



YAMAHA

SNOWMOBILE

EC540D

SUPPLEMENTARY SERVICE MANUAL



[Frame serial number: 8K1-004101 ~ 8K1-008999
Engine serial number: SA535-004101 ~ SA535-008999]

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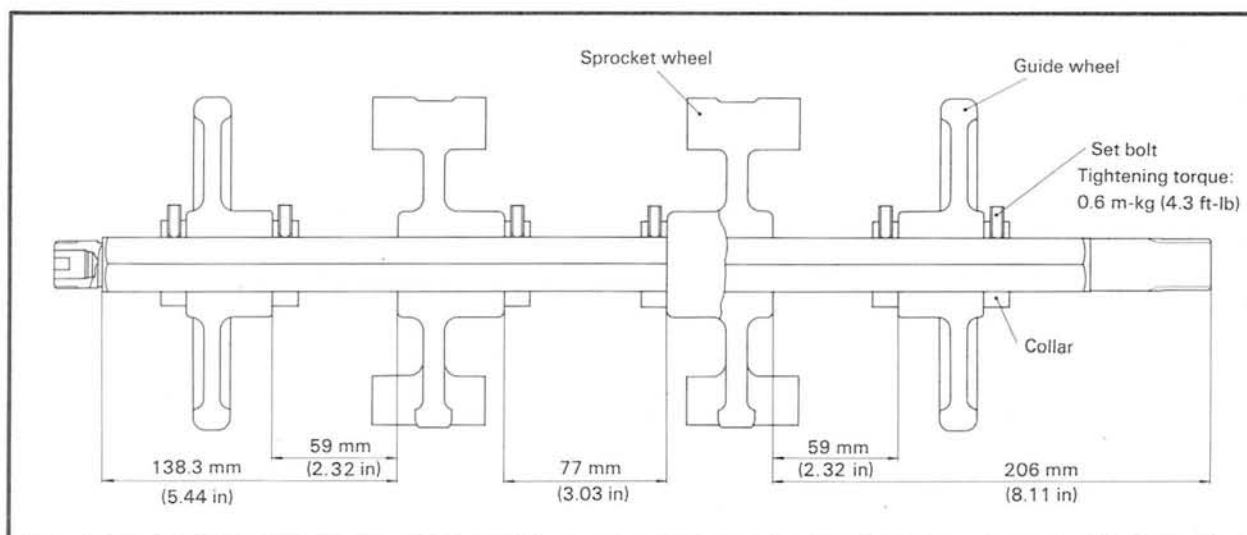
1. NEW SERVICE PROCEDURE

(New service procedure applied to the 1980 EC540D)

Front axle

To facilitate the removal and installation of front axle and to prevent the guide wheel from coming loose, a lock collar has been provided on both sides of the guide wheel.

When installing the wheel sprocket to the front axle, position the wheel sprockets on the front axle as shown. Use a press.



2. MAINTENANCE INTERVAL

[PERIODIC MAINTENANCE]

