YAMAHA

XS650D

Supplementary Service Manual

IT3-28197-10

FOREWORD

This Supplementary Service Manual for XS650D has been published to supplement the Service Manual for the XS650B and includes changes in specifications and addition to the data.
For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the Service Manual for the XS650B and the Supplementary Service Manual for the XS650C.

NOTICE

This manual has been written by Yamaha Motor Company for use by Authorized Yai. aha Dealers and their qualified mechanics. In light of this purpose it has been assumed that certain basic mechanical precepts and procedures inherent to our product are already known and understood by the reader. Without such basic knowledge, repaires or service to this model may render the machine unsafe, and for this reason we must advise that all repairs and/or service be performed by an Authorized Yamaha Dealer who is in possession of the requisite basic product knowledge.
The Research, Engineering, and Overseas Service Departments of Yamaha are continually striving to further improve all models manufactured by the company. Modifications are therefore inevitable and changes in specifications or procedures will be forwarded to all Authorized Yamaha Dealers and will, where applicable, appear in future editions of this manual.

YAMAHA XS650D
SUPPLEMENTARY SERVICE MANUAL
1st EDITION, JULY 1976
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YAMAHA MOTOR COMPANY LTD., JAPAN
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SPECIFICATIONS

General specifications

Model	XS650D
Dimensions:	
Overall length	2,180 mm (85.8 in)
Overall width	835 mm (32.9 in)
Overall height	1,160 mm (45.7 in)
Wheelbase	1,435 mm (56.5 in)
Min. ground clearance	150 mm (5.9 in)
Weight:	
Net	212 kg (467 lb)
Performance:	
Minimum turning radius	2,500 mm (98.4 in)
Climbing ability	26°
Engine:	
Type	4-stroke, Air-cooled, OHC
Engine model	447
Cylinder	Two in cylinder
Bore and stroke	75 mm × 74 mm (2.953 in × 2.913 in)
Displacement	653 cc (39.8 cu.in)
Compression ratio	8.4 : 1
Compression pressure	9.0 ~ 11.0 kg/cm² (128 ~ 156 psi) at 500 rpm
Valve timing	Intake BTDC 36° (open) ABDC 68° (close) Exhaust BBDC 68° (open) ATDC 36° (close)
Valve clearance (cold)	Intake 0.05 mm (0.002 in) Exhaust 0.15 mm (0.006 in)
Lubrication:	
Lubrication system	Pressure lubricated, wet sump
Delivery pump type	Trochoid pump
Sump capacity	2,500 cc (2.64 US.qt)
Recommended lubricant	Yamalube 4-cycle oil or 20W/40 "SE" motor oil
Carburetor:	
Type	BS38 × 2
Manufacturer	MIKUNI
Main jet	#122.5
Needle jet	Z-8
Pilot jet	#25
Starter jet	No. 1: #80 No. 2: 0.5
Jet needle/Clip position	4M1-3
Float level	25.0 ± 2.5 mm (0.98 ± 0.098 in)
Pilot screw	1-1/4 turns out
Air jet, main	ϕ1.0
Air jet, pilot	ϕ1.4
Cutaway (Throttle valve)	#120
Idling engine speed	1,200 ± 50 rpm
Air cleaner:	Dry foam rubber
Clutch:	
Type	Wet, multi-disc
Clutch spring free length	34.6 mm (1.362 in)
Wear limit	33.6 mm (1.323 in)
Spring rate	2.6 kg/mm (145.6 lb/in)
Friction plate thickness	3.0 mm (0.118 in)
Wear limit	2.7 mm (0.106 in)
Warp. limit	0.05 mm (0.002 in)

Model	XS650D
Starter motor:	
Manufacturer	HITACHI
Type	S108-35
Field coil resistance	0.04Ω ± 10% (20°C)
Armature winding resistance	0.0067Ω ± 10% (20°C)
Brush size/Q'ty	16 mm (0.63 in)/2
Wear limit	4 mm (0.158 in)
Spring pressure	800 g (1.764 lb)
Commutator diameter	33 mm (1.299 in)
Wear limit	31 mm (1.220 in)
Mica undercut	0.7 mm (0.028 in)
Min. limit	0.2 mm (0.008 in)
Generator:	
Charging method	Regulated A.C. Generator
Manufacturer	HITACHI
Model	LD115-02
Max. output	14V 11A/2,000 rpm
Rotor coil resistance	5.25Ω ± 10%
Stator coil resistance	0.46Ω ± 10%
Brush spring pressure	350 g ± 15% (0.772 ± 15%)
Brush size/Q'ty	14.5 mm (0.571 in)/2
Regulator:	
Manufacturer	HITACHI
Model	TLIZ-80
No-load voltage adjustment	14.5 ± 0.5V/3,000 rpm
Yoke gap	0.9 mm (0.035 in)
Core gap	0.6 ~ 1.0 mm (0.024 ~ 0.039 in)
Point gap	0.3 ~ 0.4 mm (0.012 ~ 0.016 in)
Voltage coil resistance	10Ω ± 10% (20°C)
Rectifier:	
Manufacturer	HITACHI
Model	SB6B-17
Description (Type)	Full wave
Material	Silicon
Resistance	9 ~ 10Ω
Reverse resistance	∞
Starter switch:	
Manufacturer	HITACHI
Model	A104-70
Winding resistance	3.5Ω ± 10% (20°C)
Actuating voltage, ON	6.5V
OFF	4.0V
Core gap	1.5 ~ 1.88 mm (0.059 ~ 0.074 in)
Point gap	0.88 ~ 1.11 mm (0.035 ~ 0.044 in)
Starter safety relay:	
Cut out voltage	2.5V
Type	AS1-07
Core gap	0.5 ~ 0.6 mm (0.020 ~ 0.024 in)
Primary drive:	
Type	Spur gear
Reduction ratio	72/27 (2.666)
Transmission:	
Type	Constant mesh, 5-speed
Reduction ratio 1st	32/13 (2.461)
2nd	27/17 (1.588)

Model	XS650D
3rd	26/20 (1.300)
4th	23/21 (1.095)
5th	22/23 (0.956)
Secondary drive:	
Type	Single row chain
No. of links	103L + Joint
Size/Manufacturer	DK530HDS/DAIDO
Reduction ratio	34/17 (2.000)
Chassis:	
Frame type	Tubular steel double cradle
Fuel tank capacity	15.0 lit (3.9 US.gal)
Front suspension system	Telescopic fork
Fork travel	150 mm (5.906 in)
Fork oil quantity	168 ± 4 cc (5.68 ± 0.135 oz)
Fork oil grade	Yamaha Fork Oil 20 Wt.
Fork dimensions	
Caster	27°
Trail	115 mm (4.53 in)
Rear suspension system	Swing arm
Suspension travel	80 mm (3.15 in)
Front wheel, rim size	1.85-19/Aluminum
tire size	3.50H19-4PR
inflation pressure	1.6 kg/cm² (23 psi): Normal riding 2.0 kg/cm² (28 psi): Continues high speed riding
Rear wheel, rim size	2.15-18/Aluminum
tire size	4.00H18-4PR
inflation pressure	2.0 kg/cm² (28 psi): Normal riding 2.3 kg/cm² (33 psi): Continues high speed riding
Braking system:	
Operation system, front	Right hand operation
Brake type	Hydraulic disc brake
Operation system, rear	Right foot operation
Brake type	Drum brake
Generator:	
Type	A.C. Generator
Model	LD115-02
Manufacturer	HITACHI
Maximum output	14V-11A/2,000 rpm
Starter motor:	
Manufacturer	HITACHI
Type	S108-35
Output	0.5KW
Rectifier:	
Model	SB6B-17
Manufacturer	HITACHI
Regulator:	
Model	TLIZ-80
Manufacturer	HITACHI
No load voltage adjustment	14.5 ± 0.5V/3,000 rpm
Ignition system:	
Type	Battery ignition
Ignition timing	15 ± 2 degree retarded
Breaker point gap	0.35 ± 0.05 mm (0.014 ± 0.002 in)
Spark plug, manufacturer	NGK
heat range	BP-7ES

Model	XS650D
Ignition coil, manufacturer	HITACHI
Battery: Model/Manufacturer Capacity	 YB14L-A2/YUASA 12V, 14AH
Lighting system: Headlight Taillight Stoplight Flasher light License light Meter light Flasher pilot light High beam indicator Neutral light Headlight outage Brake lining warning light Stoplight outage	 12V, 50W/40W 12V, 8W 12V, 27W 12V, 27W × 4 12V, 8W 12V, 3.4W × 4 12V, 3.4W × 2 12V, 3.4W 12V, 3.4W 12V, 3.4W 12V, 3.4W 12V, 3.4W

Maintenance specifications

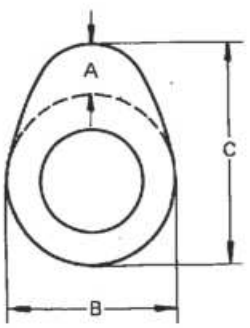
Cylinder head bolt tightening torque:	
M10	3.0 ~ 3.5 m-kg (21.7 ~ 25.3 ft-lb)
M8	2.1 ~ 2.5 m-kg (15.2 ~ 18.1 ft-lb)
M6	1.0 ~ 1.5 m-kg (7.2 ~ 10.8 ft-lb)

