



Presents

# Repair Manuals from

# SELOC<sup>®</sup>

## Contents of this manual:

<b>1</b>	<b>GENERAL INFORMATION, SAFETY AND TOOLS</b>	HOW TO USE THIS MANUAL	1-2
		BOATING SAFETY	1-4
		BOATING EQUIPMENT (NOT REQUIRED BUT RECOMMENDED)	1-10
		SAFETY IN SERVICE	1-12
		TROUBLESHOOTING	1-13
		SHOP EQUIPMENT	1-16
		TOOLS	1-18
		FASTENERS, MEASUREMENT, AND CONVERSIONS	1-26
		SPECIFICATIONS	1-27
		<b>2</b>	<b>MAINTENANCE &amp; TUNE-UP</b>
LUBRICATION SERVICE	2-4		
ENGINE MAINTENANCE	2-8		
BOAT MAINTENANCE	2-19		
TUNE-UP	2-22		
TIMING AND SYNCHRONIZATION	2-30		
STORAGE (WHAT TO DO BEFORE & AFTER)	2-41		
CLEARING A SUBMERGED MOTOR	2-44		
SPECIFICATIONS	2-45		
<b>3</b>	<b>FUEL SYSTEM</b>		
		FUEL TANK & LINES	3-4
		CARBURETORED FUEL SYSTEMS	3-9
		SPECIFICATIONS	3-39
		<b>4</b>	<b>IGNITION &amp; ELECTRICAL SYSTEMS</b>
IGNITION SYSTEMS			
IGNITION SYSTEMS - GENERAL INFORMATION	4-8		
TYPE I - DISTRIBUTOR MAGNETO SYSTEMS	4-12		
TYPE II DISTRIBUTOR BATTERY	4-24		
TYPE III - CAPACITOR DISCHARGE (CD) WITH SENSOR	4-34		
TYPE IV - CAPACITOR DISCHARGE (CD) WITH BREAKER POINTS	4-46		
TYPE V - CAPACITOR DISCHARGE (CD) FLYWHEEL MAGNETO SYSTEMS	4-57		
CHARGING SYSTEM - GENERATOR	4-63		
CHARGING SYSTEM - ALTERNATOR	4-69		
STARTING SYSTEM	4-77		
ELECTRICAL ACCESSORIES	4-89		
WIRING DIAGRAMS	4-93		

# CONTENTS

COOLING SYSTEM 5-2

COOLING SYSTEMS

5

POWERHEAD 6-2  
POWERHEAD DISASSEMBLY 6-4  
POWERHEAD BREAK-IN 6-28  
EXPLODED VIEWS 6-29  
SPECIFICATIONS 6-31

POWERHEAD

6

GEARCASE BASICS 7-2  
TYPE I - MANUAL SHIFT, SPLIT LOWER UNIT 7-4  
TYPE II - MANUAL SHIFT, SINGLE ENCLOSED HOUSING 7-12  
TYPE III - ELECTROMATIC LOWER UNIT 7-21  
TYPE IV - ELECTROMATIC LOWER UNIT 7-30  
TYPE V - ELECTRIC SHIFT, TWO SOLENOIDS 7-39  
SPECIFICATIONS

LOWER UNIT

7

REMOTE CONTROLS 8-2  
OLD-STYLE SHIFT LEVER 8-3  
NEW STYLE SHIFT LEVER 8-5  
SINGLE LEVER CONTROL JOHNSON UNITS  
USED ON ELECTRIC GEAR BOXES 8-8  
PUSHBUTTON SHIFT BOX - EVINRUDE UNITS ONLY 8-11  
SINGLE LEVER HYDRO-ELECTRIC  
REMOTE CONTROL SHIFT BOX 8-15  
REMOTE CONTROL CABLES 8-20

