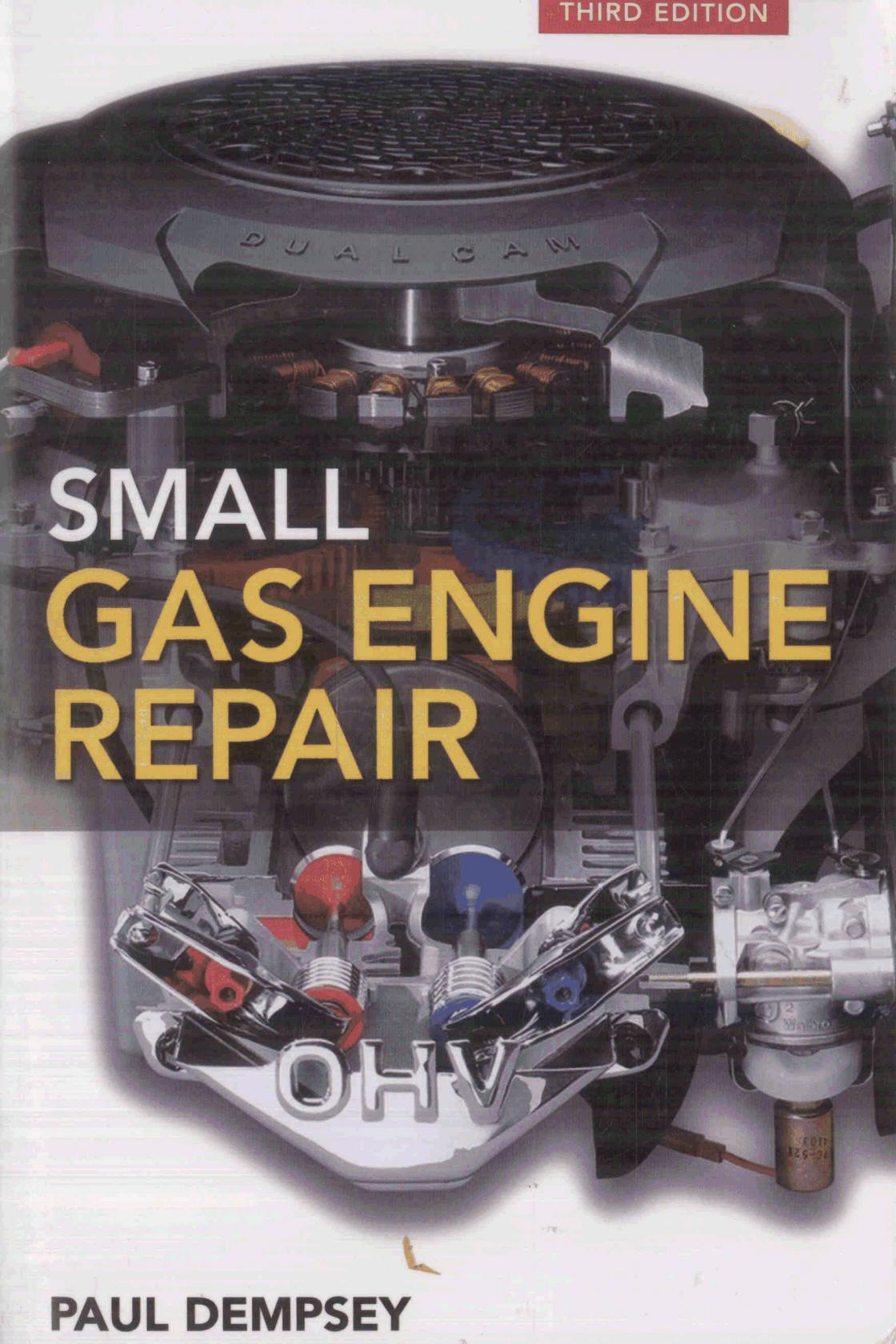


THIRD EDITION



SMALL GAS ENGINE REPAIR

PAUL DEMPSEY

Contents

Prefacexiii
---------------	-------

1 • Basics .....	.1
Four-cycle engines .....	.1
<i>Construction</i> .....	.1
<i>Operation</i> .....	.5
Two-cycle engines .....	.7
<i>Construction</i> .....	.7
<i>Operation</i> .....	.7
<i>Hybrid</i> .....	.12
Displacement .....	.13
Power, torque, and RPM .....	.14

