



YAMAHA

XS650D

**Supplementary
Service Manual**

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 Yamaha 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, repairs 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
PRINTED IN JAPAN
LIT-11616-00-52S**

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

Model	XS650D
3rd	26/20 (1.300)
4th	23/21 (1.095)
5th	22/23 (0.956)
Secondary drive: Type No. of links Size/Manufacturer Reduction ratio	Single row chain 103L + Joint DK530HDS/DAIDO 34/17 (2.000)
Chassis: Frame type Fuel tank capacity Front suspension system Fork travel Fork oil quantity Fork oil grade Fork dimensions Caster Trail Rear suspension system Suspension travel Front wheel, rim size tire size inflation pressure Rear wheel, rim size tire size inflation pressure	Tubular steel double cradle 15.0 lit (3.9 US.gal) Telescopic fork 150 mm (5.906 in) 168 ± 4 cc (5.68 ± 0.135 oz) Yamaha Fork Oil 20 Wt. 27° 115 mm (4.53 in) Swing arm 80 mm (3.15 in) 1.85-19/Aluminum 3.50H19-4PR 1.6 kg/cm ² (23 psi): Normal riding 2.0 kg/cm ² (28 psi): Continues high speed riding 2.15-18/Aluminum 4.00H18-4PR 2.0 kg/cm ² (28 psi): Normal riding 2.3 kg/cm ² (33 psi): Continues high speed riding
Braking system: Operation system, front Brake type Operation system, rear Brake type	Right hand operation Hydraulic disc brake Right foot operation Drum brake
Generator: Type Model Manufacturer Maximum output	A.C. Generator LD115-02 HITACHI 14V-11A/2,000 rpm
Starter motor: Manufacturer Type Output	HITACHI S108-35 0.5KW
Rectifier: Model Manufacturer	SB6B-17 HITACHI
Regulator: Model Manufacturer No load voltage adjustment	TLIZ-80 HITACHI 14.5 ± 0.5V/3,000 rpm
Ignition system: Type Ignition timing Breaker point gap Spark plug, manufacturer heat range	Battery ignition 15 ± 2 degree retarded 0.35 ± 0.05 mm (0.014 ± 0.002 in) NGK 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 12V, 3.4W

Maintenance specifications

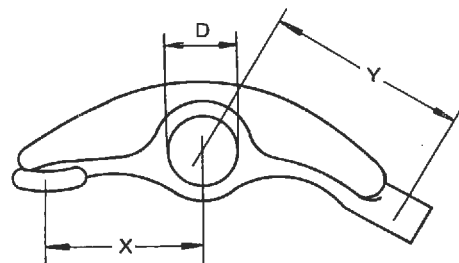
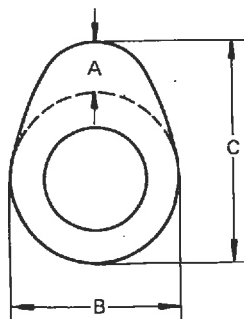
Cylinder head bolt tightening torque:	
M10	3.0 ~ 3.5 m·kg (21.7 ~ 25.3 ft·lb)
M8	2.1 ~ 2.5 m·kg (15.2 ~ 18.1 ft·lb)
M6	1.0 ~ 1.5 m·kg (7.2 ~ 10.8 ft·lb)

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)

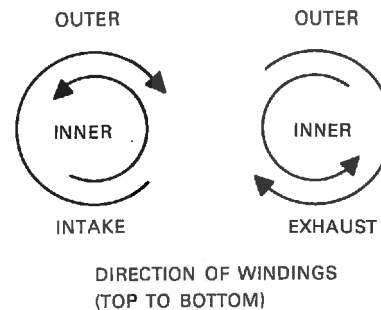
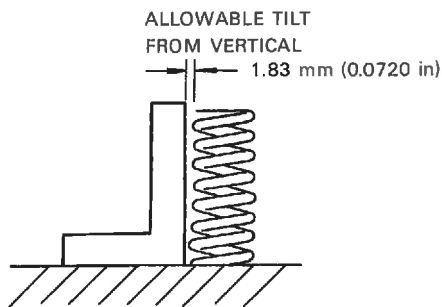
Rocker arms

Dimensions	Standard size	Wear limit
D ₁ : Arm I.D.	15 $\begin{smallmatrix} +0.018 \\ -0 \end{smallmatrix}$ mm (0.591 $\begin{smallmatrix} +0.0007 \\ -0 \end{smallmatrix}$ in)	—
D ₂ : Shaft O.D.	15 $\begin{smallmatrix} -0.009 \\ -0.015 \end{smallmatrix}$ mm (0.591 $\begin{smallmatrix} -0.00035 \\ -0.00059 \end{smallmatrix}$ 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)	

