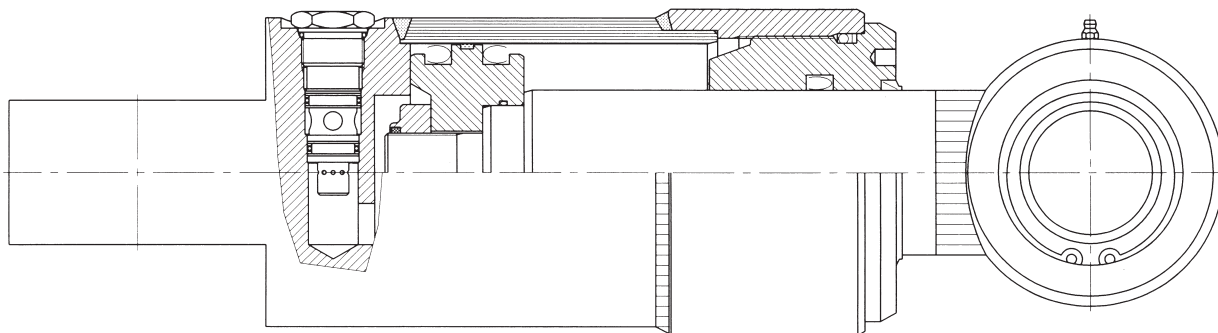
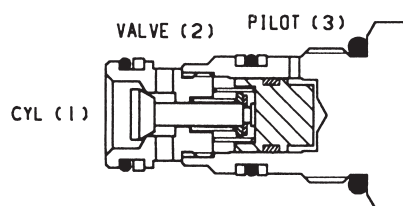
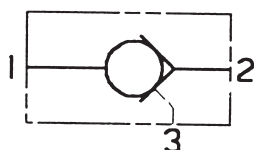


# Indbyggede ventiler

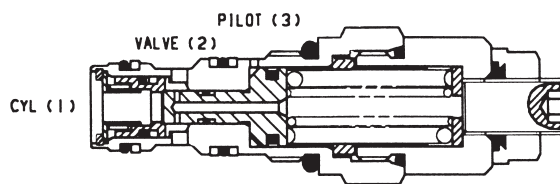
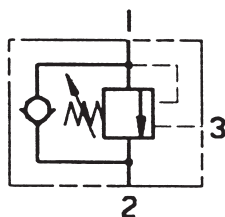


LJM's cylinder program kan også fås med enten indbyggede pilotstyrede kontraventiler eller overcentreventiler.

Pilotstyret kontraventil



Overcentreventil eller lastholdeventil.



- \* Enkelt- eller dobbeltfunktioner.
- \* To ventilserier "30" l/min. og "90" l/min.
- \* Arbejdstryk til 350 bar.
- \* Findes med alle forekommende balanceringer for proportionalkørsel, regenerativ drift, lukkecenter, varierende tanktryk m.m.
- \* Forskellige pilotforhold.
- \* Samme ventilhus for alle ventiler i "30" l/min. og "90" l/min. serierne.

## Pilottryk (pilot pressure):

Pilottrykket er det tryk, der skal til for at åbne ventilen, så olien kan løbe tilbage til retningsventilen. Ventilene

har et fast pilotforhold (pilot ratio) på f.eks. 2,5:1, 5:1, 10:1, som ventilen er "født" med.

Ventilerne har ydermere en indstillelig sikkerhedsventil (relief-valve) åbningstrykket (relief setting) er det tryk, hvor sikkerhedsventilen åbner.



Lind Jensens Maskinfabrik A/S  
Kroghusvej 7, Højmark  
DK-6940 Lem St. • Denmark  
Home page: [www.ljm.dk](http://www.ljm.dk)

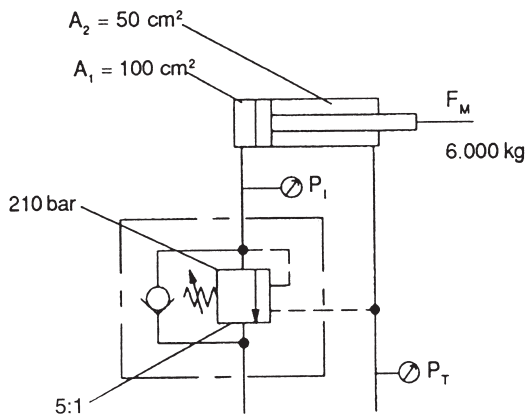




# Indbyggede ventiler

## Pilottrykket udregnes som følger:

$$\text{pilottryk} = \frac{\text{Sikkerhedsventilindstilling} - \text{Belastning}}{\text{Pilotforhold}}$$



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

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

$$F_M = 210 \times 100 = \underline{21.000 \text{ kg}}$$

Dvs. der skal bruges 30 bar til at åbne ventilen.

