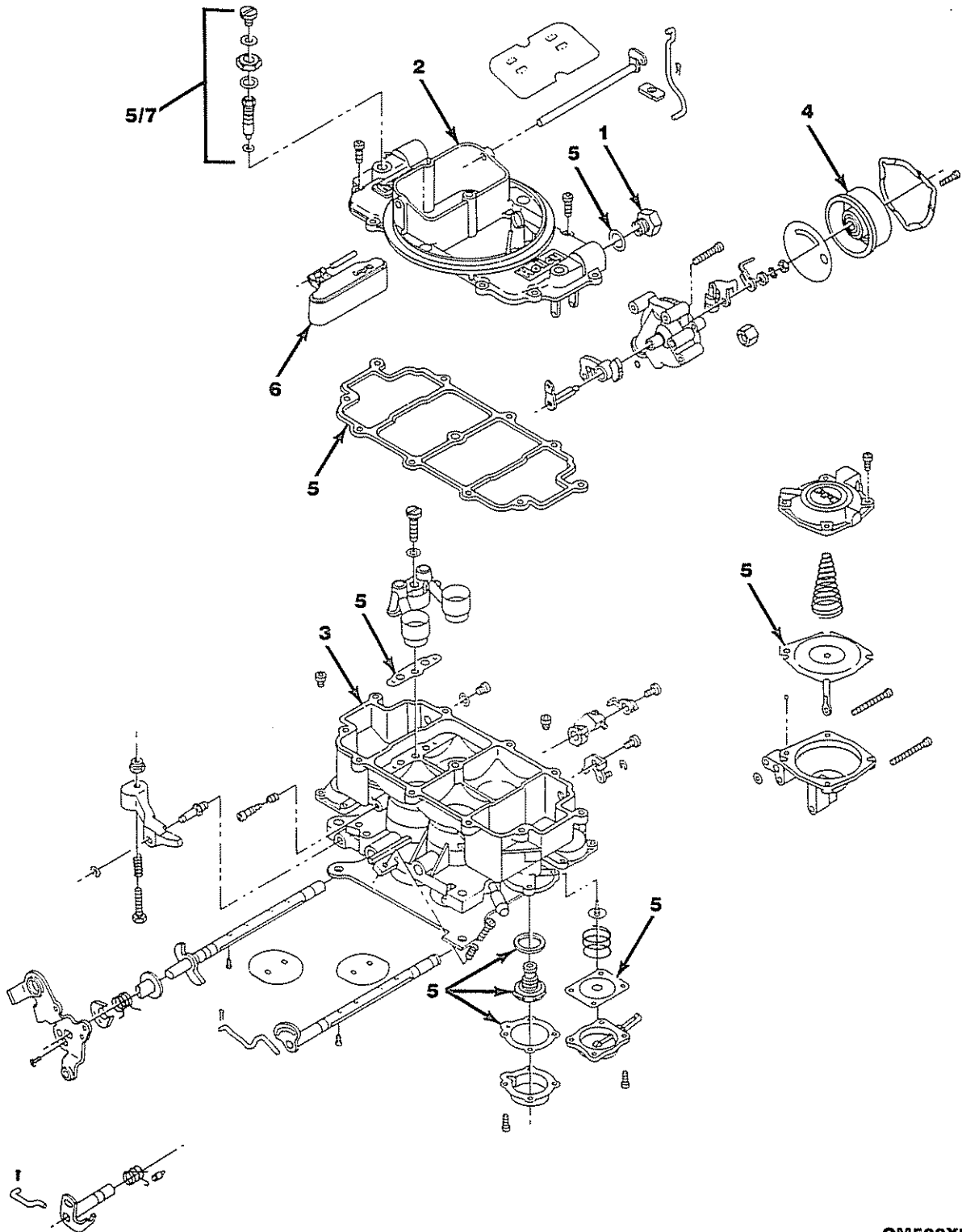
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 CARBURETOR MOUNTING – FIGURE 7



MODEL CM502XL PARTS BOOK  
 CARBURETOR MOUNTING – FIGURE 7

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98189	<b>Cover</b> , flame arrestor	1
2	22831	<b>Decal</b> , flame arrestor cover	1
3	22760	<b>Nut</b> , flame arrestor stud	1
4	22004	<b>Washer</b> , flame arrestor cover	1
5	33628	<b>Flame Arrestor</b> , carburetor	1
6	98086	<b>Stud</b> , flame arrestor	1
7	22843	<b>Vent Hose</b> , crankcase	2
8	46100	<b>Carburetor Assembly</b>	1
9	21025	<b>Ball Joint Assembly</b> , cable attaching (Single)	1
10	22232	<b>Cable Attaching Kit</b> (Dual)	OPT
11	103339	<b>Washer</b> , spacing	AR
=====			
<b>Use Following Parts for 12-Degree Installation Only</b>			
=====			
12	98088	<b>Gasket</b> , carburetor mounting ★ ▲ ■	2
13	98087	<b>Wedge Plate</b> , carburetor	1
14	97983	<b>Stud</b> , carburetor attaching (2-3/8")	2
15	22052	<b>Stud</b> , carburetor attaching (1-7/8")	2
16	9418304	<b>Washer</b> , carburetor stud	4
17	9417953	<b>Lockwasher</b> , carburetor stud	4
18	9413583	<b>Nut</b> , carburetor stud	4
=====			
<b>Use Following Parts for "V"-Drive &amp; 0-Degree Installations Only</b>			
=====			
12	46091	<b>Gasket</b> , carburetor mounting ★ ▲ ■	1
15	22052	<b>Stud</b> , carburetor attaching (1-7/8")	4
16	9418304	<b>Washer</b> , carburetor stud	4
17	9417953	<b>Lockwasher</b> , carburetor stud	4
18	9413583	<b>Nut</b> , carburetor stud	4
=====			
19	98110	<b>Bracket</b> , throttle cable mounting	1
20	179817	<b>Bolt</b> , throttle bracket mounting (7/8")	2
21	9417953	<b>Lockwasher</b> , mounting bolt	2
22	21033	<b>Clip</b> , throttle attaching (Single)	1
22	22232	<b>Clip</b> , throttle attaching kit (Dual)	OPT
23	443874	<b>Screw</b> , clip to throttle bracket	2
24	22440	<b>Nut</b> , clip mounting screw	2

MODEL CM502XL PARTS BOOK  
CARBURETOR ASSEMBLY (HOLLEY) – FIGURE 8

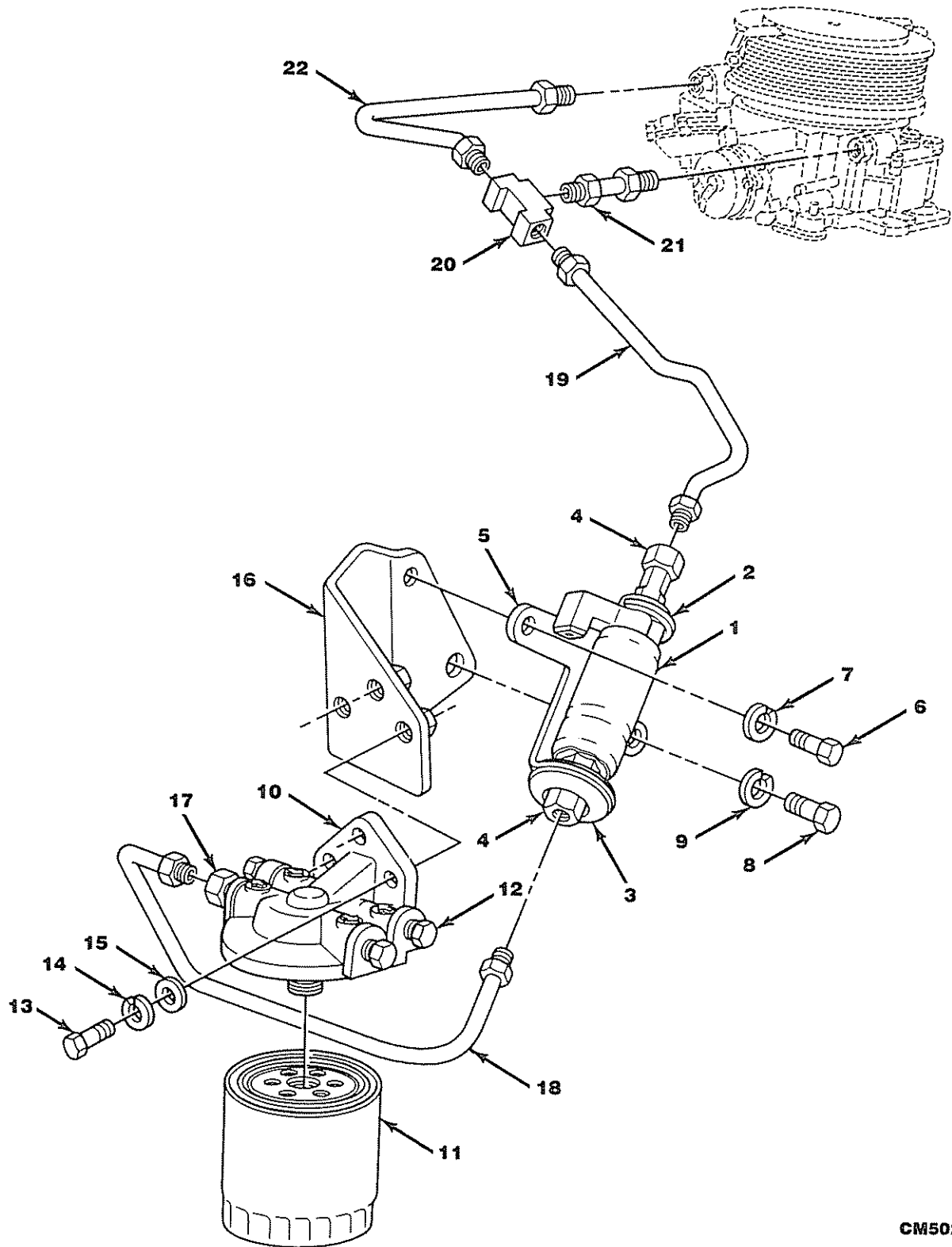


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MODEL CM502XL PARTS BOOK  
CARBURETOR ASSEMBLY (HOLLEY) – FIGURE 8

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	46100	<b>Carburetor Assembly (84044)</b>	1
1	46096	<b>Nut, fuel inlet</b>	2
2	NSS	<b>Air Horn Assembly</b>	1
3	NSS	<b>Float Bowl and Throttle Body Assembly</b>	1
4	46095	<b>Electric Choke Assembly</b>	1
5	46102	<b>Carburetor Overhaul Kit</b>	1
6	46094	<b>Float Assembly</b>	2
7	46098	<b>Needle and Seat Assembly</b>	2
<p><b>NOTE:</b> DO NOT USE the carburetor mounting gasket supplied in overhaul kit. Order flange gasket part number 98088 as needed.</p> <p><b>NOTE:</b> Crusader does not stock all components to overhaul carburetor completely. If parts are needed which are not shown, they can be purchased through your local Holley distributor. Reference the Holley part number on the carburetor body when ordering parts locally.</p>			

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FUEL PUMP AND FUEL SYSTEM – FIGURE 9

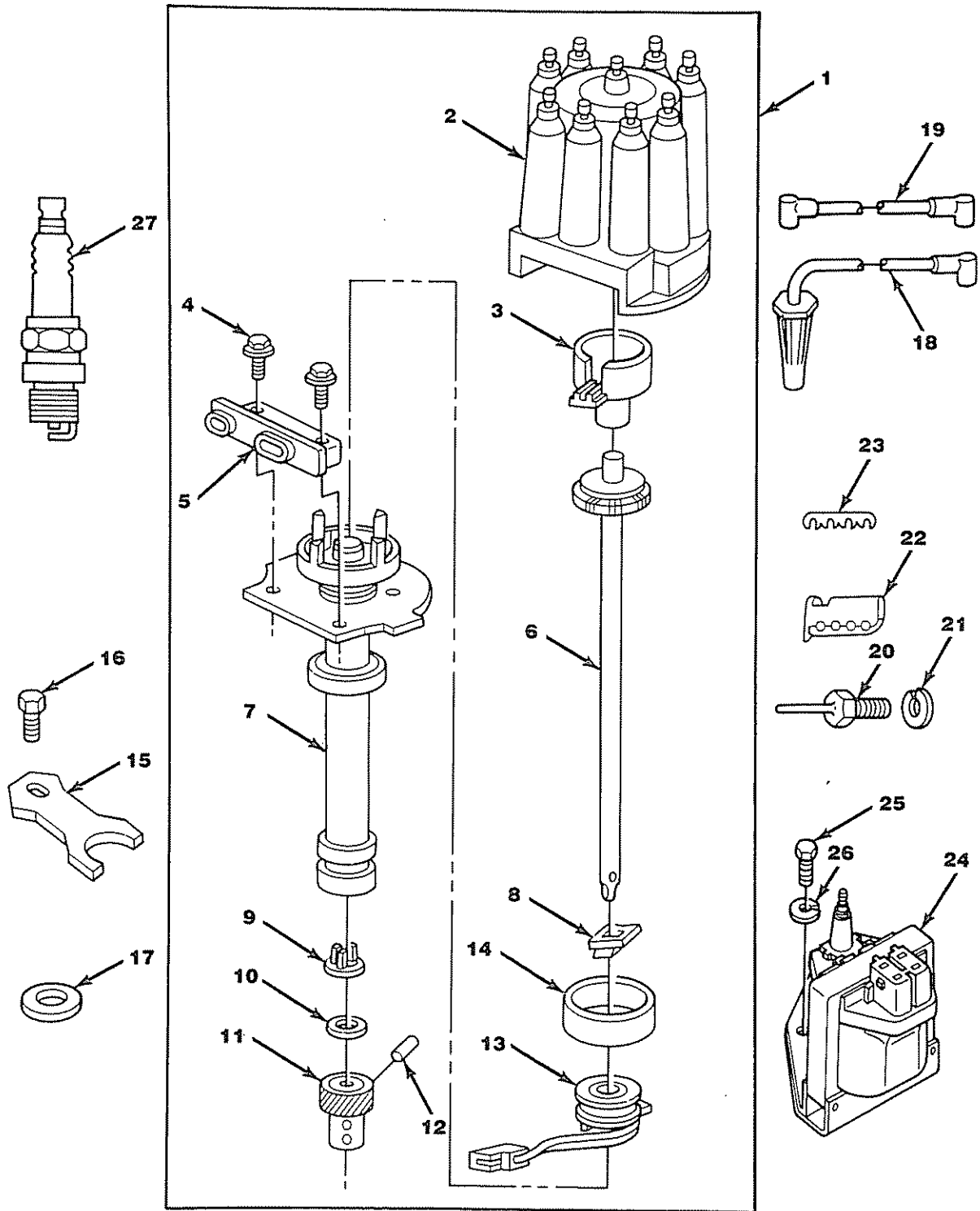


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MODEL CM502XL PARTS BOOK  
 FUEL PUMP AND FUEL SYSTEM – FIGURE 9

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	22898	<b>Fuel Pump Assembly</b>	1
2	22798	<b>Grommet</b> , fuel pump mounting (Upper)	1
3	22799	<b>Grommet</b> , fuel pump mounting (Lower)	1
4	NSS	<b>Fitting</b> , fuel line	
5	98116	<b>Bracket</b> , fuel pump mounting	1
6	179839	<b>Bolt</b> , fuel pump bracket to head (1")	1
7	103321	<b>Lockwasher</b> , mounting bolt	1
8	179858	<b>Bolt</b> , fuel pump bracket to head (1")	1
9	103322	<b>Lockwasher</b> , mounting bolt	1
10	22778	<b>Header</b> , fuel filter	1
11	22687	<b>Fuel Filter/Water Separator</b>	1
12	127951	<b>Plug</b> , pipe (1/4")	3
13	9418918	<b>Bolt</b> , header mounting (1")	3
14	9417953	<b>Lockwasher</b> , header mounting bolt	3
15	9418304	<b>Washer</b> , header mounting bolt	3
16	98111	<b>Bracket</b> , fuel filter mounting	1
17	30572	<b>Adaptor</b> , fuel line to header	1
18	98114	<b>Fuel Line</b> , fuel filter to fuel pump	1
19	98115	<b>Fuel Line</b> , fuel pump to carburetor (12-degree)	1
19	98139	<b>Fuel Line</b> , fuel pump to carburetor (0-degree)	1
20	178661	<b>Tee</b> , fuel pump to carburetor fuel lines	1
21	98091	<b>Fuel Line</b> , tee to carburetor (Front)	1
22	98083	<b>Fuel Line</b> , tee to carburetor (Rear)	1

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DELCO IGNITION COMPONENTS – FIGURE 10



