



Directional Control Valve RS 160

Key valve features

RS 160 is a sectional open center valve in size 3/8" of modular design that together with the wide range of standard parts offers maximum flexibility.

The valve is designed for high performance applications mainly in systems with fixed pumps but also for systems with variable pumps.

Two or more valves can be connected to each other in a range of different circuits.

The valve is very robust and well suited for demanding mobile applications. The sections are designed to meet the most stringent requirements on controllability.

The modular system includes different types of inlets, sections and outlets.

The valve is available with 1 – 10 working sections per valve assembly.

The sections are symmetric which makes it possible to use the valve both as "Left Hand Inlet" and "Right Hand Inlet".

Applications

RS 160 is designed as a flexible valve for a wide range of applications, but typical applications are outriggers of mobile working machines, wheel loaders and agriculture applications within the flow range for the valve.

Technical data

Pressure and flow values*

Max. operating pressure per port:

P1, P2, PM, A, B: 250 bar (25.0 MPa)

Max. tank pressure: 25 bar (2.5 MPa)

Max. permissible flow either on port P1 or P2: Max. 60 l/min

Further data

Recommended contamination level at normal duty: Equal to or better than 20/18/14 as per ISO 4406

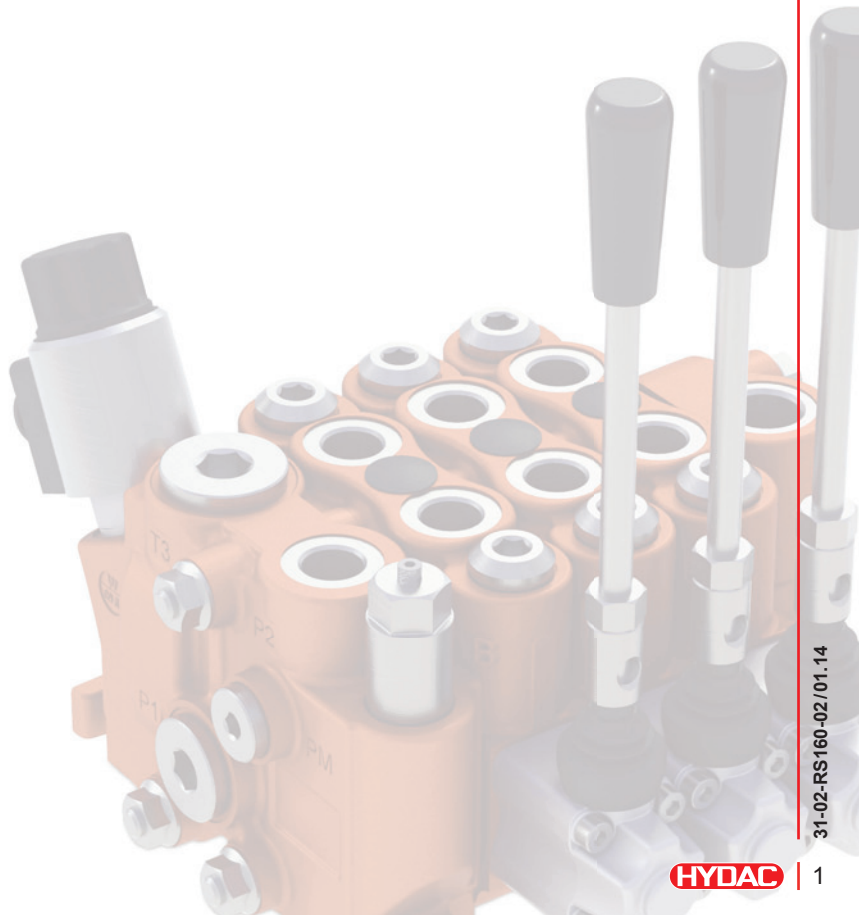
Hydraulic fluid viscosity range at continuous operation: 10 – 400 mm²/s(cSt). Higher viscosity allowed at start up

Mineral oil and synthetic oil based on mineral oil HL, HLP according to din 51524

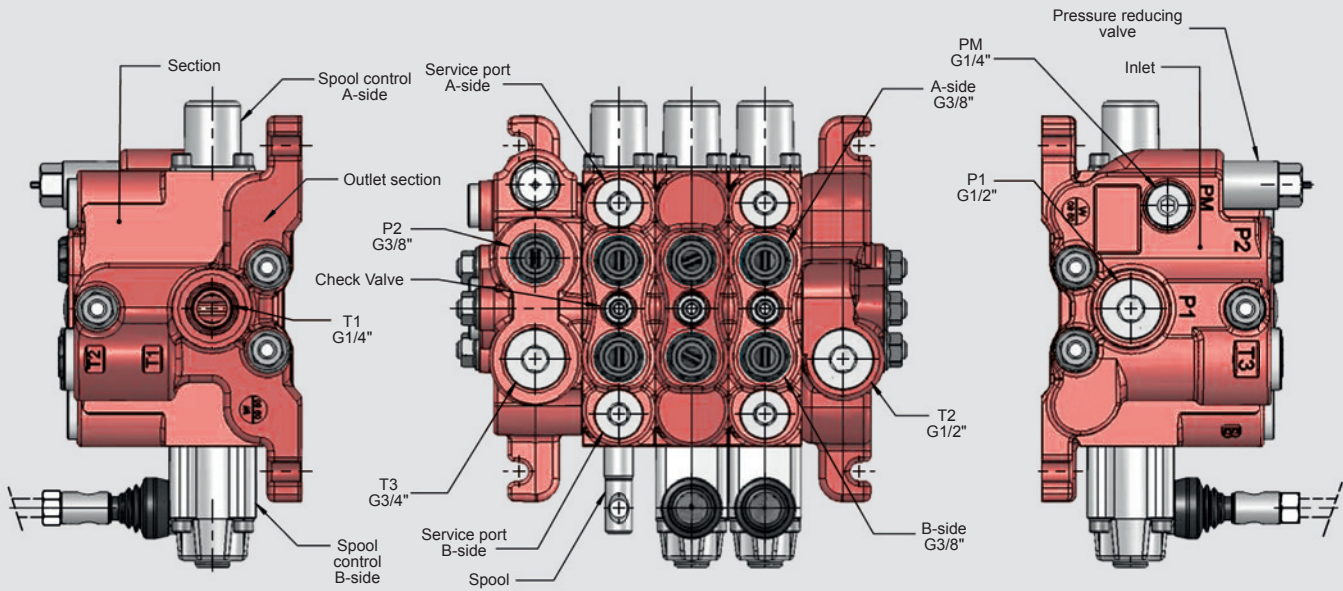
Recommended temperature range for continuous operation: -15 °C up to +80 °C

Spool leakage at 100 bar, 32 cSt and 40 °C: < 10 cm³/min

* 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.

