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16	Kraftstoffbehälter und -leitungen	Fuel tank and lines	Réservoir à essence et conduites	Serbatoio e condutture carburante
18	Auspuffanlage	Exhaust system	Dispositif d'échappement	Impianto di scarico
21	Kupplung	Clutch	Embrayage	Frizione
23	Getriebe	Transmission	Boîte à vitesses	Cambio
26	Gelenkwelle	Drive shaft	Arbre de transmission	Albero di trasmissione
31	Vorderradgabel	Front fork	Fourche d'avant	Forcella anteriore
32	Lenkung	Steering	Direction	Sterzo
33	Hinterachse	Rear axle	Essieu arrière	Asse posteriore
34	Bremsen	Brakes	Freins	Freni
35	Fußbetätigung	Pedal assembly	Pédalier	Pedali
36	Räder und Bereifung	Wheels and tyres	Roues et pneumatiques	Ruote e pneumatici
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61	Allgemeine Fahrzeug-elektrik	General electrics	Châssis-électricité	Telaio-impianto elettrico
62	Instrumente	Instruments	Instruments	Strumenti
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00	Entretimiento e informes generales	Vård och allmänna hänvisningar	Onderhoud en algemene aanwijzingen
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12	Motor-Equipo eléctrico	Motor-Elsystem	Motor-elektrisch
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16	Depósito de carburante y tubería	Bensintank och ledningar	Benzinetank en leidingen
18	Tubería de escape	Avgassystem	Uitlaatinstallatie
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31	Horquilla delantera	Framgaffel	Voorwielvork
32	Dirección	Styrning	Stuurinrichting
33	Eje trasero	Bakaxel	Achteras
34	Frenos	Bromsar	Remmen
35	Pedales	Pedaler	Pedalen
36	Ruedas y neumáticos	Hjul och däckutrustning	Wielen en banden
46	Cuadro	Ram	Frame
52	Asiento doble	Säten	Duozaad
61	Instalación eléctrica	Fordonets elsystem Chassi elsystem	Elektrische Installatie
62	Instrumentos	Instrument	Instrumenten
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● Work Time Rates

Motorcycles

R 60/6 - R 75/6 - R 90/6 - R 90 S

BMW Motorrad GmbH



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INTRODUCTION

General remarks

These works information sheets contain a summary of all work time rates (WT) for our motorcycle models. They are an important prerequisite for a company's own fixed price repairs and for the settlement of warranty claims.

The advantages of the consistent use of the Work Time catalogue are:

- Exactness in the wording of orders
- Quick preparation of invoices
- Precalculation (quotations)
- Planning completion times
- Calculating profitability when planning the installation of plant
- Flat rate standards (calculation of incentive pay)

Layout of the Work Time Catalogue

The Work Time Catalogue is arranged under main headings in the same order as the Service Information and Parts Catalogues.

Similarly, the part descriptions of the text or works orders and costings is similar to that of the parts department.

After every group catalogue section there is a group index and, in addition, there is, before every group, a summary of possible associated work connected with major test work.

Main and Associated Jobs

Main jobs are self-contained operations that begin with the acceptance of the order by the mechanic and end with its return.

Associated jobs make it possible to extend main jobs.

Each associated job appears in the catalogue only once (except in the summaries of Test jobs). It appears in the group with which it is best associated from a technical or functional viewpoint.

Example:

Main job	11 12 232	Overhaul both cylinder heads complete
Associated job	712	Overhaul both cylinder heads complete (cylinder heads removed)

The associated job 11 12 712 — Overhaul both cylinder heads complete (cylinder heads removed) can, for example, be given to the service foreman for the main job 11 12 090 — Remove and refit both cylinder heads.

Main jobs are identifiable by the last 3 numbers in the job number being between 000 and 499 while, with associated jobs, they are between 500 and 999.

Job Numbers

The job numbers have seven figures and comprise a 2 figure main group, a two figure sub group and a 3 figure serial number.

Example:	Main job:	Remove and refit engine	11	00	050
	Ass. job:	Remove and refit or replace chain tensioner	11	31	630
		in which there is:			
	Main job	(engine 11)			
	Sub job	(engine complete 00)			
		(control 31)			
		Serial number 050 and 630			

Job Descriptions

The scope of jobs is shown, where necessary, by the details given under "includes" but no attempt is made to give a complete description of the working operations, for which reference should be made to the Repair Instructions and Service Information Sheets. Only from these can complete technical descriptions be taken.

Necessary associated work, such as visual inspection, greasing, oiling or cleaning of parts or assemblies is included within the scope of jobs.

With job positions which differ only in the number of parts, the "includes" text is given only once.

Example:	11 24 000	Remove and refit or replace left or right connecting rod
		includes: Removal and refitting cylinder. Removal and refitting/cleaning and measuring of connecting rod and bearing shells.
	11 24 030	Removal and refitting or replacement of both connecting rods

Here either the left or right-hand part is to be taken out or replaced under a single position in the text and in another position they are both to be done together.

In such a case the service foreman should note in the order e.g. left or right, as is appropriate.

Workshop Efficiency

The work time units (WT) given against each job position are times required for one job relative to another and so it is necessary for every workshop to determine the average number of WT's they can achieve in a working hour. For this it is necessary to take approx. 10 time checks for each of 20 frequently performed job positions.

From the average times for each of these time checks the WT per hour achieved for each of these 20 job positions can then be calculated. And from the average of these time checks the number of WT achieved per hour can be seen.

The average for these 20 job positions then gives the performance rating for the workshop and from this performance rating you can work out a factor (see example), with the help of which all the work time rates given in the catalogue can be converted to working times.

The price to be charged for repairs per WT is determined when your hourly selling price is divided by the performance rating for your workshop (e. g. = 12 WT).

With this factor the rate of DM 2.00 in our example can be quickly and accurately determined as the price to be charged for each of the group of operations covered by the job positions in our work time rates Catalogue.

Brief Example for the Calculation of Performance Rating:
(Three of the 20 most common job positions)

23 00 052	Overhaul transmission	47 WT
11 14 151	Replace crankshaft radial sealing ring	36 WT
11 24 000	Remove and refit or replace left or right connecting rod	28 WT

Job No.	23 00 052	11 14 151	11 24 000
Work time rate acc. to catalogue	47 WT	36 WT	28 WT
approx. 10 time determinations *strike out times which differ widely from average	4.3 h	2.5 h	2.3 h
	4.0 h	3.2 h	2.0 h
	4.0 h	3.5 h	2.5 h
	5.8 h	2.8 h	2.1 h
	3.6 h	2.2 h	1.8 h
	3.9 h	4.9 h	2.0 h
	5.7 h	3.7 h	2.6 h
	3.6 h	4.0 h	2.2 h
	4.2 h	2.7 h	1.7 h
	3.7 h	3.1 h	2.8 h
divided by number of time determinations = average time	31.3 h : 8 = 3.91 h	27.7 h : 9 = 3.08 h	22.0 h : 10 = 2.20 h
Achieved WT per hour	47 WT : 3.91 h = 12.02 WT/h	36 WT : 3.08 h = 11.7 WT/h	28 WT : 2.20 h = 12.7 WT/h

Average value: $12.02 + 11.7 + 12.7 = 36.4 : 3 = 12.1 \text{ WT/h}$
Performance rating (based on average) 12 WT/h

Calculation factor: $1 \text{ WT} = \frac{1 \text{ h}}{12 \text{ WT}} = 0,084 \text{ h}$

$\frac{60 \text{ min}}{12 \text{ WT}} = 5 \text{ min.}$

Working time	47 WT x 0.084 = 3.91 h	36 WT x 0.084 = 3.02 h	28 WT x 0.084 = 2.35 h
With an hourly rate of, for example, 24.00 DM the price per WT = $\frac{24.00 \text{ DM}}{12 \text{ WT}} = 2.00 \text{ DM/WT}$			
Price to charge for repairs	47 WT x 2.00 = 94.00 DM	36 WT x 2.00 = 72.00 DM	28 WT x 2.00 = 56.00 DM

If any questions should arise, as a result of your experience, concerning this work time rates Catalogue, please contact BMW Motorrad GmbH, Service Department.

