WORKSHOP MANUAL

R80/7 R100T R100S R100 RT R100 RS

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AIR FILTER

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FOREWORD

This Repair Manual is designed to assist in ensuring that all necessary maintenance and repair work is carried out in a skilled and competent manner. It is for the use of master mechanics and fitters whose practical and theoretical training at our Service School will be complemented by the detailed information provided in this reference work.

Each main section is preceded by the relevant Technical Data.

The same classification system has been adopted as that used in our Flat Rate Manual.

The page references are broken down as follows, for example 33–10/2:

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The special tools necessary for carrying out some aspects of repair work are summarized in Service Promotion (Equipment Advice) Information bulletin No. 6/76 (419 R). In each case their use is illustrated for relevant jobs.

For each operation a description of the removal procedure is always given. If installing is not possible in reverse sequence, appropriate instructions will be provided.

Supplements to this Repair Manual consist of Alterations and Additions. If the sheet is marked 'Alteration', the existing page with the same number should be deleted and the new page inserted. 'Addition' sheets are added to the manual at the correct points.

If technical modifications lead to duplication of the work number, the second repair procedure is printed with the same number on colored paper and these sheets must then be inserted as an addition to the manual.

In addition to the improvements and modifications which are notified regularly by Service Information bulletins we can recommend our clearly and generously illustrated Spare Parts Microfilms as an additional source of information.

BMW Motorrad GmbH + Co.
Customer Service Department

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12.77 Alteration

11.78 Addition

Engine — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Mean piston speed m/s (ft/min) at engine speed min⁻¹ (rpm)	16.4 (3228) * 17.1 (3366) 7000 * 7250	16.55 (3248) 6600	17.1 (3366) 7250		
Compression in bar good normal poor	more than 10.0 8.5 ... 10.0 below 8.5				
Compression test instructions (Motorcycle with starter)	1. Unscrew spark plugs 2. Measurement to be carried out with a calibrated compression gauge with fully charged battery, engine at normal operating temperature at starter speed. Remove constant pressure carburetor before test.				
Weight complete, kg (lbs) with starter, carburetor, oil; without coils and intake system	63.5 (140.0)	62.5 (137.8)			
Fuel grade	* regular grade fuel super (premium) fuel				
Rated fuel consumption Imperial miles per gallon /us mpg/liters per 100 km (at 110 km [68 mile/h])	59.5/49.5/4.75 * 56.5/47.0/5.0	51.8/43.2/5.45	49.1/40.9/5.75		

* low-compression engine

11–0/19

11.78 Addition

Engine — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Rotor height, mm (in)	$14^{-0,015}_{-0,045}$ ($0.5512^{-0.00059}_{-0.00177}$)				
Housing depth, mm (in)	$14^{+0,025}_{+0,010}$ ($0.5512^{+0.00098}_{+0.00039}$)				
Clearance between pump housing base and rotor seal base, mm (in)	0.025 ... 0.070 (0.00098 ... 0.00275)				
Gap between inner and outer rotor, mm (in)	0.12 ... 0.20 (0.0047 ... 0.0079)				
Entry depth in cover, maximum, mm (in)	0.05 (0.0020)				
Length of excess pressure spring, unbased, mm (in)	68 (2.677)				
Valve Clearance: Set with engine cold, max. 35° C (95° F)	temperature				
On Inlet valve, mm (in)	0.15 (0.006)	(0.10 (0.004)			
Exhaust valve, mm (in)	0.20 (0.008)	(0.15 (0.006)	after 1000 km [600 mile] Inspection)		
Valve timing settings (tolerance ± 2.0°)	Camshaft setting with 2 mm (0.08 in) valve clearance				
Inlet opens	16° BTDC				
Inlet closes	44° ABDC				
Exhaust opens	56° BBDC				
Exhaust closes	4° BTDC				
Valves: Overall valve length					
Inlet, mm (in)	98.8–0.4 (3.890–0.016)				
Exhaust, mm (in)	98.8–0.4 (3.890–0.016)				
Valve head diameter Inlet, mm (in)	42 (1.654)	44 (1.73)			
Valve head diameter Exhaust, mm (in)	38 (1.496)	40 (1.575)			
Stem diameter Inlet, mm (in)	$8^{-0.050}_{-0.065}$ ($0.3150^{-0.0020}_{-0.0026}$)				

11–0/21

Engine — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Mean piston speed m/s (ft/min) at engine speed min	16.4 (3228) * 17.1 (3366) 7000 * 7250	16.55 (3248) 6600	17.1 (3366) 7250		
Compression in bar good / normal / poor	more than 10.0 8.5 ... 10.0 below 8.5				
Compression test instructions (Motorcycle with starter)	1. Unscrew spark plugs 2. Measurement to be carried out with a calibrated compression gauge with fully charged battery, engine at normal operating temperature at starter speed. Remove constant pressure carburetor before test.				
Weight complete, kg (lbs) with starter, carburetor, oil, without coils and intake system	63.5 (140.0)	62.5 (137.8)			
Fuel grade	* regular grade fuel super (premium) fuel				
Rated fuel consumption Imperial miles per gallon /us mpg/liters per 100 km (at 110 km [68 mile/h])	59.5/49.5/4.75 * 56.5/47.0/5.0	51.8/43.2/5.45	49.1/40.9/5.75		

* low-compression engine

Engine — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Rotor height, mm (in)	$14^{-0,015}_{-0,045}$ (0.5512$^{-0.00059}_{-0.00177}$)				
Housing depth, mm (in)	$14^{+0,025}_{+0,010}$ (0.5512$^{+0.00098}_{+0.00039}$)				
Clearance between pump housing base and rotor seal base, mm (in)	0.025 ... 0.070 (0.00098 ... 0.00275)				
Gap between inner and outer rotor, mm (in)	0.12...0.20 (0.0047...0.0079)				
Entry depth in cover, maximum, mm (in)	0.05 (0.0020)				
Length of excess pressure spring, unbased, mm (in)	68 (2.677)				
Valve Clearance: Set with engine cold, max. 35° C (95° F)	temperature				
Inlet valve, mm (in)	0.15 (0.006)	(0.10 (0.004)	after 1000 km [600 mile] Inspection)		
Exhaust valve, mm (in)	0.20 (0.008)	(0.15 (0.006)	after 1000 km [600 mile] Inspection)		
Valve timing settings (tolerance ± 2.0°)	Camshaft setting with 2 mm (0.08 in) valve clearance				
Inlet opens	16° BTDC				
Inlet closes	44° ABDC				
Exhaust opens	56° BBDC				
Exhaust closes	4° BTDC				
Valves: Overall valve length					
Inlet, mm (in)	98.8−0.4 (3.890−0.016)				
Exhaust, mm (in)	98.8−0.4 (3.890−0.016)				
Valve head diameter Inlet, mm (in)	42 (1.654)		44 (1.73)		
Valve head diameter Exhaust, mm (in)	38 (1.496)		40 (1.575)		
Stem diameter Inlet, mm (in)	$8^{-0.050}_{-0.065}$ (0.3150$^{-0.0020}_{-0.0026}$)				

Engine — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Stem diameter, mm (in) Exhaust, mm (in)	$8^{-0.050}_{-0.065}$ ($0.3150^{-0.0020}_{-0.0026}$)				
Minimum rim thickness of valve head Inlet, mm (in)	1 (0.039)				
Exhaust, mm (in)	1 (0.039)				
Valve head deflection, mm (in)	0.025 (0.0010)				
Valve seat ring: Outer diameter, mm Inlet	$43{,}2^{0}_{-0{,}025}$ ($1.701^{0}_{-0.001}$)		$45.2^{0}_{-0.025}$ ($1.780^{0}_{-0.001}$)		
Outer diameter, mm Exhaust	$43{,}2^{0}_{-0.066}$ ($1.701^{0}_{-0.002}$)		$45.2^{0}_{-0.025}$ ($1.780^{0}_{-0.001}$)		
Valve seat ring bore in cylinder head: Inlet, mm	$43^{+0.025}_{0}$ ($1.693^{+0.001}_{0}$)		$45^{+0.025}_{0}$ ($1.772^{+0.001}_{0}$)		
Exhaust, mm	$43^{+0.025}_{0}$ ($1.693^{+0.001}_{0}$)		$45^{+0.025}_{0}$ ($1.772^{+0.001}_{0}$)		
Interference fit in head Inlet, mm	0.15 . . . 0.20 (0.006 . . . 0.008)				
Exhaust, mm	0.11 . . . 0.15 (0.004 . . . 0.006)				
Valve seat angle, degrees	45				
Valve seat width: Inlet, mm (in)	1.5 (0.059)				
Exhaust, mm (in)	2.0 (0.079)				

Engine — Specification — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Engine Lubrication: Lubrication system	Force feed circulation				
Oil filter	in main circuit (full flow)				
Differential pressure for opening the bypass valve – bars (lb/in²)	1.5 (21.3)				
Oil pressure warning lamp lights at below	0.2...0.5 bar (2.8...7.1 lb/in²)				
Safety valve opening pressure bars (lb/in²)	5.0 (71.1)				
Oil filling quantity without filter change – liters (Imp. pints/US quarts)	2.0 (3.5/2.1)				
with filter change – liters (Imp. pints/US quarts)	2.25 (4.0/2.38)				
Oil consumption litres/100 km max.	0.1 (355 mile/Imp. pint)				
Type of oil to be used	HD branded oil for spark ignition engines				
Viscosity at external temperature, primarily over +30° C (86° F)	SAE 40, SAE 20 W 50				
over 0° C (32° F)	SAE 20 W 40, SAE 20 W 50				
below 0° C (32° F)	SAE 10 W 30, SAE 10 W 40, SAE 10 W 50				
All the year round, down to –20° C (–4° F)	SAE 15 W 50				
Oil Pump Oil pump design	Eaton type (hyp. trochoidal gearing)				
Delivery liters/hour at rev/min	1400 (308 Imp. gal.) 6000 (1320 Imp. gal.)				
Outer rotor diameter, mm (in)	$57.1^{0}_{-0{,}025}$ ($2.248^{0}_{-0.0010}$)				
Housing inner diameter, mm (in)	$57{,}2^{+0{,}046}_{0}$ ($2.252^{+0.0018}_{0}$)				
Outer rotor/pump housing clearance, mm (in)	0.10...0.17 (0.0039...0.0067)				

Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Valve Springs:					
Wire thickness, mm (in)	4.25 (0.167)				
Outer coil diameter, mm (in)	31.9 (1.256)				
Spring length, relaxed, mm (in)	approx. 43.5 (1.712)				
Spring force in kp at test length, mm (lb/in)	29 at 37.6	70 at 28.5 (63.9 at 1.48; 154 at 1.12)			
Coil direction	right hand				
Number of windings, resilient	4				
Number of windings, total	6				
Fitting direction	With the windings painted green facing the cylinder head side				
Rocker arms:	needle roller mounted				
Axial float of rocker arm	Clearance-free but easily movable				
Rocker arm ratio	1 : 1.39				

Specifications

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Crankshaft and bearings	Main bearing journal dia. mm (in)				
Crankshaft	Generator end			Flywheel end	
Crankshaft markings	red/red	59.980 ... 59.990 (2.3614 ... 2.3618)		59.980 ... 59.990 (2.3614 ... 2.3618)	
	red/blue	59.980 ... 59.990 (2.3614 ... 2.3618)		59.971 ... 59.980 (2.3611 ... 2.3614)	
Standard	blue/red	59.971 ... 59.980 (2.3611 ... 2.3614)		59.980 ... 59.990 (2.3614 ... 2.3618)	
	blue/blue	59.971 ... 59.980 (2.3611 ... 2.3614)		59.971 ... 59.980 (2.3611 ... 2.3614)	
	red/red	59.730 ... 59.740 (2.3516 ... 2.3520)		59.730 ... 59.740 (2.3516 ... 2.3520)	
Stage 1 — 0.25 mm	red/blue	59.730 ... 59.740 (2.3516 ... 2.3520)		59.721 ... 59.730 (2.3512 ... 2.3516)	
(0.0098 in)	blue/red	59.721 ... 59.730 (2.3512 ... 2.3516)		59.730 ... 59.740 (2.3516 ... 2.3520)	
	blue/blue	59.721 ... 59.730 (2.3512 ... 2.3516)		59.721 ... 59.730 (2.3512 ... 2.3516)	
	red/red	59.480 ... 59.490 (2.3417 ... 2.3421)		59.480 ... 59.490 (2.3417 ... 2.3421)	
Stage 2 — 0.50 mm	red/blue	59.480 ... 59.490 (2.3417 ... 2.3421)		59.471 ... 59.480 (2.3414 ... 2.3417)	
(0.0197 in)	blue/red	59.471 ... 59.480 (2.3414 ... 2.3417)		59.480 ... 59.490 (2.3417 ... 2.3421)	
	blue/blue	59.471 ... 59.480 (2.3414 ... 2.3417)		59.471 ... 59.480 (2.3414 ... 2.3417)	
	red/red	59.230 ... 59.240 (2.3319 ... 2.3323)		59.230 ... 59.240 (2.3319 ... 2.3323)	
Stage 3 — 0.75 mm	red/blue	59.230 ... 59.240 (2.3319 ... 2.3323)		59.221 ... 59.230 (2.3315 ... 2.3319)	
(0.0295 in)	blue/red	59.221 ... 59.230 (2.3315 ... 2.3319)		59.230 ... 59.240 (2.3319 ... 2.3323)	
	blue/blue	59.221 ... 59.230 (2.3315 ... 2.3319)		59.221 ... 59.230 (2.3315 ... 2.3319)	
Bore for 3-layer bearing shell in engine block mm (in)	$65^{+0.019}_{0}$ ($2.5591^{+0.0007}_{0}$)				
Bore for 3-layer bearing in bearing cap mm (in)	$65^{+0.019}_{0}$ ($2.5591^{+0.0007}_{0}$)				
Main bearing journal radial clearance mm (in)	0.035 ... 0.065 (0.0014 ... 0.0026)				
Seat dia. for front crankshaft deep-groove ball bearing mm (in)	$35^{+0.025}_{+0.009}$ ($1.3780^{+0.0010}_{+0.0004}$)				
Bearing seat bore for deep-groove ball bearing in timing chain cover mm (in)	$62^{-0.009}_{-0.039}$ ($2.4409^{-0.0004}_{-0.0015}$)				

Engine

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Valve seat ring oversize, mm (in)	0.2 (0.0079)				
Valve guides: inlet:	48 (1.8898)				
Overall length, mm (in) exhaust:	48 (1.8898)				
Outer diameter, mm (in)	$14^{+0.061}_{+0.050}$		$(0.546^{+0.0023}_{+0.0019})$		
Inside diameter, mm (in)	8 H 7 (0.31 H 0.27)				
Bore in cylinder head, mm (in)	14 H 7 (0.54 H 0.27)				
Interference fit in cylinder head, mm (in)	0.032 . . . 0.061 (0.0012 . . . 0.0023)				
Oversize, first stage diameter, mm (in)	$14.1^{+0.061}_{+0.050}$		$(0.555^{+0.0024}_{+0.0020})$		
Second stage diameter, mm (in)	$14.2^{+0.061}_{+0.050}$		$(0.559^{+0.0024}_{+0.0020})$		
Valve stem clearance: inlet, mm (in)	0.050 . . . 0.080 (0.0019 . . . 0.0031)				
Exhaust, mm (in)	0.050 . . . 0.080 (0.0019 . . . 0.0031)				
Maximum permissible wear tolerance, mm (in)	0.15 (0.0059)				
Valve gear: Valve operation	by the camshaft via hard cast tappets, push rods and rocker arms				
Camshaft drive	3/8 x 7/32 in single roller chain with socket insert and hydraulically damped chain tensioner				
Number of links	50				

Engine

Specifications – '79 models

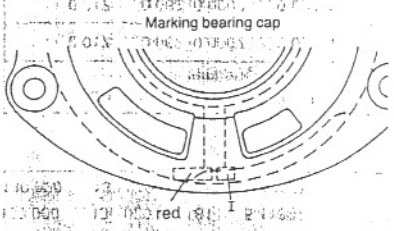
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Camshaft: Flange bearing bore in crank case, diameter, mm (in)	$40^{+0.039}_{0}$		$(1.575^{+0.0015}_{0})$		
Flange bearing outer diameter, mm (in)	$40^{0}_{-0.016}$		$(1.575^{0}_{-0.0006})$		
Flange bearing bore diameter, mm (in)	$25^{+0.013}_{0}$		$(0.984^{+0.0005}_{0})$		
Camshaft bearing journals – alternator end, diameter, mm (in)	$25^{-0.020}_{0.033}$		$(0.984^{-0.0007}_{-0.0012})$		
Bearing bore, flywheel end, for camshaft in crank case, diameter, mm (in)	$24^{+0.021}_{0}$		$(0.945^{0.0008}_{0})$		
Camshaft bearing journal – flywheel end, diameter, mm (in)	$24^{-0.020}_{-0.033}$		$(0.945^{-0.0008}_{-0.0012})$		
Alternator and flywheel end radial clearance, mm (in)	0.02...0.046 (0.0008...0.0018)				
Maximum permissible deflection of contact breaker, shaft, mm (in)	0.02 (0.00079)				
Axial float (clearance between camshaft starter collar and flange mounted bearing) mm (in)	0.1±0.02 (0.0039±0.0008)				
Cam base circle diameter, mm (in)	28 (1.102)				
Cam lift, mm (in)	6.756 (0.2660)				
Tappet outer diameter, mm (in)	$22^{-0.025}_{-0.045}$		$(0.8661^{-0.0010}_{-0.0006})$		
Tappet bore in crankcase, diameter, mm (in)	$22^{+0.006}_{-0.015}$		$(0.8661^{+0.0002}_{-0.0006})$		
Tappet radial clearance, mm (in)	0.01...0.051 (0.0004...0.0020)				
Maximum permissible wear tolerance for tappets, mm (in)	0.075 (0.0030)				
Pushrod length mm (in)	275 ± 0.3				

Engine

Specifications

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Main bearing bushings Wall thickness mm (in)					
Standard 0 red	2.500 . . . 2.510 (0.0984 . . . 0.0988)				
Standard 0 blue	2.511 . . . 2.521 (0.0989 . . . 0.0993)				
Stage 1 0.25 mm (0.0098 in) red	2.625 . . . 2.635 (0.1033 . . . 0.1037)				
Stage 1 0.25 mm (0.0098 in) blue	2.636 . . . 2.646 (0.1038 . . . 0.1042)				
Stage 2 0.50 mm (0.0197 in) red	2.750 . . . 2.760 (0.1083 . . . 0.1087)				
Stage 2 0.50 mm (0.0197 in) blue	2.761 . . . 2.771 (0.1087 . . . 0.1091)				
Stage 3 0.75 mm (0.0295 in) red	2.875 . . . 2.885 (0.1132 . . . 0.1136)				
Stage 3 0.75 mm (0.0295 in) blue	2.886 . . . 2.896 (0.1136 . . . 0.1140)				

Selection table, bearing cap assembly:	to be combined only with Main bearing bushing	Crankshaft	⌀A	⌀B
Bearing cap assembly red	red	red	65.000 . . . 65.015 (2.5591 . . . 2.5596)	130.003 . . . 130.023 (5.1182 . . . 5.1190)
Bearing cap assembly blue	blue	blue	65.015 . . . 65.030 (2.5596 . . . 2.5602)	
Bearing cap assembly red	red	red	65.000 . . . 65.015 (2.5591 . . . 2.5596)	130.023 . . . 130.043 (5.1190 . . . 5.1198)
Bearing cap assembly blue	blue	blue	65.015 . . . 65.030 (2.5506 . . . 2.5602)	
with pressure relief valve				



Engine

Specifications

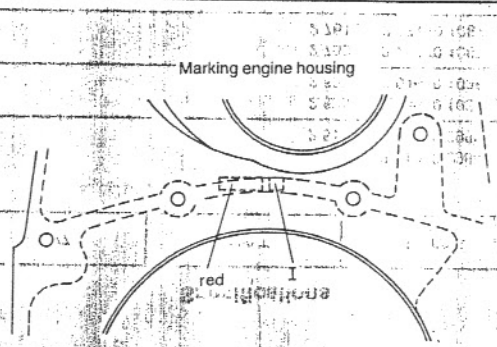
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Main bearings	**Combination I**				
Standard 0	Generator end			Flywheel end	
Crankshaft marking:	Bearing journal dia.	Main bearing bushing	Bearing cap	Bearing journal dia.	Main bearing bushing	Engine block
red/red	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red I	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red I
red/blue	59.980 . . . 59.990 (2.3614 . . . 2.3618)			59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue I
blue/red	59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue I	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red I
blue/blue	59.971 . . . 59.980 (2.3611 . . . 2.3614)			59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue I
Standard	**Combination II**					
Crankshaft marking:						
red/red	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red II	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red II
red/blue	59.980 . . . 59.990 (2.3614 . . . 2.3618)			59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue II
blue/red	59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue II	59.980 . . . 59.990 (2.3614 . . . 2.3618)	red	red II
blue/blue	59.971 . . . 59.980 (2.3611 . . . 2.3614)			59.971 . . . 59.980 (2.3611 . . . 2.3614)	blue	blue II

Engine

Specifications

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Engine block	Ø A (main bearing bores) = 65 (2.5591) H 7			Ø B (bearing cap bore) = 130 (5.1181)	
	red 65.000 . . . 65.015 (2.5591 . . . 2.5596)			I 130.000 . . . 130.020 (5.1181 . . . 5.1189)	
	blue 65.015 . . . 65.030 (2.5596 . . . 2.5602)			II 130.020 . . . 130.040 (5.1189 . . . 5.1197)	

Selection table, engine block assembly	to be combined only with Main bearing bushing	Crankshaft	Main bearing play at 20° C (68° F) ambient temperature
Engine block assembly red I	red	red	0.017 . . . 0.062 (0.0007 . . . 0.0024)
Engine block assembly red II	red	red	0.017 . . . 0.062 (0.0007 . . . 0.0024)
Engine block assembly blue I	blue	blue	0.020 . . . 0.064 (0.0008 . . . 0.0025)
Engine block assembly blue II	blue	blue	0.020 . . . 0.064 (0.0008 . . . 0.0025)



Engine

Specifications '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Seat dia. on crankshaft for chain sprocket mm (in)			$35.003^{+0.020}_{+0.009}$ (1.3781 $^{+0.0008}_{+0.0004}$)		
Chain sprocket mounting bore mm (in)			$35.003^{+0.003}_{-0.013}$ (1.3781 $^{+0.0001}_{-0.0005}$)		
Crankshaft endplay mm (in)			0.08 . . . 0.15 (0.0031 . . . 0.0059)		
Thrust washer red thickness "S" mm (in)			2.483 . . . 2.530 (0.0978 . . . 0.0996)		
blue thickness "S" mm (in)			2.530 . . . 2.578 (0.0996 . . . 0.1015)		
green thickness "S" mm (in)			2.578 . . . 2.626 (0.1015 . . . 0.1034)		
yellow thickness "S" mm (in)			2.626 . . . 2.673 (0.1034 . . . 0.1052)		
Max. play after wear mm (in)			0.20 (0.0079)		
Max. permissible runout at outer shaft journal (generator end when supported at main bearings mm (in)			0.02 60.0008)		
Max. permissible crankshaft imbalance (dynamic) without flywheel cmp			20		
Max. flywheel lateral runout mm (in)			0.1 (0.004)		
Connecting rods and bearings			Crankpin dia. mm (in)		
Standard 0			$48.00^{-0.009}_{-0.025}$ (1.8898 $^{-0.0004}_{-0.0010}$)		
Stage 1 0.25 mm (0.010 in)			$47.75^{-0.009}_{-0.025}$ (1.8799 $^{-0.0004}_{-0.0010}$)		
Stage 2 0.50 mm (0.020 in)			$47.50^{-0.009}_{-0.025}$ (1.8701 $^{-0.0004}_{-0.0010}$)		
Stage 3 0.75 mm (0.030 in)			$47.25^{-0.009}_{-0.025}$ (1.8602 $^{-0.0004}_{-0.0010}$)		
Big end bearing bore mm (in)			$52^{+0.015}_{0}$ (2.0472 $^{+0.0006}_{0}$)		
Big end bearing radial clearance mm (in)			0.023 . . . 0.069 (0.0009 . . . 0.0027)		
Big end bearing width mm (in)			$22^{-0.065}_{-0.117}$ (0.8661 $^{-0.0026}_{-0.0046}$)		
Crankpin bearing width mm (in)			$22^{+0.149}_{+0.065}$ (0.8661 $^{+0.0059}_{+0.0026}$)		
Connecting rod axial play mm (in)			0.130 . . . 0.266 (0.0051 . . . 0.0105)		
Max. axial play after wear mm (in)			0.32 (0.0126)		

Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Centre to centre bore spacing, mm (in)	135 (5.315)				
Connecting rod bore at small end eye (basic bore), diameter, mm (in)	$24^{+0.021}_{0}$		($0.9449^{+0.00081}_{0}$)		
Small end bush outer diameter, mm (in)	24.060...24.100 (0.9472...0.9488)				
Piston pin bore diameter in small end bush, mm (in)	$22^{+0.020}_{+0.015}$		($0.8661^{+0.00078}_{+0.00058}$)		
Piston pin bore diameter in small end bush (wear tolerance), mm (in)	22+0.040		(0.8661+0.00156)		
Maximum permissible devition from Parallel in connecting rod bores with bearing shells over 150 mm spacing, mm (in)	0.04 (0.00156)				
Maximum permissible basic bore twist relative to piston pin bore over 150 mm spacing, mm (in)	1.5 (0.059)				
Permissible weight discrpancy of both connecting rods, g	±3 (0.118)				
Cylinders: Bore diameter, original A mm (in)	84.795+0.01 (3.3384+0.0004)		94.005+0.01 (3.7010+0.0004)		
B mm (in)	84.805+0.01 (3.3388+0.0004)		94.015+0.01 (3.7014+0.0004)		
C mm (in)	84.815+0.01 (3.3392+0.0004)		94.025+0.01 (3.7018+0.0004)		
1st oversize + 0.50 mm (R 100/7—R 100 RS: + 0,25 mm) A mm (in)	85.045+0.01 (3.3482+0.0004)		94.255+0.01 (3.7108+0.0004)		
B mm (in)	85.055+0.01 (3.3486+0.0004)		94.265+0.01 (3.7112+0.0004)		
C mm (in)	85.065+0.01 (3.3490+0.0004)		94.275+0.01 (3.7116+0.0004)		
2nd oversize + 1.00 mm A mm (in)					
B mm (in)					
C mm (in)					
Surface roughness, µm	3 . . . 7				

Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Piston rings: Rectangular ring first groove [1] Height, mm (in)		$1.75^{-0.010}_{-0.022}$	($0.0689^{-0.00039}_{-0.00086}$)		
Ring gap, mm (in)	0.30 . . . 0.50 (0.0117 . . . 0.0197)				
Side clearance, mm (in)	0.06 . . . 0.09 (0.0023 . . . 0.0035)				
Lower compression ring, second groove [1] Height, mm (in)		$2.00^{+0.010}_{+0.022}$	($0.0787^{+0.00039}_{+0.00086}$)		
Ring gap, mm (in)	0.30 . . . 0.45 (0.0117 . . . 0.0175)				
Side clearance, mm (in)	0.04 . . . 0.07 (0.0016 . . . 0.0027)				
Equal chamferring, third groove [1] Height, mm (in)		$4.00^{+0.010}_{+0.022}$	($0.157^{+0.00039}_{+0.00086}$)		
Ring gap, mm (in)	0.25...0.40 (0.0098...0.0157)				
Side clearance, mm (in)	0.03 . . . 0.06 (0.0012 . . . 0.0024)				
Fitting direction of piston rings	With marking "top" upward:				

[1] Not in accordance with DIN specifications – special BMW version

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Permissible ovality of cylinder bore, mm (in)	0.01 (0.00039)				
Permissible taper in cylinder bore, (head end tighter), mm (in)	0.02 (0.00079)				
Pistons:					
Piston form	Convex-rising-oval				
Weight category, piston complete	+ or – punched-in				
Piston diameter mm (in) (original),	A 84.765 (3.3372)	93.960 (3.6992)			
	B 84.775 (3.3376)	93.970 (3.6996)			
	C 84.785 (3.3380)	93.980 (3.7000)			
1st oversize + 0.50 mm (0.019 in) on R 100/7 & R 100 RS; + 0.25 mm (0.0098 in)	A 85.015 (3.3470)	94.210 (3.7090)			
	B 85.025 (3.3474)	94.220 (3.7094)			
	C 85,035 (3.3478)	94.230 (3.7098)			
Piston fitting clearance mm (in)	0.023–0.047 (0.00091…0.00185)	0.028…0.047 (0.00110…0.00185)			
Total permissible wear clearance of piston and cylinder, mm (in)	max. 0.08 (0,0031)				
Piston fitting direction	Arrow with "vorn" in direction of travel				

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Piston pins:					
Piston pin offset from piston centre, mm (in)	1.5 (0.059)				
Piston pin diameter, code-colouring white, mm (in)	$22^{0}_{-0.003}$	$(0.8661^{0}_{-0.00012})$			
Piston pin diameter, code-colouring black, mm (in)	$22^{-0.003}_{-0.006}$	$(0.8661^{-0.00012}_{-0.00024})$			
Bore diameter of piston boss, colour coding (white) W punched in piston crown, mm (in)	$22^{+0.003}_{0}$	$(0.8661^{+0.00012}_{0})$			
Bore diameter of piston boss, colour code (black) S punched in piston crown, mm (in)	$22^{+0.003}_{0}$	$(0.8661^{-0.00012}_{0})$			
Piston pin clearance[1]) in piston, mm (in)	0…0.006 (0.00024)				
Running clearance of piston pin in connecting rod bush mm (in)	0.015…0.026 (0.00059…0.00102)				

[1]) Piston and piston pin must always be renew together.

Tightening torques and preload forces

Applicable only to bolts in accordance with DIN 912, 931, 933, 960, 961, 6912 and nuts with a nut height of 0.8 x d in accordance with DIN 934 and exclusively for μ ges = 0.14 (Bolts phosphate treated, nuts without aftertreatment or galvanized. Lubricated condition: either non-lubricated or oiled.)

For cadmium plated bolts or nuts (μ ges $\approx$ 0.08 to 0.09) the tightening torque must be $\approx$ 30% less than in the table with the same utilization factor of the bolt material.

Not applicable when another surface or lubricated condition of the thread is used or if there is a variation in the nut height. In such cases it is necessary to determine the values separately.

Not applicable to bolts with expansion shanks, self-locking screw connections as well as screw connections of parts made of different materials. The utilization factor of the bolt in the case of a standard metric thread is:

$$\sigma_{red} = 0.09 \cdot \sigma_{0.2}$$

Thread	Tightening torque M_A mkp / ft. lb — Strength rating as per DIN 267						Preload force P v kp / lb — Strength rating as per DIN 267					
	5.6	6.8	6.9	8.8	10.9	12.9	5.6	6.8	6.9	8.8	10.9	12.9
M 6	0.4+0.1 2.9+0.7	0.6+0.1 4.3+0.7	0.7+0.1 5+0.7	0.9+0.1 6.5+0.7	1.2+0.2 8.7+1.4	1.5+0.2 10.8+1.4	425 937	600 1323	685 1510	855 1885	1210 2668	1440 3175
M 8	1.0+0.1 7.25+0.7	1.6+0.2 11.6+1.4	1.8+0.2 13+1.4	2.2+0.2 16+1.4	3.0+0.3 21.7+2.2	3.6+0.4 26+2.9	740 1631	1190 2624	1330 2932	1570 3462	2170 4785	2630 5799
M 10	2.0+0.2 14.5+1.4	3.2+0.4 23.1+2.9	3.6+0.4 26+2.9	4.3+0.5 29+3.6	6.0+0.7 43.4+5	7.3+0.8 52.8+5.8	1160 2558	1880 4145	2090 4608	2500 5512	3480 7673	4200 9261
M 8 x 1	1.0+0.1 7.2+0.7	1.0+0.2 7.2+1.4	1.8+0.2 13+1.4	2.2+0.2 16+1.4	3.0+0.3 21.7+2.2	3.6+0.4 26+2.9	740 1631	1190 2624	1330 2932	1610 3550	2200 4851	2670 5887
M 10 x 1.25	2.0+0.2 14.5+1.4	3.2+0.4 23.1+2.9	3.6+0.4 26+2.9	4.3+0.5 29+3.6	6.0+0.7 43.4+5	7.3+0.8 52.8+5.8	1160 2558	1900 4189	2120 4674	2520 5556	3530 7784	4250 9371
M 12 x 1.25	3.4+0.4 24.6+2.9	5.4+0.6 39+4.3	6.1+0.7 44.1+5	7.2+0.8 52+5.8	10.3+1 74.5+7.2	12.0+1.5 86.7+10.8	1720 3792	2710 5975	3070 6769	3610 7960	5100 11245	6090 13428
M 1 x 1.5	3.4+0.4 24.6+2.9	5.4+0.6 39+4.3	6.1+0.7 44.1+5	7.2+0.8 52+5.8	10.3+1 74.5+7.2	12.0+1.5 86.7+10.8	1690 3726	2670 5887	3030 6681	3570 7872	5040 11113	6000 13230
M 14 x 1.5	5.4+0.6 39+4.3	8.6+1 62.2+7.2	9.8+1 71+7.2	11.5+1.5 83+10.8	16.0+2 115.7+14.5	20+2 144.6+14.5	2330 5137	3720 8202	4180 9217	5030 11091	6970 15369	8510 18764
M 16 x 1.5	8.3+1 60.0+7.2	13.5+1.5 97.6+10.8	15.5+1.5 112+10.8	18.0+2 130+14.5	25+3 180.7+22	30.0+4 217+29	3240 7144	5190 11444	5840 12877	6920 15258	9710 21410	11770 25953
M 18 x 1.5	11.0+1.5 19.5+10.8	18.0+2 130+14.5	20.0+2.5 144.6+18	24.0+3 173.5+22	34.0+4 246+29	40.0+5 289+36	3890 8577	6240 13759	7020 15479	8380 18478	11800 26019	13960 30782
M 20 x 1.5	16.0+2 115.7+14.5	26.0+3 188+22	29.0+3.5 210+25	34.0+4 246+29	49.0+5 354+36	59.0+6 426.6+43.4	5070 11179	8170 18015	9180 20242	10680 22549	15200 33516	18250 40159

The values stipulated in the table apply to a screw connection which corresponds to the above conditions. The tightening torque including tolerance is only given on the layout or assembly drawing if

a) a value different from the Standard sheet is necessary for operational reasons,
b) the strength rating of the bolt and nut is not evident.

Note: All deviations from this table have been taken into account in the technical data

Bolts and Screws

Description	Head shape	DIN No.	Strength rating
Hexagon bolts	⬡	931 933 960 961 70614	8.8 10.9 12.9
		561	8.8
Cheese-head screws	⊘	84	4.8 8.8
	⊙	912 6912	8.8 10.9
Button-headed screws	⊕	7986	4.8
Carriage bolts	⊡	603	4.6 8.8
Countersunk screws	⊘	63	4.8 8.8
	⊕	7987	4.8 8.8
Oval-head screws	⊘	920 921	5.6 [4]
	⊕	7985	4.8
Oval-head countersunk screws	⊘	91	4.8 8.8
	⊕	7988	4.8
Cheese-head self-tapping screws	⊘	7971	[1]
Hexagon self-tapping screws	⬡	7976	[1]

Description	Head shape	DIN No.	Strength rating
Countersunk self-tapping screws	⊕	7982	[1]
Oval-head self-tapping screws	⊕	7981	[1]
Oval-head countersunk self-tapping screws	⊕	7983	[1]
Stud bolts	–	833 835 836 838 939 940	8.8
Threaded pins	⊘	417 551 553	[2] [4]
		438	4.8 [4]
Shoulder studs	⊘	427	5.8
Winged screws	⊘	316	4.6
Screw plugs	⊙	906 908	4.6
		910 7604	5.6 [4]
Hollow screws	⬡	7623 71436	6.8
Cap screws	⬡	3871	5.6 [4]
Slotted plugs	⊙	71022	5.6 [4]

Nuts

Description	shape	DIN No.	Strength rating
Hexagon nuts	⬡	439	[5]
		985	8 10 [4]
		934	[3]
		936	6G 8G
		70615 70616	8/10 [4] 6G/8G [4]
Castellated nuts	⬡	935 937	8/10 6S/8G
Wing nuts	⬡	315	GTS

Description	shape	DIN No.	Strength rating
Square nuts	⬡	557	5–2
		562	4D–2
Cap nuts	⬡	986	8 [4]
		1587	6–2
Slotted nuts	⬡	70851 70852	6G [4]
Screw caps	⬡	3870 7606	5D–2 [4]
Knurled nuts	⬡	466 467	5–2
Ball collar nuts Flat collar nuts	⬡	74361	8/10

[1] Case hardened steel, tempered file-hard, depth of case 0.1 . . . 0.2 mm (0.004 . . . 0.008")
[2] up to M 10: 4.8, from M 12: 4.6
[3] up to M 4: 5–2, from M 5: 8 and 10
[4] The stipulated strength characteristics deviate from the DIN specification
[5] up to M 8: 4D-2, for M 10: 5S-2

Confirmation sheet for Supplements

Suplement / Order No.	Inserted on:	Signature

Tightening torques

for self-locking nuts

BMW N
113 49.0

Applicable only to nuts in accordance with BMW N 113 48.0 and DIN 985.

Surface condition: Bolt phosphate treated or galvanized, nut galvanized and not waxed.
Lubricated condition of bolt: either non-lubricated or lightly oiled.

For cadmium plated bolts or nuts the tightening torque, with the same utilization factor of the bolt material, must be ≈ 30% less than the value in the table.

Not applicable in the case of another surface or lubricated condition of the thread, a strength rating of the bolt of less than 8.8 (e. g. 6.9) in conjunction with expansion bolts.

In such cases it is necessary to determine the values separately.

Thread	Tightening torque M_A $\frac{mkp}{ft.\,lb}$					
	Nuts as per BMW N 113 48.0 Strength rating			Nuts as per DIN 985 Strength rating		
	8	10	12	8	10	12
M 6	1.1 +0.1 7.9 +0.7	1.5 +0.2 10.8 +1.4	1.8 +0.2 13.0 +1.4	1.0 +0.1 7.2 +0.7	1.3 +0.2 9.4 +1.4	1.6 +0.2 11.6 +1.4
M 8 M 8 x 1	2.5 +0.3 18.0 +2.2	3.4 +0.4 24.6 +2.9	4.0 +0.5 29.0 +3.6	2.5 +0.2 18.0 +1.4	3.3 +0.3 24.0 +2.2	3.9 +0.4 28.2 +2.5
M 10 M 10 x 1.25	35.4 +0.5 4.9 +3.6	6.8 +0.8 49.0 +5.8	8.0 +0.9 57.8 +6.5	4.7 +0.5 34.0 +3.6	6.4 +0.7 46.3 +5	7.7 +0.8 55.7 +5.8
M 12 M 12 x 1.5	8.1 +0.9 58.5 +6.5	11.4 +1.3 82.4 +9.4	13.5 +1.5 97.6 +10.8	7.8 +0.8 56.4 +5.8	10.9 +1 78.8 +7.2	12.6 +1.5 91.0 +10.8
M 14 M 14 x 1.5	13.0 +1.5 94.0 +10.8	18.0 +2 130.0 +14.5	22.0 +2 159.0 +14.5	12.7 +1.5 92.0 +10.8	17.0 +2 123.0 +14.5	21.0 +2 152.0 +14.5
M 16 M 16 x 1.5	22.5 +2 162.7 +14.5	28.0 +3 202.0 +22	33.0 +4 238.6 +29	19.5 +2 141.0 +14.5	26.0 +3 188.0 +22	31.0 +4 224.0 +29
M 18 M 18 x 1.5	27.0 +3 195.0 +22	38.0 +4 274.7 +29	44.0 +5 318.0 +36	26.0 +3 188.0 +22	36.0 +4 260.0 +29	42.0 +5 303.6 +36

The respective preload forces Pv (kp/lb), according to the individual strength ratings, can be taken from the table "Tightening torques and preload forces" in BMW N 600 02.0.

The values stipulated in the table apply to a screw connection which corresponds to the above mentioned conditions. The tightening torque including tolerance is only given on the layout or assembly drawing if a value different from the Standard sheet is necessary for operational reasons.

In the case of a screw connection which is highly stressed dynamically an exact examination by means of calculations and tests is essential.

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Engine design	4 stroke horizontally opposed engine with overhead valves in V configuration					
Location of engine number	on engine block above oil filler pipe					
Cylinder bore mm (in)	73.5 (2.89)	82 (3.23)	84.8 (3.34)	94 (3.70)	94 (3.70)	94 (3.70)
Piston stroke mm (in)	70.6 (2.78)					
Number of cylinders	2					
Cylinder arrangement	opposed					
Stroke/bore ratio	0.96	0.86	0.83	0.75	0.75	0.75
Rated cubic capacity cm³ (in³)	595 (36.3)	740 (45.2)	785 (47.9)	971 (59.3)	971 (59.3)	971 (59.3)
Actual cubic capacity cm³ (in³)	599 (36.6)	745 (45.5)	797.5 (48.7)	978 (59.7)	978 (59.7)	978 (59.7)
Compression ratio	9.2:1	9.0:1	9.2:1 * 8.2:1	9.1:1	9.5:1	9.5:1
Maximum useful output DIN kW (hp) at engine speed min⁻¹	29.5 (40) 6400	36.8 (50) 6200	41 (55) 7000 * 37 (50) 7250	44.1 (60) 6500	48 (65) 6600	51.6 (70) 7250
Maximum permissible constant engine speed min⁻¹	6500	6500	7200	6800	7000	7200
Maximum permissible engine speed min⁻¹	7200	7400	7400	7400	7400	7400
Idling speed min⁻¹	800 . . . 1100					
Maximum permissible engine speed during running in: up to 1000 km (600 miles) min⁻¹ up to 2000 km (1200 miles) min⁻¹	4000 4500					
Direction of engine rotation	clockwise viewed towards dynamo					
Maximum torque in Nm (mkp, lb. ft) at engine speed min⁻¹	48 (4.9, 35.4) 5000	58.8 (6, 43.4) 5000	62.5 (6.37, 46,1) 5500 * 56.6 (5.76, 41,7) 5500	73.5 (7.4, 54.2) 4000	75 (7.6, 55.3) 5500	76 (7.7, 56.1) 5500

* Low-compression engine for regular fuel
** from frame No. 6 007 001, 78 model

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Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Rotor height, mm(in)	$14^{-0.015}_{-0.045}$ $\left(0.5512^{-0.00059}_{-0.00177}\right)$					
Housing depth, mm(in)	$14^{+0.025}_{+0.010}$ $\left(0.5512^{+0.00098}_{+0.00039}\right)$					
Clearance between pump housing base and rotor seal base, mm(in)	0.025 . . . 0.070 (0.00098 . . . 0.00275)					
Gap between inner and outer rotor, mm(in)	0.12 . . . 0.20 (0.0047 . . . 0.0079)					
Entry depth in cover, maximum, mm(in)	0.05 (0.0020)					
Length of excess pressure spring, unbiased, mm(in)	68 (2.677)					
Valve clearance: Set with engine cold, max. 35° C (95° F) Inlet valve, mm(in) Exhaust valve, mm(in)	0.15 (0.006) (0.10 (0.004) 0.20 (0.008) 0.15 (0.006) after 1000 km [600 mile] Inspection)					
Valve timing settings (tolerance ± 2.0°)	Camshaft setting with 2 mm (0.08 in) valve clearance					
Inlet opens Inlet closes Exhaust opens Exhaust closes	TDC 6° BTDC 40° ABDC 34° ABDC 40° BBDC 46° BBDC TDC 6° BTDC *	10° BTDC 16° BTDC * 50° ABDC 44° ABDC 50° BBDC 56° BBDC 10° BTDC 4° BTDC				
Valves: Overall valve length Inlet, mm(in) Exhaust, mm(in)	99.5–0.3 (3.917–0.012) 98.5–0.3 (3.878–0.012)	98.8–0.4 (3.890–0.016) 98.8–0.4 (3.890–0.016)				
Valve head diameter Inlet, mm(in)	38 (1.496)	42 (1.654)	42 (1.654)	42 (1.654)	44 (1.73)	44 (1.73)
Valve head diameter Exhaust, mm(in)	34 (1.339)	38 (1.496)	38 (1.496)	40 (1.575)	40 (1.575)	40 (1.575)
Stem diameter Inlet, mm(in)	$8^{-0.050}_{-0.065}$ $\left(0.3150^{-0.0020}_{-0.0026}\right)$					

* 78 models

11 Engine

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Technical Data

Engine

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Mean piston speed m/s (ft/min) at engine speed min^{-1}	15.1 (2972) 6400	14.6 (2874) 6200	16.4 (3228) * 17.1 (3366) 7000 7250	15.3 (3012) 6500	16.5 (3248) 7000	17.1 (3366) 7250
Compression in bar good normal poor	more than 10.0 8.5 ... 10.0 below 8.5					
Compression test instructions (Motorcycle with starter)	1. Unscrew spark plugs 2. Measurement to be carried out with a calibrated compression gauge with fully charged battery, engine at normal operating temperature and throttle twist grip fully open at starter speed. Remove constant pressure carburetor before test on R 60/7 only.					
Weight complete, kg (lbs) with starter, carburetor, oil; without coils and intake system	63.5 (140.0)	64.9 (143.1)	63.5 (140.0)		62.5 (137.8)	
Fuel grade	* regular grade fuel super (premium) fuel					
Rated fuel consumption Imperial miles per gallon / l/100 km (at 110 km/h (68 mile/h))	51.4/5.5	62.8/4.5	59.5/4.75 * 56.5/5.0	62.8/4.5	51.8/5.45	49.1/5.75

* low-compression engine

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Stem diameter Exhaust, mm	$8^{-0.050}_{-0.065}$ $\left(0.3150^{-0.0020}_{-0.0026}\right)$					
Minimum rim thickness of valve head Inlet, mm(in)	1 (0.039)					
Exhaust, mm(in)	1 (0.039)					
Valve head deflection, mm(in)	0.025 (0.0010)					
Valve seat ring: Outer diameter, mm Inlet	$39.2^{0}_{-0.025}$ $\left(1.543^{0}_{-0.001}\right)$		$43.2^{0}_{-0.025}$ $\left(1.701^{0}_{-0.001}\right)$		$45.2^{0}_{-0.025}$ $\left(1.780^{0}_{-0.001}\right)$	
Outer diameter, mm Exhaust	$39.2^{0}_{-0.025}$ $\left(1.543^{0}_{-0.001}\right)$		$43.2^{0}_{-0.066}$ $\left(1.701^{0}_{-0.002}\right)$		$45.2^{0}_{-0.025}$ $\left(1.780^{0}_{-0.001}\right)$	
Valve seat ring bore in cylinder head: Inlet, mm	$39^{+0.025}_{0}$ $\left(1.535^{+0.001}_{0}\right)$		$43^{+0.025}_{0}$ $\left(1.693^{+0.001}_{0}\right)$		$45^{+0.025}_{0}$ $\left(1.772^{+0.001}_{0}\right)$	
Exhaust, mm	$39^{+0.025}_{0}$ $\left(1.535^{+0.001}_{0}\right)$		$43^{+0.025}_{0}$ $\left(1.693^{+0.001}_{0}\right)$		$45^{+0.025}_{0}$ $\left(1.772^{+0.001}_{0}\right)$	
Interference fit in head Inlet, mm	0.15 . . . 0.20 (0.006 . . . 0.008)					
Exhaust, mm	0.11 . . . 0.15 (0.004 . . . 0.006)					
Valve seat angle, degrees	45					
Valve seat width: Inlet, mm(in)	1.5 (0.059)					
Exhaust, mm(in)	2.0 (0.079)					

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Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Camshaft: Flange bearing bore in crank case, diameter, mm(in)	$40^{+0.039}_{0}$ $\left(1.575^{+0.0015}_{0}\right)$					
Flange bearing outer diameter, mm(in)	$40^{0}_{-0.016}$ $\left(1.575^{0}_{-0.0006}\right)$					
Flange bearing bore diameter, mm(in)	$25^{+0.013}_{0}$ $\left(0.984^{+0.0005}_{0}\right)$					
Camshaft bearing journals – alternator end, diameter, mm(in)	$25^{-0.020}_{-0.033}$ $\left(0.984^{-0.0007}_{-0.0013}\right)$					
Bearing bore, flywheel end, for camshaft in crank case, diameter, mm(in)	$24^{+0.021}_{0}$ $\left(0.945^{+0.0008}_{0}\right)$					
Camshaft bearing journal – flywheel end, diameter, mm(in)	$24^{-0.020}_{-0.033}$ $\left(0.945^{-0.0008}_{-0.0013}\right)$					
Alternator and flywheel end radial clearance, mm(in)	0.02...0.046 (0.0008...0.0018)					
Maximum permissible deflection of contact breaker shaft, mm(in)	0.02 (0.00079)					
Axial float (clearance between camshaft starter collar and flange mounted bearing) mm(in)	0.1±0.02 (0.0039±0.0008)					
Cam base circle diameter, mm(in)	28 (1.102)					
Cam lift, mm(in)	6.198 (0.2440)	6.756 (0.2660)				
Tappet outer diameter, mm(in)	$22^{-0.025}_{-0.015}$ $\left(0.8661^{-0.0010}_{-0.0006}\right)$					
Tappet bore in crankcase, diameter, mm(in)	$22^{+0.006}_{-0.015}$ $\left(0.8661^{+0.0002}_{-0.0006}\right)$					
Tappet radial clearance, mm(in)	0.01...0.051 (0.0004...0.0020)					
Maximum permissible wear tolerance for tappets, mm(in)	0.075 (0.0030)					

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Engine Lubrication: Lubrication system	Force feed circulation					
Oil filter	in main circuit (full flow)					
Differential pressure for opening the bypass valve – bars (lb/in²)	1.5 (21.3)					
Oil pressure warning lamp lights at below	0.2…0.5 bar (2.8…7.1 lb/in²)					
Safety valve opening pressure bars (lb/in²)	5.0 (71.1)					
Oil filling quantity without filter change – liters (Imp. pints) with filter change – liters (Imp. pints)	2.0 (3.5/2.1) 2.25 (4.0/2.38)					
Oil consumption litres/100 km max.	0.1 (355 mile/Imp. pint)					
Type of oil:	HD branded oil for spark igniton engines					
Viscosity at external temperature, primarily over + 30° C (86° F) over 0° C (32° F) below 0° C (32° F) All the year round, down to –20° C (–4° F)	 SAE 40, SAE 20 W 50 SAE 20 W 40, SAE 20 W 50 SAE 10 W 30, SAE 10 W 40, SAE 10 W 50 SAE 15 W 50					
Oil Pump Oil pump design	Eaton type (hyp. trochoidal gearing)					
Delivery liters/hour at rev/min	1400 (308 Imp. gal) 6000 (1320 Imp. gal)					
Outer rotor diameter, mm(in)	$57.1^{\ 0}_{-0.025}$			$(2.248^{\ 0}_{-0.0010})$		
Housing inner diameter, mm(in)	$57.2^{+0.046}_{\ 0}$			$(2.252^{+0.0018}_{\ 0})$		
Outer rotor/pump housing clearance, mm(in)	0.10…0.17 (0.0039…0.0067)					

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Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Valve seat ring oversize, mm(in)	0.2 (0.0079)					
Valve guides: inlet: Overall length, mm(in) exhaust:	48 (1.8898) 48 (1.8898)					
Outer diameter, mm(in)	$14^{+0.061}_{+0.050}$			$(0.5512^{+0.0024}_{+0.0020})$		
Inside diameter, mm(in)	8 H 7 (0.315 H 7)					
Bore in cylinder head, mm(in)	14 H 7 (0.551 H 7)					
Interference fit in cylinder head, mm(in)	0.032…0.061 (0.0012…0.0024)					
Oversize, first stage diameter, mm(in)	$14.1^{+0.061}_{+0.050}$			$(0.555^{+0.0024}_{+0.0020})$		
Second stage diameter, mm(in)	$14.2^{+0.061}_{+0.050}$			$(0.559^{+0.0024}_{+0.0020})$		
Valve stem clearance: Inlet, mm(in)	0.050…0.080 (0.0020…0.0031)	0.050 . . . 0.080 (0.0019 . . . 0.0031)				
Exhaust, mm(in)	0.065…0.095 (0.0026…0.0037)	0.050 . . . 0.080 (0.0019 . . . 0.0031)				
Maximum permissible wear tolerance, mm(in)	0.15 (0.0059)					
Valve gear: Valve operation	by the camshaft via hard cast tappets, push rods and rocker arms					
Camshaft drive	Duplex chain 3/8×7/32 (double roller chain) with chain tensioner under spring pressure (leaf spring)					
Number of links	50					

12.77 Alteration

Engine

Technical Data

Model			R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Crankshaft and Bearings:			Main bearing journal dia. mm (in)					
			Generator side			Flywheel side		
Standard	0	red		$60.00^{-0.030}_{-0.040}$	$(2.3622^{-0.0012}_{-0.0016})$	$60.00^{-0.010}_{-0.020}$	$(2.3622^{-0.0004}_{-0.0008})$	
		blue		$60.00^{-0.040}_{-0.049}$	$(2.3622^{-0.0016}_{-0.0019})$	$60.00^{-0.020}_{-0.029}$	$(2.3622^{-0.0008}_{-0.0011})$	
		green		$60.00^{-0.045}_{-0.060}$	$(2.3622^{-0.0018}_{-0.0024})$			
First undersize	0,25 mm	red		$59.75^{-0.030}_{-0.040}$	$(2.3524^{-0.0012}_{-0.0016})$	$59.75^{-0.010}_{-0.020}$	$(2.3524^{-0.0004}_{-0.0008})$	
		blue		$59.75^{-0.040}_{-0.049}$	$(2.3524^{-0.0016}_{-0.0019})$	$59.75^{-0.020}_{-0.029}$	$(2.3524^{-0.0008}_{-0.0011})$	
Second undersize	0,50 mm	red		$59.50^{-0.030}_{-0.040}$	$(2.3425^{-0.0012}_{-0.0016})$	$59.50^{-0.010}_{-0.020}$	$(2.3425^{-0.0004}_{-0.0008})$	
		blue		$59.50^{-0.040}_{-0.049}$	$(2.3425^{-0.0016}_{-0.0019})$	$59.50^{-0.020}_{-0.029}$	$(2.3425^{-0.0008}_{-0.0011})$	
Third undersize	0,75 mm	red		$59.25^{-0.030}_{-0.040}$	$(2.3327^{-0.0012}_{-0.0016})$	$59.25^{-0.010}_{-0.020}$	$(2.3327^{-0.0004}_{-0.0008})$	
		blue		$59.25^{-0.040}_{-0.049}$	$(2.3327^{-0.0016}_{-0.0019})$	$59.25^{-0.020}_{-0.029}$	$(2.3327^{-0.0008}_{-0.0011})$	
Bore for 3-component bearing in crankcase, diameter, mm(in)					$65^{+0.019}_{0}$	$(2.5591^{+0.0007}_{0})$		
Bore for 3-component bearing in bearing cap, diameter, mm(in)					$65^{+0.010}_{+0.030}$	$(2.5591^{+0.0004}_{+0.0012})$		
Main bearing journal, radial clearance, mm(in)					0.035...0.065 (0.0014...0.0026)			
Bearing seat for grooved bearings of front crankshaft mounting, diameter, mm(in)					$35^{+0.025}_{+0.009}$	$(1.3779^{+0.0010}_{+0.0004})$		
Bearing seat bore for grooved bearing in timing cover, diameter, mm(in)					$62^{-0.009}_{-0.039}$	$(2.4409^{-0.0004}_{-0.0015})$		

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Engine

Technical Data

Model		R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Permissible ovality of cylinder bore, mm(in)		0.01 (0.00039)					
Permissible taper in cylinder bore, (head end tighter), mm(in)		0.02 (0.00079)					
Pistons: Piston form		Convex-rising-oval					
Weight category, piston complete		+ or — punched-in					
Piston diameter) mm (in) (original)	A	73.470 (2.8925)	81.965 (3.2270)	84.765 (3.3372)		93.960 (3.6992)	
	B	73.480 (2.8929)	81.975 (3.2274)	84.775 (3.3376)		93.970 (3.6996)	
	C	73.490 (2.8933)	81.985 (3.2277)	84.785 (3.3380)		93.980 (3.7000)	
1st oversize + 0.50 mm (0.019 in) — on R 100/7 – R 100 RS: +0.25 mm (0.0098 in)	A	73.970 (2.9122)	82.465 (3.2466)	85.015 (3.3470)		94.210 (3.7090)	
	B	73.980 (2.9126)	82.475 (3.2470)	85.025 (3.3474)		94.220 (3.7094)	
	C	73.990 (2.9130)	82.485 (3.2474)	85.035 (3.3478)		94.230 (3.7098)	
2nd oversize + 1.0 mm (0.039 in)	A	74.470 (2.9319)	82.965 (3.2663)				
	B	74.480 (2.9323)	82.975 (3.2667)				
	C	74.490 (2.9327)	82.985 (3.2671)				
Piston fitting clearance mm (in)		0.020 . . . 0.040 (0.00079...0.00157)	0.019 . . . 0.041 (0.00075 . . . 0.00161)	0.023 . . . 0.047 (0.00091...0.00185)		0.028 . . . 0.047 (0.00110 . . . 0.00185)	
Total permissible wear clearance of piston and cylinder, mm(in)		max. 0.08 (0.0031)					
Piston fitting direction		Arrow with "vorn" in direction of travel					

12.77 Alteration

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Valve Springs: Wire thickness, mm(in)	4.25 (0.167)					
Outer coil diameter, mm(in)	31.9 (1.256)					
Spring length, relaxed, mm(in)	approx. 43.5 (1.712)					
Spring force in kp at test length, mm(lb/in)	29 at 37.6 70 at 28.5 (63.9 at 1.48, 154 at 1.12)					
Coil direction	right hand					
Number of windings, resilient	4					
Number of windings, total	6					
Fitting direction	With the windings painted green facing the cylinder head side					
Rocker arms:	needle roller mounted					
Axial float of rocker arm	Clearance-free but easily movable					
Rocker arm ratio	1 : 1.39					

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Crankshaft sprocket seat diameter, mm(in)			$35.003^{+0.020}_{+0.009}$	$\left(1.3781^{+0.0008}_{+0.0004}\right)$		
Mounting bore for sprocket, mm(in)			$35.003^{+0.003}_{-0.013}$	$\left(1.3781^{+0.0001}_{-0.0005}\right)$		
Axial float, crankshaft, mm(in)	0.08…0.15 (0.0031…0.0059)					
Thrust washer, red – thickness "S" mm(in)	2.483…2.530 (0.0978…0.0996)					
blue – thickness "S" mm(in)	2.530…2.578 (0.0996…0.1015)					
green – thickness "S" mm(in)	2.578…2.626 (0.1015…0.1034)					
yellow – thickness "S" mm(in)	2.626…2.673 (0.1034…0.1052)					
Maximum permissible wear tolerance, mm(in)	0.20 (0.0079)					
Maximum permissible deflection at shaft journal (alternator end) externally when supported at main bearing points, mm(in)	0.02 (0.00079)					
Maximum permissible dynamic imbalance in crankshaft (without flywheel), cmp	20					
Maximum lateral deflection at flywheel, mm(in)	0.1 (0.0039)					
Connecting and bearings	Diameter mm Crank pin					
Standard 0	$48.00^{-0.009}_{-0.025}$			$\left(1.890^{-0.0004}_{-0.0010}\right)$		
1st undersize 0.25 mm	$47.75^{-0.009}_{-0.025}$			$\left(1.880^{-0.0004}_{-0.0010}\right)$		
2nd undersize 0,50 mm	$47.50^{-0.009}_{-0.025}$			$\left(1.870^{-0.0004}_{-0.0010}\right)$		
3rd undersize 0.75 mm	$47.25^{-0.009}_{-0.025}$			$\left(1.860^{-0.0004}_{-0.0010}\right)$		
Basic bore diameter for big end bearing eye, mm(in)	$52^{+0.010}_{0}$			$\left(2.047^{+0.0004}_{0}\right)$		
Connecting rod radial clearance mm(in)	0.023 . . . 0.069 (0.0009 . . . 0.0027)					
Width of connecting rod at big end bearing eye, mm (in)	$22^{-0.065}_{-0.117}$			$\left(0.866^{-0.0026}_{-0.0046}\right)$		
Crank pin bearing width, mm(in)	$22^{+0.149}_{-0.065}$			$\left(0.866^{+0.0059}_{+0.0026}\right)$		
Axial connecting rod clearance, mm(in)	0.130…0.266 (0.0051…0.0105)					
Maximum permissible axial wear tolerance in connecting rod clearance, mm(in)	0.32 (0.0126)					

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Engine

Technical Data

Model			R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Centre to centre bore spacing, mm(in)			135 (5.315)					
Connecting rod bore at small end eye (basic bore), diameter, mm(in)			$24^{+0.021}_{0}$			$(0.9449^{+0.0008}_{0})$		
Small end bush outer diameter, mm(in)			24.060...24.100 (0.9472...0.9488)					
Piston pin bore diameter in small end bush, mm(in)			$22^{+0.020}_{+0.015}$			$(0.8661^{+0.0008}_{+0.0006})$		
Piston pin bore diameter in small end bush (wear tolerance), mm(in)			22+0.040 (0.8661+0.0016)					
Maximum permissible deviation from parallel in connecting rod bores with bearing shells over 150 mm spacing, mm(in)			0.04 (0.0016)					
Maximum permissible basic bore twist relative to piston pin bore over 150 mm spacing, mm (in)			1.5 (0.059)					
Permissible weight discrepancy of both connecting rods, g (oz)			± 3 (0.11)					
Cylinders:								
Bore diameter, original	A	mm(in)	73.500+0.01 (2.8937+0.0004)	82.005+0.01 (3.2285+0.0004)	84.795+0.01 (3.3384+0.0004)	94.005+0.01 (3.7010+0.0004)		
	B	mm(in)	73.510+0.01 (2.8941+0.0004)	82.015+0.01 (3.2289+0.0004)	84.805+0.01 (3.3388+0.0004)	94.015+0.01 (3.7014+0.0004)		
	C	mm(in)	73.520+0.01 (2.8945+0.0004)	82.025+0.01 (3.2293+0.0004)	84.815+0.01 (3.3392+0.0004)	94.025+0.01 (3.7018+0.0004)		
1st oversize + 0.50 mm (R 100/7 – R 100 RS: + 0.25 mm)	A	mm(in)	74.000+0.01 (2.9134+0.0004)	82.505+0.01 (3.2482+0.0004)	85.045+0.01 (3.3482+0.0004)	94.255+0.01 (3.7108+0.0004)		
	B	mm(in)	74.010+0.01 (2.9138+0.0004)	82.515+0.01 (3.2486+0.0004)	85.055+0.01 (3.3486+0.0004)	94.265+0.01 (3.7112+0.0004)		
	C	mm(in)	74.020+0.01 (29142+0.0004)	82.525+0.01 (3.2490+0.0004)	85.065+0.01 (3.3490+0.0004)	94.275+0.01 (3.7116+0.0004)		
2nd oversize + 1.00 mm	A	mm(in)	74.500+0.01 (2.9331+0.0004)	83.005+0.01 (3.2679+0.0004)				
	B	mm(in)	74.510+0.01 (2.9335+0.0004)	83.015+0.01 (3.2683+0.0004)				
	C	mm(in)	74.520+0.01 (2.9339+0.0004)	83.025+0.01 (3.2607+0.0004)				
Surface roughness, µm			3...7					

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Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Piston pins: Piston pin offset from piston centre, mm(in)	1.5 (0.059)					
Piston pin diameter, code colouring white, mm(in)			$22^{0}_{-0.003}$	$(0.8661^{0}_{-0.00012})$		
Piston pin diameter, code colouring black, mm(in)			$22^{-0.003}_{-0.006}$	$(0.8661^{-0.00012}_{-0.00024})$		
Bore diameter of piston boss, colour coding (white) W punched in piston crown, mm(in)			$22^{+0.003}_{0}$	$(0.8661^{+0.00012}_{0})$		
Bore diameter of piston boss, colour code (black) S punched in piston crown, mm(in)			$22^{+0.003}_{0}$	$(0.8661^{-0.00012}_{0})$		
Piston pin clearance[1]) in piston, mm(in)			0...0.006	(0...0.00024)		
Running clearance of piston pin in connecting rod bush mm(in)			0.015...0.026	(0.00059...0.00102)		

[1]) Piston and piston pin must always be renewd together.

