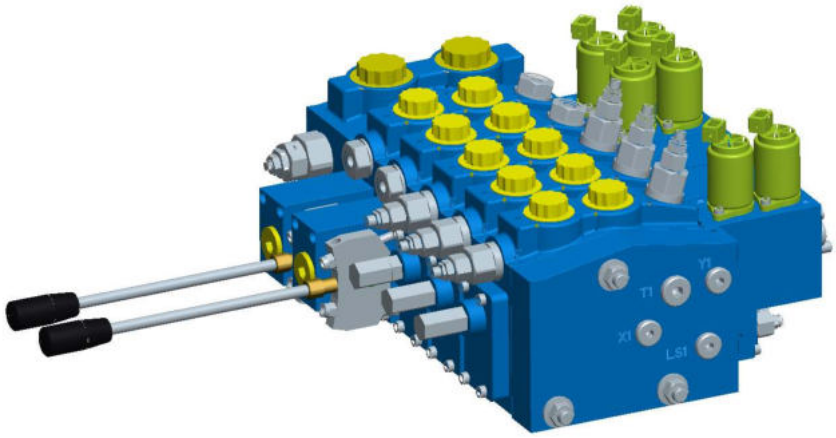
HPV Hydraulic Proportional Valves

AMCA HYDRAULIC CONTROLS

XPV-16



- Modular assembly system, suitable for ‘Build Program’.
- Maximum operating pressure 420 Bar / 6090 PSI
- Different spool types up to 160 L/min / 35,2 GPM
- Compact sandwich design, suitable for mobile applications.
- Pressure compensated for simultaneous multi users.
- Several inlet plate types available for different types of pumps.
- Operating control in any combination (Electric-, Hydraulic and manual).
- Adjustable ΔP for setting the maximum flow for maximum proportional range.
- Several user port option functions.
- Designed for customisation.

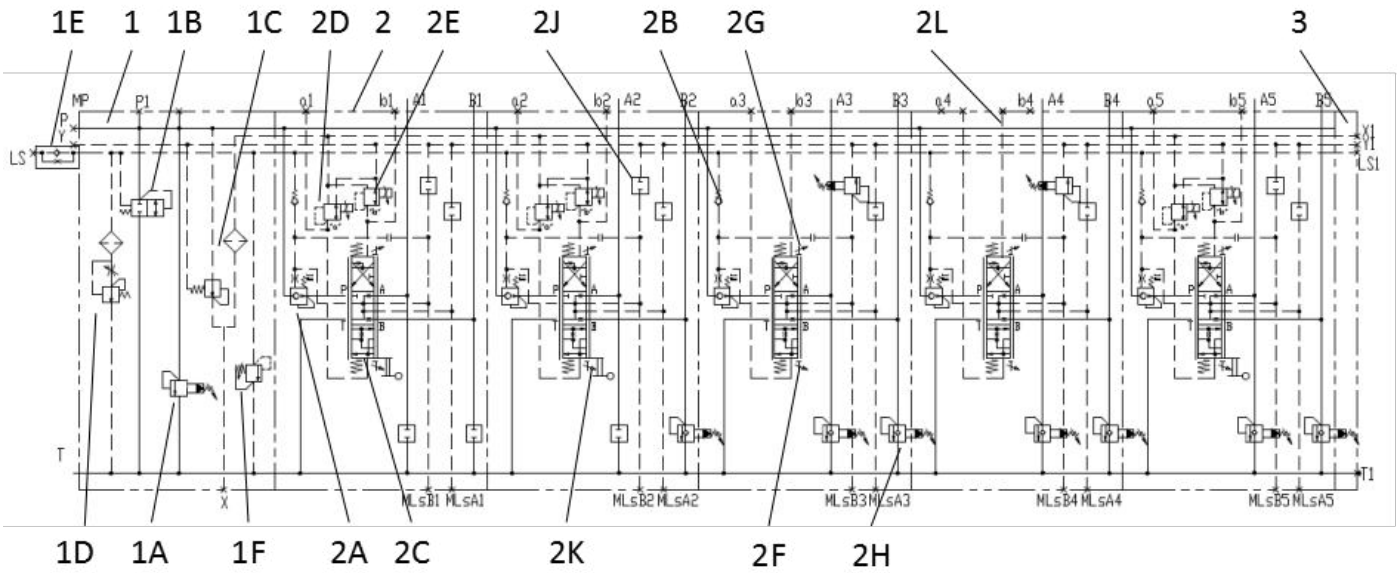
Index:

Main technical data

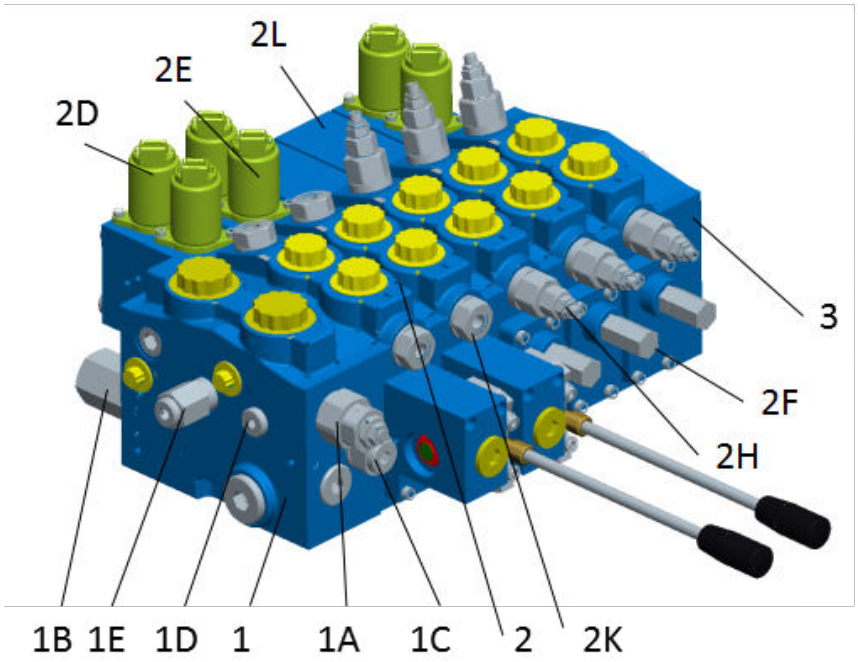
Max. flow:	Port P1 or P2	200 L/min.	44 Gallons/min
	Port P1 + P2	400 L/min.	88 Gallons/min
	Port A / B	160 L/min.	35,2 Gallons/min
Max. pressure:	Port P / A / B	350 Bar	5076 PSI
	Port T	35 Bar	508 PSI
Pressure setting range		14-350 Bar	205-5075 PSI
Pressure drop over 2-way compensator (A,B)		3-12 Bar	44-175 PSI
Internal pilot pressure supply		28 Bar	406 PSI
Pilot pressure for electric and hydraulic control		6-20 Bar	87-290 PSI
Spool stroke		9 mm	
Spool overlap (dead band)		1,3 mm (14,4% of spool stroke)	
Fluid		Mineral oil according to DIN 51524/51525	
Fluid temperature range		-30°C…+80°C	
Viscosity range		10…500cSt, optimal 30cSt	
Contamination level max.		According to NAS 1638 Class 8 or ISO 4406: 18/16/13	

