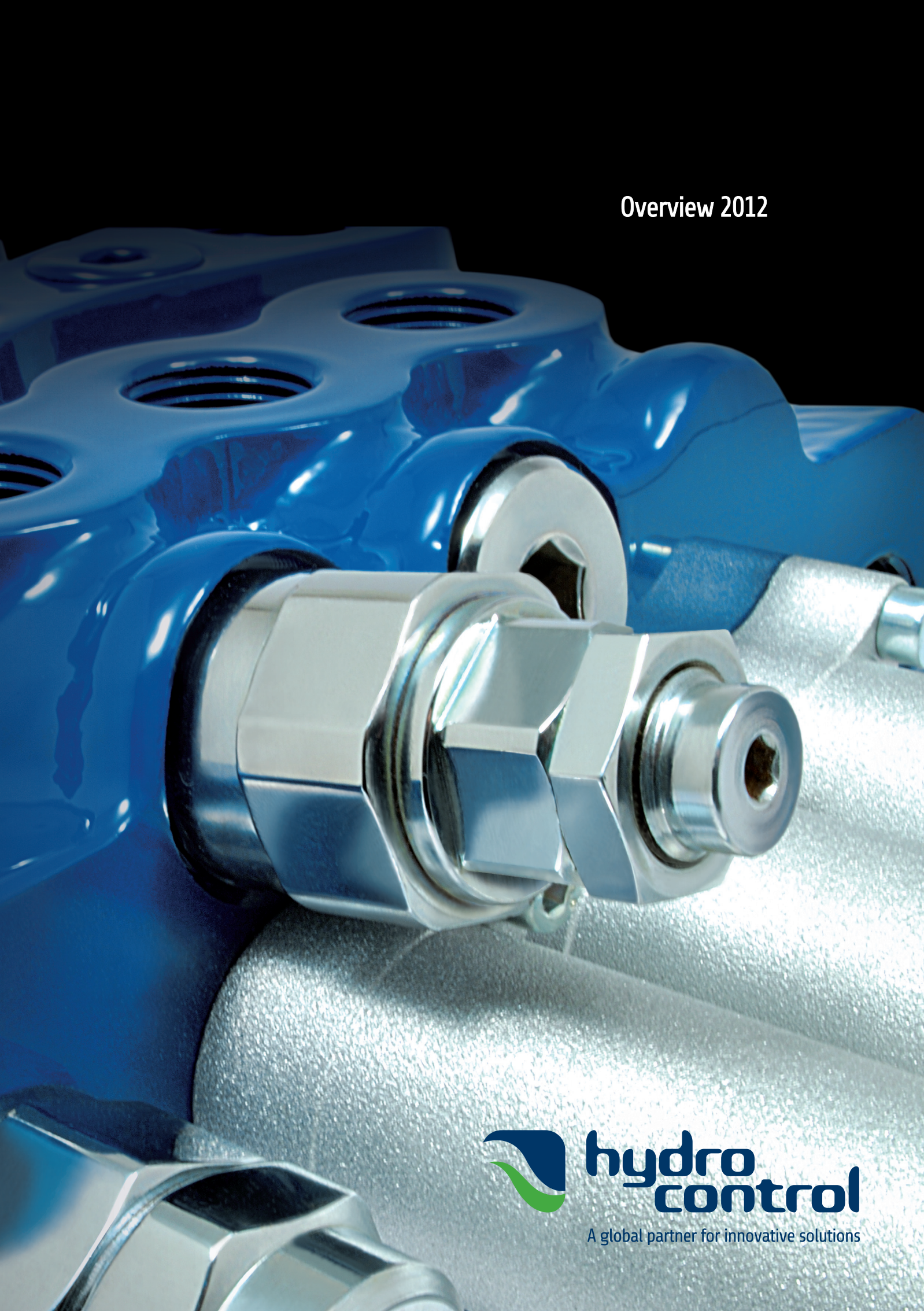
Overview 2012



hydro control

A global partner for innovative solutions

Overview 2012

Innovation and investments: a pragmatic approach

Hydrocontrol has always concentrated its efforts on being a reliable, proactive **partner** for both large OEMs and small and medium-sized manufacturers. Hydrocontrol's decision to take an **active** part in designing and developing products for earth moving machinery is not only a strategic choice but is essentially it's **vocation**. Over the past forty years of activity, this decision has enabled the company to reach all the major international markets, obtain important accolades, and become one of the **world leaders** in the production of hydraulic valves.

Living and working in the Global Market

Hydrocontrol started its strategic activity of catering for the global market in 1998, since then we have opened subsidiaries in Europe, USA, China and India in order to be close and support the growth of these markets.
The close proximity to the diverse markets has enabled us to understand their specific requirements, in many cases due to extreme working conditions, and by collaborating with local and global manufacturers of Mobile machinery we have found **customised solutions**.
As a consequence of direct contact and problem solving activities with the Customer, Hydrocontrol actually becomes its qualified and proactive Partner.

Hydrocontrol's presence world wide:

ITALY
World Wide HQ. Sales and production facility covering 16.000 mq.

U.S.A.
Sales and production facility covering 1.500 mq.

FRANCE
Sales facility covering 800 mq.

GERMANY
Sales facility covering 500 mq.

INDIA
Sales and production facility covering 3.000 mq.

CHINA
Sales and production facility covering 3.500 mq.

General index

Sectional valves

HC-D9

Sectional valve for flow up to 35 l/min and 350 bar rated pressure. Especially suitable for miniexcavators and small machines, even with two and three pump circuits.

pg. 12

HC-D3

Sectional valve for flow up to 45 l/min and 350 bar rated pressure. Especially suitable for mobile cranes and backhoe applications.

pg. 14

HC-D3M

Sectional valve for flow up to 55 l/min and 350 bar rated pressure. Especially suitable for mobile cranes and forest machines.

pg. 16

HC-DVS10

Sectional valve for flow up to 45 l/min and 350 bar rated pressure. Especially suitable for mini skid loaders and mini dumpers.

pg. 18

HC-D4

Sectional valve for flow up to 80 l/min and 350 bar rated pressure. Especially suitable for excavators (up to 7 t), truck mounted cranes and backhoe loaders.

pg. 20

Sectional valves

HC-D6

Sectional valve for flow up to 100 l/min and 350 bar rated pressure. Especially suitable for backhoes, backhoe loaders and Wheel loaders.

pg. 22

HC-D16

Sectional valve for flow up to 150 l/min and 350 bar rated pressure. Especially suitable for backhoes, backhoe loaders, Wheel loaders, garbage compactors, hook and skip loaders.

pg. 24

HC-D12

Sectional valve for flow up to 180 l/min and 350 bar rated pressure. Especially suitable for mobile cranes, excavators, Wheel loaders, hook and skip loaders and marine cranes.

pg. 26

HC-DVS20

Sectional valve for flow up to 250 l/min and 250 bar rated pressure. Especially suitable for garbage compactors, hook loaders and Wheel loaders.

pg. 28

HC-D20

Sectional valve for flow up to 250 l/min and 350 bar rated pressure. Especially suitable for Wheel loaders, rough terrain cranes, drilling machines, marine cranes and presses.

pg. 30

Sectional valves

HC-D25

Sectional valve for flow up to 380 l/min and 350 bar rated pressure. Especially suitable for Wheel loaders, rough terrain cranes, drilling machines, marine cranes and presses.

pg. 32

HC-D40

Sectional valve for flow up to 700 l/min and 350 bar rated pressure. Especially suitable for Wheel loaders, marine cranes, oil rigs and presses.

pg. 34

HC-D50

Sectional valve for flow up to 1200 l/min and 250 bar rated pressure. Especially suitable for marine cranes, oil rigs and presses.

pg. 36

General specifications

TYPE	D9	D3	D3M	DVS10	D4	D6	D16	D12	DVS20	D20	D25	D40	D50
Working sections number	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-10	1-6
CIRCUIT													
Parallel	●	●	●	●	●	●	●	●	●	●	●	●	●
Series	●	●	●	●	●	●	●	●		●	●		
Tandem	●		●	●	●	●	●		●	●			
Parallel circuit stroke (mm)	6	5	5	6	6	7	7	9,5	9,5	9,5	12	15	18
Series circuit stroke (mm)	6	5	5	6	6	5	7	6,5		6,5	8,5		
Float spool extra stroke (mm)	5	5	5	5	5,5	6	7	7	7	7	9,5	10	
Spools pitch (mm)	31	38	38	35	40	46	46	56	56	64	74	91	132
RATED FLOW													
Flow rate (l/min)	35	45	55	45	80	100	150	180	250	250	380	700	1200
Flow rate (GPM)	10	12	15	12	22	27	40	48	67	67	100	185	320
RATED PRESSURE													
Max working pressure (bar)	350	350	350	350	350	350	350	350	250	350	350	350	250
Max working pressure (PSI)	5000	5000	5000	5000	5000	5000	5000	5000	3600	5000	5000	5000	3600

Options chart

TYPE	D9	D3	D3M	DVS10	D4	D6	D16	D12	DVS20	D20	D25	D40	D50
Direct acting pressure relief valve	●	●	●	●	●								
Pilot operated pressure relief valve		●	●		●	●	●	●	●	●	●	●	●
2 stage pilot operated relief valve		●	●		●	●	●	●		●	●	●	
Externally piloted valve	●	●	●	●	●	●	●	●		●	●	●	
Solenoid dump valve (12 Vdc)	●	●	●	●	●	●	●	●					
Solenoid dump valve (24 Vdc)	●	●	●	●	●	●	●	●					
Main anticavitation check valve		●	●		●	●	●	●	●	●	●	●	
Clamping valve		●	●	●	●								
SPOOL ACTUATION													
Manual control	●	●	●	●	●	●	●	●		●	●	●	●
Without lever	●	●	●	●	●	●	●	●	●	●	●	●	
90° joystick control		●	●	●	●	●	●						
Hydraulic control	●	●	●	●	●	●	●	●	●	●	●	●	●
Direct electric control (12-24 Vdc)			●		●								
SPOOL RETURN ACTION													
Spring return	●	●	●	●	●	●	●	●	●	●	●	●	●
Detent in A - in B - in A/B	●	●	●	●	●	●	●	●	●	●	●	●	●
Detent in 4th position	●	●	●	●	●	●	●	●	●	●	●	●	●
Arrangement for dual control	●	●	●		●	●	●	●		●			
Hydraulic load limit	●	●	●		●	●	●						
Pneumatic control ON - OFF		●	●	●	●	●	●	●	●	●			
Proportional pneumatic control		●	●	●	●	●	●	●	●	●			
Electrical load limit	●	●	●		●	●	●						
Electrohydraulic control ON-OFF (12-24 Vdc)		●	●	●	●	●	●	●	●	●			
Electrohydraulic control PROP. (12-24 Vdc)		●	●	●	●	●	●	●	●	●			
Electropneumatic control (12-24 Vdc)		●	●	●	●	●	●	●	●	●			
AUXILIARY VALVES													
Antishock valve	●	●	●	●	●	●	●	●	●	●	●	●	
Anticavitation valve	●	●	●	●	●	●	●	●	●	●	●	●	
Antishock and anticavitation valve	●		●	●		●	●	●					
Pilot operated Antishock and anticavitation valve							●		●	●	●	●	

Standard working conditions - Sectional valve

Operating temperature range	-20°C / +80°C
Kinematic viscosity range	10 ÷ 300 cSt
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration level	β10 > 75 (ISO 16889:2008)

All information and diagrams in this catalogue refer to a mineral base oil VG46 at 50°C temperature (32 cSt kinematic viscosity)

Fluid options

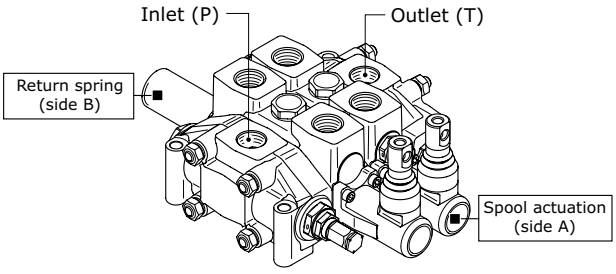
Types of fluid (according to IS0 6743/4) Oil and Solutions	Temperature (°C)		Compatible gasket
	min	max	
Mineral Oil HL, HM (or HLP acc. to DIN 51524)	-25	+80	NBR
Oil in water emulsions HFA	+5	+55	NBR
Water in oil emulsions HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

For special applications and different fluids, please call our Technical Department.

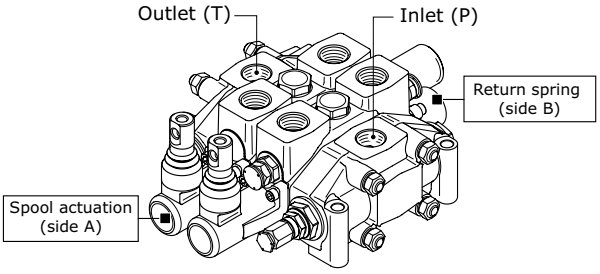
General classification

Hydrocontrol sectional valves have symmetric bodies: thanks to this characteristic, it is possible to change the control side, by simply reversing the spool 180°.
All valves can easily be changed from right inlet (R) to left inlet (L) and vice versa.

SECTIONAL VALVES WITH LEFT INLET

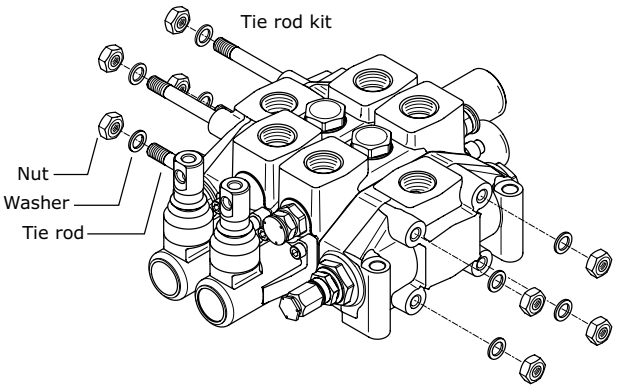


SECTIONAL VALVES WITH RIGHT INLET



Tie-rod kit classification for sectional valve (appendix "A")

Tie rod kit allows the correct assembling of sectional valves. Tie rods lenght depends on number of sections; each valve is assembled with tie rod kits including a tie rod, two nuts and two washers.



TYPE	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
Tie-rod kit quantity (for sectional valve)	4	3	3	4	4	4	4	4	4	4	4	4	4
CLAMPING TORQUE	**D9**	**D3**	**D3M**	**DVS10**	**D4**	**D6**	**D16**	**D12**	**D20**	**DVS20**	**D25**	**D40**	**D50**
Value (Nm)	25	35	35	35	35	50	50	70	110	70	110	150	300

Special body classification - Sectional valve

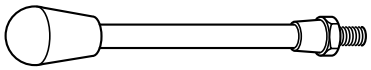
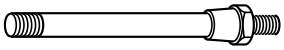
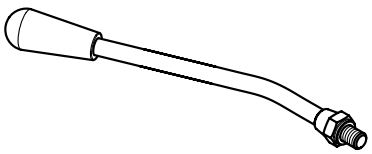
The following spools may require bodies with special machining (SPC): bodies with special machinings are not symmetrical and it is not possible to reverse spools.

TYPE / SPOOL	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40
W012 (4 pos. double-acting with float in 4th position)	SPC	SPC	SPC	SPC	SPC*		SPC			SPC		SPC
W013 (3 pos. double-acting regenerative)	SPC	SPC	SPC		SPC	SPC	SPC	SPC	SPC		SPC	
W014 (4 pos. double-acting regenerative in 4th position)		SPC	SPC									
W015 (3 pos. double-acting series)								SPC				
W016 (3 pos. double-acting series A-B to tank)						SPC						
W019 (3 pos. double-acting regenerative A-B to tank)			SPC			SPC						

* = only on hydraulic control
Series spool W015 and W016 needs special RS body (see table pg. 48)

Kit lever identification (appendix "B")

Hydrocontrol can supply a lever kit to be assembled on the valve's manual controls; different lengths and threads are available. Lever kits must be ordered separately.

CLASSIFICATION LEVER					
ZA	Lever with knob	**ZB**	Lever without knob	**ZC**	Lever with knob for joystick control
					

Order example

ZA - M8 - 210

- 210 — Lever lenght (mm)
- M8 — Lever thread
- ZA — Lever type

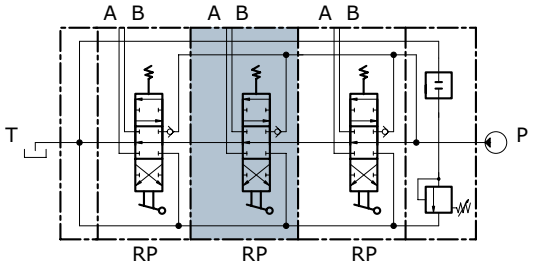
Option Chart - Sectional valve

TYPE / CODE	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
ZA - M8 - 135 (cod. 430503001)	•	•	•	•									
ZA - M8 - 210 (cod. 430503002)	•	•	•	•									
ZA - M8 - 295 (cod. 430503003)	•	•	•	•									
ZB - M8 - 180 (cod. 430503007)	•	•	•	•									
ZB - M8 - 230 (cod. 430503008)	•	•	•	•									
ZA - M10 - 140 (cod. 430504001)					•								
ZA - M10 - 190 (cod. 430504002)					•								
ZA - M10 - 240 (cod. 430504003)					•								
ZC - M10 - 210 (cod. 430504019)		•	•	•	•	•							
ZC - M10 - 250 (cod. 430504031)		•	•	•	•	•							
ZA - M10 - 190 (cod. 430505001)						•	•						
ZA - M10 - 240 (cod. 430505002)						•	•						
ZA - M10 - 415 (cod. 430505003)						•	•						
ZB - M10 - 180 (cod. 430505004)						•	•						
ZB - M10 - 230 (cod. 430505005)						•	•						
ZB - M10 - 405 (cod. 430505006)						•	•						
ZA - M12 - 215 (cod. 430507001)								•					
ZA - M12 - 290 (cod. 430507002)								•					
ZA - M12 - 390 (cod. 430507003)								•					
ZA - M14 - 350 (cod. 430509001)									•	•	•	•	•
ZA - M14 - 590 (cod. 430509002)									•	•	•	•	•

Hydraulic schematic - Sectional valve

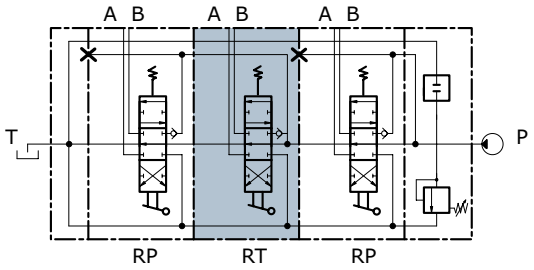
Parallel circuit

When the spool is operated it intercepts the by-pass gallery by diverting the flow of oil to service port A or B. If two or more spools are actuated at the same time, the oil will power the service port that has the lower load; by throttling the spools, the flow of oil can be divided between two or more service ports.



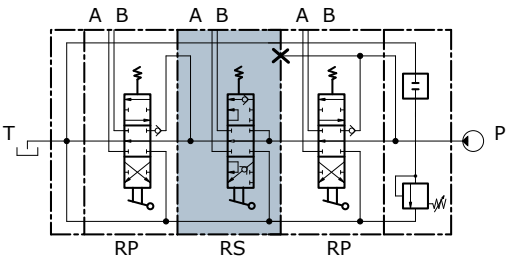
Parallel-Tandem circuit

When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The Tandem circuit is powered by the switch gallery thus permitting the use of just one work section at a time. The section downstream from the tandem section that has been actuated does not operate, the upstream section has priority.



Series circuit

When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The oil that flows back from the actuator is carried to the switch gallery thus making it available to the service ports downstream from the series section. The pressure drop downstream is added to the pressure drop of the section itself.



Technical specifications

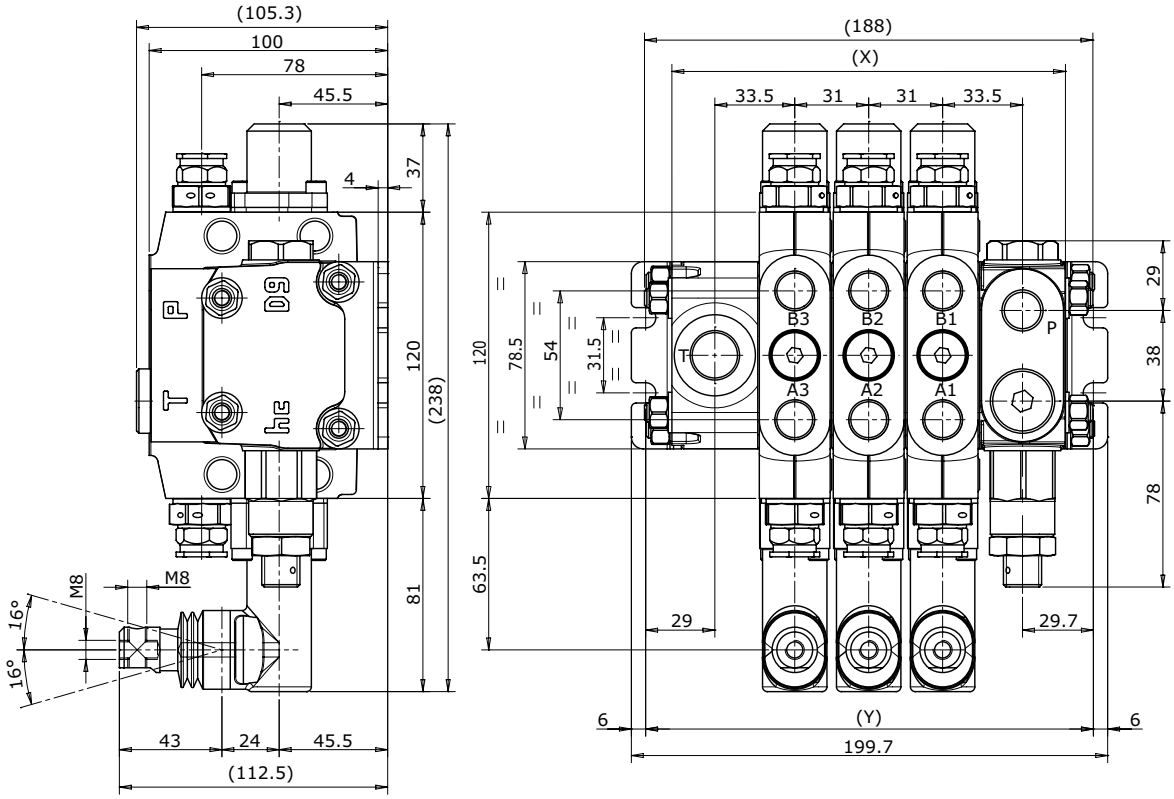
Working section number	1 - 12
Rated flow	35 l/min - 10 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	6 + 6 mm
Spool pitch	31 mm
Circuit type	Parallel, series, tandem

Applications

Mini-excavators, Mini-backhoe loaders
Skid-steer loaders, Mini skid loaders, Mini dumpers
Forestry machines

HC-D9 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions



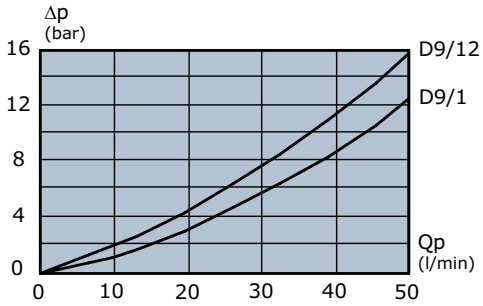
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	125	156	187	218	249	280	311	342	373	404	435	466
Y (mm)	137	168	199	230	261	292	323	354	385	416	447	478
Weights (kg)	4,5	6,2	7,9	9,6	11,3	13	14,7	16,4	18,1	19,8	21,5	23,2

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8	G 3/8	G 1/2	G 1/2
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	7/8" - 14 UNF	7/8" - 14 UNF

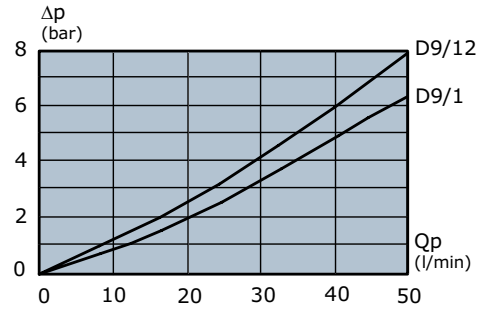
Typical curves

indicated values have been tested with standard sectional valve and W001A spools.

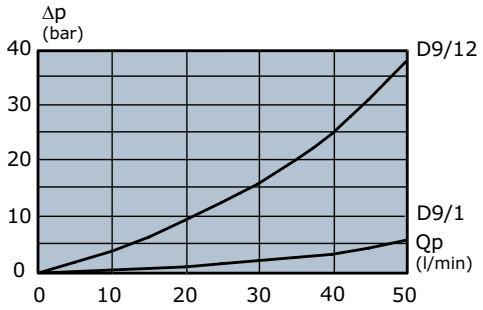
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

Different kind of manual and hydraulic remote controls.
Countless configurations and custom made solutions.
Working sections have auxiliary valves and a broad range of interchangeable spools.

Ideal for mini-excavators between 1 t and 2.5 t. Especially limited size and weight.
It can be equipped with:

- 2 or 3 pumps circuit
- flow addition on PTO function
- second travel speed
- regenerating system on the arm
- flow addition on the boom
- flow addition on the bucket
- flow addition on the arm
- straight travel
- built in boom anti-drift
- various kinds of hydraulic and manual controls
- any number of customisations and set-ups

Technical specifications

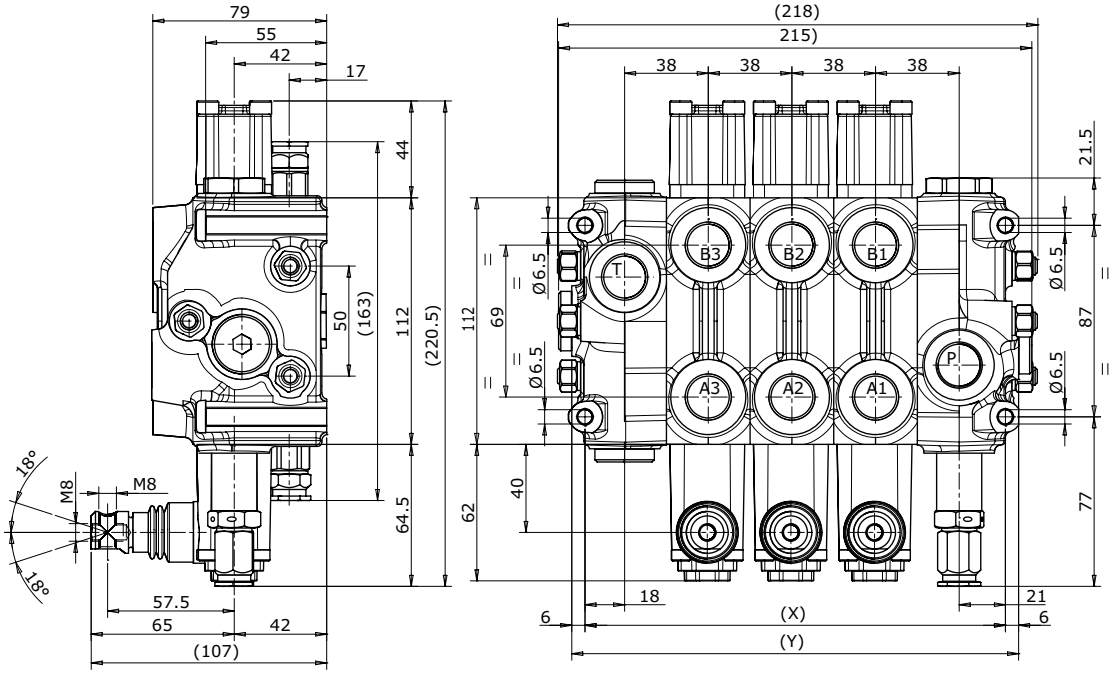
Working section number	1 - 12
Rated flow	45 l/min - 12 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	38 mm
Circuit type	Parallel, series

Applications

Cranes and Aerial platforms, Backhoes

HC-D3 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)
Intermediate adjustable flow regulator

Dimensions



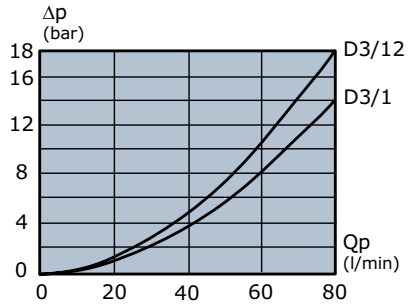
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	115	153	191	229	267	307	343	381	419	457	495	533
Y (mm)	127	165	203	241	279	317	355	393	431	469	507	545
Weights (kg)	5,6	7,8	9,9	12,1	14,3	16,5	18,6	20,8	22,9	25,1	27,2	29,4

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 1/2	G 1/2	G 1/2	G 1/2
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF
METRIC Thread (ISO 9974-1)	M18 x 1,5	M18 x 1,5	M22 x 1,5	M22 x 1,5

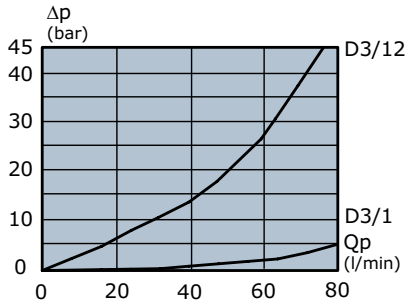
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

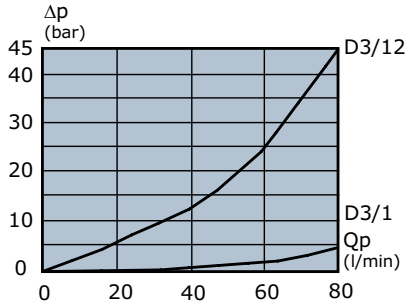
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, direct electric, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.

Technical specifications

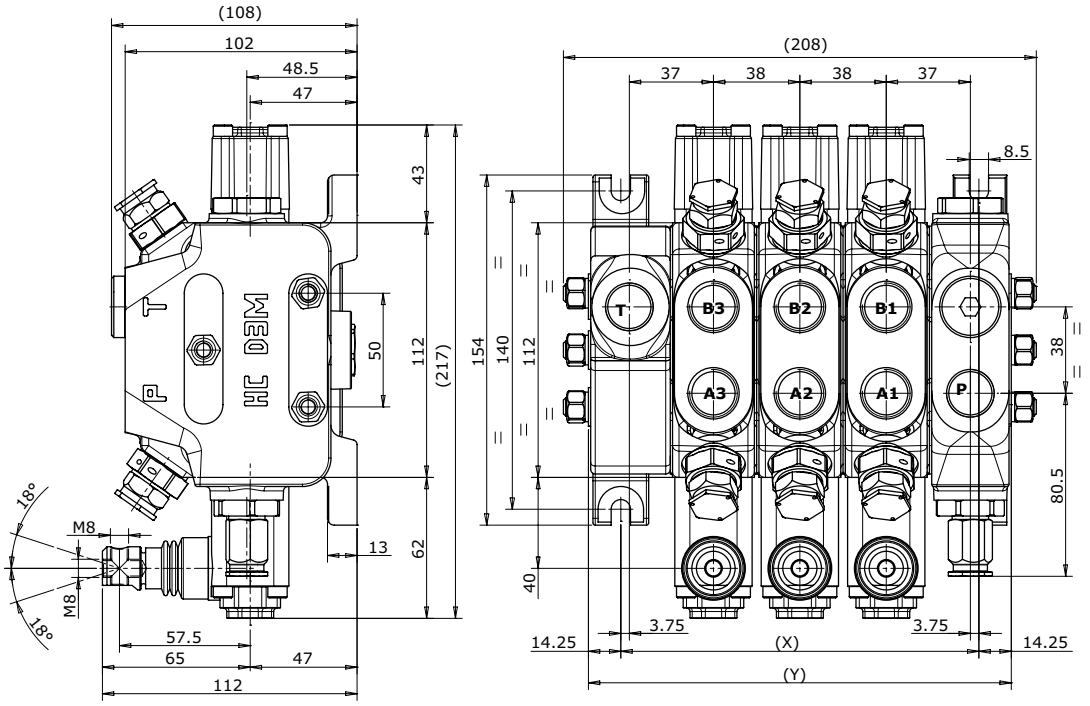
Working section number	1 - 12
Rated flow	55 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	38 mm
Circuit type	Parallel, series, tandem

Applications

Mini-excavators (max 3,5 t), Forestry machines, Cranes and Aerial platforms, Backhoe loaders, Wheel loaders, Backhoes, Drilling machines, Compactor, Hook and Skip loaders, Forklifts

HC-D3M family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions

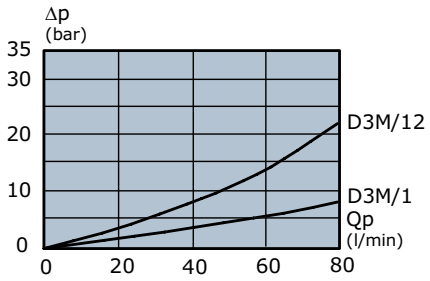


TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	81,5	119,5	157,5	195,5	233,5	271,5	309,5	347,5	385,5	423,5	461,5	499,5
Y (mm)	110	148	186	224	262	300	338	376	414	452	490	528
Weights (kg)	6,3	8,8	11,2	13,7	16,2	18,6	21	23,5	26	28,5	31	33,3
PORTS	**Inlet (P)**			**Ports (A-B)**			**Outlet (T)**			**Outlet (HPCO)**		
BSP Thread (ISO 1179-1)	G 1/2			G 1/2			G 1/2			G 1/2		
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF			3/4" - 16 UNF			3/4" - 16 UNF			3/4" - 16 UNF		

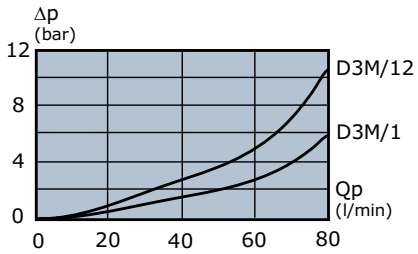
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

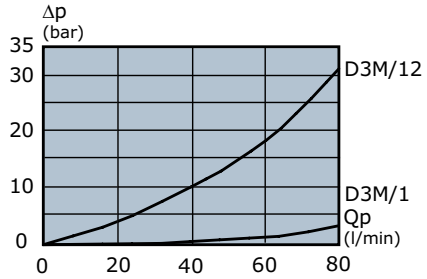
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, direct electric, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.

HC-D3M has available:
Direct electric control push push type (see doc.DS004) and push pull type.
Special inlet section for parallel valves connection (suitable for forest applications): see doc. I01642
Potentiometer and microswitch kits and Overcenter spool (Fork lift trucks): see doc. I02130

Technical specifications

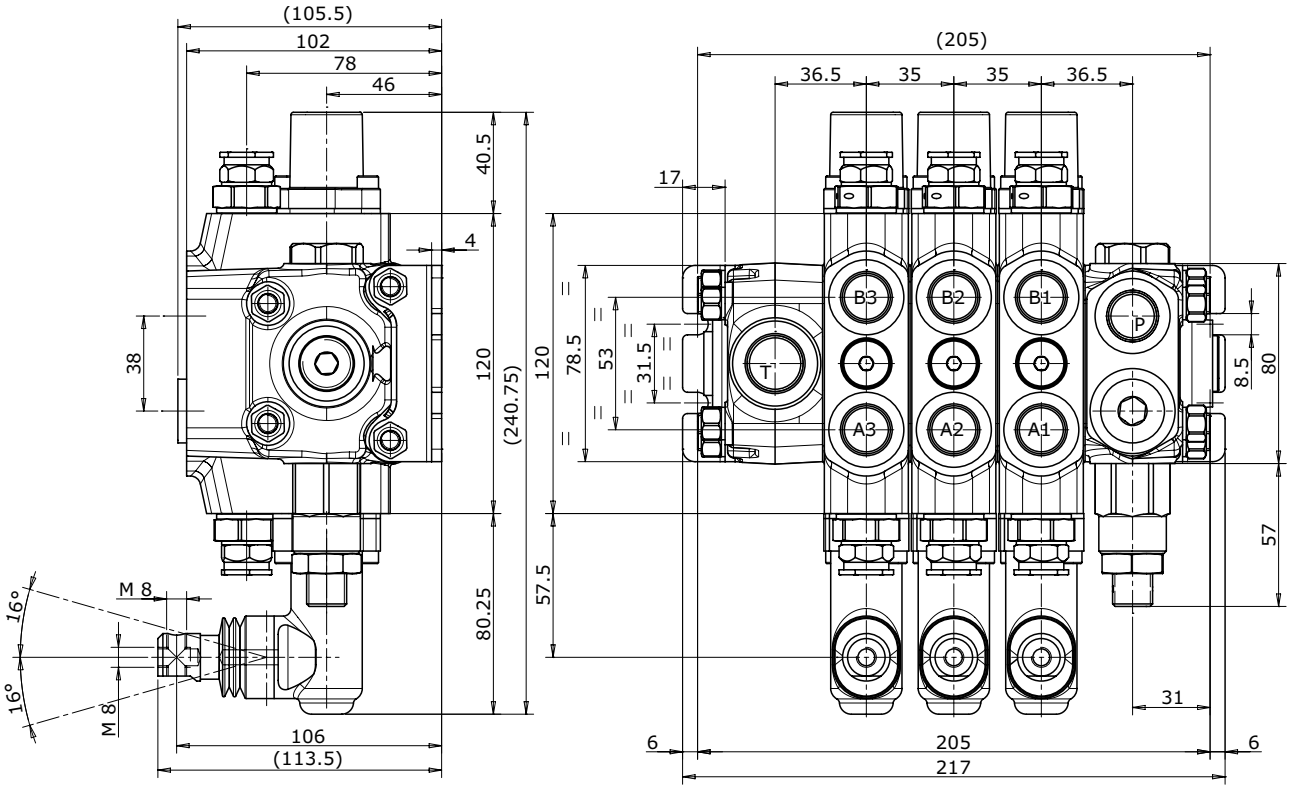
Working section number	1 - 12
Rated flow	45 l/min - 12 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	6 + 6 mm
Spool pitch	35 mm
Circuit type	Parallel, series, tandem

Applications

Escavators (max 7 t), Cranes and Aerial platforms, Backhoe loaders, Wheel loaders, Backhoes, Hook and Skip loaders , Drilling machines , Forklifts.

HC-DVS10 is a new family in the broad range of Hydrocontrol sectional valves.
Specifically designed for mini skid loaders and mini dumpers applications HC-DVS10 can include different components normally assembled on the machine.
The valve has very exact control characteristics, smoth and precise in operation, with compact light weight design.

Dimensions



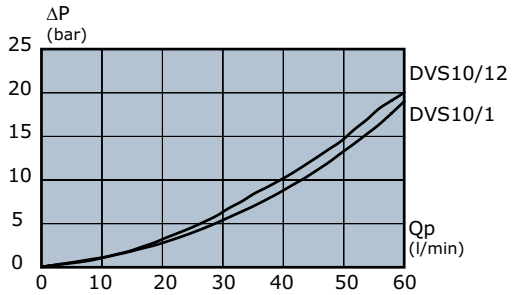
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	133	168	203	238	273	308	343	378	413	448	483	518
Y (mm)	145	180	215	250	285	320	355	390	425	460	495	530
Weights (kg)	6	8,5	11	13,5	16	18,5	21	23,5	26	28,5	31	33,5

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8 - G 1/2	G 3/8	G 1/2	G 1/2
UN-UNF Thread (ISO 11926-1)	3/4”-16 UNF 7/8”-14 UNF	3/4”-16 UNF	7/8”-14 UNF	7/8” - 14 UNF

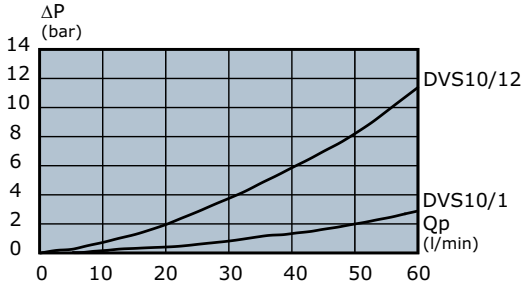
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

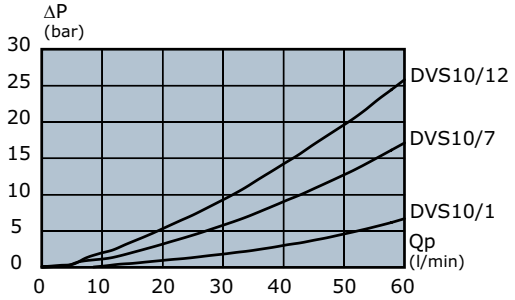
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic, electrohydraulic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.
There are special versions custom made to fit needs of specific applications like Mini dumpers: see doc. I02147

Technical specifications

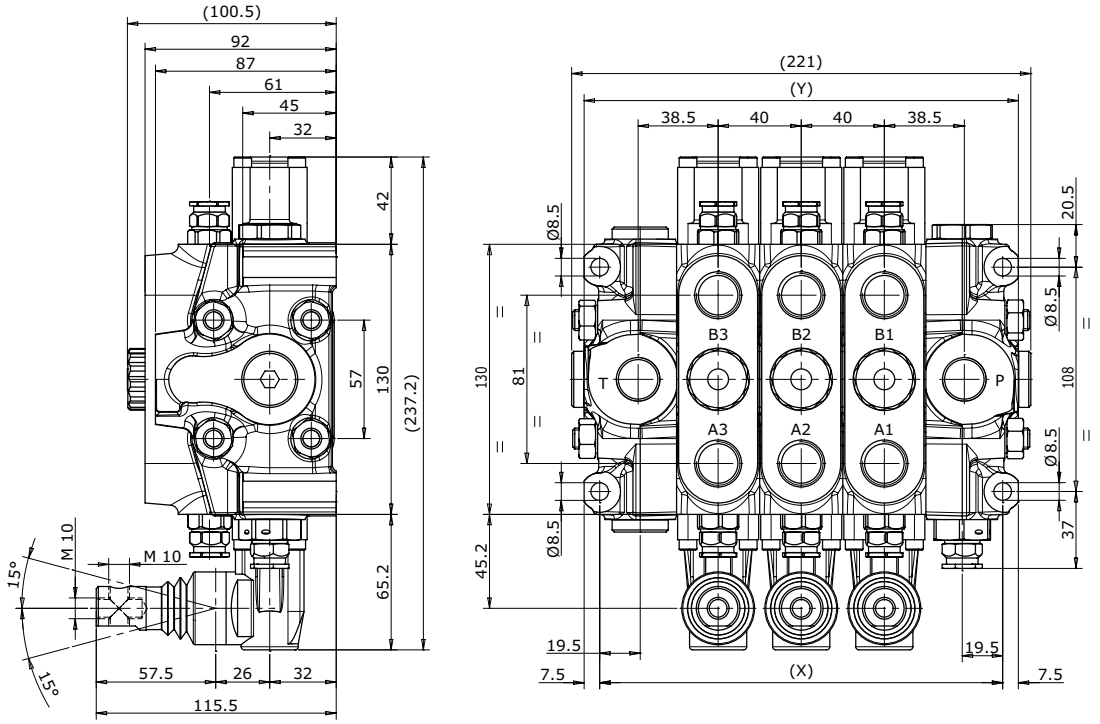
Working section number	1 - 12
Rated flow	80 l/min - 22 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	6 + 6 mm
Spool pitch	40 mm
Circuit type	Parallel, series, tandem

Applications

Excavators (max 7 t), Cranes and aerial platforms, Backhoe loaders, Wheel loaders, Backhoes, Compactor, hook and skip loaders, Drilling machines, Forklifts.

HC-D4 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)
Intermediate adjustable flow regulator

Dimensions



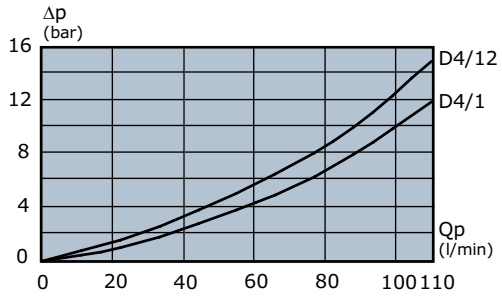
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	114	154	194	234	274	314	354	394	434	474	514	554
Y (mm)	129	169	209	249	289	329	369	409	449	489	529	569
Weights (kg)	8	10,8	13,7	16,5	19,4	22,3	25,2	28	30,8	33,7	36,6	39,5

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 1/2	G 1/2	G 1/2 - G 3/4	G 1/2 - G 3/4
UN-UNF Thread (ISO 11926-1)	7/8" - 14 UNF	7/8" - 14 UNF	7/8" - 14 UNF 1"1/16 - 12 UNF	7/8" - 14 UNF 1"1/16 - 12 UNF
METRIC Thread (ISO 9974-1)	M18 x 1,5	M18 x 1,5	M22 x 1,5	M22 x 1,5

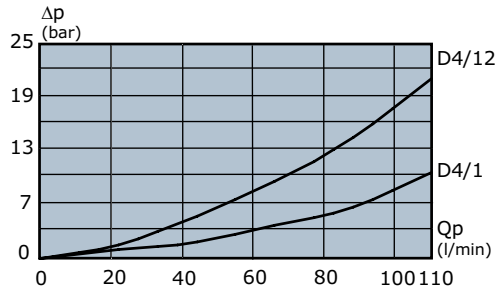
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

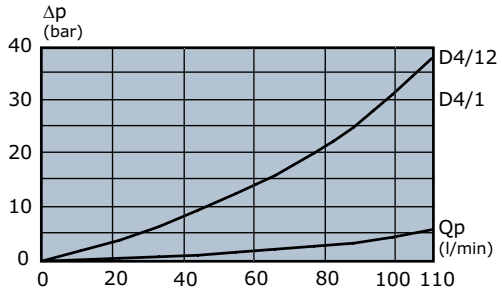
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, direct electric, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Working sections have auxiliary valves and a broad range of interchangeable spools.
Special versions for LS variable pumps can be realised on request.

Following features are available on HC-D4 family:
Direct electric control push push type (see doc.DS006)
Special auxiliary valve for Single acting/Double acting choice (tractor application)
Special inlet with Priority Steer function integrated for LS and CA systems (Fork lift trucks, Telehandler, Loaders...): see doc. I01824
Special circuit to regulate reduced flow on HPCO connection (Truck mounted cranes, stabilizers circuits): doc. I02033
Special inlet section for parallel valves connection (suitable for forest applications): see doc. I01642
Boom Priority function (Wheel loaders): doc. I02132
Potentiometer and microswitch kits and Overcenter spool (Fork lift trucks).

Technical specifications

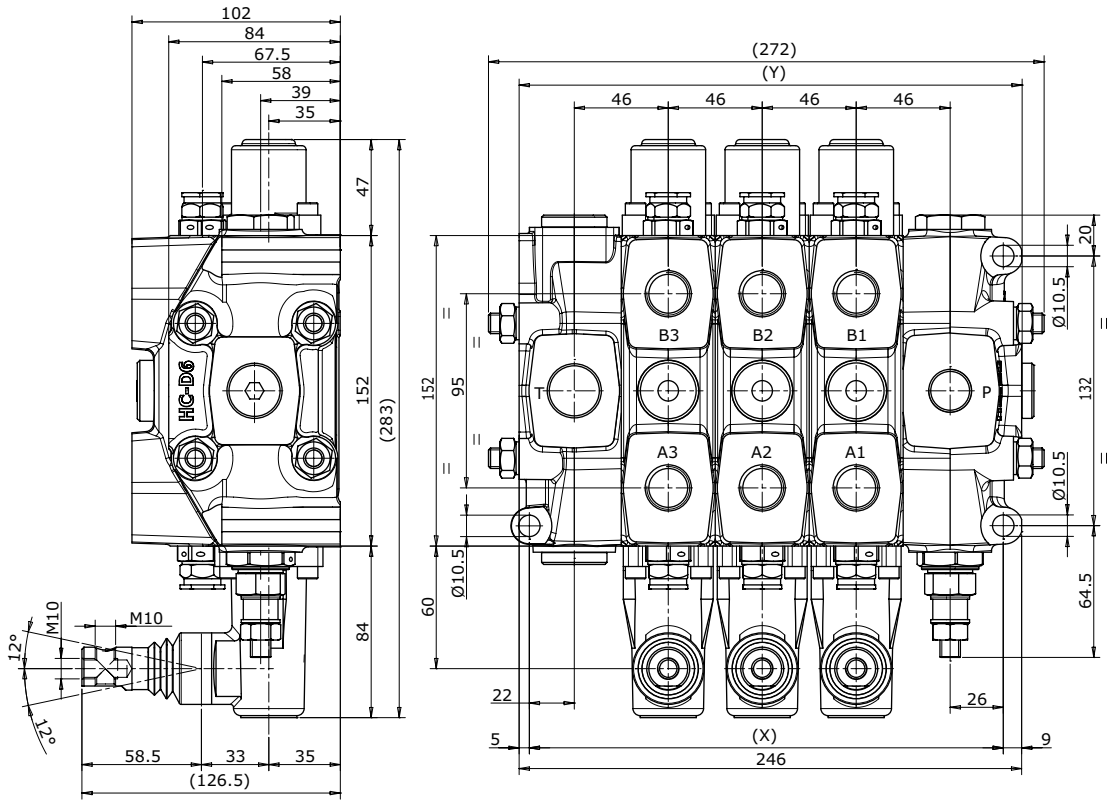
Working section number	1 - 12
Rated flow	100 l/min - 27 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	7 + 7 mm
Spool pitch	46 mm
Circuit type	Parallel, series, tandem

Applications

Backhoe loaders, Wheel loaders, Backhoes
Compactor, Hook and Skip loaders, Drilling machines

HC-D6 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)
Intermediate adjustable flow regulator

Dimensions

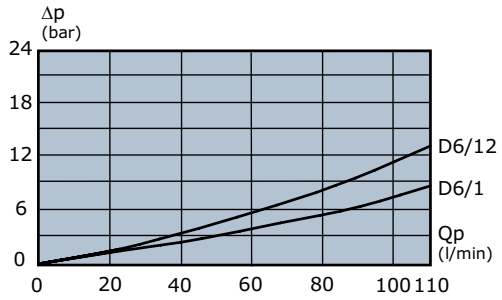


TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	140	186	232	278	324	370	416	462	508	554	600	646
Y (mm)	156	202	248	294	340	386	432	478	524	570	616	662
Weights (kg)	11,6	16,1	20,5	25	29,4	33,9	38,3	42,8	47,2	51,7	56,1	60,6
PORTS	**Inlet (P)**			**Ports (A-B)**			**Outlet (T)**			**Outlet (HPCO)**		
BSP Thread (ISO 1179-1)	G 1/2 - G 3/4			G 1/2 - G 3/4			G 3/4 - G 1			G 3/4 - G 1		
UN-UNF Thread (ISO 11926-1)	7/8" - 14 UNF			7/8" - 14 UNF			1"1/16 - 12 UNF			1"1/16 - 12 UNF		

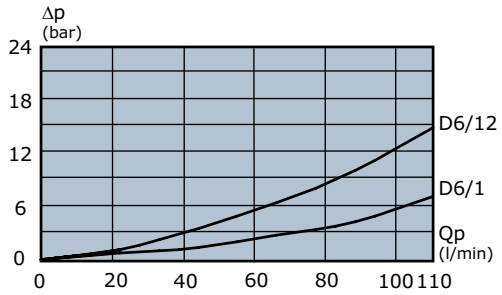
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

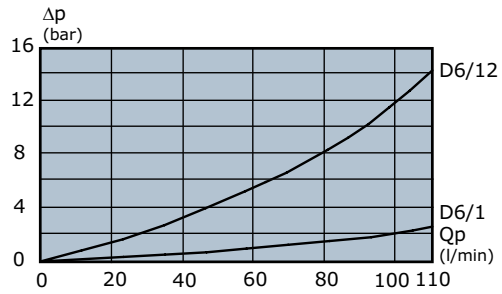
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.
Special versions for LS variable pumps can be realised on request.

HC-D6 has available:
Special inlet section for parallel valves connection (suitable for forest applications): see doc. I01642

Technical specifications

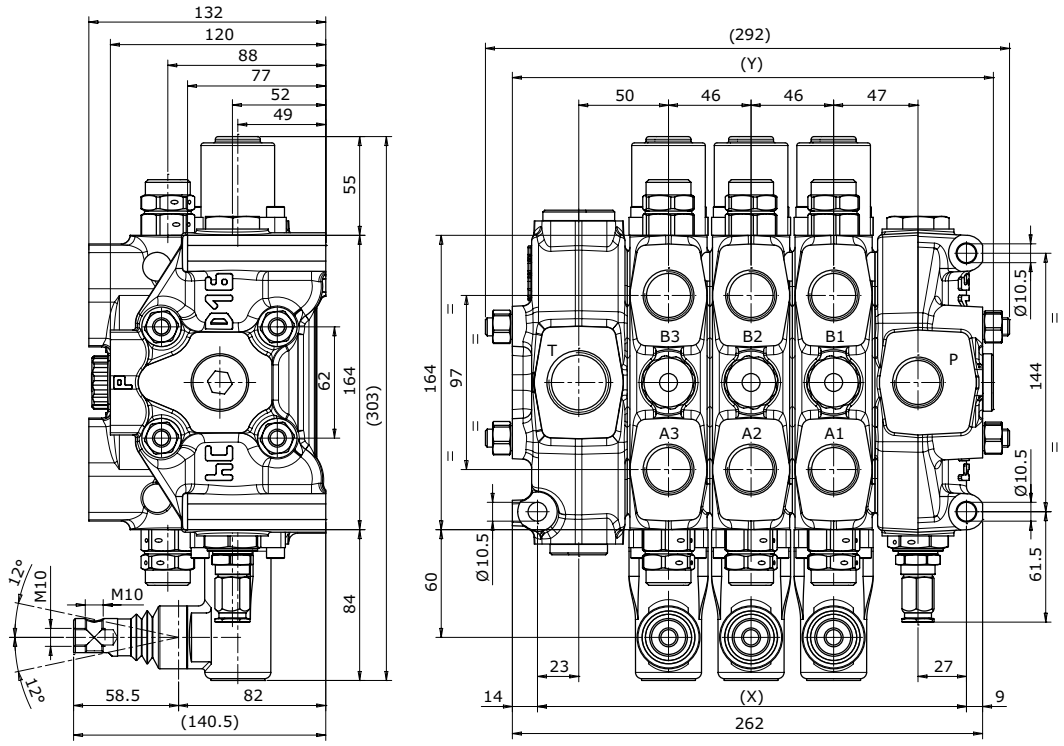
Working section number	1 - 12
Rated flow	150 l/min - 40 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	7 + 7 mm
Spool pitch	46 mm
Circuit type	Parallel, series, tandem

Applications

Backhoe loaders, Wheel loaders, Backhoes
Compactor, Hook and Skip loaders, Drilling machines

HC-D16 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions

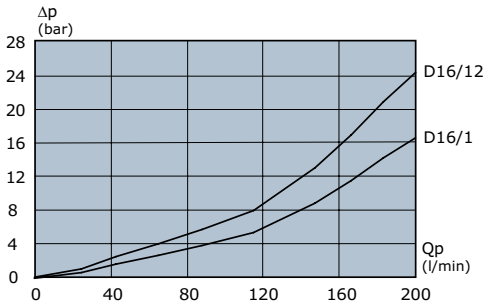


TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	147	193	239	285	331	377	423	469	515	561	607	653
Y (mm)	170	216	262	308	354	400	446	492	538	584	630	676
Weights (kg)	19,1	24,1	29,2	34,4	39,5	44,5	49,6	54,7	59,8	64	70	75,1
PORTS	**Inlet (P)**			**Ports (A-B)**			**Outlet (T)**			**Outlet (HPCO)**		
BSP Thread (ISO 1179-1)	G 3/4			G 3/4			G 1			G 1		
UN-UNF Thread (ISO 11926-1)	1"1/16 - 12 UNF 1"5/16 - 12 UNF			1"1/16 - 12 UNF			1"5/16 - 12 UNF			1"5/16 - 12 UNF		

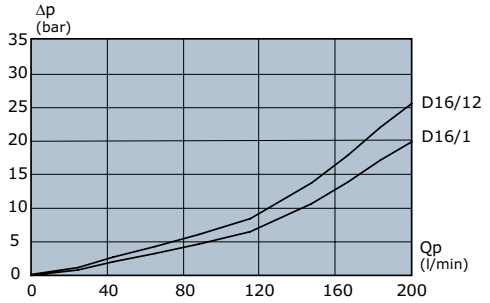
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

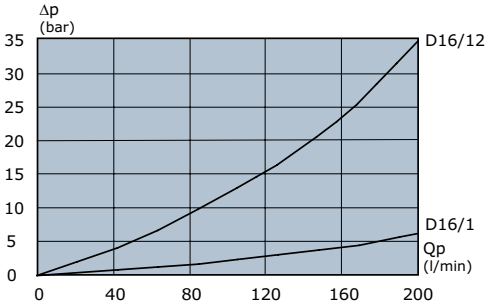
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.
Special versions for LS variable pumps can be realised on request.