Check point	Every			When necessary	Seasonally
	20 hrs. or 400 km (250 mi)	40 hrs. or 800 km (500 mi)	80 hrs. or 1,600 km (1,000 mi)		
ENGINE:					
Tightness of bolts and nuts	○				○
Bends, cracks and wear	○				○
Abnormal noise	○				○
Loose connection and breaks of fuel and pulse pipes	○				○
Loose connection and breaks of oil pipes	○				○
Loose connection and breaks of oil delivery pipe	○				○
Fan belt tension/cracks/damage	○				○
Manual rope starter system		○			○
Carburetor					
● Operation of starter jet		○			○
● Mixing adjuster (pilot screw)				○	○
● Idling speed adjustment				○	○
Operation and adjustment of oil pump		○			○
Ignition timing					○
Cylinder compressions			○		○
Cylinder head/exhaust pipe decarbonize					○
Spark plug condition, gap and cleaning	○				○
Tightening of the cylinder head**					○
DRIVE:					
Tightness of bolts and nuts	○				○
Wear on slide runners	○				○
Primary drive system		○			○
V-belt	○				○
Secondary drive system		○			○
Sheave distance		○			○
Sheave offset		○			○
Brake pad wear		○			○
Brake operation and adjustment		○			○
Guide wheel rubber		○			○
Wear of drive track wheel sprocket		○			○
Drive track adjustment		○			○
Breaks in drive track		○			○
Bends in front and rear axles		○			○
Checking of lock washers		○			○
Drive chain adjustment		○			○
Drive chain oil level		○			○
CHASSIS:					
Tightness of bolts and nuts	○				○
Bends and cracks	○				○
Welded riveted, joints	○				○
Ski adjustment		○			○
Ski runner wear	○				○
Breaks in fuel tank		○			○
Cleaning of fuel tank					○
Fuel filter					○
Loose connection and breaks in fuel pipe		○			○
Breaks in oil tank		○			○
Oil filter					○

Check point	Every			When necessary	Seasonally
	20 hrs. or 400 km (250 mi)	40 hrs. or 800 km (500 mi)	80 hrs. or 1,600 km (1,000 mi)		
ELECTRICAL:					
Wear, breakage of wire covering		○			○
Breaks in high-tension cord	○				○
Voltage regulator working voltage					○
Operation of engine stop switch		○			○
Operation of tether switch		○			○
Headlight		○			○
Taillight		○			○
Brake light		○			○
Battery fluid top up specific gravity and breather pipe	○				○

** Retighten every 10 hours from the first use.

[LUBRICATION INTERVALS]

Lubrication point	Every			When necessary	Seasonally	Oil/Grease Brand name
	20 hrs. or 400 km (250 mi)	40 hrs. or 800 km (500 mi)	80 hrs. or 1,600 km (1,000 mi)			
ENGINE:						
Starter case					○	Aeroshell grease #7A or Esso Beacon 325 grease
Oil pump control box			○		○	
Pump drive cover			○		○	
Oil in the oil tank				○		YAMALUBE 2-cycle oil
DRIVE:						
Primary sheave weight and roller pins		○			○	Molybdenum disulfide snowmobile grease
Secondary shaft and Sliding sheave		○			○	
Front axle housing		○			○	Light all-purpose grease
Shaft 1 and shaft 2 (Slide rail)			○		○	
Drive chain oil replacement		○			○	Gear oil API "GL-3" SAE #75 or #80
CHASSIS:						
Steering column lower bearing		○			○	Light all-purpose grease
Steering column upper bearing		○			○	Motor oil
Steering links		○			○	Light all-purpose grease
Ski column		○			○	
Ski wear plate		○			○	Light all-purpose grease
Ski retaining pin		○			○	
Brake wire and stopper and brake lever		○			○	Esso Beacon 325 grease

3. SPECIFICATIONS

General

NOTE: * New specification (Compared with 1979 EXCEL-V)

Model	EXCEL-V
Model: Model (I.B.M. No.) Frame I.D. & starting number Engine I.D. & starting number	*EC540D (8K1) *8K1-004101 *SA535-004101
Dimension: Overall length Overall width (std) Overall height (w/windshield)	*2,760 mm (108.7 in) 1,030 mm (40.6 in) 1,040 mm (41.0 in)

