

2013 VRSC

SERVICE MANUAL

Part Number 99501-13

[Chapter 1 Maintenance](#)
[Chapter 2 Chassis](#)
[Chapter 3 Engine](#)
[Chapter 4 Fuel System](#)
[Chapter 5 Cooling System](#)
[Chapter 6 Transmission](#)
[Chapter 7 Electrical](#)

ELECTRICAL DIAGNOSTICS

Part Number 99499-13

[Chapter 1 General Information](#)
[Chapter 2 Initial Diagnostics and Serial Data](#)
[Chapter 3 Starting and Charging](#)
[Chapter 4 Instruments](#)
[Chapter 5 Accessories, Horn, Lighting and Security](#)
[Chapter 6 Engine Management](#)
[Chapter 7 ABS](#)



**2013 Harley-Davidson V-Rod Models
Service Manual**

99501-13

©2012 H-D.

MAINTENANCE

1.1 FASTENER TORQUE VALUES

Fastener Torque Values in this Chapter.....1-1

1.2 GENERAL

Servicing a New Motorcycle.....1-3

Safe Operating Maintenance.....1-3

Shop Practices.....1-3

 Repair Notes.....1-3

 Safety.....1-3

 Removing Parts.....1-3

 Cleaning.....1-3

 Disassembly and Assembly.....1-4

 Checking Torques on Fasteners.....1-4

 Magnetic Parts Trays.....1-4

Repair and Replacement Procedures.....1-4

 Hardware and Threaded Parts.....1-4

 Threadlocking Agents.....1-4

 Wiring, Hoses and Lines.....1-4

 Instruments and Gauges.....1-4

 Bearings.....1-4

 Bushings.....1-4

 Gaskets.....1-4

 Lip-Type Seals.....1-4

 O-Rings.....1-5

 Gears.....1-5

 Shafts.....1-5

 Part Replacement.....1-5

Cleaning.....1-5

 Part Protection.....1-5

 Cleaning Process.....1-5

 Rust or Corrosion Removal.....1-5

 Bearings.....1-5

Tool Safety.....1-5

 Air Tools.....1-5

 Wrenches.....1-5

 Pliers/Cutters/Pry Bars.....1-6

 Hammers.....1-6

 Punches/Chisels.....1-6

 Screwdrivers.....1-6

 Ratchets and Handles.....1-6

 Sockets.....1-6

 Storage Units.....1-6

1.3 FUEL AND OIL

Fuel.....1-7

Gasoline Blends.....1-7

Engine Lubrication.....1-7

Winter Lubrication.....1-8

1.4 BULB REQUIREMENTS

General.....1-9

1.5 MAINTENANCE SCHEDULE

General.....1-10

1.6 ENGINE OIL AND FILTER

Checking and Adding Oil.....1-14

 Cold Engine Oil Level Check.....1-14

 Hot Engine Oil Level Check.....1-14

Changing Oil and Filter.....1-15

1.7 AIR CLEANER AND EXHAUST SYSTEM

Air Cleaner Removal.....1-17

Installation.....1-18

Exhaust System Leak Check.....1-20

1.8 TIRES AND WHEELS

Tires.....1-21

Tire Replacement.....1-21

 Inspection.....1-21

 When To Replace Tires.....1-21

Wheel Bearings.....1-22

1.9 CLUTCH

General.....1-23

Fluid Inspection.....1-23

1.10 DRIVE BELT AND SPROCKETS

General.....1-24

Cleaning.....1-24

Inspection.....1-24

 Sprockets.....1-24

 Drive Belt.....1-24

Checking and Adjusting Drive Belt Deflection.....1-26

1.11 THROTTLE CABLES

Inspection.....1-28

Lubrication.....1-28

Adjustment.....1-28

1.12 CABLE, LINE AND FRAME INSPECTION

General.....1-29

Cables and Hand Levers.....1-29

Jiffy Stand.....1-29

Fuel System Lines and Fittings.....1-29

Hydraulic Lines.....1-29

1.13 BRAKES

Fluid Inspection.....1-30

Rear Brake Pedal.....1-30

 Pedal Adjustment.....1-30

Brake Lines.....1-30

1.14 BRAKE PADS AND DISCS

Inspection.....1-32

 Brake Pads.....1-32

 Brake Disc Thickness.....1-32

 Brake Disc Lateral Runout and Warp.....1-32

Brake Pad Replacement.....1-32

 Rear Brake Caliper.....1-32

 Front Brake Caliper.....1-34

1.15 SPARK PLUGS AND COIL

Removal.....1-36

Inspection.....1-36

Cleaning.....1-37

Installation.....1-37

1.16 COOLING SYSTEM

Checking Coolant Level in Overflow Bottle.....1-38

Check for Coolant in System.....1-38

1.17 STEERING HEAD BEARINGS

Adjustment (Fall-Away).....1-39

1.18 VALVE LASH

Lash Measurement.....1-41

Camshaft Inspection.....1-43

TABLE OF CONTENTS

| | |
|--------------------------|------|
| Lobe Surface Finish..... | 1-43 |
| Camshaft Spalling..... | 1-44 |
| Verify Cam Timing..... | 1-45 |
| Lash Adjustment..... | 1-46 |

1.19 CRITICAL FASTENERS

| | |
|------------------------------------|------|
| Inspection..... | 1-51 |
| Checking Torques on Fasteners..... | 1-51 |

1.20 BATTERY MAINTENANCE

| | |
|------------------------------|------|
| General..... | 1-52 |
| Disconnection/Removal..... | 1-53 |
| Cleaning and Inspection..... | 1-53 |
| Voltmeter Test..... | 1-53 |
| Voltmeter Test..... | 1-54 |
| Charging Battery..... | 1-54 |
| Safety Precautions..... | 1-54 |
| Using a Battery Charger..... | 1-54 |
| Installation/Connection..... | 1-55 |
| Storage..... | 1-55 |

1.21 RADIATOR SIDE COVERS

| | |
|-------------------|------|
| Removal..... | 1-57 |
| Installation..... | 1-58 |

1.22 SUSPENSION ADJUSTMENTS

| | |
|----------------------|------|
| Shock Absorbers..... | 1-59 |
| General..... | 1-59 |
| Adjustment..... | 1-59 |

1.23 SECONDARY CAM CHAIN

| | |
|-----------------|------|
| General..... | 1-60 |
| Adjustment..... | 1-60 |

1.24 HEADLAMP ALIGNMENT

| | |
|--------------------------|------|
| Headlamp Alignment..... | 1-62 |
| Headlamp Adjustment..... | 1-62 |

1.25 STORAGE

| | |
|---------------------------|------|
| General..... | 1-63 |
| Placing in Storage..... | 1-63 |
| Removal from Storage..... | 1-63 |

1.26 TROUBLESHOOTING

| | |
|--|------|
| General..... | 1-64 |
| Engine..... | 1-64 |
| Starter Motor Does Not Operate or Does Not Turn Engine Over..... | 1-64 |
| Engine Turns Over But Does Not Start..... | 1-64 |
| Starts Hard..... | 1-64 |
| Starts But Runs Irregularly or Misses..... | 1-64 |
| Spark Plug Fouls Repeatedly..... | 1-64 |
| Pre-Ignition or Detonation (Knocks or Pings)..... | 1-64 |
| Overheating..... | 1-65 |
| Valve Train Noise..... | 1-65 |
| Excessive Vibration..... | 1-65 |
| Check Engine Light Illuminates During Operation..... | 1-65 |
| Lubrication System..... | 1-65 |
| Engine Uses Too Much Oil Or Smokes Excessively.. | 1-65 |
| Engine Leaks Oil From Cases, Hoses, Etc..... | 1-65 |
| Low Oil Pressure..... | 1-65 |

| | |
|---|------|
| High Oil Pressure..... | 1-65 |
| Electrical System..... | 1-65 |
| Alternator Does Not Charge..... | 1-65 |
| Alternator Charge Rate Is Below Normal..... | 1-65 |
| Speedometer Operates Erratically..... | 1-65 |
| Transmission..... | 1-66 |
| Shifts Hard..... | 1-66 |
| Jumps Out Of Gear..... | 1-66 |
| Clutch Slips..... | 1-66 |
| Clutch Drags Or Does Not Release..... | 1-66 |
| Clutch Chatters..... | 1-66 |
| Handling..... | 1-66 |
| Irregularities..... | 1-66 |
| Brakes..... | 1-66 |
| Brake Does Not Hold Normally..... | 1-66 |