HC-D16 has available:
Special inlet section with second pump managing system (Backhoe loaders).
Electric operated clamping valve (Backhoe loaders).
Special inlet with priority function for steering.
Special intermediate section for combination with HC-D20 and HC-D25.

Technical specifications

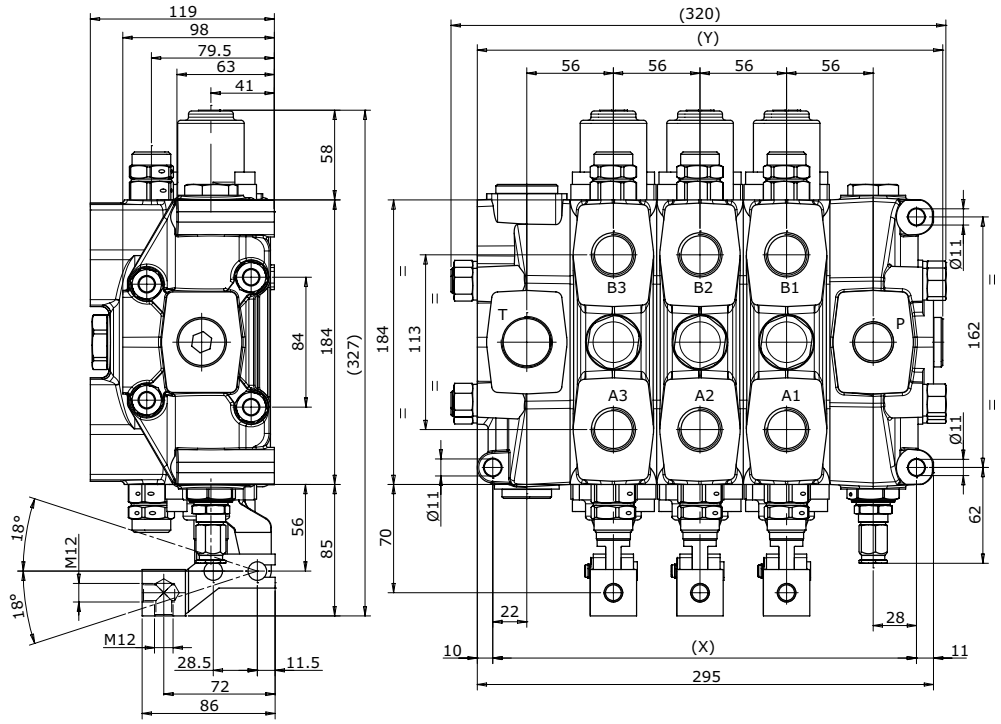
Working section number	1 - 12
Rated flow	180 l/min - 48 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	9,5 + 9,5 mm
Spool pitch	56 mm
Circuit type	Parallel, series

Applications

Cranes and Aerial platforms, Excavators
Wheel loaders, Hook and Skip loaders, Marine cranes

HC-D12 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions

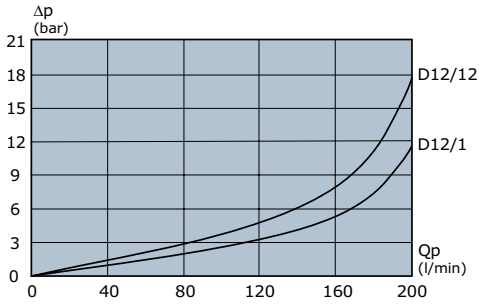


TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	162	218	274	330	386	442	498	554	610	666	722	778
Y (mm)	183	239	295	351	407	463	519	575	631	687	743	799
Weights (kg)	18,4	26	33,6	41,2	48,8	56,4	64	71,6	79,2	86,7	94,3	102
PORTS	**Inlet (P)**			**Ports (A-B)**			**Outlet (T)**			**Outlet (HPCO)**		
BSP Thread (ISO 1179-1)	G 3/4 - G 1			G 3/4 - G 1			G 1			G 1		
UN-UNF Thread (ISO 11926-1)	1”1/16 - 12 UNF			1”1/16 - 12 UNF			1”5/16 - 12 UNF			1”5/16 - 12 UNF		
SAE 3000 Flange	3/4”MA - 3/4”UNC			3/4”MA - 3/4”UNC			3/4”MA - 3/4”UNC			3/4”MA - 3/4”UNC		

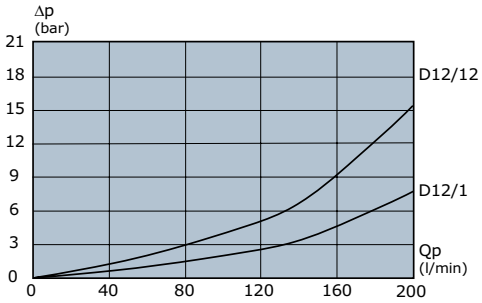
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

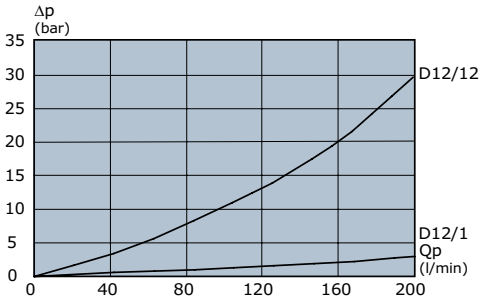
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.

Technical specifications

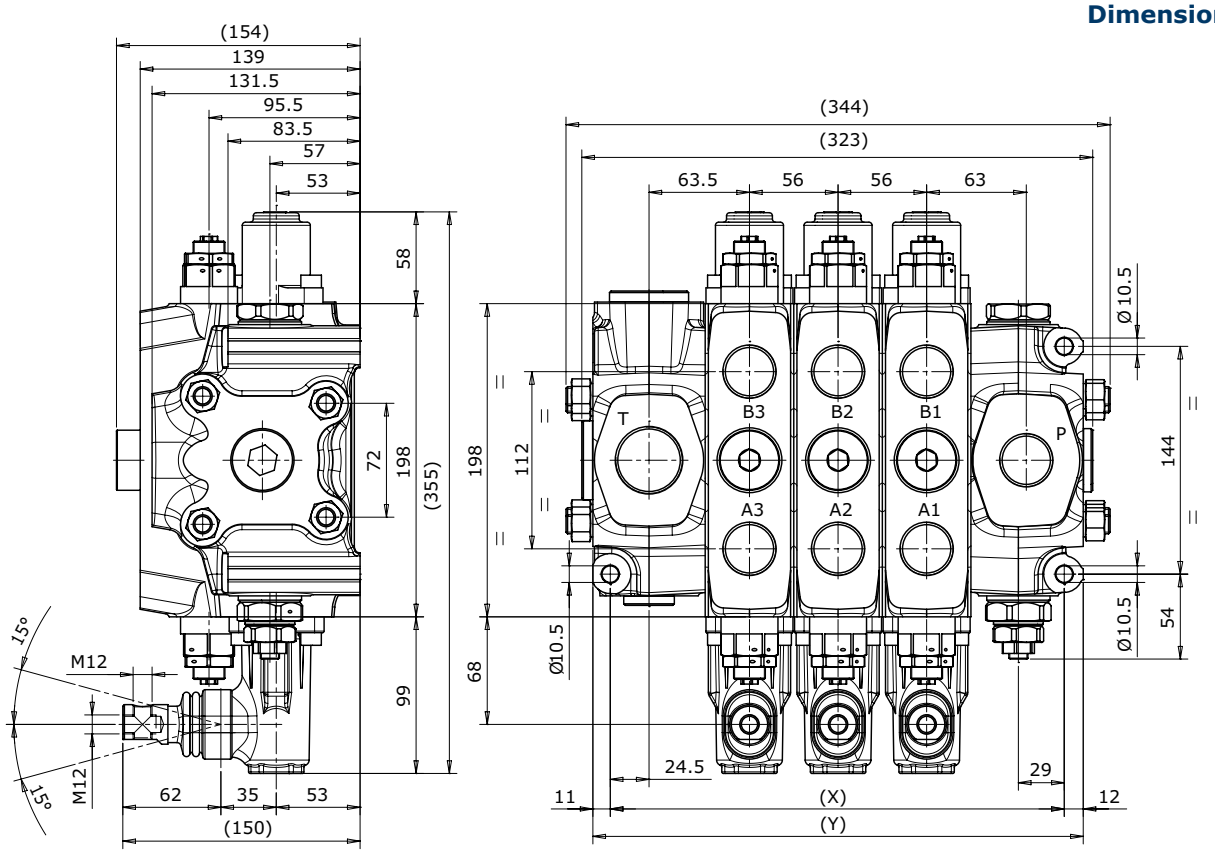
Working section number	1 - 12
Rated flow	250 l/min - 67 GPM
Rated pressure	250 bar - 3600 PSI
Spool stroke	9,5 + 9,5 mm
Spool pitch	56 mm
Circuit type	Parallel, tandem

Applications

Refuse trucks, Wheel loaders, Hook and Skip loaders

HC-DVS20 is a new family in the broad range of Hydrocontrol sectional valves.
The valve is specially indicated for Garbage Refuse trucks, Hook loaders, Wheel loaders.
The innovative design allows it to manage of very high flows comparing to the overall dimensions.
The valve has high control characteristics, smooth and precise in operation.

Dimensions



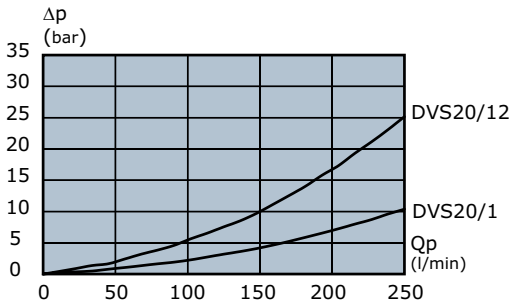
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	173	229	285	341	397	453	509	565	621	677	733	789
Y (mm)	196	252	308	364	420	476	532	588	644	700	756	812
Weights (kg)	25	34	43	52	61	70	79	88	97	106	115	124

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 1	G 1	G 1"1/4	G 1"1/4
UN-UNF Thread (ISO 11926-1)	1"5/16 - 12 UNF	1"5/16 - 12 UNF	1"5/8 - 12 UNF	1"5/8 - 12 UNF
SAE 3000 Flange	1"MA - 1"UNC	-	1"MA - 1"UNC	1"MA - 1"UNC

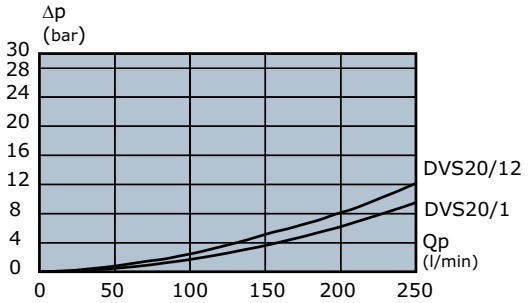
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

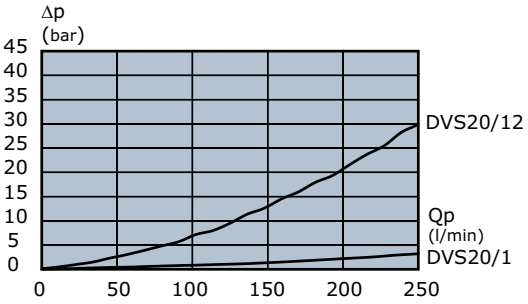
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Working sections have auxiliary valves and a broad range of interchangeable spools.
Larger sections are available to manage higher flows on tank line (Garbage compactors).

Technical specifications

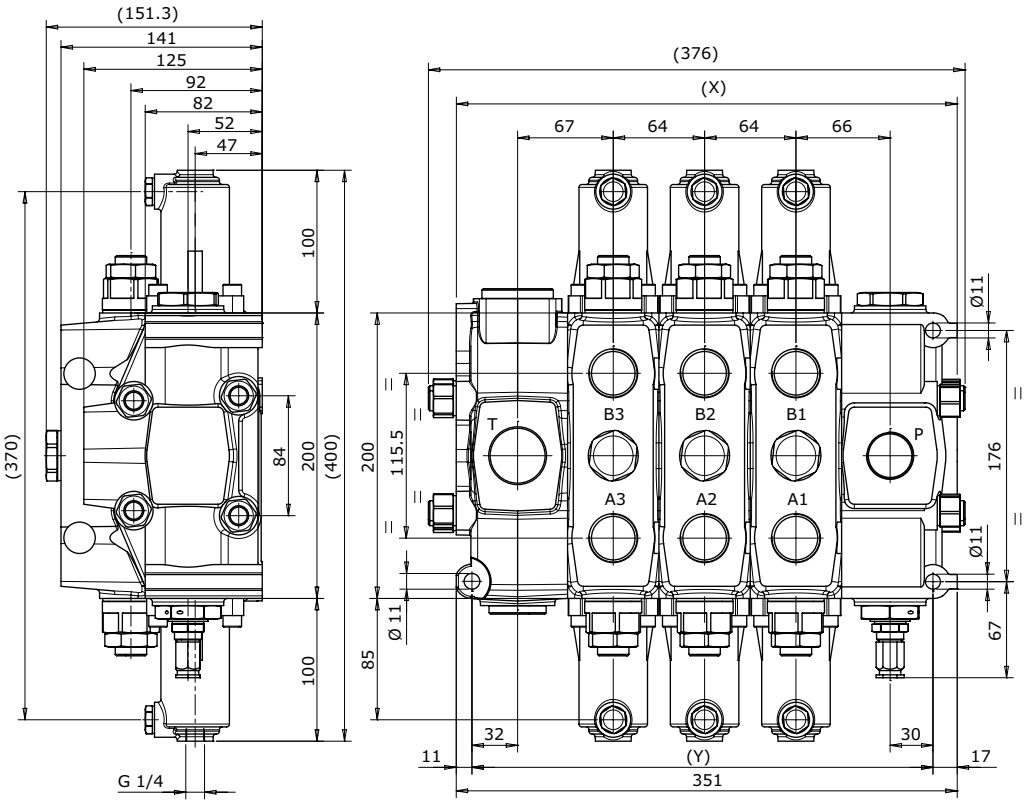
Working section number	1 - 12
Rated flow	250 l/min - 67 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	9,5 + 9,5 mm
Spool pitch	64 mm
Circuit type	Parallel, series, tandem

Applications

Wheel loaders, Truck cranes, Drilling machines, Sea platform cranes, Presses, Compactor, Hook and Skip loaders

HC-D20 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions



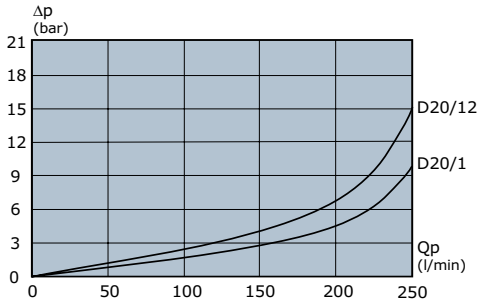
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	195	259	323	387	451	515	579	643	707	771	835	899
Y (mm)	223	287	351	415	479	543	607	671	735	799	863	927
Weights (kg)	28,6	39,6	50,6	61,6	72,6	83,6	94,6	105,5	116,4	127,4	138,4	149,4

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 1 - G 1”1/4	G 1 - G 1”1/4	G 1”1/4	G 1”1/4
UN-UNF Thread (ISO 11926-1)	1”5/16 - 12 UNF	1”5/16 - 12 UNF	1”5/16 - 12 UNF	1”5/8 - 12 UNF
SAE 3000 Flange	1” (MA) - 1” (UNC)	1” (MA) - 1” (UNC)	1”1/4 (MA) 1”1/4 (UNC)	1”1/4 (MA) 1”1/4 (UNC)
SAE 6000 Flange	3/4”(MA) - 3/4”(UNC)	3/4”(MA) - 3/4”(UNC)	-	1” (MA) - 1” (UNC)

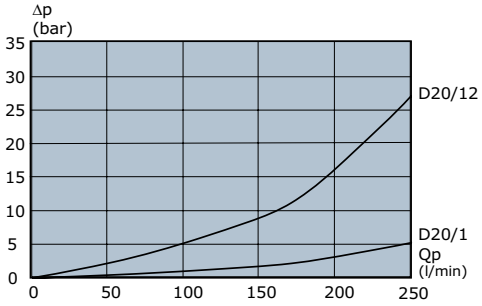
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

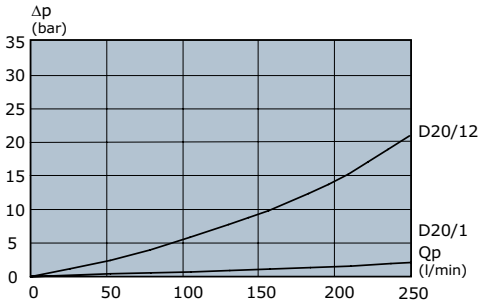
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, hydraulic remote, pneumatic and electrohydraulic controls.
Working sections have auxiliary valves and a broad range of interchangeable spools.
Special versions for LS variable pumps can be realised on request.

Technical specifications

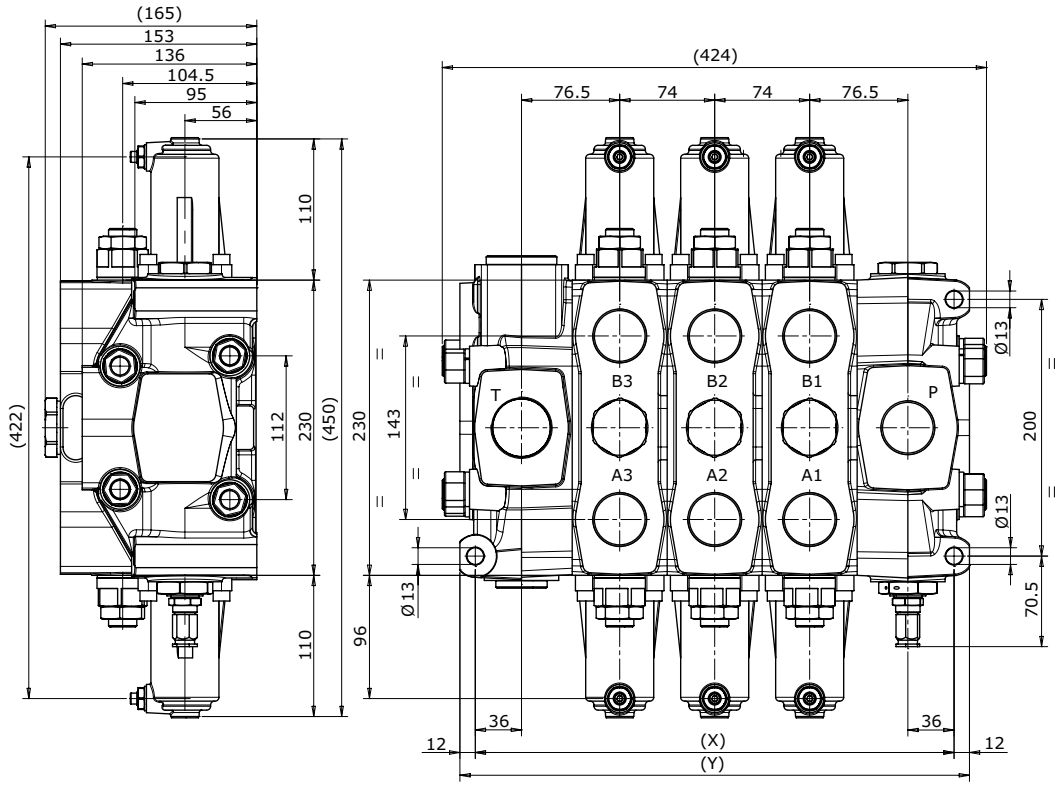
Working section number	1 - 12
Rated flow	380 l/min - 100 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	12 + 12 mm
Spool pitch	74 mm
Circuit type	Parallel, series

Applications

Wheel loaders, Truck cranes, Sea platform cranes, Drilling machines, Presses

HC-D25 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions



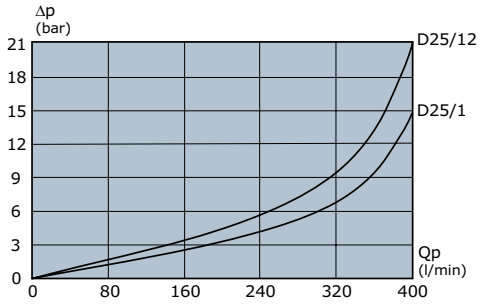
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	225	299	373	447	521	595	669	743	817	891	965	1039
Y (mm)	249	323	397	471	545	619	693	767	841	915	989	1063
Weights (kg)	41,3	56,8	72,3	87,8	103,4	119	134,4	150	65,5	181	196,5	212

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 1”1/4 - G 1”1/2	G 1”1/4 - G 1”1/2	G 1”1/2	G 1”1/2
UN-UNF Thread (ISO 11926-1)	1”5/8 - 12 UNF	1”5/8 - 12 UNF	1”5/8 - 12 UNF	1”5/8 - 12 UNF
SAE 3000 Flange	1”-1/4 (MA) 1”-1/4 (UNC)	1”-1/4 (MA) 1”-1/4 (UNC)	1”-1/2 (MA) 1”-1/2 (UNC)	1”-1/2 (MA) 1”-1/2 (UNC)
SAE 6000 Flange	1”-1/4 (MA) 1”-1/4 (UNC)	1”-1/4 (MA) 1”-1/4 (UNC)	1”-1/4 (MA) 1”-1/4 (UNC)	1”-1/4 (MA) 1”-1/4 (UNC)

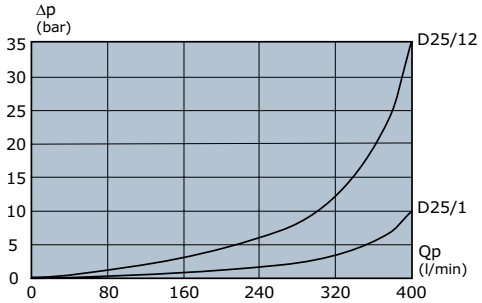
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

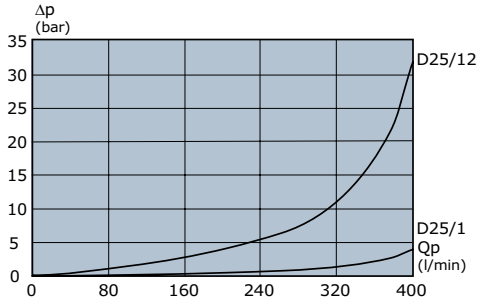
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual and hydraulic remote controls.
Working sections have auxiliary valves and a broad range of interchangeable spools.

Technical specifications

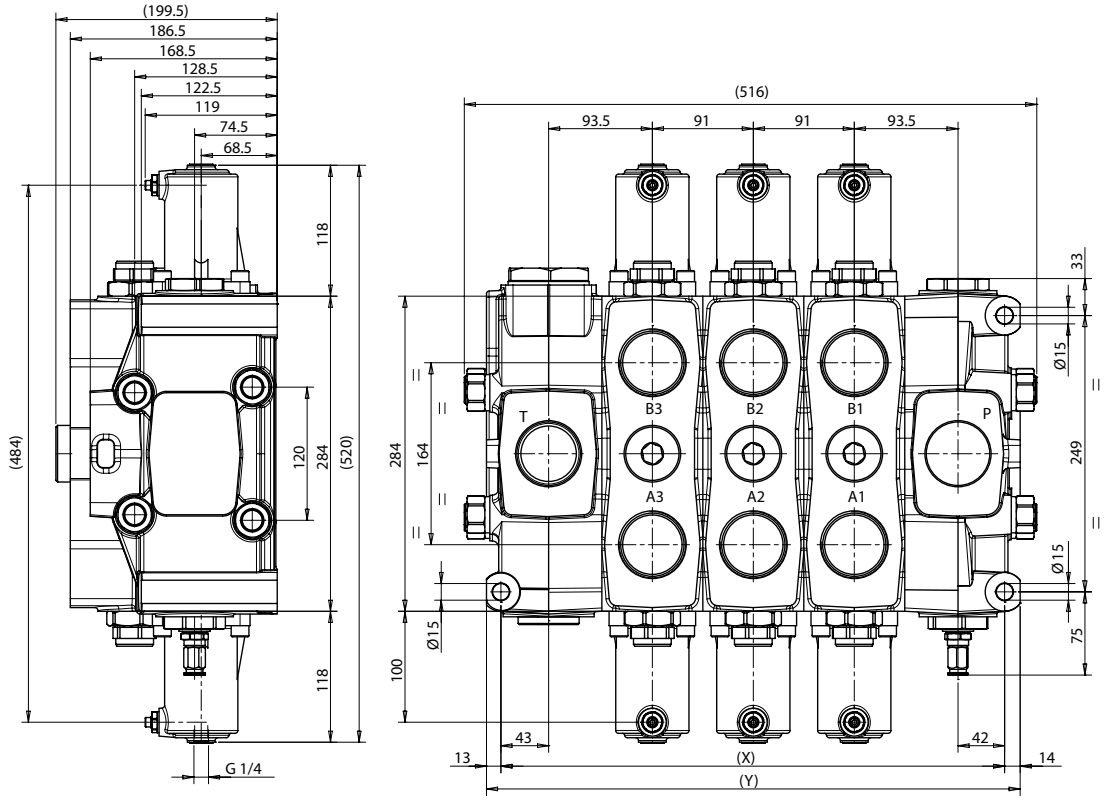
Working section number	1 - 10
Rated flow	700 l/min - 185 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	15 + 15 mm
Spool pitch	91 mm
Circuit type	Parallel

Applications

Sea platform cranes, Presses, Wheel loaders

HC-D40 family has different intermediate sections available:
Intermediate section for second pump inlet (BE type)
Intermediate section to house a second main relief valve (BV type)
Intermediate outlet for two pumps systems (BF type with a single T port and BG type for HPCO connection)

Dimensions



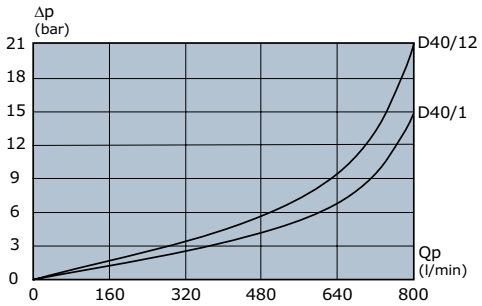
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	272	363	454	545	636	727	818	909	1000	1091	1182	1273
Y (mm)	299	390	481	572	663	754	845	936	1027	1118	1209	1300
Weights (kg)	75	104	133	162	191	220	249	278	307	336	365	394

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 2″	G 2″	G 2″	G 2″
SAE 3000 Flange	1″1/2(MA)-2″(MA) 1″1/2(UNC)-2″(UNC)	1″1/2(MA)-2″(MA) 1″1/2(UNC)-2″(UNC)	2″(MA) 2″(UNC)	2″(MA) 2″(UNC)
SAE 6000 Flange	1″ 1/2 (MA) 1″ 1/2 (UNC)	1″ 1/2 (MA) 1″ 1/2 (UNC)	1″ 1/2 (MA) 1″ 1/2 (UNC)	1″ 1/2 (MA) 1″ 1/2 (UNC)

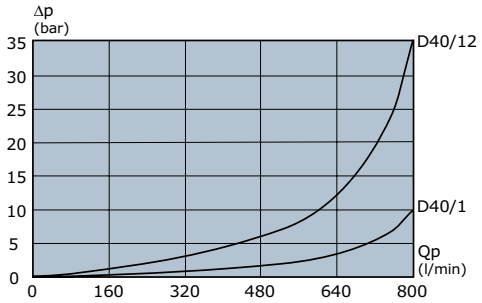
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

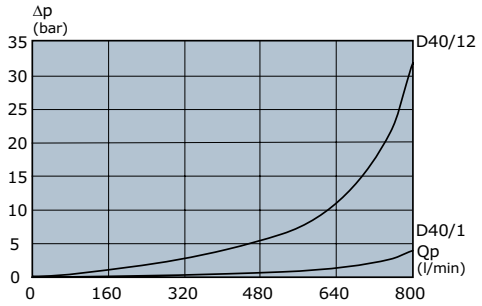
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual and hydraulic remote controls.

Technical specifications

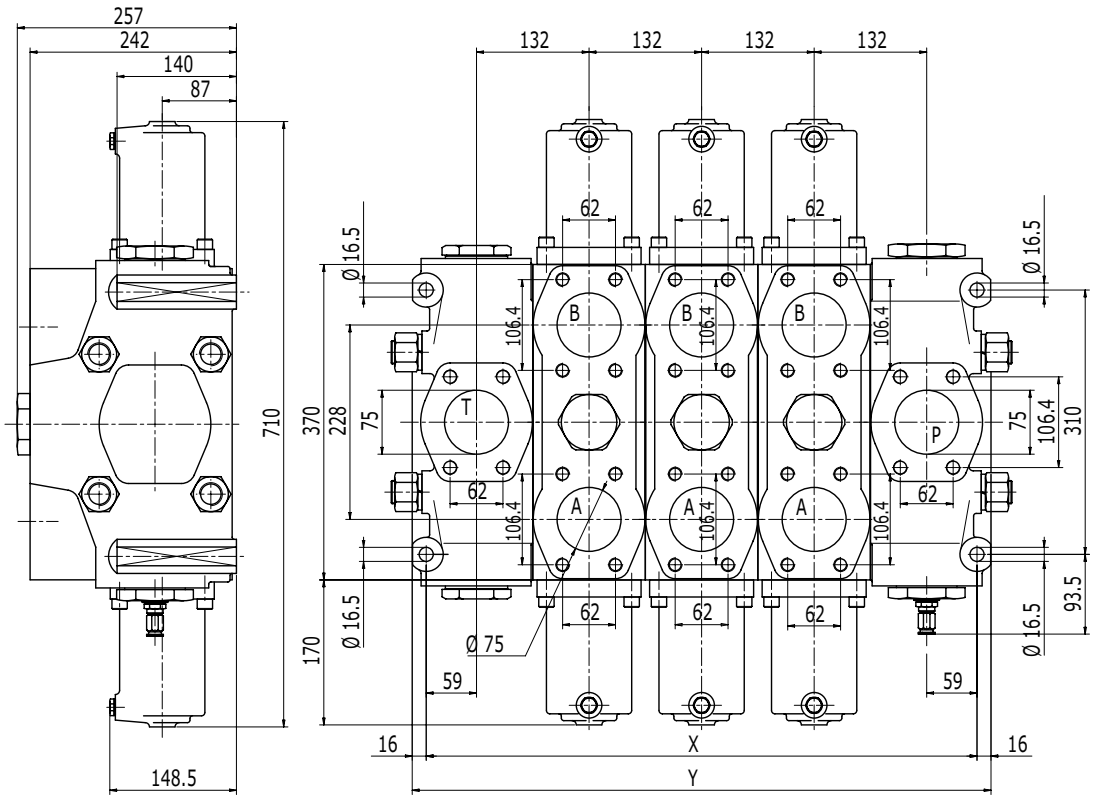
Working section number	1 - 6
Rated flow	1200 l/min - 320 GPM
Rated pressure	250 bar - 3600 PSI
Spool stroke	18 + 18 mm
Spool pitch	132 mm
Circuit type	Parallel

Applications

Sea platform cranes, Presses

HC-D50 is one of the largest sectional valves available on the market.
Strong design for very special applications.

Dimensions



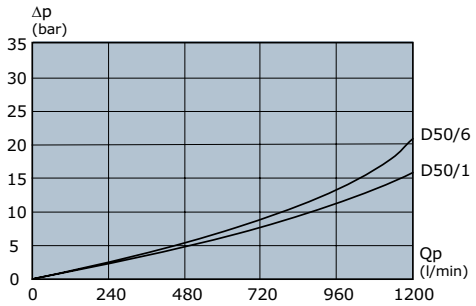
TYPE	/1	/2	/3	/4	/5	/6
X (mm)	382	514	646	778	910	1042
Y (mm)	414	546	678	810	942	1074
Weights (kg)	186	274	362	450	538	626

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
SAE 3000 Flange	3” (MA) - 3” (UNC)	3” (MA) - 3” (UNC)	3” (MA) - 3” (UNC)	3” (MA) - 3” (UNC)

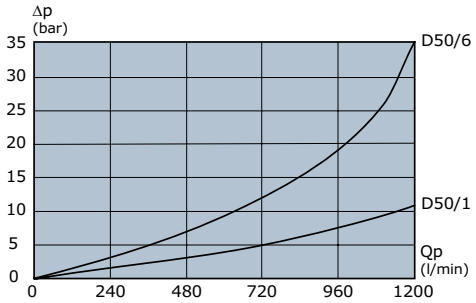
Typical curves

Indicated values have been tested with standard sectional valve and W001A spools.

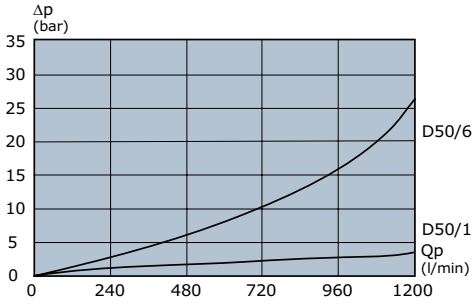
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual and hydraulic remote controls.
Inlet arrangement available with pilot operated pressure relief valve or relief valve plugged.

Order example - Sectional valve

HC-D4/1: IR 001 150 A G04 - W001A H001 F001A RP G04 01 PA 100 01 PB 120 - TJ A G04

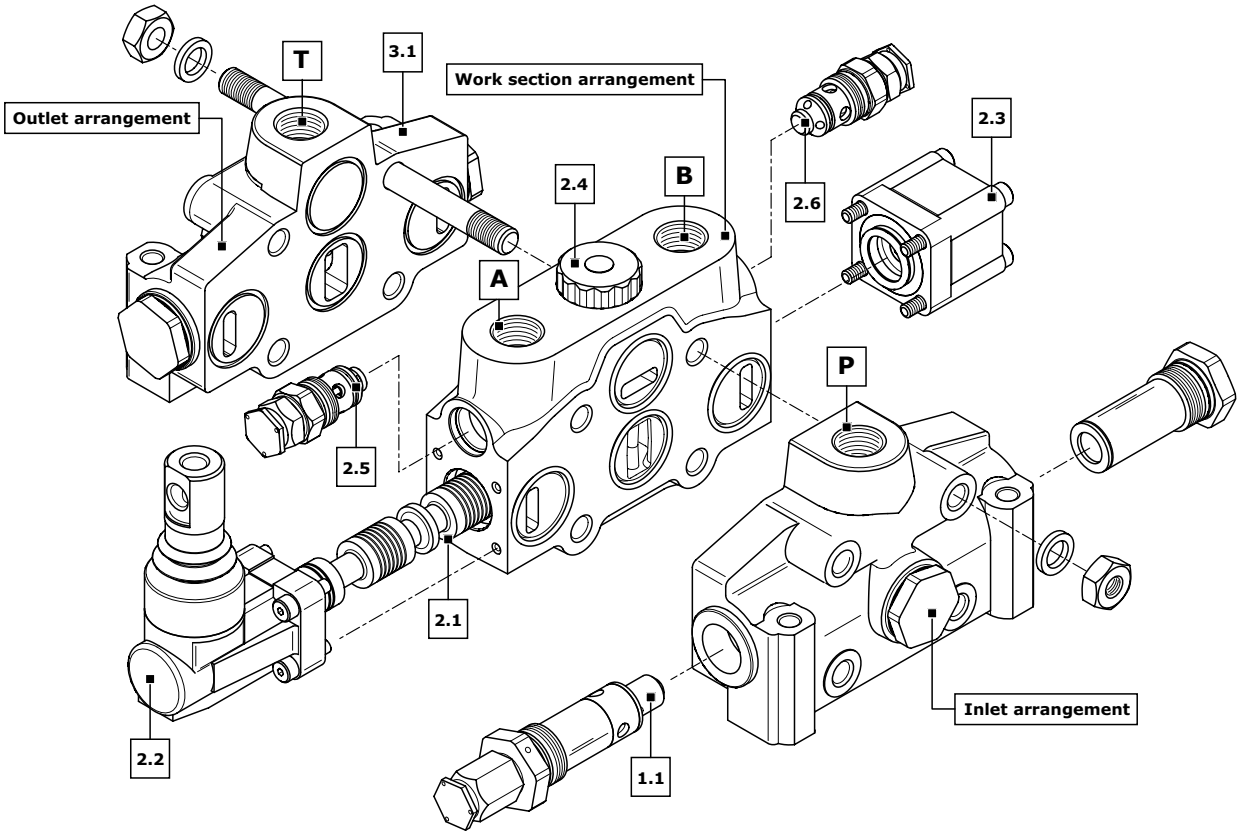
PRODUCT TYPE:
D4 product type
/1 working section number

1) INLET ARRANGEMENT:
1.1 **IR 001** inlet side and valve type
(150) setting (bar)
A G04 inlet position and available thread type

2) WORK SECTION ARRANGEMENT:
2.1 **W001A** spool type
2.2 **H001** spool actuation type
2.3 **F001A** spool return action type
2.4 **RP G04** section type and port threads
2.5 **01 PA 100** auxiliary valve (port A)
2.6 **01 PB 120** auxiliary valve (port B)

3) OUTLET ARRANGEMENT:
3.1 **TJ** outlet type
A G04 outlet position and available thread type

Ordering row 2 must be repeated for every work section



Features

Sectional valves are assembled through tie rod kits; tie rod length changes according to the valve family and to the number of sections.
Every valve includes n°4 tie rod kits; every kit includes bolts and washers.
HC-D3 and HC-D3M have only n°3 tie rod kits (see Appendix "A" page 9).
Lever kits are not included in the valve controls: they must be ordered separately (see Appendix "B" page 10).
On request, all Hydrocontrol valves can be delivered painted (RAL 9005 black primer).

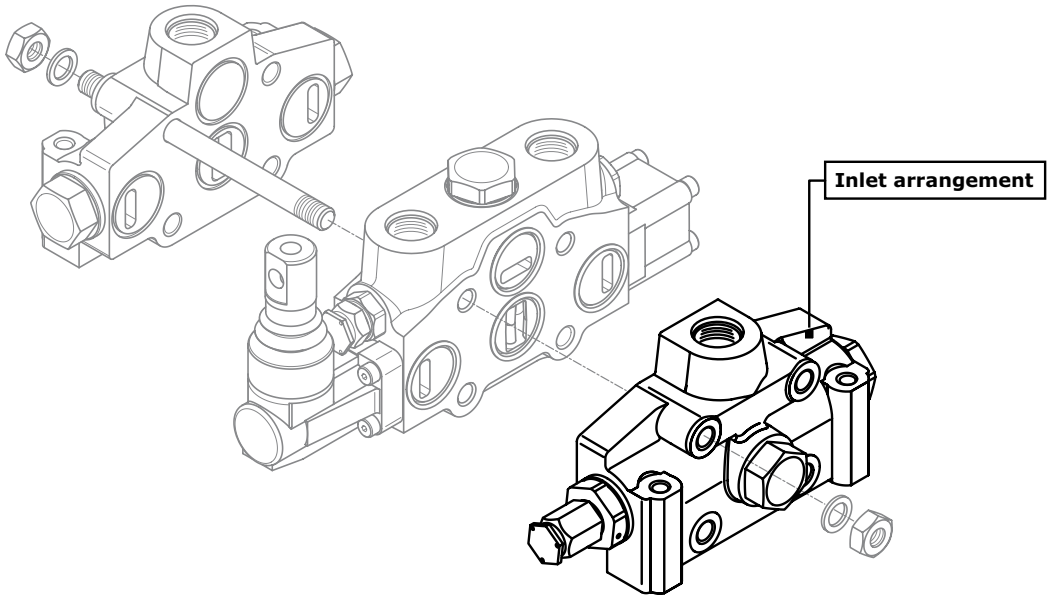
INLET ARRANGEMENT

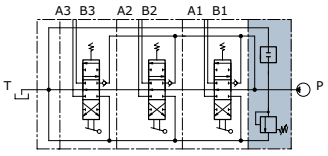
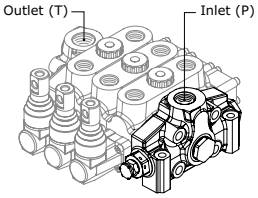
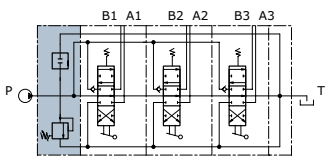
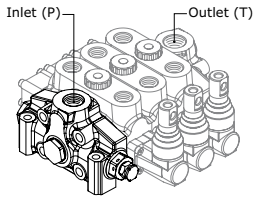
This code part indicates inlet side, type and thread, and the kind of valves assembled in the inlet section.
The P port available threads change according to valve size (see table on page 175).
On all sectional valves it is possible to choose a right or left inlet (see drawings on page 8)

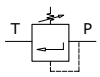
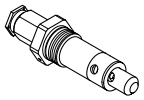
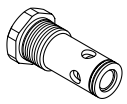
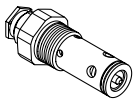
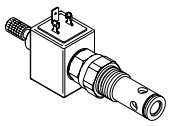
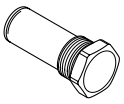
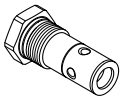
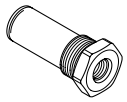
Order example

IR 001 (150) A G04

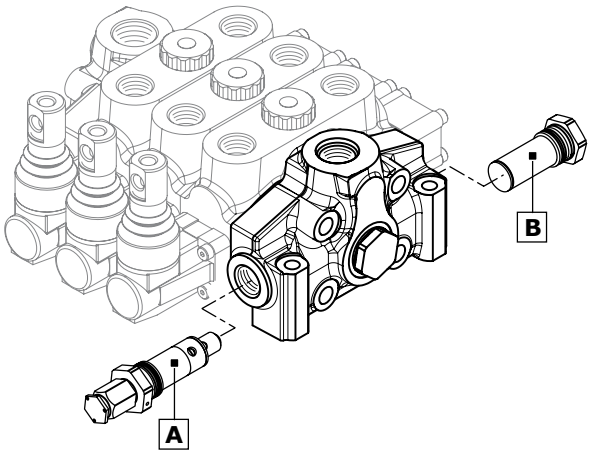
1.	**IR**	inlet side
2.	**001**	valve arrangement
	(150)	setting (bar); when ordering a main relief valve it is necessary to specify setting
3.	**A G04**	inlet position and available thread type



Inlet side classification			
code	**description**	**schema**	**configuration**
IR	Sectional valve with **right** inlet section		
IL	Sectional valve with **left** inlet section		

valve identification							
type	**schema**	**layout**	**description**	**type**	**schema**	**layout**	**description**
1			Direct acting pressure relief valve	**6**			Externaly piloted valve
2			Pilot operated pressure relief valve	**7**			Solenoid dump valve 12 Vdc
3			Port plugged	**8**			Solenoid dump valve 24 Vdc
4			Main anticavitation check valve	**11**			Plug with pressure-gauge connection

NOTE:
According to different families valves can be differently combined and even assembled on A side (control side) or B side (return spring side).



Combination valve example: 001 = 1A - 3B

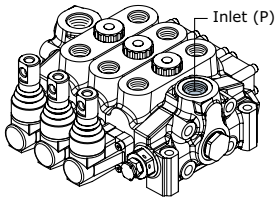
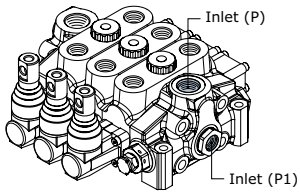
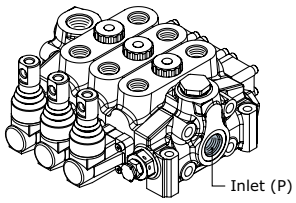
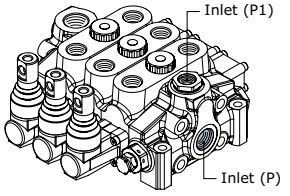
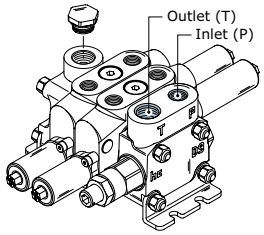
001 Combination valve
1A Pressure relief valve in port A
3B Plug in port B

The code identifies:
with a number, the type of valve; with a letter its position on the inlet section.

(A) = spool action side (B) = spool return action side

NOTE:
when ordering a main relief valve it is necessary to specify setting (example 150 bar)

valves combination		directional control valve																									
		D9		D3		D3M		DVS10		D4		D6		D16		D12		D20		DVS20		D25		D40		D50	
		IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL	IR	IL
1A-3B	001	•	•	•	•	•	•	•	•	•	•																
1A-4B	002			•		•	•			•	•																
1A-6B	003	•	•	•		•	•			•	•																
1A-7B	004	•	•	•		•	•			•	•																
1A-8B	005	•	•	•		•	•			•	•																
1A-11B	008	•	•	•	•	•	•	•	•	•	•																
2A-3B	009				•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2A-4B	010					•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
2A-6B	011					•	•			•	•	•	•	•	•	•	•	•	•			•	•	•	•		
2A-7B	012					•	•			•	•	•	•	•	•	•	•										
2A-8B	013					•	•			•	•	•	•	•	•	•	•										
2A-11B	016				•	•	•			•	•	•	•	•	•	•	•	•	•			•	•			•	•
3A-1B	017	•	•	•	•	•	•	•	•	•	•																
3A-2B	018			•		•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•
3A-3B	019	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•
3A-4B	020			•		•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•				
3A-6B	022	•	•	•		•	•			•	•	•	•	•	•	•	•	•	•			•	•				
3A-7B	023	•	•	•		•	•			•	•	•	•	•	•	•	•										
3A-8B	024	•	•	•		•	•			•	•	•	•	•	•	•	•										
3A-11B	027	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•			•	•
4A-1B	028				•	•	•			•	•																
4A-2B	029					•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•				
4A-3B	030				•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•				
4A-6B	032					•	•			•	•	•	•	•	•	•	•	•	•			•	•				
4A-7B	033					•	•			•	•	•	•	•	•	•	•										
4A-8B	034					•	•			•	•	•	•	•	•	•	•										
4A-11B	037				•	•	•			•	•	•	•	•	•	•	•	•	•			•	•				
6A-1B	046	•	•		•	•	•			•	•																
6A-2B	047					•	•			•	•	•	•	•	•	•	•	•	•			•	•				
6A-3B	048	•	•		•	•	•			•	•	•	•	•	•	•	•										
6A-4B	049					•	•			•	•	•	•	•	•	•	•	•	•			•	•				
6A-11B	052	•	•		•	•	•			•	•	•	•	•	•	•	•	•	•			•	•				
7A-1B	053	•	•		•	•	•			•	•																
7A-2B	054					•	•			•	•	•	•	•	•	•	•										
7A-3B	055	•	•		•	•	•			•	•	•	•	•	•	•	•										
7A-4B	056					•	•			•	•	•	•	•	•	•	•										
7A-11B	059	•	•		•	•	•			•	•	•	•	•	•	•	•										
8A-1B	060	•	•		•	•	•			•	•																
8A-2B	061					•	•			•	•	•	•	•	•	•	•										
8A-3B	062	•	•		•	•	•			•	•	•	•	•	•	•	•										
8A-4B	063					•	•			•	•	•	•	•	•	•	•										
8A-11B	066	•	•		•	•	•			•	•	•	•	•	•	•	•										
11A-1B	084	•	•	•	•	•	•	•	•	•	•																
11A-2B	085			•		•	•			•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•
11A-3B	086	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•
11A-4B	087			•		•	•			•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•
11A-6B	089	•	•	•		•	•			•	•	•	•	•	•	•	•	•	•			•	•	•	•		
11A-7B	090	•	•	•		•	•			•	•	•	•	•	•	•	•										
11A-8B	091	•	•	•		•	•			•	•	•	•	•	•	•	•										

Inlet and thread position			directional control valve												
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
A	Upper inlet		G03	G04	G04	G03	G04	G04	G05	G05	G06	G06	G07	G09	S15
			U03	U03	U03	U03	G05	G05	U05	G06	G07	U06	G08	S09	S16
				M01	M01		U03	U04		U05	U06		U07	S10	
							U04			U06	S05		S07	S11	
							M01			S03	S06		S08	S12	
							M02			S04	S33		S35	S39	
											S34		S36	S40	
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
B	Upper inlet - P1 with pressure gauge connection 1/4" BSP			G04			G04	G04	G05	G05	G06	G06	G07	G09	S15
							G05	G05	U05	G06	G07	U06	G08	S09	S16
							U03	U04		U05	U06		U07	S10	
							U04			U06	S05		S07	S11	
							M01			S03	S06		S08	S12	
							M02				S33		S35		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
C	Central side inlet			G04		G03	G04	G04	G05	G05	G06	G06	G07	G09	S15
				U03		U03	G05	G05	U05	G06	G07	U06	G08	S09	S16
				M01			U03	U04		U05	U06		U07	S10	
							U04			U06	S05		S07	S11	
							M01			S03	S06		S08	S12	
							M02			S04	S33		S35	S39	
											S34		S36	S40	
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
D	Central side inlet - P1 with pressure gauge connection 1/4" BSP			G04			G04	G04	G05	G05	G06	G06	G07	G09	S15
							G05	G05	U05	G06	G07	U06	G08	S09	S16
							U03	U04		U05	U06		U07	S10	
							U04			U06	S05		S07	S11	
							M01			S03	S06		S08	S12	
							M02				S33		S35		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
E	Upper inlet (inlet-outlet) only with "E" or "W" outlet		G03		G04	G03									
			U03		U03	U03									
					M01										

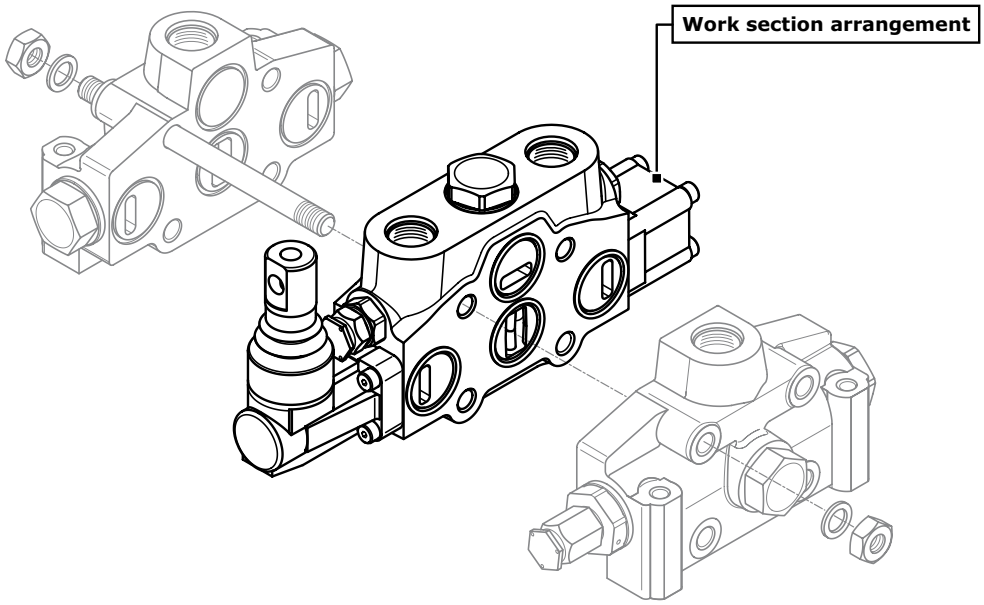
WORK SECTION ARRANGEMENT

This code indicates the complete working section set up: spool, control, return spring kit, circuit and auxiliary valves.
Elements designed to house auxiliary-valve option require double choise on work ports A-B.
Should you order the working section only, please specify the entry side:
R = right
L = left
When ordering a port relief valve or port antishock and anticavitation valve it is necessary to specify the setting (example 120 bar).

Order example

W001A H001 F001A RP G04 01 PA (100) 01 PB (120)

1.	**W001A**	spool type
2.	**H001**	spool actuation type
3.	**F001A**	spool return action type
4.	**RP**	section type
	G04	thread type
5.	**01 PA**	auxiliary valve (port A - handle side)
	(100)	setting
6.	**01 PB**	auxiliary valve (port B - cap side)
	(120)	setting



Spools classification

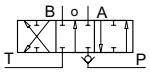
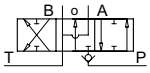
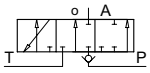
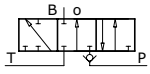
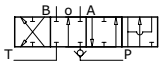
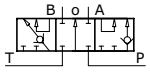
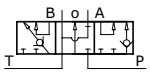
Spools Hydrocontrol fall into three categories:

A = standard spool

B = metered spool

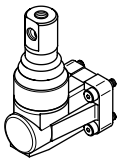
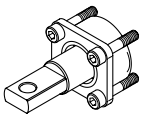
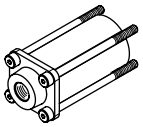
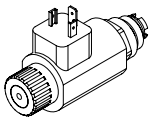
E = solenoid operated spool

Please contact our sales department for informations about spools with restricted connection to tank.

Spool identification				directional control valve												
code		schema	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
W001A	standard		3 positions double-acting	•	•	•	•	•	•	•	•	•	•	•	•	•
W001B	metered				•	•		•	•	•	•	•	•	•	•	
W001E	solenoid operated					•		•								
W002A	standard		3 positions double-acting A and B to tank	•	•	•	•	•	•	•	•	•	•	•	•	•
W002B	metered				•	•		•	•	•	•	•	•	•	•	
W002E	solenoid operated					•		•								
W005A	standard		3 positions single-acting on A	•	•	•	•	•	•	•	•	•	•	•	•	•
W005B	metered				•	•		•	•			•	•			
W005E	solenoid operated					•		•								
W006A	standard		3 positions single-acting on B	•	•	•	•	•	•	•	•	•	•	•	•	•
W006B	metered				•	•		•	•			•	•			
W006E	solenoid operated					•		•								
W012A	standard		4 positions double-acting with float in the 4th position	•	•	•	•	•	•	•	•	•	•	•	•	
W012B	metered									•			•			
W015A	standard		3 positions double-acting series	•	•	•	•	•	•	•	•	•		•	•	
W015B	metered									•						
W016A	standard		3 positions double-acting series A and B to tank	•	•	•	•	•	•	•	•	•		•	•	
W016B	metered									•						

The spools shown correspond to standard configurations; for different applications contact our Commercial Department.

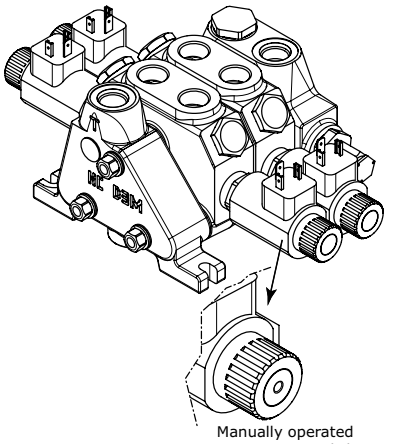
NOTE:
Float spools (W012) need special detent kit (F005).
All section with single acting spool include plug to close the unused port.
Electrical spool (type E) needs special body, special spool actutions and special return action.

Spool actuation identification			directional control valve												
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
H001		protected lever	•	•	•	•	•	•	•			•			
H002		protected lever rotated 180°	•	•	•	•	•	•	•			•			
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
H004		control without lever	•	•	•	•	•	•	•	•	•	•	•	•	
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
H005 leave out the spool return action code		hydraulic actuation	•	•	•	•	•	•	•	•	•	•	•	•	•
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
H036 leave out the spool return action code		Direct electric control 12 Vdc			•		•								
H037 leave out the spool return action code		Direct electric control 24 Vdc			•		•								

The spool actuation shown correspond to standard configurations; for different applications or different controls contact our Commercial Department.