Lubricating oils	16
<i>Four cycle</i>	16
<i>Two cycle</i>	17
Buying parts	18
Buying an engine	18
Safety	20

2 • Troubleshooting 23

Tools and supplies	23
<i>Preliminaries</i>	23
Engine binds or freezes during cranking	27
Engine cranks but does not start	28
<i>Spark test</i>	28
<i>Primer and choke</i>	28
<i>No or insufficient fuel</i>	30
<i>Fuel flooding</i>	31
<i>Oil flooding</i>	31
<i>Compression check</i>	32
<i>Flywheel inertia</i>	32
<i>Long shots</i>	32
Engine runs several minutes and quits	33
Failure to idle	33
Loss of power	34
Excessive vibration	35
Exhaust smoke	35

3 • Ignition systems	37
Spark plug	37
Flywheel	38
<i>Spark test</i>	43
<i>Flywheel installation</i>	43
Basic CDI	44
<i>Operation</i>	45
<i>Troubleshooting</i>	47
Smart Spark	48
<i>Troubleshooting Smart Spark</i>	49
Magnetron	49
<i>Operation</i>	50
<i>Troubleshooting</i>	51
<i>Service</i>	51
Magneto-to-Magnetron conversion	51
<i>Magnetos</i>	51
<i>Operation</i>	52
<i>Troubleshooting</i>	55
<i>Contact points</i>	55
Armature air gap	60
Battery and coil systems	61
<i>Operation</i>	61
<i>Troubleshooting</i>	62
Updating	62
Timing	64
Interlocks	68

4 • Fuel system	71
Tools and supplies	71
<i>Engine condition</i>	71
<i>Troubleshooting</i>	72
<i>No fuel delivery</i>	72
<i>Flooding</i>	73
<i>Refusal to idle</i>	74
<i>Refusal to run at high speed</i>	75
<i>Black smoke, acrid exhaust</i>	75
<i>Stumble during acceleration</i>	75
<i>Hot start difficulties</i>	78
Removal and installation	78
Repairs	78
Carburetor types	80
<i>Float-type carburetor operation</i>	80
<i>Float-type carburetor service</i>	82
<i>Diaphragm carburetor operation</i>	93
<i>Diaphragm carburetor service</i>	95
<i>Suction-lift carburetor operation</i>	97
<i>Suction-lift carburetor service</i>	97
External adjustments	103
<i>Initial adjustments</i>	103
<i>Final adjustments</i>	104
Air cleaners	104
Fuel pumps	106
Governors	106

5 • Rewind starters	111
Side pull	111
Troubleshooting	112
Overview of service procedures	112
Briggs & Stratton	117
<i>Disassembly</i>	117
<i>Assembly</i>	118
Eaton	119
<i>Disassembly</i>	124
<i>Assembly</i>	124
Fairbanks-Morse	127
<i>Disassembly</i>	128
<i>Assembly</i>	128
Vertical pull	131
Briggs & Stratton	132
<i>Disassembly</i>	132
<i>Assembly</i>	134
Tecumseh	137
<i>Disassembly</i>	138
<i>Assembly</i>	138
Vertical pull, vertical engagement	140
<i>Rope replacement</i>	140
<i>Disassembly</i>	141
<i>Assembly</i>	142

6 • Electrical system	145
Starting circuits	145
<i>Lead acid</i>	145
<i>NiCad</i>	148
<i>Starter motors</i>	151
Charging circuits	157
<hr/>	
7 • Engine mechanical	165
Cylinder head	165
Valves	168
<i>Valve guides</i>	176
<i>Valve seats</i>	178
<i>Valve lash adjustment</i>	178
Breathers	182
Reed valves	182
Pistons and rings	184
<i>Inspection</i>	184
Piston pins	189
Piston rings	190
<i>Installation</i>	190
Cylinder bores	195
Connecting rods	195
<i>Rod orientation</i>	197
<i>Rod inspection</i>	198
<i>Rod assembly</i>	200

Crankshafts and cam timing	202
Camshafts	205
Main bearings	207
<i>Antifriction bearings</i>	207
<i>Plain bearings</i>	208
Thrust bearings	209
Seals	209
Governor	211
Lubrication systems	211

Appendix • Internet resources	215
--	-----

Index	221
------------------------	-----