

Service-Information Motorcycle



BMW of N.A.
Service Department

Group: 00

March 1985

Maintenance
& General
Hints

00 036 85
(2149)

For USA and Canada
Only

R80 and R80RT, 1985 Models

The new R80 and R80RT models are being delivered to your dealerships. For your information, this Service Information has been prepared with all technical changes, descriptions and data currently available.

Note: Since printing, the following details have been finalized. Please note them in the following pages.

FRONT FORK: During the 600-mile service, use the following quantities of oil:

| | | |
|-------|---|--------------|
| R80 | : | 290 - 300 cc |
| R80RT | : | 310 - 320 cc |

When assembling the upper spring retainer, use the following instructions to seal the threads from leaking:

-- Use Loctite #242

-- Oil the thread on the spring retainer lightly and apply sealant (Loctite) to one or two turns of the thread. (This will make a perfect seal, yet enable the thread to be unscrewed later.)

PACKING: To prevent damage from the tie-down straps during crating, the following parts are packaged separately and should be installed during pre-delivery:

| <u>Item:</u> | <u>Part Number:</u> |
|-------------------|---------------------|
| Cap for seat lock | 51 25 1 452 297 |
| Stop for seat | 52 53 1 452 424 |
| Shim washer | 07 11 9 932 041 |
| Screw (5 x 20) | 07 11 9 919 897 |

RECOMMENDEDTIRES:

| | <u>Front:</u> | <u>Rear:</u> |
|---------------|---------------|----------------|
| <u>Sizes:</u> | 90/90-18 51 H | 120/90-18 65 H |
| | 90/90-H 18 | 120/90-H 18 |

Manufacturer:

| | | |
|-------------|-------------|--------------|
| Continental | TK 22 TL RC | TK 44A TL RC |
| Metzeler | ME 11 TL | ME 99B TL |
| Michelin | A 48 TL | M 48 TL |
| Pirelli | MT 59 TL | MT 58 TL |

"EARLY WARNING"
SYSTEM:

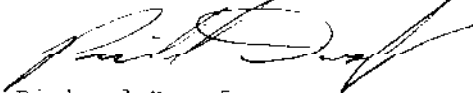
1985 model R80 and R80RT's are included in the Early Warning Quality Assurance system.

When using these post cards, please cross out "K-model" and note either "R80, '85" or "R80RT, '85".

New cards are now in print with R80 designations.

Very truly yours,

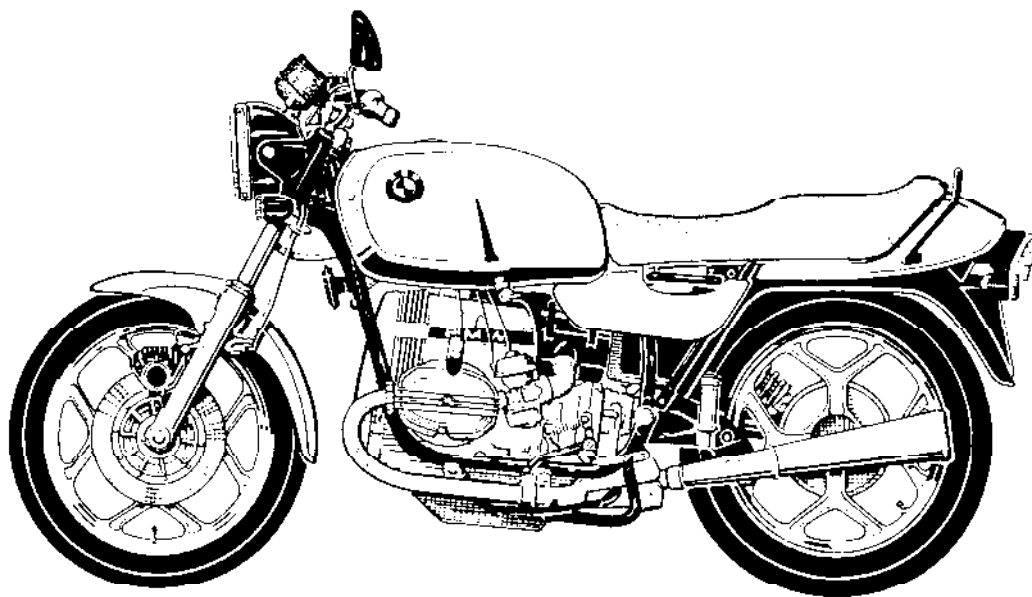
BMW OF NORTH AMERICA, INC.



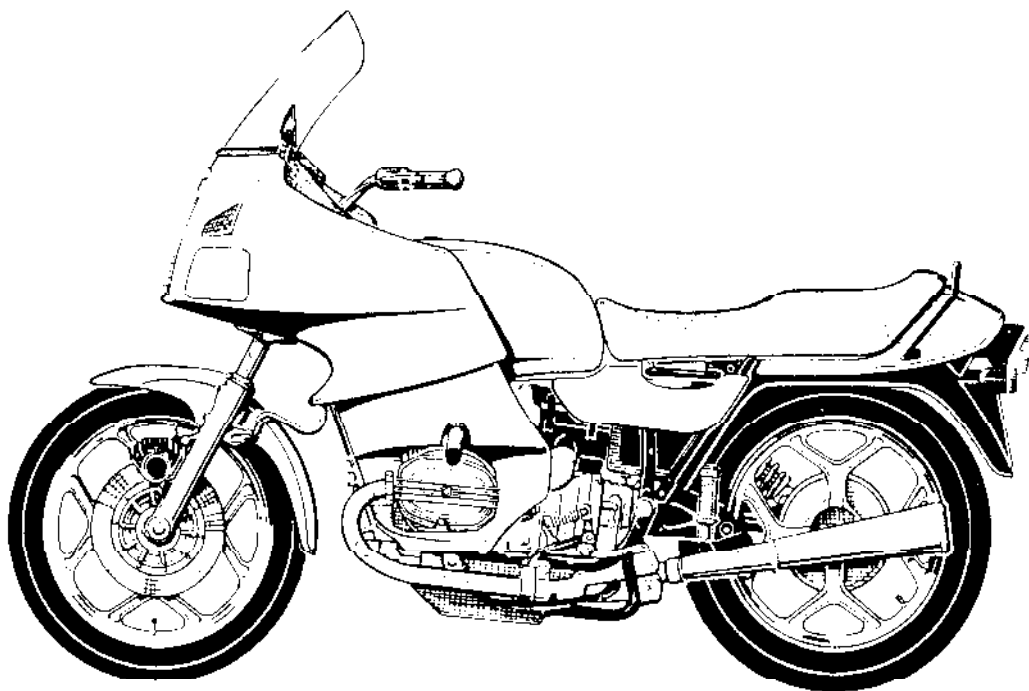
Richard Dampf
National Technical Manager
Motorcycle Group

RD:ch

Introduction



This Service Information contains a brief technical description of the new R 80 models. As well as providing you with their technical data, it is intended to describe new features. It is exclusively for the information of Service personnel.