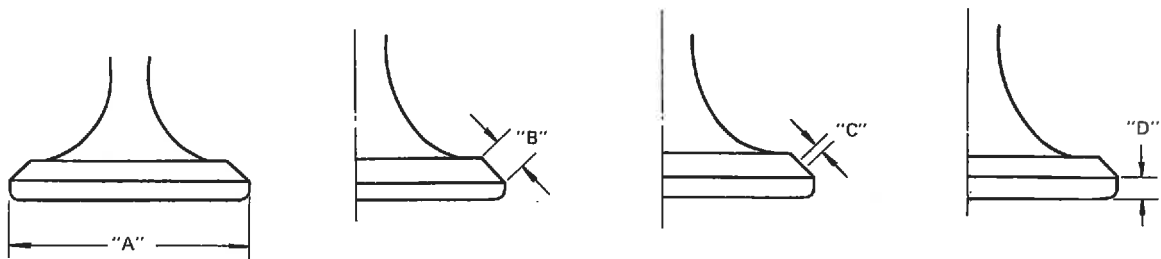


Valves — Intake

	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 (0.051 in)	1.1 mm (0.0433 in)
Stem diameter (O.D.)	8 $\begin{smallmatrix} -0.025 \\ -0.040 \end{smallmatrix}$ mm (0.315 $\begin{smallmatrix} -0.00098 \\ -0.00158 \end{smallmatrix}$ in)	
Guide diameter (I.D.)	8 $\begin{smallmatrix} +0.019 \\ +0.010 \end{smallmatrix}$ mm (0.315 $\begin{smallmatrix} +0.00075 \\ +0.00039 \end{smallmatrix}$ 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 $\begin{smallmatrix} +0.020 \\ +0 \end{smallmatrix}$ mm (2.953 $\begin{smallmatrix} +0.00080 \\ +0 \end{smallmatrix}$ 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

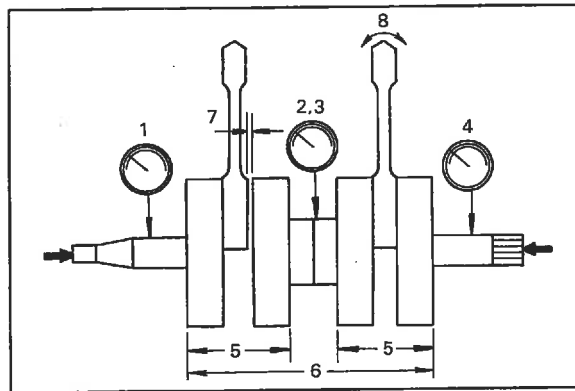
	Top	2nd	3rd
Nominal	1.2 mm (0.047 in)	1.5 mm (0.059 in)	2.8 mm (0.110 in)
Wear limit	1.25 mm (0.049 in)	1.55 mm (0.061 in)	2.85 mm (0.112 in)

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			
1	2	3	4	5	6	Axial		Side	
						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

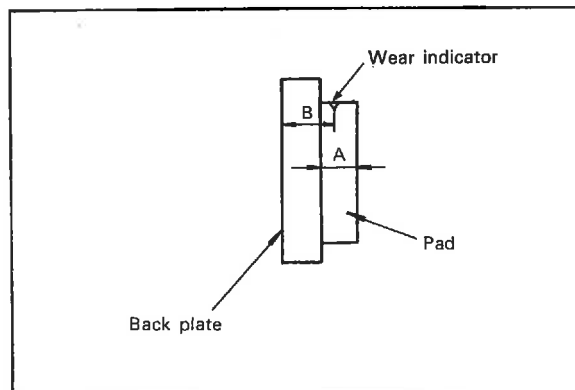
	Front	Rear
Type	Telescopic fork	Swing arm
Travel	150 mm (5.906 in)	80 mm (3.150 in)
Spring length free	470.5 mm (18.52 in)	226 mm (8.90 in)
Spring length installed	445.5 mm (17.54 in)	201 mm (7.913 in)
Spring constant	$K_1 = 0.48 \text{ kg/mm}$ (0 ~ 100 mm) (26.9 lb/in (0 ~ 3.937 in)) $K_2 = 0.65 \text{ kg/mm}$ (100 ~ 150 mm) (36.4 lb/in (3.937 ~ 5.906 in))	$K_1 = 1.714 \text{ kg/mm}$ (0 ~ 45 mm) (96.0 lb/in (0 ~ 1.772 in)) $K_2 = 2.244 \text{ kg/mm}$ (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	1.6 kg/cm ² (23 psi)	2.0 kg/cm ² (28 psi)
With passenger	2.0 kg/cm ² (28 psi)	2.3 kg/cm ² (33 psi)
High speed riding	2.0 kg/cm ² (28 psi)	2.3 kg/cm ² (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 mm ² /2 pcs. (6.772 × 1.181 in = 7.998 in ² /2 pcs.)
Pad length × width = area/Quant.	51 × 38 mm = 1,800 mm ² /2 pcs. (2.008 × 1.496 in = 2.790 in ² /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 bolt stud bolt	10 mm	3.0 ~ 3.5 m-kG	(22.0 ~ 25.0 ft-lb)
	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)
	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:

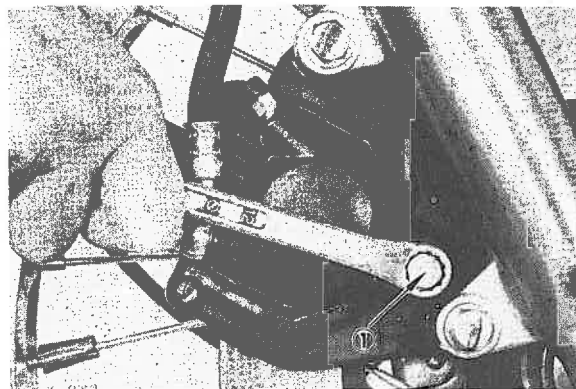
Disc brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic connection in the system is opened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly.

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.

