Electromagnetic control EMC (ON-OFF)

General Specifications

Technical specification	Metering unit system	
Max flow rate	l/min U.S.G.P.M.	60 16.5
Max operating pressure	bar PSI	280 3976
Max back pressure on the channel "T"	bar PSI	20 285
Oil temperature	° C ° F	-10 to +80 14 to 180
Oil viscosity	° E cSt	6 to 6.6 20 to 50
Oil filtration	μ	⩽ 25

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 cSt:		
Maximum	cm^3/min Cu. In./min	25 1.780
Middle	cm^3/min Cu. In./min	15 1.068

Number of spools	1 to 10
Adjustable direct operated relief valve (tamper-proof seal available on request)	RV
Load hold check valve in each section	LC
Cartridge anti-shock, anticavitation and service relief valve	OA-UC-C

Material specification:

Body: High strength cast-iron.
Spool: Hardened steel.
Seals: Buna "N".

Optional features available

Series circuit;
Load sensing circuit;
Spool 3-way or 4-way at 2-3 positions;
Port relief and anti-cavitation valves -OA-UC-C-

Ports

P-T-P_1-T_1-T2-T3-A-B . . . . . (M18X1.5-3/8"BSP 1/2" BSP SAE10)
T2 - T3 - HPCO . . . . . 3/4" BSP

7B.1.4 Input voltages

VDC . . . . . 12V - 24V*

Solenoid specification

Technical specification	Metering unit system	
Voltage	V.D.C.	12 (24) ± 10%
Power consumption	Watts (W)	34
Intensity of current	Ampere (A)	2.8 (1.4)
Resistance	Ohms (Ω)	4.2 (17.1)
Duty cycle (continuous)	ED	100%
Stabilized temperature at nominal voltage	° C	110
Ambient temperature	° C	-20 to +40

Protection class . . . . . IP65 (DIN 40050)
Coil insulation . . . . . class H (VDEO 0580)
STD. connection . . . . . (DIN 43650)
Manual override.
Explosion-proof version on demand.

Mechanical specification

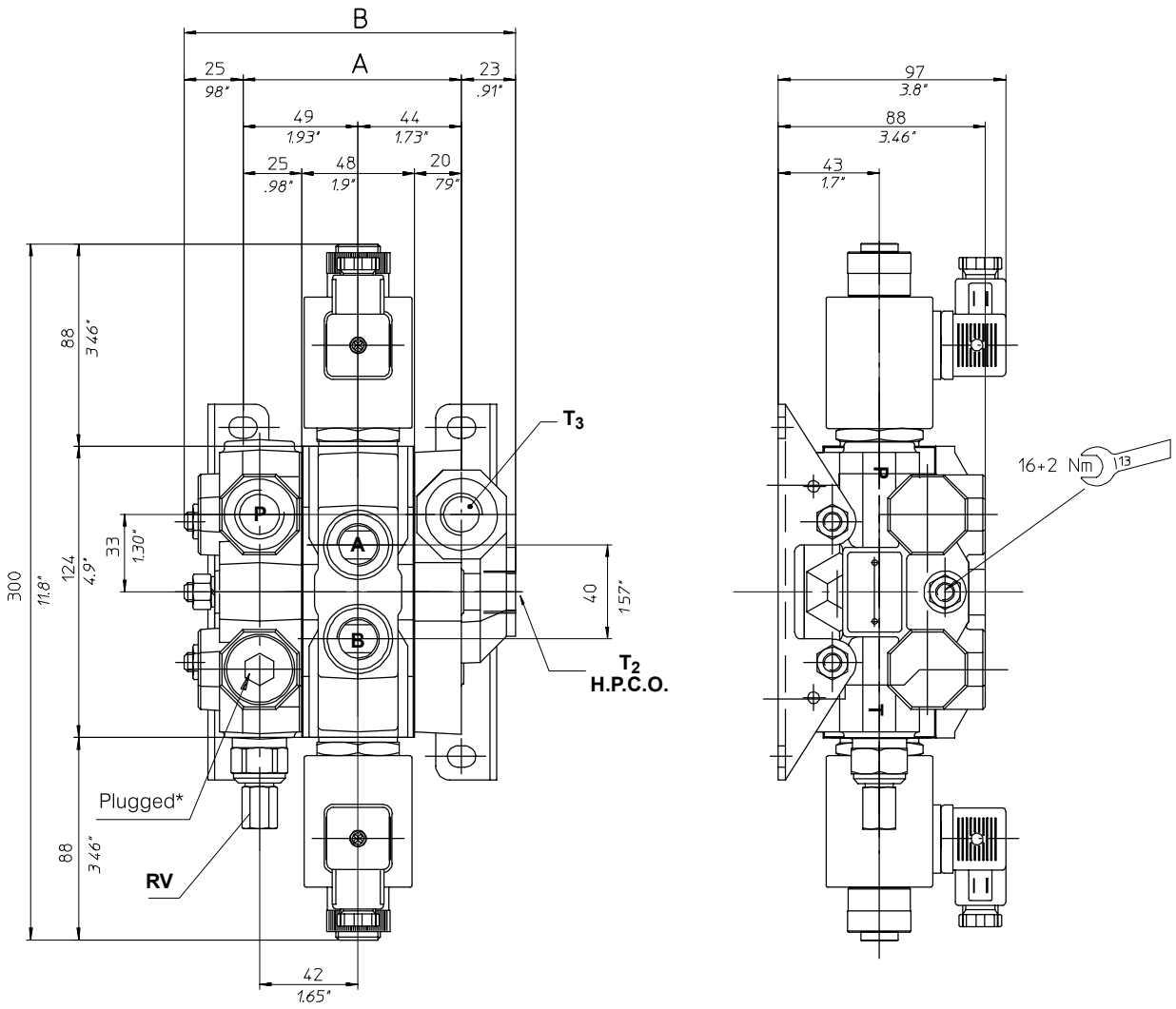
Spool diameter . . . . . 14 mm
Spool stroke . . . . . 2.75 mm
Overlapping . . . . . 1.5 mm
Internal passage . . . . . 12 mm
Dimensional section (width) . . . . . 48 mm

Weight

1 spool section with solenoid on both sides . . . . > 3.5 kg

* for non indicated tension valves, please contact our Sales Department

Dimensional data



For inlet and outlet manifold see 7A.4 - 7A.5 - 7A.6
* : Always use side outlet covers T_2-T_3 connection.

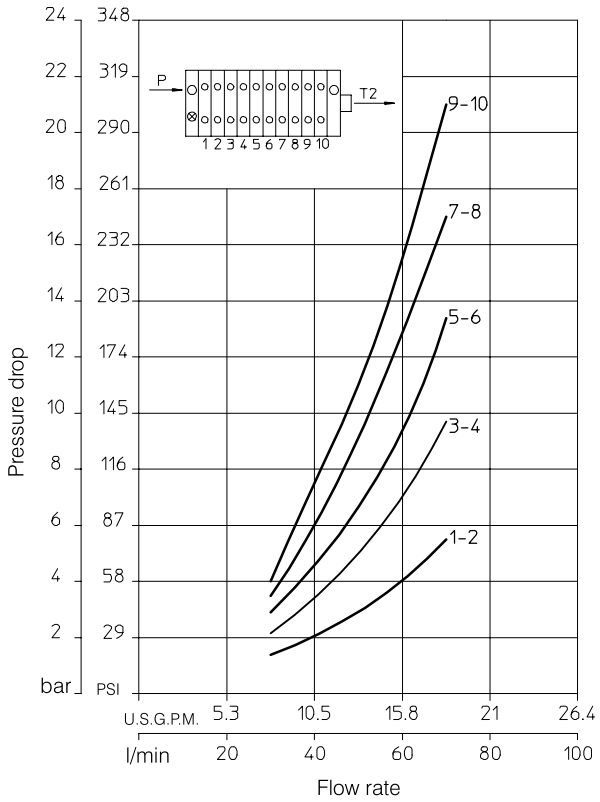
Ex.: 42 = mm
1.65" = inches

N. of sections	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Dimension **A**	93	141	189	237	285	333	381	429	477	525
	3.66”	5.55”	7.44”	9.33”	11.22”	13.11”	15”	16.89”	18.78”	20.67”
Dimension **B**	141	189	237	285	333	381	429	477	525	573
	5.55”	7.44”	9.33”	11.22”	13.11”	15”	16.89”	18.78”	20.67”	22.56”