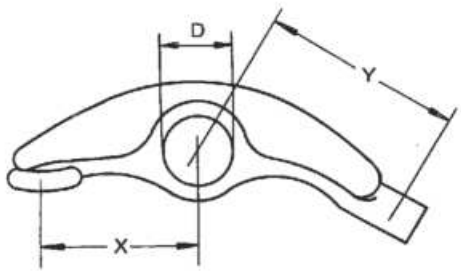
Camshaft

Dimensions		Standard size	Wear limit
Intake	A	7.991 mm (0.315 in)	—
	B	32.24 ± 0.05 mm (1.269 ± 0.0020 in)	32.09 mm (1.263 in)
	C	39.99 ± 0.05 mm (1.574 ± 0.0020 in)	39.84 mm (1.568 in)
Exhaust	A	8.030 mm (0.315 in)	—
	B	32.30 ± 0.05 mm (1.272 ± 0.0020 in)	32.15 mm (1.266 in)
	C	40.04 ± 0.05 mm (1.576 ± 0.0020 in)	39.88 mm (1.570 in)

Rocker arms

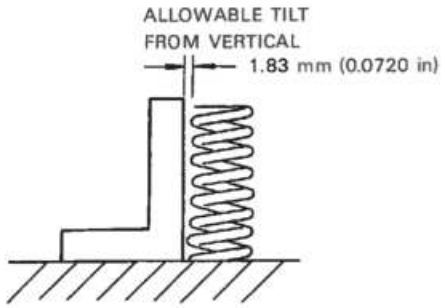
Dimensions	Standard size	Wear limit
D_1: Arm I.D.	$15\ ^{+0.018}_{-0}$ mm (0.591 $^{+0.0007}_{-0}$ in)	—
D_2: Shaft O.D.	$15\ ^{-0.009}_{-0.015}$ mm (0.591 $^{-0.00035}_{-0.00059}$ in)	—
Clearance	0.009 mm (0.00035 in) (Min.)	0.33 mm (0.0013 in) (Max.)
Lift ratio	X : Y = 40 : 48.41 mm(1.575 : 1.906 in)	

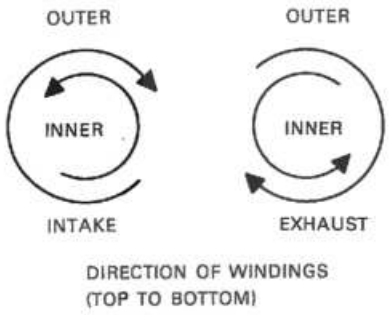




Valve springs

	Inner		Outer	
	Intake	Exhaust	Intake	Exhaust
Free length	42.0 mm (1.654 in)		42.55 mm (1.675 in)	
Spring rate	K_1 = 1.43 kg/mm (80.10 lb/in) K_2 = 1.81 kg/mm (101.47 lb/in)		K_1 = 3.20 kg/mm (179.2 lb/in) K_2 = 4.18 kg/mm (234.1 lb/in)	
Installed length (Valve closed)	35.0 mm (1.378 in)		37.0 mm (1.457 in)	
Installed pressure (Valve closed)	10.0 ± 0.7 kg (22.05 ± 1.54 lb)		17.7 ± 1.25 kg (39.03 ± 2.76 lb)	
Compressed length (Valve open)	25.5 mm (1.004 in)		27.5 mm (1.083 in)	
Compressed pressure (Valve open)	27.2 ± 1.9 kg (59.98 ± 4.19 lb)		57.5 ± 4.0 kg (126.79 ± 8.82 lb)	
Wire diameter	2.9 mm (0.114 in)		4.2 mm (0.165 in)	
Number of winding	6.0 turns		4.25 turns	
Winding O.D.	19.4 mm (0.764 in)		32.6 mm (1.284 in)	



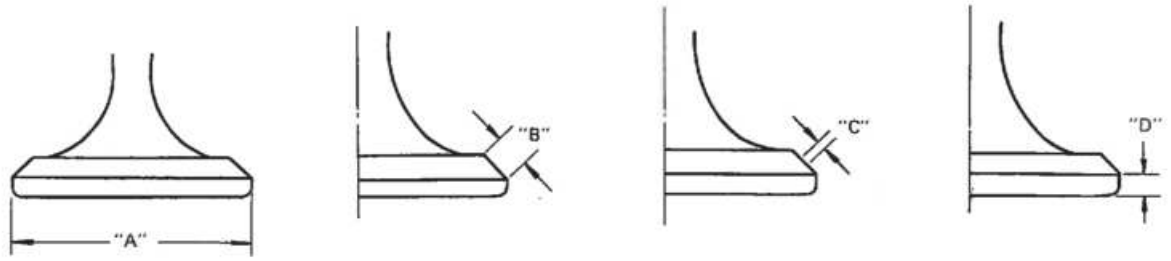


Valves — Intake

	Dimensions	
	Standard	Wear limit
Clearance (Cold engine)	0.05 mm (0.002 in)	—
"A" head diameter	41 mm (1.614 in)	—
"B" face width	2.1 mm (0.083 in)	—
"C" seat width	1.3 mm (0.051 in)	2.0 mm (0.079 in)
"D" margin thickness	1.3 mm (0.051 in)	1.1 mm (0.0433 in)
Stem diameter (O.D.)	$8\ ^{-0.010}_{-0.025}$ mm ($0.315\ ^{-0.00039}_{-0.00098}$ in)	—
Guide diameter (I.D.)	$8\ ^{+0.019}_{+0.010}$ mm ($0.315\ ^{+0.00075}_{+0.00039}$ in)	—
Stem-to-guide clearance	0.020 ~ 0.044 mm (0.00079 ~ 0.0017 in)	0.10 mm (0.0039 in)

Valves — Exhaust

	Dimensions	
	Standard	Wear limit
Clearance (Cold engine)	0.15 mm (0.0059 in)	—
"A" head diameter	35 mm (1.378 in)	—
"B" face width	2.1 mm (0.083 in)	—
"C" seat width	1.3 mm (0.051 in)	2.0 mm (0.079 in)
"D" margin thickness	1.3 mm (0.051in)	1.1 mm (0.0433 in)
Stem diameter (O.D.)	$8\ ^{-0.025}_{-0.040}$ mm ($0.315\ ^{-0.00098}_{-0.00158}$ in)	
Guide diameter (I.D.)	$8\ ^{+0.019}_{+0.010}$ mm ($0.315\ ^{+0.00075}_{+0.00039}$ in)	
Stem-to-guide clearance	0.035 ~ 0.059 mm (0.0014 ~ 0.0023 in)	0.12 mm (0.0047 in)



Cylinder

Cylinder	Standard bore size	$75\ ^{+0.020}_{+0}$ mm ($2.953\ ^{+0.00080}_{+0}$ in)
	Wear limit	75.1 mm (2.957 in)
	Taper limit	0.05 mm (0.0020 in)
Piston	Nominal clearance	0.05 ~ 0.055 mm (0.0020 ~ 0.0022 in)
	Wear limit	0.1 mm (0.0040 in)

Ring groove width

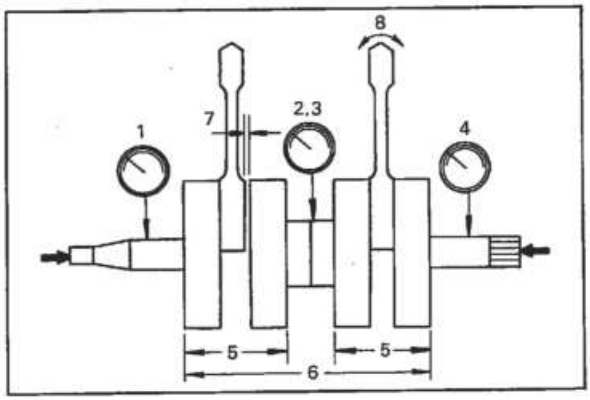
	Top	2nd	3rd
Nominal	1.2 mm (0.047 in)	1.5 mm (0.059 in)	2.8 mm (0.110 in)
Wear limit	1.25 mm (0.049 in)	1.55 mm (0.061 in)	2.85 mm (0.112 in)

Piston ring

		Top	2nd	3rd
Ring end gap, installed	Nominal	0.2 ~ 0.4 mm (0.0080 ~ 0.016 in)	0.2 ~ 0.4 mm (0.0080 ~ 0.016 in)	0.3 ~ 0.9 mm (0.012 ~ 0.035 in)
	Wear limit	1.0 mm (0.039 in)	1.0 mm (0.039 in)	1.5 mm (0.059 in)
Ring end gap, installed	Nominal	8.5 mm (0.335 in)	11.0 mm (0.433 in)	—
	Wear limit	—	—	—
Side clearance	Nominal	0.04 ~ 0.08 mm (0.0016 ~ 0.0032 in)	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)	−0.030 ~ +0.010 mm (−0.0012~+0.00039 in)
	Wear limit	0.15 mm (0.0059 in)	0.15 mm (0.0059 in)	—

