



Directional Control Valve RS 160

Key valve features

RS 160 is a sectional open center valve in a 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 cranes, wheel loaders and agriculture applications within the flow range for the valve.

Technical data

Pressures / Flows

Max. operating pressure per port:

P1, P2, PM, A, B:	3,625 psi	250 bar
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Typical Nominal Inlet Flow:	16 gpm	Max. 60 Lpm
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Recommended contamination level at normal duty:	Equal to or better than 18/14 as per ISO 4406	
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Hydraulic fluid viscosity range at continuous operation:	10 – 400 mm ² /s(cSt). Higher viscosity allowed at start up	
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Mineral oil and synthetic oil based on mineral oil are recommended

Recommended temperature range for continuous operation:	5°F up to 176°F	-15°C up to +80°C
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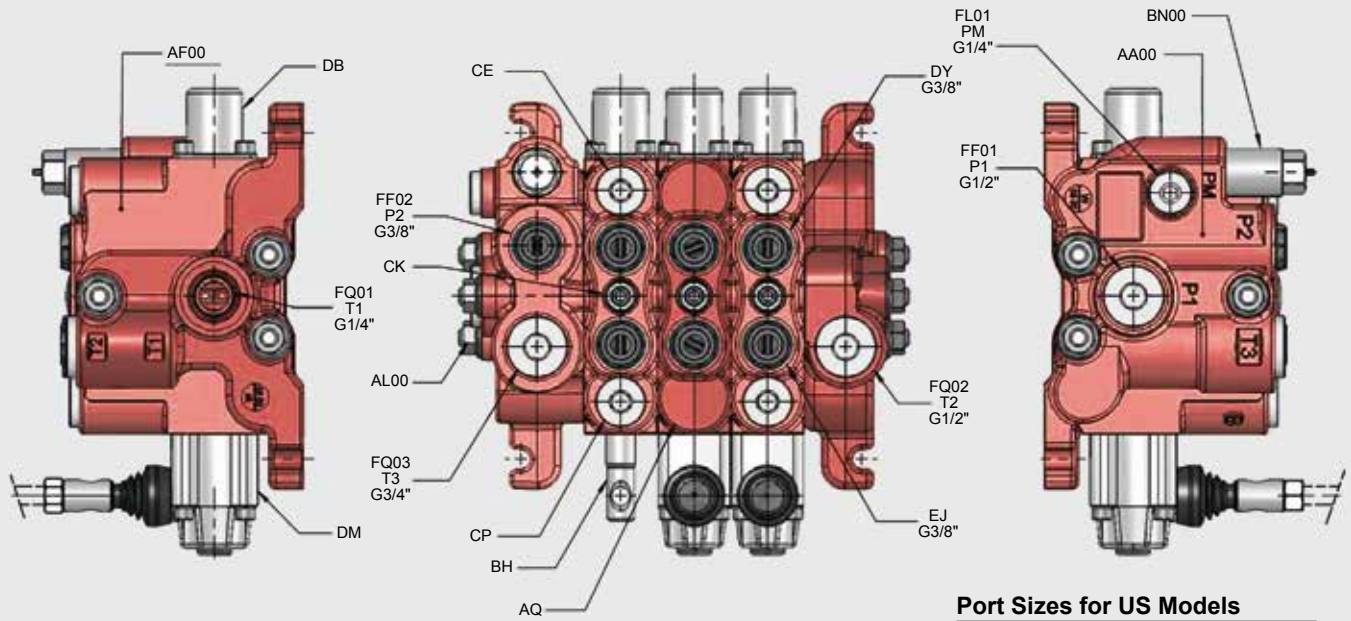
Spool leakage at 100 bar, 32 cSt and 40°C:	< 10 cm ³ /min
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Higher values are possible, depending on application. For applications with demands that exceed stated data above, please contact us for consideration.

MTTFd value after consultation with HYDAC.



Overview

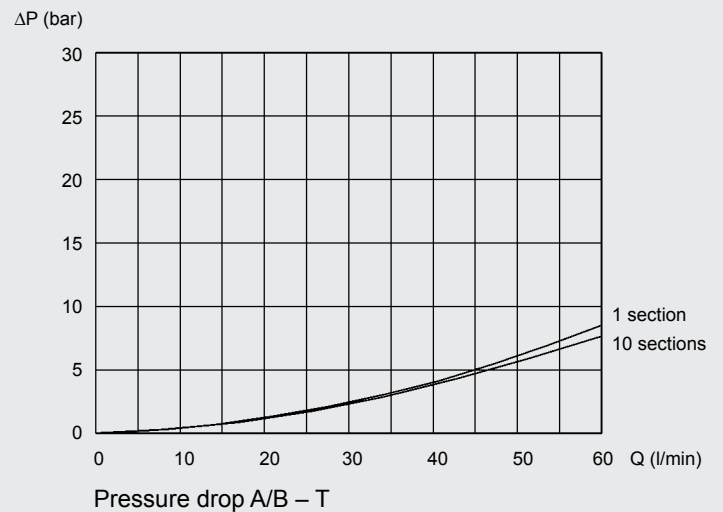
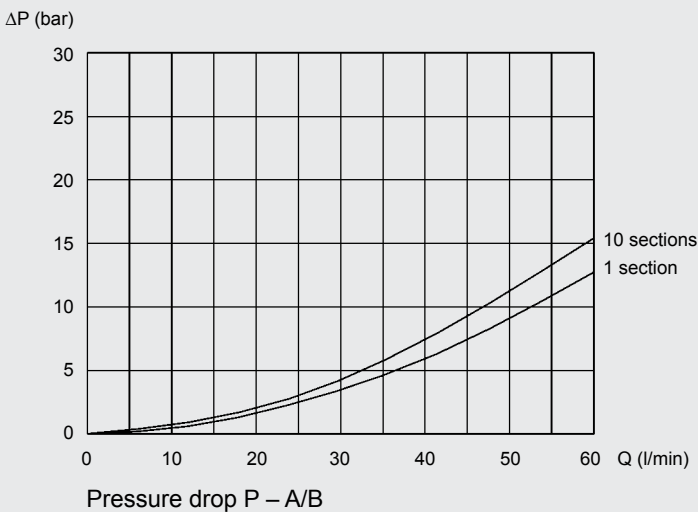
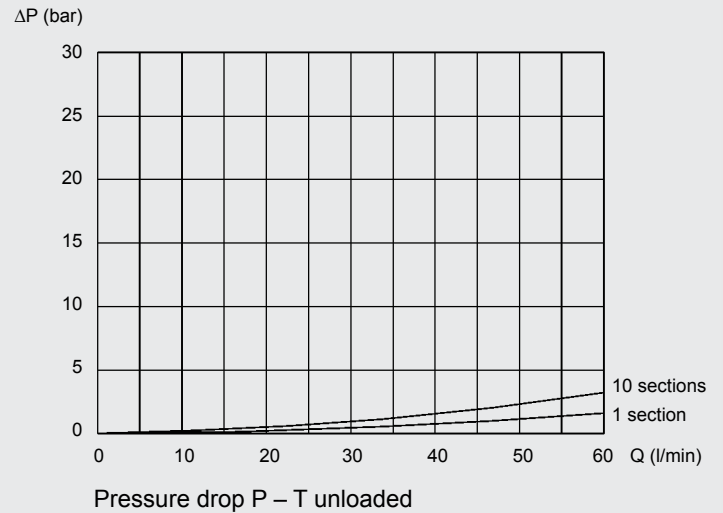
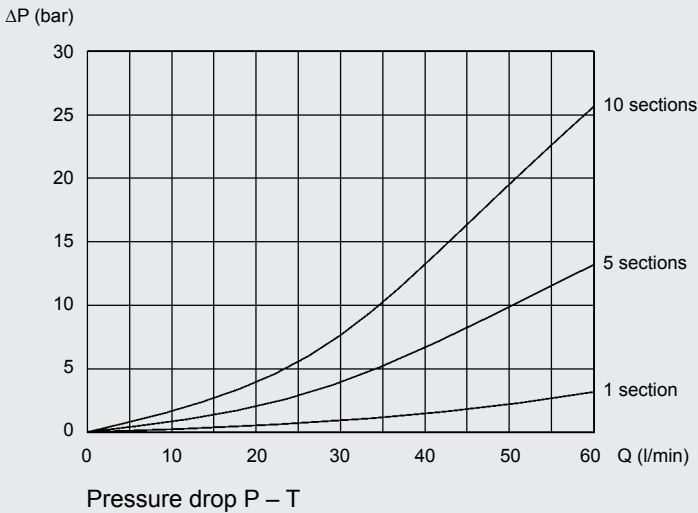