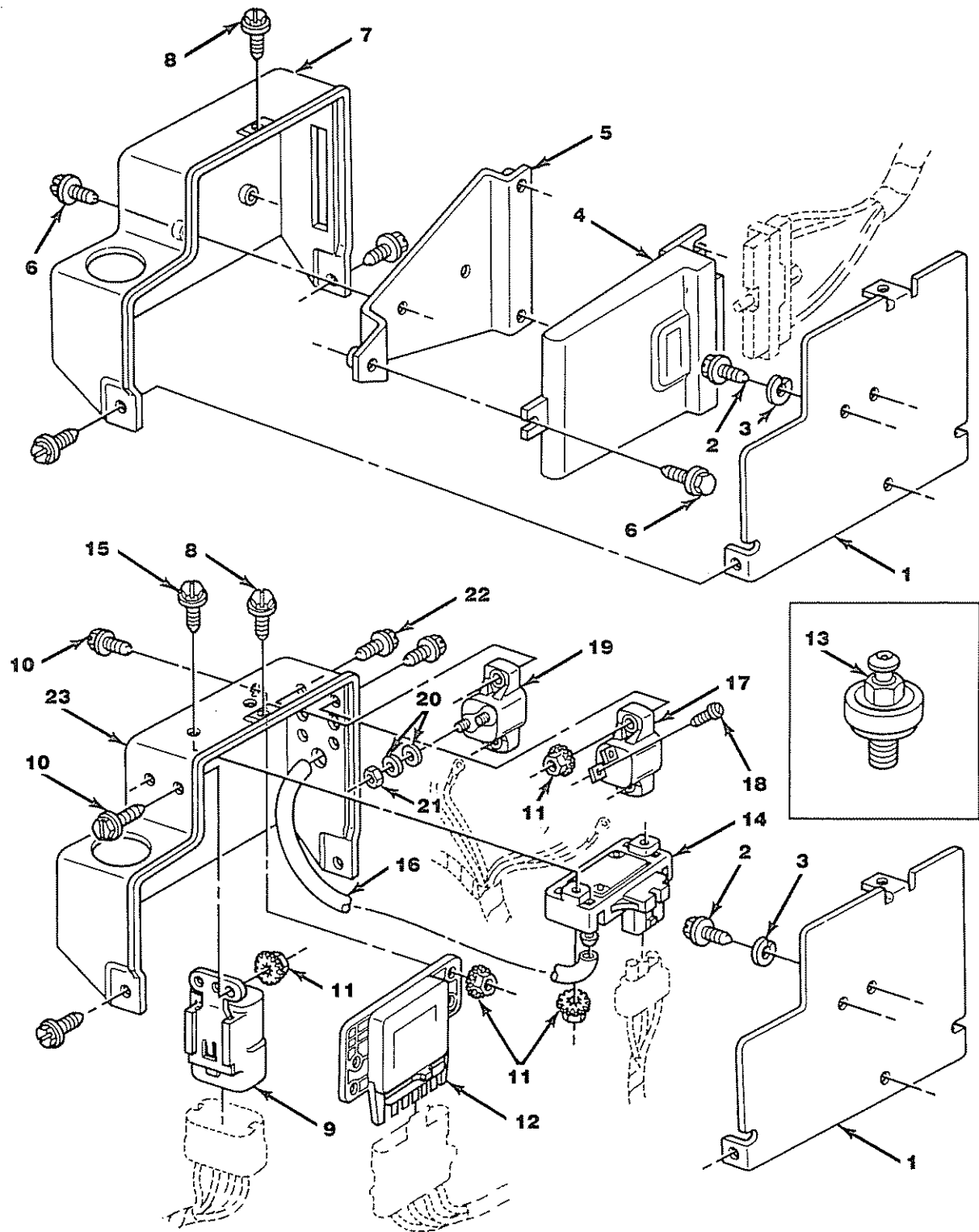
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MODEL CM502XL PARTS BOOK  
 DELCO IGNITION COMPONENTS – FIGURE 10

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	38065	<b>Distributor Assembly</b>	1
2	38070	<b>Cap</b> , distributor	1
3	38071	<b>Rotor</b> , ignition	1
4	38069	<b>Screw</b> , ignition module attaching	2
5	38068	<b>Module</b> , ignition	1
6	38073	<b>Shaft Assembly</b>	1
7	38078	<b>Housing</b> , distributor	1
8	38074	<b>Retainer</b>	1
9	38023	<b>Washer</b> , tang	1
10	38077	<b>Washer</b> , thrust	1
11	38072	<b>Gear</b> , drive	1
12	38060	<b>Pin</b> , drive gear	1
13	38075	<b>Pickup Coil Assembly</b>	1
14	38076	<b>Shield</b> , pickup coil	1
15	20799	<b>Clamp</b> , distributor hold-down	1
16	97948	<b>Bolt</b> , distributor clamp	1
17	91083	<b>Gasket</b> , distributor ☆ ▲ ■	1
18	98171	<b>Spark Plug Wire Set</b>	1
19	98094	<b>Coil Wire</b>	1
20	97663	<b>Stud, Pin</b> , retainer mounting (5/8")	1
20	98235	<b>Stud, Pin</b> , retainer mounting (1")	1
21	103321	<b>Lockwasher</b> , wire retainer stud	2
22	22222	<b>Retainer</b> , spark plug wires	2
23	22300	<b>Separator</b> , spark plug wires	2
24	38079	<b>Ignition Coil Assembly</b>	1
25	179817	<b>Bolt</b> , coil to intake manifold (7/8")	2
26	9417953	<b>Lockwasher</b> , coil mounting bolt	2
27	97782	<b>Spark Plug</b> (Champion RV8C)	8

MODEL CM502XL PARTS BOOK  
MST COMPONENTS – FIGURE 11



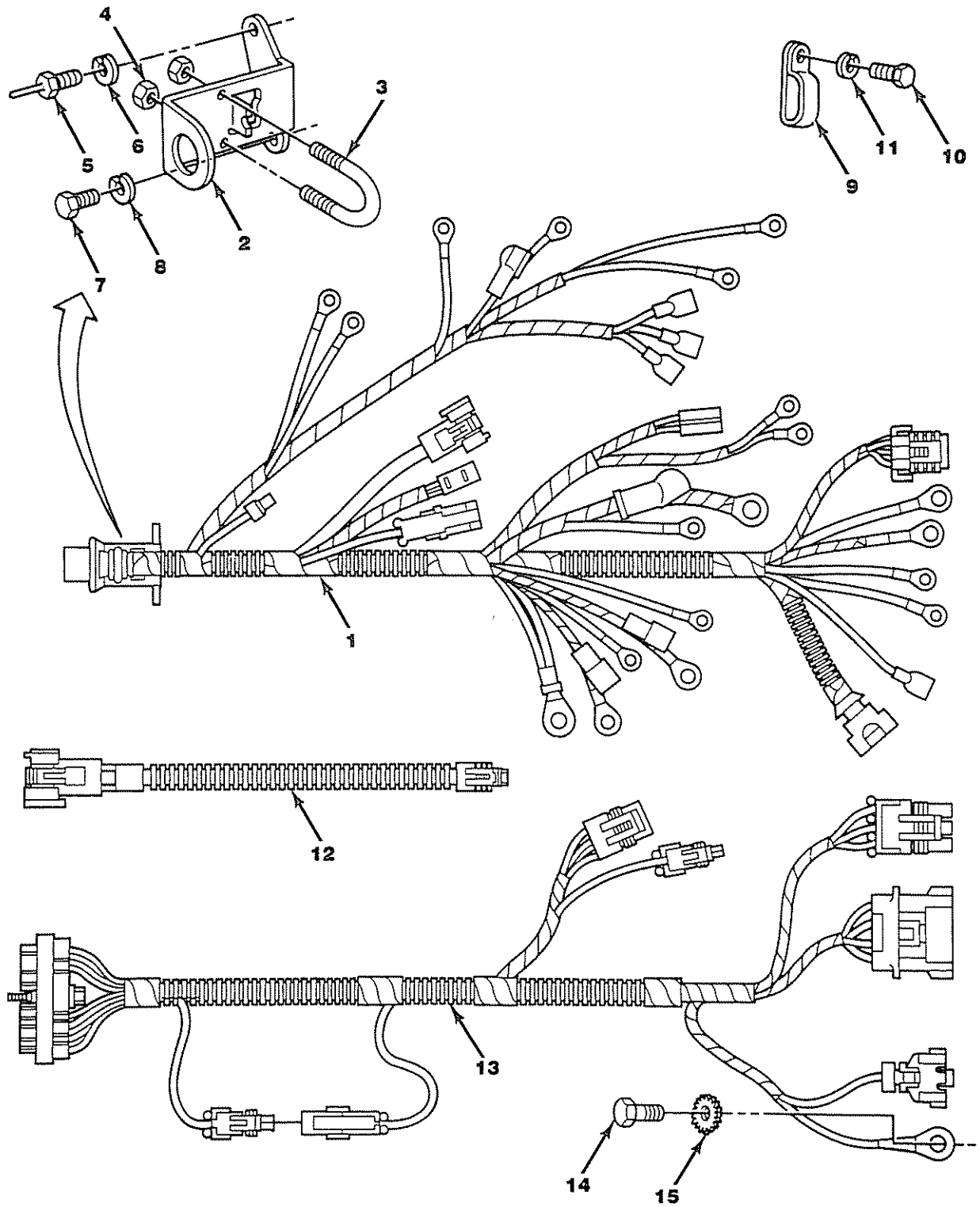
CM502XL-011

MODEL CM502XL PARTS BOOK  
MSTS COMPONENTS – FIGURE 11

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98130	<b>Bracket, component mounting</b>	2
2	9439930	<b>Bolt, bracket to riser attaching (9/16")</b>	6
3	103319	<b>Lockwasher, bracket mounting bolt</b>	6
4	48001	<b>Electronic Control Module (ECM)</b>	1
5	98132	<b>ECM Mounting Bracket</b>	1
6	9439930	<b>Bolt, ECM to bracket attaching (9/16")</b>	5
7	98133	<b>Cover, ECM mounting</b>	1
8	22860	<b>Screw, cover attaching (3/8")</b>	6
9	98175	<b>Relay, MSTS Power</b>	1
10	22861	<b>Bolt, attaching (1/2")</b>	4
11	22440	<b>Nut, attaching bolt</b>	10
12	48002	<b>Knock Module</b>	1
13	48003	<b>Knock Sensor (Block)</b>	1
14	48004	<b>MAP Sensor (Manifold Absolute Pressure)</b>	1
15	22863	<b>Bolt, attaching (1")</b>	2
16	20237	<b>Hose, MAP sensor to carburetor [24"]</b>	1
17	98131	<b>Circuit Breaker (10 AMP)</b>	1
18	21306	<b>Screw, wire attaching</b>	2
19	97568	<b>Circuit Breaker (50 AMP)</b>	1
20	21147	<b>Washer, wire attaching stud</b>	4
21	21148	<b>Nut, wire attaching stud</b>	2
22	22862	<b>Bolt, circuit breaker mounting (3/4")</b>	4
23	98181	<b>Cover, component mounting</b>	1

**NOTE:** Numbers in brackets "[24"]" indicate minimum length that must be ordered when using bulk hose for replacement.

MODEL CM502XL PARTS BOOK  
WIRING HARNESS ASSEMBLIES – FIGURE 12

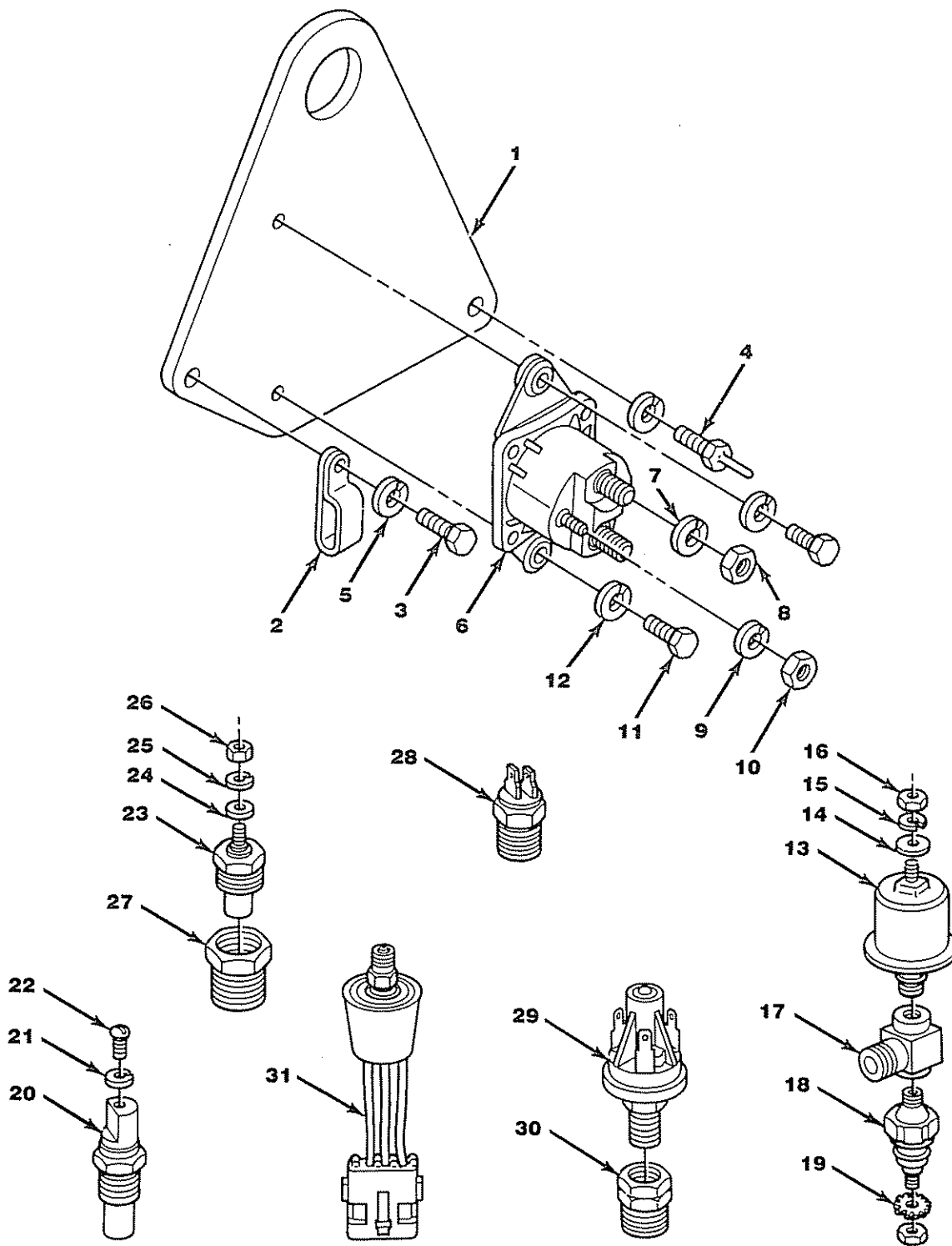


CM502XL-012

MODEL CM502XL PARTS BOOK  
WIRING HARNESS ASSEMBLIES – FIGURE 12

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98119	<b>Wiring Harness</b> , main engine (Serial Number 89381 and Below) (SEE NOTE)	1
1	98119	<b>Wiring Harness</b> , main engine (Serial Number 89382 and Above)	1
2	98196	<b>Bracket</b> , harness plug mounting	1
3	98197	<b>U-Clamp</b> , wiring harness attaching	1
4	22760	<b>Nut</b> , U-clamp	2
5	98235	<b>Bolt, Pin</b> , bracket to block (3/8–1")	1
6	103321	<b>Lockwasher</b> , mounting bolt	1
7	179858	<b>Bolt</b> , mounting (7/16–1")	1
8	103322	<b>Lockwasher</b> , mounting bolt	1
9	20247	<b>Clamp</b> , harness attaching	2
10	179839	<b>Bolt</b> , clamp attaching (3/8–1")	1
10	179858	<b>Bolt</b> , clamp attaching (7/16–1")	1
11	103321	<b>Lockwasher</b> , clamp attaching bolt	1
11	103322	<b>Lockwasher</b> , clamp attaching bolt (7/16")	1
12	98177	<b>Wire Lead</b> , coil to distributor	1
13	48005	<b>Wiring Harness, MSTs</b>	1
14	179835	<b>Bolt</b> , harness ground	1
15	138487	<b>Lockwasher</b> , harness ground bolt	1
<p><b>NOTE:</b> When replacing a main engine wiring harness on all XL models, serial number 89381 and below, it will be necessary to replace the electric fuel pump oil pressure switch. Order switch part number 98220. This is necessary due to incompatibility in wiring harness connectors in this location.</p>			