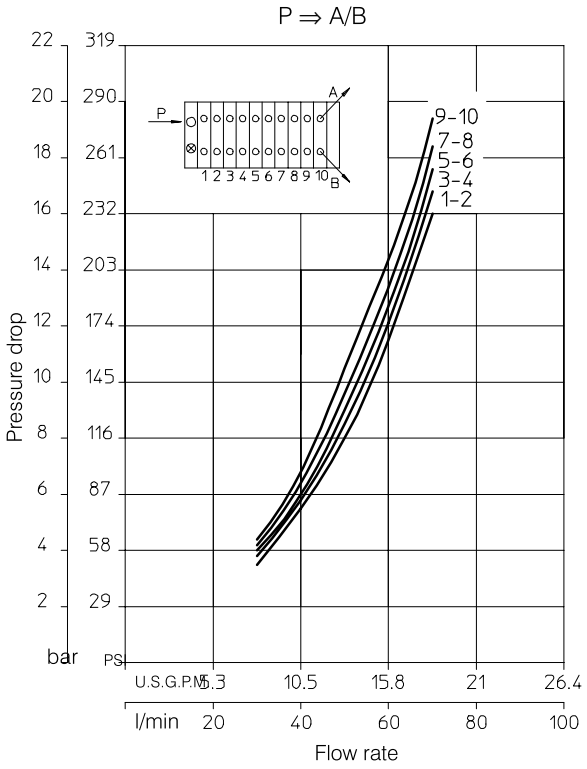
Performance curves

Oil: Shell Tellus T37
Temperature: 50°C (120°F)
Viscosity: 27 cSt

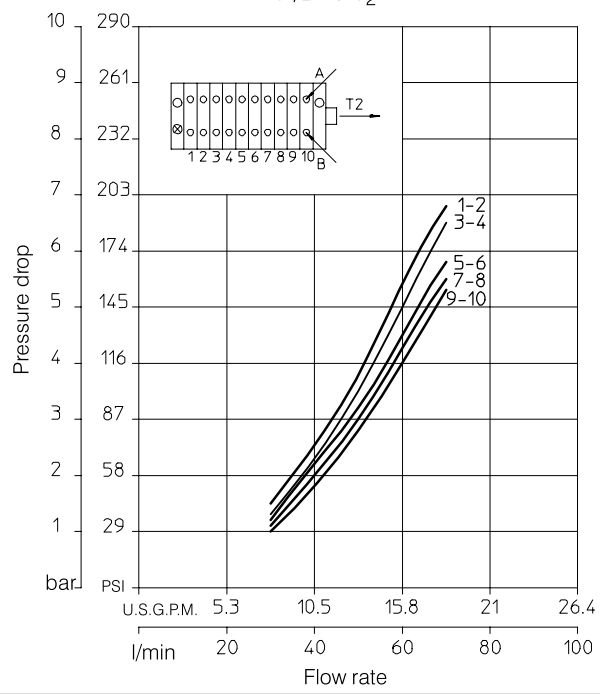
$P \Rightarrow T_2$



$P \Rightarrow A/B$



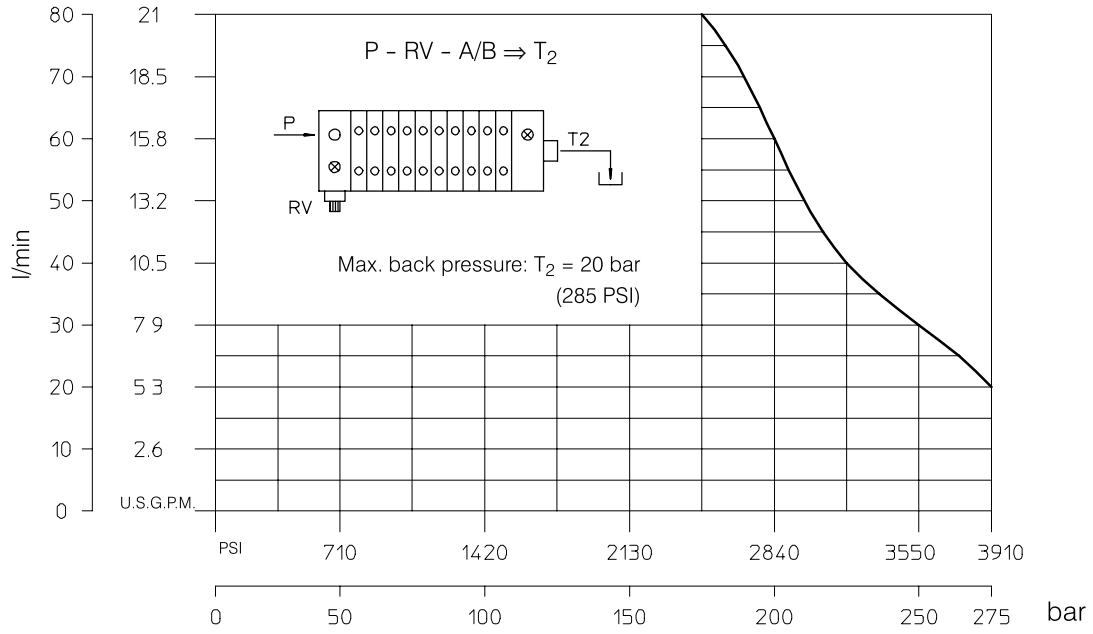
$A/B \Rightarrow T_2$



Operating limit

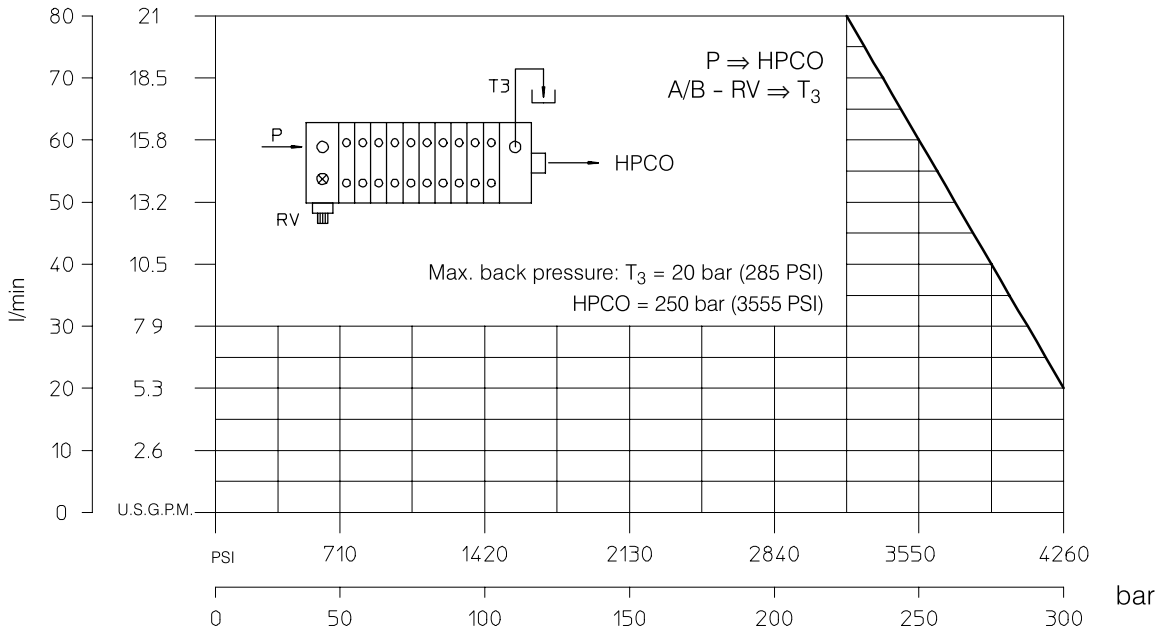
Oil: Shell Tellus T37
Temperature: 50°C (120°F)
Viscosity: 27 cSt
Tested with voltage V = -10%

Standard Circuit



Operating Pressure

Carry–over circuit



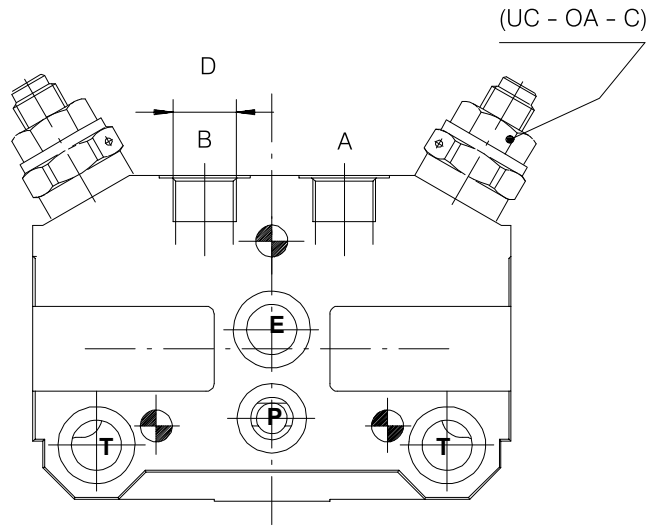
Operating Pressure

HDS15 Series

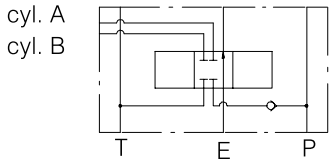
Sectional Directional Control Valve - Load Sensing

Sectional body

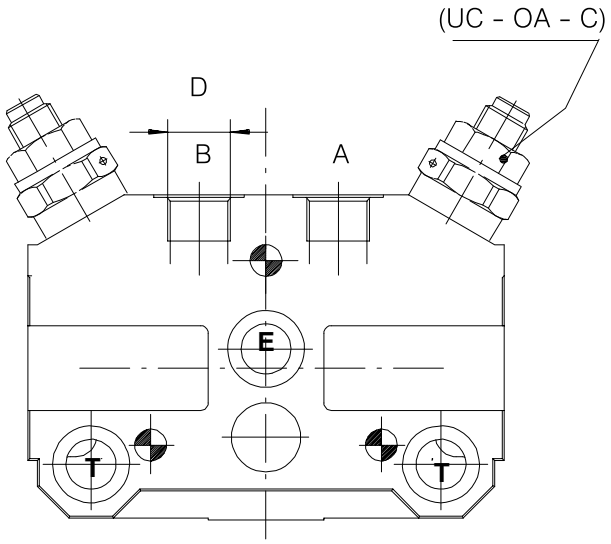
Standard circuit: parallel



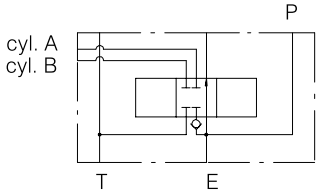
Ø D	Code	
	Standard	Section with valve UC- OA- C
M18X1.5	**K201** 200.9413.1270.0	**K211** 200.9413.1271.0
3/8" BSP	**K202** 200.9413.2622.0	**K212** 200.9413.2623.0
1/2" BSP	**K203** 200.9413.3106.0	**K213** 200.9413.3107.0
SAE10	**K205** 200.9413.8012.0	**K215** 200.9413.8015.0



Optional circuit: series and tandem



Ø D	Code	
	Standard	Section with valve UC- OA- C
M18X1.5	**K241** 200.9413.1029.0	**K251** 200.9413.1036.0
3/8" BSP	**K242**	**K252**
1/2" BSP	**K243** 200.9413.3101.0	**K253** 200.9413.3109.0
SAE10	**K245** 200.9413.8013.0	**K255** 200.9413.8016.0

