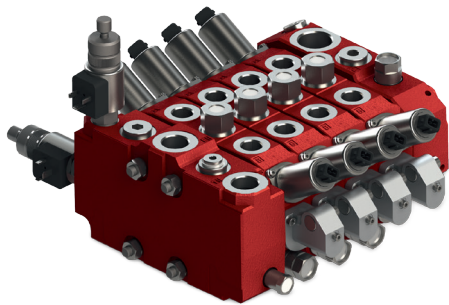


## Sectional Directional Control Valve RSQ 240



### Key valve features

RSQ 240 is a sectional open center valve, designed for max. operating pressures up to 350 bar and max. pump flows up to 100 l/min.

It is available with 1 to 10 working sections per valve assembly.

RSQ 240 is designed with an open center for fixed and variable displacement pumps.

The valve is characterized by the unique dual flow range possibility and its ability to facilitate simultaneous operation of several functions.

RSQ 240 is available with electro-hydraulic or hydraulic proportional remote control, but the valve can also be manually operated.

The electro-hydraulic proportional version in particular offers compact design with internal pilot oil supply, solenoids integrated in the valve body and integral hand levers for manual override / manual operation.

The valve offers excellent operating characteristics because of the specially designed spools for different applications.

Low and uniform spool forces are the result of careful balancing of the flow forces.

### Q-function

The flow control (Q-function) of the inlet section bypasses the major part of the pump flow to tank when the system is idling, still giving access to full pump flow when the services are operated. Besides greatly reducing heat generation this also provides improved operating characteristics.

Q-function, in combination with the RSQ 240 unique dual parallel gallery functional principle, and separate flow regulation in each working section, gives this valve a very high performance level.

### Applications

The RSQ 240 is ideal for applications such as truck cranes, backhoe-loaders, excavators, drilling rigs, telescopic load handlers, skylifts, refuse vehicles and fork lift trucks.

### Technical data

Pressure and flow values*	
Max. operating pressure per port:	
P1, P2, A, B:	350 bar
PPM:	25 bar
Without HPCO-Function T4:	20 bar
With HPCO-Function T4:	300 bar
With internal connection of T3 to T T3, T2, T1:	5 bar
With external pilot drain line T2, T1:	20 bar
T3:	depressurized to tank
Max. permissible flow on port P1:	100 l/min
Further data	
Spool control force of spool control 901:	
Neutral position:	110 N
Max. spool stroke:	130 N
Permissible contamination level:	Equal or better than 20/18/14 as per ISO 4406
Viscosity range:	10 – 400 mm <sup>2</sup> /s (cst) Higher viscosity allowed at start up
Leakage A, B → T at 100 bar, 32 cst and 40 °C: ≤ 13 cc/min	
Pressure fluid:	Mineral oil and synthetic oil based on mineral oil HL, HLP according to din 51524
Fluid temperature range:	-15 °C up to +80 °C

\* Higher values are possible, depending on application. For applications with demands that exceed stated data above, please contact us for consideration.  
MTTFd value after consultation with HYDAC.

### Remote control

The RSQ 240 is designed with an integrated pilot supply system in order to achieve an easy installation and a reliable remote control function. It is also possible (and in some cases to prefer) to supply the pilot system externally.

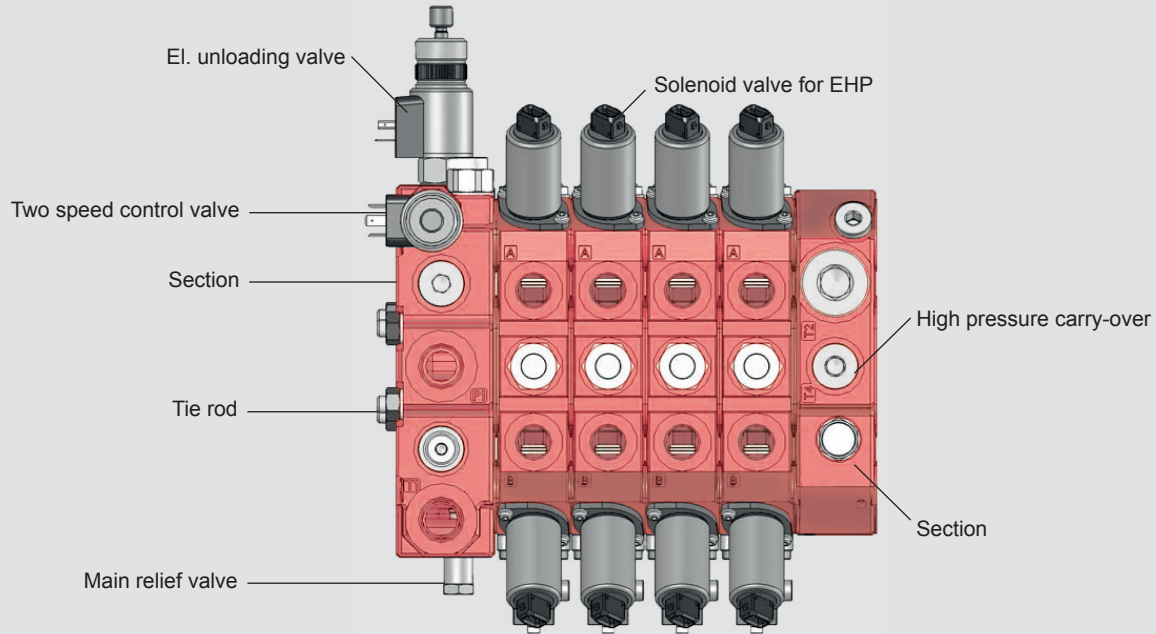
### Further RSQ 240 properties and possibilities

- Complete flow regulation control. At reduced flow the entire spool (lever) resolution is maintained
- Raised working pressure level in low flow mode allowing increased payloads, for example in cranes
- Separate adjustable flow limitation in each section, independent of pump flow
- A wide choice of spools and spool controls for different flow combinations

and for several applications and systems

- A full range of service port valves.
- Load check valves in each working section
- Spool actuators for external kick-out and spool position sensing
- L. h. and r. h. inlet configurations are available
- Intermediate outlet section for dual circuit systems
- Configurable for systems with variable displacement pump
- Manual versions easily convertible to remote control
- Pressure relief valve for downstream services
- Electrical unloading
- Regenerative function
- Possibility of high pressure carry-over

## General overview



## Weight

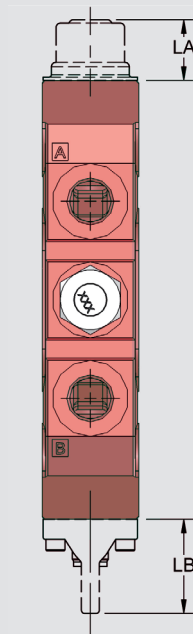
Inlet section	Weight in kg
I11D	8.2
I21A	6.2
I21B	6.1

Working section	Weight in kg
S11B	5.6
S11C	5.5

Outlet section	Weight in kg
U21A	6.0
U21B	5.9
U21C	5.8

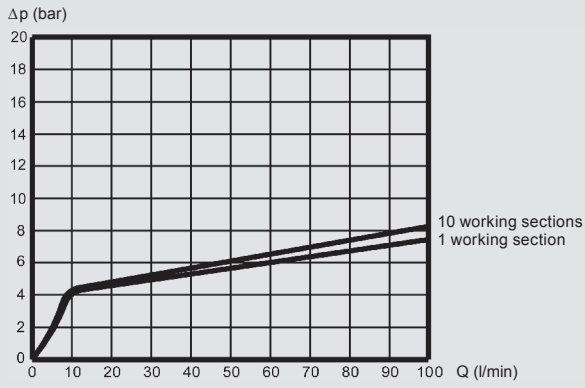
## Dimensions, spool controls

Type	LA [mm]	LB [mm]
901	27	
1001	64	
1101	64	
HP04	32	
HP02	70	
L61	87	
L64	91	
HL61	87	
HL64	96	
SM/SR	74	
M01		38
HP03		70
MH02		57
MH03		57

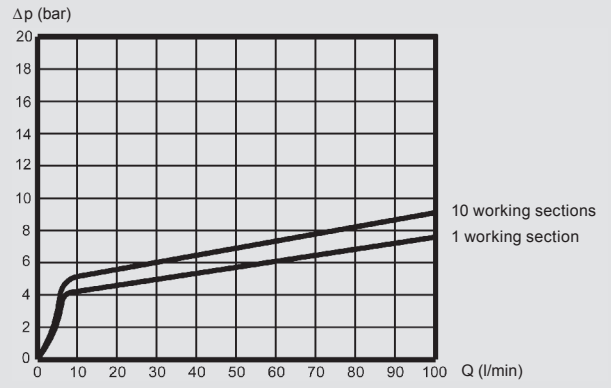


# Pressure drop

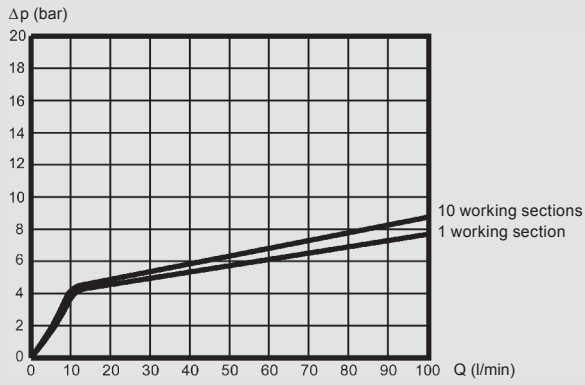
Oil temperature / viscosity for all graphs: +40 °C / 32 cSt



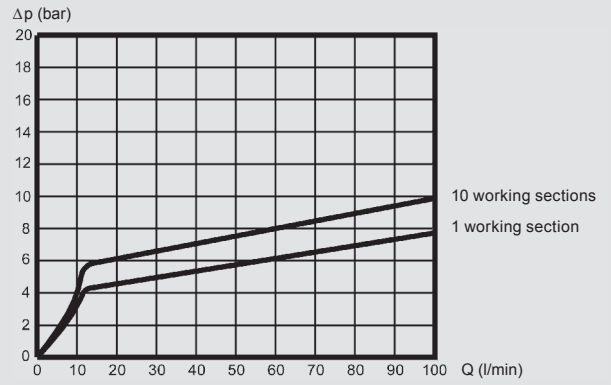
Pressure drop P - T el. unloaded, with PF505, FK501



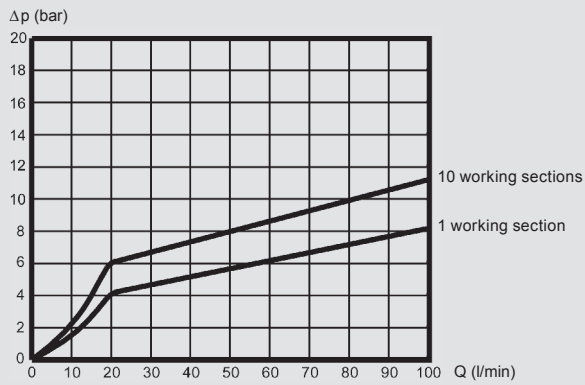
Pressure drop P - T (idling), with PF505, FK501



