WESSEL® HYDRAULIK

Cartridge Valve Technology

- CEE 2/2 Way Cartridge Valves
- CVE 2/2 Way Cartridge Valves
- CHF 2/2 Way High-Flow Cartridge Valves
- CHE 2/2 Way Active Cartridge Valves
- CCE Functional Cover for Cartridge-Elements
- PCL Proportional Flow Control Cartridge Valves

we engineer your progress

HYDROMENT® CONTROLS

Contents

With the **HYDROMENT-CONTROLS** valve program WESSEL-HYDRAULIK offers the complete modular kit for hydraulic valve systems. The proven and worldwide used modular system is the basis for the development of simple and complex controls with special requirements:

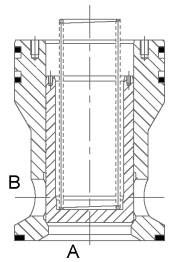
- Long service life
- High efficiency
- High working pressure
- Repeatability and accuracy
- Meets internationals specifications

The valve technology has been proven in industrial and mobile applications as well. It can be used for flow rates from 100 to 10.000 l/min under the toughest conditions and high pressures.

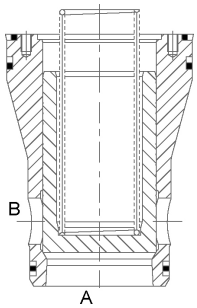
The system consists of the following key components:

1. 2/2 Way Cartridge Valve Type CEE

2/2 way cartridge valves are logic valves for the use in hydraulic control blocks, which allow a very compact design and provide a high power density. They have two operational ports (A and B) and a pilot port X. Depending on the valve function the flow is running from A to B or from B to A. Due to the conical seat design the valves are leakage free at port A. As an option port B can also be leakage free by the use of an additional seal. For a complete valve function, a control cover and in most cases a pilot control valve is needed. Depending on the cover design the cartridge valves are operating as check valves, directional valves or pressure relief valves.
WESSEL-HYDRAULIK provides the cartridge valve program for mounting cavities according to DIN 24342 respectively ISO 7368 as well as an in-house standard (Hydroment standard). Due to the optimized mounting cavity geometry Hydroment standard allows a more compact design with the same performance.