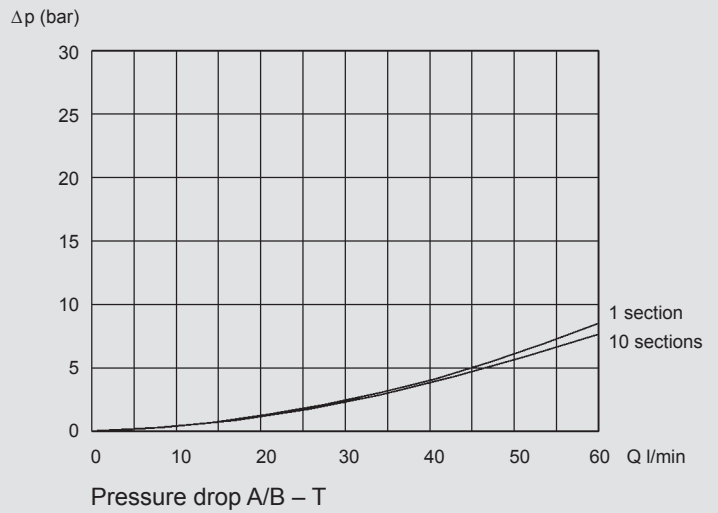
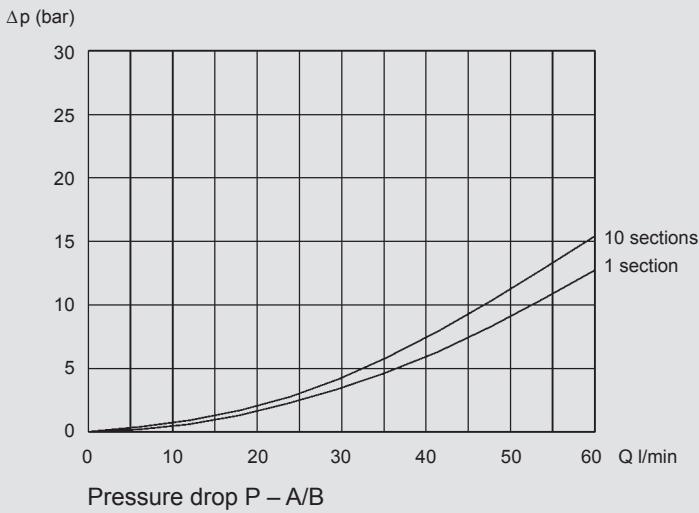
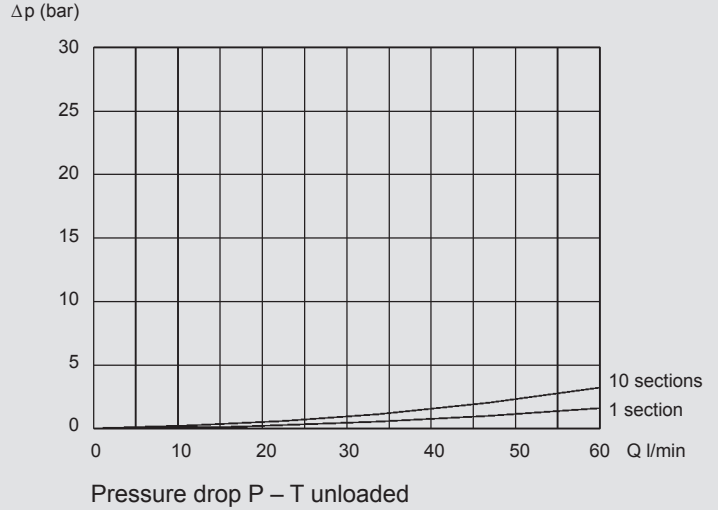
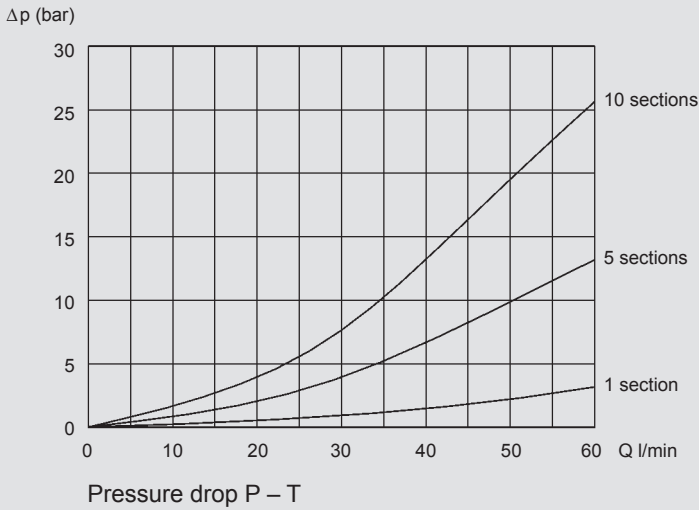