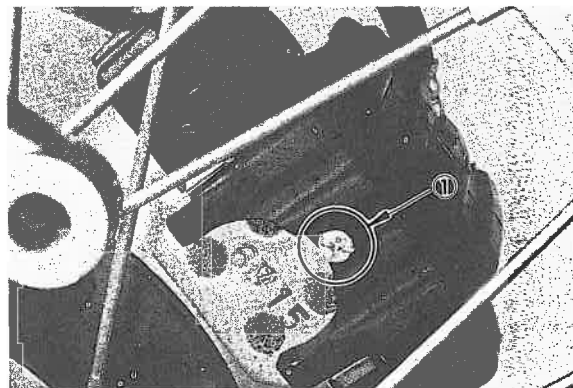
A. Caliper pad replacement

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



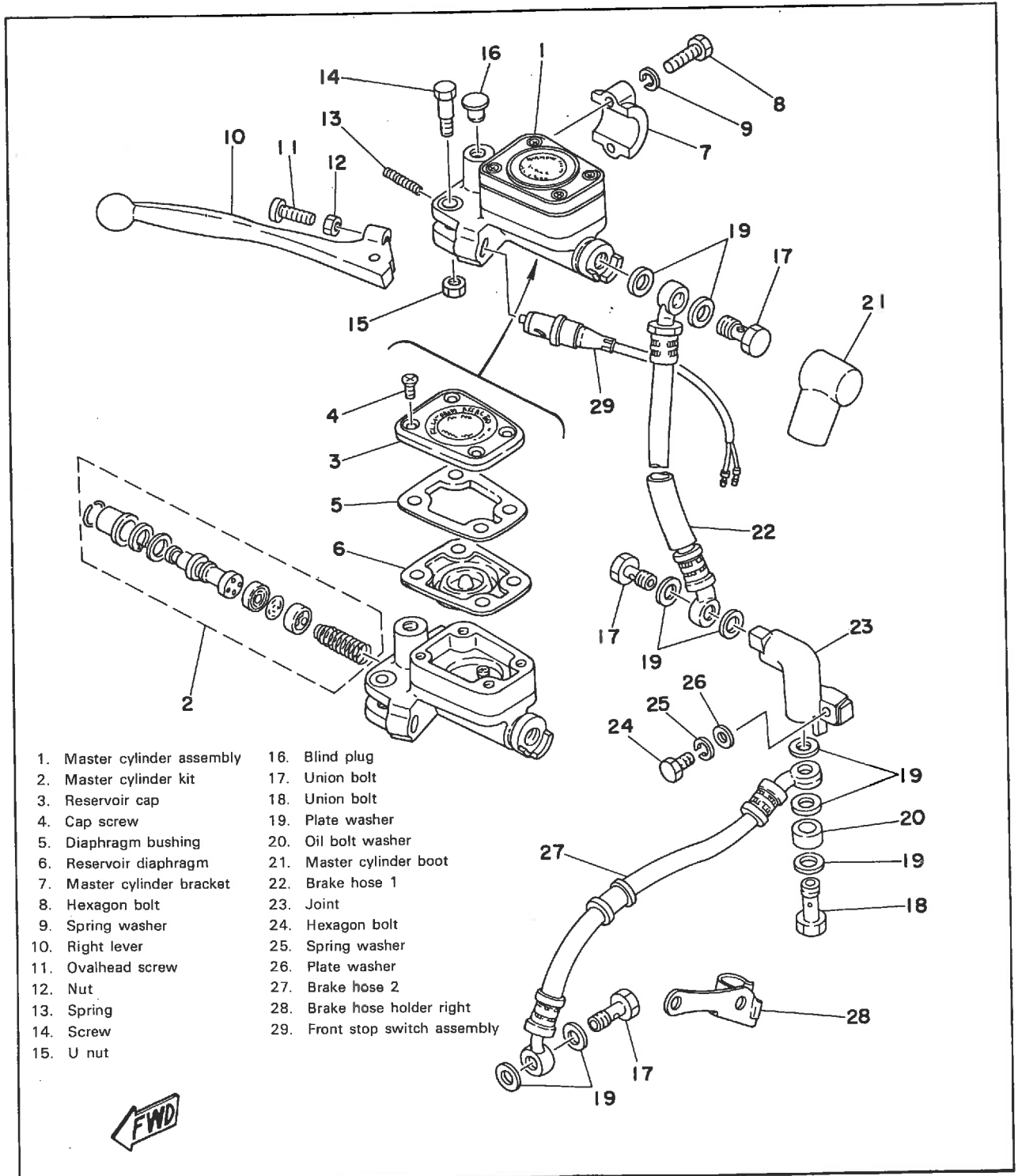
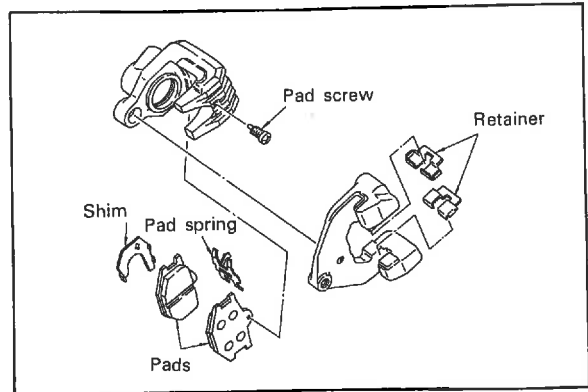
1. Support bolt

