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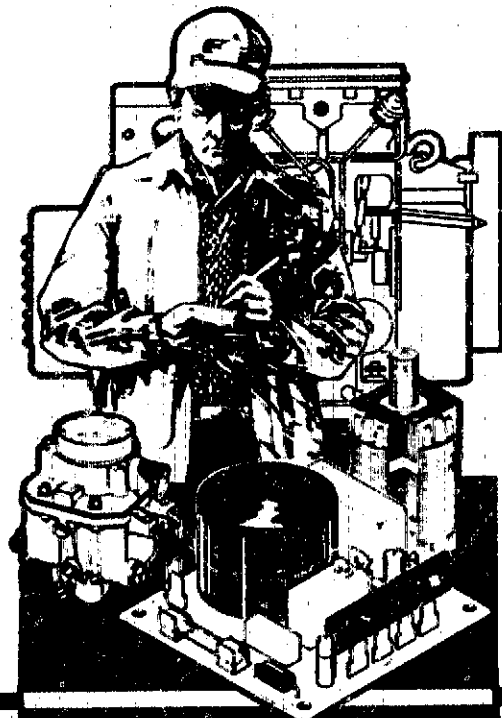
McGRAW-EDISON

Onan

Parts Manual

MDEG

Marine GenSet



Onan Service Parts

977-0222

3-84 (SPEC L)

Replaces **Power**

12-83 (SPEC L)

Printed in U.S.A.

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GENERAL INFORMATION

INSTRUCTIONS FOR ORDERING REPAIR PARTS

For parts or service, contact the dealer from whom you purchased this equipment or refer to your Nearest Authorized Onan Parts and Service Center.

To avoid errors or delay in filling your parts order, please furnish all information requested.

Always refer to the nameplate on your unit.

1. Always give the MODEL, SPEC NO. and SERIAL NO.

McGRAW-EDISON

Onan

MODEL AND SPEC NO.

SERIAL NO.

M-1149

For handy reference, insert "YOUR" nameplate information in the spaces above.

2. Do not order by reference number; always use part number and description.
3. Give the part number, description and quantity needed of each item. If an older part cannot be identified, return the part prepaid to your dealer or nearest Onan Parts and Service Center. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions. Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

Prices are purposely omitted from this Parts Manual due to the confusion resulting from fluctuating costs, import duties, sales taxes, exchange rates, etc.

For current parts prices, consult your Onan Dealer, Distributor or Parts and Service Center.

"En esta lista de partes los precios se omiten de proposito, ya que bastante confusion resulto de fluctuaciones de los precios, derechos aduanales, impuestos de venta, cambios extrajeros, etc."

Consiga los precios vigentes de su distribuidor de productos "ONAN."

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INTRODUCTION

FORWORD

This parts manual applies to the standard generator sets listed below. Any engine parts modified or added to the set will be listed in this manual. These modified or added parts supersede similar parts listed in the Onan Engine manual. The illustrations are arranged in groups of related items, and each part or assembly is identified by a reference number. All parts illustrated are typical, and unless otherwise mentioned, parts are interchangeable. These typical illustrations are subject to change and reflect only the latest replacement parts arrangement. The Right and Left generator set sides are determined by facing the front end of the engine.

SET DATA TABLE

MODEL IDENTIFICATION	RATING	MODEL IDENTIFICATION	RATING
40.0MDEG -*/#£	40,000 Watts	50.0MDEG -*/#£	50,000 Watts

ELECTRICAL DATA TABLE

*VOLTAGE CODES	VOLTS	HERTZ	WIRE	PHASE	NOTES
3	120/240	60	3	1	
6D	240/480	60	4	3	
7	220/380	60	4	3	
9X	347/600	60	4	3	
15	120/240	60	12	1	*
15	120/208	60	12	3	*
	120/240				
	127/220				
	139/240				
	240/416				
	254/440				
	227/480				
53	120/240	50	3	1	
515	110/220	50	12	1	*
	115/230				
515	110/190	50	12	3	*
	110/220				
	115/200				
	115/230				
	120/208				
	127/220				
	220/380				
	230/400				
	240/416				
	254/440				

- * - Voltage codes follow model letters designations.
- # - Specification number, number 1 is standard, all others indicate variations.
- £ - Specification letter, letter advances (A to B, B to C, etc.) with major manufacturing changes.
- + - These generators are reconnectable, refer to Operator's manual for wiring data.

Engine Section

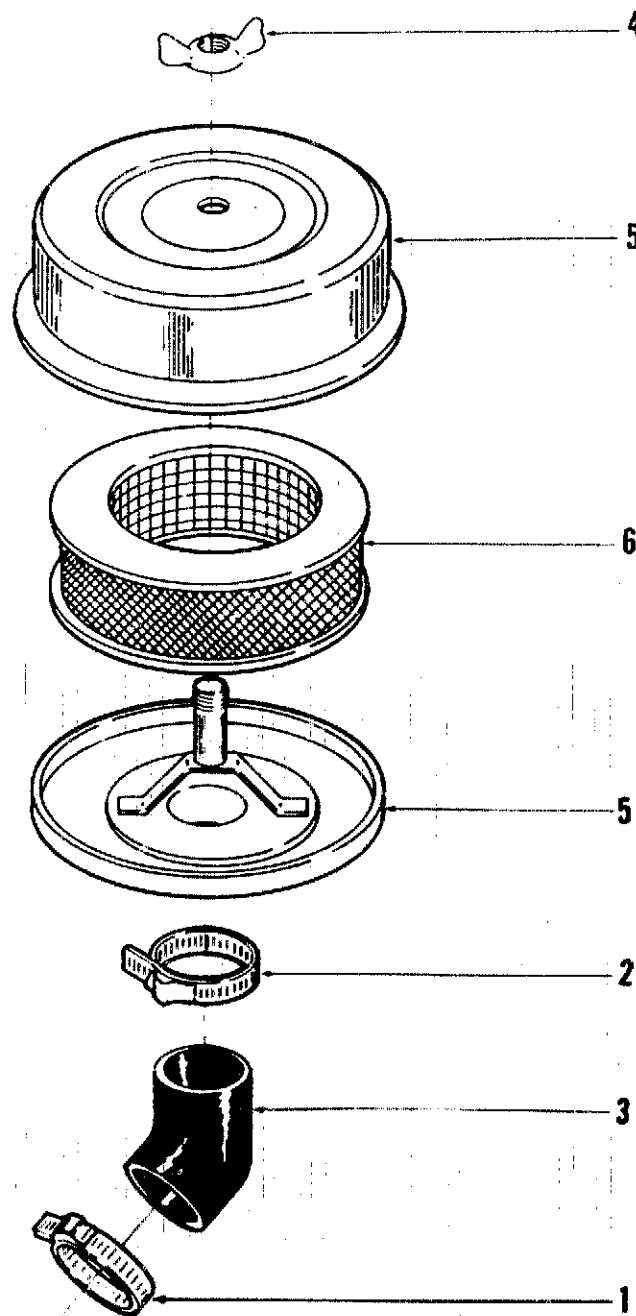
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ENGINE REPLACEMENT PARTS

All engine replacement parts must be ordered from the engine manufacturer, except those modified or added by Onan. When ordering engine parts, refer to the manufacturer's nameplate and supply the Model, Spec. Serial numbers and other available information. Refer to the engine manufacturer's manuals for your nearest authorized distributor or parts center; or contact the Onan distributor from whom you purchased this set or assistance in ordering replacement parts.

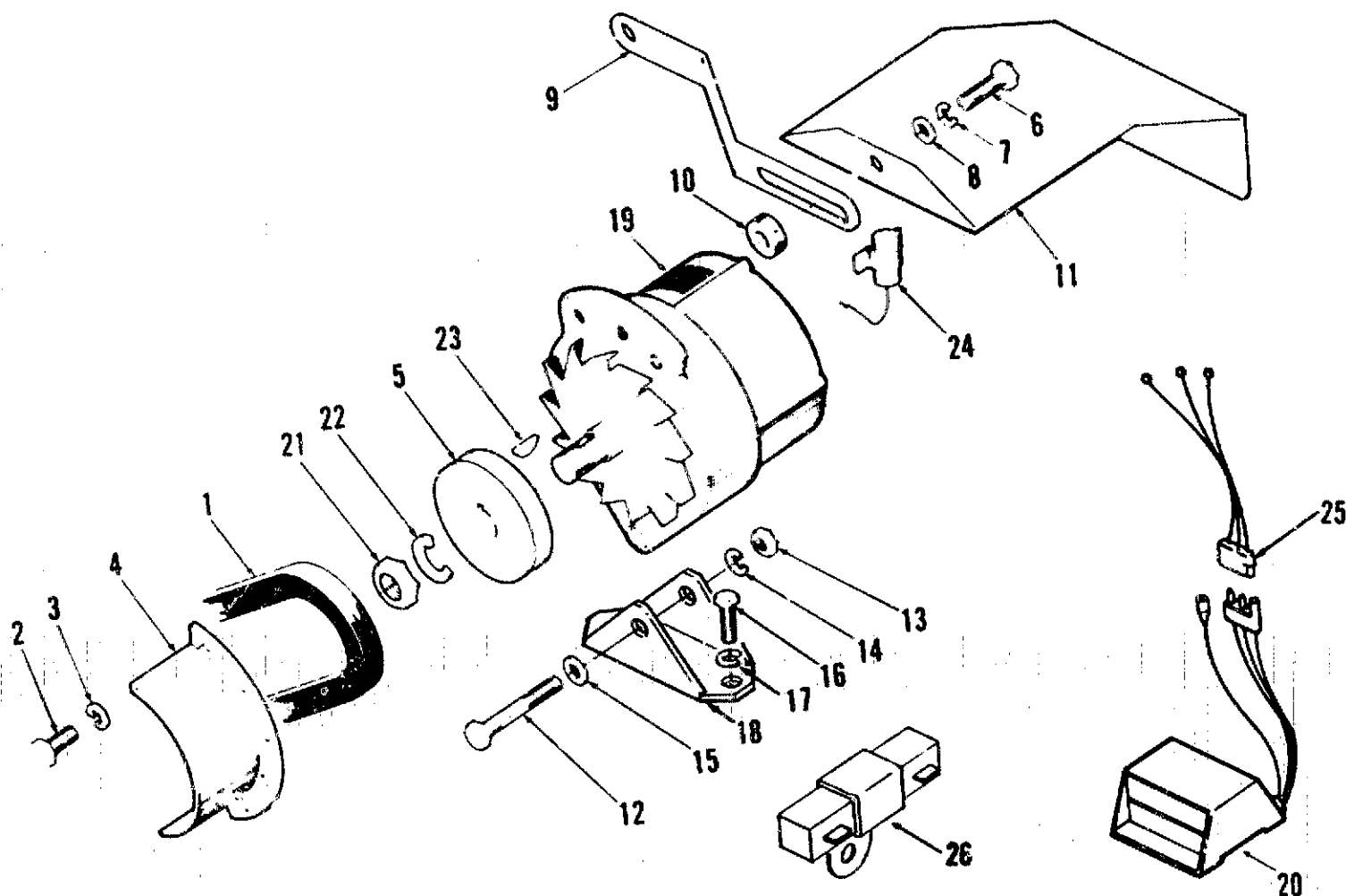
AIR CLEANER



FS-1515

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0612	1	Clamp, Hose
2	503-0648	1	Clamp, Hose
3	503-1187	1	Hose, Rubber - Preformed
4	865-0020	1	Nut, Wing (1/4-20)
5	140-1091	1	Air Cleaner Assembly (Includes Element)
6	140-1089	1	Element, Air Cleaner

ALTERNATOR



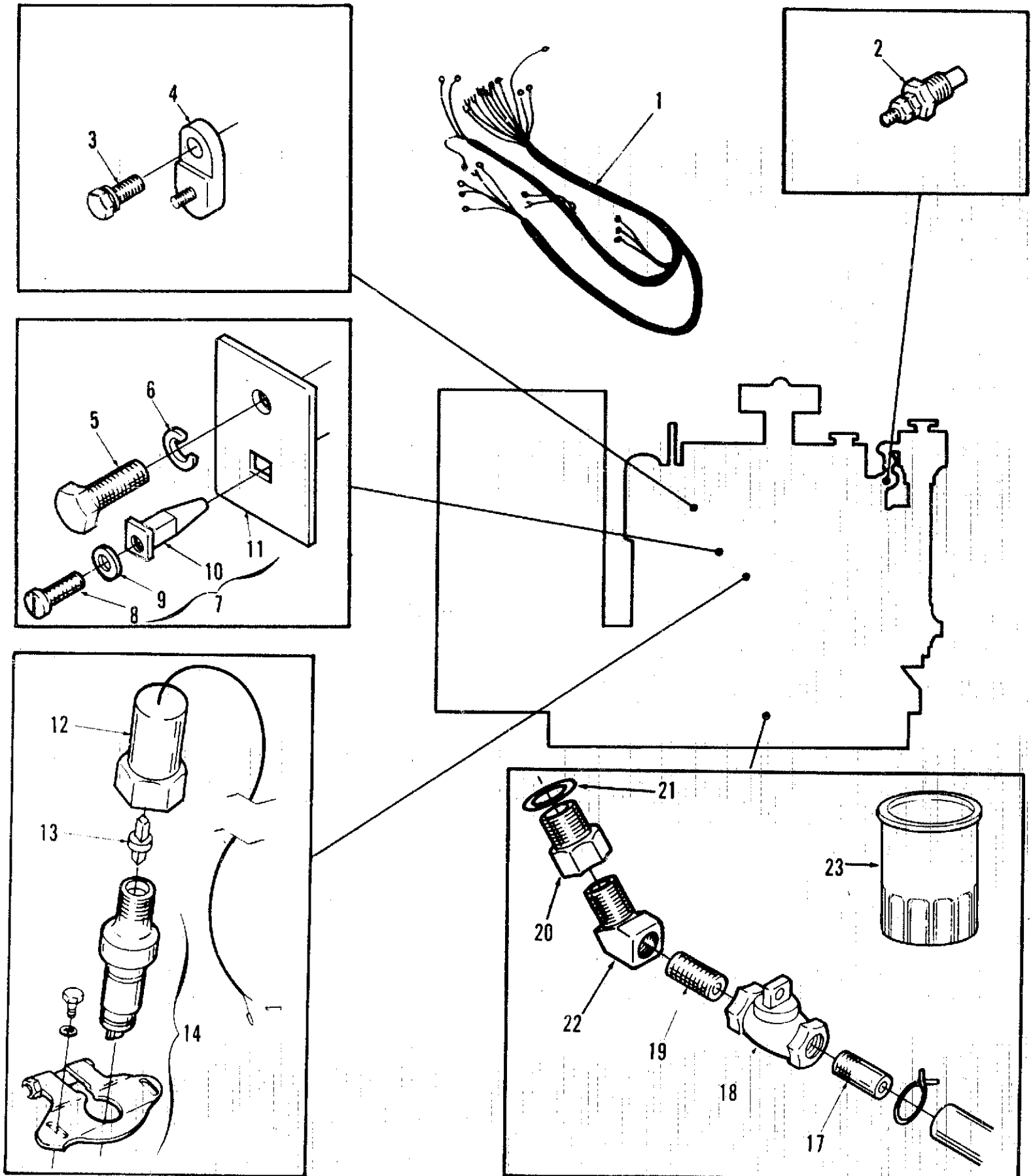
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REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	511-0084	1	Belt, Drive
2	800-0024	1	Screw, Cap - Hex Head (5/16-18 x 1/2")
3	850-0045	1	Washer, Lock - Spring (5/16")
4	191-0725	1	Guard, Belt
5	191-0781	1	Pulley
6	800-0030	1	Screw, Cap - Hex Head (5/16-18 x 1-1/4")
7	850-0045	1	Washer, Lock - Spring (5/16")
8	526-0030	1	Washer, Flat (13/32"ID x 7/8"OD x 1/8"Thk)
9	191-0101	1	Strap, Adjusting
10	191-0791	1	Spacer (Optional)
11	191-0619	1	Heat Shield (Optional)
12	800-1096	1	Screw, Cap - Hex Head (1/2-13 x 2 1/2")
13	862-0016	1	Nut, Hex (1/2-13)
14	850-0060	1	Washer, Lock - Spring (1/2")
15	526-0219	3	Washer, Flat (17/32"ID x 1"OD x 1/8"Thk)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
16	850-0048	2	Screw, Cap - Hex Head (3/8-16 x 3/4")
17	850-0050	2	Washer, Lock - Spring (3/8")
18	191-1554	1	Bracket, Mounting
19	ALTERNATOR (Includes Parts Marked £)		
	191-1257	1	12 VDC
	191-1258	1	24/32 VDC
20	REGULATOR, VOLTAGE		
	191-1389	1	12 VDC
	191-0548	1	24 VDC
	191-1259	1	32 VDC
21	868-0007	1	£Nut, Hex (5/8-18)
22	850-0070	1	£Washer, Lock-Spring (5/8")
23	515-0093	1	£Key, Woodruff (#5)
24	312-0201	1	Capacitor (Not used all applications)
25	191-0681	1	Cable, Electrical (Alternator to Regulator)
26	191-0550	1	Resistor (Used with 191-1258 Alternator)

£ - Parts included with Alternators

MISCELLANEOUS ENGINE PARTS - LEFT SIDE

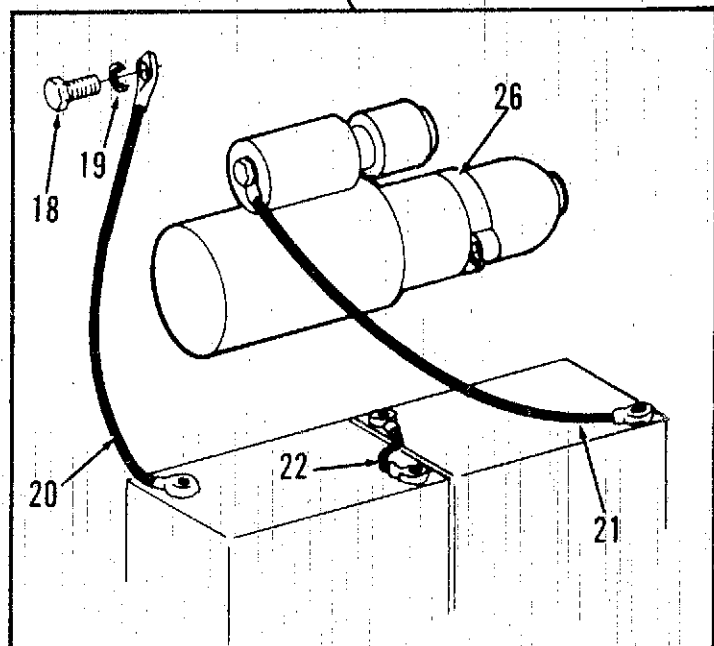
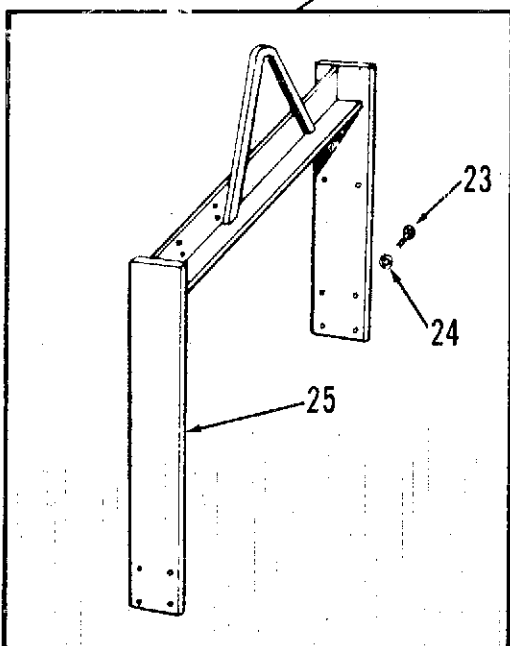
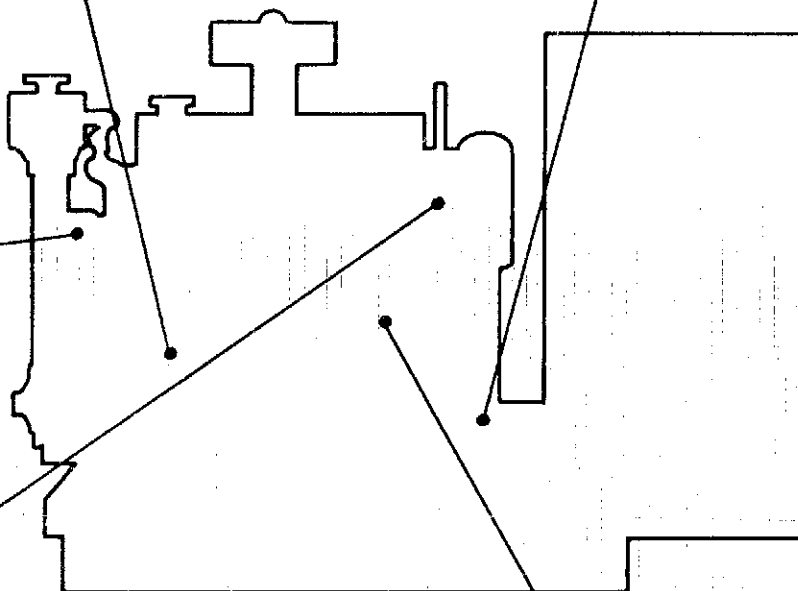
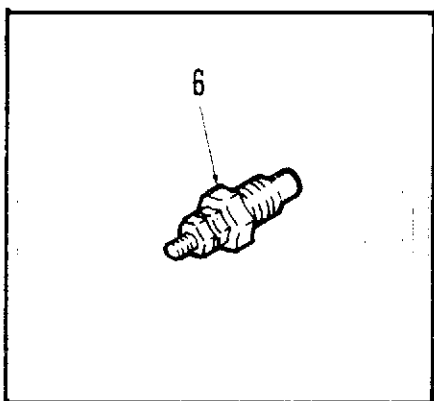
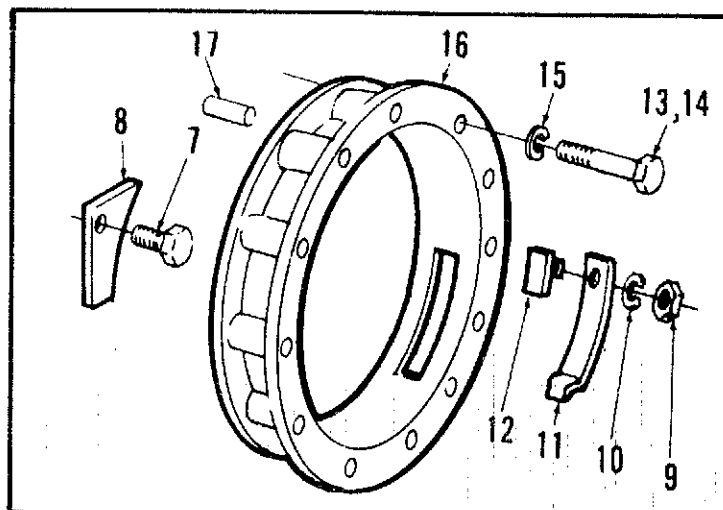
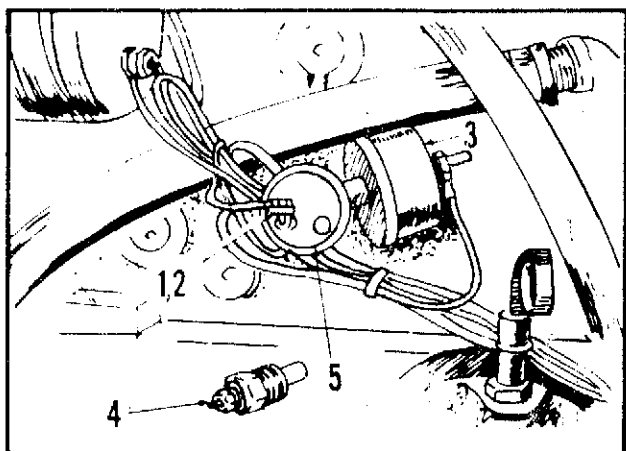


MISCELLANEOUS ENGINE PARTS - LEFT SIDE

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	WIRING HARNESS - ENGINE			9	508-0015	1	+Washer, Insulating - Fiber (#8)
	338-1692	1	Standard	10	870-0196	1	+Nut, Insulating (#8)
		1	Special (NOTE: Use Standard Wiring Harness and add electrical leads as required for optional sensors, switches per Gen Set wiring diagram)	11	332-1281	1	+Plate, Mounting - Terminal
2	193-0246	1	*Sender, Temperature - Engine Coolant	12	302-0750	1	*Sender, Tachometer
3	821-0029	1	Screw, Self-locking - Hex Washer Head (3/8-16 x 3/4")	13	302-0751	1	Tang, Drive - Tachometer Sender
4	309-0269	1	*Switch, Thermostatic - Low Engine Temperature	14	302-0757	1	Drive Assembly - Tachometer
5	800-0047	1	Screw, Cap - Hex Head (3/8-16 x 5/8")	15	503-0131	1	Clamp, Hose
6	856-0010	1	Washer, Lock - External/Internal Tooth (3/8")	16	503-0891	1	Hose, Rubber (5/8" ID x 7/8" OD x 14" Lg)
7	332-1292	1	Terminal Board (Includes Parts Marked +)	17	505-0135	1	Nipple, Pipe - Half (3/8" NPT x 1-1/2" Lg)
8	809-0035	1	+Screw, Machine - Thread Cutting, Round Head (#8 x 3/4")	18	504-0030	1	Valve, Cock - Brass (3/8" NPT)
				19	505-0101	1	Nipple, Pipe - Close (3/8" NPT x 1")
				20	102-0619	1	Adapter, Oil Drain
				21	102-0532	1	Gasket, "O" Ring
				22	505-0119	1	Elbow, Pipe - Street - 45 Deg (3/8 NPT)
				23	122-0644	1	Filter, Oil

* - Items used with fault lights or gauges on Engine Control Panel.
+ - Parts Included in Terminal Board.