REMOTE CONTROLS

8

HAND REWIND STARTER 9-2

HAND REWIND STARTERS

9

MASTER INDEX 9-7

MASTER INDEX

ANCHORS .....	1-10	<b>CHARGING SYSTEM</b>	
ANODES .....	2-18	ALTERNATOR .....	4-69
INSPECTION .....	2-18	GENERATOR .....	4-63
SERVICE .....	2-18	<b>CHARGING SYSTEM - ALTERNATOR</b> .....	<b>4-69</b>
AUTOLITE STARTERS .....	4-79	BATTERY .....	4-74
CLEANING & INSPECTION .....	4-81	DESCRIPTION .....	4-69
DISASSEMBLY & ASSEMBLY .....	4-80	OPERATION .....	4-69
REMOVAL & INSTALLATION .....	4-79	TROUBLESHOOTING .....	4-70
TESTING .....	4-81	<b>CHARGING SYSTEM - GENERATOR</b> .....	<b>4-63</b>
AVOIDING COMMON MISTAKES .....	1-3	DESCRIPTION .....	4-63
AVOIDING TROUBLE .....	1-2	GENERATOR .....	4-65
BAILING DEVICES .....	1-10	TROUBLESHOOTING .....	4-64
BASIC OPERATING PRINCIPLES .....	1-13	VOLTAGE REGULATOR .....	4-65
2-STROKE MOTORS .....	1-13	CHEMICALS .....	1-17
4-STROKE MOTORS .....	1-15	CLEANERS .....	1-18
COMBUSTION .....	1-16	LUBRICANTS & PENETRANTS .....	1-17
BATTERY		SEALANTS .....	1-17
CONSTRUCTION .....	4-75	CHOKE SYSTEM SERVICE .....	3-32
DUAL BATTERY .....	4-76	ALL ELECTRIC CHOKE .....	3-34
JUMPER CABLES .....	4-76	HEAT/ELECTRIC CHOKE .....	3-32
LOCATION .....	4-76	WATER CHOKE .....	3-34
MAINTENANCE .....	2-19	<b>CLEARING A SUBMERGED MOTOR</b> .....	<b>2-44</b>
MARINE BATTERIES .....	4-74	CLUTCH DOG MODIFICATION .....	7-12
RATINGS .....	4-76	COMPASS .....	1-10
SERVICE .....	4-76	INSTALLATION .....	1-11
STORAGE .....	4-76	PRECAUTIONS .....	1-11
STORAGE .....	2-21	SELECTION .....	1-10
TESTING .....	2-20	COMPRESSION CHECK .....	2-23
BEFORE/AFTER EACH USE .....	2-3	PERFORMING A TUNE-UP COMPRESSION CHECK .....	2-24
VISUALLY INSPECTING THE BOAT AND MOTOR .....	2-3	CONNECTING ROD & PISTON .....	6-12
<b>BOAT MAINTENANCE</b> .....	<b>2-19</b>	ASSEMBLY .....	6-16
BATTERIES .....	2-19	CLEANING & INSPECTION - PISTON & RING .....	6-15
<b>BOATING EQUIPMENT (NOT REQUIRED BUT RECOMMENDED)</b> ..	<b>1-10</b>	DISASSEMBLY .....	6-13
ANCHORS .....	1-10	INSPECTION & SERVICE - CONNECTING ROD .....	6-14
BAILING DEVICES .....	1-10	REMOVAL .....	6-12
COMPASS .....	1-10	CONTROL UNIT .....	8-17
FIRST AID KIT .....	1-10	ASSEMBLY .....	8-19
OAR/PADDLE .....	1-10	CLEANING & INSPECTION .....	8-17
TOOLS & SPARE PARTS .....	1-12	DISASSEMBLY .....	8-17
VHF-FM RADIO .....	1-10	<b>COOLING SYSTEM</b>	
<b>BOATING SAFETY</b> .....	<b>1-4</b>	DESCRIPTION & OPERATION .....	5-2
COURTESY MARINE EXAMINATIONS .....	1-10	FLUSHING THE COOLING SYSTEM .....	2-8
REGULATIONS FOR YOUR BOAT .....	1-4	THERMOSTAT (& PRESSURE RELIEF VALVE) .....	5-5
REQUIRED SAFETY EQUIPMENT .....	1-5	TROUBLESHOOTING .....	5-3
BOLTS, NUTS & OTHER THREADED RETAINERS .....	1-26	WATER PUMP .....	5-6
BOTTOM SEAL		COOLING SYSTEM MAINTENANCE .....	2-30
INSTALLATION .....	6-26	WATER PUMP CHECK .....	2-30
REMOVAL .....	6-9	COURTESY MARINE EXAMINATIONS .....	1-10
BREAKING IN A POWERHEAD .....	6-28	CRANKCASE COVER	
BYPASS COVER		REMOVAL .....	6-12
REMOVAL .....	6-7	INSTALLATION .....	6-24
INSTALLATION .....	6-26	CRANKSHAFT, NEEDLE, MAIN & ROD BEARING .....	6-22
CAN YOU DO IT? .....	1-2	INSTALLATION .....	6-22
<b>CARBURETED FUEL SYSTEMS</b> .....	<b>3-9</b>	CRANKSHAFT & BEARING .....	6-17
APPLICATIONS .....	3-14	ASSEMBLY .....	6-19
CHOKE SYSTEM SERVICE .....	3-32	CLEANING & INSPECTION .....	6-19
DESCRIPTION & OPERATION .....	3-10	REMOVAL & DISASSEMBLY .....	6-17
FUEL PUMP .....	3-36	CYLINDER BLOCK .....	6-20
GENERAL INFORMATION .....	3-14	SERVICE .....	6-20
TROUBLESHOOTING .....	3-11	CYLINDER HEAD	
TYPE IA/IB CARBURETORS .....	3-15	INSTALLATION .....	6-26
TYPE II CARBURETOR .....	3-20	SERVICE .....	6-5
TYPE III CARBURETOR .....	3-26	DE-CARBONING THE PISTONS .....	2-23
TYPE IV A & IV B CARBURETORS .....	3-29	DELCO-REMY STARTERS .....	4-83
CARBURETOR ADJUSTMENTS .....	2-30	CLEANING & INSPECTION .....	4-84
HIGH-SPEED .....	2-30	DISASSEMBLY & ASSEMBLY .....	4-83
IDLE .....	2-31	REMOVAL & INSTALLATION .....	4-83
CENTERING PIN .....	6-11	TESTING .....	4-84
REMOVAL .....	6-11	DESCRIPTION & OPERATION	
		AIR/FUEL MIXTURE .....	3-10
		CHARGING SYSTEM - ALTERNATOR .....	4-69
		CHARGING SYSTEM - GENERATOR .....	4-63