Crankshaft

Deflection tolerance				Flywheel width		Rod clearance			
						Axial		Side	
1	2	3	4	5	6	New	Max.	Max.	Min.
0.03 mm (0.0012 in)	0.05 mm (0.0020 in)	0.05 mm (0.0020 in)	0.03 mm (0.0012 in)	$66\ ^{-0.05}_{-0.10}$ mm ($2.598\ ^{-0.0020}_{-0.0039}$ in)	$186\ ^{0}_{-0.03}$ mm ($7.323\ ^{0}_{-0.0012}$ in)	0.8 ~ 1.0 mm (0.0325 ~ 0.0394 in)	2.0 mm (0.079 in)	0.6 mm (0.024 in)	0.3 mm (0.012 in)



Suspension

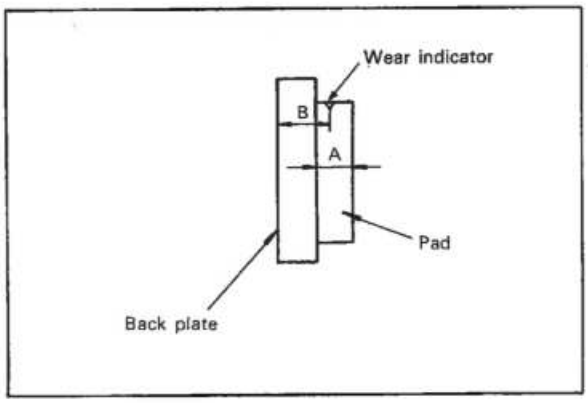
	Front	Rear
Type	Telescopic fork	Swing arm
Travel	150 mm (5.906 in)	80 mm (3.150 in)
Spring length free	470.5 mm (18.52 in)	226 mm (8.90 in)
Spring length installed	445.5 mm (17.54 in)	201 mm (7.913 in)
Spring constant	K_1 = 0.48 kg/mm (0 ~ 100 mm) (26.9 lb/in (0 ~ 3.937 in)) K_2 = 0.65 kg/mm (100 ~ 150 mm) (36.4 lb/in (3.937~5.906 in))	K_1 = 1.714 kg/mm (0 ~ 45 mm) (96.0 lb/in (0 ~ 1.772 in)) K_2 = 2.244 kg/mm (45 ~ 80 mm) (125.7 lb/in (1.772~3.150 in))
Number of coils	65.25 turns	14.75 turns
Diameter of coil	24.3 mm (0.957 in)	60.5 mm (2.382 in)
Diameter of wire	4.0 mm (0.158 in)	7.5 mm (0.295 in)
Caster	27°	—
Trail	115 mm (4.53 in)	—
Rear swing arm nominal length	—	461 mm (18.150 in)

Wheels/Tires

	Front	Rear
Manufacturer	B.S. or YOKOHAMA	B.S. or YOKOHAMA
Size/tread type	3.50H19-4PR/S21F2 or Y-986	4.00H18-4PR/S21R2 or Y-987
Tire pressure Normal riding With passenger High speed riding	 1.6 kg/cm² (23 psi) 2.0 kg/cm² (28 psi) 2.0 kg/cm² (28 psi)	 2.0 kg/cm² (28 psi) 2.3 kg/cm² (33 psi) 2.3 kg/cm² (33 psi)
Rim size/material/type	1.85-19/Aluminum/H type	2.15-18/Aluminum/H type
Spoke diameter	3.5 mm (0.138 in)	3.5 mm (0.138 in)
Spoke length (Inside)	187.0 mm (7.362 in) 18 pcs.	150.5 mm (5.925 in) 18 pcs.
Spoke length (Outside)	186.5 mm (7.343 in) 18 pcs.	150.0 mm (5.906 in) 18 pcs.
Runout limits (Vertical)	2 mm (0.079 in)	2 mm (0.079 in)
Runout limits (Horizontal)	2 mm (0.079 in)	2 mm (0.079 in)

Brakes

	Front	Rear
Type	Disc brake	Drum brake
Actuating method	Hydraulic	Link rod
Brake drum I.D.	—	180 mm (7.087 in)
Lining length × width = area/Quant.	—	172 × 30 mm = 5,160 mm²/2 pcs. (6.772 × 1.181 in = 7.998 in²/2 pcs.)
Pad length × width = area/Quant.	51 × 38 mm = 1,800 mm²/2 pcs. (2.008 × 1.496 in = 2.790 in²/2 pcs.)	—
Pad (lining) thickness/ wear limit	5.5 mm/6.0 mm (0.217 in/0.236 in)	4 mm/2 mm (0.158 in/0.079 in)
Disc diameter/thickness/ wear limit	298 mm/7.0 mm/6.5 mm (11.73 in/0.276 in/0.256 in)	—



A : Pad thickness
B : Wear limit

TORQUE SPECIFICATIONS

Part to be tightened	Thread dia	Tightening torque
Valve clearance adjusting nut	8 mm	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
Cylinder head tightening nut	10 mm	3.0 ~ 3.5 m-kg (22.0 ~ 25.0 ft-lb)
bolt	8 mm	2.1 ~ 2.5 m-kg (15.2 ~ 18.0 ft-lb)
	6 mm	1.0 ~ 1.5 m-kg (7.2 ~ 10.8 ft-lb)
stud bolt	10 mm	1.5 ~ 2.0 m-kg (10.8 ~ 14.5 ft-lb)
Strainer cover tightening bolt	6 mm	0.8 ~ 1.0 m-kg (5.8 ~ 7.2 ft-lb)
Delivery pipe holding banjo bolt	10 mm	2.0 ~ 2.2 m-kg (14.5 ~ 16.0 ft-lb)
	14 mm	2.5 ~ 3.0 m-kg (18.0 ~ 22.0 ft-lb)
Drain plug	30 mm	3.5 ~ 4.0 m-kg (25.0 ~ 29.0 ft-lb)
Pump cover tightening screw	6 mm	0.7 ~ 0.9 m-kg (5.1 ~ 6.5 ft-lb)
Kick crank holding bolt	8 mm	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
A.C. Generator (rotor) securing nut	12 mm	5.0 ~ 8.0 m-kg (36.2 ~ 58.0 ft-lb)
A.C. Generator (stator) securing screw	6 mm	0.7 ~ 0.9 m-kg (5.1 ~ 6.5 ft-lb)
Clutch boss securing nut	18 mm	5.0 ~ 8.0 m-kg (36.2 ~ 58.0 ft-lb)
Drive sprocket securing nut	22 mm	10.0 ~ 12.0 m-kg (72.3 ~ 86.8 ft-lb)
Crankcase tightening stud bolt	8 mm	1st 1.0 m-kg (7.2 ft-lb) 2nd 1.5 m-kg (10.8 ft-lb) 3rd 2.0 m-kg (14.5 ft-lb)
Crankcase tightening stud nut	8 mm	1st 1.0 m-kg (7.2 ft-lb) 2nd 1.5 m-kg (10.8 ft-lb) 3rd 2.0 m-kg (14.5 ft-lb)
Primary drive gear securing nut	14 mm	8.0 ~ 10.0 m-kg (58.0 ~ 82.3 ft-lb)
Spark plug	14 mm	1.5 ~ 2.5 m-kg (10.8 ~ 18.1 ft-lb)
Breaker shaft securing nut	6 mm	0.8 ~ 1.0 m-kg (5.8 ~ 7.2 ft-lb)
Front wheel axle and nut	14 mm	7.0 ~ 10.0 m-kg (50.6 ~ 72.3 ft-lb)
Front fender stay and front fork	8 mm	0.8 ~ 1.25 m-kg (5.8 ~ 9.0 ft-lb)
Crown handle and inner tube	8 mm	0.8 ~ 1.25 m-kg (5.8 ~ 9.0 ft-lb)
Crown handle and steering shaft	8 mm	0.8 ~ 1.25 m-kg (5.8 ~ 9.0 ft-lb)
Crown handle and steering shaft	14 mm	4.2 ~ 6.5 m-kg (30.4 ~ 47.0 ft-lb)
Crown handle and handle holder upper	8 mm	1.8 ~ 2.5 m-kg (13.0 ~ 18.0 ft-lb)
Front flasher and headlight	8 mm	0.8 ~ 1.25 m-kg (5.8 ~ 9.0 ft-lb)
Caliper and bleed screw	8 mm	0.4 ~ 0.7 m-kg (2.9 ~ 5.1 ft-lb)
Master cylinder and brake hose	10 mm	2.3 ~ 2.8 m-kg (16.6 ~ 20.3 ft-lb)
Caliper and brake hose	10 mm	2.3 ~ 2.8 m-kg (16.6 ~ 20.3 ft-lb)
Caliper and front fork	10 mm	4.0 ~ 5.0 m-kg (28.9 ~ 36.2 ft-lb)
Caliper and support bracket	8 mm	1.5 ~ 2.0 m-kg (10.8 ~ 14.5 ft-lb)
Disc brake and hub	8 mm	1.7 ~ 2.2 m-kg (12.3 ~ 15.9 ft-lb)
Stop switch and joint	10 mm	1.5 ~ 2.0 m-kg (10.8 ~ 14.5 ft-lb)
Engine mounting Upper	8 mm	1.4 ~ 2.2 m-kg (10.1 ~ 16.0 ft-lb)
Upper	10 mm	2.3 ~ 3.7 m-kg (16.6 ~ 26.8 ft-lb)
Front	10 mm	3.5 ~ 5.6 m-kg (25.0 ~ 40.5 ft-lb)
Rear	10 mm	3.1 ~ 5.0 m-kg (22.4 ~ 36.2 ft-lb)
Rear lower	10 mm	3.5 ~ 5.6 m-kg (25.0 ~ 40.5 ft-lb)
Lower	10 mm	3.5 ~ 5.6 m-kg (25.0 ~ 40.5 ft-lb)
Pivot shaft and frame	14 mm	5.0 ~ 8.0 m-kg (36.2 ~ 58.0 ft-lb)

