



UNIVERSAL GLOW PLUG DRILLING OUT KIT M8x1

Manual

60416300 / 60416305



PICHLER
tools since 1978.

SAFETY NOTICE

To understand the functioning of the tools, is it 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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UNIVERSAL GLOW PLUG DRILLING OUT KIT M8X1

Part.-Nr. 60416300 / 60416305

No.	Part.-No.	Description	60416300	60416305
1	6049027	Pipe Brush Ø7.0 mm	1	1
2	6049024	Pipe Brush Ø4.7 mm	1	1
3	6041738	Tool Holder with Ratchet „KEEPER“	1	1
4	6041639	Drill Bit Ø4.5 mm	1	1
5	4024030	Angle Gauge 60° - 90° - 120°	1	1
6	60416536	Extraction Nut	1	1
7	1131025	Stud Puller Ø2.5 mm	1	1
8	6041633	Drill Bit Ø2.6 mm	1	1
9	6041632	Tool Holder for Taps	1	1
10	151.2042	Hex Key 2.0 mm	1	1
11	151.20425	Hex Key 2.5 mm	1	1
12	60421010	Reamer M8x1	1	-
13	1131035	Stud Puller Ø3.5 mm	1	1
14	6041631	Drill Sleeve with inner thread IG M8x1	1	1
15	60416675	Tool Holder for the Drill	1	1
16	6041635	Shouldered Drill	1	1
17	60416473	Pulling Spindle 180 mm	2	2
18	60416533	Pulling Sleeve	1	1
19	6041798	Thread Adapter for Slide Hammer AG M10 / IG M8	1	1
20	1131040	Stud Puller Ø4.0 mm	1	1
21	6041641	Drill Sleeve	2	2
22	6041643	Machine Tap UNF No.12x28	1	1
23	6041634	Machine Tap M8x1	1	1
24	6041874	Machine Tap M10x1	1	-
25	6042106	Insert Setting Tool for M8x1	1	1
26	6044080	Thread Insert M8x1 x 11	4	-
27	6041625	Glow Plug Hole Reamer Angle 90°	1	-
28	60416228	Glow Plug Hole Reamer Angle 120°	1	-

BEFORE STARTING WORK



In preparation the glow plugs must be freed of all obstructions to the repair, all attachments e.g. the plastic cover, the cable loom across the valve cover, high pressure pipes from the rail to the injector, inlet manifold etc. have to be disassembled.

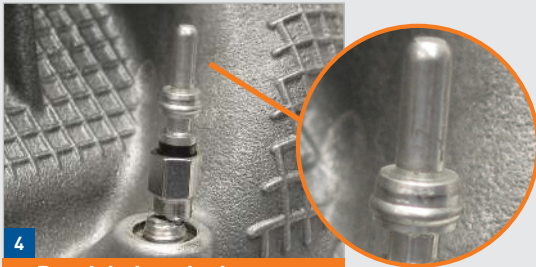


In order to better recognize the alignment of the glow plug in the cylinder head during non-guided boring or thread cutting, it is recommended, if possible, to remove the next following glow plug from the cylinder head and screw in the threaded bushing setter **6042106** instead.



1. REMOVING THE CORE ELECTRODE

A.) ELECTRICAL CONNECTION WITH A PLUG



4 Break below the hexagon

Place the **Stud Puller Ø4.0 mm 1131040** for smooth connectors on to the core electrode and break off the core electrode by turning it several times clockwise with a ¼" ratchet.



5 Remove the freed parts



...continue on page 15.

B.) THREADED ELECTRICAL CONNECTION



6 Break below the hexagon

Place the **Stud Puller Ø3.5 mm 1131035** for threaded connectors on to the pin of the cap of the glow plug and hammer it on. Break off the core electrode by turning it several times clockwise with a ¼" ratchet.



