DENSO

Exhaust Gas Temperature Sensors

www.denso-am.eu

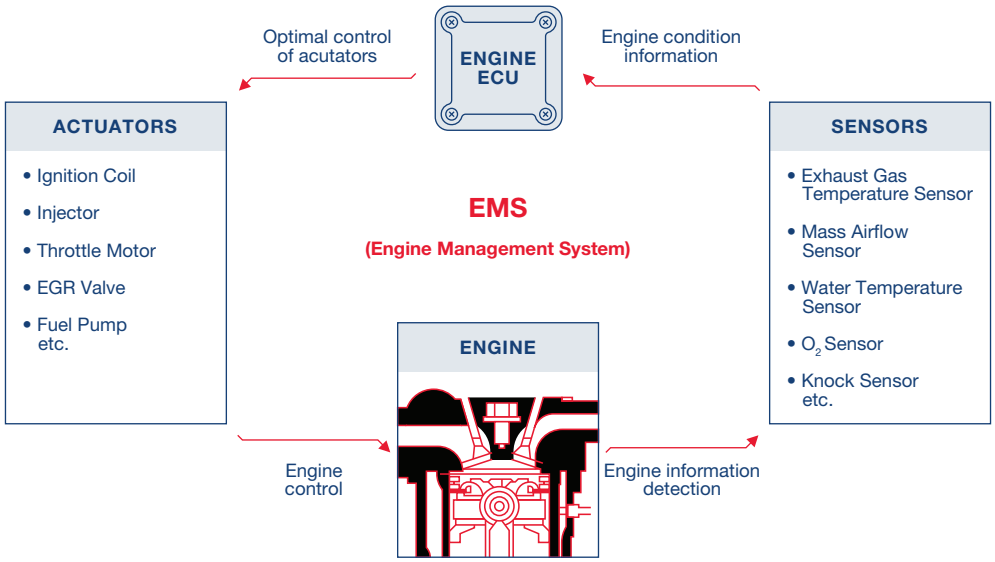
Driven by Quality

Content

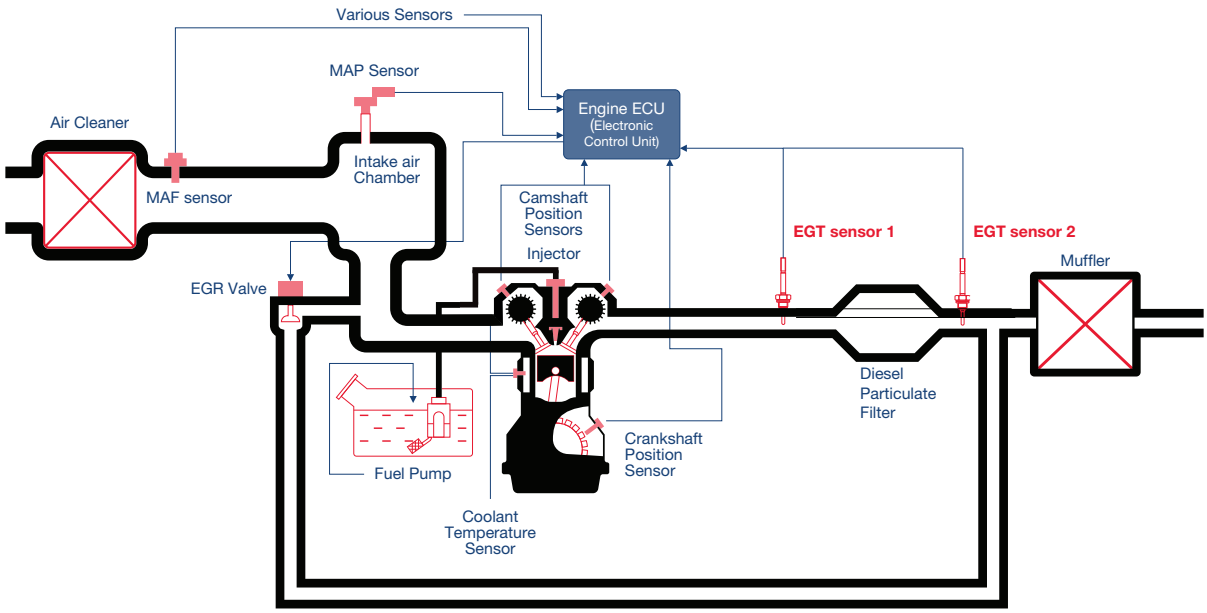
DENSO EMS RANGE

- Mass Air Flow (MAF) Sensors
- Ignition Coils
- Fuel Pumps
- Exhaust Gas Recirculation (EGR) Valves
- **Exhaust Gas Temperature (EGT) Sensors**
- Manifold Absolute Pressure (MAP) Sensors
- Cam & Crank Shaft Position Sensors

The **Engine Management System (EMS)** is an electronically controlled system that uses a computer (the Electronic Control Unit, or ECU) to optimize engine operation at all times. Various types of sensors in the EMS detect the operating condition of the engine and transmit the information to the ECU, which in turn electronically controls various types of actuators (motors) to operate the engine at optimal conditions.



EMS system overview (EGT sensor)



DENSO leading in OE business

DENSO Engine Management Systems (EMS) are designed with a strategic focus on key aspects that contribute to the overall efficiency, reliability, and cost-effectiveness of automotive systems.

Here are the primary areas of emphasis in DENSO EMS designs:

- Most efficient emission controls
- Lifetime vehicle durability
