DOLMAR

Model	Bore mm (in.)	Stroke mm (in.)	Displacement cc (cu. in.)	Drive Type
116	45 (1.77)	35 (1.38)	56 (3.4)	Direct
116 Super	47 (1.85)	35 (1.38)	61 (3.7)	Direct
116si	46 (1.81)	36 (1.42)	60 (3.66)	Direct
120	47 (1.85)	35 (1.38)	61 (3.7)	Direct
120 Super	49 (1.93)	36 (1.42)	68 (4.15)	Direct
120si	49 (1.93)	36 (1.42)	68 (4.15)	Direct

MAINTENANCE

SPARK PLUG. Recommended spark plug is Bosch WSR-5F. Electrode gap should be 0.5 mm (0.020 in.). The spark plug should be tightened to the torque listed in the TIGHTENING TORQUE paragraph.

CARBURETOR. Tillotson HS or HU carburetor is used on all models. Verify carburetor model, then refer to the appropriate Tillotson section of the CARBURETOR SERVICE section for service and exploded views.

To remove carburetor, remove air filter cover and filter element. Disconnect fuel line. Remove carburetor mounting screws and withdraw carburetor and intake elbow. Disconnect choke lever and throttle linkage.

Tighten the screws attaching the intermediate flange and screws attaching the carburetor to the torque listed in the TIGHTENING TORQUE paragraph.

Refer to Fig. D111 for the location of carburetor adjustment screws. Initial setting of both the low-speed and high-speed mixture needles for all models is 1 turn open from lightly seated.

To adjust the mixture needles, first remove and clean the air filter, then reinstall it. Start the engine and allow it to run until it reaches normal operating temperature. If necessary, turn each of the mixture needles clockwise until seated lightly, then back the needles out (counterclockwise) to the initial setting so the engine can be started. Turn the idle speed stop screw so the engine idles at about 2,400 rpm.

Adjust the low-speed mixture needle (L) so the engine idles smoothly and accelerates without hesitation. Adjust the idle speed screw (S) so clutch does not engage when engine is idling, then recheck low-speed mixture adjustment.

Adjust the high-speed mixture needle (H) to provide the best performance while operating at maximum speed under load. The high-speed mixture needle may be set slightly rich to improve performance under load. The engine may be damaged if the high-speed mixture is set too lean.

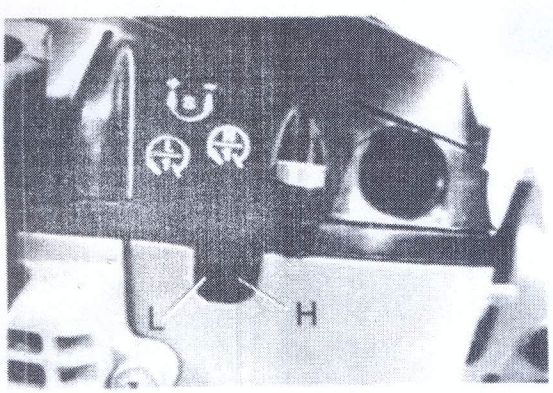

Fig. D111—View showing location of the carburetor adjustment screws. The idle speed stop screw is located at "S," low-speed mixture needle at "L" and high-speed mixture needle at "H."

Final adjustment of the mixture needles should be within 1/4 turn of the initial settings. Large differences may indicate air leaks, plugged passages or other problems.

IGNITION. All models are equipped with a breakerless electronic ignition system. All electronic circuitry is contained in a one-piece ignition module/coil located outside the flywheel. Ignition timing is fixed and not adjustable. The flywheel attaching nut should be tightened to the torque listed in TIGHTENING TORQUE paragraph.

Air gap between the legs of the module/coil and the flywheel magnets should be 0.15 mm (0.006 in.). When installing, set the air gap between the flywheel magnets and the legs of the ignition module as follows.

Install the ignition module, but tighten the two screws only enough to hold it in place away from the flywheel. Insert setting gauge (part No. 944 500 890) or brass/plastic shim stock of the proper thickness between the legs of the ignition module and the flywheel, then turn the flywheel until the flywheel magnets are near the module legs. Loosen the screws attaching the ignition module and press legs of the ignition module against the setting gauge. Tighten the two attaching screws to the torque listed in the TIGHTENING TORQUE paragraph. Remove the setting gauge, then turn the flywheel and check that flywheel does not hit the legs of the coil.