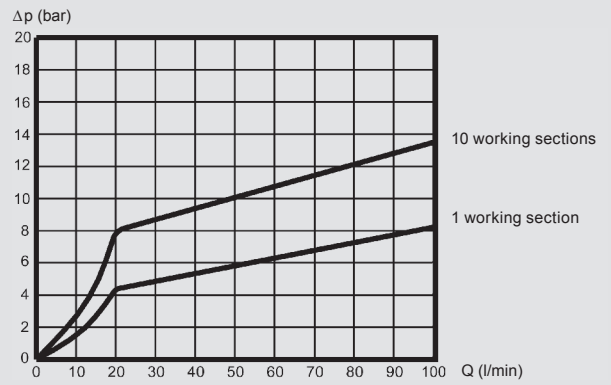
Pressure drop P - T el. unloaded, with PF507, FK502



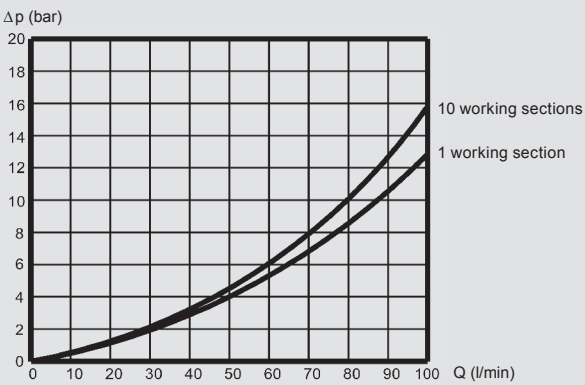
Pressure drop P - T (idling), with PF507, FK502



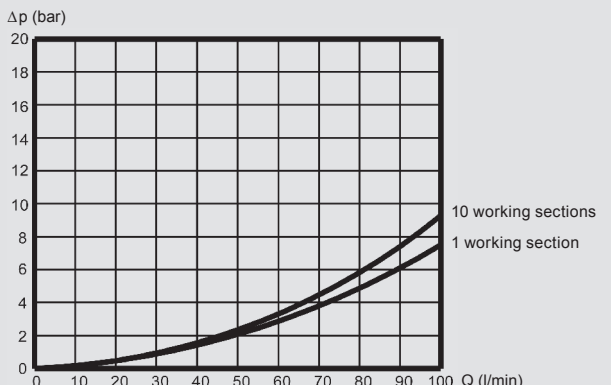
Pressure drop P - T el. unloaded, with PF511, FK505



Pressure drop P - T (idling), with PF511, FK505

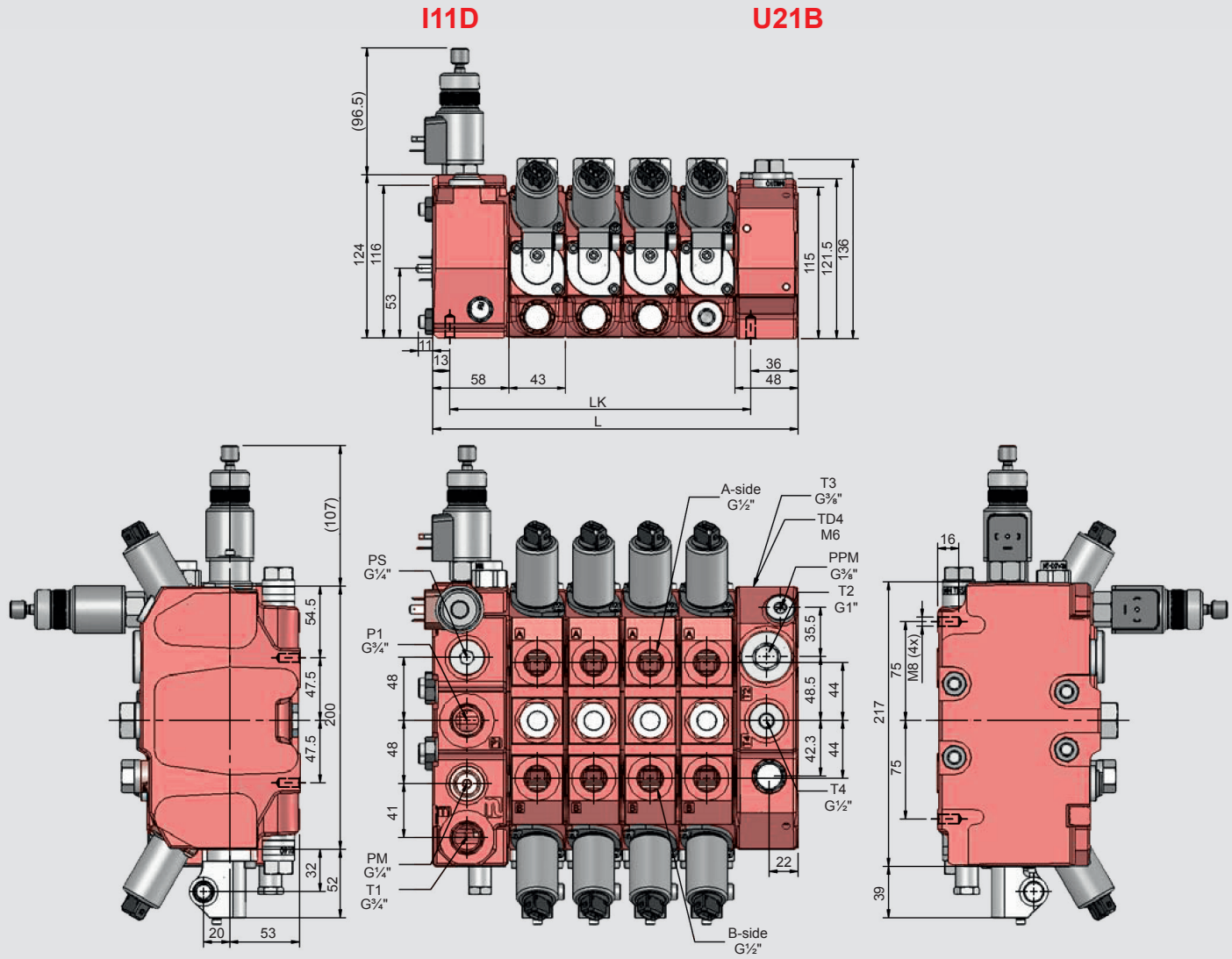


Pressure drop P-A/B



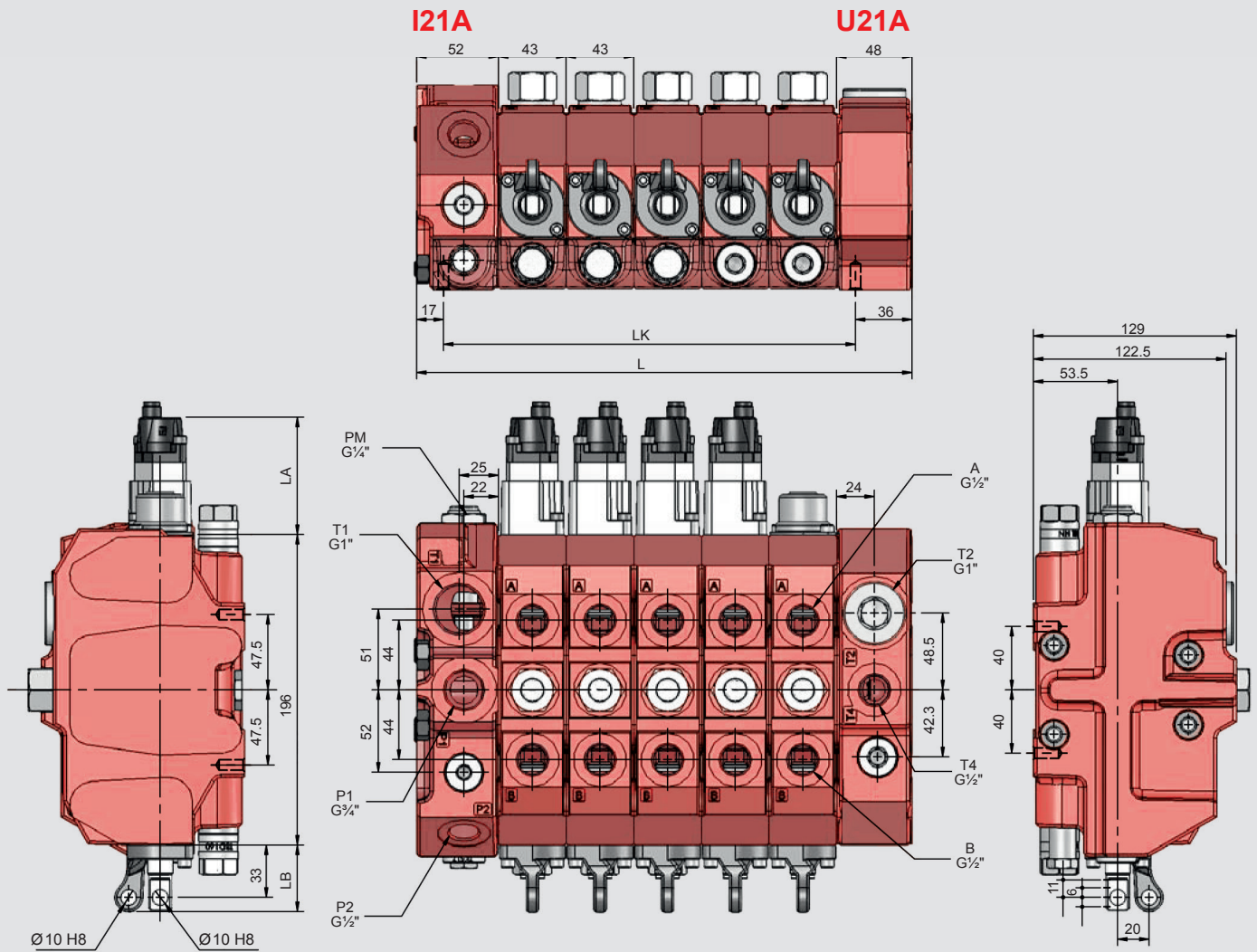
Pressure drop A/B - T

# Dimensions



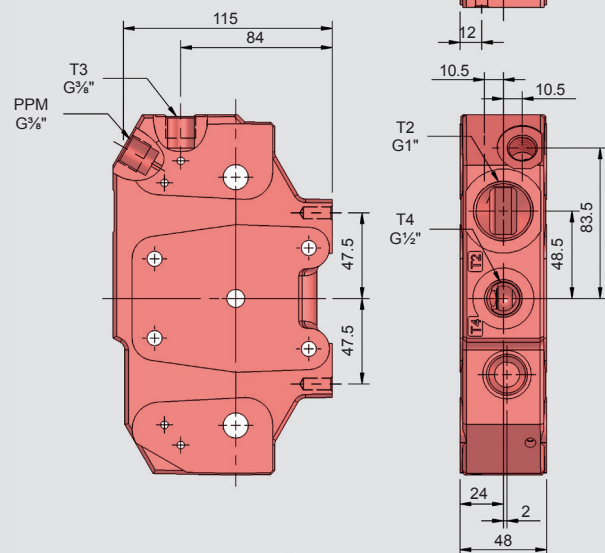
No. of sections	L [mm]	LK [mm]
1	149	100
2	192	143
3	235	186
4	278	229
5	321	272
6	364	315
7	407	358
8	450	401
9	493	444
10	536	487

