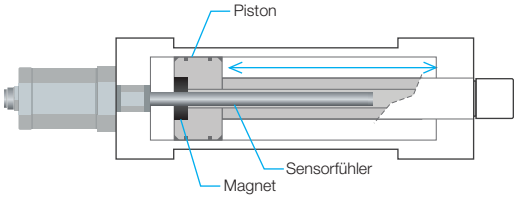
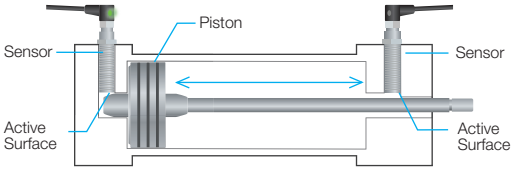
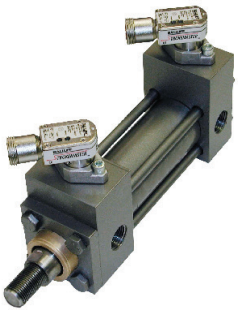
BALLUFF

Continuous vs End-of-stroke Cylinder Position Sensing

COMPARISON OF POSITION SENSING OPTIONS FOR HYDRAULIC CYLINDERS

What are the two most popular methods of detecting the position of a hydraulic cylinder?

	Continuous	VS	End-of-stroke
How it works	A magnetostrictive linear position sensor is installed into the back end of a hydraulic cylinder. The sensor detects the position of a magnet attached to the moving piston and outputs a variable electrical signal. The sensor is rated to withstand the pressure of the hydraulic system.		IInductive proximity sensors are installed into the end caps of a hydraulic cylinder. The proximity sensors detect the piston as it reaches the end of the cylinder stroke in either direction. The sensors are rated to withstand the pressure of the hydraulic system.
			
Strengths	■ Provides near-real-time position feedback throughout the entire stroke of the cylinder ■ Enables servo-hydraulic motion control of position and velocity ■ Single cable in most cases (exception: fieldbus and network interfaces)		■ Lower total cost than continuous position sensing ■ Simple method to detect if cylinder is fully extended or fully retracted ■ Basic on-off controller interface to standard I/O
Consider-ations	■ Cylinder rod must be gun-drilled to accept the length of the sensing rod ■ Higher cost compared to basic proximity sensors ■ Controller interface is potentially more complex		■ Sensors occupy additional space on one side of both end caps ■ Two cables required: one for each sensor ■ Only detects end of stroke. Provides no information about cylinder status during motion
Common applications	■ Sawmill hydraulic automation ■ Hydraulic plastic injection molding machines ■ Control of mold opening/closing for tire curing presses ■ Hydraulic valve actuator position control		■ Hydraulic clamps: detection of open/closed in welding operations ■ Hydraulic compactors: compress material until end-ofstroke is detected, then retract ■ Cylinder-based high-pressure pumps: initiate reversal
Typical examples			
	Hydraulic cylinder with position sensor installed		Hydraulic cylinder with proximity sensors installed