# 9-8 MASTER INDEX

COOLING SYSTEM	5-2	FUEL FILTER	2-12
FLOAT SYSTEMS	3-10	FUEL PUMP FILTERS	2-13
FUEL SYSTEM	3-11	INLINE FILTERS	2-13
HAND STARTER	9-2	SEDIMENT BOWL FILTERS	2-14
PUSHBUTTON SHIFT BOX	8-11	FUEL GAUGE	4-90
REMOTE CONTROLS	8-2	HOOKUP	4-90
SINGLE LEVER CONTROL USED ON ELECTRIC GEAR BOXES	8-8	TROUBLESHOOTING	4-90
SINGLE LEVER HYDRO-ELECTRIC REMOTE CONTROL SHIFT BOX	8-15	FUEL LINES & FITTINGS	3-7
STARTING SYSTEM	4-77	SERVICE	3-8
THE ROLE OF A CARBURETOR	3-10	TESTING	3-7
TYPE I IGNITION	4-12	FUEL PUMP	3-36
TYPE II IGNITION	4-24	REMOVAL, DISASSEMBLY & INSTALLATION	3-36
TYPE III GEARCASE	7-21	TROUBLESHOOTING	3-36
TYPE III IGNITION	4-34	<b>FUEL SYSTEM BASICS</b>	<b>3-2</b>
TYPE IV IGNITION	4-46	FUEL	3-2
TYPE V GEARCASE	7-39	FUEL SYSTEM PRESSURIZATION	3-4
TYPE V IGNITION	4-57	FUEL SYSTEM SERVICE CAUTIONS	3-2
DIRECTIONS & LOCATIONS	1-2	FUEL SYSTEM MAINTENANCE	2-29
ELECTRIC CHOKE	3-34	CARBURETOR ADJUSTMENTS	2-29
REMOVAL & INSTALLATION	3-34	FUEL & FUEL TANKS	2-30
ELECTRIC STARTER MOTOR PINION	2-4	FUEL PUMPS	2-30
LUBRICATION	2-4	FUEL SYSTEM PRESSURIZATION	3-4
RECOMMENDED LUBRICANT	2-4	PRESSURIZING	3-4
<b>ELECTRICAL ACCESSORIES</b>	<b>4-89</b>	FUEL SYSTEM SERVICE CAUTIONS	3-2
FUEL GAUGE	4-90	FUEL TANK	3-5
HORNS	4-91	SERVICE	3-5
TACHOMETER	4-91	<b>FUEL TANK &amp; LINES</b>	<b>3-4</b>
TEMPERATURE GAUGE AND/OR WARNING LIGHT	4-89	FUEL LINES & FITTINGS	3-7
ELECTRONIC TOOLS	1-23	FUEL TANK	3-5
BATTERY CHARGERS	1-23	FUNCTIONAL CHECK	
BATTERY TESTERS	1-23	TYPE I GEARCASE	7-12
GAUGES	1-24	TYPE III GEARCASE	7-30
MULTI-METERS (DVOMS)	1-24	<b>GEARCASE BASICS</b>	<b>7-2</b>
ENGINE COVER LATCHES	2-5	GEARCASE DIFFERENCES	7-2
LUBRICATION	2-5	GEARCASE MAINTENANCE & SERVICE	7-2
RECOMMENDED LUBRICANT	2-5	LOWER UNIT (GEARCASE) OIL	7-3
ENGINE IDENTIFICATION	2-2	PROPELLER	7-3
ENGINE SERIAL NUMBERS	2-2	GEARCASE DIFFERENCES	7-2
<b>ENGINE MAINTENANCE</b>	<b>2-8</b>	DESCRIPTION	7-2
ANODES (ZINCS)	2-18	LOWER UNIT COVERAGE	7-2
COOLING SYSTEM	2-8	WATER PUMP	7-2
FUEL FILTER	2-12	GEARCASE MAINTENANCE & SERVICE	7-2
LOWER UNIT (GEARCASE) OIL	2-10	GEARCASE OIL	2-10
PROPELLER	2-14	DRAINING & FILLING	2-11
2-STROKE ENGINE OIL	2-9	OIL LEVEL & CONDITION	2-11
EXHAUST COVER		OIL RECOMMENDATIONS	2-10
CLEANING	6-9	<b>GEARCASE - TYPE I</b>	<b>7-4</b>
REMOVAL	6-8	FUNCTIONAL CHECK	7-12
INSTALLATION	6-26	LOWER UNIT	7-6
<b>EXPLODED VIEWS - POWERHEAD</b>	<b>6-29</b>	TROUBLESHOOTING	7-4
<b>FASTENERS, MEASUREMENTS &amp; CONVERSIONS</b>	<b>1-26</b>	WATER PUMP	7-11
BOLTS, NUTS & OTHER THREADED RETAINERS	1-26	<b>GEARCASE - TYPE II</b>	<b>7-12</b>
STANDARD & METRIC MEASUREMENTS	1-27	CLUTCH DOG MODIFICATION	7-12
TORQUE	1-27	LOWER UNIT	7-13
FIBERGLASS HULL	2-21	TROUBLESHOOTING	7-13
INSPECTION & CARE	2-21	WATER PUMP	7-20
FIRE EXTINGUISHERS	1-5	<b>GEARCASE - TYPE III</b>	<b>7-21</b>
CARE & TREATMENT	1-6	DESCRIPTION & OPERATION	7-21
CONTENTS OF EXTINGUISHERS	1-6	FUNCTIONAL CHECK	7-30
EXTINGUISHER APPROVAL	1-6	LOWER UNIT	7-22
HALON EXTINGUISHERS	1-6	TROUBLESHOOTING	7-22
LEGAL REQUIREMENTS	1-6	WATER PUMP	7-30
USING A EXTINGUISHER	1-6	<b>GEARCASE - TYPE IV</b>	<b>7-30</b>
FIRST AID KIT	1-10	LOWER UNIT	7-30
FUEL	3-2	TROUBLESHOOTING	7-30
ALCOHOL-BLENDED FUELS	3-3	WATER PUMP	7-38
HIGH ALTITUDE OPERATION	3-3	<b>GEARCASE - TYPE V</b>	<b>7-39</b>
OCTANE RATING	3-2	BEARING CARRIER, BEARINGS & SEALS	7-46
RECOMMENDATIONS	3-3	CLEANING & INSPECTION	7-53
STALE/CONTAMINATED FUEL	3-3	DESCRIPTION & OPERATION	7-39
VAPOR PRESSURE	3-3	DRIVESHAFT & PINION GEAR	7-49