LUBRICATION. The engine is lubricated by mixing oil with the gasoline fuel. The manufacturer recommends mixing DOLMAR two-stroke oil with

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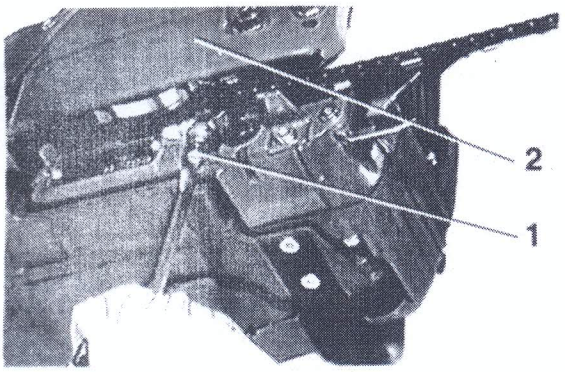

Fig. D112—The chain oil adjustment screw is located as shown. The chain and guide bar are removed for clarity. Turn the screw clockwise to reduce the amount of oil or counterclockwise to increase the amount of oil.

regular grade gasoline at a ratio of 40:1 after break-in. When using regular two-stroke engine oil, mix at a ratio of 25:1. During the initial break-in (first 10 hours) the fuel to oil ratio should be 30:1 when using DOLMAR oil or 20:1 when using other approved oil.

Use a separate container to mix gasoline and oil before filling the fuel tank. The manufacturer recommends not using fuel containing alcohol.

The saw chain is lubricated by oil contained in the oil reservoir by the automatic chain oil pump. The manufacturer recommends using DOLMAR Saw Chain oil or other good quality oil designed for lubricating saw chain. Make sure the reservoir is filled at all times.

The volume of oil delivered by the pump is adjustable by turning screw (Fig. D112) located under the saw on the right side. The engine must be stopped before turning the adjusting screw. Turn the screw clockwise to reduce the amount of oil or counterclockwise to increase the amount of oil.

REPAIRS

TIGHTENING TORQUE. Recommended tightening torque values are as follows.

Carburetor attaching screws . . . . 5.0-7.0 N·m (44-62 in.-lb.)
Clutch hub . . . . . 52.5-57.5 N·m (39-42 ft.-lb.)
Crankcase . 10-11 N·m (88.5-97 in.-lb.)
Cylinder . . . . . 11.5-12.5 N·m (102-110 in.-lb.)
Flywheel . . . . . 27.5-30.0 N·m (243-265 in.-lb.)
Ignition module/coil . . . . . 3.0-4.0 N·m 26.6-35 in.-lb.)
Intermediate flange (intake) . . . . . 5.5-6.5 N·m (48.5-57.5 in.-lb.)
Muffler. . . 8.0-9.0 N·m (71-79.7 in.-lb.)
Spark plug . . . . . 20-30 N·m (177-265 in.-lb.)
Tubular handle . . . . . 4.5-5.5 N·m (40-48.7 in.-lb.)
Vibration isolator . . . . . 7.0-8.0 N·m (62-70.8 in.-lb.)

POWER HEAD. The following disassembly procedure can generally be used when removing the power head. Remove sprocket guard and chain brake assembly. Remove chain and bar, muffler, clutch assembly, oil pump, starter housing, ignition module, flywheel, carburetor and intake manifold. Unbolt and remove top handle. Remove screws attaching power head to fuel tank and withdraw power head.

PISTON, PIN, RINGS AND CYLINDER. Refer to Fig. D113 for exploded view of typical piston and cylinder. To remove cylinder, remove four retaining screws and lift cylinder off the piston.

Two piston rings are used and are pinned in the grooves to prevent movement. The piston pin rides in a needle bearing (6) located in the upper end of the connecting rod. The piston pin is retained in the piston by retainer rings (5) located in the piston at each end of the pin.

Always install new retainer rings if they are removed and position the ring ends toward the bottom of the piston. When assembling, make sure the arrow on the piston crown is visible and pointing toward the exhaust (muffler) side of the cylinder.

Inspect the cylinder bore for excessive wear or damage. Oversize parts are not available and the cylinder is available only with a matching piston. Pistons may be available separately. Tops of the cylinder and piston are marked with "A, B," or "C" and both should have the same letter. Tighten the cylinder retaining screws to the torque listed in TIGHTENING TORQUE paragraph.

