

Integrated Positiontransducer
Inductive Poximity switches
Build in valves
Double acting-
telescopic cylinders



LJM

Hydrauliek

Hydraulic cylinders with integrated position transducers

Combining hydraulics and electronics gives new and greater possibilities for using hydraulic power transmissions. The combination of hydraulic cylinders, transducers and electronically-operated valves are important components for industry to use in solving the demands of productivity and quality. With an integrated position transducer it is possible continuously to register the position of the piston rod.

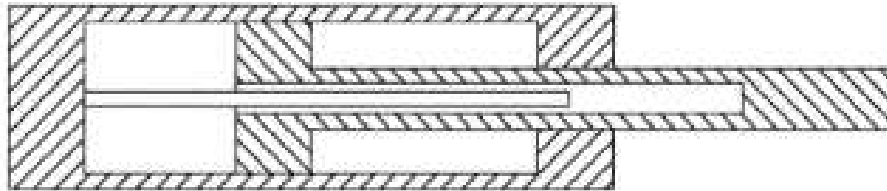


Figure 1. Hydraulic cylinder with integrated position transducer

- are important components of modern machine design as they meet the demand, large flexibility in automation jobs.
- helps simplify machine design and reduce the number of hydraulic components. At the same time, the cylinders have considerable reliability and a long service-life due to the integrated design which protects against external influences such as shock, dirt and humidity from the environment.
- gives opportunities to arbitrarily control position, speed and acceleration with precision. In addition, good repeatability with short time response and high frequency is achieved.

Applications - possibilities

The LJM series NH XX makes it possible to install intelligent control systems.

These cylinders can be used when:

- Position control requires high precision and high repeatability, independent of the stroke.
- Movements demand a specific and arbitrary velocity profile.
- Short set-up time is important.
- The movements of several cylinders must be synchronised.

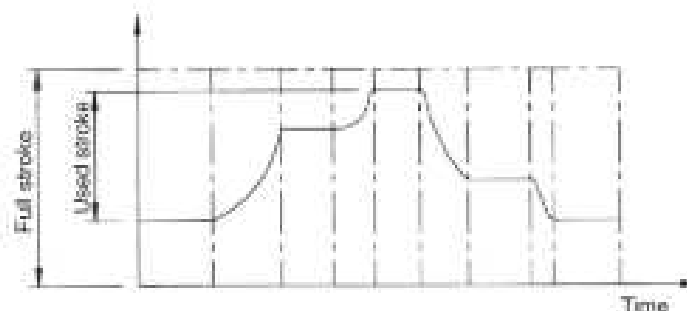


Figure 2. Example of a movement cycle independent of stroke

The LJM cylinders series NH can be used in mobile, industry and marine applications.

Examples of applications:

Presses
 Plastic injection moulding machine
 Moulding machines
 Rolling mills
 Robots
 Cranes
 Stabilizers
 Forest machinery
 Excavation machinery

Heavy construction equipment
 Bending Machines
 Harbour ramps
 Platforms
 Test equipment
 Machine tools
 Agricultural machinery
 Wind mills
 Wood working machinery

These integrated transducer cylinders can be used in open as well as closed-loop control systems.

