

## 11 21 531 Replacing all crankshaft main bearings (N12)



**Special tools required:**

11 4 470



**Important!**

Modified assignment of bearing positions.

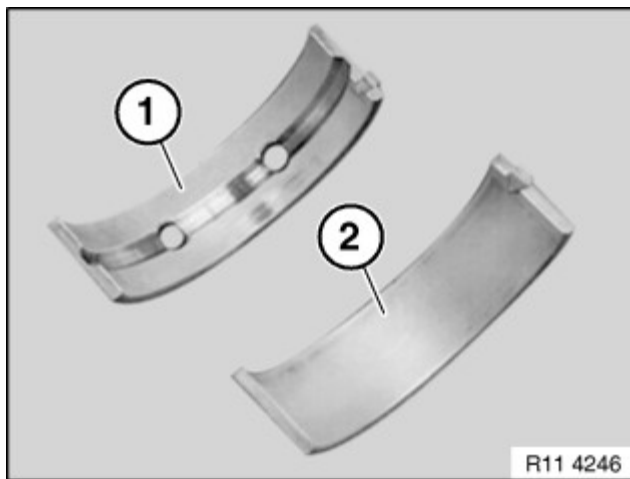
Bearing position (1) is at the output end (clutch end)

Determine main bearing colours; the designations on the crankcase and crankshaft are always required and can only be determined using the table.



*Necessary preliminary work:*

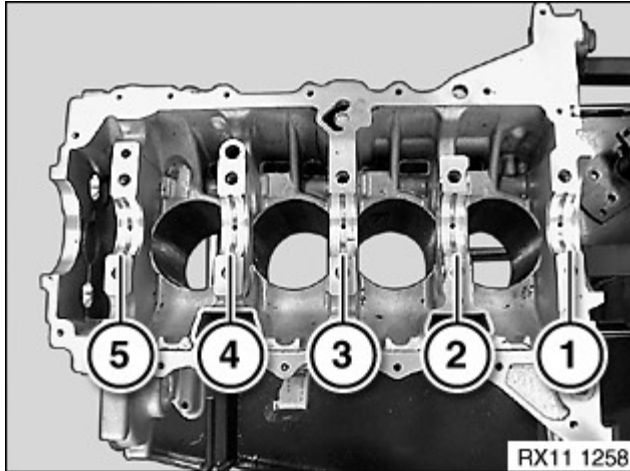
Remove crankshaft.



*Installation note:*

Bearing shell (1) with lubricating groove must be fitted in crankcase upper part.

Bearing shell (2) without lubricating groove must be fitted in crankcase lower section (bedplate).

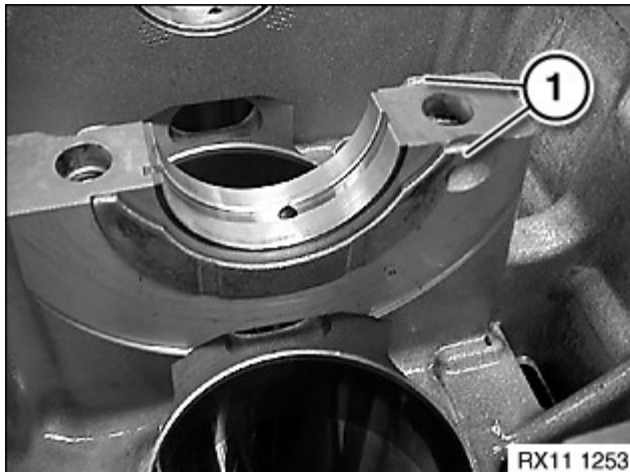


**Important!**  
 Modified assignment of bearing positions.  
 Bearing position (1) is at the output end  
 (clutch end)

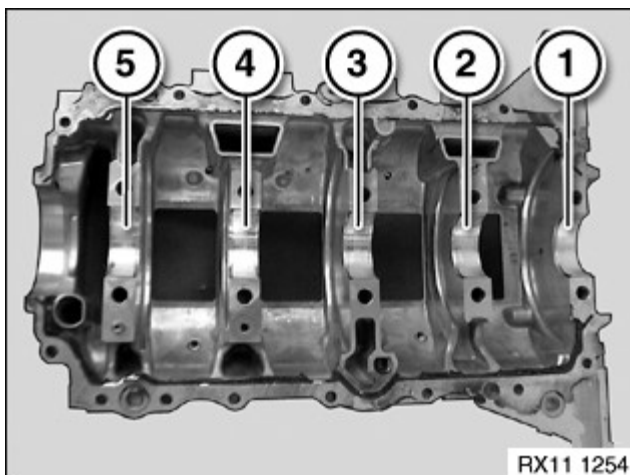
Bearings (1 to 5).  
 Bearing (2) is a guide bearing.

