

# **Technical Data**

<b>11 - 1 Engine</b>		<b>M30 B 30 M</b>	<b>M30 B 35 M</b>		
<b>11 00 Engine in General</b>					
<b>Bore</b>	<b>mm</b>	<b>89 (3.504)</b>	<b>92 (3.622)</b>		
<b>Stroke</b>	<b>mm</b>	<b>80</b>	<b>86 (3.386)</b>		
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2986 (182)</b>	<b>3430 (209)</b>		
<b>Compression ratio with catalytic converter</b>	<b>:1</b>	<b>9.0</b>	<b>9.0</b>		
<b>Compression ratio without catalytic converter</b>	<b>:1</b>	<b>9.2</b>	<b>9.2</b>		
<b>Power with catalytic converter</b>	<b>kW at rpm</b>	<b>135/5800</b>	<b>155/5700</b>		
<b>Power without catalytic converter</b>	<b>kW at rpm</b>	<b>145/5800</b>	<b>162/5700</b>		
<b>Max. top speed</b>	<b>rpm</b>	<b>6400</b>	<b>6200</b>		
<b>Max. constant speed</b>	<b>rpm</b>	<b>6000</b>	<b>6000</b>		
<b>Max. torque with catalytic converter</b>	<b>Nm rpm</b>	<b>260/4000</b>	<b>305/4000</b>		
<b>Max. torque without catalytic converter</b>	<b>Nm rpm</b>	<b>275 (199)/4000</b>	<b>315 (228)/4000</b>		
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>bar (psi)</b>	<b>10 - 11</b>	<b>10 - 11</b>		

<b>11 - 2 Engine</b>		<b>M30 B 30 M</b>	<b>M30 B 35 M</b>		
<b>11 11 Crankcase</b>					
Bore dia. a)	mm	<b>89.00 + 0.01</b>	<b>92.00 + 0.01</b>		
Intermediate bore dimension a)	mm	<b>89.08 + 0.01</b>	<b>92.08 + 0.01</b>		
1) Grinding dimension a)	mm	<b>89.25 + 0.01</b>	<b>92.25 + 0.01</b>		
2) Grinding dimension a)	mm	<b>89.50 + 0.01</b>	<b>92.50 + 0.01</b>		
Permitted roundness deviation of cylinder bore a)	mm	<b>0.01</b>			
Permitted roundness deviation of cylinder bore a)	mm	<b>0.01</b>			
Permitted total wear clearance between piston and cylinder (engine run in).	mm	<b>0.15</b>			
a) New condition or rework					

<b>11 - 3 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 12 Cylinder head with cover</b>					
<b>Machining limit</b>	<b>mm</b>	<b>128.6</b>			
<b>Valve guides are not available as replacement parts.</b>					
<b>Valve guide inner dia. (installed)</b>					
<b>Standard</b>	<b>mm</b>	<b>8.0 H7</b>			
<b>Size 1</b>	<b>mm</b>	<b>8.1 H7</b>			
<b>Size 2</b>	<b>mm</b>	<b>8.2 H7</b>			
<b>Tilt clearance "K" max. (wear between valve and valve guide)</b>	<b>mm</b>	<b>0.5</b>			

<b>11 - 4 Engine</b>		<b>M30 B 30 M</b>	<b>M30 B 35 M</b>		
<b>11 12 Cylinder head with cover</b>					
Valve seat angle	°	45			
Correction angle, outer	°	15			
Correction angle, inner	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.4 ± 0.4			
Exhaust	mm	1.7 ± 0.4			
Valve seat diameter					
Intake outside diameter	mm	45.4	46.4		
Exhaust outside diameter	mm	37.6			

**11 - 5 Engine****M30****B 30 M, B 35 M****11 21 Crankshaft and Bearings**

Ground sizes of main bearing journals

Standard yellow

mm

59.984 ... 59.990

Standard green

mm

59.977 ... 59.983

Standard white

mm

59.971 ... 59.976

Undersize 1 (U 0.25) yellow

mm

59.734 ... 59.740

Undersize 1 (U 0.25) green

mm

59.727 ... 59.733

Undersize 1 (U 0.25) white

mm

59.721 ... 59.726

Undersize 2 (U 0.50) yellow

mm

59.484 ... 59.490

Undersize 2 (U 0.50) green

mm

59.477 ... 59.483

Undersize 2 (U 0.50) white

mm

59.471 ... 59.476

Undersize 3 0.75 mm (0.030) yellow

mm

59.234 ... 59.240

Undersize 3 0.75 mm (0.030) green

mm

59.227 ... 59.233

Undersize 3 0.75 mm (0.030) white

mm

59.221 ... 59.226

Radial crankshaft bearing play

mm

0.020 ... 0.046

**11 - 6 Engine****M30  
B 30 M, B 35 M****11 21 Crankshaft and Bearings****Ground sizes of crankshaft thrust bearing****Standard****mm****30 F8****Size 1****mm****30.2 F8****Size 2****mm****30.4 F8****Size 3****mm****30.6 F8****Axial crankshaft play****mm****0.085 ... 0.174**

**11 - 7 Engine**

**M30**  
**B 30 M, B 35 M**

**11 21 Crankshaft and Bearings**

**Ground sizes of conrod bearing journals**

**Standard**

mm

**48.00** <sup>-0.009</sup><sub>-0.025</sub>

**Undersize 1 0.25 mm (0.010<sup>⊙</sup>)**

mm

**47.75** <sup>-0.009</sup><sub>-0.025</sub>

**Undersize 2 0.50 mm (0.020<sup>⊙</sup>)**

mm

**47.50** <sup>-0.009</sup><sub>-0.025</sub>

**Undersize 3 0.75 mm (0.030<sup>⊙</sup>)**

mm

**47.25** <sup>-0.009</sup><sub>-0.025</sub>

**Radial conrod bearing play**

mm

**0.020 ... 0.055**



<b>11 - 8 Engine</b>		<b>M30</b> <b>B 30 M</b>	<b>M30</b> <b>B 35 M</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. permissible runout on middle main bearing journal (crankshaft taken up on outer bearing journals)</b>	<b>mm</b>	<b>0.1</b>			

<b>11 - 9 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 22 Flywheel</b>					
<b>Max. axial runout measured on outside diameter</b>	<b>mm</b>	<b>0.1</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.2</b>			
<b>Max. axial runout</b>	<b>mm</b>	<b>0.4</b>			

<b>11 - 10 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 24 Connecting Rods and Bearings</b>					
Bore in conrod for conrod bush	mm	24 + 0.021 -0.005			
Conrod sleeve inside diameter	mm	22 +0.003 +0.008			
Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm	mm	0.04			
Max. permissible displacement to one side	°	0.5			
Max. deviation in weight of connecting rods in one engine (without bearing shells)	g	± 4			
Big end	g	± 2			
Small end	g	± 2			
Big conrod eye diameter	mm	52.00 <sup>+0.016</sup>			

<b>11 - 11 Engine</b>		<b>M30</b> <b>B 30 M</b>	<b>M30</b> <b>B 35 M</b>		
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace together in pairs					
Piston diameter (measuring point "A")					
Standard	mm	88.970	91.980		
1st Oversize	mm	89.220	92.222		
2nd Oversize	mm	89.470	92.472		
Piston running clearance	mm	0.02 ... 0.05			
Max. total wear clearance between piston and cylinder	mm	0.15			

<b>11 - 12 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 25 Pistons with Rings and Pins</b>					
<b>1st Groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.45</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.04 ... 0.072</b>			
<b>2nd Groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.4 ... 0.65</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.03 ... 0.062</b>			
<b>3rd Groove (oil scraper ring with spring loaded oil ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.3 ... 0.6</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.02 ... 0.055</b>			

<b>11 - 13 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 31 Camshaft</b>					
<b>Axial running clearance</b>	<b>mm</b>	<b>0.03 ... 0.18</b>			
<b>11 33 Rocker Arms/Drag Arms and Bearings</b>					
<b>Radial clearance</b>	<b>mm</b>	<b>0.016 ... 0.052</b>			

<b>11 - 14 Engine</b>		<b>M30</b>		<b>M30</b>			
		<b>B 30</b>		<b>B 35 M</b>			
<b>11 34 Valves with Springs</b>							
<b>Clearance of</b>							
<b>intake and exhaust valves At max. 35° C coolant temperature</b>	<b>mm</b>	<b>0.30</b>					
<b>At operating temperature</b>	<b>mm</b>	<b>0.35</b>					
<b>Min. valve head edge thickness Machining limit (dimension "A")</b>							
<b>Intake</b>	<b>mm</b>	<b>1.3</b>					
<b>Exhaust</b>	<b>mm</b>	<b>2.0</b>					
<b>Plate Ø (dimension "T")</b>							
<b>Intake</b>	<b>mm</b>	<b>46</b>	<b>47</b>				
<b>Exhaust</b>	<b>mm</b>	<b>38</b>	<b>38</b>				
<b>Shaft Ø (dimension "S")</b>							
<b>Standard</b>	<b>mm</b>	<b>8.0 H7</b>					
<b>In addition to standard valves, the following valve variants are available for repair work</b>							
<b>Size 1</b>	<b>mm</b>	<b>8.1 H7</b>					
<b>Size 2</b>	<b>mm</b>	<b>8.2 H7</b>					
<b>Tilt clearance "K" (between valve stem and valve guide)</b>	<b>mm</b>	<b>0.8</b>					

<b>11 - 15 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 40 Oil Supply</b>					
<b>Oil type</b> <b>see BMW Service Operating Fluids</b>					
<b>Engine oil consumption</b> <b>see BMW Service Operating Fluids</b>					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>5.75</b>			



<b>11 - 16 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>5</b>			

<b>11 - 17 Engine</b>		<b>M30</b> <b>B 30 M, B 35 M</b>			
<b>11 52 Fan Clutch</b>					
Switch-on temperature	°C	<b>82 ± 4</b>			
Switch-off temperature	°C	<b>≥ 60</b>			
Tilt play of bearing (dia. 156 mm)	mm	<b>± 0.65</b>			
<b>11 53 Thermostat and connections</b>					
Opening temperature (stamped in thermostat)	approx. °C	<b>80</b>			

<b>11 - 18 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B18</b>	<b>M42</b> <b>B18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B18</b>	
<b>11 00 Engine in General</b>							
Cylinder		4					
Bore	mm	84					
Stroke	mm	72	81		72	81	
Effective displacement	cm <sup>3</sup>	1596	1796		1596	1796	
Compression ratio	:1	9.1	8.8	10.0	9.7		
Power (without catalytic converter)	kW at rpm	75/5500	85/5500	-	-	-	
Power (with catalytic converter)	kW at rpm	73/5500	83/5500	100/6000	75/5500	85/5500	
Max. top speed	rpm	6200		6500	6200		
Max. constant speed	rpm	6000		-	6000		
Max. torque (without catalytic converter)	Nm rpm	143/4250	165/4250	-	-	-	
Max. torque (with catalytic converter)	Nm rpm	141/4250	162/4250	172/4600	150/3900	168/3900	
Compression pressure (approx. equal value for all cylinders)	min. bar	10...11					

<b>11 - 19 Engine</b>	<b>M40</b>	<b>M40</b>	<b>M42</b>	<b>M43</b>	<b>M43</b>	
	<b>B16</b>	<b>B 18</b>	<b>B 18</b>	<b>B16</b>	<b>B 18</b>	

<b>11 11 Crankcase</b>						
Bore dia. a)	mm	84.00 + 0.014				
Intermediate bore dimension a)	mm	84.080 + 0.014				
1) Grinding dimension a)	mm	84.250 + 0.014				
2) Grinding dimension a)	mm	84.500 + 0.014				
Permitted roundness deviation of cylinder bore a)	mm	0.01				
Permitted conicity of cylinder bore a)	mm	0.01				
Permitted total wear clearance between piston and cylinder (engine run in)	mm	0.15				

a) New condition or rework

<b>11 - 20 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 12 Cylinder head with cover</b>							
<b>Cylinder head height Standard</b>	<b>mm</b>	<b>141.0</b>	<b>140.0</b>	<b>141.0</b>			
<b>Machining limit</b>	<b>mm</b>	<b>140.55</b>	<b>139.55</b>	<b>140.55</b>			
<b>Valve guides are not available as replacement parts.</b>							
<b>Valve guide inner Ø (installed)</b>							
<b>Standard</b>	<b>mm</b>	<b>7.0 H7</b>	<b>6.0 H7</b>	<b>7.0 H7</b>			
<b>Size 1</b>	<b>mm</b>	<b>7.1 H7</b>	<b>6.1 H7</b>	<b>7.1 H7</b>			
<b>Size 2</b>	<b>mm</b>	<b>7.2 H7</b>	<b>6.2 H7</b>	<b>7.2 H7</b>			
<b>Tilt clearance (between valve and valve guide)</b>	<b>mm</b>	<b>0.5</b>					

<b>11 - 21 Engine</b>		<b>M40</b>	<b>M40</b>	<b>M42</b>	<b>M43</b>	<b>M43</b>	
		<b>B16</b>	<b>B 18</b>	<b>B 18</b>	<b>B16</b>	<b>B 18</b>	
<b>11 12 Cylinder head with cover</b>							
Valve seat angle	°	45					
Correction angle outside	°	15					
Correction angle inside	°	60					
Valve seat width (dimension "B")							
Intake	mm	1.65 ± 0.25					
Exhaust	mm	2.0 ± 0.25					
∅ valve seat							
Intake, outer ∅	mm	41.4		32.4		41.4	
Exhaust, outer ∅	mm	35.6		30.1		35.6	

<b>11 - 22 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 21 Crankshaft and Bearings</b>							
<b>Ground sizes of main bearing journals</b>							
<b>Standard yellow</b>	<b>mm</b>	<b>59.984 ... 59.990</b>					
<b>Standard green</b>	<b>mm</b>	<b>59.977 ... 59.983</b>					
<b>Standard white</b>	<b>mm</b>	<b>59.971 ... 59.976</b>					
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>59.734 ... 59.740</b>					
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>59.727 ... 59.733</b>					
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>59.721 ... 59.726</b>					
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>59.484 ... 59.490</b>					
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>59.477 ... 59.483</b>					
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>59.471 ... 59.476</b>					
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.046</b>	<b>0.020 ... 0.058</b>	<b>0.020 ... 0.046</b>			

<b>11 - 23 Engine</b>		<b>M40</b>	<b>M40</b>	<b>M42</b>	<b>M43</b>	<b>M43</b>	
		<b>B16</b>	<b>B 18</b>	<b>B 18</b>	<b>B16</b>	<b>B 18</b>	
<b>11 21 Crankshaft and Bearings</b>							
<b>Ground sizes of crankshaft thrust bearing</b>							
<b>Standard</b>	<b>mm</b>	<b>25.0 F8</b>					
<b>Size 1</b>	<b>mm</b>	<b>25.2 F8</b>					
<b>Size 2</b>	<b>mm</b>	<b>25.4 F8</b>					
<b>Axial crankshaft play</b>	<b>mm</b>	<b>0.080 ... 0.163</b>					
<b>Ground sizes of conrod bearing journals</b>							
<b>Standard</b>	<b>mm</b>	<b>45.00 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Size 1</b>	<b>mm</b>	<b>44.75 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Size 2</b>	<b>mm</b>	<b>44.50 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Radial conrod bearing play</b>	<b>mm</b>	<b>0.010 ... 0.052</b>					
<b>Max. allowed runout at center main journal Crankshaft supported on outer bearing pins</b>	<b>mm</b>	<b>0.15</b>					



<b>11 - 24 Engine</b>	<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
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<b>11 22 Flywheel</b>						
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<b>Max. axial run-out measured on outside diameter</b>	<b>mm</b>	<b>0.1</b>				
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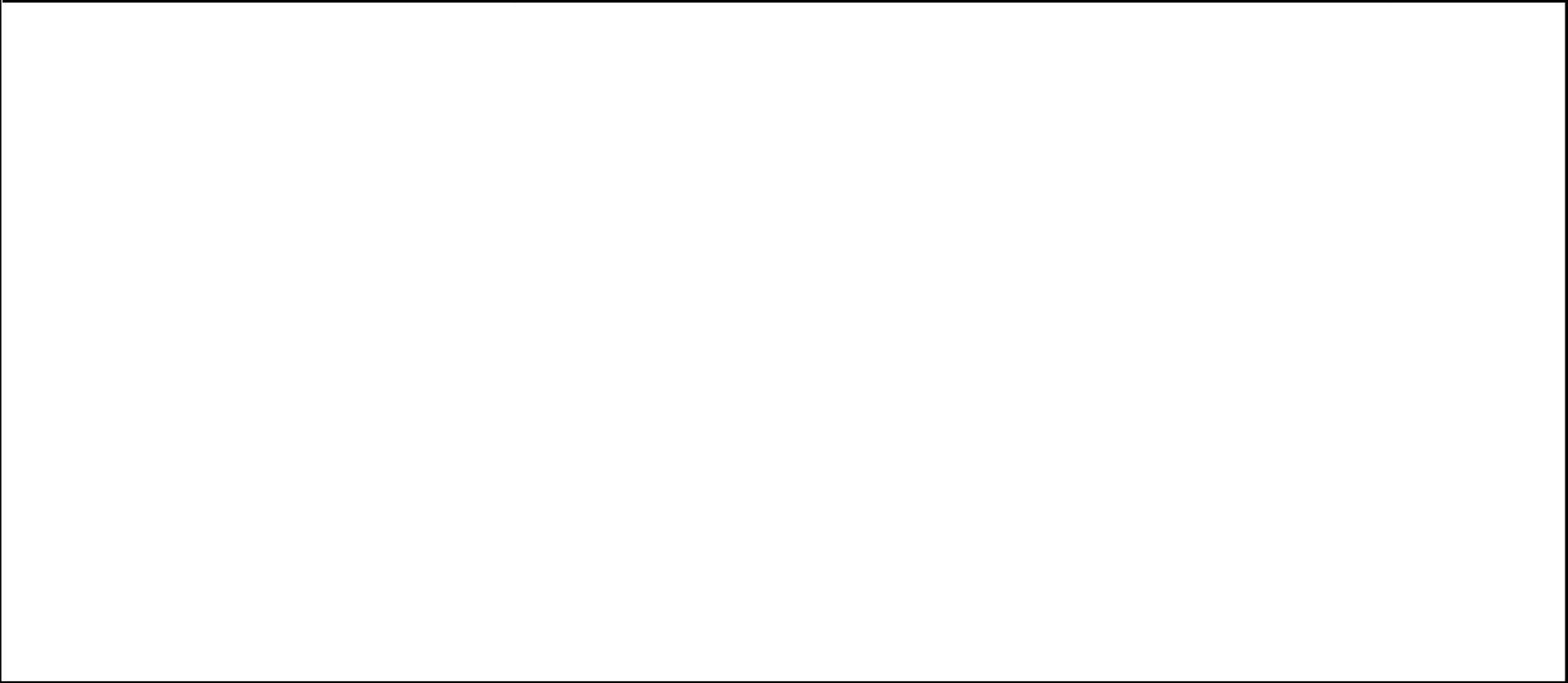
<b>11 - 25 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 23 Vibration Damper</b>							
<b>Max. radial runout</b>	<b>mm</b>	<b>0.40</b>					
<b>Max. axial runout</b>	<b>mm</b>	<b>0.60</b>					

<b>11 - 26 Engine</b>		<b>M40</b>	<b>M40</b>	<b>M42</b>	<b>M43</b>	<b>M43</b>	
		<b>B16</b>	<b>B 18</b>	<b>B 18</b>	<b>B16</b>	<b>B 18</b>	
<b>11 24 Connecting Rods and Bearings</b>							
<b>Ø Large conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>					
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24.000 <sup>+0.021</sup><sub>-0.005</sub></b>					
<b>Conrod sleeve bore diameter</b>	<b>mm</b>	<b>22.005<sup>+0.007</sup></b>					
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>mm</b>	<b>0.04</b>					
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>					
<b>Max. deviation in weight of connecting rods in one engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>					
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>					
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>					

<b>11 - 27 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B18</b>	<b>M42</b> <b>B18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B18</b>	
<b>11 25 Pistons with Rings and Pins</b>							
Pistons and pins are matched - only replace together in pairs							
Measuring point "A" (Lage)	mm	15	9	15	13		
Piston diameter (measuring point "A")							
Standard Size 0	mm	83.985					
Size 00	mm	84.065					
oversize +1.	mm	84.235					
oversize +2.	mm	84.485					
Piston running clearance	mm	0.01 ... 0.04					
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.15					

<b>11 - 28 Engine</b>		<b>M40</b>	<b>M40</b>	<b>M42</b>	<b>M43</b>	<b>M43</b>	<b>M43</b>
		<b>B16</b>	<b>B 18</b>	<b>B 18</b>	<b>B16</b>	<b>B 18</b>	<b>B 19</b>
<b>11 25 Pistons with rings and pins</b>							
<b>1st groove</b>							
<b>End clearance a)</b>	<b>mm</b>	<b>0.2 ... 1.0</b>					
<b>End float a)</b>	<b>mm</b>	<b>0.02 ... 0.20</b>					
<b>2nd groove</b>							
<b>End clearance a)</b>	<b>mm</b>	<b>0.2 ... 1.0</b>					
<b>End float a)</b>	<b>mm</b>	<b>0.02 ... 0.10</b>					
<b>3rd groove (oil scraper ring with spring loaded oil ring)</b>		<b>x</b>	<b>-</b>	<b>x</b>	<b>-</b>		
<b>End clearance a)</b>	<b>mm</b>	<b>0.2 ... 1.0</b>	<b>-</b>	<b>0.2 ... 1.0</b>	<b>-</b>		
<b>End float a)</b>	<b>mm</b>	<b>0.02 ... 0.10</b>	<b>-</b>	<b>0.02 ... 0.10</b>	<b>-</b>		
<b>3rd groove (three piece steel band ring)</b>		<b>-</b>	<b>x</b>	<b>-</b>	<b>x</b>	<b>-</b>	
<b>End clearance of fins</b>	<b>mm</b>	<b>-</b>	<b>0.4 ... 1.4</b>	<b>-</b>	<b>0.4 ... 1.4</b>	<b>-</b>	
<b>End float</b>	<b>mm</b>	<b>-</b>	<b>not measurable</b>	<b>-</b>	<b>not measurable</b>	<b>-</b>	
<b>3. Groove (U-Flexring)</b>		<b>-</b>					<b>x</b>
<b>End clearance</b>		<b>-</b>					<b>not measurable</b>
<b>End float</b>		<b>-</b>					<b>not measurable</b>
<b>a) Upper value is wear limit</b>							

<b>11 - 29 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 31 Camshaft</b>							
<b>Pilot bearing (camshaft) width</b>	<b>mm</b>	<b>23 H9</b>	<b>20 H9</b>	<b>23 H9</b>			
<b>Pilot bearing (cylinder head) width</b>	<b>mm</b>	<b>23 d8</b>	<b>20 d8</b>	<b>23 d8</b>			
<b>Runout radial</b>	<b>mm</b>	<b>0.020 ... 0.061</b>					
<b>Axial running clearance</b>	<b>mm</b>	<b>0.065 ... 0.150</b>					



<b>11 - 30 Engine</b>		<b>M40 B16</b>	<b>M40 B 18</b>	<b>M42 B 18</b>	<b>M43 B16</b>	<b>M43 B 18</b>	
<b>11 34 Valves with Springs</b>							
Plate Ø intake	mm	42		33.0		42	
Plate Ø exhaust	mm	36		30.5		36	
Shaft Ø intake	mm	7.0 <sup>-0.025</sup> <sub>-0.040</sub>		6.0 <sup>-0.025</sup> <sub>-0.040</sub>		7.0 <sup>-0.025</sup> <sub>-0.040</sub>	
Shaft Ø exhaust	mm	7.0 <sup>-0.040</sup> <sub>-0.055</sub>		6.0 <sup>-0.040</sup> <sub>-0.055</sub>		7.0 <sup>-0.040</sup> <sub>-0.055</sub>	
Repair valves: In addition to the standard valves, the following oversizes are also available							
Shaft Ø intake stage 1	mm	7.1 <sup>-0.025</sup> <sub>-0.040</sub>		6.1 <sup>-0.025</sup> <sub>-0.040</sub>		7.1 <sup>-0.025</sup> <sub>-0.040</sub>	
Shaft Ø exhaust, stage 1	mm	7.1 <sup>-0.040</sup> <sub>-0.055</sub>		6.1 <sup>-0.040</sup> <sub>-0.055</sub>		7.1 <sup>-0.040</sup> <sub>-0.055</sub>	
Head dia.	mm	0.2					
Identification on stem		R1					
Shaft Ø intake, stage 2	mm	7.2 <sup>-0.025</sup> <sub>-0.040</sub>		6.2 <sup>-0.025</sup> <sub>-0.040</sub>		7.2 <sup>-0.025</sup> <sub>-0.040</sub>	
Shaft Ø exhaust, stage 2	mm	7.2 <sup>-0.040</sup> <sub>-0.055</sub>		6.2 <sup>-0.040</sup> <sub>-0.055</sub>		7.2 <sup>-0.040</sup> <sub>-0.055</sub>	
Head dia.	mm	0.4					
Identification on stem		R2					

<b>11 - 31 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 40 Oil Supply</b>							
<b>Oil type</b> <b>see BMW Service Operating Fluids</b>							
<b>Engine oil consumption</b> <b>see BMW Service Operating Fluids</b>							
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>4.0</b>	<b>5.0</b>	<b>4.0</b>			



<b>11 - 32 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 41 Oil Pump with Strainer and Drive</b>							
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>					
<b>Regulated pressure</b>	<b>bar</b>	<b>4.3 ± 0.2</b>					

**11 - 33 Engine****M40  
B16****M40  
B 18****M42  
B 18****M43  
B16****M43  
B 18****11 52 Fan Clutch**

Fan clutch

Switch-on temperature

°C

 $92 \pm 4$ 

Switch-off temperature

°C

60

Tilt play of bearing  
(at  $\varnothing$  156 mm)

mm

 $\pm 0.65$

<b>11 - 34 Engine</b>		<b>M40</b> <b>B16</b>	<b>M40</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	
<b>11 53 Thermostat and connections</b>							
<b>Opening temperature (stamped on housing)</b>	<b>°C</b>	<b>92</b>			<b>95</b>		

<b>11 - 35 Engine</b>		<b>M44</b>					
		<b>B 19</b>					

<b>11 00 Engine in general</b>							
<b>Cylinder</b>		<b>4</b>					
<b>Bore</b>	<b>mm</b>	<b>85</b>					
<b>Stroke</b>	<b>mm</b>	<b>83.5</b>					
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>1895</b>					
<b>Compression ratio</b>	<b>:1</b>	<b>10.0</b>					
<b>Power</b>	<b>kW at rpm</b>	<b>103/6000</b>					
<b>Max. top speed</b>	<b>rpm</b>	<b>6500</b>					
<b>Max. constant speed</b>	<b>rpm</b>	<b>6000</b>					
<b>Max. torque</b>	<b>Nm at rpm</b>	<b>180/4300</b>					
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10...11</b>					

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<b>11 - 36 Engine</b>		<b>M44</b>					
		<b>B 19</b>					

<b>11 11 Crankcase</b>							
Bore dia. a)	mm	<b>85.00 + 0.014</b>					
Intermediate bore dimension a)	mm	<b>85.080 + 0.014</b>					
1) Grinding dimension a)	mm	<b>85.250 + 0.014</b>					
2) Grinding dimension a)	mm	<b>85.500 + 0.014</b>					
Permitted conicity of cylinder bore a)	mm	<b>0.01</b>					
Permitted conicity of cylinder bore a)	mm	<b>0.01</b>					
Permitted total wear clearance between piston and cylinder (engine run in)	mm	<b>0.15</b>					

a) New condition or rework

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<b>11 - 37 Engine</b>		<b>M44</b>					
		<b>B 19</b>					

<b>11 12 Cylinder head with cover</b>							
<b>Cylinder head height standard</b>	<b>mm</b>	<b>140.0</b>					
<b>Machining limit</b>	<b>mm</b>	<b>139.55</b>					
<b>Valve guides are not available as replacement parts.</b>							
<b>Valve guide inner dia. (installed)</b>							
<b>Standard</b>	<b>mm</b>	<b>6.0 H7</b>					
<b>Size 1</b>	<b>mm</b>	<b>6.1 H7</b>					
<b>Size 2</b>	<b>mm</b>	<b>6.2 H7</b>					
<b>Tilt clearance (between valve and valve guide)</b>	<b>mm</b>	<b>0.5</b>					

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<b>11 - 38 Engine</b>		<b>M44</b>					
		<b>B 19</b>					
<b>11 12 Cylinder head with cover</b>							
Valve seat angle	°	<b>45</b>					
Correction angle outside	°	<b>15</b>					
Correction angle inside	°	<b>60</b>					
Valve seat width (dimension "B")							
Intake	mm	<b>1.65 ± 0.25</b>					
Exhaust	mm	<b>1.65 ± 0.25</b>					
Valve seat diameter							
Intake outside diameter	mm	<b>32.4</b>					
Exhaust outside diameter	mm	<b>30.1</b>					

**11 - 39 Engine****M44****B 19****11 21 Crankshaft and bearings**

Ground sizes of main bearing journals

Standard yellow

mm

59.984 ... 59.990

Standard green

mm

59.977 ... 59.983

Standard white

mm

59.971 ... 59.976

Undersize 1 (U 0.25) yellow

mm

59.734 ... 59.740

Undersize 1 (U 0.25) green

mm

59.727 ... 59.733

Undersize 1 (U 0.25) white

mm

59.721 ... 59.726

Undersize 2 (U 0.50) yellow

mm

59.484 ... 59.490

Undersize 2 (U 0.50) green

mm

59.477 ... 59.483

Undersize 2 (U 0.50) white

mm

59.471 ... 59.476

Radial crankshaft bearing play

mm

0.020 ... 0.046



<b>11 - 40 Engine</b>		<b>M44</b>					
		<b>B 19</b>					
<b>11 21 Crankshaft and bearings</b>							
<b>Ground sizes of crankshaft thrust bearing</b>							
<b>Standard</b>	mm	<b>25.0 F8</b>					
<b>Size 1</b>	mm	<b>25.2 F8</b>					
<b>Size 2</b>	mm	<b>25.4 F8</b>					
<b>Axial crankshaft play</b>	mm	<b>0.080 ... 0.163</b>					
<b>Ground sizes of conrod bearing journals</b>							
<b>Standard</b>	mm	<b>45.00 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Size 1</b>	mm	<b>44.75 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Size 2</b>	mm	<b>44.50 <sup>+0.009</sup><sub>+0.025</sub></b>					
<b>Radial conrod bearing play</b>	mm	<b>0.010 ... 0.052</b>					
<b>Max. allowed runout at center main journal Crankshaft supported on outer bearing pins</b>	mm	<b>0.15</b>					

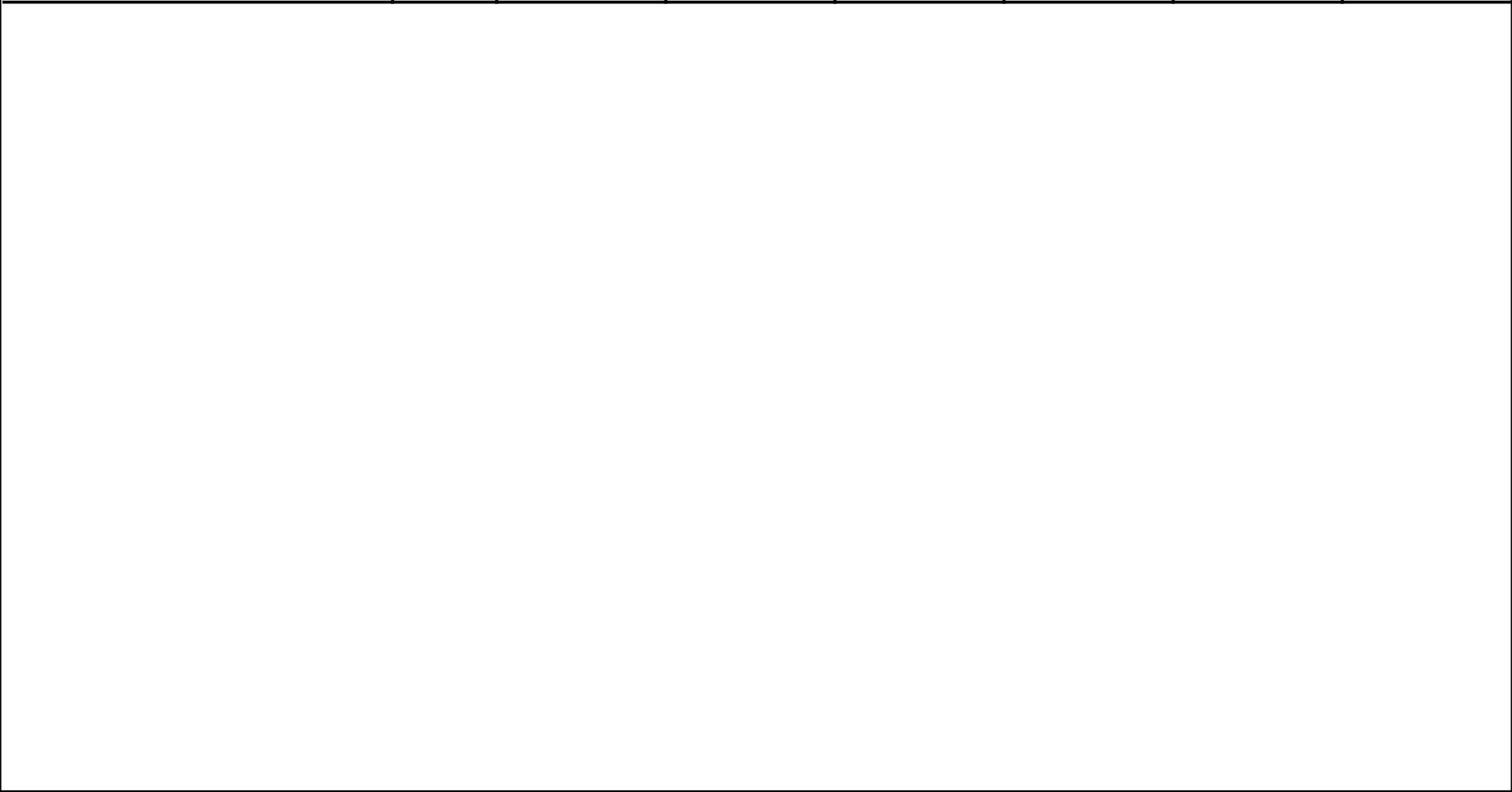
<b>11 - 41 Engine</b>	<b>M44</b> <b>B 19</b>					
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<b>11 22 Flywheel</b>						
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<b>Max. axial run-out measured on outside diameter</b>	<b>mm</b>	<b>0.1</b>					
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<b>11 - 42 Engine</b>		<b>M44</b>					
		<b>B 19</b>					
<b>11 23 Vibration Damper</b>							
<b>Max. radial runout</b>	<b>mm</b>	<b>0.40</b>					
<b>Max. axial runout</b>	<b>mm</b>	<b>0.60</b>					



**11 - 43 Engine****M44****B 19****11 24 Connecting Rods and Bearings**

<b>Ø great conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>					
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24.000 <sup>+0.021</sup><sub>-0.005</sub></b>					
<b>Conrod sleeve inside diameter</b>	<b>mm</b>	<b>22.005<sup>+0.007</sup></b>					
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>mm</b>	<b>0.04</b>					
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>					
<b>Max. deviation in weight of connecting rods in one engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>					
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>					
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>					

**11 - 44 Engine****M44****B 19****11 25 Pistons with rings and pins**Pistons and pins are matched - only  
replace together in pairs

Measuring point "A" (position)

mm

13

Piston diameter (measuring  
point "A")

Standard Size 0

mm

84.985

Size 00

mm

85.065

1st oversize +0.25

mm

85.235

2nd oversize +0.50

mm

85.485

Piston running clearance

mm

0.01 ... 0.04

Max. total wear clearance between  
piston and cylinder  
(engine operated)

mm

0.15

**11 - 45 Engine****M44****B 19****11 25 Pistons with rings and pins**

1st groove

End clearance a)

mm

0.2 ... 1.0

End float a)

mm

0.02 ... 0.20

2nd groove

End clearance a)

mm

0.2 ... 1.0

End float a)

mm

0.02 ... 0.10

3rd groove (three piece steel band ring)

End clearance of fins

mm

0.4 ... 1.4

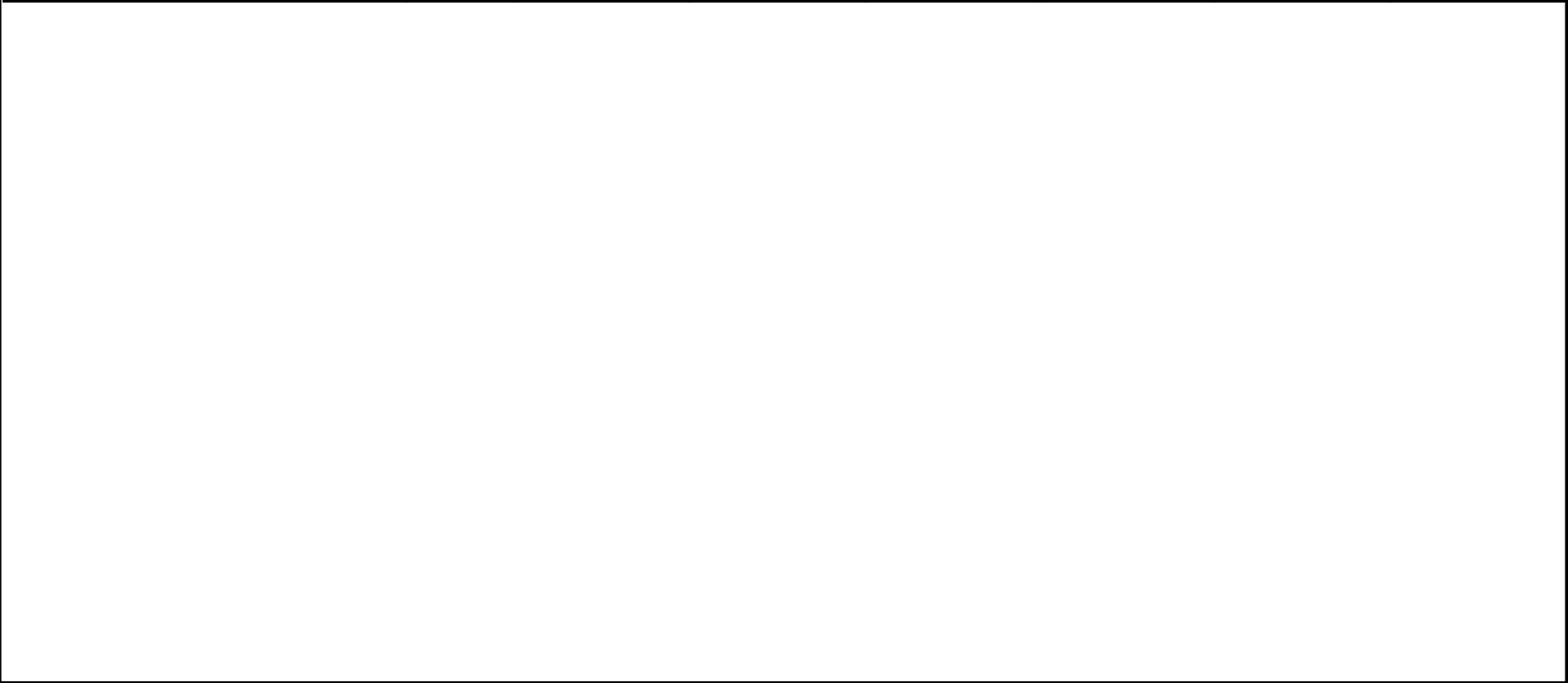
End float

mm

not measurable

a) Upper value is wear limit

<b>11 - 46 Engine</b>		<b>M44</b>					
		<b>B 19</b>					
<b>11 31 Camshaft</b>							
<b>Pilot bearing (camshaft) width</b>	<b>mm</b>	<b>20 H9</b>					
<b>Pilot bearing (cylinder head) width</b>	<b>mm</b>	<b>20 d8</b>					
<b>Runout radial</b>	<b>mm</b>	<b>0.040 ... 0.082</b>					
<b>Axial running clearance</b>	<b>mm</b>	<b>0.065 ... 0.150</b>					



**11 - 47 Engine****M44****B 19****11 34 Valves with springs**

Plate Ø intake	mm	33.0					
Plate Ø exhaust	mm	30.5					
Intake stem diameter	mm	6.0 <sup>-0.025</sup> <sub>-0.040</sub>					
Exhaust stem diameter	mm	6.0 <sup>-0.040</sup> <sub>-0.055</sub>					
Repair valves: In addition to the standard valves, the following oversizes are also available							
Shaft Ø intake stage 1	mm	6.1 <sup>-0.025</sup> <sub>-0.040</sub>					
Shaft Ø exhaust, stage 1	mm	6.1 <sup>-0.040</sup> <sub>-0.055</sub>					
Head dia.	mm	0.2					
Identification on stem		R1					
Shaft Ø intake, stage 2	mm	6.2 <sup>-0.025</sup> <sub>-0.040</sub>					
Shaft Ø exhaust, stage 2	mm	6.2 <sup>-0.040</sup> <sub>-0.055</sub>					
Head dia.	mm	0.4					
Identification on stem		R2					



<b>11 - 48 Engine</b>		<b>M44</b>					
		<b>B 19</b>					
<b>11 40 Oil supply</b>							
<b>Oil type refer to BMW Service Operating Fluids</b>							
<b>Engine oil consumption refer to BMW Service Operating Fluids</b>							
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>5.0</b>					

**11 - 49 Engine****M44****B 19****11 41 Oil pump with strainer and drive**Oil pressure at idle speed with  
engine at operating temperature

min bar

**0.5**

Regulated pressure

bar

**4.3 ± 0.2**

**11 - 50 Engine****M44****B 19****11 52 Fan coupling**

Fan clutch

Switch-on temperature

°C

**92 ± 4**

Switch-off temperature

°C

**60**Tilt play of bearing  
(at Ø 156 mm)

mm

**± 0.65**

<b>11 - 51 Engine</b>	<b>M44</b> <b>B 19</b>					
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<b>11 53 Thermostat and connections</b>						
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<b>Opening temperature (stamped on housing)</b>	<b>°C</b>	<b>95</b>					
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<b>11 - 52 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>			
<b>Bore</b>	<b>mm</b>	<b>80</b>	<b>84</b>	<b>80</b>	<b>84</b>
<b>Stroke</b>	<b>mm</b>	<b>66</b>	<b>75</b>	<b>66</b>	<b>75</b>
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>1991</b>	<b>2494</b>	<b>1991</b>	<b>2494</b>
<b>Compression ratio</b>	<b>:1</b>	<b>10.5</b>	<b>10.0</b>	<b>11.0</b>	<b>10.5</b>
<b>Compression ratio (with MS-40 Engine Control)</b>	<b>:1</b>	<b>11.0</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Power</b>	<b>kW at rpm</b>	<b>110/6000</b>	<b>141/6000</b>	<b>110/5900</b>	<b>141/5900</b>
<b>Max. top speed</b>	<b>rpm</b>	<b>6500 ± 40</b>			
<b>Max. torque</b>	<b>Nm rpm</b>	<b>190/4700</b>	<b>245/4700</b>	<b>190/4200</b>	<b>-</b>
<b>Max. torque E 36</b>	<b>Nm rpm</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>245/4200</b>
<b>Max. torque E 34</b>	<b>Nm rpm</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>250/4200</b>
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10 ...11</b>			

<b>11 - 53 Engine</b>		<b>M50 B 20</b>	<b>M50 B25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 11 Engine block, cylinder crankcase</b>					
Bore dia. a)	mm	<b>80.000 <sup>+0.014</sup></b>	<b>84.000 <sup>+0.014</sup></b>	<b>80.000 <sup>+0.014</sup></b>	<b>84.000 <sup>+0.014</sup></b>
Intermediate bore dimension a)	mm	<b>80.080 <sup>+0.014</sup></b>	<b>84.080 <sup>+0.014</sup></b>	<b>80.080 <sup>+0.014</sup></b>	<b>80.080 <sup>+0.014</sup></b>
1) Grinding dimension a)	mm	<b>80.250 <sup>+0.014</sup></b>	<b>84.250 <sup>+0.014</sup></b>	<b>80.250 <sup>+0.014</sup></b>	<b>84.250 <sup>+0.014</sup></b>
2) Grinding dimension a)	mm	<b>80.500 <sup>+0.014</sup></b>	<b>84.500 <sup>+0.014</sup></b>	<b>80.500 <sup>+0.014</sup></b>	<b>84.500 <sup>+0.014</sup></b>
Permitted roundness deviation of cylinder bore a)	mm	<b>0.005</b>			
Permitted conicity of cylinder bore a)	mm	<b>0.01</b>			
Permitted total wear clearance between piston and cylinder (engine run in)	mm	<b>0.113</b>			
a) New condition or rework					

<b>11 - 54 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 12 Cylinder head with cover</b>					
<b>Cylinder head height Standard</b>	<b>mm</b>	<b>140</b>			
<b>Machining limit</b>	<b>mm</b>	<b>139.7</b>			
<b>Valve guides are not available as replacement parts.</b>					
<b>Valve guide inner Ø (installed)</b>					
<b>Standard</b>	<b>mm</b>	<b>7.0 H7</b>		<b>6.0 H7</b>	
<b>Size 1</b>	<b>mm</b>	<b>7.1 H7</b>		<b>6.1 H7</b>	
<b>Size 2</b>	<b>mm</b>	<b>7.2 H7</b>		<b>6.2 H7</b>	
<b>Tilt clearance (between valve and valve guide)</b>	<b>max. mm</b>	<b>0.5</b>			
<b>Camshaft bearing</b>					
<b>Pilot bearing (1) width</b>	<b>mm</b>	<b>20 d8</b>			

<b>11 - 55 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.65 ± 0.25			
Exhaust	mm	1.65 ± 0.25			
∅ valve seat					
Intake outer ∅	mm	29.4 ± 0.20	32.4 ± 0.20	29.4 ± 0.20	32.4 ± 0.20
Exhaust, outer ∅	mm	26.4 ± 0.20	29.4 ± 0.20	26.4 ± 0.20	29.4 ± 0.20



<b>11 - 56 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>59.984 ... 59.990</b>			
<b>Standard green</b>	<b>mm</b>	<b>59.977 ... 59.983</b>			
<b>Standard white</b>	<b>mm</b>	<b>59.971 ... 59.976</b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>59.734 ... 59.740</b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>59.727 ... 59.733</b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>59.721 ... 59.726</b>			
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>59.484 ... 59.490</b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>59.477 ... 59.483</b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>59.471 ... 59.476</b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.058</b>			

<b>11 - 57 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	<b>mm</b>	<b>25.0 F8</b>			
<b>Size 1</b>	<b>mm</b>	<b>25.2 F8</b>			
<b>Size 2</b>	<b>mm</b>	<b>25.4 F8</b>			
<b>Axial crankshaft play</b>	<b>mm</b>	<b>0.080 ... 0.163</b>			
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	<b>mm</b>	<b>45.00<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 1</b>	<b>mm</b>	<b>44.75<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 2</b>	<b>mm</b>	<b>44.50<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Radial conrod bearing play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>			

<b>11 - 58 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. permissible runout on middle main bearing journal (crankshaft taken up on outer bearing journals)</b>	<b>mm</b>	<b>0.15</b>		<b>0.20</b>	

<b>11 - 59 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 22 Flywheel</b>					
<b>Max. axial run-out measured on outside diameter</b>	<b>mm</b>	<b>0.30</b>			
<b>Max. radial runout measured on outside diameter</b>	<b>mm</b>	<b>0.20</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			
<b>Max. axial runout</b>	<b>mm</b>	<b>0.40</b>			

<b>11 - 60 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 24 Connecting Rods and Bearings</b>					
<b>Ø Large conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>			
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24 <sup>+0.021</sup><sub>-0.005</sub></b>			
<b>Conrod sleeve bore diameter</b>	<b>mm</b>	<b>22 <sup>+0.010</sup><sub>+0.005</sub></b>			
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>mm</b>	<b>0.04</b>			
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Max. deviation in weight of connecting rods in one engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>			
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>			
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>			

<b>11 - 61 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (position) Refer to <u>Construction Group Workshop Manual</u>	mm	7	6	7	6
Piston Ø (measuring point "A") Refer to <u>Assembly Repair Manual</u>					
Standard	mm	79.980	83.980	79.980	83.980
1st Oversize	mm	80.230	84.230	80.230	84.230
2nd Oversize	mm	80.480	84.480	80.480	84.480
Piston running clearance		0.011 ... 0.043			
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.113			

<b>11 - 62 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 25 Pistons with rings and pins</b>					
<b>1st groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.052</b>		<b>0.02 ... 0.055</b>	<b>0.02 ... 0.06</b>
<b>2nd groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.052</b>		<b>0.020 ... 0.065</b>	<b>0.030 ... 0.065</b>
<b>3rd groove (oil scraper ring with spring loaded oil ring)</b>		<b>x</b>			<b>-</b>
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.45</b>		<b>0.2 ... 0.5</b>	<b>-</b>
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.055</b>			<b>-</b>
<b>3rd groove (steel band ring with 3-part support spring)</b>		<b>-</b>			<b>x</b>
<b>End clearance</b>	<b>mm</b>	<b>-</b>			<b>0.4 ... 1.4</b>
<b>End float</b>	<b>mm</b>	<b>-</b>			<b>does not have to be measured</b>