<p>HYDRAULIC PUMP ..... 7-51</p> <p>LOWER DRIVESHAFT BEARING ..... 7-53</p> <p>LOWER UNIT ..... 7-40</p> <p>PROPELLER SHAFT ..... 7-47</p> <p>SHIFT CABLE, SOLENOIDS &amp; ROD ..... 7-45</p> <p>TROUBLESHOOTING ..... 7-39</p> <p>WATER PUMP ..... 7-42</p> <p><b>GENERAL INFORMATION</b></p> <p><b>(WHAT EVERYONE SHOULD KNOW ABOUT MAINTENANCE)</b> ..... 2-2</p> <p>BEFORE/AFTER EACH USE ..... 2-3</p> <p>ENGINE IDENTIFICATION ..... 2-2</p> <p>MAINTENANCE COVERAGE IN THIS MANUAL ..... 2-2</p> <p>MAINTENANCE EQUALS SAFETY ..... 2-2</p> <p>OUTBOARDS ON SAIL BOATS ..... 2-2</p> <p>GENERATOR ..... 4-65</p> <p>ARMATURE TESTING ..... 4-66</p> <p>ASSEMBLY &amp; INSTALLATION ..... 4-68</p> <p>CLEANING &amp; INSPECTION ..... 4-68</p> <p>REMOVAL &amp; DISASSEMBLY ..... 4-65</p> <p>HAND TOOLS ..... 1-19</p> <p>BREAKER BARS ..... 1-20</p> <p>HAMMERS ..... 1-22</p> <p>PLIERS ..... 1-21</p> <p>SCREWDRIVERS ..... 1-21</p> <p>SOCKET SETS ..... 1-19</p> <p>TORQUE WRENCHES ..... 1-20</p> <p>WRENCHES ..... 1-21</p> <p><b>HAND REWIND STARTER</b> ..... 9-2</p> <p>DESCRIPTION &amp; OPERATION ..... 9-2</p> <p>HAND STARTER ..... 9-3</p> <p>HAND STARTER ..... 9-3</p> <p>CLEANING &amp; INSPECTION ..... 9-6</p> <p>DISASSEMBLY &amp; ASSEMBLY ..... 9-4</p> <p>REMOVAL &amp; INSTALLATION ..... 9-3</p> <p>SAFETY PAWL ADJUSTMENT ..... 9-6</p> <p>HEAT/ELECTRIC CHOKE ..... 3-32</p> <p>REMOVAL &amp; INSTALLATION ..... 3-32</p> <p>HORNS ..... 4-91</p> <p><b>HOW TO USE THIS MANUAL</b> ..... 1-2</p> <p>AVOIDING COMMON MISTAKES ..... 1-3</p> <p>AVOIDING TROUBLE ..... 1-2</p> <p>CAN YOU DO IT? ..... 1-2</p> <p>DIRECTIONS &amp; LOCATIONS ..... 1-2</p> <p>MAINTENANCE OR REPAIR? ..... 1-2</p> <p>PROFESSIONAL HELP ..... 1-3</p> <p>PURCHASING PARTS ..... 1-3</p> <p>WHERE TO BEGIN ..... 1-2</p> <p>IDENTIFICATION</p> <p>TYPE I IGNITION ..... 4-12</p> <p>TYPE II IGNITION ..... 4-24</p> <p>TYPE III IGNITION ..... 4-34</p> <p>TYPE IV IGNITION ..... 4-46</p> <p>TYPE V IGNITION ..... 4-57</p> <p>IGNITION SYSTEM SERVICE - TYPE I ..... 4-15</p> <p>CHECKS &amp; ADJUSTMENT ..... 4-23</p> <p>CLEANING &amp; INSPECTION ..... 4-17</p> <p>DISTRIBUTOR BELT REPLACEMENT ..... 4-22</p> <p>INSTALLATION &amp; ASSEMBLY ..... 4-18</p> <p>REMOVAL &amp; DISASSEMBLY ..... 4-15</p> <p>IGNITION SYSTEM SERVICE - TYPE II ..... 4-27</p> <p>BELT REPLACEMENT &amp; TIMING ..... 4-30</p> <p>CLEANING &amp; INSPECTION ..... 4-28</p> <p>INSTALLATION &amp; ASSEMBLY ..... 4-29</p> <p>REMOVAL &amp; DISASSEMBLY ..... 4-27</p> <p>IGNITION SYSTEM SERVICE - TYPE III ..... 4-43</p> <p>1967 100 HP ..... 4-43</p> <p>ALL OTHER MODELS ..... 4-43</p> <p>IGNITION SYSTEM SERVICE - TYPE IV ..... 4-54</p> <p>ASSEMBLY ..... 4-56</p> <p>CLEANING &amp; INSPECTION ..... 4-55</p> <p>DISASSEMBLY ..... 5-54</p>	<p>IGNITION SYSTEM SERVICE - TYPE V ..... 4-61</p> <p>POWER PACK ..... 4-63</p> <p>STATOR &amp; CHARGE COIL ..... 4-62</p> <p>TIMER BASE &amp; SENSOR ASSEMBLY ..... 