Port connections	
Port P, T	G 1” BSP
Port A,B	G 3/4” BSP
Port Ls	G 1/4” BSP
Port L	G 1/4” BSP
Port YA,YB	G 1/8” BSP
Electric connection	AMP Junior Power Timer / Deutsch
Nominal voltage	12 VDC or 24 VDC
Nominal current	12 VDC (1500 mA) 24 VDC (750 mA)
Coil resistance	12 VDC (4,72 ± 5% Ω) 24 VDC (20,8 ± 5% Ω)
Recommended dither frequency	100 Hz
Type of protection	IP 65
Duty cycle	100%
Hysteresis	4%

Overview

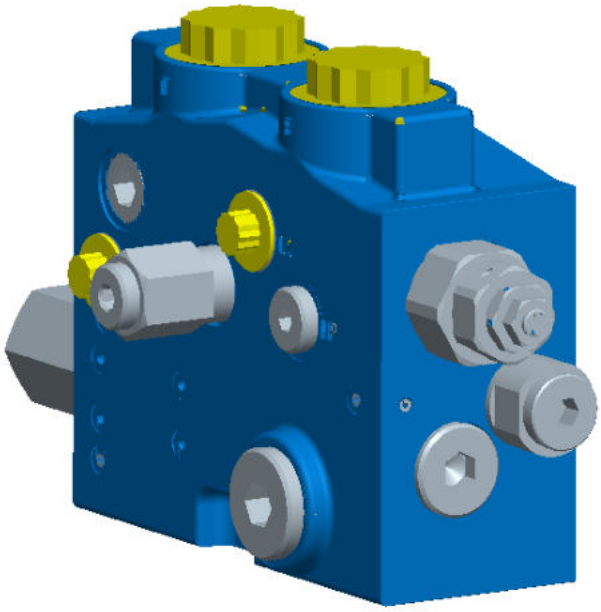


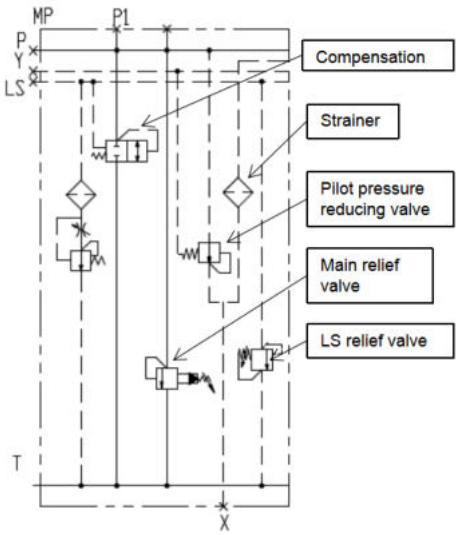
1 Inlet plate
1A Adjustable pressure relief
1B Inlet compensator/3-way compensator
1C Pilot pressure reducing valve
1D insert filter
1E compensator throttle valve
2 Control section
2A 2-way compensator
2B LS check valve
2C Main control spool
2D solenoids A side
2E solenoids B side
2F stroke limitation B
2G stroke limitation A
2H A/B shock/suction valve
2J LS Dummy
2K Manual end cap
2L Hydraulic end cap
3 End plate, P2 and T2



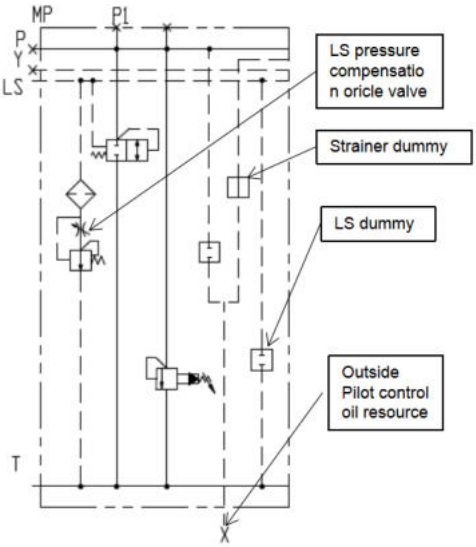
Inlet section

Inlet plates are available for fixed and variable displacement pumps, and constant pressure networks. Pilot pressure reducing valve for pilot pressure is included. Interchange plug and orifice to change between UJ and SJ is reachable from outside. P & T ports are ¾" BSP .