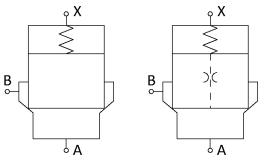


Hydroment-standard

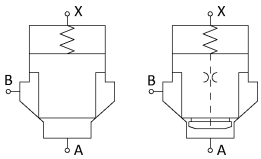


DIN 24342

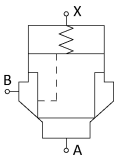
Variants



Sleeve A, cone A:
pressure valve function



Sleeve B, cone B or C
Directional valve function



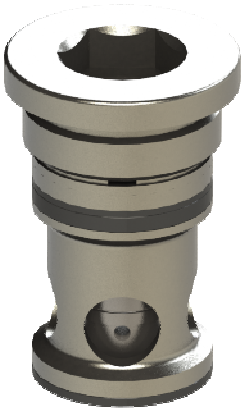
Sleeve R
Check valve function

Type Code

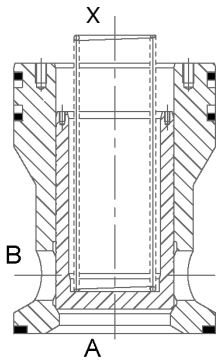
CEE						
00	01	02	03	04	05	06

00	Product Group	2/2 way cartridge valve		CEE
01	Nominal size	DIN 24342	16, 25, 32, 40, 50, 63, 80, 100	
		Hydroment-standard	10, 15, 30, 40, 50, 63, 80, 100	
02	DIN 24342			B6
	Hydroment-standard	Hydroment-standard allows a more compact design with the same performance.		C1
03	Cone type	A- cone (always with sleeve A)	1:1	A
		D- cone (always with sleeve A)	1:1, as A but with damping element	D
		B- cone (always with sleeve B)	reduced seat	B
		C- cone (always with sleeve B)	reduced seat and damping element	C
		R- cone (always with sleeve B)	check valve function	R
04	Spring	T= 2bar		T
		U= 4bar		U
05	Seal	NBR	temperature range -25°C to +80°C	N
		FKM / Viton	temperature range -20°C to +120°C	V
06	Nozzle in the cone	cone without cover	no nozzle / plug	K00
		cone with nozzle	nozzle size 0.6	K06
			nozzle size 0.8	K08
			nozzle size 1.0	K10
			nozzle size 1.2	K12
			nozzle size 1.5	K15
			nozzle size 2.0	K20
			nozzle size 2.2	K22
			nozzle size 2.5	K25

2. 2/2 Way Cartridge Valve Type CVE

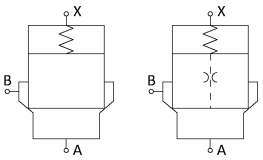


Cartridge valves of type CVE are a combination of CEE 2/2 way valves (size NG10-30) and a plug. For this valve kit no additional cover is needed. Due to the plug a recessed mounting position is possible.
This design is only available for valves with Hydroment standard design.

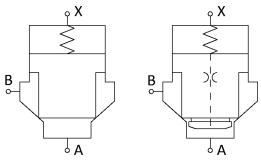


Hydroment-standard

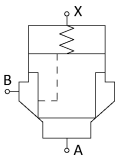
Variants



Sleeve A, cone A:
pressure valve function



Sleeve B, cone B or C
Directional valve function



Sleeve R
Check valve function

Type Code

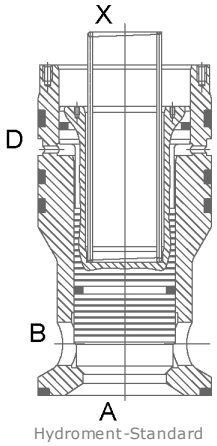
CVE		C1				
00	01	02	03	04	05	06

00	Product group	2/2 way cartridge valve		CVE
01	Nominal size	Hydroment-standard	10, 15, 30	
02	Hydroment-standard	Hydroment standard allows a more compact design with the same performance.		C1
03	Cone type	A- cone (always with sleeve A)	1:1	A
		D- cone (always with sleeve A)	1:1, as A but with damping element	D
		B- cone (always with sleeve B)	reduced seat	B
		C- cone (always with sleeve B)	reduced seat and damping element	C
		R- cone (always with sleeve B)	check valve function	R
04	Feder	T= 2bar		T
		U= 4bar		U
05	Seal	NBR	temperature range -25°C to +80°C	N
		FKM / Viton	temperature range -20°C to +120°C	V
06	Nozzles in the cone	cone without nozzle	no nozzle / plug	K00
		cone with nozzle	nozzle size 0.6	K06
			nozzle size 0.8	K08
			nozzle size 1.0	K10
			nozzle size 1.2	K12
			nozzle size 1.5	K15
			nozzle size 2.0	K20
			nozzle size 2.2	K22
			nozzle size 2.5	K25

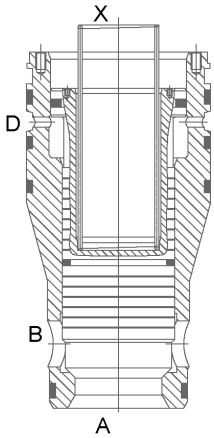
3. 2/2 Way Cartridge Valve Type CHE

Compared to the CEE cartridge valves active cartridge valves provide an additional pilot surface which allows a more dynamic switching of the valve.
Due to this additional pilot surface the cone can be controlled independently of the inlet pressure. The valve can be fit into the same cavity, only the associated cover needs more space.