4-62</p> <p><b>IGNITION SYSTEMS</b></p> <p>GENERAL INFORMATION ..... 4-8</p> <p>TYPE I - DISTRIBUTOR MAGNETO ..... 4-12</p> <p>TYPE II - DISTRIBUTOR BATTERY ..... 4-24</p> <p>TYPE III - CAPACITOR DISCHARGE (CD) W/SENSOR ..... 4-34</p> <p>TYPE IV - CAPACITOR DISCHARGE (CD) W/BREAKER POINTS ..... 4-46</p> <p>TYPE V - CAPACITOR DISCHARGE (CD) FLYWHEEL MAGNETO ..... 4-57</p> <p><b>IGNITION SYSTEMS - GENERAL INFORMATION</b> ..... 4-8</p> <p>BREAKER POINTS ..... 4-11</p> <p>COIL POLARITY CHECK ..... 4-10</p> <p>CONDENSER ..... 4-12</p> <p>IGNITION WIRING HARNESS ..... 4-10</p> <p>INTRODUCTION &amp; IDENTIFICATION ..... 4-8</p> <p>KEY SWITCH ..... 4-10</p> <p>SPARK PLUG EVALUATION ..... 4-8</p> <p><b>IGNITION SYSTEMS - TYPE I</b> ..... 4-12</p> <p>DESCRIPTION &amp; OPERATION ..... 4-12</p> <p>IDENTIFICATION ..... 4-12</p> <p>SERVICE ..... 4-15</p> <p>TROUBLESHOOTING ..... 4-13</p> <p><b>IGNITION SYSTEMS - TYPE II</b> ..... 4-24</p> <p>DESCRIPTION &amp; OPERATION ..... 4-24</p> <p>IDENTIFICATION ..... 4-24</p> <p>SERVICE ..... 4-27</p> <p>TROUBLESHOOTING ..... 4-25</p> <p><b>IGNITION SYSTEMS - TYPE III</b> ..... 4-34</p> <p>DESCRIPTION &amp; OPERATION ..... 4-34</p> <p>IDENTIFICATION ..... 4-34</p> <p>SERVICE - 1967 100 HP ..... 4-43</p> <p>SERVICE - ALL OTHER MODELS ..... 4-43</p> <p>TROUBLESHOOTING - GENERAL ..... 4-34</p> <p>TROUBLESHOOTING - 1967-68 100 HP ..... 4-36</p> <p>TROUBLESHOOTING - 1969-70 115 HP ..... 4-39</p> <p>TROUBLESHOOTING - 1972 100 HP &amp; 1971-72 125 HP ..... 4-41</p> <p><b>IGNITION SYSTEMS - TYPE IV</b> ..... 4-46</p> <p>DESCRIPTION &amp; OPERATION ..... 4-46</p> <p>IDENTIFICATION ..... 4-46</p> <p>SERVICE ..... 4-54</p> <p>TROUBLESHOOTING - GENERAL ..... 4-47</p> <p>TROUBLESHOOTING - 1968-69 55 HP &amp; 1968 65/85 HP ..... 4-48</p> <p>TROUBLESHOOTING - 1969-72 85 HP &amp; 1971 100 HP ..... 4-51</p> <p>TROUBLESHOOTING - 1970-71 60 HP ..... 4-53</p> <p>IGNITION SYSTEMS - TYPE V ..... 4-57</p> <p>DESCRIPTION &amp; OPERATION ..... 4-57</p> <p>IDENTIFICATION ..... 4-57</p> <p>SAFETY WORDS ..... 4-58</p> <p>SERVICE ..... 4-61</p> <p>SPECIAL EQUIPMENT &amp; ADVICE ..... 4-58</p> <p>TROUBLESHOOTING ..... 4-58</p> <p>IGNITION &amp; ELECTRICAL SYSTEM MAINTENANCE ..... 2-29</p> <p>INSPECTION ..... 2-29</p> <p>LINKAGE, CABLES AND SHAFTS ..... 2-6</p> <p>LUBRICATION ..... 2-6</p> <p>RECOMMENDED LUBRICANT ..... 2-6</p> <p>LOWER UNIT OIL ..... 2-10</p> <p>DRAINING &amp; FILLING ..... 2-11</p> <p>OIL LEVEL &amp; CONDITION ..... 2-11</p> <p>OIL RECOMMENDATIONS ..... 2-10</p> <p>LOWER UNIT - TYPE I ..... 7-6</p> <p>CLEANING &amp; INSPECTION ..... 7-10</p> <p>DISASSEMBLY &amp; ASSEMBLY ..... 7-7</p> <p>REMOVAL &amp; INSTALLATION ..... 7-6</p> <p>LOWER UNIT - TYPE II ..... 7-13</p> <p>CLEANING &amp; INSPECTION ..... 7-18</p> <p>DISASSEMBLY &amp; ASSEMBLY ..... 7-14</p> <p>REMOVAL &amp; INSTALLATION ..... 7-13</p>
---	--

