

# Cooled Switching Adapter Type 7531

## Description

Two-way switching adapter with water cooling for cooling piezoresistive pressure sensors in inlet/exhaust ports of internal combustion engines. Interference on signals due to component vibrations is prevented by vibration damping. Particularly suitable for low pressure indications.

- Vibration-damped
- Reliable up to exhaust gas temperatures of 1000 °C
- For low pressure indication

## Technical data

Gas pressure (Sensor)	bar	<15
Control pressure	bar	2 ... 6
Switching delay	ms	approx. 10
Coolant flow	L/min	0,5
Length of the measuring channel	mm	26
Weight	g	260
Tightening torque	Nm	25

## Application

Today, piezoresistive pressure sensors are normally used for absolute pressure measurement in the inlet and exhaust ports of internal combustion engines. Because of the extremely high gas temperatures (1000 °C) in the exhaust chamber close to the outlet valves, permanent cooling of the pressure sensor is in any event essential.

If a pressure sensor is directly exposed to high temperatures for a long time, this results in a measurable temperature drift leading to an unacceptable zero offset of the sensor signal.

In contrast to normally aspirated engines, high gas temperatures occur in supercharged engines also in the inlet, which is why cooled adapters are also advisable for these engines for measurements in the inlet port.

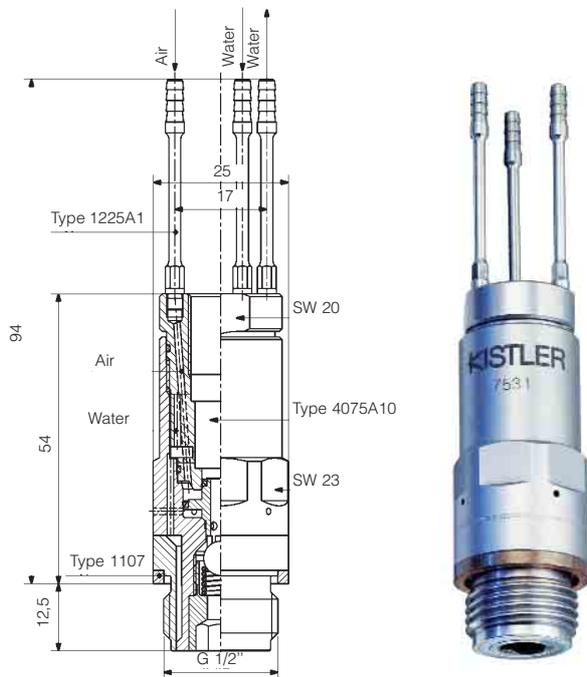


Fig. 1: Cooled Switching Adapter Type 7531

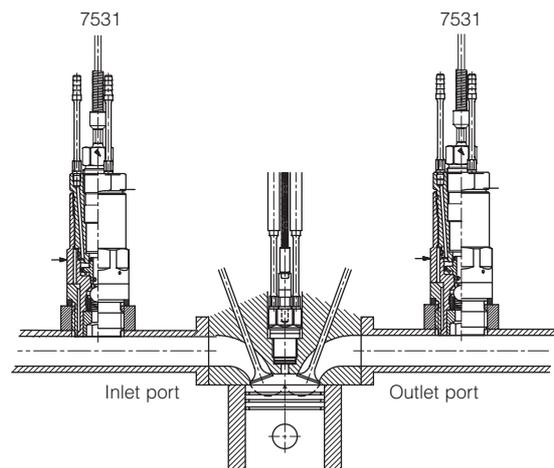


Fig. 2: Fitting Type 7531 in the inlet/exhaust ports

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With the cooled two-way switching adapter Type 7531, the pressure sensor is exposed to the hot gases only for the duration of the measurement (e.g. 100 combustion cycles). This is achieved by actuating a pneumatic valve in the adapter with a control pressure of 2-6 bar, which can be carried out manually or via the indicating system as required (Fig. 3).

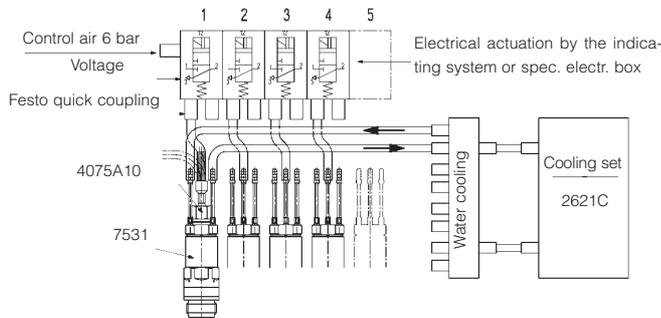


Fig. 3: Control diagram for cooled switching adapter

With control pressure at the adapter, the sensor membrane is exposed to the exhaust gas. With no control pressure present, the sensor membrane is in contact with the ambient air. By measuring the atmospheric pressure before and after the actual engine indication, any temperature drift occurring can be compensated by means of a computation.

Suitable sensor types are 4075A, 701A und 7001.

### Low pressure indication

The cooled switching adapter Type 7531 in conjunction with the piezoresistive pressure sensor Type 4075 is very suitable for low pressure indication in gas exchange analysis, because the absolute pressures can thereby be measured in the inlet and exhaust ports with the accuracy required.

Furthermore, it is possible to adjust the zero point of the cylinder pressure signal to the absolute pressure. This is done by setting the cylinder pressure signal to the existing value of the absolute pressure in the inlet port with the inlet valve open and a stable inlet flow (approx. 150 °KW).

Fig. 4 shows the close coincidence of cylinder pressure curve and inlet/exhaust pressure curve during the gas exchange phase after the cylinder pressure was previously adjusted to the absolute pressure.

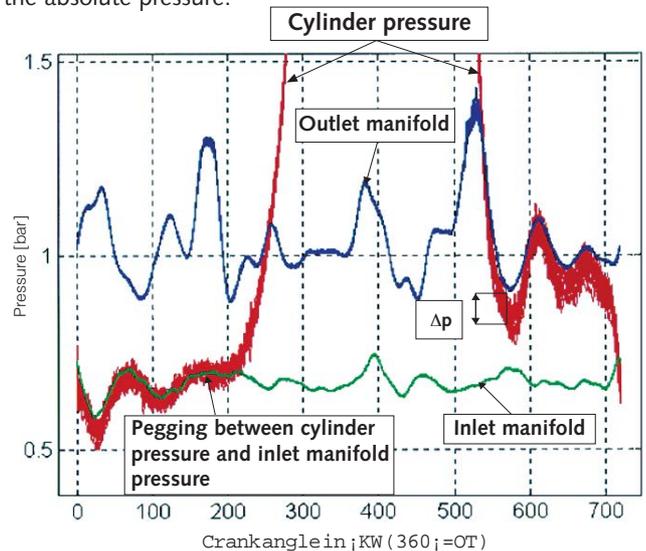


Fig. 4: Comparison of the cylinder pressure signal with the exhaust pressure signal (adjusting the cylinder pressure to the absolute pressure with the inlet valve open/150 °KW to the inlet pressure)

### Accessories

- Viton hose for cooling water
- Cooling tube
- Copper gasket ring

### Type

- 1203Csp
- 1225A1
- 1107