Engine

Description: Engine type Engine model Displacement Bore × Stroke Effective compression ratio Starting system Ignition system Lubrication system	Axial fan cooled two-stroke, torque induction, twin cylinders SA535 535 cc (36.65 cu.in) 73 × 64 mm (2.874 × 2.52 in) 6.0 : 1 Recoil hand and electric starter C.D.I. "Autolube" oil injection
Cylinder head: Combustion chamber volume (with spark plug) Compression chamber type Head gasket thickness	32.5 cc (1.98 cu.in) Dome + Squish 0.5 mm (0.02 in)
Cylinder: Material Bore size Taper limit Out of round limit	Cast iron sleeves aluminum 73 mm (2.874 in) 0.05 mm (0.0020 in) 0.01 mm (0.0004 in)
Piston: Piston skirt clearance (measuring point) Piston oversize Piston pin outside diameter × length	0.055 ~ 0.060 mm (0.0012 ~ 0.0024 in) (17 mm from piston skirt end) 1st 73.25 mm (2.884 in) 2nd 73.50 mm (2.894 in) 3rd 73.75 mm (2.904 in) 4th 74.00 mm (2.913 in) φ20 × 56 mm (φ0.787 × 2.20 in)
Piston ring: Piston ring design (Top) Piston ring design (2nd) Ring end gap (installed) (Top) Ring end gap (installed) (2nd)	Keystone Keystone 0.30 ~ 0.50 mm (0.012 ~ 0.020 in) 0.30 ~ 0.50 mm (0.012 ~ 0.020 in)
Small end bearing: Type	Needle bearing
Big end bearing: Type	Needle bearing
Crankshaft: Crankshaft assembly width (A)	200 ± 0.25 mm (7.87 ± 0.010 in)

<p>Crankshaft assembly width (F)</p> <p>Crankshaft deflection (D)</p> <p>Connecting rod big end side clearance (C)</p> <p>Connecting rod small end deflection (P)</p>	<p>$60^{+0}_{-0.05}$ mm ($2.362^{+0}_{-0.002}$ in)</p> <p>0.03 mm (D-1) 0.04 mm (D-2)</p> <p>0.04 mm (D-3) 0.05 mm (D-4)</p> <p>0.25 ~ 0.75 mm (0.010 ~ 0.030 in)</p> <p>2.0 mm (0.079 in)</p>
<p>Crank pin outside diameter × length</p> <p>Crank pin type</p> <p>Crank bearing type (Left) × q'ty</p> <p>Crank bearing type (Center) × q'ty</p> <p>Crank bearing type (Right) × q'ty</p> <p>Crank oil seal type (Left) × q'ty</p> <p>Crank oil seal type (Center) × q'ty</p> <p>Crank oil seal type (Right) × q'ty</p>	<p>$\phi 24 \times 59$ mm ($\phi 0.945 \times 2.323$ in)</p> <p>Solid shaft assembly type with serration</p> <p>#6306 special × 2 pcs.</p> <p>#6206 special × 2 pcs.</p> <p>#6206 special × 1 pc.</p> <p>FWJ-3278 9.5TS × 1 pc.</p> <p>Labyrinth seal × 1 pc.</p> <p>FWJ-3248 10-1 TS × 1 pc.</p>
<p>Cooling fan:</p> <p>Fan belt tension</p>	<p>3.5 ~ 6 kg/8 mm (7.7 ~ 13.2 lb/0.31 in)</p>
<p>Carburetor:</p> <p>Type & manufacturer/quantity</p> <p>I.D. Mark</p> <p>Main jet (M.J.)</p> <p>Main air jet (M.A.J.)</p> <p>Power jet (Pw.J.)</p> <p>Power air jet (Pw.A.J.)</p> <p>Slow jet (S.J.)</p> <p>Slow air jet (S.A.J.)</p> <p>Pilot screw (P.S.)</p> <p>Starter jet (St.J.)</p> <p>Float height</p> <p>Idling engine speed</p>	<p>BD44-38/KEIHIN/1 pc.</p> <p>8H800</p> <p>#145</p> <p>#180</p> <p>#200</p> <p>#200</p> <p>#95</p> <p>#100</p> <p>2-1/4 turns out</p> <p>#160</p> <p>15^{+2}_{-3} mm ($0.59^{+0.08}_{-0.12}$ in)</p> <p>1500 r/min</p>

Main jet setting chart:

Altitude		Temperature					
		-30°C (-22°F)	-20°C (-4°F)	-10°C (14°F)	0°C (32°F)	10°C (50°F)	20°C (68°F)
Sea level				#145 (Std.)		#140	
~ 600 m (2000 ft)				#145 (Std.)		#140	
~ 1200 m (4000 ft)				#140		#135	
~ 1800 m (6000 ft)				#135		#130	
~ 2400 m (8000 ft)				#130		#125	
~ 3000 m (10000 ft) or more				#125		#120	

Intake reed valve: Type Bending limit Valve lift	V type 0.6 mm (0.024 in) 9.7 mm (0.38 in)
Lubrication: Autolube pump—Color code Autolube pump—Minimum stroke Autolube pump—Maximum stroke Autolube pump—Reduction ratio Autolube pump—Output Min./200 strokes Autolube pump—Output Max./200 strokes Autolube pump wire free play Oil tank capacity Oil grade	Brown 0.20 ~ 0.25 mm (0.0079 ~ 0.0098 in) 1.65 ~ 1.87 mm (0.0650 ~ 0.0736 in) 1/36 0.95 ~ 1.19 cc (0.0321 ~ 0.0402 oz) 7.84 ~ 8.89 cc (0.2651 ~ 0.3006 oz) 25 ± 1 mm (0.98 ± 0.04 in) at idle 2.6 Liter (2.7 US.qt) YAMALUBE 2-cycle

Drive and track suspension

Transmission: Type Drive ratio Engagement rpm Primary spring: Part No. Color code Secondary spring: Part No. Color code Secondary spring pre-load (twist) Sheave distance Sheave off-set V-belt width and outer line length V-belt wear limit	V-belt automatic centrifugal engagement 3.5 : 1 ~ 1 : 1 2900 ~ 3300 r/min 90501-50543 Green—Green 90508-45286 Yellow 240° (No.4 hole) 270 $\begin{smallmatrix} +0 \\ -3 \end{smallmatrix}$ mm (10.63 $\begin{smallmatrix} +0 \\ -0.11 \end{smallmatrix}$ in) 5.5 ± 0.5 mm (0.217 ± 0.020 in) 31.5 × 1,099 mm (1.24 × 43.3 in) 26 mm (1.02 in)
Track suspension: Type Damper type Spring color code (Front) Spring color code (Rear) Slide runner wear limit Track width Track deflection Length on ground Wheel sprocket material and number of teeth Stopper band length	Slide rail suspension Oil and gas damper *Pink No painted 10 mm (0.394 in) 419 mm (16.5 in) *30 ~ 35mm/10kg (1.18 ~ 1.38 in/22 lb) 990 mm (39.0 in) Polyethylene 12T *235 mm (9.25 in) (1st hole from the bottom)
Secondary drive: Type Reduction ratio Chain pitch × Number of links Free play Chain housing oil quantity Chain housing oil grade	Chain (#35K-3) 17/29 (1:1.706) 9.525 mm (0.375 in) × 66L 10 $\begin{smallmatrix} +5 \\ -2 \end{smallmatrix}$ mm (0.4 $\begin{smallmatrix} +0.2 \\ -0.08 \end{smallmatrix}$ in) 300 cc (10.1 oz) Gear oil API "GL-3" (SAE #75 or 80)
Brake: Type Brake pad thickness Brake pad wear limit Gap between pad and disc	Floating disc type 13.5 mm (0.68 in) 9.5 mm (0.37 in) 0.15 mm (0.06 in)