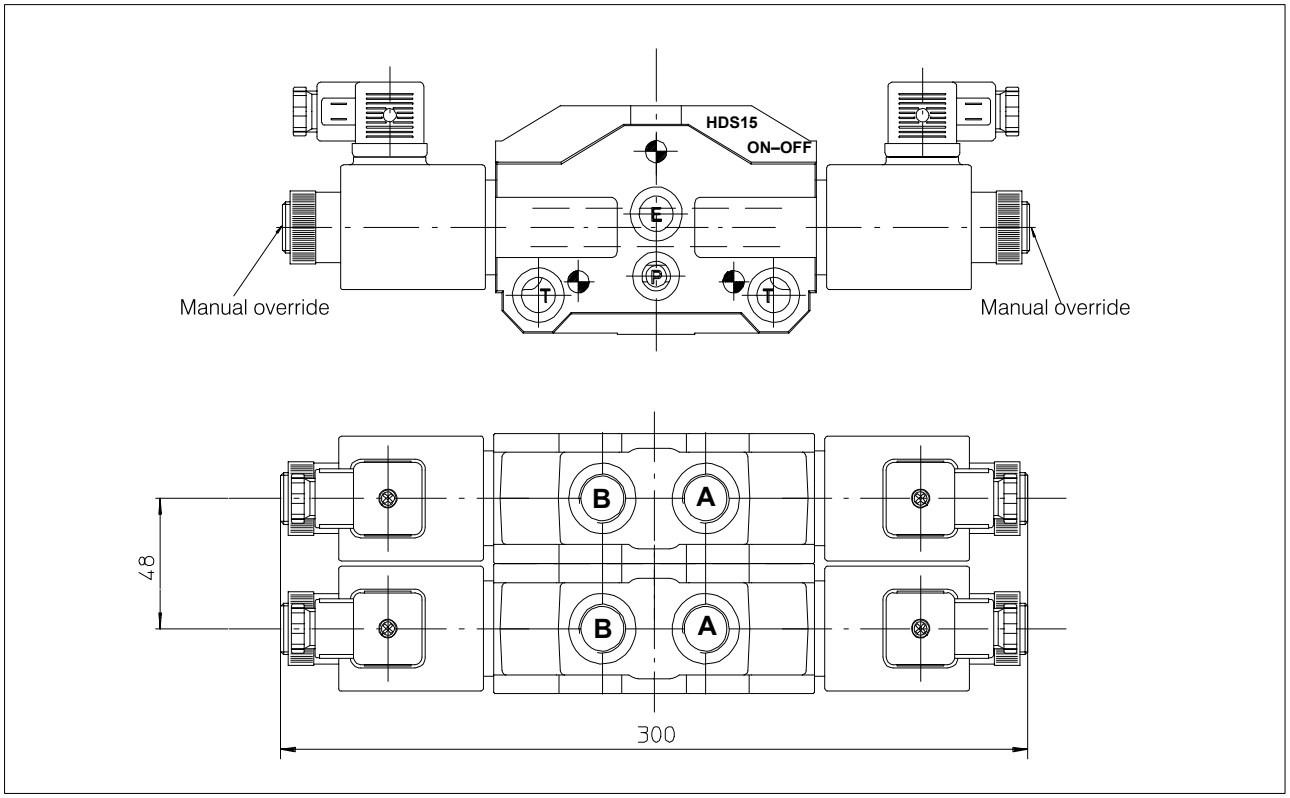


Attention: in case of series, series-parallel and tandem connections, it is necessary to reverse the positioner and the lever group, even on standard parallel sections (see the indications on the side of the valve body).

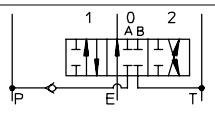
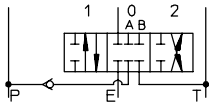
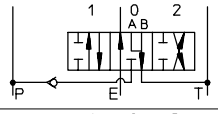
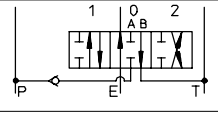
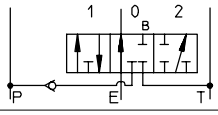
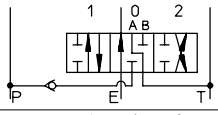
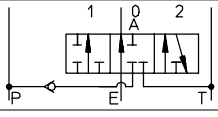
Note: for availability of -K- bodies without ordering code please contact our Sales Department.

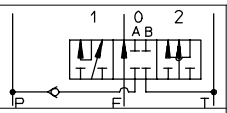
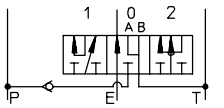
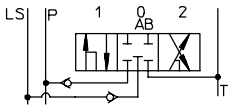
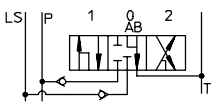
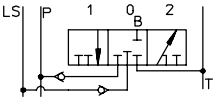
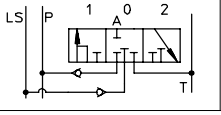
HDS15 Series

Sectional Directional Control Valve - Load Sensing



Spool chart

Type	Spool scheme	Spool features
AE		4 way - 3 position A/B blocked E: open by pass
BE		4 way - 3 position A/B blocked E: closed
CE		4 way - 3 position A/B to tank in neutral - E: open by pass
DE		4 way - 3 position A: blocked B: to tank in neutral
GE		3 way - 3 position B: blocked E:open by pass
LE		4 way - 3 position B: blocked A: to tank in neutral
SE		3 way - 3 position A: blocked E: open by pass

XE*		4 way - 3 position series connection
XCE*		4 way - 3 position A: to tank in neutral
LAE**		4 way - 3 position A: blocked Load Sensing
LCE**		4 way - 3 position A/B to tank in neutral Load Sensing
LGE**		3 way -3 position B: blocked Load Sensing
LsE**		3 way - 3 position A: blocked Load Sensing

* series body required
** special body required

Note: For availability of L/S versions please contact our Sales Department

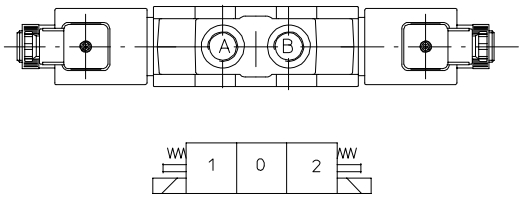
HDS15 Series

Sectional Directional Control Valve - Load Sensing

Spool Action

Double–Solenoid spring–centered valves

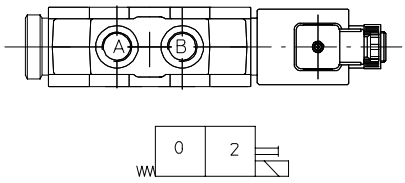
Type **01E**



Single Solenoid spring offset valves

Type **02E**

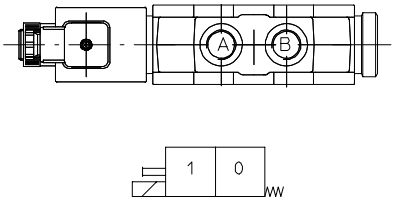
Solenoid at port “A” end of body



Single Solenoid spring offset valves

Type **03E**

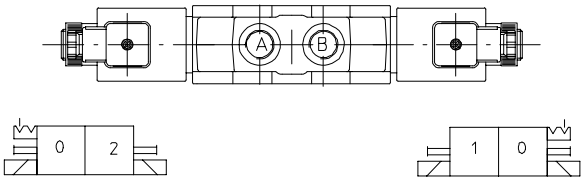
Solenoid at port “B” end of body



Double Solenoid, two detent position valves*

Type **04E**

Type **05E**



* Available only on request

Elements with pressure and flow control PQ

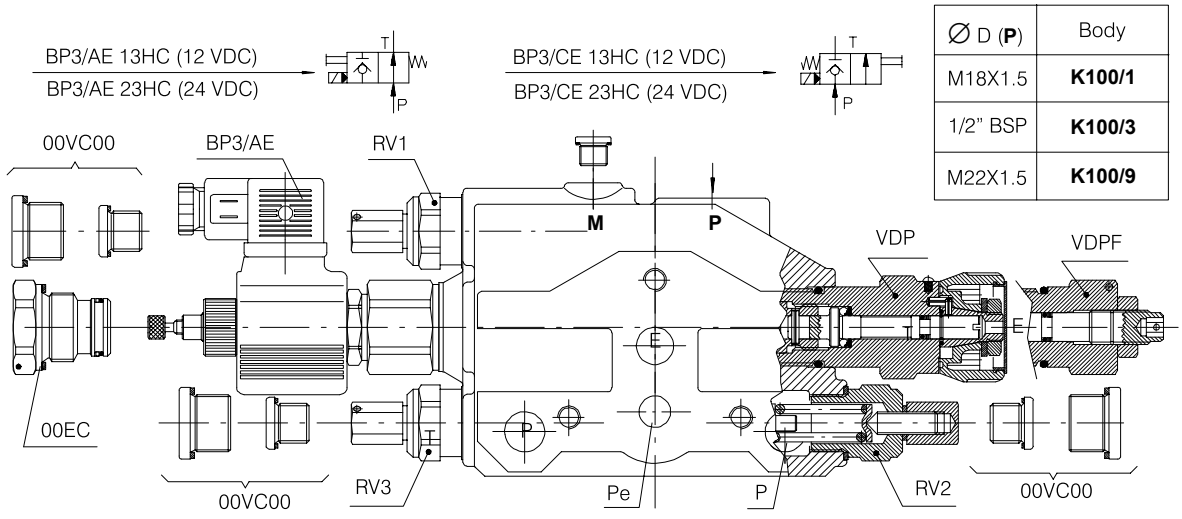
General Specifications

Operating pressure	320 bar
Nominal flow	max. 60 l/min
Adjustable setting flow range on 350 turning-knob:	
Min flow	0 l/min
Max flow (input)	50 l/min
Fixed priority flow	VDPF = 0 to 50 l/min
Adjustable priority flow	VDP 06 = 0 to 6 l/min
	VDP 12 = 0 to 12 l/min
	VDP 25 = 0 to 25 l/min
	VDP 50 = 0 to 50 l/min
Control accuracy	±5 %
Pressure difference Δp	max. 6 bar
Oil temperature range	-10° to +80° C
Viscosity range	16 to 75 cSt
Recommended filtration	≤25 micron
Adjustable direct acting:	
Relief valve on the lines	General flow: RV1
	Priority flow: RV2
	Residual flow: RV3
By-pass solenoid valve	BP3/AE
	BP3/CE
Manometer port (M)	1/8” BSP

Sectional body K100

Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.



