

SD 16

SECTIONAL  
DIRECTIONAL CONTROL VALVES



# SD16

## Features

Simple, compact and heavy duty designed sectional valve from 1 to 12 sections for open and closed center hydraulic systems.

H Fitted with a main pressure relief valve and a load check valve on every working section

H Available with parallel, tandem or series circuit.

H Optional power beyond port.

H A wide variety of port and circuit valves.

H Available manual, pneumatic, hydraulic, electro-hydraulic, and remote with flexible cables spool control kits.

H Diameter 20 mm (0.79 in) interchangeable spools.

## Working conditions

This catalog shows technical specifications and diagrams measured with mineral oil of 46 mm<sup>2</sup>/s - 46 cSt viscosity at 40°C - 104°F temperature.

Nominal flow rating		140 l/min	37 US gpm
Operating pressure (maximum)	<i>parallel or tandem circuit</i>	315 bar	4600 psi
	<i>series circuit</i>	210 bar	3050 psi
Back pressure (maximum)	<i>on outlet port T</i>	25 bar	360 psi
Internal leakage A(B)→T	<i>Δp=100 bar - 1450 psi fluid and valve at 40°C - 104°F</i>	3 cm <sup>3</sup> /min	0.18 in <sup>3</sup> /min
Fluid		Mineral base oil	
Fluid temperature range	<i>with NBR (BUNA-N) seals</i>	from -20° to 80°C	from -4° to 176°F
	<i>with FPM (VITON) seals</i>	from -20° to 100°C	from -4° to 212°F
Viscosity	<i>operating range</i>	from 15 to 75 mm <sup>2</sup> /s	from 15 to 75 cSt
	<i>min.</i>	12 mm <sup>2</sup> /s	12 cSt
	<i>max.</i>	400 mm <sup>2</sup> /s	400 cSt
Max level of contamination		19/16 - ISO 4406	NAS 1638 - class10
Ambient temperature range		from -40° to 60°C	from -40° to 140°F

NOTE - For different conditions please contact Customer Service.

### Additional information

This catalog shows the product in the most standard configurations.

Please contact Customer Service Dpt. for more detailed information or special request.

### WARNING!

All specifications of this catalog refer to the standard product at this date.

