

CRUSADER CHALLENGER SERIES ENGINES

A DIVISION OF  PLEASURECRAFT ENGINE GROUP

MARINETM ILLUSTRATED PARTS MANUAL CLEAN EMISSION SYSTEM MODEL CES 6.0L / 6.0L HO

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HOW TO READ THIS PARTS BOOK:

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RB001005I	1	Base Engine Assembly, 5.7L	

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- ① ITEM NUMBER - This number corresponds with the number in the exploded view on the facing page.
- ② PART NUMBER - This is the designated part number for the particular component or assembly.
- ③ QUANTITY - This refers to the number of pieces used.
- ④ DESCRIPTION - This identifies what the component or assembly is.
- ⑤ MODEL ID - This identifies a component or assembly that is unique to a specific engine model.

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

- AR = As Required
- OPT = Optional
- NSS = Not Serviced Separately
- NA = Not Available
- OS = Oversize
- US = Undersize
- NS = Not Shown
- TBD = To Be Determined
- NI = Not Illustrated

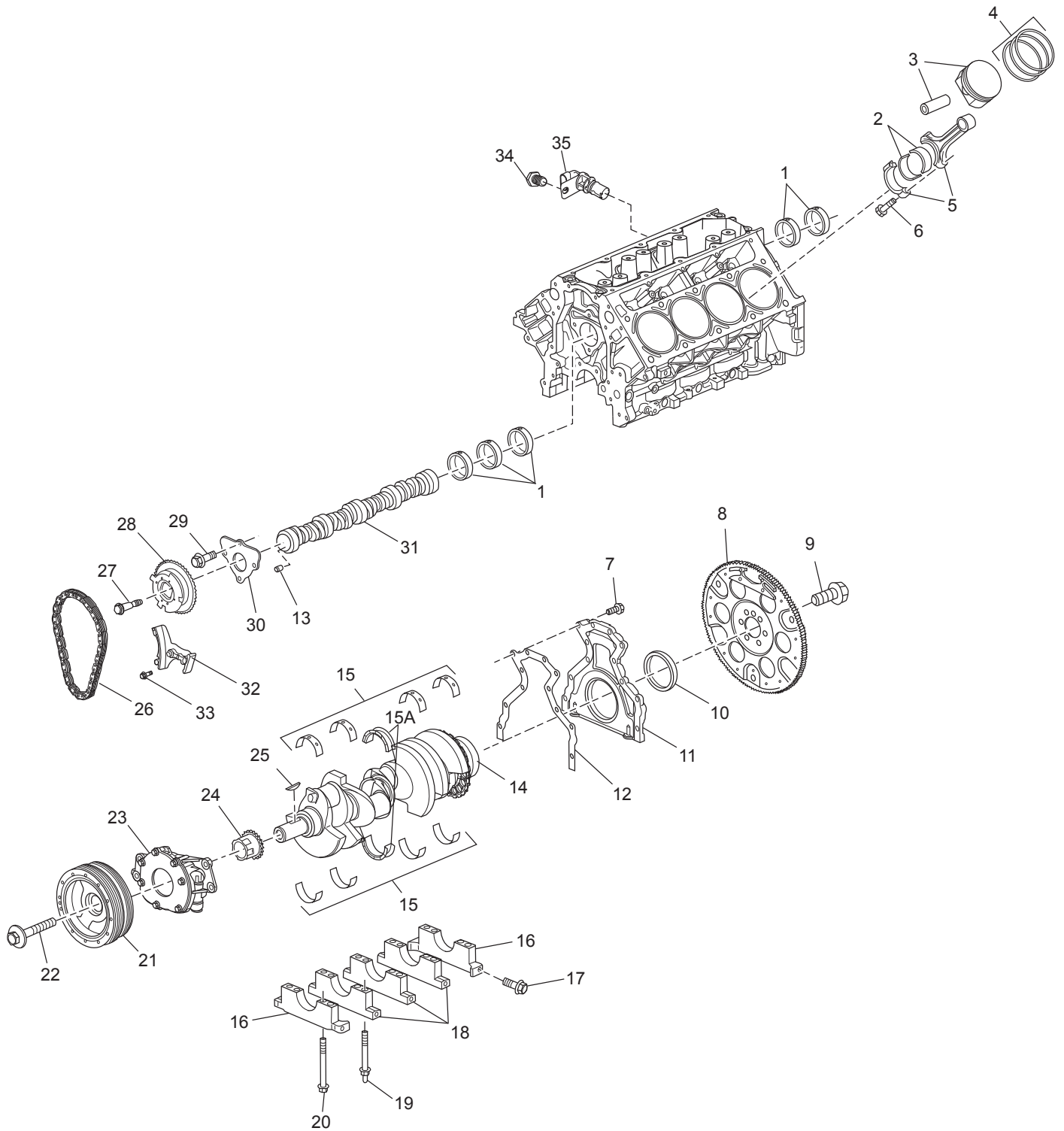
REPLACEMENT PARTS:**WARNING:**

Electrical, ignition and fuel system components on Pleasurecraft Marine 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.

MAINTENANCE ITEM PART NUMBERS:

Description	Part Number
Oil Filter	R077001
Fuel Filter (FCC), Kit (FCC Fuel System Only)	RP080026
Fuel/ Water Separator Element (FCC Fuel System Only)	R077019
Spark Plugs	RP030011
Spark Plug Wire Set	RK120021B
Serpentine Drive Belt	R066033
Raw Water Pump Impeller Kit	RP061022
Thermostat	R026007A

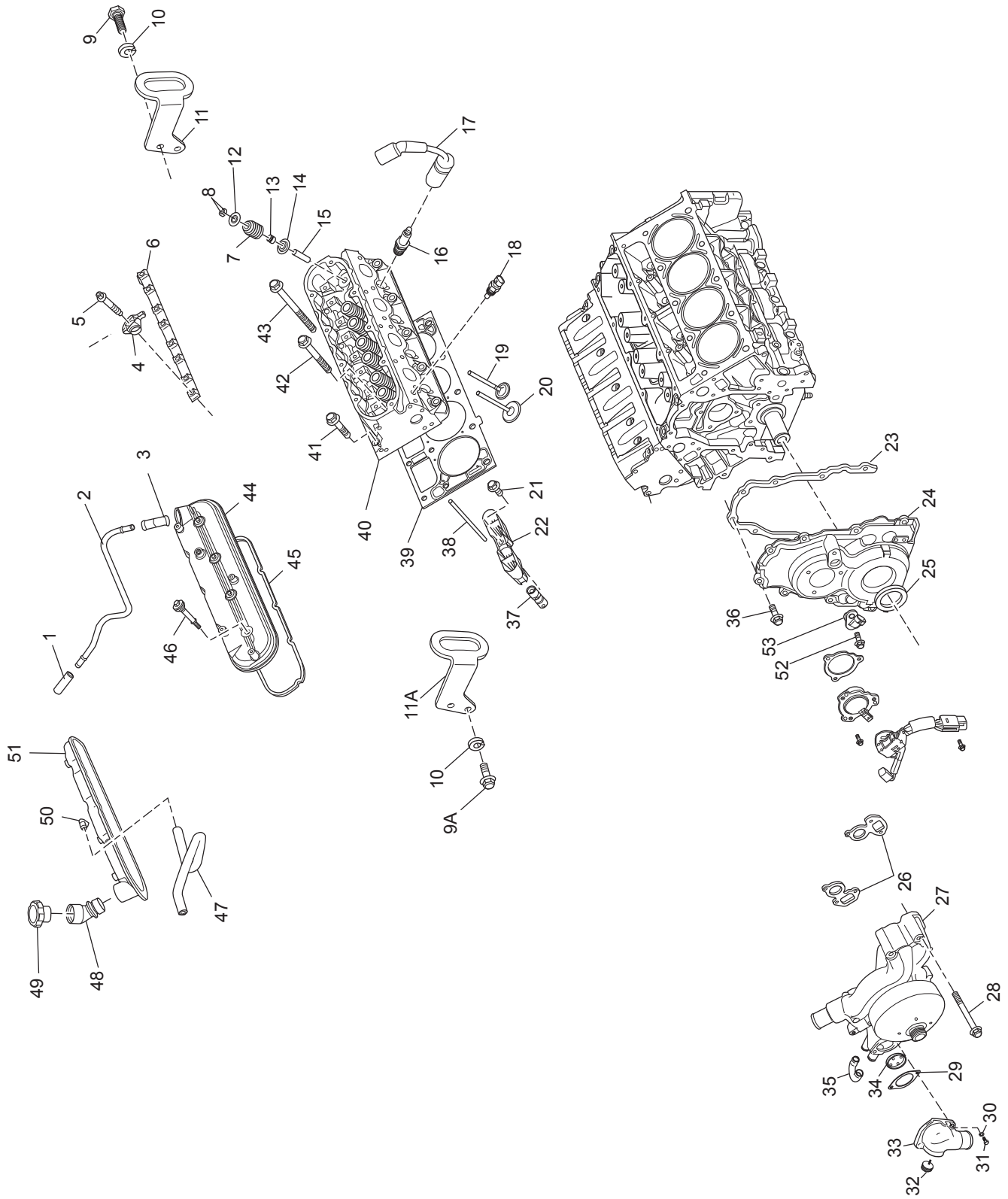
CYLINDER BLOCK ASSEMBLY - FIGURE 1



CYLINDER BLOCK ASSEMBLY - FIGURE 1

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
*	RB001022		Base Engine Assembly , (STD)	
1	TBD	1	Bearing Set , camshaft	
2	R007029	8	Bearing , for one connecting rod (STD)	
3	RA013019	8	Piston w/Pin , (STD)	
4	R015015	8	Ring Set , piston (STD)	
5	RA011013	8	Connecting Rod (STD)	
6	TBD	16	Bolt , connecting rod cap	
7	TBD	12	Bolt , rear engine cover	
8	RA138016	1	Flywheel Assembly , bottom mount starter	
8	RA138017	1	Flywheel Assembly , top mount starter	
9	R009205	6	Bolt , flywheel attaching	
10	R047236	1	Seal , crankshaft rear oil	
11	TBD	1	Cover , rear engine	
12	TBD	1	Gasket , rear engine cover	
13	p/o item #14	1	Reluctor Ring , crankshaft	
14	TBD	1	Crankshaft Assembly	
15	R007030	4	Bearings , crankshaft	
15A	R007031	1	Bearing , crankshaft	
16	TBD	2	Cap , crankshaft bearing #1 and #5	
17	TBD	10	Bolt , crankshaft bearing cap side	
18	TBD	3	Cap , crankshaft bearing #2 - #4	
19	TBD		Stud , crankshaft bearing cap attaching	
20	TBD		Bolt , crankshaft bearing cap attaching	
21	R064016	1	Balancer , crankshaft	
22	R009202	1	Bolt , crankshaft balancer	
23	TBD	1	Oil Pump Assembly	
24	R054042	1	Drive , oil pump	
25	TBD	1	Key , crankshaft	
26	R055017	1	Chain , timing	
27	TBD	1	Valve , camshaft position actuator solenoid	
28	R054044	1	Actuator , camshaft position	
29	RA159004	3	Bolt , camshaft retainer attaching	
30	TBD	1	Retainer , camshaft/phaser	
31	RA050027	1	Camshaft , (STD - ZR409)	
31	RA050028	1	Camshaft , (HO - ZR450)	
32	TBD	1	Tensioner Kit , includes items 32, 33, 26 (GM 12626407)	
33	TBD	1	Bolt , camshaft tensioner retainer (GM 11515758)	
34	TBD	1	Bolt , crankshaft position sensor attaching	
35	R020044	1	Sensor , crankshaft position	

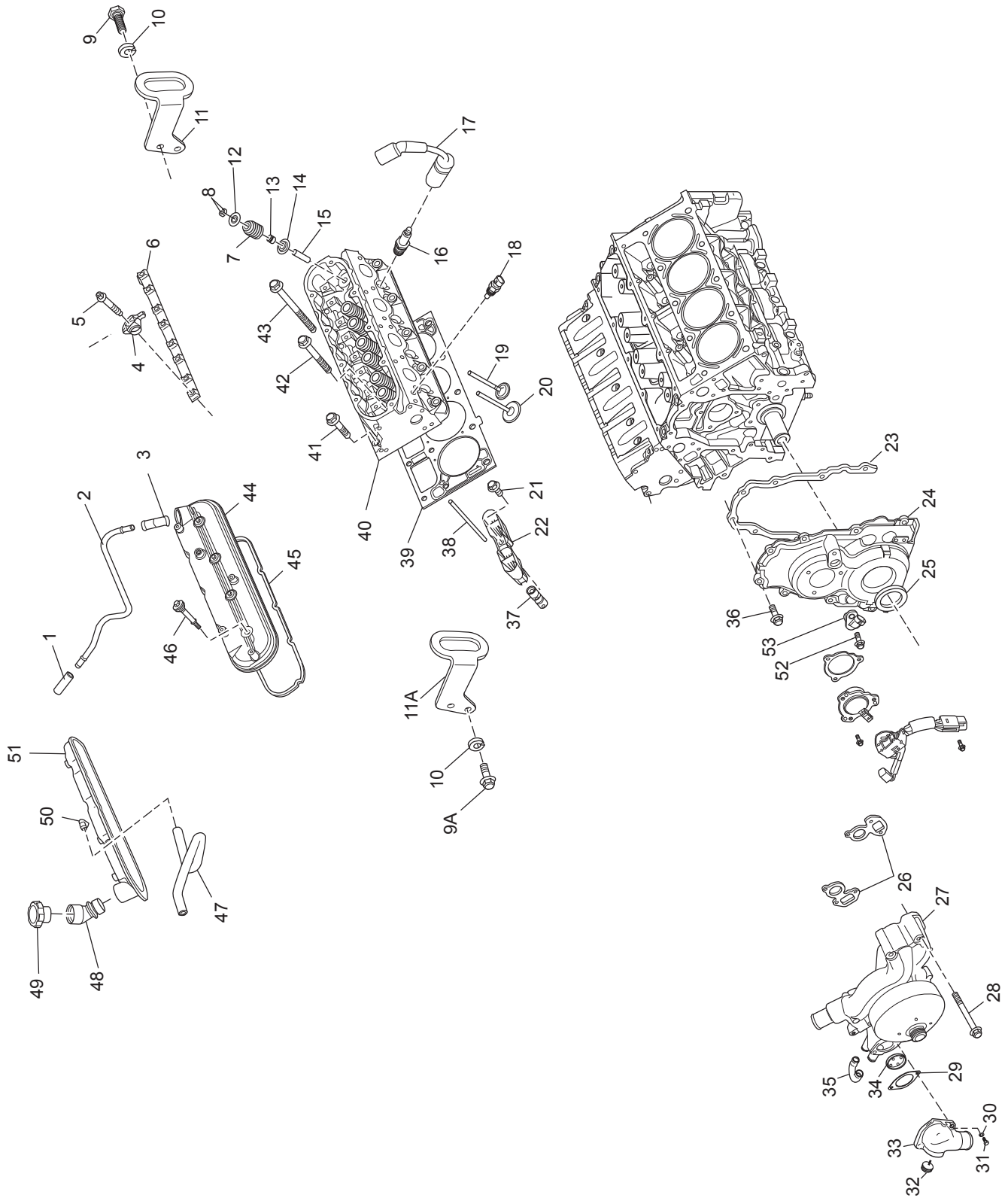
CYLINDER HEAD ASSEMBLY / FRONT COVER - FIGURE 2



CYLINDER HEAD ASSEMBLY / FRONT COVER - FIGURE 2

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	TBD	1	Hose , PCV valve (GM 12597774)	
2	NSS	1	Valve , positive crankcase ventilation (PCV)	
3	TBD	1	Grommet , PCV valve	
4	TBD	16	Rocker Arm , valve	
5	TBD	16	Bolt , valve rocker arm attaching	
6	R037006	2	Guide , valve rocker arm	
7	R046052	16	Valve Spring Assembly	
8	TBD	32	Retainer , valve stem	
9	98443025	4	Bolt , lifting eye attaching	
9A	98443030	4	Bolt , lifting eye attaching, front	
10	93940000	4	Lockwasher , lifting eye attaching bolt	
11	R042018	2	Lifting Eye , rear	
11A	R042019	2	Lifting Eye , front	
12	R049015	16	Cap , valve spring	
13	R047239	16	Seal , intake valve stem	
13	R047240	16	Seal , exhaust valve stem	
14	TBD	32	Rotator , valve	
15	TBD	16	Guide , valve stem	
16	RP030011	8	Spark Plug	
17	RK120021B	1	Spark Plug Wire Set	
18	R020046	1	Engine Coolant Temperature (ECT) Sensor	
19	R043040	8	Valve , exhaust (STD)	
20	R043039	8	Valve , intake (STD)	
21	TBD	8	Bolt , valve lifter retainer attaching	
22	R037005	8	Retainer , valve lifter	
23	RM0280	1	Gasket , front engine cover	
24	TBD	1	Cover , front engine	
25	R047237	1	Seal , front engine cover oil	
26	RM0281	2	Gasket , water circulating pump	
27	RK057036	1	Water Circulation Pump Assembly	
28	TBD	4	Bolt , water circulating pump attaching	
29	RM0275	2	Gasket , housing	
30	93920000	2	Lockwasher , housing attaching	
31	98223035	2	Bolt , housing attaching	
32	RS3533A	1	Plug , housing	
33	R025036	1	Housing	
34	R069073A	1	Plug , circulation pump cup	
35	R045210	1	Utube , hose	
35A	RS3865	1	Clamp , utube hose 3/4"	
35B	RS3864	1	Clamp , utube hose 5/8"	
36	TBD	8	Bolt , front engine cover attaching	

