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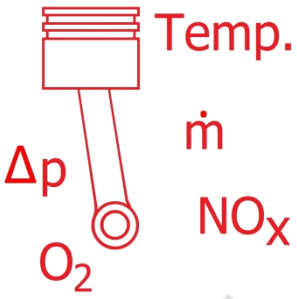
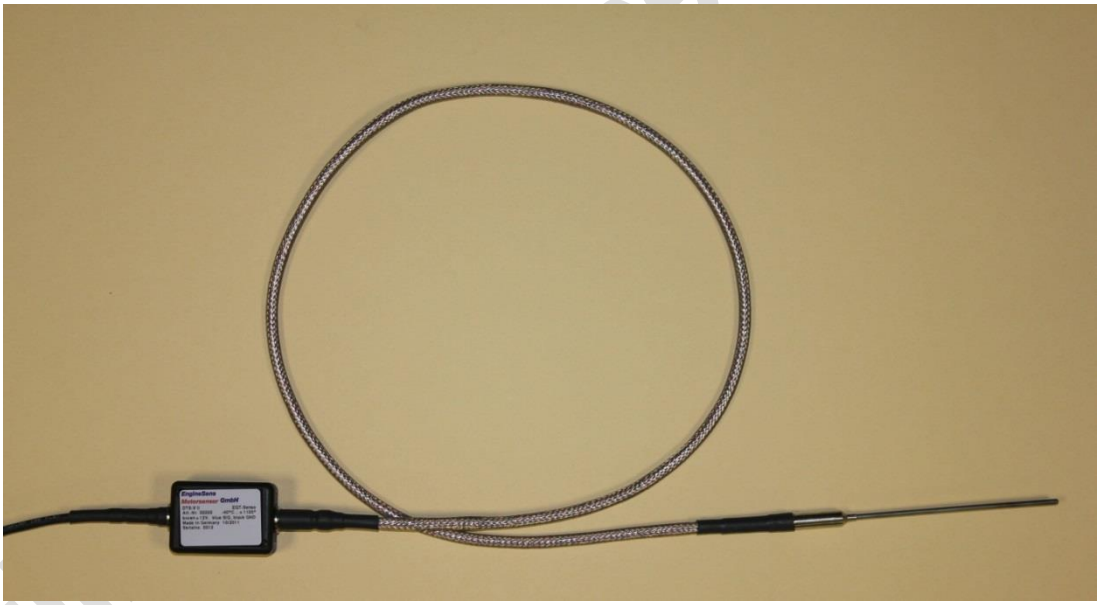


Installation Instructions for High-Temperature Probes DTS-V III BHKW Part.-No. 30200



Content:

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Dear customer,

With this product you purchased a quality sensor „made in Germany“. Each part was carefully assembled and tested. The design of this product has been used in many racing applications. These sensor probes have been successfully tested in vehicles of the Rally Paris-Dakar and in formula III racing cars. The maximum operation temperature is 1100°C and by far higher most components can withstand. Please consider that turbochargers cannot resist to those temperatures over longer time. Catalysts are destroyed when exceeding 950°C. The final engine fine tuning and the way of driving should consider those facts. In case of questions do not hesitate to contact us.

1. Mechanical mounting with compression fitting M6 (not included)

It is recommended to position the probe tip as centered as possible in the hot zone of the exhaust manifold or exhaust pipe. An overhead installation is permitted. An easy way to attach is our stainless steel compression fitting M6 (Part-no. 40040). To fix this a hole ∅ 4.9 mm has to be drilled. A thread M6 is to be cut then. Please make sure that no dirt or other parts remain in engine parts.

2. Assembly of compression fitting

Disassemble the compression fitting in separate parts. Slide the union nut with the thread showing to the sensor tip over the long tube. Then slide the compression cone showing with the small diameter to the tip over the tube.

