

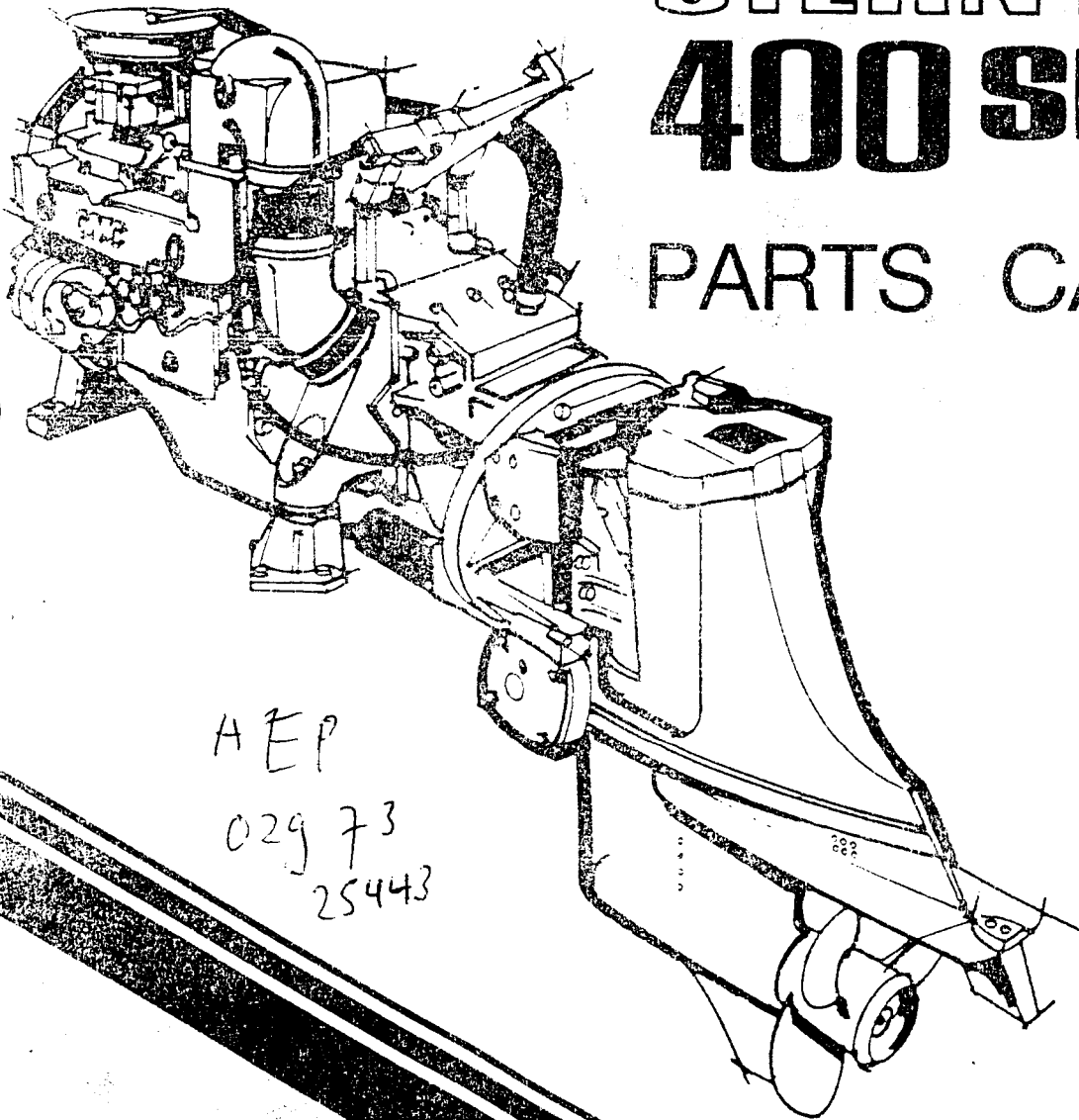


OUTBOARD MARINE  
BELGIUM N.V.  
BRUGGE, BELGIUM

1980

Model 901110  
Serienu W 158363


# STERN DRIVE 400 SERIES PARTS CATALOG



AEP  
029 73  
25443

 SAFETY WARNING

DO NOT SUBSTITUTE AUTOMOTIVE PARTS FOR THE FOLLOWING MARINE COMPONENTS: STARTER, ALTERNATOR, VOLTAGE REGULATOR, DISTRIBUTOR AND RELATED IGNITION PARTS, SPARK PLUG LEADS, SOLENOIDS, CARBURETOR (AND RELATED PARTS) OR FUEL PUMP. THESE COMPONENTS HAVE BEEN SPECIFICALLY DESIGNED NOT TO EMIT FUEL VAPORS OR TO CAUSE IGNITION OF FUEL VAPORS IN THE BILGE. TO PREVENT AN ACCIDENT DO NOT SUBSTITUTE AUTOMOTIVE COMPONENTS OR PARTS.

PARTS DESIGNATED WITH A  SAFETY SYMBOL MUST BE REPLACED WITH GENUINE OMC PARTS OR EQUIVALENT PARTS WHICH MEET ALL CURRENT U.S. COAST GUARD SAFETY REGULATIONS AND ABYC-BIA AND OTHER APPLICABLE STANDARDS. THIS IS NECESSARY TO INSURE THE COMPLETED ASSEMBLY WILL RETAIN ITS EXTERNAL IGNITION PROTECTION FEATURE.

THIS PARTS CATALOG COVERS THE FOLLOWING MODELS:

120 MODEL

990243C & C1 (SelecTrim)  
990242C & C1 (Pre-Set Trim)

140 MODEL

990245C & C1 (SelecTrim)  
990244C & C1 (Pre-Set Trim)

OMC Stern Drive, a Product Group of Outboard Marine Corporation, reserves the right to make changes at any time, without notice, in specifications and models and also to discontinue models. The right is also reserved to change any specifications or parts at any time without incurring any obligation to equip same on models manufactured prior to date of such change.

While the information contained in this Parts Catalog is based on the latest product information available at the time of publication, the continuing accuracy of this Parts Catalog cannot be guaranteed.

All illustrations used in this Parts Catalog may not depict actual models or equipment and are intended as representative views for reference only.

PART NUMBERS NEW FOR THIS MODEL YEAR CAN BE IDENTIFIED BY THE BOX SYMBOL ■ IN NAME OF PART COLUMN.

INDENTED PART NAMES INDICATE THAT THESE PARTS ARE INCLUDED IN PRECEDING ASSEMBLY PARTS NOT IN BOLD ARE AVAILABLE AT LOCAL CHEVROLET DEALERS

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 NOTE

THIS PARTS CATALOG SHOULD NOT BE USED IN LIEU OF  
A SERVICE MANUAL. ORDER YOUR SERVICE MANUAL  
FROM:

OUTBOARD MARINE BELGIUM N.V.  
PATHOEKEWEG 72  
8000 BRUGGE  
BELGIUM

SUPPLY ENGINE MODEL AND SERIAL NUMBER FROM THE  
ENGINE VALVE COVER WHEN REQUESTING A SERVICE  
MANUAL.

 SAFETY WARNING

 NOTE

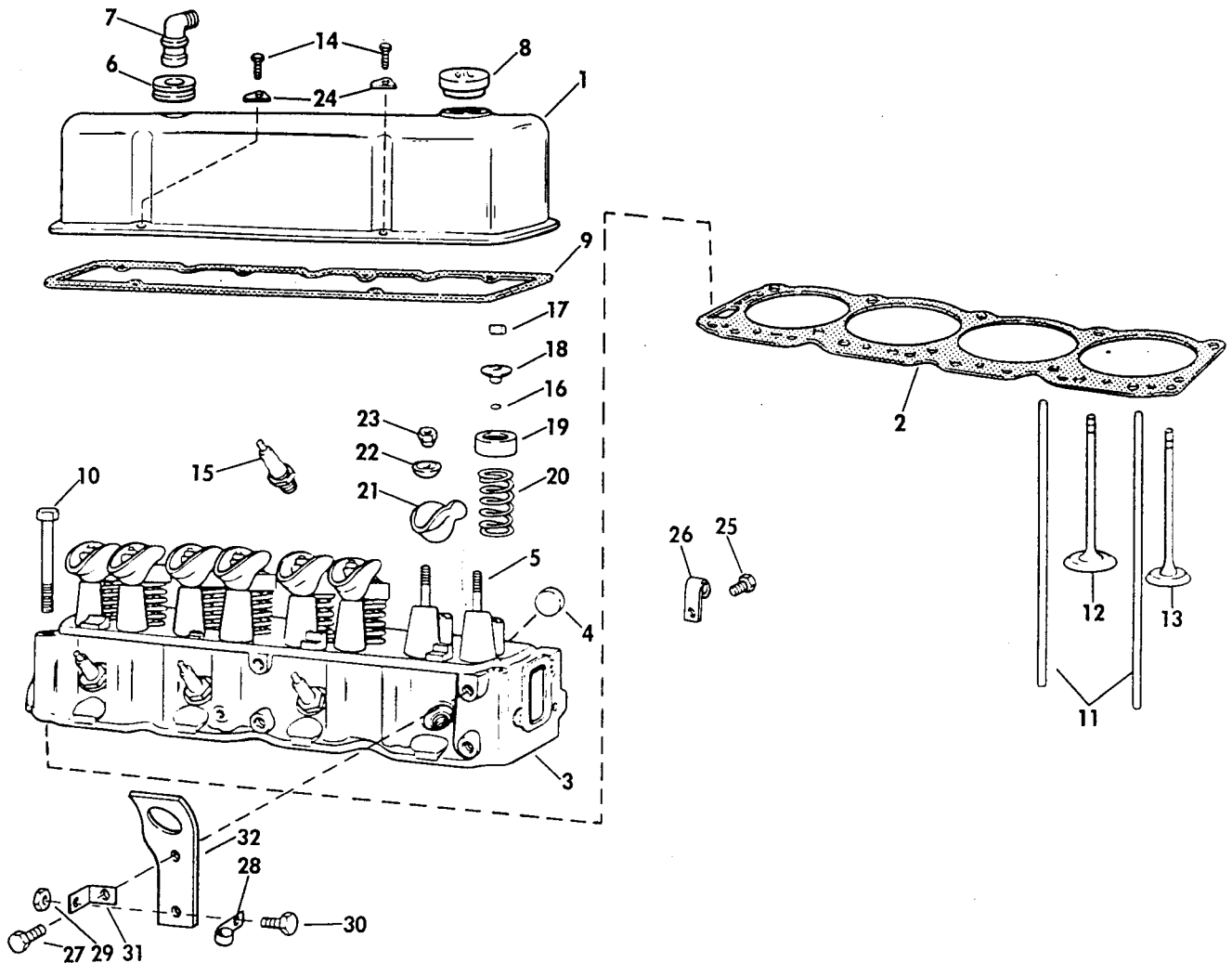
WHEN REPLACEMENT PARTS ARE REQUIRED, USE GENUINE OMC  
PARTS OR PARTS WITH EQUIVALENT CHARACTERISTICS INCLUDING  
TYPE, STRENGTH, AND MATERIAL. FAILURE TO DO SO MAY RESULT  
IN PRODUCT MALFUNCTION AND POSSIBLE INJURY TO THE  
OPERATOR AND/OR PASSENGERS.

ESNO.	PAINT	SPRAY	1QTCAN
209	PRIMER	172757	376015
318	WHITE	172756	278493
1110	BLUE	172836	N/A

**SPECIFY MODEL AND SERIAL NUMBER OF MOTOR WHEN ORDERING PARTS  
ORDER ALL PARTS FROM YOUR LOCAL AUTHORIZED DEALER**

# HEAD AND ROCKER ARM GROUP

120 MODEL STERN DRIVE



SD0007A - A2

94028

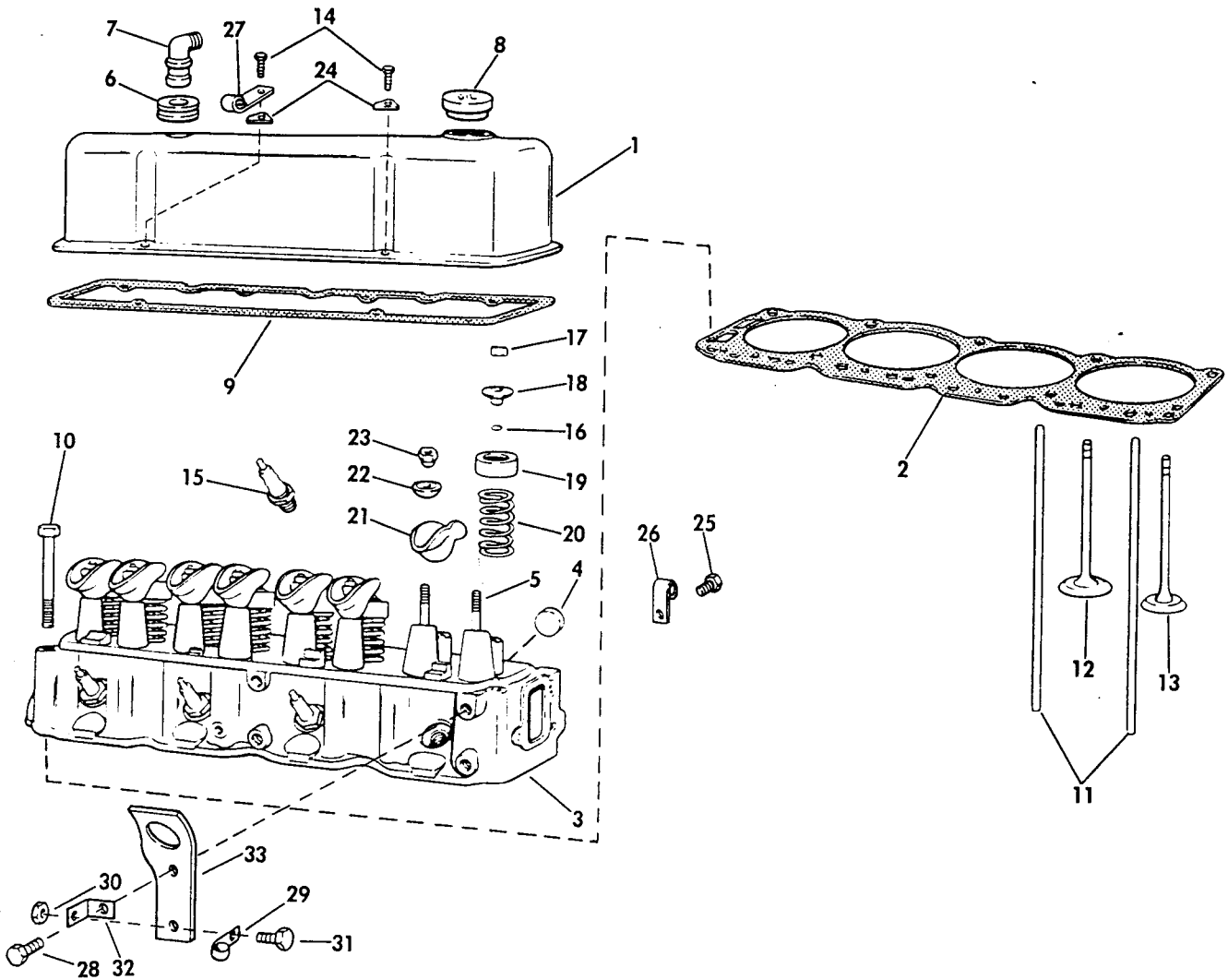
REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	980502	VALVE COVER .....	1	15	979826	SPARK PLUG, AC MR43T .....	4
2	311210	GASKET, Cylinder head .....	1	15	979827	SPARK PLUG, Champion RBL-8 ..	4
3	982241	CYLINDER HEAD .....	1	16	3835333	SEAL .....	8
4	311378	CORE PLUG .....	2	17	3947770	KEY .....	16
5	3814692	STUD, 0.003" O.S. ....	AR	18	3729363	CAP .....	8
5	3815892	STUD, 0.013" O.S. ....	AR	†19	3836755	SHIELD .....	8
6	311543	GROMMET .....	1	★19	10007818	SHIELD .....	8
7	311545	ELBOW .....	1	20	3735381	VALVE SPRING & DAMPER .....	8
8	3980273	OIL CAP, Push-on .....	1	21	5723551	ARM, Valve rocker .....	8
9	3923468	GASKET, Valve cover .....	1	22	3992294	BALL UNIT .....	1
10	3788417	BOLT, Head to crankcase .....	10	23	465934	NUT, Coned, 3/8-24 .....	1
11	3788495	PUSH ROD .....	8	24	3877670	REINFORCEMENT .....	5
12	329275	VALVE, Exhaust, std. ....	4	25	311415	SCREW, Clamp cylinder head, starboard .....	1
12	3995602	VALVE, Exhaust, 0.003" O.S. ....	4	26	310928	CLAMP, Cylinder head, starboard ..	1
12	3995603	VALVE, Exhaust, 0.015" O.S. ....	4	27	306834	SCREW .....	2
12	3995604	VALVE, Exhaust, 0.030" O.S. ....	4	28	907852	CLAMP, Fuel line bracket .....	1
13	3989088	VALVE, Intake, std. ....	4	29	316659	NUT, Screw .....	1
13	3997749	VALVE, Intake, 0.003" O.S. ....	4	30	312889	SCREW, Clamp .....	1
13	3997750	VALVE, Intake, 0.015" O.S. ....	4	31	908605	BRACKET, Clamp .....	1
13	3997751	VALVE, Intake, 0.030" O.S. ....	4	32	311111	LIFT BRACKET .....	1
14	180016	SCREW .....	5				

† Models with "C" suffix

★ Models with "C1" suffix

# HEAD AND ROCKER ARM GROUP

140 MODEL STERN DRIVE



SD0008A - A2

94029

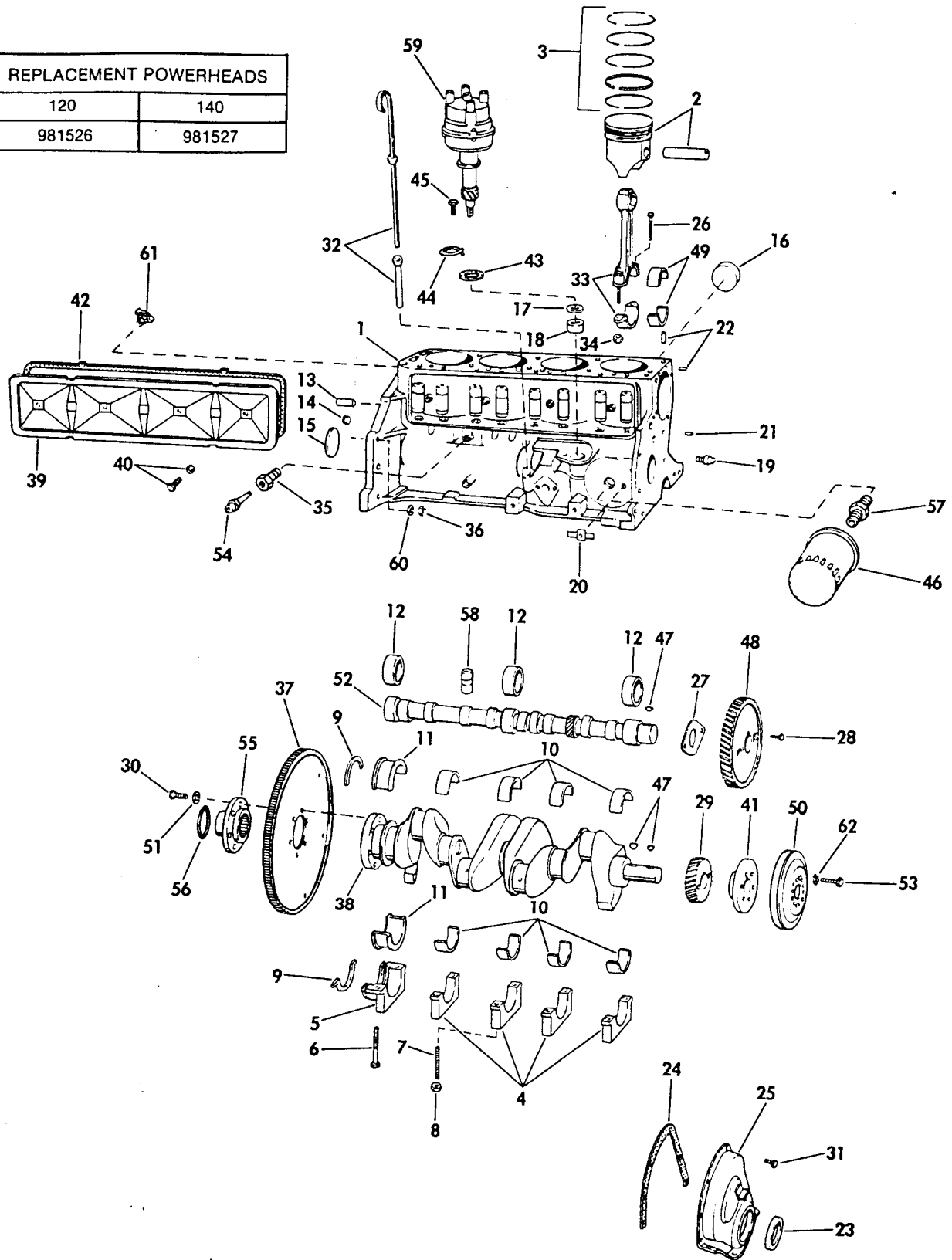
REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	980502	VALVE COVER .....	1	15	979826	SPARK PLUG, AC MR 43T .....	4
2	908611	GASKET, Cylinder head .....	1	15	979827	SPARK PLUG, Champion RBL-8 ..	4
3	982242	CYLINDER HEAD .....	1	16	3835333	SEAL .....	8
4	311378	. CORE PLUG .....	2	17	3947770	KEY .....	16
5	3814692	. STUD, 0.003" O.S. ....	AR	18	3729363	CAP .....	8
5	3815892	. STUD, 0.013" O.S. ....	AR	†19	3836755	SHIELD .....	8
6	311543	GROMMET .....	1	★19	10007818	SHIELD .....	8
7	311545	ELBOW .....	1	20	3735381	VALVE SPRING & DAMPER .....	8
8	3980273	OIL CAP, Push-on .....	1	21	5723551	ARM, Valve rocker .....	8
9	3923468	GASKET, Valve cover .....	1	22	3992294	. BALL UNIT .....	1
10	3788417	BOLT, Head to crankcase .....	10	23	465934	. NUT, Coned, 3/8-24 .....	1
11	3845266	PUSH ROD .....	8	24	3877670	REINFORCEMENT .....	5
12	3937750	VALVE, Exhaust, std. ....	4	25	311415	SCREW, Clamp, cylinder head ...	1
12	3940912	VALVE, Exhaust, 0.003" O.S. ....	4	26	310928	CLAMP, Cylinder head, stbd .....	1
12	3940913	VALVE, Exhaust, 0.015" O.S. ....	4	27	310439	CLAMP, Hose to valve cover .....	1
12	3940914	VALVE, Exhaust, 0.030" O.S. ....	4	28	306834	SCREW .....	2
13	3984180	VALVE, Intake, std. ....	4	29	907852	CLAMP, Fuel line bracket .....	1
13	3995945	VALVE, Intake, 0.003" O.S. ....	4	30	316659	NUT, Screw .....	1
13	3995946	VALVE, Intake, 0.015" O.S. ....	4	31	312889	SCREW, Clamp .....	1
13	3995947	VALVE, Intake, 0.030" O.S. ....	4	32	908605	BRACKET, Clamp .....	1
14	180016	SCREW .....	5	33	311111	LIFT BRACKET .....	1

† Models with "C" suffix  
 ★ Models with "C1" suffix

# CRANKCASE GROUP

## 120 MODEL STERN DRIVE

REPLACEMENT POWERHEADS	
120	140
981526	981527



# CRANKCASE GROUP

120 MODEL STERN DRIVE

SD0005A - A2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
‡1	347061	<b>CRANKCASE ASSEMBLY</b> .....	1	29	3882892	GEAR, Crankshaft .....	1
2	3860413	. PISTON & PIN, Standard .....	4	30	908375	BOLT, Flywheel .....	6
2	3860426	. PISTON & PIN, 0.030" O.S. ....	4	31	3817006	SCREW & LKWASH, 1/4-20 x 7/16"	8
3	326400	. RING SET, Standard .....	4	32	381927	OIL LEVEL GAUGE AND	
3	328503	. RING SET, 0.030" O.S. ....	4			TUBE ASSY .....	1
4	3970194	. CAP, Crankshaft bearing .....	4	33	3977110	CONNECTRING ROD &	
5	3928975	. CAP, Crankshaft brg. rear .....	1			CAP ASSY .....	4
6	3872781	. BOLT, 7/16-14 x 3-9/32 .....	9	34	3815280	NUT, Conn rod, 11/32-24 .....	8
7	3872718	. STUD, #3 bearing cap .....	1	35	121688	ADAPTER, Oil press. sender .....	1
8	9422297	. NUT, 3/8-16 .....	1	36	309602	NUT, Adapter housing	
□9	3958001	. SEAL, Upper and lower .....	2			to engine ground .....	2
★9	473424	. SEAL, Upper and lower .....	2	37	2778809	FLYWHEEL ASSEMBLY .....	1
10	3829061	. BRG ASSY, Exc rear, std .....	4	38	5743124	CRANKSHAFT ASSEMBLY .....	1
10	3829062	. BRG ASSY, Exc rear, 0.001" U.S. ....	4	39	3788548	COVER, Push rod .....	1
10	3829063	. BRG ASSY, Exc rear, 0.002" U.S. ....	4	40	3814350	BOLT & SEAL ASSY .....	4
10	3829064	. BRG ASSY, Exc rear, 0.010" U.S. ....	4	41	908616	HUB, Crankshaft pulley .....	1
10	3829065	. BRG ASSY, Exc rear, 0.020" U.S. ....	4	42	3923469	GASKET, Push rod cover .....	1
10	3829066	. BRG ASSY, Exc rear, 0.030" U.S. ....	4	43	6256636	GASKET, Distributor .....	1
11	3829067	. BRG ASSY, Rear, std .....	1	44	355780	CLAMP, Distributor .....	1
11	3829068	. BRG ASSY, Rear, 0.001" U.S. ....	1	45	454905	BOLT, Distributor .....	1
11	3829069	. BRG ASSY, Rear, 0.002" U.S. ....	1	46	173232	OIL FILTER .....	1
11	3829070	. BRG ASSY, Rear, 0.010" U.S. ....	1	47	106751	KEY, Woodruff, 3/16 x 3/4" .....	3
11	3829071	. BRG ASSY, Rear, 0.020" U.S. ....	1	48	908613	GEAR, Camshaft timing .....	1
11	3829072	. BRG ASSY, Rear, 0.030" U.S. ....	1	49	463259	ROD BEARING, Std .....	4
12	3750884	. BRG, Camshaft .....	3	49	463319	ROD BEARING, 0.001" U.S. ....	4
13	3712745	. DOWEL PIN .....	2	49	463320	ROD BEARING, 0.002" U.S. ....	4
14	444782	. PLUG, 3/8" .....	2	50	3793717	PULLEY, Crankshaft .....	1
15	3704158	. PLUG, Camshaft brg hole .....	1	51	316959	LOCKWASHER, Coupler to	
16	311376	. CORE PLUG, Side .....	2			flywheel .....	6
16	311377	. CORE PLUG, Rear .....	1	52	380343	CAMSHAFT ASSY .....	1
17	3792285	. THRUST WASHER .....	1	53	181593	BOLT, Pulley .....	1
18	3792286	. BEARING, Shaft pilot .....	1	53	3793100	SCREW, Pulley .....	2
19	3875950	. NOZZLE, Timing gear oil .....	1	54	172127	SENDING UNIT, Oil press .....	1
20	5575416	. VALVE ASSY, By-pass .....	1	55	980994	COUPLING & O-RING ASSY .....	1
21	3835577	. PLUG, Cylinder .....	1	56	302540	. O-RING, Coupling .....	1
22	585927	. PIN, Cylinder head dowel .....	2	57	3853870	CONNECTOR, Oil filter .....	1
23	3980267	SEAL .....	1	58	5232450	VALVE LIFTER .....	8
24	3923472	GASKET, Front crankcase cover ..	1	△†59	982351	DISTRIBUTOR ASSY, Compl .....	1
25	3996616	COVER ASSY, Crankshaft, front ..	1	60	306025	LOCKWASHER, Engine to	
26	460405	BOLT, Connecting rod .....	8			adapter .....	1
27	3790531	BEARING, Thrust unit .....	1	61	379957	PETCOCK ASSY .....	1
28	3817006	SCREW & LOCKWASHER, 1/4-20 x 1/2" .....	2	62	9778346	LOCKWASHER .....	1

† See Page 30 for detail parts

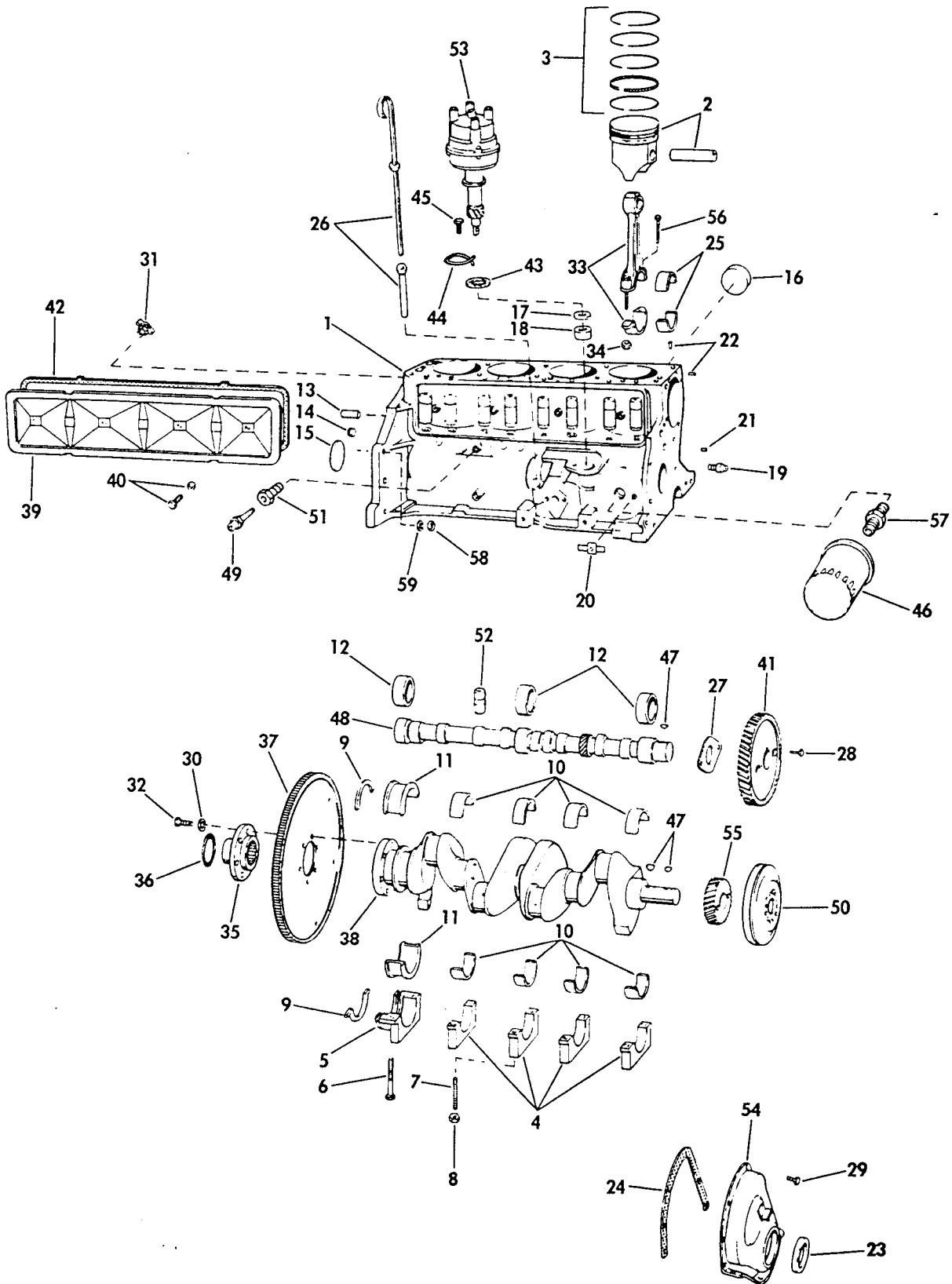
‡ Order this assembly through factory service dept.