# Dimensions

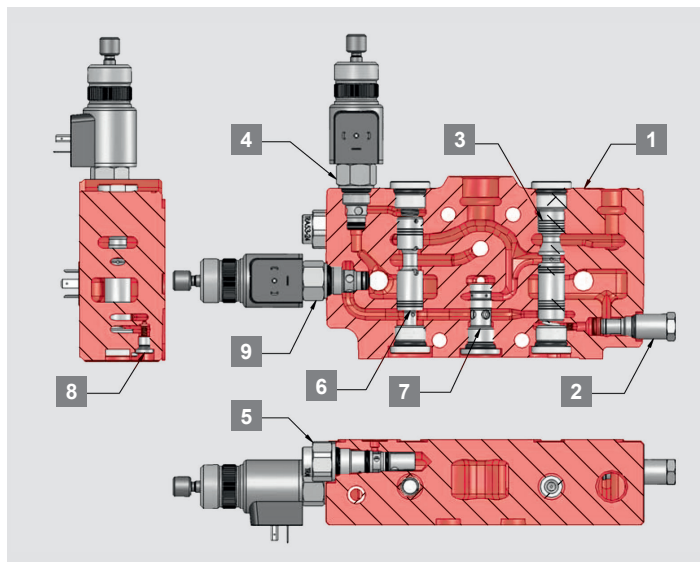


No. of sections	L [mm]	LK [mm]
1	143	90
2	186	133
3	229	176
4	272	219
5	315	262
6	358	305
7	401	348
8	444	391
9	487	434
10	530	477

## U21C



## Inlet section I11D – dual flow ranges



The unique RSQ 240 high-low flow property is achieved by the integral switching spool **6** of I11D, which can be electrically operated by the use of a solenoid valve **4**.

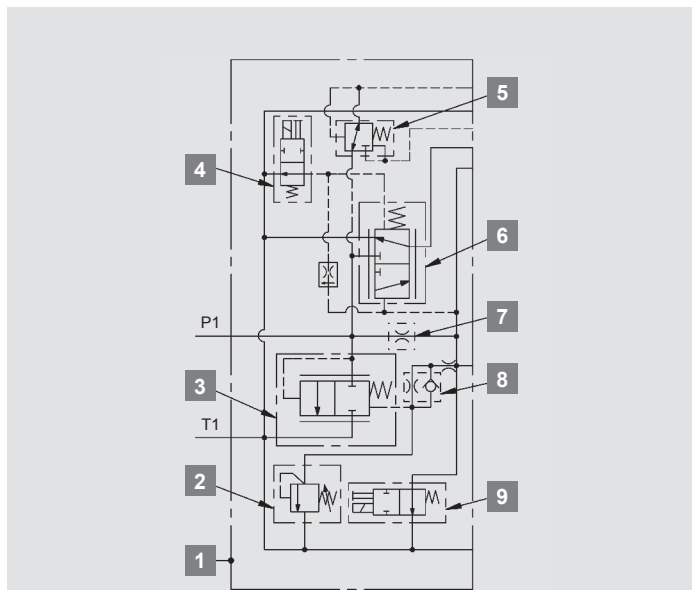
The I11D **1** with its integral Q-function provides bypass **3** of pump flow to tank in idling condition thereby reducing pressure drop and heat generation, as well as accomplishing improved control characteristics.

The bypass flow control spool in combination with an electrical unloading valve **9** achieves emergency dump of all pump oil to tank.

I11D houses a small relief valve cartridge TB12 **2** which together with the bypass flow control spool **3** provides the primary relief valve function of the RSQ 240. A choice of different metering orifice cartridges **7** are available, determining low flow range, influencing pressure build-up to suit different applications and constituting flow from the high pressure carry-over for downstream services.

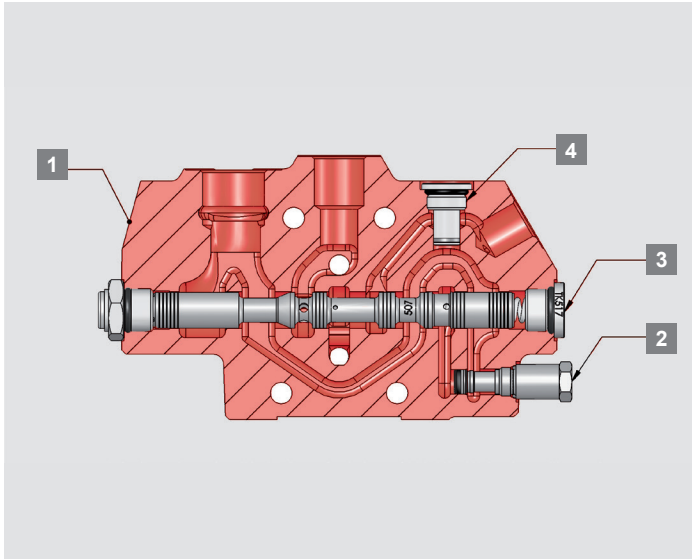
I11D when equipped with a pressure reducing cartridge TRA53 **5**, provides pilot oil supply for hydraulic and electro-hydraulic proportional remote controlled working sections.

I11D is equipped with a special check valve, FSB4 **8**, to cushion the opening of the bypass control spool thereby eliminating unnecessary pressure peaks.



<b>1</b>	Inlet type D	I11D
<b>2</b>	Main relief valve	TB12
<b>3</b>	Bypass flow control spool unit	FK401
<b>4</b>	Solenoid valve for el. high-low flow control	E926
<b>5</b>	Pressure reducing valve	TRA53
<b>6</b>	High-low flow control spool unit	FV401
<b>7</b>	Metering orifice cartridge for low flow	PF505
<b>8</b>	Cushioning check valve	FSB4
<b>9</b>	Electrical unloading valve	E926

## Inlet section I21A – single flow range and manually operated sections

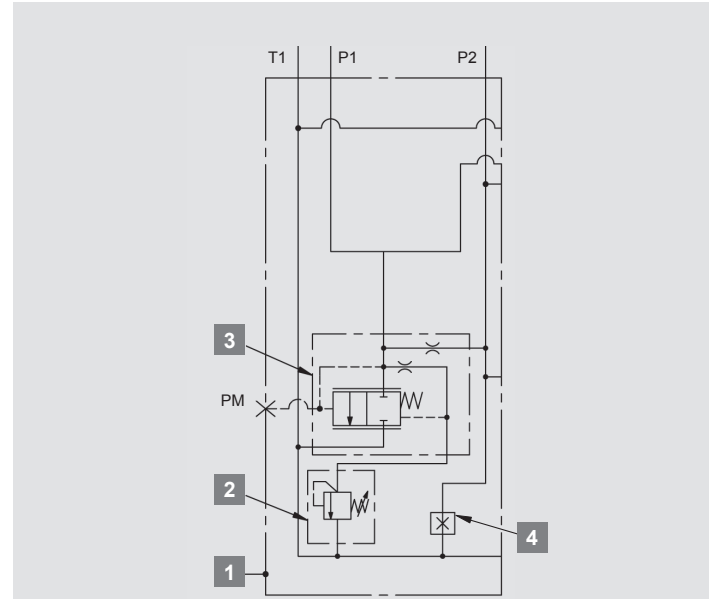


The I21A **1** provides full RSQ 240 Q-function **3**.

When equipped with an electrical unloading valve (E926), emergency dump is achieved. Here we have a plug **4**.

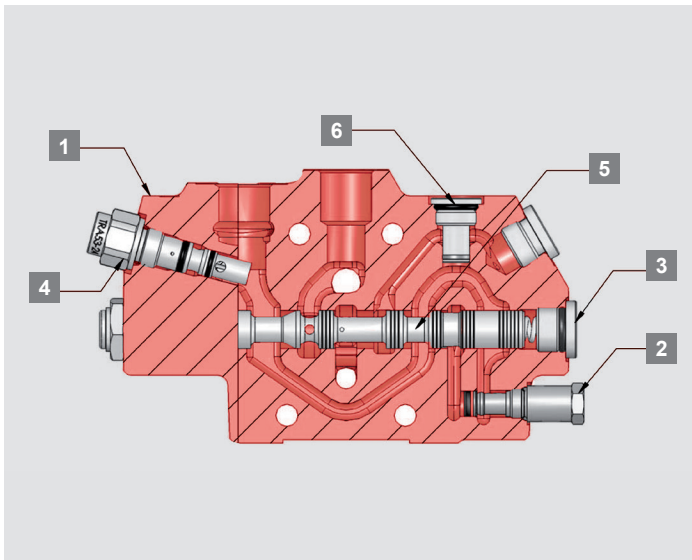
The integral TB12 **2** in combination with flow control spool FK../TK.. **3** form the primary relief valve function.

A number of bypass flow control spools, with its integral metering orifice, are available to suit different system requirements in terms of desired flow from the high pressure carry-over.