2 way cartridge valves consist of a sleeve with the valve seat, the belonging cone and a spring which closes the valve in the not operated mode. The cavity is closed with a cover fixing the cartridge and connecting the pilot circuit to pilot port X. By this the pilot valve directly controls the function of the cartridge valve, either by switching to one of the end positions or proportionally in any intermediate position.
Due to the active control the kind of opening and speed are independent of the operational pressure at port A and B. They only depend on the pressure in the pilot lines X and D.

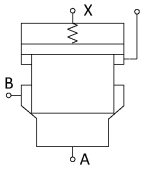


Hydroment-Standard

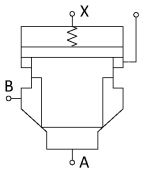


DIN 24342

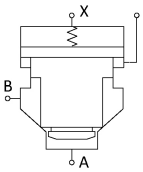
Variants



Sleeve A, cone X:
directional valve,
check valve



Sleeve B, cone S:
directional valve, check valve,
flow control valve



Sleeve B, damping element cone T:
avoiding pressure peaks

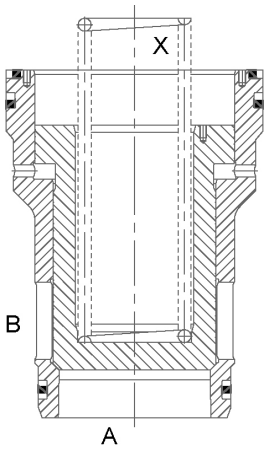
Type Code

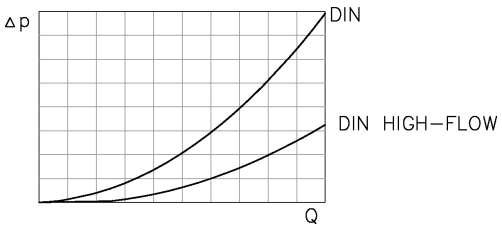
CHE					
00	01	02	03	04	05

00	Product group	2/2 way cartridge valve		CHE
01	Nominal size	DIN 24342	16, 25, 32, 40, 50, 63, 80, 100	
		Hydroment-standard	15, 30, 40, 50, 63, 80, 100	
02	DIN 24342 Hydroment-standard			A6
		Hydroment standard allows a more compact design with the same performance.		C 1
03	Cone type	X-cone (always with sleeve A)	1:1	X
		S-cone (always with sleeve B)	stepped piston	S
		T-cone (always with sleeve B)	Stepped piston with damping element	T
04	Spring	T=2bar		T
		U=4bar		U
05	Seal	NBR	temperature range -25°C to +80°C	N
		FKM / Viton	temperature range -20°C to +120°C	V

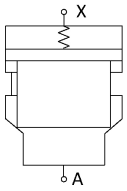
4. 2/2 Way Cartridge Valve Type CHF

2/2 way cartridge valves of type CHF are an advanced version of the standard CEE cartridge. They grant lower pressure loss at the same flow due to an additional pilot surface.
This high-flow version allows higher safety to keep a switched position as well as energetic advantages.
CHF cartridges can be mounted into the same cavities as CEE cartridges, also the same covers and pilot valves can be used.
The valves are available in nominal size from 16 to 100.

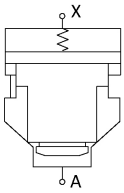




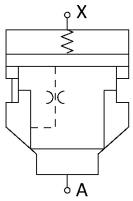
Variants



Sleeve B, cone S:
directional valve, check valve,
flow control valve



Sleeve B, cone T with damping:
Directional valve,
check valve, flow control valve