7 Remove the freed parts



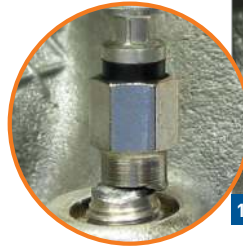
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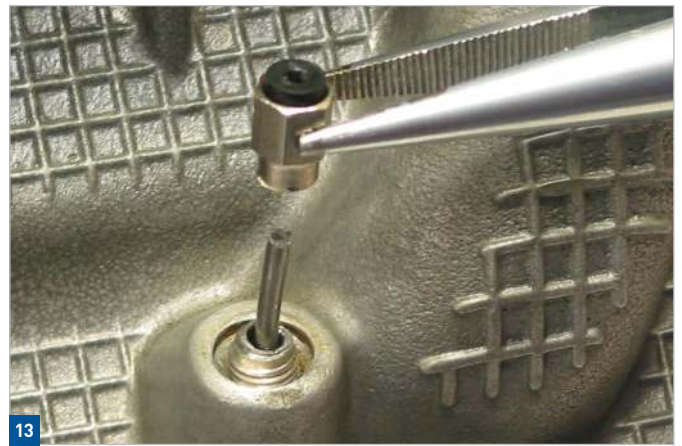
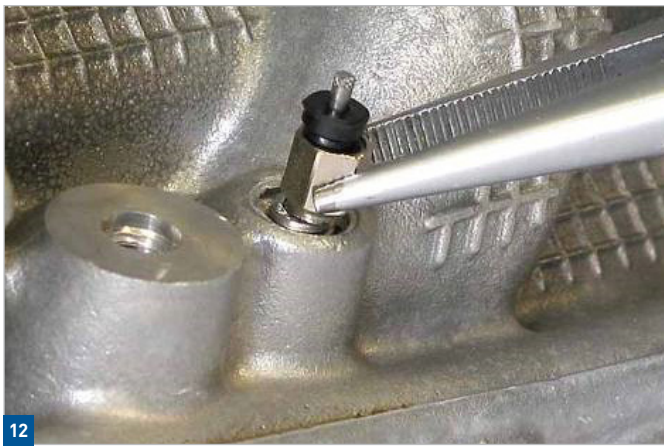
HINT: In rare cases it can happen that the center electrode breaks but cannot be removed from the glow plug. In this case the 3-cup puller **6041797** (not included in the set) can be used.



1.1 IF THE ELECTRODE BREAKS OFF DIRECTLY BELOW THE CONNECTOR CAP



Remove the freed parts.



Hammer the **Stud Puller Ø 2.5 mm 1131025** on the core electrode and break it off by turning it several times clockwise.



...continue on page 15

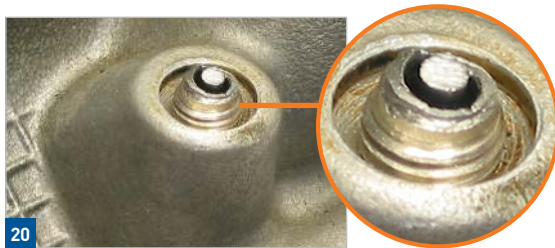
1.2 IF THE ELECTRODE DOES NOT BREAK OFF AT THE BOTTOM OR WORKING ACCORDING 1.1 IS NOT POSSIBLE



In order to better recognize the alignment of the glow plug in the cylinder head during non-guided boring or thread cutting, it is recommended, if possible, to remove the next following glow plug from the cylinder head and screw in the threaded bushing setter **6042106** instead.

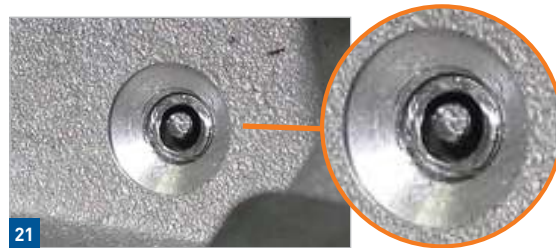


GLOW PLUG WITH A PROTRUDING THREAD



...continue with 1.2.1 on page 19.