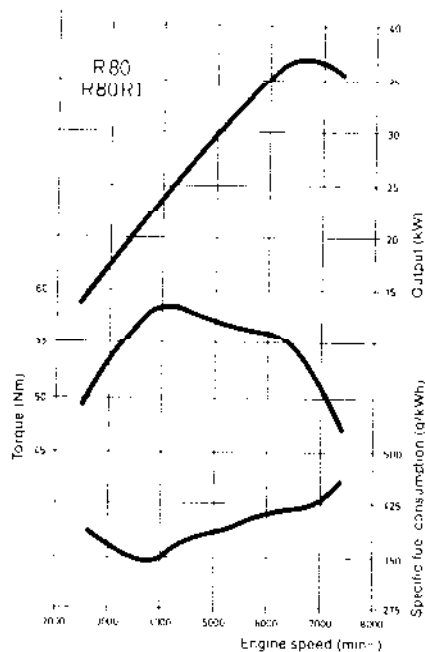
Brief Description

The principal feature of the R 80 and R 80 RT are:

- improved technical design
- improved handling
- optimum control
- increased ride comfort
- modernized design

The new flat-twin models for the 1985 model year include the successful elements of BMW's flat-twin designs together with modifications and improvements based on the 'K' series introduced in 1984.

The power unit is a revised version of the air-cooled horizontally opposed twin-cylinder unit, with a displacement of 800 cubic centimeters.

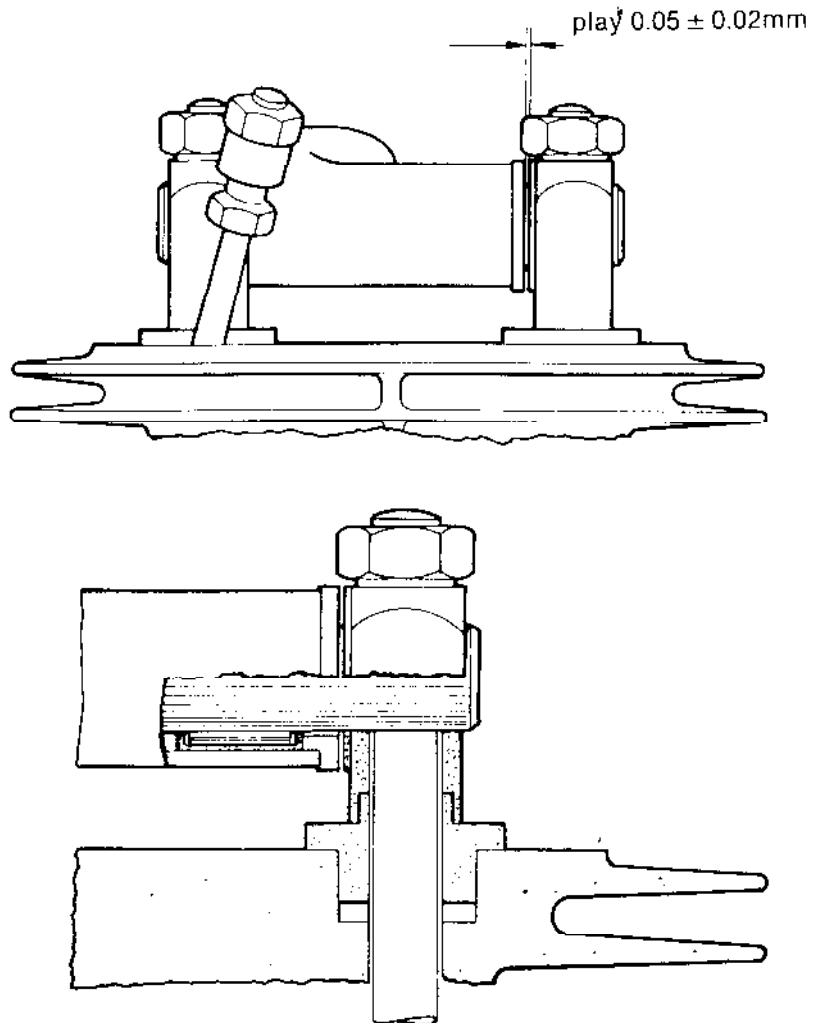


This engine's smooth running and high torque even at low engine speeds are highly impressive.

For insurance reasons, the power output of this engine, which runs on low octane fuel has been deliberately kept down to 50 bhp (37 kW).

These modified flat-twin models, like all other BMW motorcycles, are extremely easy to service.

Rocker arm bearings



Modifications to the cylinder heads result in a lower level of mechanical noise.

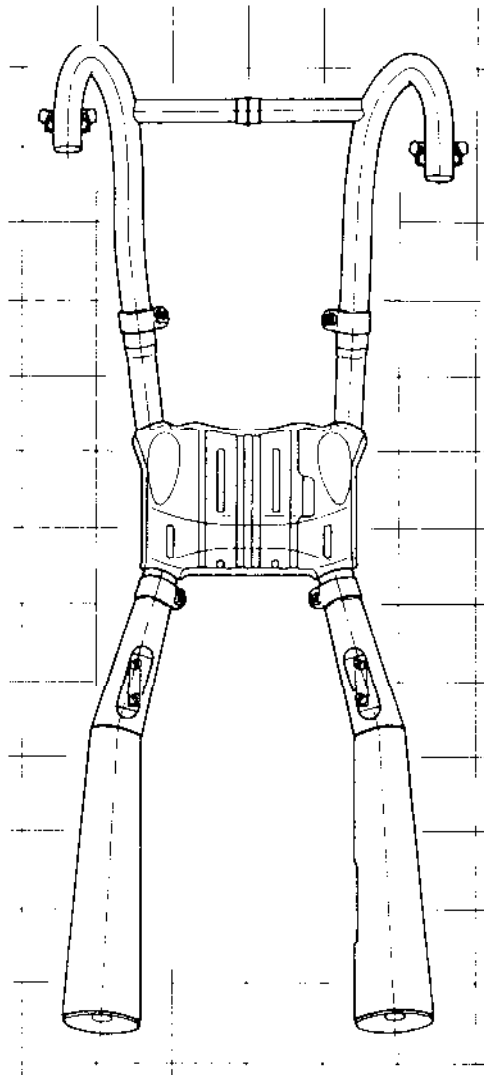
This has been achieved by locating the rocker arm bearing mounts in the cylinder head with no play.

Rocker arm end play is adjusted to 0.05 ± 0.02 mm with chime.

The noise of the rocker arm striking the bearing mount has been further reduced by a pressed-in plastic ring.

A further noise reduction is achieved by pressed-in pieces of silicone rubber located between the cooling fins. In addition to facilitating maintenance, these features can also be retro-fitted to older flat-twin models.