CHASSIS

2.1 FASTENER TORQUE VALUES

| | |
|---|-----|
| Fastener Torque Values in this Chapter..... | 2-1 |
|---|-----|

2.2 SPECIFICATIONS: CHASSIS

| | |
|--------------|-----|
| General..... | 2-5 |
|--------------|-----|

2.3 VEHICLE IDENTIFICATION NUMBER (V.I.N.)

| | |
|---|-----|
| Vehicle Identification Number (V.I.N.)..... | 2-7 |
| General..... | 2-7 |
| Location..... | 2-7 |
| Abbreviated V.I.N..... | 2-7 |

2.4 LOWER FRAME RAILS

| | |
|-------------------|------|
| Removal..... | 2-9 |
| Installation..... | 2-10 |

2.5 FRONT ENGINE MOUNT

| | |
|------------------|------|
| Replacement..... | 2-11 |
|------------------|------|

2.6 FRONT ENGINE MOUNT ASSEMBLY

| | |
|-------------------------------|------|
| Removal..... | 2-12 |
| Disassembly And Assembly..... | 2-12 |
| Installation..... | 2-12 |

2.7 REAR ENGINE MOUNTS

| | |
|-------------------|------|
| Removal..... | 2-14 |
| Installation..... | 2-14 |

2.8 ENGINE REPLACEMENT

| | |
|-------------------|------|
| General..... | 2-15 |
| Removal..... | 2-15 |
| Installation..... | 2-19 |

2.9 RIDER FOOTRESTS AND FOOT CONTROLS

| | |
|----------------------|------|
| Rider Footrests..... | 2-23 |
| Removal..... | 2-23 |
| Installation..... | 2-23 |

TABLE OF CONTENTS

2.10 PASSENGER FOOTRESTS

| | |
|--|------|
| Passenger Footrests: All except VRSCF..... | 2-25 |
| Removal..... | 2-25 |
| Installation..... | 2-25 |
| Passenger Footrests: VRSCF..... | 2-25 |
| Removal..... | 2-25 |
| Installation..... | 2-25 |

2.11 THROTTLE CABLES

| | |
|--------------------------------|------|
| Removal/Disassembly..... | 2-26 |
| Cleaning And Inspection..... | 2-26 |
| Assembly and Installation..... | 2-26 |

2.12 CLUTCH MASTER CYLINDER AND RESERVOIR

| | |
|-------------------|------|
| General..... | 2-28 |
| Removal..... | 2-28 |
| Disassembly..... | 2-29 |
| Assembly..... | 2-30 |
| Installation..... | 2-31 |

2.13 CLUTCH HAND LEVER

| | |
|-------------------|------|
| Removal..... | 2-32 |
| Installation..... | 2-32 |

2.14 CLUTCH FLUID LINE

| | |
|-------------------|------|
| Removal..... | 2-33 |
| Installation..... | 2-34 |

2.15 SECONDARY CLUTCH ACTUATOR

| | |
|-------------------|------|
| Removal..... | 2-36 |
| Assembly..... | 2-36 |
| Installation..... | 2-36 |

2.16 BLEEDING CLUTCH FLUID LINE

| | |
|----------------|------|
| Procedure..... | 2-38 |
|----------------|------|

2.17 FRONT BRAKE MASTER CYLINDER AND RESERVOIR

| | |
|------------------------------|------|
| General..... | 2-40 |
| Removal and Disassembly..... | 2-40 |
| Cleaning and Inspection..... | 2-42 |
| Assembly..... | 2-42 |
| Installation..... | 2-42 |

2.18 FRONT BRAKE CALIPER

| | |
|-------------------|------|
| Removal..... | 2-44 |
| Installation..... | 2-44 |

2.19 REAR BRAKE MASTER CYLINDER AND RESERVOIR

| | |
|------------------------------|------|
| Removal..... | 2-46 |
| Disassembly..... | 2-48 |
| Cleaning and Inspection..... | 2-48 |
| Assembly..... | 2-48 |
| Installation..... | 2-49 |

2.20 REAR BRAKE CALIPER

| | |
|--------------|------|
| Removal..... | 2-50 |
|--------------|------|

| | |
|-------------------|------|
| Installation..... | 2-50 |
|-------------------|------|

2.21 BLEEDING BRAKES

| | |
|----------------|------|
| General..... | 2-52 |
| Procedure..... | 2-52 |

2.22 HANDLEBARS: VRSCDX

| | |
|-------------------|------|
| Removal..... | 2-54 |
| Installation..... | 2-54 |

2.23 HANDLEBARS: VRSCF

| | |
|-------------------|------|
| Removal..... | 2-56 |
| Installation..... | 2-56 |

2.24 HAND GRIPS

| | |
|----------------------|------|
| Right Hand Grip..... | 2-58 |
| Left Hand Grip..... | 2-58 |
| Removal..... | 2-58 |
| Installation..... | 2-58 |

2.25 FRONT WHEEL

| | |
|---|------|
| General..... | 2-59 |
| Preliminary Inspection - Brake Discs..... | 2-59 |
| Preliminary Inspection - Wheel/Tire..... | 2-59 |
| Removal..... | 2-60 |
| Disassembly..... | 2-62 |
| Cleaning and Inspection..... | 2-63 |
| Assembly..... | 2-63 |
| Installation..... | 2-64 |

2.26 REAR WHEEL

| | |
|--|------|
| General..... | 2-65 |
| Preliminary Inspection - Brake Disc..... | 2-65 |
| Preliminary Inspection - Wheel/Tire..... | 2-65 |
| Removal..... | 2-66 |
| Disassembly..... | 2-67 |
| Cleaning and Inspection..... | 2-68 |
| Assembly..... | 2-69 |
| Installation..... | 2-70 |

2.27 SEALED WHEEL BEARINGS

| | |
|-----------------------------------|------|
| General..... | 2-72 |
| Inspection: Lateral End Play..... | 2-72 |
| Removal..... | 2-72 |
| Installation..... | 2-73 |

2.28 CHECKING CAST WHEEL RUNOUT

| | |
|------------------------------|------|
| Checking Wheel Runout..... | 2-75 |
| Checking Lateral Runout..... | 2-75 |
| Checking Radial Runout..... | 2-75 |

2.29 TIRES

| | |
|---------------------------------------|------|
| General..... | 2-76 |
| Removal..... | 2-76 |
| Cleaning, Inspection, and Repair..... | 2-77 |
| Tire Installation..... | 2-77 |
| Checking Tire Runout..... | 2-77 |
| Lateral Runout..... | 2-77 |
| Radial Runout..... | 2-78 |
| Wheel Balancing..... | 2-78 |
| Static vs Dynamic..... | 2-78 |