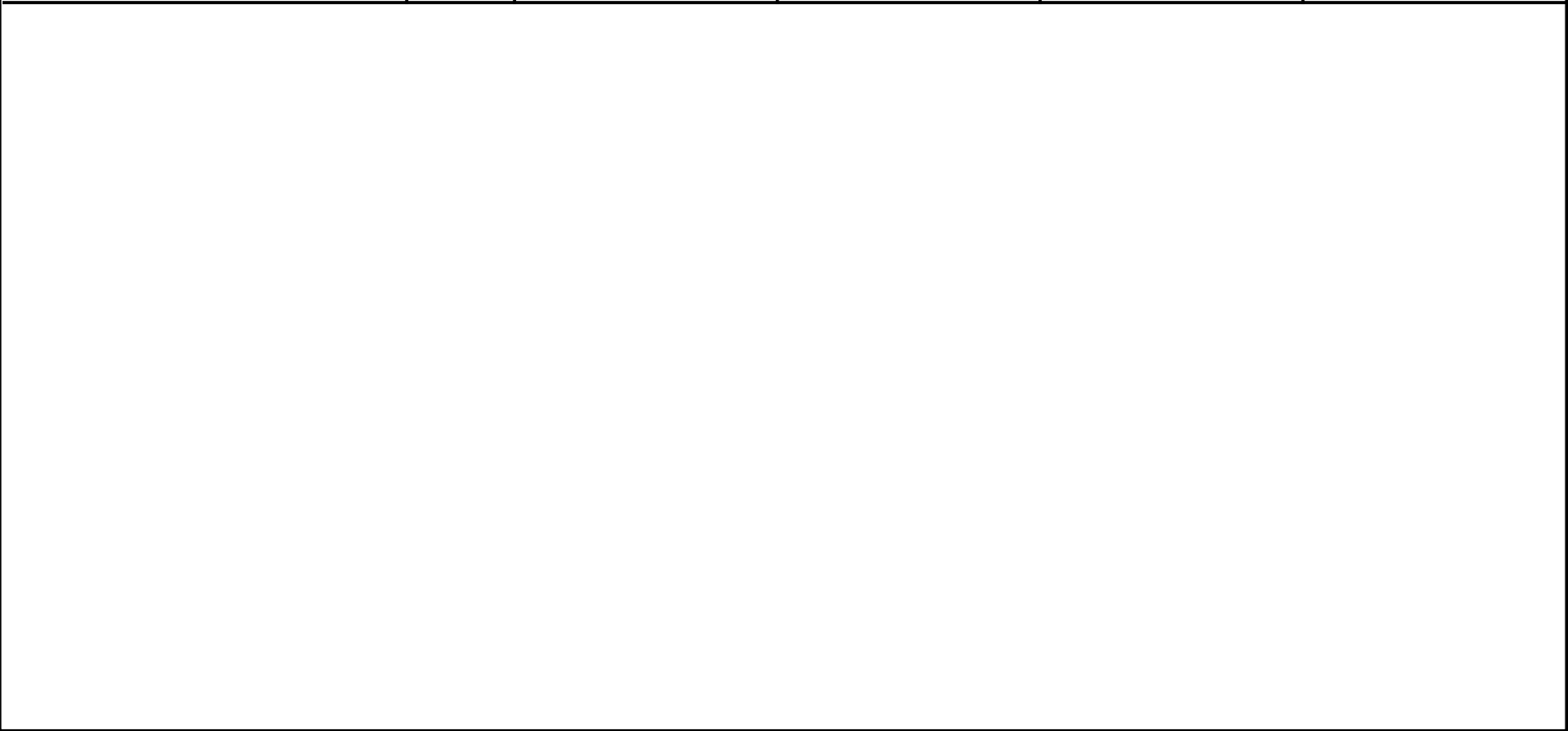
<b>11 - 63 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 31 Camshaft</b>					
<b>Pilot bearing width Intake (bearing no. 1)</b>	<b>mm</b>	<b>20 H8</b>			
<b>Pilot bearing width Exhaust (bearing no. 1)</b>	<b>mm</b>	<b>20 H9</b>			
<b>Bearing radial play</b>	<b>mm</b>	<b>0.020 ... 0.054</b>			
<b>Bearing axial play</b>	<b>mm</b>	<b>0.065 ... 0.150</b>		<b>0.15 ... 0.330</b>	



<b>11 - 64 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 34 Valves with Springs</b>					
<b>Plate Ø</b>					
<b>Intake</b>	<b>mm</b>	<b>30.0</b>	<b>33.0</b>	<b>30</b>	<b>33</b>
<b>Exhaust</b>	<b>mm</b>	<b>27.0</b>	<b>30.5</b>	<b>27.0</b>	<b>30.5</b>
<b>Shaft Ø</b>					
<b>Intake</b>	<b>mm</b>	<b>7.0<sup>-0.025</sup><sub>-0.040</sub></b>		<b>6.0<sup>-0.025</sup><sub>-0.040</sub></b>	
<b>Exhaust</b>	<b>mm</b>	<b>7.0<sup>-0.040</sup><sub>-0.055</sub></b>		<b>6.0<sup>-0.040</sup><sub>-0.055</sub></b>	

11 - 65 Engine		M50 B 20	M50 B 25	M50 B 20 VANOS	M50 B 25 VANOS
<b>11 34 Valves with Springs</b>					
Following valve versions are available for repairs in addition to the standard valves					
Shaft Ø intake	mm	7.1 <sup>-0.025</sup> <sub>-0.040</sub>		6.1 <sup>-0.025</sup> <sub>-0.040</sub>	
Shaft Ø exhaust,	mm	7.1 <sup>-0.040</sup> <sub>-0.055</sub>		6.1 <sup>-0.040</sup> <sub>-0.055</sub>	
Head dia.	mm	0.2			
Identification on stem		R1			
Shaft Ø intake	mm	7.2 <sup>-0.025</sup> <sub>-0.040</sub>		6.2 <sup>-0.025</sup> <sub>-0.040</sub>	
Shaft Ø exhaust,	mm	7.2 <sup>-0.040</sup> <sub>-0.055</sub>		6.2 <sup>-0.040</sup> <sub>-0.055</sub>	
Head dia.	mm	0.4			
Identification on stem		R2			

<b>11 - 66 Engine</b>		<b>E34</b> <b>M50</b> <b>B 20, B 25</b>	<b>E36</b> <b>M50</b> <b>B 20, B 25</b>	<b>E34</b> <b>M50</b> <b>VANOS</b>	<b>E36</b> <b>M50</b> <b>VANOS</b>
<b>11 40 Oil Supply</b>					
<b>Oil type</b> <b>see BMW Service Operating Fluids</b>					
<b>Engine oil consumption</b> <b>see BMW Service Operating Fluids</b>					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>5.75</b>	<b>6.5</b>	<b>5.75</b>	<b>6.5</b>



<b>11 - 67 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.0</b>			

<b>11 - 69 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 53 Thermostat and connections</b>					
<b>Opening temperature (stamped in thermostat)</b>	<b>approx. °C</b>	<b>80</b>		<b>92</b>	
<b>With MS-40 Engine Control</b>	<b>approx. °C</b>	<b>88</b>	<b>-</b>	<b>-</b>	<b>-</b>

<b>11 - 68 Engine</b>		<b>M50 B 20</b>	<b>M50 B 25</b>	<b>M50 B 20 VANOS</b>	<b>M50 B 25 VANOS</b>
<b>11 52 Fan Clutch</b>					
<b>Fan clutch</b>					
<b>Switch-on temperature</b>	<b>°C</b>	<b>90</b>			
<b>Switch-off temperature</b>	<b>°C</b>	<b>60</b>			
<b>Tilt clearance of bearing (at ø 120 mm)</b>	<b>mm</b>	<b>± 0.65</b>			

<b>11 - 70 Engine</b>		<b>E34/E36</b>	<b>E34/E36</b>	<b>E36</b>	<b>E38/E39</b>
		<b>M51</b>	<b>M51</b>	<b>M41</b>	<b>M51</b>
		<b>td</b>	<b>TDS</b>		<b>TDS</b>
<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>		<b>4</b>	<b>6</b>
<b>Bore</b>	<b>mm</b>	<b>80</b>		<b>80</b>	<b>80</b>
<b>Stroke</b>	<b>mm</b>	<b>82.8</b>		<b>82.8</b>	<b>82.8</b>
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2499</b>		<b>1665</b>	<b>2499</b>
<b>Compression ratio</b>	<b>:1</b>	<b>22</b>		<b>22</b>	<b>22</b>
<b>Power</b>	<b>kW at rpm</b>	<b>85/4800</b>	<b>105/4800</b>	<b>66/4400</b>	<b>105/4600</b>
<b>Max. top speed</b>	<b>rpm</b>	<b>5200</b>		<b>4800</b>	<b>5200</b>
<b>Max. torque</b>	<b>Nm rpm</b>	<b>222/1900</b>	<b>260/2200</b>	<b>190/2000</b>	<b>280/2200</b>
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>bar</b>	<b>&gt; 20</b>			

11 - 71 Engine		M51	M41		
11 11 Crankcase					
Bore Ø (new dimension)	mm	80.000 <sup>+0.014</sup>			
Bore Ø (wear limit)	mm	80.000 <sup>+0.040</sup>			
Intermediate bore dimension (new dimension)	mm	80.080 <sup>+0.014</sup>			
Intermediate bore dimension (wear limit)	mm	80.080 <sup>+0.040</sup>			
1. Grinding dimension (new dimension)	mm	80.250 <sup>+0.014</sup>			
1. Grinding dimension (wear limit)	mm	80.250 <sup>+0.040</sup>			
Permitted roundness deviation of cylinder bore (new dimension)	mm	0.01			
Permitted roundness deviation of cylinder bore (wear limit)	mm	0.04			
Permitted conicity of cylinder bore (new dimension)	mm	0.01			
Permitted conicity of cylinder bore (wear limit)	mm	0.04			
Permitted total wear clearance between piston and cylinder (engine run in)	mm	0.15			



<b>11 - 72 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 12 Cylinder head with cover</b>					
<b>Cylinder head may not be machined. Top runout on cylinder head refer to BMW SI 11 03 94 (795)</b>					
<b>Valve guides are not available as replacement parts.</b>					
<b>Valve guide inner dia. (installed)</b>					
<b>Standard</b>	<b>mm</b>	<b>6.0 H7</b>			
<b>Size 1</b>	<b>mm</b>	<b>6.1 H7</b>			
<b>Size 2</b>	<b>mm</b>	<b>6.2 H7</b>			
<b>Tilt clearance "K" max. (wear between valve and valve guide)</b>	<b>mm</b>	<b>0.5</b>			
<b>Camshaft bearing</b>					
<b>Pilot bearing width</b>	<b>mm</b>	<b>21.85<sup>-0.08</sup></b>			

<b>11 - 73 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width					
Intake	mm	2.00 ± 0.25			
Exhaust	mm	2.75 ± 0.15			
∅ valve seat					
Intake outer ∅	mm	35.5			
Exhaust, outer ∅	mm	30.6			

<b>11 - 74 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>59.984 ... 59.990</b>			
<b>Standard green</b>	<b>mm</b>	<b>59.977 ... 59.983</b>			
<b>Standard white</b>	<b>mm</b>	<b>59.971 ... 59.976</b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>59.734 ... 59.740</b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>59.727 ... 59.733</b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>59.721 ... 59.726</b>			
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>59.484 ... 59.490</b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>59.477 ... 59.483</b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>59.471 ... 59.476</b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.058</b>			

<b>11 - 75 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	mm	<b>25.0 F8</b>			
<b>Size 1</b>	mm	<b>25.2 F8</b>			
<b>Size 2</b>	mm	<b>25.4 F8</b>			
<b>Axial crankshaft play</b>	mm	<b>0.080 ... 0.163</b>			
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	mm	<b>45.00<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 1</b>	mm	<b>44.75<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 2</b>	mm	<b>44.50<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Radial conrod bearing play</b>	mm	<b>0.020 ... 0.055</b>			

<b>11 - 76 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. allowed runout at center main journal Crankshaft supported on outer bearing pins</b>	<b>mm</b>	<b>0.15</b>			

<b>11 - 77 Engine</b>	<b>M51</b>	<b>M41</b>		
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<b>11 22 Flywheel</b>				
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<b>Max. runout measured on outside dia.</b>	<b>mm</b>	<b>0.6</b>		
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11 - 78 Engine		M51	M41		
<b>11 24 Connecting Rods and Bearings</b>					
Ø Large conrod eye (without bearing)	mm	48.000 ... 48.016			
Bore in conrod for conrod bush	mm	29 <sup>+0.021</sup> <sub>-0.005</sub>			
Conrod bush bore diameterØ	mm	27 <sup>+0.008</sup> <sub>+0.015</sub>			
Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm	max. mm	0.05			
Max. permissible displacement to one side	max. °	0.5			
Max. deviation in weight of connecting rods in one engine (without bearing shells)	g	± 4			
Large conrod eye	g	± 2			
Small conrod eye	g	± 2			

<b>11 - 79 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (Lage)	mm	7			
Piston Ø measuring point "A"					
Standard	mm	$79.96 \pm 0.009$			
Intermediate size	mm	$80.04 \pm 0.009$			
1st Oversize	mm	$80.21 \pm 0.009$			
Piston running clearance	mm	$0.031 \dots 0.063$			
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.15			



<b>11 - 80 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 25 Pistons with Rings and Pins</b>					
<b>1st Groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>Axial play</b>	<b>mm</b>	<b>Does not have to be measured</b>			
<b>2nd groove (Taper face compression ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.040 ... 0.072</b>			
<b>3rd Groove (oil scraper ring with spring loaded oil ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.030 ... 0.065</b>			

<b>11 - 81 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 31 Camshaft</b>					
<b>Pilot bearing width</b>	<b>mm</b>	<b>22.0 +0.1</b>			
<b>Runout radial</b>	<b>mm</b>	<b>0.040 ... 0.081</b>			
<b>Axial running clearance</b>	<b>mm</b>	<b>0.150 ... 0.330</b>			

11 - 82 Engine		M51	M41		
<b>11 34 Valves with Springs</b>					
Valve plate diameter					
Intake	mm	36.0			
Exhaust	mm	31.0			
Stem diameter					
Intake	mm	6.97/5.97 <sup>-0.015</sup>	5.97 <sup>-0.015</sup>		
Exhaust	mm	6.95/5.96 <sup>-0.015</sup>	5.96 <sup>-0.015</sup>		
Valve clearance "R"					
Intake	mm	0.75 ± 0.1			
Exhaust	mm	0.95 ± 0.1			
Repair valves: Following valve versions are available for repairs in addition to the standard valves					
Stem diameter					
Intake Size 1	mm	6.07/7.07 <sup>-0.015</sup>	6.07 <sup>-0.015</sup>		
Intake Size 2	mm	6.17/7.17 <sup>-0.015</sup>	6.17 <sup>-0.015</sup>		
Exhaust Size 1	mm	6.06/7.06 <sup>-0.015</sup>	6.06 <sup>-0.015</sup>		
Exhaust Size 2	mm	6.16/7.16 <sup>-0.015</sup>	6.16 <sup>-0.015</sup>		

<b>11 - 83 Engine</b>		<b>E34</b> <b>M51</b>	<b>E36</b> <b>M51</b>	<b>E36</b> <b>M41</b>	<b>E38</b> <b>M51</b>	<b>E39</b> <b>M51</b>	
<b>11 40 Oil Supply</b>							
<b>Oil grade, refer to BMW Service Operating Fluids</b>							
<b>Engine oil consumption refer to BMW Service Operating Fluids</b>							
<b>Oil change volume with oil filter up to and including model year 95 refer to BMW SI 11 04 95 (008)</b>	<b>ltr.</b>	<b>6.75</b>	<b>6.5</b>	<b>-</b>	<b>-</b>	<b>-</b>	
<b>Oil change volume with oil filter from model year 96 refer to BMW SI 11 04 95 (008)</b>	<b>ltr.</b>	<b>7.25</b>	<b>7.0</b>	<b>-</b>	<b>-</b>	<b>-</b>	
<b>Oil change volume with oil filter refer to BMW SI 11 04 95 (008)</b>	<b>ltr.</b>	<b>-</b>	<b>-</b>	<b>5.5</b>	<b>-</b>	<b>-</b>	
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>7.0</b>	<b>6.75</b>	

<b>11 - 84 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 41 Oil Pump with Strainer and Drive</b>					
Oil pressure at idle speed with engine at operating temperature.	min bar	0.5			
Regulated pressure	bar	3.8			

<b>11 - 85 Engine</b>		<b>M51</b>	<b>M41</b>		
<b>11 53 Thermostat and connections</b>					
<b>Opening temperature (stamped in thermostat)</b>	<b>°C</b>	<b>80</b>			

<b>11 - 86 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>			
<b>Bore</b>	<b>mm</b>	<b>80</b>	<b>84</b>		
<b>Stroke</b>	<b>mm</b>	<b>66</b>	<b>75</b>	<b>84</b>	
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>1991</b>	<b>2494</b>	<b>2793</b>	
<b>Compression ratio</b>	<b>:1</b>	<b>11.0</b>	<b>10.5</b>	<b>10.2</b>	
<b>Power</b>	<b>kW at rpm</b>	<b>110/5900</b>	<b>125/5500</b>	<b>142/5300</b>	
<b>Max. top speed</b>	<b>rpm</b>	<b>6500</b>			
<b>Max. torque</b>	<b>Nm rpm</b>	<b>190/4200</b>	<b>245/3950</b>	<b>280/3950</b>	
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10 ...11</b>			

<b>11 - 87 Engine</b>		<b>M52</b>			
		<b>Z3</b>			
		<b>B 28</b>			

<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>			
<b>Bore</b>	<b>mm</b>	<b>84</b>			
<b>Stroke</b>	<b>mm</b>	<b>84</b>			
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2793</b>			
<b>Compression ratio</b>	<b>:1</b>	<b>10.2</b>			
<b>Power</b>	<b>kW at rpm</b>	<b>141/5300</b>			
<b>Max. top speed</b>	<b>rpm</b>	<b>6500</b>			
<b>Max. torque</b>	<b>Nm at rpm</b>	<b>275/3950</b>			
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10 - 11</b>			

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<b>11 - 88 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 11 Engine block, cylinder crankcase</b>					
<b>Bore dia. a)</b>	<b>mm</b>	<b>80.000 <sup>+0.010</sup></b>	<b>84.000 <sup>+0.010</sup></b>		
<b>1. Grinding dimension a) (only permitted on cast aluminium engine with cast iron bushes)</b>	<b>mm</b>	<b>-</b>	<b>-</b>	<b>84.250 <sup>+0.010</sup></b>	
<b>1. Grinding dimension a) (only permitted on cast iron engine blocks)</b>	<b>mm</b>	<b>-</b>	<b>-</b>	<b>84.250 <sup>+0.010</sup></b>	
<b>2. Grinding dimension a) (only permitted on cast iron engine blocks)</b>	<b>mm</b>	<b>-</b>	<b>-</b>	<b>84.500 <sup>+0.010</sup></b>	
<b>Permitted roundness deviation of cylinder bore a)</b>	<b>mm</b>	<b>0.005</b>			
<b>Permitted conicity of cylinder bore a)</b>	<b>mm</b>	<b>0.010</b>			
<b>Permitted total wear clearance between piston and cylinder (engine run in)</b>	<b>mm</b>	<b>0.15</b>			
<b>a) New condition or rework</b>					

<b>11 - 89 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 12 Cylinder head with cover</b>					
Cylinder head height standard	mm	140			
Machining limit <u>Refer to Repair Manual</u>	mm	139.7			
Valve guides are not available as replacement parts.					
Valve guide inner dia. (installed)					
Standard	mm	6.0 H7			
Size 1	mm	6.1 H7			
Size 2	mm	6.2 H7			
Tilt clearance (between valve and valve guide)	max. mm	0.5			
Camshaft bearing					
Pilot bearing (1) width	mm	20 d8			

<b>11 - 90 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.65 ± 0.25			
Exhaust	mm	1.65 ± 0.25			
Valve seat diameter					
Intake outside diameter	mm	29.4	32.4		
Exhaust outside diameter	mm	26.4	29.4		

<b>11 - 91 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>59.984 ... 59.990</b>			
<b>Standard green</b>	<b>mm</b>	<b>59.977 ... 59.983</b>			
<b>Standard white</b>	<b>mm</b>	<b>59.971 ... 59.976</b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>59.734 ... 59.740</b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>59.727 ... 59.733</b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>59.721 ... 59.726</b>			
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>59.484 ... 59.490</b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>59.477 ... 59.483</b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>59.471 ... 59.476</b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.058</b>			

<b>11 - 92 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	<b>mm</b>	<b>25.0 F8</b>			
<b>Size 1</b>	<b>mm</b>	<b>25.2 F8</b>			
<b>Size 2</b>	<b>mm</b>	<b>25.4 F8</b>			
<b>Axial crankshaft play</b>	<b>mm</b>	<b>0.080 ... 0.163</b>			
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	<b>mm</b>	<b>45.00<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 1</b>	<b>mm</b>	<b>44.75<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 2</b>	<b>mm</b>	<b>44.50<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Radial conrod bearing play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>			

<b>11 - 93 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. permissible runout on middle main bearing journal (crankshaft taken up on outer bearing journals)</b>	<b>mm</b>	<b>0.20</b>			

<b>11 - 94 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 22 Flywheel</b>					
<b>Max. axial run-out measured on outside diameter</b>	<b>mm</b>	<b>0.30</b>			
<b>Max. radial runout measured on outside diameter</b>	<b>mm</b>	<b>0.20</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			
<b>Max. axial runout</b>	<b>mm</b>	<b>0.40</b>			

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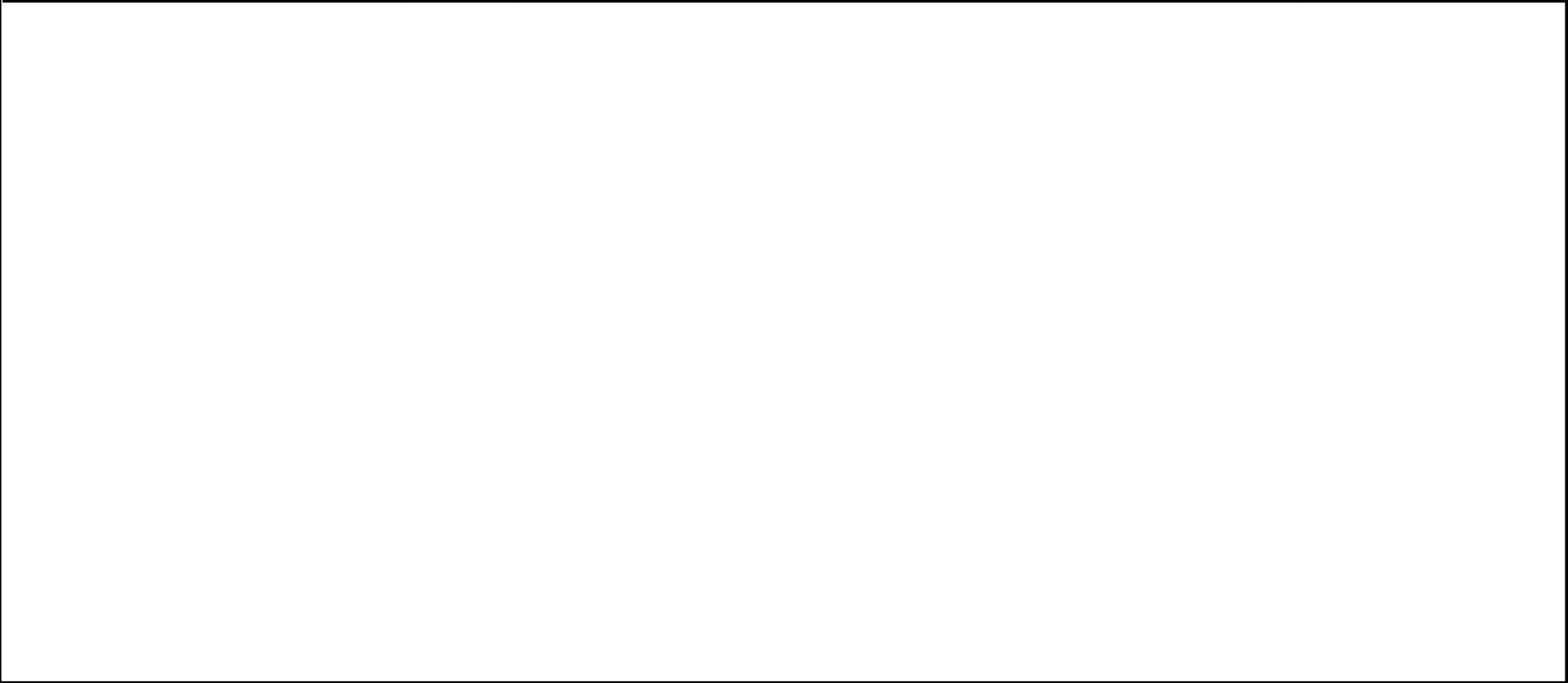
<b>11 - 95 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 24 Connecting Rods and Bearings</b>					
<b>Ø large conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>			
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24 <sup>+0.021</sup><sub>-0.005</sub></b>			
<b>Conrod sleeve inside diameter</b>	<b>mm</b>	<b>22 <sup>+0.010</sup><sub>+0.005</sub></b>			
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>mm</b>	<b>0.04</b>			
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Max. deviation in weight of connecting rods in one engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>			
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>			
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>			



<b>11 - 96 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (position)	mm	8	10	14	
Piston diameter (measuring point "A")					
Standard	mm	79.985 ± 0.009	83.980 ± 0.009	83.980 ± 0.009	
1. Oversize (only permissible for aluminium cast engine block with cast iron sleeves)	mm	-	-	84.230 ± 0.009	
1. Oversize (only permissible for cast iron engine block)	mm	-	-	84.230 ± 0.009	
2. Oversize (only permissible for cast iron engine block)	mm	-	-	84.480 ± 0.009	
Piston running clearance	mm	0.01 - 0.04			
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.15			

<b>11 - 97 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 25 Pistons with Rings and Pins</b>					
<b>1st groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.1 ... 0.3</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>	<b>0.020 ... 0.060</b>		
<b>2nd groove</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>	<b>0.030 ... 0.065</b>		
<b>3rd groove (oil scraper ring with spring loaded oil ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>	<b>0.25 ... 0.5</b>		
<b>Axial play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>	<b>0.020 ... 0.060</b>		

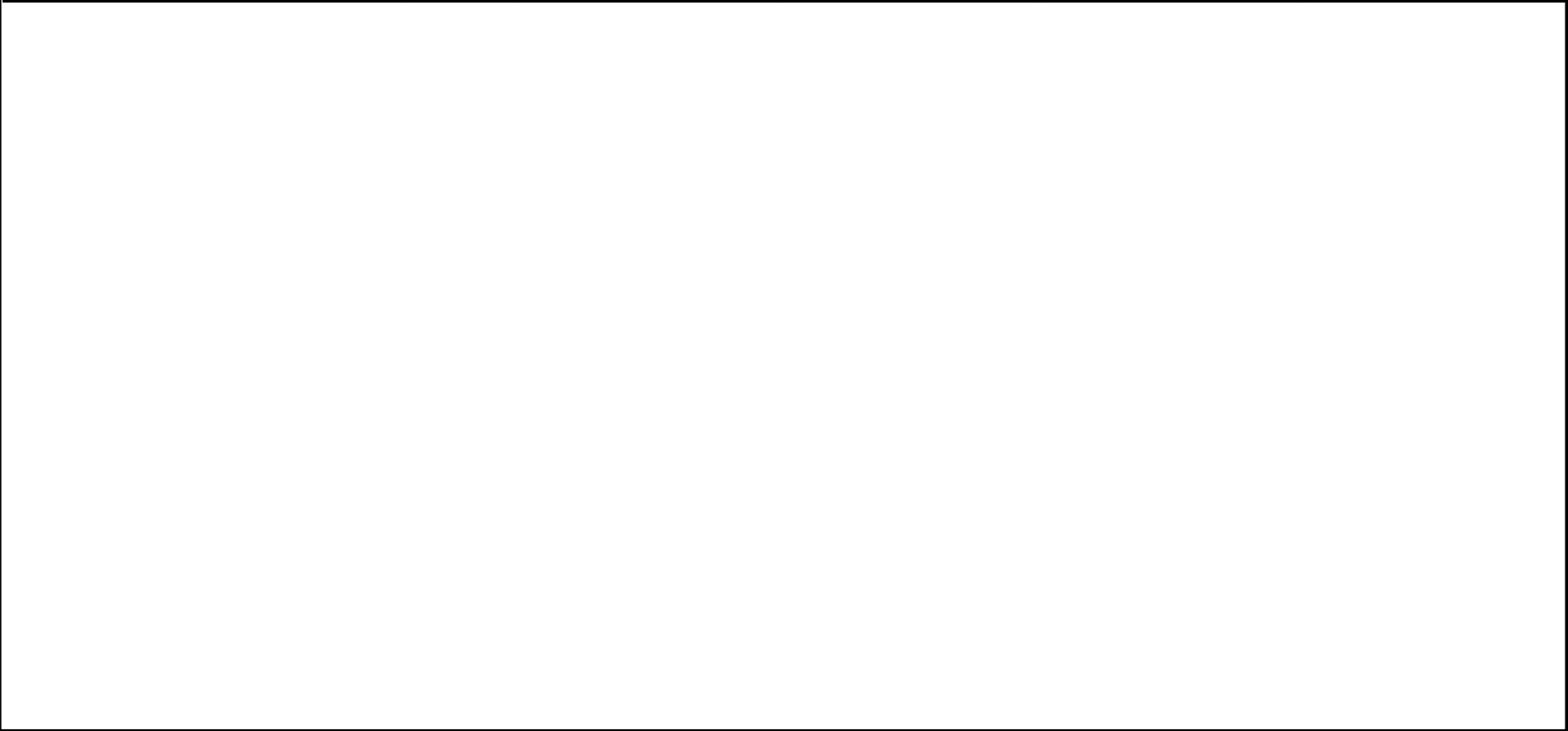
<b>11 - 98 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 31 Camshaft</b>					
<b>Pilot bearing width Intake (bearing no. 1)</b>	<b>mm</b>	<b>20 H8</b>			
<b>Pilot bearing width Exhaust (bearing no. 1)</b>	<b>mm</b>	<b>20 H9</b>			
<b>Bearing radial play</b>	<b>mm</b>	<b>0.020 ... 0.054</b>			
<b>Bearing axial play</b>	<b>mm</b>	<b>0.150 ... 0.330</b>			



<b>11 - 99 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 34 Valves with Springs</b>					
<b>Valve plate diameter</b>					
<b>Intake</b>	<b>mm</b>	<b>30.0</b>	<b>33</b>		
<b>Exhaust</b>	<b>mm</b>	<b>27.0</b>	<b>30.5</b>		
<b>Stem diameter</b>					
<b>Intake</b>	<b>mm</b>	<b>6.0<sup>-0.025</sup><sub>-0.040</sub></b>			
<b>Exhaust</b>	<b>mm</b>	<b>6.0<sup>-0.040</sup><sub>-0.055</sub></b>			

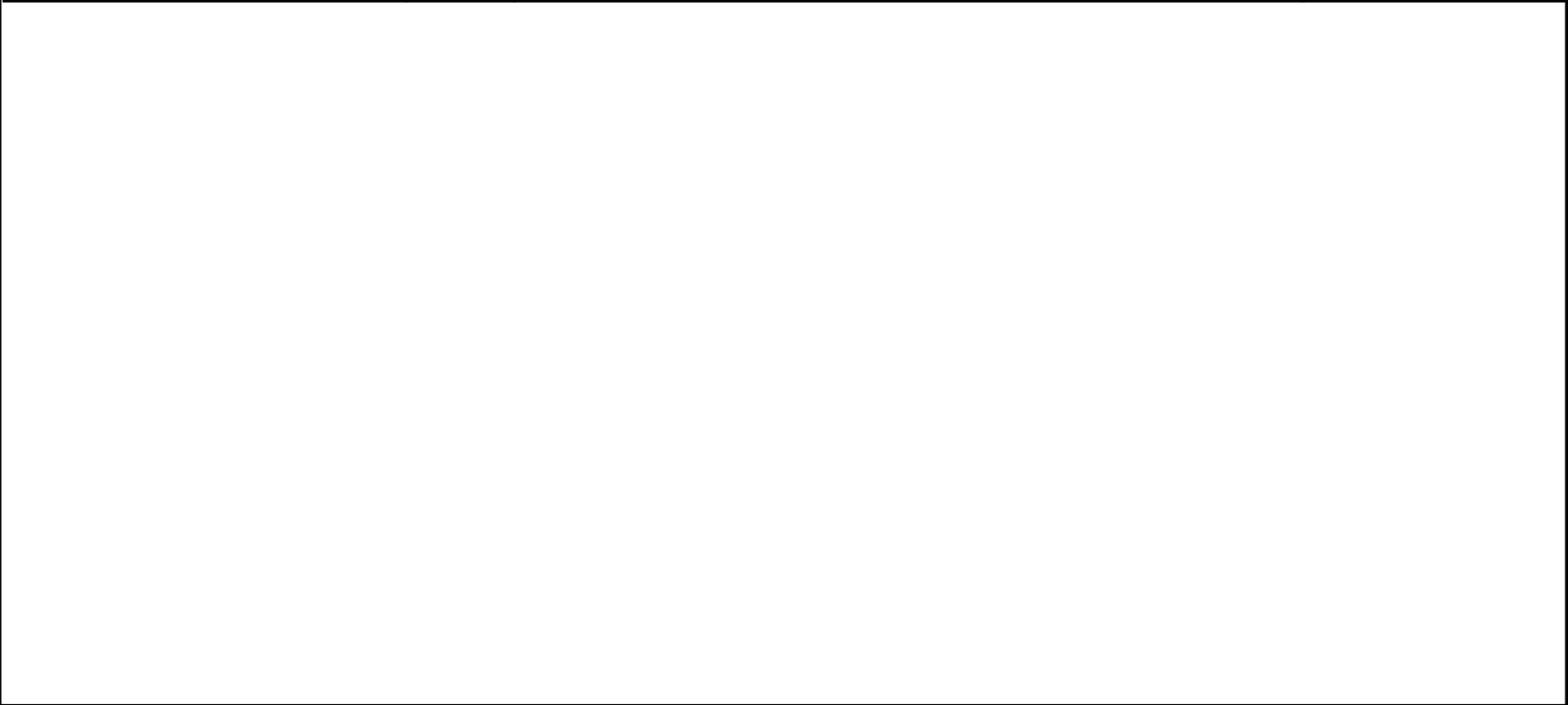
<b>11 - 100 Engine</b>		<b>M52 B 20</b>	<b>M52 B 25</b>	<b>M52 B 28</b>	
<b>11 34 Valves with Springs</b>					
Following valve versions are available for repairs in addition to the standard valves					
Intake stem diameter	mm	6.1 <sup>-0.025</sup> <sub>-0.040</sub>			
Exhaust stem diameter	mm	6.1 <sup>-0.040</sup> <sub>-0.055</sub>			
Head dia.	mm	0.2			
Identification on stem		R1			
Intake stem diameter	mm	6.2 <sup>-0.025</sup> <sub>-0.040</sub>			
Exhaust stem diameter	mm	6.2 <sup>-0.040</sup> <sub>-0.055</sub>			
Head dia.	mm	0.4			
Identification on stem		R2			

<b>11 - 101 Engine</b>		<b>E36</b> <b>M52</b>	<b>E38</b> <b>M52</b>	<b>E39</b> <b>M52</b>	
<b>11 40 Oil supply</b>					
<b>Engine oils, maximum oil consumption and oil consumption measurement, refer to BMW Service Operating Fluids</b>					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>6.50</b>	<b>5.75</b>	<b>6.50</b>	



<b>11 - 102 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.0</b>			

<b>11 - 103 Engine</b>		<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 52 Fan Clutch</b>					
<b>Fan clutch</b>					
<b>Switch-on temperature</b>	<b>°C</b>	<b>90</b>			
<b>Switch-off temperature</b>	<b>°C</b>	<b>60</b>			
<b>Tilt clearance of bearing (dia. 120 mm)</b>	<b>mm</b>	<b>± 0.65</b>			





<b>11 - 104 Engine</b>	<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>11 53 Thermostat and connections</b>				
<b>Opening temperature</b> <b>(stamped in thermostat)</b>	<b>approx. °C</b>	<b>92</b>		

<b>11 - 105 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 00 Engine in General</b>					
<b>Design</b>		<b>90° V</b>			
<b>Cylinder</b>		<b>8</b>			
<b>Bore</b>	<b>mm</b>	<b>84</b>	<b>89</b>	<b>84</b>	<b>92</b>
<b>Stroke</b>	<b>mm</b>	<b>67.6</b>	<b>80</b>	<b>78.9</b>	<b>82.7</b>
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2997</b>	<b>3982</b>	<b>3498</b>	<b>4398</b>
<b>Compression ratio</b>	<b>:1</b>	<b>10.5</b>	<b>10.0</b>		
<b>Power</b>	<b>kW at rpm</b>	<b>160/5800</b>	<b>210/5800</b>	<b>173/5700</b>	<b>210/5700</b>
<b>Max. top speed</b>	<b>rpm</b>	<b>6500</b>		<b>6200</b>	<b>6100</b>
<b>Max. torque</b>	<b>Nm rpm</b>	<b>290/4500</b>	<b>400/4500</b>	<b>320/3300</b>	<b>420/3900</b>
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>12 - 14</b>			

<b>11 - 106 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 11 Engine block, cylinder crankcase</b>					
<b>Bore dia. a)</b>	<b>mm</b>	<b>84.000 <sup>+0.014</sup></b>	<b>89.000 <sup>+0.014</sup></b>	<b>84.000 <sup>+0.014</sup></b>	<b>92.000 <sup>+0.014</sup></b>
<b>Permitted conicity of cylinder bore a)</b>	<b>mm</b>	<b>0.007</b>			
<b>Permitted total wear clearance between piston and cylinder (engine run in)</b>	<b>mm</b>	<b>0.10</b>			
<b>a) New condition</b>					

<b>11 - 107 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 12 Cylinder head with cover</b>					
Cylinder head height Original height	mm	140.0			
Machining limit	mm	139.7			
Valve guides are not available as replacement parts.					
Valve guide inner dia. (installed)					
Standard	mm	6.0 H7			
Size 1	mm	6.1 H7			
Size 2	mm	6.2 H7			
Max. tilt clearance (wear between valve and valve guide)	mm	0.5			
Camshaft bearing					
Width of bearing thrust (cylinder head)	mm	28.85 <sup>-0.08</sup>		21.90 <sup>-0.06</sup>	

<b>11 - 108 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.25 ± 0.25			
Exhaust	mm	1.65 ± 0.35			
Valve seat diameter					
Intake outside diameter	mm	31.5	34.5	31.5	34.5
Exhaust outside diameter	mm	28.0	30.0	28.0	30.0

<b>11 - 109 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>69.984 +0.006</b>			
<b>Standard green</b>	<b>mm</b>	<b>69.977 +0.006</b>			
<b>Standard white</b>	<b>mm</b>	<b>69.971 +0.005</b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>69.734 +0.006</b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>69.727 +0.006</b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>69.721 +0.005</b>			
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>69.484 +0.006</b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>69.477 +0.006</b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>69.471 +0.005</b>			
<b>Undersize 3 (U 0.75 mm) yellow</b>	<b>mm</b>	<b>69.234 +0.006</b>			
<b>Undersize 3 (U 0.75) green</b>	<b>mm</b>	<b>69.227 +0.006</b>			
<b>Undersize 3 (U 0.75) white</b>	<b>mm</b>	<b>69.221 +0.005</b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.046</b>			

<b>11 - 110 Engine</b>	<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
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<b>11 21 Crankshaft and Bearings</b>				
<b>Ground sizes of crankshaft thrust bearing</b>				
<b>Standard</b>	<b>mm</b>	<b>32.0 F8</b>		
<b>Size 1</b>	<b>mm</b>	<b>32.2 F8</b>		
<b>Size 2</b>	<b>mm</b>	<b>32.4 F8</b>		
<b>Size 3</b>	<b>mm</b>	<b>32.6 F8</b>		
<b>Axial crankshaft play</b>	<b>mm</b>	<b>0.085 ... 0.257</b>		

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<b>11 - 111 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	<b>mm</b>	<b>48.00</b> <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Size 1</b>	<b>mm</b>	<b>47.75</b> <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Size 2</b>	<b>mm</b>	<b>47.50</b> <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Size 3</b>	<b>mm</b>	<b>47.25</b> <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Radial conrod bearing play</b>	<b>mm</b>	<b>0.020 ... 0.056</b>			



<b>11 - 112 Engine</b>	<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
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<b>11 21 Crankshaft and Bearings</b>				
<b>Max. runout on center main bearing journal (crankshaft running on outer bearing journals)</b>	<b>mm</b>	<b>0.15</b>		

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<b>11 - 113 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 22 Flywheel</b>					
Max. axial run-out measured on outside diameter	mm	0.35			
<b>11 23 Vibration Damper</b>					
Max. radial runout	mm	0.20			
Max. axial runout	mm	0.30			

<b>11 - 114 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 24 Connecting Rods and Bearings</b>					
<b>Ø Large conrod eye (without bearing)</b>	<b>mm</b>	<b>52.000 ... 52.013</b>			
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24 <sup>+0.021</sup><sub>-0.005</sub></b>			
<b>Conrod bush inside diameter</b>	<b>mm</b>	<b>22 <sup>+0.012</sup><sub>+0.005</sub></b>			
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>max. mm</b>	<b>0.04</b>			
<b>Max. permitted displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Permitted deviation in weight of connecting rods (without bearing shells)</b>	<b>g</b>	<b>± 3</b>			

<b>11 - 115 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (position) <u>Refer to Rep. Manual for 7 Series E38</u>	mm	14		22	17
Piston Ø measuring point "A" <u>Refer to Rep. Manual for 7 Series E38</u>	mm	83.976 ... 83.994	88.976 ... 88.994	83.976 ... 83.994	91.976 ... 91.994
Piston running clearance	mm	0.006 ... 0.038			
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.1			

<b>11 - 116 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 25 Pistons with Rings and Pins</b>					
<b>1st groove (plain compression ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.1 ... 0.3</b>			
<b>End float</b>	<b>mm</b>	<b>0.02 ... 0.055</b>	<b>0.03 ... 0.065</b>	<b>0.02 ... 0.055</b>	<b>0.02 ... 0.060</b>
<b>2nd groove (taper face ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			
<b>End float</b>	<b>mm</b>	<b>0.02 ... 0.055</b>	<b>0.03 ... 0.065</b>	<b>0.02 ... 0.055</b>	<b>0.02 ... 0.060</b>
<b>3rd groove (three piece steel band ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.4 ... 1.4</b>		<b>0.2 ... 0.9</b>	
<b>End float</b>	<b>mm</b>	<b>Does not have to be measured</b>			

<b>11 - 117 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 31 Camshaft</b>					
<b>Width of bearing thrust (camshaft)</b>	<b>mm</b>	<b>28.95 <sup>+0.10</sup></b>		<b>22.10 <sup>+0.10</sup></b>	
<b>Bearing radial play</b>	<b>mm</b>	<b>0.040 ... 0.074</b>			
<b>Bearing end float</b>	<b>mm</b>	<b>0.10 ... 0.28</b>		<b>0.20 ... 0.36</b>	

<b>11 - 118 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 34 Valves with Springs</b>					
<b>Plate Ø</b>					
<b>Intake Standard</b>	<b>mm</b>	<b>32</b>	<b>35</b>	<b>32</b>	<b>35</b>
<b>Exhaust Standard</b>	<b>mm</b>	<b>28.5</b>	<b>30.5</b>	<b>28.5</b>	<b>30.5</b>
<b>Shaft Ø</b>					
<b>Intake Standard</b>	<b>mm</b>	<b>6.0<sup>-0.025</sup><sub>-0.040</sub></b>			
<b>Exhaust Standard</b>	<b>mm</b>	<b>6.0<sup>-0.040</sup><sub>-0.055</sub></b>			
<b>Following valve versions are available for repairs in addition to the standard valves</b>					
<b>Shaft Ø</b>					
<b>Intake Size 1</b>	<b>mm</b>	<b>6.1<sup>-0.025</sup><sub>-0.040</sub></b>			
<b>Intake Size 2</b>	<b>mm</b>	<b>6.2<sup>-0.025</sup><sub>-0.040</sub></b>			
<b>Exhaust Size 1</b>	<b>mm</b>	<b>6.1<sup>-0.040</sup><sub>-0.055</sub></b>			
<b>Exhaust Size 2</b>	<b>mm</b>	<b>6.2<sup>-0.040</sup><sub>-0.055</sub></b>			

<b>11 - 119 Engine</b>	<b>M60/1 B 30</b>	<b>M60/2 B 40</b>	<b>M62 B 35</b>	<b>M62 B 44</b>
<b>11 40 Oil Supply</b>				
Oil grade, refer to BMW Service Operating Fluids				
Oil consumption refer to BMW Service Operating Fluids				
Oil change volume with oil filter		7.5		



<b>11 - 120 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min. bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.5</b>			

<b>11 - 121 Engine</b>		<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>
<b>11 52 Fan coupling</b>					
Switch-on temperature	°C	95 ± 4			
Switch-off temperature	°C	60			
Tilt play of bearing (with ø 156 mm)	mm	± 0.65			
<b>11 53 Thermostat and connections</b>					
Opening temperature (stamped in thermostat)	°C	85			

<b>11 - 122 Engine</b>	<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
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<b>11 00 Engine in General</b>					
Design		<b>60 ° V</b>			
Cylinder		<b>12</b>			
Bore	mm	<b>84</b>	<b>86</b>	<b>85</b>	
Stroke	mm	<b>75</b>	<b>80</b>	<b>79</b>	
Effective displacement	cm <sup>3</sup>	<b>4988</b>	<b>5576</b>	<b>5379</b>	
Compression ratio	:1	<b>8.8</b>	<b>9.8</b>	<b>10.0</b>	
Power	kW at rpm	<b>220/5200</b>	<b>280/5300</b>	<b>240/5000</b>	
Max. top speed	rpm	<b>6000</b>	<b>6400</b>	<b>6000</b>	
Max. torque	Nm at rpm	<b>450/4100</b>	<b>550/4000</b>	<b>490/3900</b>	
Compression pressure (approx. equal value for all cylinders)	bar	<b>10 - 12</b>	<b>11 - 13</b>	<b>10 - 12</b>	

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<b>11 - 123 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 11 Crankcase</b>					
<b>Cylinder bore Ø a)</b>					
<b>Stage 0 Size A</b>	<b>mm</b>	<b>84.000 +0.010</b>	<b>86.000 +0.010</b>	<b>85.000 +0.010</b>	
<b>Stage 0 Size B</b>	<b>mm</b>	<b>84.011 +0.009</b>	<b>86.011 +0.009</b>	<b>85.011 +0.009</b>	
<b>Stage 00 Size A</b>	<b>mm</b>	<b>84.080 +0.010</b>	<b>86.080 +0.010</b>	<b>85.080 +0.010</b>	
<b>Stage 00 Size B</b>	<b>mm</b>	<b>84.091 +0.009</b>	<b>86.091 +0.009</b>	<b>85.091 +0.009</b>	
<b>Stage 1 Size A</b>	<b>mm</b>	<b>84.250 +0.010</b>	<b>86.250 +0.010</b>	<b>85.250 +0.010</b>	
<b>Stage 1 Size B</b>	<b>mm</b>	<b>84.261 +0.009</b>	<b>86.261 +0.009</b>	<b>85.261 +0.009</b>	
<b>Stage 2 Size A</b>	<b>mm</b>	<b>84.500 +0.010</b>	<b>86.500 +0.010</b>	<b>85.500 +0.010</b>	
<b>Stage 2 Size B</b>	<b>mm</b>	<b>84.511 +0.009</b>	<b>86.511 +0.009</b>	<b>85.511 +0.009</b>	
<b>Permitted roundness deviation of cylinder bore a)</b>	<b>mm</b>	<b>0.01</b>			
<b>Permitted conicity of cylinder bore a)</b>	<b>mm</b>	<b>0.01</b>			
<b>Permitted total wear clearance between piston and cylinder (engine run in)</b>	<b>mm</b>	<b>0.10</b>			
<b>a) New condition or rework</b>					

<b>11 - 124 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 12 Cylinder head with cover</b>					
<b>Cylinder head height standard</b>	<b>mm</b>	<b>140</b>			
<b>Machining limit</b>	<b>mm</b>	<b>139.8</b>	<b>Cylinder head may not be machined.</b>	<b>139.8</b>	
<b>Valve guides are not available as replacement parts.</b>					
<b>Valve guide inner dia. (installed)</b>					
<b>Standard</b>	<b>mm</b>	<b>7.0 H7</b>			
<b>Size 1</b>	<b>mm</b>	<b>7.1 H7</b>			
<b>Size 2</b>	<b>mm</b>	<b>7.2 H7</b>			
<b>Max. tilt clearance (wear between valve and valve guide)</b>	<b>mm</b>	<b>0.5</b>			
<b>Camshaft bearing Pilot bearing - width</b>	<b>mm</b>	<b>25.85<sup>-0.08</sup></b>		<b>21.85<sup>-0.08</sup></b>	