- Lowest overall system cost

DENSO is

- Preferred OE supplier
- Exhaust emission control expert for both diesel and petrol EMS
- Essential for IAM distributors that need a complete range

- Isuzu
- Ford
- Subaru
- Suzuki
- Renault
- Nissan
- Dacia
- Volvo
- Toyota
- FIAT
- Lexus
- BMW
- GM
- Opel
- KIA
- Peugeot
- Citroën
- Mitsubishi
- Mazda
- Cummins
- Alfa-Romeo
- Infiniti
- Mercedes-Benz
- Hyundai
- Iveco

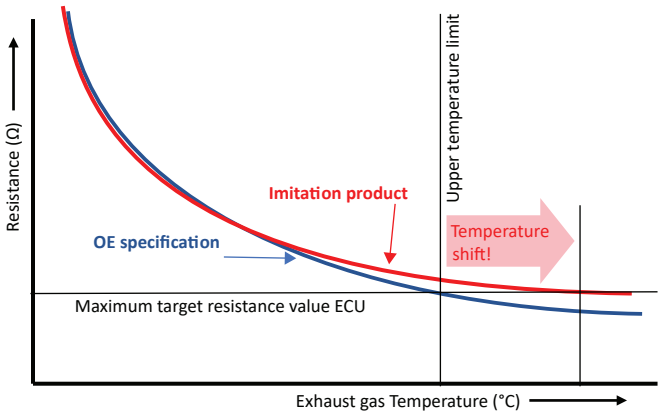
Aftermarket growth based on OE business know how

Technical benefits

No risk: 100% guaranteed vehicle compatibility

DENSO Negative thermal coefficient (NTC) sensors use thermistors with Market leading detection accuracy. The non-linear behavior which is faster and more accurate than linear PTC based sensors.

Our sensors are manufactured on the same production lines and with the same materials and processes. This guarantees the same strict OE specifications. This is critical due to the non-linear characteristics of NTC thermistors: Imitation products are often creating out of range signals, which can lead to very severe damage to expensive exhaust related emission control systems (for example overheating of DPF, turbocharger, etc).