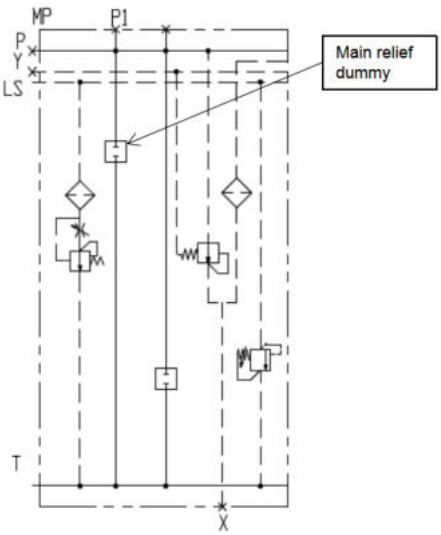




XP-1610-608U
Applied in constant flow pump and open loop system, with load relief in centre position



XP-1610-608S
Applied in variable flow pump and open loop system, with load relief in centre position



XP-1610-608N
Applied in variable flow pump and closed loop system, without load relief in centre position

Inlet configuration codes

XPV16 - 04 U 320 O F 315

Size

-	XPV16 series

Quantity of control sections

04	Four pieces

Type of control

U	Applied in constant flow pump and open loop system , with compensation
S	Applied in variable flow pump and closed loop system , with compensation
N	Applied in variable flow pump and closed loop system , without compensation

Main relief valve and max pressure set

Q	Without main relief valve
320	Max. pressure of main relief valve （320bar）

Type of pilot control oil resource

O	Outside Pilot control oil resource
I	Inner Pilot control oil resource

Strainer in pilot control oil way

Q	Without strainer in pilot control oil way
S	With strainer in pilot control oil way

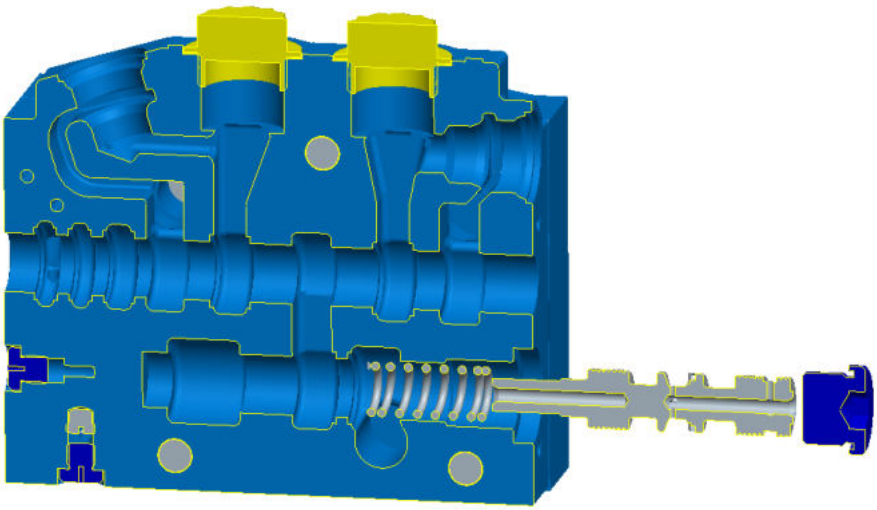
LS oil way relief valve and max pressure set

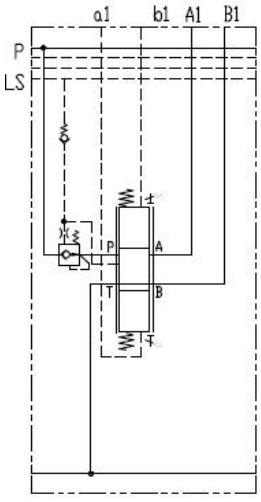
Q	Without LS relief valve
315	Max. pressure of LS relief valve （315bar）

Control section

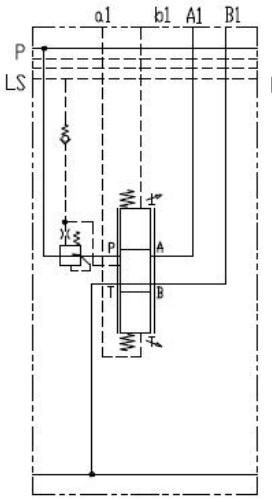
1.1 Basic types

The control section is multi-function block, which is able to mounted different kinds of safety cartridges within certain costs. The 2-way compensator has option to have delta P adjustment, so the flow can be adjusted without using the stroke limitation.
Each control sections has a handle mechanism, for emergency control, a lever can be mounted if needed.
To change between the several control types, a different end cap is used.

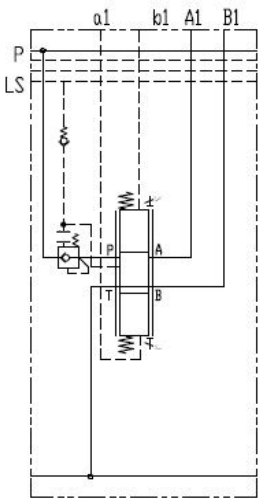




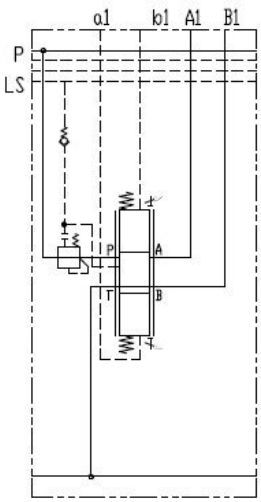
XP-1620-415F2
with compensator;
with load keeping;



XP-1620-415F
with compensator;
w.o. load keeping;



XP-1620-415F3
w.o. compensator;
with load keeping;

