KISTLER
measure. analyze. innovate.

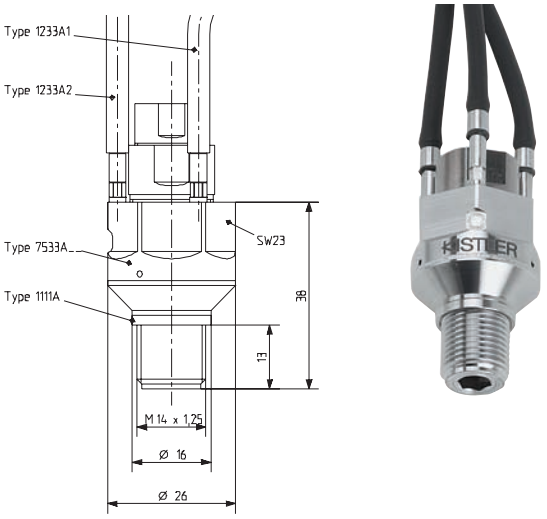
Switching Adapter, water-cooled

Type 7533A...

Compact Cooled Switching Adapter for Combustion Engine Measurements

Two-way switching adapter with water cooling for cooling piezoresistive pressure sensors. Particularly suitable for low-pressure indication in the exhaust system of combustion engines.

- For extremely accurate pressure measurements
- For exhaust gas temperatures up to 1 000 °C
- Increased sensor life



Description

Cooled switching adapters are used in combustion engine measurements for low-pressure indication in the gas exchange channels.

The mounting of piezoresistive pressure sensors in the cooled switching adapter Type 7533A… offers the maximum possible accuracy of pressure measurement combined with increased sensor life time. The pressure sensor is exposed to the hot exhaust gas only for the period of the measurement (e.g. 100 combustion cycles). A pneumatic valve alternates exposure of the sensor to exhaust gas pressure or ambient pressure. Stress to the sensor resulting from high gas temperatures, soot and vibration is therefore kept to a minimum. A further advantage is the facility for adjustment of the zero point to the known ambient pressure while the engine is running.

The cooled switching adapter Type 7533A…is available for all standard piezoresistive sensors. Optimum cooling is achieved with the Kistler temperature conditioning unit Type 2621E.

Application

Low-pressure combustion analysis as the basis for gas exchange analysis is gaining importance. As the gas exchange can be influenced by very small pressure differences in the inlet and outlet, accurate measurement of the pressure characteristics is essential. Despite the high accuracy of present-day piezoresistive absolute-pressure sensors, further increases in measuring accuracy can be achieved by using a cooled switching adapter.

Use of a cooled switching adapter allows a correction of the sensor signal to be made with the known ambient pressure (Fig. 2). Ideally the sensor signal should be adjusted before every measurement.

Upon application of a control pressure the measuring port opens and the sensor can measure the desired media. To maximize the life time of the sensor it is only necessary to expose the device to the heat and gases while a test point is completed.

The entire cooled switching adapter system with connections to the cooling system and pneumatic compressed-air control system can be seen in Fig. 1.

Technical Data

Measuring pressure at the sensor	bar	<15
Control air pressure	bar	2...6
Switching delay	ms	<200
Coolant flow	l/min	0,25 ... 0,5
Weight	g	185
Tightening torque	N·m	25

7533A_000-606e-04.08

KISTLER
measure. analyze. innovate.