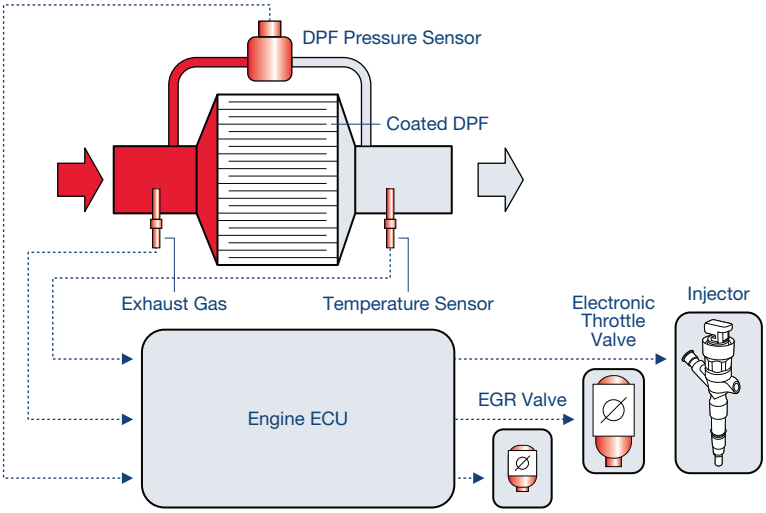
Diesel exhaust after-treatment systems

Components:

- Diesel Particulate Filter (DPF)
- Exhaust Gas Temperature Sensor
- DPF pressure sensor

One very common example of application:

When the DPF is clogged, the DPF pressure sensor detects a pressure drop out of specification. The ECU will then adjust the fuel injection and EGRV operation to increase the exhaust temperatures. The task of the temperature sensor is to monitor this process.



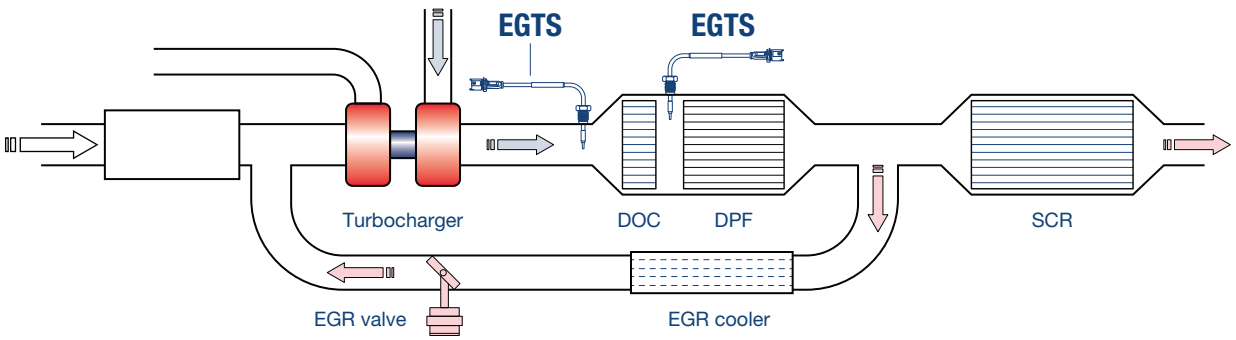
Emission reduction AND keeping engine performance

How EGTS work

EGTS work by accurately measuring the temperature of the exhaust gases and providing this information to the vehicle's ECM or ECU. This data is crucial for optimizing combustion, controlling emissions, facilitating regeneration processes, and preventing overheating in the exhaust system. EGTS contribute to the overall efficiency, performance, and environmental compliance of modern vehicles.