TABLE OF CONTENTS

| | |
|---|-------|
| Weights..... | 2-78 |
| 2.30 WHEEL ALIGNMENT | |
| General..... | 2-80 |
| Inspection..... | 2-80 |
| Front Engine Mount..... | 2-80 |
| Rear Engine Mounts and Rear Fork Pivot..... | 2-80 |
| Engine Stabilizer Link..... | 2-80 |
| Clearances..... | 2-80 |
| Verification..... | 2-80 |
| Centering Engine..... | 2-82 |
| 2.31 FRONT FENDER | |
| All Models..... | 2-83 |
| 2.32 FRONT FORK | |
| Removal..... | 2-84 |
| Disassembly..... | 2-85 |
| Left Side..... | 2-85 |
| Right Side..... | 2-87 |
| Cleaning and Inspection..... | 2-88 |
| Assembly..... | 2-91 |
| Left Side..... | 2-91 |
| Right Side..... | 2-93 |
| Installation..... | 2-96 |
| 2.33 STEERING HEAD | |
| Removal..... | 2-98 |
| Cleaning and Inspection..... | 2-98 |
| Lower Fork Stem Bearing..... | 2-99 |
| Steering Head Bearing Race..... | 2-99 |
| Assembly..... | 2-100 |
| Installation..... | 2-100 |
| 2.34 FORK LOCK | |
| General..... | 2-101 |
| Removal..... | 2-101 |
| Installation..... | 2-101 |
| 2.35 BELT GUARD AND DEBRIS DEFLECTOR | |
| Removal..... | 2-102 |
| Belt Guard..... | 2-102 |
| Debris Deflector..... | 2-102 |
| Installation..... | 2-102 |
| Belt Guard..... | 2-102 |
| Debris Deflector..... | 2-102 |
| 2.36 REAR SHOCK ABSORBERS | |
| Removal..... | 2-103 |
| Installation..... | 2-103 |
| 2.37 REAR FORK | |
| Removal..... | 2-105 |
| Disassembly and Assembly..... | 2-106 |
| General..... | 2-106 |
| Left Side Rear Fork Bearing Removal..... | 2-107 |
| Left Side Rear Fork Bearing Installation..... | 2-107 |
| Right Side Bushing Removal..... | 2-107 |
| Right Side Bearing Installation..... | 2-107 |
| Installation..... | 2-108 |

| | |
|--|-------|
| 2.38 SEAT | |
| Removal..... | 2-110 |
| Cleaning and Inspection..... | 2-110 |
| Installation..... | 2-111 |
| 2.39 REAR FENDER | |
| Removal..... | 2-112 |
| Installation..... | 2-113 |
| 2.40 LICENSE PLATE BRACKET: VRSCF | |
| Removal: US Only..... | 2-114 |
| Removal: Non-US..... | 2-115 |
| Installation: US Only..... | 2-116 |
| Installation: Non-US..... | 2-116 |
| 2.41 JIFFY STAND | |
| Cleaning..... | 2-117 |
| Jiffy Stand Interlock: International Models..... | 2-117 |
| Removal..... | 2-117 |
| Installation..... | 2-118 |

ENGINE

| | |
|--|------|
| 3.1 FASTENER TORQUE VALUES | |
| Fastener Torque Values in this Chapter..... | 3-1 |
| 3.2 SPECIFICATIONS: ENGINE | |
| General..... | 3-3 |
| 3.3 SERVICE WEAR LIMITS | |
| General..... | 3-7 |
| 3.4 HOW TO USE THIS SECTION | |
| Top End Repair..... | 3-9 |
| Bottom End Repair..... | 3-9 |
| Typical Symptoms..... | 3-9 |
| 3.5 OIL FLOW | |
| General..... | 3-10 |
| 3.6 OIL PRESSURE | |
| Oil Pressure Indicator Lamp..... | 3-14 |
| Checking Oil Pressure..... | 3-14 |
| 3.7 TROUBLESHOOTING | |
| Compression Test..... | 3-15 |
| Diagnosing Valve Train Noise..... | 3-15 |
| Cylinder Leakage Test..... | 3-15 |
| Diagnosing Smoking Engine or High Oil Consumption..... | 3-16 |
| Check Prior to Cylinder Head Removal..... | 3-16 |
| Check After Cylinder Head Removal..... | 3-16 |
| 3.8 PREPARING MOTORCYCLE FOR SERVICE | |
| General..... | 3-17 |
| Engine Cradle and Stand..... | 3-18 |

3.9 CAMSHAFTS, DRIVE CHAINS AND CAMSHAFT TIMING

Camshaft and Secondary Timing Chain Removal.....3-20
 Primary Cam Drive Removal.....3-23
 Primary Cam Drive Installation.....3-24
 Installation of Cams, Timing Chains and Camshaft Timing.....3-27

3.10 CYLINDER HEAD

Removal.....3-34
 Disassembly.....3-35
 Valve Seat Refacing.....3-39
 Head Assembly.....3-41
 Installation.....3-43

3.11 UPPER AND LOWER CRANKCASE SEPARATION

Disassembly.....3-46

3.12 ENGINE BOTTOM END SERVICE

Crankshaft, Piston and Cylinder Liner Removal/Installation.....3-50

3.13 OIL PUMP

Removal/Installation.....3-64

3.14 OIL FILTER MOUNT

Removal/Installation.....3-65

FUEL SYSTEM

4.1 FASTENER TORQUE VALUES

Fastener Torque Values in this Chapter.....4-1

4.2 SPECIFICATIONS: FUEL SYSTEM

General.....4-2

4.3 THROTTLE POSITION SENSOR (TP)

General.....4-3
 Removal.....4-3
 Installation.....4-3

4.4 INTAKE AIR TEMPERATURE SENSOR (IAT)

General.....4-4
 Removal.....4-4
 Installation.....4-4

4.5 THROTTLE BODY AND FUEL RAIL

Removal.....4-5
 Installation.....4-5

4.6 IDLE AIR CONTROL (IAC)

General.....4-7
 Removal.....4-7
 Installation.....4-7

4.7 MANIFOLD ABSOLUTE PRESSURE SENSOR (MAP)

Removal.....4-9
 Installation.....4-9

4.8 OXYGEN SENSOR

Removal.....4-10
 Front Sensor.....4-10
 Rear Sensor.....4-10
 Installation.....4-10

4.9 FUEL INJECTORS

General.....4-12
 Removal.....4-12
 Disassembly.....4-12
 Fuel Injectors.....4-12
 Fuel Pressure Regulator.....4-12
 Fuel Tubes.....4-12
 Assembly.....4-13
 Fuel Injectors.....4-13
 Fuel Pressure Regulator.....4-13
 Fuel Tubes.....4-13
 Installation.....4-13

4.10 FUEL TANK

Removal.....4-14
 Cleaning and Inspection.....4-14
 Installation.....4-15

4.11 FUEL MODULE ASSEMBLY

Removal.....4-16
 Installation.....4-17
 Suction Side Fuel Filter.....4-17
 Removal.....4-17
 Installation.....4-17
 Pressure Side Fuel Filter.....4-17
 Removal.....4-17
 Installation.....4-18
 Fuel Pump.....4-18
 General.....4-18
 Removal.....4-18
 Installation.....4-18
 Fuel Level Sensor.....4-20
 Removal.....4-20
 Installation.....4-20

4.12 VAPOR VALVE

General.....4-21
 Replacement.....4-21

4.13 FUEL PRESSURE TEST

General.....4-22
 Testing.....4-22

4.14 EXHAUST SYSTEM: VRSCDX

Removal.....4-24
 Installation.....4-26

4.15 EXHAUST SYSTEM: VRSCF

Removal.....4-27

TABLE OF CONTENTS

Installation.....4-29

4.16 INTAKE LEAK TEST

General.....4-30
Leak Tester.....4-30
 Parts List.....4-30
 Tester Assembly.....4-30
 Tester Adjustment.....4-30
Procedure.....4-30

4.17 EVAPORATIVE EMISSIONS CONTROL

General.....4-32
Purge Solenoid.....4-32
 Removal.....4-32
 Installation.....4-33
Carbon Canister.....4-33
 Removal/Inspection.....4-33
 Installation.....4-33
Tube Routing/Replacement.....4-33

COOLING SYSTEM

5.1 FASTENER TORQUE VALUES

Fastener Torque Values in this Chapter.....5-1

5.2 SPECIFICATIONS: COOLING SYSTEM

General.....5-2

5.3 COOLANT FLOW

General.....5-3
Flow Description.....5-3
Troubleshooting.....5-3
 Low Engine Temperature.....5-3
 High Engine Temperature.....5-3
 Coolant Leaks.....5-3
Pressure Cap.....5-3
Pressure Cap Test.....5-4
System Pressure Test.....5-5
Leak Detection Dye Test.....5-5
Tests for Blown Gasket.....5-6