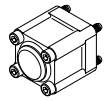
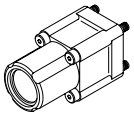
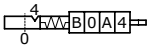
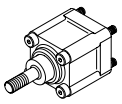
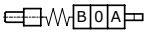
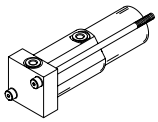
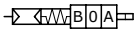
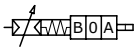
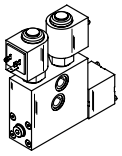
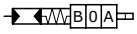
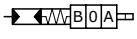
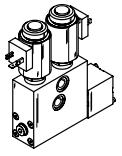
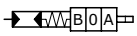
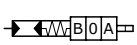
Direct electric control specifications

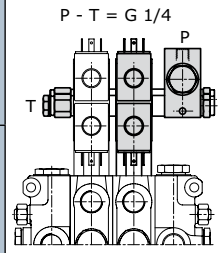
Type	HC-D3M		HC-D4	
Rated voltage	12 VDC	24 VDC	12 VDC	24 VDC
Rated current	3 A	1,5 A	3,75 A	1,88 A
Rated power	45 W			
Permitted working voltage	±10% Nominal			
Max ambient temperature	+40°C			
Max oil temperature	+80°C			
Operation time	S1 (100%)			
Protection degree	IP65			
Insulation degree	H			
Standard connector	DIN 43650			
Spool stroke	2,8 + 2,8 mm			



Manually operated emergency push-button

The H036 and H037 direct electric controls come as two kits each including a: spring, solenoid and adapter.
The Direct electric controls use a type E special spool and a type special body.
The ON-OFF Electric Control kit includes a manually operated emergency push-button.

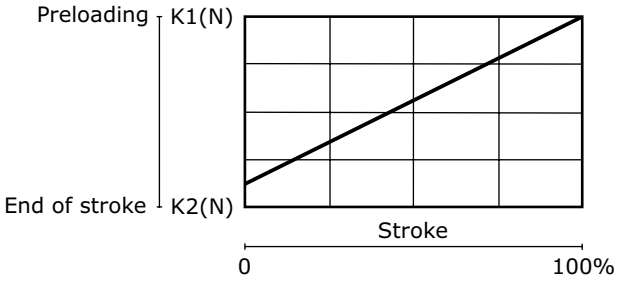
Spool return action identification			directional control valve												
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
F001A		return spring 	•	•	•	•	•	•	•	•	•	•	•	•	•
F001B			•	•	•	•	•	•	•	•	•	•	•		
F001C			•	•	•	•	•	•	•	•	•	•	•		
F002A		detent in A and B 	•	•	•	•	•	•	•	•	•	•	•	•	
F003A		detent in A 	•	•	•	•	•	•	•	•	•	•	•	•	
F004A		detent in B 	•	•	•	•	•	•	•	•	•	•	•	•	
F005A only available for spool type W012		detent in 4th position 	•	•	•	•	•	•	•	•	•	•	•	•	
F013A		prearrangement dual command 	•	•	•	•	•	•	•	•	•	•		•	
F013B			•	•	•	•	•	•	•	•	•	•			
F013C			•	•	•	•	•	•	•	•	•	•			
F020A		pneumatic control ON-OFF 		•	•	•	•	•	•	•	•	•			
F022A		proportional pneumatic control 		•	•	•	•	•	•	•	•	•			
F1600		electrohydraulic control ON - OFF 12 vdc 		•	•	•	•	•	•	•	•	•			
F1610		electrohydraulic control ON-OFF 24 vdc 		•	•	•	•	•	•	•	•	•			
F2600		electrohydraulic control proportional solenoid 12 vdc 		•	•	•	•	•	•	•	•	•			
F2610		electrohydraulic control proportional solenoid 24 vdc 		•	•	•	•	•	•	•	•	•			

Spool return action identification			directional control valve												
code	configuration	description	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
F1520		Electrohydraulic control ON - OFF (fixed pressure reducing valve) 12 Vdc		•	•	•	•	•	•	•	•	•			
F1530		Electrohydraulic control ON - OFF (fixed pressure reducing valve) 24 Vdc		•	•	•	•	•	•	•	•	•			
F2520		Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) 12 Vdc		•	•	•	•	•	•	•	•	•			
F2530		Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) 24 Vdc		•	•	•	•	•	•	•	•	•			

The spool return action shown correspond to standard configurations; for different applications contact our Commercial Department.

Springs load values

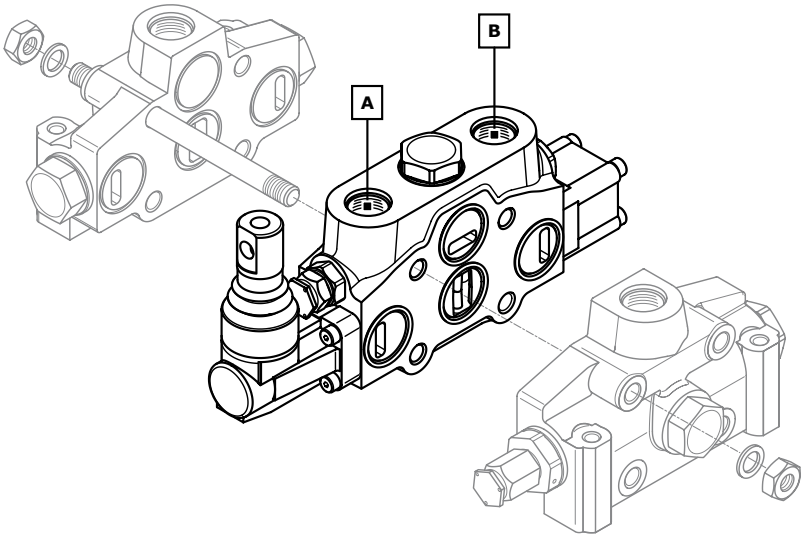
Spool return kits have three different spring types; following the codes depending on spring loads.

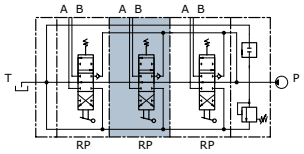
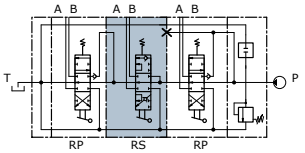
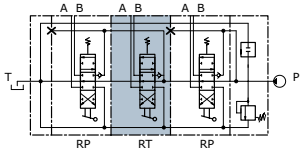


Spring type			directional control valve												
code		value	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
A	**standard spring**	K1 (N)	100	121.6	121.6	98	117.7	137.3	137.3	151	196.2	151	155	272.6	392.4
		K2 (N)	150	203	203	125	145.2	176.6	176.6	186.4	245.2	186.4	373.7	593.5	686.7
B	**soft spring**	K1 (N)	80	88.3	88.3	71	101	109.8	98.1	112.8	145.1	112.8	116.7		
		K2 (N)	130	147.1	147.1	102	117.7	141.2	137.3	141.2	176.6	141.2	152		
C	**heavy spring**	K1 (N)	120	149.1	149.1	120	172.6	168.7	196.2	253	313.9	253	188.3		
		K2 (N)	180	206	206	150	246.2	259	255	430.6	412	430.6	454.3		

Working section identification

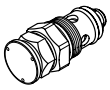
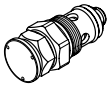
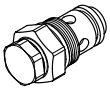
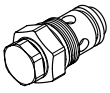
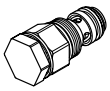
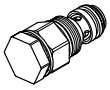
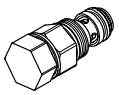
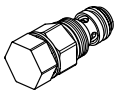
A and B ports dimensions and threads depends on the valve size (see table on page 169).



Work section and thread type		directional control valve												
code	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
RP		G03	G04	G04	G03	G04	G04	G05	G05	G06	G06	G07	G09	S15
		U03	U03	U03	U03	U03	G05	U05	G06	G07	U06	G08	S09	S16
			M01			U04	U04		U05	U06		U07	S10	
						M01			S03	S05		S07	S11	
									S04	S06		S08	S12	
	sercice ports A-B parallel circuit section									S33		S35	S39	
										S34		S36	S40	
code	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
RS only available for spool type: W015 - W016 W017 - W018		G03	G04	G04	G03	G04	G04	G05	G05	G06		G07		
		U03	U03	U03	U03	U03	G05	U05	G06	G07		G08		
			M01			U04	U04		U05	U06		U07		
						M01			S03	S05		S07		
									S04	S06		S08		
	sercice ports A-B series circuit section									S33		S35		
										S34		S36		
code	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
RT		G03		G04	G03	G04	G04	G05		G06	G06			
		U03		U03	U03	U03	G05	U05		U06	U06			
						U04	U04			S05				
						M01				S06				
										S33				
	sercice ports A-B tandem circuit section													

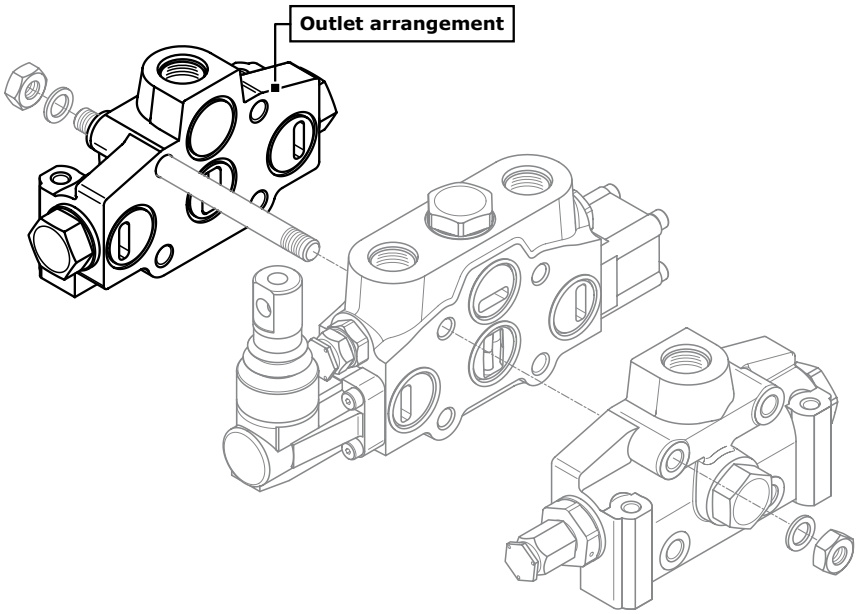
Auxiliary valve classification

Sections designed to house auxiliary valve option require double choice on work ports A and B: port PA - port PB
Always indicate setting value when using Service line relief valve, Antichock and anticavitation valve, and Pilot operated antishock and anticavitation valve. **Example: 01 PA (120)** = setting at full flow / **01 PA (120-A)** = setting at min. flow

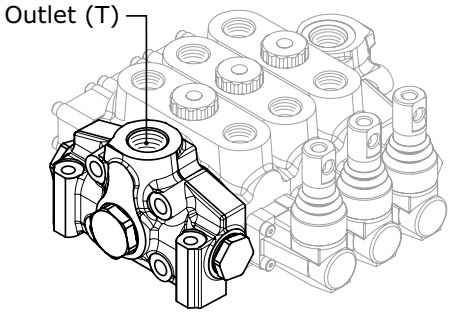
Auxiliary valve type			directional control valve												
code	schema	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
01 PA															
	Service line relief valve (port A)		•	•	•	•	•	•	•	•	•	•	•	•	•
01 PB															
	Service line relief valve (port B)														
code	schema	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
02 PA															
	Anticavitation valve (port A)		•	•	•	•	•	•	•	•	•	•	•	•	•
02 PB															
	Anticavitation valve (port B)														
code	schema	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
03 PA															
	Antishock and anticavitation valve (port A)		•	•	•	•		•	•	•					
03 PB															
	Antishock and anticavitation valve (port B)														
code	schema	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
04 PA															
	Pilot operated Antishock and anticavitation valve (port A)								•	•	•	•	•	•	
04 PB															
	Pilot operated Antishock and anticavitation valve (port B)														
code	schema	configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
05 PA															
	prearrangement valve (service port A)		•	•	•	•	•	•	•	•	•	•	•	•	•
05 PB															
	prearrangement valve (service port B)														

OUTLET SECTION ARRANGEMENT

This code indicates the characteristics on the outlet section: ports position and thread, simple T port or HPCO connection. It is possible to have simple T port or two ports configuration for HPCO connection: HPCO allows to extend the by pass channel and connect a second valve. T ports dimensions and threads depends on the valve size (see table on page 175).



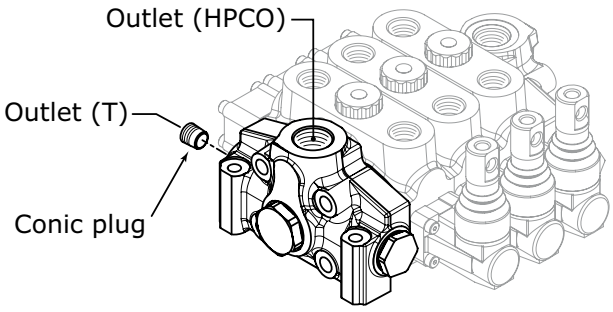
Order example - version 1 outlet



TJ A G04

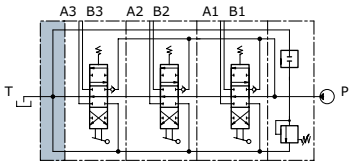
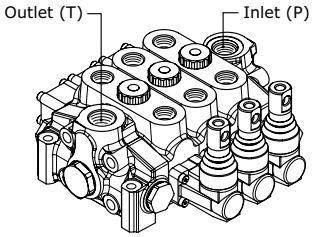
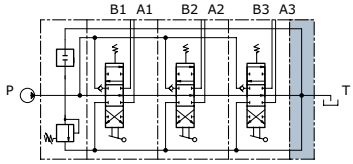
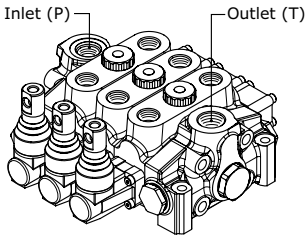
1. **TJ** outlet section type
2. **A G04** outlet position and available thread type

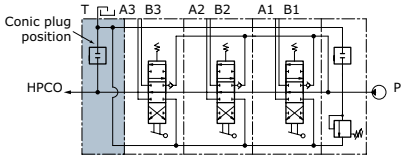
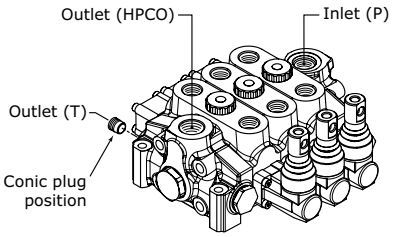
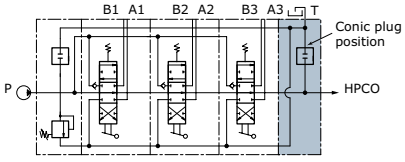
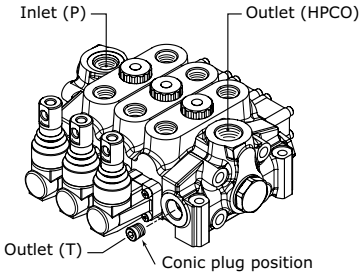
Order example - HPCO version Outlet



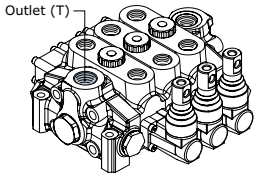
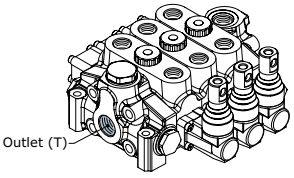
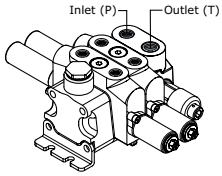
TM M G04

1. **TM** outlet section type
2. **M G04** outlet position and available thread type

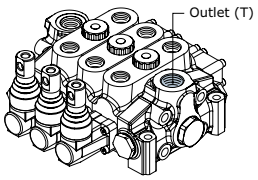
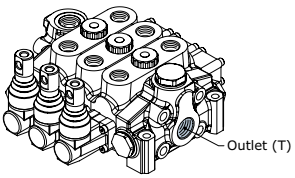
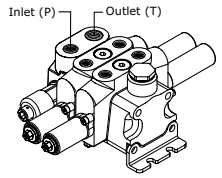
Outlet side classification - version 1 outlet			
code	**description**	**schema**	**configuration**
TJ	Outlet section with single return (T) **right** side inlet (P)		
TK	Outlet section with single return (T) **left** side inlet (P)		

Outlet side classification - HPCO version outlet			
code	**description**	**schema**	**configuration**
TM	Outlet section with two returns (T - HPCO) **right** side inlet (P)		
TN	Outlet section with two returns (T - HPCO) **left** side inlet (P)		

Outlet section with single tank return outlet position "TJ"

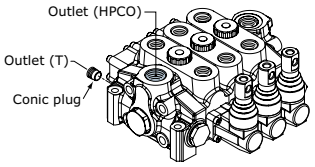
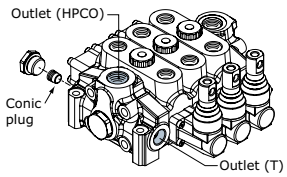
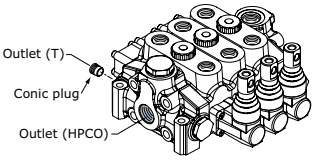
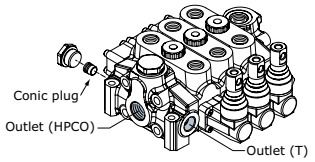
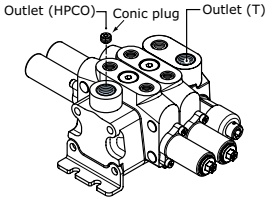
Outlet and thread position			directional control valve												
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
A	Upper outlet (T)		G04	G04	G04	G04	G04	G05	G06	G06	G07	G07	G08	G09	S15
			U04	U03	U03	U04	U03	G06	U06	U06	U07	U07	U07	S11	S16
				M02	M02		U04	U05		S03	S07		S09	S12	
							M02			S04	S08		S10		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
C	Central outlet (T)			G04		G04	G04	G05	G06	G06	G07	G07	G08	G09	S15
				U03		U04	U03	G06	U06	U06	U07	U07	U07	S11	S16
				M02			U04	U05		S03	S07		S09	S12	
							M02			S04	S08		S10		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
E	Upper outlet (inlet-outlet) only with "E" inlet		G04		G04	G04									
			U04		U03	U04									
					M02										

Outlet section with single tank return outlet position "TK"

Outlet and thread position			directional control valve												
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
A	Upper outlet (T)		G04	G04	G04	G04	G04	G05	G06	G06	G07	G07	G08	G09	S15
			U04	U03	U03	U04	U03	G06	U06	U06	U07	U07	U07	S11	S16
				M02	M02		U04	U05		S03	S07		S09	S12	
							M02			S04	S08		S10		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
C	Central outlet (T)			G04		G04	G04	G05	G06	G06	G07	G07	G08	G09	S15
				U03		U04	U03	G06	U06	U06	U07	U07	U07	S11	S16
				M02			U04	U05		S03	S07		S09	S12	
							M02			S04	S08		S10		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
E	Upper outlet (inlet-outlet) only with "E" inlet		G04		G04	G04									
			U04		U03	U04									
					M02										

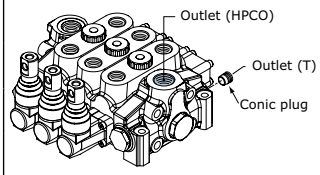
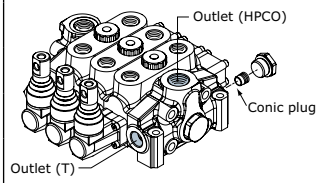
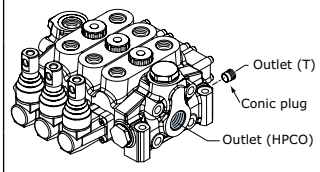
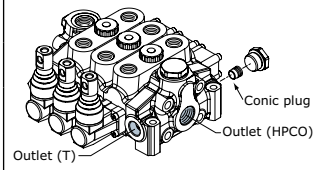
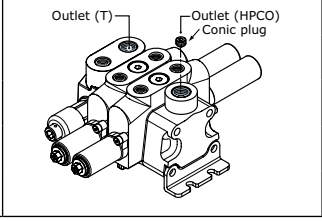
HPCO position on outlet section with two tanks "TM"

The threads under montioned refer to hpco only; for T see outlet section with single return type TJ

Outlet and thread position			directional control valve												
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
M	HPCO upper outlet (T) TANK side outlet B			G04			G04	G05	G06	G06	G07	G07	G08	G09	S16
				U03			U03	G06	U06	U06	U07	U07	U07	S11	
				M02			U04	U05		S03	S07		S09	S12	
							M02			S04	S08		S10	S39	
													S35	S40	
													S36		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
N	HPCO upper outlet (T) TANK front outlet side A			G04			G04	G05							S16
				U03			U03	G06							
				M02			U04	U05							
							M02								
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
P	HPCO central outlet (T) TANK side outlet B			G04			G04	G05	G06	G06	G07	G07	G08	G09	
				U03			U03	G06	U06	U06	U07	U07	U07	S11	
				M02			U04	U05		S03	S35		S09	S12	
							M02			S04	S36		S10	S39	
													S35	S40	
													S36		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
Q	HPCO central outlet (T) TANK front outlet side A			G04			G04	G05							
				U03			U03	G06							
				M02			U04	U05							
							M02								
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
W	Upper outlet (inlet-outlet) only with "E" inlet		G04		G04	G04									
			U04		U03	U04									
					M02										

HPCO position on outlet section with two tanks "TN"

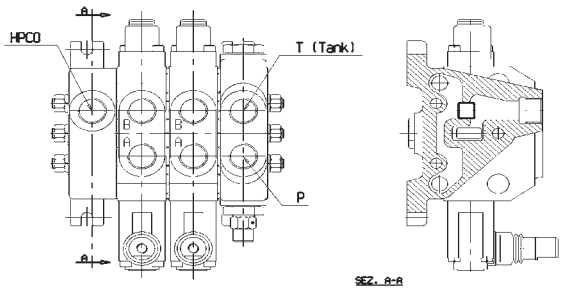
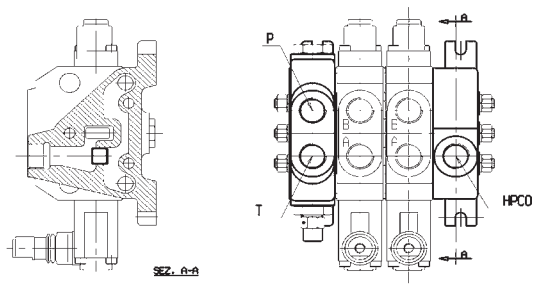
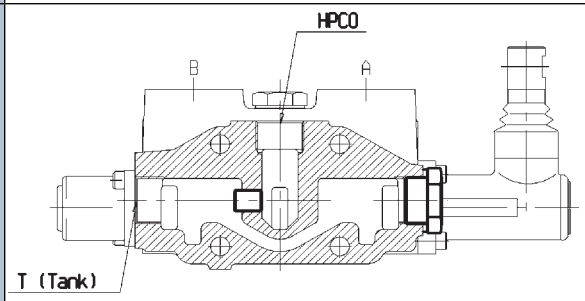
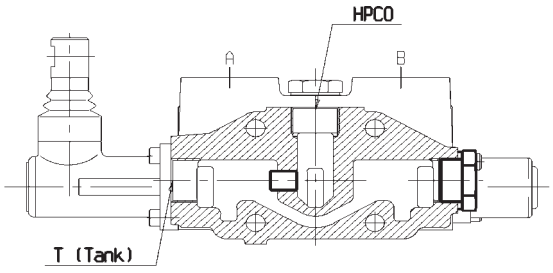
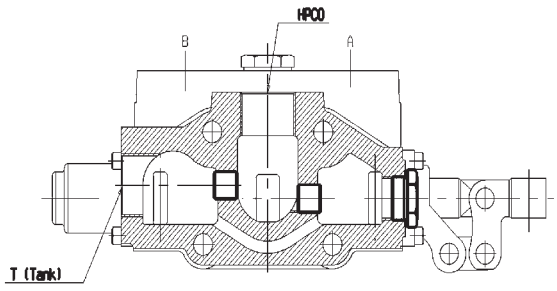
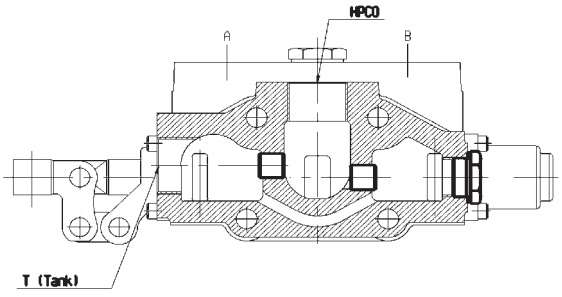
The threads under montioned refer to hpco only; for T see outlet section with single return type TK

Outlet and thread position			directional control valve												
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
M	HPCO upper outlet (T) TANK side outlet B			G04			G04	G05							S16
				U03			U03	G06							
				M02			U04	U05							
							M02								
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
N	HPCO upper outlet (T) TANK front outlet side A			G04			G04	G05	G06	G06	G07	G07	G08	G09	S16
				U03			U03	G06	U06	U06	U07	U07	U07	S11	
				M02			U04	U05		S03	S35		S09	S12	
							M02			S04	S36		S10	S39	
													S35	S40	
													S36		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
P	HPCO central outlet (T) TANK side outlet B			G04			G04	G05							
				U03			U03	G06							
				M02			U04	U05							
							M02								
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
Q	HPCO central outlet (T) TANK front outlet side A			G04			G04	G05	G06	G06	G07	G07	G08	G09	
				U03			U03	G06	U06	U06	U07	U07	U07	S11	
				M02			U04	U05		S03	S35		S09	S12	
							M02			S04	S36		S10	S39	
													S35	S40	
													S36		
code		configuration	D9	D3	D3M	DVS10	D4	D6	D16	D12	D20	DVS20	D25	D40	D50
W	Upper outlet (inlet-outlet) only with "E" inlet		G04		G04	G04									
			U04		U03	U04									
					M02										

Carry-over connection (HPCO)

All outlet section of all product families can be easily transformed from simple T port to HPCO configuration just by installing conic plug(s), (see following table).

Conic plug identification			
Type	Code	Description	Q.ty
D9	413010203	G 1/4 x 13 plug	1
D3	413010203	G 1/4 x 13 plug	1
D3M	413010203	G 1/4 x 13 plug	1
DVS10	413010203	G 1/4 x 13 plug	1
D4	413010203	G 1/4 x 13 plug	1
D6	413010203	G 1/4 x 13 plug	1
D16	413010207	G 3/8 x 15 plug	2
D12	413010207	G 3/8 x 15 plug	1
DVS20	413010201	G 1/2 x 17 plug	2
D20	413010201	G 1/2 x 17 plug	1
D25	413010201	G 1/2 x 17 plug	2
D40	413010208 413010205	G 1 x 25,6 plug G 3/4 x 20,5 plug	1 1
D50	413010212	G 1”1/2 x 32 plug	2

Type	Conversion of a discharge section with a single outlet TJ into one with two outlets TM	Conversion of a discharge section with a single outlet TK into one with two outlets TN
D9 D3M DVS10		
D3 D4 D6 D12 D20		
DVS20 D16 D25 D40 D50		

Sectional valves specifically designed for applications

PRODUCT AND SOLUTION FOR TRACTORS

HC-D3L

Hydrocontrol has a dedicated valve for tractors in the 40 - 100 HP range that can be directly flanged on the trasmission. The solution incorporates innovative technology that is ideal for even the most demanding applications of modern professional agriculture.

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HC-D4L

Hydrocontrol has a dedicated valve for tractors in the 80 - 120 HP range that can be easily mounted on the rear part of the tractor. The solution incorporates innovative technology that is ideal for even the most demanding applications of modern professional agriculture.

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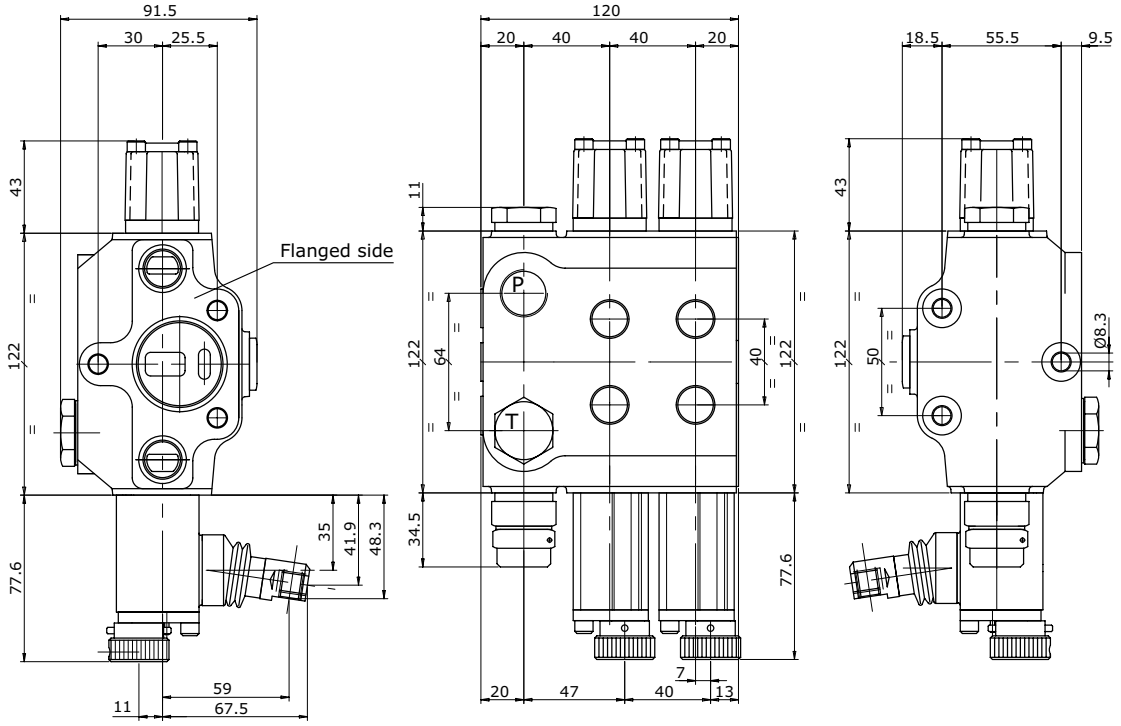
Technical specifications

Working section number	1 - 12
Rated flow	55 l/min - 15 GPM
Rated pressure	280 bar - 4000 PSI
Spool stroke	5 + 5 mm
Spool pitch	40 mm

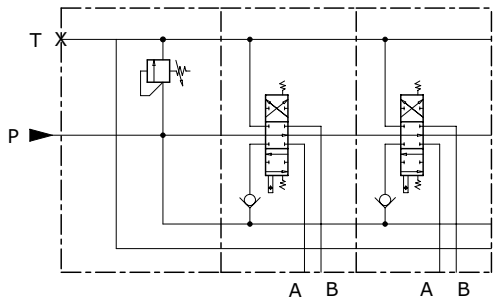
Applications

Agricoltural machines

Dimensions



Hydraulic schematic



Features

Ideal for tractors between 40 to 100 HP
Frame mounted sectional valve
Manual, cable actuation.
Port relief valves.
Inlet section with flow divider. Priority flow working section
Cylinder and motor spool, floating and kickout working section.
SE/DE selector.

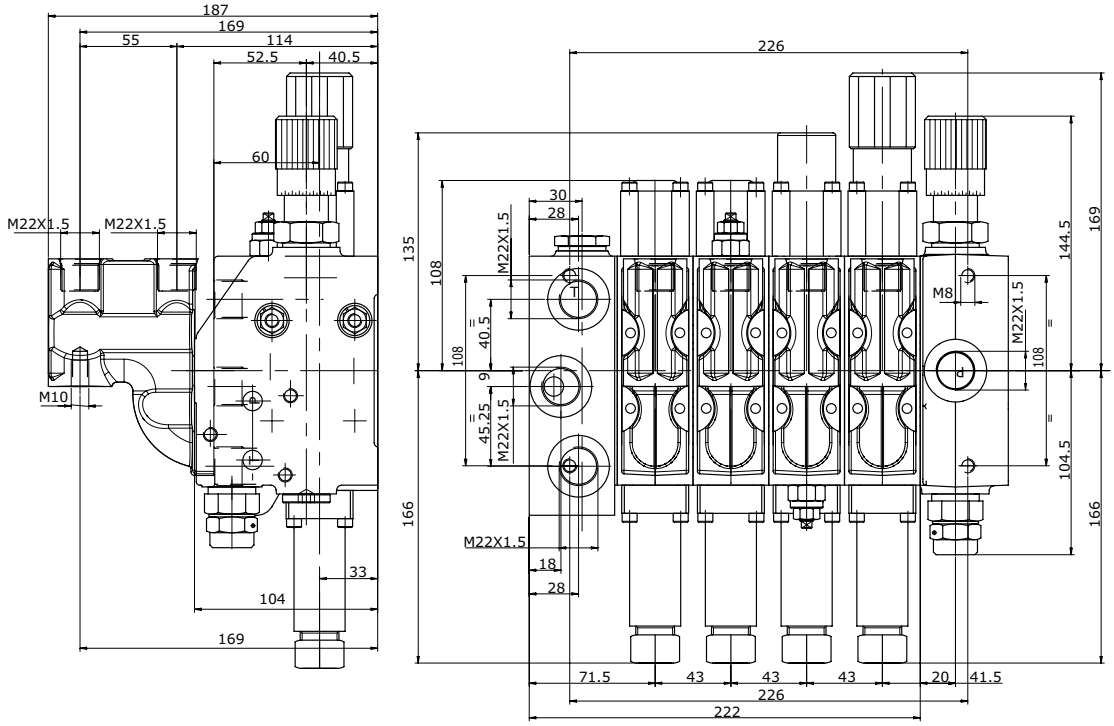
Technical specifications

Working section number	1 - 12
Rated flow	80 l/min - 22 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	6 + 6 mm
Spool pitch	43 mm

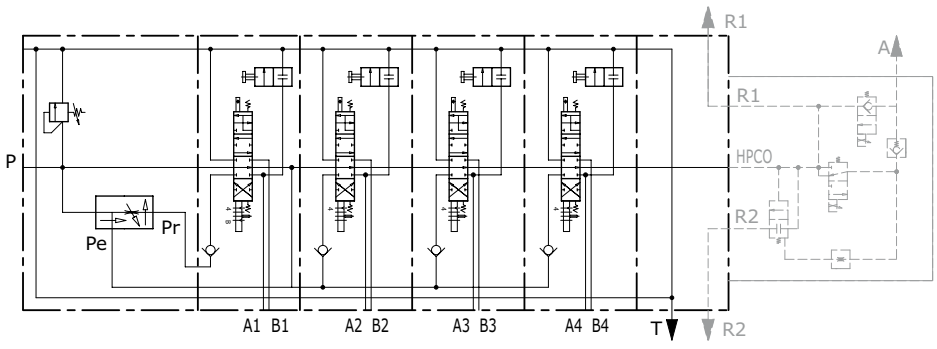
Applications

Agricoltural machines

Dimensions



Hydraulic schematic



Features

Ideal for tractors between 80 to 120 HP
Rear mounted.
Cable actuation
Port relief valves, SE/DE valves, priority flow working section
Cylinder and motor spool, floating and kickout working section
Inlet section with flow divider and interface for breaking trailer valve
Outlet section with interface for BOSCH EHR5 hitch valve
Connectors for fast coupling system

Sectional valves specifically designed for applications

PRODUCT AND SOLUTION FOR MINI-EXCAVATORS

HC-EV24

All the control valve HC-EV, have been specifically studied to equip mini-excavators. Even with their limited dimensions and weight, the valves resolve all the typical problems experienced in this application field. Specifically designed for mini-excavators from 0,8 t to 1,2 t

HC-EV31

All the control valve HC-EV, have been specifically studied to equip mini-excavators. Even with their limited dimensions and weight, the valves resolve all the typical problems experienced in this application field. Specifically designed for mini-excavators from 1,3 t to 4,5 t

HC-EV38

All the control valve HC-EV, have been specifically studied to equip mini-excavators. Even with their limited dimensions and weight, the valves resolve all the typical problems experienced in this application field. Specifically designed for mini-excavators from 4,6 t to 6,0 t.

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Compact valves for Mini-excavators

HC-EV24
Range 0,8 - 1,2 t

HC-EV31
Range 1,3 - 4,5 t

HC-EV38
Range 4,6 - 6 t

Main characteristics

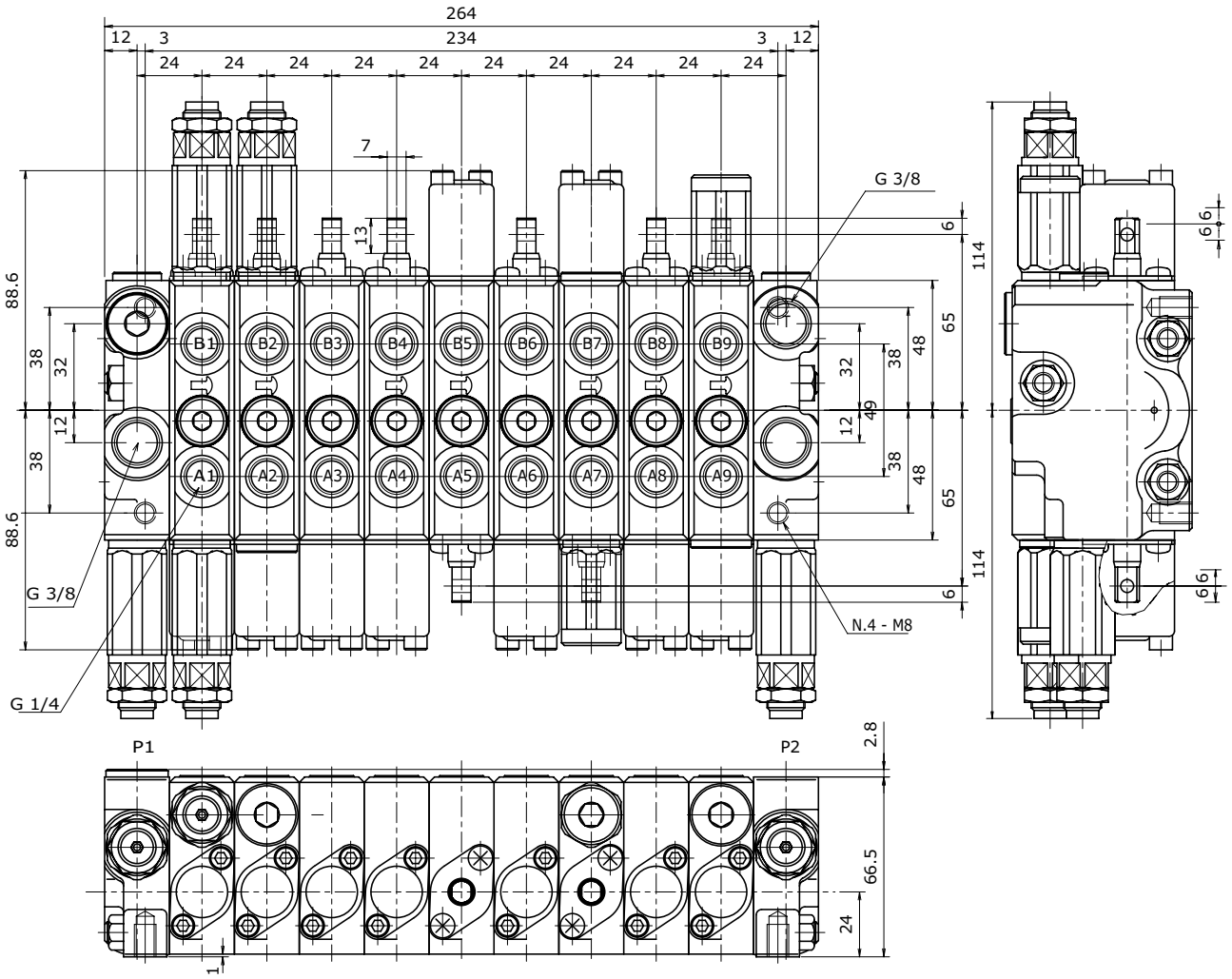
- Two pumps
- Three pumps
- Parallel circuit available
- Tandem circuit available
- Manual and hydraulic operated
- Internal double flow on arm, boom and service
- Mini-excavators Range from da 0,8 t up to 6 t
- Max working pressure 250 bar and 300 bar on port A/B
- Two internal pilot lines (auto idle, straight travel, fifth wheel unleash)

General specifications

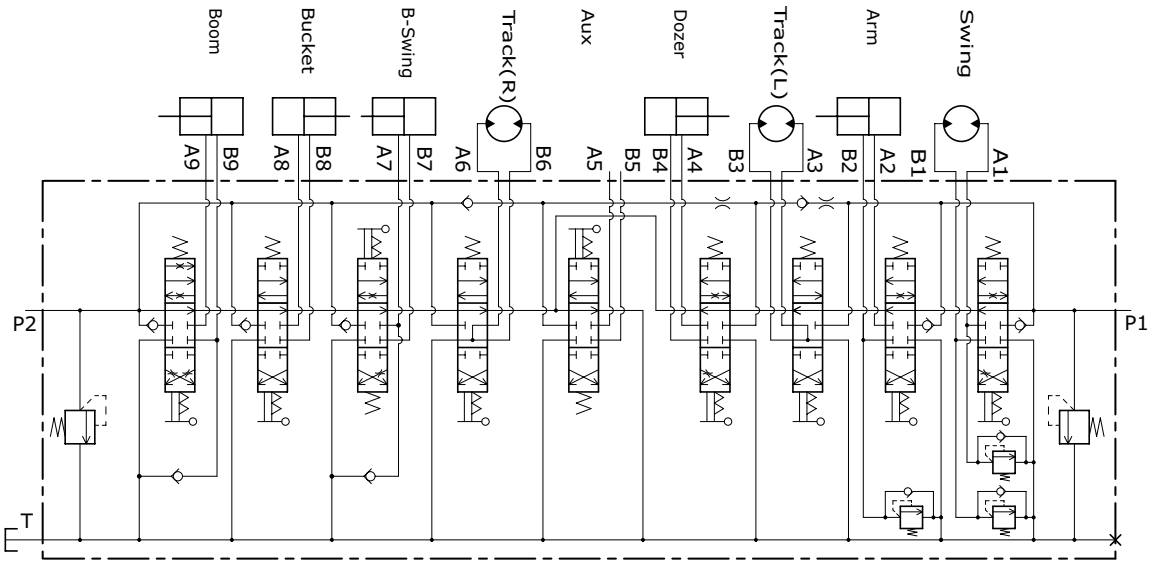
TYPE	EV24	EV31	EV38
Working sections number	1 - 12	1 - 12	1 - 12
TECHNICAL SPECIFICATIONS			
Spool diameter (mm)	10	12	14,5
Spool stroke (mm)	5+5	7+7	8+8
Float spool extra stroke (mm)	5		5
Spool pitch (mm)	24	31	38
Return spring force neutral (N)	83,4	68,6	98
Return spring force full stroke (N)	103	88,3	137
Max pilot pressure (bar)	50	50	50
Inner leakage from spool (cm^3/min)(*)	< 4	< 5	< 7
Allowable back pressure (bar)	10	10	10
RATED FLOW			
Flow rate for each pump (l/min)	15	35	65
Flow rate for each pump (GPM)	4	9	17
RATED PRESSURE			
Max working pressure (bar)	210	250	250
Max working pressure (PSI)	3000	3600	3600

(*) = at 9,8 MPa oil viscosity 37 CSt

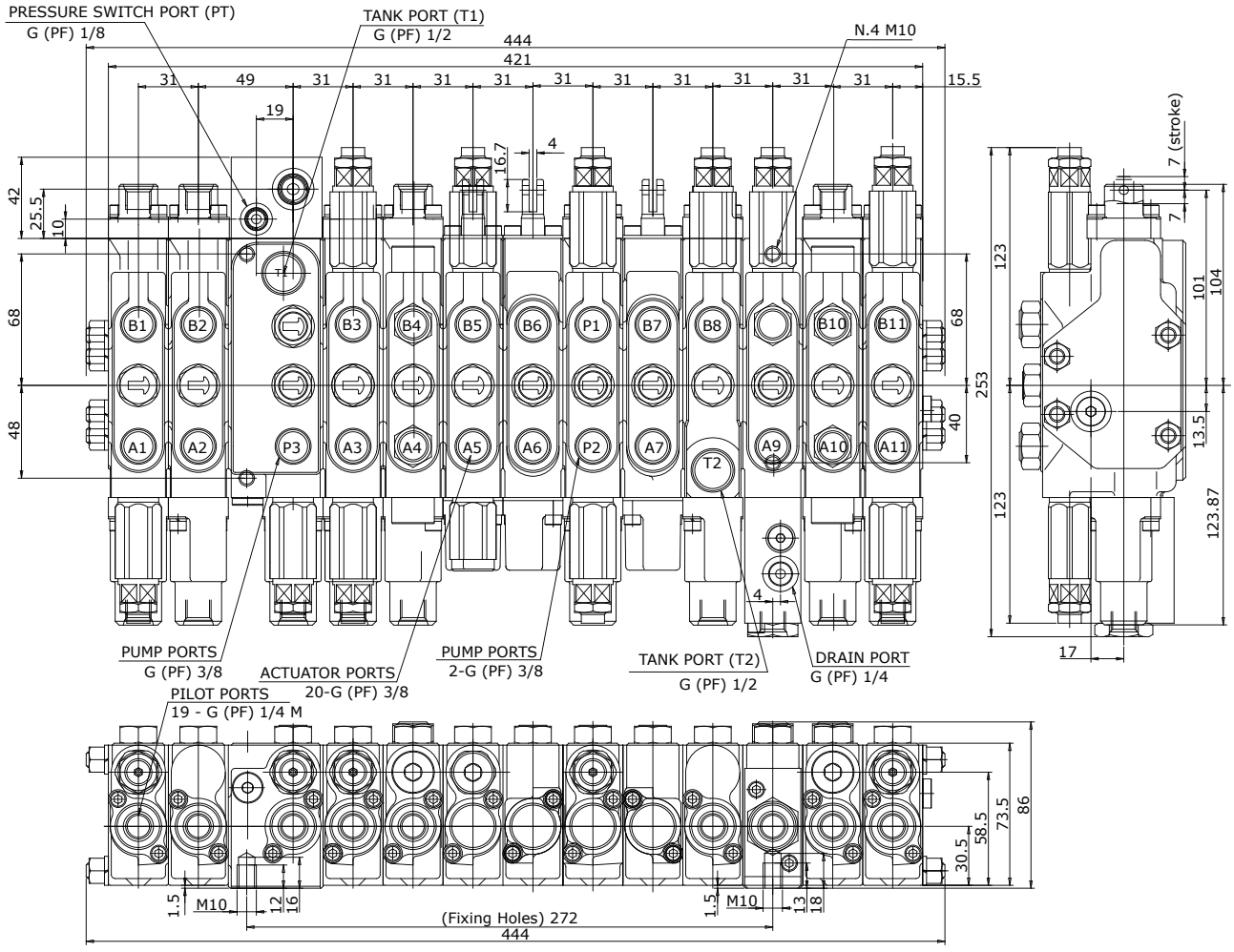
HC-EV24 Dimensions



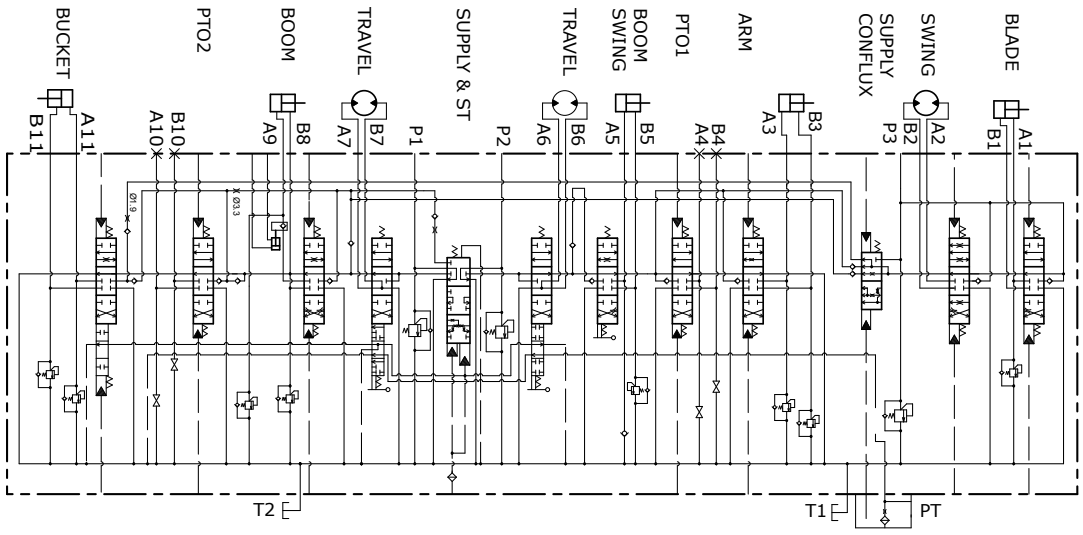
HC-EV24 Hydraulic schematic



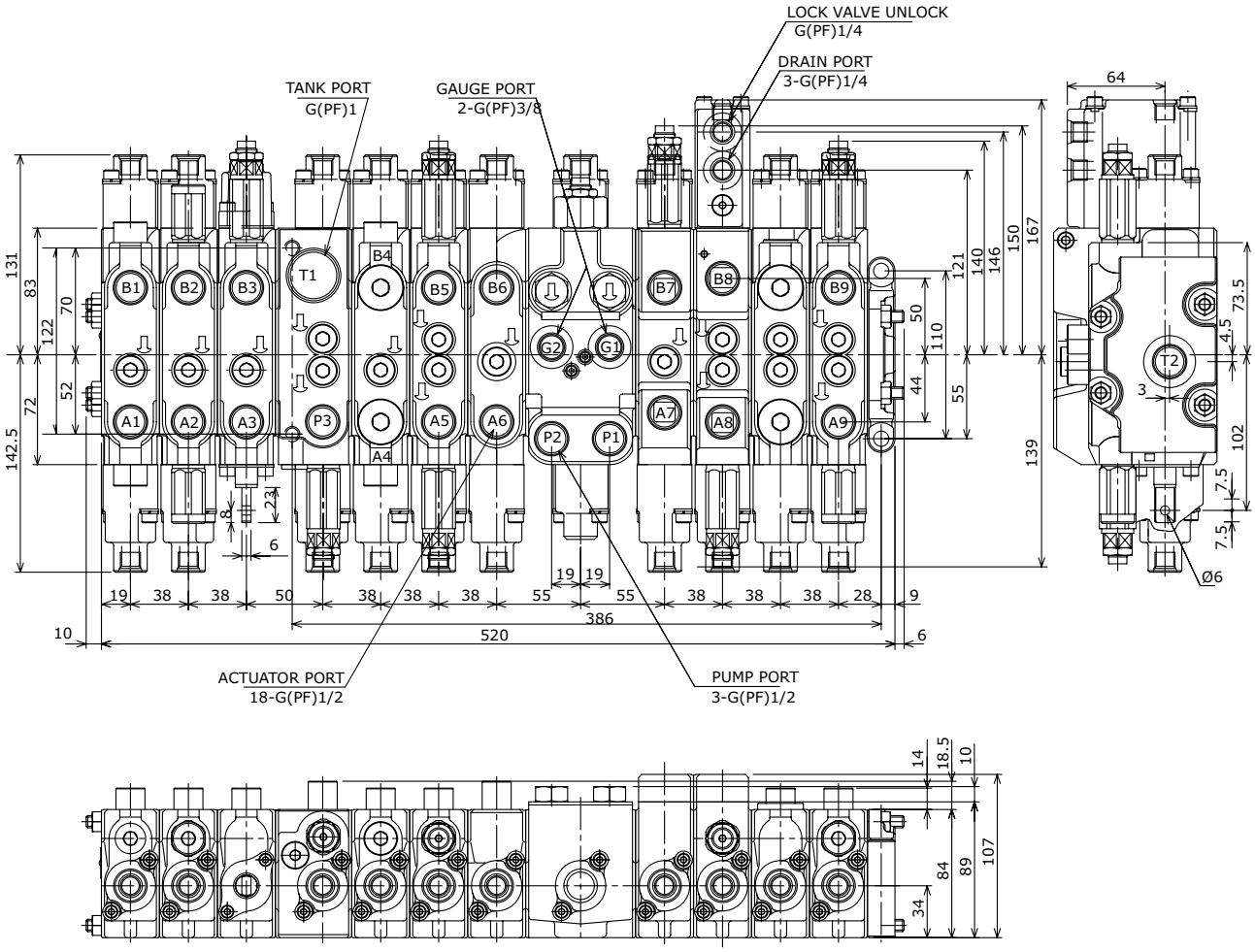
HC-EV31 Dimensions



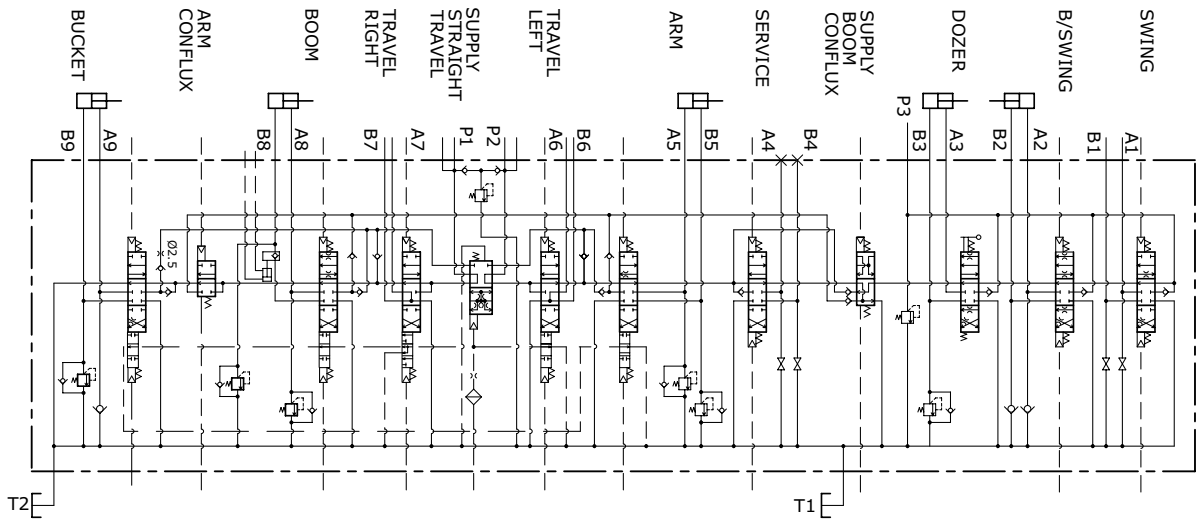
HC-EV31 Hydraulic schematic



HC-EV38 Dimensions



HC-EV38 Hydraulic schematic



Load-Sensing Proportional Valves

HC-MV99

The new proportional valve HC-MV99 has specifically been studied to equip lifting machinery; the Load Sensing system and the proportional electrohydraulic actuation allows for sensitive and accurate movement control. Besides the inlet compensated version, now the fully compensated system is available: this resolves the difficulty of simultaneous movements, even with different loads on the ports. Several different configurations give a solution to every application needs.

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HC-NVD2

The multifunctional proportional diverter model HC-NVD2 is a new and patented hydraulic valve generation designed to reach simplicity and linearity of construction to assure great function ability, quality and flexibility. By means of special electronics (radio controls or senders) it is possible to perform simultaneous control of more cylinders and keep the capacity constant even with different loads on each port. The HC-NVD2 also has versions for fixed or variable displacement pumps, electrohydraulic proportional actuation, internal reducing pressure valve and by-pass electric valve.