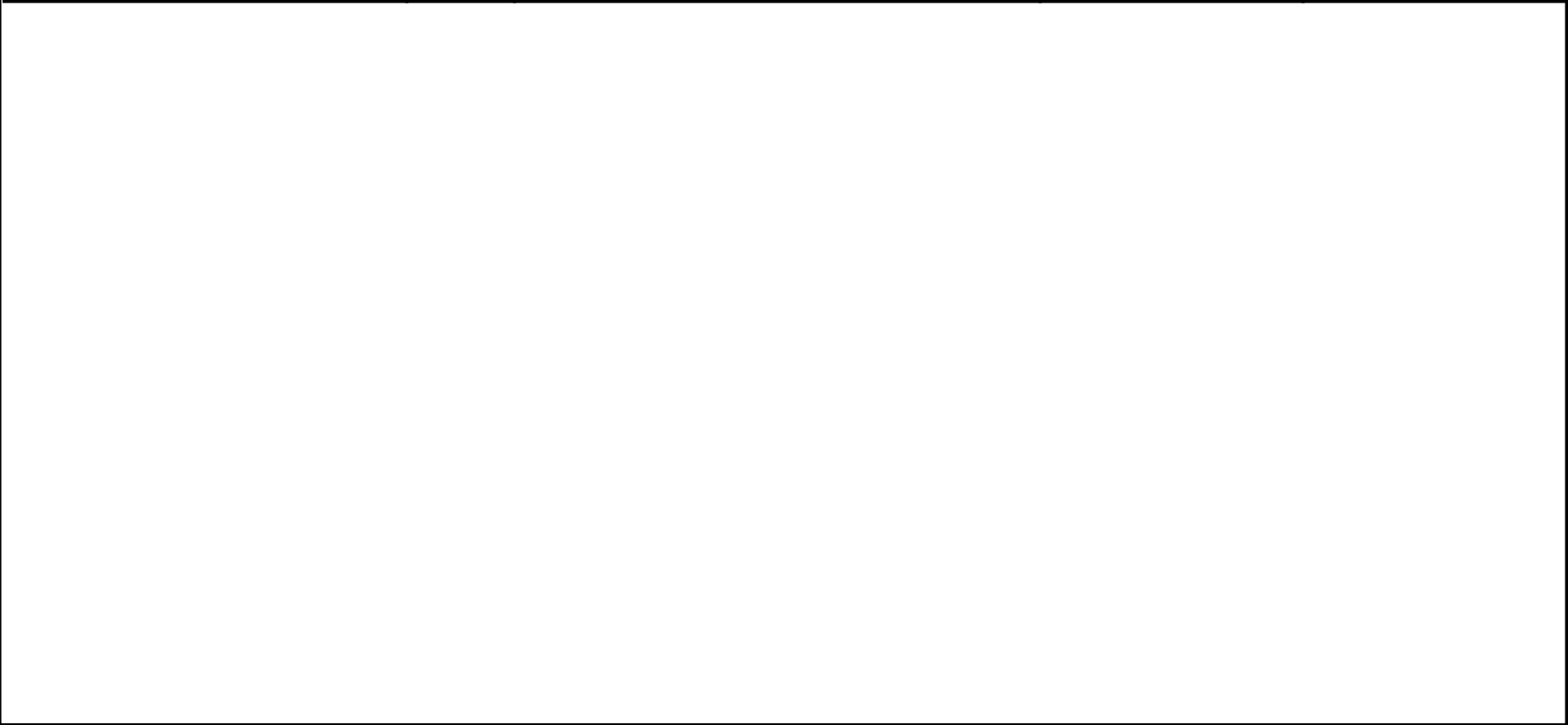
<b>11 - 125 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.65 ± 0.25			
Exhaust	mm	2.00 ± 0.25			
Valve seat diameter					
Intake outside diameter	mm	41.5			
Exhaust valve Ø 35 Outer Ø	mm	34,6	-	-	
Exhaust valve Ø 36 Outer Ø	mm	35.6			

<b>11 - 126 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>74,984<sup>+0.006</sup></b>			
<b>Standard green</b>	<b>mm</b>	<b>74,977<sup>+0.006</sup></b>			
<b>Standard white</b>	<b>mm</b>	<b>74,971<sup>+0.005</sup></b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>74,734<sup>+0.006</sup></b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>74,727<sup>+0.006</sup></b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>74,721<sup>+0.005</sup></b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>74,477<sup>+0.006</sup></b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>74,471<sup>+0.005</sup></b>			
<b>Undersize 3 (U 0.75) green</b>	<b>mm</b>	<b>74,227<sup>+0.006</sup></b>			
<b>Undersize 3 (U 0.75) white</b>	<b>mm</b>	<b>74,221<sup>+0.005</sup></b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.026 ... 0.052</b>			

<b>11 - 127 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	mm	31.0 F8			
<b>Size 1</b>	mm	31.2 F8			
<b>Size 2</b>	mm	31.4 F8			
<b>Size 3</b>	mm	31.6 F8			
<b>Axial crankshaft play</b>	mm	0.085 ... 0.174		0.085 ... 0.257	
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	mm	45.00 <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Size 1</b>	mm	44,75 <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Size 2</b>	mm	44,50 <sup>-0.009</sup> <sub>-0.025</sub>			
<b>Radial conrod bearing play</b>	mm	0.016 ... 0.058			
<b>Max. permitted runout on center main bearing journal (crankshaft supported on outer bearing spigot)</b>	mm	0.15			



<b>11 - 128 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 22 Flywheel</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			
<b>Max. axial runout</b>	<b>mm</b>	<b>0.40</b>		<b>0.30</b>	



<b>11 - 129 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 24 Connecting Rods and Bearings</b>					
<b>Ø Large conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>			
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24 <sup>+0.021</sup><sub>-0.005</sub></b>			
<b>Conrod bush bore diameterØ</b>	<b>mm</b>	<b>22.005<sup>+0.005</sup></b>			
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>max. mm</b>	<b>0.04</b>			
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Permitted deviation in weight of Conrod inside an engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>			
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>			
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>			

<b>11 - 130 Engine</b>		<b>M70 B 50</b>	<b>S70 B 56</b>	<b>M73 B 54</b>	
<b>11 25 Pistons with rings and pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (position)	mm	14	7.5	14	
Piston diameter (measuring point "A")					
Stage 0 Size A	mm	83.976 <sup>+0.014</sup>	-	84.976 <sup>+0.014</sup>	
Stage 0 Size B	mm	83.991 <sup>+0.013</sup>	-	84.991 <sup>+0.013</sup>	
Stage 0 Size AB	mm	-	85.987 <sup>+0.006</sup>	-	
Stage 00 Size A	mm	84.056 <sup>+0.014</sup>	-	85.056 <sup>+0.014</sup>	
Stage 00 Size B	mm	84.071 <sup>+0.013</sup>	-	85.071 <sup>+0.013</sup>	
Stage 00 Size AB	mm	-	86.067 <sup>+0.006</sup>	-	
Stage 1 Size A	mm	84.226 <sup>+0.014</sup>	-	85.226 <sup>+0.014</sup>	
Stage 1 Size B	mm	84.241 <sup>+0.013</sup>	-	85.241 <sup>+0.013</sup>	
Stage 2 Size A	mm	84.476 <sup>+0.014</sup>	-	85.476 <sup>+0.014</sup>	
Stage 2 Size B	mm	84.491 <sup>+0.013</sup>	-	85.491 <sup>+0.013</sup>	
Piston running clearance	mm	0.010 <sup>+0.024</sup>	0.007 <sup>+0.026</sup>	0.010 <sup>+0.024</sup>	
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.1			

<b>11 - 131 Engine</b>		<b>M70 B 50</b>	<b>S70 B 56</b>	<b>M73 B 54</b>	
<b>11 25 Pistons with rings and pins</b>					
<b>1st groove (plain compression ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.15 ... 0.35</b>	<b>0.20 ... 0.40</b>	<b>0.15 ... 0.35</b>	
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.055</b>	<b>0.040 ... 0.075</b>	<b>0.020 ... 0.055</b>	
<b>2nd groove (taper face ring)</b>					
<b>End clearance</b>	<b>mm</b>	<b>0.20 ... 0.40</b>			
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.055</b>	<b>0.030 ... 0.065</b>	<b>0.020 ... 0.055</b>	
<b>3rd groove (Oil scraper ring with rubber lined spring)</b>		<b>x</b>			
<b>End clearance</b>	<b>mm</b>	<b>0.25 ... 0.50</b>			
<b>End float</b>	<b>mm</b>	<b>0.020 ... 0.055</b>			
<b>3rd groove (three piece steel band ring)</b>		<b>x</b>	<b>-</b>	<b>x</b>	
<b>End clearance of fins</b>	<b>mm</b>	<b>0.40 ... 1.40</b>	<b>-</b>	<b>0.40 ... 1.40</b>	
<b>End float</b>	<b>mm</b>	<b>does not have to be measured</b>	<b>-</b>	<b>does not have to be measured</b>	

<b>11 - 132 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 31 Camshaft</b>					
<b>Pilot bearing width</b>	<b>mm</b>	<b>26 <sup>+0.1</sup></b>		<b>22<sup>+0.1</sup></b>	
<b>Runout radial</b>	<b>mm</b>	<b>0.040 ... 0.074</b>		<b>0.040 ... 0.082</b>	
<b>Axial running clearance</b>	<b>mm</b>	<b>0.150 ... 0.330</b>			

11 - 133 Engine		M70 B 50	S70 B 56	M73 B 54	
<b>11 34 Valves with Springs</b>					
Plate Ø					
Intake	mm	42			
Exhaust without sodium filling until 4/90	mm	35	-		
Exhaust with sodium filling from 4/90 <u>Disposal: refer to Service Information bulletin bulletin</u>	mm	36		-	
Exhaust	mm	-		36	
Shaft Ø					
Intake	mm	7.0 <sup>-0.025</sup> <sub>-0.040</sub>			
Exhaust	mm	7.0 <sup>-0.040</sup> <sub>-0.055</sub>			
Following valve versions are available for repairs in addition to the standard valves					
Shaft Ø					
Intake Size 1	mm	7.1 <sup>-0.025</sup> <sub>-0.040</sub>			
Intake Size 2	mm	7.2 <sup>-0.025</sup> <sub>-0.040</sub>			
Exhaust Size 1	mm	7.1 <sup>-0.040</sup> <sub>-0.055</sub>			
Exhaust Size 2	mm	7.2 <sup>-0.040</sup> <sub>-0.055</sub>			

<b>11 - 134 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 40 Oil Supply</b>					
<b>Oil grade</b> <b>see BMW Service Operating Fluids</b>					
<b>Engine oil consumption</b> <b>see BMW Service Operating Fluids</b>					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>7.5</b>		<b>8.0</b>	

<b>11 - 135 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.3 ± 0.2</b>			



<b>11 - 136 Engine</b>		<b>M70</b> <b>B 50</b>	<b>S70</b> <b>B 56</b>	<b>M73</b> <b>B 54</b>	
<b>11 52 Fan Clutch</b>					
Fan clutch					
Switch-on temperature	°C	<b>92 ± 4</b>		<b>102 ± 4</b>	
Switch-off temperature	°C	<b>60</b>		<b>75</b>	
Tilt play of bearing (at Ø 156 mm)	mm	<b>± 0.65</b>		<b>± 0.45</b>	
<b>11 53 Thermostat and connections</b>					
Opening temperature (stamped on housing)	°C	<b>85</b>		<b>95</b>	

<b>11 - 137 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>			
<b>Bore</b>	<b>mm</b>	<b>86</b>	<b>86.4</b>	<b>94.6</b>	
<b>Stroke</b>	<b>mm</b>	<b>85.8</b>	<b>91.0</b>	<b>90</b>	
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2990</b>	<b>3201</b>	<b>3795</b>	
<b>Compression ratio</b>	<b>:1</b>	<b>10.8</b>	<b>11.3</b>	<b>10.5</b>	
<b>Power</b>	<b>kW at rpm</b>	<b>210/7000</b>	<b>236/7400</b>	<b>250/6900</b>	
<b>Max. top speed</b>	<b>rpm</b>	<b>7280 ± 80</b>	<b>7600 ± 50</b>	<b>7200</b>	
<b>Max. constant speed</b>	<b>rpm</b>	<b>7000</b>	<b>7400</b>	<b>6900</b>	
<b>Max. torque</b>	<b>Nm rpm</b>	<b>320/3600</b>	<b>350/3250</b>	<b>400/4750</b>	
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10 - 11</b>	<b>11 - 12</b>	<b>10 - 11</b>	

<b>11 - 138 Engine</b>		<b>S50 B 30</b>	<b>S50 B 32</b>	<b>S38 B 38</b>	
<b>11 11 Engine block, cylinder crankcase</b>					
Bore Ø stage 0 a)	mm	86.000 <sup>+0.014</sup>	86.400 <sup>+0.014</sup>	94.600 <sup>+0.01</sup>	
Bore Ø stage 00 a)	mm	86.050 <sup>+0.014</sup>	86.450 <sup>+0.014</sup>	94.650 <sup>+0.01</sup>	
Bore Ø stage 1 a)	mm	86.200 <sup>+0.014</sup>	86.600 <sup>+0.014</sup>	94.800 <sup>+0.01</sup>	
Bore Ø stage 2 a)	mm	86.400 <sup>+0.014</sup>	86.800 <sup>+0.014</sup>	95.000 <sup>+0.01</sup>	
Permitted roundness deviation of cylinder bore a)	mm	0.005			
Permitted conicity of cylinder bore a)	mm	0.01			
Permitted total wear clearance between piston and cylinder (engine run in)	mm	0.15			
a) New condition or rework					

<b>11 - 139 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 12 Cylinder head with cover</b>					
Height of cylinder head (cylinder head must not be machined)	mm	<b>95.0 ± 0.07</b>		<b>96.0 ± 0.07</b>	
Valve guides are not available as replacement parts.					
Valve guide inner dia. (installed)					
Standard	mm	<b>7.0 H7</b>	<b>6.0 H7</b>	<b>7.0 H7</b>	
Size 1	mm	<b>7.1 H7</b>	<b>6.1 H7</b>	<b>7.1 H7</b>	
Size 2	mm	<b>7.2 H7</b>	<b>6.2 H7</b>	<b>7.2 H7</b>	
Max. tilt clearance (wear between valve and valve guide)	mm	<b>0.5</b>			
Camshaft bearing					
Pilot bearing (1) width	mm	<b>22.9<sup>-0.05</sup></b>			
Axial play	mm	<b>0.1 ... 0.183</b>			
Bucket tappets					
Bore	mm	<b>37.5<sup>+0.016</sup></b>			
Tappet clearance	mm	<b>0.025 ... 0.066</b>	<b>0.025 ... 0.057</b>	<b>0.025 ... 0.066</b>	

<b>11 - 140 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	45			
Correction angle outside	°	15			
Correction angle inside	°	60			
Valve seat width (dimension "B")					
Intake	mm	1.0 <sup>+0.1</sup>		1.2 <sup>+0.1</sup>	
Exhaust	mm	1.2 <sup>+0.1</sup>		1.4 <sup>+0.1</sup>	
Valve seat diameter					
Intake outside diameter	mm	33.5 <sup>+0.1</sup>	34.5 <sup>+0.1</sup>	38.0 <sup>+0.1</sup>	
Exhaust outside diameter	mm	30.0 <sup>+0.1</sup>		32.0 <sup>+0.1</sup>	

<b>11 - 141 Engine</b>		<b>S50 B30</b>	<b>S50 B30</b>	<b>S50 B32</b>	<b>S50 B32</b>
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>		<b>Bearing point 1</b>	<b>Bearing points 2 to 7</b>	<b>Bearing point 1</b>	<b>Bearing points 2 to 7</b>
<b>Standard yellow</b>	mm	59.964 <sup>+0.006</sup>	59.984 <sup>+0.006</sup>	59.964 <sup>+0.006</sup>	59.984 <sup>+0.006</sup>
<b>Standard green</b>	mm	59.957 <sup>+0.006</sup>	59.977 <sup>+0.006</sup>	59.957 <sup>+0.006</sup>	59.977 <sup>+0.006</sup>
<b>Standard white</b>	mm	59.951 <sup>+0.005</sup>	59.971 <sup>+0.005</sup>	59.951 <sup>+0.005</sup>	59.971 <sup>+0.005</sup>
<b>Undersize 1 (U 0.25) yellow</b>	mm	59.714 <sup>+0.006</sup>	59.734 <sup>+0.006</sup>	59.714 <sup>+0.006</sup>	59.734 <sup>+0.006</sup>
<b>Undersize 1 (U 0.25) green</b>	mm	59.707 <sup>+0.006</sup>	59.727 <sup>+0.006</sup>	59.707 <sup>+0.006</sup>	59.727 <sup>+0.006</sup>
<b>Undersize 1 (U 0.25) white</b>	mm	59.701 <sup>+0.005</sup>	59.721 <sup>+0.005</sup>	59.701 <sup>+0.005</sup>	59.721 <sup>+0.005</sup>
<b>Undersize 2 (U 0.50) yellow</b>	mm	59.464 <sup>+0.006</sup>	59.484 <sup>+0.006</sup>	59.464 <sup>+0.006</sup>	59.484 <sup>+0.006</sup>
<b>Undersize 2 (U 0.50) green</b>	mm	59.457 <sup>+0.006</sup>	59.477 <sup>+0.006</sup>	59.457 <sup>+0.006</sup>	59.477 <sup>+0.006</sup>
<b>Undersize 2 (U 0.50) white</b>	mm	59.451 <sup>+0.005</sup>	59.471 <sup>+0.005</sup>	59.451 <sup>+0.005</sup>	59.471 <sup>+0.005</sup>
<b>Radial crankshaft bearing play</b>	mm	0.020 ... 0.046		0.020 ... 0.046	

<b>11 - 142 Engine</b>		<b>S38</b> <b>B 38</b>	<b>S38</b> <b>B 38</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>		<b>Bearing point 1</b>	<b>Bearing points 2 to 7</b>		
<b>Standard red</b>	mm	<b>60.0</b> <sup>-0.030 ... -0.040</sup>	<b>60.0</b> <sup>-0.010 ... -0.020</sup>		
<b>Standard blue</b>	mm	<b>60.0</b> <sup>-0.040 ... -0.049</sup>	<b>60.0</b> <sup>-0.020 ... -0.029</sup>		
<b>Undersize 1 0.25 mm (0.010) red</b>	mm	<b>59.75</b> <sup>-0.030 ... -0.040</sup>	<b>59.75</b> <sup>-0.010 ... -0.020</sup>		
<b>Undersize 1 0.25 mm (0.010) blue</b>	mm	<b>59.75</b> <sup>-0.040 ... -0.049</sup>	<b>59.75</b> <sup>-0.020 ... -0.029</sup>		
<b>Undersize 2 0.50 mm (0.020) red</b>	mm	<b>59.50</b> <sup>-0.030 ... -0.040</sup>	<b>59.50</b> <sup>-0.010 ... -0.020</sup>		
<b>Undersize 2 0.50 mm (0.020) blue</b>	mm	<b>59.50</b> <sup>-0.040 ... -0.049</sup>	<b>59.50</b> <sup>-0.020 ... -0.029</sup>		
<b>Undersize 3 0.75 mm (0.030) red</b>	mm	<b>59.25</b> <sup>-0.030 ... -0.040</sup>	<b>59.25</b> <sup>-0.010 ... -0.020</sup>		
<b>Undersize 3 0.75 mm (0.030) blue</b>	mm	<b>59.25</b> <sup>-0.040 ... -0.049</sup>	<b>59.25</b> <sup>-0.020 ... -0.029</sup>		
<b>Radial crankshaft bearing play</b>	mm	<b>0.03 ... 0.07</b>			

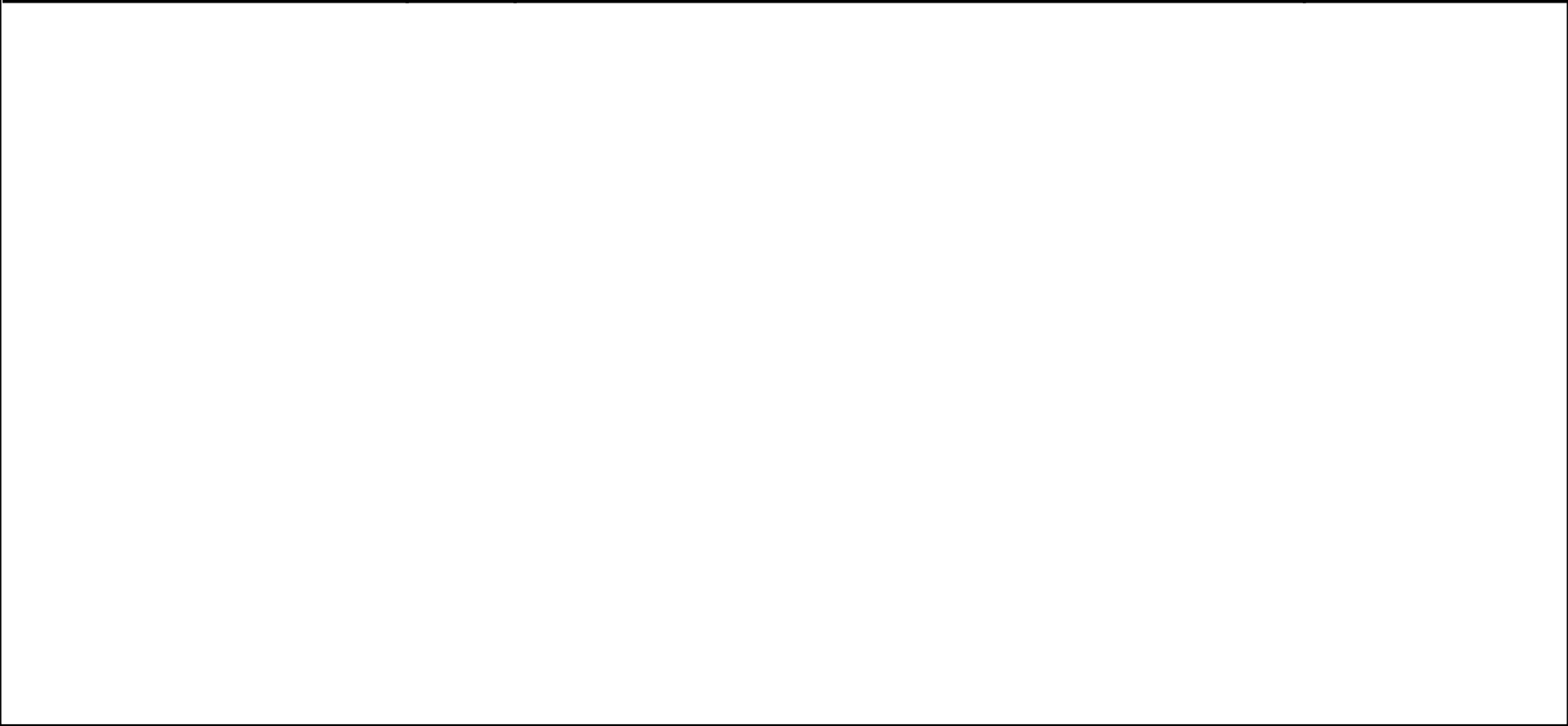
<b>11 - 143 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	<b>mm</b>	<b>25.0 F8</b>	<b>30.0 F8</b>		
<b>Size 1</b>	<b>mm</b>	<b>25.2 F8</b>	<b>30.2 F8</b>		
<b>Size 2</b>	<b>mm</b>	<b>25.4 F8</b>	<b>30.4 F8</b>		
<b>Axial crankshaft play</b>	<b>mm</b>	<b>0.080 ... 0.163</b>	<b>0.085 ... 0.174</b>		



<b>11 - 144 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Standard</b>	mm	<b>50.00</b> <sup>-0.009</sup> <sub>-0.025</sub>	<b>49.00</b> <sup>-0.009</sup> <sub>-0.025</sub>		
<b>Size 1</b>	mm	<b>49.75</b> <sup>-0.009</sup> <sub>-0.025</sub>	<b>48.75</b> <sup>-0.009</sup> <sub>-0.025</sub>		
<b>Size 2</b>	mm	<b>49.50</b> <sup>-0.009</sup> <sub>-0.025</sub>	<b>48.50</b> <sup>-0.009</sup> <sub>-0.025</sub>		
<b>Radial conrod bearing play</b>	mm	<b>0.028 ... 0.070</b>	<b>0.026 ... 0.068</b>	<b>0.030 ... 0.070</b>	

<b>11 - 145 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. permissible runout on middle main bearing journal (crankshaft taken up on outer bearing journals)</b>	<b>mm</b>	<b>0.20</b>	<b>0.10</b>		

<b>11 - 146 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 22 Flywheel</b>					
<b>Max. runout measured on outer Ø</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.10</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			



<b>11 - 147 Engine</b>		<b>S50</b> <b>B 30</b>	<b>S50</b> <b>B 32</b>	<b>S38</b> <b>B 38</b>	
<b>11 24 Connecting Rods and Bearings</b>					
<b>Ø Large conrod eye (without bearing)</b>	<b>mm</b>	<b>53.000<sup>+0.010</sup></b>		<b>52.000<sup>+0.010</sup></b>	
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>23<sup>+0.021</sup><sub>-0.005</sub></b>		<b>24<sup>+0.021</sup><sub>-0.005</sub></b>	
<b>Conrod bush bore diameterØ</b>	<b>mm</b>	<b>21<sup>+0.020</sup><sub>+0.024</sub></b>	<b>21<sup>+0.017</sup><sub>+0.013</sub></b>	<b>22<sup>+0.020</sup><sub>+0.024</sub></b>	
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>max. mm</b>	<b>0.04</b>			
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Permitted deviation in weight of Conrod inside an engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>			
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>			
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>			

<b>11 - 148 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (Lage)	mm	8.5		12	
Piston Ø, original	mm	85.965 ± 0.009	85.365 ± 0.009	94.555 ± 0.009	
Kolben-Ø 1. Übermaß	mm	86.165 ± 0.009	86.165 ± 0.009	94.755 ± 0.009	
Kolben-Ø 2. Übermaß	mm	86.365 ± 0.009	86.765 ± 0.009	94.955 ± 0.009	
Piston running clearance	mm	0.026 ... 0.058		0.036 ... 0.064	
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.15			

<b>11 - 149 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 25 Pistons with Rings and Pins</b>					
<b>1st groove (plain compression ring)</b>					
<b>Height</b>	<b>mm</b>	<b>1.2<sup>-0.010</sup><sub>-0.025</sub></b>		<b>1.5<sup>-0.010</sup><sub>-0.025</sub></b>	
<b>End clearance</b>	<b>mm</b>	<b>0.25 ... 0.40</b>		<b>0.30 ... 0.55</b>	
<b>Axial play</b>	<b>mm</b>	<b>0.03 ... 0.065</b>		<b>0.060 ... 0.095</b>	
<b>2nd groove (taper face ring)</b>					
<b>Height</b>	<b>mm</b>	<b>1.5<sup>-0.010</sup><sub>-0.025</sub></b>			
<b>End clearance</b>	<b>mm</b>	<b>0.25 ... 0.40</b>		<b>0.30 ... 0.55</b>	
<b>Axial play</b>	<b>mm</b>	<b>0.02 ... 0.055</b>		<b>0.040 ... 0.075</b>	
<b>3.st groove (Oil scraper ring with hose-spring)</b>					
<b>Height</b>	<b>mm</b>	<b>2.0<sup>-0.010</sup><sub>-0.025</sub></b>		<b>2.5<sup>-0.010</sup><sub>-0.025</sub></b>	
<b>End clearance</b>	<b>mm</b>	<b>0.25 ... 0.50</b>			
<b>Axial play</b>	<b>mm</b>	<b>0.020 ... 0.055</b>		<b>0.2 ... 0.55</b>	

<b>11 - 150 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 31 Camshaft</b>					
<b>Thrust bearing intake (bearing no. 1) width</b>	<b>mm</b>	<b>23 H8</b>			
<b>Runout radial</b>	<b>mm</b>	<b>0.027 ... 0.053</b>			
<b>Axial running clearance</b>	<b>mm</b>	<b>0.10 ... 0.183</b>	<b>0.10 ... 0.15</b>		

<b>11 - 151 Engine</b>		<b>S50 B30</b>	<b>S50 B32</b>	<b>S38 B38</b>	
<b>11 34 Valves with Springs</b>					
<b>Plate Ø</b>					
<b>Intake</b>	<b>mm</b>	<b>34</b>	<b>35</b>	<b>38.5</b>	
<b>Exhaust</b>	<b>mm</b>	<b>30.5</b>		<b>32.5</b>	
<b>Shaft Ø</b>					
<b>Intake Standard</b>	<b>mm</b>	<b>7.0<sup>-0.025</sup><sub>-0.040</sub></b>	<b>6.0<sup>-0.025</sup><sub>-0.039</sub></b>	<b>7.0<sup>-0.025</sup><sub>-0.040</sub></b>	
<b>Exhaust Standard</b>	<b>mm</b>	<b>7.0<sup>-0.040</sup><sub>-0.055</sub></b>	<b>6.0<sup>-0.040</sup><sub>-0.055</sub></b>	<b>7.0<sup>-0.040</sup><sub>-0.055</sub></b>	
<b>Clearance of</b>					
<b>Intake valve At max. 35° C coolant temperature</b>	<b>mm</b>	<b>0.28 ... 0.33</b>	<b>0.18 ... 0.23</b>	<b>0.28 ... 0.33</b>	
<b>Exhaust valve At max. 35° C coolant temperature</b>	<b>mm</b>	<b>0.28 ... 0.33</b>			
<b>Repair valves: In addition to the standard valves other valve versions are available for repairs</b>					
<b>Shaft Ø stage 1</b>	<b>mm</b>	<b>7.1</b>	<b>6.1</b>	<b>7.1</b>	
<b>Identification on stem</b>		<b>R1</b>			
<b>Shaft Ø stage 2</b>	<b>mm</b>	<b>7.2</b>	<b>6.2</b>	<b>7.2</b>	
<b>Identification on stem</b>		<b>R2</b>			



<b>11 - 152 Engine</b>		<b>S50</b> <b>B 30</b>	<b>S50</b> <b>B 32</b>	<b>S38</b> <b>B 38</b>	
<b>11 40 Oil Supply</b>					
<b>Oil grade, refer to BMW Service Operating Fluids</b>					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>7.00</b>	<b>5.50</b>	<b>5.75</b>	

<b>11 - 153 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>1.0</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.0</b>			

<b>11 - 154 Engine</b>		<b>S50</b> <b>B30</b>	<b>S50</b> <b>B32</b>	<b>S38</b> <b>B38</b>	
<b>11 52 Fan Clutch</b>					
Switch-on temperature	°C	92			
Switch-off temperature	°C	60			
Tilt clearance of bearing (dia. 120 mm)	mm	± 0.65			
<b>11 53 Thermostat and connections</b>					
Opening temperature (stamped in thermostat)	°C	80		79	

<b>11 - 155 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 00 Engine in General</b>					
<b>Cylinder</b>		<b>6</b>			
<b>Bore</b>	<b>mm</b>	<b>86.0</b>	<b>86.4</b>		
<b>Stroke</b>	<b>mm</b>	<b>85.8</b>	<b>89.6</b>		
<b>Effective displacement</b>	<b>cm<sup>3</sup></b>	<b>2990</b>	<b>3152</b>		
<b>Compression ratio</b>	<b>:1</b>	<b>10.5</b>			
<b>Power</b>	<b>kW at rpm</b>	<b>176/6000</b>			
<b>Max. top speed</b>	<b>rpm</b>	<b>6800</b>			
<b>Max. torque</b>	<b>Nm rpm</b>	<b>305/4250</b>	<b>320/3800</b>		
<b>Compression pressure (approx. equal value for all cylinders)</b>	<b>min. bar</b>	<b>10 ...11</b>			

<b>11 - 156 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 11 Engine block, cylinder crankcase</b>					
Bore dia. a)	mm	<b>86.000 <sup>+0.014</sup></b>	<b>86.400 <sup>+0.014</sup></b>		
Intermediate bore dimension a)	mm	<b>86.050 <sup>+0.014</sup></b>	<b>86.450 <sup>+0.014</sup></b>		
1) Grinding dimension a)	mm	<b>86.250 <sup>+0.014</sup></b>	<b>86.600 <sup>+0.014</sup></b>		
2) Grinding dimension a)	mm	<b>86.500 <sup>+0.014</sup></b>	-		
Permitted roundness deviation of cylinder bore a)	mm	0.005			
Permitted conicity of cylinder bore a)	mm	0.01			
Permitted total wear clearance between piston and cylinder (engine run in)	mm	0.113			
a) New condition or rework					

<b>11 - 157 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 12 Cylinder head with cover</b>					
<b>Cylinder head height, original dimension (cylinder head must not be machined)</b>	<b>mm</b>	<b>140</b>			
<b>Valve guides are not available as replacement parts.</b>					
<b>Valve guide inner dia. (installed)</b>					
<b>Standard</b>	<b>mm</b>	<b>6.0 H7</b>			
<b>Size 1</b>	<b>mm</b>	<b>6.1 H7</b>			
<b>Size 2</b>	<b>mm</b>	<b>6.2 H7</b>			
<b>Tilt clearance (between valve and valve guide)</b>	<b>max. mm</b>	<b>0.5</b>			
<b>Camshaft bearing</b>					
<b>Pilot bearing (1) width</b>	<b>mm</b>	<b>20 d8</b>			

<b>11 - 158 Engine</b>		<b>S50 US B 30</b>	<b>S52 B 32</b>		
<b>11 12 Cylinder head with valve seat cover</b>					
Valve seat angle	°	<b>45</b>			
Correction angle outside	°	<b>15</b>			
Correction angle inside	°	<b>60</b>			
Valve seat width (dimension "B")					
Intake	mm	<b>1.65 ± 0.25</b>			
Exhaust	mm	<b>1.65 ± 0.25</b>			
Valve seat diameter					
Intake outside diameter	mm	<b>29.4 ± 0.20</b>			
Exhaust outside diameter	mm	<b>26.4 ± 0.20</b>			

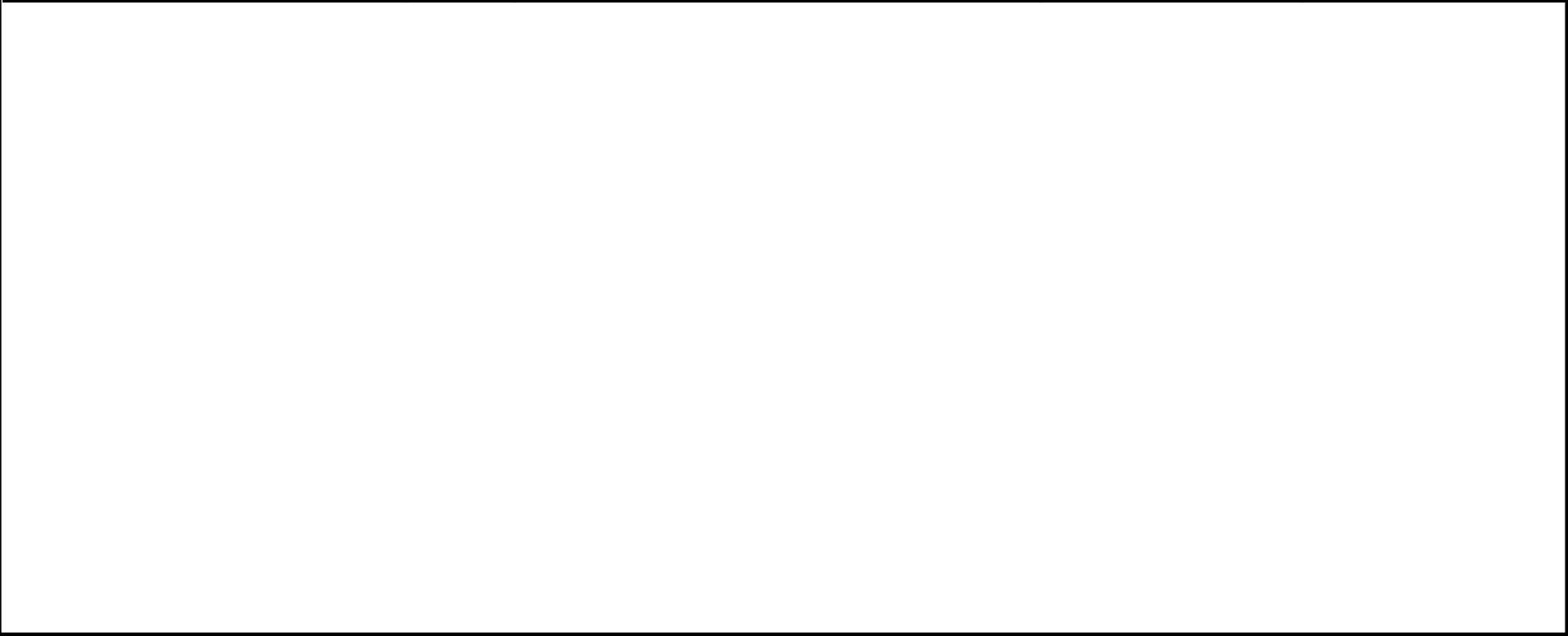
<b>11 - 159 Engine</b>		<b>S50 US B 30</b>	<b>S52 B 32</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of main bearing journals</b>					
<b>Standard yellow</b>	<b>mm</b>	<b>59.984 ... 59.990</b>			
<b>Standard green</b>	<b>mm</b>	<b>59.977 ... 59.983</b>			
<b>Standard white</b>	<b>mm</b>	<b>59.971 ... 59.976</b>			
<b>Undersize 1 (U 0.25) yellow</b>	<b>mm</b>	<b>59.734 ... 59.740</b>			
<b>Undersize 1 (U 0.25) green</b>	<b>mm</b>	<b>59.727 ... 59.733</b>			
<b>Undersize 1 (U 0.25) white</b>	<b>mm</b>	<b>59.721 ... 59.726</b>			
<b>Undersize 2 (U 0.50) yellow</b>	<b>mm</b>	<b>59.484 ... 59.490</b>			
<b>Undersize 2 (U 0.50) green</b>	<b>mm</b>	<b>59.477 ... 59.483</b>			
<b>Undersize 2 (U 0.50) white</b>	<b>mm</b>	<b>59.471 ... 59.476</b>			
<b>Radial crankshaft bearing play</b>	<b>mm</b>	<b>0.020 ... 0.058</b>			



<b>11 - 160 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Ground sizes of crankshaft thrust bearing</b>					
<b>Standard</b>	mm	<b>25.0 F8</b>			
<b>Size 1</b>	mm	<b>25.2 F8</b>			
<b>Size 2</b>	mm	<b>25.4 F8</b>			
<b>Axial crankshaft play</b>	mm	<b>0.080 ... 0.163</b>			
<b>Ground sizes of conrod bearing journals</b>					
<b>Standard</b>	mm	<b>45.00<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 1</b>	mm	<b>44.75<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Size 2</b>	mm	<b>44.50<sup>-0.009</sup><sub>-0.025</sub></b>			
<b>Radial conrod bearing play</b>	mm	<b>0.020 ... 0.055</b>			

<b>11 - 161 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 21 Crankshaft and Bearings</b>					
<b>Max. permissible runout on middle main bearing journal (crankshaft taken up on outer bearing journals)</b>	<b>mm</b>	<b>0.20</b>			

<b>11 - 162 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 22 Flywheel</b>					
<b>Max. axial run-out measured on outside diameter</b>	<b>mm</b>	<b>0.30</b>			
<b>Max. radial runout measured on outside diameter</b>	<b>mm</b>	<b>0.20</b>			
<b>11 23 Vibration Damper</b>					
<b>Max. radial runout</b>	<b>mm</b>	<b>0.20</b>			
<b>Max. axial runout</b>	<b>mm</b>	<b>0.40</b>			



<b>11 - 163 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 24 Connecting Rods and Bearings</b>					
<b>∅ great conrod eye (without bearing)</b>	<b>mm</b>	<b>48.000 ... 48.016</b>			
<b>Bore in conrod for conrod bush</b>	<b>mm</b>	<b>24 <sup>+0.021</sup><sub>-0.005</sub></b>			
<b>Conrod sleeve inside diameter</b>	<b>mm</b>	<b>22 <sup>+0.010</sup><sub>+0.005</sub></b>			
<b>Max. deviation in parallel of conrod bores with bearing shells at distance of 150 mm</b>	<b>mm</b>	<b>0.04</b>			
<b>Max. permissible displacement to one side</b>	<b>max. °</b>	<b>0.5</b>			
<b>Max. deviation in weight of connecting rods in one engine (without bearing shells)</b>	<b>g</b>	<b>± 4</b>			
<b>Large conrod eye</b>	<b>g</b>	<b>± 2</b>			
<b>Small conrod eye</b>	<b>g</b>	<b>± 2</b>			

<b>11 - 164 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 25 Pistons with Rings and Pins</b>					
Pistons and pins are matched - only replace them together.					
Measuring point "A" (position)	mm	8.5	9.5		
Piston diameter (measuring point "A")					
Standard	mm	$85.97 \pm 0.009$	$86.365 \pm 0.009$		
1st oversize	mm	$86.17 \pm 0.009$	$86.565 \pm 0.009$		
2nd oversize	mm	$86.37 \pm 0.009$	-		
Piston running clearance		$0.021 \dots 0.053$	$0.026 \dots 0.058$		
Max. total wear clearance between piston and cylinder (engine operated)	mm	0.113			

<b>11 - 165 Engine</b>	<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
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<b>11 25 Pistons with Rings and Pins</b>				
1st groove (plain compression ring)				
End clearance	mm	0.25 ... 0.40		
End float	mm	0.03 ... 0.065		
2nd groove (taper face ring)				
End clearance	mm	0.2 ... 0.4		
End float	mm	0.02 ... 0.055		
3.st groove (Oil scraper ring with hose-spring)				
End clearance	mm	0.25 ... 0.50		
End float	mm	0.020 ... 0.055		

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<b>11 - 166 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 31 Camshaft</b>					
<b>Pilot bearing width Intake (bearing no. 1)</b>	<b>mm</b>	<b>20 H8</b>			
<b>Pilot bearing width Exhaust (bearing no. 1)</b>	<b>mm</b>	<b>20 H9</b>			
<b>Bearing radial play</b>	<b>mm</b>	<b>0.020 ... 0.054</b>			
<b>Bearing end float</b>	<b>mm</b>	<b>0.15 ... 0.330</b>			

<b>11 - 167 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 34 Valves with springs</b>					
<b>Valve plate diameter</b>					
<b>Intake</b>	<b>mm</b>	<b>30.0</b>			
<b>Exhaust</b>	<b>mm</b>	<b>27.0</b>			
<b>Stem diameter</b>					
<b>Intake</b>	<b>mm</b>	<b>6.0</b> <sup>-0.025</sup> <sub>-0.040</sub>			
<b>Exhaust</b>	<b>mm</b>	<b>6.0</b> <sup>-0.040</sup> <sub>-0.055</sub>			



**11 - 168 Engine**

**S50 US**  
**B 30**

**S52**  
**B 32**

**11 34 Valves with springs**

Following valve versions are available for repairs in addition to the standard valves

Intake stem diameter

mm

 $6.1^{+0.025}_{-0.040}$ 

Exhaust stem diameter

mm

 $6.1^{+0.040}_{-0.055}$ 

Head dia.

mm

0.2

Identification on stem

R1

Intake stem diameter

mm

 $6.2^{+0.025}_{-0.040}$ 

Exhaust stem diameter

mm

 $6.2^{+0.040}_{-0.055}$ 

Head dia.

