



UNIVERSAL BROKEN GLOW PLUG TIP REMOVAL UNI

Manual

90417900 / 90417910 / 90417920



SAFETY NOTICE

To understand the functioning of the tools, it is necessary to read the manual first!

- > Read these instructions before assembling, during installation and throughout use and in the proper sequence
- > Always refer to the OEM manufacturer's instructions and service manuals for the latest data and to maintain the correct sequence
- > These work instructions and the recommended tools are meant to serve as aides only and are by no means a guarantee for certain results.
- > This tool kit is a special collection and it has been tested and used successfully on several occasions. It is of the utmost importance to maintain the correct procedure as per the instructions
- > The use of the tools should only be carried out by qualified personnel!



ATTENTION
Special caution



CORRECT



LIGHT BULB
Hint or recommendation



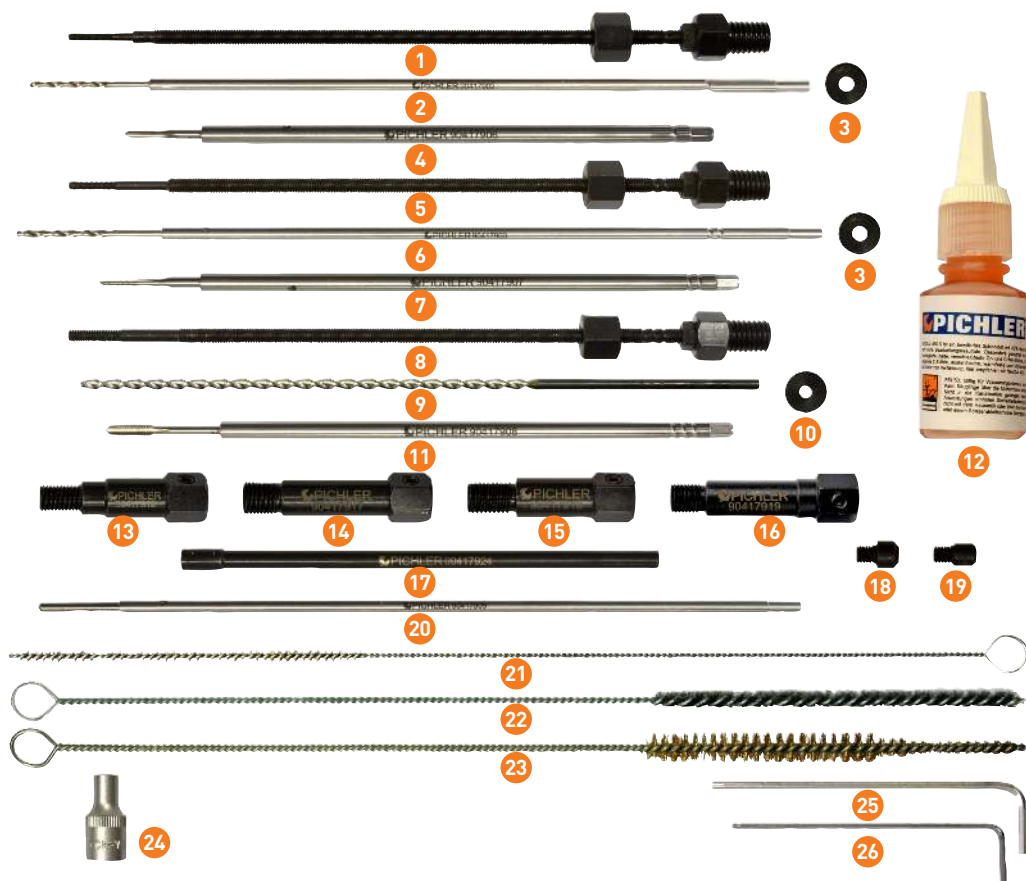
WRONG



SAFETY GOGGLES
Wearing safety goggles
necessary

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NR.	PART NO.	Description	90417900	90417910	90417920
1	90417921	Extraction Spindle M2,5	1	-	-
2	90417902	Drill Custom Made for M2,5	1	-	-
3	90417912	Stop And Clamping Ring for M2,5 and M3	2	-	1
4	90417906	Tap M2,5 (custom made)	1	-	-
5	90417922	Extraction Spindle M3	1	-	1
6	90417903	Drill For M3 (custom made)	1	-	1
7	90417907	Tap M3 (custom made)	1	-	1
8	90417923	Extraction Spindle M4	1	1	-
9	90417904	Drill for M4 (custom made)	1	1	-
10	90417914	Stop and Clamping Ring for M4	1	1	-
11	90417908	Tap M4 (custom made)	1	1	-
12	90417911	Cutting Fluid 25 ml	1	1	1
13	90417916	Guide M8x1	1	1	-
14	90417917	Guide M10x1	1	1	-
15	90417918	Guide M10x1,25	1	-	1
16	90417919	Guide M9x1	1	-	-