MODEL CM502XL PARTS BOOK  
ELECTRICAL COMPONENTS – FIGURE 13

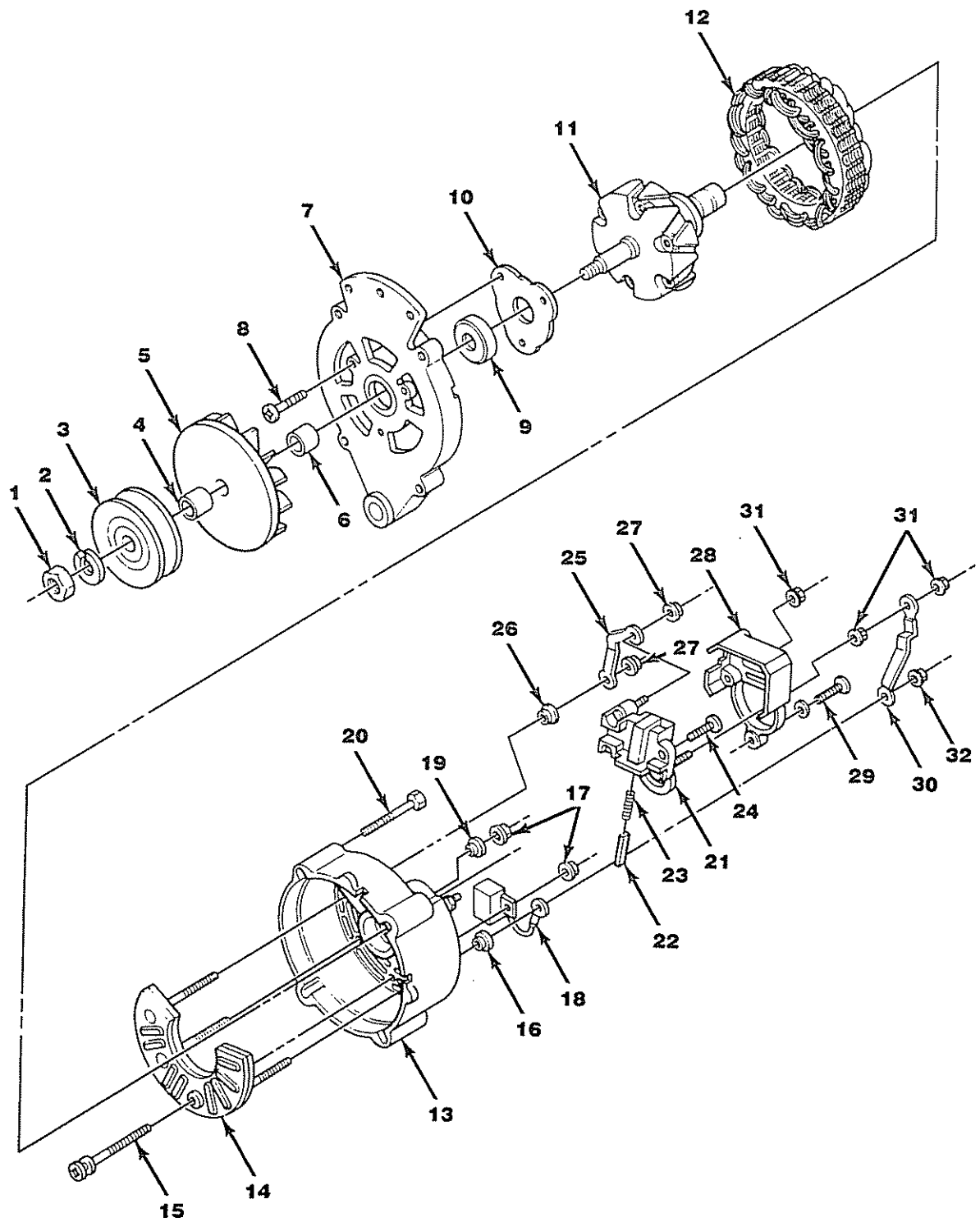


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MODEL CM502XL PARTS BOOK  
ELECTRICAL COMPONENTS – FIGURE 13

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98182	<b>Bracket</b> , solenoid mounting	1
2	20247	<b>Clamp</b> , wiring harness mounting	1
3	179839	<b>Bolt</b> , bracket mounting (1")	1
4	98235	<b>Bolt, Pin</b> , bracket mounting (1")	1
5	103321	<b>Lockwasher</b> , mounting bolt	2
6	22611	<b>Solenoid</b> , starter	1
7	21305	<b>Lockwasher</b> , solenoid terminal	2
8	21304	<b>Nut</b> , solenoid terminal	2
9	106497	<b>Lockwasher</b> , solenoid terminal	2
10	112432	<b>Nut</b> , solenoid terminal (10-32)	2
11	9439930	<b>Bolt</b> , solenoid mounting	2
12	103319	<b>Lockwasher</b> , mounting bolt	2
13	700425	<b>Oil Pressure Sender</b> (SS)	1
13	700403	<b>Oil Pressure Sender</b> (DS)	OPT
14	106090	Washer, sender terminal	1
15	455777	Lockwasher, sender terminal	1
16	112432	Nut, sender terminal	1
13A	22702	<b>Oil Pressure Sender</b> (VDO – SS)	OPT
13A	22704	<b>Oil Pressure Sender</b> (VDO – DS)	OPT
17	30606	Tee, oil sender mounting	1
18	97767	<b>Oil Pressure Alarm Sender</b>	1
19	271163	Nut, sender terminal	1
20	20326	<b>Water Temperature Alarm Sender</b>	1
21	106497	Lockwasher, sender screw	1
22	159997	Screw, wire attaching	1
23	700427	<b>Water Temperature Sender</b> (SS)	1
23	727046	<b>Water Temperature Sender</b> (DS)	OPT
24	106090	Washer, sender terminal	1
25	455777	Lockwasher, sender terminal	1
26	112432	Nut, sender terminal	1
23A	22701	<b>Water Temperature Sender</b> (VDO – SS)	OPT
23A	22703	<b>Water Temperature Sender</b> (VDO – DS)	OPT
27	120322	<b>Reducer</b> , VDO temperature sender	OPT
28	21088	<b>Trans Temperature Alarm Sender</b>	1
29	98176	<b>Oil Pressure Switch</b> (Fuel Pump) (Serial Number 89381 and Below)	1
30	30610	<b>Reducer</b> , oil pressure switch	1
31	98220	<b>Oil Pressure Switch</b> (Fuel Pump) (Serial Number 89382 and Above)	1

MODEL CM502XL PARTS BOOK  
ALTERNATOR ASSEMBLY (MANDO) – FIGURE 14



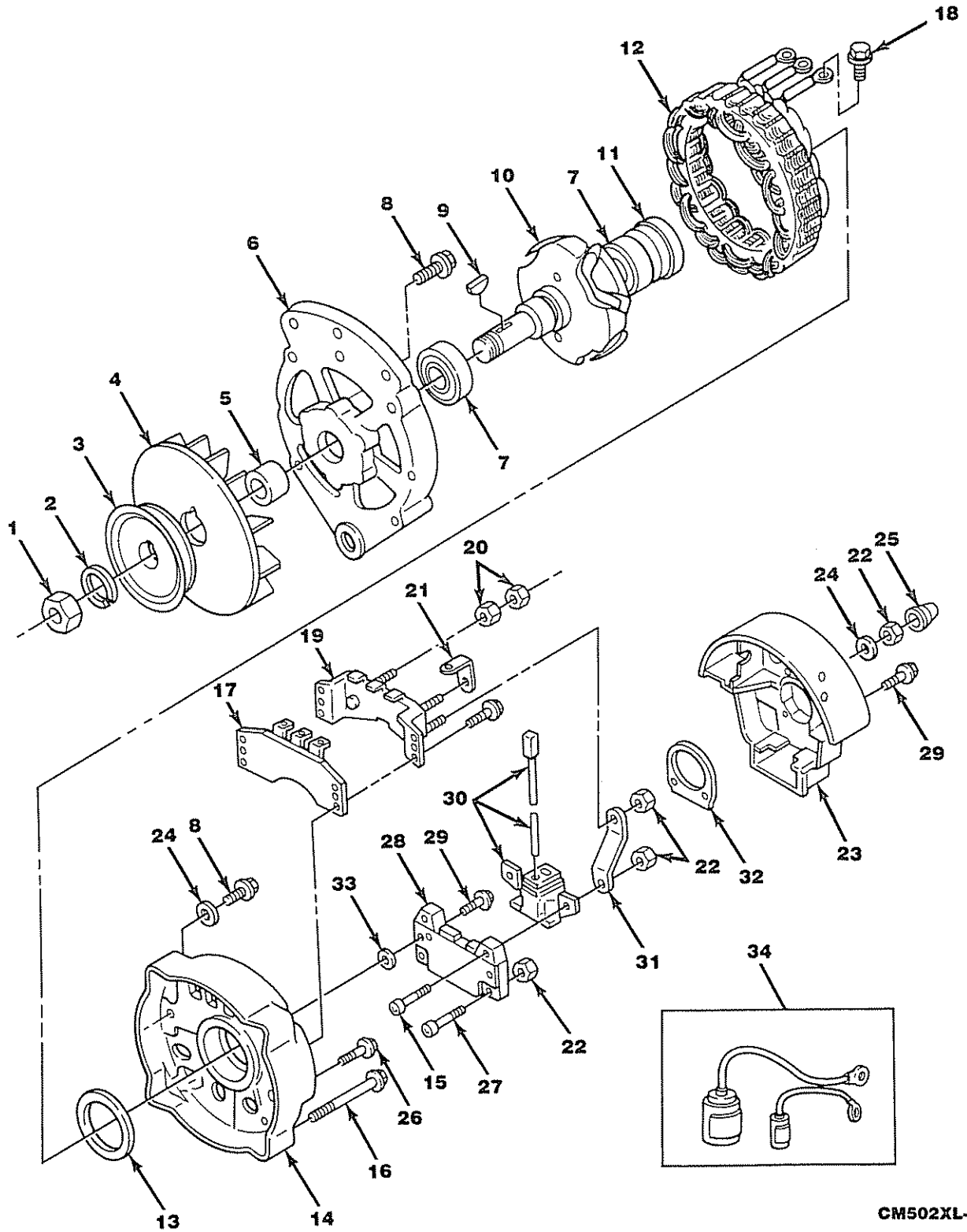
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MODEL CM502XL PARTS BOOK  
 ALTERNATOR ASSEMBLY (MANDO) – FIGURE 14

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	39200	<b>Alternator Assembly (51 AMP)</b>	1
1	39201	<b>Nut</b> , pulley to shaft	1
2	39202	<b>Lockwasher</b> , pulley to shaft nut	1
3	39203	<b>Pulley</b> , drive	1
4	39204	<b>Spacer</b> , pulley to fan	1
5	39205	<b>Fan</b> , cooling	1
6	39206	<b>Spacer</b> , cooling fan to frame	1
7	39207	<b>Housing Assembly</b> , front	1
8	39209	<b>Screw</b> , retainer attaching	3
9	39210	<b>Bearing</b> , rotor	1
10	39211	<b>Retainer</b> , bearing	1
11	39212	<b>Rotor Assembly</b>	1
12	39213	<b>Stator Assembly</b>	1
13	39214	<b>Housing Assembly</b> , rear	1
14	39216	<b>Rectifier Assembly</b>	1
15	39217	<b>Screw Set</b> , rectifier attaching	1
16	39218	<b>Insulator</b> , terminal screw	1
17	39219	<b>Nut</b> , terminal screw	2
18	39220	<b>Condenser Assembly</b>	1
19	39221	<b>Insulator</b> , terminal screw	1
20	39222	<b>Bolt</b> , housing assembly	4
21	39223	<b>Voltage Regulator Assembly</b>	1
22	39224	<b>Brush</b>	2
23	39225	<b>Brush Spring</b>	2
24	39226	<b>Screw</b> , regulator attaching	2
25	39227	<b>Strap</b> , Terminal-L	1
26	39218	<b>Insulator</b> , terminal screw	1
27	39219	<b>Nut</b> , terminal screw	2
28	39228	<b>Cover</b> , regulator	1
29	39229	<b>Screw</b> , cover attaching	1
30	39230	<b>Strap</b> , Terminal-B	1
31	39219	<b>Nut</b> , terminal screw	3
32	39221	<b>Nut</b> , terminal screw	1

MODEL CM502XL PARTS BOOK  
ALTERNATOR ASSEMBLY (PRESTOLITE) – FIGURE 15

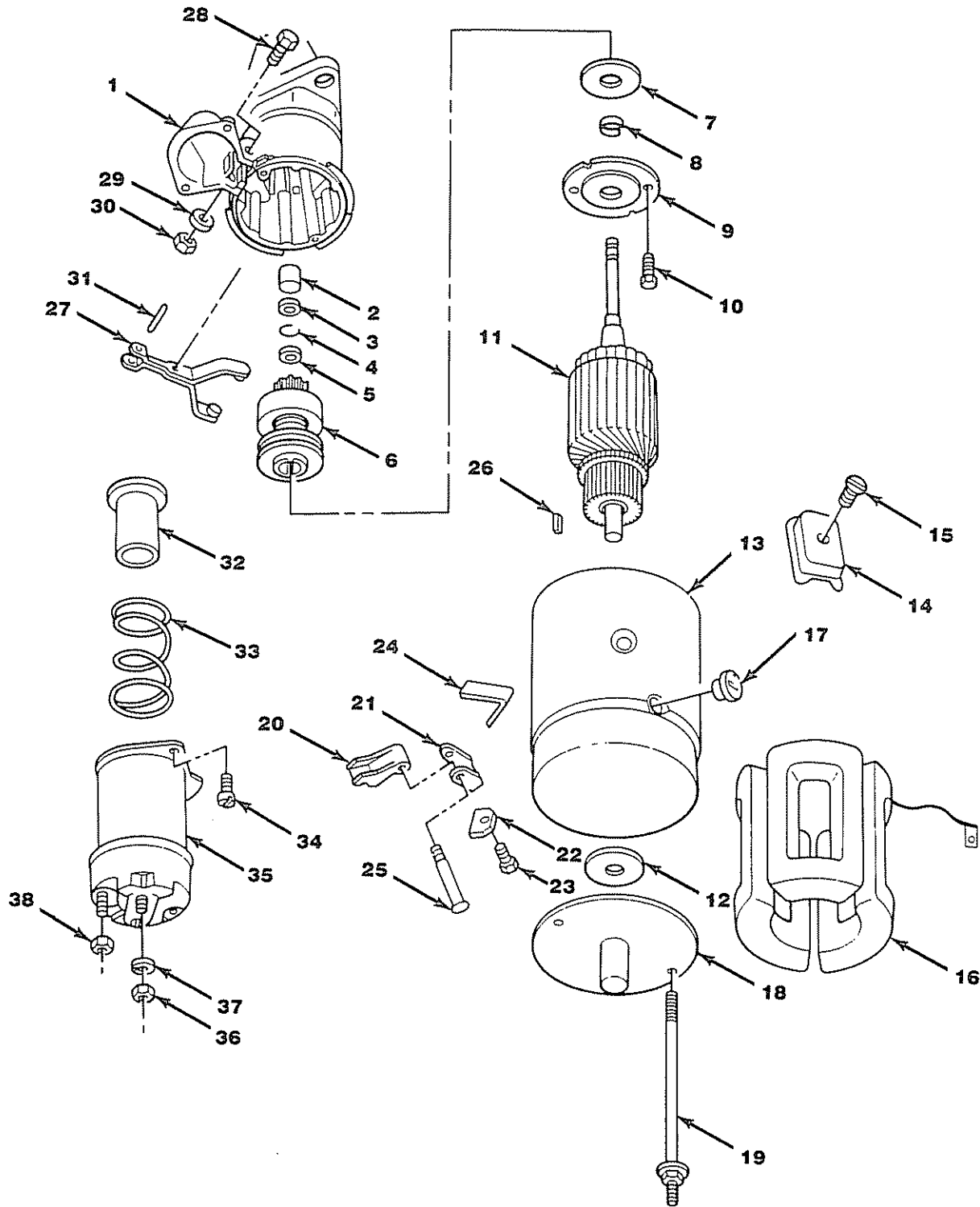


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MODEL CM502XL PARTS BOOK  
ALTERNATOR ASSEMBLY (PRESTOLITE) – FIGURE 15

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	39064	<b>Alternator Assembly (51 AMP)</b>	1
1	39072	<b>Nut</b> , pulley to shaft	1
2	39073	<b>Lockwasher</b> , pulley to shaft nut	1
3	39039	<b>Pulley</b> , drive	1
4	39074	<b>Fan</b> , cooling	1
5	39005	<b>Spacer</b> , cooling fan to frame	1
6	39076	<b>Housing</b> , front	1
7	39008	<b>Bearing</b> , rotor	2
8	39077	<b>Screw</b> , bearing to front housing	3
9	39086	<b>Key</b> , pulley drive	1
10	39069	<b>Rotor Assembly</b>	1
11	39078	<b>Slip Ring</b>	1
12	39068	<b>Stator Assembly</b>	1
13	39019	<b>Retainer</b> , rotor shaft bearing	1
14	39080	<b>Housing</b> , rear	1
15	39094	<b>Screw</b> , brush holder retaining	2
16	39081	<b>Bolt</b> , housing assembly	4
17	39082	<b>Rectifier</b> , diode bridge	1
18	39083	<b>Screw</b> , stator lead	3
19	39067	<b>Diode Trio</b>	1
20	39089	<b>Nut</b> , terminal	2
21	39084	<b>Strap</b> , AC tap	1
22	39090	<b>Nut</b> , terminal	6
23	39087	<b>Cover</b> , rear	1
24	39053	<b>Washer</b> , terminal stud	2
25	39088	<b>Cap</b> , terminal stud	3
26	39093	<b>Screw</b> , diode to rectifier	1
27	39091	<b>Screw</b> , voltage regulator	1
28	39065	<b>Voltage Regulator</b>	1
29	39092	<b>Screw</b> , regulator mounting	8
30	39066	<b>Brush Assembly</b>	1
31	39085	<b>Strap</b> , D+	1
32	39086	<b>Gasket</b> , felt	1
33	39044	<b>Washer</b> , insulator	2
34	39047	<b>Alternator Suppression Kit</b>	OPT
	NSS	<b>Capacitor</b>	1
	NSS	<b>Capacitor</b>	1