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For information on the order modality refer to the relative technical catalogue:
HC-MV99 = technical catalogue **HCMV99**
HC-NVD2 = for the technical catalogue please contact NEM hydraulics

General specifications

TYPE	MV99	NVD2
working section number	1 - 10	1 - 8
CIRCUIT		
stroke (mm)	7 + 7	5 + 5
spool pitch	43	40
dead band (mm)	1,5 + 1,5	1,5 + 1,5
RATED FLOW		
Flow rate ports P and T	130 l/min - 34 GPM	50 l/min - 13 GPM
Flow rate ports A and B	100 l/min - 26 GPM	40 l/min - 10,5 GPM
RATED PRESSURE		
max recommended pressure port P	420 bar - 6000 PSI	350 bar - 5000 PSI
max recommended pressure ports A and B	420 bar - 6000 PSI	350 bar - 5000 PSI
max recommended pressure port T	20 bar - 290 PSI	20 bar - 290 PSI

Options chart

TYPE	MV99	NVD2
direct acting pressure relief valve on L.S. signal	•	
direct acting pressure relief valve on full flow	•	•
electric operated dump valve (12 Vdc)	•	•
electric operated dump valve (24 Vdc)	•	•
SPOOL ACTUATION		
lever actuation	•	•
hydraulic actuation	•	
proportionlal electrohydraulic actuation	•	•
Manual actuation specifications - actuation force on the spool		
only lever actuation (daN)	9,8 - 13-7	8 - 28
lever + hydraulic actuation (daN)	12,5 - 37-4	
lever + electrohydraulic actuation (daN)	12,5 - 37-4	8 - 28
lever displacement	+ 21° / - 21°	+ 19° / - 19°
Hydraulic actuation specifications		
regulating pressure (bar)	5 -15	
max pressure on pilot line (bar)	40	
max pressure on pilot tank line (bar)	3	
Proportional electrohydraulic actuation specifications		
feeding reducing pressure (bar)	30	18
supply voltage (Vdc)	12 - 24	12 - 24
coil resistance (Ω)	5,3 - 21,2	3,9 - 14,5
PWM frequency suggested (Hz)	70-90	70-90
Current control range 12 Vdc (mA)	500-1100	900-1800
Current control range 24 Vdc (mA)	250-550	450-900
Connector	AMP Junior Power Timer	DIN 43650 ISO 4400
ON-OFF control current (A)	2,2 - 1,1	3 - 1,6
SPOOL RETURN ACTION		
Return spring	•	•
Hydraulic load limit	•	
Electical load limit	•	•
AUXILIARY VALVE		
Antishock valve	•	•
Anticavitation valve	•	
Pilot operated Antishock and anticavitation valve	•	

Standard working conditions - Load-Sensing Proportional valves

Operating temperature range	-20°C / +80°C
Kinematic viscosity range	10 ÷ 300 cSt
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration level	β10 > 75 (ISO 16889:2008)
Internal filter (on electroproportional valves pilot line)	30 μm

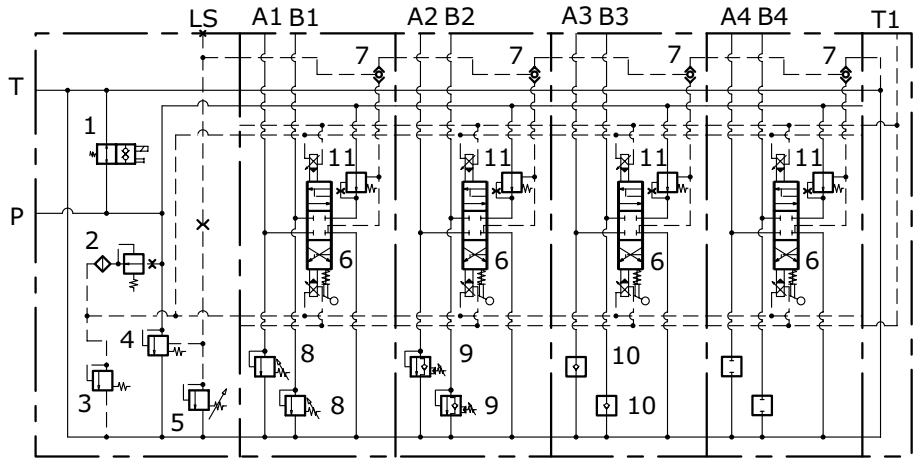
All information and diagrams in this catalogue refer to a mineral base oil VG46 at 50°C temperature (32 cSt kinematic viscosity)

Fluid options

Types of fluid (according to IS0 6743/4) Oil and Solutions	Temperature (°C)		Compatible gasket
	min	max	
Mineral Oil HL, HM (or HLP acc. to DIN 51524)	-25	+80	NBR
Oil in water emulsions HFA	+5	+55	NBR
Water in oil emulsions HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

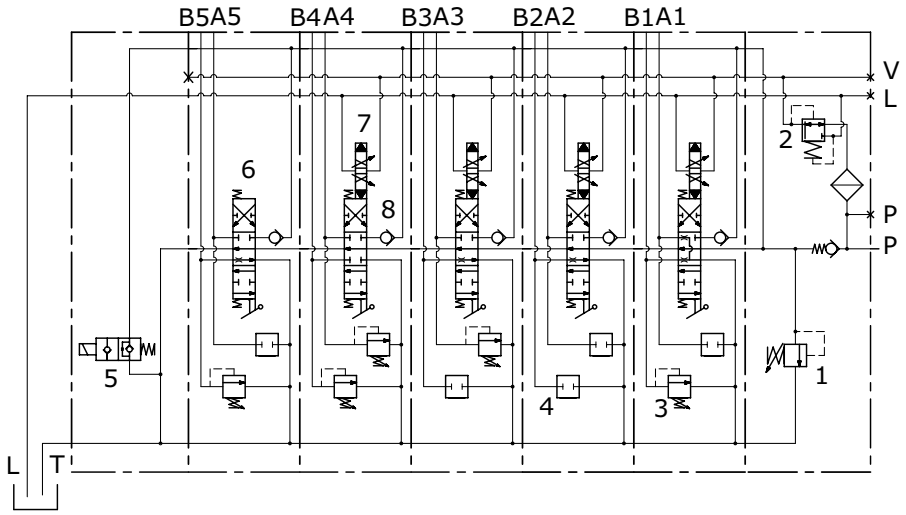
For special applications and different fluids, please call our Technical Department.

HC-MV99 Hydraulic schematic



1. Electric operated dump valve
2. Pressure reducing valve with internal filter for electrohydraulic actuation
3. Relief valve for electrohydraulic actuation
4. Inlet pressure compensator
5. Main relief valve
6. Manual and electrohydraulic operated spool
7. L.S. selection valve
8. Antichock auxiliary valve
9. Pilot combined auxiliary valve
10. Anticavitation auxiliary valve
11. Work section pressure compensator

HC-NVD2 Hydraulic schematic



1. Main relief valve
2. Pressure reducing valve
3. Antishock auxiliary valve
4. Auxiliary valve plugged
5. Electric operated dump valve
6. Manual operated spool
7. Electrohydraulic operated spool
8. Check valve on the section

Technical specifications

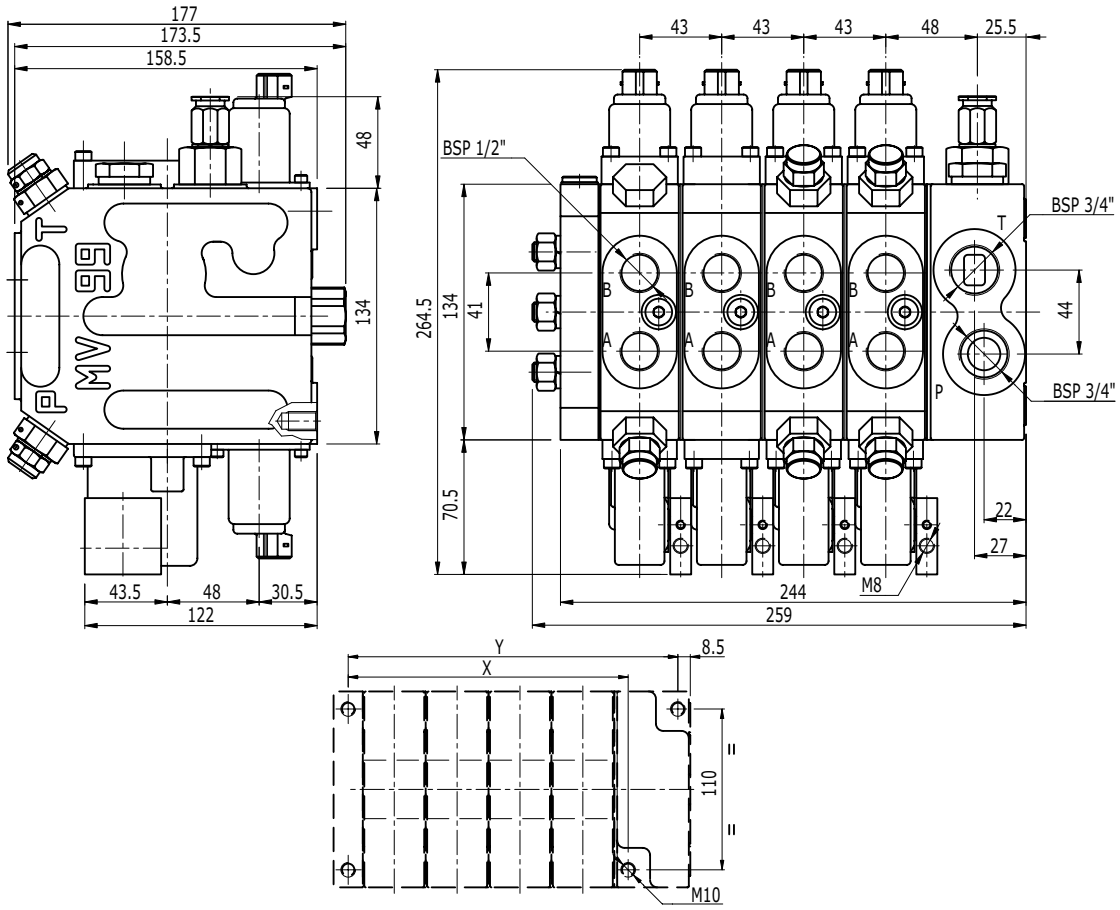
Working section number	1 - 10
Rated flow	P/T - 130 l/min (34 GPM)
	A/B - 100 l/min (26 GPM)
Rated pressure	P - 420 bar (6000 PSI)
Rated pressure	A/B - 420 bar (6000 PSI)
Rated pressure	T - 20 bar
Spool stroke	7 + 7 mm
Spool pitch	43 mm
Circuit type	Parallel, LS

Applications

Cranes and aerial platforms, Forestry machines, Compactors, Aerial platforms, Concrete pumps, Hook and Skip loaders.

HC-MV99 is Load Sensing control valve with electro-proportional actuation. The Load Sensing system maintains the ΔP constant through spool control notches by means of the pressure compensation principle: flow rate delivery and consequently control is entirely free from any variation in the handled load. In addition to the evident advantages of regulation, the system permits significant energy saving.

Dimensions

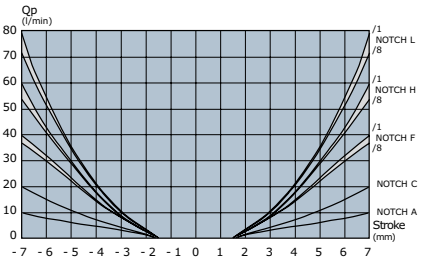


TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X (mm)	62	105	148	191	234	277	320	363	406	449
Y (mm)	96	139	182	225	268	311	354	397	440	483
Weights (kg)	16,5	23	29,5	36	42,5	49	55,5	62	68,5	75

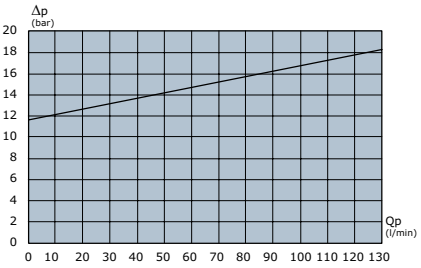
PORTS	Inlet (P)	Ports (A-B)	Outlet (T)
BSP Thread (ISO 1179-1)	G 3/4	G 1/2	G 3/4
UN-UNF Thread (ISO 11926-1)	1"1/16 - 12 UNF	7/8" - 14 UNF	1"1/16 - 12 UNF

Typical curves

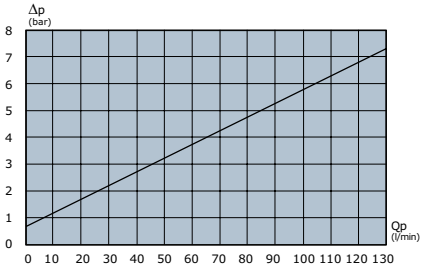
Regulated flow on port A and B



Pressure drop P - T (fix pump)



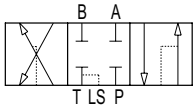
Pressure drop P - T (VPE)



Spool type

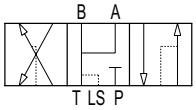
W001C

3 positions double-acting



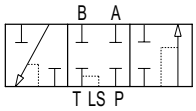
W002C

3 positions double-acting
A and B to tank



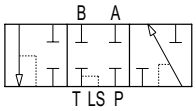
W005C

3 positions
single-acting on A



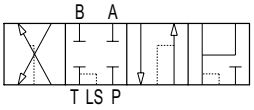
W006C

3 positions
single-acting on B



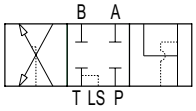
W012C

4 positions double-acting
with float in the 4th position



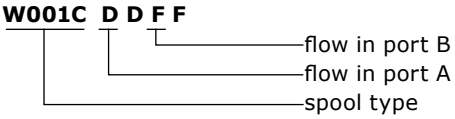
W013C

3 positions double-acting
regenerative



Spool flow

A 4 letter code identify the flow required on port A and B.



Following table shows possible flows for ports A and B: flows are different depending on the type of section (compensated or not compensated): data are valid considering 100 l/min inlet flow and fixed pump configuration.

NOTCH TYPE	Z	A	D	F	I	N
not-compensated section (RD) (l/min)	5	10	25	40	65	95
compensated section (RC) (l/min)	4	8	20	30	50	70

Features

HC-MV99 can be adapted for fixed or variable pump systems.
The valve can be delivered with manual, hydraulic remote, electrohydraulic ON-OFF or proportional controls.
All components for electrohydraulic control (pressure reducing valve, filter, piloting system) are internal for a simple and reliable design.

Following options are available:
- intermediate inlet section for variable pump up to 200 l/min: see doc. DS003
- special inlet section for variable pump with security system "P closed": see doc. I02412
- simplified version for manual actuation and cloche control: see doc. I01539

Technical specifications

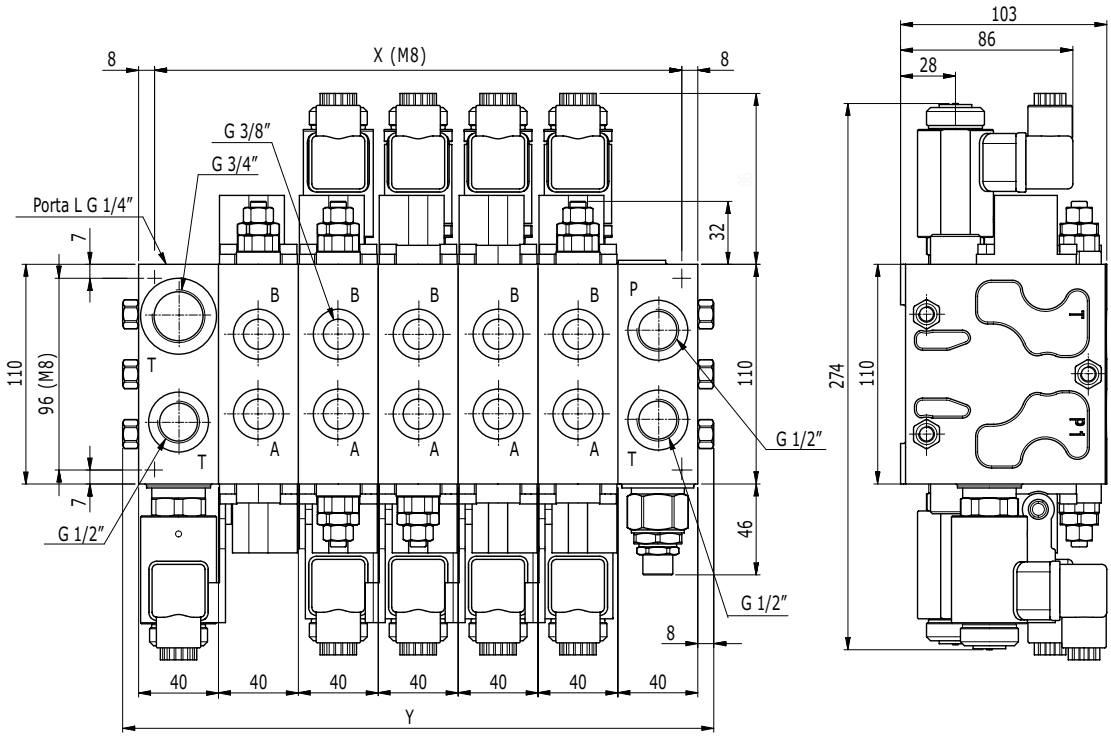
Working section number	1 - 8
Rated flow	40 l/min - 10,5 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	40 mm

Applications

Cranes and Aerial platforms, Aerial platforms
Concrete pumps, Compactor, Hook and Skip loaders

The patented Flow Sensing technology of HC-NVD2 allows a perfect integration between design simplicity and high functional performances: the design is lean and reliable like an open center valve, but the control characteristics are typical of a load sensing valve: fine control is not affected by the load changing and the simultaneous movements.
Overall dimensions are reduced thanks to the lack of sectional compensators and to integrated proportional valves for electrohydraulic actuation. Pressure drop in the stand-by condition are typical of an open center valve, particularly low compared to load sensing systems.

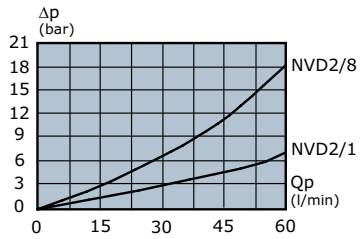
Dimensions



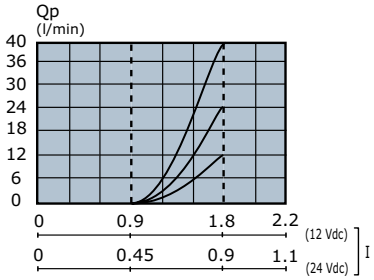
TYPE	/1	/2	/3	/4	/5	/6	/7	/8
X (mm)	114	154	194	234	274	314	354	394
Y (mm)	129	169	209	249	289	329	369	409
Weights (kg)	8	10,8	13,7	16,5	19,4	22,3	25,2	28
PORTS	**Inlet (P)**		**Ports (A-B)**		**Outlets (T-HPCO)**		**Outlet (T1)**	
BSP Thread (ISO 1179-1)	G 1/2		G 3/8		G 1/2		G 3/4	
UN-UNF Thread (ISO 11926-1)	7/8" - 14 UNF		3/4" - 16 UNF		7/8" - 14 UNF		1"1/16 - 12 UNF	

Typical curves

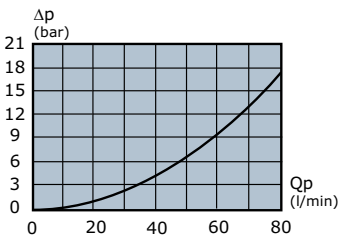
Pressure drop (P - T)



Regulated flow on port A and B



Pressure drop P - T (VPE)

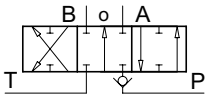


Indicated values have been tested with standard sectional valve and W001A spools.

Spool type

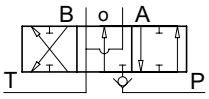
W001

3 positions double-acting



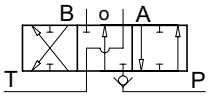
W002

3 positions double-acting
A and B to tank



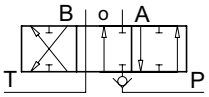
W003

3 positions double-acting
A to tank B blocked



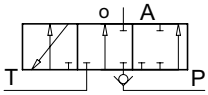
W004

3 positions double-acting
A blocked B to tank



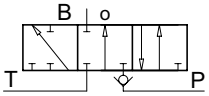
W005

3 positions
single-acting on A



W006

3 positions
single-acting on B



The control characteristic depends on the spool and on the section type (see product catalogue for more information). Depending on the pump flow, there are following available spools:

A : flow Q = above 30 l/min
B : flow Q = from 15 to 30 l/min
C : flow Q = up to 15 l/min

Features

HC-NVD2 is available for fixed pump system (standard) and for variable pump (on request).
The inlet section has an integrated precharge valve to allow correct operations of the electrohydraulic control.
Manual and electrohydraulic proportional and ON-OFF controls are available.
Proportional electrovalves need PWM current control.
It is possible to limit maximum flow on every port by changing maximum current value to the proportional electrovalves. Working sections have ports auxiliary valves.
On the outlet section it is possible to have an electric operated dump valve for security functions

Flow sharing pre/post compensated valves

HC-EX34

Flow Sharing valve for 130 l/min inlet flow rate: suitable for mini-excavators up to 5 t, truck-mounted cranes up to 10 tm, small and medium-sized agricoltural (harvesting) machinery and work elevator lifting platforms.

HC-EX38

Flow Sharing valve for 150 l/min inlet flow rate: suitable for applications including truck-mounted cranes up to 25 tm, forestry cranes, tractors and mini-excavators up to 6 t.

HC-EX46

Flow Sharing valve for 220 l/min inlet flow rate. Common applications for this control valve are telehandlers, midi-excavators, medium and large sized backhoe loaders, forestry cranes and crane trucks.

HC-EX54

Flow Sharing valve for 300 l/min inlet flow rate. Common applications for this control valve are excavators, wheeled loaders, rough terrain cranes, drilling machines, mobile cranes, mining and off-shore equipments.

HC-EX72

Flow Sharing valve for 450 l/min inlet flow rate. Suitable applications include drilling machines, wheeled loaders, telescoping cranes, marine cranes, mining and off-shore equipments.

Functional advantages offered by the EX Family

PATENTED SYSTEM

All the control valves belonging to the EX family work according to a principle designed by Hydrocontrol's R&D department and covered by patents **EP1860327 (A1) EP1860327 (B1) US2008282691 (A1) and US7581487 (B2)**.
The valve LS signal is managed according to innovative procedures which are an absolute first in the flow sharing world, ensuring:

• elimination of any LS signal bleed off, which can be observed in most systems currently available commercially, and is often the cause of poor compensation accuracy, slow response and excessive sensitivity to operating conditions.

• LS signal picking downstream from the local compensator: this will make signal detection "neater" improving control efficiency and accuracy.

This Hydrocontrol patent has been widely tested on a variety of applications, with excellent results.

RESPONSE RATE

The EX control valve's strength resides in their quick, prompt response, achieved thanks to the functional advantages built into our patented system. Even the most critical applications such as excavator bucket shacking and the swift dynamics of forestry machinery, usually hard to achieve on flow sharing systems, can be successfully implemented by using EX family products.

ACCURACY ANDSTABILITY

The unique technical characteristics of the Hydrocontrol patent allow for outstanding flow control and compensation precision, not likely to be affected even by the most diverse operating conditions. Simultaneous functions are never mutually influenced, not even in the presence of the same load factors (an aspect best highlighted in crawler machinery travelling). System stability itself is greatly benefited by the EX design; the system, also in combination with traditional overcenter valves, appears well balanced and able to effectively reduce oscillation and dynamic instability.

EFFICIENCY

In addition to the well known advantages typically offered by flow sharing systems which, associated with a variable pump, will dramatically reduce the machine operating consumption, the EX family introduces a number of interesting options, including pressure relief on the LS signal to further increase energy saving and guarantee top efficiency levels.

FLEXIBILITY

The EX family control valves can be easily adjusted to a variety of application fields, thanks to the wide range of available options and different types of available control systems.

COMPACT DIMENSIONS

The carefully designed features and integrated electrohydraulic control ensure a highly compact, optimised layout. Integrated end plates are available in the final working section, adding to the system's dimensional and functional efficiency.

PRIORITY

The EX family allow to install side by side pre-compensated sections with post-compensated section. This feauture allow to establish a priority in the way the oil is directed and increse the number of application where the EX family can be applied solving technical difficulties that before required external components. Both Inlets and Outlets remain common for the pre and post compensated sections making the assembling of the valve particularly convenient.

Standard working conditions

Operating temperature range	-20°C / +80°C
Kinematic viscosity range	10 ÷ 300 cSt
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration level	β10 > 75 (ISO 16889:2008)

All information and diagram refer to a mineral base oil VG46 at 50°C temperature (32 cSt Kinematic viscosity).

Fluid options

Types of fluid (according to IS0 6743/4) Oil and Solutions	Temperature (°C)		Compatible gasket
	min	max	
Mineral Oil HL, HM (or HLP acc. to DIN 51524)	-25	+80	NBR
Oil in water emulsions HFA	+5	+55	NBR
Water in oil emulsions HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

For special applications and different fluids, please call our Technical Department.

General specifications

TYPE	EX34	EX38	EX46	EX54	EX72
Working section number	1 - 10	1 - 10	1 - 10	1 - 10	1 - 8
CIRCUIT					
Spool stroke (mm)	7	7	8	9	11
Spool pitch (mm)	34	38	46	54	72
RATED FLOW					
Pump flow rate (l/min)	130	150	220	300	450
A/B port flow rate (l/min) **(*)**	80	100	180	250	350
RATED PRESSURE					
working pressure inlet port P (bar)	350	350	350	350	350
BACK PRESSURE MAX					
Max pressure outlet port T (bar)	10	10	10	10	10

(*) = Compensator with 14 bar Δp

Options chart

TYPE	EX34	EX38	EX46	EX54	EX72
LS Signal pressure relief valve	●	●	●	●	●
Pump pressure relief valve	●	●	●	●	●
LS Signal dump valve (electric 12/24 Vdc)	●	●	●	●	●
Pump dump valve (electric 12/24 Vdc)	●	●	●	●	●
SPOOLS TYPE					
Single acting	●	●	●	●	●
Double acting	●	●	●	●	●
Float spool	●	●	●	●	●
SPOOL ACTUATION					
Hydraulic actuation	●	●	●	●	●
Lever actuation	●	●	●	●	
Without lever	●	●	●	●	●
Cloche control		●	●		
Prop. electrohydraulic actuation 12-24 Vdc **(*)**	●	●	●	●	●
ON/OFF electrohydraulic actuation 12-24 Vdc **(*)**	●	●	●	●	●
CAN BUS interface actuation				on development	●
SPOOL RETURN ACTION					
Return spring	●	●	●	●	●
Mechanical detent kit	●	●	●	(●)	(●)
Hydraulic load limit	(●)	(●)	(●)		
Pneumatic control	(●)	(●)	(●)		
Spools displacement sensor (HLPS)	●	●	●	●	●
PORT RELIEF VALVE					
Antishock valve				●	●
Anticavitation valve	●	●	●	●	●
Antishock and anticavitation valve	●	●	●	●	●
Plug	●	●	●	●	●

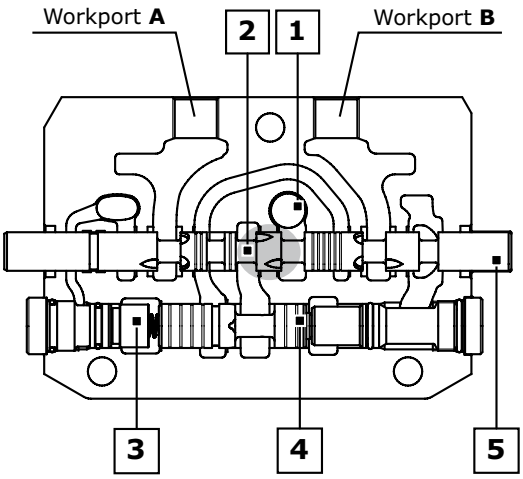
● = available

(●) = special arrangement available on request

(*) = we recommend to keep the T line for the electrohydraulic cartridges separate from the T line of the valve.

Operating principle

The flow sharing technology applied to the standard load sensing system characterizes the new control valves HC-EX. The valve, completely pressure compensated, guarantees great controllability to all actuations, making workport flow dependent only on metering area (spool position). When flow saturation occurs the system reacts by implementing an equal reduction of pressure margin across all spools, generating a proportional reduction of workport flow.



LEGEND:

1. Inlet line (High pressure)
2. Metering notches
3. Load sensing line
4. Local compensator
5. Metering spool

Single section

Referring to picture it's possible to remark some aspects of system functionality. Coming from the common inlet line the main flow, passing across the metering area, reaches local compensator. Metering area, according to the pressure margin, controls the total amount of flow to the workport selected by the main spool. The load sensing signal, picked up downstream the local compensator, feeds the common load-sensing line. When a single section is actuated, the local compensator fully opens to the left side, reaching its complete balanced position. The control of the LS system is made by the inlet compensator for fixed displacement pump or pump compensator for variable displacement pump.

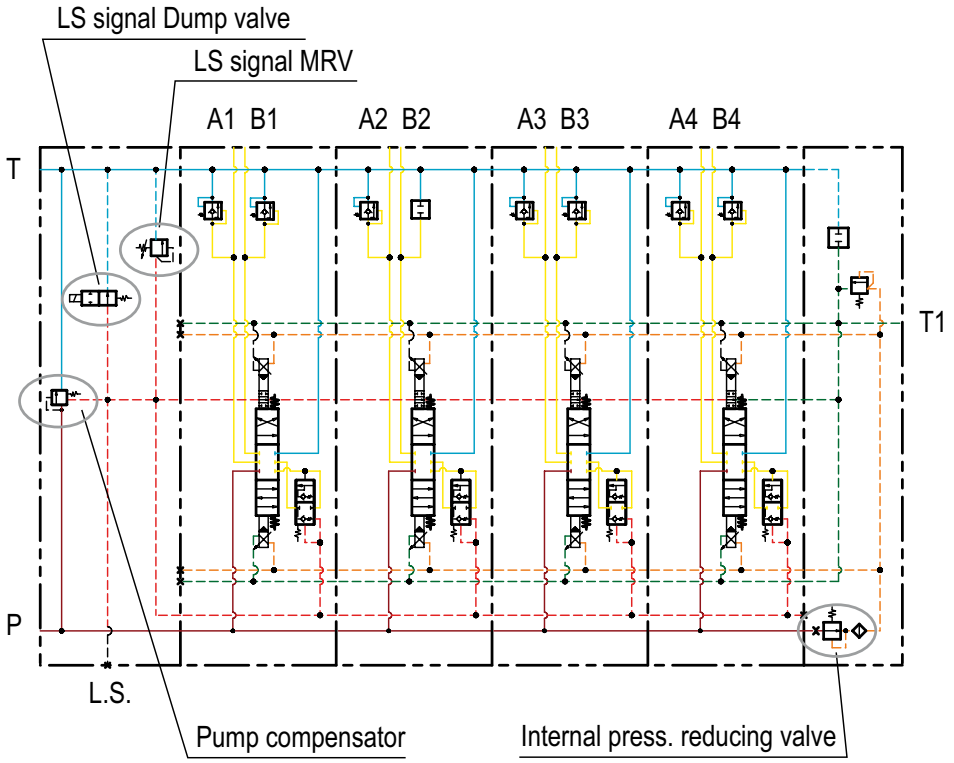
Multi-section

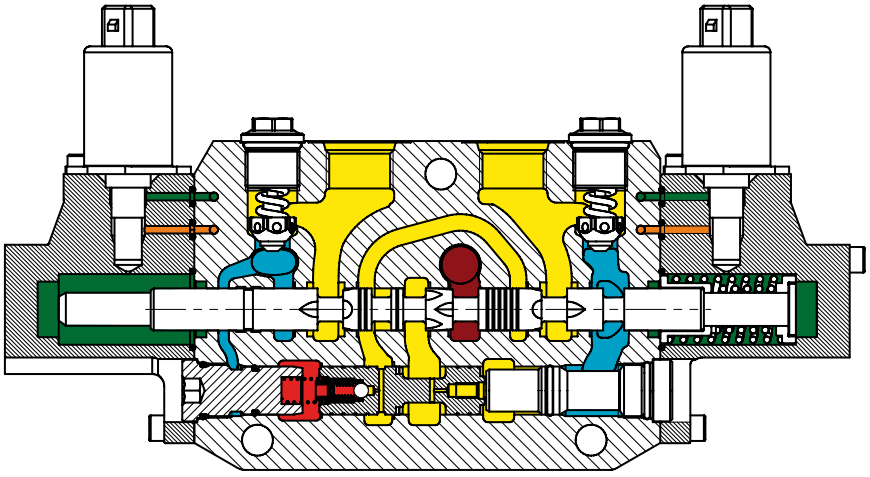
When two or more sections are actuated only one, characterized by the highest pressure (dominant), is involved in the LS signal transmission, working as briefly described in the previous paragraph. The other functions (slaves) become directly dependent on it. The common LS line transfers the information coming from the dominant local compensator to all dependent compensators. Driven by the LS signal, the unbalanced slave compensators activate the pressure compensation creating an artificial pressure drop able to keep pressure margin nominally the same on all the spools. Workport flow becomes only a function of metering area making the system totally load independent.

Flow Sharing function

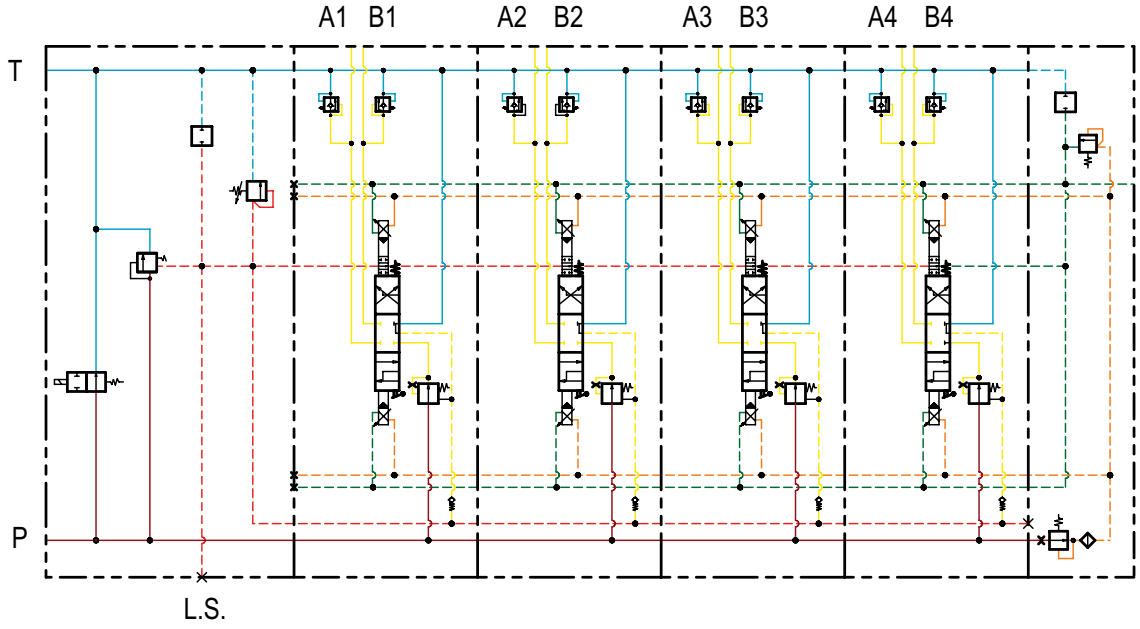
When saturation occurs the total amount of flow required by actuations is higher than the maximum pump flow rate. The system is able to keep the nominal pressure margin no more. The actual pressure margin reduces according to real flow demand. Since all the local compensators feel the same LS signal and the same pressure drop is applied to different metering areas, then workport flows are reduced proportionally in order to keep all actuations completely under control.

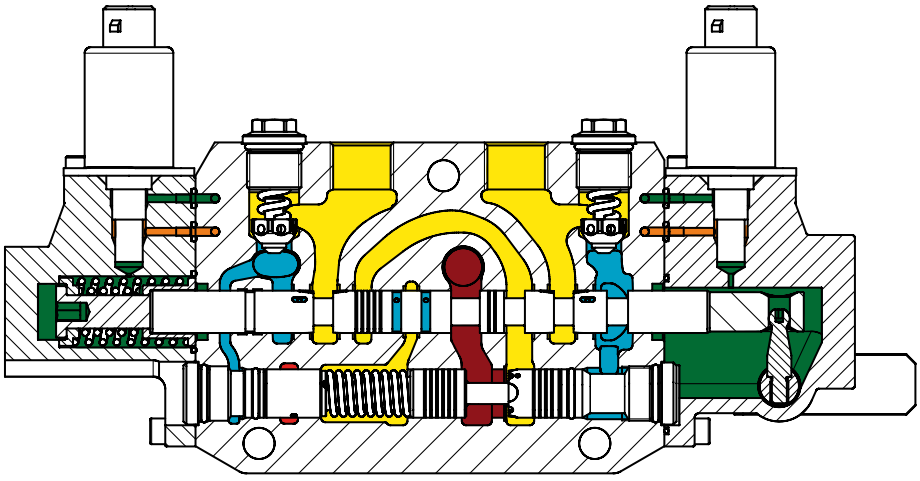
Post-compensated system



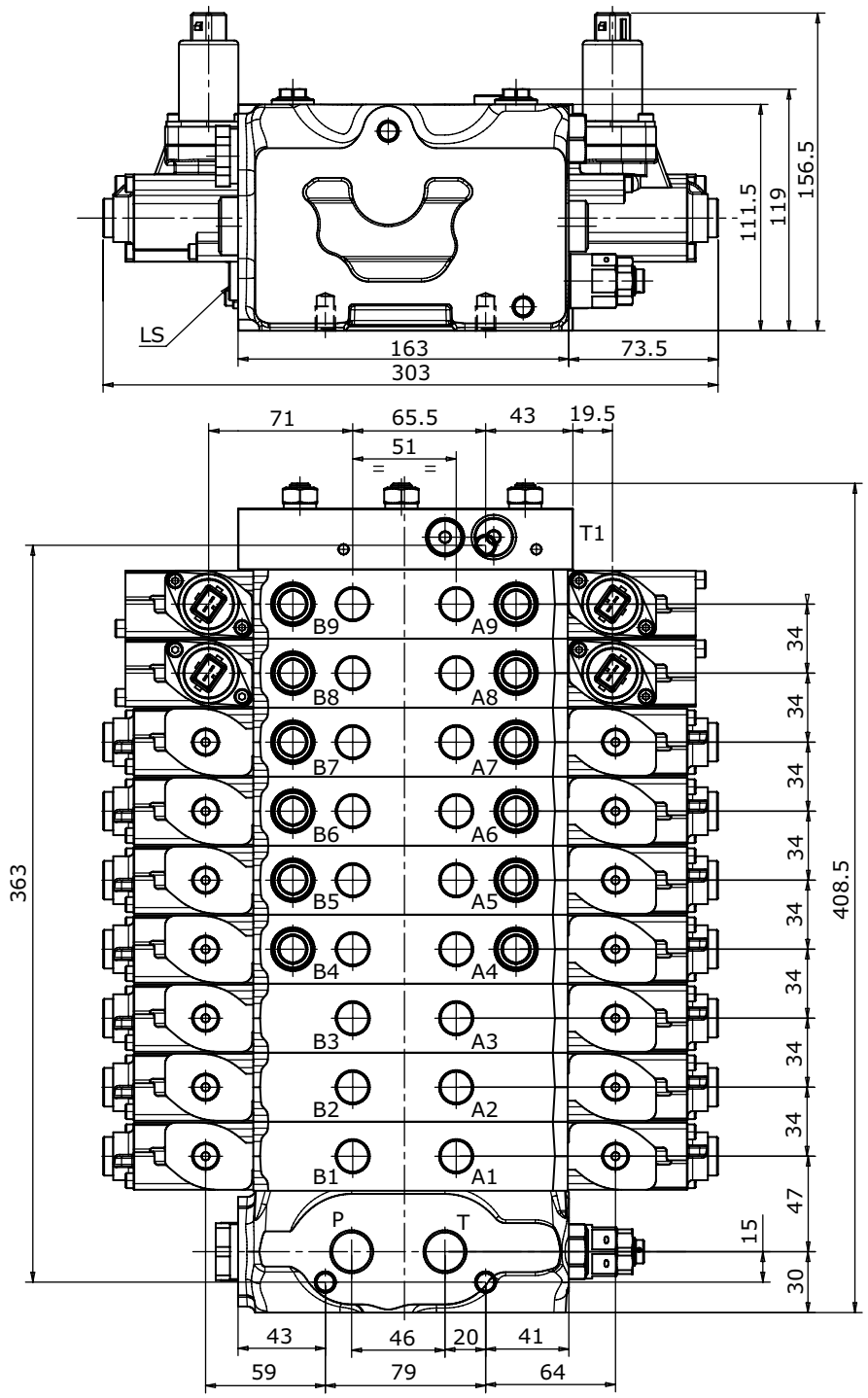


Pre-compensated system





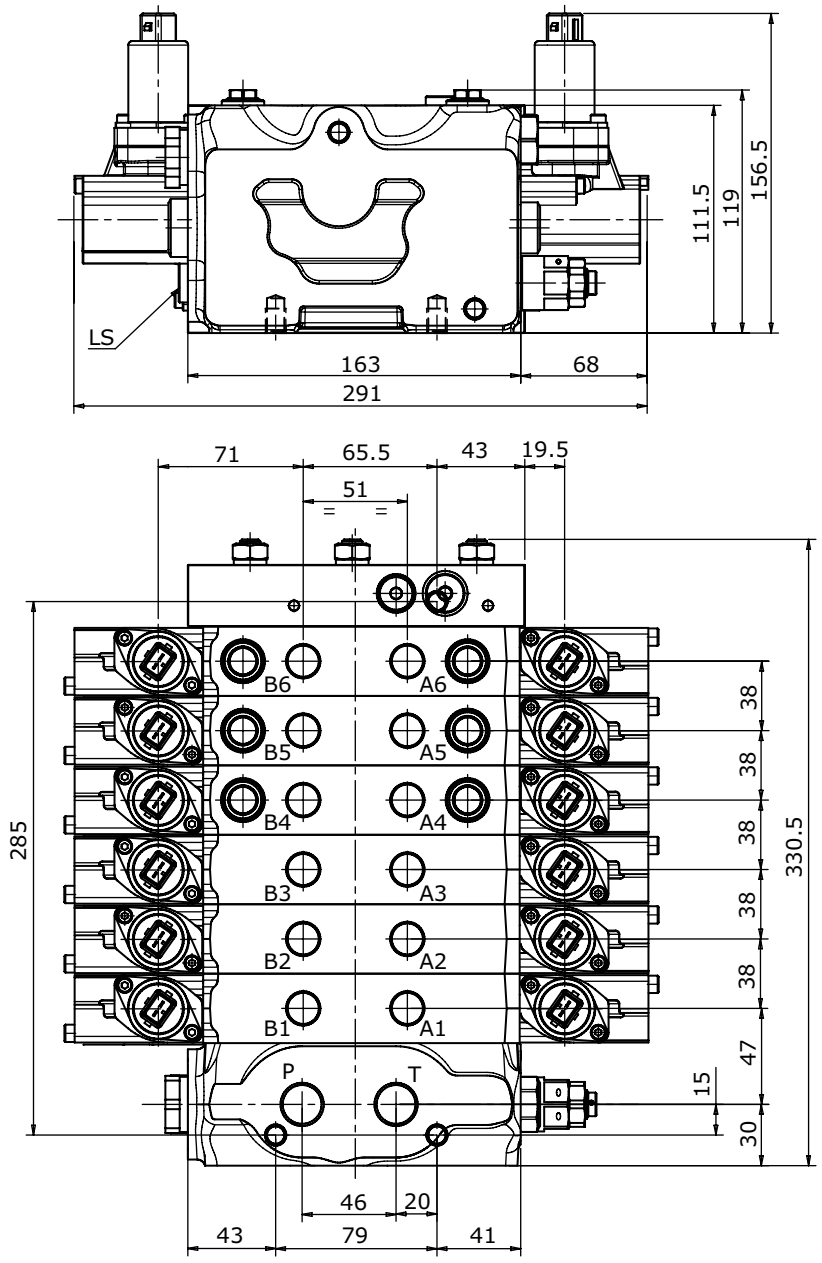
Dimensional drawing EX34



Standard threads EX34

TYPE / PORTS		BSP (ISO 228-1) (ISO 1179-1)	UN-UNF (ISO-725) (ISO 11926-1)
HC-EX34	Ports (P - T)	G 1/2	7/8"-14 UNF SAE 10
	Ports (A - B)	G 3/8	3/4"-16 UNF SAE 8

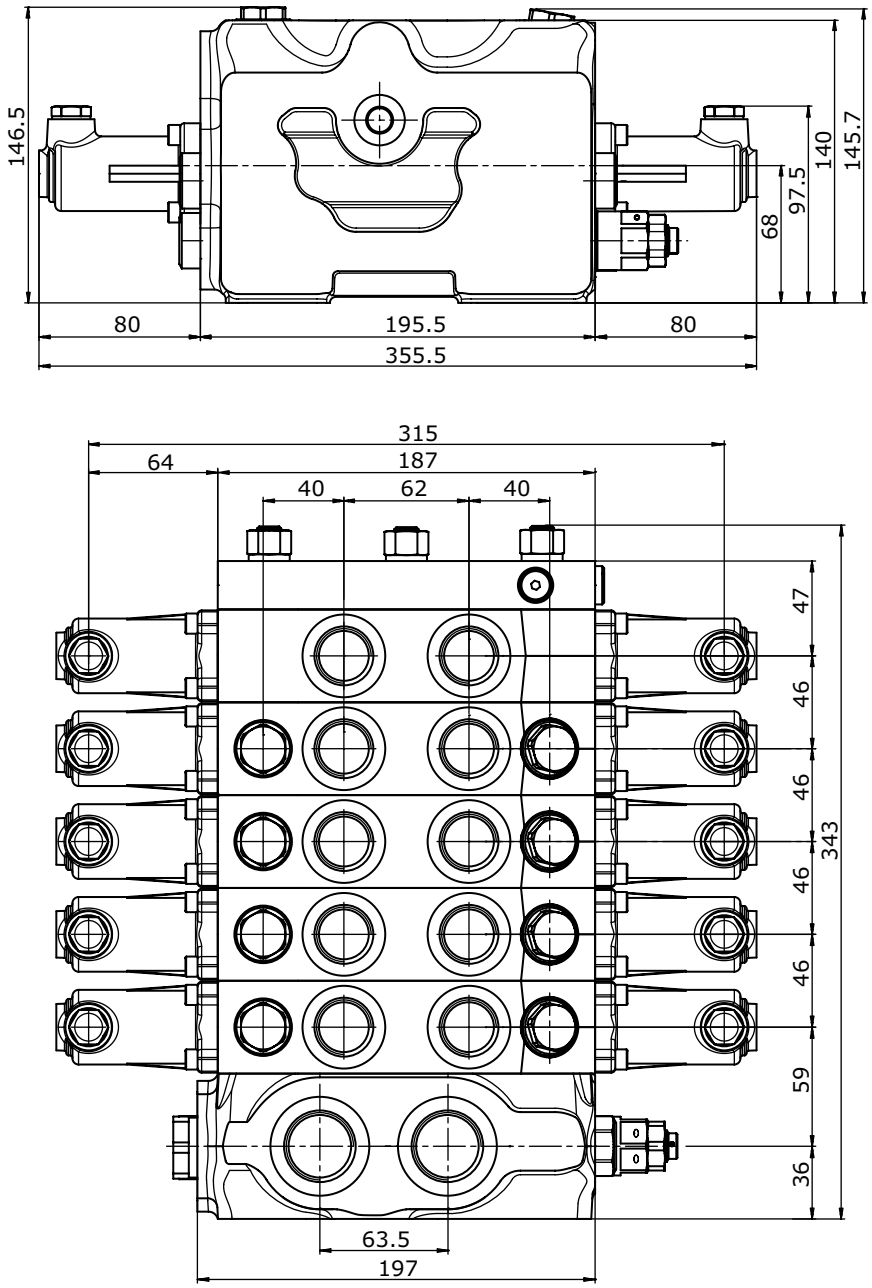
Dimensional drawing EX38



Standard threads EX38

TYPE / PORTS		BSP (ISO 228-1) (ISO 1179-1)	UN-UNF (ISO-725) (ISO 11926-1)
HC-EX38	Ports (P - T)	G 3/4	1”1/16-12 UNF SAE 12
	Ports (A - B)	G 1/2	7/8”-14 UNF SAE 10

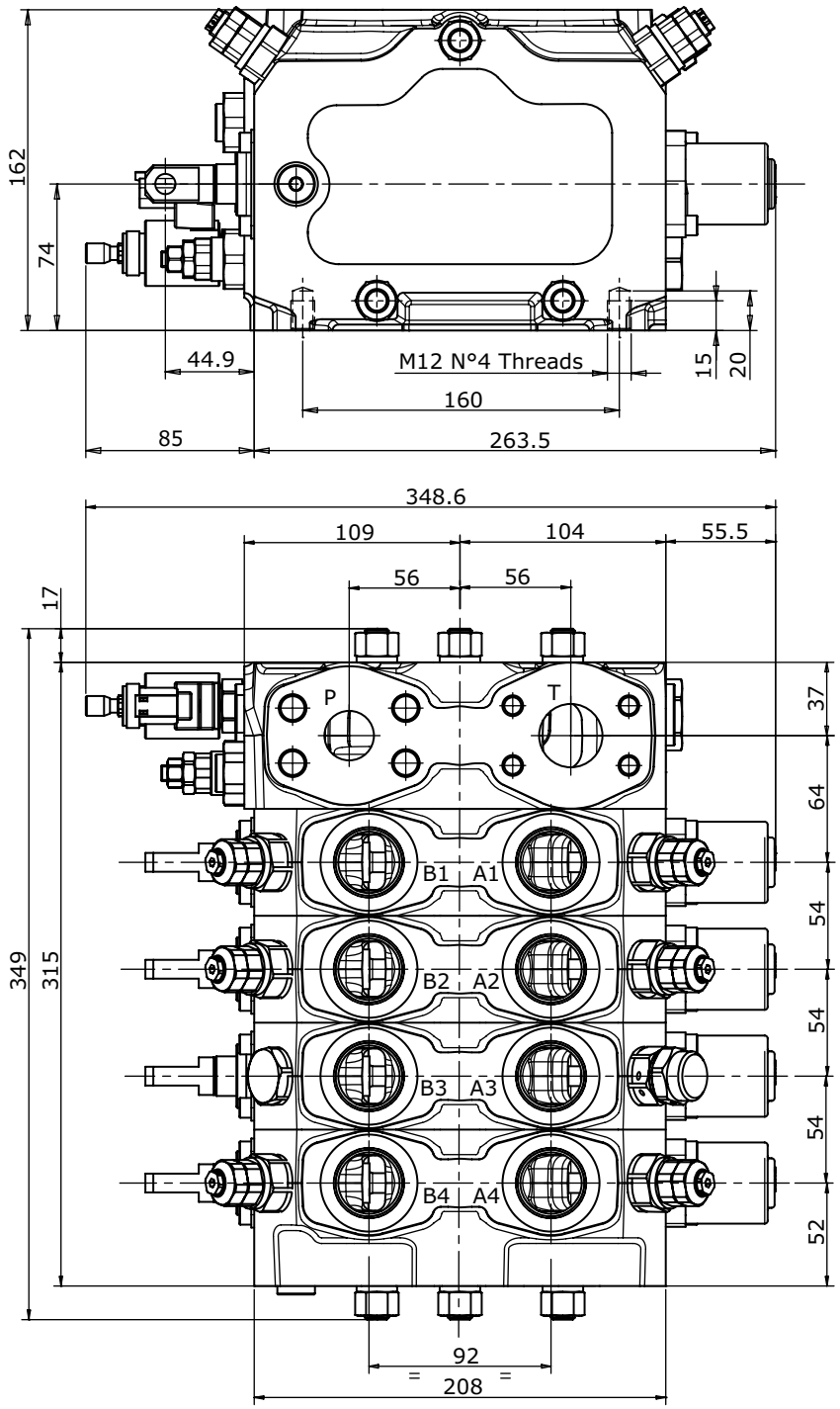
Dimensional drawing EX46



Standard threads EX46

TYPE / PORTS		BSP (ISO 228-1) (ISO 1179-1)	UN-UNF (ISO-725) (ISO 11926-1)
HC-EX46	Ports (P - T)	G 1	1"5/16-12 UNF SAE 12
	Ports (A - B)	G 3/4	1"1/16-12 UNF SAE 10

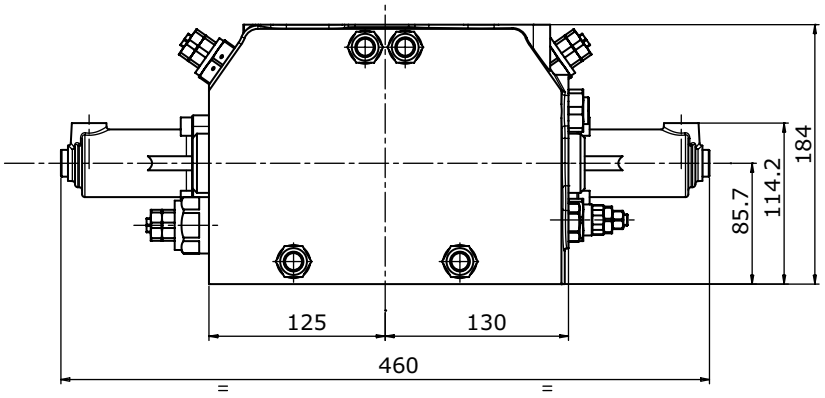
Dimensional drawing EX54

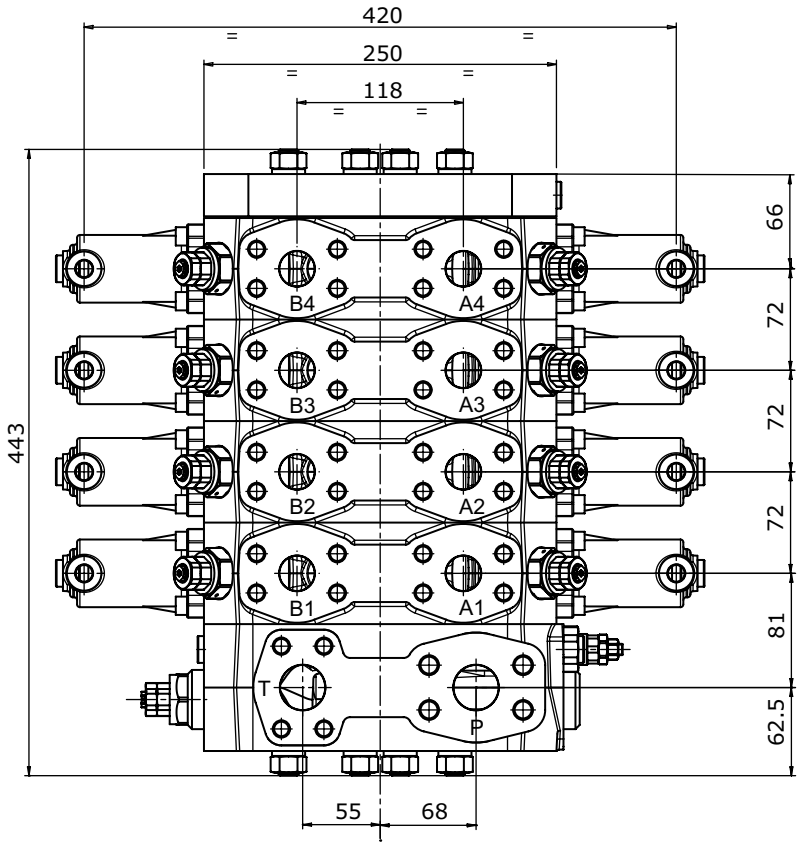


Standard threads EX54

TYPE / PORTS		BSP (ISO 228-1) (ISO 1179-1)	UN-UNF (ISO-725) (ISO 11926-1)	SAE 6000 (ISO 6162-2)	SAE 3000 (ISO 6162-1)
HC-EX54	Ports (P)	G 1"1/4	1"5/8 12 UNF SAE 20	1" MA - 1" UNC	
	Ports (T)	G 1"1/4	1"5/8 12 UNF SAE 20		1"1/4 MA-1"1/4 UNC
	Ports (A - B)	G 1"	1"5/16 12 UNF SAE 16		3/4" MA - 3/4" UNC

Dimensional drawing EX72





Standard threads EX72

TYPE / PORTS		SAE 6000 (ISO 6162-2)	SAE 3000 (ISO 6162-1)
HC-EX72	Ports (P)	1”1/4 MA - 1”1/4 UNC	
	Ports (T)		1”1/4 MA - 1”1/4 UNC
	Ports (A - B)	1” MA - 1” UNC	

Order example - Flow sharing pre\post compensated valves

HC-EX38/1: MR 701 200 KV G05 - W001C 4025 H404 RC1 G04 03 PA 100 03 PB 150 - KZ10

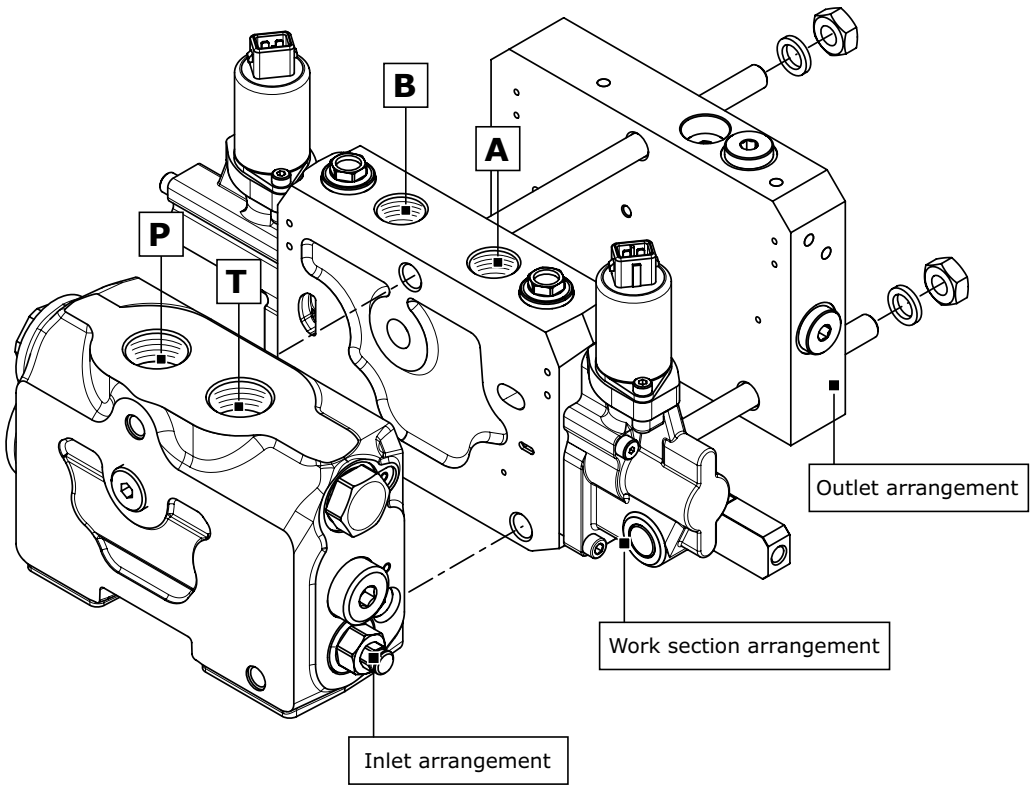
TYPE:
EX38 product type
/1 working section number

1) INLET ARRANGEMENT:
1.1 **MR 701** inlet side and valve type
200 setting (bar)
KV G05 inlet position and available thread type

2) WORK SECTION ARRANGEMENT:
2.1 **W001C 4025** type and spool delivery
2.2 **H404** spool actuation type
2.3 **RC1 G04** section type and port threads
2.4 **03 PA 100** auxiliary valve (port A)
2.5 **03 PB 150** auxiliary valve (port B)

3) OUTLET ARRANGEMENT (END PLATE):
3.1 **KZ10** plate type

Ordering row 2 must be repeated for every work section



Features

Flow sharing valves are assembled through tie rod kits; tie rod length changes according to the valve family and to the number of sections.
Every valve includes 3 or 4 tie rod kits; every kit includes bolts and washers.
Lever kits are not included in the valve controls: they must be ordered separately.
On request, all Hydrocontrol valves can be delivered painted (RAL 9005 black primer).