5.4 ENGINE COOLANT

General.....5-7
Drain and Fill Cooling System.....5-7

5.5 THERMOSTAT

General.....5-9
Removal.....5-9
Installation.....5-9

5.6 WATER PUMP

Removal.....5-11
Installation.....5-11

5.7 COOLANT PIPES AND HOSES

Removal.....5-13
Disassembly.....5-13
Assembly.....5-15
Installation.....5-15

5.8 ENGINE COOLANT TEMPERATURE SENSOR (ECT)

General.....5-16
Removal.....5-16
Installation.....5-16

5.9 OIL LINE FITTINGS

Removal.....5-17
Installation.....5-18

5.10 RADIATOR AND OIL COOLER

General.....5-19
Removal.....5-19
Installation.....5-21

5.11 OIL COOLER

Removal.....5-24
Installation.....5-24

TRANSMISSION

6.1 FASTENER TORQUE VALUES

Fastener Torque Values in this Chapter.....6-1

6.2 SPECIFICATIONS: TRANSMISSION

General.....6-2

6.3 CLUTCH

Removal.....6-3
Disassembly.....6-6
Cleaning and Inspection.....6-7
Assembly.....6-7
Installation.....6-10

6.4 TRANSMISSION

Disassembly.....6-13
 Shift Drum Removal.....6-14
Assembly.....6-16

6.5 COUNTERBALANCER BEARING REPLACEMENT

Removal.....6-24
Installation.....6-27

6.6 SHIFT SHAFT AND SEAL

General.....6-31
Removal.....6-31
Installation.....6-32

6.7 OUTPUT SHAFT

General.....6-33
Disassembly: 2nd Gear End.....6-33
 Bearing Removal: 2nd Gear End.....6-33
 Bearing Installation: 2nd Gear End.....6-33
Assembly: 2nd Gear End.....6-38
 Bearing Removal: 1st Gear End.....6-38
 Bearing Installation: 1st Gear End.....6-39
Assembly: 1st Gear End.....6-40

6.8 INPUT SHAFT

Disassembly: 2nd Gear End.....6-43
 Bearing Removal: 2nd Gear End.....6-43
 Bearing Installation: 2nd Gear End.....6-43
 Assembly: 2nd Gear End.....6-46
 Disassembly: 1st Gear End.....6-47
 Bearing Removal: 1st Gear End6-47
 Assembly: 1st Gear End.....6-48
 Bearing Installation: 1st Gear End6-48

6.9 DRIVE BELT

Replacement.....6-49

6.10 DRIVE SPROCKET FLANGE

Replacement.....6-51

ELECTRICAL

7.1 FASTENER TORQUE VALUES

Fastener Torque Values in this Chapter.....7-1

7.2 SPECIFICATIONS: ELECTRICAL

General.....7-3

7.3 ELECTRONIC CONTROL MODULE (ECM)

General.....7-4
 Removal.....7-4
 Installation.....7-4

7.4 TURN SIGNAL AND SECURITY MODULE (TSM/TSSM/HFSM)

General.....7-5
 Removal.....7-5
 TSM/HFSM/TSSM Configuration.....7-5
 Installation.....7-5

7.5 RELAY AND FUSE BLOCK

General.....7-6
 Relay/Fuse Block Removal.....7-6
 Fuse Replacement.....7-6
 Relay Replacement.....7-6
 Relay/Fuse Block Installation.....7-6

7.6 MAIN FUSE

General.....7-7
 Replacement.....7-7

7.7 STARTER SYSTEM

General.....7-8
 Wiring Diagrams.....7-8
 Starter Relay.....7-8
 Starter.....7-8
 Starter Solenoid.....7-8
 Operation.....7-8

7.8 STARTER RELAY

Removal.....7-9
 Installation.....7-9

7.9 STARTER

Removal.....7-10
 Installation.....7-10

7.10 STARTER SOLENOID

Removal.....7-11
 Installation.....7-11

7.11 IGNITION/HEADLAMP KEY SWITCH

General.....7-13
 Replacement.....7-13

7.12 HEADLAMP

General.....7-14
 Headlamp Bulb.....7-14
 Removal.....7-14
 Installation.....7-14

7.13 TAIL LAMP: VRSCDX

Removal.....7-16
 Installation.....7-16

7.14 TAIL LAMP: VRSCF

Removal.....7-17
 Installation.....7-17

7.15 TURN SIGNALS AND RUNNING LIGHTS: VRSCDX

Bulb Replacement.....7-18
 Lamp Replacement.....7-18
 Front Turn Signals.....7-18
 Rear Turn Signals.....7-19
 License Plate Bulbs.....7-20
 License Plate Lamp.....7-20

7.16 TURN SIGNALS: VRSCF

Turn Signal Replacement.....7-21
 Front Turn Signals.....7-21
 Rear Turn Signals.....7-22

7.17 CRANK POSITION SENSOR (CKP)

General.....7-23
 Removal.....7-23
 Installation.....7-23

7.18 VOLTAGE REGULATOR

General.....7-24
 Removal.....7-24
 Installation.....7-24

7.19 ALTERNATOR

General.....7-25
 Removal.....7-25
 Disassembly.....7-26
 Assembly.....7-27
 Installation.....7-27

7.20 INSTRUMENT CLUSTER: VRSCDX

General.....7-29

TABLE OF CONTENTS

| | |
|-------------------|------|
| Removal..... | 7-29 |
| Installation..... | 7-29 |

7.21 INSTRUMENT CLUSTER: VRSCF

| | |
|-------------------|------|
| Removal..... | 7-30 |
| Installation..... | 7-30 |

7.22 VEHICLE SPEED SENSOR (VSS)

| | |
|-------------------|------|
| General..... | 7-31 |
| Removal..... | 7-31 |
| Installation..... | 7-31 |

7.23 NEUTRAL SWITCH

| | |
|-------------------|------|
| General..... | 7-32 |
| Removal..... | 7-32 |
| Installation..... | 7-32 |

7.24 OIL PRESSURE SWITCH

| | |
|-------------------|------|
| General..... | 7-33 |
| Removal..... | 7-33 |
| Installation..... | 7-33 |

7.25 REAR STOPLIGHT SWITCH

| | |
|-------------------|------|
| General..... | 7-34 |
| Removal..... | 7-34 |
| Installation..... | 7-34 |

7.26 HORN

| | |
|------------------|------|
| Inspection..... | 7-35 |
| Replacement..... | 7-35 |

7.27 COOLING FANS

| | |
|-------------------|------|
| Removal..... | 7-36 |
| Installation..... | 7-36 |

7.28 HANDLEBAR SWITCH ASSEMBLIES

| | |
|------------------------|------|
| General..... | 7-38 |
| Repair Procedures..... | 7-38 |

7.29 RIGHT HANDLEBAR SWITCH

| | |
|---|------|
| Removal..... | 7-39 |
| Installation..... | 7-39 |
| Disassembly..... | 7-41 |
| Switch Repair/Replacement..... | 7-42 |
| Switch and Lead Replacement..... | 7-42 |
| Switch Only Replacement: Upper Housing..... | 7-42 |
| Switch Only Replacement: Lower Housing..... | 7-43 |
| Turn-Right Signal Switch Only..... | 7-43 |
| Front Stop Lamp Switch Only..... | 7-43 |
| Assembly..... | 7-43 |

7.30 LEFT HANDLEBAR SWITCH

| | |
|---|------|
| Removal..... | 7-45 |
| Installation..... | 7-45 |
| Disassembly..... | 7-46 |
| Switch Repair and Replacement..... | 7-46 |
| Switch and Lead Replacement..... | 7-46 |
| Switch Only Replacement: Upper Housing..... | 7-46 |
| Switch Only Replacement: Lower Housing..... | 7-47 |
| Turn-Left Signal Switch Only..... | 7-47 |

| | |
|-----------------------------------|------|
| Clutch Interlock Switch Only..... | 7-47 |
| Assembly..... | 7-47 |

7.31 HFSS MAINTENANCE

| | |
|-----------------------------------|------|
| General..... | 7-49 |
| Fob Battery..... | 7-49 |
| Battery Replacement Schedule..... | 7-49 |
| Battery Replacement..... | 7-49 |
| Smart Siren (If Installed)..... | 7-49 |
| Battery Replacement Schedule..... | 7-49 |
| Battery Replacement..... | 7-49 |

7.32 PERSONAL IDENTIFICATION NUMBER (PIN)

| | |
|--------------------------------|------|
| General..... | 7-50 |
| Initial PIN Entry..... | 7-50 |
| Changing the PIN..... | 7-50 |
| Modifying an Existing PIN..... | 7-50 |