Overview

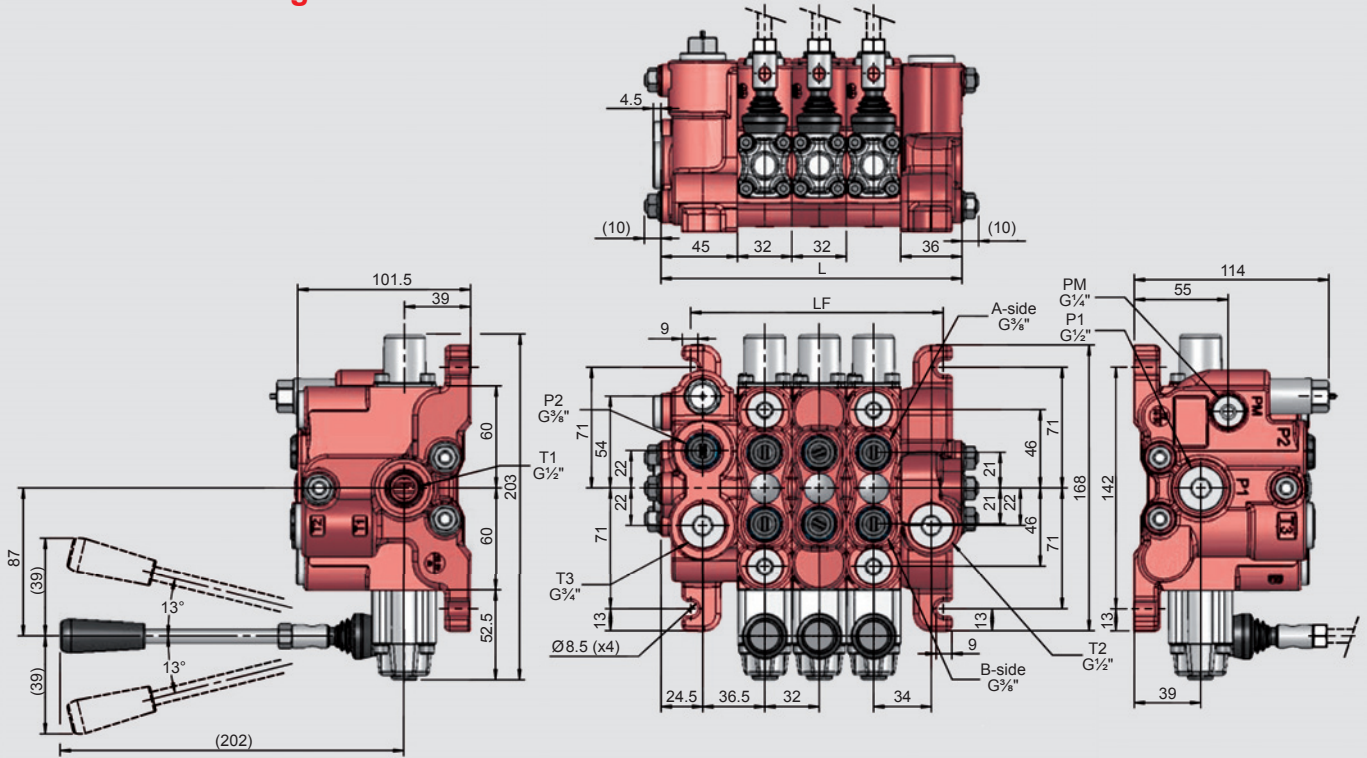


Pressure drop

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



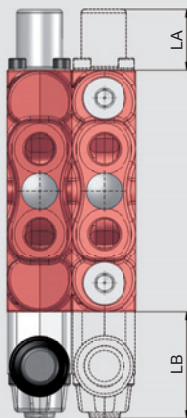
Dimensions and weight



Weight

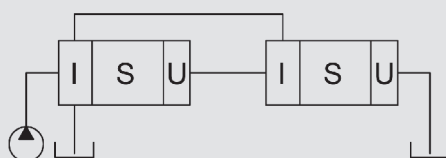
Inlet section I01G	2.0 kg
Inlet section I02G	2.9 kg
Working section	2.2 kg
Outlet section	1.0 kg

Sections	L [mm]	LF [mm]	Type	LA [mm]	LB [mm]
1	113	84.5	M1		53
2	145	117	M2		72
3	177	149	9	30	
4	209	181	10	36	
5	241	213	14	62	
6	273	245	16	74	
7	305	277	HP	57	57
8	337	309	P	104	
9	369	341	3W		86
10	401	373	4W		103.5
			9LE2	92.5	

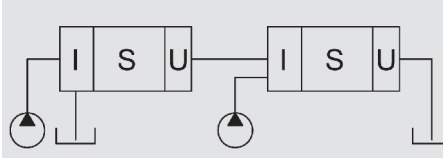


Configurations – system connection

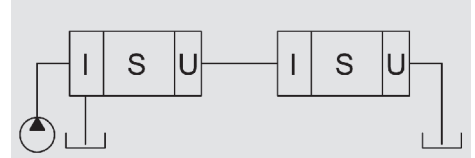
Example of how the RS 160 can be configured and connected for different systems. I is standing for inlet, S for sections and U for outlet.



Circuit of type parallel

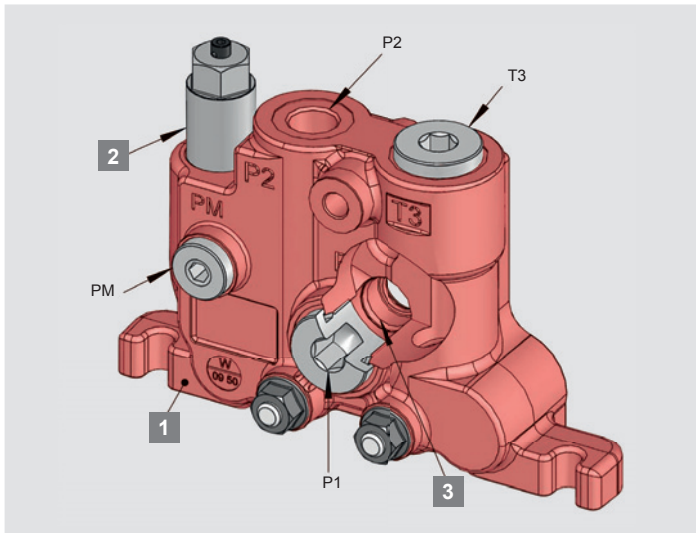


Tandem with a second pump to the second valve

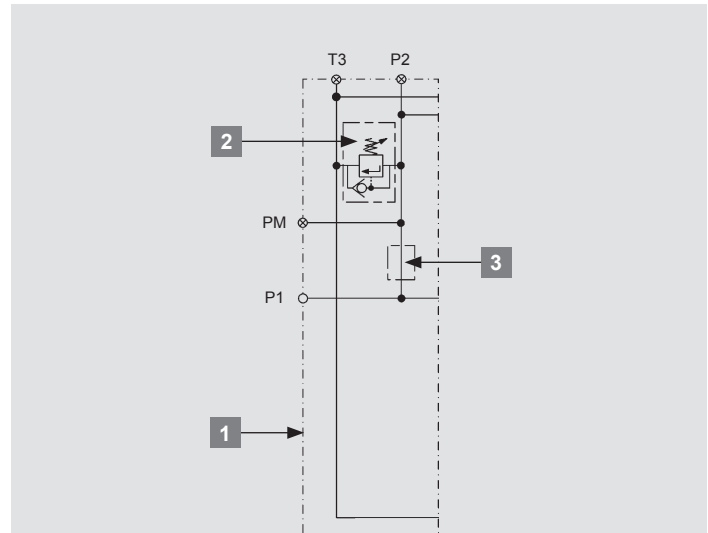


Tandem or series parallel. First valve has priority

Inlet section I01G

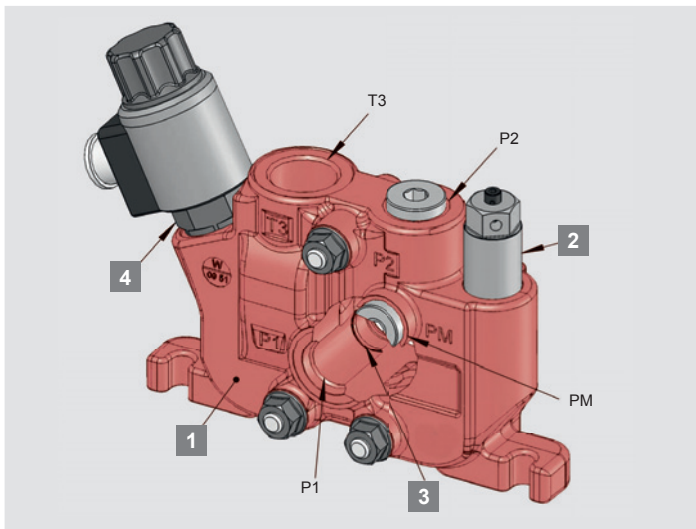


The standard inlet section I01G has 2 pump connections P1 and P2, a gauge port PM to monitor system pressure and a tank connection T3. The main relief valve either TBBS110 (adjustable) or TBS110 (fixed setting). Option cavity pos. 3 see below description.