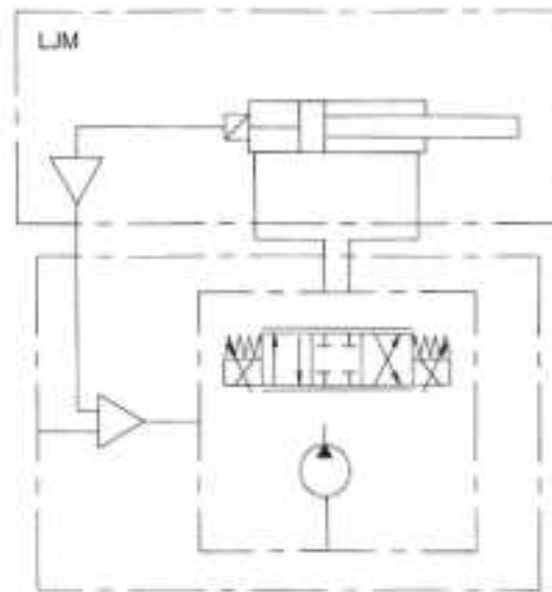


Figure 3. Basic sketch of a control system

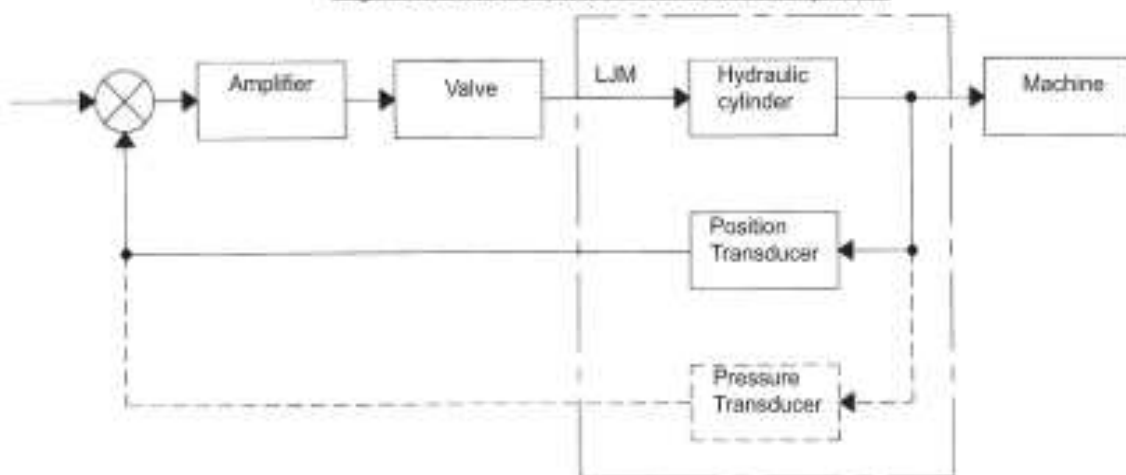


Figure 4. Block diagram for a closed-loop control system

Construction. The stationary part of the transducer is secured to the endcap of the cylinder and the moveable part is secured to the piston rod of the cylinder. It has to be a hollow piston rod. The position measuring is done when the transducer produces an analogue or digital signal depending on where the moveable part is according to the stationary part which means proportionally to the stroke of the cylinder.

The seals in the cylinder are of Teflon which secures that the stick-slip condition at its optimum. At the same time it gives the cylinder a higher efficiency. This is of great importance to achieve an exact position.

Basic version

- The fundamental design is based on standard cylinders in the NH series.
- The smallest diameter of a piston rod is $\varnothing 30\text{mm}$.

Possibilities/alternatives

- Assembly blocks/manifolds for mounting of directional valves.
- Built in cartridge.
- Inductive proximity switches.
- Through piston rod.