Port Sizes for US Models

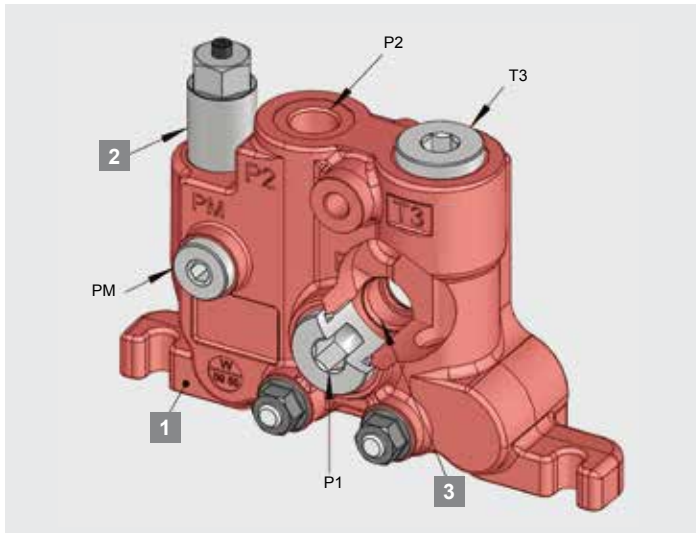
P1	SAE10	P2	SAE08
T1	SAE10	T2	SAE10
T3	SAE12	PM	SAE04

Pressure drop

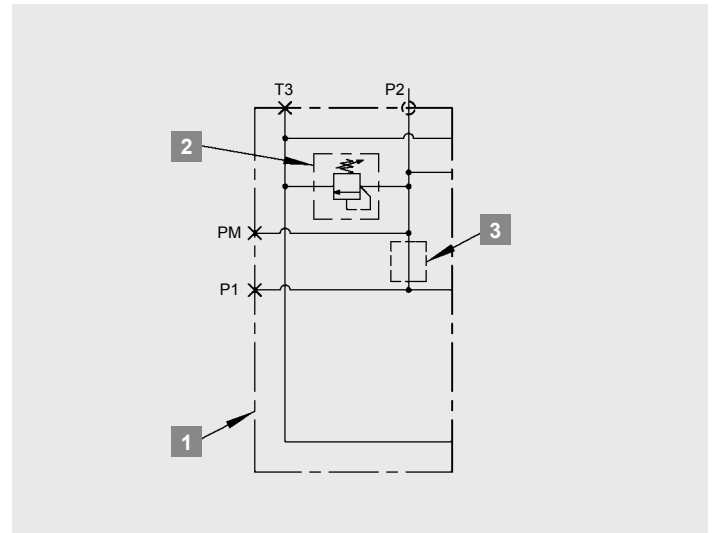
Oil temperature/viscosity for all graphs: 104°F (40 °C / 32 cSt)



Inlet section I01U

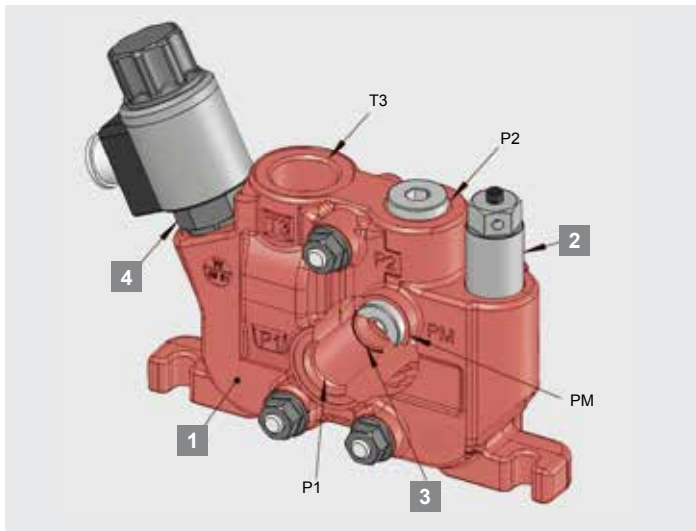


The standard inlet section I01U has two pump connections P1 and P2, a gauge port PM to monitor system pressure and a tank connection T3. The main relief valve either TBBS110 (adjustable) or TBS110 (fixed setting). Option cavity pos. 3 see below description.