17	90417924	Guide Tube	1	1	1
18	90417927	Centering Cone M10x1 / M10x1.25	1	1	1
19	90417926	Centering Cone M8x1	1	1	-
20	90417909	Bevelled Cutter	1	1	1
21	6049024	Pipe Brush 300x100x4,7	1	1	1
22	6049025	Pipe Brush 300x100x5,3	1	1	1
23	9049026	Pipe Brush Stepped	1	1	1
24	7270450	Socket Hex 4,5 mm drive 1/4"	1	1	1
25	151.20425	Allen Key 2,5 mm	1	1	1
26	151.2042	Allen Key 2 mm	1	1	1

BEFORE STARTING TO WORK

In preparation, it is important to check whether this Glow Plug Elements Removal Set is suitable for the present problem case. For this purpose, compare the removed glow plug with the broken-off glow element with pictures **A** and **B**:

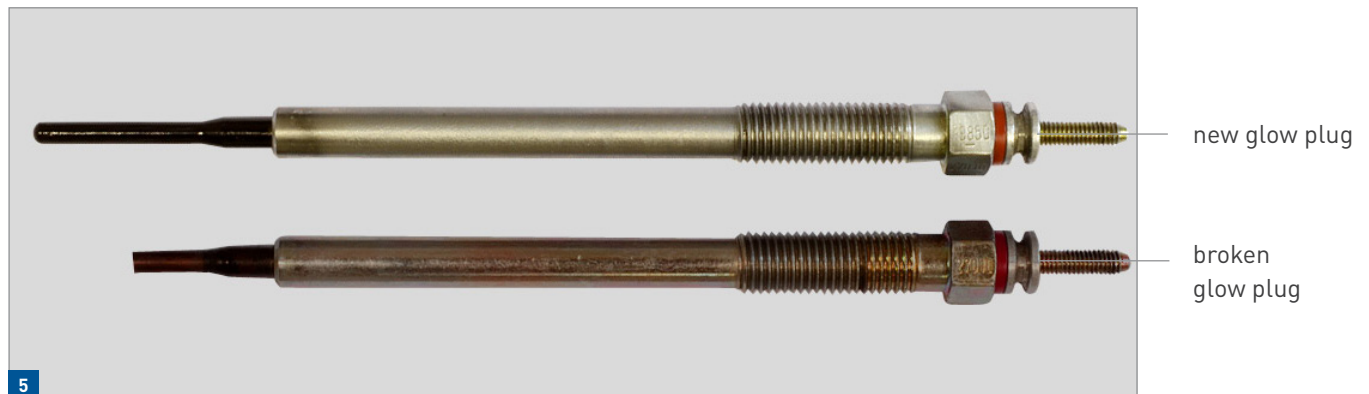
A 	Glow plug with heating element in a steel (with insulated internal heating and regulating coil)  ... continue with point 1. Preparation
B 	Glow plug with solid ceramic glow element without a steel jacket  Removing sets 90417900 / 90417910 / 90417920 cannot be used here.

1. PREPARATION

1.1. Determine the size of the thread of the glow plug, either by measuring or by screwing in the various Guide Bushes (M8x1 **90417916** ¹³ / M9x1 **90417919** ¹⁶ / M10x1 **90417917** ¹⁴ / M10x1,25 **90417918** ¹⁵) in the cylinder head.



1.2. The broken-off glow element, which is still stuck in the cylinder head, must be long enough to cut a pulling thread into it. This length can be determined by comparing the broken glow plug with a new one.



Symbolic examples of glow plugs stepped glow element:



Example 1

Cut a thread into the **smaller Ø1** of the glow element.

$L1 \geq 1,5 \times \varnothing 1$

Example 2

Cut a thread into the **smaller Ø1** of the glow element.

$L2 \neq 1,5 \times \varnothing 2$

Example 3

Cut a thread into the **smaller Ø2** of the glow element.