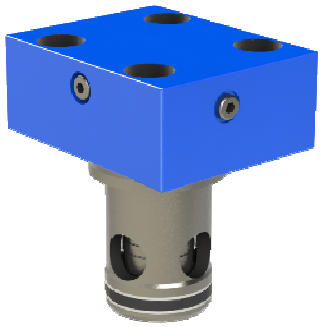
Sleeve B, Cone R:
Check valve function

Type Code

CHF		B6			
00	01	02	03	04	05

00	Product Group	2/2 way cartridge valve		CHF
01	Nominal size	DIN 24342	16, 25, 32, 40, 50, 63, 80, 100	
02	DIN 24342			B6
03	Cone type	S-cone (always with sleeve B)	stepped cone, reduced seat	S
		T-cone (always with sleeve B)	reduced seat and damping element	T
		R-cone (always with sleeve B)	check valve function	R
04	Spring	T=2bar		T
		U=4bar		U
05	Seal	NBR	temperature range -25°C to +80°C	N
		FKM / Viton	temperature range -20°C to +120°C	V

5. Cover CCE for 2/2 Way Cartridge

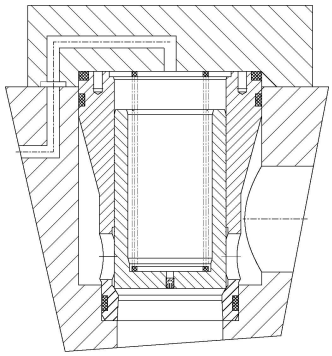


Cartridge cover and 2/2 way cartridge valve type CEE or CHF together establish the control function in an integrated block system. In many cases the cover also set up the connection from the pilot surface of the cartridge to the pilot valves, which are directly mounted on the cover or also can be installed anywhere in the hydraulic block or can be connected by external pilot lines to the cartridge valve (remote control).

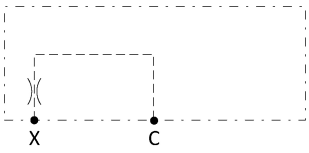
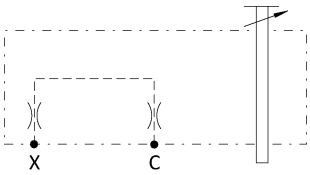
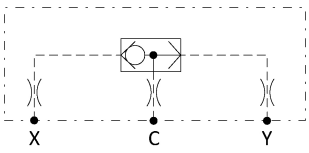
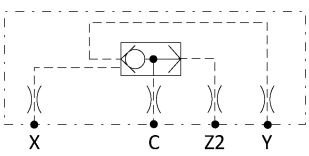
By use of different pilot valves the cartridge valve can perform directional control, pressure relief or throttle valve functionality or a combination of these functions.

Depending on the specified function the cover contains control lines and optionally a stroke limiter, check or shuttle valves.

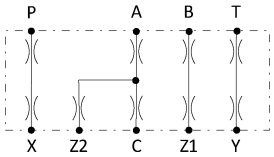
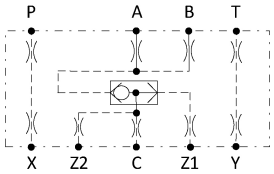
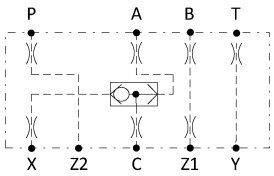
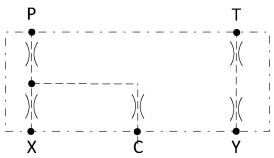
The WESSEL program provides covers for the nominal sizes 16, 25, 32, 40, 50, 63, 80 and 100 according to DIN 24342 (ISO 7368) and Hydroment Standard NG15-100. The available functions are described on the following pages.