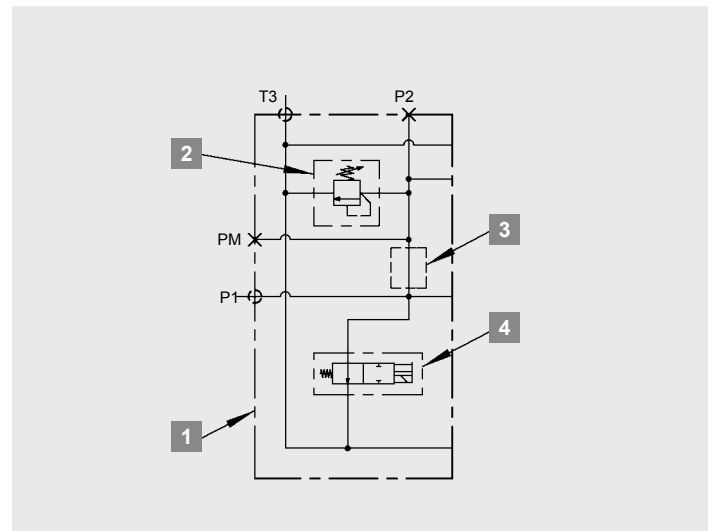


1	Inlet	I01U
2	Main relief valve	TBBS110
3	Cavity for adaptor K16G	

Inlet section I02U



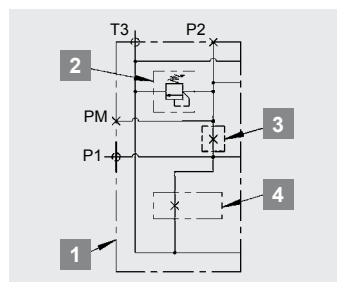
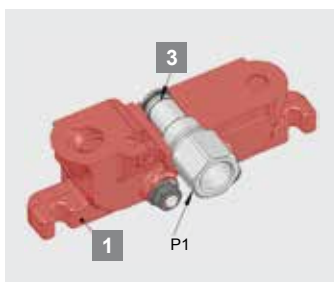
The inlet section I02U has two pump connections P1 and P2, a gauge port PM to monitor system pressure and a tank connection T3. The main relief valve either TBBS110 (adjustable) or TBS110 (fixed setting). Option cavity pos. 3 see below description. The I02U inlet section has an unloading function via 2/2 solenoid valve (EV1XX) for emergency dump of pump flow.



1	Inlet	I02U
2	Main relief valve	TBBS110
3	Cavity for adaptor K16G	
4	Unloading valve	EV1XX

K16U

As an option the adapter K16U can be assembled into the P1 port (pos. 3 cavity). When assembled the K16U will separate the center passage from the parallel gallery to accomplish systems such as parallel connections downstream of another valve or to control a variable displacement pump.



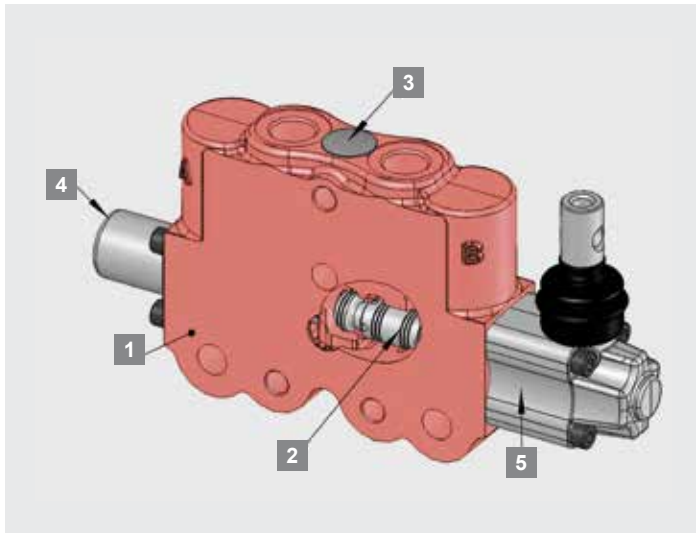
Data EU912/EU926

Rated flow:	15 gpm (60 Lpm)
Operating pressure:	3,625 psi (250 bar)
Power consumption:	27 W
Rated voltage EU912:	12 V
Rated Voltage EU926:	24 V
Max voltage variation:	+/- 15%
Duty factor*:	100%
Connection:	EN 175301-803 form A
Protection class:	IP65

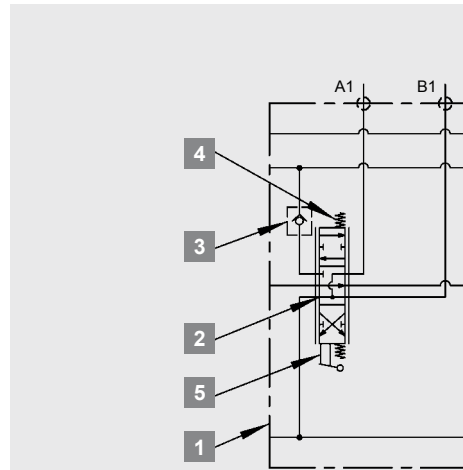
* Sufficient cooling must be secured

The unloading valve has manual override with push pin operation. PE1 is the plug for the cavity.

Working section S01U

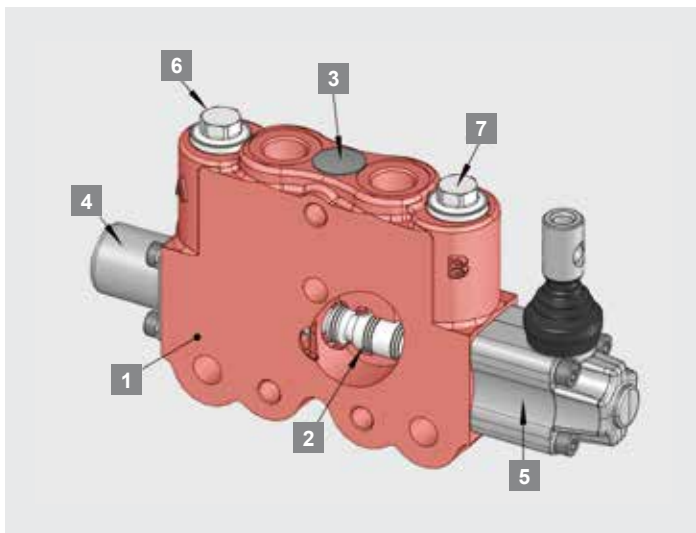


The working section S01U for parallel circuitry. The symmetrical design allows flexible configuration. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and double acting motor spool. The S01U working section includes a load-check valve.