GLOW PLUG WITH NO PROTRUDING THREAD



...continue with 1.2.2 on page 12.

1.2.1 GLOW PLUG WITH THREAD PROJECTION

A) Clean the protruding thread of the glow plug and the possible burr between the glow plug and center electrode.



B) Place the **drill-out sleeve 6041641** on the center electrode and initially drive the drill-out sleeve only halfway in.



HINT: If the boring sleeve falls in very easily, it must be slightly punched!

C) Hammer the boring sleeve flush with the center electrode.



D) Screw the **drill guide with IG 6041631** onto the protruding glow plug thread and tighten hand-tight.



E) Clamp **Tool Holder 60416675** with clamped in **Drill 6041635** in a power drill and grease it.

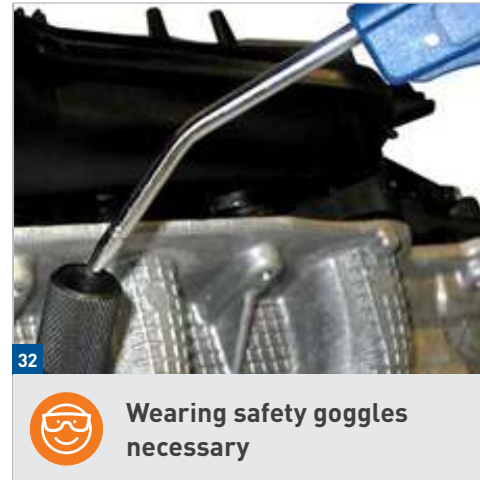


GREASE!

F) Drill out the centre electrode maximally to the bottom of the marker and withdraw the drill repeatedly during the drilling.



G) Remove the swarf from the sleeve with a magnet or compressed air.



H) Clamp Drill Ø 4.5 mm 6041639 in the Tool Holder 60416675 and drill till the stop of the sleeve and withdraw the drill repeatedly.



IMPORTANT: Grease!



Pull the drill out of the sleeve again and again and use a suction device, a magnet or compressed air to remove dirt and chips from the sleeve!



Wearing safety goggles necessary



...continue on page 15!

1.2.2 GLOW PLUG WITHOUT THREAD PROJECTION

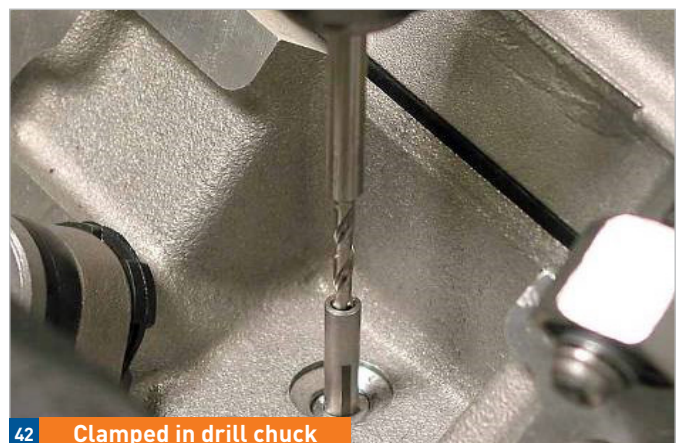
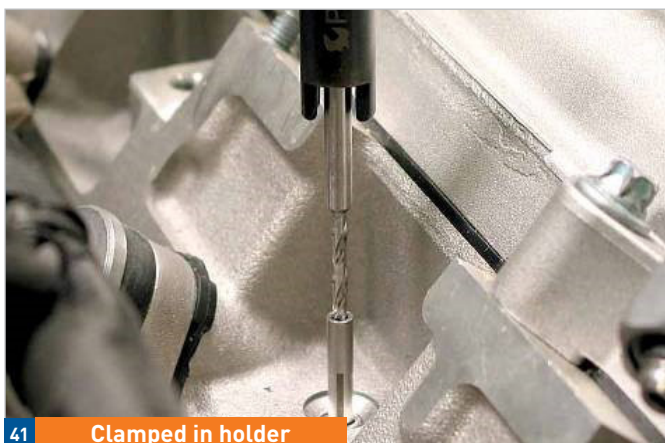
A) Remove possible burr between glow plug and center electrode and put the **drill-out sleeve 6041641** on the center electrode.