12.77 Alteration

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Piston rings: Rectangular ring first groove [1] Height, mm(in)			$1.75^{-0.010}_{-0.022}$	$\left(0.06890^{-0.00039}_{-0.00086}\right)$		
Ring gap, mm(in)	0.25 . . . 0.40 (0.0098 . . . 0.0157)	0.30...0.50 (0.0118...0.0197)				
Side clearance, mm(in)	0.06...0.09 (0.0024...0.0035)					
Lower compression ring, second groove [1] Height, mm(in)			$2.00^{+0.010}_{+0.022}$	$\left(0.07874^{+0.00039}_{+0.00087}\right)$		
Ring gap, mm(in)	0.25 . . . 0.40 (0.0098 . . . 0.0157)	0.30...0.45 (0.0118...0.0177)				
Side clearance, mm(in)	0.04...0.07 (0.0016...0.0027)					
Equal chamfer ring, third groove [1] Height, mm(in)			$4.00^{+0.010}_{+0.022}$	$\left(0.15748^{+0.00039}_{+0.00087}\right)$		
Ring gap, mm(in)	0.25...0.35 (0.0098...0.0138)	0.25...0.40 (0.0098...0.0157)				
Side clearance, mm(in)	0.02 . . . 0.05 (0.0008 . . . 0.0020)	0.03 . . . 0.06 (0.0012 . . . 0.0024)				
Fitting direction of piston rings	With marking "top" upward					

[1] Not in accordance with DIN specifications – special BMW version

Engine

Technical Data

Model	R 60/7	R 75/7	R 80/7		R 100/7	R 100 S	R 100 RS
Road performance:	The actual maximum speed reached by the motorcycle after running in depends to a high degree on the air resistance offered by the driver and is governed by such variable factors as size, attitude and clothing, the condition of the road and weather conditions.						
Speed, seated kph(mph)	155 (96)	165 (103)	172 (107)	165* (103)	178 (111)	195 (121)	197 (122)
Speed, prone kph(mph)	167 (104)	177 (110)	182 (113)	177 (110)	188 (117)	over 200 (124)	over 200 (124)
Acceleration 0 to 50 kph (31 mph) in secs	2.2	2.0	1.8	1.9	1.6	1.6	1.6
0 to 80 kph (50 mph) in secs	5.0	4.4	3.9	4.3	3.6	3.5	3.5
0 to 100 kph (62 mph) in secs	7.7	6.7	5.9	6.5	5.1	4.7	4.6
0 to 120 kph (75 mph) in secs	10.8	9.1	8.0	8.8	7.2	6.8	6.8
0 to 140 kph (87 mph) in secs	16.0	13.1	11.3	12.6	9.8	8.8	8.8
0 to 160 kph (100 mph) in secs	27.5	19.8	15.6	18.8	13.7	12.6	12.6

* values with low-compression engine

Tightening torques in Nm (ft.lb)

Cyl. head studs (in 3 stages 15—35—39)	35...39 (25.8...28.8)	Oil sump at crankcase	9...11 (6.6...8.1)
Connecting rod bolts	48...52 (35.4...38.4)	Nuts for valve adjustment screw	18...23 (13.3...17.0)
Flywheel on crankshaft	100...105 (73.7...77.4)	Carburetor threaded stub pipe	12+2 (8.8+1.5)

All other nuts, screws and bolts are to be tightened with the values recommended in the manufacturer's tables or the latest BMW Standard Specification 60 002.0.

Determining oil consumption

Wait until about 7500 km (5000 miles) have been covered before measuring oil consumption.
This distance is needed for oil consumption to settle down to a steady figure.
There must be no engine oil leaks.
Drain the engine oil while at normal operating temperature.
Drain the oil cooler.
Renew the filter element.
Fill the engine with fresh oil to the correct level.
Ride the machine under normal operating conditions until the oil level drops to the lower mark on the dipstick. Measurement after covering only 500 – 1000 km (300 – 600 miles) is never accurate, since experience has shown that the first half-liter of oil (about 3/4 pint) is consumed more rapidly than the remainder.
The permissible oil consumption figure is up to 0.1 liter per 100 km (350 miles per Imp. pint, 590 miles per US quart).

Possible causes of excessive engine oil consumption:

1. Running-in is not yet complete
2. Leaks past valve guides
3. Score marks resulting from piston seizure
4. Piston rings incorrectly installed, broken or worn
5. Too much clearance between valve stems and guides.

Determining fuel consumption by the DIN (German Industrial Standard) 70030 test method

The machine's carburetor and ignition settings[1] must be to standard specification.
The tire sizes must be as stated in the documents.
The pressures must be corrected if necessary to the specified values.
The brakes must be fully released.
The engine should have covered at least 7500 km (5000 miles) and be at normal operating temperature.
During fuel consumption testing the motorcycle should carry a weight halfway between the gross weight limit and the unladen weight.
Speed over the entire test route should be as uniform as possible, and three-quarters of the machine's top speed.
However, the test speed must not exceed 110 km/h (68 mile/h).
The test route should be as flat and dry as possible and 10 km (6.3 miles) in length. It should be traversed in both directions. Uphill and downhill gradients of up to 1.5% (1 in 67) are permissible.
The air temperature should be between +10° C (50° F) and +30° C (86° F), and the wind velocity not more than 3 m (9.85 ft) / s.
The machine is to run on a brand-name grade of fuel in accordance with the manufacturer's specification.

The fuel consumption should be determined with a commercially available meter or by means of the following formula, adding 10% for unfavorable circumstances.

$$\frac{\text{Fuel consumed} \times 100}{\text{Distance covered in km}} = \text{fuel consumption in l/100 km}$$

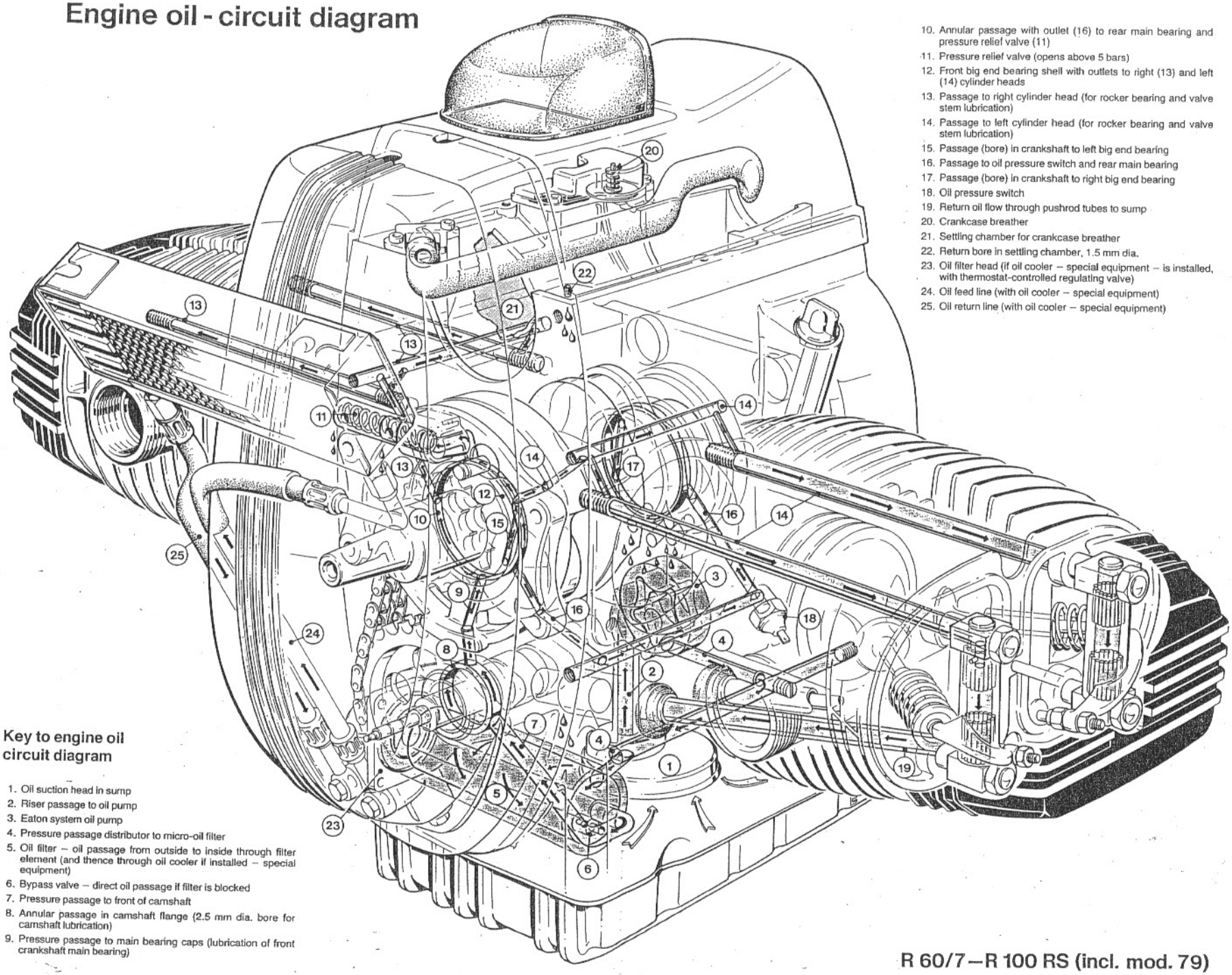
Note: Fuel consumption in Imperial miles per gallon $= \frac{282.47}{\text{Consumption in l/100 km}}$

Fuel consumption in US miles per gallon $= \frac{235.2}{\text{Consumption in liters/100 km}}$

Specifications — '79 models

Motor					
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Engine design	4 stroke horizontally opposed engine with overhead valves in V configuration				
Location of engine number	on engine block above oil filler pipe				
Cylinder bore mm (in)	84.8 (3.34)	94 (3.70)		94 (3.70)	
Piston stroke mm (in)	70.6 (2.78)				
Number of cylinders	2				
Cylinder arrangement	opposed				
Stroke/bore ratio	0.83	0.75		0.75	
Rated cubic capacity cm^3 (in^3)	785 (47.9)	971 (59.3)		971 (59.3)	
Actual cubic capacity cm^3 (in^3)	797.5 (48.6)	980 (59.7)		980 (59.7)	
Compression ratio	9.2:1 * 8.2:1	9.5:1		9.5:1	
Maximum useful output DIN kW (hp) at engine speed min^{-1}	41 (55) 7000 * 37 (50) 7250	48 (65) 660		51.6 (70) 7250	
Maximum permissible constant engine speed min^{-1}	7200	7000		7200	
Maximum permissible engine speed min^{-1}	7400	7400		7400	
Idling speed min^{-1}	800 . . . 1100				
Maximum permissible engine speed during running in: up to 1000 km (600 miles) min^{-1} up to 2000 km (1200 miles) min^{-1}	4000 4500				
Direction of engine rotation	clockwise viewed towards dynamo				
Maximum torque in Nm (mkp, lb. ft) at engine speed min^{-1}	62.5 (6.37, 46.7) 5500 * 56.6 (5.76, 41.7) 5500	75 (7.6, 55.3) 5500		76 (7.7, 56.1) 5500	
* Low-compression engine for regular fuel					

Engine oil - circuit diagram



Key to engine oil circuit diagram

1. Oil suction head in sump
2. Riser passage to oil pump
3. Eaton system oil pump
4. Pressure passage distributor to micro-oil filter
5. Oil filter – oil passage from outside to inside through filter element (and thence through oil cooler if installed – special equipment)
6. Bypass valve – direct oil passage if filter is blocked
7. Pressure passage to front of camshaft
8. Annular passage in camshaft flange (2.5 mm dia. bore for camshaft lubrication)
9. Pressure passage to main bearing caps (lubrication of front crankshaft main bearing)
10. Annular passage with outlet (16) to rear main bearing and pressure relief valve (11)
11. Pressure relief valve (opens above 5 bars)
12. Front big end bearing shell with outlets to right (13) and left (14) cylinder heads
13. Passage to right cylinder head (for rocker bearing and valve stem lubrication)
14. Passage to left cylinder head (for rocker bearing and valve stem lubrication)
15. Passage (bore) in crankshaft to left big end bearing
16. Passage to oil pressure switch and rear main bearing
17. Passage (bore) in crankshaft to right big end bearing
18. Oil pressure switch
19. Return oil flow through pushrod tubes to sump
20. Crankcase breather
21. Settling chamber for crankcase breather
22. Return bore in settling chamber, 1.5 mm dia.
23. Oil filter head (if oil cooler – special equipment – is installed, with thermostat-controlled regulating valve)
24. Oil feed line (with oil cooler – special equipment)
25. Oil return line (with oil cooler – special equipment)

R 60/7–R 100 RS (incl. mod. 79)

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Road performance:	The actual maximum speed reached by the motorcycle after running in depends to a high degree on the air resistance offered by the driver and is governed by such variable factors as size, attitude and clothing, the condition of the road and weather conditions.				
Speed, seated kph (mph)	172 (107) * 165 (103)	191	200	ca. 190	197 (122)
Speed, prone kph (mph)	182 (113) 177 (110)	ca. 195 (121)	over 200 (124)		over 200 (124)
Acceleration 0 to 50 kph (31 mph) in secs	1.8 1.9	1.6	1.6	1.6	1.6
0 to 80 kph (50 mph) in secs	3.9 4.3	3.5	3.5	3.5	3.5
0 to 100 kph (62 mph) in secs	5.9 6.5	4.7	4.7	5.0	4.6
0 to 120 kph (75 mph) in secs	8.0 8.8	6.8	6.8	7.0	6.8
0 to 140 kph (87 mph) in secs	11.3 12.6	8.9	8.8	9.8	8.8
0 to 160 kph (100 mph) in secs	15.6 18.8	12.7	12.6	17.8	12.6

* values with low-compression engine

Tightening torques in Nm (ft. lb)

Cyl. head studs (in 3 stages 15–35–39)	35...39 (25.8...28.8)	Oil sump at crankcase	9...11 (6.6...8.1)
Connecting rod bolts	48...52 (35.4...38.4)	Nuts for valve adjustment screw	18...23 (13.3...17.0)
Flywheel on crankshaft	100...105 (73.7...77.4)	Carburetor threaded stub pipe	12+2 (8.8+1.5)
		Camshaft flange bearing	15...3

All other nuts, screws and bolts are to be tightened with the values recommended in the manufacturer's tables or the latest BMW Standard Specification 60002.0.

11 00 050 Engine – removing and refitting

Remove fuel tank.
Remove left ignition coil – 12 13 100.
Take off exhaust system – 18 00 020.
Detach engine fairing (RT and RS only).
Detach cross-strut (RT and RS only).
Remove gearbox – 23 00 020.
Disconnect Bowden cables on left and right carburetors; remove both carburetors and place to one side.
Refitting and adjusting of carburetors – 13 10 100 and 13 00 004.
After removing the two hexagonal socket head screws, take off the starter cover to the right.

Detach leads (arrows) on starter.

Remove front engine guard cover after releasing the three hexagonal socket head screws. Draw rev. counter drive shaft from the pinion after releasing the locking screw (with mechanical drive to revolution counter only).

Note when fitting:
When fitting ensure that the breather tube for the contact breaker chamber is first inserted in the engine cover (models without rotary ignition trigger only).

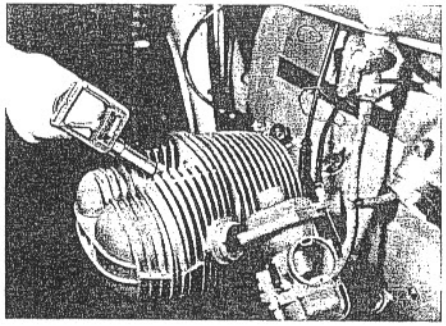
Pull off terminal 1 (black) at right coil. Separate connector (blue) at engine wiring harness and disconnect terminals 87 a (red) and 30 (black) at starter relay plug board.

Pull off both spark plug terminals and, after opening the front clamp, take engine lead harness and ignition leads from the rubber grommet in the tank.

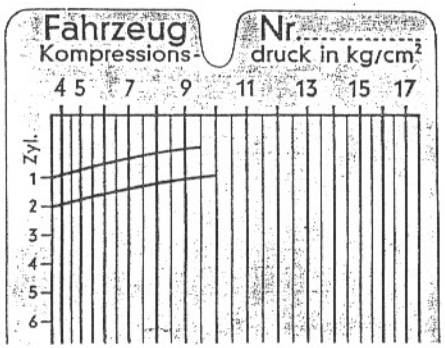
Flat terminal connection 87 – red lead
Flat terminal connection 87 a – red lead
Flat terminal connection 86 – 2 leads: green, blue
Flat terminal connection 85 – blue/yellow lead
Flat terminal connection 30 – black lead

11 00 039 Check compression of all cylinders

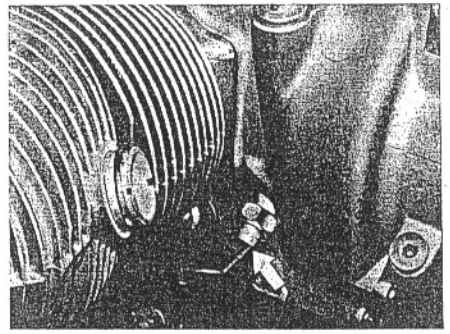
1. Unscrew spark plugs.
2. Carry out measurements at starting speed with a calibrated compression gauge, battery fully charged, engine at normal running temperature and the throttle twist grip set to full acceleration. R 60/7 only: remove constant pressure carburetor before measurement.



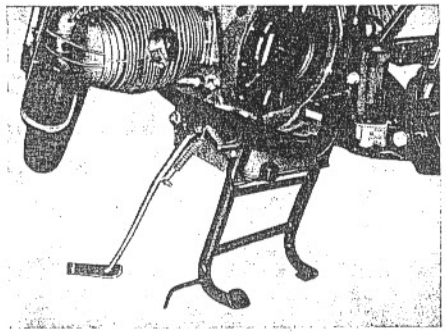
Graph for visual compression indicator.



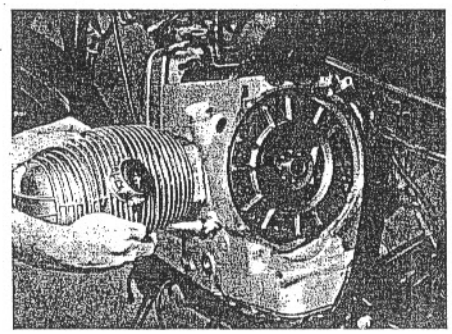
Remove lead from oil pressure warning switch (arrow).



Before extracting the engine bolts disengage the three tilt and side stand springs.
When removing the bolts care must be taken to ensure that the engine with pushrod protective tubes does not tilt onto the frame.
Note when fitting:
The rear engine mounting bolt is long to accommodate the left and right foot rests and the exhaust system clamps. Care must be taken to ensure that spacer collars are fitted at the rear right and left between crankcase and frame.
On the front engine mounting the side rest and parking stand clip is to be fitted on the left and the parking stand clip on the right.

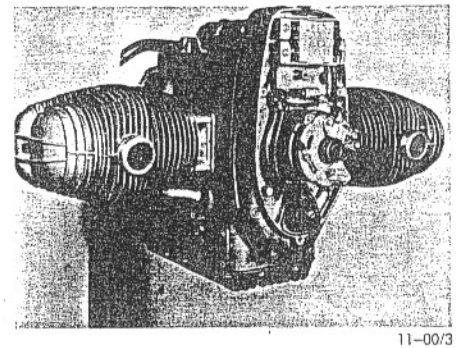


Tilt the engine slightly to the left from vertical position and lift out of the frame.



Fit engine on assembly stand BMW 00 1 500 in jig BMW 11 0 600, and screw down firmly.

Before dismantling the engine it is advisable to check the ignition timing 12 11 004, contact gap 12 11 141 and valve clearances 11 34 504 in order to ascertain any faults in advance and take due account of them during subsequent tests and measurements.



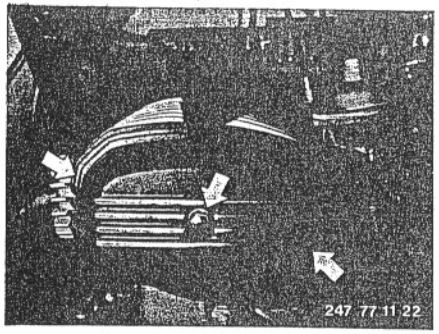
11 12 080 Cylinder head – removing and refitting

Engine removed (11 00 050) or fitted.
Remove exhaust system, engine is still in situ. Detach left and right engine fairings (RS only).

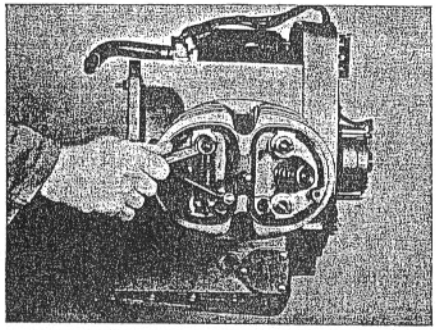
Note when fitting:

Insert both exhaust manifolds with cross tube in the exhaust ducts before tightening the cylinder heads.

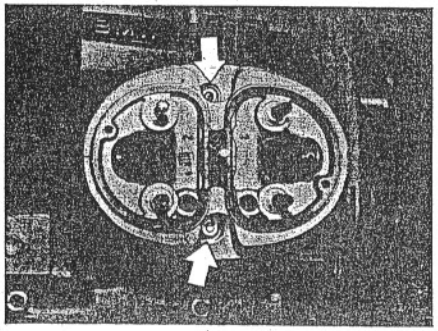
Unscrew cap nut and the two nuts (arrows); remove cylinder head cover and gasket.



After releasing the four collar nuts on the tie rod bolts lake off rocker arms and withdraw push rods.

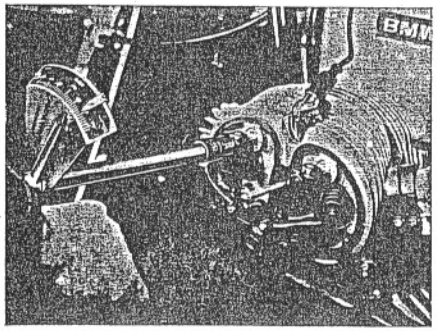


Unscrew two hexagonal nuts (arrows). Use plastic-faced mallet to tap cylinder head away from cylinder and draw off tie rod bolts.



Note when fitting cylinder head:

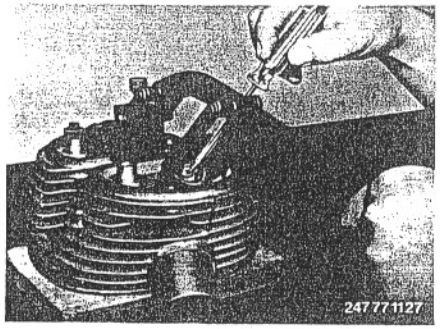
With the engine cold, tighten the cylinder head fastening nuts in three stages – see drawing for sequence. See Technical Data section for tightening torques.



11 12 513 Cylinder head – dismantling, assembling and valve grinding

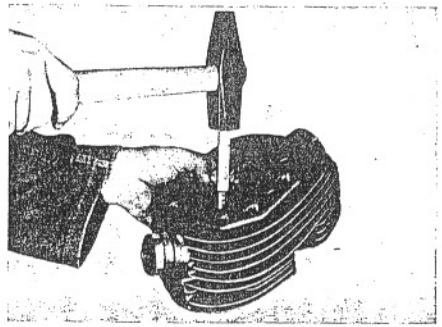
Remove and refit cylinder head – 11 12 080.

Fasten cylinder head on the BMW No. 11 1 750 assembly jig clamped in the bench vice. Use the valve lifter on the jig to compress the valve springs and then lift the pair of tapered cones out of the spring retainer with a magnet or scriber, after which the spring retainers and valve springs are laid to one side. Remove the cylinder head from the assembly jig and withdraw the valves.



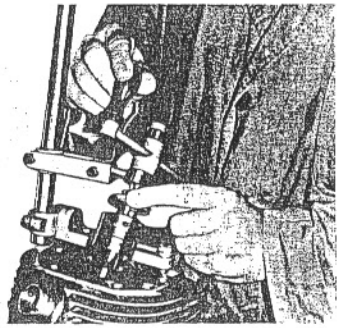
Cylinder head checks

a) For cracks and perfect sealing surfaces.
b) Secure valve guides (illustration) and valve seats.
c) Valve guide wear.
d) Surface condition of contact surface and spherical recess.
e) Radial play in rocker arm.
f) Check valve spring resiliency and force (see Technical Data section)
g) Check security of screw unions for carburetor mounting. If necessary set threads cleanly with Loctite No. 241.

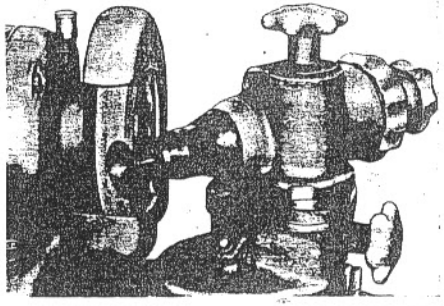


Regrinding valve seats

Regrind the valve seat rings in the cylinder head with Hunger valve seat grinder. Valve face angle 45° + 20', seat contact width for inlet valve 1.5 mm (0.06 in), for exhaust valve 2.0 mm (0.08 in), measured at 45° angle. Chamfer sloping toward combustion chamber 15°, toward intake or exhaust duct 75°. The sealing seat should be close to the maximum valve seat diameter.



Regrind seat on valve in grinding machine to 45° 20'. Maximum permissible regrinding up to 1 mm (0.04 in) valve disc rim width.
No grinding in of the valves is necessary with ground valve tapers and valve seat rings turned on the Hunger machine. Nevertheless after the valves have been fitted it is necessary to carry out a sealing test (tipping petrol into the valve chamber).



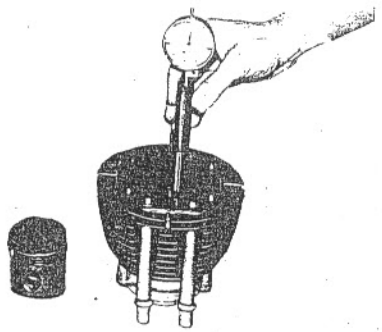
11 11 527 Cylinder – boring and honing

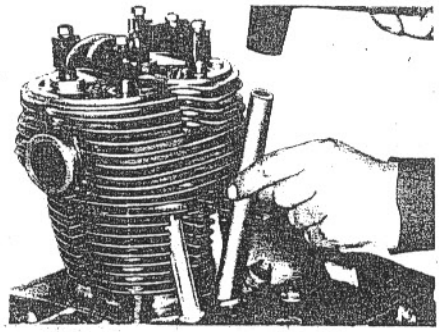
Remove and refit cylinder head – 11 12 080.
Remove and refit piston – 11 25 000.

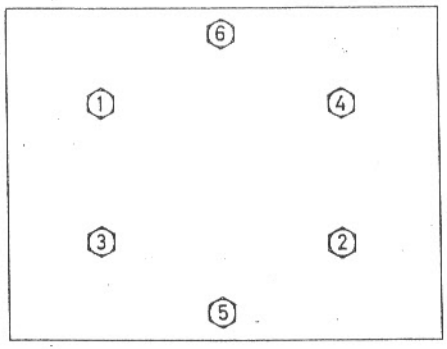
All the testing and repair jobs outlined in the preliminary work are to be carried out only when necessary. The cylinders can be reground in two stages. See Technical Data section for oversizes.

As a result of thermal stresses to which the cylinders are subjected, regrinding to a third oversize is not possible. Gauge reground cylinder; measuring point cylinder base. Determine oversize piston according to cylinder dimensions, see Technical Data for piston fitting tolerances.

If there are any leaks in the rubber collar on the push rod protective tubes the contact rings can be tapped down with the special BMW No. 11 1 600 tubular punch to improve the rubber sleeve contact pressure.







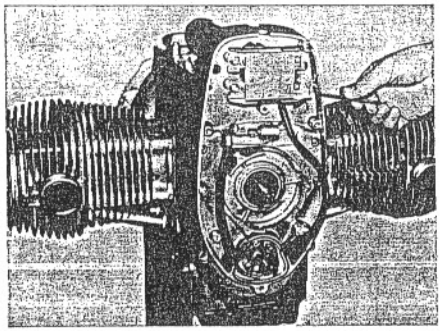
Tightening Sequence

11 14 060 Timing Cover-Removing and Refitting (models without rotary ignition trigger)

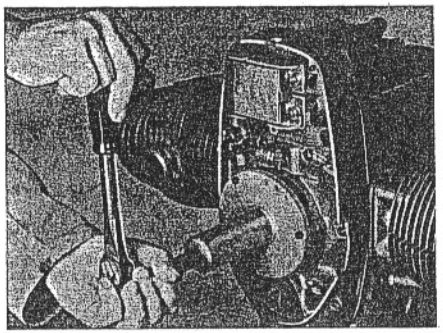
Engine removed (11 00 050) or fitted. Illustration and text refer to engine removed.

Overhaul alternator – 12 31 212.
Replace contact breaker points – 12 11 141.

Unscrew nine hexagon socket head bolts and three hexagon socket with angled Allen key.



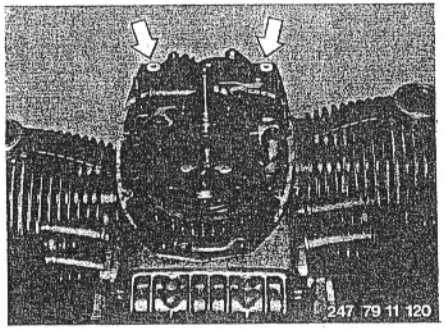
Bolt the BMW No. 11 1 800 extractor tool to the tapped fastening bores for the alternator housing with the aid of three hexagon socket head bolts (M 5), not forgetting the extractor thrust cup. Draw off the timing cover.



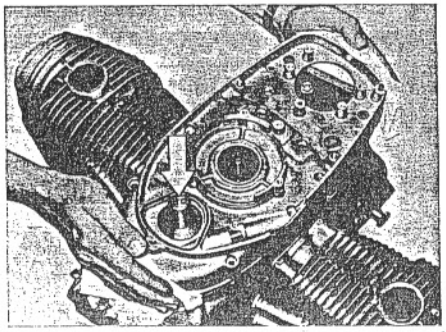
Timing cover, fitting

Position the crankase vertically in the assembly jig and lay the gasket and two strip seals (arrows) in position on the housing. For refitting the timing cover remove the diode carrier.

Heat timing cover to 80 . . . 100° C (176 . . . 212° F).



Fit the slip sleeve BMW No. 11 1 830 over the centrifugal timing advance shaft. With the aid of the BMW No. 11 1 830 locating bush fit and centre the timing cover. Tighten the hexagonal socket head bolts and nuts starting from the centre. Relax grooved ball bearings in their seating with a few taps with a rubber hammer.



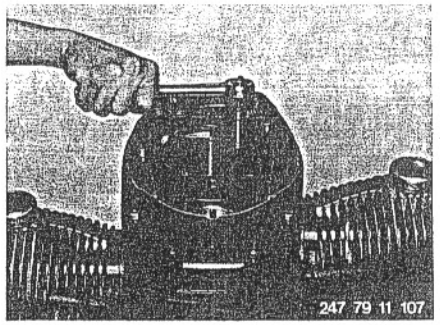
11 14 060 Timing chain cover — detaching and attaching (models with rotary ignition trigger)

Engine removed (11 00 050) or installed.

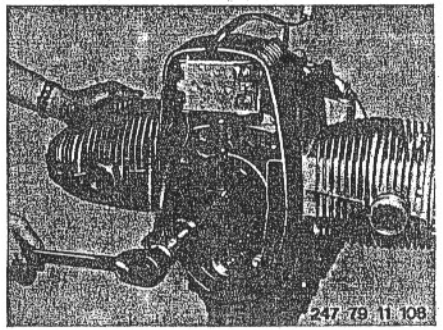
Remove (install) alternator – 12 31 020.

Remove (install) ignition trigger – 12 11 060.

Remove nine Allen screws and three internal hexagon nuts.

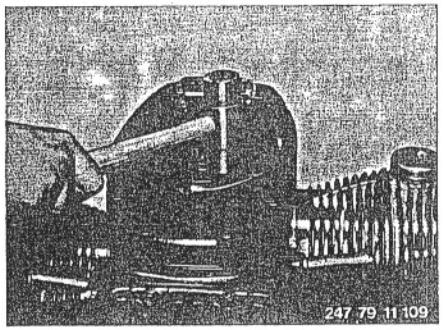


Attach BMW puller 11 1 800 to the tapped holes for the alternator housing, using three M 5 Allen screws. Attach thrust head for puller and pull off the cover.



Attaching timing chain cover:

Heat the cover at the ball bearing seat to app. 80° C (175° F) and install on the engine.
Tighten the Allen screws and nuts, starting from the center. Strike the deep-groove ball bearing sharply several times with a plastic-faced hammer to relieve stresses at the bearing seat.

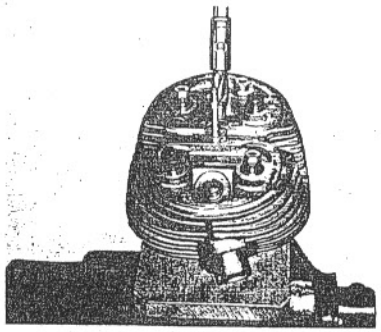


11 12 561 Valve guides – renewing

Remove and refit, cylinder head – 11 12 080.
Dismantle cylinder head, grind in valves – 11 12 513.

All the testing and repair jobs described in the preliminary work are to be carried out only where necessary.

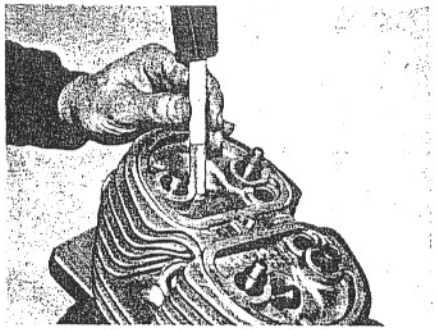
Lower top of old valve guide to the circlip.



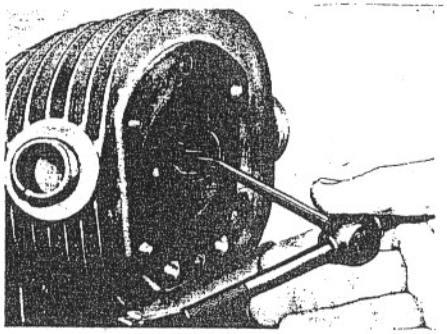
Remove circlip, heat cylinder head to 240 . . . 260° C (460 . . .500° F) and knock out valve guide toward combustion chamber with BMW 11 1 790 drift.

Before knocking out the guide the valve support of BMW No. 111 750 assembly jig is to be removed.

Oversizes of valve guides and basic bores in the cylinder head will be found in the Technical Data section.



Tap in new valve guides (see Technical Data) complete with circlip into the heated cylinder head. After the valve guide has cooled it must be reamed out with fixed valve guide reamer 8H7.

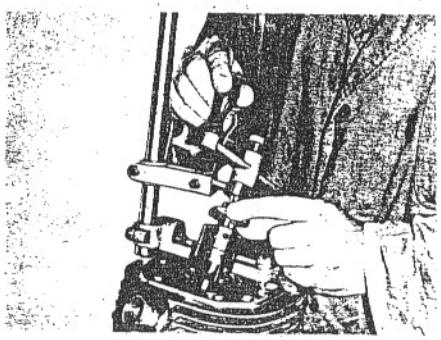


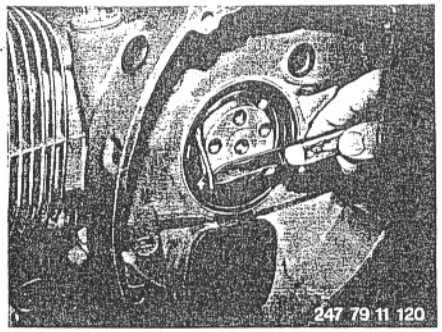
11 12 621 One valve seat ring – renewing

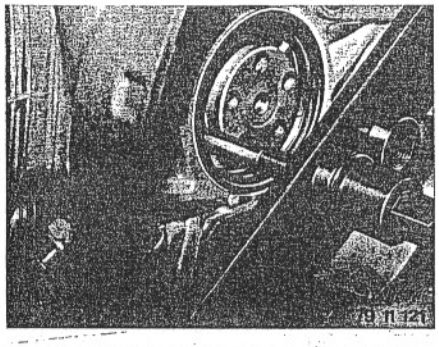
Cylinder head removed – 11 12 080.

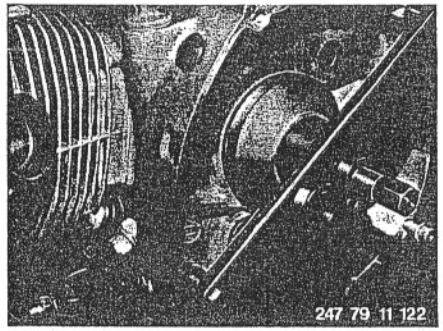
Dismantle cylinder head, grind in valves – 11 12 513.

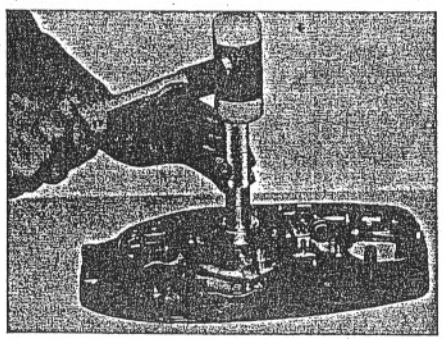
If it is necessary to change the valve seat ring after the valve seats have been remachined several times, use the Hunger valve seat turning cutter to turn out the valve seat ring taking care to avoid damaging the basic bore in the cylinder head. Heat cylinder head to 240 . . . 260° C (460 . . . 500° F) and fit new valve seat ring (see Technical Data).











11 14 151 Crankshaft radial seal – renewing (flywheel end)

To extract the seal:
Remove (install) the flywheel – 11 22 000.
Cut into the lip of the seal for a length of app. 5 cm (2 in) at the bottom left.

Attach cross-member of BMW 11 1 890 puller to engine block (at top right and bottom left). Insert puller spindle, place eccentric lug through cut in seal and move up to stop on thrust disc; the lug should point down.
Turn the nut clockwise and hold at flats on puller with wrench until the ring has been extracted.

To insert the seal:
Attach cross-member of BMW assembly tool 11 1 890 to engine block (at top right and bottom left). Place seal on BMW arbor 11 1 880 and attach thrust block.
Offer up arbor to engine block, screw spindle through to the front and press in the seal.

11 14 651 Crankshaft radial seal – renewing

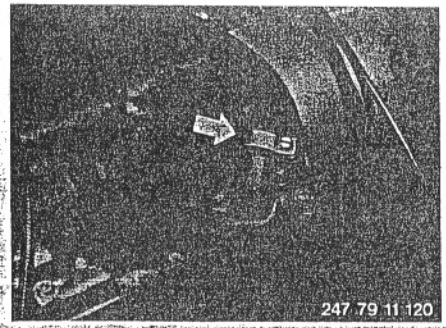
Detach (attach) timing chain cover – 11 14 060.

Press in radial seal for front crankshaft journal with BMW arbor 11 1 850.

11 15 101 Engine breather hose – renewing (double-sided breather)

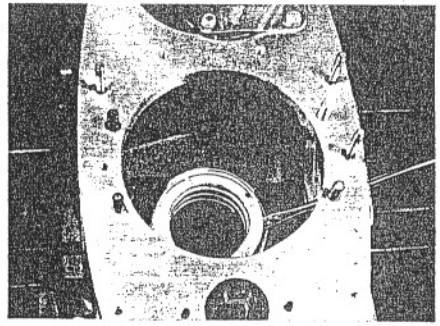
Remove the fuel tank – 16 11 030.

Remove the Allen screws at the starter cover and take off the cover to the right.
Release the hose clip at the breather dome with a screwdriver (arrow).



Pull the breather hose away from the air cleaner at left and right.

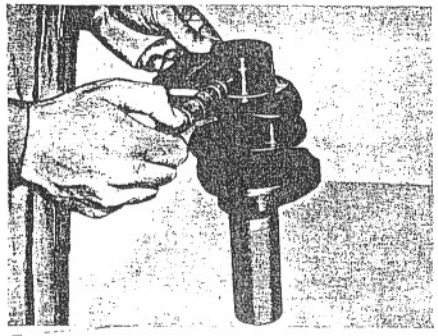




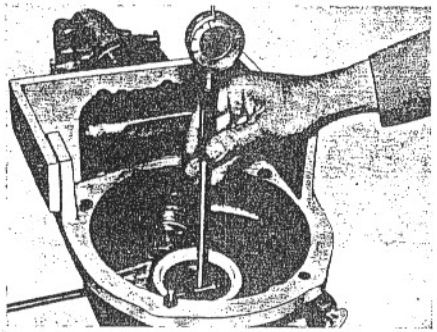
Knock both thrust washers off the locating pins using a screwdriver.

Crankshaft and bearing bush – measuring

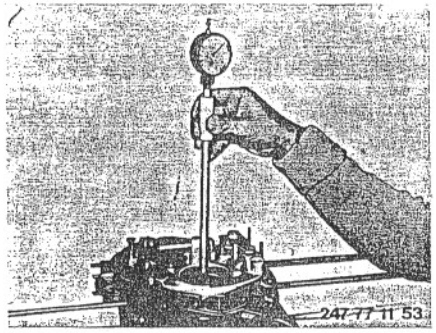
Remove housing from assembly mount. Measure the main and big end bearing journals with micrometer in a criss-cross pattern.



Measure big end bush in crankcase,



bearing cap, and

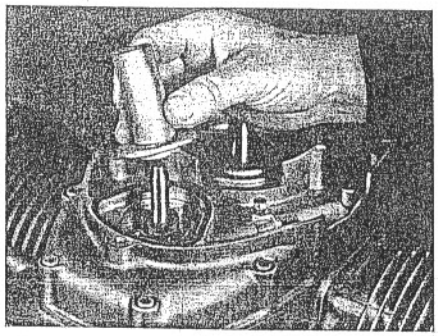


15

11 14 671 Camshaft Radial Seal – Renewing

Remove and refit timing cover – 11 14 060.

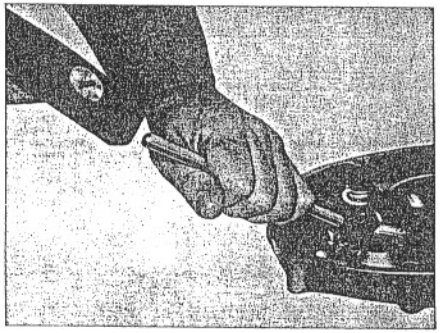
Fit radial seal over slip collar and knock in as far as it will go with the of BMW 11 1 830 tool.



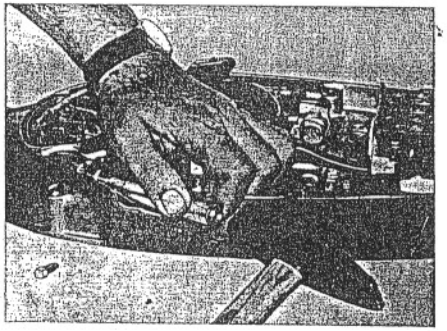
11 14 691 Revolution Counter Drive Radial Seal – Renewing

Remove and refit timing cover – 11 14 060.

When replacing the radial seal for the revolution counter helical gear drive, unscrew the retaining screw and extract the bushing with the aid of a suitable hook.
Position an aluminium drift against the helical drive gear and knock out with radial seal.



Fit helical drive gear, thrust washer, radial seal and bushing and knock firmly into position with the aid of a suitable drift.



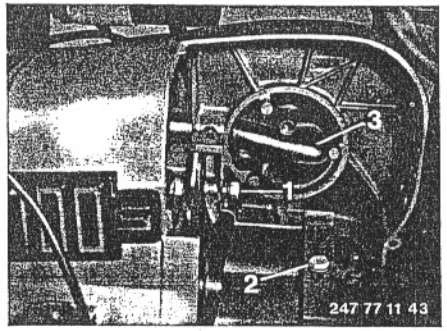
11 15 101 Engine Breather Hose – Renewing (single-sided breather)

Remove and refit fuel tank – 16 11 030.

Remove and refit air filter element – 13 72 000.

Disconnect both choke cables at the carburettor and lay to one side with left hand half of the air filter housing shell.

With a straight ring spanner unscrew nut (1), slacken hexagon bolt (2) and take off the right hand half of the air filter housing shell, at the same time pushing breather hose (3) to the rear.

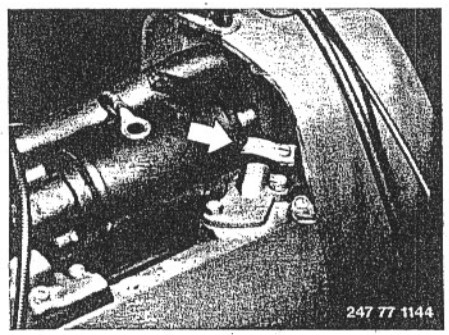


Disconnect battery.

Detach starter motor cover.

Disconnect wiring terminals at starter.

Release hose clamp (arrow) and take off breather hose.

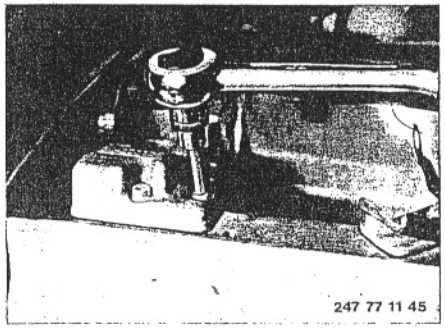


11 15 111 Check Valve for Breather – Renewing

Renewing engine breather hose – 11 15 101.

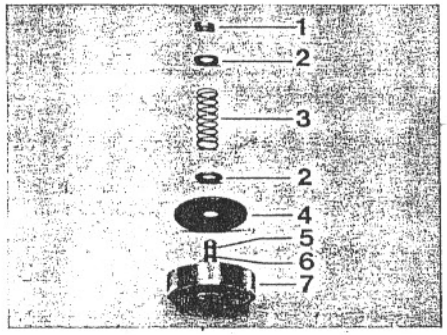
Disconnect battery, remove tank and starter cover.
Remove starter (12 41 020), loosen 2 Allen screws and take off breather cover.

Replace plastic valve disc.



Check valve (breather)

1 Lock ring
2 Washer
3 Spring
4 Valve disc
5 Spring groove, R 60/7
6 Spring groove, R 75/7, R 100/7, R 100 S, R 100 RS
7 Valve body



big and bore with inside gauge in criss-cross pattern with connecting rod bolted together. See Technical Data for nominal dimensions and tolerances.

11 21 531 Main Bearing Bushes – Renewing

Renew crankshaft – 11 21 001.

All the testing and repair jobs detailed in the preliminary work are to be carried out only where necessary.

Press main bearing bush out of crankcase

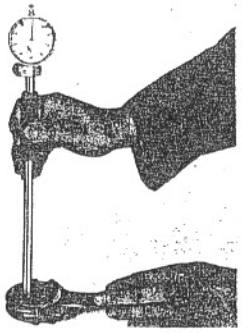
Heat crankcase to 100 . . . 120° C (212 . . . 248° F) and then invert over the cylinder of the BMW 11 2 710 extractor tool in such a way that the locating pins for the inside thrust washer engage in the corresponding bores of the cylinder. Press out the bearing bush with the aid of the BMW 11 2 710 arbor and a hand press.

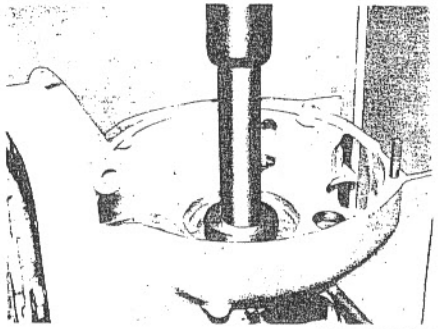
Press in oversize bearing bush reground to 1st or 2nd stage

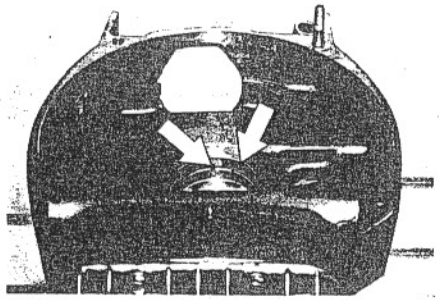
Heat crankcase to 100 . . . 120° C (212 . . . 248° F). Fit the aluminium cap of BMW tool 11 2 710 on the arbor cylinder and invert the crankcase over the arbor press so that the two locating pins engage in the appropriate bores in the aluminium cap.

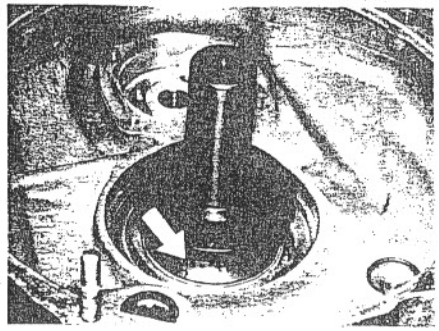
Fit new bearing bushes so that the bush join is at the top right as viewed toward the flywheel end and the oil bores of the bush are vertical (arrows); bearing bush joint offset approx. 26° from vertical.

Insert the press arbor with plastic bush on the BMW 11 2710 tool in the bearing bush, taking care to ensure that the locating pins projecting in the housing protrude into the recesses around the arbor after the bearing bush has been pressed into position. The bearing bush is proportioned so that both sides stand back slightly when it is fitted in the crankcase bearing bore.

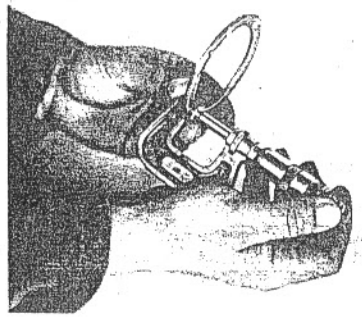


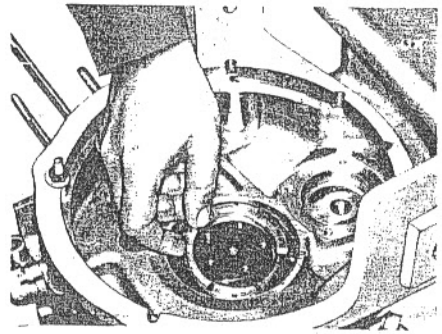


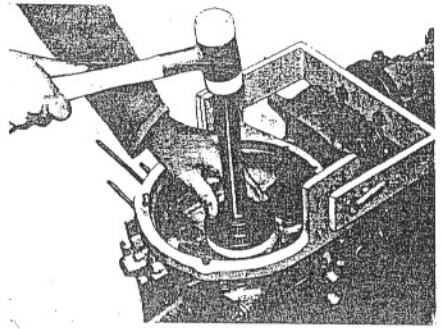




11–21/3







11–21/6

Example:

Established endplay	=	0.18 mm
Required endplay	=	0.12 mm
Discrepancy	=	0.06 mm
Established thickness of removed thrust washer	=	2.48 mm
Plus discrepancy	=	+0.06 mm
Thrust washer (blue) to be used	=	2.54 mm

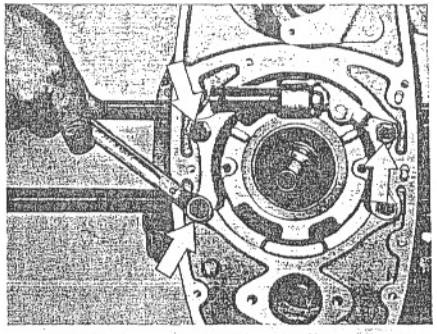
From the blue-marked thrust washers select one with a thickness as close as possible to the value measured and which does not deviate by more than +0.03 mm or —0.04 mm. Fit the thrust washer on the locating pins.

With the aid of BMW No. 11 1 880 arbor, knock the radial seal into the crankcase down to the contact collar. Lightly oil the radial seal.

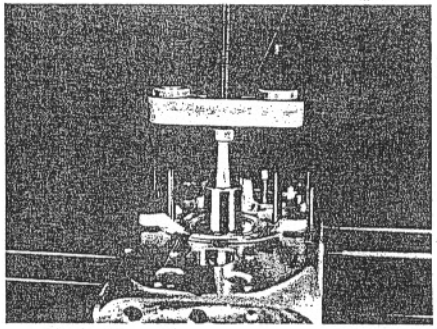
11 21 001 Crankshaft – renewing

Renew timing chain gear train – 11 31 061.

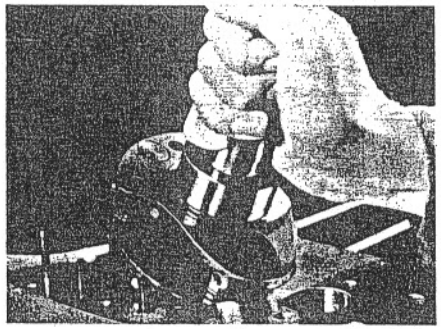
All the testing and repair jobs detailed in the preliminary work are to be carried out only where necessary. Remove the remaining three hexagon nuts (arrows), one collar nut and two nuts from the main bearing cap.

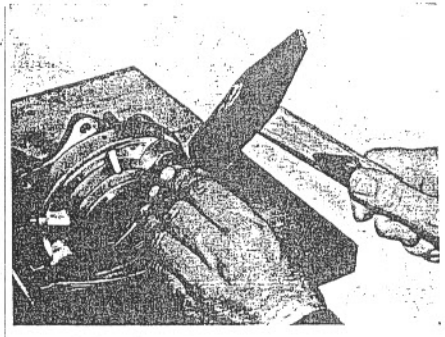


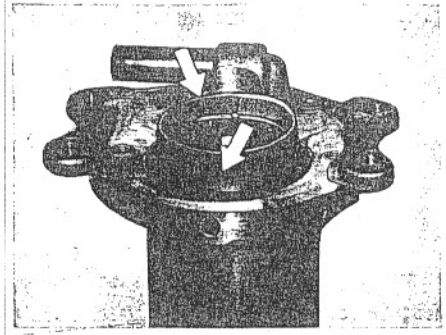
Position engine vertically. Screw two bolts on the BMW 00 7 500 extractor tool into the appropriate tapped bores in the main bearing cap. Position extractor bridge parallel to the main bearing cap, remembering to fit the extractor thrust cup. Draw off main bearing cap.

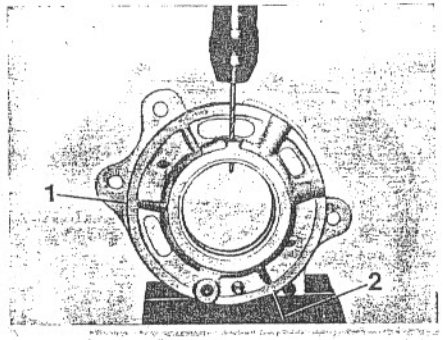


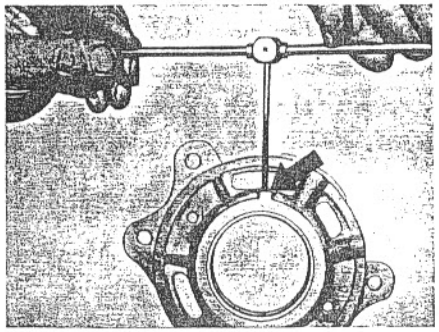
Turn crankshaft until the metal plugs face in direction of starter. Withdraw crankshaft halfway, tilt down and then pull out fully.











11–21/4

Main Bearing Bush in Main Bearing Cap, Renewing

Knock out the bearing bush locating pin from the inside. Heat bearing cap to 100 . . . 120° C (212 . . . 248° F, and lay on the cylinder of the BMW 11 2 710 arbor press. With the aid of the arbor from BMW tool 11 2 710, press out the bearing bush by hand.

Press the new bearing bush into the bearing cap heated to 100 . . . 120° C (212 . . . 248° F) so that the bearing bush join viewed vertically onto the fitted bearing cap is at the upper left and the oil bores are vertical. Bearing bush joint offset by approx. 26° from vertical (arrows).

Clamp bearing cap between soft-jaws in bench vice. Drill two extra oil bores 1 and 2 in the bearing bushes through the two 3.2 mm diameter bores already existing in the bearing cap. Carefully deburr the bore apertures in the bearing bush.

Secure bearing bush! Fit on bearing bush locator with 3.9 mm spiral bit through the locating pin mounting bore (4H8) in the bearing cap and then bore through the bearing bush to 3.8 mm (basic reaming bore).

Do not ream completely through the bearing bush with the hand reamer (4H8), so that the retaining pin cannot escape inward.
Carefully deburr the bore apertures.

11 22 000 Flywheel – Removing and Refitting

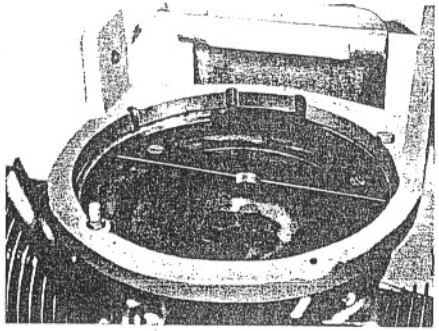
First possibility: remove and refit engine – 11 00 050.
Remove and refit clutch – 21 21 000.

Secord possibility: remove and refit gearbox – 23 00 020.

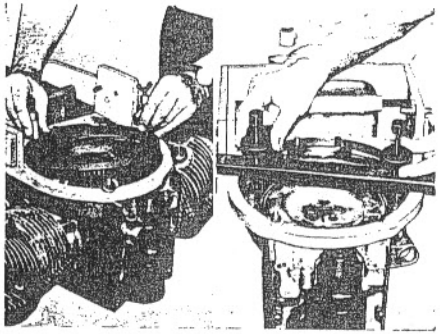
Engine remains in frame.

Remove and refit clutch – 21 21 000.

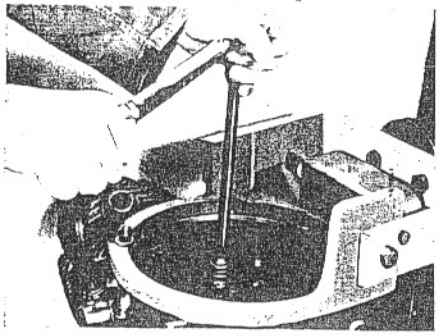
Fit BMW 11 2 800 back-up plate in flywheel so that it comes to rest at the lower cast eyes in the housing.



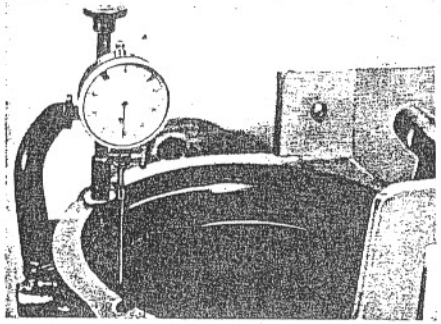
Release five fastening bolts and carefully lift out the flywheel after screwing in two clamping screws, taking care not to tilt the flywheel. Alternatively pull the flywheel off the crankshaft stump with the BMW 11 2 810 extractor tool.



When refitting, set piston to top dead centre and place the flywheel on the crankshaft stump so that the TDC marking is visible in the sight aperture of the housing.
Fit the BMW 11 2 800 back-up plate in the flywheel. Tighten five fastening screws to the prescribed torque ratings; see Technical Data. The flywheel fastening bolts are of the expanding head type and must be fitted in dry condition.
Ensure that the contact surface of the flywheel, the front end of the crankshaft and the crankshaft tapped bores are free of oil (dry).



Use a dial gauge mounted in gauge holder BMW 00 2 500 to check the flywheel for wobble. To eliminate end float on the crankshaft when checking the flywheel for wobble the engine must be positioned vertically in the assembly jig. When the engine is in situ press against the crankshaft stump locator.

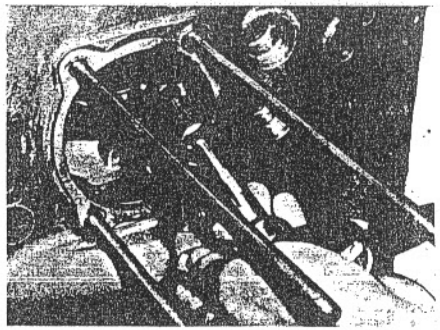


11 24 000 Connecting rod – removing and refitting

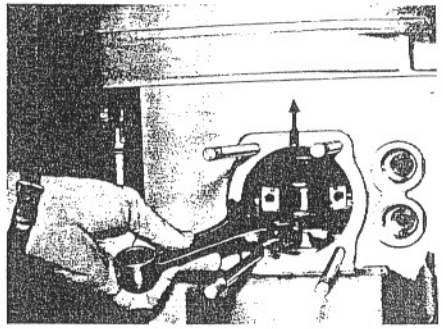
Remove and refit engine – 11 00 050.
Remove and refit cylinder head – 11 12 080.
Remove and refit piston – 11 25 000.

All the testing and repair jobs outlined in the preliminary work are to be carried out only when necessary.

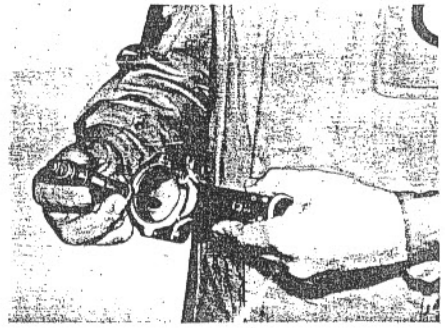
The connecting rod is removed and refitted with the crankshaft at TDC. Release connecting rod bolts with multi-tooth wrench and take off connecting rods and connecting rod cover together with bearing shells.



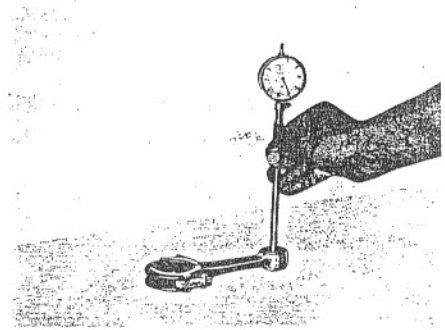
Note when fitting:
Fit both connecting rods so that the connecting rod locating pins are situated at the alternator end.



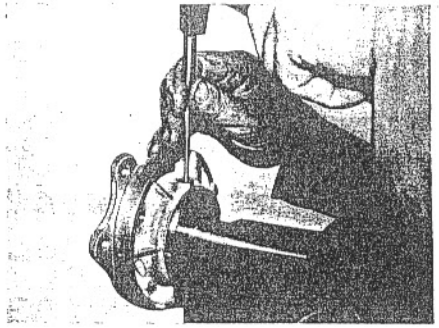
Check and repair: Measure connecting rod thickness at big end bearing with micrometer gauge. See Technical Data for dimensions. Both connecting rods within an engine must display the same weight or colour markings. Check small end bush for secure seating and dimensional accuracy.



If the wear limit has been exceeded in the inside diameter of the small end bush, the bush must be pressed out. See Technical Data for dimensions.



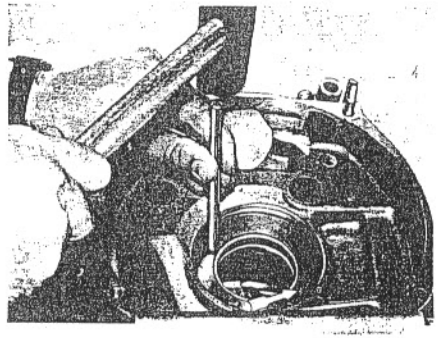
Clamp the BMW No. 11 2 710 arbor press in the bench vice, fit bearing cap, knock in retaining pin only until it stands 0.5 to 1.0 mm (0.02 . . . 0.04 in) back from the bearing bush bore. Lock pin in position with three punch marks.



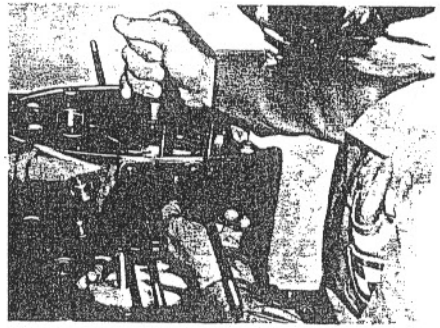
Crankshaft Endplay, Resetting

See Technical Data for thrust washer selection chart.

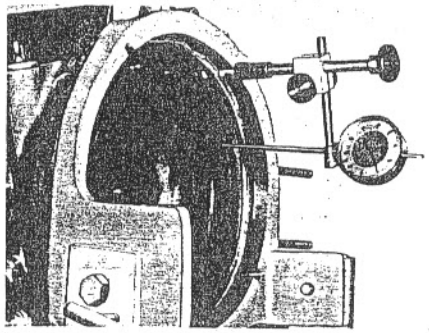
To facilitate adjustment of crankshaft endplay it is advisable to fit thrust washers on the inside and outside of the locating pins. Both locating pins must project an equal distance into the clutch and crankshaft end of the crankcase. Heat the crankcase to align or insert the locating pins.

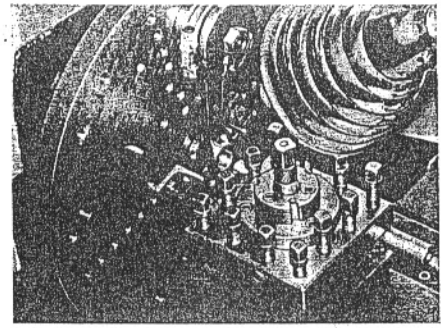


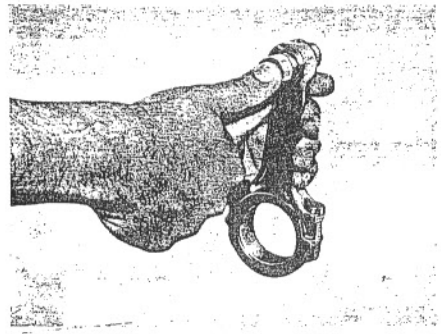
Heat the crankcase to 100 . . . 120 ° C (212 . . . 248° F), fit in assembly mount and position vertically. Insert crankshaft carefully into the crankcase. Fit and tighten down bearing cap. Rotate crankcase by 180°. Fit flywheel, remove and refit – 11 22 000).

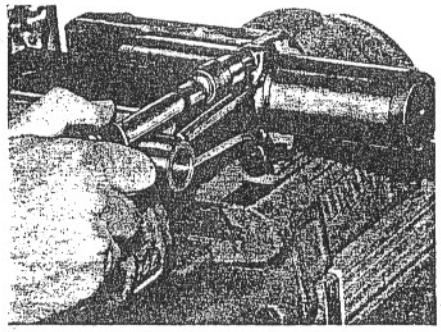


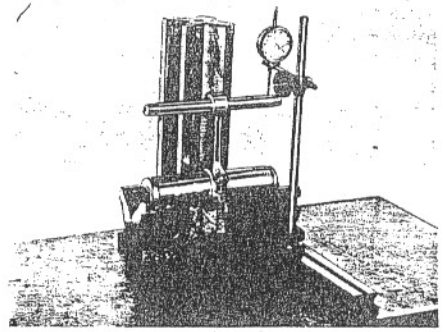
Return crankcase to horizontal position. Bolt BMW 00 2 500 gauge holder to the gear box flange of the crankcase. Establish end play. Remove flywheel and use micrometer gauge to measure the fitted red-marked thrust washer.