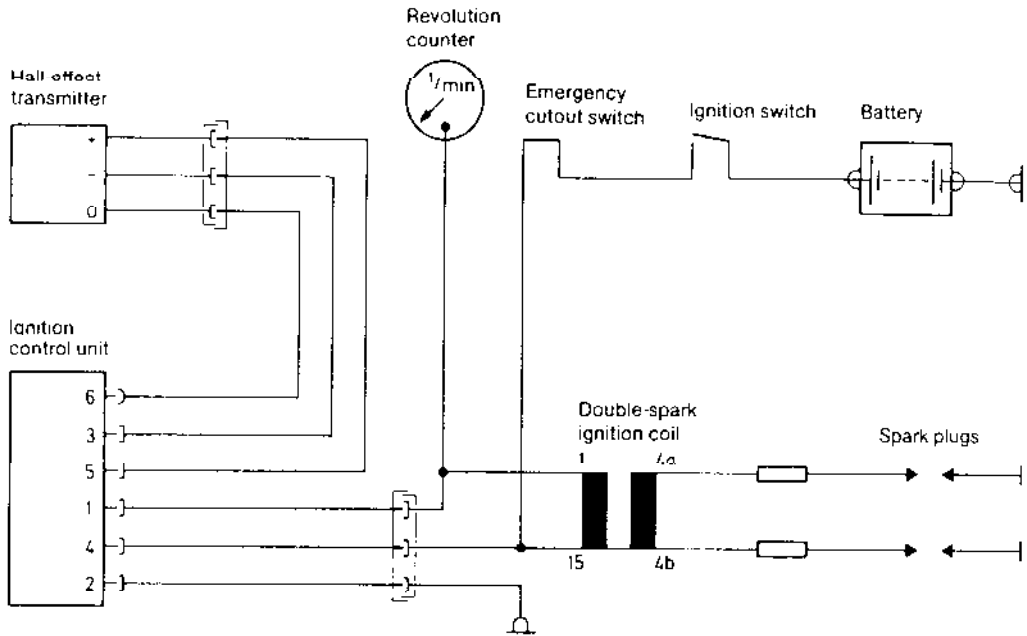
Exhaust system



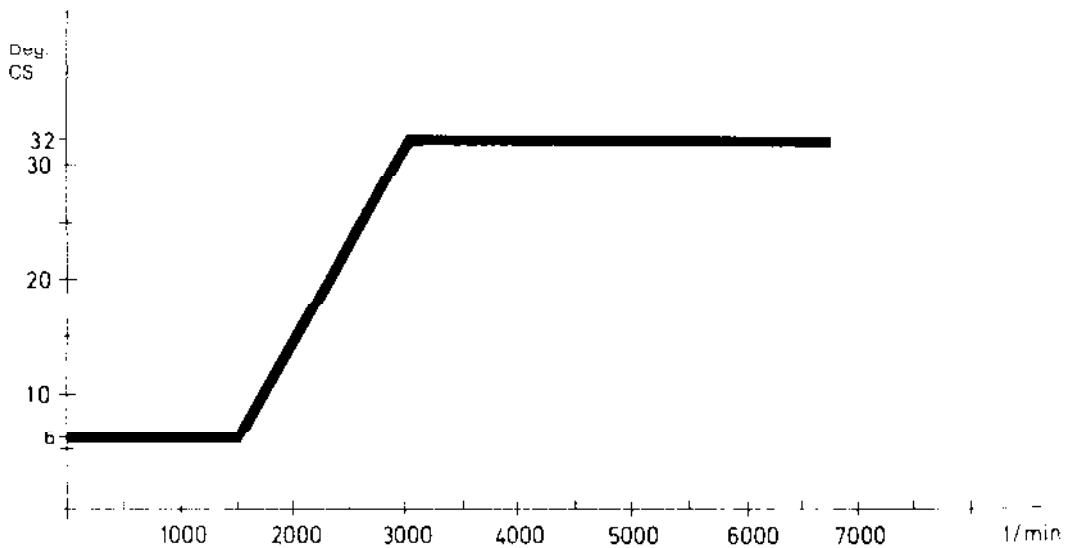
A completely new exhaust system with altered settings (interference pipe with large-volume pre-silencer) further increases power output and torque as well as reducing noise levels by 3 dB(A) compared with the previous model.

At the same time, fuel consumption has been lowered.

Ignition system: circuit diagram/ignition advance/retard graph



Ignition timing graph



Ignition system: operating principle

The BMW R 80's ignition system is of transistorized coil pattern, with a Hall-effect transmitter (TSZ-H); it is breakerless and therefore incurs no mechanical wear and requires no routine maintenance.

The Hall-effect transmitter (a breakerless magnetic gate releases the ignition impulse) replaces the mechanical contact breaker. It regulates the TSZ-H control unit and determines ignition timing (= the point at which the ignition current is switched off). The control unit, on the other hand, determines the switching-on point and therefore the duration of the coil current of app. 7.5 A. This "dwell period" control principle keeps the ignition voltage largely constant at all engine speeds.

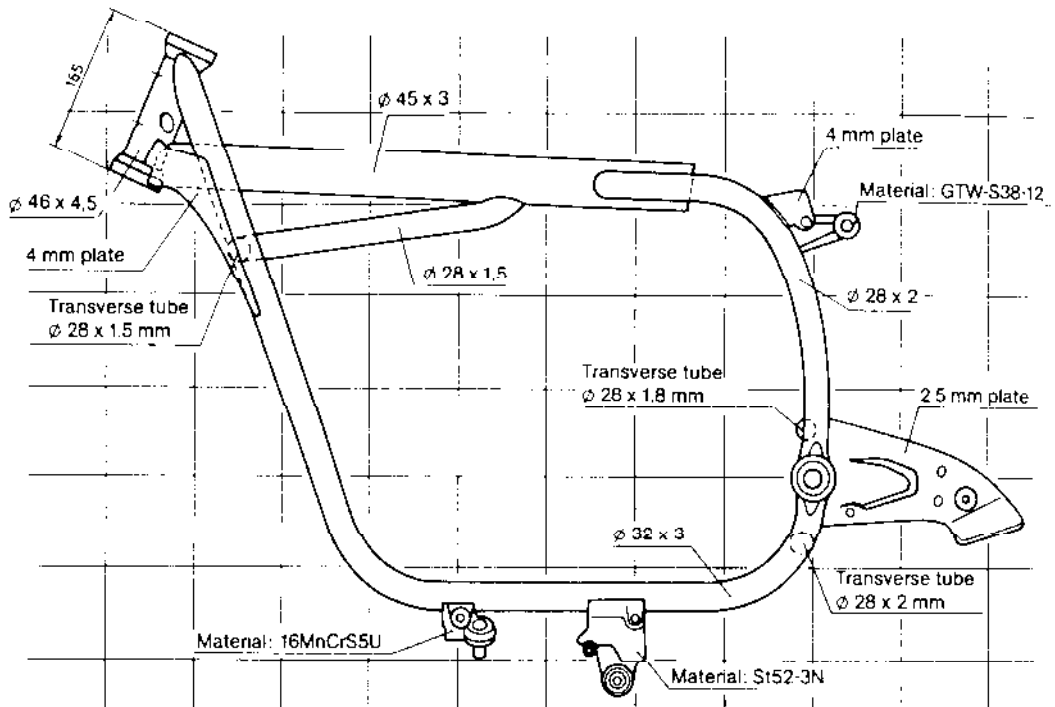
To protect the control unit and the coil against overheating, the current supply to the ignition coil is interrupted after app. 5 seconds when the ignition is switched on but the engine is at a standstill.