Chassis

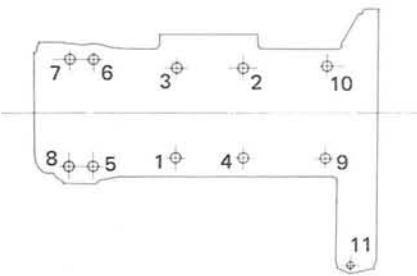
Frame: Material	Aluminum + Steel + FRP
Steering system: Caster (ski column) Camber Ski length × width × thickness Ski stance Ski toe-out Steering linkage type Lock to lock angle (Ski) Lock to lock angle (Steering column)	25° 0° 1015 × 136 × 2.6 mm (40.0 × 5.4 × 0.10 in) 888 mm (35.0 in) 0 ~ 6 mm (0 ~ 0.23 in) Tie-rod Right ski, L: 30° R: 28.4° Left ski, L: 27.8° R: 30.8° Right: 56.2° Left: 56.2°
Front suspension: Type Damper type	Leaf spring Oil damper
Fuel tank: Capacity Fuel grade	27 Liter (7 US.gal) Regular gasoline

Electrical

Ignition system: Type—flywheel magneto (C.D.I. Type) Model/Manufacturer Voltage Pulser coil resistance Charging coil resistance Charging coil resistance	F3T352/MITSUBISHI 12V 9.0Ω at 20°C (68°F) (White/Red—Black) 350Ω at 20°C (68°F) (Brown—Black) 15.0Ω at 20°C (68°F) (Blue—Black)
Ignition timing: B.T.D.C.	1.5 ± 0.1 mm (0.059 ± 0.004 in)
Ignition coil: Model/Manufacturer/Quantity Spark gap Primary winding resistance Secondary winding resistance Diode (Yes or No)	CM62-20/HITACHI/1 pc. 9 mm (0.4 in)/300 r/min 11 mm (0.6 in)/3,000 r/min 0.15Ω at 20°C (68°F) 3.6kΩ at 20°C (68°F) No
Spark plug: Type & quality Spark plug gap	NGK BR-9ES × 2 pcs. 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Spark plug cap: Type Noise suppressor resistance	Rubber type with noise suppressor 5kΩ at 20°C (68°F)
C.D.I. unit: Model/Manufacturer	8H4-20/MITSUBISHI
Starter motor type: Armature coil resistance Field coil resistance Brush length: standard minimum Brush spring pressure Armature mica undercut	S114-246/HITACHI 0.007Ω at 20°C (68°F) 0.0046Ω at 20°C (68°F) 16 mm (0.63 in) 12 mm (0.47 in) 1600 g (56.5 oz) 0.5 mm (0.02 in)