00 MAINTENANCE

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00 00 009	Free-of-charge handover inspection (without vehicle cleaning)	19	20	20	
00 00 119	1st upkeep operation at 1,000 km	29	30	30	
00 00 139	BMW upkeep operation every 7,500 km	30	31	31	
00 00 149	BMW inspection every 15,000 km	51	51	51	
00 00 199	Engine inspection includes all necessary work e.g. engine oil and oil filter element replacement, removal, cleaning and replacement of oil sump and oil screen. Cleaning of air filter element and both carburetors. Checking tightness of engine, oil sump, exhaust, cylinder and cylinder head nuts and screws. Adjust valve clearance. Check spark plugs, adjust ignition timing. Adjust clutch free travel, engine idle speed and petrol-air mixture.	25	25	25	
00 11 209	Change oil in engine with filter	4	4	4	
00 11 219	Change oil in engine without filter	2	2	2	
00 11 229	Change oil in gearbox	2	2	2	
00 11 279	Change oil in telescopic forks	5	5	5	
00 11 289	Change oil in rear wheel gear	2	2	2	
00 11 299	Change oil in rear swing arm	2	2	2	
00 11 459	Clean motorcycle	AZ	AZ	AZ	
00 11 469	Wash engine	AZ	AZ	AZ	
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11 ENGINE

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11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 00 009	Diagnosis with engine tester Includes: Battery voltage, contact resistance, dwell angle and engine timing, performance comparison (dynamic compression) check charging current and ignition condenser, check ignition coils earth connection, ignition coils primary and secondary winding. Associated work: 11 00 539 Check compression 12 11 514 Adjust dwell angle and ignition timing 12 11 601 Replace contact breaker points 12 11 641 Replace ignition condenser 12 12 511 Replace all spark plugs 12 12 531 Replace one ignition lead 12 12 541 Replace all ignition leads 12 12 571 Replace one ignition lead connector 12 12 581 Replace all ignition lead connectors 12 13 501 Replace one ignition coil 12 31 521 Replace generator 13 00 604 Adjust engine idle speed and petrol/air mixture 61 12 501 Positive battery lead replacement 61 12 511 Negative battery lead replacement 61 21 519 Battery recharging	9	9	9	

11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 00 039	Test compression includes: Removal and refitting of spark plugs	3	3	3	
539	Test compression (job No. 11 00 009)	2	2	2	
11 00 050	Engine removal and reinstallation includes: Removal and refitting of petrol tank, transmission and exhaust system. Clean motor externally. Check and top-up engine oil. Adjust engine idle speed and petrol/air mixture.	43	43	43	
11 00 051	Install replacement engine includes: Removal and installation of engine, filling with engine oil, preparing old engine for dispatch.	53	53	53	
11 00 103	Engine dismantling and reassembly includes: Removal and reinstallation of the engine, fitting engine into and removing engine from assembly stand, sump removal and refitting, removal, replacement and cleaning of oil screen and suction bell, removal, replacement and cleaning of flywheel, removal and refitting of chain case cover and both cylinders. Cleaning of parts and checking for wear. Measuring both cylin- ders and pistons, all bearings, both main bearing bushings and connecting rod bearings. Measure and adjust axial play of the crankshaft.	144	144	144	
603	Dismantle and reassemble engine (loose engine)	101	101	101	
11 11 001	Replace engine housing includes: Removal and refitting of engine, fitting engine in and taking engine out of assembly stand. Removal and refitting of oil sump, removal, cleaning and refitting of oil screen and suction tube. Removal and refitting of flywheel and chain case cover. Removal and refitting/ cleaning of both cylinders. Cleaning parts and checking for wear. Measuring both cylinders and pistons, all crankshaft bearings and all connecting rod bearings. Measuring and adjusting axial play of the crankshaft. Punching in engine number.	141	141	141	

11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 11 050	Removal and reinstallation or replacement of left or right cylinder includes: Removal, cleaning and replacement of cylinder. Measuring cylinders and pistons. Adjusting valve clearance. Adjusting engine idle speed and petrol/air mixture.	23	23	23	
700	Removal, reinstallation or replacement of left or right cylinder	13	13	13	
11 11 061	Replace left or right cylinder foot and cylinder head gasket includes: Removal, cleaning and reinstallation of cylinder. Measuring cylinder and piston. Adjusting valve clearance. Adjusting engine idle speed and petrol/air mixture.	23	23	23	
711	Replacing cylinder head and cylinder foot gaskets right or left (loose engine)	13	13	13	
11 11 120	Removal and reinstallation or replacement of both cylinders includes: Removal and installation/clean sealing surfaces of both cylinders. Measure cylinder and piston. Adjust valve clearances. Adjust motor idle speed and petrol/air mixture.	30	30	30	
740	Remove, reinstall or replace both cylinders	23	23	23	
11 11 131	Replace both cylinder head and cylinder base gaskets includes: Remove and replace/clean sealing surfaces of both cylinders. Measure cylinders and pistons. Adjust valve clearances. Adjust motor idle speed and petrol/air mixture.	30	30	30	
751	Replace both cylinder head and cylinder base gaskets (loose engine)	23	23	23	
11 12 009	Tighten cylinder head bolts includes: Removal and reinstallation/sealing both cylinder head covers. Adjust valve clearances.	8	8	8	
11 12 030	Removal and reinstallation/sealing or replacement of left or right cylinder head cover	3	3	3	

11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 12 050	Removal and reinstallation/sealing or replacement of both cylinder head covers	5	5	5	
11 12 070	Removal and reinstallation of left or right cylinder head includes: Removal and replacement/cleaning and sealing of cylinder head. Adjust valve clearance. Adjust motor idle speed and petrol/air mixture.	22	22	22	
11 34					
560	Remove and install or replace one valve (cylinder head removed)	3	3	3	
570	Remove, install or replace two valves (cylinder head removed)	6	6	6	
600	Remove and replace all valves (cylinder head removed)	12	12	12	
11 12 071	Replacement of left or right cylinder head gaskets includes: Removal and refitting/cleaning and sealing of cylinder head. Adjusting valve clearance. Adjusting motor idle speed and petrol/air mixture.	22	22	22	
11 12 090	Remove and refit both cylinder heads	30	30	30	
11 12 091	Replace both cylinder head gaskets	30	30	30	
11 12 123	Dismantle and reassemble left or right cylinder head and grind all valves includes: Removal and replacement of both valves. Grinding both valves. Checking both valves for tightness.	28	28	28	
513	Dismantle and reassemble one cylinder head and grind all valves. (cylinder head complete removed)	6	6	6	
11 12 143	Dismantle and reassemble both cylinder heads and grind all valves	42	42	42	
523	Dismantle and reassemble both cylinder heads and grind all valves (cylinder head complete removed)	12	12	12	

11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 12 157	Dress all valve seats and valves includes: Removal, replacement, dismantling and reassembly of both cylinder heads.	54	54	54	
537	Dress two valve seats (cylinder head dismantled)	5	5	5	
557	Dress all valve seats (cylinder head dismantled)	10	10	10	
11 12 181	Replace left or right cylinder head includes: Removal and installation of left or right cylinder head. Grinding both valves. Checking both valves for tightness.	28	28	28	
660	Remove and replace left or right cylinder head and/or replace cylinder head gasket (loose engine)	13	13	13	
680	Remove and replace both cylinder heads and/or replace cylinder head gaskets (loose engine)	23	23	23	
11 12 201	Replace both cylinder heads	54	54	54	
11 12 212	Overhaul left or right cylinder head complete includes: Removal, dismantling, reassembly and refitting of left or right cylinder head. Dressing valve seats. Planishing cylinder head sealing surfaces.	44	44	44	
682	Overhauling left or right cylinder head complete (cylinder head removed)	22	22	22	
11 12 232	Overhaul both cylinder heads compl.	70	70	70	
712	Overhaul both cylinder heads compl. (cylinder heads removed)	44	44	44	
11 12 ...					
739	Planish sealing surfaces of one cylinder (cylinder head dismantled)	2	2	2	
749	Planish sealing surfaces of both cylinder heads (cylinder heads dismantled)	3	3	3	

11 Engine		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
11 13 000	Removal and reinstallation/sealing or replacement of oil sump includes: Engine oil draining and filling.	9	9	9	
500	Removal and refitting/sealing or replacement of oil sump (loose engine)	8	8	8	
11 41 ...					
65Q	Remove and reinstall or replace suction bell of oil pump (oil sump removed)	1	1	1	
11 14 000	Remove and reinstall or replace motor protective cover	3	3	3	
11 14 031	Replace starter cover panel includes: Remove and refit petrol tank. Fit new type emblems.	4	4	4	
11 14 060	Remove and replace/seal chain case cover includes: Remove and replace exhaust system complete. Adjust contact gap and ignition timing.	25	25	25	
651	Replace radial seal for crankshaft sealing in chain case cover (chain case cover removed)	1	1	1	
671	Replace radial sealing ring for camshaft sealing (chain case cover removed)	1	1	1	
691	Replace radial sealing ring for tachometer drive (chain case cover removed)	1	1	1	
11 41 ...					
603	Dismantle and reassemble oil pressure relief valve (chain case cover removed)	2	2	2	
11 14 061	Replace chain case cover includes: Removal and refitting of chain case cover	27	27	27	
11 14 071	Replace air intake scoop and/or filter for air intake scoop	2	2	2	
11 14 151	Replace crankshaft radial sealing ring (clutch side) includes: Removal and reinstallation of transmission. Removal, cleaning and installation of flywheel.	36	36	36	