7.33 H-DSSS ACTUATION

| | |
|---------------------------------------|------|
| General..... | 7-52 |
| Sidecar Configuration..... | 7-52 |
| Actuation..... | 7-52 |
| Fob Assignment..... | 7-52 |
| Power Disruption and Configuring..... | 7-52 |

7.34 TSM/HFSS: PASSWORD LEARN

| | |
|---------------------|------|
| General..... | 7-53 |
| Password Learn..... | 7-53 |

APPENDIX A CONNECTOR REPAIR

A.1 AUTOFUSE UNSEALED ELECTRICAL CONNECTORS

| | |
|---|-----|
| Autofuse Unsealed Connector Repair..... | A-1 |
| General..... | A-1 |
| Disassembly..... | A-1 |
| Assembly..... | A-1 |

A.2 BOSCH COMPACT 1.1M CONNECTOR

| | |
|-----------------------------------|-----|
| Bosch Compact 1.1M Connector..... | A-2 |
| General..... | A-2 |
| Housings..... | A-2 |
| Removing Socket Terminal..... | A-2 |
| Installing Socket Terminal..... | A-2 |

A.3 DELPHI 100W MICRO-PACK SEALED CONNECTOR

| | |
|---|-----|
| Delphi 100W Micro-Pack Sealed Connector Repair..... | A-3 |
| General..... | A-3 |
| Separating Socket Housing From ECM..... | A-3 |
| Mating Socket Housing To ECM..... | A-3 |
| Removing Socket Terminal..... | A-3 |
| Installing Socket Terminal..... | A-3 |
| Crimping Terminals..... | A-4 |

A.4 DELPHI 150 METRI-PACK SEALED CONNECTORS

| | |
|--|-----|
| Delphi 150 Metri-Pack Sealed Connector Repair..... | A-5 |
|--|-----|

General.....A-5
 Separating Pin and Socket Housings.....A-5
 Mating Pin and Socket Housings.....A-5
 Removing Socket Terminal.....A-5
 Inserting Socket Terminal.....A-5

A.5 DELPHI 280 METRI-PACK UNSEALED CONNECTORS

Fuse Block Repair.....A-7
 Removing Socket Terminals.....A-7
 Installing Socket Terminals.....A-7
 Crimping Terminals.....A-7

A.6 DELPHI 480 METRI-PACK UNSEALED CONNECTORS

Delphi 480 Metri-Pack Unsealed Connector Repair.....A-8
 General.....A-8
 Separating Pin and Socket Housings.....A-8
 Mating Pin and Socket Housings.....A-8
 Removing Socket Terminals.....A-8
 Installing Socket Terminals.....A-8

A.7 DELPHI 630 METRI-PACK UNSEALED CONNECTORS

Delphi 630 Metri-Pack Unsealed Connector Repair.....A-9
 Separating Pin and Socket Housings.....A-9
 Mating Pin and Socket Housings.....A-9
 Removing Socket Terminal.....A-9
 Installing Socket Terminal.....A-9

A.8 DELPHI 800 METRI-PACK SEALED MAIN FUSE HOUSING

Delphi 800 Metri-Pack Sealed Main Fuse Housing Repair.....A-10
 Removing Socket Terminals.....A-10
 Installing Socket Terminals.....A-10

A.9 DELPHI METRI-PACK TERMINAL REPAIR

Metri-Pack Terminal Crimps.....A-11
 Matching Terminal To Crimper.....A-11
 Preparing Wire Lead.....A-11
 Crimping Wire Core.....A-11
 Crimping Insulation/Seal.....A-11
 Inspecting Crimps.....A-12

A.10 DELPHI MICRO 64 SEALED CONNECTORS

Delphi Micro 64 Sealed Connector Repair.....A-13
 General.....A-13
 Separating Pin and Socket Housings.....A-13
 Mating Pin and Socket Housings.....A-13
 Removing Terminal.....A-13
 Installing Terminal.....A-14
 Preparing Wire Leads for Crimping.....A-14
 Crimping Terminals.....A-14
 Inspecting Crimps.....A-14

A.11 DELPHI GT 150 SEALED CONNECTORS

Delphi GT 150 Sealed Connector Repair.....A-16
 General.....A-16
 Separating Pin and Socket Housings.....A-16
 Mating Pin and Socket Housings.....A-16
 Removing Socket Terminals.....A-16
 Installing Socket Terminals.....A-16

A.12 DELPHI GT 280 SEALED 73-TERMINAL ECM CONNECTOR

Delphi GT 280 Sealed 73-Terminal ECM Connector.....A-18
 Separating Socket Housing From ECM.....A-18
 Mating Socket Housing To ECM.....A-18
 Socket Terminal.....A-18
 ECM Ground Terminal.....A-18

A.13 DEUTSCH DT SEALED CONNECTORS

Deutsch DT Sealed Connector Repair.....A-20
 General.....A-20
 Separating Pin and Socket Housings.....A-20
 Mating Pin and Socket Housings.....A-20
 Removing Socket Terminals.....A-20
 Installing Socket Terminals.....A-20
 Removing Pin Terminals.....A-22
 Installing Pin Terminals.....A-22
 Crimping Terminals.....A-23

A.14 DEUTSCH DT SEALED TERMINAL REPAIR

Deutsch DT Sealed Terminal Crimps.....A-24
 Preparing Wire Leads for Crimping.....A-24
 Crimping Terminal to Lead.....A-24
 Inspecting Crimps.....A-24

A.15 DEUTSCH DTM SEALED MINI TERMINAL REPAIR

Deutsch DTM Sealed Mini Terminal Crimps.....A-25
 Preparing Wire Leads for Crimping.....A-25
 Crimping a Mini Terminal to Wire Lead.....A-25
 Inspecting Crimps.....A-25

A.16 DEUTSCH DTM SEALED SOLID BARREL MINI TERMINAL REPAIR

Deutsch DTM Sealed Solid Barrel Terminal Crimps.....A-26
 Preparing Wire Leads For Crimping.....A-26
 Adjusting Crimper Tool.....A-26
 Crimping a Barrel Contact To Wire Lead.....A-26
 Inspecting Crimps.....A-26

A.17 JAE MX19 SEALED CONNECTORS

JAE MX19 Sealed Connectors.....A-28
 Connector Housings.....A-28
 Removing Terminals.....A-28
 Installing Terminals.....A-28
 Crimping Terminals.....A-28

A.18 MOLEX CMC SEALED CONNECTORS

Molex CMC Sealed Connectors.....A-29

TABLE OF CONTENTS

| | |
|-------------------------------|------|
| Separating the Connector..... | A-29 |
| Removing Terminals..... | A-29 |
| Installing Terminals..... | A-29 |
| Crimping Terminals..... | A-30 |

A.19 MOLEX MX 150 SEALED CONNECTORS

| | |
|---|------|
| Molex MX 150 Sealed Connector Repair..... | A-31 |
| Separating Pin and Socket Housings..... | A-31 |
| Mating Pin and Socket Housings..... | A-31 |
| Removing Terminals..... | A-31 |
| Installing Terminals..... | A-31 |
| Crimp Terminal to Lead..... | A-32 |
| Prepare Lead..... | A-32 |
| Prepare Tool..... | A-32 |
| Position Terminal in the Punch/Die..... | A-33 |
| Insert Stripped Lead..... | A-33 |
| Crimp Terminal to Lead..... | A-34 |
| Inspect Crimp..... | A-34 |

A.20 TYCO 070 MULTILOCK UNSEALED CONNECTOR

| | |
|---|------|
| Tyco 070 Multilock Unsealed Connector Repair..... | A-35 |
| General..... | A-35 |
| Separating Pin and Socket Housings..... | A-35 |
| Mating Pin and Socket Housings..... | A-35 |
| Removing Terminals from Housing..... | A-35 |
| Inserting Terminals into Housing..... | A-36 |
| Preparing Wire Leads for Crimping..... | A-36 |
| Crimping Terminals to Leads..... | A-37 |
| Inspecting Crimped Terminals..... | A-38 |