Press in new bush with inside oversize. Mount the connecting rod on the face plate of a lathe, align and precision turn down to finished dimension. See Technical Data.

With a new bush it must be possible to push the wrist pin into position under light thumb pressure.

Connecting rod – measuring

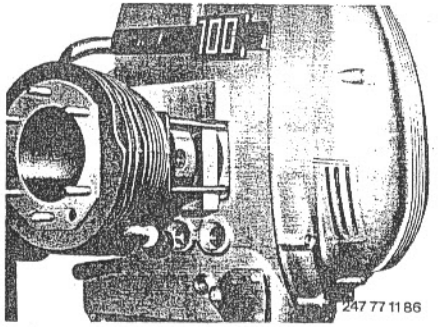
Press the bearing shells to be checked into the connecting rod. Mount the connecting rod on a hardened and ground test arbor and tighten bolts. The test arbor should not have any radial play in the big end bearing bore. Insert a hardened and ground test arbor approximately 150 mm (5.9 in) long into the small end bush so that the arbor projects an equal distance to either side.

Position two V-guides of equal dimensions on a surface plate. Lay the test arbor with connecting rod on the V-guides. Bring the vertical connecting rod to rest against the back V-guide. Use the column gauge at the ends of the test arbor to check whether the wrist pin axis runs parallel to the crank pin axis. See Technical Data for connecting rod parallel check.

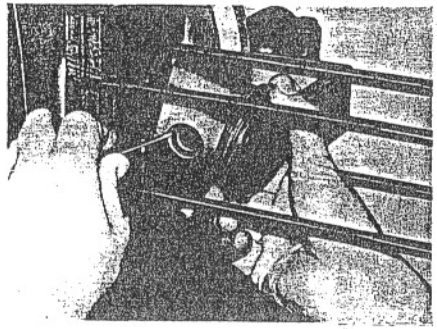
11 25 000 Piston – Removing and Refitting

Remove and refit cylinder head – 11 12 080.

Draw the cylinder and cylinder base seal off the four tie bolts, taking care to ensure that the piston is not damaged on emerging from the cylinder. Insert a protective block of wood behind the piston and between the tie bolts.

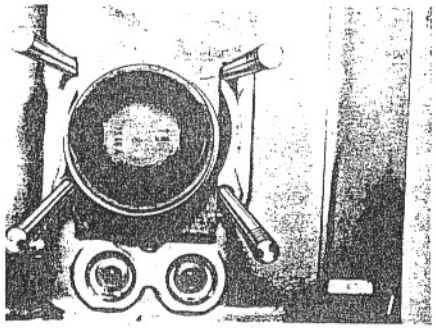


Lift out the wrist pin retainer by pressing in a scriber or small screwdriver into the transverse slot. Press out the wrist pin with a conventional extractor device or a BMW 11 2 920 arbor press.



Note when fitting:
Fit the piston so that the marking "vorn→" on the piston crown points in the direction of travel. This is the correct fitting position for the offset piston. The piston does not have to be heated for fitting the wrist pin.

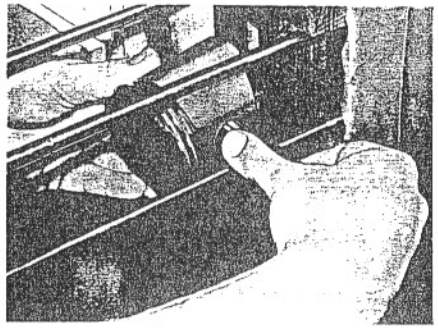
It is essential to use only pistons of the same weight category within each engine.



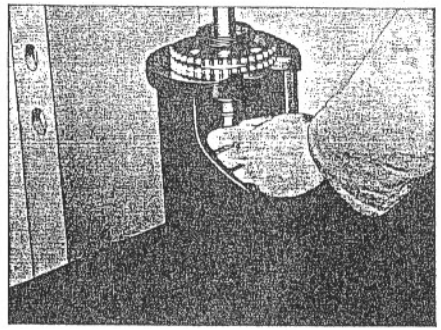
Insert the wrist pin circlip in the groove so that one end completely covers the transverse slot. Press the centre of the circlip into the wrist pin bore so that both ring ends come as close together as possible. Use the BMW No. 11 2 920 arbor press to push the ring fully into the groove.

When installing: Before installing the cylinder, clean the base and the cylinder mating surface on the engine block with nitro thinners, then coat with "Hylomar" liquid sealing compound. Make sure that the cord ring seals on the upper tie rods are not trapped and compressed.

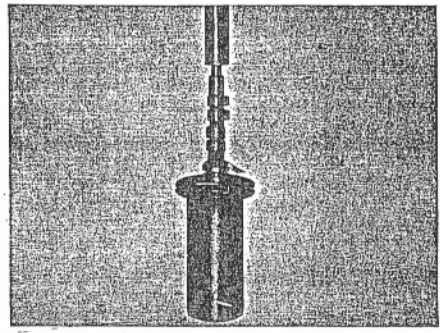
Do not block the oilways with the sealing compound.



11–25/1



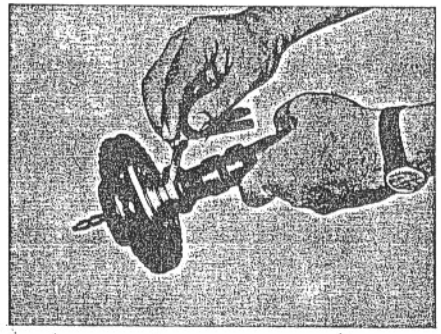
Insert the camshaft into a suitable pipe (outer diameter approx. 106 mm (4.17 in), inner diameter approx. 90 mm (3.54 in) and length approx. 225 mm (8.86 in) so that the sprocket lies flat on the pipe. Fit BMW 11 3 600 sleeve on the camshaft end face and press out the sprocket together with the rev. counter drive gear.



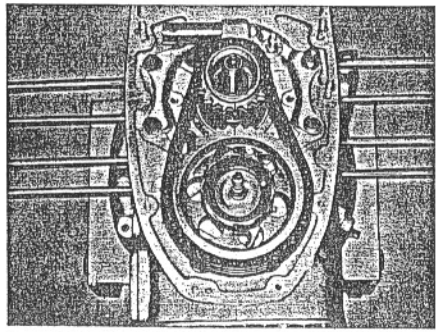
Before refitting the timing sprockets, grease the gear bores lightly with tallow.

The rev. counter drive is pressed on in reverse sequence to removal. Push the flanged bearing on to the camshaft, then push the sprocket followed by the rev. counter drive gear into place.

When pressing the camshaft into the sprocket hold a feeler gauge (see Technical Data for thickness) between the camshaft thrust collar and the flanged bearing.



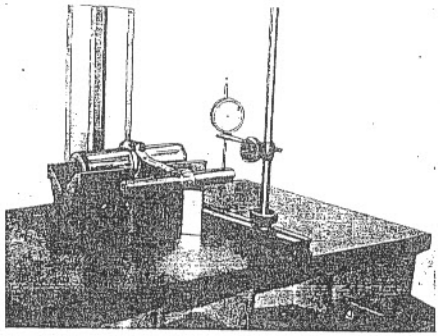
Check the end play on the camshaft flanged bearing once again with a feeler gauge.



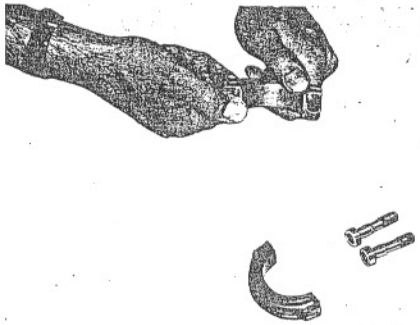
Position the crankcase vertically for fitting the camshaft. Lay the camshaft and crankshaft sprocket into the chain so that the tooth marking lines are exactly opposed.
Insert the camshaft in the crankcase and push the drive gear with slip collar on to the crankshaft stump so that the sprocket groove coincides with the fitting key.

11–31/2

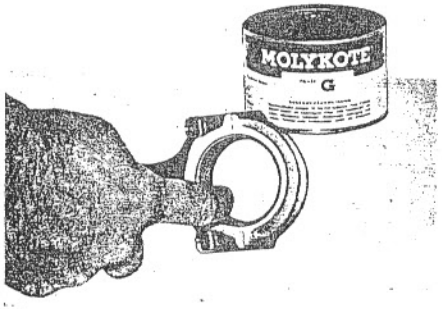
Check connecting rod for twisting. For this purpose replace the connecting rod in the V-guides and support it at the wrist pin end so that the space between the surface plate and the centre of the crank pin and wrist pin bores is approximately equal. Bring a columm gauge up against the test arbor ends to check the connecting rod for twisting, straightening where necessary. See Technical Data for permissible tolerances.

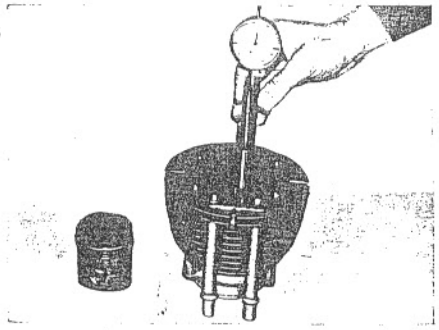


Ensure that the basic bore in the big end bearing is clean and round before pressing in the bearing shells.

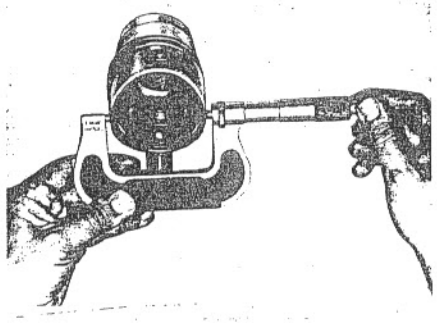


Before refitting the crankshaft smear the main and connecting rod bearing shells lightly with Molykote Paste G.

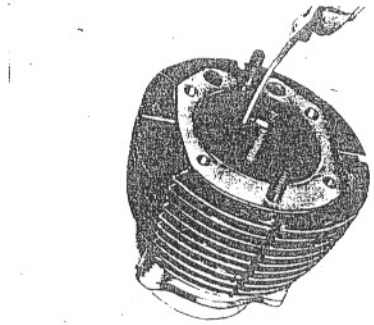




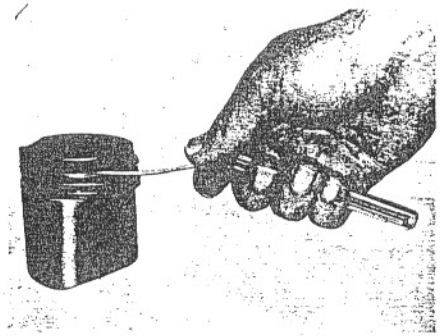
Testing and Repair: Measure the cylinder bore in the wrist pin direction and at 90° thereto 10 mm (0.4 in), from the top, in the centre and at the bottom with an inside gauge. This should be carried out at a room temperature of 20° C (68° F).



Use a micrometer gauge to measure the piston diameter at the piston skirt transverse to the wrist pin bore.



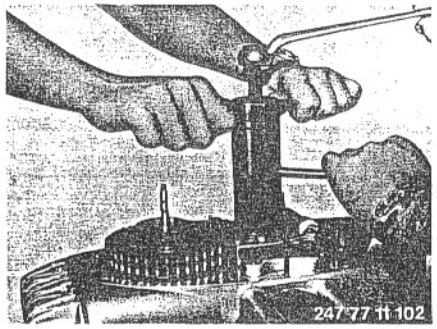
Check the ring gap.



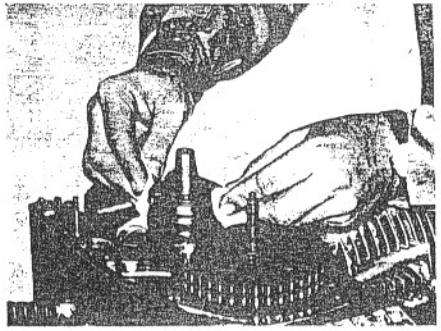
Check side clearances of the piston rings with the aid of a feeler gauge. Se Technical Data for the nominal dimensions and oversizes of cylinder bore and piston, diameter and the ring gap and side clearances of the piston rings.

Screw the BMW 11 2 620 screw press with spindle into the crankshaft stump. Press the sprocket firmly into position ensuring that the camshaft is guided accurately into its bearing seat at the flywheel end.

When installing:
Do not screw the threaded spindle fully into the crankshaft. Hold with open-ended wrench.
Assembly can only be performed by 2 persons.

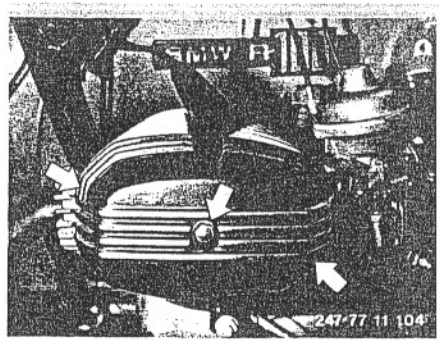


Tighten the camshaft flanged bearing with its two hex. slot screws. Heat the grooved bearing to approx. 80 . . . 100° C (175 . . . 212° F) and mount on crankshaft stump. Fit chain tensioner, ensuring that the rubber running surface is in good condition. Do not change the form or spring pressure of the timing chain tensioning spring.

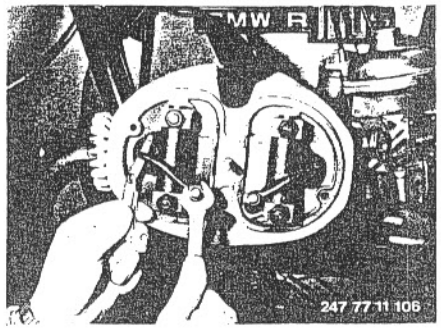


11 34 504 Valve Clearance – Adjusting

Slacken off the cap nut and the two nuts (arrows), remove the cylinder head cover and gasket.



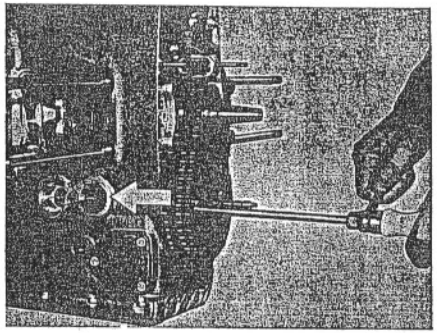
Adjust the valve clearance with the engine cold and stationary by inserting the appropriate feeler gauge between the valve stem and rocker arm. For this purpose take out the spark plugs and turn the engine with the kick starter till the cylinder to be adjusted is at top dead centre on the compression stroke. Both valves are closed. If necessary adjust the adjusting screw after releasing the lock nut and then secure with the lock nut. Recheck the valve clearance. See Technical Data for valve clearances.



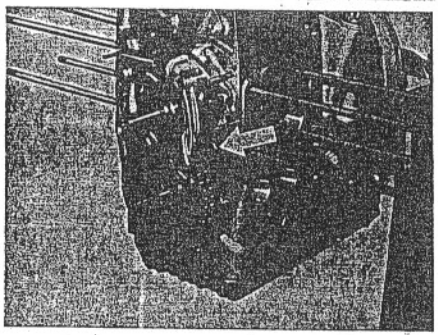
11 31 061 Timing chain sprockets – renewing (models without rotary ignition trigger)

Remove and refit engine – 11 00 050.
Remove and refit cylinder head – 11 12 080.
Remove and refit timing cover – 11 14 060.
Remove and refit flywheel – 11 22 000.
Remove and refit connecting rod – 11 24 000.
Remove and refit piston – 11 25 000.
Remove and refit oil pump – 11 41 000.
Remove and refit alternator – 12 31 020.
Remove and refit clutch – 21 21 000.

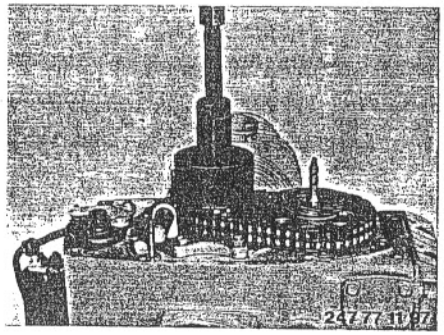
Unscrew the two slotted hexagon head screws fastening the camshaft flanged bearing with the aid of an M 10 spanner or a screwdriver. Withdraw the four push rods with the aid of a wire hook.



After removing the circlip, take off the chain tensioner. Remove the chain tensioner spring after releasing the nut (arrow).



Fit the BMW 11 2 600 timing chain sprocket extractor on the crankshaft sprocket (not forgetting the extractor pad cap). Draw off the sprocket and ball bearing while tightening the camshaft.

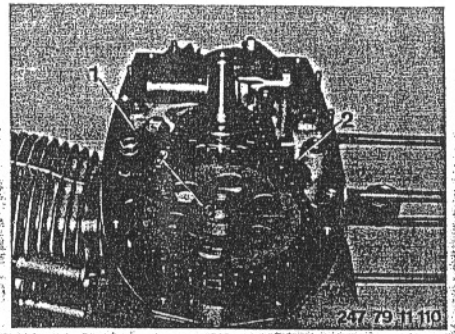


11 31 061 Chain sprockets – renewing (models with rotary ignition trigger)

The engine can be either removed or left installed.
If installed, drain the engine oil.
Remove (install) engine – 11 00 500.
Remove (install) rotary ignition trigger – 12 11 060.
Detach (attach) timing chain cover – 11 14 060.
Remove chain guide rail (1) and chain tensioner arm (2).
Release spring link (3) and remove chain.

When installing:

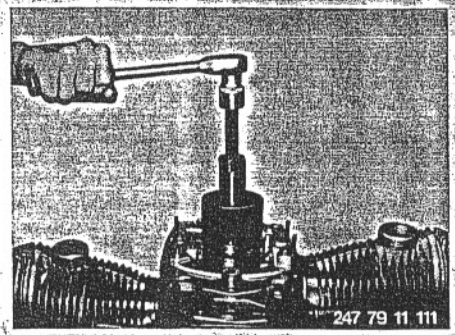
The closed end of the spring link must face the direction of chain movement. The chain guide rail must be parallel to the chain.



Pull the chain sprocket off the crankshaft together with the bearing. Use BMW puller 11 2 600, but replace dish 11 2 606 by one with a groove. This will enable the bearing to be re-used.

When installing:

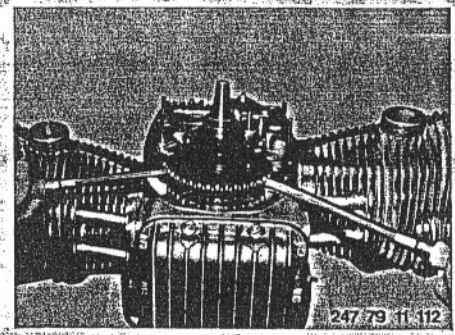
Heat the chain sprocket to app. 80° C (175° F), then heat the bearing and push on.



Press off the camshaft chain sprocket with two screwdrivers, avoiding damage to the sealing face.

When installing:

The marks on the two chain sprockets should be opposite one another.



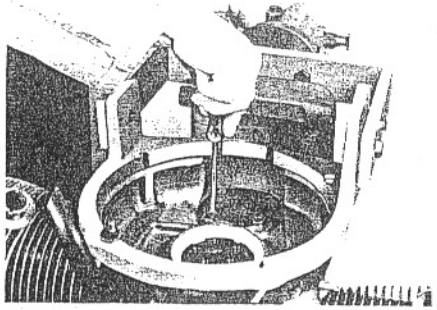
11 41 000 Oil Pump – Removing and Refitting

First possibility: Remove and refit engine – 11 00 050.
The illustrations and text were prepared after this preliminary work.

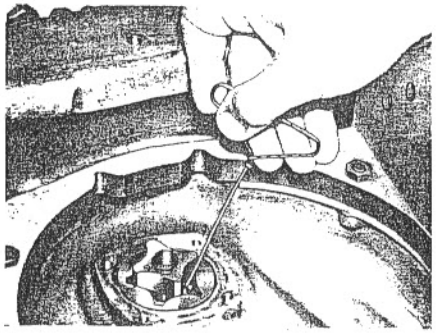
Second possibility: Remove and refit gearbox – 23 00 020 (Engine remains in frame).

Remove and refit clutch – 21 21 000.
Remove and refit flywheel – 11 22 000.

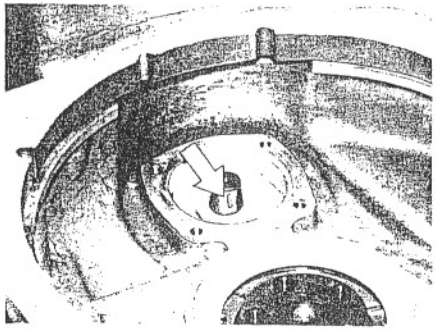
After unscrewing the four hexagon bolts, take off the oil pump housing cover.



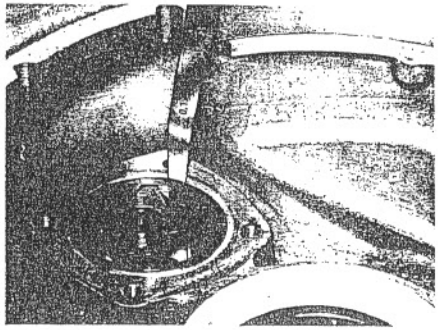
Take the inner and outer rotor out of the housing with the aid of a wire hook.



Before extracting the driver key (fitting key) for the inner rotor it is advisable to press a small rag into the oil pump housing bores.



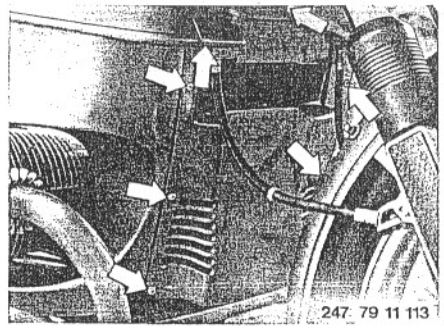
Tests:
See Technical Data for clearance between outer rotor and pump housing.



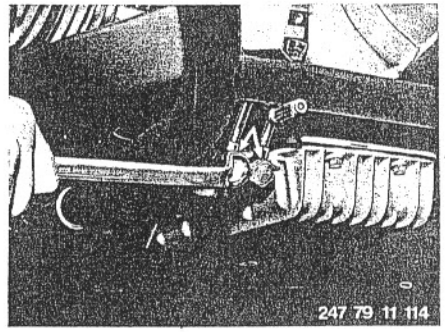
11 42 130 Oil cooler – removing and installing

Drain the engine oil.

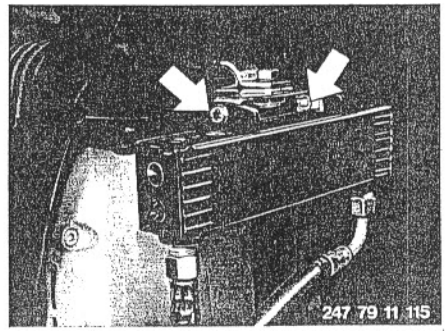
Detach and take off the center section of the engine panelling.



Unscrew the threaded unions at the oil filter head.



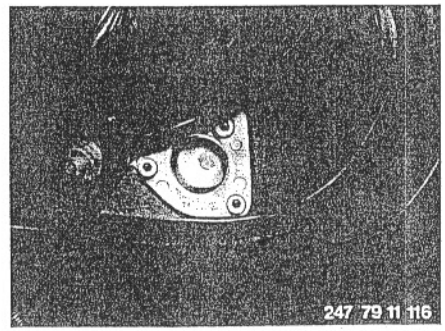
Remove the two hex bolts (arrows) at the oil cooler mount.
Detach the oil cooler with hoses.

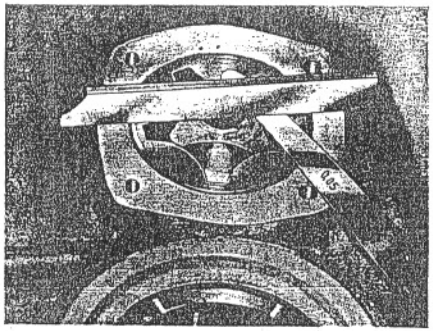


Remove the three Allen screws (arrows) at the oil filter head and take it off.

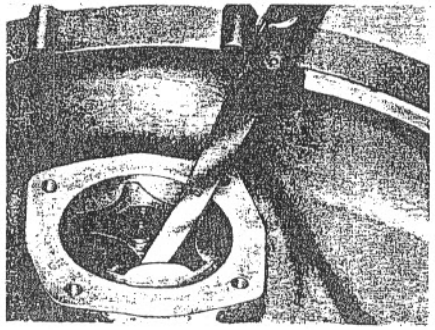
When installing:

Tighten the Allen screws in several successive stages.



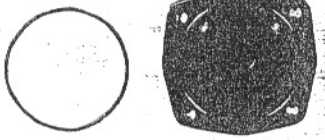


See Technical Data for clearance between pump housing contact surface and rotor sealing surface.

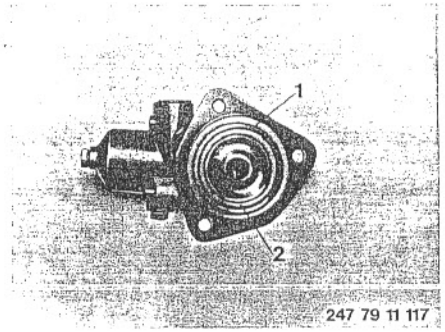


Determine the gap between the inner and outer rotors with the aid of a feeler gauge. See Technical Data for clearances.

When reassembling, do not forget to replace the fitting key and ensure that the O-ring in the cover is in perfect condition.

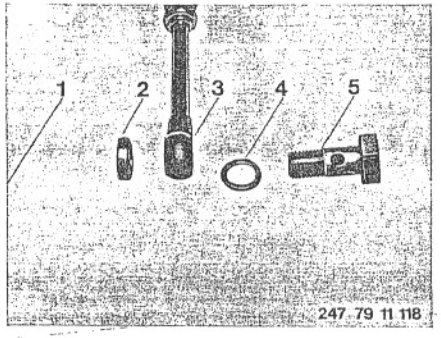


When assembled, the O-ring must be compressed so that the cover lies flat on the housing contact surface.



Important:

Use new O-rings (1 and 2) at filter head.



When assembling, make sure that the spacer between the pipe union and the filter head is correctly seated.

1 Filter head
2 Spacer
3 Union
4 Gasket
5 Hollow screw

Add oil (2.5 liters [2.7 US quarts, 4.4 Imp. pints] including oil cooler and hoses).

Engine electrical system

Technical Data

Model	R 60/7	R 75/7	R 80 7	R 100/7	R 100 S	R 100 RS
Diode carrier: Type (Bosch)	D 120 915 158 14 V 20 A					
Ignition coil: Type (Bosch)	E 6 V					
Length of starting spark at 300 sparks/minute and 3 V, mm(in)	8 (0.32)					
Length of operating spark at 3600 sparks per minute, mm(in)	13.5 (0.53)					
Spark plugs: Thread	M 14 × 1.25					
Bosch	W 225 T 30	W 200 T 30	W 175 T 30	W 200 T 30	W 225 T 30	W 225 T 30
Beru	230/14/3A	200/14/3A	175/14/3A	200/14/3A	230/14/3A	230/14/3A
Champion	N 6 Y	N 7 Y	N 10 Y	N 7 Y	N 6 Y	N 6 Y
Electrode gap, mm(in)	0.7 (0.028)					
Contact breaker: Type (Bosch)	Automatic centrifugal advance on camshaft					
Advance commences min^{-1}	1550					
Advance ends min^{-1}	3000					
Breaker lubricating felt and centrifugal advance lubrication	Bosch grease Ft 1 v 4					
Bearing journal for centrifugal advance	Bosch grease Ft 1 v 26					
Contact breaker points gap mm(in)	0.35 . . . 0.40 (0.014 . . . 0.016)					
Contact spring pressure p	450					

12-0/4

Engine electrical system

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Diode carrier: Type (Bosch)	D 120 915 158 14 V 20 A					
Ignition coil: Type (Bosch)	E 6 V					
Length of starting spark at 300 sparks/minute and 3 V, mm(in)	8 (0.32)					
Length of operating spark at 3600 sparks per minute, mm(in)	13.5 (0.53)					
Spark plugs: Thread	M 14 × 1.25					
Bosch	W 225 T 30	W 200 T 30	W 175 T 30	W 200 T 30	W 225 T 30	W 225 T 30
Beru	230/14/3A	200/14/3A	175/14/3A	200/14/3A	230/14/3A	230/14/3A
Champion	N 6 Y	N 7 Y	N 10 Y	N 7 Y	N 6 Y	N 6 Y
Electrode gap, mm(in)	0.7 (0.028)					
Contact breaker: Type (Bosch)	Automatic centrifugal advance on camshaft					
Advance commences min^{-1}	1550					
Advance ends min^{-1}	3000					
Breaker lubricating felt and centrifugal advance lubrication	Bosch grease Ft 1 v 4					
Bearing journal for centrifugal advance	Bosch grease Ft 1 v 26					
Contact breaker points gap mm(in)	0.35 . . . 0.40 (0.014 . . . 0.016)					
Contact spring pressure p	450					

12.77 Alteration

Fault	Cause	Remedy
Loss of compression	Valve leaking or bent	Regrind or renew
	Piston ring spring loading to weak, ring gap too large	Check, renew if necessary
	Piston rings broken	Renew
Low power output	Incorrect ignition timing	Check, adjust if necessary
	Float level too low	Check and adjust if necessary
	Air cleaner blocked	Renew element
	Fuel tap blocked	Clean, check flow rate
	Tank vent defective	Drill vent holes (see SI)
Engine reluctant to start or will not start at all	Valve clearances too low	Check and adjust if necessary
	Choke cannot be closed	Check choke setting
	Ignition timing incorrect	Check timing
	Breaker points gap too small	Reset points
	Contacts eroded	Renew
	Spark plug gaps incorrect	Reset
	Spark plugs wet	Dry out
Engine does not accelerate smoothly	Centrifugal ignition advance too small or not working	Renew centrifugal governor
	Broken springs	Renew springs
	Cam seized to shaft, shaft rusted	Free contact breaker cam
	Spark plug gaps incorrect	Reset
Engine starts, but immediately stalls	Break or short circuit at condenser	Renew condenser
Engine misfires – high fuel consumption	Defective ignition lead or spark plug cap	Renew
	Defective suppressor resistors	Renew
Pre-ignition (pinking)	Incorrect ignition timing	Retime ignition
	Incorrect needle position at carburetor	Reset needle to correct position
Oil pressure too low	Main bearing play excessive	Measure crankshaft and bearings
	Blocked oil suction head	Check, renew if necessary
	Pressure relief valve stuck open	Remove and repair valve

12 Engine electrical system

Technical Data		Page 12– 0/3
Specifications – '79 models		12– 0/6
12 11 004	Ignition timing – adjusting (models without rotary ignition trigger)	12–11/1
12 11 004	Ignition timing – adjusting (models with rotary ignition trigger)	12–11/1
12 11 141	Contact breaker points – renewing (models without rotary ignition trigger)	12–11/4
12 11 141	Contact breaker points – renewing (models with rotary ignition trigger)	12–11/4
	Trouble-shooting – ignition system	12–11/5
12 13 100	One ignition coil – removing and refitting	12–13/1
12 31 009	Alternator, diode carrier and regulator – testing	12–31/1
12 31 019	Alternator with regulator – quick test	12–31/2
12 31 020	Alternator – removing and refitting	12–31/2
12 31 212	Alternator – overhauling	12–31/3
12 31 689	Stator winding and rotor – testing	12–31/3
12 32 000	Regulator switch for generator – removing and refitting	12–31/4
	Fault finding on alternator	12–31/5
12 41 009	Starter – testing in situ	12–41/1
12 41 020	Starter – removing and refitting	12–41/1
12 41 513	Starter – dismantling and reassembling	12–41/3
12 41 541	Carbon brushes – renewing	12–41/5
12 41 602	Starter – overhauling	12–41/5
12 41 701	Exciter coil – renewing	12–41/6
	Fault finding on the starter	12–41/7

Engine electrical system

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Dwell angle	78° ± 1°					
Capacitor	0.2 µF – 25 %					
Ignition timing, static for engine assembly	6° ± 3° BTDC					
Adjustment range, °crankshaft	25° ± 2°					

Tightening torques Nm (ft. lb)

Armature fastening screw	23...27 (17.0...19.9)	Spark plugs	23...30 (17.0...22.1)
Starter fastening bolts	47.5 (35.0)	Centrifugal advance unit	5...6 (3.7...4.4)

All other bolts and nuts are to be tightened in accordance with the usual figures shown in the manufacturer's tables or in accordance with the latest BMW Standard Specification 60 002.0.

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Engine electrical system

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Starter: Type	Bosch DF 12 V				
Starting short circuit current strength A	320				
Output kW	0.7				
Torque mkp (ft/lb)	0.75 (5.4)				
Starter relay	Bosch				
Axial float, armature, mm (in)	0.10...0.15 (0.0039...0.0059)				
Alternator: Type	Bosch G 1 14 V 20 A 21/280 W	Bosch G 1 14 V 18 A 22/240 W			
Alternator drive	direct from crankshaft				
Maximum output W/V	280/14	250/14			
Maximum current strength A	20	18			
Resistance between phase outputs, Ohms	0.62				
Charging commences, rev/min	980				
Maximum rev/min	10000				
Maximum deflection at slip rings, mm (in)	0.06 (0.0023)				
Resistance between rotor sliprings, max. Ohms	$3{,}4^{+0{,}34}$				
Minimum slip ring diameter, mm (in)	26.8 (1.055)				
Voltage Regulator: Type (Bosch)	0 190 601 AD 1/14 V				
Regulating voltage, without load, Volts under load, Volts	13.55–14.25 13.9–14.3				

Engine electrical system

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Diode carrier: Type (Bosch)	D 120 915 158 14 V 20 A				
Ignition coil: Type (Bosch)	E 6 V				
Length of starting spark at 300 sparks/minute and 3 V, mm	8 (0.314)				
Length of operating spark at 3600 sparks per minute, mm	13.5 (0.531)				
Spark plugs: Thread	M 14 × 1.25				
Bosch	W 175 T 30	W 225 T 30	W 225 T 30		
Beru	175/14/3A	230/14/3A	230/14/3A		
Champion	N 10 Y	N 6 Y	N 6 Y		
Electrode gap, mm	0.7 (0.028)				
Ignition trigger: Type (Bosch)	Mechanical contact breaker with centrifugal advance, in fully-enclosed housing, with provision for dynamic adjustment.				
Advance commences min^{-1}	1550	1550	1550		
Advance ends min^{-1}	3000	3000	3000		
Contact breaker points gap mm (in)	$0{,}45 \pm 0{,}05$				

23

12 11 004 Ignition timing – adjusting (models without rotary ignition trigger)

Engine is removed (11 00 050) or fitted. Illustrations and text (apart from the two pictures with the timing gun) were prepared with engine removed.

Take off engine cover after unscrewing the three hexagon socket head bolts.

Note when fitting:

When assembling, ensure that the breather hose is first inserted in the engine cover.

Where no dwell angle tester is available, turn the engine, with spark plugs removed, clockwise as viewed facing against direction of travel, with the aid of the hexagon socket head bolt used to secure the rotor.

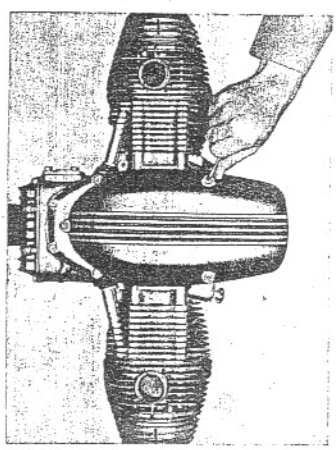
The contact breaker arm (hammer) must lift fully clear. Check points gap with feeler gauge. If necessary replace points – 12 11 141.

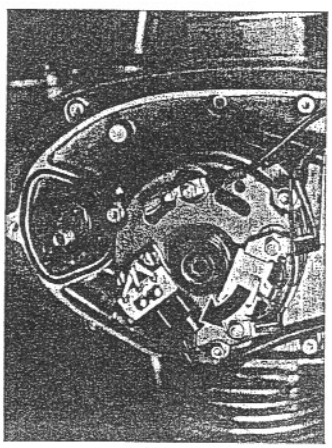
Adjusting the points gap

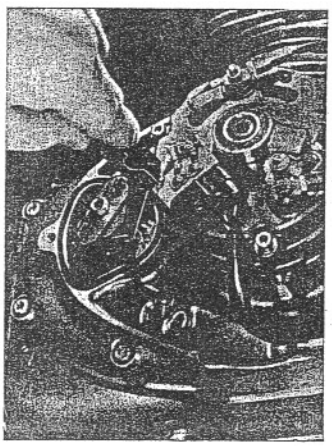
Slacken off the locking screw (arrow), insert screwdriver between the two pegs and in the slot of the anvil point and adjust the points gap by turning the screwdriver. Tighten locking screw.

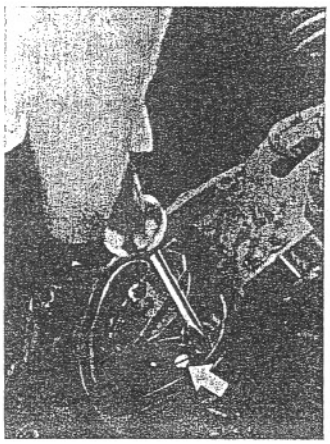
Recheck the dwell angle and points gap.

See Technical Data for dwell angle and points gap.









Checking ignition timing

a) With test lamp or buzzer

b) Timing light gun (stroboscope)

c) Connect the test lamp or buzzer with one terminal to the capacitor and the other to earth. Switch on ignition.

■

The test lamp must light up when the central "S" marking on the flywheel coincides with sight aperture marking when the engine is turned clockwise (centrifugal weights in rest position).
Between the left and right cylinders the ignition timing may deviate by a maximum of 6° (corresponding to 12 mm [0.47 in] on the flywheel circumference).
Markings on flywheel: notches 3° above and 3° below the "S" mark.

■

b) Connect timing light gun (stroboscope) and aim at the flywheel marking in the sight aperture while the engine is running.

■

With the timing set correctly (2) the white spot coincides with the marking on the housing.

As engine speed increases the flywheel marking "S" disappears upwards (adjustment commences at about 1550 min^{-1}) until as the revolution speed increases still further the flywheel marking "F" (full advance) appears from the bottom in the sight aperture and at 2800±200 min^{-1} it moves up to the housing mark.

At engine idling speed (600–800 min^{-1}) the white spot on the "S" flywheel marking must appear in the sight aperture. If the spot appears below the center (1) the timing is retarded. If above the center (3) the timing is advanced.

■

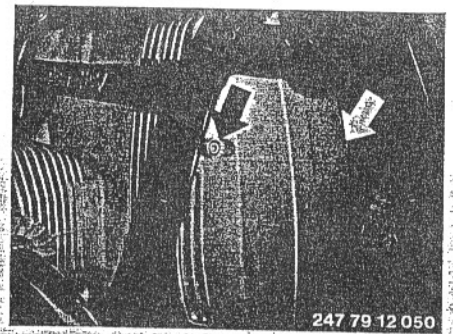
Specifications – '79 models

Engine electrical system					
Model	R 80/7	R 100T	R 100 S	R 100 RT	R 100 RS
Dwell angle	N i0 A	N 8 A	120° ± 3%		
Capacitor			0.2 µF ± 20% Bosch Nr. 1237 330 295		
Ignition timing, static for engine assembly	M 12/1 x 1.5	M 22x1.5	6±3° BTDC		M 22x1.5
Adjustment range, ° crankshaft	26°				

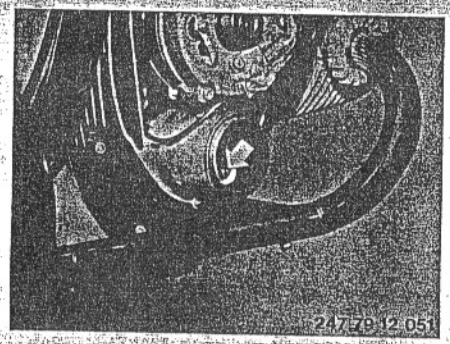
Tightening torques Nm (ft. lb)			
Alternator fastening screw	23...27 (17.0...19.9)	Spark plugs	23...30 (17.0...21.7)
Starter fastening bolts	47.5 (35.0)		
All other bolts and nuts are to be tightened in accordance with the usual figures shown in the manufacturer's tables or in accordance with the latest BMW Standard Specification 60 002.0.			

12 11 004 Timing ignition (models with rotary ignition trigger)

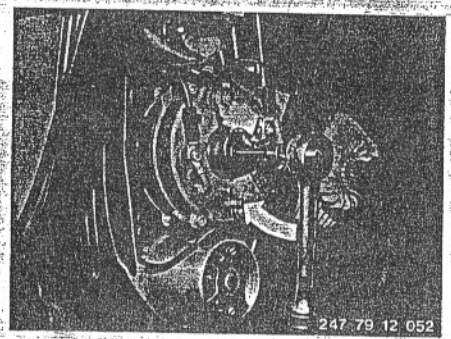
Remove the two Allen screws and take off the engine cover.



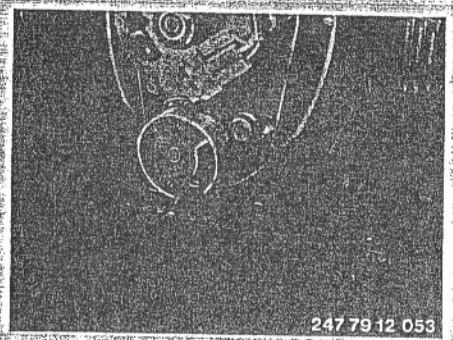
Remove the screw from the ignition trigger cover and take off the cover.



Remove the spark plugs and turn the engine over clockwise (looking from front) at the Allen screw used to retain the rotor.

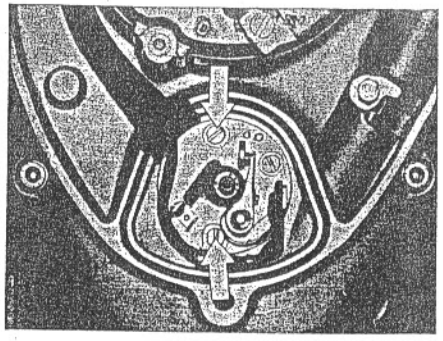


The contact breaker arm (hammer) must lift off fully. Check points gap with a feeler gauge; it must be 0.40±0.05 mm (0.016±0.002 in). Renew breaker points if necessary ⇒12 11 141.



Ignition Timing Adjustment:

Slacken off two slotted screws (arrow) in the contact breaker base plate. Turning the base plate in the same rotary sense as the engine retards the timing and turning contrary to the rotary sense of the engine advances the timing (rotary sense of engine and camshaft are identical). Tighten the slotted screws.

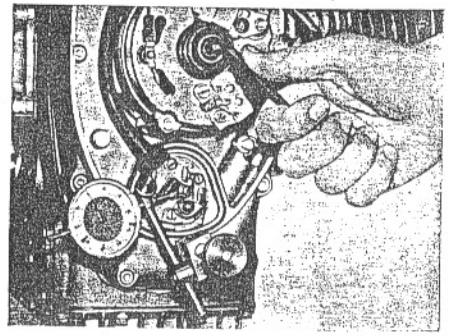


When checking the timing with a **test lamp**, turn the engine back 45° contrary to the direction of rotation of the engine (test lamp extinguishes) in order to eliminate all play between the moving elements for the subsequent rotation in the same direction of rotation as the engine. Recheck the timing.

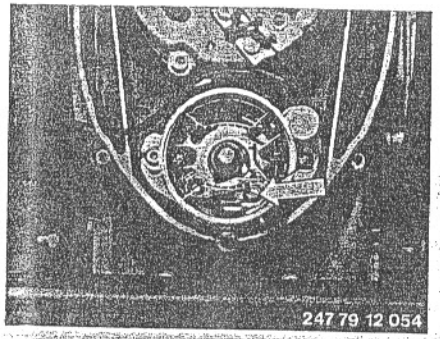
Timing check with **timing light gun** (stroboscope).

If full advance cannot be reached check the ease of operation of the adjusting cam on the bearing journal.

If the timing sequence from one cylinder to the other is outside the stipulated tolerance check the bearing journal for runout.

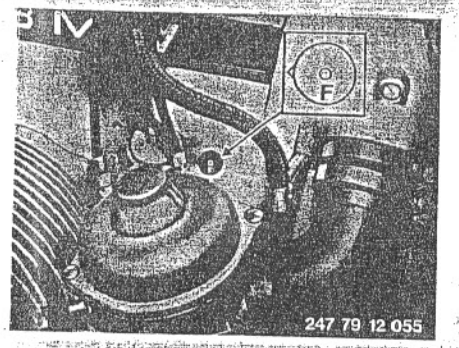


Warning:
To eliminate radial displacement of the camshaft on account of valve spring pressure, the rocker pivot pedestals should be slackened off or detached.



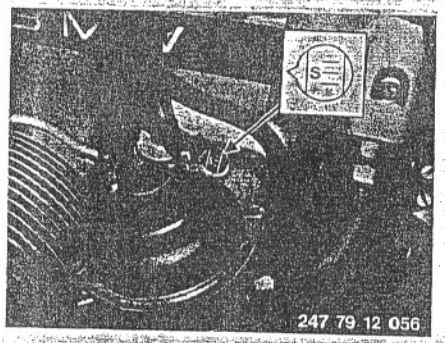
Adjusting breaker points gap:

Slacken retaining screw (arrow), insert screwdriver blade into slot of opposing contact holder (1) and turn against block (2) until the correct points gap has been obtained.
Tighten the retaining screw again.
Check that the points gap has not altered and that the dwell angle is correct (use only correct dwell angle tester).
For points gap and dwell angle, see Specifications.

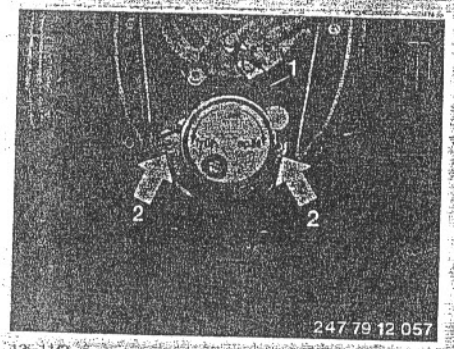


Checking ignition timing:

Connect the stroboscopic light to the battery and the ignition lead, start the engine and run at 3500 min^{-1}. When the light is directed on to the inspection hole the white spot 'F' on the flywheel should be visible (full ignition advance).
To check the ignition advance characteristic, turn the adjusting thumbwheel on the timing light until the 'OT' (top dead center) mark appears.
The scale marked on the timing light will then show the amount of ignition angle displacement in degrees.
For ignition advance angle, see Specifications.

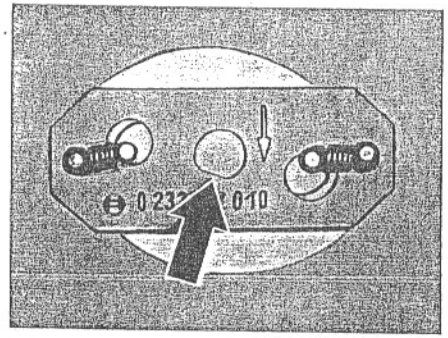


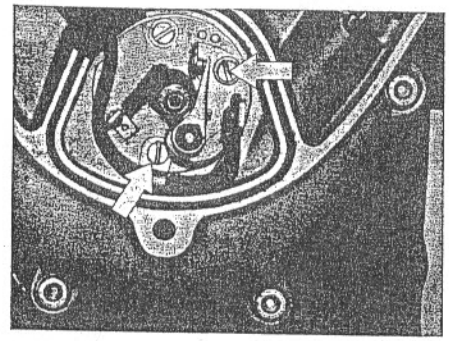
At engine idle speed (950±150 min^{-1}), the central white line of flywheel mark 'S' must be aligned with the notch in the flywheel inspection hole (2). If the upper of the tree marks (1) has reached or is below the notch mark, the ignition is retarded; if only the lower of the three marks (3) has reached or is still above the notch mark, the ignition is too far advanced.

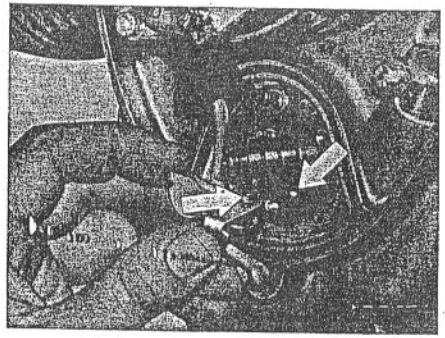


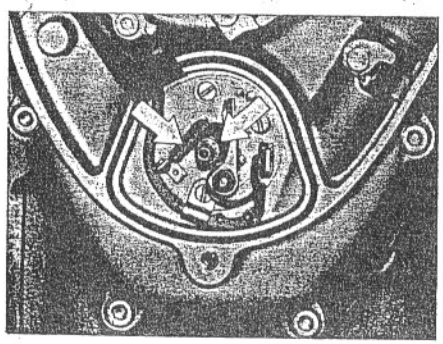
Retiming the ignition (dynamic, with engine running):

Slacken the Allen screws holding the ignition trigger (arrows). Turning the trigger assembly in the direction of engine rotation retards the ignition; turning it in the opposite direction to engine rotation advances the ignition. Note that the crankshaft and camshaft both rotate in the same direction. Retighten the screws.









12 11 141 Contact Breaker Points – Renewing (models without rotary ignition trigger)

Take off the engine cover after unscrewing the three hexagonal socket head bolts. When refitting ensure that the breather hose is first inserted in the engine cover.

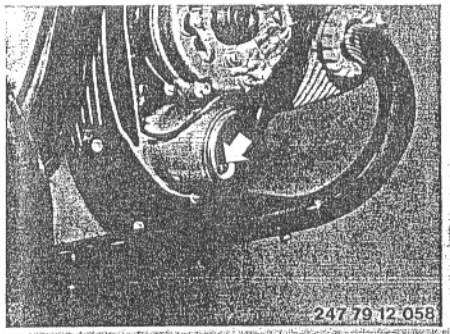
After unscrewing the hexagonal nuts remove the centrifugal timing advance.

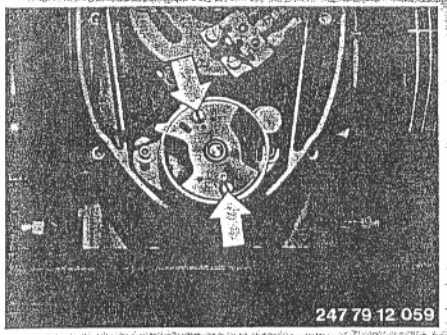
When refitting the centrifugal timing advance note the locating surface (arrow).

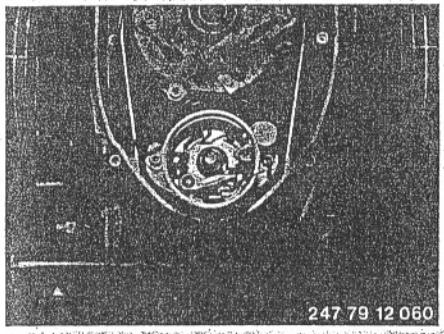
Check the points for wear, smoothing with a point file in emergencies but preferably if worn they should be renewed. To replace the points unscrew the two cheese head screws (arrows) from the plate, pull off the lead plug from the capacitor and remove with contact breaker.

When fitting, ensure that the protruding brass pivot of the contact breaker arm (hammer) is inserted accurately in the relevant bore of the contact breaker plate (arrows).

Before fitting the centrifugal advance mechanism, check the breaker cam lubricating felt and, if necessary, rub in a little Bosch Ft 1 v 4 lubricating grease. Grease the centrifugal advance drive shaft with Bosch grease Ft 1 v 26. Ensure that the breaker cam on the drive shaft operates smoothly and easily.







12 11 141 Breaker points – renewing (models with rotary ignition trigger)

Remove Allen screws and take off engine cover.
Remove screw at ignition trigger cover (arrow) and take off cover.

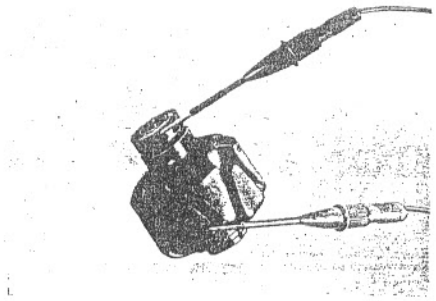
Remove the 2 screws holding the support bearing (arrows) and take out the bearing.

Remove the machine screw. Pull off the flat pin socket (2) and pull out the complete breaker contact.

Note:
After renewing the breaker points the ignition timing must be checked and adjusted if necessary.

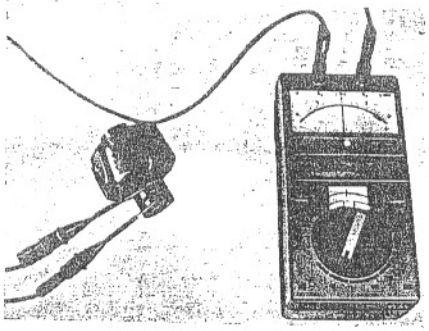
Trouble-shooting – ignition system

Fault	Cause	Remedy
Engine will not start, or misfires	Burnt or dirty breaker points	Renew breaker points
Low engine power output	Dwell angle incorrect	Reset dwell angle
Engine will not accelerate	Centrifugal ignition advance out of action	Check centrifugal advance unit, renew if necessary
Engine starts, but stalls immediately	Break or short circuit at condenser	Renew condenser
Engine misfires – high fuel consumption	Defective ignition lead Defective spark plug cap Defective suppressor resistors	Renew ignition lead Renew spark plug cap Renew suppressor resistors



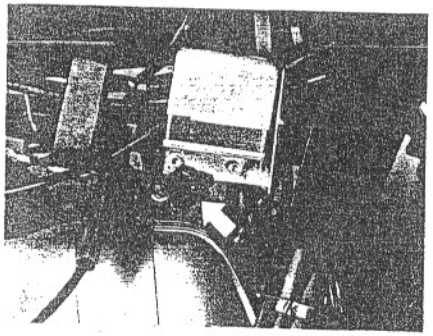
After removal, check the claw pole rotor with 40 V AC for shorting to ground (earth).

■



Check exciter winding (ohmmeter).

■

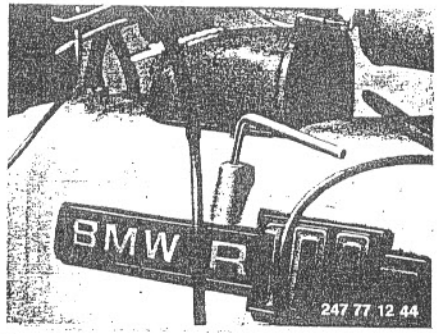


12 32 000 Regulator Switch for Alternator – Removing and Refitting

Remove fuel tank – 16 11 030.

Detach battery earth lead. Remove plug (arrow) and take off regulator after unscrewing the two Allen screws.

■



Slacken the two Allen screws and tilt the starter cover to the right to remove.

■



Raise cover at negative battery post and disconnect lead (arrow).

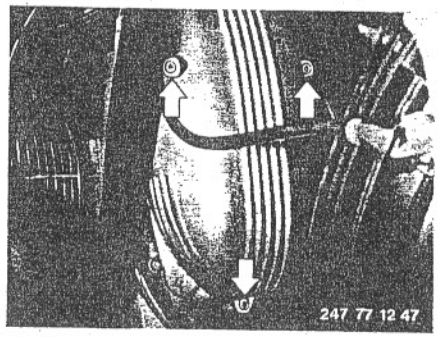
■



Detach lead from starter.

Remove rear fastening screws (arrows).

■



After unscrewing the three Allen screws, remove the engine cover.

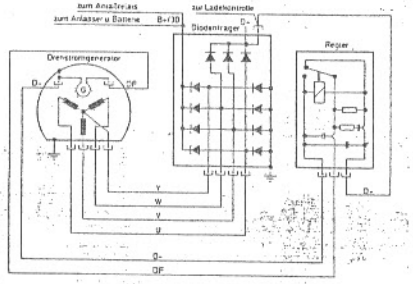
■

12 31 009 Alternator, Diode Carrier and Regulator – Testing

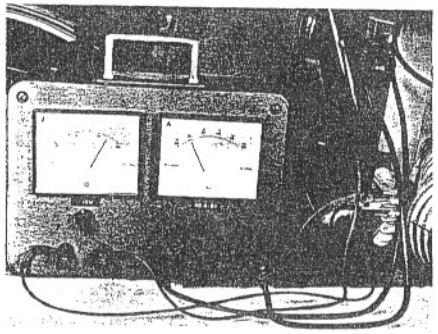
The picture shows the arrangement of the alternator, diode carrier and regulator.

Warning: The leads between battery, alternator and regulator should be parted only when the engine is stationary. If the battery is charged with a charger while still on the motor cycle, the positive and negative leads must be disconnected from the battery.

The battery warning lamp is used to pre-excite the alternator.



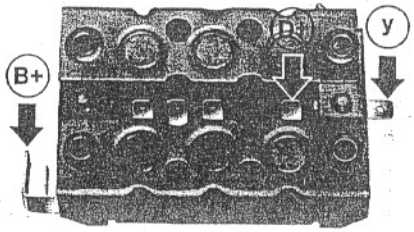
To check the regulator remove the B+ (black lead) from the diode carrier while the engine is stationary. Connect the volt meter to B+ and D–. Start engine. The voltage should read 13.5 to 14.2 volts shortly after the regulator commences operation.



To check the charge current interpose an ammeter (measuring range 15–20 A) in the B+ lead. Switch on a consumer unit or slide resistor (potentiometer) allowing a loading of up to 13 amps, connect parallel with battery.

Allow engine to run at about 4000 rpm. Set maximum current on sliding resistor (potentiometer). Read off regulator voltage at load on volt meter, see Technical Data for values.

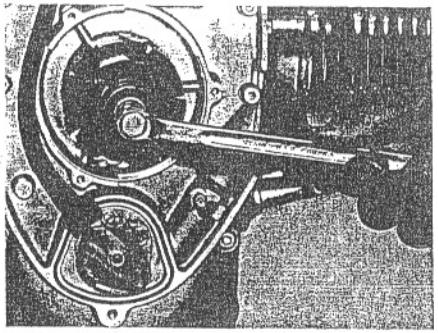
With the aid of a voltmeter (measuring range approx. 3 V) the voltage difference can also be measured direct between D+ and B+.



A voltage difference of up to 0.5 V indicates a fault in the regulator.

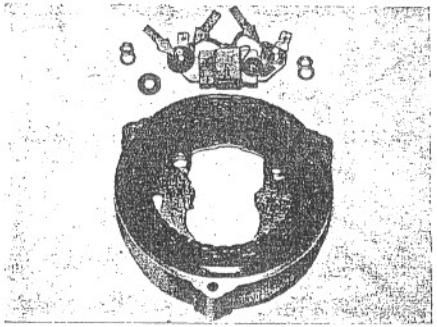
With a voltage difference of 1.5 V to 4 V the fault is in the diode carrier.

Unscrew the rotor fastening screw and press the rotor off the crankshaft stump with the aid of screw press BMW 12 3 600.



12 31 212 Alternator – Overhauling

Remove and refit alternator – 12 31 020.

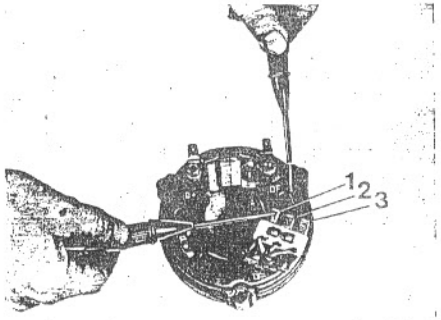


Unscrew two nuts from the inside of the housing and draw out brush holder with brushes. If the brushes have to be renewed care must be taken when soldering (arrow) to ensure that no solder escapes into the copper wires.

Fit insulating bushes on the brush holder stud bolts. Retighten brush holder in housing, not forgetting insulating washers.

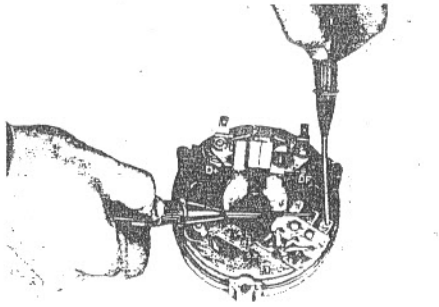
12 31 689 Stator Winding and Rotor – Testing

Overhaul alternator – 12 31 212.

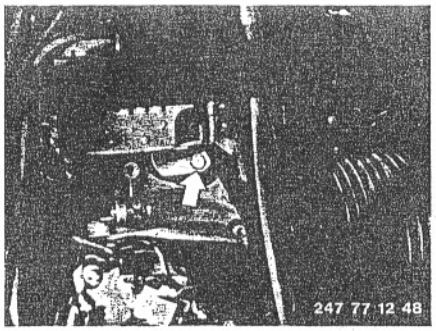


Check stator winding for shorting with 40 V AC; make three measurements in each case.

Check the resistance alternatively between the phase outputs, see Technical Data for values.

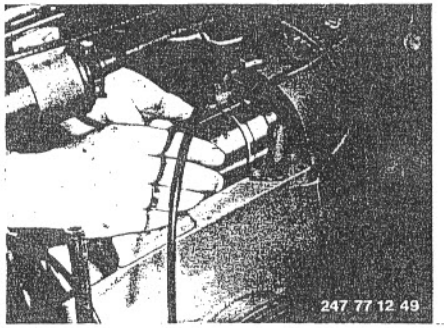


Unscrew the hexagonal bolt (arrow) with a box spanner.



Remove engine breather hose – 11 15 101.

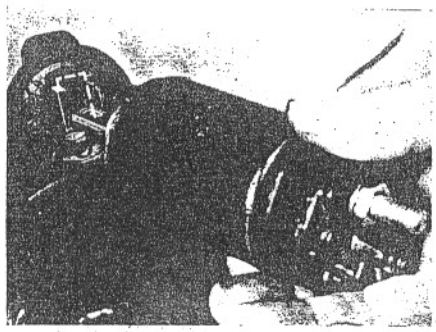
Lift the starter forward out of its guide.



12 41 513 Starter – Dismantling and Assembling

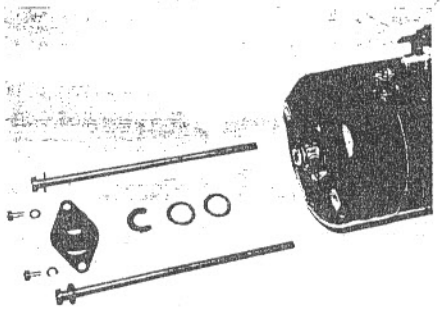
Remove and refit starter – 12 41 020.

Unscrew the exciter lead.
Detach solenoid switch.
Disengage engaging arm.



Remove dust cap.
Take off lock washer, shim and gasket.
Unscrew the pole housing screws.
Pull off the cap.

Note when fitting: Compensate axial armature float; see Technical Data.
Check commutator bearings.

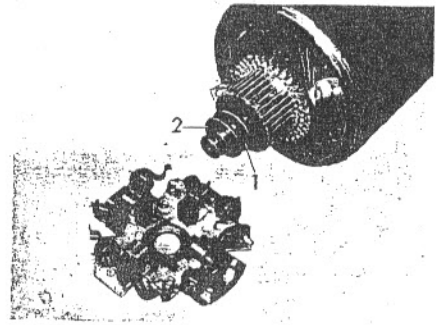


12 41 541 Carbon Brushes – Renewing

Dismantle and re-assemble starter – 12 41 513.

Unsolder and resolder the brushes on the exciter coil and the brush holder plate.

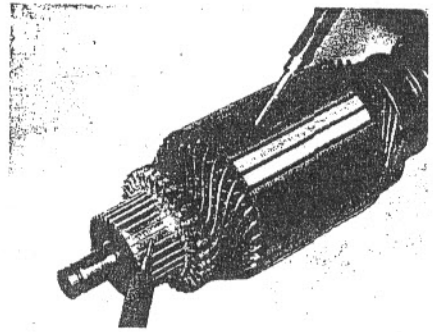
Note when fitting: Washer (1) on armature, insulating washer (2) in front of it.



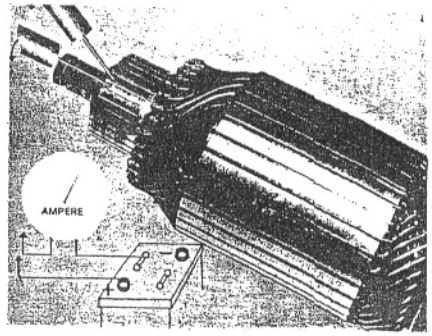
12 41 602 Starter – Overhauling

Dismantle and re-assemble starter – 12 41 513.

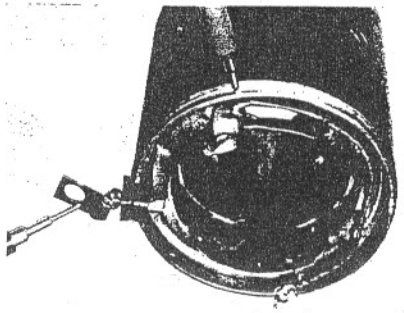
Check armature and field winding – test lamp 220 volts.
Probe commutator and plate stack with test probe.
In the event of earthing the lamp will light up and the armature must be replaced.