Hvis cylinderen udsættes for en belastning større end 21.000 kg, åbner sikkerhedsventilen.

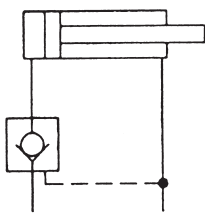
Andre pilotforhold på forespørgsel.

Ventiltype	Ventiltype	Fast pilotforhold	l/min
Overcentreventil	1 CE 30	2:1, 5:1, 10:1	30
	1 CER 30	2:1	
	1 CEB 30	5:1	
Pilotstyret kontraventil	4 CK 30	3:1	
Overcentreventil	1 CE 90	4:1	90
	1 CER 90	4:1	
	1 CEB 90	4:1	
Pilotstyret kontraventil	4 CK 90	3:1	

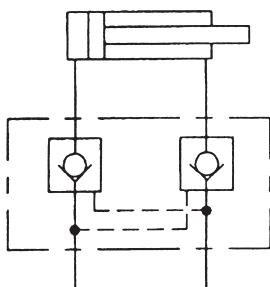
CE Normal balanceret ventil.

CER Halvbalanceret ventil, anvendes ved ventiler med lukket center.

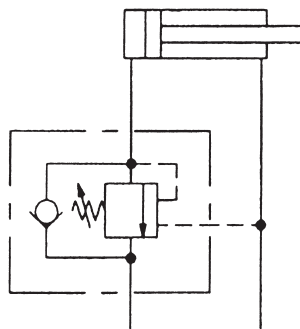
CEB Fuld balanceret ventil, anvendes f.eks. i forbindelse med proportionalventiler



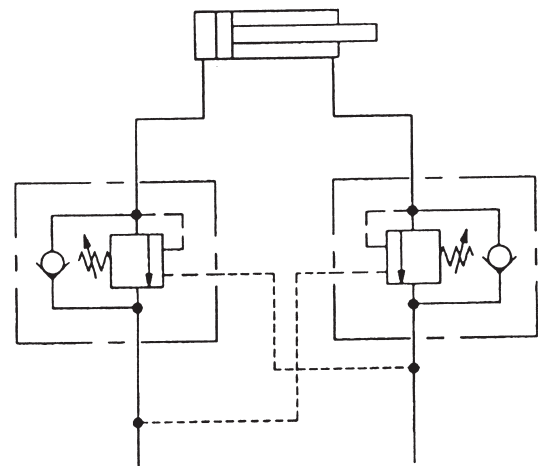
Enkelt pilotstyret kontraventil



Dobbelt pilotstyret kontraventil



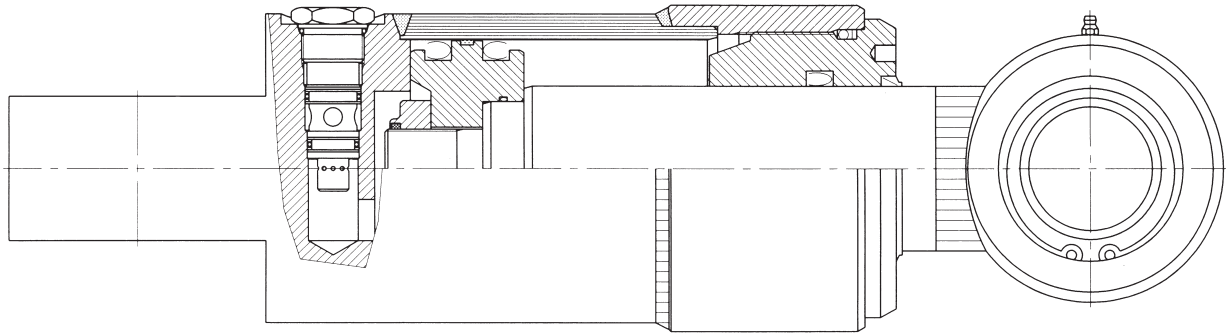
Enkelt overcentreventil



Dobbelt overcentreventil

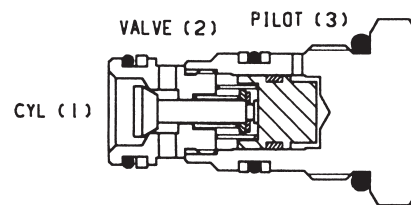
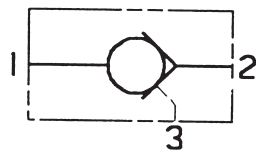