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

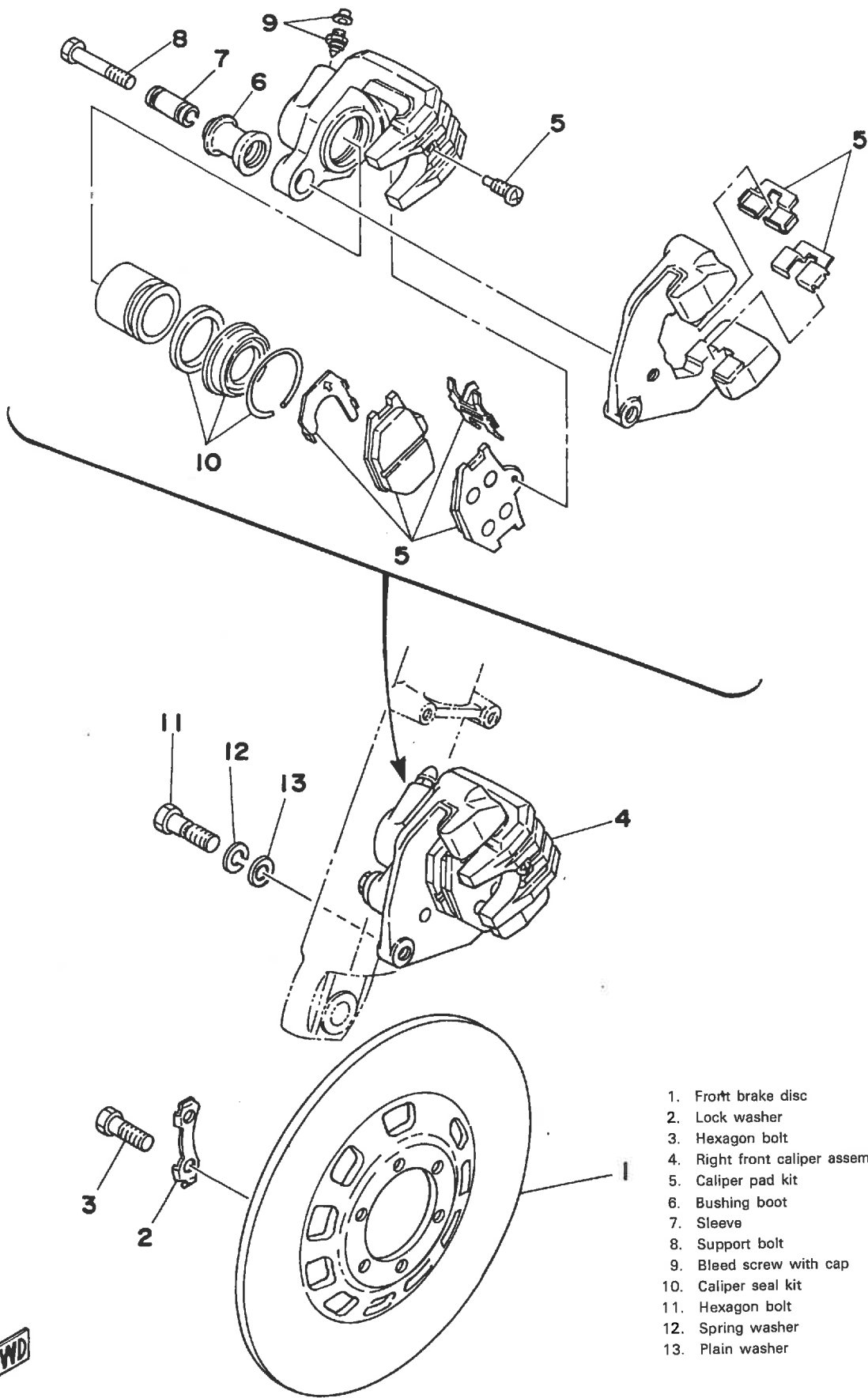


1. Pad screw

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



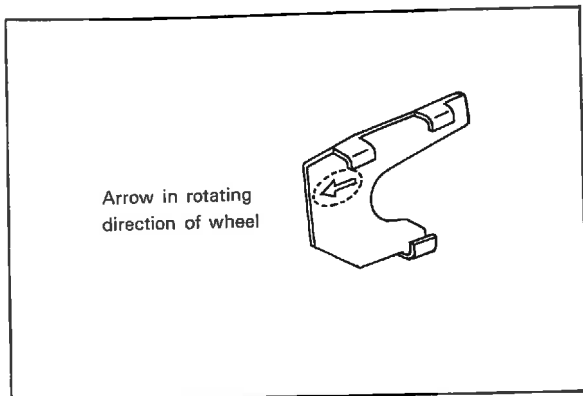
- | | |
|-----------------------------|--------------------------------|
| 1. Master cylinder assembly | 16. Blind plug |
| 2. Master cylinder kit | 17. Union bolt |
| 3. Reservoir cap | 18. Union bolt |
| 4. Cap screw | 19. Plate washer |
| 5. Diaphragm bushing | 20. Oil bolt washer |
| 6. Reservoir diaphragm | 21. Master cylinder boot |
| 7. Master cylinder bracket | 22. Brake hose 1 |
| 8. Hexagon bolt | 23. Joint |
| 9. Spring washer | 24. Hexagon bolt |
| 10. Right lever | 25. Spring washer |
| 11. Ovalhead screw | 26. Plate washer |
| 12. Nut | 27. Brake hose 2 |
| 13. Spring | 28. Brake hose holder right |
| 14. Screw | 29. Front stop switch assembly |
| 15. U nut | |



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

- Lightly grease the surface of the shim that contacts 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

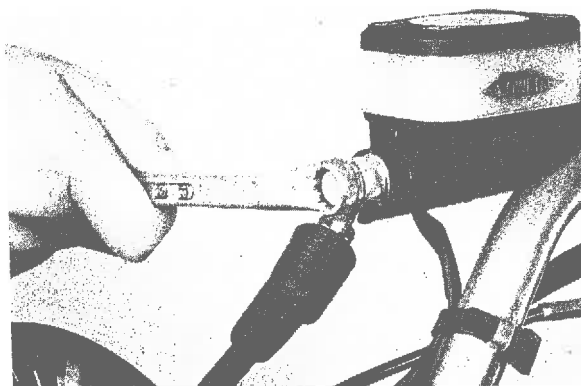
- Remove caliper brake hose. Allow caliper assembly to drain into a container.
- Place the open hose end into the container and pump the old fluid out of the master cylinder.
- Remove caliper support bolt and pad securing screw as in Caliper pad replacement procedure.
- Remove caliper assembly from caliper frame.
- Remove retaining ring and dust seal.
- 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.