$L2 \geq 1,5 \times \varnothing 2$

1.3. Measure the outside diameter of the glow element of the new glow plug at the failing point with a sliding calliper and write it down.



1.4. Select using the previously written down value the right drilling and extraction tool system (**M2.5** or **M3** or **M4**) from the table.

Table for determining the system

Glow element diameter		System
Ø2.9 mm → Ø3.3 mm	=	M2.5 (1 ring mark)
Ø3.4 mm → Ø4.3 mm	=	M3 (2 ring mark)
Ø4.4 mm → Ø5.4 mm	=	M4 (3 ring mark)

1.5. Slide the previously selected, appropriate Guide Bush on the Centring and Guide Tube **90417924** (17) and screw it to the stop in the cylinder head.



Cross section of the cylinder head

1.6. Now unscrew the Guide Bush approximately 2 revolutions, push the Centring and Guide Tube **90417924** (17) all the way down and fix it with one of the two clamping screws of the Guide Bush.



1.7. Unscrew the Guide Bush a 1/2 revolution and clamp the Centring and Guide Bush Tube **90417924** (17) with the other clamping screw and screw the combination hand tight to the stop in the cylinder head.



Cross section of the cylinder head Cross section of the cylinder head

2. STRAIGHTENING AND CENTRING THE BREAKING EDGE OF THE GLOW ELEMENT.

2.1. Clamp the Bevelled Cutter **90417909** (20) into a power drill, lubricate the shank and guide the Cutter through the centring and Centring and Guide Bush Tube **90417924** (17) into the cylinder head.





TIP:

If the chuck of your drill does not close so far to clamp the drill or milling cutter or should there be space problems when drilling, you can use the drill chuck **9269034** and the flexible bit holder 1/4" **9039034** (both are not included in the kit).



2.2. Carefully straighten and make a centre point in the uneven surface of the glow element remains by multiple spot cutting with a high rpm.



Cross section of the cylinder head

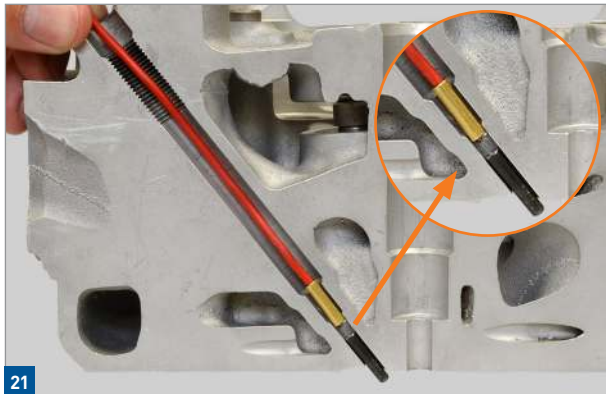


Cross section of the cylinder head

2.3. Remove and disassemble the Guide Bush and clean everything.



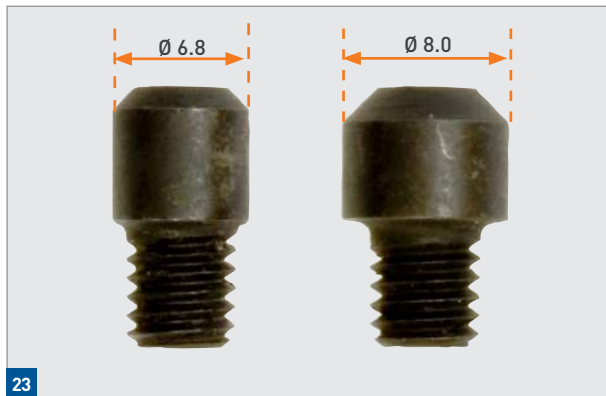
2.4. Remove with a vacuum cleaner, a magnet or compressed air the grime and swarf from the glow plug shaft.



Cross section of the cylinder head

3. THE DRILLING PROCESS

3.1. Select the appropriate Centring Cone depending on the thread of the glow plug and screw it on the Centring and Guide Tube **90417924** (17).



