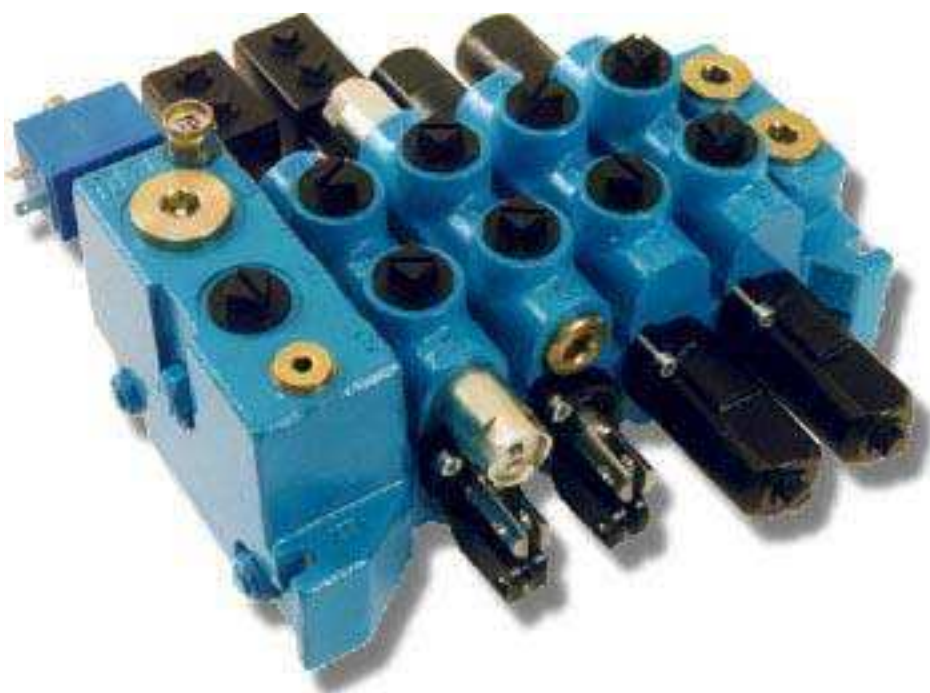




Nordhydraulic

DIRECTIONAL CONTROL VALVE RS210

-Sectional design



P.P.H.U. Pokora
ul. Idzikowskiej 11
92-624 Łódź
tel./fax: 042 648 88 01
kom.: 501 587 853

 **Nordhydraulic**

GET IN TOUCH WITH NORDHYDRAULIC AT AN EARLY STAGE

At Nordhydraulic there are skilled and experienced engineers/designers ready to adapt the valve for your very needs.

RS210 is a sectional valve designed to match your specific requirements.

It can be built in the range one to ten spool sections per valve assembly.

RS210 will cope with a system pressure up to **350 bar** and flows up to **70 l/min**.

The valve can be used in different systems for parallel as well as tandem circuitry.

THE VALVE WITH POSSIBILITIES

Over the years the RS210 has been developed into the very versatile and well-proven valve of today including for example Q-function, el. hydr.prop. remote control versions (see separate data sheets RS210 EHPD and EHPS) and a great variety of different inlet-, outlet- and spool sections, spools and spool controls etc.

The design of this sectional valve offers you as a systems designer and/or operator wide opportunities to optimum function and control.

Q-FUNCTION

Briefly the Q-function may be described in such a way that when the system is idling part of the pump flow is routed directly to tank instead of just circulating in the system. This reduces heat generation and improves control characteristics.

APPLICATIONS

The number of different applications where RS210 has proven useful is extensive. Typical examples are cranes, excavators, backhoe-loaders, skid loaders and tipping gear.

TYPICAL RS210 PROPERTIES AND POSSIBILITIES

-el.hydraulic, hydraulic and pneumatic remote controls and cable control

-several different in- and outlet alternatives offering possibility for electrical unloading, connecting and dimensional flexibility

-Q-function for further improved operating characteristics and lower pressure drop etc

-very wide programme of different spools optimised for various pump flows, applications, system alternatives etc.

-spool controls for external kick-out and spool position sensing

-load checks in each spool section

-high pressure carry-over

-l.h and r.h. side inlet

-feed restriction (meter-in)

-regenerative function

-careful compensation of flow forces

DATA SHEET

This data sheet presents the variety of standard components available, and how to specify these in a valve assembly according to your application requirements.

Contents

Technical data.....	page 3
Inlets.....	page 4-9
Spool sections.....	page 10
Intermediate sections.....	page 11
Outlets.....	page 11-12
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Spool controls.....	page 19-20
Spools.....	page 21
Miscellaneous.....	page 22
Valve specification.....	page 23-25

RS210

TECHNICAL DATA

PRESSURES

Max. system pressure..... 350 bar (35 MPa)
 (Depending on application and configuration, valid unless otherwise not stated)

Max. continuous return line pressure..... 20 bar(2.0Mpa)

Max. contamination level:

- At normal duty, equal to or better than 18/14 as per ISO 4406
- At high system pressure and/or for remote control equal to or better than 16/13 as per ISO 4406.

FLOWS

Max. recommended pump flow 60 l/min
 With Q-inlet..... 70 l/min

Hydraulic fluid

viscosity range.....10-400 mm²/s (cSt)

Hydraulic fluid temperature range for continuous operation...-15°C - +80°C

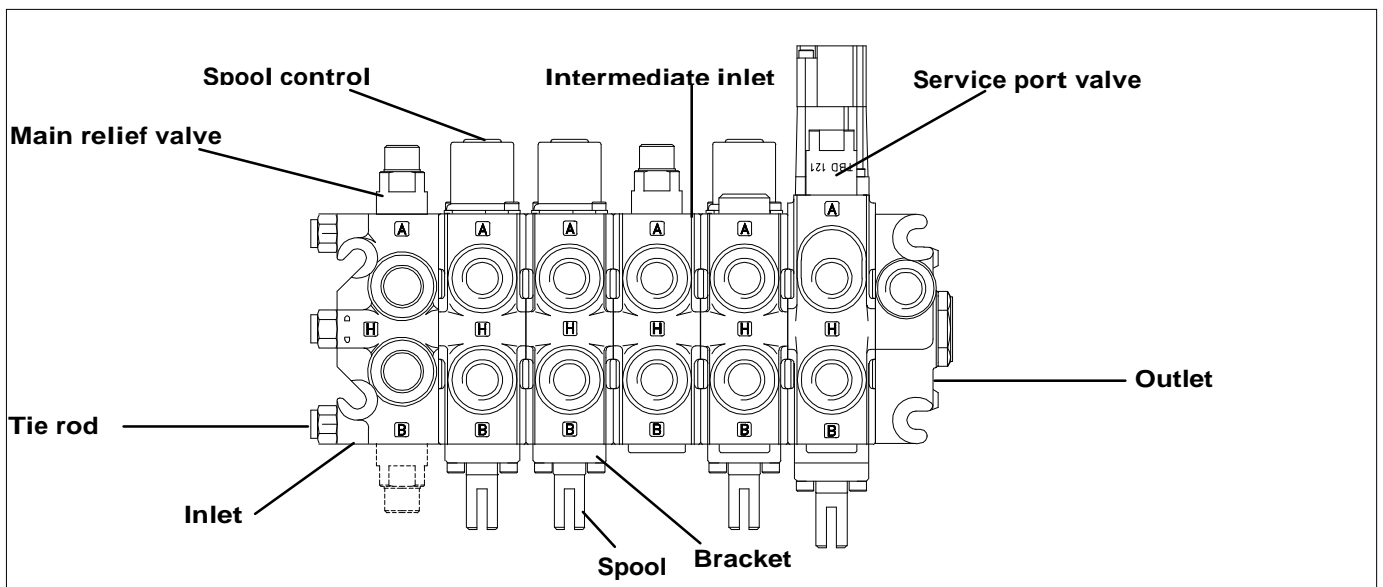
(Higher temperature - contact us. High temp. seals available)

FURTHER DATA

Spring force, spool control 910 in neutral position..... 110 N (11 kp)
 Spring force, spool control 910 fully selected spool..... 135 N (13,5 kp)