11 Engine		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
11 15 101	Replace engine breather hose (on breather dome)	4	4	4	
11 15 111	Replace membrane valve for engine breather	4	4	4	
11 21 001	Replace crankshaft includes: Removal and replacement of engine, engine in assembly stand, sump, flywheel and chain case cover. Removal, cleaning and refitting of both cylinders. Cleaning parts and checking for wear. Measuring all bearings on crankshaft, both main bearing bushings and connecting rod bearings. Measuring and adjusting axial play of the crankshaft. Replacing all gaskets and similar spoiled parts.	151	151	151	
531	Replace all crankshaft main bearings (engine dismantled)	7	7	7	
601	Replace toothed ball bearing on the front of the crankshaft (chain case cover removed)	2	2	2	
11 22 000	Removal and reinstallation or replacement of flywheel includes: Removal and replacement of transmission	35	35	35	
11 24 000	Remove and refit or replace left or right connecting rod includes: Removal and refitting cylinder. Removal and refitting/cleaning and measuring of connecting rod and bearing shells	28	28	28	
11 24 030	Removal and refitting or replacement of both connecting rods	42	42	42	
531	Replace one connecting rod bearing shell (engine dismantled and/or connecting rod taken out)	2	2	2	
541	Replace all connecting rod bearing shells (engine dismantled and/or connecting rod taken out)	3	3	3	
601	Replace one connecting rod small end bush (connecting rod taken out)	7	7	7	
611	Replace both connecting rod small end bushes (connecting rods taken out)	14	14	14	

11 Engine		R 60/6	a) R75/6 b) R90/6	R 90 S	
11 25 000	Remove and refit or replace all pistons includes: Remove and replace both cylinders. Measure cylinders, pistons and connecting rod small end bushes.	33	33	33	
651	Replace piston rings on one piston (piston taken out)	2	2	2	
671	Replace piston rings on all pistons	3	3	3	
11 31 001	Replace camshaft and/or flange bearing for camshaft includes: Removal and refitting of engine. Fixing engine into and removing engine from assembly stand. Removal and refitting of flywheel, chain case cover and both cylinders.	112	112	112	
630	Removal and refitting or replacement of chain tensioner complete	1	1	1	
11 31 061	Replace chain wheel set includes: Removal and refitting of engine. Fitting engine into and removing engine from assembly stand, removal and refitting of flywheel, chain case cover and both cylinders.	111	111	111	
630	Removal and refitting of chain tensioner complete	1	1	1	
11 31 080	Remove and refit or replace chain tensioner complete includes: Removal and refitting of chain case cover	26	26	26	
11 31 001	Replace one pushrod left or right includes: Adjust valve clearance.	8	8	8	
11 32 041	Replace both pushrods left or right includes: Adjust valve clearance.	9	9	9	
11 32 061	Replace all pushrods includes: Adjust valve clearance.	12	12	12	
11 32 100	Remove and refit or replace tappet and/or exhaust valve left or right includes: Removal and refitting of cylinder.	23	23	23	

11 Engine		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
11 32 140	Remove and refit or replace both tappets left or right includes: Removal and refitting of cylinder	23	23	23	
11 32 160	Remove and refit or replace all tappets includes: Removal and refitting of both cylinders	32	32	32	
11 33 200	Replace one rocker arm shaft and/or one rocker arm for inlet or exhaust valve left or right includes: Adjust valve clearances.	11	11	11	
11 33 240	Remove and refit or replace both rocker arm shafts and/or both rocker arms left or right includes: Adjust valve clearances.	13	13	13	
11 33 280	Remove and refit or replace all rocker arm shafts, all rocker arms includes: Adjust valve clearances.	23	23	23	
11 34 004	Adjust valve clearances	5	5	5	
11 34 100	Remove and refit or replace valve springs for inlet and/or exhaust valves left or right includes: Removal and refitting of cylinder head left or right	25	25	25	
607	Dress one (two) valve cones (valves removed)	1	1	1	
11 34 250	Remove and refit or replace both valve springs left or right	28	28	28	
11 34 170	Remove and refit or replace all valve springs	42	42	42	
637	Dress all valve cones	2	2	2	
11 41 000	Remove and refit or replace oil pump includes: Remove and refit transmission. Clean engine housing. Check and top-up engine oil.	39	39	39	
11 42 090	Remove and refit/seal or replace cover (outer) for full flow oil filter includes: Check and, if necessary, top-up engine oil.	2	2	2	

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12 Engine Electrics		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
12 00 009	Check ignition system (with engine tester) includes: Battery, spark p ugs, both ignition coils, ignition leads and ignition lead connectors for insulation and continuity, check ignition condenser. Adjust contact gap and ignition timing.	12	12	12	
12 11 004	Adjust ignition timing includes: Check and adjust contact breaker contacts.	5	5	5	
12 11 130	Remove and refit or replace centrifugal advance includes: Check and adjust contact breaker points. Adjust ignition timing.	6	6	6	
12 11 141	Replace contact breaker points includes: Adjust contact breaker points and ignition timing.	8	8	8	
601	Replace contact breaker points (engine protective cover removed)	6	6	6	
12 11 169	Check ignition condenser (with engine tester)	4	4	4	
641	Replace ignition condenser (motor protective cover removed)	1	1	1	
12 11 171	Replace ignition condenser	3	3	3	
12 12 009	Check spark plugs includes: Adjust electrode gap	3	3	3	
12 12 011	Replace all spark plugs includes: Check and, if necessary, adjust electrode gaps.	2	2	2	
511	Replace all spark plugs (for job No. 11 00 009)	1	1	1	
12 12 019	Check ignition leads and ignition lead connectors (with engine tester)	3	3	3	

12 Engine Electrics		R 60/6	a) R75/6 b) R90/6	R 90 S	
12 12 021	Replace one ignition lead includes: Removal and refitting of fuel tank.	3	3	3	
531	Replace one ignition lead (for job No. 11 00 009)	1	1	1	
12 12 041	Replace all ignition leads includes: Removal and replacement of fuel tank.	4	4	4	
541	Replace all ignition leads				
12 12 071	Replace one ignition lead connector	1	1	1	
571	Replace one ignition lead connector (for job No. 11 00 009)	1	1	1	
12 13 089	Test both ignition coils (with engine tester)	5	5	5	
12 13 100	Remove and refit or replace left or right ignition coil	3	3	3	
501	Replace one ignition coil (for job No. 11 00 009)	1	1	1	
12 31 009	Test generator and regulator cutout includes: Connecting and disconnecting test apparatus	5	5	5	
12 31 020	Remove and refit or replace generator includes: Loosen and fasten horn and motor protective cover.	6	6	6	
521	Replace generator (for job No. 11 00 009)	3	3	3	
12 31 170	Remove and refit or replace diode carrier of the generator includes: Loosen and fasten horn and engine protective cover.	4	4	4	
670	Remove and refit or replace diode carrier (motor protective cover removed)	2	2	2	

12 Engine Electrics		R 60/6	a) R75/6 b) R90/6	R 90 S	
12 31 201	Replace carbon brushes in generator includes: Loosen and fasten horn and motor protective cover.	10	10	10	
551	Replace carbon brushes (generator frame removed)	5	5	5	
569	Skim sliprings (rotor removed)	1	1	1	
12 32 000	Remove and refit or replace regulator cutout for generator includes: Removal and refitting of petrol tank.	3	3	3	
12 41 020	Remove and refit or replace starter includes: Removal and refitting of petrol tank. Loosening and refastening horn and motor protective cover.	8	8	8	
12 41 041	Replace magnetic engagement switch includes: Removal and replacement of starter.	10	10	10	
12 41 103	Dismantle and reassemble starter includes: Removal and replacement of starter and magnetic switch. Cleaning parts and checking for wear. Checking operation.	17	17	17	