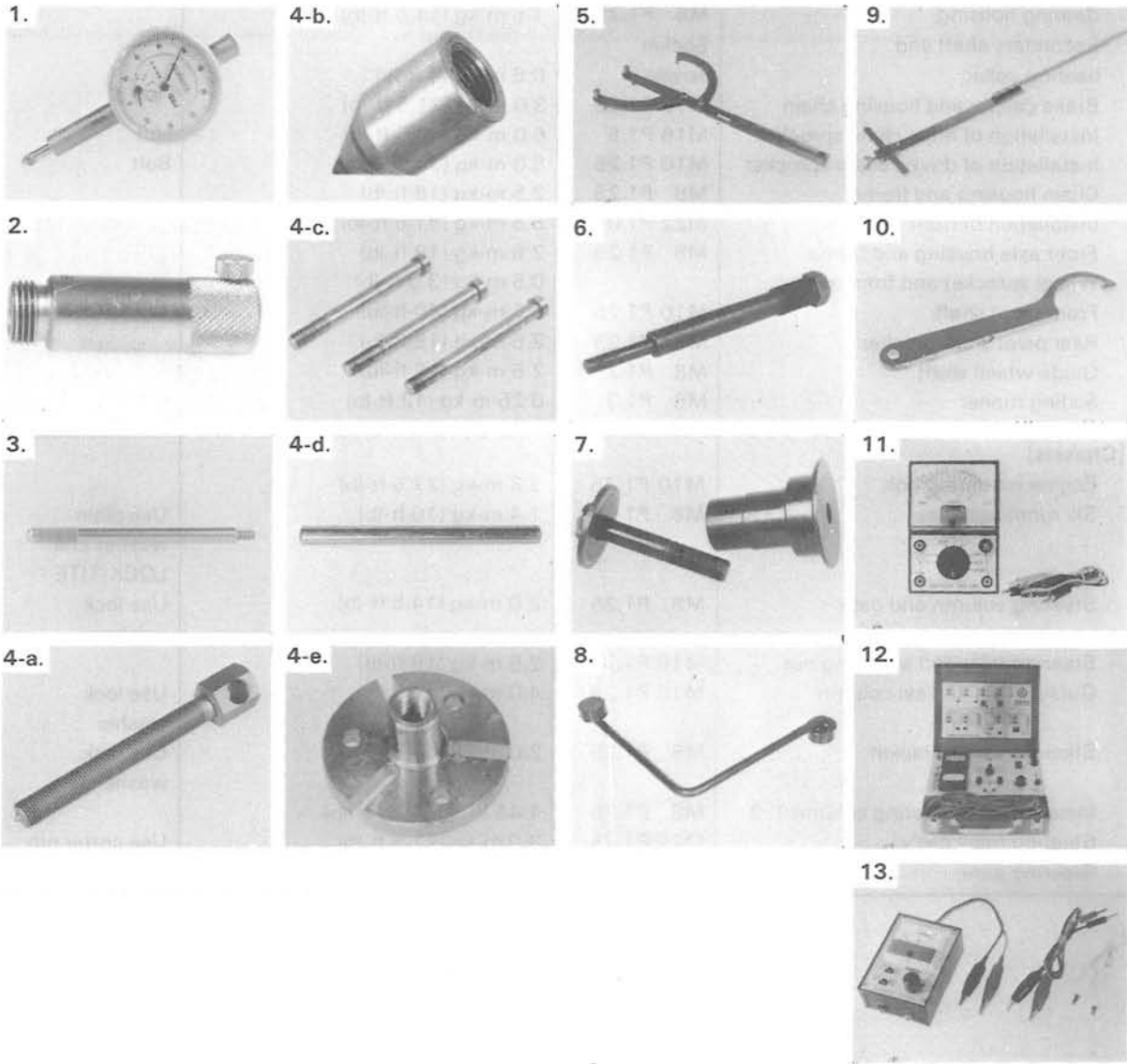
Battery type: Charging rate Specific gravity	G.S. GM18Z-3A 2.0 Amps for 10 Hours 1.28/20°C (68°F)
Charging system: Type Charging coil resistance	Flywheel magneto 0.22Ω at 20°C (68°F) (White—Black)
Starter relay switch: Cut-in voltage Winding resistance	Hitachi A104-61 6.5V 3.0Ω at 20°C (68°F)
Rectifier: Type Model/Manufacturer Capacity With stand voltage	1-element type (Half wave) DE5404/STANLEY 6A 400V
Lighting system: Lighting output Lighting coil resistance Headlight type Bulb wattage/q'ty Tail/Brake light wattage	12V-110W 0.19Ω at 20°C (68°F) (Yellow—Black) Halogen light 12V-60/55W × 1 pc. 12V-8W/23W
A.C. regulator: Model/Manufacturer Voltage	TRIZ-24B HITACHI or S8516B TOSHIBA 13.8 ± 0.5V

Tightening torque

Part to be tightened	Thread size	Tightening torque	Remarks
[Engine]			
Spark plug	M14 P1.25	2.8 m-kg (20 ft-lb)	
Cylinder head	M8 P1.25	2.5 m-kg (18 ft-lb)	
Cylinder	M8 P1.25	2.5 m-kg (18 ft-lb)	
Flywheel magneto	M16 P1.0	7.3 m-kg (53 ft-lb)	
Crankcase upper and lower	M8 P1.25	First: 1.0 m-kg (7 ft-lb) Final: 2.0 m-kg (15 ft-lb)	
Tightening sequence	M6 P1.0	First: 0.5 m-kg (3.5 ft-lb) Final: 1.0 m-kg (7 ft-lb)	
			