Spool leakage at 100 bar, 32 cSt

and 40°C.....4-9 cm³/min

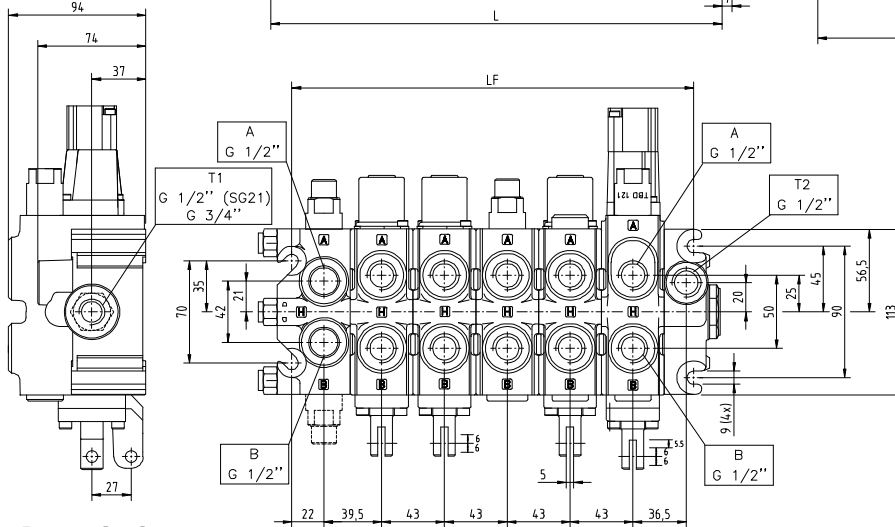
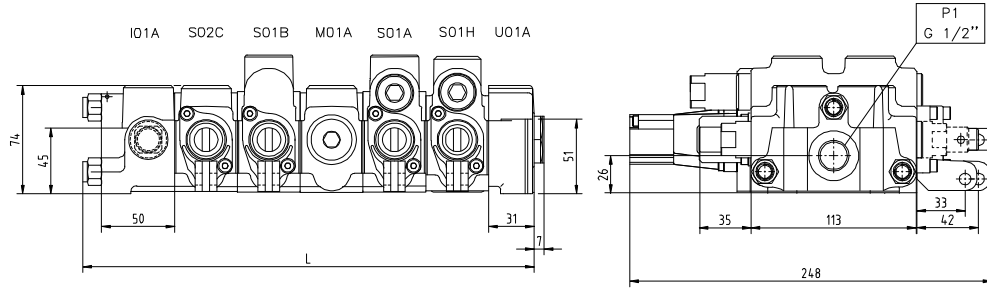


RS210

INLETS AND OUTLETS

—with side connection—

Weights	
Code	Kg
I01A	1,8
I03P	1,8



No. of spool/intermediate sections.	L mm	LF mm
1	136	103
2	179	146
3	222	189
4	265	232
5	308	275
6	351	318
7	394	361
8	437	404

Code Description

I01A Has two pump ports (one side located) and one tank port.

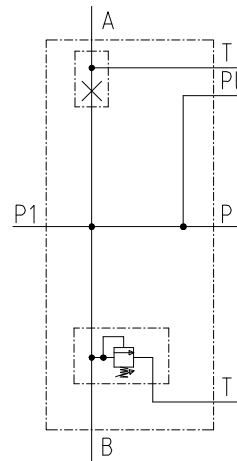
With m.r.v. fitted in A-side cavity, A-port is pump port and B-port is tank port and vice versa when m.r.v. is B-side mounted. For max. **300 bar**.

Port P1-side, A and B face upwards.

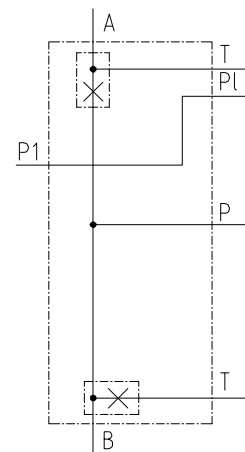
I03P Installation dimensions and port locations as I01A. Side inlet port only connected with parallel gallery. Top inlet port only connected with centre gallery. For max. **300 bar**. Usable to achieve two separate valves in one parallel circuit system, and for use of RS210 in LS-systems.

Port P1-side, A and B face upwards.

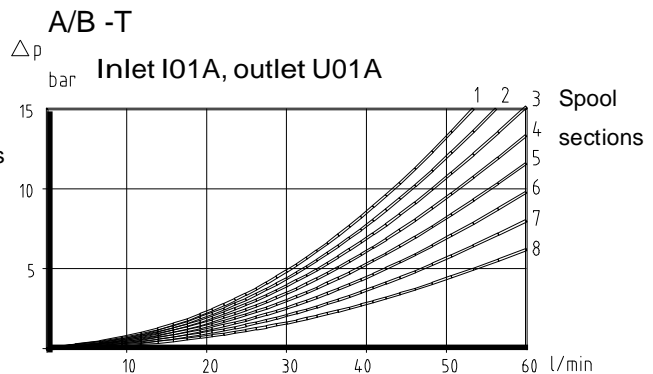
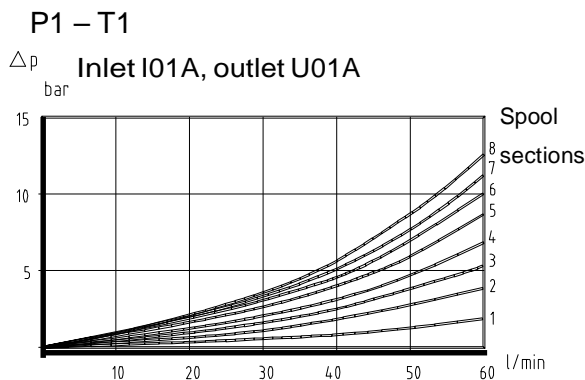
I01A



I03P



Pressure drop



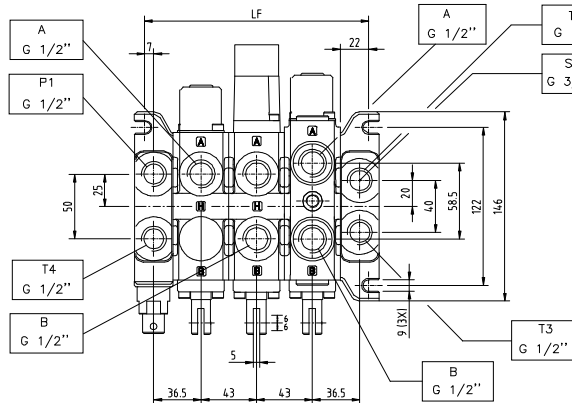
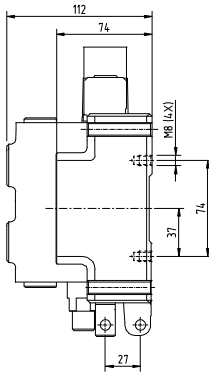
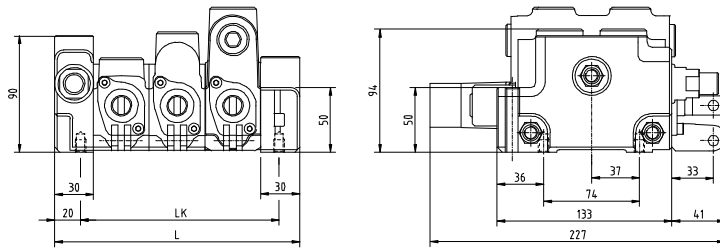
RS210

INLETS AND OUTLETS

—with top connection—

I01B S01C S01B S01R U01B

Weights	
Code	Kg
I01B	1,7
I06G	1,7

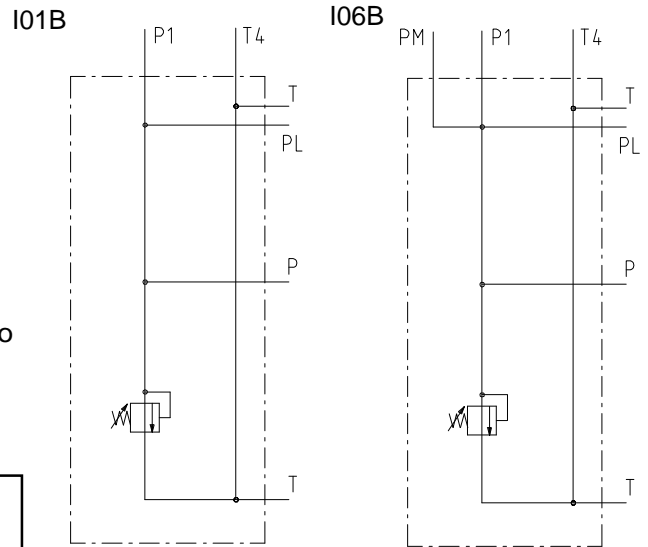


No. of spool/intermediate sections.	LK mm	L mm	LF mm
1	68	103	87
2	111	146	130
3	154	189	173
4	197	232	216
5	240	275	259
6	283	318	302
7	326	361	345
8	369	404	388