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13 Fuel Cleaning and Control		R 60/6	a) R75/6 b) R90/6	R 90 S	
13 00 004	Adjust engine idle speed and petrol/air mixture includes: Synchronizing both carburetors and adjusting both accelerator cables.	4	4	4	
604	Adjust engine idle speed and petrol/air mixture (for job No. 11 00 009)	2	2	2	
13 10 004	Adjust float level in both carburetors includes: Removal and refitting of both carburetors.	10	10	10	
13 10 009	Clean both carburetors includes: Removal and refitting of both carburetors. Adjusting engine idle speed and petrol/air mixture.	15	15	15	
13 10 080	Remove and refit left or righthand carburetor includes: Adjusting engine idle speed and petrol/air mixture.	5	5	5	
13 10 100	Remove and refit/replace both carburetors includes: Adjust engine idle speed and petrol/air mixture.	8	8	8	
13 10 110	Remove and refit/replace nozzle needle for left or righthand carburetor includes: Adjust engine idle speed and petrol/air mixture.	4	5	4	
13 10 130	Remove and refit/replace nozzle needle for both carburetors includes: Adjust engine idle speed and petrol/air mixture.	5	6	5	
13 10 231	Replace membrane on piston for left or right carburetor includes: Adjust engine idle speed and petrol/air mixture.	—	6	—	
13 10 251	Replace membrane on piston of both carburetors includes: Adjust engine idle speed and petrol/air mixture.	—	8	—	
13 10 260	Remove and refit/seal or replace float chamber for left or righthand carburetor	2	2	2	

13 Fuel Cleaning and Control		R 60/6	a) R75/6 b) R90/6	R 90 S	
13 10 280	Remove and refit/seal or replace float chamber of both carburetors	2	2	2	
13 10 290	Remove and refit/replace float for left or righthand carburetor includes: Remove and refit carburetor.	7	7	7	
13 10 310	Remove and refit/replace float for both carburetors includes: Remove and refit carburetors.	10	10	10	
13 10 321	Replace float needle in left or righthand carburetor	7	7	7	
13 10 341	Replace float needles in both carburetors	10	10	10	
13 10 350	Remove and refit/replace choke housing on left or righthand carburetor includes: Remove and refit carburetor.	6	6	6	
13 10 370	Remove and refit/replace choke housing on both carburetors includes: Remove and refit carburetors.	8	8	8	
13 11 ...					
562	Overhaul one carburetor (carburetor removed)	4	5	4	
13 23 004	Adjust both Bowden cables for choke operation	2	2	2	
13 23 041	Replace left or righthand bowden cable for choke operation includes: Removing and fitting Bowden cable to choke lever. Adjusting Bowden cable.	5	5	5	
13 23 080	Remove and refit/replace choke control complete (with Bowden cables) includes: Removing and refitting both Bowden cables on choke lever and both carburetors. Adjusting both Bowden cables.	4	4	4	
13 72 000	Remove and refit/replace air filter element	3	3	3	

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Fuel Screen	– 1
Fuel hose	– 1

16 Petrol Tank and Fuel Hoses		R 60/6	a) R75/6 b) R90/6	R 90 S	
16 00 009	Clean complete fuel system includes: Removing and refitting petrol tank. Cleaning both carburetors.	13	13	13	
16 11 009	Clean petrol tank includes: Removing and refitting petrol tank.	6	6	6	
16 11 030	Remove and refit petrol tank	2	2	2	
16 11 031	Replace petrol tank includes: Removing and refitting petrol tank.	8	8	8	
16 11 271	Replace both rubber buffers securing petrol tank includes: Removing and refitting petrol tank.	3	3	3	
16 11 281	Replace rubber support bracket for petrol tank front includes: Removing and refitting petrol tank.	4	4	4	
16 11 291	Replace rubber support beneath petrol tank includes: Removing and refitting petrol tank.	4	4	4	
16 12 150	Remove and refit or replace left or right fuel cock	3	3	3	
16 12 180	Remove and refit/clean right or left fuel screen	2	2	2	
16 12 251	Replace fuel hose (from fuel cock to carburetor) left or right	2	2	2	
16 12 281	Replace fuel hose (between dividing piece left and right)	3	3	3	
16 12 301	Replace all fuel hoses	4	4	4	
16 12 311	Replace dividing piece for fuel hoses right or left	1	1	1	

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31 Gear Shift Fork	- 2
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41 Foot Change Pedal	- 2

23 Mechanical Transmission		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
23 00 020	Remove and refit transmission includes: Removal and refitting of transmission on engine flange. Cleaning transmission externally. Checking oil level and topping up, if necessary.	23	23	23	
23 00 030	Fit rebuilt transmission includes: Removal and refitting transmission. Filling new transmission with oil.	24	24	24	
23 00 052	Overhaul transmission includes: Removal and refitting of transmission. Draining and refilling gear oil. Fitting transmission in and removing from assembly stand. Removal and refitting of bearing stand for gearshift discs. Removal and refitting/measuring of complete set of gears. Dismantle and reassemble drive shaft, driven shaft and gearshift mechanism (bearing) complete. Replace all bearings and sealing rings.	47	47	47	
23 11 001	Replace transmission housing includes: Removal and refitting of transmission. Removal and refitting of transmission housing cover and replacing gasket. Removal and refitting/measuring complete set of gears. Removal and refitting bearing stand for gearshift discs and shaft with gearshift forks.	35	35	35	
23 11 040	Remove and replace/seal transmission housing cover includes: Removal and refitting of transmission. Draining and refilling gear oil. Fitting transmission in and removing from assembly stand.	32	32	32	
23 12 . . .					
541	Replace radial seal ring on driven shaft (transmission housing cover removed)	1	1	1	
23 12 011	Replace radial sealing ring on drive shaft includes: Removal and replacement of transmission.	23	23	23	
501	Replace radial seal ring on drive shaft (loose transmission)	1	1	1	
23 12 051	Replace radial sealing ring or driven flange includes: Removal and replacement of transmission.	31	31	31	
531	Replace radial seal ring for driven flange (loose transmission)	8	8	8	

23 Mechanical Transmission		R 60/6	a) R75/6 b) R90/6	R 90 S	
23 12 111	Replace radial seal ring for foot change shaft includes: Removal and refitting of foot change pedal.	2	2	2	
611	Replace radial seal ring for foot change shaft (loose transmission)	1	1	1	
23 21 001	Replace drive flange for transmission includes: Removal and refitting of transmission.	26	26	26	
23 21 101	Replace toothed ball bearings on all gear shafts includes: Removal and replacement of transmission. Removal and replacement of transmission housing cover.	41	41	41	
23 22 001	Replace complete set of gears includes: Removal and replacement of transmission. Removal and replacement of transmission housing cover.	43	43	43	
23 22 100	Remove and refit/replace speedometer drive pinion	2	2	2	
23 31 001	Replace gearshift forks includes: Remove and refit transmission, transmission housing cover with gasket, bearing support for gearshift discs.	34	34	34	
501	Replace all gearshift forks (loose gear box)	9	9	9	
23 31 303	Dismantle and reassemble gearshifting mechanism (gearshift lever) complete includes: Removal and refitting of transmission, transmission housing cover with gasket.	33	33	33	
23 41 300	Remove and refit/replace foot change pedal	1	1	1	

26 PROPELLER SHAFT

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26 Propeller Shaft	R 60/6	a) R 75/6 b) R 90/6	R 90 S	
26 11 000 Remove and refit or replace propeller shaft (cardan shaft) complete includes: Removal and refitting of rear wheel gear. Cleaning rear swing arm. Balance and set rear swing arms. Grease both swing arm bearings.	20	20	20	
26 11 140 Remove and refit or replace coupling bell on propeller shaft (cardan shaft) rear includes: Removal and refitting of rear wheel gear.	14	14	14	

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31 Front Axle		R 60/6	a) R75/6 b) R90/6	R 90 S	
31 42 009	Measure telescopic fork	41	41	41	
31 42 050	Remove and refit/replace steering shock absorber	3	3	3	
31 42 100	Remove and refit telescopic fork	25	25	25	
31 42 103	Dismantle and reassemble telescopic fork	38	38	38	
701	Replace lower fork bridge (telescopic fork dismantled)	12	12	12	
31 42 112	Overhaul telescopic fork	54	54	54	
31 42 131	Replace fork sliding tube left or right	13	13	13	
31 42 151	Replace both fork sliding tubes	15	15	15	
31 42 200	Replace left or right fork stand tube	38	38	38	
31 42 221	Replace both fork stand tubes	39	39	39	
31 42 250	Remove and refit or replace both shock absorbers in the telescopic fork	18	18	18	
31 42 321	Replace both tapered roller bearings for the telescopic fork support	31	31	31	
721	Replace both tapered roller bearings for the telescopic fork support (telescopic fork taken out)	11	11	11	
31 42 361	Replace cup for sealing fork sliding tube left or right	13	13	13	
31 42 381	Replace both cups for sealing fork sliding tubes	15	15	15	
31 42 391	Replace sealing ring for sliding tube bottom screw coupling left or right	6	6	6	
821	Replace sealing ring for sliding tube bottom screw coupling left or right (telescopic fork taken out)	4	4	4	

