

The road-holding qualities and the springing are mainly dependent on correctly matched springs and shock-absorbers. Springs and shock-absorbers are therefore selected so as to provide optimum riding qualities.

The decisive factors in judging a spring are the trim dimension, i. e. the spring length at load  $P_{\text{normal}}$  and the helical deflection coefficient, i. e. the spring deflection per 100 kg load. To check the springs, a special spring scale is used with which the trim dimension and the helical deflection coefficient can easily be checked (Fig. 32 — 0/1).

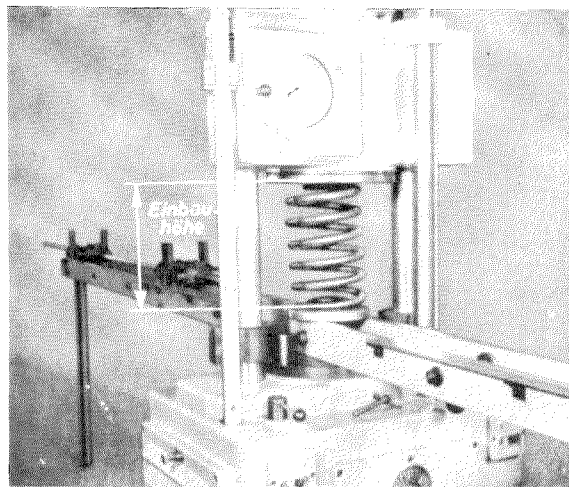


Fig. 32 — 0/1

When checking, measure the spring length, i. e. the trim dimension, at  $P_{\text{normal}}$ .

Tolerances are unavoidable in the manufacture of springs. In order to obtain even springing, however, the manufacturer can allow for the tolerances by varying the spring length (trim dimension). **To indicate the various lengths, springs are supplied with a color code marking on the bottom coil.**

**Color marks in the middle of the spring are check marks and do not refer to the length.**

Key to color coding:

white = short spring

red = medium

blue = long spring

## A. Front Springs

### Color Code for Front Springs

Color Code	Standard springs Part No. 120 321 14 04	Harder springs as an optional extra SA 10 014 Part No. 120 321 19 04
	Trim dimension measured at P <sub>normal</sub> in mm	
white	from 213 — 216	from 219.5 — 222
red	above 216 — 219	above 222 — 224.5
blue	above 219 — 222	above 224.5 — 227

In the case of the front springs, the varying trim dimensions are not equalized by spacers. When springs are replaced, only springs with the same color coding should therefore be installed on both sides.

### Test Values of Standard Front Springs

Part No.	Maximum front axle load capacity kg	Free length of spring in mm	Trim dimension, i. e. spring length under normal load in mm	Load		Spring rate for 100 kg of load in mm	Wire gage in mm	Mean coil diameter in mm	Number of coils
				P norm. kg	P max. kg				
120 321 14 04	770	339	216 <sup>+6</sup> <sub>-3</sub>	570	819	21.7	15.1	110 <sup>±1</sup>	8.5

## B. Rear Springs

### a) Color Code for Standard Rear Springs

Color Code		Rear spring left Part No. 121 324 20 04 and Part No. 105 324 00 04 *	Rear spring right Part No. 121 324 21 04 and Part No. 105 324 01 04 *
		Trim dimension measured at P <sub>normal</sub> in mm	
white	1 line	from 170.5 — 172.5	from 171 — 173
	2 lines	above 172.5 — 174.5	above 173 — 175
	3 lines	above 174.5 — 176.5	above 175 — 177
red	1 line	above 176.5 — 178.5	above 177 — 179
	2 lines	above 178.5 — 180.5	above 179 — 181
blue	1 line	above 180.5 — 182.5	above 181 — 183
	2 lines	above 182.5 — 184.5	above 183 — 185
	3 lines	above 184.5 — 186.5	above 185 — 187

\* For reasons of standardization, recent models are provided with the same rear springs as Model 219.