1	Inlet	I01G
2	Main relief valve	TBBS110
3	Cavity for adaptor K16G	

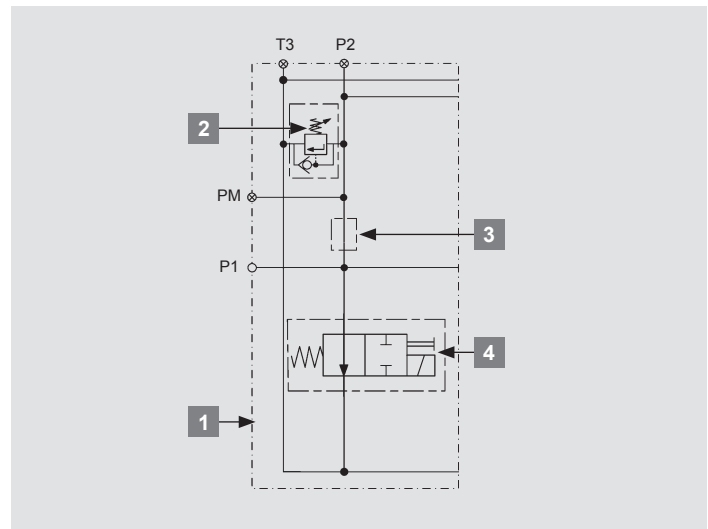
Inlet section I02G



The inlet section I02G has 2 pump connections P1 and P2, a gauge port PM to monitor system pressure and a tank connection T3. The main relief valve either TBBS110 (adjustable) or TBS110 (fixed setting). Option cavity pos. 3 see below description. The I02G inlet section has an unloading function via 2/2 solenoid valve (EV1XX) for emergency dump of pump flow.

K16G

As an option the adapter K16G can be assembled into the P1 port (pos. 3 cavity). When assembled the K16G will separate the center gallery from the parallel gallery to accomplish systems such as parallel connections downstream of another valve or to control a variable displacement pump via restriction.

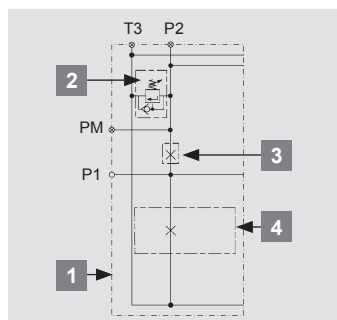
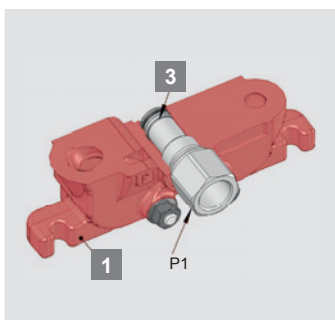


1	Inlet	I02G
2	Main relief valve	TBBS110
3	Cavity for adaptor K16G	
4	Unloading valve	EV1XX

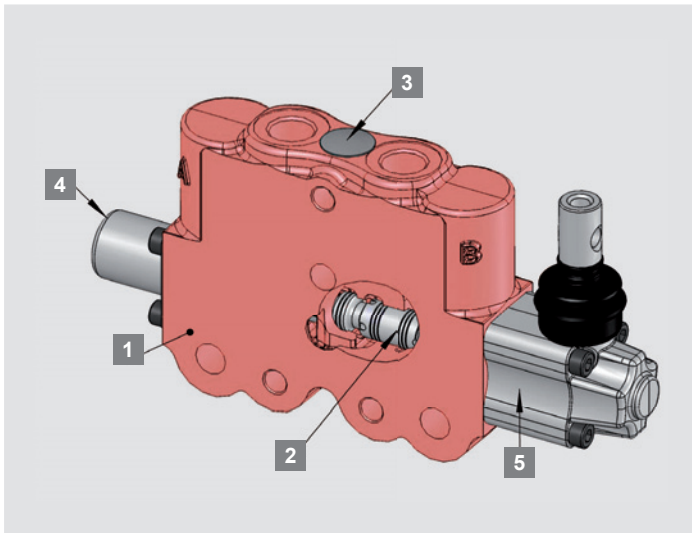
Data EV112/124

Rated flow P – T:	75 l/min
Rated flow P – A/B:	60 l/min
Operating pressure:	250 bar
Power consumption:	18 W
Rated voltage EV112:	12 V
Rated voltage EV124:	24 V
Max. voltage variation:	+/- 15 %
Duty factor*:	100 %
Connection:	EN 175301-803 form A / AMP Junior-Power-Timer / Deutsch Connector
Protection class:	IP65

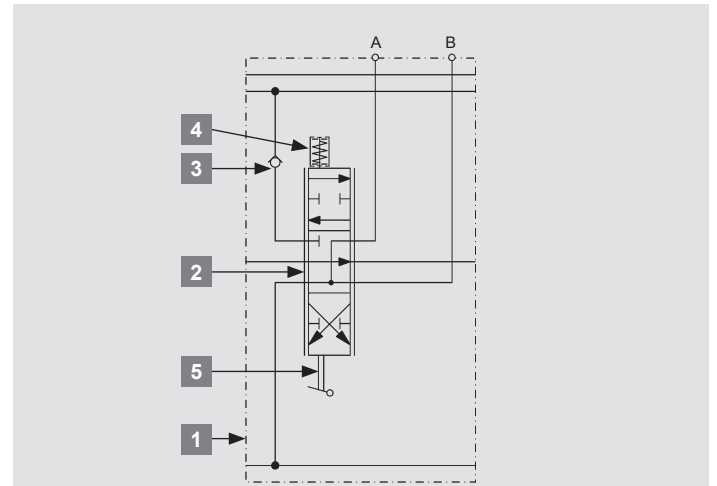
* Sufficient cooling must be secured
The unloading valve has manual override optional with push pin operation. PE1 is the plug for the cavity.



Working section S01G

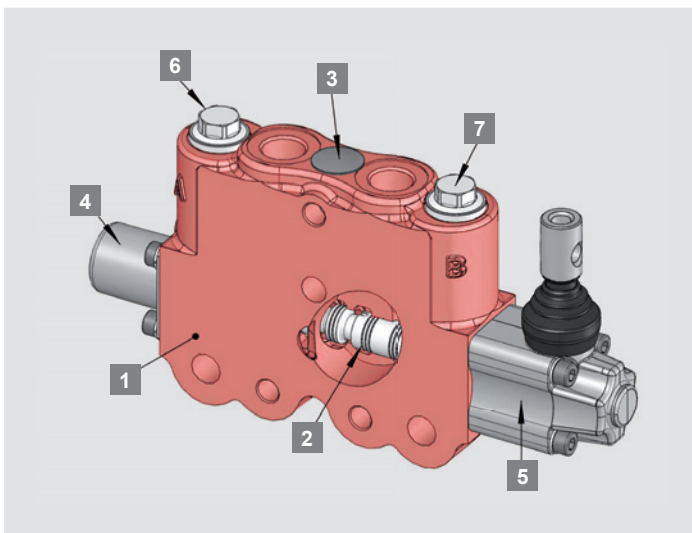


The working section S01G for parallel circuitry. The symmetrical design allows flexible configuration. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and double acting motor spool. The S01G working section includes a load check valve.



