

## DESIGN SPECIFICATION GLOW PLUG SENSOR / ADAPTOR

**A detailed description of the original glow plug and bore is required in order to customize the glow plug sensor / adaptor according to your specific application.**

To ensure the best performance and durability of the sensor / adaptor solution the bore dimensions in the flame deck are particularly critical. Based on this data, AVL can design the adaptor according to the customer's needs. The data is stored in the AVL database for further orders. The input, as well as forwarding of the form, can be carried out electronically. The order form is also available as download at [www.avl.com/sensors](http://www.avl.com/sensors).

### Base information:

Customer name / contact	AVL name / contact	Date

### Engine information:

Engine manufacturer / code	Glow plug manufacturer / part number

### Selection of glow plug sensor / adaptor (type selection via checkbox):

Article number	Sensor / adapter	Thread diameter D4	Tip bore diameter DB	Selection
TIGH13GPA.01	GH13G	$\geq M8$	$4.3 \text{ mm} \leq DB \leq 5.0 \text{ mm}$	<input type="checkbox"/>
TIGG1323A.01 TIAG04A.01	GH14P AG04	$\geq M8$	$\geq 5.0 \text{ mm}$	<input type="checkbox"/>
TIGG1323A.01 TIAG03A.01	GH14P AG03	$\geq M10$	$\geq 5.0 \text{ mm}$	<input type="checkbox"/>

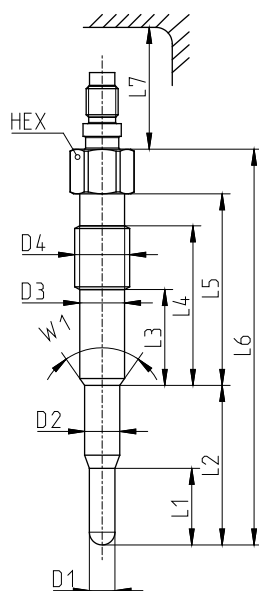
### New glow plug design (definition by AVL personal):

A new design needs to be done, if the glow plug of interest isn't available in the AVL adapter data base. Customer understands the need for this article.

Article number	Article	Selection
TIAGDESA.01	Glow plug sensor / adaptor design	<input type="checkbox"/>

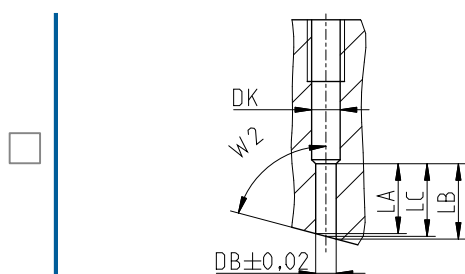
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Specify shape and dimension of the original glow plug:

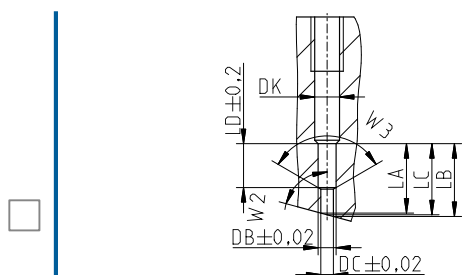


D1 = \_\_\_\_\_ mm  
D2 = \_\_\_\_\_ mm  
D3 = \_\_\_\_\_ mm  
D4 = M\_\_\_\_\_ x \_\_\_\_\_  
L1 = \_\_\_\_\_ mm  
L2 = \_\_\_\_\_ mm  
L3 = \_\_\_\_\_ mm  
L4 = \_\_\_\_\_ mm  
L5 = \_\_\_\_\_ mm  
L6 = \_\_\_\_\_ mm  
L7 = \_\_\_\_\_ mm  
W1 = \_\_\_\_\_ °  
HEX = \_\_\_\_\_ mm

Specify type, shape and dimension of the glow plug bore:



LA = \_\_\_\_\_ mm  
LB = \_\_\_\_\_ mm  
LC = \_\_\_\_\_ mm  
DB = \_\_\_\_\_ ± \_\_\_\_\_ mm  
DK = \_\_\_\_\_ ± \_\_\_\_\_ mm  
W2 = \_\_\_\_\_ °