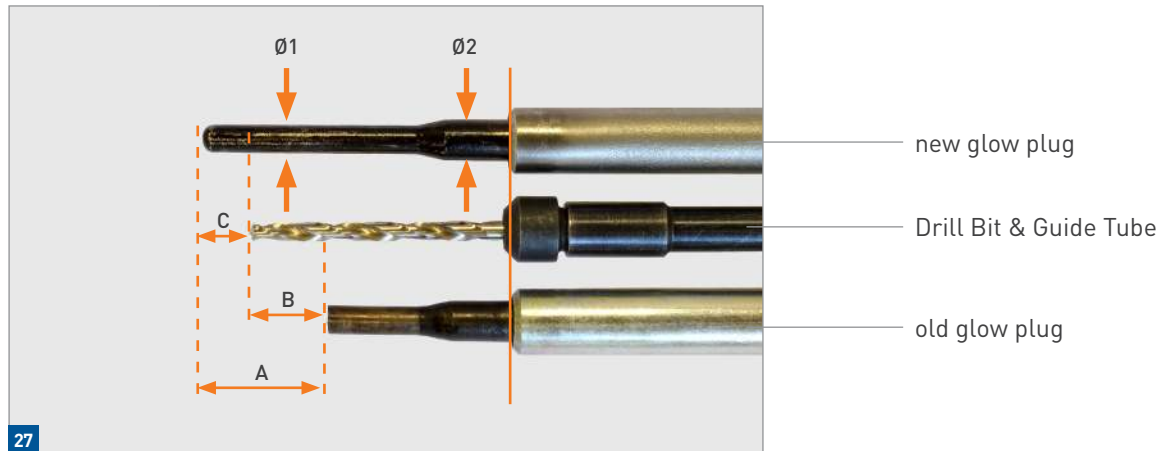
M8 x 1
M9 x 1
90417926 (19)

M10 x 1
M10 x 1,25
90417927 (18)

3.2. Slide the Special Drill Bit from the previously selected system (M2.5 / I, M3 / II, M4 / III) through the Centring and Guide Tube **90417924** (17) and release the Clamp Collar.



3.3. Arrange parts and tool according to the picture for determining the depth that has to be drilled.



A: element length still stuck in the cylinder head
B: minimum drill depth $1,5 \times \text{Ø1}$
C: minimum 2 mm



TIP If the depth with M2.5 and M3 cannot be reached then remove the centring cone.