**Important!**  
 Clean sealing surfaces.  
 Do **not** clean sealing surfaces with a metal-  
 cutting tool.

Only use special tool 11 4 470 to clean  
 sealing surfaces.



Insert guide rings (1) in crankcase at bearing  
 seat (2) with groove facing outwards.  
 If necessary, attach with engine oil to  
 crankcase.

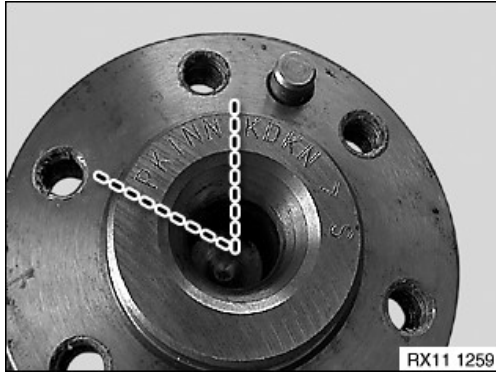


**Important!**  
 Modified assignment of bearing positions.  
 Bearing position (1) is at the output end  
 (clutch end)

Bearings (1 to 5).

**Important!**  
 Clean sealing surfaces.  
 Do **not** clean sealing surfaces with a metal-  
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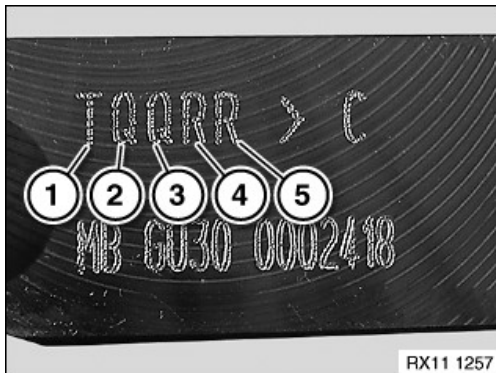
**Bearing classification on crankcase upper part:**

Bearing allocation 1 - 5: the designations on the crankcase and crankshaft are always required.

Refer to the table for the colour code.

**Example:**

- Lager 1. Letter P
- Lager 2. Letter K
- Lager 3. Letter I
- Lager 4. Letter N
- Lager 5. Letter N



**Bearing classification on crankcase upper part:**

**Bearing allocation 1 - 5: the designations on the crankcase and crankshaft are always required.**

Refer to the table for the colour code.

**Example:**

- Lager 1. Letter T
- Lager 2. Letter Q
- Lager 3. Letter Q
- Lager 4. Letter R
- Lager 5. Letter R

Table overview of bearing classification: upper part																		
Code letter of crankshaft																		
Bearings 1 - 5		A	B	C	D	E	G	H	I	K	M	N	P	q	R	S	T	U
Crankcase	A	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl
	B	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl
	C	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl
		Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl
	E	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw
	G	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw
	H	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw
	I	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw
	K	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw
	M	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw

<b>N</b>	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw
<b>P</b>	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw
<b>q</b>	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	
<b>R</b>	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	
<b>S</b>	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	
<b>T</b>	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	
<b>U</b>	Or	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	
<b>X</b>	Or	Or	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	
<b>Y</b>	Or	Or	Or	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	
<b>Z-Series</b>	Or	Or	Or	Or	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	



Crankshaft bearing colours:

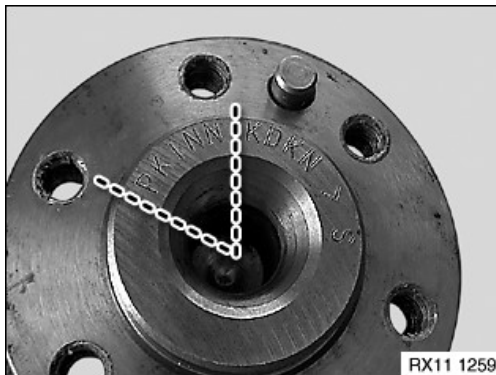
BL= Blue.

SW= Black.

Gr= Green.

Ge Yellow.

Or Orange.



**Bearing classification on crankcase lower section:**

Bearing allocation 1 - 5: the designations on the crankcase and crankshaft are always required.