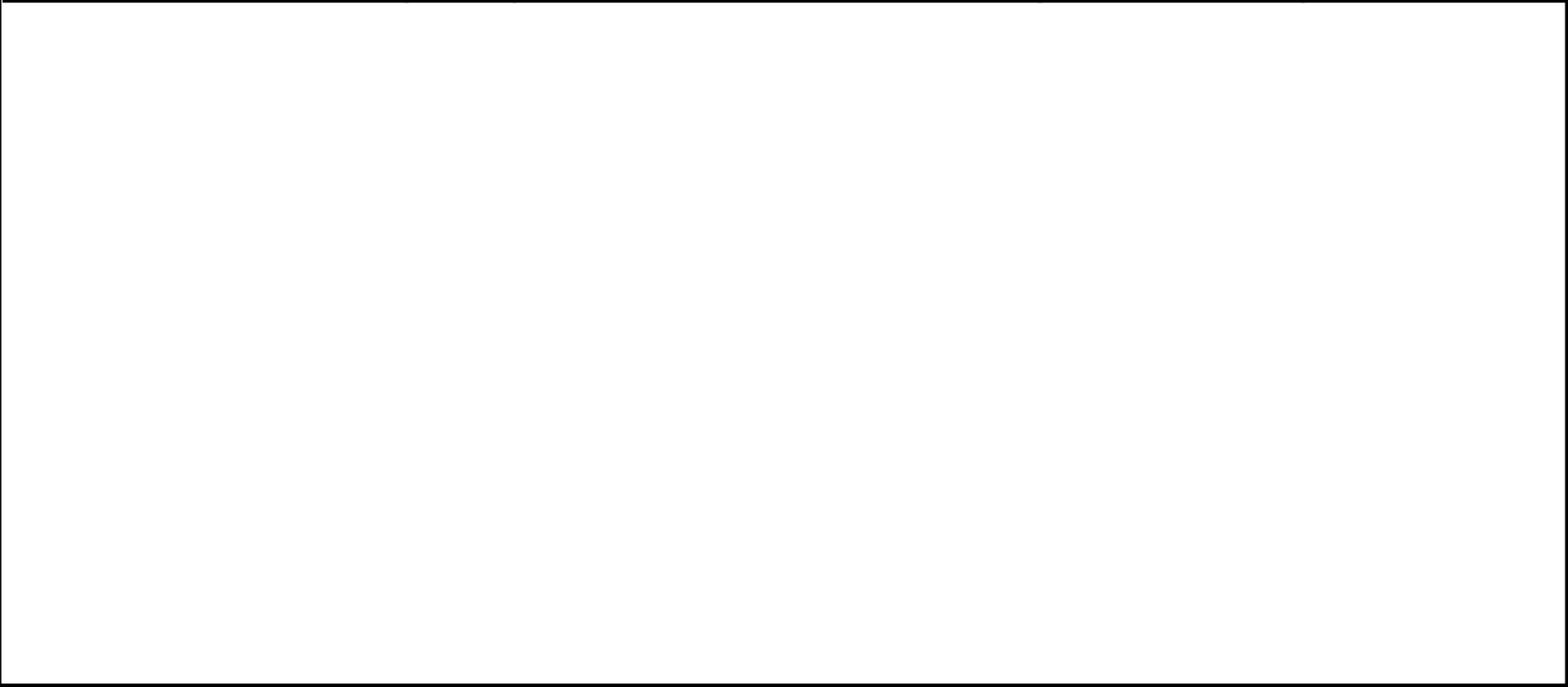
mm

0.4

Identification on stem

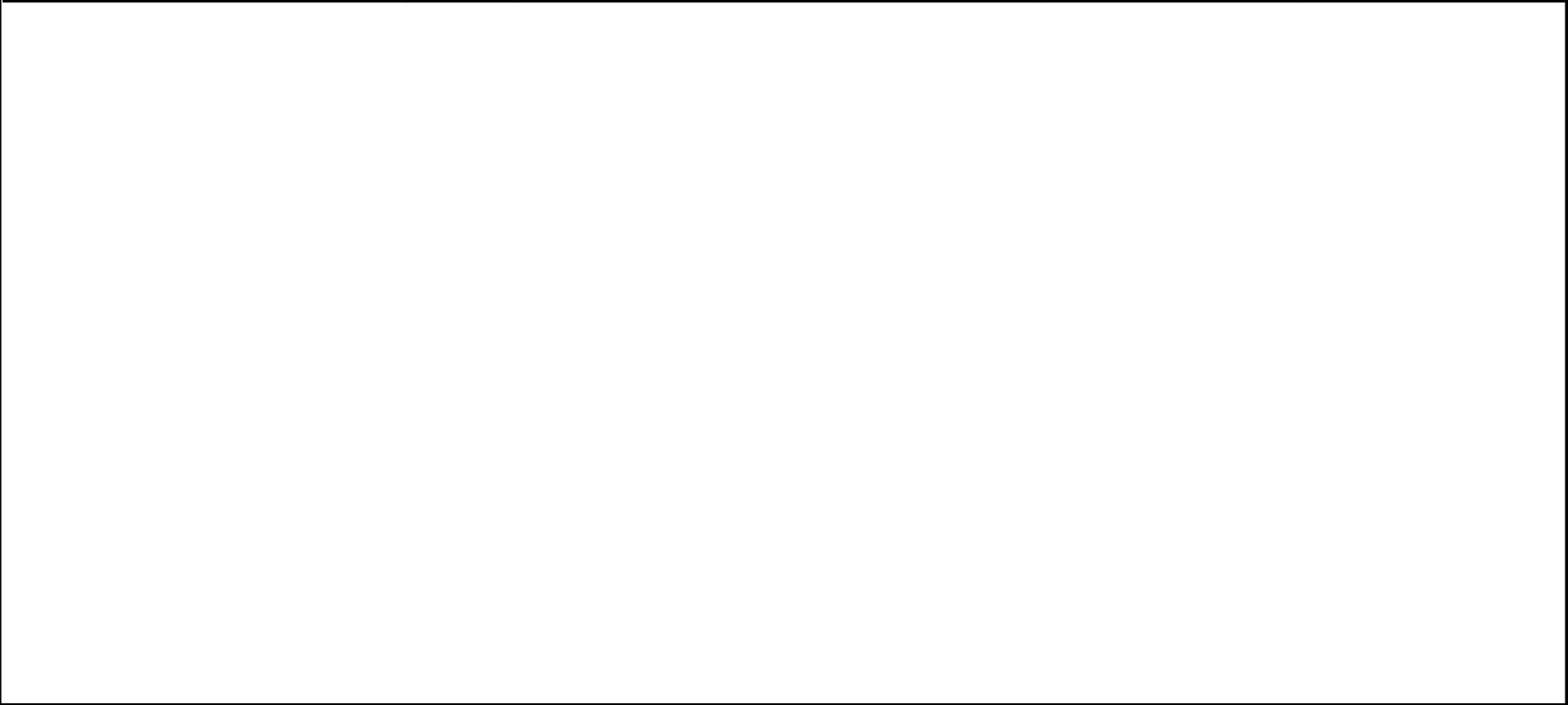
R2

<b>11 - 169 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 40 Oil Supply</b>					
<b>Oil type</b> refer to BMW Service Operating Fluids					
<b>Engine oil consumption</b> refer to BMW Service Operating Fluids					
<b>Oil change volume with oil filter</b>	<b>ltr.</b>	<b>6.5</b>			



<b>11 - 170 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 41 Oil Pump with Strainer and Drive</b>					
<b>Oil pressure at idle speed with engine at operating temperature.</b>	<b>min bar</b>	<b>0.5</b>			
<b>Regulated pressure</b>	<b>bar</b>	<b>4.0</b>			

<b>11 - 171 Engine</b>		<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 52 Fan coupling</b>					
<b>Fan clutch</b>					
<b>Switch-on temperature</b>	°C	<b>90</b>			
<b>Switch-off temperature</b>	°C	<b>60</b>			
<b>Tilt clearance of bearing (dia. 120 mm)</b>	mm	<b>± 0.65</b>			



<b>11 - 172 Engine</b>	<b>S50 US</b> <b>B 30</b>	<b>S52</b> <b>B 32</b>		
<b>11 53 Thermostat and connections</b>				
<b>Opening temperature (stamped in thermostat)</b>	<b>approx. °C</b>	<b>92</b>		

<b>12 - 1 Engine Electrical System</b>		<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E36</b>
		<b>M70</b>	<b>M70/M73</b>	<b>M73</b>	<b>M40</b>
<b>12 11 Igniter, Distributor, Interrupter</b>					
<b>High-tension distributor for DME</b>					
<b>Winding resistance</b>	<b>kΩ</b>	<b>1.1 ± 10%</b>			
<b>Clearance between stator and rotor tooth</b>	<b>mm</b>	<b>0.3 ... 0.7</b>			
<b>Resistors in Secondary Circuit</b>					
<b>Angled plugs/shielded plugs</b>	<b>kΩ</b>	<b>1 ± 20%</b>			
<b>Spark plug connectors</b>	<b>kΩ</b>	<b>5 ± 10%</b>			
<b>Ignition lead at 20° C</b>	<b>mΩ/m</b>	<b>20</b>			
<b>Distributor</b>	<b>kΩ</b>	<b>1 ± 30%</b>			
<b>Position sensor</b>					
<b>Coil resistance</b>	<b>Ω</b>	<b>80 ± 10%</b>			

<b>12 - 2 Engine Electrical System</b>		<b>S38</b>	<b>S50 B 30</b>	<b>S70</b>	<b>S50 B 32</b>	<b>S52</b>	
<b>12 12 Ignition Harness, Spark Plugs</b>							
Bosch Y6 DC		x	-	-	-	-	
Bosch Y5 DDC		-	x	-	-	-	
Bosch F8 LCR2		-	-	x	-	-	
NGK PKR 7A		-	-	-	x	-	
Bosch FGR 8KQC		-	-	-	-	x	

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12 - 3 Engine Electrical System	E34 M40	E34 M43	E36 M42	E36 M43	M50	M52
<b>12 12 Ignition Harness, Spark Plugs</b>						
Bosch F8 LDCR	-	-	-	-	-	-
NGK BKR 6EK	-	x	x	x	x	x
Bosch F04 DAR	x	-	-	-	-	-
Bosch F7 LDCR	-	-	x US	x	x	-
Bosch F7 LDCR from 9/93	-	x	x	-	-	x
Country version S961 Bosch F8 LCR	-					x US



12 - 4 Engine Electrical System	M60/1 B 30	M60/2 B 40	M70	M73	M62	
12 12 Ignition Harness, Spark Plugs						
Bosch F7 LDCR	x	ECE	-	-	-	
NGK 6E EKG	x	ECE	-	-	-	
NGK BKR 6EK	From 9/92	-	-	-	ECE; US up to 5/97	
NGK BKR 6EK (E31 only)	-	-	-	-	US from 5/97	
Bosch F8 LCR	-	-	x	x	-	
Bosch F9 LCR	-	-	-	x	-	
Bosch W8 LCR	-	US	-	-	-	
Bosch W8 LPR	-	US	-	-	-	
Bosch F8 LDCR (E38; E39 only)	-	-	-	-	US from 5/97	

12 - 5 Engine Electrical System		E36	E34	E32	E31	E38	E39
<b>12 12 Ignition Harness, Spark Plugs</b>							
Electrode gap on spark plugs							
All models except "M"	mm	0.7 <sup>+0.1</sup>					
M models	mm	0.6 <sup>+0.1</sup>	-				
All models with dual mass electrode	mm	0.9 <sup>+0.1</sup>					
Cylinder identifying sensor							
Coil resistance at 20 °C							
Pins 1 and 2	Ω	< 1					
Firing sequence: 4 cylinders 1,3,4,2 6 cylinders 1,5,3,6,2,4 8 cylinders 1,5,4,8,6,3,7,2 12 cylinders 1,7,5,11,3,9,6,12,2,8,4,10							

<b>12 - 6 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 13 Ignition Coil</b>							
Primary winding resistance	$\Omega$	<b>0.82</b>			-		
Primary coil resistance Code 2051118335	$\Omega$	-			<b>0.5</b>		
Primary coil resistance Code 20510171101	$\Omega$	-			<b>0.37</b>		
Secondary coil resistance	$k\Omega$	<b>8.25</b>			-		
Secondary coil resistance Code 2051118335	$k\Omega$	-			<b>6.0</b>		
Secondary coil resistance Code 20510171101	$k\Omega$	-			<b>9.0</b>		
Primary inductance	mH	<b>5.6</b>			-		
Primary inductance Code 2051118335	mH	-	<b>3.7</b>	-		-	
Primary inductance Code 20510171101	mH	-	<b>5.8</b>			-	
Secondary inductance	H	<b>31</b>			-		
Secondary inductance Code 2051118335	H	-	<b>31</b>			-	
Secondary inductance Code 20510171101	H	-	<b>44</b>			-	

<b>12 - 7 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 13 Ignition Coil</b>							
<b>Ignition coil for non-operating ignition distribution (Engines: M42, M43, M50, M52, M60)</b>							
<b>Primary winding resistance</b>	<b>approx. <math>\Omega</math></b>	<b>0.8</b>					
<b>Secondary winding resistance</b>		<b>not measurable</b>					

<b>12 - 8 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 14 Electronic Shift Units or Control Units</b>							
<b>Pulse sender</b>							
<b>Coil resistance at 20 °C</b>							
<b>All models except:</b>	$\Omega$	<b>540 ± 10%</b>					
<b>M models</b>	$\Omega$	-	<b>960 ± 10%</b>	-			
<b>With breakerless ignition distribution (M42, M43, M50, M60, S50, S38)</b>	$\Omega$	<b>1280 ± 10%</b>					
<b>Distance from Inductive pulse sender / gear</b>	mm	<b>1.0 ± 0.3</b>					

<b>12 - 9 Engine Electrical System</b>		<b>E36 M41</b>	<b>E36 M51</b>	<b>E34 M51</b>	
<b>12 21 Heating Time Control Unit</b>					
Max. heating time in sec. with					
Coolant temperature below 60° C	sec.	5			
Coolant temperature above 60°C	sec.	0			
Safety switch-off after	sec.	8 +5			
Glow plug fuse	A	80			
<b>12 23 Glow Plugs</b>					
Testing voltage	V	12 ± 0.5			
Max. current consumption of one glow plug after approx. 5 sec. operation	max. A	13 ... 15			
After approx. 20 sec. operation	max. A	12			
Temperature after about 5 sec. operation	approx. °C	800			
Glow plug resistance at 20° C	Ω	0.4 ... 0.6			
Current consumption of all glow plugs at 20° C measured with current clips of BMW Service Tester	A	60 ... 80			

<b>12 - 10 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>	
<b>12 31 Alternator with Drive and Mounting Parts</b>							
<b>Rated voltage</b>	<b>V</b>	<b>14</b>					
<b>Rated voltage</b>	<b>A/W</b>	<b>65/910</b> <b>70/980</b> <b>80/1120</b> <b>90/1260</b> <b>105/1470</b> <b>115/1610</b> <b>140/1960</b>					
<b>Shielded capacitor</b>	<b>μF</b>	<b>2.2 ± 20%</b>					

<b>12 - 11 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 32 Governor</b>							
Regulated voltage at 1500 rpm engine speed / no electrical devices on (at 30 °C to 60 °C at regulator)	V	13.5 ... 14.2			13.5 ... 14.1		
Constant voltage regulator (only for vehicles with battery in trunk or underneath rear seat)	V	-	14.3 ± 0.1		-		

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<b>12 - 12 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 41 Starter and Mounting Parts</b>							
<b>Rated power</b>	<b>kW</b>						
<b>M40, M42, M43, M52, S50</b>	<b>kW</b>	<b>1.4</b>			<b>-</b>		
<b>M41</b>	<b>kW</b>	<b>1.8</b>			<b>-</b>		
<b>M50, M52, S52</b>	<b>kW</b>	<b>1.7</b>			<b>-</b>	<b>1.7</b>	
<b>M20</b>	<b>kW</b>	<b>-</b>	<b>1.4</b>		<b>-</b>		
<b>M30</b>	<b>kW</b>	<b>-</b>	<b>1.7</b>	<b>1.5 / 1.7</b>		<b>-</b>	
<b>M21</b>	<b>kW</b>	<b>-</b>	<b>2.2</b>		<b>-</b>		
<b>M51</b>	<b>kW</b>	<b>2.2</b>			<b>-</b>		
<b>S38</b>	<b>kW</b>	<b>-</b>	<b>1.7</b>		<b>-</b>		
<b>M60, M62</b>	<b>kW</b>	<b>-</b>			<b>1.7</b>		
<b>M70. M73</b>	<b>kW</b>	<b>-</b>			<b>2.2</b>		
<b>Axial armature play</b>	<b>mm</b>	<b>0.1 - 0.2</b>					
<b>Carbon brush length</b>	<b>at least mm</b>	<b>13</b>					
<b>Testing voltage</b>	<b>V</b>	<b>12 ± 0.3</b>					

<b>12 - 13 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 41 Starter Motor with Bracket, Solenoid Switch</b>							
Current consumption at term 50 (with rated voltage)							
With rated power of 1.1 ... 1.7 KW							
Pull-in winding	A	40					
Hold-in winding	A	7.5					
With rated power of 2.2 KW							
Pull-in winding	A	60					
Hold-in winding	A	10					

<b>12 - 14 Engine Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>	<b>E38</b>	<b>E39</b>
<b>12 61 Oil pressure, oil temperature, oil level display</b>							
Switch-on pressure	bar	0.2 ... 0.5					
Oil Level Switch Note: Max. 200 mA testing load. Measured against vehicle ground							
Static at connection 1							
Level okay	k $\Omega$	$\pm 1\%$					
Level too low	$\Omega$	0 ... 0.2					
Dynamic at connection 2							
Level okay	$\Omega$	0 ... 0.2					
Level too low	$\Omega$	$\infty$					

<b>12 - 15 Engine Electrical System</b>		<b>E34</b>			
		<b>M21</b>			
<b>12 62 Coolant Temperature</b>					
Coolant temperature resistance between connection G1 and ground					
at 60°C	-G1 Ω	134 ± 13.5			
at 90°C	- G2 Ω	51.2 ± 4.3			
Heating time control resistance between conn. G2 and ground					
at 20°C	Ω	1134 ±125			
at 60°C	Ω	272 ± 27			
at 90°C	Ω	114 ± 11			
<b>12 63 Switch and Relay</b>					
Operating voltage	V	9 ...15			
Switch-off temp.	°C	17 ± ,2			
Switch-on temp.	°C	11 ... 14			
Temperature switch 5.5°C Fuel Preheating					
Switch-on temp. (with dropping temperature)	°C	5.5 ± 2.5			
Switch-off temp. (with dropping temperature)	°C	-0.5 ± 2.5			

**12 - 16 Engine Electrical System****E36****M41****E36****M51****E34****M51****E38/E39****M51****12 64 Fuel Filter Heater****Current consumption with max.  
heating output****A****12.5 ± 1****Testing voltage****V****12 ± 0.5**

<b>13 - 1 Fuel System</b>		<b>E36</b> <b>M43</b> <b>B16</b>	<b>E36</b> <b>M43</b> <b>B 18</b>	<b>E34</b> <b>M43</b> <b>B 18</b>	<b>E36</b> <b>M42</b> <b>B 18</b>
<b>13 00 Checking/adjusting engine and exhaust</b>					
<b>Engine designation</b>		<b>16 4 E2</b>	<b>18 4 E2</b>		<b>18 4 S1</b>
<b>Inspection prerequisite: engine at operating temperature</b>					
<b>Idle speed</b>					
<b>without consumers</b>	<b>1rpm ± 50</b>	<b>900</b>			<b>850</b>
<b>with air conditioner</b>	<b>1rpm ± 50</b>	<b>900</b>			<b>850</b>
<b>with drive range selected</b>	<b>1rpm ± 50</b>	<b>760</b>	<b>850</b>		<b>780</b>
<b>with drive range selected and air conditioner</b>	<b>1rpm ± 50</b>	<b>-</b>			<b>830</b>
<b>max. engine speed</b>	<b>1rpm ± 50</b>	<b>6200</b>		<b>6200</b>	<b>6700</b>
<b>CO vol. before catalytic converter</b>	<b>%</b>	<b>0.7 ± 0.5</b>			
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>≤ 0.5</b>			

<b>13 - 2 Fuel System</b>		<b>E34</b> <b>M50</b> <b>B 20</b>	<b>E36</b> <b>M50</b> <b>B 20</b>	<b>E34</b> <b>M50</b> <b>B 25</b>	<b>E36</b> <b>M50</b> <b>B 25</b>
<b>13 00 Checking/adjusting engine and exhaust</b>					
<b>Engine designation</b>		<b>20 6 S2</b>		<b>25 6 S2</b>	
<b>Inspection prerequisite: engine at operating temperature</b>					
<b>Idle speed</b>					
<b>without consumers</b>	<b>rpm ± 50</b>	<b>700</b>			<b>850</b>
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>700</b>	<b>740</b>	<b>700</b>	<b>740</b>
<b>with drive range selected</b>	<b>rpm ± 50</b>	<b>680</b>		<b>850</b>	<b>780</b>
<b>with drive range selected and air conditioner</b>	<b>rpm ± 50</b>	<b>680</b>	<b>720</b>	<b>680</b>	<b>720</b>
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>6500</b>			
<b>CO vol. in front of catalytic converter</b>	<b>%</b>	<b>0.5 + 1.0 -0.3</b>			
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>0.5 ± 0.3</b>			

<b>13 - 3 Fuel System</b>		<b>E36</b> <b>M52</b> <b>B 20</b>	<b>E36</b> <b>M52</b> <b>B 25</b>	<b>E36</b> <b>M52</b> <b>B 28</b>	
<b>13 00 Checking/adjusting engine and exhaust</b>					
<b>Engine designation</b>		<b>20 6 S3</b>	<b>25 6 S3</b>	<b>28 6 S1</b>	
<b>Inspection prerequisite: Engine at operating temperature, consumers off, no error</b>					
<b>Idle speed</b>					
<b>without consumers</b>	<b>rpm ± 50</b>	<b>700</b>			
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>740</b>	<b>-</b>		
<b>with drive range selected</b>	<b>rpm ± 50</b>	<b>680</b>	<b>-</b>		
<b>with drive range selected and air conditioner</b>	<b>rpm ± 50</b>	<b>720</b>	<b>-</b>		
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>6500</b>			
<b>CO vol. in front of catalytic converter</b>	<b>%</b>	<b>0.7 ± 0.5</b>			
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>0.5 ± 0.3</b>			



<b>13 - 4 Fuel System</b>		<b>E32</b> <b>M60/1</b> <b>B 30</b>	<b>E34</b> <b>M60/1</b> <b>B 30</b>	<b>E38</b> <b>M60/1</b> <b>B 30</b>	<b>E32</b> <b>M60/2</b> <b>B 40</b>	<b>E34</b> <b>M60/2</b> <b>B 40</b>	<b>E31</b> <b>M60/2</b> <b>B 40</b>
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation</b>		<b>30 8 S1</b>			<b>40 8 S1</b>		
<b>Test prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>1/min ± 50</b>	<b>600</b>					
<b>with air conditioner</b>	<b>1/min ± 50</b>	<b>700</b>	<b>750</b>	<b>700</b>			
<b>with drive range selected</b>	<b>1/min ± 50</b>	<b>600</b>	<b>670</b>	<b>600</b>			
<b>with drive range selected and air conditioner</b>	<b>1/min ± 50</b>	<b>700</b>	<b>750</b>	<b>700</b>			
<b>max. engine speed</b>	<b>1/min ± 50</b>	<b>6500</b>					
<b>CO vol. before catalytic converter</b>	<b>%</b>	<b>1.0 ± 0.5</b>					
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>0.8 ± 0.3</b>					

<b>13 - 5 Fuel System</b>		<b>E38</b> <b>M60/2</b> <b>B 40</b>	<b>E38</b> <b>M62</b> <b>B 35</b>	<b>E38</b> <b>M62</b> <b>B 44</b>	<b>E39</b> <b>M62</b> <b>B 35</b>	<b>E39</b> <b>M62</b> <b>B 44</b>	<b>E31</b> <b>M62</b> <b>B 44</b>
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation</b>		<b>40 8 S1</b>	<b>35 8 S1</b>	<b>44 8 S1</b>	<b>35 8 S1</b>	<b>44 8 S1</b>	
<b>Inspection prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>rpm ± 50</b>	<b>600</b>	<b>580</b>				
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>750</b>	<b>700</b>				
<b>with drive range selected</b>	<b>rpm ± 50</b>	<b>600</b>	<b>580</b>		<b>550</b>		
<b>with drive range selected and air conditioner</b>	<b>rpm ± 50</b>	<b>750</b>	<b>700</b>		<b>650</b>		
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>6500</b>	<b>6200</b>	<b>6100</b>			
<b>CO vol. in front of catalytic converter</b>	<b>%</b>	<b>1.0 ± 0.5</b>					
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>0.8 ± 0.3</b>					

<b>13 - 6 Fuel System</b>		<b>E31</b>	<b>E38</b>	<b>E31</b>			
		<b>M70</b>	<b>M73</b>	<b>M73</b>			
		<b>B 50</b>	<b>B 54</b>	<b>B 54</b>			
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation</b>		<b>50 12 1</b>	<b>56 12 1</b>				
<b>Inspection prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>rpm ± 50</b>	<b>700</b>	<b>600</b>				
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>700</b>					
<b>with drive range selected</b>	<b>rpm ± 50</b>	<b>700</b>	<b>-</b>				
<b>with drive range selected and air conditioner</b>	<b>rpm ± 50</b>	<b>-</b>	<b>-</b>				
<b>if batt. V &lt; 12 V</b>		<b>-</b>	<b>750</b>				
<b>directly after start up to 1st time driving range is engaged</b>		<b>-</b>	<b>900</b>				
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>6000</b>					
<b>CO vol. without catalytic converter</b>	<b>%</b>	<b>0.4 - 1.6</b>					
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>≤ 0.5</b>					

<b>13 - 7 Fuel System</b>		<b>S38</b> <b>B 38</b>	<b>S70</b> <b>B 56</b>	<b>S50</b> <b>B 30</b>	<b>S50</b> <b>B 32</b>		
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation</b>		<b>38 6 S1</b>	<b>54 12 1</b>	<b>30 6 S1</b>	<b>32 6 S3</b>		
<b>Inspection prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>rpm ± 50</b>	<b>920</b>	<b>750</b>	<b>800</b>	<b>780</b>		
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>920</b>	<b>750</b>	<b>800</b>	<b>780</b>		
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>7240</b>	<b>at V = 0: 6400</b>	<b>7280</b>	<b>7600</b>		
<b>CO vol. without catalytic converter</b>	<b>%</b>	<b>0.7 ± 0.2</b>			<b>-</b>		
<b>CO vol. with catalytic converter</b>	<b>%</b>	<b>≤ 0.5</b>					
<b>in front of catalytic converter</b>	<b>%</b>	<b>-</b>			<b>0.7 ± 0.2</b>		

<b>13 - 8 Fuel System</b>		<b>E34</b>	<b>E36</b>	<b>E34</b>	<b>E36</b>	<b>E36</b>	<b>E38/E39</b>
		<b>M51</b>	<b>M51</b>	<b>M51</b>	<b>M51</b>	<b>M41</b>	
		<b>D 25</b>	<b>D 25</b>	<b>D 25</b>	<b>D 25</b>	<b>D 17</b>	
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation (performance)</b>		<b>25 6 T1 (85 kW)</b>	<b>25 6 T1 (105 kW)</b>		<b>17 4 T1</b>	<b>25 6 T1</b>	
<b>Inspection prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>rpm ± 50</b>	<b>750</b>	<b>770</b>	<b>750</b>	<b>770</b>	<b>820</b>	
<b>with air conditioner</b>	<b>rpm ± 50</b>	<b>750</b>	<b>770</b>	<b>750</b>	<b>770</b>	<b>820</b>	
<b>with drive range selected</b>	<b>rpm ± 50</b>	<b>730</b>	<b>730</b>	<b>730</b>		<b>-</b>	
<b>with drive range selected and air conditioner</b>	<b>rpm ± 50</b>	<b>750</b>				<b>-</b>	
<b>max. engine speed</b>	<b>rpm ± 50</b>	<b>5250</b>					

<b>13 - 9 Fuel System</b>		<b>E39</b>	<b>E38</b>				
		<b>M51</b>	<b>M51</b>				
		<b>D 25</b>	<b>D 25</b>				
<b>13 00 Checking/adjusting engine and exhaust</b>							
<b>Engine designation (performance)</b>		<b>25 6 T1 (105kW)</b>					
<b>Inspection prerequisite: engine at operating temperature</b>							
<b>Idle speed</b>							
<b>without consumers</b>	<b>1rpm ± 50</b>	<b>770</b>	<b>770</b>				
<b>with air conditioner</b>	<b>1rpm ± 50</b>	<b>770</b>	<b>770</b>				
<b>with drive range selected</b>	<b>1rpm ± 50</b>	<b>730</b>	<b>730</b>				
<b>with drive range selected and air conditioner</b>	<b>1rpm ± 50</b>	<b>750</b>					
<b>max. engine speed</b>	<b>1rpm ± 50</b>	<b>5250</b>					

<b>13 - 10 Fuel System</b>		<b>E34</b> <b>524td</b>	<b>E34</b> <b>524td</b> <b>Automatic</b>		
<b>13 31 Fuel Supply</b>					
<b>Pressure with intank pump</b>	<b>approx.</b> <b>mbar</b>	<b>200</b>			

<b>13 - 11 Fuel System</b>		<b>E28</b> <b>524td</b>	<b>E28</b> <b>524td</b> <b>Automatic</b>	<b>E34</b> <b>524td</b>			
<b>13 51 Distributor Injection Pump, Control Receptacle, Mixture Regulator</b>							
<b>Code</b>		<b>VE 6/10 F</b> <b>E 2400 R 121</b>	<b>VE 6/10</b> <b>E 2400 R 206/1</b>				
<b>Internal pump pressure (operating temperature)</b>							
<b>at 750 rpm (1rpm)</b>	<b>bar</b>	<b>≥ 1.5</b>	<b>≥ 4</b>				
<b>at 20001 rpm</b>	<b>bar</b>	<b>&gt; 4</b>	<b>&gt; 5</b>				
<b>at 4500 rpm</b>	<b>bar</b>	<b>≥ 7.5</b>	<b>≥ 7</b>				
<b>cold running at 750 rpm</b>	<b>bar</b>	<b>&gt; 3</b>	<b>&gt; 4</b>				
<b>Static injection pump setting (new adjustment)</b>							
<b>Adjustment value in TDC setting (Ignition pos. in cyl. no. 1)</b>	<b>mm</b>	<b>0.74 ± 0.02</b>	<b>1.05 ± 0.02</b>				
<b>Testing value (without new adjustment afterwards)</b>	<b>mm</b>	<b>0.74 ± 0.02</b>	<b>1.05 ± 0.02</b>				



<b>13 - 12 Fuel System</b>		<b>E34</b> <b>524td</b>	<b>E34</b> <b>524td</b> <b>Automatic</b>				
<b>13 51 Distributor Injection Pump, Control Receptacle, Mixture Regulator Cut-off valve</b>							
<b>Switching-on voltage</b>	<b>min. V</b>	<b>10</b>					
<b>Resistance at 20°C</b>	<b>Ω</b>	<b>7.5 ± 1</b>					

<b>13 - 13 Fuel System</b>		<b>E34</b> <b>524td</b>	<b>E34</b> <b>524td</b> <b>Automatic</b>		
<b>13 53 Combination Fuel Injector</b>					
<b>Nozzle holder</b>	<b>Code</b>	<b>KCA 30 S 56</b>			
<b>Nozzle holder with needle motion sensor</b>	<b>Code</b>	<b>KCA 30 S 57</b>			
<b>Paint dot</b>		<b>red</b>			
<b>Injection nozzle</b>	<b>Code</b>	<b>DNO SD 286</b>			
<b>Opening pressure</b>					
<b>Adjusted value</b>	<b>bar</b>	<b>150 ... 158</b>			
<b>Minimum value</b>	<b>bar</b>	<b>140</b>			
<b>Maximum value</b>	<b>bar</b>	<b>160</b>			
<b>Testing oil for injection nozzle tester: Shell Calibration Fluid V 1404</b>					
<b>Max. deviation in opening pressure among all injection nozzles</b>	<b>bar</b>	<b>10</b>			
<b>Shims thickness</b>	<b>mm</b>	<b>1.0 ... 2.0</b>			
<b>Shims thickness steps</b>	<b>mm</b>	<b>0.05</b>			
<b>Shim thickness = opening pressure difference</b>	<b>mm/bar</b>	<b>0.1 = 10</b>			

<b>13 - 14 Fuel System</b>		<b>E36</b> 325td	<b>E36</b> 325tds	<b>E36</b> 318tds	<b>E34</b> 525td	<b>E34</b> 525tds	
<b>13 31 Fuel pump with drive and pipe</b>							
Fuel delivery pressure/vacuum measured after filter							
at idling speed (approx. 800 rpm)	mbar	100 ... 160					
at 4800 rpm	mbar	60 ... 90					
at 4400 rpm (1/min)	mbar	-	100 ... 160	-			
Min.	mbar	-100 continuous -200 for 10 secs.					
Max.	mbar	+400					
Pressure with intank pump	mbar	200 ... 300					

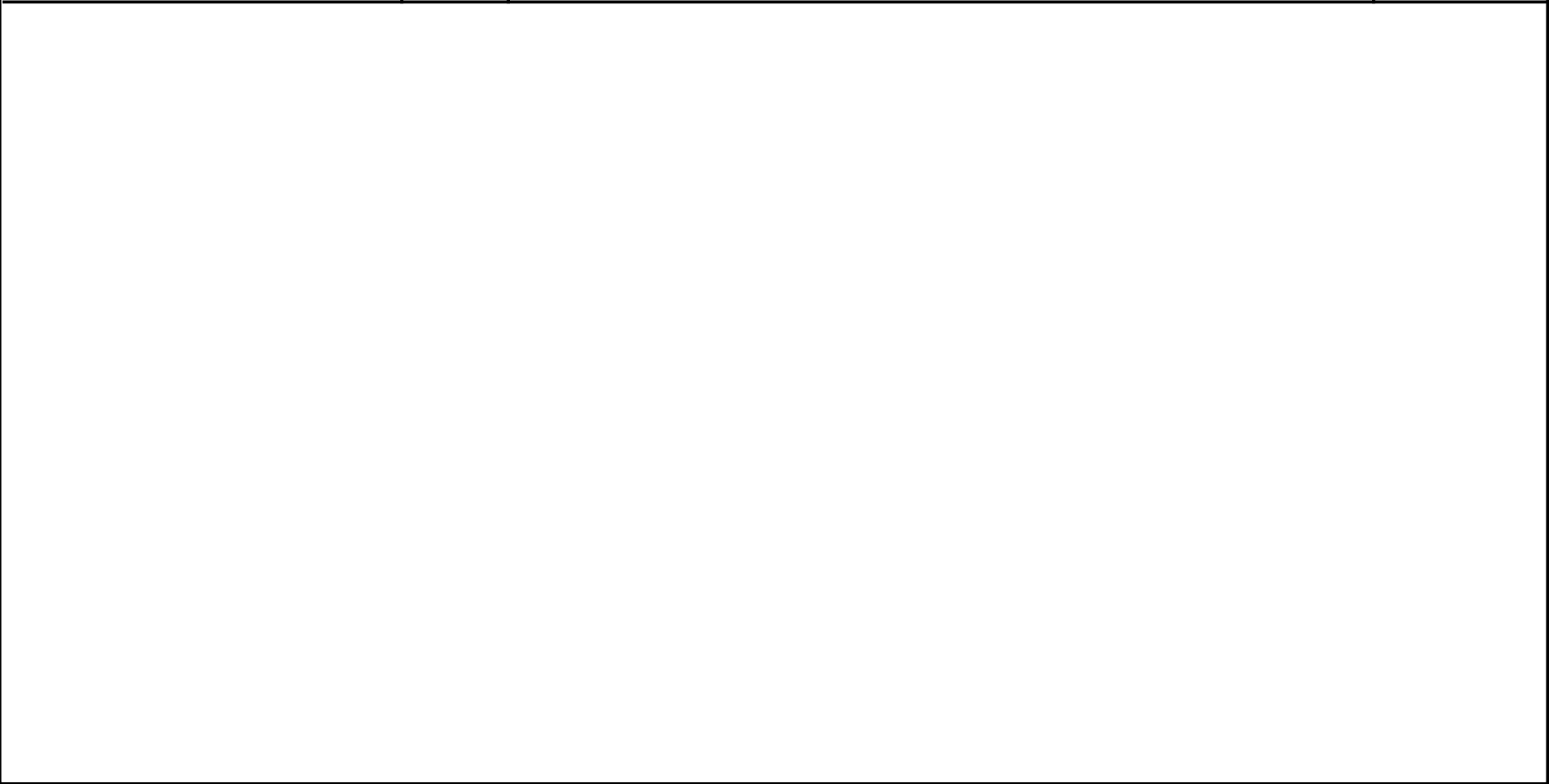
<b>13 - 15 Fuel System</b>		<b>E38</b> <b>725tds</b>	<b>E39</b> <b>525tds</b>				
<b>13 31 Fuel Supply</b>							
<b>Fuel delivery pressure/vacuum measured after filter</b>							
<b>At idling speed (approx. 800 rpm)</b>	<b>mbar</b>	<b>100 ... 160</b>					
<b>At 4800 rpm</b>	<b>mbar</b>	<b>60 ... 90</b>					
<b>Min.</b>	<b>mbar</b>	<b>-100 continuous -200 for 10 secs.</b>					
<b>Max.</b>	<b>mbar</b>	<b>+400</b>					
<b>Pressure with intank pump</b>	<b>mbar</b>	<b>200 ... 300</b>					

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<b>13 - 16 Fuel System</b>		<b>E36</b> <b>325td</b>	<b>E36</b> <b>325tds</b>	<b>E36</b> <b>318tds</b>	<b>E34</b> <b>525td</b>	<b>E34</b> <b>525tds</b>		
<b>13 51 Distributor Injection Pump, Control Receptacle, Mixture Regulator</b>								
<b>Code</b>		<b>VP 15</b> <b>VE 6/10 E</b> <b>2400 R 300-1</b>	<b>VP 36</b> <b>VE 6/10 E</b> <b>2400 R515</b>	<b>VP 36</b> <b>VE 4/9E</b> <b>2200 R576</b>	<b>VP 15</b> <b>VE 6/10 E</b> <b>2400 R 300-1</b>			
<b>Internal pump pressure</b> <b>(fuel temperature 40 ... 60 °C)</b>								
<b>At approx. 700 rpm (idle)</b>	<b>max. bar</b>	<b>6.5</b>			<b>6.5</b>			
	<b>min. bar</b>	<b>4.5</b>			<b>4.5</b>			
<b>At approx. 4800 rpm (not under load)</b>	<b>max. bar</b>	<b>10.0</b>			<b>10.0</b>			
	<b>min. bar</b>	<b>8.0</b>			<b>8.0</b>			
<b>Overflow valve opens at</b>	<b>bar</b>	<b>&gt; 3.5</b>		<b>-</b>	<b>&gt; 3.5</b>			
<b>Static injection pump timing (new setting or new timing chain)</b>								
<b>Adjustment value in TDC setting</b> <b>(Ignition pos. in cyl. no. 1)</b> <b>New chain (service life &lt;20000 km)</b>	<b>mm</b>	<b>0.95 ± 0.03</b>		<b>0.60 ± 0.03</b>	<b>0.95 ± 0.03</b>			
<b>Inspection value (service life of timing chain &gt; 20000 km)</b>	<b>mm</b>	<b>0.90 ... 0.78</b>		<b>0.60 ... 0.48</b>	<b>0.90 ... 0.78</b>			
<b>Adjustment value in the event of complaint or if appropriate. Value &lt;0.78 mm</b>	<b>mm</b>	<b>0.90 ± 0.03</b>		<b>-</b>	<b>0.90 ± 0.03</b>			
<b>or if appropriate. Value &lt;0.48mm</b>		<b>-</b>		<b>0.60 ± 0.03</b>	<b>-</b>			

<b>13 - 17 Fuel System</b>		<b>E38</b> <b>725tds</b>	<b>E39</b> <b>525tds</b>				
<b>13 51 Distributor Injection Pump, Control Receptacle, Mixture Regulator</b>							
<b>Code</b>		<b>VP 15</b> <b>VE 6/10 E</b> <b>2400 R515</b>					
<b>Internal pump pressure</b> <b>(fuel temperature 40 ... 60 °C)</b>							
<b>At approx. 700 rpm (idle)</b>	<b>max. bar</b>	<b>6.5</b>					
	<b>min. bar</b>	<b>4.5</b>					
<b>At approx. 4800 rpm (not under load)</b>	<b>max. bar</b>	<b>10.0</b>					
	<b>min. bar</b>	<b>8.0</b>					
<b>Overflow valve opens at</b>	<b>bar</b>	<b>&gt; 3.5</b>					
<b>Static injection pump timing (new setting or new timing chain)</b>							
<b>Adjustment value in TDC setting</b> <b>(Ignition pos. in cyl. no. 1)</b> <b>New chain (running time &lt;20000 km)</b>	<b>mm</b>	<b>0.95 ± 0.03</b>					
<b>Inspection value (service life of timing chain &gt; 20000 km)</b>	<b>mm</b>	<b>0.90 ... 0.78</b>					
<b>Adjustment value in the event of complaint</b>	<b>mm</b>	<b>0.90 ± 0.03</b>					

<b>13 - 18 Fuel System</b>		<b>E36</b> <b>325td</b>	<b>E36</b> <b>325tds</b>	<b>E36</b> <b>318tds</b>	<b>E34</b> <b>525td</b>	<b>E34</b> <b>525tds</b>	
<b>13 51 Electric Shutoff Valve (on Distributor Injection Pump)</b>							
<b>Switching-on voltage</b>	<b>min. V</b>	<b>10</b>					
<b>Resistance at 20°C</b>	<b>Ω</b>	<b>7.5 ± 2</b>					



<b>13 - 19 Fuel System</b>		<b>E36</b> <b>325td</b>	<b>E36</b> <b>325tds</b>	<b>E36</b> <b>318tds</b>	<b>E34</b> <b>525td</b>	<b>E34</b> <b>525tds</b>	
<b>13 53 Combination Fuel Injector</b>							
Nozzle holder	Code	KCA 21 S 71	KCA 21 S 71"R"	KCA 21 S 71			
Nozzle holder with needle motion sensor	Code	KCA 21 S 76/1	KCA 21 S 91"R"	KCA 21 S 76/1			
Paint dot	Code	green	-	green			
Injection nozzle		DNO SD 300	DNO SD 318	DNO SD 300			
Opening pressure							
Adjusted value	bar	150 ... 158					
Minimum value	bar	140					
Maximum value	bar	160					
Testing oil for injection nozzle tester: Shell Calibration Fluid V 1404							
Max. deviation in opening pressure among all injection nozzles	bar	10					
Shims thickness	mm	1.0 ... 2.0					
Shims thickness steps	mm	0.05					
Shim thickness = opening pressure difference	mm/bar	0.1 = 10					



<b>13 - 20 Fuel System</b>		<b>E38</b> <b>725tds</b>	<b>E39</b> <b>525tds</b>				
<b>13 53 Combination Fuel Injector</b>							
Nozzle holder	Code	KCA 21 S 71					
Nozzle holder with needle motion sensor	Code	KCA 21 S 76/1					
Paint dot	Code	-					
Injection nozzle		DNO SD 300					
Opening pressure							
Adjusted value	bar	150 ... 158					
Minimum value	bar	140					
Maximum value	bar	160					
Testing oil for injection nozzle tester: Shell Calibration Fluid V 1404							
Max. deviation in opening pressure among all injection nozzles	bar	10					
Shims thickness	mm	1.0 ... 2.0					
Shims thickness steps	mm	0.05					
Shim thickness = opening pressure difference	mm/bar	0.1 = 10					

<b>13 - 21 Fuel System</b>	<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M44</b> <b>B 19</b>		
<b>13 53 Injectors and lines, fuel pressure regulator</b>						
<b>Testing pressure</b>	<b>bar ± 0.2</b>	<b>3.0</b>				

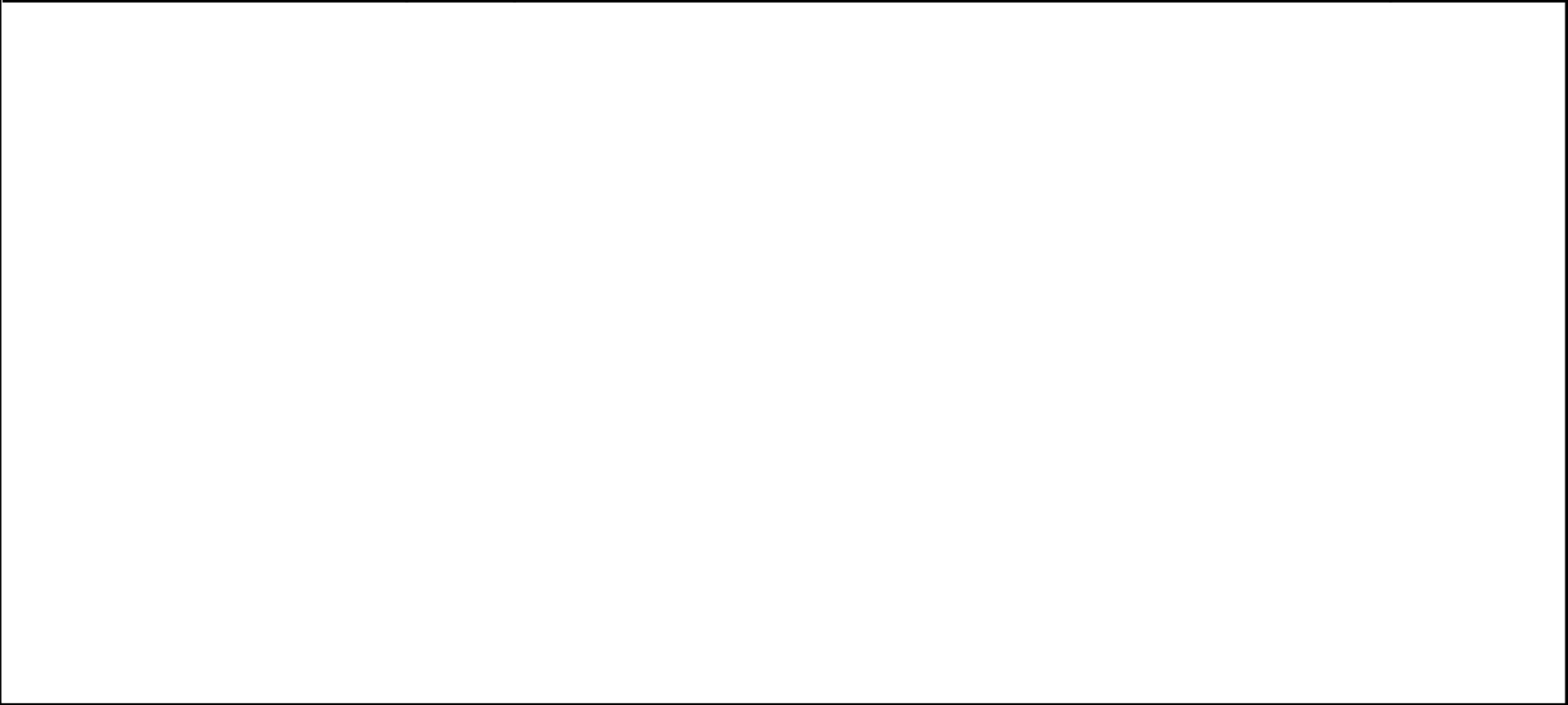
<b>13 - 22 Fuel System</b>		<b>M50</b> <b>B 20</b>	<b>M50</b> <b>B 25</b>	<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B25</b>	<b>M52</b> <b>B 28</b>	
<b>13 53 Injectors and lines, fuel pressure regulator</b>							
<b>Testing pressure</b>	<b>bar ± 0.2</b>	<b>3.0</b>	<b>3.5</b>	<b>3.5</b>	<b>3.5</b>	<b>3.5</b>	

<b>13 - 23 Fuel System</b>	<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>		
<b>13 53 Injectors and lines, fuel pressure regulator</b>						
<b>Testing pressure</b>	<b>bar ± 0.2</b>	<b>3.5</b>				

<b>13 - 24 Fuel System</b>		<b>M70</b> <b>B 50</b>	<b>M73</b> <b>B 54</b>				
<b>13 53 Injectors and lines, fuel pressure regulator</b>							
<b>Testing pressure</b>	<b>bar ± 0.02</b>	<b>3.0</b>	<b>3.5</b>				

<b>13 - 25 Fuel System</b>		<b>S50</b> <b>B30</b>	<b>S38</b> <b>B38</b>	<b>S70</b> <b>B 56</b>	<b>S50</b> <b>B32</b>		
<b>13 53 Injectors and lines, fuel pressure regulator</b>							
<b>Testing pressure</b>	<b>bar ± 0.02</b>	<b>3.0</b>	<b>3.5</b>	<b>3.0</b>	<b>5.0</b>		

<b>13 - 26 Fuel System</b>		<b>E36</b> <b>325td</b>	<b>E36</b> <b>325tds</b>	<b>E36</b> <b>318tds</b>	<b>E34</b> <b>525td</b>	<b>E34</b> <b>525tds</b>	
<b>13 62 Senders for Control Unit</b>							
<b>Charge pressure sensor</b>							
<b>Power supply</b>	<b>V</b>	<b>5 ± 0.25</b>					
<b>Pressure measuring range until 8/93</b>	<b>kPa</b>	<b>50 ... 300</b>	<b>-</b>	<b>50 ... 300</b>			
<b>Pressure measuring range with effect from 9/93</b>	<b>kPa</b>	<b>50 ... 250</b>					



<b>13 - 27 Fuel System</b>		<b>M43</b> <b>B16</b>	<b>M43</b> <b>B 18</b>	<b>M42</b> <b>B 18</b>	<b>M44</b> <b>B 19</b>		
<b>13 54 Injector valves, start valves</b>							
<b>Testing pressure</b>	<b>bar ± 0.06</b>	<b>3.0</b>					

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<b>13 - 28 Fuel System</b>		<b>M50</b> <b>B 20</b>	<b>M50</b> <b>B 25</b>	<b>M52</b> <b>B 20</b>	<b>M52</b> <b>B 25</b>	<b>M52</b> <b>B 28</b>	
<b>13 54 Injector valves, start valves</b>							
<b>Testing pressure</b>	<b>bar ± 0.06</b>	<b>3.0</b>	<b>3.5</b>				

<b>13 - 29 Fuel System</b>	<b>M60/1</b> <b>B 30</b>	<b>M60/2</b> <b>B 40</b>	<b>M62</b> <b>B 35</b>	<b>M62</b> <b>B 44</b>		
<b>13 54 Injector valves, start valves</b>						
<b>Testing pressure</b>	<b>bar ± 0.06</b>	<b>3.5</b>				

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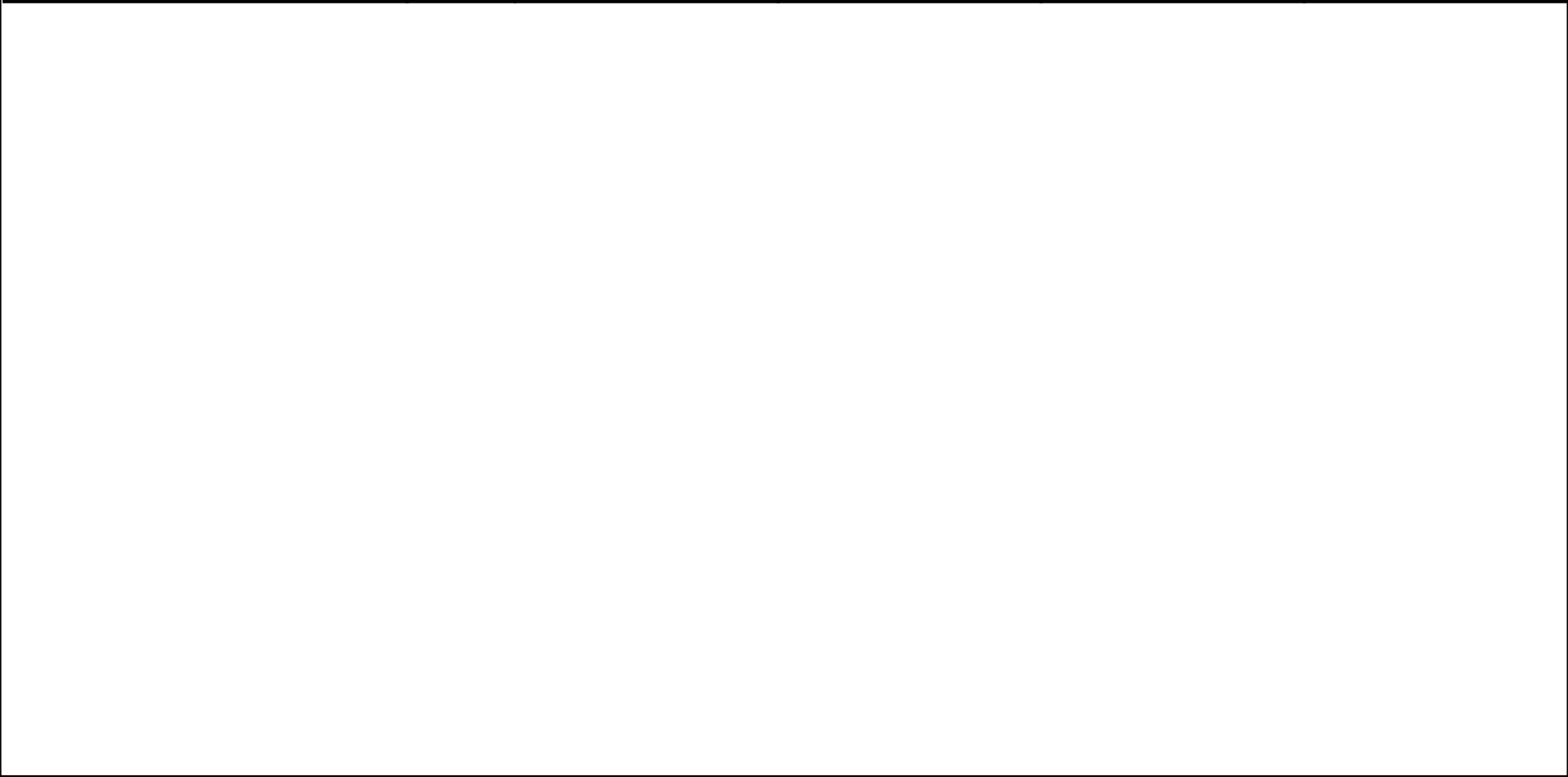
<b>13 - 30 Fuel System</b>		<b>M70</b> <b>B 50</b>	<b>M73</b> <b>B 56</b>				
<b>13 54 Injector valves, start valves</b>							
<b>Testing pressure</b>	<b>bar ± 0.06</b>	<b>3.0</b>					

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<b>13 - 31 Fuel System</b>	<b>S50</b> <b>B 30</b>	<b>S38</b> <b>B 38</b>	<b>S70</b> <b>B 54</b>			
<b>13 54 Injector valves, start valves</b>						
<b>Testing pressure</b>	<b>bar ± 0.06</b>	<b>3.0</b>				

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<b>16 - 7 Fuel Tank and Lines</b>		<b>E31</b>			
<b>16 11 Fuel Tank and Mounting Parts</b>					
<b>Tank volume/reserve</b>	<b>ltr.</b>	<b>91/10</b>			
<b>Venting: Via rollover and venting valve, through carbon canister into intake system.</b>					



<b>16 - 11 Fuel Tank and Lines</b>		<b>E31</b>			
<b>16 12 Fuel Supply, Fuel Level Sender</b>					
<b>Resistance at connection</b>					
<b>With empty tank Left-hand tank side</b>	$\Omega$	<b>10 <math>\pm</math> 2</b>			
<b>With empty tank Right-hand tank side</b>	$\Omega$	<b>10 <math>\pm</math> 2</b>			
<b>With full tank Left-hand tank side</b>	$\Omega$	<b>250 <math>\pm</math> 5</b>			
<b>With full tank Right-hand tank side</b>	$\Omega$	<b>250 <math>\pm</math> 5</b>			

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<b>16 - 18 Fuel Tank and Lines</b>		<b>E31 840i</b>	<b>E31 850Ci</b>	<b>E31 850 CSi</b>	
<b>16 14 Fuel Pump</b>					
<b>Operating pressure</b>	<b>bar</b>	<b>3</b>			
<b>Delivery rate at 12 V (pump removed, tested with testing fluid, approx. 20 °C) - counterpressure 3 bar -</b>	<b>ltr./min.</b>	<b>≥ 1.9</b>	<b>≥ 1.7</b>		
<b>Delivery volume - inspection with pump installed and under backpressure</b>	<b>cm<sup>3</sup> /30 sec</b>	<b>875</b>			
<b>Typical current consumption (per pump)</b>	<b>A</b>	<b>≥ 5</b>	<b>≥ 5.5</b>		

<b>16 - 1 Fuel Tank and Lines</b>		<b>E36</b> <b>Gasoline-</b> <b>driven cars</b>	<b>E36</b> <b>Diesel</b>				
<b>16 11 Fuel Tank and Mounting Parts</b>							
<b>Tank volume/reserve</b>	<b>ltr.</b>	<b>65/8</b>					
<b>Venting:</b> <b>Gasoline-driven cars: Via rollover</b> <b>and venting valve, through carbon</b> <b>canister into intake system.</b> <b>Diesel: via expansion tank into</b> <b>open.</b>							



<b>16 - 8 Fuel Tank and Lines</b>		<b>E36</b>					
		<b>Gasoline / diesel-driven cars</b>					
<b>16 12 Fuel Supply, Fuel Level Sender</b>							
<b>Resistance at connection</b>							
<b>With empty tank: left-hand tank side</b>	$\Omega$	<b>10 ± 2</b>					
<b>With empty tank: right-hand tank side</b>	$\Omega$	<b>10 ± 2</b>					
<b>With full tank: left-hand tank side</b>	$\Omega$	<b>250 ± 5</b>					
<b>With full tank: right-hand tank side</b>	$\Omega$	<b>250 ± 5</b>					
<b>Reserve warning contact</b>	<b>ltr.</b>	<b>≤ 6.5</b>					

<b>16 - 12 Fuel Tank and Lines</b>		<b>E36 Gasoline- driven cars</b>	<b>E36 Diesel</b>				
<b>16 14 Fuel Pump</b>							
<b>Operating pressure</b>	<b>bar</b>	<b>3.5 - 4</b>	<b>0.4</b>				
<b>Delivery rate at 12 V (pump removed, tested with testing fluid, approx. 20 °C)- counterpressure 3 bar -</b>	<b>ltr./min.</b>	<b>≥ 2.0</b>	<b>-</b>				
<b>- Counterpressure 0.2 bar -</b>	<b>ltr./min.</b>	<b>-</b>	<b>≥ 2.0</b>				
<b>Delivery volume - inspection with pump installed and under backpressure</b>	<b>cm<sup>3</sup> /30 sec</b>	<b>-</b>	<b>1030</b>				
<b>Typical current consumption</b>	<b>A</b>	<b>≤ 5.5</b>	<b>≤ 1</b>				

<b>16 - 6 Fuel Tank and Lines</b>		<b>E38</b> Gasoline-driven cars	<b>E38</b> Diesel		
<b>16 11 Fuel Tank and Mounting Parts</b>					
Tank volume/reserve	ltr.	85/10			
Tank volume/reserve if equipped with level control feature	ltr.	95/10			
Venting: Gasoline-driven cars via rollover and bleed valve, through active carbon filter to the inlet manifold. Diesel via expansion tank into open.					