# 9-10 MASTER INDEX

LOWER UNIT - TYPE III . . . . .	7-22	<b>POWERHEAD DISASSEMBLY . . . . .</b>	<b>6-4</b>
CLEANING & INSPECTION . . . . .	7-29	BOTTOM SEAL . . . . .	6-9
DISASSEMBLY & ASSEMBLY . . . . .	7-23	BYPASS COVER . . . . .	6-7
REMOVAL & INSTALLATION . . . . .	7-22	CENTERING PIN . . . . .	6-11
LOWER UNIT - TYPE IV . . . . .	7-30	CONNECTING ROD & PISTON . . . . .	6-12
CLEANING & INSPECTION . . . . .	7-38	CRANKCASE COVER . . . . .	6-12
DISASSEMBLY & ASSEMBLY . . . . .	7-32	CRANKSHAFT & BEARING . . . . .	6-17
REMOVAL & INSTALLATION . . . . .	7-30	CYLINDER BLOCK . . . . .	6-20
LOWER UNIT - TYPE V . . . . .	7-40	CYLINDER HEAD SERVICE . . . . .	6-5
BEARING CARRIER, BEARINGS & SEALS . . . . .	7-46	EXHAUST COVER . . . . .	6-8
CLEANING & INSPECTION . . . . .	7-53	MAIN BEARING BOLT & CRANKCASE SIDE BOLT . . . . .	6-11
DRIVESHAFT & PINION GEAR . . . . .	7-49	PRELIMINARY WORK . . . . .	6-4
HYDRAULIC PUMP . . . . .	7-51	REED VALVES . . . . .	6-5
LOWER DRIVESHAFT BEARING . . . . .	7-53	TOP SEAL . . . . .	6-9
PROPELLER SHAFT . . . . .	7-47	PRELIMINARY WORK . . . . .	6-4
REMOVAL & INSTALLATION . . . . .	7-40	PRESSURE RELIEF VALVE . . . . .	5-5
SHIFT CABLE, SOLENOIDS & ROD . . . . .	7-45	REMOVAL & INSTALLATION . . . . .	5-5
<b>LUBRICATION SERVICE . . . . .</b>	<b>2-4</b>	PRESTOLITE STARTERS . . . . .	4-84
ELECTRIC STARTER MOTOR PINION . . . . .	2-4	CLEANING & INSPECTION . . . . .	4-86
ENGINE COVER LATCHES . . . . .	2-5	DISASSEMBLY & ASSEMBLY . . . . .	4-85
LINKAGE, CABLES AND SHAFTS . . . . .	2-6	REMOVAL & INSTALLATION . . . . .	4-85
POWER STEERING FLUID RESERVOIR . . . . .	2-5	TESTING . . . . .	4-86
POWER TILT RESERVOIR . . . . .	2-5	PROFESSIONAL HELP . . . . .	1-3
STEERING ARM (CABLE RAM/TILLER ARM) . . . . .	2-7	PROPELLER . . . . .	
TILT TUBE ASSEMBLY . . . . .	2-7	FROZEN PROPELLER . . . . .	7-3
MAIN BEARING BOLT & CRANKCASE SIDE BOLT . . . . .		GENERAL INFORMATION . . . . .	7-3
REMOVAL . . . . .	6-11	INSPECTION . . . . .	2-14
INSTALLATION . . . . .	6-25	REMOVAL & INSTALLATION . . . . .	2-15
MAINTENANCE OR REPAIR? . . . . .	1-2	PURCHASING PARTS . . . . .	1-3
MAINTENANCE COVERAGE IN THIS MANUAL . . . . .	2-2	<b>PUSHBUTTON SHIFT BOX . . . . .</b>	<b>8-11</b>
MAINTENANCE EQUALS SAFETY . . . . .	2-2	DESCRIPTION & OPERATION . . . . .	8-11
MEASURING TOOLS . . . . .	1-25	SHIFT BOX . . . . .	8-13
DEPTH GAUGES . . . . .	1-26	TROUBLESHOOTING . . . . .	8-11
DIAL INDICATORS . . . . .	1-25	RE-COMMISSIONING . . . . .	2-43
MICROMETERS & CALIPERS . . . . .	1-25	REMOVAL FROM STORAGE . . . . .	2-43
TELESCOPING GAUGES . . . . .	1-26	REBUILDING TIPS . . . . .	6-4
OAR/PADDLE . . . . .	1-10	CLEANLINESS . . . . .	6-4
OTHER COMMON TOOLS . . . . .	1-22	POWERHEAD COMPONENTS . . . . .	6-4
OUTBOARDS ON SAIL BOATS . . . . .	2-2	REED INSTALLATION . . . . .	6-4
PERSONAL FLOTATION DEVICES . . . . .	1-7	TORQUE VALUES . . . . .	6-4
CARE OF LIFE JACKETS . . . . .	1-8	REED BOX . . . . .	6-26
GENERAL CONSIDERATIONS . . . . .	1-8	INSTALLATION . . . . .	6-26
LEGAL REQUIREMENTS . . . . .	1-8	REED VALVES . . . . .	6-5
PISTON & ROD ASSEMBLY . . . . .	6-21	ASSEMBLING THE REEDS . . . . .	6-7
INSTALLATION . . . . .	6-21	CLEANING & SERVICING REED VALVES . . . . .	6-7
POWER STEERING FLUID RESERVOIR . . . . .	2-5	DESCRIPTION . . . . .	6-5
CHANGING FLUID & FILTER . . . . .	2-6	REGULATIONS FOR YOUR BOAT . . . . .	1-4
CHECKING FLUID LEVEL/CONDITION . . . . .	2-6	CAPACITY INFORMATION . . . . .	1-4
RECOMMENDED LUBRICANT . . . . .	2-5	CERTIFICATE OF COMPLIANCE . . . . .	1-4
POWER TILT RESERVOIR . . . . .	2-5	DOCUMENTING OF VESSELS . . . . .	1-4
CHECKING FLUID LEVEL/CONDITION . . . . .	2-5	HULL IDENTIFICATION NUMBER . . . . .	1-4
RECOMMENDED LUBRICANT . . . . .	2-5	LENGTH OF BOATS . . . . .	1-4
<b>POWERHEAD . . . . .</b>	<b>6-2</b>	NUMBERING OF VESSELS . . . . .	1-4
INSTALLATION . . . . .	6-28	REGISTRATION OF BOATS . . . . .	1-4
REBUILDING TIPS . . . . .	6-4	SALES & TRANSFERS . . . . .	1-4
SECTION ORGANIZATION . . . . .	6-4	VENTILATION . . . . .	1-4
THEORY OF OPERATION . . . . .	6-2	<b>REMOTE CONTROL CABLES . . . . .</b>	<b>8-20</b>
<b>POWERHEAD ASSEMBLY . . . . .</b>	<b>6-21</b>	RIGGING . . . . .	8-22
BOTTOM SEAL - TYPE ATTACHED TO LOWER END OF . . . . .		SHIFT CABLE . . . . .	8-21
CRANKSHAFT . . . . .	6-26	THROTTLE CABLE . . . . .	8-20
CRANKCASE COVER . . . . .	6-24	<b>REMOTE CONTROLS . . . . .</b>	<b>8-2</b>
CRANKSHAFT, NEEDLE, MAIN & ROD BEARING . . . . .	6-22	DESCRIPTION . . . . .	8-2
CYLINDER HEAD . . . . .	6-26	INTRODUCTION . . . . .	8-2
EXHAUST & BYPASS COVER . . . . .	6-26	<b>REMOTE CONTROLS - NEW STYLE SHIFT LEVER . . . . .</b>	<b>8-5</b>
MAIN BEARING BOLT & CRANKCASE SIDE BOLT . . . . .	6-25	SHIFT BOX . . . . .	8-6
PISTON & ROD ASSEMBLY . . . . .	6-21	TROUBLESHOOTING . . . . .	8-5
POWERHEAD ASSEMBLY . . . . .	6-28	<b>REMOTE CONTROLS - OLD-STYLE DOUBLE LEVER . . . . .</b>	<b>8-3</b>
REED BOX . . . . .	6-26	SHIFT BOX . . . . .	8-3
<b>POWERHEAD BREAK-IN . . . . .</b>	<b>6-28</b>	TROUBLESHOOTING . . . . .	8-3
BREAKING IN A POWERHEAD . . . . .	6-28		
GENERAL INFORMATION . . . . .	6-28		