32 STEERING

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32 Steering		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
32 00 454	Adjust steering includes: Removing and replacing petrol tank.	4	4	4	
32 32 000	Remove and refit or replace steering lock	3	3	3	
32 71 000	Remove and refit or replace handlebar includes: Loosening and tightening cable clamps left and right. Switch on swivel pieces left and right, removing and refitting clamp supports on handlebar. Removing and refitting both swivel pieces left and right on handlebar and pulling tight. Checking operation of the electrical equipment. Adjusting clutch free play.	7	7	7	
32 72 001	Replace handlebar grips left or right	2	2	2	
32 72 021	Replace both handlebar grips	3	3	3	
32 72 040	Remove and refit or replace hand clutch lever includes: Removing and refitting clutch cable above and below. Setting clutch free play.	3	3	3	
32 72 050	Remove and refit or replace swivel piece with hand clutch lever complete includes: Removing and refitting clutch cable above and below, swivel piece on handlebar, clutch switch in swivel piece. Check function of electrical equipment. Adjust clutch free play.	5	5	5	
32 72 061	Replace swivel piece for hand clutch lever includes: Removing and refitting swivel piece with hand clutch lever, hand clutch lever on swivel piece.	6	6	6	
32 72 080	Remove and refit or replace hand brake lever includes: With R 75/6 – R 90/6 – R 90 S: Removing and refitting petrol tank. Adjust hand brake at brake cylinder includes with R 60/6: Adjusting hand brake Bowden cable	3	4	4	

32 Steering	R 60/6	a) R 75/6 b) R 90/6	R 90 S	
32 72 100 Remove and refit or replace throttle twist grip with handbrake cable complete includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting petrol tank, brake cable on brake cylinder, handbrake lever and brake cable from swivel piece. Loosening and retightening swivel piece and throttle twist grip on handlebar. Removing and refitting mirror. Adjusting handbrake at brake cylinder. includes with R 60/6: Removing and refitting handbrake cable above and below.		6	6	
32 72 131 Replace grip tube with handlebar grip for throttle cable operation includes: Adjusting cam for throttle cable operation.	3	3	3	
32 72 141 Replace cam for throttle cable operation includes: Setting motor idle speed and petrol/air mixture, cam for the throttle cable.	5	5	5	
32 73 000 Remove and refit or replace clutch cable	4	4	4	
32 73 010 Remove and refit or replace handbrake cable includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting petrol tank. Checking handbrake adjustment. includes with R 60/6: Adjusting Bowden cable at the brake lever of the front wheel brake, Bowden cable at the handbrake lever and swivel piece.	4	4	4	
32 73 030 Remove and refit or replace throttle cable for carburetor left or right includes with R 60/6 – R 90 S: Removing and refitting petrol tank. Removing and refitting throttle cable. Adjusting motor idle speed and petrol/air mixture. includes with R 75/6 – R 90/6: Removing and refitting petrol tank. Removing and refitting cable on the carburetor cover and removing the throttle cable on the choke lever. Adjusting motor idle speed and petrol/air mixture.	8	7	8	

32 Steering	R 60/6	a) R 75/6 b) R 90/6	R 90 S	
32 74 050 Remove and refit or replace both throttle cables for carburetors includes with R 60/6 – R 90 S: Removing and refitting petrol tank. Removing and refitting throttle cable. Adjusting motor idle speed and petrol/air mixture. includes with R 75/6 – R 90/6: Removing and refitting petrol tank. Removing and refitting cable on the carburetor cover and removing the throttle cable on the choke lever. Adjusting motor idle speed and petrol/air mixture.	10	9	10	

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33 Rear Axle		R 60/6	a) R75/6 b) R90/6	R 90 S	
33 10 050	Remove and refit rear wheel drive includes: Draining and refilling oil from rear swing arm. Removing and refitting rear wheel.	9	9	9	
33 10 051	Replace rear wheel drive complete includes: Removing and refitting rear wheel drive, both rear wheel brake-shoes, brake lever on brake key and brake key in cardan housing.	12	12	12	
33 10 052	Overhaul rear wheel drive includes: Removal and refitting of rear wheel drive, cardan housing cover and bevel drive gear (pinion). Replacing taper roller bearing and needle bearing or bevel drive gear and toothed roller bearing and needle bearing for bevel gear. Adjusting torsional backlash of bevel gear and taking contact pattern. Determining and adjusting axial play of bevel gear.	63	63	63	
33 11 401	Replace cardan housing includes: Removing and refitting rear wheel drive, cardan housing cover and bevel drive gear (pinion). Determining installation dimension of bevel drive gear and setting bevel drive gear. Adjusting torsional backlash of bevel gear and taking contact pattern. Determining and adjusting axial play of bevel gear.	56	56	56	
33 11 410	Removing and refitting/sealing cardan housing cover includes: Removing and refitting rear wheel drive. Draining and refilling oil in rear wheel drive. Removing, refitting and sealing cardan housing cover.	14	14	14	
33 11 411	Replace cardan housing cover gasket includes: Removing and refitting rear wheel drive and cardan housing cover. Determining and adjusting axial play of bevel gear.	16	16	16	
33 12 051	Replace bevel drive gear (pinion) with bevel gear includes: Removing and replacing rear wheel drive, cardan housing cover and bevel drive gear (pinion). Determining installation dimension of bevel drive gear and setting bevel drive gear. Determining axial backlash of bevel gear and taking contact pattern. Determining and adjusting axial play of bevel gear.	59	59	59	

33 Rear Axle		R 60/6	a) R75/6 b) R90/6	R 90 S	
33 12 101	Replacing coupling hub on bevel drive gear for rear wheel drive includes: Removing and refitting gear wheel drive. Removing and refitting both rear wheel brake blocks and brake lever. Removing and refitting brake key in cardan housing.	14	14	14	
33 12 111	Replace shaft seal ring for coupling hub of rear wheel drive includes: Removing and refitting rear wheel drive. Draining and refilling oil in rear wheel drive. Removing and refitting both rear wheel brake blocks, brake lever on brake key and brake key on cardan housing.	15	15	15	
611	Replace shaft sealing ring for coupling hub of rear wheel drive (rear wheel drive taken out)	6	6	6	
631	Replace shaft sealing ring for bevel gear sealing in cardan housing cover	6	6	6	
33 12 131	Replace shaft seal ring for bevel gear sealing in cardan housing cover includes: Removing and refitting rear wheel drive. Draining and refilling oil in rear wheel drive. Removing and refitting both rear wheel brake-shoes, brake lever on brake key and brake key in cardan housing.	15	15	15	
33 12 151	Replace shaft sealing ring for bevel gear sealing in cardan housing includes: Removing and refitting rear wheel drive. Draining and refilling oil in rear wheel drive. Removing and refitting both rear wheel brake-shoes, brake lever on brake key and brake key in cardan housing.	16	16	16	
651	Replace shaft seal ring for bevel gear sealing in cardan housing cover (rear wheel drive taken out)	7	7	7	
33 12 171	Replace taper roller bearing for drive bevel gear support includes: Removing and refitting rear wheel drive. Dismantling and reassembling rear wheel drive.	39	39	39	
681	Replace needle bearing for bevel drive gear support (bevel drive gear support complete taken out)	7	7	7	
691	Replace tapered roller bearing and needle bearing for bevel drive gear support (bevel drive gear complete taken out)	12	12	12	

33 Rear Axle		R 60/6	a) R75/6 b) R90/6	R 90 S	
33 12 . . .					
721	Replace toothed roller bearing and needle bearing for bevel gear support (bevel gear complete taken out)	4	4	4	
33 17 350	Remove and refit complete rear swing arm includes: Removing and refitting rear wheel drive, brake pedal complete with pull rod and propeller shaft at gear drive flange and left-hand spring strut. Adjust rear swing arm and set bearing. Grease both swing arm bearings.	17	17	17	
851	Replace rear swing arm (rear swing arm taken out)	8	8	8	
33 17 361	Replace both shaft seal rings for rear swing arms includes: Removal and refitting rear swing arms complete and both pressure sleeves for tapered roller bearings.	19	19	19	
33 17 381	Replace both tapered roller bearings for rear swing arm includes: Removing and refitting rear swing arm complete, both pressure casings for tapered roller bearings and shaft sealing rings.	22	22	22	
881	Replace both tapered roller bearings on rear swing arms (rear swing arms taken out).	5	5	5	
33 17 391	Replace seal between rear swing arm and cardan housing includes: Draining and refilling oil in rear swing arm. Removing and refitting rear wheel, cardan housing on rear swing arm and rear wheel drive complete.	9	9	9	
33 17 401	Replace rubber bellows between gear and rear swing arm	8	8	8	
901	Replace rubber bellows between gear and rear swing arm (rear swing arm taken out)	1	1	1	
33 52 021	Replace both rear shock absorbers includes: Removing and refitting both spring strut shock absorbers complete.	7	7	7	
33 52 100	Remove and refit left or right rear spring strut shock absorber	3	3	3	