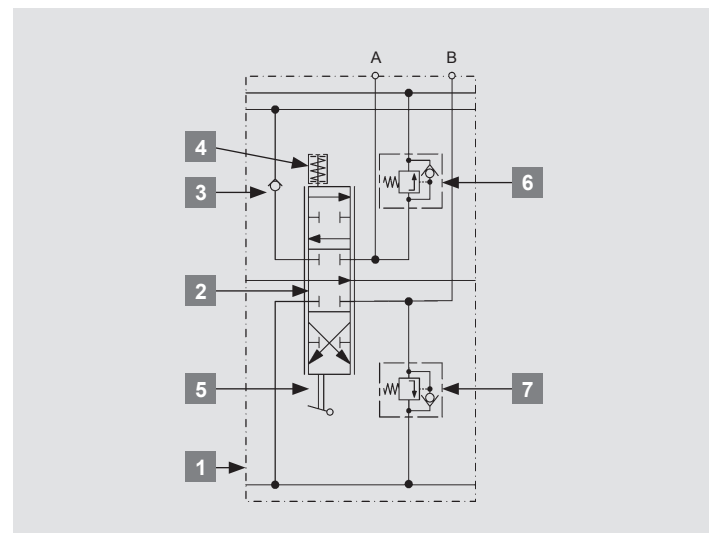
1	Working section	S01G
2	Spool	4XXX
3	Load check valve	MB1
4	Spool control, A-side	901
5	Spool control, B-side	M1

Working section S02G



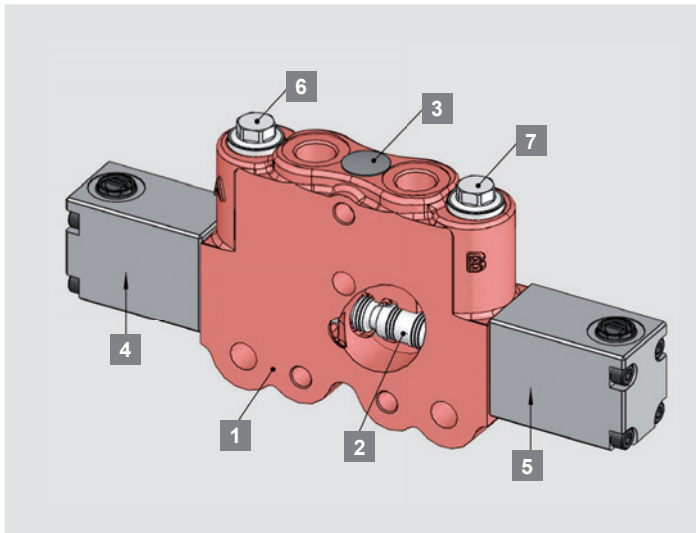
The working section S02G for parallel circuitry. The symmetrical design allows flexible configuration. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and double acting cylinder spool.

The S02G working section includes a load check valve and cavities for service port valves of type SB110, TBS110, TBBS110 or plug P110.



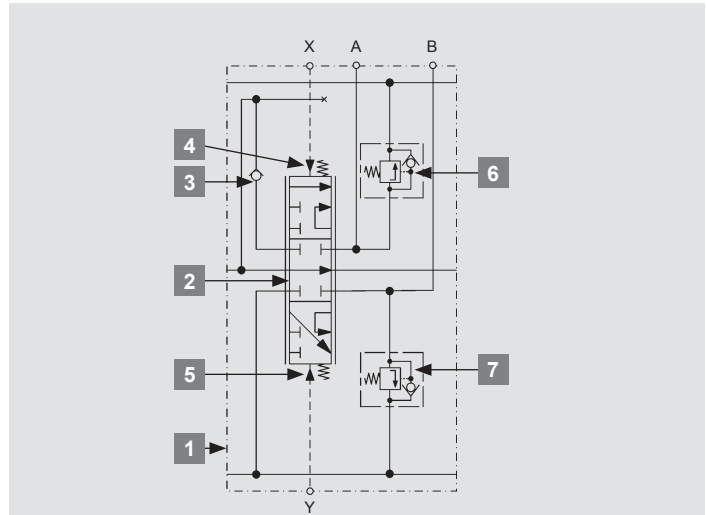
1	Working section	S02G
2	Spool	1XXX
3	Load check valve	MB1
4	Spool control, A-side	901
5	Spool control, B-side	M1
6	Service port valve, A-side	TBS110
7	Service port valve, B-side	TBS110

Working section S03G



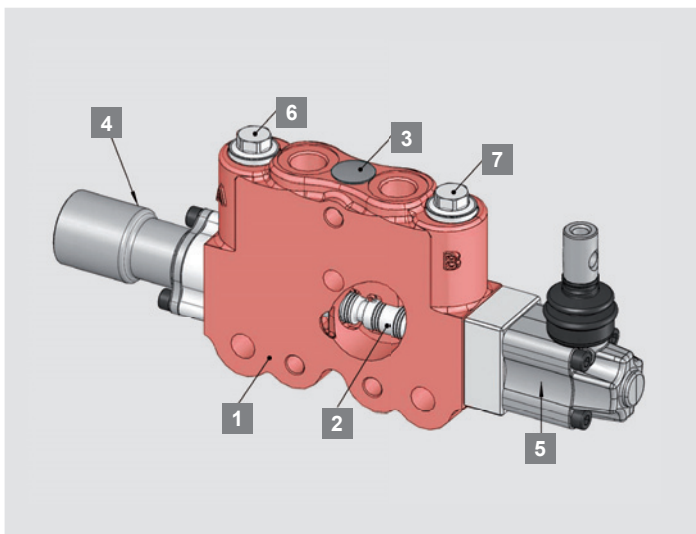
The working section S03G for series circuitry. The symmetrical design allows flexible configuration. This example shows hydraulic operated spool controls and double acting cylinder spool for series circuitry. The S03G working section includes a load check valve and cavities for service port valves of type SB110, TBS110, TBBS110 or plug P110.

Working section, S03G, must only be used with spool type XXSX (see "spools").



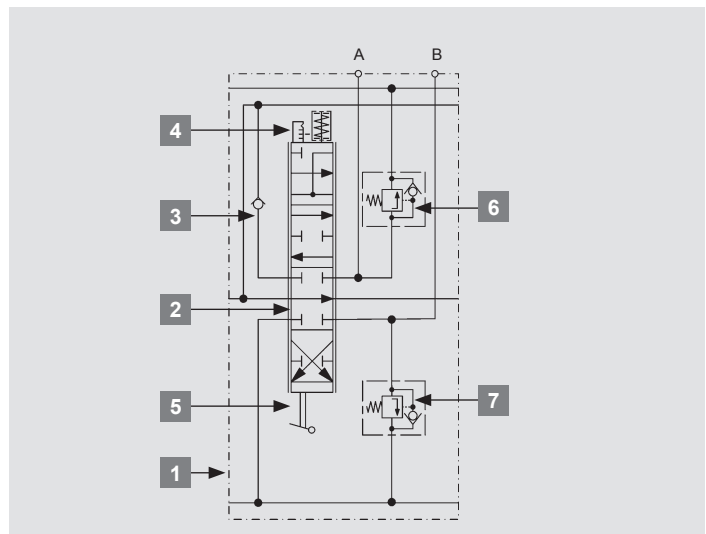
1	Working section	S03G
2	Spool	XXSX
3	Load check valve	MB1
4	Spool control, A-side	HPA
5	Spool control, B-side	HPB
6	Service port valve, A-side	TBS110
7	Service port valve, B-side	TBS110