A.21 TYCO GET 64 SEALED CONNECTOR

| | |
|-----------------------------------|------|
| Tyco GET 64 Sealed Connector..... | A-39 |
| General..... | A-39 |
| Housings..... | A-39 |
| Removing Socket Terminals..... | A-39 |
| Installing Socket Terminals..... | A-39 |
| Crimping Terminals..... | A-40 |

A.22 TYCO MCP SEALED CONNECTOR

| | |
|-----------------------------------|------|
| Tyco MCP Sealed Connector..... | A-41 |
| General..... | A-41 |
| Housing..... | A-41 |
| Removing the Large Terminals..... | A-41 |
| Removing the Small Terminals..... | A-41 |
| Installing Terminals..... | A-42 |
| Crimping Terminals..... | A-42 |

A.23 SEALED SPLICE CONNECTORS

| | |
|-------------------------------------|------|
| Sealed Splice Connector Repair..... | A-43 |
| General..... | A-43 |
| Preparing Wire Leads..... | A-43 |
| Splicing Wire Leads..... | A-43 |
| Inspecting Seals..... | A-43 |

APPENDIX B WIRING

B.1 CONNECTORS

| | |
|--------------------------|-----|
| Connector Locations..... | B-1 |
|--------------------------|-----|

| | |
|--------------------------|-----|
| Function/Location..... | B-1 |
| Place and Color..... | B-1 |
| Connector Number..... | B-1 |
| Repair Instructions..... | B-1 |

B.2 WIRING DIAGRAMS

| | |
|---------------------------------|-----|
| Wiring Diagram Information..... | B-4 |
| Wire Color Codes..... | B-4 |
| Wiring Diagram Symbols..... | B-4 |
| 2013 V-Rod Wiring Diagrams..... | B-6 |

APPENDIX C ABS

C.1 FASTENER TORQUE VALUES

| | |
|---|-----|
| Fastener Torque Values in this Chapter..... | C-1 |
|---|-----|

C.2 ABS MODULE

| | |
|-------------------------|-----|
| Removal..... | C-2 |
| ABS Module Service..... | C-3 |
| ABS Diode Service..... | C-3 |
| Installation..... | C-4 |

C.3 WHEEL SPEED SENSOR

| | |
|-------------------------------|-----|
| Front Wheel Speed Sensor..... | C-5 |
| Removal..... | C-5 |
| Installation..... | C-5 |
| Rear Wheel Speed Sensor..... | C-6 |
| Removal..... | C-6 |
| Installation..... | C-6 |

C.4 ABS BRAKE LINES

| | |
|--|------|
| Front Master Cylinder to ABS Module..... | C-8 |
| Removal..... | C-8 |
| Installation..... | C-8 |
| ABS Module to Front Brake Calipers..... | C-9 |
| Removal..... | C-9 |
| Installation..... | C-9 |
| Rear Master Cylinder to ABS Module..... | C-10 |
| Removal..... | C-10 |
| Installation..... | C-10 |
| ABS Module to Rear Brake Caliper..... | C-11 |
| Removal..... | C-11 |
| Installation..... | C-11 |

APPENDIX D VALVE LASH

D.1 VALVE TAPPET SHIMS

| | |
|-------------|-----|
| Tables..... | D-1 |
|-------------|-----|

D.2 VALVE LASH CALCULATION WORKSHEET 1

| | |
|------------------|-----|
| Worksheet 1..... | D-2 |
|------------------|-----|

D.3 VALVE LASH CALCULATION WORKSHEET 2

| | |
|------------------|-----|
| Worksheet 2..... | D-3 |
|------------------|-----|

APPENDIX E CONVERSIONS

E.1 LENGTH CONVERSION

Conversion Table.....E-1

E.2 FLUID CONVERSION

United States System.....E-2

Metric System.....E-2

British Imperial System.....E-2

E.3 TORQUE CONVERSION

United States System.....E-3

Metric System.....E-3

APPENDIX F GLOSSARY

F.1 GLOSSARY

Acronyms and Abbreviations.....F-1

REFERENCE MATERIAL

TOOLS.....I

TORQUE VALUES.....IX

INDEX.....XIX

NOTES

TABLE OF CONTENTS

| SUBJECT | PAGE NO. |
|--|-----------------|
| 1.1 FASTENER TORQUE VALUES..... | 1-1 |
| 1.2 GENERAL..... | 1-3 |
| 1.3 FUEL AND OIL..... | 1-7 |
| 1.4 BULB REQUIREMENTS..... | 1-9 |
| 1.5 MAINTENANCE SCHEDULE..... | 1-10 |
| 1.6 ENGINE OIL AND FILTER..... | 1-14 |
| 1.7 AIR CLEANER AND EXHAUST SYSTEM..... | 1-17 |
| 1.8 TIRES AND WHEELS..... | 1-21 |
| 1.9 CLUTCH..... | 1-23 |
| 1.10 DRIVE BELT AND SPROCKETS..... | 1-24 |
| 1.11 THROTTLE CABLES..... | 1-28 |
| 1.12 CABLE, LINE AND FRAME INSPECTION..... | 1-29 |
| 1.13 BRAKES..... | 1-30 |
| 1.14 BRAKE PADS AND DISCS..... | 1-32 |
| 1.15 SPARK PLUGS AND COIL..... | 1-36 |
| 1.16 COOLING SYSTEM..... | 1-38 |
| 1.17 STEERING HEAD BEARINGS..... | 1-39 |
| 1.18 VALVE LASH..... | 1-41 |
| 1.19 CRITICAL FASTENERS..... | 1-51 |
| 1.20 BATTERY MAINTENANCE..... | 1-52 |
| 1.21 RADIATOR SIDE COVERS..... | 1-57 |
| 1.22 SUSPENSION ADJUSTMENTS..... | 1-59 |
| 1.23 SECONDARY CAM CHAIN..... | 1-60 |
| 1.24 HEADLAMP ALIGNMENT..... | 1-62 |
| 1.25 STORAGE..... | 1-63 |
| 1.26 TROUBLESHOOTING..... | 1-64 |

NOTES

FASTENER TORQUE VALUES

FASTENER TORQUE VALUES IN THIS CHAPTER

The table below lists torque values for all fasteners presented in this chapter.

| FASTENER | TORQUE VALUE | | NOTES |
|--|--------------|------------------|---|
| Air cleaner velocity stack screw | 6 Nm | 53 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Battery terminal | 6.8-7.9 Nm | 60-70 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Battery terminal | 6.8-7.9 Nm | 60-70 in-lbs | 1.20 BATTERY MAINTENANCE, Installation/Connection |
| Bleed Screw | 9-11 Nm | 80-100 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Caliper pad pin | 8.5-11.5 Nm | 75-102 in-lbs | 1.14 BRAKE PADS AND DISCS, Brake Pad Replacement |
| Cam cover fasteners | 11 Nm | 97 in-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Cam cover fasteners | 9.7 Nm | 86 in-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Cam journal caps | 9.7 Nm | 86 in-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Clutch inspection cover | 6-10 Nm | 53-88 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Coil fasteners | 9.7 Nm | 86 in-lbs | 1.15 SPARK PLUGS AND COIL, Installation |
| Drain plug, engine oil | 35 Nm | 25.8 ft-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Drain plug, radiator | 2.3-2.8 Nm | 21-24 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Fork and stem pinch bolts | 41-48 Nm | 30-35 ft-lbs | 1.17 STEERING HEAD BEARINGS, Adjustment (Fall-Away) |
| Fork stem bracket pinch bolts | 41-48 Nm | 30-35 ft-lbs | 1.17 STEERING HEAD BEARINGS, Adjustment (Fall-Away) |
| Front caliper pin | 8.5-11.5 Nm | 75-102 in-lbs | 1.14 BRAKE PADS AND DISCS, Brake Pad Replacement |
| Front cylinder secondary cam chain tensioner | 100 Nm | 74 ft-lbs | 1.23 SECONDARY CAM CHAIN, Adjustment |
| Front engine mount fastener | 38 Nm | 28 ft-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Handlebar clamp screw | 6.8-9.0 Nm | 60-80 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Handlebar housing screws | 4.0-5.1 Nm | 35-45 in-lbs | 1.11 THROTTLE CABLES, Lubrication |
| Handlebar switch housing screw | 4-5 Nm | 35-45 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Headlamp alignment fastener | 4.5-7.5 Nm | 40-66 in-lbs | 1.24 HEADLAMP ALIGNMENT, Headlamp Adjustment |
| Master cylinder reservoir cover | 1.1-1.4 Nm | 10-12 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Master cylinder reservoir cover | 0.7-0.9 Nm | 6-8 in-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Oil drain plug | 35 Nm | 25.8 ft-lbs | 1.6 ENGINE OIL AND FILTER, Changing Oil and Filter |
| Radiator hose fasteners | 9.7 Nm | 86 in-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Radiator side cover fastener | 3-4 Nm | 27-35 in-lbs | 1.21 RADIATOR SIDE COVERS, Installation |
| Rear axle nut | 190-203 Nm | 140-150 ft-lbs | 1.10 DRIVE BELT AND SPROCKETS, Checking and Adjusting Drive Belt Deflection |
| Reservoir cap screws (front) | 1.1-1.4 Nm | 10-12 in-lbs | 1.14 BRAKE PADS AND DISCS, Brake Pad Replacement |
| Reservoir cap screws (rear) | 0.7-0.9 Nm | 6-8 in-lbs | 1.14 BRAKE PADS AND DISCS, Brake Pad Replacement |
| Side cover fasteners | 4.1-6.8 Nm | 36.3-60.2 in-lbs | 1.7 AIR CLEANER AND EXHAUST SYSTEM, Installation |