Part to be tightened	Thread dia.	Tightening torque
Rear wheel axle and rear arm	18 mm	12.0 ~ 18.0 m-kg (86.8 ~ 130.2 ft-lb)
Tension bar and brake plate	8 mm	1.4 ~ 2.2 m-kg (10.1 ~ 16.0 ft-lb)
Tension bar and rear arm	8 mm	1.4 ~ 2.2 m-kg (10.1 ~ 16.0 ft-lb)
Handle crown and meter bracket	8 mm	1.8 ~ 2.9 m-kg (13.0 ~ 21.0 ft-lb)
Neutral switch and engine	12 mm	1.0 ~ 1.5 m-kg (7.2 ~ 10.8 ft-lb)
Rear arm and rear arm end	8 mm	0.8 ~ 1.25 m-kg (5.8 ~ 9.0 ft-lb)
Axle holder and front fork	8 mm	1.0 ~ 1.7 m-kg (7.2 ~ 12.3 ft-lb)
Rear shock absorber Upper	10 mm	2.3 ~ 3.7 m-kg (16.6 ~ 26.8 ft-lb)
Rear shock absorber Lower	10 mm	3.0 ~ 4.8 m-kg (22.0 ~ 34.7 ft-lb)

SERVICE CHART

A. Periodic maintenance intervals

Unit: km (mile)

Item	Remarks	Initial				Thereafter every		
		400 (250)	800 (500)	1,600 (1,000)	3,200 (2,000)	1,600 (1,000)	3,200 (2,000)	6,400 (4,000)
Cylinder	Check compression				○			○
Valves	Check/Adjust valve clearance			○	○			○
Spark plugs	Inspect/Clean or replace as required	○			○		○	
Air filter	Dry type — Clean/Replace as required			○		○		
Carburetor	Check operation/Adjust as required		○		○		○	
Brake system	Check/Adjust as required — Repair as required		○	○		○		
Wheel and tires	Check pressure/Wear/Balance	○	○	○		○		
Fuel petcocks	Clean/Flush as required	○		○			○	
Battery	Top-up/Check specific gravity and breather pipe	○	○	○	○	○		
Ignition timing	Adjust/Clean or replace parts as required		○	○	○		○	
Lights/Signals	Check operation/Replace as required	○	○	○	○	○		
Fittings/Fasteners	Tighten before each trip and/or	○	○	○	○	○		

B. Lubrication intervals

Unit: km (mile)

Item	Remarks	Type	Initial				Thereafter every		
			400 (250)	800 (500)	1,600 (1,000)	3,200 (2,000)	1,600 (1,000)	3,200 (2,000)	6,400 (4,000)
Engine/Transmission oil	Replace/Warm engine before draining	YAMALUBE 4-cycle oil or SAE 20W/40 "SE" motor oil	○			○		○	
Drive chain	Lube/Adjust as required	Yamaha chain and cable lube or SAE 10W/30 "SE" motor oil	○	○	○	○	400 (250)		
	Remove/Clean/Lube				○		○		
Brake pedal shaft	Light application	Lithium base grease			○		○		
Change pedal shaft	Light application	Lithium base grease			○		○		

Item	Remarks	Type	Initial				Thereafter every		
			400 (250)	800 (500)	1,600 (1,000)	3,200 (2,000)	1,600 (1,000)	3,200 (2,000)	6,400 (4,000)
Control/Meter cables	Apply thoroughly	Yamaha chain and cable lube or SAE 10W/30 "SE" motor oil			○	○		○	
Throttle grip/ Housing	Apply lightly	Lithium base grease				○		○	
Hydraulic brake fluid reserve	Use new fluid only	DOT No. 3 Brake fluid	check	check	check	check	check		
Oil filter element	See note	—	○			○		○	
Front forks	Drain completely— Check specifications	Yamaha Fork Oil 20 Wt.				○			○
Steering bearings	Inspect thoroughly/ Yearly or	Medium-weight wheel bearing grease							12,800 (8,000)
Speedometer gear housing	Inspect thoroughly/ Pack moderately	Lithium base grease				○			○
Rear arm pivot shafts	Apply grease fully	Medium-weight wheel bearing grease				○			○
Wheel bearings	Do not over/ Yearly or	Medium-weight wheel bearing grease							12,800 (8,000)
Point cam lubrication wicks	Apply very lightly	Light-weight machine oil			○			○	

NOTE:

If the oil filter element is clogged, unfiltered oil will circulate directly to the engine and reduce the service life. Ask your Yamaha dealer to clean the engine oil filter element.

DISC BRAKE

CAUTION:

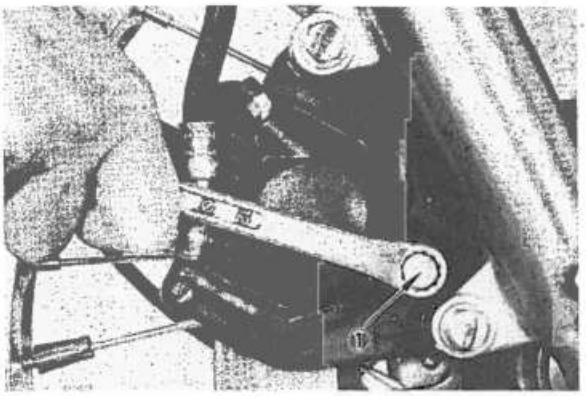
Disc brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic connection in the system is opened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly.

CAUTION:

Do not use solvents on brake internal components. Solvents will cause seals to swell and distort. Use only clean brake fluid for cleaning. Use care with brake fluid. Brake fluid is injurious to eyes and will damage painted surfaces.

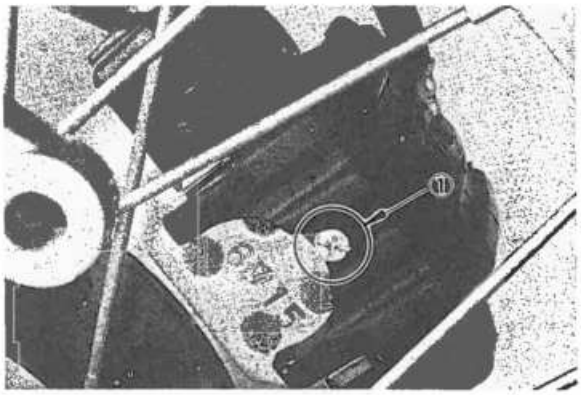
A. Caliper pad replacement

1. It is not necessary to disassemble the brake fluid hoses to replace the brake pads.
2. Remove the caliper support bolt.