B) Hammer the boring sleeve in half.



C) Clamp the **Drill Ø2.6 mm 6041633** depending upon space conditions, into the **Tool Holder for Drills 60416675** or directly into the drill chuck.



D) Drill out the center electrode with feeling and under repeated settling and lubricating. Use a suction device, a magnet or compressed air to remove dirt and chips from the drill sleeve.



ATTENTION:

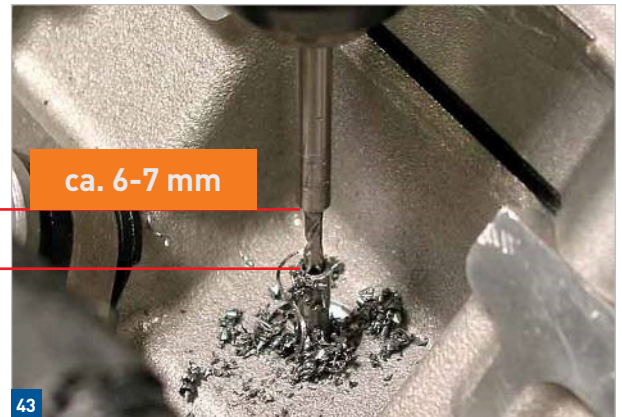
The special drill $\varnothing 2.6$ mm must not be used to drill completely into the drill sleeve. (at least 6 mm free).



Grease again and again!



Wearing safety goggles necessary



E) Drive the boring sleeve into the glow pencil until it protrudes only approx. 4-5 mm.

F) Repeat POINT **D)** and use a suction device, a magnet or compressed air to remove dirt and chips from the boring sleeve.



Wearing safety goggles necessary

G) Remove the sleeve with a pair of pliers.



H) Clamp Drill Ø4.5 mm **6041639** in the Tool Holder **60416675** and drill till the stop of the sleeve and withdraw the drill repeatedly.



IMPORTANT: withdraw the drill repeatedly from the sleeve to avoid a chip build up!



Grease again and again!



Wearing safety goggles necessary

Remove the swarf from the sleeve with a magnet or compressed air.



2. DRILLING OUT THE GLOW PLUG THREAD AND CUTTING A NO.12X28 UNF TH-READ IN THE GLOW PLUG



In order to better recognize the alignment of the glow plug in the cylinder head during non-guided boring or thread cutting, it is recommended, if possible, to remove the next following glow plug from the cylinder head and screw in the threaded bushing setter **6042106** instead.



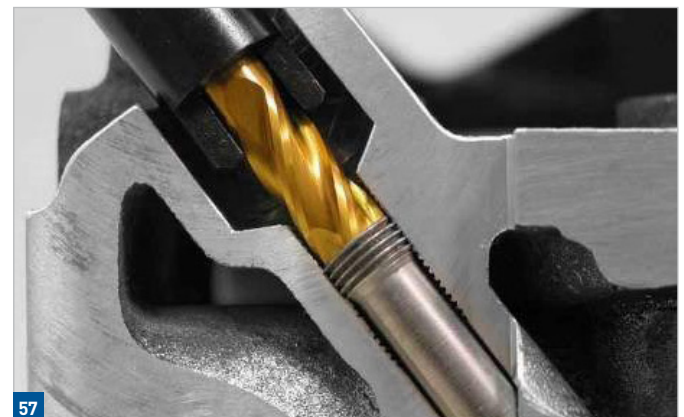
Clamp **Drill Ø4.5 mm 6041635** in the **Tool Holder 60416675** hand.

chamfer in 3-4 revolutions the glow plug by



Clamp **Drill Ø 4.5 mm** with the **Tool Holder** in an electric drill and drill for about 4 to 5 mm into the glow plug thread.