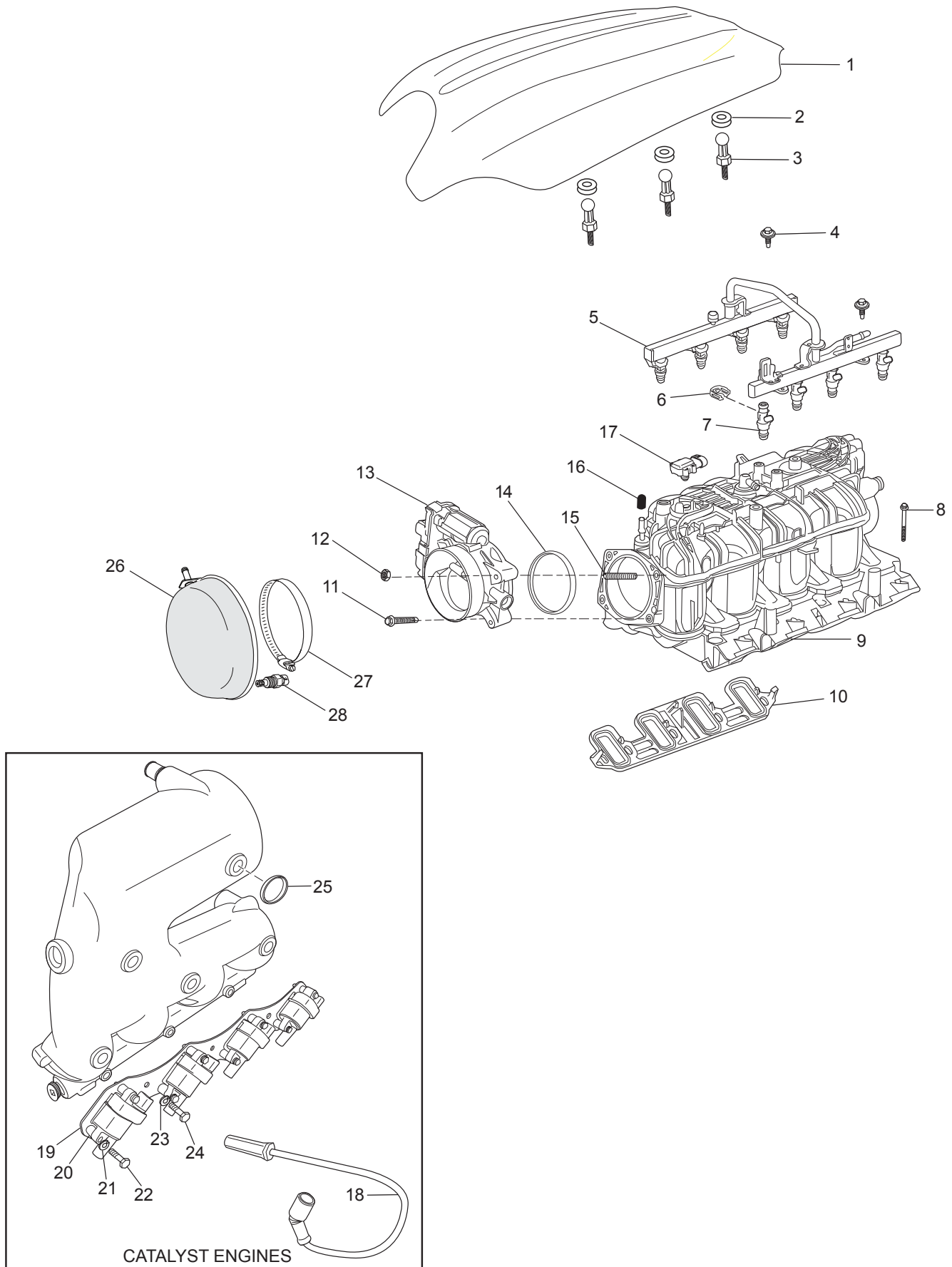
CYLINDER HEAD ASSEMBLY / FRONT COVER - FIGURE 2 (cont'd)



CYLINDER HEAD ASSEMBLY / FRONT COVER - FIGURE 2 (cont'd)

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
37	R040007	16	Lifter , valve	
38	R039024	16	Push Rod	
39	RM0298	2	Gasket , Cylinder Head	
40	R003017	2	Cylinder Head	
41	R009208	4	Bolt , cylinder head (short)	
42	R009209	10	Bolt , cylinder head (medium)	
43	R009215	16	Bolt , cylinder head (long)	
44	RA033016A	1	Cover , rocker (LH with straight push on hose barb)	
45	RM0282	2	Gasket , rocker cover	
46	R009210	8	Bolt , rocker cover attaching	
47	TBD	1	Tube , breather	
48	R034049	1	Tube , oil fill	
49	R034038B	1	Cap , oil fill tube	
50	TBD	1	Fitting , breather tube	
51	RA033017	1	Cover , rocker w/Oil Fill (RH)	
52	TBD	1	Bolt , camshaft position sensor attaching	
53	R020053	1	Sensor , camshaft position	

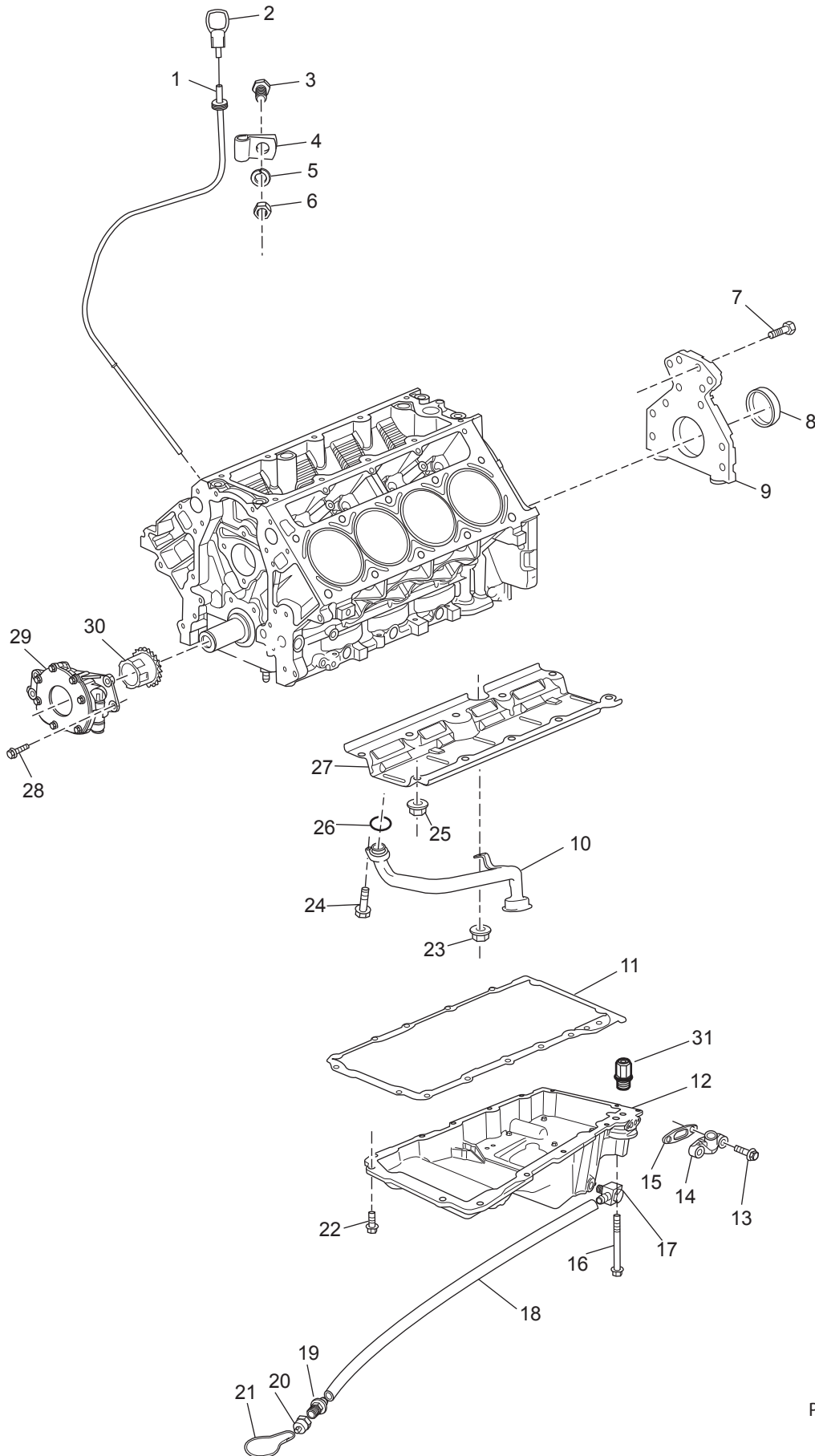
INTAKE MANIFOLD COMPONENTS - FIGURE 3



INTAKE MANIFOLD COMPONENTS - FIGURE 3

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R060091	1	Cover , engine, Monsoon	
1	R060092	1	Cover , engine, Monsoon Salt	
2	R094048	3	Grommet , engine cover attaching	
3	R095044	3	Standoff , engine cover attaching	
4	98222018	4	Bolt , fuel rail attaching	
5	TBD	1	Fuel Rail	
6	R127097	8	Retainer , fuel injector to rail	
7	RA087010	8	Fuel Injector Assembly	
8	TBD	10	Bolt , intake manifold mounting	
9	TBD	1	Intake Manifold	
10	RM0297	1	Gasket Set , intake manifold	
11	TBD	2	Bolt , throttle body attaching, lower	
12	L00918	2	Nut , throttle body attaching	
13	RA035044	1	Throttle Body Assembly	
14	TBD	1	Seal , throttle body	
15	TBD	2	Stud , throttle body attaching, upper	
16	R128004	1	Cap , vacuum	
17	R020055	1	Sensor , manifold absolute pressure (MAP)	
18	RK120021B	1	Spark Plug Wire Set	
19	R090365A	2	Bracket , ignition coil mounting	
20	R062094	16	Spacer , ignition coil mounting	
21	93920000	16	Lockwasher , ignition coil mounting	
22	98223045	16	Bolt , ignition coil mounting	
23	93934000	6	Lockwasher , coil bracket mounting	
24	99335016	6	Bolt , coil bracket mounting	
25	RS3661	AR	Freeze Plug , manifold	
26	R145028	1	Arrestor , flame	
27	RS3857	1	Clamp , flame arrestor	
28	R020032	1	Air Temp Sensor	

OIL PAN and OIL PUMP ASSEMBLY - FIGURE 4

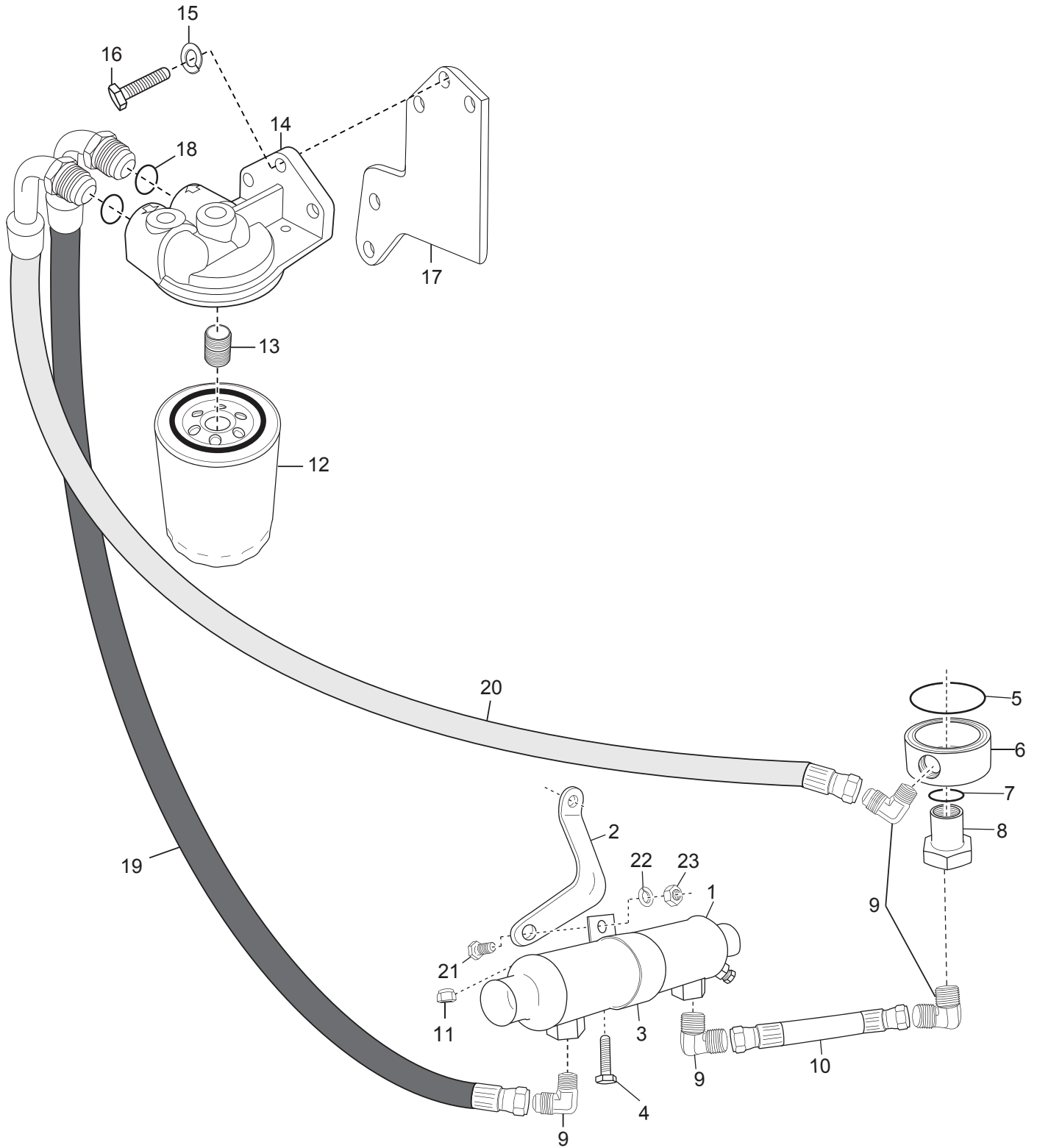


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OIL PAN and OIL PUMP ASSEMBLY - FIGURE 4

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R041095	1	Tube , oil dipstick	
2	R041092	1	Dipstick	
3	RS0302	1	Bolt , oil dipstick tube attaching	
4	R127065	1	Clamp , oil dipstick tube attaching	
5	RS2180	1	Lockwasher , oil dipstick tube attaching	
6	RS1028	1	Nut , oil dipstick tube attaching	
7	TBD	1	Bolt , engine rear cover attaching	
8	R047236	1	Seal , engine rear cover oil	
9	TBD	1	Cover , engine rear	
10	R074030	1	Tube , oil pickup	
11	RM0279	1	Gasket , oil pan	
12	R005025	1	Oil Pan	
13	TBD	2	Bolt , oil sending unit adapter attaching	
14	R079071	1	Adapter , oil sending unit	
15	RM0284	1	Gasket , oil sending unit adapter	
16	TBD	2	Bolt , oil pan attaching (long)	
17	R024213	1	Fitting , oil drain	
18	R045049	AR	Hose , oil drain	
19	R024061	1	Fitting , oil drain	
20	R024066A	1	Cap , oil drain	
21	R190123	1	Hook , oil drain hose	
22	TBD	12	Bolt , oil pan attaching (short)	
23	TBD	1	Nut , oil pickup tube attaching	
24	TBD	1	Bolt , oil pickup tube attaching	
25	TBD	10	Nut , windage tray attaching	
26	TBD	1	O-ring , oil pickup tube	
27	R012027	1	Tray , windage	
28	TBD	4	Bolt , oil pump attaching	
29	RA070018	1	Oil Pump Assembly	
30	TBD	1	Drive , oil pump	
31	TBD	1	Check Valve , oil pressure	

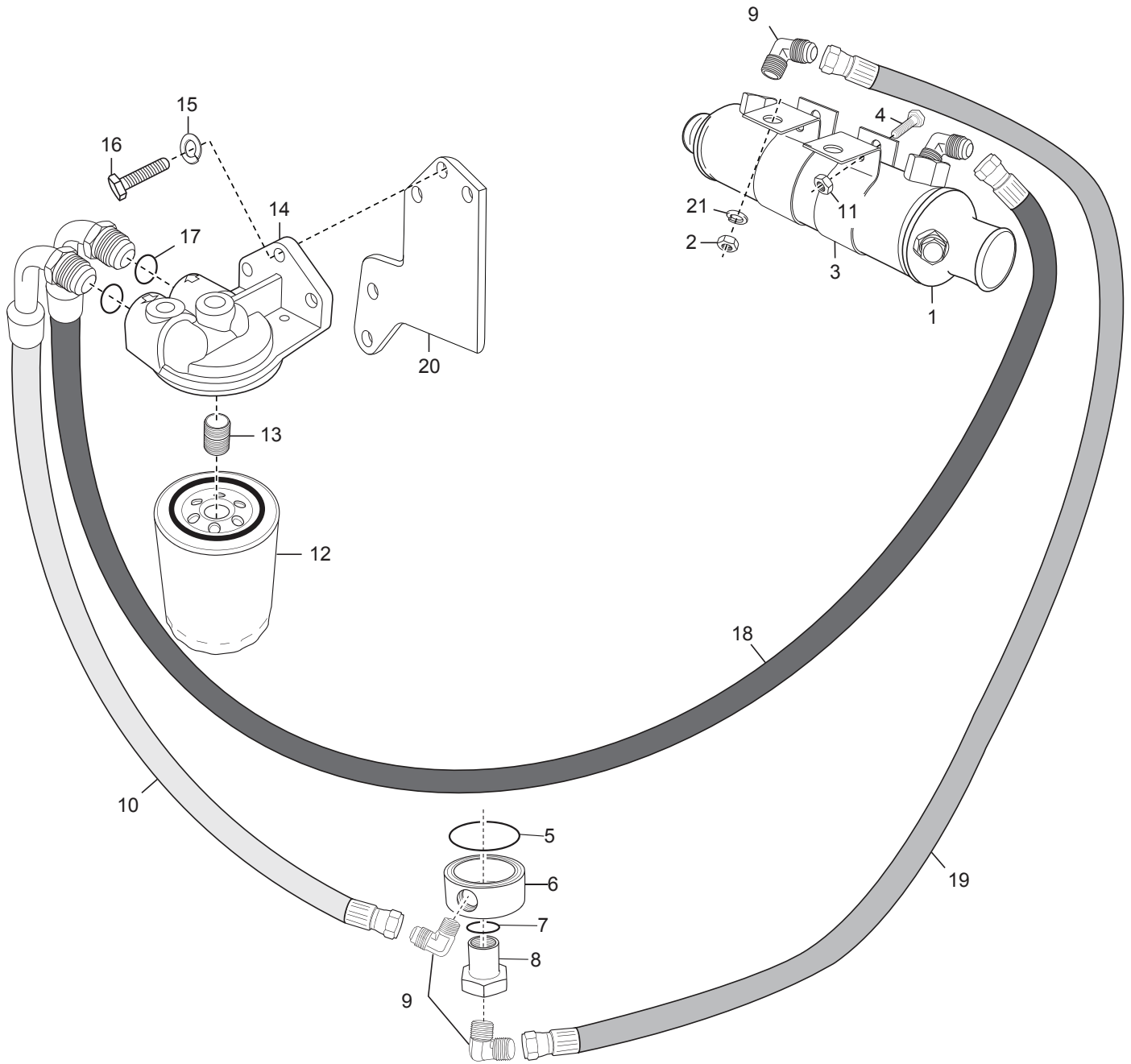
REMOTE OIL FILTER COMPONENTS (Direct Drive) - FIGURE 5



REMOTE OIL FILTER COMPONENTS (Direct Drive) - FIGURE 5

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R147049	1	Oil Cooler , 9"	
2	R090404	1	Bracket , oil cooler mounting	
3	R090010	1	Bracket , oil cooler attaching	
4	RS0256	1	Bolt , oil cooler attaching	
5	R047240	1	Oring , ROF adapter	
6	R079067	1	Adapter , remote oil filter	
7	R047202	1	Oring , ROF adapter	
8	R079075	1	Retainer , ROF adapter	
9	R024184	4	Fitting , 90 degree	
10	RA045103D	1	Hose Assembly , oil cooler to ROF adapter	
11	RS2058	1	Nut , oil cooler attaching nylock	
12	22679	1	Oil Filter	
13	R024203	1	Nipple , oil filter header	
14	R079066	1	Header , oil filter	
15	RS2179	3	Lockwasher , remote oil filter header mounting	
16	98333020	3	Bolt , remote oil filter header mounting	
17	R090431	1	Bracket , remote oil filter mounting	
18	R047245	2	O-Ring , oil line	
19	RA045120F	1	Hose Assembly , oil filter header to oil cooler	
20	RA045120D	1	Hose Assembly , oil adapter to remote oil filter header	
21	RS0302	1	Bolt , oil cooler bracket mounting	
22	RS2180	1	Lockwasher , oil cooler bracket mounting	
23	RS1028	1	Nut , oil cooler bracket mounting	