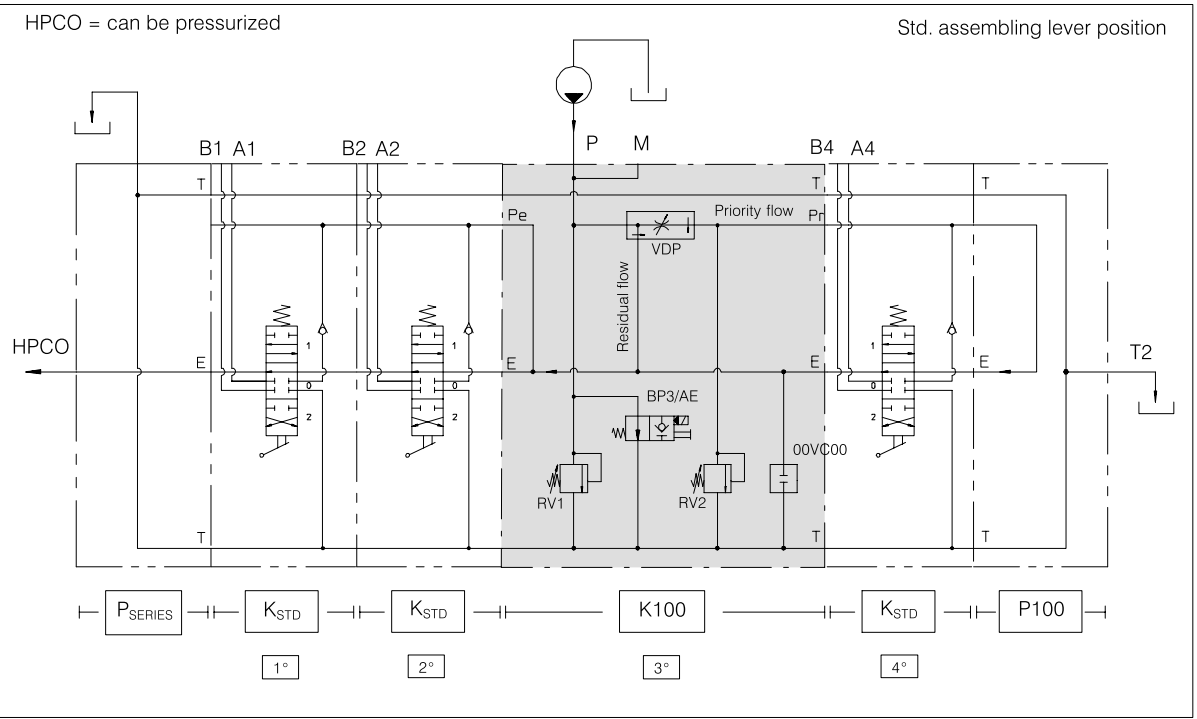
∅ D (**P**)	Body
M18X1.5	**K100/1**
1/2" BSP	**K100/3**
M22X1.5	**K100/9**

VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV1 - RV2 - RV3	06	30 ÷ 95
RV1 - RV2 - RV3	15	96 ÷ 210
RV1 - RV2 - RV3	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

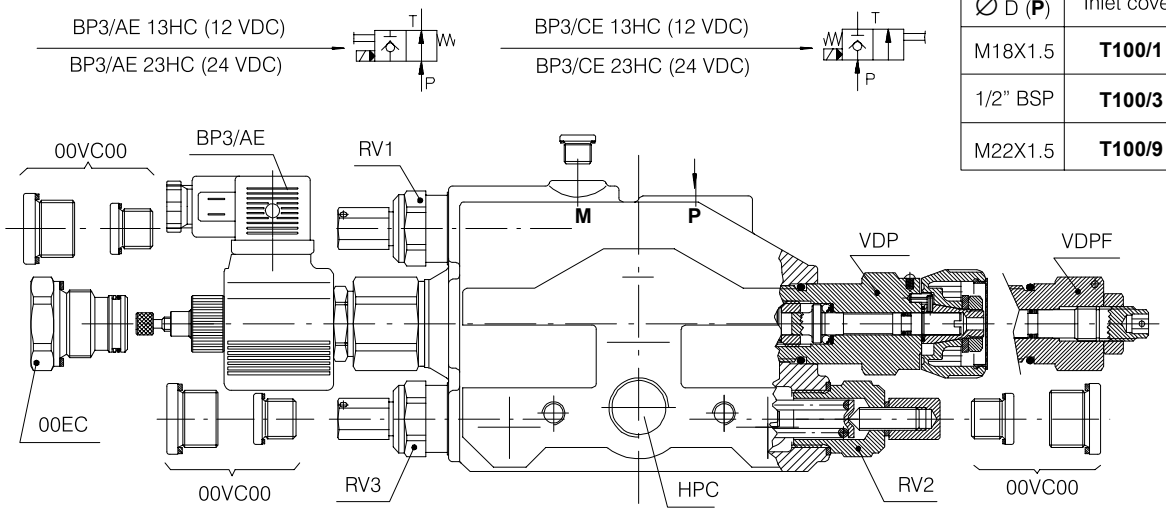
Scheme



Inlet cover T100

Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.



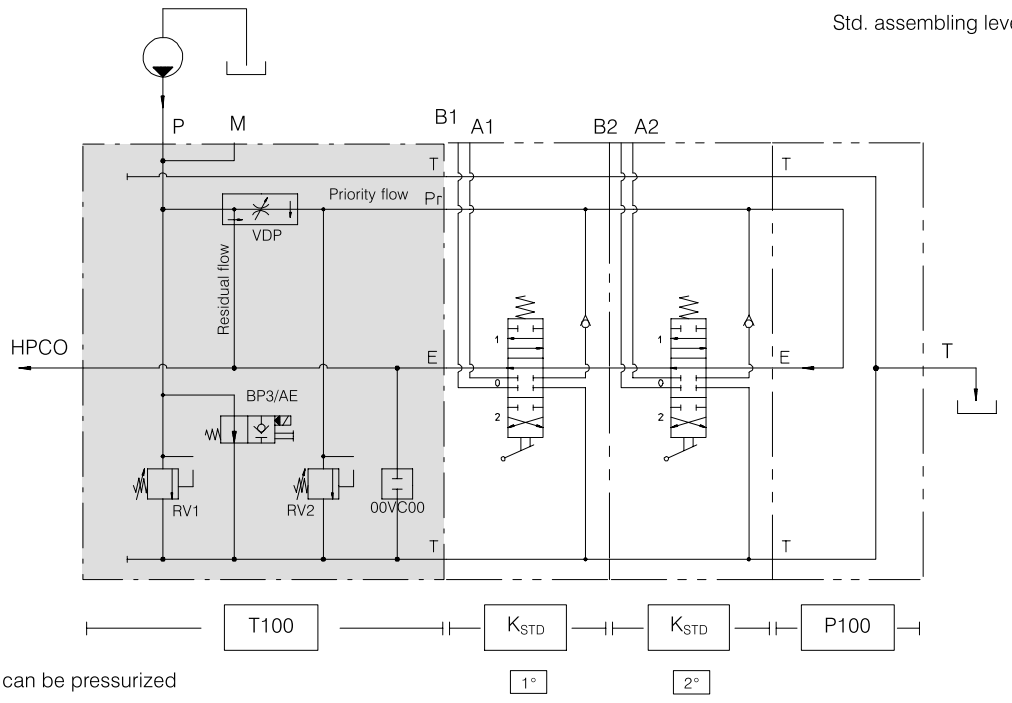
∅ D (**P**)	Inlet cover
M18X1.5	**T100/1**
1/2" BSP	**T100/3**
M22X1.5	**T100/9**

VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV1 - RV2 - RV3	06	30 ÷ 95
RV1 - RV2 - RV3	15	96 ÷ 210
RV1 - RV2 - RV3	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

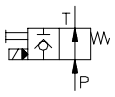


Sectional body K88

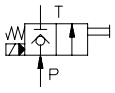
Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

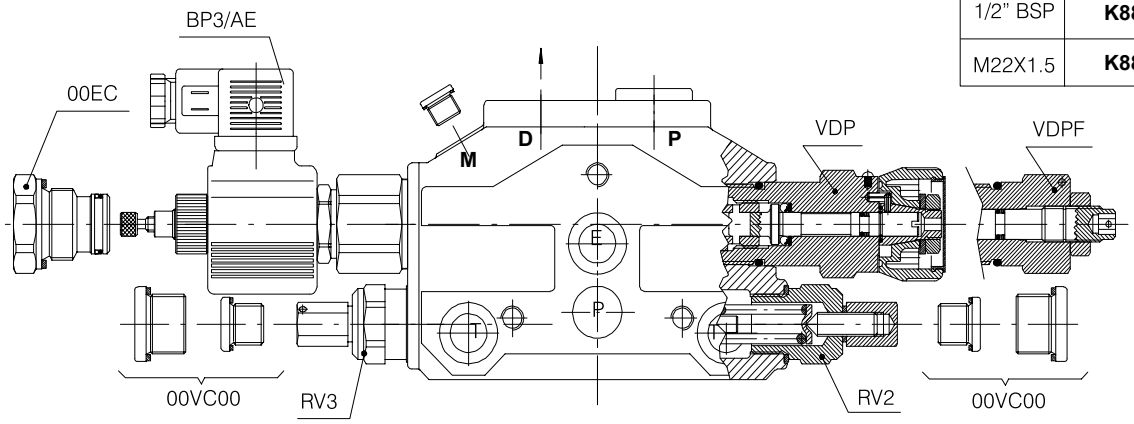
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