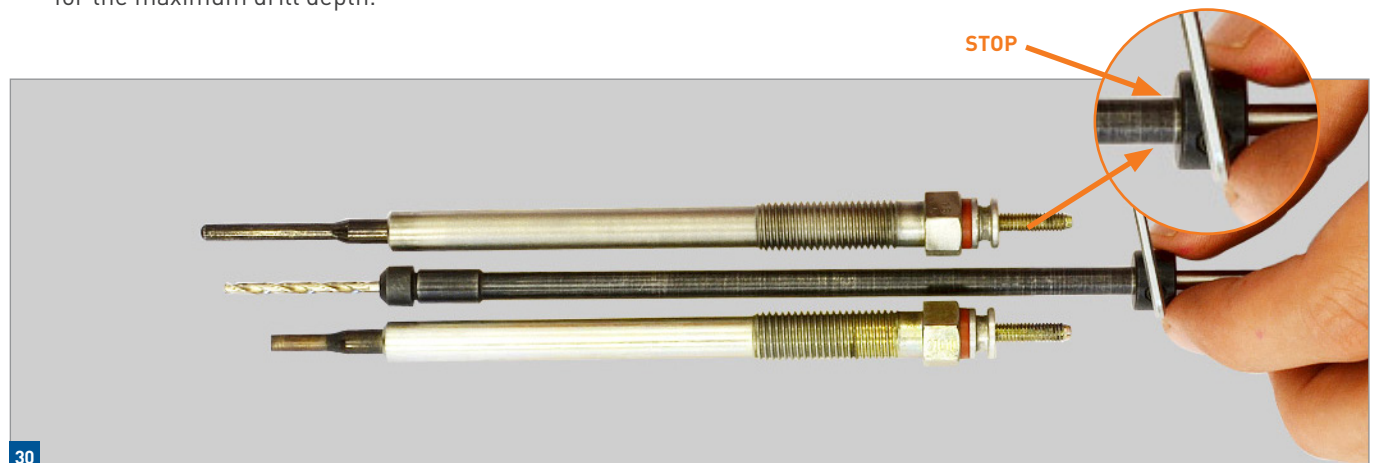


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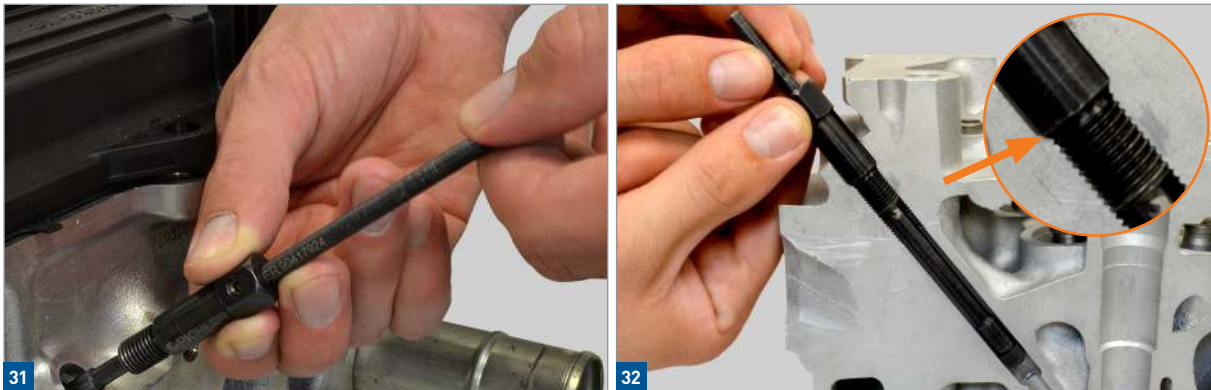
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3.4. Slide the Clamping Collar down on to the Centring and Guide Tube [90417924](#) (17) and tighten it. This is the stop for the maximum drill depth.



30

3.5. Slide the Centring and Guide Tube **90417924** (17) through the previously selected Guide Bush and screw the combination down to the stop in the cylinder head.



Cross section of the cylinder head

3.6. Unscrew the Guide Bush approximately 2 revolutions, push the Centring and Guide Tube **90417924** (17) all the way down and fix it with one of the two clamping screws of the Guide Bush.



3.7. Unscrew the Guide Bush a 1/2 revolution and clamp the Centring and Guide Tube **90417924** (17) with the other clamping screw and screw the combination hand tight to the stop in the cylinder head.



ATTENTION

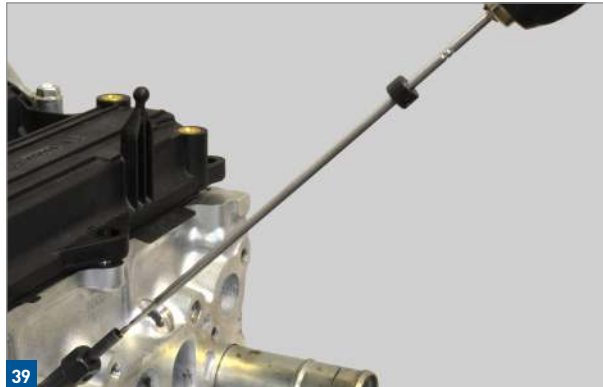
Centering and guide tube must be touching the glow plug sealing seat of the cylinder head.



Cross section of the cylinder head

Cross section of the cylinder head

3.8. Clamp the Special Drill Bit from the previously selected system (M2.5 / I, M3 / II, M4 / III) in a power drill, lubricate the cutting edge and the shaft and guide the Drill Bit through the Centring and Guide Tube **90417924** (17) into the cylinder head.



3.9. Carefully drill out with a high rpm the core of the glow element to the stop on the Centring and Guide Tube **90417924** (17).