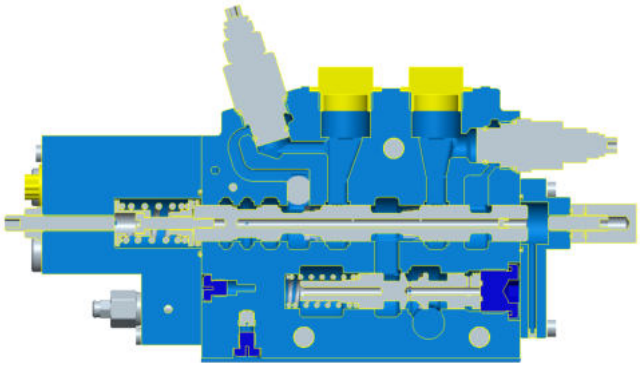


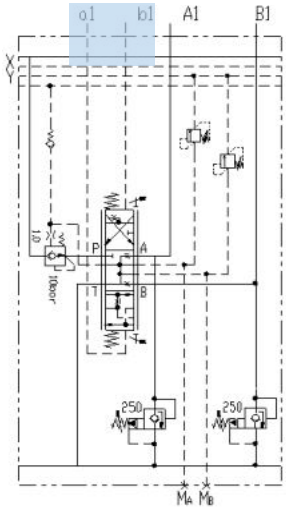
XP-1620-415N
w.o. compensator;
with load keeping;

Note: Though fitting different amount of gaskets on the top of compensation spring, you could make differential pressure between the main spool, for example, fitting none gasket could make the ΔP≈7bar, one gasket ΔP≈9bar, two gaskets ΔP≈11bar.

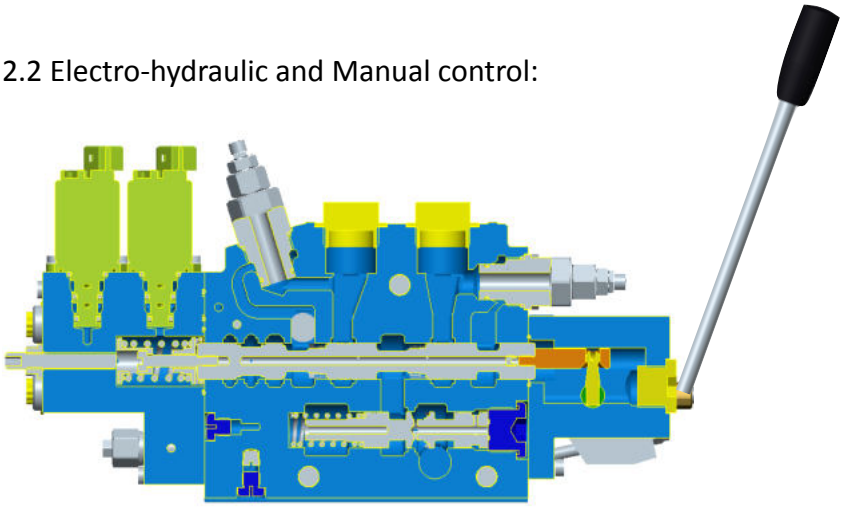
1.2 Control methode

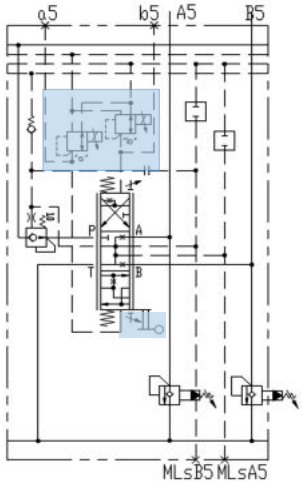
2.1 Hydraulic control,end cap with 2 ports ¼" BSP:



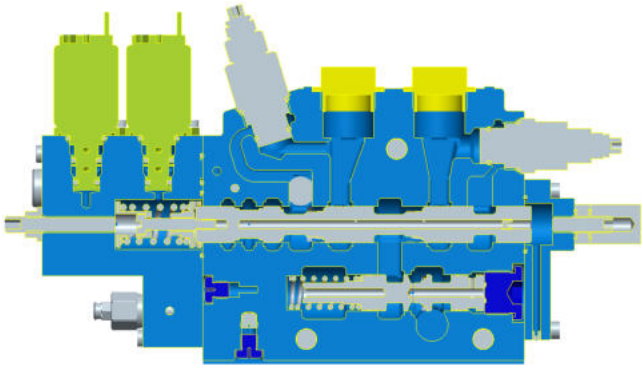


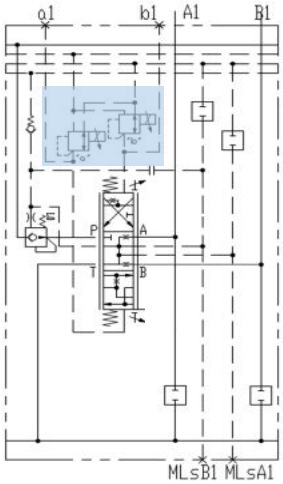
2.2 Electro-hydraulic and Manual control:





2.3 Electro-hydraulic control:



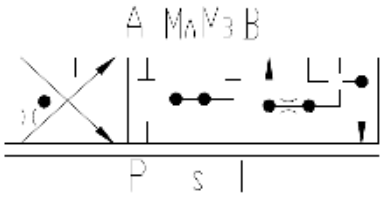


2.4 EPM2 control(under development)

3. Control spool

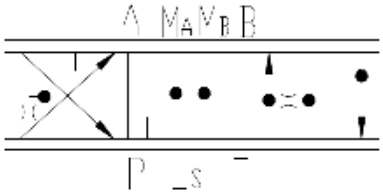
There are 3 basic control spools available, the E spool with all ports closed in neutral position ,the J spool with P closed and A en B to T in neutral position, the Q spool with P closed and A en B to T in neutral position also, but with 20% of nominal opening to T.
These 3 basic spools have 3 flow ranges, shown below.