∅ D (**D**)	Body
M18X1.5	**K88/1**
1/2" BSP	**K88/3**
M22X1.5	**K88/9**



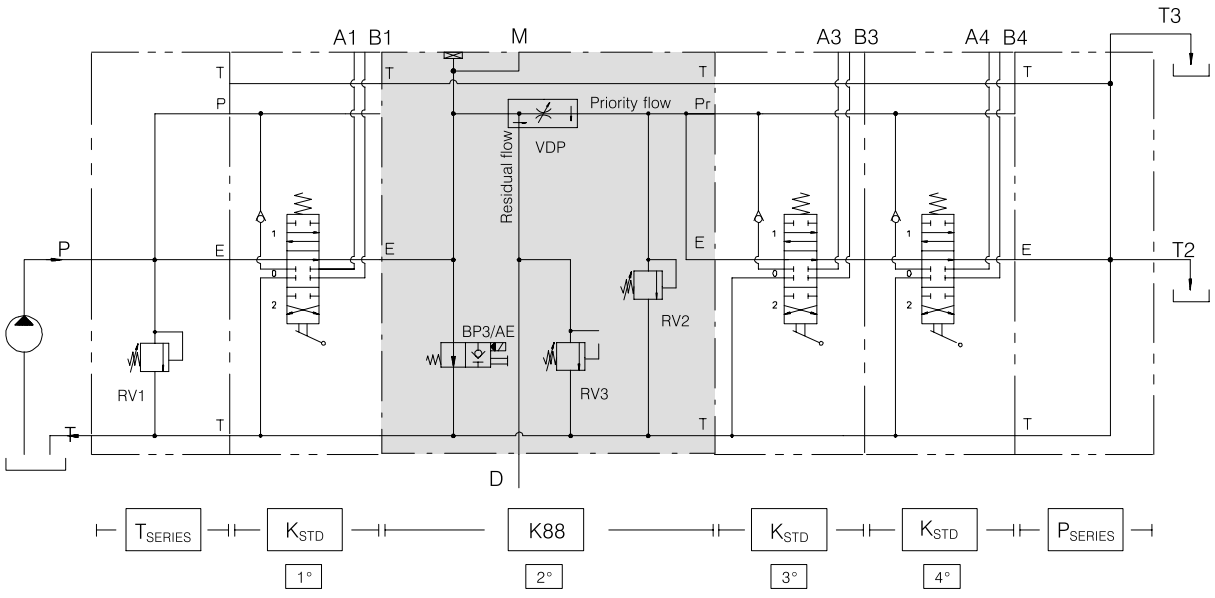
VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV2 - RV3	06	30 ÷ 95
RV2 - RV3	15	96 ÷ 210
RV2 - RV3	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

D = excessed flow can be pressurized



Spool reversed to have the lever at the same side of the knob regulator

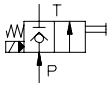
Inlet cover T88

Application variation

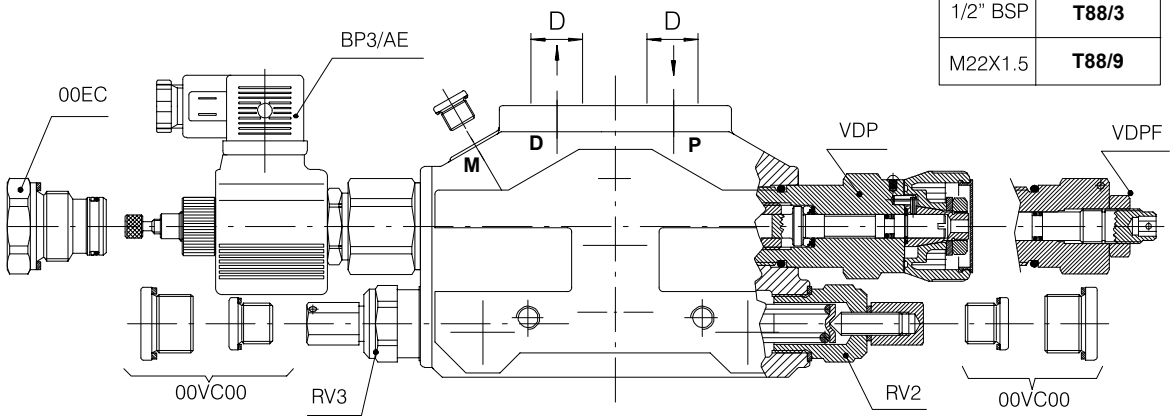
Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)

BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



∅ D	Inlet cover
M18X1.5	**T88/1**
1/2" BSP	**T88/3**
M22X1.5	**T88/9**



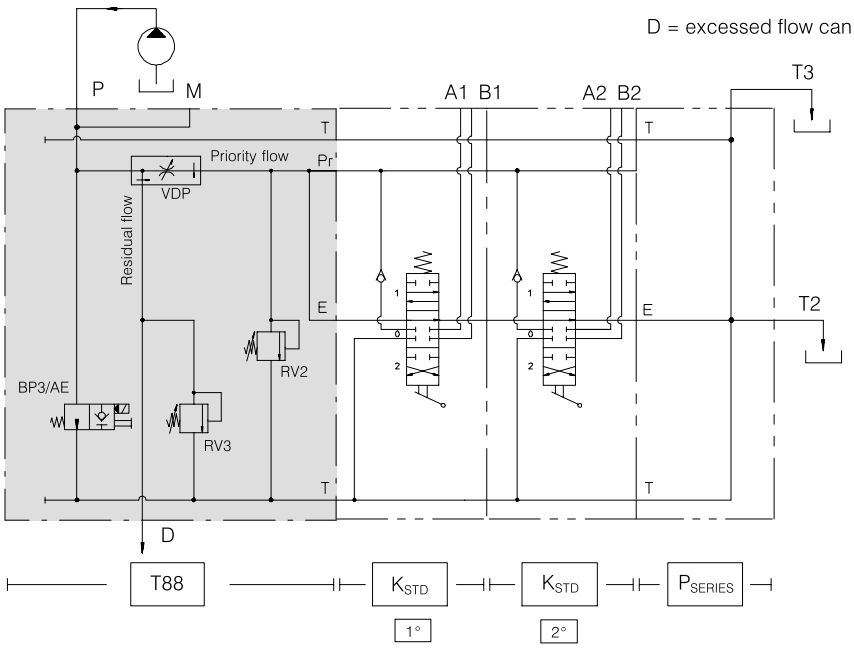
VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV2 - RV3	06	30 ÷ 95
RV2 - RV3	15	96 ÷ 210
RV2 - RV3	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

D = excessed flow can be pressurized



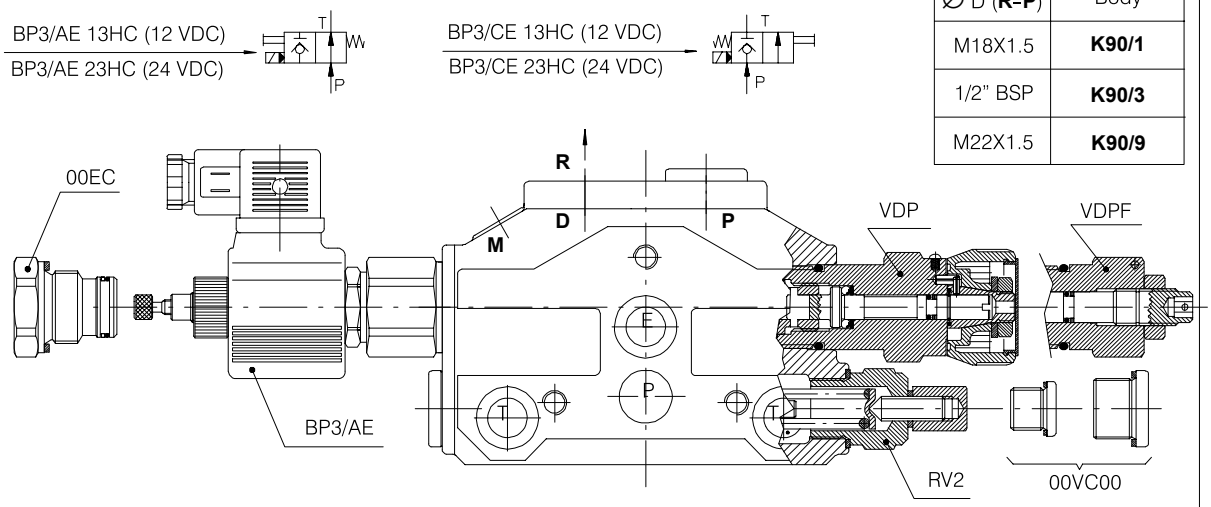
Spool reversed to have the lever at the same side of the knob regulator

Sectional body K90

Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.
Excess flow to tank.

∅ D (**R-P**)	Body
M18X1.5	**K90/1**
1/2" BSP	**K90/3**
M22X1.5	**K90/9**



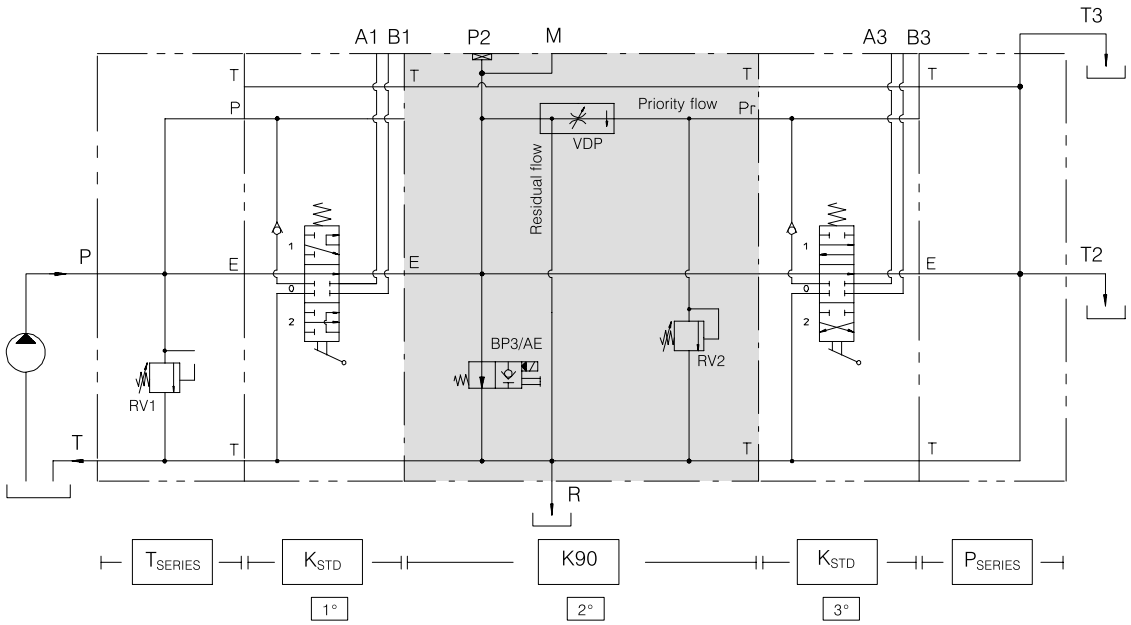
VDPF: 1 ÷ 40 l/min

Relief valves Type	code	Range of adjustment (bar)
RV2	06	30 ÷ 95
RV2	15	96 ÷ 210
RV2	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	40	0 ÷ 40

Scheme

Port R = Tank connection (cannot be pressurized)



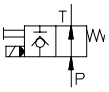
Spool reversed to have the lever at the same side of the knob regulator

Inlet cover T90

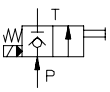
Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve. Excess flow to tank.