Code Description

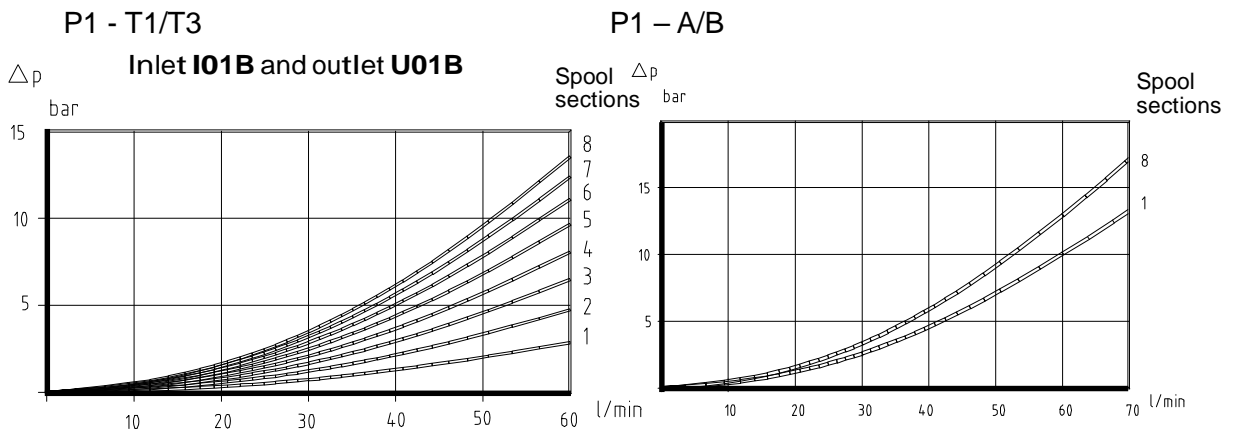
I01B Has one pump and one tank port, both facing upwards. M.r.v. cavity is on the B-side. For max. **300 bar**. Max. recommended pump flow for tank port (T4): 35 l/min. **Ports P1 and T4 face upwards.**

I06B Same as **I01B** but with pressure gauge port (**PM**). PM (1/4" BSP) is located adjacent to pump port (P1).



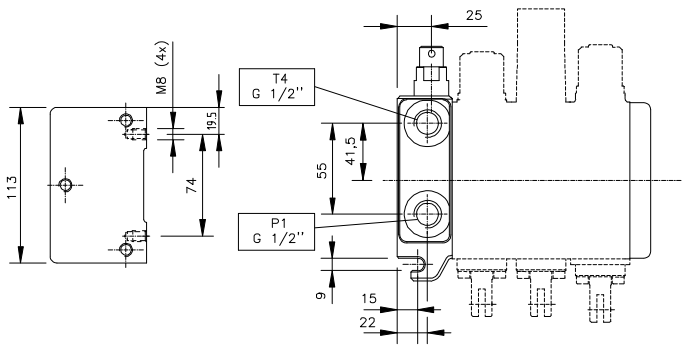
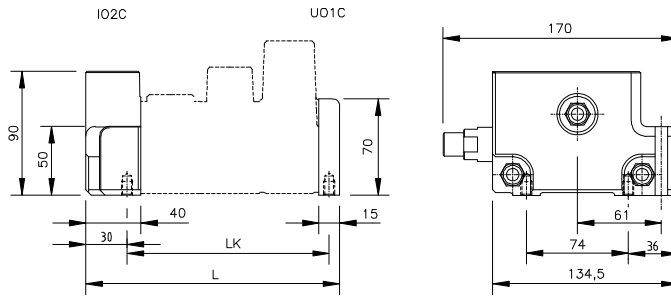
(Note: Inlets of type B offer a connection between tank galleries of the A and B sides.)

Pressure drop



“C” INLET AND “C” OUTLET (END PLATE)

Weights	
Code	Kg
I02C	2,5
U01C	0,7



No. of spool/ intermediate sections.	L mm	LK mm
1	98	61
2	141	104
3	184	147
4	227	190
5	270	233
6	313	276
7	356	319
8	399	362

Code **Description**

I02C Has one pump and one tank port, both facing upwards. M.r.v. cavity is on the A-side.

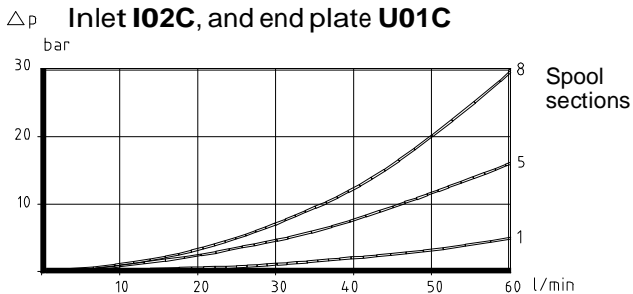
Ports P1 and T4 face upwards.

U01C End plate without porting. (See page 11 as well.)

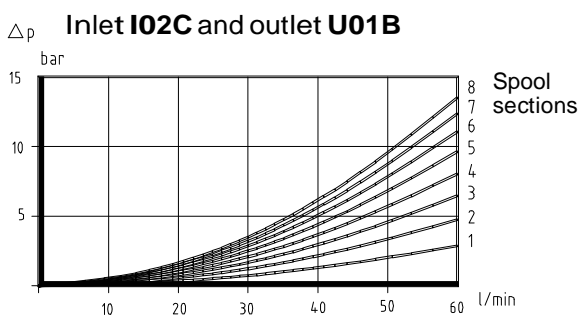
(Note: Inlet of type C offers a connection between tank galleries of the A and B sides.)

Pressure drop

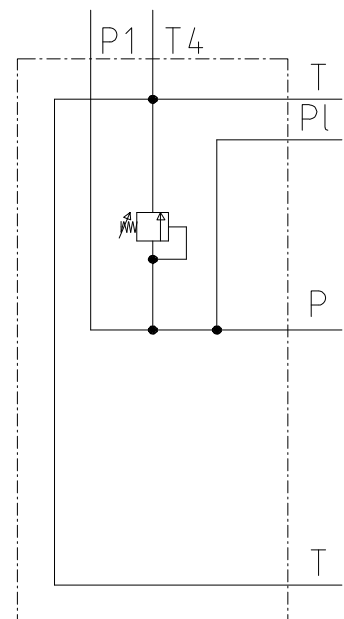
P1 - T4



P1 - T1/T3



I02C

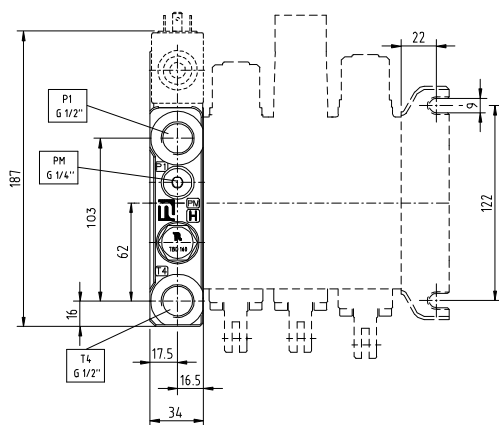
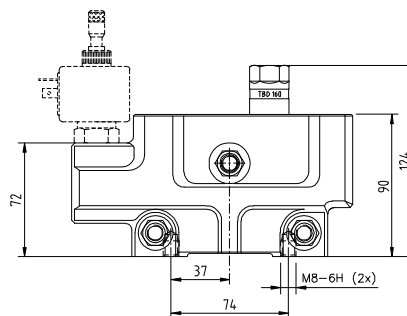
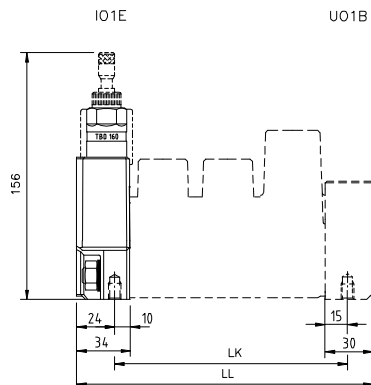


RS210

"E" INLET

E-inlet offers el. unloading of the pump flow

Weights	
Code	Kg
I01E	2,3



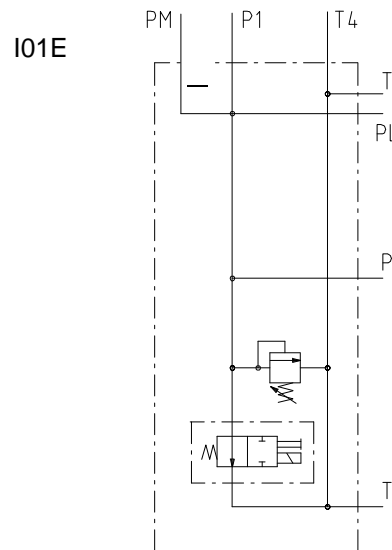
No. of spool/ intermediate sections.	LK mm	LL mm
1	68	107
2	111	150
3	154	193
4	197	236
5	240	279
6	283	322
7	326	365
8	369	408

Code Description

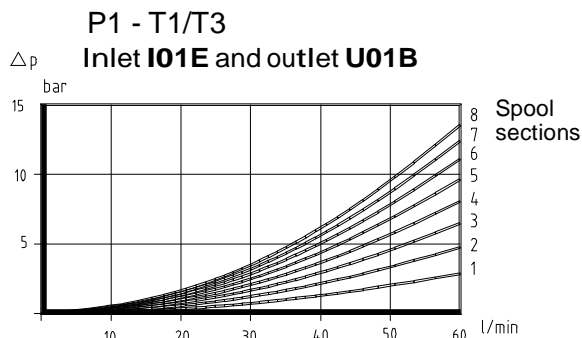
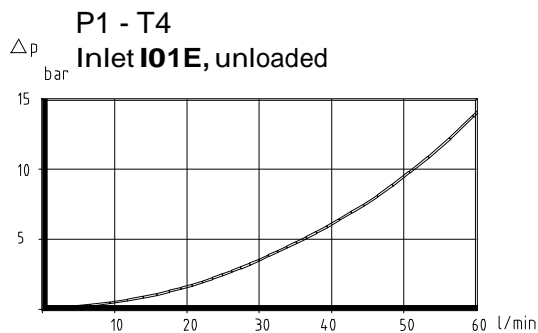
I01E Has one pump and one tank port, both facing upwards.
 M.r.v. cavity facing upwards.
 Main inlet valve options:
-TBD160 up to 300 bar
-TBS400 up to 350 bar

With cavity (facing upwards) for optional el. unloading valve.
 With pressure gauge port (PM).
 Connects A-B at T.