MISCELLANEOUS ENGINE PARTS - RIGHT SIDE



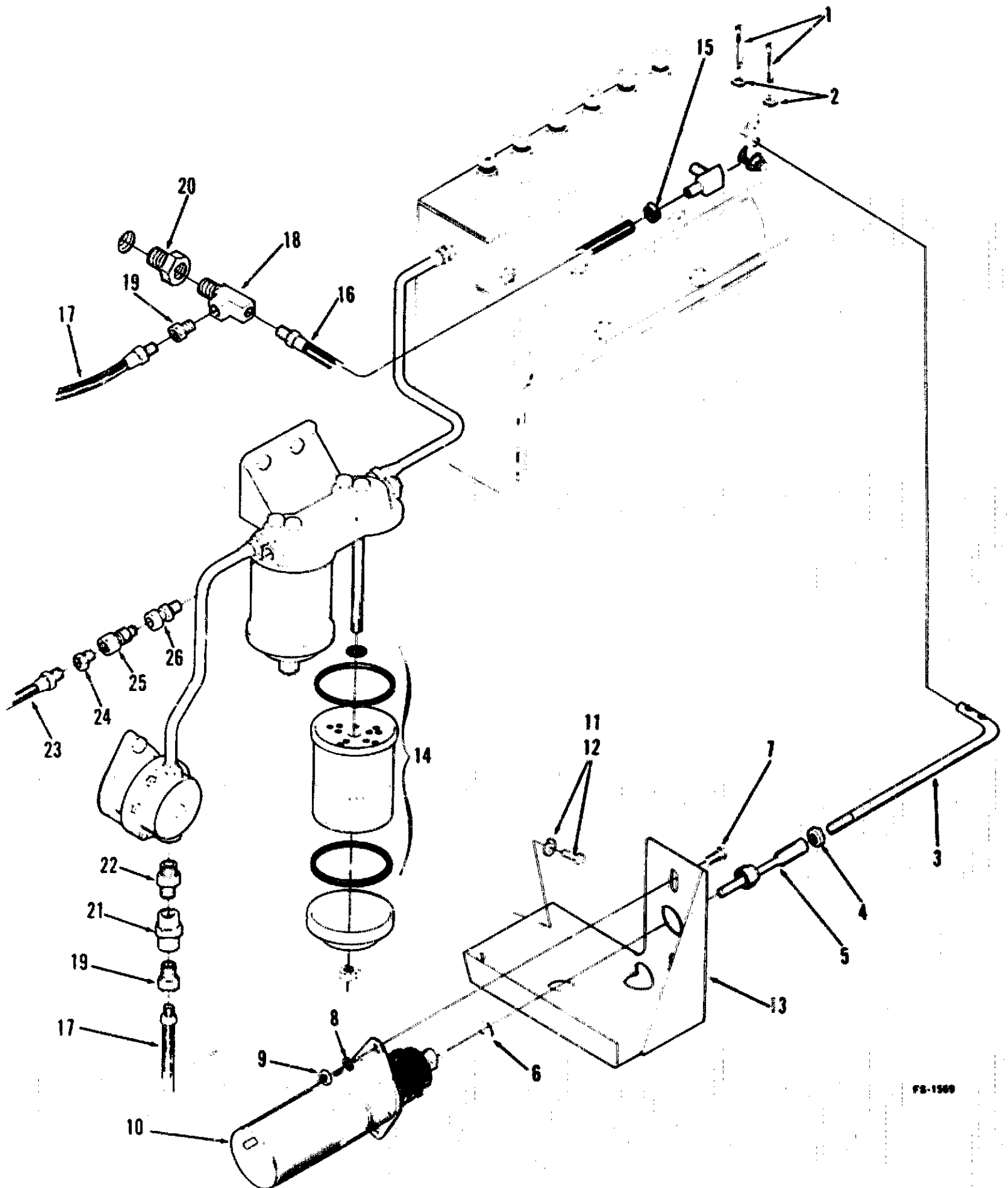
MISCELLANEOUS ENGINE PARTS - RIGHT SIDE

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	309-0064	1	*Switch, Pressure - Oil (Shutdown)
2	309-0169	1	*Switch, Pressure - Oil (Pre-Alarm)
3	193-0244	1	*Sender, Pressure - Oil
4	193-0249	1	Sender, Temperature - Oil
5	MOUNTING HARDWARE (Select as Applicable)		
	502-0058	1	Tee, Pipe - Street (1/8" NPT)
	505-0763	1	Cross, Pipe (1/8"NPT)
	505-0098	1	Nipple, Pipe - Close (1/8"NPT x 3/4")
	505-0007	1	Bushing, Reducer - Hex (1/4"NPT x 1/8"NPT)
6	*SWITCH, HIGH ENGINE TEMPERATURE		
	309-0178	1	Shutdown
	309-0179	1	Pre-Alarm
7	800-0069	1	Screw, Cap - Hex Head (7/16-14 x 3/4")
8	191-0802	1	Cover, Access - Starter
9	862-0001	2	Nut, Hex (1/4-20)
10	850-0040	2	Washer, Lock - Spring (1/4")
11	232-2210	2	Cover, Access - Generator Adapter
12	232-2211	2	Catch, Access Cover

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
13	800-0072	8	Screw, Cap - Hex Head (7/16-14 x 1-1/4")
14	800-0076	1	Screw, Cap - Hex Head (7/16-14 x 2-1/4")
15	850-0055	9	Washer, Lock - Spring (7/16")
16	231-0149	1	Adapter, Generator
17	516-0152	2	Pin, Dowel - Adapter Alignment
18	800-0071	1	Screw, Cap - Hex Head (7/16-14 x 1")
19	856-0012	1	Washer, Lock - External/Internal Tooth (7/16")
20	416-0530	1	Cable, Battery - Negative (16"Lg)
21	416-0531	1	Cable, Battery - Positive (24"Lg)
22	416-0446	1	Cable, Battery - Jumper
23	800-0072	8	Screw, Cap - Hex Head (7/16-14 x 1-1/4")
24	850-0055	8	Washer, Lock - Spring (7/16")
25	403-0836	1	Bracket, Lifting
26	STARTER		
	191-0722	1	12 VDC
	191-0703	1	24/32 VDC

* - Items used with fault lights or gauges on Engine Control Panel.

FUEL SYSTEM

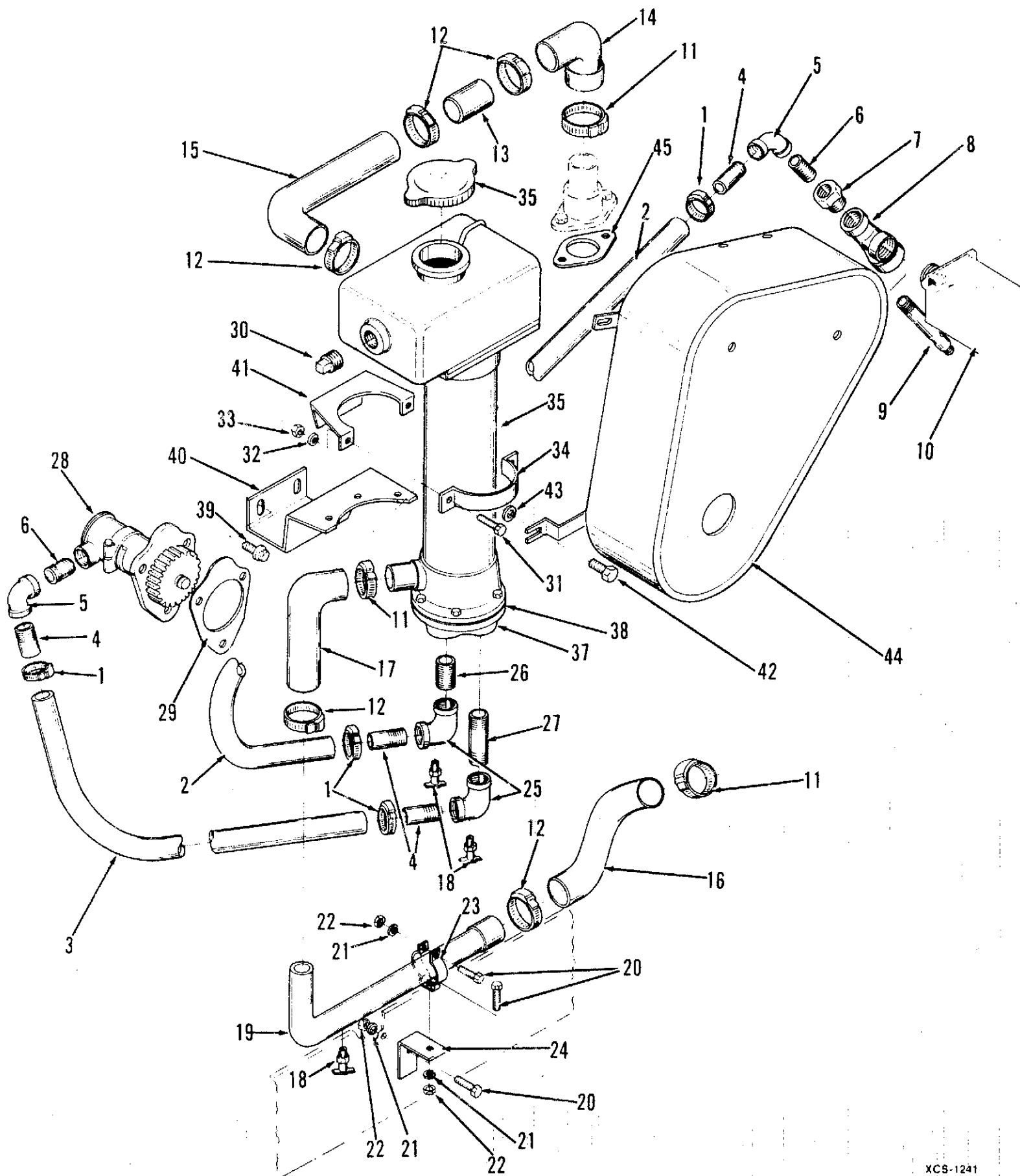


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FUEL SYSTEM

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	516-0027	2	Pin, Cotter (1/16" x 1/2" Lg)	17	501-0242	2	Line, Fuel - Flexible (24" Lg, 5/8-18 Female Swivel both ends)
2	526-0016	2	Washer, Flat (17/64" ID x 9/16" OD x 1/32" Thk)	18	502-0058	1	Tee, Pipe - Street (1/8-27 NPT)
3	ROD, ACTUATING - FUEL VALVE			19	502-0577	2	Adapter, Pipe - Hex (5/8-18 x 1/8-27 NPT)
	150-1943	1	MDEH (4-3/4" Lg)	20	502-0306	1	Adapter, Pipe - Hex (5/16-24 x 1/8-27 NPT)
	150-1944	1	MDEG (9" Lg)	21	502-0051	1	Coupling, Pipe (1/8-27 NPT)
4	862-0001	1	Nut, Hex (1/4-20)	22	502-0193	1	Connector, Pipe - Male (1/8-27 NPT x 1/2-20 SAE)
5	150-1945	1	Ball Joint	23	501-0227	1	Line, Fuel - Flexible (24" Lg, 1/8-27 Male x 1/8-27 Male Swivel)
6	850-0040	1	Washer, Lock - Spring (1/4")	24	505-0007	1	Bushing, Reducer - Hex (1/4-18 NPT x 1/8-27 NPT)
7	812-0150	2	Screw, Machine - Round Head (1/4-20 x 5/8")	25	502-0678	1	Adapter, Pipe - Hex (1/4-18 NPT Female x 9/16-18 UNF Male SAE 37 Deg)
8	850-0040	2	Washer, Lock - Spring (1/4")	26	502-0872	1	Adapter, Pipe - Hex (9/16-18 Female SAE 37 Deg x M14 x 1.5 MM)
9	862-0001	2	Nut, Hex (1/4-20)				
10	307-1904	1	Solenoid - 12 VDC				
11	800-0071	2	Screw, Cap - Hex Head (7/16-14 x 1")				
12	850-0055	2	Washer, Lock - Spring (7/16")				
13	306-0214	1	Bracket, Mounting - Solenoid				
14	149-1697	2	Element - Fuel Filter (Includes Gaskets)				
15	503-0685	1	Clamp Hose				
16	LINE, FUEL - FLEXIBLE						
	501-0481	1	MDEH (20" Lg x 1/8-27 NPT Male)				
	501-0480	1	MDEG (30" Lg x 1/8-27 NPT Male)				

COOLING SYSTEM WITH HEAT EXCHANGER

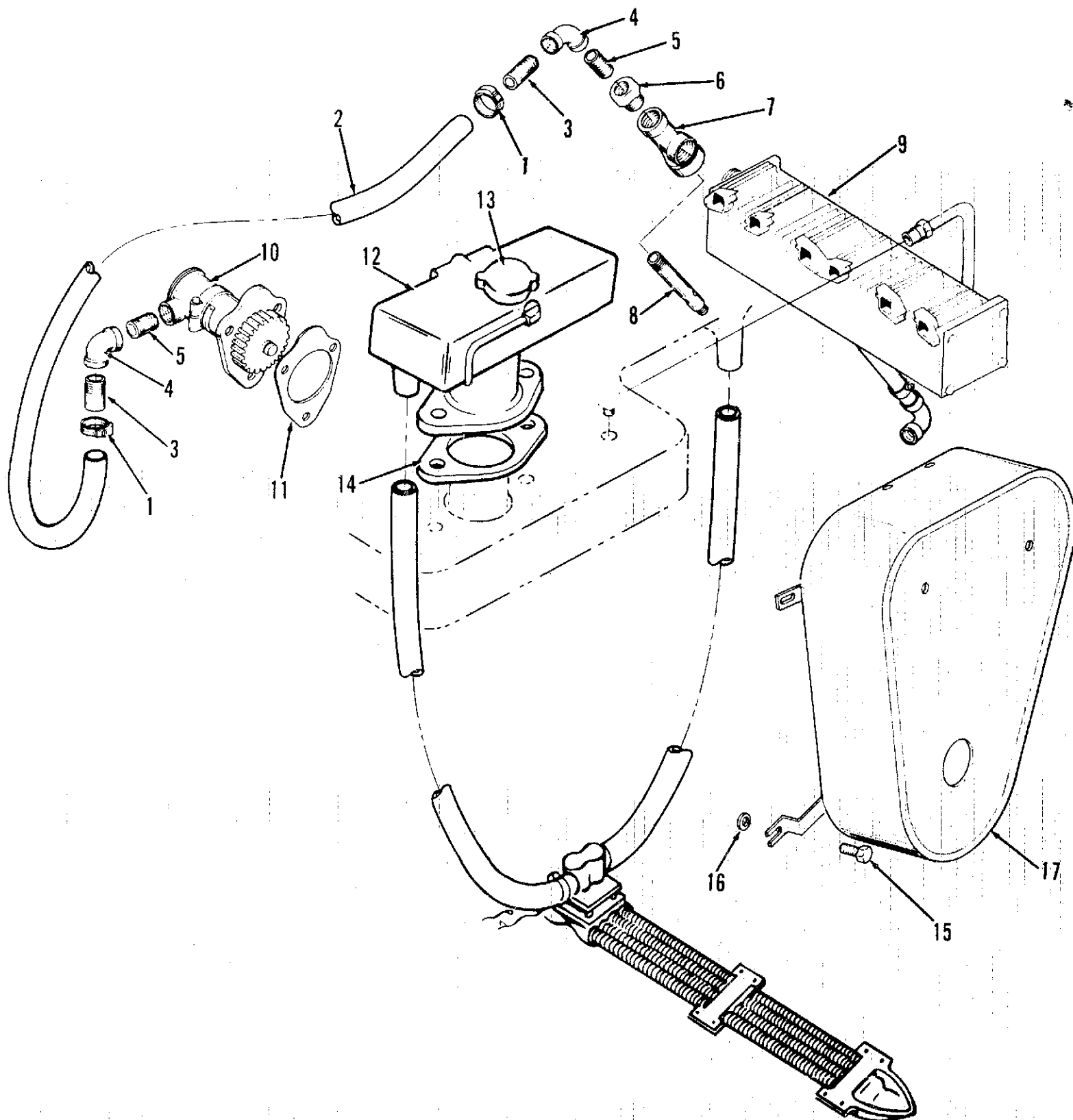


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COOLING SYSTEM WITH HEAT EXCHANGER

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0189	4	Clamp, Hose
2	503-1202	1	Hose, Rubber (1" ID x 1-3/8" OD x 72" Lg)
3	503-1163	1	Hose, Rubber (1" ID x 1-3/8" OD x 24" Lg)
4	505-0907	4	Nipple, Pipe - Half, Brass (3/4" NPT x 2" Lg)
5	505-0909	2	Elbow, Pipe - 90 Deg, Brass (3/4" NPT)
6	505-0912	2	Nipple, Pipe - Close, Brass (3/4" NPT)
7	505-0772	1	Bushing, Reducer - Hex (1-1/4" NPT x 3/4" NPT)
8	505-1334	1	Tee, Pipe - Reducing (2-1/2" NPT x 1-1/4" NPT x 2-1/2" NPT)
9	130-0725	1	Tube, Injection - Water
10		REF	Manifold, Exhaust - Liquid Cooled (See Separate Figure for Components)
11	503-0365	3	Clamp, Hose
12	503-0004	5	Clamp, Hose
13	130-0508	1	Adapter, Tube
14	503-1218	1	Hose, Rubber - Preformed
15	503-0553	1	Hose, Rubber - Preformed
16	503-1216	1	Hose, Rubber - Preformed
17	503-0553	1	Hose, Rubber - Preformed
18	504-0005	3	Cock, Drain (1/8" NPT)
19	130-2230	1	Tube, Preformed
20	800-0007	3	Screw, Cap - Hex Head (1/4-20 x 1")
21	850-0040	3	Washer, Lock - Spring (1/4")
22	862-0001	3	Nut, Hex (1/4-20)
23	331-0101	1	Hanger, Pipe
24	130-2231	1	Bracket, Angle
25	505-0938	2	Elbow, Pipe - 90 Deg, Reducing, with Tapped Drain Port (1" NPT x 3/4" NPT)
26	505-1314	1	Nipple, Pipe - Brass (1" NPT x 4-1/2" Lg)
27	505-1315	1	Nipple, Pipe - Brass (1" NPT x 6" Lg)
28	132-0274	1	Pump, Water - Replacement (Does Not Include Mounting Adapter and Gear)
29	132-0273	1	Gasket
30	505-0130	1	Plug, Pipe - Square Head (3/4" NPT)
31	800-0007	2	Screw, Cap - Hex Head (1/4-20 x 1")
32	850-0040	2	Washer, Lock - Spring (1/4")
33	862-0001	2	Nut, Hex (1/4-20)
34	130-0722	1	Clamp
35	130-0505	1	Heat Exchanger (Includes End Bonnet, Gasket, Pressure Cap)
36	130-0900	1	Cap, Radiator (4 Lb)
37	130-0901	1	Bonnet, End
38	130-0902	1	Gasket
39	821-0016	4	Screw, Self-locking - Hex Washer Head (5/16-18 x 3/4")
40	130-2228	1	Bracket, Support - Lower
41	130-2227	1	Bracket, Support - Upper
42	800-0048	3	Screw, Cap - Hex Head (3/8-16 x 3/4")
43	526-0029	2	Washer, Flat (3/8")
44	130-2223	1	Guard, Belt
45	130-1016	1	Gasket - Water Outlet