CRANKSHAFT, CONNECTING ROD AND CRANKCASE. The clutch, oil pump, pump drive worm, flywheel, cylinder, and piston must be removed before separating the crankcase halves. Rotate the crankshaft in the crankcase

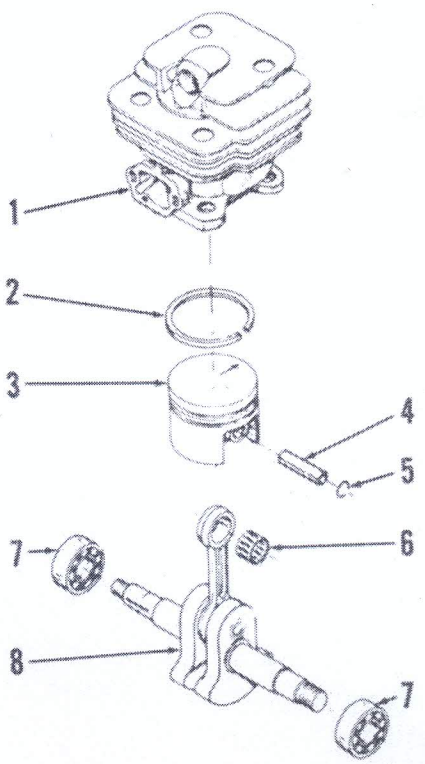

Fig. D113—Exploded view of the cylinder, piston, cylinder and crankshaft assembly typical of all models.

1. Cylinder
2. Piston rings
3. Piston
4. Piston pin
5. Retaining rings
6. Needle bearing
7. Main bearings
8. Crankshaft and connecting rod assy.

main bearings and check for roughness before removing the crankshaft assembly.

Tap the crankcase as necessary with a soft faced hammer to separate the halves. The ball type main bearings (7—Fig. D113) and shaft seals are located in the case halves. Main bearings and shaft seals should be removed only if new parts will be installed in the case halves.

Rotate the connecting rod around the crankpin while checking for roughness, excessive play or other damage. The crankshaft and connecting rod are a unit assembly and not available separately.

If main bearings (7) are to be removed from the crankcase, heat the case halves to approximately 100 degrees C (212 degrees F) before pressing the bearings from or into the case bores.

When assembling, lubricate the shaft seals and bearings with clean engine oil. Insert the crankshaft in the clutch (right) side crankcase half, position a new gasket against the case then assemble the other case half. Tighten the screws attaching the crankcase halves to the torque listed in TIGHTENING TORQUE paragraph.

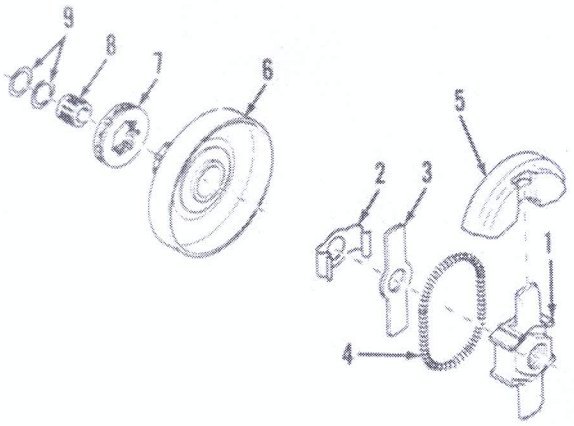

Fig. D114—Exploded view of typical clutch assembly.

1. Clutch hub
2. Clamp
3. Guide piece
4. Spring
5. Shoes
6. Clutch drum
7. Sprocket
8. Needle bearing
9. Spacer washers

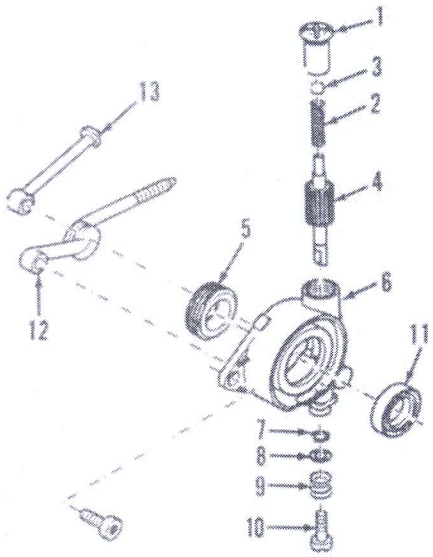

Fig. D115—Exploded view of the automatic chain oil pump, typical of all models.

1. Plug
2. Spring
3. Ball
4. Plunger
5. Worm gear
6. Housing
7. "O" ring
8. Washer
9. Spring
10. Adjusting screw
11. Seal
12. Suction line to pump
13. Pressure line

CLUTCH. A two shoe centrifugal clutch with a coil type garter spring (4—Fig. 114) is used. The clutch hub is attached to the right end of the engine crankshaft with left-hand threads. Keep the crankshaft from turning by using an appropriate piston stopper. The clutch hub can be turned using a 17 mm socket wrench. Note that clutch hub has left-hand threads (turn clockwise to remove). The clutch drum can be withdrawn after the hub and shoes are removed. The floating chain drive sprocket is splined to the clutch drum.