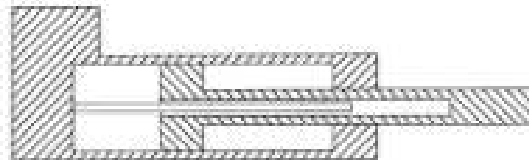


Figure 5. Hydraulic cylinder with manifold

Transducers

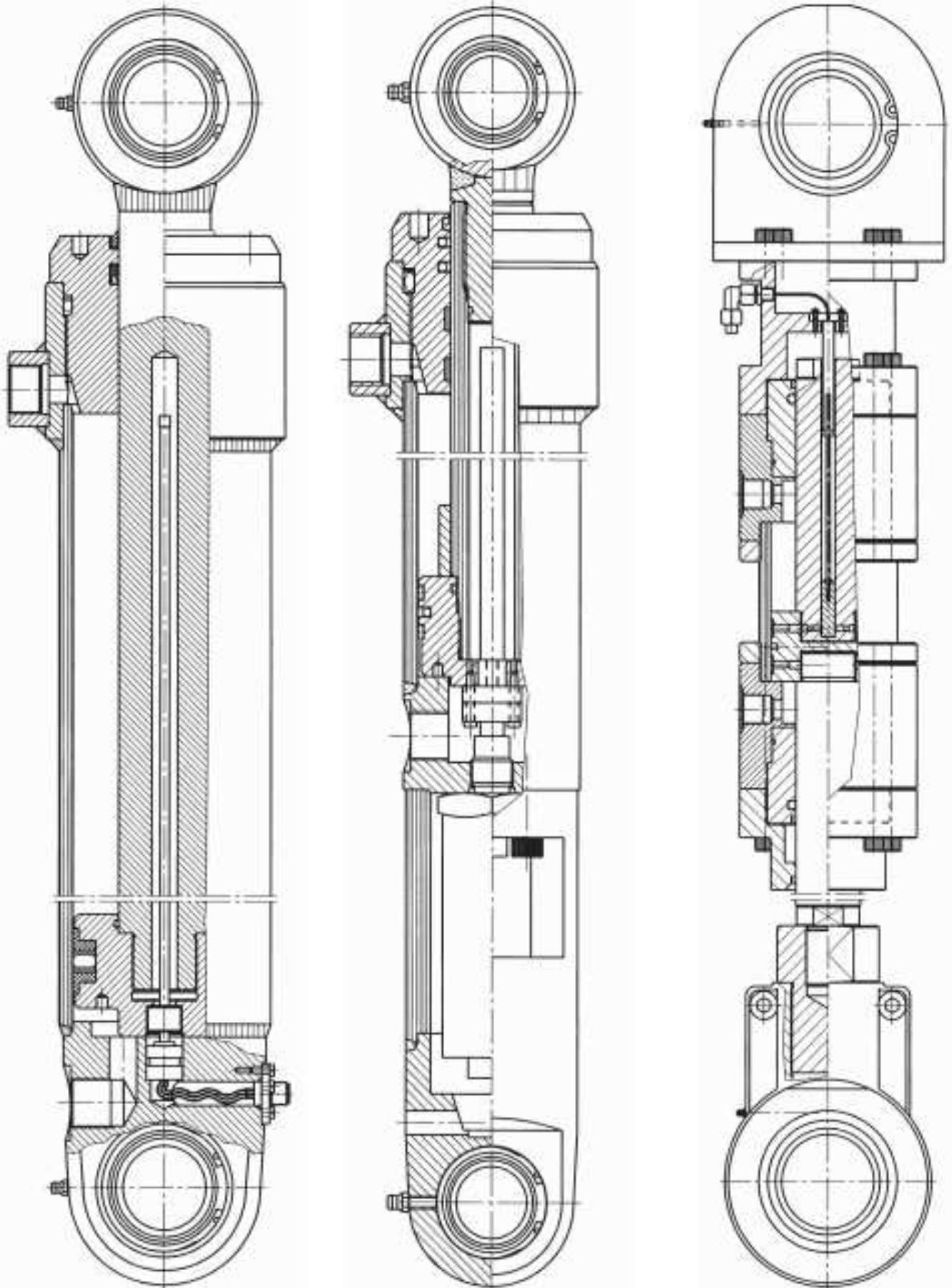
As standard the cylinder is delivered with one of the types of transducers below. How to choose is depending on what the cylinder has to be used for:

- Potentiometer-transducer
- Magnetostrictive-transducer
- Inductive-transducer



NH XX

Hydraulic cylinders with position transducer



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Examples of applications

Hydraulic cylinders with positioning transducer

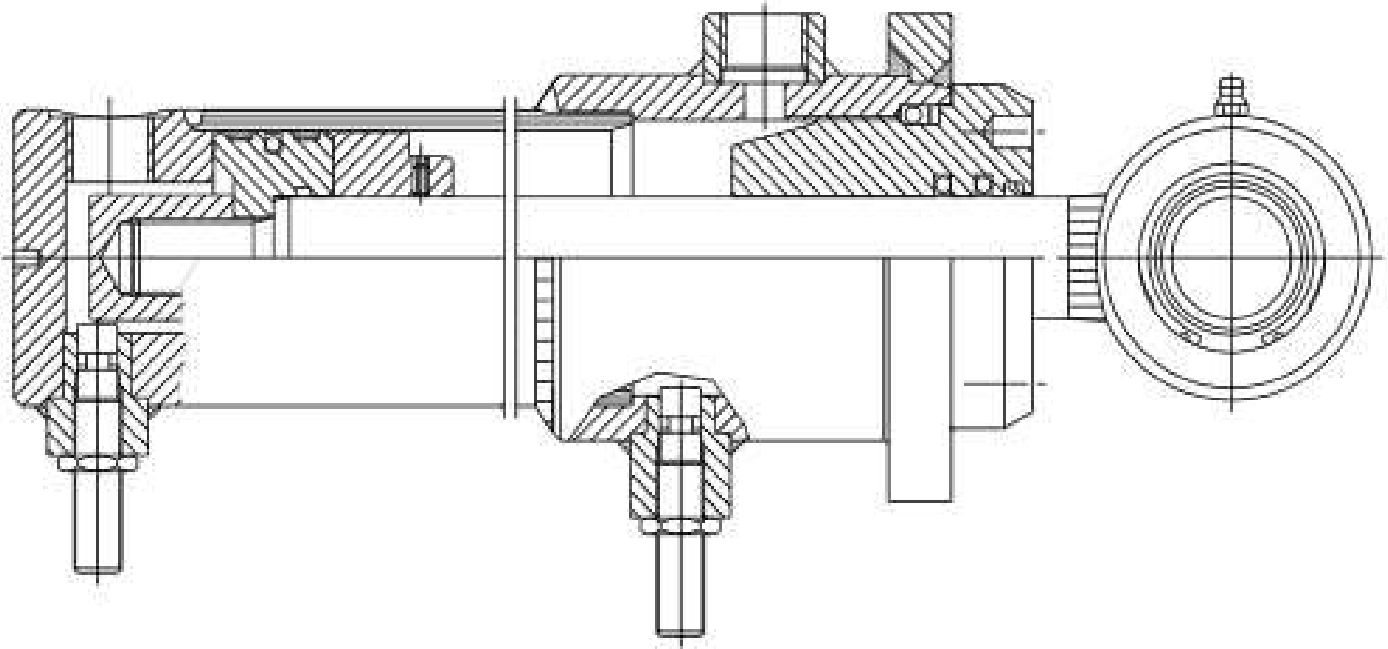


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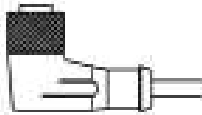
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Inductive Proximity switches



STK
STECKER
PLUG

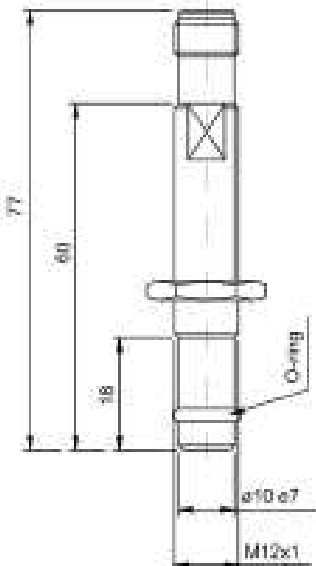


BKS - S 20



BKS - S 19

Inductive Proximity switches NH 30 cylinder



Housing size:

Nominal sensing distance:

Operating zone:

Supply voltage:

Max. current load:

Switching frequency:

Shortcircuit protected:

Material:

Max. pressure:

Protection class:

Working temperature

M12 x 1

1,5 mm

0- 1,2 mm

10 - 30 V DC

200 mA

1000 Hz

Ja, Yes

stainless

500 bar

IP 68

-25 +80 Grad C

General

High pressure inductive proximity switches for cylinder applications.