□ Models with "C" suffix

★ Models with "C1" suffix

# CRANKCASE GROUP

## 140 MODEL STERN DRIVE



94207



# CRANKCASE GROUP

140 MODEL STERN DRIVE

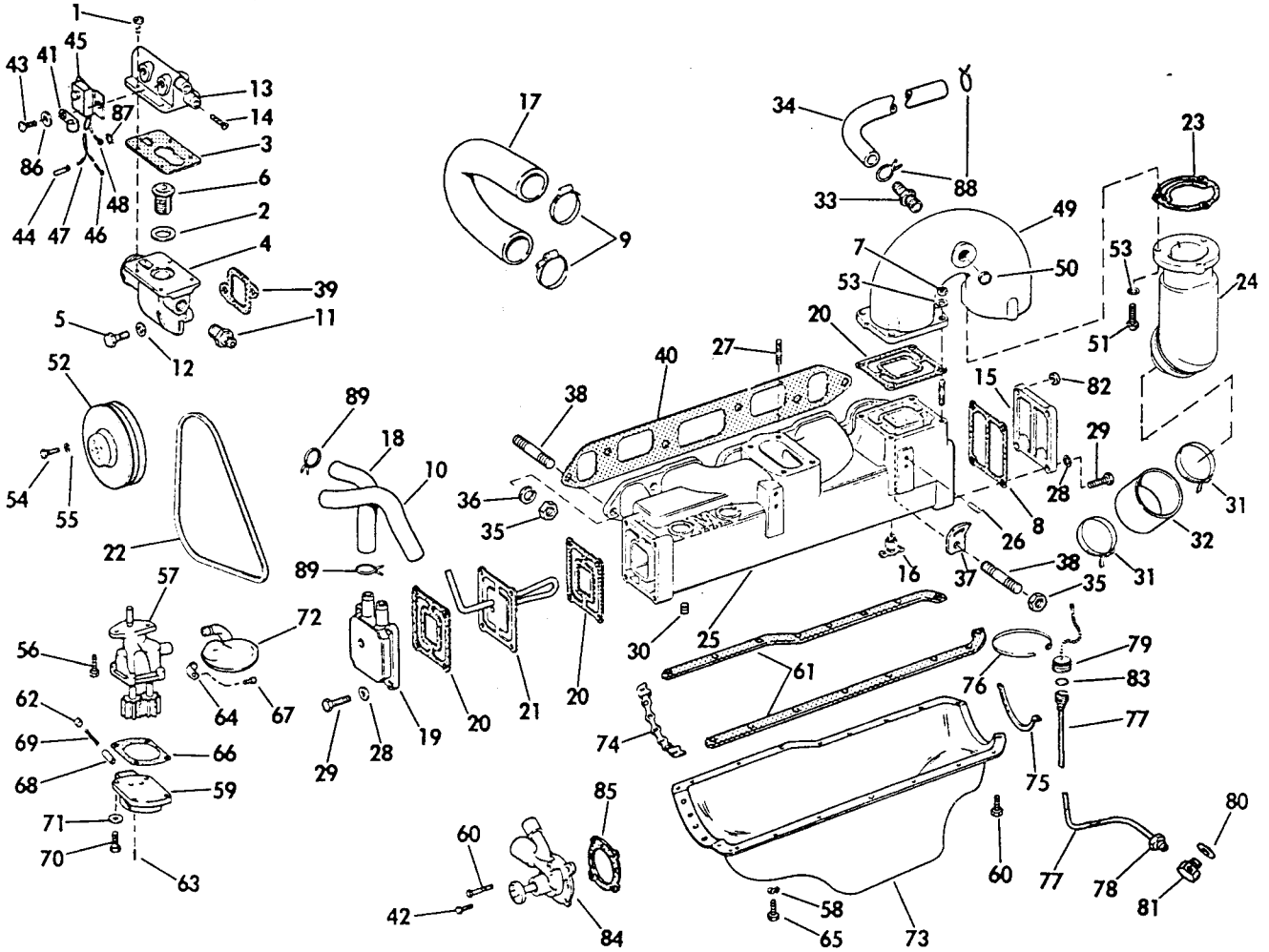
SD0006A - B2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
‡1	347064	CRANKCASE ASSEMBLY .....	1	25	3910556	ROD BEARING, .001" U.S. ....	4
2	980503	PISTON & PIN, Standard .....	4	25	3910557	ROD BEARING, .002" U.S. ....	4
2	980504	PISTON & PIN, 0.020" O.S. ....	4	25	3910558	ROD BEARING, .010" U.S. ....	4
3	328506	RING SET, Standard .....	4	25	3910559	ROD BEARING, .020" U.S. ....	4
3	328511	RING SET, 0.020" O.S. ....	4	26	381927	OIL LEVEL GAUGE & TUBE ASSY	1
4	3970194	CAP, Crankshaft bearing .....	4	27	3790531	BEARING, Thrust unit .....	1
5	3928975	CAP, Crankshaft brg. rear .....	1	28	3817006	SCREW & LKWASH, 1/4-20 x 7/16"	2
6	3872781	BOLT, 7/16-14 x 3-9/32 .....	9	29	3817006	SCREW & LKWASH, 1/4-20 x 7/16"	8
7	3872718	STUD, #3 bearing cap .....	1	30	316959	LOCKWASHER, Coupling bolt ....	6
8	9422297	NUT, 3/8-16 .....	1	31	379957	PETCOCK ASSEMBLY .....	1
□9	3958001	SEAL, Upper and lower .....	2	32	908375	BOLT, Flywheel .....	6
★9	473424	SEAL, Upper and lower .....	2	33	980505	CONNECTING ROD & CAP ASSY	4
10	3829061	BRG ASSY, Exc rear, std .....	4	34	3866766	NUT, Conn rod, 11/32-34 .....	8
10	3829062	BRG ASSY, Exc rear, 0.001" U.S. ....	4	35	980994	COUPLING & O-RING ASSY .....	1
10	3829063	BRG ASSY, Exc rear, 0.002" U.S. ....	4	36	302540	O-RING .....	1
10	3829064	BRG ASSY, Exc rear, 0.010" U.S. ....	4	37	2778809	FLYWHEEL ASSEMBLY .....	1
10	3829065	BRG ASSY, Exc rear, 0.020" U.S. ....	4	38	908614	CRANKSHAFT ASSEMBLY .....	1
10	3829066	BRG ASSY, Exc rear, 0.030" U.S. ....	4	39	3788548	COVER, Push rod .....	1
11	3829067	BRG ASSY, Rear, std .....	1	40	3814350	BOLT & SEAL ASSEMBLY .....	4
11	3829068	BRG ASSY, Rear, 0.001" U.S. ....	1	41	908613	GEAR, Camshaft timing .....	1
11	3829069	BRG ASSY, Rear, 0.002" U.S. ....	1	42	3923469	GASKET, Push rod cover .....	1
11	3829070	BRG ASSY, Rear, 0.010" U.S. ....	1	43	6256636	GASKET, Distributor .....	1
11	3829071	BRG ASSY, Rear, 0.020" U.S. ....	1	44	355780	CLAMP, Distributor .....	1
11	3829072	BRG ASSY, Rear, 0.030" U.S. ....	1	45	454905	BOLT, Distributor .....	1
12	3750884	BRG, Camshaft .....	3	46	173232	OIL FILTER .....	1
13	3712745	DOWEL PIN .....	2	47	106751	KEY, Woodruff, 3/16 x 3/4" .....	3
14	444782	PLUG, 3/8" .....	2	48	908610	CAMSHAFT ASSEMBLY .....	1
15	3704158	PLUG, Camshaft brg hole .....	1	49	172127	SENDING UNIT, Oil pressure .....	1
16	311376	CORE PLUG, Side .....	2	50	3826280	DAMPER Crankshaft pulley .....	1
16	311377	CORE PLUG, Rear .....	1	51	121688	ADAPTER, Sender unit .....	1
17	3792285	THRUST WASHER .....	1	52	5232450	VALVE LIFTER .....	8
18	3792286	BEARING, Shaft pilot .....	1	Δ†53	982351	DISTRIBUTOR ASSY, Complete ..	1
19	3875950	NOZZLE, Timing gear oil .....	1	54	3996616	COVER ASSY, Crankshaft, front ..	1
20	5575416	VALVE ASSY, By-pass .....	1	55	3882892	GEAR, Crankshaft .....	1
21	3835577	PLUG, Cylinder and crankcase main oil gallery - front hole .....	1	56	360182	BOLT, Connecting rod .....	8
22	585927	PIN, Cylinder head dowel .....	2	57	3853870	CONNECTOR, Oil filter .....	1
23	3980267	SEAL .....	1	58	309602	NUT, Adapter hsg to engine ground .....	1
24	3923472	GASKET, Front crankcase cover ..	1	59	306025	LOCKWASHER, Engine to adapter .....	1
25	3910555	ROD BEARING, Std .....	4				

- † See page 30 for detail parts
- ‡ Order this assembly through factory service dept.
- Models with "C" suffix
- ★ Models with "C1" suffix

# COOLING & OILING GROUP

## 120 MODEL STERN DRIVE



804038

# COOLING & OILING GROUP

120 MODEL STERN DRIVE

SD0009A - B2

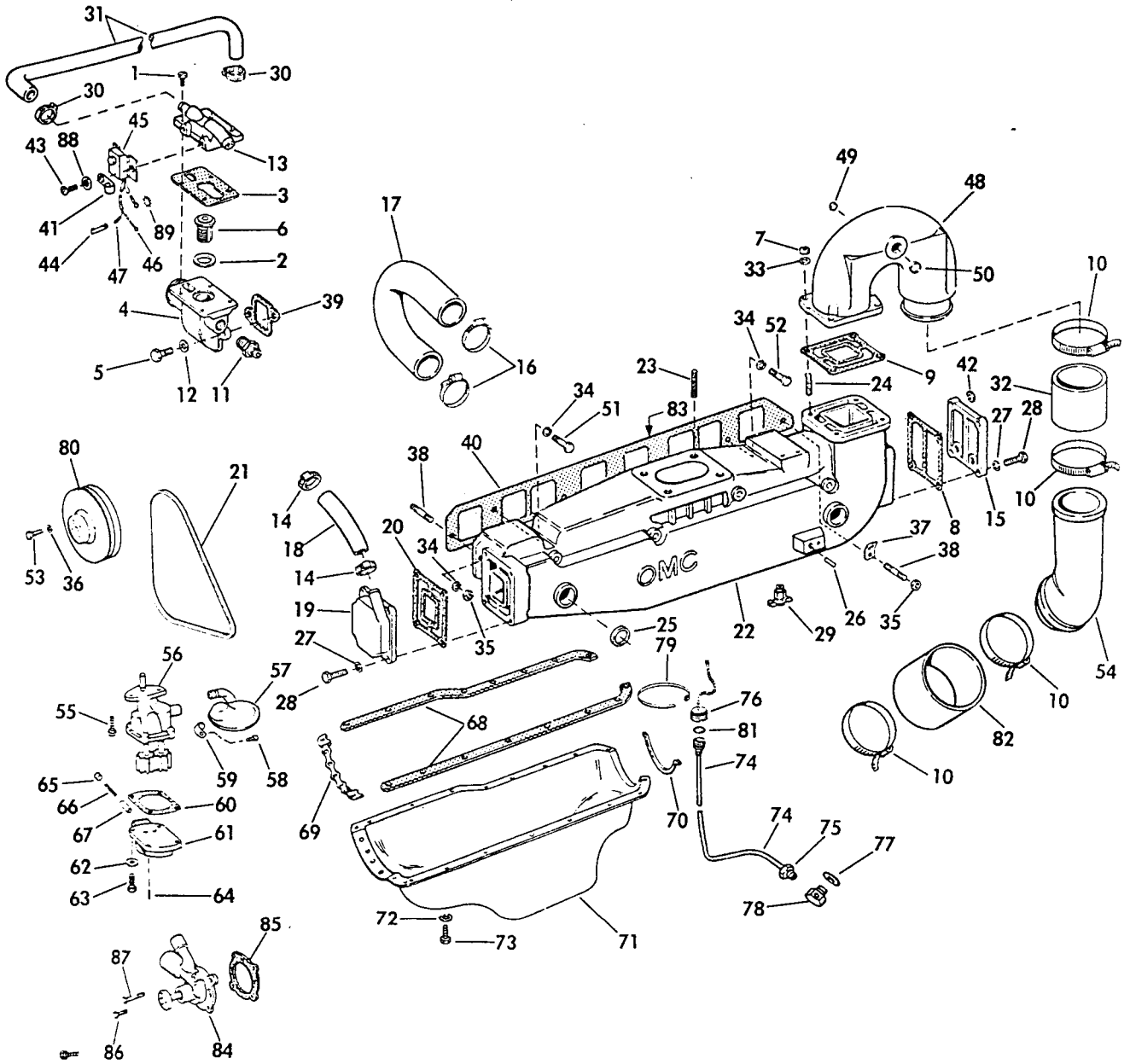
REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	306010	SCREW	4	46	204036	. RING TERMINAL	1
†2	310913	GASKET, Thermostat	1	47	308808	. TERMINAL	1
*2	313416	GASKET, Thermostat	1	48	308294	. RING, Terminal	1
3	314809	GASKET, Upper to lower assy	1	49	980536	ELBOW AND STUD ASSY	1
†4	383313	HOUSING, Thermostat assy	1	50	315712	. CORE PLUG	1
*4	910303	HOUSING, Thermostat assy	1	51	552940	SCREW, Elbow to high rise	3
5	306414	. SCREW	2	52	383932	PULLEY ASSEMBLY	1
†6	383307	THERMOSTAT ASSEMBLY	1	53	306470	LOCKWASHER, Stud	7
*6	982554	THERMOSTAT ASSEMBLY	1	54	306861	SCREW	4
7	306422	NUT, Stud	7	55	306325	LOCKWASHER	4
8	907761	GASKET, Cap to manifold	1	56	9424877	BOLT, Hex	2
9	311076	CLAMP	2	57	3832449	PUMP ASSEMBLY	1
10	311930	HOSE, Outlet	1	58	120638	LOCKWASHER	18
11	171960	SENDING UNIT, Water temp	1	59	3788457	COVER, Oil pump	1
12	306405	WASHER	2	60	180083	BOLT, Hex, 5/16-18 x 1-1/2"	1
*13	910281	HOUSING ASSEMBLY, Upper	1			(RH)	2
†13	982160	HOUSING ASSEMBLY, Upper	1	61	3930961	GASKET UNIT, Sides	2
14	160280	. DRIVESCREW	2	62	3830824	PLUG, Regulator hole	1
15	907885	CAP, Exhaust manifold rear	1	63	103677	PIN, Pressure regulator	1
16	379957	PETCOCK ASSY, Water drain	2	64	3905965	SUPPORT ASSEMBLY	1
17	311075	HOSE	1	65	180075	SCREW, Oil pan	18
18	311554	HOSE, Thermostat housing	1	66	3789970	GASKET, Pump cover	1
*19	910280	CAP, Manifold	1	†67	180016	SCREW, Suction pipe bracket	1
†19	311550	CAP, Manifold	1	*67	9437702	SCREW, Suction pipe brkt	1
20	311121	GASKET, Cap to manifold	3	68	3829433	VALVE, Pressure regulator	1
21	380446	HEAT EXCHANGER ASSY	1	69	3814903	SPRING, Regulator valve	1
22	311606	BELT	1	70	133043	SCREW, Cover to pump	4
23	907764	GASKET	1	71	9421423	WASHER, Cover bolt	4
24	909368	ELBOW, High rise to adapter	1	72	2778187	SUCTION TUBE & SCREEN ASSY	1
25	981462	MANIFOLD & STUD ASSEMBLY	1	73	313647	OIL PAN	1
26	907799	. PIN	1	74	3923440	SEAL, Front	1
27	310870	. STUD	8	75	3921973	SEAL, Rear	1
28	306470	. LOCKWASHER, Screw	7	76	320107	TIE STRAP, Cap & bead chain	1
29	552940	. SCREW, End cap	8				1
30	552909	. PLUG, Manifold	2	77	979841	OIL LINE ASSEMBLY	1
31	981323	CLAMP, Hose to adapter	2	78	310958	. FITTING, Oil line	1
32	909371	HOSE, Exhaust	1	79	980068	CAP & BEAD CHAIN ASSY	1
33	310904	NIPPLE, Elbow	1	80	909632	WASHER, Elbow	1
34	909750	HOSE, Inter housing	1	81	907848	ELBOW, Oil pan	1
35	552938	NUT, Manifold to engine	6	82	306799	LOCKWASHER, Tilt motor ground	1
36	120177	LOCKWASHER, Manifold	5				1
37	311111	LIFT, Bracket, port	1	83	907845	SEAL, Cap oil drain tube	1
38	310968	STUD, Manifold, front and rear	6	84	980512	WATER PUMP	1
39	3789161	GASKET, Housing	1	85	3788478	GASKET, Water pump	1
40	311068	GASKET, Manifold to head	1	86	305981	WASHER, Voltage regulator	2
41	309846	CLAMP, Voltage reg leads	1	87	306488	LOCKWASHER, Voltage reg ground	1
42	443899	BOLT, Hex 5/16-18 x 7/8" (LH)	2	88	307899	CLAMP	6
43	908158	SCREW, Voltage regulator mtg	2	*89	979803	CLAMP	4
44	303806	SLEEVE, Regulator lead	1	†89	307899	CLAMP	4
△45	383440	VOLTAGE REGULATOR AND CABLE ASSEMBLY	1				

† Models with "C" suffix only

\* Models with "C1" suffix only

# COOLING & OILING GROUP

## 140 MODEL STERN DRIVE



94031

# COOLING & OILING GROUP

140 MODEL STERN DRIVE

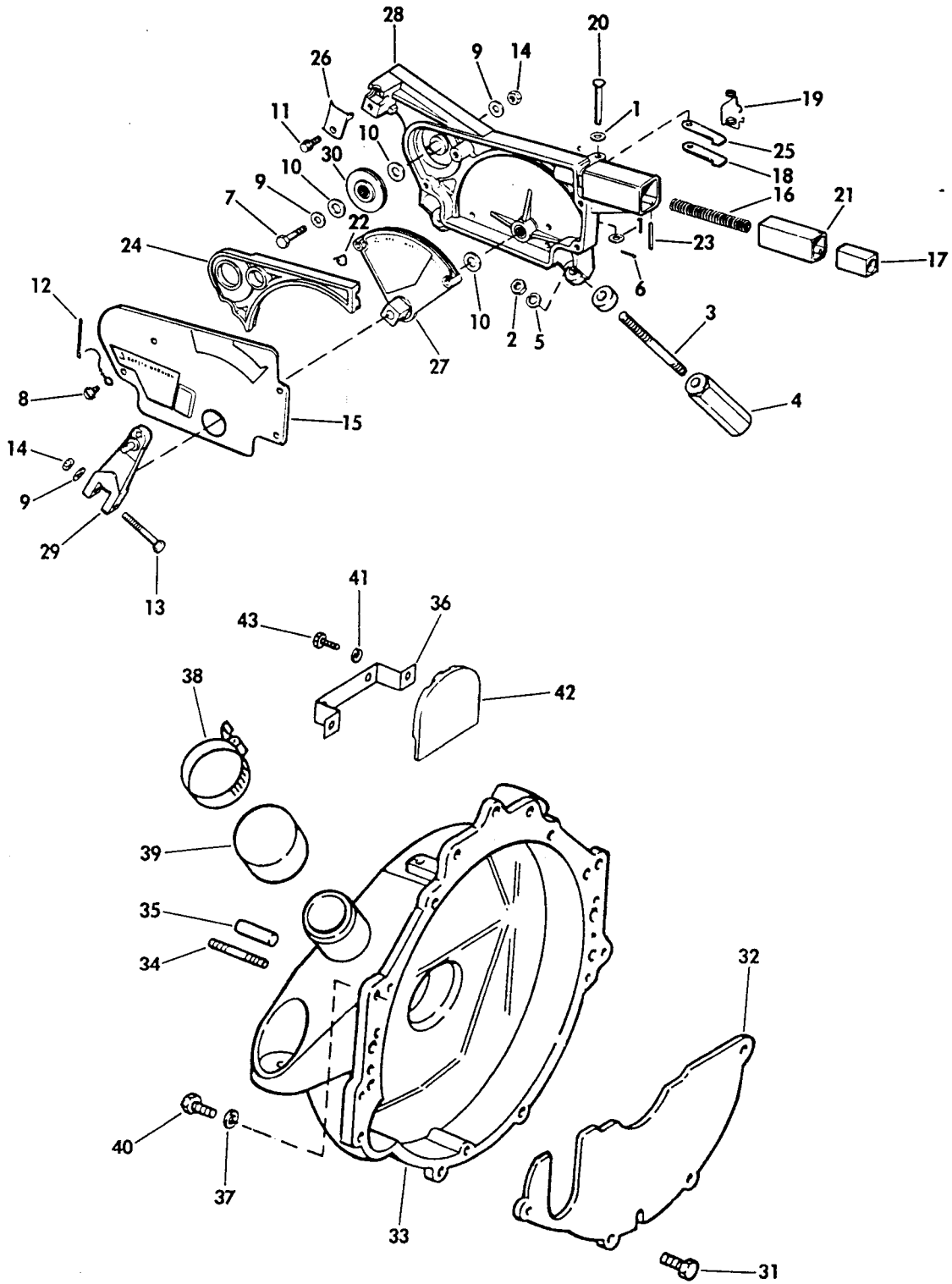
SD00010A - C2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	306010	SCREW	4	46	204036	. RING TERMINAL	1
†2	310913	GASKET, Thermostat	1	47	308808	. TERMINAL	1
*2	313416	GASKET, Thermostat	1	48	980188	ELBOW AND STUD ASSY	1
3	314809	GASKET, Upper to lower assy	1	49	907807	. CORE PLUG	2
†4	383313	HOUSING, Thermostat assy	1	50	315712	. CORE PLUG	1
*4	910303	HOUSING, Thermostat assy	1	51	201809	SCREW, Exh. mfl'd	3
5	306414	. SCREW	2	52	907891	SCREW, Exh. mfl'd, rear	1
†6	383307	THERMOSTAT ASSEMBLY	1	53	306861	SCREW	4
*6	982554	THERMOSTAT ASSEMBLY	1	54	909369	ELBOW, High rise to adapter	1
7	306422	NUT, Stud	4	55	9424877	BOLT, Hex	1
8	907761	GASKET, Cap to manifold	1	56	3832449	PUMP ASSEMBLY	1
9	908013	GASKET, Elbow to mfl'd	1	†57	2778187	SUCTION TUBE & SCREEN ASSY	1
10	981323	CLAMP, Hose to elbow	4	*57	3915988	SUCTION TUBE & SCREW ASSY	1
11	171960	SENDING UNIT, Water temp	1	†58	180016	SCREW, Suction pipe brkt	1
12	306405	WASHER	2	*58	9437702	SCREW, Suction pipe brkt	1
†13	908216	HOUSING ASSY, Upper	1	†59	3905965	SUPPORT ASSEMBLY	1
*13	910304	HOUSING ASSY, Upper	1	*59	3920913	SUPPORT ASSEMBLY	1
14	313851	CLAMP	2	60	3789970	GASKET, Pump cover	1
15	907885	CAP, Exh manifold rear	1	61	3788457	COVER, Oil pump	1
16	311076	CLAMP	2	62	9421423	WASHER, Cover bolt	4
17	311075	HOSE	1	63	133043	SCREW & LOCKWASHER, Cover to pump	4
†18	908189	HOSE, Thermostat housing	1	64	103677	PIN, Pressure regulator	1
*18	910305	HOSE, Thermostat housing	1	65	3930824	PLUG, Regulator hole	1
19	908184	CAP, Manifold	1	66	3814903	SPRING, Regulator valve	1
20	311121	GASKET, Cap to manifold	1	67	3829433	VALVE, Pressure regulator	1
21	311606	BELT	1	68	3930961	GASKET UNIT, Sides	1
22	980957	MANIFOLD AND STUD ASSY	1	69	3923440	SEAL, Front	1
23	314616	. STUD, Carburetor	4	70	3921973	SEAL, Rear	1
24	310870	. STUD, Cap and elbow	4	71	313647	OIL PAN	1
25	315712	. CORE PLUG	3	72	120638	LOCKWASHER	18
26	907799	. PIN	1	73	180075	SCREW	18
27	306470	. LOCKWASHER	7	74	979841	OIL LINE ASSEMBLY	1
28	552940	. SCREW	8	75	310958	. FITTING, Oil line	1
29	379957	. PETCOCK ASSY, Wtr. drain	1	76	980068	CAP & BEAD CHAIN ASSY	1
30	979803	CLAMP, Hose to thermostat housing	2	77	909632	WASHER, Elbow	1
31	908192	HOSE, Thermostat to int. hsg	1	78	907848	ELBOW, Oil pan	1
32	909232	HOSE, Exhaust	1	79	320107	TIE STRAP, Cap and bead chain	1
33	306470	LOCKWASHER	4	80	383932	PULLEY ASSEMBLY	1
34	120177	LOCKWASHER, Manifold, screw	5	81	907845	SEAL, Cap oil drain tube	1
35	552938	NUT, Manifold to engine	2	82	909371	HOSE, Elbow to adapter	1
36	306325	LOCKWASHER	4	83	980669	TUBE SERVICE KIT	1
37	311111	LIFT BRACKET, Port	1	84	980512	WATER PUMP	1
38	310968	STUD, Manifold, front & rear	2	85	3788478	GASKET, Water pump	1
39	3789161	GASKET, Housing	1	86	443899	BOLT, Hex 5/16-18 x 7/8" (LH)	2
40	908079	GASKET, Manifold to head	1	87	180083	BOLT, Hex, 5/16-18 x 1-1/2" (RH)	2
41	309846	CLAMP, Voltage reg leads	1	88	305981	WASHER, Voltage regulator	2
42	306799	LOCKWASHER, Tilt motor ground	1	89	306488	LOCKWASHER, Voltage reg ground	1
43	908158	SCREW, Voltage reg mtg	2				
44	303806	SLEEVE, Reg lead	1				
△45	383440	VOLTAGE, REGULATOR AND CABLE ASSEMBLY	1				

† Models with "C" suffix only  
 \* Models with "C1" suffix only

# ADAPTER HOUSING AND SHIFT ASSEMBLY

120, 140 MODELS STERN DRIVE



94209

# ADAPTER HOUSING AND SHIFT ASSEMBLY

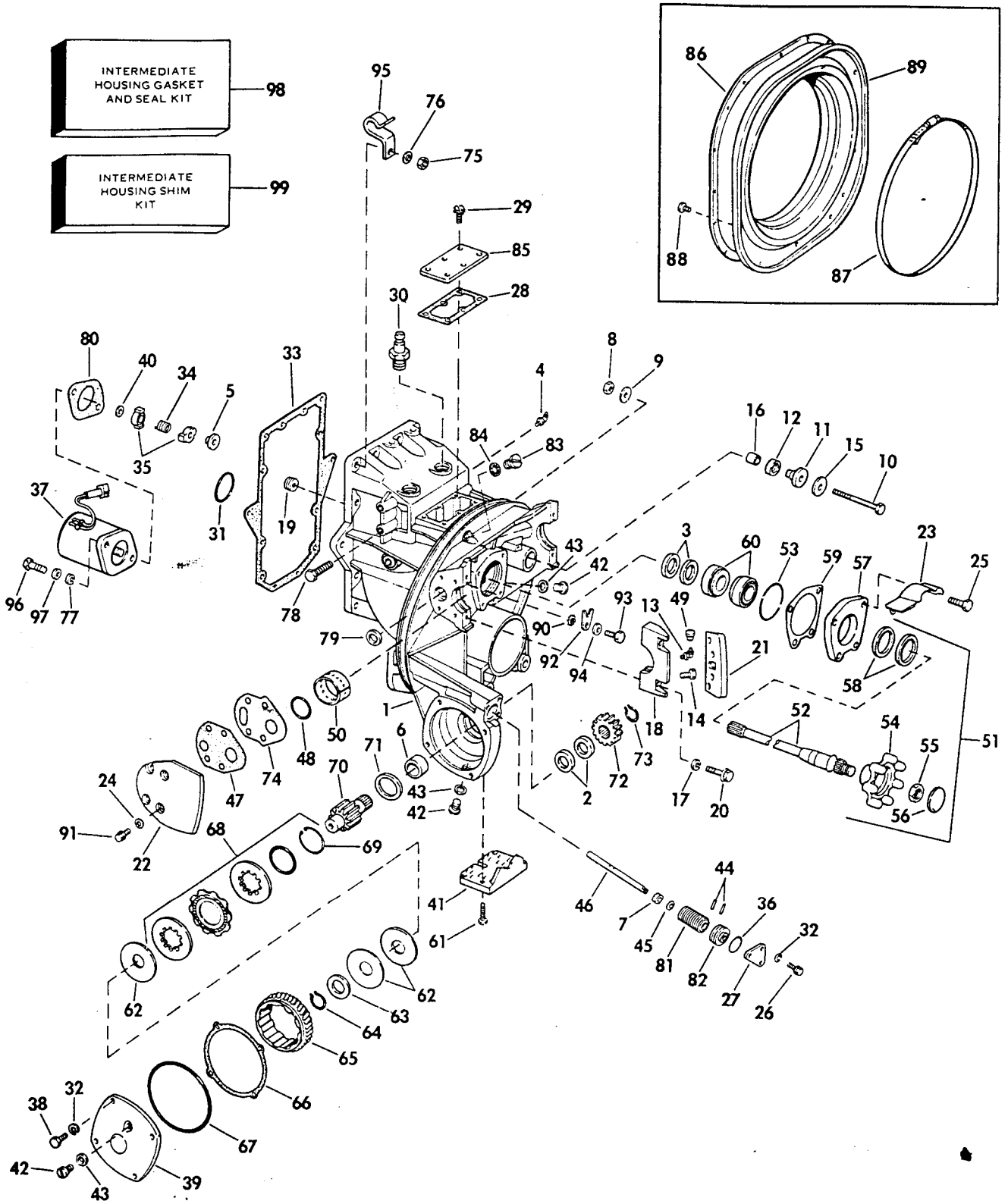
120, 140 MODELS STERN DRIVE

SD0091 - C2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	303887	WASHER, Pin, pawl .....	2	27	981892	PULLEY SEGMENT & SHAFT	
2	312329	NUT, Spacer to housing .....	2			ASSY .....	1
3	910005	STUD, Spacer to housing .....	2	28	981322	HOUSING, Bearings and	
4	909662	SPACER, Stud to housing .....	2			seal assembly .....	1
5	306325	LOCKWASHER, Spacer to stud ...	2	29	981324	LEVER ARM & PIN ASSY .....	1
6	305650	COTTER PIN, Pin, pawl .....	1	30	981346	IDLER PULLEY & BEARING	
7	302030	SCREW, Idler pulley .....	1			ASSY .....	1
8	303311	SCREW, Cover .....	4	31	907768	SCREW, Ring guard .....	4
9	120590	WASHER, Lever arm, pulley .....	3	32	909370	RING GUARD .....	1
10	308371	SPACER, Idler pulley .....	3	33	981552	ADAPTER HSG & STD ASSY .....	1
11	318468	SCREW, Spring .....	1	34	909514	STUD .....	14
12	319658	COTTER PIN, Rack to hsg .....	1	35	309614	DOWEL .....	2
13	600014	SCREW, Lever arm .....	1	36	909811	CLAMP, Exhaust seal .....	1
14	313022	NUT, Lever arm pulley .....	2	37	306405	WASHER .....	5
15	981893	COVER, Shift housing .....	1	37	306993	LOCKWASHER .....	1
16	909333	SPRING, Cable to tensioner .....	1	38	981323	CLAMP, Exhaust inlet .....	1
17	909334	RACK, Cable tensioner .....	1	39	909347	CAP, Exhaust inlet,	
18	909335	PAWL, Tensioner, long .....	1			adapter .....	1
19	909336	SPRING, Tensioner .....	1	40	312178	SCREW .....	1
20	909337	PIN, Pawl to housing .....	1	40	909571	SCREW .....	5
21	909338	LINER, Cable tensioner .....	1	41	306470	LOCKWASHER, Clamp,	
22	909339	HITCH PIN, Cable retainer .....	2			exhaust housing .....	2
23	909357	ROLL PIN, Rack to housing .....	1	42	981927	EXHAUST SEAL, Adapter	
24	909477	GUIDE, Cables .....	1			housing .....	1
25	909599	PAWL, Tensioner, short .....	1	43	908668	SCREW, Clamp, exhaust	
26	909790	RETAINER, Remote control				housing .....	2
		cable .....	1				