When assembling, install the smaller spacer (9) next to the oil pump, with the larger spacer (9) next to the clutch drum. Grease the needle bearing (8) lightly before assembling the bearing and drum. Assemble the clutch shoes (5), and spring (4) on the hub (1), making sure the connection of the spring is centered in one of the shoes. Assemble thrust plate (3) and clamp (2). Install the clutch assembly, tightening the hub to the torque listed in TIGHTENING TORQUE paragraph.

OIL PUMP. All models are equipped with an automatic chain oil pump typical of the type shown in Fig. D115. Oil is pumped by plunger (4), which is turned by worm gear (5). Pump output is adjusted by turning screw (10).

The oil pump can be unbolted and pulled from the engine after removing the clutch assembly. Oil suction and pressure lines can be inspected after the oil pump is removed. Install new hoses if cracked or leaking. Use suitable sealer on suction hose to prevent leakage. Special tool (part No. 957 433 000) should be used to pull the worm drive gear (5) from the crankshaft.

Inspect plunger (4), worm gear (5) and bore in pump housing (6) for wear of damage. If wear or damage is excessive, it is suggested that a new pump assembly and worm drive gear be installed. To install the worm gear, screw the worm gear onto special tool (part No. 957 433 000), then heat the worm gear to approximately 100 degrees C (212 degrees F). Position the worm gear on the crankshaft until the tool is bottomed, allow the worm gear to cool, then remove the special tool leaving the worm on the crankshaft.

REWIND STARTER. Refer to Fig. D116 for exploded view of the rewind starter. The starter assembly can be unbolted and removed from the engine. If the recoil spring is under pressure, remove the assembly from the engine, pull the rope out about 20 cm (8 in.), hold the pulley (5), unwind the rope from the pulley, then allow the pulley to slowly unwind. Remove clip (6) and washer (7), then slide pulley (5) from the shaft. Make sure spring is completely unwound before removing the pulley.

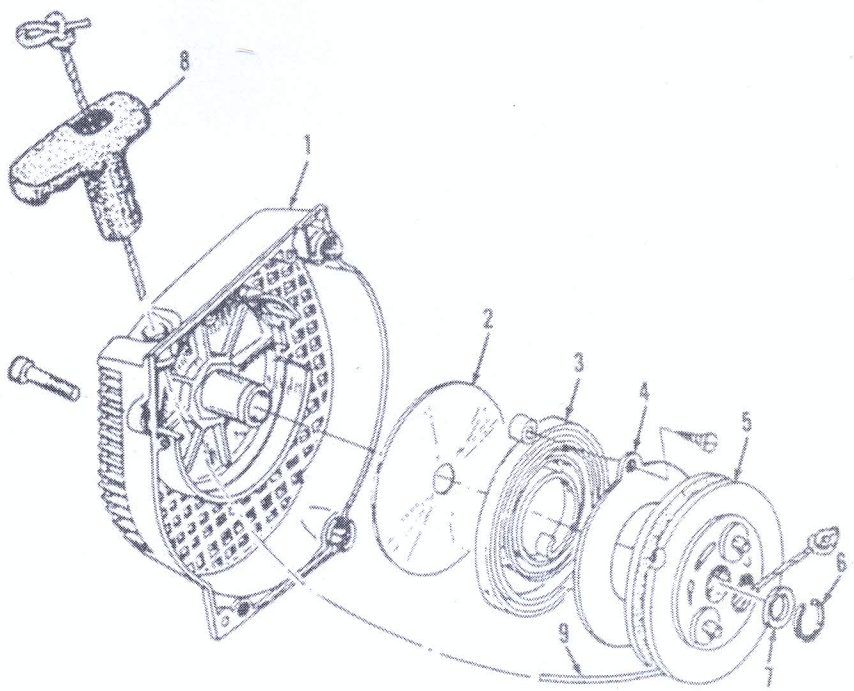

Fig. D116—Exploded view of the rewind starter typical of models 115 and 120.