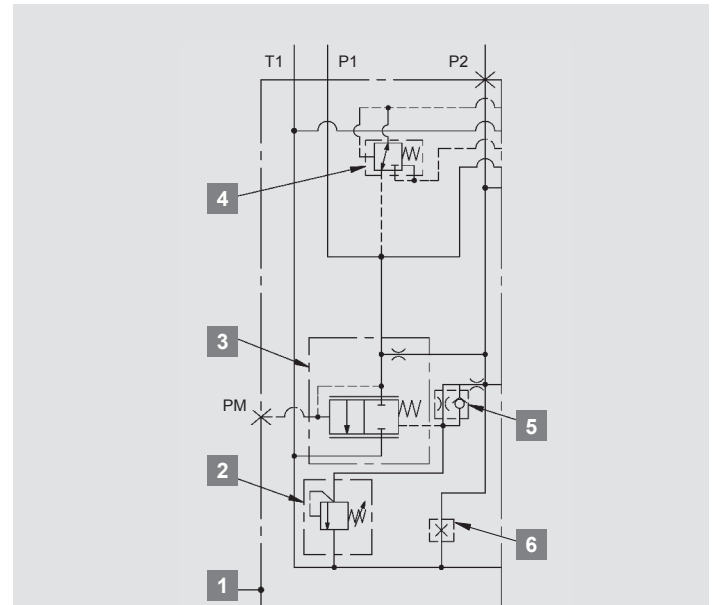
<b>1</b>	Inlet type A	I21A
<b>2</b>	Main relief valve	TB12
<b>3</b>	Bypass flow control spool unit	TK517
<b>4</b>	Plug	PE20

## Inlet section I21B – single flow range and remote controlled sections



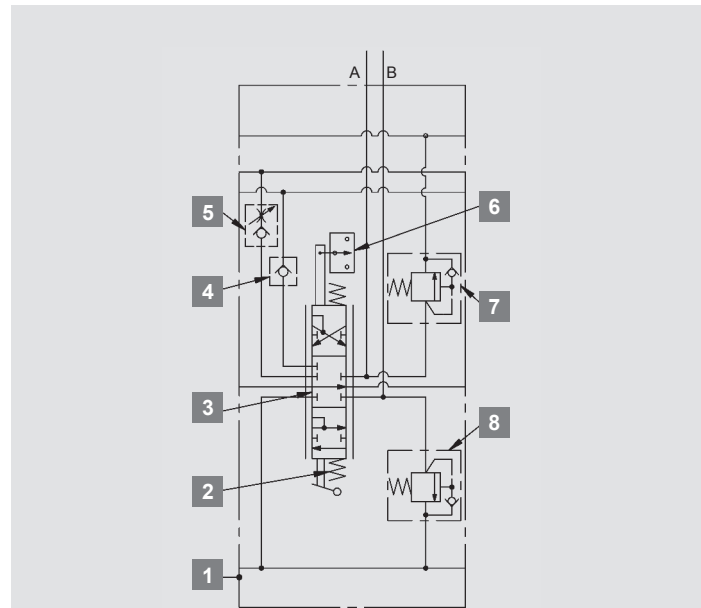
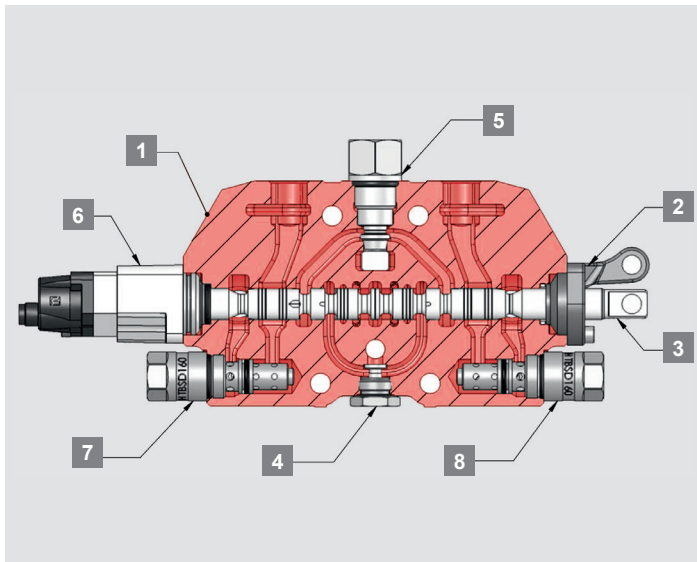
The properties of the I21B are the same as for I21A, with the addition that it can be equipped with a pressure reducing cartridge TRA53 **4** providing pilot oil supply for remote control.

I21B is equipped with a special check valve, FSB5 **5**, to cushion the opening of the by pass control spool thereby eliminating unnecessary pressure peaks.



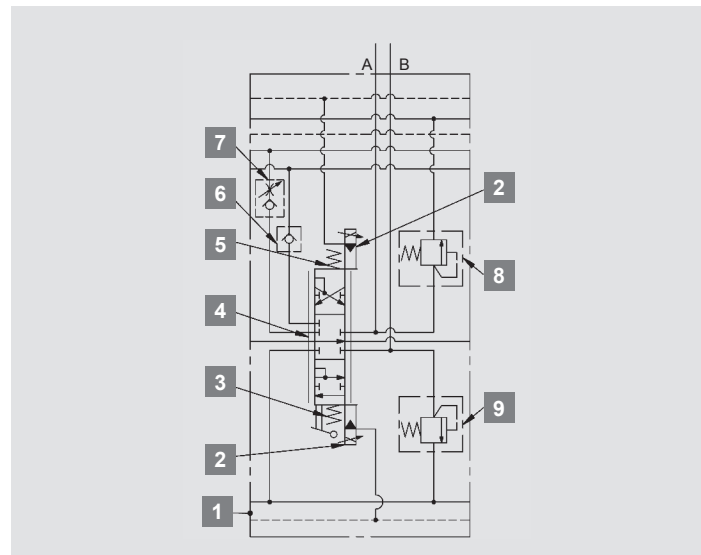
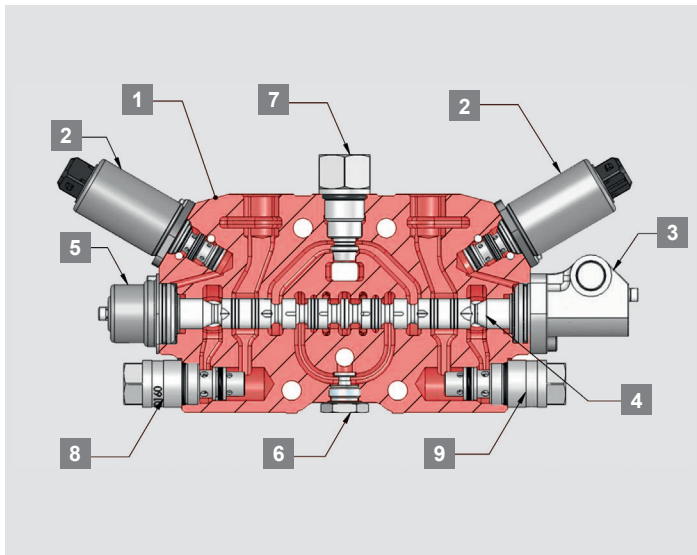
<b>1</b>	Inlet type B	I21B
<b>2</b>	Main relief valve	TB12
<b>3</b>	Bypass flow control spool unit	FK512
<b>4</b>	Pressure reducing valve	TRA53
<b>5</b>	Cushioning check valve	FSB5
<b>6</b>	Plug	PE20

## Working section S11B manually operated



1	Working Section	S11B
2	Spool actuator bracket	M01
3	Spool	
4	Low flow check valve	ML24
5	Full flow metering check valve	MF24
6	Spool position indicator	SM1
7	Port relief / anticavitation valve	TBSD160
8	Port relief / anticavitation valve	TBSD160

## Working section S11C remote controlled

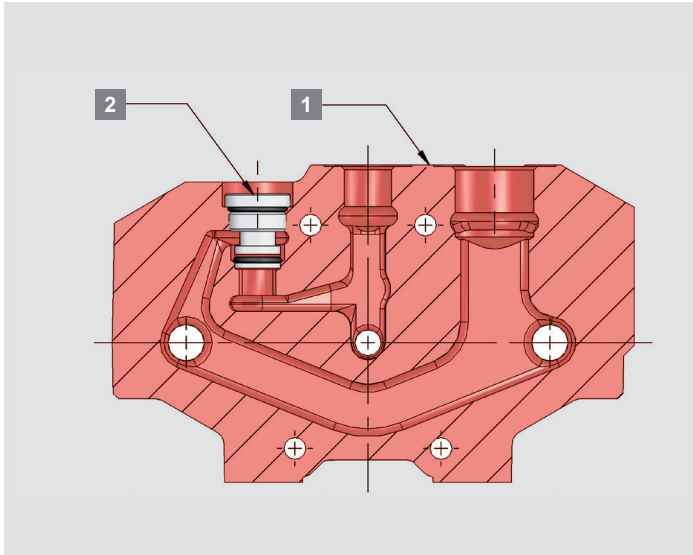


1	Working section	S11C
2	Solenoid valve EHP, 12V/24 V	ER62/ER64
3	Spool actuator	MH02
4	Spool	
5	Spool control	HP04
6	Low flow check valve	ML24
7	Full flow metering check valve	MF24
8	Port relief valve	TBD160
9	Port relief valve	TBD160

With cavities for service port valves and for solenoid operated valves for EHP.

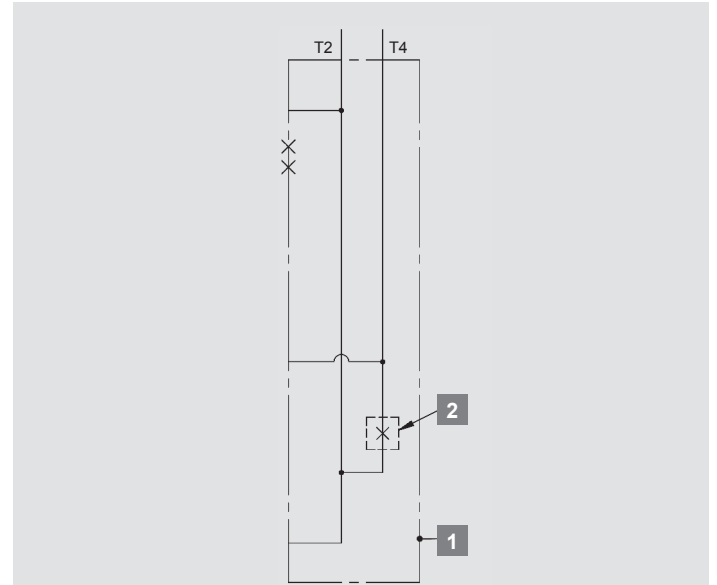


## Outlet section U21A for manually operated sections



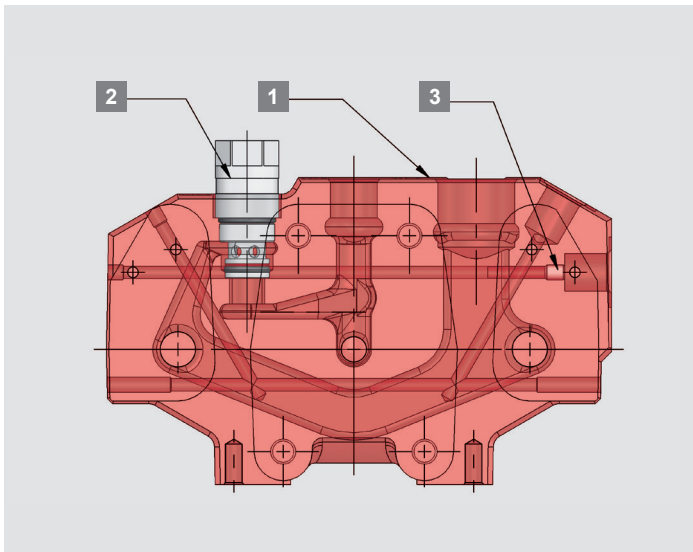
With cavity for high pressure carry-over plug.