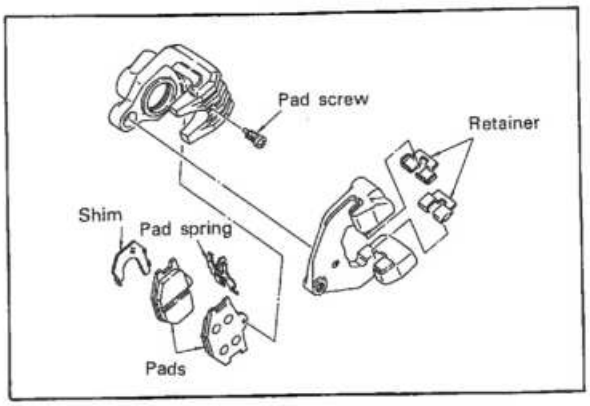
1. Support bolt

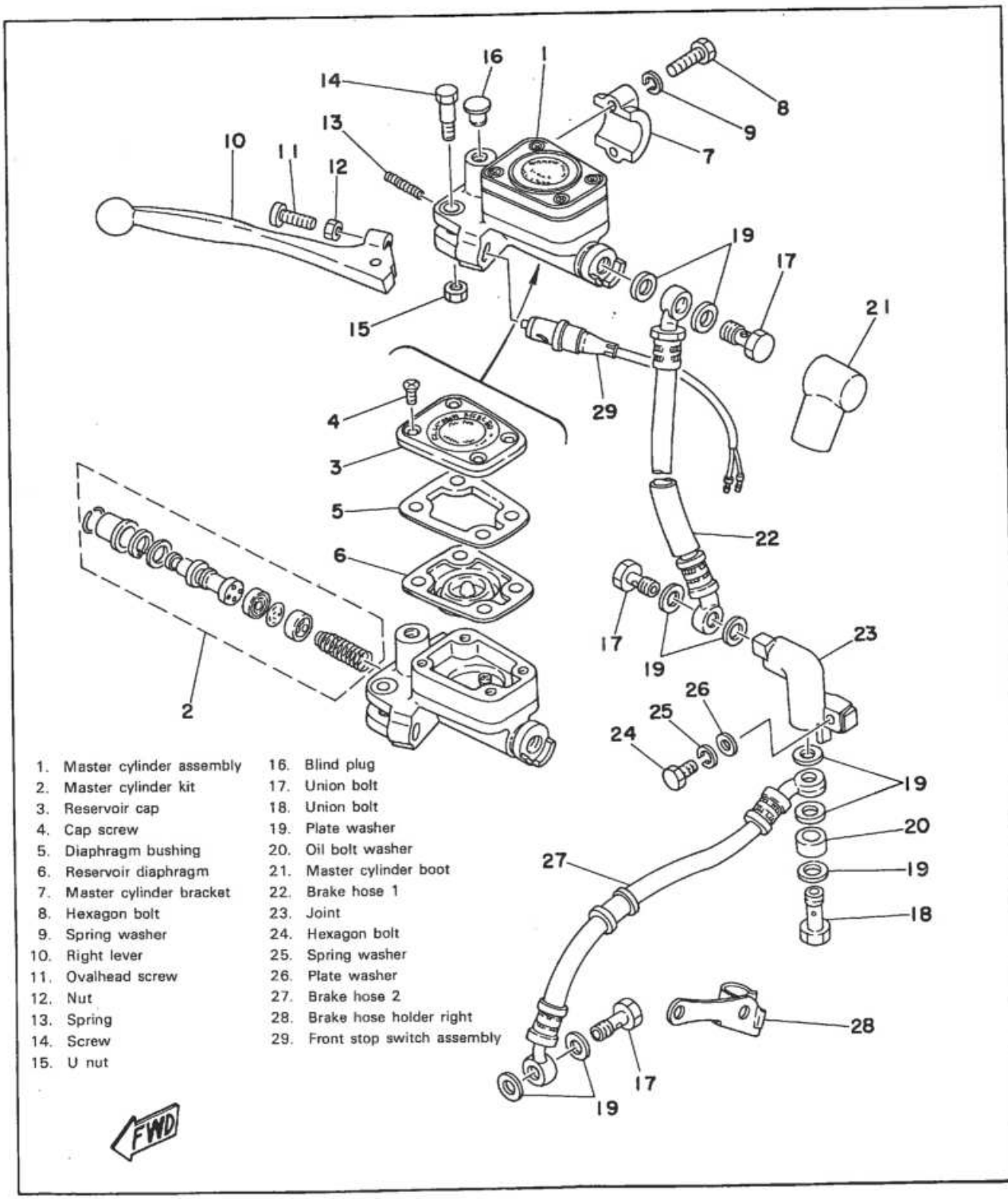
3. Remove the phillips screw that holds the brake pads.

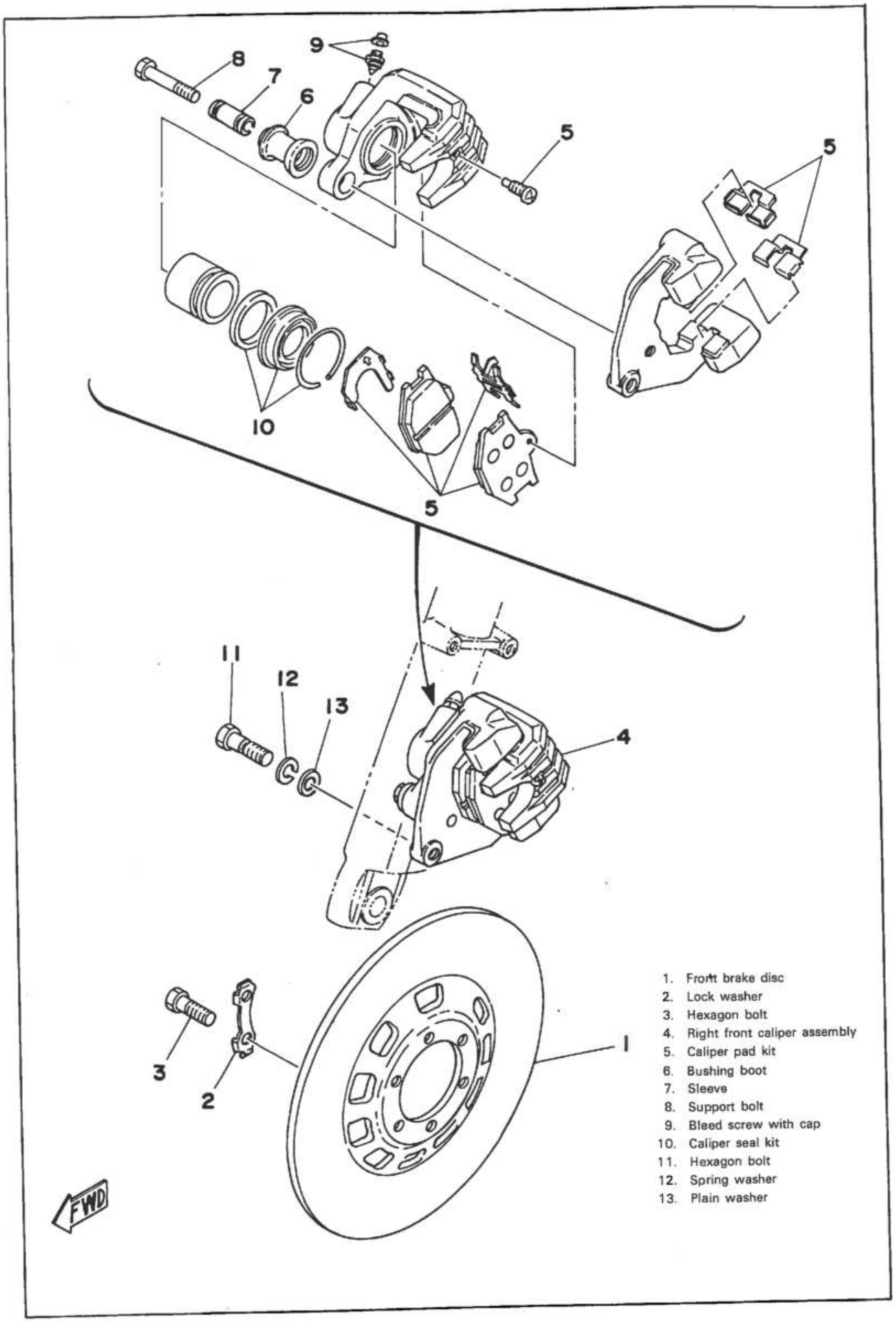


1. Pad screw

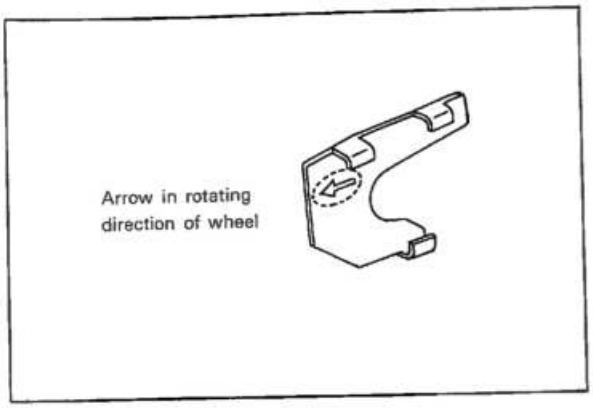
4. Pull caliper cylinder off caliper frame.
5. Install new brake pads. Replace pads as a set. Replace the following when pads are replaced:






1. Front brake disc
2. Lock washer
3. Hexagon bolt
4. Right front caliper assembly
5. Caliper pad kit
6. Bushing boot
7. Sleeve
8. Support bolt
9. Bleed screw with cap
10. Caliper seal kit
11. Hexagon bolt
12. Spring washer
13. Plain washer
FWD

6. Lightly grease the surface of the shim that contacgs the pad. Bend each tab of the shim over the brake pad. The arrow on the shim must be in the turning direction of the wheel.



B. Caliper disassembly

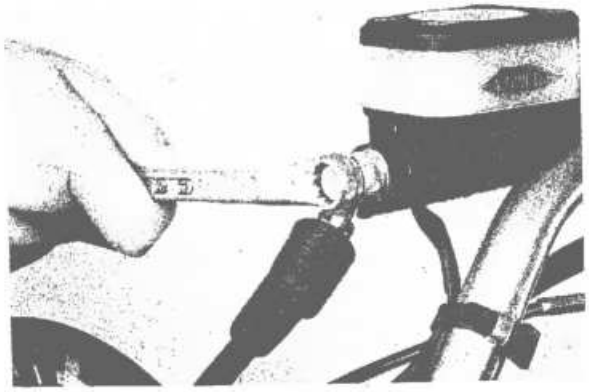
1. Remove caliper brake hose. Allow caliper assembly to drain into a container.
2. Place the open hose end into the container and pump the old fluid out of the master cylinder.
3. Remove caliper support bolt and pad securing screw as in Caliper pad replacement procedure.
4. Remove caliper assembly from caliper frame.
5. Remove retaining ring and dust seal.
6. Carefully force the piston out of the caliper cylinder with compressed air. Never try to pry out the piston.