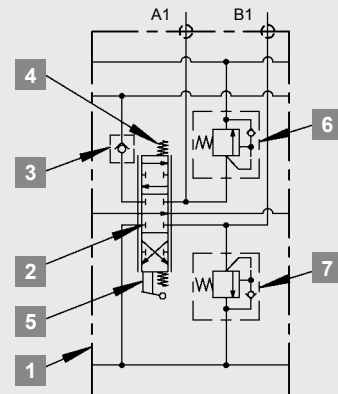
1	Working section	S01U
2	Spool	4XXX
3	Load check valve	MB1
4	Spool control A-side	9
5	Spool control B-side	M1

Working section S02U



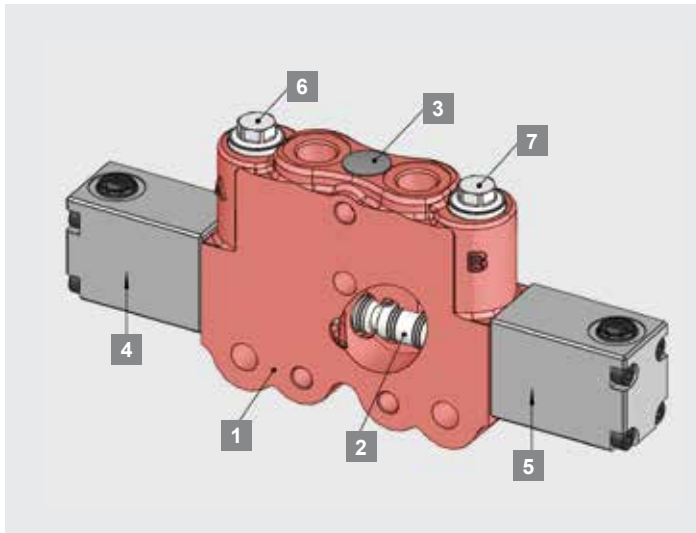
The working section S02U for parallel circuitry. The symmetrical design allows flexible configuration. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and double acting cylinder spool.

The S02U working section includes a load-check valve and cavities for service port valves of type TBS110.



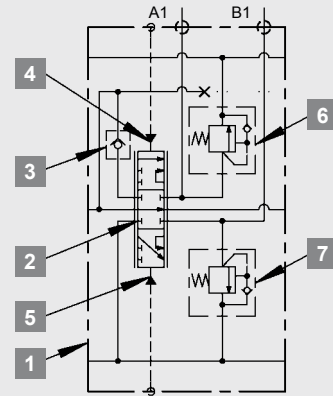
1	Working section	S02U
2	Spool	1XXX
3	Load check valve	MB1
4	Spool control A-side	9
5	Spool control B-side	M1
6	Service port valve A-side	TBS110
7	Service port valve B-side	TBS110

Working section S03U



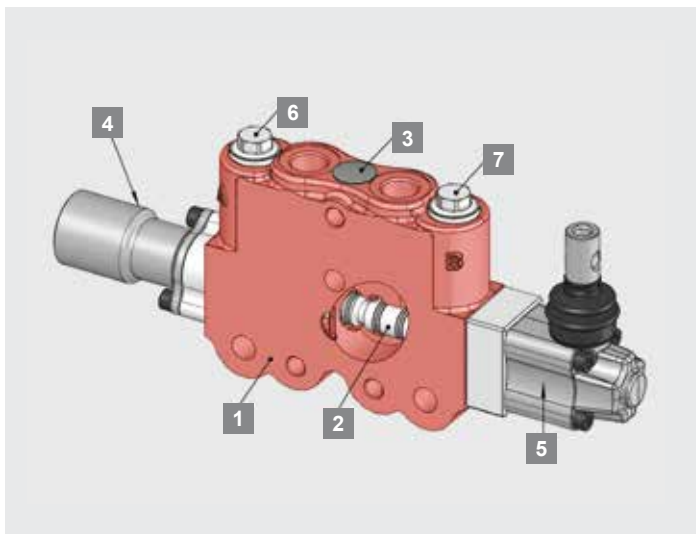
The working section S03U for series circuitry. The symmetrical design allows flexible configuration. This example shows hydraulic operated spool controls and double acting cylinder spool for series circuitry. The S03U working section includes a load-check valve and cavities for service port valves of type TBS110.

Working section, S03U, must only be used with spool type XXSX (see "spools").



1	Working section	S03U
2	Spool	XXSX
3	Load check valve	MB1
4	Spool control A-side	HPUA
5	Spool control B-side	HPUB
6	Service port valve A-side	TBS110
7	Service port valve B-side	TBS110

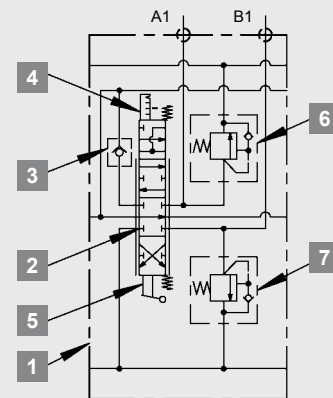
Working section S04U



The working section S04U 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.

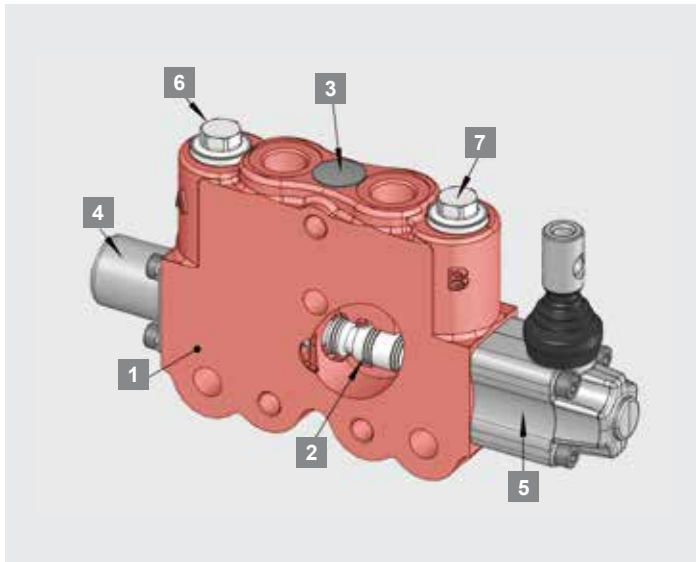
Float detent is engaged by moving handle beyond B power position away from the valve body.

The S04U working section includes a load-check valve and cavities for service port valves of type TBS110.