It is important for the mechanic to comply with specific safety measures when working on such systems, to avoid personal injury and damage to the system.

In particular, ignition leads (including high-tension leads and measuring equipment cables) should only be attached or removed with the ignition switched off.

In addition, if the engine is to turn over at starting speed without firing, the high-tension lead (terminal 4 on spark-plug cap) must be connected to ground. Avoid booster gaps (spark in circuit prior to spark plug electrode gap).

Frame

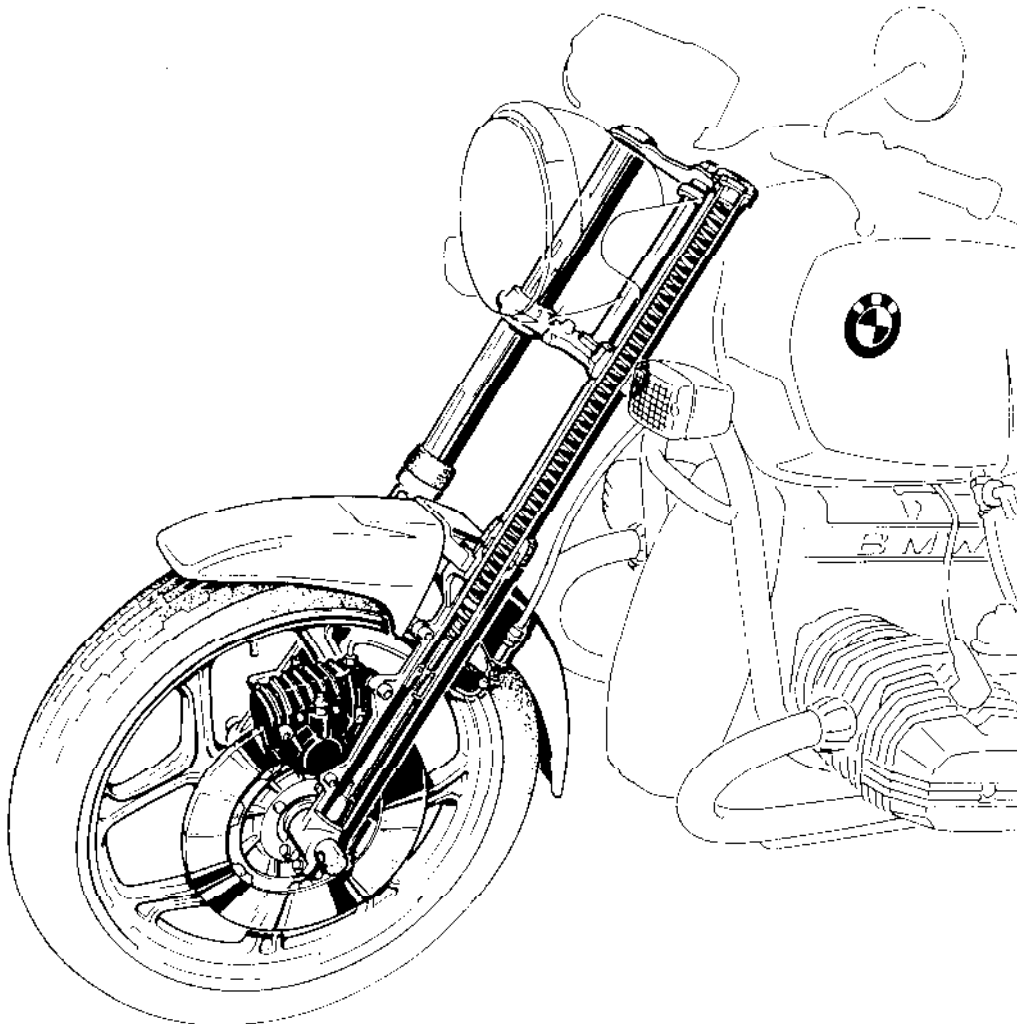


The successful twin loop frame, manufactured of high-strength steel tubing, has been used again on the R 80.

The frame backbone tube has been strengthened, and is now more rigid and can support greater loads.

The frame is fabricated by automatic inert-gas welding and subjected to comprehensive quality assurance testing.

Telescopic fork and front wheel

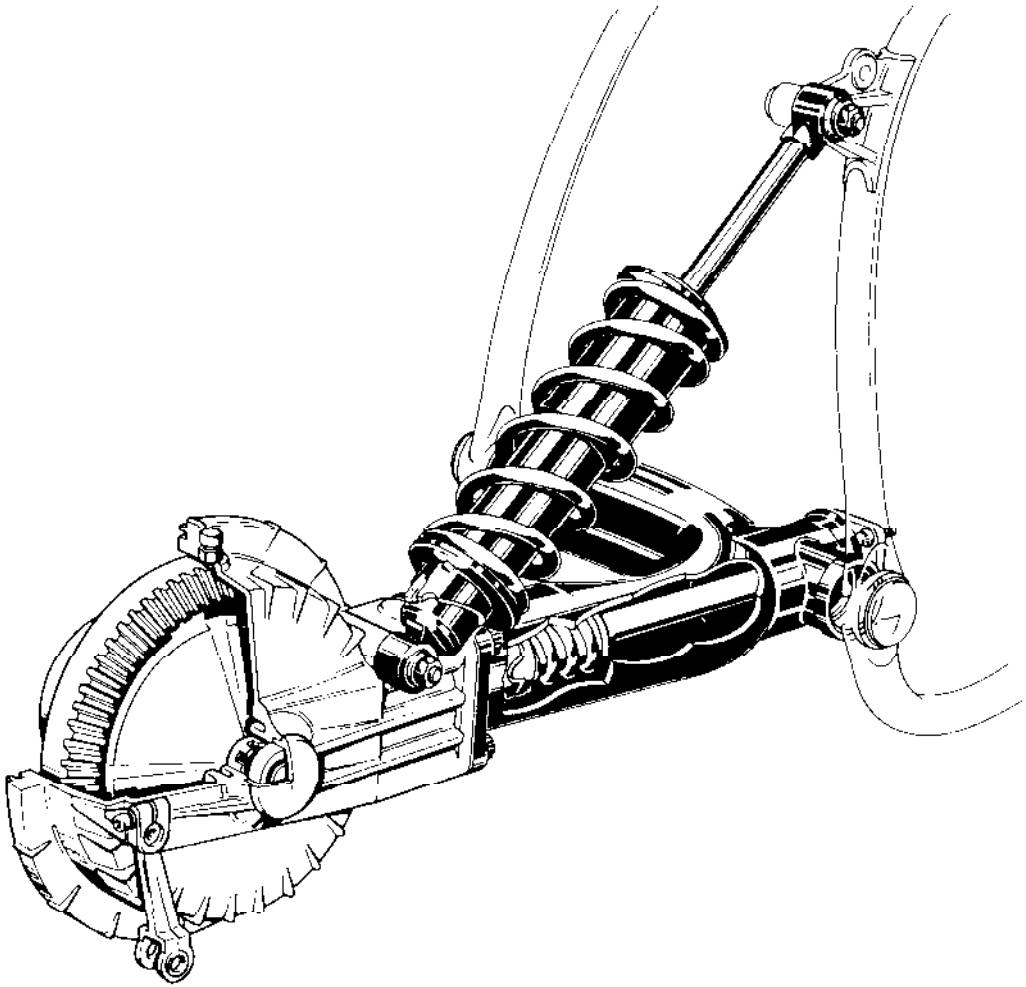


A new design of highly rigid telescopic fork, made up of elements from the 'K' model fork, guarantees absolute riding stability under all load conditions.