COOLING SYSTEM WITH KEEL COOLER



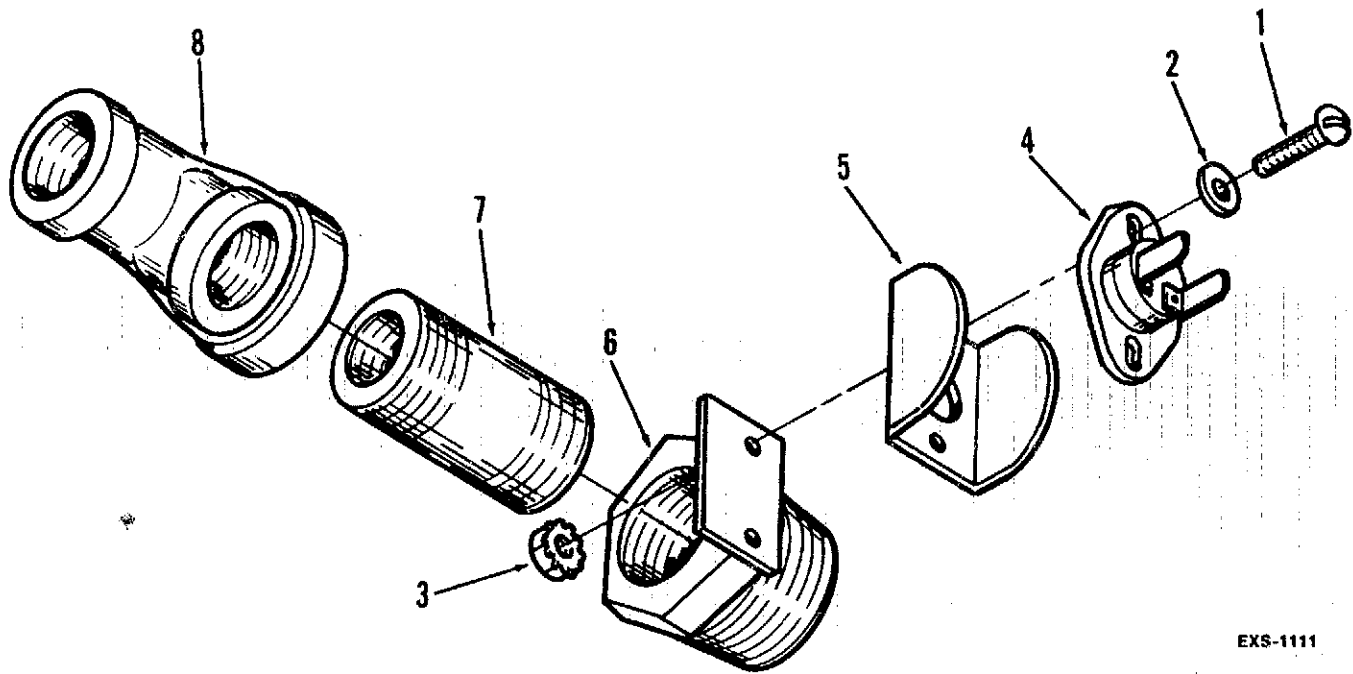
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KEEL COOLING SYSTEM

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0189	2	Clamp, Hose
2	503-1164	1	Hose, Rubber (1" ID x 1-3/8" OD x 48" Lg)
3	505-0907	2	Nipple, Pipe - Half, Brass (3/4" NPT x 2" Lg)
4	505-0909	2	Elbow, Pipe - 90 Deg. Brass (3/4" NPT)
5	505-0912	2	Nipple, Pipe - Close, Brass (3/4" NPT)
6	505-0772	1	Bushing, Reducer - Hex (1-1/4" NPT x 3/4" NPT)
7	505-1334	1	Tee, Pipe - Reducing (1-1/4" NPT x 2-1/2" NPT x 2-1/2" NPT)
8	130-0725	1	Tube, Injection - Water
9		REF	Manifold, Exhaust - Liquid Cooled (See Separate Figure for Components)
10	132-0274	1	Pump, Water - Replacement (Does Not Include Adapter and Gear)
11	132-0273	1	Gasket
12	130-0705	1	Tank, Expansion (Includes Cap)
13	130-0900	1	Cap, Radiator (4 Lb)
14	130-1016	1	Gasket
15	800-0048	3	Screw, Cap - Hex Head (3/8-16 x 3/4")
16	526-0029	2	Washer, Flat (3/8")
17	130-2223	1	Guard, Belt

NOTE: See your authorized Onan Marine Dealer for parts or service on items installed between the Generator Set and the Keel Cooler.

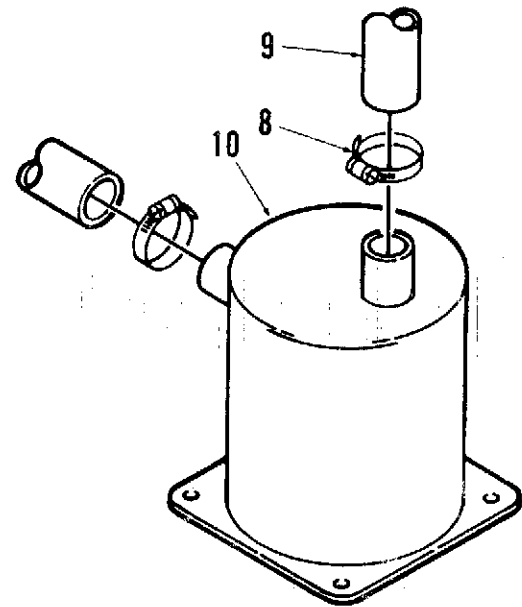
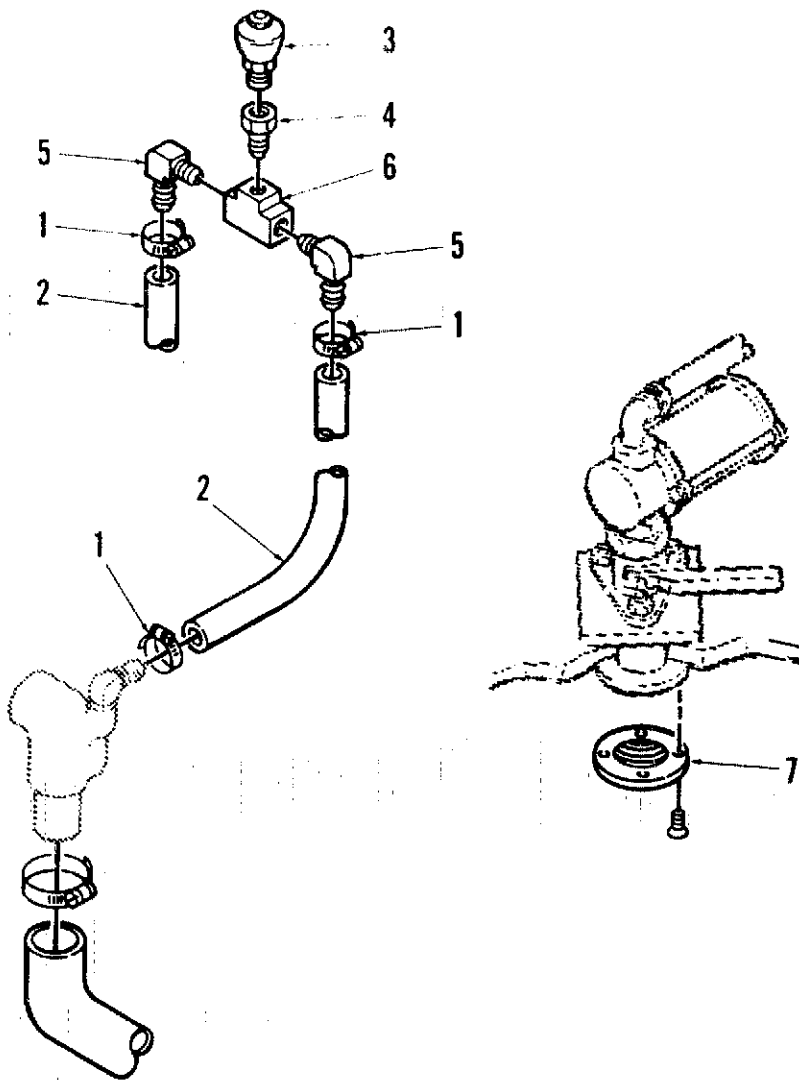
HIGH EXHAUST TEMPERATURE SWITCH



EXS-1111

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
2	526-0018	2	Washer, Flat (17/64" ID x 5/8" OD x 1/16" Thk)
3	870-1183	2	Nut, With ET Lockwasher (#6-32)
4	309-0484	1	Switch, High Temperature
5	309-0501	1	Shield, Switch
6	BUSHING WITH SWITCH MOUNTING PLATE		
	505-1338	1	MDEG (3" NPT x 2-1/2" NPT)
	505-1337	1	MDEH (2-1/2" NPT x 2" NPT)
7	NIPPLE, PIPE		
	505-0114	1	MDEG (2-1/2" NPT x 3")
	505-0645	1	MDEH (2" NPT x 3")
8	TEE, PIPE - REDUCING		
	505-1334	1	MDEG (2-1/2" NPT x 1-1/4" NPT x 2-1/2" NPT)
	505-0771	1	MDEH (2" NPT x 1-1/4" NPT x 2" NPT)

MARINE EXHAUST SYSTEM

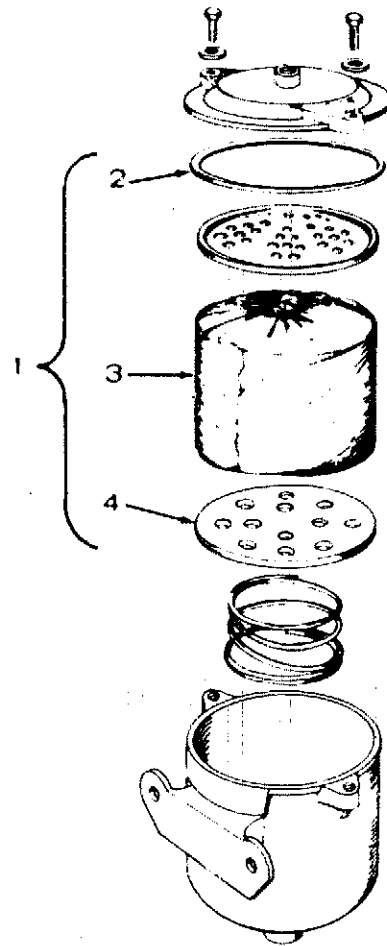


EXS-1109

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CLAMP, HOSE (Select)		
	503-0685	4	3/8" to 1/2" Hose Size
	503-0446	4	7/16" to 3/4" Hose Size
	503-0547	4	1/2" to 7/8" Hose Size
	503-0183	4	9/16" to 1-1/16" Hose Size
	503-0398	4	13/16" to 1-3/4" Hose Size
2	HOSE, RUBBER (Select)		
	503-0890	2	1/2" ID x 27/32" OD x 24" LG
	503-0658	2	1/2" ID x 27/32" OD x 48" LG
	503-0803	2	1/2" ID x 27/32" OD x 144" LG
	503-1163	2	1" ID x 1-3/8" OD x 24" LG
	503-1202	2	1" ID x 1-3/8" OD x 72" LG
3	504-0062	1	Valve, Vacuum Relief (1/2" NPT)
4	502-0270	1	Adapter, Hex - Brass (3/8" NPT x 1/2" NPT)
5	ELBOW, PIPE TO HOSE (Select)		
	502-0237	2	1/2" NPT x 3/8" ID Hose
	502-0881	2	3/4" NPT x 1" ID Hose
6	TEE, PIPE - BRASS (Select)		
	502-0090	1	3/8" NPT - three places
	502-0883	1	3/4" NPT x 3/4" NPT x 1/2" NPT
7	155-1002	1	Strainer, Water - Thru Hull

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	CLAMP, HOSE (Select)		
	503-0429	8	1-1/16" to 2" Hose Size
	503-0365	8	1-9/16" to 2-1/2" Hose Size
	503-0514	8	1-13/16" to 3" Hose Size
	503-0354	8	2-1/2" to 3-1/4" Hose Size
	503-0648	8	2-9/16" to 3-1/2" Hose Size
	503-0612	8	3-5/16" to 4-1/4" Hose Size
	503-1180	8	4" to 4-3/4" Hose Size
9	HOSE, EXHAUST - MARINE (Select)		
	503-1293	1	1-5/8" ID x 2-1/32" OD x 120" LG
	503-1296	1	1-7/8" ID x 2-9/32" OD x 120" LG
	503-1320	1	2" ID x 2-13/32" OD x 120" LG
	503-1299	1	2-1/4" ID x 2-5/8" OD x 120" LG
	503-1302	1	2-1/2" ID x 2-15/16" OD x 120" LG
	503-1305	1	2-7/8" ID x 3-7/16" OD x 120" LG
	503-1308	1	3-1/2" ID x 4-3/32" OD x 120" LG
10	MUFFLER, EXHAUST - MARINE		
	155-2029	1	2" OD Inlet/Outlet Tubes
	155-2009	1	2-1/4" OD Inlet/Outlet Tubes
	155-2010	1	2-1/2" OD Inlet/Outlet Tubes
	155-2011	1	2-7/8" OD Inlet/Outlet Tubes
	155-2012	1	3-1/2" OD Inlet/Outlet Tubes

ENGINE COOLANT FILTER ASSEMBLY



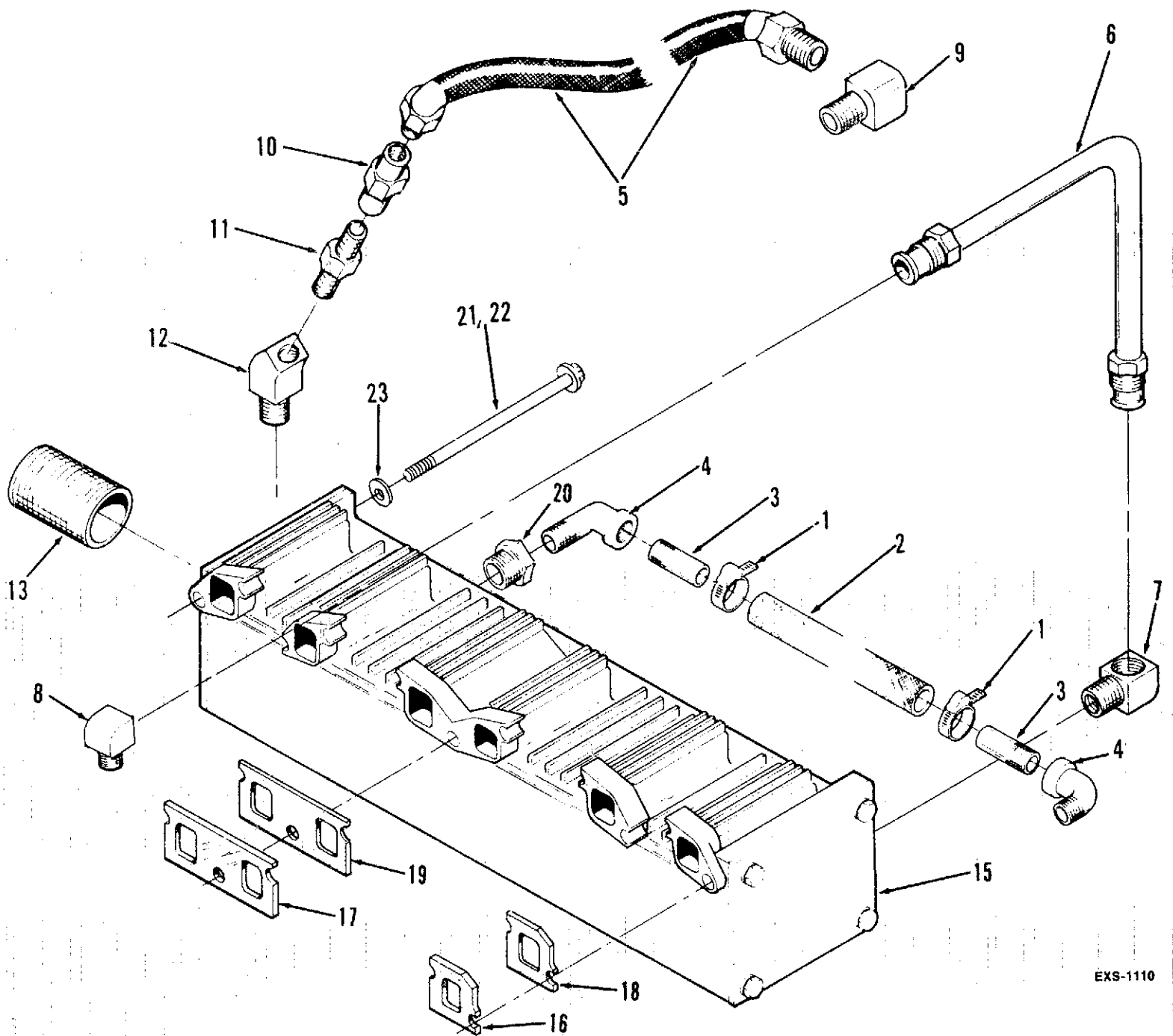
CS-1059

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	FILTER ASSEMBLY, ENGINE COOLANT		
	130-0462	1	15 to 30 Gallon Capacity (Replacement Items Marked £)
	130-0497	1	5 to 10 Gallon Capacity (Replacement Items Marked †)
1	KIT REPLACEMENT - FILTER (Includes Items 2 Thru 4)		
	130-0769	1	£Original Equipment (Water Coolant)
	130-0770	1	£Special (Perm. Anti-Freeze Coolant)
	130-0771	1	†Original Equipment (Water Coolant)
	130-0772	1	†Special (Perm. Anti-Freeze Coolant)
2	GASKET, COVER		
	130-0777	1	£
	130-0778	1	†
3	ELEMENT, FILTER		
	130-0773	1	£Chromate (Water Coolant)
	130-0774	1	£Special (Perm. Anti-Freeze Coolant)
4	PLATE, SACRIFICIAL		
	130-0779	1	£
	130-0780	1	†

£ - **NOTE:** Used on 130-0462 Filter Assembly

† - **NOTE:** Used on 130-0497 Filter Assembly

EXHAUST MANIFOLD (LIQUID COOLED)



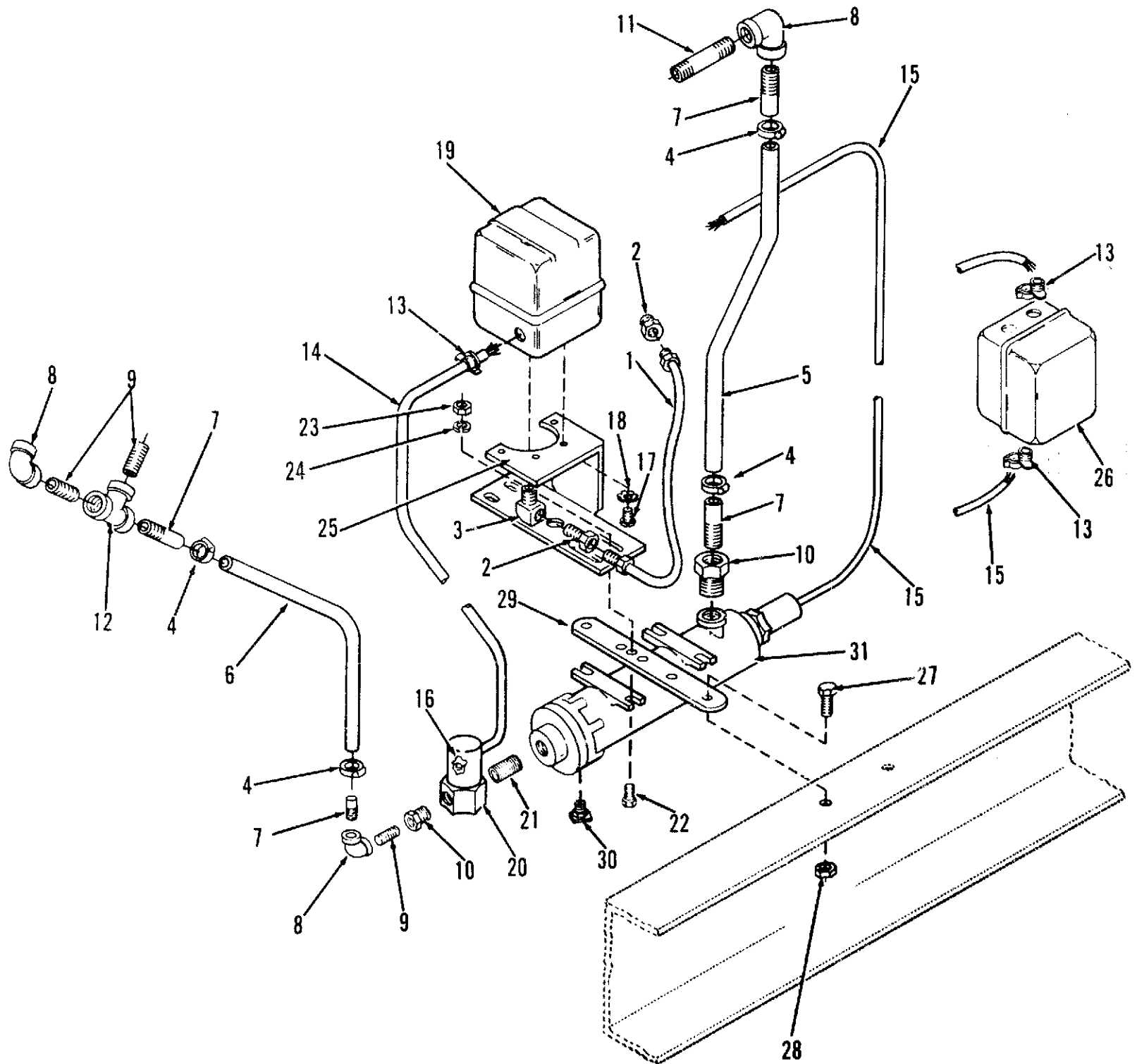
EXS-1110

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0183	2	Clamp, Hose
2	503-1168	1	Hose, Rubber (5/8" ID x 61/64" OD x 24" Lg)
3	505-0135	2	Nipple, Pipe - Half (3/8" NPT x 1-1/2" Lg)
4	505-0120	2	Elbow, Pipe - Street 90 Deg (3/8" NPT)
5	501-0225	1	Line, Fuel - Flexible (1/8 NPT Male x 1/4 SAE Male x 45" Lg)
6	130-0226	1	Line, Water
7	502-0073	1	Elbow, Pipe to Tube - 90 Deg
8	502-0074	1	Elbow, Pipe to Tube - 90 Deg
9	502-0020	1	Elbow, Pipe Street, 90 Deg (1/8 NPT)
10	502-0051	1	Coupling, Pipe - Hex (1/8 NPT x 9/16")
	502-0082	1	Nipple, Pipe - Hex (1/8 NPT)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
12	502-0053	1	Elbow, Pipe - Street 45 Deg (1/8 NPT)
13	505-0103	1	Nipple, Pipe - Close 2-1/2" NPT x 2-1/2" Lg
15	154-2416	1	Manifold, Exhaust - Liquid Cooled
16	154-2421	4	Shim
17	154-2422	1	Shim
18	154-2423	4	Gasket
19	154-2424	1	Gasket
20	505-0019	1	Bushing, Reducer - Hex (1/2 NPT x 3/8 NPT)
21	800-0156	2	Screw, Cap - Hex Head (3/8-16 x 5-1/4")
22	800-0065	1	Screw, Cap - Hex Head (3/8-16 x 4 3/4")
23	526-0066	3	Washer, Flat (3/8")