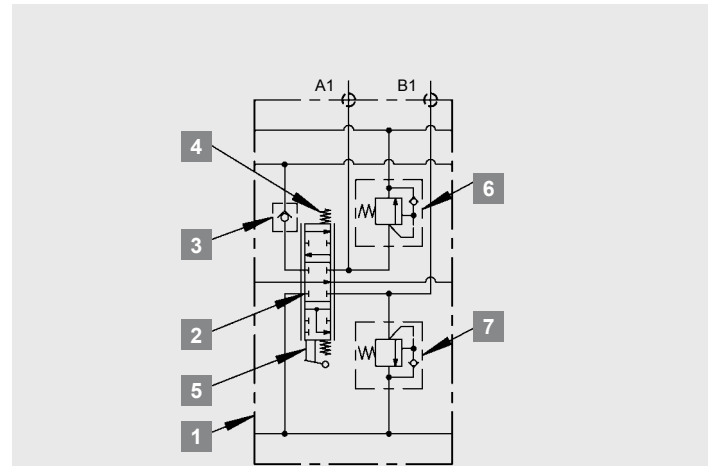


1	Working section	S04U
2	Spool	3XXX
3	Load check valve	MB1
4	Spool control A-side	16
5	Spool control B-side	M2
6	Service port valve A-side	TBS110
7	Service port valve B-side	TBS110

Working section S08U

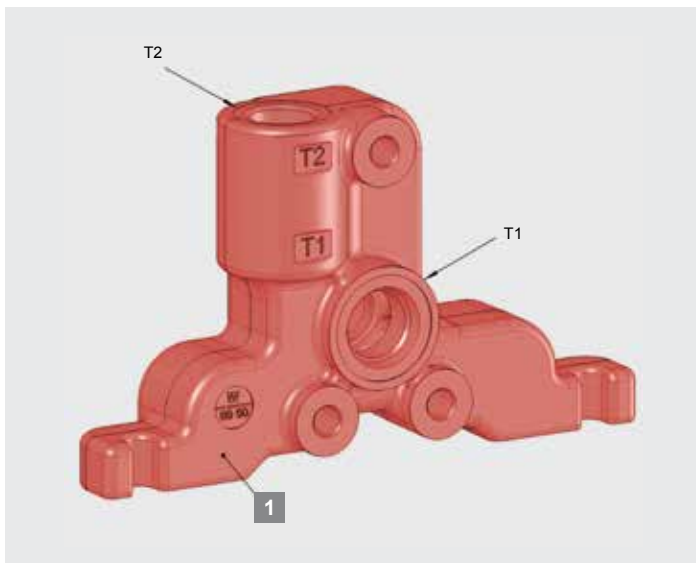


The working section S08U for parallel circuitry with regenerative functionality. This example shows manual operation with encapsulated lever, 3 position spring centered spool control and regenerative spool. The S08U working section includes a load-check valve and cavities for service port valves of type TBS110. Working section, S08U, must only be used with spool type 8xxx (see "spools").

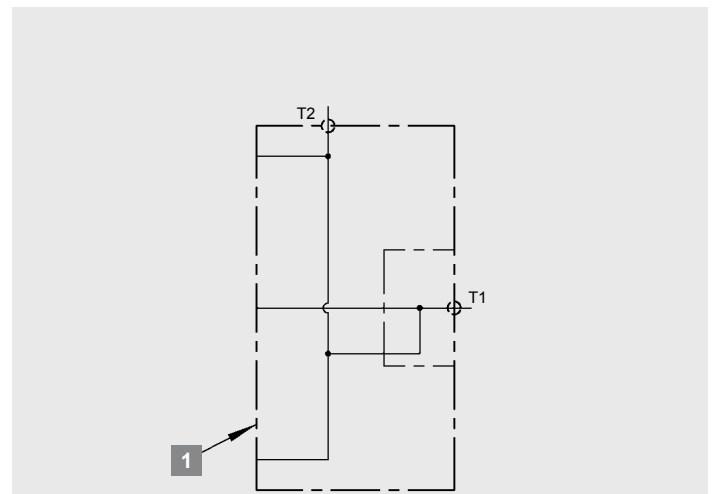


1	Working section	S08U
2	Spool	8XXX
3	Load check valve	MB1
4	Spool control A-side	9
5	Spool control B-side	M1
6	Service port valve A-side	TBS110
7	Service port valve B-side	TBS110

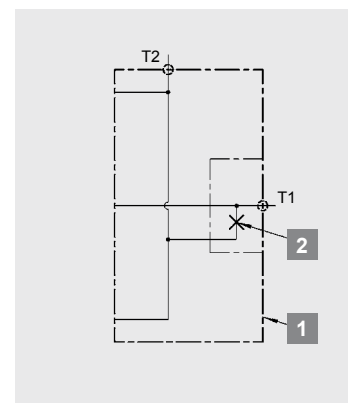
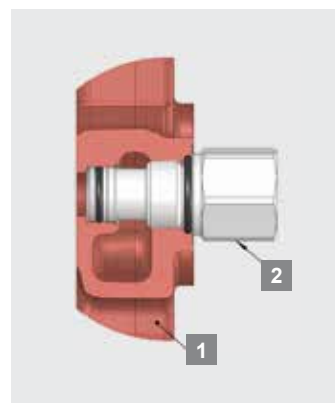
Outlet section U01U



The standard outlet section U01U has two tank connections T1 and T2. Port T1 is used for high pressure carry over function (HPCO) when the adapter S16U is installed in the T1 port.



1	Outlet section	U01U
2	High pressure carry over adapter	S16U



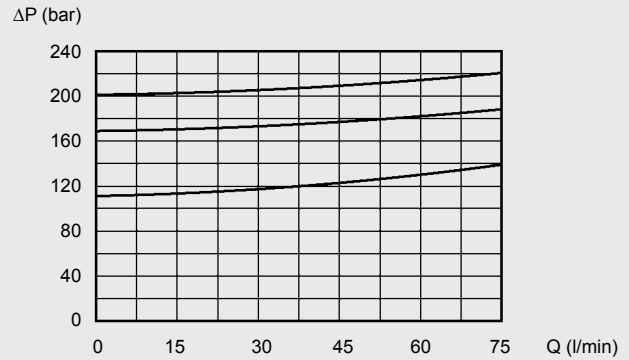
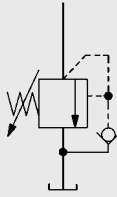
Main relief and service port valves

Oil temperature/viscosity for all graphs: 104°F (+40 °C / 32 cSt)

Main relief and service port valve TBBS110

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

- Setting range: 100-4,500 psi (10-300 bar)
- Setting range step: 100 psi (7 bar)

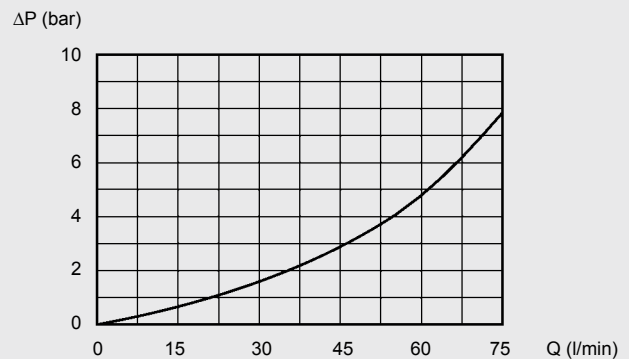
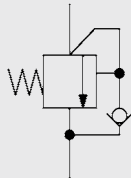


Pressure drop characteristics relief valve function

Main relief and service port valve TBS110

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

- Setting range: 300-4,500 psi (10-300 bar)
- Setting range step: 100 psi (7 bar)



Anticavitation characteristics TBS, TBBS and SB 110

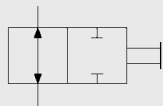
Anticavitation valve SB110

The anticavitation valve service to ensure 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.