# INTERMEDIATE HOUSING GROUP

120, 140 MODELS STERN DRIVE



804238



# INTERMEDIATE HOUSING GROUP

SD0018A - C2

120, 140 MODELS STERN DRIVE

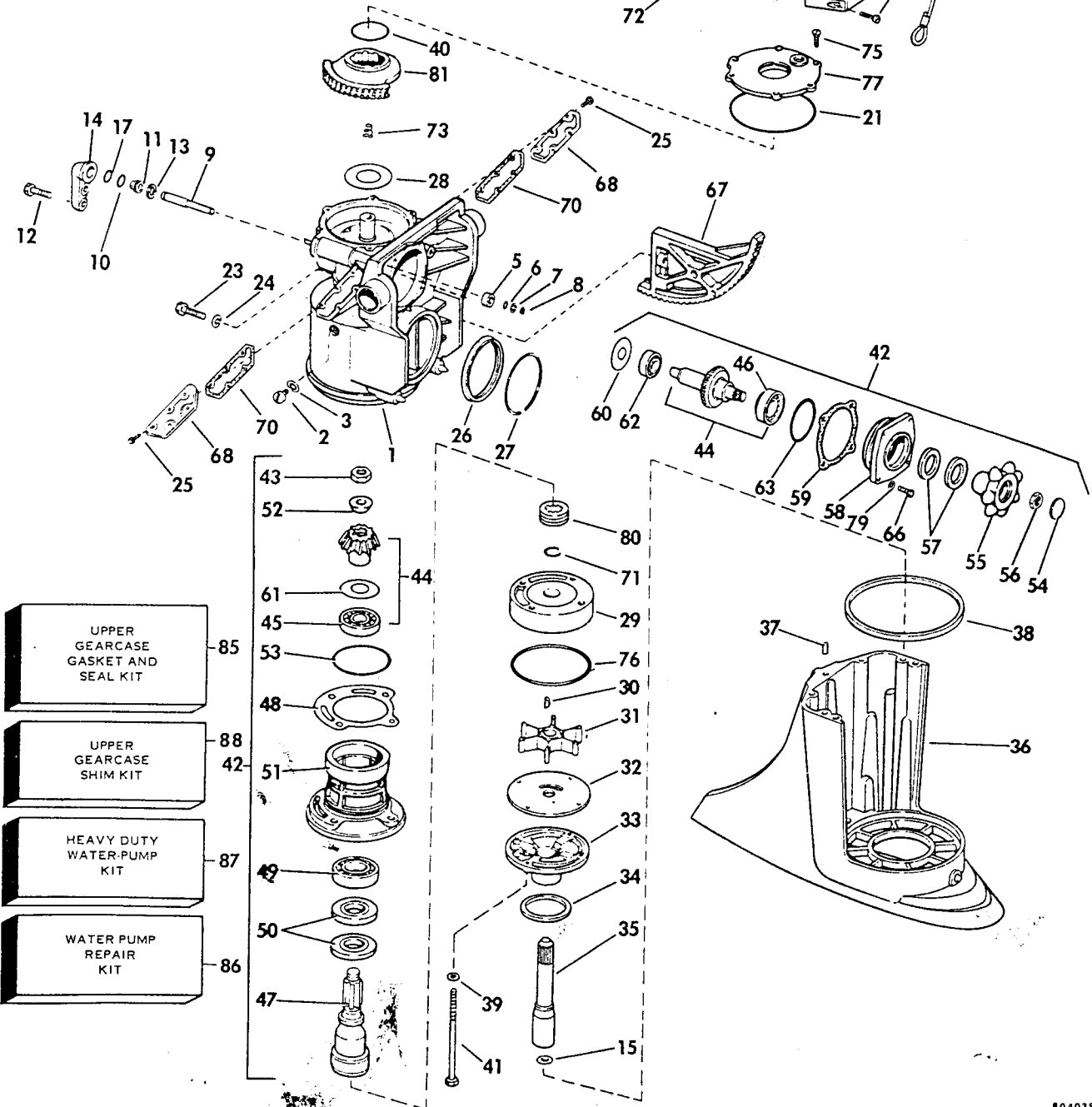
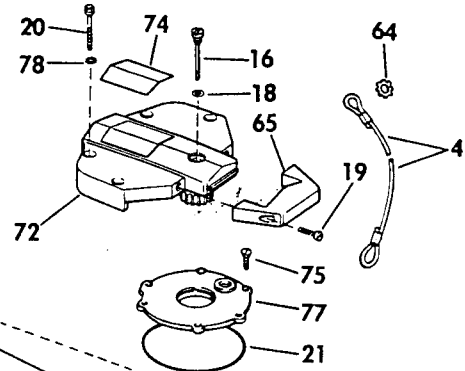
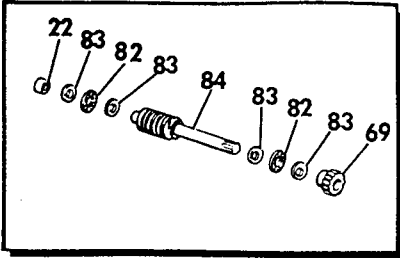
REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
□1	982061	INTERMEDIATE HOUSING ASSY	1	57	981554	. RETAINER & SEAL ASSY .....	1
*1	982596	INTERMEDIATE HSG ASSY .. ■	1	+58	981195	. . SEAL .....	2
□+2	908957	. OIL RETAINER, Clutch .....	1	#59	909502	. SHIM, Seal retainer, 0.002 .....	AR
+*2	321467	. OIL RETAINER, Clutch .....	2	#59	909503	. SHIM, Seal retainer, 0.003 .....	AR
+3	313992	. OIL RETAINER, Shaft .....	2	#59	909504	. SHIM, Seal retainer, 0.004 .....	AR
4	319253	. LUB FITTING, Front 45° .. ■	1	#59	909505	. SHIM, Seal retainer, 0.005 .....	AR
4	313607	. LUBRICATION FITTING, Rear ..	1	#59	909506	. SHIM, Seal retainer, 0.006 .....	AR
5	909513	. RETAINING, Coupling .....	1	#59	909507	. SHIM, Seal retainer, 0.007 .....	AR
6	909501	. BUSHING, Clutch shaft .....	1	#59	909508	. SHIM, Seal retainer, 0.008 .....	AR
7	909499	. BUSHING, Tilt worm shaft .....	1	#59	909509	. SHIM, Seal retainer, 0.009 .....	AR
8	900402	. LOCKNUT .....	1	#59	909510	. SHIM, Seal retainer, 0.010 .....	AR
9	310055	. WASHER .....	1	60	979986	. BEARING ASSEMBLY .....	2
10	318803	. SCREW .....	1	61	312978	SCREW, Ground pit to intmd hsg .....	4
11	908853	. PLUG .....	1				
+12	908855	. SEAL, Steering shaft .....	1	62	308809	BELLEVILLE SPRING .....	3
13	908768	. LUBRICATION FITTING .....	2	63	309845	SPACER .....	1
14	908769	. SCREW, Pivot cap bumper .....	4	64	309844	RETAINING RING .....	1
15	902041	. WASHER, Screw plug .....	1	65	308806	WORM WHEEL .....	1
16	908933	. BUSHING .....	1	+66	308799	GASKET, Cover .....	1
17	302865	. WASHER, Cap screw .....	2	+67	908194	O-RING, Tilt unit cover .....	1
18	909578	. PIVOT CAP .....	4	68	380561	CLUTCH DISC, End plate and shim package .....	1
19	908276	. PLUG .....	3				
20	314614	. SCREW, Pivot cap .....	4	69	308804	. RETAINING RING .....	1
21	909512	BUMPER .....	2	*	980292	. TILT CLUTCH SHIM PACKAGE .....	1
22	909516	COVER, Pivot cap .....	2				
23	909267	WATER DEFLECTOR, Ball gear ..	1	□70	980031	SHAFT, Tilt clutch .....	1
24	302290	WASHER .....	8	□70	982593	SHAFT, Tilt clutch .....	1
25	908668	SCREW, Seal retainer .....	4	71	308800	THRUST WASHER .....	1
26	909386	SCREW, Retainer plate .....	3	72	308453	QUADRANT GEAR .....	1
27	909387	RETAINER PLATE .....	1	73	308633	RETAINING RING .....	1
+28	313246	GASKET, Cover .....	1	74	909578	PLATE, Cover .....	2
29	307195	SCREW, Cover to housing .....	6	75	313457	NUT, Adapter stud .....	14
‡30	908196	NIPPLE, Housing .....	1	76	306453	WASHER, Adapter stud .....	14
*30	316521	NIPPLE, Housing .....	1	77	306325	LOCKWASHER, Tilt motor screw ..	2
+31	302337	O-RING, Sleeve to housing .....	1	78	311415	SCREW, Clamp to housing .....	1
32	302290	LOCKWASHER, Cover & plate .....	7	+79	313244	SEAL, Plate .....	2
+33	909515	GASKET .....	1	+80	909902	GASKET, Tilt motor .....	1
34	309267	SPRING, Coupling .....	1	81	908168	WORM .....	1
35	980274	COUPLING AND KEY .....	2	82	980182	RETAINER AND BUSHING .....	1
+36	302540	O-RING, Tilt worm retainer .....	1	83	313224	SCREW PLUG, Oil fill .....	1
Δ†37	982058	TILT MOTOR ASSEMBLY .....	1	+84	315189	GASKET, Plug .....	1
38	909386	SCREW, Tilt unit cover .....	4	85	313247	COVER, Oil reservoir .....	1
39	908564	COVER .....	1	*	981558	TRANSOM SEAL ASSEMBLY .....	1
40	310612	WASHER .....	1	86	909526	. PLATE, Transom seal .....	1
41	982277	GROUND PLATE .....	1	87	981679	. CLAMP, Seal .....	1
42	307551	FILL SCREW .....	3	88	312270	. SCREW .....	26
+43	311598	. WASHER .....	1	89	909527	. SEAL TRANSOM .....	1
44	309525	PIN, Tilt worm shaft .....	2	90	306799	LOCKWASHER, Retainer .....	1
45	309272	WASHER .....	1	91	909533	SCREW, Pivot cap .....	8
46	980183	SHAFT, Tilt worm .....	1	92	910327	RETAINER, Shift cable to hsg .. ■	1
+47	909529	GASKET, Cover .....	2	93	322726	SCREW, Retainer .....	1
+48	308626	O-RING .....	2	94	306470	LOCKWASHER, Retainer .....	1
49	908247	CAP, Fitting .....	4	95	909452	CLAMP, Cable to housing .....	2
50	308602	LINER .....	2	96	306435	SCREW, Tilt motor to intermediate housing .....	2
51	981550	D'SHAFT & BALL GEAR ASSY ..	1				
52	909044	. DRIVESHAFT .....	1	97	306453	WASHER, Tilt motor to hsg .....	2
+53	908383	. O-RING, Retainer .....	1	98	982179	INTER. HOUSING GASKET & SEAL KIT .....	1
54	908063	. BALL GEAR .....	1				
55	908064	. NUT, Gear to shaft .....	1	99	982053	INTER. HOUSING SHIM KIT .....	1
56	908062	. PLUG, Ball gear .....	1				

- \* Not shown
- # Contents of Kit 982053
- + Contents of kit 982179
- † See page 25 for detail parts
- ‡ 140 Model only
- 120 Model only
- Models with "C" suffix
- ★ Models with "C1" suffix

# UPPER GEARCASE GROUP

120, 140 MODELS STERN DRIVE

ABBREVIATED UPPER -  
UPPER GEARCASE ASSY COMPLETE  
982486 \*



UPPER GEARCASE GASKET AND SEAL KIT 85

UPPER GEARCASE SHIM KIT 88

HEAVY DUTY WATER-PUMP KIT 87

WATER PUMP REPAIR KIT 86

804039

# UPPER GEARCASE GROUP

120, 140 MODELS STERN DRIVE

SD0019A - D2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	982226	GEAR HOUSING AND BUSHING ASSEMBLY	1	†53	553126	O-RING, Housing	1
2	307551	PLUG, Oil	1	54	908062	PLUG, Ball gear	1
†3	311598	WASHER, Plug	1	55	908069	BALL GEAR, Shaft	1
4	981870	CABLE ASSEMBLY, Ground	1	56	908064	NUT	1
5	308883	BUSHING, Retainer	1	†57	981196	OIL RETAINER	1
†6	909048	SEAL RING, Shaft	1	58	313184	BEARING RETAINER	1
7	314390	RETAINER, O-ring	1	•59	313202	SHIM, Retainer to hsg. 0.002"	AR
8	313236	RETAINING RING, Shaft	1	•59	313203	SHIM, Retainer to hsg. 0.003"	AR
9	908890	SPACER SHAFT	1	•59	313204	SHIM, Retainer to hsg. 0.004"	AR
†10	909139	QUAD RING, Retainer	1	•59	313205	SHIM, Retainer to hsg. 0.005"	AR
11	908871	RETAINER, Steering worm	1	•59	313206	SHIM, Retainer to hsg. 0.010"	AR
12	305282	SCREW, Bracket	2	•60	313162	SHIM, Bearing to hsg. 0.002"	AR
13	313238	RETAINING RING	1	•60	313163	SHIM, Bearing to hsg. 0.003"	AR
14	908870	BRACKET, Steering worm ret.	1	•60	313164	SHIM, Bearing to hsg. 0.004"	AR
†o+15	314491	O-RING, Driveshaft	1	•60	313165	SHIM, Bearing to hsg. 0.005"	AR
16	980657	INDICATOR PLUG, Cover	1	•60	313166	SHIM, Bearing to hsg. 0.006"	AR
†17	909140	O-RING, Retainer back-up	1	•60	313167	SHIM, Bearing to hsg. 0.007"	AR
18	315189	GASKET, Screw plug	1	•60	313168	SHIM, Bearing to hsg. 0.008"	AR
19	323099	SCREW, Bumper	2	•61	313192	SHIM, Bearing to pinion 0.002"	AR
20	908511	SCREW, Cover to housing	4	•61	313193	SHIM, Bearing to pinion 0.003"	AR
†21	313175	O-RING, Cover	1	•61	313194	SHIM, Bearing to pinion 0.004"	AR
22	308883	BUSHING	1	•61	313195	SHIM, Bearing to pinion 0.005"	AR
23	308843	SCREW, Tilt quadrant	3	•61	313196	SHIM, Bearing to pinion 0.006"	AR
24	120177	WASHER, Tilt quadrant	3	•61	313197	SHIM, Bearing to pinion 0.007"	AR
25	909636	SCREW, Water cover	10	•61	313198	SHIM, Bearing to pinion 0.008"	AR
26	308768	EXHAUST SEAL	1	•61	313199	SHIM, Bearing to pinion 0.009"	AR
27	308590	SPRING, Seal	1	•61	313200	SHIM, Bearing to pinion 0.010"	AR
28	313220	SHIM	AR	62	375761	ROLLER BEARING ASSY	6
+29	910241	IMPELLER HOUSING	1	63	308621	O-RING, Retainer to housing	1
o+30	308928	KEY, Impeller to shaft	1	64	303480	LOCKWASHER, Ground wire	1
o+31	379475	IMPELLER ASSEMBLY	1	65	980370	BUMPER ASSEMBLY	1
o+32	313176	PLATE, Impeller	1	66	909386	SCREW, Retainer to housing	4
33	910239	SWIVEL HOUSING	1	67	313223	TILT QUADRANT	1
34	310648	THRUST WASHER	1	68	910353	WATER COVER	2
35	909753	DRIVESHAFT	1	69	313235	GEAR	1
36	981056	EXHAUST HOUSING	1	†70	308592	GASKET, Water cover	2
37	908510	PIN	2	71	909163	RETAINER, Driveshaft	1
38	308596	SEAL, Exhaust housing	1	72	981099	COVER, Exhaust housing	1
39	313169	LOCKWASHER	4	73	908834	SPRING, Ground	1
†40	310327	O-RING, Steering worm wheel	1	74	909823	TRANSFER	1
41	313540	SCREW, Housing	4	75	909638	SCREW, Cover to housing	1
42	982476	BEARING RETAINER ASSY	1	76	910238	O-RING	1
43	907866	LOCKNUT, Pinion	1	77	313228	COVER, Gear housing	1
44	982244	PINION GEAR & BEARING ASSY	1	78	319150	LOCKWASHER, Ext hsg cover	4
45	379585	BEARING ASSY, Pinion	1	79	302290	WASHER, Retainer screw	4
46	382212	BEARING ASSY, Shaft	1	†o+80	907774	SEAL, Driveshaft	1
47	909121	DRIVESHAFT, Upper	1	81	313183	WORM WHEEL	1
•48	313185	SHIM, Bearing housing, 0.005"	AR	82	381791	THRUST BEARING ASSEMBLY	2
•48	313186	SHIM, Bearing housing, 0.006"	AR	83	608030	THRUST WASHER, Worm gear	4
•48	313187	SHIM, Bearing housing, 0.007"	AR	84	313234	WORM GEAR, Steering	1
•48	313188	SHIM, Bearing housing, 0.008"	AR	85	981798	UPPER GEARCASE GASKET & SEAL KIT	1
•48	313189	SHIM, Bearing housing, 0.009"	AR	86	981802	WATER PUMP REPAIR KIT	1
•48	313190	SHIM, Bearing housing, 0.010"	AR	87	981683	HEAVY DUTY WATER PUMP & IMPELLER HOUSING KIT	1
49	382165	ROLLER BEARING, Lower	1	88	981796	UPPER GEARCASE SHIM KIT	1
†50	981587	SEAL, Bearing retainer	2				
51	910240	BEARING HOUSING	1				
52	909123	CENTERING CONE	1				

- + Contents of Water Pump Repair Kit 981802
- o Contents of Heavy Duty Water Pump Kit 981683
- Contents of Kit 981796
- † Contents of Kit 981798

\* Abbreviated Upper does not Contain Water Pump, Exhaust Housing, Exhaust Housing Cover, Tilt, Steering or Related Parts.

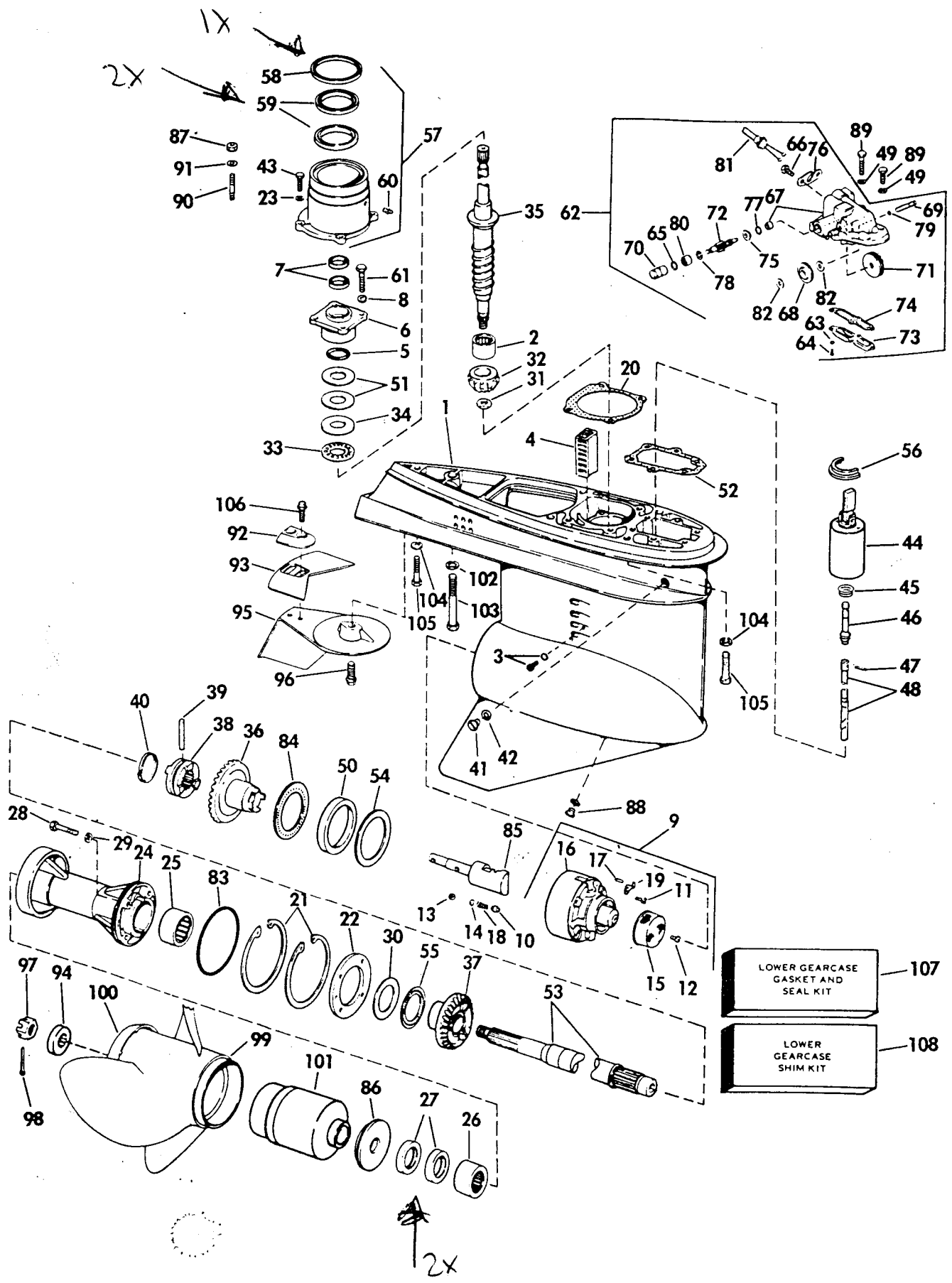
*Whi shore*  
*02236-35852*

*Steering*

# LOWER GEARCASE

120, 140 MODELS STERN DRIVE

020 632 8316



# LOWER GEARCASE

SD0020A - D2

120, 140 MODELS STERN DRIVE

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
*	982475	GEARCASE ASSY, Complete	1	57	982606	SWIVEL BEARING RETAINER & BUSHING ASSY	1
1	982111	GEARCASE & BEARING ASSY	1				
2	384195	BEARING, Pinion	1	•58	310649	SEAL	1
3	324852	RETAINING SCREW & O-RING, bearing	1	•59	313353	SEAL	1
3	307853	O-RING	1	60	313607	LUBRICATING FITTING	4
4	323466	SCREEN, Water intake	1	61	316534	SCREW, Hsg to gearcase	4
•5	314728	O-RING, Driveshaft bearing	1	62	982154	SHIFT ASSEMBLY	1
6	982422	BEARING HOUSING & SEAL	1	63	307247	LOCKWASHER, Screw, cover	4
•7	321467	OIL RETAINER, Driveshaft	2	64	323465	SCREW, Cover	4
8	301250	WASHER	1	•65	307450	O-RING, Retainer	1
9	981609	OIL PUMP HSG & COVER	1	66	908158	SCREW, Cable retainer	2
10	909590	SET SCREW, Pressure relief	4	67	982155	SHIFT HSG & SUPPORT ASSEMBLY	1
11	321127	SCREW, Cover	4	68	982033	IDLER PULLEY & BRG ASSY	1
12	308120	SCREW, Screen to cover	1	69	910033	SHAFT, Idler pulley	1
13	160084	BALL, Pressure relief	1	70	909294	RETAINER, Pinion shaft	1
14	909593	GUIDE, Ball valve	1	71	909299	DRIVE PULLEY	1
15	383784	SCREEN, Valve housing	1	72	909300	PINION SHAFT	1
16	982034	COVER ASSEMBLY	1	73	909603	COVER, Shift housing	1
17	202136	PIN, Cover to gearcase	1	•74	909604	GASKET, Cover, shift hsg	1
18	909591	SPRING, Pressure relief	1	•75	909606	SEAL, Pinion shaft, shift hsg	1
19	909589	RETAINER, Relief	1	76	909620	RETAINER, Cable, shift hsg	1
•20	910338	GASKET, Swivel bearing retainer	1	•77	909747	O-RING, Seal, pinion shaft	1
21	313445	RETAINING RING	2	78	909748	WASHER, Pinion to bearing	1
•22	314732	RETAINER PLATE, Bearing hsg	1	•79	909969	QUAD RING, Shaft	2
23	302290	WASHER, Screw, retainer	4	80	981312	BEARING ASSY, Pinion shaft	1
24	384523	BEARING HOUSING SEAL ASSY	1	81	981394	CABLE ASSEMBLY	1
25	382407	NEEDLE BEARING ASSY	1	82	909303	WASHER	2
26	379504	NEEDLE BEARING ASSY	1	•83	313446	O-RING, Propeller shaft	1
•27	321463	SEAL	2	84	385043	THRUST BEARING ASSY, Forward gear	1
28	316563	SCREW	4	85	982333	SHIFT ROD & BEARING ASSY	1
•29	317178	O-RING	1	86	318841	THRUST BEARING	1
30	314731	THRUST WASHER, Reverse gear	1	•87	121731	NUT	4
31	314730	NUT, Pinion to driveshaft	1	88	318544	SCREW, Drain & fill	1
32	323205	PINION	1	89	302510	SCREW, Shift housing to gear	5
33	387656	THRUST BEARING, Pinion	1	89	324474	SCREW, Shift hsg to grc, long	1
34	314729	THRUST WASHER, Pinion	1	•90	910551	STUD, Bearing retainer to gearcase	4
35	982423	DRIVESHAFT ASSEMBLY	1	•91	305981	WASHER, Locknut, bearing retainer	4
36	982243	GEAR & BUSHING ASSY, Forward	1	92	909548	CLAMP, Extension, rudder	1
37	323315	GEAR, Reverse	1	93	909549	EXTENSION, Rudder	1
38	323664	SHIFTER, Clutch dog	1	94	315810	SPACER, Propeller nut	1
39	313448	PIN, Clutch dog	1	95	909779	TRIM TAB, Gearcase	1
40	324369	SPRING, Clutch dog pin	1	96	313715	SCREW, Trim tab	1
41	307551	PLUG, Fill and drain	1	97	314503	NUT, Propeller	1
•42	311598	WASHER, Nylon	1	98	314502	COTTER PIN, Propeller nut	1
43	302510	SCREW, Retainer to gearcase	4	99	382761	PROPELLER, 14 x 11	1
44	981857	SHIFT ASSEMBLY, Gearcase	1	99	382762	PROPELLER, 14 x 13	1
45	909961	SPRING	1	99	382763	PROPELLER, 13-3/4 x 15	1
46	909953	OIL STEM VALVE	1	99	382764	PROPELLER, 13-3/4 x 17	1
47	320176	PIN, Push rod	1	99	382765	PROPELLER, 13 x 19	1
48	982106	PUSH ROD ASSY	1	99	389788	PROPELLER, 12-3/4 x 21	1
49	302290	LOCKWASHER, Shift housing to gearcase	6	99	384136	PROPELLER, 12-3/4 x 23	1
50	317165	THRUST WASHER, Forward gear	1	99	389514	PROPELLER, 12-3/4 x 23 - SST	1
•51	314742	SHIM, 0.002 Pinion	AR	99	389949	PROPELLER, 13-3/4 x 15 - SST	1
•51	323362	SHIM, 0.003 Pinion	AR	99	389948	PROPELLER, 13-3/8 x 17 - SST	1
•51	323361	SHIM, 0.004 Pinion	AR	99	389510	PROPELLER, 13 x 19 - SST	1
•51	314745	SHIM, 0.005 Pinion	AR	99	389512	PROPELLER, 12-3/4 x 21 - SST	1
•52	324670	GASKET, Shift housing	1	o100	319432	CONVERGING RING	1
53	387818	PROPELLER SHAFT ASSY	1	101	384977	PROPELLER BUSHING ASSY	1
•54	323363	SHIM, 0.002 Forward gear	AR	102	306314	LOCKWASHER, Screw, long	1
•54	323364	SHIM, 0.003 Forward gear	AR	103	313697	SCREW, Gearcase to hsg, long	1
•54	323365	SHIM, 0.004 Forward gear	AR	104	307708	LOCKWASHER, Screw, short	5
55	382408	THRUST BEARING ASSY, Reverse gear	1	105	552898	SCREW, Gearcase to hsg, short	5
56	909945	ADAPTOR, Shift cyl to hsg	1	106	908668	SCREW, Extension, rudder	1
				107	982177	LOWER GEARCASE GASKET & SEAL KIT	1
				108	982178	LOWER GEARCASE SHIM KIT	1

\* Not shown

o Alum. Prop only

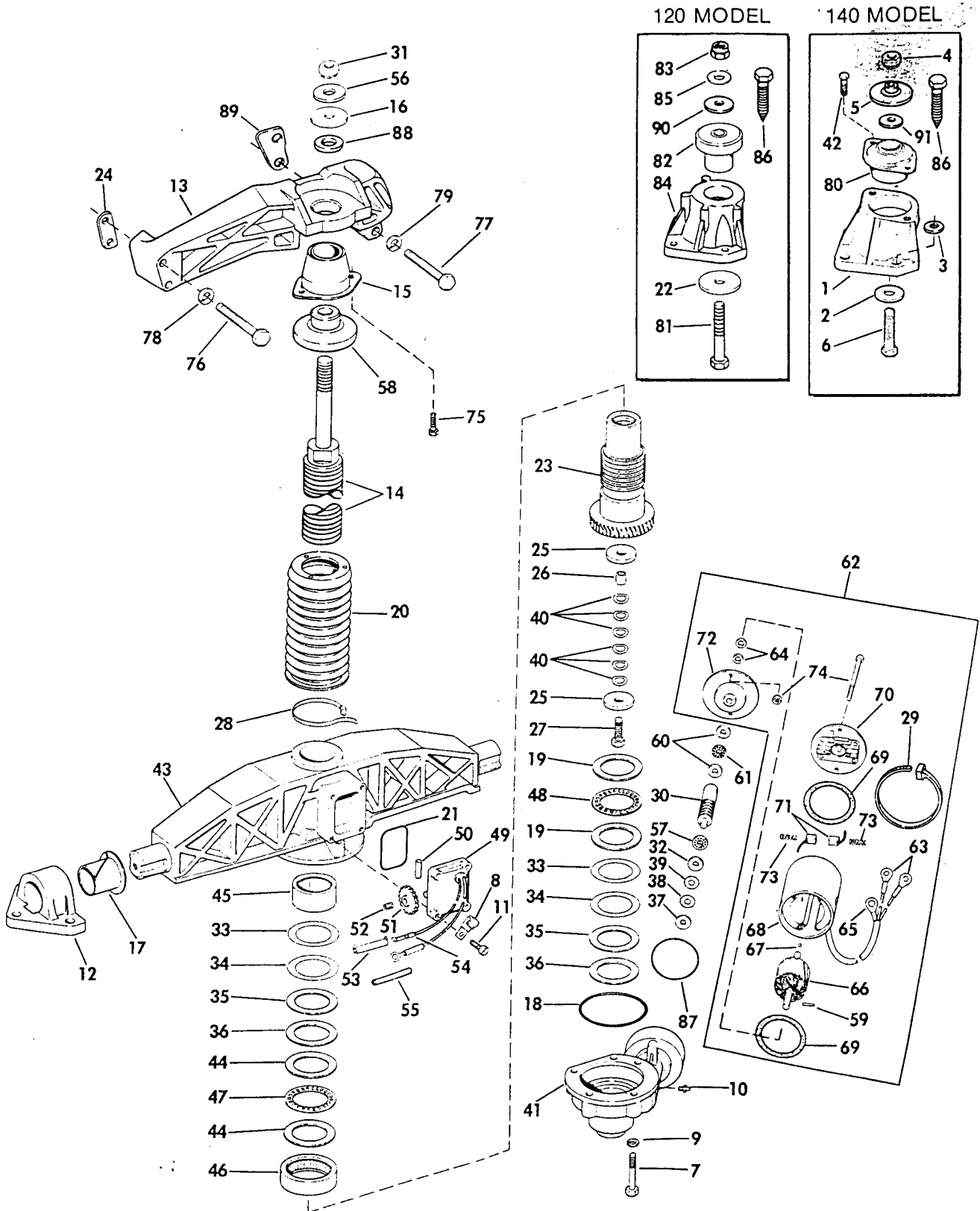
• Contents of Lower Gearcase Gasket and Seal Kit #982177