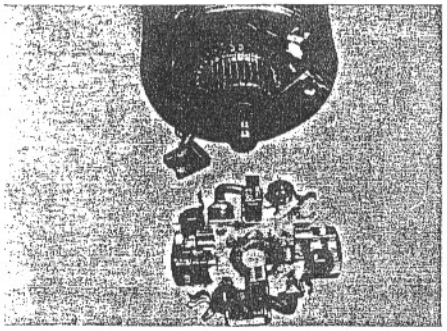


Interpose an ammeter (measuring range 60 amps) in the current circuit and probe the commutator briefly from segment to segment. Test voltage 2–4 volts.
The deflection on the instrument should be uniform between the individual segments.
Sharp deviations indicate a short circuit and the defective armature must be replaced.

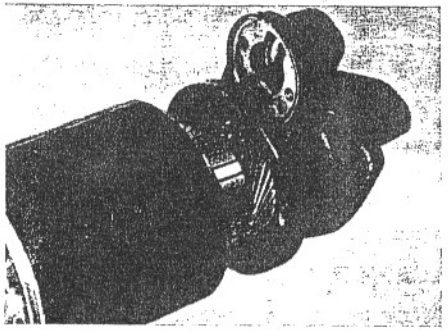


Check exciter coil for earthing. Replace scorched or charred windings.

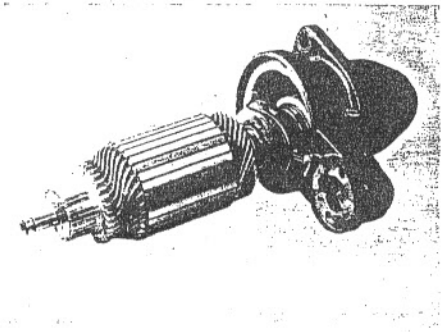




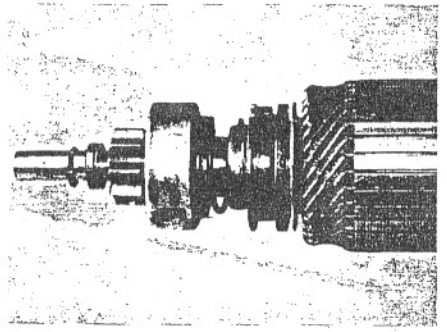
Lift out the positive brushes and remove the brush holder plate.



Separate the pole housing from the drive bearing.



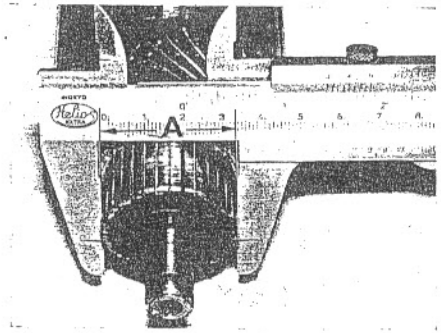
Unscrew the bearing screw for the engaging lever.
Pull out armature with engaging lever.



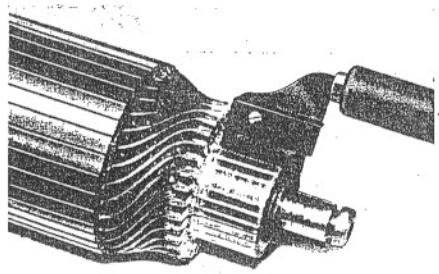
Press the thrust ring to the rear.
Lift out circlip.
Pull off starter gear.

Note when fitting: Coat the steep thread and engaging ring with Bosch Silicone grease Ft 2 v 3.

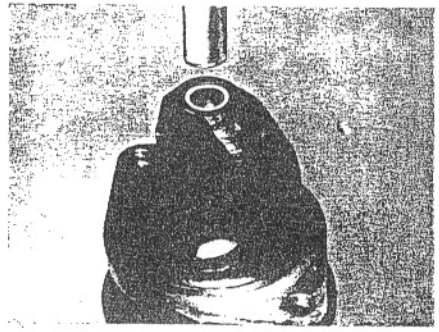
Pull the starter ring over the circlip.



Superfinish the commutator. The commutator diameter (A) must not be less than 33 mm (1.3 in).

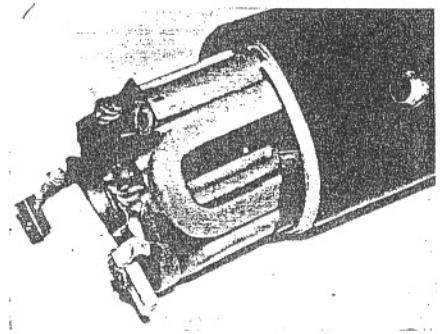


Undercut the commutator segments, and remove any swarf or metal dust with polishing cloth. The insulation should be 0.5 mm (0.02 in) deeper than the segments.



Press out worn bushing.

Note when fitting:
Before fitting the new bushing it should be soaked for at least 30 minutes in engine oil and pressed in to a flush fit.



12 41 701 Exciter Coil – Renewing

Starter – dismantle and re-assemble 12 41 513.

Mark the pole terminals to ensure the same position on re-assembly. Unscrew the four pole terminal screws. Remove the pole terminals and exciter coil from the pole housing.

Note when fitting:
Before finally tightening down the pole screws, ensure that the pole terminals are aligned parallel to the longitudinal axis.
Lay paper insulating strip between the exciter coil and pole housing.

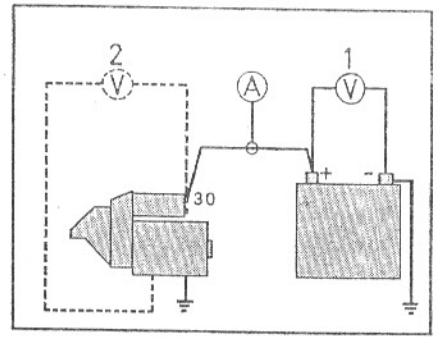
Trouble-shooting – alternator

Fault	Cause	Remedy
Noise from alternator	Carbon brushes squeaking	Skim sliprings, renew carbon brushes
Telltale lamp glows at half intensity when engine is running	Poor cable contact	Check cables and connections
	Defective regulator	Renew regulator
	Defective carbon brushes	Renew carbon brushes
	Defective rectifier diode, or short to earth (ground)	Renew rectifier diode
	Short to earth (ground) in stator	Renew stator
	Partial short to earth (ground) in rotor	Renew rotor
Battery emitting large amounts of gas	Poor contact between regulator and alternator	Check cable connections between regulator and alternator
Telltale lamp burns at half or full intensity when engine is running	Defective regulator	Renew regulator
	Break or short-circuit in supply leads	Check cables and connections
	Defective carbon brushes	Renew carbon brushes
	Defective rotor winding	Renew rotor
	Break in exciter circuit	Check cable connections
	Diode or diode board defective	Check diode and diode board, renew if necessary
	Short to earth (ground) at cable D+/61	Rectify short or renew cable
Telltale lamp does not come on when engine is started	Defective bulb	Install a new 3 Watt bulb
	Break in cable 61	Rectify break
Telltale lamp does not come on when engine is stopped but ignition switched on	Defective bulb	Install a new 3 Watt bulb
	Battery flat	Recharge battery
	Battery defective	Renew battery
	Cable detached or defective	Renew cable or tighten terminals
	Defective regulator	Renew regulator
	Short circuit at positive diode in alternator	Disconnect charge cable at once to avoid flat battery: have alternator repaired
	Worn carbon brushes	Renew carbon brushes
	Oxide coating on sliprings, break in rotor winding	Have alternator repaired

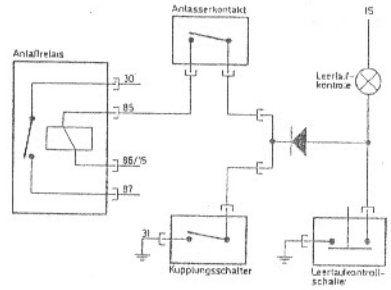
12 41 009 Starter – Testing in situ

Check the state of the battery charge; see Technical Data for values.

For the purpose of checking the starter, engage fourth gear and depress the footbrake. Actuate starter for two to three seconds. The starter voltage should not drop below 8 volts under load and must be uniform with the volt meter at 1 and 2, otherwise the earth connection to engine or battery is poor; at the same time read off the current input from the ammeter, see Technical Data.



Note:
If, with the gear engaged, the engine should be killed, it is possible to start it again without disengaging the gear just by pulling the clutch.



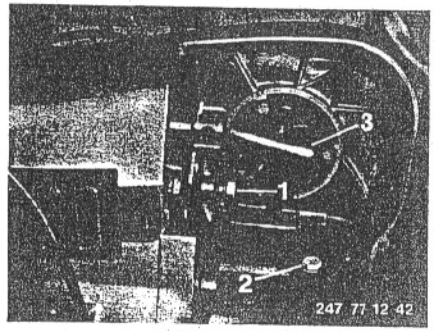
12 41 020 Starter – Removing and Refitting

Remove and refit air filter element – 13 72 000.

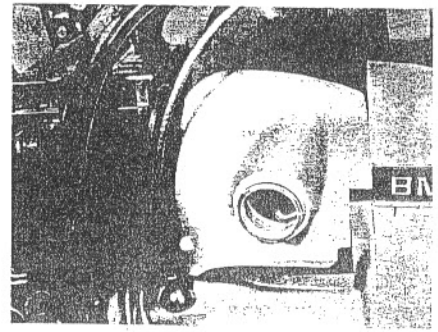
Remove and refit fuel tank – 16 11 030.

Detach both choke cables at the carburettors and lay aside the left-hand half shell of the air filter housing with choke cables.

Unscrew nut (1) with straight ring spanner; slacken hexagonal bolt (2).



Remove the right-hand half shell of the air filter housing, at the same time pushing the breather hose (3) to the rear.



Fauld finding on starter

Fault	Test method	Remedy
Starter fails to turn when starter button is operated	Switch on light.	
	a) Light does not burn. Battery dead. Battery feed interrupted.	a) Measure battery voltage. Recharge battery. Check battery leads and terminals.
	b) Light burns, becoming gradually dimmer as starter is actuated.	b) Recharge battery.
	c) Light burns but extinguishes immediately starter is actuated. Oxidized battery terminals or earth connection.	c) Clean battery terminals or earth connection.
	d) Light burns normally. Bridge terminals 50 and 30 on the starter. The starter turns. Ignition/starter switch defective or input leads interrupted.	d) Replace ignition/starter switch, remedy interruption.
	e) Light burns normally. Solenoid switch actuates, starter fails to turn. Bridge with an appropriate lead from the battery positive pole to terminal 30 on the starter. Starter turns. Solenoid switch contact fouled or scorched.	e) Replace solenoid switch.
Starter fails to turn when lead is run direct from the battery positive pole to terminal 30.	a) Brushes too short.	a) Replace brushes.
	b) Brushes jamming.	b) Release jamming.
	c) Inadequate brush pressure.	c) Replace thrust springs.
Starter turns too slowly, fails to turn engine over.	c) Commutator fouled.	a) Clean commutator.
	b) Faulty armature or energizer coil.	b) Repair starter.
Starter runs at high speed but engine does not turn or moves only in jerks	a) Drive pinion defective	a) Renew drive pinion
	b) Flywheel gear ring defective	b) Renew flywheel gear ring
	c) Drive pinion not engaging; dirty or damaged spiral track	c) Have starter repaired
Drive pinion does not engage and starter runs at high speed	a) Very dirty drive pinion	a) Clean drive pinion bearings
	b) Defective coil spring in solenoid switch	b) Renew solenoid switch
	c) Badly damaged teeth on flywheel gear ring	c) Renew gear ring
Drive pinion engages but starter does not turn engine over	a) Roller freewheel in drive pinion is slipping	a) Renew drive pinion

28

Technical Data

Fuel preparation

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Float chamber vent bore diameter, mm(in)	—			2.0 (0.08)	2.0 (0.08)	2.0 (0.08)
Throttle valve	20—570			—		
Idling outlet bore diameter, mm(in)	0.8 (0.031)			1.0 (0.04)		
Induction air filter	A common "Micro Star" dry air filter for both carburetors					
Fuel System: Fuel grade	Super (premium)		Super (premium) Regular *	Super (premium)		
Minimum octane rating (RM) to DIN 51 600 standard	98		98 91 *	98		
Fuel tank capacity (litres/Imp gal.)	24 (5.3 / 6.3) Incl. 3.0 (0.6 / 0.8) reserve					

Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Carburetor: Construction	2 inclined Bing constang vacuum carburetors with needle jet, vacuum plunger, throttle butterfly and central lever float				
Carburetor type: Left-hand carburetor	64/32/201	94/40/103	94/40/105	94/40/105	
Right-hand carburetor	64/32/202	94/40/104	94/40/106	94/40/106	
Carburetor throat diameter, mm (in)	32 (1.26)		40 (1.57)		
Main jets	145		170		
Needle jets	2.66	2.66	2.68		
Jet needle number	146–241		46–341		
Needle position	3		2		
Starting jet diameter, mm (in)	60		80		
Starting air jet diameter, mm (in) (starting chamber vent)	2.0 (0.079)				
Mixture passage dia., mm (in)			6.0 (0.24)		
Air passage dia. mm (in)			6.0 (0.24)		
Diameter of mixture in rotary slider, mm (in)	2.0/1.2/0.7 (0.078/0.047/0.027)				
Idling jets	50		45		
Idling air jet diameter, mm (in)	1.0 (0.04)				
Idling mixture regulating screw opened (turns)	1/2+1		1–1 1/4		
Bypass bore no. 1, dia., mm (in)	0.7 (0.028)		0.8 (0.031)		
Bypass bore no. 2, dia., mm (in)	0.65 (0.026)		0.65 (0.026)		
Float valve diameter mm (in)	2.5				

Slide-type carburetor 1/26
(with choke and duplex float)

A Carburetor body
A2 Atomizer air passage
A3 Air correction passage
B Cover plate
B1 Cover union
B2 Setscrew
B3 Nut
B5 Sealing ring
B6 Spring keeper
C Throttle slide
C2 Throttle slide spring
C3 Setscrew
C5 Spring
E1 Atomizer
F Needle jet
F1 Sealing ring
F4 Mixing tube
G Jet needle
G2 Retaining plate
G4 Washer
H Main jet
J Idle jet
J1 Screw
J2 Sealing ring
K Air correction jet
K1 Air regulating screw
K3 Spring
L Starting jet (fixed)
M Starting plunger
M2 Screw plug
M3 Coil spring
N Sleeve
N1 Clamp ring
N2 Clamp bolt
U Nut
U2 Float chamber
V Gasket
V1 Tickler
V3 Cotter
W Float
W2 Peg
W5 Spring clip
X Float needle
Y Hose grommet
Y3 Sealing ring

13 Fuel preparation and control system

Technical Data . . . . . Page 13– 0/3
Specifications – '79 models 13– 0/5
13 00 004 Engine idling and fuel/air mixture – adjusting 13–00/1
13 10 004 Fuel level – checking and adjusting 13–10/1
13 10 009 Carburettor – cleaning 13–10/1
13 10 100 Left and right-hand carburettors – removing and refitting 13–10/1
13 10 370 Choke chamber – removing and refitting 13–10/2
13 72 000 Air filter element – removing and refitting (single-sided breather) 13–72/1
13 72 000 Air filter element – removing and refitting (double-sided breather) 13–72/1

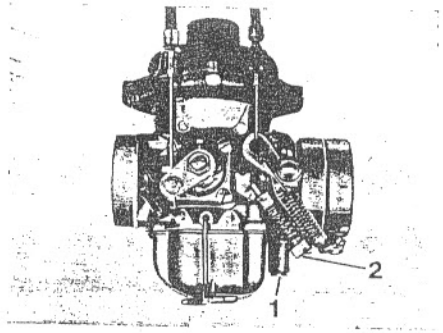
Fuel Preparation

Technical Data

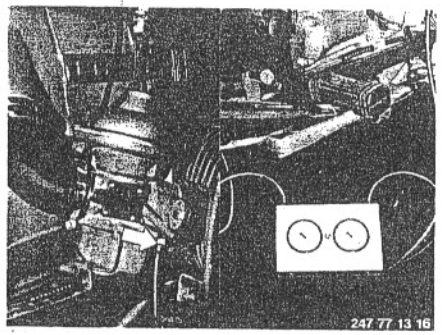
Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Carburettor: Construction	2 inclined Bing slide-type carburetors with needle jet and central level float	2 inclined Bing constant vacuum carburetors with needle jet, vacuum plunger, throttle butterfly and central lever float				
Carburettor type: Left-hand carburettor	1/26/123	64/32/13	64/32/201	64/32/19	94/40/103	94/40/105
Right-hand carburettor	1/26/124	64/32/14	64/32/202	64/32/20	94/40/104	94/40/106
Carburettor throat diameter, mm(in)	26 (1.02)	32 (1.26)			40 (1.57)	
Main jets	140	145		150	170	
Needle jets	2.68 with accelerator pump	2.66		2.68	2.66	2.68
Jet needle number	4	46—241			46—341	
Needle position	2	3				2
Starting jet diameter, mm(in)	0.9 (0.035)	60		70	80	80
Starting air jet diameter, mm(in) (starting chamber vent)	2.0 (0.079)	2.0 (0.079)				
Mixture passage dia. mm(in)	7.5 (0.30)	—		6.0 (0.24)		
Air passage dia. mm(in)	6.0 (0.24)	—		6.0 (0.24)		
Diameter of mixture bores in rotary slider, mm(in)	—	2.0 / 1.2 / 0.7 (0.079/0.047/0.028)				
Idling jets	40	50			45	
Idling air jet diameter, mm(in)	0.8 (0.031)	1.0 (0.04)				
Idling air regulating screw opened (turns)	1/4—1 1/4	—				
Idling mixture regulating screw opened (turns)	—	1/2—1		1	1—1 1/4	
Bypass bore no. 1, dia., mm (in)	0.8 (0.031)	0.7 (0.028)			0.8 (0.031)	0.8 (0.031)
Bypass bore no. 2, dia., mm (in)		0.65 (0.026)			0.65 (0.026)	0.65 (0.026)
Float valve diameter mm(in)	2.2 (0.087)	2.5				

List of components – Type 64 . . . 94

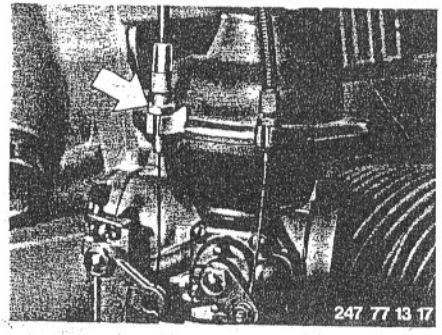
No.	Part name	No.	Part name
1	Main jet	40	Float
2	Atomizer	41	Peg
3	Needle jet	42	Float needle
4	Jet needle	43	Clamp spring
5	Idle jet	44	Float cap with starting jet
6	Sealing ring		
7	Mixture regulating screw	45	Spring clip
8	Spring	46	Gasket
9	Sealing ring	47	Choke
10	Jet block	48	Choke housing
11	Sealing ring	49	Sealing ring
12	Washer	50	
13	Plunger	51	Screw
14	Keeper	52	Lever
15	Washer	53	Nut
16	Diaphragm	54	Lock washer
17	Retaining ring		
18	Screw		
19	Lock washer		
20	Cover		
21	Screw		
22	Spring		
23	Throttle butterfly		
24	Throttle shaft		
25	Screw		
26	Sealing ring		
27	Lever		
28	Lever		
29	Lock washer		
30	Nut		
31	Retaining arm		
32	Bolt		
33	Lock washer		
34/36	Setscrew		
35	Spring		
37	Spring		
38	Sleeve		
39	Screw		



Set the idle mixture regulating screws 1 and throttle butterfly stop screws 2 on both carburetors to their basic positions.
This is done by screwing in the idle mixture regulating screw fully, then slackening off by a specific number of turns (see Technical Data). The throttle butterfly stop screw is tightened until it just touches the stop on the throttle butterfly lever, then slackened by one turn.



To synchronize the carburetors, use 'Duo-Test' unit, BMW No. 13 0 700.
Remove the screw plug from the union for connecting the tester (arrow) and push on the rubber hose of the 'Duo-Test' unit.
Reset the throttle stop screws and idle mixture regulating screws on both sides of the engine alternately until the carburetors are synchronized.
If the engine idling speed is then beyond the specified range of 800 . . . 1100 min^{-1}, lower or raise it by turning both throttle butterfly stop screws clockwise or anti-clockwise by an equal amount.
Finally, reset the idle mixture regulating screws again.



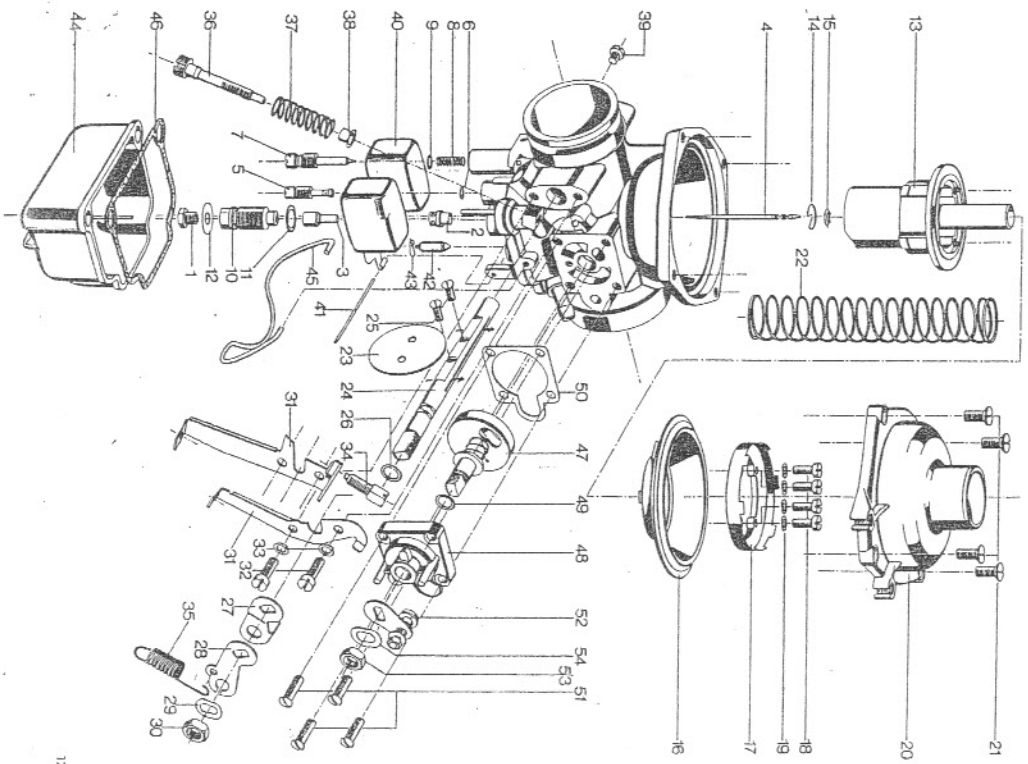
To adjust the throttle cables, raise engine speed slightly at the twistgrip and detach the two spark plug caps in turn to determine the speed at which each cylinder is operating. Adjust the throttle cables at the setscrew and lock with hex nut (arrow).

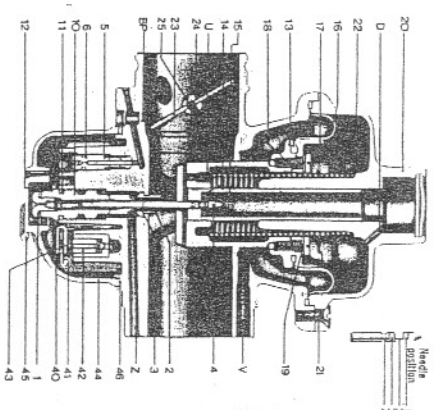
Warning: do not allow the engine to idle with the motorcycle at a standstill for more than 10 minutes.

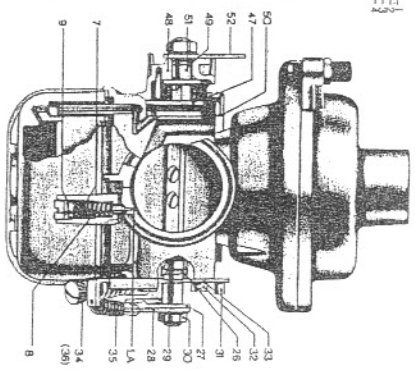
Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Float chamber vent bore diameter, mm (in)	2.0 (0.08)				
Throttle valve	1.0 (0.04)				
Induction air filter	A common "Micro Star" dry air filter for both carburetors				
Fuel System: Fuel grade units/oct.	Super (premium) Regular*	Super (premium)			
Minimum octan rating (RM) to DIN 51 600 standard	98 91	98			
Fuel tank capacity (litres/Imp gal./US gal.)	24 (5.3 / 6.3) Incl. 3.0 (0.6 / 0.8) reserve				

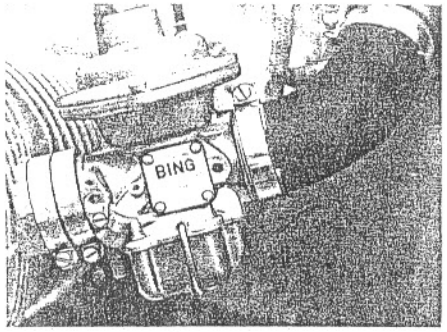
*low compression engine







Type 64 . . . 94 constant-depression carburetor



13 10 100 Carburettors, Left and Right – Removing and Refitting

On the R 60/7, unscrew the carburettor cover and draw the throttle valve out of the chamber. Loosen choke fastening and pull out with the starter slider. On the R 75/7 R 100/7, R 100 S and R 100 RS models disengage or disconnect the choke and throttle cables.

After slackening the hose clamps, lay the carburettor to one side.

13 10 370 Choke Chamber – Removing and Refitting

R 75/7, R 100/7, R 100 S and R 100 RS

Carburettors, left and right – remove and refit 13 10 100.

Slacken the four domed head countersunk screws and take off the choke chamber with rotary slide valve and gasket.

Take care not to interchange the left and right hand choke chambers.

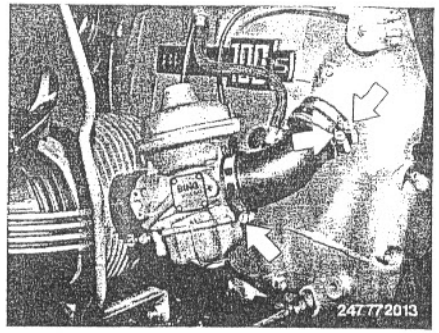
1 = left-hand choke chamber
2 = right-hand choke chamber



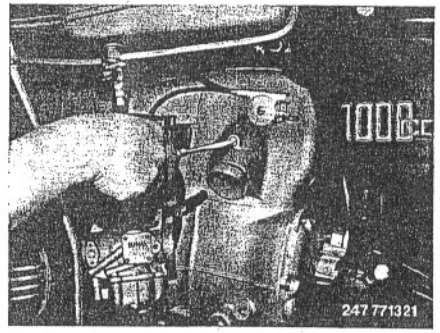
2 1

13 72 000 Air filter element – removing and installing (single-sided breather)

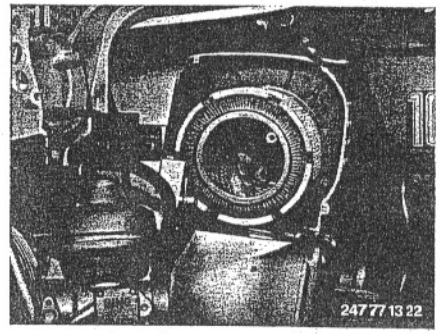
Slacken the hose clip on the left air line and take off the air line after pushing back the rubber sleeve.



Remove the machine screw from the air filter chamber on the left and take off the chamber half shell.



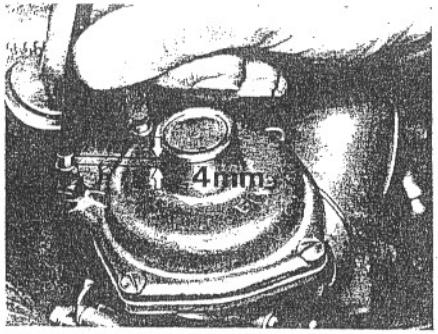
Take out the filter element.



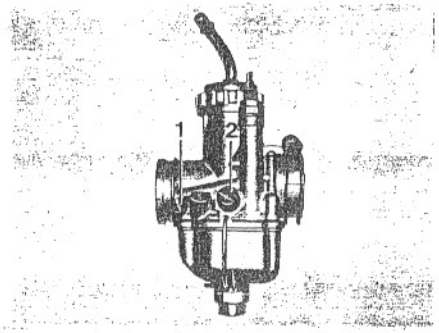
31

13 00 004 Engine idling – adjusting

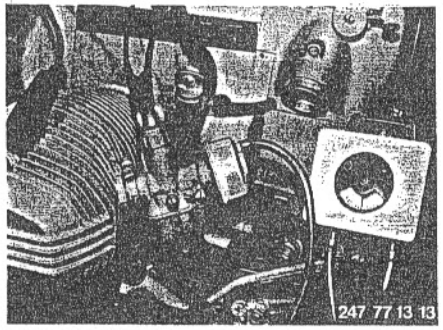
Adjust engine idling with engine running at normal operating temperature and throttle twistgrip closed.
For idle speed, see Technical Data.
Adjust throttle cable free travel to 4 mm (0.16 in) initially, to prevent the throttle slides or butterflies from being suspended from the cables without any play.



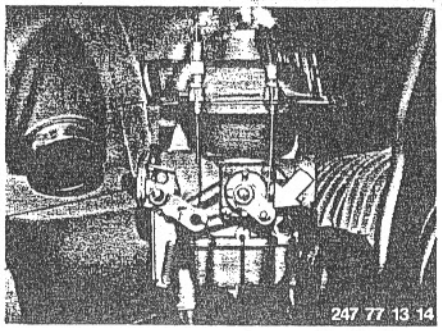
Carburetor with throttle slide
Pull off first one spark plug cap, then the other, to determine which cylinder departs the most from the normal idle speed of the engine. Increase idle speed at this cylinder to match the faster cylinder. This is done by turning throttle slide stop screw 2 clockwise (to speed up engine) or anticlockwise (to slow down engine).
To obtain the best possible mixture, carefully turn idle air regulating screw 1 in both directions and listen to the engine; if engine speed rises slightly, this is the more favorable setting.
Note:
Insert a suppressor cartridge or a suitable piece of metal at the detached spark plug cap to prevent sparks from jumping the gap to the protective seal and damaging it.



To synchronize the two carburetors, use 'Unitest' adjuster BMW No. 13 0 500 with the correct adapter caps.
Each time the throttle slide stop screw is moved, the idle air regulating screw must be reset as well. The carburetors are correctly synchronized when the needle on the tester is at zero. If the engine speed is then beyond the specified idle speed range of 800...1100 min^{-1}, turn throttle stop screws 2 on both sides to an equal extent either anti-clockwise or clockwise, to reduce or raise idle speed. Finally, reset mixture at idle air regulating screws 1.



Constant-depression carburetor
Set the throttle cables to the basic position and adjust the cold-start (choke) cables so that when the choke is out of action the cold-start levers (arrow) are pressed down to their limit of travel.

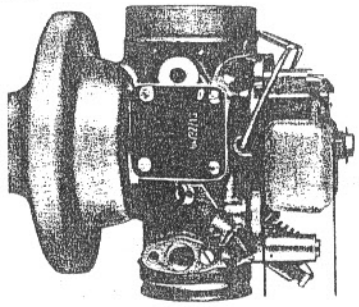


13 10 004 Fuel Level – Checking and Adjusting

Remove and refit carburettors, left and right – 13 10 100.

Take off the float chamber cover and place the carburetor horizontal (float mount at top) until tongue of float pivot just touches the sprung ball in the float needle.

In this position base of the float must be parallel to the upper edge of the float chamber. Bend the tongue as necessary.

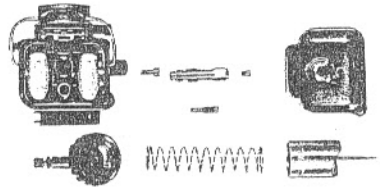


13 10 009 Carburettor – Cleaning

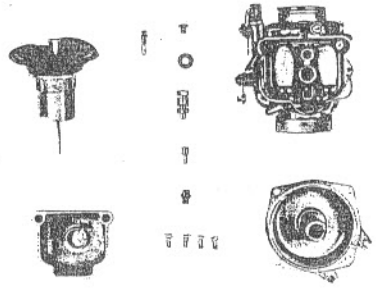
Remove and refit carburettors, left and right – 13 10 100.

Check and adjust fuel level – 13 10 004.

On the R 60/7 model, take off the carburettor cover and remove the throttle slider, idling jet, main jet, main jet holder, accelerator pump, needle jet and atomizer and clean in clean fuel, after which the nozzles and bores must be blown through with compressed air.

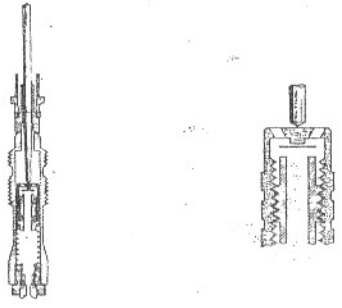


On the R 75/7, R 100/7, R 100 S and R 100 RS models, remove the domed cover, plunger and diaphragm, idling jet, main jet holder, main jet, needle jet and atomizer, clean all parts in clean fuel and blow through jets and bores with compressed air.



Note: On the R 60/7 carburetor the accelerator pump is installed in the main jet holder (left picture). In the idling setting the plunger (right picture) is pressed down by the jet needle.

On acceleration, the plunger is released, pressed up by the spring beneath and allows the fuel quantity above the plunger to flow additionally through the needle jet into the intake passage.



12.77 Alteration

Fuel tank and lines

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Tank capacity, l (Imp. gal.) Including reserve, l (Imp. gal.)	24 (5.3/6.3) 3 (0.6/0.8)					

16-0/3

32

16-0/4

Fuel tank and lines

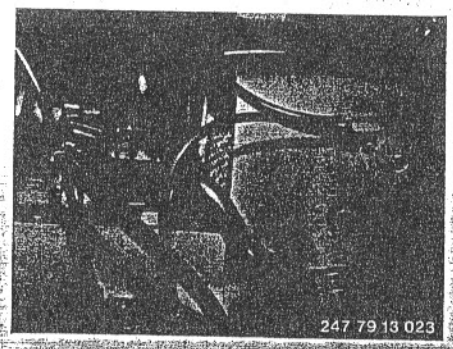
Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Tank capacity, l (Imp. gal./US gal.) Including reserve, l (Imp. gal./US gal.)	24 (5.3) 3 (0.6)				

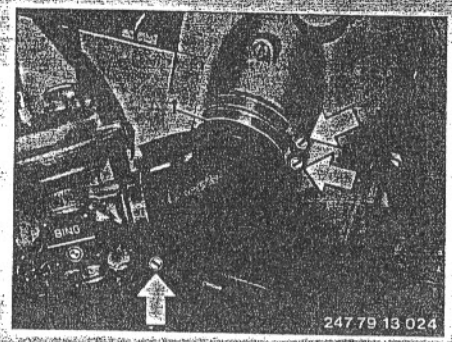
11.78 Addition

13 72 000 Air cleaner element – removing and installing (double-sided breather)

Remove (install) fuel tank – 16 11 030.
Remove the two Allen screws at left and right and take off the starter cover. Pull the engine breather hose out of the left half of the air cleaner housing.



Slacken the hose clip screws for the left air hose, push back the the rubber sleeve and take off the air hose.



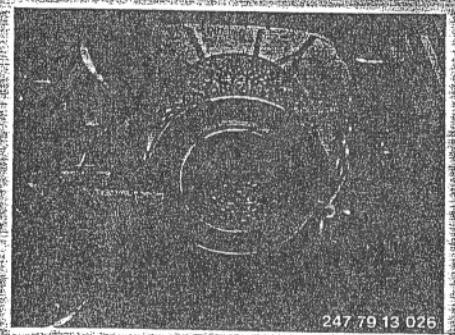
Remove the machine screw from the left of the air cleaner housing and pull off the housing shell.



Pull out the air cleaner element.

Note:

Push in the breather hose before installing the left housing shell.

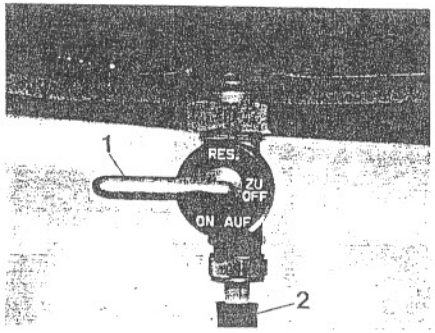


16 Fuel tank and lines

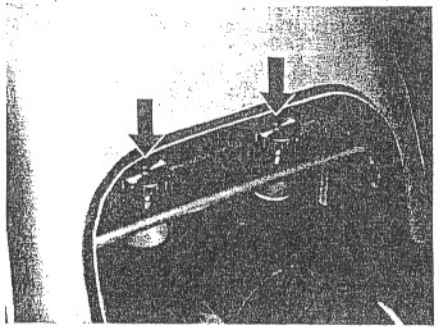
Technical Data . . . . . Page 16– 0/3
Specifications '79 models 16– 0/4
16 11 030 Fuel tank – removing and refitting 16–11/1
16 12 190 Fuel tap – stripping down 16–12/1

16 11 030 Fuel Tank – Removing and Refitting

Close fuel taps (1) and take off hoses (2).

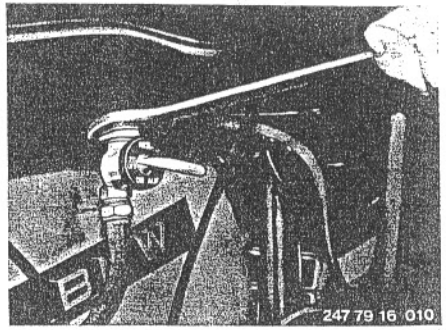


Lift the twin seat, unscrew the knurled knobs, raise the fuel tank slightly to the rear, lift at front and remove.

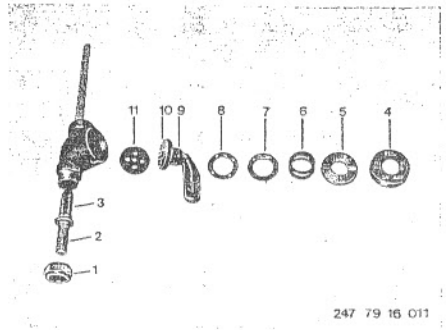


16 12 190 Fuel tap – stripping

Pull off the fuel hose, turning slightly at the same time.
Detach the fuel tap from the fuel tank.



Unscrew the collar nut (1) and pull out the hose connection (2) with mesh strainer (3).
Take off cap (4). Unscrew threaded cap (5) and take off spring (6), slotted discs (7 and 8) and actuating lever (9).
Check cord ring seal (10) for damage and note gasket (11).



18 Exhaust system

Technical Data . . . . . Page 18– 0/3
Specifications – '79 models 18– 0/4
18 00 020 Exhaust system – removing and refitting 18–00/1
18 11 321 Silencer – renewing 18–00/2

12. 77 Alteration

Technical Data

Exhaust system

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Silencer diameter, mm(in)	87 (3.43)					
Exhaust pipe diameter, mm(in)	38×1.5 (1.50×0.06)					40×1.5 (1.57×0.06)

Tightening torques Nm (ft. lb)

Star nut for exhaust	160 ± 20 (118 ± 15)

All remaining bolts, screws and nuts are to be tightened in accordance with the normal values specified in the manufacturer's tables or in accordance with the latest BMW Standard Specification 60002.0.

33

Specifications – '79 models

Exhaust system						
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Silencer diameter, mm (in)	87 (3.425)				
Exhaust pipe diameter, mm (in)	38×1.5 (1.496×0.06)	40 × 1.5 (1.57 × 0.06)			

Tightening torques Nm (ft. lb)

Star nut for exhaust	160±20 (118±15)

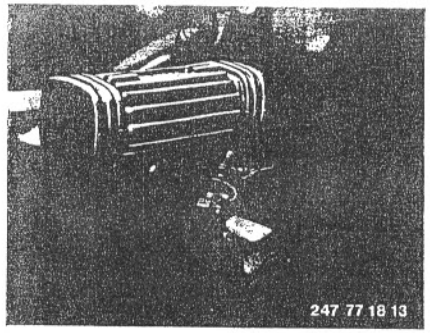
All remaining bolts, screws and nuts are to be tightened in accordance with the values specified in the manufacturer's tables or in accordance with the latest BMW Standard Spezification 60002.0.

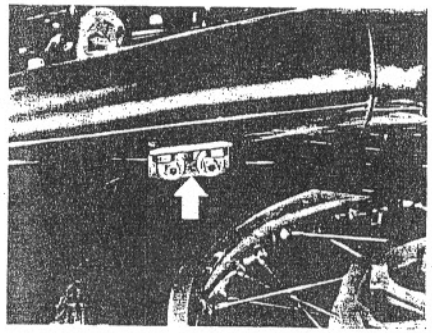
18 00 020 Exhaust System – Removing and Refitting

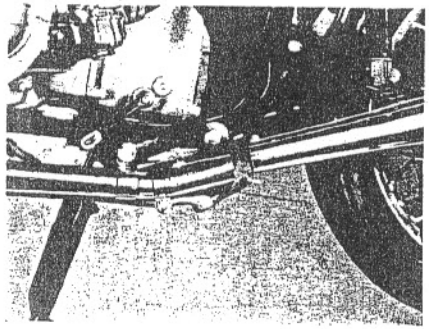
Use the special BMW 18 0 600 exhaust spanner to detach the exhaust nut from each cylinder head.

Unscrew the hexagonal nuts on the footrests and unscrew the hexagonal socket head bolts from the frame (arrow).

Slacken the hexagonal socket head bolts on the cross pipe and remove exhaust system.







18 11 321 Silencer – Renewing

Slacken the hexagonal bolt on the pipe clamp and push back the pipe clamp.

Unscrew the hexagonal socket head bolts on the frame (arrow).

Pull off the silencer to the rear.

21 Clutch

Technical Data . . . . . Page 21– 0/3
Specifications – '79 models 21– 0/4
21 21 000 Clutch – removing and refitting 21–21/1
21 51 020 Clutch throwout lever – removing and refitting 21–51/1

34

12.77 Alteration

Clutch

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Type	Single plate dry type clutch with diaphragm spring					
Material thickness (diaphragm spring) mm(in)	2.6 (0.102)			2.8 (0.110)		
Diaphragm spring pressure when fitted, kp	180 . . . 220 (397 . . . 485)			202 . . . 220 (445 . . . 485)		
Height of diaphragm spring (relaxed) mm(in)	19.0±0.5 (0.748±0.020)			17.4±0.3 (0.685±0.012)		
Diaphragm spring dia. (pressed flat) mm(in)	183 (7.205)					
Test specification for diaphragm spring	When the edge of the disc is laid on the gauge plate the height differences in the spring tabs should be a maximum of 0.3 mm (0.011") or when the spring tabs are laid on the gauge plate the height deflection of the disc rim should be a maximum of 0.8 mm (0.031").					
Overall thickness of clutch plate mm(in) (segment and lining)	6±0.25 (0.236±0.010)					
Minimum thickness of clutch plate, mm(in)	4.5 (0.177)					
Clutch plate external diameter, mm(in)	180 (7.087)					
Maximum lateral runout of clutch plate at outer diameter, mm(in)	0.15 (0.006)					
Maximum vertical play of clutch plate, mm(in)	0.3 (0.012)					
Maximum deflection of diaphragm driver plate, mm(in)	0.1 (0.004)					
Maximum imbalance of clutch plate, cmg	6					
Clutch travel at throwout lever (cable); mm(in)	2 (0.079)					

Tightening torques Nm (ft. lb)

Clutch lever adjusting screw locknut	20...23 (14.7...17.0)
Clutch at flywheel	23 (17.0)

All other screws, bolts and nuts are to be tightened in accordance with the normal values indicated in the manufacturer's tables or in the latest BMW Standard Specification 60002.0.

21–0/3

21-0/4

Clutch

Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Type	Single plate dry type clutch with diaphragm spring				
Material thickness (diaphragm spring) mm (in)	2.6 (0.102)	2.8 (0.110)			
Diaphragm spring pressure when fitted, kp	180 . . . 220 (397 . . . 485)	202 . . . 220 (445 . . . 485)			
Height of diaphragm spring (relaxed) mm (in)	19.0±0.5 (0.748±0.019)	17.4±0.3 (0.685±0.012)			
Diaphragm spring dia. (pressed flat) mm (in)	183 (7.205)				
Test specification for diaphragm spring	When then edge of the disc is laid on the gauge plate the height differences in the spring tabs should be a maximum of 0.3 mm (0.011") or when the spring tabs are laid on the gauge plate the height deflection of the disc rim should be a maximum of 0.8 mm (0.031").				
Overall thickness of clutch plate mm (in) (segment and lining)	6±0.25 (0.236±0.0098)				
Minimum thickness of clutch plate, mm (in)	4.5 (0.177)				
Ciutch plate external diameter, mm (in)	180 (7.087)				
Maximum lateral runout of clutch plate at outer diameter, mm (in)	0.15 (0.0059)				
Maximum vertical play of clutch plate, mm (in)	0.3 (0.012)				
Maximum deflection of diaphragm driver plate, mm (in)	0.1 (0.0039)				
Maximum imbalance of clutch plate, cmg	6				
Clutch travel at throwout lever (cable), mm (in)	2 (0.078)				

Tightening torques Nm (ft. lb)

Clutch lever adjusting screw locknut	20...23 (14.7...17.0)
Clutch at flywheel	23 (17.0)

All other screws, bolt and nuts are to be tightened in accordance with the normal values indicated in the manufacturer's tables or in the latest BMW Standard Specification 60002:0.

11.78 Addition

Gearbox

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Gearbox:	5-speed gearbox with dog clutch gear selection integral with engine, driving torque damped in all gears					
Gear shift system	Hooked lever shift					
Transmission ratios:					Competition ratios:	
1st gear	4.4 : 1				3.38 : 1	
2nd gear	2.86 : 1				2.43 : 1	
3rd gear	2.07 : 1				1.93 : 1	
4th gear	1.67 : 1				1.67 : 1	
5th gear	1.50 : 1				1.50 : 1	
Type of oil above 5° C (41° F)	Brand-name hypoid gear oil SAE 90					
Type of oil below 5° C (41° F)	Brand-name hypoid gear oil SAE 80					
Filling capacity, litres (Imp. pints)	0.8 (1.4/0.85)					
Drive shaft: Axial float, mm(in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)					
Layshaft: Axial float, mm(in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)					
Output shaft: Axial float, mm(in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)					
Ball bearing seating in gearbox	Press fit (heat gearbox case to about 100° C [212° F] for assembly)					
Axial play of the free-running pinions in the shaft mm(in)	0.15...0.30 (0.006...0.012)					

36

Gearbox

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Bushes on output shaft mm(in)	0.005...0.035 (0.00019...0.00138)					
Driving flange radial play, mm(in)	±0.05 (±0.0020)					
Face runout, mm(in)	±0.05 (±0.0020)					
Power transmission from gearbox to rear wheel	Enclosed universal-joint shaft in right-hand swing arm tube, universal joint at gearbox end. Curved spline coupling bell at axle drive end					
Axial float of foot-operated gear shift lever shaft, mm(in)	0.1 (0.0039)					
Overshift clearance between ratchet and selector points on the cam selector plate 1st to 5th gear, mm(in)	approx. 0.5 (0.02)					

Tightening torques Nm (lb. ft)

Mounting on engine	20 . . . 24	(14.7...17.7)	Gearbox case/gearbox cover	7 . . . 8	(5.2 ... 5.9)
driver flange on gearbox output shaft	200 . . . 220	(147...162)	Kick starter lever nut	20 . . . 23	(14.7...17.0)
			Oil filler plug	28 . . . 31	(21 ...22.9)
			Oil drain plug	23 . . . 26	(14.7...19.2)

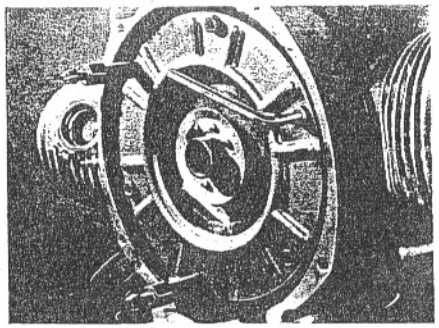
All other bolts, screws and nuts are to be teghtened with the values recommended in the manufacturer's tables or the latest BMW Standard Specification 60002.0.

21 21 000 Clutch – removing and refitting

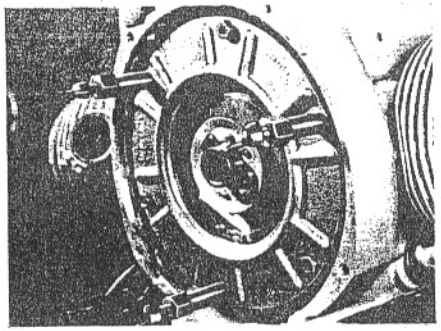
First possibility: Engine removed (11 00 050).
Second possibility: Gearbox removed (23 00 020). Engine remains in frame.

Illustrations and text prepared after this preliminary work.

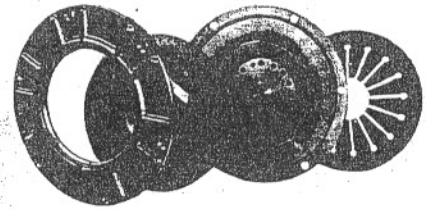
Use an Allen key to slacken six hexagonal socket head bolts, unscrew alternate fastening bolts, replace by three clamping bolts and screw down their nuts to contact the thrust ring.



Remove the remaining three fastening bolts and turn back the clamping bolt nuts uniformly until the spring disc is fully relaxed.

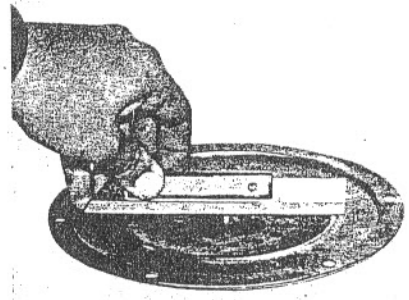


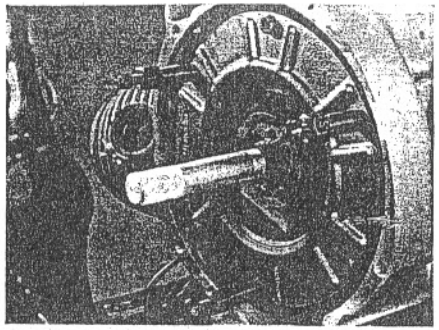
Remove the thrust ring, clutch plate, diaphragm and diaphragm spring.



Checking and repair

Check the clutch plate for wear, the diaphragm for distortion and the spring for clamping force when fitted. Check the driven plate for lateral runout, wear tolerances and play; see Technical Data section.



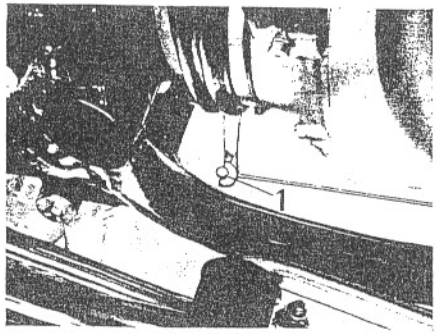


When re-assembling use the BMW 21 2 650 centering arbor to locate the clutch plate. See Technical Data for tightening torques.

Lightly coat inside splines of the clutch hub with "Molykote Longterm 2" lubricant.

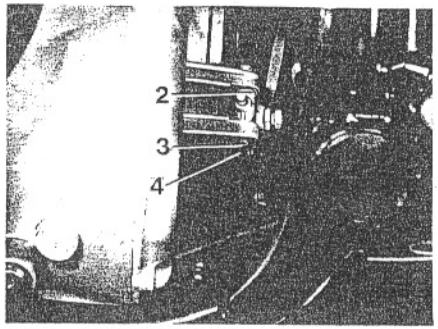
21 51 020 Clutch Throwout Lever – Removing and Refitting

Disconnect the clutch cable (1).



■

Extract cotter (2), take out pin (3) and lay the parts with thrustspring (4) to one side.



■

23 Gearbox

Technical Data		Page 23– 0/3
Specifications – '79 models		23– 0/5
23 00 020	Gearbox – removing and refitting	23–00/1
23 11 040	Gearbox housing cover – removing and refitting/sealing	23–12/1
23 22 001	Gear train – renewing	23–21/1
23 31 001	Selector forks – renewing	23–31/1
23 31 210	Selector bracket – removing and refitting	23–31/1
23 31 861	Selector discs – renewing	23–31/2
23 31 881	Gearshift – renewing	23–31/2
23 31 401	Neutral indicator – renewing	23–31/3
23 51 010	Kick starter – removing and refitting	23–31/3
	Trouble-shooting – gearbox	23–31/5

Gearbox — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Gearbox:	5-speed gearbox with dog clutch gear selection integral with engine, driving torque damped in all gears				
Gear shift system	Hooked lever shift				
Transmission ratios:				Competition ratios:	
1st gear	4.4 : 1			3.38 : 1	
2nd gear	2.86 : 1			2.43 : 1	
3rd gear	2.07 : 1			1.93 : 1	
4th gear	1.67 : 1			1.67 : 1	
5th gear	1.50 : 1			1.50 : 1	
Type of oil above 5° C (41° F)	Brand-name hypoid gear oil SAE 90				
below 5° C (41° F)	Brand-name hypoid gear oil SAE 80				
Filling capacity, litres (Imp. pints/US quarts)	0.8 (1.4/0.85)				
Drive shaft: Axial float, mm (in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)				
Layshaft: Axial float, mm (in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)				
Output shaft: Axial float, mm (in)	0 . . . 0.1 (0 . . . 0.0039) (adjust with shims)				
Ball bearing seating in gearbox	Press fit (heat gearbox case to about 100° C [212° F] for assembly)				
Axial play of the free-running pinions in the shaft mm (in)	0.15…0.30 (0.006…0.018)				

Gearbox — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Bushes on output shaft mm (in)	0.005 . . . 0.035 (0.00019 . . . 0.0013)				
Driving flange radial play, mm (in)	±0.05 (±0.0019)				
Face runout, mm (in)	±0.05 (±0.0019)				
Power transmission from gearbox to rear wheel	Fully-enclosed drive shaft with torsional vibration damper in right swinging arm tube; universal joint at gearbox end, coupling with curved splines at final drive end.				
Axial float of foot-operated gear shift lever shaft, mm (in)	0.1 (0.0039)				
Obershift clearance between ratchet and selector points on the cam selector plate 1st to 5th gear, mm (in)	approx. 0.5 (0.019)				

Tightening torques Nm (lb. ft)

Mounting on engine	20…24 (14.7…17.7)	Gearbox case/gearbox cover	7…8 (5.2…5.9)
driver flange on gearbox output shaft	200…220 (147…162)	Kick starter lever nut	20…23 (14.7…17.0)
		Oil filler plug	28…31 (21…22.9)
		Oil drain plug	23…26 (14.7…19.2)

All other bolts, screws and nuts are to be tightened with the values recommended in thee manufacturer's tables or the latest BMW Standard Specification 60002.0.

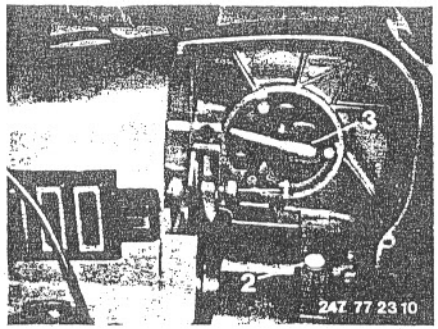
23 00 020 Gearbox – removing and refitting

Stand the motorcycle on its parking stand and on an additional support behind the parking stand.

Air filter – remove and refit (13 72 000).

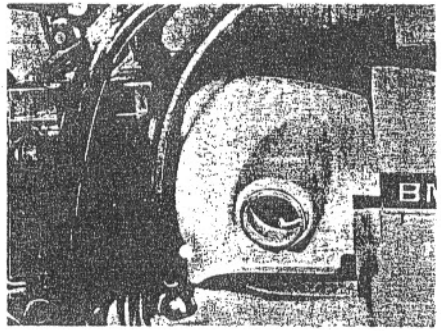
Disconnect both choke cables at the carburetors and lay the left-hand half shell of the air filter housing with choke cables to one side.

Unscrew nut (1) with straight ring spanner. Slacken hexagonal bolt (2).



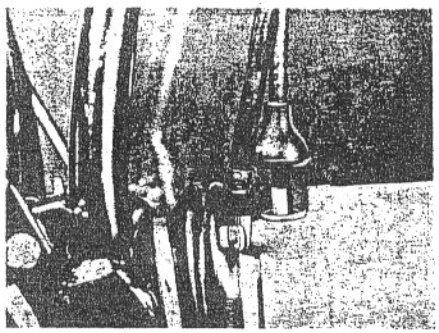
Take off the right-hand half shell of the air filter housing, at the same time pushing back breather hose (3).

Remove carburetor.



Push back the rubber protective cap on the speedometer drive and, after releasing the retaining screw and disconnecting the battery earth lead, withdraw together with the washer.

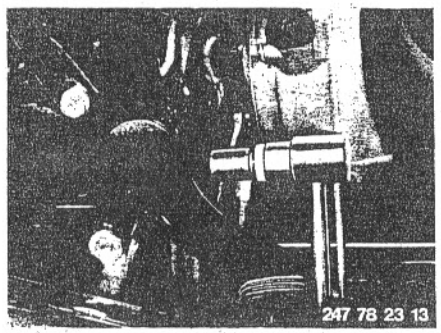
Battery – remove and refit 61 21 010.
Battery bracket – remove and refit 61 21 100.

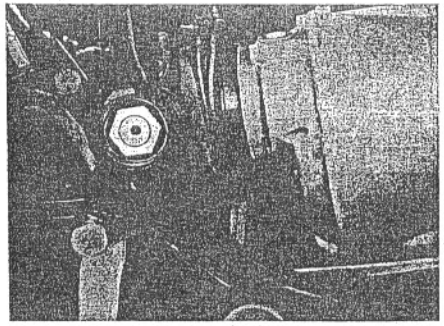


Slacken the rubber gaiter clamp on the gearbox and push back the gaiter as far as possible, not forgetting to place an oil drip tray in position.

Unscrew the four 12-sided bolts with a ring spanner and lay to one side with washers. Depress footbrake to hold the universal-joint shaft.

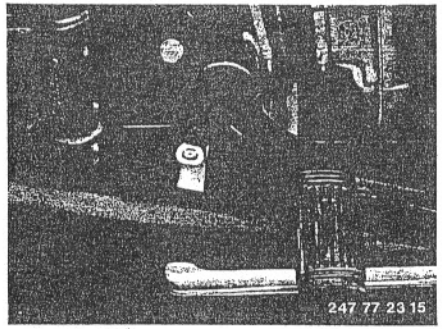
Tighten with BMW special tool 00 2 560. For torque, see Technical Data.



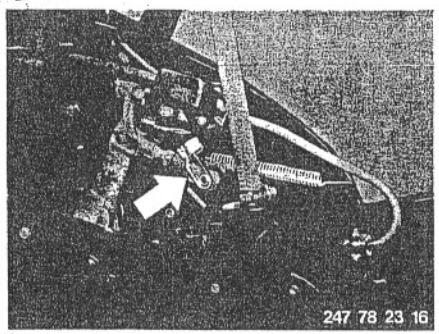


Take off the cap of the swinging arm mounting. Slacken the locknut on the bearing journals and unscrew both bearing journals.

When refitting the swinging ar, care must be taken to ensure that the two thrust collars do not project.

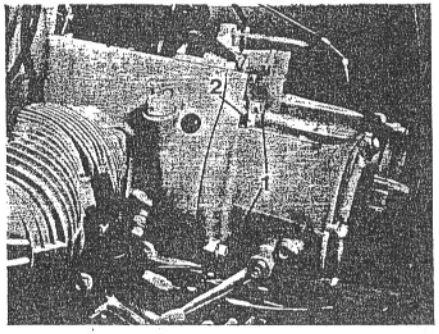


Remove footbrake lever, at the same time holding securely at the bearing bolt, and unscrew the locknut.



On R 100 RS, with disc rear brake, detach brake linkage at brake cylinder (arrow) and disconnect tension spring.

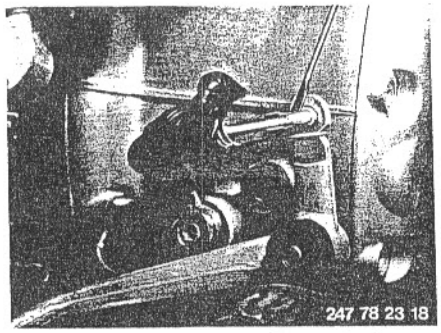
Clutch throwout lever – remove and refit 21 51 020.



Unscrew the two hexagonal socket head bolts (1) and one hexagonal socket head thorugh bolt on the lower right of the gearbox.

When re-assembling, remember tab (2).

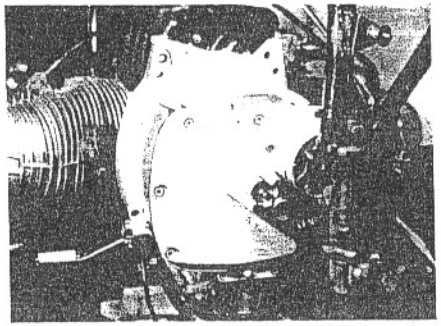
Disconnect gear shift linkage at pedal arm. Push back rubber gaiter, disengage spring and release pull rod from keeper with a screwdriver blade.



With the aid of a wooden wedge (approx. 20 mm², 400 mm [15.7 in] long) inserted between the tire and rear section of the frame, secure the swinging arm in its rearmost position.

Carefully remove the gearbox, place on footrest, disconnect lead for idling check.

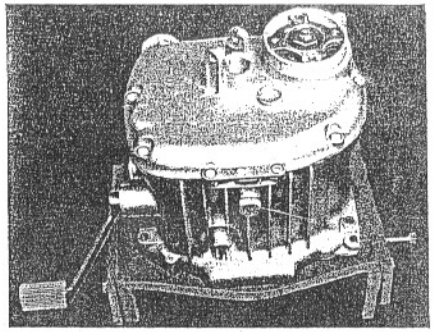
Take out gearbox completely.



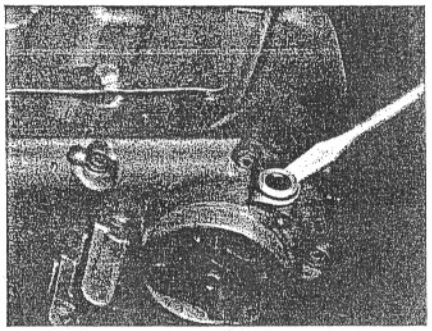
23 11 040 Gearbox housing cover – removing and refitting/sealing

Gearbox – remove and refit (23 00 020).

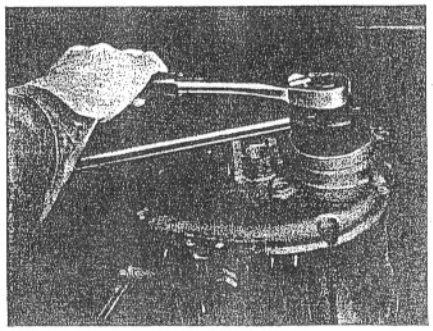
Fit BMW 11 0 600 mounting for engine and gearbox in combination with BMW 00 1 500 assembly stand. Fasten the gearbox on the mounting with two bolts at opposite corners.



After removing the retaining bolt use screwdriver pressed against the side of the bush collar to press out the speedometer helical gear bush and remove the helical gear.



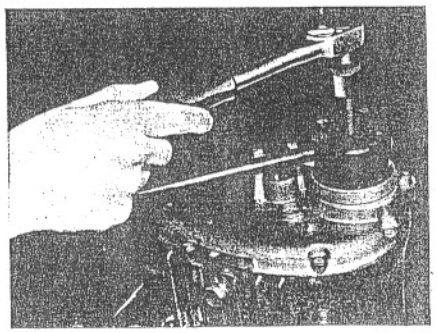
Use four bolts to fasten the BMW No. 23 1 700 back plate holding device to the driver flange of the output shaft.
Release the locknuts.

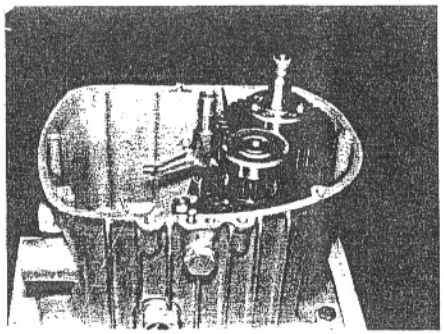


After bolting on the BMW No. 23 1 710 extractor press, press out the driver flange. If necessary release the taper seat with a gentle knock on the spindle.

Note when fitting: When refitting the driver flange, clean the tapered seats with trichlorethylene and refit in dry condition.

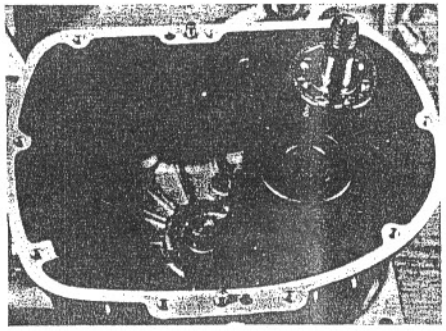
Lubricate the retaining nut with a high-viscosity oil.