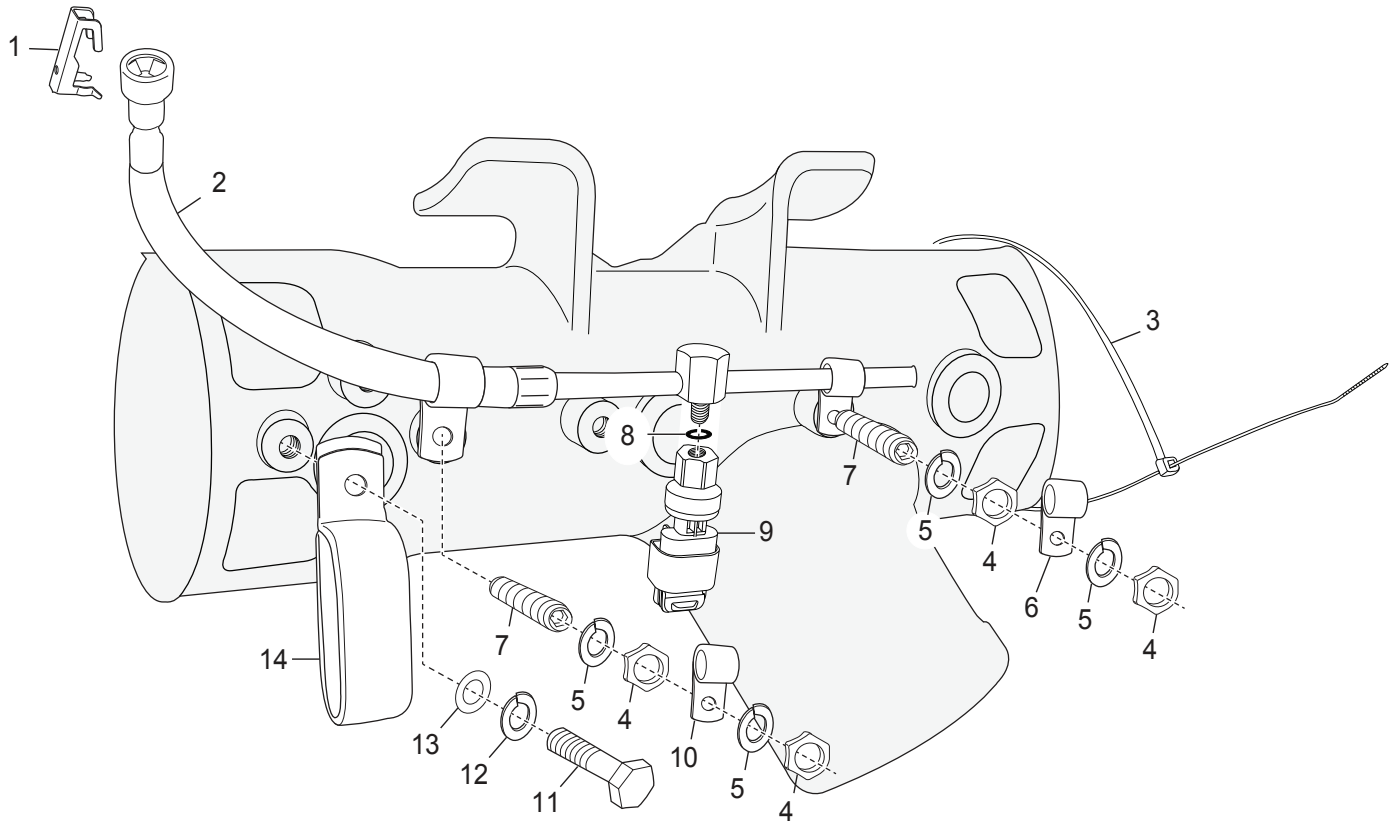
REMOTE OIL FILTER COMPONENTS (VDrive) - FIGURE 6



REMOTE OIL FILTER COMPONENTS (VDrive) - FIGURE 6

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R147049	1	Oil Cooler , 9"	
2	RS1028	2	Nut , oil cooler bracket mounting	
3	R090010	2	Bracket , oil cooler attaching	
4	RS0256	2	Bolt , oil cooler attaching	
5	R047240	1	Oring , ROF adapter	
6	R079067	1	Adapter , remote oil filter	
7	R047202	1	Oring , ROF adapter	
8	R079075	1	Retainer , ROF adapter	
9	R024184	4	Fitting , 90 degree	
10	RA045120E	1	Hose Assembly , oil adapter to remote oil filter header	
11	RS2058	2	Nut , oil cooler attaching nylock	
12	22679	1	Oil Filter	
13	R024203	1	Nipple , oil filter header	
14	R079066	1	Header , oil filter	
15	RS2179	3	Lockwasher , remote oil filter header mounting	
16	98333020	3	Bolt , remote oil filter header mounting	
17	R047245	2	O-Ring , oil line	
18	RA045120A	1	Hose Assembly , oil filter header to oil cooler	
19	RA045121B	1	Hose Assembly , oil cooler to ROF adapter	
20	R090431	1	Bracket , remote oil filter mounting	
21	RS2180	1	Lockwasher , oil cooler bracket mounting	

IN-TANK FUEL SYSTEM COMPONENTS - FIGURE 7

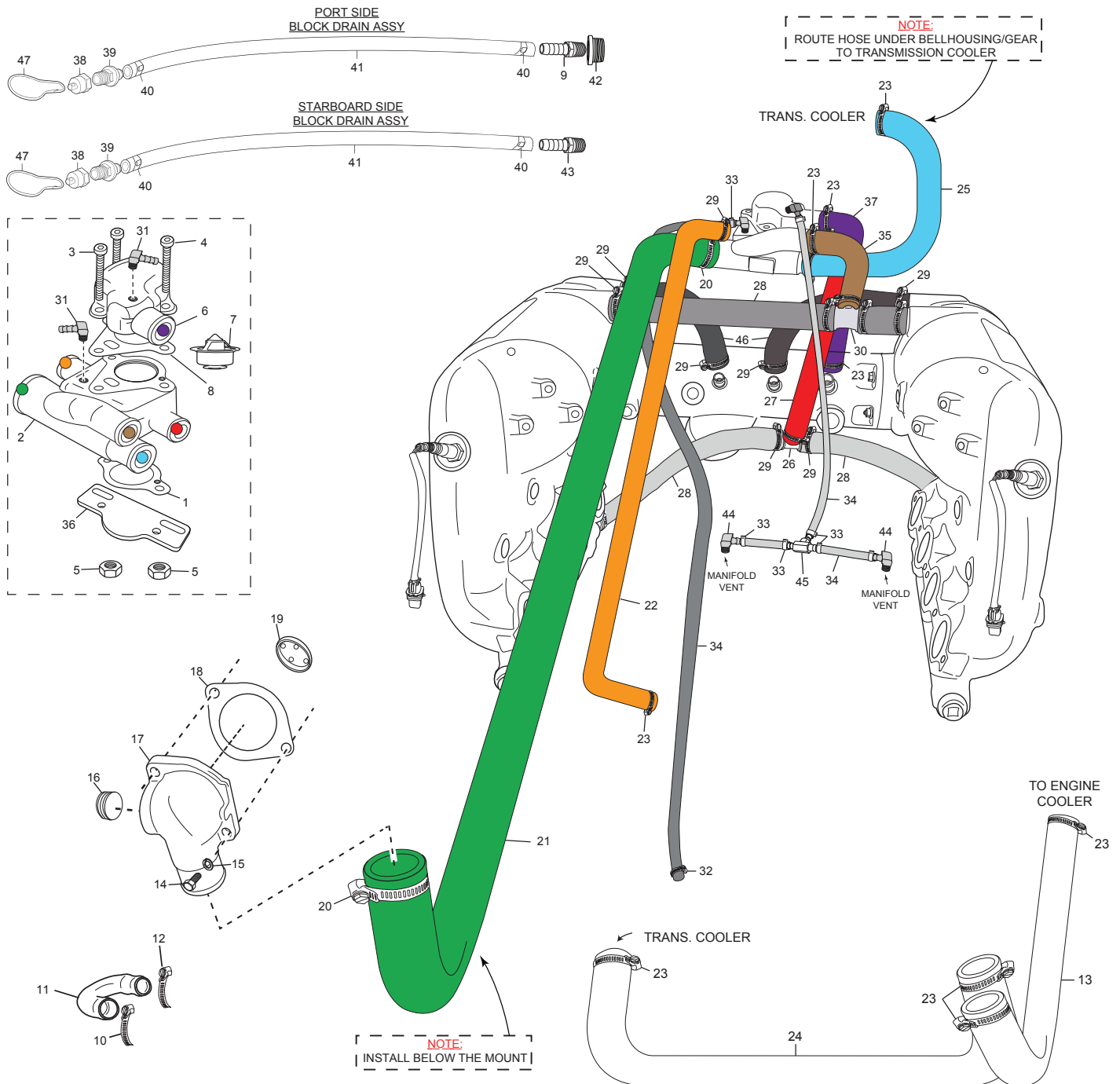


NOTE: For in-tank fuel system components and fuel line from fuel tank to the engine, consult your boat manufacturer.

IN-TANK FUEL SYSTEM COMPONENTS - FIGURE 7

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R127100	1	Locking Clip , fuel line	
2	RA085105	1	Fuel Line , connection	
3	R127067	1	Strap , fuel line tie	
4	97334000	4	Nut , attaching	
5	93934000	4	Lockwasher , nut attaching	
6	R127065	1	Clamp , fuel line	
7	99335035	2	Stud , fuel line attaching	
8	R047263	1	O-Ring , fuel pressure sensor	
9	R020061	1	Sensor , fuel pressure	
10	R127050	1	Clamp , fuel line	
11	98334014	1	Bolt , retaining	
12	93934000	1	Lockwasher , bolt retaining	
13	92934020	1	Washer , bolt retaining	
14	R127099	1	Clamp , retaining	
<p>NOTE: For in-tank fuel system componets and fuel line from fuel tank to the engine, consult your boat manufacturer.</p>				

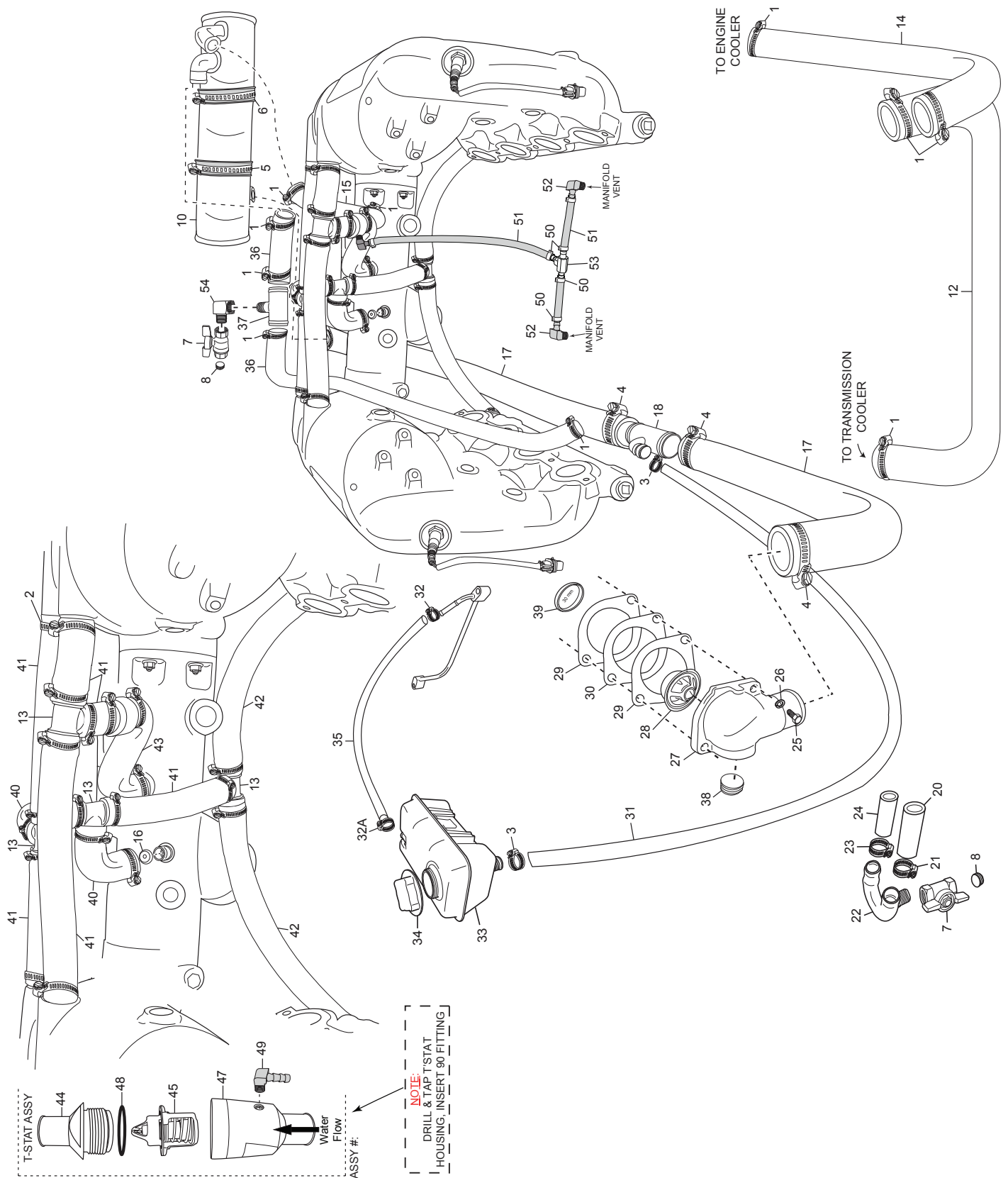
COOLING SYSTEM COMPONENTS(xx-652C) - FIGURE 8



COOLING SYSTEM COMPONENTS(xx-652C) - FIGURE 8

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RM0121	1	Gasket , thermostat housing lower	
2	R025040A	1	Housing , lower thermostat	
3	99333025	1	Bolt , thermostat housing attaching, short	
4	99333070	2	Bolt , thermostat housing attaching, long	
5	97330410	2	Nut , thermostat housing attaching	
6	R025041A	1	Housing , upper thermostat housing	
7	R026002	1	Thermostat , engine	
8	RM0290	1	Gasket , thermostat housing upper	
9	R024107	1	Fitting , port side engine block drain	
10	RS3865	1	Clamp , hose #10 (3/4")	
11	R045210	1	Hose , Utube circulation pump	
12	RS3864	1	Clamp , hose #8 (5/8")	
13	R045152	1	Hose , oil cooler to raw water pump	
14	98223035	2	Bolt , housing attaching	
15	93920000	2	Lockwasher , housing attaching	
16	RS3533A	1	Plug , housing	
17	R025036	1	Housing	
18	RM0275	1	Gasket , housing	
19	R069073A	1	Plug , circulation pump cup	
20	RS3868	2	Clamp , #24 (1 1/2")	
21	R045211	1	Hose , thermostat housing to circulation pump housing	
22	R045212	1	Hose , circulation pump to thermostat housing	
23	RS3858	12	Clamp , #20 (1 1/4")	
24	R045147	1	Hose , raw water pump to transmission cooler	
25	20865	Bulk/ft	Hose , 1 1/4" wire reinforced	
26	R024028C	1	Fitting , tee (1" x 1" x 1")	
27	R045213	1	Hose , thermostat housing to 1" tee	
28	R045107	Bulk/ft	Hose , 1" tee to exhaust manifolds	
29	RS3851	15	Clamp , #16 (1")	
30	R024054D	1	Fitting , tee (1" x 1" x 1 1/4")	
31	R024055	2	Fitting , 90 degree barb	
32	RS3870	1	Clamp , #4 (1/4")	
33	R127087A	7	Clamp , 5/8" oetiker	
34	R045132	Bulk/ft	Hose , 1/4"	
35	18402	1	Hose , exhaust manifold outlet tee to thermostat housing	
36	R109062	1	Plate , thermostat housing blockoff	
37	R045214	1	Hose , thermostat housing to exhaust manifold inlet tee	
38	R024066A	2	Cap , block drain hose	
39	R024061	2	Connector , block drain hose	
40	R127087C	4	Clamp , 23/32" oetiker	
41	R045049	Bulk/ft	Hose , 3/8"	
42	R069076A	1	Plug , engine block drain	
43	R024265	1	Fitting , engine block drain	
44	R024267	2	Fitting , 90 degree	
45	R024245	1	Fitting , tee (1/4" x 1/4" x 1/4")	
46	20866	Bulk/ft	Hose , 1" wire reinforced	
47	R190123	2	Hook , block drain hose	

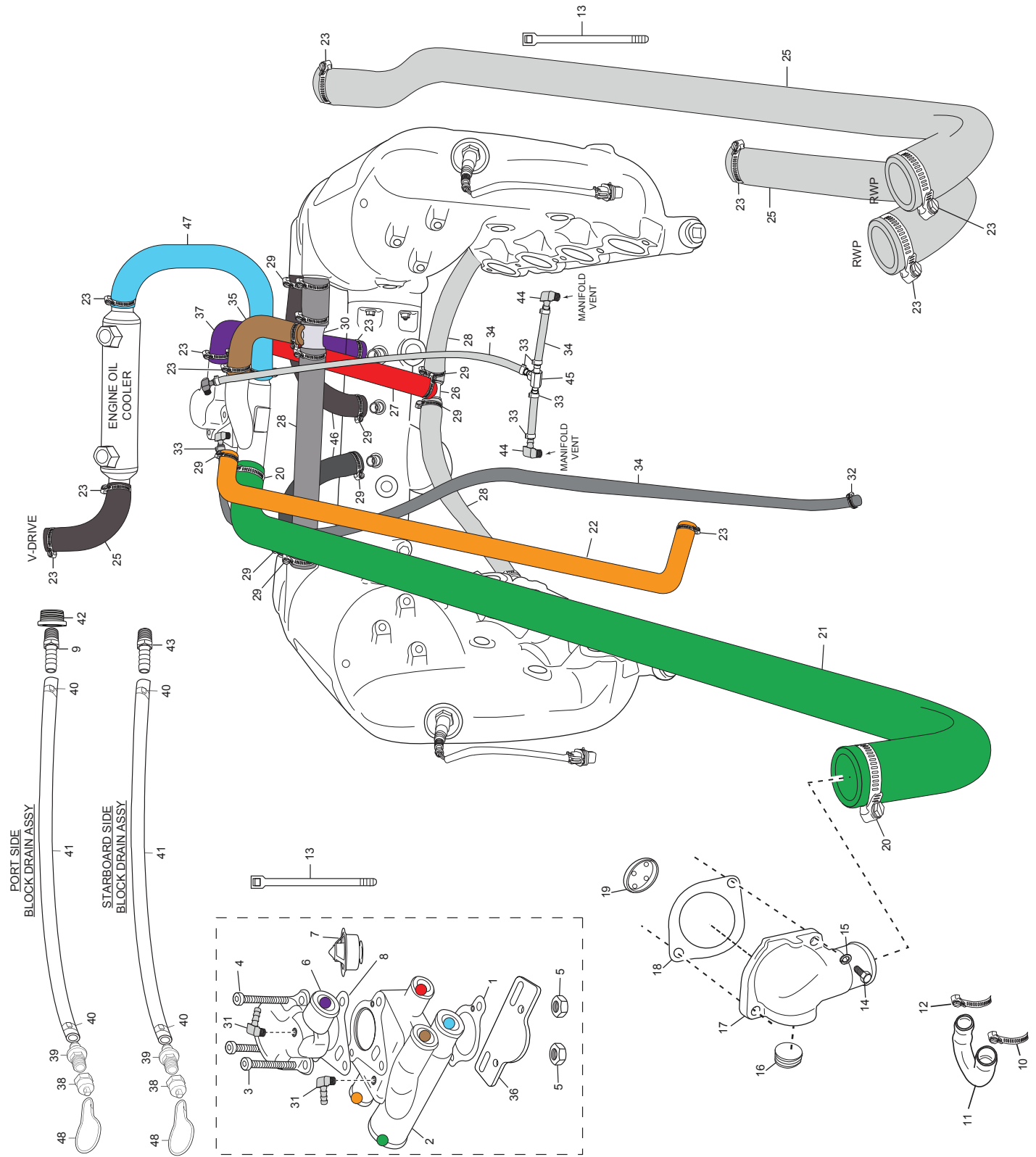
COOLING SYSTEM COMPONENTS (xx-652CS-xx) - FIGURE 9



