CIMSmart
Integrated measuring system
Cylinder integrated measuring system

The Bosch Rexroth smart Cylinder Integrated Measuring System (CIMSmart) provides a highly reliable and versatile solution to measure the position of the piston rod.

For over 20 years, from the original system (Mk I) up to the latest generation (CIMSmart), CIMS has been accurately and reliably measuring the piston rod’s position in thousands of large hydraulic cylinders. The continued cooperation between Bosch and Rexroth resulted in the latest version of CIMS. This smart version is not only based on the latest automotive measurement technologies, it also provides information about the cylinder motion and performance. Fully integrated in Rexroth’s large hydraulic cylinder, CIMSmart works in virtually every environmental situation.

Application areas
The smart Cylinder Integrated Measuring System is used on a wide variety of large hydraulic cylinders. Many industries depend greatly on accurate piston rod positioning. Application areas in which CIMS is often used are:

▶ Dredging vessels
▶ Offshore platforms
▶ Ship loading and unloading systems
▶ Tunneling machines
▶ Bridges, sluices and dams
▶ Metallurgy systems
Function and characteristics

The smart Cylinder Integrated Measuring System is a highly unified incremental position measuring system for use on hydraulic cylinders with Enduroq 2x00 and Enduroq 3 series piston rod surface technologies. Grooves underneath the piston rod coating cause a variation in the magnetic field from the permanent magnet inside the CIMSmart.

The CIMSmart linear Hall-effect sensor elements measure the magnetic field and its variations resulting in precise position measurements with an accuracy of less than 1 millimeter (linearity < 1 mm). Their signals are fed into a microcontroller which calculates the position inside the groove and generates the incremental RS-422 output signal (1024 pulses/cm).

The sensor and electronics are protected by a robust stainless steel housing, which is installed into the head of the cylinder. CIMSmart can withstand almost any environment: low (-40°C) to high temperatures (70°C); high pressure when submerged in (sea)water (IP68, 10 bar); and even potentially explosive atmospheres (ATEX zone 1).
Features that remained

Features:

- High accuracy combined with unlimited stroke lengths.
- Easy installation or replacement possible without restricting the hydraulic integrity of the cylinder; sensor integrated in sealing flange, out of the pressure zone of the cylinder.
- Ensures reliable position measurement at all times, reliable redundancy possible with multiple CIMS sensors per cylinder; With its stainless steel housing, CIMS can be used while submerged in (sea) water up to 100 m - Waterproof, IP68 10 bar (depending on output connection type)
- Can be used in Ex zone 1 areas; optionally available for potentially explosive atmospheres; ATEX zone 1 certified.
- Contactless operation, no contact between sensor and cylinder rod: no-wear parts and a completely closed housing.
- Easy commissioning/easy installation: plug & play and no (manual) calibration necessary; CIMS will automatically compensate for mounting tolerances, magnetic disturbances and temperature effects.
- Status of the CIMS can be monitored using the diagnostic output through a PC or PLC, which can be retrieved for sensor status, error codes and sensor identification.
- Wide operating window: CIMS withstands tougher environmental conditions, larger temperature range (down to -40 °C), higher speeds (up to 4m/s).
- Backward compatibility: Previous CIMS versions (II & III) can be easily replaced. The system is backward compatible with CIMS II/III, apart from the standard connector which has changed from a 6-pin to a 9-pin connector.
CIMSmart: Keeping your application in check

The CIMSmart stores and updates application information during its use:
- Total number of cylinder strokes
- The accumulative stroke length at high and low speeds
- The accumulative stroke length history
- The cylinder stroke length distribution
- Maximum speed and acceleration including time stamp
- Maximum and minimum temperature including time stamp
- Temperature zone distribution

It logs not only how the cylinder is being used, but in case of a problem, it helps to find what did cause to the issue. But the feedback can not only be used as input for root cause analysis of system malfunctions, it provides valuable input for condition monitoring methods and systems. The data collected by the CIMSmart can be monitored from a computer or a PLC. Thus, service engineers can for example take preventive maintenance measures before damage becomes too extreme.