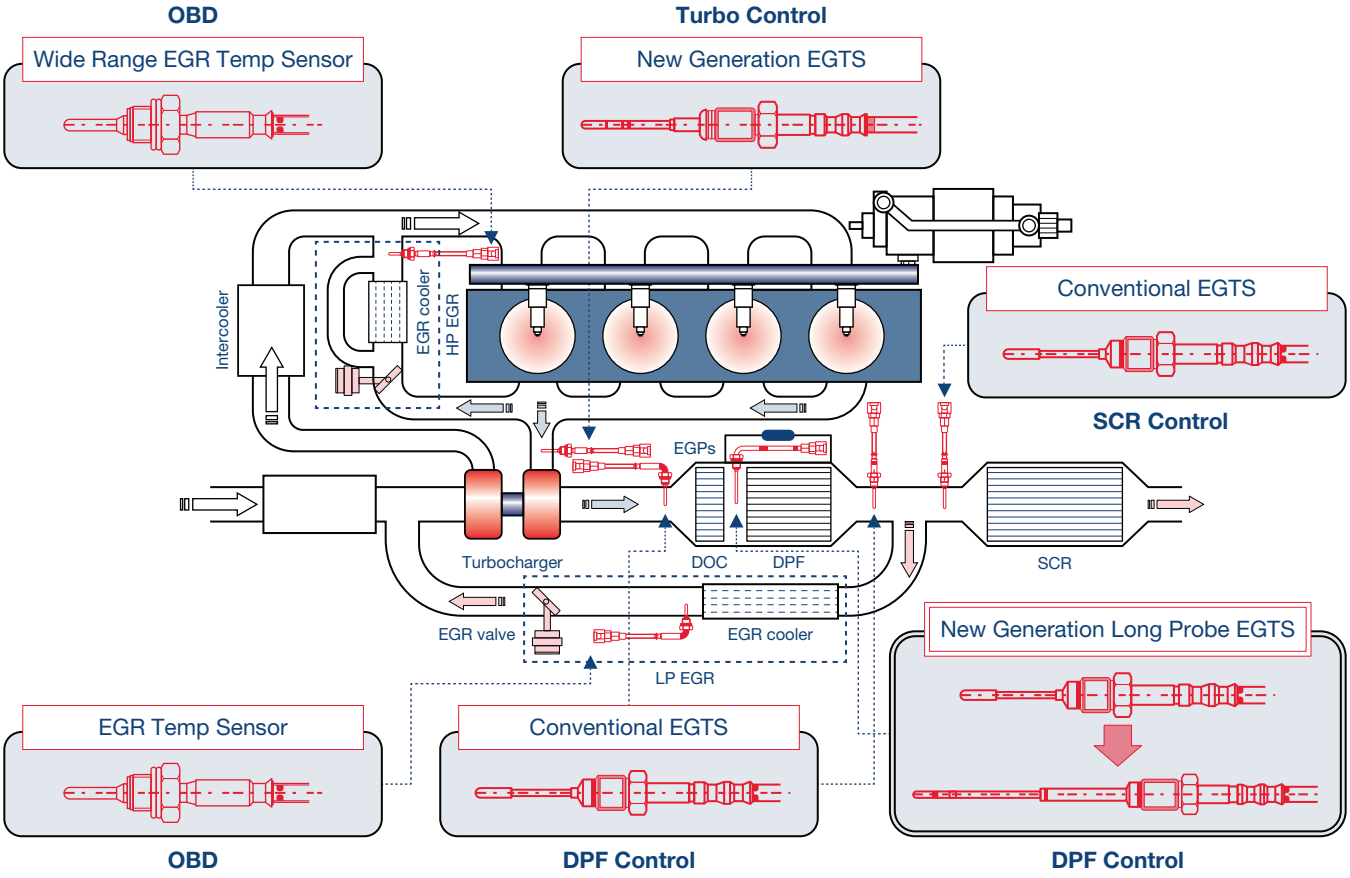
Additional EMS capabilities by using EGTS feedback

- Post injection control
- Estimation of particulate matter loaded amount
- Improved regeneration control (fuel economy up and emissions down)
- Catalyst deterioration
- Over heat protection



Temperature Sensor Applications

These applications highlight the versatility and importance of temperature sensors in maintaining optimal conditions, ensuring safety, and enhancing the efficiency of various processes.