**b) Color Code for Rear Springs for Bad Roads and for Export Rear Springs  
(Optional, SA 10 113/1 or 2, see also Section C)**

Color Code		Rear spring left		Rear spring right	
		Part No. 121 324 22 04	Part No. 180 324 26 04*	Part No. 121 324 23 04	Part No. 180 324 27 04*
		Trim dimension measured at P <sub>normal</sub> in mm			
white	1 line	from 182 — 184	from 186.5 — 188.5	from 182.5 — 184.5	from 187 — 189
	2 lines	above 184 — 186	above 188.5 — 190.5	above 184.5 — 186.5	above 189 — 191
	3 lines	above 186 — 188	above 190.5 — 192.5	above 186.5 — 188.5	above 191 — 193
red	1 line	above 188 — 190	above 192.5 — 194.5	above 188.5 — 190.5	above 193 — 195
	2 lines	above 190 — 192	above 194.5 — 196.5	above 190.5 — 192.5	above 195 — 197
blue	1 line	above 192 — 194	above 196.5 — 198.5	above 192.5 — 194.5	above 197 — 199
	2 lines	above 194 — 196	above 198.5 — 200.5	above 194.5 — 196.5	above 199 — 201
	3 lines	above 196 — 198	above 200.5 — 202.5	above 196.5 — 198.5	above 201 — 203
* For reasons of standardization, recent models are provided with the same rear springs as Model 220 S					

**c) Color Code for Rear Springs for Special-Purpose Vehicles  
(Optional, SA 10 154/1/2 and SA 10 155, see also Section C)**

Color Code		Load capacity (maximum rear axle load)		
		1100 kg		1250 kg
		SA 10 154/1 or 2		SA 10 155
		Rear spring left Part. No. 121 324 12 04	Rear spring right Part. No. 121 324 13 04	Rear springs, left and right Part. No. 121 324 24 04
white	1 line	from 173.5 — 175.5	from 174 — 176	from 182 — 184
	2 lines	above 175.5 — 177.5	above 176 — 178	above 184 — 186
	3 lines	above 177.5 — 179.5	above 178 — 180	above 186 — 188
red	1 line	above 179.5 — 181.5	above 180 — 182	above 188 — 190
	2 lines	above 181.5 — 183.5	above 182 — 184	above 190 — 192
blue	1 line	above 183.5 — 185.5	above 184 — 186	above 192 — 194
	2 lines	above 185.5 — 187.5	above 186 — 188	above 194 — 196
	3 lines	above 187.5 — 189.5	above 188 — 190	above 196 — 198

In contrast to the color coding of the front springs the color coding of the rear springs is further subdivided by lines.

**Color Code, Corresponding Notch Position and Use of Rubber Compensating Ring  
(For all rear springs)**

Rear spring Color Code		Corresponding notch position	Rubber compensating ring
white	1 line	4	yes
	2 lines	3	yes
	3 lines	2	yes
red	1 line	1	yes
	2 lines	4	no
blue	1 line	3	no
	2 lines	2	no
	3 lines	1	no

**Test Values of Standard Rear Springs**

Part. No.	Load capacity (maximum front axle load)** kg	Free length of spring in mm	Trim dimension i. e. spring length under normal load in mm	Load		Spring rate per 100 kg of load in mm	Wire gauge in mm	Mean coil diameter in mm	Number of coils
				P norm. kg	P max. kg				
121 324 2004 left	890	296	178.5 ± 8	627	867	18.75	16.2	135	5.25
121 324 2104 right	890	293.5	179 ± 8	645	899	17.75	16.2	135	5.0
105 324 0004* left	920	299.5	178.5 ± 8	644	848	18.75	16.2	135	5.25
105 324 0104* right	920	296	179 ± 8	660	880	17.75	16.2	135	5.0

\* For reasons of standardization, recent models are provided with the same rear axle springs as Model 219. When replacing springs, make sure that matched springs are used at the left and at the right.

\*\* Within the limits indicated, the permissible rear axle load depends on the load capacity of the tire (see also Job No. 40 — 0, Section B., Tires, and Job No. 40 — 3, Section C. Wheel Adjustment Data).

To maintain the prescribed rear-wheel camber, allowance must be made for the variation in loaded heights of the rear springs by setting the lower spring plate. The spring plate can be set in four different notch positions, and if necessary, an additional compensating rubber ring can be inserted at the top between the spring plate and the spring (see Job No. 32—5, Paragraphs 7—11). The table above gives the correct notch position for each spring length, after allowance has been made for the compensating rubber ring.