Working section S04G



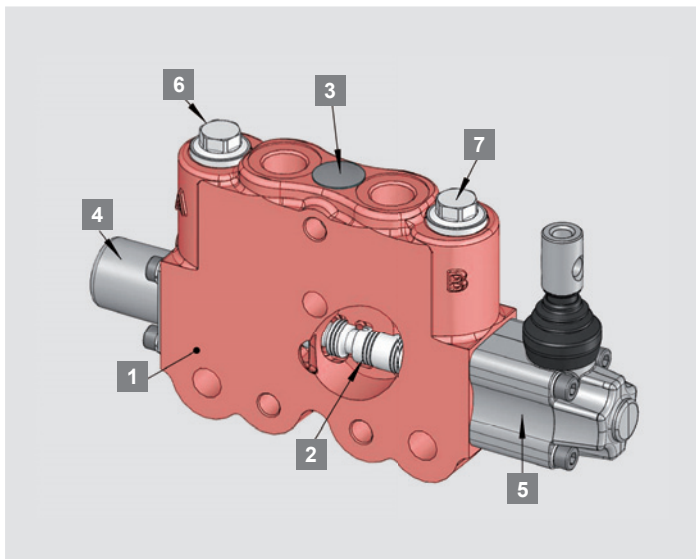
The working section S04G for tandem circuitry. The symmetrical design allows flexible configuration. This example shows manual operation with encapsulated lever, 4 position spring centered spool control with detent and double acting cylinder spool with float.

The S04G working section includes a load check valve and cavities for service port valves of type SB110, TBS110, TBBS110 or plug P110.



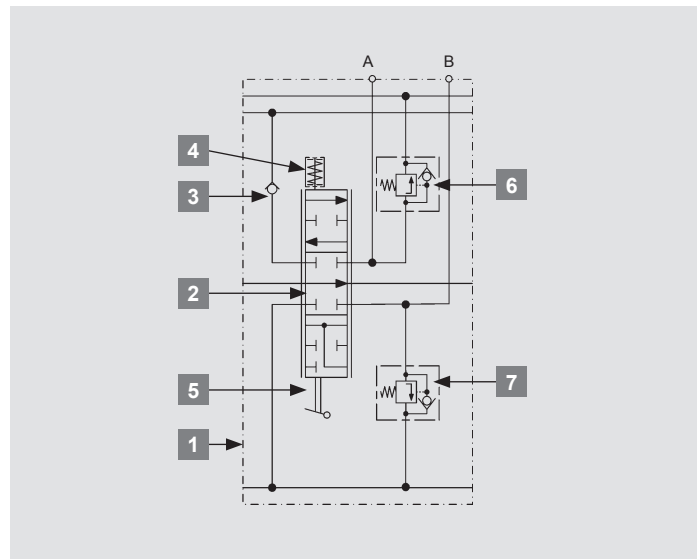
1	Working section	S04G
2	Spool	3XXX
3	Load check valve	MB1
4	Spool control, A-side	16
5	Spool control, B-side	M2
6	Service port valve, A-side	TBS110
7	Service port valve, B-side	TBS110

Working section S08G



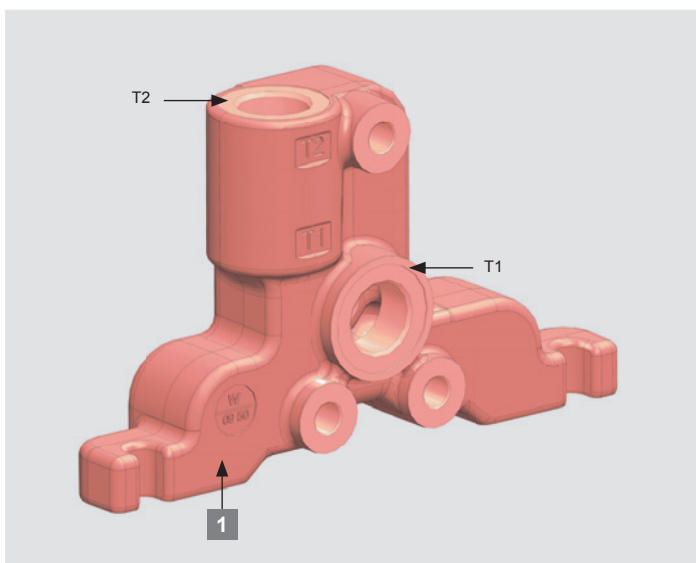
The working section S08G for parallel circuitry with regenerative functionality. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and regenerative spool. The S08G working section includes a load check valve and cavities for service port valves of type SB110, TBS110, TBBS110 or plug P110.

Working section, S08G, must only be used with spool type 8xxx (see "spools").

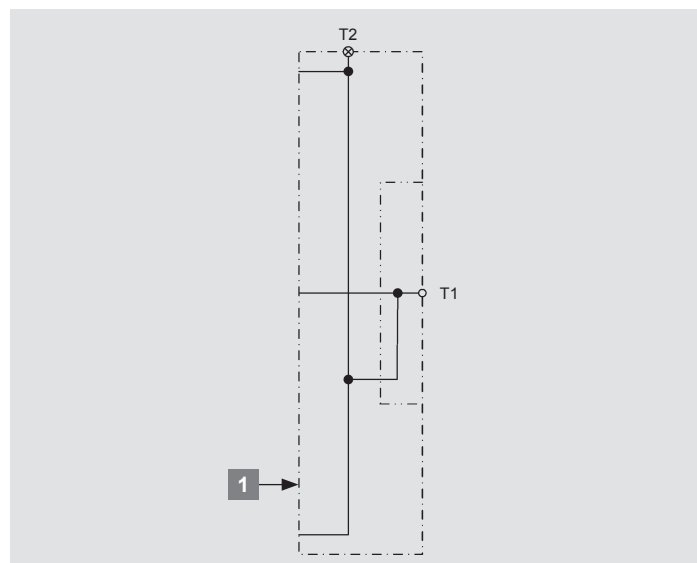


1	Working section	S08G
2	Spool	8XXX
3	Load check valve	MB1
4	Spool control, A-side	901
5	Spool control, B-side	M1
6	Service port valve, A-side	TBS110
7	Service port valve, B-side	TBS110

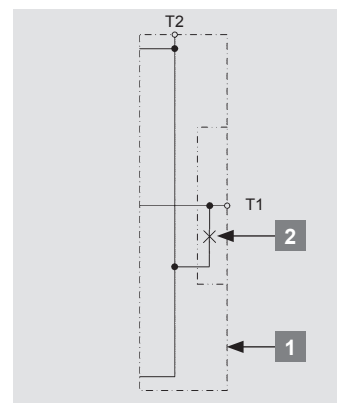
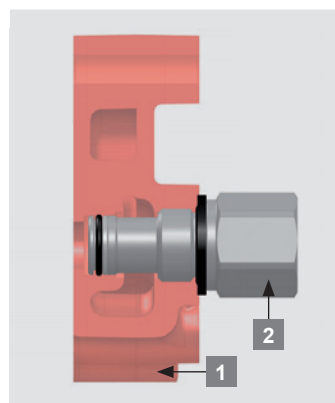
Outlet section U01G



The standard outlet section U01G has 2 tank connections T1 and T2. Port T1 can be used for high pressure carry-over function (HPCO) when the adapter S16G is installed in the T1 port.