| FASTENER | TORQUE VALUE | | NOTES |
|--------------------------|---------------------|------------------|---|
| Spark plugs | 23 Nm | 17 ft-lbs | 1.5 MAINTENANCE SCHEDULE, General |
| Spark plugs | 23 Nm | 17 ft-lbs | 1.15 SPARK PLUGS AND COIL, Installation |
| Spark plugs | 23 Nm | 17 ft-lbs | 1.18 VALVE LASH, Lash Adjustment |
| Steering stem bolt | 9.5 Nm | 84 in-lbs | 1.17 STEERING HEAD BEARINGS, Adjustment (Fall-Away) |
| Steering stem bolt | 9.5 Nm | 84 in-lbs | 1.17 STEERING HEAD BEARINGS, Adjustment (Fall-Away) |
| Velocity stack fasteners | 6 Nm | 53 in-lbs | 1.7 AIR CLEANER AND EXHAUST SYSTEM, Installation |

SERVICING A NEW MOTORCYCLE

WARNING

Perform the service and maintenance operations as indicated in the regular service interval table. Lack of regular maintenance at the recommended intervals can affect the safe operation of your motorcycle, which could result in death or serious injury. (00010a)

Perform necessary set-up tasks before customer delivery. See applicable model year predelivery and set-up instructions.

The performance of new motorcycle initial service is required to keep warranty in force and to verify proper emissions systems operation. See [1.5 MAINTENANCE SCHEDULE](#).

SAFE OPERATING MAINTENANCE

NOTES

- Do not attempt to tighten engine head bolts or engine damage may result.
- During the initial break-in period, use only GENUINE HARLEY-DAVIDSON H-D 360 MOTORCYCLE OIL 20W50. Failure to use the recommended oil will result in improper break-in of the engine cylinders and piston rings.

Inspect motorcycle on a regular basis for additional maintenance needs. Routinely check components between regular maintenance intervals. Always inspect motorcycle after periods of storage before riding.

Check:

1. Tires for correct pressure, excessive wear or any signs of tire damage.
2. Drive belt tension and condition.
3. Brakes, steering and throttle for responsiveness.
4. Brake fluid level and condition. Hydraulic lines and fittings for leaks. Also, check brake pads and discs for wear.
5. Cables for fraying, crimping and free operation.
6. Engine oil and transmission fluid levels.
7. Headlamp, auxiliary/fog lamp, tail lamp, stop lamp, horn and turn signal operation.

SHOP PRACTICES

Repair Notes

General maintenance practices are given in this section.

NOTES

- Repair = Disassembly/Assembly.
- Replacement = Substitute a **new** part for existing component.

All special tools and torque values are noted at the point of use.

All required parts or materials can be found in the parts catalog.

Safety

Safety is always the most important consideration when performing any job.

- Always have a complete understanding of the task.
- Use common sense.
- Use the proper tools.
- Protect yourself and bystanders with approved eye protection.

Don't just do the job, do the job safely.

Removing Parts

Always consider the weight of a part when lifting. Use a hoist whenever necessary. Do not lift heavy parts by hand. If a hoist and adjustable lifting beam or sling are needed to remove some parts, verify that:

- The lengths of multiple chains or cables from the hoist to the part are equal and parallel.
- Slings, chains and cables are positioned directly over the center of the part.
- No obstructions will interfere with the lifting operation.
- Parts are not left suspended.

WARNING

Be sure to check capacity rating and condition of hoists, slings, chains and cables before use. Exceeding capacity ratings or using lifting devices that are in poor condition can lead to an accident, which could result in death or serious injury. (00466c)

Always use blocking or proper stands to support the part that has been hoisted. If a part cannot be removed, verify that all bolts and attaching hardware have been removed. Verify that no parts are in the way of the part being removed.

When removing hoses, wiring or tubes, always tag each part to verify proper installation.

Cleaning

Always clean around lines or covers before they are removed. Plug, tape or cap holes and openings to keep out dirt, dust and debris. Clean and inspect all parts as they are removed. Verify all holes and passages are clean and open. After cleaning, cover all parts with clean lint-free cloth, paper or other material. Verify the part is clean when installed.

Thoroughly clean all parts to be reused before assembly. Clean parts promote better component operation and longer life. Seals, filters and covers used in this vehicle keep out extraneous dirt and dust. Keep these items in good condition to guarantee satisfactory operation.

When instructed to clean fastener threads or threaded holes, always:

- Clean all threadlocking material from fastener threads and threaded holes.
- Use a wire brush to clean fastener threads.
- Use a thread chaser or other suitable tool to clean threaded holes.
- Use PJ1 cleaner or equivalent to remove all traces of oil and contaminants from threads.
- Clear all threaded holes with low pressure compressed air.

Always verify cleanliness of blind holes before assembly. Tightening a screw with dirt, water or oil in the hole can cause castings to crack or break.

Disassembly and Assembly

Always assemble or disassemble one part at a time. Do not work on two assemblies simultaneously. Make all necessary adjustments. Inspect your work when finished to verify that everything is done.

Operate the vehicle to perform any final check or adjustments. If all is correct, the vehicle is ready to go back to the customer.

Checking Torques on Fasteners

Check torque using a torque wrench set to the minimum specification for that fastener. If the fastener does not rotate, the torque has been maintained. If the fastener rotates, remove it to determine if it has a threadlocking agent.

If it has a threadlocking agent, clean all material from the threaded hole. Replace the fastener with a **new** one or clean the original fastener threads and apply the appropriate threadlocking product. Install and tighten the fastener to specification.

If the fastener does not use a threadlocking agent, install and tighten it to specification.

Magnetic Parts Trays

Magnetic parts trays are common in the service facility because they are convenient and can keep parts from becoming lost during a repair procedure. However, hardened steel parts can become magnetized when held in magnetic parts trays.

Metal fragments from normal wear are usually trapped in the oil filter or by the magnetic drain plug. Magnetized parts in the engine can retain these fragments, potentially causing accelerated engine wear and damage.

Never place parts that will be returned to service inside the vehicle's powertrain such as gears, thrust washers and especially bearings in magnetic parts trays.

REPAIR AND REPLACEMENT PROCEDURES

Hardware and Threaded Parts

Install thread repair inserts when threaded holes in castings are stripped, damaged or not capable of withstanding specified torque.

Replace bolts, nuts, studs, washers, spacers and small common hardware if missing or damaged. Clean up or repair minor thread damage with a suitable tap or die.

Replace all damaged or missing lubrication fittings.

Use LOCTITE 565 THREAD SEALANT on pipe fitting threads.