<p>REQUIRED SAFETY EQUIPMENT ..... 1-5</p> <p>FIRE EXTINGUISHERS ..... 1-5</p> <p>PERSONAL FLOTATION DEVICES ..... 1-7</p> <p>SOUND PRODUCING DEVICES ..... 1-8</p> <p>TYPES OF FIRES ..... 1-5</p> <p>VISUAL DISTRESS SIGNALS ..... 1-8</p> <p>WARNING SYSTEM ..... 1-6</p> <p>RIGGING ..... 8-22</p> <p><b>SAFETY IN SERVICE ..... 1-12</b></p> <p>DO'S ..... 1-12</p> <p>DON'TS ..... 1-12</p> <p>SAFETY TOOLS ..... 1-16</p> <p>EYE &amp; EAR PROTECTION ..... 1-16</p> <p>WORK CLOTHES ..... 1-17</p> <p>WORK GLOVES ..... 1-16</p> <p>SHIFT BOX</p> <p>  OLD-STYLE DOUBLE LEVER ..... 8-3</p> <p>  NEW STYLE SHIFT LEVER ..... 8-5</p> <p>  SINGLE LEVER CONTROL USED ON ELECTRIC GEAR BOXES ..... 8-8</p> <p>  PUSHBUTTON SHIFT BOX ..... 8-11</p> <p>SHIFT CABLE ..... 8-21</p> <p>  INSTALLATION AT THE ENGINE ..... 8-21</p> <p>  INSTALLATION AT THE REMOTE ..... 8-21</p> <p><b>SHOP EQUIPMENT ..... 1-16</b></p> <p>CHEMICALS ..... 1-17</p> <p>SAFETY TOOLS ..... 1-16</p> <p><b>SINGLE LEVER CONTROL SHIFT BOX ..... 8-8</b></p> <p>  DESCRIPTION &amp; OPERATION ..... 8-8</p> <p>  SHIFT BOX ..... 8-10</p> <p>  TROUBLESHOOTING ..... 8-8</p> <p><b>SINGLE LEVER HYDRO-ELECTRIC SHIFT BOX ..... 8-15</b></p> <p>  CONTROL UNIT ..... 8-17</p> <p>  DESCRIPTION &amp; OPERATION ..... 8-15</p> <p>  TROUBLESHOOTING ..... 8-15</p> <p>SPARK PLUG WIRES ..... 2-28</p> <p>  REMOVAL &amp; INSTALLATION ..... 2-29</p> <p>  TESTING ..... 2-28</p> <p>SPARK PLUGS ..... 2-25</p> <p>  HEAT RANGE ..... 2-25</p> <p>  INSPECTION &amp; GAPPING ..... 2-28</p> <p>  READING SPARK PLUGS ..... 2-27</p> <p>  REMOVAL &amp; INSTALLATION ..... 2-25</p> <p>SPECIAL TOOLS ..... 1-23</p> <p><b>SPECIFICATIONS</b></p> <p>  BOLT TORQUE - TYPICAL METRIC BOLT TORQUE VALUES ..... 1-28</p> <p>  BOLT TORQUE - TYPICAL U.S. STANDARD BOLT TORQUE VALUES ..... 1-28</p> <p>  CONVERSION FACTORS ..... 1-27</p> <p>  GEAR OIL CAPACITIES ..... 7-54</p> <p>  GEARCASE OIL CAPACITIES ..... 2-47</p> <p>  GENERAL ENGINE &amp; TUNE-UP ..... 2-45</p> <p>  GENERAL ENGINE &amp; TUNE-UP ..... 3-39</p> <p>  GENERATOR ..... 4-93</p> <p>  OIL/FUEL MIXTURE RATIOS ..... 2-47</p> <p>  POWERHEAD ..... 6-31</p> <p>  REGULATOR ..... 4-93</p> <p>  SPARK PLUG DIAGNOSIS</p> <p>  STARTER MOTOR ..... 4-92</p> <p>  TORQUE SPECIFICATIONS &amp; TYPICAL TORQUE VALUES ..... 4-92</p> <p>  TORQUE &amp; TYPICAL TORQUE VALUES ..... 6-32</p> <p>STANDARD &amp; METRIC MEASUREMENTS ..... 1-27</p> <p>STARTER DRIVE GEAR ..... 4-87</p> <p>  ASSEMBLY &amp; INSTALLATION ..... 4-88</p> <p>  CLEANING &amp; INSPECTION ..... 4-88</p> <p>  REMOVAL &amp; DISASSEMBLY ..... 4-87</p> <p>STARTERS</p> <p>  AUTOLITE ..... 4-79</p> <p>  DELCO-REMY ..... 4-83</p> <p>  PRESTOLITE ..... 4-84</p>	<p><b>STARTING SYSTEM ..... 4-77</b></p> <p>  AUTOLITE STARTERS ..... 4-79</p> <p>  DELCO-REMY STARTERS ..... 4-83</p> <p>  DESCRIPTION &amp; OPERATION ..... 4-77</p> <p>  PRESTOLITE STARTERS ..... 4-84</p> <p>  STARTER DRIVE GEAR ..... 4-87</p> <p>  TESTING ..... 4-78</p> <p>  TROUBLESHOOTING ..... 4-78</p> <p>STEERING ARM (CABLE RAM/TILLER ARM) ..... 2-7</p> <p>  LUBRICATION ..... 2-7</p> <p>  RECOMMENDED LUBRICANT ..... 2-7</p> <p><b>STORAGE (WHAT TO DO BEFORE &amp; AFTER) ..... 2-41</b></p> <p>  RE-COMMISSIONING ..... 2-43</p> <p>  WINTERIZATION ..... 2-41</p> <p>SYNCHRONIZATION ..... 2-31</p> <p>  1958-59 50 HP MODELS ..... 2-31</p> <p>  1964-66 60 HP, 1960-65 75 HP, 1964-65 90 HP &amp; 1966-67 80/100 HP MODELS ..... 2-33</p> <p>  1968-69 55 HP &amp; 1970-71 60 HP MODELS ..... 2-35</p> <p>  1968 65, 85 &amp; 100 HP MODELS ..... 2-36</p> <p>  1969 85 HP MODELS ..... 2-36</p> <p>  1970 85 HP &amp; 1969-70 115 HP MODELS ..... 2-36</p> <p>  1971-72 85, 100 &amp; 125 HP MODELS ..... 2-36</p> <p>  1972 65 HP MODELS ..... 2-37</p> <p>TACHOMETER ..... 4-91</p> <p>TEMPERATURE GAUGE/WARNING LIGHT ..... 4-89</p> <p>  TEMPERATURE GAUGES ..... 4-89</p> <p>  THERMOMELT STICKS ..... 4-89</p> <p>  WARNING LIGHTS ..... 4-89</p> <p>THEORY OF OPERATION ..... 6-2</p> <p>  ACTUAL OPERATION ..... 6-3</p> <p>  INTAKE/EXHAUST ..... 6-2</p> <p>  LUBRICATION ..... 6-3</p> <p>  PHYSICAL LAWS ..... 6-3</p> <p>  POWER STROKE ..... 6-3</p> <p>  SUMMARY ..... 6-4</p> <p>THERMOSTAT ..... 5-5</p> <p>  REMOVAL &amp; INSTALLATION ..... 5-5</p> <p>THROTTLE CABLE ..... 8-20</p> <p>  INSTALLATION AT THE ENGINE ..... 8-20</p> <p>  INSTALLATION AT THE REMOTE ..... 8-20</p> <p>TILT TUBE ASSEMBLY ..... 2-7</p> <p>  LUBRICATION ..... 2-7</p> <p>  RECOMMENDED LUBRICANT ..... 2-7</p> <p>TIMING ..... 2-38</p> <p>  TIMING POINTER ADJUSTMENT -</p> <p>  1971-72 85, 100 &amp; 125 HP MODELS ..... 2-38</p> <p>  TIMING - CDI/FLYWHEEL W/SENSOR (1967 100 HP) ..... 2-40</p> <p>  TIMING - 1968-69 55 HP &amp; 1970-71 60 HP MODELS ..... 2-38</p> <p>  TIMING - 1968 65 HP, 1968-70 85 HP, 1968-69 100 HP &amp; 1969-70 115 HP MODELS ..... 2-39</p> <p>  TIMING - 1971-72 125 HP MODELS ..... 2-40</p> <p><b>TIMING &amp; SYNCHRONIZATION ..... 2-30</b></p> <p>  CARBURETOR ADJUSTMENTS ..... 2-30</p> <p>  SYNCHRONIZATION ..... 2-31</p> <p>  TIMING ..... 2-38</p> <p><b>TOOLS ..... 1-18</b></p> <p>  ELECTRONIC TOOLS ..... 1-23</p> <p>  HAND TOOLS ..... 1-19</p> <p>  MEASURING TOOLS ..... 1-25</p> <p>  OTHER COMMON TOOLS ..... 1-22</p> <p>  SPECIAL TOOLS ..... 1-23</p> <p>TOOLS &amp; SPARE PARTS ..... 1-12</p> <p>TOP SEAL ..... 6-9</p> <p>  REMOVAL &amp; INSTALLATION ..... 6-9</p> <p>TORQUE ..... 1-27</p>
---	--