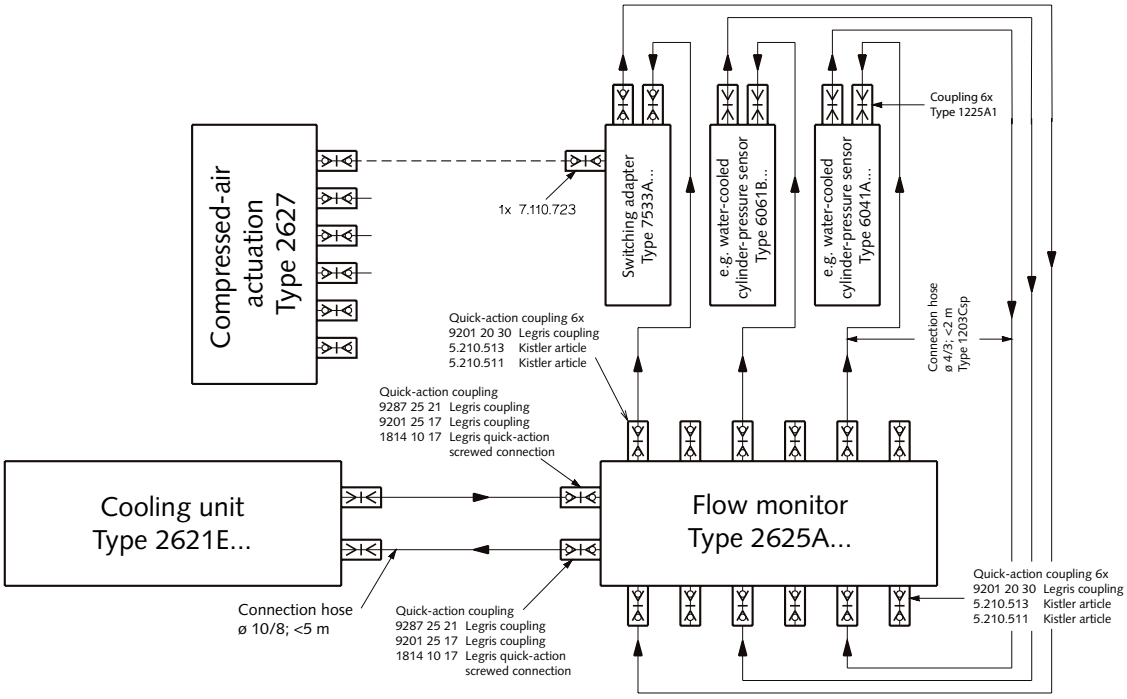


Fig. 1: Entire system of cooled switching adapter Type 7533A… with cooling system and pneumatic actuation