MODEL CM502XL PARTS BOOK  
STARTER MOTOR ASSEMBLY – FIGURE 16

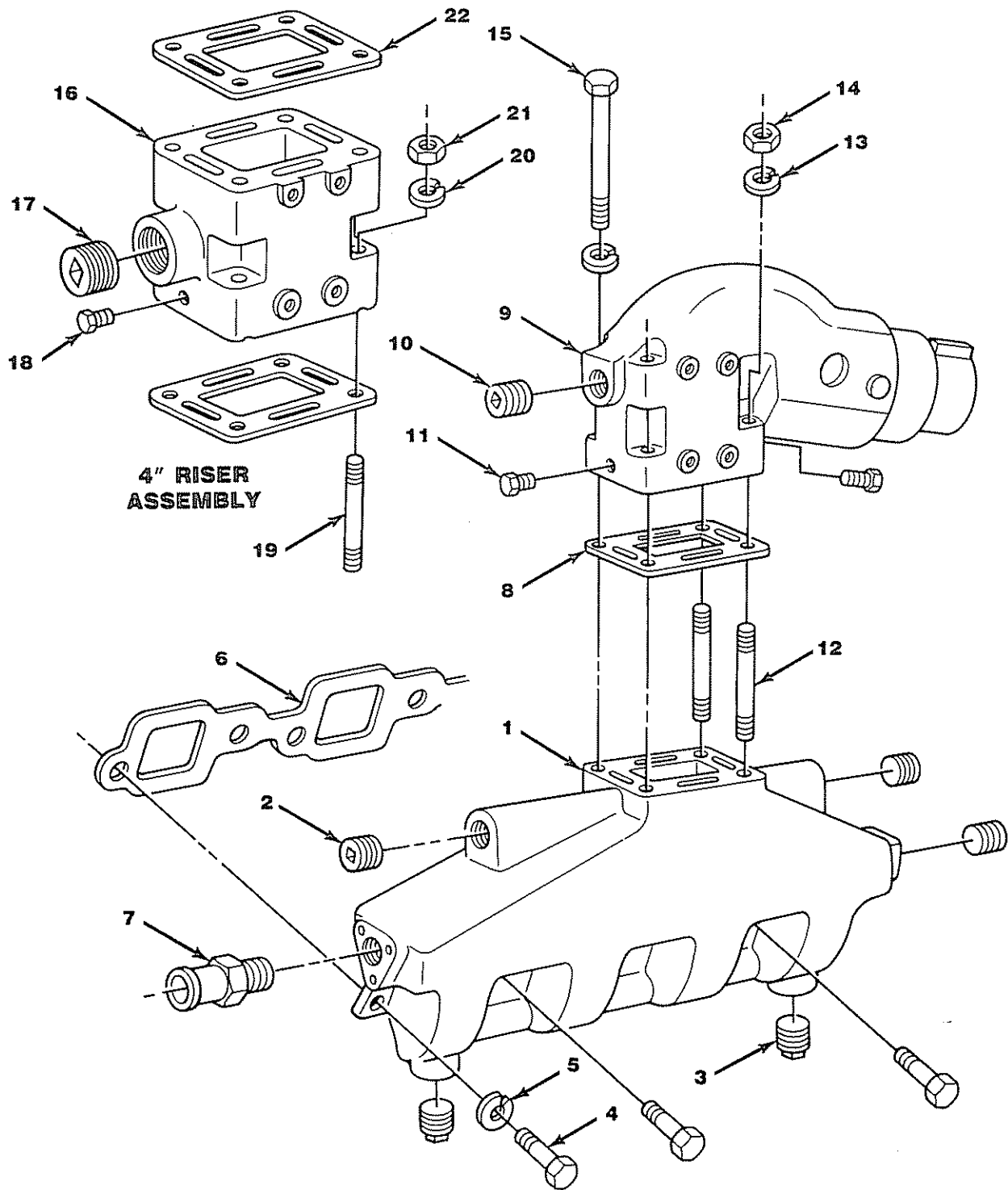


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MODEL CM502XL PARTS BOOK  
STARTER MOTOR ASSEMBLY – FIGURE 16

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	42091	<b>Starter Motor</b> (LH ROT) #1998316	1
*	42090	<b>Starter Motor</b> (RH ROT) #1998315	1
1	NSS	<b>Housing</b> , drive end	1
2	42051	<b>Bushing</b> , drive end	1
3	42014	<b>Collar</b> , thrust	1
4	42013	<b>Ring</b> , retaining	1
5	42012	<b>Collar</b> , pinion stop	1
6	42036	<b>Drive Assembly</b> , clutch (LH ROT)	1
6A	42031	<b>Drive Assembly</b> , clutch (RH ROT)	1
7	42095	<b>Washer</b> , bearing plate	1
8	42096	<b>Bushing</b> , bearing plate	1
9	42097	<b>Plate</b> , bearing	1
10	42098	<b>Screw</b> , bearing plate	2
11	42099	<b>Armature</b> (LH ROT)	1
11A	42100	<b>Armature</b> (RH ROT)	1
12	42101	<b>Washer</b> , commutator end frame	1
13	NSS	<b>Frame</b> , main	1
14	NSS	<b>Shoe</b> , pole – field coil	4
15	NSS	<b>Screw</b> , pole shoe retaining	4
16	42078	<b>Field Coil Assembly</b> (LH ROT)	1
16A	42079	<b>Field Coil Assembly</b> (RH ROT)	1
17	42102	<b>Grommet</b> , field coil	1
18	NSS	<b>Commutator End Cap</b>	1
19	42049	<b>Bolt</b> , thru	2
20	42003	<b>Brush Holder</b> , insulated	2
21	42002	<b>Brush Holder</b> , grounded	2
22	42001	<b>Brush</b> , field frame	4
23	42070	<b>Screw</b> , brush lead	4
24	42004	<b>Spring</b> , field frame brush	4
25	42005	<b>Brush Holder Support Kit</b>	2
26	NSS	<b>Pin</b> , dowel	1
27	42020	<b>Lever</b> , shift	1
28	42022	<b>Bolt</b> , shift lever	1
29	42103	<b>Washer</b> , shift lever bolt	2
30	42104	<b>Nut</b> , shift lever bolt	1
31	NSS	<b>Pin</b> , plunger to shift lever	1
32	42105	<b>Plunger</b> , shift lever	1
33	42018	<b>Spring</b> , plunger return	1
34	42073	<b>Screw</b> , solenoid mounting	2
35	42094	<b>Solenoid Assembly</b>	1
36	21118	<b>Nut</b> , terminal	2
37	106497	<b>Lockwasher</b> , terminal	2
38	21123	<b>Nut</b> , battery cable attaching	1
<p><b>NOTE:</b> Parts not available from the Crusader Parts Department can be purchased locally through Delco Distributors. Use the proper Delco starter number when ordering parts.</p>			

MODEL CM502XL PARTS BOOK  
EXHAUST MANIFOLD ASSEMBLY – FIGURE 17

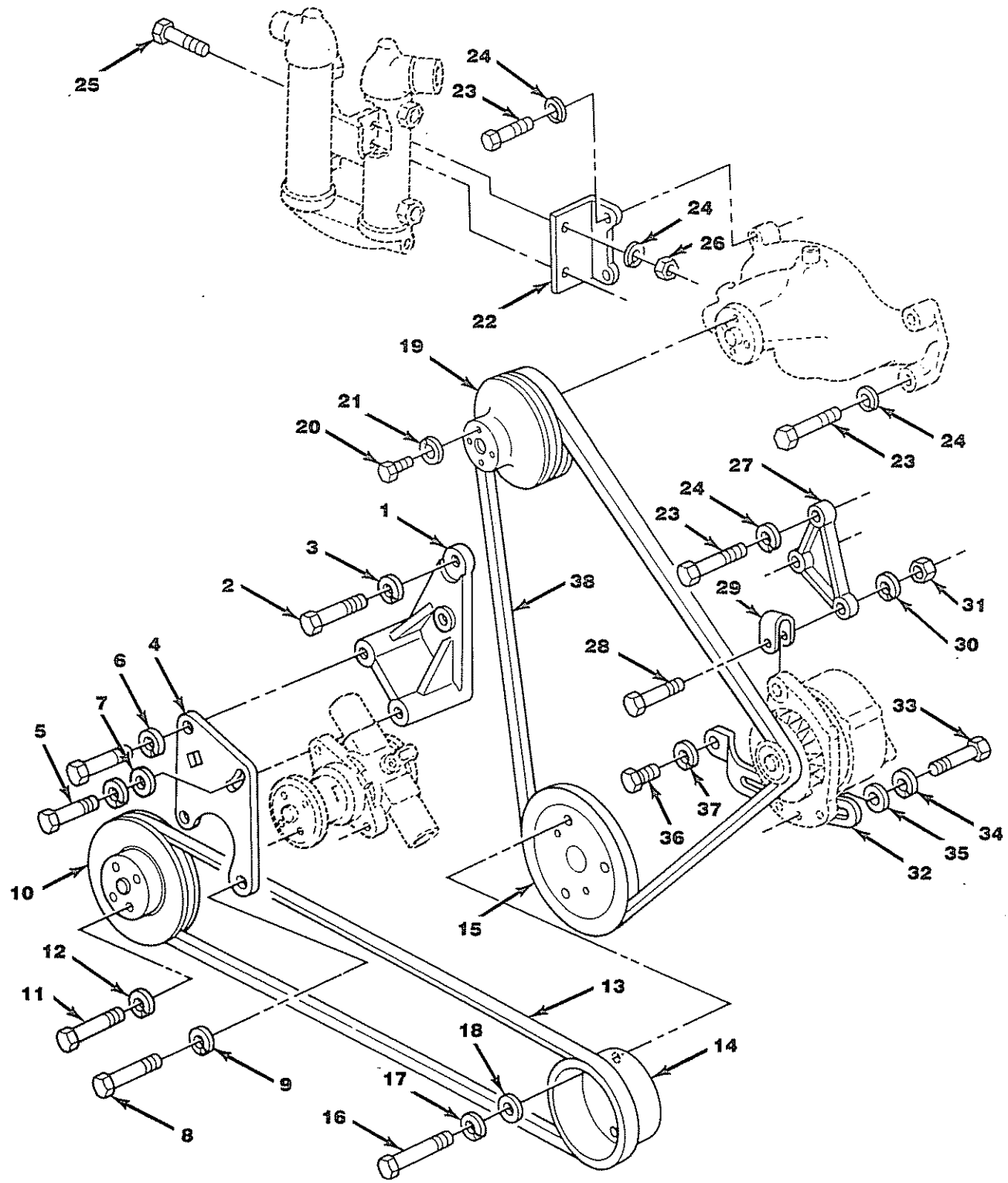


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MODEL CM502XL PARTS BOOK  
EXHAUST MANIFOLD ASSEMBLY – FIGURE 17

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98125	<b>Exhaust Manifold</b>	2
2	103876	<b>Plug</b> , exhaust manifold (1")	8
3	113178	<b>Plug</b> , manifold drain	2
4	186628	<b>Bolt</b> , manifold to cylinder head (1-1/2")	16
5	103321	<b>Lockwasher</b> , manifold to head bolt	16
6	96653	<b>Gasket</b> , manifold to cylinder head ★ ▲ ■	2
7	97852	<b>Fitting</b> , water (Straight)	1
7	97854	<b>Fitting</b> , water (90-degree)	1
8	98127	<b>Gasket</b> , manifold to elbow	2
9	98126	<b>Exhaust Elbow Assembly</b>	2
10	113186	<b>Plug</b> , exhaust elbow (3/4")	2
11	127950	<b>Plug</b> , drain	4
12	20827	<b>Stud</b> , exhaust elbow attaching (3")	4
13	103321	<b>Lockwasher</b> , elbow attaching stud	8
14	102635	<b>Nut</b> , elbow attaching stud	4
15	450517	<b>Bolt</b> , exhaust elbow attaching (4-3/4")	4
*	22818	<b>4-Inch Riser Kit</b>	1
16	98128	<b>Exhaust Riser</b>	2
17	113186	<b>Plug</b> , exhaust riser (3/4")	2
18	127950	<b>Plug</b> , drain	4
19	20783	<b>Stud</b> , riser mounting (2-3/4")	8
20	103321	<b>Lockwasher</b> , riser stud	8
21	102635	<b>Nut</b> , riser mounting stud	8
22	98127	<b>Gasket</b> , riser mounting	4
<p><b>NOTE:</b> See Fresh Water Cooling section for parts used on Fresh Water Cooled engines.</p>			

MODEL CM502XL PARTS BOOK  
PULLEYS, BELTS, AND MOUNTING HARDWARE – FIGURE 18



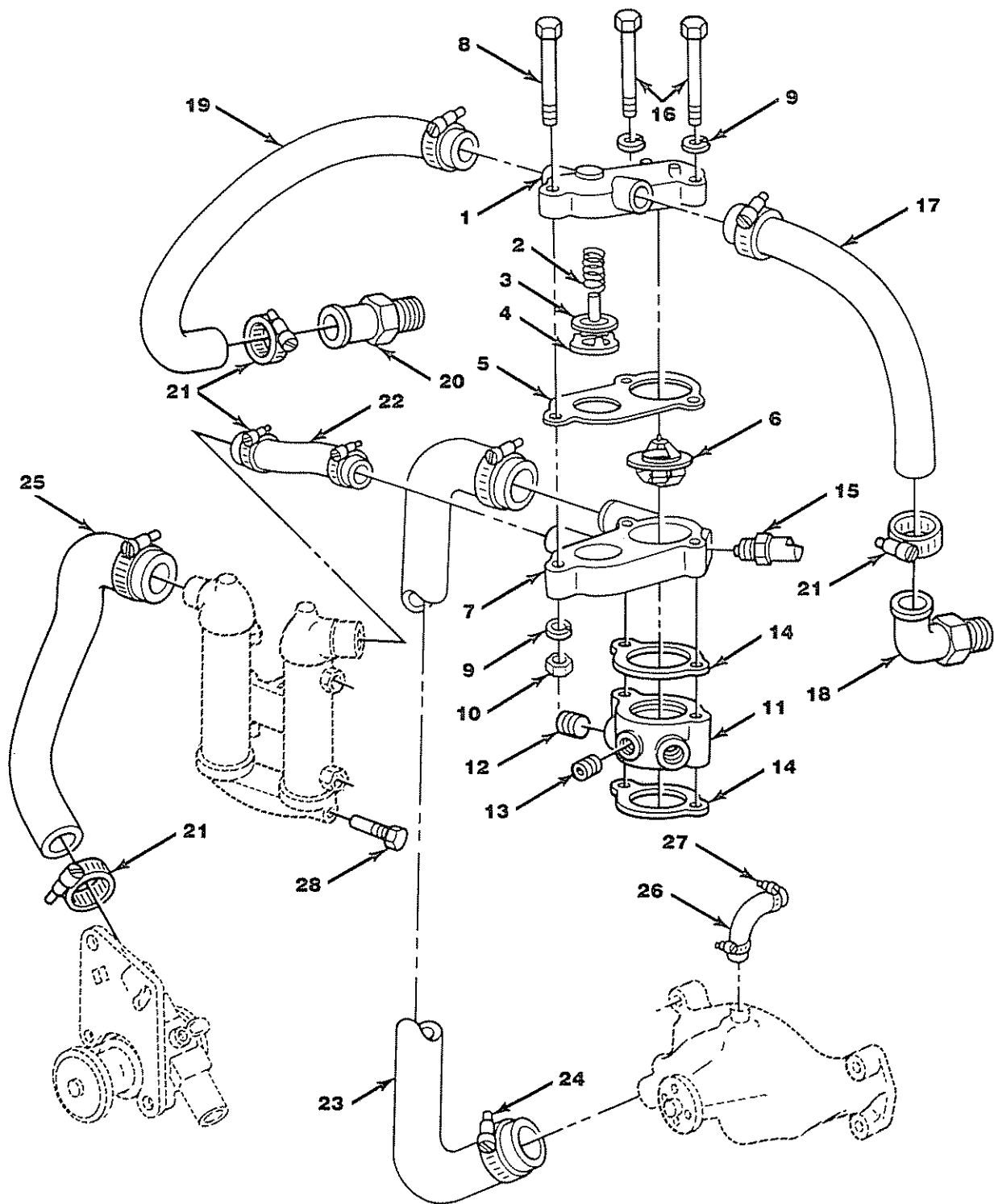
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MODEL CM502XL PARTS BOOK  
PULLEYS, BELTS, AND MOUNTING HARDWARE – FIGURE 18

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98120	<b>Bracket</b> , raw water pump mounting	1
2	179860	<b>Bolt</b> , bracket to cylinder block (1-1/4")	2
3	103322	<b>Lockwasher</b> , mounting bolt	2
4	98121	<b>Bracket</b> , raw water pump adjusting	1
5	179860	<b>Bolt</b> , adjusting bracket mounting (1-1/4")	2
6	103322	<b>Lockwasher</b> , adjusting bolt	2
7	103342	<b>Washer</b> , adjusting bolt	1
8	22828	<b>Bolt</b> , raw water pump mounting (1")	2
9	9417953	<b>Lockwasher</b> , pump mounting bolt	2
10	97952	<b>Pulley</b> , raw water pump	1
11	181336	<b>Bolt</b> , pulley attaching (3/4")	4
12	9417953	<b>Lockwasher</b> , attaching bolt	4
13	10258	<b>Belt</b> , raw water drive	1
14	97950	<b>Pulley</b> , crankshaft to raw water pump	1
15	97954	<b>Pulley</b> , crankshaft to alternator	1
16	179839	<b>Bolt</b> , pulley to balancer (1")	3
17	103321	<b>Lockwasher</b> , pulley attaching bolt	3
18	103341	<b>Washer</b> , pulley attaching bolt	3
19	98211	<b>Pulley</b> , engine circulating pump	1
20	181336	<b>Bolt</b> , water pump pulley (3/4")	4
21	9417953	<b>Lockwasher</b> , water pump pulley bolt	4
22	97937	<b>Bracket</b> , oil cooler mounting	1
23	179847	<b>Bolt</b> , attaching (2")	5
24	103321	<b>Lockwasher</b> , attaching bolt	7
25	179839	<b>Bolt</b> , oil cooler mounting (1")	2
26	102635	<b>Nut</b> , cooler mounting bolt	2
27	98193	<b>Bracket</b> , alternator mounting	1
28	9419114	<b>Bolt</b> , alternator attaching (3-1/4")	1
29	98184	<b>Loop</b> , alternator adjusting	1
30	9419665	<b>Lockwasher</b> , attaching bolt	1
31	9418828	<b>Nut</b> , attaching bolt	1
32	98209	<b>Strap</b> , alternator adjusting	1
33	9418918	<b>Bolt</b> , alternator adjusting (1")	1
34	9417953	<b>Lockwasher</b> , alternator adjusting bolt	1
35	20523	<b>Washer</b> , alternator adjusting bolt	1
36	179858	<b>Bolt</b> , adjusting strap to block (1")	1
37	103322	<b>Lockwasher</b> , adjusting strap bolt	1
38	98210	<b>Belt</b> , alternator drive	1