Ports P1, T4 and PM face upwards.



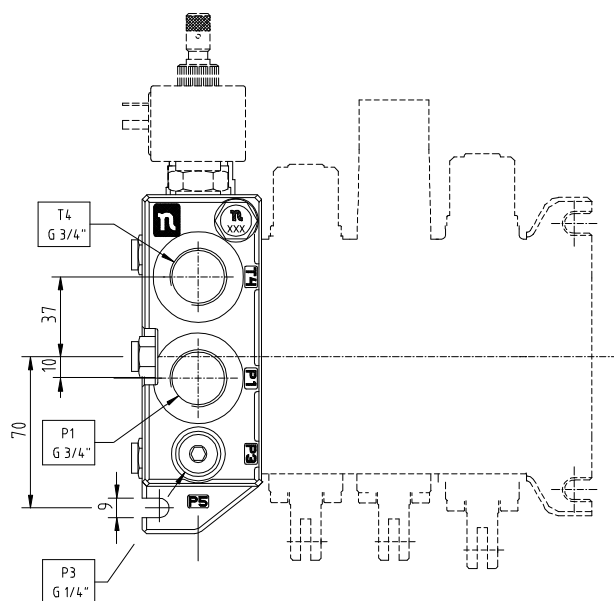
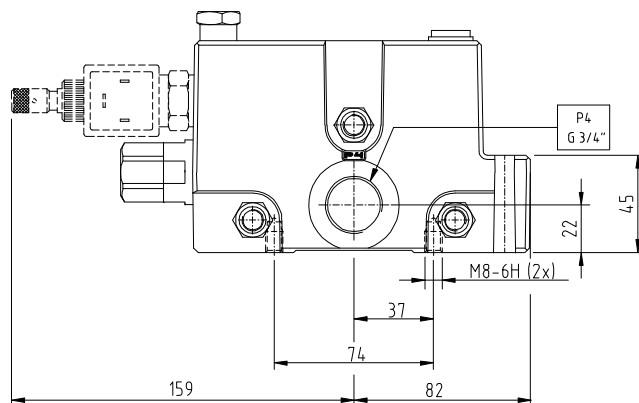
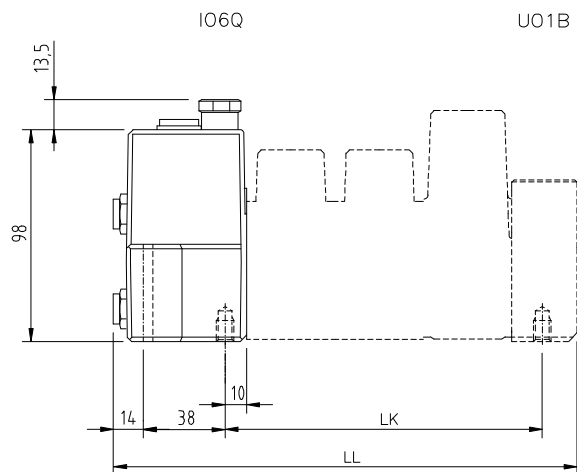
Pressure drop



"Q" INLET

Weights	
Code	Kg
I02Q	4,5
I06Q	4,5

Q-inlet provides by-pass in idling condition and el. unloading of pump flow.



No. of spool/ intermediate sections.	LK mm	LL mm
1	68	135
2	111	178
3	154	221
4	197	264
5	240	307
6	283	350
7	326	393
8	369	436

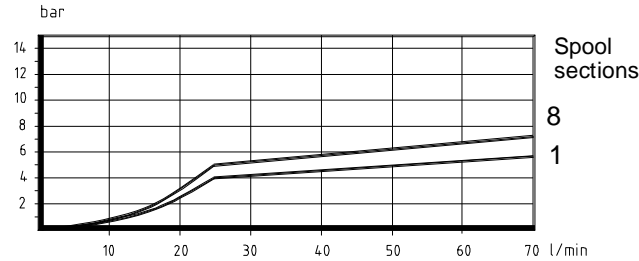
Note: I02Q has no side inlet port (P4) and port P1 is G 1 "

RS210

"Q" INLET

P1 - T4

Inlet **I02Q/I06Q**, with flow control **FKA283/2** and **PF12**, outlet **U01B**.



I02Q

Inlet section with flow control, main relief valve and unloading function.

When the system is idling a small regulated flow passes the centre gallery of the valve. Excess pump flow is routed directly to tank.

The regulated flow is defined by the flow control valve **FKA283** and the metering orifice **PF...**

When a spool is operated the whole pump flow is instantly available for the user. The low center gallery flow during idling conditions reduce pressure drop P- T through the valve body, and facilitates higher pump flow without negative influence on the spool forces and heat generation.

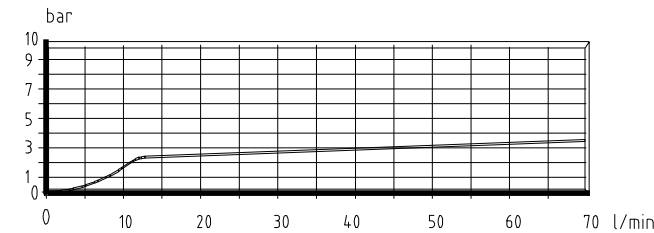
I02Q also is equipped with a main relief valve cartridge **TB11**, which together with flow control valve **FKA283** function as pilot operated main relief valve.

Q-inlet can be equipped with a solenoid operated valve for electrical unloading.

Port P1 and T4 face upwards.

P1 - T4

Inlet **I02Q/I06Q**, unloaded.



I06Q

Has the same functions as I02Q but with an added special check valve **FSB3** in the signal gallery to damp the unloading function of the flow control valve **FKA**. I06Q also provides an additional pump port.

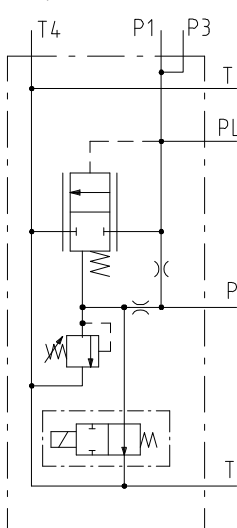
Port P1 and T4 face upwards, P4 to the side.

Available metering orifices for controlled flows. In combination with **FKA283/2** they provide:

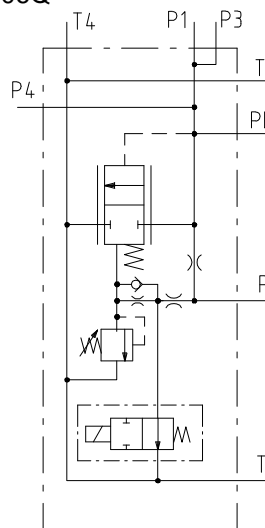
PF10	21 l/min
PF11	25 l/min
PF12	28 l/min

A lower flow creates less pressure drop P - T. A spool that matches the flow improves the operating characteristics