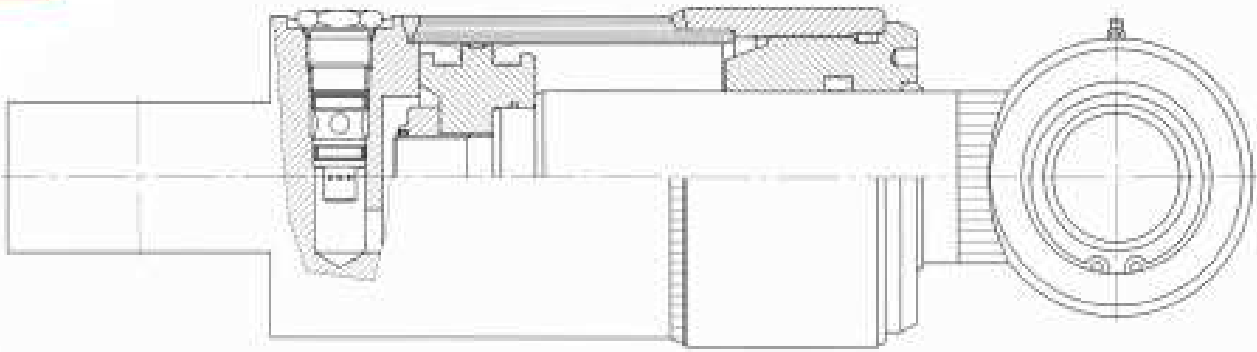
Examples of applications

Hydraulic cylinders Inductive Proximity switches



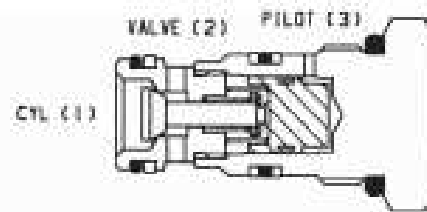
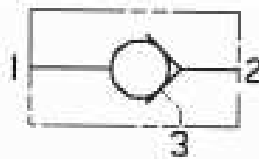


Build-in valves

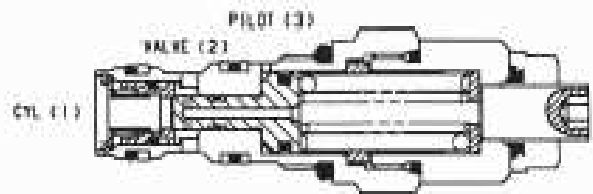
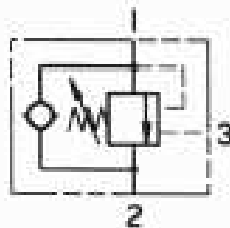


LJM's cylinders can be supplied with two types of build-in load holding valves - pilot operated check valves and overcentre valves.

Pilot operated check valve



Overcentre valve or load holding valve



- * Single or dual function.
- * Two sizes - up to 30 lpm and up to 90 lpm.
- * Rated for 350 bar.
- * Available with all types of balancing for proportional and closed centre PCVs, regenerative flow, variations in tank pressure etc.
- * Different pilot ratios available.
- * All valve types in each flow size fits the same cavity.

Function (overcentre valve):

The OCV is basically a pilot assisted leak tight relief valve.

The pilot pressure will help the cylinder pressure (or the load induced pressure) to open the valve.

Each valve has a fixed pilot ratio which determines how much influence the pilot pressure has on the opening of the valve.