1. Starter housing
2. Spacer
3. Recoil spring
4. Plate
5. Pulley
6. Snap ring
7. Washer
8. Handle
9. Rope

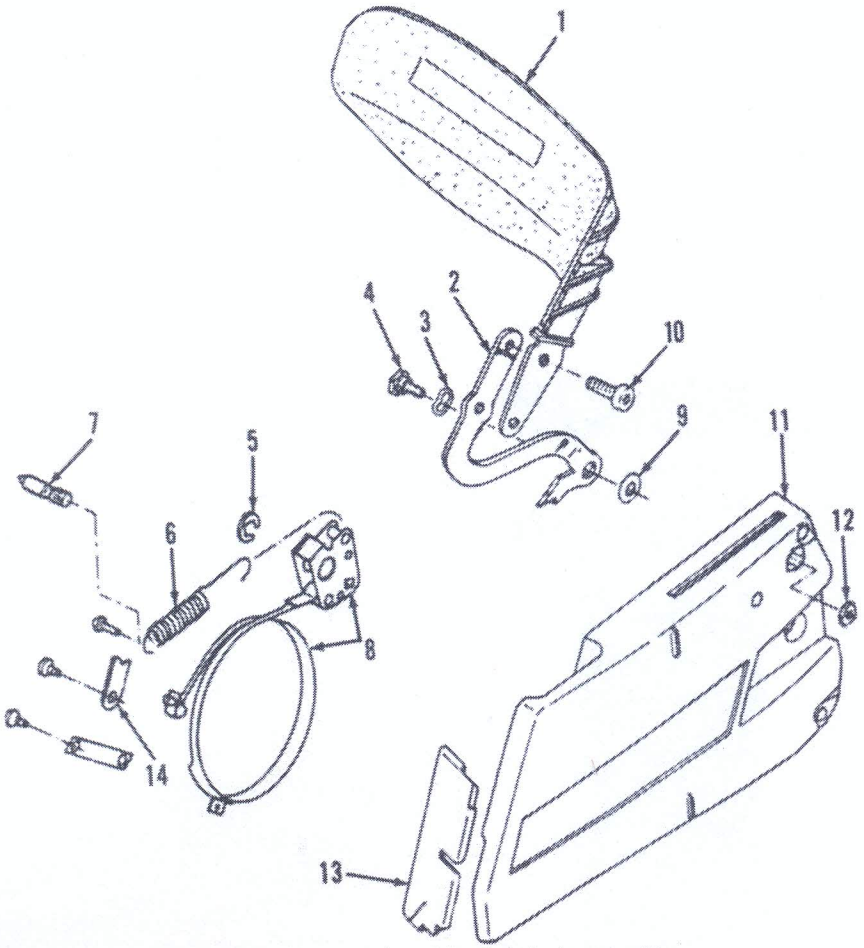

Fig. D117—Exploded view of the chain brake assembly.

1. Hand guard
2. Lever
3. Wave washer
4. Shoulder bolt
5. "E" ring
6. Brake spring
7. Pin
8. Brake band & lever assy.
9. Washer
10. Screw
11. Housing
12. Nut
13. Cover
14. Retainer

New starter rope is 100 cm (40 in.) long and 4 mm in diameter. Attach rope to the pulley, making sure that the knot is properly nested in the pulley.

If not damaged, the rewind spring (3) can remain in the housing. Inspect the spring to make sure that both ends are in good condition and the spring is not broken. If the spring is removed, it should be wound into the housing in a clockwise direction starting with the outer coil. Attach the spring case (4) to the housing after the spring is installed.

Install the pulley (5) with rope attached. The pulley should engage the inner end of the spring (3). Install washer (7) and clip (6). Wind rope onto the pulley, preload the pulley approximately 2 turns, insert the end of the rope through guide in the housing then attach the handle (8). Pull the rope out fully and check that pulley can be turned an additional 1/2 turn without causing the spring to bind. Allow the rope to rewind and make sure the handle is pulled against the housing. If the spring binds, remove some spring preload and recheck. If the handle is not wound against the housing, increase the preload and recheck.

Inspect the condition of the pawl and spring attached to the flywheel. The pawl stud should be pressed into the flywheel after coating the surface of the stud and bore with locking agent (part No. 980 009 000 or equivalent).

CHAIN BRAKE. The chain brake assembly is designed to stop the chain quickly should kickback occur. The chain brake is activated when the operator's hand strikes the hand guard (1—Fig. D117). When the brake system is activated, spring (6) draws the brake band (8) tight around the clutch drum. To release the brake, pull the hand guard back until the mechanism is reset.

The chain brake must be released before the housing (11) can be removed. To disassemble, push brake lever (2—Fig. D117) forward to relieve spring tension. Unscrew shoulder bolt (4) and remove lever (2). Unhook spring (6) and remove from housing. Disengage "E" ring (5) and withdraw brake band (8).

Lubricate all of the pivot points with suitable low temperature grease when assembling. No adjustment of the mechanism is required.

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