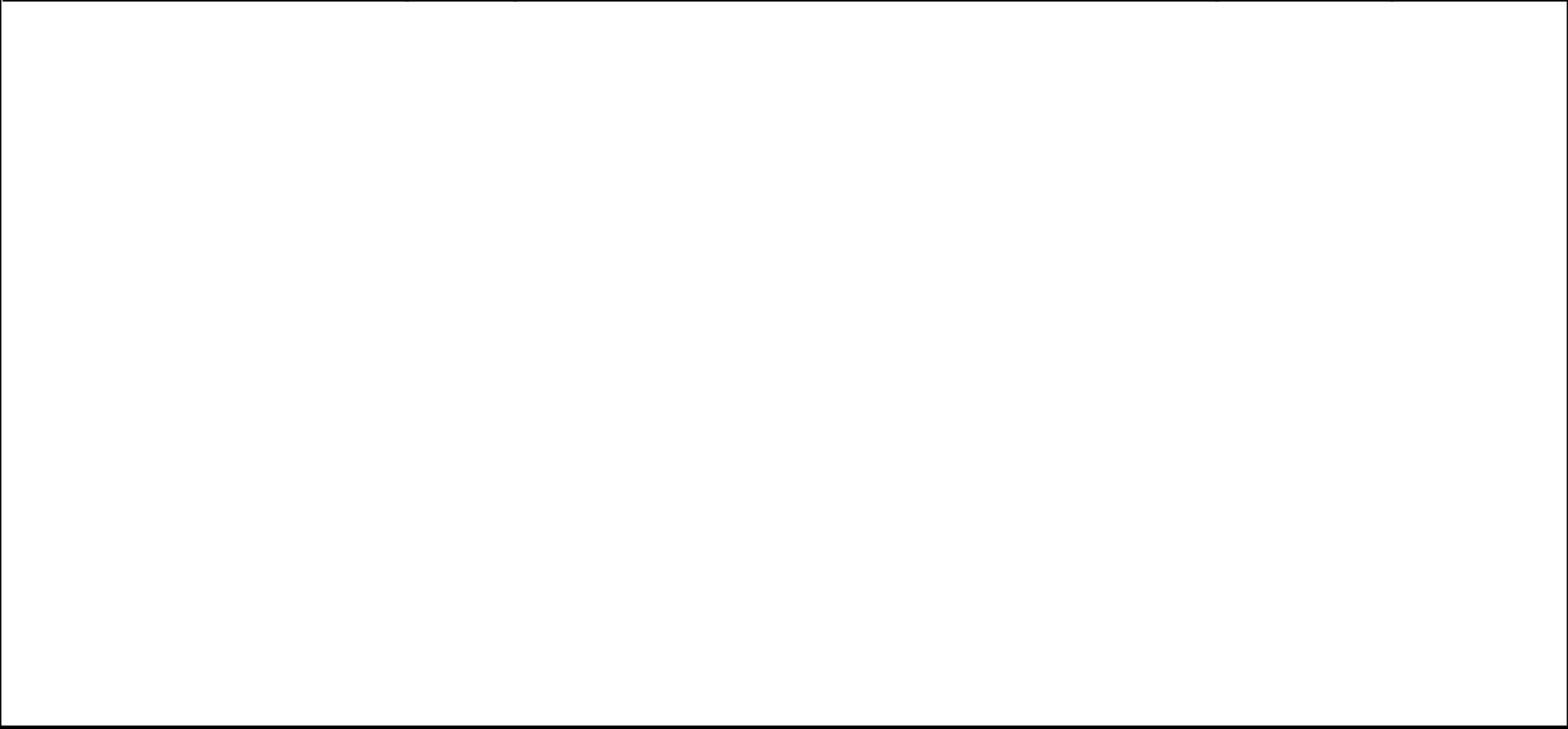
<b>16 - 17 Fuel Tank and Lines</b>		<b>E38</b> Gasoline-driven cars	<b>E38</b> Diesel		
<b>16 14 Fuel Pump</b>					
<b>Operating pressure</b>	<b>bar</b>	<b>3.5</b>	<b>0.4</b>		
<b>Delivery rate at 12 V tested with gasoline/petrol approx. 20 °C Counterpressure 3.5 bar</b>	<b>ltr./min.</b>	<b>≥ 2.25</b>	<b>-</b>		
<b>Typical current consumption</b>	<b>A</b>	<b>≥ 9.5</b>	<b>≤ 1</b>		

<b>16 - 4 Fuel Tank and Lines</b>		<b>E39</b> Gasoline-driven cars	<b>E39</b> Diesel		
<b>16 11 Fuel Tank and Mounting Parts</b>					
Tank volume/reserve	ltr.	70/8			
Venting: Gasoline-driven cars via rollover and bleed valve, through active carbon filter to the inlet manifold. Diesel via expansion tank into open.					

<b>16 - 15 Fuel Tank and Lines</b>		<b>E39</b> Gasoline-driven cars	<b>E39</b> Diesel		
<b>16 14 Fuel Pump</b>					
<b>Operating pressure</b>	<b>bar</b>	<b>3.5</b>	<b>0.4</b>		
<b>Delivery rate at 12 V tested with gasoline/petrol approx. 20 °C Counterpressure 3.5 bar</b>	<b>ltr./min.</b>	<b>≥ 2.25</b>	<b>-</b>		
<b>Typical current consumption</b>	<b>A</b>	<b>≥ 9.5</b>	<b>≤ 1</b>		

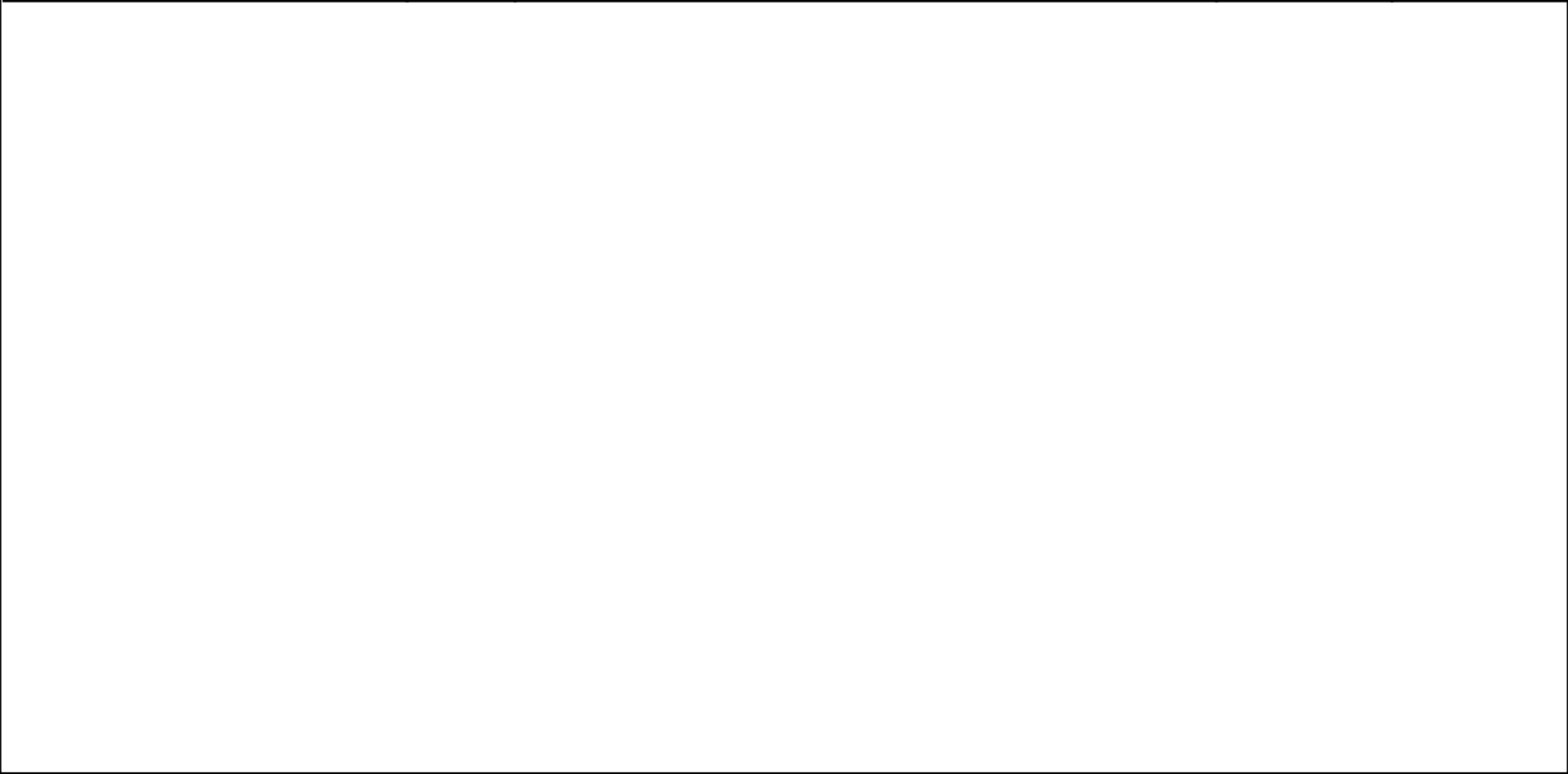
<b>17 - 10 Cooling System</b>		<b>E31 M60/2</b>	<b>E31 M62</b>	<b>E31 M70</b>	<b>E31 M73</b>	<b>E31 S70</b>	
<b>17 00 Cooling System in General</b>							
<b>Coolant Volume</b>	<b>ltr.</b>	<b>12.5</b>	<b>12.5</b>	<b>13.0</b>	<b>13.0</b>	<b>13.0</b>	
<b>Coolant specifications: refer to Operating Fluids</b>							
<b>Testing pressure for cooling system</b>	<b>bar</b>	<b>1.5</b>					

<b>17 - 20 Cooling System</b>		<b>E31 M60/2</b>	<b>E31 M62</b>	<b>E31 M70</b>	<b>E31 S70</b>		
<b>17 11 Radiator and Mounting Parts</b>							
<b>Cooling system cap</b>							
<b>Pressure valve opens at</b>	<b>bar</b>	<b>1.0 ± 0.15</b>					
<b>Vacuum valve opens at (absolute)</b>	<b>bar</b>	<b>0.9</b>					
<b>Testing pressure radiator</b>	<b>bar</b>	<b>1.5</b>					

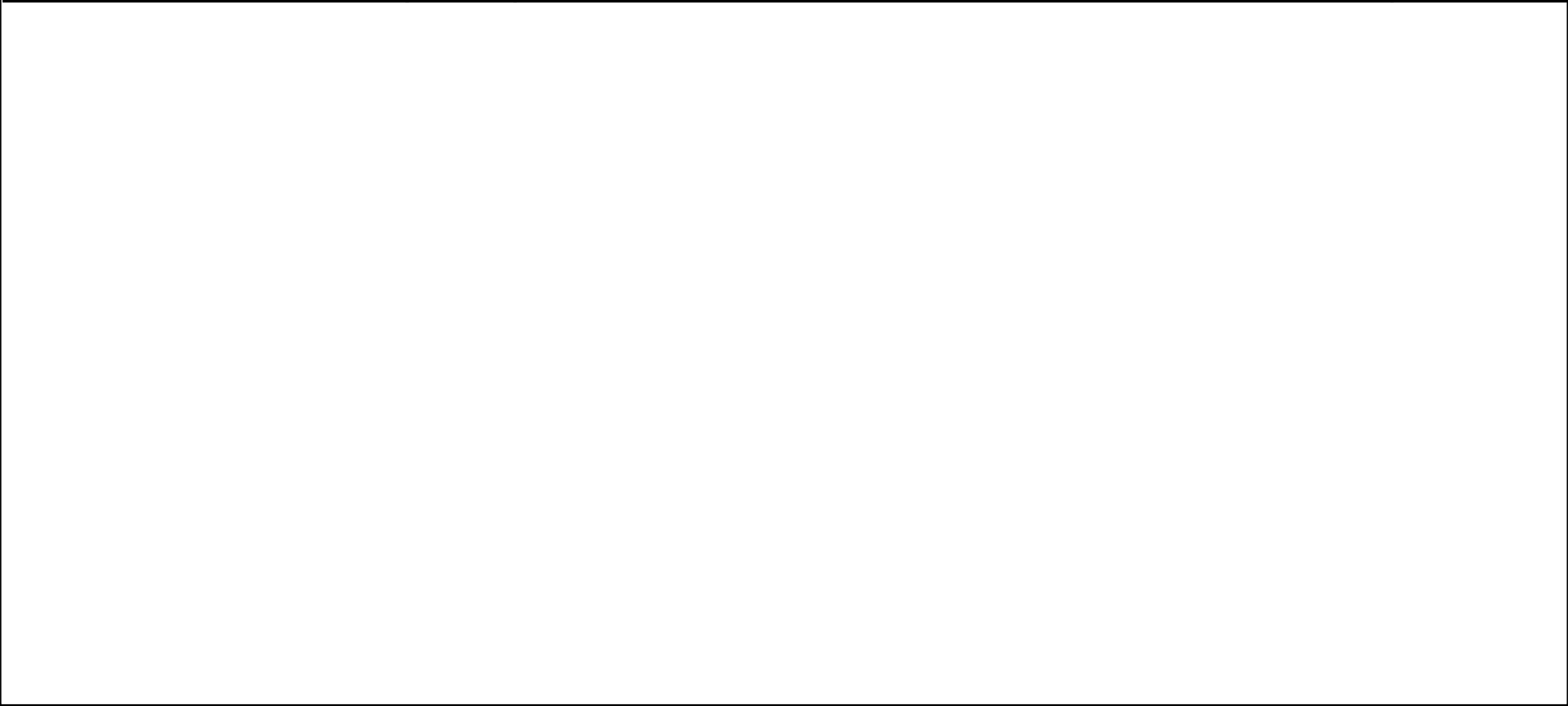




<b>17 - 29 Cooling System</b>		<b>E31 M60/2</b>	<b>E31 M62</b>	<b>E31 M70/M73</b>	<b>E31 S70</b>		
<b>17 21 Oil Cooler</b>							
<b>Engine Oil Cooler</b>							
<b>Oil Capacity (including hose lines)</b>	<b>ltr.</b>	<b>0.75</b>		<b>1.0</b>			
<b>Testing pressure</b>	<b>bar</b>	<b>16</b>					



<b>17 - 1 Cooling System</b>		<b>E36</b> <b>M40/M43</b>	<b>E36</b> <b>M42/M44</b>	<b>E36</b> <b>M50</b>	<b>E36</b> <b>M52</b>	<b>E36</b> <b>S50</b>	
<b>17 00 Cooling System in General</b>							
Coolant volume (incl. heater)	ltr.	6.1	6.5	10.5	10.0	10.75	
with integrated air conditioner	ltr.	6.3	6.7	11.0	10.0	10.75	
Coolant specifications: refer to Operating Fluids							
Testing pressure for cooling system	bar	1.0					

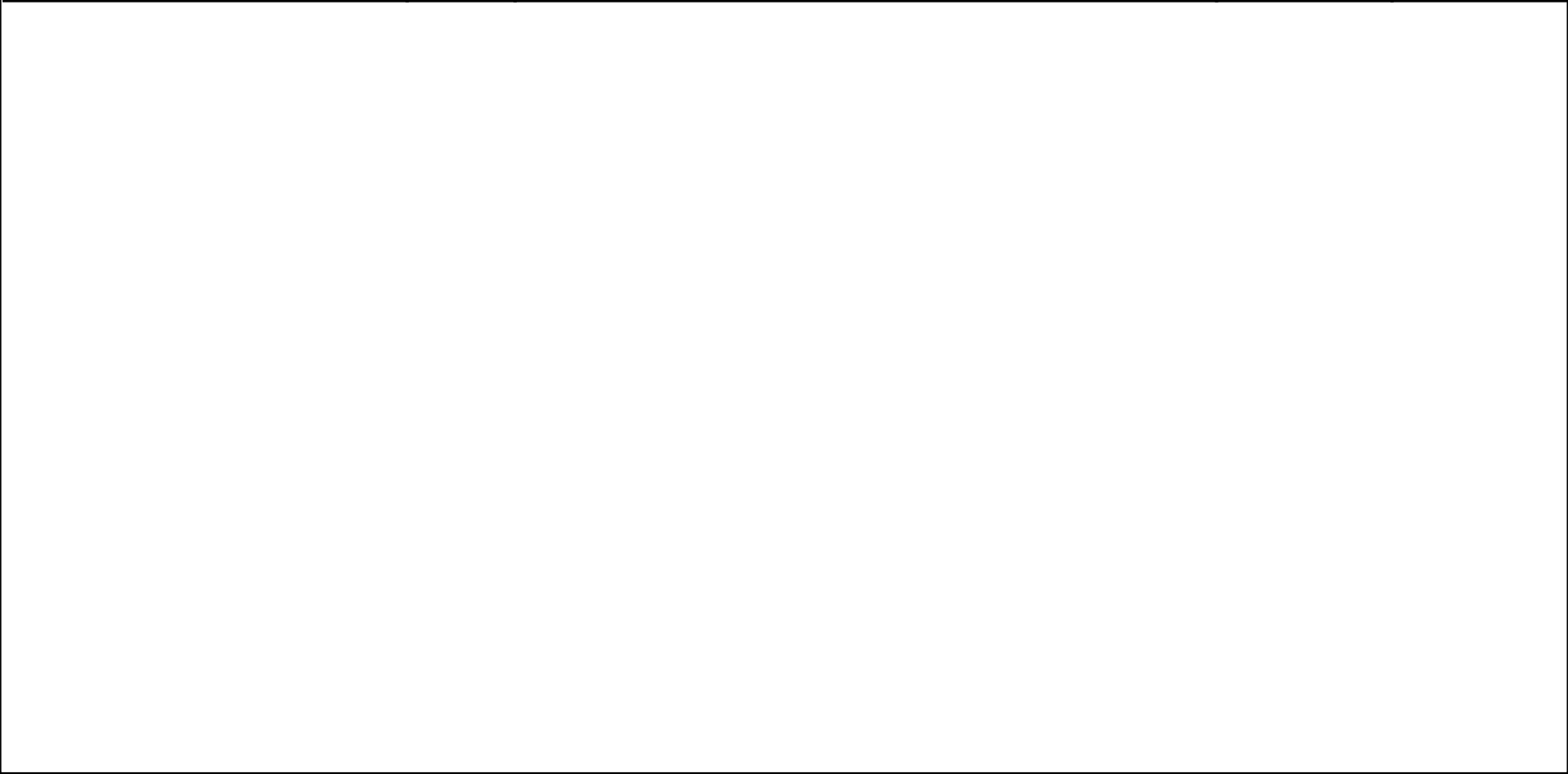


<b>17 - 11 Cooling System</b>	<b>E36</b>	<b>E36</b>	<b>E36</b>	<b>E36</b>		
	<b>M40/M43</b>	<b>M42/M44</b>	<b>M50/M52</b>	<b>S50</b>		

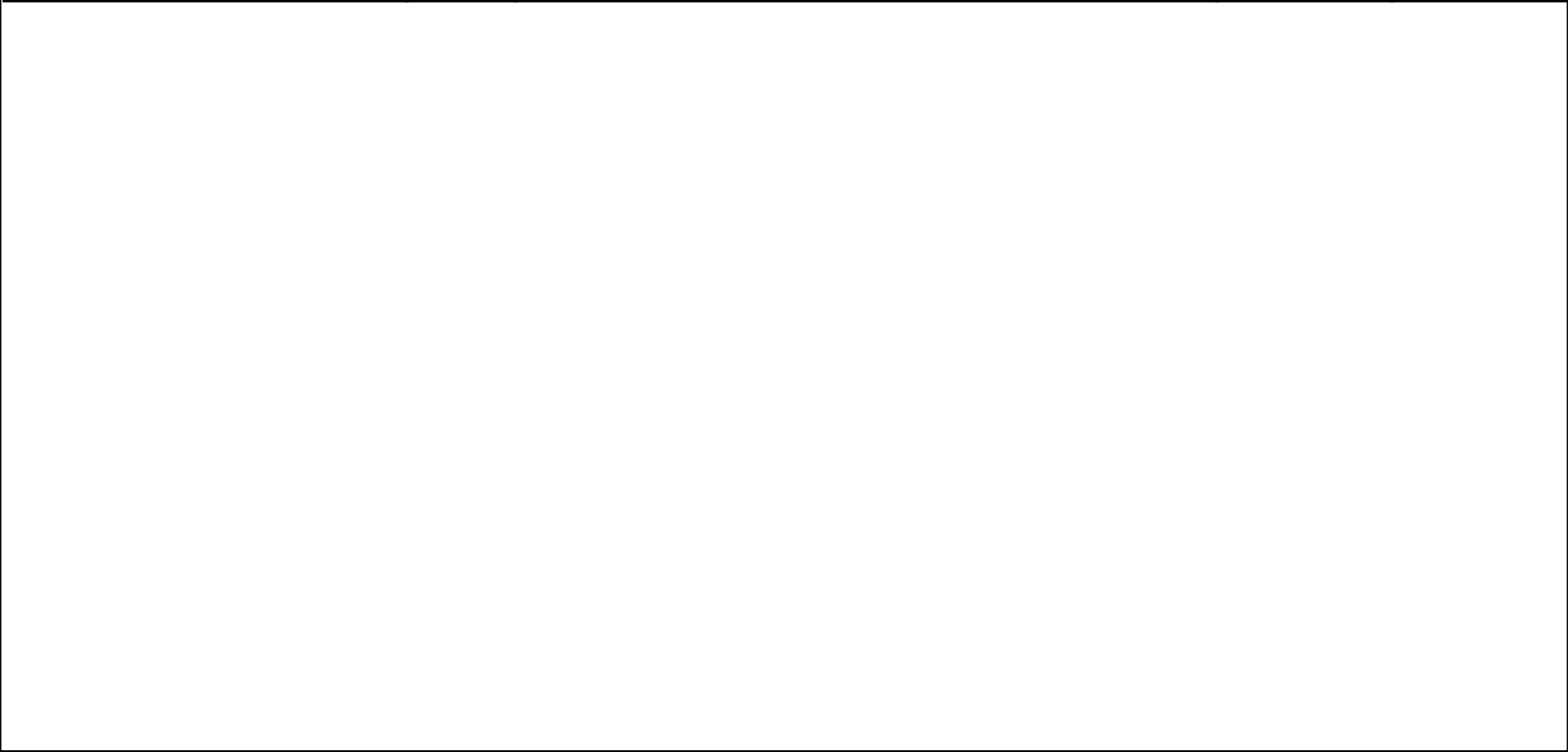
<b>17 11 Radiator and Mounting Parts</b>				
Cooling system cap				
Pressure valve opens at	bar	1.0 ± 0.15		
Vacuum valve opens at (absolute)	bar	0.9		
Testing pressure radiator	bar	1.5		
Transmission Oil Cooler (integrated in radiator) Models with automatic transmission				
Operating pressure	bar	8		
Testing pressure	bar	12		

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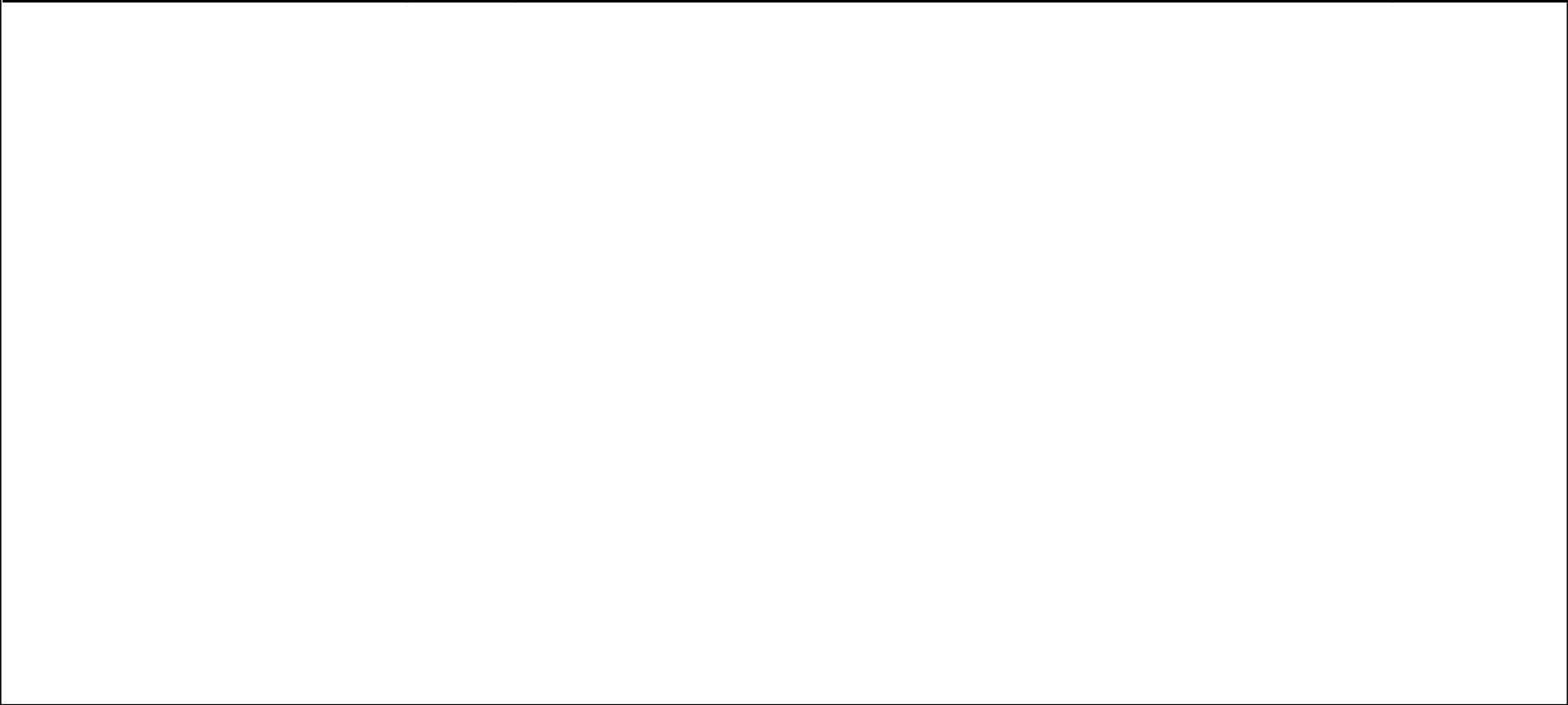
<b>17 - 21 Cooling System</b>		<b>E36</b> <b>M40/M43</b>	<b>E36</b> <b>M42/M44</b>	<b>E36</b> <b>M50/M52</b>	<b>E36</b> <b>S50</b>		
<b>17 21 Oil Cooler</b>							
<b>Engine Oil Cooler</b>							
<b>Oil Capacity (including hose lines)</b>	<b>ltr.</b>	<b>0.75</b>					
<b>Testing pressure</b>	<b>bar</b>	<b>16</b>					



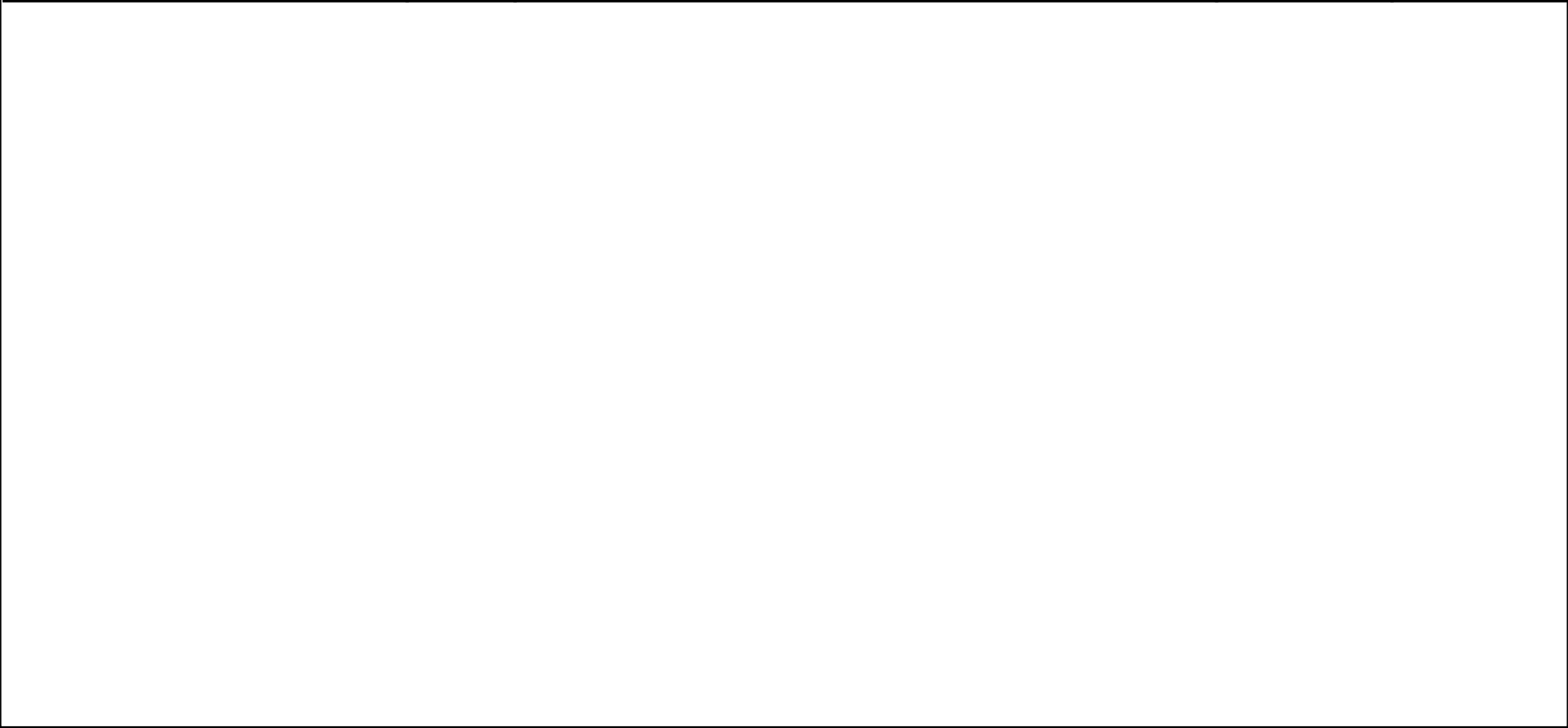
<b>17 - 30 Cooling System</b>		<b>E36</b> <b>M40/M43</b>	<b>E36</b> <b>M42/M44</b>	<b>E36</b> <b>M50/M52</b>	<b>E36</b> <b>S50</b>		
<b>17 40 Additional Fan (electric)</b>							
Testing voltage	V	12.7 - 13.3					
Current consumption - stage 1/ stage 2	A	11/30					
Speed min. stage 1 / stage 2	rpm	1400/2400					



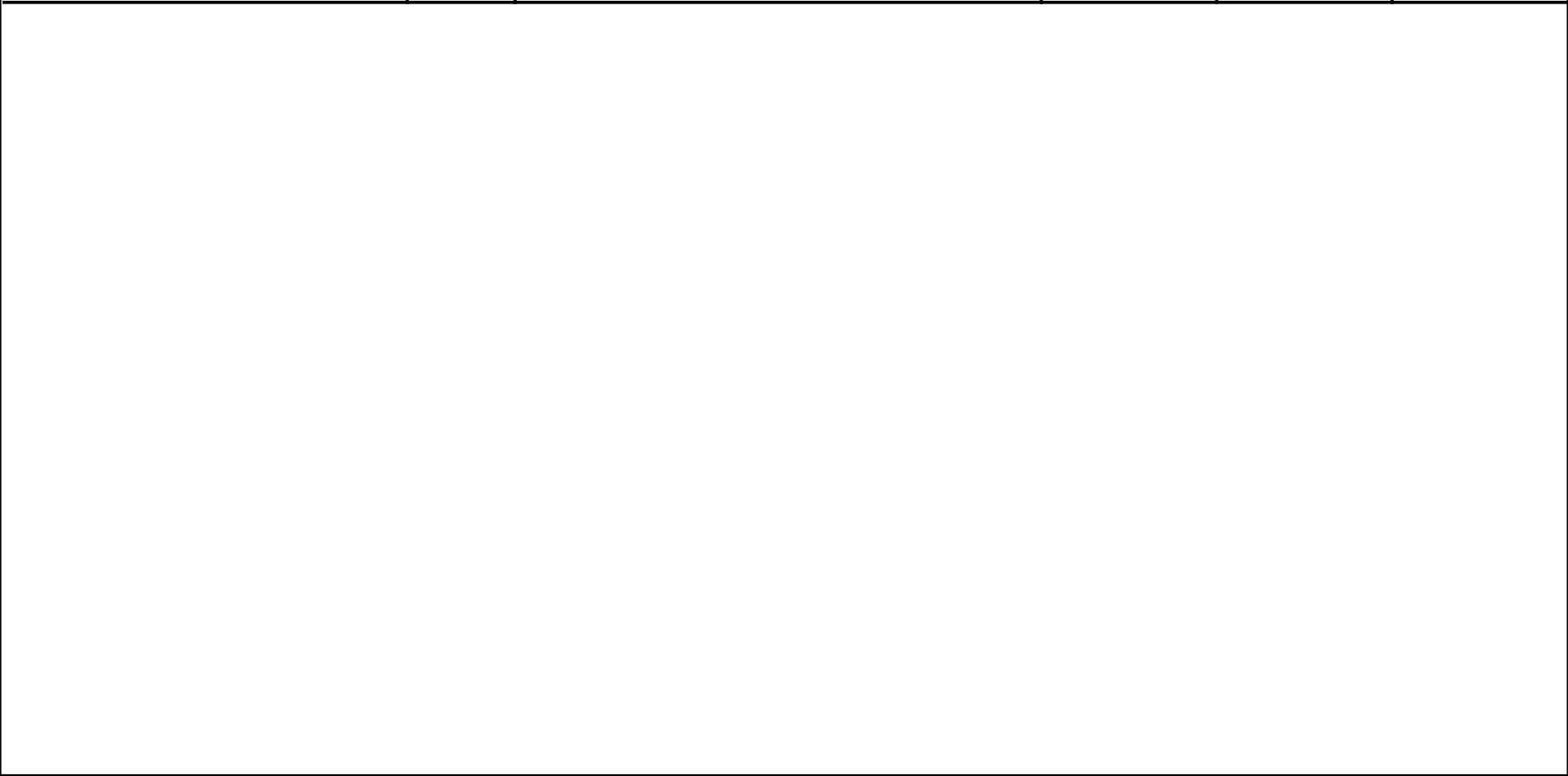
<b>17 - 8 Cooling System</b>		<b>E38 M52</b>	<b>E38 M60/1</b>	<b>E38 M60/2</b>	<b>E38 M62</b>	<b>E38 M73</b>	
<b>17 00 Cooling System in General</b>							
Coolant volume (incl. heater)	ltr.	11.0	12.5	12.5	12.5	-	
with integrated air conditioner	ltr.	11.2	12.5	12.5	12.5	13.0	
Coolant specifications: refer to Operating Fluids							
Testing pressure for cooling system	bar	1.5					



<b>17 - 18 Cooling System</b>		<b>E38 M52</b>	<b>E38 M60/1/M60/2</b>	<b>E38 M62</b>	<b>E38 M73</b>		
<b>17 11 Radiator and Mounting Parts</b>							
<b>Cooling system cap</b>							
<b>Pressure valve opens at</b>	<b>bar</b>	<b>1.0 ± 0.15</b>					
<b>Vacuum valve opens at (absolute)</b>	<b>bar</b>	<b>0.9</b>					
<b>Testing pressure radiator</b>	<b>bar</b>	<b>1.5</b>					

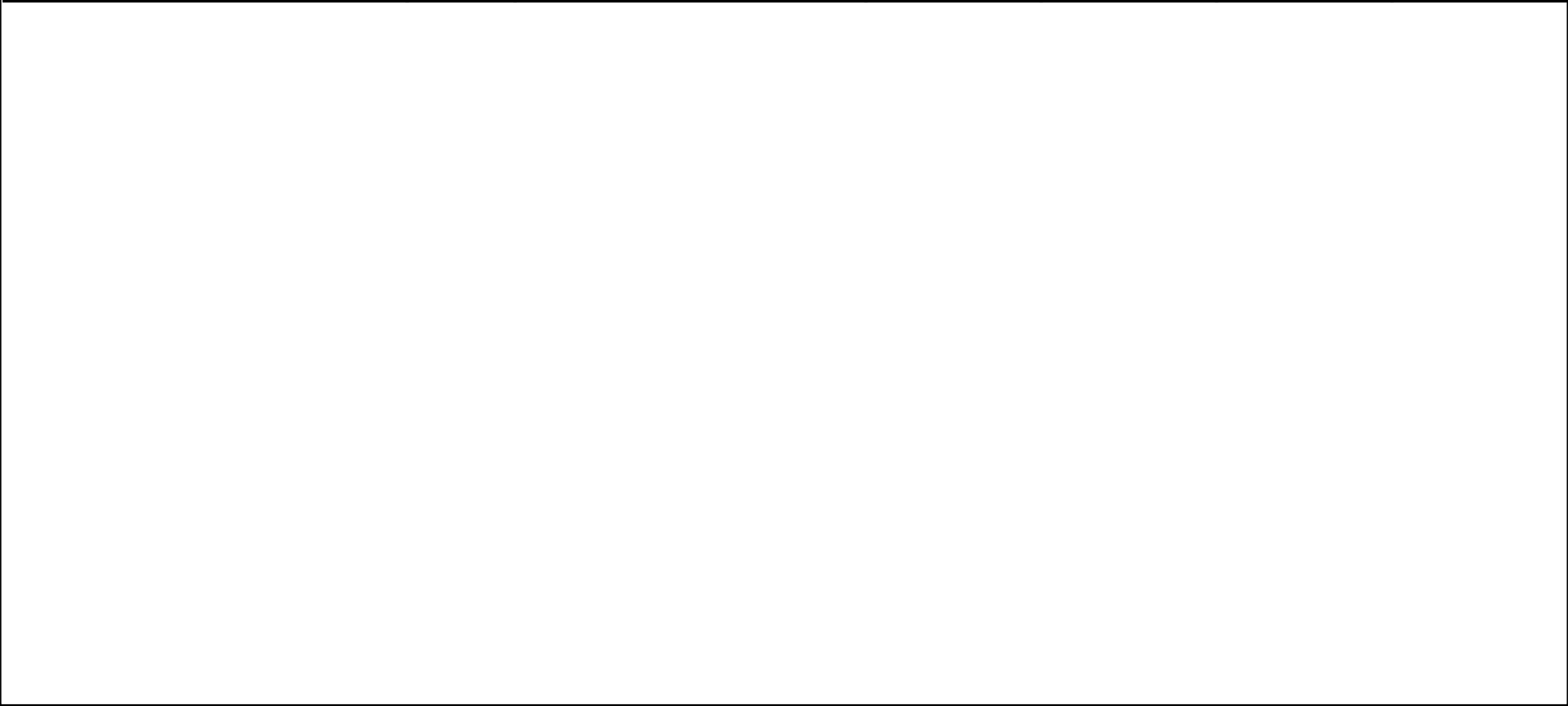


<b>17 - 27 Cooling System</b>		<b>E38</b> <b>M60/1/M60/2</b>	<b>E38</b> <b>M62</b>	<b>E38</b> <b>M73</b>			
<b>17 21 Oil Cooler</b>							
<b>Engine Oil Cooler</b>							
<b>Oil Capacity (including hose lines)</b>	<b>ltr.</b>	<b>0.75</b>		<b>1.0</b>			
<b>Testing pressure</b>	<b>bar</b>	<b>16</b>					

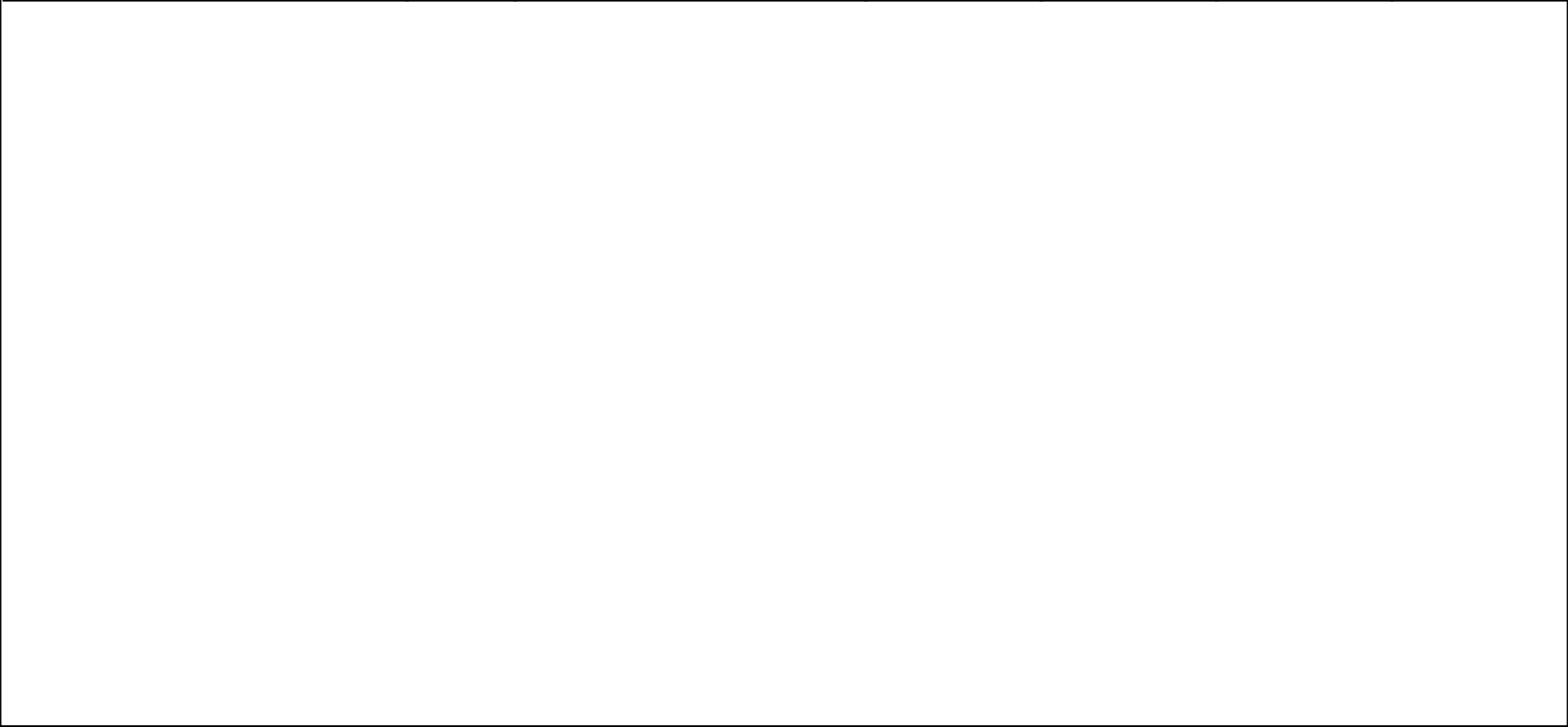




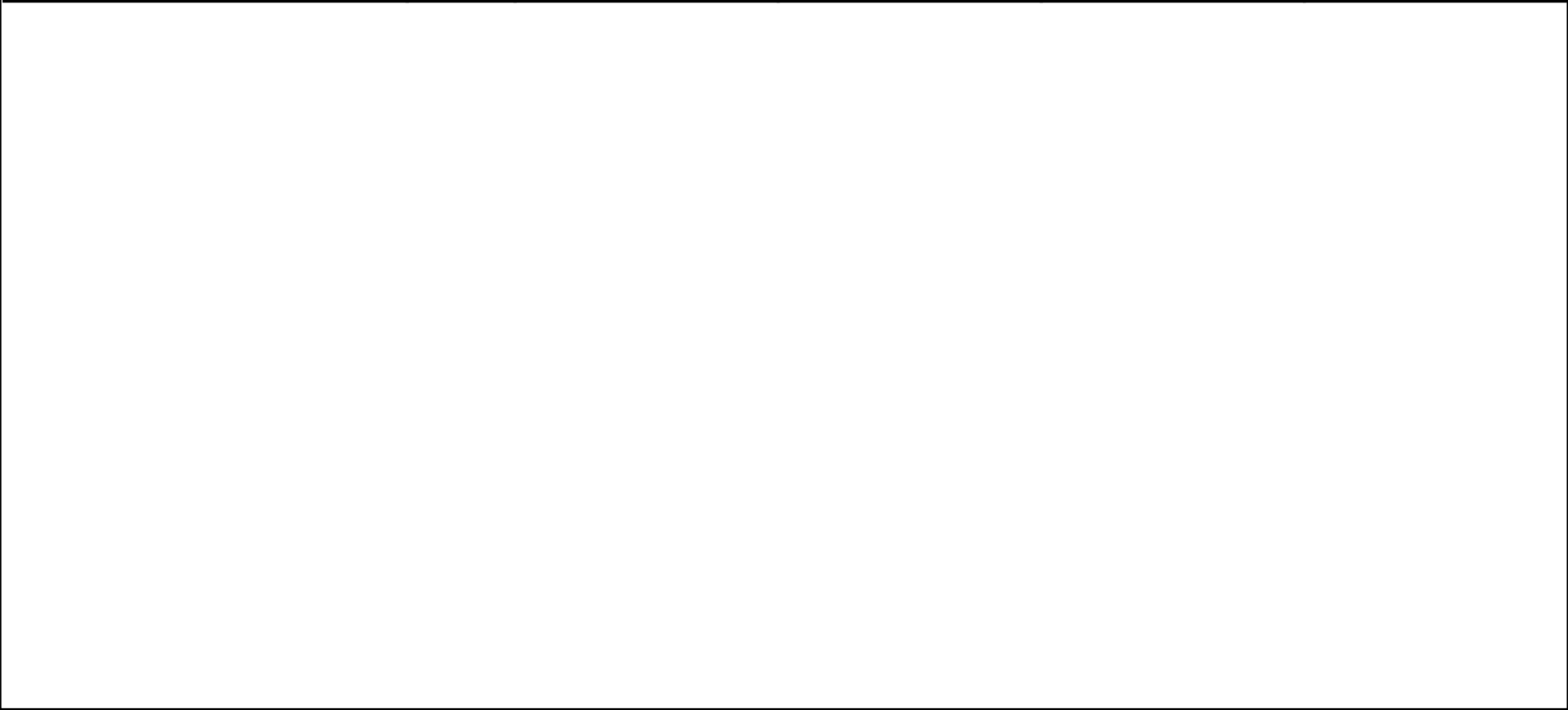
<b>17 - 5 Cooling System</b>		<b>E39 M52</b>	<b>E39 M62</b>				
<b>17 00 Cooling System in General</b>							
Coolant volume (incl. heater)	ltr.	10.5	12.5				
with integrated air conditioner	ltr.	10.5	12.5				
Coolant specifications: refer to Operating Fluids							
Testing pressure for cooling system	bar	1.5					