COOLING SYSTEM COMPONENTS (xx-652CS-xx) - FIGURE 9

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RS3858	12	Clamp , hose #20 (1 1/4")	
2	RS3851	22	Clamp , hose #16 (1")	
3	RS3854	2	Clamp , hose #12 (7/8")	
4	RS3868	4	Clamp , hose #24 (1 1/2")	
5	RS3857	2	Clamp , hose #64 (4")	
6	R094052	2	Isolator , heat exchanger attaching	
7	R035039A	2	Valve , ball	
8	444705	2	Plug , ball valve	
10	RA147053	1	Heat Exchanger	
12	R045147	1	Hose , raw water pump to heat exchanger	
13	R024028C	4	Fitting , tee (1" x 1" x 1")	
14	R045152	1	Hose , cooler to raw water pump	
15	R045197	1	Hose , heat exchanger to crossover	
16	R012031	1	Orifice , cooling system	
17	R045080	Bulk/ft	Hose , 1 1/2" ID	
18	R024250	1	Fitting , tee (1 1/2" x 1 1/2" x 3/4")	
20	R045153	Bulk/ft	Hose , 3/4" soft	
21	R127087G	2	Clamp , oetiker	
22	R024210B	1	Utube , circulation pump	
23	R127087F	2	Clamp , oetiker	
24	20806	Bulk/ft	Hose , 5/8" ID	
25	98223035	2	Bolt , thermostat housing attaching	
26	93920000	2	Lockwasher , thermostat housing attaching	
27	R025036	1	Housing , thermostat	
28	R026002	1	Thermostat , engine	
29	RM0275	2	Gasket , thermostat housing	
30	R109051	1	Plate , thermostat retention	
31	R045153	Bulk/ft	Hose , 3/4" soft	
32	RS3870	1	Clamp , #4 (1/4")	
32A	R127087	1	Clamp , 5/8" oetiker	
33	R146001	1	Bottle , cooling system degas	
34	R034045	1	Cap , degas bottle	
35	R045132	Bulk/ft	Hose , 1/4" bulk	
36	R045198	1	Hose , circulation pump to junction to heat exchanger	
37	R024249A	1	Fitting , tee (1 1/4" x 1 1/4" x 1/2 NPTM)	
38	RS3533A	1	Plug , thermostat housing pipe	
39	R069073	1	Plug , circulation pump cup	
40	R045151	2	Hose , 90 degree molded	
41	R045107	Bulk/ft	Hose , 1" ID	
42	20866	Bulk/ft	Hose , wire reinforced 1" ID	
43	R045203	1	Hose , exhaust manifold exit tee to crossover	
44	R025047A	1	Housing , exhaust thermostat exit	
45	R026009A	1	Thermostat , exhaust cooling system	
46	20865	Bulk/ft	Hose , 1 1/4" wire reinforced	
47	R025046B	1	Housing , exhaust thermostat inlet	
48	R047260	1	O-ring , exhaust cooling system thermostat housing	
49	R024055	1	Fitting , 90 degree barbed	
50	R127087A	6	Clamp , oetiker	
51	R045132	Bulk/ft	Hose , 1/4" bulk	
52	R024267	2	Fitting , 1/4" NPT x 1/4"	
53	R024245	1	Fitting , 1/4" hose barb	
54	R025046B	1	Fitting , 1/2 NPT x 1/2 FPT	

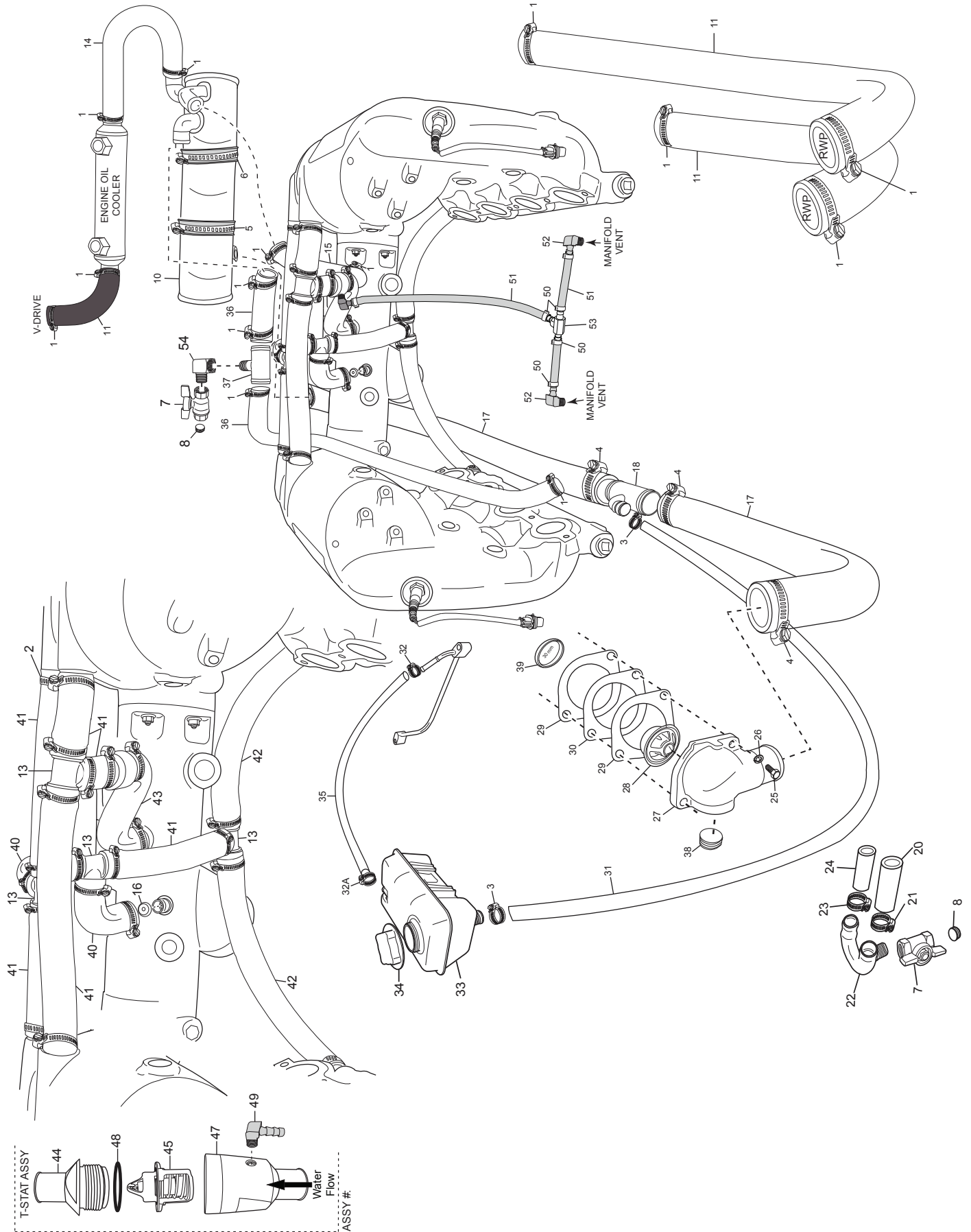
COOLING SYSTEM COMPONENTS (xx-652VC-xx) - FIGURE 10



COOLING SYSTEM COMPONENTS (xx-652VC-xx) - FIGURE 10

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RM0121	1	Gasket , thermostat housing lower	
2	R025040A	1	Housing , lower thermostat	
3	99333025	1	Bolt , thermostat housing attaching, short	
4	99333070	2	Bolt , thermostat housing attaching, long	
5	97330410	2	Nut , thermostat housing attaching	
6	R025041A	1	Housing , upper thermostat housing	
7	R026002	1	Thermostat , engine	
8	RM0290	1	Gasket , thermostat housing upper	
9	R024107	1	Fitting , port side engine block drain	
10	RS3865	1	Clamp , hose #10 (3/4")	
11	R045210	1	Hose , Utube circulation pump	
12	RS3864	1	Clamp , hose #8 (5/8")	
13	R127067	3	Wire Tie , black	
14	98223035	2	Bolt , housing attaching	
15	93920000	2	Lockwasher , housing attaching	
16	RS3533A	1	Plug , housing	
17	R025036	1	Housing	
18	RM0275	1	Gasket , housing	
19	R069073A	1	Plug , circulation pump cup	
20	RS3868	2	Clamp , #24 (1 1/2")	
21	R045211	1	Hose , thermostat housing to circulation pump housing	
22	R045212	1	Hose , circulation pump to thermostat housing	
23	RS3858	12	Clamp , #20 (1 1/4")	
25	20865	Bulk/ft	Hose , 1 1/4" wire reinforced	
26	R024028C	1	Fitting , tee (1" x 1" x 1")	
27	R045213	1	Hose , thermostat housing to 1" tee	
28	R045107	Bulk/ft	Hose , 1" tee to exhaust manifolds	
29	RS3851	15	Clamp , #16 (1")	
30	R024054D	1	Fitting , tee (1" x 1" x 1 1/4")	
31	R024055	2	Fitting , 90 degree barb	
32	RS3870	1	Clamp , #4 (1/4")	
33	R127087A	7	Clamp , 5/8" oetiker	
34	R045132	Bulk/ft	Hose , 1/4"	
35	18402	1	Hose , exhaust manifold outlet tee to thermostat housing	
36	R109062	1	Plate , thermostat housing blockoff	
37	R045214	1	Hose , thermostat housing to exhaust manifold inlet tee	
38	R024066A	2	Cap , block drain hose	
39	R024061	2	Connector , block drain hose	
40	R127087C	4	Clamp , 23/32" oetiker	
41	R045049	Bulk/ft	Hose , 3/8"	
42	R069076A	1	Plug , engine block drain	
43	R024265	1	Fitting , engine block drain	
44	R024267	2	Fitting , 90 degree	
45	R024245	1	Fitting , tee (1/4" x 1/4" x 1/4")	
46	20866	Bulk/ft	Hose , 1" wire reinforced	
47	R045112	1	Hose , oil cooler to thermostat housing	
48	R190123	2	Hook , block drain hose	

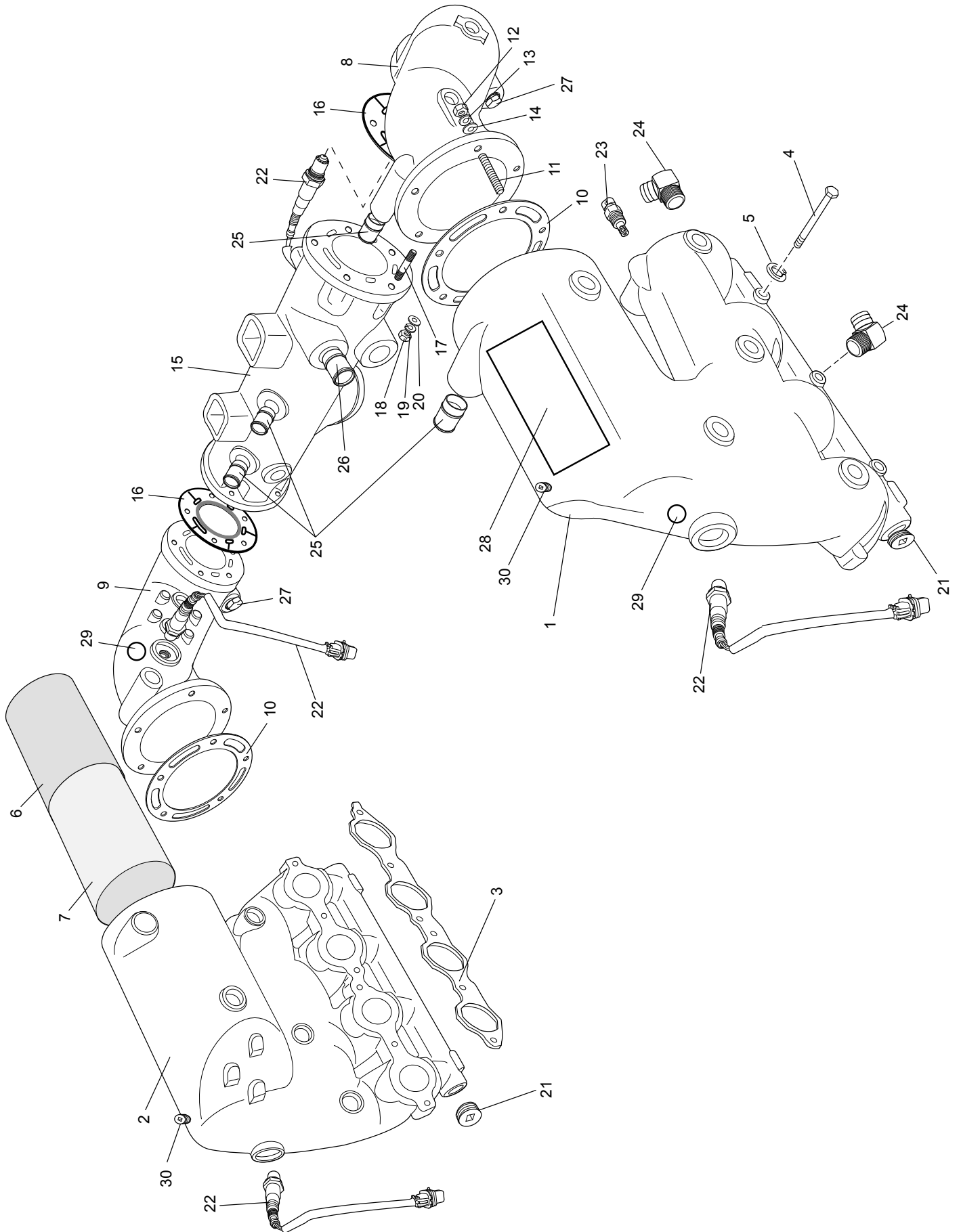
COOLING SYSTEM COMPONENTS (xx-652VCS-xx) - FIGURE 11



COOLING SYSTEM COMPONENTS (xx-652VCS-xx) - FIGURE 11

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RS3858	13	Clamp , hose #20 (1 1/4")	
2	RS3851	22	Clamp , hose #16 (1")	
3	RS3854	2	Clamp , hose #12 (7/8")	
4	RS3868	4	Clamp , hose #24 (1 1/2")	
5	RS3857	2	Clamp , hose #64 (4")	
6	R094052	2	Isolator , heat exchanger attaching	
7	R035039A	2	Valve , ball	
8	444705	2	Plug , ball valve	
10	RA147057	1	Heat Exchanger	
11	20865	Bulk/ft	Hose , 1 1/4" ID wire reinforced	
13	R024028C	4	Fitting , tee (1" x 1" x 1")	
14	R045112	1	Hose , cooler to heat exchanger	
15	R045197	1	Hose , heat exchanger to crossover	
16	R012031	1	Orifice , cooling system	
17	R045080	Bulk/ft	Hose , 1 1/2" ID	
18	R024250	1	Fitting , tee (1 1/2" x 1 1/2" x 3/4")	
20	R045153	Bulk/ft	Hose , 3/4" soft	
21	R127087G	2	Clamp , oetiker	
22	R024210B	1	Utube , circulation pump	
23	R127087F	2	Clamp , oetiker	
24	20806	Bulk/ft	Hose , 5/8" ID	
25	98223035	2	Bolt , thermostat housing attaching	
26	93920000	2	Lockwasher , thermostat housing attaching	
27	R025036	1	Housing , thermostat	
28	R026002	1	Thermostat , engine	
29	RM0275	2	Gasket , thermostat housing	
30	R109051	1	Plate , thermostat retention	
31	R045153	Bulk/ft	Hose , 3/4" soft	
32	RS3870	1	Clamp , #4 (1/4")	
32A	R127087	1	Clamp , 5/8" oetiker	
33	R146001	1	Bottle , cooling system degas	
34	R034045	1	Cap , degas bottle	
35	R045132	Bulk/ft	Hose , 1/4" bulk	
36	R045198	1	Hose , circulation pump to junction to heat exchanger	
37	R024249A	1	Fitting , tee (1 1/4" x 1 1/4" x 1/2 NPTM)	
38	RS3533A	1	Plug , thermostat housing pipe	
39	R069073	1	Plug , circulation pump cup	
40	R045151	2	Hose , 90 degree molded	
41	R045107	Bulk/ft	Hose , 1" ID	
42	20866	Bulk/ft	Hose , wire reinforced 1" ID	
43	R045203	1	Hose , exhaust manifold exit tee to crossover	
44	R025047A	1	Housing , exhaust thermostat exit	
45	R026009A	1	Thermostat , exhaust cooling system	
47	R025046B	1	Housing , exhaust thermostat inlet	
48	R047260	1	O-ring , exhaust cooling system thermostat housing	
49	R024055	1	Fitting , 90 degree barbed	
50	R127087A	6	Clamp , oetiker	
51	R045132	Bulk/ft	Hose , 1/4" bulk	
52	R024267	2	Fitting , 1/4" NPT x 1/4"	
53	R024245	1	Fitting , 1/4" hose barb	
54	R024139	1	Fitting , 1/2 NPT x 1/2 FPT	