In the case of the single-jointed rear axle, the left and the right axle halves are of different lengths. The left axle half, measured from the torsion bar, is 42 mm longer than the right axle half. Because of the different lengths of the two lever arms, a difference in the characteristic of the two springs is unavoidable. Both springs are designed so that the helical deflection coefficient is the same at the left and the right. For the same reason, when the car is standing in a horizontal position, the rear-wheel camber is different at the left and the right. In curb condition, the camber at the left is theoretically 0° 10' less than that at the right.

### C. Springs and Shock-Absorbers, Optional Version

In all cases where harder springing is necessary, the following parts can be installed in place of standard springs and shock-absorbers:

#### 1. Front Springs:

Instead of standard front springs the following springs can be installed:

#### Harder Front Springs for Bad Roads (optional, SA 10 014)

Part No.	Load capacity (maximum front axle load) kg	Free length of spring in mm	Trim dimension i. e. spring length under normal load in mm	Load		Spring rate per 100 kg of load in mm	Wire gage in mm	Mean coil diameter in mm	Number of coils
				P norm. kg	P max. kg				
1203211904	770	334	222 <sup>+5</sup> <sub>-2.5</sub>	570	844	19.7	15.25	110 <sup>±1</sup>	8
The color code is the same as for the standard springs, see page 32-0/2									

**Note:** This spring is also suitable for the needs of sports enthusiasts.

## 2. Rear Springs:

In place of the standard rear springs the following springs can be installed:

### Harder Rear Springs for Bad Roads and Special-Purpose Vehicles (optional, SA 10 113/1 or 2, SA 10 154/1 or 2 and SA 10 155)

Part No.	Load capacity (maximum rear axle load)** kg	Free length of spring in mm	Trim dimension, i. e. spring length under normal load in mm	Load		Spring rate per 100 kg of load in mm	Wire gage in mm	Mean coil diameter in mm	Number of coils
				P norm. kg	P max. kg				
Harder Rear Springs for Bad Roads and Export Rear Springs (optional, SA 10 113/1 or 2)									
1213242204 left	950	281	190 ± 8	697	1065	13.5	17.2	135	4.65
1213242304 right	950	279	190.5 ± 8	716	1108	12.38	17.2	135	4.4
1803242604* left	950	294	194.5 ± 8	668	970	14.9	17.0	135	5.05
1803242704* right	950	292	195 ± 8	686	1005	14.1	17.0	135	4.8
* For reasons of standardization, recent models are provided with the same rear springs as Model 220 S.									

**Note:** If Springs 121 324 22 04/23 04 are installed, the standard shock absorbers must be replaced by shock absorbers of shorter stroke and larger diameter (Part No. 180 326 02 00, or Part No. 121 326 03 00) (see Job Nob. 32—1, Sections B and C).

<b>Harder Rear Springs for Ambulances, Police Radio Cars, and for Special-Purpose Vehicles up to 1100 kg Rear Axle Load (optional, SA 10 154/1 or 2)</b>									
121 324 1204 left	1100	279	181.5 ± 8	840	1168	11.62	18.0	135	5.0
121 324 13 04 right	1100	277	182 ± 8	864	1210	11.0	18.0	135	4.7
<b>Harder Rear Springs for Special-Purpose Vehicles such as Light Trucks, etc., up to 1250 kg Rear Axle Load (optional, SA 10 155)</b>									
1213241304 left and right are identical	1250	264.5	190 ± 8	915	1510	8.14	19.2	135	4.5
** Within the limits indicated, the permissible rear axle load depends on the load capacity of the tires (see also Job No. 40—0, Section B. Tires, and Job No. 40—3, Section C. Wheel Adjustment Data).									

**Note:** If the springs 121 324 12 04/13 04 or 124 324 24 04 are installed, the standard type rubber buffer stops (Part No. 180 320 00 44) must be replaced by stops as per Part No. 120 320 04 44.

Similarly, shock-absorbers with smaller stroke and larger diameter, Part No. 180 326 02 00 or Part No. 121 326 03 00, must be installed (see Job No. 32 — 1, Sections B and C).

The Color Code and the appropriate notch positions of the spring plate are the same as for standard springs.

### **3. Shock-Absorbers:**

In addition to harder springs, special shock-absorbers are specified for vehicles which are used on bad roads, and for vehicles for various special purposes.

In areas where extreme dust conditions prevail, a fabric dust bag (Part No. 180 320 01 59) can be installed on the shock-absorbers as protection against the penetration of dust and dirt (see Job No. 32 — 1, Section D).