Bauformen

Schematic	Type	Use with Cartridge	Function	Pilot ports
	REE	CEE,CHF	check valve	no
	1D	CEE, CHF	Check valve: X connected with B: B to A locked: A to B open Directional valve in connection with stepped cone: X without pressure: Flow from A to B or B to A System pressure at X: Cartridge closed	no
	1H	CEE, CHF	Directional valve with stroke limiter -> throttle: The adjustable stroke limitation throttles the flow in both directions	no
	2D	CEE, CHF	Directional valve function with shuttle valve for pilot pressure: x and y to the tank: Flow from A to B or B to A, X or Y pressurized: Flow locked in both directions	no
	RV	CEE, CHF	Pilot operated check valve function: Y to tank, Z2 is connected to B, free flow A to B, B to A is locked With pressure at X (min. 20% of B) cone is unlocked	no

5. Cover CCE for 2/2 Way Cartridge

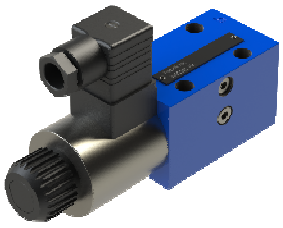
Schematic	Type	Use with Cartridge	Function	Pilot ports
	1W	CEE,CHF	Using cover 1W together with a switching cartridge and a directional valve 4/2 (NG6) a directional control function can be realized. With the ports Z1 and Z2, a second cartridge can be operated in parallel.	Cetop 3/5
	2W	CEE, CHF	Using the 2W cover and a 4/2 way directional valve a check valve is realized: B to A is always locked, A to B is open, in switched position and closed in neutral position.	Cetop 3/5
	2WR	CEE, CHF	Similar to cover 2W. In addition another cartridge can be operated through ports Z1 and Z2.	Cetop 3/5
	DB	CEE	Pressure relief function: With a flanged-on pressure relief valve the pressure at the cartridge port A is limited to the relief pressure (cartridge valve equiped with A-piston with nozzle). In this case port B has to be connected to the tank.	Cetop 3/5

Type Code

CCE						99
00	01	02	03	04	05	06

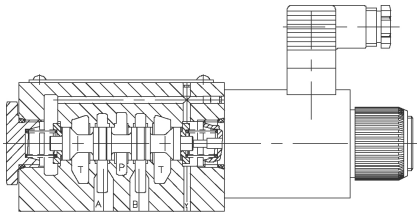
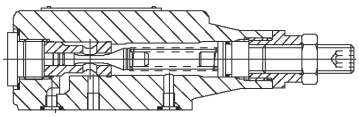
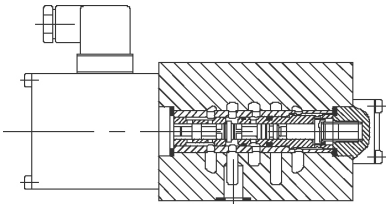
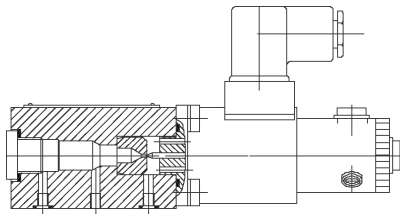
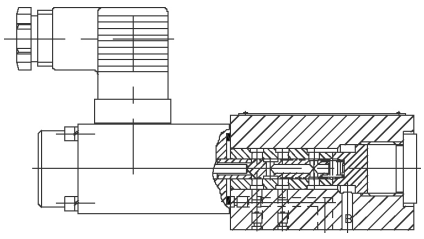
00	Product Group	cover		CCE
01	Nominal size	DIN 24342	16, 25, 32, 40, 50	
02	DIN 24342			B6
	Hydroment-standard	Hydroment standard allows a more compact design with the same performance.		C1
03	Cover type	REE, 1D, 1H, 2D, RV, 1W, 2W, 2WR, DB		
04	Cetop-type	06 = Cetop 3		06
		10 = Cetop 5		10
05	Seal	NBR	temperature range -25°C to +80°C	N
		FKM / Viton	temperature range -20°C to +120°C	V
06	Nozzle	standard version without nozzle		99

6. Pilot valves

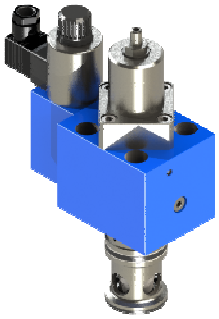


In order to realize different valve functions, various pilot valves are available. The valves are directly mounted to the cover or separately arranged in distance (remote control).
Directional valves, pressure relief valves, unlockable check valves or proportional valves can be used.

