

BENELLI

650CC TORNADO

MODEL

	650CC Tornado
Displacement—cc	642.8
Bore—mm	84
Stroke—mm	58
Number of cylinders	2
Ignition—	
Spark plug type—Champion	N-3-MC
Electrode gap—mm	0.6
Inch	0.024
Point gap—mm	0.4
Inch	0.016
Valve clearance (cold)	
Intake—mm	0.10
Inch	0.004
Exhaust—mm	0.13
Inch	0.005
Electrical system voltage	12
Battery terminal grounded	Negative
Tire size—front	3.50 x 18
Rear	4.00 x 18
Tire pressure—	
Front—kg/cm ²	1.54
Psi	22
Rear—kg/cm ²	1.96
Psi	28
Number of speeds	5

Illustrations courtesy of Cosmopolitan Motors Inc.

Throttle cable adjuster (1) should be set so that both throttle slides (4) begin movement at same instant.

IGNITION AND ELECTRICAL.

Two 6V 1.2AH batteries are mounted beneath seat. Batteries are connected in series to provide 12V power for the system. A generator is mounted behind cylinders and is driven by a "V" belt from left end of crankshaft. Belt should be checked for proper free play (5/16-3/8 inch) at regular intervals. Play is adjusted by varying quantity of spacers between halves of pulley on generator (Fig. BE3-2). Place spacers behind entire assembly to maintain alignment with crankshaft pulley.

Maximum gap of ignition points should be set at 0.4mm (0.016 inch). Ignition should occur (points just open) at 5-6 degrees BTDC. Mark on crankshaft pulley will align with mark on engine case at this point (Fig. BE3-3). Adjust ignition timing for each cylinder separately.

Check advance mechanism for freedom of movement and ease of operation.

VALVE SYSTEM. Valves are actuated by a camshaft located forward of the crankshaft in crankcase. Push rods located in front of cylinders are used to transfer movement to the rocker arms.

Valve clearance should be checked with engine cold. Remove seat, fuel tank and tappet cover. Turn crankshaft to align "O" mark on crank pulley with mark on engine case (Fig. BE3-3). One piston will be at TDC of compression stroke at this time. Adjust inlet valve

MAINTENANCE

SPARK PLUG. Recommended spark plug for normal operation is Marelli type CW 240 L or a Champion type N-3-MC. Spark plugs should be gapped to 0.6mm (0.024 inch).

CARBURETORS. Two Del'Orto concentric units with 29mm throttle bores are used. (Fig. BE3-1) Initial setting of pilot air screw (14) is 1½ turns out from a lightly seated position.

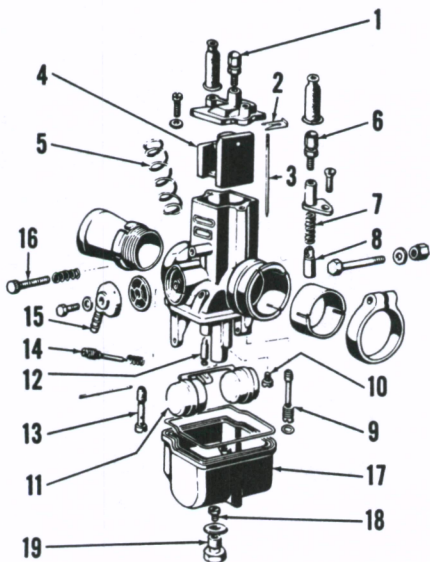


Fig. BE3-1—Exploded view of carburetor used on 650cc Tornado.

- 1. Throttle cable adjuster
- 2. Jet needle clip
- 3. Jet needle
- 4. Throttle slide
- 5. Throttle return spring
- 6. Start cable adjuster
- 7. Start return spring
- 8. Starter plunger
- 9. Starter jet
- 10. Idle jet
- 11. Floats
- 12. Fuel valve assembly
- 13. Needle jet
- 14. Pilot air screw
- 15. Fuel inlet fitting
- 16. Idle speed adjuster
- 17. Float chamber
- 18. Main jet
- 19. Main jet holder

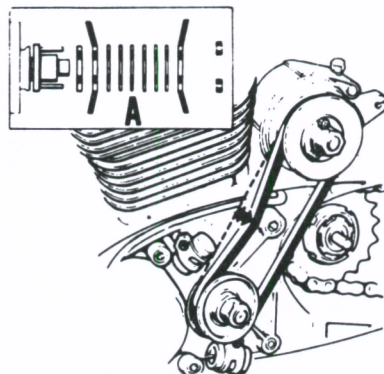


Fig. BE3-2—View of generator drive used. Inset (A) shows stacking order of pulley wheel and spacers.