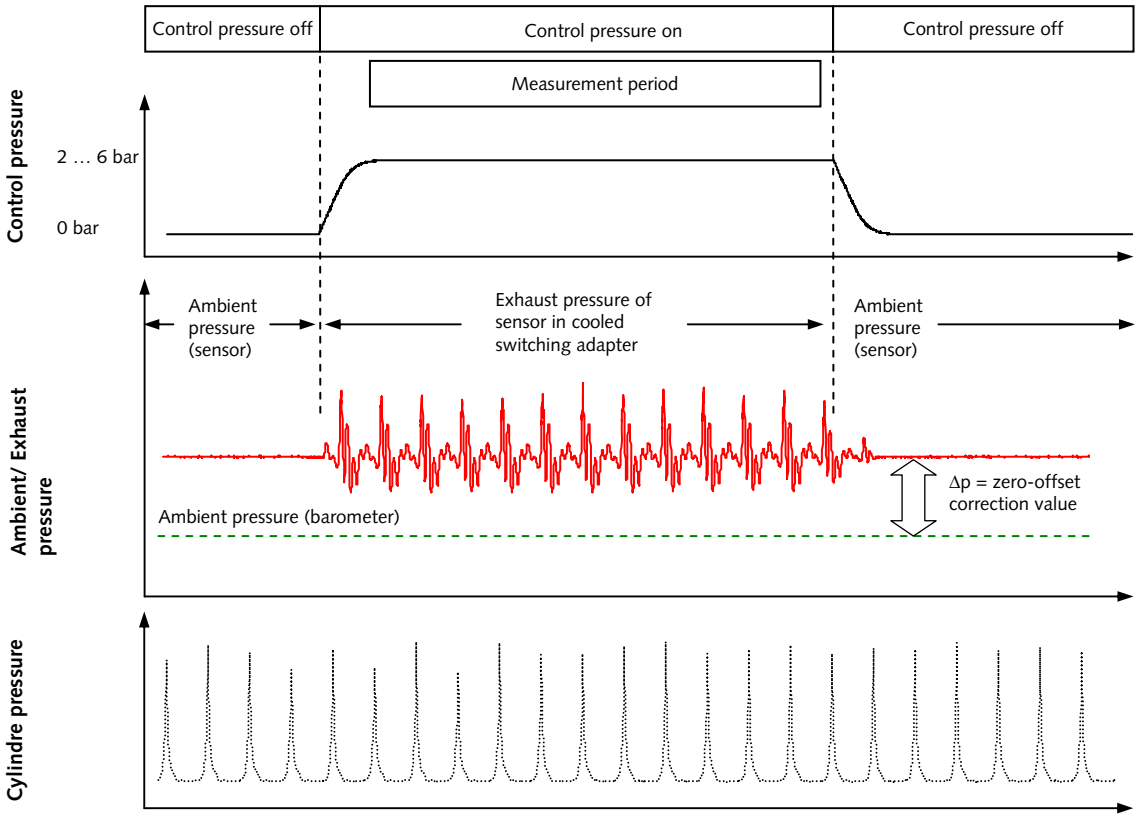


Fig. 2: Measurement in the cooled switching adapter

©2008, Kistler Group, Eulachstrasse 22, 8408 Winterthur, Switzerland
Tel. +41 52 224 11 11, Fax +41 52 224 14 14, info@kistler.com, www.kistler.com

KISTLER
measure. analyze. innovate.

Installation

For low-pressure indication in the exhaust duct of combustion engines, the pressure sensors must be actively cooled. The cooled switching adapter Type 7533A… achieves recommended conditioning of the exhaust gas and thus a highly accurate measurement. In the case of increased intake pressure temperatures, for example in engines with exhaust-gas recirculation, it is also advisable to mount the cooled switching adapter in the inlet duct.

Mounting recommendation:
Sensor Type 4075A10V200S in the cooled switching adapter Type 7533A12 is recommended for exhaust pressure measurements. A long sensor life combined with the highest possible measuring accuracy can be guaranteed by the protective steel diaphragm of the sensor and the only limited exposure to the hot exhaust gas.

Motor sport:
Small mounting dimensions and low mass are prefered for applications in motor sport and it is here that the high-temperature miniature pressure sensor Type 4007BA… can be used. The cooling adapter provides the sensor with effective cooling (Type 7525A2, Fig. 6) and vibration damping (Type 7525A6, Fig. 7).

Mounting

The bore or mounting boss must be designed to allow the switching adapter to be installed as flush with the internal wall as possible (Fig. 3). The tightening torque of the cooled switching adapter is 25 N·m.

Maintenance

Because of the incidence of soot, particles can be deposited on the switching mechanism of the cooled switching adapter. This can impair switching between the applied gas and ambient pressures therefore periodic maintenance is required (see maintenance kit Type 7529A…).