3.1 Type E spool (Similar with type A spool in APV16)
E spool 0-25 l/min: XP-1620-111
E spool 0-45 l/min: XP-1620-121
E spool 0-70 l/min: XP-1620-131
E spool 0-100 l/min: XP-1620-141
E spool 0-130 l/min: XP-1620-151



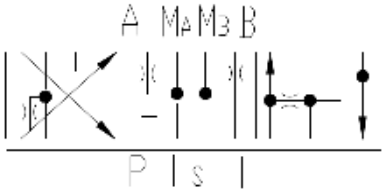
Type E spool

3.2 Type J spool (Similar with type C spool in APV16)
J spool 0-25 l/min: XP-1620-112
J spool 0-45 l/min: XP-1620-122
J spool 0-70 l/min: XP-1620-132
J spool 0-100 l/min: XP-1620-142
J spool 0-130 l/min: XP-1620-152

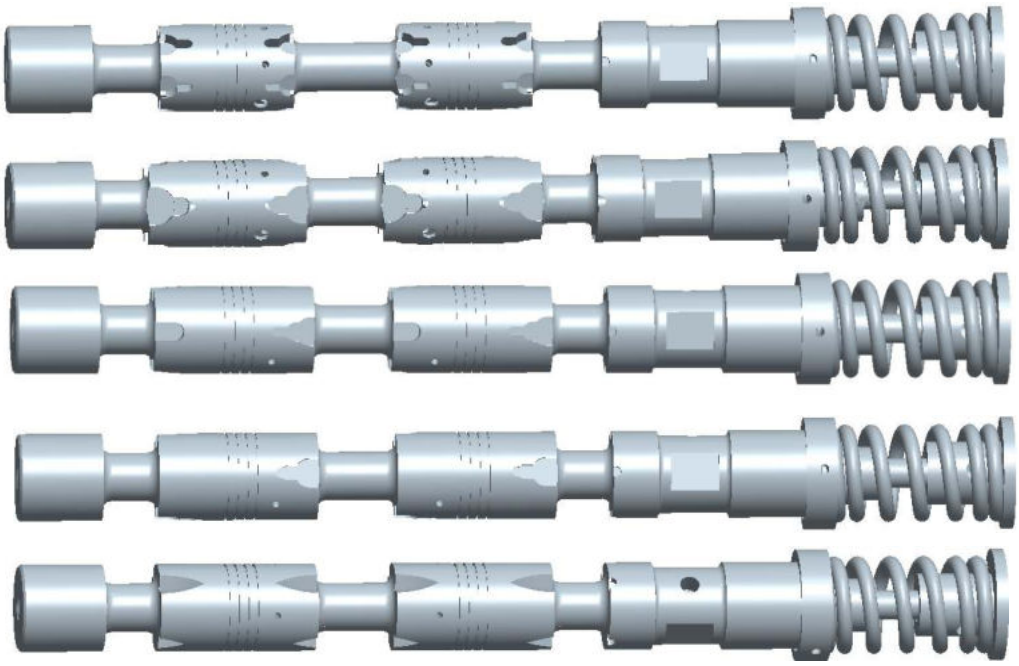


Type J spool

3.3 Type Q spool (Similar with type E,but with 20% of nominal opening to T)
Q spool 0-25 l/min: XP-1620-113
Q spool 0-45 l/min: XP-1620-123
Q spool 0-70 l/min: XP-1620-133
Q spool 0-100 l/min: XP-1620-143
Q spool 0-130 l/min: XP-1620-153