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ENGINE COOLANT HEATER (HORIZONTAL TANK)



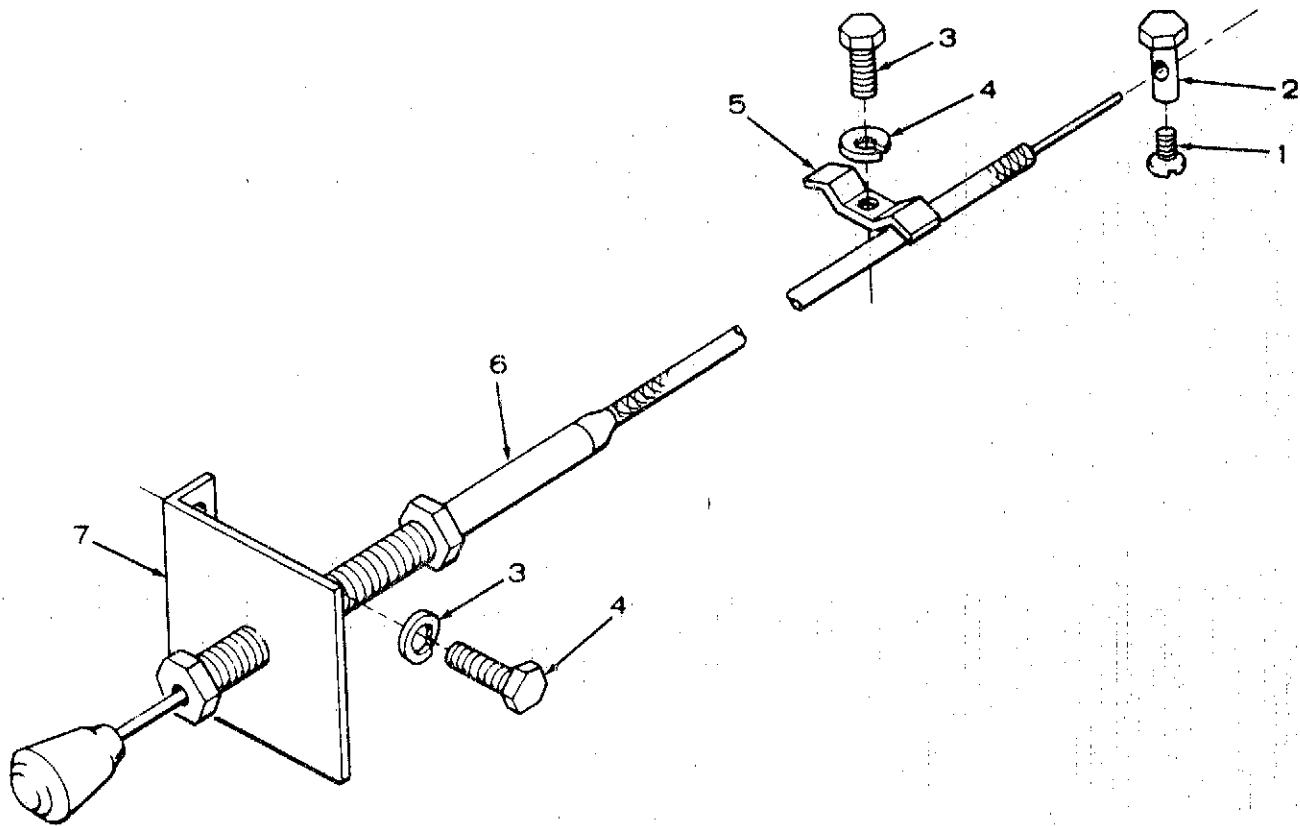
KCS-1240

ENGINE COOLANT HEATER ASSEMBLY (HORIZONTAL TANK)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
ENGINE COOLANT HEATER ASSEMBLY				16	TERMINALS (Select as Required)		
		1	115 Volt, 1 Phase		332-0014	2	#10 (Used on White Leads)
		1	208 Volt, 1 Phase		332-0149	4	#8 (Used on White Leads)
		1	208 Volt, 3 Phase		323-0957	4	Wire, Nut Type (Used on Black Leads)
		1	240 Volt, 1 Phase	17	812-0079	4	Screw, Machine - Round Head (#8-32 x 1/2")
		1	380 Volt, 1 Phase				
		1	380 Volt, 3 Phase	18	854-0007	4	Washer, Lock - ET (#8)
		1	480 Volt, 1 Phase	19	309-0307	1	Switch, Pressure
		1	480 Volt, 3 Phase	20	309-0304	1	Switch, Thermostatic
1	501-0227	1	Line, Fuel - Flexible	21	505-0004	1	Nipple, Pipe - Close (1"NPT x 1-1/4"Lg)
2	505-0007	2	Bushing, Reducer - Hex (1/4"NPT x 1/8"NPT)	22	800-0007	4	Screw, Cap - Hex Head (1/4-20 x 1")
3	502-0054	1	Elbow, Pipe - Street, 90 Deg. Brass (1/4 NPT)	23	862-0001	4	Nut, Hex (1/4-20)
4	503-0183	4	Clamp, Hose	24	850-0040	4	Washer, Lock - Spring (1/4")
5	503-0146	1	Hose, Rubber (5/8"ID x 61/64"OD x 32"Lg)	25	333-0224	1	Bracket, Support - Pressure Switch
6	503-0261	1	Hose, Rubber (5/8"ID x 61/64"OD x 9"Lg)	26	CONTACTOR, ELECTRICAL (Select as Applicable)		
7	505-0135	4	Nipple, Pipe - Half (3/8"NPT x 1-1/2"Lg)		307-1460	1	230 VAC, 3 Pole
8	505-0039	3	Elbow, Pipe - 90 Deg (3/8"NPT)		307-1164	1	460 VAC, 3 Pole
9	505-0101	3	Nipple, Pipe - Close (3/8"NPT x 1"Lg)	27	821-0018	4	Screw, Self-Locking - Hex Washer Head (5/16-18 x 3/4")
10	505-0455	2	Bushing, Reducer - Hex (1"NPT x 3/8"NPT)	28	870-0257	4	Nut, Self-Locking, Hex Washer Head (5/16-18)
11	505-0076	1	Nipple, Pipe (3/8"NPT x 3"Lg)	29	130-1191	2	Bracket, Mounting - Heater
12	505-0060	1	Tee, Pipe (3/8"NPT)	30	504-0003	1	Cock, Drain (1/4"NPT)
13	331-0027	6	Clamp Cable	31	HEATER, ELECTRICAL - ENGINE COOLANT (Select as Applicable)		
14	#		Cord, Electrical (2-#14, Type 60, 600 Volt)		333-0158	1	2000 Watts, 115 Volt, 1 Phase
15	CABLE, ELECTRICAL (TYPE SO, 600 Volt)				333-0167	1	2000 Watts, 208 Volt, 1 Phase
	#		3 - #12 (Used on Single Phase Hookup)		333-0148	1	2000 Watts, 208 Volt, 3 Phase
	#		4 - #14 (Used on Three Phase Hookup)		333-0141	1	2000 Watts, 240 Volt, 3 Phase
					333-0176	1	2000 Watts, 380 Volt, 1 Phase
					333-0170	1	2000 Watts, 380 Volt, 3 Phase
					333-0147	1	2000 Watts, 480 Volt, 1 Phase
					333-0146	1	2000 Watts, 480 Volt, 3 Phase

- Electrical Cable and Cord shown for Reference Purpose only.

VERNIER THROTTLE



M-1179

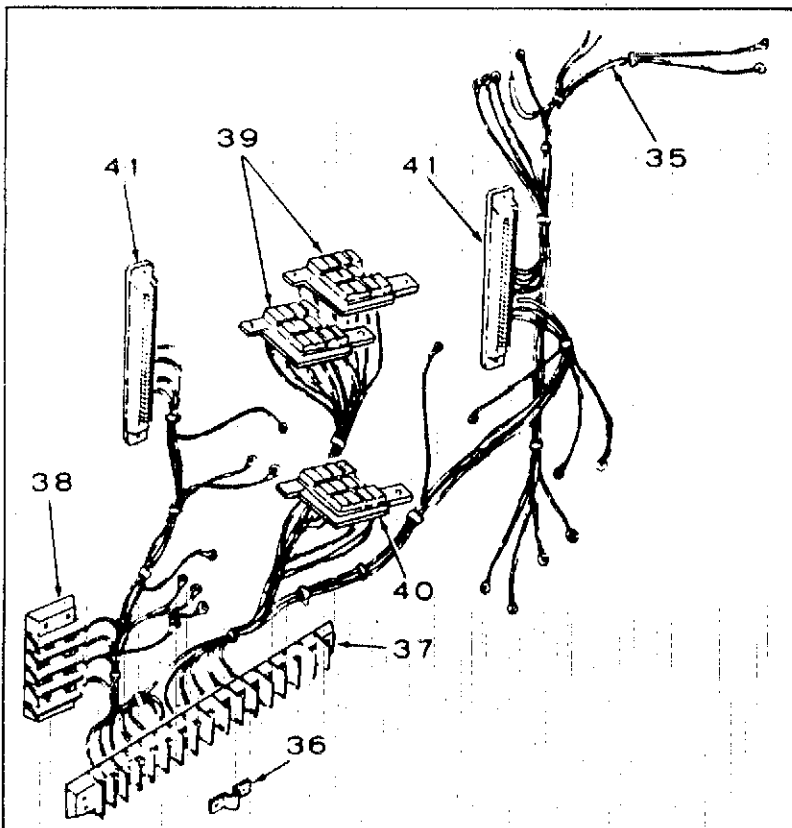
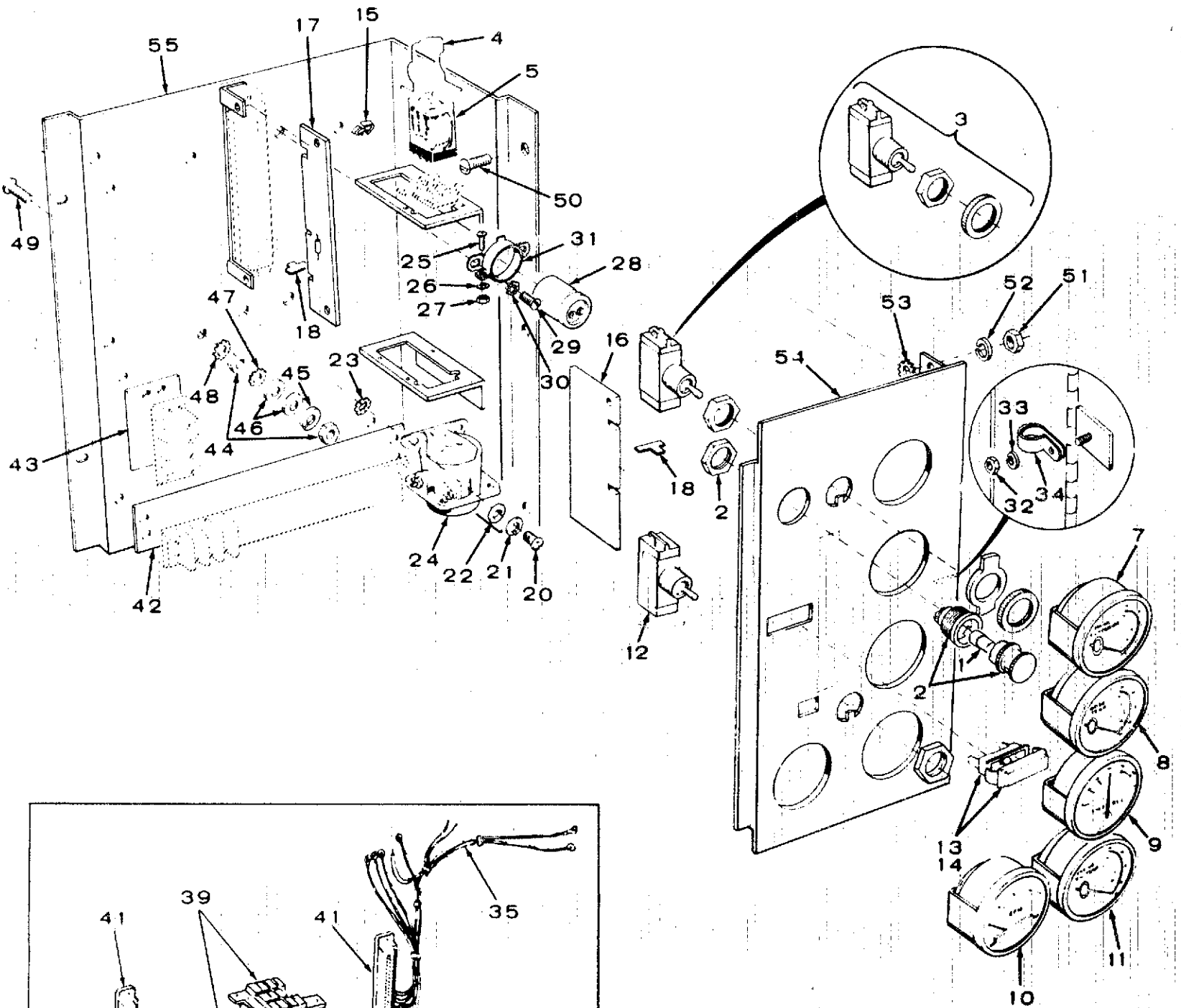
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0075	1	Screw, Machine - Round Head (#8-32 x 1 4")
2	152-0158	1	Swivel
3	800-0005	3	Screw, Cap - Hex Head (1 4-20 x 3 4")
4	850-0040	3	Washer, Lock - Spring (1 4")
5	152-0036	1	Clamp, Holddown - Cable
6	152-0120	1	Throttle Control - Vernier
7	151-0230	1	Bracket, Mounting - Throttle Control

Control Section

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ENGINE CONTROL WITH ONE FAULT LIGHT (12 VDC)



SC-1147

ENGINE CONTROL WITH ONE FAULT LIGHT (12 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0004	1	Lamp Incandescent (12 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holddown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (12 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1058	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1058	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	34	332-0051	1	Clamp, Loop
8	193-0245	1	Gauge - Water Temperature (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL		
9	302-0061	1	Ammeter	338-1065		1	Includes parts marked †
10	302-0749	1	£Tachometer - Electrical	ATTACHING HARDWARE FOR WIRING HARNESS			
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)	812-0061	4	Screw, Machine - Round Head (#6-32 x 3/8")	
12	SWITCH, TOGGLE - SELECTOR			812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")	
	308-0138	1	Standard & Cycle Cranking Controls		853-0003	14	Washer, Lock - ET (#6)
	308-0327	1	Penn State Controls		860-0006	10	Nut, Hex (#6-32)
13	*LIGHT, INDICATOR (Lens Color & Legend Listed Below)			36	332-1043	1	†Jumper, Terminal
	322-0128	1	Red - Fault - 14 VDC	37	332-0795	1	†Block, Terminal - 16 Place
14	322-0136	1	*Light, Indicator - 14 VDC (Red Lens - No Legend)	38	332-0537	1	†Block, Terminal - 4 Place
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	39	323-0765	2	†Socket, Relay - 11 Place
16	PRINTED CIRCUIT BOARD ASSEMBLY			40	323-0764	1	†Socket, Relay - 8 Place
	300-0733	1	Standard Cranker (12 VDC)	41	332-1271	2	†Connector, Electrical - PC BD
	300-0714	1	Cycle Cranker (12 VDC)	42	332-1241	1	Strip, Marker - Terminal
17	PRINTED CIRCUIT BOARD ASSEMBLY			43	332-1239	1	Strip, Marker - Terminal
	300-0679	1	Engine Control Monitor - Standard	GROUND TERMINAL ASSEMBLY (Includes parts marked #)			
	300-0730	1	Engine Control Monitor - Penn State	44	871-0010	2	#Nut, Hex - Brass (#10-32)
18	332-1276	4	Plug, Keying - PC Board	45	850-0030	1	#Washer, Lock - Spring (#10)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	46	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)
21	850-0030	2	Washer, Lock - Spring (#10)	47	853-0008	1	#Washer, Lock - ET (#10)
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	48	856-0003	1	#Washer, Lock - EIT (#10)
23	856-0003	2	Washer, Lock - EIT (#10)	49	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")
24	307-1031	1	Relay, Solenoid - Start (12 VDC)	50	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	51	870-0053	1	Nut, Hex (#10-32)
				52	850-0030	1	Washer, Lock - Spring (#10)
				53	856-0003	1	Washer, Lock - EIT (#10)
				54	PANEL, CONTROL - ENGINE		
					301-3165	1	With Three Gauge Mtg. Holes
					301-3286	1	With Four Gauge Mtg. Holes
					301-3396	1	With Five Gauge Mtg. Holes
				55	301-3253	1	Bracket, Mounting Engine Control

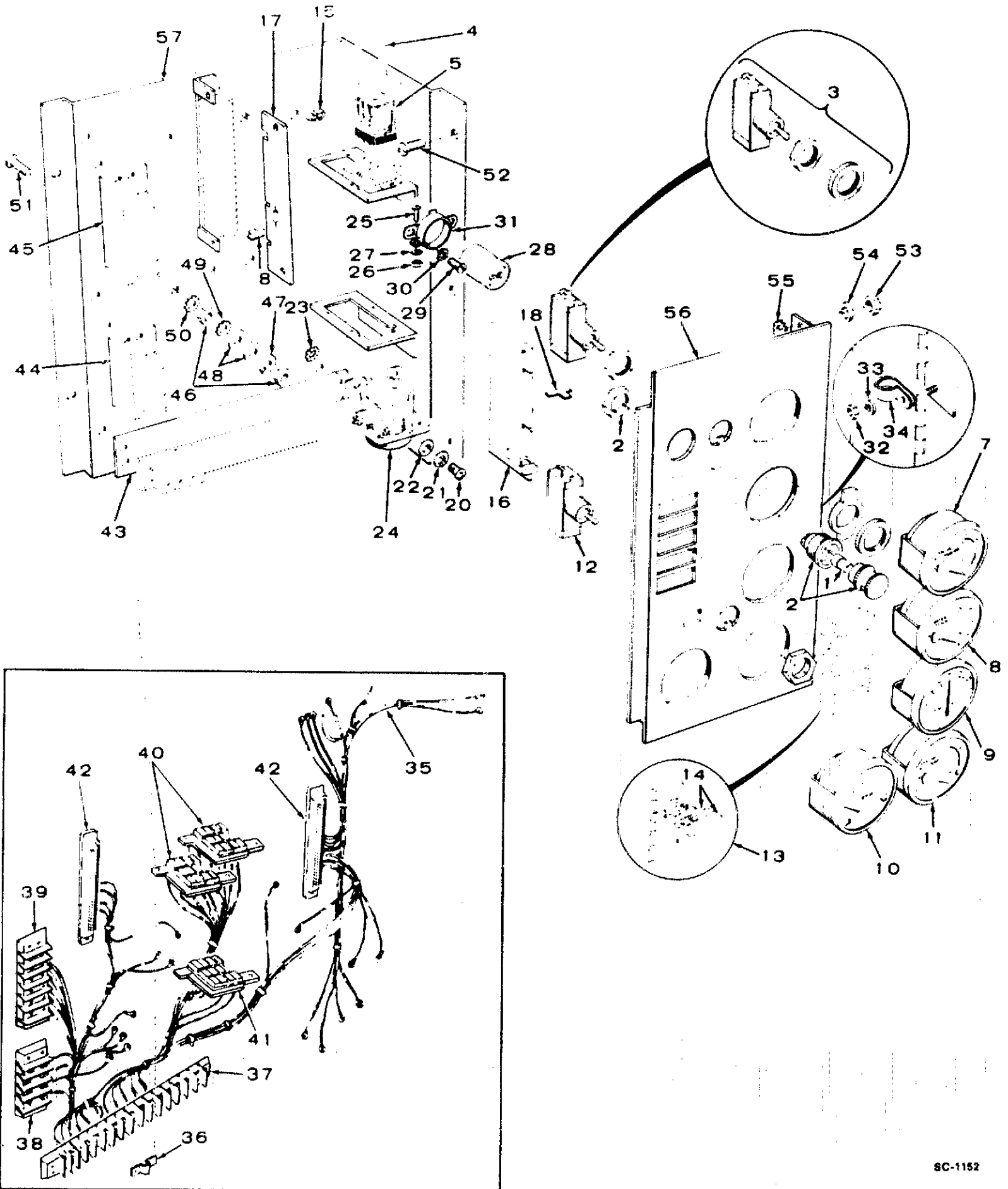
* - NOTE: For lamp replacement order 322-0136 remove and discard plain red lens; install lens with legend from burned out light — lights snap in and out of panel

£ - Optional items used with Engine Mounted Senders.