CAUTION:
Cover the piston with a rag. Use care so that piston does not cause injury as it is expelled from the cylinder.

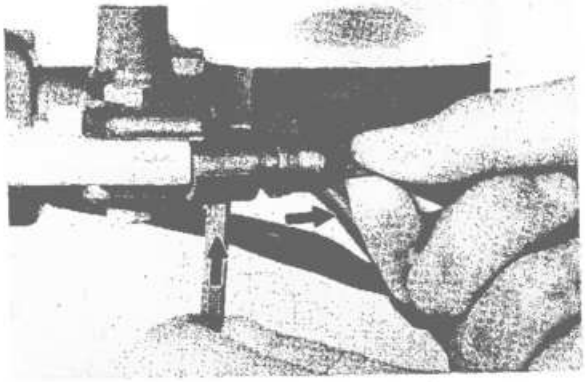
7. Remove piston seal.

C. Master cylinder disassembly

1. Remove brake hose.



2. Remove front brake switch.



3. Remove brake lever and spring.
4. Remove master cylinder from handlebars. Remove cap and drain remaining fluid.

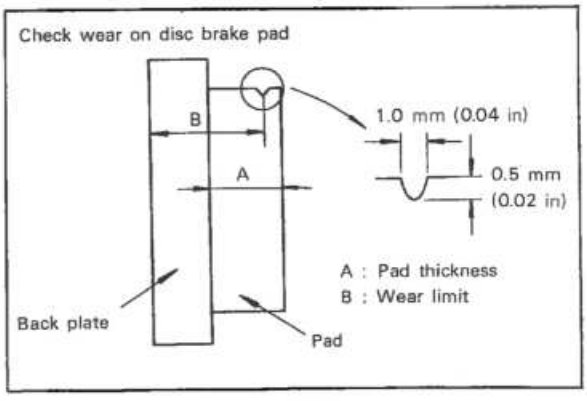
D. Brake inspection and repair

Recommended Brake Component Replacement Schedule:

Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Replace only when brakes are disassembled

1. Replace caliper piston if it is scratched.
2. Replace any brake pad worn beyond limits.
   Replace brake pads as a set.

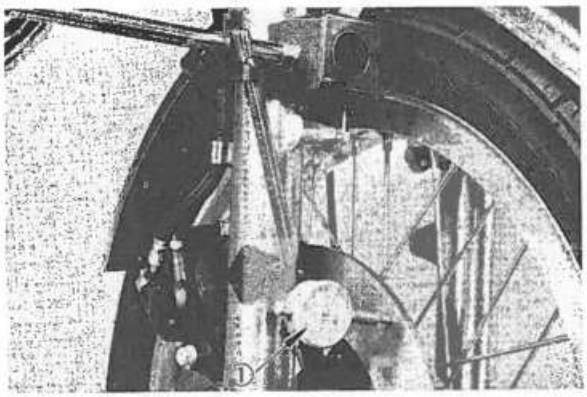




Wear limit:
6.0 mm (0.236 in)

See Caliper Pad Replacement procedure for parts to be replaced when pads are replaced.

3. Replace piston and dust seals if damaged. Replace seals every two years.
4. Inspect master cylinder body. Replace if scratched. Clean all passages with new brake fluid.
5. Inspect brake hoses. Replace every four years or if cracked, frayed or damaged.
6. Check for wear and deflection of disc.



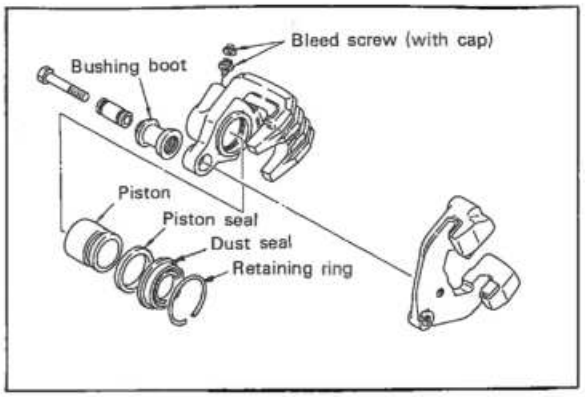
1. Dial gauge

Maximum deflection:
0.15 mm (0.06 in)
Minimum disc thickness:
6.5 mm (0.256 in)

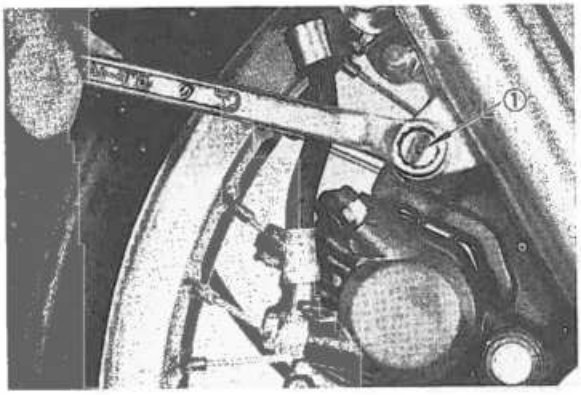
If disc is worn beyond minimum thickness or deflection exceeds specified amount, replace disc.

E. Brake reassembly

1. All internal parts should be cleaned in new brake fluid. Internal parts should be lubricated with brake fluid when installed.
2. Caliper reassembly
Replace the following parts whenever a caliper is disassembled: bleed screw and cap, bushing boot, piston seal, dust seal, retaining ring.



a. Install piston seal and piston. Place caliper cylinder into caliper frame.
b. Install pad spring, shim (with arrow) and retainer. The shim arrow is in the direction of wheel rotation. Install dust seal and clip.
c. Install pad spring and pads.
d. Install support bolt and remount caliper on brackets.



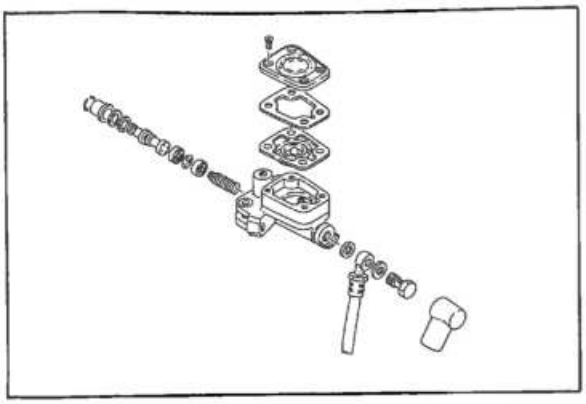
1. Mounting bolt

Support bolt torque:
1.5 ~ 2.0 m-kg
(11.0 ~ 14.5 ft-lb)
Mounting bolt torque:
4.0 ~ 5.0 m-kg
(28.9 ~ 36.2 ft-lb)

3. Attach brake hoses.

Brake hose torque:
2.3 ~ 2.8 m-kg
(16.6 ~ 20.3 ft-lb)

4. Master cylinder reassembly
Reassemble master cylinder as shown in illustration.



Brake hose torque:
(all brake union bolts)
2.3 ~ 2.8 m-kg
(16.6 ~ 20.3 ft-lb)

5. Brake disc assembly
If brake disc has been removed from hub or is loose, tighten bolts. Use new locking washers and bend over locking tabs after bolts are tightened.

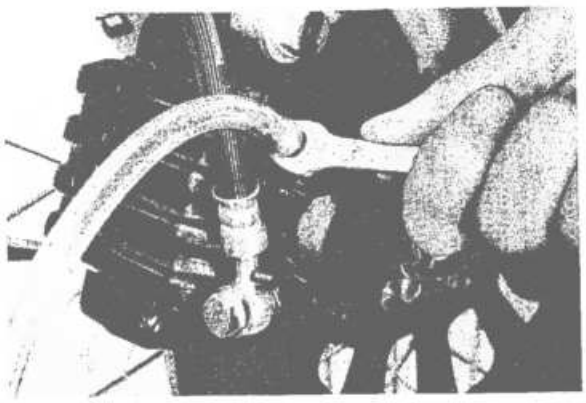
Disc bolt torque:
1.7 ~ 2.2 m-kg
(12.3 ~ 15.9 ft-lb)

6. Air bleeding

CAUTION:

If the brake system is disassembled or if any brake hose has been loosened or removed, the brake system must be bled to remove air from the brake fluid. If the brake fluid level is very low or brake operation is incorrect, bleed the brake system.

a. Add proper brake fluid to the reservoir. Install the diaphragm, being careful not to spill or overflow the reservoir.
b. Connect the clear plastic tube tightly to the caliper bleed screw. Put the end of the tube into a container.



c. Slowly apply the brake lever several times. Pull in lever. Hold lever in "on" position. Loosen bleed screw. Allow the lever to travel slowly toward its limit. When the limit is reached, tighten bleed screw.
d. Continue step "c" until all air bubbles are removed from system.