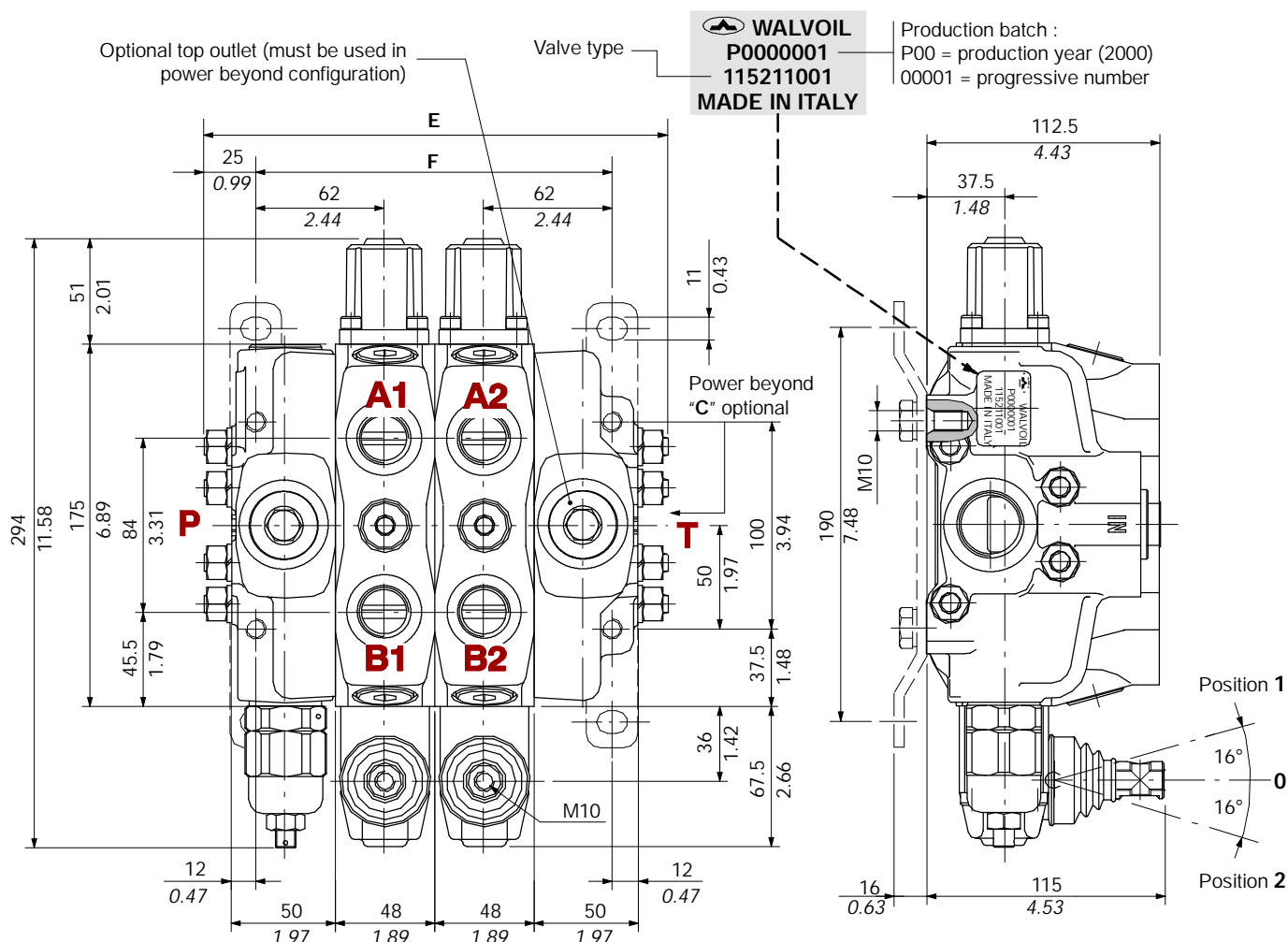
Walvoil, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN INCORRECT USE OF THE PRODUCT.

3<sup>rd</sup> edition December 2000:

**This edition supersedes all prior documents.**

## Dimensional data (parallel and tandem circuit)



TYPE	E		F		Weight	
	mm	in	mm	in	kg	lb
SD16/1	176	6.63	124	4.88	13	28.7
SD16/2	224	8.82	172	6.77	19	41.9
SD16/3	272	10.71	220	8.66	24.9	54.9
SD16/4	320	12.60	268	10.55	30.9	68.1
SD16/5	368	14.49	316	12.44	36.8	81.1
SD16/6	416	16.38	364	14.33	42.8	94.4

TYPE	E		F		Weight	
	mm	in	mm	in	kg	lb
SD16/7	464	18.27	412	16.22	48.7	107.7
SD16/8	512	20.16	460	18.11	54.6	121
SD16/9	560	22.05	508	20	60.5	134.3
SD16/10	608	23.94	556	21.89	66.4	147.6
SD16/11	656	25.83	604	23.78	72.3	160.9
SD16/12	704	27.72	652	25.67	78.2	174.2