† - Parts includes in Wiring Harness

- Parts includes in Ground Terminal Assembly

ENGINE CONTROL WITH FIVE FAULT LIGHTS (12 VDC)



8C-1152

ENGINE CONTROL WITH FIVE FAULT LIGHTS (12 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0004	1	Lamp Incandescent (12 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holddown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (12 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1058	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1058	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	34	332-0051	1	Clamp, Loop
8	193-0245	1	Gauge - Water Temperature (12 VDC)	35	HARNES, WIRING - ENGINE CONTROL		
9	302-0061	1	Ammeter		338-1066	1	Includes Parts Marked †
10	302-0749	1	£Tachometer - Electrical		ATTACHING HARDWARE FOR WIRING HARNESS		
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)		812-0063	6	Screw, Machine - Round Head (#6-32 x 1/2")
12	SWITCH, TOGGLE - SELECTOR				812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")
	308-0138	1	Standard & Cycle Cranking Controls		853-0003	14	Washer, Lock - ET (#6)
	308-0327	1	Penn State Controls		860-0006	10	Nut, Hex (#6-32)
13	LIGHT, INDICATOR-14 VDC (Lens Color & Legend Listed Below)			36	332-1043	1	†Jumper, Terminal
	322-0107	1	Red - OVERCRANK	37	332-0795	1	†Block, Terminal - 20 Place
	322-0111	1	Red - OVERSPEED	38	332-0537	1	†Block, Terminal - 4 Place
	322-0108	1	Red - LO OIL PRESS	39	332-0699	1	†Block, Terminal - 6 Place
	322-0109	1	Red - HI ENG TEMP	40	323-0765	2	†Socket, Relay - 11 Place
	322-0110	2	Red - LO ENG TEMP	41	323-0764	2	†Socket, Relay - 8 Place
14	322-0136	1	*Light, Indicator - 14 VDC (Red Lens - No Legend)	42	332-1271	1	†Connector, Electrical - PC BD
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	43	332-1559	1	Strip, Marker - Terminal
16	PRINTED CIRCUIT BOARD ASSEMBLY			44	332-1239	1	Strip, Marker - Terminal
	300-0733	1	Standard Cranker (12 VDC)	45	332-1240	1	Strip, Marker - Terminal
	300-0714	1	Cycle Cranker (12 VDC)		GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)		
17	PRINTED CIRCUIT BOARD ASSEMBLY			46	871-0010	2	#Nut, Hex - Brass (#10-32)
	300-0681	1	Engine Control Monitor - Standard	47	850-0030	1	#Washer, Lock - Spring (#10)
18	332-1276	4	Plug, Keying - PC Board	48	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	49	853-0008	1	#Washer, Lock - ET (#10)
21	850-0030	2	Washer, Lock - Spring (#10)	50	856-0003	1	#Washer, Lock - EIT (#10)
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	51	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")
23	856-0003	2	Washer, Lock - EIT (#10)	52	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
24	307-1031	1	Relay, Solenoid - Start (12 VDC)	53	870-0053	1	Nut, Hex (#10-32)
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	54	850-0030	1	Washer, Lock - Spring (#10)
				55	856-0003	1	Washer, Lock - EIT (#10)
				56	PANEL, CONTROL - ENGINE		
					301-3267	1	With Three Gauge Mtg. Holes
					301-3286	1	With Four Gauge Mtg. Holes
					301-3166	1	With Five Gauge Mtg. Holes
				57	301-3253	1	Bracket, Mounting Engine Control

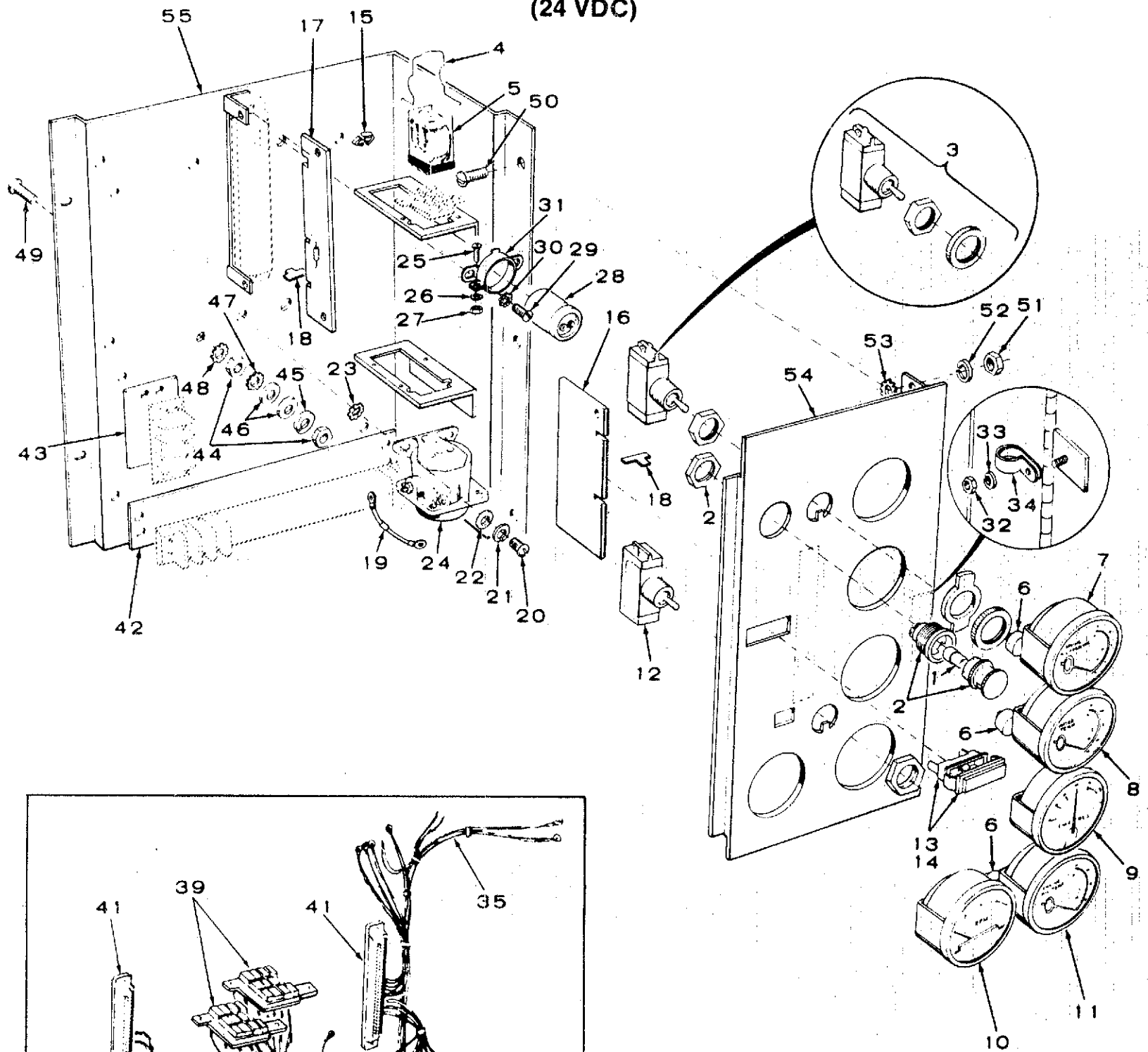
* - NOTE: For lamp replacement order 322-0136 remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.

† - Parts included in Wiring Harness

- Parts included in Ground Terminal Assembly

£ - Optional items used with Engine Mounted Senders.

ENGINE CONTROL WITH ONE FAULT LIGHT (24 VDC)



SC-1166

ENGINE CONTROL WITH ONE FAULT LIGHT (24 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0017	1	Lamp Incandescent (24 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed, Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holddown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (24 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1056	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1056	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
6	193-0250	3	Resistor - Gauge	34	332-0051	1	Clamp, Loop
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL		
8	193-0245	1	Gauge - Water Temperature (12 VDC)		338-1065	1	Includes Parts Marked †
9	302-0061	1	Ammeter		ATTACHING HARDWARE FOR WIRING HARNESS		
10	302-0749	1	£Tachometer - Electrical		812-0061	4	Screw Machine - Round Head (#6-32 x 3/8")
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)		812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")
12	SWITCH, TOGGLE - SELECTOR				853-0003	14	Washer, Lock - ET (#6)
	308-0138	1	Standard & Cycle Cranking Controls		860-0006	10	Nut, Hex (#6-32)
	308-0327	1	Penn State Controls	36	332-1043	1	†Jumper, Terminal
13	*LIGHT, INDICATOR (Lens Color & Legend Listed Below)			37	332-0795	1	†Block, Terminal - 16 Place
	322-0129	1	Red - Fault - 28 VDC	38	332-0537	1	†Block, Terminal - 4 Place
14	322-0137	1	*Light, Indicator - 28 VDC (Red Lens - No Legend)	39	323-0765	2	†Socket, Relay - 11 Place
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	40	323-0764	1	†Socket, Relay - 8 Place
16	PRINTED CIRCUIT BOARD ASSEMBLY			41	332-1271	2	†Connector, Electrical - PC BD
	300-0751	1	Standard Cranker (24 VDC)	42	332-1241	1	Strip, Marker - Terminal
	300-0715	1	Cycle Cranker (24 VDC)	43	332-1239	1	Strip, Marker - Terminal
17	PRINTED CIRCUIT BOARD ASSEMBLY				GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)		
	300-0680	1	Engine Control Monitor - Standard	44	871-0010	2	#Nut, Hex - Brass (#10-32)
	300-0731	1	Engine Control Monitor - Penn State	45	850-0030	1	#Washer, Lock - Spring (#10)
18	332-1276	4	Plug, Keying - PC Board	46	526-0062	2	#Washer, Flat - Brass (13/64" ID 1/2" OD x 1/16" Thk)
19	357-0018	1	Diode, with Terminals	47	853-0008	1	#Washer, Lock - ET (#10)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	48	856-0003	1	#Washer, Lock - ET (#10)
21	850-0030	2	Washer, Lock - Spring (#10)	49	815-0203	1	#Screw, Machine - Round head, Brass (#10-32 x 7/8")
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	50	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
23	856-0003	2	Washer, Lock - EIT (#10)	51	870-0053	1	Nut, Hex (#10-32)
24	307-0061	1	Relay, Solenoid - Start (24 VDC)	52	850-0030	1	Washer, Lock - Spring (#10)
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	53	856-0003	1	Washer, Lock - EIT (#10)
				54	PANEL CONTROL - ENGINE		
					301-3165	1	With Three Gauge Mtg. Holes
					301-3286	1	With Four Gauge Mtg. Holes
					301-3396	1	With Five Gauge Mtg. Holes
				55	301-3253	1	Bracket, Mounting Engine Control

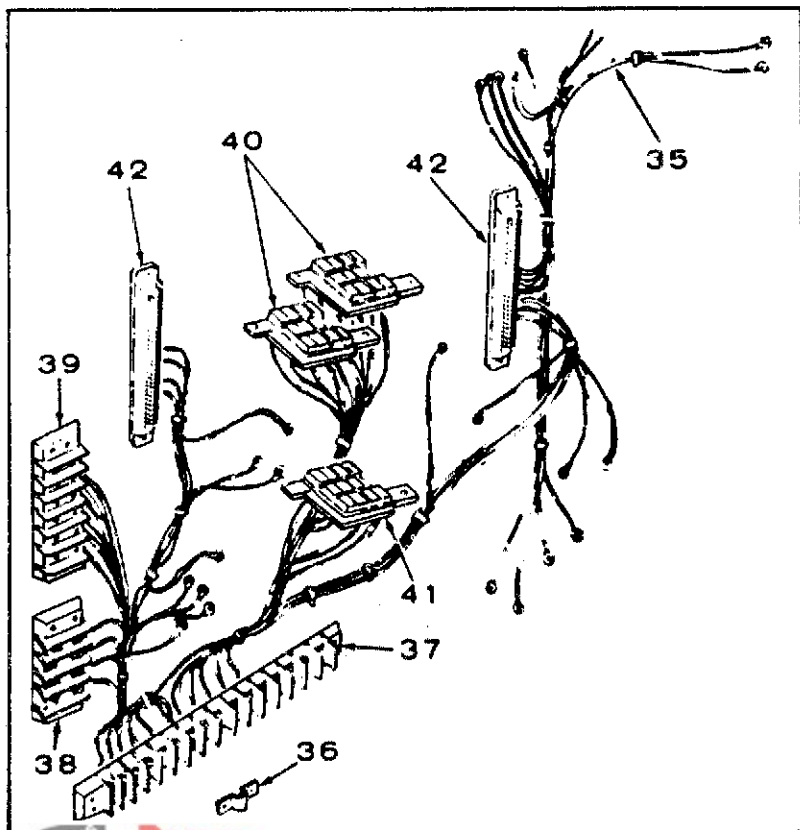
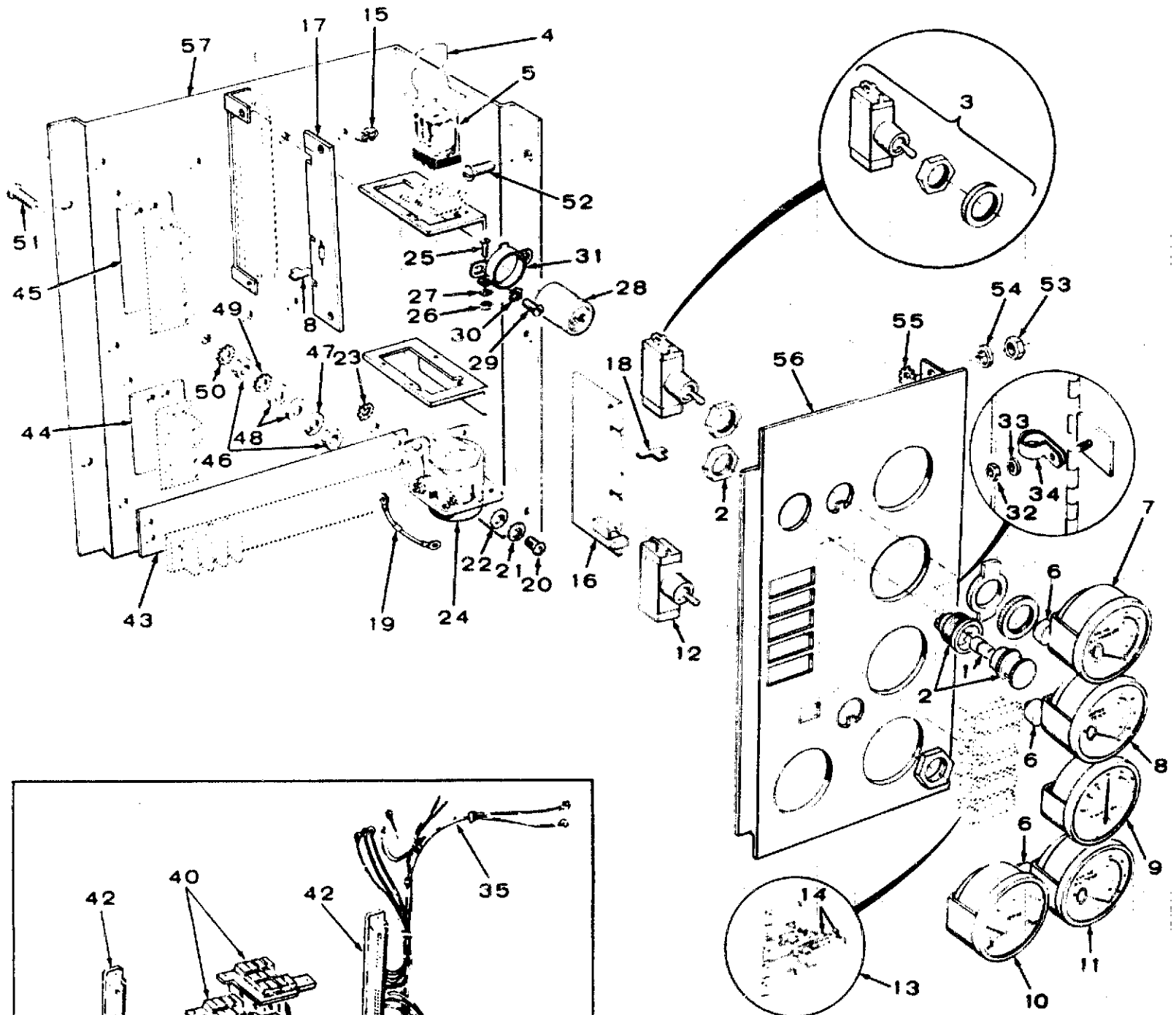
* - **NOTE:** For lamp replacement order 322-0137 remove and discard plain red lens, install lens with legend from burned out light —

£ - Optional items used with Engine Mounted Senders.

+ - Parts included in Wiring Harness.

- Parts included in Ground Terminal Assembly.

ENGINE CONTROL WITH FIVE FAULT LIGHTS (24 VDC)



XSC-1165

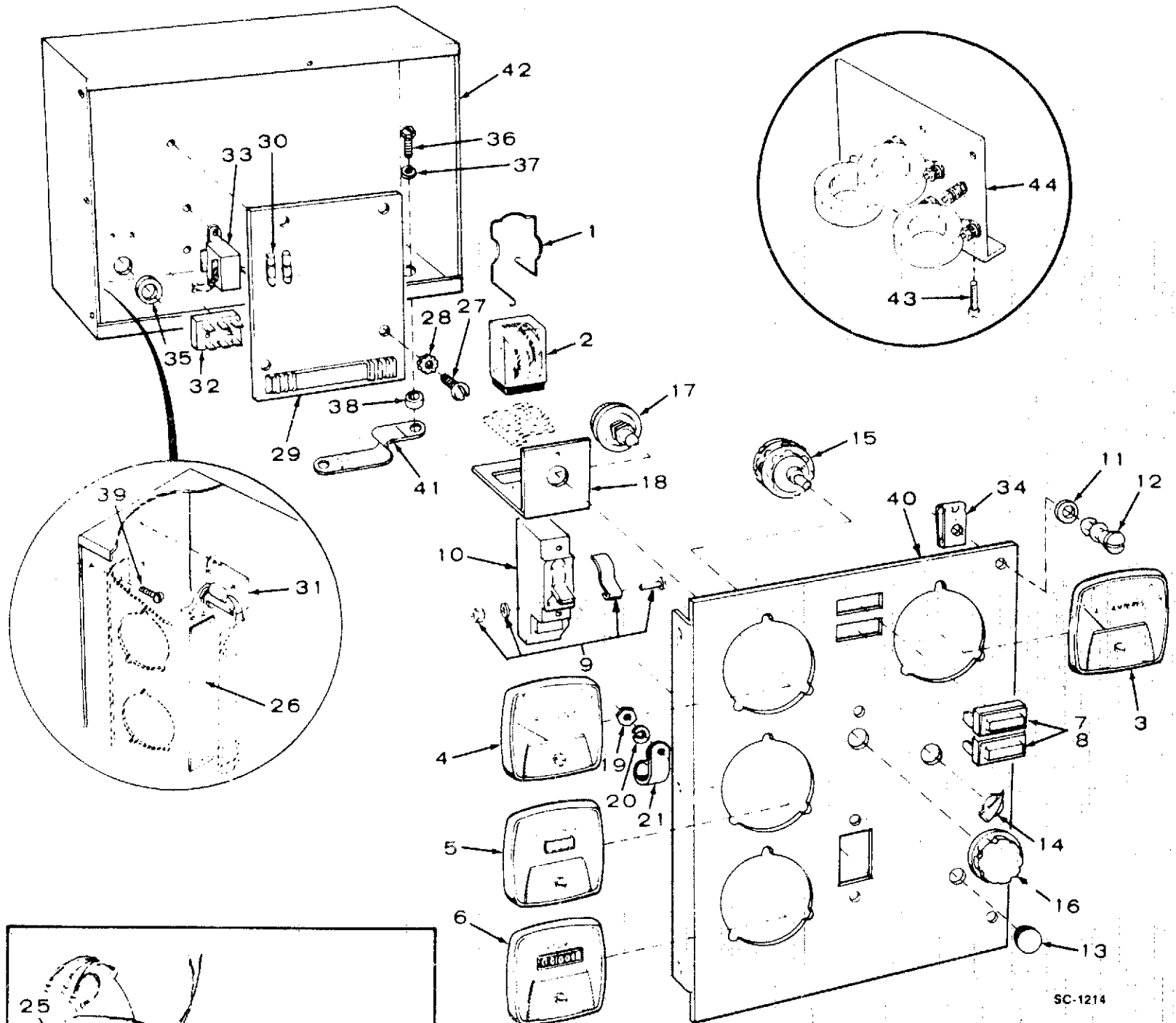
ENGINE CONTROL WITH FIVE FAULT LIGHTS (24 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0017	1	Lamp Incandescent (24 VDC)
2	322-0149	1	Lampholder
3	308-0002	1	Switch, Toggle (SPST)
4	307-1157	3	Spring, Holddown - Relay
5	RELAY (24 VDC)		
	307-1056	1	(Ignition)
	307-1056	1	(Start Disconnect)
	307-1061	1	(Starter Protection)
6	193-0250	3	Resistor - Gauge
7	193-0243	1	Gauge - Oil Pressure (12 VDC)
8	193-0245	1	Gauge - Water Temperature (12 VDC)
9	302-0061	1	Ammeter
10	302-0749	1	£Tachometer - Electrical
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)
12	SWITCH, TOGGLE - SELECTOR		
	308-0138	1	Standard & Cycle Cranking Controls
	308-0327	1	Penn State Controls
13	*LIGHT, INDICATOR - 28 VDC (Lens Color & Legend Listed Below)		
	322-0119	1	Red - OVERCRANK
	322-0123	1	Red - OVERSPEED
	322-0120	1	Red - LO OIL PRESS
	322-0121	1	Red - HI ENG TEMP
	322-0122	1	Red - LO ENG TEMP
14	322-0137	1	*Light, Indicator - 28 VDC (Red Lens - No Legend)
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)
16	PRINTED CIRCUIT BOARD ASSEMBLY		
	300-0751	1	Standard Cranker (24 VDC)
	300-0715	1	Cycle Cranker (24 VDC)
17	PRINTED CIRCUIT BOARD ASSEMBLY		
	300-0682	1	Engine Control Monitor - Standard
18	332-1276	4	Plug, Keying - PC Board
19	357-0018	1	Diode, with Terminals
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")
21	850-0030	2	Washer, Lock - Spring (#10)
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)
23	856-0003	2	Washer, Lock - EIT (#10)
24	307-0061	1	Relay, Solenoid - Start (24 VDC)
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
26	860-0006	1	Nut, Hex (#6-32)
27	853-0003	1	Washer, Lock - ET (#6)
28	356-0072	1	Capacitor, Fixed, Electrolytic (4000 MFD, 30 VDC)
29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
30	853-0003	2	Washer, Lock - ET (#6)
31	356-0070	1	Clamp, Capacitor Mounting
32	870-0053	1	Nut, Hex (#10-32)
33	850-0030	1	Washer, Lock - Spring (#10)
34	332-0051	1	Clamp, Loop
35	HARNESS, WIRING - ENGINE CONTROL		
	338-1066	1	Includes Parts Marked †
	ATTACHING HARDWARE FOR WIRING HARNESS		
	812-0063	6	Screw, Machine - Round Head (#6-32 x 1/2")
	812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")
	853-0003	14	Washer, Lock - ET (#6)
	860-0006	10	Nut, Hex (#6-32)
36	332-1043	1	†Jumper Terminal
37	332-0795	1	†Block, Terminal - 20 Place
38	332-0537	1	†Block, Terminal - 4 Place
39	332-0699	1	†Block, Terminal - 6 Place
40	323-0765	2	†Socket, Relay - 11 Place
41	323-0764	2	†Socket, Relay - 8 Place
42	332-1271	1	Connector, Electrical - PC BD
43	332-1559	1	Strip, Marker - Terminal
44	332-1239	1	Strip, Marker - Terminal
45	332-1240	1	Strip, Marker - Terminal
	GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)		
46	871-0010	2	#Nut, Hex - Brass (#10-32)
47	850-0030	1	#Washer, Lock - Spring (#10)
48	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)
49	853-0008	1	#Washer, Lock - ET (#10)
50	856-0003	1	#Washer, Lock - EIT (#10)
51	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")
52	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
53	870-0053	1	Nut, Hex (#10-32)
54	850-0030	1	Washer, Lock - Spring (#10)
55	856-0003	1	Washer, Lock - EIT (#10)
56	PANEL, CONTROL - ENGINE		
	301-3267	1	With Three Gauge Mtg. Holes
	301-3286	1	With Four Gauge Mtg. Holes
	301-3166	1	With Five Gauge Mtg. Holes
57	301-3253	1	Bracket, Mounting - Engine Control

- * - **NOTE:** For lamp replacement order 322-0137 remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.
- £ - Optional items used with Engine Mounted Senders.
- † - Parts Included in Wiring Harness.
- # - Parts Included in Ground Terminal Assembly.