# Build-in valves

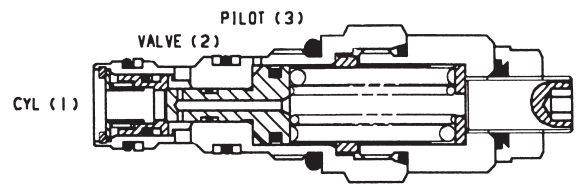
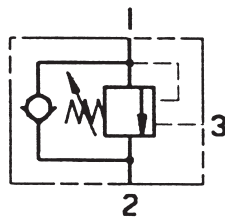


LJM's cylinders can be supplied with two types of build-in load holding valves - pilot operated check valves and overcentre valves.

Pilotstyre  
operated  
check valve



Overcentrevalve  
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.



Lind Jensens Maskinfabrik A/S  
Kroghusvej 7, Højmark  
DK-6940 Lem St. • Denmark  
Home page: [www.ljm.dk](http://www.ljm.dk)

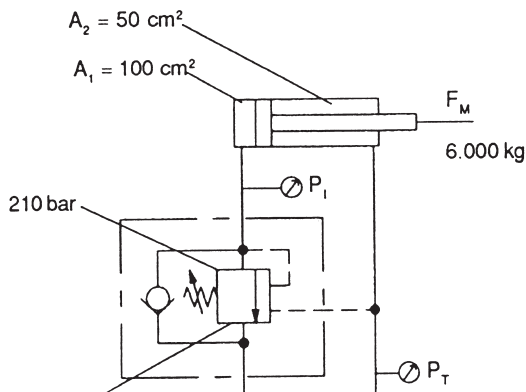




# Build-in valves

**Pilot pressure is calculated as follows:**

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



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

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

$$F_M = 210 \times 100 = \underline{21.000 \text{ kg}}$$

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.

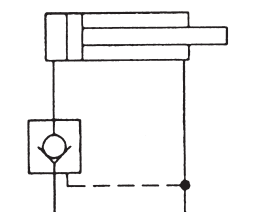
Valve type	Valve type	Pilot ratio	l/min
Overcentre valve	1 CE 30	2:1, 5:1, 10:1	30
	1 CER 30	2:1	
	1 CEB 30	5:1	
Pilotoperated checkvalve	4 CK 30	3:1	
Overcentre valve	1 CE 90	4:1	90
	1 CER 90	4:1	
	1 CEB 90	4:1	
Pilotoperated checkvalve	4 CK 90	3:1	

CE Non balanced valve.

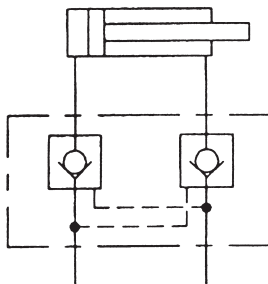
CER Part balanced, to be used in systems with closed centre PCVs.