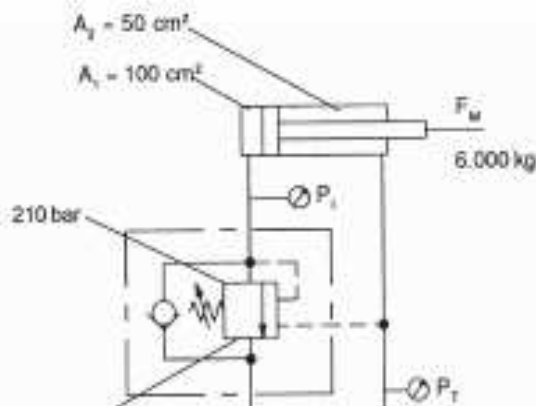




Build-in valves

Pilot pressure is calculated as follows:

$$PP = \frac{\text{Relief valve setting} - \text{load induced pressure}}{\text{Pilot ratio}}$$



$$P_1 = \frac{6.000 \text{ kg}}{100 \text{ cm}^2} = 60 \text{ bar}$$

$$P_2 = \frac{210 - 60}{5} = 30 \text{ bar}$$

$$F_u = 210 \times 100 = 21.000 \text{ kg}$$

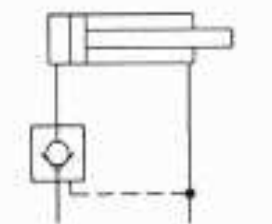
I.e. 30 bar is required to open the valve, if the cylinder is subjected to a load greater than 21,000 kgs. the valve opens as a relief valve.

Valve type	Valve type	Pilot ratio	l/min
Overcentre valve	1 CE 30	2:1, 5:1, 10:1	30
	1 CER 30	2:1	
	1 CEB 30	5:1	
Pilotoperated checkvalve	4 CK 30	3:1	
Overcentre valve	1 CE 90	4:1	90
	1 CER 90	4:1	
	1 CEB 90	4:1	
Pilotoperated checkvalve	4 CK 90	3:1	

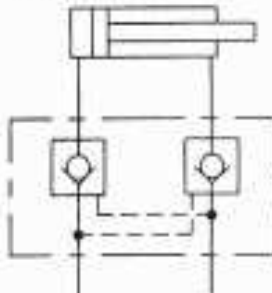
CE Non balanced valve.

CER Part balanced, to be used in systems with closed centre PCVs.