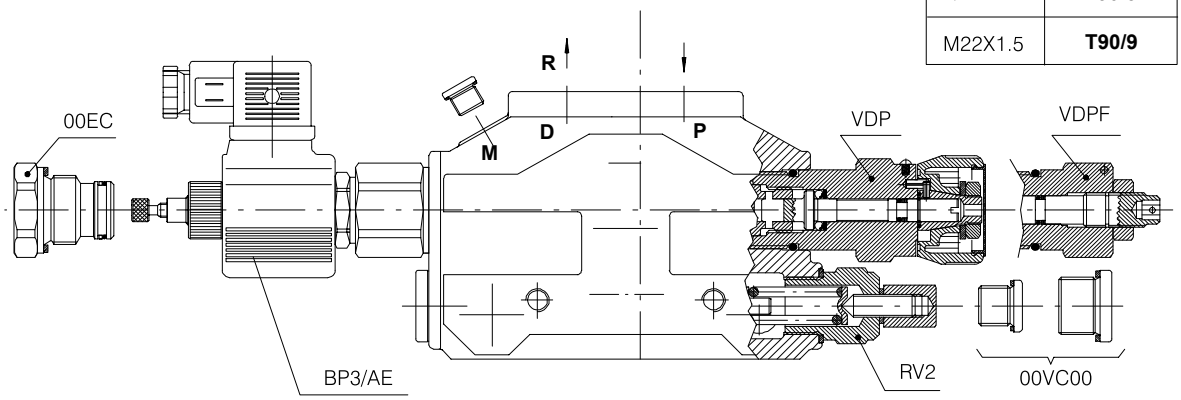
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



∅ D (**R-P**)	Inlet cover
M18X1.5	**T90/1**
1/2" BSP	**T90/3**
M22X1.5	**T90/9**



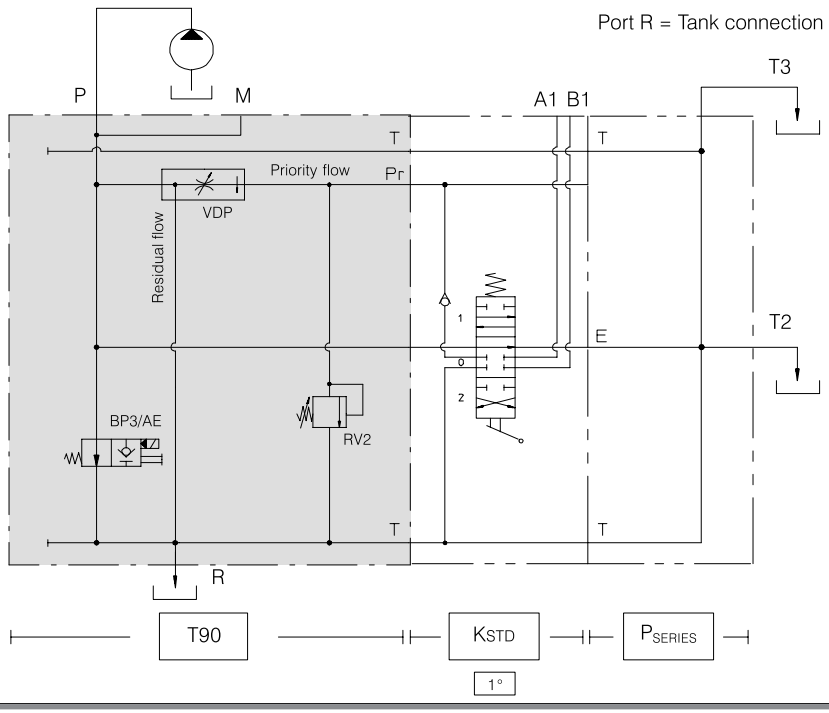
VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV2	06	30 ÷ 95
RV2	15	96 ÷ 210
RV2	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

Port R = Tank connection (cannot be pressurized)

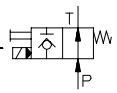


Sectional body K91

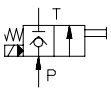
Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.
Excess flow to tank with crossing bolt-holes.

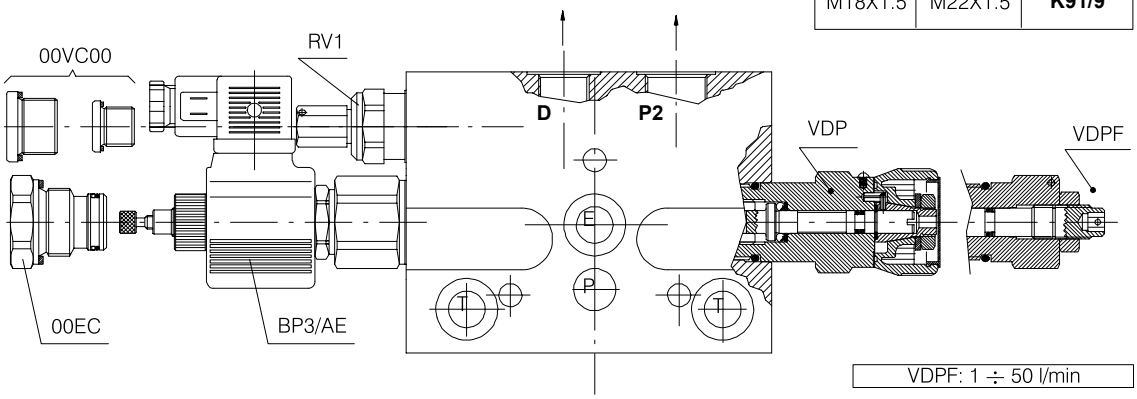
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



∅ D (**D**)	∅ D (**P2**)	Body
M18X1.5	M18X1.5	**K91/1**
3/8" BSP	1/2" BSP	**K91/3**
M18X1.5	M22X1.5	**K91/9**



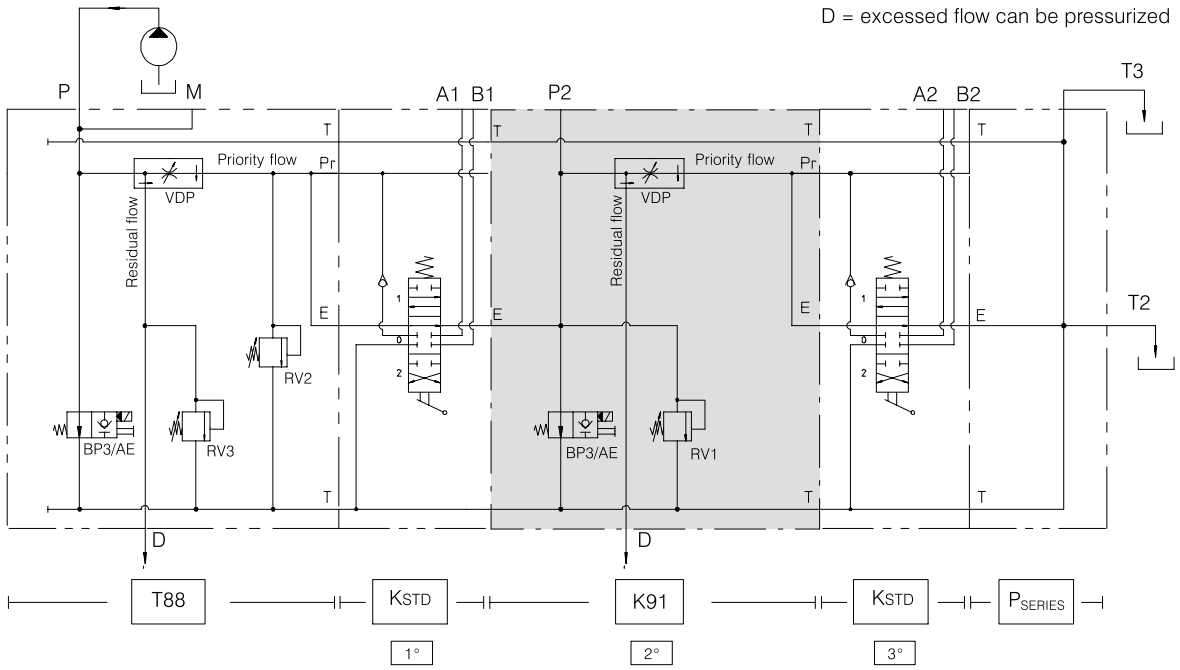
VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV1	06	30 ÷ 95
RV1	15	96 ÷ 210
RV1	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

D = excessed flow can be pressurized



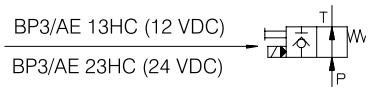
Spool reversed to have the lever at the same side of the knob regulator

Sectional body K92

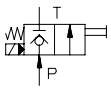
Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.
Excess flow to tank with crossing bolt-holes.