Abbreviations:

DOC = Diesel Oxidation Catalyst
DPF = Diesel Particulate Filter
EGPs = Exhaust Gas Pressure sensor
EGR = Exhaust Gas Recirculation
LP EGR = Low Pressure EGR
HP EGR = High Pressure EGR
OBD = On Board Diagnostics
SCR = Selective Catalytic Reduction

Wide variety of sensors available for each purpose/system

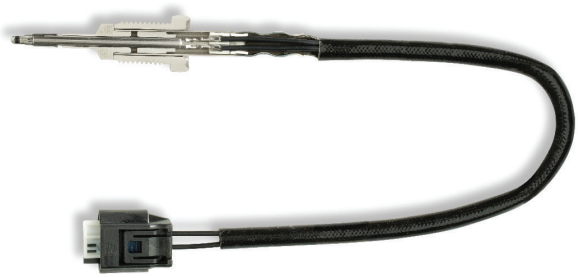
Why DENSO exhaust gas temperature sensors

Car makers often turn to DENSO for various reasons, finding it to be a reliable and preferred choice for a range of automotive components.

Here are some compelling reasons why carmakers rely on DENSO:

- Small size, High Responsiveness
- High detection accuracy
- Heat and vibration resistant

In summary, car makers rely on DENSO for its commitment to producing high-quality components that offer small size, high responsiveness, high detection accuracy, and resistance to heat and vibration. DENSO's reputation for delivering best-in-class performance, coupled with a focus on innovation, positions it as a trusted partner for automotive manufacturers seeking reliable and advanced components for their vehicles.



Reasons for distributors to sell DENSO

NTC (Negative Temperature Coefficient):

DENSO's incorporation of Negative Temperature Coefficient (NTC) technology in its products is a notable advantage. NTC thermistors are temperature-sensitive resistors that exhibit a decrease in resistance with an increase in temperature. This technology is often used in temperature sensors and other applications within automotive systems.
The use of NTC technology enhances the accuracy and responsiveness of sensors in monitoring and controlling various parameters, contributing to the overall efficiency and performance of the vehicle.

Competitive Technological Edge:

DENSO's commitment to innovation and technological advancements provides distributors with a competitive edge. If competitors lack comparable or compatible technologies, distributors can position DENSO products as technologically advanced and superior in performance.
Distributors can leverage DENSO's technological edge to attract customers who prioritize the latest advancements in automotive components for their vehicles.

Large Car Park in Europe:

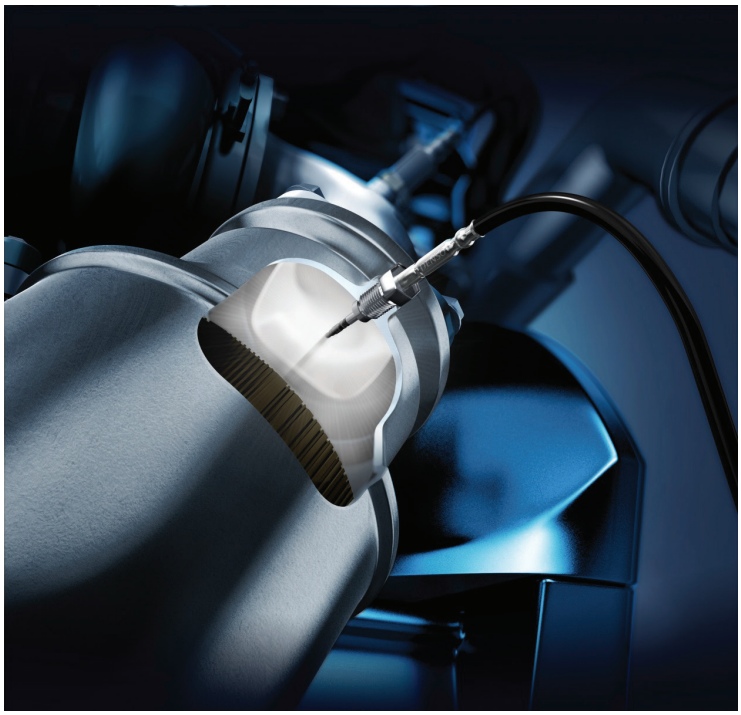
DENSO's products are designed to meet the needs of a wide range of vehicles, making them well-suited for the European automotive market.
Distributors can capitalize on the extensive coverage offered by DENSO to cater to the diverse requirements of the European car park, providing a one-stop solution for various makes and models.