Refer to the table for the colour code.

**Example:**

- Lager 1. Letter P
- Lager 2. Letter K
- Lager 3. Letter I
- Lager 4. Letter N
- Lager 5. Letter N



**Bearing classification on crankcase lower section:**

Bearing allocation 1 - 5: the designations on the crankcase and crankshaft are always required.

Refer to the table for the colour code.

**Example:**

- Lager 1. Letter T
- Lager 2. Letter Q
- Lager 3. Letter Q
- Lager 4. Letter R
- Lager 5. Letter R

Table overview of bearing classification: lower section																		
Crankshaft																		
Bearings 1 - 5		A	B	C	D	E	G	H	I	K	M	N	P	q	R	S	T	U
Crankcase	A	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl	Bl	Bl	Bl	Bl
	B	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl	Bl	Bl	Bl
	C	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl	Bl	Bl
	D	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl	Bl
	E	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl	Bl
	G	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl	Bl
	H	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl	Bl
	I	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Bl
	K	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw	Sw
	M	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw	Sw
	N	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw	Sw
	P	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw	Sw
	q	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw	Sw
	R	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw	Sw
	S	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw	Sw
	T	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Sw
	U	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	Gr
X	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	Gr	
Y	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	Gr	Gr	
Z-Series	Or	Or	Or	Or	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Ge	Gr	Gr	Gr	Gr	



Crankshaft bearing colours:

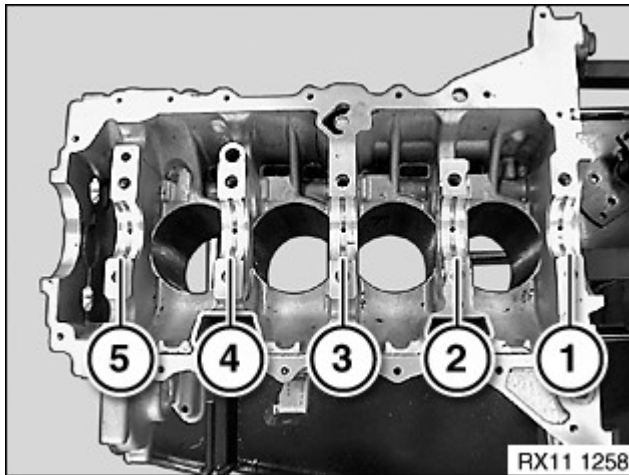
BL= Blue.

SW = Black.

Gr = Green.

Ge = Yellow.

Or = Orange.



**Example: Crankcase upper part:**

Combining the dots of the designations of the crankshaft and crankcase produces the following colour combinations.

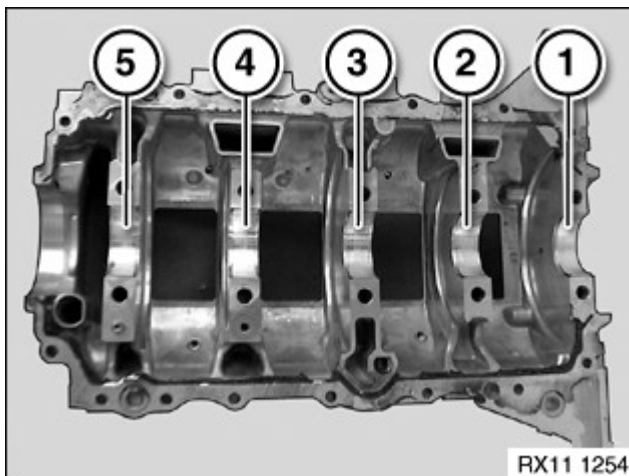
Bearing 1: The letters (P and T) produce in the crankcase upper part the colour Ge= Yellow with lubricating groove.

Bearing 2: K and Q= Ge= Yellow.

Bearing 3: I and Q= Ge= Yellow.

Bearing 4: N and R= Gr= Green.

Bearing 5: N and R= Gr= Green.



**Example: Crankcase lower section:**

Combining the dots of the designations of the crankcase and crankshaft produces the following colour combinations.

Bearing 1: The letters P. and T. produce in the crankcase lower section the colour Gr= Green without lubricating groove.

Bearing 2: K and Q = Gr = Green.

Bearing 3: I and Q= Gr= Green.

Bearing 4: N and R= Gr= Green.

Bearing 5: N and R= Gr= Green.



Install crankcase lower section.

Assemble engine.