INLET ARRANGEMENT

INLET SIDE:

MR	Flow sharing valve with right inlet section
ML	Flow sharing valve with left inlet section

VALVE ARRANGEMENT: (standard combinations)

700	Inlet section with LS Direct acting and full flow pressure relief valves
701	Inlet section with LS Direct acting pressure relief valve
704	Inlet section with LS Direct acting pressure relief valve and Solenoid dump valve 12 Vdc
705	Inlet section with LS Direct acting pressure relief valve and Solenoid dump valve 24 Vdc
706	Inlet section without valves

INLET CLASSIFICATION:

KV G05	Open centre inlet section for fixed displacement pumps (G 3/4)
JV G05	Closed centre inlet section for variable displacement pumps (G 3/4)
KV U05	Open centre inlet section for fixed displacement pumps (1”1/16 - 12 UN)
JV U05	Closed centre inlet section for variable displacement pumps (1”1/16 - 12 UN)

NOTE: when ordering a relief valve it is necessary to specify setting (example 150 bar).

WORKING SECTION

SPOOL TYPE:

W001C	3 positions double-acting
W002C	3 positions double-acting A and B to tank
W005C	3 positions single-acting on A
W006C	3 positions single-acting on B
W012C	4 positions double-acting (float in the 4th pos.)

A 4 letter code identify the flow required on port A/B.
These flows are available: 10 - 25 - 40 - 65 - 80 l/min
Example : W001C - 4025

SPOOL ACTUATION TYPE:

H001	lever actuation
H005	hydraulic actuation
H403	lever + hydraulic actuation
H404	lever + electrohydraulic actuation 12 vdc
H405	lever + electrohydraulic actuation 24 vdc

SPOOL RETURN ACTION TYPE:

F001	3 positions spring-centred spool
F002	Detent in A and B
F0470	Spool position indicator

SECTION TYPE

RL1 G04	Pre-Compensated section arranged for auxiliary valves (G 1/2)
RL2 G04	Pre-Compensated section without auxiliary valve (G 1/2)
RC1 G04	Post-Compensated section arranged for auxiliary valve (G 1/2)
RC2 G04	Post-Compensated section without auxiliary valve (G 1/2)
RL1 U04	Pre-Compensated section arranged for auxiliary valve (7/8” - 14 UN)
RL2 U04	Pre-Compensated section without auxiliary valve (7/8” - 14 UN)
RC1 U04	Post-Compensated section arranged for auxiliary valve (7/8” - 14 UN)
RC2 U04	Post-Compensated section without auxiliary valve (7/8” - 14 UN)

AUXILIARY VALVE TYPE (PORT A)

02 PA	Anticavitation valve on port A
03 PA	Antishock and Anticavitation valve on port A
05 PA	Plug on port A

AUXILIARY VALVE TYPE (PORT B)

02 PB	Anticavitation valve on port B
03 PB	Antishock and Anticavitation valve on port B
05 PB	Plug on port B

NOTE: Leave out the spool return action code when choosing H403 - H404 - H405

NOTE: sections designed to house auxiliary valve option require double choice on work ports A and B.
Always indicate setting value when using Antishock and Anticavitation valve: **03 PA (120) - 03 PB (120)**

OUTLET ARRANGEMENT (END PLATE)

The end plate provides the drainage for LS signal. If proportional electrovalves are used (H404 - H405), external drainage from port T1 is suggested.

OUTLET SIDE:

KZ10	Standard End plate
KZ20	End plate with pressure reducing valve for H404 - H405

Monoblock valves

HC-M45

Simple and affordable product with a big variety of integrated functions and possible configurations. The HC-M45 valve is highly flexible and can easily adapted to different applications.

pg. 90

HC-D10

Large range of options and possible configurations. HC-D10 easily fits the needs of a big number of different applications.

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HC-M50

HC-M50 family has two different designs: low body, simple and light weight and high body to allow the housing of ports auxiliary valves. Thanks to the symmetric body it is possible to assemble controls on both sides. Parallel and tandem circuits are available. HC-M50 is especially suitable for truck mounted cranes.

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HC-TR55

HC-TR55, the most advanced monoblock family has a symmetric body, auxiliary valves, and load holding valves on every working section to allow perfect control even in case of simultaneous movements. Especially suitable for small Wheel loaders, forestal cranes, backhoes.

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General specifications

TYPE	M45	D10	M50	TR55
Working section number	1 - 6	1 - 6	1 - 7	1 - 7
CIRCUIT				
Parallel	•	•	•	•
Tandem			•	
Parallel circuit stroke (mm)	5+5	5+5	5,5+5,5	5+5
Float spool extra stroke (mm)	4	5	4,5	4,5
Spool pitch	35	35	35	36
RATED FLOW				
Flow rate (l/min)	45	55	50	50
Flow rate (GPM)	12	15	15	15
RATED PRESSURE				
Max working pressure (bar)	350	350	350	350
Max working pressure (PSI)	5000	5000	5000	5000

Options chart

TYPE	M45	D10	M50	TR55
Direct acting pressure relief valve	•	•	•	•
Clamping valve				(•)
Externally piloted valve	(•)	(•)	(•)	
Solenoid dump valve (12 Vdc)	(•)	(•)	(•)	
Solenoid dump valve (24 Vdc)	(•)	(•)	(•)	
SPOOL ACTUATION				
Manual control	•	•	•	•
Without lever	•	•	•	•
90° joystick control lever	•	•	•	•
Hydraulic control			•	•
Direct solenoid (12 - 24 Vdc)	•			
SPOOL RETURN ACTION				
Return spring	•	•	•	•
Detent in A - in B - in A/B	•	•	•	•
Detent in 4th position	•	•	•	•
Arrangement for dual control	•	•	•	•
Hydraulic load limit	•	•	•	•
Electrical load limit	•	•	•	•
Electrohydraulic control ON-OFF (12 - 24 Vdc)	•	•	•	•
Electrohydraulic control PROP. (12 - 24 Vdc)	•	•	•	•
Pneumatic control ON-OFF	•	•	•	•
Proportional pneumatic control	•	•	•	•
Electropneumatic control (12 - 24 Vdc)	•	•	•	•
AUXILIARY VALVES				
Valves on ports			•	•

(•) = the application requires special machining in the body

Standard working conditions - Monoblock valve

Operating temperature range	-20°C / +80°C
Kinematic viscosity range	10 ÷ 300 cSt
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration level	β10 > 75 (ISO 16889:2008)

All information and diagrams in this catalogue refer to a mineral base oil VG46 at 50°C temperature (32 cSt kinematic viscosity)

Fluid options

Types of fluid (according to IS0 6743/4) Oil and Solutions	Temperature (°C)		Compatible gasket
	min	max	
Mineral Oil HL, HM (or HLP acc. to DIN 51524)	-25	+80	NBR
Oil in water emulsions HFA	+5	+55	NBR
Water in oil emulsions HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

For special applications and different fluids, please call our Technical Department.

General classification

HC-M50 and HC-TR55 valves have symmetric bodies: thanks to this design it is possible to change the control side in every moment, reversing the spool 180°.
These monoblock valves can be easily transformed from right inlet (R) to left inlet (L) and vice versa.

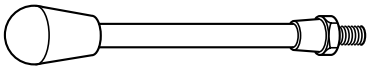
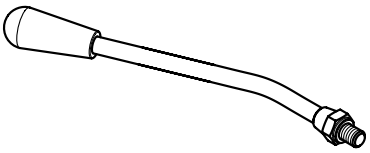
Special body classification - Monoblock valve

The following spools may require bodies with special machining (SPC): bodies with special machinings are not symmetrical and it is not possible to reverse spools.

TYPE / SPOOL	D10	M45	M50	TR55
W012 (4 positions double-acting with float in 4th position)	SPC		SPC	SPC
W013 (3 positions double-acting regenerative)	SPC	SPC		
W014 (4 positions double-acting regenerative in 4th position)	SPC	SPC		
W019 (3 positions double-acting regenerative A-B to tank)	SPC			

Kit lever identification (appendix "C")

Hydrocontrol can supply a lever kit to be assembled on valves manual controls; different lengths and threads are available. Lever kits must be ordered separately.

CLASSIFICATION LEVER			
ZA	Lever with knob	**ZC**	Lever with knob for joystick control
			

Order example

ZA - M8 - 210

- Lever lenght (mm)
- Lever thread
- Lever type

Option chart - Monoblock valve

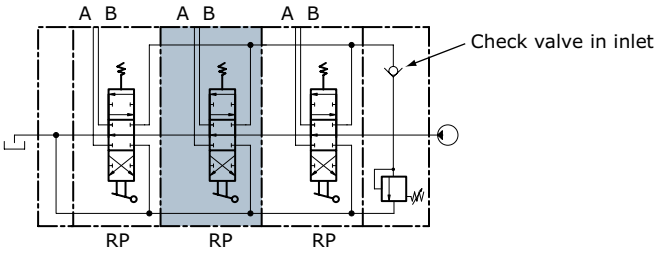
TYPE / CODE	D10	M45	M50	TR55
ZA - M8 - 135 (cod. 430503001)	•	•	•	•
ZA - M8 - 210 (cod. 430503002)	•	•	•	•
ZA - M8 - 295 (cod. 430503003)	•	•	•	•
ZC - M10 - 210 (cod. 430504019)	•	•	•	•
ZC - M10 - 250 (cod. 430504031)	•	•	•	•

Hydraulic schematic - Monoblock valve

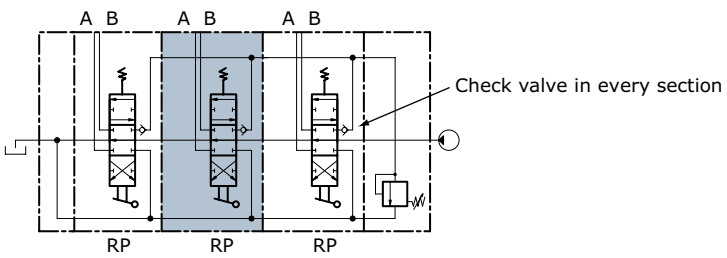
Parallel circuit

When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. If two or more spools are actuated at the same time, the oil will power the service port that has the lower load by selecting the path with the least resistance; by throtting the spools, the flow of oil can be divided between two or more service ports.

Hydraulic schematic for HC-D10, HC-M45, HC-M50



Hydraulic schematic for HC-TR55



Technical specifications

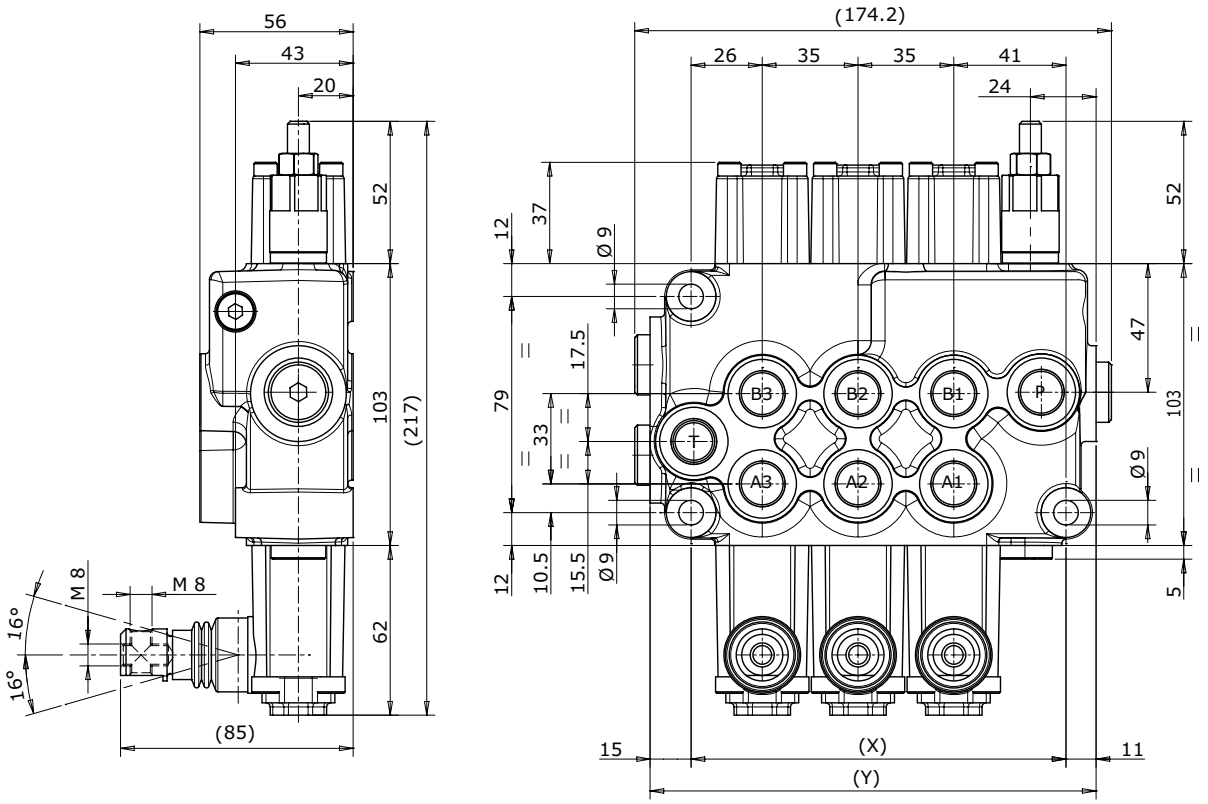
Working section number	1 - 6
Rated flow	45 l/min - 12 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	35 mm
Circuit type	Parallel

Applications

Cranes and Aerial platforms, Agricultural machines, Mini skid loaders, Mini dumpers, Forklifts

A big number of options and solutions make HC-M45 a very flexible product; it can be easily adapted to many different applications always fitting the specific needs (mobile cranes, agricoltural machines, mini skid loaders, mini dumpers, fork lift truck, etc...). The family has a big range of interchangeable spools.

Dimensions



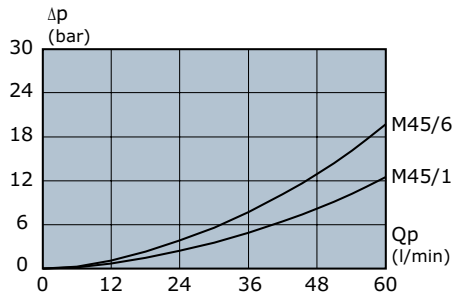
TYPE	M45/1	M45/2	M45/3	M45/4	M45/5	M45/6
X (mm)	67	102	137	172	207	242
Y (mm)	93	128	163	198	233	268
Weights (kg)	2,70	4,10	5,50	6,90	8,30	9,70

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8	G 3/8	G 3/8	G 3/8
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF

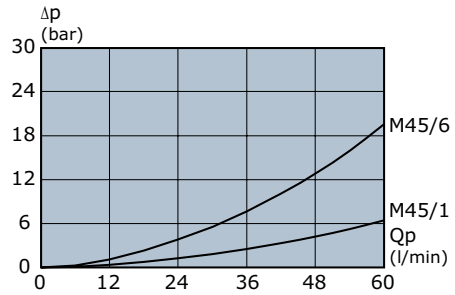
Typical curves

Indicated values have been tested with standard monoblock valve and W001A spools.

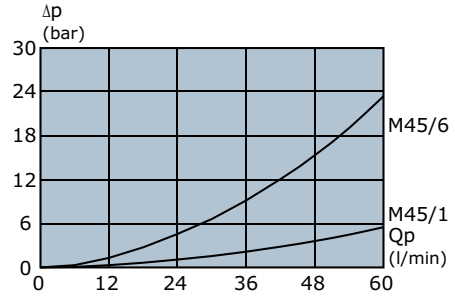
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, cable, direct electric, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Floating function is possible on standard body.
Regenerative functions are possible with dedicated spools and bodies.
Numerous configurations and solutions are possible.

Following options are available:
- special versions with left inlet
- direct electric control push-push type: see doc. DS002
- special circuits for stabilizers applications: see doc. I02027
- fork lift truck set up with potentiometer and microswitches: see doc. I01930

Technical specifications

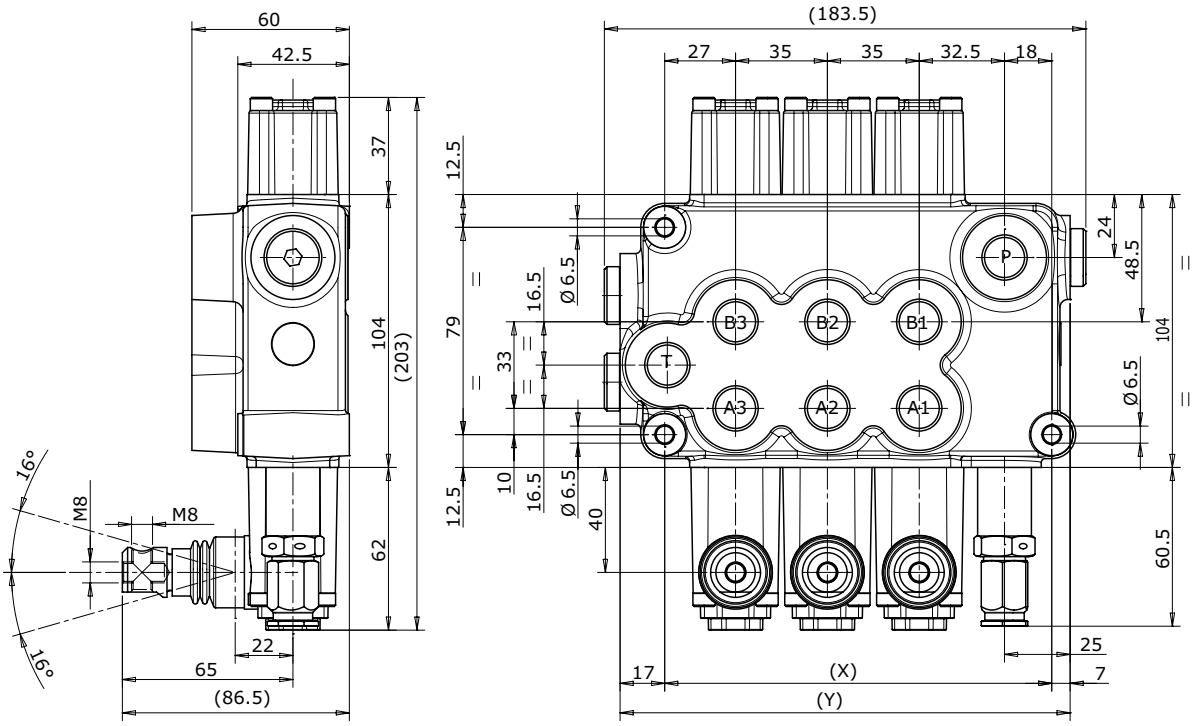
Working section number	1 - 6
Rated flow	55 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	35 mm
Circuit type	Parallel

Applications

Cranes and Aerial platforms, Agricultural machines

A big number of integrated functions and possible configurations make this monoblock very flexible for different applications.

Dimensions



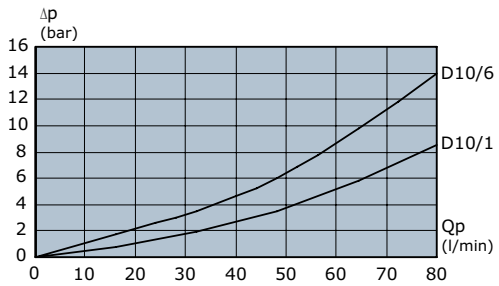
TYPE	D10/1	D10/2	D10/3	D10/4	D10/5	D10/6
X (mm)	77,5	112,5	147,5	182,5	217,5	252,5
Y (mm)	101,5	136,5	171,5	206,5	241,5	276,5
Weights (kg)	2,90	4,30	5,50	6,70	7,90	9,10

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF

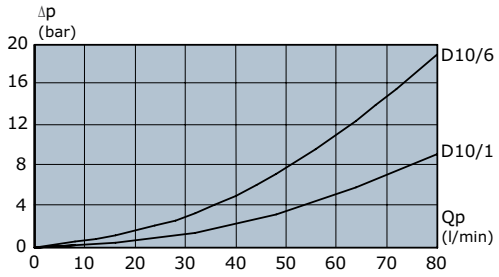
Typical curves

Indicated values have been tested with standard monoblock valve and W001A spools.

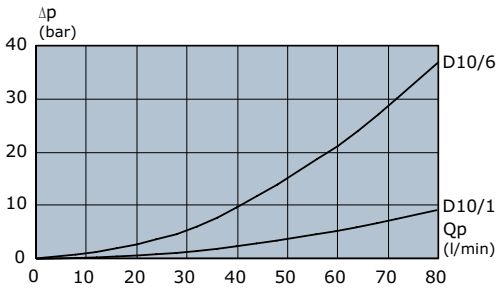
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, cable, pneumatic, electrohydraulic and electropneumatic controls.
Numerous configurations and solutions are possible.
Floating and regenerative functions are possible by means of special spools and dedicated bodies.

HC-M50 (STANDARD VERSION)

Technical specifications

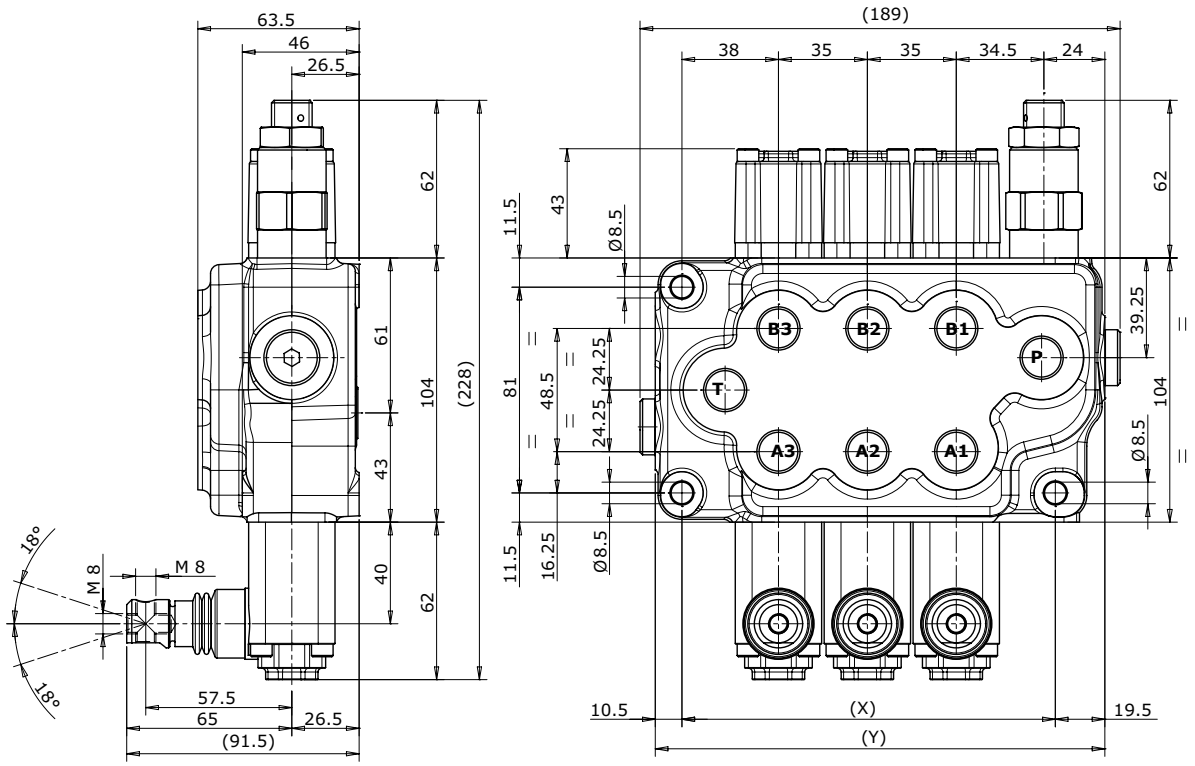
Working section number	1 - 7
Rated flow	50 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5,5 + 5,5 mm
Spool pitch	35 mm
Circuit type	Parallel, tandem

Applications

Cranes and aerial platforms, Compactor, Hook and Skip loaders, Minidumper

In addition to the high flexibility of other families HC-M50 monoblock valve allows the possibility to choose the control side, thanks to the symmetric body design.
In its basic design the valve have parallel circuits (HC-M50 PB) and tandem circuits (HC-M50 TB).

Dimensions M50 (PB-TB)



TYPE	M50/1	M50/2	M50/3	M50/4	M50/5	M50/6	M50/7
X (mm)	73	110	147	184	221	258	295
Y (mm)	107	142	177	212	252	292	327
Weights (kg)	3,8	5,5	7,3	9,0	10,8	12,6	14,3

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF

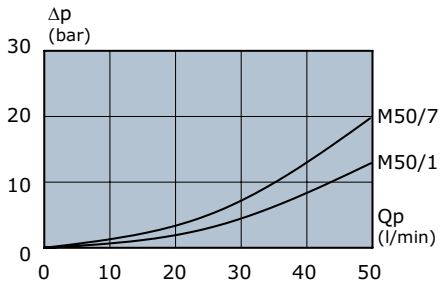
Fixing specifications:

HC-M50 PB / HC-M50 TB = N. 3 drills diameter 8,5 (length 46 mm)

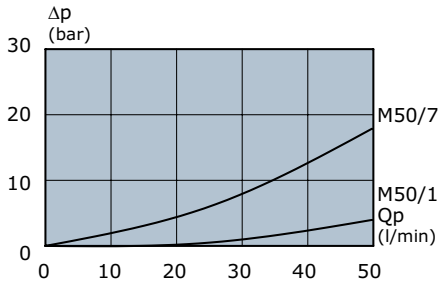
Typical curves

Indicated values have been tested with standard monoblock valve and W001A spools.

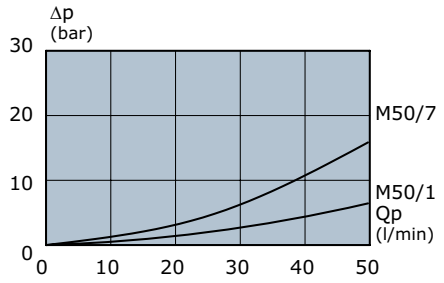
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, cable, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Dump valve versions are available on request (hydraulic or electric 12 Vdc and 24 Vdc operated).
Special circuits and solutions are available for stabilizers applications: see doc. I00591 and I01992.

HC-M50 (VITH AUXILIARY VALVE)

Technical specifications

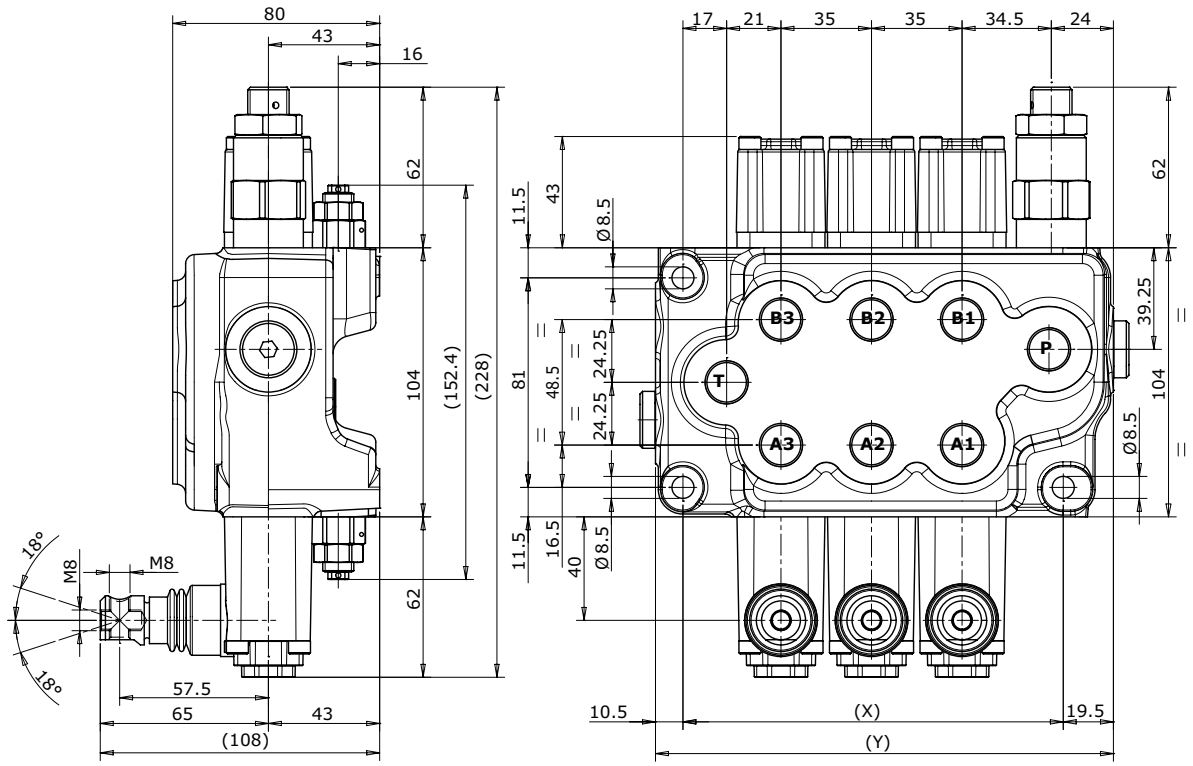
Working section number	1 - 7
Rated flow	50 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5,5 + 5,5 mm
Spool pitch	35 mm
Circuit type	Parallel, tandem

Applications

Cranes and aerial platforms, Compactor, Hook and Skip loaders, Minidumper

In addition to the high flexibility of other families the HC-M50 monoblock valve allows the possibility to choose the control side, thanks to the symmetric body design. In its higher design to house ports auxiliary vales the monoblock have parallel circuits (HC-M50 PV) and tandem circuits (HC-M50 TV).

Dimensions M50 (PV-TV)



TYPE	M50/1	M50/2	M50/3	M50/4	M50/5	M50/6	M50/7
X (mm)	73	110	147	184	221	258	295
Y (mm)	107	142	177	212	252	292	327
Weights (kg)	4,9	6,8	8,7	10,8	12,7	15,0	16,9

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2	G 3/8 - G 1/2
UN-UNF Thread (ISO 11926-1)	3/4” - 16 UNF	3/4” - 16 UNF	3/4” - 16 UNF	3/4” - 16 UNF

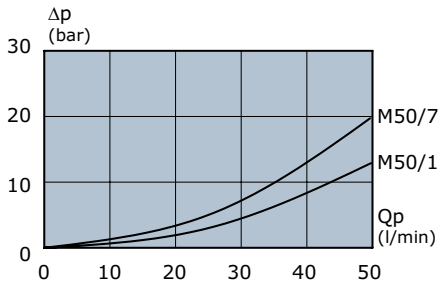
Fixing specifications:

HC- M50 PV / HC-M50 TV = N. 3 drills diameter 8,5 (length 63 mm)

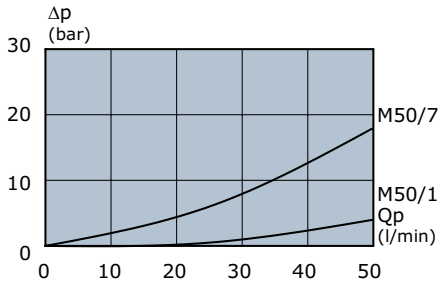
Typical curves

Indicated values have been tested with standard monoblock valve and W001A spools.

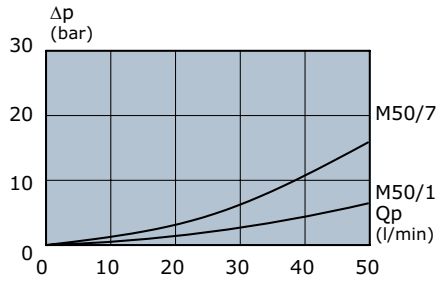
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, cable, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
Dump valve versions are available on request (hydraulic or electric 12 Vdc and 24 Vdc operated).
Special spools and options are availalble for truck mounted crane applications.

Technical specifications

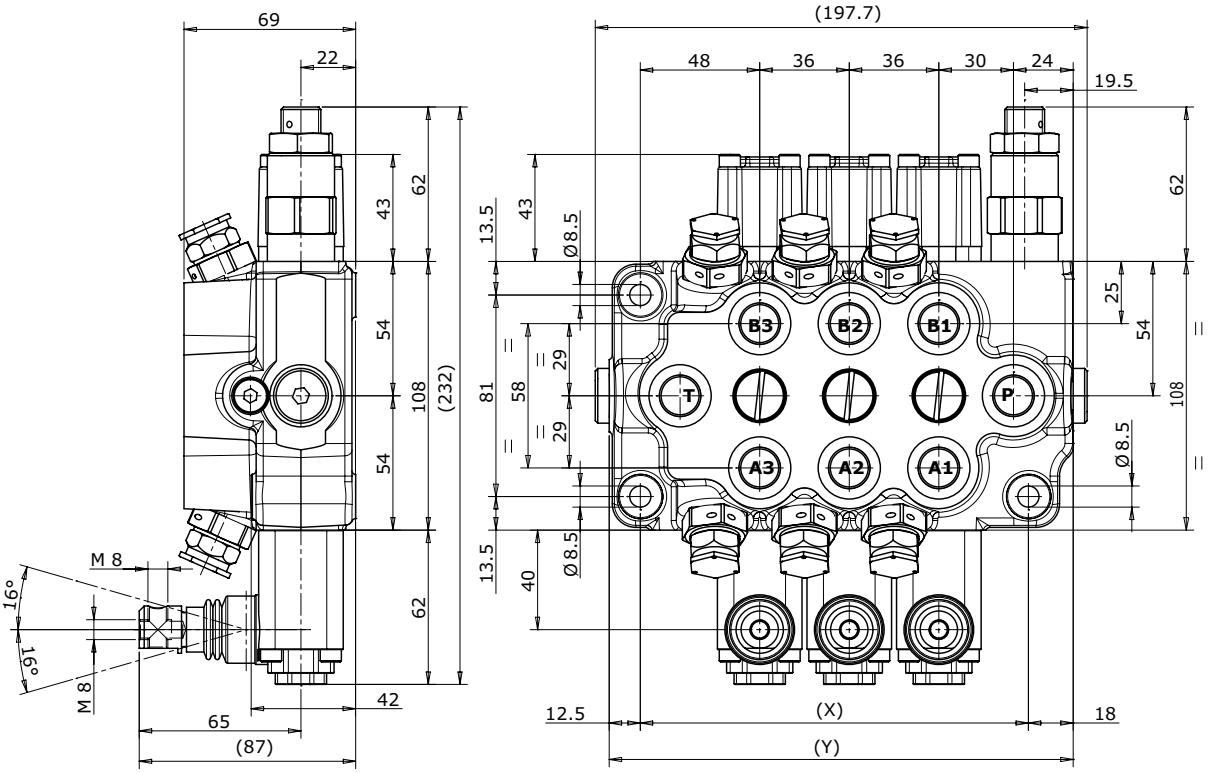
Working section number	1 - 7
Rated flow	50 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	36 mm
Circuit type	Parallel

Applications

Mini-Wheel loaders, Agricultural machines,
Mini-Backhoe loaders, Backhoes

HC-TR55 monoblock valve can house the following ports auxiliary valves:
Adjustable port relief valve, Anticavitation valve and Adjustable Antishock and anticavitation valve.
The check valve on every single section allows a perfect control even with simultaneous operations.

Dimensions



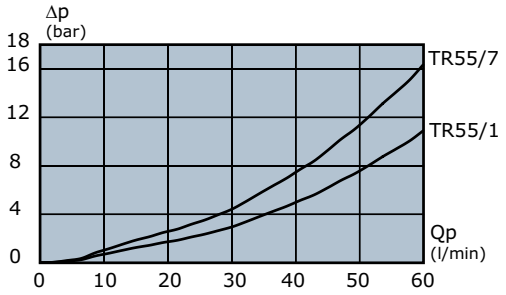
TYPE	TR55/1	TR55/2	TR55/3	TR55/4	TR55/5	TR55/6	TR55/7
X (mm)	84	120	156	192	228	264	300
Y (mm)	114,5	150,5	186,5	222,5	258,5	294,5	330,5
Weights (kg)	4	5,5	6,6	9,4	10,5	11,6	12,7

PORTS	Inlet (P)	Ports (A-B)	Outlet (T)	Outlet (HPCO)
BSP Thread (ISO 1179-1)	G 3/8	G 3/8	G 3/8	G 3/8
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF	3/4" - 16 UNF

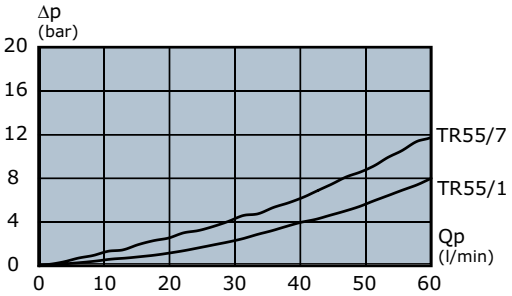
Typical curves

Indicated values have been tested with standard monoblock valve and W001A spools.

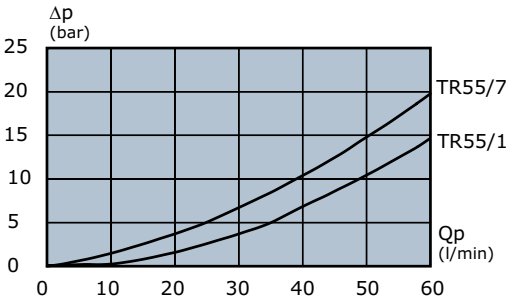
Pressure drop (P - A/B)



Pressure drop (A/B - T)



Pressure drop (P - T)



Features

The valve is available with manual, cable, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.
On HC-TR55/6 and /7 it is possible to house a clamping valve (backhoe application): this functions requires a special body execution: see doc. I02432
Floating function is possible by means of special spool and body.

Order example - Monoblock valve

HC-M45/1: IR 301 150 - W001A H001 F001A - MJ A G03

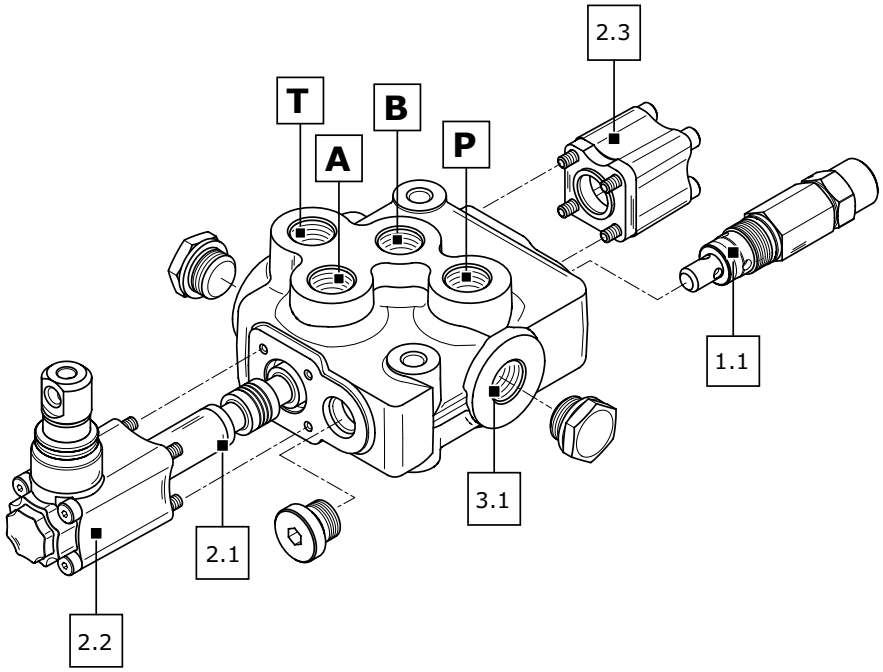
TYPE:
M45 product type
/1 working section number

1) INLET ARRANGEMENT:
1.1 IR 301 inlet side and valve type
(150) setting (bar)

2) WORK SECTION ARRANGEMENT:
2.1 W001A spool type
2.2 H001 spool actuation type
2.3 F001A spool return action type

3) BODY ARRANGEMENT:
3.1 MJ outlet type
A G03 outlet position and available thread type

Ordering row 2 must be repeated for every work section.

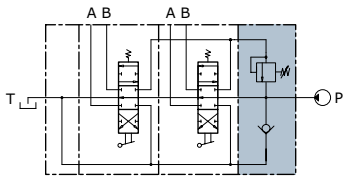
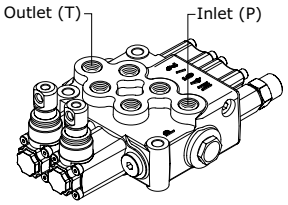
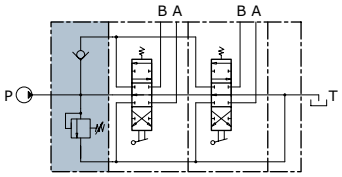
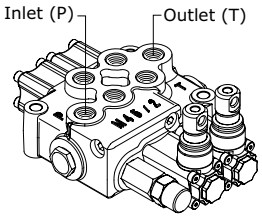


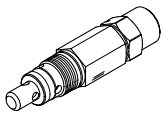
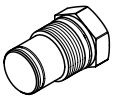
Features

Lever kits are not included in the valve controls: they must be ordered separately (see Appendix "C" page 89).
On request, all Hydrocontrol valves can be delivered painted (RAL 9005 black primer).

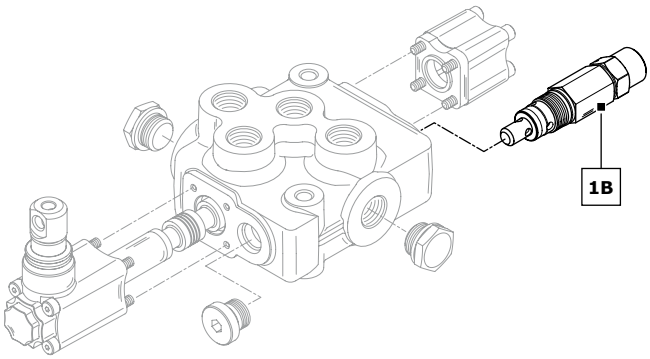
INLET ARRANGEMENT

This code part indicates inlet side, type and thread, and the kind of valves assembled in the monoblock valve.
The P port available threads change according to valve size (see table on page 175).

Inlet side classification			
code	**description**	**schema**	**configuration**
IR	Monoblock valve with **right** inlet section		
IL	Monoblock valve with **left** inlet section		

valve identification							
type	**schema**	**layout**	**description**	**type**	**schema**	**layout**	**description**
1			Direct acting pressure relief valve	**3**			Relief valve plugged

NOTE:
According to different families valves can be differently combined and even assembled on A side (control side) or B side (return spring side).
Monoblock valves can be equipped with externally piloted valve, solenoid dump valve (12-24 Vdc), clamping valve. These applications needs a special valve body. Ask our commercial dept. for further informations.



Combination valve example: 301 = 1B

301 Combination valve
1B Pressure relief valve in port B

The code identifies:
with a number, the type of valve; with a letter its position on the inlet section.

(A) = spool action side (B) = spool return action side

NOTE:
when ordering a main relief valve it is necessary to specify setting (example 150 bar).

valves combination		monoblock control valve						
		D10	M45		M50		TR55	
		IR	IR	IL	IR	IL	IR	IL
1A	**201**	•		•		•		•
3A	**203**	•		•		•		•
1B	**301**		•		•		•	
3B	**303**		•		•		•	

WORK SECTION ARRANGEMENT

This code indicates the complete working section set up: spool, control, return spring kit, and auxiliary valves.
Elements designed to house auxiliary-valve option require double choise on work ports A-B.
When ordering a port relief valve or port antishock and anticavitation valve it is necessary to specify the setting (example 120 bar).

Depending on the inlet flow, it is possible to choose appropriate spool sizes:

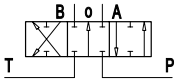
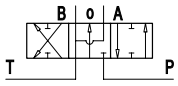
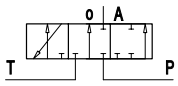
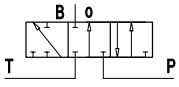
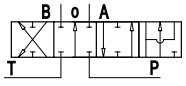
A = spool for 50 l/min inlet flow

B = spool for 30 l/min inlet flow

C = spool for 15 l/min inlet flow

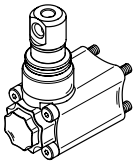
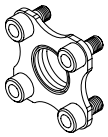
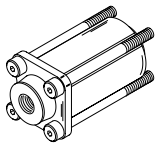
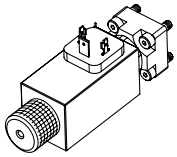
E = solenoid operated spool (available with direct electrical control)

Please contact our sales department for informations about spools with restricted connection to tank.

Spool identification				monoblock control valve			
code		schema	description	M45	D10	M50	TR55
W001A	50 l/min		3 positions double-acting	•	•	•	•
W001B	30 l/min			•	•	•	•
W001C	15 l/min			•		•	•
W001E	solenoid operated			•			
W002A	50 l/min		3 positions double-acting A and B to tank	•	•	•	•
W002B	30 l/min			•	•	•	•
W002C	15 l/min			•		•	•
W002E	solenoid operated			•			
W005A	standard		3 positions single-acting on A	•	•	•	•
W005B	metered			•	•	•	•
W006A	standard		3 positions single-acting on B	•	•	•	•
W006B	metered			•	•	•	•
W012A	standard		4 positions double-acting with float in the 4th position	•	•	•	•
W012B	metered				•	•	•

The spools shown correspond to standard configurations; for different applications contact our Commercial Department.

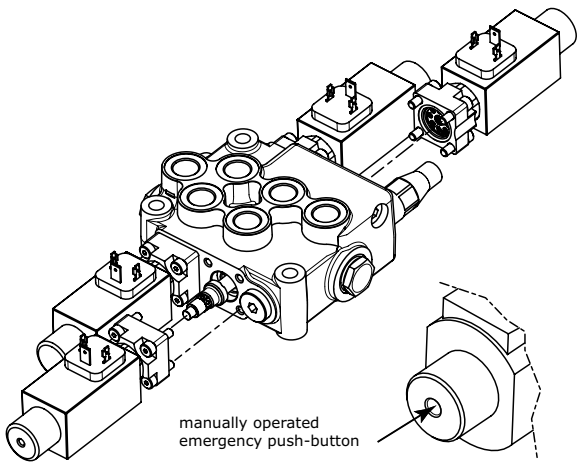
NOTE:
Float spools (W012) need special detent kit (F005).
All section with single acting spool include plug to close the unused port.
Electrical spool (type E) needs special body, special spool actutions and special return action.

Spool actuation identification			monoblock control valve			
code	configuration	description	M45	D10	M50	TR55
H001		protected lever	•	•	•	•
H002		protected lever rotated 180°	•	•	•	•
H004		control without lever	•	•	•	•
H005 leave out the spool return action code		hydraulic actuation			•	•
H036 leave out the spool return action code		Direct electric control 12 Vdc	•			
H037 leave out the spool return action code		Direct electric control 24 Vdc	•			

The spool actuation shown correspond to standard configurations; for different applications or different controls contact our Commercial Department.

Direct electric control specifications

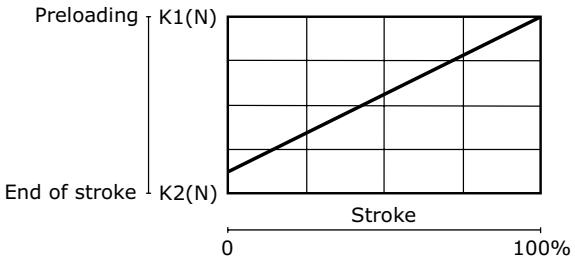
Type	HC-M45	
Rated voltage	12 VDC	24 VDC
Rated current	3,75 A	1,88 A
Rated power	45 W	
Permitted working voltage	±10% Nominal	
Max ambient temperature	+40°C	
Max oil temperature	+80°C	
Operation time	S1 (100%)	
Protection degree	IP65	
Insulation degree	H	
Standard connector	DIN 43650	
Spool stroke	2,5 + 2,5 mm	



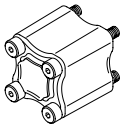
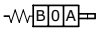
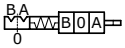
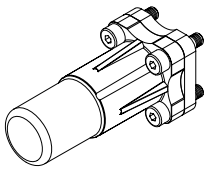
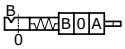
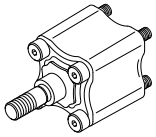
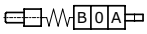
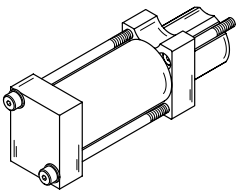
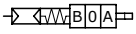
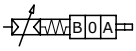
The H036 and H037 direct electric controls come as two kits each including a: spring, solenoid and adapter.
The Direct electric controls use a type E special spool and a type special body.
The ON-OFF Electric Control kit includes a manually operated emergency push-button.

Springs load values

Spool return kits have three different spring types; following the codes depending on spring loads.



Spring type			monoblock control valve			
code		value	M45	D10	M50	TR55
A	standard spring	K1 (N)	130	121.6	140	140
		K2 (N)	166	203	200	195
B	soft spring	K1 (N)	100	88.3	130	130
		K2 (N)	145	147.1	170	167
C	heavy spring	K1 (N)	140	149.1	175	175
		K2 (N)	195	206	235	230

Spool return action identification			monoblock control valve			
code	configuration	description	M45	D10	M50	TR55
F001A		return spring 	•	•	•	•
F001B			•	•	•	•
F001C			•	•	•	•
F002A		detent in A and B with return spring 	•	•	•	•
F149		detent in A and B without return spring	•	•	•	•
F003A		detent in A with return spring 	•	•	•	•
F004A		detent in B with return spring 	•	•	•	•
F005A only available for spool type W012		detent in 4th position with return spring 	•	•	•	•
F013A		prearrangement dual command 	•	•	•	
F013B			•	•	•	
F013C			•	•	•	
F020A		pneumatic control ON-OFF 	•	•	•	•
F022A		proportional pneumatic control 	•	•	•	•

The spool return action shown correspond to standard configurations; for different applications contact our Commercial Department.

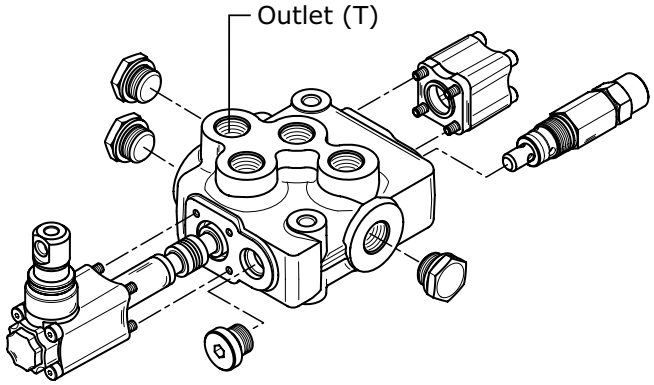
BODY ARRANGEMENT

This code indicates characteristics for outlet section: ports position and thread, simple T port or HPCO connection. It is possible to have simple T port or two ports configuration for HPCO connection: HPCO allows to extend by-pass channel and connect to a second valve. T ports dimensions and threads depends on the valve size (see table on page 175).