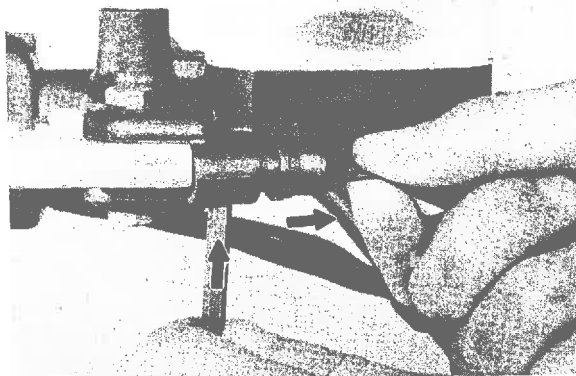
- Remove piston seal.

C. Master cylinder disassembly

- Remove brake hose.



- Remove front brake switch.



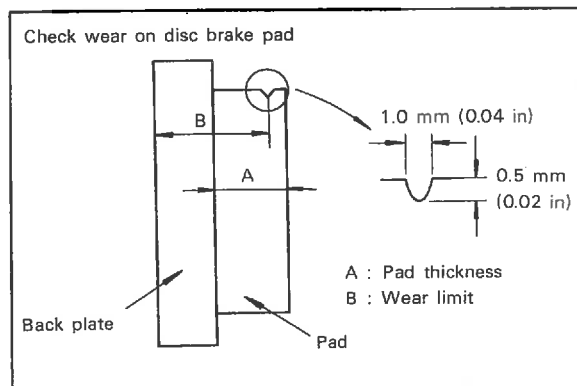
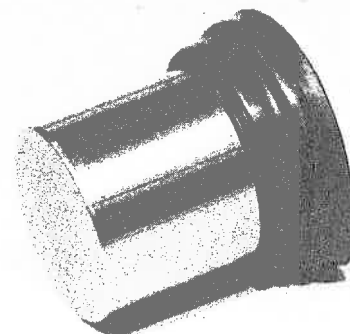
- Remove brake lever and spring.
- Remove master cylinder from handlebars. Remove cap and drain remaining fluid.

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

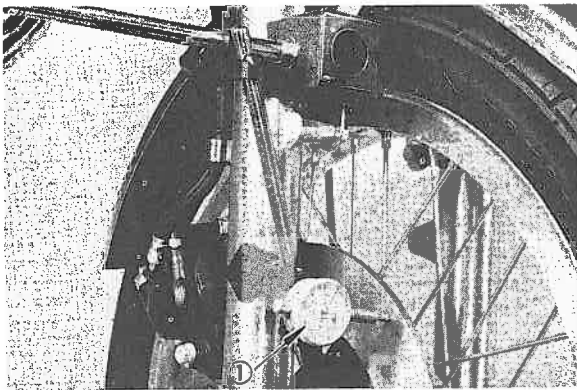
- Replace caliper piston if it is scratched.
- Replace any brake pad worn beyond limits.
 Replace brake pads as a set.



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.



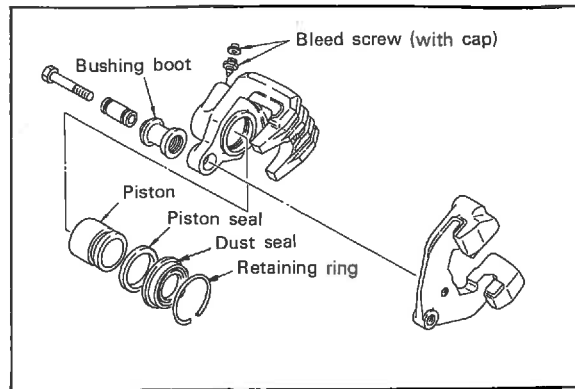
1. Dial gauge

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

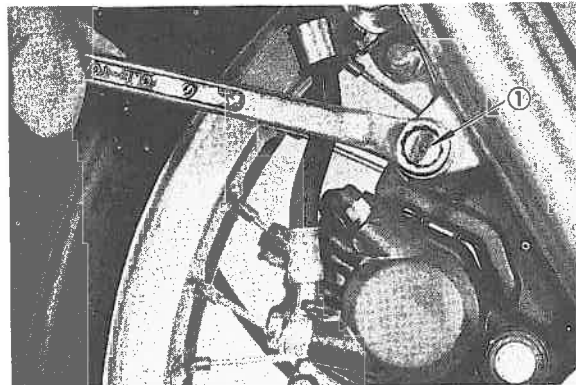
If disc is worn beyond minimum thickness or deflection exceeds specified amount, replace disc.

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.



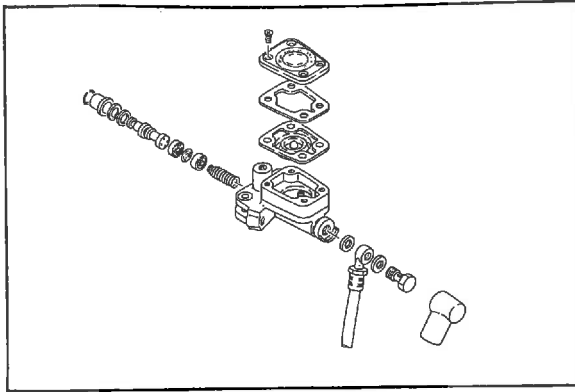
1. Mounting bolt

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.