The large double disc brake is remarkably efficient. An integral fork stabilizer prevents fork twist.

The Y-spoked cast light alloy wheels with tubeless low profile tires are also new. They are manufactured using ultra-modern casting technology, to ensure uniform elasticity without sacrificing high strength.

Monolever and rear-wheel drive



The BMW "Monolever" swinging arm, pivoted on taper roller bearings, and with a single suspension strut ("Monoshock") has now taken its place as an unmistakable feature of the R 80 too, alongside the G/S, ST and K models which are already equipped in this way.

The single suspension strut (gas-filled spring/damper strut), with its progressive overall rate and four spring rate settings, is now pivoted directly on the rear axle housing.

For reasons of weight and heat expansion, the rear wheel drive has been designed in the same way as on the 'K' models. The crown wheel support shaft consists of a bell-shaped light-alloy forging. A taper roller bearing is used as the outer crown wheel bearing instead of the previous needle roller bearing with thrust shoulder.

R 80 technical data

Engine:

| | |
|---|--|
| Number of cylinders | 2 |
| Displacement cm ³ | 798 (785) |
| Power output kW (bhp) | 37 (50) |
| — at engine speed | 6500 min. ⁻¹ |
| Max. torque Nm (lb/Ft) | 58 (42.8) |
| — at engine speed | 4000 min. ⁻¹ |
| Bore, mm | 84.8 |
| Stroke, mm | 70.6 |
| Stroke/bore ratio | 0.83 |
| Compression ratio | 8.2:1 |
| Fuel | Low Octane, octane number 91 (RM). |
| Valve angle | 2 x 33° |
| Inlet valve diameter, mm | 42 |
| Exhaust valve diameter, mm | 38 |
| Camshaft profile | 308° |
| Valve stroke, mm | 9.5 |
| Cam included angle | 110° |
| Valve timing (for checking purposes), measured at 2 mm valve clearance | Inlet opens 16° b. TDC. Inlet closes 44° a. BDC Exhaust opens 56° b. BDC Exhaust closes 4° a. TDC |
| Intake port diameter a throttle butterfly, mm | 30 |
| Intake port diameter at cylinder head, mm | 36 |
| Exhaust port diameter | 38 |
| Engine oil content | |
| — without oil filter (Quarts) | 2.25 (2.37) |
| — with oil filter (Quarts) | 2.50 (2.64) |
| Oil filter | Micronic element |
| Oil pump | Trochoidal pump |
| Oil circuit operating pressure | app. 6 bar |
| Theoretical circulating capacity l/h (qt/h) | 1320 (1395) |
| — at engine speed | 6000 min. ⁻¹ |
| Engine cooling principle | Air-cooled |
| Air filter | Micronic, plate-type |

Dimensions:

| | |
|---|--------------|
| Overall width, mm (in) | 746 (29.4) |
| Overall length, mm (in) | 360 (14.2) |
| Overall height, mm (in) | 490 (19.3) |
| Weight, kg (lb) | 58.4 (128.8) |
| (including intake system and clutch, excluding oil) | |

Clutch:

Single dry plate

| | |
|-----------------------------------|------------|
| Plate diameter, mm (in) | 160 (6.30) |
| Force required at handlebar lever | 50-70 N |

Transmission:

5-speed gearbox with claw-type selector mechanism and integral torsional vibration damper.

| Gear ratios | | Gap between ratios |
|-------------|--------|--------------------|
| 1st gear | 4.40:1 | 1.54 |
| 2nd gear | 2.86:1 | 1.38 |
| 3rd gear | 2.07:1 | 1.24 |
| 4th gear | 1.67:1 | |
| 5th gear | 1.50:1 | |
| Weight | | 11.3 kg |

Rear wheel drive:

Palloid gear-pattern crown wheel and pinion.

| | R 80 | R 80 RT |
|-------------------|--------|---------|
| Final drive ratio | 3.20:1 | 3.36:1 |
| Number of teeth | 32:10 | 37:11 |

Mixture preparation:

Two Bing constant-depression carburetors with cold-starting system, Ref. No. V 64/32/353 left, 64/32/354 right.

| | |
|--------------------------------|--------------------|
| Carburettor throat diameter mm | 32 |
| Main jet | 130 |
| Needle jet | 2.68 |
| Needle position | 3rd notch from top |
| Idle jet | 45 |

Ignition system:

Breakerless transistorized coil ignition (TSZ-H) with centrifugal control

| | |
|----------------------------|---|
| Ignition timing (advance) | 6° - 32° |
| Control movement begins at | app. 1550 min ⁻¹ |
| Control movement ends at | app. 3000 min ⁻¹ |
| Spark plugs | M 14 x 1.25 mm thread |
| Approved makes | Bosch W7D, Champion N ^o 10Y, |
| Beru | 14-7 D |
| Electrode gap, mm (in) | .06 + 0.1 (0.024 + 0.004) |

Alternator:

| | |
|------------------------------|-----------------------|
| Rating | 14 V, 20 A (280 Watt) |
| Electronic voltage regulator | 14 V/2 |

Starter motor:

Pre-engaged helical-thread drive

| | |
|-----------------|--------|
| Rating, kW | 0.7 |
| Ratio | 12.2:1 |
| Number of teeth | 111:9 |

Front fork:

Long-stroke telescopic fork with double-acting hydraulic damping and progressive-spring rates.

| | |
|--------------------------------------|------------------------------|
| Total suspension travel, mm (in) | 185 (7.28) |
| Fixed tube diameter, mm (in) | 38.5 (1.52) |
| Max. lock angle | 2 x 42° (2 x 33° on R 80 RT) |
| Quick-release axle diameter, mm (in) | 25 (0.98) |

“Monolever” rear suspension:

Torsion-free single swinging arm comprising seamless steel tube, with a single suspension strut (coil spring and gas-filled damper; four-position setting)

| | |
|----------------------------------|------------|
| Total suspension travel, mm (in) | 121 (4.76) |
|----------------------------------|------------|

Wheels:

Pressure chill-cast light alloy:

| | |
|-------------|-------------|
| Rim profile | MT-H2 |
| Size, front | 2.50" x 18" |
| rear | 2.50" x 18" |