### Standard threads

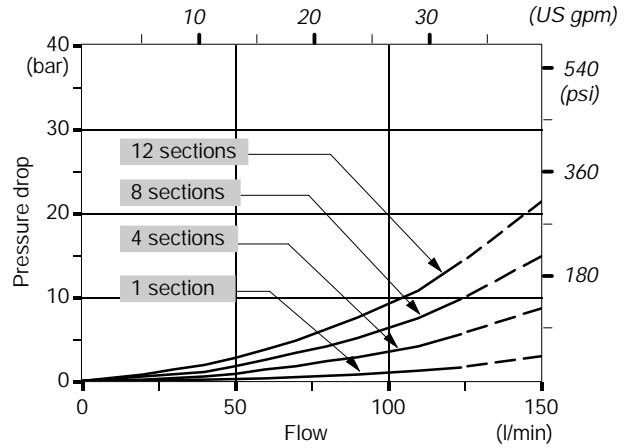
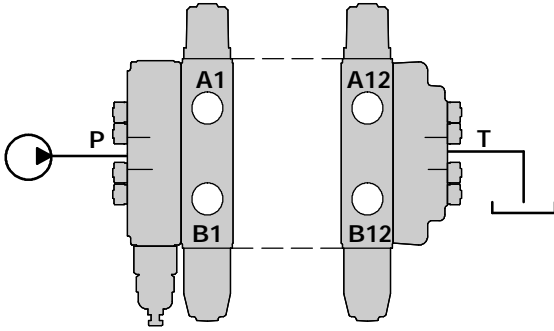
PORTS	BSP (ISO 228/1)	UN-UNF (ISO 11926-1)
Inlet P	G 3/4	1 5/16-12 UN-2B (SAE 16)
A and B ports	G 3/4	1 1/16-12 UN-2B (SAE 12)
Outlet T and power beyond C	G 1	1 5/16-12 UN-2B (SAE 16)
PILOT PORTS		
Hydraulic	G 1/4	9/16-18 UNF-2B (SAE 6)
Pneumatic	NPTF 1/8-27	NPTF 1/8-27

# SD16

## Performance data (pressure drop vs. flow)

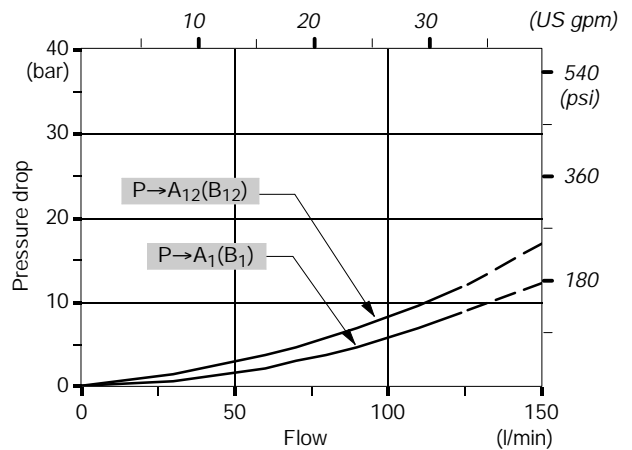
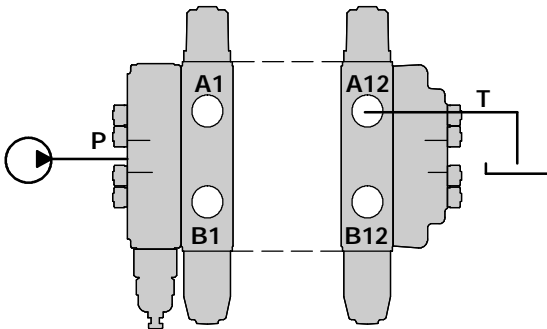
### Open center

From side inlet to side outlet.