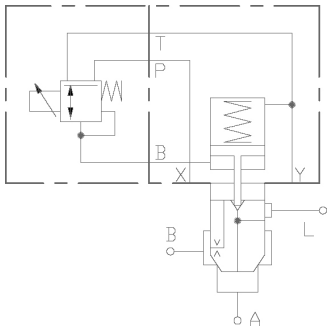
Type

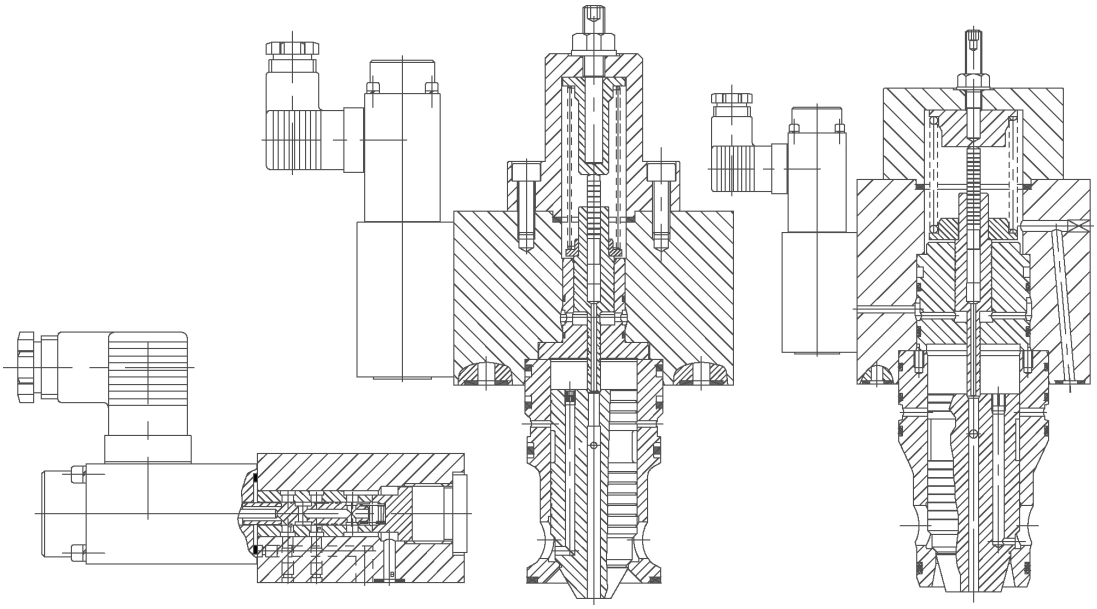
Type	Designation	Cover	Function	Use with cartridge
	WE42P06B WE42P10CA	W1	Directional valve, switching	CEE CHE CHF
	DBDP04A2002	DB	Pressure relief in port A	CEE
	WES3-2	1W	Solenoid pilot operated check valve	CEE CHF
	DBEP06	DB	Proportional pressure relief in port A	CEE
	DWME306	W1	Proportional directional valve	PCL

7. Proportional Throttle PCL



The 2 way proportional cartridge valve type PCL is a pilot operated throttle valve with a seat design. It is controlled by a low pressure proportional pressure control valve which is infinitely adjustable between 200 and 800 mA.
The main piston is pressure compensated.
The valve can be used as the proportional a throttle of a 2/2 directional valve or as a regulating orifice of flow control valve. Therefore the valve provides a load-sensing signal at port L.
The valve is available for the nominal sizes 25 to 50 and covers flows up to 2000 l/min.