Tire:

| | |
|---------------------------|------------------|
| Tubeless low profile tire | 90/90 - 18 51 H |
| Size, front | |
| Size, rear | 120/90 - 18 65 H |

Brakes:

| | |
|---|-------------------------------|
| Front: hydraulic fixed-caliper disc | dual disc |
| Brake disc diameter, mm (in) | 285 (11.2) |
| Brake disc thickness, mm (in) | 4 (0.16) |
| Piston diameter in caliper, mm (in) | 38 (1.50) |
| Master cylinder diameter, mm (in) | 13 (0.51) |
| Brake pad area, cm ² (in ²) | 80 (12.40) |
| Brake pads | semi-metallic - asbestos-free |
| Rear: | |
| Drum brake partly integrated into rear wheel drive | |
| Drum diameter, mm (in) | 200 (7.87) |
| Brake lining area, cm ² (in ²) | 89 (13.8) |
| Brake operated by rod linkage | |

Dimensions and weights:

| | R 80 | R 80 RT |
|---|-------------|-------------|
| Overall length, mm (in) | 2175 (85.6) | 2175 (85.6) |
| Max. width (over footrests), mm (in) | 530 (20.9) | 530 (20.9) |
| Max. width (with mirrors), mm (in) | 800 (31.5) | 932 (36.7) |
| Max. height (excl. mirrors), mm (in) | 1106 (43.5) | 1478 (58.2) |
| Width over handlebar (excl. mirrors), mm (in) | 635 (25.0) | 714 (28.1) |
| Wheelbase at unladen weight, mm (in) | 1447 (57.0) | 1447 (57.0) |
| Caster at unladen weight, mm (in) | 120 (4.7) | 120 (4.7) |

Dimensions and weights:

| | R 80 | R 80 RT |
|--|-------------|-------------|
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| Wheelbase at unladen weight, mm (in) | 1447 (57.0) | 1447 (57.0) |
| Caster at unladen weight, mm (in) | 120 (4.7) | 120 (4.7) |
| Steering head angle, unladen | 62° | 62° |
| Wheelbase in normal-load position (with rider), mm (in) | 1439 (56.6) | 1439 (56.6) |
| Caster in normal-load position (with rider), mm (in) | 116 (4.6) | 116 (4.6) |
| Steering head angle in normal-load position (with rider) | 62° 10' | 62° 10' |
| Seat height at unladen weight, mm (in) | 807 (31.8) | 807 (31.8) |
| Ground clearance at unladen weight, mm (in) | 140 (5.5) | 140 (5.5) |
| Heel angle, right/left (with rider) | 43.5° | 43.2° |
| Dry weight (without fuel, lubricants or tools), kg (lb) | 190 (419) | 207 (456) |
| Unladen weight (ready for road, with tank full), kg (lb) | 210 (463) | 227 (500) |
| Gross weight limit, kg (lb) | 440 (970) | 440 (970) |

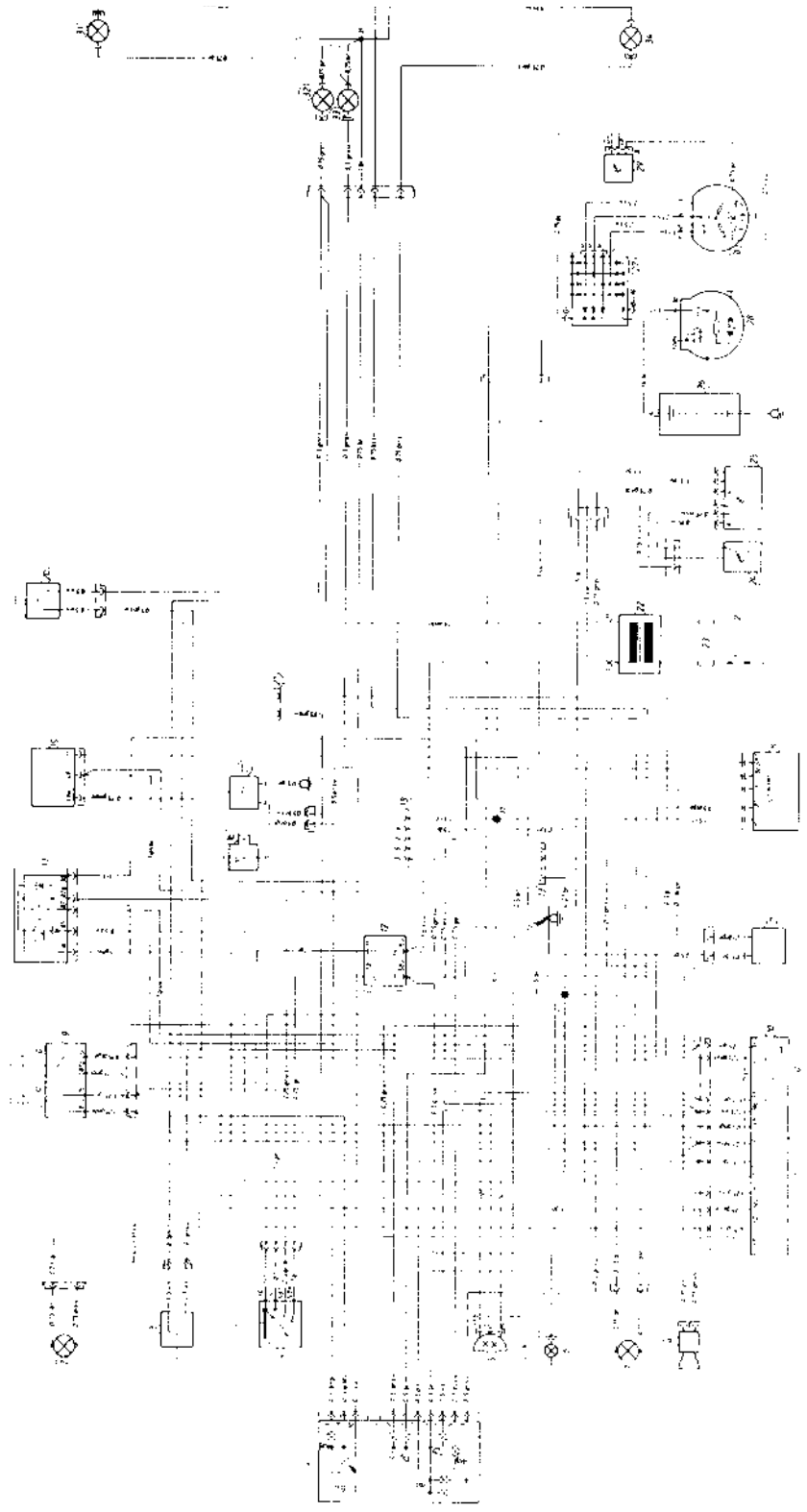
Performance:

| | | |
|---|-----------|-----------|
| Top speed, rider prone, km/h (mile/h) | 178 (111) | 170 (106) |
| Top speed, acc. to type test, km/h (mile/h) | 170 (106) | 165 (102) |

Acceleration:

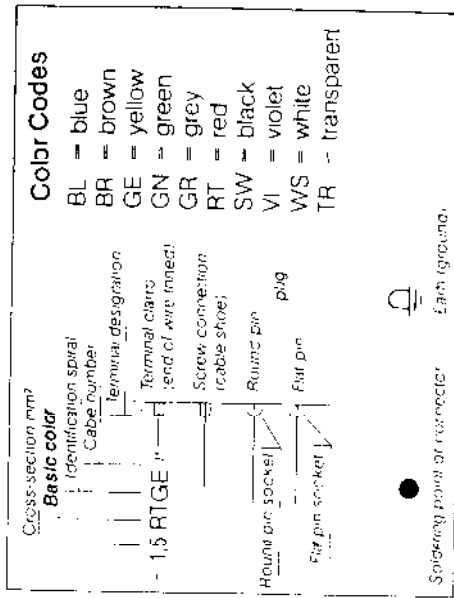
| | | |
|--------------------------|--------|--------|
| 0 - 50 km/h (31 mile/h) | 2.1 s | 2.1 s |
| 0 - 100 km/h (62 mile/h) | 6.0 s | 6.4 s |
| 0 - 120 km/h (75 mile/h) | 8.6 s | 9.2 s |
| 0 - 140 km/h (87 mile/h) | 12.1 s | 14.4 s |
| 0 - 160 km/h (99 mile/h) | 18.4 s | — |
| 0 - 400 m (1312 ft) | 14.4 s | 14.8 s |
| 0 - 1000 m (3281 ft) | 27.7 s | 29.1 s |

55 Electrical circuit diagram R 80

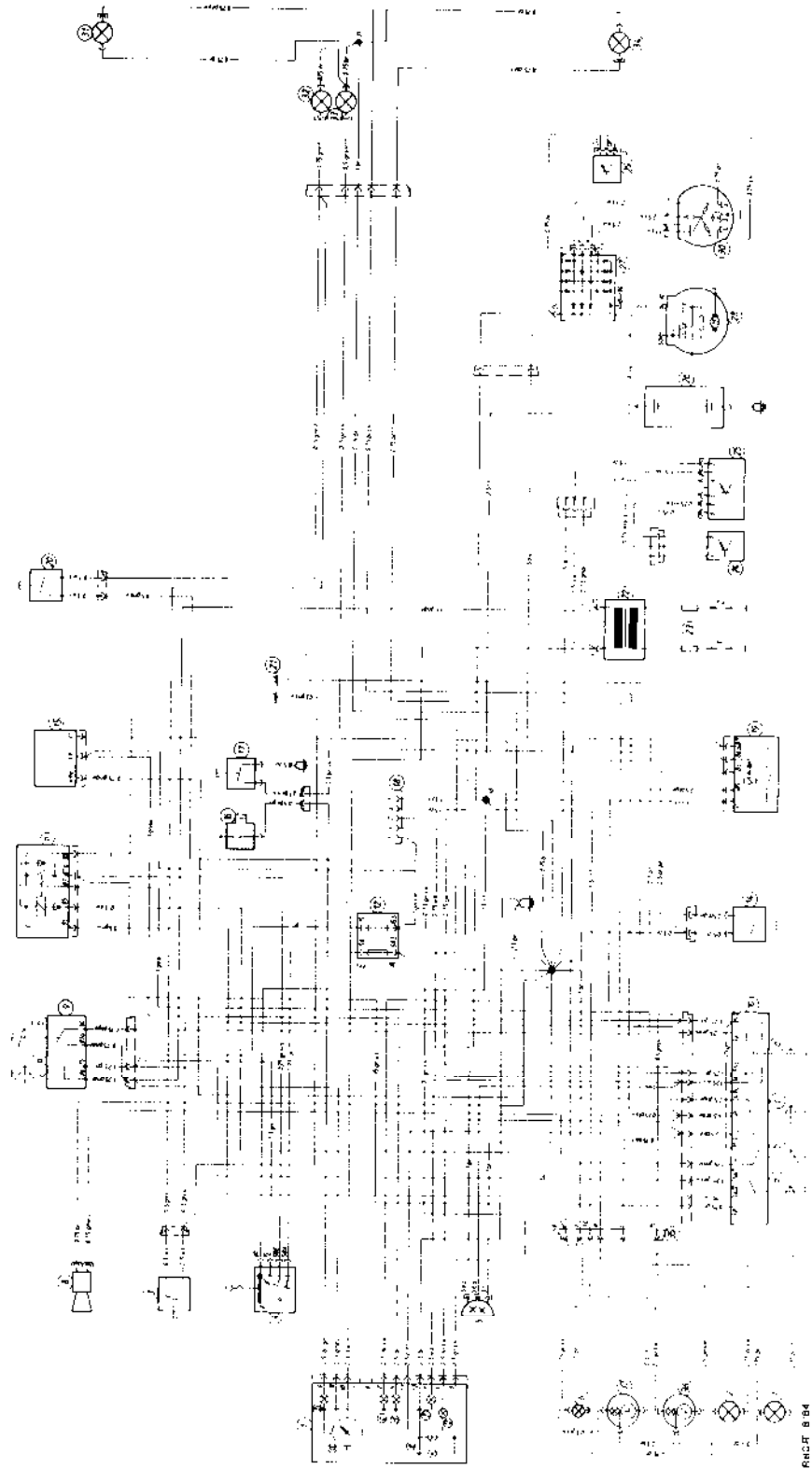


Key to electrical circuit diagram - R 60

- | | | | |
|----|---------------------------------------|----|---------------------------|
| 1 | Instruments | 25 | Ignition control unit |
| a) | Revolution counter | 26 | Battery |
| b) | Oil pressure warning | 27 | Rectifier |
| c) | Neutral indicating light | 28 | Starter motor |
| d) | Battery charge failure | 29 | Regulator |
| e) | Instrument lighting | 30 | Alternator |
| f) | High-beam failure | 31 | Rear right turn indicator |
| g) | Turn indicator repeater | 32 | Brake light |
| 2 | Front light turn indicator | 33 | Rear light |
| 3 | Hand brake light switch | 34 | Rear left turn indicator |
| 4 | Ignition switch | | |
| 5 | Headlight | | |
| 6 | Parking light | | |
| 7 | Front left turn indicator | | |
| 8 | Horn | | |
| 9 | Right handlebar switch assembly | | |
| a) | Emergency cutout ("kill") switch | | |
| b) | Starter switch | | |
| 10 | Left handlebar switch assembly | | |
| a) | Light switch | | |
| b) | Form button | | |
| c) | Turn indicator switch | | |
| d) | High-beam headlight switch | | |
| 11 | Light relay | | |
| 12 | Fuse box | | |
| 13 | Connection for additional instruments | | |
| 14 | Clutch switch | | |
| 15 | Flasher unit | | |
| 16 | Oil pressure switch | | |
| 17 | Neutral switch | | |
| 18 | Connection for special equipment | | |
| 19 | Starter relay | | |
| 20 | Foot brake light switch | | |
| 21 | Connection for heated handlebar grips | | |
| 22 | Ignition coil | | |
| 23 | Spark plugs 1 and 2 | | |
| 24 | Hall-effect transmitter | | |