★ Contents of Lower Gearcase Shim Kit #982178

# Models with "C1" suffix only

# ENGINE MOUNT GROUP

120, 140 MODELS WITH SELECTRIM



94038

# ENGINE MOUNT GROUP

120, 140 MODELS WITH SELECTRIM

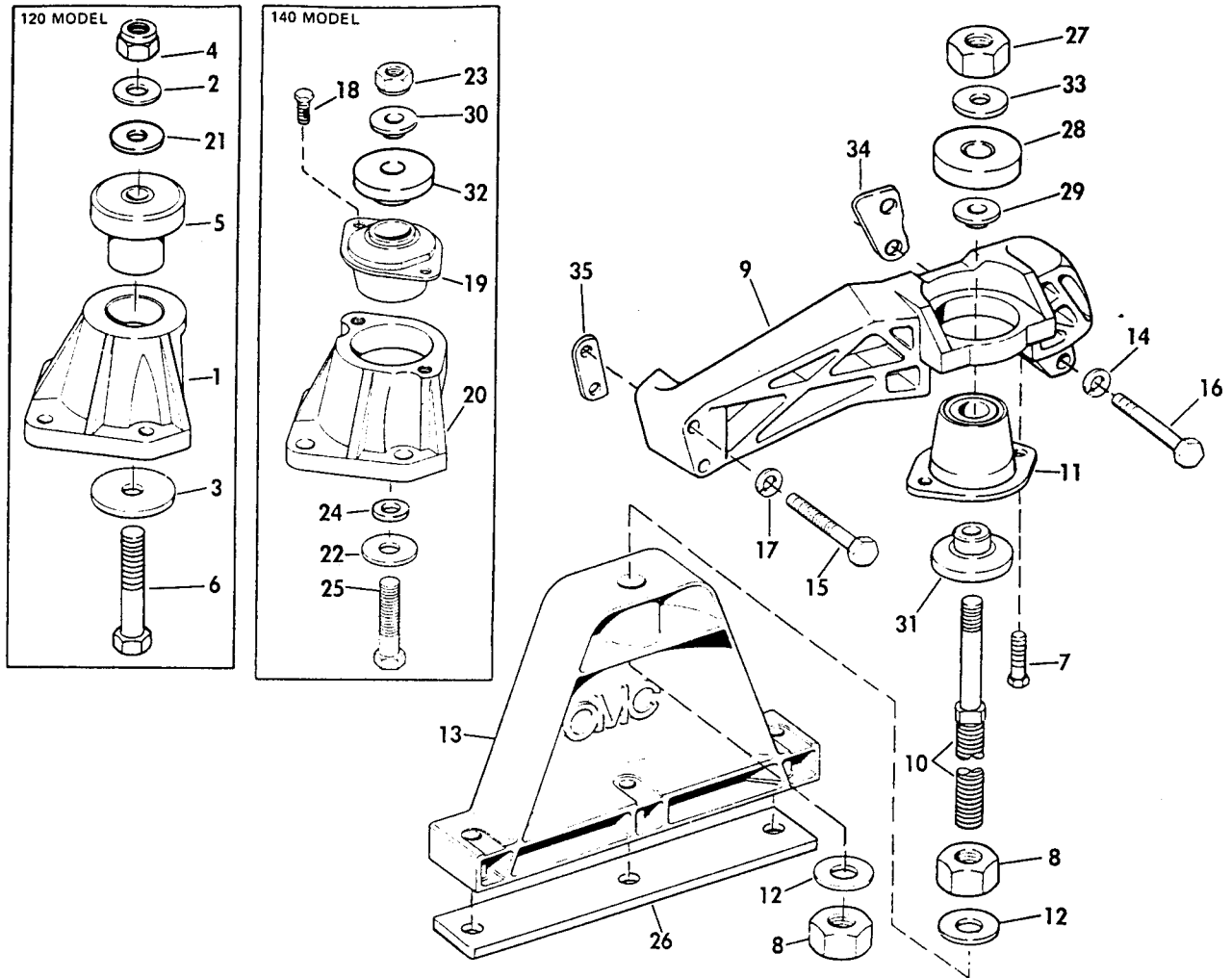
SD0021A - E2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
†1	909713	BRACKET, Rear	2	49	981458	SENDING UNIT ASSEMBLY	1
†2	980808	WASHER	2	50	316198	HEAT SHRINK TUBE	2
†3	909944	SPACER, Mount lower	2	51	907815	GEAR	1
†4	313650	NUT	2	52	907816	CLUTCH PINS	1
†5	909684	WASHER	2	53	303806	TUBING	1
†6	316913	SCREW	2	54	308808	TERMINAL	1
7	306500	SCREW, Trunnion housing	5	55	908615	HEAT SHRINK TUBE	1
8	310441	CLAMP, Leads sending unit	1	56	907826	WASHER, Upper	1
9	311388	LOCKWASHER, Screw housing	5	57	979798	BEARING	1
10	313607	LUBRICATION FITTING	1	58	909683	SPACER, Lower	1
11	510397	SCREW, Sending unit cover	4	59	317134	SPIROL PIN	1
12	909711	PILLOW BLOCK, Trunnion hsg	2	60	907837	WASHER	2
13	909052	BRACKET, Engine, front	1	61	979798	THRUST BEARING, Worm gear	1
14	981740	JACK SCREW ASSEMBLY	1	△62	982069	MOTOR ASSEMBLY	1
15	980809	RUBBER MOUNT ASSEMBLY	1	63	204053	RING TERMINAL	2
16	980808	REBOUND WASHER ASSY	1	64	979945	THRUST WASHER & SPACER	1
17	907769	BUSHING, Pillow block	2	65	310502	RING TERMINAL	1
18	907770	O-RING, Trunnion housing	1	66	982149	ARMATURE	1
19	907791	WASHER, Trunnion housing	2	67	121987	BALL STEEL, 0.156"	1
20	907795	BOOT, Jack screw	1	68	982307	FRAME & FIELD, Complete	1
21	907817	O-RING, Sending unit	1	△69	122790	GASKET PACKAGE	1
*22	907857	WASHER	2	△70	982151	HEAD ASSY, Comm end	1
23	979793	NUT & WORM WHEEL ASSY	1	△71	380706	BRUSH SET	1
24	910086	PLATE, Backup, front mount, starboard	2	△72	979942	HEAD ASSY, Drive end	1
25	907826	WASHER, Lower	2	73	382950	SPRING SET, Brush	1
26	907828	SPACER, Stop screw	1	△74	982152	THRU BOLT PACKAGE	1
27	907832	SCREW, Bumper stop	1	75	909682	SCREW, Mount to bracket	2
28	907833	TIE STRAP, Boot	1	76	306837	SCREW, Bracket to engine, starboard	2
29	320107	TIE STRAP, Cable to motor	1	77	910087	SCREW, Bracket to engine, port	2
30	907835	WORM GEAR, Trim	1	78	120177	LOCKWASHER, Screw	2-6
31	313650	NUT, Front mount	1	79	303269	LOCKWASHER, Screw, port	2
32	907837	WASHER, Worm gear	1	†80	980809	RUBBER MOUNT ASSY	2
33	907925	SHIM, 0.002"	AR	•81	317573	SCREW	2
34	907926	SHIM, 0.003"	AR	•82	979722	RUBBER MOUNT ASSY	2
35	907927	SHIM, 0.004"	AR	•83	907858	NUT	2
36	907928	SHIM, 0.010"	AR	•84	909712	BRACKET, Rear	2
37	907929	SHIM, 0.002"	AR	•85	907838	WASHER	2
38	907930	SHIM, 0.003"	AR	86	909716	LAG BOLT, Mount	2
39	907931	SHIM, 0.004"	AR	87	909694	O-RING, Motor, trunnion housing	1
40	907966	WASHER, Bumper stop	6	88	909944	SPACER, Upper	1
41	981670	TRUNNION HOUSING, Lower	1	89	910085	PLATE, Backup, front mount, port	1
†42	909682	SCREW, Mount to base	4	90	909633	WASHER, Mount upper	2
43	981671	TRUNNION HSG & BRG ASSY	1	†91	909683	SPACER, Mount	2
44	907791	WASHER	2				
45	979769	NEEDLE BEARING ASSY	1				
46	979770	NEEDLE BEARING ASSY	1				
47	979771	BEARING ASSY, Thrust	1				
48	979771	BEARING ASSY, Thrust	1				

• 120 Models only  
 † 140 Models only

# ENGINE MOUNT GROUP

120, 140 MODELS WITH PRE-SET TRIM



SD0022A - E2

94039

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
•1	910061	BRACKET, Rear	2	†19	980809	RUBBER MOUNT ASSY	2
•2	907838	WASHER	2	†20	909713	BRACKET, Rear	2
•3	907857	WASHER	2	•21	909633	WASHER, Mount upper	2
•4	907858	NUT	2	†22	980808	WASHER	2
•5	979722	RUBBER MOUNT ASSY	2	†23	313650	NUT	2
•6	317573	SCREW	2	†24	909944	SPACER	2
7	909682	SCREW	2	†25	316913	SCREW	2
8	908233	NUT	1	26	908830	PAD	1
9	909052	BRACKET, Engine front	1	27	313650	NUT	1
10	981739	SHAFT, Trim adjustment	1	28	980808	WASHER	1
11	981739	RUBBER MOUNT ASSY	1	29	909944	SPACER	1
12	980809	WASHER, Mount	2	†30	909684	WASHER	2
13	103960	MOUNT, Front, long base	1	31	909683	SPACER, Mount	1
13	981551	MOUNT, Front, short base	1	†32	909683	SPACER, Mount	2
14	303269	LOCKWASHER, Bracket port	2	33	907826	WASHER	1
15	306837	SCREW, Bracket to engine, starboard	2	34	910085	PLATE, Backup, front mount, port	1
16	910087	SCREW, Bracket to engine, port	2	35	910086	PLATE, Backup, front mount, starboard	1
17	120177	LOCKWASHER, Bracket	2-6				
†18	909682	SCREW, Mount to mount base	4				

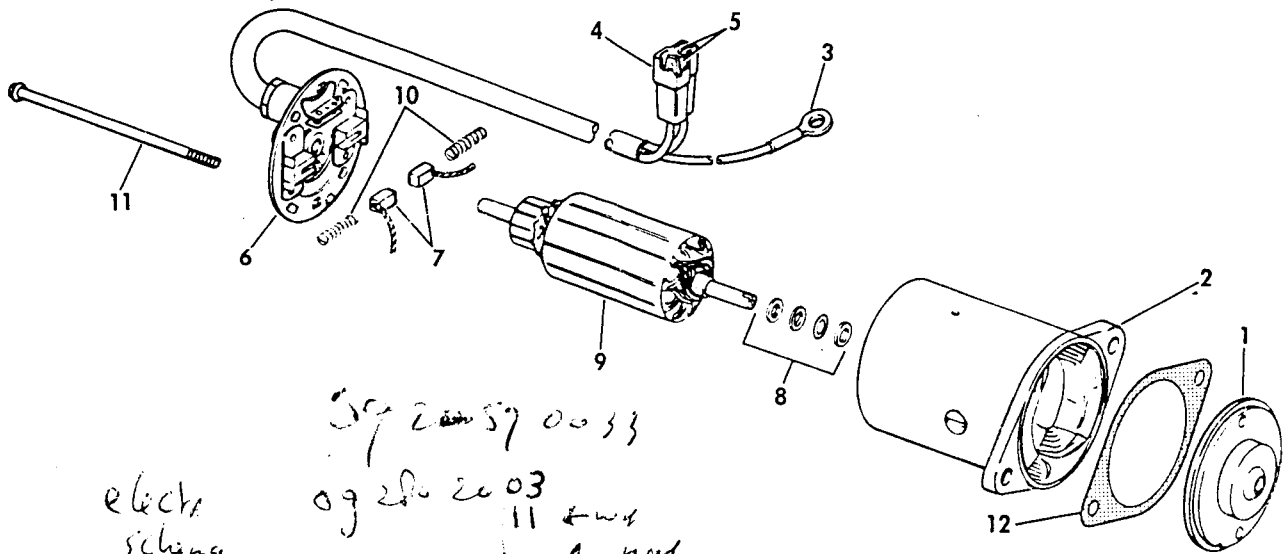
• 120 Models only

† 140 Models only



# TILT MOTOR GROUP

120, 140 MODELS STERN DRIVE



SD0017A - E2

804041

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
△ *	982058	TILT MOTOR ASSEMBLY .....	1	→ 7	982310	.. BRUSH SET .....	1
△ 1	982309	. HEAD ASSY, Drive end .....	1	*	982313	.. O-RING PACKAGE .....	1
△ 2	982315	. FRAME & FIELD COIL ASSY ....	1	→ 8	380752	. THRUST WASHER & SPACER PACKAGE .....	1
*	982313	.. O-RING PACKAGE .....	1	9	982314	. ARMATURE ASSEMBLY .....	1
*	910107	.. INSULATOR .....	1	10	382950	. SPRING SET .....	1
3	310502	. RING TERMINAL .....	1	△ 11	982308	. THRU BOLT PACKAGE .....	1
4	510472	. HOUSING .....	1	12	982312	. GASKET PACKAGE .....	1
5	510470	. TERMINAL .....	2	*	982313	.. O-RING PACKAGE .....	1
△ 6	982311	. HEAD ASSY, Commutator end ..	1				

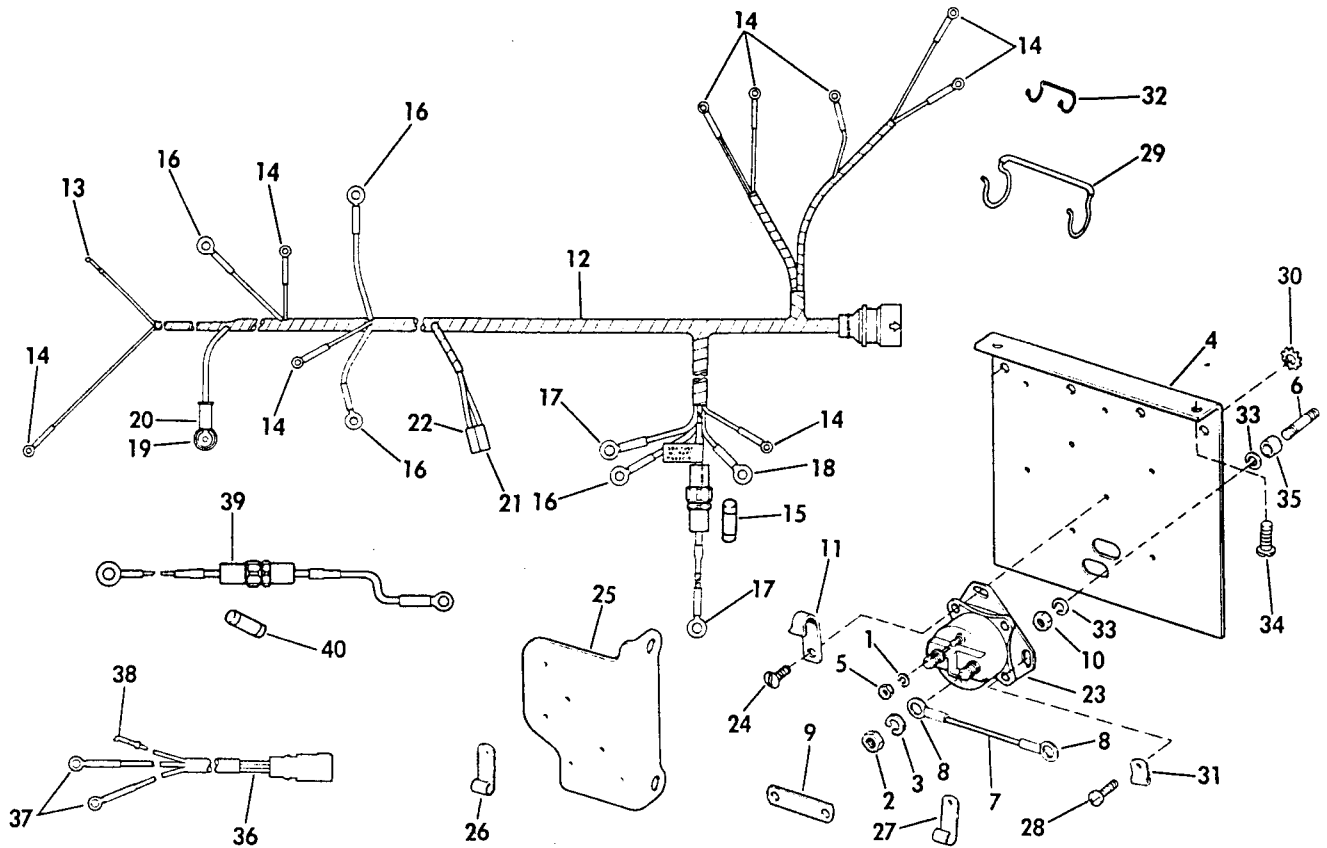
\* Not shown

gdr 706 f503,96 ex BTU.

~~.....~~ ~~.....~~ ex BTU.

# SOLENOIDS & CABLES GROUP

120, 140 MODELS STERN DRIVE WITH SELECTRIM



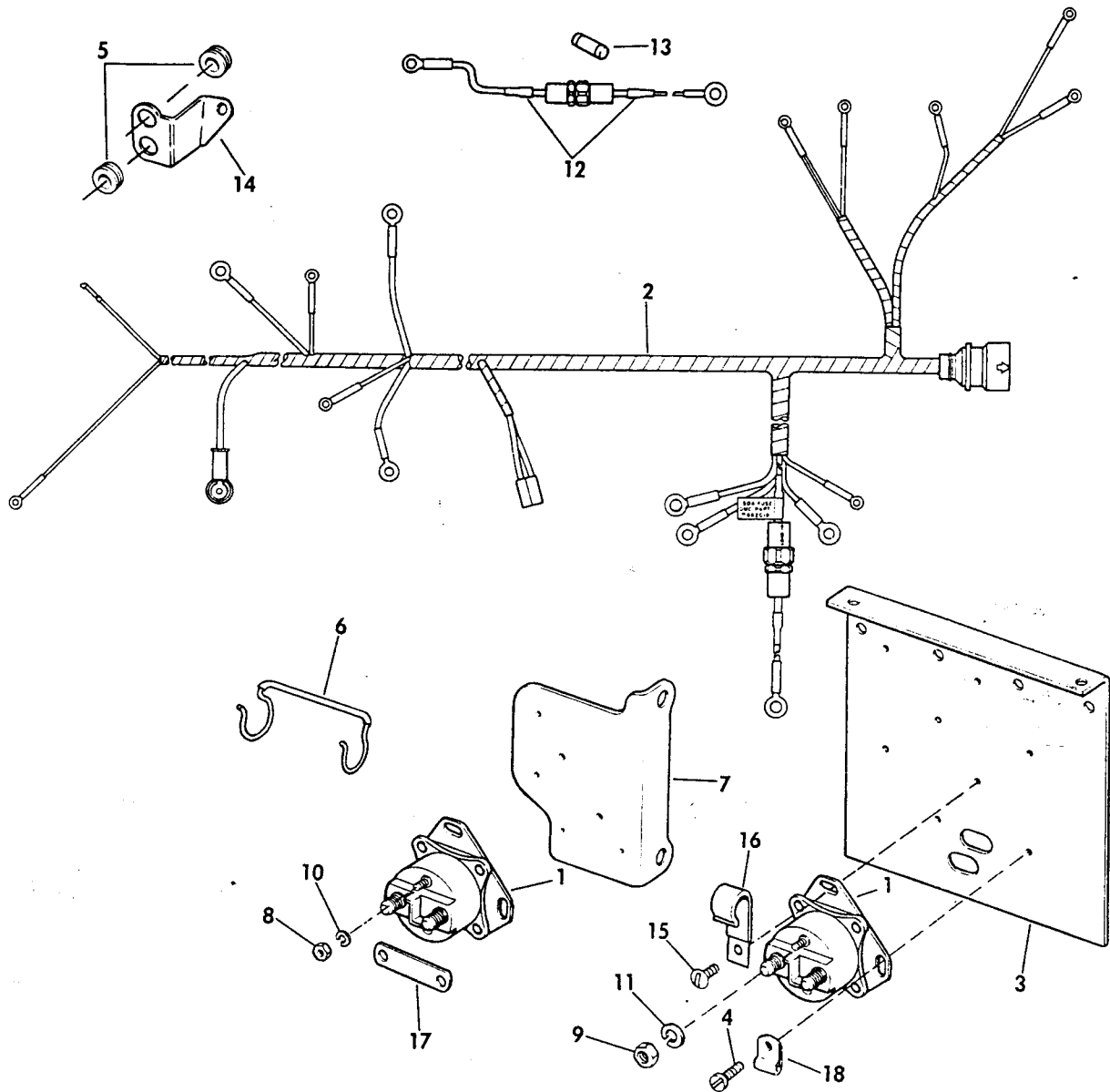
94211

SD0015A - E2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
1	120052	LOCKWASHER, Solenoid term. ....	5	21	510469	. TERMINAL .....	2
2	302103	NUT, Solenoid terminals .....	8	22	510471	. HOUSING .....	1
3	310755	LOCKWASHER, Solenoid term. ....	8	23	982187	SOLENOID .....	5
4	909451	BRACKET TILT & TRIM, Solenoids .....	1	24	317753	SCREW, Solenoid to brkt .....	10
5	306556	NUT, Solenoid terminals .....	5	25	909448	BRACKET, Solenoid to engine .....	1
6	909454	STUD, Bracket to engine .....	1	26	310439	CLAMP, Trim connector .....	1
7	981856	LEAD ASSEMBLY .....	1	27	311339	CLAMP, Trim sender lead .....	1
8	204053	. TERMINAL .....	2	28	304608	SCREW, Clamp to bracket .....	2
9	909450	BUS BAR, Solenoid to solenoid .....	2	29	315182	CLAMP, Cable connector .....	1
10	307160	NUT, Stud .....	1	30	303480	LOCKWASHER, Nut to brkt .....	8
11	309846	J-CLAMP .....	1	31	909424	CLAMP, Bracket .....	2
12	982025	CABLE ASSEMBLY, Engine .....	1	32	322548	RETAINER, Connector, trim cable .....	1
13	308808	. KNIFE DISCONNECT .....	1	33	311096	WASHER, Stud spacer .....	2
14	204036	. RING TERMINAL .....	9	34	552421	SCREW, Bracket mounting .....	2
15	982019	. FUSE, 50 Amp .....	1	35	909449	SPACER, Bracket to engine .....	1
16	204053	. RING TERMINAL .....	4	36	981307	CABLE ASSEMBLY, Trim .....	1
17	310502	. RING TERMINAL .....	2	37	204036	. RING TERMINAL .....	2
18	203523	. TERMINAL .....	1	38	308808	. TERMINAL .....	1
19	312037	. RING TERMINAL .....	1	39	982024	FUSE HOLDER & LEAD ASSY .....	1
20	314902	. COVER, Terminal .....	1	40	982019	. FUSE, 50 amp .....	1

# SOLENOIDS & CABLE ASSEMBLY GROUP

120, 140 MODELS WITH PRE-SET TRIM



SD0016A - E2

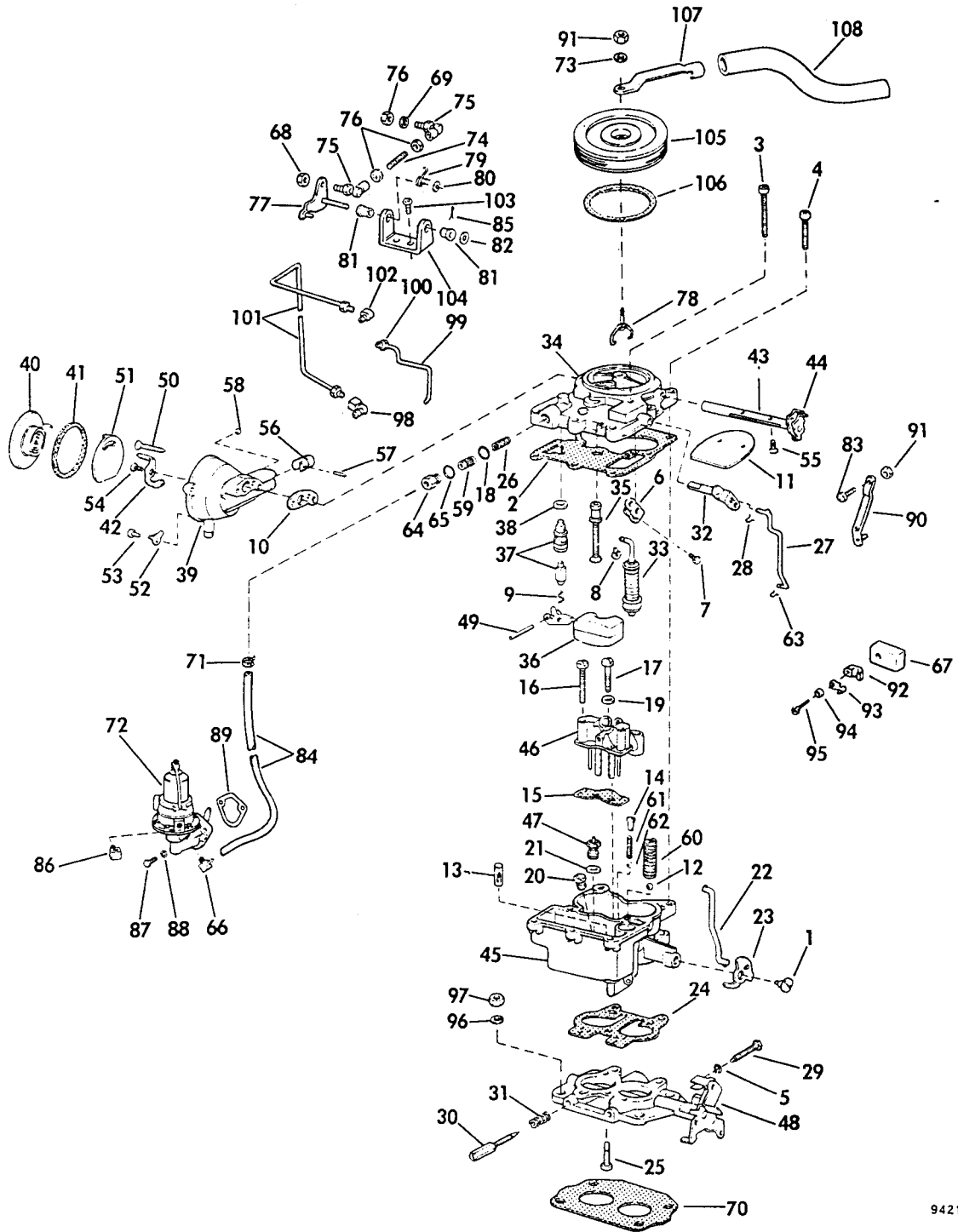
94212

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
△ 1	982187	SOLENOID ASSEMBLY .....	3	10	120052	LOCKWASHER .....	3
• 2	982025	CABLE ASSEMBLY .....	1	11	306325	LOCKWASHER .....	6
3	909451	BRACKET, Tilt solenoids .....	1	12	982024	FUSE AND LEAD ASSY .....	1
4	304608	SCREW, Clamp to bracket .....	2	13	982019	. FUSE, 50 amp .....	1
5	909988	GROMMET, Fuse holder .....	2	14	910206	RETAINER, Fuse holder .....	1
6	315182	CLAMP, Cable connector .....	1	15	317753	SCREW, Tilt solenoid to adptr .....	6
7	909448	BRACKET, Aux. start solenoid .....	1	16	309846	CLAMP, Engine cable .....	1
8	306556	NUT .....	3	17	909450	BUS BAR .....	1
9	302103	NUT, Solenoid terminal .....	6	18	909424	CLAMP, Cable connector .....	2

• See page 26 for detail parts list

# CARBURETOR & FUEL PUMP GROUP

120, 140 MODELS STERN DRIVE



94213

# CARBURETOR & FUEL PUMP GROUP

120, 140 MODELS STERN DRIVE

SD0011A - F2

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
••	982217	CARBURETOR ASSEMBLY .....	1	54	311669	SCREW, Choke lever attachment .....	1
★	982219	CARBURETOR ASSEMBLY .....	1	55	311666	SCREW, Choke valve .....	2
1	311651	SCREW, Idle stop .....	1	56	311665	PISTON, Choke .....	1
2	†	GASKET, Air horn .....	1	57	311664	PIN, Choke piston .....	1
3	312416	SCREW, Air horn, long .....	1	58	311673	PLUG, Lead ball .....	1
4	316307	SCREW, Air horn, short .....	7	•59	908034	FILTER, Fuel inlet .....	1
•5	**	CLIP, Idle stop screw .....	1	60	†	SPRING, Pump return .....	1
★6	312419	LEVER, Pump inside .....	1	61	†	SPRING, Pump discharge .....	1
7	311661	SCREW, Pump lever .....	1	62	†	BALL, Pump discharge .....	1
8	†	CLIP, Pump plunger .....	1	63	†	CLIP, Pump rod .....	1
9	†	PULL CLIP, Float valve .....	1	•64	908035	FILTER NUT, Fuel inlet .....	1
10	†	GASKET CHOKE HOUSING .....	1	•65	†	GASKET, Fuel inlet nut .....	1
11	908031	CHOKE VALVE .....	1	66	908637	FITTING, Fuel pump to carb vent hose .....	1
12	†	BALL, Pump inlet check .....	1	★67	981534	PIN AND SPACER ASSY .....	1
13	†	SCREEN, Pump inlet .....	1	•68	554427	NUT, Ball joint to throttle lever .....	1
14	†	GUIDE, Pump discharge .....	1	•69	120052	LOCKWASHER .....	1
15	†	GASKET, Venturi cluster .....	1	70	315055	GASKET, Carburetor to manifold .....	1
16	312430	SCREW, Venturi cluster, outer .....	2	71	910068	TIE STRAP .....	3,4
17	**	SCREW, Venturi cluster, center .....	1	72	982240	FUEL PUMP ASSEMBLY .....	1
•18	†	GASKET, Fuel filter .....	2	*	982811	FILTER & GASKET ASSY, Fuel pump .....	1
19	†	GASKET, Center cluster screw .....	1	•73	306482	WASHER .....	1
•20	910183	MAIN METERING JET .....	2	•74	908082	LINK .....	1
★20	910185	MAIN METERING JET .....	2	•75	379926	BALL JOINT, Link .....	2
21	†	GASKET, Power valve .....	1	•76	309485	NUT, Ball joint to lever .....	2
•22	313057	CHOKE ROD .....	1	•77	980094	THROTTLE SHAFT ASSY .....	1
★22	312436	CHOKE ROD .....	1	78	907917	BAIL, Flame arrestor .....	1
23	312437	STOP, Idle speed screw .....	1	•79	908450	SPRING, Throttle return .....	1
24	†	GASKET, Throttle body .....	1	•80	908187	RETAINER, Throttle arm .....	1
25	312439	SCREW, Throttle body .....	3	•81	908979	BUSHING, Pivot bracket .....	2
•26	314548	SPRING, Fuel filter .....	1	•82	303887	WASHER, Throttle arm .....	1
★27	312441	PUMP ROD .....	1	★83	306487	SCREW, Throttle lever .....	2
•27	384469	PUMP ROD & LIP ASSY .....	1	84	#	HOSE, Pump vent to carb .....	1
•28	†	HITCH PIN .....	1	•85	305650	COTTER PIN, Lever .....	1
★28	†	CLIP, Pump rod .....	2	86	310924	ELBOW, Fuel line .....	1
•29	908029	SCREW, Idle stop .....	1	87	306322	SCREW, Fuel pump mounting .....	2
★29	312443	SCREW, Idle stop .....	1	88	306325	LOCKWASHER, Fuel pump .....	2
30	†	NEEDLE, Idle adjusting .....	2	89	3705042	GASKET, Pump to engine .....	1
31	312445	SPRING, Idle needle .....	2	★90	981649	THROTTLE LEVER & PIN ASSY .....	1
•32	**	PUMP SHAFT & LEVER ASSY .....	1	•91	901646	NUT, Bail .....	1
★32	381385	PUMP SHAFT & LEVER ASSY .....	1	★91	900402	NUT, Throttle & flame arrestor .....	2
33	†	PUMP ASSEMBLY .....	1	92	310685	ANCHOR BLOCK .....	1
34	**	AIR HORN ASSEMBLY .....	1	93	310687	SPRING .....	1
35	382013	POWER PISTON ASSEMBLY .....	1	94	310688	SPACER .....	1
36	982385	FLOAT ASSEMBLY .....	1	•95	311084	SCREW, Anchor block .....	1
37	†	NEEDLE & SEAT ASSEMBLY .....	1	★95	511111	SCREW, Anchor block .....	1
38	†	GASKET, Needle seat .....	1	96	311388	LOCKWASHER, Stud .....	4
•39	980006	CHOKE HOUSING ASSEMBLY .....	1	97	306422	NUT, Carburetor to manifold .....	4
★39	381391	CHOKE HOUSING ASSEMBLY .....	1	★98	306344	BALL SLEEVE, Nut .....	1
•40	980005	THERMOSTAT COVER .....	1	★99	907797	TUBE, Heat exchange .....	1
★40	381392	THERMOSTAT COVER .....	1	100	980093	HEAT EXCHANGER TUBE ASSY .....	1
41	†	GASKET, Thermostat cover .....	1	101	306345	NUT, Tube .....	1
42	**	CHOKE LEVER & LINK ASSY .....	1	★101	982222	FUEL LINE, Pump to carb .....	1
43	381395	CHOKE SHAFT ASSY .....	1	•101	980077	FUEL LINE, Pump to carb .....	1
•44	980004	CHOKE LEVER & COLLAR ASSY .....	1	•102	310958	FITTING, Fuel line .....	1
★44	381393	CHOKE LEVER & COLLAR ASSY .....	1	102	310924	FITTING, Fuel line .....	1
•45	980002	FLOAT BOWL ASSEMBLY .....	1	•103	304992	SCREW, Bracket to manifold .....	2
★45	**	FLOAT BOWL ASSEMBLY .....	1	•104	908081	PIVOT BRACKET, Linkage .....	1
46	†	VENTURI CLUSTER ASSY .....	1	105	982105	FLAME ARRESTOR .....	1
47	†	POWER VALVE ASSEMBLY .....	1	106	908947	GASKET, Flame arrestor to carburetor .....	1
48	**	THROTTLE BODY ASSEMBLY .....	1	107	908240	CONNECTOR, Hose .....	1
49	311677	PIN, Float hinge .....	1	108	907792	HOSE, Cover .....	1
50	311672	SCREW, Choke housing .....	2				
•51	908032	BAFFLE PLATE .....	1				
★51	910184	BAFFLE PLATE .....	1				
52	311662	RETAINER, Thermostat cover .....	3				
53	311661	SCREW, Thermostat cover .....	3				