CEB Fully balanced, to be used in regenerative systems

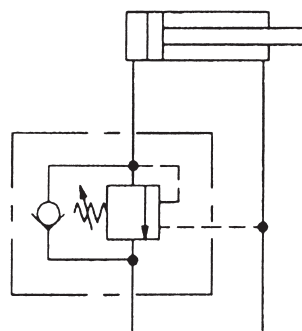
## Build-in valves



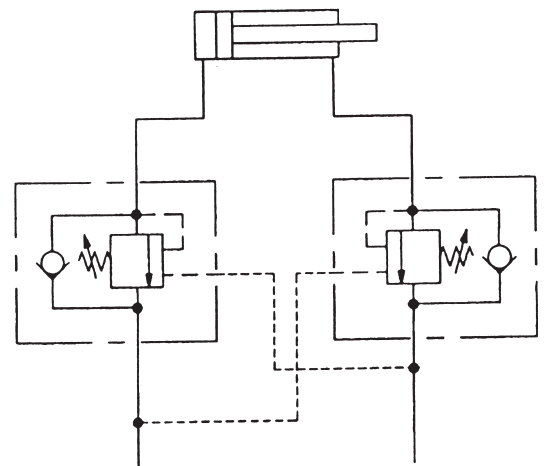
Single pilot operated checkvalve



Double pilot operated chechvalve



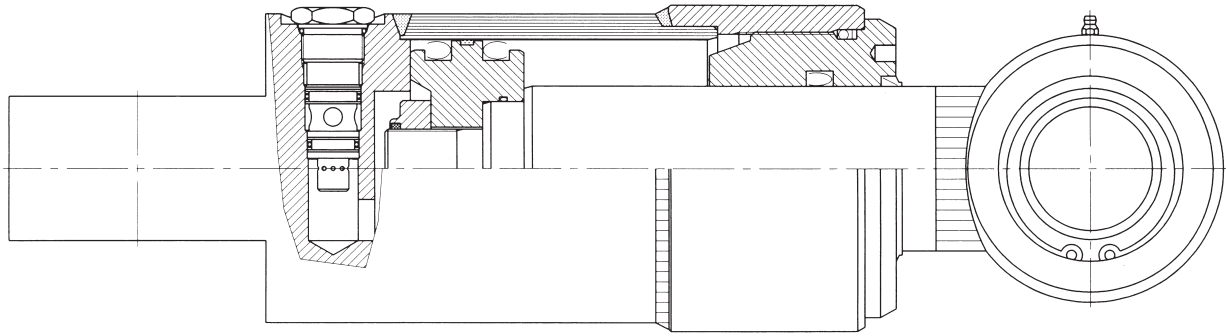
Single overcentrevalve



Double overcentrevalve

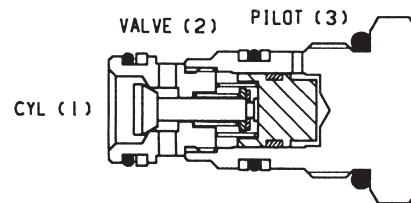
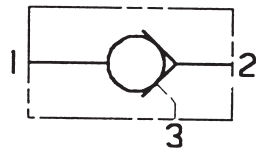


# Einbauventile

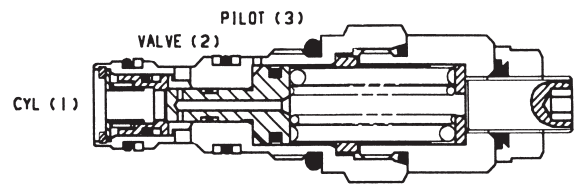
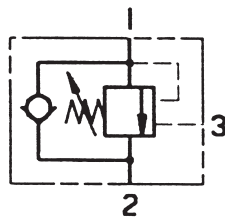


Die Zylinderreihen von LJM sind auch mit entsperrbaren Rückschlagventilen oder mit Lasthalte- bzw. Senkbremsventilen lieferbar.

Entsperrbare  
Rückschlagventile



Senkbrems- oder  
Lasthalteventile



- \* Ausführung mit Einfach- oder Doppelfunktion
- \* Ventile mit Nennvolumenstrom von 30 und 90 L/min.
- \* Betriebsdruck bis 350 bar.
- \* Ausführungen für alle Steuerungsarten, wie z.B. Proportionalventilsteuerung, Schaltung mit geschlossener Mittelstellung (Closed Center), druckbelasteter Ablauf (Eilgangsschaltung).
- \* Verschiedene Aufsteuerverhältnisse.
- ' Einheitliche Aufnahmebohrung für Ventile 30 und 60 L/min.

## Aufsteuerdruck

Zum Öffnen der Ventile ist ein vom Aufsteuerverhältnis und der Belastung abhängiger Druck erforderlich. Die Ventile sind serienmäßig mit einem festen Aufsteuerverhältnis ausgeführt, wie z.B. 2,5:1, 5:1, 10:1. Die Lasthalteventile sind von ihrer Bauart her Druckbegrenzungsventile. Sie werden auch gleichzeitig als einstellbare Sicherheitsventile eingesetzt.



Lind Jensens Maskinfabrik A/S  
Kroghusvej 7, Højmark  
DK-6940 Lem St. • Denmark  
Home page: [www.ljm.dk](http://www.ljm.dk)

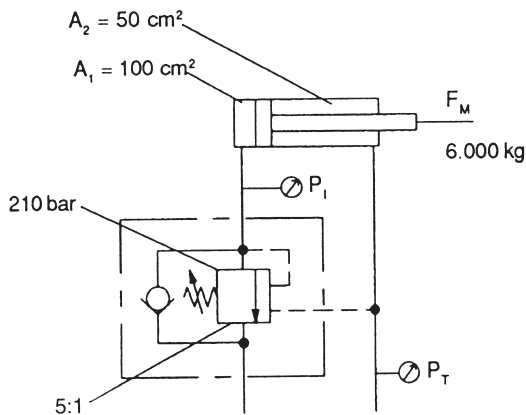




# Einbauventile

## Der Aufsteuerdruck wird wie folgt ermittelt:

$$\text{Aufsteuerdruck} = \frac{\text{Sicherheitseinstelldruck} - \text{Lastdruck}}{\text{Aufsteuerverhältnis}}$$



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

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

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

Das Beispiel zeigt, dass für das Öffnen des Ventiles ein Aufsteuerdruck von 30 bar erforderlich ist, und dass der Zylinder mit mehr als 21.000 kg. belastet werden muss, bevor das Sicherheitsventil öffnet.