Order example - version 1 outlet

HC-M45/1: IR 301 150 - W001A H001 F001A - **MJ A G03**

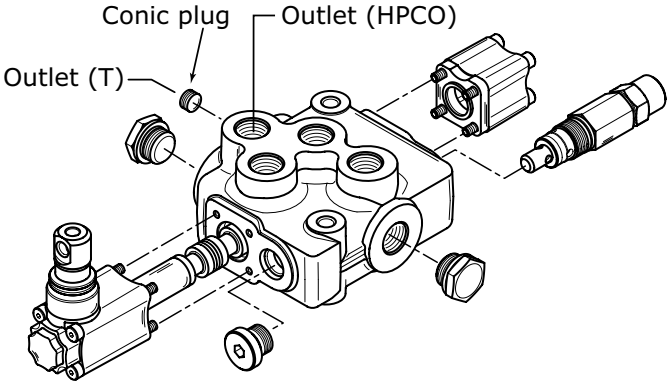
TYPE:
M45 product type
/1 working section number
1) INLET ARRANGEMENT:
IR 301 inlet side and valve type
(150) setting (bar)
2) WORK SECTION ARRANGEMENT:
W001A spool type
H001 spool actuation type
F001A spool return action type
3) BODY ARRANGEMENT:
MJ outlet type
A G03 outlet position and available thread type



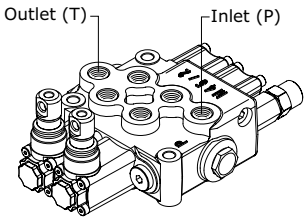
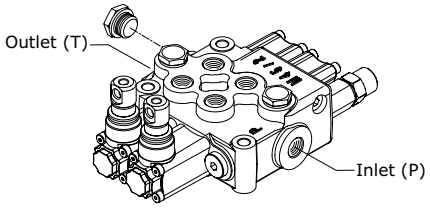
Order example - HCPO version outlet

HC-M45/1: IR 301 150 - W001A H001 F001A - **MM U G03**

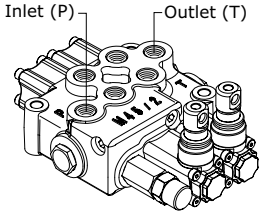
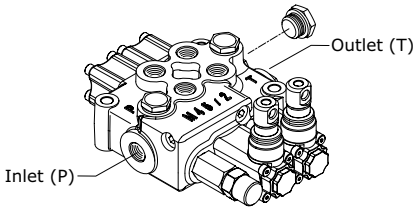
TYPE:
M45 product type
/1 working section number
1) INLET ARRANGEMENT:
IR 301 inlet side and valve type
(150) setting (bar)
2) WORK SECTION ARRANGEMENT:
W001A spool type
H001 spool actuation type
F001A spool return action type
3) BODY ARRANGEMENT:
MM outlet type
U G03 outlet position and available thread type



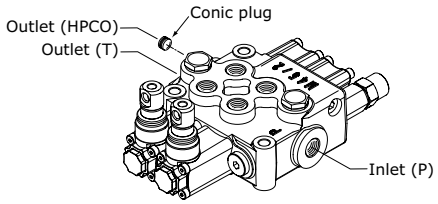
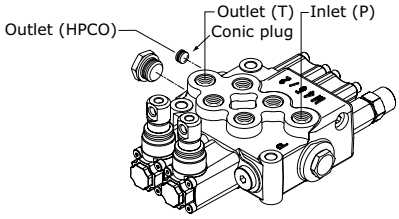
Single outlet (T) position and type of thread on inlet-ports-outlet "MJ"

Outlet and thread position			monoblock control valve			
code		configuration	M45	D10	M50	TR55
A	Top inlet P and outlet T top ports A - B		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	
code		configuration	M45	D10	M50	TR55
C	Side inlet P outlet T top ports A - B		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	

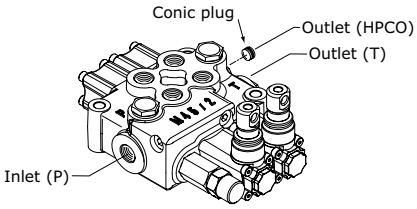
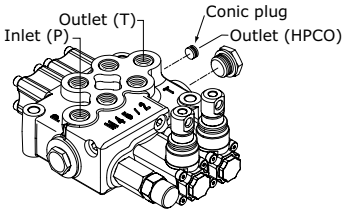
Single outlet (T) position and type of thread on inlet-ports-outlet "MK"

Outlet and thread position			monoblock control valve			
code		configuration	M45	D10	M50	TR55
A	Top inlet P and outlet T top ports A - B		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	
code		configuration	M45	D10	M50	TR55
C	Side inlet P outlet T top ports A - B		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	

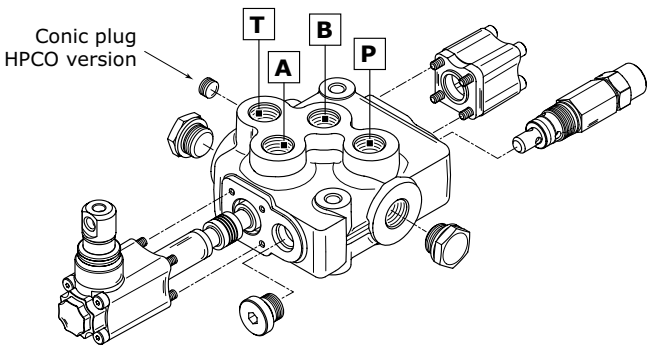
Two outlets position with HPCO and type of thread on inlet-ports-outlet "MM"

Outlet and thread position			monoblock control valve			
code		configuration	M45	D10	M50	TR55
T	P - T - HPCO (on sides)		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	
code		configuration	M45	D10	M50	TR55
U	P - T (on the top) HPCO (on side)		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	

Two outlets position with HPCO and type of thread on inlet-ports-outlet "MN"

Outlet and thread position			monoblock control valve			
code		configuration	M45	D10	M50	TR55
T	P - T - HPCO (on sides)		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	
code		configuration	M45	D10	M50	TR55
U	P - T (on the top) HPCO (on side)		G03	G03	G03	G03
			U03	G04	G04	U03
				U03	U03	

All monoblock valves of all product families can be easily transformed from simple T port to HPCO configuration just by screwing a conic plug (see following table).



Conic plug identificationn			
Type	Code	Description	Q.ty
M45	413010210	G 1/4 x 6,5 plug	1
D10	413010210	G 1/4 x 6,5 plug	1
M50	413010210	G 1/4 x 6,5 plug	1
TR55	413010210	G 1/4 x 6,5 plug	1

Monoblock valves specifically designed for applications

PRODUCT AND SOLUTION FOR BOOM MOWERS

HC-BV50

The integrated valve HC-BV50 has been studied to ensure high flexibility and to satisfy the needs of many applications, in those fields where two pumps with different flows are used. It enables you to manage and sum the service pump with the main motor pump, it improves the performance and simplifies the assembly of the valve on the machine.

pg. 110

PRODUCT AND SOLUTION FOR SKID STEER LOADERS

HC-SK6

The monoblock valve HC-SK6 has been specifically designed for skid steer loaders. The pressure drops are very low thanks to the serial circuit integrated in the casting. All options typical of this applications are available: float spool, regenerative spool, electromechanic spool lock device. The valve can be actuated with manual, hydraulic remote and electrohydraulic controls.

pg. 112

Monoblock valves specifically designed for applications

PRODUCT AND SOLUTION FOR WHEEL LOADERS

HC-M25

This monoblock valve is specifically designed for big Wheel loaders and perfectly fits all requirements of this application.
Tandem and parallel circuits are available.
Different options allow a big variety of solutions, always with high performances and optimal control.

pg. 114

PRODUCT AND SOLUTION FOR FORKLIFTS

HC-FL50

HC-FL50 monoblock valve is available in 3 and 4 sections versions; it is especially suitable for fork lift truck application.
Special spools, kits and options required by fork lift manufacturer are available.

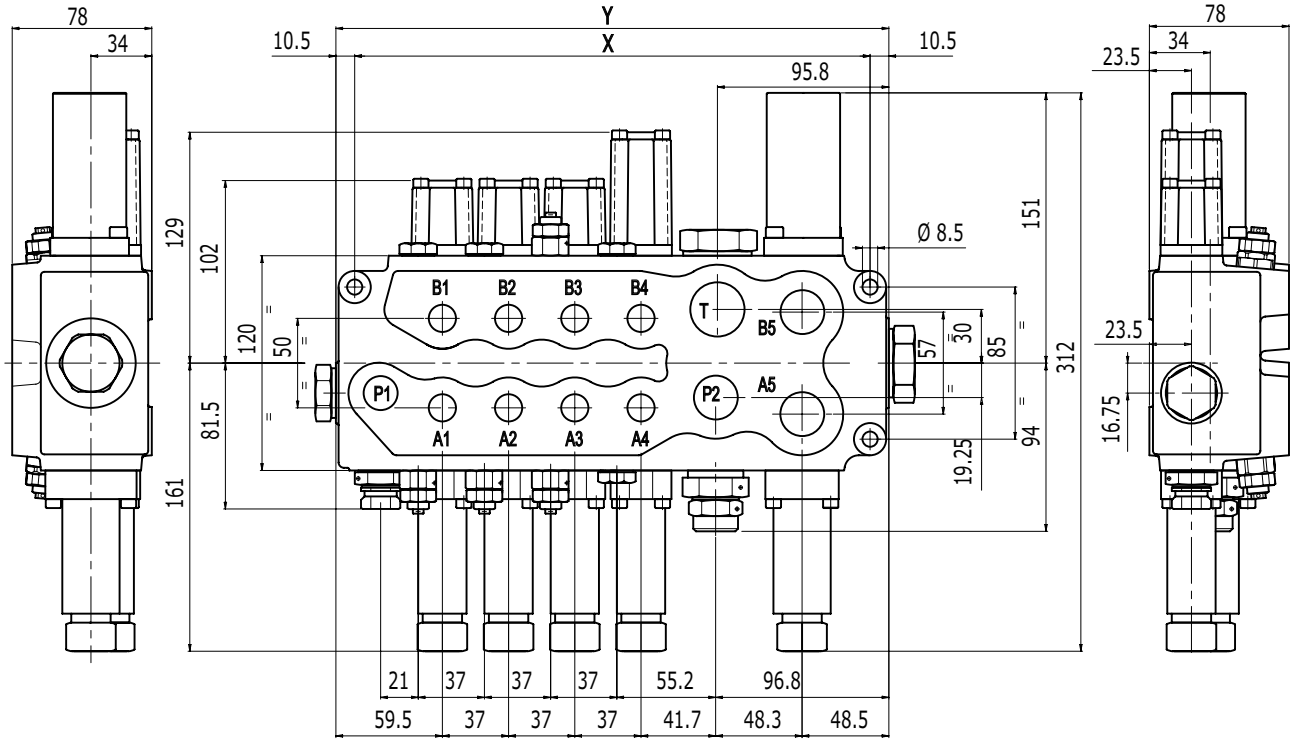
pg. 116

Technical specifications

Working section number	3+1 / 4+1 / 5+1
Rated flow	P1 = 50 l/min - 13 GPM
	P2 = 150 l/min - 39 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5,5 + 5,5 mm
High flow spool stroke	7 + 7 mm
Spool pitch	37 mm

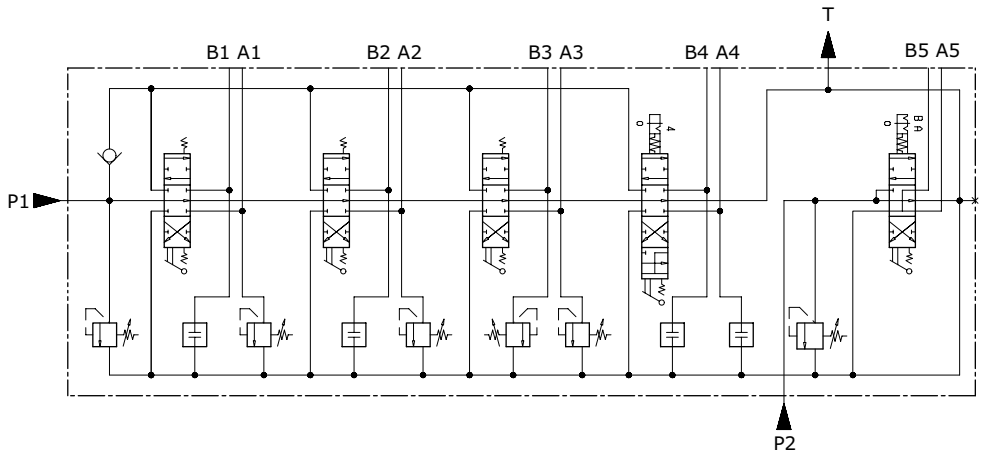
Thanks to the particular geometry (design) of the valve, it is possible to manage both the flows with a single valve: it is available in 3+1 - 4+1 - 5+1 versions; the symmetrical body ensures functional advantages, it enables you to choose on which side you want to put the control devices.

Dimensions



TYPE	BV50 3 + 1	BV50 4 + 1	BV50 5 + 1
X (mm)	251	288	325
Y (mm)	272	309	346
Weights (kg)	15,2	17,6	19,8
PORTS	**Inlet (P1 - P2)**	**Ports (A-B)**	**Outlet (T)**
BSP Thread (ISO 1179-1)	G 3/4 - G 1/2	G 3/8	G 1
UN-UNF Thread (ISO 11926-1)	3/4" - 16 UNF 7/8" - 14 UNF	3/4" - 16 UNF 7/8" - 14 UNF	1"1/16 - 12 UNF

Hydraulic schematic



Features

MANUAL REMOTE CONTROL: it allows the remote activation of the valve through flexible cables. Due to special spool configurations the control is very precise and smooth.
HYDRAULIC CONTROL: it allows either the proportional or the on/off remote activation of the valve through the use of hydraulic remote controls. Maximum working pressure 50 bar.
ELECTRO-HYDRAULIC PROPORTIONAL CONTROL: it allows the remote activation of the valve either proportional or on/off through the use of electric remote controls, that pilot the proportional electrovalves. Maximum pilot pressure 30 bar.
DIRECT ELECTRIC CONTROL: it allows the remote activation of the valve through the use of electrical on/off switches. Available voltages: 12 Vdc and 24 Vdc.

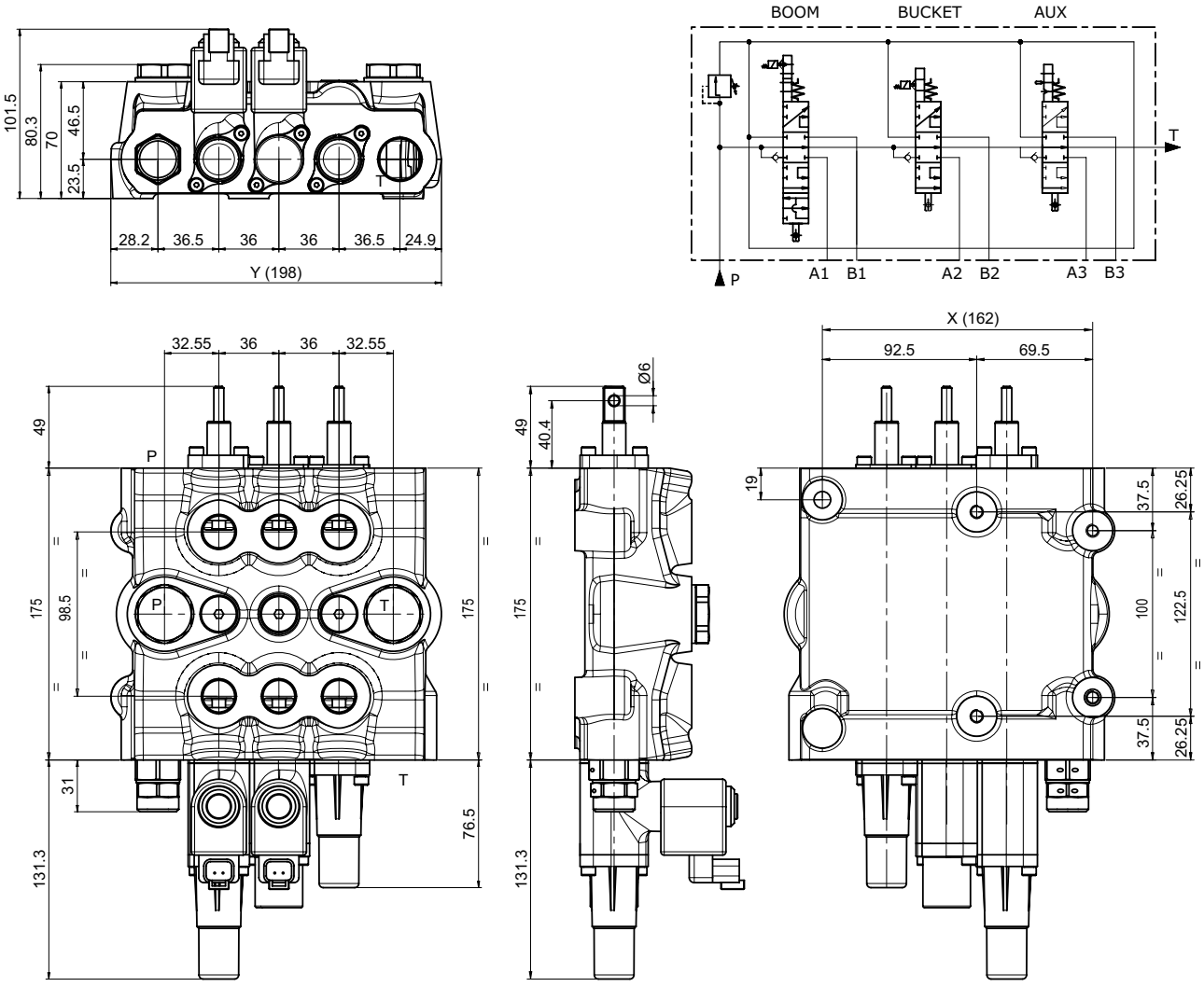
The monoblock valve can house the following auxiliary valves:
- antishock valve
- anticavitation valve
- valve plugged

Technical specifications

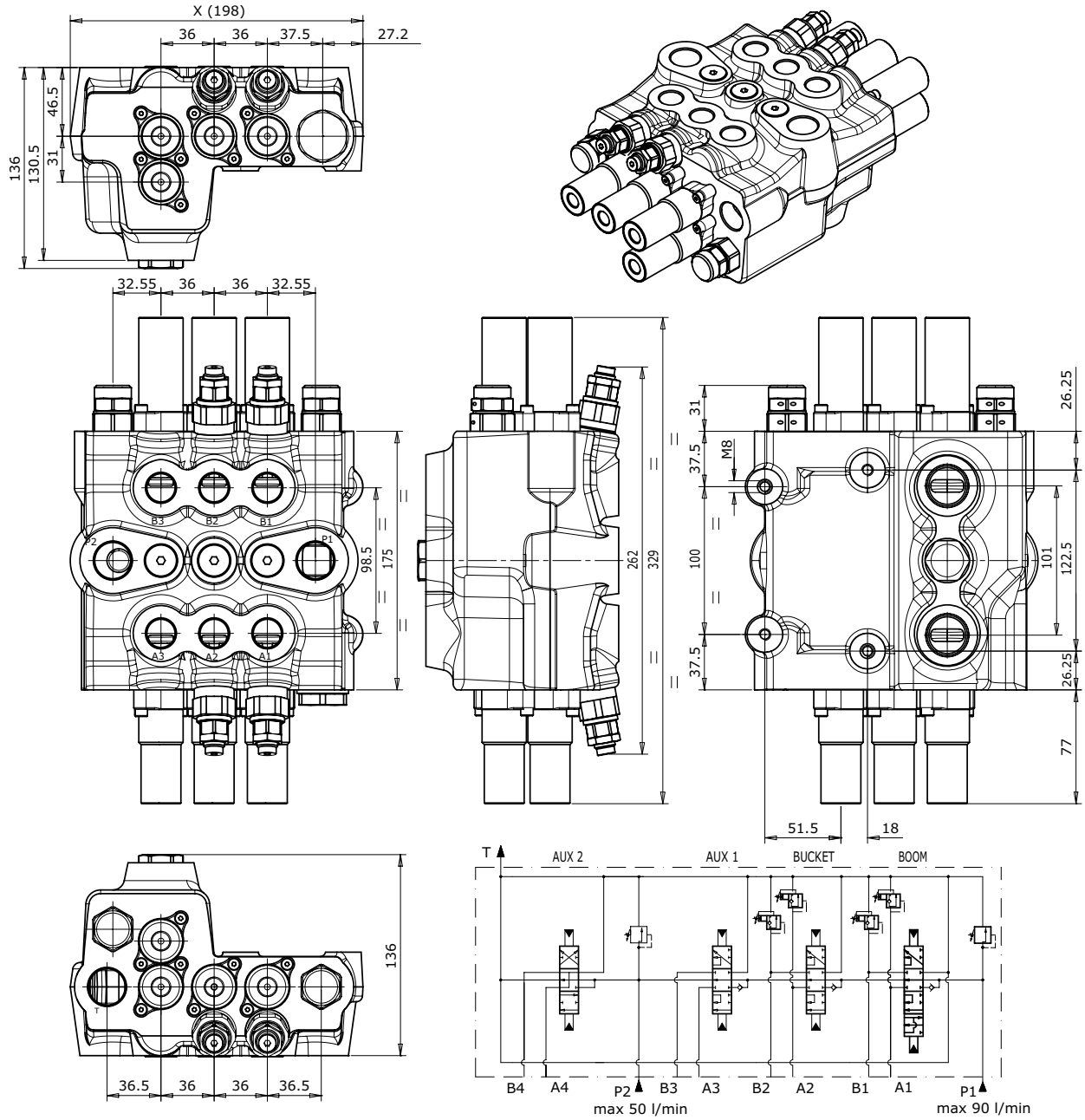
Working section number	3 / 4
Rated flow	P1 = 90 l/min - 23,5 GPM
	P2 = 50 l/min - 15 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	7 + 7 mm
Spool pitch	36 mm

HC-SK6 is a specific product for skid steer loaders. It is available with 3 or 4 working sections. The valve is highly flexible and can easily fit all requirements of this application. Hydrocontrol designed several and various solutions in terms of controls, spools and circuits. The pressure drops are very low thanks to the serial circuit integrated in the casting.

Dimensions HC-SK6/3



Dimensions HC-SK6/4



TYPE	HC-SK6/3	HC-SK6/4
X (mm)	162	198
Y (mm)	198	234
Weights (kg)	11,5	15
PORTS	**Inlet (A-B)**	**Ports (P-T)**
BSP Thread (ISO 1179-1)	G 3/4	G 1/2
UN-UNF Thread (ISO 11926-1)	7/8" - 14 UNF	1"1/16- 12 UNF

Features

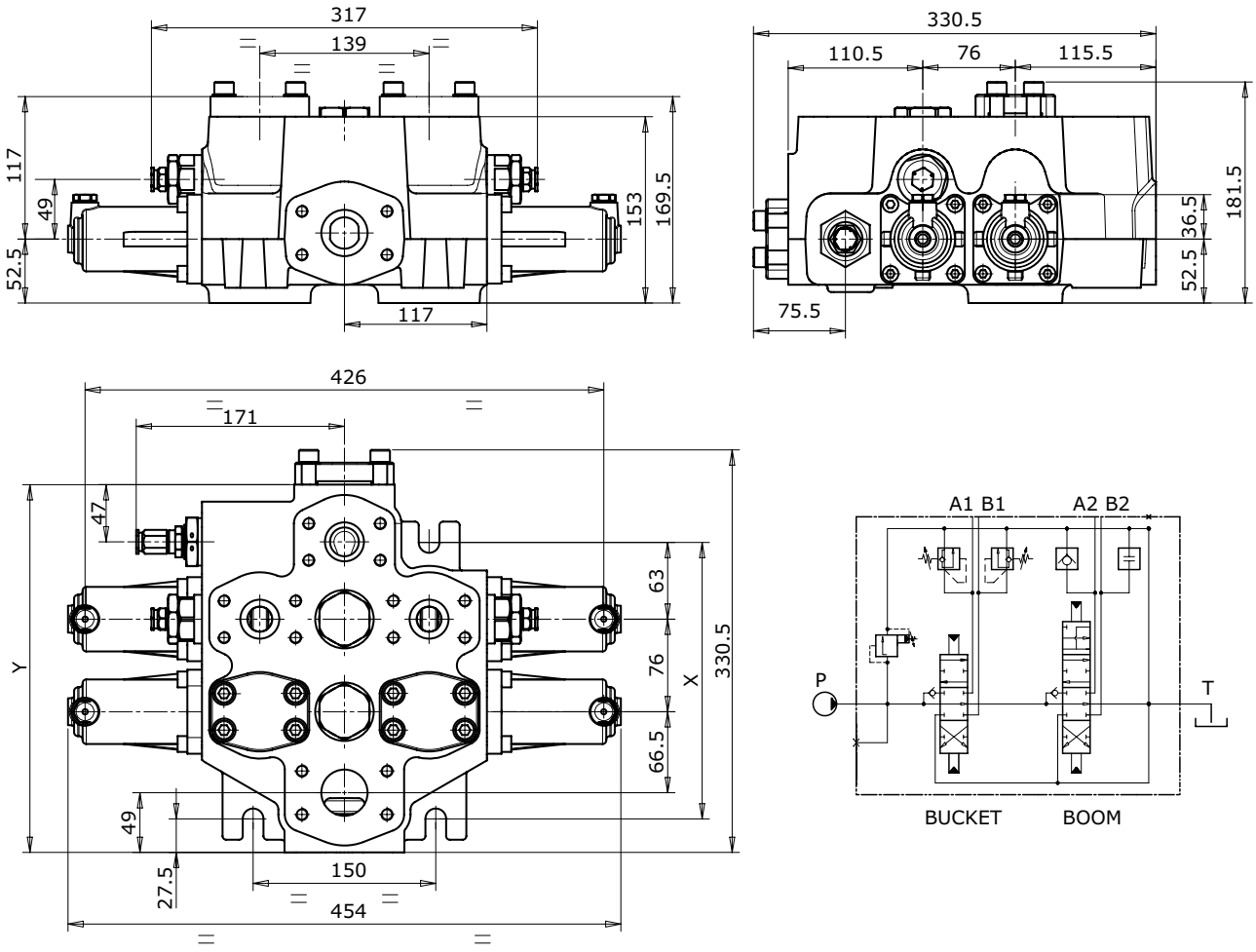
The valve can be actuated with manual, hydraulic remote and electrohydraulic controls. All options typical of this applications are available: float spool, regenerative spool, electromechanic spool lock device.
The pressure drops are very low thanks to the serial circuit integrated in the casting.

Technical specifications

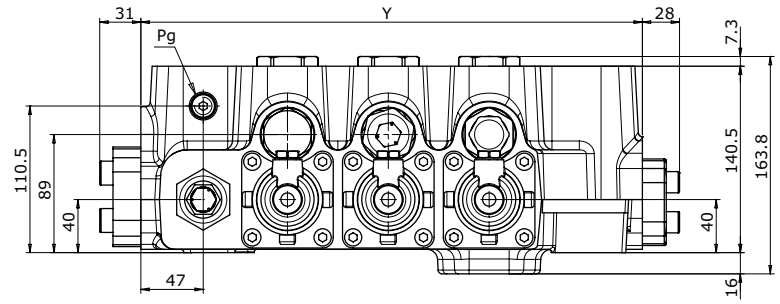
Working section number	2 / 3
Rated flow	350 l/min - 91 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	12 + 12 mm
Spool pitch	76 mm

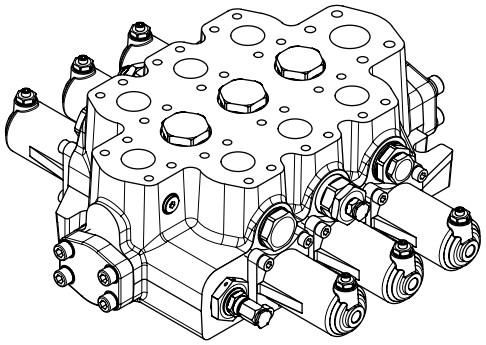
Hydrocontrol has especially designed HC-M25 for wheel loaders.
The monoblock is availalble in 2 or 3 working sections and easily fit all requirements of this application.
Hydraulic circuit can be parallel or, as normally required by the application, tandem.

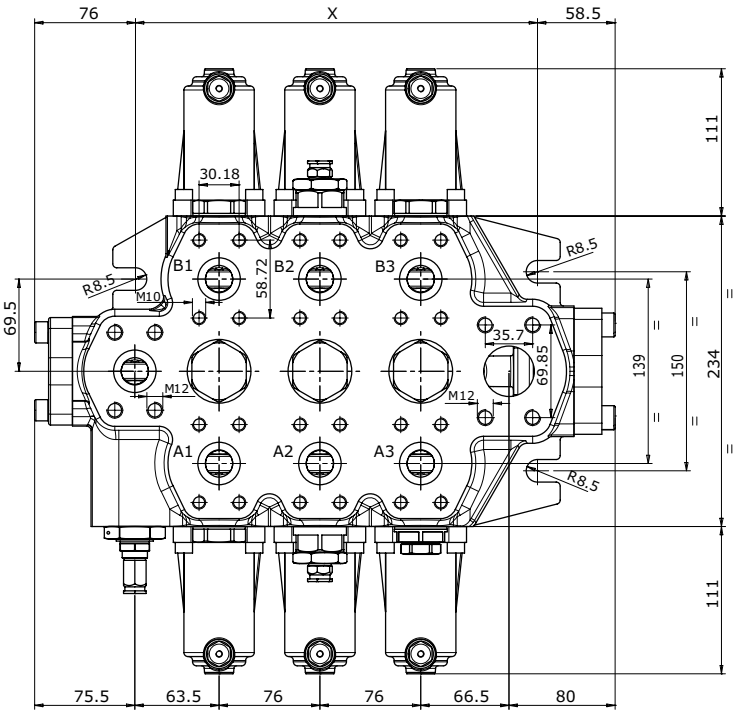
Dimensions HC-M25/2

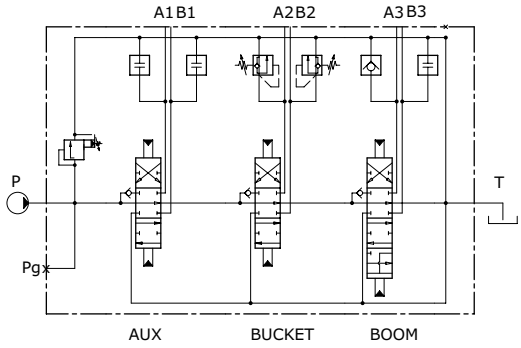


Dimensions HC-M25/3









TYPE	HC-M25/2	HC-M25/3
X (mm)	227	303
Y (mm)	302	378
Weights (kg)	47	68
PORTS	**Inlet (P-A-B)**	**Outlet (T)**
SAE 3000 Flange	1”-1/4 (MA)	1”-1/2 (MA)

Features

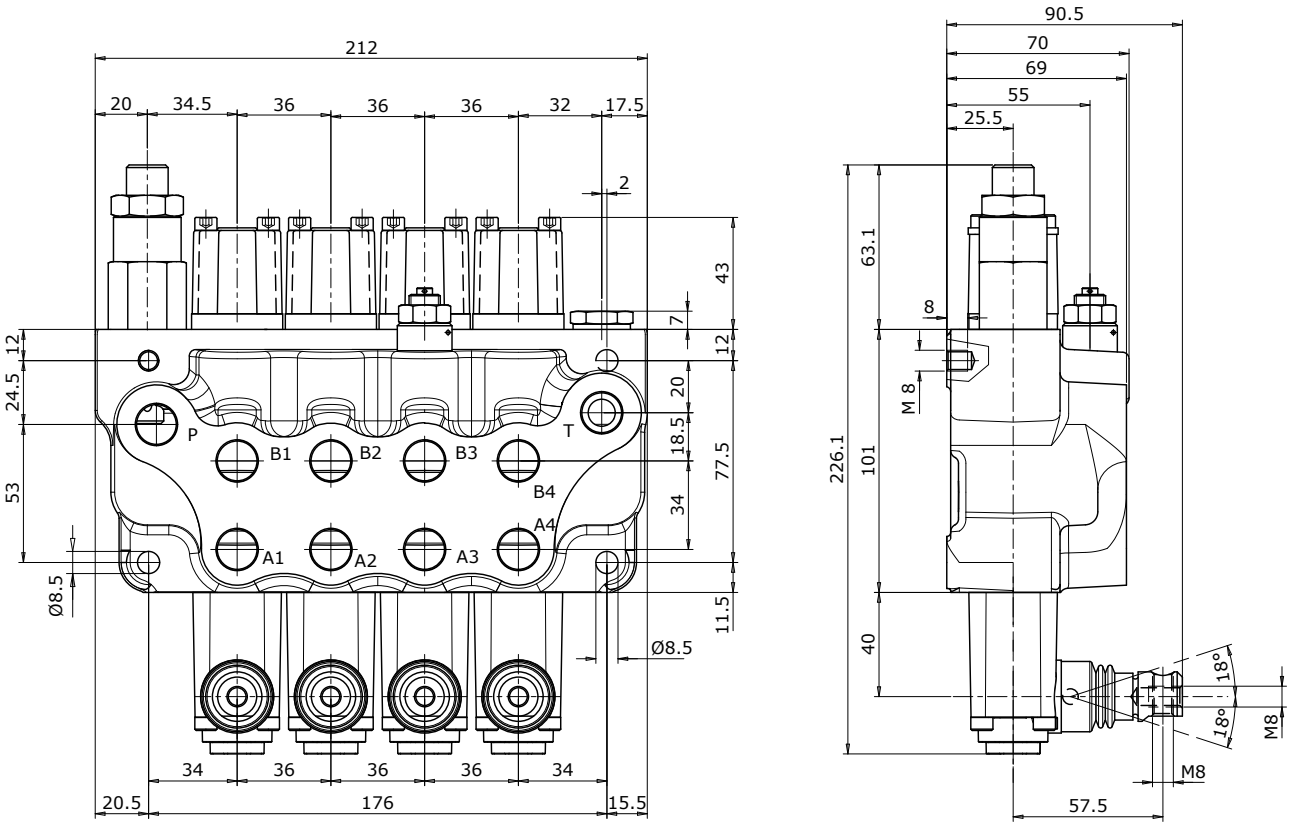
The auxiliary valves are incorporated in the valve. It is available in several hydraulic configurations at the Customer’s request, and it can also be supplied in the mechanically or hydraulically-controlled versions.
The float function is also available.

Technical specifications

Working section number	3 / 4
Rated flow	50 l/min - 13 GPM
Rated pressure	350 bar - 5000 PSI
Spool stroke	5 + 5 mm
Spool pitch	36 mm

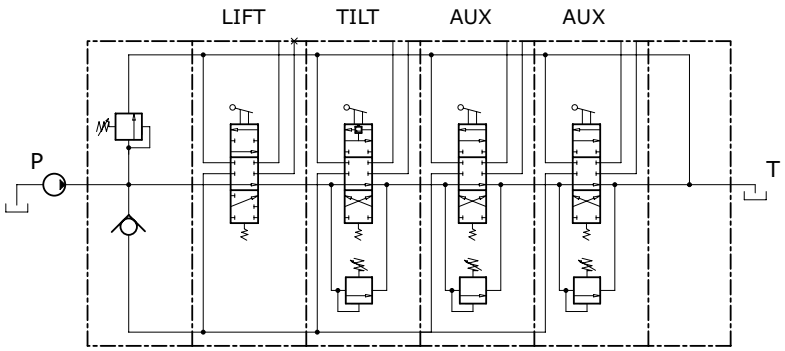
Hydrocontrol has especially designed HC-FL50 for forklifts.
HC-FL50 monoblock valve is available in 3 and 4 sections versions; it is especially suitable for fork lift truck application.
Special spools, kits and options required by fork lift manufacturer are available.

Dimensions



TYPE	HC-FL50/3	HC-FL50/4
X (mm)	140	176
Y (mm)	176	212
Weights (kg)	6,5	7,8
PORTS	**Ports (P-A-B)**	**Ports (T)**
BSP Thread (ISO 1179-1)	G 3/8	G 3/8

Hydraulic schematic



Features

Ports auxialiary valves integrated.
Available in different configurations with lever control
Microswitches and potentiometers are available.
Several devices specific for fork lift applications are available, like lever clamping, security electrovalves or electro-mechanic spool locks, even in respect of ISO3691 standard.

Hydraulic remote control

HC-RCX

Hydraulic remote control 4 service ports one control lever.

pg. 123

HC-RCY

2 axis single lever remote control reduced operating force.

pg. 124

HC-RCM

Stackable hydraulic remote control 2 service ports, one control lever.

pg. 125

HC-RCB

Hydraulic remote control 4 service ports, 2 control levers.

pg. 126

HC-RCP

Foot pedal 2 service ports with side ports and reduced body height.

pg. 127

Hydraulic remote control

HC-RCF

Foot pedal 2 service ports with lower rear ports.

pg. 128

HC-RCD

Double foot pedal with 2 service ports.

pg. 129

HC-RCS

Foot pedal 2 service ports with low rear ports.

pg. 130

HC-RCT

Double foot pedal 4 service ports with low rear ports.

pg. 132

HC-RCV

Hydraulic remote control 1 service port.

pg. 133

Supply units

HC-SU2
Two "P" lines supply at high pressure.

HC-SU3
Three "P" lines supply at high pressure.

pg. 134

HC-SE2
Two "P" lines supply at high pressure with dump valve

HC-SE3
Three "P" lines supply at high pressure with dump valve

pg. 135

For information on the order modality refer to the relative technical catalogue: **HCRC-01**

General specifications

TYPE	MAX INPUT PRESSURE (bar)	MAX OIL INPUT CAPACITY (l/min)	WEIGHT (kg)
HC-RCX	100	12	2,5
HC-RCY	100	12	2,5
HC-RCM	60	12	1,5
HC-RCB	60	12	3,2
HC-RCP	100	12	3,4
HC-RCF	100	12	4,1
HC-RCD	60	12	3,2
HC-RCS	100	12	4,1
HC-RCT	100	12	5,1
HC-RCV	100	12	1
HC-SU2	350	12	1,7
HC-SU3	350	12	2
HC-SE2	350	12	2,6
HC-SE3	350	12	2,9

Hydraulic remote control operating principle

Hydraulic remote controls work according to the principle of direct acting pressure reducing valves. In rest position, the joystick lever is held in neutral by return spring; inlet port P is closed and U ports are connected to tank port T. By selecting control lever, plunger compresses return spring and reaction spring through a cam mechanism; consequently it shifts spool and opens connection holes between inlet port P and service ports U. This causes a pressure increase on service ports U that is proportional to the control lever stroke and the reaction spring. Hydraulic remote controls HC-RC are designed with a special cartridge that prevents the lever from hunting when it is released from its operating position. Very fine proportional control, low operating efforts, low energy consumption and low maintenance makes these hydraulic remote controls ideal for piloting remote control directional valves, variable displacement pumps and motors, auxiliary valves, frictions and hydraulic brakes.

Supply units operating principle

The purpose of supply unit HC-SU and HC-SE is to fit hydraulic remote controls in an hydraulic system working at high pressure with reduced flow at a low pressure. Operating principle is that of a direct acting pressure reducing valve. High pressure fluid from the main circuit is routed through ports P1, P2 and P3: pressure is decreased to the value required for supplying the hydraulic controls by means of a pressure reducing valve that directs the necessary fluid to the control via port (U). Supply units are fitted with an accumulator that satisfies short term peak power demands and is a source of emergency power should the main circuit pressure fail. To avoid the accumulator discharge, low pressure circuit is protected both by the adjustable main relief valve inside the cartridge of the pressure reducing valve and by the check valve. To start the hydraulic system, a backpressure of at least 10 bar on service port (P) has to be applied when the accumulator is discharged.

NOTE: because of the small dimensions and working on the same adjusting screw, this valve has the possibility of setting both the pressure reducing valve and the main relief valve. Main relief valve pressure setting is higher than about 10 bar if compared to the pressure reducing valve - see the pressure setting diagram. Supply unit may be installed in any mounting position but the accumulator should be as far as possible from heat sources.

Standard working conditions - Hydraulic remote control

Maximum input pressure	100 bar	1450 PSI
Maximum back pressure on tank line	3 bar	43,5 PSI
Maximum flow on ports	12 l/min	3 GPM
Hysteresis	< 1 bar	< 14,5 PSI
Hydraulic fluid	Mineral Oil HL, HM (or HLP acc. to DIN 51524)	
Fluid temperature range	-20°C / +80°C	
Fluid viscosity range	10 ÷ 300 cSt	
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)	
Recommended filtration	β10 > 75 (ISO 16889:2008)	
Leakage	3 cc/min (with 50 bar of pressure)	

Standard working conditions - Supply units

Maximum input pressure	350 bar	5000 PSI
Pressure on U port line	10 - 70 bar	145 - 1000 PSI
Maximum back pressure on tank line	3 bar	43,5 PSI
Minimum pressure in P1	10 bar	145 PSI
Hysteresis	< 1 bar	< 14,5 PSI
Hydraulic fluid	Mineral Oil HL, HM (or HLP acc. to DIN 51524)	
Fluid temperature range	-20°C / +80°C	
Fluid viscosity range	10 ÷ 300 cSt	
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)	
Recommended filtration	β10 > 75 (ISO 16889:2008)	
Accumulator precharge pressure	10 bar	145 PSI
Maximum working pressure accumulator	210 bar	3000 PSI
Maximum allowed pressure ratio	≤ 6/1	
Capacity on service port U (without accumulator)	8 l/min	2 GPM
Weight accumulator (0,35 l)	3 kg	
Weight accumulator (0,75 l)	2,5 kg	
Weight accumulator (1,50 l)	5,7 kg	

All information and diagrams in this catalogue refer to a mineral base oil VG46 at 50°C temperature (32 cSt kinematic viscosity)

Technical specifications

Body	Cast iron
Surface coating	Zinc plated (According to International standards 2000/53/CE RoHS)
Plunger	Stainless steel
Plunger guide	Brass

Technical specifications

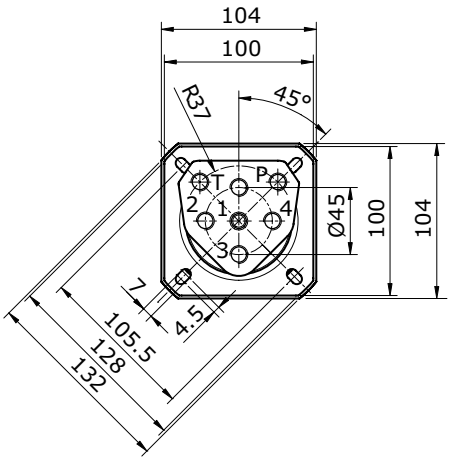
Max pressure	100 bar
Oil capacity	12 l/min
Weight	2,5 Kg

Applications

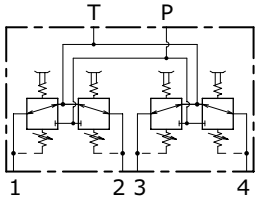
Mini-excavators, Mini steer loaders, Backhoe loaders,
Wheel loaders, Tractors, Boom mowers

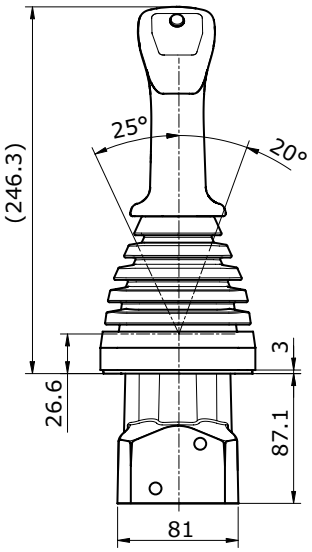
Hydraulic remote control HC-RCX belongs to wide range of Hydrocontrol'e Remote Control; the lever's anti-swaying system and the ergonomic handle provides great sensitivity while manoeuvring and makes his use very comfortable for the operator. Low operating efforts, low energy consumption and low maintenance make these hydraulic remote controls HC-RCX ideal for piloting remote control directional valves, variable displacement pumps and motors, auxiliary valves, frictions and hydraulic brakes.

Dimensions

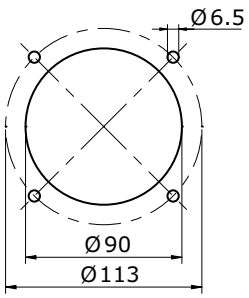


HYDRAULIC SCHEMA





HOLDER HOLE DIMENSION



Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
The remote control can be operated by means of different controls: simple return in central position, mechanical detent on one position; round and squared bellows are available with straight or bent levers.
A version arranged to fit other commercial handles is also available.

Technical specifications

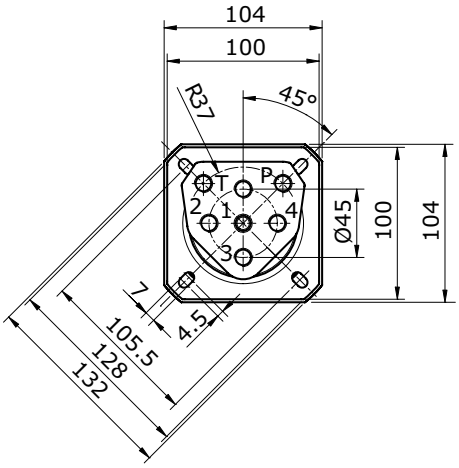
Max pressure	100 bar
Oil capacity	12 l/min
Weight	2,5 Kg

Applications

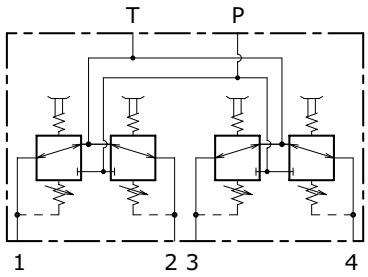
Mini-excavators, Mini steer loaders, Backhoe loaders, Wheel loaders, Tractors, Boom mowers

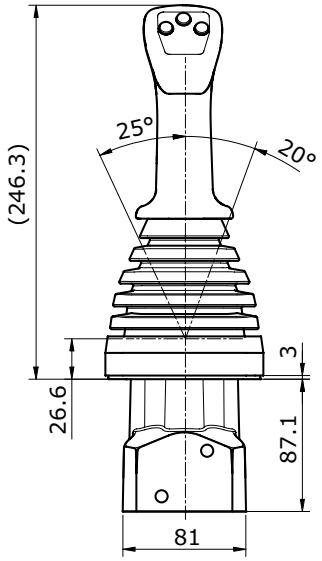
The new HC-RCY hydraulic remote control is an evolution of the HC-RCX model. It adds to the variety of options and solutions offered by HC-RCX with an upgraded hydraulic control system, allowing the operating comfort to be improved; the reduced-diameter control spool allows the required operating effort to be reduced by approximately 30%, without affecting the control, hysteresis and accuracy characteristics of this device.

Dimensions

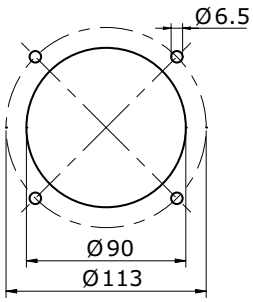


HYDRAULIC SCHEMA





HOLDER HOLE DIMENSION



Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
The remote control can be operated by means of different controls: simple return in central position, mechanical detent on one position; round and squared bellows are available with straight or bent levers.
A version arranged to fit other commercial handles is also available.

Technical specifications

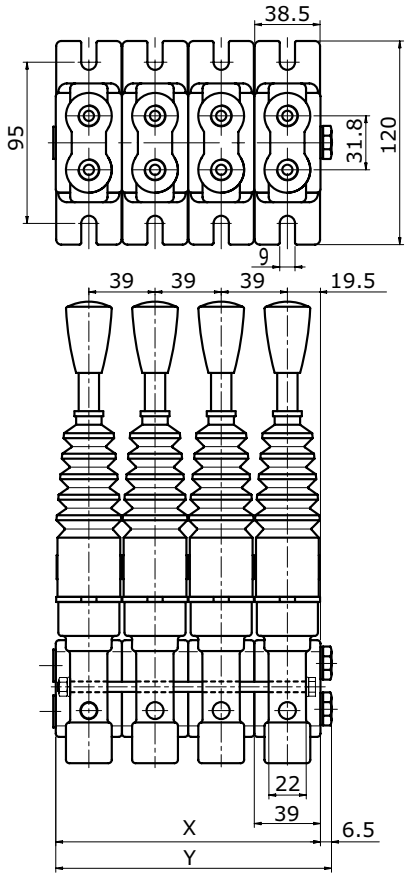
Working section number	1 - 12
Max pressure	60 bar
Oil capacity	12 l/min
Weight	1,5 Kg
Tie-rods clamping torque	14 Nm

Applications

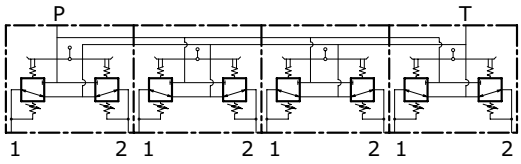
Mini skid loaders, Backhoe loaders, Tractors

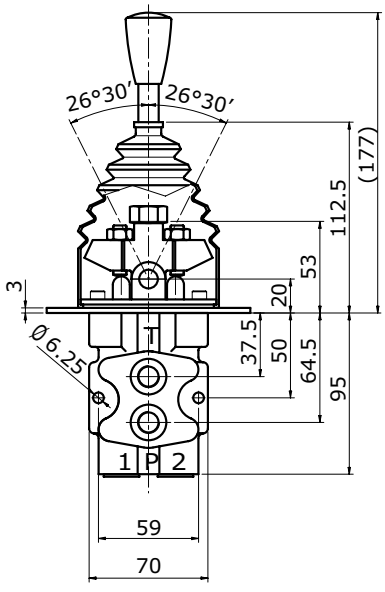
Hydraulic remote control HC-RCM belongs to the wide range of Hydrocontrol products. Low operating efforts, low energy consumption and low maintenance make these hydraulic remote controls HC-RCM ideal for piloting remote control directional valves, variable displacement pumps and motors, auxiliary valves, frictions and hydraulic brakes. Each hydraulic remote control is assembled with N.2 tie rod kits which include a tie rod, two nuts and two washers. It can be assemble up to 12 working sections.

Dimensions



HYDRAULIC SCHEMA





TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	39	78	117	156	195	234	273	312	351	390	429	468
Y (mm)	45,5	84,4	123,5	162,5	201,5	240,5	279,5	318,5	357,5	396,5	435,5	474,5
Weights (kg)	1,5	3	4,5	6	7,5	9	10,5	12	13,5	15	16,5	18

Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
The remote control can be operated by means of different controls: simple return in central position, mechanical detent on one or both positions; lever security lock in central position, frictioned positioning, microswitch.

Technical specifications

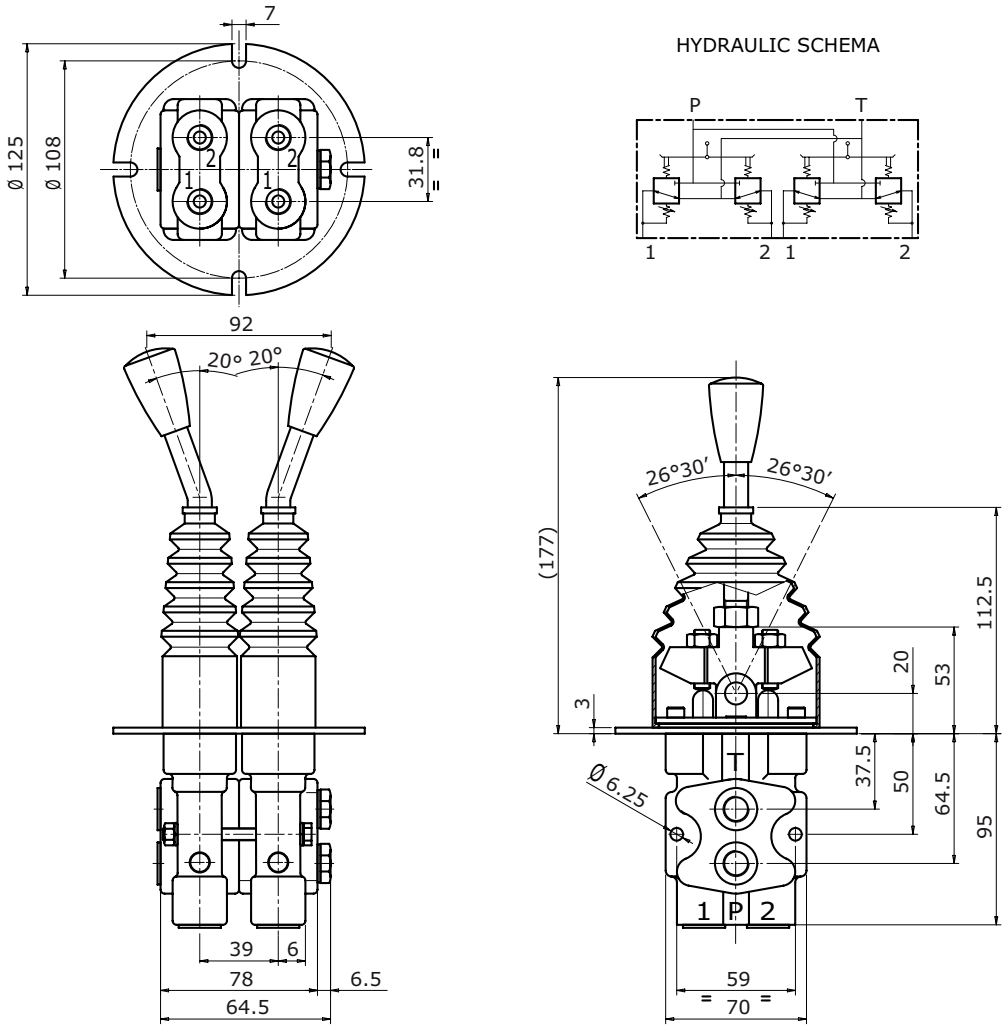
Working section number	2
Max pressure	60 bar
Oil capacity	12 l/min
Weight	3,2 Kg
Tie-rods clamping torque	14 Nm

Applications

Mini skid loaders, Backhoe loaders, Tractors

Hydraulic remote control HC-RCB belongs to the wide range of Hydrocontrol. Low operating efforts, low energy consumption and low maintenance makes these hydraulic remote controls HC-RCB ideals for piloting remote control directional valves, variable displacement pumps and motors, auxiliary valves, frictions and hydraulic brakes. Each hydraulic remote control is assembled with N.2 tie rod kits including a tie rod, two nuts and two washers.

Dimensions



Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
The remote control can be operated by means of different controls: simple return in central position, mechanical detent on one or both positions; lever security lock in central position, frictioned positioning, microswitch.

Technical specifications

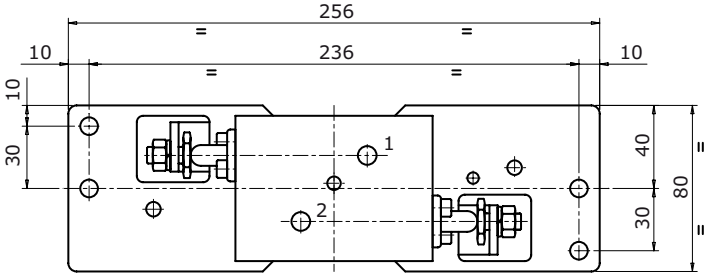
Max pressure	100 bar
Oil capacity	12 l/min
Weight	3,4 Kg

Applications

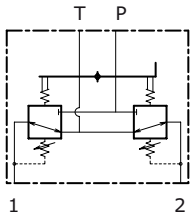
Mini-excavators

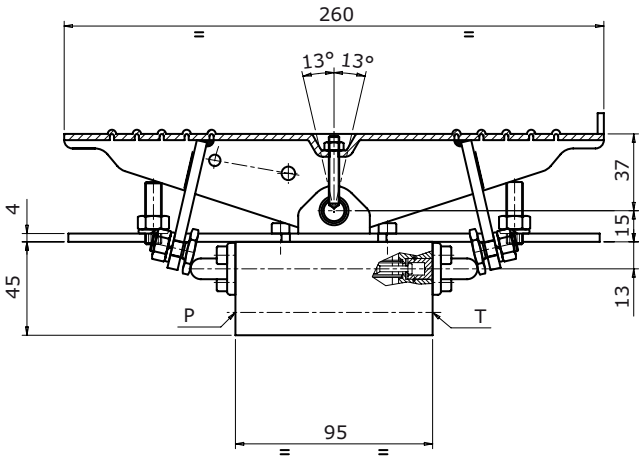
HC-RCP is a pedal version remote control. Reduced overall dimensions and several configurations available; P, T and ports connections are on the body sides.