I02Q



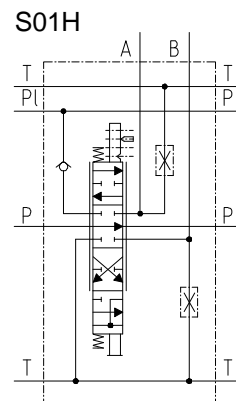
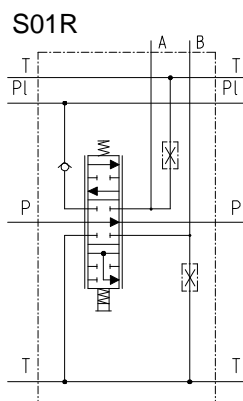
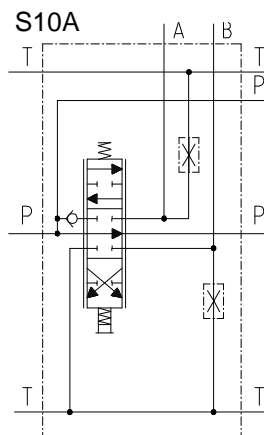
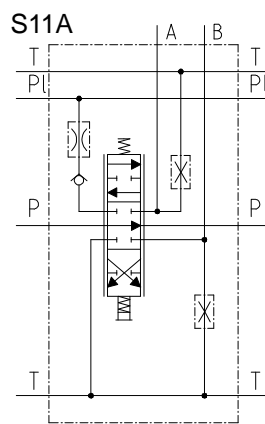
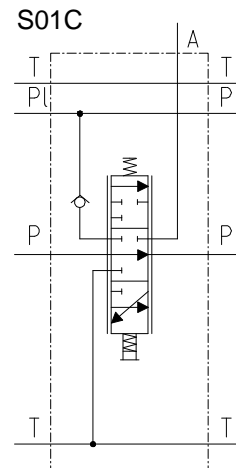
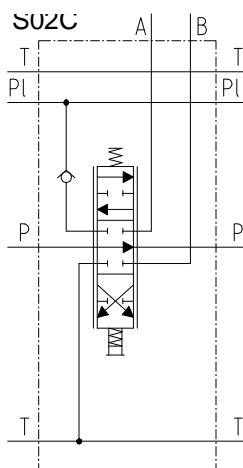
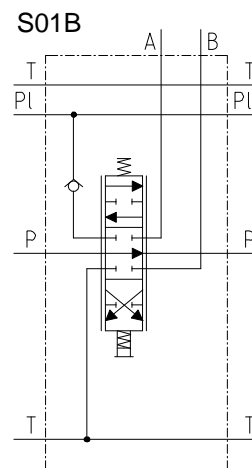
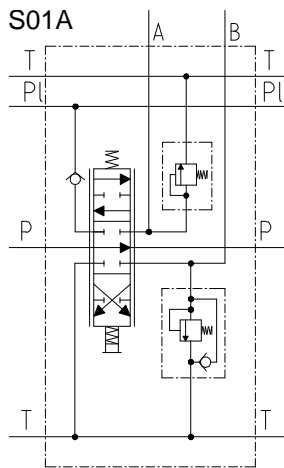
I06Q



SPOOL SECTIONS

Code is only valid for section body

Code	Description
S01A	High, for service port valves, for 3-pos. spool. Weight 2,4 kg
S01B	High, no port valve cavities, for 3-pos. spool. Weight 2,4 kg
S02C	Low, for 3-pos. spool. Weight 1,9 kg
S01C	Low, only for single acting 3-pos. spool, A-port for user. No B-port provided. Weight 1,9 kg
S11A	High, for service port valves, for 3-pos. spool, allowing meter-in restrictions (one for each cyl.port). Weight 2,4 kg
S10A	High, for service port valves, for 3-pos. spool, for tandem circuit. Weight 2,4 kg
S01R	High, for service port valves, for 3-pos. regenerative spool. Weight 3,0 kg
S01H	High, for service port valves, for 4-pos. float spool. Weight 2,8 kg



RS210

INTERMEDIATE SECTIONS

Code is only valid for section body

Code **Description**

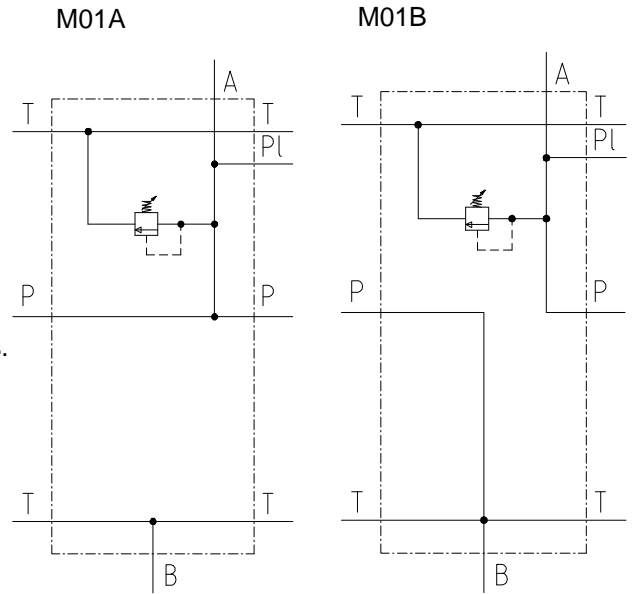
M01A Intermediate **inlet** section.
 A-port for pump and B-port for tank connections.

 M.r.v. cavity on A-side.
 Used in dual circuit systems.
 Second circuit pump is connected to port A.
 If first circuit pump flow, feeding spool sections upstream of **M01A**, is not used, both pump flows are available for use downstream **M01A**.
 With common tank gallery.

M01B Intermediate **inlet** section.
 A-port for pump and B-port for tank connections.

 M.r.v. cavity on A-side.
 Used for two completely separated circuits.
 With common tank gallery.

Weights	
Code	kg
M01A	1,7
M01B	1,7



OUTLET SECTIONS

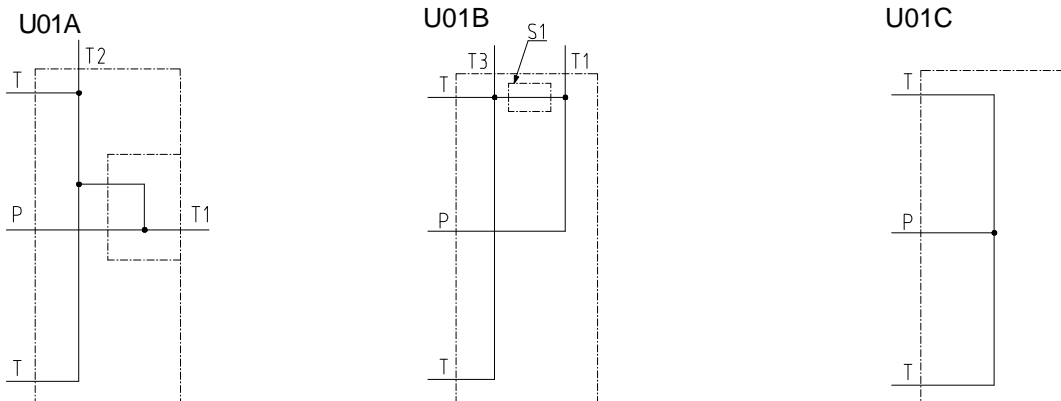
Code **Description**

U01A Has two tank ports, top (**T2**) and side (**T1**).
 A high pressure carry-over nipple can be fitted in **T1**.
 If so, an alternative tank port must always be connected to tank.

U01B Has two tank ports, both facing upwards.
 Through port **T1** a plug for high pressure carry-over can be fitted in location **S1**. If **T1** is used for series connection of a downstream valve, **T3** (or an alternative tank port) must be connected to tank.

U01C End plate without porting.

Weights	
Code	kg
U01A	1,0
U01B	1,4
U01C	0,7



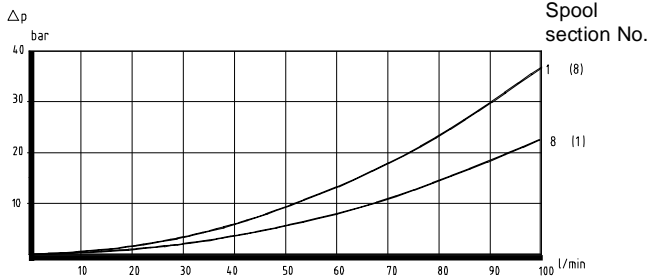
OUTLET SECTIONS

Pressure drop

A/B – T1

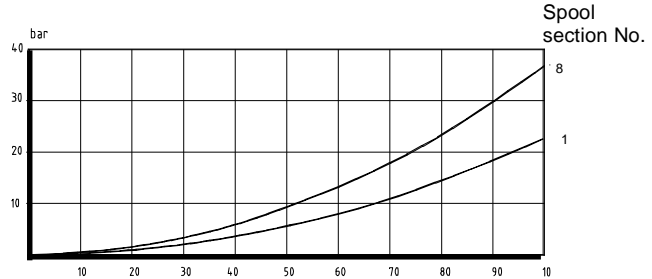
All outlets

(except in combination with inlet I01A)



A/B – T4

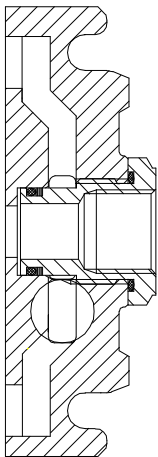
Inlets I02C, I01E and I02Q/I06Q



Series connections

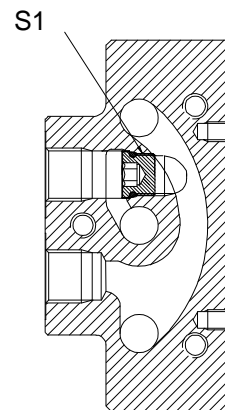
Outlet section U01A

High pressure carry-over nipple **SG21** is fitted in port **T1**.