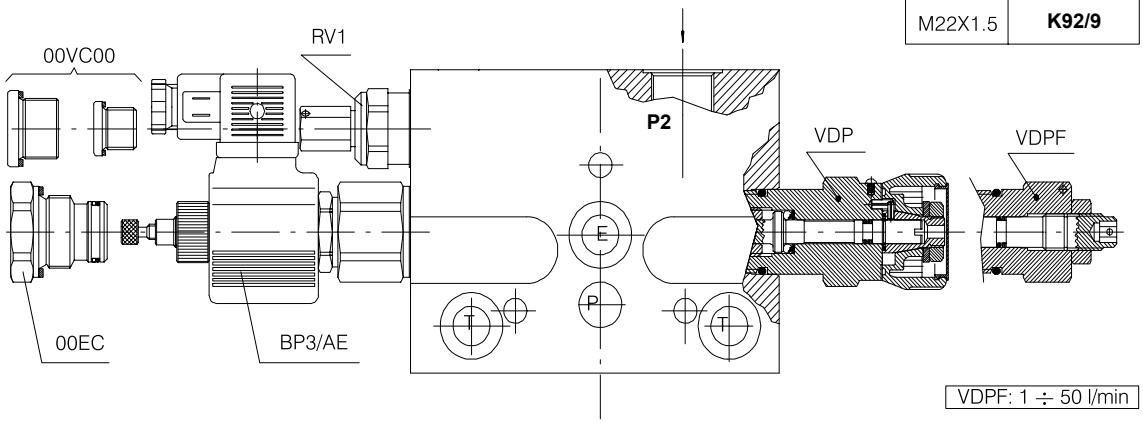
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



∅ D (**P2**)	Body
M18X1.5	**K92/1**
1/2" BSP	**K92/3**
M22X1.5	**K92/9**



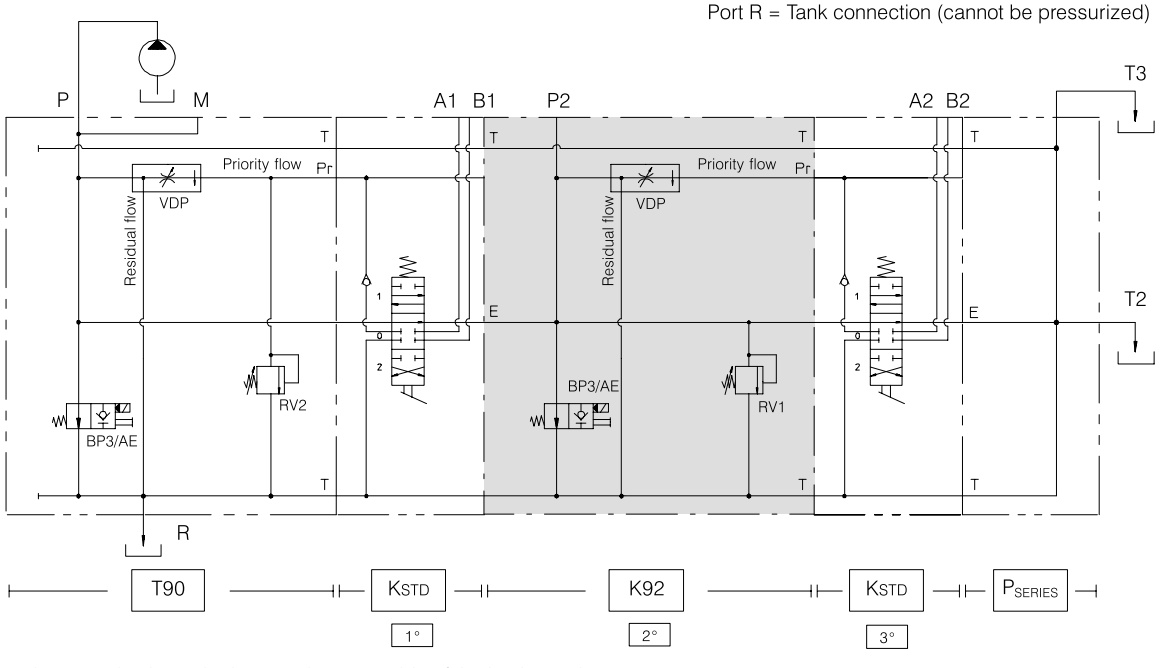
VDPF: 1 ÷ 50 l/min

Relief valves Type	code	Range of adjustment (bar)
RV1	06	30 ÷ 95
RV1	15	96 ÷ 210
RV1	26	211 ÷ 320

Flow regulator Type	code	Range of adjustment (l/min)
VDP 06	06	0 ÷ 6
VDP 12	12	0 ÷ 12
VDP 25	25	0 ÷ 25
VDP 50	50	0 ÷ 50

Scheme

Port R = Tank connection (cannot be pressurized)



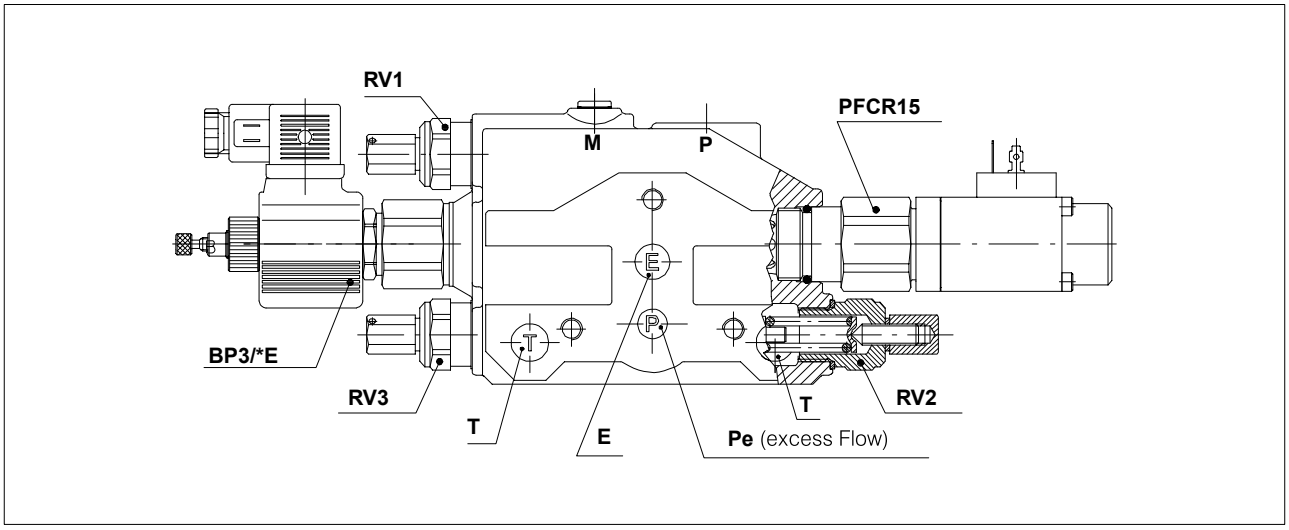
Spool reversed to have the lever at the same side of the knob regulator

HDS15 Series

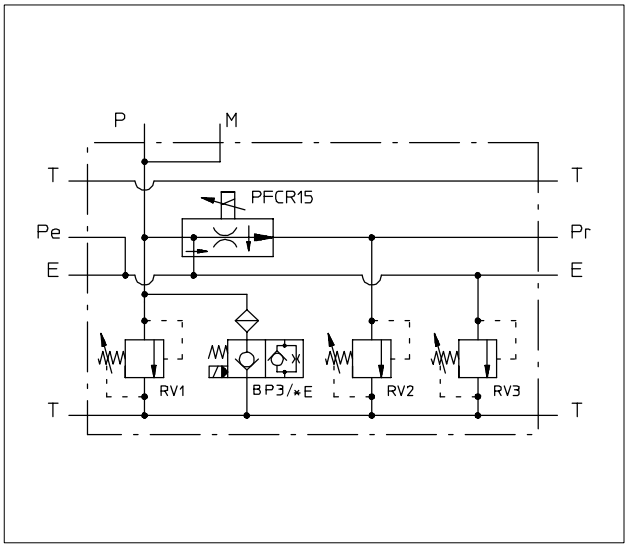
Sectional Directional Control Valve - Load Sensing

Proportional Flow Control PFCR15

Example of application on K100 body



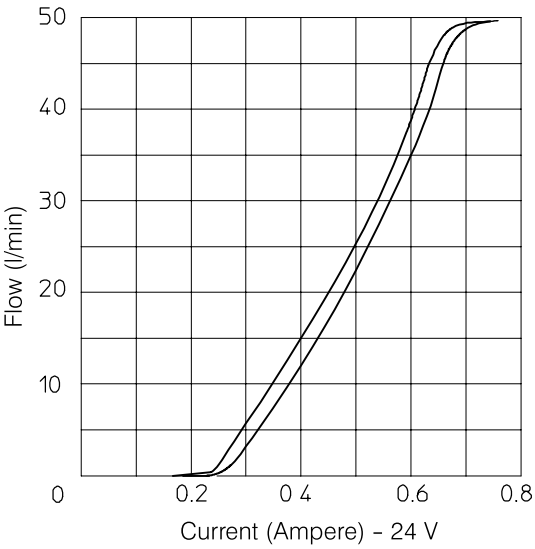
Example of hydraulic scheme K100



Hydraulic performances

Max. pressure	**270 bar**
Max. recommended pressure	**230 bar**
Regulated flow range	**0 – 45 l/min**
Temperature range	**–5/+70° C**

Current/flow regulated diagram



Electric performances

Coil according to	**VDE 0580**
Connector type	**DIN 43650**
Max. current	**0.75 A (24 V. DC)**
Duty rating	**ED= 100%**
Suggested dither	**110 Hz**
Insulation class with std. plug	**IP54 (DIN 40050)**

Voltage ±5%	**12**	**24**	**V (DC)**
Nominal current	**1.25**	**0.68**	**Ampere**
Resistance at 20°C	**7.2**	**24.6**	**Ohm**
Nominal power	**17.2**	**17.4**	**Watt**

Code

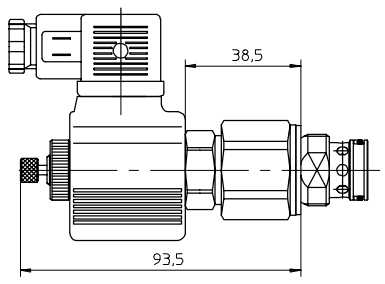
PFCR15/V8 - 45 - P2 - 13 Code: **200.7880.0010.0** (12 V)
PFCR15/V4 - 45 - P2 - 23 Code: **200.7880.0009.0** (24 V)
(without connector)

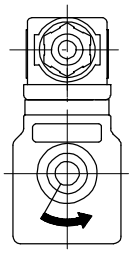
HDS15 Series

Sectional Directional Control Valve - Load Sensing

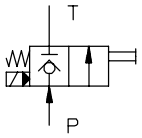
By-Pass solenoid valve - BP3 -

Normally closed with manual override



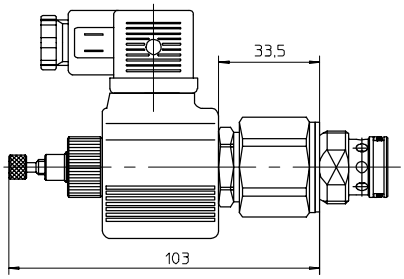


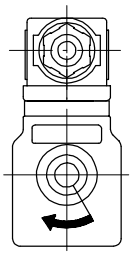
Open manually



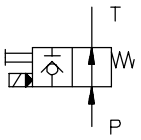
BP3/CE HDS15PQ p.m.	**200.7572.0048.0**	without coil
BP3/CE 13HC HDS15PQ	**200.9570.1003.5**	12 V. D.C.
BP3/CE 23HC HDS15PQ	**200.9570.2003.6**	24 V. D.C.

