

# Automatic transmission control systems

SMP14x pressure sensor for hydraulic pressure measurement



**BOSCH**

Invented for life



## PRODUCT BENEFITS

- ▶ Designed to meet ASIL requirements
- ▶ Various diagnostic information available
- ▶ Digital or analog interface selectable
- ▶ Temperature signal available
- ▶ Customized pressure ranges and transfer functions
- ▶ Short circuit and ESD protected
- ▶ Easy integration due to small and optimized housing
- ▶ Flexible mounting possibilities due to hermetically sealed housing
- ▶ Flexible electrical connection through wire bonding, soldering or welding

- 1 3 pin disc-shaped metal housing,  
diameter: < 17.5 mm  
height: < 11.0 mm

# versatile

due to the availability of a digital or analog interface and over 30 sensor variants to meet all customer requirements.

## TASK

The pressure sensor SMP14x is designed to control with a high accuracy the clutches used in automatic transmissions (DCT, CVT, AT) and thus allowing a comfortable, quick and smooth triggering of the clutch (e.g. at the kiss point).

## FUNCTION

The measurement principle is based on four piezo resistors located on the membrane which are connected to a wheatstone bridge. A reference vacuum is enclosed between the chip surface and the hermetically sealed metal housing. The applied pressure leads to a deflection of the membrane which causes a change in the resistors' values. The level of the electric bridge signal changes proportionally to the bend of the membrane. The resulting signal is processed by an ASIC; the calibrated pressure sensor signal is then routed to the outside via the sensor's electrical connections. Fed in via the sensor's hydraulic connection, the hydraulic fluid presses against the monocrystalline measuring membrane. Only the membrane backside is in contact with oil. The electronics are located in and protected by the hermetically sealed metal housing. The sensor therefore has a very high media resistance and a long lifetime.

# 100 %

Leak-tight for a safe operation in oil over lifetime.

## TECHNICAL CHARACTERISTICS

Measurement range	50 kPa to 2 MPa (SMP142) 50 kPa to 4 MPa (SMP144) 50 kPa to 7 MPa (SMP147)
Accuracy*	<1.2% FS
Start-up time	10 ms

\*Over lifetime and temperature

## OPERATING CONDITIONS

Supply voltage	5V
Supply current	<12.5 mA
Operating temperature	-40 °C to +150 °C