Glow plug bore in section



Remove the metal swarf with a magnet or compressed air.



Wearing safety goggles necessary



Clamp Tap UNF No.12x28 **6041643** into the **Adapter 6041632** or in the **tool holder Keeper 6041738** and tap, carefully and as deeply as possible, a thread in the glow plug. Check the alignment by means of a screwed-in threaded bush setter.

Remove the metal swarf with a magnet or compressed air.



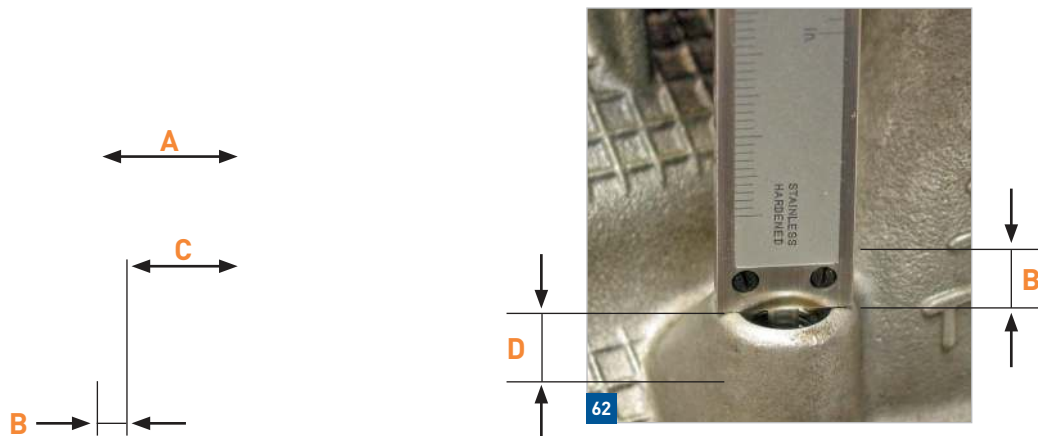
Wearing safety goggles necessary



3. DETERMINING THE REMAINING LENGTH OF THREAD AND DRILLING IT OUT

1. First measure the thread length **A** of a removed or a new glow plug and write it down.
2. If thread of the installed glow plug protrudes from the glow plug shaft, then this protrusion **B** must be subtracted from the total length **A**.
3. Now measure the present thread depth **D**.

$$A - B = C$$



No protrusion:
Protrusion:

$A - D$ = now to be drilled depth
 $C - D$ = now to be drilled depth

4. TAPPING A THREAD UNF NO.12X28 INTO THE GLOW PLUG AND MEASURE

Now drill out the previously calculated length of thread, while withdrawing the drill repeatedly.



IMPORTANT: Occasionally re-measuring avoids that the glow plug is drilled out too deep or not enough!



GREASE!



Glow plug bore in section



Use a suction device, a magnet or compressed air to remove dirt and chips from the glow plug shaft.

Clamp Tap UNF No.12x28 **6041643** into the **Tool Holder 6041632** or in the **Tool Holder Keeper 6041738** and tap, carefully and as deeply as possible, thread in the glow plug. Remove the metal swarf with a magnet or compressed air.

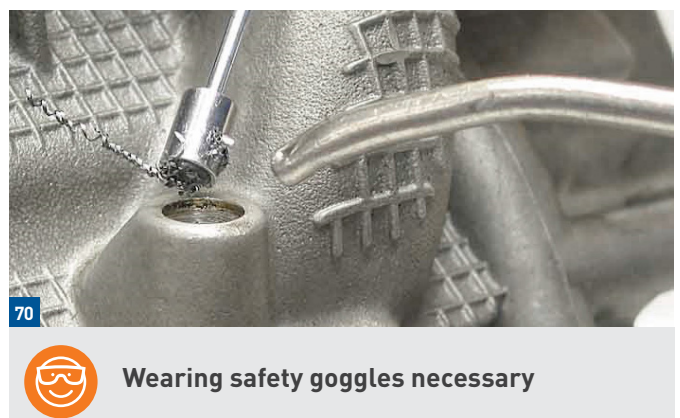


Remeasure the depth **D** and write it down.