Outlet section U01B

High pressure carry-over plug **PS20** is fitted through port **T1** in location **S1**. **T1** is now port for series connection.

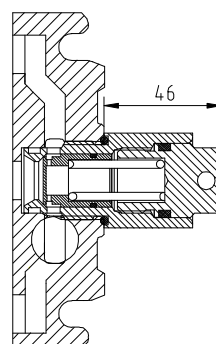


PILOT PRESSURE VALVE TMB200

TMB 200

Adjustment range:
4 - 20 bar

Fits port **T1** in outlet section **U01A**.



RS210

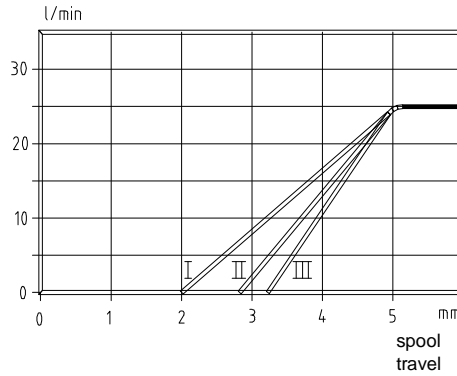
CONTROL CHARACTERISTICS

Graphs show principal functions, valid for manually operated spools.

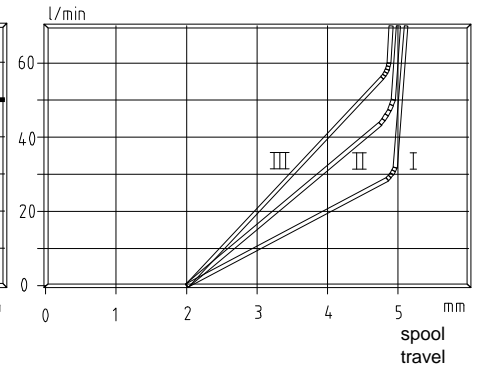
Spool type D

Pump flow 25 l/min
 I = load pressure 50 bar
 II = load pressure 150 bar
 III = load pressure 250 bar

P - A/B



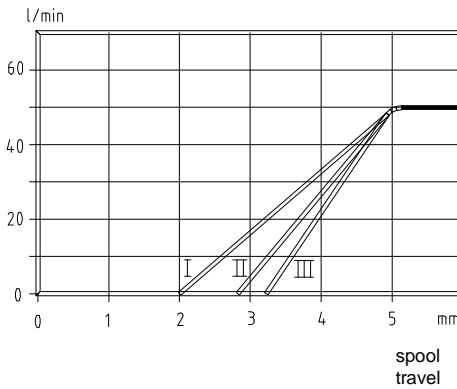
A/B - T



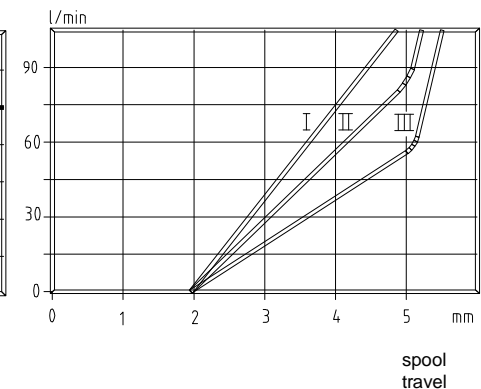
Spool type K

Pump flow 50 l/min
 I = load pressure 50 bar
 II = load pressure 150 bar
 III = load pressure 250 bar

P - A/B



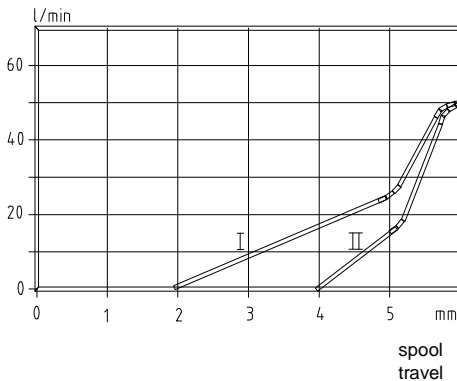
A/B - T



Spool type 1KS1

Pump flow 50 l/min
 I = load pressure 50 bar
 II = load pressure 200 bar

P - A/B - B/A - T



ELECTRICAL UNLOADING VALVE

This 2-way, normally open, solenoid type cartridge valve, code name **EDI**, is an option in inlet sections **I02Q/I06Q** and **I01E**.

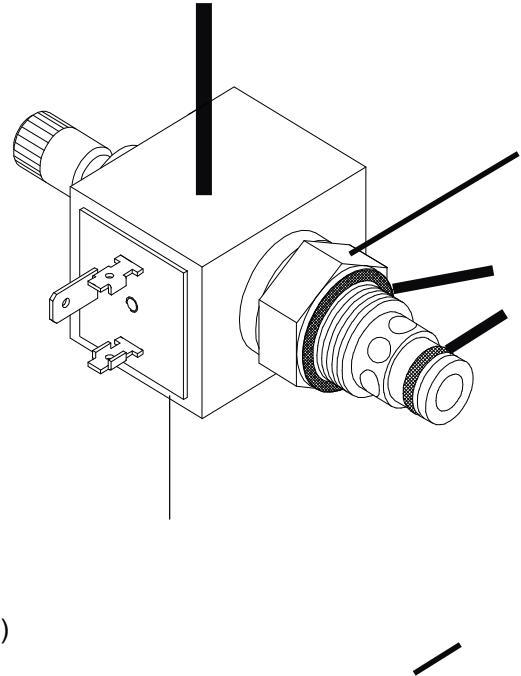
It is intended for emergency stop and for pressure drop/heat generation reduction.

In Q-inlets a de-energised **EDI** drains the pilot circuit so that the **FKA283** spool dumps the whole pump flow directly to tank.

In inlet **I01E** a de-energised **EDI** dumps the whole pump flow to tank.

Data

Rated flow:	40 l/min
Power consumption	17W
Rated voltage:	12 och 26V
Max voltage variation:	± 10%
Duty factor:	100 % (sufficient cooling must be secured)



EDI has manual override. Two versions are available

EDI618 has push type pin operation.