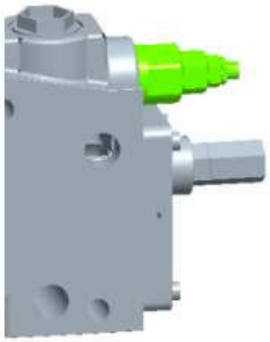


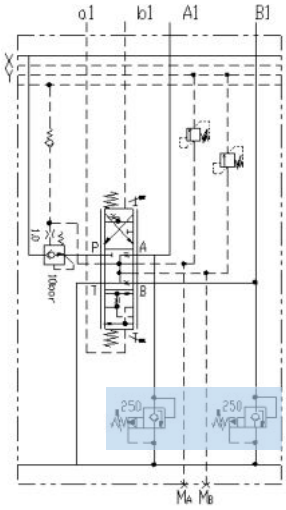
Type Q spool



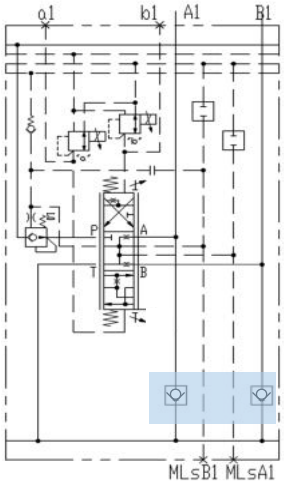
4. Port A/B functions

4.1 Shock-anti cavitation valves

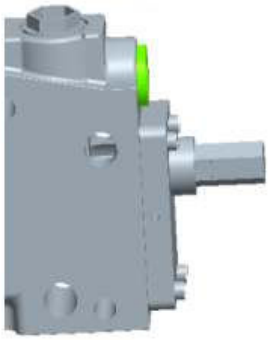


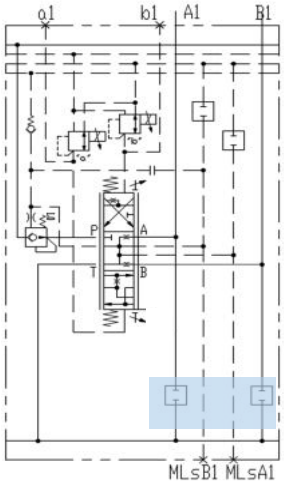


4.2 Anti cavitation valves



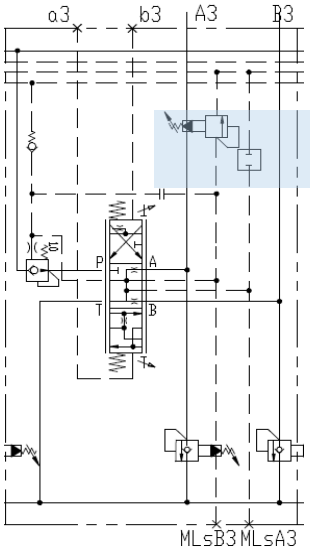
4.3 Dummy



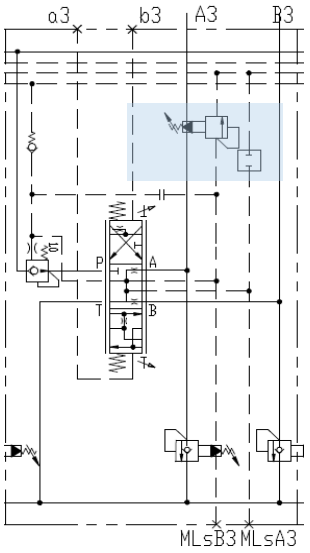


5. LS relief valve

5.1 LS relief valve by both ports A/B



5.2 LS relief valve by port A or B



6. Configuration codes control section

F1 E B M J 75 - 75 M 300 Q H 300 H 300

Basic type of control section

F	With compensation ,without load keeping
F1	With compensation and load keeping
F3	Without compensation ,with load keeping
N	Without compensation and load keeping

The way to control

HF	Manual control
OJ	Hydraulic control
OJM	Hydraulic and manual control
E.	EA..EH:Electricity control
E.M	Electricity and hydraulic control
	EA : 12V DC ,Electrical proportion solenoid
	EB:24V DC ,Electrical proportion solenoid
	EC:24V DC ,Electrical switch solenoid
	EH:24V DC , anti-explosion solenoid

Function of Spool at the middle position

E	With all ports closed in neutral position
J	With P closed and A en B to T in neutral position
Q	Similar to "J",also with 20% of nominal opening to T

Max. flow of Port A - B

...-...	... L/min.-...L/min (three-digit number)

LS relief valve

Q	Without LS relief valve
M...-M...	With measure ports and LS relief valve and could set port A -port B pressure （ bar）

Port A/B supplement function

H...H...	With shock /suction valve, set port A and B pressure value(for example:H200=200bar)
E	With suction valve
Q	With dummy

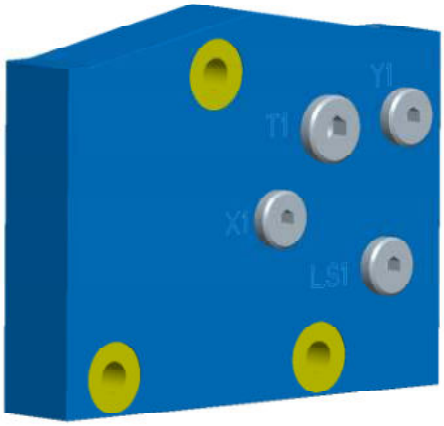
Note:

Max pressure code of port A/B			
050=50bar	140=140bar	210=210bar	300=300bar
063=63bar	150=150bar	230=230bar	320=320bar
080=80bar	160=160bar	240=240bar	330=330bar
100=100bar	175=175bar	250=250bar	350=350bar
125=125bar	190=190bar	280=280bar	

End plate

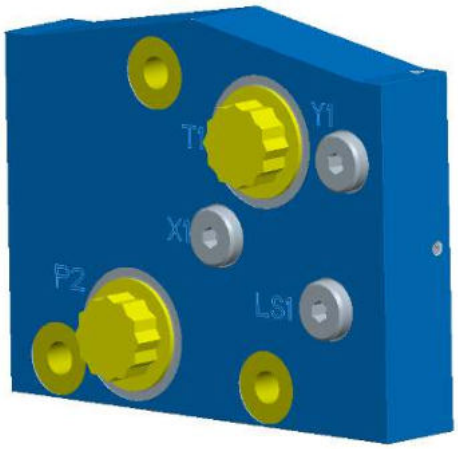
1. Basic end plate

The basic end plate has T1,X1,Y1,LS1 ports.



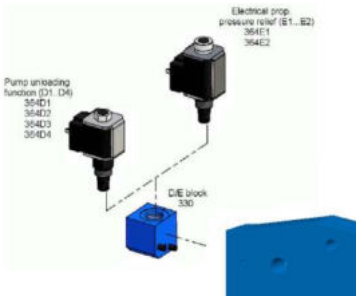
2. End plate with additional P2

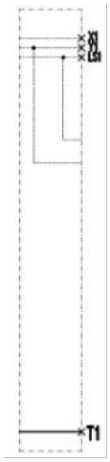
This end plate has additional P2 in 1” BSP.



3. End plate with additional ports for pump unloading and electrical prop. block

Pump unloading and electrical prop. Block used in APV series valve could also be used.





End plate configuration codes

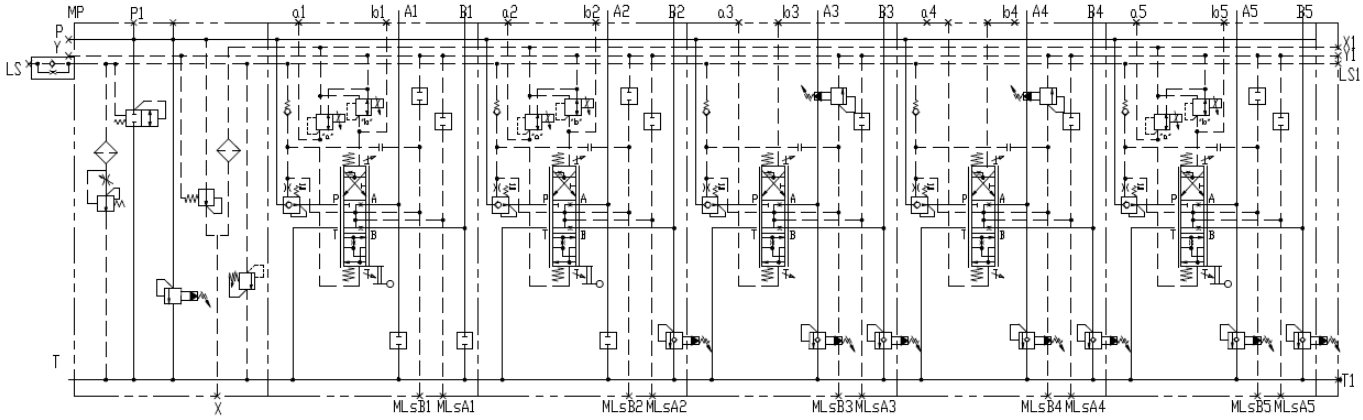
L A / D4

Type	
--	End plate

Type of end plate	
Blank	The basic end plate has T1,X1,Y1,LS1 ports
P	This end plate has additional P2 in 1” BSP.
A	Basic plate that could fit the addition function block