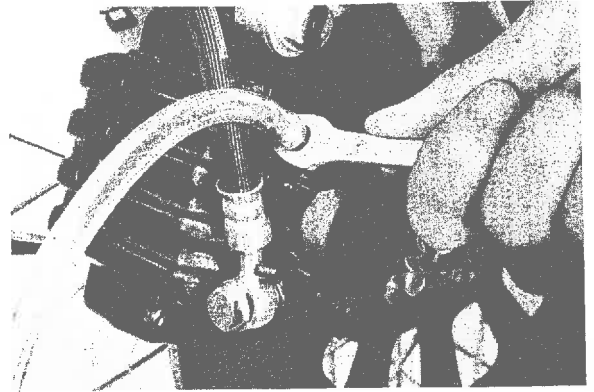
Disc bolt torque:
 1.7 ~ 2.2 m-kg
 (12.3 ~ 15.9 ft-lb)

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

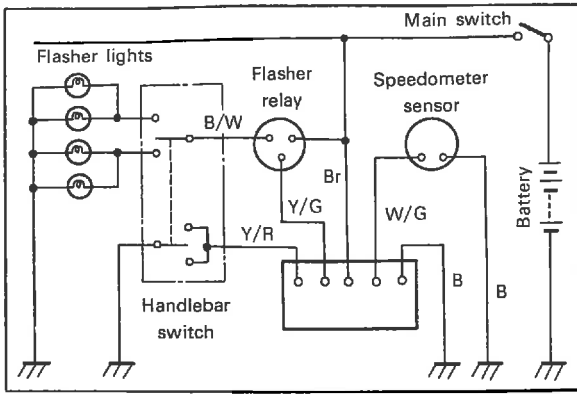
1. Description:

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:

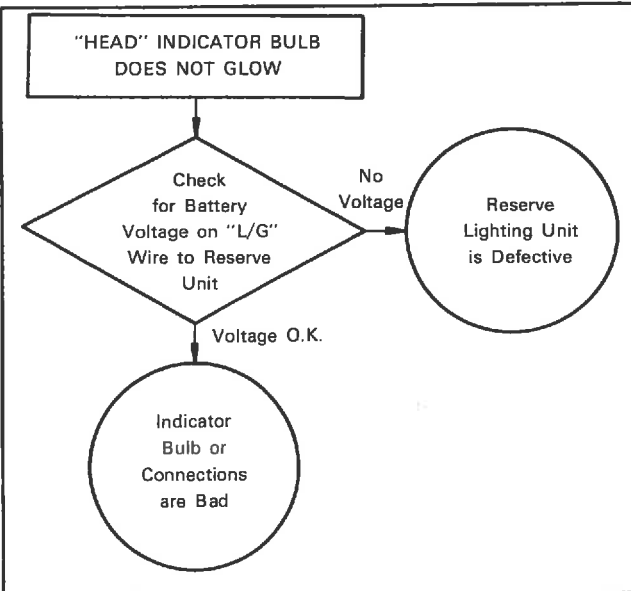
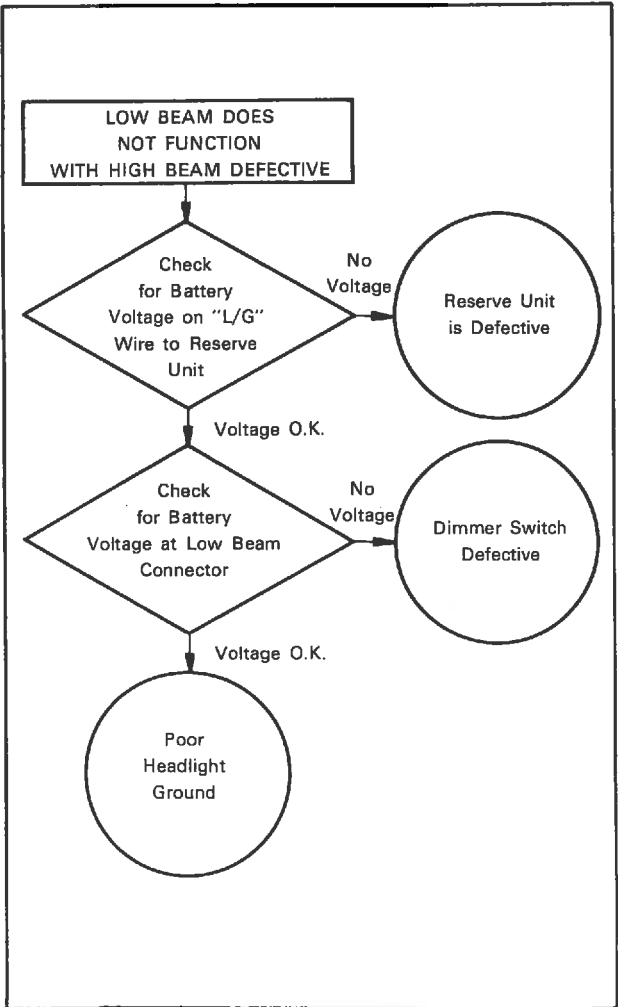
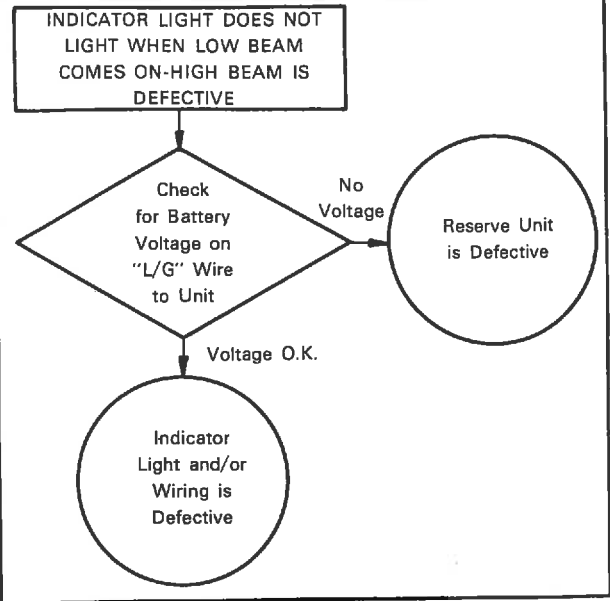
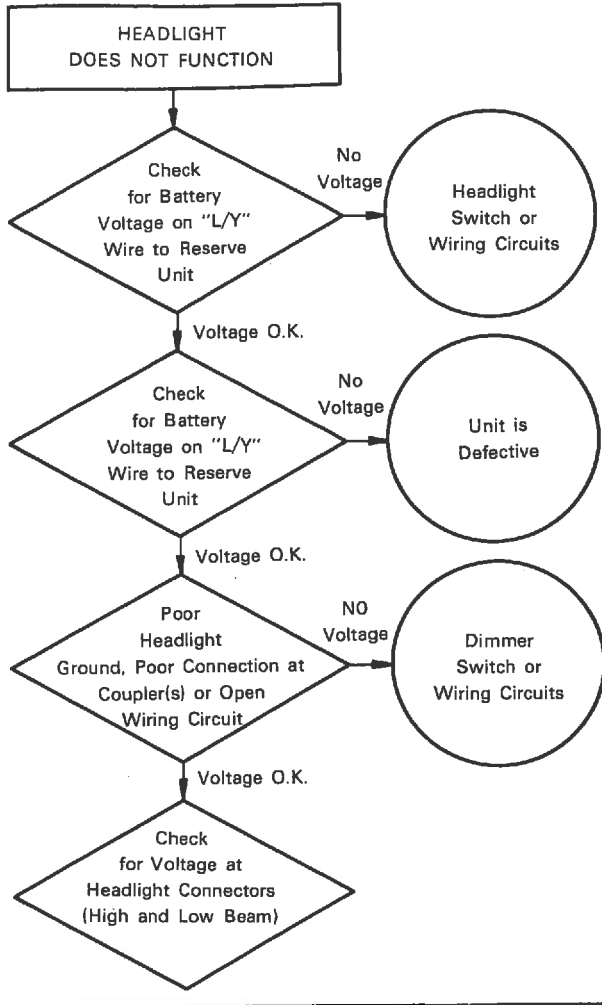
- (1) It notifies the rider that one of the headlight filaments is inoperative, and
- (2) It switches current from the inoperative filament to the remaining functional filament.