Pilot pressure reducing valveDWME3P06A4007NB

Hydroment-Standard

DIN 24342

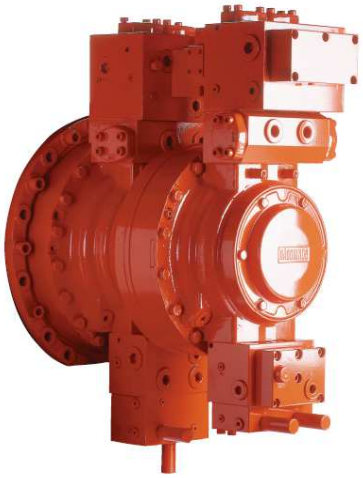
As Hydroment standard version the valve is available in nominal size 30 to 50.
The DIN 24342 version of the valve is available in nominal size 25 to 50.
The section drawings show the advantage of the compact design with the same size for Hydroment standard.

Type Code

PCL			
00	01	02	03

00	Product Group	2/2 way cartridge valve		PCL
01	Nominal size	DIN 24342	25, 32, 40, 50	
		Hydroment-standard	30, 40, 50	
02	DIN 24342 Hydroment-standard			B6
		Hydroment standard allows a more compact design with the same performance.		C1
03	Cone type	standard-cone 15°		C
		standard-cone 30°		E
		other cones with customized control design on request		

8. Application examples: Winch control blocks

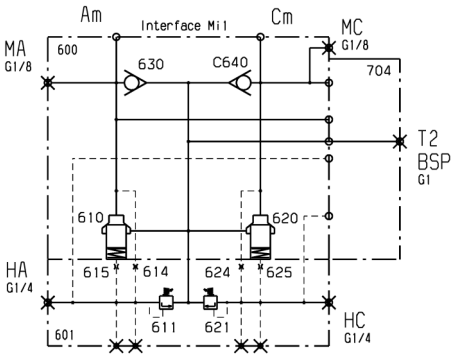


Winch control is a typical application for the usage of Hydroment control valves:
The valve technology complies with the high requirements regarding to high reliability at complex functions. The modular system guarantees a compact design.
The picture on the left shows a Hägglunds motor for which a comprehensive valve program is available.
This allows the motor to be used optimally for offshore applications.

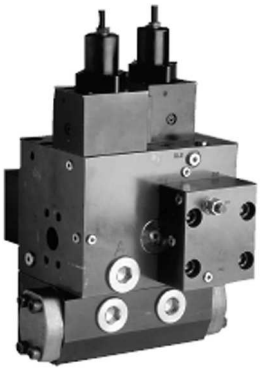
Valve variants

Cross Over relief valve
COCB1000

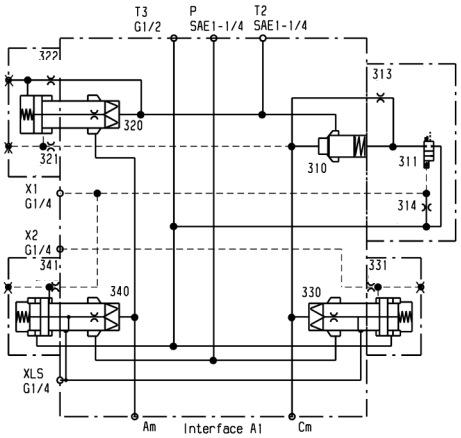
The valve is designed for compact motors type CA or CB. It can be operated in open or closed hydraulic circuits and is normally mounted at the opposite side of the motor oil supply.
The motor is protected against pressure peaks by pressure relief valves set to 350 bar. Cavitation is prohibited by suction valves.
In this block CEE cartridge valves and pilot pressure relief valves type DBDE are used.