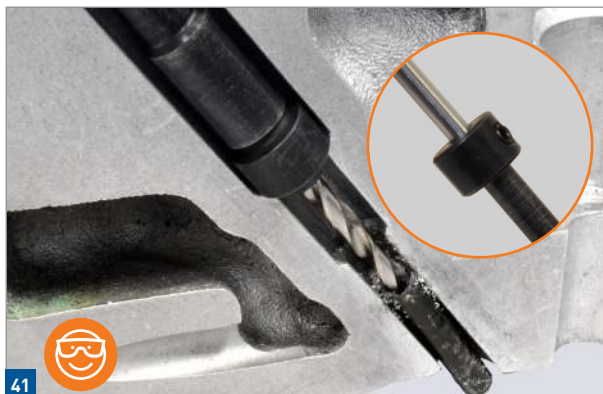


ATTENTION

Stop several times, lubricate and clean the Drill Bit if necessary



Cross section of the cylinder head

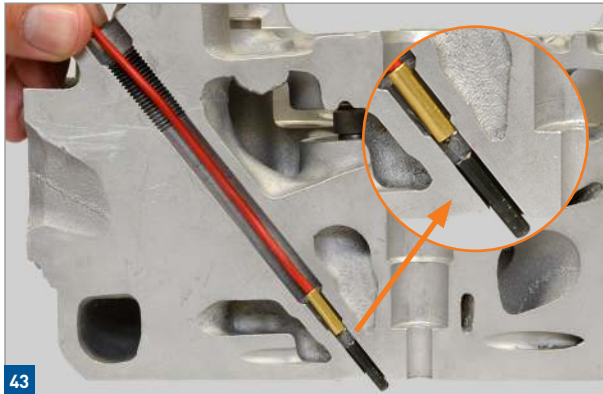


Cross section of the cylinder head

3.10. Remove and disassemble the Guide Bush and clean everything.



3.11. Remove with a vacuum cleaner, a magnet or compressed air the grime and swarf from the glow plug shaft.

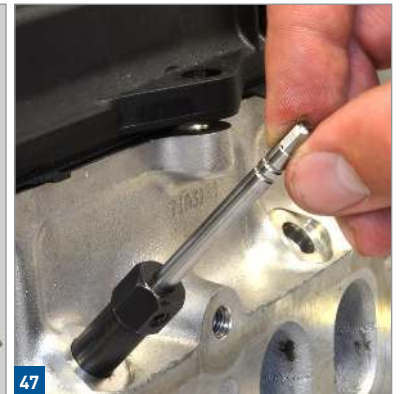


Cross section of the cylinder head



4. CUTTING THE EXTRACTION THREAD

4.1. Screw the Guide Bush in the cylinder head and unscrew it a ½ revolution. Coat the Tap with Cutting Oil [90417911](#) ⁽¹²⁾ and guide the Tap through the Guide Bush into the cylinder head.



4.2. Cut a thread in the glow element with Socket 4.5 [7270450](#) ⁽²⁴⁾ and a ratchet (¼") or another suitable actuating tool.



ATTENTION

Always reverse the tap in order to break the chips!

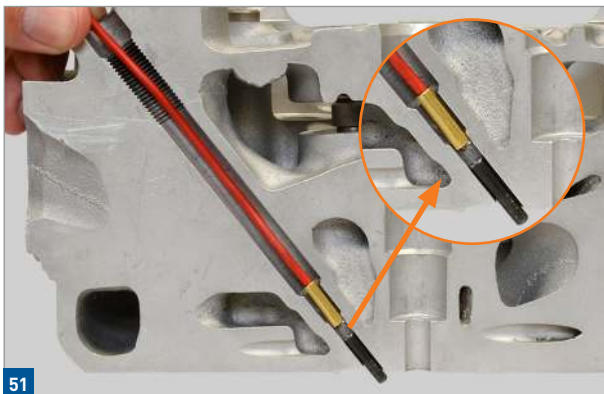


Cross section of the cylinder head

4.3. Remove and disassemble the Guide Bush and clean everything.



4.4. Remove with a vacuum cleaner, a magnet or compressed air the grime and swarf from the glow plug shaft.



Cross section of the cylinder head



5. EXTRACTING THE ELEMENT

5.1. Spray rust remover e.g. **9990020** (not included in the set) into the glow plug shaft and give it time to react.



5.2. Screw the Guide Bush into the cylinder head as far as it will go, screw the Extraction Spindle into the glow element and tighten it with a spanner



Cross section of the cylinder head

5.3. Screw the operating nut on the Spindle so far that there is a gap of 2-3 mm between the operating nut and the Guide Bush.



2-3 mm

5.4. Hammer down the Extraction Spindle with a hammer until the actuating nut touches the Guide Bush.



flush

5.5. By operating the nut and simultaneously counter holding the Extraction Spindle at the end with a spanner 13mm, extract the element.



ATTENTION

Should this not be possible or if the operating nut can only be turned very sluggishly, repeat steps 5.3 - 5.5 until the glow element can be removed with ease from the glow plug shaft.



Optionally, to extract the glow element, can also a slide hammer e.g. **1030210** or **6039750** be used.