Note that the carry-over flow is the flow that is regulated into the center channel i. e. the flow determined by the metering orifice of the inlet section.



1	Outlet section type A	U21A
2	Plug	P400

## Outlet section U21B for remote controlled sections

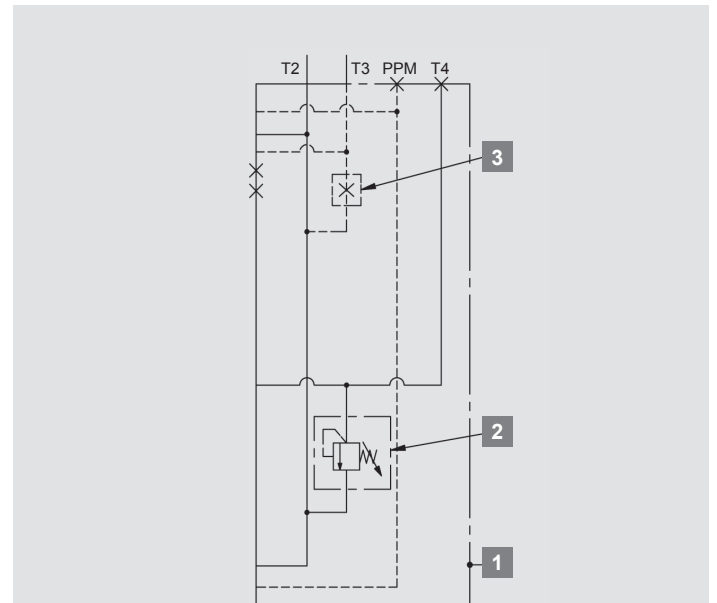


With cavity for high pressure carry-over plug. Here you have the pilot pressure valve TMB210 **2**.

With port (PPM) for external pilot oil supply / pilot pressure gauge.

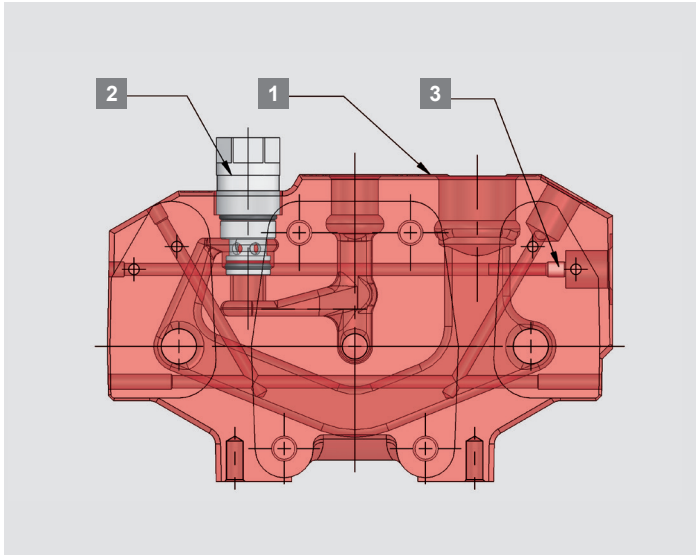
With port (T3) for external pilot oil drain (provided plug PMS6 **3** fitted in TD4). The return flow from the spool controls and the pressure reducing valve should be drained directly to tank in a separate piping.

With cross drillings for pilot oil supply to B-side of S11C sections.



1	Outlet section type B	U21B
2	Pilot pressure valve	TMB210
3	Plug	PMS6

## Outlet section U21C – intermediate outlet



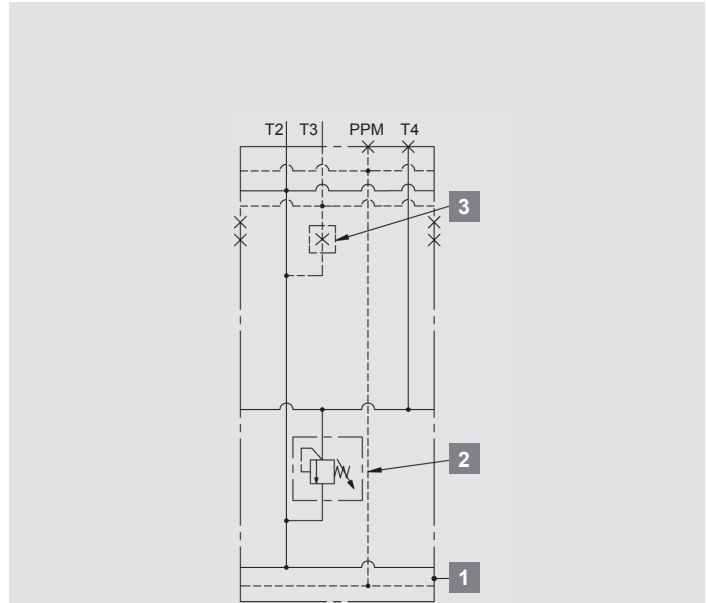
Intermediate outlet allowing dual circuit system. Intended both for manually and remote controlled valves.

With cavity for high pressure carry-over plug. Here we have the pilot pressure valve TMB210 **2**.

With port (PPM) for external pilot oil supply / pilot pressure gauge.

With port (T3) for external pilot oil drain (provided plug PMS6 **3** fitted in TD4). The return flow from the spool controls and the pressure reducing valve should be drained directly to tank in a separate piping.

With cross drillings for pilot oil supply to B-side of S11C sections.



<b>1</b>	Outlet section type C	U21C
<b>2</b>	Pilot pressure valve	TMB210
<b>3</b>	Plug	PMS6

## Electrical unloading valve and two speed control

The electrical unloading valve is a 2-way, normally open, solenoid type cartridge valve. It is an option in inlet sections I11D and I21.

It is intended for emergency stop and for pressure drop / heat generation reduction.

The unloading valve has manual override.

E912 and E926 has push and twist type pin operation.

This pin is sealable.

PE20 is the plug for the cavity.

### Data

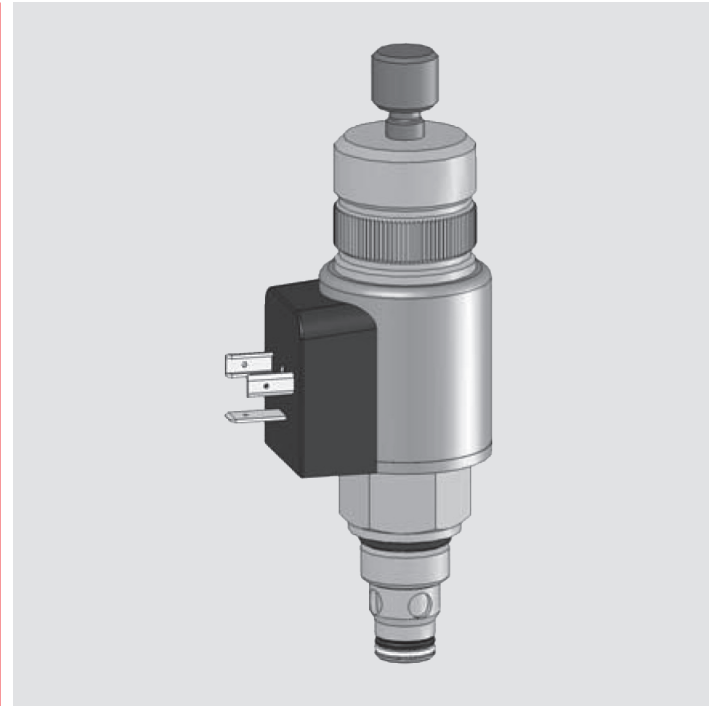
Rated flow:	40 l/min
Power consumption:	18 W (12 V) 19 W (24 V)
Rated voltage E912:	12 V
Rated voltage E926:	24 V
Max. voltage variation:	+/- 15 %
Duty factor*:	100 %
Connection**:	Connector according to EN 175304-803 (form A)
Protection class:	IP65

\* Sufficient cooling must be provided.

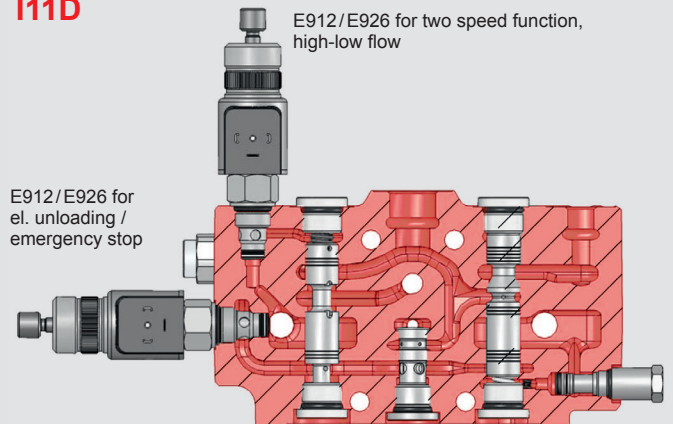
\*\* Other options available on request.

### Codes

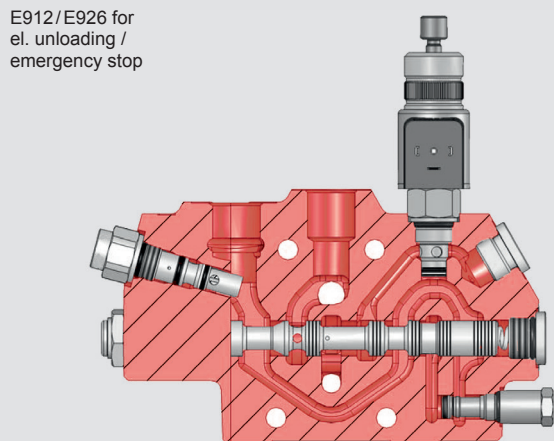
E912	Push and twist type override 12 V
E926	Push and twist type override 24 V



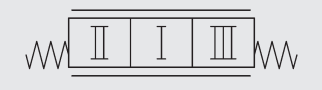
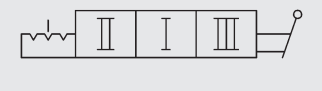





### I11D



### I21



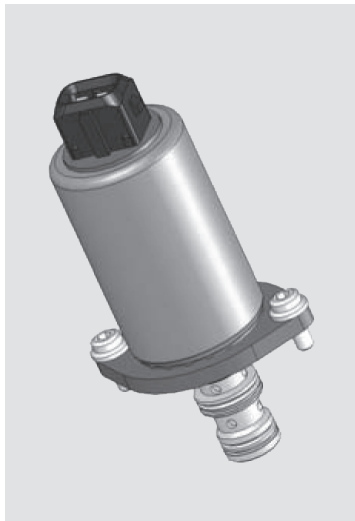
## Spool controls – A-side

<b>Spring cap 901</b> Spring centered	
<b>Spring cap 1001</b> Detents at positions 1, 2 and 3	
<b>Spring cap 1101</b> Spring centering with detent at position 4	
<b>Spool control HP</b> Hydr. proportional. For external pilot oil supply. Pilot pressure 6 – 16 bar, max pilot pressure 25 bar*	
<b>Spring cap L61</b> External hydraulic kick-out from inserted spool*	
<b>Spring cap L64</b> External hydraulic kick-out from inserted and extended spool, locking neutral position*	
<b>Spring cap SM**/SR**</b> Spool position indicator. Power supply 10 – 30 V.	

