PSM spool position sensor
for M4-12/15, M6-15 and SX14 control blocks

CUSTOMER BENEFITS
- Use in applications with high safety requirements regarding ISO 13849
- Efficient monitoring directly on the control spool
- No effect on switching times and hysteresis
- Defined switching window for every valve type
- Increased reliability through switching logic

FUNCTION AND BENEFITS
Use in applications with high safety requirements
The PSM (Position Sensor Mobile) spool position sensor from Rexroth can be used in M4-12/15, M6-15 and SX14 control blocks, and is used in applications with high safety requirements (e.g. in telescopic handlers, forklifts and truck loader cranes). It monitors the position of the control spool in directional valves to prevent the machine from unintentionally moving. The PSM sensor detects both the neutral position and the A and B direction of motion of the control spool in the valve block. The sensor tracking pin is force-fitted on the front side of the control spool and tracks its position. A Hall effect sensor forwards the signal to the integrated electronics, which send it to the signal output. The output signal can then be analyzed by the customer’s higher-level controller, which is essential especially with regard to safety issues.

APPLICATIONS

Wherever people work directly with powerful handling technology, ever-increasing safety regulations apply worldwide, such as for telehandlers with man baskets or truck loader cranes. One basic requirement is to monitor the condition in hydraulic valves. This should prevent unintended, hazardous machine movements and thus avoid accidents, including injury. With its new PSM spool position sensor, Bosch Rexroth offers a reliable monitoring option for valves that also gives machine manufacturers the possibility of enormous savings.
TECHNICAL DATA

PSM switching position sensor

Operating voltage: 9 to 32 V DC

Max. output current: 10 mA (in permissible temperature range from -40 to +100°C and supply voltage range from 9 to 32V)

Electrical connection: DEUTSCH DT04-4P

Max. working pressure: 60 bar

Temperature range: -40 °C to +100 °C

CE mark in accordance with EMC Directive 2014/30/EU: Conformity with Harmonized Standards applied: EN 50121-3-2 (2016) and EN 13309 (2010)

Stroke range: ± 8.7 mm

Output signal: Low < 1.5 V, High > 7.0 V

This makes it easier to conform to the necessary category classes for safety requirements per ISO 13849. The sensor does not have any effect on switching times or the hysteresis of the monitored valve. For the monitored valve axis, a diagnostic coverage (DC) value of up to 99% as per ISO 13849 is possible for the “flow shut-off” safety function (with full spool position sensor plausibility check by higher-level electronics).

Sensor signals – defined switching window for every valve type

Every directional valve type has a defined switching window for detecting switching direction. These windows are programmed in the sensor electronics. When the directional valve is in the neutral position, both sensor signals (S1 and S2) are set to high. To detect the switching direction, one of these signals moves from high to low (within the defined switching window) as soon as the control spool moves to the A or B side (see example illustration).

Increased reliability through switching logic

The switching logic allows even an implausible signal to be detected (e.g. cable break), increasing reliability. The sensor signals can be monitored by the higher-level machine controller, and used to check plausibility and detect faults. This makes it possible to achieve a very high DC value of 99% for the “flow shut-off” safety function.