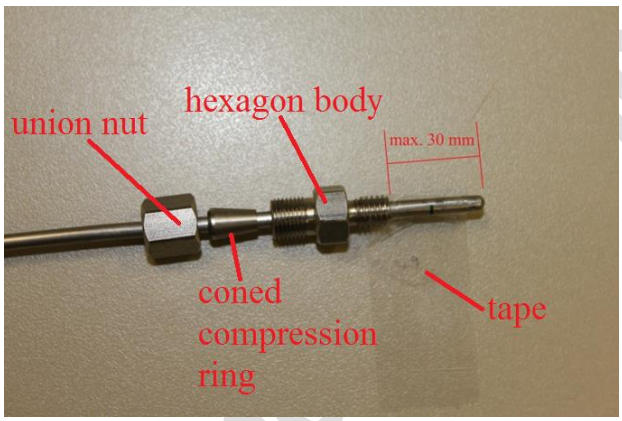


Fig: Separated parts of the compression fitting.
The threaded hexagon body is fixed with
adhesive tape at the desired intrusion length.

Determine the intrusion length for the next step. It is depending on the installation conditions. Ideally the sensor tip is in the middle of the exhaust pipe. It is up to the user to determine the optimum intrusion length. Nevertheless 30 mm should not be exceeded especially if high temperatures and tough vibrations occur at the same time. Push the hexagon threaded body over the sensor tip according to the determined intrusion length. Fix the sealing surface at the desired position. Helpful is the use of adhesive tape or modeling clay. Screw the union nut together with the coned compression ring to the hexagon body. The compression fitting have to be pressure proof.

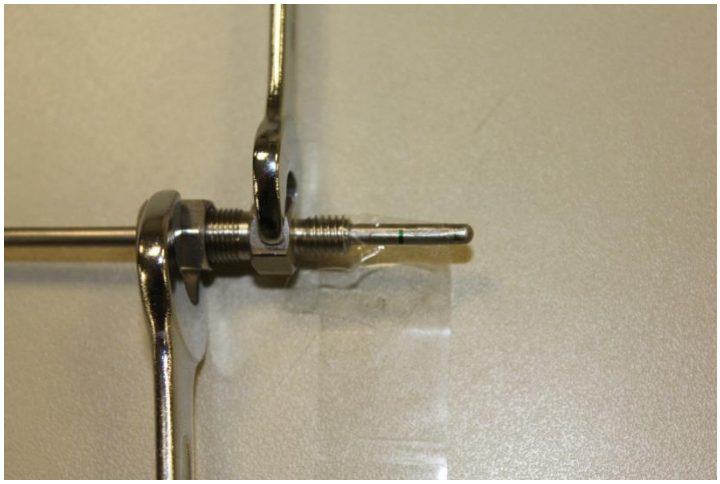


Fig.: Installation of the compression fitting. The tape assisting to fix the intrusion depth has to be removed before final assembly at the engine.

4. Bending of the sensor tip

If needed the sensor tip can be bent between compression fitting and transition sleeve fixed to the stainless steel braided sleeving. A minimum bending radius of 15 mm has to be considered. Sharp edges are to be avoided and destroy the sensor. The sensor tube must never be bent from the free hand. It is helpful to use a round contour, e.g. a broom handle.

Fig.: Bending the thermocouple over a circular shape. Never press the transition sleeve.

5. Mounting the sensor tip in the exhaust line

Screw the temperature probe with the compression fitting in the exhaust line. The mounting torque is limited to 10 Nm.

6. Mounting the black transmitter box

The transmitter (black plastic case) has to be mounted at a suitable location in the engine compartment. A flat space ca. 50 x 90 mm is required. A simple means for attachment is the use of cable binders. The maximum operating temperature of the transmitter is 130°C. The metal braided cable may never be cut or enlongened. The minimum bending angle is 20 mm. sharp edges have to be avoided.

7. Electrical installation

The high-temperature probe DTS is based on a thermocouple type N and a transmitter that amplifies the thermal voltage and integrates a cold-junction compensation.
The supply voltage of the transmitter is battery voltage 12V DC at pin no. 3
Ground is on pin no. 2. The output signal comes from pin no. 3.
Please use the color scheme underneath:

Pin 1:	output 0-5V DC	blue or white
Pin 2:	ground	black
Pin 3:	+12V DC supply voltage	brown or red

The black cable is specified for temperatures: -40°C…+130°C. Thermal hot components like exhaust gas manifold, turbocharger, etc. should never be too close to the wire.