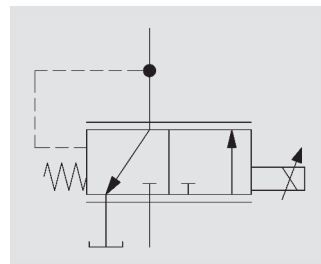
\* Connection G 1/4" BSP

\*\* Available in connector M12x1 and DT-04

## Solenoid valve for EHP – ER62 / 64



**Note: If used as “on-off” it is recommended to limit the current by using for example a coupling resistance. Please contact HYDAC for detailed information.**



## Spool actuators – B-side

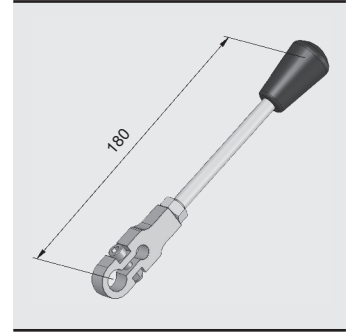
<b>Spool actuator M01</b> Spool actuator	<b>Spool actuator MH02</b> Cap for manual override
---	---

For valves in standard configuration spool controls are mounted on the A-side of the valve and the spool actuator on the B-side.

## Hand lever ME180

The hand lever ME180 is designed to be used in combination with spool actuator MH02, but it is a separate item and must be ordered separately.

ME180 provides manual override for EHP controlled RSQ 240 valves.



## Solenoid valve for EHP – ER62 / 64

### ER62/64

ER62/64 are 3/2-way electrically operated pressure reducing valves used to provide controlled pilot pressure to operate valve spools.

Functional principle	PWM (Pulse Width Modulation)
Duty factor	100 %
Connection	AMP Junior-Power-Timer
Recommended PWM frequency	100 Hz
Protection class	IP 65
Ambient temperature range	-30 °C – +50 °C
Fluid temperature range	-15 °C – +80 °C

### ER62

Rated voltage	12 V DC
Starting current	500 mA
Fully shifted	1,200 mA
Coil resistance +20°	5.4 Ohm

### ER64

Rated voltage	24 V DC
Starting current	250 mA
Fully shifted	600 mA
Coil resistance +20°	21.7 Ohm

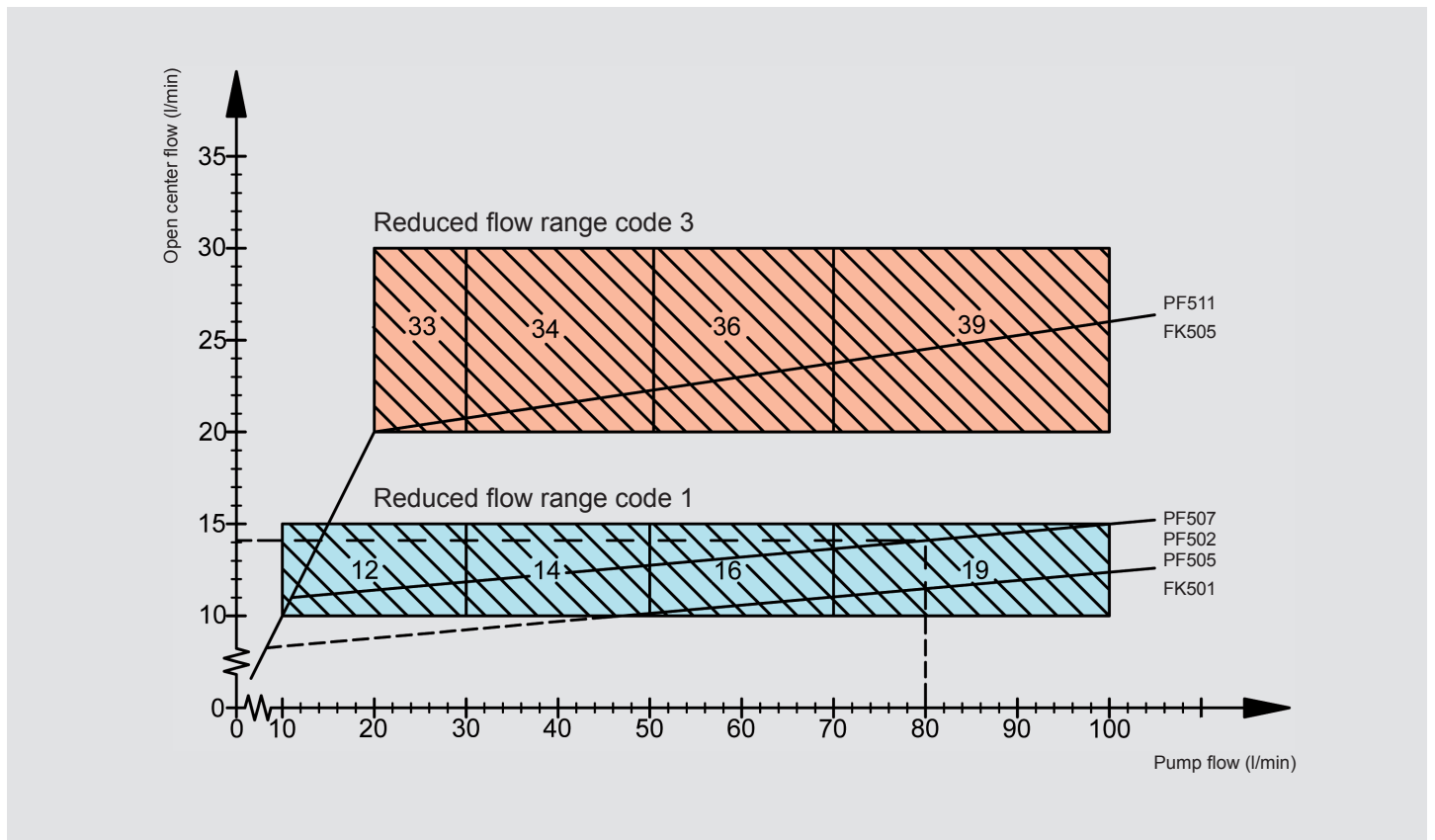
### Important:

The capacity of the current source must be higher than the current demand of all parallelly active solenoids in order to provide the PWM effect.

The HG plug is used when the valve is hydraulically remote controlled by a hydraulic servo valve.

## Spools

The RSQ 240 spools are available in a variety of flows and styles to accommodate most design requirements. Since the development of spools is a continuous process and all available spools are not described in this data sheet, contact HYDAC for advice on choosing spools in order to optimize your valve configuration.



First digit in shaded squares represents reduced flow range code.

Second digit represents full flow range code.

PF5.. are metering orifices of I11D inlet.

FK5.. are flow control spool (with integral metering orifice) of I21.. inlets.)

How to choose metering orifice: If pump flow is 80 l/min, and wanted reduced speed flow is approx 15 l/min, then metering orifices PF507/FK502 will achieve an open centre flow of 14 l/min.

## Principle spool matrix

		Flow range (l/min)			
		10 – 30	30 – 50	50 – 70	50 – 100
	Function / Type	10 – 30	30 – 50	50 – 70	50 – 100
	Double acting spool / 1	112	114	116	119
	Single acting spool / 2	212	214	216	219
	Double acting spool with 4 <sup>th</sup> pos. for float / 3	312	314	316	319
	Motor spool / 4	412	414	416	419

Spools in reduced flow code 3 (upper shaded area above) are also available. Spools specially developed for truck cranes (also for use in systems with load holding valves), as well as other application adapted spools are available on request. Recommended low flow range: 10-30 l/min.

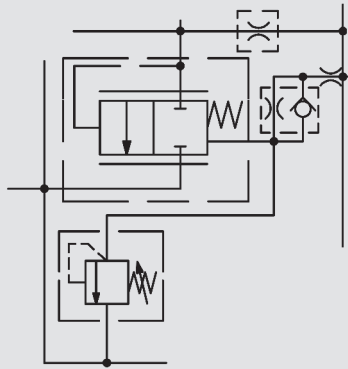
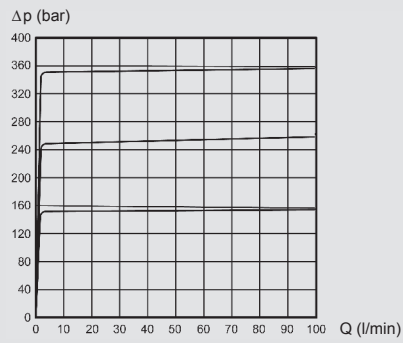
## Main relief valves

### Main relief valve TB12

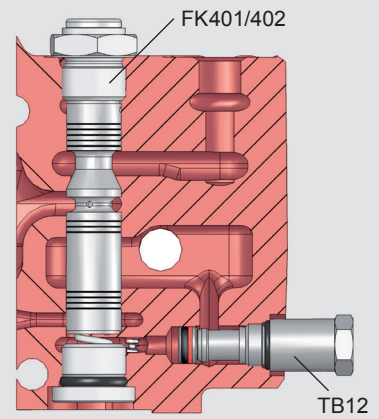
The bypass flow control valve FK.. in combination with the relief valve cartridge TB12 form the pilot operated relief valve function of the inlet sections for the primary circuit.

TB12 is adjustable and sealable.

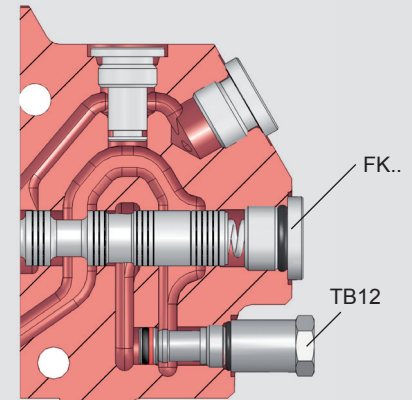
- Setting range:  
35 – 350 bar  
(3.5 – 35.0 MPa)
- Setting range step: 5 bar



I11D



I21..