• 140 Model only

★ 120 Model only

† Not shown

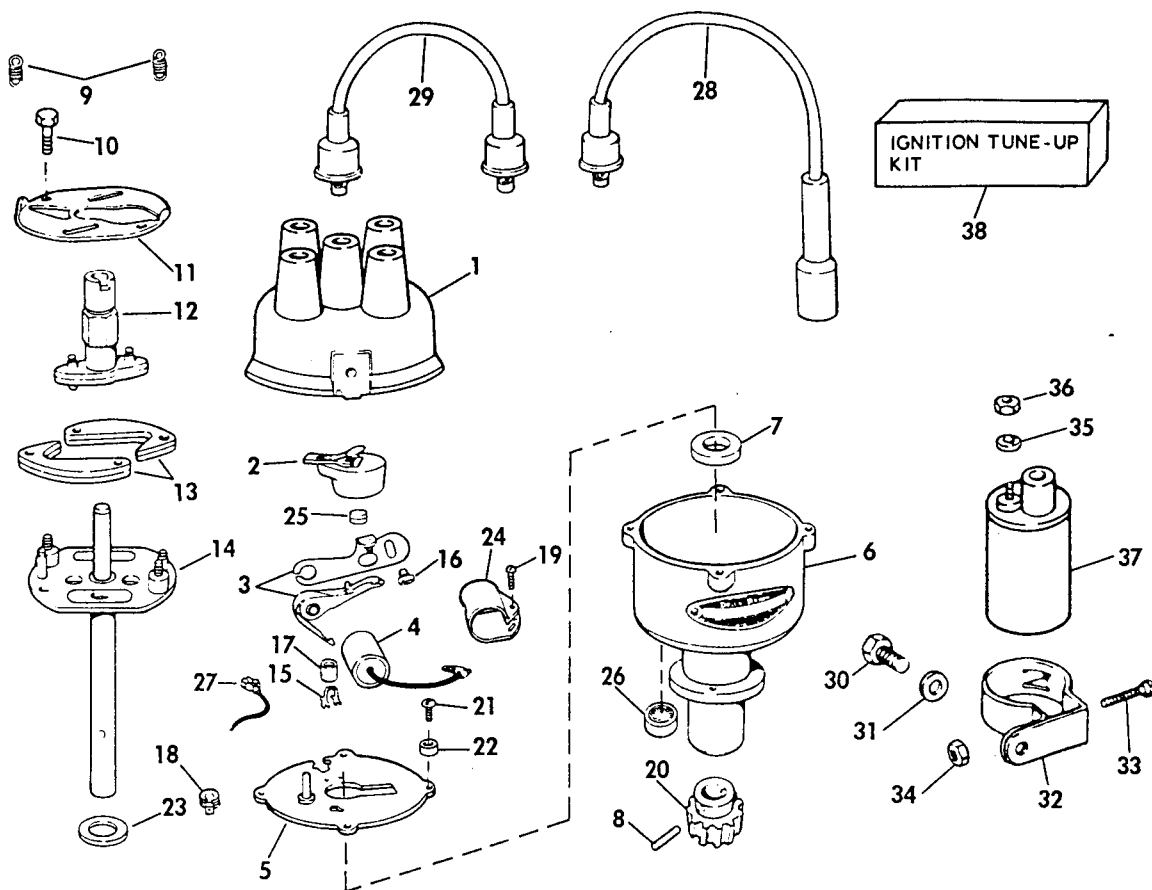
‡ Available only in overhaul kit, part #982384 for 140, part #982386 for the 120 Model

# Cut to length from 909938

\*\* No part number

# IGNITION GROUP

120, 140 MODELS STERN DRIVE



SD0012A - F2

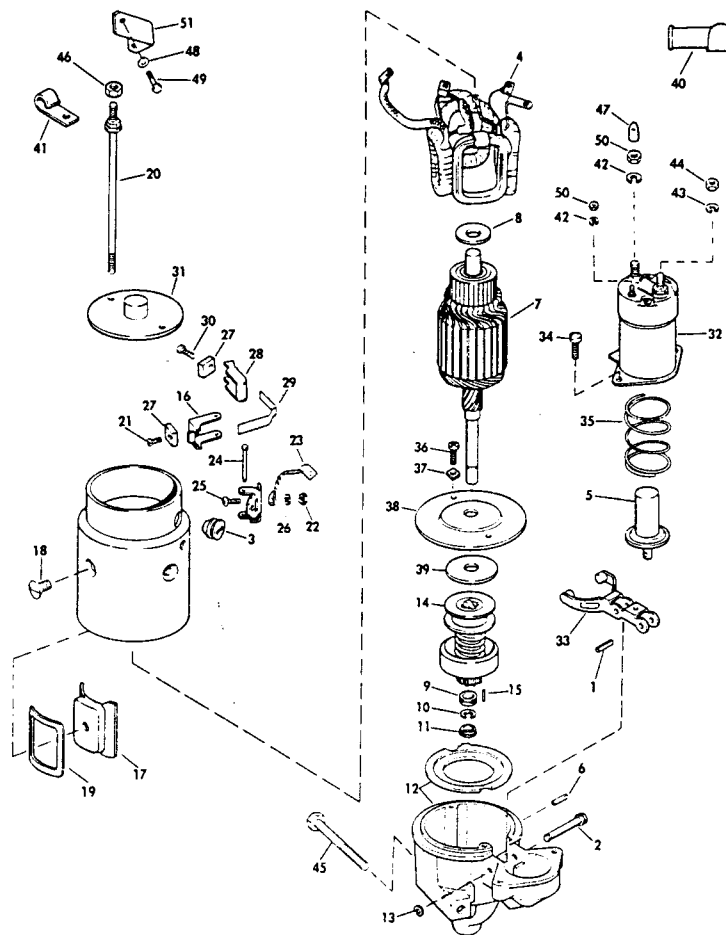
94214

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
△*	982351	DISTRIBUTOR ASSEMBLY .....	1	20	311703	GEAR, Distributor drive .....	1
△1	380541	CAP & BUTTON ASSEMBLY ....	1	21	316673	SCREW, Breaker plate .....	4
2	384735	ROTOR ASSEMBLY .....	1	△22	908105	WASHER, Breaker plate .....	2
3	380538	CONTACT POINTS SET .....	1	23	908106	WASHER, Cam & main shaft ....	1
4	380537	CONDENSER ASSEMBLY .....	1	24	908107	BRACKET, Capacitor .....	1
5	311705	BREAKER PLATE .....	1	25	908108	WICK, Rotor .....	1
△6	908104	HOUSING, Distributor .....	1	△26	980155	SCREEN ASSY, Vent housing ...	2
7	316674	OIL SEAL, Housing .....	1	27	311692	LEAD, Primary .....	1
8	311702	PIN, Gear .....	1	△28	979871	LEAD, #1 and 2 .....	2
9	316671	SPRING, Weight .....	2	△28	979872	LEAD, #3 .....	1
10	311718	SCREW & LOCKWASHER, Weight hold down .....	2	△28	979873	LEAD, #4 .....	1
11	311699	PLATE, Weight hold down .....	1	△29	580558	LEAD, Coil .....	1
12	384736	CAM ASSEMBLY .....	1	30	306834	SCREW .....	1
13	316672	WEIGHT, Distributor .....	1	31	306405	WASHER .....	1
14	384737	MAIN SHAFT ASSEMBLY .....	1	32	383448	CLAMP, Coil .....	1
15	312307	RETAINER, Cam lubricator .....	1	33	306519	SCREW .....	1
16	311695	SCREW, Contact adjusting .....	1	34	308335	NUT, Screw, coil clamp .....	2
17	908608	WICK, Cam lubricator .....	1	35	550757	WASHER .....	1
△18	311693	GROMMET .....	1	36	306556	NUT, Coil terminal .....	2
19	908609	SCREW, Bracket .....	1	37	383444	COIL ASSEMBLY .....	1
				38	172527	IGNITION TUNE-UP KIT .....	1

\* Not shown

# STARTER MOTOR GROUP

120, 140 MODELS STERN DRIVES



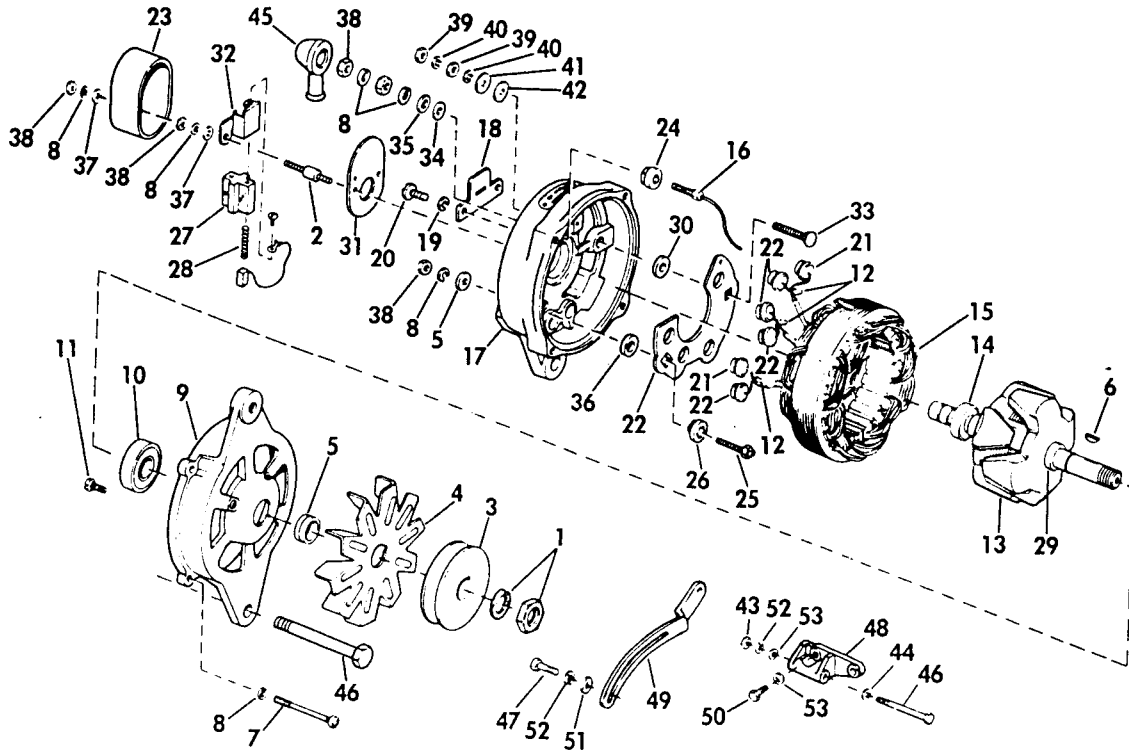
SD0014A - G2

804042

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
△ *	982200	STARTER MTR & STUD ASSY	1	26	453435	WASHER, Support	2
1	455106	PIN	1	27	1906945	BRUSH	4
2	1945804	SHAFT	1	28	1926618	BRUSH HOLDER, Insulated	2
△ 3	1966391	GROMMET	1	29	1926622	SPRING, Brush	2
4	1877291	FIELD COIL	1	30	1967747	SCREW, Insulating brush	2
5	1941113	PLUNGER	1	△ 31	1928966	FRAME AND BUSHING	1
6	315986	ROLL PIN, Drive housing	1	△ 32	1114356	SWITCH	1
7	830842	ARMATURE	1	33	801433	LEVER, Shift	1
8	818265	WASHER	1	34	132255	SCREW, Switch	2
9	1927849	COLLAR, Stop	1	35	1958679	RETURN SPRING	1
10	1927848	RING	1	36	1914580	SCREW	2
11	1927850	COLLAR, Thrust	1	37	1962276	WASHER	2
12	830845	DRIVE HOUSING (incl bushing)	1	△ 38	1956939	PLATE	1
13	9416878	RETAINING RING	1	39	1914842	THRUST WASHER	1
14	1954842	DRIVE ASSEMBLY	1	40	910111	BOOT, Battery cable	1
15	809593	DOWEL PIN	1	41	309322	CLAMP, Oil line	1
16	1940477	BRUSH HOLDER, Grounded	2	42	306991	LOCKWASHER	2
17	1931129	POLE SHOE	1	43	306025	LOCKWASHER	1
18	1970469	SCREW, Pole shoe	4	44	309602	NUT, Starter solenoid	1
19	1927853	INSULATOR	4	45	1366043	SCREW, Starter, long	1
20	1941111	THRU BOLT, W/extension	1	45	1366042	SCREW, Starter, short	1
20	1939970	THRU BOLT	1	46	313022	NUT, Starter motor bracket	2
21	310859	SCREW, Ground brush	2	47	910091	CAP, Solenoid terminal	1
	1928015	SUPPORT PACKAGE	2	48	306325	LOCKWASHER, Bracket	1
22	120361	NUT, Support	2	49	908581	SCREW, Starter Motor Brace	1
23	1960864	LEAD, Ground	1	50	133079	NUT, Solenoid	2
24	1966923	PIN	1	51	910000	BRACKET	1
25	274738	SCREW, Support	2				

\*Not shown

# ALTERNATOR GROUP



SD0086B - G2

94167A

REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.	REF. NO.	PART NO.	NAME OF PART	QTY. PER ASSY.
Δ *	981187	ALTERNATOR ASSY, Compl	1	29	312486	. RETAINER, Felt washer	1
1	982275	. NUT & L'WASHER ASSY	1	30	†	. BUSHING, Insulator, battery terminal	1
Δ 2	909174	. STUD, Cover, slip ring	1	Δ 31	313047	. PL, Back-up, br hldr	1
3	311312	. PULLEY, Driven	1	32	**	. COVER, Brush holder	1
4	312485	. FAN, Ventilating	1	33	†	. STUD, Battery term	1
5	312487	. SPACER, Rotor shaft	1	34	†	. WASHER, Insul, field term	1
6	311315	. KEY, Rotor shaft	1	35	†	. WASHER, Plain, field & aux. term	2
7	980184	. THRU BOLT PACKAGE	1	36	†	. WASHER, Insulated, auxiliary terminal	1
8	120052	. LOCKWASHER	10	37	306547	. WASHER, Mounting stud	4
9	381468	. HEAD ASSY, Drive end	1	38	309485	. NUT, Hex	8
10	380207	. BEARING ASSY, Drive end	1	39	**	. NUT, Battery terminal, 1/4-28	2
11	304608	. SCREW, Retainer	3	40	**	. L'WASHER, Battery terminal, 1/4"	2
12	382009	. EYELET PACKAGE	1	41	†	. WASHER, Plain, battery term	1
13	981182	. ROTOR & BEARING ASSY	1	42	†	. WASHER, Insul, battery term	1
14	383900	. SLIP RING & BEARING PACKAGE	1	43	303889	. NUT, Alternator bracket	1
15	382003	. STATOR ASSY	1	44	120177	L'WASHER, Alternator to brkt	1
16	†	. STUD, Field term	1	45	314902	COVER, Terminal	1
17	981183	. HEAD ASSY, Slip ring end	1	46	311391	SCREW, Alternator to brkt	1
18	**	. INSUL, Slip ring end	1	47	306416	SCREW, Brace to alternator	1
19	**	. L'WASHER, Insul #10	2	48	907798	BRACKET, Alternator	1
20	**	. SCREW, Insul, #10-32	2	49	907796	BRACE, Alternator	1
21	980294	. RECT SET, Neg	1	50	310896	SCREW, Alternator bracket	2
22	383897	. PL & RECT ASSY, Pos	1	51	306283	WASHER, Brace to alternator	1
Δ 23	909127	. COVER, Slip ring	1	52	306325	L'WASHER, Screw, brace	4
24	†	. BUSHING, Insul, field term	1	53	306405	WASHER, Screw bracket	2
25	†	. STUD, Aux term	1				
26	†	. BUSH, Insul, aux term	1				
27	382005	. BR HLDRS ASSY	1				
28	980084	. BRUSH SET	1				


\* Not shown

\*\* No part number

† Available in Terminal Stud and Parts Package, Order Part #383899



## Engine Removal


-  1. **Disconnect battery cables at battery.**
2. Disconnect electrical cable plug at engine, and disconnect SelecTrim plug (if used).
3. Disconnect fuel line, throttle, gearshift, and steering control cables.

### Note


*In most cases it is unnecessary to remove transom seal from intermediate housing.*


4. Remove vertical drive (see Section 7) and intermediate housing seal plate. Carefully remove seal from transom of boat. A marine sealer is used between seal and transom.
5. Remove engine mounting bolts and remove engine. If shimming or adapters are used, re-install mounting bolts to retain them where used.

## Engine Installation

1. If necessary, clean engine compartment.
2. Install the engine being sure to place shims or adaptors (if used) in the same place they were before engine removal.
3. Connect the engine cable plugs and other electrical leads.
-  4. **Connect the fuel line and test for leaks.**
5. Connect the throttle, gearshift, and steering control cables.
6. Connect the SelecTrim plug (if used).
7. Install intermediate housing seal to transom using an approved marine sealer and attach with seal plate.
8. Install vertical drive. See Section 7.
9. Fill engine crankcase to full mark on dip stick. See "Lubrication Recommendations" in Section 2.
10. Check lubricant in intermediate housing and vertical drive and lubricate as required. See Section 2.
11. Connect battery cables.
12. Test engine and adjust as necessary.

### Note

-  *This step can be performed out of water, on suitable trailer or dolly by installing an "OMC Flushing Adaptor Kit" to supply cooling water to prevent overheating damage to engine. **Remove propeller before attempting to start engine. Failure to do so may result in serious injury if contact is made with propeller.***

-  13. With engine at idle speed, **cycle remote control to forward-neutral-reverse-neutral several times to insure system is working properly.** If hard shifting or other shift problem is noted, refer to Section 7-1 for proper adjustment and service. Stop engine in forward gear and attempt to re-start in gear. Repeat in reverse gear. **If engine cranks in gear, refer to Section 7-1 for adjustment.**

### Safety Related

## Section 8-1 120, 140 Model Engines

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### Safety Warning

- **Before working on any part of the engine, read the section called Safety at the beginning of this manual.**
- **Unless instructed otherwise, always disconnect the battery cables from the battery before working on electrical system (to prevent possible sparks or arcing in the engine compartment).**
- **Before starting engine after repair or maintenance procedures, always make sure engine compartment is free of fuel vapors.**

**OMC Special Tools**

	Part Number
Valve Spring Compressor .....	J-8062
Carbon Remover Brush .....	J-8089
Valve Guide Cleaner .....	J-8101
Valve Spring Tester .....	J-8056
Valve Guide Reamer (0.015 Oversize) .....	J-5830-02
Rocker Arm Stud Remover .....	J-5802-01
Rocker Arm Stud Hole Reamer (0.003 Oversize) .....	J-5715
Rocker Arm Stud Hole Reamer (0.013 Oversize) .....	J-6036
Rocker Arm Stud Installer .....	J-6880
Vibration Damper and Crankshaft Gear Remover .....	J-6978-E
Timing Cover Seal Aligner .....	J-23042
Crankshaft Gear Installer .....	J-5590
Cam Lode Lift Indicator .....	J-8520
Camshaft Bearing Remover and Installer ....	J-6098-01
Piston Pin Tool .....	J-24086
Piston Ring Expander .....	J-25220
Cylinder Bore Checker .....	J-8087
Bolt Guide Set .....	J-6305-01
Piston Ring Compressor .....	J-837
Distributor Shaft Lower Bearing Remover ...	J-9534-01
Valve Seal Tester .....	J-23994-01
Air Line Adaptor .....	J-23590
Valve Spring Compressor .....	J-5892

Prices and ordering information are available from:

Kent-Moore Tool Division  
2978 Little Mack  
Roseville, MI 48066

**Material Required**

Molykote Lubricant  
GM Engine Oil Supplement  
OMC Gasket Sealing Compound  
Permatex No. 2  
GM Super Engine Oil Supplement  
Plastigage  
OMC Premium 4-Cycle Motor Oil or Equivalent  
kerosene or Equivalent Cleaning Solvent

## Intake and Exhaust Manifold - 120, 140 Models

### Removal and Inspection

1. **Disconnect battery cables at battery.**
2. Drain coolant from block, and exhaust manifold (see Section 2).
3. Disconnect throttle cable from carburetor throttle shaft arm. Disconnect the fuel line and crankcase ventilator hose from carburetor. Disconnect the fuel pump indicator bowl hose.
4. Disconnect the choke heat tube. Remove the carburetor.
5. Disconnect coolant hoses running between manifold end cap and thermostat housing and between manifold elbow and intermediate housing.
6. Loosen outer hose clamp securing exhaust hose to adaptor elbow. Loosen and remove bolts and nuts securing manifold to cylinder head and remove the manifold and elbow as an assembly.
7. Clean all gasket surfaces of cylinder head and manifold and check for cracks on the manifold casting. Remove end cap and inspect heat exchanger tube (120 only).

### Installation

1. Position a new gasket over the manifold end studs on the head and carefully install the manifold in position making sure that the gasket is correctly placed. Use a gasket sealer if leakage has occurred.
2. Install nuts, bolts and washers while holding the manifold in place with one hand. Run the bolts and nuts down finger tight and alternately torque to 20-25 foot pounds (28-33 N.m) working from the center toward the ends.
3. Attach exhaust hose to adaptor elbow and tighten hose clamp. Reinstall carburetor and attach crankcase ventilator hose, fuel line and fuel pump indicator hose. Attach heat tube. Connect throttle cable to throttle shaft arm. Install coolant hoses making sure manifold end cap to thermostat housing hoses are correctly installed; (see Figure 8-1-1 or 8-1-2).

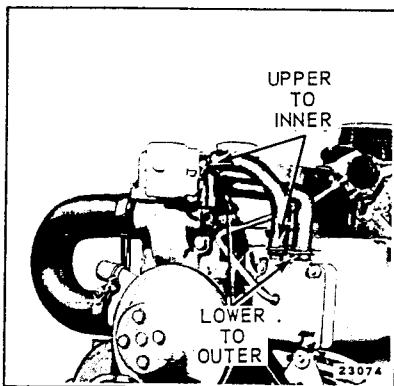


Figure 8-1-1  
120 Model

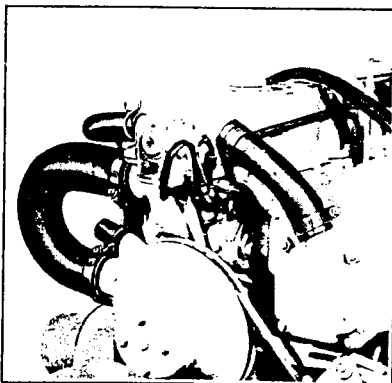


Figure 8-1-2  
140 Model

4. **Connect battery cables. Start engine and check for fuel leaks.**

### Hydraulic Valve Lifter

Refer to Section 8-2, pages 8-2-4 thru 8-2-8 for:

- Checking hydraulic valve lifter
- Disassembly and cleaning
- Inspection
- Assembly

### Removal

1. With air hose and cloths, clean dirt from cylinder head and adjacent parts to avoid getting dirt into engine. It is extremely important that no dirt gets into the valve lifters.
2. Remove flame arrestor.
3. Disconnect ventilation hose, fuel line, fuel pump indicator bowl hose, and remove rocker arm cover.
4. Note threads showing above rocker arm nuts, then loosen nuts and pivot the rocker arms free of the push rods.
5. Disconnect spark plug wires at plugs and high tension lead from coil.
6. Remove distributor primary lead from coil, note distributor rotor position and remove distributor. (Mark distributor housing with chalk at point of rotor.)

**△ Safety Related**

7. Remove push rod cover and gasket.
8. Remove push rods and remove valve lifters that require service. Place lifters in a wooden block having numbered holes or use other suitable means of identifying them according to original position in the engine.
9. If less than a complete set of lifters is being removed, immediately disassemble one or two for presence of dirt or varnish. If lifters contain dirt or varnish, it is advisable to remove all lifters for cleaning and inspection. Otherwise, it will be satisfactory to service only those lifters that are not operating properly.
10. Examine the cam contact surface at lower end of lifter body. If this surface is excessively worn, galled or otherwise damaged, discard the lifter assembly (see Figure 8-1-3). In this case, also examine the mating camshaft lobe for excessive wear or damage.

### INSTALLATION

#### NOTE

Before installing any new lifters, coat the bottom of the lifter with Molykote or its equivalent.

1. Install valve lifters in cylinder block. If any new lifters or a new camshaft has been installed, an additive containing EP lubricant such as G.M. Engine Oil Supplement must be added to the crankcase oil for run-in.
2. Install push rods onto lifters and install push rod cover with a new gasket.
3. Install distributor (position rotor to mark on housing). Install spark plug and coil wires.
4. Pivot rocker arms in place and turn adjusting nuts the amount necessary to eliminate lash.

### Valve Lash Adjustment

Adjust valve lash when lifter is on base circle of cam as follows:

1. Remove distributor cap and crank engine until distributor rotor points to number one cylinder terminal with breaker points open. In this position the piston in number one cylinder is at top center on compression stroke with both lifters on base circle of cam and both valves can be adjusted.
2. Turn adjusting nut until all lash is removed from valve train. This can be determined by checking push rod side play by hand while turning adjusting nut slowly (see Figure 8-1-4). At this point, turn adjusting nut one more turn to place the lifter plunger in center of its travel.
3. Follow steps 1 and 2 for each cylinder in order of firing order and adjust remaining valves one cylinder at a time. No further adjustment is necessary.

#### NOTE

Do not attempt to turn the adjusting nut one full turn while the engine is operating. Adjustment in this manner will not allow the lifters to bleed down which would result in valve train damage, probably bent push rods. For those who prefer to adjust the valve lash while the engine is running, the preferred method would be to find the "zero lash" point as described above and then slowly turning the adjusting nut 1/4 turn. Wait for the lifter to bleed down (several engine revolutions) and again turn adjusting nut 1/4 turn. Continue this adjust and wait cycle until nut is

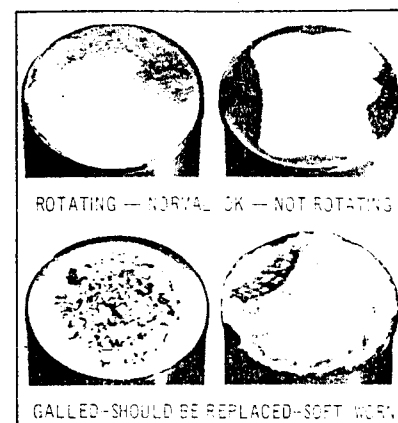


Figure 8-1-3

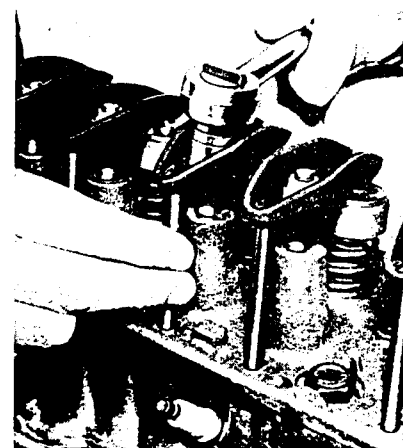



Figure 8-1-4

one complete turn down from "zero lash" point. Repeat sequence on remaining valves.

4. Install rocker cover gasket and cover.

5. Connect crankcase ventilation hose.

 6. **Start engine and check for oil or fuel leaks and listen for noisy lifter.**

7. Install flame arrestor.

## Valve Spring and Seal Repair

Refer to Section 8-2, pages 8-2-8 - 8-2-9 for procedure.

## Cylinder Head Assembly

The condition of the cylinder head and valve mechanism, significantly determines the power, performance and economy of a valve-in head engine. Extreme care should be exercised when conditioning the cylinder head and valves to maintain correct valve stem to guide clearance, correctly ground valves, valve seats of correct width and correct valve adjustment.

### Removal

1. Remove intake and exhaust manifold as described in paragraph, Intake and Exhaust Manifold.

2. Disconnect fuel line, retaining clips from water outlet and cylinder head. Disconnect wire harness from the temperature sending unit leaving harness clear of clips on rocker arm cover. Remove thermostat housing assembly from front of cylinder head. Disconnect fuel line at the fuel pump and remove.

3. Disconnect coolant hoses at water outlet. Disconnect spark plug wires and remove spark plugs.

4. Remove the rocker arm cover. Next back off the rocker arm nuts and pivot the rocker arms to clear the push rods. Remove the push rods.

5. Remove the cylinder head bolts, cylinder head and gasket. Place the cylinder head on two blocks of wood to prevent damage to the head.

### Disassembly

1. Remove rocker arms nuts, ball seats and rocker arms.

2. Using tool J-8062, compress the valve springs and remove valve spring caps, spring seats, oil seals, springs and spring dampers. Release the spring compressor tool and remove keys (see Figure 8-1-5).

3. Remove valves from bottom of cylinder head and place them in a rack in their proper sequence so they can be assembled in their original positions.

### Cleaning

1. Clean all carbon from combustion chambers and valve ports using tool J-8089 (see Figure 8-1-6).

2. Thoroughly clean the valve guides using tool J-8101 (see Figure 8-1-7).

3. Clean all carbon and sludge from push rods and rocker arms.

4. Clean valve stems and heads on a buffing wheel.

 **Safety Related**



Figure 8-1-5

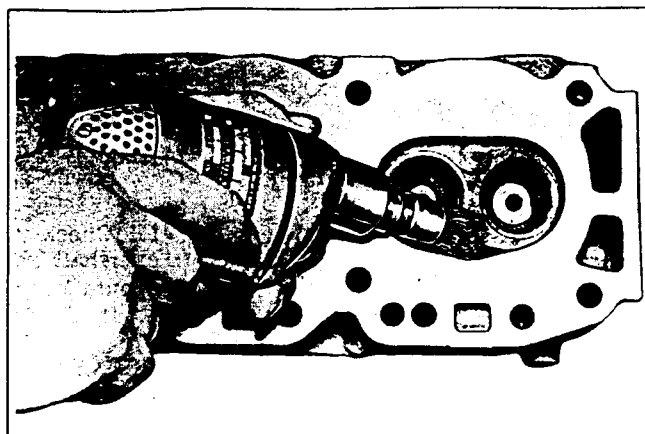


Figure 8-1-6

5. Clean carbon deposits from head gasket mating surfaces.
6. Wash all parts in cleaning solvent and dry them thoroughly.
7. Inspect the cylinder head for cracks in the exhaust ports, combustion chambers, or external cracks to the water chamber.
8. Inspect the valves for burned heads, cracked faces or damaged stems.
9. Check fit of valve stems in their respective bores.

10. Measure valve stem clearance (Figure 8-1-8) as follows: Clamp a dial indicator on one side of the cylinder head rocker arm cover gasket rail, locating the indicator so that movement of the valve stem from side to side (crosswise to the head) will cause a direct movement of the indicator stem. The indicator stem must contact the side of the valve stem just above the valve guide. With the valve head dropped about  $1/16$ " off the valve seat; move the stem of the valve from side to side using light pressure to obtain a clearance reading. If clearance exceeds specifications it will be necessary to ream valve guides for oversize valves as outlined.