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 cavity. Replaces TBS110, SB110 and SBM110.

Plug PK110

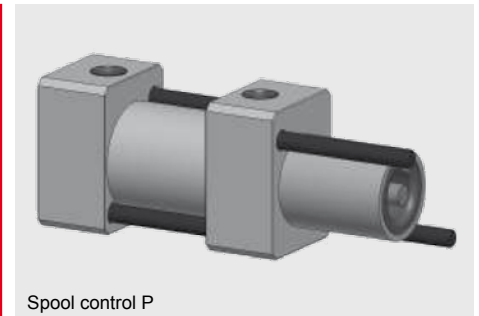
Plug PK110 for service port cavity, connecting port to tank.

Spools

Spools for general use		20 l/min	45 l/min	65 l/min
	Function			
	Double acting spool	12AA	14AA	16AA
	Single acting spool P – A	22AA	24AA	26AA
	Double acting spool with 5th pos. for float	32AB	34AB	36AB
	Motor spool	42AA	44AA	46AA
	Regenerative spool, for section S08	82AA	84AA	86AA
	Spool for series circuit, for section S03	12SA	14SA	16SA

Spool control A-side

Spool control 9	
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 SAE04	
Spool control 9LE2	
Spring centered with spool position indicator	



Spool control P

Spring force for spool control 9 in neutral position: 12.4 lbs (55 N).
 Spring force for spool control 9 with fully selected spool: 22.5 lbs (100 N).

Spool control B-side

Spool control M1

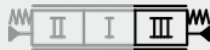
Lever cup and lever mechanism for 3-positional spools

Spool control M2

Lever cup and lever mechanism for 4-positional spools

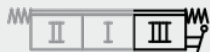
Spool control HPB

Hydr. proportional, connection G 1/4" BSP



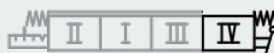
Spool control 3W

Cable attachment for 3-positional spools



Spool control 4W

Cable attachment for 4-positional spools



Joy-stick lever MK1XX

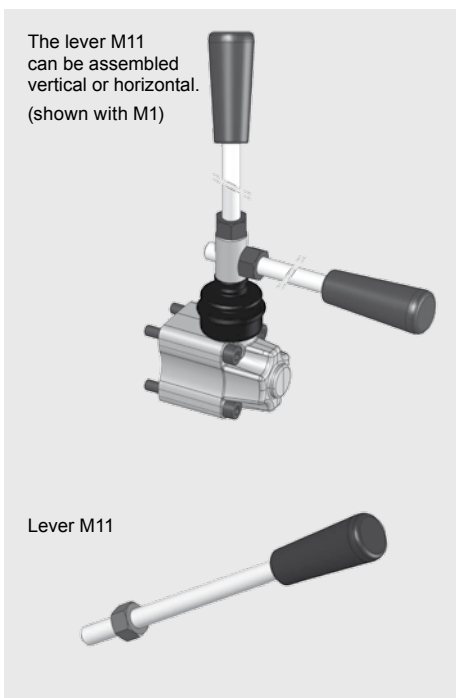
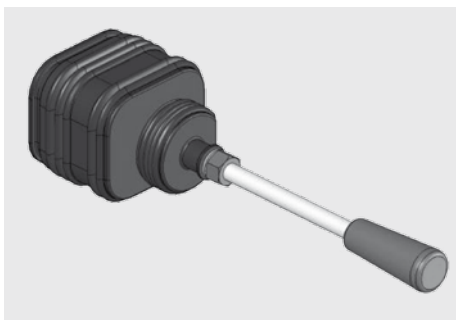
The spool control MK1XX is a mechanical joystick to operate two working sections with one lever. It is designed for four different setups determined by the spool layout.

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

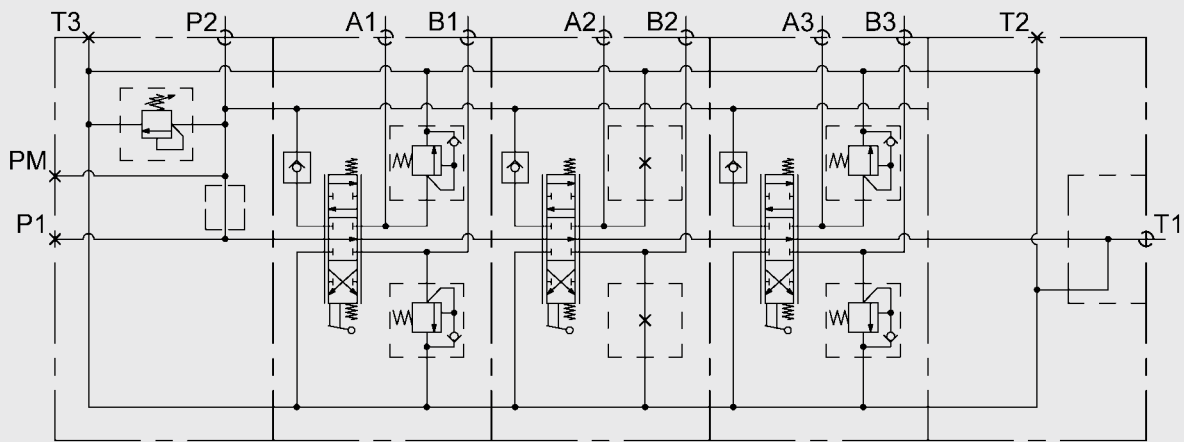
The lever M11 can be assembled vertical and horizontal for spool control M1 or M2. Includes a jam nut and a plastic knob. Length 135 mm. The lever M11 is sold separately.



Typical hydraulic circuit 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.



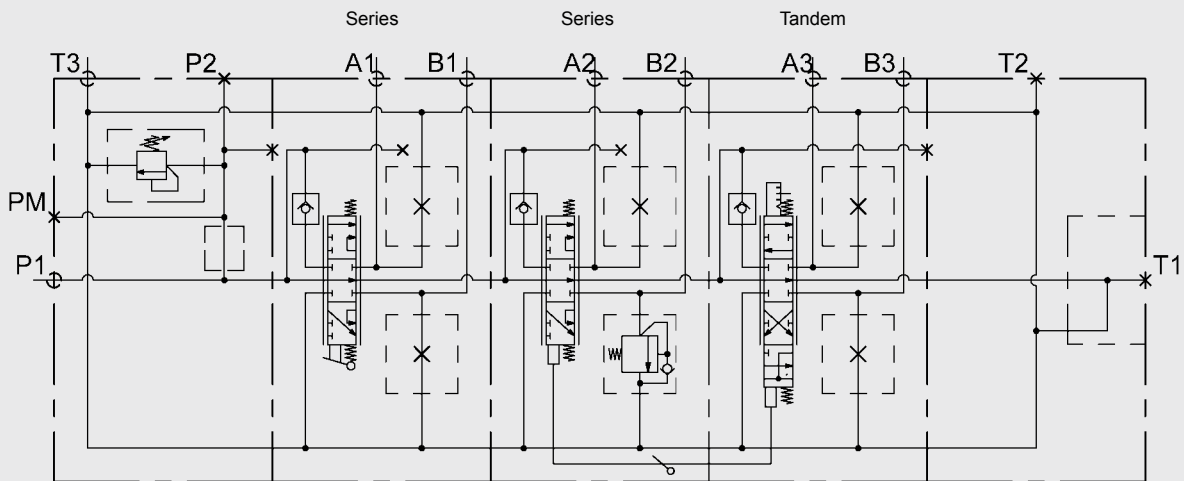
The example shows the RS 160 with three manual operated working sections.