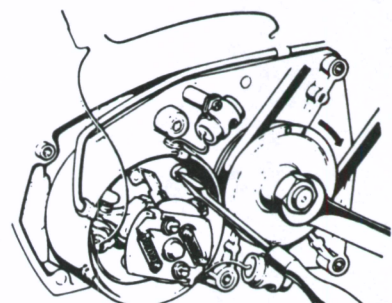


Fig. BE3-3—Moving entire breaker point base plate will change timing of both cylinders. "O" mark on flywheel indicates TDC position.

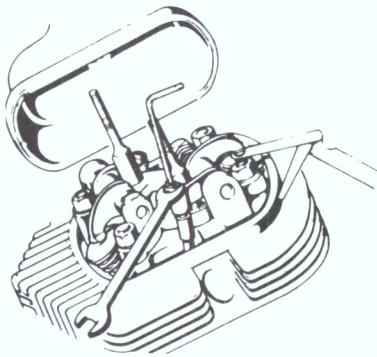


Fig. BE3-4—Loosen lock nut and use a 5mm Allen wrench to adjust valve clearance. Engine should be cold to perform clearance check.

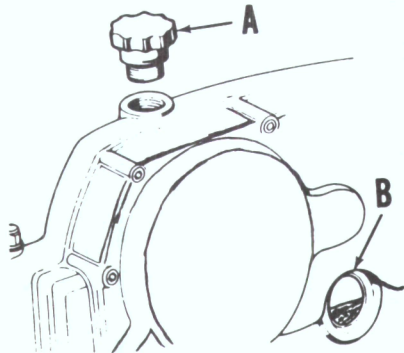


Fig. BE3-5—Remove plug (A) and fill crankcase with oil to level of gauge (B).

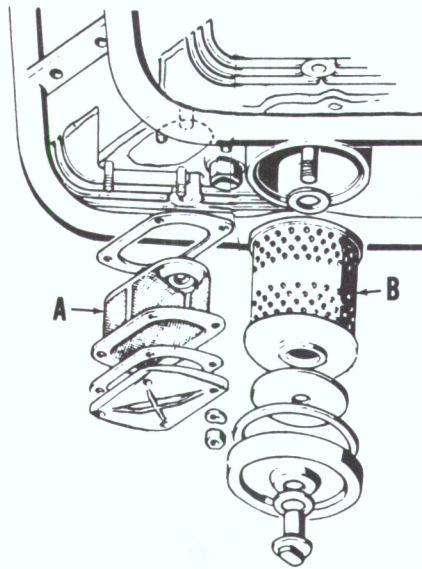


Fig. BE3-6—Renew paper oil filter (B) at every third oil change.

to 0.10mm (0.004 inch) clearance and exhaust valve to 0.13mm (0.005 inch) clearance (Fig. BE3-4), turn crankshaft one full turn and adjust valves for the other cylinder.

LUBRICATION. Crankcase lubricant (SAE 40 in summer and SAE 30 in winter) should be maintained at level of sight glass (B—Fig. BE3-5) at all

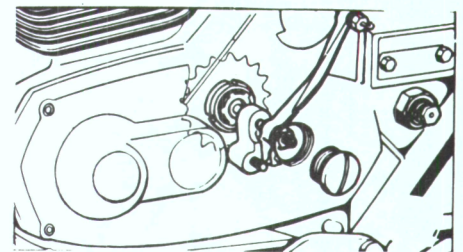


Fig. BE 3-8—Clutch adjusting screw is located behind plug in left side cover.

times. Crankcase capacity is approximately 2.6 qt. Oil should be drained and renewed every 1600 miles. Oil screen (A—Fig. BE3-6) should be removed and cleaned every oil change; oil filter (B) should be renewed every third oil change.

CLUTCH CONTROLS. Clutch may be adjusted at cable end on handle bar or on control arm adjuster (Fig. BE3-8).

SUSPENSION. Front suspension units contain 210cc of hydraulic fluid each. Fluid should be drained and renewed every 6000 miles.

Rear suspension units are adjustable to three different settings of varying firmness. Both units should be adjusted to the same setting. Rear suspension units are not repairable and should be renewed if leaking or damaged.

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