8. Signal output

The thermal voltage of the sensor tip is transmitted in a 0…5V voltage output. The dependency of temperature and voltage output is described by the formula following:

Up to an output voltage < Uout = 2,327V (500°C) this formula is to be applied:

$$T = 10{,}14 \times (Uout^3 - 7 \times Uout^2 + 40 \times Uout - 18{,}2)$$

With an output voltage higher than > Uout = 2,327V (500°C) the second formula has to be used:

$$T = 232{,}4 \times Uout - 39{,}86$$

The calculated measuring error is max. 10°C.

A precise Temperature-Voltage-Table can be downloaded in the internet under http://www.enginesens.com/DTS-V_V-T-Table_since_September_2011.pdf .
In case of interruption, breakage of sensor tip and short-circuit ground-signal an output signal of 0 V will be generated. In case of short-circuit +12V-signal a signal >5 V will be measured. Avoid misconnections!

9. The transmitter

The black transmitter box is mounted in the engine compartment and is designed for these conditions. It resists heat up to 130°C, moisture and vibrations. All electronic components are fixed on a printed circuit board (PCB) with leadless solder. The plastic box is made out of PA-66. The supply voltage is provided by the vehicle´s battery voltage 12 V DC at clamp 15 (ignition on). In order to fulfill all EMC requirements the electronics has been equipped with filters. All components are RoHS-compatible. The transmitter circuit is optimized for ambient temperatures of 85°C. Here the precision achieved is at an optimum. At higher and lower temperatures the characteristic curve shifts some degrees. At ambient temperatures of 125°C the column indicated 125°C is then valid. The table under http://www.enginesens.com/DTS-V_V-T-Table_since_September_2011.pdf is very precise and ensures an overall precision of 12 K at 1.100°C. For free programmable ECU we recommend to take the values in column 85°C or to measure the temperature profile in the compartment where the transmitter box is installed.

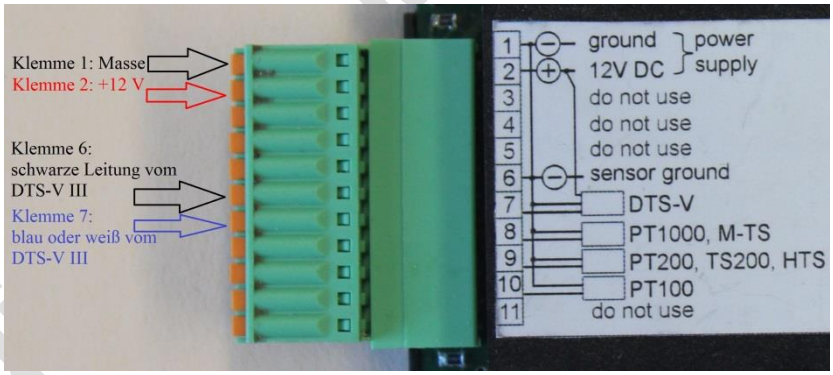
10. Signal processing

The output signal can be read and processed directly by some racing ECU´s (e.g. by Trijekt). If you are processing in another manner please consider that most electric circuits only can process up to 5 V DC. In case of short-circuit the battery voltage might be conducted to the ECU. Then 12 V DC are on that clamp. In any case it is recommended to use a short-response fuse for that channel. EngineSens Motorsensor offers a display unit especially adapted for the DTS-V, supply voltage +12 V DC and simultaneously indicating the present gas temperature.

11. Electrical interface specification

Supply Voltage	
Power	7….30 Volt
Stand-By Current	<10mA
Polarity Protection	available
Output Signal	
Min. output voltage	0,37V @ T=-44 °C
Max. output voltage	4,89V @ T=1097 °C
voltage-temperature characteristics see table	
Cable interruption detection Output current sink	Ua=0V typ 15mA
Output current as current source	typ 15mA
Max. capacitive load	typ 47nF

We offer the DTS-V III product line with many variants regarding different intrusion lengths, different mounting options, bending angles, etc. In case of any questions or information required contact us.



Always good success!

Your Team

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