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 three 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.

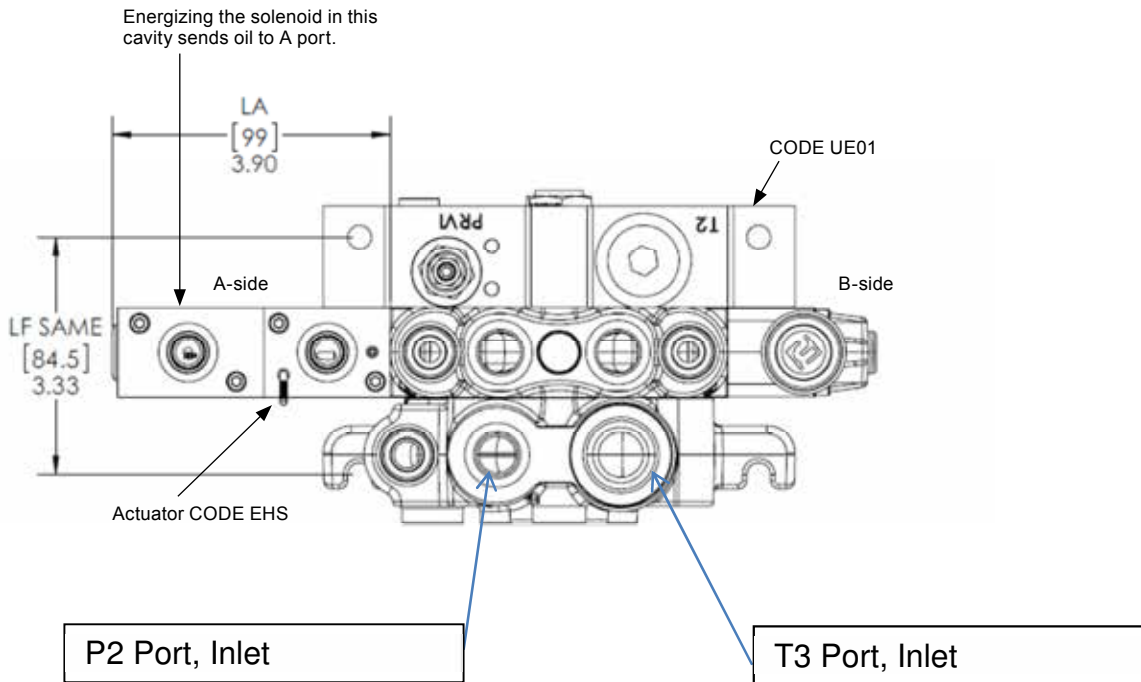


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Supplemental data sheet for RS160 with Electrical Configuration

Dimensions remain the same as data sheet except as noted.



Port Sizes: Pressure and Tank ports: SAE-10, section workports, SAE-8.

Outlet configurable for external drain or internal drain. External drain recommended for EH applications.

Valve sections are operated by electrical pressure reducing valves which control the pressure acting on spool ends to vary the spool stroke.

Electrical Specifications:

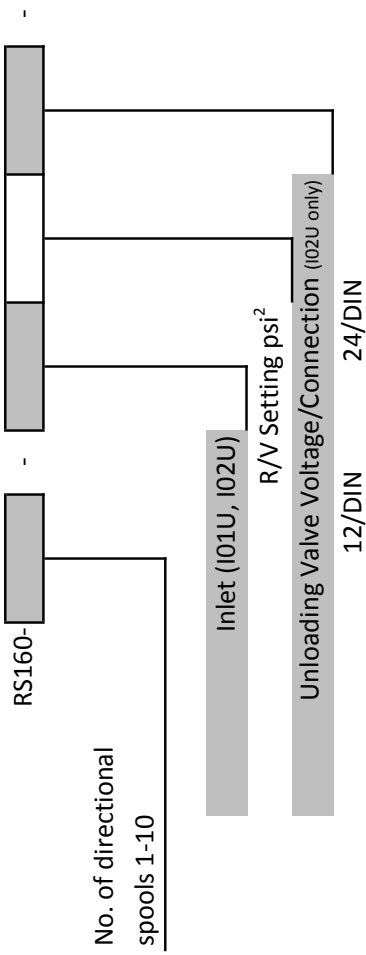
Functional Principle.....PWM(Pulse Width Modulation, 100Hz)
 Duty Factor.....100%
 Connection.....AMP Junior Power Timer or Deutsch DT04-2P
 Protection Class.....IP65
 Ambient Temperature.....-30-80 deg C

Solenoid Characteristics:

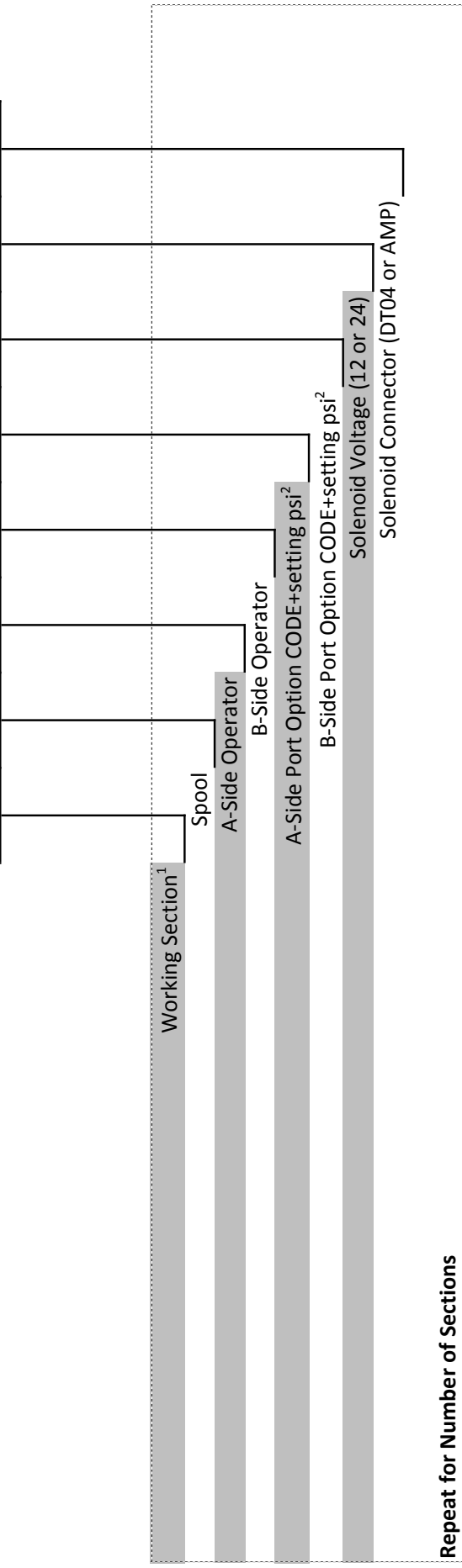
ER12
 Voltage: 12VDC +/-2V
 Current Command: 0-1500mA
 Resistance @ 20 deg C: 4.72 Ohm