Starter pulley	M8 P1.25	2.3 m-kg (16.5 ft-lb)	
Crankcase and engine bracket	M10 P1.25	3.8 m-kg (27.5 ft-lb)	
[Drive and track suspension]			
Primary sliding sheave and cap Installation of primary sheave	M6 P1.0 UNF 1/2"	1.1 m-kg (8 ft-lb) Initial: 12 m-kg (87 ft-lb) Loosen once and retighten: 6.5 m-kg (47 ft-lb)	Use motor oil

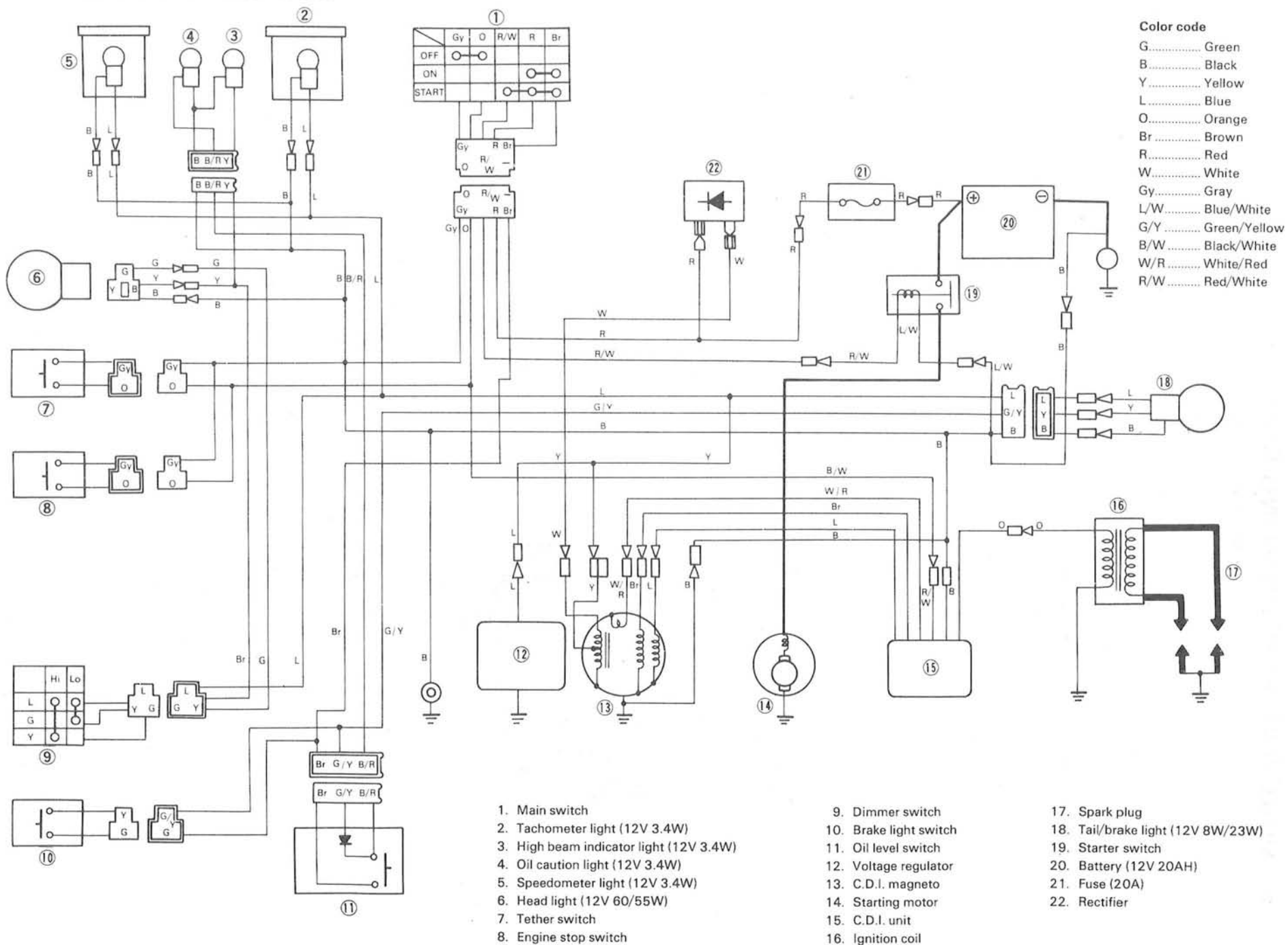
Part to be tightened	Thread size	Tightening torque	Remarks
Installation of secondary sheave	M10 P1.25	4.8 m-kG (35 ft-lb)	Nut Bolt
Bearing housing	M8 P1.25	1.6 m-kG (11.5 ft-lb)	
Secondary shaft and bearing collar	Socket screw	0.6 m-kG (4 ft-lb)	
Brake caliper and housing chain	M10 P1.25	3.0 m-kG (21.5 ft-lb)	
Installation of drive chain sprocket	M16 P1.5	6.0 m-kG (43.5 ft-lb)	
Installation of driven chain sprocket	M10 P1.25	5.0 m-kG (36 ft-lb)	
Chain housing and frame	M8 P1.25	2.5 m-kG (18 ft-lb)	
Installation of front axle L.H.	M22 P1.0	8.5 m-kG (61.5 ft-lb)	
Front axle housing and frame	M8 P1.25	2.5 m-kG (18 ft-lb)	
Wheel sprocket and front axle		0.5 m-kG (3.5 ft-lb)	
Front pivot shaft	M10 P1.25	5.5 m-kG (40 ft-lb)	
Rear pivot shaft bracket	M8 P1.25	2.5 m-kG (18 ft-lb)	
Guide wheel shaft	M8 P1.25	2.5 m-kG (18 ft-lb)	
Sliding runner	M6 P1.0	0.25 m-kG (12 ft-lb)	
[Chassis]			