<b>17 - 15 Cooling System</b>		<b>E39</b>	<b>E39</b>				
		<b>M52</b>	<b>M62</b>				
<b>17 11 Radiator and Mounting Parts</b>							
<b>Cooling system cap</b>							
<b>Pressure valve opens at</b>	<b>bar</b>	<b>1.0 ± 0.15</b>					
<b>Vacuum valve opens at (absolute)</b>	<b>bar</b>	<b>0.9</b>					
<b>Testing pressure radiator</b>	<b>bar</b>	<b>1.5</b>					



<b>21 - 1 Clutch</b>		<b>All</b>			
<b>21 21 Clutch with Drive Plate</b>					
<b>Lateral runout deviation of diaphragm springs to pressure plate</b>	<b>mm</b>	<b>0.6</b>			
<b>Minimum lining thickness of clutch disk: Lining surface up to rivet closing head</b>	<b>mm</b>	<b>1.0</b>			



<b>23 - 1 Manual Transmission</b>	<b>All</b>			
<b>23 00 Transmission, complete, transmission configuration</b>				
<p>A letter code is located on the transmission case - underside of transmission centre - lower clutch bell housing - sticker on left side of transmission extension With help of letter code and the appropriate BMW parts microfiche for the vehicle, the transmission model can be established.</p>				
<p>Example: xxxxxxx = Transmission no. AKD = BMW Code S 5 D 200 G = transmission</p>				

<b>23 - 2 Manual Transmission</b>		<b>240/5 Overdrive</b>	<b>ZF-S5-16</b>	<b>260/5 Overdrive</b>	<b>260/5 524td Overdrive</b>	<b>260/5 Sport</b>	
<b>23 00 Transmission in General</b>							
<b>Oil grade: Refer to Operating Fluids</b>							
<b>Oil volume</b>	<b>ltr.</b>	<b>1.05</b>	<b>1.25 (2.6/2.2)</b>				
<b>Oil fill quantity for initial fill or repair transmission</b>	<b>ltr.</b>	<b>1.15</b>	<b>1.35</b>				

<b>23 - 3 Manual Transmission</b>		<b>240/5 Overdrive</b>	<b>ZF-S5-16</b>	<b>260/5 Overdrive</b>	<b>260/5 524td Overdrive</b>	<b>260/5 Sport</b>	
<b>23 11 Case and Cover</b>							
Temperature for installation of bearings	°C	80					
<b>23 21 Transmission Shafts</b>							
Axial play (axial bearing clearance) of:							
Output shaft	mm	0 ... 0.09					
Input shaft	mm	0 ... 0.09	1.1 ... 1.3	0 ... 0.09			
Layshaft	mm	0.1 ... 0.2	-	0.1 ... 0.2	0.13 ... 0.23		
Output spigot							
Radial runout	max mm	0.07					
Output flange							
Radial runout	max mm	0.07					
Axial runout	max mm	0.1					

<b>23 - 4 Manual Transmission</b>		<b>240/5 Overdrive</b>	<b>ZF-S5-16 Overdrive</b>	<b>260/5 Overdrive</b>	<b>260/5 Sport</b>
<b>23 22 Gears (Layshaft)</b>					
<b>Pressing-off force at ambient temperature</b>					
<b>3rd gear</b>	<b>t</b>	-	<b>7.5</b>	-	-
<b>4th gear</b>	<b>t</b>	-	<b>8.0</b>	-	-
<b>5th gear</b>	<b>t</b>	<b>4.5 ... 5.5</b>	<b>8.0</b>	<b>5.5 ... 6.8</b>	
<b>Contact pressure force at warming temperature</b>					
<b>3rd gear</b>	<b>t °C</b>	- -	- -	- -	- -
<b>4th gear</b>	<b>t °C</b>	- -	<b>0.015 150 ... 180</b>	- -	- -
<b>5th gear</b>	<b>t °C</b>	-	- -	<b>4.9 ... 6.8 approx. 120</b>	
<b>23 23 Synchronization Guide Sleeves</b>					
<b>Pressing-off force</b>					
<b>1st/2nd and 5th/r-gears</b>	<b>t max</b>	<b>3.0</b>	-	<b>3.7</b>	
<b>3rd/4th gear</b>	<b>t max</b>	<b>2.7</b>	-	<b>3.0</b>	
<b>Pressing-on force</b>					
<b>1st/2nd and 5th/r-gears</b>	<b>t max</b>	<b>2.1</b>	<b>0.08</b>	<b>2.5</b>	
<b>3rd/4th gear</b>	<b>t max</b>	<b>1.9</b>	-	<b>2.1</b>	

<b>23 - 5 Manual Transmission</b>	<b>240/5 Overdrive</b>	<b>ZF-S5-16 Overdrive</b>	<b>260/5 Overdrive</b>	<b>260/5 Sport</b>
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<b>23 22 Gears (Layshaft)</b>				
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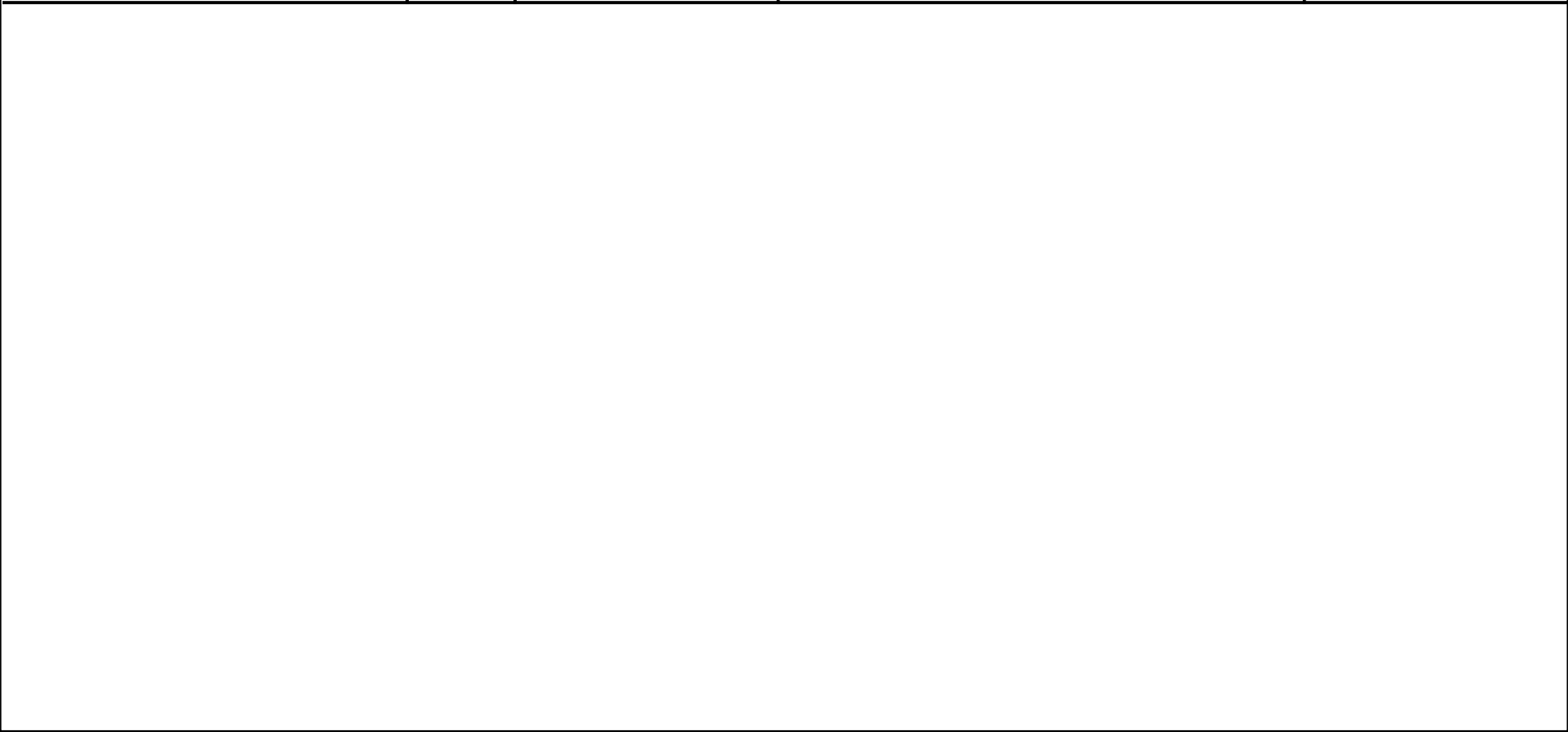
<b>Bearing Sleeves</b>	<b>approx. °C</b>	<b>80</b>		
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<b>23 - 6 Manual Transmission</b>		<b>240/5 Overdrive</b>	<b>ZF-S5-16 Overdrive</b>	<b>260/5 Overdrive</b>	<b>260/5 Sport</b>
<b>23 23 Synchromesh Ring</b>					
<b>Distance between synchronizer ring and clutch body</b>					
<b>New condition</b>	<b>mm</b>	<b>1.0 ... 1.3</b>			
<b>Max. wear limit size</b>	<b>mm</b>	<b>0.8</b>			
<b>Reverse gear</b>					
<b>New condition</b>	<b>mm</b>	<b>0.5 ... 0.6</b>			
<b>Max. wear limit size</b>	<b>mm</b>	<b>0.4</b>			
<b>23 31 Internal Shift Components</b>					
<b>Shift fork guide width</b>					
<b>1st ... 5th gear</b>					
<b>Wear limit</b>	<b>mm</b>	<b>4.8</b>			

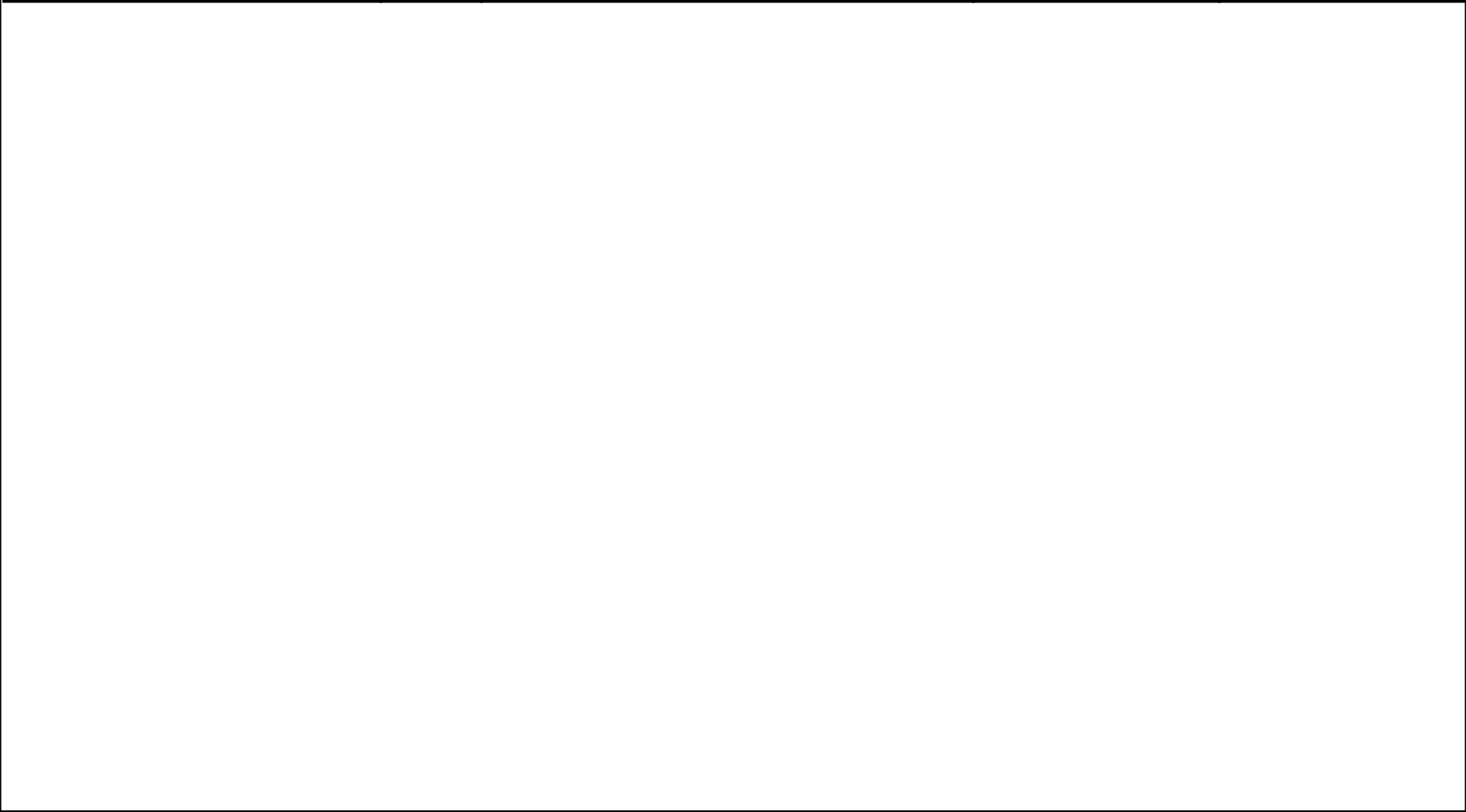
<b>23 - 7 Manual Transmission</b>		<b>260/6 Overdrive</b>	<b>265/5 Sport</b>	<b>265/6 Overdrive</b>	<b>280/5 Sport</b>
<b>23 00 Transmission in General</b>					
<b>Oil grade: Refer to Operating Fluids</b>					
<b>Oil volume</b>	<b>ltr.</b>	<b>1.25 (2.6/2.2)</b>	<b>1.5</b>	<b>1.25 (2.6/2.2)</b>	
<b>Oil fill quantity for initial fill or repair transmission</b>	<b>ltr.</b>	<b>1.35</b>	<b>1.7</b>	<b>1.35</b>	



<b>23 - 8 Manual Transmission</b>		<b>260/6 Overdrive</b>	<b>265/5 Sport</b>	<b>265/6 Overdrive</b>	<b>280/5 Sport</b>
<b>23 11 Case and Cover</b>					
Temperature for installation of bearings	°C	80			
<b>23 21 Transmission Shafts</b>					
Axial play (axial bearing clearance) of:					
Output shaft	mm	0 ... 0.09			
Input shaft	mm	0 ... 0.09			
Layshaft	mm	0.1 ... 0.2			-
Output spigot					
Radial runout	max mm	0.07			
Output flange					
Radial runout	max mm	0.07			
Axial runout	max mm	0.1			

<b>23 - 9 Manual Transmission</b>		<b>260/6 Overdrive</b>	<b>280/5 Sport</b>		
<b>23 22 Gears (Layshaft)</b>					
<b>Pressing-off force at ambient temperature</b>					
<b>3rd gear</b>	t	-	5 ... 7		
<b>4th gear</b>	t	-	5 ... 7		
<b>5th gear</b>	t	5.5 ... 6.8	9 ... 10		
<b>Contact pressure force at warming temperature</b>					
<b>3rd gear</b>	t °C	- -	- -		
<b>4th gear</b>	t °C	- -	- -		
<b>5th gear</b>	t approx. °C	4.9 ... 6.8 120	5 ... 6 150		
<b>23 23 Synchronization Guide Sleeves</b>					
<b>Pressing-off force</b>					
<b>1st/2nd and 5th/r-gears</b>	t max	3.7	-		
<b>3rd/4th gear</b>	t max	3.0	-		
<b>Pressing-on force</b>					
<b>1st/2nd and 5th/r-gears</b>	t max	2.5	-		
<b>3rd/4th gear</b>	t max	2.1	-		

<b>23 - 10 Manual Transmission</b>	<b>260/6 Overdrive</b>	<b>280/5 Sport</b>		
<b>23 22 Gears (Layshaft)</b>				
<b>Bearing Sleeves</b>	<b>approx. °C</b>	<b>80</b>		



<b>23 - 13 Manual Transmission</b>	<b>260/6 Overdrive</b>	<b>265/5 Sport</b>	<b>265/6 Overdrive</b>	<b>280/5 Sport</b>
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<b>23 23 Synchromesh Ring</b>				
Distance between synchronizer ring and clutch body				
New condition	mm	1.0 ... 1.3		
Max. wear limit size	mm	0.8		
Reverse gear				
New condition	mm	0.5 ... 0.6		
Max. wear limit size	mm	0.4		

<b>23 31 Internal Shift Components</b>				
Shift fork guide width				
1st ... 5th gear				
Wear limit	mm	4.8		

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<b>23 - 14 Manual Transmission</b>		<b>S 5 D 200 G</b>	<b>S 5 D 250 G</b>	<b>S 5 D 310 Z</b>	<b>S 6 S 420 G</b>	<b>S 6 S 560 G</b>	
<b>23 00 Transmission in General</b>							
<b>Oil grade: Refer to Operating Fluids</b>							
<b>Oil volume</b>	<b>ltr.</b>	<b>1.0</b>	<b>1.2</b>	<b>1.75</b>	<b>2.3</b>		
<b>Oil fill quantity for initial fill or repair transmission</b>	<b>ltr.</b>	<b>1.1</b>	<b>1.3</b>	<b>1.9</b>	<b>2.5</b>		

<b>23 - 15 Manual Transmission</b>		<b>S 5 D 200 G</b>	<b>S 5 D 250 G</b>	<b>S 5 D 310 Z</b>	<b>S 6 S 420 G</b>	<b>S 6 S 560 G</b>	
<b>23 11 Case and Cover</b>							
Temperature for installation of bearings	approx. °C	80					
<b>23 21 Transmission Shafts</b>							
Axial play (axial bearing clearance) of:							
Output shaft	mm	0 ... 0.09					
Input shaft	max. mm	0.04	-	-	-		
Output spigot							
Radial runout	max. mm	0.07					
Output flange							
Radial runout	max. mm	0.07					
Axial runout	max. mm	0.1					



<b>23 - 16 Manual Transmission</b>		<b>S 5 D 200 G</b>	<b>S 5 D 250 G</b>	<b>S 5 D 310 Z</b>	<b>S 6 S 420 G</b>	<b>S 6 S 560 G</b>	
<b>23 22 Gears (Layshaft)</b>							
Pressing off and pressing on forces							
5th gear	kN	50 ... 70	-	-	-		
<b>23 23 Synchronization Guide Sleeves</b>							
Pressing off and pressing on forces	kN	10 ... 20	-	-	-		
<b>23 23 Synchromesh Ring</b>							
Distance between synchronizer ring and clutch body							
New condition							
1st/2nd gear	mm	1.3 ... 2.1	1.1 ... 1.6	-	-		
3rd gear	mm	1.1 ... 1.5	0.95 ... 1.35	-	-		
4th/5th gear	mm	0.9 ... 1.5	0.95 ... 1.35	-	-		
Max. wear limit size	mm	0.8					
Reverse gear							
New condition	mm	1.1 ... 1.7	0.7 ... 1.15	-	-		
Max. wear limit size	mm	0.5					

<b>24 - 1 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 310 R</b> <b>316i</b>	<b>E36</b> <b>A 4 S 310 R</b> <b>318i</b>	<b>E36</b> <b>A 4 S 310 R</b> <b>325i</b>	
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>THM R1</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>2.40</b>			
<b>2nd gear</b>		<b>1.46</b>			
<b>3rd gear</b>		<b>1.00</b>			
<b>4th gear</b>		<b>0.72</b>			
<b>Reverse gear</b>		<b>2.00</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>8.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.0</b>			

<b>24 - 2 Automatic Transmission</b>		<b>E36 A 4 S 310 R 316i</b>	<b>E36 A 4 S 310 R 318i</b>	<b>E36 A 4 S 310 R 325i</b>	
<b>24 00 Transmission complete, shift points, partial throttle</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2100 ... 2300</b>	<b>2200 ... 2400</b>	<b>2100 ... 2300</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>2200 ... 2300</b>	<b>2300 ... 2400</b>	<b>2200 ... 2300</b>	
<b>3 - 4</b>	<b>rpm</b>	<b>2200 ... 2300</b>	<b>2300 ... 2400</b>	<b>2200 ... 2300</b>	
<b>CL closed 3</b>	<b>rpm</b>	<b>4200 ... 4400</b>	<b>4200 ... 4400</b>	<b>4100 ... 4300</b>	
<b>CL opened 3</b>	<b>rpm</b>	<b>3500 ... 3700</b>	<b>3500 ... 3700</b>	<b>3600 ... 3800</b>	
<b>CL closed 4</b>	<b>rpm</b>	<b>2600 ... 2700</b>	<b>2400 ... 2500</b>	<b>2300 ... 2400</b>	
<b>CL opened 4</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2300 ... 2400</b>	<b>2300 ... 2400</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>14 ... 19</b>	<b>14 ... 19</b>	<b>16 ... 22</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>29 ... 34</b>	<b>29 ... 34</b>	<b>30 ... 36</b>	
<b>3 - 4</b>	<b>km/h</b>	<b>44 ... 49</b>	<b>44 ... 49</b>	<b>46 ... 51</b>	
<b>CL closed 3</b>	<b>km/h</b>	<b>105 ... 110</b>	<b>105 ... 110</b>	<b>116 ... 122</b>	
<b>CL opened 3</b>	<b>km/h</b>	<b>84 ... 89</b>	<b>84 ... 89</b>	<b>104 ... 110</b>	
<b>CL closed 4</b>	<b>km/h</b>	<b>80 ... 85</b>	<b>71 ... 76</b>	<b>79 ... 84</b>	
<b>CL opened 4</b>	<b>km/h</b>	<b>74 ... 79</b>	<b>65 ... 70</b>	<b>74 ... 80</b>	

<b>24 - 3 Automatic Transmission</b>		<b>E36 A 4 S 310 R 316i</b>	<b>E36 A 4 S 310 R 318i</b>	<b>E36 A 4 S 310 R 325i</b>	
<b>24 00 Transmission complete, shift points, full throttle</b>					
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5800 ... 6200</b>	<b>5800 ... 6200</b>	<b>5800 ... 6200</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>5900 ... 6200</b>	<b>6000 ... 6200</b>	<b>5900 ... 6200</b>	
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>6000 ... 6200</b>	<b>6000 ... 6200</b>	<b>6000 ... 6200</b>	
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3900 ... 4110</b>	<b>3900 ... 4100</b>	<b>3500 ... 3600</b>	
<b>3 - 2</b>	<b>rpm</b>	<b>3300 ... 3500</b>	<b>3400 ... 3600</b>	<b>3300 ... 3400</b>	
<b>2 - 1</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2600 ... 2700</b>	<b>2700 ... 2800</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>53 ... 58</b>	<b>53 ... 58</b>	<b>61 ... 67</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>96 ... 101</b>	<b>96 ... 101</b>	<b>109 ... 114</b>	
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>150 ... 155</b>	<b>149 ... 155</b>	<b>172 ... 178</b>	
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>139 ... 144</b>	<b>139 ... 144</b>	<b>141 ... 147</b>	
<b>3 - 2</b>	<b>km/h</b>	<b>76 ... 81</b>	<b>76 ... 81</b>	<b>80 ... 86</b>	
<b>2 - 1</b>	<b>km/h</b>	<b>28 ... 33</b>	<b>28 ... 33</b>	<b>34 ... 39</b>	

<b>24 - 4 Automatic Transmission</b>		<b>E36 A 4 S 310 R 316i</b>	<b>E36 A 4 S 310 R 318i</b>	<b>E36 A 4 S 310 R 325i</b>	
<b>24 00 Transmission complete, shift points, kickdown</b>					
<b>Program E, selector lever in D Accelerator pedal at kickdown Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5800 ... 6200</b>	<b>5800 ... 6200</b>	<b>5800 ... 6200</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>5900 ... 6200</b>	<b>6000 ... 6200</b>	<b>5900 ... 6200</b>	
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>6000 ... 6200</b>	<b>6000 ... 6200</b>	<b>6000 ... 6200</b>	
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4100 ... 4200</b>	<b>4100 ... 4200</b>	<b>4100 ... 4300</b>	
<b>3 - 2</b>	<b>rpm</b>	<b>3800 ... 4000</b>	<b>3900 ... 4100</b>	<b>3700 ... 3900</b>	
<b>2 - 1</b>	<b>rpm</b>	<b>2900 ... 3100</b>	<b>3100 ... 3300</b>	<b>3100 ... 3300</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>53 ... 58</b>	<b>53 ... 58</b>	<b>61 ... 67</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>96 ... 101</b>	<b>95 ... 101</b>	<b>108 ... 114</b>	
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>150 ... 155</b>	<b>149 ... 155</b>	<b>172 ... 178</b>	
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>145 ... 150</b>	<b>145 ... 150</b>	<b>168 ... 174</b>	
<b>3 - 2</b>	<b>km/h</b>	<b>89 ... 94</b>	<b>89 ... 94</b>	<b>98 ... 104</b>	
<b>2 - 1</b>	<b>km/h</b>	<b>43 ... 48</b>	<b>43 ... 48</b>	<b>50 ... 55</b>	

<b>24 - 5 Automatic Transmission</b>		<b>E36 A 4 S 310 R 316i</b>	<b>E36 A 4 S 310 R 318i</b>	<b>E36 A 4 S 310 R 325i</b>	
<b>24 00 Transmission in general Manual shift points</b>					
CL closed 4 - 3	km/h	4100 ... 4200	4100 ... 4200	4100 ... 4300	
3 - 2	km/h	3700 ... 3900	3700 ... 3900	3600 ... 3800	
2 - 1	km/h	2900 ... 3200	3900 ... 4000	2400 ... 2700	
Road speed					
CL closed 4 - 3	km/h	145 ... 150	144 ... 150	168 ... 174	
3 - 2	km/h	95 ... 100	95 ... 100	106 ... 112	
2 - 1	km/h	53 ... 58	53 ... 58	54 ... 60	
Reverse gear interlock					
Road speed	km/h	9 ... 11	9 ... 11	10 ... 12	

<b>24 - 6 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 310 R</b>			
<b>24 00 Transmission in general: oil pressure</b>					
<b>Main pressure in P, N Programs S, E, M</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>9.6 ... 10.5</b>			
<b>Selector lever at R</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>12.9 ... 13.9</b>			
<b>24 21 Input shaft, intermediate shaft, output shaft</b>					
<b>Axial play of input shaft</b>	<b>mm</b>	<b>0.1 ... 0.8</b>			
<b>Axial play of output shaft</b>	<b>mm</b>	<b>0.36 ... 0.80</b>			

<b>24 - 7 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 310 R</b> <b>316i</b>	<b>E36</b> <b>A 4 S 310 R</b> <b>318i</b>	<b>E36</b> <b>A 4 S 310 R</b> <b>325i</b>	
<b>24 40 Torque converter</b>					
Torque converter Ø	mm	245			
Identification		SZ/9S		SE/9S	
Stall speed	rpm	2100 ... 2300	2300 ... 2500	2100 ... 2300	
<b>24 61 Electronic control units</b>					
Code letters / code: refer to Parts Catalog					



<b>24 - 8 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>	<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>		
<b>24 00 Transmission in general</b>					
Identification on data plate		5 HP 18			
Code letters/code on data plate or label: refer to Parts Catalog					
Manual shift					
1st gear		3.66			
2nd gear		2.00			
3rd gear		1.41			
4th gear		1.00			
5th gear		0.74			
Reverse gear		4.1			
Oil grade, refer to Operating Fluids					
Total oil volume (transmission and torque converter drained)	approx. ltr.	7.8	8.9		
Oil change volume (transmission at operating temperature)	approx. ltr.	3.3			

<b>24 - 9 Automatic Transmission</b>		<b>E36 A 5 S 310 Z 320i</b>	<b>E36 A 5 S 310 Z 325i</b>		
<b>24 00 Transmission complete, shift points, partial throttle</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2300 ... 2600</b>	<b>2000 ... 2300</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>2400 ... 2600</b>	<b>2100 ... 2300</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2200 ... 2300</b>		
<b>4 - 5</b>	<b>rpm</b>	<b>2600 ... 2800</b>	<b>2400 ... 2500</b>		
<b>CL closed 4</b>	<b>rpm</b>	<b>4470 ... 4800</b>	<b>5600 ... 5800</b>		
<b>CL opened 4</b>	<b>rpm</b>	<b>4500 ... 4700</b>	<b>5400 ... 5600</b>		
<b>CL closed 5</b>	<b>rpm</b>	<b>2400 ... 2600</b>	<b>2100 ... 2200</b>		
<b>CL opened 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2200</b>		

<b>24 - 10 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>			
<b>24 00 Transmission complete, shift points, partial throttle</b>							
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>12 ... 18</b>	<b>13 ... 20</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>27 ... 33</b>	<b>28 ... 36</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>43 ... 50</b>	<b>54 ... 52</b>				
<b>4 - 5</b>	<b>km/h</b>	<b>70 ... 77</b>	<b>77 ... 84</b>				
<b>CL closed 4</b>	<b>km/h</b>	<b>150 ... 156</b>	<b>204 ... 211</b>				
<b>CL opened 4</b>	<b>km/h</b>	<b>143 ... 150</b>	<b>195 ... 203</b>				
<b>CL closed 5</b>	<b>km/h</b>	<b>76 ... 83</b>	<b>84 ... 91</b>				
<b>CL opened 5</b>	<b>km/h</b>	<b>73 ... 80</b>	<b>80 ... 87</b>				

<b>24 - 11 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>	<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>		
<b>24 00 Transmission complete, shift points, full throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5000 ... 5700</b>	<b>4900 ... 5600</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>5200 ... 5600</b>	<b>5100 ... 5500</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>5400 ... 5600</b>	<b>5300 ... 5600</b>		
<b>4 - 3</b>	<b>rpm</b>	<b>3400 ... 3600</b>	<b>3300 ... 3500</b>		
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>	<b>6300 ... 6500</b>		
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>3600 ... 3700</b>	<b>3600 ... 3700</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3200 ... 3400</b>	<b>3100 ... 3300</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2600 ... 2800</b>	<b>2500 ... 2700</b>		

<b>24 - 12 Automatic Transmission</b>		<b>E36 A 5 S 310 Z 320i</b>		<b>E36 A 5 S 310 Z 325i</b>			
<b>24 00 Transmission complete, shift points, full throttle</b>							
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>42 ... 49</b>	<b>46 ... 54</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>82 ... 88</b>	<b>90 ... 97</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>120 ... 127</b>	<b>131 ... 139</b>				
<b>4 - 3</b>	<b>km/h</b>	<b>97 ... 103</b>	<b>106 ... 113</b>				
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>209 ... 216</b>	<b>229 ... 236</b>				
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>159 ... 166</b>	<b>174 ... 182</b>				
<b>3 - 2</b>	<b>km/h</b>	<b>62 ... 69</b>	<b>68 ... 76</b>				
<b>2 - 1</b>	<b>km/h</b>	<b>26 ... 33</b>	<b>29 ... 36</b>				

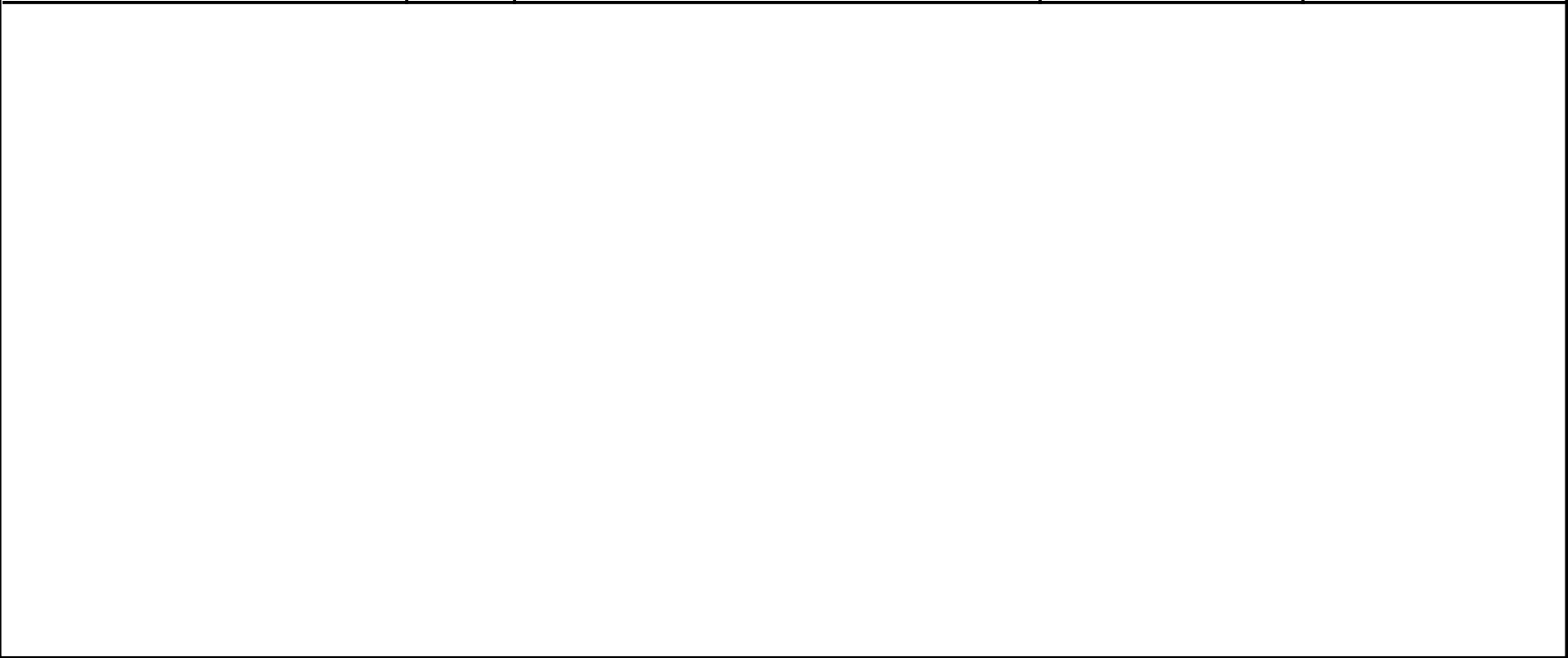
<b>24 - 13 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>	<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>		
<b>24 00 Transmission complete, shift points, kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5700 ... 6300</b>	<b>5600 ... 6300</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>6100 ... 6400</b>	<b>5900 ... 6300</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>6200 ... 6400</b>	<b>6100 ... 6400</b>		
<b>4 - 3</b>	<b>rpm</b>	<b>4400 ... 4600</b>	<b>4300 ... 4500</b>		
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>	<b>6300 ... 6500</b>		
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4400 ... 4500</b>	<b>4400 ... 4600</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>4100 ... 4400</b>	<b>4000 ... 4300</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>3000 ... 3300</b>	<b>2900 ... 3200</b>		

<b>24 - 14 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>			
<b>24 00 Transmission complete, shift points, kickdown</b>							
<b>Program E, selector lever in D Accelerator pedal at kickdown Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>49 ... 55</b>	<b>53 ... 61</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>97 ... 103</b>	<b>105 ... 112</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>140 ... 147</b>	<b>152 ... 160</b>				
<b>4 - 3</b>	<b>km/h</b>	<b>133 ... 139</b>	<b>147 ... 154</b>				
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>209 ... 216</b>	<b>229 ... 236</b>				
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>196 ... 203</b>	<b>216 ... 224</b>				
<b>3 - 2</b>	<b>km/h</b>	<b>87 ... 94</b>	<b>96 ... 104</b>				
<b>2 - 1</b>	<b>km/h</b>	<b>39 ... 46</b>	<b>44 ... 51</b>				

<b>24 - 15 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>	<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>		
<b>24 00 Transmission in general, shift points, manual</b>					
<b>5 - 4</b>	<b>rpm</b>	<b>4300 ... 4400</b>	<b>4300 ... 4400</b>		
<b>4 - 3</b>	<b>rpm</b>	<b>3900 ... 4100</b>	<b>3900 ... 4100</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3500 ... 3800</b>	<b>3600 ... 3900</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2100 ... 2600</b>	<b>2200 ... 2600</b>		
<b>Road speed</b>					
<b>5 - 4</b>	<b>km/h</b>	<b>196 ... 203</b>	<b>216 ... 224</b>		
<b>4 - 3</b>	<b>km/h</b>	<b>133 ... 139</b>	<b>146 ... 154</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>87 ... 94</b>	<b>96 ... 104</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>39 ... 46</b>	<b>44 ... 51</b>		
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>7 ... 9</b>	<b>8 ... 10</b>		



<b>24 - 16 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 310 Z</b> <b>320i</b>	<b>E36</b> <b>A 5 S 310 Z</b> <b>325i</b>		
<b>24 40 Torque converter</b>					
Torque converter Ø	mm	230	260		
Identification		Z 10	B 11		
Stall speed	rpm	2400 ... 2600	2200 ... 2500		
<b>24 61 Electronic control units</b>					
Code letters / code: refer to Parts Catalog					



<b>24 - 17 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>	<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>		
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>JATCO</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.86</b>			
<b>2nd gear</b>		<b>2.14</b>			
<b>3rd gear</b>		<b>1.38</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.69</b>			
<b>Reverse gear</b>		<b>3.15</b>			
<b>Oil grade: refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.8</b>	<b>8.1</b>		

<b>24 - 18 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>	<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>		
<b>24 00 Transmission complete, shift points, partial throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2200 ... 2500</b>	<b>1900 ... 2200</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>2300 ... 2600</b>	<b>2000 ... 2200</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2300</b>		
<b>4 - 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2300</b>		
<b>CL closed 4</b>	<b>rpm</b>	<b>4300 ... 4500</b>	<b>4300 ... 4500</b>		
<b>CL opened 4</b>	<b>rpm</b>	<b>4200 ... 4300</b>	<b>4100 ... 4300</b>		
<b>CL closed 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2300 ... 2400</b>		
<b>CL opened 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2200 ... 2300</b>		

<b>24 - 19 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>			
<b>24 00 Transmission complete, shift points, partial throttle</b>							
Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed							
Road speed							
1 - 2	km/h	9 ... 14	9 ... 15				
2 - 3	km/h	22 ... 27	21 ... 28				
3 - 4	km/h	36 ... 42	37 ... 43				
4 - 5	km/h	51 ... 57	53 ... 59				
CL closed 4	km/h	116 ... 122	129 ... 135				
CL opened 4	km/h	111 ... 117	124 ... 130				
CL closed 5	km/h	77 ... 83	86 ... 92				
CL opened 5	km/h	73 ... 79	82 ... 88				

<b>24 - 20 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>	<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>		
<b>24 00 Transmission complete, shift points, full throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
1 - 2	rpm	5400 ... 6100	5200 ... 5900		
2 - 3	rpm	5400 ... 5800	5500 ... 5900		
3 - 4	rpm	5700 ... 6000	5600 ... 5900		
CL closed 4 - 5	rpm	6000 ... 6200	5800 ... 6100		
CL closed 5 - 4	rpm	3600 ... 3800	3500 ... 3600		
4 - 3	rpm	3500 ... 3700	3300 ... 3400		
3 - 2	rpm	2800 ... 3000	2600 ... 2700		
2 - 1	rpm	2500 ... 2700	2400 ... 2600		

<b>24 - 21 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>			
<b>24 00 Transmission complete, shift points, full throttle</b>							
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>31 ... 37</b>	<b>33 ... 39</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>63 ... 69</b>	<b>70 ... 76</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>108 ... 114</b>	<b>116 ... 122</b>				
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>164 ... 170</b>	<b>177 ... 183</b>				
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>147 ... 153</b>	<b>154 ... 160</b>				
<b>4 - 3</b>	<b>km/h</b>	<b>85 ... 91</b>	<b>88 ... 94</b>				
<b>3 - 2</b>	<b>km/h</b>	<b>44 ... 50</b>	<b>44 ... 50</b>				
<b>2 - 1</b>	<b>km/h</b>	<b>20 ... 26</b>	<b>22 ... 28</b>				

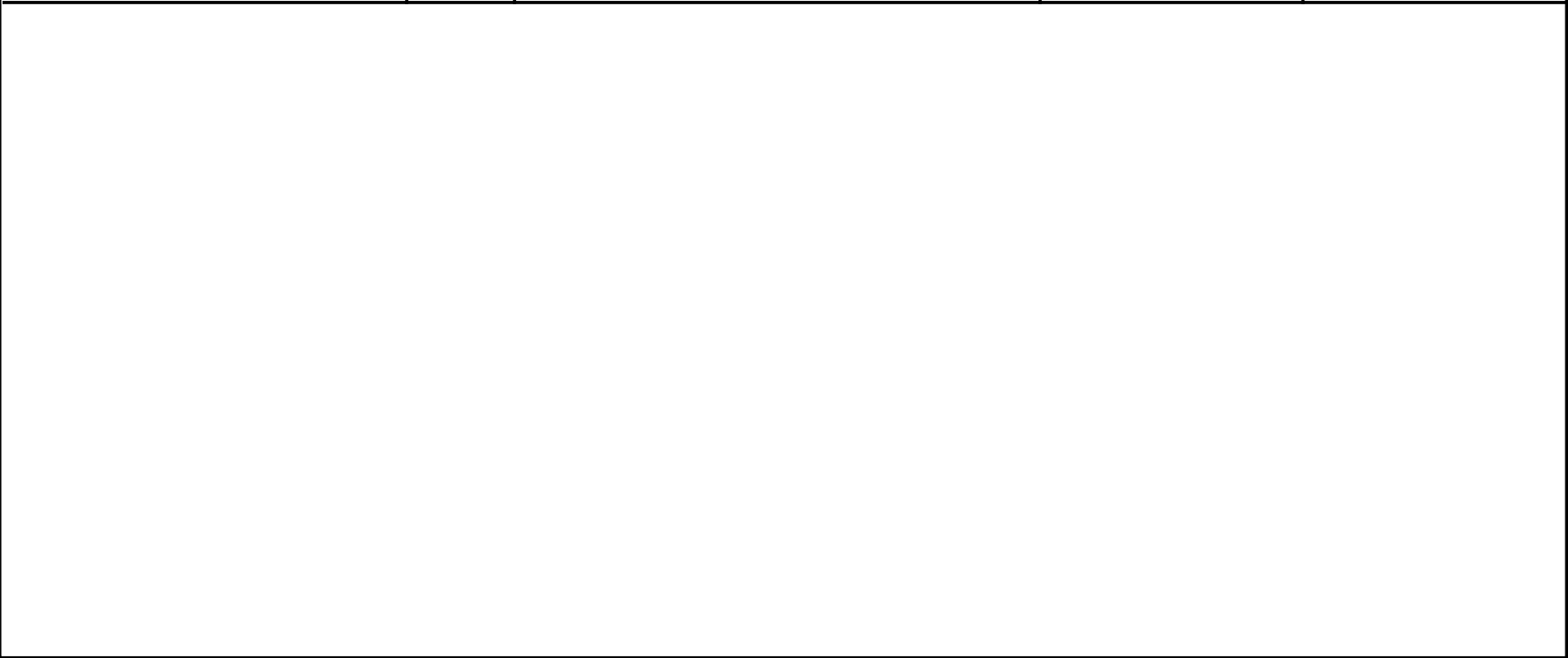
<b>24 - 22 Automatic Transmission</b>		<b>E36 A 5 S 300 J 320i</b>	<b>E36 A 5 S 300 J 325i</b>		
<b>24 00 Transmission complete, shift points, kickdown</b>					
<b>Program E, selector lever in D Accelerator pedal at kickdown Shift point at engine speed</b>					
1 - 2	rpm	5800 ... 6500	5700 ... 6400		
2 - 3	rpm	5900 ... 6300	6000 ... 6400		
3 - 4	rpm	6100 ... 6300	6100 ... 6400		
CL closed 4 - 5	rpm	6300 ... 6500	6300 ... 6500		
CL closed 5 - 4	rpm	4000 ... 4200	4100 ... 4200		
CL closed 4 - 3	rpm	4000 ... 4200	4000 ... 4200		
3 - 2	rpm	3600 ... 3800	3600 ... 3900		
2 - 1	rpm	2800 ... 3100	2700 ... 3000		

<b>24 - 23 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>			
<b>24 00 Transmission complete, shift points, kickdown</b>							
<b>Program E, selector lever in D Accelerator pedal at kickdown Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>34 ... 40</b>	<b>37 ... 43</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>69 ... 75</b>	<b>78 ... 84</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>116 ... 122</b>	<b>129 ... 135</b>				
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>172 ... 178</b>	<b>190 ... 196</b>				
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>162 ... 168</b>	<b>180 ... 186</b>				
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>111 ... 116</b>	<b>124 ... 130</b>				
<b>3 - 2</b>	<b>km/h</b>	<b>64 ... 70</b>	<b>73 ... 79</b>				
<b>2 - 1</b>	<b>km/h</b>	<b>28 ... 34</b>	<b>31 ... 37</b>				



<b>24 - 24 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>	<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>		
<b>24 00 Transmission in general, shift points, manual</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4000 ... 4200</b>	<b>4100 ... 4200</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4100 ... 4300</b>	<b>4100 ... 4300</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3300 ... 3600</b>	<b>3300 ... 3500</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>900 ... 1300</b>	<b>900 ... 1300</b>		
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>162 ... 168</b>	<b>179 ... 186</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>114 ... 120</b>	<b>126 ... 132</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>69 ... 75</b>	<b>75 ... 81</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>15 ... 21</b>	<b>17 ... 23</b>		
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>5 ... 7</b>	<b>5 ... 7</b>		

<b>24 - 25 Automatic Transmission</b>		<b>E36</b> <b>A 5 S 300 J</b> <b>320i</b>	<b>E36</b> <b>A 5 S 300 J</b> <b>325i</b>		
<b>24 40 Torque converter</b>					
Torque converter Ø	mm	236	250		
Identification		N1/N2	M1/M2		
Stall speed	rpm	2200 ... 2400			
<b>24 61 Electronic control units</b>					
Code letters / code: refer to Parts Catalog					



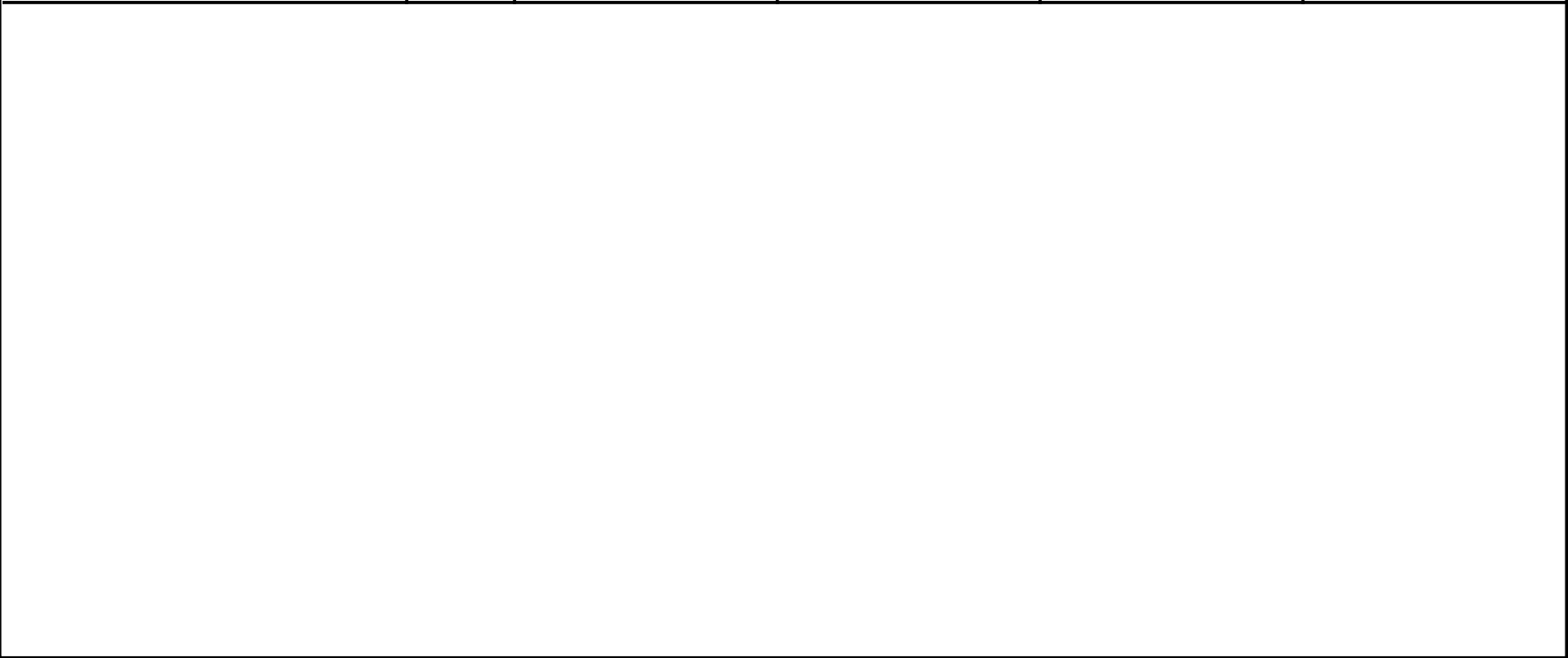
<b>24 - 26 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 270 R</b> <b>325td</b>			
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>THM-R1</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>2.86</b>			
<b>2nd gear</b>		<b>1.62</b>			
<b>3rd gear</b>		<b>1.00</b>			
<b>4th gear</b>		<b>0.72</b>			
<b>Reverse gear</b>		<b>2.00</b>			
<b>Oil grade: refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>8.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.0</b>			