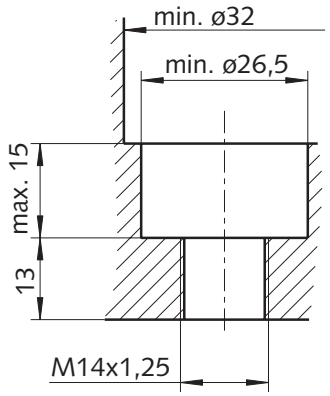


Fig. 3: Mounting bore for the cooled switching adapter Type 7533A1

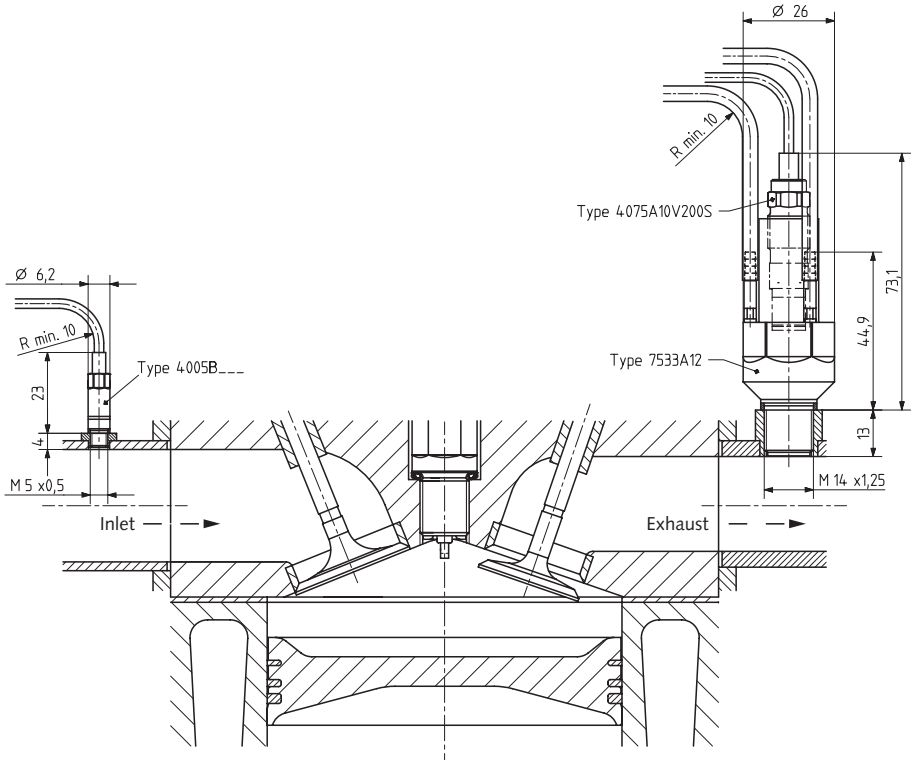


Fig. 4: Mounting the sensor Type 4075A10V200S in the cooled switching adapter Type 7533A12 in the exhaust

7533A_000-606e-04.08

KISTLER
measure. analyze. innovate.