MODEL CM502XL PARTS BOOK  
RAW WATER COOLING COMPONENTS – FIGURE 19



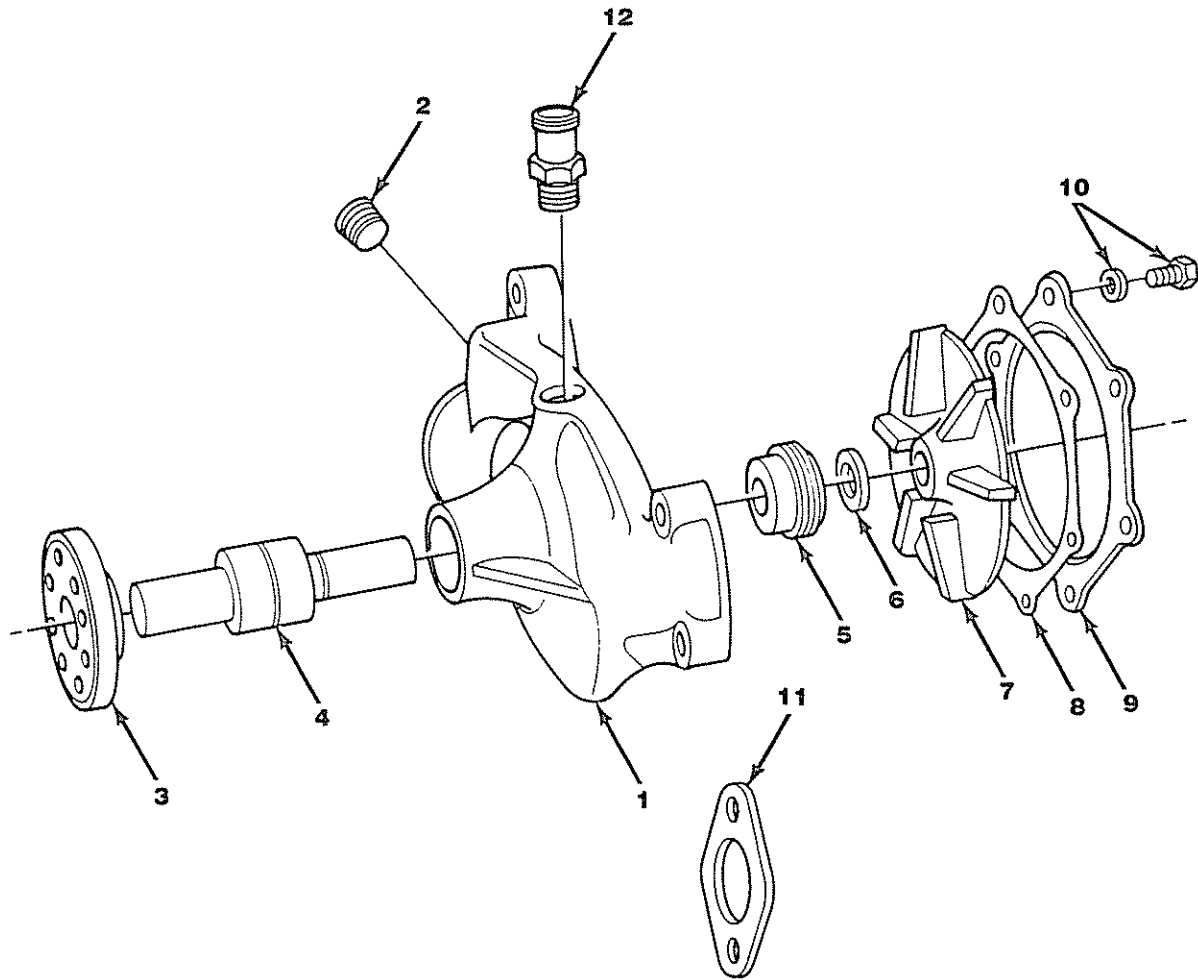
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MODEL CM502XL PARTS BOOK  
RAW WATER COOLING COMPONENTS – FIGURE 19

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	22366	<b>Thermostat Housing Assembly, Complete</b>	1
1	97556	<b>Thermostat Housing</b> , upper	1
2	96686	<b>Spring</b> , pressure relief	1
3	96066	<b>Valve</b> , pressure relief	1
4	96065	<b>Seat</b> , pressure relief	1
5	97361	<b>Gasket</b> , thermostat housing ★ ▲ ■	1
6	96319	<b>Thermostat</b> (143-degree)	1
7	97557	<b>Thermostat Housing</b> , lower	1
8	186283	<b>Bolt</b> , thermostat housing (3-1/2")	1
9	103321	<b>Lockwasher</b> , thermostat housing bolt	3
10	102635	<b>Nut</b> , thermostat housing bolt	1
11	98069	<b>Spacer</b> , thermostat housing	1
12	444705	<b>Plug</b> , pipe (1/2")	1
13	444868	<b>Plug</b> , pipe (3/8")	1
14	96105	<b>Gasket</b> , spacer to intake	2
15	20326	<b>Sender</b> , temperature alarm	1
16	9419192	<b>Bolt</b> , thermostat housing to intake (6")	2
17	18303	<b>Hose</b> , thermostat housing to manifold (Port)	1
18	97854	<b>Fitting</b> , water – 90 degree	1
19	18304	<b>Hose</b> , thermostat housing to manifold (Starboard)	1
20	97852	<b>Fitting</b> , water – straight	1
21	20228	<b>Clamp</b> , water hose	8
22	18301	<b>Hose</b> , oil cooler to thermostat housing	1
23	18302	<b>Hose</b> , water pump to thermostat housing	1
24	20420	<b>Clamp</b> , hose	2
25	18300	<b>Hose</b> , water pump to oil cooler	1
26	30178	<b>Hose</b> , block water bypass	1
27	20226	<b>Clamp</b> , bypass hose	2
28	10335	<b>Zinc</b> , sacrificial	1

MODEL CM502XL PARTS BOOK  
ENGINE WATER CIRCULATION PUMP – FIGURE 20

---

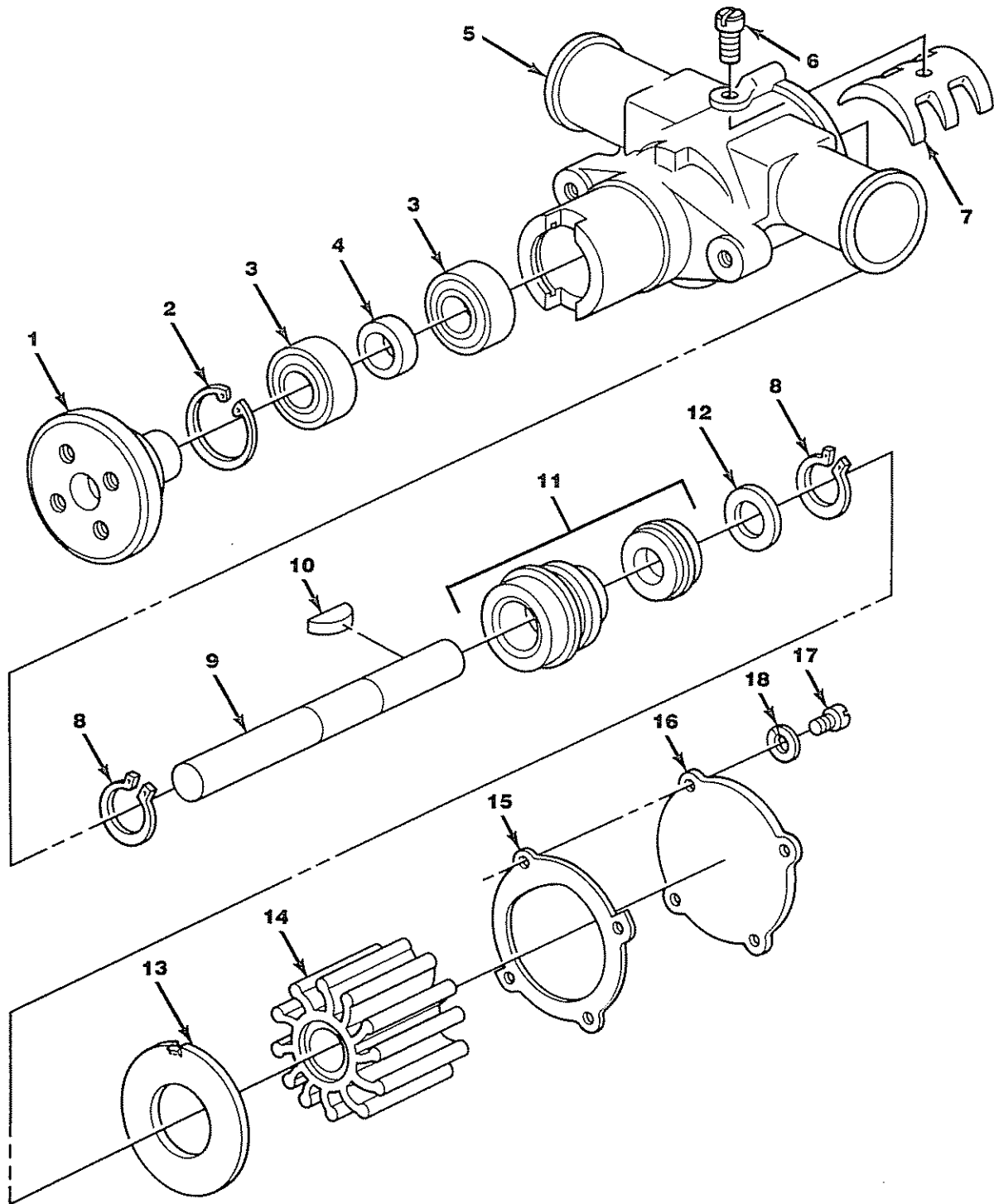


CM502XL-020

MODEL CM502XL PARTS BOOK  
ENGINE WATER CIRCULATION PUMP – FIGURE 20

ITEM	PART NO.	DESCRIPTION	QUANTITY
*	30109	<b>Water Pump Assembly</b>	1
1	NSS	<b>Housing</b> , water pump	1
2	444705	<b>Plug</b> , pump housing	1
3	96972	<b>Hub</b> , drive pulley	1
4	30102	<b>Bearing and Shaft Assembly</b>	1
5	10164	<b>Seal Assembly</b>	1
6	96971	<b>Seat</b> , seal	1
7	30103	<b>Impeller</b> , water pump	1
8	96774	<b>Gasket</b> , impeller housing cover	1
9	96467	<b>Cover</b> , impeller housing	1
10	30248	<b>Bolt</b> , cover attaching	6
11	30006	<b>Gasket</b> , water pump to cylinder block ★	2
12	30177	<b>Fitting</b> , water bypass hose	1
=====			
<b>Repair Kits:</b>			
=====			
	<b>Kit Part No.</b> 20514	<b>Description</b> <b>Overhaul Kit, Major</b> (Includes items 4, 5, 6, 7, 8 and 11)	

MODEL CM502XL PARTS BOOK  
RAW WATER COOLING PUMP – FIGURE 21



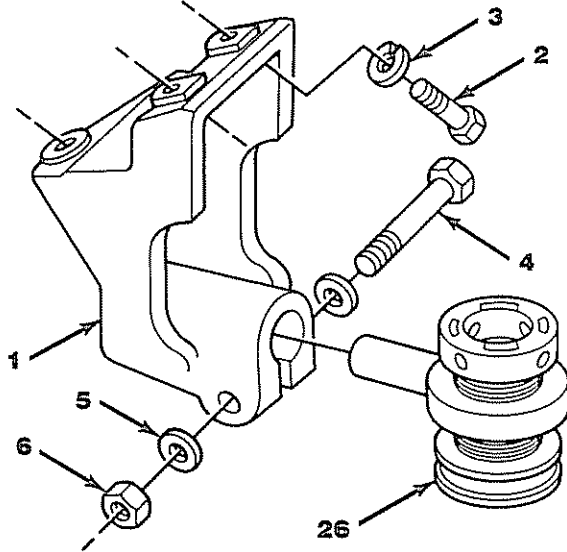
CM502XL-021

MODEL CM502XL PARTS BOOK  
RAW WATER COOLING PUMP – FIGURE 21

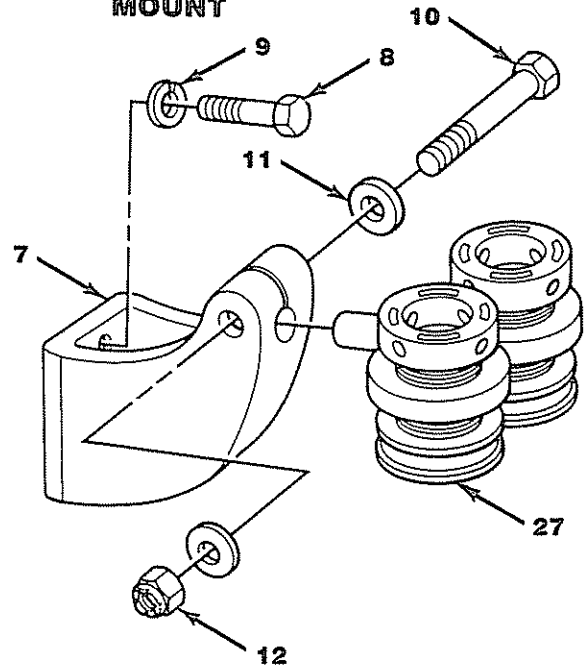
ITEM	PART NO.	DESCRIPTION	QUANTITY
*	40050	<b>Raw Water Pump Assembly</b>	1
1	97176	<b>Hub, drive</b>	1
2	20294	<b>Retainer, bearing</b>	1
3	40054	<b>Bearing, shaft</b>	2
4	40053	<b>Spacer, bearing</b>	1
5	40062	<b>Housing, water pump</b>	1
6	20298	<b>Screw, cam retaining</b>	1
7	20303	<b>Cam, eccentric</b>	1
8	20293	<b>Retainer, shaft</b>	2
9	40061	<b>Shaft Assembly</b>	1
10	20295	<b>Key, impeller drive</b>	1
11	40057	<b>Seal and Seat Assembly</b>	1
12	40052	<b>Washer</b>	1
13	40063	<b>Plate, wear</b>	1
14	20300	<b>Impeller, water pump</b>	1
15	40059	<b>Gasket, rear cover</b>	1
16	40060	<b>Cover</b>	1
17	40071	<b>Bolt, rear cover attaching</b>	4
18	40051	<b>Lockwasher, cover bolt</b>	4
=====			
<b>Repair Kits:</b>			
=====			
	<b>Kit Part No.</b>	<b>Description</b>	
	40065	<b>Impeller Kit</b> (Includes items 14 and 15)	
	40064	<b>Overhaul Kit, Major</b> (Includes items 2, 3, 11, 14 and 15)	