<b>24 - 27 Automatic Transmission</b>		<b>E36</b>			
		<b>A 4 S 270 R</b>			
		<b>325td</b>			
<b>24 00 Transmission complete, shift points, partial throttle</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at partial throttle</b>					
<b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>1325 ... 1520</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>1392 ... 1543</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>1375 ... 1443</b>			
<b>CL closed 4</b>	<b>rpm</b>	<b>1756 ... 1848</b>			
<b>CL opened 4</b>	<b>rpm</b>	<b>1633 ... 1761</b>			
<b>CL closed 3</b>	<b>rpm</b>	<b>2674 ... 2843</b>			
<b>CL opened 3</b>	<b>rpm</b>	<b>2107 ... 2298</b>			
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>10 ... 17</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>24 ... 31</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>36 ... 43</b>			
<b>CL closed 4</b>	<b>km/h</b>	<b>81 ... 88</b>			
<b>CL opened 4</b>	<b>km/h</b>	<b>74 ... 81</b>			
<b>CL closed 3</b>	<b>km/h</b>	<b>96 ... 104</b>			
<b>CL opened 3</b>	<b>km/h</b>	<b>74 ... 81</b>			

<b>24 - 28 Automatic Transmission</b>		<b>E36</b>			
		<b>A 4 S 270 R</b>			
		<b>325td</b>			
<b>24 00 Transmission complete, shift points, kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4605 ... 5110</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>4686 ... 4963</b>			
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>4786 ... 4986</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>2704 ... 2849</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>2909 ... 2999</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2606 ... 2711</b>			
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>50 ... 57</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>94 ... 101</b>			
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>165 ... 172</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>133 ... 140</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>75 ... 82</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>28 ... 35</b>			

<b>24 - 29 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 270 R</b> <b>325td</b>			
<b>24 00 Transmission in general: oil pressure</b>					
<b>Main pressure in P, N Programs S, E, M</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>9.6 ... 10.5</b>			
<b>Selector lever at R</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>12.9 ... 13.9</b>			
<b>24 21 Input shaft, intermediate shaft, output shaft</b>					
<b>Axial play of input shaft</b>	<b>mm</b>	<b>0.1 ... 0.8</b>			
<b>Axial play of output shaft</b>	<b>mm</b>	<b>0.36 ... 0.80</b>			

<b>24 - 30 Automatic Transmission</b>		<b>E36</b> <b>A 4 S 270 R</b> <b>325td</b>			
<b>24 40 Torque converter</b>					
Torque converter Ø	mm	245			
Identification		SE / 95			
Stall speed	rpm	2265 ... 2449			
<b>24 61 Electronic control units</b>					
Code letters / code: refer to Parts Catalog					



<b>24 - 31 Automatic Transmission</b>		<b>E34</b> <b>A 4 S 310 R</b>			
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>THM-R1</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>2.40</b>			
<b>2nd gear</b>		<b>1.47</b>			
<b>3rd gear</b>		<b>1.00</b>			
<b>4th gear</b>		<b>0.72</b>			
<b>Reverse gear</b>		<b>2.00</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>8.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.0</b>			

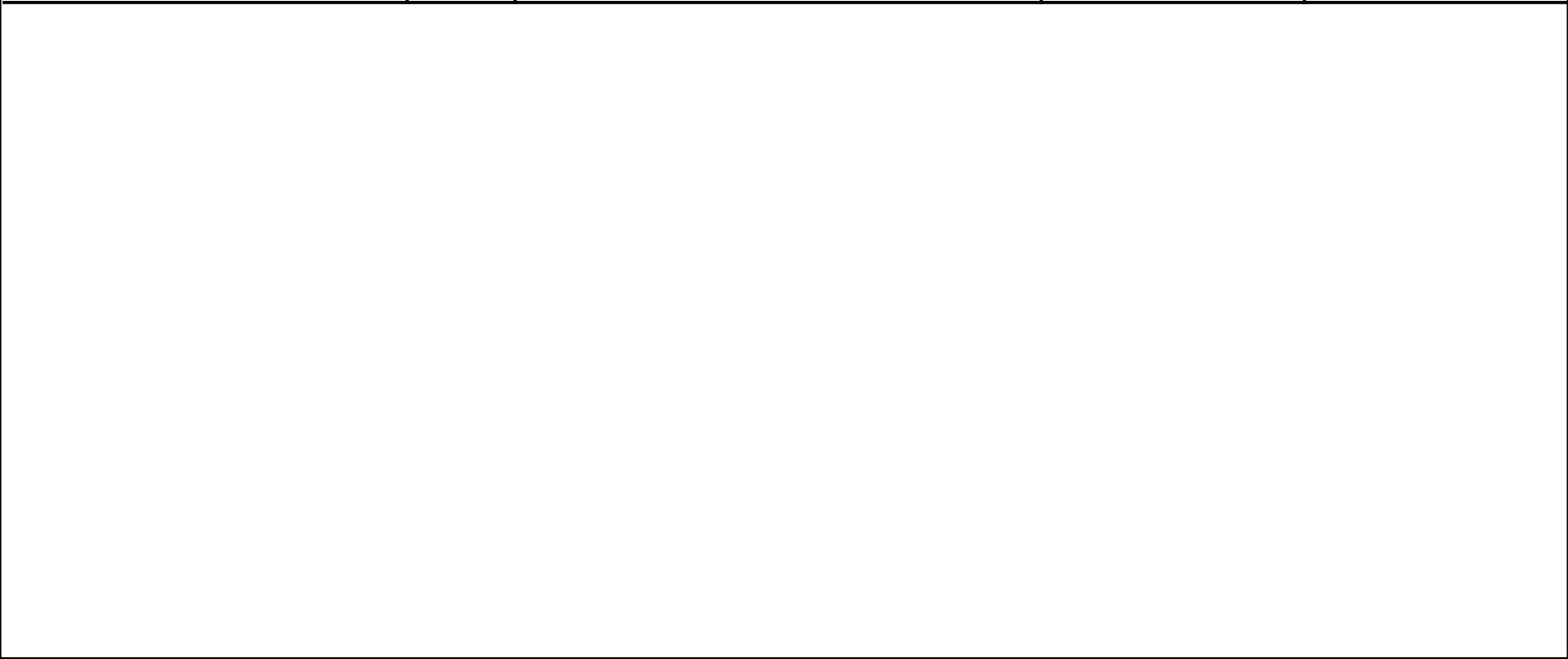


<b>24 - 32 Automatic Transmission</b>		<b>E34</b> <b>A 4 S 310 R</b> <b>520i</b>	<b>E34</b> <b>A 4 S 310 R</b> <b>525i</b>		
<b>24 00 Transmission Complete, Shift Points, Partial Throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2400 ... 2600</b>	<b>2200 ... 2400</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2200 ... 2300</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>2600 ... 2700</b>	<b>2300 ... 2400</b>		
<b>CL closed 4</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2300 ... 2400</b>		
<b>CL opened 4</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2200 ... 2300</b>		
<b>CL closed 3</b>	<b>rpm</b>	<b>3100 ... 3300</b>	<b>2800 ... 3000</b>		
<b>CL opened 3</b>	<b>rpm</b>	<b>2900 ... 3100</b>	<b>2700 ... 2900</b>		
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>17 ... 23</b>	<b>19 ... 25</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>33 ... 38</b>	<b>29 ... 35</b>		
<b>3 - 4</b>	<b>km/h</b>	<b>53 ... 59</b>	<b>50 ... 55</b>		
<b>CL closed 4</b>	<b>km/h</b>	<b>73 ... 79</b>	<b>73 ... 79</b>		
<b>CL opened 4</b>	<b>km/h</b>	<b>67 ... 73</b>	<b>70 ... 75</b>		
<b>CL closed 3</b>	<b>km/h</b>	<b>73 ... 79</b>	<b>73 ... 79</b>		
<b>CL opened 3</b>	<b>km/h</b>	<b>67 ... 73</b>	<b>70 ... 75</b>		

<b>24 - 33 Automatic Transmission</b>		<b>E34</b> <b>A 4 S 310 R</b> <b>520i</b>	<b>E34</b> <b>A 4 S 310 R</b> <b>525i</b>		
<b>24 00 Transmission Complete, Shift Points, Full Throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5900 ... 6300</b>	<b>5900 ... 6300</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>6000 ... 6300</b>	<b>6000 ... 6300</b>		
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>6000 ... 6200</b>	<b>6000 ... 6200</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3800 ... 4000</b>	<b>3500 ... 3600</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3300 ... 3500</b>	<b>3200 ... 3300</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2800 ... 3000</b>	<b>2700 ... 2800</b>		
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>54 ... 59</b>	<b>59 ... 64</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>97 ... 102</b>	<b>105 ... 111</b>		
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>152 ... 157</b>	<b>166 ... 171</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>138 ... 143</b>	<b>137 ... 142</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>74 ... 79</b>	<b>78 ... 83</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>33 ... 38</b>	<b>32 ... 38</b>		

<b>24 - 34 Automatic Transmission</b>		<b>E34</b> <b>A 4 S 310 R</b> <b>520i</b>	<b>E34</b> <b>A 4 S 310 R</b> <b>525i</b>		
<b>24 00 Transmission in general: oil pressure</b>					
<b>Main pressure in P, N Programs S, E, M</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>9.6 ... 10.5</b>			
<b>Selector lever at R</b>					
<b>Engine speed</b>	<b>rpm</b>	<b>&gt; 1500</b>			
<b>Main pressure</b>	<b>bar</b>	<b>12.9 ... 13.9</b>			
<b>24 21 Input Shaft, Intermediate Shaft, Output Shaft</b>					
<b>Axial play of input shaft</b>	<b>mm</b>	<b>0.1 ... 0.8</b>			
<b>Axial play of output shaft</b>	<b>mm</b>	<b>0.36 ... 0.80</b>			

<b>24 - 35 Automatic Transmission</b>		<b>E34</b> <b>A 4 S 310 R</b> <b>520i</b>	<b>E34</b> <b>A 4 S 310 R</b> <b>525i</b>		
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	245			
Identification		SZ / 95	SE / 95		
Stall speed	rpm	2400 ... 2600	2200 ... 2400		
<b>24 61 Electronic Control Units</b>					
Code letters / code: refer to Parts Catalog					



<b>24 - 36 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission in general</b>					
Identification on data plate		5 HP 18			
Code letters/code on data plate or label: refer to Parts Catalog					
Manual shift					
1st gear		3.66		3.67	
2nd gear		2.00			
3rd gear		1.41			
4th gear		1.00			
5th gear		0.74			0.69
Reverse gear		4.1			
Oil grade, refer to Operating Fluids					
Total oil volume (transmission and torque converter drained)	approx. ltr.	7.8	8.9	7.8	
Oil change volume (transmission at operating temperature)	approx. ltr.	3.3			

<b>24 - 37 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission Complete, Shift Points, Partial Throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2300 ... 2600</b>	<b>2000 ... 2300</b>	<b>1428 ... 2065</b>	<b>2080 ... 2378</b>
<b>2 - 3</b>	<b>rpm</b>	<b>2400 ... 2600</b>	<b>2100 ... 2300</b>	<b>1396 ... 1676</b>	<b>2167 ... 2339</b>
<b>3 - 4</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2200 ... 2300</b>	<b>1500 ... 1735</b>	<b>2242 ... 2374</b>
<b>4 - 5</b>	<b>rpm</b>	<b>2600 ... 2800</b>	<b>2400 ... 2500</b>	<b>1724 ... 1922</b>	<b>2355 ... 2486</b>
<b>CL closed 4</b>	<b>rpm</b>	<b>4600 ... 4800</b>	<b>4600 ... 4800</b>	<b>3156 ... 3335</b>	<b>3959 ... 4146</b>
<b>CL opened 4</b>	<b>rpm</b>	<b>4500 ... 4700</b>	<b>4400 ... 4600</b>	<b>2939 ... 3109</b>	<b>3626 ... 3815</b>
<b>CL closed 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2200</b>	<b>1474 ... 1583</b>	<b>2188 ... 2247</b>
<b>CL opened 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2200</b>	<b>1443 ... 1544</b>	<b>2149 ... 2207</b>

<b>24 - 38 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission Complete, Shift Points, Partial Throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>11 ... 18</b>	<b>13 ... 20</b>	<b>17 ... 25</b>	<b>13 ... 21</b>
<b>2 - 3</b>	<b>km/h</b>	<b>26 ... 32</b>	<b>28 ... 35</b>	<b>27 ... 36</b>	<b>29 ... 37</b>
<b>3 - 4</b>	<b>km/h</b>	<b>42 ... 48</b>	<b>45 ... 52</b>	<b>44 ... 53</b>	<b>46 ... 54</b>
<b>4 - 5</b>	<b>km/h</b>	<b>67 ... 74</b>	<b>76 ... 83</b>	<b>74 ... 83</b>	<b>74 ... 82</b>
<b>CL closed 4</b>	<b>km/h</b>	<b>144 ... 150</b>	<b>162 ... 169</b>	<b>144 ... 153</b>	<b>143 ... 151</b>
<b>CL opened 4</b>	<b>km/h</b>	<b>138 ... 144</b>	<b>155 ... 162</b>	<b>133 ... 142</b>	<b>130 ... 137</b>
<b>CL closed 5</b>	<b>km/h</b>	<b>73 ... 80</b>	<b>83 ... 90</b>	<b>81 ... 90</b>	<b>81 ... 88</b>
<b>CL opened 5</b>	<b>km/h</b>	<b>70 ... 77</b>	<b>79 ... 86</b>	<b>79 ... 88</b>	<b>76 ... 83</b>

<b>24 - 39 Automatic Transmission</b>		<b>E34 A 5 S 310 Z 520i</b>	<b>E34 A 5 S 310 Z 525i</b>	<b>E34 A 5 S 310 Z 525tds</b>	<b>E34 A 5 S 310 Z 530i</b>
<b>24 00 Transmission Complete, Shift Points, Full Throttle</b>					
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>					
1 - 2	rpm	5000 ... 5700	4900 ... 5600	3827 ... 4462	4932 ... 5639
2 - 3	rpm	5200 ... 5600	5100 ... 5500	4157 ... 4515	5164 ... 5550
3 - 4	rpm	5400 ... 5600	5300 ... 5600	4372 ... 4631	5322 ... 5594
CL closed 4 - 5	rpm	6300 ... 6500	6300 ... 6500	4700 ... 4900	3258 ... 3436
CL closed 5 - 4	rpm	3500 ... 3700	3600 ... 3700	2751 ... 2900	6300 ... 6500
4 - 3	rpm	3400 ... 3600	3300 ... 3500	3021 ... 3119	3559 ... 3707
3 - 2	rpm	3200 ... 3400	3100 ... 3300	2910 ... 3044	3012 ... 3241
2 - 1	rpm	2600 ... 2800	2500 ... 2700	2713 ... 2774	2495 ... 2662



<b>24 - 40 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission Complete, Shift Points, Full Throttle</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>41 ... 47</b>	<b>46 ... 53</b>	<b>43 ... 52</b>	<b>48 ... 56</b>
<b>2 - 3</b>	<b>km/h</b>	<b>78 ... 85</b>	<b>88 ... 96</b>	<b>87 ... 96</b>	<b>93 ... 100</b>
<b>3 - 4</b>	<b>km/h</b>	<b>115 ... 122</b>	<b>130 ... 137</b>	<b>132 ... 140</b>	<b>136 ... 143</b>
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>201 ... 207</b>	<b>226 ... 234</b>	<b>210 ... 219</b>	<b>109 ... 117</b>
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>153 ... 159</b>	<b>172 ... 180</b>	<b>166 ... 175</b>	<b>237 ... 245</b>
<b>4 - 3</b>	<b>km/h</b>	<b>93 ... 99</b>	<b>104... 112</b>	<b>102 ... 112</b>	<b>180 ... 188</b>
<b>3 - 2</b>	<b>km/h</b>	<b>60 ... 66</b>	<b>68 ... 75</b>	<b>66 ... 75</b>	<b>70 ... 77</b>
<b>2 - 1</b>	<b>km/h</b>	<b>25 ... 32</b>	<b>29 ... 36</b>	<b>27 ... 36</b>	<b>30 ... 38</b>

<b>24 - 41 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission Complete, Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
1 - 2	rpm	5700 ... 6300	5600 ... 6300	4330 ... 5017	5723 ... 6415
2 - 3	rpm	6100 ... 6400	5900 ... 6300	4619 ... 4999	6082 ... 6459
3 - 4	rpm	6200 ... 6400	6100 ... 6400	4747 ... 5017	6224 ... 6489
CL closed 4 - 5	rpm	6300 ... 6500	6300 ... 6500	4700 ... 4900	4028 ... 4228
CL closed 5 - 4	rpm	4400 ... 4500	4400 ... 4600	3345 ... 3493	6300 ... 6500
4 - 3	rpm	4400 ... 4600	4300 ... 4500	2972 ... 3172	4413 ... 4562
3 - 2	rpm	4100 ... 4400	4000 ... 4300	3304 ... 3493	4024 ... 4296
2 - 1	rpm	3000 ... 3300	2900 ... 3200	2838 ... 2996	2884 ... 3187

<b>24 - 42 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 00 Transmission Complete, Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>47 ... 53</b>	<b>53 ... 60</b>	<b>50 ... 59</b>	<b>56 ... 64</b>
<b>2 - 3</b>	<b>km/h</b>	<b>93 ... 99</b>	<b>103 ... 111</b>	<b>99 ... 108</b>	<b>111 ... 118</b>
<b>3 - 4</b>	<b>km/h</b>	<b>135 ... 141</b>	<b>151 ... 158</b>	<b>144 ... 153</b>	<b>161 ... 169</b>
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>201 ... 207</b>	<b>226 ... 234</b>	<b>210 ... 219</b>	<b>152 ... 159</b>
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>189 ... 195</b>	<b>214 ... 221</b>	<b>202 ... 211</b>	<b>237 ... 245</b>
<b>4 - 3</b>	<b>km/h</b>	<b>127 ... 134</b>	<b>145 ... 152</b>	<b>133 ... 142</b>	<b>224 ... 231</b>
<b>3 - 2</b>	<b>km/h</b>	<b>84 ... 90</b>	<b>95 ... 102</b>	<b>89 ... 98</b>	<b>100 ... 107</b>
<b>2 - 1</b>	<b>km/h</b>	<b>38 ... 44</b>	<b>44 ... 51</b>	<b>41 ... 50</b>	<b>46 ... 53</b>

<b>24 - 43 Automatic Transmission</b>		<b>E34 A 5 S 310 Z 520i</b>	<b>E34 A 5 S 310 Z 525i</b>	<b>E34 A 5 S 310 Z 525tds</b>	<b>E34 A 5 S 310 Z 530i</b>
<b>24 00 Transmission in General, Shift Points, Manual</b>					
<b>Shift point at engine speed</b>					
5 - 4	rpm	4300 ... 4400	4300 ... 4400	3345 ... 3493	4413 ... 4562
4 - 3	rpm	3900 ... 4100	3900 ... 4100	2972 ... 3172	4028 ... 4228
3 - 2	rpm	3500 ... 3800	3600 ... 3900	2543 ... 2828	3607 ... 3897
2 - 1	rpm	2100 ... 2600	2200 ... 2600	1537 ... 1984	2240 ... 2670
<b>Road speed</b>					
5 - 4	km/h	189 ... 195	214 ... 221	202 ... 211	224 ... 231
4 - 3	km/h	127 ... 134	145 ... 152	133 ... 142	152 ... 159
3 - 2	km/h	84 ... 90	95 ... 102	89 ... 98	100 ... 107
2 - 1	km/h	38 ... 44	44 ... 51	41 ... 50	46 ... 53
<b>Reverse gear interlock</b>					
<b>Road speed</b>	km/h	7 ... 9	8 ... 10	10 ... 13	8.4 ... 10.8

<b>24 - 44 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 310 Z</b> <b>520i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525i</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>525tds</b>	<b>E34</b> <b>A 5 S 310 Z</b> <b>530i</b>
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	230	260		
Stall speed	rpm	2400 ... 2600	2200 ... 2500	2568 ... 2768	2075 ... 2275
<b>24 61 Electronic Control Units</b>					
Code letters / code: refer to Parts Catalog					

<b>24 - 45 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>JATCO</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.86</b>			
<b>2nd gear</b>		<b>2.14</b>			
<b>3rd gear</b>		<b>1.38</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.69</b>			
<b>Reverse gear</b>		<b>3.15</b>			
<b>Oil grade: refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.8</b>	<b>8.1</b>		

<b>24 - 46 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general partial throttle</b> <b>Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2200 ... 2500</b>	<b>1900 ... 2200</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>2300 ... 2600</b>	<b>2000 ... 2300</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2200</b>		
<b>4 - 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2100 ... 2200</b>		
<b>CL closed 4</b>	<b>rpm</b>	<b>4300 ... 4500</b>	<b>4300 ... 4500</b>		
<b>CL opened 4</b>	<b>rpm</b>	<b>4200 ... 4400</b>	<b>4100 ... 4300</b>		
<b>CL closed 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2300 ... 2400</b>		
<b>CL opened 5</b>	<b>rpm</b>	<b>2400 ... 2500</b>	<b>2200 ... 2300</b>		

<b>24 - 47 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>			
<b>24 00 Transmission in general partial throttle</b>							
<b>Shift points</b>							
<b>Program E, selector lever in D</b>							
<b>Accelerator pedal at partial throttle</b>							
<b>Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>9 ... 14</b>	<b>9 ... 15</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>21 ... 27</b>	<b>21 ... 27</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>35 ... 41</b>	<b>35 ... 41</b>				
<b>4 - 5</b>	<b>km/h</b>	<b>50 ... 56</b>	<b>51 ... 57</b>				
<b>CL closed 4</b>	<b>km/h</b>	<b>114 ... 119</b>	<b>124 ... 130</b>				
<b>CL opened 4</b>	<b>km/h</b>	<b>109 ... 114</b>	<b>119 ... 125</b>				
<b>CL closed 5</b>	<b>km/h</b>	<b>76 ... 81</b>	<b>83 ... 89</b>				
<b>CL opened 5</b>	<b>km/h</b>	<b>72 ... 77</b>	<b>79 ... 85</b>				



<b>24 - 48 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
1 - 2	rpm	5400 ... 6100	5400 ... 6100		
2 - 3	rpm	5500 ... 5900	5500 ... 5900		
3 - 4	rpm	5800 ... 6000	5600 ... 5800		
CL closed 4 - 5	rpm	6000 ... 6200	5800 ... 6000		
CL closed 5 - 4	rpm	4000 ... 4200	3500 ... 3600		
4 - 3	rpm	3500 ... 3700	3300 ... 3400		
3 - 2	rpm	2800 ... 3000	2600 ... 2700		
2 - 1	rpm	2500 ... 2700	2400 ... 2600		

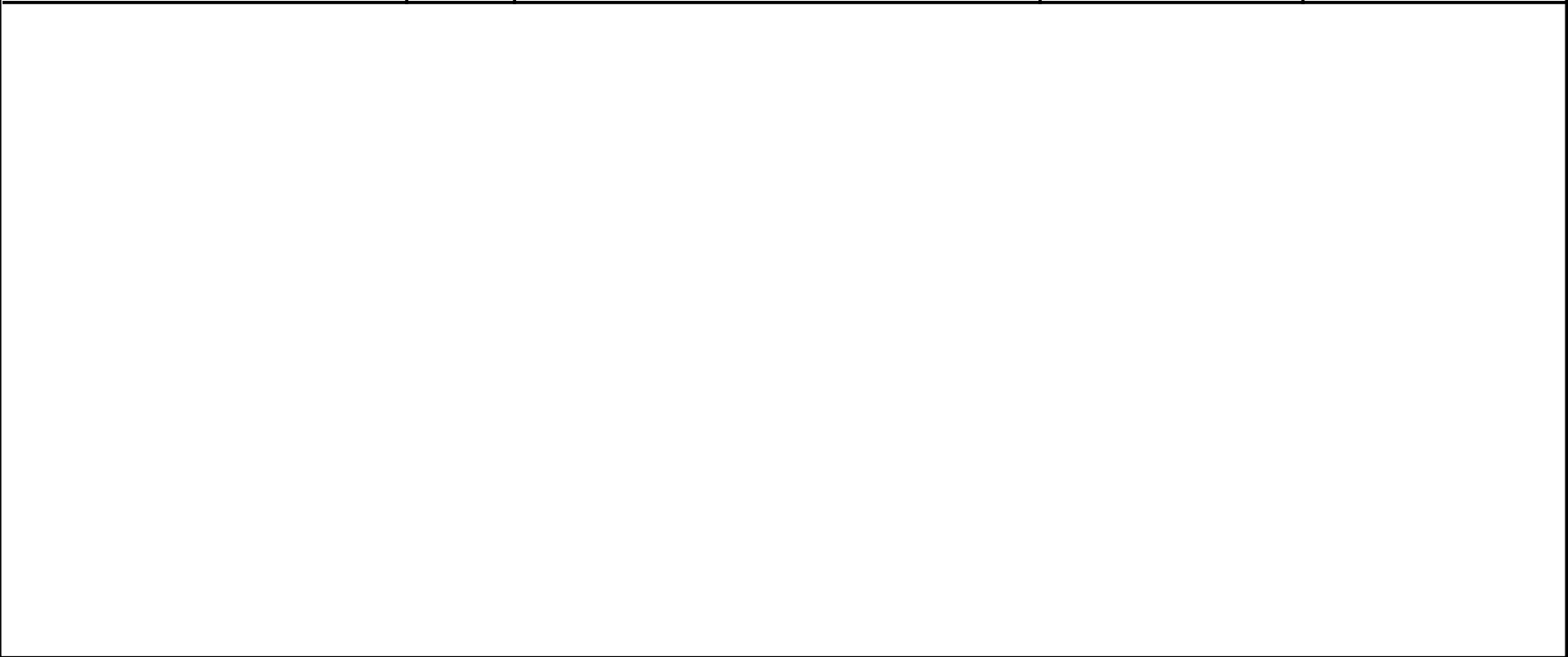
<b>24 - 49 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>							
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>							
<b>Road speed</b>							
<b>1 - 2</b>	<b>km/h</b>	<b>31 ... 36</b>	<b>33 ... 39</b>				
<b>2 - 3</b>	<b>km/h</b>	<b>62 ... 67</b>	<b>68 ... 73</b>				
<b>3 - 4</b>	<b>km/h</b>	<b>106 ... 111</b>	<b>112 ... 118</b>				
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>161 ... 166</b>	<b>170 ... 176</b>				
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>144 ... 150</b>	<b>149 ... 155</b>				
<b>4 - 3</b>	<b>km/h</b>	<b>83 ... 89</b>	<b>85 ... 91</b>				
<b>3 - 2</b>	<b>km/h</b>	<b>43 ... 49</b>	<b>43 ... 49</b>				
<b>2 - 1</b>	<b>km/h</b>	<b>20 ... 25</b>	<b>21 ... 27</b>				

<b>24 - 50 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5800 ... 6500</b>	<b>5600 ... 6400</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>5900 ... 6300</b>	<b>6000 ... 6400</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>6100 ... 6400</b>	<b>6100 ... 6400</b>		
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>	<b>6300 ... 6500</b>		
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4400 ... 4500</b>	<b>4100 ... 4200</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4400 ... 4600</b>	<b>4000 ... 4200</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3600 ... 3900</b>	<b>3600 ... 3900</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2800 ... 3100</b>	<b>2700 ... 3000</b>		

<b>24 - 51 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>33 ... 39</b>	<b>35 ... 41</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>68 ... 73</b>	<b>75 ... 81</b>		
<b>3 - 4</b>	<b>km/h</b>	<b>114 ... 119</b>	<b>124 ... 130</b>		
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>169 ... 174</b>	<b>183 ... 189</b>		
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>159 ... 164</b>	<b>173 ... 179</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>109 ... 114</b>	<b>119 ... 125</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>63 ... 68</b>	<b>70 ... 76</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>28 ... 33</b>	<b>29 ... 35</b>		

<b>24 - 52 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4100 ... 4200</b>	<b>4100 ... 4200</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4100 ... 4300</b>	<b>4000 ... 4300</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3400 ... 3600</b>	<b>3300 ... 3500</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>900 ... 1300</b>	<b>900 ... 1300</b>		
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>159 ... 164</b>	<b>173 ... 179</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>112 ... 117</b>	<b>121 ... 127</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>68 ... 73</b>	<b>72 ... 78</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>15 ... 20</b>	<b>16 ... 22</b>		
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>5 ... 7</b>	<b>5 ... 7</b>		

<b>24 - 53 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 300 J</b> <b>520i</b>	<b>E34</b> <b>A 5 S 300 J</b> <b>525i</b>		
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	236	250		
Identification		N1/N2	M1/M2		
Stall speed	rpm	2200 ... 2400	2200 ... 2400		
<b>24 61 Electronic Control Units</b>					
Code letters / code: refer to Parts Catalog					



<b>24 - 54 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 560 Z</b> <b>540i</b>			
<b>24 00 Transmission in general</b>					
Identification on data plate		<b>5 HP 30</b>			
Code letters/code on data plate or label: refer to Parts Catalog					
Manual shift					
1st gear		<b>3.55</b>			
2nd gear		<b>2.24</b>			
3rd gear		<b>1.55</b>			
4th gear		<b>1.00</b>			
5th gear		<b>0.79</b>			
Reverse gear		<b>3.68</b>			
Oil grade, Special oil - refer to Operating Fluids					
Total oil volume (transmission and torque converter drained)	approx. ltr.	<b>13.0</b>			
Oil change volume (transmission at operating temperature)	approx. ltr.	<b>5.5</b>			

**24 - 55 Automatic Transmission****E34****A 5 S 560 Z****540i****24 00 Transmission in general partial throttle  
Shift points**

Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed					
1 - 2	rpm	1795 ... 2142			
2 - 3	rpm	1908 ... 2163			
3 - 4	rpm	1946 ... 2125			
4 - 5	rpm	1959 ... 2075			
CL closed 4	rpm	3038 ... 3231			
CL opened 4	rpm	2854 ... 3045			
CL closed 5	rpm	1961 ... 2054			
CL opened 5	rpm	1892 ... 1964			



<b>24 - 56 Automatic Transmission</b>		<b>E34</b>			
		<b>A 5 S 560 Z</b>			
		<b>540i</b>			
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>13 ... 21</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>26 ... 34</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>40 ... 48</b>			
<b>4 - 5</b>	<b>km/h</b>	<b>63 ... 71</b>			
<b>CL closed 4</b>	<b>km/h</b>	<b>118 ... 126</b>			
<b>CL opened 4</b>	<b>km/h</b>	<b>110 ... 119</b>			
<b>CL closed 5</b>	<b>km/h</b>	<b>81 ... 89</b>			
<b>CL opened 5</b>	<b>km/h</b>	<b>73 ... 81</b>			

<b>24 - 57 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 560 Z</b> <b>540i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4904 ... 5591</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>5134 ... 5571</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>5135 ... 5437</b>			
<b>4 - 3</b>	<b>rpm</b>	<b>2847 ... 3007</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>5148 ... 5348</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>3271 ... 3428</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>2486 ... 2706</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2184 ... 2360</b>			

<b>24 - 58 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 560 Z</b> <b>540i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>47 ... 55</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>86 ... 94</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>130 ... 138</b>			
<b>4 - 3</b>	<b>km/h</b>	<b>100 ... 108</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>209 ... 217</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>169 ... 177</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>52 ... 60</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>23 ... 31</b>			

<b>24 - 59 Automatic Transmission</b>		<b>E34</b>			
		<b>A 5 S 560 Z</b>			
		<b>540i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>6118 ... 6801</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>6251 ... 6672</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>6188 ... 6478</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3580 ... 3780</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4379 ... 4536</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3753 ... 4045</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2883 ... 3249</b>			

<b>24 - 60 Automatic Transmission</b>		<b>E34</b>			
		<b>A 5 S 560 Z</b>			
		<b>540i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>61 ... 69</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>107 ... 115</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>159 ... 167</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>146 ... 154</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>256 ... 264</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>226 ... 234</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>92 ... 100</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 54</b>			

<b>24 - 61 Automatic Transmission</b>		<b>E34</b>			
		<b>A 5 S 560 Z</b>			
		<b>540i</b>			
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4379 ... 4536</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3580 ... 3780</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3395 ... 3710</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2357 ... 2822</b>			
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>226 ... 234</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>146 ... 154</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>92 ... 100</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 54</b>			
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>5 ... 10</b>			

<b>24 - 62 Automatic Transmission</b>		<b>E34</b> <b>A 5 S 560 Z</b> <b>540i</b>			
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	280			
Stall speed	rpm	1871 ... 2042			
<b>24 61 Electronic Control Units</b>					
Code letters / code: refer to Parts Catalog					

<b>24 - 63 Automatic Transmission</b>		<b>E32</b> <b>4HP-22 EH</b> <b>730i</b>	<b>E32</b> <b>4HP-22 EH</b> <b>735i</b>	<b>E32</b> <b>4HP-22 EH</b> <b>750i</b>	
<b>24 00 Transmission in general</b>					
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>2.48</b>			
<b>2nd gear</b>		<b>1.48</b>			
<b>3rd gear</b>		<b>1.00</b>			
<b>4th gear</b>		<b>0.73</b>			
<b>Reverse gear</b>		<b>2.09</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.5</b>		<b>8.1</b>	
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.0</b>		<b>3.0</b>	



<b>24 - 64 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>1900 ... 2200</b>	<b>2000 ...2200</b>	<b>1900 ... 2200</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>2000 ...2200</b>	<b>2100 ... 2200</b>	<b>2050 ... 2180</b>	
<b>3 - 4</b>	<b>rpm</b>	<b>2100 ... 2300</b>	<b>2170 ... 2300</b>	<b>2220 ... 2350</b>	
<b>Converter lockup clutch to 4th gear</b>	<b>rpm</b>	<b>2200 ... 2300</b>	<b>2230 ... 2300</b>	<b>2240 ... 2330</b>	
<b>Converter lock-up clutch open 4th gear</b>	<b>rpm</b>	<b>1670 ... 1820</b>	<b>1740 ... 1890</b>	<b>1740 ... 1890</b>	
<b>Converter lock-up clutch closed 3rd gear</b>	<b>rpm</b>	<b>4250 ... 4440</b>	<b>4230 ... 4450</b>	<b>-</b>	
<b>Converter lock-up clutch open 3rd gear</b>	<b>rpm</b>	<b>4000 ... 4200</b>	<b>4000 ... 4200</b>	<b>-</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>18 ... 24</b>	<b>19 ... 26</b>	<b>20 ... 28</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>33 ... 40</b>	<b>35 ... 42</b>	<b>39 ... 46</b>	
<b>3 - 4</b>	<b>km/h</b>	<b>57 ... 64</b>	<b>61 ... 68</b>	<b>71 ... 79</b>	
<b>Converter lock-up clutch closed 4th gear</b>	<b>km/h</b>	<b>80 ... 88</b>	<b>90 ... 97</b>	<b>99 ... 107</b>	

<b>24 - 65 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general partial throttle Shift points</b>					
Converter lock-up clutch open 4th gear	km/h	75 ... 81	83 ... 90	91 ... 98	
Converter lock-up clutch closed 3rd gear	km/h	135 ... 142	144 ... 150	-	
Converter lock-up clutch open 3rd gear	km/h	130 ... 137	138 ... 145	-	

<b>24 - 66 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4670 ... 5150</b>	<b>4680 ... 5200</b>	<b>3890 ... 4360</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>4800 ... 5100</b>	<b>4830 ... 5120</b>	<b>4150 ... 4440</b>	
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>4500 ... 4700</b>	<b>4640 ... 4840</b>	<b>4280 ... 4480</b>	
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>2600 ... 2750</b>	<b>2600 ... 2750</b>	<b>2330 ... 2470</b>	
<b>3 - 2</b>	<b>rpm</b>	<b>2640 ... 2760</b>	<b>2750 ... 2900</b>	<b>2480 ... 2570</b>	
<b>2 - 1</b>	<b>rpm</b>	<b>2330 ... 2450</b>	<b>2490 ... 2620</b>	<b>2410 ... 2530</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>58 ... 65</b>	<b>62 ... 69</b>	<b>55 ... 63</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>101 ... 107.5</b>	<b>107 ... 114</b>	<b>100 ... 108</b>	
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>147 ... 153</b>	<b>160 ... 167</b>	<b>162 ... 170</b>	
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>117 ... 123</b>	<b>124 ... 131</b>	<b>121 ... 128</b>	
<b>3 - 2</b>	<b>km/h</b>	<b>72 ... 78</b>	<b>76 ... 83</b>	<b>64 ... 72</b>	
<b>2 - 1</b>	<b>km/h</b>	<b>33 ... 40</b>	<b>35 ... 42</b>	<b>39 ... 46</b>	

<b>24 - 67 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D Accelerator pedal at kickdown Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5400 ... 5900</b>	<b>5460 ... 5940</b>	<b>5370 ... 5840</b>	
<b>2 - 3</b>	<b>rpm</b>	<b>5600 ... 5900</b>	<b>5670 ... 5950</b>	<b>5570 ... 5850</b>	
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>6200 ... 6400</b>	<b>6000 ... 6200</b>	<b>5820 ... 6020</b>	
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4330 ... 4480</b>	<b>4190 ... 4340</b>	<b>4070 ... 4220</b>	
<b>3 - 2</b>	<b>rpm</b>	<b>3470 ... 3660</b>	<b>3500 ... 3700</b>	<b>3490 ... 3670</b>	
<b>2 - 1</b>	<b>rpm</b>	<b>2840 ... 3100</b>	<b>2910 ... 3250</b>	<b>2920 ... 3150</b>	
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>69 ... 75</b>	<b>73 ... 80</b>	<b>80 ... 87</b>	
<b>2 - 3</b>	<b>km/h</b>	<b>120 ... 126</b>	<b>127 ... 134</b>	<b>139 ... 147</b>	
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>202 ... 209</b>	<b>208 ... 215</b>	<b>220 ... 228</b>	
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>194 ... 200</b>	<b>199 ... 206</b>	<b>212 ... 220</b>	
<b>3 - 2</b>	<b>km/h</b>	<b>104 ... 110.5</b>	<b>110 ... 117</b>	<b>121 ... 128</b>	
<b>2 - 1</b>	<b>km/h</b>	<b>55 ... 62</b>	<b>58 ... 65</b>	<b>64 ... 72</b>	

<b>24 - 68 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4330 ... 4480</b>	<b>4190 ... 4340</b>	<b>4070 ... 4220</b>	
<b>3 - 2</b>	<b>rpm</b>	<b>3180 ... 3390</b>	<b>3170 ... 3380</b>	<b>2780 ... 2990</b>	
<b>2 - 1</b>	<b>rpm</b>	<b>2220 ... 2520</b>	<b>2200 ... 2500</b>	<b>1850 ... 2170</b>	
<b>Road speed</b>					
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>194 ... 200</b>	<b>199 ... 206</b>	<b>212 ... 219</b>	
<b>3 - 2</b>	<b>km/h</b>	<b>107 ... 114</b>	<b>114 ... 121</b>	<b>112 ... 120</b>	
<b>2 - 1</b>	<b>km/h</b>	<b>52 ... 58</b>	<b>55 ... 62</b>	<b>54 ... 62</b>	
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>5.5 ... 12</b>	<b>6 ... 13</b>	<b>6 ... 14</b>	

<b>24 - 69 Automatic Transmission</b>		<b>E32 4HP-22 EH 730i</b>	<b>E32 4HP-22 EH 735i</b>	<b>E32 4HP-22 EH 750i</b>	
<b>24 00 Transmission in general Oil pressure</b>					
Pump pressure selector lever in D					
1st gear idle speed	bar	5.5 ... 7.7			
1st gear Kickdown	bar	9.0 ... 11.0			
Engine speed	approx. rpm	4000			
2nd ... 4th gear idle speed	bar	4.6 ... 6.0			
2nd - 4th gear Kickdown	bar	7.0 ... 9.0			
Reverse gear Idle	bar	11.0 ... 14.0			
Reverse gear Kickdown	bar	17.0 ... 20.0			
Converter pressure Selector lever in D and CL closed	max. bar	0.7			
<b>24 21 Input Shaft, Intermediate Shaft, Output Shaft</b>					
Axial play of input shaft	mm	0.2 ... 0.4			

<b>24 - 70 Automatic Transmission</b>		<b>E32</b> <b>4HP-22 EH</b> <b>730i</b>	<b>E32</b> <b>4HP-22 EH</b> <b>735i</b>	<b>E32</b> <b>4HP-22 EH</b> <b>750i</b>	
<b>24 31 Primary Pump</b>					
Radial clearance	mm	0.09 ... 0.14			
End float	mm	0.03 ... 0.06			
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	260		280	
Identification		D5/D7	R2 / C7	07	
Stall speed	rpm	1900 ... 2100	2100 ... 2300	2000 ... 2200	
Stapp speed 730i Kat	rpm	2000 ... 2200	-	-	
Journal Ø	mm	32			
<b>24 61 Electronic Control Units</b>					
Code letter refer to Parts Catalog					
Downshift Preventing Control Unit					
Bosch No.		0 260 002 022			

<b>24 - 71 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general</b>					
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.67</b>			
<b>2nd gear</b>		<b>2.00</b>			
<b>3rd gear</b>		<b>1.41</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.74</b>			
<b>Reverse gear</b>		<b>4.1</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.3</b>			



<b>24 - 72 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 310 Z</b> <b>730i</b>			
<b>24 00 Transmission in general partial throttle</b> <b>Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>1997 ... 2331</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>2091 ... 2275</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>2167 ... 2326</b>			
<b>4 - 5</b>	<b>rpm</b>	<b>2297 ... 2446</b>			
<b>CL closed 4</b>	<b>rpm</b>	<b>3945 ... 4135</b>			
<b>CL opened 4</b>	<b>rpm</b>	<b>3608 ... 3800</b>			
<b>CL closed 5</b>	<b>rpm</b>	<b>2112 ... 2174</b>			
<b>CL opened 5</b>	<b>rpm</b>	<b>2072 ... 2132</b>			

<b>24 - 73 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general partial throttle</b>					
<b>Shift points</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at partial throttle</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>13 ... 20</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>28 ... 36</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>45 ... 52</b>			
<b>4 - 5</b>	<b>km/h</b>	<b>72 ... 80</b>			
<b>CL closed 4</b>	<b>km/h</b>	<b>140 ... 147</b>			
<b>CL opened 4</b>	<b>km/h</b>	<b>127 ... 134</b>			
<b>CL closed 5</b>	<b>km/h</b>	<b>79 ... 86</b>			
<b>CL opened 5</b>	<b>km/h</b>	<b>74 ... 81</b>			

<b>24 - 74 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 310 Z</b> <b>730i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4932 ... 5639</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>5164 ... 5550</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>5322 ... 5594</b>			
<b>4 - 3</b>	<b>rpm</b>	<b>3258 ... 3436</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>3559 ... 3707</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3012 ... 3241</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2495 ... 2662</b>			

<b>24 - 75 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at full throttle</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>47 ... 54</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>90 ... 98</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>133 ... 140</b>			
<b>4 - 3</b>	<b>km/h</b>	<b>107 ... 114</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>231 ... 238</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>176 ... 183</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>68 ... 75</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>29 ... 37</b>			

**24 - 76 Automatic Transmission**

**E32**  
**A 5 S 310 Z**  
**730i**

**24 00 Transmission in general Shift Points, Kickdown**

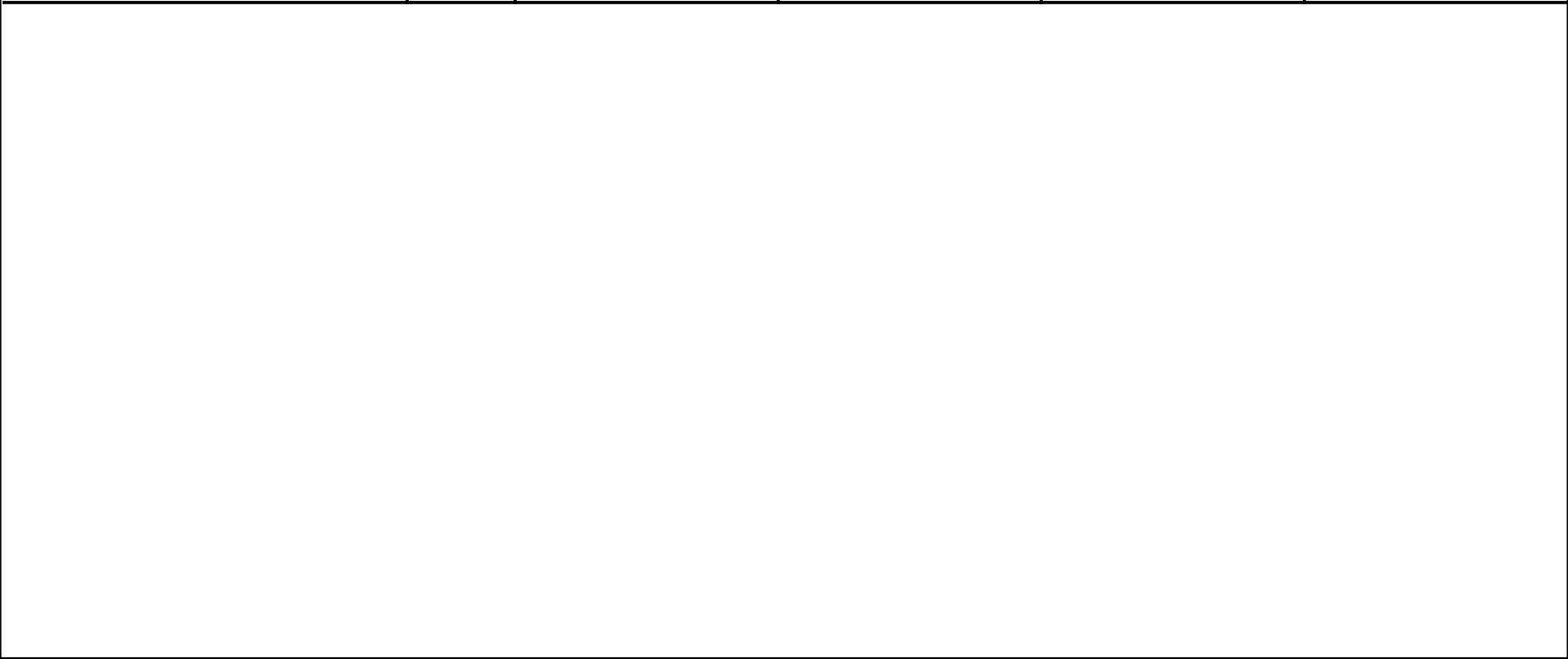
Program E, selector lever in D  
 Accelerator pedal at kickdown  
 Shift point at engine speed

1 - 2	rpm	5723 ... 6415			
2 - 3	rpm	6082 ... 6459			
3 - 4	rpm	6224 ... 6489			
CL closed 4 - 3	rpm	4028 ... 4228			
CL closed 4 - 5	rpm	6300 ... 6500			
CL closed 5 - 4	rpm	4413 ... 4562			
3 - 2	rpm	4024 ... 4296			
2 - 1	rpm	2884 ... 3187			

<b>24 - 77 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>55 ... 62</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>108 ... 115</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>157 ... 165</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>148 ... 155</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>231 ... 238</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>218 ... 226</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>97 ... 105</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 52</b>			

<b>24 - 78 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4413 ... 4562</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4028 ... 4228</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3622 ... 3907</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2262 ... 2688</b>			
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>218 ... 226</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>148 ... 155</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>97 ... 105</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 52</b>			
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>8.2 ... 10.6</b>			

<b>24 - 79 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 40 Torque Converter</b>					
<b>Torque converter Ø</b>	<b>mm</b>	<b>260</b>			
<b>Identification</b>		<b>A 11</b>			
<b>Stall speed</b>	<b>rpm</b>	<b>2075 ... 2275</b>			
<b>24 61 Electronic Control Units</b>					
<b>Code letter</b> <b>refer to Parts Catalog</b>					