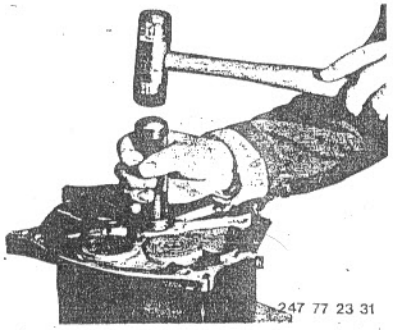
Unscrew Phillips screw for oil guide cover and remove cover. Withdraw shaft for selector forks 1-2-5 and remove forks.

Note when fitting: When fitting the selector forks, match the short guide ends of the forks together.

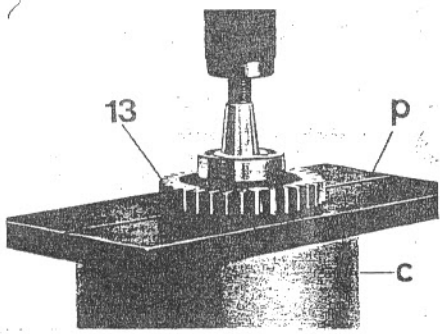


Heat the output shaft and layshaft bearing seats in the gearbox to 100° C (212° F) and remove both shafts with selector fork for 3rd and 4th gear.

Note when fitting: When fitting the selector fork, the long guide end should point downwards into the housing.

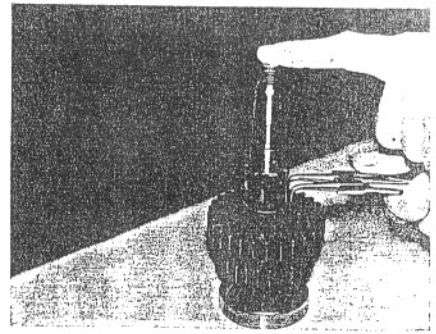


Install a new input shaft radial seal. Drive the sealing ring in with BMW 11 1 850 drift and BMW 00 5 500 handgrip.

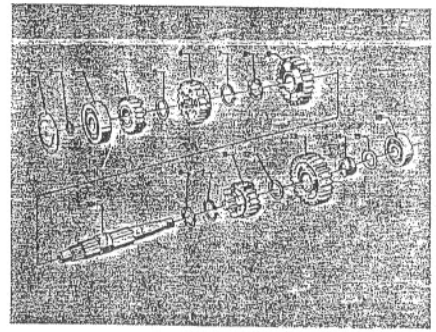


Remove oil baffle 1 from the base of the ball-bearing bore of the output shaft in the casing. Arrange a divided plate p below the first gear wheel 13 and set the divided plate on a suitable press cylinder c. Press out the gear wheel together with thrust washer 15 and ball-bearing 16.

Take off the floating bush 14 for the first gear wheel, the second thrust washer 12 and the fourth gear wheel 11. Remove circlip 7 for the second and third gear wheel with thrust washer 8, and the second gear wheel 9.

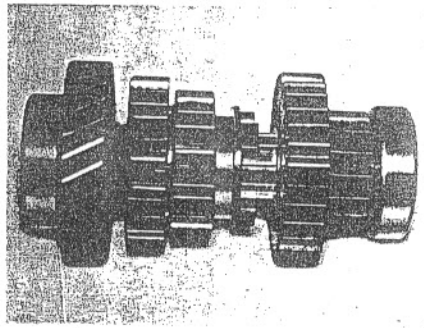


Lift off circlip 2 on the front shaft end. Lay the divided plate between gear wheel 4 and 6, and lay the divided plate on a suitable press cylinder. Press off ball-bearing 3 with a suitable arbor. Remove the fifth gear wheel 4 with washer 5, the third gear wheel 6 and 7 as well as washer 8. If the collar bush for second and third gear pressed on to the splined keyway is faulty the output shaft must be replaced.
Assembly in reverse sequence.

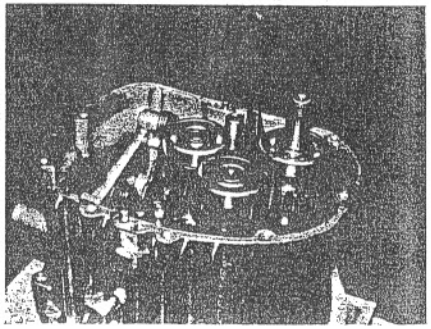


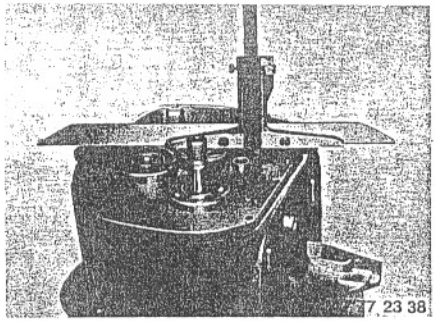
If it is faulty the whole intermediate shaft should be renewed.

Pull off bearing with Kukko extractor, BMW No. 00 7 500.



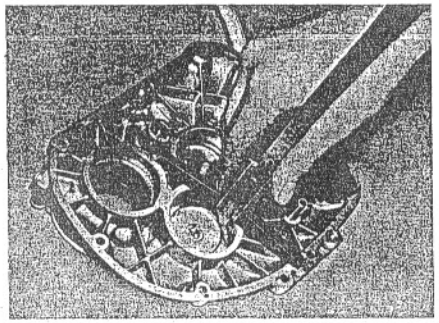
The whole shaft should be renewed if faulty.
Before fitting the output shaft, lay oil retainer in the ball-bearing bore of the housing.
Fit the **output shaft and layshaft** together with the selector fork for third and fourth gear in the housing.
Care must be taken to ensure that the selector fork does not jam. Then insert the selector forks for first, second and fifth gears.
Fit the selector bracket in neutral and fit the input shaft.





To determine the axial play of the layshaft, use a depth gauge to measure the gap between the ball-bearing race and the housing joint surface, with gasket in position.

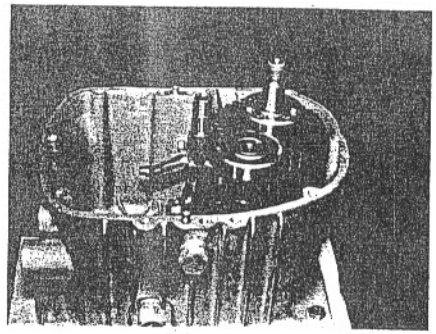
Attach BMW measuring plate 23 3 650 to guide the shafts on to the housing. Add thickness of measuring plate to distance between ball bearing and measuring plate.



Now measure the distance between the housing cover contact surface and the base of the ball-bearing seating in the cover and compensate any discrepancy with appropriate shims down to a clearance of 0.1 mm (0.004 in). It is advisable to stick the shims in the bearing seat of the gearbox with the aid of a little grease.
The three shafts are all shimmed in the same way, to max. endplay 0.1 mm (0.004 in).

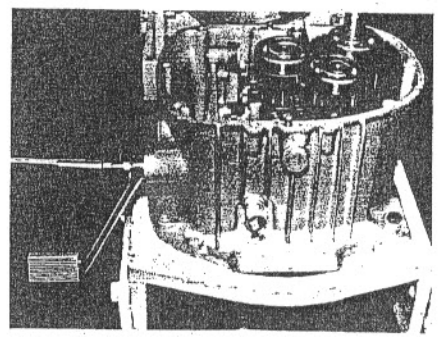
23 31 001 Selector forks – renewing

Gearbox – remove and refit (23 00 020).
Gearbox housing cover – remove and refit/seal (23 11 040).
Selector bracket, remove and replace.
Withdraw the shaft for selector forks 1-2-5 from the still warm housing, and lay aside together with the selector forks. In order to replace selector fork 3–4 the gear train must be removed.

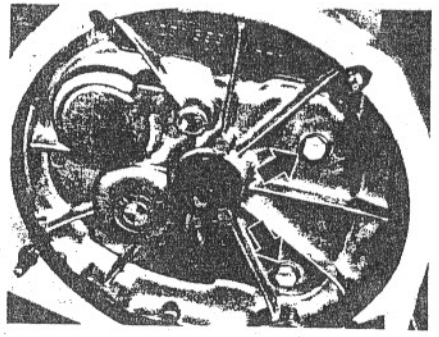


23 31 210 Selector bracket – removing and fitting

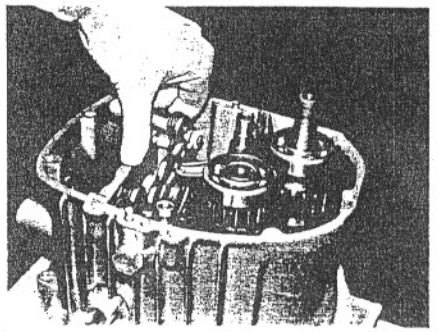
Gearbox – remove and refit (23 00 020).
Gearbox housing cover – remove and refit/seal (23 11 040).
Unscrew hexagonal socket head screw with screwdriver and withdraw selector lever.

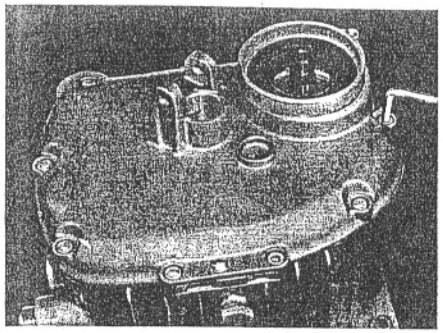


Loosen the two reamed bolts (arrows) for the selector bracket attachment.



Tilt the selector bracket so that the selector forks are released. Withdraw the selector bracket.



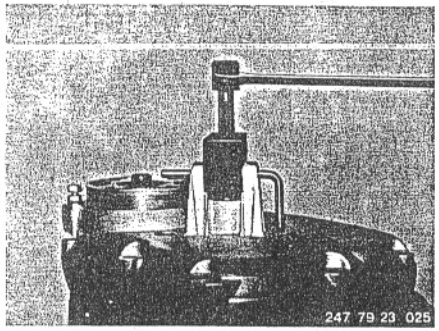


Remove the clutch pressure plate assembly with ring seal, ball race, pressure plate and thrust rod with felt ring.

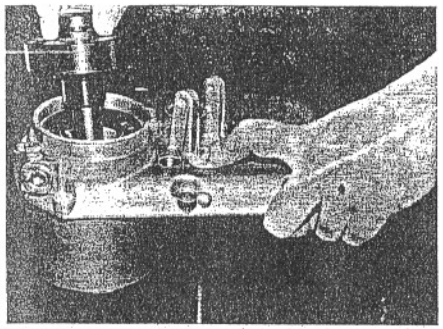
Remove the hexagonal socket head bolts from the gearbox cover with washer.

When assembling, insert the thrust rod with felt ring from the flywheel end to protect the felt ring from damage. Rub hot bearing grease into the felt ring.

When fitting the clutch pressure plate assembly care must be taken to ensure that the two lips of the ring seal are not buckled.



Heat the gearbox cover to app. 100° C (212° F) and force away from the housing with BMW puller 23 3 700.



Remove the shaft axial float shims from the cover and take out the defective output flange radial seal. Knock in new radial seal with the aid of BMW 23 1 750 tool. The open side of the radial seal faces the drive output flange.

23 22 001 Complete gear train – renewing

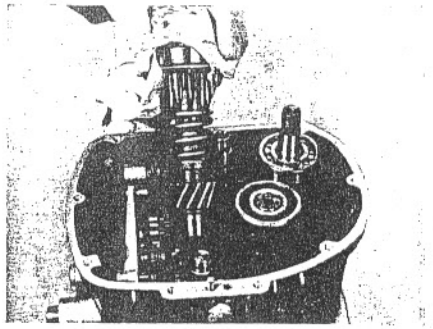
Gearbox – remove and refit (23 00 020).

Gearbox housing cover – remove and refit (23 11 040).

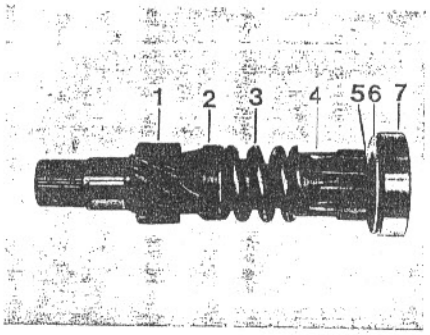
Selector bracket – remove and refit (23 31 210).

Use a plastic-faced hammer on the front end of the shaft to gently tap out the input shaft from the housing, which still should be warm.

Warning: Avoid damage to roller bearing.

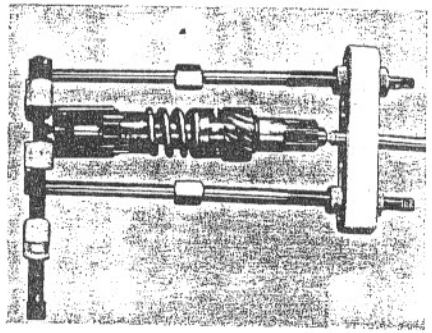


Remove bearing 7 of the input shaft and cover plate 6 using universal extracting tool 00 7 500.

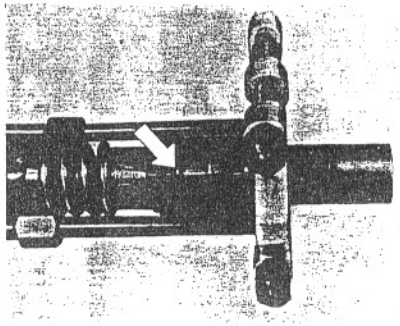


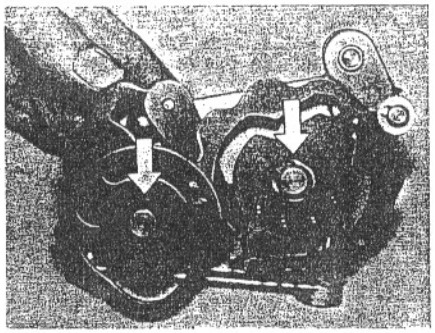
Compress thrust spring 3 with universal extracting tool 00 7 500 and lift out retaining ring 5 from groove. Remove drive gear for kick starter 4, thrust spring 3, thrust piece 2 and drive gear 1.

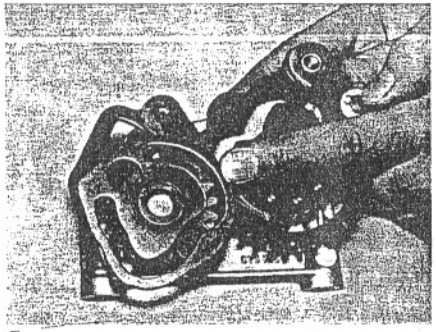
Note: use same procedure for input shafts without kick starter pinion. On input shafts with pressure pad at front, use BMW disc 23 2 760. Insert disc at shoulder in extracting tool.

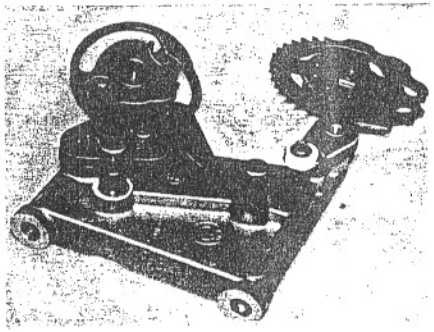


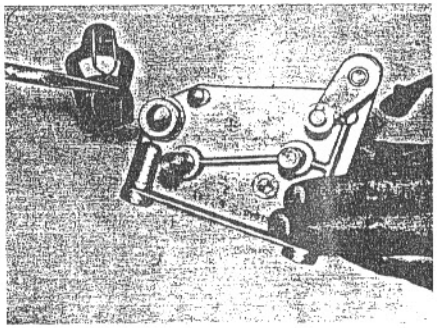
When re-assembling input shaft, compress thrust spring 3 with the BMW universal extracting tool. Fit retaining ring 5 onto guide sleeve and, using the fitting sleeve, press the retaining ring up to the groove.











23 31 861 Selector discs – renewing – selector bracket removed –

The repair work outlined in previous chapters should be carried out only where necessary.

Remove the two retaining rings (arrows) of the cam plate mounting.

Renew the selector discs, ensuring that the first teeth of the selector discs are in mesh.

23 31 881 Gearshift – renewing – selector bracket removed –

The repairs outlined in previous chapters should only be carried out where necessary.

Remove selector discs.

Withdraw the selector segment from the guide and remove the spring.

23 31 401 Neutral indicator – renewing

1. Gearbox removed:

Gearbox – remove and refit (23 00 020).

After tilting the gearbox to the side the neutral indicator switch can be removed.

2. Gearbox installed:

Drain the oil.

Slacken nuts on rear engine mounting pin and take off exhaust pipe mount. Pull out pin. Drive spacing tube out of engine block with plastic-faced hammer.

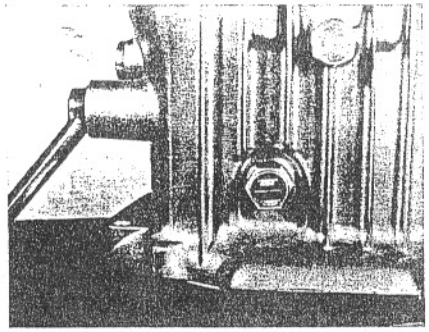
Pull off leads and unscrew neutral indicator switch.

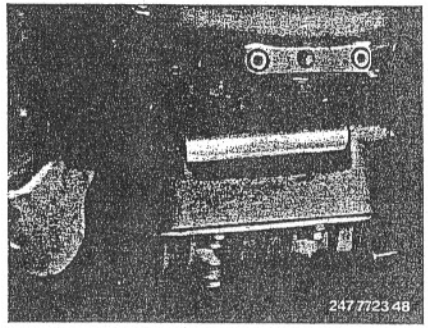
23 51 010 Kick starter – removing and refitting (Opt. 58.4)

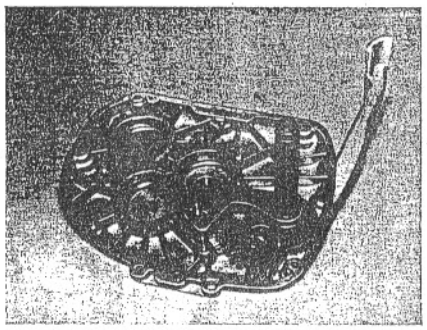
Gearbox housing cover – remove and refit/seal (23 11 040).

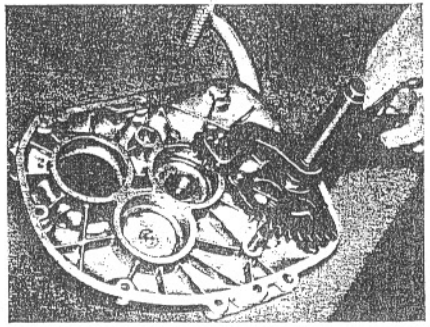
The repair jobs shown in previous chapters should only be carried out if necessary.

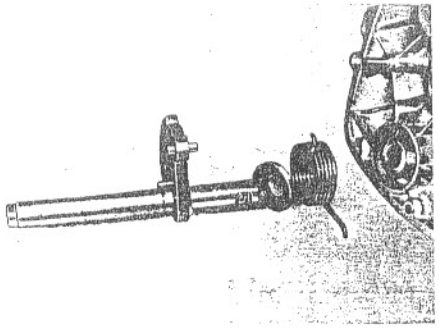
Remove the circlip for the intermediate gear and take off the intermediate gear of the kick starter.











Loosen the splined bolt of the kick starter lever and remove lever. Lift out the kick starter from the cover with the washer and spring.

■

Trouble-shooting – gearbox

Fault	Cause	Remedy
Noise from gearbox	Defective bearing	Renew bearing
	Selector forks rubbing	Inspect selector forks for wearmarks, grind away, renew forks if necessary
	Gearbox shafts not shimmed to correct endplay	Install correct thickness of shims
Gear shift is stiff to move	Too little play at gearbox shafts (shims)	Install correct thickness of shims
	Pawl is touching large selector disc (1st, 2nd and 5th gears)	Align pawl correctly

26 Drive shaft

Technical Data . . . . . Page 26– 0/3
Specifications – '79 models 26– 0/4
26 11 000 Drive shaft – removing and refitting (model without torsional vibration damper) 26–11/1
26 11 000 Drive shaft – removing and refitting (model with torsional vibration damper) 26–11/1

12.77 Alteration

Technical Data

Drive Shaft

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Arrangement	Enclosed drive shaft in the right-hand swinging arm, with needle bearing universal joint at the gearbox end and curved-spline coupling at the input end					
Type of oil, over 5° C (41° F) below 5° C (41° F)	Brand-name hypoid gear oil SAE 90 Brand-name hypoid gear oil SAE 80					
Filling capacity, ltr. (Imp. pints)	0.15 (0.26/0.16)					

Tightening torques Nm (ft. lb)

Hexagonal nut on coupling bell housing	200...220 (147...162)
Twelve-sided bolt	38 + 4 (28+2.9)

All other bolts, screws and nuts are to be tightened in accordance with the usual figures as recommended by the manufacturers or in accordance with the latest BMW Standard Specification 60002.0.

Drive Shaft

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Arrangement	Fully-enclosed drive shaft with torsional vibration damper in right swinging arm tube; universal joint at gearbox end, coupling with curved splines at final drive end.				
Type of oil, over 5° C (41° F)	Brand-name hypoid gear oil SAE 90				
Type of oil, below 5° C (41° F)	Brand-name hypoid gear oil SAE 80				
Filling capacity, ltr. (Imp. pints)	0.15 (0.26)				

Tightening torques Nm (ft. lb)

Twelve-sided bolt	38+4 (28+2.9)

All other bolts, screws and nuts are to be tightened in accordance with the usual figures as recommended by the manufacturers or in accordance with the latest BMW Standard Specification 60002.0.

11.78 Addition

41

26 11 000 Drive shaft – removing and refitting (models without torsional vibration damper)

Rear wheel swinging arm – remove (33 17 350).

Clamp the rear wheel swinging arm in a bench vice fitted with jaw pads. Insert toothed back plate holder BMW No. 26 1 600 in the inside toothing of the coupling bell housing and unscrew the nut from the drive shaft with the aid of the appropriate socket wrench.

Using extractor 26 1 650, pull the coupling bell housing off the drive shaft.

If the housing is seated very securely, tighten the thrust spindle and give it a sharp blow. Remove drive shaft and housing.

Check universal joint for wear. Test for radial play by turning to produce relative rotary movement between flange and shaft. Test for endplay (axial) by pushing along line of shaft.

Note when fitting:

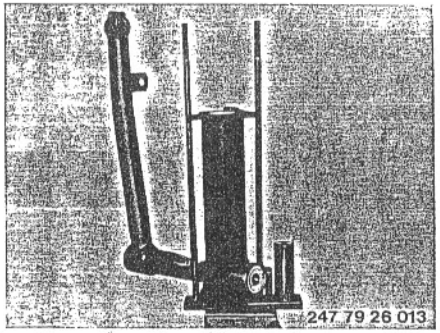
Before fitting the housing it is essential to clean the inside and outside cone with trichlorethylene (do not use petrol/gasoline). See Technical Data for tightening torque.

11.78 Alteration

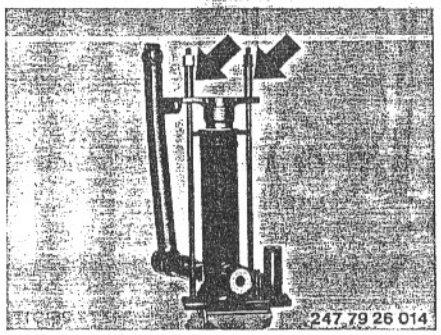
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26 11 000 Drive shaft – removing and installing (models with torsional vibration damper)

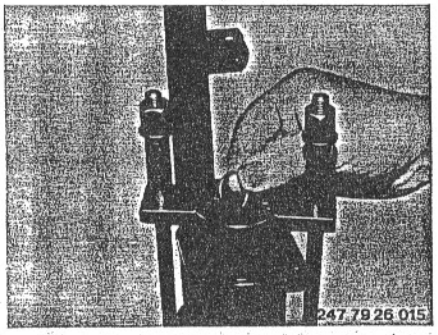
Remove rear wheel swinging arm – 33 17 350.
Clamp BMW assembly fixture 26 1 700 into vise, and insert swinging arm into fixture.



Attach upper plate of fixture and tension the fixture (use spacing sleeves (arrows) for short swinging arm).

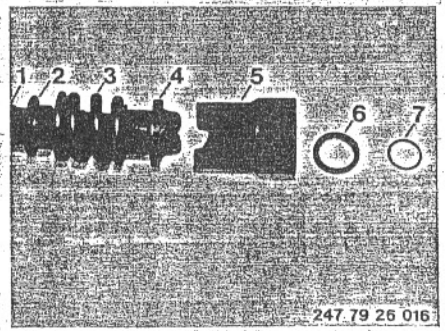


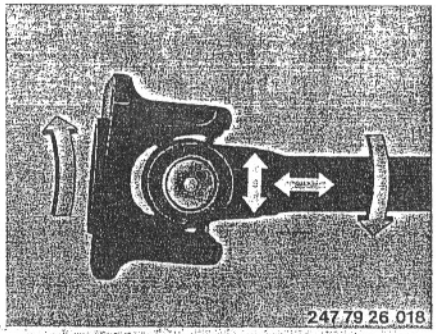
Insert drift into slot and extract the snap ring.
Release the tension slowly from the fixture.

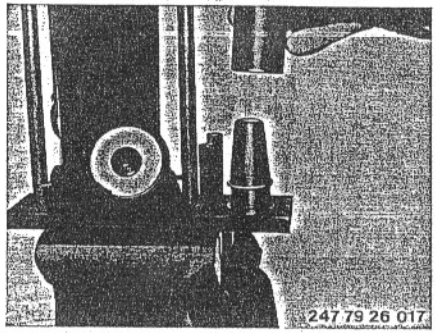


Remove the swinging arm from the fixture.
Pull the drive shaft and loose components out of the swinging arm.

1 Drive shaft
2 Thrust block
3 Spring
4 Reaction block
5 Coupling shell
6 Ring
7 Snap ring







Check universal joint for wear: check radial play by turning flange and shaft in opposite directions, and determine endplay by pulling and pushing the two components along the axis of the shaft.
Renew drive shaft if necessary.

When installing:

Use slip-over and driving sleeves to install snap ring (7).
Press ring over taper of slip-over sleeve with driving sleeve. Mount the slip-over sleeve on the drive shaft and force the snap ring into its groove with a hammer and the driving sleeve.
After the fixture has been released, the snap ring must be correctly located in ring (6).

31 Front fork

	Page
Technical Data	31 – 0/3
Specifications – '79 models	31 – 0/5
31 42 009 Telescopic fork – measuring	31 – 42/1
31 42 050 Steering damper – removing and refitting	31 – 42/2
31 42 100 Telescopic fork – removing and refitting	31 – 42/2
31 42 103 Telescopic fork – dismantling and assembling	31 – 42/5
Trouble-shooting – front forks	31 – 42/9

11.78 Alteration

31–0/1

12.77 Alteration

Technical Data

Front Forks

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Wheel bearing lubrication	Branded multipurpose lubricating grease with 180° C (355° F) drip point					
Front wheel castor, mm(in)	approx. 95 (3.74) – no provision for adjustment					
Steering lock	approx. 42° to either side					35°
Front fork lock angle	42°					35°
Spring travel (75 kg (165 lb) load) mm(in) Upward mm(in) Downward mm(in)	200 (7.87) 120 (4.72) 80 (3.15)					
Test fitting length (measured from top of support tube to the machined surface on the lower fork mount) mm(in)	160 (6.30)					
Fork stand tube	hard chromed					
Fork sliding tube	light metal casting					
Fork bridge, lower	light metal forging					
Oil capacity per fork column, litre (Imp. pint)	0.25 (0.44, 0.26)					
Type of oil	Shock absorber oil, Shell 4001, Shell Aero Fluid 4, BP Aero Hydraulic 1, Castrol DB Hydraulic Fluid, Castrol Shock Absorber 1–318					
Telescopic fork stand tube (hard chromed) Outer diameter mm(in)	$36^{-0.050}_{-0.075}$ $\left(1.417^{-0.002}_{-0.003}\right)$					
Stand tube for telescopic fork (maximum permissible deflection in mm) (in)	0.1 (0.004)					
Fork sliding tube inside diameter mm(in)	$36^{+0.025}_{0}$ $\left(1.417^{+0.001}_{0}\right)$					
Running play of fork sliding tube on fork stand tube, maximum, mm(in)	0.24 (0.0094)					

Specifications – '79 models

Front Fork

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Plunger to the damper tube outer diameter, mm (in)	27.7±0.1 (1.091±0.0039)				
Fork stand tube (inside diameter), mm (in)	28±0.15 (1.102±0.0059)				
Running play of plunger in fork stand tube, mm (in)	0.05…0.55 (0.00 19…0.0216)				
Length of fork carrier spring (relaxed) mm (in)	567 (22.32)		543 (21.38)		

Tightening torque Nm (lb. ft)

Centering nut for telescopic fork	120…130 (88.5…95.8)	Bottom screw coupling in sliding tube	80…100 (59…74)
Clamp bolt on clamp ring	10…12 (7.4…8.8)	Nut M8 × 1 (connecting damper bottom screw coupling – sliding tube)	20…23 (14.7…17.0)
Top spring seat for telescopic fork	120…130 (88.5…95.8)	Axle clamping bolt	15+2 (11.0+1,5)
Clamp bolts on the lower fork yoke	35…40 (25.8…29.5)	Top splash plate stirrup	20…25 (14.7…18.4)
Screw plugs on bottom of damper tube and top of plunger (spring seat)	25 (18.4)		

All other bolts, screws and nuts are to be tightened according to the customary values shown in the manufacturer's tables or in accordance with latest BMW Standard Specification 60002.0.

43

31 42 009 Telescopic fork – measuring

Telescopic fork – dismantle and assemble (31 42 100).

In the event of damage to the fork it is essential to inspect the upper and lower fork yokes, fork stand tubes and sliding tubes for any possible hairline cracks.

After removal, check the stand tubes for deflection, laying both ends in V-guides or between points, see Technical Data for maximum permissible deflection.

■

Warning! No attempt must be made **to straighten distorted** stand tubes, as these represent a permanent danger.

To check the lower fork yoke, clamp in two new stand tubes (test fitting length 160 mm (6.3 in), measured from top edge of carrier tube to the machined surface on the lower fork mount).

■

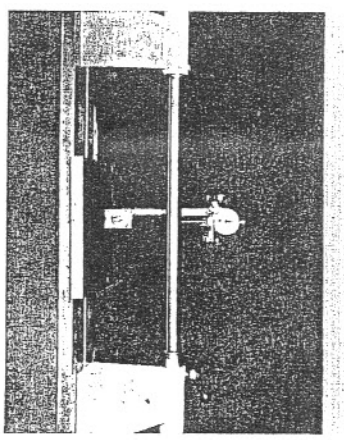
Lay two BMW 31 4 620 straight edges transversely over the ends of the fork carrier tubes and take a sight reading to determine distortion.

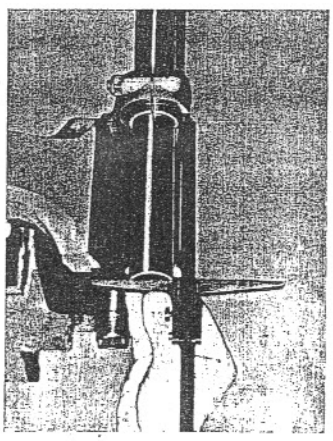
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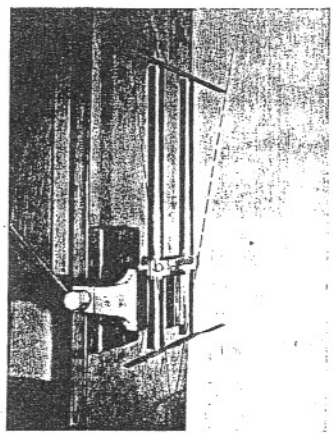
Check that the fitted stand tubes are parallel with the aid of a slide gauge.

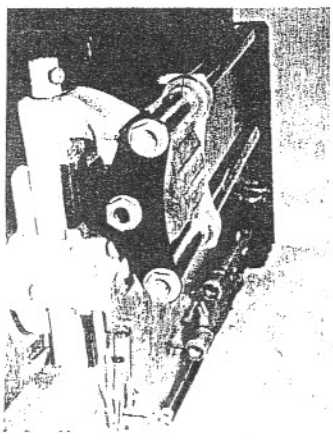
Check the fork carrier tube for precise alignment with the stand tubes. For this purpose, fit the upper fork yoke. Both upper spring seatings (each with shim) and the centering nut must screw on without any signs of stress.

■









Front Forks

Technical Data

Model	R 60/7	R 75/7	R 60/7	R 100/7	R 100 S	R 100 RS
Plunger to the damper tube outer diameter, mm(in)	27.7±0.1 (1.091±0.004)					
Fork stand tube (inside diameter), mm(in)	28±0.15 (1.102±0.006)					
Running play of plunger in fork stand tube, mm(in)	0.05...0.55 (0.0020...0.0217)					
Length of fork carrier spring (relaxed) mm(in)	567 (22.32)					543 (21.38)

Tightening torque Nm (lb. ft)

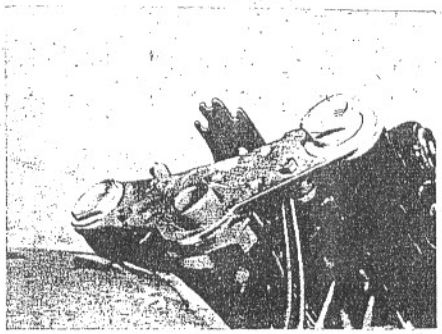
Centering nut for telescopic fork	120...130	(88.5...95.8)	Bottom screw coupling in sliding tube	80...100	(59...74)
Clamp bolt on clamp ring	10... 12	(7.4... 8.8)	Nut M8×1 (connecting damper – bottom – screw coupling – sliding tube)	20... 23	(14.7...17.0)
Top spring seat for telescopic fork	120...130	(88.5...95.8)	Axle clamping bolt	15 + 2	(11.0+1.5)
Clamp bolts on the lower fork yoke	35... 40	(25.8...29.5)	Top splash plate stirrup	20... 25	(14.7...18.4)
Screw plugs on bottom of damper tube and top of plunger (spring seat)	25	(18.4)			

All other bolts, screws and nuts are to be tightened according to the customary values shown in the manufacturers' tables or in accordance with latest BMW Standard Specification 60002.0.

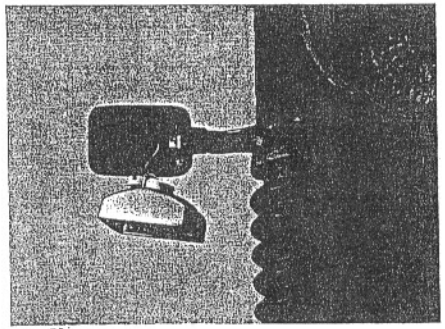
Front Forks

Specifications – '79 models

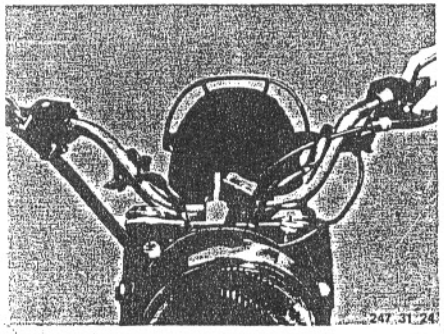
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Wheel bearing lubrication	Branded multipurpose lubricating grease with 180° C (355° F) drip point				
Front wheel castor, mm (in)	approx. 95 (3.74) – no provision for adjustment				
Steering lock	approx. 42° to either side			35°	
Front fork lock angle	42°			35°	
Spring travel (75 kg [165 lb] load) mm (in) Upward mm (in) Downward mm (in)			200 (7.87) 120 (4.72) 80 (3.15)		
Test fitting length (measured from top of support tube to the machined surface on the lower fork mount) mm (in)			160 (6.30)		
Fork stand tube	hard chromed				
Fork sliding tube	light metal casting				
Fork bridge, lower	light metal forging				
Oil capacity per fork column, litre (Imp. pint, US quart)	0.25 (0.44, 0.26)				
Type of oil	Shock absorber oil, Shell 4001, Shell Aero Fluid 4, BP Aero Hydraulic 1, Castrol DB Hydraulic Fluid, Castrol Shock Absorber 1–318				
Telescopic fork stand tube (hard chromed) Outer diameter mm (in)	$36^{-0.050}_{-0.075}$ $(1.417^{-0.00196}_{-0.00295})$				
Stand tube for telescopic fork (maximum permissible deflection in mm) (in)			0.1 (0.0039)		
Fork sliding tube inside diameter mm (in)	$36^{+0.025}_{0}$ $(1.417^{+0.00098}_{0})$				
Running play of fork sliding tube on fork stand tube, maximum, mm (in)	0.050–0,100 (0.00195–0.00390)				



Unscrew the two upper spring seatings with their shims (see Technical Data for tightening torque) and take off the upper fork yoke.



Unscrew the lenses from the left and right turn indicators and detach the leads from the reflectors.



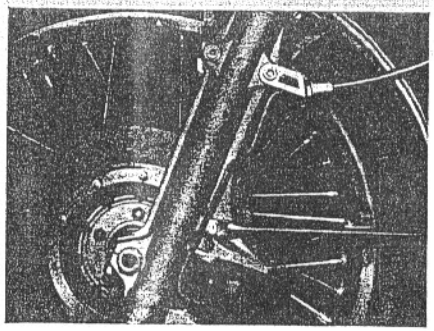
Note when fitting: Care must be taken to ensure accurate positioning of the control cables.



Remove left and right headlamp mounts with rubber rings and turn indicator leads (the bottom rubber rings are provided with bores for breather tubes in the fork yoke and for leads to the turn indicators).

Remove turn indicator housing with mount.

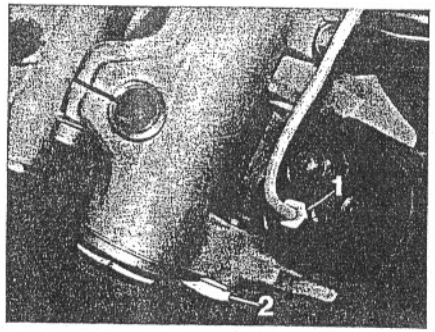
Unscrew the brake line holder on the left fork sliding tube. On the R 100 S and R 100 RS, also unscrew the brake line holder on the right sliding tube.



Note when fitting: Do not unscrew the brake line screw (1) otherwise the brake system must be bled.

Unscrew the cap (2) and remove with spring. Pull off the eccentric bolt (see floating caliper, removing and refitting – 34 11 020).

On R 100 RS, remove center engine fairing and screen panel. Remove steering damper – 31 42 050.



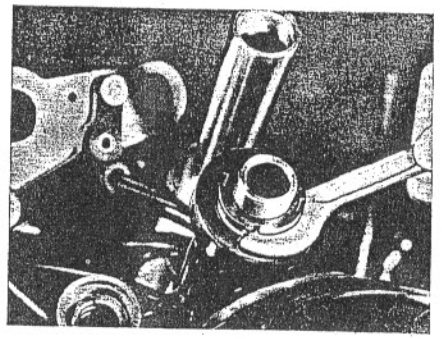
Unscrew slotted nut and remove protective ball race cap.

Draw the fork downward out of the frame, possibly assisting by gentle tapping with a rubber mallet on the fork guide tube. Avoid misplacing the angular-contact roller bearings. The outer races for the top and bottom roller bearing remain in the frame tube.

Note when fitting: For fitting the races and roller bearings must be greased.

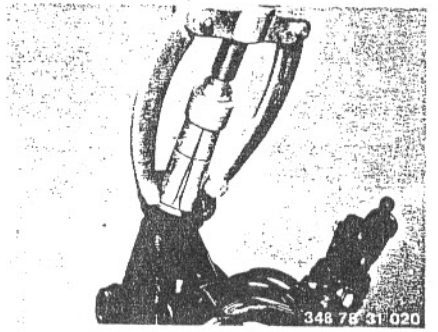
Fit the upper angular-contact roller bearing (1), insert the fork carefully into the frame complete with the lower angled roller bearing (2).

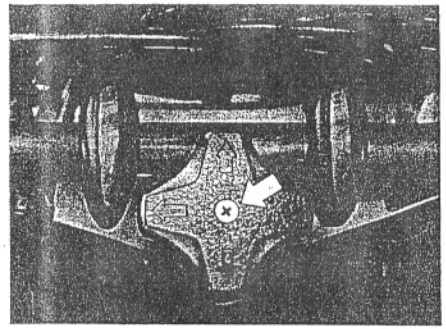
Reminder: Note the make of bearings.



The outer bearing races can be removed with "Kukko" puller BMW 00 5 560 in conjunction with support ring BMW 31 4 800.

When installing: use the old bearing shell to drive in the new shell.



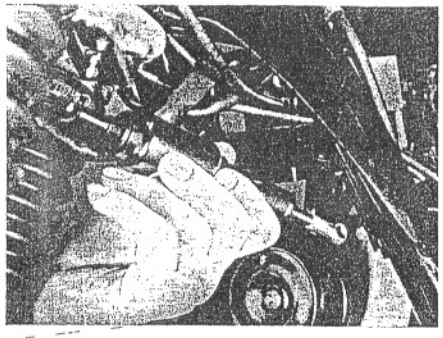


31 42 050 Steering damper – removing and refitting

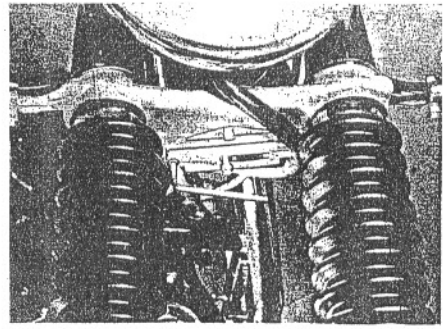
Opt. 63.6 (not for R 100 RS)

Remove Phillips-head screw from the adjusting grip and lift off the adjusting grip and the rubber piece.

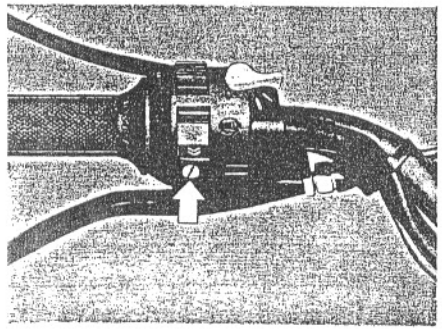
On R 100 RS, detach left and right engine fairings and take off screen panel and center fairing. Remove fuel tank.



Pull off retaining clip and press the damper out of the ball joint.



Slacken the two cheese-head screws on the plate, remove plate with slider and lock. Remove gear downwards.



31 42 100 Telescopic fork – removing and refitting

Front wheel – remove and refit (36 30 300).

Front wheel mudgard – remove and refit (46 61 000).

Steering damper – remove and refit (31 42 050).

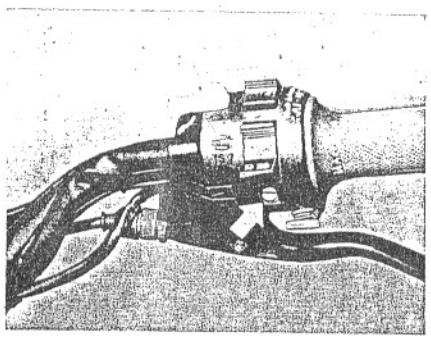
On the R 100 RS, detach the left and right engine fairings and take off the screen panel and center fairing.

On the R 100 S, detach the cockpit fairing (46 63 020). Disconnect earth (ground) lead at battery.

Remove the screw (arrow) from the combined electrical switch on the left handlebar.

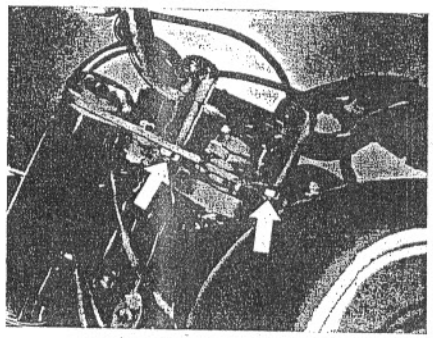
Detach plastic strap from handlebar.

Remove the switch from the right steering handle in the same way. The screw is shown by an arrow.



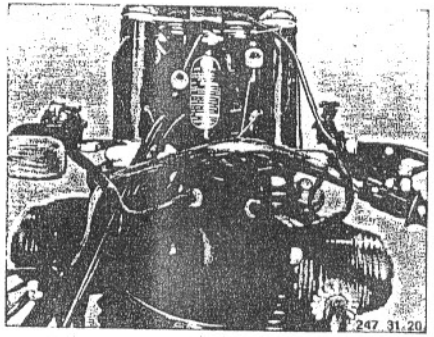
Detach star handle for steering damper and impact-absorbing pad (R 100 RS only).

Remove two nuts with spring washers from the clamp mountings for the handlebar. Lay aside the handlebar with fittings and attached cable controls.



Remove one screw with washer, two rubber rings and rubber sleeve from the left and right of the headlamp; allow the headlamp to hang downward taking care to avoid damage.

Note when fitting: Align headlamp beam (63 10 004).



Unscrew the two light metal caps left and right with a socket wrench.

Remove centering nut (see Technical Data for tightening torque).

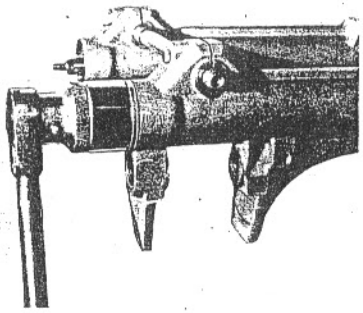


Remove the bottom screw plug.

Note when fitting: When assembling tighten the screw plug to the prescribed torque rating (see Technical Data).

Remove soft metal sealing washers from the end bolts of the damper.

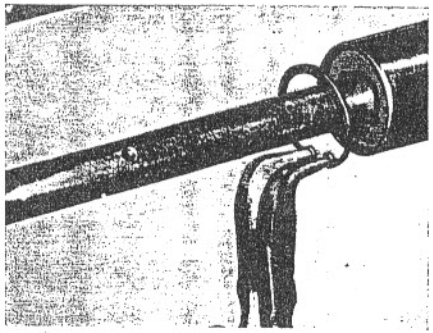
■



Note when fitting: Always use new sealing washers for re-assembly.

Lift out circlip on the damper nozzle.

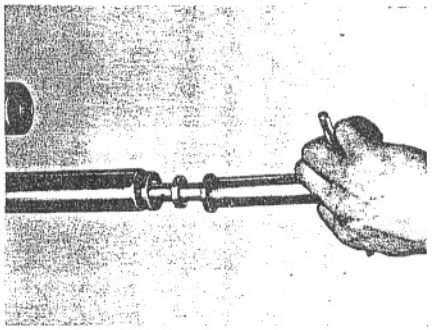
■



Remove the floating damper nozzle (consisting of two threaded rings and damper ring) with a suitable tool (Seeger circlip pliers).

Note tightening torque when fitting (see Technical Data).

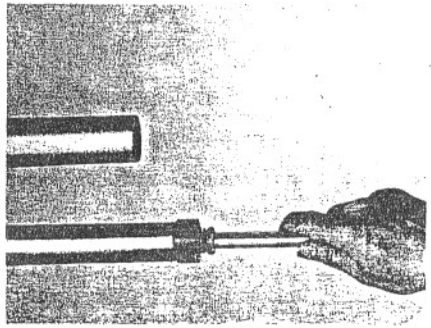
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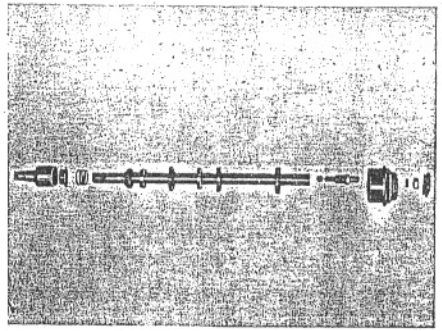


Withdraw the damper with plastic stop and carrier springs downward.

Note **when fitting:** When refitting the complete damper unit use the BMW 31 4 700 assembly sleeve to protect the plunger rings.

■





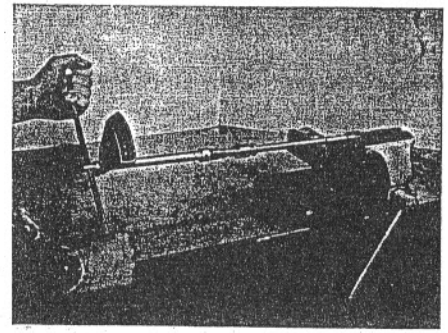
Check telescopic fork measurements – 31 42 009.

Clamp the complete damper at the hexagon of the end bolt and unscrew the spring seating on the top of the damper tube.

Remove in sequence: spring seating with plunger rings, damper valve and valve spring.

Remove ball valve: clamp the damper tube at the damper stop carefully between soft metal jaw pads and unscrew the end bolt. Take out the thrust spring and ball.

■



Note when fitting: Clamp the damper tube at the end bolt hexagon and use a torque wrench on the spring seating hexagon to tighten both screw couplings to the prescribed torque rating (see Technical Data).

Fill 280 cc. of the prescribed grade of oil (see Technical Data) in each fork column of the assembled fork unit and depress the fork strongly 4–5 times to allow any air to escape.

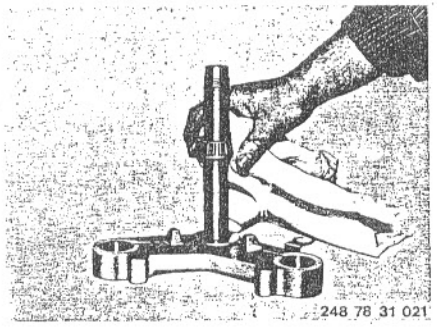
■

Note when fitting: If the lower fork yoke is to be renewed it is necessary for correct installation of the stand tube for the lower and upper fork yokes to be fitted in the frame complete together with preset steering bearings (with slotted nut and centering nut tightened). Only then are the fork stand tubes pushed through the lower fork yoke to come into full contact with the upper fork guide.

Tighten the clamping screws for fastening the stand tubes to the prescribed tightening torque (see Technical Data).

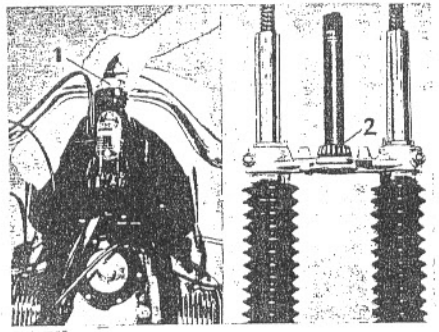
If only one single fork stand tube is renewed, the exact fitting height can be taken from the opposite stand tube.

■


248 78 31 021

To renew lower taper roller bearing, heat the lower fork bridge to 80 . . . 100° C (176 . . . 212° F), drive the guide tube out downwards and insert again immediately without the bearing. Heat the bearing slightly to simplify assembly.

When installing: note the locating marks on the guide tube and fork bridge for the anti-theft lock slot.



The wiring harness, speedometer shaft and rev. counter drive shaft must run below the lower fork yoke.

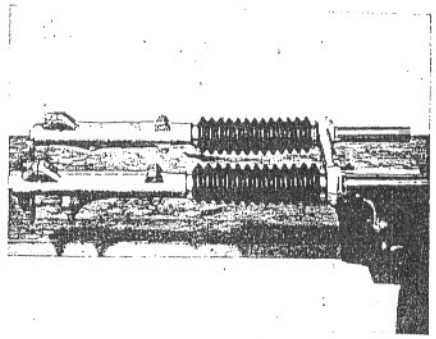
Screw on the protective cap for the upper angular-contact roller bearing and slotted nut. Tighten down the slotted nut until the steering system is free of play. Strike the bottom and top of the fork guide tube several times with a rubber mallet. When tightening the cap nut ensure that the threads of the slotted nut engage deeper into the thread on the fork guide tube, thus subjecting the bearings to stronger bias. If necessary slacken off the slotted nut about ½ turn and retighten cap nut.

Adjust steering – 32 00 454.

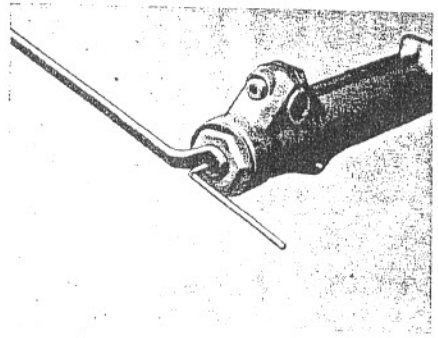
31 42 103 Telescopic fork – dismantling and assembling

Telescopic fork – remove and refit (31 42 100).
After removal, empty the fork by pumping motion at the sliding tubes.

Clamp the fork in a bench vice with the BMW 31 4 600 clamping block.

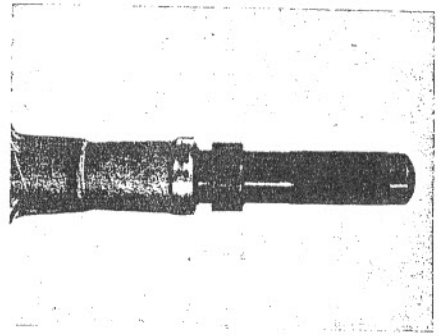


Loosen off two clamping straps each on the left and right of the rubber gaiter. Remove the rubber caps from the bottom screw coupilngs, unscrew the M 8 × 1 damper fastening nut (see Technical Data for tightening torque) at the same time holding firmly in place with an Allen key.

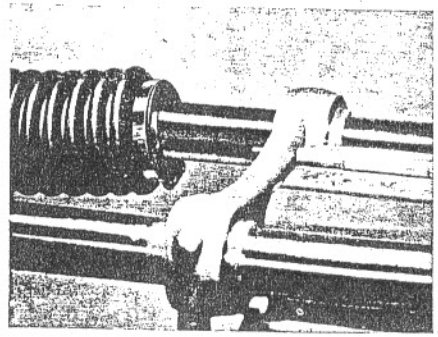


Draw off the sliding tubes, remove rubber gaiter.

Note when fitting: Use BMW tool 31 4 650 to tap in a new cap-type gasket.



When fitting the rubber gaiter, slide the appropriate vent aperture onto the clamping pin in the lower fork guide.



12.77 Alteration

Steering

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Steering lock	42° to each side					35°
Width of handlebar mm(in)	600 (23.6)					548 (21.6)
Width of US handlebar version mm(in)	680 (26.8)					548 (21.6)
Handlebar tube diameter mm(in)	22 (0.87)					
Steering damper (R 100 RS)	hydraulic, adjustable in 2 stages					

Tightening torque Nm (lb. ft) + friction value Ncm

Cap nut for telescopic fork	120 . . . 130 Nm (88 . . . 96 lb. ft)
Steering bearing	350 ± 20 Ncm

All remaining screws, bolts and nuts are to be tightened in accordance with the customary values recommended in the manufacturers' tables or in accordance with the latest BMW Standard Specification 60002.0

32-0/3

32-0/4

Steering

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Steering lock	42° to each side			35°	
Width of handlebar mm (in)	600 (23.6)			690 (26.8)	548 (21.6)
Width of US handlebar version mm (in)	680 (26.8)			690 (26.8)	548 (21.6)
Handlebar tube diameter mm (in)	22 (0.87)				
Steering damper (R 100 RS)	hydraulic, adjustable in 2 stages				

Tightening torque Nm (lb. ft) + friction value Ncm

Cap nut for telescopic fork	120 . . . 130 Nm (88 . . . 96 lb. ft)
Steering bearing	350 ± 20 Ncm

All remaining screws, bolts and nuts are to be tightened in accordance with the customary values recommended in the manufacturers' tables or in accordance with the latest BMW Standard Specification 60002.0.

11.79 Addition

Trouble-shooting – front forks

Fault	Cause	Remedy
Forks do not compress easily ('stiction') or seize	Forks distorted	Release all bolts at sheet-metal pressing and quick-release axle, and check pressing for distortion; compress the forks fully and tighten bolts to specified torques
Rattling sound when forks are compressed several times in rapid succession	Damping valve touching piston	Insert a rubber washer between these components (see S.I.)

32 Steering

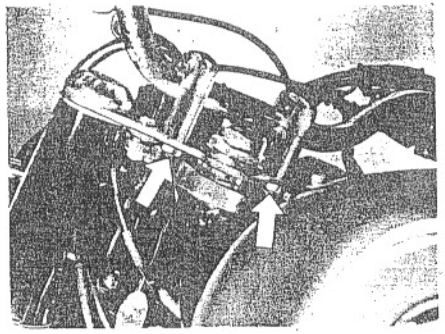
Technical Data . . . . . Page 32– 0/3
Specifications – '79 models 32– 0/4
32 00 454 Steering – adjusting 32–00/1
32 71 000 Handlebars – removing and refitting 32–71/1
32 73 030 Throttle cable – removing and refitting 32–73/1

32 00 454 Steering – adjusting

On the R 100 RS, set the hydraulic steering damper to "0".

Remove the Phillips-head screw from the adjusting grip, pull off the adjusting grip and take off the impact-absorbing pad.

Push integral fairing sealing sleeves down fork tubes.

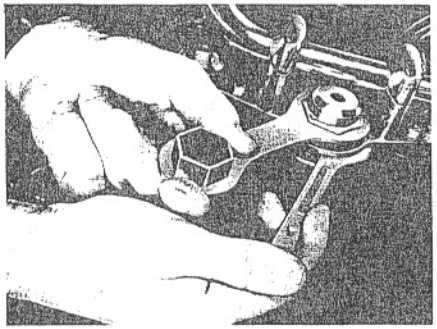


Slacken centering nut and adjust steering play at the slotted nut using special wrench 31 4 870. Relieve stress at bearing by striking centering nut.

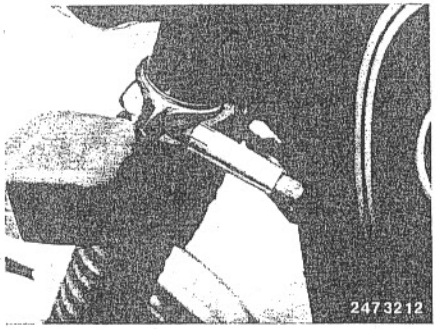
Prevent the slotted nut from moving when tightening the centering nut.

Note when fitting: See Technical Data for tightening torque for the centering nut.

Use special wrench 31 4 850.

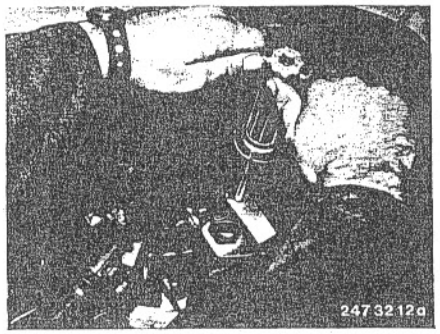


Insert stop between lower fork yoke and front tube of frame to locate front forks at 20° to left.



Place friction gauge with measuring wrench on centering nut and turn to right to move forks back to center from 20° position. The specified friction reading (see Technical Data) must not be exceeded.

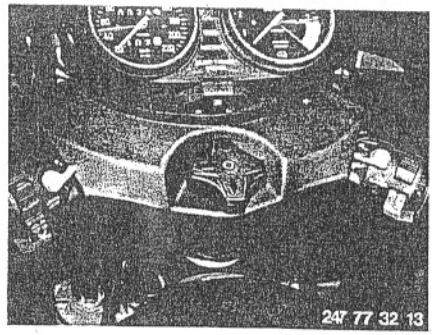
Note:
Make sure that all leads and wire cables are correctly positioned so that the friction reading is not falsified.



32 71 000 Handlebars – removing and refitting

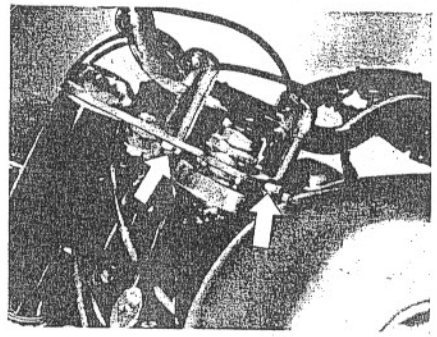
Disconnect the battery earth (ground) lead.

Remove the Phillips-head screw from the star grip and lift off the star grip and impact-absorbing pad.

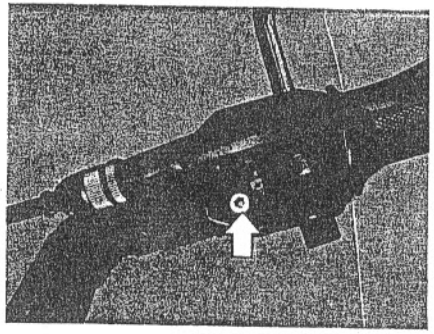


Remove two nuts each with spring washers from the handlebar clamp mounts (arrows).

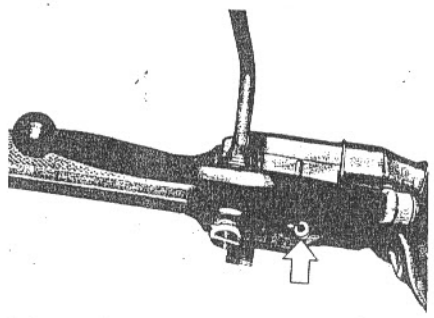
Lay aside the handlebar with instruments and control cables on the tank on a suitable soft underlay.



Unscrew the right-hand hexagonal socket head bolt (arrow) on the housing for throttle twist grip and brake lever and draw off the housing as a complete unit.



Remove left handlebar grip by blowing through handlebar tube from right with compressed air. Unscrew socket head bolt (arrow) from housing and withdraw assembly from handlebar tube.



Final Drive — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Toothing system	Klingelnberg (Palloid) helical				
Number of teeth	10 : 32 **11 : 37	11 : 33	11 : 32	11 : 33	
Transmission ratio	1 : 3,2 **1 : 3,36	1 : 3,0	1 : 2,91	1 : 30	
Special version: Number of teeth	11 : 37	11 : 32	11 : 33	11 : 32	
Special version: Transmission ratio	1 : 3,36	1 : 2,91	1 : 3,0	1 : 2,91	
Type of oil: Initial filling	Brand-name running in hypoid gear oil SAE 90				
After the first oil change, over 5° C (41° F)	Brand-name hypoid gear oil SAE 90				
After the first oil change, below 5° C (41° F)	Brand-name hypoid gear oil SAE 80				
Filling quantity, ltr (Imp pints/US quants)	0.25 (0.44/0.26)				
Tooth backlash, mm (in)	0.15 . . . 0.20 (0.006 . . . 0.008)				
Lateral play in crown wheel	Zero play (without seal)				
Rear wheel suspension	Long swinging arm and spring struts with triple adjustment and double-acting hydraulic shock absorbers.				
Spring travel, mm (in)	125 (4.921)				
Maximum length, mm (in)	316±2 (12.44±0.078)				
Minimum length, mm (in)	216±2 (8.50±0.078)				
Shock absorber test					
Test stroke, mm (in)		25 (0.984)	75 (2.925)	50 (1.950)	
Test speed min^{-1}		100	100	382	
Tension stage, kp (lb)		30±6 (66±13.2)	62±7 (136.4±15.4)	88±10 (176±22)	
Compression stage, kp (lb)		5±3 (11±6.6)	9±3 (19.8±6.6)	28±5 (62±11)	

** version with low-compression engine

Rear Axle — Specifications — '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Bearing spring Fitting length, mm (in)	199.1 (7.838)				
Length relaxed, mm (in)	251 (9.881)				
Spring outer diameter, mm (in)	49.6 (1.952)				
Spring inner diameter, mm (in)	41.8+0.3 (1.645+0.0118)				
Wire thickness, mm (in)	7.5±0.04 (0.2952±0.0015)				
Spring compression at 120.2 mm (4.732 in) spring travel, kp/mm^2	105				
Long swinging arm Type of oil over 5° C (41° F)	Brand-name hypoid gear oil SAE 90				
Type of oil below 5° C (41° F)	Brand-name hypoid gear oil SAE 80				
Filling capacity, ltr (Imp. pints/US quarts)	0.15 (0.26/0.16)				

Tightening torques Nm (ft. lb)

Nut on drive pinion	150+15 (111…11)	Oil drain plug rear wheel drive	23…26 (17.0…19.2)
Threaded ring on drive pinion	100…120 (73.8…88.5)	Oil filler plug on swing arm	14 (10.3)
Oil filler plug on rear wheel drive	28…31 (20.6…22.9)	Oil drain plug on swing arm	14…16 (10.3…11.8)
Bearing bolts on swing arm	10…12 (7.4…8.8)	Nuts on drive housing	18…21 (13.3…15.5)
Shock absorber rod on spring strut eyelet, top	34…39 (25.1…28.8)	Locknut for swing arm bearing bolts	100…120 (73.8…88.5)
		Clamp screw for rear spindle	14…18 (10.3…13.3)

All other bolts, screws and nuts are to be tightened in accordance with the customary values indicated in the manufacturers' tables or according to the latest BMW Standard Specification 60002.0.