Engine mounting bolt	M10 P1.25	3.8 m-kG (27.5 ft-lb)	Use plain washer and LOCK-TITE
Ski runner	M8 P1.25	1.4 m-kG (10 ft-lb)	
Steering column and gate	M8 P1.25	2.0 m-kG (14.5 ft-lb)	Use lock washer
Steering relay rod adjusting nut	M10 P1.25	2.5 m-kG (18 ft-lb)	Use lock washer
Outside arm and ski column	M10 P1.25	4.0 m-kG (29 ft-lb)	
Steering lower bracket	M8 P1.25	2.0 m-kG (14.5 ft-lb)	Use lock washer
Installation of steering column 1, 2	M8 P1.25	1.45 m-kG (10.5 ft-lb)	Use cotter pin
Steering relay ass'y	M10 P1.25	3.0 m-kG (21.5 ft-lb)	
Steering gate	M8 P1.25	1.4 m-kG (10 ft-lb)	

4. SPECIAL TOOLS



No.	Description	Tool No.
1	Dial gauge	90890-03097
2	Dial gauge stand No. 2	90890-01195
3	Dial gauge needle (56 mm)	90890-03098
4-a	Flywheel puller bolt	90890-01803
4-b	Flywheel puller attachment	90890-01804
4-c	Flywheel puller screw	90890-01806
4-d	Drive handle	90890-01817
4-e	Flywheel puller body	90890-01848
5	Rotor holding tool	90890-01235
6	Primary fixed sheave puller	90890-01859
7	Sheave sub-assembly tool	90890-01858
8	Bushing tool	90890-01877
9	Sheave gauge	90890-01875
10	Eccentric bearing installer	90890-01851
11	Pocket tester	90890-03104
12	Electro tester	90890-03021
13	A.C. Regulator checker	90890-03090

5. WIRING DIAGRAM



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