MODEL CM502XL PARTS BOOK  
 ENGINE AND TRANSMISSION MOUNTS – FIGURE 22

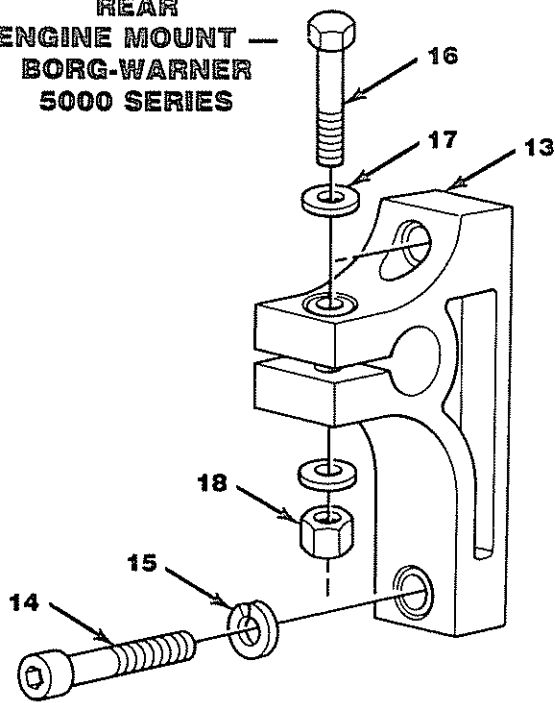
**STANDARD  
 FRONT ENGINE  
 MOUNT**



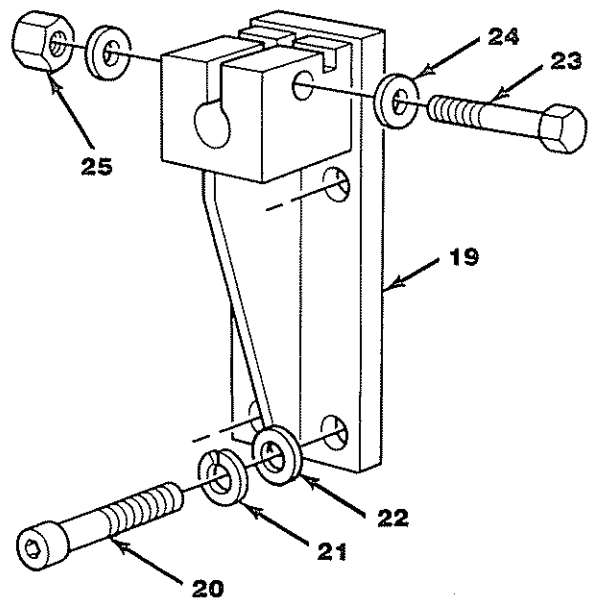
**STANDARD  
 REAR ENGINE  
 MOUNT**



**REAR  
 ENGINE MOUNT —  
 BORG-WARNER  
 5000 SERIES**



**REAR  
 ENGINE MOUNT —  
 HURTH TRANSMISSION**



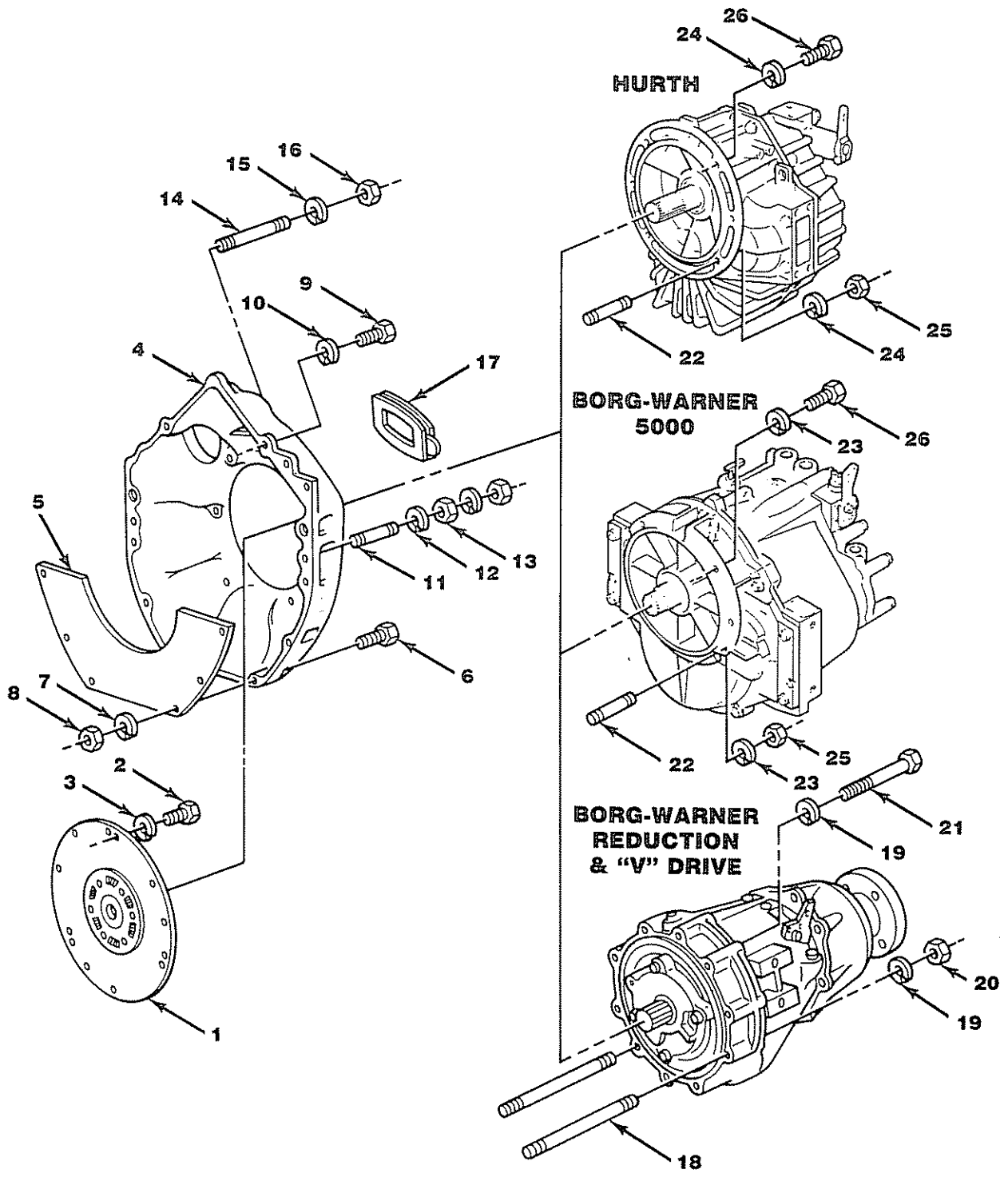
CM502XL-022



MODEL CM502XL PARTS BOOK  
ENGINE AND TRANSMISSION MOUNTS – FIGURE 22

ITEM	PART NO.	DESCRIPTION	QUANTITY
<b>** Standard Front Engine Mount ***</b>			
1	97938	<b>Bracket</b> , engine mounting (Front)	2
2	179841	<b>Bolt</b> , bracket to engine (1-1/4")	6
3	103321	<b>Lockwasher</b> , bracket mounting bolt	6
4	454916	<b>Bolt</b> , trunnion shaft (2-1/4")	2
5	103341	<b>Washer</b> , trunnion bolt	4
6	22436	<b>Nut</b> , trunnion bolt – locking	2
<b>** Standard Rear Engine Mount ***</b>			
7	97917	<b>Bracket</b> , engine mounting (Rear)	2
8	179860	<b>Bolt</b> , bracket to transmission (1-1/4")	4
9	103322	<b>Lockwasher</b> , bracket mounting bolt	4
10	9423205	<b>Bolt</b> , trunnion shaft (3-1/4")	2
11	103341	<b>Washer</b> , trunnion bolt	4
12	22436	<b>Nut</b> , trunnion bolt – locking	2
<b>** Rear Engine Mount – Borg-Warner 5000 Series ***</b>			
13	98224	<b>Bracket</b> , transmission mounting (Starboard)	1
13	98225	<b>Bracket</b> , transmission mounting (Port)	1
14	21149	<b>Bolt</b> , bracket to transmission (12mm x 60mm)	4
15	21113	<b>Lockwasher</b> (12mm)	4
16	454916	<b>Bolt</b> , trunnion shaft (3-1/4")	2
17	103341	<b>Washer</b> , trunnion bolt	4
18	22436	<b>Nut</b> , trunnion bolt – locking	2
<b>** Rear Engine Mount – Hurth Transmission ***</b>			
19	98077	<b>Bracket</b> , engine mounting (Rear)	2
20	21144	<b>Bolt</b> , bracket to transmission (12mm x 35mm)	8
21	21145	<b>Lockwasher</b> (12mm)	8
22	21146	<b>Washer</b> (12mm)	8
23	9426907	<b>Bolt</b> , trunnion shaft (3-1/4")	2
24	103341	<b>Washer</b> , trunnion bolt	4
25	22436	<b>Nut</b> , trunnion bolt – locking	2
<b>** Mount Supports ***</b>			
26	97926	<b>Mount</b> , engine support (Single Front)	2
27	97906	<b>Mount</b> , engine support (Dual Rear)	2

MODEL CM502XL PARTS BOOK  
 BELLSHOUSING ASSEMBLY – FIGURE 23

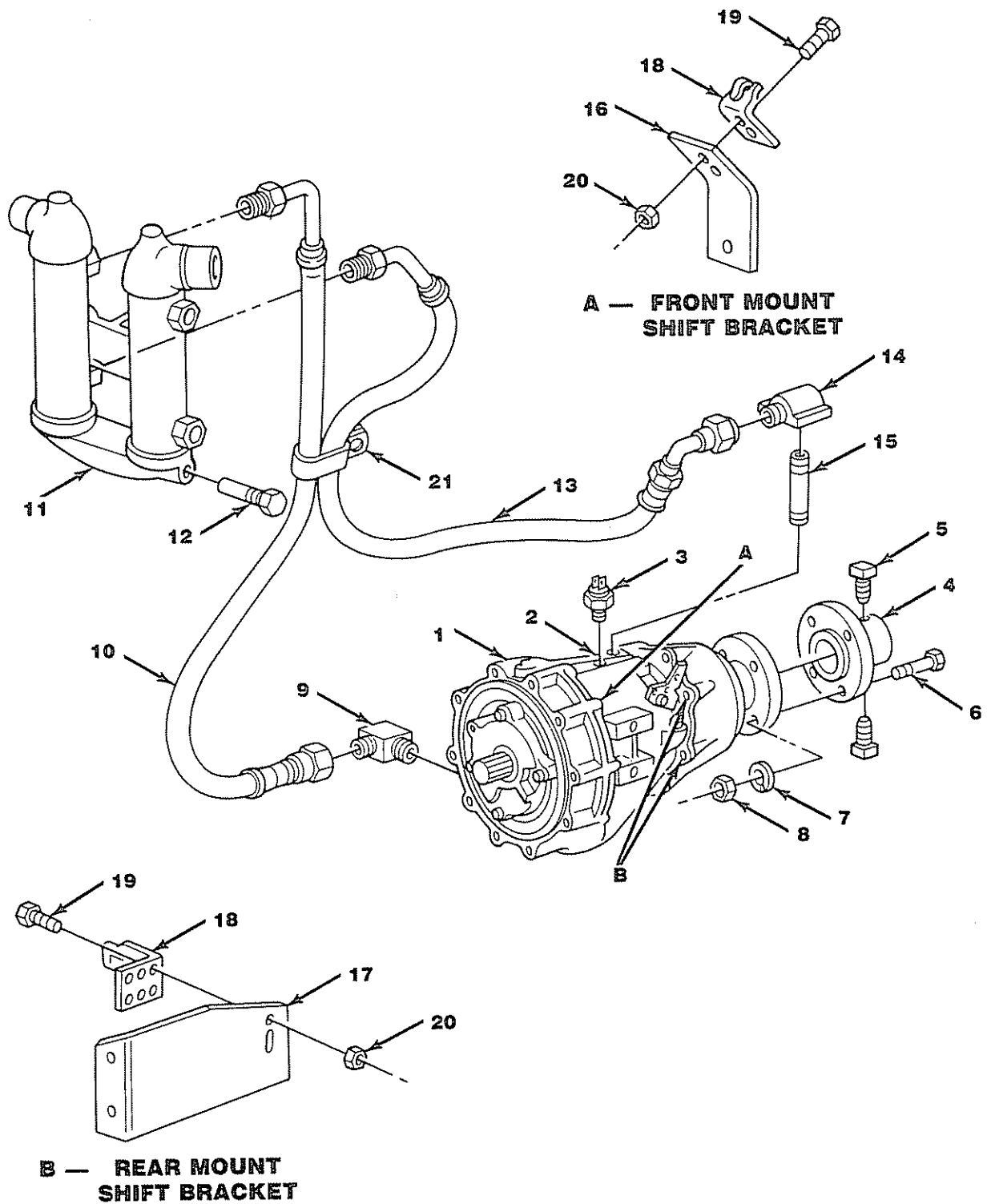


CM502XL-023

MODEL CM502XL PARTS BOOK  
 BELLHOUSING ASSEMBLY – FIGURE 23

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98248	<b>Drive Damper Assembly</b> (Hurth and 5000 only)	1
1	97334	<b>Drive Damper Assembly</b> (Standard Borg-Warner)	1
2	22030	<b>Bolt</b> , damper to flywheel (1")	6
3	103321	<b>Lockwasher</b> , damper bolt	6
4	97999	<b>Bellhousing</b> , flywheel	1
5	98015	<b>Cover</b> , bellhousing	1
6	179799	<b>Bolt</b> , cover to bellhousing (1-1/4")	6
7	103319	<b>Lockwasher</b> , cover bolt	6
8	109084	<b>Nut</b> , cover bolt	6
9	179841	<b>Bolt</b> , bellhousing to block (1-1/4")	2
10	103321	<b>Lockwasher</b> , bellhousing bolt	2
11	22455	<b>Stud</b> , bellhousing mounting (2-3/4")	2
12	103321	<b>Lockwasher</b> , mounting stud	4
13	102635	<b>Nut</b> , mounting stud	4
14	96433	<b>Stud</b> , starter mounting (1-5/8")	2
15	103322	<b>Lockwasher</b> , starter mounting stud	2
16	102636	<b>Nut</b> , starter mounting stud	2
17	96350	<b>Boot</b> , bellhousing	1
<b>** Borg-Warner Reduction &amp; "V"-Drive **</b>			
18	96541	<b>Stud</b> , transmission mounting (4")	2
19	136857	<b>Lockwasher</b> , transmission mounting	6
20	102635	<b>Nut</b> , transmission mounting stud	2
21	179872	<b>Bolt</b> , transmission mounting	4
<b>** Borg-Warner 5000 &amp; Hurth Series **</b>			
22	96433	<b>Stud</b> , transmission mounting (1-5/8")	2
23	103322	<b>Lockwasher</b> , transmission mounting	6
24	136857	<b>Lockwasher</b> , transmission mounting	6
25	102636	<b>Nut</b> , transmission mounting stud	2
26	179860	<b>Bolt</b> , transmission mounting	4