GENERATOR CONTROL



SC-1214

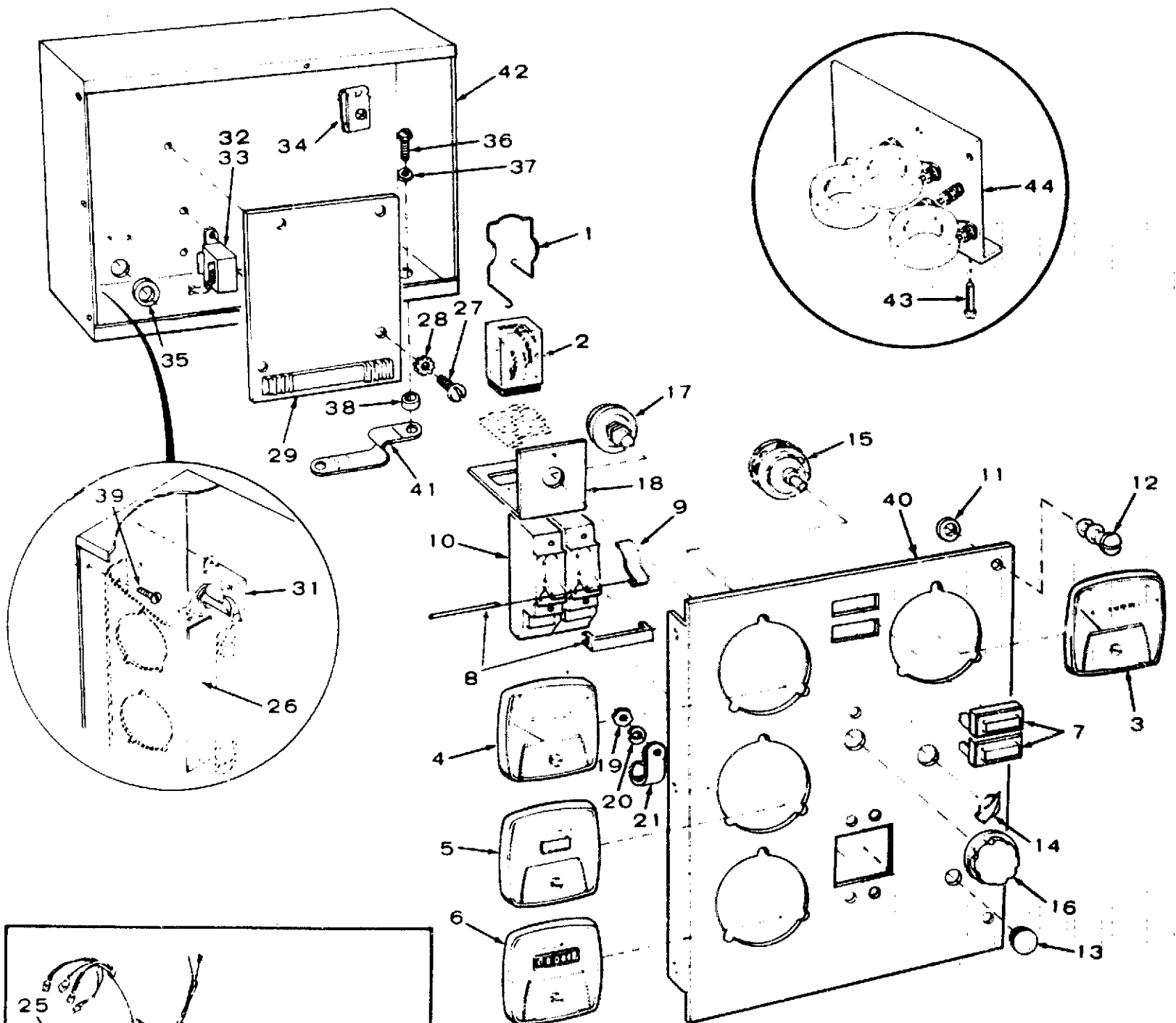
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	307-1157	1	Spring, Holddown, Relay
2	307-1061	1	Relay
3	AMMETER (Select as Required)		
			SINGLE SCALE
	302-0406	1	0-50 Amp
	302-0408	1	0-75 Amp
	302-0410	1	0-100 Amp
	302-0411	1	0-200 Amp
	302-0412	1	0-250 Amp
	302-0413	1	0-300 Amp
	302-0605	1	0-400 Amp
			DUAL SCALE
	302-0719	1	0-75, 0-150 Amp
	302-0720	1	0-100, 0-200 Amp
	302-0721	1	0-150, 0-300 Amp
	302-0722	1	0-200, 0-400 Amp
	302-0723	1	0-250, 0-500 Amp
	302-0724	1	0-375, 0-750 Amp

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GENERATOR CONTROL

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
4	VOLTMETER (Select as Required)			23	BLOCK, TERMINAL (Select as Required)		
	302-0421	1	SINGLE SCALE		332-0607	1	12 Place
	302-0422	1	0-300 Volt		332-0795	1	16 Place
	302-0612	1	0-600 Volt	24	350-0556	1	Resistor, Fixed, Composition (47K Ohms, 1/2 Watt) - Code 15, 515
	302-0779	1	0-500 Volt				
			0-750 Volt	25	323-0765	1	Socket, Relay - 11 Place - Code 15, 515
	302-0718	1	DUAL SCALE				
			0-300, 0-600 Volt	26	STRIP, MARKER (Select as Required)		
5	METER, FREQUENCY (Select as Required)				332-1242	1	16 Place
			REED TYPE		332-1248	1	12 Place
	302-0213	1	115 VAC, 60 Hz	27	812-0065	4	Screw, Machine - Round Head (#6-32 x 5/8")
	302-0221	1	230 VAC, 60 Hz				
	302-0234	1	115 VAC, 50 Hz	28	853-0003	4	Washer, Lock - ET (#6)
	302-0256	1	230 VAC, 50 Hz	29	REGULATOR, VOLTAGE (Select as Required)		
			POINTER TYPE				NOTE: REGULATOR MATCHED TO VOLTAGE TRANSFORMER, Item #31. (See Separate Parts Catalog #900-0234 for Components)
	302-0809	1	120 VAC, 60 Hz		332-1268	1	Used with 120 VAC Input Signal
	302-0810	1	208 VAC, 60 Hz		332-1956	1	Used with 240 VAC Input Signal
	302-0811	1	240 VAC, 60 Hz	30	321-0204	2	Fuse, Cartridge (1/4 Amp) - Part of 332-1956 Voltage Regulator
6	METER, TIME TOTALIZING (Select as Required)						
	302-0466	1	60 Hz	31	TRANSFORMER, VOLTAGE (Select as Required)		
	302-0469	1	50 Hz				NOTE: Transformer Matched to Voltage Regulator, Item #29
7	LIGHT, INDICATOR - 125 VAC (Lens Color & Legend Listed Below)				315-0342	1	120 VAC
	322-0130	1	Red - Lower Scale		315-0431	1	240 VAC
	322-0131	1	Red - Upper Scale				ATTACHING PARTS FOR TRANSFORMER
8	322-0178	1	Light, Indicator - 125 VAC (Replacement) - Discard Lens - Used Lens From Original Light		812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
9	320-0307	1	Lock - Circuit Breaker Handle (Penn State Sets)		853-0003	2	Washer, Lock - ET (#6)
			ATTACHING HARDWARE FOR LOCK	32	305-0675	1	Rectifier, Bridge
	815-0203	1	Screw, Machine - Round Head (#10-32 x 7/8")				ATTACHING PARTS FOR RECTIFIER
	854-0010	1	Washer, Lock - IT (#10)		812-0070	2	Screw, Machine - Round Head (#6-32 x 1-1/4")
	871-0010	1	Nut, Hex (#10-32)		850-0020	2	Washer Lock - Spring (#6)
10	320-0431	1	Circuit Breaker	33	315-0384	1	Reactor
			ATTACHING HARDWARE FOR CIRCUIT BREAKER				ATTACHING PARTS FOR REACTOR
	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")		812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
	850-0020	2	Washer, Lock - Spring (#6)		853-0003	2	Washer, Lock - ET (#6)
	815-0203	1	Screw, Machine - Round Head, Brass (#10-32 x 7/8")	34	406-0332	2	Receptacle, Turnbutton Fastener
	871-0010	1	Nut, Hex - Brass (#10-32)	35	508-0001	4	Grommet, Rubber
	853-0008	1	Washer, Lock - ET (#10)	36	800-0045	4	Screw, Cap - Hex Head (5/16-18 x 3/8")
	526-0049	1	Washer, Flat - Brass (13/64"ID x 7/16"OD x 132"Thk)	37	850-0045	4	Washer, Lock - Spring (5/16")
11	406-0334	2	Clip, Retaining - Turnbutton Fastener	38	402-0070	4	Dampener, Vibration
12	406-0333	2	Stud, Turnbutton Fastener	39	815-0026	3	Screw, Machine - Truss Head (#10-32 x 3/8")
13	517-0131	1	Plug, Plastic				
14	303-0076	1	Knob, Pointer	40	PANEL CONTROL		
15	308-0284	1	Switch, Selector				Sets Without Meter Panel
16	303-0032	1	Knob		301-3822	1	Code 3
17	303-0170	1	Rheostat (35K Ohms, 25 Watt)		301-3821	1	Code 6D, 7, 9X
18	301-3244	1	Bracket, Mounting, Relay - Code 15, 515		301-3274	1	Code 15, 515
							Sets With Meter Panel
19	870-0053	1	Nut, Hex (#10-32)		301-3169	1	Code 3
20	850-0030	1	Washer, Lock - Spring (#10)		301-3342	1	Code 6D, 7, 9X
21	332-0051	1	Clamp, Loop		301-3170	1	Code 15, 515
22	HARNES, WIRING - GENERATOR CONTROL			41	337-0049	1	Strap, Ground
			Sets Without Meter Panel				ATTACHING PARTS FOR STRAP
	338-0765	1	Code 3		800-0045	1	Screw, Cap - Hex Head (5/16-18 x 3/8")
	338-0764	1	Code 15, 515		850-0045	1	Washer, Lock - Spring (5/16")
	338-0766	1	Code 6D, 7, 9X		856-0008	2	Washer, Lock - EIT (5/16")
			Sets With Meter Panel		862-0015	1	Nut, Hex (5/16-18)
	338-0735	1	Code 3	42	301-3158	1	Box, Control
	338-0730	1	Code 15, 515	43	821-0010	2	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")
	338-0759	1	Code 6D, 7, 9X				
			ATTACHING HARDWARE FOR WIRING HARNESS	44	CURRENT TRANSFORMER ASSEMBLY (See Separate Figure For Parts) - NOTE: Assembly is Located Behind the Control Box.		
	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")				
	812-0066	2	Screw, Machine - Round Head (#6-32 x 3/4")				
	850-0020	2	Washer, Lock - Spring (#6)				
	853-0003	4	Washer, Lock - ET (#6)				
	853-0036	2	Nut, Hex (#6-32)				

GENERATOR CONTROL (WITH SWITCHING REGULATOR)



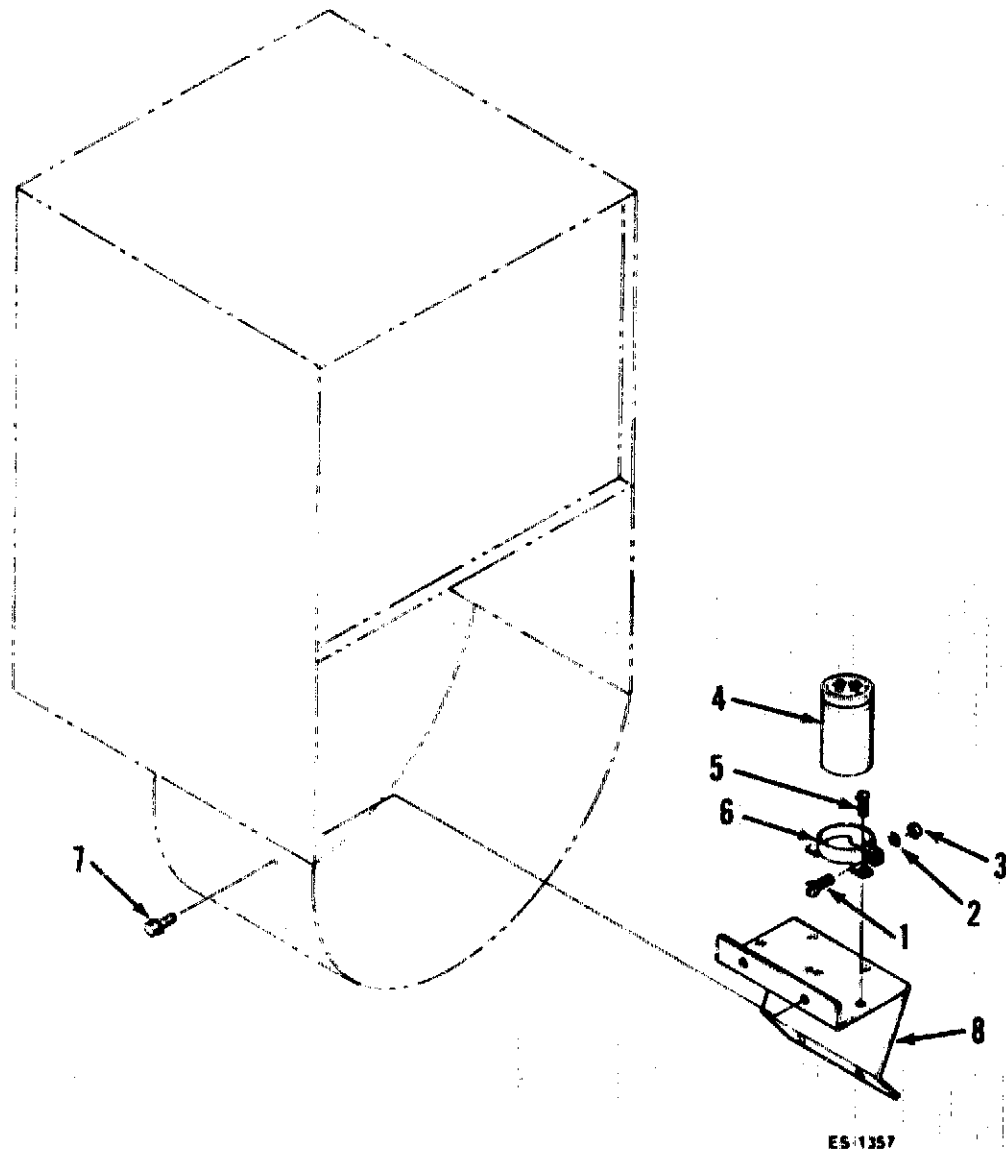
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	307-1157	1	Spring, Holddown, Relay - Code 15, 515
2	307-1061	1	Relay Code 15, 515
3	AMMETER (Select as Required)		
			SINGLE SCALE
	302-0406	1	0-50 Amp
	302-0408	1	0-75 Amp
	302-0410	1	0-100 Amp
	302-0411	1	0-200 Amp
	302-0412	1	0-250 Amp
	302-0413	1	0-300 Amp
	302-0605	1	0-400 Amp
			DUAL SCALE
	302-0719	1	0-75, 0-150 Amp
	302-0720	1	0-100, 0-200 Amp
	302-0721	1	0-150, 0-300 Amp
	302-0722	1	0-200, 0-400 Amp
	302-0723	1	0-250, 0-500 Amp
	302-0724	1	0-375, 0-750 Amp

GENERATOR CONTROL (WITH SWITCHING REGULATOR)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
4	VOLTMETER (Select as Required)			23	BLOCK, TERMINAL (Select as Required)		
	302-0421	1	SINGLE SCALE		332-0607	1	12 Place
	302-0422	1	0-300 Volt		332-0795	1	16 Place
	302-0612	1	0-600 Volt	24	350-0556	1	Resistor, Fixed, Composition (47K Ohms, 1/2 Watt) - Code 15, 515
	302-0779	1	0-500 Volt				
			0-750 Volt	25	323-0765	1	Socket, Relay - 11 Place - Code 15, 515
	302-0718	1	DUAL SCALE				
			0-300, 0-600 Volt	26	STRIP, MARKER (Select as Required)		
5	METER, FREQUENCY (Select as Required)				332-1242	1	16 Place
			REED TYPE		332-1248	1	12 Place
	302-0213	1	115 VAC, 60 Hz	27	812-0065	4	Screw, Machine - Round Head (#6-32 x 5/8")
	302-0221	1	230 VAC, 60 Hz				
	302-0234	1	115 VAC, 50 Hz	28	853-0003	4	Washer, Lock - ET (#6)
	302-0256	1	230 VAC, 50 Hz	29	REGULATOR, VOLTAGE (Requires 240 VAC Input Signal)		
			POINTER TYPE		300-1928	1	Semi-Frequency Sensitive Type
	302-0809	1	120 VAC, 60 Hz		300-1929	1	Voltage Sensitive Type
	302-0810	1	208 VAC, 60 Hz		300-1930	1	Frequency Sensitive Type
	302-0811	1	240 VAC, 60 Hz	31	315-0431	1	Transformer, Voltage (240 VAC Output Signal)
6	METER, TIME TOTALIZING (Select as Required)				ATTACHING PARTS FOR TRANSFORMER		
	302-0466	1	60 Hz		812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
	302-0469	1	50 Hz				
7	LIGHT INDICATOR - 125 VAC (Lens Color & Legend Listed Below)				853-0003	2	Washer, Lock - ET (#6)
	322-0130	1	Red - Lower Scale	32	315-0343	1	Reactor
	322-0131	1	Red - Upper Scale		ATTACHING PARTS FOR REACTOR		
	322-0178	1	Light Indicator - 125 VAC (Amber Lens - No Legend)		812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
8	320-0202	1	Tie Bar - Circuit Breaker				
9	320-0307	1	Lock, Handle - Circuit Breaker (Used On Penn State Sets)		853-0003	2	Washer, Lock - ET (#6)
10	320-0455	2	Circuit Breaker - 3 Amp 240 Volt	33	315-0343	1	Reactor
	ATTACHING HARDWARE FOR CIRCUIT BREAKER				ATTACHING PARTS FOR REACTOR		
	812-0061	4	Screw, Machine - Round Head (#6-32 x 3/8")		812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")
	850-0020	4	Washer, Lock - Spring (#6)				
	815-0203	2	Screw, Machine - Round Head, Brass (#10-32 x 7/8")		853-0003	2	Washer, Lock - ET (#6)
	871-0010	2	Nut, Hex - Brass (#10-32)	34	406-0332	2	Receptacle, Turnbutton Fastener
	853-0008	2	Washer, Lock - ET (#10)	35	508-0001	4	Grommet, Rubber
	526-0049	2	Washer, Flat - Brass (13.64" ID x 7.16" OD x 1.32" Thk)	36	800-0045	4	Screw, Cap - Hex Head (5/16-18 x 3/8")
11	406-0334	2	Clip, Retaining - Turnbutton Fastener	37	850-0045	4	Washer, Lock - Spring (5/16")
12	406-0333	2	Stud, Turnbutton Fastener	38	402-0070	4	Dampener, Vibration
13	517-0131	1	Plug, Plastic	39	815-0026	2	Screw, Machine - Truss Head (#10-32 x 3/8")
14	303-0076	1	Knob, Pointer	40	PANEL CONTROL		
15	308-0284	1	Switch, Selector		301-3822	1	Code 3
16	303-0032	1	Knob		301-3821	1	Code 6D, 7, 9X
17	303-0170	1	Rheostat (35K Ohms, 25 Watt)		301-7078	1	Code 15, 515
18	301-3244	1	Bracket, Mounting, Relay - Code 15, 515				
19	870-0053	1	Nut, Hex (#10-32)		301-3189	1	Code 3
20	850-0030	1	Washer, Lock - Spring (#10)		301-3342	1	Code 6D, 7, 9X
21	332-0051	1	Clamp, Loop		301-6298	1	Code 15, 515
22	HARNESS, WIRING - GENERATOR CONTROL			41	337-0049	1	Strap, Ground
			Sets Without Meter Panel		ATTACHING PARTS FOR STRAP		
	338-0765	1	Code 3		800-0045	1	Screw, Cap - Hex Head (5/16-18 x 3/8")
	338-0764	1	Code 15, 515				
	338-0766	1	Code 6D, 7, 9X		850-0045	1	Washer, Lock - Spring (5/16")
			Sets With Meter Panel		856-0008	2	Washer, Lock - ET (5/16")
	338-0735	1	Code 3		862-0015	1	Nut, Hex (5/16-18)
	336-1469	1	Code 15, 515	42	301-3158	1	Box, Control
	338-0759	1	Code 6D, 7, 9X	43	821-0010	2	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")
	ATTACHING HARDWARE FOR WIRING HARNESS			44	CURRENT TRANSFORMER ASSEMBLY (See Separate Figure For Parts) - NOTE: Assembly is Located Behind the Control Box.		
	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")				
	812-0066	2	Screw, Machine - Round Head (#6-32 x 3/4")				
	850-0020	2	Washer, Lock - Spring (#6)				
	853-0003	4	Washer, Lock - ET (#6)				
	853-0006	2	Nut, Hex (#6-32)				

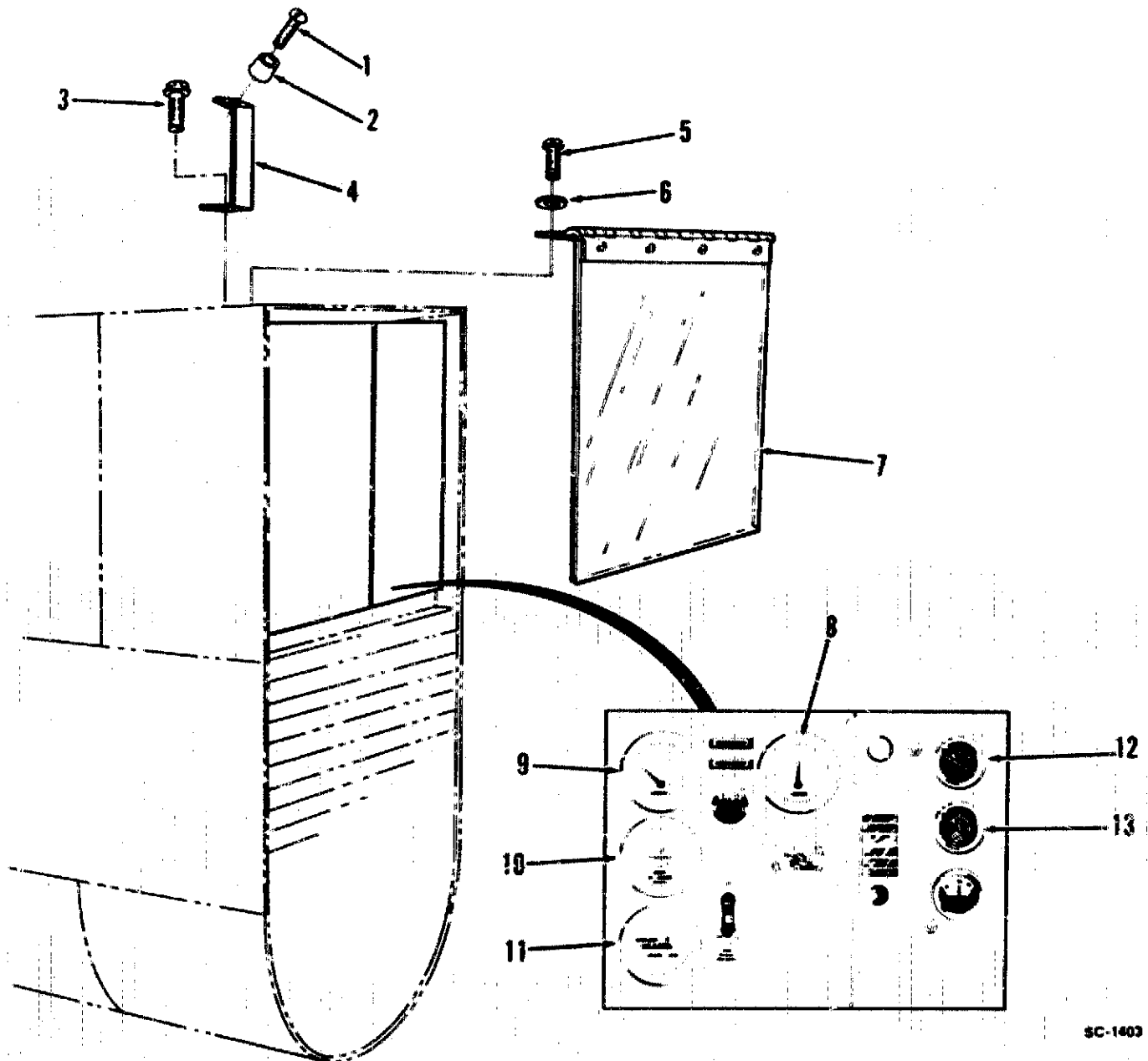
NOTE: For lamp replacement order 322-0178. Remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.