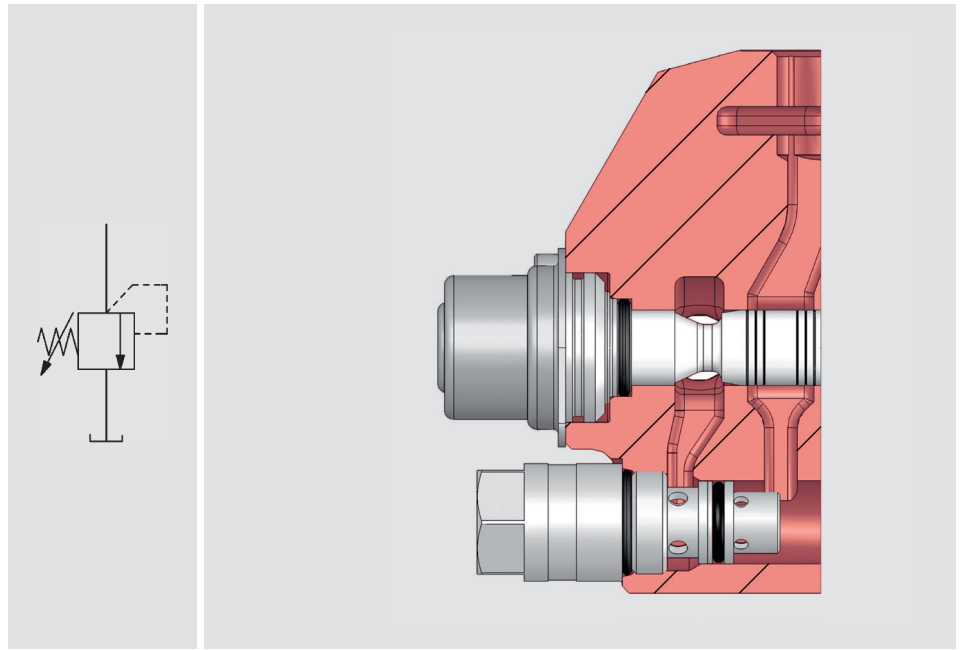
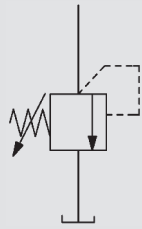
## Service port valves

### Port relief valve TBD160

The TBD160 is a differential area, direct acting relief valve, for the secondary circuit. TBD160 is adjustable and sealable.

Setting ranges for TBD and TBSD160:

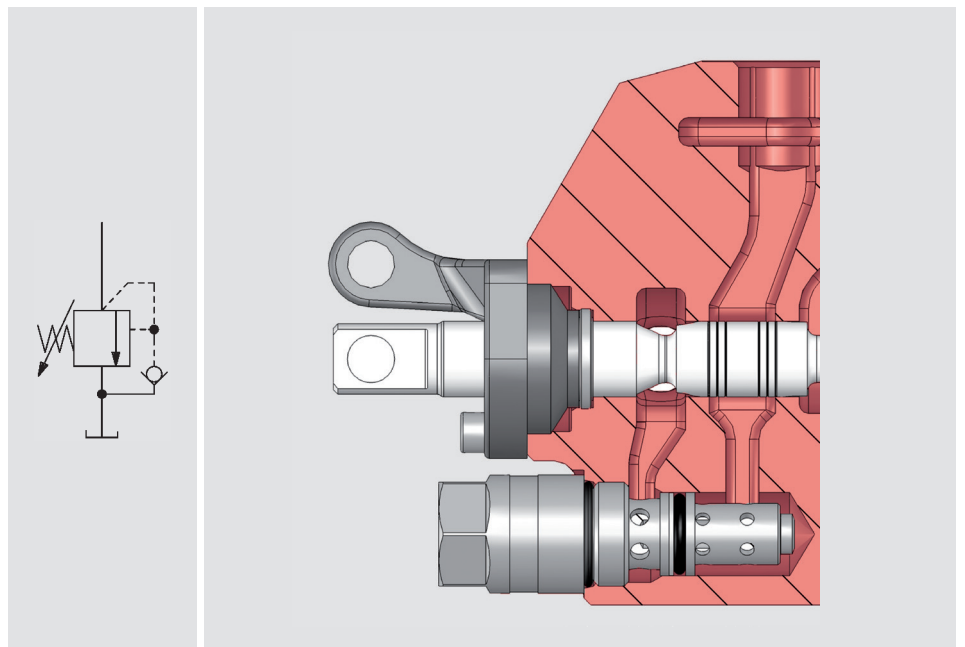
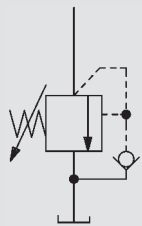
- Setting range:  
35 – 350 bar (3.5 – 35.0 MPa)
- Setting range step: 5 bar



### Port relief and anticavitation valve TBSD160

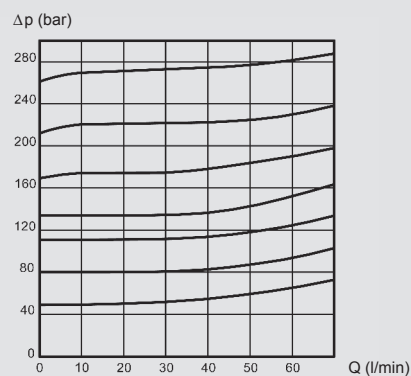
See TBD160 for functional principles.

TBSD160 is adjustable and sealable.

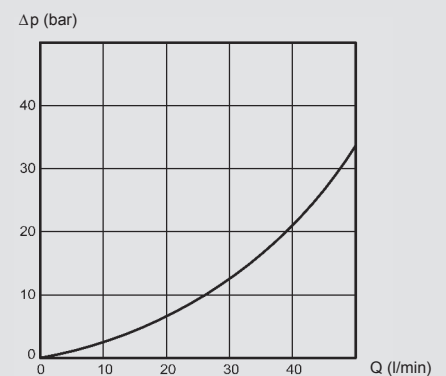


### Relief and anticavitation characteristics

Relief characteristics TBD / TBSD160



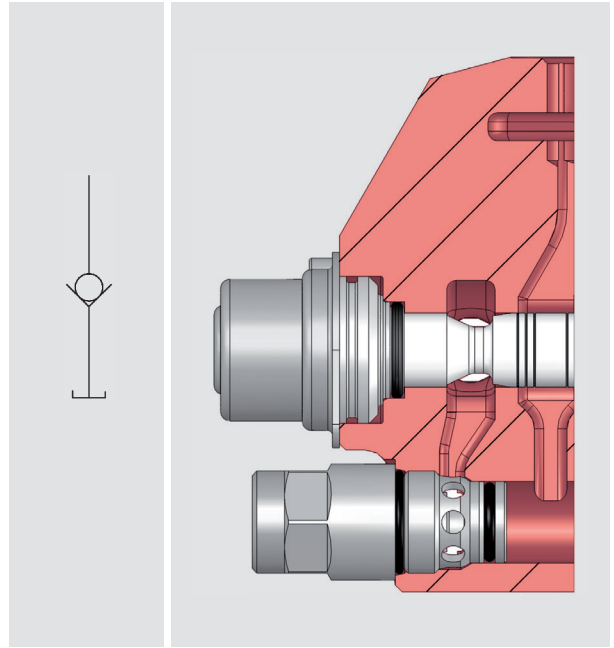
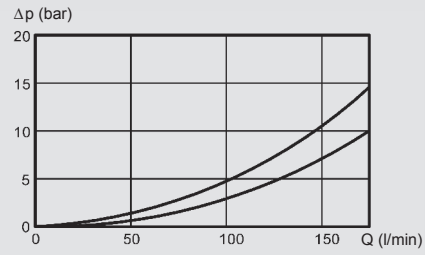
Anticavitation characteristics TBSD160



## Service port valves

### Anticavitation valve SB500

The anticavitation valve service to ensures that, in the event of a lower pressure in the cylinder port than in the tank, oil can be drawn from the system oil tank to the consumer.



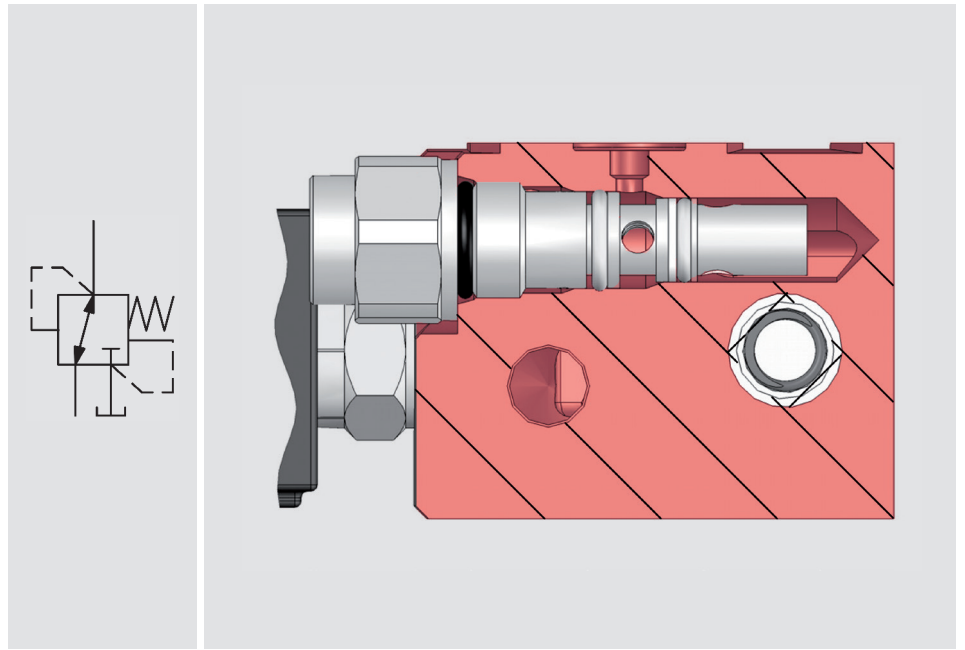
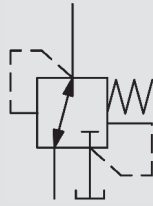


## Miscellaneous

### Pressure reducing valve TRA53

The cartridge type pressure reducing valve TRA53 is used in inlet section I11D and I21B to provide pilot oil supply for remote control.