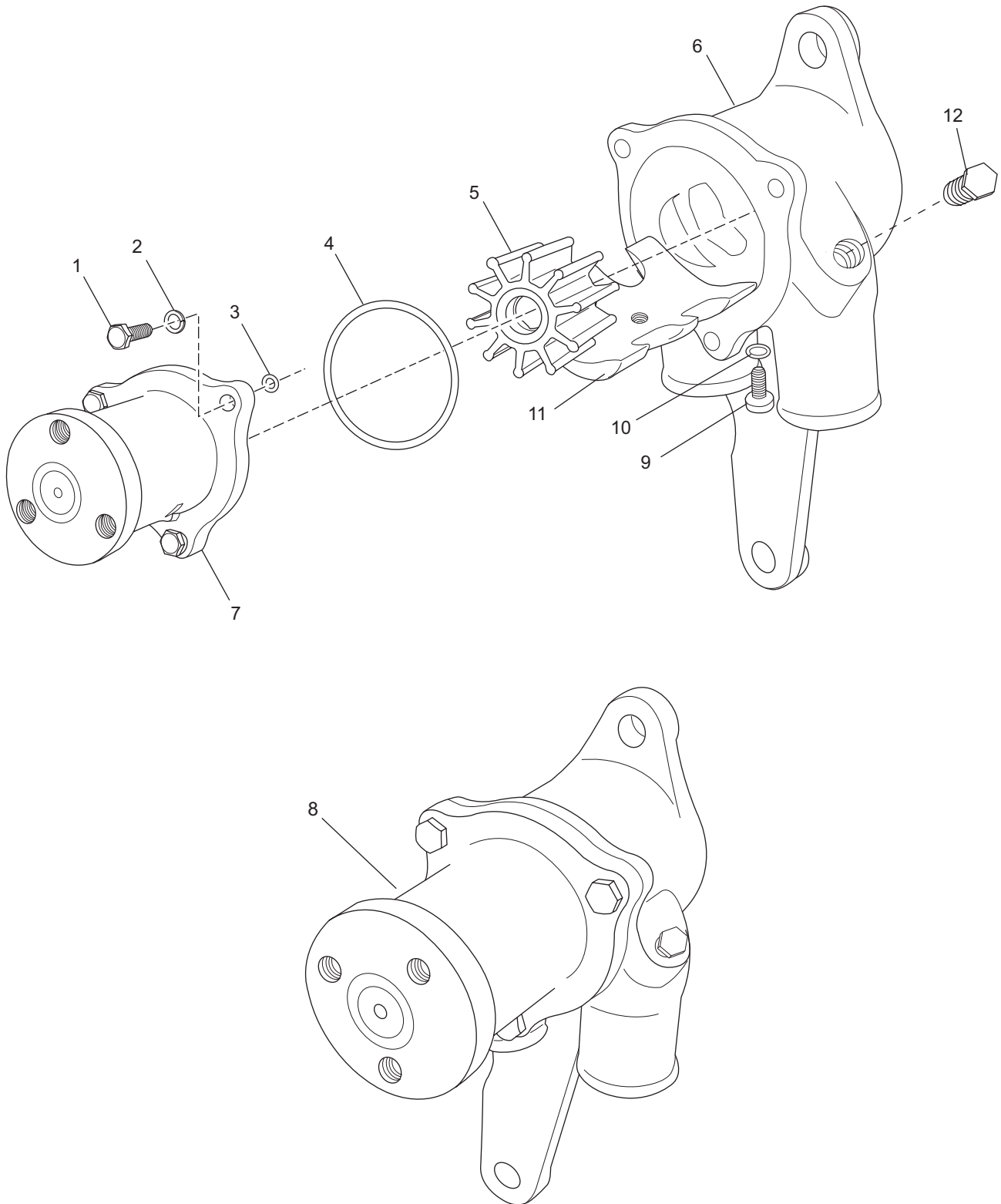
CES EXHAUST MANIFOLD and COMPONENTS - FIGURE 12



CES EXHAUST MANIFOLD and COMPONENTS - FIGURE 12

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R028027	1	Exhaust Manifold Assembly - Port	
2	R028028	1	Exhaust Manifold Assembly - Starboard	
3	RM0276A	2	Gasket , manifold to cylinder head	
4	98334040	12	Bolt , manifold to cylinder head attaching	
5	93934000	12	Lockwasher , manifold to cylinder head attaching	
6	R144003A	2	Catalyst	
7	RM0291	2	Mesh , catalyst support	
8	R133001	1	Exhaust Corner - Port	
9	R133002	1	Exhaust Corner - Starboard	
10	RM0285	2	Gasket , manifold to corner	
11	R031044	10	Stud , exhaust manifold to corner attaching	
12	97334000	10	Nut , corner to manifold attaching	
13	93934000	10	Lock Washer , corner to manifold attaching	
14	92934020	10	Flat Washer , corner to manifold attaching	
15	R133003	1	Exhaust Crossover	
16	RM0299	2	Gasket , corner to crossover	
17	R031045	10	Stud , exhaust corner to crossover attaching	
18	97334000	10	Nut , crossover to corner attaching	
19	93934000	10	Lock Washer , crossover to corner attaching	
20	92934020	10	Flat Washer , crossover to corner attaching	
21	RS3533	2	Plug , exhaust manifold	
22	R020051	4	Sensor , Oxygen	
23	R020019	2	Sensor , Exhaust Manifold Water Temperature	
24	R024006A	2	Fitting , 90 degree	
25	R024239	6	Fitting , 1" hose	
26	R024240	1	Fitting , 1.25" hose	
27	RS3557	2	Plug , exhaust corner	
28	R143195	2	Decal , "Catanium", each exhaust manifold	
28	R143195A	2	Decal , "Catanium", each exhaust manifold model year 2014	
29	R143175	4	Decal , "HOT", each Oxygen Sensor	
30	RS3539	2	Plug , cooling system bleeder	
30	RS3550	2	Plug , cooling system bleeder	

RAW WATER COOLING PUMP - FIGURE 13

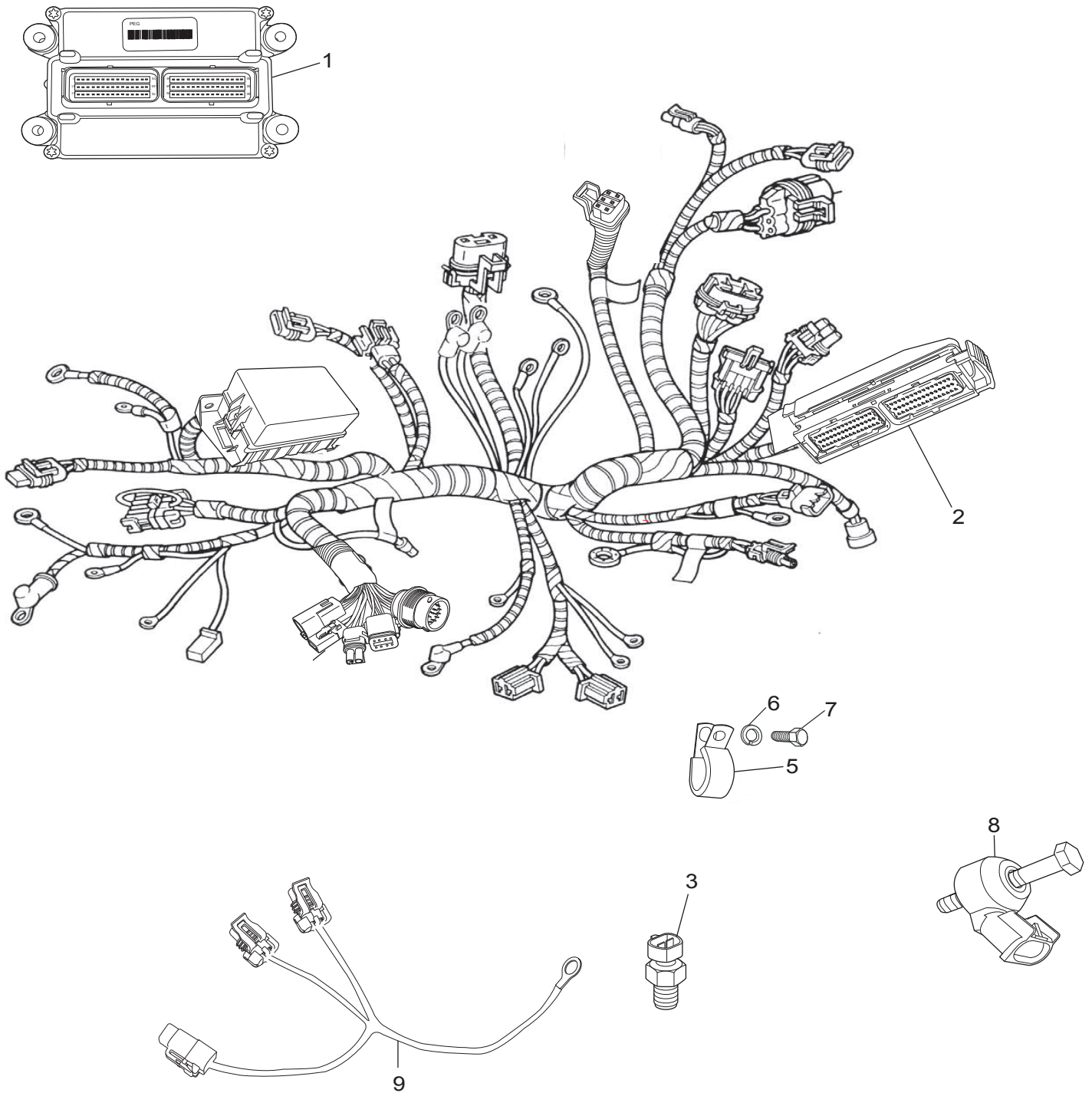


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RAW WATER COOLING PUMP - FIGURE 13

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	98224020	3	Bolt , bearing housing attaching	
2	93924000	3	Lockwasher , bearing housing attaching bolt	
3	R047243	3	O-ring , bearing housing attaching bolt	
4	R047242	1	O-ring , bearing housing attaching	
5	RP061022	1	Impeller Kit (includes O-rings and impeller)	
6	R057032	1	Housing , raw water pump	
7	RA134071	1	Bearing Housing Assembly	
8	RA057032	1	Raw Water Pump Assembly	
9	R175056	1	Bolt , raw water pump cam	
10	R047254	1	O-ring , raw water pump cam	
11	R161018	1	Cam , raw water pump	
12	RS3554	1	Plug , brass 1/8 NPT	

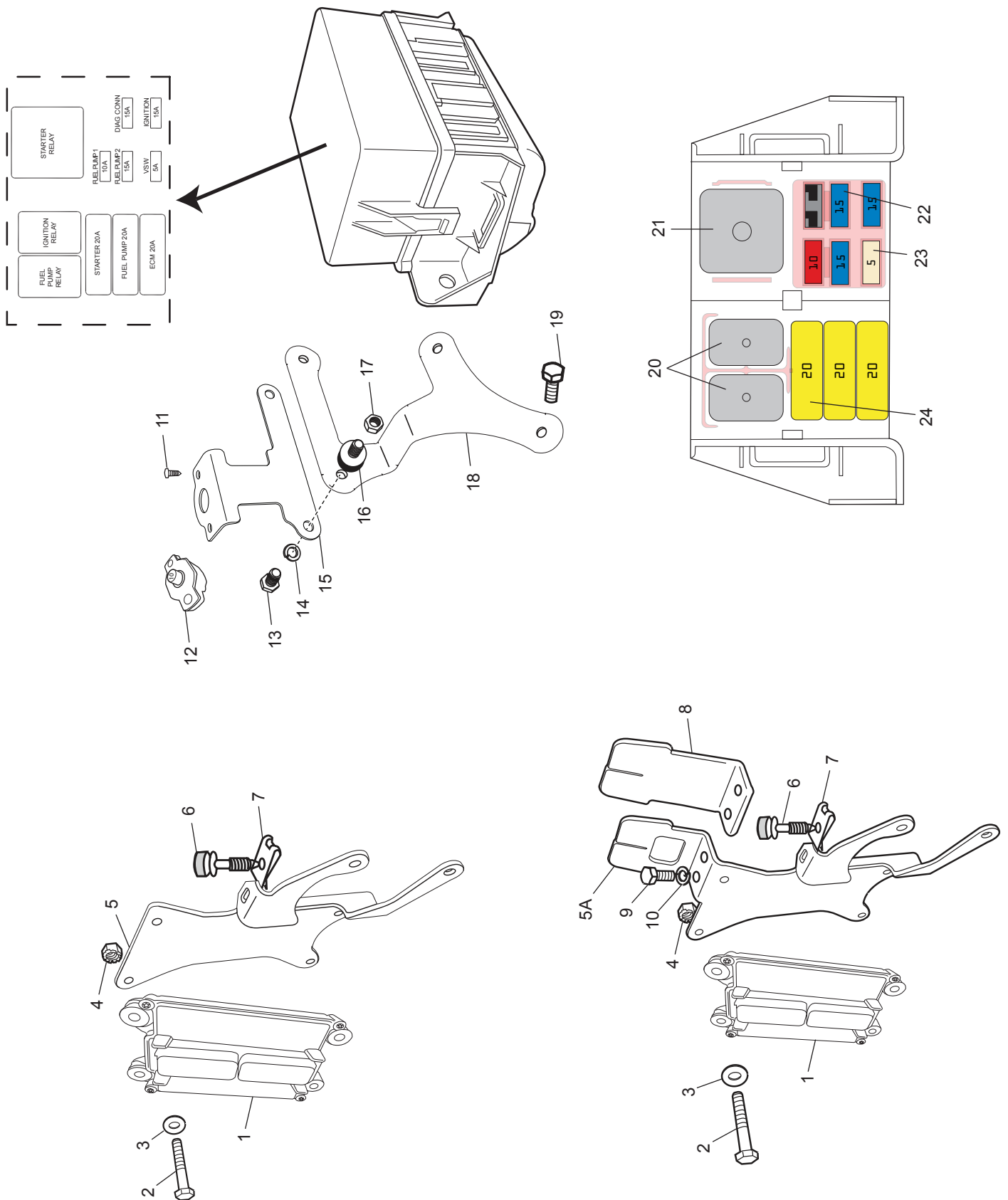
WIRING HARNESS and ECM - FIGURE 14



WIRING HARNESS and ECM - FIGURE 14

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R116027	1	Engine Control Module (must be programmed)	
2	RA121120	1	Engine Wiring Harness Assembly	
3	R020019	3	Sensor , engine coolant temp/exhaust manifold coolant temp	
5	R127039	AR	Clamp , component securing	
6	RS2178	AR	Bolt , attaching	
7	90105075	AR	Bolt , attaching	
8	R020052	2	Sensor , knock	
9	R121117	AR	Harness , electric shift	12-575-CS-xx

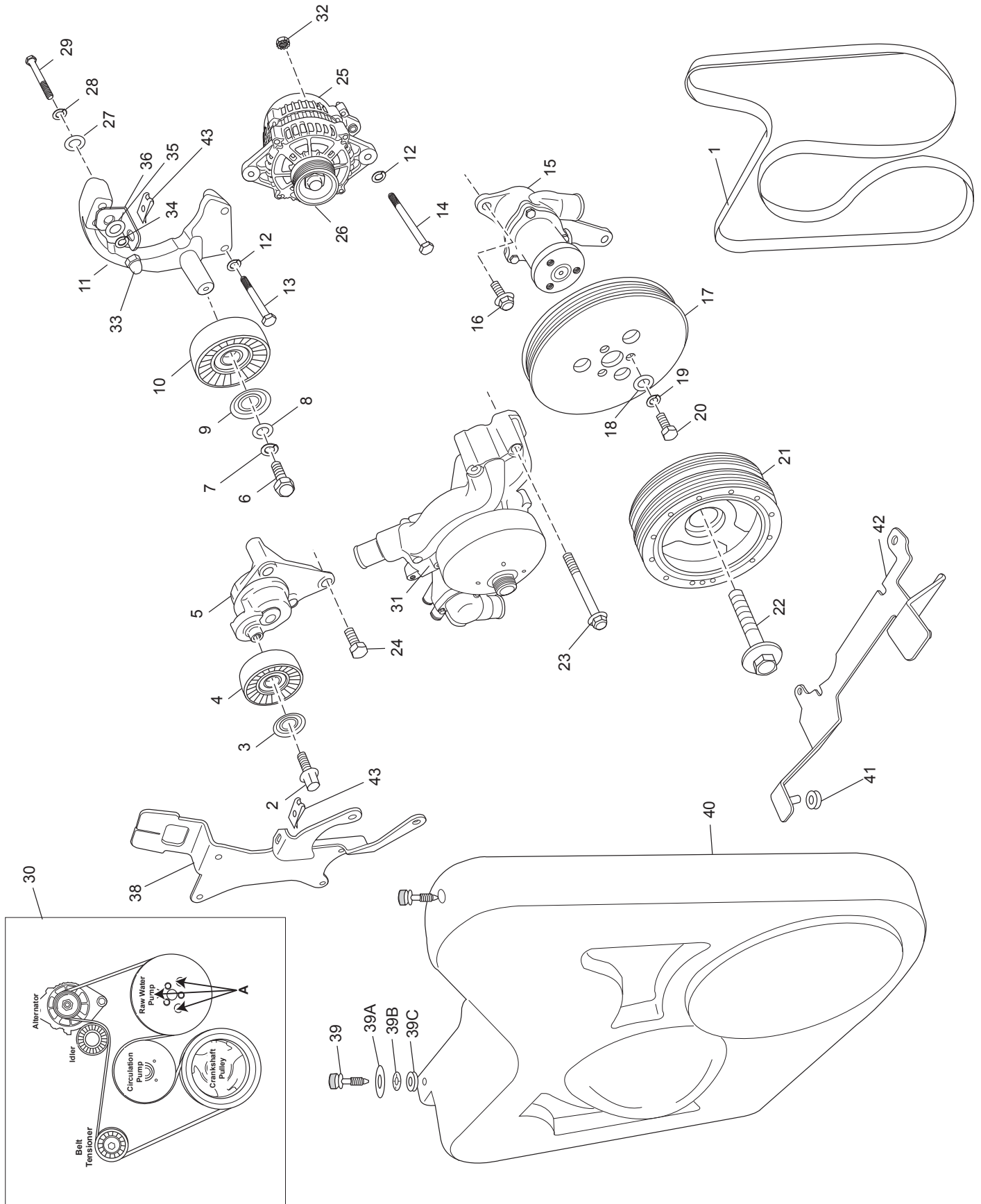
ECM and RELAYS - FIGURE 15



ECM and RELAYS - FIGURE 15

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R116027	1	Engine Control Module (ECM)	
2	98224035	4	Bolt , ECM attaching	
3	RS2672	4	Washer , ECM attaching	
4	97224300	4	Nut , ECM attaching	
5	R090362A	1	Bracket , ECM	xx-652C-xx; xx-652VC-xx
5A	R090362	1	Bracket , ECM/degas bottle	xx-652CS-xx; xx-652VCS-xx
6	R175057A	2	Screw , belt cover attaching	
7	R017084	2	Clip , belt cover attaching	
8	R090385	1	Bracket , high mount degas bottle	xx-652CS-xx; xx-652VCS-xx
9	98334014	2	Bolt , high mount degas bottle bracket attaching	xx-652CS-xx; xx-652VCS-xx
10	93934000	2	Lockwasher , high mount degas bottle bracket attaching	xx-652CS-xx; xx-652VCS-xx
11	Part of 12	AR	Screw , circuit breaker attaching	
12	R153017C	1	Circuit Breaker , 10 amp	
13	RS0251	2	Bolt , fuse block mounting	
14	RS2178	2	Lockwasher , fuse block mounting	
15	R090430	1	Bracket , circuit breaker	
16	R094044	2	Isolator , fuse block mounting	
17	RS1078	2	Nut , KEPS, fuse Block attaching	
18	R090361A	1	Bracket , fuse block	
19	98222016	2	Bolt , fuse block bracket attaching	
20	R130015	AR	Relay , fuel Pump and ignition	
21	R130016	AR	Relay , starter	
22	R153017A	AR	Fuses , 15 amp	
23	R153017C	AR	Fuse , 5 amp	
24	R153019C	AR	Fuse , maxi, 20 Amp	