<b>24 - 80 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 560 Z</b> <b>740i</b>			
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>5 HP 30</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.55</b>			
<b>2nd gear</b>		<b>2.24</b>			
<b>3rd gear</b>		<b>1.54</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.79</b>			
<b>Reverse gear</b>		<b>3.68</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>13.0</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>5.5</b>			

<b>24 - 81 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 560 Z</b>			
		<b>740i</b>			
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>1767 ... 2117</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>1875 ... 2137</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>1910 ... 2101</b>			
<b>4 - 5</b>	<b>rpm</b>	<b>1927 ... 2049</b>			
<b>CL closed 4</b>	<b>rpm</b>	<b>3022 ... 3215</b>			
<b>CL opened 4</b>	<b>rpm</b>	<b>2838 ... 3029</b>			
<b>CL closed 5</b>	<b>rpm</b>	<b>1930 ... 2025</b>			
<b>CL opened 5</b>	<b>rpm</b>	<b>1860 ... 1934</b>			

<b>24 - 82 Automatic Transmission</b>	<b>E32</b> <b>A 5 S 560 Z</b> <b>740i</b>			
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<b>24 00 Transmission in general partial throttle Shift points</b>				
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<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
1 - 2	km/h	13 ... 21			
2 - 3	km/h	26 ... 34			
3 - 4	km/h	40 ... 48			
4 - 5	km/h	63 ... 71			
CL closed 4	km/h	118 ... 126			
CL opened 4	km/h	110 ... 119			
CL closed 5	km/h	81 ... 89			
CL opened 5	km/h	73 ... 81			

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<b>24 - 83 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 560 Z</b> <b>740i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
1 - 2	rpm	4304 ... 4991			
2 - 3	rpm	4934 ... 5371			
3 - 4	rpm	5135 ... 5437			
4 - 3	rpm	3001 ... 3161			
CL closed 4 - 5	rpm	5148 ... 5348			
CL closed 5 - 4	rpm	3497 ... 3655			
3 - 2	rpm	2812 ... 3059			
2 - 1	rpm	2313 ... 2567			

**24 - 84 Automatic Transmission**

**E32**  
**A 5 S 560 Z**  
**740i**

**24 00 Transmission in general full throttle Shift points**

Program E, selector lever in D  
 Accelerator pedal at full throttle  
 Shift point at engine speed

Road speed

1 - 2

km/h

47 ... 55

2 - 3

km/h

86 ... 94

3 - 4

km/h

130 ... 138

4 - 3

km/h

108 ... 116

CL closed 4 - 5

km/h

209 ... 217

CL closed 5 - 4

km/h

181 ... 189

3 - 2

km/h

64 ... 72

2 - 1

km/h

30 ... 38

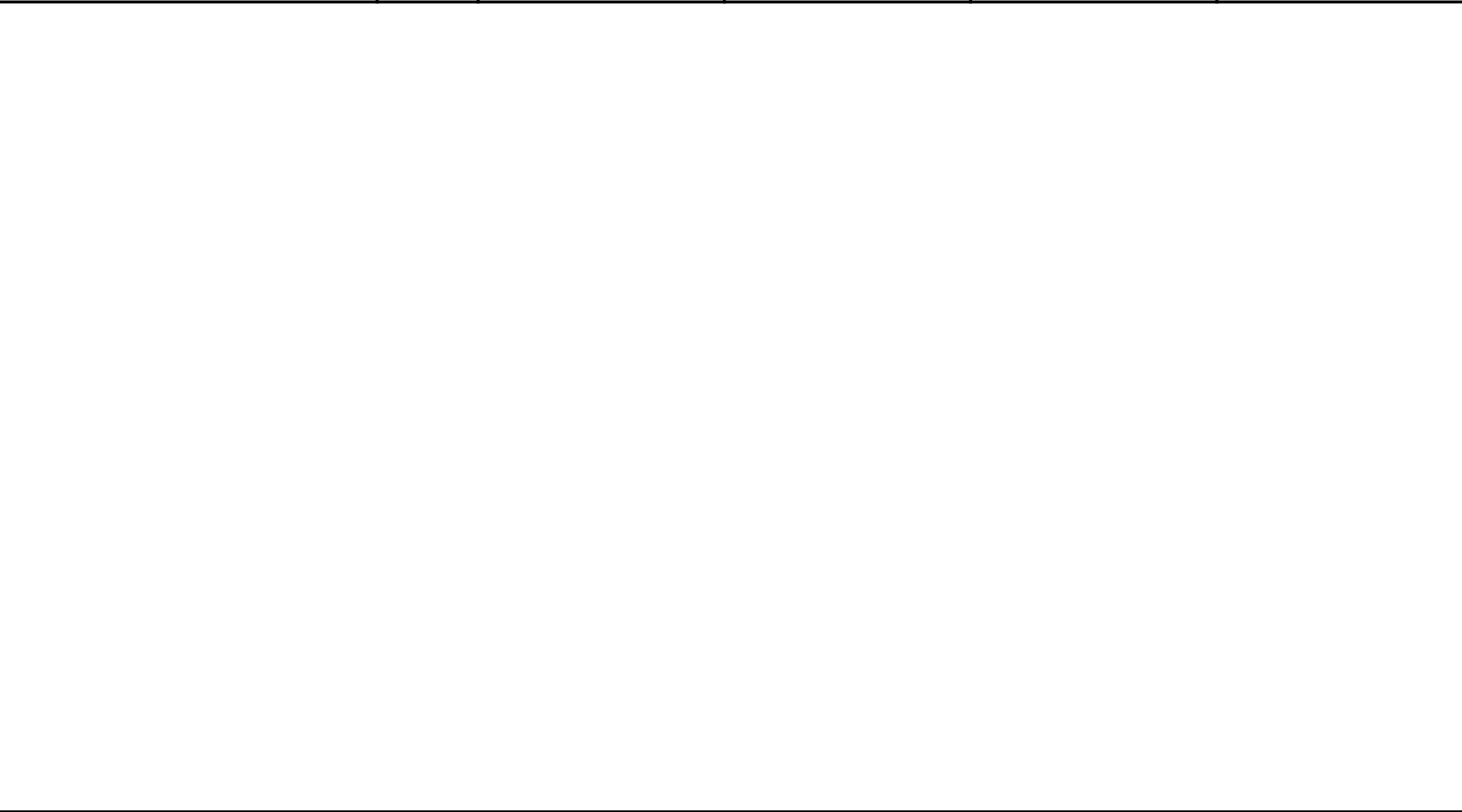
<b>24 - 85 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 560 Z</b> <b>740i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5518 ... 6201</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>6051 ... 6472</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>6188 ... 6478</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3612 ... 3812</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6108 ... 6308</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4379 ... 4536</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3845 ... 4141</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2883 ... 3249</b>			

<b>24 - 86 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 560 Z</b>			
		<b>740i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>61 ... 69</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>107 ... 115</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>159 ... 167</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>147 ... 155</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>248 ... 256</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>226 ... 234</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>95 ... 103</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 54</b>			

<b>24 - 87 Automatic Transmission</b>		<b>E32</b>			
		<b>A 5 S 560 Z</b>			
		<b>740i</b>			
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4379 ... 4536</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3612 ... 3812</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3494 ... 3807</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2353 ... 2818</b>			
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>226 ... 234</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>147 ... 155</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>95 ... 103</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>45 ... 54</b>			
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>9 ... 12</b>			



<b>24 - 88 Automatic Transmission</b>		<b>E32</b> <b>A 5 S 560 Z</b> <b>740i</b>			
<b>24 40 Torque Converter</b>					
<b>Stall speed</b>	<b>rpm</b>	<b>1871 ... 2042</b>			



<b>24 - 89 Automatic Transmission</b>		<b>E31</b>			
		<b>4HP-24</b>			
<b>24 00 Transmission in general</b>					
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>2.48</b>			
<b>2nd gear</b>		<b>1.48</b>			
<b>3rd gear</b>		<b>1.00</b>			
<b>4th gear</b>		<b>0.73</b>			
<b>Reverse gear</b>		<b>2.09</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>8.1</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.0</b>			

<b>24 - 90 Automatic Transmission</b>		<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>ECE, Japan, Aus.</b>	<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>US</b>		
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at partial throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2100 ... 2300</b>	<b>1900 ... 2200</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>2200 ... 2300</b>	<b>2100 ... 2300</b>		
<b>3 - 4</b>	<b>rpm</b>	<b>2300 ... 2400</b>	<b>2000 ... 2100</b>		
<b>CL closed 4</b>	<b>rpm</b>	<b>2200 ... 2300</b>	<b>2000 ... 2100</b>		
<b>CL opened 4</b>	<b>rpm</b>	<b>2100 ... 2300</b>	<b>1900 ... 2000</b>		
<b>CL closed 3</b>	<b>rpm</b>	<b>3000 ... 3200</b>	<b>3000 ... 3200</b>		
<b>CL opened 3</b>	<b>rpm</b>	<b>2900 ... 3100</b>	<b>2800 ... 3000</b>		
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>20 ... 28</b>	<b>18 ... 25</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>42 ... 50</b>	<b>38 ... 45</b>		
<b>3 - 4</b>	<b>km/h</b>	<b>71 ... 79</b>	<b>49 ... 56</b>		
<b>CL closed 4</b>	<b>km/h</b>	<b>85 ... 92</b>	<b>94 ... 100</b>		
<b>CL opened 4</b>	<b>km/h</b>	<b>78 ... 86</b>	<b>68 ... 75</b>		
<b>CL closed 3</b>	<b>km/h</b>	<b>108 ... 117</b>	<b>65 ... 71</b>		
<b>CL opened 3</b>	<b>km/h</b>	<b>101 ... 108</b>	<b>88 ... 94</b>		

<b>24 - 91 Automatic Transmission</b>		<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>ECE, Japan, Aus.</b>	<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>US</b>		
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4300 ... 4700</b>	<b>4200 ... 4700</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>5300 ... 5500</b>	<b>5200 ... 5500</b>		
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>4700 ... 4900</b>	<b>4400 ... 4600</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3400 ... 3500</b>	<b>2900 ... 3100</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>2700 ... 2800</b>	<b>2500 ... 2600</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2500 ... 2600</b>	<b>2200 ... 2300</b>		
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>62 ... 69</b>	<b>53 ... 59</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>130 ... 138</b>	<b>111 ... 118</b>		
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>175 ... 183</b>	<b>143 ... 150</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>155 ... 163</b>	<b>118 ... 124</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>78 ... 86</b>	<b>67 ... 73</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>39 ... 46</b>	<b>33 ... 39</b>		

<b>24 - 92 Automatic Transmission</b>		<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>ECE, Japan, Aus.</b>	<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>US</b>		
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5000 ... 5400</b>	<b>4900 ... 5400</b>		
<b>2 - 3</b>	<b>rpm</b>	<b>5400 ... 5700</b>	<b>5400 ... 5700</b>		
<b>CL closed 3 - 4</b>	<b>rpm</b>	<b>5700 ... 5900</b>	<b>5700 ... 5900</b>		
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4300 ... 4400</b>	<b>4200 ... 4400</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3400 ... 3600</b>	<b>3300 ... 3500</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>2900 ... 3100</b>	<b>2700 ... 2900</b>		
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>72 ... 80</b>	<b>62 ... 68</b>		
<b>2 - 3</b>	<b>km/h</b>	<b>135 ... 143</b>	<b>115 ... 122</b>		
<b>CL closed 3 - 4</b>	<b>km/h</b>	<b>212 ... 220</b>	<b>184 ... 190</b>		
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>206 ... 214</b>	<b>179 ... 185</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>114 ... 122</b>	<b>99 ... 106</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>59 ... 67</b>	<b>50 ... 57</b>		

<b>24 - 93 Automatic Transmission</b>		<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>ECE, Japan, Aus.</b>	<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>US</b>		
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4000 ... 4200</b>	<b>3900 ... 4100</b>		
<b>3 - 2</b>	<b>rpm</b>	<b>3000 ... 3200</b>	<b>2800 ... 3000</b>		
<b>2 - 1</b>	<b>rpm</b>	<b>1800 ... 2200</b>	<b>1800 ... 2200</b>		
<b>Road speed</b>					
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>206 ... 214</b>	<b>175 ... 181</b>		
<b>3 - 2</b>	<b>km/h</b>	<b>112 ... 118</b>	<b>96 ... 102</b>		
<b>2 - 1</b>	<b>km/h</b>	<b>54 ... 62</b>	<b>46 ... 53</b>		
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>6 ... 10</b>	<b>5 ... 8</b>		

<b>24 - 94 Automatic Transmission</b>		<b>E31</b>			
		<b>4HP-24</b>			
<b>24 00 Transmission in general oil pressure</b>					
<b>Pump pressure selector lever in D</b>					
<b>1st gear idle speed</b>	<b>bar</b>	<b>5.5 ... 7.7</b>			
<b>1st gear Kickdown</b>	<b>bar</b>	<b>9.0 ... 11.0</b>			
<b>Engine speed</b>	<b>approx. rpm</b>	<b>4000</b>			
<b>2nd - 4th gear idle speed</b>	<b>bar</b>	<b>4.6 ... 6.0</b>			
<b>2nd - 4th gear Kickdown</b>	<b>bar</b>	<b>7.0 ... 9.0</b>			
<b>Reverse gear Idle</b>	<b>bar</b>	<b>11.0 ... 14.0</b>			
<b>Reverse gear Kickdown</b>	<b>bar</b>	<b>17.0 ... 20.0</b>			
<b>Converter pressure Selector lever in D and CL closed</b>	<b>max. bar</b>	<b>0.7</b>			
<b>24 21 Input Shaft, Intermediate Shaft, Output Shaft</b>					
<b>Axial play of input shaft</b>	<b>mm</b>	<b>0.2 ... 0.4</b>			

<b>24 - 95 Automatic Transmission</b>		<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>ECE, Japan, Aus.</b>	<b>E31</b> <b>4HP-24</b> <b>850Ci</b> <b>US</b>		
<b>24 31 Primary Pump</b>					
Radial clearance	mm	0.09 ... 0.14			
End float	mm	0.03 ... 0.06			
<b>24 40 Torque Converter</b>					
Torque converter Ø	mm	280			
Identification		07			
Stall speed	rpm	2100 ... 2300	1000 ... 2000		
Journal Ø	mm	32			
<b>24 61 Electronic Control Units</b>					
Code letter refer to Parts Catalog					



<b>24 - 96 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general</b>					
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.66</b>			
<b>2nd gear</b>		<b>2.00</b>			
<b>3rd gear</b>		<b>1.41</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.74</b>			
<b>Reverse gear</b>		<b>4.1</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.3</b>			

<b>24 - 97 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general partial throttle</b>					
<b>Shift points</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at partial throttle</b>					
<b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>2080 ... 2370</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>2160 ... 2330</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>2200 ... 2320</b>			
<b>4 - 5</b>	<b>rpm</b>	<b>2340 ... 2470</b>			
<b>CL closed 4</b>	<b>rpm</b>	<b>4080 ... 4270</b>			
<b>CL opened 4</b>	<b>rpm</b>	<b>3570 ... 3750</b>			
<b>CL closed 5</b>	<b>rpm</b>	<b>2180 ... 2440</b>			
<b>CL opened 5</b>	<b>rpm</b>	<b>2150 ... 2210</b>			

<b>24 - 98 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>14 ... 21</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>30 ... 37</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>45 ... 52</b>			
<b>4 - 5</b>	<b>km/h</b>	<b>76 ... 83</b>			
<b>CL closed 4</b>	<b>km/h</b>	<b>153 ... 160</b>			
<b>CL opened 4</b>	<b>km/h</b>	<b>132 ... 139</b>			
<b>CL closed 5</b>	<b>km/h</b>	<b>83 ... 91</b>			
<b>CL opened 5</b>	<b>km/h</b>	<b>78 ... 86</b>			

<b>24 - 99 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 310 Z</b> <b>730i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>4930 ... 5640</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>5160 ... 5550</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>5320 ... 5590</b>			
<b>4 - 3</b>	<b>rpm</b>	<b>3260 ... 3440</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>3040 ... 3190</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>2780 ... 2950</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2390 ... 2530</b>			

<b>24 - 100 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at full throttle</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>50 ... 57</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>96 ... 103</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>140 ... 148</b>			
<b>4 - 3</b>	<b>km/h</b>	<b>113 ... 121</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>245 ... 252</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>159 ... 167</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>62 ... 70</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>25 ... 33</b>			

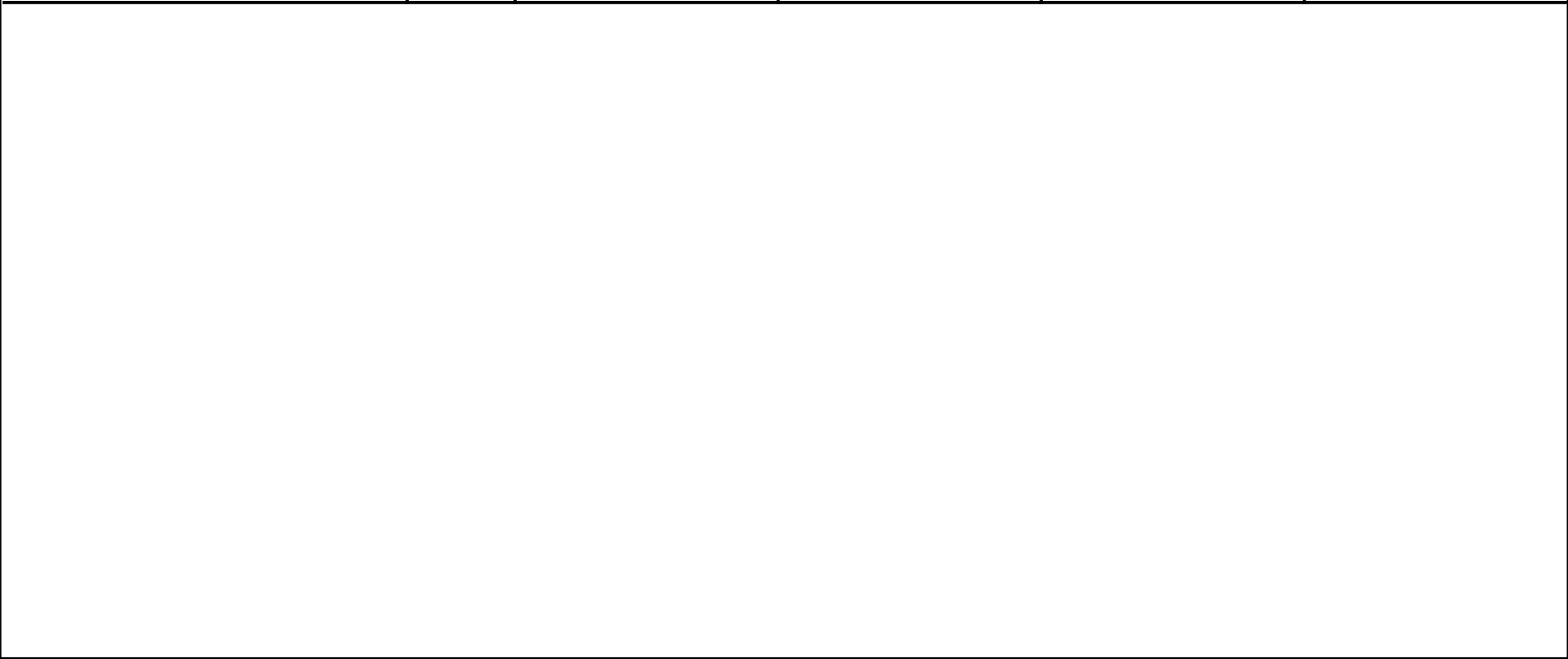
<b>24 - 101 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>5720 ... 6420</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>6080 ... 6460</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>6220 ... 6490</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4030 ... 4230</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4410 ... 4560</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>4020 ... 4300</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2880 ... 3190</b>			

<b>24 - 102 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at kickdown</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>58 ... 66</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>114 ... 122</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>166 ... 174</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>156 ... 164</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>245 ... 252</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>231 ... 239</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>103 ... 111</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>47 ... 55</b>			

<b>24 - 103 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4410 ... 4560</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>4030 ... 4230</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3600 ... 3900</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2240 ... 2670</b>			
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>231 ... 239</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>156 ... 164</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>102 ... 111</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>47 ... 55</b>			
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>9 ... 11</b>			



<b>24 - 104 Automatic Transmission</b>		<b>E38</b>			
		<b>A 5 S 310 Z</b>			
		<b>730i</b>			
<b>24 40 Torque converter</b>					
<b>Torque converter Ø</b>	<b>mm</b>	<b>260</b>			
<b>Identification</b>		<b>E 18</b>			
<b>Stall speed</b>	<b>rpm</b>	<b>2070 ... 2270</b>			
<b>24 61 Electronic control units</b>					
<b>Code letter refer to Parts Catalog</b>					



<b>24 - 105 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general</b>					
<b>Designation old</b>		<b>5 HP 30</b>			
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.55</b>			
<b>2nd gear</b>		<b>2.24</b>			
<b>3rd gear</b>		<b>1.54</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.79</b>			
<b>Reverse gear</b>		<b>3.68</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>13.1</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>5.5</b>			

<b>24 - 106 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general partial throttle Shift points</b>					
<b>Program E, selector lever in D Accelerator pedal at partial throttle Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>1750 ... 2020</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>1830 ... 2050</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>1890 ... 2060</b>			
<b>4 - 5</b>	<b>rpm</b>	<b>1920 ... 2030</b>			
<b>CL closed 4</b>	<b>rpm</b>	<b>2670 ... 2860</b>			
<b>CL opened 4</b>	<b>rpm</b>	<b>2500 ... 2680</b>			
<b>CL closed 5</b>	<b>rpm</b>	<b>2220 ... 2340</b>			
<b>CL opened 5</b>	<b>rpm</b>	<b>1890 ... 1960</b>			

<b>24 - 107 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general partial throttle</b>					
<b>Shift points</b>					
<b>Program E, selector lever in D</b>					
<b>Accelerator pedal at partial throttle</b>					
<b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>		<b>10 ... 18</b>		
<b>2 - 3</b>	<b>km/h</b>		<b>21 ... 29</b>		
<b>3 - 4</b>	<b>km/h</b>		<b>35 ... 42</b>		
<b>4 - 5</b>	<b>km/h</b>		<b>56 ... 63</b>		
<b>CL closed 4</b>	<b>km/h</b>		<b>95 ... 103</b>		
<b>CL opened 4</b>	<b>km/h</b>		<b>88 ... 96</b>		
<b>CL closed 5</b>	<b>km/h</b>		<b>95 ... 103</b>		
<b>CL opened 5</b>	<b>km/h</b>		<b>68 ... 75</b>		

<b>24 - 108 Automatic Transmission</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
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<b>24 00 Transmission in general full throttle Shift points</b>				
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Program E, selector lever in D Accelerator pedal at full throttle Shift point at engine speed				
1 - 2	rpm	5340 ...6040		
2 - 3	rpm	5480 ... 5920		
3 - 4	rpm	5430 ... 5730		
4 - 3	rpm	2670 ... 2830		
CL closed 4 - 5	rpm	5340 ... 5540		
CL closed 5 - 4	rpm	2740 ... 2900		
3 - 2	rpm	2280 ... 2440		
2 - 1	rpm	2110 ... 2240		

<b>24 - 109 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general full throttle Shift points</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at full throttle</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>48 ... 56</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>86 ... 93</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>128 ... 136</b>			
<b>4 - 3</b>	<b>km/h</b>	<b>85 ... 92</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>202 ... 209</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>132 ... 139</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>39 ... 46</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>17 ... 24</b>			

<b>24 - 110 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>1 - 2</b>	<b>rpm</b>	<b>6120 ... 6800</b>			
<b>2 - 3</b>	<b>rpm</b>	<b>6250 ... 6670</b>			
<b>3 - 4</b>	<b>rpm</b>	<b>6100 ... 6390</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3450 ... 3650</b>			
<b>CL closed 4 - 5</b>	<b>rpm</b>	<b>6300 ... 6500</b>			
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4660 ... 4810</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3660 ... 3950</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2660 ... 3010</b>			

<b>24 - 111 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general Shift Points, Kickdown</b>					
<b>Program E, selector lever in D</b> <b>Accelerator pedal at kickdown</b> <b>Shift point at engine speed</b>					
<b>Road speed</b>					
<b>1 - 2</b>	<b>km/h</b>	<b>57 ... 64</b>			
<b>2 - 3</b>	<b>km/h</b>	<b>99 ... 107</b>			
<b>3 - 4</b>	<b>km/h</b>	<b>145 ... 153</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>131 ... 138</b>			
<b>CL closed 4 - 5</b>	<b>km/h</b>	<b>238 ... 246</b>			
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>224 ... 231</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>83 ... 91</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>37 ... 45</b>			



<b>24 - 112 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 00 Transmission in general Manual shift points</b>					
<b>Shift point at engine speed</b>					
<b>CL closed 5 - 4</b>	<b>rpm</b>	<b>4660 ... 4810</b>			
<b>CL closed 4 - 3</b>	<b>rpm</b>	<b>3450 ... 3650</b>			
<b>3 - 2</b>	<b>rpm</b>	<b>3290 ... 3610</b>			
<b>2 - 1</b>	<b>rpm</b>	<b>2040 ... 2530</b>			
<b>Road speed</b>					
<b>CL closed 5 - 4</b>	<b>km/h</b>	<b>224 ... 231</b>			
<b>CL closed 4 - 3</b>	<b>km/h</b>	<b>131 ... 138</b>			
<b>3 - 2</b>	<b>km/h</b>	<b>83 ... 91</b>			
<b>2 - 1</b>	<b>km/h</b>	<b>37 ... 45</b>			
<b>Reverse gear interlock</b>					
<b>Road speed</b>	<b>km/h</b>	<b>5 ... 10</b>			

<b>24 - 113 Automatic Transmission</b>		<b>E38</b> <b>A 5 S 560 Z</b> <b>740i</b>	<b>E38</b> <b>A 5 S 560 Z</b> <b>740iL</b>		
<b>24 40 Torque Converter</b>					
<b>Stall speed</b>	<b>rpm</b>	<b>1870 ... 2040</b>			

<b>24 - 114 Automatic Transmission</b>		<b>E39</b> <b>A 5 S 310 Z</b>			
<b>24 00 Transmission in general</b>					
<b>Code letters/code on data plate or label: refer to Parts Catalog</b>					
<b>Manual shift</b>					
<b>1st gear</b>		<b>3.66</b>			
<b>2nd gear</b>		<b>2.00</b>			
<b>3rd gear</b>		<b>1.41</b>			
<b>4th gear</b>		<b>1.00</b>			
<b>5th gear</b>		<b>0.74</b>			
<b>Reverse gear</b>		<b>4.1</b>			
<b>Oil grade, refer to Operating Fluids</b>					
<b>Total oil volume (transmission and torque converter drained)</b>	<b>approx. ltr.</b>	<b>7.8</b>			
<b>Oil change volume (transmission at operating temperature)</b>	<b>approx. ltr.</b>	<b>3.3</b>			

<b>24 - 115 Automatic Transmission</b>		<b>E39</b> <b>A 5 S 310 Z</b>			
<b>24 40 Torque converter</b>					
<b>Stall speed</b>	<b>rpm</b>	<b>2070 ... 2270</b>			
<b>24 61 Electronic control units</b>					
<b>Code letter</b> <b>refer to Parts Catalog</b>					

**26 - 1 Propeller Shaft****26 00 Propeller Shaft in General**

Grease for slide

Molykote Longtherm 2

Grease for constant velocity joint

Optimol

Volume of grease for velocity joints

g

80

<b>26 - 2 Propeller Shaft</b>		<b>E34 M20</b>	<b>E34 M21</b>	<b>E34 M40</b>	
<b>26 11 Propeller Shaft Complete</b>					
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>			
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>			
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 30' ... +0° 30'</b>	<b>-0° 30' ... +0° 30'</b>	<b>-0° 39' ... +0°21'</b>	
<b>Deflection angle center mount (front)</b>		<b>-0° 58' ... +0° 02'</b>	<b>-0° 44' ... +0° 16'</b>	<b>-0° 28' ... +0° 32'</b>	
<b>Deflection angle center mount (rear)</b>		<b>-</b>	<b>-</b>	<b>-0° 39' ... +0°21'</b>	
<b>Deflection angle propeller shaft/ final drive</b>		<b>-0° 18' ... +0° 42'</b>	<b>-0° 05' ... +0° 55'</b>	<b>+0° 26' ... +1° 26'</b>	
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>					

<b>26 - 3 Propeller Shaft</b>		<b>E34</b> <b>M30</b> <b>530I</b>	<b>E34</b> <b>M30</b> <b>535I</b>	<b>E34</b> <b>M30</b>	<b>E34</b> <b>M5</b>
<b>26 11 Propeller Shaft Complete</b>					
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>			
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>			
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 28' ... +0° 32'</b>			
<b>Deflection angle of center mount</b>		<b>-1° 04' ... -0° 04'</b>			
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 29' ... +1° 29'</b>	<b>+0° 47' ... +1° 47'</b>		
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>					

<b>26 - 4 Propeller Shaft</b>		<b>E34</b>	<b>E34</b>	<b>E34</b>	<b>E34</b>		
		<b>M50</b>	<b>M51</b>	<b>M50</b>	<b>M50</b>		
		<b>520i</b>		<b>525i</b>	<b>525iX</b>		
<b>26 11 Propeller Shaft Complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 31' ... +0° 29'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 41' ... +0° 19'</b>			
<b>Deflection angle of center mount</b>		<b>-0° 59' ... +0° 01'</b>	<b>-1° 03' ... -0° 03'</b>	<b>-0° 29' ... +0° 31'</b>			
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 45' ... +1° 45'</b>	<b>+0° 49' ... +1° 49'</b>	<b>+0° 43' ... +1° 43'</b>			
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							



<b>26 - 5 Propeller Shaft</b>		<b>E34</b> <b>M60/1</b> <b>530i</b> <b>Manual/ Automatic Transmission</b>	<b>E34</b> <b>M60/2</b> <b>540i</b> <b>Manual Transmission</b>	<b>E34</b> <b>M60/2</b> <b>540i</b> <b>Automatic Transmission</b>			
<b>26 11 Propeller Shaft Complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 31' ... +0° 29'</b>	<b>-0° 58' ... -0° 02'</b>	<b>-0° 26' ... +0° 34'</b>			
<b>Deflection angle of center mount</b>		<b>-1° 03' ... -0° 03'</b>	<b>-1° 29' ... -0° 29'</b>	<b>-1° 15' ... -0° 05'</b>			
<b>Deflection angle propeller shaft/ final drive</b>		<b>+0° 49' ... +1° 49'</b>	<b>+0° 46' ... +1° 46'</b>	<b>+0° 46' ... +1° 46'</b>			
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 6 Propeller Shaft</b>		<b>E38</b> <b>725tds</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>725tds</b> <b>Automatic</b> <b>Transmission</b>	<b>E38</b> <b>728i</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>728i</b> <b>Automatic</b> <b>Transmission</b>	<b>E38</b> <b>M60/1</b> <b>730i</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>M60/1</b> <b>730i</b> <b>Automatic</b> <b>Transmission</b>
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 30' ... +0° 30'</b>	<b>-0° 30' ... +0° 30'</b>	<b>-0° 27' ... +0° 33'</b>	<b>-0° 30' ... +0° 30'</b>	<b>-0° 26' ... +0° 34'</b>	<b>-0° 29' ... +0° 31'</b>
<b>Deflection angle of center mount</b>		<b>-1° 07' ... -0° 07'</b>	<b>-1° 04' ... -0° 04'</b>	<b>-1° 09' ... -0° 09'</b>	<b>-1° 04' ... -0° 04'</b>	<b>-1° 13' ... -0° 13'</b>	<b>-1° 08' ... -0° 08'</b>
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 06' ... +2° 06'</b>	<b>+1° 04' ... +2° 04'</b>	<b>+1° 06' ... +2° 06'</b>	<b>+1° 04' ... +2° 04'</b>	<b>+1° 09' ... +2° 09'</b>	<b>+1° 07' ... +2° 07'</b>
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 7 Propeller Shaft</b>		<b>E38</b> <b>M62</b> <b>735i</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>M62</b> <b>735i</b> <b>Automatic</b> <b>Transmission</b>	<b>E38</b> <b>M60/2</b> <b>740i</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>M60/2</b> <b>740i</b> <b>Automatic</b> <b>Transmission</b>	<b>E38</b> <b>M62</b> <b>740i</b> <b>Manual</b> <b>Transmission</b>	<b>E38</b> <b>M62</b> <b>740i</b> <b>Automatic</b> <b>Transmission</b>
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>
<b>Deflection angle of center mount</b>		<b>-1° 14' ... -0° 14'</b>	<b>-1° 06' ... -0° 06'</b>	<b>-1° 13' ... -0° 13'</b>	<b>-1° 14' ... -0° 14'</b>	<b>-1° 10' ... -0° 10'</b>	<b>-1° 10' ... -0° 10'</b>
<b>Deflection angle propeller shaft/final drive</b>		<b>+1° 13' ... +2° 13'</b>	<b>+1° 06' ... +2° 06'</b>	<b>+1° 13' ... +2° 13'</b>	<b>+1° 13' ... +2° 13'</b>	<b>+1° 10' ... +2° 10'</b>	<b>+1° 10' ... +2° 10'</b>
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 8 Propeller Shaft</b>		<b>E38</b>					
		<b>750i</b>					
		<b>Automatic Transmission</b>					
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 29' ... +0° 31'</b>					
<b>Deflection angle of center mount</b>		<b>-1° 14' ... -0° 14'</b>					
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 13' ... +2° 13'</b>					
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 9 Propeller Shaft</b>		<b>E38</b> <b>728iL</b> <b>Automatic Transmission</b>	<b>E38</b> <b>M60/1</b> <b>730iL</b> <b>Manual Transmission</b>	<b>E38</b> <b>M60/1</b> <b>730iL</b> <b>Automatic Transmission</b>	<b>E38</b> <b>M62</b> <b>735iL</b> <b>Automatic Transmission</b>	<b>E38</b> <b>M60/2</b> <b>740iL</b> <b>Automatic Transmission</b>	<b>E38</b> <b>M62</b> <b>740iL</b> <b>Automatic Transmission</b>
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 30' ... +0° 30'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>	<b>-0° 29' ... +0° 31'</b>
<b>Deflection angle of center mount</b>		<b>-0° 30' ... +0° 30'</b>	<b>-0° 42' ... +0° 18'</b>	<b>-0° 41' ... +0° 19'</b>	<b>-0° 30' ... +0° 30'</b>	<b>-0° 44' ... +0° 16'</b>	<b>-0° 45' ... +0° 15'</b>
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 30' ... +1° 30'</b>	<b>+0° 41' ... +1° 41'</b>	<b>+0° 40' ... +1° 40'</b>	<b>+0° 29' ... +1° 29'</b>	<b>+0° 43' ... +1° 43'</b>	<b>+0° 43' ... +1° 43'</b>
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 10 Propeller Shaft</b>		<b>E38</b> <b>750iL</b> <b>Automatic Transmission</b>	<b>E38</b> <b>L7</b> <b>Automatic Transmission</b>				
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>					
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 29' ... +0° 31'</b>	<b>-0° 11' ... +0° 49'</b>				
<b>Deflection angle of center mount</b>		<b>-0° 45' ... +0° 15'</b>	<b>-0° 47' ... +0° 13'</b>				
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 43' ... +1° 43'</b>	<b>+0° 28' ... +1° 28'</b>				
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 11 Propeller Shaft</b>		<b>E32</b> <b>M30</b> <b>Manual Transmission</b>	<b>E32</b> <b>M30</b> <b>Automatic Transmission</b>	<b>E32</b> <b>M70</b> <b>Automatic Transmission</b>	
<b>26 11 Propeller Shaft Complete</b>					
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>			
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>			
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 23' ... +0° 37'</b>	<b>-0° 21' ... +0° 39'</b>	<b>-0° 17' ... +0° 43'</b>	
<b>Deflection angle of center mount</b>		<b>-0° 46' ... +0° 14'</b>	<b>-0° 48' ... +0° 12'</b>	<b>-1° 08' ... -0° 08'</b>	
<b>Deflection angle propeller shaft/final drive</b>		<b>-0° 10' ... +0° 50'</b>	<b>-0° 10' ... +0° 50'</b>	<b>+0° 40' ... +1° 40'</b>	
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>					

<b>26 - 12 Propeller Shaft</b>		<b>E32</b> <b>M60/2</b> <b>740i</b> <b>6 Speed Manual</b> <b>Transmission</b>	<b>E32</b> <b>M60/1</b> <b>730i</b> <b>Automatic</b> <b>Transmission</b>	<b>E32</b> <b>M60/2</b> <b>740i</b> <b>Automatic</b> <b>Transmission</b>	
<b>26 11 Propeller Shaft Complete</b>					
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>			
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>			
<b>Deflection angle transmission/propeller shaft</b>		<b>0° 0' ... +1° 0'</b>	<b>-0° 03' ... +0° 57'</b>	<b>-0° 16' ... +0° 07'</b>	
<b>Deflection angle of center mount</b>		<b>-1° 02' ... +0° 02'</b>	<b>-1° 01' ... +0° 01'</b>	<b>-1° 07' ... -0° 07'</b>	
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 37' ... +1° 37'</b>	<b>+0° 38' ... +1° 38'</b>	<b>+0° 40' ... +1° 40'</b>	
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>					



<b>26 - 13 Propeller Shaft</b>	<b>E31</b> <b>M70</b>	<b>E31</b> <b>M73</b>		
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<b>26 11 Propeller Shaft Complete</b>				
Deflection torque of universal joints	Ncm	20 ... 70		
Preload of center mount in forward direction	mm	2 ... 4		
Deflection angle transmission/propeller shaft		-0° 27' ... +0° 33'		
Deflection angle of center mount		-1° 22' ... -0° 22'		
Deflection angle propeller shaft/final drive		-0° 27' ... +0° 33'		
Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)				

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<b>26 - 14 Propeller Shaft</b>		<b>E36</b> <b>M40</b>	<b>E36</b> <b>M42</b>	<b>E36</b> <b>M43</b>	<b>E36</b> <b>M50</b>	<b>E36</b> <b>M52</b>	<b>E36</b> <b>M51</b>
<b>26 11 Propeller Shaft Complete</b>							
Deflection torque of universal joints	Ncm	20 ... 70					
Preload of center mount in forward direction	mm	4 ... 6					
Deflection angle transmission/ propeller shaft		-0° 29' ... +0° 31'			-0° 30' ... +0° 30'		
Deflection angle of center mount		-0° 46' ... +0° 14'			-0° 48' ... +0° 12'		
Deflection angle propeller shaft/ final drive		+0° 43' ... +1° 43'			+0° 46' ... +1° 46'		
Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)							

<b>26 - 15 Propeller Shaft</b>		<b>E36</b> <b>S50</b> <b>B 30</b>	<b>E36</b> <b>M43</b> <b>compact</b>	<b>E36</b> <b>M41</b>			
<b>26 11 Propeller Shaft Complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Preload of center mount in forward direction</b>	<b>mm</b>	<b>2 ... 4</b>	<b>4 ... 6</b>				
<b>Deflection angle transmission/propeller shaft</b>		<b>-0° 38' ... +0° 22'</b>	<b>-0° 43' ... +0° 17'</b>	<b>-0° 24' ... +0° 36'</b>			
<b>Deflection angle of center mount</b>		<b>-0° 47' ... +0° 13'</b>	<b>-0° 55' ... +0° 25'</b>	<b>-0° 52' ... +0° 08'</b>			
<b>Deflection angle propeller shaft/final drive</b>		<b>+0° 41' ... +1° 41'</b>	<b>+0° 24' ... +1° 24'</b>	<b>+0° 43' ... +1° 43'</b>			
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 16 Propeller Shaft</b>		<b>E39</b> <b>M52</b> S5D 200G/S5D 250G <b>Sedan</b>	<b>E39</b> <b>M52</b> S 5 D 310 Z <b>Sedan</b>	<b>E39</b> <b>M52</b> A 5 S 310 Z <b>Sedan</b>	<b>E39</b> <b>M52</b> A 4 S 270 R <b>Sedan</b>	<b>E39</b> <b>M52</b> A 5 S 300 J <b>Sedan</b>	
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 18' ... +0° 42'</b>	<b>-0° 18' ... +0° 42'</b>	<b>-0° 16' ... +0° 44'</b>	<b>-0° 15' ... +0° 45'</b>	<b>-0° 13' ... +0° 47'</b>	
<b>Deflection angle of center mount</b>		<b>-1° 07' ... -0° 07'</b>	<b>-1° 05' ... -0° 05'</b>	<b>-1° 07' ... -0° 07'</b>	<b>-1° 08' ... -0° 08'</b>	<b>-1° 00' ... +0° 00'</b>	
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 37' ... +2° 37'</b>	<b>+1° 35' ... +2° 35'</b>	<b>+1° 35' ... +2° 35'</b>	<b>+1° 35' ... +2° 35'</b>	<b>+1° 35' ... +2° 35'</b>	
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 17 Propeller Shaft</b>		<b>E39</b> <b>M62</b> <b>S 5 D 310 Z</b> <b>Sedan</b>	<b>E39</b> <b>M62</b> <b>S 6 S 420 G</b> <b>Sedan</b>	<b>E39</b> <b>M62</b> <b>A 5 S 440 Z</b> <b>Sedan</b>	<b>E39</b> <b>M62</b> <b>A 5 S 560 Z</b> <b>Sedan</b>	<b>E39</b> <b>M51</b> <b>S 5 D 310 Z</b> <b>Sedan</b>	<b>E39</b> <b>M51</b> <b>A 5 S 310 Z</b> <b>Sedan</b>
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 47' ... +0° 13'</b>	<b>-0° 50' ... +0° 10'</b>	<b>-0° 52' ... +0° 08'</b>	<b>-0° 54' ... +0° 06'</b>	<b>-0° 18' ... +0° 42'</b>	<b>-0° 16' ... +0° 44'</b>
<b>Deflection angle of center mount</b>		<b>-1° 01' ... -0° 01'</b>	<b>-1° 03' ... -0° 03'</b>	<b>-0° 58' ... +0° 02'</b>	<b>-0° 58' ... -0° 02'</b>	<b>-1° 07' ... -0° 07'</b>	<b>-1° 07' ... -0° 07'</b>
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 18' ... +2° 18'</b>	<b>+1° 22' ... +2° 22'</b>	<b>+1° 20' ... +2° 20'</b>	<b>+1° 22' ... +2° 22'</b>	<b>+1° 37' ... +2° 37'</b>	<b>+1° 35' ... +2° 35'</b>
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 18 Propeller Shaft</b>		<b>E39</b> <b>M51</b> <b>S5D 320Z</b> <b>Touring</b>	<b>E39</b> <b>M51</b> <b>A 5 S 310 Z</b> <b>Touring</b>	<b>E39</b> <b>M52</b> <b>S 5 D 200 G</b> <b>Touring</b>	<b>E39</b> <b>M52</b> <b>S5D 320Z</b> <b>Touring</b>	<b>E39</b> <b>M52</b> <b>A 5 S 310 Z</b> <b>Touring</b>	<b>E39</b> <b>M52</b> <b>A 5 S 300 J</b> <b>Touring</b>
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 18' ... +0° 42'</b>	<b>-0° 16' ... +0° 44'</b>	<b>-0° 18' ... +0° 42'</b>	<b>-0° 18' ... +0° 42'</b>	<b>-0° 16' ... +0° 44'</b>	<b>-0° 13' ... +0° 47'</b>
<b>Deflection angle of center mount</b>		<b>-1° 07' ... -0° 07'</b>	<b>-1° 07' ... -0° 07'</b>	<b>-1° 06' ... -0° 06'</b>	<b>-1° 05' ... -0° 05'</b>	<b>-1° 07' ... -0° 07'</b>	<b>-1° 10' ... -0° 10'</b>
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 37' ... +2° 37'</b>	<b>+1° 37' ... +2° 37'</b>	<b>+1° 37' ... +2° 37'</b>	<b>+1° 37' ... +2° 37'</b>	<b>+1° 35' ... +2° 35'</b>	<b>+1° 35' ... +2° 35'</b>
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>26 - 19 Propeller Shaft</b>		<b>E39</b>	<b>E39</b>				
		<b>M62</b>	<b>M62</b>				
		<b>S 6 S 420 G</b>	<b>A 5 S 440 Z</b>				
		<b>Touring</b>	<b>Touring</b>				
<b>26 11 Propeller shaft complete</b>							
<b>Deflection torque of universal joints</b>	<b>Ncm</b>	<b>20 ... 70</b>					
<b>Deflection angle transmission/ propeller shaft</b>		<b>-0° 50' ... +0° 10'</b>	<b>-0° 52' ... +0° 08'</b>				
<b>Deflection angle of center mount</b>		<b>-1° 03' ... -0° 03'</b>	<b>-1° 00' ... 0° 00'</b>				
<b>Deflection angle propeller shaft/ final drive</b>		<b>+1° 22' ... +2° 22'</b>	<b>+1° 22' ... +2° 22'</b>				
<b>Explanation of deflection angle: Propeller shaft bent upwards= Deflection angle positive (+) Propeller shaft bent downwards= Deflection angle negative (-)</b>							

<b>27 - 1 Transfer Box</b>		<b>E34</b>			
		<b>525ix</b>			
<b>27 00 Transfer Box in General</b>					
<b>Designation/Type</b>		<b>A-110</b>			
<b>Oil grade: refer to Operating Fluids</b>					
<b>Oil change volume</b>	<b>ltr.</b>	<b>0.55</b>			
<b>New oil filling volume In case of refilling, recheck oil level again after driving car approx. 200 meters.</b>	<b>ltr.</b>	<b>0.6</b>			
<b>Power distribution (front axle:rear axle)</b>		<b>1 : 1.78 (36 : 64)</b>			
<b>27 21 Transmission Shafts</b>					
<b>Output journal radial runout</b>	<b>max mm</b>	<b>0.07</b>			
<b>Output flange axial runout</b>	<b>max mm</b>	<b>0.07</b>			
<b>Transmission bearings</b>					
<b>Pressing-in force</b>	<b>t</b>	<b>2.4</b>			



<b>61 - 1 Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>
<b>61 20 Battery</b>					
<b>Rated voltage</b>	<b>V</b>	<b>12</b>			
<b>Capacity (cold testing current in A)</b>	<b>Ah (A)</b>	<b>46 / (250)</b>	<b>50 / (265)</b>	<b>84 / (410)</b>	<b>65 / (300)</b>
		<b>50 / (265)</b>	<b>75 / (380)</b>	<b>85 / (410)</b>	<b>-</b>
		<b>65 / (300)</b>	<b>85 / (410)</b>	<b>92 / (450)</b>	<b>-</b>
		<b>75 / (380)</b>	<b>-</b>	<b>-</b>	<b>-</b>
		<b>85 / (410)</b>	<b>-</b>	<b>-</b>	<b>-</b>

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<b>61 - 2 Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>
<b>61 31 Switches</b>					
Oil pressure switch Switching-on pressure (high pressure)	bar	0.2 ... 0.5			
Temperature switch for additional fan Optionally double temperature switch or single switches					
Double temperature switch					
Swichting-on temp. - stage I/II	°C	93 ± 3 / 103 ± 3			
Switching-off temp. - stage I/II	°C	89 ± 3 / 98 ± 3			
Temperature switch 91° C Switching-on temp./switching-off temp.	°C	91 ± 2 / 84 ± 2			
Temperature switch 99° C Switching-on temp./switching-off temp.	°C	99 ± 2 / 92 ± 2			

<b>61 - 3 Electrical System</b>		<b>E36</b>	<b>E34</b>	<b>E32</b>	<b>E31</b>
<b>61 31 Switches</b>					
Door lock heating control unit Outside temperature in °C/heating time in sec.		Controlled by central locking module	Central body electronics controlled	Central body electronics controlled	Central body electronics controlled
Heat ring for door locking current consumption	approx. A	7			
Brake pad sensor Warning position for remaining pad thickness					
	at least mm	1.5			
	max. mm	3.5			
<b>61 66 Windscreen wiper system</b>					
Delivery pressure	bar (psi)	1.5			
<b>61 67 Headlamp washing system</b>					
Foglamp/headlamp pump	bar (psi)	2.5 <sup>+0.5</sup>			
Dual-mode pump, anticlockwise/ clockwise	bar (psi)	2.5 <sup>+0.5</sup>			

<b>62 - 1 Instruments</b>		<b>E36</b>	<b>E34</b>	<b>E34</b>	
			up to 240 km/h	up to 260/280 km/h	
<b>62 12 Speedometer with Drive Shaft</b>					
Display range	km/h	220/260	240	260/280	
Distance pulse K	Pulse/km	4712	4651	4534	
Displayed value/frequency	km/h / Hz	40/52	40/52	40/50	
	km/h / Hz	80/104	80/103	80/101	
	km/h / Hz	120/157	120/155	120/151	
	km/h / Hz	160/209	160/207	160/202	
	km/h / Hz	200/261	200/258	200/252	
	km/h / Hz	240/313	240/310	240/302	

<b>62 - 2 Instruments</b>		<b>E32</b>	<b>E31</b>	<b>E31</b>	
			k 4534	k 4615	
<b>62 12 Speedometer with Drive Shaft</b>					
<b>Display range</b>	<b>km/h</b>	<b>240/260/280</b>	<b>300</b>	<b>300</b>	

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