MODEL CM502XL PARTS BOOK  
TRANSMISSION AND RELATED PARTS (BORG-WARNER IN-LINE) – FIGURE 24



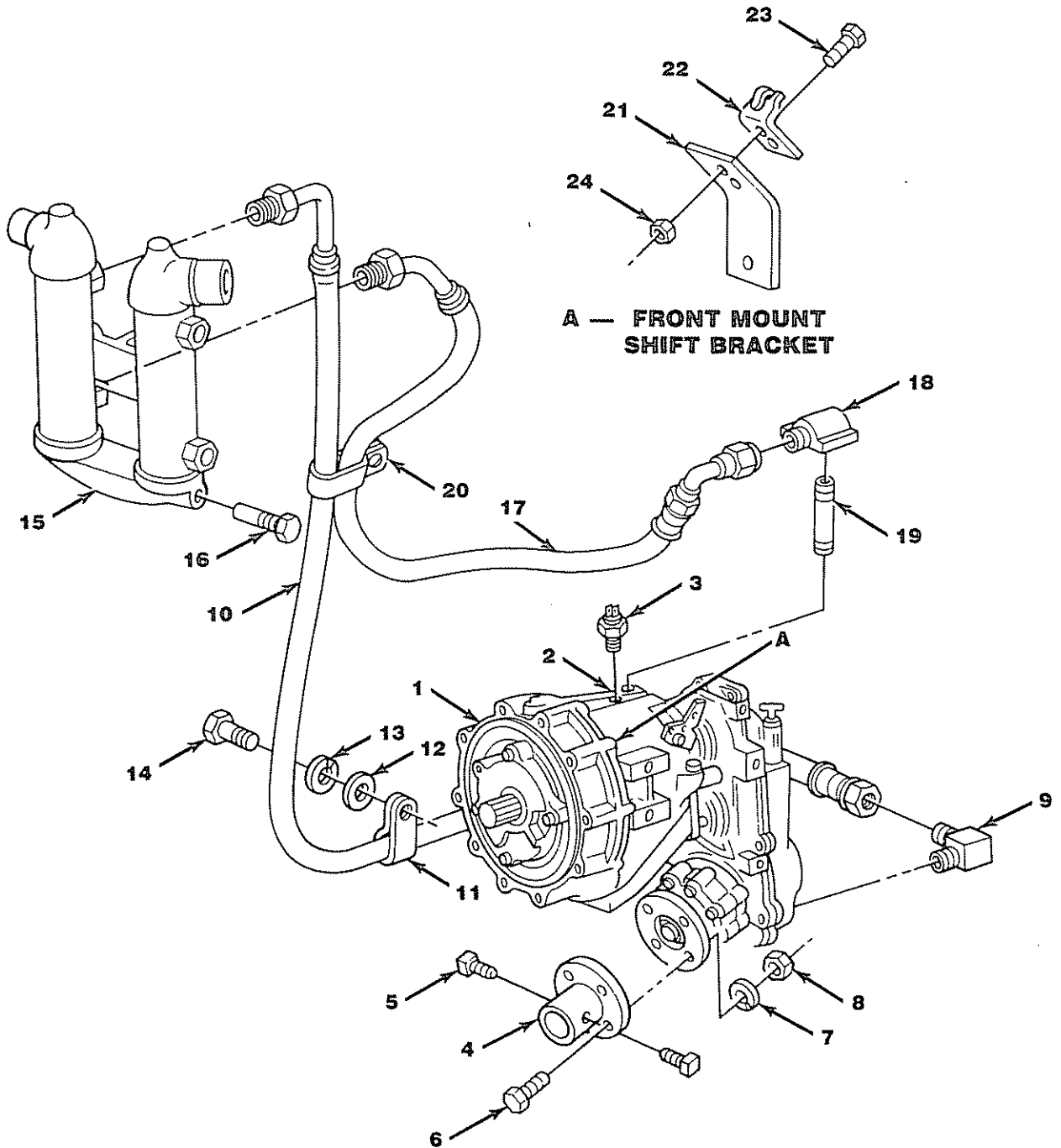
CM502XL-024

MODEL CM502XL PARTS BOOK

TRANSMISSION AND RELATED PARTS (BORG-WARNER IN-LINE) – FIGURE 24

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	9001517	<b>Transmission</b> (1:1 Direct Drive)	1
1	9001545	<b>Transmission</b> (1.52:1 Reduction)	1
1	25514	<b>Transmission</b> (1.88:1 Reduction)	1
1	1001512	<b>Transmission</b> (2.57:1 Reduction)	1
1	1001513	<b>Transmission</b> (2.91:1 Reduction)	1
2	20171	<b>Switch Kit</b> , neutral start	1
2A	25542	<b>Switch &amp; O-Ring Assembly</b> (Not Shown)	1
3	21088	<b>Sender</b> , temperature alarm	1
4	91690	<b>Coupler</b> , prop shaft (1" shaft)	OPT
4	91691	<b>Coupler</b> , prop shaft (1-1/8" shaft)	OPT
4	91692	<b>Coupler</b> , prop shaft (1-1/4" shaft)	OPT
4	91693	<b>Coupler</b> , prop shaft (1-3/8" shaft)	OPT
4	91694	<b>Coupler</b> , prop shaft (1-1/2" shaft)	OPT
4	91695	<b>Coupler</b> , prop shaft (1-3/4" shaft)	OPT
4	91696	<b>Coupler</b> , prop shaft (2" shaft)	OPT
5	2000090	<b>Screw</b> , set – coupler (1-1/4")	2
6	22136	<b>Bolt</b> , coupling (1-1/2")	4
7	103322	<b>Lockwasher</b> , coupling bolt	4
8	272231	<b>Nut</b> , coupling bolt	4
9	30526	<b>Elbow</b> , hose – transmission (90-degree)	1
10	18200	<b>Hose Assembly</b> , transmission to cooler (45")	1
11	98123	<b>Oil Cooler Assembly</b>	1
12	10335	<b>Zinc</b> , sacrificial	1
13	18201	<b>Hose Assembly</b> , transmission to cooler (46")	1
14	30516	<b>Elbow</b> , hose – transmission (90-degree)	1
15	144603	<b>Nipple</b> , pipe (3")	1
16	96341	<b>Shift Bracket</b> (Front Entry)	1
17	97471	<b>Shift Bracket</b> (Rear Entry)	OPT
18	21033	<b>Cable Clip</b> , single cable	1
18A	22232	<b>Cable Clip</b> , dual cable kit	OPT
19	443874	<b>Bolt</b> , clip attaching (1/2")	2
20	22440	<b>Nut</b> , attaching bolt	2
21	22112	<b>Clamp</b> , oil hose mounting	2

MODEL CM502XL PARTS BOOK  
 TRANSMISSION AND RELATED PARTS (BORG-WARNER "V"-DRIVE) – FIGURE 25

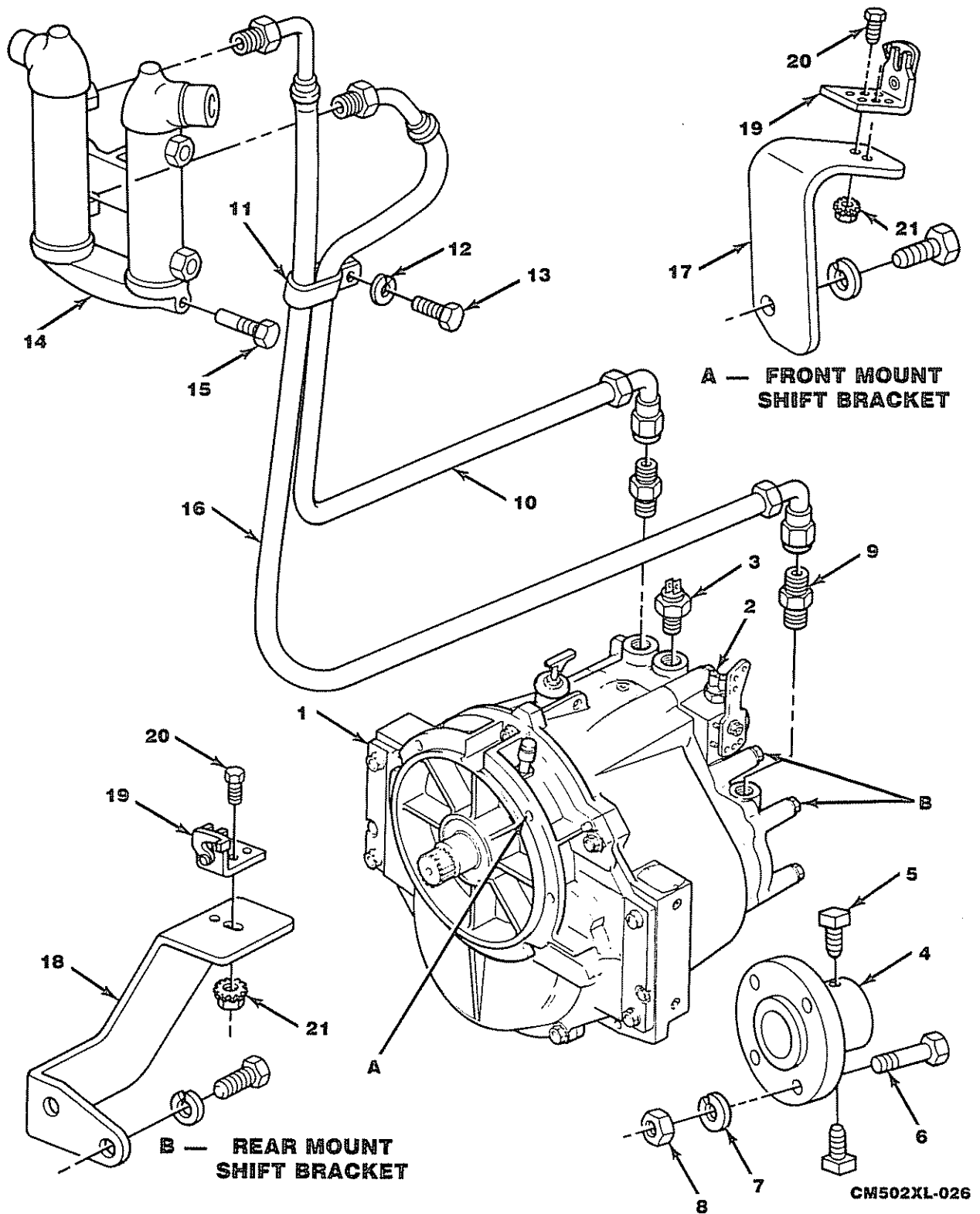


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MODEL CM502XL PARTS BOOK  
TRANSMISSION AND RELATED PARTS (BORG-WARNER "V"-DRIVE) – FIGURE 25

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	25448	<b>Transmission</b> (0.96:1 Direct Drive)	1
1	25449	<b>Transmission</b> (1.21:1 Reduction)	1
1	25447	<b>Transmission</b> (1.51:1 Reduction)	1
1	25450	<b>Transmission</b> (1.99:1 Reduction)	1
1	25451	<b>Transmission</b> (2.49:1 Reduction)	1
1	25452	<b>Transmission</b> (3.14:1 Reduction)	1
2	20171	<b>Switch Kit</b> , neutral start (Not Shown)	1
2A	25542	<b>Switch &amp; O-Ring Assembly</b> (Not Shown)	1
3	21088	<b>Sender</b> , temperature alarm	1
4	91690	<b>Coupler</b> , prop shaft (1" shaft)	OPT
4	91691	<b>Coupler</b> , prop shaft (1-1/8" shaft)	OPT
4	91692	<b>Coupler</b> , prop shaft (1-1/4" shaft)	OPT
4	91693	<b>Coupler</b> , prop shaft (1-3/8" shaft)	OPT
4	91694	<b>Coupler</b> , prop shaft (1-1/2" shaft)	OPT
4	91695	<b>Coupler</b> , prop shaft (1-3/4" shaft)	OPT
4	91696	<b>Coupler</b> , prop shaft (2" shaft)	OPT
5	2000090	<b>Screw</b> , set – coupler (1-1/4")	2
6	22136	<b>Bolt</b> , coupling (1-1/2")	4
7	103322	<b>Lockwasher</b> , coupling bolt	4
8	272231	<b>Nut</b> , coupling bolt	4
9	30526	<b>Elbow</b> , hose – transmission (90-degree)	1
10	18202	<b>Hose Assembly</b> , transmission to cooler (60")	1
11	20247	<b>Clamp</b> , oil line retaining	1
12	106263	<b>Washer</b> , retaining clamp bolt	1
13	103320	<b>Lockwasher</b> , retaining clamp bolt	1
14	179858	<b>Bolt</b> , retaining clamp	1
15	98123	<b>Oil Cooler Assembly</b>	1
16	10335	<b>Zinc</b> , sacrificial	1
17	18201	<b>Hose Assembly</b> , transmission to cooler (46")	1
18	30516	<b>Elbow</b> , hose – transmission (90-degree)	1
19	144603	<b>Nipple</b> , pipe (3")	1
20	22112	<b>Clamp</b> , oil line retaining	2
21	96341	<b>Shift Bracket</b> (Front Entry)	1
22	21033	<b>Cable Clip</b> , single cable	1
22A	22232	<b>Cable Clip</b> , dual cable kit	OPT
23	443874	<b>Bolt</b> , clip attaching (1/2")	2
24	22440	<b>Nut</b> , attaching bolt	2

MODEL CM502XL PARTS BOOK  
 TRANSMISSION AND RELATED PARTS (BORG-WARNER 5000) – FIGURE 26

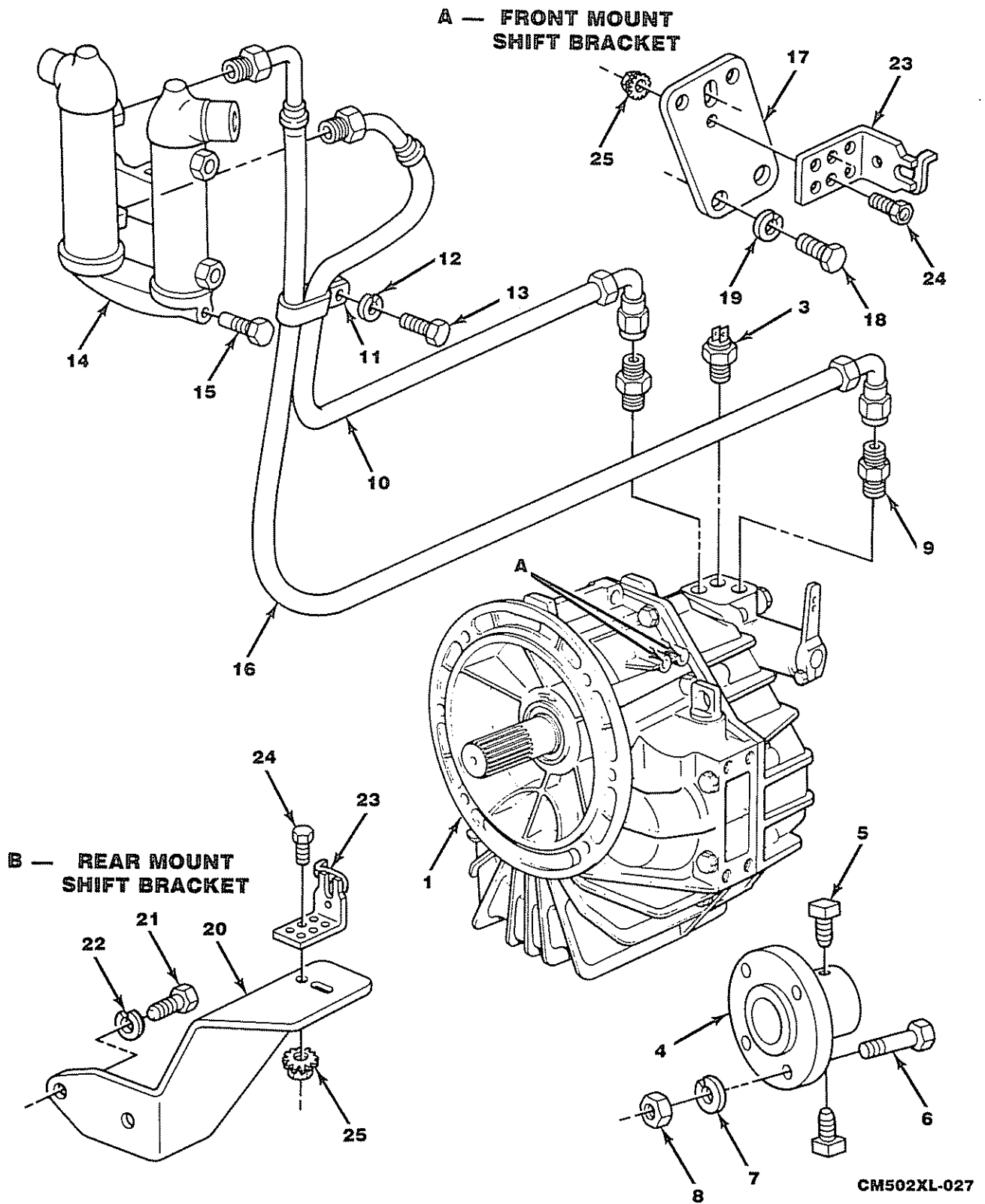




MODEL CM502XL PARTS BOOK  
TRANSMISSION AND RELATED PARTS (BORG-WARNER 5000) – FIGURE 26

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	26003	<b>Transmission</b> (1.50:1 Reduction)	1
1	26004	<b>Transmission</b> (2.00:1 Reduction)	1
1	26005	<b>Transmission</b> (2.45:1 Reduction)	1
1	26006	<b>Transmission</b> (2.80:1 Reduction)	1
2	25542	<b>Switch</b> , neutral start	1
3	21088	<b>Sender</b> , temperature alarm	1
4	91690	<b>Coupler</b> , prop shaft (1" shaft)	OPT
4	91691	<b>Coupler</b> , prop shaft (1-1/8" shaft)	OPT
4	91692	<b>Coupler</b> , prop shaft (1-1/4" shaft)	OPT
4	91693	<b>Coupler</b> , prop shaft (1-3/8" shaft)	OPT
4	91694	<b>Coupler</b> , prop shaft (1-1/2" shaft)	OPT
4	91695	<b>Coupler</b> , prop shaft (1-3/4" shaft)	OPT
4	91696	<b>Coupler</b> , prop shaft (2" shaft)	OPT
5	2000090	<b>Screw</b> , set – coupler (1-1/4")	2
6	22136	<b>Bolt</b> , coupling (1-1/2")	4
7	103322	<b>Lockwasher</b> , coupling bolt	4
8	272231	<b>Nut</b> , coupling bolt	4
9	30603	<b>Fitting</b> , hose	2
10	18203	<b>Hose Assembly</b> , transmission to cooler (50-1/2")	1
11	22112	<b>Clamp</b> , oil line retaining	2
12	103321	<b>Lockwasher</b> , retaining clamp bolt	1
13	20257	<b>Bolt</b> , retaining clamp	1
14	98123	<b>Oil Cooler Assembly</b>	1
15	10335	<b>Zinc</b> , sacrificial	1
16	18204	<b>Hose Assembly</b> , transmission to cooler (63")	1
17	98227	<b>Shift Bracket</b> (Front Entry)	1
18	98143	<b>Shift Bracket</b> (Rear Entry)	OPT
19	21033	<b>Cable Clip</b> , single cable	1
19	22232	<b>Cable Clip</b> , dual cable kit	OPT
20	443874	<b>Bolt</b> , clip attaching (1/2")	2
21	22440	<b>Nut</b> , attaching bolt	2