OE Product Specifications Only:

Distributors can emphasize that DENSO components are designed to the same specifications as the original parts installed in vehicles during manufacturing.
This focus on OE specifications ensures compatibility, reliability, and seamless integration, which are critical factors for both distributors and end customers seeking high-quality automotive components.

EGTS unique selling points and features

- **Ultra small design**
  (90% smaller than conventional)
- **Ultra fast response time**
  (20-1000 °C in 7 seconds)
- **High detection accuracy**
  (±10 °C)
- **Robust design**
  (vibration and heat resistant)
- **OE specified product**
  (smartly consolidated into efficient AM range)



100% matching
OE specifications

EGTS failure and symptoms

Possible failure modes:

Vibrations ➞ Open circuit
Extreme temperatures (>900 °C) ➞ Resistance out of tolerance
Wire damage ➞ Open circuit

Symptoms:

Decreased fuel efficiency

DPF regeneration can take longer (increased fuel consumption)

Poor Drivability

DPF regeneration frequency goes up (inconvenience during driving)
Engine component damage Undetected overheating can lead to premature failure of engine components (e.g. turbocharger)

Prevention and solutions:

EGTS issues will activate the check engine light (and diagnostic trouble code)
A defective EGTS must be replaced

EGTS OE design features

Visible features

- Probe length and diameter
- Fixation (threat size and seating angle)
- Rear body length
- Rear body angle

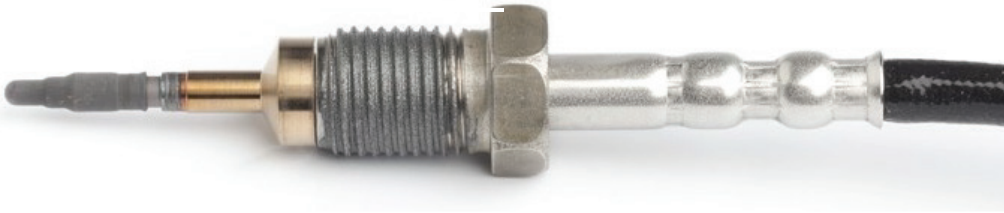
Invisible features

- Thermistor type (NTC curve)
- Responsiveness
- Robustness (temperature/vibrations/pressures)

Tailor made for OE applications

EGTS product characteristics

Stainless cover
Protects thermistor and wires

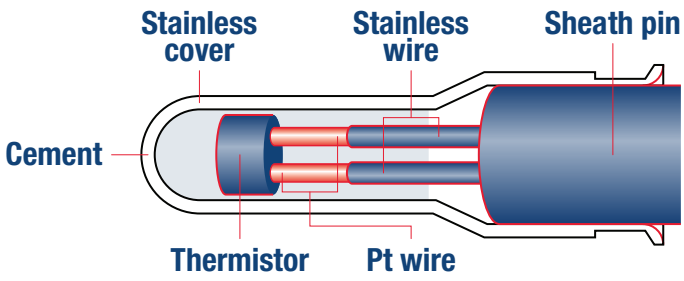


Cement
Securing components in position

Thermistor
Detects temperature, outputs as resistance

Pt and Stainless wire
Main leads between the thermistor and assembly wires

Sheath pin
Securing wiring position and insulation



EGTS OE design vs. consolidated IAM range

Sensor core meet **100% OE** production specifications

All units are manufactured on the same **OE production lines**

Consolidation on wire length only

OE connectors for secure and reliable connections

Special **DENSO wire** specification

The No-Risk aftermarket range

Discover **DENSO**

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