Final Drive

Technical Data

Model	R 60/7	R 75/7	R 80.7	R 100/7	R 100 S	R 100 RS
Toothing system	Klingelnberg (Palloid) helical					
Number of teeth	11 : 37 * 9 : 32	10 : 32	10 : 32 ** 11 : 37	11 : 34	11 : 32	11 : 33
Transmission ratio	1 : 3.36 * 1 : 3.56	1 : 3.2	1 : 3.2 ** 1 : 3.36	1 : 3.09	1 : 2.91	1 : 3.0
Special version: Number of teeth		11 : 37	11 : 37	10 : 32	11 : 33	11 : 32
Special version: Transmission ratio		1 : 3.36	1 : 3.36	1 : 3.3	1 : 3.0	1 : 2.91
Type of oil: initial filling	Brand-name running in hypoid gear oil SAE 90					
After the first oil change, over 5° C (41° F)	Brand-name hypoid gear oil SAE 90					
below 5° C (41° F)	Brand-name hypoid gear oil SAE 80					
Filling quantity, ltr (Imp pints)	0.25 (0.44/0.26)					
Tooth backlash, mm(in)	0.15 . . . 0.20 (0.006 . . . 0.008)					
Lateral play in crown wheel	Zero play (without seal)					
Rear wheel suspension	Long swinging arm and spring struts with triple adjustment and double-acting hydraulic shock absorbers.					
Spring travel, mm(in)	125 (4.92)					
Maximum length, mm(in)	316±2 (12.44±0.08)					
Minimum length, mm	216±2 (8.50±0.08)					
Shock absorber test						
Test stroke, mm(in)			25 (0.98)	75 (2.95)	50 (1.97)	
Test speed min^{-1}			100	100	382	
Tension stage, kp (lb)			30±5 (66±11)	58±5 (128±11)	80±10 (176±22)	
Compression stage, kp (lb)			5±3 (11±6.6)	9±3 (19.8±6.6)	28±5 (62±11)	

* 1978 model
** version with low-compression engine

Rear Axle

Technical Data

Model	R 60/7	R 75/7	R 80 7	R 100/7	R 100 S	R 100 RS
Bearing spring Fitting length, mm(in)	199.1 (7.84)					
Length relaxed, mm(in)	251 (9.88)					
Spring outer diameter, mm(in)	49.6 (1.953)					
Spring inner diamster, mm(in)	41.8+0.3 (1.646+0.012)					
Wire thickness, mm(in)	7.5±0.04 (0.2953±0.0016)					
Spring compression at 120.2 mm (4.732 in) spring travel, kp/mm^2	105					
Long swinging arm Type of oil over 5° C (41° F)	Brand-name hypoid gear oil SAE 90					
below 5° C (41° F)	Brand-name hypoid gear oil SAE 80					
Filling capacity, ltr (Imp. pints)	0.15 (0.26/0.16)					

Tightening torques Nm (ft.lb)

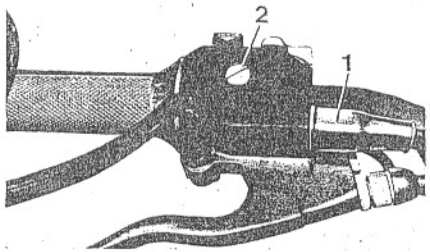
Nut on drive pinion	150 + 15	(111 ... 11)	
Threaded ring on drive pinion	100 . . . 120	(73.8...88.5)	
Oil filler plug on rear wheel drive	28 . . . 31	(20.6...22.9)	
Bearing bolts on swing arm	10 . . . 12	(7.4...8.8)	
Shock absorber rod on spring strut eyelet, top	34 . . . 39	(25.1 . . . 28.8)	
Oil drain plug rear wheel drive	23 . . . 26	(17.0...19.2)	
Oil filler plug on swing arm	14	(10.3)	
Oil drain plug on swing arm	14 . . . 16	(10.3...11.8)	
Nuts on drive housing	18 . . . 21	(13.3...15.5)	
Locknut for swing arm bearing bolts	100 . . . 120	(73.8...88.5)	
Clamp screw for rear spindle	14 . . . 18	(10.3...13.3)	

All other bolts, screws and nuts are to be tightened in accordance with the customary values indicated in the manufacturers' tables or according to the latest BMW Standard Specification 60002.0

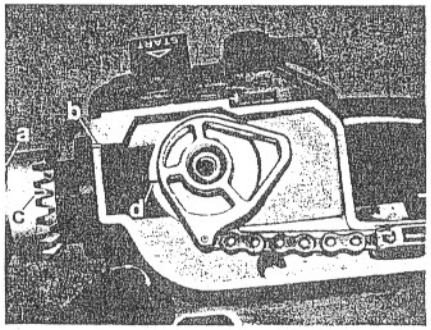
32 73 030 Throttle cable – removing and refitting

Push back the splash guard cap 1 and unscrew cover 2.

Disconnect the throttle cable.



Note when fitting: Before assembly grease the adjusting cam and toothing on the throttle grip. When refitting care must be taken to ensure that slot end "a" in the throttle grip coincides with the rear end of recess "b" in the grip. Thread the lower control cable through the double nipple and fit, together with the tension chain and adjusting cam, in the grip so that the "c" and "d" markings are opposite each other on the cam and the grip. Fit the upper throttle cable in the double nipple. Replace cover and at the same time pull back the upper throttle cable sleeve sufficiently to allow the throttle cable end sleeve to engage in its seat in the cover recess. Screw down the cover and push on the splash guard cap. Only if this procedure is followed the full functional travel of the throttle cables is ensured.

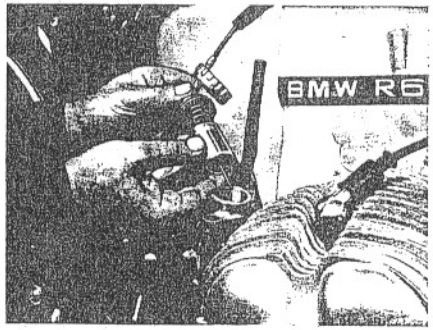


Fuel tank – remove and refit (16 11 030).

R 60/7

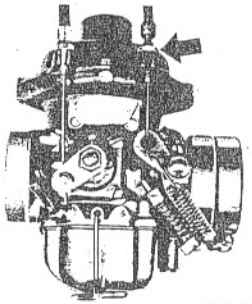
Unscrew the cover from the carburetor housing and remove with spring and throttle valve.

Disconnect the throttle cable.



R 75/7 – R 100 RS

Unscrew Bowden cable adjusting screw (arrow) on the carburetor cover. Disconnect the control cable with nipple at the throttle flap lever.



247 77 32 20

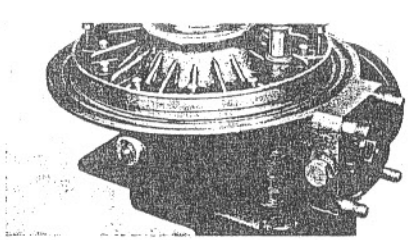
33 Rear axle

Technical Data	Page	33– 0/3
Specifications – '79 models		33– 0/5
33 10 050	Rear wheel drive – removing and refitting	33–10/1
33 10 113	Rear wheel drive – dismantling and assembling	33–10/2
33 12 051	Crown wheel and pinion – renewing	33–12/1
33 17 350	Rear wheel swinging arm – removing and refitting	33–17/1
33 17 381	Taper roller bearing of rear wheel swinging arm – renewing	33–17/2
33 52 120	Spring strut – removing and refitting	33–17/2
33 53 580	Coil spring – removing and refitting	33–17/2
	Trouble-shooting – final drive	33–17/5

47

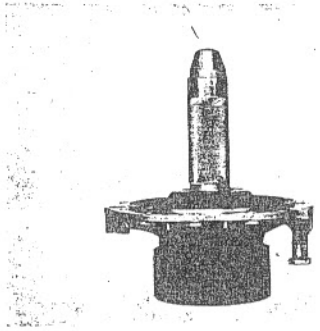
pressed off. Take off the cover, crown wheel with grooved ball bearings and needle bearing inner race together with shim.

Note when fitting: Heat the housing cover to approx. 80° C (175° F).

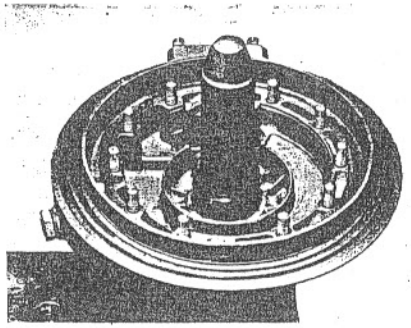


Take the shaft ring seal out of the drive housing cover.

Note when fitting: Fit the new ring seal with BMW tool 33 1 850 and BMW handle 00 5 500.

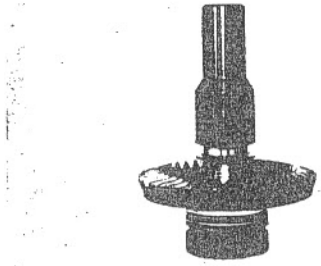


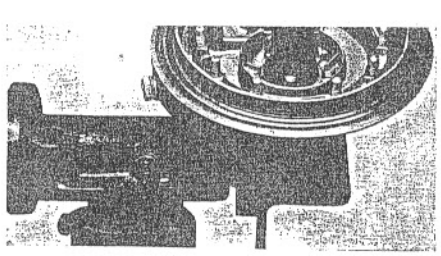
Heat the housing to approx. 100° C (212° F) and pull the needle bearing out of the housing with 2 hooks.
Install the new bearing immediately.



Draw the needle bearing inner race off the crown wheel hub.

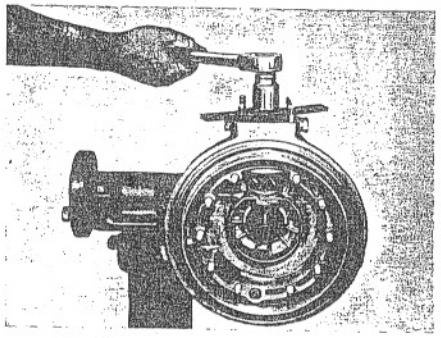
When installing: heat inner race of needle roller bearing to approx. 80° C (176° F).





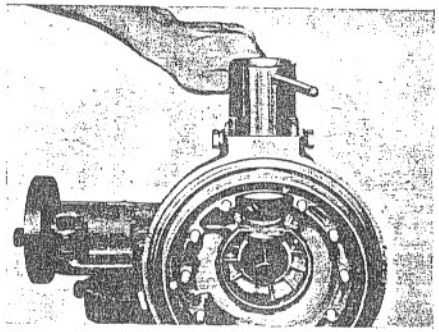
Fit the backplate for pinion BMW No. 33 1 650 on the clutch hub and unscrew the nut from the drive pinion with the socket wrench. Take off nut, washer, plastic ring and clutch hub.

Note when fitting: Secure nut with Loctite 74 red. See Technical Data for tightening torques of nut on drive pinion. Thread must be dry and free of grease.



Unscrew the tapped ring together with the shaft ring seal with socket wrench BMW 33 1 700. Take off the compensator ring and washer.

Note when fitting: Coat both sides of the compensator ring with sealing compound to prevent oil overflowing out of the swinging arm assembly.



Take the shaft ring seal out of the tapped ring.

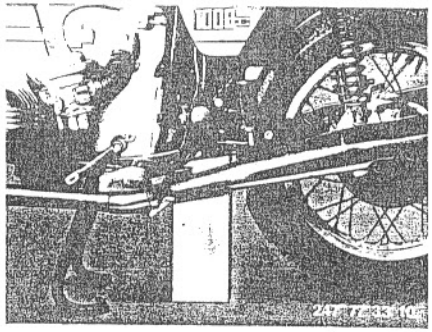
Note when fitting: A new ring seal is fitted with the aid of BMW arbor 33 1 750 and handle 00 5 500.



33 10 050 Rear wheel drive – removing and refitting

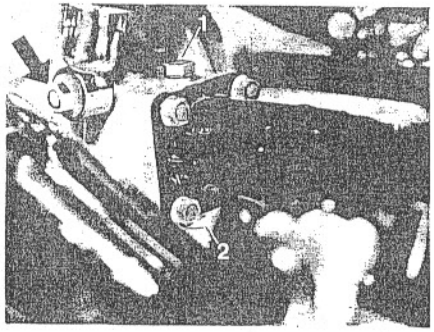
Rear wheel – remove and refit (36 30 320).

Place the machine on its center stand and support with a block below the swing arm bearing so that the rear wheel can turn freely.



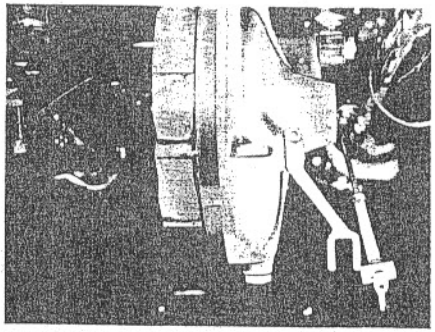
Unscrew the right-hand spring strut fastening bolt (arrow) and lay aside with washer.

Unscrew the drain plug (2) and drain oil from right-hand rear swing arm. For ventilation and to facilitate oil drainage unscrew filler plug (1).



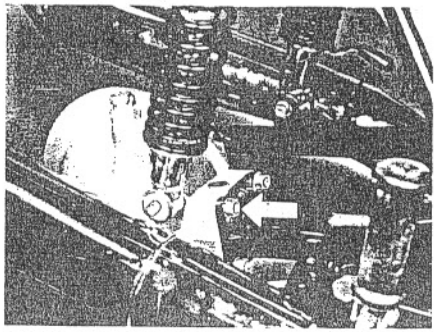
Note when fitting: After reassembly fill with 0.25 liter (0.44 Imp. pint, 0.26 US quart) of oil (see Technical Data for oil type).

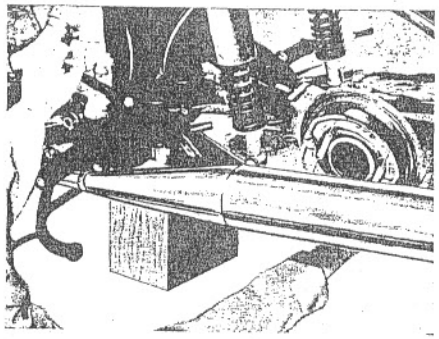
Unscrew the wing nut from the brake linkage, pull the brake arm from the lever bolts, take the hollow bolt out of the lever, fit on brake arm and secure with wing nut.



Loosen the top spring strut fastening bolt and unscrew the four nuts with spring washers from the fastening bolts on the right-hand swing arm.

On assembly these four nuts must only be tightened after the axle has been inserted through the rear wheel drive and axle clamp.





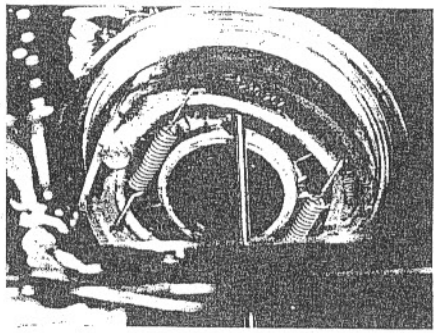
Draw the rear wheel drive off the swing arm and lay aside.

Note when fitting: When fitting the rear wheel drive on the swing arm, engage one of the gears and turn the drive shaft so that toothed coupling is able to mesh.

33 10 113 Rear wheel drive – dismantling and assembling

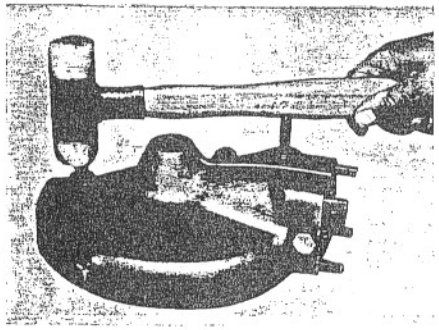
Rear wheel drive – remove and refit (33 10 050).

Note when fitting: After refitting, fill with 0.25 liter (0.44 Imp. pint, 0.26 US quart) of oil as indicated in the Technical Data section.



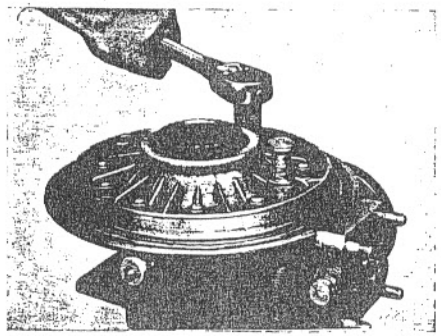
Mark the rear wheel brake shoes in relation to the housing. First use a screwdriver to tilt away from the housing the brake shoe lying against the flattened collar washer of the brake cam, then take off both brake shoes.

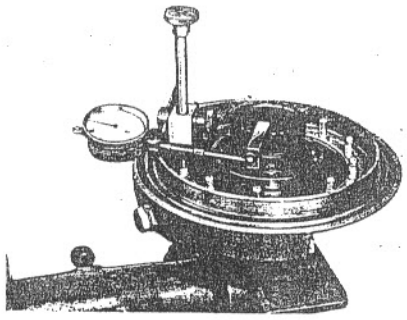
Unscrew the clamp screw from the brake lever and lay aside with toothed washer. Detach brake lever and take out the brake cam.



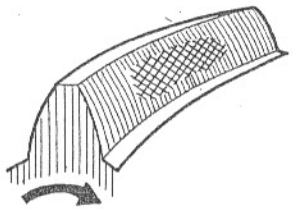
Mount housing with BMW tool 33 1 600 on assembly stand BMW 00 1 500.

Unscrew ten nuts from the rear wheel drive housing cover and lay aside with spring washers.

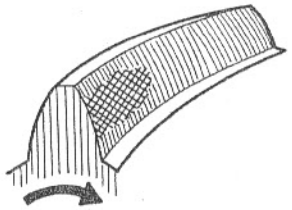




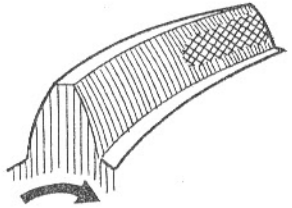
Check the gear mesh and backlash (see Technical Data) around the outer diameter of the crown wheel with a dial gauge and BMW jig 33 1 630 with BMW clamp 00 2 500.



Check the contact pattern on the leading flank of the pinion after applying Prussian blue. A correct contact pattern of the leading flank on the pinion is in the center of the tooth length slightly closer to the thicker end of the tooth.



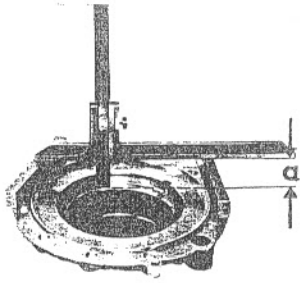
If the contact pattern on the leading flank of the pinion is at the thicker end of the tooth this indicates that the pinion must be spaced further from the crown wheel center by the use of thicker shims and the tooth backlash will have to be corrected by fitting a thinner bronze shim between the needle bearing inner race and the needle bearing outer race on the crown wheel.



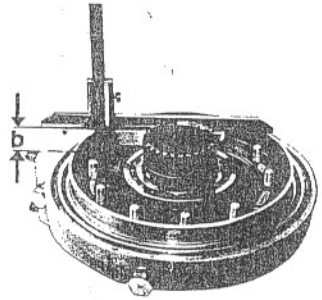
If the contact pattern lies at the thinner end of the tooth the pinion spacing from the crown wheel center will have to be reduced by the use of thinner shims at the ball-bearing outer race and the tooth backlash corrected by a thicker bronze shim at the needle bearing.

The tooth contact pattern must then be checked once again. Owing to pressure on the bearings the pinion should be removed and refitted only after the housing has been heated.

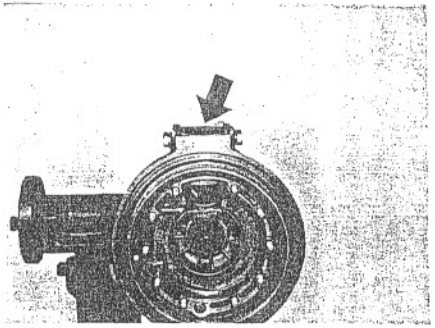
Now adjust crown wheel lateral play. For this purpose use a depth gauge and any intermediate measuring aids which may be required to measure the distance (a) between the grooved ball-bearing seating base and the cover contact surfaces.



On the rear wheel drive housing, without a gasket on the contact surface, measure the distance (b) of the grooved ball-bearing on the crown wheel to the contact surface. Play can be eliminated by fitting an appropriate number of shims between the grooved ball-bearing and the seating base in the cover. The required shim thickness is obtained by deducting dimension (b) from dimension (a), less 0.1 mm (0.004 in). The required play is obtained after fitting the gasket; the crown wheel must not be under pressure.



Heat housing to approx. 120° C (248° F) – use 'Thermochrom' pin – and remove pinion with angular-contact ball bearing.

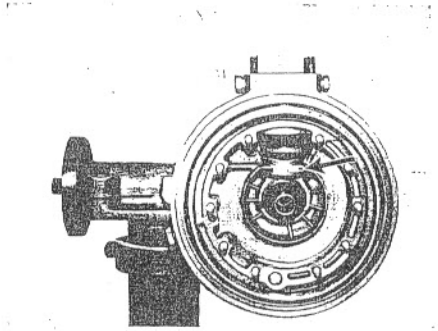


Replace pinion needle bearing in rear wheel drive housing.

Loosen screw (arrow) and remove.

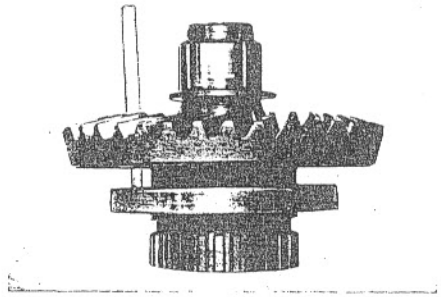
Heat housing to approx. 100° C (212° F) and extract pinion needle bearing with Kukko internal extractor No. 21/3.

When installing: heat housing to approx. 100° C (212° F) and drive in pinion needle bearing with a suitable arbor.



Use a soft metal rod to tap out the grooved ball-bearing uniformly at the crown wheel through the bores provided for that purpose.

Note when fitting: Heat the grooved ball-bearing to approx. 100° C (212° F).

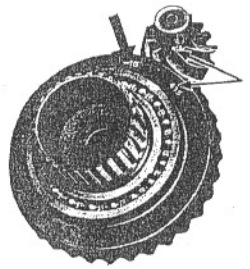


33 12 051 Crown wheel and pinion – renewing

Rear wheel drive – dismantle and re-assemble (33 10 113).

The crown wheel and pinion must always be used as a mated pair. Note pairing number (arrow).

The pairing number indicates which pinion belongs to which crown wheel. When testing both parts tolerances were laid down which ensure quiet running and correct backlash when the crown wheel and pinion are fitted..

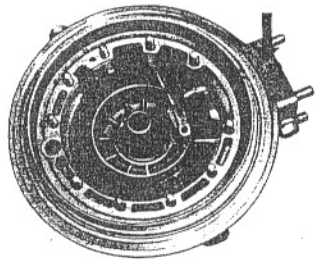


247 77 33 30

The basic housing measurement is 75.5 ± 0.05 mm (2.972 ± 0.002 in), measured from the angular-contact roller bearing shoulder on the pinion to the center of the crown wheel axis.

The basic measurement is not stamped on the housing. If the housing has a different measurement, the two decimal places (of the dimension in millimeters) are stamped on the inside (arrow).

The basic pinion measurement is 77.50 mm (2.972 in). Any deviation from this measurement is shown on the crown wheel as decimals of a millimeter and preceded by a + or – sign (see arrow in upper illustration).

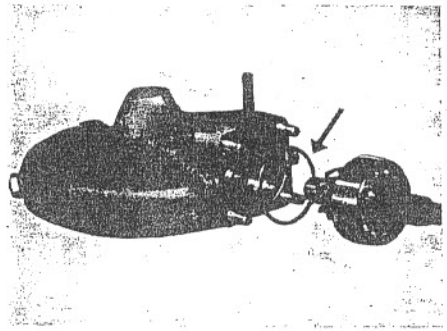


247 77 33 31

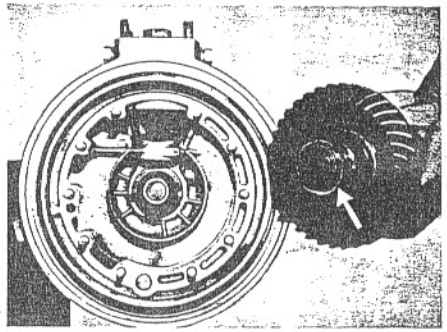
Deduct the housing measurement from the basic pinion measurement, plus or minus the variation shown on the crown wheel. The resulting difference is the thickness of the shim needed (arrow) between the shoulder of the ball thrust bearing and the seat in the housing.

If no variation is shown on the crown wheel and no measurement on the housing, this indicates that the housing and pinion are to the specified dimensions.

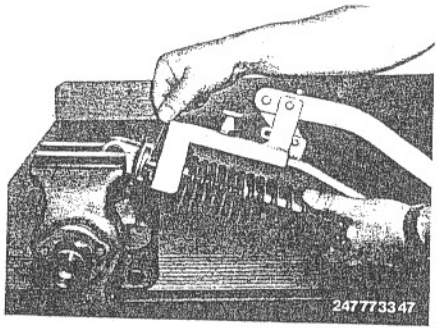
In this case the shim thickness is 77.50 mm –75.50 mm = 2 mm (0.08 in).



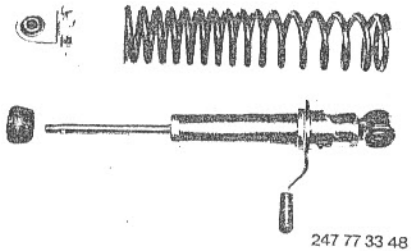
To adjust the gear backlash, a bronze thrust washer (arrow) is to be fitted between the collar of the needle bearing inner race on the crown wheel and the wide contact surface of the needle bearing outer race to allow the actually required thickness of the bronze thrust washer used to ascertain the gear backlash to be determined as described below.



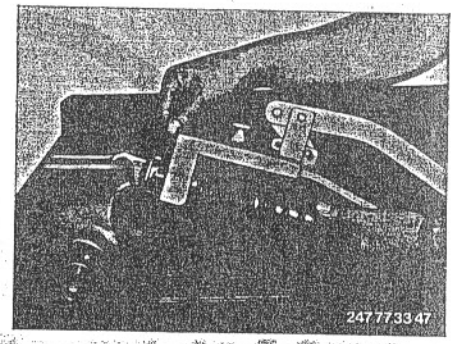
Place the biasing tool plate on the clamp, using the adjuster plate as a reaction stay. Press the lever on the tool down until it is heard to engage. Using an open-ended wrench, unscrew the damper rod from the upper eye. For tightening torque, see Technical Data.



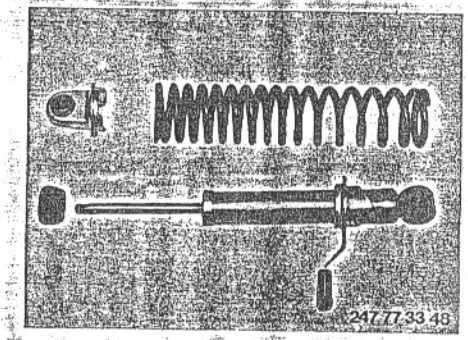
Note when fitting: Note the sequence of parts when assembling. The metal/rubber mount in the spring strut eyelet may be pressed out only where necessary.
Before refitting check the spring length for resiliency of the carrier springs (see Technical Data). The shock absorber must be stiffer under traction and easier under pressure but in both instances always uniform. In compressed end position the shock absorber may not be subjected to more than 500 grammes pressure, as otherwise interior damage could be caused.
If traction and compression require an equally small amount of force or if there is any tendency toward jerky movements this indicates leaks which necessitate replacement of the shock absorber unit.



Place the biasing tool plate on the clamp, using the adjuster plate as a reaction stay. Press the lever on the tool down until it is heard to engage. Using an open-ended wrench, unscrew the damper rod from the upper eye. For tightening torque, see Technical Data.



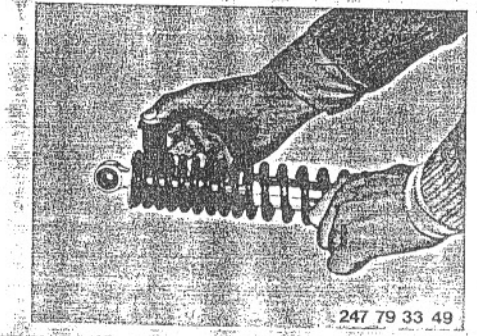
Note when fitting: Note the sequence of parts when assembling. The metal/rubber mount in the spring strut eyelet may be pressed out only where necessary.
Before refitting check the spring length for resiliency of the carrier springs (see Technical Data). The shock absorber must be stiffer under traction and easier under pressure but in both instances always uniform. In compressed end position the shock absorber may not be subjected to more than 500 grammes pressure, as otherwise interior damage could be caused.
If traction and compression require an equally small amount of force or if there is any tendency toward jerky movements this indicates leaks which necessitate replacement of the shock absorber unit.



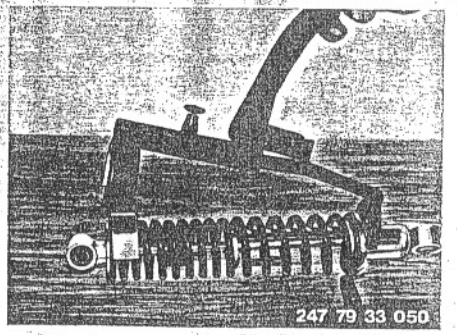
33 53 580 Coil spring – removing and installing (models with spring endplate)

Remove (install) spring-damper strut – 33 52 120.

Place strut on bench and set adjusting plate handle to solo riding position. Insert BMW clamp 33 5 650 at upper end of spring.



Mount tension plate of spring compressing tool on clamp. Use the ride control plate as a support. Press the lever of the special tool down until the catch is heard to engage.



33 17 350 Rear wheel swinging arm – removing and refitting

Rear wheel – remove and refit 36 30 320.

Rear wheel drive – remove and refit 33 10 050.

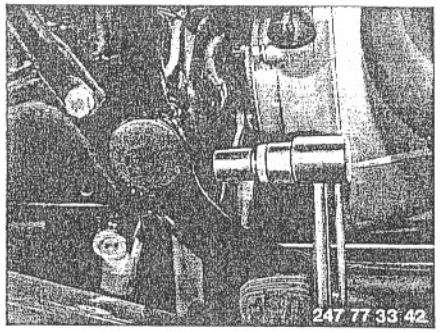
Detach the lower left-hand mounting of the spring strut.

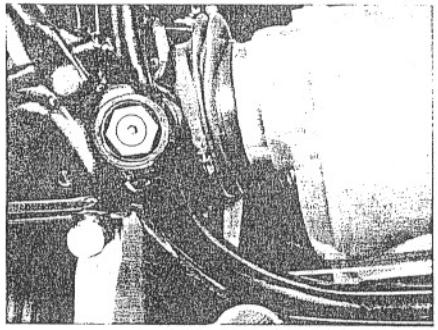
Release the rubber collar between the gearbox and swinging arm on the gearbox side and push back as far as possible. Use a ring spanner to unscrew the four connecting bolts on the universal joint and lay aside with spring washers.
When installing, tighten bolts with special wrench 00 2 560 and torque wrench (see Technical Data for correct torque).

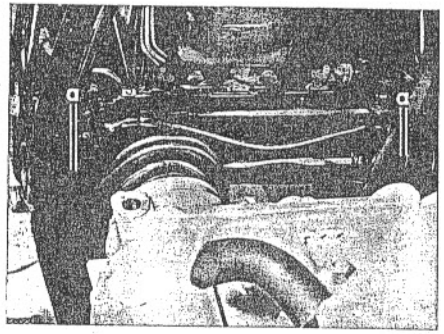
Remove right and left swinging arm bearings. Take off caps and slacken locknut. Screw out the swing bearing journal.

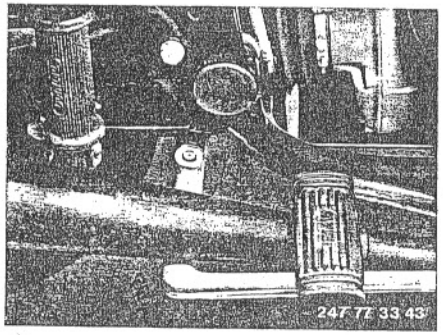
Note when fitting: Screw in the bearing journal so that a uniform distance (a) is provided to the left and right between the swinging arm hub and the frame. At the same time the drive shaft should be centered in the swinging arm tube so that it cannot make contact with full compression and extension. Where necessary the spacings (a) can be set with marginal differences.
In order to obtain the correct bearing preload, tighten both pins to a torque of 20 Nm (14.7 lb. ft), then slacken off again and tighten finally to 10 Nm (7.4 lb. ft). Tighten the hexagon locknut on the pivot pin. For correct torque, see Specifications.
Press in the end cap.

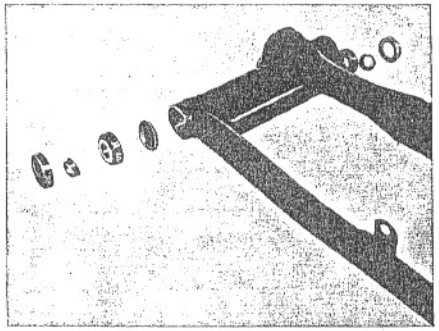
Remove the brake pedal arm, holding the pivot pin to prevent it from moving, and unscrew the locknut.

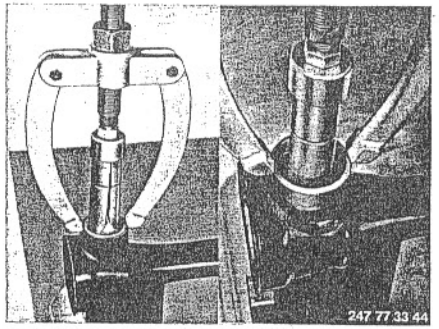


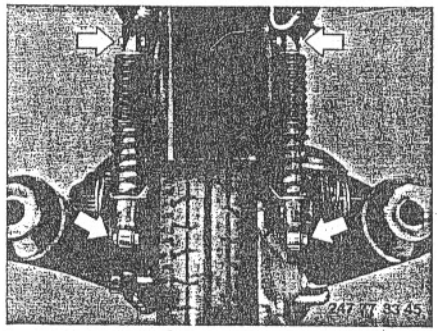


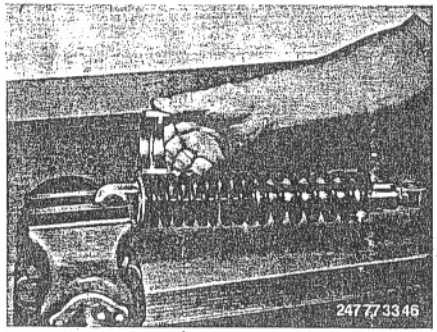












33 17 381 Taper roller bearings of rear wheel swinging arm – renewing

Rear wheel swinging arm – remove and refit (33 17 350).

Drive shaft – remove and refit (26 11 000).

Remove spacing bushing. Pull out sealing ring with Kukko internal puller, BMW No. 00 8 551, and take taper roller bearing inner race out of swinging arm complete with roller cage. Pull out outer race with Kukko tool as above.

Drive in bearing shell with BMW drift 00 5 550.

Note when fitting: When assembling, clean and thoroughly grease the tapered roller bearings.

33 52 120 Spring strut – removing and refitting

Unscrew the hexagonal nuts with washers and take out the top bolt. In the case of the left hand spring strut the machine must be pressed additionally downward before removing the bottom bolt.

33 53 580 Coil spring – removing and refitting (models without spring endplate)

Spring strut – remove and refit (33 52 120).

Clamp the upper fastening lug in a bench vice. Set handle on adjuster plate to "Solo" riding position. Insert BMW 33 5 610 clamp at upper end of spring.

34 Brakes

		Page
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Specifications – '79 models		34– 0/5
34 00 046	Front brake – bleeding	34–00/1
34 00 047	Rear brake – bleeding	34–00/1
34 10 114	Front brake – adjusting	34–00/1
34 11 000	Front brake pads – removing and installing	34–11/1
34 11 020	Swinging caliper – removing and installing	34–11/1
34 21 200	Rear brake pads – removing and installing	34–21/1
34 21 220	Rear brake caliper – removing and installing	34–21/1
34 21 301	Rear brake disc – removing and installing	34–21/2
34 31 000	Front brake master cylinder – removing and installing	34–31/1
34 31 001	Rear brake master cylinder – removing and installing	34–31/1
Trouble-shooting – brakes		34–31/3

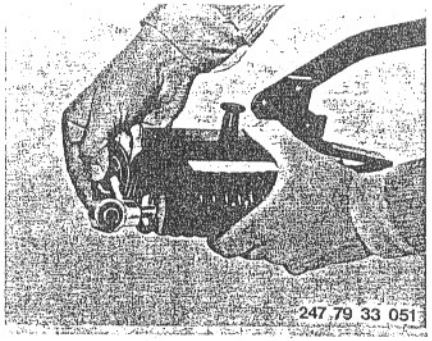
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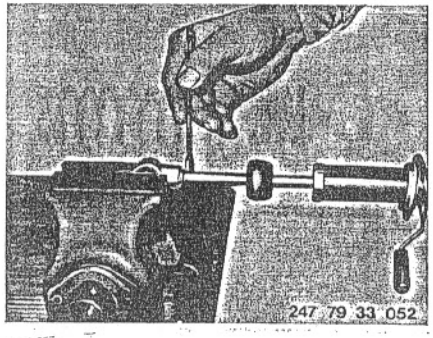
Brakes

Technical Data

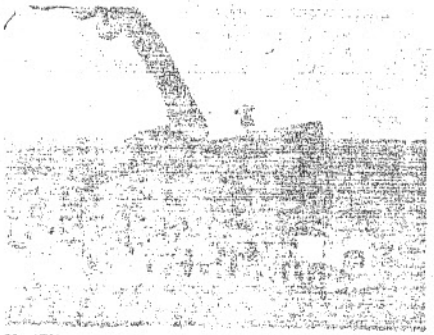
Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Front wheel	Single disc brake			Twin disc brake		
Brake disc dia. mm (in)	264 (10.39)					
Min. brake disc thickness mm (in)	4.6 (0.181)					
Effective rubbed area per disc cm² (in²)	40 (6.2)					
Min. brake pad thickness mm (in)	1.5 (0.06)					
Max permissible brake surface runout in relation to wheel hub mm (in)	0.03 (0.0012)					
Brake master cylinder piston dia. mm (in)	17.46 (0.6874)					
Wheel brake cylinder piston dia. mm (in)	40 (1.57)					
Brake fluid volume in system l (Imp. pint, US quart)	0.06 (0.11, 0.06) 0.07 (0.12, 0.07) *					
Brake disc lateral runout mm (in)	0.1 (0.004)					
Rear wheel	Leading and trailing shoe drum brake					
Brake drum diameter mm (in) Max. brake drum oversize after wear mm (in)	200 (7.87) 201.5 (7.93)					
Brake lining width mm (in)	30 (1.18)					
Effective rubbed area cm² (in²)	214 (33.17)					
Min. brake lining thickness mm (in)	1.5 (0.06)					
Rear wheel						* Disc brake
Brake disc dia. mm (in)						260 (10.24)
Min. brake disc thickness mm (in)						4.6 (0.181)
Effective rubbed area cm² (in²)						37.4 (5.8)
Min. brake pad thickness mm (in)						1.5 (0.06)
Max. braking surface runout in relation to wheel hub mm (in)						0.03 (0.0012)

* on 1978 model









Pull out the spring endplate and release the spring compressing tool.

Note:
Press the spring strut down on to the bench to prevent the spring from flexing as it is compressed, and escaping from the tool.

Clamp the upper spring eye into the vise and unscrew the damper piston rod with an open-end wrench.

Trouble-shooting – final drive

Fault	Cause	Remedy
Noise	Bearing defective	Renew bearing
	Excessive tooth backlash	Reset
	Too much play between coupling hub and shell	Renew
	Oil level in final drive or swinging arm too low	Check and add oil if necessary

34 00 046 Front brake – bleeding

Brake fluid must be renewed annually.

Brake fluid is hygroscopic and therefore absorbs moisture from the atmosphere through the air hole in the reservoir. This reduces the boiling point of the brake fluid from 240° C (465° F) to 160 ... 180° C (320 ... 355° F).

Warning: Do not let the brake fluid come into contact with the motorcycle's paintwork. Brake fluid will destroy the paintwork.

Remove tank and top up brake fluid reservoir.

Mount the bleed hose with trap vessel on the bleed screw.

Apply the handbrake lever several times until the brake pressure is detected.

Hold the lever applied against this pressure and open the bleed screw, at the same time pulling firmly on the lever. Do not release the lever until the bleed screw has been closed.

Repeat this process until brake fluid emerges from the hose into the vessel entirely free of air bubbles. Tighten bleed screw.

Warning: Do not pump the brake fluid reservoir dry or air will penetrate the brake system again.

34 00 047 Rear brake – bleeding

Take off the right battery cover and fill the brake fluid reservoir.

Bleeding procedure as in 34 00 046.

34 10 114 Front brake – adjusting
Handbrake lever – adjusting

If the wire cable has stretched, so that free travel at the handbrake lever is too great, it must be adjusted. This can only be done at the master cylinder after removing the fuel tank. Take off the dust cap and check clearance with a feeler gauge.

To adjust correctly, slacken the locknut for the adjusting screw. Insert the feeler gauge and turn the adjusting screw clockwise to increase clearance or anticlockwise to reduce clearance. The correct setting is when the feeler gauge can just be moved.

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Brake master cylinder piston dia. mm (in)	15.8 (0.622)				
Wheel brake cylinder piston dia. mm (in)	38 (1.496)				
Volume of brake fluid in system l (Imp. pint)	0.6 (1.0998)				
Brake disc runout mm (in)	0.1 (0.004)				
Clearance between piston (brake cyl. and lever mm (in)	1.4–1.5 (0.055...0.059)				
Brake fluid for front and rear disc brakes	ATE 'DOT 4 SL' brake fluid				

	Tightening torques Nm (lb. ft.)
End cap	40...45 (29.5...33.2)
Brake pipe at master cylinder	8+3 (5.9+2.2)
Brake pipe at brake caliper	8+3 (5.9+2.2)

Brakes

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Brake master cylinder piston dia. mm (in)						15.8 (0.622)
Wheel brake cylinder piston dia. mm (in)						38 (1.496)
Volume of brake fluid in system 1 (Imp. pint)						0.6 (1.0559)
Brake disc runout mm (in)						0.1 (0.004)
Clearance between piston (brake cyl.) and lever mm (in)						1.4…1.5 (0.055…0.059)
Brake fluid for front and rear disc brakes	DOT 3					

Tightening torques Nm (lb.ft.)

End cap	40…45 (29.5…33.2)
Brake pipe at master cylinder	8 +3 (5.9 +2.2)
Brake pipe at brake caliper	8 +3 (5.9 +2.2)

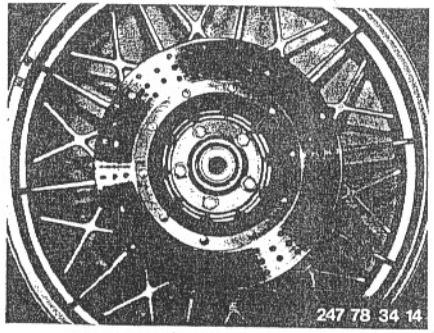
12.77 Alteration

11.78 Addition

Brakes

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Front wheel	Twin disc brake				
Brake disc dia. mm (in)	264 (10.39)				
Min. brake disc thickness mm (in)	4.6 (0.181)				
Effective rubbed area per disc cm^2 (in^2)	40 (6.2)				
Min. brake pad thickness mm (in)	1.5 (0.06)				
Max permissible brake surface runout in relation to wheel hub mm (in)	0.03 (0.0012)				
Brake master cylinder piston dia. mm (in)	17.46 (0.6874)				
Wheel brake cylinder piston dia. mm (in)	40 (1.57)				
Brake fluid volume in system 1 (Imp. pint. US quart)	0.07 (0.12, 0.07)				
Brake disc lateral runout mm (in)	0.1 (0.004)				
Rear wheel	Leading and trailing shoe drum brake				
Brake drum diameter mm (in)	200 (7.87)				
Max. brake drum oversize after wear mm (in)	201.5 (7.93)				
Brake lining width mm (in)	30 (1.18)				
Effective rubbed area cm^2 (in^2)	214 (33.17)				
Min. brake lining thickness mm (in)	1.5 (0.06)				
Rear wheel	Disc brake				
Brake disc dia. mm (in)	260 (10.24)				
Min. brake disc thickness mm (in)	4.6 (0.181)				
Effective rubbed area cm^2 (in^2)	37.4 (5.8)				
Min. brake pad thickness mm (in)	1.5 (0.06)				
Max. braking surface runout in relation to wheel hub mm (in)	0.03 (0.0012)				



34 21 301 Rear brake disc – removing and installing

Remove and install rear brake – 26 30 320.
Remove keepers from hex bolts, unscrew the bolts and take off the brake disc.

When installing: use new keeper plates.

34 31 000 Front brake master cylinder – removing and installing

Detach and attach the fuel tank – 16 11 030.

Bleed the brakes – 34 00 046.

Remove the rubber dust cap.

Disconnect brake cable and remove knurled screw.

Detach brake hose, pull off brake telltale lamp cable and unscrew hose clip.

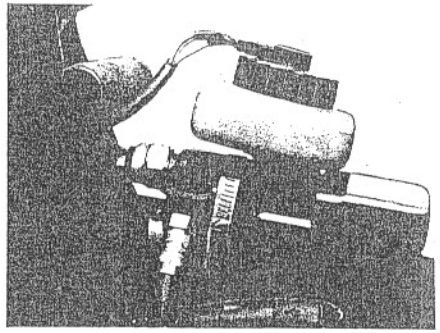
Lift off the brake master cylinder.

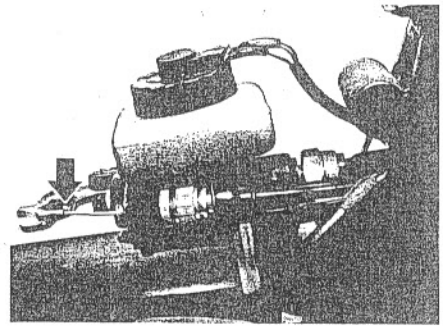
34 31 001 Rear brake master cylinder – removing and installing

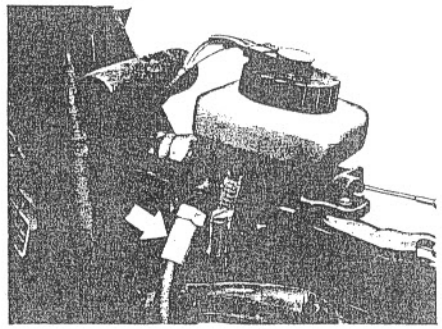
Remove rear wheel – 36 30 320.

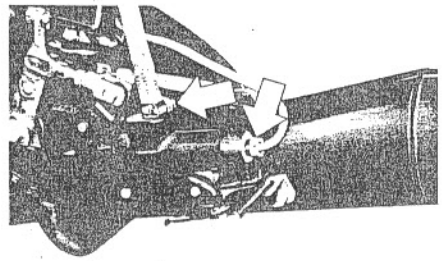
Remove brake pedal lever – 35 21 000.

Detach brake fluid reservoir, drain and detach hose clip at brake cylinder and brake pipe (arrows).





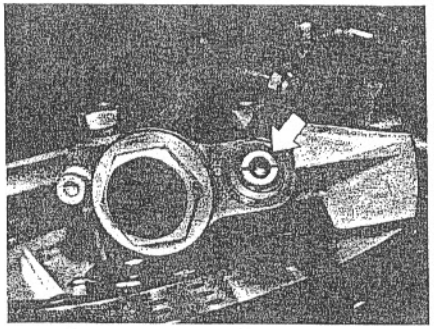




247 78 34 18

To adjust the brake pads, remove the cap over the eccentric pin and unscrew complete with spring. Turn the pin (arrow) with a screwdriver until the inner pad is parallel to the inner face of the brake disc (pull the brake caliper slightly outwards).
Apply one or two heavy marks with a felt-tip pen to the inside of the brake disc (working from the inside to the outside edge). Turn the front wheel and pull the brake caliper outwards. Check the ink marks to ensure that the full area of the inner brake pad is touching the disc. The outer pad, which is operated by the brake cylinder piston, is aligned automatically. Grease the spring, replace the end cap and tighten.

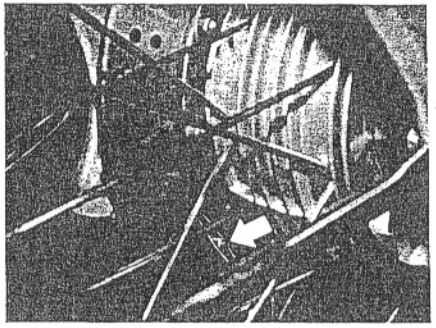
For tightening torques, see Technical Data.



34 11 000 Front brake pads – removing and refitting

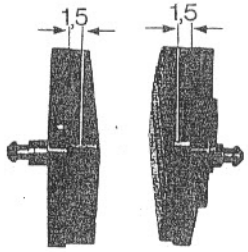
Slacken cap over eccentric pin and remove complete with spring. Insert a suitable screw and pull out the eccentric pin. Remove the swing caliper from the fork tube.

Remove the retaining spring of the inner pad (arrow) and remove both pads from the brake caliper.



To prevent scored brake discs, renew the pads in good time. Minimum thickness 1.5 mm (0.06 in).

Note when fitting: Before inserting the new brake pads push back the brake cylinder piston with a screw clamp. Grease the outer pad guide pin slightly (with Molykote) and mount the O-ring before installing the outer pad. Secure the inner ring with the retaining spring, the angled end of which must face down.



34 11 020 Floating caliper – removing and refitting

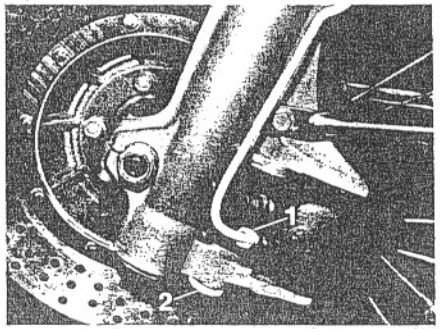
Syphon off the brake fluid from the reservoir, using a tube which must only come into contact with the brake fluid.

Remove brake line screw (1).

Loosen cap (2) and unscrew complete with spring.

Remove eccentric pin with a suitable screwdriver.

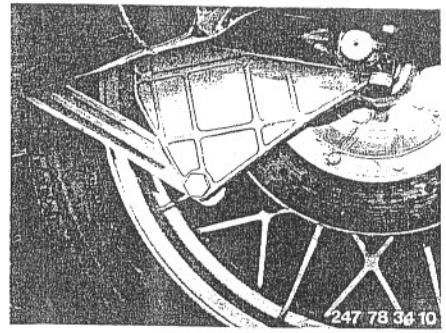
Lay aside floating caliper.



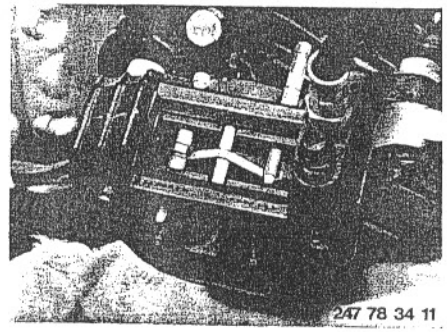
34 21 200 Rear brake pads – removing and installing

Detach support strut from brake carrier, unscrew the quick-release axle nut, slacken the axle clamp bolt and pull out the axle.

Press the brake hose out of the retaining clip on the swinging arm and pull the brake caliper carrier with brake caliper away from the brake disc.

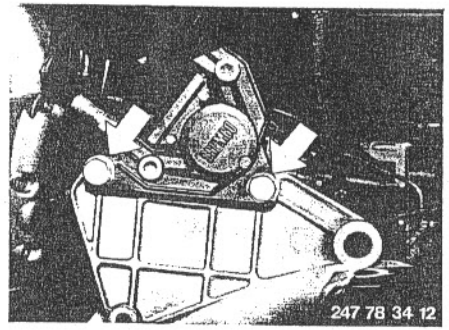


Lift the cover cap off the brake caliper with a screwdriver blade. Drive out the first pad retaining pin with a suitable drift, remove the center clamping pin and drive out the second retaining pin. Allow the brake pads to drop out of the brake caliper.

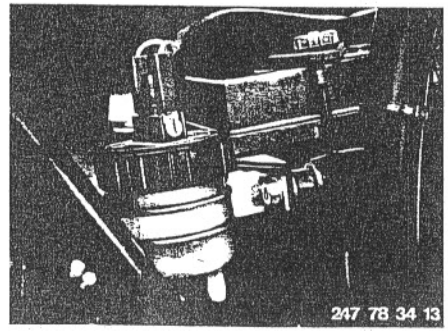


34 21 220 Rear brake caliper – removing and installing

Remove and install the brake pads – 34 21 200.
Remove the two hex bolts on the brake carrier (arrows) and take off the brake caliper.



Take off the right battery cover, drain the rear brake fluid reservoir and detach the brake hose from the brake caliper



35 Foot controls

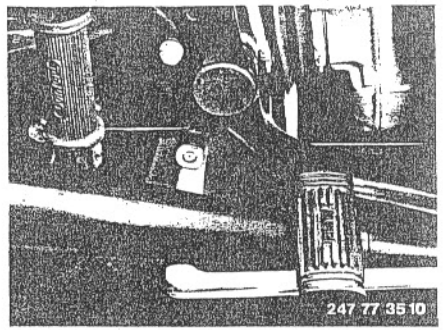
35 21 000 Foot brake lever – removing and refitting . . . . . Page 35–21/1

5|5

35 21 000 Foot brake lever – removing and installing (mechanical brake)

Unscrew locknut while supporting on the bearing bolt.

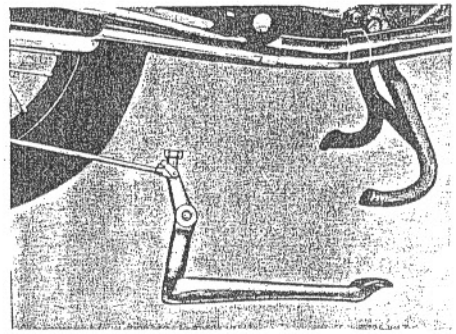
Take off the foot brake lever.



Detach the keeper pin from the brake pull rod and remove the pull rod.

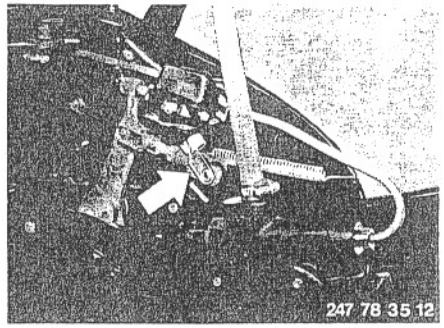
Foot brake adjustment:

Adjust the wing nut at the end of the pull rod until the rear wheel just starts to brake. Turn the wing nut back by 3 to 4 turns.



Removing and installing foot brake lever (hydraulic brake)

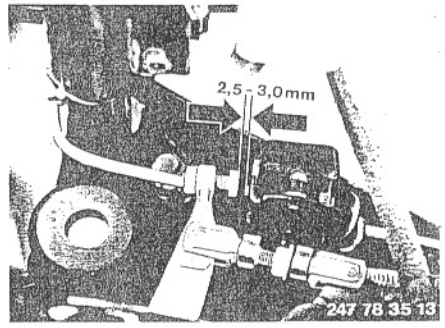
Remove keeper from pull rod (arrow) at brake cylinder and disconnect tension spring. Unscrew locknut from pivot pin and take off foot brake lever.

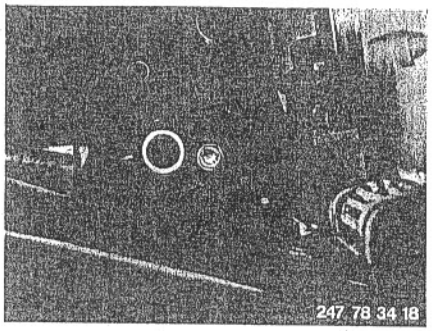


When the pedal is pressed down lightly with a finger, the free travel before the master cylinder operating point is reached will be noticeable.

This free travel measures 2.5 ... 3.0 mm (0.1 ... 0.12 in) between the stop light switch when pressed in and the adjusting bolt.

If necessary, correct free travel.





Detach support for brake master cylinder at frame and remove internal hexagon screw for muffler mount.

Remove brake cylinder retaining bolts at support.

Trouble-shooting – brakes

Fault	Cause	Remedy
Judder at brake lever	Excessive lateral runout at brake disc	Renew brake disc
Poor braking action	Brake pads/linings worn	Renew
	Air in brake circuit	Bleed
	Eccentric adjustment incorrect	Check and adjust if necessary
Effort required at brake lever is too high	No clearance at handbrake lever or master cylinder	Reset

36 Wheels and tires

		Page
Technical Data		36– 0/3
Specifications – '79 models		36– 0/5
36 30 300	Front wheel – removing and refitting	36–30/1
36 30 320	Rear wheel – removing and refitting	36–30/2
36 31 321	Spokes of a road wheel (front or rear) – renewing	36–31/1
36 30 028	Wheels – static balancing	36–31/2
36 31 371	Wheel bearings – renewing (front or rear wheel)	36–31/2

Technical Data

Wheels and tires

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS	
Type of rim	aluminium well base rim						
Rim size, front	1.85 B × 19						
Rim size, rear	2.15 B × 18					Spoked wheel 2.15	Cast alloy wheel 2.50 / 2.75
Number of spokes	40						—
Max. radial run-out, mm(in)	0.5 (0.020) measured at the rim flange without tire						0.3 (0.012)
Max. lateral run-out, mm(in)	0.3 (0.012) measured at the rim flange without tire						0.3 (0.012)
Tire size, front	3.25 S 19			3.25 H 19			
Tire size, rear	4.00 S 18			4.00 H 18			
Max. tire imbalance measured at the inner rim diameter, cmp equivalent to g(oz)	170 8–9 (0.28—0.32)						
Max. permissible run-out of side groove mm(in)	1.7 (0.067)						
Tire pressures: Front wheel solo / above 160 km/h (100 mile/h) lb/in² (bar)	27 (1.9) / 30 (2.1)						
with pillion passenger / above 160 km/h lb/in² (bar)	30 (2.1) / 30 (2.1)						
Rear wheel solo / above 160 km/h (100 mile/h) lb/in² (bar)	28.5 (2.0) / 31 (2.2)						
with pillion passenger / above 160 km/h (100 mile/h) lb/in² (bar)	31 (2.2) / 33 (2.3)						
Travelling at max. speed over long period lb/in² (bar)	2.9 more (0.2)						
Wheel bearing grease	Brand-name multi-purpose grease with 180° C (355° F) drip point (approx.)						
Quantity of grease per wheel, g(oz)	10 (0.3)						

Specifications – '79 models

Wheels and tires

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Permissible wheel load solo front with 27 psi (1.9 bar) kg (lb) rear with 28.5 psi (2,0 bar) kg (lb)	160 (353) 245 (540)				
Permissible wheel load with pillion passenger front with 28.5 psi (2.0 bar) kg (lb) rear with 32.0 psi (2.25 bar) kg (lb)	178 (392) 270 (595)				

Tightening torques Nm (ft. lb) and friction values Ncm

Friction moment of wheel bearing with stipulated tightening torque of axle nut	Ncm	15...30
Quick release axle front and rear	Nm (lb. ft)	45...50 (33.2...36.8)

All other screws and nuts in accordance with the standard values in the tables of the manufacturers or the new BMW Standards Sheet 60002.0

36 30 300 Front wheel – removing and refitting

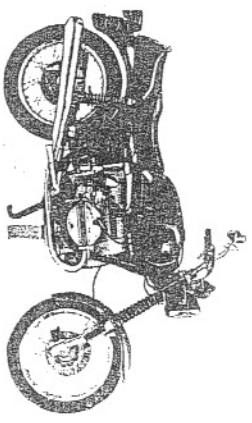
Put the motorcycle on its center stand and support it at the oil sump.

Remove axle nut (1) and washer, loosen the clamp screws (2) of the front axle (hexagonal socket head bolt) with spring washer and withdraw front axle (3) with a drift.

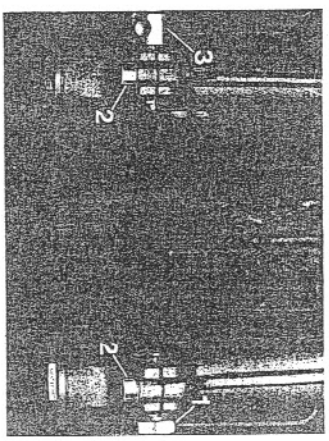
Note when fitting: When refitting the lightly greased front axle, first tighten the axle nut (if necessary with the aid of an arbor). Vigorously push the fork down through the spring range several times and then tighten the clamp screws. In this way distortion of the fork sliding tube is avoided.

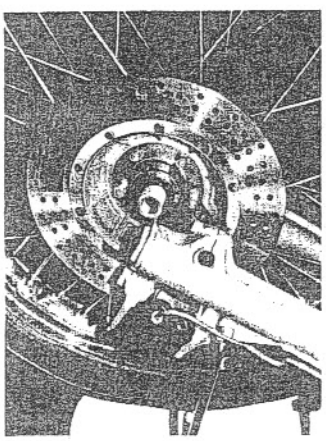
The direction of rotation of the wheel should not be changed on the R 100 S and R 100 RS models (twin disc brake) otherwise the floating calipers would have to be readjusted.

Withdraw front wheel forwards.



247 77 36 10





Wheels and tires

Technical Data

Model	R 60/7	R 75/7	R 80 7	R 100/7	R 100 S	R 100 RS
Permissible wheel load solo front with 27 psi (1.9 bar) kg(lb) rear with 28.5 psi (2.0 bar) kg(lb)	160 (353) 245 (540)					
Permissible wheel load with pillion passenger front with 28.5 psi (2.0 bar) kg(lb) rear with 32.0 psi (2.25 bar) kg(lb)	178 (392) 270 (595)					

Tightening torques Nm (ft.lb) and friction values Ncm

Friction moment of wheel bearing with stipulated tightening torque of axle nut	Ncm	15 . . . 30
Quick release axle front and rear	Nm (lb. ft)	45...50 (33.2...36.8)

All other screws and nuts in accordance with the standard values in the tables of the manufacturers or the new BMW Standards Sheet 60002.0

12.77 Alteration

11.78 Addition

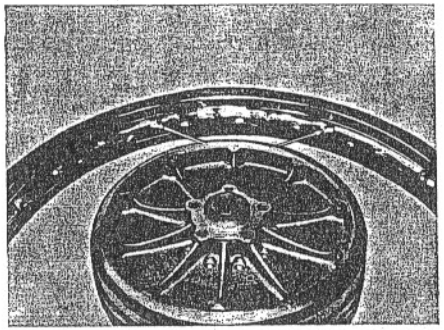
Wheels and tires

Specifications – '79 models

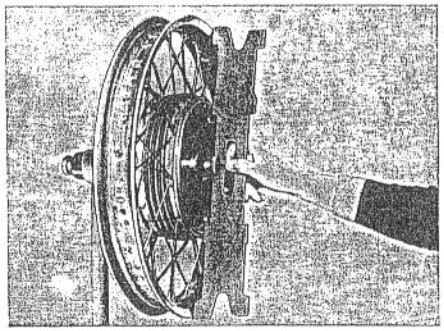
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Type of rim	Light alloy pressure-cast wheels				
Rim size, front	1.85 B × 19				
Rim size, rear	2.50 B × 18		2.75 C × 18		
Max. radial run-out, mm (in)	0.9 (0.035) measurd at the rim flange without tire				
Max. lateral run-out, mm (in)	0.5 (0.019) measured at the rim flange without tire				
Tire size, front	3.25 S 19		3.25 H 19		
Tire size, rear	4.00 S 18		4.00 H 18		
Max. tire imbalance measured at the inner rim diameter, cmp equivalent to g(oz)	170 8–9 (0.28–0.32)				
Max. permissible run-out of side groove mm (in)	1.7 (0.067)				
Tire pressures: Front wheel solo/above 160 km/h (100 mile/h) lb/in² (bar)	27 (1.9) / 30 (2.1)				
with pillion passenger/above 160 km/h lb/in² (bar)	30 (2.1) / 30 (2.1)				
Rear wheel solo/above 160 km/h (100 mile/h) lb/in² (bar)	28.5 (2.0) / 31 (2.2)				
with pillion passenger/above 160 km/h (100 mile/h) lb/in² (bar)	31 (2.2) / 33 (2.3)				
Travelling at max. speed over long period lb/in² (bar)	2.9 more (0.2)				
Wheel bearing grease	Brand-name multi-purpose grease with 180° C (355° F) drip point (approx.)				
Quantity of grease per wheel, g(oz)	10 (0.3)				

36 31 321 Spokes of a road wheel (front or rear) – renewing

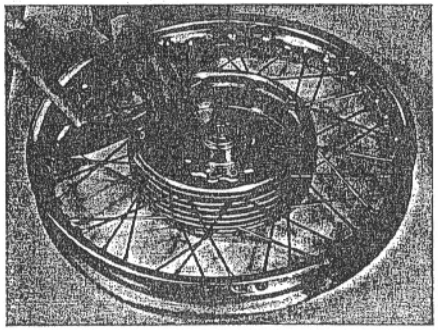
Front wheel – remove and refit (36 30 300),
or rear wheel – remove and refit (36 30 320).
The motor cycles R 60/7, R 75/7, R 80/7, R 100/7 and R 100 S have aluminium rims as standard equipment. See Technical Data section for dimensions. The combined spoke gauge BMW 36 3 850 is necessary for the rear and front wheels.
The wheel hubs supplied as replacements have an undersize inside diameter which must be turned out to a nominal size of 200 + 0.185 mm (7.874 + 0.007 in) after the spokes have been fitted and the wheel hubs centered. To do this, mount the hub axle center in a lathe and turn the surface as finely as possible. The unavoidable distortion of the wheel hub caused during spoke fitting is corrected in this way. The maximum permissible run-out of the brake surface to wheel hub is 0.02 mm (0.0008 in).
Place wheel hub together with bearings on the work bench with the brake drum side facing downwards.