ER24
 Voltage: 24VDC +/-4V
 Current Command: 0-750mA
 Resistance @ 20 deg C: 20.8 Ohm

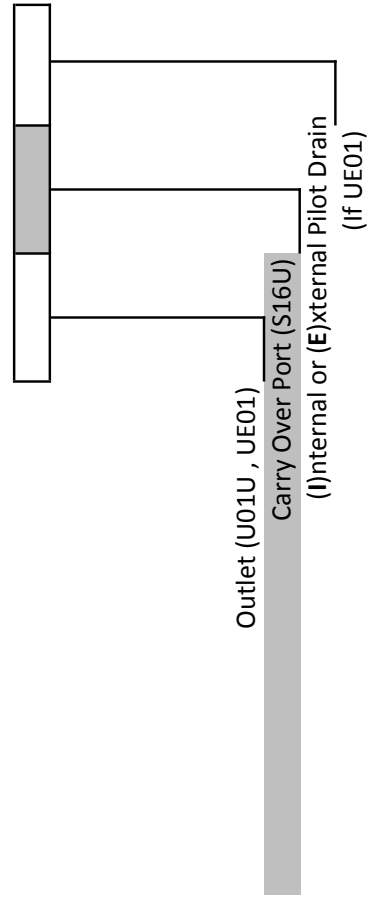
Ordering Details RS160 Sectional Control Valve



Section	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]



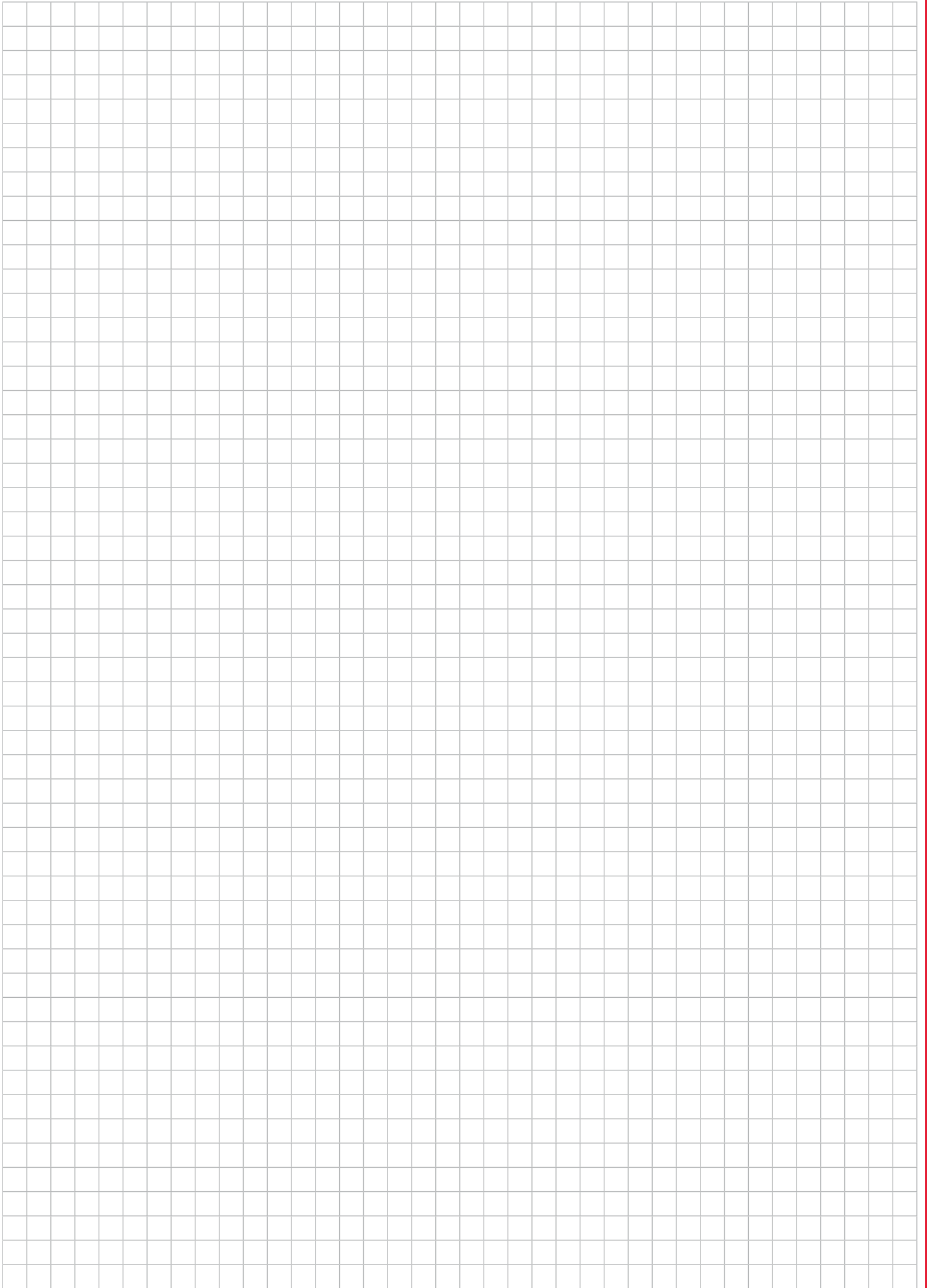
Repeat for Number of Sections



Application Information

- OEM:
- Machine Type:
- Pump Type:
- Pump Flow:
- System Pressure:
- EAU:
- Other Information:

A large grid of graph paper for taking notes, consisting of 20 columns and 40 rows of small squares.





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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.