EDI619 has push and twist type pin operation. This pin is sealable

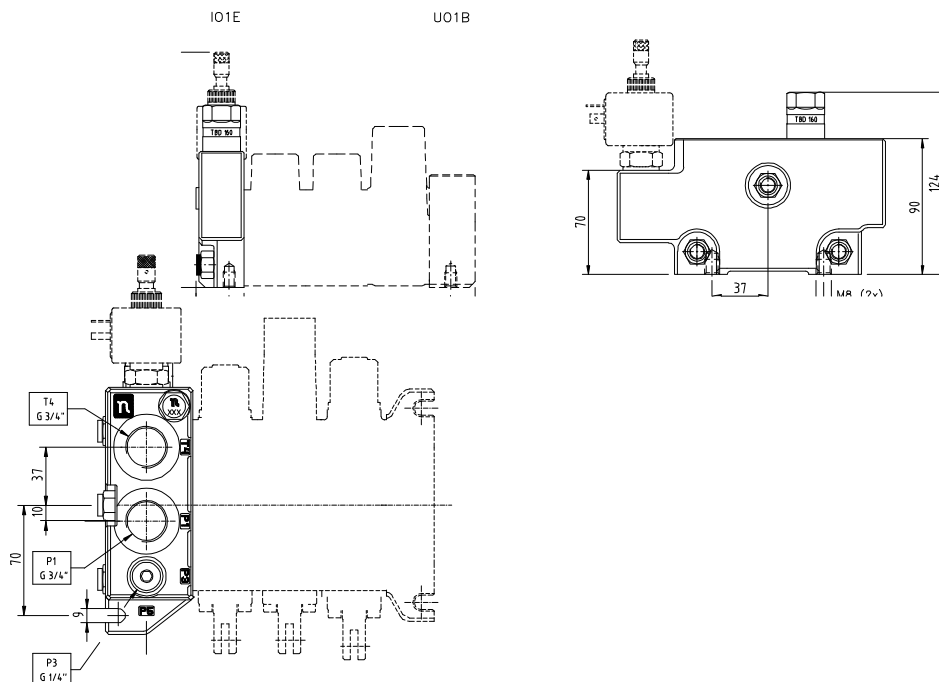
Codes

EDI61812 – push type override 12V

EDI61826 – push type override 26V

EDI61912 – push and twist type override 12V

EDI61926 – push and twist type override 26V



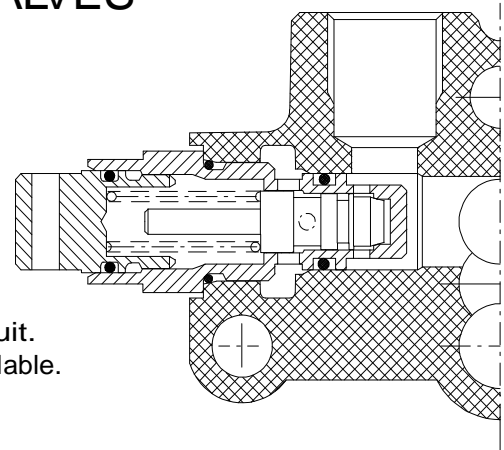
RS210

MAIN RELIEF VALVES

Main relief valve TBB131

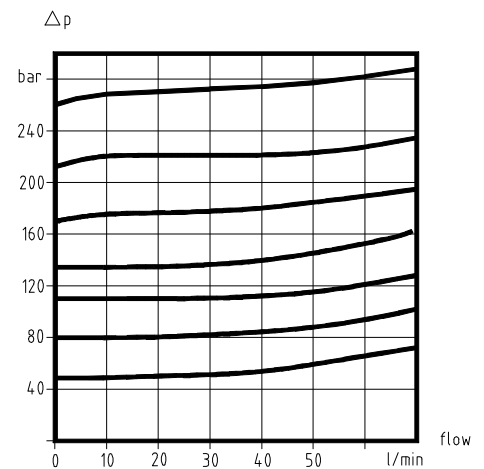
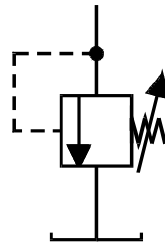
TBB 131 is used in inlet sections **I01A**, **I01B**, **I02C** and in intermediate sections **M01A** and **M01B**.

Differential area, direct acting relief valve for the primary circuit. **TBB** is adjustable. A non-adjustable version, type **TBA**, is available.



Setting ranges:

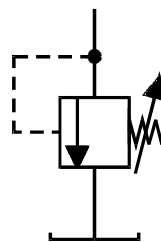
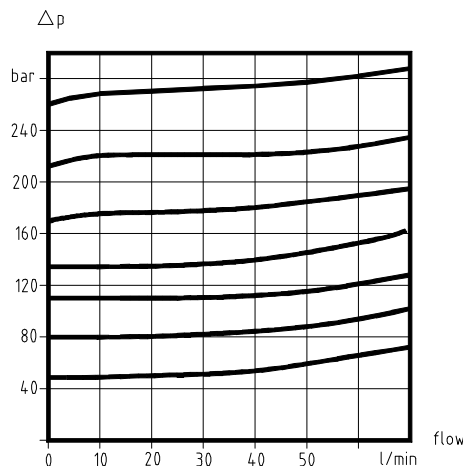
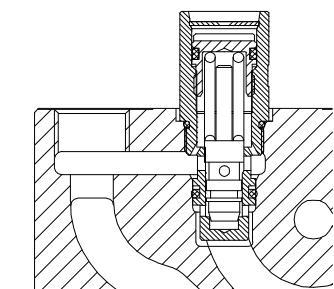
- 35 - 65 bar
- 65 - 95 bar
- 95 - 125 bar
- 125 - 160 bar
- 160 - 200 bar
- 200 - 240 bar
- 240 - 300 bar



Main relief valve TBD160

TBD160 is used in inlet section **I01E**.

Differential area, direct acting relief valve for the primary circuit. Adjustable and sealable.



Setting ranges:

- 35 - 65 bar
- 65 - 95 bar
- 95 - 125 bar
- 125 - 160 bar
- 160 - 200 bar
- 200 - 240 bar
- 240 - 300 bar

MAIN RELIEF VALVES

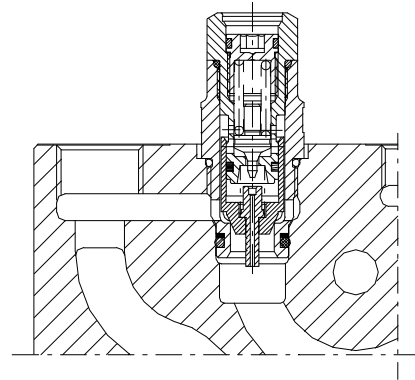
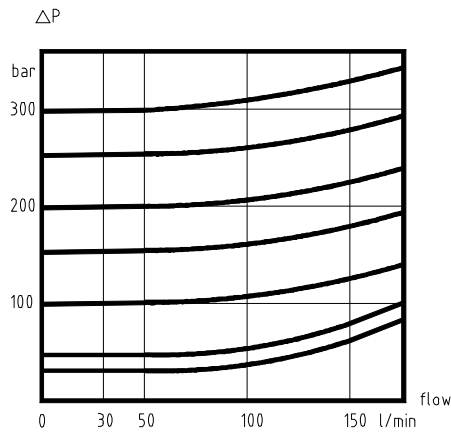
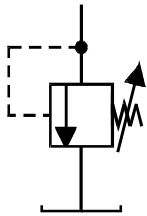
Main relief valve TBS400

Optional in inlet section **I01E**.

Pilot operated relief valve for the primary circuit. Adjustable and sealable.

Setting range

35 - 350 bar



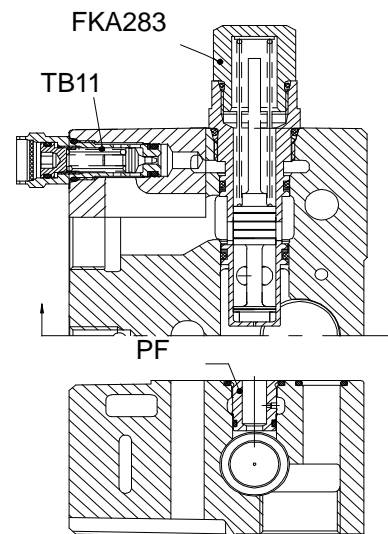
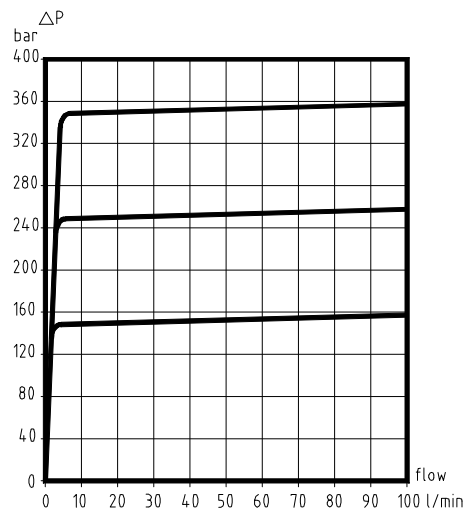
Main relief valve for Q-inlets

The flow control valve **FKA283**, in combination with relief valve cartridge **TB11**, form the pilot operated main relief function of the **Q-inlets**.

TB11 is adjustable and sealable.

Setting range for TB11:

35 - 350 bar



In inlet section **I02Q** and **I06Q**.

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SERVICE PORT VALVES

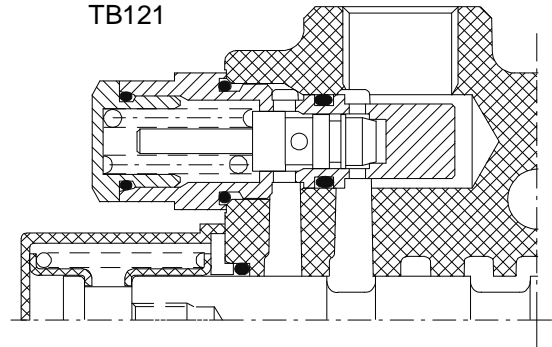
Port relief valves TB121 and TBD121

Differential area, direct acting relief valves for the secondary circuit.

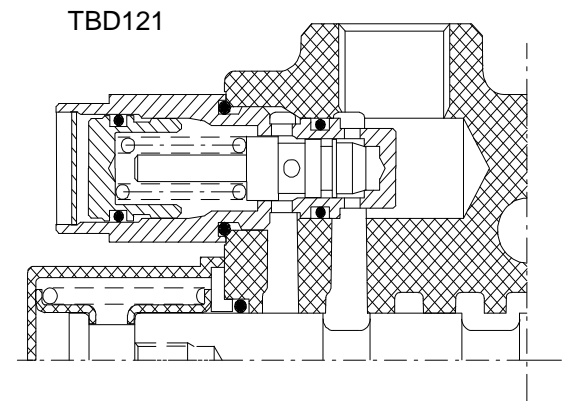
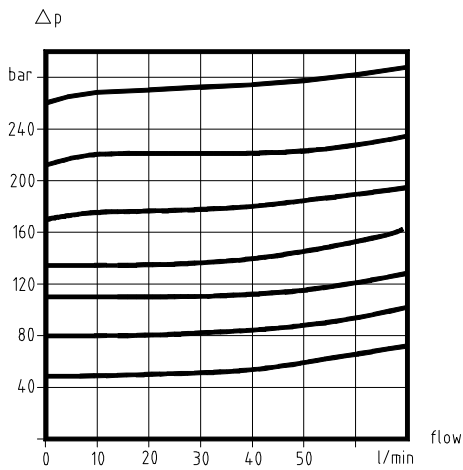
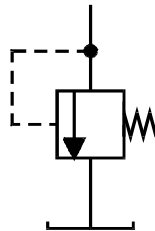
TBD121 is adjustable but sealed.