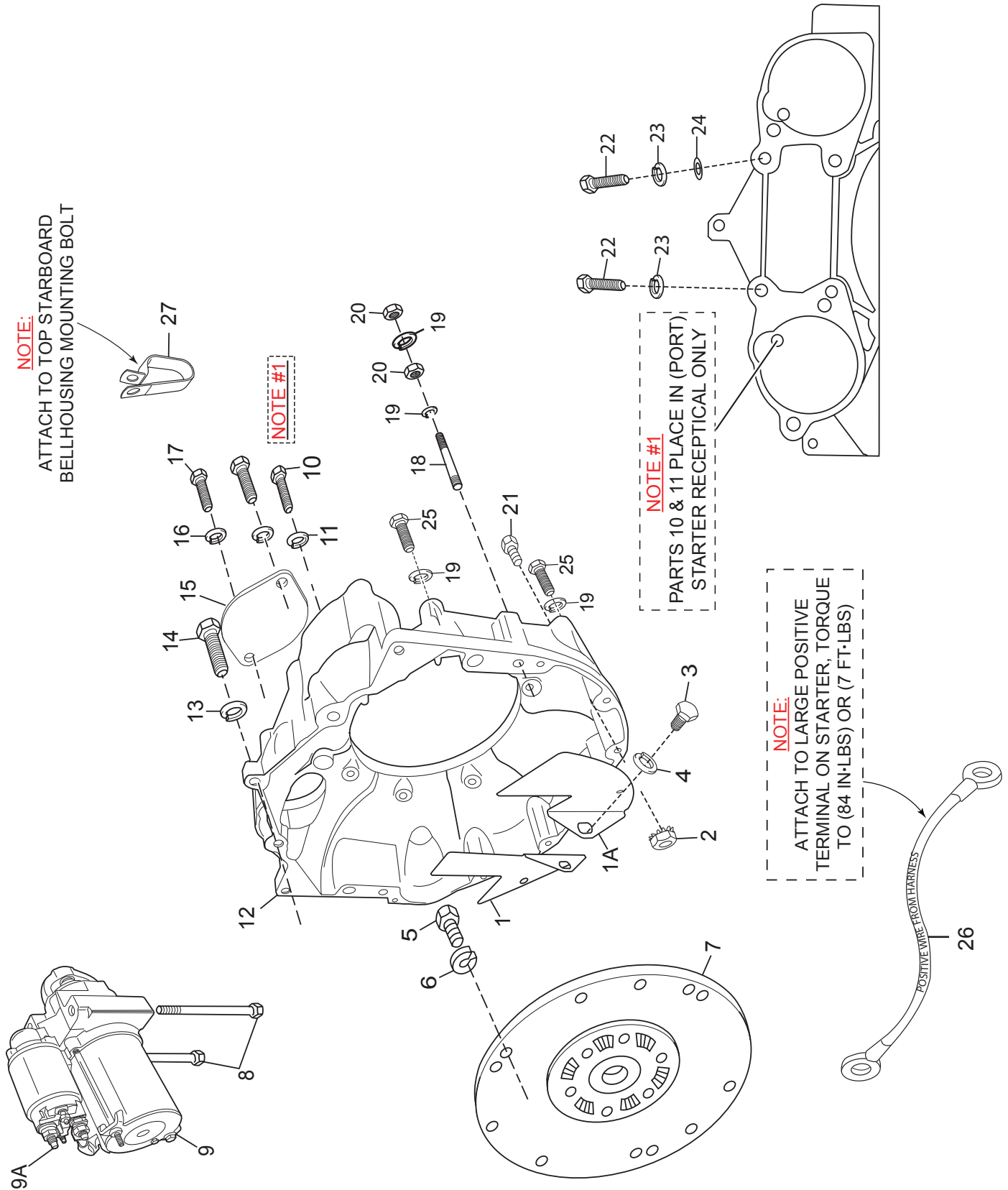
ACCESSORY DRIVE SYSTEM COMPONENTS - FIGURE 16



ACCESSORY DRIVE SYSTEM COMPONENTS - FIGURE 16

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R066033A	1	Belt , serpentine drive	
2	p/o item #5	1	Bolt , tensioner pulley attaching	
3	p/o item #5	1	Washer , tensioner pulley attaching bolt	
4	p/o item #5	1	Pulley , tensioner	
5	RA068002	1	Tensioner , belt	
6	98333025	1	Bolt , idler pulley attaching	
7	RS2179	1	Lockwasher , idler pulley attaching bolt	
8	92940000	1	Washer , idler pulley attaching bolt (small)	
9	R096145	1	Washer , formed, idler pulley attaching bolt (large)	
10	R065040	1	Pulley , idler	
11	R090335	1	Bracket , idler pulley mounting / alternator	
12	93940000	2	Lockwasher , idler pulley bracket attaching bolt	
13	98443110	1	Bolt , idler pulley bracket attaching	
14	98446070	1	Bolt , alternator mounting, lower	
15	RA057032	1	Raw Water Pump Assembly	
16	98442030	2	Bolt , raw water pump mounting	
17	R065050	1	Pulley , raw water pump	
18	92934000	3	Flat Washer , raw water pump pulley attaching	
19	93934000	3	Lockwasher , raw water pump pulley attaching bolt	
20	99335016	3	Bolt , raw water pump pulley attaching	
21	R064016	1	Balancer , crankshaft	
22	TBD	1	Bolt , crankshaft balancer	
23	TBD	4	Bolt , water circulation pump attaching	
24	TBD	3	Bolt , belt tensioner mounting	
25	RA097009	1	Alternator Assembly, 100 Amp	
NI	RF097009C	AR	Retro Fit Kit, 70 to 100 Amp Alternator	
26	TBD	1	Pulley , alternator (100 amp)	
27	92200000	1	Flatwasher , alternator mounting	
28	RS2179	1	Lockwasher , alternator mounting	
29	98339070	1	Bolt , alternator mounting, upper	
30	R143147A	1	Decal , belt routing	
31	RK057036	1	Water Circulation Pump Assembly	
32	97330060	1	Nut , KEPS, Alternator Positive Post, 100A	
NI	R101016	1	Wire , Ground, alternator 100A	
NI	R153018D	1	Wire , Charge, 100A Fuse Link - alternator to starter	
33	97334030	1	Nut , belt guard bracket attaching	
34	93934000	1	Lockwasher , belt guard bracket attaching	
35	RS2179	1	Washer , flat, belt guard bracket attaching	
36	R090366	1	Bracket , belt guard, upper port	
37	R090340	1	Bracket , belt guard, upper starboard	
38	R090362A	1	Bracket , ECM/belt guard upper starboard	xx-652C-xx; xx-652VC-xx
38	R090362	1	Bracket , ECM/Degas bolt/belt guard upper starboard	xx-652CS-xx; xx-652VCS-xx
39	R175058	2	Screw , belt guard retaining	
39A	92104200	2	Washer , 1/4" fender	
39B	R048118	2	Washer , belt guard retaining	
39C	R094048	2	Grommet , belt guard retaining	
40	R060078	3	Cover , Belt guard	
41	R094048	2	Grommet , belt guard retaining	
42	R090367	1	Bracket , front cover, lower	
43	R017084	2	Nut , Clip-on	

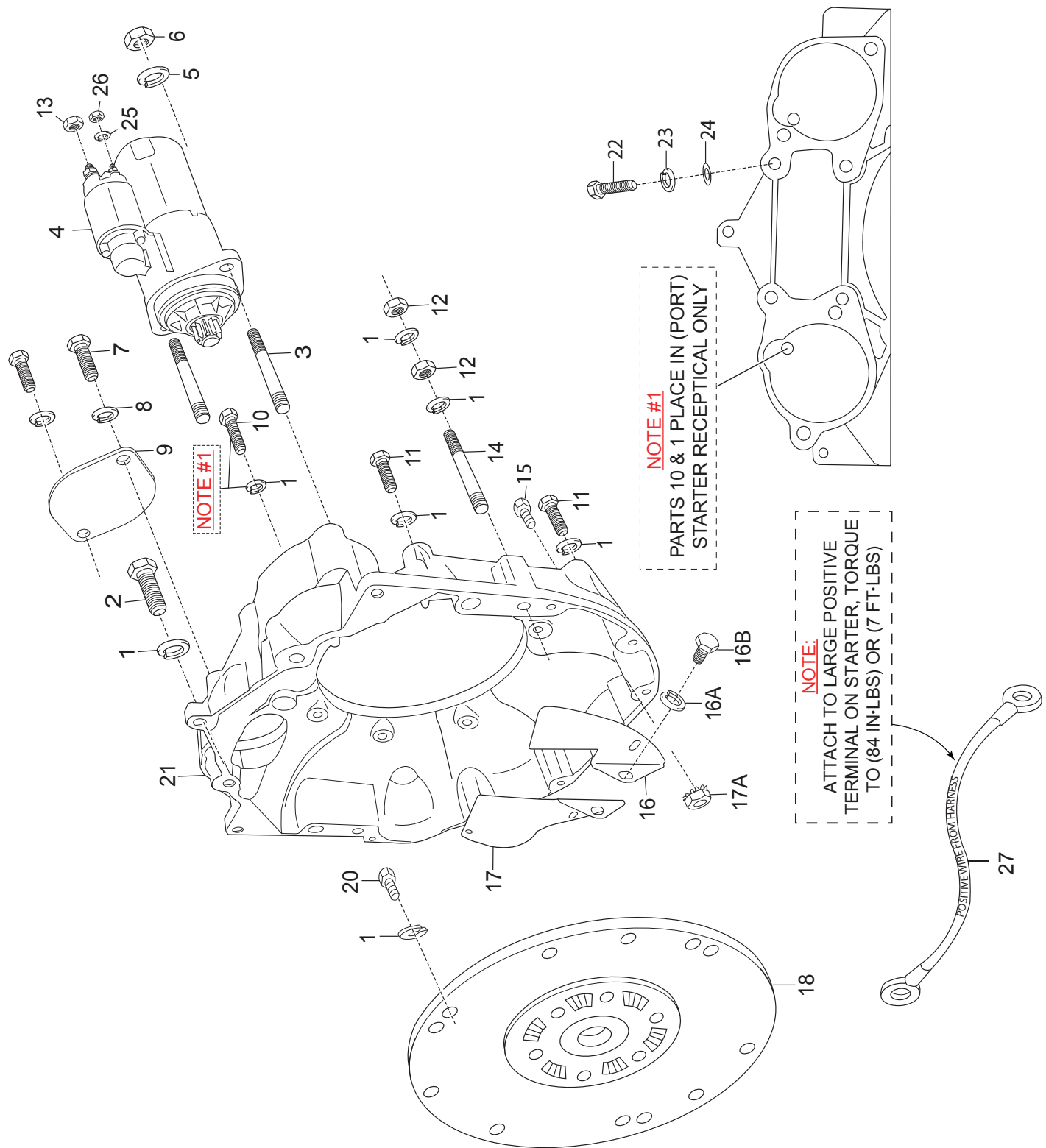
DIRECT DRIVE STARTER ASSEMBLY AND BELLHOUSING COMPONENTS - FIGURE 17



DIRECT DRIVE STARTER ASSEMBLY AND BELLHOUSING COMPONENTS - FIGURE 17

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R019011	1	Plate , flywheel cover (stbd)	
1A	R019012	1	Plate , flywheel cover (port)	
2	RS1078	3	Nut , flywheel cover plate attaching	
3	98223016	2	Bolt , flywheel cover plate attaching	
4	93920000	2	Lockwasher , flywheel cover plate attaching	
5	98446030	6	Bolt , damper plate attaching	
6	93940000	6	Lockwasher , damper plate attaching	
7	R140024	1	Damper Plate Assembly	
8	R009203	2	Bolt , starter attaching	
9	RA122019	1	Starter Assembly , bottom mount	
9A	RU0050B	1	Solenoid , starter	
10	99443030	1	Bolt , bellhousing attaching	
11	93940000	1	Lockwasher , bellhousing attaching	
12	R142015E	1	Bellhousing , flywheel	
13	93940000	1	Lockwasher , bellhousing attaching	
14	98443030	1	Bolt , bellhousing attaching	
15	R019010	2	Cover , dust	
16	RS2181	4	Lockwasher , dust cover attaching	
17	RS0327	4	Bolt , dust cover attaching	
18	R031034	2	Stud , bellhousing attaching	
19	93940000	8	Lockwasher , bellhousing attaching	
20	97440000	4	Nut , bellhousing attaching	
21	RS0256	3	Bolt , attaching	
22	RS0302	2	Bolt , bellhousing attaching	
23	RS2180	2	Lockwasher , bellhousing attaching	
24	92300000	2	Washer , bellhousing attaching	
25	98446075	4	Bolt , bellhousing attaching	
26	R101018	1	Positive Starter Lead , (1ga. / 24")	12-575XX-XX
27	R127099	1	Strap , component retaining	

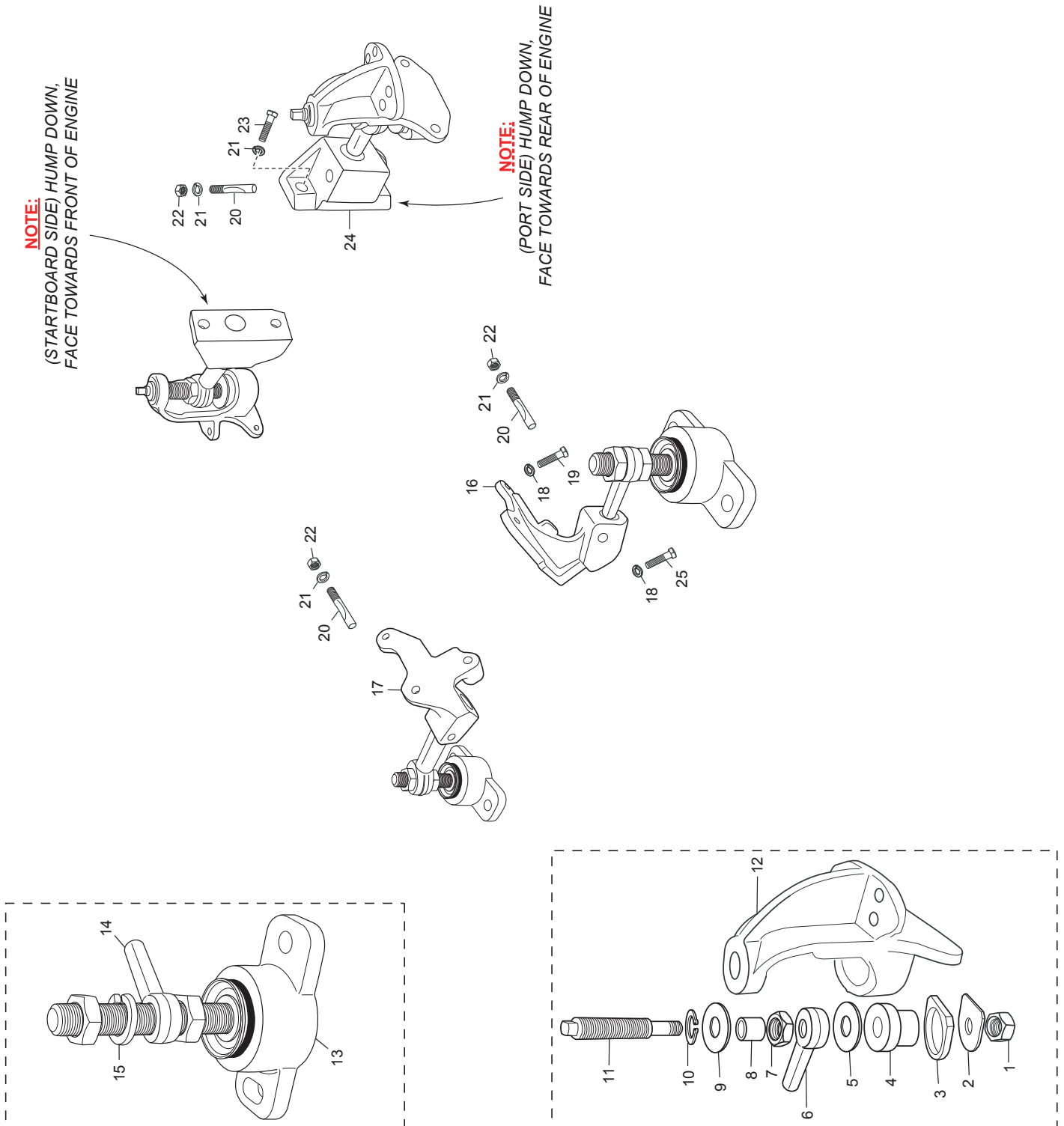
VEE DRIVE STARTER ASSEMBLY AND BELLHOUSING COMPONENTS - FIGURE 18



VEE DRIVE STARTER ASSEMBLY AND BELLHOUSING COMPONENTS - FIGURE 18

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	93940000	8	Lockwasher , bellhousing attaching	
2	98443030	1	Bolt , bellhousing attaching	
3	R031018	2	Stud , top mount starter attaching	
4	RA122009	1	Starter Assembly , top mount	
5	RS2181	2	Lockwasher , top mount starter attaching	
6	RS1029	2	Nut , top mount starter attaching	
7	RS0327	2	Bolt , dust cover attaching	
8	RS2181	2	Lockwasher , dust cover attaching	
9	R019010	1	Cover , dust	
10	99443030	1	Bolt , bellhousing attaching	
11	98446075	4	Bolt , bellhousing attaching	
12	97440000	4	Nut , bellhousing attaching	
13	97330060	1	Nut , Keps, battery lead attaching	
14	R031034	2	Stud , bellhousing attaching	
15	RS0256	3	Bolt , attaching	
16	R019012	1	Plate , flywheel cover (port)	
16A	93920000	2	Lockwasher , flywheel cover plate attaching	
16B	98223016	2	Bolt , flywheel cover plate attaching	
17	R019011A	1	Plate , flywheel cover (stbd)	
17A	RS1078	3	Nut , flywheel cover plate attaching	
18	R140024	1	Damper Plate Assembly	
20	98446030	6	Bolt , damper plate attaching	
21	R142015E	1	Bellhousing , flywheel	
22	RS0302	2	Bolt , bellhousing attaching	
23	RS2180	2	Lockwasher , bellhousing attaching	
24	92300000	2	Washer , bellhousing attaching	
25	93003000	1	Lockwasher , solenoid wire attaching	
26	RS7036	1	Nut , solenoid wire attaching	
27	R101018	1	Positive Starter Lead , (1ga. / 24")	12-575VX-XX