1	Outlet section	U01G
2	High pressure carry-over adapter	S16G



Main relief and service port valves

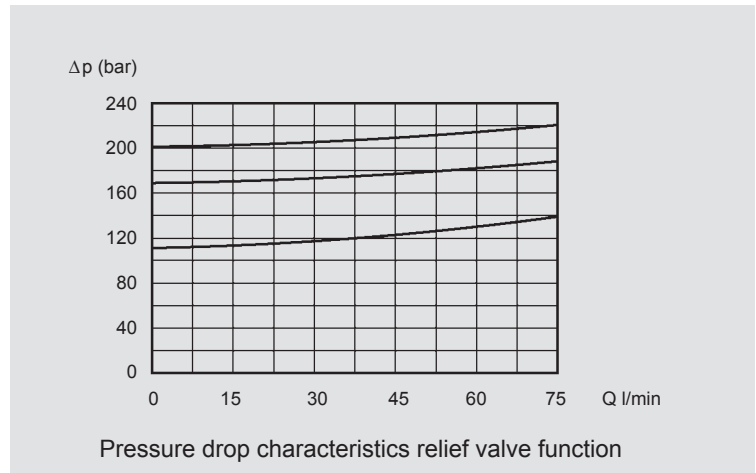
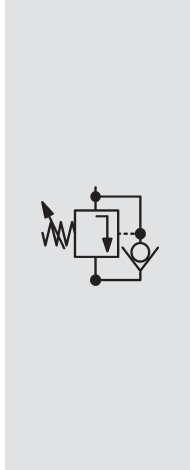
Oil temperature/viscosity for all graphs: +40 °C / 32 cSt

Main relief and service port valve TBBS110

The adjustable type, TBBS110 is used as alternative main relief valve.

- Setting range: 20 – 250 bar (2.0 – 25.0 MPa)
- Spring Ranges:

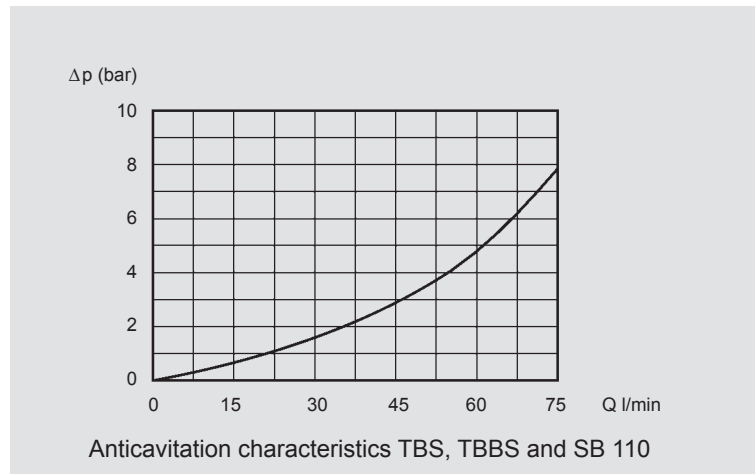
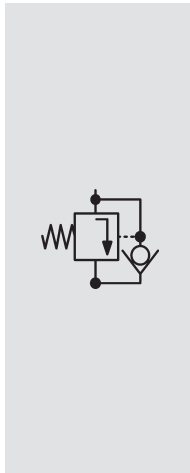
Spring Model Code:	Pressure Setting Range (bar):
N	20 – 70
B	71 – 130
G	131 – 210
V	211 – 250



Main relief and service port valve TBS110

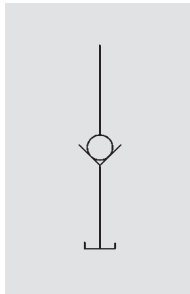
Relief valve with anticavitations valve TBS110 is used both as shock valve and as main relief valve.

- Setting range: 20 – 250 bar (2.0 – 25.0 MPa)
- Setting range step: 10 bar



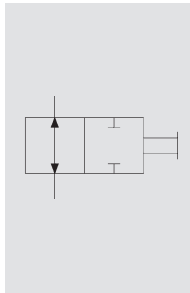
Anticavitation valve SB110

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



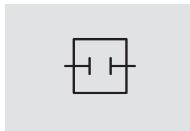
Selector cartridge SBM110

SBM110 is a selector valve. Select between single or double acting function. In open position the cylinder port is connected direct to tank.



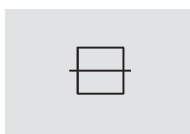
Plug P110

Plug P110, for service port valve cavity. Replaces TBBS110, TBS110, SB110 and SBM110.


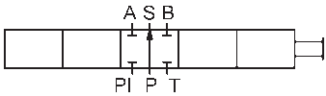
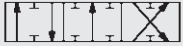
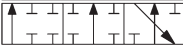
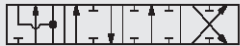
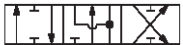

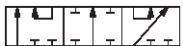


Plug PK110




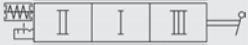
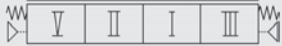


Plug PK110 for service port valve cavity, connecting port to tank.



Spools

Spools for general use		20 l/min	45 l/min
	Function		
			
	Double acting spool	12AA	14AA
	Single acting spool P – A	22AA	24AA
	Double acting spool with 5 th pos. for float	32AA	34AA
	Motor spool	42AA	44AA
	Regenerative spool, for section S08	82AA	84AA
	Spool for series circuit, for section S03	12SA	14SA



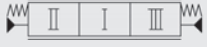


Spool control, A-side

Spool control 901 Spring centered spool control on A-side	
Spool control 10 Detents at positions 1, 2 and 3	
Spool control 16 Spring centering with detent at position 5	
Spool control 14 Spring centering with detent at position 3	
Spool control P Pneumatic, connection G $\frac{1}{8}$ " BSP	
Spool control HP Hydr. proportional, connection G $\frac{1}{4}$ " BSP	
Spool control 9LE2 Spring centered with spool position indicator	

Spring force for spool control 901 in neutral position: 100 N (10 kp).

Spring force for spool control 901 with fully selected spool: 135 N (13.5 kp).