33 Rear Axle		R 60/6	a) R75/6 b) R90/6	R 90 S	
33 52 120	Remove and refit both rear spring strut shock absorbers	5	5	5	
33 52 271	Replace one (both) silent block(s) for rear spring strut shock absorbers	5	5	5	
33 52 291	Replace both silent blocks on rear spring strut shock absorbers	10	10	10	
33 53 101	Replace left or right lug for rear spring strut shock absorber complete includes: Removing and refitting rear spring strut shock absorber complete	5	5	5	
33 53 121	Replace both spring strut lugs for rear spring strut shock absorbers includes: Removing and refitting rear spring strut shock absorbers complete	9	9	9	
33 53 131	Replace left or right bellows covering for rear spring strut shock absorber includes: Removing and refitting rear spring strut shock absorber complete.	5	5	5	
33 53 151	Replace both bellows coverings for rear spring strut shock absorbers includes: Removing and refitting rear spring strut shock absorbers complete.	8	8	8	
33 53 160	Remove and refit/replace adjustment gear for left or right rear spring strut shock absorber Includes: Removing and refitting rear spring strut shock absorber complete.	5	5	5	
33 53 180	Remove and refit/replace adjustment gear for both rear spring strut shock absorbers includes: Removing and refitting rear spring strut shock absorber complete.	9	9	9	

34 BRAKES

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34 Brakes		R 60/6	a) R75/6 b) R90/6	R 90 S	
34 00 021	Renew brake fluid in brake system includes with R 75/6 – R 90/6 – R 90 S only: Removing and refitting petrol tank. Bleeding brake caliper(s), filling with brake fluid.	—	4	4	
34 00 046	Bleed brakes includes with R 75/6 – R 90/6 – R 90 S only: Removing and refitting petrol tank. Fill with brake fluid.	—	3	3	
34 10 114	Adjust front wheel brake includes: with R 75/6 – R 90/6 – R 90 S: Removing and replacing petrol tank. Adjusting cable assembly on the cylinder with gauge. Testing operation. with R 60/6: Adjust knurled screws for cable adjustment, eccentric adjusting bolts and handbrake cable.	2	4	5	
34 10 124	Adjust rear brake	2	2	2	
34 10 134	Adjust front and rear brakes	2	5	5	
34 10 159	Clean and adjust front brake includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting front wheel and brake pads. Cleaning caliper(s). Checking freedom of movement in brake plunger. Adjust caliper(s). includes with R 60/6: Removing and refitting front wheel. Checking handbrake rod for freedom of movement.	5	4	6	

34 Brakes		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
34 10 169	Clean and adjust rear brake includes: Removing and refitting rear wheel. Checking foot brake operation for ease of movement.	4	4	4	
34 10 179	Clean and adjust front and rear brakes includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting front and rear wheels. Adjusting brake caliper(s). Cleaning and adjusting rear brake. includes with R 60/6: Checking Bowden cable for ease of movement. Adjusting front and rear brakes.	9	8	9	
34 11 000	Removing and refitting or replacing brake pads in one or both disc brakes includes: Removing and refitting front wheel. Removing, refitting and greasing bolts (eccentric). Adjusting brake caliper (front brake). Testing operation.	–	4	6	
34 11 012	Overhauling front brake (R 60/6) includes: Removing and refitting front wheel. Removing and refitting brake cable on brake lever and nipple holder. Removing and refitting front brake bracket complete and brake cable. Removing and refitting both brake-shoes and brake-shoe safety rings. Mark position of brake lever on brake key and remove and refit. If necessary, replace both brake-shoes and other parts.	15	–	–	
34 11 020	Remove and refit or replace front brake fixed caliper left or right includes: Removing and refitting caliper on sliding tube. Bleeding brake. Adjusting brake pads.	–	5	–	
34 11 040	Remove and refit or replace both front brake fixed calipers includes: Removing and refitting caliper on sliding tube. Bleeding brake. Adjusting brake pads.	–	–	6	

34 Brakes		R 60/6	a) R75/6 b) R90/6	R 90 S	
34 11 101	Replace front brake bracket includes: Removing and refitting front brake bracket complete.	12	—	—	
34 11 150	Remove and refit or replace both brake-shoes of front brake includes: Removing and refitting front wheel.	8	—	—	
740	Remove and refit or replace both brake-shoes of front brake (front wheel taken out)	4	—	—	
34 11 169	Check brake ring in front wheel for out of true includes: Removing and refitting front wheel.	6	—	—	
769	Check brake ring in front wheel for out of true (front wheel taken out)	2	—	—	
34 11 ...					
779	Turn out brake ring in front wheel hub (front wheel taken out)	9	—	—	
34 11 200	Remove and refit or replace front brake disc left or right includes: Removing and refitting front wheel. Adjusting brake pads on front brake.	—	5	—	
34 11 220	Remove and refit or replace both front brake discs includes: Removing and refitting front wheel. Adjusting brake pads on front brake.	—	—	7	
34 21 032	Overhaul rear brake includes: Removing and refitting rear wheel. Removing and refitting both brake blocks and springs. Cleaning all parts and checking for wear. Checking brake ring in rear hub for out-of-true. Replacing both brake blocks in rear brake.	11	11	11	
34 21 150	Remove and refit or replace both brake blocks in rear brake includes: Removing and refitting rear wheel. Cleaning both brake blocks. Replacing brake block springs.	5	5	5	
540	Remove and refit or replace both brake blocks in rear brake (rear wheel or rear wheel drive taken out)	2	2	2	

34 Brakes		R 60/6	a) R75/6 b) R90/6	R 90 S	
34 21 169	Check brake ring in rear wheel hub for out-of-true includes: Removing and refitting rear wheel.	5	5	5	
959	Check brake ring in rear wheel hub for out-of-true (rear wheel taken out)	2	2	2	
34 21 ...					
969	Turn out brake ring in rear wheel hub (rear wheel taken out)	9	9	9	
34 31 000	Remove and refit or replace main brake cylinder includes: Removing and refitting petrol tank, brake cylinder on frame and brake switch. Bleed brakes. Fill with brake fluid. Check operation.	—	7	7	
34 31 111	Replace brake light switch includes: Removing and refitting petrol tank. Checking operation.	—	3	3	
34 31 161	Replace cover for brake fluid container includes: Removing and refitting petrol tank. Checking operation.	—	3	3	
34 32 381	Replace front brake hose includes: Removing and refitting petrol tank. Bleeding brakes. Filling with brake fluid and checking for leaks.	—	4	—	
34 32 401	Replace both brake hose includes: Removing and refitting petrol tank. Bleeding brakes. Filling with brake fluid and checking for leaks.	—	—	5	
34 32 201	Replace front brake tubing includes: Bleeding brakes. Filling with brake fluid and checking for leaks.	—	4	—	
34 32 221	Replace tubing for both front brakes includes: Bleeding brakes. Filling with brake fluid and checking for leaks.	—	—	5	

35 FOOT OPERATION

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35 21 Foot Brake Pedal	35 - 1
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35 Foot Operation		R 60/6	a) R75/6 b) R90/6	R 90 S	
35 21 000	Remove and refit or replace brake pedal includes: Removing and refitting rod on brake pedal, ring and pressure spring. Greasing foot brake pedal and adjusting height of brake pedal. Adjusting foot brake. Adjusting brake light switch.	4	4	4	
35 21 101	Replace pivot bolts for foot brake pedal includes: Removing and refitting pull-rod on brake pedal, ring and pressure spring. Greasing foot brake pedal. Adjusting foot brake.	3	3	3	
35 21 111	Replace grease nipple in pivot bolts for foot brake pedal includes: Greasing foot brake pedal.	1	1	1	
35 21 120	Remove and refit or replace pull-rod for foot brake includes: Greasing foot brake pedal. Adjusting foot brake.	3	3	3	
35 21 131	Replace pressure spring on pull-rod for foot brake includes: Adjusting foot brake.	2	2	2	