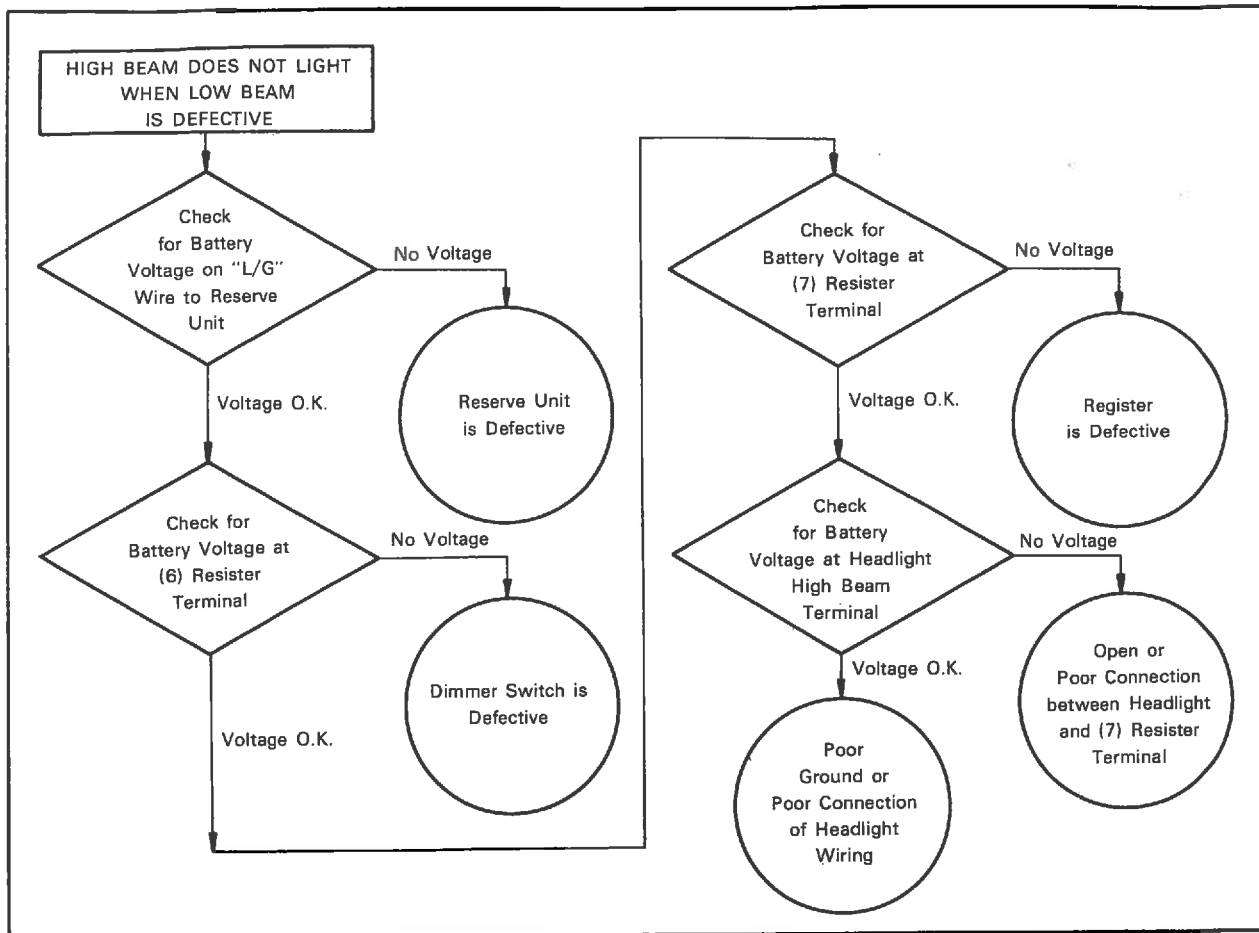
The system is connected to the headlight circuit only. The reserve lighting system unit is located under the seat.