CAPACITOR ASSEMBLY USED WITH SWITCHING VOLTAGE REGULATOR



REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0078	2	Screw, Machine - Round Head (#8-32 x 7-16")
2	850-0025	2	Washer, Lock - Spring (#8)
3	861-0007	2	Nut, Square (#8-32)
4	356-0090	2	Capacitor, Fixed, Electrolytic (1300 MFD)
5	812-0078	6	Screw, Machine - Round Head (#8-32 x 7-16")
6	356-0102	2	Clamp, Capacitor Mounting
7	821-0009	4	Screw, Self-Locking - Hex Washer Head (1/4-20 x 3/8")
8	356-0104	1	Bracket, Mounting - Capacitor

CONTROL - ENGINE/GENERATOR RUGGEDIZED WITH PROTECTING SHIELD



SC-1403

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
2	402-0029	2	Bumper, Rubber
3	821-0014	2	Screw, Self-locking - Hex Washer Head (5/16-18 x 1/2")
4	301-3482	2	Bracket
5	813-0098	5	Screw, Machine - Round Head (#10-32 x 3/8")
6	854-0010	5	Washer, Lock - Internal Tooth (#10)
7	301-3486	1	Cover, Protective

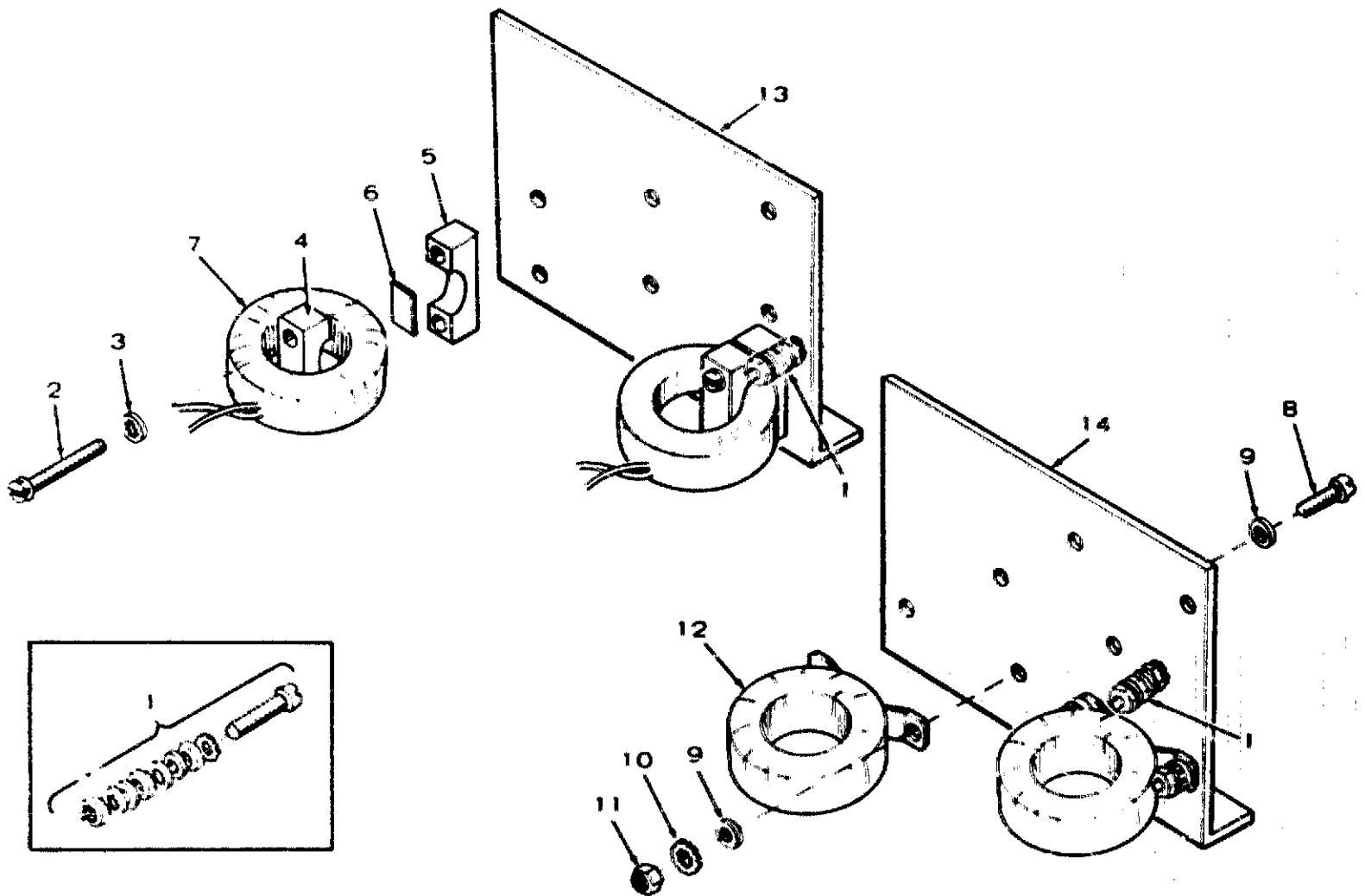
GENERATOR CONTROL - RUGGEDIZED

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	AMMETER - DUAL SCALE (Select as Required)		
	302-0833	1	0-75, 0-150 AMPS
	302-0834	1	0-100, 0-200 AMPS
	302-0835	1	0-150, 0-300 AMPS
	302-0837	1	0-250, 0-500 AMPS
	302-0838	1	0-375, 0-750 AMPS

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
9	302-0839	1	Voltmeter - Dual Scale (0-300, 0-600 VOLTS)
10	METER, FREQUENCY - REED TYPE (Select as Required)		
	302-0840	1	60 Hz
	302-0841	1	50 Hz
11	METER, TIME TOTALIZING (Select as Required)		
	302-0817	1	60 Hz
	302-0816	1	50 Hz
	ENGINE CONTROL - RUGGEDIZED		
12	193-0212	1	Gauge - Oil Pressure
13	193-0213	1	Gauge - Water Temperature

For Standard components, refer to applicable illustrations and parts lists.

CURRENT TRANSFORMER ASSEMBLY

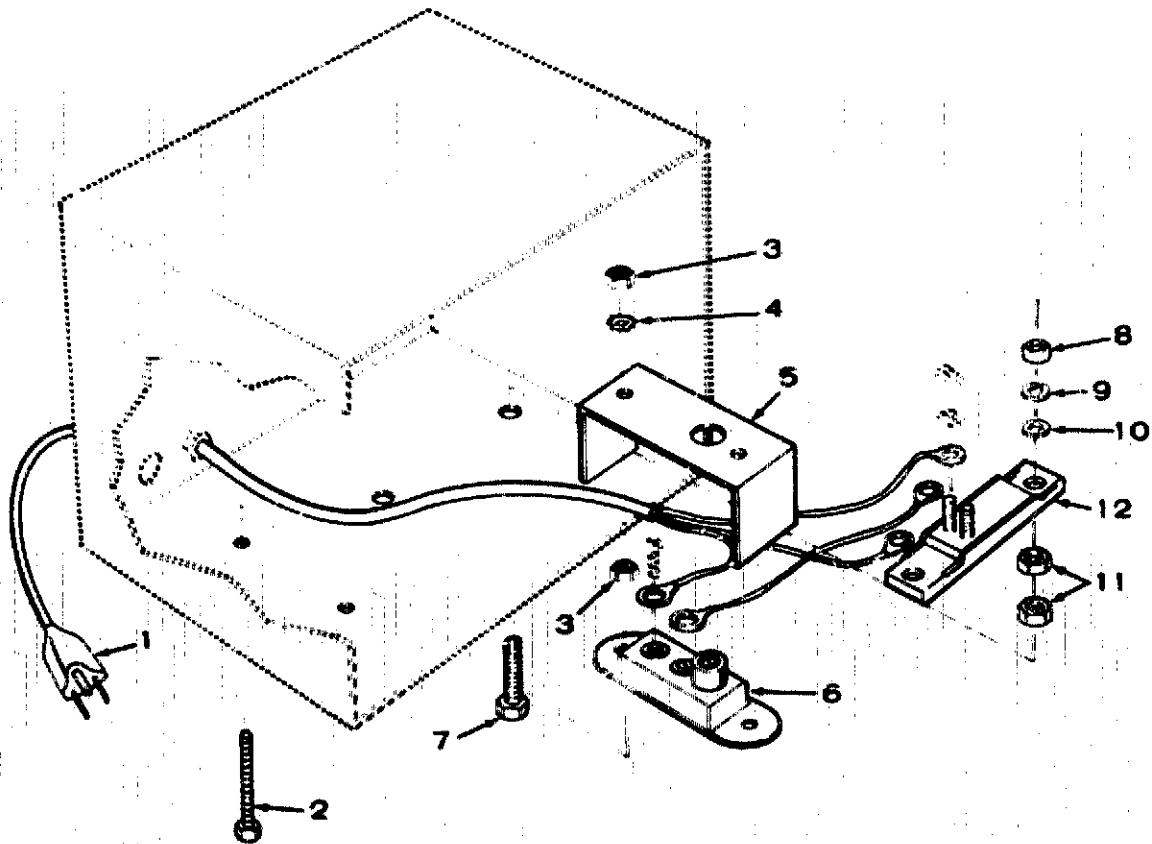


SC-1150

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
CURRENT TRANSFORMER ASSEMBLY (Select Components as Required)			
1	GROUND TERMINAL ASSEMBLY (Includes Following Items)		
	815-0203	1	Screw Machine - Round Head, Brass (#10-32 x 7.8")
	871-0010	3	Nut Hex - Brass (#10-32)
	856-0003	1	Washer Lock - EIT (#10)
	854-0010	2	Washer Lock - IT (#10)
	526-0049	2	Washer Flat - Brass (#13.64" ID x 7.32" OD x 1.32" Thick)
2	813-0110	6	Screw Machine - Round Head (#10-32 x 2")
3	854-0010	6	Washer Lock - IT (#10)
4	302-0235	3	Clamp, Upper
5	302-0236	3	Clamp, Lower
6	302-0253	6	Shim

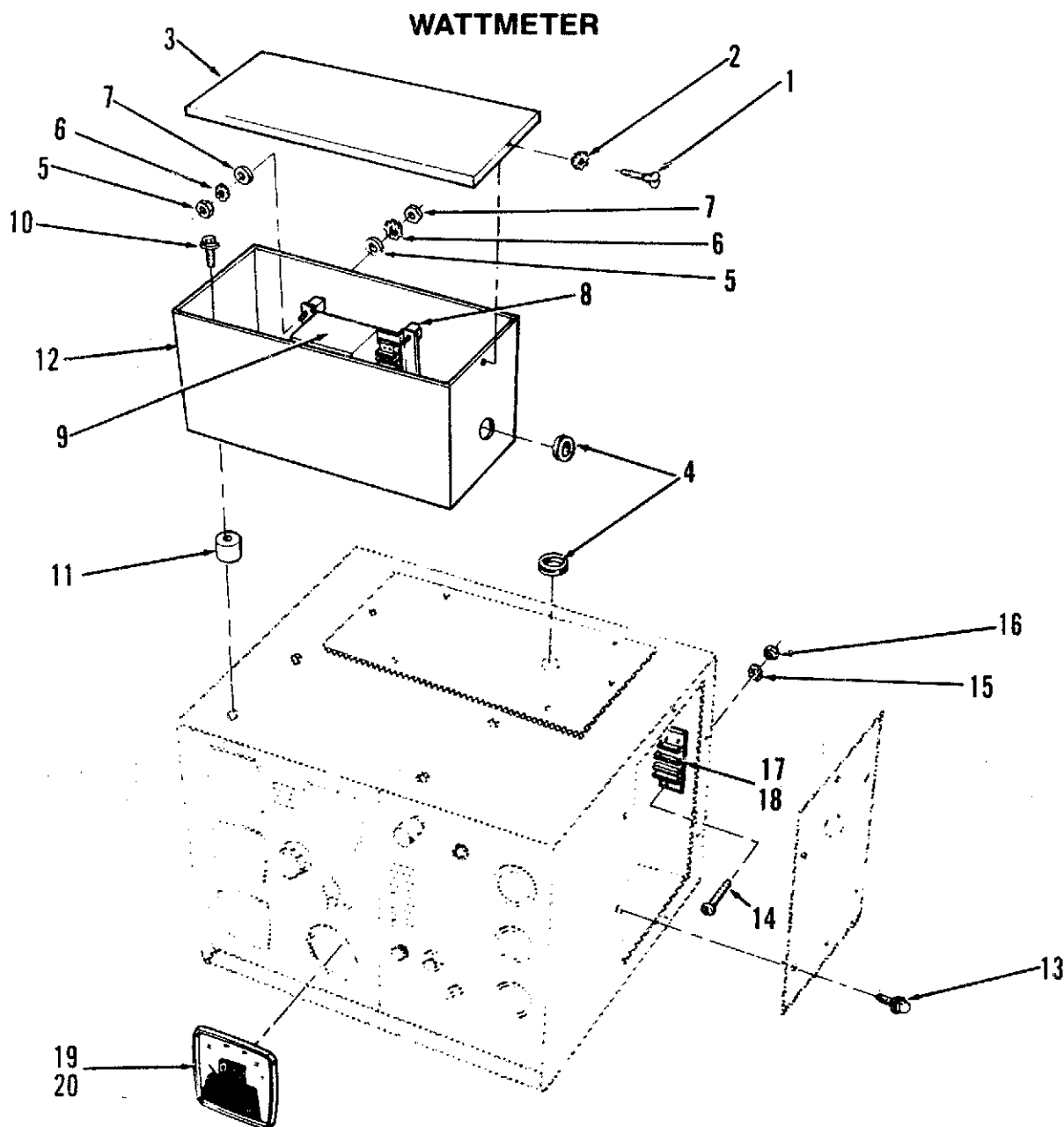
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	CURRENT TRANSFORMER (Select Size as Required)		
	302-0117	3	Ratio 50:5, 3 VA
	302-0076	3	Ratio 75:5, 2 VA
	302-0078	3	Ratio 100:5, 2 VA
	302-0079	3	Ratio 150:5, 1 VA
	302-0106	3	Ratio 200:5, 1 VA
	302-0209	3	Ratio 250:5, 1 VA
	302-0107	3	Ratio 300:5, 1 VA
8	813-0100	6	Screw Machine - Round Head (#10-32 x 1.5")
9	526-0008	6	Washer Flat (#13.64" ID x 7.16" OD x 1.32" Thick)
10	856-0003	6	Washer Lock - EIT (#10)
11	870-0053	6	Nut Hex (#10-32)
12	CURRENT TRANSFORMER (Select Size as Required)		
	302-0952	3	Ratio 75:5, 2 VA
	302-0864	3	Ratio 150:5, 2 VA
	302-0865	3	Ratio 200:5, 2 VA
	302-0866	3	Ratio 250:5, 2 VA
	302-0608	3	Ratio 400:5, 2 VA
	302-0547	3	Ratio 500:5, 2 VA
	302-0471	3	Ratio 750:5, 2 VA
13	302-0729	1	Bracket, Mounting - Transformer
14	302-0764	1	Bracket, Mounting - Transformer

CONTROL HEATER



SC-1158

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	335-0110	1	Cable, Electrical (3 Wire)
2	812-0090	2	Screw, Machine - Round Head (#6-32 x 2-1/4")
3	850-0006	4	Nut, Hex (#6-32)
4	856-0001	2	Washer, Lock - EIT (#6)
5	301-1886	1	Cover, Thermostat
6	309-0128	1	Thermostat - Adjustable
7	800-0007	2	Screw, Cap - Hex Head (1/4-20 x 1")
8	862-0001	2	Nut, Hex (1/4-20)
9	850-0040	2	Washer, Lock - Spring (1/4)
10	526-0052	2	Washer, Flat (17/64" ID x 9/16" OD x 1/16" Thk)
11	862-0015	4	Nut, Hex (5/16-18) - Used As Spacers
12	333-0151	1	Heater - 75 Watt, 120 VAC 300 Watt, 240 VAC

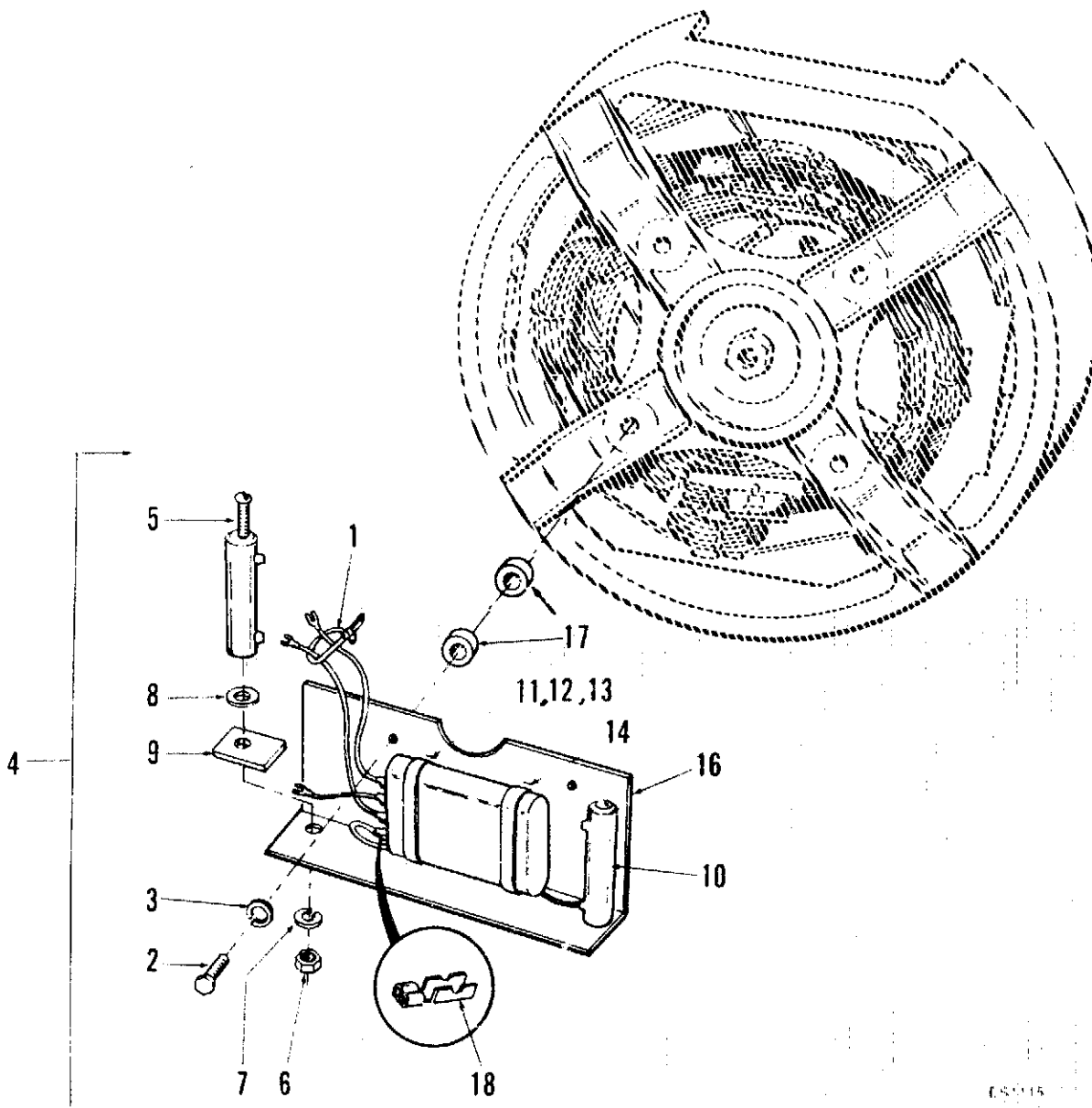


SC1157

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	815-0026	2	Screw, Machine - Truss Head (#10-32 x 3/8")
2	853-0008	2	Washer, Lock - External Tooth (#10)
3	301-3476	1	Cover - Transducer Box
4	508-0001	2	Grommet, Rubber (1-1/6"OD)
5	860-0008	8	Nut, Hex (#8-32)
6	853-0005	8	Washer, Lock - External Tooth (#8)
7	526-0003	8	Washer, Flat (11/64"ID x 3/8"OD x 1/32"Thk)
8	402-0354	4	Mount, Vibration
9	TRANSDUCER (Select as Required)		
	302-1082	1	60 Hertz
	302-1083	1	50 Hertz
10	821-0014	8	Screw, Self-locking - Hex Washer Head (5/16-18 x 1/2")
11	402-0070	4	Mount, Vibration
12	301-3477	1	Box, Transducer
13	815-0350	6	Screw, Tapping - Hex Washer Head (#10-32 x 3/8")
14	812-0063	4	Screw, Machine - Round Head (#6-32 x 1/2")

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
15	853-0003	4	Washer, Lock - External Tooth (#6)
16	860-0006	4	Nut, Hex (#6-32)
17	332-0609	1	Terminal, Strip
18	332-0610	1	Marker, Strip
19	302-1102	1	Wattmeter (Less Replaceable Dial)
20	DIAL, WATTMETER (Select as Required)		
	302-1103	1	Scale 0-35 kW
	302-1104	1	Scale 0-50 kW
	302-1105	1	Scale 0-70 kW
	302-1106	1	Scale 0-90 kW
	302-1107	1	Scale 0-115 kW
	302-1108	1	Scale 0-160 kW
	302-1109	1	Scale 0-180 kW
	302-1110	1	Scale 0-200 kW
	302-1115	1	Scale 0-250 kW
	302-1116	1	Scale 0-300 kW
	302-1117	1	Scale 0-350 kW
	302-1118	1	Scale 0-400 kW
	302-1119	1	Scale 0-450 kW
	302-1120	1	Scale 0-550 kW
	302-1121	1	Scale 0-650 kW
	302-1122	1	Scale 0-750 kW