Normally open with manual override



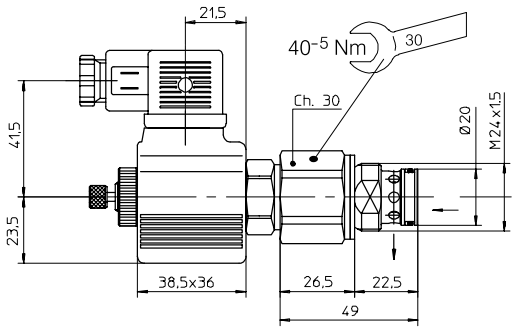


Close manually



BP3/AE HDS15PQ p.m.	**200.7572.0049.0**	without coil
BP3/AE 13HC HDS15PQ	**200.9570.1003.6**	12 V. D.C.
BP3/AE 23HC HDS15PQ	**200.9570.2003.7**	24 V. D.C.

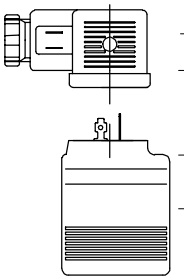
Dimension



BP3 Solenoid valve performances

Max. pressure	**315 bar**
Max. flow	**60 l/min**
Power	**22 Watt**
Intermittence	**ED 100%**
Voltage tolerance	**±10%**
Temperature range	**–20/+80 °C**
Oil filtration	**⩽25 micron**
Pressure drop Q= 30 l/min	**7.5 bar**
Pressure drop Q= 50 l/min	**12.7 bar**

Spare parts



200.5441.10009	
200.9749.1031.0	12 V. D.C.
200.9749.2011.0	24 V. D.C.
200.6749.1001.0	12 V. D.C.
200.6749.2001.0	24 V. D.C.

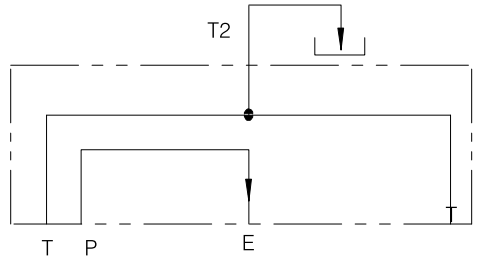
Coil specifications

Voltage	**12**	**24**	**V. D.C.**
Power	**22.8**	**22.5**	**Watt**
Resistance (Ambient Temp.)	**6.3**	**25.6**	**Ohm**
Resistance (Stabilized Temp.)	**8.9**	**36.4**	**Ohm**
Current (Ambient Temp.)	**1.9**	**0.94**	**Ampere**
Current (Stabilized Temp.)	**1.35**	**0.66**	**Ampere**

End cover

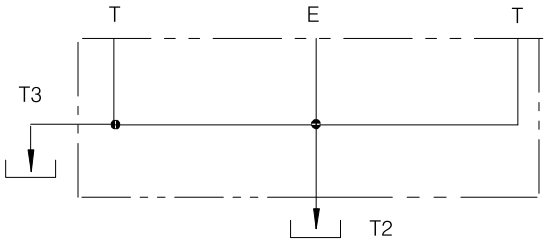
Right cover for K100 and T100

Ø D (diameter)	Code
M18X1.5	**P100/1** 200.6302.1005.0
1/2" BSP	**P100/3** 200.6302.3009.0



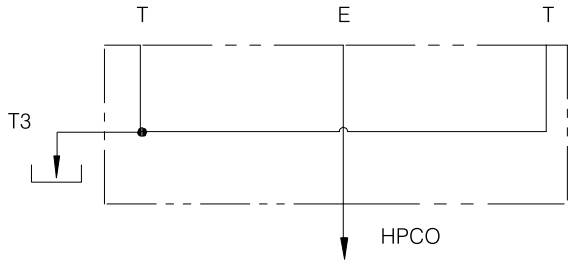
Standard cover for series circuit

Ø D (diameter)	Code
M18X1.5	**P41** 200.9302.1004.0
3/8" BSP	**P42** 200.9302.2005.0
1/2" BSP	**P43** 200.9302.3005.0
SAE 10	**P45** 200.9302.8006.0
3/4" BSP	**P09** 200.9302.4001.0



Carry–over cover for series circuit

Ø D (diameter)	Code
M18X1.5	**P51** 200.9302.1005.0
3/8" BSP	**P52** 200.9302.2006.0
1/2" BSP	**P53** 200.9302.3006.0
SAE 10	**P55** 200.9302.8004.0
3/4" BSP	**P59** 200.9302.4004.0



LOAD SENSING

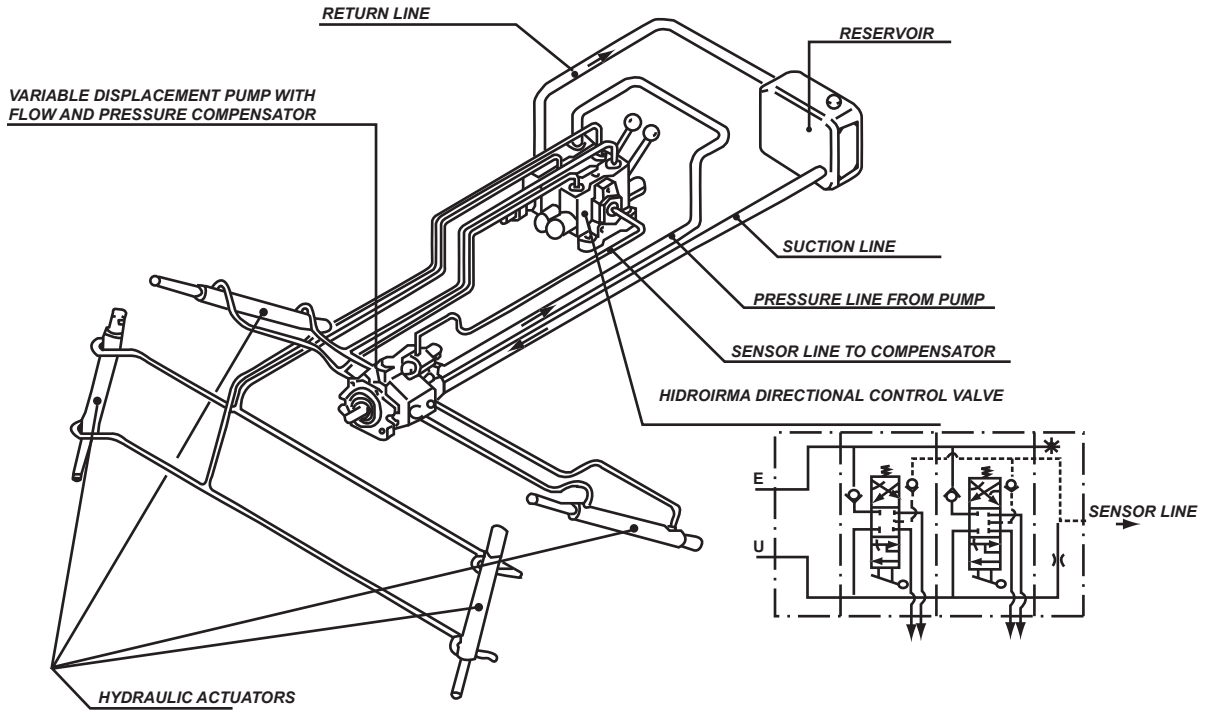
'Load sensing' is a closed centre hydraulic system whereby the flow to the system is matched to the demand of the system. When there is no demand from the system the pump automatically assumes a low pressure 'standby' mode thus this type of control is energy efficient as power is provided only to the extent demanded by the system. Metering of the delivery oil to the system also enables infinite speed control to the load. This can be achieved via needle valve metering in individual legs of the circuit or via fine metering across the spool of the directional valve associated with the circuit.

These systems use as their hydraulic power source a flow and pressure compensated (Load Sensing) piston pump. Control of the stroke of the pump enables the characteristics described above to be achieved.

A sensing line between the pump controller and the special load sensing directional valve enables the pump delivery to self adjust to maintain a specific set pressure drop at a particular measuring point in the system. This comparison point can be the pressure drop measured between the inlet and work port of a directional spool valve, i.e. the pressure drop across the valve spool.

Standard directional valves will not allow a load sensing circuit to work as intended as they do not contain the necessary porting and characteristics for feed-back signal to the pump. Use of a standard valve will cause the circuit to behave as a normal closed centre, pressure compensated configuration.

A 'Special' version of the HDS 15 Series valves (designated HDS 15 / *LS) is available for use in Load Sensing circuit applications. If adding in to an existing circuit the sensing pilot line from the HDS 15 / *LS Series valve must be plumbed into the existing pilot line via a separate shuttle valve. (A shuttle valve is not incorporated in the HDS 15 / *LS Series valve.)



HOW TO ORDER

HDS15 / 3 - LS

- HDS15 — Valve series
- 3 — Number of Spools
- LS — Load Sensing Designation