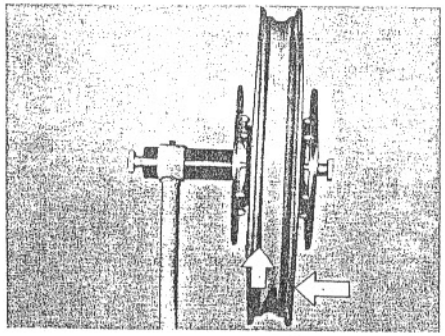
Position the rim in such a way that the stamp mark on the inside of the rim flange is on the brake drum side and the arrow is facing in the normal direction of rotation. The pressed-in nipple locating holes must point exactly in the direction of the spokes inserted in the hub. The higher spoke must coincide with a higher locating hole in the rim and the lower spoke must line up with a correspondingly lower locating hole in the rim. The other spokes are inserted and fitted with nipples in the same way.
Tighten the nipples to a uniform torque reading. Place rim and hub with knockout spindle in BMW jig No. 36 3 600.

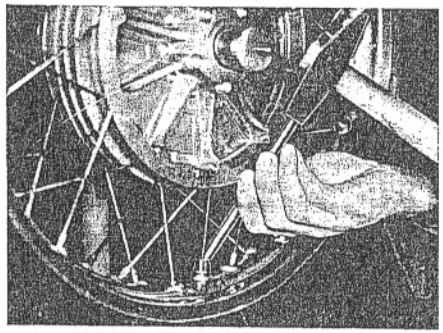


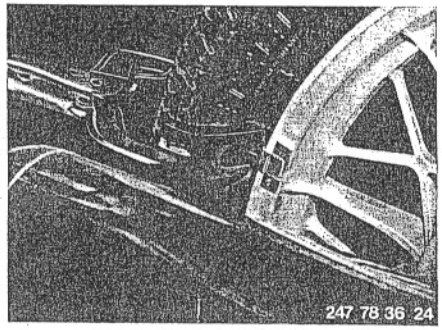
Adjust distance from rim to hub using a spoke fitting gauge positioned on the brake drum side.

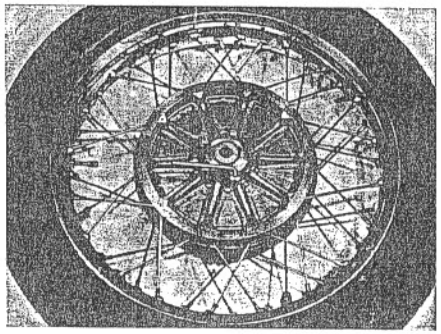


Note when fitting: Bend in the spoke heads with a suitable punch. Remove and refit rear wheel – 36 30 320.









Maximum radial and lateral run-out measured at rim flange (see Technical Data).

Grind off any projecting spoke ends to prevent damage to the inner tube. Re-tension the spokes after the first 1000 km (600 miles). All road wheels must be balanced after the tire has been fitted.

36 30 028 Wheels – static balancing

Mount wheel in BMW 36 3 600 device and tighten – take out the reducing bush on the front wheel for this purpose. Spin wheel and allow it to come to rest. Knock on the balance weights with a hammer on the nipples of the top spokes. A correctly balanced wheel must remain still in every position. See Technical Data for max. imbalance of a road wheel.

On cast alloy wheels the weight are installed with pliers BMW No. 36 3 860.

Bring the pliers as close as possible to the rim, compress and push on the weight retaining clip.

Note: the amount of balancing weight necessary is divided equaly between the left and right sides of the rim at the same point on the rim circumference.

Warning: max. value of balance weight 60 grams.

36 31 371 Wheel bearings – renewing (front or rear wheel)

Spoked rear wheel

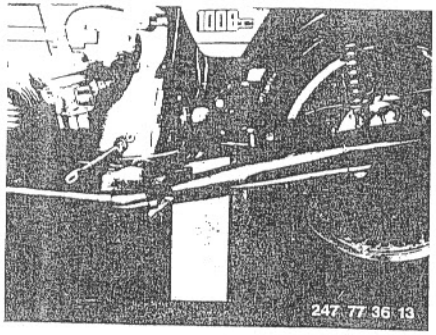
Remove and install rear wheel – 36 30 320.

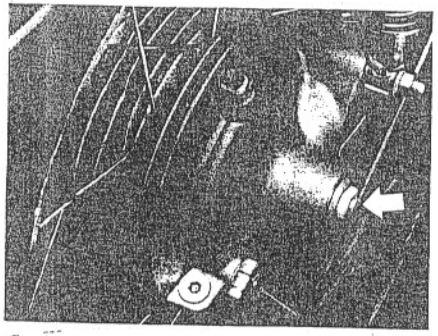
Remove internal hex bolts and place to one side complete wth spring washers.

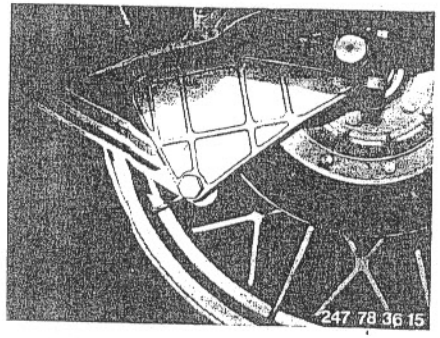
Take off bearing cap with inset lip sealing ring and thrust sleeve.

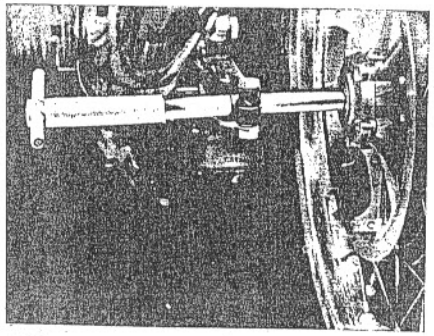
When installing:

Use the stub axle to center the bearing cap.









36 30 320 Rear wheel – removing and refitting

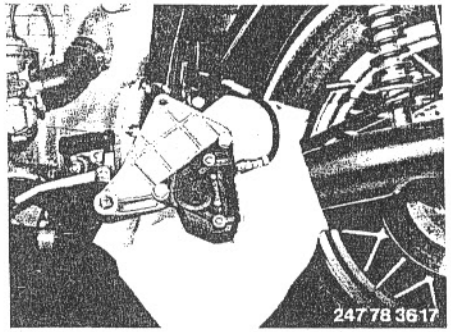
Place the motorcycle on its center stand and provide additional support.

Unscrew quick release axle nut and remove with washer.

Detach strut from brake caliper support and swing down.

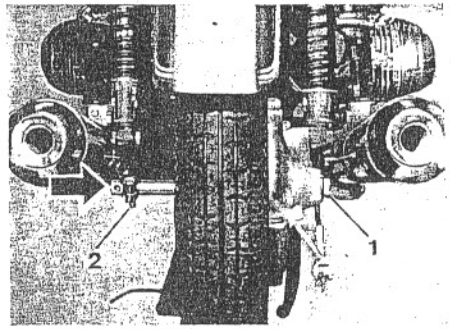
Unscrew quick release axle clamp-screw nut on the left-hand swinging arm and remove including the hexagonal socket head bolt and spring washer. Extract quick release axle with a drift.

Press brake hose out of retaining clip on swinging arm, pull brake caliper and carrier away from brake disc, place on a soft cloth and secure with wire.



Remove rear wheel from drive. When doing this tilt machine slightly to the right.

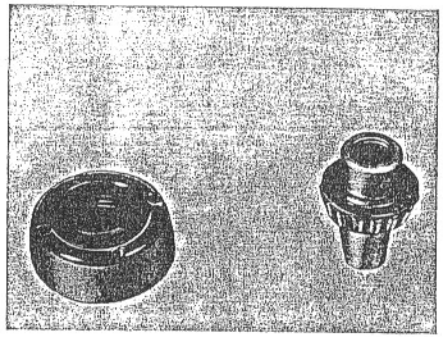
Note when fitting: Thoroughly clean axle and gearing when assembling and lightly coat with a viscous grease. Rotate axle when sliding in. After tightening the axle nut (1) activate the spring action and then tighten the clamp screw (2). The transverse bore in the axle end must point to the rear (arrow).



Press the guide sleeve out of the cap. Push the bearing off the sleeve.

Heat the front wheel hub to 100° C (212° F) and tap out the bearing shells.

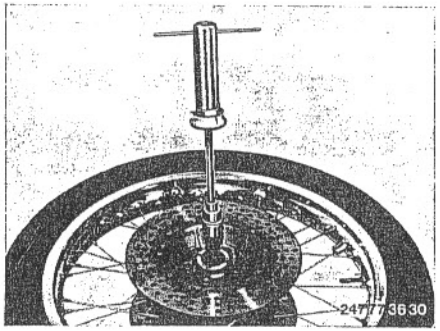
Note when fitting: Heat bearing before pushng it onto the guide sleeve.



Insert the knockout spindle with spacer sleeve (50 mm [2 in]) through the wheel hub and preload with the knockout spindle nut.

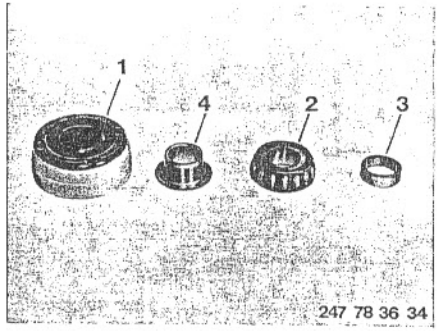
Fit friction gauge with adapter and socket head on spindle nut, and check friction.

See Technical Data for coefficent of friction and tightening torque.



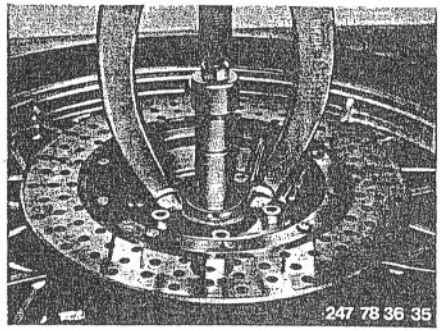
Cast alloy front wheel

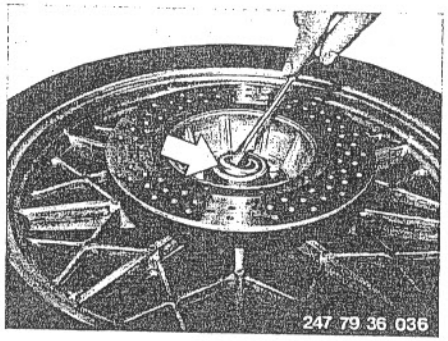
Unscrew end cap (1) with pin wrench and take out taper roller bearing (2). There is a spacing ring (3) on the left (looking forwards). Note thrust sleeve (4).



Extract bearing shells with Kukko puller, BMW No. 00 8 551; heat hub to approx. 100° C (212° F).

To drive in the bearing shell. use BMW drift No. 00 5 550.

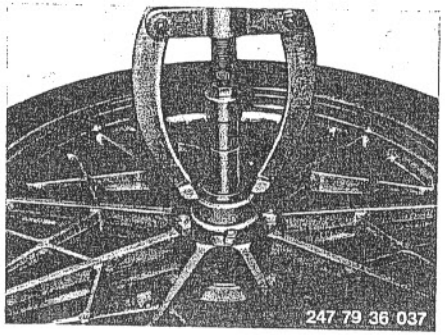




On front cast alloy wheel (without end cap) pull thrust piece through sealing ring, lever out sealing ring with screwdriver and remove taper roller bearing.

When installing:

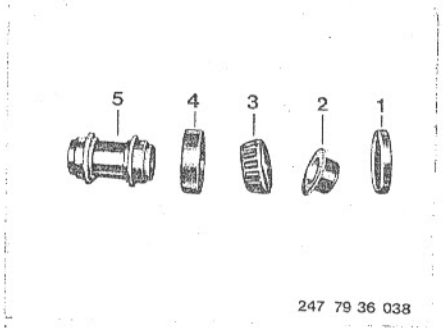
Force sealing ring in flush with BMW arbor 00 8 550.



Remove bearing shell from hub with BMW (Kukko) puller 00 8 551.

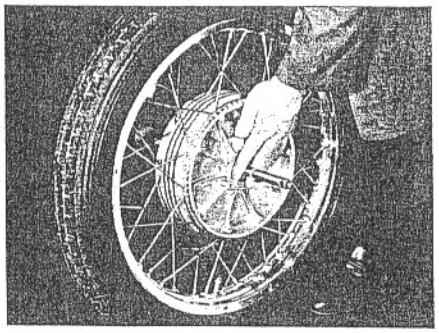
When installing:

Heat hub to app. 80° C (175° F) and drive in with BMW arbor 00 8 550.

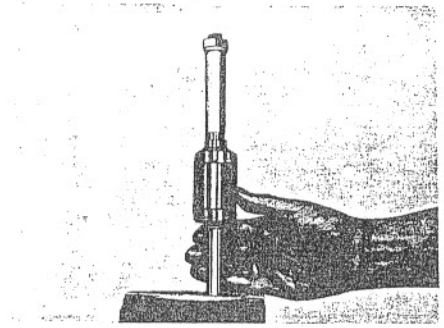


1 Sealing ring
2 Thrust piece
3 Taper roller bearing
4 Bearing shell
5 Spacer

Heat the wheel hub. Insert the rear wheel quick-release axle with reducing bushing into the wheel bearing. Place drilled-out arbor BMW No. 36 3 700 over the axle on the brake side. Hold the hub against the bearing assembly on the left side with one hand. Drive the bearing out of the hub from the brake side by striking lightly.

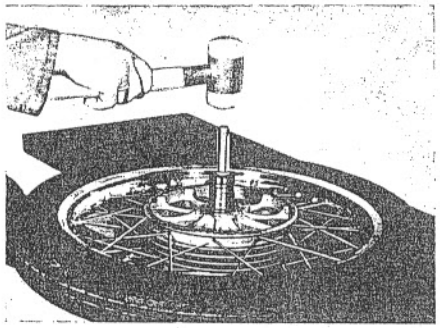


Before refitting the bearings in the hub check whether they are free from play. To do this, clamp the rear wheel knockout spindle with clamping jaws in a vice and fit the complete bearing assembly, consisting of left-hand thrust sleeve, left-hand taper roller bearing, adaptor ring, inner spacer bush, outer spacer bush, right-hand taper roller bearing and right-hand thrust sleeve, over the spindle. Fit adjusting bush and pre-load with nut of knockout spindle.
The correct bearing setting has been reached when the outer spacer bush can be moved backwards and forwards between the two outer races of the taper roller bearings with a sucking action (tight push fit). If this is not the case the adaptor ring should be re-machined or a new ring of appropriate thickness fitted.
See Technical Data for tightening torque of the knockout spindle nut.



Remove adjusting bush; coat the cleaned bearings with grease – see Technical Data.

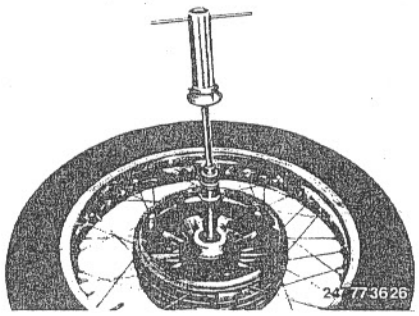
Fit the complete bearing assembly including the thrust sleeves in the wheel hub, which should be heated to 100° C (212° F). Remove knockout spindle and left-hand thrust sleeve. Tighten bearing cap with fitted lipped sealing ring, using the knockout spindle for centering. Fit the left-hand thrust sleeve.

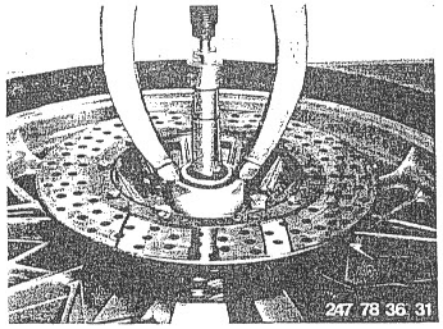


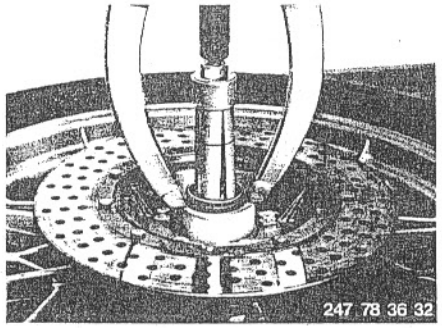
Check bearing setting with friction tester (torsiometer).
To do this, install the knockout spindle in the wheel bearings and preload with spacing sleeve (85 mm 3.35 in) and hex nut.

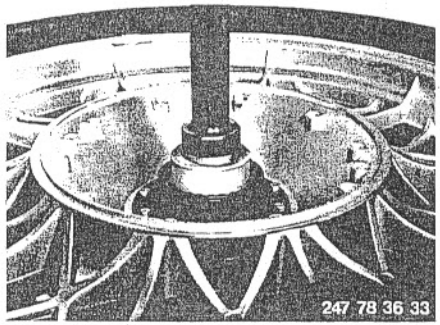
Install friction gauge with adapter and socket head on knockout spindle nut.

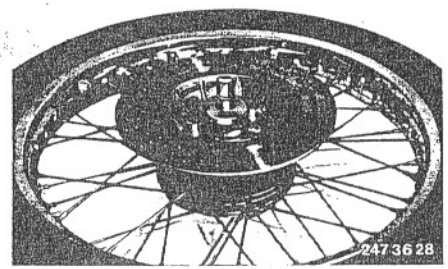
For correct friction value and tightening torque, see Technical Data.











Cast alloy wheel (with disc brake)

Heat the wheel hub to approx. 100° C (212° F).
Remove the thrust sleeve on the brake disc or drive side and extract lip sealing ring with Kukko No. 21/4 internal puller.

Take out the taper roller bearing.

Using Kukko internal puller BMW No. 00 8 551, pull out bearing shell and take out spacing sleeve.

Drive in the bearing shells and sealing rings with BMW drift No. 00 5 550; heat the hub to approx. 100° C (212° F).

The sealing rings must be flush with the upper rim of the hub when driven in.

When installing: install the thrust sleeves after driving in the sealing rings.

Spoked front wheel

Remove and install front wheel – 36 30 300.

Unscrew end cap with BMW pin wrench No. 36 3 350.

46 Frame

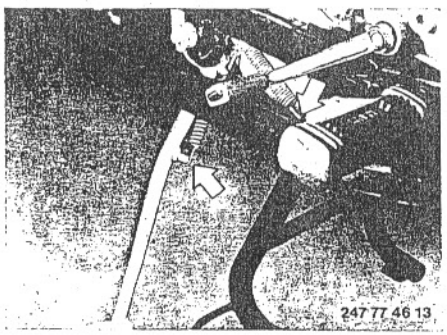
Technical Data		Page 46– 0/3
Specifications – '79 models		46– 0/5
46 52 000	Center stand – removing and refitting	46–52/1
46 53 000	Side stand – removing and refitting	46–52/2
46 61 000	Front mudguard – removing and refitting	46–61/1
46 62 000	Rear mudguard – removing and refitting	46–61/2
46 63 020	Cockpit fairing – removing and installing	46–63/1
46 63 031	Windshield – removing and installing	46–63/1
46 63 031	Windshield for Touring integral fairing – removing and installing	46–63/2
46 63 105	Integral fairing – removing and installing	46–63/3
46 63 106	Touring integral fairing – removing and installing	46–63/5
46 63 120	Side section of fairing – removing and installing	46–63/4
46 63 201	Air plenum chamber – removing and installing	46–63/8
46 63 231	Air outlet – removing and installing	46–63/8
	Trouble-shooting – frame and suspension	46–63/9
51 16 042	Rear-view mirror – removing and installing	51–16/1

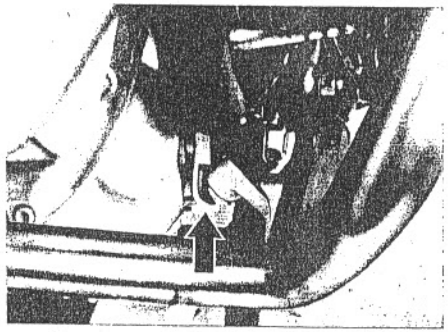
Tightening torques in Nm (lb. ft)

Securing bolts for rear frame section	25 (18.4)	Center stand securing bolts	43 . . . 48 (32 . . . 35)
Securing nuts for upper front wheel mudgard bracket	20 . . . 25 (14.7 . . . 18.4)		

All other nuts and bolts should be tightened to the values given in the tables issued by the manufacturers or the new BMW standards sheet 60002.0.

59





46 53 000 Side stand – removing and refitting

Disconnect springs for side stand and center stand.

On R 100 RS, detach left engine fairing.

Remove left-hand hexagon nut of front engine mounting. Knock through the engine bolt so that the shackle (arrow) can be taken out.

Note when fitting: The shackle should be turned in such a way and secured so that the side stand automatically folds back into the normal position when the motorcycle is brought into the vertical position.

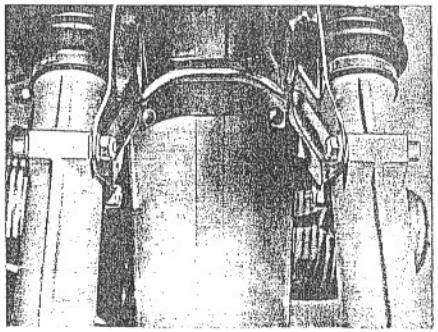
46 61 000 Front mudguard – removing and refitting

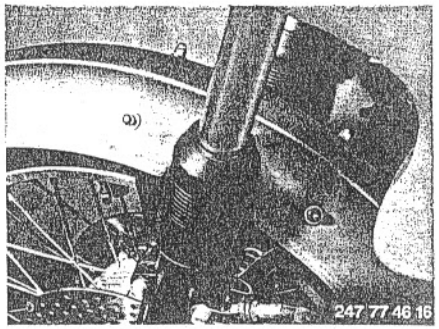
Front wheel – remove (36 30 300).

Remove the 2 hexagonal bolts on both sides of the metal section.

To renew mudguard without metal section, remove the 4 cap nuts at the mudguard.

When installing: do not forget rubber underlay washers.





Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Frame	Double-loop tubular steel frame welded from oval tubes with bolted on rear frame section – not suitable for sidecars –				
Position of factory plate	on steering head, right gusset plate				
Position of frame number	on steering head, right gusset plate				
Motorcycle dimensions and weights Maximum width (engine) mm (in)	746 (29.37)				
Maximum height without mirror mm (in) (Motorcycle unladen)	1080 (42.5)			1210 (47.6)	1310 (51.6)
Saddle height, unladen mm (in)	810 (31.9)			820 (32.3)	
Maximum length mm (in)	2180 (85.8)				
Wheelbase mm (in)	1465 (57.7)				
Max. permissible non-alignment of front and rear wheels mm (in)	4 (0.16)				
Road clearance when loaded with 75 kg (165 lb) driver mm (in)	165 (6.5)				
Empty weigt plus lubricants, without fuel and tools kg (lb)	195 (430)			200 (441)	210 (463)
Empty weight plus lubricants, full tank and tools kg (lb)	215 (474)			220 (485)	230 (507)
Permissible gross weight = empty weight plus rider and passenger and luggage kg (lb)	398 (877)				
Permissible wheel loadings Solo front at 27 psi (1.9 bar) kg (lb) rear at 28.5 psi (2.0 bar) kg (lb)	160 (353) 245 (540)				
Permissible wheel loadings with pillion passenger front at 28.5 psi (2.0 bar) kg (lb) rear at 32 psi (2.25 bar) kg (lb)	178 (392) 270 (595)				
Maximum capacity including rider	2 persons				

11.78 Addition

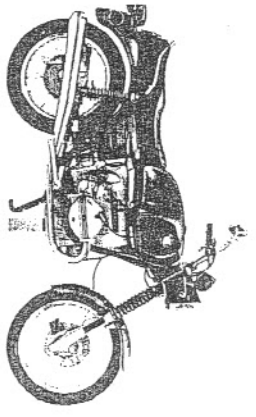
12.77 Alteration

46 52 000 Center stand – removing and refitting

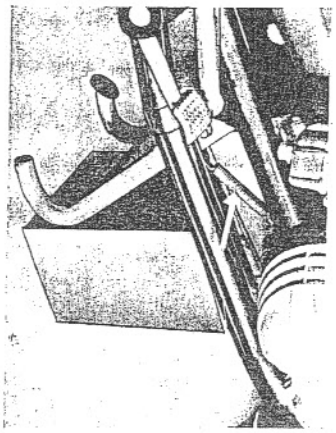
Raise motorcycle under the oil sump so that the center stand hangs free.

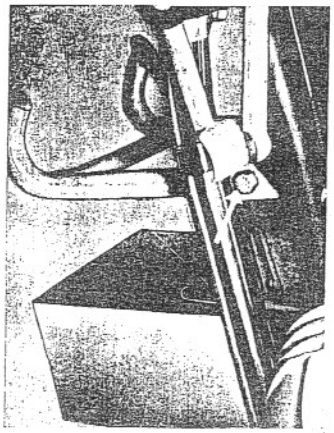
Disconnect springs on the left and right of the center stand.

Unscrew hexagonal head bolt (arrow) on the left and right and withdraw center stand to the rear, paying attention to the spacer washers.



24 77 46 10

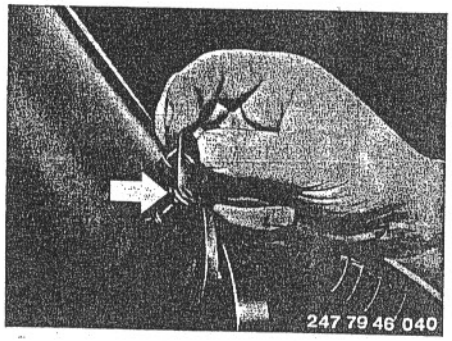






46 63 031 Windshield for 'Touring' integral fairing – removing and installing

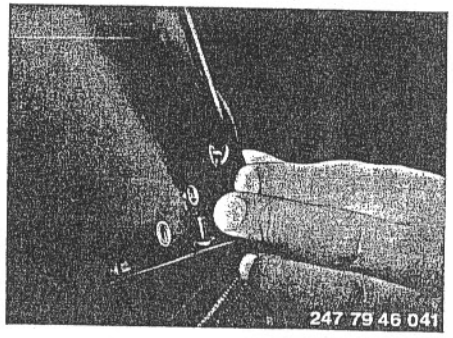
Use a Phillips-head screwdriver to unscrew and remove the left and right locking catches (arrows).



To remove the windshield holder first take off the parking (marker) light, then unscrew the two hex nuts from the inside, push back the rubber and pull out the windshield holder.

When installing:

Note O-rings (arrow) for windshield holder; do not overtighten the hex nuts.



Detach rubber sealing strip from windshield and remove windshield from panelling.



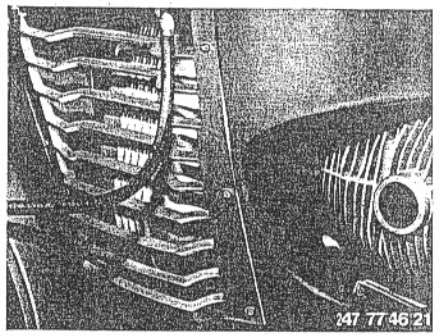
When installing:

Make sure that the plastic guide for the locating rod on the adjusting mechanism is correctly positioned. The thicker end (arrow) must face inwards.

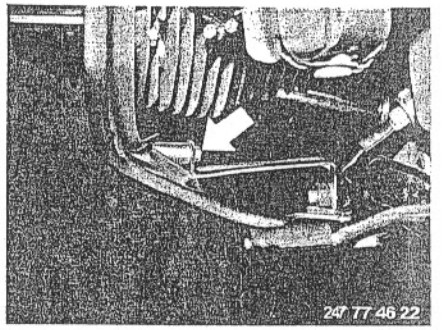
61

46 63 105 Integral fairing – removing and installing

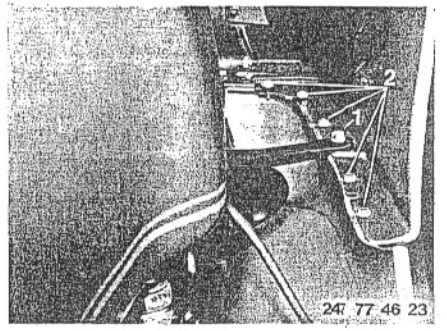
Detach the exhaust system – 18 00 020.
Remove the 9 Phillips-head screws from the center engine fairing, pull it down slightly, press to the rear at the top and remove.



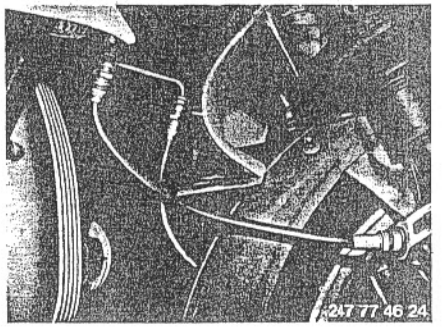
Remove one hex bolt (arrow) from engine fairing holder at left and right.

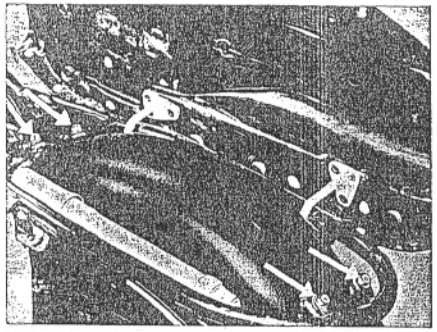


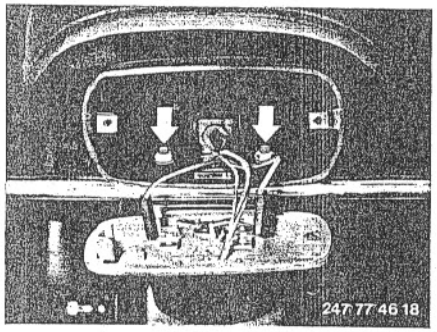
Remove one hex bolt (1) for cross-strut mounting and 5 self-tapping screws (5) from the upper fairing section, and take off the left and right engine fairings.



Pull sleeves out of screen panel, press down both brake lines with rubber sleeves, remove the 7 Phillips-head screws and take off the fairing section.







46 62 000 Rear mudguard – removing and refitting

Disconnect earth (ground) lead from the battery.

Fold up the dual seat, remove the 4 hexagonal bolts with washers, rubber washers and locknuts (arrows).

Remove the two Phillips screws of the rear light and remove the lens with reflector.

Unscrew securing bolts with washers and nuts (arrows) and take off rear light housing with the turn indicator carrier from mudguard.

46 63 020 Cockpit fairing – removing and attaching

Disconnect battery earth (ground) lead. Remove 1 hex bolt at each holder on upper fork bridge.

Remove front turn indicator – 62 23 170.

Tilt the fairing forwards so that headlamp is freed.
Remove right rubber sleeve, carefully pull the cockpit fairing over the right turn indicator and push away from left turn indicator.

Warning: Fairing can break easily if spread too far. Disconnect cables at instrument panel and remove cockpit fairing.

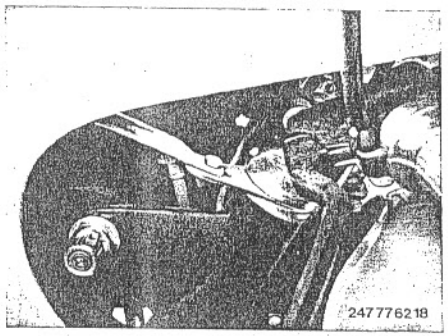
46 63 031 Windshield – removing and installing

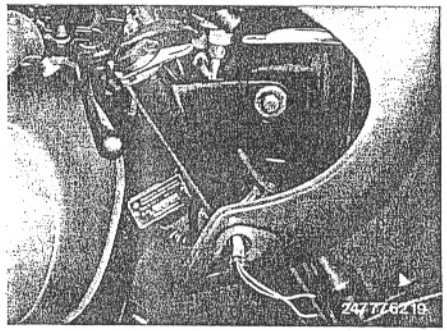
Drive pin out of rivet inwards with a suitable drift.
Pull out the rivet and take off the windshield.

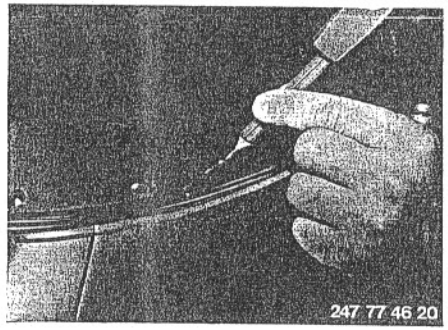
The windshield is attached with BMW rivet insertion tool 00 9 510. Start with the center rivet, then work outwards to left and right. Insert expanding rivet through windshield and force shank through with insertion tool.

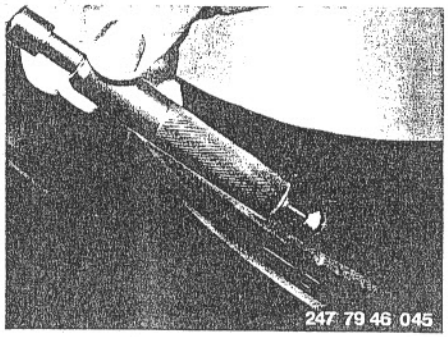
Note:

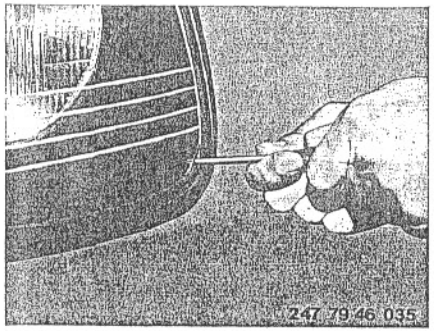
Do not forget the sealing washer.







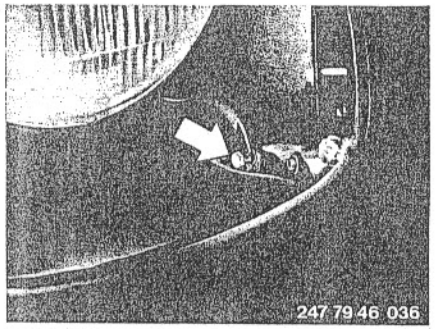




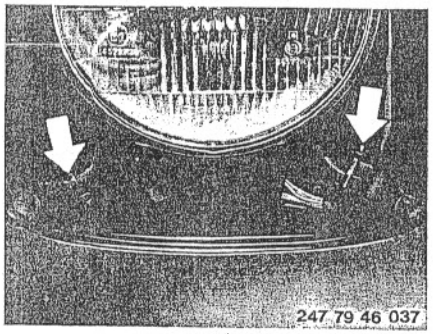
Press away the rubber surround at the corners of the front glass, and remove the Phillips-head screws.

Caution: avoid damage to glass.

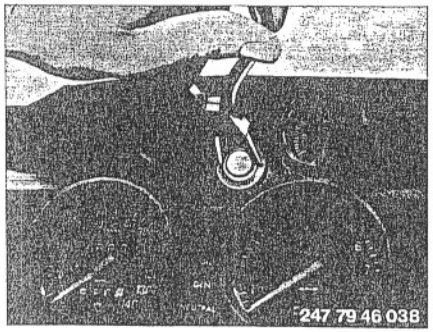
Take off the glass and the light tunnel.



Slacken the 2 hex bolts at the lower left and right of the central mount (arrow).



Separate the 6-pole connecting plug and detach the two cable straps (arrows).



Unscrew circular nut at ignition switch with Seeger circlip pliers and press the ignition switch out of the instrument panel.

Slacken the two hex bolts at the top of the central mount.
Pull the fairing away to the front.

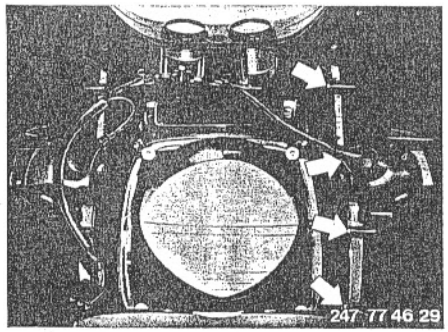
46 63 130 Side section of fairing – removing and installing

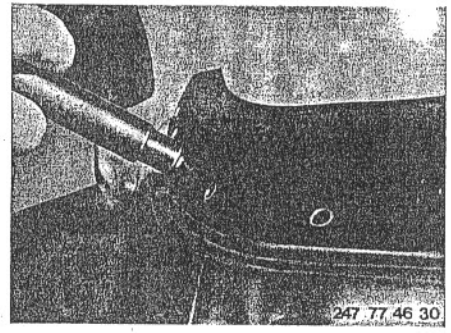
On RS:
Remove integral fairing – 46 63 105.
Detach windshield – 46 63 031.
Remove front flashing turn indicator – 63 13 150.

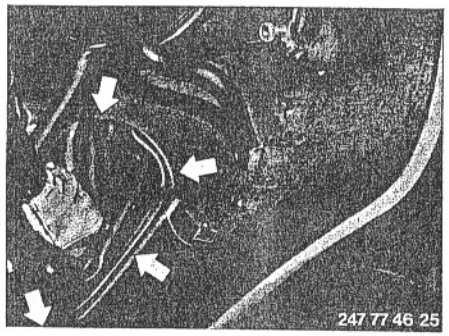
On Touring model:
Remove 'Touring' integral fairing – 46 63 106.
Detach windshield – 46 63 140.
Detach mirror – 52 16 042.
Remove air plenum chamber – 46 63 201.
Remove front flashing turn indicator – 63 13 150.
Place fairing on bench.
Drill out hollow rivets for the length of the section to be replaced, using a power drill. Remove side section retaining screw (arrows) and detach side section.

When installing:

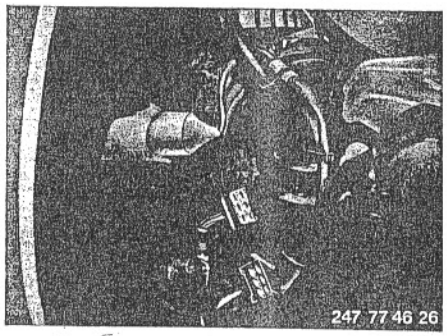
First screw side section to fairing, then rivet instrument panel to side section. Use BMW rivet insertion tool 00 9 500. Insert tubular rivet through panel from the inside, hold block against it and screw head former into block from the outside.



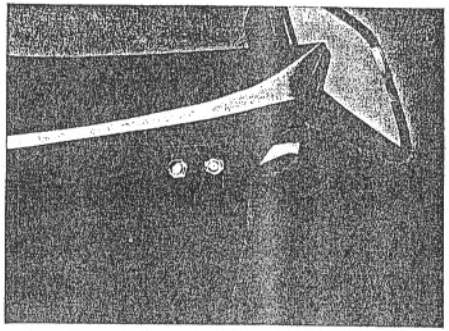




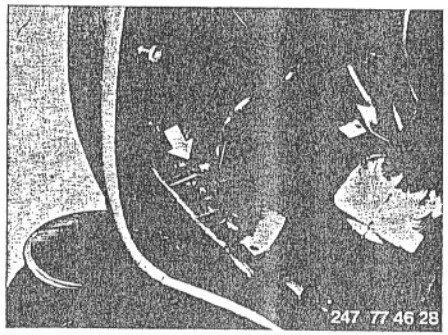
When installing: Secure sleeves with 'Sicomet 8200' adhesive. Apply one drop at isolated points (arrows).



Before removing the fairing cockpit section, disconnect the 6-pin plug and remove the ignition switch from the instrument panel.



Remove the 4 hex nuts from the combined mirror and fairing mounting.



Loosen one hex bolt at the left and right lower fairing mounts (arrow). Grasp the fairing at the front left and right, and pull away forwards.

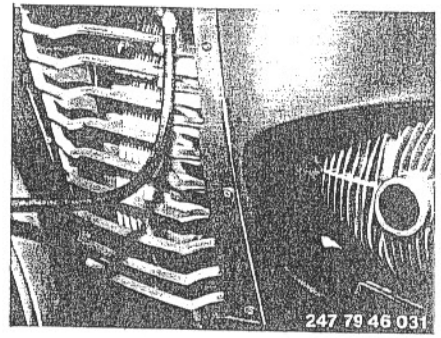
Note:

When installing plastic sections, tighten bolts and nuts carefully, since the threaded bushings can easily be pulled out or sections broken off.

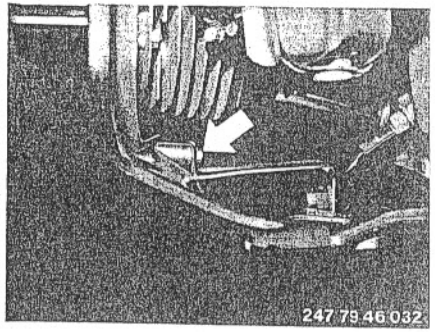
11.78 Alteration

46 63 106 'Touring' integral fairing – removing and installing

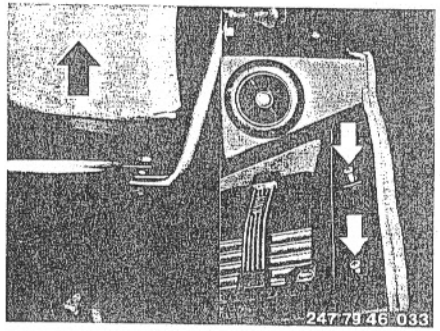
Detach the exhaust system – 18 00 020.
Remove the 9 Phillips-head screws from the center of the engine panelling, pull it down slightly, press to the rear at the top and detach.



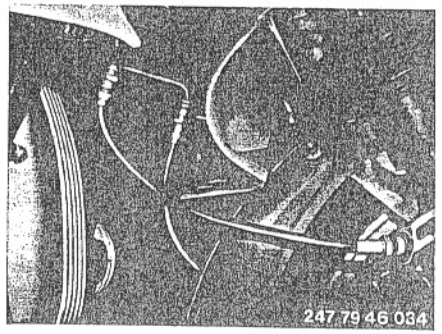
Remove left and right hex bolts (arrow) from engine panelling holders.



Remove hex bolt at each cross-strut fastening and the 3 screws in the air plenum chambers.
Detach the engine panelling at left and right.
To remove the hex bolts raise the plenum chambers slightly after removing the screws for the cover next to the plenum chamber (arrows).



Pull sleeve out of screen panel and press out both brake lines with rubber grommets downwards. Remove the 7 Phillips-head screws and take off the panel.



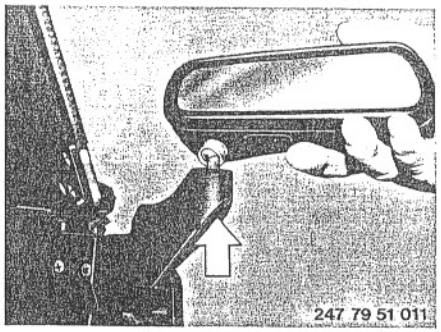
11.78 Addition

51 16 042 Mirror – removing and installing

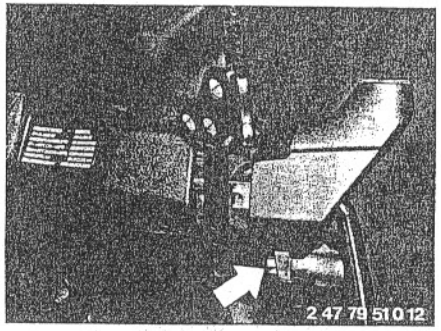
Unscrew hex nut at base of mirror and pull mirror out upwards.

When installing:

Do not forget the spring when assembling the mirror.



To remove the mirror base unscrew the hex bolt (arrow) and take off the base.

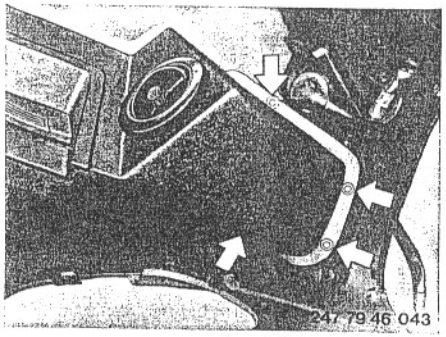


11.78 Addition

52 Seats

52 53 000 Dualseat – removing and installing . . . . . Page 52–53/1

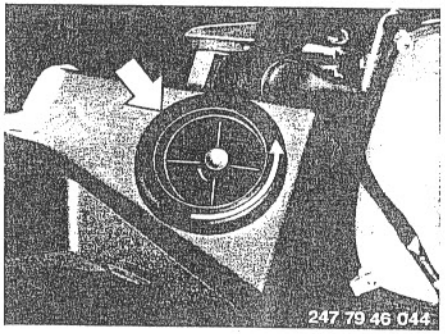
12.77 Alteration



46 63 201 Air plenum chamber – removing and installing

Remove 'Touring' integral fairing – 46 63 106.

Remove the hexagonal screws (arrows) and take off the plenum chamber.



46 63 241 Air outlet – removing and installing

Remove the 'Touring' integral fairing – 46 63 106.

Remove the plenum chamber – 46 63 201.

Remove the front ring (arrow) by hand and take out the air outlet.

Trouble-shooting – frame and suspension

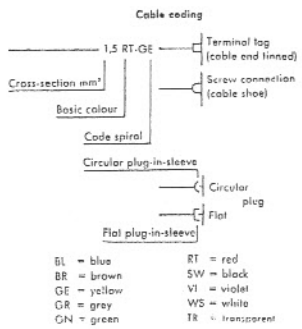
Fault	Cause	Remedy
Telescopic forks sticking	Forks distorted	Unscrew quick-release axle and sheet metal pressing mount Compress forks fully several times Tighten bolts and nuts to correct torques
Unsteady straightline running	Defective steering head bearings	Renew
	Steering head bearings out of adjustment	Reset
	Tire or rim runout	Check vertical and lateral runout and renew affected items
	Defective wheel bearing	Renew or adjust
	Tire of wrong type or make	Renew (use only approved tire)
	Swinging arm bearing preload incorrect	Check setting, correct if necessary
	Defective swinging arm bearing	Renew and adjust
	One damper defective	Check dampers (install only dampers with approximately identical traction and compression stages)
	Track misalignment too great	Check and adjust if necessary (see Specifications)

General Vehicle Electrics

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Horn	Fiamm 410 Hz					410 Hz 510 Hz
Battery (VARTA) Voltage	12					
Capacity Amp/h	28					
Polarity	negative earth (ground)					
Flasher unit (Hella)	T BB 21 1 — 4 · 21 W — 12 V					
Fuses (2)	8 Amp					

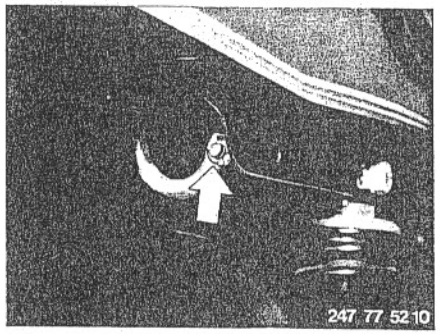
Key to wiring diagram – R 60/7 – R 100 S



1 Turn indicator switch with starter button and emergency cutout
2 Headlight
a) Flasher unit
b) High beam
c) Low beam
d) Parking light
e) Light relay
f) Ignition – light switch
g) Contact plate with fuses
3 Dimmer switch with headlight flasher and horn button
4
5 Front right turn indicator
6 Clutch operated switch
7 Front left turn indicator
8 Horn
9 Hydraulic hand brake switch
10 Combined instrument
a) Speedometer illumination
b) Revolution counter illumination
c) Brake fluid level telltale (red)
d) Neutral indicator (green)
e) Charge indicator (red)
f) Oil pressure telltale (orange)
g) Turn indicator repeater (orange)
h) Headlight high beam indicator (blue)
11 Starter relay
12 Coils
13 Spark plugs with caps
14 Condenser
15 Contact breaker
16 Oil pressure switch
17 Ground (earth)
18 Brake pedal stoplight switch
19 2-pin connection
20 Neutral indicator switch
21 Brake fluid level switch
22 4-pin connection
23 1-pin connection
24 Diode carrier
25 Battery
26 Starter
27 Alternator
28 Voltage regulator
29 Rear right turn indicator
30 Rear light
a) Rear and license plate light
b) Stop light
31 Rear left turn indicator
32 Voltmeter (R 100 S only)
33 Clock (R 100 S only)

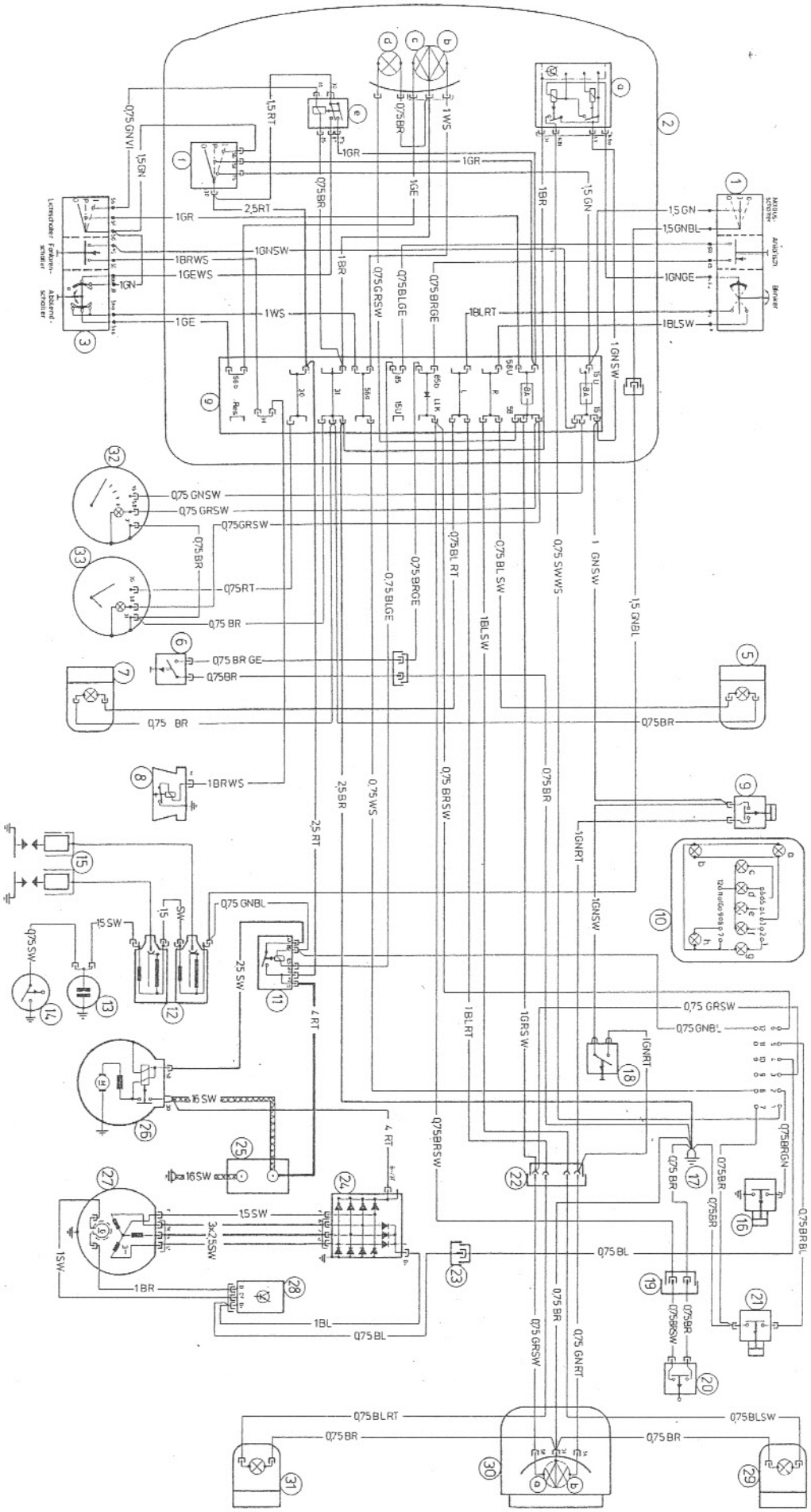
52 53 000 Dualseat – detaching and attaching

Remove keeper at rear hinge (arrow), hinge up the dualseat, pull to the rear and remove.



61 General vehicle electrics

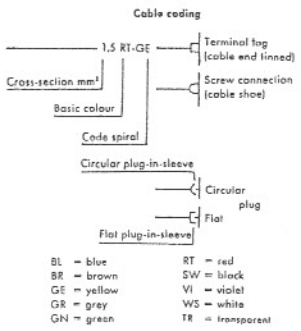
Technical Data and Wiring Diagrams . . . . . Page 61– 0/3
Specifications – '79 models and circuit diagrams 61– 0/4
61 21 010 Battery – removing and refitting 61–21/1
61 21 100 Battery bracket – removing and refitting 61–21/2
61 31 350 Flasher unit – removing and refitting 61–21/2
61 31 367 Buzzer – removing and installing 61–21/2
61 31 400 Starter relay and horn relay – removing and refitting 61–31/1
61 33 000 Horn – removing and refitting 61–33/1


0,75 GNYI
1,5 GN
1,5 RT
1 GR
0,75 BR
1 WS
2,5 RT
1 GE
1 BR
1 BRWS
1 GEWS
1 GNSW
0,75 GRSW
0,75 BLGE
0,75 BRGE
1 BLRT
1 BLSW
1,5 GNBL
1 GNGE
0,75 GNSW
0,75 BR GE
0,75 BL RT
0,75 BL SW
0,75 SWWS
1 GNSW
0,75 BRSW
0,75 WS
2,5 BR
2,5 RT
1 GNRT
0,75 GNBL
1,5 SW
0,75 SW
2,5 SW
1,6 SW
4 RT
0,75 GRSW
0,75 GNRT
0,75 BRGN
0,75 BL
1,5 SW
3x2,5 SW
1 SW
1 BR
1 BL
0,75 BLRT
0,75 BLSW

Specifications – '79 models

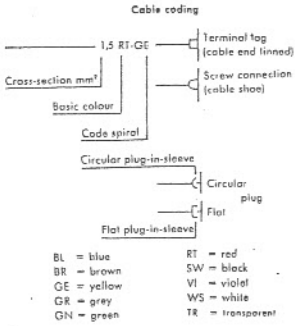
Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Horn	Fiamm 410 Hz	410 HZ 510 HZ			
Battery (VARTA) Voltage	12				
Capacity Amp/h	28				
Polarity	negative earth (ground)				
Flasher unit (Hella)	TBB 26 1 – 4 × 21 W – 12 V				
Fuses (2)	8 Amp				

Key to electrical wiring diagram – R 100 RS



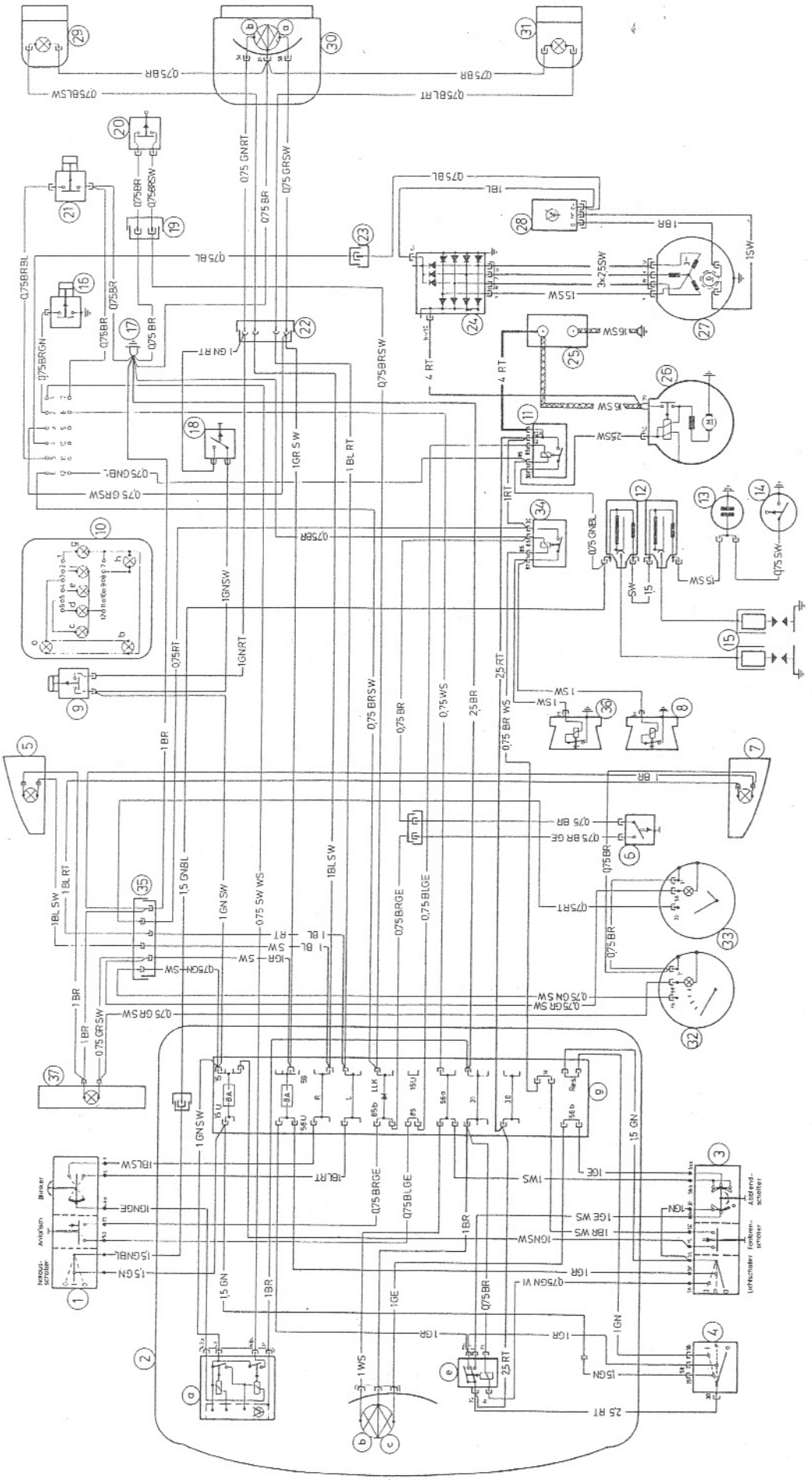
1 Turn indicator switch with starter button and emergency cutout
2 Headlight
  a) Flasher relay
  b) High beam
  c) Low beam
  e) Light relay
  g) Contact board with fuses
3 Low beam (dip) switch with headlight flasher and horn push
4 Ignition and light switch
5 Front right turn indicator
6 Clutch-operated switch
7 Front left turn indicator
8 Left horn
9 Hydraulic hand brake lever switch
10 Combined instrument
  a) Speedometer dial lighting
  b) Revolution counter dial lighting
  c) Brake fluid level telltale (red)
  d) Neutral telltale (green)
  e) Battery charge telltale (red)
  f) Oil pressure telltale (orange)
  g) Turn indicator repeater (orange)
  h) Headlight high beam telltale (blue)
11 Starter relay
12 Coils
13 Condenser
14 Ignition contact breaker
15 Spark plugs and caps
16 Oil pressure contact switch
17 Earth (ground)
18 Brake pedal (stop light) switch
19 2-pin connector
20 Neutral contact switch
21 Brake fluid level sensing switch
22 4-pin connector
23 1-pin connector
24 Diode carrier
25 Battery
26 Starter
27 Alternator
28 Voltage regulator
29 Rear right turn indicator
30 Rear light
  a) Rear and license plate light
  b) Brake light
31 Left rear turn indicator
32 Voltmeter
33 Clock
34 Horn relay
35 6-pin plug connector
36 Right horn
37 Front parking/marker light

Key to electrical circuit diagram
R 60/7 – R 100 S – model 78

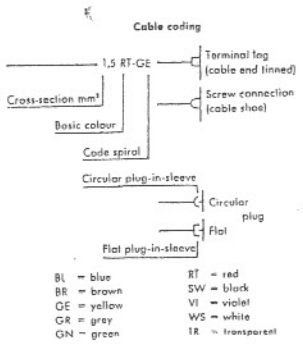


1 Turn indicator switch with starter contact and emergency cutout
2 Headlight
  a) Flasher unit
  b) High beam
  c) Low beam
  d) Parking light
  e) Lighting relay
  f) Ignition and light switch
  g) Contact board with fuses
3 Low beam (dip) switch with headlight flasher and horn switch
4 Front right flashing turn indicator
5 2-pin plug
6 Clutch-operated switch
7 Voltmeter (R 100 S only)
8 Clock (R 100 S only)
9 Front left flashing turn indicator
10 Horn
11 Hydraulic handbrake lever switch
12 Instrument cluster
  a) Speedometer dial illumination
  b) Revolution counter dial illumination
  c) Brake fluid telltale (red)
  d) Neutral indicator (green)
  e) Battery charge telltale (red)
  f) Oil pressure telltale (orange)
  g) Turn indicator repeater (green)
  h) Headlight high beam telltale (blue)
13 Foot brake light switch
14 Starter relay
15 Relay
16 Coils
17 Spark plugs with caps
18 Condenser
19 Contact breaker
20 Starter
21 Battery
22 Alternator
23 Regulator
24 Diode board
25 Single-pole connector
26 2-pole connector
27 Buzzer
28 6-pole connector
29 Neutral telltale switch
30 2-pole connector
31 Brake fluid level telltale switch
32 Oil pressure sensing switch
33 Rear right flashing turn indicator
34 Rear light cluster
  a) Brake light
  b) Rear and license plate light
35 Rear left flashing turn indicator

99

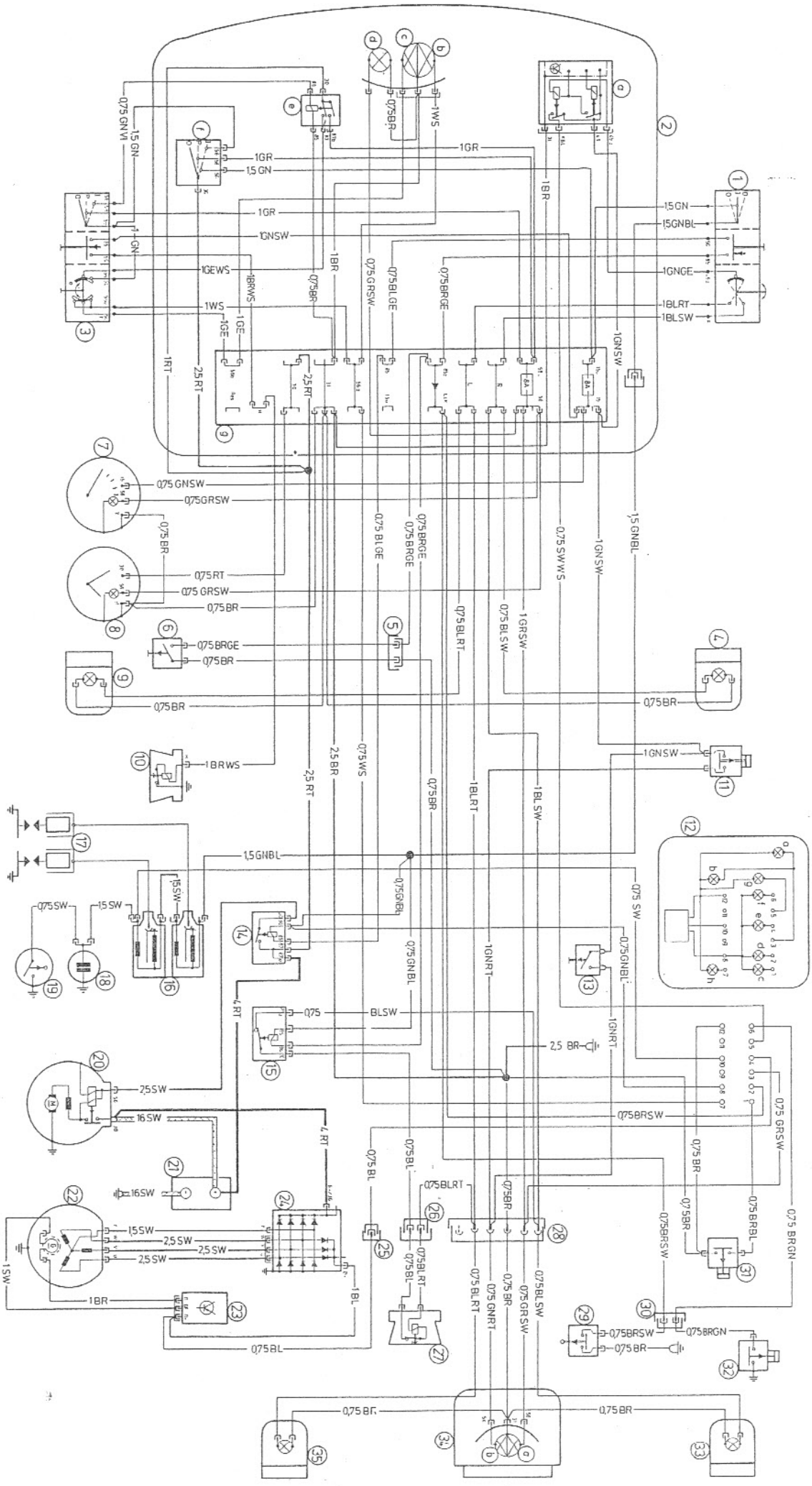


Key to electrical circuit diagram R 100 RS – model 78

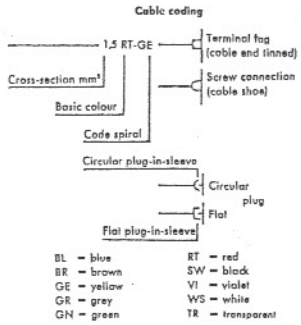


1 Turn indicator switch with starter contact and emergency cutout
2 Headlight
  a) Turn indicator relay
  b) High beam
  c) Low beam
  d) Lighting relay
  e) Contact board with fuses
3 Ignition and lighting switch
4 Low beam (dip) switch with headlight flasher and horn switch
5 Front marker light
6 6-pin connector
7 Front right flashing turn indicator
8 2-pin connector
9 Voltmeter
10 Clock
11 Clutch-operated switch
12 Front left flashing turn indicator
13 Left horn
14 Horn relay
15 Right horn
16 Hydraulic handbrake light switch
17 Instrument cluster
  a) Speedometer dial illumination
  b) Revolution counter illumination
  c) Brake fluid level telltale (red)
  d) Oil pressure telltale (orange)
  e) Battery charge telltale (red)
  f) Neutral indicator (green)
  g) Turn indicator repeater (green)
  h) Headlight high beam telltale (blue)
18 Brake pedal light switch
19 Starter relay
20 Coils
21 Spark plugs with caps
22 Condenser
23 Contact breaker
24 Relay
25 Starter
26 Battery
27 Alternator
28 Regulator
29 Diode board
30 1-pin plug
21 2-pin plug
32 6-pin plug
33 Brake fluid level sensing switch
34 2-pin connector
35 Neutral indicating switch
36 Oil pressure sensing switch
37 Rear right flashing turn indicator
38 Rear light cluster
  a) Rear and license plate light
  b) Brake light
39 Buzzer
40 Rear left flashing turn indicator