Final check (with bore type B):  
LA – LD ≥ 15 mm  
LA + L3 ≥ 57 mm

LA = \_\_\_\_\_ mm  
LB = \_\_\_\_\_ mm  
LC = \_\_\_\_\_ mm  
LD = \_\_\_\_\_ ± \_\_\_\_\_ mm  
DB = \_\_\_\_\_ ± \_\_\_\_\_ mm  
DC = \_\_\_\_\_ ± \_\_\_\_\_ mm  
DK = \_\_\_\_\_ ± \_\_\_\_\_ mm  
W2 = \_\_\_\_\_ °  
W3 = \_\_\_\_\_ °

## FREQUENTLY ASKED QUESTIONS GLOW PLUG SENSOR / ADAPTOR

**AVL has made a list of frequently asked questions and tricks in order to avoid typical problems occurring while defining a glow plug adapter.**

Question	What is the difference between an original glow plug and a measurement glow plug?
Answer	<p>The original glow plug is supporting the engine start especially with low ambient temperatures (cold start). Due to this the tip of the glow plug is designed to bring as much heat as possible into the fuel / air mixture in the combustion chamber. One factor that influences the heat contribution is the gap between the glow plug and the glow plug bore in the cylinder head.</p> <p>The glow plug adaptors and sensors are used for the pressure measurement in the combustion chamber without the glow function. It is necessary to have a minimum gap between the glow plug adaptor / sensor and the bore in the cylinder head in order to ensure the best possible lifetime of the sensor. With this design, the heat transfer from combustion to the adaptor and sensor is reduced to a minimum. Based on this, the diameter and shape of the tip has to be aligned with the glow plug bore in the cylinder head. The diameter DB, DK and DC (if applicable) have to be determined with the best possible precision in order to allow the design department the smallest tolerances.</p> <p>Beside the lifetime the measurement accuracy is most important. The adapter construction allows a positioning of the pressure sensor membrane close to the combustion chamber with a minimum of pipe oscillation.</p> <p>To ensure a safe and damage-free dismounting a minimum wall thickness is needed. The pressure sensor GH14P has an outer diameter of 4.3 mm, therefore the minimum diameter for the usage of a sensor with glow plug adaptor (modular approach) is a DB of 5 mm. For bore diameters smaller than 5mm, AVL can provide a glow plug sensor GH13G. This glow plug sensor will then be suplication specific and can't be used in engines with different bore dimensions.</p>
Question	Which dimensions are needed minimum in order to make a proper design proposal?
Answer	<p>It is possible to make a design proposal, if:</p> <ul style="list-style-type: none"> <li>a) the dimension of the original glow plug is available (but this is a recessed solution with pipe oszillation)</li> <li>b) the dimension of the original glow plug and the diameter DB, DK and DC (if applicable) and the length LA respectively LD are available</li> <li>c) all dimension / the construction drawing of the glow plug bore and the tip geometry of the original glow plug (D1 and L2) are available</li> </ul> <p>AVL will do a check of these dimensions with all existing glow plug drawings. In case the drawing already exists, you will get a drawing for verification. If the drawing does not exist, AVL will make a new design and the construction costs of this drawing are charged. You will get the design proposal afterwards for verification.</p>
Question	How could the bore dimensions be determined in an easy way?
Answer	<p>The minimum information are the diameters of the bore (DB, DK and DC (if applicable)). The diameters could be determined by the use of small bore gauges, a length of drill rod, or the shank of a new drill bit. A maximum diameter difference of 0.1 mm is required for the bore so that the customer could define the normal which fits and the normal which does not fit into the bore (go/no go).</p> <p>The determination with a tolerance of 0.1 mm is the minimum level of precision needed. A more precise determination with the help of a micrometer and small bore gauges is the preferred solution.</p>

## FREQUENTLY ASKED QUESTIONS GLOW PLUG SENSOR / ADAPTOR

Question	Why is the information of the engine type, original part number or manufacturer code not enough?
Answer	<p>The engine type normally only leads to a part number of the spare part. With this spare part number (or manufacturer part number) the dimension of the glow plug is normally not available and the dimensions of the bore in the cylinder head cannot be judged. Most of the time it is impossible to judge the bore diameter DB and DC. Depending on the tolerances of the glow plug bore it could be necessary to define different adapters for each bore or to ream the bore to a defined value.</p> <p>For most requests no engine code or part number is given, although AVL has manufactured more than 500 different types of glow plug adapters. In addition, it is possible that due to some of the required changes, the cylinder head has to be changed slightly as well. Based on this the dimension must be checked even with known engine type information in the data base.</p>

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