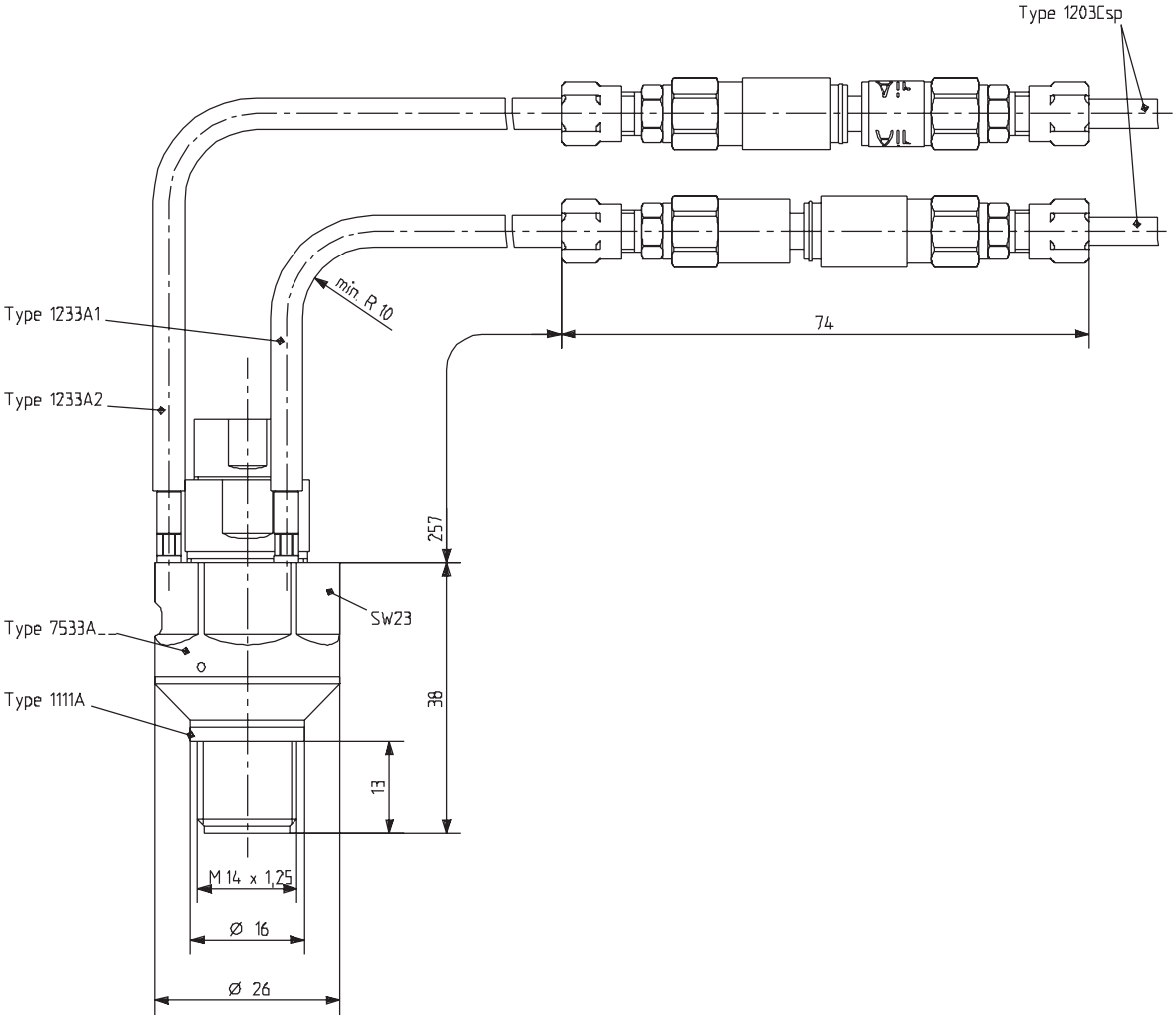


Fig. 5: Cooled switching adapter Type 7533A...

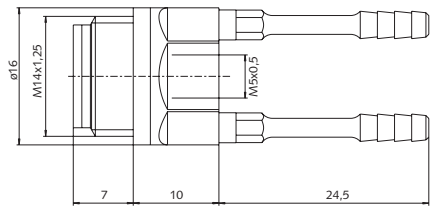


Fig. 6: Cooling adapter Type 7525A2

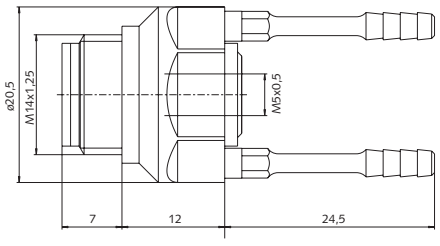


Fig. 7: Cooling adapter, damped Type 7525A6

©2008, Kistler Group, Eulachstrasse 22, 8408 Winterthur, Switzerland
Tel. +41 52 224 11 11, Fax +41 52 224 14 14, info@kistler.com, www.kistler.com

KISTLER
measure. analyze. innovate.

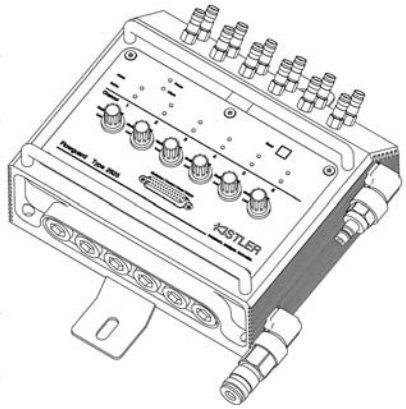


Fig. 8: Flow monitor Type 2625

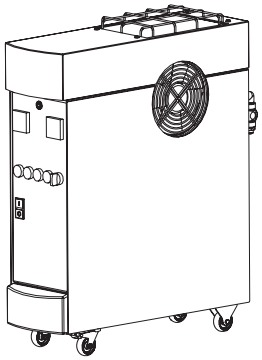


Fig. 9: Temperature conditioning unit Type 2621E

Included Accessories	**Type/Art. No.**
• Water connecting tube	1233A1
• Pneumatic connecting tube	1233A2

Optional Accessories	**Type/Art. No.**
• Temperature conditioning unit	2621E
• Viton® connecting hose ø4/2,5	1203Csp
• Adapter G1/2" – M14x1,25	7543A1
• Adapter M18x1,5 – M14x1,25	7543A2
• Flow monitor	2625

Maintenance Set	
• Sealing set	7529A5
• Repair set (contains sealing set Type 7529A5, sapphire ball, compression spring)	7529A6

Ordering Key

Type 7533A□

For Type 4045..., thread: M14x1,25	**11**
For Type 4075..., thread: M12x1	**12**
For Type 4005..., 4007... thread: M5x0,5	**14**

7533A_000-606e-04.08

Viton® is registered trademark of DuPont Performance Elastomers

©2008, Kistler Group, Eulachstrasse 22, 8408 Winterthur, Switzerland
Tel. +41 52 224 11 11, Fax +41 52 224 14 14, info@kistler.com, www.kistler.com