Threadlocking Agents

Always follow specific service manual procedures when working with fasteners containing preapplied threadlocking agents when fastener replacement is recommended. When re-using fasteners containing threadlocking agents, thoroughly clean all fasteners and threaded holes. Always use the recommended threadlocking agent for the specific procedure.

Wiring, Hoses and Lines

Replace hoses, clamps, electrical wiring, electrical switches or fuel lines if they do not meet specifications.

Instruments and Gauges

Replace damaged or defective instruments and gauges.

Bearings

Always use the proper tools and fixtures when servicing bearings.

Anti-friction bearings must be handled in a special way. To keep out dirt and abrasives, cover the bearings as soon as they are removed from the package.

When bearings are installed against shoulders, always verify that the chamfered side of the bearing faces the shoulder. Lubricate bearings and all metal contact surfaces before pressing into place. Only apply pressure on the part of the bearing that makes direct contact with the mating part. Install bearings with numbered side facing out.

Only remove bearings if necessary. Removal usually damages bearings requiring replacement with **new** parts.

Bushings

Do not remove a bushing unless damaged, excessively worn or loose in its bore. Press out bushings requiring replacement.

When pressing or driving bushings, always apply pressure in line with the bushing bore. Use a bearing/bushing driver or a bar with a smooth, flat end. Never use a hammer to drive bushings.

Verify that all oil holes are properly aligned during installation.

Gaskets

Always discard gaskets after removal. Replace with **new** gaskets. Never use the same gasket twice. Verify that gasket holes match up with holes in the mating part. Be aware that sections of a gasket may be used to seal passages.

Lip-Type Seals

Lip seals are used to seal oil or grease and are usually installed with the sealing lip facing the contained lubricant. Seal orientation, however, may vary under different applications.

Do not remove seals unless necessary. Only remove seals to gain access to other parts or if seal damage or wear dictates replacement.

Leaking oil or grease usually means that a seal is damaged. Replace leaking seals to prevent overheated bearings.

Always discard seals after removal. Do not use the same seal twice.

O-Rings

Always discard O-rings after removal. Many O-rings are similar in size and appearance. Always use **new** O-rings keeping them packaged until use to avoid confusion. To prevent leaks, lubricate the O-rings before installation with the same type of lubricant as that being sealed. Be sure that all gasket, O-ring and seal mating surfaces are thoroughly clean before installation.

Gears

Always check gears for damaged or worn teeth.

Remove burrs and rough spots with a honing stone or crocus cloth before installation.

Lubricate mating surfaces before pressing gears on shafts.

Shafts

If a shaft does not come out easily, check that all nuts, bolts or retaining rings have been removed. Check to see if other parts are in the way before using force to remove.

Shafts fitted to tapered splines should be very tight. If shafts are not tight, disassemble and inspect tapered splines. Discard parts that are worn. Verify that tapered splines are clean, dry and free of burrs before putting them in place. Press mating parts together tightly.

Clean all rust from the machined surfaces of **new** parts.

Part Replacement

WARNING

Harley-Davidson parts and accessories are designed for Harley-Davidson motorcycles. Using non-Harley-Davidson parts or accessories can adversely affect performance, stability or handling, which could result in death or serious injury. (00001b)

Always install **new** genuine Harley-Davidson parts and accessories. This will provide best service life and maintain compliance with noise and emissions regulations.

Installing non-Harley-Davidson, off-road or competition parts can void warranty or result in an unsafe vehicle.

CLEANING

Part Protection

Before cleaning, protect rubber parts (such as hoses, boots and electrical insulation) from cleaning solutions. Use a grease-proof barrier material. Remove the rubber part if it cannot be properly protected.

Cleaning Process

Any cleaning method may be used as long as it does not result in parts damage. Thorough cleaning is necessary for proper parts inspection. Strip rusted paint areas to bare metal before priming and repainting.

Rust or Corrosion Removal

Remove rust and corrosion with a wire brush, abrasive cloth, sand blasting, vapor blasting or rust remover. Use buffing crocus cloth on highly polished parts that are rusted.

Bearings

Wash bearings in a non-flammable petroleum cleaning solution. Never use a solution that contains chlorine. Knock out packed lubricant by tapping the bearing against a wooden block. Wash bearings again.

WARNING

Using compressed air to "spin dry" bearings can cause bearing to fly apart, which could result in death or serious injury. (00505b)

Cover bearings with a clean shop towel and allow to air dry. Do not spin bearings while they are drying. Never use compressed air to dry bearings.

When dry, coat bearings with clean oil. Wrap bearings in clean paper.

TOOL SAFETY

Air Tools

- Always use approved eye protection equipment when performing any task using air-operated tools.
- On all power tools, use only recommended accessories with proper capacity ratings.
- Do not exceed air pressure ratings of any power tools.
- Bits should be placed against work surface before air hammers are operated.
- Disconnect the air supply line to an air hammer before attaching a bit.
- Never point an air tool at yourself or another person.
- Protect bystanders with approved eye protection.

Wrenches

- Never use an extension on a wrench handle.
- If possible, always pull on a wrench handle and adjust your stance to prevent a fall if something suddenly releases.
- Always keep the wrench squarely installed on the fastener.
- Never use a hammer on any wrench other than a STRIKING FACE wrench.
- Discard any wrench with damaged or battered points.
- Never use a pipe wrench to bend, raise or lift a pipe.

Pliers/Cutters/Pry Bars

- Plastic- or vinyl-covered pliers handles are not intended to act as insulation. Do not use them on live electrical circuits.
- Do not use pliers or cutters for cutting hardened wire unless they were designed for that purpose.
- Always cut at right angles.
- Do not use any pry bar as a chisel, punch or hammer.

Hammers

- Never strike a hammer against a hardened object, such as another hammer.
- Always grasp a hammer handle firmly, close to the end.
- Strike the object with the full face of the hammer.
- Never work with a hammer which has a loose head or cracked handle.
- Discard hammer if face is chipped or mushroomed.
- Wear approved eye protection when using striking tools.
- Protect bystanders with approved eye protection.

Punches/Chisels

- Never use a punch or chisel with a chipped or mushroomed end. Dress mushroomed chisels and punches with a grinder.
- Hold a chisel or a punch with a tool holder if possible.
- When using a chisel on a small piece, clamp the piece firmly in a vise and chip toward the stationary jaw.
- Always wear approved eye protection when using these tools.
- Protect bystanders with approved eye protection.

Screwdrivers

- Do not use a screwdriver for prying, punching, chiseling, scoring or scraping.
- Use the right type of screwdriver for the job. Match the tip of a screwdriver to the fastener.
- Do not interchange POZIDRIV, PHILLIPS or REED AND PRINCE screwdrivers.
- Screwdriver handles are not intended to act as insulation. Do not use them on live electrical circuits.
- Do not use a screwdriver with rounded edges because it will slip. Redress with a grinder.

Ratchets and Handles

- Periodically clean and lubricate ratchet mechanisms with a light grade oil. Do not replace parts individually. Ratchets should be rebuilt with the entire contents of service kit.
- Never hammer on a ratchet or put a pipe extension on a ratchet handle for added leverage.
- Always support the ratchet head when using socket extensions, but do not put your hand on the head or you may interfere with the action of its reversing mechanism.
- When breaking a fastener loose, apply a small amount of pressure as a test to be sure the ratchet's gear wheel is engaged with the pawl.

Sockets

- Never use hand sockets on power or impact wrenches. Select only impact sockets for use with air or electric impact wrenches.
- Select the right size socket for the job.
- Always keep the wrench or socket squarely on the fastener.
- Replace sockets showing cracks or wear.
- Keep sockets clean.
- Always use approved eye protection when using power or impact sockets.

Storage Units

- Do not open more than one loaded drawer at a time. Close each drawer before opening another to prevent the cabinet from unexpectedly tipping over.
- Close lids and lock drawers and doors before moving storage units.
- Do not pull on a tool cabinet. Always push tool cabinets in front of you.
- Set the brakes on the locking casters after the cabinet has been rolled into position.

Thank you so much for reading.
Please click the “Buy Now!”
button below to download the
complete manual.



After you pay.

You can download the most
perfect and complete manual in
the world immediately.

Our support email:

ebooklibonline@outlook.com