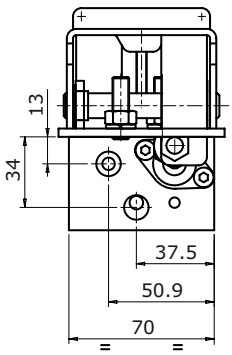
Dimensions



HYDRAULIC SCHEMA







Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
Standard pedals, pedals with connections for levers, bented pedals can be supplied.

Technical specifications

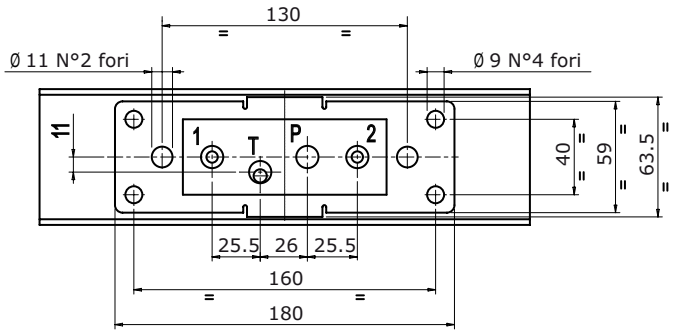
Max pressure	100 bar
Oil capacity	12 l/min
Weight	4,1 Kg

Applications

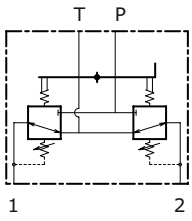
Mini-excavators

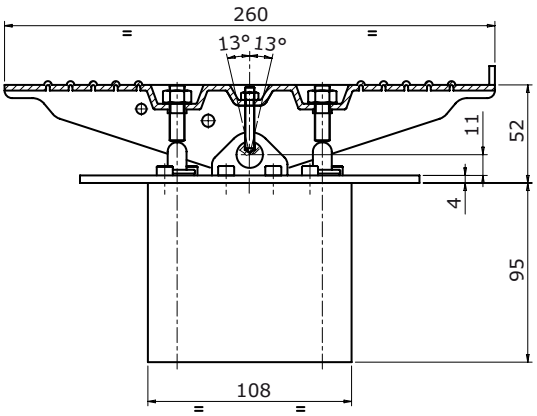
HC-RCF is a pedal version remote control. Reduced overall dimensions and several configurations available; P, T and users ports are under the body, opposite to the pedal.

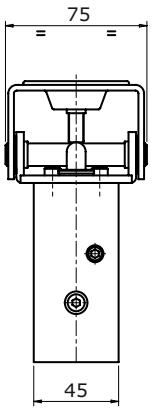
Dimensions



HYDRAULIC SCHEMA







Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.
Standard pedals, pedals with connections for levers, bented pedals can be supplied.

Technical specifications

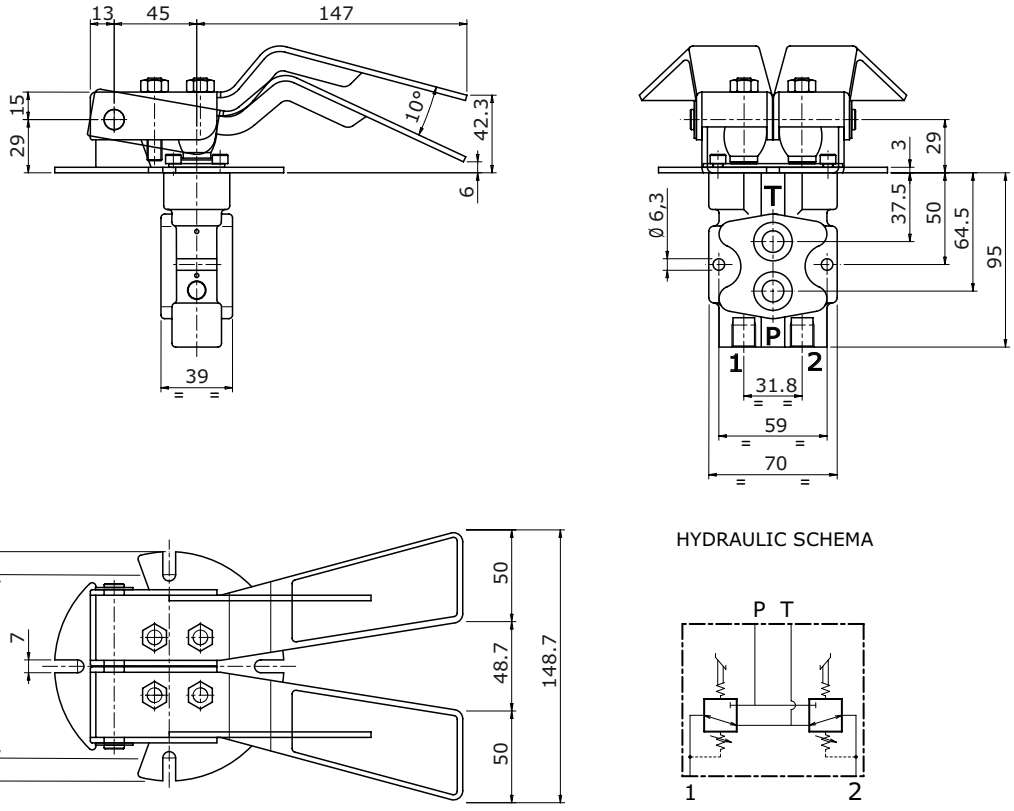
Max pressure	60 bar
Oil capacity	12 l/min
Weight	3,2 Kg

Applications

Mini skid loaders, Mini dumper

HC-RCD is a double pedal version remote control. Reduced overall dimensions and ergonomic design for a optimal control.

Dimensions



HYDRAULIC SCHEMA

Features

A broad range of control curves are available; bodies can have BSP or UNF connection threads.

Technical specifications

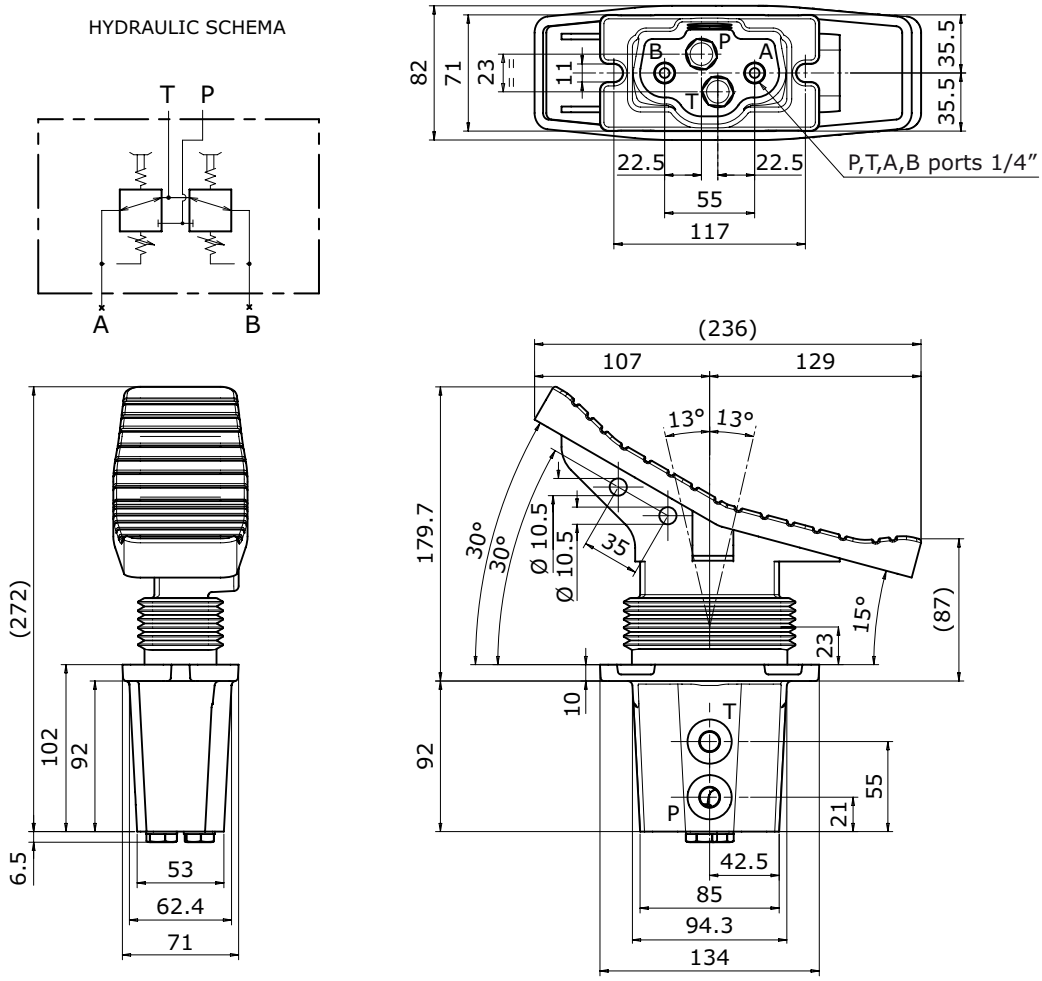
Max pressure	100 bar
Oil capacity	12 l/min
Weight	4,1 Kg

Applications

Mini-excavators

HC-RCS is a single pedal version remote control. It’s a new family completing the broad range of remote control. Different pedal designs are available: flat, bent, extended bent for an optimal ergonomic solution.

Dimensions



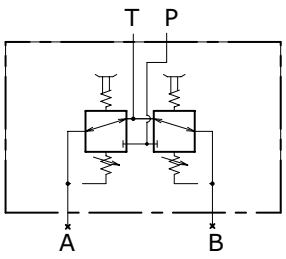
Features

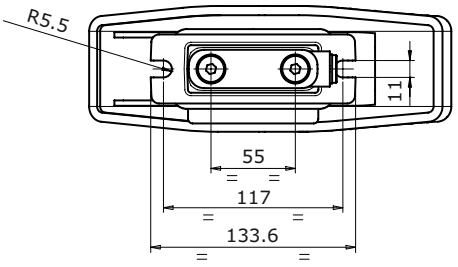
Several body configurations are possible with connection ports in different positions.

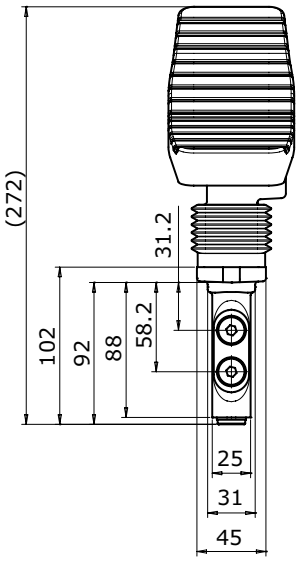
HC-RCS dimensions with narrow body

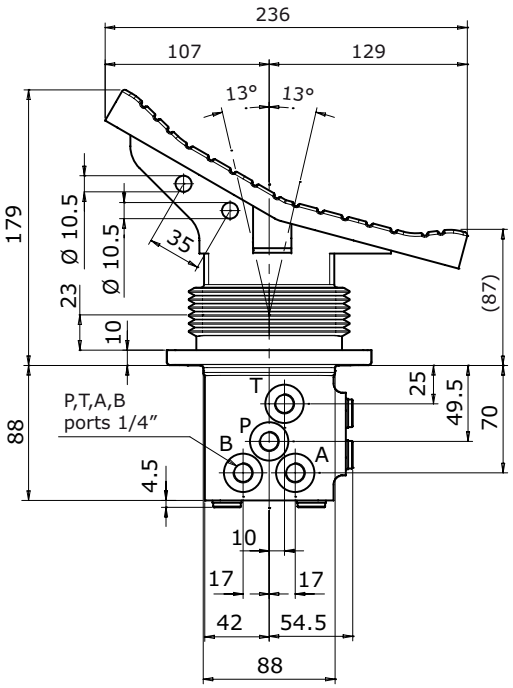
The special design with narrow body is suitable for use on small machines.

HYDRAULIC SCHEMA









Technical specifications

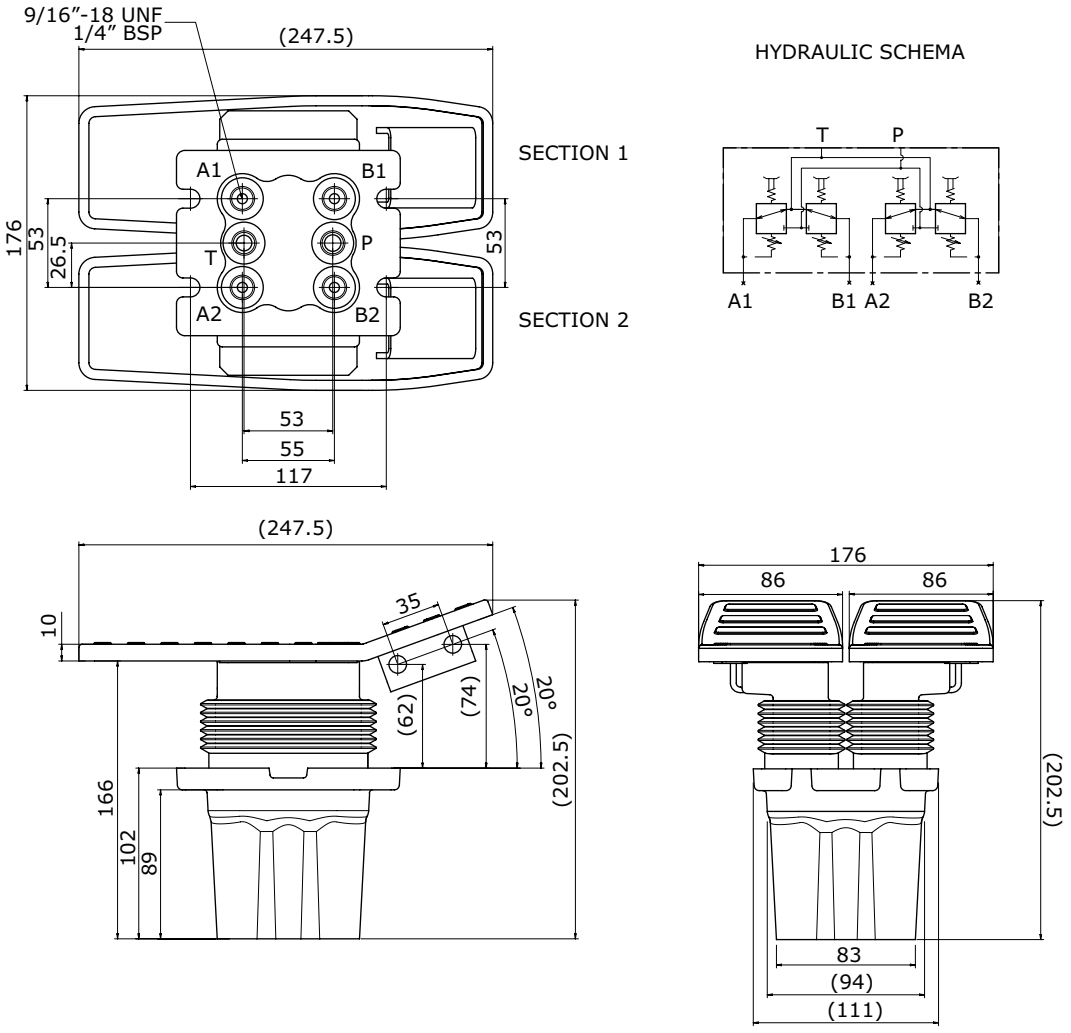
Max pressure	100 bar
Oil capacity	12 l/min
Weight	5,1 Kg

Applications

Mini-excavators

HC-RCT is a double pedal version remote control. It's a new family completing the broad range of remote control. Different pedal designs are available: flat, bent, extended bent for an optimal ergonomic solution.

Dimensions



Features

Several body configurations are possible with connection ports in different positions.
It is also available with special body construction including shuttle valve for service signals (brakes control, security).

Technical specifications

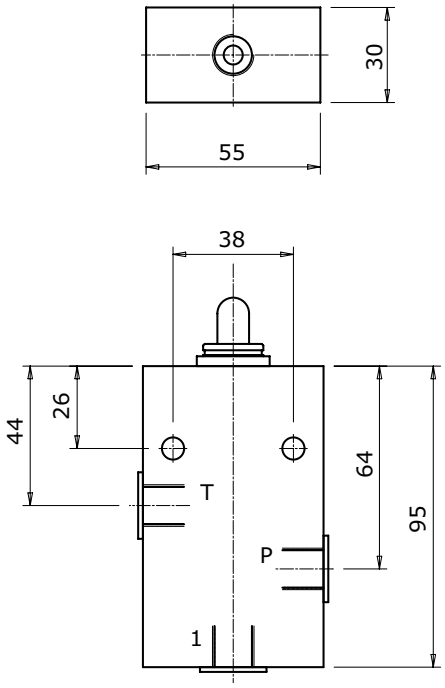
Max pressure	100 bar
Oil capacity	12 l/min
Weight	1 Kg

Applications

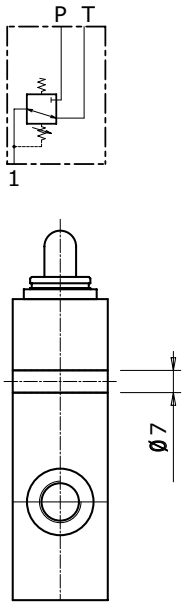
Forklifts, Tractors

HC-RCV is a general purpose single user remote control.
It can be delivered with simple spring centering control, 360° regulating handle holding the control position or with pedal control.

Dimensions



HYDRAULIC SCHEMA



Features

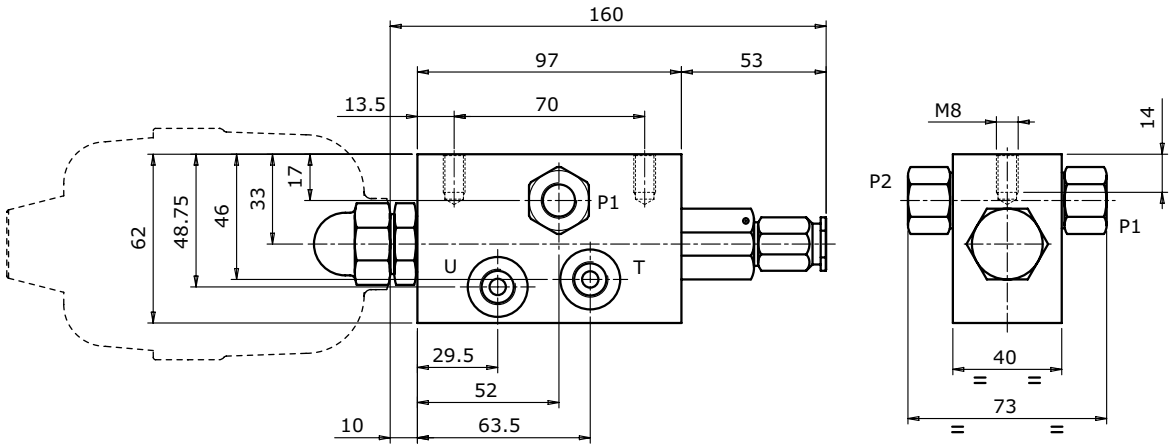
Bodies can have BSP or UNF connection threads.

The purpose of supply unit HC-SU2 and HC-SU3 is to fit hydraulic remote controls in an hydraulic system working at high pressure with reduced flow at low pressure.

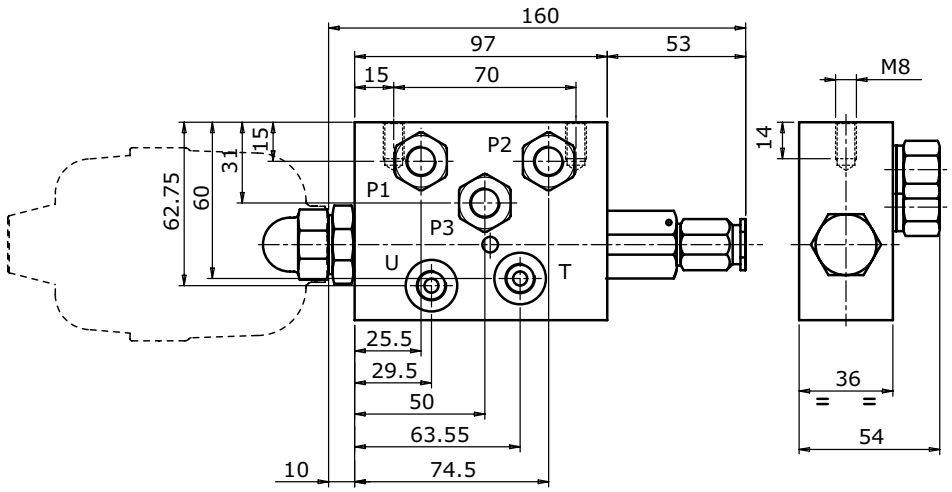
Applications

Piloting remote of:
Directional control valves
Variable displacements pumps and motors
Auxiliary valves
Frictions and hydraulic brakes

HC-SU2 Dimensions



HC-SU3 Dimensions



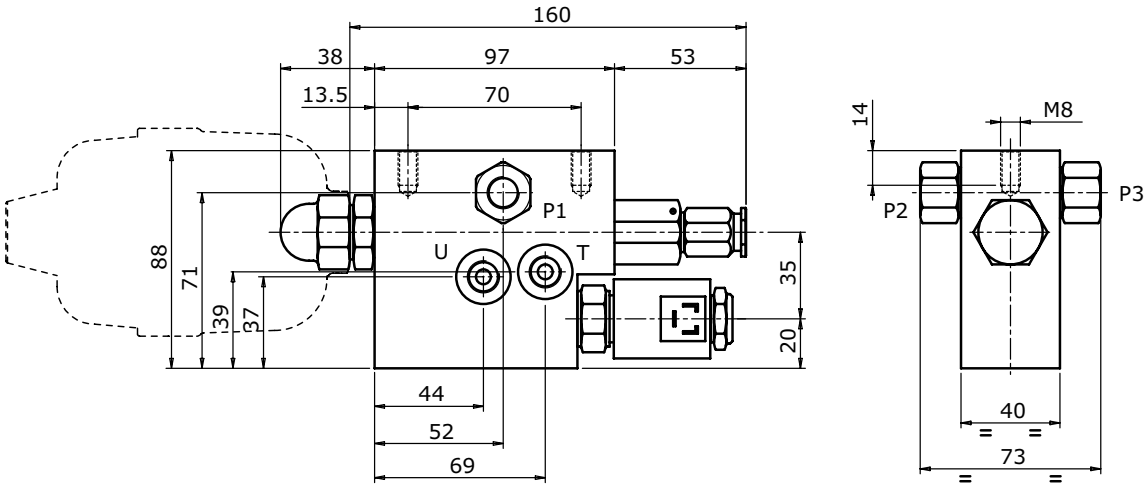
The purpose of supply unit HC-SE2 and HC-SE3 is to fit hydraulic remote controls in an hydraulic system working at high pressure with reduced flow at low pressure.

Applications

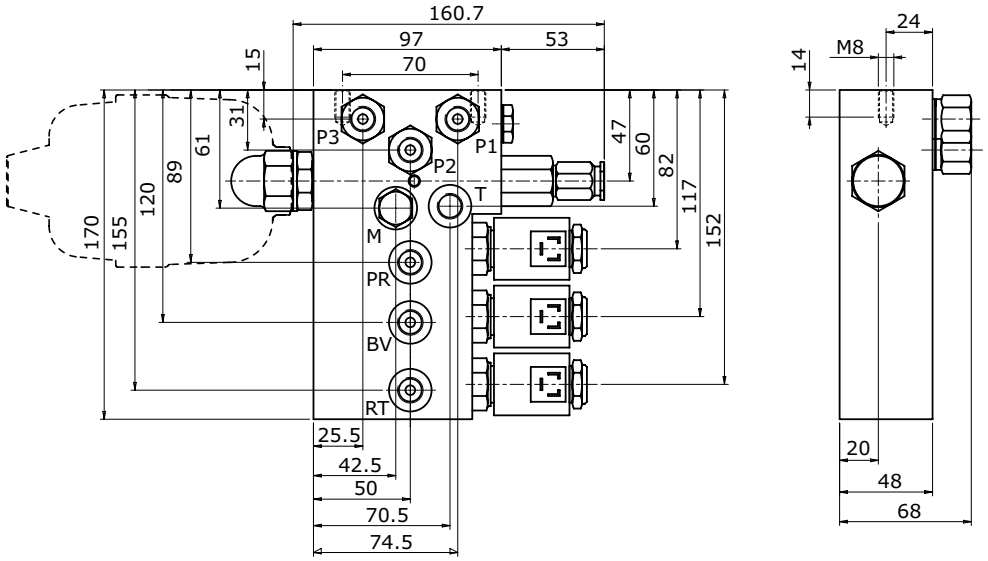
Piloting remote of:
Directional control valves
Variable displacements pumps and motors
Auxiliary valves
Frictions and hydraulic brakes

Possibility to fit 1, 2 or 3 dump valves (12 - 24 Vdc)

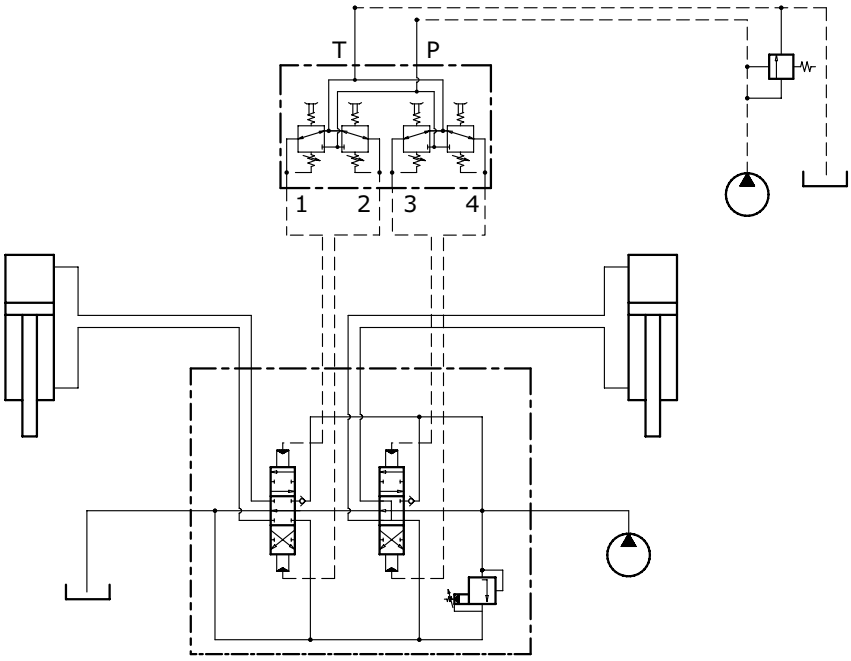
HC-SE2 Dimensions



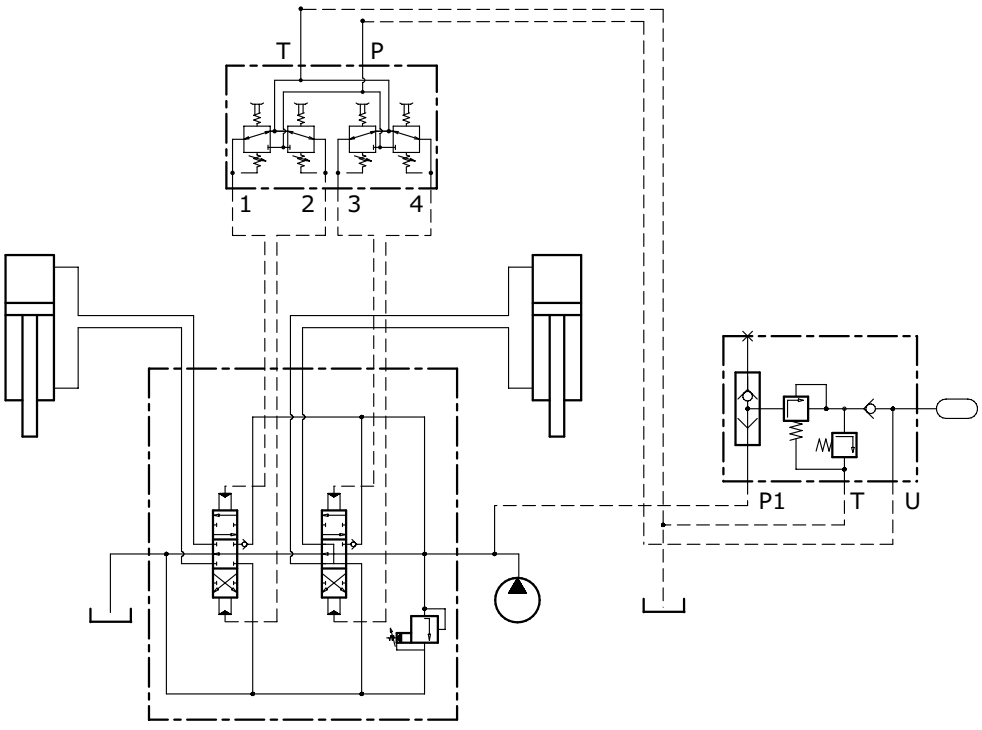
HC-SE3 Dimensions



Hydraulic remote control input with auxiliary pump



Hydraulic remote control input with supply unit coming from the main circuit



Hydraulic remote control Specifically designed for applications

PRODUCT AND SOLUTION FOR WHEEL LOADERS

HC-RCL

HC-RCL is a remote control specifically designed for Wheel Loaders application. Based on the design of HC-RCX, it is used for two axis control (typically boom and bucket). It includes the function of electromagnetic detent to hold the lever at the end of the stroke: this feature is requested on loaders to allow the operator to start driving while boom and bucket functions are still moving.

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HC-RCL3

HC-RCL3 is a remote control specifically designed for Wheel Loaders application. The compact design combines in a single body the two axis control (for boom and bucket) with a third axis (for auxiliary function). Electromagnetic detent is available on all ports. A security electrovalve to activate the remote control is available on request.

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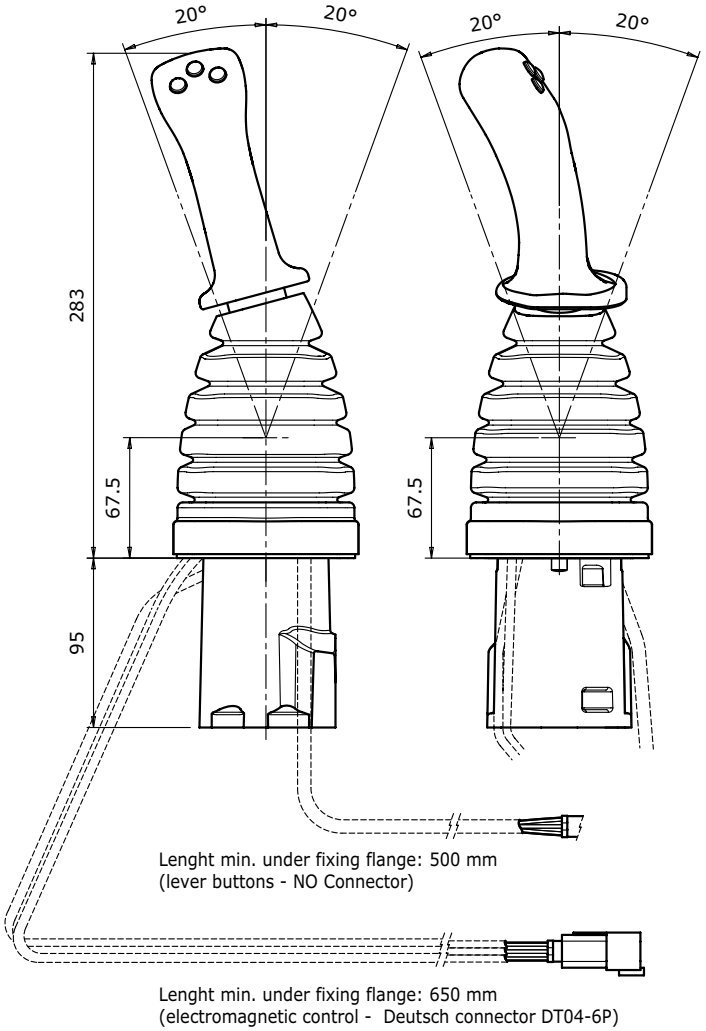
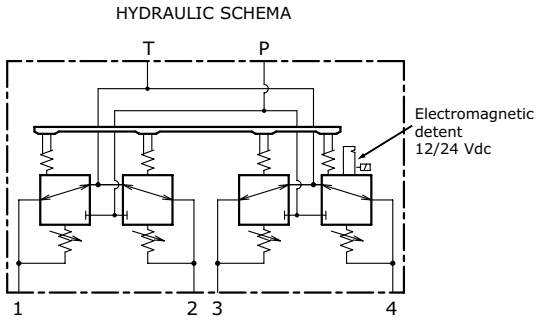
Technical specifications

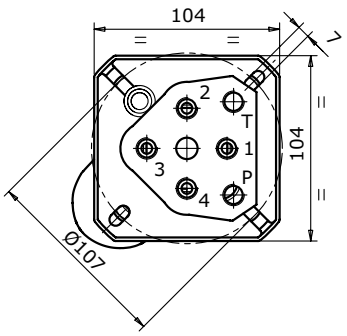
Max pressure	40 bar
Oil capacity	12 l/min
Weight	2,9 Kg

Hydraulic remote control 4 service ports, one control lever.
Electromagnetic detent on service port.
Ergonomic handles available in several configurations.
Possibility to add-on different functions on the joystick for optional controls.

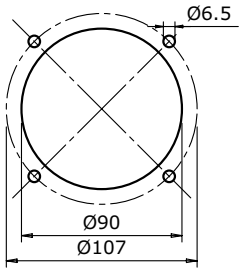
Dimensions







HOLDER HOLE DIMENSION

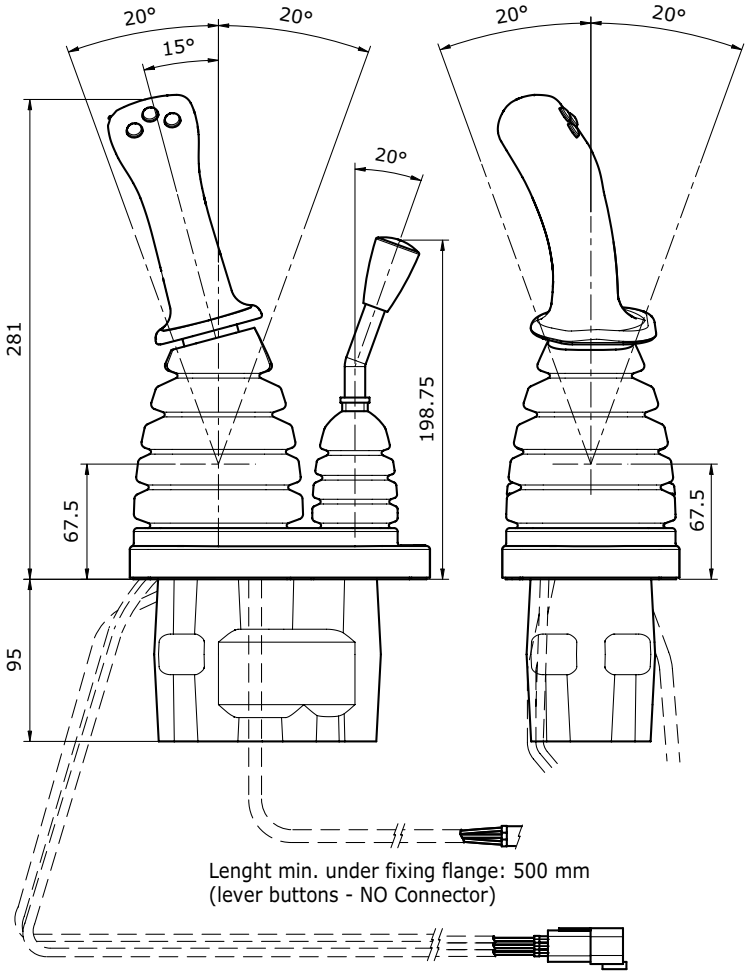


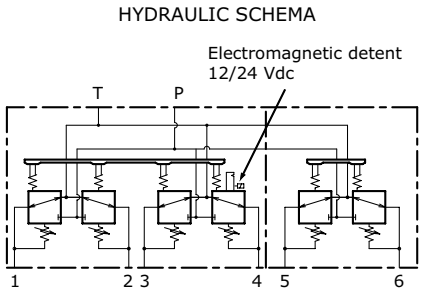
Technical specifications

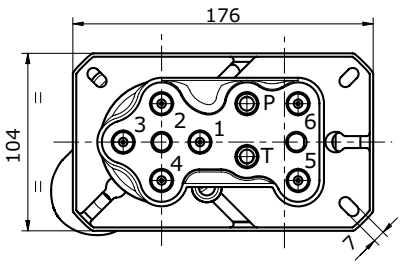
Max pressure	40 bar
Oil capacity	12 l/min
Weight	4,8 Kg

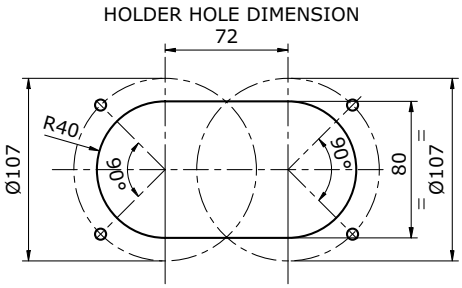
Hydraulic remote control 6 service ports, two control lever.
Electromagnetic detent on service port.
Ergonomic handles available in several configurations.
A security electrovalve to activate the remote control is available on request.

Dimensions









Selector valves

HC-SVM

Manual selector valve

Hydrocontrol selector valves has been designed with in mind the most demanding applications. The body is made of cast iron and the spool are made of steel with chrome coating. They are available in a broad range of flows and configurations.

pg. 144

HC-SVE

Electrical selector valve

Hydrocontrol selector valves has been designed with in mind the most demanding applications. The body is made of cast iron and the spool are made of steel with chrome coating. They are available in a broad range of flows and configurations.

pg. 146

General specifications

TYPE	053	056	083	086	123	126	206*	306*
Number of ways	3	6	3	6	3	6	6	6
SVM selector valves stroke (mm)	7	7	10	10	14	14	10	13
SVE selector valves stroke (mm)	4	4	4	4	5	5		
Max. recommended flow rate for SVM selector valves (l/min)	50	50	80	80	120	120	250	350
Max. recommended flow rate for SVE selector valves (l/min)	30	30	60	60	100	100		
Max. operating pressure for SVM and SVE selector valves (bar)	350	350	350	350	350	350	350	350
Max. shifting pressure for SVE selector valves (bar)	130	130	180	180	130	130		
Min. required pilot pressure for hydraulic operated (bar)	15		18		16		24	24

(*) Only hydraulic operated

Standard working conditions - Selector valves

Fluid temperature range	-25°C / +80°C
Fluid viscosity range	10 ÷ 460 cSt
Maximum contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration	β10 > 75 (ISO 16889:2008)

Order example - Manual selector valve (SVM)

HC-SVM086: W025A - H001 - F0400 - DB G04

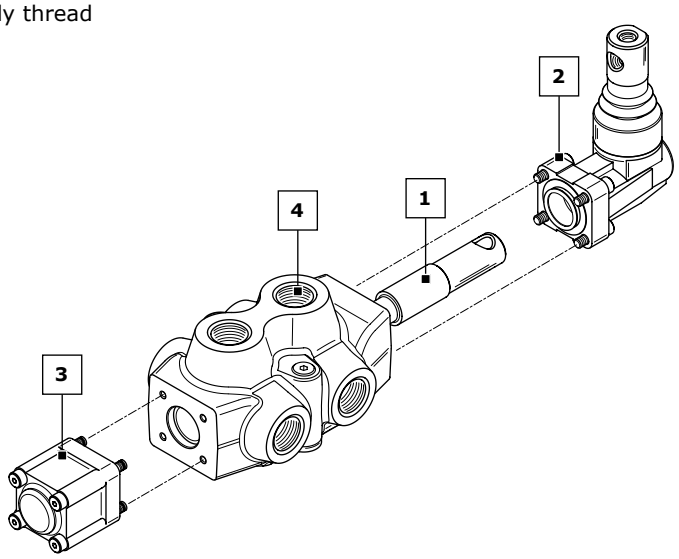
TYPE:
SVM product type
086 model

1) SPOOL TYPE:
1.1 **W025A** spool type

2) SPOOL ACTUATION TYPE:
2.1 **H001** spool actuation

3) SPOOL RETURN ACTION TYPE:
3.1 **F0400** return action

4) BODY ARRANGEMENT:
4.1 **DB** circuit type
4.2 **G04** body thread



PRODUCT TYPE:

SVM053	manual selector valve (50 l/min - 3 ways)
SVM083	manual selector valve (80 l/min - 3 ways)
SVM123	manual selector valve (120 l/min - 3 ways)
SVM056	manual selector valve (50 l/min - 6 ways)
SVM086	manual selector valve (80 l/min - 6 ways)
SVM126	manual selector valve (120 l/min - 6 ways)
SVM206	manual selector valve (250 l/min - 6 ways)**(*)**
SVM306	manual selector valve (350 l/min - 6 ways)**(*)**

SPOOL TYPE:

W022A	3 way ports connected in central position
W023A	3 way ports closed in 1 position
W024A	3 way ports closed in central position
W025A	6 way ports connected in central position
W026A	6 way ports closed in central position

SPOOL ACTUATION TYPE:

H001	Protected lever
H002	Protected lever rotated 180°
H004	Control without lever
H005	Hydraulic control

SPOOL RETURN ACTION TYPE:

F0400	2 position spring/centred in 1 (standard)
F0410	2 position spring/centred in 2
F0420	2 position detent in 1-2
F0430	Pneumatic control ON-OFF
F0440	Pneumatic control ON-OFF rotated 180°

BODY ARRANGEMENT:

DA	Service ports 3 way curcuit
DB	Service ports 6 way curcuit

3 WAYS SELECTOR VALVES THREAD:

053	M01 - G03 - U03
083	M02 - G04 - U04
123	M03 - G05 - U05

6 WAYS SELECTOR VALVES THREAD:

056	M01 - G03 - U03
086	M02 - G04 - U04
126	M03 - G05 - U05
206	S35 - S36
306	S37 - S38

NOTE:
When ordering hydraulic control (H005) leave out ordering code for return spring kit.
(*) The models SVM206 and SVM306 are available only with hydraulic control.

Order example - Electrical selector valve (SVE)

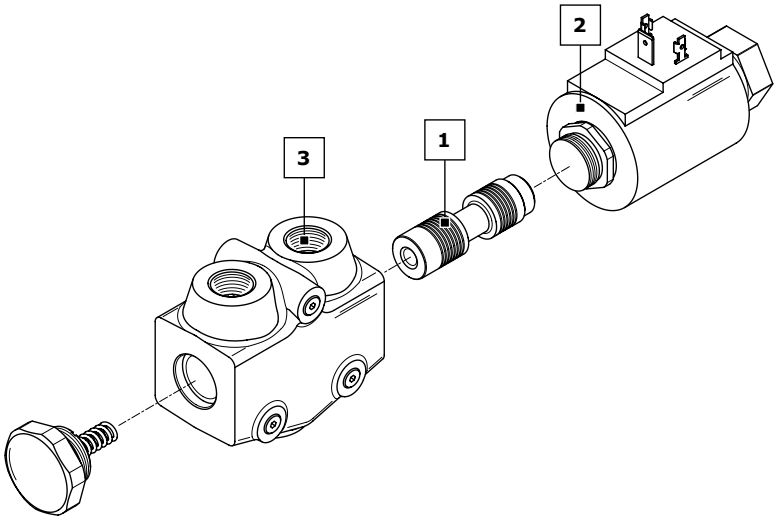
HC-SVE056: W029E - H338 - DD G03

TYPE:
SVE product type
056 model

1) SPOOL TYPE:
1.1 W029E spool type

2) SPOOL ACTUATION TYPE:
2.1 H338 spool actuation

3) BODY ARRANGEMENT:
3.1 DD circuit type
3.2 G03 body thread



PRODUCT TYPE:
SVE053 electrical selector valve (30 l/min - 3 ways)
SVE083 electrical selector valve (60 l/min - 3 ways)
SVE123 electrical selector valve (100 l/min - 3 ways)
SVE056 electrical selector valve (30 l/min - 6 ways)
SVE086 electrical selector valve (60 l/min - 6 ways)
SVE126 electrical selector valve (100 l/min - 6 ways)

SPOOL TYPE:
W027E 3 way P in port A
W028E 3 way P A B normally closed
W029E 6 way A (B) normally in port C (D)
W030E 6 way A (B) normally in port C (D).
E connected to F. E F ports in Y drainage

SPOOL ACTUATION TYPE:
H338 Solenoid 12 Vdc without drainage
H339 Solenoid 24 Vdc without drainage
H340 Solenoid 12 Vdc with drainage
H341 Solenoid 24 Vdc with drainage

BODY ARRANGEMENT:
DC Service ports 3 way curcuit
DD Service ports 6 way curcuit

3 WAYS SELECTOR VALVES THREAD:
053 M01 - G03 - U03
083 M02 - G04 - U04
123 M03 - G05 - U05

6 WAYS SELECTOR VALVES THREAD:
056 M01 - G03 - U03
086 M02 - G04 - U04
126 M03 - G05 - U05

NOTE:
W030E spool only compatible with H340-H341 controls (without drainage).

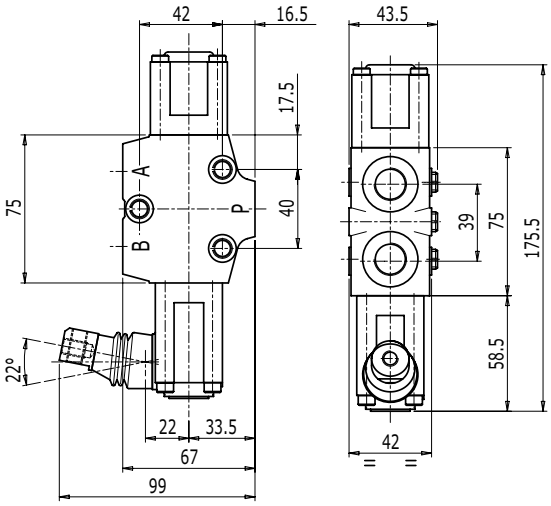
Technical specifications

The SVM series selector valves are available with manual and hydraulic actuation.

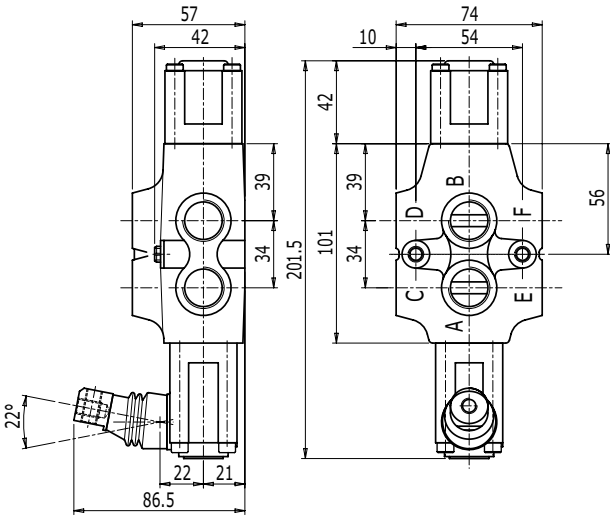
3 or 6 way, they offer all the features that today's applications may request.

They range from 50 to 350 l/min (12 - 100 Gpm) with different options available.

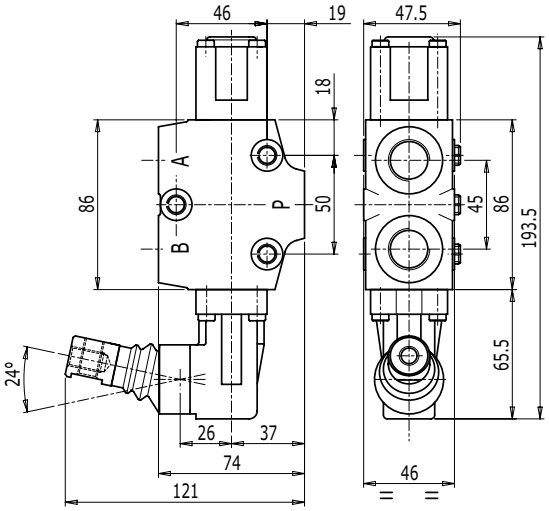
HC-SVM053 Dimensions



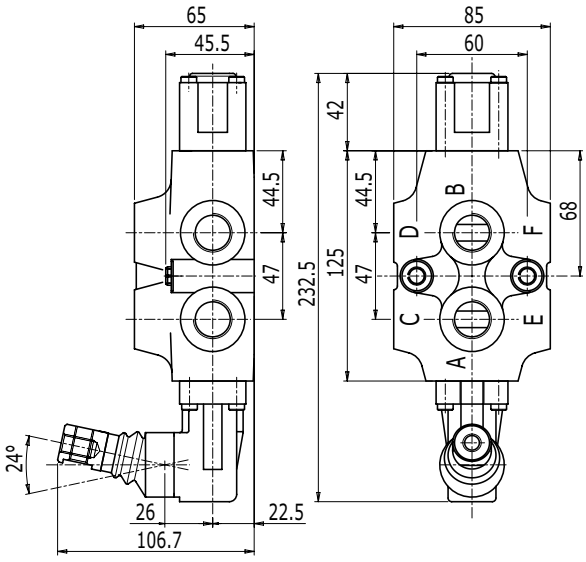
HC-SVM056 Dimensions



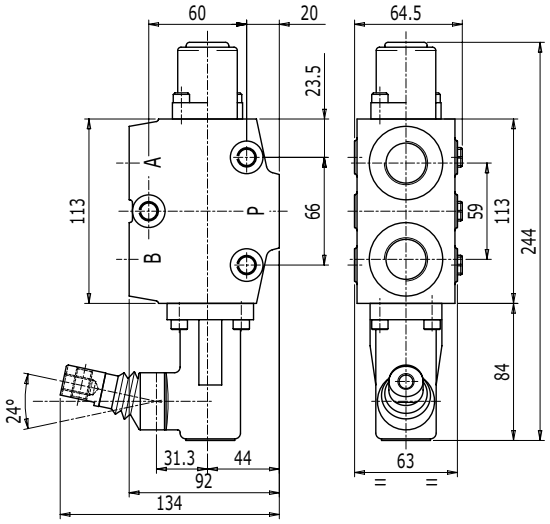
HC-SVM083 Dimensions



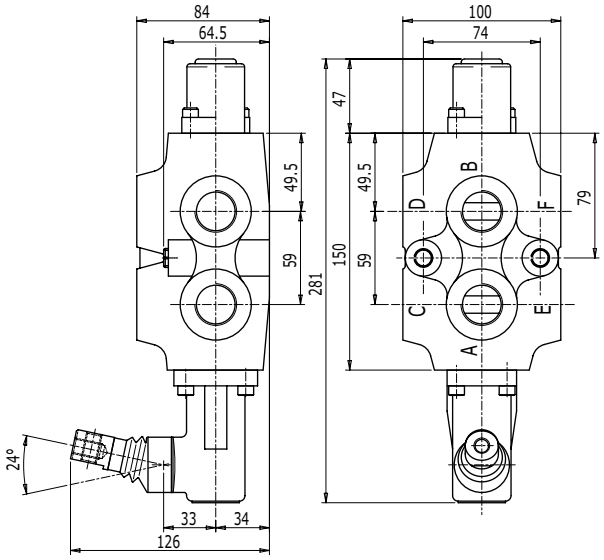
HC-SVM086 Dimensions



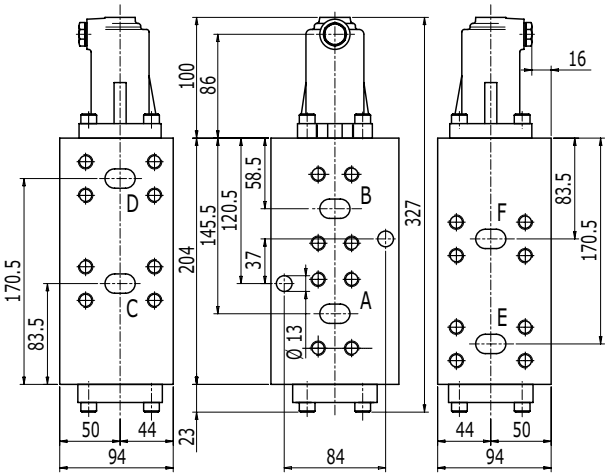
HC-SVM123 Dimensions



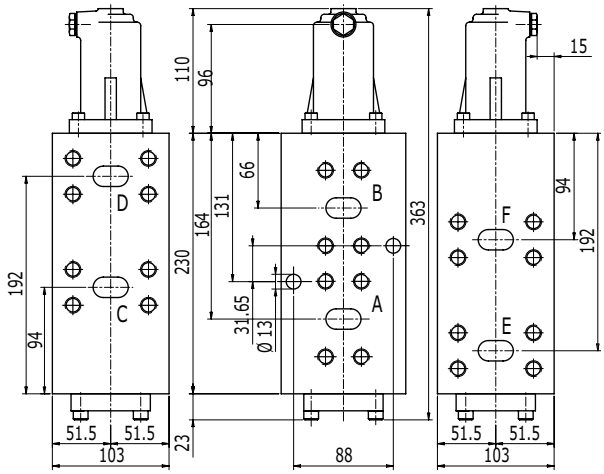
HC-SVM126 Dimensions



HC-SVM206 Dimensions



HC-SVM306 Dimensions



Technical specifications

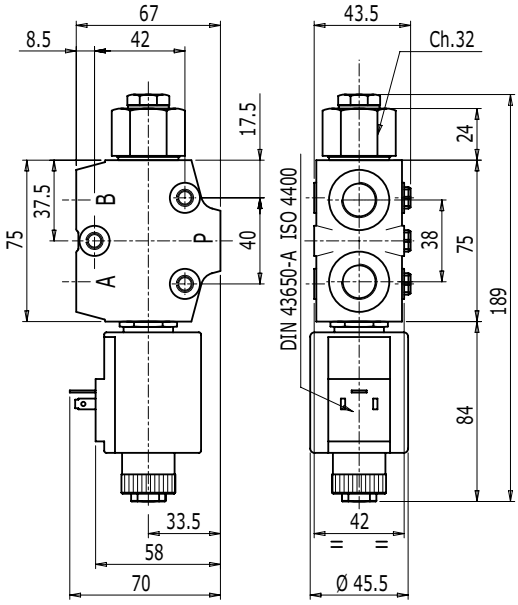
The SVE series selector valves offer a reliable solenoid operation.

3 or 6 way, they offer all the features that today's applications may request.

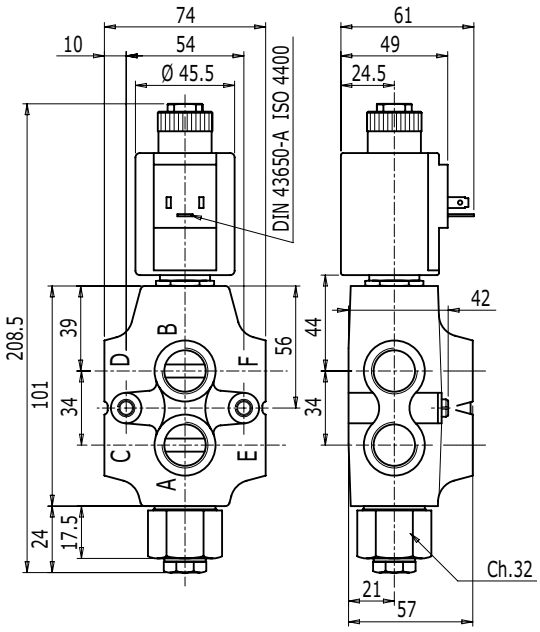
They range from 30 to 100 l/min (8 - 26 Gpm) with different options available.

Drain connection is available for high pressure applications.