4-way cover with brake valve

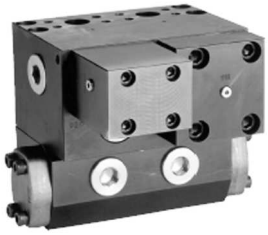


The valve performs a 4-directional control function. The winch raise and lowering speed is set by external pilot pressures at port x1 and x2 which operate PCL valves (component 330 and 340). While lowering the load is hold by a counter balance valve (320) at port AM, which is piloted by the inlet pressure. For lifting the load a check valve (310) on the back line is opened (port CM).

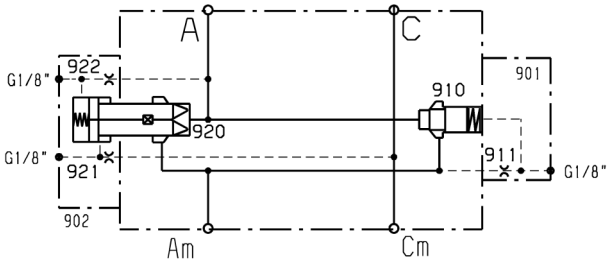


Valve variants

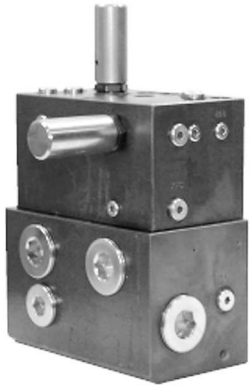
Counter balance valve



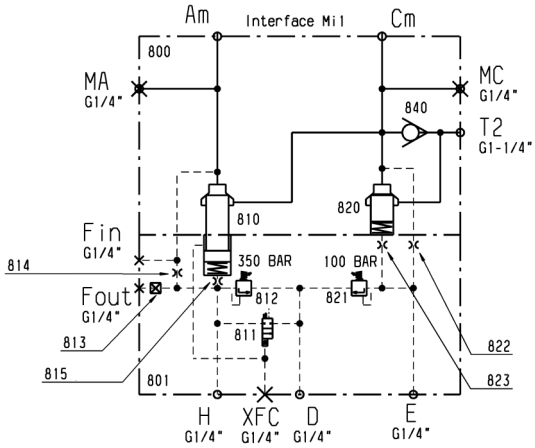
Typically the valve is mounted on the motor via an adapter plate. It provides a counterbalance function on the A-side for flow direction AM to A. The inlet flow is lead to the motor via a check valve.



Constant winch traction



Constant winch tension is achieved by a pressure relief valve which permits the flow from AM to CM in case the adjusted pressure exceeds. This pressure can also be set by an external remote control (port H) or totally switched off (port XFC).
If port XFC is piloted a fast and pressureless lowering is allowed (free circulation). By connecting a tankline at port T2 cavitation is reliably prevented.



WESSEL-HYDRAULIK GmbH is an innovative medium sized company in the hydraulic industry. We are focussed on development and production of hydraulic control valves.
Together with our international partners we distribute our products worldwide. We develop and produce products for industrial and mobile applications. Our production plant is equipped with CNC-machining centers, honing and grinding machines and allows us to produce optimized high quality products at reasonable costs, our engineers strive for the best combination of our developments and standard products from the market.

Besides standard valves likes pilot control valves, temperature control valves, check valves, pressure relief valves, directional valves and flow control valves customized control valves belong to our product range. Our products are developed and produced for ambitious tasks. E.g. pressure intensifier, quick coupling systems or drive and traction control units. Specific focus is set to the safety valve technology for protection of cylinder und motor-applications (winches, ...). For this WESSEL-HYDRAULIK offers a big range of valves from 5 to 2500 lpm and pressures up to 750 bar

we engineer your progress

WESSEL-HYDRAULIK GmbH
Liebigstraße 8
26389 Wilhelmshaven Germany
Telefon +49 4421-9911 0
Telefax +49 4421-9911 29

info@wessel-hydraulik.de

www.wessel-hydraulik.de