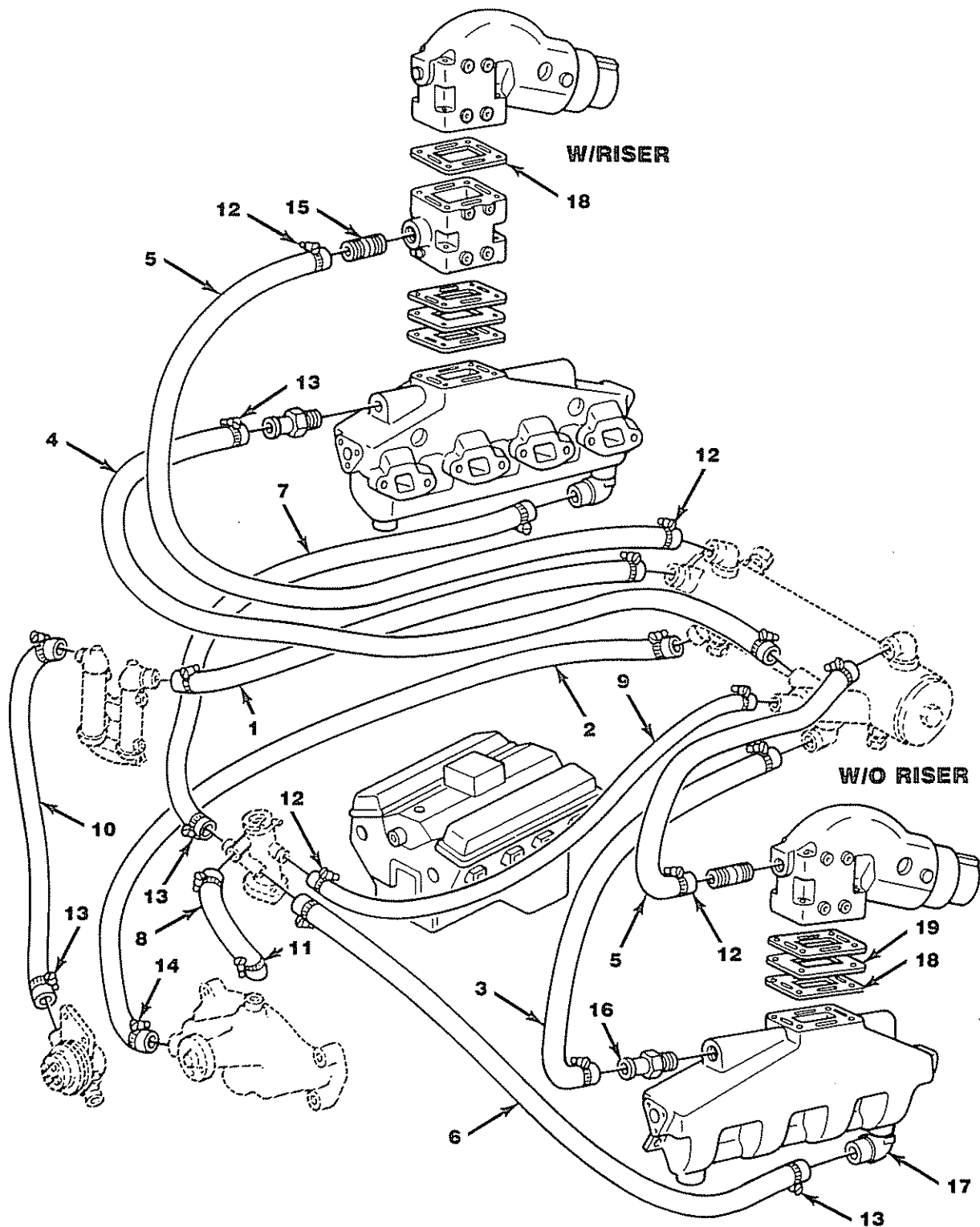
MODEL CM502XL PARTS BOOK  
TRANSMISSION AND RELATED PARTS (HURTH GEAR) – FIGURE 27



MODEL CM502XL PARTS BOOK  
TRANSMISSION AND RELATED PARTS (HURTH GEAR) – FIGURE 27

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	24000	<b>Transmission</b> (1.50:1 Reduction)	1
1	24001	<b>Transmission</b> (2.00:1 Reduction)	1
1	24002	<b>Transmission</b> (2.50:1 Reduction)	1
1	24003	<b>Transmission</b> (2.85:1 Reduction)	1
2		<b>Switch Kit</b> , neutral start	1
3	21088	<b>Sender</b> , temperature alarm	1
4	91690	<b>Coupler</b> , prop shaft (1" shaft)	OPT
4	91691	<b>Coupler</b> , prop shaft (1-1/8" shaft)	OPT
4	91692	<b>Coupler</b> , prop shaft (1-1/4" shaft)	OPT
4	91693	<b>Coupler</b> , prop shaft (1-3/8" shaft)	OPT
4	91694	<b>Coupler</b> , prop shaft (1-1/2" shaft)	OPT
4	91695	<b>Coupler</b> , prop shaft (1-3/4" shaft)	OPT
4	91696	<b>Coupler</b> , prop shaft (2" shaft)	OPT
5	2000090	<b>Screw</b> , set – coupler (1-1/4")	2
6	22136	<b>Bolt</b> , coupling (1-1/2")	4
7	103322	<b>Lockwasher</b> , coupling bolt	4
8	272231	<b>Nut</b> , coupling bolt	4
9	30603	<b>Fitting</b> , transmission	2
10	18203	<b>Hose Assembly</b> , transmission to cooler (50-1/2")	1
11	22112	<b>Clamp</b> , oil line retaining	2
12	103321	<b>Lockwasher</b> , retaining clamp bolt	1
13	20257	<b>Bolt</b> , retaining clamp	1
14	98123	<b>Oil Cooler Assembly</b>	1
15	10335	<b>Zinc</b> , sacrificial	1
16	18204	<b>Hose Assembly</b> , transmission to cooler (63")	1
17	98212	<b>Shift Bracket</b> (Front Entry)	1
18	21150	<b>Bolt</b> , bracket attaching (20mm)	2
19	103320	<b>Lockwasher</b> , attaching bolt	2
20	98075	<b>Shift Bracket</b> (Rear Entry)	OPT
21	179839	<b>Bolt</b> , bracket attaching (1")	2
22	103321	<b>Lockwasher</b> , attaching bolt	2
23	21033	<b>Cable Clip</b> , single cable	1
23	22232	<b>Cable Clip</b> , dual cable kit	OPT
24	443874	<b>Bolt</b> , clip attaching (1/2")	2
25	22440	<b>Nut</b> , attaching bolt	2

**Rear-Mounted Exchanger**

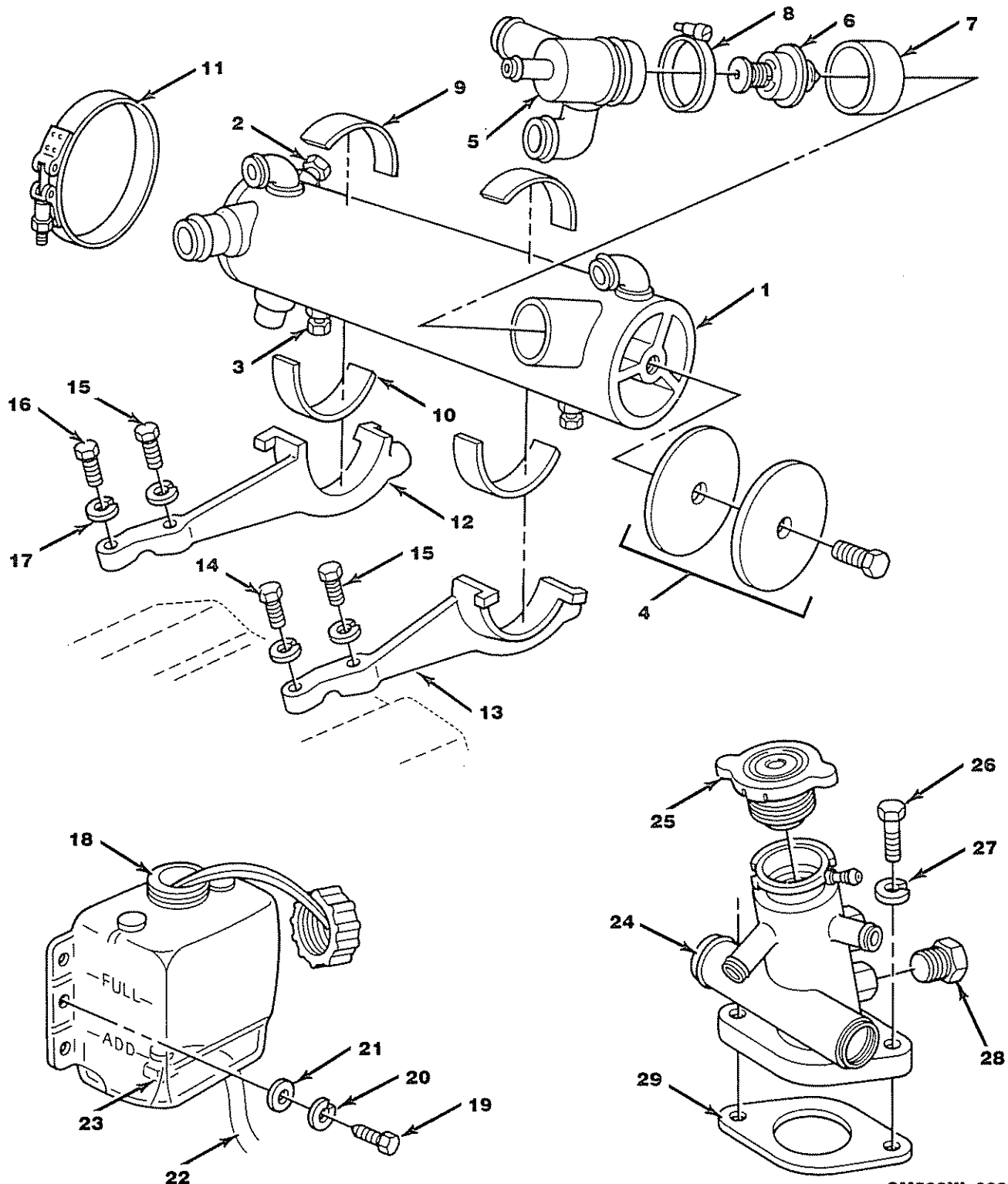


CM502XL-028

MODEL CM502XL PARTS BOOK  
FRESH WATER COOLING COMPONENTS 1 – FIGURE 28

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	18305	<b>Hose</b> , oil cooler to exchanger	1
2	18306	<b>Hose</b> , circulation pump to exchanger	1
3	18307	<b>Hose</b> , thermostat housing to manifold (LH)	1
4	18308	<b>Hose</b> , thermostat housing to manifold (RH)	1
5	18309	<b>Hose</b> , exchanger to exhaust elbow (STD)	2
5A	18311	<b>Hose</b> , exchanger to exhaust elbow ("V"-drive)	2
6	18316	<b>Hose</b> , fill riser to manifold (Port)	1
7	18317	<b>Hose</b> , fill riser to manifold (Starboard)	1
8	22102	<b>Hose</b> , fill riser to circulation pump	1
9	20806	<b>Hose</b> , bypass – thermostat to fill riser	1
10	18300	<b>Hose</b> , raw water pump to oil cooler	1
11	20226	<b>Clamp</b> , hose (#12)	2
12	20227	<b>Clamp</b> , hose (#16)	4
13	20228	<b>Clamp</b> , hose (#20)	12
14	20420	<b>Clamp</b> , hose (#32)	2
15	97911	<b>Fitting</b> , exhaust elbow (1" hose)	2
16	97852	<b>Fitting</b> , exhaust elbow (1-1/4" hose)	2
17	97854	<b>Fitting</b> , exhaust manifold (90-degree)	2
18	98127	<b>Gasket</b> , exhaust riser & elbow (Use of exhaust riser requires 6 gaskets)	4
19	98124	<b>Block-Off Plate</b> , exhaust elbow	2
=====			
<b>Fresh Water Cooling Kits:</b>			
=====			
*	22816	FWC Kit (Standard application) (Rear)	AR
*	22817	FWC Kit ("V"-drive applications) (Rear)	AR

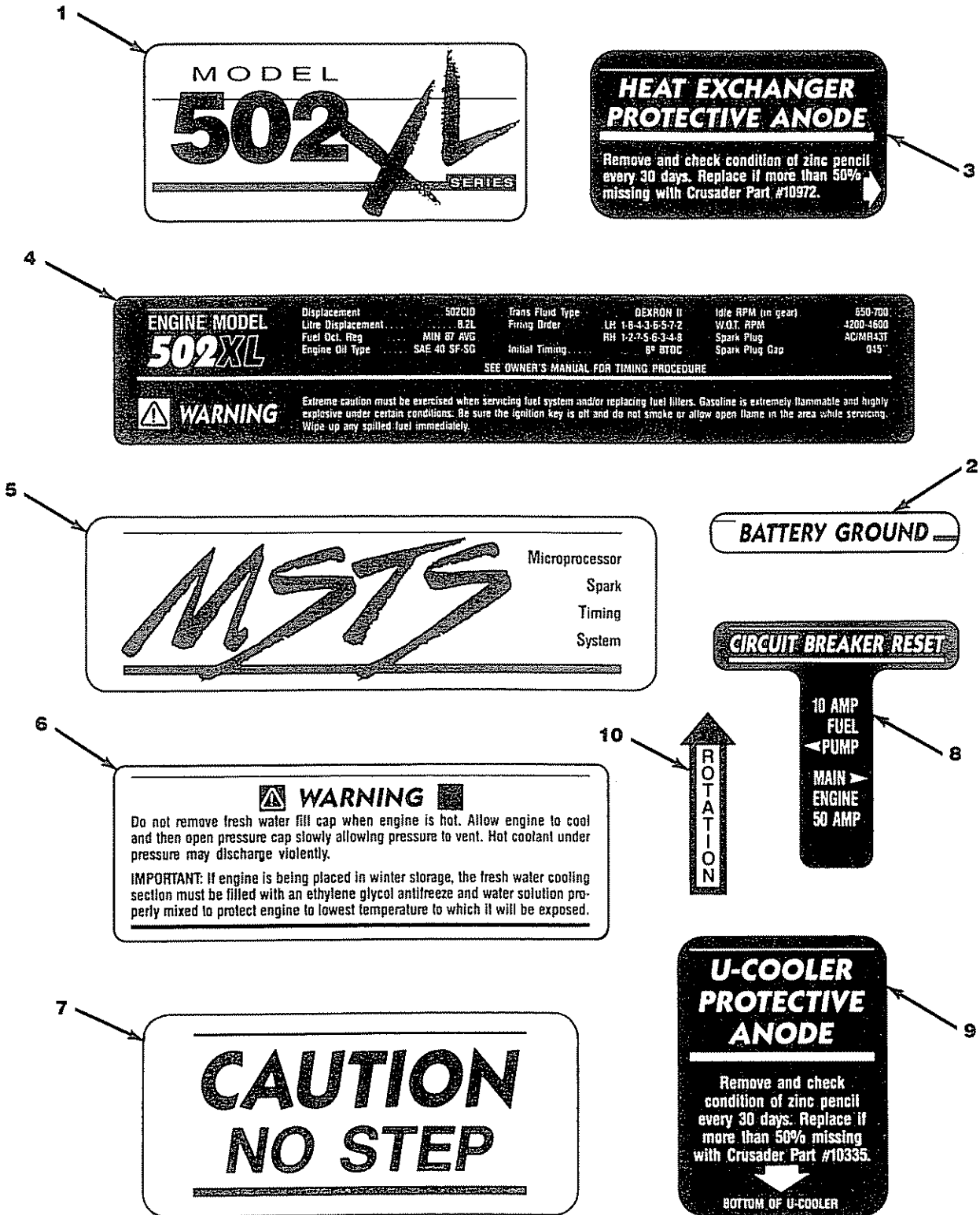
Rear-Mounted Exchanger



CM502XL-029

MODEL CM502XL PARTS BOOK  
FRESH WATER COOLING COMPONENTS 2 – FIGURE 29

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	98117	<b>Heat Exchanger Assembly</b>	1
2	10335	<b>Zinc, sacrificial</b>	1
3	127951	<b>Plug, drain (1/4")</b>	2
4	22164	<b>End Cap Kit</b>	2
5	98202	<b>Thermostat Housing</b>	1
6	98203	<b>Thermostat (170-degree)</b>	1
7	98204	<b>Hose, thermostat housing attaching</b>	1
8	20868	<b>Clamp, thermostat housing (#36)</b>	2
9	98206	<b>Isolator, top</b>	2
10	98205	<b>Isolator, bottom</b>	2
11	22829	<b>Clamp, exchanger mounting</b>	2
12	98213	<b>Support, exchanger (Starboard)</b>	1
13	98118	<b>Support, exchanger (Port)</b>	1
14	179847	<b>Bolt, support attaching (2")</b>	1
15	179849	<b>Bolt, support attaching (2-1/2")</b>	2
16	179848	<b>Bolt, support attaching (2-1/4")</b>	1
17	103321	<b>Lockwasher, attaching bolt</b>	4
18	98207	<b>Bottle, overflow</b>	1
19	179816	<b>Bolt, bottle mounting</b>	2
20	9417953	<b>Lockwasher, mounting bolt</b>	2
21	9418304	<b>Washer, mounting bolt</b>	2
22	23083	<b>Tube, overflow [48"]</b>	1
23	22830	<b>Clamp, overflow tube</b>	2
24	98200	<b>Fill Riser, fresh water</b>	1
25	98201	<b>Cap, fill riser</b>	1
26	186628	<b>Bolt, fill riser mounting</b>	2
27	103321	<b>Lockwasher, mounting bolt</b>	2
28	444705	<b>Plug, pipe – fill riser</b>	1
29	96105	<b>Gasket, fill riser to intake manifold</b>	1
<p><b>NOTE:</b> Numbers in brackets "[24]" indicate minimum length that must be ordered when using bulk hose for replacement.</p>			



CM502XL-030



MODEL CM502XL PARTS BOOK  
ENGINE DECALS – FIGURE 30

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	22842	<b>Decal</b> , engine model (502XL)	2
2	22835	<b>Decal</b> , engine ground ▲ ■	1
3	22848	<b>Decal</b> , protective anode (FWC)	1
4	22834	<b>Decal</b> , engine specifications	1
5	22838	<b>Decal</b> , MSTs system	1
6	22839	<b>Decal</b> , heat exchanger	1
7	22847	<b>Decal</b> (CAUTION NO STEP) (FWC)	1
8	22837	<b>Decal</b> , circuit breaker	1
9	22840	<b>Decal</b> , protective anode (Oil Cooler)	1
10	22190	<b>Decal</b> , rotation	1
11	22742	<b>Decal</b> , oil fill cap (Not Shown)	1





To help keep your engine running trouble-free, specify only genuine Crusader Engine replacement parts.



**Crusader**  
E N G I N E S

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