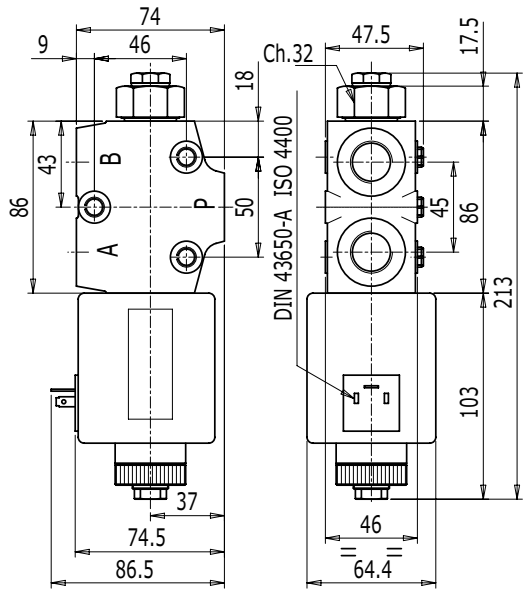
HC-SVE053 Dimensions



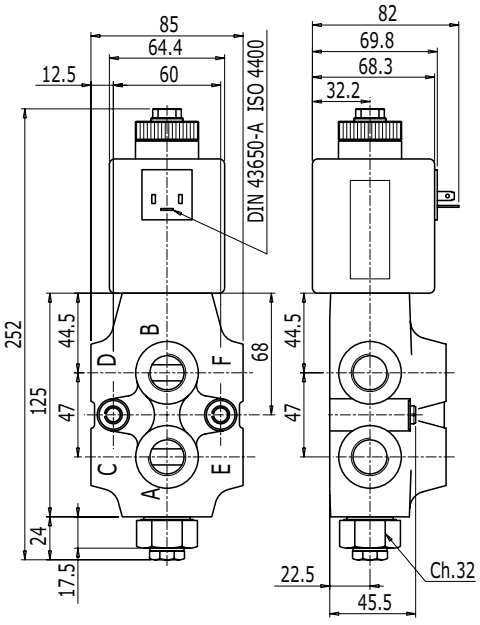
HC-SVE056 Dimensions



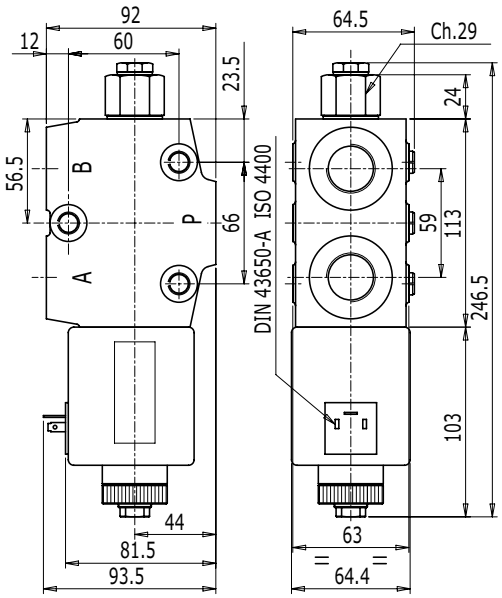
HC-SVE083 Dimensions



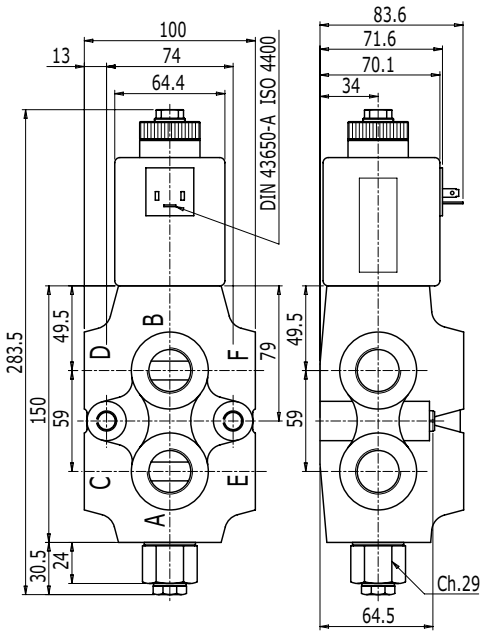
HC-SVE086 Dimensions



HC-SVE123 Dimensions



HC-SVE126 Dimensions



Coil specifications

Type	SVE053 - SVE056		SVE083 - SVE086 - SVE123 - SVE126	
Rated voltage	12 VDC	24 VDC	12 VDC	24 VDC
Rated current	3,25 A	1,63 A	3,75 A	1,88 A
Rated power	39 W		45 W	
Permitted working voltage	±10% Nominal			
Max ambient temperature	+40°C			
Max oil temperature	+80°C			
Operation time	S1 (100%)			
Protection degree	IP65			
Insulation degree	H			
Standard connector	DIN 43650			

Electronic accessories

ELECTRONIC JOYSTICK

HC-MAS
Single axis joystick with analog output.

HC-MAP
Single axis joystick with PWM output.

HC-JHM-ANH
Two axis electronic joystick with 0.5 - 4.5 Vdc analog output.

HC-JHM-AVS
Two axis electronic joystick with 0.5 - 4.5 Vdc analog output and two direction signals.

HC-JHM-TCN
Two axis electronic joystick with one PWM output and 5 digital outputs.

HC-JHM-PWM
Two axis electronic joystick with PWM outputs

HC-JHM-CAN
Two axis electronic joystick with CAN Bus interface (SAE J1939).

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ERGONOMIC HANDLES

Handles classification

"A-B-C-D"
Ergonomic type handle

"F"
Ergonomic type handle

"S"
Ergonomic type handle

"T"
Ergonomic type handle

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PWM DRIVER MODULES

HC-A1E
PWM driver module for one single monosolenoid proportional valve.

HC-A2H
PWM driver module for one bisolenoid proportional valve.

HC-EHPD
PWM driver module for 2 + 2 bisolenoid proportional valves.

HC-P8H
PWM driver module for 4 bisolenoid proportional valve.

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Electronic accessories

MACHINE MANAGEMENT MODULES

HC-STU-RC/BC
Machine management module for 8 bisolenoid proportional valves and 2 bisolenoid ON/OFF valves.

HC-1012H
Machine management module for 1 single solenoid proportional valves and 5 ON/OFF bisolenoid valves.

HC-6252H
Machine management module with up to 62 outputs and 52 inputs.

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SENSORS & ALERTERS

HC-HLPS
Linear Hall effect position sensor with analog output

HC-DHPS
Digitall Hall effect position sensor with ON/OFF outputs.

HC-SADR
Silent alerter for “F” type handle.

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HC-MAS

HC-MAS is a robust, single axis proportional joystick with analog output. Operation is based on no-contact Hall effect sensors which avoid electrical and mechanical problems. The analog output can vary in the 0 to 5V or 0 to 10V range and is suitable for driving PWM modules and ECU's in Hydrocontrol's electronic products range. Two ON/OFF outputs on signals are also available that indicate the current stroke direction.

Options

Specific electrical stroke, different from the the standard 5 Volt.
Spring center return lever/frictioned lever
'SPDT' unstable rocker switch on top of handle.

Technical specifications

Power supply voltage	10 ÷ 28 Vdc
Operating temperature	-20 °C ÷ +50 °C
Proportional output	+5 ÷ 0 ÷ +5 Vcc - 0 ÷ 5V ÷ 10 Vcc
Max output current	10 mA
Max output voltage	[Supply Voltage] - 2,5 Vdc
ON-OFF directional signals	500 mA (max) positive outputs
Connections	Extractable screw connectors, 1.5 mm^2 max sect.
Mechanical stroke	± 26 degrees
Force on handle at stroke end	20 N
Height (under panel)	115 mm
Ingress Protection Rating	IP55 (mounting screws must be sealed apart)
Ingress Protection Rating (over mounting flange)	IP66-IP65 (simple knob - handgrip with rocker switch)

HC-MAP

HC-MAP is a robust, single axis proportional joystick with PWM outputs. Operation is based on no-contact Hall Effect sensors which avoid electrical and mechanical problems. The two PWM outputs can drive directly proportional electrovalve coils with loopback current control to avoid temperature and power supply variation effects. One ON/OFF output is provided to signal PWM output activation. Minimum and maximum PWM current, PWM frequency, rise and fall ramp times are easily adjustable.

Options

Spring center return lever/frictioned lever
'SPDT' unstable rocker switch on top of handle.

Technical specifications

Power supply voltage	10 ÷ 28 Vdc
Operating temperature	-20 °C ÷ +50 °C
PWM output manimum current	100 to 2500 mA '(200 mA preset)
PWM output maximum current	100 to 2500 mA '(800 mA preset)
PWM Frequency	70 to 350 Hz
ON-OFF output max current	500 mA
Connections	Extractable screw connectors, 1.5 mm^2 max sect.
Mechanical stroke	± 26 degrees
Force on handle at stroke end	20 N
Ingress Protection Rating	IP55 (mounting screws must be sealed apart)
Ingress Protection Rating (over mounting flange)	IP66-IP65 (simple knob - handgrip with rocker switch)

HC-JHM

The HC-JHM family of joystick controller has been designed for use in Mobile and Industrial field applications and comprises of a two-axis electronic joystick based on no contact Hall effect sensors and digital electronics. The use of no contact Hall effect sensors eliminates any moving electrical parts improving performance, flexibility, reliability and working life. Furthermore, a complete line of integrated digital electronic modules offers a full range of application interfaces such as ON-OFF output, analog output, PWM output and CAN Bus field interface: the highest level of controllability for any type of electro-hydraulic system is guaranteed. When coupled with the ergonomic multi-function HC-MG up to 5 proportional axes and 9 on-off push buttons can be integrated in the same joystick. As a further option, the JHM is also available with a magnetic position detent on the X or Y axis.

Options

Joystick Movement (Option **L2S**) - Single axis control / Bi-directional
Joystick Movement (Option **L4C**) - Cross axis control / Bi-directional
Joystick Movement (Option **L4D**) - Multi axis control / Bi-directional

Common mechanical specifications

Main body material	Aluminium
Boot material	NBR / Shore 50 - UV proof
Lever deflection angle	+5 ÷ 0 ÷ +5V - 0 ÷ 5V ÷ 10 Vcc
Electrical angle	+/-23° +/- 1°
Operating temperature range	-25°C / + 80°C
Ingress Protection Rating (above panel)	Up to IP 67, depending on grip
Life	> 5 million cycles

Common electrical specifications

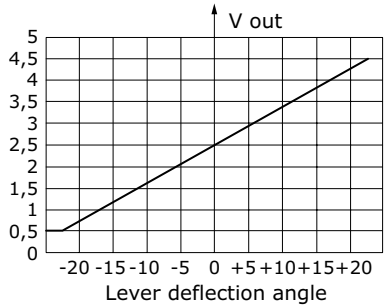
Sensor	Hall Effect contactless technology
Supply voltage	8 - 32 Vdc
Current consumption at rest	25 mA (sensor only)
Protections	Overvoltage and reverse voltage
Electronic Seal	Potted Electronics
Connector type	Deutsch HD14-9-16P (other type available on request)

HC-JHM-ANH

Two X-Y analog outputs

Technical specifications

Supply voltage	8-32 Vdc
Stand by current	25 mA
Signal output at rest	2.5 Vdc +/-0.1 Vdc
Output signal range	0.5 - 4.5 Vdc +/-0.2 Vdc (see graph)
Rated output current	1 mA

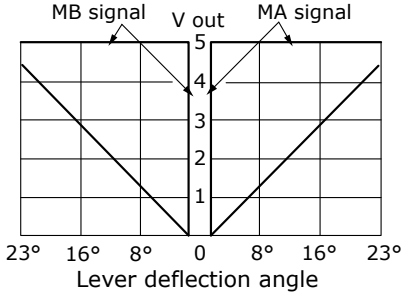


HC-JHM-AVS

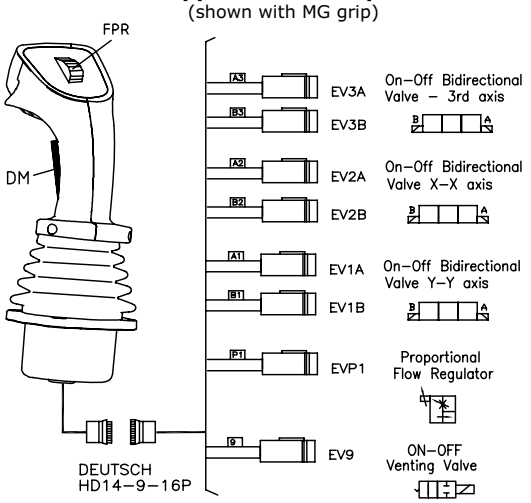
Center tap analog output signal with digital directional signals

Technical specifications

Supply voltage (Vin)	8-32 Vdc
Current consumption at rest	25 mA
Signal output at rest	0V
Output signal range	0.5 - 4.5 Vdc +/-0.2 Vdc (see graph)
Rated output current	1 mA
Digital directional outputs (MA,MB) on both axes	0 - Vin (0.7 A max)



Application example
(shown with MG grip)



HC-JHM-TCN

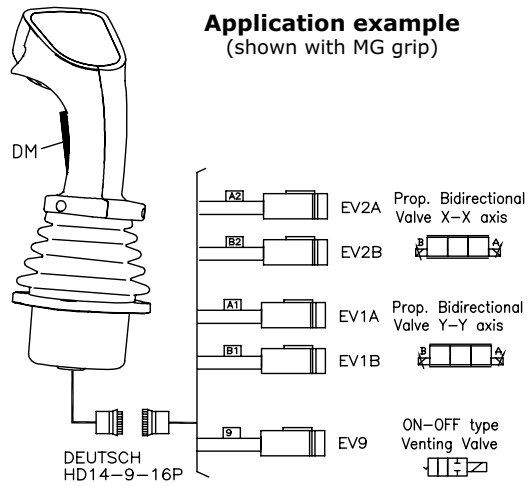
Center tap output signal with digital directional signals

1 PWM single coil output (inlet section)+
4 ON/OFF power outputs (2 bisolenoid ON/OFF sections)
+ 1 ON/OFF power output

Technical specifications

Supply voltage (Vin)	8-32 Vdc
Current consumption at rest	250 mA
PWM output	1 x single prop. solenoid valves
Current output range (PWM)	100 to 3000 mA
Dither frequency	75 to 250 Hz (factory preset)
Adjustable ramp time	0.05 to 5 sec.
Power digital outputs	5 (3.5 A)
Adjustments	via RS 232 serial line

Application example
(shown with MG grip)



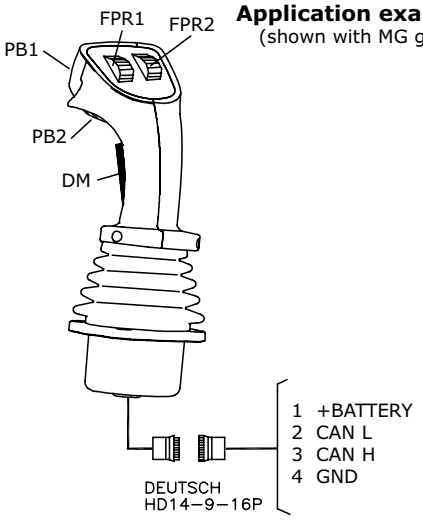
HC-JHM-PWM

PWM version (2 PWM channels)

Technical specifications

Supply voltage (Vin)	8-32 Vdc
Current consumption at rest	250 mA
PWM output	2 x dual prop. solenoid valves
Current output range (PWM)	100 to 3000 mA
Dither frequency	75 to 250 Hz (factory preset)
Adjustable ramp time	0.05 to 5 sec.
Power digital outputs	2 (3.5 A)
Adjustments	via RS 232 serial line

Application example
(shown with MG grip)



HC-JHM-CAN

CAN bus version (with interface for CAN bus line)

Technical specifications

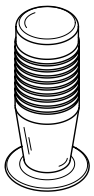
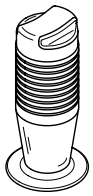
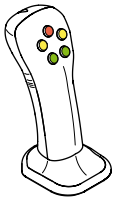
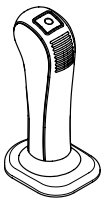
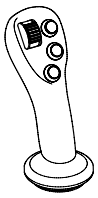
Supply voltage (Vin)	8-32 Vdc
Current consumption at rest	250 mA
Physical layer	ISO 11898 (CAN 2.0 B), 250 kbit/s
Protocol	SAE J1939
Connector type	Deutsch HD14-9-16P

The CAN Bus Module can also manage the following signals on the grip:

Digital outputs (LEDs, detent coils, buzzers)	4 x 0.7 A
Analog inputs (prop. rollers and mini-joysticks)	6 x (0-5V)
Digital inputs (push buttons, toggles)	6 x (0-Vin)

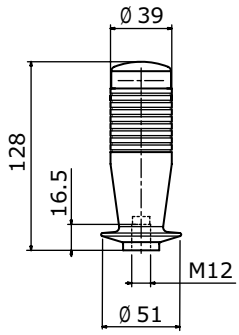
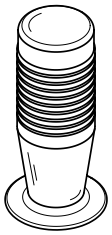
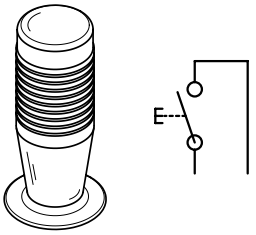
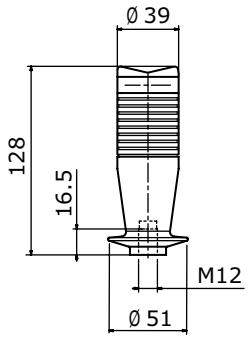
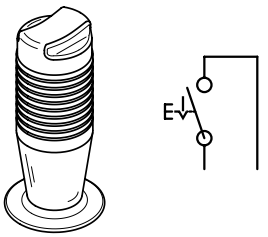
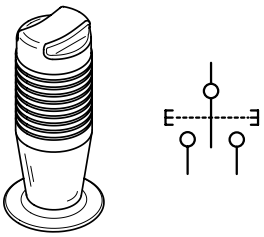
Handles classification

All the hydraulic remote controls manufactured by Hydrocontrol can be set up to have different handles according to the system dimensions and applications. All the handles in the range are shown here below; for each handle, the corresponding operation is also pictured. The choice of a handle will also influence the choice of a lever kit.

HANDLE IDENTIFICATION - QUICK REFERENCE GUIDE								
Type		Description	RCX	RCY	RCL	RCL3	RCM	RCB
A		Handle without micro-switch	•	•			•	
B		Handle with micro-switch to close	•	•			•	
C		Handle with micro-switch to close with detent	•	•			•	
D		Handle with dual micro-switch	•	•			•	
F		Ergonomic handle	•	•	•	•		
M		Handle with lens					•	•
S		Ergonomic handle slim	•	•	•			
T		Ergonomic handle	•	•	•	•		
K		Spherical handle	•	•				

Handles "A - B - C - D"

The handle families identified with A, B, C and D have been designed to equip the vast range of earth-moving machines including mini-excavators, mini-loaders, brush cutters, backhoe loaders, tractors, etc.
These handles can be set up to have – or not – a microswitch.
The hydraulic remote controls most suitable for fitting these handles are HC-RCX, HC-RCY and HC-RCM.

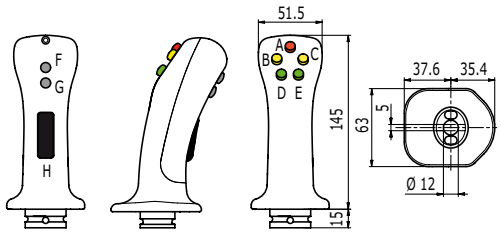
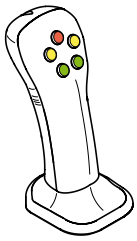
TYPE	DESCRIPTION	DIMENSIONS	CONFIGURATION
A	without micro-switch (standard)		
B	with micro-switch to close		
C	with micro-switch to close with detent		
D	with dual micro-switch		

Handles microswitch breaking B - C - D

MICROSWITCH SPECIFICATIONS	
Direct current load resistive	4.8 A 30 Vdc
TECHNICAL SPECIFICATIONS	
Hande protection	IP 40

Handle "F"

This handle has been designed to be used on our remote controls type RCX. Its ergonomics, the accurate buttons position and dimensions make its use comfortable and restful.
It can be supplied with 7 microswitches in different combinations together with a dead man push button.-

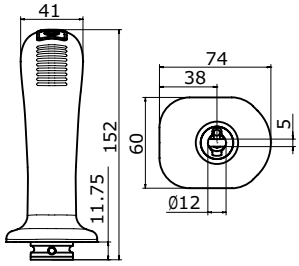
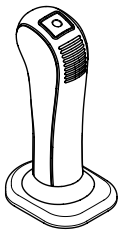
TYPE	DESCRIPTION	DIMENSIONS	CONFIGURATION
F	Ergonomic handle		

Technical specifications

BUTTONS COLOURS	
Type A	red
Type B - C	yellow
Type D - E	green
Type F - G	grey
Type H (dead man push button)	black
MICROSWITCH SPECIFICATIONS	
Direct current load resistive	5 A 30 Vdc
Direct current load inductive	3 A 30 Vdc
TECHNICAL SPECIFICATIONS	
Handle protection	IP 65
Cable section	0,5 mm^2
Useful cable lenght	700 mm

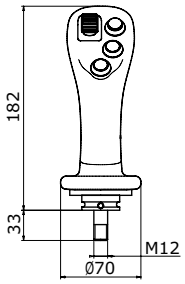
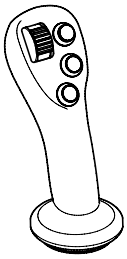
Handle "S"

This handle has been designed to be used on our remote controls type RCX. Its small size and low cost make this handly a competitive alternative for all off-highway machines manufacturers.
The handle is equipped with a top push button (3A / 125 Vac).

TYPE	DESCRIPTION	DIMENSIONS	CONFIGURATION
S	Ergonomic handle slim		

Handle "T"

Handle "T" is a multi-function ergonomic right hand grip suitable for the most demanding applications in every field: agricultural, forestry, lifting, earth moving. The handle can be set-up in a number of different and mixed configurations including pushbuttons, analog output rollers, PWM output rollers, rocker switches, mini joysticks, LED's.
Special configuration can be analyzed and realized by our technical staff.

TYPE	DESCRIPTION	DIMENSIONS	CONFIGURATION
T	Ergonomic Handle		

Technical specifications

TECHNICAL SPECIFICATIONS	
Material	thermoplastic
Colour	black
Operating temperature	-25 °C / +85 °C
INGRES PROTECTION RATING	
Standard handle	IP 65
Handle with special arrangement on request	IP 67
Handle with "Dead man" trigger option	IP 54

Standard technical specification of push button and Rocker

"DEAD MAN" PUSH BUTTON (NO)	
Rated amperage	up to 3 A inductive
Ingress protection rating (microswitch)	IP 67
PUSH BUTTON (NO)	
Rated amperage (load inductive)	3 A (max)
Rated amperage (load resistive)	5 A (max)
Operation life	100.000 cycles
Ingress protection rating	IP 64
Material	thermoplastic
Contacts	gold plated silver alloy
ROCKER SWITCH (MOMENTARY OR STABLE)	
Rated amperage (load inductive)	10 A (max)
Rated amperage (load resistive)	16 A (max)
Operation life	100.000 cycles
Ingress protection rating	IP 68
Material	thermoplastic

Standard technical specification Roller

FPR SNCH (ANALOGIC ROLLER)	
Supply voltage (Vin)	8 - 32 Vdc
Segnal output at rest	2,5 Vdc +/- 0,1 Vdc
Full output signal range	0,5 - 4,5 Vdc, +/- 0,2 Vdc
Rated output current	1 mA
Current consumption at rest	15 - 25 mA
Rotation angle	+/- 30°
Operating temperature	-25 °C / +85 °C
Ingress protection rating	IP 68 (above panel)
Operation life	> 5.000.000 cicli
Applied standards (EMC) - Immunity	EN 61000 - 4 - 2,3,6 / EN 14982
Applied standards (EMC) - Emission	EN 61000 - 6 - 3

Optional

The "T" type handle can be set-up according to countless combinations of optional components: special push-buttons, special rollers and Mini trim switches; for more informations contact our Commercial Dept.

PUSH BUTTONS	
Profiles buttons available	low - high
Available colours	red, black, yellow, green, white, blu
Buttons function	momentary N.A. - stable ON/OFF
Ingress protection rating	IP64 - IP68 (on request)
Options	Red LED built

LED	
Led dimension	Diameter 5
Supply voltage	2 V
Available colours	red, green

FPR TWCH (ROLLER)	
Supply voltage (Vin)	8 - 32 Vdc
Segnal output at rest	2,5 Vdc +/- 0,1 Vdc
Full output signal range	0,5 - 4,5 Vdc, +/- 0,2 Vdc
Rated output current	1 mA
Current consumption at rest	15 - 25 mA
FPR PWM (ROLLER PWM)	
Supply voltage (Vin)	8 - 32 Vdc
Max current consumption (no load applied)	100 mA
PWM output	100 - 1400 mA @ 12 Vdc
PWM dithering frequency	100 Hz

The "T" type handle can be equipped with MINI TRIM 4-way switches for 2 additional axis control.

MINI TRIM 4 WAY	
Rated amperage (load resistive)	2 A
Rated amperage (load inductive)	1 A
Operation life	100.000 cycles 1A inductive @ 28 Vdc
Stroke	15° (max)
Ingress protection rating	IP64 - IP68S
Operating temperature	-55°C to +85°C
Lever pivot & Stop Strenght	6,8 kg

HC-A1E

HC-A1E is a microprocessor based PWM electronic driver for the remote control of a single proportional solenoid valve. The PWM (Pulse Width Modulated) output current is controlled by an input signal coming from a potentiometer, a PLC or other control systems. The reference input signal can be a 0-5V or 0-10V voltage signal or a 0-20 mA current signal (factory options). Adjustments of minimum an maximum PWM current, ramp time, deadband and PWM dither frequency can be effected directly from a keypad integrated on the front panel. Thanks to closed loop control the current in the solenoid is independent from any change in the coil resistance or in the supply voltage. The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.

Technical specifications

Operating voltage	8.5 - 30 Vdc
Max current consumption (no load applied)	100 mA
Operating temperature	-25 / +85 °C
Ingress Protection Rating	IP 67
Analog input signal	0-5 Vdc 0-10 Vdc 0-20 mA
Input impedance	50 kOhm
Control potentiometer resistance	2 - 47 kOhm
Adjustable PWM output current	100 - 3000 mA
Adjustable PWM dither frequency	55 - 200 Hz
Adjustable ramp time	0.05 - 5 s
Protections	Supply polarity inversion, Load dump Input short circuit, PWM Output overcurrent Overtemperature
Connections	Female DIN 43650 socket (valve side) Male DIN 43650 plug (control, side)

HC-A2H

HC-A2H is a microprocessor based PWM electronic driver for the remote control of a bi-solenoid proportional valve.The PWM output current is controlled by an input signal in the 0.5-4.5 Vdc range coming from a potentiometer, a PLC or other control systems. Two trimmers allows for minimum and maximum PWM current adjustment while an auxiliary digital output signal activates whenever the PWM output is energised. Thanks to closed loop control the current in the solenoid is independent from any change in the coil resistance or in the supply voltage. The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device. The EC-PWM-A2 circuit is potted inside a plastic enclosure suitable for panel mounting by means of 2 set screws.

Technical specifications

Operating voltage	8 - 32 Vdc
Max current consumption (no load applied)	100 mA
Operating temperature	-25 / +85 °C
Ingress Protection Rating	IP 68
Analog input signal	0,5 - 4,5 Vdc
Input impedance	40 kOhm
Control potentiometer resistance	2 - 10 kOhm
Adjustable PWM output current	100 - 1400 mA
Auxiliary output max current	3A
PWM dither frequency	100 Hz
Resolution	10 bits
Protections	Supply polarity inversion, Input short circuit PWM Output overcurrent, Overtemperature
Optional	DT04-8P Deutsch connector

HC-EHPD

HC-EHPD is a microprocessor based PWM driver for the remote control of two couples of bisolenoid hydraulic valves. Two out of the overall four valves can be activated simultaneously: a digital input signal selects which valve in the couple is to be activated.Closed loop control of PWM current allows for a stable operation against coil resistance and voltage fluctuations. The module operation is fully configurable by means of a dumb terminal or a Windows software interface. Typical user configurable parameters are input signal operating range, dead-band and null position, transfer curve type, minimum and maximum PWM current, ramp-up and ramp down intervals. Moreover frequency and amplitude of superimposed PWM dithering are separately adjustable. Two different configurations can be stored and user-selected during operation by means of a dedicated digital input. Auxiliary output signals report output activation, activation direction and module malfunctioning.

Technical specifications

Electrical	
Operating voltage	10 ÷ 30 Vdc
Max current consumption (no load applied)	max 260 mA@12 Vdc
Auxiliary outputs max current (Low Side type)	300 mA
PWM output adjustable current range (ED=100%)	0 - 2000 mA
Reference input signal range/impedance (SW configurable)	0-5 Vdc (200 KΩ), 0-10 Vdc (150 KΩ), 4-20 mA (230 Ω)
Control potentiometer resistance	0.5 ÷ 10 KΩ
Auxiliary analog input (opt.)	0-5 Vdc (200 KΩ), 0-10 Vdc (100 KΩ)
Dithering frequency	20 - 350 Hz
Dithering amplitude	0 - 100% Imax
Ramp-up/down time (indipendent)	0 - 25 s
Protections	Power supply polarity inversion, overvoltage, load dump, electrovalve short circuit, disconnection, reference signal disconnection
Connections	
PWM output (J1)	Molex minifit Jr 20 p
Control signals (J2)	Molex minifit Jr 18 p
Output signals (J3)	Molex minifit Jr 8 p
Mechanical and Environmental	
Dimensions	100 x 100 x 30 mm (W x L x H)
Ingress Protection Rating: Standard	IP 30
Ingress Protection Rating: with optional watertight case	IP 67
Operating temperature	-20 + 70 °C
Operating humidity range (non condensing)	10% - 85%
Stocking temperature range	-40 + 80 °C
Stocking humidity range (non condensing)	10% - 95%
Applied standards	
Immunity	EN 61000 - 6 - 1,2
Emission	EN 61000 - 6 - 3,4
EMC earth moving machinery	ISO 13766
EMC agricultural and forestry machinery	EN 14982

HC-P8H

HC-P8H is a microprocessor based PWM driver for remote control of proportional solenoid valves in 12 and 24V systems. The unit supplies up to 4 dual coil proportional valves with PWM current proportional to the input signals coming from potentiometers, PLC or other control systems. The closed loop control makes the solenoid current independent from any change in the coil resistance or in the supply voltage. Also the inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device. It is specifically designed for applications requiring accurate adjustments and calibrations. The different operating parameters minimum and maximum current, ramp intervals, deadband, dither frequency are easily configurable via a PC connected to the RS232 port with a custom adapter kit. Input, output and supply lines are protected against common faults.

Technical specifications

Electrical	
Operating voltage	9 ÷ 30 Vdc
Max current consumption (no load applied)	100 mA
Output	
PWM outputs channels (dual coil)	4 x 2
PWM output current range	100 - 3000 mA
Input	
Analog inputs	8 x 0-5 Vdc
Resolution	10 bit
Input impedance	100 kOhm
Control potentiometer resistance	1 - 10 kOhm
Functionality	
PWM dither frequency	75 - 250 H
Ramp-up/down time (indipendent)	0,05 - 5 s
Protections	Power supply reverse polarity, load dump Output/Input short circuit, Over-current, Over-temperature
Mechanical, Environmental	
Operating temperature	-25 / +85 °C
Degree of protection	IP 67
Dimensions	132x83x28 mm (L x W x H)
Mounting holes centre to centre	119 mm
Interface	
Serial interface	RS232 (external adapter needed)
Connections	
I/O	1 xFCI SICMA2 24 ways
Software update	1xAMP-Seal 2 way
Serial line	1xAMP-Seal 3 way
Applied Standards	
Immunity	EN 61000 - 4 - 2,9,4,6
Emission	EN 58081 - 1

HC-STU

The HC-STU control unit is a powerful module with a considerable amount of on-board resources that allow for encompassing the requirements of a wide application range. HC-STU can drive up to 8 bisolenoid proportional or ON/OFF hydraulic valves and 4 single solenoid ON/OFF valves. Standard control signals are of analog 0-5V type coming from a potentiometer, a PLC or other control systems. CAN Bus 2.0b interfacing is provided as well. Operating parameters, like PWM currents, PWM dither frequency, ramp interval and more, can be set up by means of a Windows application running on a PC or by a simple handeld keypad. On board diagnostics keep module operation monitored and report errors on a standard 2 digits 7 segment display. Optionally a wider LCD display is available. Non standard configurations and customized functionalities can be available on request. Functionality and system architecture can be furtherly extended using the CAN Bus interface. The unit is available in resin moulded version for cabinet mounting – HC-ST_RC - or in sealed case (IP67) with connectors – HC-ST_BC.

Technical specifications

Electrical	
Operating voltage	10 ÷ 30 Vdc
Max current consumption [no load applied]	300 mA
Output signals	
PWM output	16 x [0-2250] mA
ON/OFF power outputs	4 x 2500 mA
ON/OFF auxiliary outputs	1 x 700 mA
Analog outputs	1 x (0÷10 Vdc), 10mA
Input signals	
Analog inputs	8 x (0÷5 Vdc), Rin =11 Kohm
Digital inputs	7 x (0÷30 Vdc)
Frequency input (pick-up)	1x (0÷Vcc), 10 KHz max
Control potentiometer resistance	1÷10 kOhm
External reference power supply	5 Vdc ± 5%, 100 mA
Functionality	
Ramp-up/down time (indipendent)	0 ÷ 25 s
PWM frequency	50-300 Hz
Protections	Power supply polarity inversion, Output short circuit, Reference signal disconnection
Interfacing	
CAN Bus interface	CAN 2.0b
Serial interface	TTL levels (adapter needed)
Connections	
J2,J3,J4	SAURO-CTF04008
J5,J6,J8,J9	SAURO-CTF12008
J10	SAURO-CTF04001
Display	
2 digit 7 segments on board	Standard
External 16 characters x 4 lines LCD	optional
Mechanical (resin moulded version)	
Dimensions	221 x139 x 38 mm
Mounting holes interaxis	188x101, 3 x Φ5mm
Ingress Protection Rating	IP 30
Mechanical (watertight case version)	
Dimensions	256 x 210 x 45 mm
Mounting holes interaxis	242 x142 mm, 4 x Φ6mm
Ingress Protection Rating	IP 65
Environmental	
Operating temperature range	-20 + 70 °C
Operating humidity range (non condensing)	10% ÷ 85%
Operating temperature range	-40 + 80 °C
Stocking humidity range (non condensing)	10% ÷ 95%
Applied standards	
Industrial immunity	EN 61000 - 6 - 1,2
Residential emission	EN 61000 - 6 - 3,4

HC-1012H

HC-1012H unit has the full functionality needed for the integrated control of mobile equipment functions when advanced safety and fault detection features are a major concern. It is normally used as a stand-alone controller for 5 functions systems using 1 proportional inlet section feeding up to 5 ON/OFF bi-directional valves: 10 inputs and 12 outputs are overall managed by this small-size unit. Operating parameters - like PWM output current, PWM frequency, ramp intervals - are field adjustable and their settings are stored in a EEPROM memory. Parameters set-up is performed via a Windows application running on a standard PC connected with a RS232 serial line allowing for accurate adjustments and calibration. Input, Output and supply lines are protected against all main faults. A 3-wires RS232 serial interface is also available on board.

Technical specifications

Electrical	
Operating voltage	9 - 30 Vdc
Max current consumption (no load applied)	100 mA
Output	
PWM outputs channels (single solenoid)	1
PWM output current range	100 - 1500 mA
Digital power outputs (Highside)	11 x 3.5A max
Input	
Analog inputs	8 x 0-5 Vdc
Resolution	10 bit
Input impedance	100 kOhm
Control potentiometer resistance	1 - 10 kOhm
Digital inputs	2
Functionality	
PWM dither frequency	75 - 250 Hz
Ramp-up/down time (indipendent)	0,05 - 5 s
Protections	Power supply reverse polarity, load dump, Output/Input short circuit, Over-current, Over-temperature
Mechanical, Environmental	
Operating temperature	-25 / +85 °C
Ingress Protection Rating	IP 67
Dimensions	132x83x28 mm (L x W x H)
Mounting holes centre to centre	119 mm
Interface	
Serial interface	RS232 (external adapter needed)
Connections	
I/O	1 x FCI SICMA2
I/O	1 x Deutsch DT06-6S
Software update	1 x AMP-Seal 2 way
Serial line	1 x AMP-Seal 3 way
Applied Standards	
Immunity	EN 61000 - 4 - 2,3,4,6
Emission	EN 61000 - 6 - 3

HC-6252H

HC-6252 is the answer for applications requiring a considerable amount of controlling power together with advanced safety and fault-detection features. The unit can handle up to 62 inputs and 52 outputs with a redundant processing subsystem using two microcontrollers. Especially designed for applications where high safety requirements and management of numerous functions are needed, this module is commonly used as the main ECU in machine management systems of aerial platforms, cranes, telehandlers and agricultural machines. For even more demanding applications two or more MMS boards can be interconnected by means of a 2-wires RS485 serial lines or CAN bus. Adjustment of working parameters can be carried out in the field via RS232 serial line, CAN bus interface or a terminal unit. A serial connection is also provided for software download.

Technical specifications

Electrical	
Operating voltage	8.5 - 30 Vdc
Max current consumption (no load applied)	1000 mA
Input	
Analog voltage inputs	16 x 0-5 V dc
Input impedance	100 kOhm
Control potentiometer resistance	1 - 10 kOhm
Analog current inputs	6 x 0-20mA
Resolution	10 bit
Digital inputs	40
Output	
High Side power outputs	8 x 5000 mA
High Side power outputs	28 x 3500 mA
High Side signal outputs	10 x 700 mA
Max current load on all outputs	16 A
PWM outputs channels	4 x 0-2000 mA
Analog outputs	6 x 0-5 Vdc
Protections	Power supply reverse polarity, load dump, Output/Input short circuit, Over-current, Over-temperature
Mechanical, Environmental	
Dimensions	215.5 x 148
Operating temperature	-25 / +85 °C
Ingress Protection Rating	IP67
Interfaces	
RS232	1
RS422 (4 wires) or RS485 (2 wires)	1
CAN Bus	3
Connections	
Main connectors	2 x FCI-SICMA-2/DCS2 56 ways
Auxiliary connector	FCI-SICMA-2 24 ways
RS232	DB15F
Applied Standards	
Immunity	EN 61000 - 4 - 3,4,6
Emission	EN 61000 - 6 - 3

HC-HLPS

HLPS is a Hall effect sensor based device used in conjunction with spool position transducer kits (1) available for HC-MV99, HC-D4, HC-M50. HC-HLPS is based on a state of the art programmable Hall effect sensor device; after the final assembly of the valve a computer assisted calibration procedure is performed that compensates for mechanical inaccuracies and uncertainties allowing to attain high accuracy and linearity in spool position detection. Spool position is output as an analog voltage signal in the 0.5-4.5V range. The unit works in 12V and 24V environments and is protected against load-dump and other major electrical faults. Fault signalling is carried out through the output signal. HLPS with the companion mechanical kit is therefore applicable in spool loopback control applications and whenever determining spool position reliably is, as in safety functions, a major concern.

Technical specifications

Electrical	
Operating voltage	6 - 30 Vdc
Max current consumption	20.5 mA
Output	
Output voltage spanning	0.5 - 4.5 Vdc
Quiescent voltage	2.5 Vdc
Output current	-1 - +1 mA
Minimum output load resistance	4.5 kOhm
Overall accuracy	± 2.5%
Resolution	12 bit
Fault signalling levels	4.8V < Vout < 0.2 Vdc
Protections	short circuit protection, reverse,battery protection, thermal shutdown, overvoltage, undervoltage, load-dump
EM Immunity	> 60 Vdc/m
Mechanical, Environmental	
Operating temperature	-40 / +85 °C
Ingress Protection Rating	IP 65
Dimensions	28 x 18 x 23 mm (L x W x H)
Connections	
I/O	DIN 43650-C male
Applied Standards	
Immunity for industrial environments	EN 61000-6-2
Emission standard for residential commercial and light-industrial environments	EN 61000-6-3
EMC - Agricultural and forestry machines	EN 14982
EMC - Earth-moving machinery	ISO 13766

HC-DHPS

DHPS is a microprocessor controlled, Hall effect sensor based device designed to cope with the electro-hydraulic kit F2700 to realize a digital spool position transducer. DHPS activates an ON/OFF output signal corresponding to the valve output being opened: actually, the output signal activates before oil flows to the user allowing a controlling ECU to prevent possible dangerous actuation. Both an "Active HIGH" and an "Active LOW" output signal versions are available. Also different termination connectors, Deutsch DT04 and Framatome SICMA, are available as an alternative. The unit works with both the 12V and 24V power supply voltage and is protected against load dump and other major electrical faults. Fault signalling is carried out through the couple of output signals. A particular design of the magnetic system integrated in the spool, working in conjunction with a self calibration software algorithm, helps compensate for mechanical tolerances allowing the DHPS to provide the system with a safe and reliable spool position information. Besides that, a couple of redundant Hall effect sensors are used which allows the controller to detect possible malfunctioning and prevent uncontrolled, dangerous situation. DHPS for the F2700 kit find its typical application in lifting machines where safety functions such as load moment limitation and tilt prevention are to be implemented.

Technical specifications

Electrical				
Operating voltage	8 – 28.8 Vdc			
Max current consumption	34 mA			
Output				
Low level Output voltage	0 Vdc			
High level Output voltage	VBattery - 0.5 Vdc			
Spool stroke at Output activation	0.9 mm			
Spool stroke at Output de-activation	0.8 mm			
Output current	1000 mA			
Output Logic	**Active LOW Logic**		**Active HIGH Logic**	
	OUT_A	OUT_B	OUT_A	OUT_B
Flow on port A	OFF	ON	ON	OFF
Rest position	ON	ON	OFF	OFF
Flow on port B	ON	OFF	OFF	ON
Fault	OFF	OFF	ON	ON
Protections	Overcurrent, reverse,battery, thermal shutdown overvoltage, undervoltage, load-dump			
EM Immunity	30 Vdc/m			
Mechanical, Environmental				
Operating temperature	-40 / +85 °C			
Ingress Protection Rating	IP68 (FCI Sicma version) IP67 (Deutsch version)			
Dimensions	65 x 27 x 9.5 mm (L x W x H)			
Connections				
'S' option	FCI Sicma Sealed 4 ways (211PC062S4049 + 211CL2S1160)			
'D' option	Deustch (DT04-4P)			
Applied Standards				
EMC - Agricultural and forestry machines	EN 14982			
EMC - Earth-moving machinery	ISO 13766			

HC-SADR

HC-SADR is a so called "silent alerter" available as a companion device of the ergonomic "F" type handle with Dead Man switch. Situations exist where the operator must be alerted for some event but no audible or visible means can be used due to environmental or operational limitations. In these cases HC-SADR can send a tactile alarm to the operator, generating a variable frequency vibration in the handle. The typical application is in large cranes where the operator can't perceive load movement and speed due to the distance and the reduced visibility: a proximity sensor, coupled with a tooth wheel, generate pulses with a frequency proportional to winch speed. The HC-SADR can translate these pulses into an alerting vibration transferred to the operator's hand. "F" type handles with "Dead man" switch can be equipped with HC-SADR and a maximum of three front pushbuttons.

Technical specifications

Electrical	
Operating voltage	19.2 - 28.8 Vdc
Max current consumption (at standby)	80 mA
Input	
Input pulse frequency	0 - 65 Hz
Input pulse high level	17 - 28.8 Vdc
Output	
Alerting frequency (same as input)	0 - 65 Hz
Max solenoid current (at max frequency)	800 mA
Protections	Reverse battery, load-dump
EM Immunity	30 Vdc/m
Mechanical, Environmental	
Operating temperature	-40 / +85 °C
Ingress Protection Rating	IP 65
Connections	Non terminated 3 conductors shielded cable
Applied Standards	
EMC - Agricultural and forestry machines	EN 14982
EMC - Earth moving machinery	ISO 13766

HYDRAULIC CARTRIDGE VALVES

Pressure control valves

Pressure relief valves
Pressure reducing valves

Counterbalance valves

Counterbalance valves
Partially compensated counterbalance valves
Fully compensated counterbalance valves

Directional control valves

Spool directional valves
Check valves
Selector valves

Flow control valves

2 ways flow control valves
3 ways flow control valves
Flow divider and combiner valves
Logic element

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ELECTRIC CARTRIDGE VALVES

On-Off directional valves

2 ways directional valves
3 ways directional valves
4 ways directional valves

Proportional valves

2 ways directional valves
3 ways directional valves
4 ways directional valves

Pressure relief valves
Pressure reducing valves

2 ways flow control valves
3 ways flow control valves

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Valves

PARTS IN BODY VALVES

Pressure control valves

Proportional pressure reducing valves
Sequence valves

Counterbalance valves

Counterbalance valves
Partially compensated counterbalance valves
Fully compensated counterbalance valves
Rigenerative circuit counterbalance valves

Pilot operated check valves

Single acting pilot operated check valves
Double acting pilot operated check valves
Single acting pilot operated check valves with 2 position manual shut off

Boom - Lowering control devices (ISO 8643)

Boom - Lowering control devices for excavator
Boom - Lowering control devices for loader

Flow control valves

3 ways flow control valves for mobile applications
2 ways flow control valves for earth moving machine
3 ways flow control valves for earth moving machine
Accessories for FR-S

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ACCESSORIES

Coils and connectors
Standard in line bodies and Cavities

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APPLICATIONS

Weight lifting
Earth moving
Agricultural and industrial vehicle

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Hydraulic cartridges are manual or hydraulic operated valves in which the mobile components are installed inside a threaded body to be mounted inside a pre-defined cavity.

Pressure Control Valves

Cartridges meant to limit or reduce working pressure inside an hydraulic circuit. In this chapter there are also pressure relief cartridges, with stronger seats for heavy duty applications and/or lifting machines.

Counterbalance Valves

Counterbalance valves are auxiliary valves, to be installed directly on hydraulic actuators (cylinders and hydraulic motor). Thanks to their configuration, these valves hold the loads, and are able to limit maximum pressure inside hydraulic actuators and regulate lowering speed according to the flows coming out of directional control valves.

Directional Control Valves

In this chapter there are many types of valves: unidirectional valves, pilot operated check valves, spool type directional valves both manual and hydraulic operated. Selector valves are designed to manage pilot signals and/or Load-Sensing signal of directional control valves and integrated circuits.

Flow Control Valves

These cartridges are meant to control flow: for instance, adjustable restrictors, compensated flow regulators and pressure compensators which allow to obtain flow regulation inside integrated circuits.

Electric cartridge valves are electric-hydraulic actuated valves in which the moving components are installed inside a threaded body, to be mounted inside a pre-defined cavity. NEM-HYDRAULICS design the electric-mechanic components, granting its products the best performances.

ON-OFF Directional valves

They are all the electric cartridges which must open and close hydraulic connections. In particular, their main characteristic is the type of change over, which does not allow to regulate the intermediate position of the inner components. There are 2 different types of on-off directional valves: 2, 3, 4 way direct acting or 2 way piloted operated.

Proportional Valves

Electric proportional valves regulate passing sections, pressures or flows in proportion to a current value PWM sent out to a coil. Inside this chapter there may be 2, 3, 4 way directional valves, pressure control valves and flow regulators.

In the so called Parts-In-Body valves, moving components are installed directly into the manifold. This specific solution is designed for lifting machines, earth moving machines, agricultural application and industrial vehicles.

Pressure Control Valves

Belong to this type the valves meant to limit or reduce working pressure inside an hydraulic circuit. Inside this chapter there are also the sequence valves and the proportional pressure reducing valves.

Counterbalance Valves

Counterbalance valves are auxiliary valves, to be installed directly on hydraulic actuators (cylinders and hydraulic motors). Thanks to their configuration, these valves hold the loads, are able to limit maximum pressure inside hydraulic actuators and regulate lowering velocity in function of flows coming out of directional control valves. Parts-In-Body counterbalance valves can be: simple or double effect, in line or flange-mounted, with or without pilot dampers, high/low pilot ratio, for regenerative circuits, with open-centre or close-centre spools, etc.

Pilot operated check valves

They are auxiliary valves, to be installed directly on hydraulic cylinders, to prevent any movement due to external forces. Cylinders unlock is obtained through an inner pilot pressure which brings about the on/off opening. Parts-In-Body check valves can be: simple or double effect, in line or flange-mounted, with two position manual shut off, etc.

Boom - Lowering control devices (ISO 8643)

They are auxiliary valves, to be installed directly on hydraulic lifting cylinder in earth moving machines. They are meant to prevent the effects of a possible rupture of the flexible pipes from the directional control valve, according to international law ISO-8643*. According to their configuration or type of application on which they are mounted on, they can be piloted 1) by pilot pressure 2) or by pressure picked up from the cylinder's chamber opposite to the side which the valve is installed on.
*** The conformity to ISO8643 is obtained setting the components directly on the equipment. The machines' manufacturer or retrofit installation firms are bound to certificate results of the conformity test.**

Flow control valves

Parts-In-Body flow control valves main characteristic is that setting and compensation components are installed inside a collector, so that this type of valves can be mounted directly on the hydraulic circuit. According to their adjusting device, there can be two types of Parts-In-Body flow control valves: electro-proportional flow regulators and manually adjustable flow regulators. Among manual adjustable regulators are auxiliary regulators for earth moving machines, drawn to feed hammers or auxiliary actuator.

Coils and connectors

For every electric valve NEM is pointed out the type coil to be used, the coil must be select through the relative Technical data, in consideration of voltage supply and the type of connector. Following we bring some definitions related to the technical characteristics of the Coils.

Standard in line body - Cavity

Bodies and cavities chapter shows, the cavities for all the cartridges of the general catalogue and standard manifolds for SAE cartridges. For each cartridge, the technical chart indicates NEM part number of its related cavity. Bodies and cavities chapter, shows cavity drawing and related steel/aluminum bodies.

Applications

Weight lifting - Earth moving - Agricultural and industrial vehicle

NEM components find application in many fields, from the agricultural to the industrial vehicle to earth moving and weigh lifting equipments. They are preferred by those OEM that want to distinguish their products with the most advanced equipments.

Innovation and competence in system's development

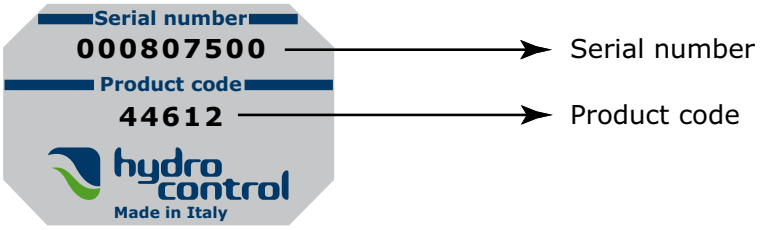
NEM S.p.A., founded in 1993, is a specialist in developing hydrailuc solutions for mobile applications. Our aim is to be a reliable partner for every customer of ours, providing him with a skilled staff, its know-how and its attitude towards the development of custom projects.

NEM is aware that the future of hydraulics is represented by the systems, hence the decision of delivering high quality products whose outdtanding performances will not change despite different applications. Our components will guarantee maximum standards of safety, and handiness in every condition. These factors together with our patented electroproportional directional control valve made so that soon many OEM, among the most important, would appreciate our products at first, to the prove us their trust.

Out total commitment and our flexibility brought us in 2004 to become partner of Hydrocontrol S.p.A., leader in designing and production of directional control valves. The support given by Hydrocontrol brought rapidly NEM to solid international success.

Product identification

All Hydrocontrol products have an identifying plate placed in specific position.



SERIAL NUMBER:

It univocally identifies the physical valve: this provides an easy way to find all sales and production details.

PRODUCT CODE:

It is a number univocally identifying the configuration and pressure settings of a valve.

Dimensions - Thread codes

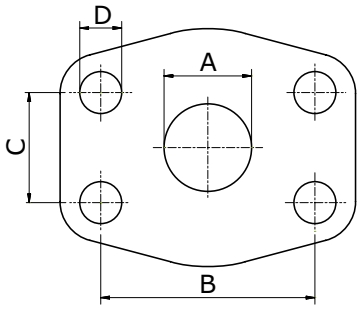
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections.

METRIC THREAD (ISO 9974-1)												
Type	M18x1,5	M22x1,5	M27x2									
Code	**M01**	**M02**	**M03**									

BSP THREAD (ISO 1179-1)												
Type	1/4"	3/8"	1/2"	3/4"	1"	1"1/4	1"1/2	2"				
Code	**G02**	**G03**	**G04**	**G05**	**G06**	**G07**	**G08**	**G09**				

UN / UNF THREAD (ISO 11926-1)							
Type	9/16" 18 UNF SAE6	3/4" 16 UNF SAE8	7/8" 14 UNF SAE10	1"1/16 12 UNF SAE12	1"5/16 12 UNF SAE16	1"5/8 12 UNF SAE20	
Code	**U02**	**U03**	**U04**	**U05**	**U06**	**U07**	

Dimensions - SAE Flange codes



SAE / 3000 FLANGE (ISO 6162-1)												
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1"1/4 (MA)	1"1/4 (UNC)	1"1/2 (MA)	1"1/2 (UNC)	2" (MA)	2" (UNC)	3" (MA)	3" (UNC)
Code	**S03**	**S04**	**S05**	**S06**	**S07**	**S08**	**S09**	**S10**	**S11**	**S12**	**S15**	**S16**
A	19	19	25	25	32	32	38	38	51	51	76	76
B	47,6	47,6	52,4	52,4	58,7	58,7	69,9	69,9	77,8	77,8	106,4	106,4
C	22,3	22,3	26,2	26,2	30,2	30,2	35,7	35,7	42,9	42,9	61,9	61,9
D	M10	3/8-16	M10	3/8-16	M10	7/16-14	M12	1/2-13	M12	1/2-13	M16	5/8-11

SAE / 6000 FLANGE (ISO 6162-2)												
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1"1/4 (MA)	1"1/4 (UNC)	1"1/2 (MA)	1"1/2 (UNC)				
Code	**S33**	**S34**	**S35**	**S36**	**S37**	**S38**	**S39**	**S40**				
A	19	19	25	25	32	32	38	38				
B	50,8	50,8	57,2	57,2	66,6	66,6	79,3	79,3				
C	23,8	23,8	27,8	27,8	31,8	31,8	36,5	36,5				
D	M10	3/8-16	M12	7/16-14	M14	1/2-13	M16	5/8-11				

Suggested metering curve for hydrocontrol valves

VALVES	TYPE	ORDER CODE	CURVE	RCX (control 02)	RCL
D9	std	W001 - H005	**A01**		
DVS10	std	W001 - H005	**A01**		
D3	std	W001 - H005	**A01**		
	floating - lifting	W012 - H005	**A01**		
	floating - lowering		**A07**	**A22**	**A07**
D4	std	W001 - H005	**A01**		
	floating - lifting	W012 - H005	**A01**		
	floating - lowering		**A07**	**A22**	**A07**
D6	std	W001 - H005	**A01**		
	floating - lifting	W012 - H005	**A01**		
	floating - lowering		**A07**	**A22**	**A07**
D16	std	W001 - H006	**A01**		
	floating	W012 - H006	**A01**	**A02**	**A01**
	floating	W012 - H034	**A07**	**A22**	**A07**
D12	std	W001 - H005	**A02**		
	floating	W012 - H005	**A22**	**A16**	**A01**
DVS20	std	W001 - H005	**A02**		
	floating - lifting	W012 - H005	**A01**		
	floating - lowering		**A22**	**A16**	**A01**
D20	std	W001 - H005	**A22**		
	floating	W012 - H005	**A22**	**A16**	**A01**
D25	std	W001 - H005	**A01**		
	floating	W012 - H005	**A22**	**A16**	**A01**
D40	std	W001 - H005	**A22**		
	floating	W012 - H005	**A22**	**A16**	**A01**
M45	std	W001 - H005	**A22**		
D10	std	W001 - H005	**A01**		
M50	std	W001 - H005	**A01**		
TR55	std	W001 - H005	**A22**		
M25	std	W001 - H005	**A22**		
	floating (28 bar)	W012 - H005	**A07**	**A22**	**A07**
BV50	diam. 17	W001 - H005	**A01**		
	diam. 22	W001 - H005	**A01**		
MV99	std	W001 - H403	**A07**		
EX34	std	W001 - H005	**A01**		
SVM306	std	W025 - H005	**A02**		
SVM206	std	W025 - H005	**A02**		
SVM126	std	W025 - H005	**A22**		
SVM086	std	W025 - H005	**A22**		
SVM056	std	W025 - H005	**A22**		