5. RECUTTING THE FASTENING THREAD IN THE CYLINDER HEAD

Clamp Tap M8x1 **6041634** in **Tool Holder 6041632** or in **Tool Holder Keeper 6041738** coat the tap with grease and clean the thread in the cylinder head. Remove the metal swarf with a magnet or compressed air.



6. PULLING THE GLOW PLUG

Screw **Pulling Spindle** 180 mm **60416473** in the glow plug.



Place **Pulling Sleeve** **60416533** over Pulling Spindle screw **Pulling Nut** **60416536**.



By operating the pull nut with a wrench SW13 and simultaneously holding it against the hexagon of the extraction thread spindle 180 mm with a wrench SW5, pull out the glow plug residue.



If extraction goes sluggish (excessive force is needed on the pulling nut) then the pulling nut must be unscrewed (1-2 turns) every now and again and the pulling spindle be tapped on the hex end with a hammer!

Furthermore, with the **adapter 6041798** and the **impact hammer 60390750** (not included in the set) can be attached to the feed shaft and the glow plug residue can be loosened and removed by lightly tapping.



7. CLEANING THE GLOW PLUG SHAFT

Clean the now vacant glow plug shaft, first with **Pipe Brush Ø7 mm 6049027** and then with **Pipe Brush Ø 4.7 mm 6049024**.



Wearing safety goggles necessary



HINT: With a visual inspection (possibly videoscope 9078000 - not included in the set) check the cleaned glow plug bore in the cylinder head for dirt residues and repeat the cleaning procedure if necessary.



8. DETERMINING THE SEALING SEAT ANGLE OF THE GLOW PLUG FOR CHOOSING THE APPROPRIATE REAMER

Determine the sealing seat angle with the **angle gauge 4024030** on the removed and cleaned or at the newly to be installed glow plug.

on the removed and cleaned or at the newly to be installed glow plug.

Example: glow plug with sealing cone angle 60°



9. INSTALLING THE REAMER IN THE CYLINDER HEAD (GLOW PLUG SHAFT)

Slide the selected reamer into the screw-in guide.

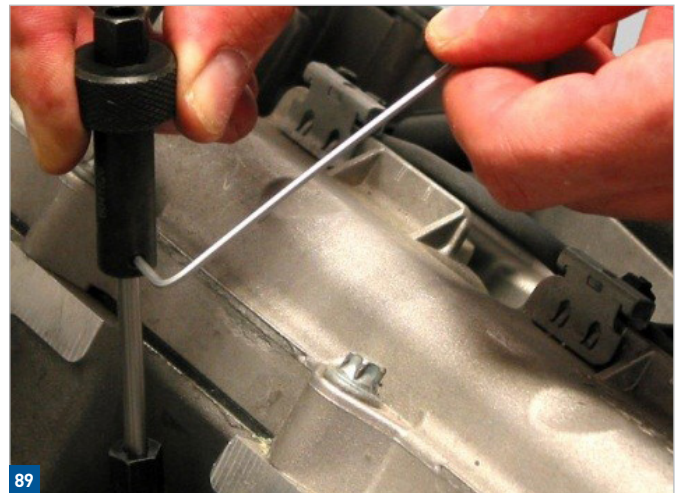


IMPORTANT: Wet the cutting edge of the reamer with some grease to bind the removed material.



Screw the guide in the glow plug hole to the stop, insert the reamer carefully into the glow plug hole and tighten the guide by hand with a socket.

Mount the thumbwheel on the square of the reamer and clamp it.



10. REAMING THE SEALING SEAT IN THE CYLINDER HEAD

Clear the sealing cone in the cylinder head carefully, only rotating clockwise and without noticeable pressure, of soot and grime.



IMPORTANT: Rotate only clockwise and apply only light pressure!