36 WHEELS

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36 30	Wheel Balancing	36 — 1
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	Wheel Hubs	— 3
	Wheel Bearings	— 3
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36 Wheels		R 60/6	a) R75/6 b) R90/6	R 90 S	
36 30 008	Balance front wheel (statically) includes: Removing foreign bodies and mounting wheel in and taking out of balancing gear.	7	6	6	
508	Balance front wheel (statically) (wheel taken out)	3	3	3	
36 30 018	Balance rear wheel (statically) includes: Removing foreign bodies and mounting wheel in and taking out of balancing gear.	7	7	7	
518	Balance rear wheel (statically) (wheel taken out)	3	3	3	
36 30 028	Balance front and rear wheels (statically) includes: Removing foreign bodies and mounting wheels in and taking out of balancing gear.	12	12	12	
528	Balance front and rear wheels (statically) (wheels taken out)	7	7	7	
36 30 039	Recenter front wheel includes: Removing and refitting front wheel. Mounting wheel in and taking out of balancing gear. Check brake ring for out-of-true.	13	12	12	
539	Recenter front wheel (wheel taken out)	10	10	10	
36 30 049	Recenter rear wheel includes: Removing and refitting rear wheel. Mounting wheel in and taking out of balancing gear. Check brake ring for out-of-true.	12	12	12	
549	Recenter rear wheel (wheel taken out)	10	10	10	
36 30 059	Recenter front and rear wheels includes: Removing and refitting front and rear wheels. Mounting wheels in and taking out of balancing gear. Check brake rings for out-of-true.	25	25	25	
559	Recenter front and rear wheels (wheels taken out)	19	19	19	

36 Wheels		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
36 30 300	Remove and refit front wheel includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting linchpin with spacer. includes with R 60/6: Removing and refitting brake torque arm and removing and refitting linchpin. Adjusting front brake.	4	3	3	
36 30 320	Removing and refitting rear wheel includes: Removing and refitting linchpin. Adjusting rear brake.	3	3	3	
36 30 330	Removing and refitting front and rear wheels	6	5	5	
36 30 341	Replacing front wheel includes: Removing and refitting front wheel. Adjust air pressure and check tube for leaks. Balance wheel statically.	12	11	11	
601	Replace front wheel (wheel taken out)	8	8	8	
36 30 351	Replacing rear wheel includes: Removing and refitting rear wheel. Adjust air pressure and check tube for leaks. Balance wheel statically.	11	11	11	
611	Replace rear wheel (wheel taken out)	8	8	8	
36 30 361	Replacing front and rear wheel	22	22	22	
621	Replacing front and rear wheels (wheels taken out)	16	16	16	
36 31 061	Replace lipped sealing ring(s) for sealing front wheel bearings includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting wheel. Adjusting wheel bearing play. includes with R 60/6: Removing and refitting wheel. Removing and refitting bearing cover.	6	5	5	

36 Wheels		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
36 31 071	Replace lipped sealing ring for sealing rear wheel bearings includes: Removing and refitting wheel. Removing and refitting bearing cover.	6	6	6	
36 31 101	Replacing rim or spokes for front wheel includes: Removing and refitting wheel. Checking brake ring for out-of-true. Grinding down spokes. Mounting tyre and tube, checking air pressure and for leaks. Balancing wheel statically.	40	39	39	
36 31 111	Replacing rim or spokes for rear wheel includes: Removing and refitting wheel. Checking brake ring for out-of-true. Grinding down spokes. Mounting tyre and tube, checking air pressure and for leaks. Balancing wheel statically.	40	40	40	
36 31 201	Replace front wheel hub includes with R 75/6 – R 90 6 – R 90 S: Removing and refitting wheel. Removing and refitting/cleaning brake disc(s). Removing tyre and tube. Removing and refitting both sleeves with bearings. Greasing bearing. Removing and refitting both bearing rings. Centering rim. Grinding down spokes. Mounting tyre and tube. Balancing wheel statically. Adjusting brake pads. Adjusting wheel bearings. includes with R 60/6: Removing and refitting wheel. Removing tyre and tube. Removing and refitting bearing pressure sleeve and, if necessary, reducing sleeve. Renewing grease filling. Removing old rim and fitting new rim to spokes. Mounting tyre and tube. Balancing wheel statically. Turning out brake ring to size.	52	44	44	
36 31 211	Replacing wheel hub for rear wheel	52	52	52	
36 31 221	Replacing wheel hubs for front and rear wheels	103	95	95	
36 31 324	Adjust wheel bearing play in front wheel includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting wheel. Adjusting wheel bearings with friction meter. includes with R 60/6: Removing and refitting wheel. Greasing bearings. Pre-loading bearings and checking bearing play	12	6	6	
824	Adjust wheel bearing play in front wheel (wheel taken out)	8	3	3	

36 Wheels		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
36 31 334	Adjust wheel bearing play in rear wheel	12	12	12	
834	Adjust wheel bearing play in rear wheel	8	8	8	
36 31 344	Adjust wheel bearing play in front and rear wheels	22	22	22	
844	Adjust wheel bearing play in front and rear wheels (wheels taken out)	17	12	12	
36 31 351	Replace wheel bearings of front wheel includes with R 75/6 – R 90/6 – R 90/7: Removing and refitting wheel. Adjusting wheel bearings. includes with R 60/6: Removing and refitting wheel. Preloading and adjusting wheel bearings.	13	6	6	
36 31 361	Replace wheel bearings in rear wheel	13	13	13	
36 31 371	Replace wheel bearings in front and rear wheels	25	18	18	
36 32 001	Replace tyre for front wheel includes: Removing and refitting wheel. Balancing wheel statically.	12	11	11	
36 32 011	Replace tyre for rear wheel includes: Removing and refitting wheel. Balancing wheel statically.	11	11	11	
36 32 021	Replace tyres for front and rear wheels	22	21	21	
36 32 031	Replace inner tube for front wheel includes: Removing and refitting wheel. Balance wheel statically.	11	10	10	
36 32 041	Replace inner tube for rear wheel includes: Removing and refitting wheel. Balance wheel statically.	10	10	10	
36 32 051	Replace tubes for front and rear wheels	20	19	19	

46 FRAME

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46 Frame		R 60/6	a) R75/6 b) R90/6	R 90 S	
46 51 030	Remove and refit/replace frame front part includes: Removal and refitting engine. Removal and refitting telescopic fork. Removal and refitting rear swing arm complete. (R 90 S: remove and refit cockpit enclosure.)	110	126	128	
46 51 ...					
509	Measure frame front part (frame front part removed)	AZ	AZ	AZ	
46 51 ...					
519	Align frame front part (frame front part removed)	AZ	AZ	AZ	
46 51 050	Remove and refit/replace frame rear part	16	16	16	
46 51 080	Remove and refit/replace frame front and rear parts includes: R 90 S — remove and refit cockpit enclosure	114	133	135	
46 52 000	Remove and refit/replace motorcycle stand	7	7	7	
46 52 011	Replace one (both) spring(s) for motorcycle stand	4	4	4	
46 52 041	Replace buffer rubber for motorcycle stand and for side supports	1	1	1	
46 53 000	Remove and refit/replace side supports	3	3	3	
46 53 011	Replace springs for side supports	3	3	3	
46 61 000	Remove and refit or replace front mudguard	4	4	4	
46 61 020	Remove and refit/replace supporting stirrup for front mudguard	2	2	2	
46 62 000	Remove and refit or replace rear mudguard	10	10	10	
46 63 020	Remove and refit cockpit protection	—	—	3	

46 Frame		R 60/6	a) R75/6 b) R90/6	R 90 S	
46 63 021	Replace cockpit protection includes: Removing and refitting cockpit protection. Removing and refitting voltmeter and clock.	—	—	6	
46 63 031	Replace windscreen for cockpit protection includes: Removal and refitting of cockpit protection.	—	—	5	
46 71 001	Replace engine securing bolts front	3	3	3	
46 71 011	Replace engine securing bolts rear	4	4	4	
46 71 030	Remove and refit front foot rest left or right complete	2	2	2	
46 71 050	Remove and refit both foot rests front complete	3	3	3	
46 71 061	Replace left/right front foot rest	4	4	4	
46 71 081	Replace both foot rests	6	6	6	
46 71 160	Remove and refit/replace left or right pillion foot rest complete	2	2	2	
46 71 180	Remove and refit/replace both pillion foot rests	2	2	2	

51 EQUIPMENT

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51 Equipment		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
51 14 070	Remove and refit/replace BMW plaque on petrol tank left or right	2	2	2	
51 14 090	Remove and refit/replace both BMW plaques on petrol tank	2	2	2	
51 14 201	Replace type emblem (on starter, cover hood) left or right	3	3	3	
51 14 221	Replace both type emblems (on starter, cover hood)	5	5	5	
51 16 490	Remove and refit/replace rearview mirror	2	2	2	
51 25 050	Remove and refit or replace seat lock	2	2	2	
51 25 060	Remove and refit or replace lock cylinder for seat lock	3	3	3	
51 25 081	Replace lock set (for steering lock and lock cylinder for seat lock)	5	5	5	