# 9-12 MASTER INDEX

## TROUBLESHOOTING

BASIC OPERATING PRINCIPLES	1-13
BY SYMPTOM	3-14
CHARGING SYSTEM - ALTERNATOR	4-70
CHARGING SYSTEM - GENERATOR	4-64
CHOKE PROBLEMS	3-12
COOLING SYSTEM	5-3
DRAIN & PRIMER TESTING	3-13
ELECTRICAL SYSTEMS	4-6
ENGINE SURGE	3-14
EXCESSIVE FUEL CONSUMPTION	3-13
FUEL DELIVERY	3-11
FUEL GAUGE	4-90
NEW STYLE SHIFT LEVER	8-5
OLD-STYLE DOUBLE LEVER	8-3
PUSHBUTTON SHIFT BOX	8-11
ROUGH ENGINE IDLE	3-12
SINGLE LEVER CONTROL UNITS	8-8
SINGLE LEVER HYDRO-ELECTRIC UNITS	8-15
SOUR FUEL	3-11
STARTING SYSTEM	4-78
TYPE I GEARCASE	7-4
TYPE I IGNITION	4-13
TYPE II GEARCASE	7-13
TYPE II IGNITION	4-25
TYPE III GEARCASE	7-22
TYPE III IGNITION	4-34
TYPE IV GEARCASE	7-30
TYPE IV IGNITION	4-47
TYPE V GEARCASE	7-39
TYPE V IGNITION	4-58
<b>TUNE-UP</b>	<b>2-22</b>
COMPRESSION CHECK	2-23
COOLING SYSTEM MAINTENANCE	2-30
DE-CARBONING THE PISTONS	2-23
FUEL SYSTEM MAINTENANCE	2-29
IGNITION & ELECTRICAL SYSTEM MAINTENANCE	2-29
INTRODUCTION	2-22
SPARK PLUG WIRES	2-28
SPARK PLUGS	2-25
TUNE-UP SEQUENCE	2-22

TUNE-UP SEQUENCE	2-22
SERVICE	2-18
<b>UNDERSTANDING &amp; TROUBLESHOOTING ELECTRICAL SYSTEMS</b>	<b>4-2</b>
BASIC ELECTRICAL THEORY	4-2
ELECTRICAL COMPONENTS	4-2
ELECTRICAL TESTING	4-6
PRECAUTIONS	4-8
TEST EQUIPMENT	4-4
TROUBLESHOOTING ELECTRICAL SYSTEMS	4-6
WIRE & CONNECTOR REPAIR	4-8
VHF-FM RADIO	1-10
VOLTAGE REGULATOR	4-65
REMOVAL & INSTALLATION	4-65
WATER CHOKE	3-34
DESCRIPTION	3-34
REMOVAL & INSTALLATION	3-34
WATER PUMP	
INSPECTION & OVERHAUL	5-10
REMOVAL & INSTALLATION	5-6
TYPE I GEARCASE	7-11
TYPE II GEARCASE	7-20
TYPE III GEARCASE	7-30
TYPE IV GEARCASE	7-38
TYPE V GEARCASE	7-42
WHERE TO BEGIN	1-2
WINTERIZATION	2-41
PREPPING FOR STORAGE	2-42
STORAGE CHECKLIST	2-42
WHERE TO STORE YOUR BOAT AND MOTOR	2-42
<b>WIRING DIAGRAMS</b>	<b>4-93</b>
INDEX	4-93
ZINCS	2-18
INSPECTION	2-18
2-STROKE ENGINE OIL	2-9
FUEL:OIL RATIO	2-9
OIL RECOMMENDATIONS	2-9
PRE-MIX	2-9