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





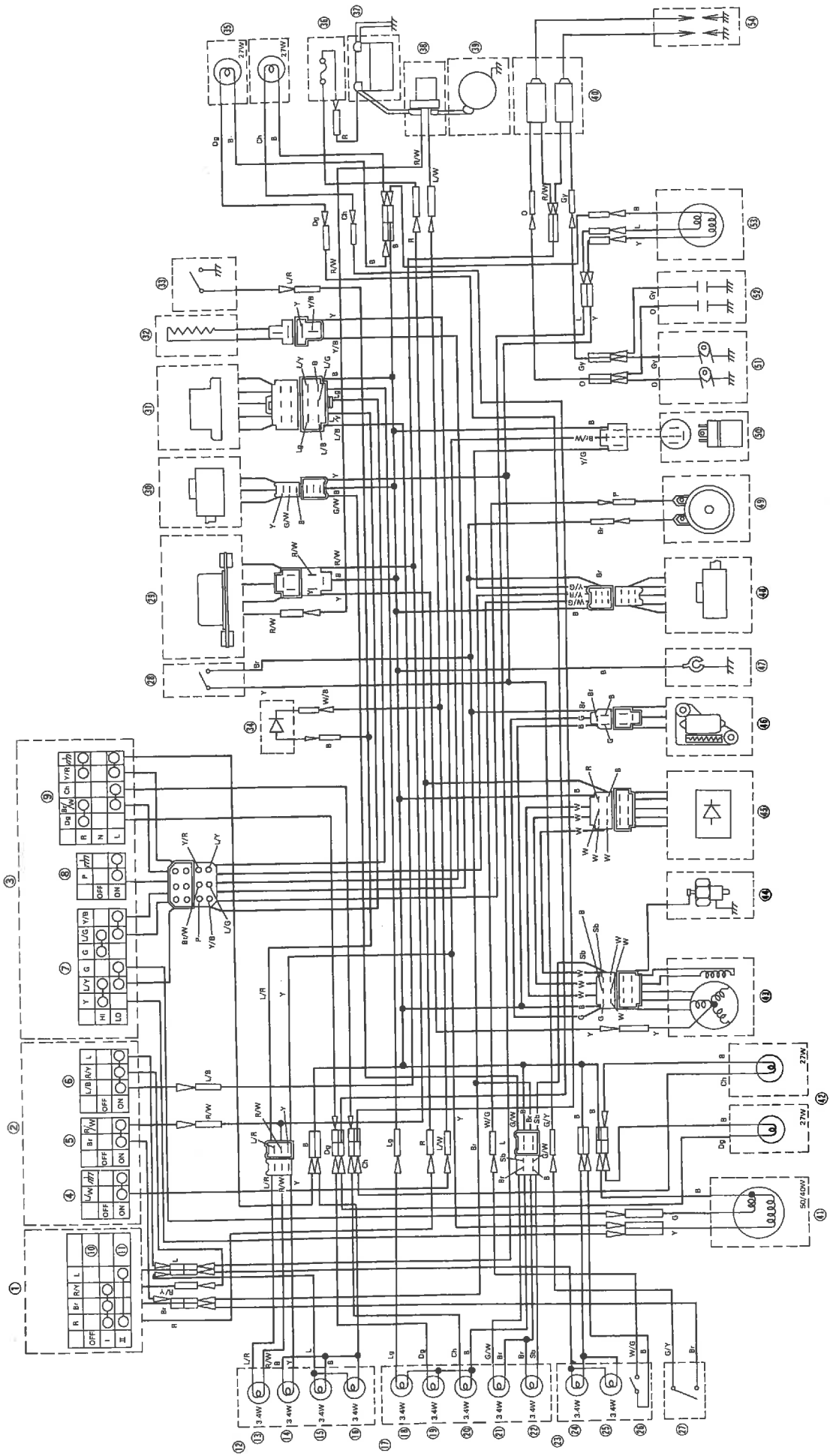
XS650D WIRING DIAGRAM

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

LIT-11616-00-52S

PRINTED IN JAPAN
76 · 7 - 2.35 x 1 ©