52 SEATS

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52 53 Double Seat	52 - 1
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52 Seats	R 60/6	a) R 75/6 b) R 90/6	R 90 S	
52 53 000 Remove and refit double seat includes: Removing and refitting hinge on front of seat.	4	4	—	
52 53 001 Replace double seat includes: Removing and refitting double seat.	4	4	—	
52 53 011 Remove and refit/replace seat cushion includes: Removing and refitting double seat.	—	—	6	
52 53 041 Replace hinge at front of double seat	3	3	—	
52 53 051 Replace hinge at back of double seat includes: Removing and refitting double seat	4	4	—	
52 53 061 Replace both hinges for double seat	4	4	—	
52 53 100 Remove and refit handgrip on double seat	2	2	—	
52 53 161 Replace center rubber for double seat cover	1	1	—	
52 53 381 Replace frame for seat includes: Removing and replacing seat cushion. Fixing BMW emblem and type shield.	—	—	11	

61 GENERAL VEHICLE ELECTRICS

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32 Ignition Light Switch	- 2
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61 General Vehicle Electrics		R 60/6	a) R75/6 b) R90/6	R 90 S	
61 00 009	Trouble shooting in electrical equipment	AZ	AZ	AZ	
61 11 050	Removal and refitting/replacement of the cable harness, engine section includes: Removal and refitting of petrol tank. Loosening and tightening securing bands. Disconnecting and reconnecting cable.	9	9	9	
61 11 060	Removing and refitting/replacing cable harness, frame section includes: Removing and refitting petrol tank. Loosening and tightening securing bands. Disconnecting and reconnecting cable and pulling cable harness out of and into the rear part of the frame and checking for correct operation. (With R 90 S: Removing and refitting cockpit protection).	22	22	22	
61 11 070	Removing and refitting/replacing cable harness, engine section and frame section	27	27	27	
61 12 001	Replace positive battery lead	5	5	5	
501	Replace positive battery lead (for operation No. 11 00 009)	1	1	1	
61 12 011	Replace negative battery lead	2	2	2	
511	Replace negative battery lead (for operation No. 11 00 009)	1	1	1	
61 12 201	Replace leads for front direction indicators includes: Additionally with R 90 S Removing and refitting cockpit protection.	14	14	14	
61 12 211	Replace leads for rear direction indicators	7	7	7	
61 20 009	Test battery (with engine tester) includes: Connecting and disconnecting test apparatus.	3	3	3	
61 20 029	Check level of distilled water in battery and top-up.	3	3	3	
61 21 010	Remove and refit battery	6	6	6	

61 General Vehicle Electrics		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
61 21 011	Replace battery	7	7	7	
61 21 019	Recharge battery	8	8	8	
519	Recharge battery (for job No. 11 00 009)	6	6	6	
61 21 100	Remove and refit/replace battery bracket	7	7	7	
61 21 151	Replace battery acid drain-off	1	1	1	
61 31 000	Remove and refit/replace headlamp dip-switch includes: Removing and refitting headlight assembly. Disconnecting and reconnecting cables from cable harness in headlight body. Adjusting headlight and checking operation.	6	6	6	
61 31 010	Remove and refit/replace direction indicator switch	6	6	6	
61 31 280	Remove and refit/replace oil pressure switch	2	2	2	
61 31 295	Remove and refit/replace clutch switch	3	3	3	
61 31 300	Remove and refit/replace brake light switch (of handbrake) includes with R 75/6 – R 90/6 – R 90 S: Removing and refitting the petrol tank.	3	3	3	
61 31 304	Adjust brake light switch (of the foot brake)	2	2	2	
61 31 310	Remove and refit/replace brake light switch of the foot brake	3	3	3	
61 31 350	Remove and refit/replace blinker	2	2	2	
61 31 400	Remove and refit/replace headlamp relay	2	2	2	
61 32 000	Remove and refit/replace ignition switch	5	5	5	
61 33 000	Remove and refit/replace horn	2	2	2	

62 INSTRUMENTS

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99	Bulb for Direction Indicator Tell Tale	– 2
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	Bulb for Battery Charging Condition Tell Tale	– 2
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	Bulb for Neutral Position Tell Tale	– 2
	Bulb for Speedometer Lighting	– 2
	Bulb for Tachometer Lighting	– 2
	Bulb for Instrument Lighting	– 2
	Bulb for Clock Lighting	– 2
	Bulb for Voltmeter Lighting	– 2

62 Instruments	R 60/6	a) R75/6 b) R90/6	R 90 S	
62 11 200 Remove and refit/replace instrument combination includes: Removing and refitting speedometer shaft and tachometer shaft on instruments. Adjusting headlamp. Checking operation.	4	4	4	
62 12 000 Remove and refit/replace speedometer includes: Removing and refitting instrument combination. Checking operation.	6	6	6	
62 12 020 Remove and refit/oil or replace speedometer shaft includes: Removing and refitting petrol tank. Oiling speedometer shaft. Checking operation.	5	5	5	
62 12 031 Replace protective socket for speedometer shaft sealing (at gear end)	2	2	2	
62 13 000 Remove and refit/replace tachometer includes: Removing and refitting instrument combination. Checking operation.	6	6	6	
62 13 020 Remove and refit/replace drive shaft for tachometer includes: Removing and refitting motor protective hood. Loosening and tightening horn. Checking operation.	4	4	4	
62 13 031 Replace protective socket for tachometer shaft	4	4	4	
62 13 050 Remove and refit/replace clock includes: Removing and refitting cockpit protection.	—	—	4	
62 13 070 Remove and refit/replace voltmeter includes: Remove and refit cockpit protection.	—	—	4	

62 Instruments	R 60/6	a) R 75/6 b) R 90/6	R 90 S	
62 99 001 Replace bulb for direction indicator tell tale 62 99 011 Replace bulb for headlamp tell tale 62 99 021 Replace bulb for battery charging tell tale 62 99 031 Replace bulb for oil pressure tell tale 62 99 061 Replace bulb for handbrake tell tale (only with R 75/6 – R 90/6 – R 90 S) 62 99 091 Replace bulb for gear idle position tell tale 62 99 111 Replace bulb for speedometer lighting 62 99 121 Replace bulb for tachometer lighting 62 99 181 Replace bulb for instrument lighting includes: Removing and refitting instrument combination. Removing and refitting bulb carrier. Testing operation.	6	6	6	
62 99 131 Replace bulb for clock lighting 62 99 136 Replace bulb for voltmeter lighting	–	–	3	

63 LIGHTS

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23	Blinker Glass Rear	- 2
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63 Lighting

		R 60/6	a) R75/6 b) R90/6	R 90 S	
63 00 009	Check operation of lighting equipment				
63 10 004	Adjust headlight	1	1	1	
63 12 090	Remove and refit headlight compl. includes: Removing and refitting lens and reflector. Disconnecting and reconnecting cable. Removing and refitting headlamp to bracket. Testing operation. Adjusting headlight. Additionally with R 90 S: Remove and refit cockpit protection.	2	2	2	
63 12 091	Replace headlamp complete includes: Removing and refitting headlamp. Removing and fitting contact plate. Additionally with R 90 S: Removing and refitting cockpit protection.	14	14	16	
63 12 380	Remove and refit/replace lens for headlamp includes: Adjusting headlamp. Checking operation.	15	15	15	
62 12 390	Remove and refit/replace reflector for headlamp	4	4	4	
63 12 460	Remove and refit or replace bracket headlamp unit includes: Adjusting headlamp. Checking operation.	4	4	4	
63 13 000	Remove and refit or replace front direction indicator glass left or right	4	4	4	
63 13 020	Remove and refit or replace both front direction indicator glasses	2	2	2	
63 13 150	Remove and refit or replace left or right direction indicator lamp complete	2	2	2	
63 13 170	Remove and refit or replace both front direction indicator lamps complete	2	2	2	
63 21 340	Remove and refit/replace glass for rearlight combination	3	3	3	
		2	2	2	

63 Lighting		R 60/6	a) R 75/6 b) R 90/6	R 90 S	
63 21 360	Remove and refit/replace lamp holder for rearlight combination	2	2	2	
63 21 380	Remove and refit or replace rearlight combination complete	5	5	5	
63 23 000	Remove and refit or replace rear direction indicator light glass left or right	2	2	2	
63 23 020	Remove and refit/replace both rear direction indicator light glasses	2	2	2	
63 23 150	Remove and refit/replace rear direction indicator light left or right	2	2	2	
63 23 170	Remove and refit/replace both rear direction indicator lights	3	3	3	
63 23 180	Remove and refit or replace rear direction indicator light bracket	7	7	7	
63 99 161	Replace bulb for front parking light	2	2	2	
63 99 241	Replace bulb for headlamp	3	3	3	
63 99 271	Replace bulb for front left or right direction indicator	2	2	2	
63 99 321	Replace bulb for left or right rear direction indicator	2	2	2	
63 99 381	Replace bulb for rearlight	2	2	2	