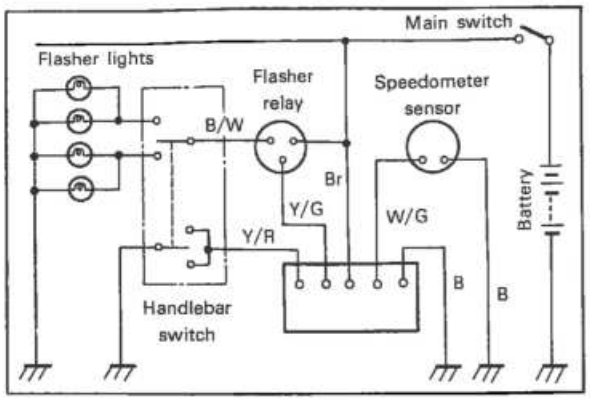
NOTE:

If bleeding is difficult, it may be necessary to let the brake system stabilize for a few hours. Repeat bleeding procedure.

SELF CANCELING FLASHER SYSTEM

1. Description:
The self canceling flasher system turns off the turn signal after a period of time or distance involved in turning or changing lanes. Generally, the signal will cancel after either 10 seconds, or 150 meters (164 yards), whichever is greater. At very low speed, the function is determined by distance; at high speed, it is determined by time. At low speed, especially when changing speeds, the canceling determination is a combination of both time and distance.
2. Operation:
The handlebar switch has three positions: L (left), OFF, and R (right). The switch lever will return to the "OFF" position after being pushed to L or R, but the signal will function. By pushing the lever in, the signal may be cancelled manually.

3. Circuit diagram:



4. Inspection:
   If the flasher self canceling system should become inoperative, proceed as follows:

a. Pull off the 6-pin connector from the flasher canceling unit, and operate the handlebar switch. If the signal operates normally in L, R, and OFF, the following are in good condition:
   1) Flasher unit.
   2) Bulb.
   3) Lighting circuit.
   4) Handlebar switch light circuit.

   If (1) through (4) are in good condition, the following may be faulty:
   1) Flasher canceling unit.
   2) Handlebar switch reset circuit.
   3) Speedometer sensor circuit.

b. Pull off the 6-pin connector from the flasher canceling unit, and connect a tester ($\Omega \times 100$ range) across the white/green and the black lead wires on the wire harness side. Turn the speedometer shaft. If the tester needle swings back and forth, four times between 0 and ∞, the speedometer sensor circuit is in good condition. If not, the sensor or wire harness may be inoperative.

c. Pull off the 6-pin connector from the flasher canceling unit. Check if there is continuity between the yellow/red lead wire on the wire harness side and the chassis.

Flasher switch OFF	∞
Flasher switch L or R	0Ω

   If the tester needle does not swing as indicated above, check the handlebar switch circuit and wire harness.

d. If no defect is found with the above three check-ups and the flasher canceling system is still inoperative, replace the flasher canceling unit.

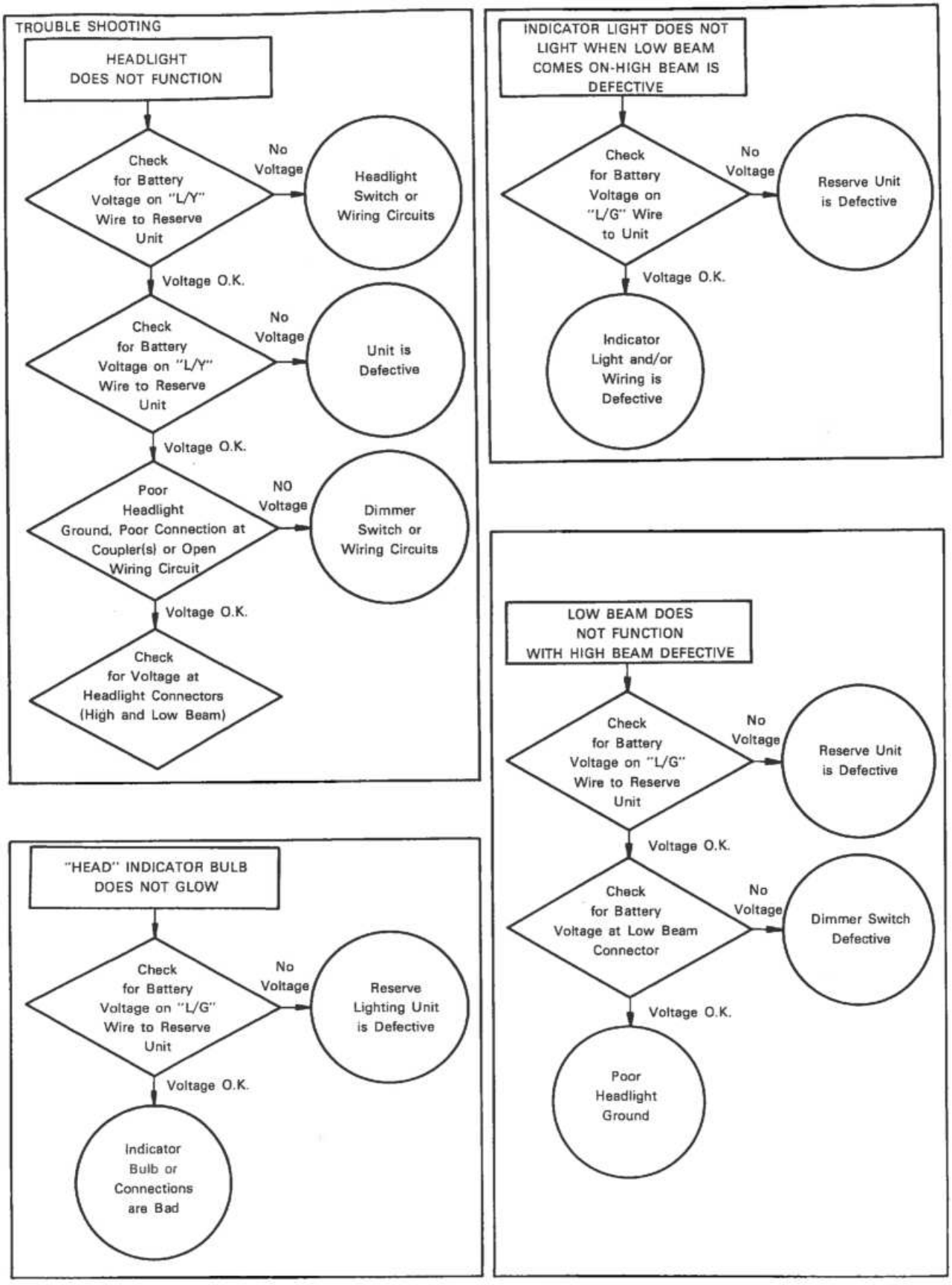
c. If the signal flashers only when the handlebar switch lever is turned to L or R and it turns off immediately when the handlebar switch lever returns to center, replace the flasher canceling unit.