Spool control, B-side

Spool control M1 Lever cup and lever mechanism for 3-positional spools	
Spool control M2 Lever cup and lever mechanism for 4-positional spools	
Spool control HPB Hydr. proportional, connection G 1/4" BSP	
Spool control 3W Cable attachment for 3-positional spools	
Spool control 4W Cable attachment for 4-positional spools	

Joystick lever MK1XX

The spool control MK1XX is a mechanical joystick to operate 2 working sections with one lever. It is designed for 4 different setups determined by the spool layout.

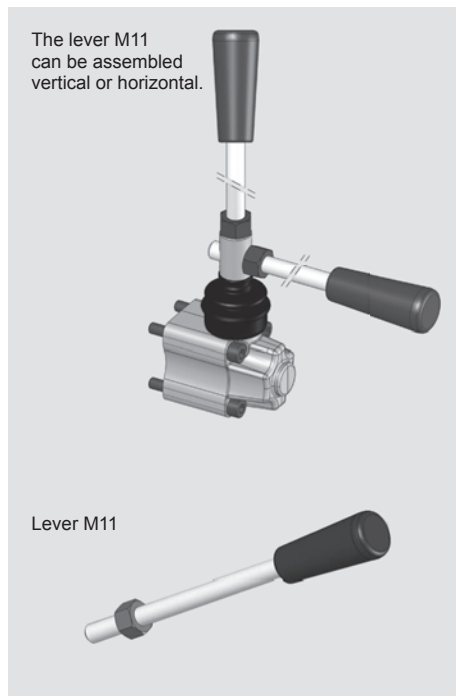
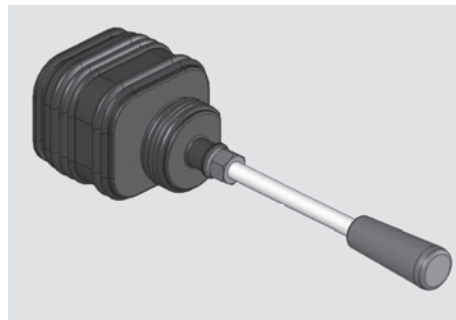
MK133	Operating 2 work sections with 3 positional spools
MK144	Operating 2 work sections with 4 positional spools
MK134	Operating 2 work sections with one 3 positional spool (left hand section) and one 4 positional spool (right hand section)
MK143	Operating 2 work sections with one 4 positional spool (left hand section) and one 3 positional spool (right hand section)

The mechanical joystick MK1XX must be placed on 2 adjacent working sections.

Enter, in the specification sheet, the spool control code for the working section that should have horizontal movement. The lever M11 is sold separately.

Lever M11

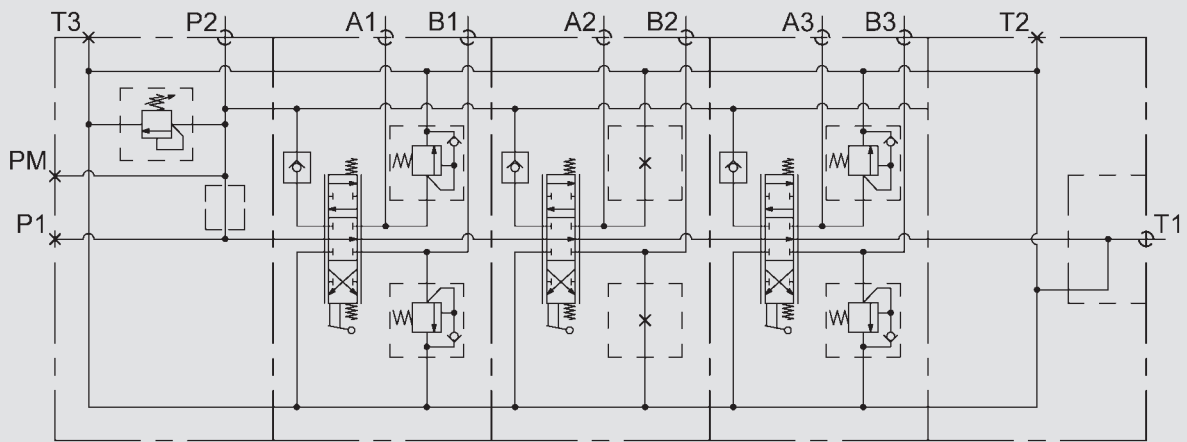
The lever M11 can be assembled vertical and horizontal for spool control M1 or M2. Includes a jam nut and a plastic knob. Length 150 mm. The lever M11 is sold separately.



Typical hydraulic diagrams

Hydraulic diagram – Parallel circuit

In a parallel circuit the oil flows through the open center gallery when all spools are in neutral position. When operating the spools the oil is diverted to the parallel gallery and available for each operated working section.



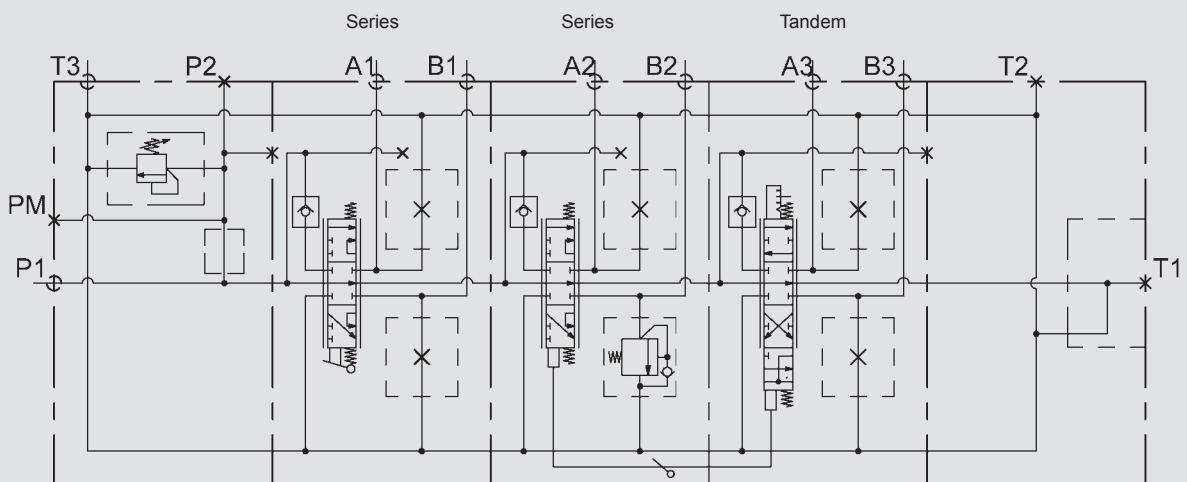
The example shows the RS 160 with 3 manual operated working sections.

Hydraulic diagram – Series/tandem circuit

In a series/tandem circuit the oil flows through the open center gallery when all spools are in neutral position. The parallel gallery is blocked between each section.

The series circuit spools directs the return oil from the actuator back into the open center gallery available for down-stream working sections.

Tandem section must be selected to connect the series circuitry to parallel circuitry.



The example shows the RS 160 with 3 manual operated working sections. Section 1 and 2 are configured with series circuitry and tandem section 3 with a 4-position float spool and spool control. Section 2 and 3 are controlled with a mechanical joystick.

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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