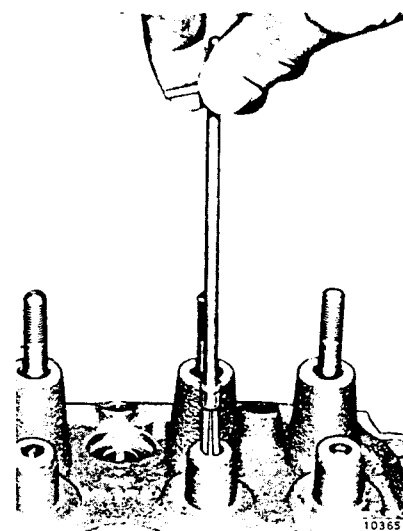


Figure 8-1-7

NOTE

Excessive valve stem to bore clearance will cause lack of power, oil consumption, rough idling and noisy valves, and may cause valve breakage. Insufficient clearance will result in noisy and sticky functioning of the valves and disturb engine smoothness of operation. Intake valve stem to bore clearance should be 0.001" to 0.0027" (140 Model), while exhaust stem clearance should be 0.0015" to 0.0032" (120 Model). By using a micrometer and a suitable hole gage, check the diameter of the valve stem in three places; top, center and bottom. Insert hole gage in valve guide bore, measuring at the center. Subtract highest reading of valve stem diameter from valve guide bore center diameter to obtain valve to valve guide clearance. If clearance is not within limits use next oversize valve and ream bore to fit using suitable reamer.

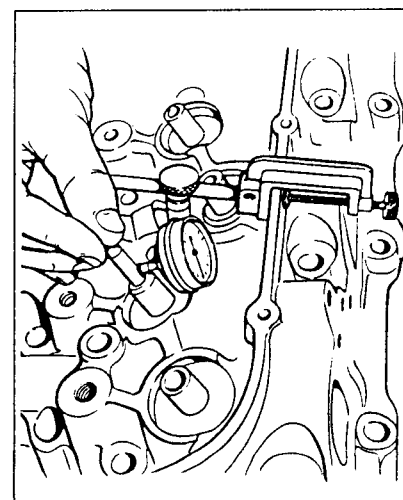


Figure 8-1-8

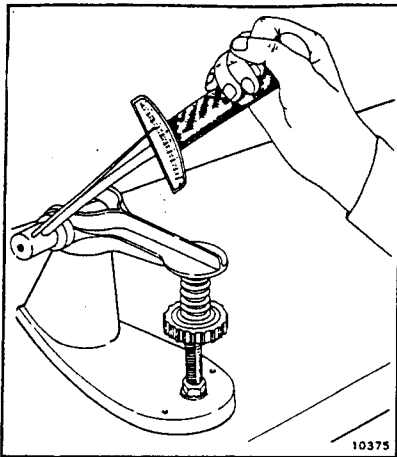


Figure 8-1-9

11. Check valve spring tension with tool J-8056 spring tester (see Figure 8-1-9).

**NOTE**

On all models, springs should be compressed to 1-21/32" at which height it should check 78-86 pounds. Weak springs affect power and economy and should be replaced if below 70 pounds.

12. Check valve lifters for free fit in block. The end that contacts the camshaft should be smooth. If this surface is worn or rough the lifter should be replaced. If lifter is damaged, check the corresponding camshaft lobe for damage.

**REPAIR**

1. Valve Guide Bore:

Valves with oversize stems are available for inlet and exhaust valves in the following sizes, 0.003", 0.015", and 0.030". Use the 11/32" diameter reamer sizes from reamer tool set J5830-02 which are: J4822 standard; J5830-1, 0.003" oversize, J5830-2, 0.015" oversize and J5830-3, 0.030" oversize to ream the bores for new valves (see Figure 8-1-10).

2. Rocker Arm Studs

Rocker arm studs that have damaged threads may be replaced with standard studs. If the studs are loose in the head, oversize studs, available in .003" or .013" oversize, may be installed after reaming the holes as follows:

**NOTE**

Do not attempt to install oversize stud without reaming stud hole.

a. Remove old stud by placing tool J5802-01 over the stud, installing nut and flat washer and removing stud by turning nut (see Figure 8-1-22).

b. Ream hole for oversize stud, using tool J-5715 for 0.003" oversize and tool J-6036 for 0.013" oversize (see Figure 8-1-12).

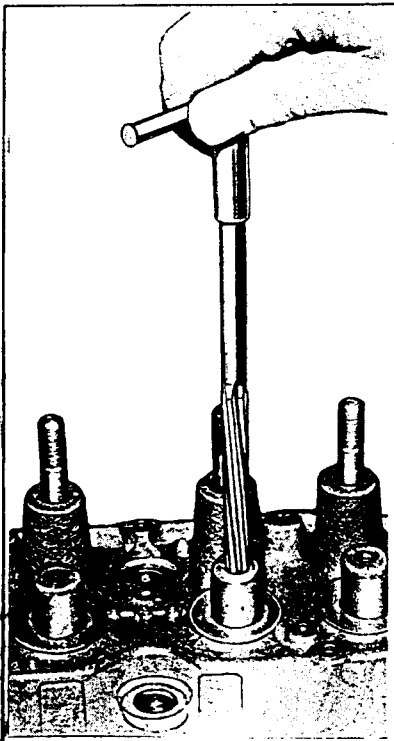


Figure 8-1-10

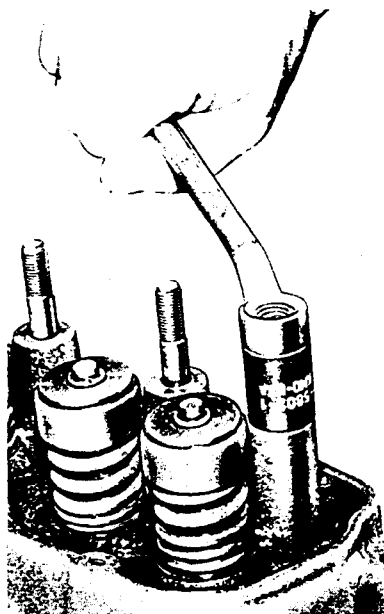


Figure 8-1-11

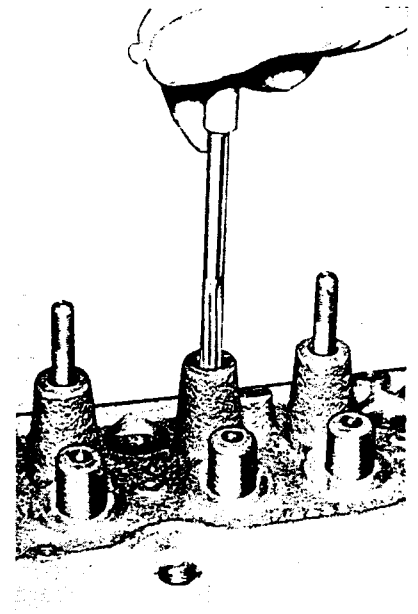


Figure 8-1-12



c. Coat press-fit area of stud with a hypoid axle lubricant. Install new stud using tool J-6880. Tool should bottom on head (see Figure 8-1-13).

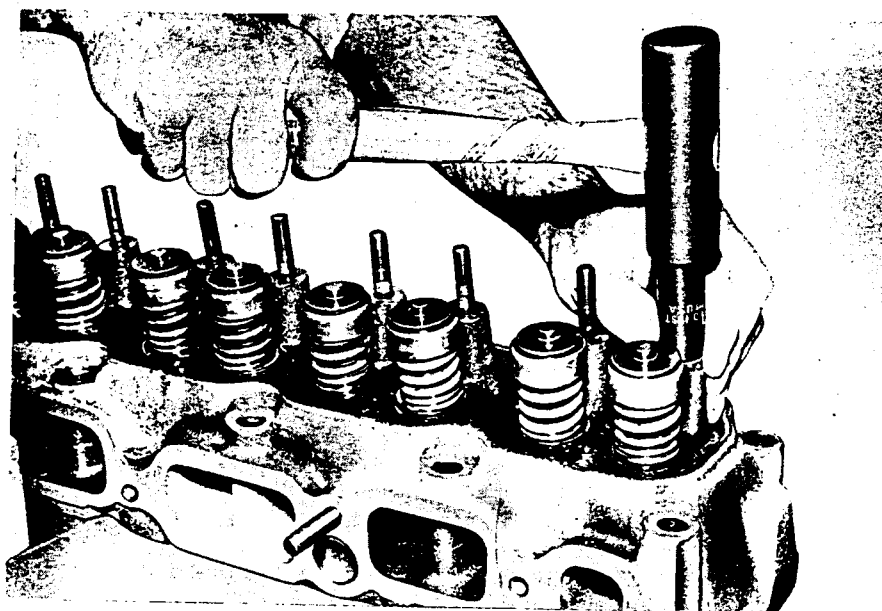


Figure 8-1-13

### 3. Valve Seats:

Reconditioning the valve seats is very important, because the seating of the valve must be perfect for the engine to deliver the power and performance built into it.

Another important factor is the cooling of the valve heads. Good contact between each valve and its seat in the head is imperative to insure that the heat in the valve head will be properly carried away.

Several different types of equipment are available for reseating valve seats; the recommendations of the manufacturer of the equipment being used should be carefully followed to attain proper results.

Regardless of what type of equipment is used, however, it is essential that valve guides be free from carbon or dirt to insure proper centering of pilot in the guide.

a. Install expanding pilot in the valve guide bore and expand pilot by tightening nut on top of pilot.

b. Place roughing stone or forming stone over pilot and just clean up the valve seat. Use a 46° stone for both the inlet and exhaust valve seats.

c. Remove roughing stone or forming stone from pilot, install finishing stone on pilot and cut just enough metal from the seat to provide a smooth finish.

d. Narrow down the valve seats to the proper width for the intake and exhaust. See specifications.

#### NOTE

This operation is done by grinding the port side with a 30° stone to lower seat and a 60° stone to raise seat.

e. Remove expanding pilot and clean cylinder head carefully to remove all chips and grindings from above operations.

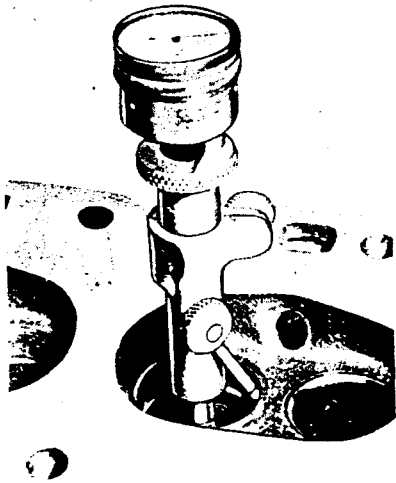


Figure 8-1-14

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**NOTE**

Valve seats should be concentric to within 0.002" total indicator reading (see Figure 8-1-14).

**4. Valves:**

Valves that are pitted can be refaced to the proper angle, insuring correct relation between the head and stem on a valve refacing machine. Valve stems which show excessive wear, or valves that are warped excessively should be replaced. When a valve head which is warped excessively is refaced, a knife edge will be ground on part or all of the valve head due to the amount of metal that must be removed to completely reface. Knife edges lead to breakage, burning or pre-ignition due to heat localizing on this knife edge. If the edge of the valve head is less than 1/32" thick after grinding, replace the valve.

a. If necessary, dress the valve refacing machine grinding wheel to make sure it is smooth and true. Set chuck at 45° mark for grinding valves.

b. Clamp the valve stem in the chuck of the machine.

c. Start the grinder and move the valve head out in line with the grinder wheel by moving the lever to the left.

d. Turn the feed screw until the valve head just contacts wheel. Move valve back and forth across the wheel and regulate the feed screw to provide light valve contact.

e. Continue grinding until the valve face is true and smooth all around valve. If this makes the valve thin the valve must be replaced as the valve will overheat and burn.

f. Remove valve from chuck and place stem in "V" block. Feed valve squarely against grinding wheel to grind any pit from rocker arm end of stem.

**NOTE**

Only the extreme end of the valve stem is hardened to resist wear. Do not grind end of stem excessively.

g. After cleaning valve face and cylinder head valve seat of grinding particles, make pencil marks about 1/4" apart across the valve face, place the valve in cylinder head and give the valve one-half turn in each direction while exerting firm pressure on face of valve.

h. Remove valve and check face carefully. If all pencil marks have not been removed at the point of contact with the valve seat, it will be necessary to repeat the refacing operation and again recheck for proper seating.

i. Grind and check remaining valves in the same manner.

**ASSEMBLY**

1. Starting with No. one cylinder, place the exhaust valve in the port and place the valve spring and cap in position. Place spring and cap on exhaust valves. Then, using tool J-8062, compress the spring and install the oil seal and valve keys. See that the seal is flat and not twisted in the valve stem groove and that the keys seat properly in the valve stem groove (see Figure 8-1-15).

**NOTE**

Place valve springs in position with the closed coil and toward the cylinder head.

2. Assemble the remaining valve, valve springs, spring caps, oil seals and valve keys in the cylinder head using tool J-8062. Check seals by placing a vacuum cup over valve stem and cap, squeeze vacuum cup to make sure no oil leaks past oil seal.

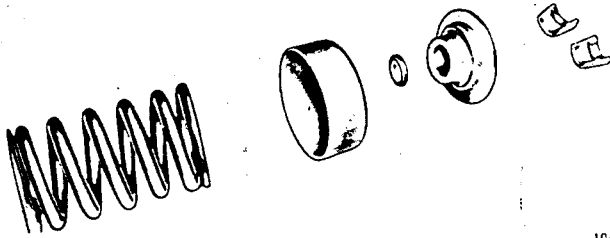
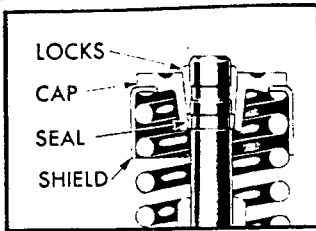


Figure 8-1-15

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Figure 8-1-16

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3. Check the installed height of the valve springs, using a narrow, thin scale to measure from the top of the shim, or spring seat, in the head to the top of the valve spring shield. If this is found in excess of  $1\frac{23}{32}$ " , install a valve spring seat shim, approximately  $\frac{1}{16}$ " thick. At no time should the spring be shimmed to give an installed height of less than  $1\frac{21}{32}$ " (see Figure 8-1-16).

**NOTE**

If springs are to be changed with cylinder head installed, refer to Valve Spring and Seal Repair, in Section 8-2, page 8-2-8 - 8-2-9.

**INSTALLATION**

1. The gasket surfaces of both the head and the block must be clean and free of any foreign matter and free of nicks or heavy scratches.
2. Cylinder head bolt threads in the block must be cleaned as well as the threads on the cylinder head bolts. Dirt will affect bolt torque.
3. Place a new cylinder head gasket in position over the dowel pins in the cylinder block (see Figure 8-1-17). On engines with a steel gasket coat both sides of a new gasket with a thin, even coat of OMC Gasket

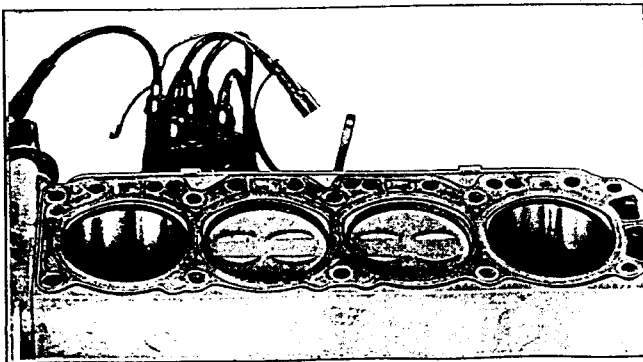


Figure 8-1-17

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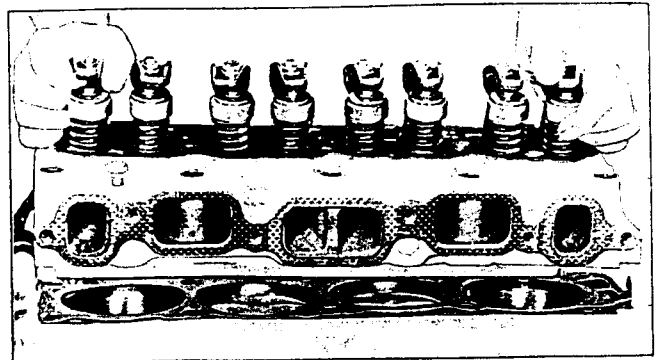


Figure 8-1-18

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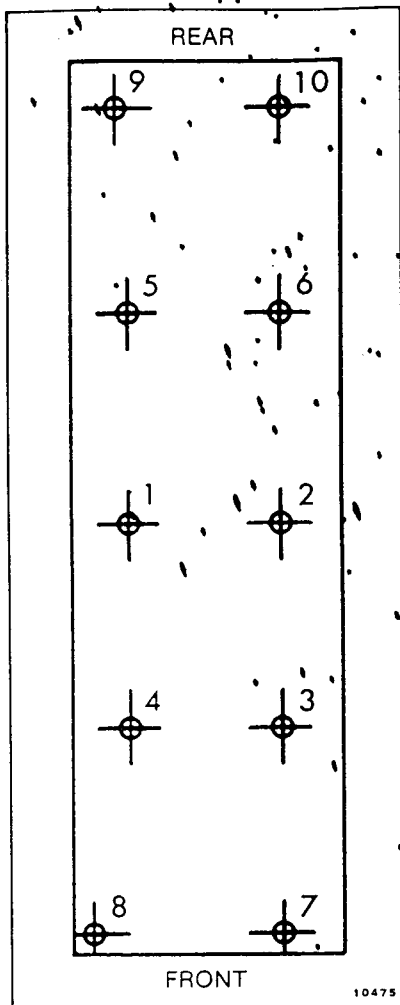


Figure 8-1-19

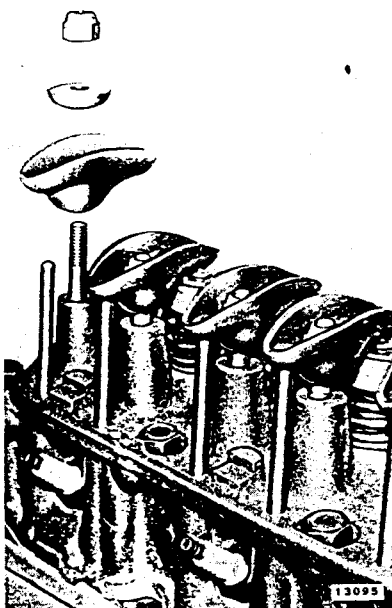


Figure 8-1-20

**Sealing Compound.** Too much sealer will hold the beads of the gasket away from the block or head.

#### Note

*The 140 Model engine has a special marine head gasket. Do not substitute an automotive head gasket.*

4. Carefully guide cylinder head into place over dowel pins and gasket (see Figure 8-1-18).
5. Coat threads of cylinder head bolts with Permatex No. 2 P/N 910032, install and run them down to the block.
6. Tighten the cylinder head a little at a time with a torque wrench in the sequence shown in Figure 8-1-19. The final torque should be 90 to 100 foot-pounds.

#### **Push Rod Assembly**

1. Install valve push rods down through openings in the cylinder head and seat them in lifter sockets.
2. Install rocker arms, balls and nuts and tighten rocker arm nuts until all push rod play is taken up (see Figures 8-1-20 and 8-1-3).
3. Install thermostat housing, using a new gasket.
4. Clean all spark plugs with abrasive-type cleaner, inspect for damage (replace if necessary) and set the gap at 0.035" using a wire gage.
5. Install the spark plugs. Tighten to 15 foot-pounds.
6. Install coil, then, connect temperature sending unit and coil primary wires.
7. Clean manifold gasket surfaces and install new gasket over manifold studs. Position manifold and slide it into place over the studs, making sure it seats against the gasket. Install bolts and nuts and tighten as described in paragraph, Intake and Exhaust Manifold.
8. Connect throttle linkage and adjust.
9. Connect fuel line to carburetor and install fuel line support clamps (two).
10. Adjust valve lash as outlined in paragraph, Intake and Exhaust Manifold.
11. Install rocker arm cover.
12. Clean and install flame arrestors.
13. **Start engine and check for fuel leaks.**

### **Timing Gear Cover**

#### **Removal**

Drain coolant from block and exhaust manifold.

2. Remove alternator belt. Next remove crankshaft pulley from pulley hub (120 Model) or harmonic balancer and pulley assembly from pulley hub (140 Model).
3. Install pulley tool J6978-E to pulley hub with two 3/8-24 x 2" and one 5/16-24 x 2" bolts and remove hub (see Figure 8-1-21 or Figure 8-1-22). Remove pulley tool (140 Model uses three 3/8-24 bolts).
4. Remove oil drain tube cap and withdraw oil with a suction pump. Disconnect oil drain tube and remove oil pan.

#### Safety Related

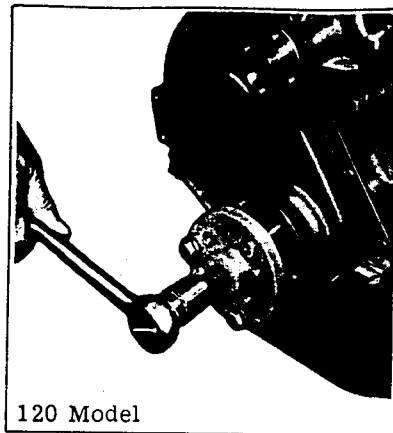


Figure 8-1-21

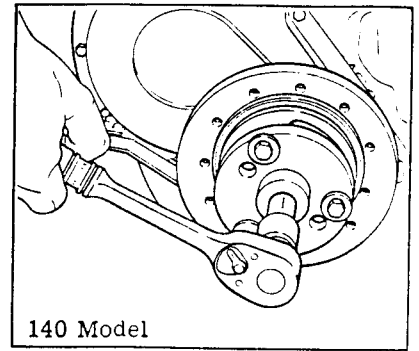


Figure 8-1-22

5. Remove timing gear cover attaching screws and remove cover and gasket.

#### REPLACEMENT - OIL SEAL - TIMING GEAR COVER

1. After removing timing gear cover, pry oil seal out of cover from front with a large screwdriver.

2. Install new lip seal with lip (open side of seal) inside of cover and drive or press seal into place with tool J23042 (see Figure 8-1-23).

#### REPLACEMENT - OIL NOZZLE

1. Remove nozzle with pliers (see Figure 8-1-24).

2. Drive new nozzle in place using a suitable light plastic or rubber hammer.

#### INSTALLATION - TIMING GEAR COVER

1. Clean gasket surface on block and cover.

2. Install centering tool J23042 over end of crankshaft.

3. Coat the gasket with a light grease and stick a new cover gasket in position on block with light grease.

4. Install cover over centering tool (see Figure 8-1-25) and install cover screws. Torque screws to 6 to 8 foot pounds (9 to 10 N·m) and remove centering tool.



Figure 8-1-23

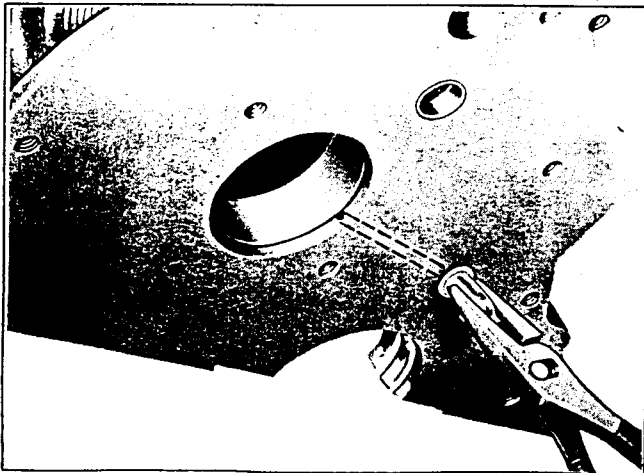


Figure 8-1-24



Figure 8-1-25

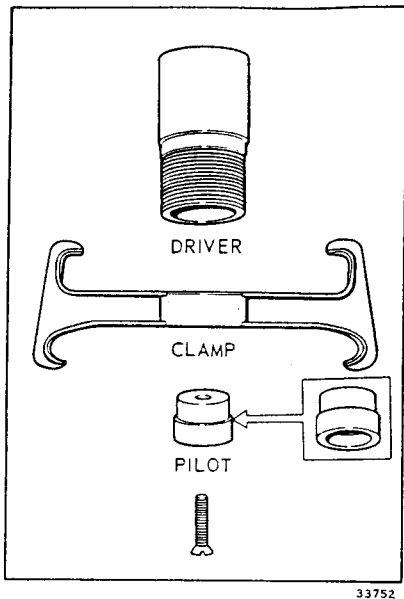


Figure 8-1-26

### INSTALLATION - PULLEY AND HUB (120 MODEL) OR HARMONIC BALANCER (140 MODEL)

1. Coat oil seal contact area on hub or (harmonic balancer (140 Model)) with engine oil, position hub over crankshaft and key and start hub into position with a mallet. Using tool J-5590, (Figure 8-1-26) drive hub onto crankshaft until it bottoms against crankshaft gear. See Figure 8-1-28.

#### NOTE

Crankshaft extends slightly through hub and a hollow tool is necessary to drive hub completely into bottomed position.

2. Install pulley onto hub. (120 Model)

#### NOTE - (120 Model)

There are two 3/8" holes and one 5/16" hole that must be matched on hub in order to properly position timing mark (see Figure 8-1-27).

3. Install alternator belt and adjust to specifications.

4. Lake or tank test unit and check for leaks.

## CAMSHAFT

### MEASURING CAMSHAFT LIFT

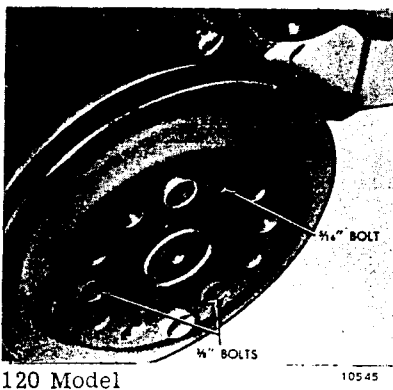
If improper valve operation is indicated, measure the lift of each push rod in consecutive order and record the readings.

1. Remove valve mechanism as outlined.

2. Position indicator with ball socket adapter (Tool J-8520) on push rod (Figure 8-1-29).

3. Rotate on crankshaft slowly in the direction of rotation until the lifter is on the heel of the cam lobe. At this point, the push rod will be in its lowest position.

4. Set dial indicator on zero, then rotate the crankshaft slowly, or attach an auxiliary starter switch and "bump" the engine over, until the push rod is in the fully raised position.



120 Model

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Figure 8-1-27

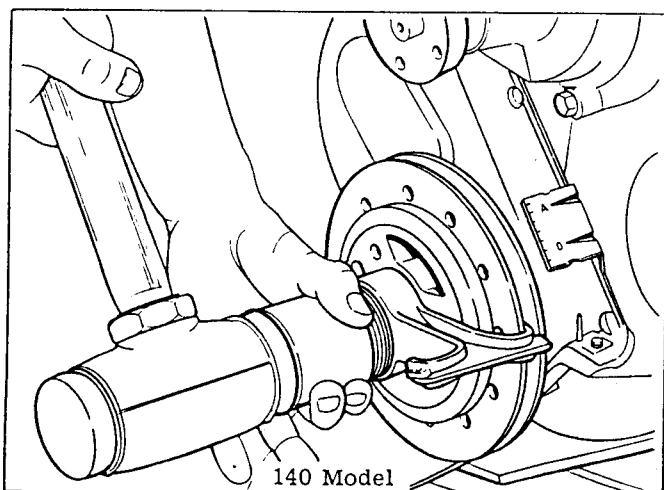


Figure 8-1-28

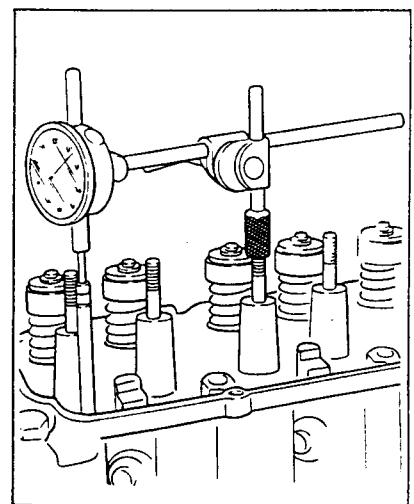



Figure 8-1-29

 NOTE

The distributor primary lead must be disconnected from the negative post on the coil and the ignition switch must be in the ON position. Failure to do this will result in a damaged grounding circuit in the ignition switch.

5. Compare the total lift recorded from the dial indicator with specifications.
6. Continue to rotate the camshaft until the indicator reads zero. This will be a check on the accuracy of the original indicator reading.
7. If camshaft readings for all lobes are within specifications, remove dial indicator assembly.
8. Install and adjust valve mechanism as outlined.

### REMOVAL

1. Withdraw oil from crankcase and drain coolant from block and exhaust manifold.
2. Remove valve cover and gasket, loosen valve rocker arm nuts and pivot rocker arms clear of push rods.
3. After noting position of rotor, remove distributor.
4. Remove coil and side cover and gasket. Remove push rods and valve lifters.
5. Remove crankshaft pulley and hub. Disconnect oil drain tube. Remove oil pan and timing gear cover.
6. Remove two camshaft thrust plate screws by working through holes in camshaft gear (see Figure 8-1-30).
7. Remove the camshaft and gear assembly by pulling it out through the front of the block.

 NOTE

Support shaft carefully when removing so as not to damage camshaft bearings.

### INSPECTION

The camshaft has three bearings, all with the same journal diameter of 1.8692" to 1.8682". These dimensions should be checked with a micrometer for an out-of-round condition. If the journals exceed .001" out-of-round, the camshaft should be replaced.

The camshaft should also be checked for alignment. The best method is by use of "V" blocks and a dial indicator. The dial indicator will indicate the exact amount that the camshaft is out of true. If it is out more than .002" dial indicator reading, the camshaft should be replaced. When checking, the high reading of the dial indicator indicates the high point of the shaft. Examine the camshaft bearings and if any bearing needs replacement, replace all bearings.

### GEAR AND THRUST PLATE

If the inspection indicated that the camshaft, gear and thrust plate were in good condition, the camshaft end play should be checked (see Figure 8-1-31). This clearance should be 0.001" to 0.005".

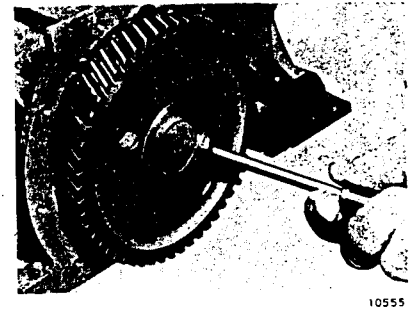


Figure 8-1-30

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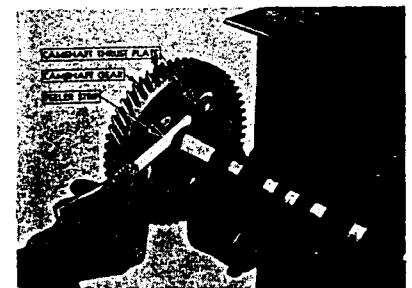


Figure 8-1-31

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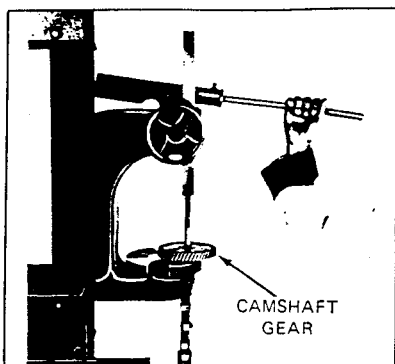


Figure 8-1-32

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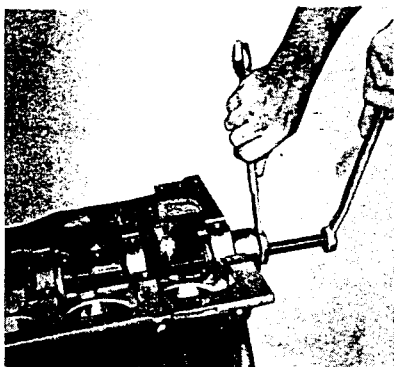


Figure 8-1-33

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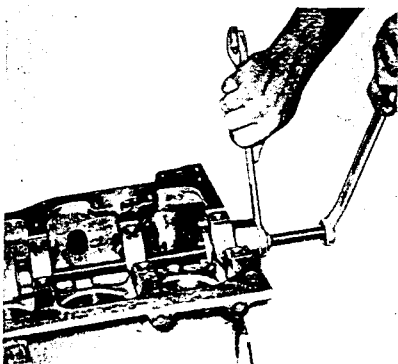


Figure 8-1-34

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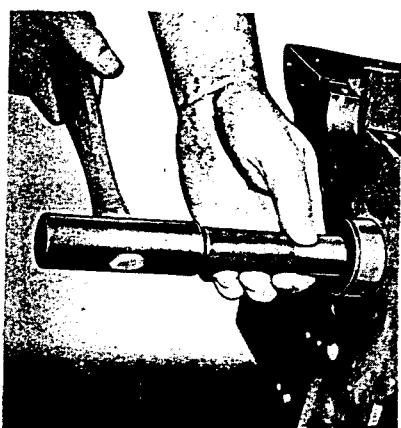


Figure 8-1-35

10605

### Disassembly

1. If the inspection indicated that the shaft, gear or plate should be replaced, the gear must be removed from the shaft.
2. Support the camshaft gear and press shaft out of gear (see Figure 8-1-32).