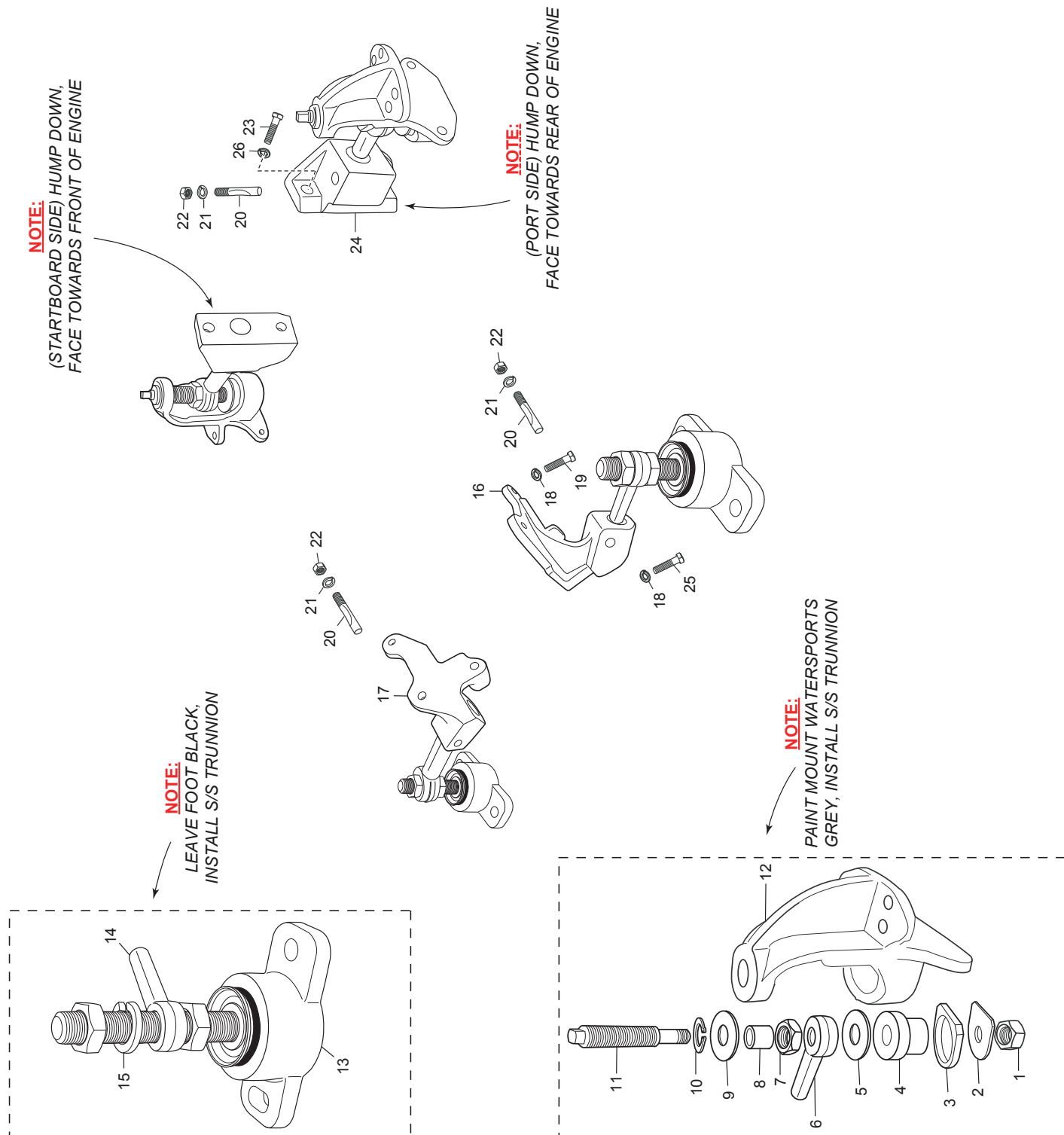
ENGINE and TRANSMISSION MOUNTS (XX-652C-XX) - FIGURE 19



ENGINE and TRANSMISSION MOUNTS (XX-652C-XX) - FIGURE 19

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RS1082	2	Nut , mount lower	
2	R096148	2	Washer , mount lower	
3	R094050	2	Bushing , mount lower	
4	R094017	2	Isolator , mount lower	
5	R096001	2	Washer , mount isolator	
6	R091003	2	Trunnion , mount	
7	RS1577	2	Nut , mount hex jam	
8	R094004	2	Isolator , mount upper	
9	R096150	2	Washer , stainless steel upper isolator	
10	R048120	2	Snap Ring , mount	
11	R095002	2	Stud , mount trunnion	
12	R092003A	2	Body , mount (short back)	
13	RA092017	2	Mount , DF-216 front	
14	R091001	2	Trunnion , front	
15	RS2186	2	Lockwasher , front mount	
16	R090302	1	Bracket , front mount (port)	
17	R090303	1	Bracket , front mount (stbd)	
18	93940000	6	Lockwasher , mount bracket attaching	
19	98443030	4	Bolt , mount bracket attaching	
20	R095020	4	Wedge Pin , trunnion securing	
21	RS2181	8	Lockwasher , wedge pin / mount bracket attaching	
22	RS1529	4	Nut , wedge pin attaching	
23	RS0328	4	Bolt , mount bracket attaching	
24	R090145	2	Block , rear mount	
25	98449055	2	Bolt , mount bracket attaching	

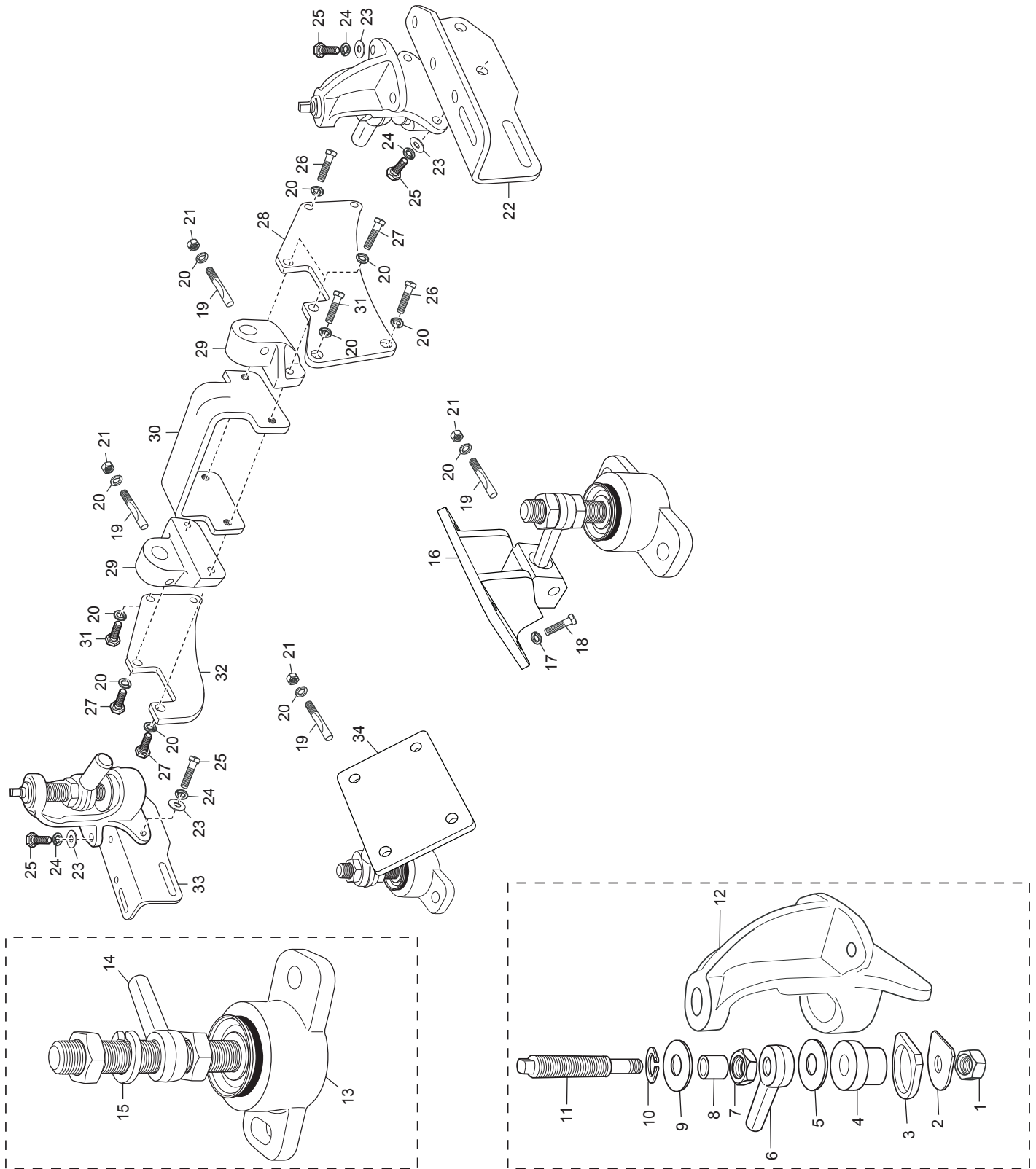
ENGINE and TRANSMISSION MOUNTS (XX-652CS-XX) - FIGURE 19S



ENGINE and TRANSMISSION MOUNTS (XX-652CS-XX) - FIGURE 19S

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	95604020	2	Nut , mount lower (stainless steel)	
2	R096148A	2	Washer , mount lower (stainless steel)	
3	R094050	2	Bushing , mount lower	
4	R094017	2	Isolator , mount lower	
5	R096001A	2	Washer , mount isolator (stainless steel)	
6	R091006A	2	Trunnion , mount (stainless steel)	
7	96104050	2	Nut , mount hex jam (stainless steel)	
8	R094004	2	Isolator , mount upper	
9	R096150	2	Washer , stainless steel upper isolator	
10	R048120	2	Snap Ring , mount	
11	R095002	2	Stud , mount trunnion	
12	R092003A	2	Body , mount (short back)	
13	RA092017	2	Mount , DF-216 front	
14	R091001A	2	Trunnion , front (stainless steel)	
15	93704000	2	Lockwasher , front mount (stainless steel)	
16	R090302	1	Bracket , front mount (port)	
17	R090303	1	Bracket , front mount (stbd)	
18	93940000	6	Lockwasher , mount bracket attaching	
19	98443030	4	Bolt , mount bracket attaching	
20	R095020A	4	Wedge Pin , trunnion securing (stainless steel)	
21	93404000	4	Lockwasher , wedge pin (stainless steel)	
22	95414000	4	Nut , wedge pin attaching (stainless steel)	
23	RS0328	4	Bolt , mount bracket attaching	
24	R090145	2	Block , rear mount	
25	98449055	2	Bolt , mount bracket attaching	
26	RS2181	4	Lockwasher , mount bracket attaching	

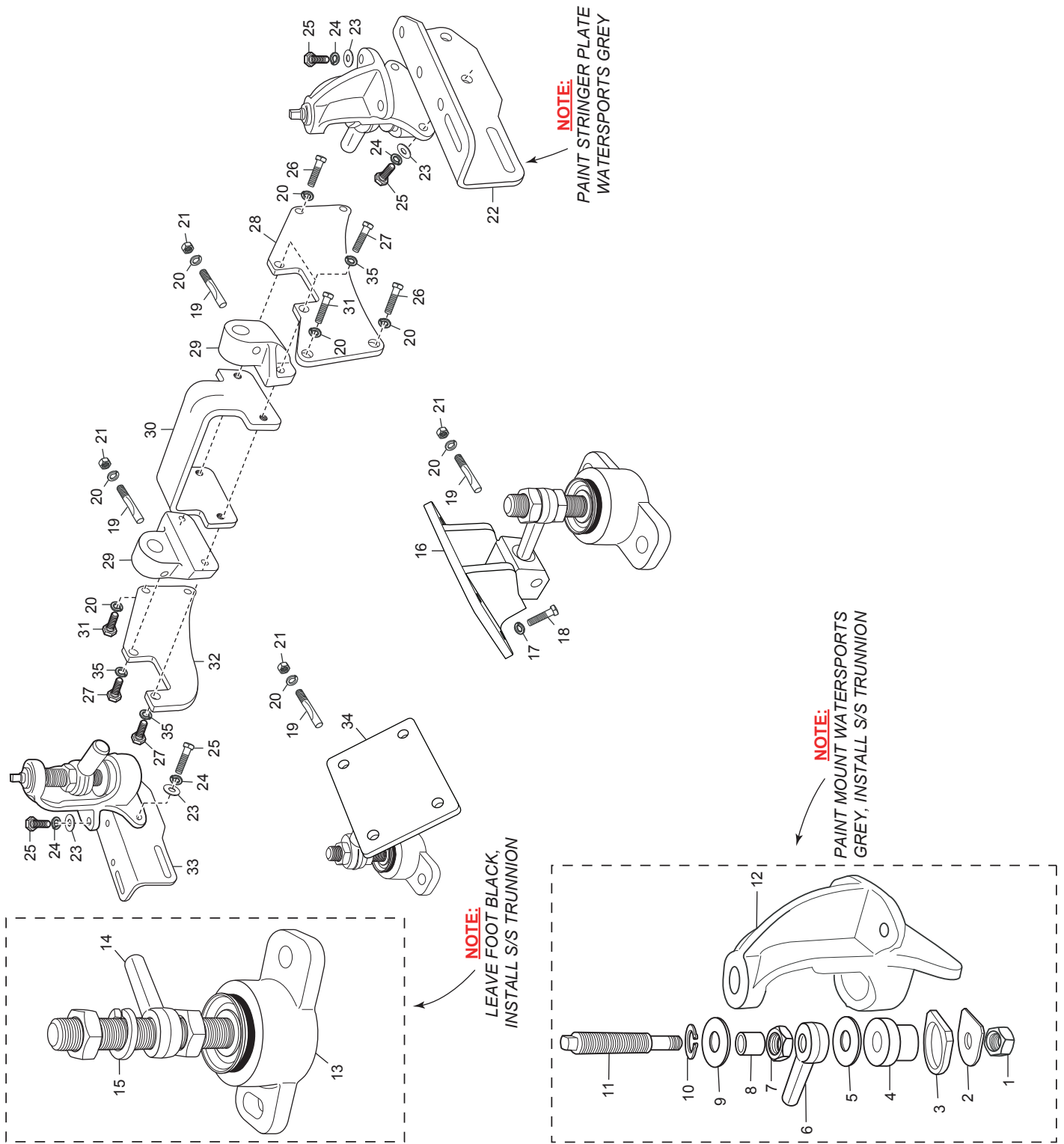
ENGINE and TRANSMISSION MOUNTS (XX-652VC-XX) - FIGURE 20



ENGINE and TRANSMISSION MOUNTS (XX-652VC-XX) - FIGURE 20

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	RS1082	2	Nut , mount lower	
2	R096148	2	Washer , mount lower	
3	R094050	2	Bushing , mount lower	
4	R094017	2	Isolator , mount lower	
5	R096001	2	Washer , mount isolator	
6	R091011	2	Trunnion , mount (3")	
7	RS1577	2	Nut , mount hex jam	
8	R094004	2	Isolator , mount upper	
9	R096150	2	Washer , stainless steel upper isolator	
10	R048120	2	Snap Ring , mount	
11	R095002	2	Stud , mount trunnion	
12	R092003	2	Body , mount (short back)	
13	RA092017	2	Mount , DF-216 front	
14	R091001	2	Trunnion , front	
15	RS2186	2	Lockwasher , front mount	
16	R090432	1	Bracket , front mount (port)	
17	93940000	8	Lockwasher , mount bracket attaching	
18	98443030	8	Bolt , mount bracket attaching	
19	R095020	4	Wedge Pin , trunnion securing	
20	RS2181	14	Lockwasher , wedge pin / mount bracket attaching	
21	RS1529	4	Nut , wedge pin attaching	
22	R090424	1	Bracket , stringer mount (left)	
23	92944000	8	Flatwasher , mount bracket attaching	
24	93304000	8	Lockwasher , mount bracket attaching	
25	90304100	8	Bolt , mount bracket attaching	
26	RS0328	3	Bolt , support brace attaching	
27	RS0330	4	Bolt , support brace attaching	
28	R109063	1	Brace , support brace attaching (left)	
29	R090205	2	Bracket , mount	
30	R090423	1	Bracket , Vdrive support brace	
31	RS0327	3	Bolt , support brace attaching	
32	R109064	1	Brace , support brace attaching (right)	
33	R090425	1	Bracket , stringer mount (right)	
34	R090433	1	Bracket , front mount (stbd)	

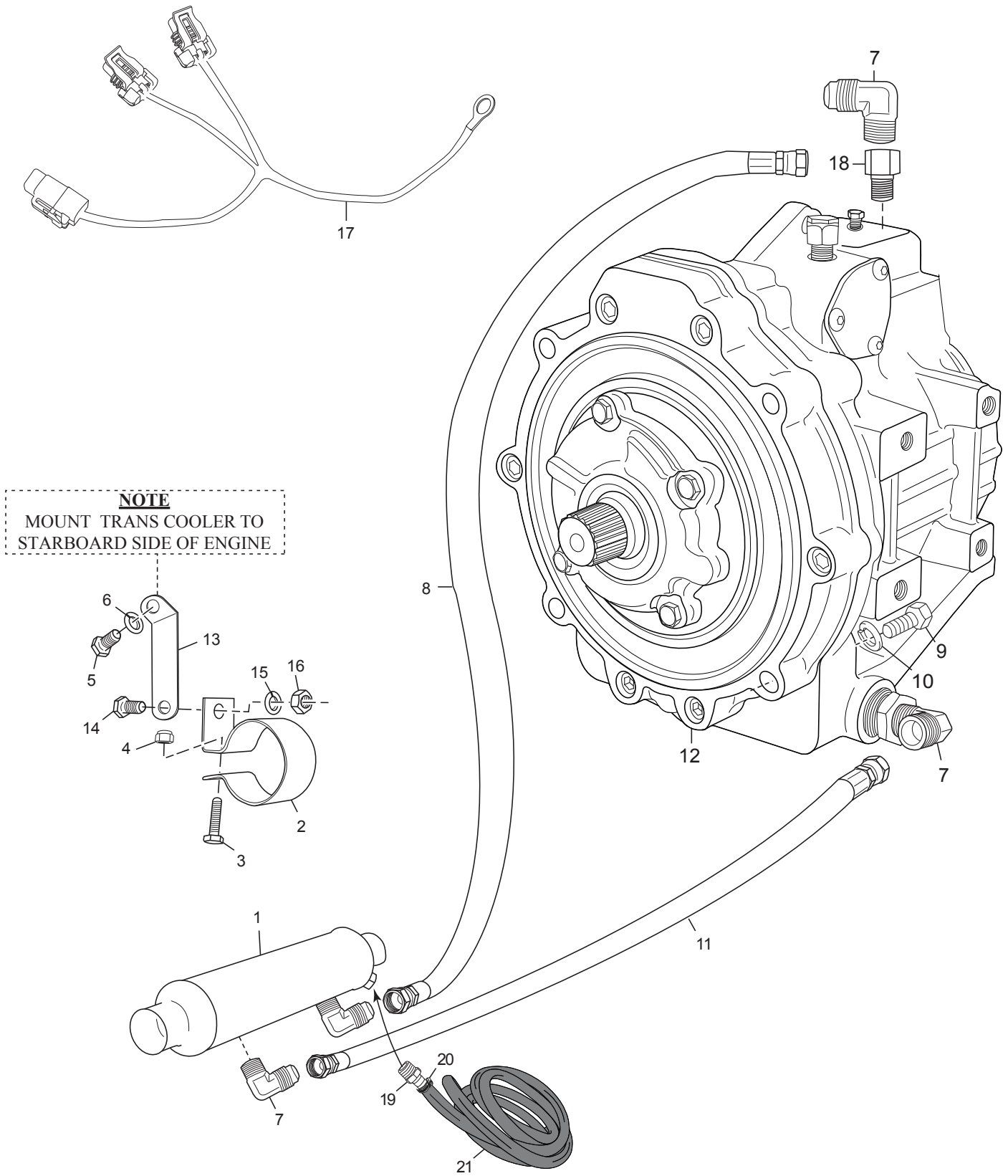
ENGINE and TRANSMISSION MOUNTS (XX-652VCS-XX) - FIGURE 20S