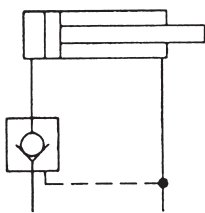
Ventil	Typ	Aufsteuer- verhältnis	l/min
Lasthalteventil	1 CE 30	2:1, 5:1, 10:1	30
	1 CER 30	2:1	
	1 CEB 30	5:1	
Rückschlagventil entsperrbar	4 CK 30	3:1	
Lasthalteventil	1 CE 90	4:1	90
	1 CER 90	4:1	
	1 CEB 90	4:1	
Rückschlagventil entsperrbar	4 CK 90	3:1	

CE Standardausführung

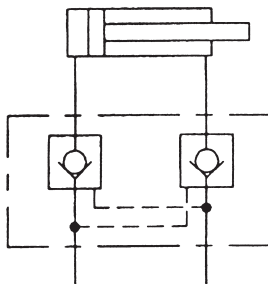
CER Sonderausführung, z.B. für Schaltung mit geschlossener Ventilmittelstellung.

CEB Sonderausführung bei druckbelastetem Ablauf oder Proportionalventilen.

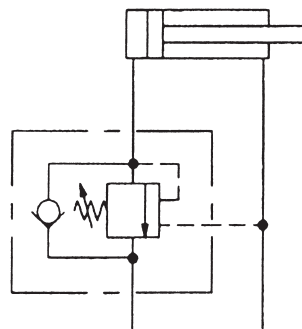
## Schaltungsbeispiele



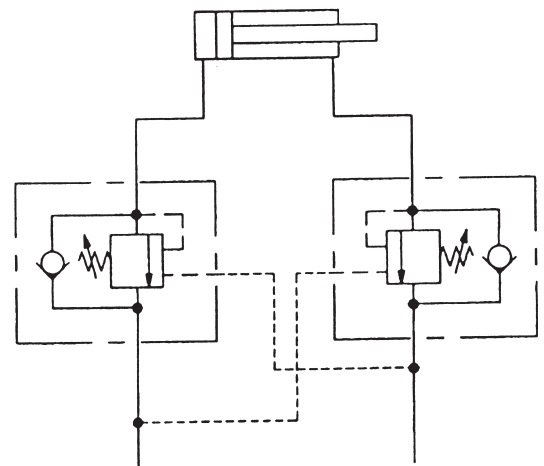
Entsperrbare Rückschlagventile - einfach



Entsperrbare Rückschlagventile - doppelt



Lasthalteventile - einfach

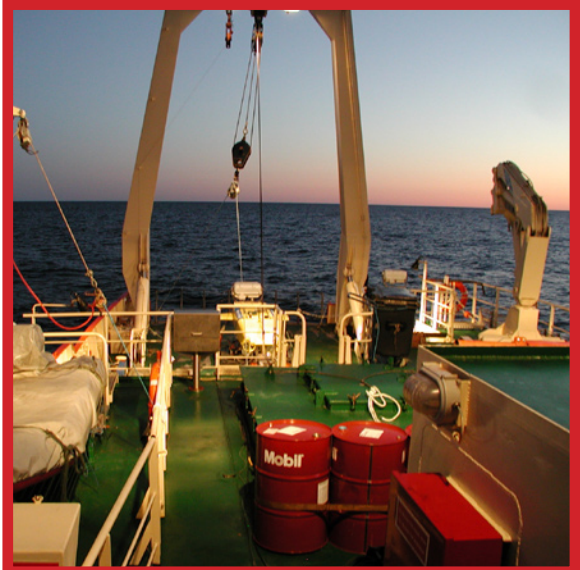


Lasthalteventile - doppelt



# Examples of applications

Hydraulic cylinders with build in valves



Lind Jensens Maskinfabrik A/S  
Kroghusvej 7, Højmark  
DK-6940 Lem St. • Denmark  
Home page: [www.ljm.dk](http://www.ljm.dk)



Hydraulik