The thumbwheel can be extended, if needed, with an extension and a socket 10.



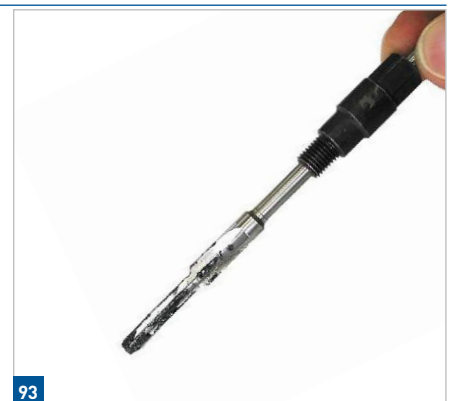
11. CLEANING AND INSPECTING OF THE SEALING SEAT IN THE CYLINDER HEAD

After cleaning remove the thumbwheel from the reamer and unscrew the guide with the socket wrench and pull the stepped reamer carefully out of the hole.



Clear the glow plug hole with compressed air or a suction extractor unit of soot and grime.

With a visual inspection (evet. **videoscope 9078000** - not included in the set) check the cleaned glow plug bore in the cylinder head for dirt residues and repeat the cleaning procedure if necessary.



12. REPAIR OF THE THREAD IN THE CYLINDER HEAD

Prepare glow pencil residue for the sealing plug: Shorten the removed glow plug residue at the drilled end by approx. 25 mm, cut UNF No.12x28 threads and deburr with a file or emery cloth.

Reinsert the glow pencil residue into the cleaned glow pencil shaft as a sealing plug.



Insert the **Reamer Ø9 60421010** into the glow plug shaft and ream with an appropriate tool approx. 14 mm into the glow plug shaft and remove the swarf.



Use a suction device, a magnet and/or compressed air to remove dirt and chips from the glow plug shaft in the cylinder head.





In order to better recognize the alignment of the glow plug in the cylinder head during non-guided boring or thread cutting, it is recommended, if possible, to remove the next following glow plug from the cylinder head and screw in the threaded bushing setter **6042106** instead.



Clamp Tap M10x1 **6041874** into Tool Holder **6041632** or in Tool Holder Keeper **6041738** and tap, carefully and as deep as possible, a thread in the cylinder head.



Remove with a magnet or compressed air the swarf.

Use a magnet or the spindle to remove the plug from the glow plug shaft.



Wearing safety goggles necessary

Screw a **Thread Insert M8x1 6044080** on **Insert Setting Tool 6042106**.



Coat the Thread Insert with a thread locking adhesive



Screw using the Insert Setting Tool the Thread Insert M8x1 in the cylinder head.



Remove Insert Setting Tool and install the new glow plug. Please observe the torque specified by the manufacturer.



RECOMMENDED ACCESSORIES

DRILLING OUT MILLING CUTTER SET

90417960 tool holder and milling cutters for M8, M10 and M12 for broken taps in e.g. glow plugs

UNI BROKEN GLOW PLUG REMOVAL

90417900 for M8x1, M9x1, M10x1, M10x1,25

UNIVERSAL GLOW PLUG REMOVAL KIT

60417755

GLOWPLUG HOLE BRUSHES SET

90490300 14-pcs.

THREAD INSERT SET

6044085 M 8x1,0x11

EXTRACTION SPINDLE UNF NO.12, M8

60416475



CENTRING AND SUPPORT TUBE

60416535 162 mm long

GLOW PLUG EXTRACTION KIT

60390755 for frozen glow plugs including extractor

SLIDE HAMMER 1350 G

60390750 Inner Thread M10, stroke: 45 mm

SLIDE HAMMER 0.7 KG

1030210 Inside Thread M10, Stroke 140 mm

FLEXIBLE LAMP „BAL“

9078000 410 mm long with protective tube, tip diameter 3.2 mm

HOLDER FOR SPECIAL DRILLS

6041667 164 mm long for
6041635
6041639
6041633
and more





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