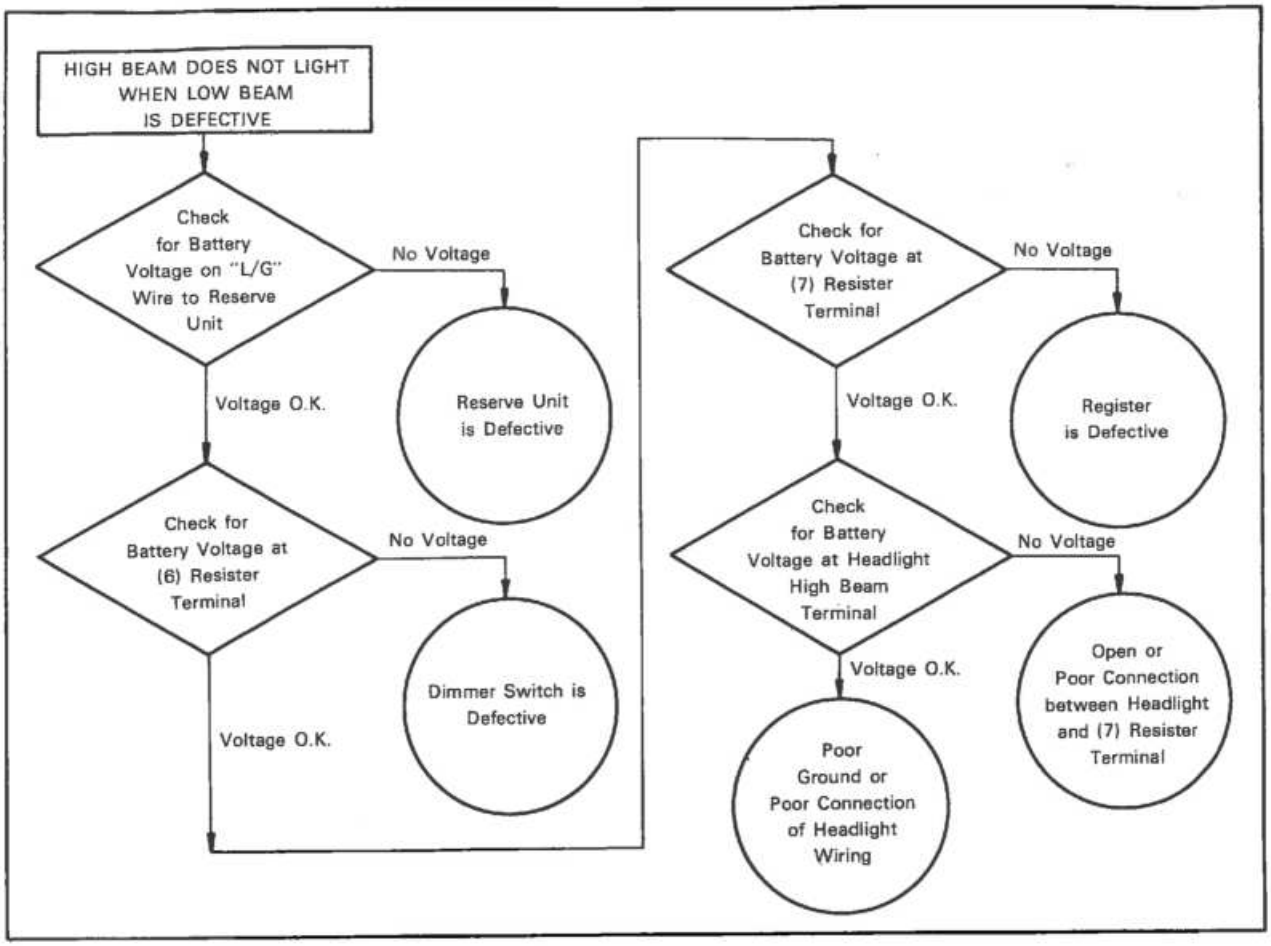
RESERVE LIGHTING SYSTEM

1. Description:
   The reserve lighting system has two functions:
   (1) It notifies the rider that one of the headlight filaments is inoperative, and
   (2) It switches current from the inoperative filament to the remaining functional filament.
   The system is connected to the headlight circuit only. The reserve lighting system unit is located under the seat.

HEADLIGHT CONDITION	"HEAD" INDICATOR LIGHT	RESERVE LIGHTING FUNCTION
Normal	*Comes on (very dim)	.....
High beam faulty	Comes on	Low beam comes on
Low beam faulty	Comes on	High beam comes on at low brilliance

*Can only be seen by removing cover and inspecting bulb.


TROUBLE SHOOTING
HEADLIGHT DOES NOT FUNCTION
Check for Battery Voltage on "L/Y" Wire to Reserve Unit
No Voltage
Headlight Switch or Wiring Circuits
Voltage O.K.
Check for Battery Voltage on "L/Y" Wire to Reserve Unit
No Voltage
Unit is Defective
Voltage O.K.
Poor Headlight Ground, Poor Connection at Coupler(s) or Open Wiring Circuit
NO Voltage
Dimmer Switch or Wiring Circuits
Voltage O.K.
Check for Voltage at Headlight Connectors (High and Low Beam)
INDICATOR LIGHT DOES NOT LIGHT WHEN LOW BEAM COMES ON-HIGH BEAM IS DEFECTIVE
Check for Battery Voltage on "L/G" Wire to Unit
No Voltage
Reserve Unit is Defective
Voltage O.K.
Indicator Light and/or Wiring is Defective
"HEAD" INDICATOR BULB DOES NOT GLOW
Check for Battery Voltage on "L/G" Wire to Reserve Unit
No Voltage
Reserve Lighting Unit is Defective
Voltage O.K.
Indicator Bulb or Connections are Bad
LOW BEAM DOES NOT FUNCTION WITH HIGH BEAM DEFECTIVE
Check for Battery Voltage on "L/G" Wire to Reserve Unit
No Voltage
Reserve Unit is Defective
Voltage O.K.
Check for Battery Voltage at Low Beam Connector
No Voltage
Dimmer Switch Defective
Voltage O.K.
Poor Headlight Ground



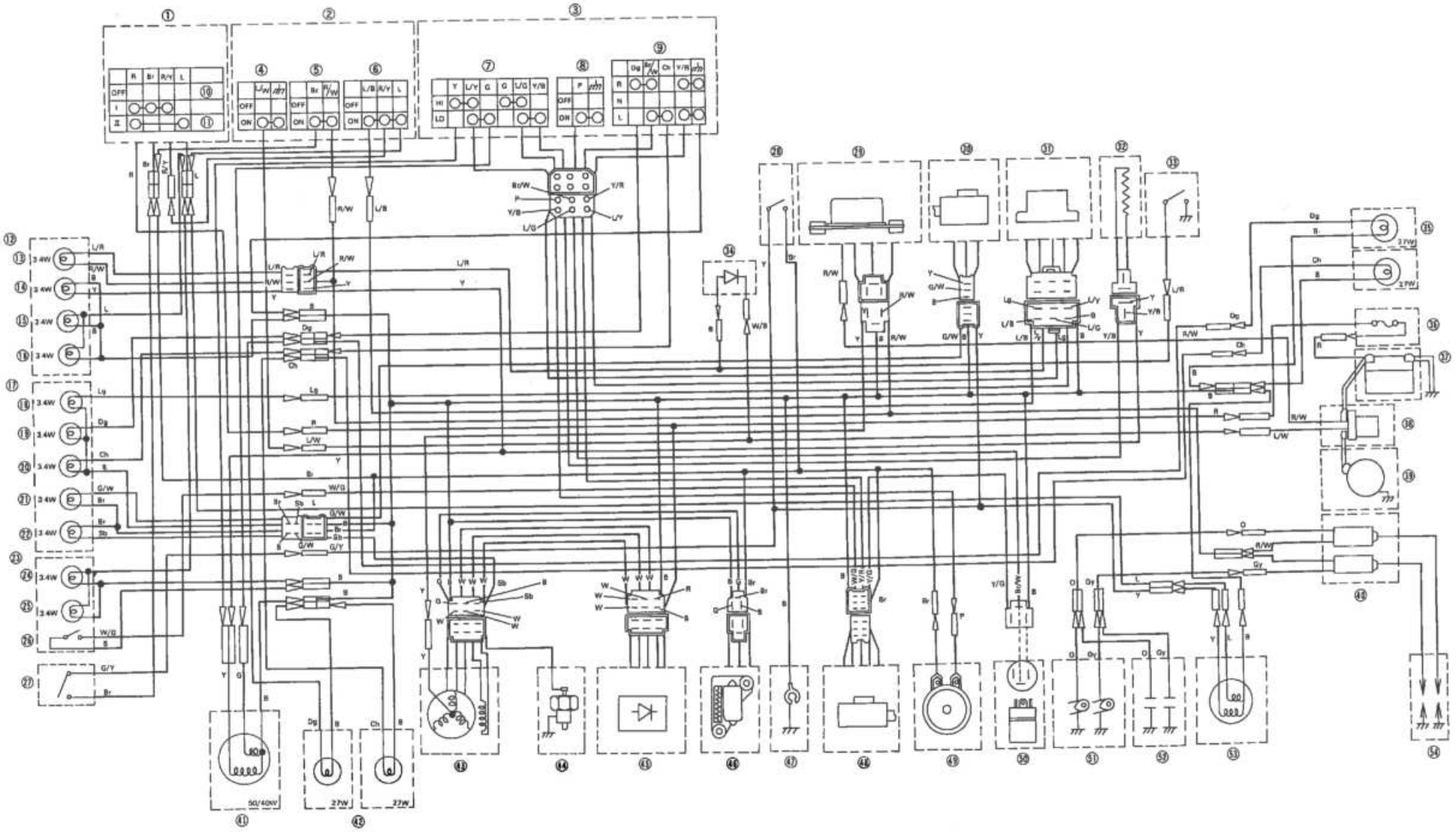
XS650D WIRING DIAGRAM

1. Main switch
2. Handle switch right
3. Handle switch left
4. Starter switch
5. Engine stop switch
6. Headlight switch
7. Dimmer switch
8. Horn switch
9. Flasher switch
10. Key removal
11. Key removal
12. Tachometer
13. Brake lining
14. High beam
15. Meter light
16. Meter light
17. Pilot box
18. Headlight outage
19. Turn right
20. Turn left
21. Stop light
22. Neutral
23. Speedometer
24. Meter light
25. Meter light
26. Speedometer sensor (Lead switch)
27. Front stop switch
28. Rear stop switch
29. Safety relay
30. Light checker
31. Reserve lighting unit
32. Resistor
33. Brake lining switch
34. Diode
35. Rear flasher light
36. Fuse
37. Battery
38. Starter switch
39. Starting motor
40. Ignition coil
41. Headlight
42. Front flasher light
43. A.C. Generator
44. Neutral switch
45. Rectifier
46. Regulator
47. Body earth
48. Cancelling unit
49. Horn
50. Flasher relay
51. Breaker
52. Condensor
53. Taillight
54. Spark plug

COLOR CODE

R	Red	L/W	Blue/White
Br	Brown	R/W	Red/White
L	Blue	L/B	Blue/Black
Y	Yellow	L/Y	Blue/Yellow
G	Green	L/G	Blue/Green
P	Pink	Y/B	Yellow/Black
B	Black	Br/W	Brown/White
Dg	Dark green	Y/R	Yellow/Red
Ch	Chocolate	L/R	Blue/Red
Sb	Sky blue	W/B	White/Black
W	White	G/W	Green/White
Gy	Gray	W/G	White/Green
O	Orange	G/Y	Green/Yellow
R/Y	Red/Yellow	Y/G	Yellow/Green
Lg	Light green		

XS650D WIRING DIAGRAM



SINCE 1887

YAMAHA MOTOR CO.,LTD.

IWATA, JAPAN

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