Setting ranges:

- 35 - 65 bar
- 65 - 95 bar
- 95 - 125 bar
- 125 - 160 bar
- 160 - 200 bar
- 200 - 240 bar
- 240 - 300 bar



Fits in sections **S01A, S10A, S11A, S01R** and **S01H**.



SERVICE PORT VALVES

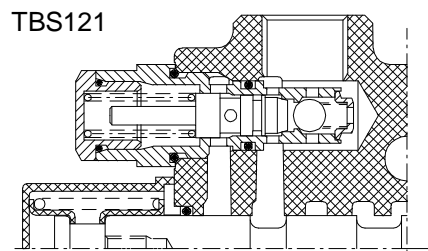
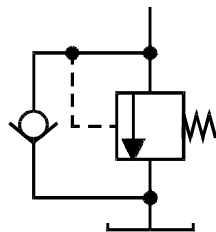
PORT RELIEF AND ANTICAVITATION VALVES TBS121 AND TBSD121

See **TB/TBD121** and **SB160** for functional principles.

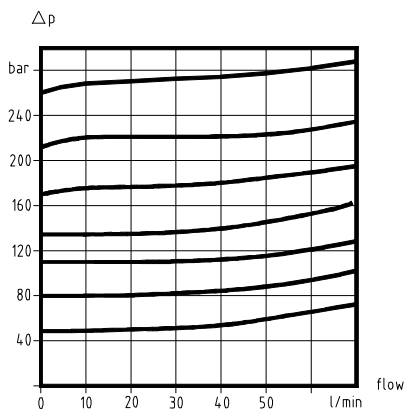
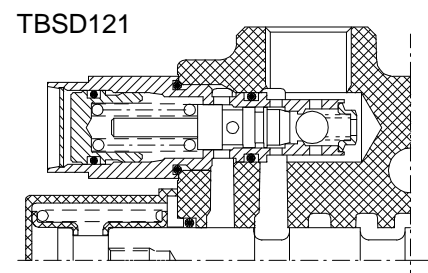
TBSD121 is adjustable but sealed.

Setting ranges:

- 35 - 65 bar
- 65 - 95 bar
- 95 - 125 bar
- 125 - 160 bar
- 160 - 200 bar
- 200 - 240 bar
- 240 - 300 bar

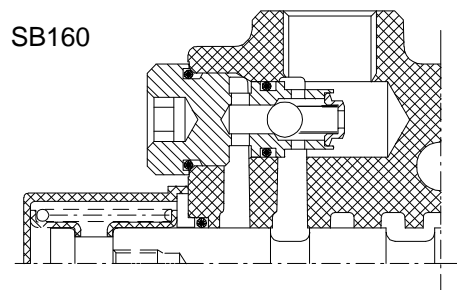
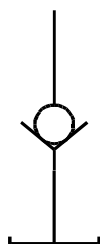
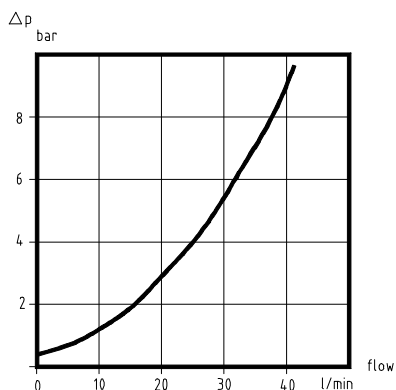


Fits in sections **S01A, S10A, S11A, S01R** and **S01H**.



Anticavitation valve SB160

Check valve for equalising vacuum in the secondary circuit.



See **TBS121/TBSD121**

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SPOOL CONTROLS

Symbol	Description	Code	Symbol	Description	Code
	Spring centred. Marine version	910 9M		P=pneumatic on/off PP=pneumatic proportional. Conn. 1/8" BSP	P/PP
	Detent in positions I, II and III.	10		Electric pneumatic on/off. Rated voltage 12/24 V=*	EP
	For 4-position spool. Spring centred and with detent in position IV.	11		Hydr. proportional.*** Pilot pressure 6-16 bar Pilot pressure max 40 bar	HPD
	Spring centred. Detent in position III and IV.	12		El.hydr. on/off.*** Flow demand 1 l/min for opera- tion. Pilot pressure min 7 bar. Pilot pressure max 40 bar.Duty factor 100%.**	EH 12/24
	Spring centred. Detent in position II.	13		El.hydr. proportional. See separate data sheet.	EHPD 12/24
	Spring centred. Detent in position III.	14		El. hydr. proportional. Single-side mounted. See separate data sheet.	EHPS 1601
	Spring centred. Detent in position II and IV.	15		Spool position indicator. Operating range 10-30 V. Output voltage, spool centered: < 1 V. External electronics are required. See separate data sheet.	LE11
	External hydraulic kick-out from inserted spool.***	L61		Spool position indicator. Operating range 10-36 V. Output voltage, spool centered: ? supply voltage. External electronics are required. See separate data sheet.	LE14
	External hydraulic kick-out from extended spool.***	L62			
	External hydraulic kick-out from inserted and extended spool.***	L63			
	External hydraulic kick-out from inserted and extended spool,locking neutral position.***	L64			

* Rated current 350/190mA. Operation output 2,3 W. Min holdingpower 0,15 W. Max voltage variation.±5%. Duty factor 100 %. Conn. M5. For hose 6x1.

** Rated voltage 12/24V =. Rated current 180/90 mA. Voltage variation max ± 16%. Selection time to extreme position 200 ms, spring centering 110 ms.

*** Connection 1/4" BSP.

This is a selection of most frequent spool controls.

In addition following standard spool controls are available:

- MM- marine/enclosed hand lever
- HPD4 -hydr. prop. for 4 pos. spool (non standard).
- HPDM -hydr. prop. with hand lever.
- 3W, 4W, 9W -spool controls for cable control (see separate datasheet).

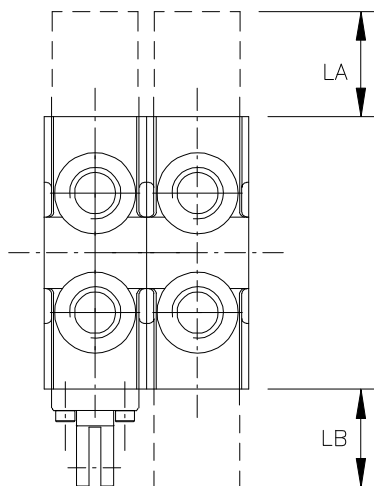
Contact us for further information.

SPOOL CONTROLS

Bracket types and dimensions						
Code	M19	M29	M39	M111	M211	M2
For spool type	3-pos.	4-pos.	3-pos.	3-pos.	4-pos.	3-pos.
Lever ratio. (MV/MH 245)	9:1	9:1	9:1	11:1	11:1	
Notes.			Allows service port valve also when turned 180°. Special lever required			Not for lever (no ear). Only retainer for wiper seal.
Length mm (LB)	41	50	50	41	50	9

Type of bracket is chosen depending of required lever ratio, type of lever and if 3- or 4- pos. spool.

A range of manual hand levers, linear and joystick versions, are available.

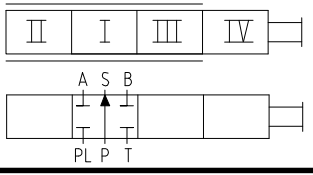


Spool control dimensions											
Code	910	9M	10, 13-14	11-12 15	L61-L63	L64	P/PP EP	MM MPDM	HPD	EH	LE11
Length LA (mm)	37	70	74	83	97	101	101		70	180	95
LB								88	70		

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

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SPOOLS

	Spools for general use			
	Recommended pump flow range, l/min			
	10-30	25-50	40-70	
	1D	1K	1Q	
	-	1M	-	For slew function .
	-	1KS1	-	For slew function .
	-	1L	-	For use in LS-systems
	2D	2K	-	
	3D	3K	-	For section S01H.
	-	3L	-	For use in LS-systems
	-	4K	-	
	-	4KA	-	
	-	4KB	-	
	8DB	8KB	-	Regen. function For section S01R
	Spools designed for cranes			NOTE: Spools for flow range "35-50 l/min" in combination with Q-inlets only.
	Recommended pump flow range, l/min			
	20-30	30-45	35-50	
	12SA	14SA	124SA	For slew function. In combination with spool control 918 only.
	12ZA	14ZA	124ZA	For use with load holding valves. Asymmetric. B-port to be connected to piston side of cylinder.
	12ZB	14ZB	124ZB	For use with load holding valves.
	12XA	14XA	124XA	For use with load holding valves. Asymmetric. A-port to be connected to piston side of cylinder.
	12YA	14YA	124YA	For use with load holding valves. Asymmetric. B-port to be connected to piston side of cylinder.