Addition function	
D3	With D block,pump unloading function,24VDC.N.O
D4	With D block,pump unloading function,24VDC.N.C
E2	With E block,electrical proportional pressure relief,24VDC

Product code explanation



Inlet plate XPV16-4 U350 I S350

- Applied in variable flow pump and closed loop,with load relief in centre position;
- With main relief valve ,the max pressure is 350bar;
- Inter Pilot control oil resource, with strainer in pilot control oil way;
- With Ls relief valve, and the max pressure is 350bar;

The first spool section F1EBM E100-100 QQQH300

- With compensator and load keeping;
- Electrical prop and manual control,24VDC;
- With O type spool and flow of port A/B is 100Lmin-100L/min;
- Without LS relief valve;
- Port A/B assembly with dummies;

The second spool section F1EBM E100-100 QQQH300

- With compensator and load keeping,
- Electrical prop and manual control,24VDC;
- With O type spool and flow of port A/B is 100Lmin-100L/min;
- Without LS relief valve;
- Port A assembly with dummies and port B with shock,300bar

The third spool section F1EBM E60-60M280QH300H300

- With compensator and load keeping;
- Hydraulic control;
- With O type spool and flow of port A/B is 60Lmin-60L/min;
- Port A/B assembly with shock valve, pressure of port A/B is 300bar-300bar;
- With A-LS relief valve,280bar, Without B-LS relief valve;

The forth spool section F1OJ E60-60M280QH300H300

- With compensator and load keeping;
- Hydraulic control;
- With O type spool and flow of port A/B is 60Lmin-60L/min;
- Port A/B assembly with shock valve, pressure of port A/B is 300bar-300bar;
- With A-LS relief valve,280bar, Without B-LS relief valve;

The fifth spool section F1OJ E50-50MQQH300H300

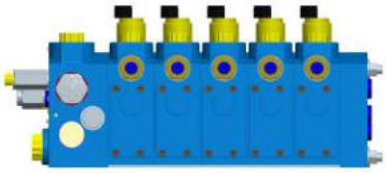
- With compensator and load keeping;
- Hydraulic control;
- With O type spool and flow of port A/B is 50Lmin-50L/min;
- Port A/B assembly with shock valve, pressure of port A/B is 300bar-300bar;
- Without LS relief valve;

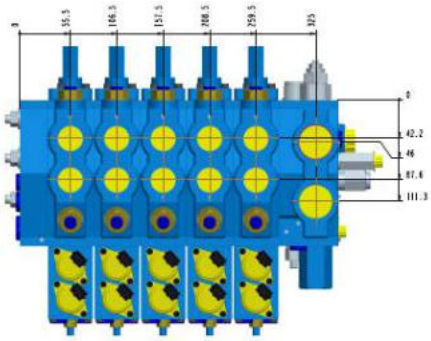
End plate L

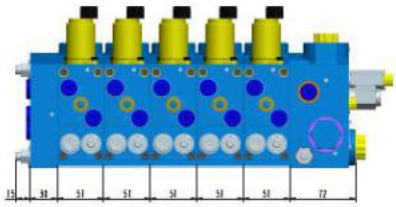
- The basic end plate has T1,X1,Y1,LS1 ports

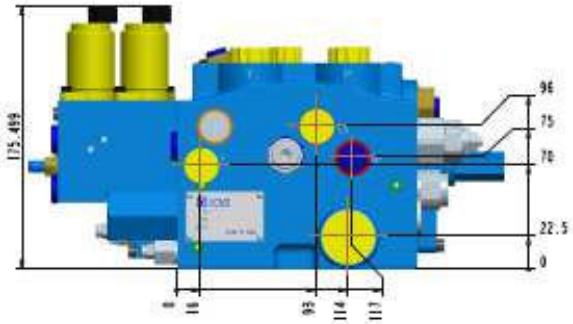
General dimensions (in mm)

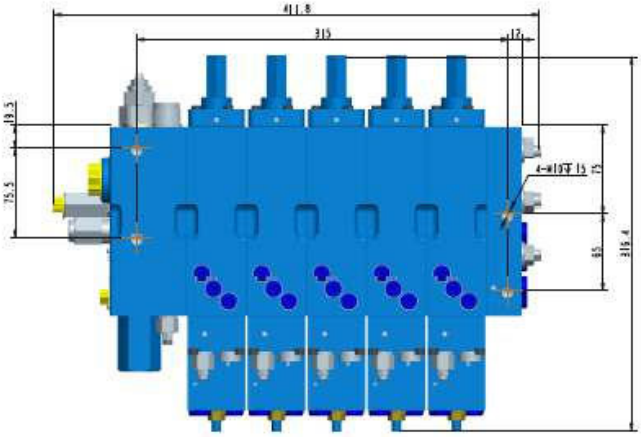
Port P, T	G 1” BSP
Port A,B	G 3/4” BSP
Port Ls	G 1/4” BSP
Port L	G 1/4” BSP
Port YA,YB	G 1/8” BSP