#### NOTE

Thrust plate must be positioned so that woodruff key in shaft does not damage it when shaft is pressed out of gear. Also, support the hub of the gear or the gear will be seriously damaged.

### Assembly

To assemble camshaft gear, thrust plate and gear spacer ring to camshaft, proceed as follows:

1. Firmly support shaft at back of front journal in an arbor press.
2. Place gear spacer ring and thrust plate over end of shaft, and install woodruff key in shaft keyway.
3. Install camshaft gear and press it onto the shaft until it bottoms against the gear spacer ring. The end clearance of the thrust plate should be 0.001" to 0.005".

### CAMSHAFT BEARINGS

#### Removal

Camshaft bearings can be replaced while the engine is disassembled for overhaul, or without complete disassembly of the engine after camshaft and flywheel have been removed. Operation is easier if crankshaft is removed also.

1. With camshaft and flywheel removed, drive out expansion plug from rear cam bearing by driving from inside.
2. Position bearing pilot in inner bearing.
3. Install nut on puller screw far enough so puller screw can be threaded into pilot while nut extends out front of block.
4. Install remover section onto puller screw and then install screw through cam bore and thread it into pilot.
5. Using two wrenches, hold screw shaft and turn puller nut to remove bearing (see Figure 8-1-33).
6. Remove pilot from shaft and install on driver handle with shoulder to handle, then drive out front and rear bearings from outside to inside of block (see Figure 8-1-33).

#### Installation

Inner bearing should be installed first to prevent damaging end bearings with screw shaft.



**NOTE**

Bearing O.D.'s for number one and number two are 1.999" - 2.001" and number three is 2.009" - 2.011".

1. Remove handle from pilot. Install inner bearing on pilot.
2. Position inner bearing and pilot to rear of inner bearing bore and install screw shaft (with remover adapter on it) through the block from front of engine into pilot.
3. Align oil hole on bearing with oil hole from oil gallery. Snug puller nut against adapter.
4. Using two wrenches, hold screw shaft and turn puller nut to pull bearing into place (see Figure 8-1-34).

**NOTE**

Oil hole is on top side of bearing shell and cannot be seen during installation, so first align bearing shell oil hole with oil hole in bore and mark opposite side of bearing and block at bore to easily index oil hole during installation.

5. Install new number one bearing on pilot with drive handle attached.
6. Align oil hole on bearing with oil hole from oil gallery and drive bearing in from front of engine (see Figure 8-1-35).

**NOTE**

The front bearing must be driven approximately 1/8" behind front of cylinder block to uncover oil hole to timing gear oil nozzle (see Figure 8-1-37).

7. Repeat steps (5) and (6) above to drive rear bearing into position from rear of block.

**NOTE**

Rear bearing installed position is flush with inner edge of rear cam bearing bore in block.

8. Install a new expansion plug at rear bearing.

## INSTALLATION

If a new camshaft is to be installed, coat cam lobes with G.M. Super Engine Oil Supplement (G.M. P/N 1051858) and add rest of can to crank-case oil.

1. Install the camshaft assembly in the engine block, being careful not to damage bearings or cam.
2. Turn crankshaft and camshaft so that the valve timing marks on the gear teeth will line up, (see Figure 8-1-36) push camshaft into position. Install camshaft thrust plate to block screws and tighten 72-90 inch-pounds (8.2 - 9.1 N·m).
3. Check camshaft and crankshaft gear runout with a dial indicator (see Figure 8-1-38). The camshaft gear runout should not exceed 0.004" and the crankshaft gear runout should not exceed 0.003".
4. If gear runout is excessive, the gear will have to be removed and any burrs cleaned from the shaft or the gear replaced.
5. Check the backlash between the timing gear teeth with a narrow feeler gage or dial indicator (see Figure 8-1-39). The backlash should not be less than 0.004" nor more than 0.006".

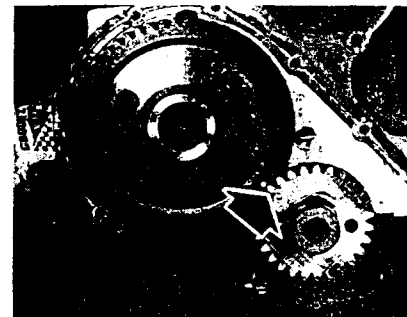


Figure 8-1-36

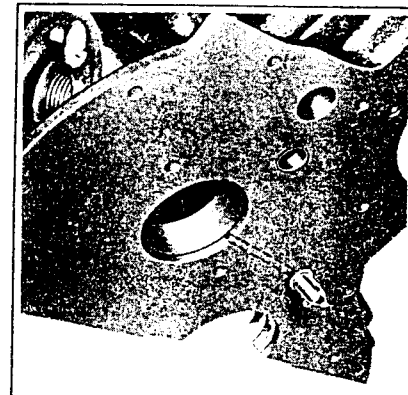


Figure 8-1-37

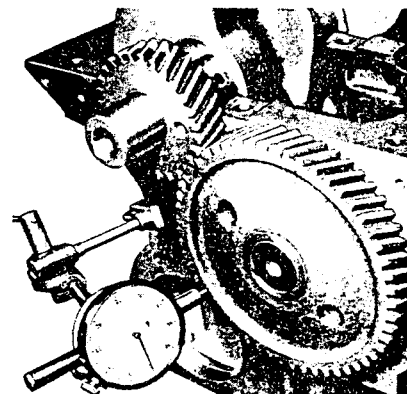


Figure 8-1-38

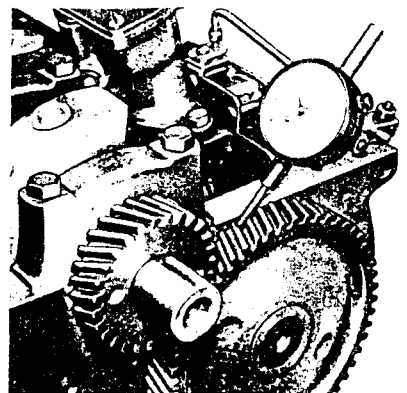


Figure 8-1-39

6. Install timing gear cover with new gaskets.
7. Install oil pan with new gaskets. Connect oil drain tube.
8. Install pulley hub and pulley as described in paragraph, Installation - Pulley and Hub (120 Model) or Harmonic Balancer (140 Model) page 8-1-12.
9. Install valve lifters and push rods. Install side cover with a new gasket. Attach coil and wires. Then install distributor, positioning rotor to mark as when removed.
10. Pivot rocker arms over push rods and lash valves as described in paragraph, Installation (Hydraulic Valve Lifter).
11. Add oil to engine. Install the alternator belt and adjust to specifications.
12. Check and adjust timing.

## **CRANKSHAFT REMOVAL AND INSTALLATION**

1. Remove main bearing caps and connecting rod caps and lift crankshaft out of cylinder block. Push pistons to top of bores.
2. Inspect the crankshaft. All main bearing journals are ground to 2.2983" - 2.2993", and crankpin journals to 1.999" - 2.000" (120 Model), 2.099" - 2.100" (140 Model).

These dimensions should be checked with a micrometer for out-of-round, taper or undersize. If the journals exceed 0.001" out-of-round or taper the crankshaft should be replaced or reconditioned to an undersize figure that will enable the installation of undersize precision type bearings.

The crankshaft should also be checked for runout. To perform this operation, support the crankshaft at the front and rear main bearing journals in "V" blocks and indicate the runout of both the front center and rear center journals, using a dial indicator. The runout limit of each of these journals is 0.002". If the runout exceeds 0.002" the crankshaft must be repaired or replaced.

3. Remove old bearing shells from cylinder block and caps.
4. Remove rear main bearing oil seal.
5. Install new bearing shells in the cylinder block and caps.

### **NOTE**

Main bearing shells with oil holes are the upper halves of the bearing shells and are inserted between the crankshaft and cylinder block.

6. Carefully place the crankshaft in the bearings.
7. Install all bearing caps and bolts. Torque all main bearing cap bolts, except the rear main bearing 60-70 foot-pounds (82-94 N·m). When tightening rear main bearing cap, torque bolts 10 to 12 foot-pounds (14-16 N·m) first, then tap end of crankshaft rearward with a lead hammer (this will locate bearing cap and bearing). Then tap crankshaft forward (this will line up both upper and lower crankshaft bearing thrust surfaces). Proceed with final tightening of main bearing cap bolts, 60-70 foot-pounds (82-94 N·m) torque.
8. Check main bearing clearance and crankshaft end play as outlined in paragraph Replacement - Crankshaft Bearings.

9. Install new rear bearing oil seal.
10. Install connecting rod bearings and caps.

## REPLACEMENT - CONNECTING ROD BEARINGS

Connecting rod bearing inserts are available in standard sizes and undersizes of 0.001", 0.002", 0.010" and 0.020". These bearings are not shimmed and when clearances become excessive the next undersize bearing insert should be used.

### NOTE

Do not file rod or rod caps.

### Removal and Inspection

1. Withdraw oil, disconnect oil drain tube and remove oil pan.
2. Remove the connecting rod bearing cap.
3. Wipe bearing insert shell and crankpin clean of oil.
4. Place a piece of Plastigage gauging plastic the full width of the bearing on crankpin (parallel to the crankshaft), (see Figure 8-1-40).
5. Reinstall the bearing cap and evenly tighten the retaining nuts to 35-45 foot-pounds (48-61 N·m).

### NOTE

Do not turn crankshaft with the gauging plastic installed.

6. Remove the bearing cap and, without removing the gauging plastic, check its width at the widest point with the Plastigage scale (see Figure 8-1-41).

### NOTE

If the crankpin is out-of-round be sure to fit the bearing to the maximum diameter of the crankpin. If the flattened plastic is not uniform from end to end in its width, the crankpin or bearing is tapered, has a low spot or some other irregularity. Check the crankpin with a micrometer for taper if the flattened gauging plastic indicates more than 0.001" difference.

7. If the reading is not over 0.004" or not less than 0.001" (120 Model), 0.0009"-0.0014" (140 Model), the fit is satisfactory. If, however, the clearances are not within these limits, replace the bearing with the proper undersize bearing.

### NOTE

The insert bearing shells are not adjustable and no attempt should be made to adjust by filling the bearing caps.

### Installation

New bearing shell insert clearance should be 0.0007" minimum and 0.0027" maximum (120 Model), 0.00085"-0.00135" (140 Model).

1. Rotate the crankshaft after bearing adjustment to be sure the bearings are not too tight.

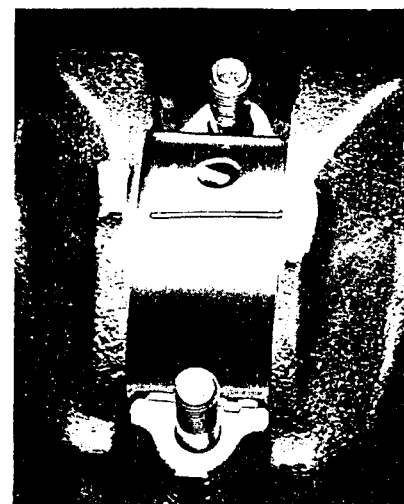


Figure 8-1-40

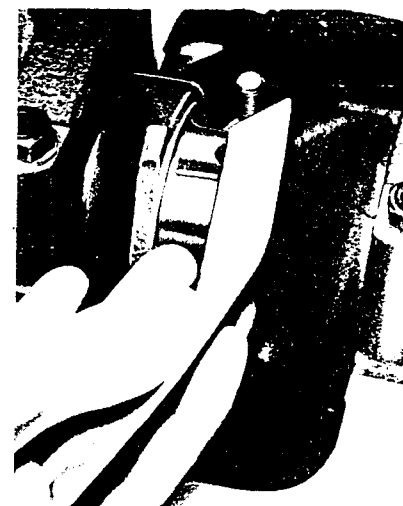


Figure 8-1-41

2. Check connecting rod end clearance between connecting rod cap and side of crankpin (see Figure 8-1-42). See Engine Specifications for clearance.

3. Install oil pan with new gaskets and seals. Connect oil drain tube. Refill with engine oil.

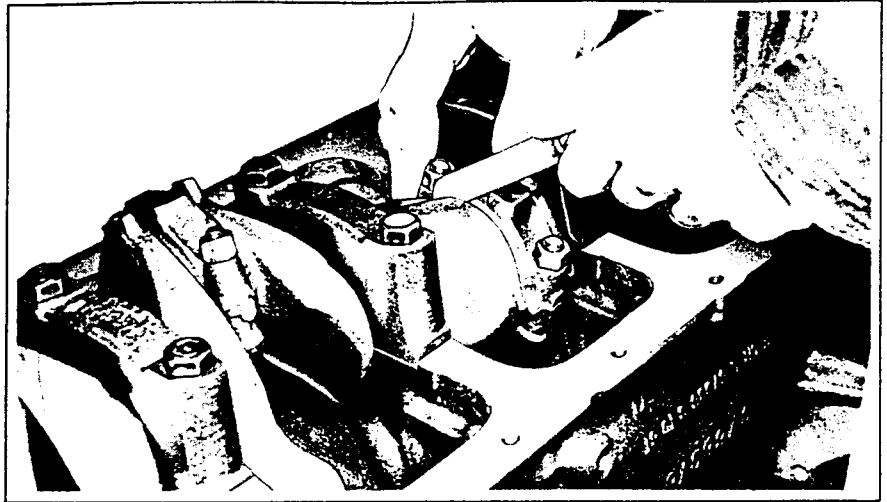


Figure 8-1-42

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### REPLACEMENT - CRANKSHAFT BEARINGS

The main bearings are of the precision insert type and do not utilize shims for adjustment. If the clearances are found to be excessive, a new standard or oversize bearing insert, both upper and lower halves, will be required.

#### NOTE

If, for any reason, main bearing caps are replaced, shimming may be necessary. Laminated shims for each cap are available for service. Shim requirements will be determined by bearing clearance.

The clearance may be checked by using Plastigage gauging plastic. When one bearing is being checked, all the other main bearing caps must be in place and at required torque.

The main bearings used as service replacement are of high quality with close tolerances of fit and will not require line reaming on installations. The close dimensional tolerances assure an equalized bearing surface at all points on the crankshaft when replaced in sets.

#### NOTE

Main bearings may be replaced without removing the crankshaft.

1. Withdraw oil from crankcase. Disconnect oil drain tube. Remove the oil pan.
2. Remove the spark plugs.
3. Remove cap on main bearing requiring replacement and remove bearing from shell.
4. Install a main bearing shell removing and installing tool in the oil hole in the crankshaft.

#### NOTE

Use J6098-01, if such a tool is not available, a cotter pin may be bent as required to do the job.

5. Rotate the crankshaft clockwise as viewed from the front of the engine. This will roll upper bearing shell out of engine.

6. Oil new upper bearing shell and insert plain (unnotched) end of shell between crankshaft and indented or notched side. Rotate the bearing into place.

7. Install new bearing shell in bearing cap.

8. The rear main bearing journal has no oil hole drilling. To remove the upper bearing half proceed as follows after cap is removed:

a. Use a small drift punch and hammer to start the bearing rotating out of block.

b. Then use a pair of pliers to hold the bearing thrust surface to the oil slinger and rotate the crankshaft to pull bearing out (see Figure 8-1-43).

c. To install, start the bearing (side not notched) into notched side of block by hand, then use pliers as before to turn shell half into place.

d. The last 1/4" movement may be done by holding just the slinger with pliers (taped jaws) or tap in place with a drift punch.

9. Check bearing clearance per paragraph below.

### Main Bearing Clearance

Plastigage gauging plastic is a wax-like plastic material which will compress evenly between the bearing and journal surfaces without damaging either surface. To obtain the most accurate results with gauging plastic, certain precautions should be observed. If the engine is upside down, the crankshaft will rest on the upper bearings and it can be assumed that the total clearance can be measured between the cap bearing and journal.

#### NOTE

To assure the proper seating of the crankshaft, the rear main bearing oil seal should be removed and all bearing cap bolts should be at their specified torque. In addition, preparatory to checking fit of bearings, the surface of the crankshaft journal and bearing should be wiped clean of oil.

1. Starting with the rear main bearing, remove bearing cap.

#### NOTE

Wipe oil from journal and bearing cap before applying gauging plastic.

2. Place a piece of gauging plastic the full width of the bearing (parallel to the crankshaft) on the journal (see Figure 8-1-44).

#### NOTE

Do not rotate the crankshaft while the gauging plastic is between the bearing and journal.

3. Install the bearing cap and evenly tighten the retaining bolts to 60-70 foot-pounds (82-94 N·m).

4. Remove bearing cap. The flattened gauging plastic will be found adhering to either the bearing shell or journal. On the edge of gauging plastic packing envelope there is a graduated scale which is correlated in thousandths of an inch.

5. Without removing the gauging plastic, check its compressed width (at the widest point) with the graduations on the gauging plastic envelope, figure 8-1-45).

#### NOTE

Normally, main bearing journals wear evenly and are not out-of-round. However, if a bearing is being fitted to an out-of-round journal be sure to fit to the maximum diameter of the journal. If the bearing is fitted to the minimum diameter of the

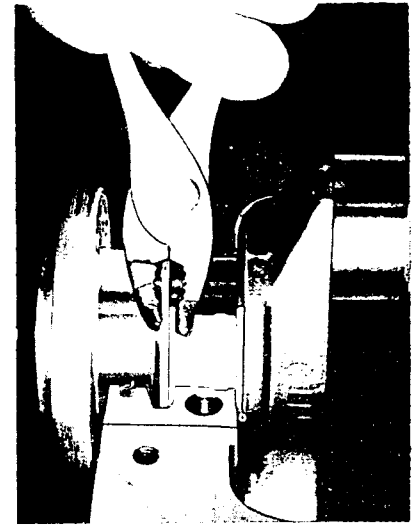


Figure 8-1-43

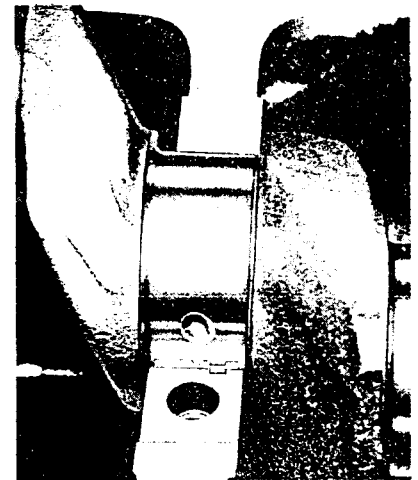


Figure 8-1-44

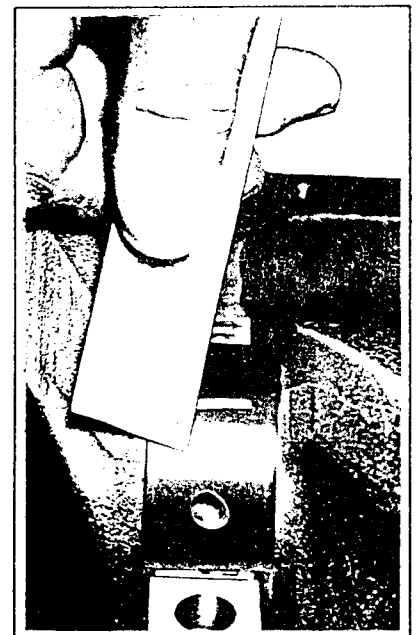


Figure 8-1-45



Figure 8-1-46

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journal and the journal is out-of-round 0.001" or more, interference between the bearing and journal will result in rapid bearing failure. If the flattened gauging plastic tapers toward the middle or ends, there is a difference in clearance indicating a taper, low spot or other irregularity of the bearing or journal. Be sure to check the journal with a micrometer if the flattened gauging plastic indicates more than 0.001" difference.

6. If the bearing clearance is not over 0.0035" (worn) or 0.003" (new) or less than 0.001" the bearing insert is satisfactory. If the clearance is not within these limits replace the insert.

**NOTE**

If a new bearing cap is being installed and clearance is less than 0.001" check for burrs or nicks; if none are found then install shims as required.

7. A 0.002" undersize bearing may produce the proper clearance. If not, it will be necessary to grind the crankshaft journal for use with the next undersize bearing.

**NOTE**

Bearings are available in standard sizes and various undersizes. See your parts catalog.

8. Proceed to the next bearing. After all bearings have been checked, rotate the crankshaft to see that there is no excessive drag.

9. Check the end play by forcing the crankshaft to its extreme front position. Check at the front side of the rear main bearing with a feeler gage (see Figure 8-1-46). This clearance should be from 0.002" to 0.006".

10. Install a new rear main bearing oil seal in the cylinder block and main bearing oil cap as described below.

### REPLACEMENT - REAR MAIN BEARING OIL SEAL

The rear main bearing oil seal, shown in Figure 8-1-47 can be removed (both halves) without removal of the crankshaft.

**NOTE**

Always replace upper and lower seal as a unit. Always clean crankshaft surface before installing a new seal. Lip of seal goes toward front of engine.

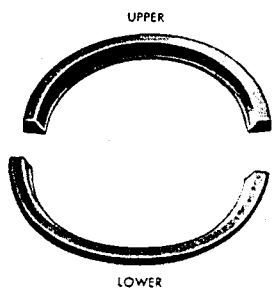


Figure 8-1-47

1. With rear main bearing cap removed, remove oil seal from groove by prying from bottom using a small screwdriver.

2. Insert a new seal well lubricated with engine oil in bearing cap groove. (Keep oil off of parting line surface, this surface is treated with glue.) Gradually push with a hammer handle until seal is rolled into place.

3. To replace the upper half of the seal, use a small hammer and brass pin punch to tap one end of seal (see Figure 8-1-48) until it protrudes far enough to be removed with pliers.

4. Install a new seal by rolling seal into the groove similar to installing a main bearing.

5. Install bearing cap and torque bearing cap bolts to specifications.

6. Install oil pan, refill with engine oil, and check for leaks.

## PISTON, RING AND CONNECTING ROD

### REMOVAL - PISTON AND ROD

1. Withdraw crankcase oil. Disconnect oil drain tube. Remove oil pan.
2. Drain coolant from block and exhaust manifold and remove cylinder head.
3. Remove any ridge and/or deposits from the upper end of the cylinder bores with a ridge reamer.

#### NOTE

Move piston to the bottom of its travel and place a cloth on top of piston to collect the cuttings. After ridge and/or deposits are removed, turn crankshaft until piston is at the top of its stroke and carefully remove cloth with the cuttings.

4. Check connecting rods and pistons for cylinder number identification and if necessary, mark them.
5. Remove connecting rod cap nuts and caps. Push the rods away from the crankshaft and install caps and nuts loosely to their respective rods.
6. Push piston and rod assemblies away from crankshaft and out of the cylinders.

#### NOTE

It will be necessary to turn the crankshaft slightly to disconnect some of the rods and to push them out of the cylinder.

### DISASSEMBLY - PISTON AND ROD

1. Install pilot of piston pin removing and installing tool J24086 on piston pin.
2. Install piston and connecting rod assembly on support and place assembly in an arbor press (see Figure 6-49). Press pin out of connecting rod.
3. Remove assembly from press and remove piston pin from support and remove tool from piston and rod.
4. Piston pins are matched fit to the piston and are not available separately. Piston pins will not become loose enough to cause a knock or tapping until after prolonged use and in such cases a new piston and pin assembly should be installed.

Piston pins should be capable of supporting their own weight in either pin boss when coated with light engine oil and at 60° F. Higher or lower temperatures will cause false indications. Pistons and pins are serviced as assemblies.

Check fit of used piston pins using a dial bore gage or telescoping snap gage for the bore and a micrometer for the pin.

Wear limit on piston pin is production clearance plus 0.001". Replace piston and pin assembly if wear is excessive.

### Cleaning and Inspection

Clean varnish from piston skirts and pins with a cleaning solvent. **DO NOT WIRE BRUSH THE PISTON SKIRT.** Clean the ring grooves with a groove cleaner and make sure oil ring holes and slots are clean.

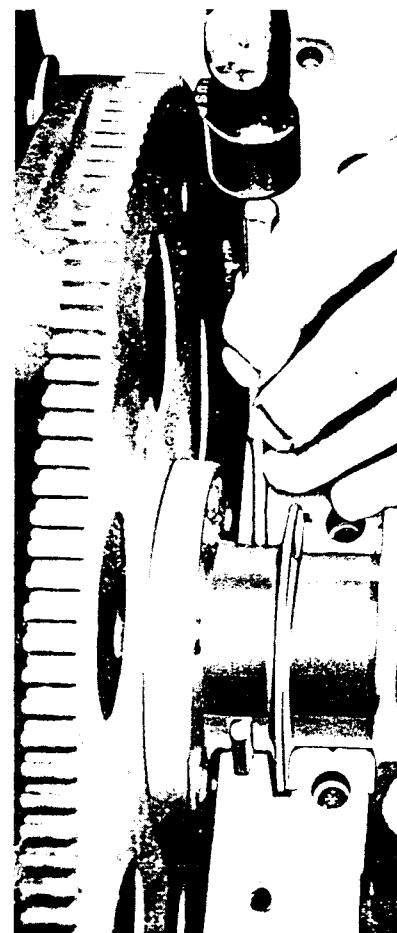


Figure 8-1-48

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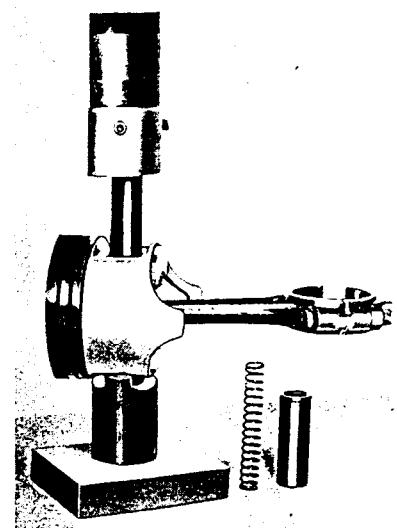


Figure 8-1-49

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Inspect the piston for cracked ring lands, skirts or pin bosses, wavy worn ring lands, scuffed or damaged skirts, or eroded areas at top of the piston. Replace pistons that are damaged or otherwise show signs of excessive wear.

### ASSEMBLY - PISTON AND ROD

1. Lubricate piston pin holes in piston and connecting rod to facilitate installation of pin.
2. Position connecting rod in its respective piston so that flange or heavy side of rod at the bearing end will be towards front of piston (cast depression in top of piston head).
3. Install piston pin on installer and pilot spring and pilot in support (see Figure 8-1-50).

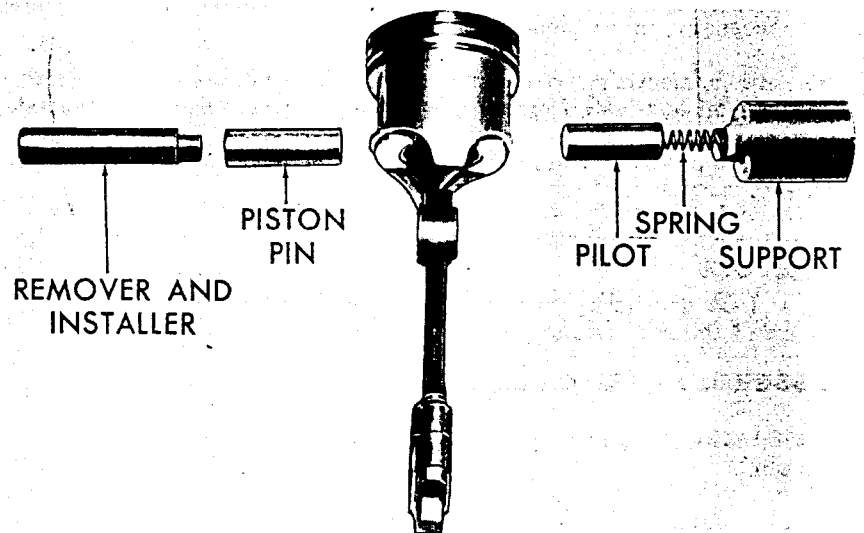


Figure 8-1-50

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4. Install piston and rod on support, indexing pilot through piston and rod.
5. Place support on arbor press, start pin into piston and press on installer until pin pilot bottoms.
6. Remove installer and support assembly from piston and connecting rod assembly.
7. Check piston pin for freedom of movement in piston bore.

### PISTON RING

Piston rings are furnished in standard sizes as well as several over-sizes. See your parts catalog.

Oil control rings used on all engines consist of two segments (rails) and a spacer.

Compression rings in all engines are the deep section twist type, 0.0775" - 0.0780" wide.

This type compression ring takes its name, twist type, from its installed position which is cocked or twisted. It assumes and maintains



this position for life because the upper edge of its diameter is chamfered, making the ring unbalanced in cross section.

 NOTE

All compression rings are marked with the letters "GM" cast in the upper side of the ring. When installing compression rings, make sure the side marked "GM" is toward the top of the piston.

### Removal

1. Remove piston rings by expanding them and sliding them off the ends of the piston. Tool No. J25220 for 120 Model and J25220 on 140 Model is available for this purpose.
2. Clean piston ring grooves by carefully removing all particles of carbon. Also check for burrs or nicks that might cause rings to hang up.

### Installation

1. Select rings comparable in size to the piston being used.

 NOTE

It is important that each ring be fitted to its individual cylinder for proper gap spacing and to its individual piston and groove for proper groove clearance.

2. Slip the ring in the cylinder bore; then, using the head of a piston, press the ring down into the cylinder bore about two inches.

 NOTE

Using a piston in this way will place the ring square with the cylinder walls.

3. Check the space or gap between the ends of the ring with a feeler gage (see Figure 8-1-45).
4. If the gap between the ends of the ring is below specifications, remove the ring and try another for fit.
5. Fit each ring separately to the cylinder in which it is going to be used.
6. New pistons, rings and cylinder bores wear considerably during seating and gaps widen quickly; however, engine operation will not become seriously affected if ring gaps do not become greater than  $1/32$ ".
7. Carefully remove all particles of carbon from the ring grooves in the piston and inspect the grooves carefully for burrs or nicks that might cause the rings to hang up.

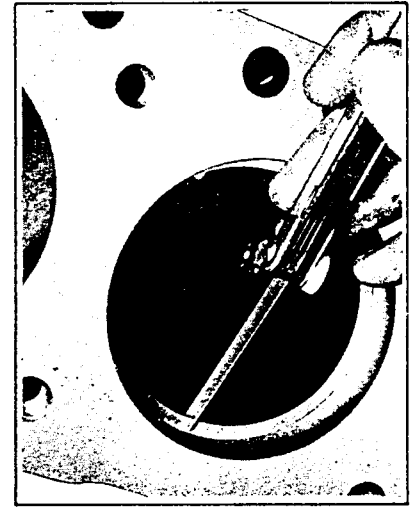


Figure 8-1-51

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8. Slip the outer surface of the compression ring into the piston ring groove and roll the ring entirely around the groove to make sure that the ring is free and does not bind in the groove at any point (see Figure 8-1-52). If binding occurs, the cause should be determined and removed by carefully dressing with a fine cut file. However, if the binding is caused by a distorted ring, install a new ring.

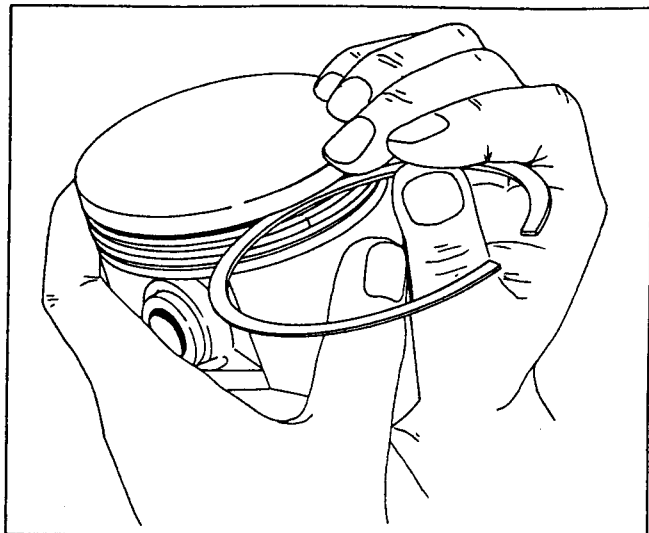


Figure 8-1-52

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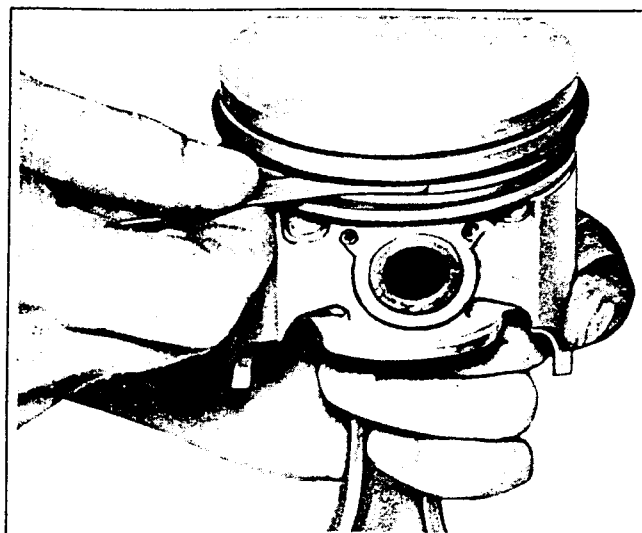


Figure 8-1-53

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9. Install the oil ring spacer in the oil ring groove and position gap in line with piston hole. Hold spacer ends butted and install steel rail on top side of spacer. Position gap at least one inch to left of spacer gap, then install second rail on lower side of spacer. Position gap at least one inch to right of spacer gap.