VOLTAGE REGULATOR FILTER



ES015

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	KIT, FILTER - VOLTAGE REGULATOR (Includes Parts Marked *)		
	232-2694	1	Used on Sets with End Bell Mounted Voltage Regulator
	232-2695	1	Used on Sets with Voltage Regulator Mounted in Control Box
1	332-0941	5	Tie Cable
2	800-0003	2	Screw Cap - Hex Head (1 4-20 x 1 2")
3	850-0040	2	Washer, Lock - Spring (1 4")
4	* FILTER ASSEMBLY (Includes all Parts Except as Indicated)		
	232-2219	REF	Part of Kit 232-2694
	232-2692	REF	Part of Kit 232-2695
5	812-0165	2	Screw Machine - Round Head (1 4-20 x 4-1 2")
6	862-0001	2	Nut, Hex (1 4-20)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
7	850-0040	2	Washer, Lock - Spring (1 4")
8	304-0427	4	Washer, Centering (1 4")
9	304-0292	2	Insulator
10	354-0025	2	Resistor, Fixed, Wire Wound (10-Ohm 100 Watt)
11	813-0098	4	Screw Machine - Round Head (#10-32 x 3 8")
12	870-0053	4	Nut, Hex (#10-32)
13	850-0030	4	Washer, Lock - Spring (#10)
14	312-0189	2	Bracket, Mounting - Capacitor
15	312-0188	1	Capacitor, Fixed - 15 MFD, 440 VAC
16	232-2210	1	Bracket, Mounting
17	526-0018	15	Washer, Flat (1/4")
18	TERMINALS (Select as Required)		
	332-1279	8	Insulated 14-16 AWG
	332-0529	4	Lug 14-16 AWG

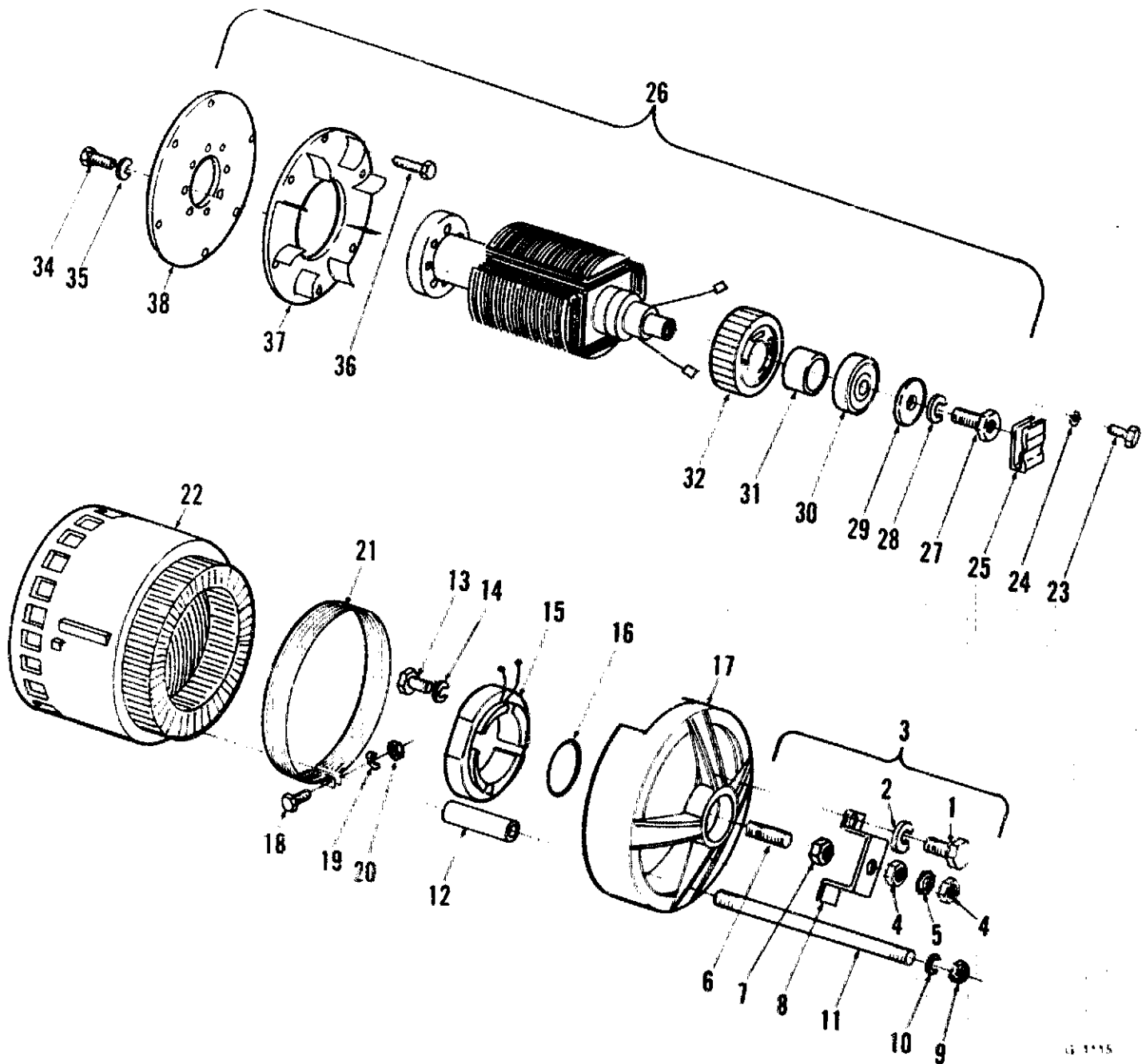
* Parts included in kits

Generator Section

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GENERATOR ASSEMBLY - BRUSHLESS TYPE USED WITH REMOTE VOLTAGE REGULATOR



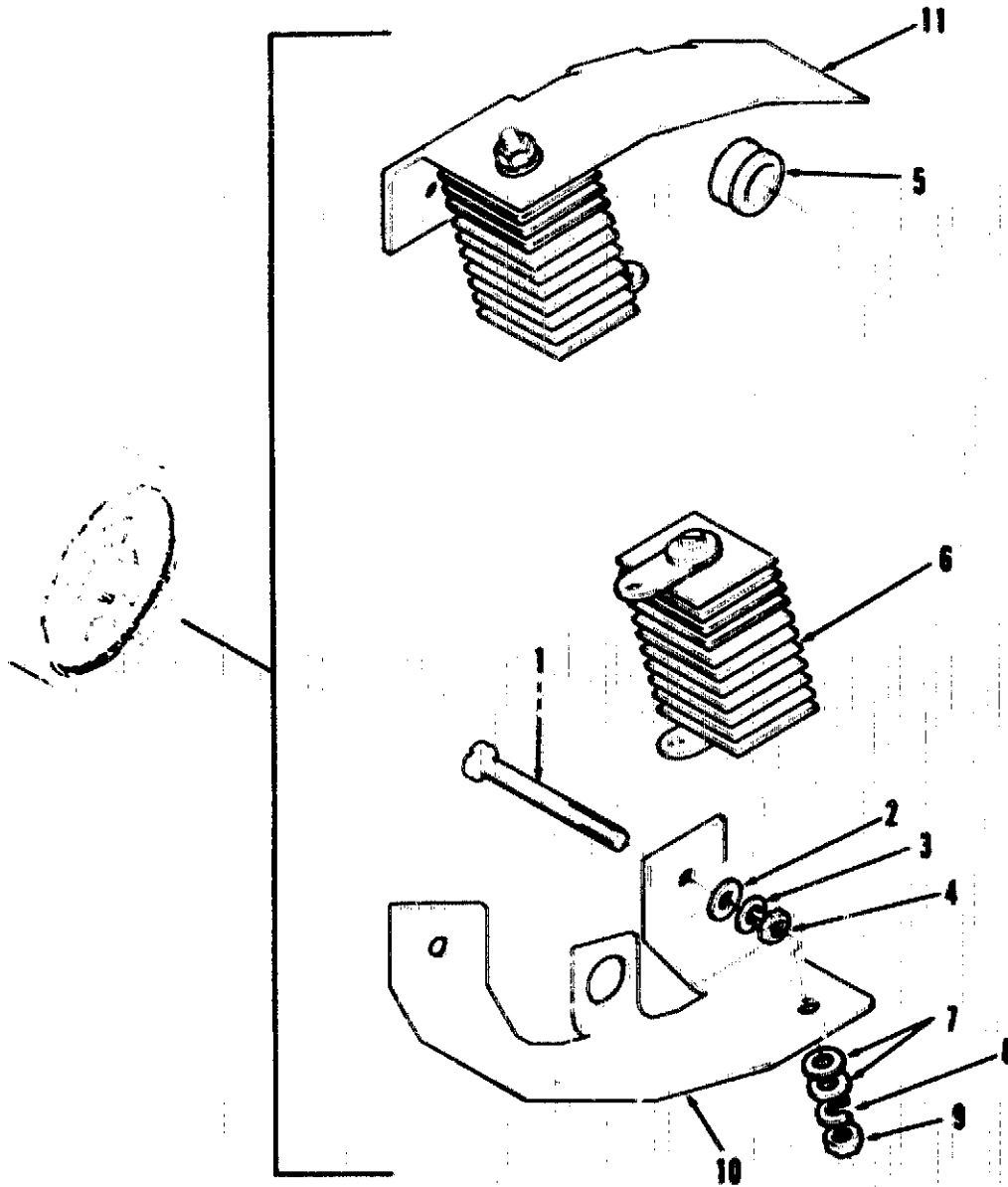
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GENERATOR ASSEMBLY - BRUSHLESS TYPE USED WITH REMOTE VOLTAGE REGULATOR

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	800-0003	2	Screw, Cap - Hex Head (1/4-20 x 1-1/2") (1/4-20 x 1-1/2")	26	ROTOR ASSEMBLY, GENERATOR (Includes Parts Marked*)		
2	850-0040	2	Washer, Lock - Spring (1-4")	201-2669	1		50 HERTZ SETS
3	150-1456	1	Contact Assembly - Overspeed Switch (Includes Parts Marked -)	201-2671	1		Code 515
4	862-0001	2	+Nut, Hex (1/4-20)				†Code 515 (Extended Stack)
5	853-0013	1	+Washer, Lock - ET (1-4")	201-2671	1		60 HERTZ SETS
6	150-0723	1	+Contact, Electrical	201-2689	1		Code 3
7	870-0250	1	+Nut, Insulated				†Code 3 (Environmental Protected)
8	150-1356	1	+Bracket, Mounting - Contact	201-2669	1		Codes 6D, 7, 9X, 15
9	862-0011	4	Nut, hex - Grade 8 (3/8-16)	201-2671	1		†Code 15 (Extended Stack)
10	850-0050	4	Washer, Lock - Spring (3/8")	201-2687	1		£Code 15 (Environmental Protected)
11	STUD (Select as Required)			201-2689	1		†£Code 15 (Extended Stack and Environmental Protected)
	520-0718	4	3/8-16 UNC x 14-11/16" Lg	27	800-0513	1	*Screw, Cap - Hex Head Modified with 3/8-16 Tapped Center Hole (3/4-10 x 1-1/2")
	520-0721	4	3/8-16 UNC x 16-11/32" Lg	28	850-0079	1	*Washer, Lock - Spring (3/4")
12	503-0611	4	Hose, Rubber	29	526-0238	1	*Washer, Flat - Steel Alloy (13/16" ID x 2" OD x 3/16" Thk)
13	800-0009	4	Screw, Cap - Hex Head (1/4-20 x 1-1/2")	30	510-0101	1	*Bearing, Ball
14	850-0040	4	Washer, Lock - Spring (1-4")	31	232-2102	1	*Spacer, Sleeve
15	STATOR, EXCITER (Select as Required)			32	*ROTOR ASSEMBLY, EXCITER (See Separate Group for Components)		
	220-2353	1	Standard	201-1739	1		Standard
	220-1774	1	£Environmental Protected	201-1845	1		£Environmental Protected
16	509-0125	1	Seal, Oil - "O" Ring	33	515-0145	1	*Key, Machine (1/4" x 1/4" x 7/8")
17	211-0185	1	End Bell, Generator	34	*BOLT, PLACE - HEX HEAD, GRADE 8 (Select as Required)		
18	800-0008	2	Screw, Cap - Hex Head (1/4-20 x 1-1/4")	805-0033	8		5/8-11 x 1"
19	850-0040	2	Washer, Lock - Spring (1-4")	805-0035	8		5/8-11 x 1-1/2"
20	862-0001	2	Nut, Hex (1/4-20)	35	526-0259	8	*Washer, Flat - Hardened Steel (11/16" ID x 1-3/8" OD x 7/64" Thk)
21	234-0368	1	Screen, Air - Generator	36	*BOLT, PLACE - HEX HEAD, GRADE 8 (Select as Required)		
22	STATOR ASSEMBLY, GENERATOR			805-0018	8		3/8-16 x 1"
			50 HERTZ SETS	805-0019	8		3/8-16 x 1-1/4"
	220-1997	1	Code 515	37	205-0089	1	*Fan, Generator
	220-1999		†Code 515 (Extended Stack)	38	232-2078	1	*Disk Drive - Generator
			60 HERTZ SETS				
	220-1554	1	Code 3				
	220-1847	1	£Code 3 (Environmental Protected)				
	220-2624	1	Code 6D				
	220-2462	1	Code 7				
	220-1602	1	Code 9X				
	220-1454	1	Code 15				
	220-1456	1	†Code 15 (Extended Stack)				
	220-1786	1	£Code 15 (Environmental Protected)				
	220-1788	1	†£Code 15 (Extended Stack and Environmental Protected)				
23	800-0048	1	Screw, Cap - Hex Head (3/8-16 x 3/4")				
24	856-0010	1	Washer, Lock - EIT (3/8")				
25	150-0717	1	Switch, Overspeed				

- * - Parts Included in Overspeed Switch Assembly.
- * - Parts Included in Generator Rotor Assembly
- † - Extended Stack type assemblies that are used on sets having full power output on both single and three phase hookups. Both phases carry same kW and kVA ratings.
- £ - Environmental protected assemblies or parts which are coated with epoxy and are for use in high humidity areas.

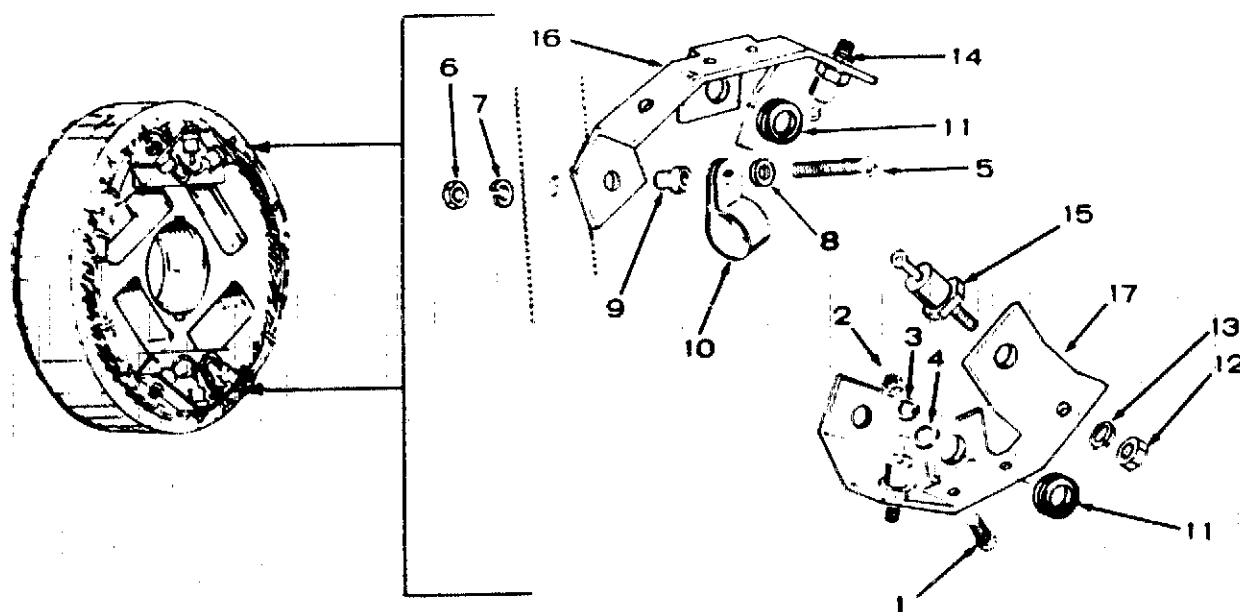
VOLTAGE SUPPRESSOR ASSEMBLY



ES-1285-1

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	232-2444	1	Voltage Suppressor Assembly (Includes Items 5 thru 11)	6	305-0526	1	Set Voltage Suppressor (Matched Pair) (Includes Items 7 thru 9)
ATTACHING PARTS FOR ASSEMBLY				ATTACHING PARTS FOR SUPPRESSORS			
1	813-0112	4	Screw, Machine - Round Head (#10-32 x 2-1/2")	7	526-0140	4	Washer, Flat (7/32" ID x 3/8" OD x 3/64" Thk)
2	526-0140	4	Washer, Flat (7/32" ID x 3/8" OD x 3/64" Thk)	8	850-0030	4	Washer, Lock - Spring (#10)
3	850-0030	4	Washer, Lock - Spring (#10)	9	870-0053	4	Nut, Hex (#10-32)
4	870-0053	4	Nut, Hex (#10-32)	10	363-0054	1	Heatsink - Positive
5	508-0093	2	Grommet, Rubber	11	363-0055	1	Heatsink - Negative

EXCITER ROTOR



G-1030

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
ROTOR ASSEMBLY EXCITER (Includes Parts Marked *)			
	201-1739	1	Standard
	201-1845	1	Environmental Protected (Expoxyed)
1	813-0100	2	Screw, Machine - Round Head (#10-32 x 1 1/2")
2	870-0053	2	Nut, Hex (#10-32)
3	850-0030	2	Washer, Lock - Spring (#10)
4	526-0008	2	Washer, Flat (13 64" ID x 7 16" OD x 1 32" Thk)
5	813-0110	4	*Screw, Machine - Round Head (#10-32 x 2")
6	870-0053	4	*Nut, Hex (#10-32)
7	850-0030	4	*Washer, Lock - Spring (#10)
8	526-0009	4	*Washer, Flat (7 32" ID x 1 2" OD x 1 16" Thk)
9	508-0187	4	*Spacer, Stepped
10	332-0050	2	*Clamp, Loop
11	508-0093	2	*Grommet, Rubber
12	870-0053	6	*Nut, Hex (#10-32)
13	850-0030	6	*Washer, Lock - Spring (#10)
14	*DIODE, RECTIFIER - POSITIVE (CR1, CR2, CR3)		
	358-0016	3	Standard
	358-0044	3	Environmental Protected (Expoxyed)
15	*DIODE, RECTIFIER - NEGATIVE (CR4, CR5, CR6)		
	358-0015	3	Standard
	358-0043	3	Environmental Protected (Expoxyed)
16	363-0054	1	*Heat, Sink - Positive Diodes
17	363-0055	1	*Heat, Sink - Negative Diodes

Parts included in Exciter Rotor Assembly

CIRCUIT BREAKER

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	815-0350	6	Screw, Tapping - Hex Washer Head (#10-32 x 3.8")
2	301-3192	1	Panel, Cover - Circuit Breaker
3	SLEEVING, INSULATION - SHRINKABLE (Select as Required)		
	898-0863		3/4" ID
	898-0865		1" ID
	898-0875		1-1/2" ID
	898-0869		2" ID
4	SLEEVING, INSULATION - FIBERGLASS (Select as Required)		
	898-0974		3/4" ID
	898-0976		1" ID
5	800-0028	5	Screw, Cap - Hex Head (5/16-18 x 1")
6	526-0022	10	Washer, Flat (21/64" ID x 9/16" OD x 1/16" Thk)
7	850-0045	5	Washer, Lock - Spring (5/16")
8	862-0015	5	Nut, Hex (5/16-18)
9	812-0094	4	Screw, Machine - Pound Head (#8-32 x 3-5/8")
10	850-0025	4	Washer, Lock - Spring (#8)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
11	CIRCUIT BREAKER (Select as Required)		
			40-50-60 AMP
	320-0415	1	40 AMP, 3 PH, 347/600 VAC
	320-0413	1	50 AMP, 3 PH, 277/480 VAC
	320-0384	1	60 AMP, 3 PH, 200/346 - 220/380 VAC
	320-0416	1	60 AMP, 3 PH, 347/600 VAC
			70-90-100 AMP
	320-0414	1	70 AMP, 3 PH, 277/480 VAC
	320-0417	1	70 AMP, 3 PH, 347/600 VAC
	320-0411	1	90 AMP, 3 PH, 120/240 VAC
	320-0379	1	90 AMP, 3 PH, 200/346 - 220/380 - 277/480 VAC
	320-0418	1	90 AMP, 3 PH, 347/600 VAC
	320-0412	1	100 AMP, 3 PH, 120/208 VAC
	320-0380	1	100 AMP, 3 PH, 200/346 - 220/380 - 277/480 VAC
	320-0771	1	100 AMP, 3 PH, 127/220 VAC with 24 VDC shunt trip and AUX contacts
			125 AMP
	320-0419	1	125 AMP, 3 PH, 200/346 - 220/380 VAC
			150 AMP
	320-0346	1	150 Amp, 3 PH, 120/208 - 120/240 VAC
	320-0425	1	150 AMP, 3 PH, 200/346 VAC
	320-0772	1	150 AMP, 3 PH, 127/220 VAC with 12 VDC shunt trip and AUX contacts
			175 AMP
	320-0344	1	175 AMP, 1 PH, 120/240 VAC
	320-0347	1	175 AMP, 3 PH, 120/208 - 120/240 VAC
	320-0773	1	175 AMP, 3 PH, 127/220 VAC with 12 VDC shunt trip and AUX contacts
			200 AMP
	320-0348	1	200 AMP, 3 PH, 120/208 - 120/240 VAC
			225 AMP
	320-0359	1	225 AMP, 1 PH, 120/240 VAC
	320-0349	1	225 AMP, 3 PH, 120/208 VAC
12	800-0003	2	Screw, Cap - Hex Head (1/4-20 x 1/2")
13	850-0040	2	Washer, Lock - Spring (1/4")
14	301-3197	1	Bracket, Mounting - Circuit Breaker

ENOTE - For Circuit Breakers with special features like Shunt Trip, AUX Contacts etc., not listed above - Contact your nearest Onan Parts Center and provide your Model, Serial and Specification numbers. Also provide any identification numbers or rating from the Circuit Breaker to be replaced.