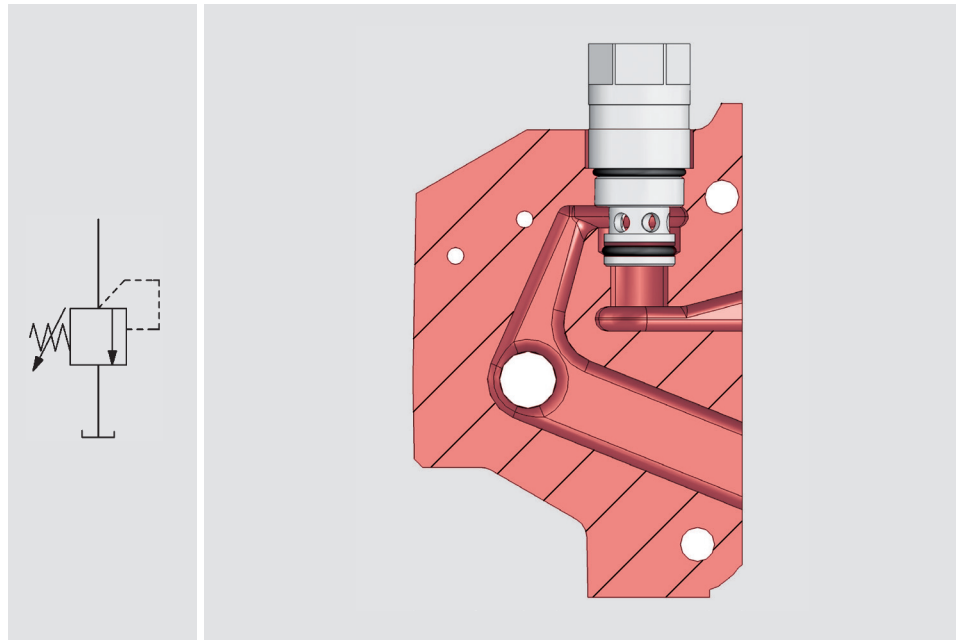
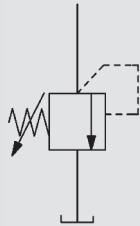
TRA53 is fixed set at 24 bar which consequently is the maximum available pressure level in the pilot system.



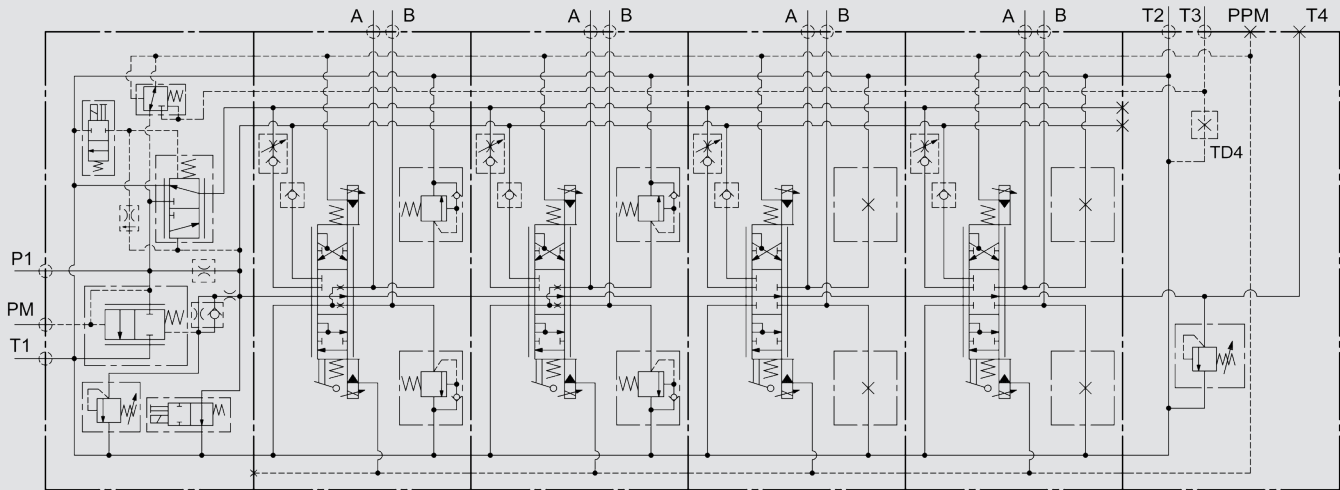
### Pilot pressure valve TMB210

The cartridge type pilot pressure relief valve TMB210, normally set at min 14 bar, is used in outlet section U21B and U21C to secure available pilot pressure build-up for remote control. Depending on system design this necessary starting pressure could also be achieved through downstream arrangements, for example a support leg valve.

TMB210 is adjustable and sealable.



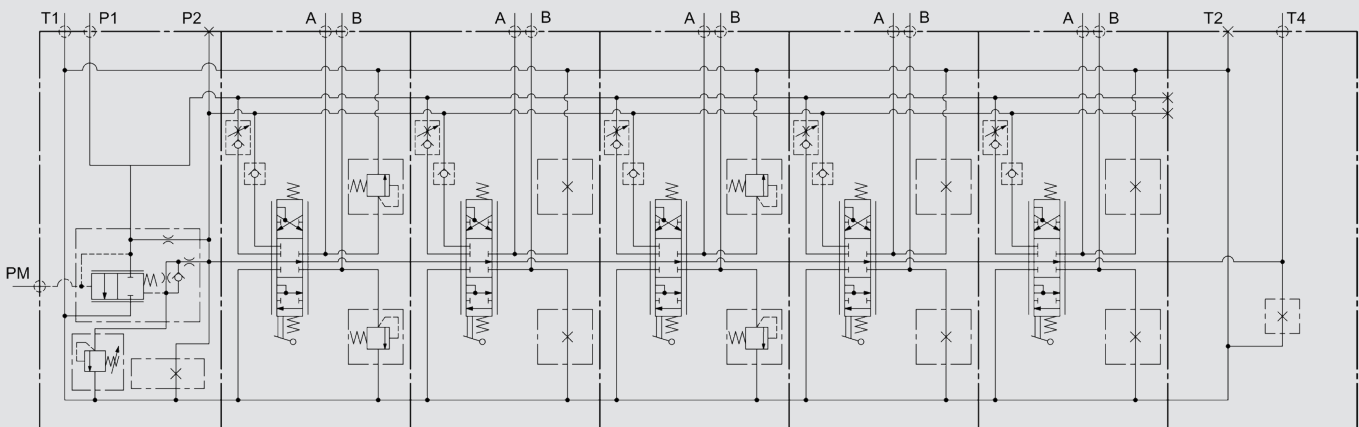
## Typical hydraulic circuit diagrams



For dual flow range.

With left inlet for single pump circuit.

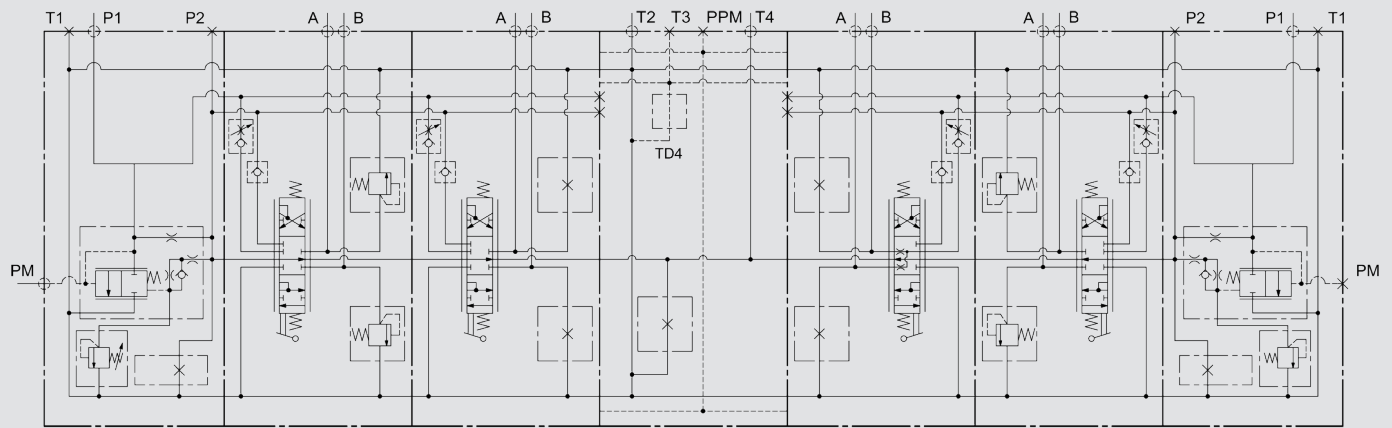
Electro-hydraulic proportional operated.



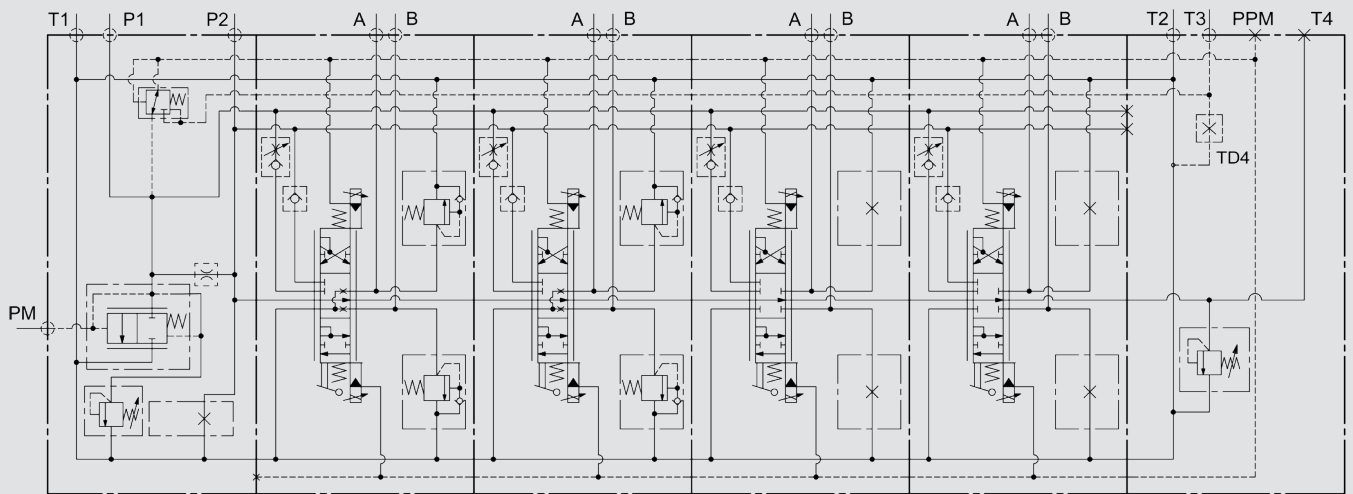
For single flow range.

With left inlet for single pump circuit.

Manually operated.



For single flow range.  
 With mid-outlet for dual pump circuits.  
 Manually operated.



For single flow range.  
 For systems with variable displacement pump.  
 Electro-hydraulic proportional operated.

## Note

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.



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