10. Flex the oil ring assembly in its groove to make sure ring is free and does not bind in the groove at any point. If binding occurs, the cause should be determined and removed by carefully dressing with a fine cut file. However, if the binding is caused by a distorted ring, install a new ring.

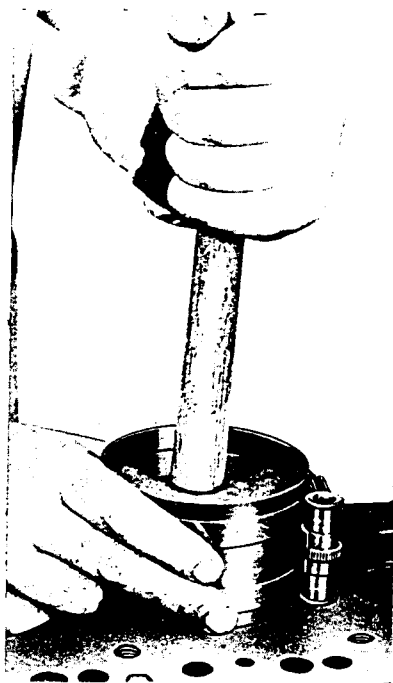


Figure 8-1-54

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11. Proper clearance of the piston ring in its piston ring groove is very important in maintaining engine performance and in preventing excessive oil consumption. Therefore, when fitting new rings, the clearances between the top and bottom surfaces of the ring grooves should be inspected (see Figure 8-1-53).

12. The compression rings should be fitted so that the clearance is 0.0020" to 0.0035" (see Figure 8-1-53).

13. Assemble the rings to the pistons as they are fitted and make a final test of the ring fit in the grooves by repeating the fitting procedure given above.

**NOTE**

Expander ends must not align with the ring gap.

**INSTALLATION - PISTON AND ROD**

1. Lightly coat pistons, rings and cylinder walls with light engine oil.
2. With bearing caps removed, install tool J6305-01 on bearing cap bolts.

3. Install each piston in its respective bore, using tool J6305-01 on each assembly (see Figure 8-1-54). The side of the piston with the cast depression in the head should be to the front of the cylinder block and the oil hole on connecting rod towards the camshaft side of the engine. Guide the connecting rod bearing into place on the crankshaft journals with the long detail of tool J6305-01 (see Figure 8-1-55). Use J8037 to compress piston rings.

4. Install bearing caps and check the bearing clearance as described previously.

5. Install oil pan gaskets, seals and oil pan. Connect oil drain tube.

6. Install cylinder head gasket and head.

7. Refill crankcase and check for leaks.

8. Lake or tank test unit and check for coolant leaks.

## CYLINDER BLOCK

### INSPECTION

1. Check the cylinder block for cracks in the cylinder walls, water jacket and main bearing webs.

2. Check the cylinder walls for taper, out-of-round or excessive ridge at top of ring travel. This should be done with a dial indicator (use Tool J8087, see Figure 8-1-56). Set the gage so that the thrust pin must be forced in about 1/4" to enter gage in cylinder bore. Center gage in cylinder and turn dial to "0". Carefully work gage up and down cylinder to determine taper and turn it to different points around cylinder wall to determine the out-of-round condition. If cylinders were found to have more than 0.002" out-of-round, boring will be necessary.

### REPAIR

The performance of the following operations is contingent upon engine condition at time of repair.

If the cylinder block inspection indicated that the block was suitable for continued use except for out-of-round or tapered cylinders, they can be conditioned by honing or boring and honing.

If the cylinders were found to have less than 0.005" taper or wear they can be conditioned with a hone and fitted with the high limit standard size pistons. A cylinder bore of less than 0.005" wear or taper may not entirely clean up when fitted to a high limit position. If it is desired to entirely clean up the bore in these cases, it will be necessary to re-bore for an oversize piston. If more than 0.005" taper or wear exists, they should be bored and honed to the smallest oversize that will permit complete resurfacing of all cylinders.

### PISTON SELECTION

Replacement pistons are available in a range of two standard sizes, two sizes for 0.001 oversize, and four sizes in each oversize (0.020" and 0.030"). The size identification of the piston is marked in ink on the piston top.

To determine the correct size of piston needed, measure the cylinder bore with a telescope gage and micrometer, and subtract the base cylinder bore diameter (3.875", 120 Model, 4.000", 140 Model) from the measured diameter. Next locate this dimension on the Piston Selection

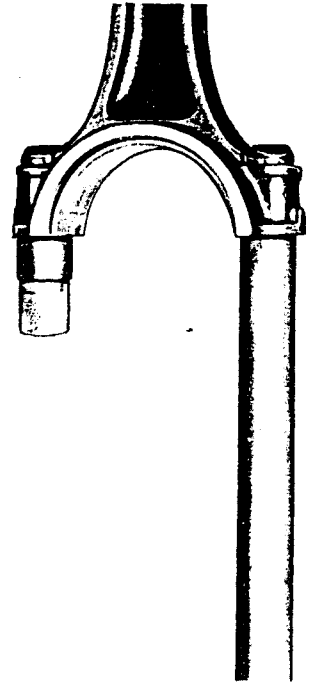


Figure 8-1-55

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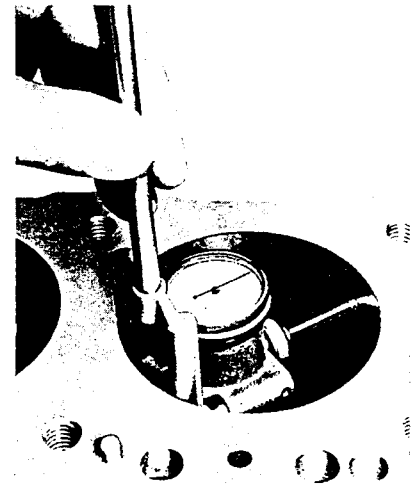


Figure 8-1-56

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Chart (see Figure 8-1-57). The number shown on the chart in the box above the dimension is the marking on the piston which should be used.

EXAMPLE "A":	120 MODEL	140 MODEL
Cylinder Bore Measurement	3.877" (Worn Bore)	4.002" (Worn Bore)
Base Cylinder Bore Diameter	<u>3.875"</u>	<u>4.000"</u>
Difference	0.002"	0.002"

The number in the box above 0.002" is S7. Therefore, in this case a 0.001" oversize piston marked S7 would be used.

EXAMPLE "B":

Cylinder Bore Measurement	3.907" (Bored Bore)	4.032" (Bored Bore)
Base Cylinder Bore Diameter	<u>3.875"</u>	<u>4.000"</u>
Difference	0.032"	0.032"

The number in the box above 0.032" is four. In this example a 0.030" oversize piston marked four would be used.

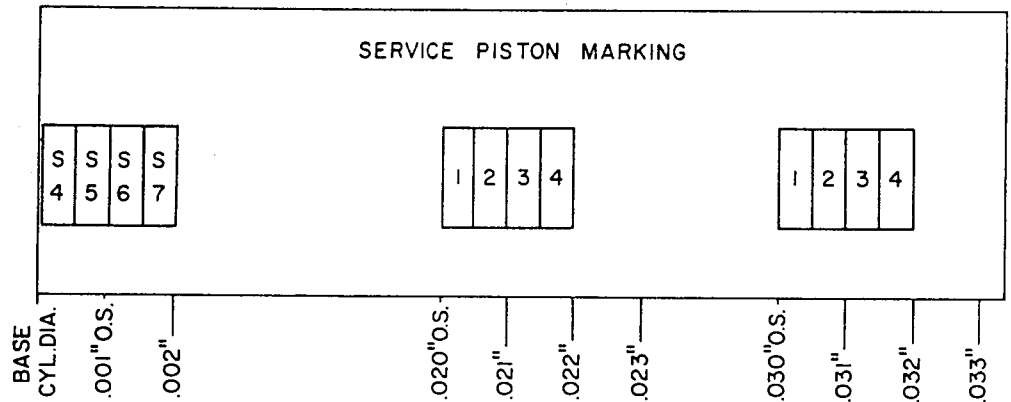


Figure 8-1-57

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### BORING

1. Before using any type boring bar, the top of the cylinder block should be dressed to remove any dirt or burrs. This is very important. Otherwise, the boring bar may be tilted which would result in the re-bored cylinder wall not being at right angles to the crankshaft.
2. The piston to be fitted should be checked with a micrometer, measuring just below the lower ring groove and at right angles to the piston pin. The cylinder should be bored to the same diameter as the piston and honed to give a clearance of 0.0005" to 0.0015" (120 Model), 0.0025"-0.0035" (140 Model).
3. The instructions furnished by the manufacturer of the equipment being used should be carefully followed.

### HONING AND PISTON FIT

1. When the cylinders are to be honed only for use of standard limit piston or for final finishing after they have been re-bored to within 0.002" of the desired size, they should be finished with a hone. Rough stones may be used at first and fine stones for the final operation.
2. Place the hone into a cylinder bore and expand the stones until the hone can just be turned by hand. Connect a 1/2" electric drill to the hone and drive hone at drill speed while moving hone up and down en-

ture length of cylinder until hone begins to run free. During this operation a liberal amount of kerosene should be used as a cutting fluid to keep the stones of the hone clean. Move hone slowly up and down with rough stones but move hone up and down rapidly enough with the fine stones to produce a final bore finish of very fine surface scratches in a cross-hatch pattern of approximately 45° to 60° included angle. The marks should be clean but not sharp and free from imbedded particles or torn or folded metal.

3. Expand the stones against the cylinder bore and repeat the honing operation until the desired bore diameter is obtained.

4. Occasionally during the honing operation, the cylinder bore should be thoroughly cleaned and the piston selected for the individual cylinder checked for correct fit.

5. Check fit of the aluminum pistons in the following manner:

**NOTE**

Thoroughly clean cylinder bores with soap and hot water to remove all grit particles.

a. Measure the cylinder bore diameter with a telescope gauge and micrometer 2-1/2 inches from top of cylinder bore at 90° from crankshaft axis.

b. Next measure the diameter of the piston skirt just below the lower ring groove and at right angles to the piston pin.

c. If the difference is greater than the maximum allowable (see Boring, step 2), try another piston or lightly hone the cylinder bore to obtain the proper fit.

d. Should the difference be less than the minimum allowable (see Boring, step 2), try another piston, or if standard size, try a standard high limit piston. If proper fit cannot be obtained, it will be necessary to rebore the cylinder to the next oversize piston.

e. Mark each piston after fitting to correspond with the cylinder to which it has been fitted. Proceed to hone cylinders and fit the remaining pistons.

**NOTE**

Handle the pistons with care and do not attempt to force them through the cylinder until the cylinder has been bored to correct size as this type piston can be distorted through careless handling.

6. Thoroughly clean the cylinder bores with hot water and soap. Scrub well with a stiff bristle brush and rinse thoroughly with hot water. It is extremely essential that a good cleaning operation be performed. If any of the abrasive material is allowed to remain in the cylinder bores, it will rapidly wear the new rings and cylinder bores in addition to the bearings lubricated by the contaminated oil. The bores should be swabbed several times with light engine oil and a clean cloth and then wiped with a clean dry cloth. Cylinders should not be cleaned with kerosene or gasoline. Clean the remainder of the cylinder block to remove the excess material spread during the honing operation.

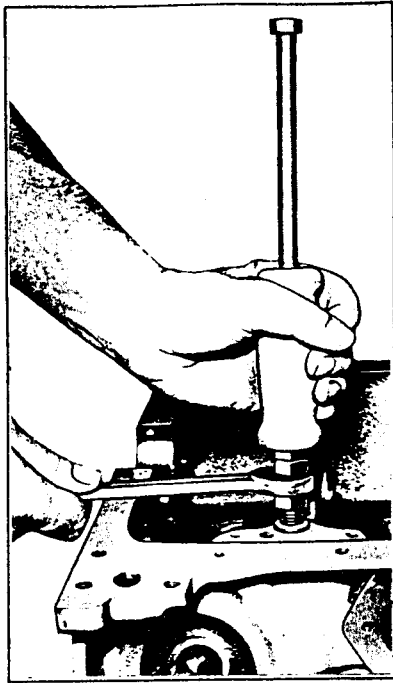


Figure 8-1-58

10835

## REPLACEMENT - DISTRIBUTOR LOWER BEARING

The distributor lower bearing is a bronze bushing pressed into the lower side of the engine block. Its upper inside diameter pilots the distributor shaft and the outside diameter extending below the block pilots the oil pump.

Some engines have a thrust washer at the upper end of the bushing bore. The thrust washer, where used, may be replaced at the same time the bushing is replaced.

The lower bushing will ordinarily require only a clearance or wear check during engine overhaul. When distributor shaft-to-bushing clearance exceeds 0.0035" the bushing should be replaced as follows with oil pump and distributor removed:

1. Install tool J9534-01 into bushing and using a slide hammer, remove the bushing (see Figure 8-1-58).

### △ SAFETY WARNING

PROTECT YOUR EYES FROM FRAGMENTS. WEAR SAFETY GLASSES WHEN STRIKING THESE TOOLS, HANDLES, DRIVERS, ETC. TOOL END MAY MUSHROOM AFTER BEING REPEATEDLY STRUCK. ALWAYS GRIND OFF ANY ROLLED EDGES BEFORE USING TOOL. USE SOFT FACE HAMMERS WHENEVER POSSIBLE.

2. Using a drift up through bushing bore, drive thrust washer (if installed) out of bore and remove from block (see Figure 8-1-59).
3. Clean bushing bore in block and check for burrs or damage.
4. If thrust washer was removed, start new washer in position in bore and drive into place using tool J9534-01 (see Figure 8-1-60).
5. Using tool J-9535 with driver-bolt in driver handle, install driver into new bushing from large inside diameter.
6. Position bushing and driver to block and drive the bushing in position (see Figure 8-1-61) which is determined by tool bottoming against the block.
7. Remove tool from bushing. It is possible that the bushing with minimum I.D. will collapse enough, during installation, to slightly seize the installer arbor. If this happens, remove installer tool using slide hammer in driver bolt hole of driver handle.

### □ NOTE

This will not damage the bushing and the tool is designed for this purpose, should it occur.

## WATER PUMP REMOVAL

1. Open petcocks on port side and drain coolant from block and exhaust manifold. Disconnect water hose from water pump.
2. Loosen four screws holding water pump pulley to water pump.
3. Loosen alternator bracket bolts and remove alternator belt. Remove water pump pulley and bolts. Next remove water pump to cylinder block bolts and remove the water pump from the engine.

### □ NOTE

Pull the pump straight out of the block first, to avoid damage to impeller.

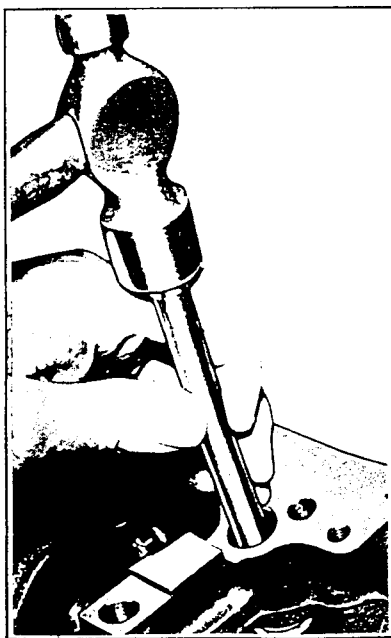


Figure 8-1-59

10845

**INSPECTION**

1. If the seal is leaking replace the pump.
2. If the bearing is rough or allows excessive sideways movement of the shaft, replace the pump.
3. If the impeller has excessive erosion replace the pump.

**INSTALLATION****NOTE**

This pump has a special shaft and bearing assembly and a special seal assembly intended for marine service. Do not substitute with an automotive pump.

Install pump assembly on cylinder block and tighten bolts securely. Use a new pump to block gasket.

1. Install alternator belt and adjust per paragraph below.
2. Install coolant hoses to water pump.
3. Lake or tank test unit and check for leaks.

**OIL PUMP**

The oil pump (see Figure 8-1-62) consists of two gears and a pressure relief valve enclosed in a two-piece housing and driven from the distributor driveshaft which in turn is driven by a helix gear on the camshaft.

It is flange mounted to the cylinder block with two bolts and piloted on the outside of the lower distributor bronze bearing.

Oil pressure passes through an opening in the mounting flange to the cylinder block, then into the full flow oil filter.

The pump cover is equipped with the pressure regulator valve that regulates oil pressure at approximately 40 psi @ 2000 rpm.

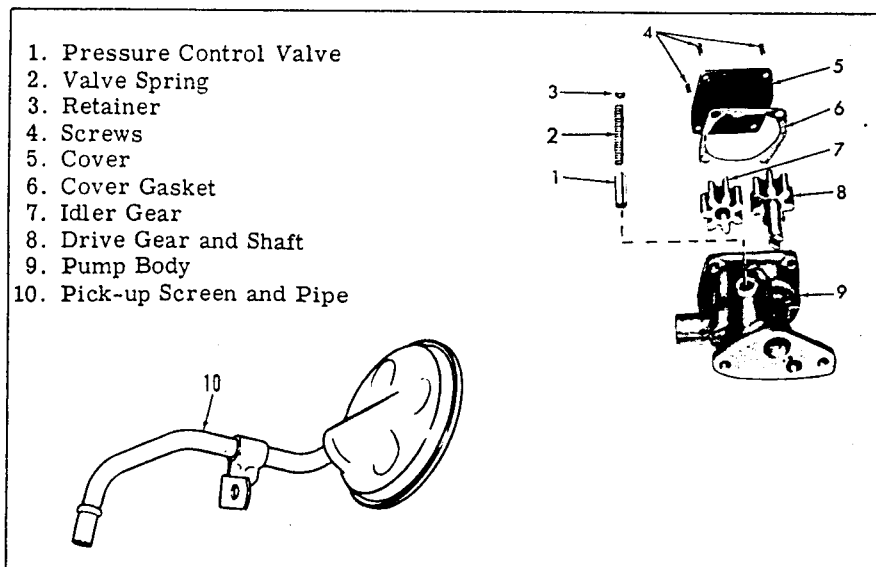


Figure 8-1-62

10875



Figure 8-1-60

10855



Figure 8-1-61

10865

The pump intake is of the fixed screen type. A mesh screen filters out small particles of dirt and sludge which may be present.

 NOTE

A baffle incorporated on the intake screen has been designed to eliminate pressure loss due to sudden surging stops, turns, and acceleration.

In the event that a screen becomes plugged a steel grommet opens and by-passes oil to the pump.

Inasmuch as the oil pump is serviced on an exchange basis, no repair operations other than disassembly and inspection operations are covered in this manual.

### REMOVAL AND DISASSEMBLY

1. Withdraw oil. Disconnect oil drain tube. Remove oil pan.
2. Remove oil pickup tube clamp bolt.
3. Remove two flange mounting bolts and remove pump and screen as an assembly.
4. Remove four cover attaching screws, cover, gasket, idler gear and drive gear and shaft.
5. Remove pressure regulator valve and valve parts.
6. If necessary remove oil pump suction pipe and screen by pulling from pump housing.

 NOTE

Do not disturb oil pickup pipe on screen. This pipe is located at assembly.

7. Wash all parts in cleaning solvent and dry using compressed air.

### INSPECTION

Should any of the following conditions be found during inspection operations, the pump assembly should be replaced.

1. Inspect pump body for cracks or excessive wear.
2. Inspect oil pump gears for excessive wear or damage.
3. Check shaft for looseness in the housing.



4. Check inside of cover for wear that would permit oil to leak past the ends of gears.
5. Check the oil pick-up screen for damage to screen or relief grommet. Check for oil in the air chamber.
6. Check pressure regulator valve plunger for fit in cover.

### **ASSEMBLY AND INSTALLATION**

1. Place drive gear and shaft in pump body.
2. Install idler gear so that smooth side of gear will be toward the cover.
3. Install a new pump to cover gasket to assure correct end clearance of the gears.
4. Install suction pipe and screen assembly to pump body and install cover and attaching screws. Tighten screws six to nine foot-pounds torque and check to see that shaft turns freely.
5. Install regulator valve plunger, spring, retainer, and pin.
6. Align oil pump driveshaft slot to match with distributor tang, then install oil pump to block positioning flange over distributor lower bushing. Use no gasket.

#### NOTE

Oil pump should slide easily into place. If not, remove and relocate slot or determine other problem.

7. Attach and tighten oil pickup tube clamp.
8. Install oil pan using new gaskets and seals. Connect oil drain tube.

### **OIL FILTER BY-PASS VALVE**

#### **Inspection**

Remove the oil filter and check the spring and fiber valve for operation. Check for a cracked or broken valve.

#### **Replacement**

If replacement is necessary:

1. Remove the valve by prying it out with a screwdriver.
2. Install a new valve and seat it by tapping into place using a 9/16" thin wall deep socket and hammer.
3. Install oil filter according to manufacturer's instructions.

**ENGINE SPECIFICATIONS**

120 MODEL

140 MODEL

**1. General Specifications**

Type - No. of Cylinder	4 - In-line	4 - In-line
Valve Arrangement	In head	In head
Bore and Stroke	3.875" x 3.250"	4.000" x 3.60"
Piston Displacement	153 Cubic Inches	181 Cubic Inches
No. System (front to rear)	1 - 2 - 3 - 4	1 - 2 - 3 - 4
Firing Order	1 - 3 - 4 - 2	1 - 3 - 4 - 2
Compression Ratio	8.3 to 1	8.4 to 1
Compression Pressure	130 PSI*	130 PSI*
Water Temperature Control	Thermostat	Thermostat
Thermostat Opens at	160° F.	160° F.
Alternator Belt Adjustment	1/4-3/8" Give With Finger Pressure	1/4-3/8" Give With Finger Pressure
Full Throttle Operating Range	4200 - 4600 RPM	4200 - 4600 RPM

\* At cranking speed with throttle wide open

**2. Engine Dimensions, Fits and Adjustments****Pistons:**

Type	Flat - Notched head	Flat - Sump head
Clearance Limit at Top Land	0.0245" - 0.0335"	0.0255" - 0.0345"
Clearance Limit at Skirt	0.0005" - 0.0015"	0.0025" - 0.0035"
Compression Ring Groove Depth	0.200" - 0.208"	0.209" - 0.211"
Oil Ring Groove Depth	0.194" - 0.202"	0.190" - 0.199"

**Piston Rings:****Compression Ring**

Material	Cast Iron	Cast Iron
Type	Taper Face (Upper and Lower)	Radius Face (Upper) Taper Face (Lower)
Coating - Upper Ring	Flash Chrome Plate	Molybdenum
Coating - Lower Ring	Wear Resistant	Wear Resistant
Width	0.0775" - 0.0780"	0.0775" - 0.0780"
Gap	0.010" - 0.020"	0.010" - 0.020" (Upper) 0.013" - 0.025" (Lower)

**Oil Ring**

Material	Flat Spring Steel	Flat Spring Steel
Type	Multi-piece Rail Expander and Spacer	Multi-piece Rail Expander and Spacer
Coating (rail)	Chrome	Chrome
Width (Piston Groove)	0.188" - 0.189"	0.188" - 0.189"
Gap (Ring)	0.015" - 0.055"	0.015" - 0.055"
Width (Ring)	0.150" - 0.156"	0.154" - 0.160"
Expanders	One-Piece Expander-Spacer	One-Piece Expander-Spacer

**Piston Pins:**

Length	2.990" - 3.010"	2.990" - 3.010"
Diameter	0.9270" - 0.9273"	0.9270" - 0.9273"
Clearance in Piston (new)	0.00015" - 0.00025"	0.0003" - 0.0004"
Wear Limit in Piston	0.001"	0.001"
Clearance in Rod	Press 0.0008" - 0.0021"	0.0008" - 0.0021"

**Connecting Rods:**

Material	Drop Forged Steel	Drop Forged Steel
Length $Q_1$ to $Q_2$	5.700"	5.700"
Connecting Rod Bearing		
Material	M400	M400
Effective Length	0.797" - 0.807"	0.792" - 0.822"
Clearance	0.0007" - 0.0027"	0.00085" - 0.00135"
End Play	0.008" - 0.015"	0.008" - 0.015"

## 120 MODEL

## 140 MODEL

## Crankshaft:

Material	Nodular Cast Iron	Nodular Cast Iron
End Play	0.002" - 0.006"	0.002" - 0.006"
End Thrust Taken By	Rear Main Bearing	Rear Main Bearing
Crankpin Journal Diameter	1.999" - 2.000"	2.099" - 2.100"
Main Bearing		
Type	Precision Removable	Precision Removable
Journal Diameter	2.2983" - 2.2993"	2.2983" - 2.2993"
Length	0.822" (rear)	0.822" (rear)
	0.802" (others)	0.830" (others)
Clearance	0.0003" - 0.0029"	0.0003" - 0.0029"

## Camshaft:

Camshaft Bearing		
Material	Steel Backed Babbit	Steel Backed Babbit
Journal Diameter x Bearing Length	1.8687" x .860"	1.8687" x .860"
Bearing Outer Diameter - Nos. 1 and 2	1.999" - 2.001"	1.999" - 2.001"
Bearing Outer Diameter - No. 3	2.009" - 2.011"	2.009" - 2.011"
Type of Drive	Gear	Gear
Crankshaft Gear Material	Helical Cut Nodular Cast Iron	Helical Cut Nodular Cast Iron
Camshaft Gear Material	Helical Cut Bakelite and Fabric Composition	Helical Cut Bakelite and Fabric Composition

## Valve Systems:

Lifter Type	Hydraulic	Hydraulic
Rocker Arm Ratio	1.75 to 1	1.75 to 1
Valve Lash Adjustment - Intake and Exhaust (hot)	3/4 to 1 Turn Down From "Zero Lash" Point	3/4 to 1 Turn Down From "Zero Lash" Point
Valve Face Angle	45°	45°
Valve Seat Angle	46°	46°
Stem to Guide Clearance - Intake Valve	0.0010" - 0.0027"	0.0010" - 0.0027"
Stem to Guide Clearance - Exhaust Valve	0.0015" - 0.0032"	0.0010" - 0.0027"
Recommended Valve Seat Width		
Intake	1/32" to 1/16"	1/32" to 1/16"
Exhaust	1/16" to 3/32"	1/16" to 3/32"
Outer Valve Spring Free Length	2.08"	2.08"
Outer Valve Spring Pressure		
Lb. @ In.	78-86 @ 1.66"	78-86 @ 1.66"
Lb. @ In.	170-180 @ 1.26"	170-180 @ 1.26"


## Engine Lubrication:

Type Oil Pump	Gear	Gear
Normal Oil Pressure	40 PSI @ 2000 RPM	40 PSI @ 2000 RPM
Oil Filter - Make and Type	OMC Part Number 173232, AC Type PF-25 or Purolator PER-49	AC Type PF-25 or Purolator PER-49
Crankshaft Capacity - Quarts	3-1/2 (4 with new filter)	3-1/2 (4 with new filter)

## Oil Grade Recommended: Service SE-Meeting GM Spec 6136M

32 Degrees F. and Above	SAE 30	SAE 30
0 Degrees F. to 32 Degrees F.	SAE 20W	SAE 20W
Below 0 Degrees F.	SAE 10W	SAE 10W

We recommend OMC PREMIUM 4 CYCLE MOTOR OIL specially formulated for heavy duty marine use. Ideal for OMC Stern Drive and Inboard engines. Provides superior anti-wear qualities, especially during long high speed operation. Neutralizes acids created in all internal combustion engines, offers superior corrosion protection. Formulated to offer superior resistance to oxidation and high temperature sludge formation.

 NOTE

The use of Multi-Viscosity oils is not recommended.

Fuel Grade Recommendation - 120 and 140 Model engines can use leaded or low lead automotive regular fuel of 86 or higher AKI Octane\*. No lead fuel must not be used.

The use of premium grade fuels is acceptable in all engines.

\*See Page 2-7.

If detonation or spark rap occurs with recommended fuel grade and the engine is properly adjusted, change to a higher grade which will eliminate the detonation or spark rap. We recommend usage of OMC 2+4™ Fuel Conditioner to prevent gum formation and corrosion in fuel lines, especially during storage.

### 3. Torque Specifications

Use a reliable torque wrench to tighten the parts listed to prevent straining or distorting the parts or possibly damaging the threads. These specifications are for clean threads only. Dirty threads produce friction which prevents accurate measurement of tightness. It is important that these torque specifications be strictly observed. Overtightening to any extent may damage threads, thus preventing proper torque from being obtained, requiring replacement or repair of the damaged part.

## TORQUE SPECIFICATIONS

PART	APPLICATION	THREAD	TORQUE	
			FT. LBS.	IN. LBS.
Bolt	Camshaft Thrust Plate	1/4-20		72-90
Nut	Connecting Rod	11/32-24	35	
Screw	Coupling, Flywheel to Crankshaft	7/16-20	60-65	
Bolt	Cylinder Head	1/2-13	90-100	
Screw	Engine Mount to Cylinder Block	3/8-16	20-24	
Bolt	Main Bearing Cap (oiled)	7/16-14	60-70	
Screw	Manifold to Cylinder Head	3/8-16	20-25	
Filter	Oil	1/2-20	Hand Tight	
Bolt	Oil Pan (end)	5/16-18		75
Bolt	Oil Pan (side)	1/4-20		80
Screw	Oil Pump Cover to Body	1/4-20		65-75
Bolt	Oil Pump Mounting	5/16-18		110-120
Screw	Pulley to Balancer Hub (1)	5/16-24	15-20	
	(2)	3/8-24	15-20	
Screw	Rocker Arm Cover	1/4-20		45
Plug	Spark	14 MM	15	
Bolt	Timing Gear Cover to Block	1/4-20		72-90
Bolt	Water Pump to Block	5/16-18	13-17	
Bolt	Temp Sending Unit	1/2-14	20	
Bolt	Push Rod Cover	5/16-18		50
Bolt	Distributor Clamp	3/8-16	20	
Bolt	Flywheel Housing to Engine	3/8-16	35-40	
Screw	Alternator Bracket to Engine		26-30	

The following specifications are for screw sizes not shown otherwise:

SCREW SIZE	FT. LBS.	IN. LBS.
#6	---	7-10
#10	2-3	25-35
#12	3-4	35-45
1/4	5-7	60-80
5/16	10-12	120-140
3/8	18-20	220-240

### 4. Metric Conversions

Inches x 25.4 = millimetres (mm)  
 Inches x 2.54 = centimetres (cm)  
 Feet x 0.3048 = metres (m)  
 Cubic inches x 0.0164 = cubic centimetres (cm<sup>3</sup>)  
 Degrees Fahrenheit (°F-32) ÷ 1.8 = degrees Celsius (°C)  
 Quarts x 0.94635 = litres (L)  
 Gallons x 3.7854 = litres (L)  
 Pound-inches x 0.11298 = newton-metres (N·m)  
 Pound-feet x 1.3558 = newton metres (N·m)  
 Pounds/sq. in. x 6.895 = kilopascals (kPa)

# Kleur coderingen BMC 1410

dd 03-04-1996

## T.P.V. stekker : (blauw/groen)

grijs	=	contact
geel/rood	=	start draad contact
blauw	=	olie druk
zwart	=	mana.
rood	=	voedingsdraad contact
pears	=	dynamo

## Tilt motor aansluiting

groen/wit (dun)	=	sein stroomdraad	tilt	(relais)
blauw/wit (dun)	=	" IDEM "	"	(relais)

## Trim motor aansluiting

blauw/bruin	=	sein draad trim
groen/bruin	=	" IDEM "

## Resterende

roze	=	dynamo
wit	=	temperatuur meter
rood/blauw	=	loos
rood	=	voeding
blauw/wit (dik)	=	?