6. CLEANING THE GLOW PLUG SHAFT

6.1. Remove with an appropriate pipe brush the grime and deposits from the glow plug shaft.

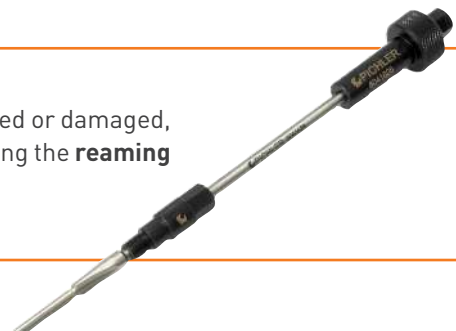


Cross section of the cylinder head



TIP

If the sealing seat angle for the glow plug in the cylinder head is soiled or damaged, the appropriate reamer for cleaning or repair can be determined using the **reaming table on page 19**.



RECOMMENDED ACCESSORIES

UNIVERSAL GLOW PLUG
REMOVING KIT M8X1

60416300



UNIVERSAL GLOW PLUG
REMOVING KIT M10X1

90417400



UNIVERSAL GLOW PLUG
REMOVING KIT M10X1,25

90417500



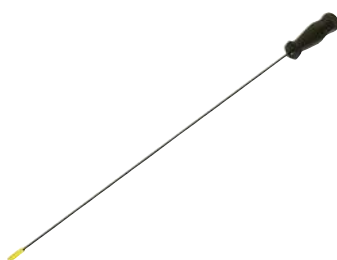
FLEXIBLE LAMP „BAL“

40103000



FLEXIBLE MAGNETIC LIFTER

52601010



FLEXIBLE BIT HOLDER

9039034



CHUCK UP

9269034



SLIDE HAMMER 0,7 KG

1030210



SLIDE HAMMER 1,35 KG

60390750



GLOWPLUG HOLE BRUSHES SET

90490300



8. REAMERS TABLE

This table can be used to select the appropriate reamer or components. The compatibility of the individual parts can be determined by the coloured markings in the table.

SET		INDIVIDUAL PARTS									
Reamer		Dimensions reamer in mm 						Guide Bush Length (mm)		Actuator	
M8x1 / 90° 6041625	Length 162	PN	∠°	Ø1	L	Ø2	Ø3		Length inside Ø		
		6041628	90°	4,7	25,4	6,9	4,8	M8x1 6041627	38 4,8	No. 1 6041626	
M8x1 / 120° 60416225	162	60416228	120°	4,7	25,4	6,9	4,8	M8x1 6041627	38 4,8	No. 1 6041626	
M9x1 / 90° 60416215	162	6041628	90°	4,7	25,4	6,9	4,8	M9x1 60416027	45 4,8	No. 1 6041626	
M10x1 / 60° 6041725	162	6041729	60°	5,5	25,6	8,5	5,5	M10x1 60417027	47 5,5	No. 2 60416166	
M10x1 / 60° 60417125	156	60417129	60°	4,2	26,0	8,7	5,5	M10x1 60417027	47 5,5	No. 1 6041626	
M10x1 / 90° 60417025	156	60417028	90°	4,2	26,2	8,7	5,5	M10x1 60417027	47 5,5	No. 1 6041626	
M10x1 / 120° 60417925	162	60416228	120°	4,7	25,4	6,9	4,8	M10x1 60417927	53 4,8	No. 1 6041626	
M10x1.25 / 60° 60417225	162	6041729	60°	5,5	25,6	8,5	5,5	M10x1.25 60417026	36 5,5	No. 2 60416166	
M10x1.25 / 60° 60417115	156	60417129	60°	4,2	26,0	8,7	5,5	M10x1.25 60417026	36 5,5	No. 1 6041626	
M10x1.25 / 90° 60417029	156	60417028	90°	4,2	26,2	8,7	5,5	M10x1.25 60417026	36 5,5	No. 1 6041626	
M10x1 / 60° M10x1.25 / 60° 6041715	202	6041714	60°	5,5	22,6	8,8	8,7	Guiding by the reamer shaft		No. 2 60416166	
M10x1 / 120° M10x1.25 / 120° 60417105	202	60417104	120°	5,5	25,3	8,8	8,7	Guiding by the reamer shaft		No. 2 60416166	
M12x1.25 / 60° 6041615	140	6041618	60°	6,9	24,0	10,5	6,0	M12x1.25 6041617	42 6,0	No. 2 60416166	



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