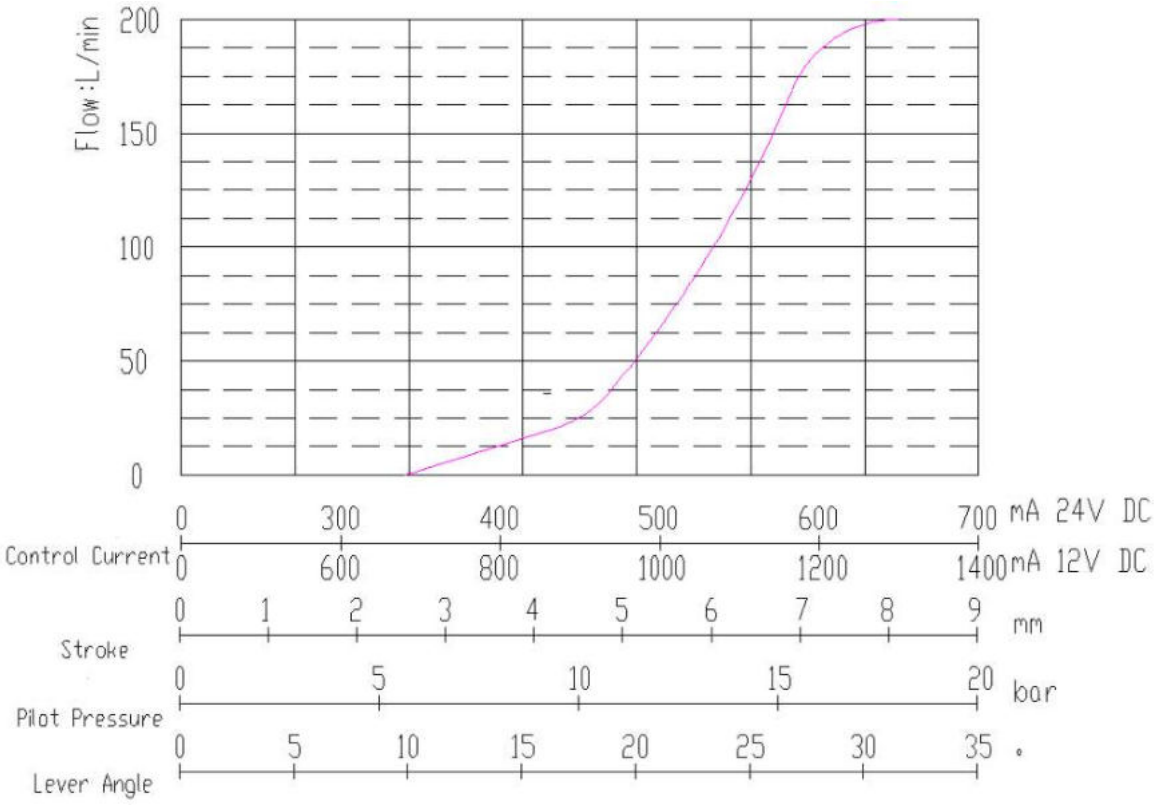




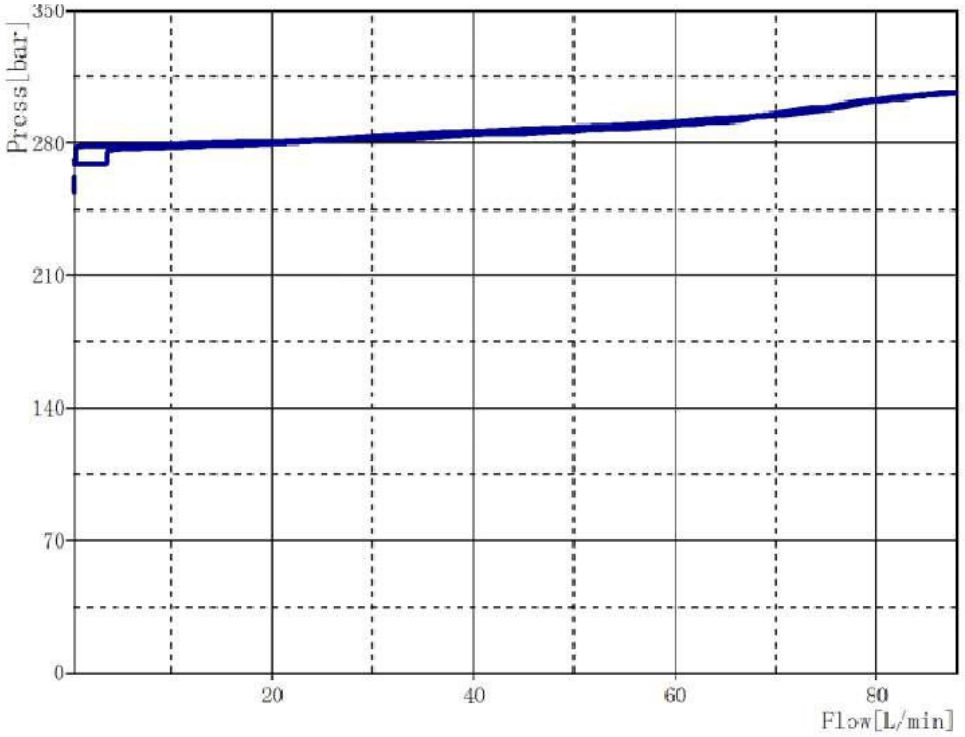
Weight, kg	
Inlet plate U/S	9,46
Endplate A	5,35
Endplate B	4,28
Endplate C	6,57
Electric & Manual control section	11,93
Hydraulic control section	9,59
Electric control section	9,87
EHA control section	11,55
5-sectional valve like shown above:	64,2

Performance curves.

Spool characteristic curve



Safety valve P-Q curve



HPV Hydraulic Proportional Valves

HPV b.v.

A. Einsteinlaan 27
9615 TE Kolham
The Netherlands

T: +31 (0) 598 - 22 70 80

E: sales@hpv-nl.com