ENGINE and TRANSMISSION MOUNTS (XX-652VCS-XX) - FIGURE 20S

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	95604020	2	Nut , mount lower (stainless steel)	
2	R096148A	2	Washer , mount lower (stainless steel)	
3	R094050	2	Bushing , mount lower	
4	R094017	2	Isolator , mount lower	
5	R096001A	2	Washer , mount isolator (stainless steel)	
6	R091011A	2	Trunnion , mount (stainless steel)	
7	96104050	2	Nut , mount hex jam (stainless steel)	
8	R094004	2	Isolator , mount upper	
9	R096150	2	Washer , stainless steel upper isolator	
10	R048120	2	Snap Ring , mount	
11	R095002	2	Stud , mount trunnion	
12	R092003	2	Body , mount (short back)	
13	RA092017	2	Mount , DF-216 front	
14	R091001A	2	Trunnion , front (stainless steel)	
15	93704000	2	Lockwasher , front mount (stainless steel)	
16	R090432	1	Bracket , front mount (port)	
17	93940000	8	Lockwasher , mount bracket attaching	
18	98443030	8	Bolt , mount bracket attaching	
19	R095020A	4	Wedge Pin , trunnion securing (stainless steel)	
20	93404000	10	Lockwasher , wedge pin/mount bracket attaching (stainless steel)	
21	95414000	4	Nut , wedge pin attaching (stainless steel)	
22	R090424	1	Bracket , stringer mount (left)	
23	92944000	8	Flatwasher , mount bracket attaching (stainless steel)	
24	93304000	8	Lockwasher , mount bracket attaching (stainless steel)	
25	90304100	8	Bolt , mount bracket attaching (stainless steel)	
26	90404125	3	Bolt , support brace attaching (stainless steel)	
27	RS0330	4	Bolt , support brace attaching	
28	R109063	1	Brace , support brace attaching (left)	
29	R090205	2	Bracket , mount	
30	R090423	1	Bracket , Vdrive support brace	
31	90404100	3	Bolt , support brace attaching	
32	R109064	1	Brace , support brace attaching (right)	
33	R090425	1	Bracket , stringer mount (right)	
34	R090433	1	Bracket , front mount (stbd)	
35	RS2181	4	Lockwasher , mount brace attaching	

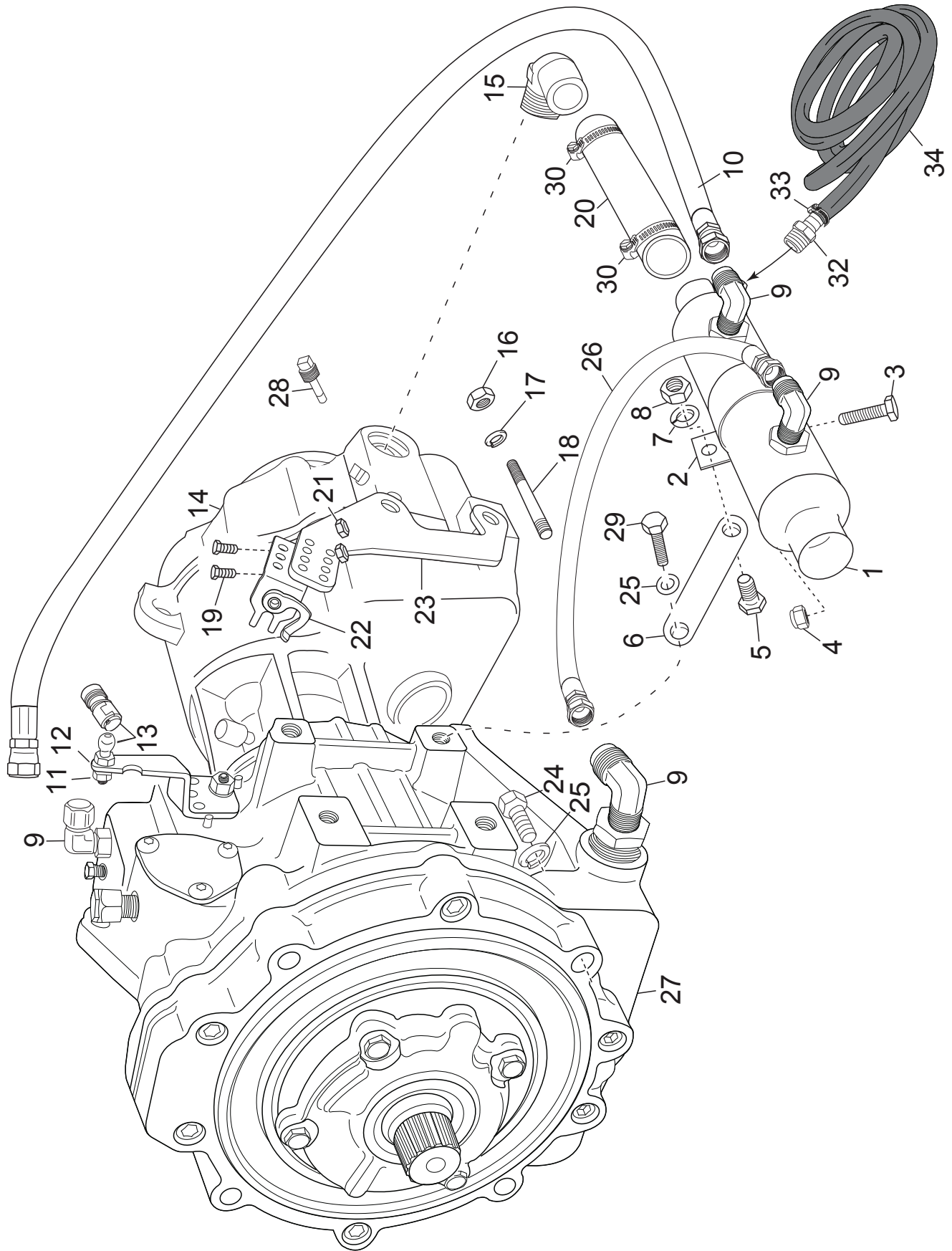
TRANSMISSION AND RELATED COMPONENTS 12-652C-XX / 12-652CS-XX - FIGURE 21



TRANSMISSION AND RELATED COMPONENTS 12-652C-XX / 12-652CS-XX - FIGURE 21

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R147006	1	Transmission Cooler, 12"	
2	R090010	1	Bracket, transmission cooler	
3	RS0256	1	Bolt, transmission cooler attaching	
4	RS2058	1	Nut, transmission cooler attaching	
5	98443025	1	Bolt, transmission cooler mounting bracket	
6	93940000	1	Lockwasher, transmission cooler mounting bracket	
7	R024010	4	Fitting, 90 degree	
8	RA045007T	1	Hose Assembly, cooler to transmission	
9	RS0337	4	Bolt, transmission attaching	
10	RS2181	4	Lockwasher, transmission attaching	
11	RA045007H	1	Hose Assembly, transmission to cooler	
12	RA157026E	1	Transmission, 1:1 electric	
13	R090289	1	Bracket, cooler strap	
14	RS0302	1	Bolt, bracket attaching	
15	RS2180	1	Lockwasher, bracket attaching	
16	RS1028	1	Nut, bracket attaching	
17	R121117	1	Harness, electric shift	
18	R024096	1	Fitting, adapter	
19	R024103	1	Fitting, 1/8" NPT x 3/8" hose barb	
20	R127087C	1	Clamp, oetiker	
21	R045049	Bulk/ft	Hose, 3/8" oil resistant	

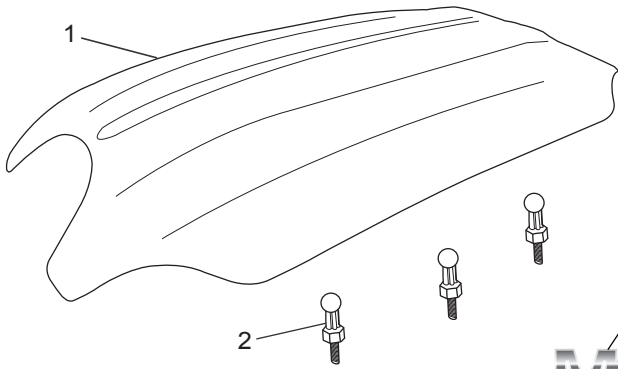
TRANSMISSION AND RELATED COMPONENTS 12-652VC-XX / 12-652VCS-XX- FIGURE 22



TRANSMISSION AND RELATED COMPONENTS 12-652VC-XX / 12-652VCS-XX- FIGURE 22

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R147006	1	Transmission Cooler , 12"	
2	R090010	1	Bracket , transmission cooler	
3	RS0256	1	Bolt , transmission cooler attaching	
4	RS2058	1	Nut , transmission cooler attaching	
5	RS0302	1	Bolt , transmission cooler bracket attaching	
6	R090405	1	Bracket , transmission cooler	
7	RS2180	1	Lockwasher , transmission cooler bracket attaching	
8	RS1028	1	Nut , transmission cooler bracket attaching	
9	R024010	4	Fitting , 90 degree	
10	RA045007B	1	Hose Assembly , transmission to cooler	
11	RS1568	1	Nut , ball joint attaching pinch	
12	R166023A	1	Lever , 80S short throw shift	
13	R178003	1	Ball Joint Assembly , shift cable attaching	
14	RA156011B	1	VDrive Assembly , 1.48:1 ratio	12-652VC-XX; 12-652VCS-XX
14	RA156013	1	VDrive Assembly , 1.72:1 ratio	12-653VC-XX; 12-653VCS-XX
15	R024268	2	Elbow , VDrive 90 degree	
16	97334000	8	Nut , VDrive attaching	
17	93934000	8	Lockwasher , VDrive attaching	
18	R031035	8	Stud , VDrive attaching	
19	91014063	2	Screw , shift cable clip attaching	
20	20865	1 ft.	Hose , 1 1/4" ID wire reinforced	
21	95014300	2	Nut , cable clip attaching	
22	R090086A	1	Cable Clip , single cable	
23	R090409A	1	Bracket , shift cable (short throw)	
24	RS0337	4	Bolt , transmission attaching	
25	93404000	5	Lockwasher , transmission attaching / cooler bracket attaching	
26	RA045007C	1	Hose Assembly , cooler to transmission	
27	RA157025	1	Transmission , 1:1 80 Series	
28	R041091	2	Dipstick , VDrive oil level	
29	90404100	1	Bolt , transmission cooler bracket attaching	
30	RS3858	2	Clamp , hose (#20)	
31	R168015A	1	Anode , sacrificial	
32	R024103	1	Fitting , 1/8" NPT x 3/8" hose barb	
33	R127087C	1	Clamp , oetiker	
34	R045049	Bulk/ft	Hose , 3/8" oil resistant	

HOODS AND DECALS - FIGURE 23



MONSOON

409

**PLEASURECRAFT MARINE ENGINE COMPANY
EMISSION CONTROL INFORMATION**

THIS WATERCRAFT'S ENGINE IS CERTIFIED TO OPERATE ON GASOLINE. MINIMUM FUEL REQUIREMENT: 87 OCTANE. LUBRICANT REQUIREMENT: FOR AMBIENT TEMPERATURES OVER 50 DEG F USE SAE 10W-40 SJ OR NEWER. FOR AMBIENT TEMPERATURES UNDER 50 DEG F USE SAE 5W-30 SJ OR NEWER.

THIS MARINE ENGINE COMPLIES WITH U.S. EPA EMISSIONS REGULATIONS FOR 2011. ENGINE FAMILY: CRUSADER CHALLENGER. ENGINE DISPLACEMENT: 6.0 LITER. MAXIMUM ENGINE POWER: 21 KW. ENGINE CONTROL SYSTEM: MP6.0LX. CODE: ECM. REQUIRED MAINTENANCE: NO OTHER ADJUSTMENTS REQUIRED.

P/N: R143310

EMISSION CONTROL INFORMATION

THIS ENGINE IS SOLELY FOR EXPORT AND IS THEREFORE EXEMPT UNDER 40 CFR 108.250 FROM U.S. EMISSION STANDARDS AND RELATED REQUIREMENTS.

THIS ENGINE MUST BE EXPORTED TO AVOID BEING IN VIOLATION OF ENVIRONMENTAL PROTECTION AGENCY REGULATIONS.

INSTALLATION OF THIS ENGINE IN A VESSEL THAT IS THEN OFFERED FOR SALE TO AN ULTIMATE PURCHASER IN THE UNITED STATES, OR OTHERWISE IS INTRODUCED INTO U.S. COMMERCE, IS IN VIOLATION OF ENVIRONMENTAL PROTECTION AGENCY REGULATIONS.

R143212



WARNING! DO NOT ATTEMPT TO START OR OPERATE ENGINE WITH FLAME ARRESTOR REMOVED

6.0L 366 c.i.d. Multi-port Fuel Injection / 6.0L HO 366 c.i.d. Multi-port Fuel Injection

Fuel Recommendations
Unleaded 87 Octane (Minimum) 6.0L
Unleaded 93 Octane (Required) 6.0L HO

Engine Oil
15W-40 above 50 degrees F
5W-30 below 50 degrees F

Marine Gear Oil Recommendation
Transmission: Dexron III
PSC V Drive: PSC Gear Oil (P/N R190250)

Electrical Specification
12 volts - Negative Ground
Ignition Timing and Engine Idle Non-Adjustable

Spark Plug P/N and Gap
R330011 - 0.040"

Maximum Engine Speed (WOT)
5200-5600 RPM (3500 RPM Preferred)

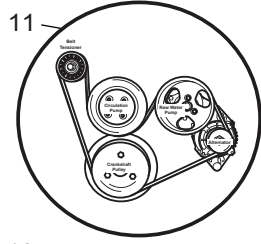
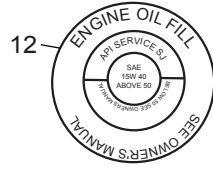
Maximum Continuous Cruise
4200 RPM

Firing Order
1-8-7-2-6-5-4-3

Fuel Pressure - CHECK UNDER LOAD
59-62 psi @ W.O.T.

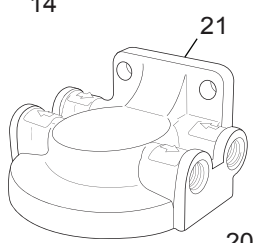
Crusader
R143215

- 15
- 22 COOLANT FILL
- 23 FRESH WATER DRAIN
- 24 SACRIFICIAL ANODE
- 13 RAW WATER DRAIN



WARNING!
BEFORE OPERATING, ALWAYS INSPECT YOUR VEHICLE.
If leakage is present, do not operate engine!

BATTERY GROUND



Fuel Control Cell OPERATOR INSTRUCTIONS

CAUTION: Visually inspect cell for leaking before operating engine. If leakage is present, do not operate engine. Contact service technician immediately.

SERVICE INSTRUCTIONS
Service Kit #: RP69028

WARNING: Improper installation of cell may cause excessive heating, a faulty repair or death. Service only by a qualified technician. Read/Observe all instructions. Run engine & check for fuel leakage and overheating, operating abnormal or missing fuel. Do not remove fuel control during normal operation or consumption, ignition, or boost O-ring swelling may result. Frequency of water draining or element replacement is determined by consumption level in fuel. Replace element at least once a year or when power loss occurs, when element is damaged.

To Drain Water: With Engine OFF

1. Disconnect two wires electrical harness from FCC and LPTP.
2. Remove 1/2 size brass plug. Drain contents into an approved container.
3. Reinstall 1/2 size brass plug and tighten.
4. Check system for correct flow to prime electric fuel pumps and fill container with fuel.
5. Repeat steps for both.
6. Start engine and inspect for leaks.

To Replace Element: With Engine OFF

1. Disconnect two wires electrical harness from FCC and LPTP.
2. Remove 1/2 size brass plug. Drain contents into an approved container.
3. If equipped, remove water supply (bottom) and discharge (top) hoses from the canister.
4. Remove canister mounting plug.
5. Slide canister element over the suspended filter element. It may be necessary to pull the filter down to remove.
6. Remove the fuel filter element from the suspended pump by pulling downward.
7. Visually inspect all fuel control components, i.e. hoses, wires, etc.
8. Install new fuel control element and secure with pump.
9. Reinstall all O-rings from the FCC head.
10. Reinstall canister in the same location. Locate the O-rings with fuel resistant O-ring tube.
11. Reinstall 1/2 size brass plug and tighten.
12. Reinstall canister from back into FCC head.
13. Reinstall discharge element. Tighten cap.
14. Reconnect electrical harness. Tighten cap.
15. No-connect fuel supply line to cell.
16. Check electric fuel pressure to prime electric fuel pumps and fill container with fuel.
17. Repeat steps for both.
18. Start engine and inspect for leaks.

Out-Of-Season Storage

1. If equipped, remove the water supply (bottom) and discharge (top) hoses from the canister.
2. Refer to Owner's Manual for additional information.

FRONT# 8140794 # 8112725 8338107
WARNING: DO NOT ATTEMPT TO SERVICE ANY OTHER PARTS ON THIS UNIT

R143200



CRUSADER CHALLENGER SERIES ENGINES
A DIVISION OF **CRUISER**

OWNER'S OPERATION and MAINTENANCE MANUAL

HOODS AND DECALS - FIGURE 23

ITEM	PART NO.	QTY.	DESCRIPTION	MODEL ID
1	R060091	1	Cover , engine (Red)	12-652C-XX, 12-652C-XX 12-653C-XX, 12-653VC-XX
1	R060092	1	Cover , engine (Salt Series - White)	12-652CS-XX, 12-652CS-XX 12-653CS-XX, 12-653VCS-XX
2	R095044	3	Standoff , engine cover attaching	
3	R143237	1	Decal , engine cover	12-652CS-XX, 12-652CS-XX 12-653CS-XX, 12-653VCS-XX
4	R143239	1	Decal , "409"	12-652CS-XX, 12-652CS-XX
5	R143235	1	Decal , specification	
6	R143236	2	Decal , "Catanium" exhaust manifold	
7	R143175	1	Decal , "caution hot"	
8	R143194	1	Decal , 4-star emissions	
9	R143210-XX	1	Label , EPA emissions	
10	R143183-XX	1	Label , CARB emissions	
11	R143165B	1	Decal , serpentine belt routing	
12	R143137	1	Decal , oil fill cap	
13	R143156	4	Decal , raw water drain	
14	22835	1	Decal , battery ground	
15	R128001C	AR	Cover , hose clamp tip (black)	
16	L510032-XX	1	Manual , owner's operation and maintenance	
17	R143090	1	Decal , "warning flame arrestor"	
18	R143114	1	Decal , fcc fuel leakage warning	
19	R143112D	1	Decal , fcc	
20	R077019	1	Filter , water separator / fuel	
21	R079076	1	Header , fuel filter / water separator	
22	R143153	1	Decal , coolant fill	
23	R143157	5	Decal , fresh water drain	
24	R143155	1	Decal , sacrificial anode	
25	RT0094A	AR	Boeshield , 4 oz can	
26	RT0094	AR	Boeshield , 12 oz can	