CEB Fully balanced, to be used in regenerative systems

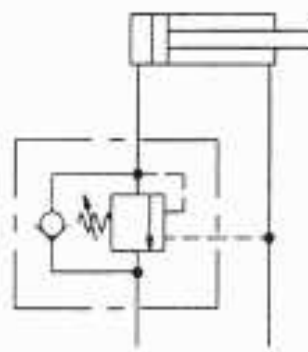


Single pilot operated checkvalve

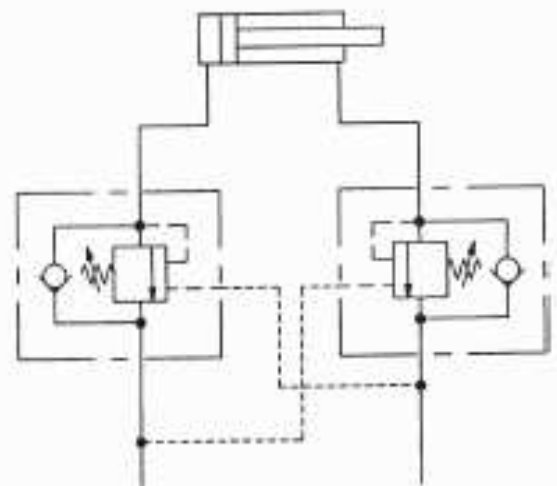


Double pilot operated checkvalve

Build-in valves



Single overcentrevalve



Double overcentrevalve



Examples of applications

Hydraulic cylinders with build in valves



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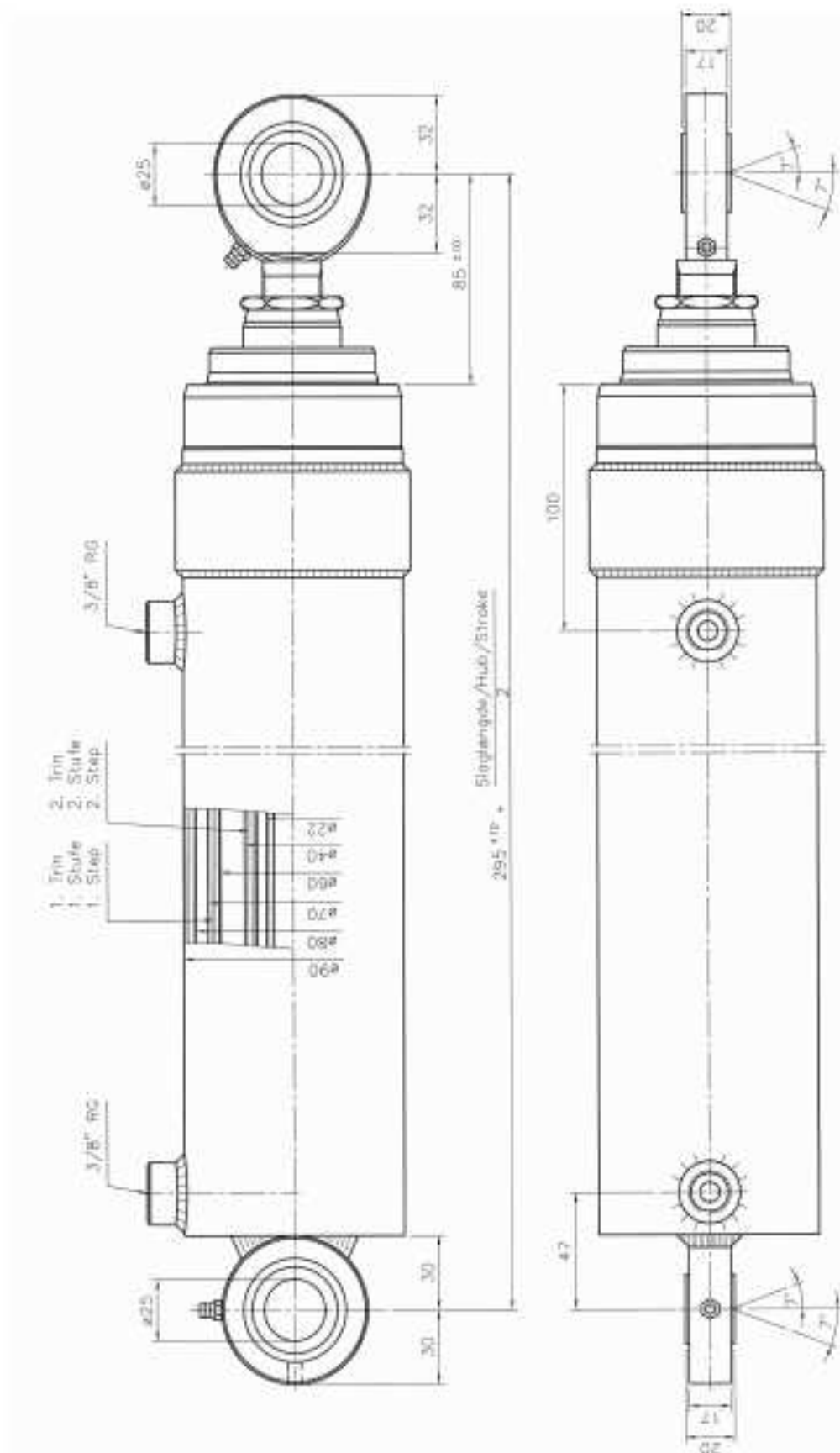
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2-trins teleskopcyllinder, dobbeltvirkende
Zweistufiger Teleskopzylinder, doppeltwirkend
Two-stage telescope cylinder, double acting

Målskitse/Massblatt/Dimension sketch





Examples of application

Double acting telescopic cylinders





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