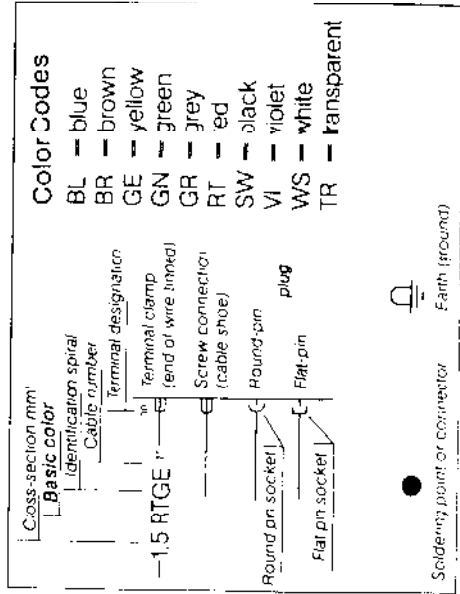
Electrical circuit diagram R 80 RT



RUCF 8 B4
1244-57

Key to electrical circuit diagram - R 80 FT

- | | | | |
|----|---------------------------------------|----|---------------------------|
| 1 | Instruments | 25 | Ignition control unit |
| a) | Revolution counter | 26 | Battery |
| b) | Oil pressure telltale | 27 | Rectifier |
| c) | Neutral indicating light | 28 | Starter motor |
| d) | Battery charge telltale | 29 | Regulator |
| e) | Instrument lighting | 30 | Alternator |
| f) | High-beam telltale | 31 | Rear right turn indicator |
| g) | Turn indicator repeater | 32 | Brake light |
| 2 | Front right turn indicator | 33 | Rear light |
| 3 | Hand brake light switch | 34 | Rear left turn indicator |
| 4 | Ignition switch | 35 | Connection for fairing |
| 5 | Headlight | 36 | Voltmeter |
| 6 | Parking light | 37 | Clock |
| 7 | Front left turn indicator | | |
| 8 | Horn | | |
| 9 | Right handlebar switch assembly | | |
| a) | Emergency cutout (kill) switch | | |
| b) | Starter switch | | |
| 10 | Left handlebar switch assembly | | |
| a) | Light switch | | |
| b) | Horn button | | |
| c) | Turn indicator switch | | |
| d) | High-beam headlight switch | | |
| 11 | Light relay | | |
| 12 | Fuse box | | |
| 13 | Connection for additional instruments | | |
| 14 | Clutch switch | | |
| 15 | Flasher unit | | |
| 16 | Oil pressure switch | | |
| 17 | Neutral switch | | |
| 18 | Connection for special equipment | | |
| 19 | Starter relay | | |
| 20 | Foot brake light switch | | |
| 21 | Connection for heated handlebar grips | | |
| 22 | Ignition coil | | |
| 23 | Spark plugs 1 and 2 | | |
| 24 | Hall-effect transmitter | | |



Servicing Data R 80 models

Item:

| | | | | |
|-------------------------------|---|---------------------------|--------------|---|
| Oil filling capacities | Engine with filter | 2.5 (2.64) | | litre (US Qt) |
| | Engine without filter | 2.25 (2.36) | | litre (US Qt) |
| | | | | Brand-name HD oil for spark ignition engines; API classifications SE and SF |
| | | | | Viscosity according to outside temperature |
| | | | | litre (US Qt) |
| | Gearbox | 0.8 (0.85) | | Brand-name hypoid gear oil |
| | Rear wheel drive | 0.35 (0.37) | | API classification GL 5 |
| | Rear swinging arm | 0.15 (0.16) | | litre (US Qt) |
| | Telescopic fork, per fork leg | 0.27 (0.29) | | Brand-name hypoid gear oil |
| | | | | API classification GL 5 |
| | | | | litre (US Qt) |
| | | | | See repair manual for oil grades |
| Valve clearance | Measured cold, i.e. max. 35 °C | Up to 1000 km Inlet: | Subsequently | |
| | | 0.15 (0.006) | 0.10 (0.004) | mm (in) |
| | | Exhaust: 0.25 (0.01) | 0.20 (0.008) | mm (in) |
| Ignition timing | Static adjustment | 6 | | ° b TDC |
| | Dynamic check above 3000 min ⁻¹ engine speed | 32 | | ° b TDB |
| Spark plugs | Bosch W 7 D Champion N-10Y Beru 14-7 D | | | |
| | Electrode gap | 0.6 + 0.1 (0.024 + 0.004) | | mm (in) |
| Idle speed | | 950 + 50 | | min ⁻¹ |
| Clutch play | Wire cable on gearbox | 202 (7.96) | | mm (in) |
| | Wire cable on handlebar lever | 2.5 (0.098) | | mm (in) |
| Tire pressure | Depending on load | | | |
| | Front | 2.2-2.4 (31.9-34.8) | | bar (PSI) |
| | Rear | 2.5-2.9 (36.3-42) | | bar (PSI) |

Tightening torques

| | | |
|--|------------|------------|
| Oil filter cap | 10 (7.37) | Nm (lb ft) |
| Engine oil drain plug | 30 (22.1) | Nm (lb ft) |
| Gearbox oil drain plug | 25 (18.4) | Nm (lb ft) |
| Gearbox oil filter plug | 30 (22.1) | Nm (lb ft) |
| Rear wheel drive oil drain plug | 22 (16.2) | Nm (lb ft) |
| Rear wheel drive oil filter plug | 20 (14.8) | Nm (lb ft) |
| Oil filter/drain plug on rear swinging arm | 14 (10.3) | Nm (lb ft) |
| Cylinder heads | 37 (27.3) | Nm (lb ft) |
| Locknut on valve clearance adjusting screw | 20 (14.8) | Nm (lb ft) |
| Cylinder head cover cap nut | 20 (14.8) | Nm (lb ft) |
| Spark plugs | 25 (18.4) | Nm (lb ft) |
| Clips for pre-striker | 21 (15.5) | Nm (lb ft) |
| Danger slider tube mounting | 15 (11.0) | Nm (lb ft) |
| Quick-release axle threaded joint (axial) | 33 (24.3) | Nm (lb ft) |
| Quick-release axle clip | 14 (10.3) | Nm (lb ft) |
| Reinforcing hoop on slider tubes | 15 (11.1) | Nm (lb ft) |
| Central nut for steering head bearing | 108 (79.6) | Nm (lb ft) |
| Brake caliper mountings | 32 (23.6) | Nm (lb ft) |
| Rear wheel retaining bolts | 105 (77.4) | Nm (lb ft) |
| Center stand at pivot mount | 42 (31.0) | Nm (lb ft) |
| Suspension strut (at top and bottom) | 29 (21.4) | Nm (lb ft) |
| Swinging arm bearing pin | 16 (11.7) | Nm (lb ft) |
| Locknut for bearing pin | 100 (73.7) | Nm (lb ft) |