67

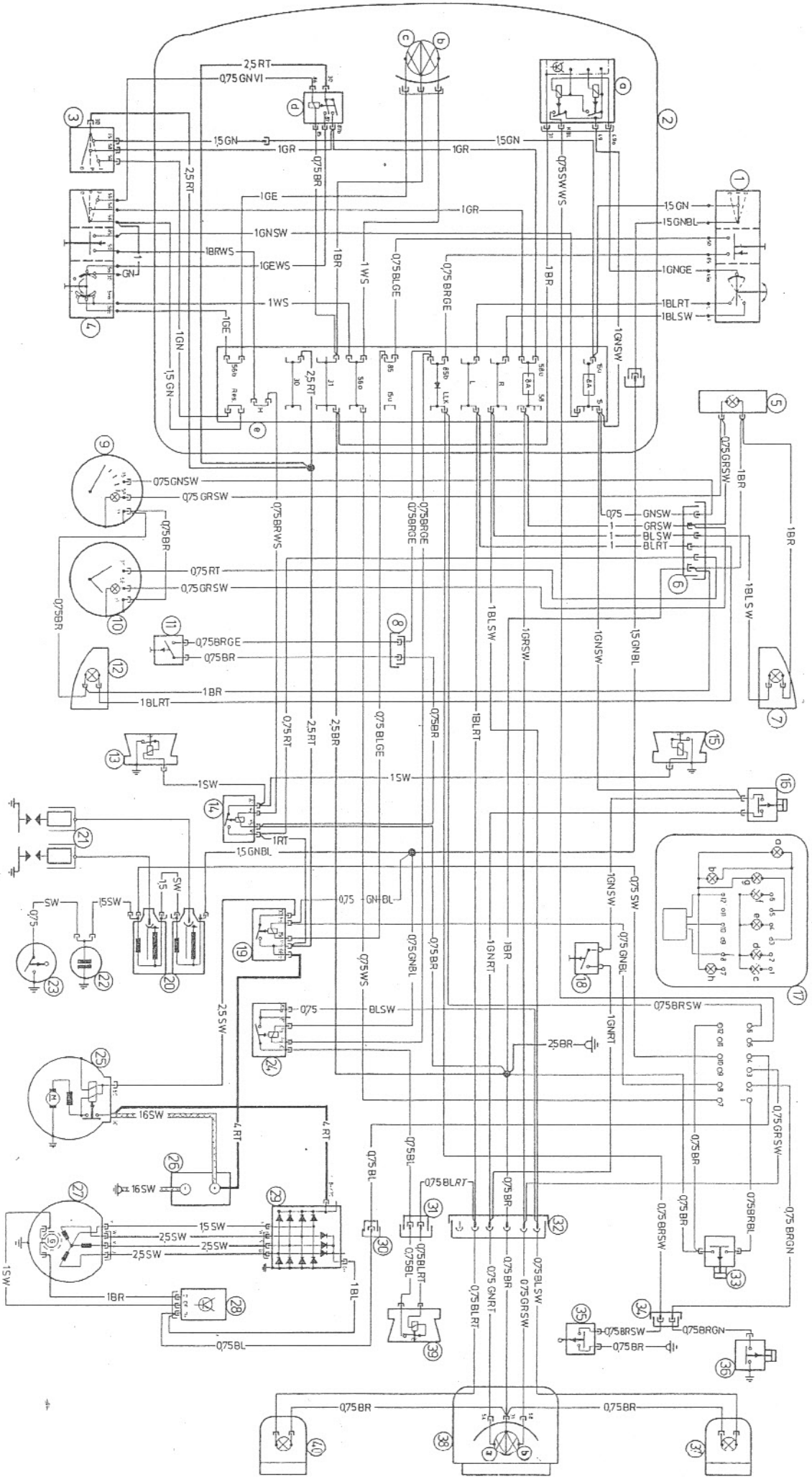

0,75 GN VI
1,5 GN
1GR
1GNSW
1GEWS
1BRWS
1WS
1GE
1BR
0,75BR
0,75 GRSW
0,75BLGE
0,75BRGE
1,5GN
1,5GNBL
1GNGE
1BLRT
1BLSW
1RT
2,5RT
0,75GNSW
0,75GRSW
0,75RT
0,75BRGE
0,75BLRT
0,75BLSW
0,75SWWS
1GRSW
1,5GNBL
1GNSW
1BRWS
2,5BR
0,75WS
0,75BR
1BLRT
1BLSW
1,5GNBL
0,75GNBL
0,75SW
1,5SW
0,75BLSW
1GNRT
2,5SW
16SW
4RT
0,75BRSW
0,75GRSW
0,75BL
0,75BLRT
0,75BR
0,75BRBL
0,75BRGN
1,5SW
2,5SW
1BL
0,75BRSW
0,75BRGN
0,75BR
0,75BR

Key to electrical circuit diagram – R 80/7 – R 100 S ('79 model)

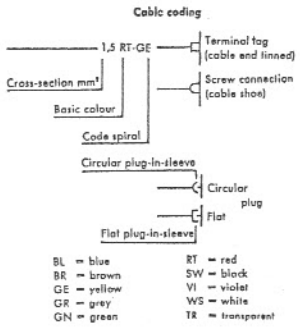


1. Starter button and kill switch
2. Headlight
   a) Flasher unit
   b) High beam
   c) Low beam
   d) Parking light
   e) Light relay
   f) Ignition and light switch
   g) Contact board with fuses
3. Dip (dimmer) switch with headlight flasher, horn and turn indicator switches
4. Front right turn indicator
5. 2-pin connector
6. Clutch-operated switch
7. Voltmeter (on R 100 T and R 100 S only)
8. Clock (on R 100 T and R 100 S only)
9. Front left turn indicator
10. Horn
11. Single-pole connector (US models only)
12. Hydraulic handbrake switch
13. Instrument cluster
    a) Dial illumination for speedometer
    b) Dial illumination for revolution counter
    c) Brake fluid telltale
    d) Neutral indicator (green)
    e) Battery charge telltale (red)
    f) Oil pressure telltale (orange)
    g) Turn indicator repeater (green)
    h) High beam telltale (blue)
14. Starter relay
15. Relay for buzzer
16. Single-pole connector
17. Coils
18. Spark plugs with caps
19. Contact breaker with condenser
20. Starter
21. Socket (on R 100 T only)
22. Flying fuse (R 100 T only)
23. Battery
24. Alternator
25. Voltage regulator
26. Diode board
27. Single-pole connector
28. Diode (US models only)
29. Foot brake light switch
30. 2-pole connector
31. Single-pole connector (US models only)
32. Brake fluid telltale switch
33. Oil pressure switch
34. 2-pole connector
35. Neutral indicating switch
36. 6-pole connector
37. 2-pole connector
38. Buzzer
39. Rear left turn indicator
40. Rear light
    a) Brake light
    b) Rear and license plate light
41. Rear right turn indicator

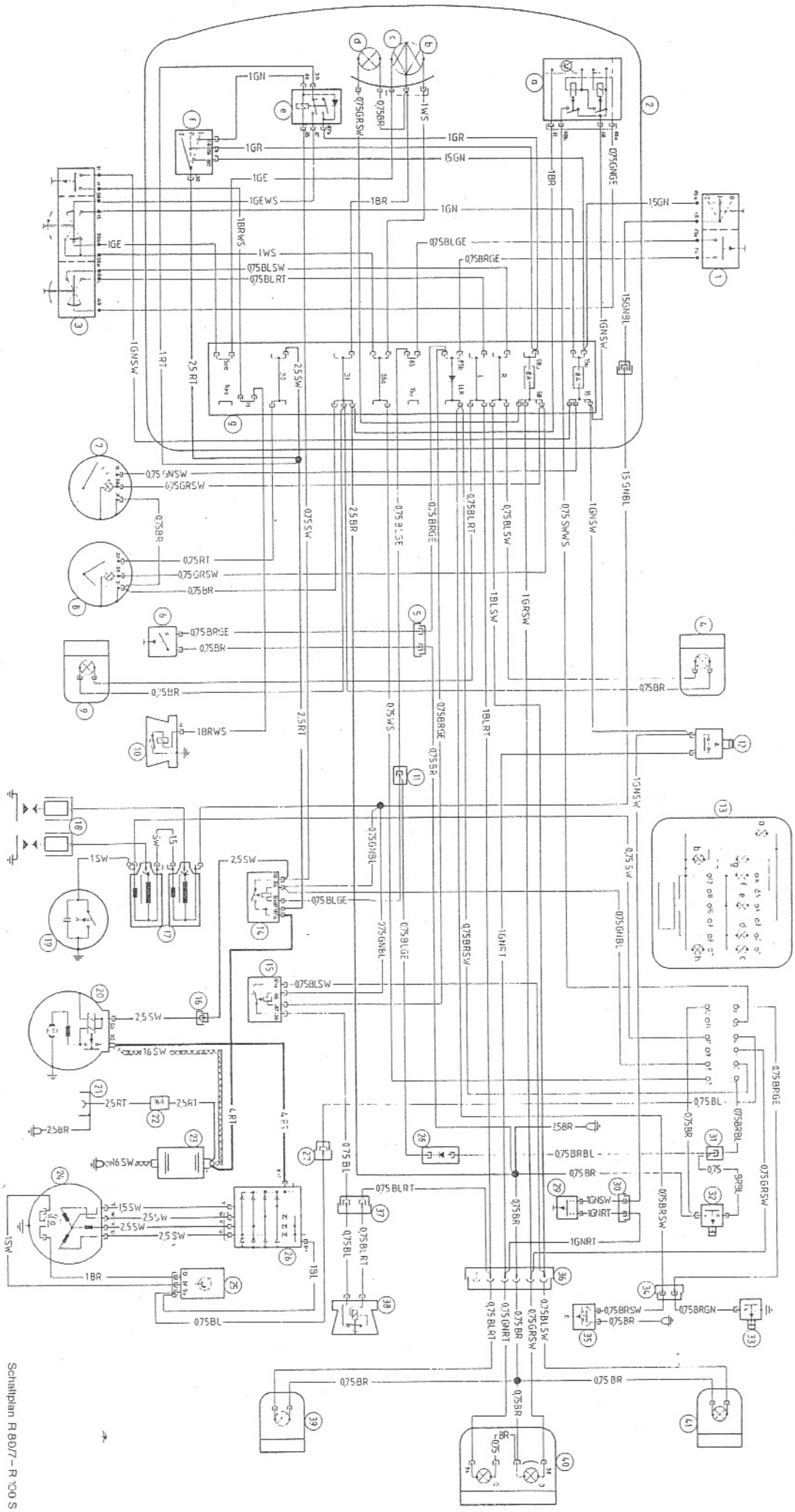
9/78


2,5 RT
0,75 GN/VI
1,5 GN
1 GR
0,75 BR
1 GE
1 GN/SW
1 BR/WS
1 GE/WS
1 WS
0,75 BL/GE
0,75 BR/GE
0,75 SW/WS
1 GN/GE
1 BL/RT
1 BL/SW
1 GN
1,5 GN/BL
0,75 GR/SW
0,75 BR/WS
0,75 RT
1 BL
1 BR/RT
1 BR/SW
1 GN/RT
1 GN/SW
1,5 GN/BL
1 SW
1 RT
0,75 GN-BL
0,75 BL/SW
0,75 SW
0,75 GN/BL
0,75 SW/WS
0,75 BR/RT
1 GN/RT
0,75 BR/SW
2,5 SW
2,5 BR
1,5 SW
1 BL
0,75 BL/RT
0,75 GN/RT
0,75 BR/GN
0,75 BR/BL

Key to electrical circuit diagram – R 100 RT and R 100 RS – '79 models



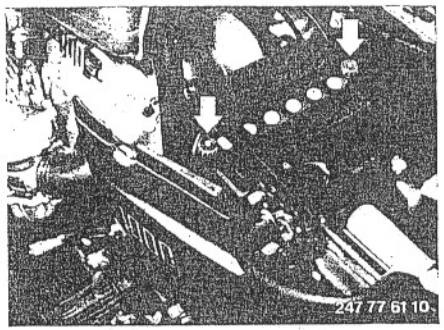
1. Switch with starter contact and kill switch
2. Headlight
   a) Flasher unit
   b) High beam
   c) Low beam
   d) Light relay
   e) Contact board with fuses
   f) Relay for fog light
   g) Relay for auxiliary driving light
3. Ignition and light switch
4. Combined switch for headlight flasher, horn and turn indicators
5. Front marker light
6. 6-pole connector
7. Front right turn indicator
8. 2-pole connector
9. Voltmeter
10. Clock
11. Clutch-operated switch
12. Front left turn indicator
13. Left horn
14. Right horn
15. Hydraulic handbrake switch
16. Instrument cluster
    a) Speedometer dial illumination
    b) Revolution counter dial illumination
    c) Brake fluid telltale (red)
    d) Neutral indicator (green)
    e) Battery charge telltale (red)
    f) Oil pressure telltale (orange)
    g) Turn indicator repeater (green)
    h) High beam telltale (blue)
17. Foot brake light switch
18. Starter relay
19. Coils
20. Spark plugs with caps
22. Contact breaker
23. Relay for buzzer
24. Starter
25. Battery
26. Alternator
27. Voltage regulator
28. Diode board
29. Single-pole connector
30. 2-pole connector
31. 6-pole connector
32. Brake fluid telltale switch
33. 2-pole connector
34. Neutral indicator switch
35. Oil pressure switch
36. Rear right turn indicator
37. Rear light
    a) Rear and license plate light
    b) Brake light
38. Buzzer
39. Rear left turn indicator
40. 3-pole connector (on R 100 RT only)
41. Fog light (with additional lights option)
42. Limit switch (not on US models)
43. Fog light switch (on R 100 RT only)
44. 3-pole connector (on R 100 RT only)
46. Auxiliary driving light (with additional lights option)
47. Limit switch (not on US models)
48. 3-pole connector (on R 100 RT only)
49. Rear brake fluid telltale switch
50. Flying fuse (on R 100 RT only)
51. Socket (on R 100 RT only)
52. 2-pole connector
53. Single-pole connector (on US models only)
54. Diode (on US models only)
55. Single-pole connector (on US models only)



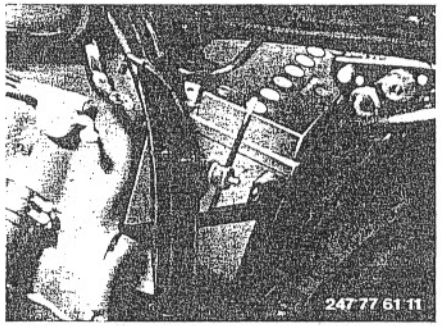
Schaltplan R 80/7 – R 100 S
Modell 79

61 21 010 Battery – removing and installing

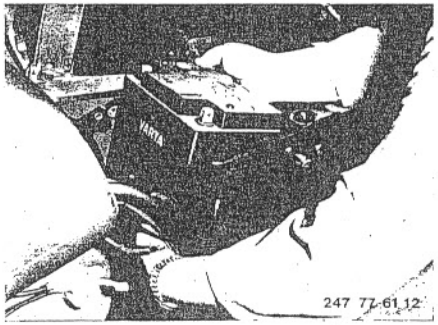
Take off the right and left battery covers by slackening the Allen screw for the lock plate retaining grip and fold up the grip.
Loosen the knurled nuts on the battery holder (arrows), raise the battery post covers and disconnect the battery cables.

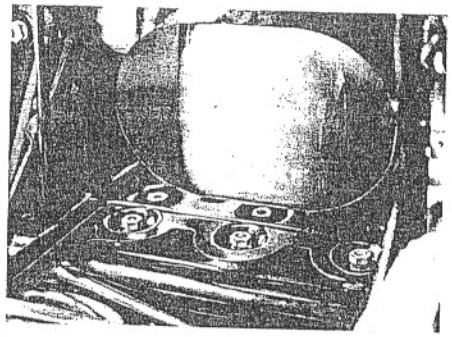


Loosen the hex nuts at the left and right on top of the battery holder, and swing the battery with holder to the rear, against the rear mudguard. Press the threaded rods for the retaining stirrups past the rubber cushion mountings.



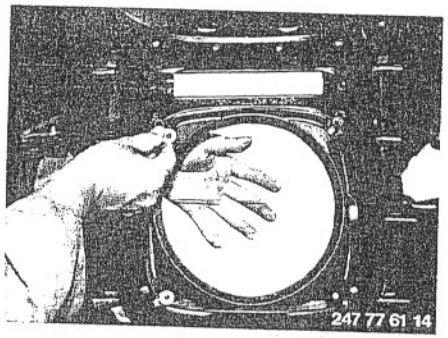
Loosen and remove the right retaining bolt for the rear section of the frame. Pull the vent line off the battery and remove the battery upwards.





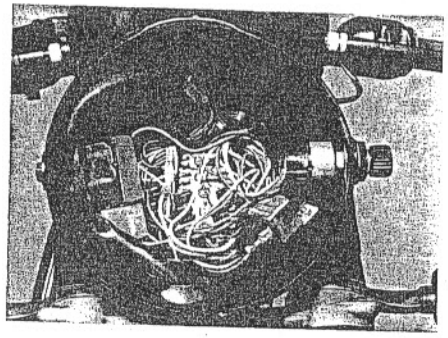
61 21 100 Battery bracket – removing and installing

Unscrew the three hex nuts at the bottom and the left and right-hand hex nuts at the top of the bracket.

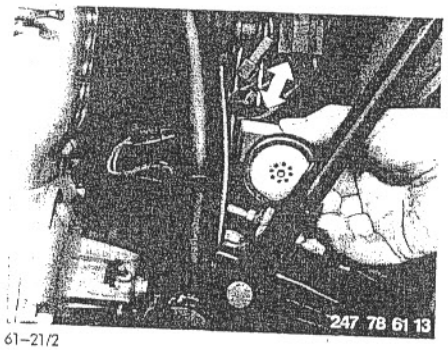


61 31 350 Flasher unit – removing and installing

On R 100 RS, remove the 4 knurled nuts securing the headlight beam tunnel, and remove tunnel and moulded glass.

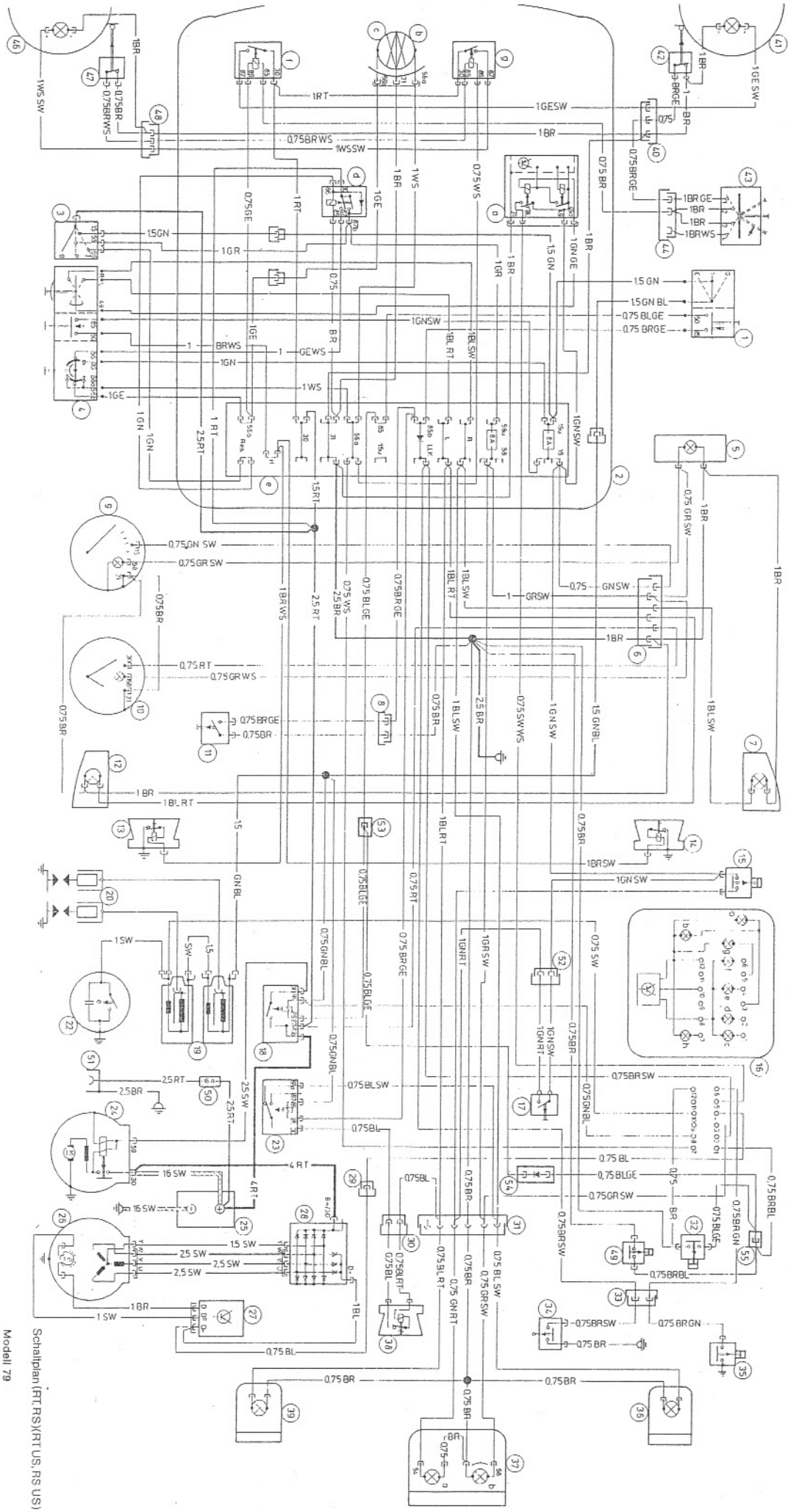


Detach earth (ground) lead from battery. Slacken the Phillips screw at the base of the headlight bezel and pull the bezel away by hand.
Detach the flasher relay from its mount and disconnect the plug.



61 31 367 Buzzer – removing and installing

Take off the left battery cover. Disconnect the 2-pin plug and pull the buzzer away downwards from the retaining plate.



Schaltplan (RT,RS)(RT US, RS US)

Modell 79

62 Instruments

Technical Data . . . . . Page 62– 0/3
Specifications – '79 models 62– 0/4
62 11 000 Combined instrument – removing and refitting 62–11/1
62 12 020 Speedometer drive shaft – removing and refitting 62–12/1
62 13 020 Revolution counter drive shaft – removing and refitting 62–12/1
62 14 020 Instruments in cockpit fairing – detaching and attaching 62–13/1

24

Technical Data

Instruments

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Revolutions per unit distance, km indicator	0.773	0.737	0.737 0.773*	0.711	0.67	0.691
Revolutions per unit distance, mile indicator	1.244	1.186	1.186 1.244*	1.144	1.078	1.112
Measuring range, km/h	20 . . . 220					
Measuring range, mile/h	10 . . . 130					
Revolution counter min^{-1}	1000 . . . 8000					

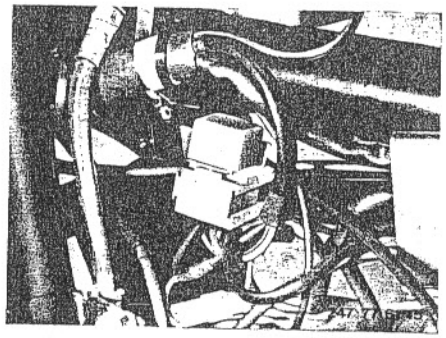
* version for regular fuel

61 31 400 Starter relay – removing and refitting

Disconnect the battery.

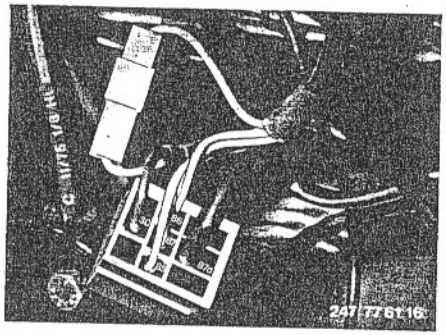
Fuel tank – remove and refit (16 11 030).

Pull relay out of plug base.



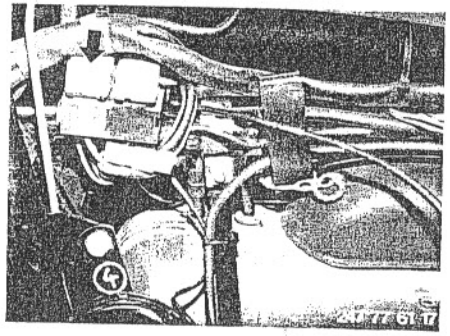
Leads on plug base:

Flat pin connection 87 = red lead
Flat pin connection 87a = red lead
Flat pin connection 86 = 2 leads, green/blue
Flat pin connection 85 = blue yellow lead
Flat pin connection 30 = black lead



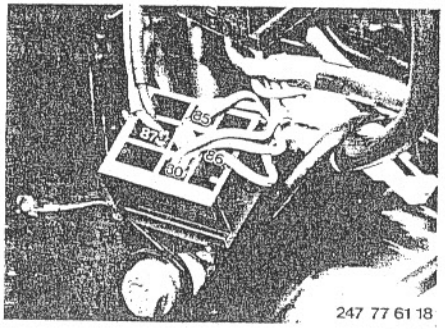
Removing and installing horn relay

Disconnect the battery.
Remove the fuel tank – 16 11 030.
Release the cable strap above the relay and pull the horn relay (arrow) out of the plug mounting. Lever out with screwdriver blade if necessary.



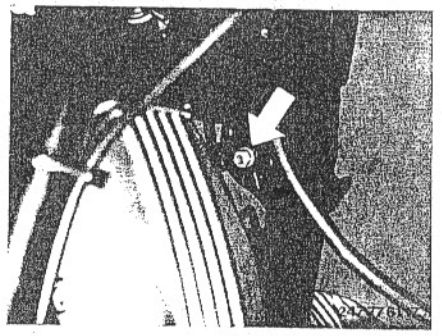
Cable connections on plug mounting:

Flat pin connection 87 = 2 black leads
Flat pin connection 86 = 1 brown white lead
Flat pin connection 85 = 2 brown leads
Flat pin connection 30 = 2 red leads

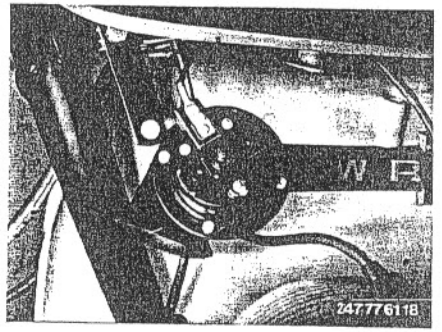


61 33 000 Horn – removing and refitting

Disconnect earth lead from battery. Unscrew hex nut from the horn.

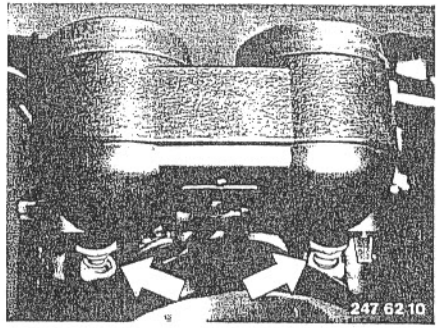


Disconnect lead from horn.

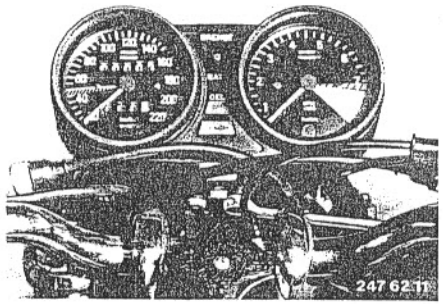


62 11 000 Combined Instrument – Removing and Refitting

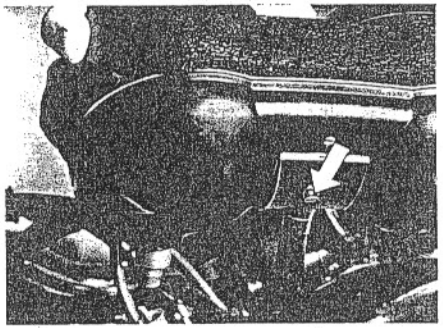
Slacken the locknuts on the speedometer and revolution counter drive shafts (22 mm wrench) and loosen the knurled nuts.



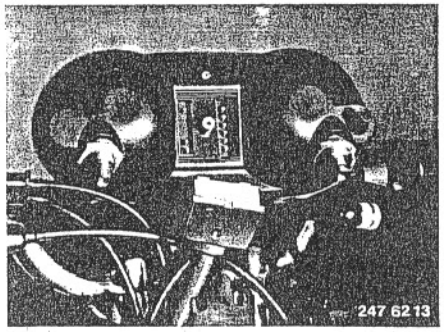
Slacken the three fastening screws and withdraw the combined instrument from its support.



Unscrew the Phillips screw of the central plug and pull off the plug.

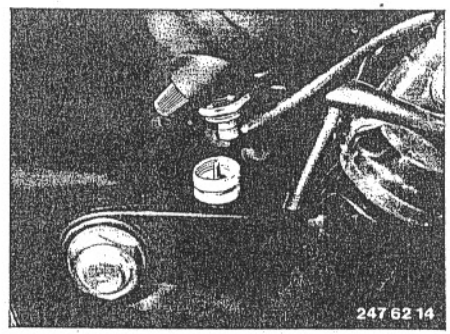


Remove combined instrument.



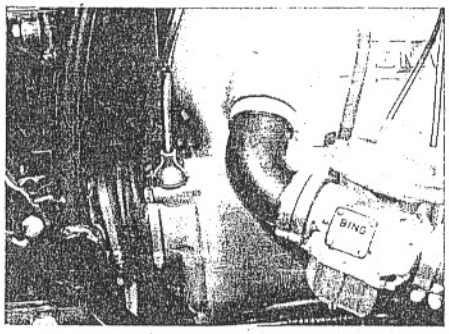
62 12 020 Speedometer Drive Shaft – Removing and Refitting

Loosen locknut (22 mm wrench), then unscrew knurled nut.



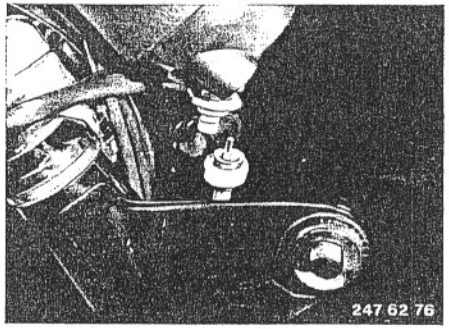
Push back protective rubber cap for speedometer drive on the gearbox. Pull out and remove speedometer drive after releasing the retaining bolt and removing the battery earth lead including washer.

Note when fitting: Make sure that the drive shaft is run correctly along the frame.



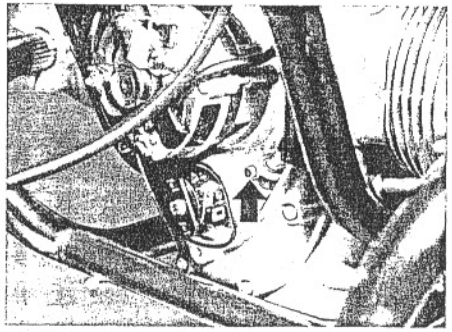
62 13 020 Revolution Counter Drive Shaft – Removing and Refitting (models with mechanical revolution counter drive)

Loosen locknut (22 mm wrench), then unscrew knurled nut.



Remove engine cover.

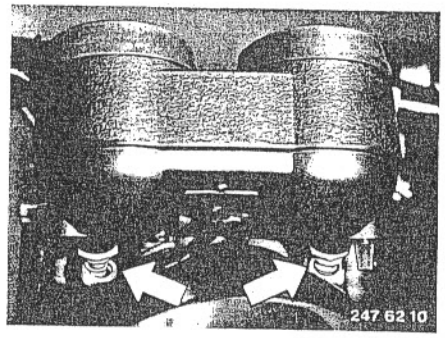
Unscrew fastening screw (arrow) for revolution counter shaft and withdraw the shaft.



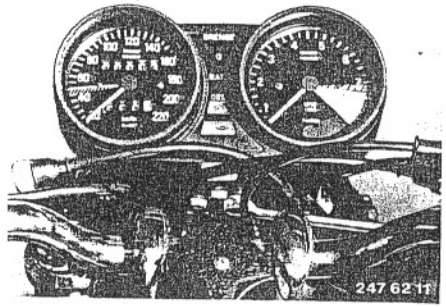
12

62 11 000 Combined Instrument – Removing and Refitting

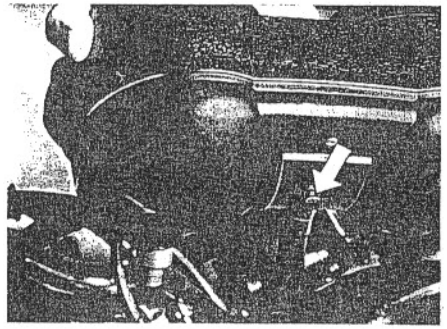
Slacken the locknuts on the speedometer and revolution counter drive shafts (22 mm wrench) and loosen the knurled nuts.



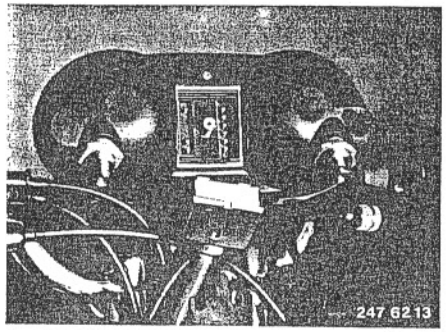
Slacken the three fastening screws and withdraw the combined instrument from its support.



Unscrew the Phillips screw of the central plug and pull off the plug.



Remove combined instrument.



Specifications – '79 models

Instruments

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Revolutions per unit distance, km indicator	0,737 0,773*	0,691	0,67	0,691	
Revolutions per unit distance, mile indicator	1,186 1,244*	1,112	1,078	1,112	
Measuring range, km/h	20 . . . 220				
Measuring range, mile/h	10 . . . 130				
Revolution counter min^{-1}	1000 . . . 8000				

* versionb for regular fuel

Lights

Technical Data

Model	R 60/7	R 75/7	R 80/7	R 100/7	R 100 S	R 100 RS
Headlamp (Type)	Bosch 0 303 850 100					
High and low beams	12 V / 60 / 55 W H4 quartz-iodine bulb					
Parking light	12 V / 4 W parking light bulb					
Idle telltale lamp (green)	12 V / 1.2 W indicator bulb					
Oil pressure telltale (orange)	12 V / 3 W indicator bulb					
Charge telltale (red)	12 V / 1.2 W indicator bulb					
High beam telltale (blue)	12 V / 1.2 W indicator bulb					
Turn indicator telltale (orange)	12 V / 3 W indicator bulb					
Instrument lighting	12 V / 1.2 W indicator bulb					
Tail and license plate light Brake light	12 V / 5 W 12 V / 21 W } two-filament bulb					
Turn indicators (2 yellow front and rear)	12 V / 21 W bulb					
Brake telltale (red)	12 V / 1.2 W indicator bulb					

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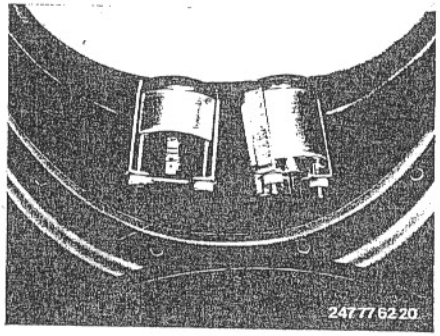
Lights

Specifications – '79 models

Model	R 80/7	R 100 T	R 100 S	R 100 RT	R 100 RS
Headlamp (Type)	Bosch 0 303 850 100				
High and low beams	12 V / 60/55 W H4 quartz-iodine bulb				
Parking light	12 V / 4 W parking light bulb				
Idle telltale lamp (green)	12 V / 1.2 W indictor bulb				
Oil pressure telltale (orange)	12 V / 3 W indicator bulb				
Charge telltale (red)	12 V / 1.2 W indicator bulb				
High beam telltale (blue)	12 V / 1.2 W indicator bulb				
Turn indicator telltale (orange)	12 V / 3 W indicator bulb				
Instrument lighting	12 V / 1.2 W indicator bulb				
Tail and license plate light	12 V / 5 W bulb				
Brake light	12 / 21 W bulb				
Turn indicators (2 yellow front and rear)	12 V / 21 W bulb				
Brake telltale (red)	12 V / 1.2 W indicator bulb				

62 13 050 Instruments in cockpit fairing – renewing

Detach cockpit fairing – 46 63 020.
On R 100 RS, detach cable plugs only.
Unscrew the 2 knurled nuts on the retainer.
Detach the retaining clip and press the instrument downwards out of the fairing.



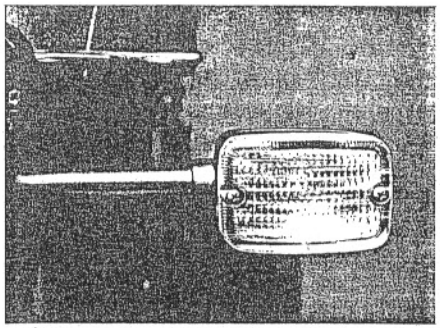
63 Lights

Technical Data . . . . . Page 63– 0/3
Specifications – '79 models 63– 0/4
63 10 004 Headlamp beam alignment 63–10/1
63 21 380 Rear lamp cluster – removing and refitting 63–10/2
63 23 170 Both turn indicators (front and rear) – removing and refitting 63–23/1
63 99 241 Bulb for headlamp – renewing 63–99/1
63 99 271 Bulb of a turn indicator (front and rear) – renewing 63–99/2
63 99 381 Bulb for rear lamp – renewing 63–99/2

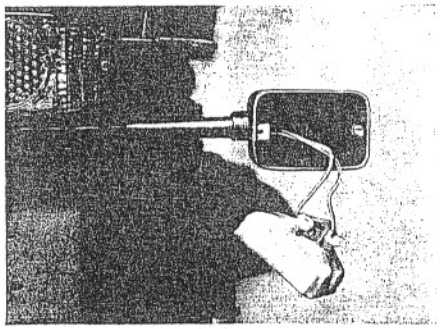
63 23 170 Both turn indicators (front or rear) – removing and refitting (R 60/7 – R 100 S)

Disconnect earth (ground) lead from the battery.
Unscrew both Phillips screws and remove the lens.

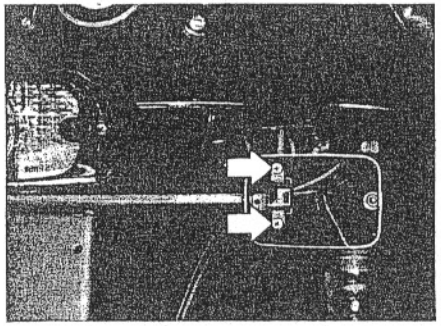
Note when fitting: When fitting the lens make sure that the marking "Top" is at the top.



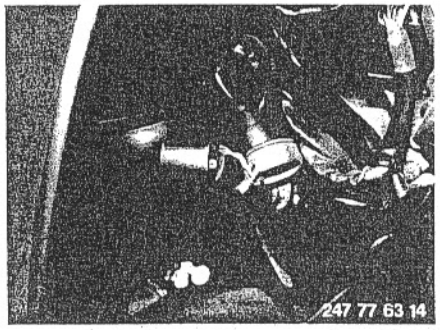
Disconnect leads at the rear of the holder.



Slacken the 2 clamp screws and remove the turn indicator housing.



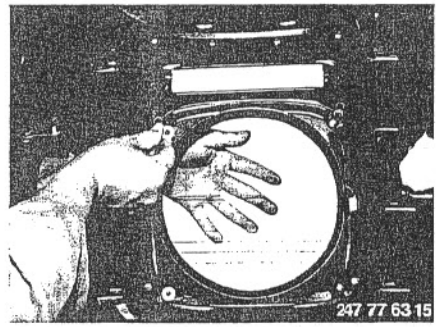
Removing and installing front turn indicators – R 100 RS:
Remove water shield from turn indicator housing and pull off flat pin plug. Remove the 2 Phillips screw for the lens and pull the turn indicator housing out forwards.



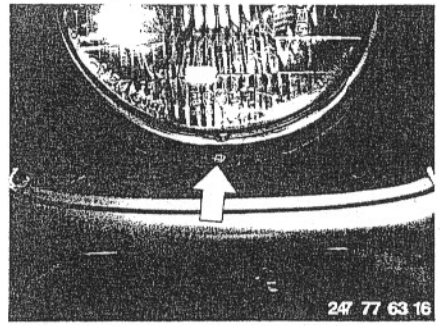
74

63 99 241 Headlamp bulb – renewing

Release the 4 knurled nuts holding the headlight enclosure, and remove the enclosure with moulded glass.

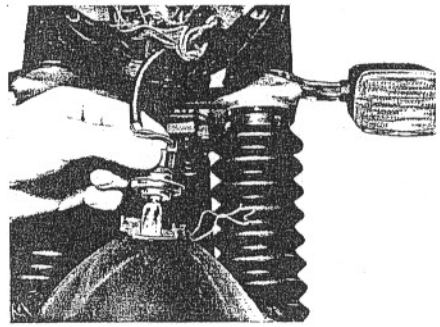


Slacken Phillips screw (arrow) at bottom of headlight bezel and pull bezel away from headlight housing.

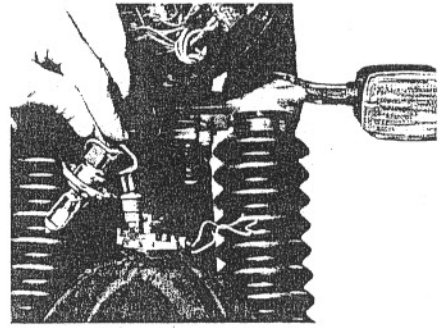


Open wire clip, release halogen bulb from reflector and pull it out of the push-button plug.

Note when fitting: When fitting the halogen bulb make sure that the anti-twist lug engages in the reflector.



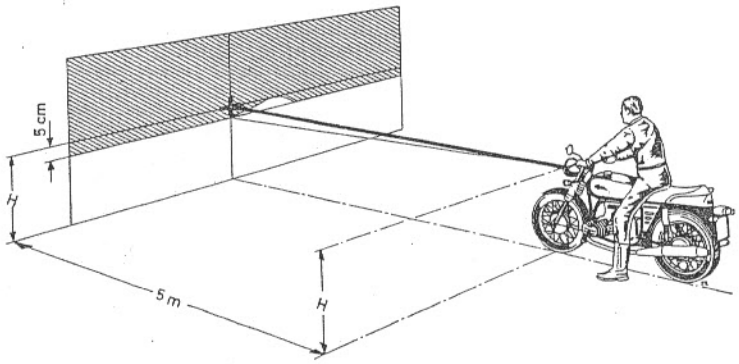
The parking light bulb is pressed out of the reflector from inside, through the opening for the halogen bulb.

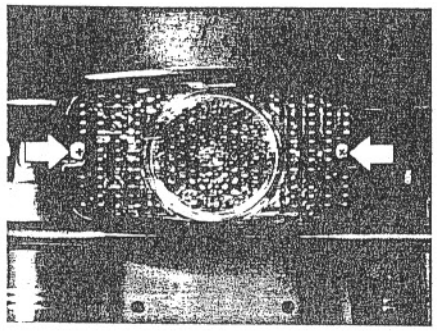


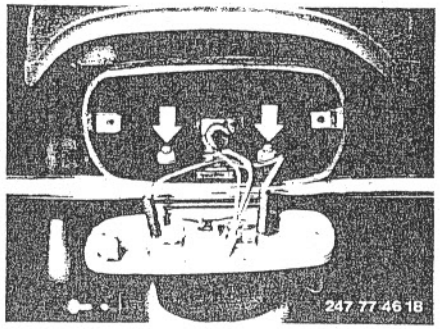
63 10 004 Headlamp beam alignment

After any work on the headlamp it is essential to check its alignment. If no headlamp aligning equipment is available the task can be carried out as follows. Check tire pressures and adjust if necessary.

Position the motorcycle upright with rider astride on a level surface at a distance of 5 metres (16 ft 5 in) from a light coloured wall. Set the rear spring struts to solo operation. Measure the distance from the ground to the center of the headlamp and mark this height on the wall with a cross, and a second cross 5 cm (2 in) below. Switch on low beam and align the headlamp so that the bright/dark boundary runs on the left level with the lower cross, rising to the right from the center of the cross reach the level of the upper cross and then fall off.







63 21 380 Rear lamp cluster – removing and refitting

Disconnect earth (ground) lead from the battery.
Unscrew both Phillips screws and remove the lens.

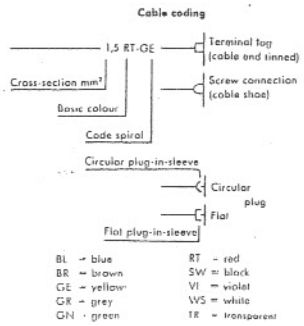
Remove leads from the back of the reflector and make a note of the connections where necessary.

Unscrew securing bolts with washers and nuts from the housing and take off the housing.

Note when fitting: Make sure that the clear lens for the license plate light is at the bottom.

Key to electrical circuit diagram – additional instruments

Cable codes



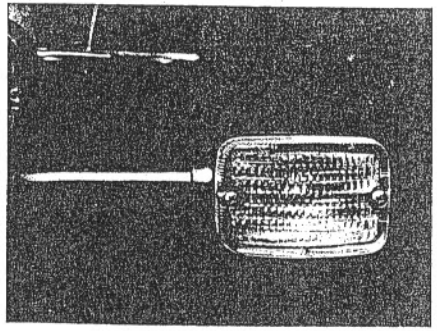
1 Headlight
2 Contact board with fuses
3 Earth (ground) at frame (near coils)
4 Ignition/light switch
5 Voltmeter
6 Clock
7 Battery

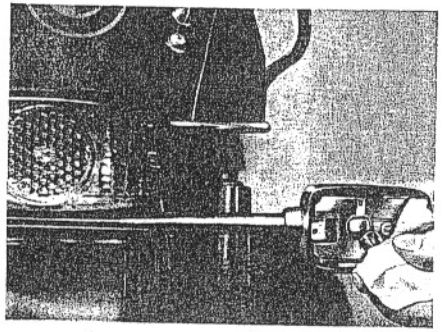
New components

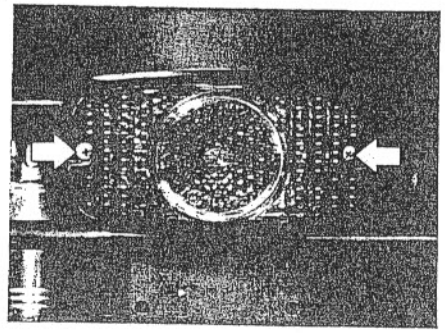
Existing components

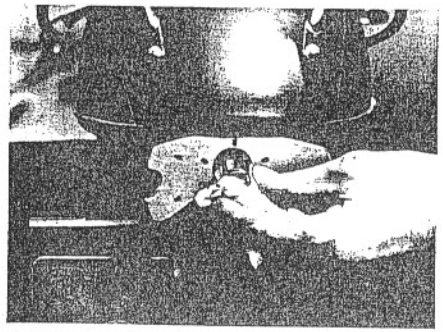
72 Special equipment

Circuit diagram for additional instruments . . . . . Page 72–0/3
Circuit diagram for additional headlights 72–0/4
Circuit diagram for hazard warning flashers 72–0/5
Circuit diagram for full interference suppression 72–0/6









63–99/2

63 99 271 Turn indicator bulb (front or rear) – renewing

Disconnect earth (ground) lead from the battery.
Unscrew both Phillips screws and remove the lens.

Push bulb into the holder and remove by turning it anti-clockwise.

Note when fitting: Fit the lens so that the marking "Top" is at the top.

63 99 381 Rear lamp bulb – renewing

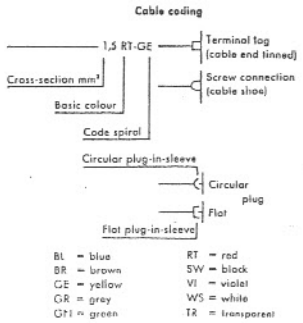
Disconnect earth (ground) lead from the battery.
Unscrew both Phillips screws and remove the lens.

Push bulb into the holder and turn to remove.

Note when fitting: Fit the lens so that the clear panel for the license plate lighting is at the bottom.

Key to electrical circuit diagram – additional headlights

Cable codes



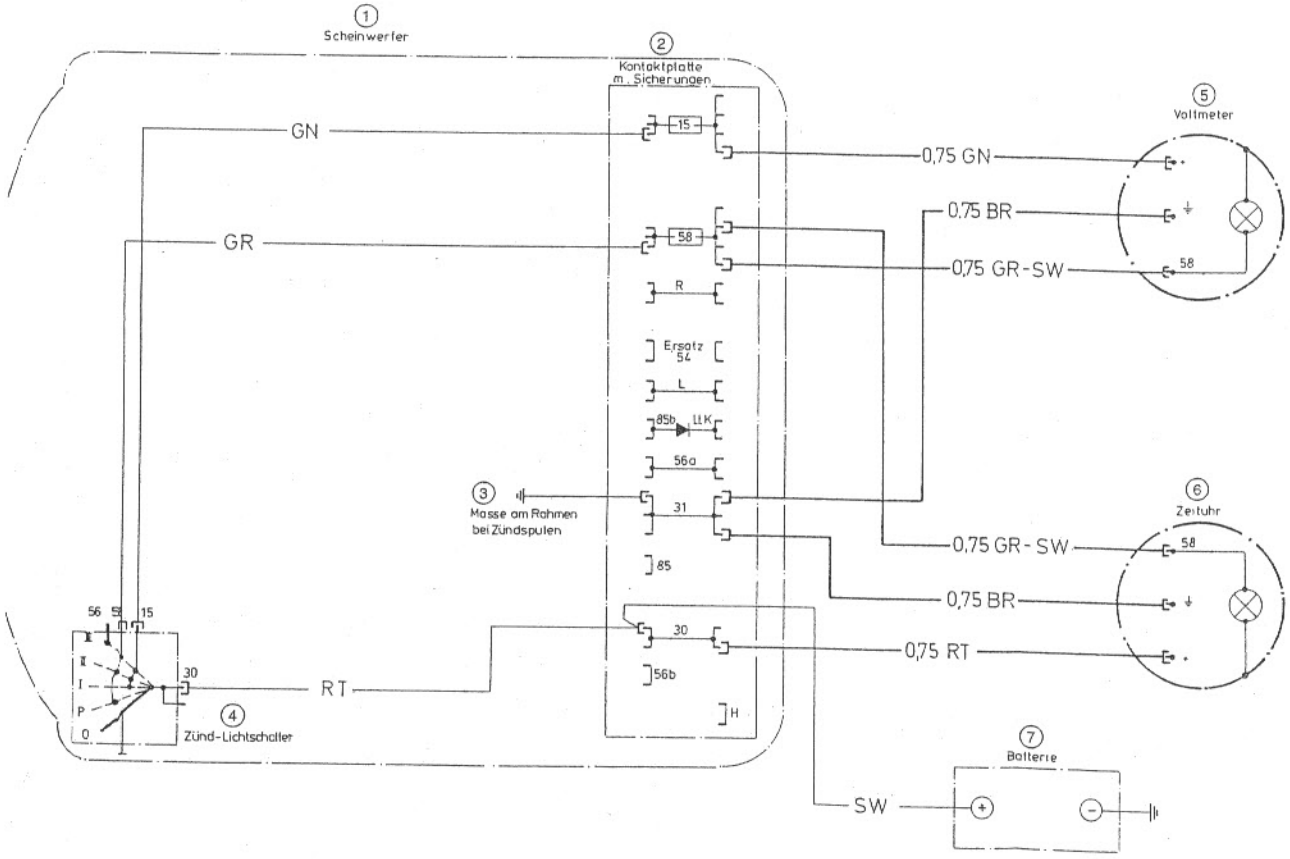
New components

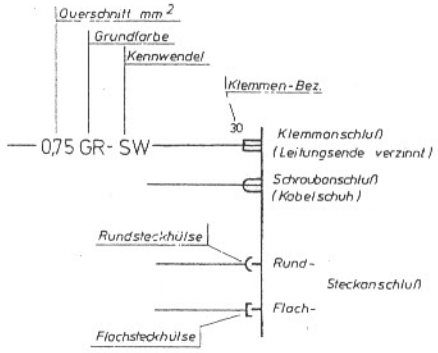
Existing components

1 Headlight
2 Earth (ground) point
3 Lighting relay
4 Ignition switch
5 Low beam (dip) switch
6 Relay I
7 Relay II
8 Contact board
9 to headlight high beam
10 to headlight low beam
11 to battery
12 Additional switch
13 Fog light
14 Additional driving light

CIRCUIT DIAGRAM

for additional instruments





Kennzeichnung

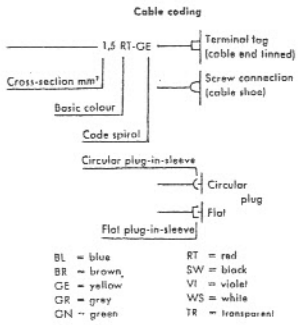
BL = blau
BR = braun
GE = gelb
GN = grün
GR = grau
RT = rot
SW = schwarz
VI = violett
WS = weiß

hinzukommende Teile

vorhandene Teile

Key to electrical circuit diagram – full interference suppression

Cable codes



New components

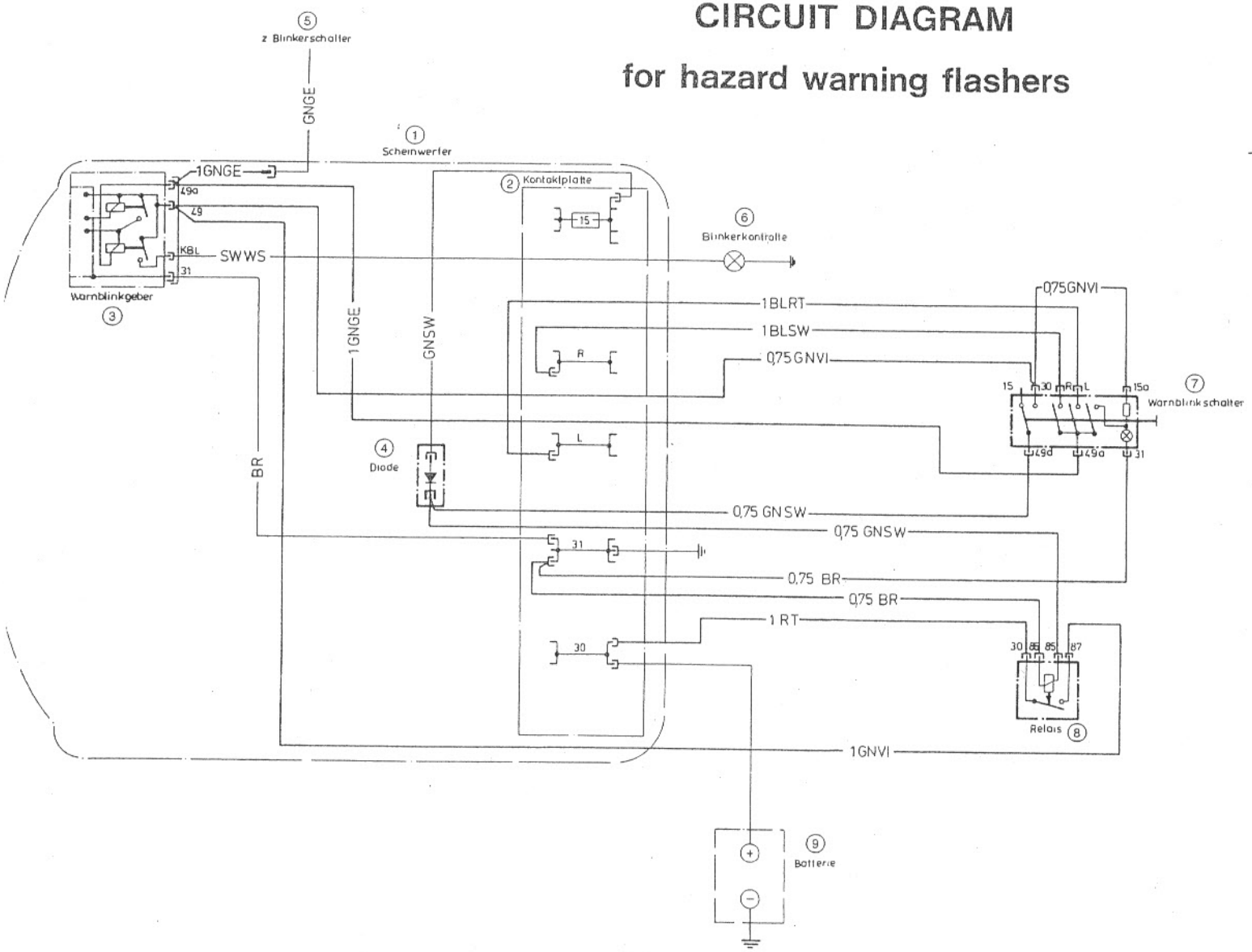
Existing components

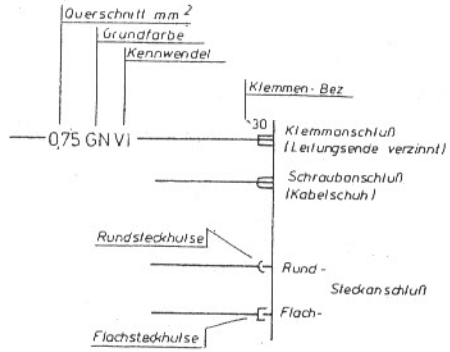
1 Ignition light switch
2 Condenser
3 Contact plate
4 Condenser
5 Foot brake light switch
6 to brake light
7 Starter
8 Condenser
9 Battery
10 Condenser
11 to wiring harness
12 Condenser
13 Starter relay
14 Condenser
15 Diode board
17 Horn, left
17 Horn, right
18 Coils
19 Condenser
20 Condenser
21 Suppressor filter
22 Spark plugs with caps
23 Condenser
24 to emergency engine cutout
25 Condenser

78

CIRCUIT DIAGRAM

for hazard warning flashers





Kennzeichnung

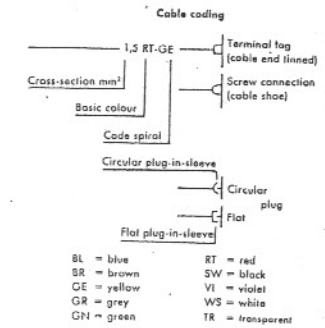
BL = blau
BR = braun
GE = gelb
GN = grun
GR = grau
RT = rot
SW = schwarz
VI = violett
WS = weiß

hinzukommende Teile

vorhandene Teile

Key to electrical circuit diagram – hazard warning flashers

Cable codes



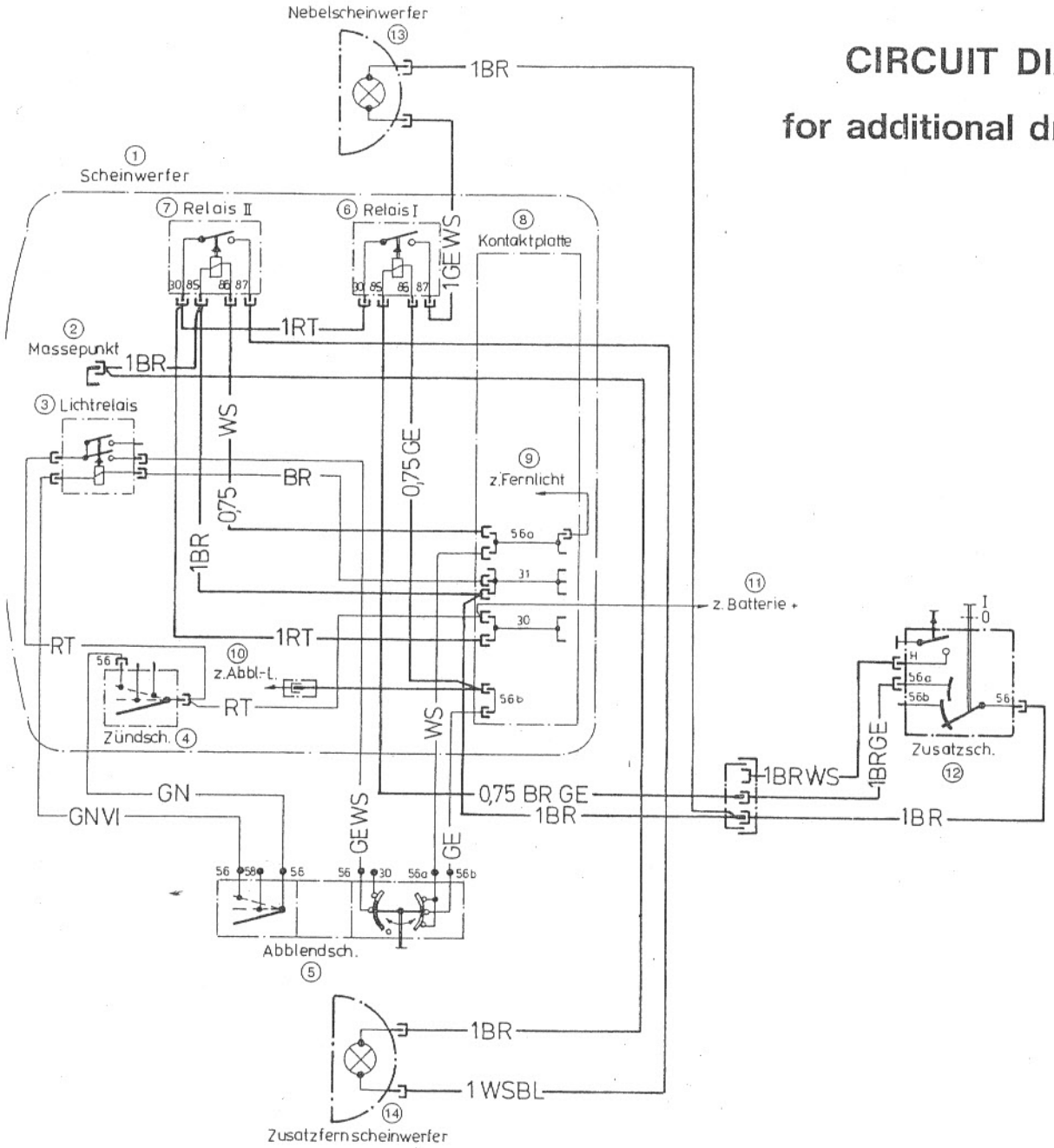
1 Headlight
2 Contact board
3 Hazard warning flasher relay
4 Diode
5 to turn indicator switch
6 Turn indicator repeater
7 Hazard warning flasher switch
8 Relay
9 Battery

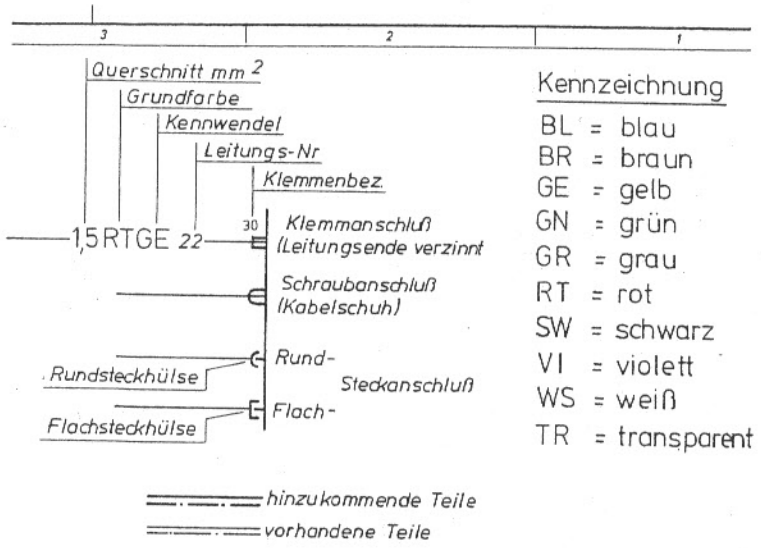
New components

Existing components

CIRCUIT DIAGRAM

for additional driving lights





Kennzeichnung

BL	=	blau
BR	=	braun
GE	=	gelb
GN	=	grün
GR	=	grau
RT	=	rot
SW	=	schwarz
VI	=	violett
WS	=	weiß
TR	=	transparent

CIRCUIT DIAGRAM

for full interference suppression