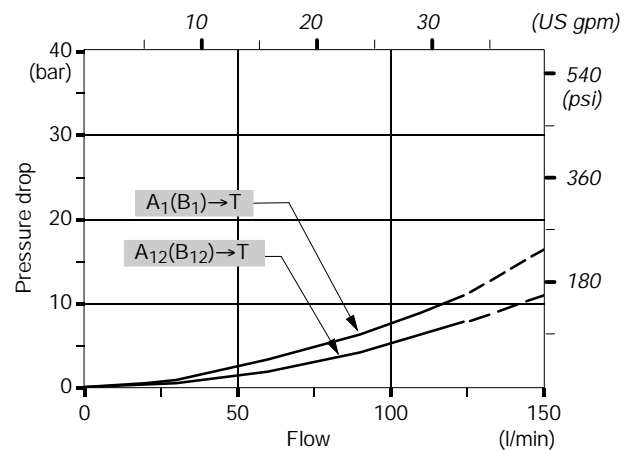
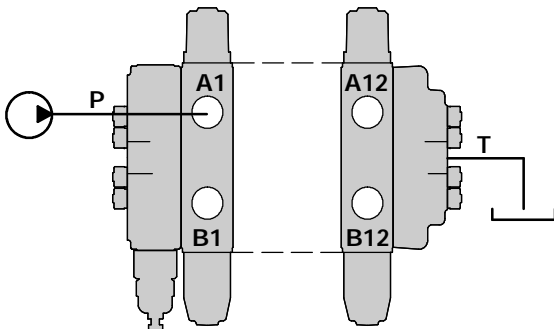
### Inlet to work port

From side inlet to A port (spool in position 1) or B port (spool in position 2).



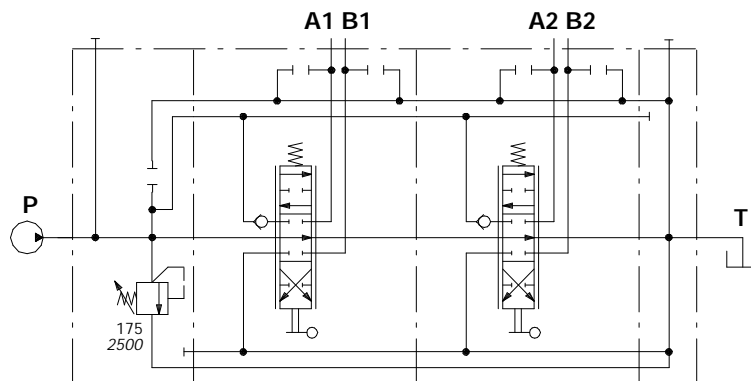
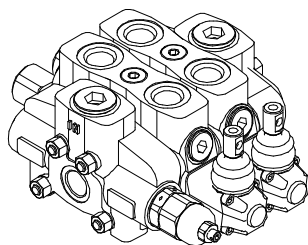
### Work port to outlet

From A port (spool in position 2) or B port (spool in position 1) to side outlet.



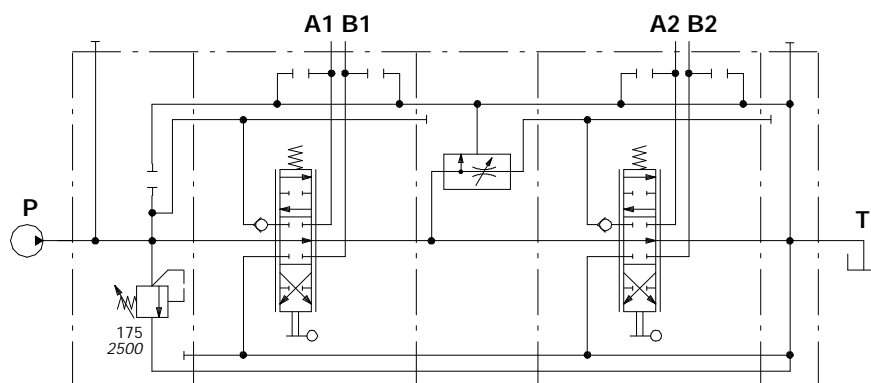
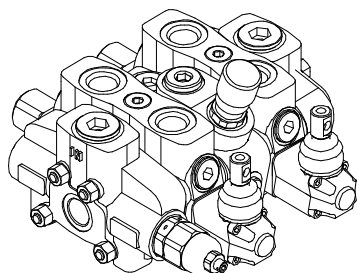
NOTE - Measured with spool type 1.

## 2 parallel working sections



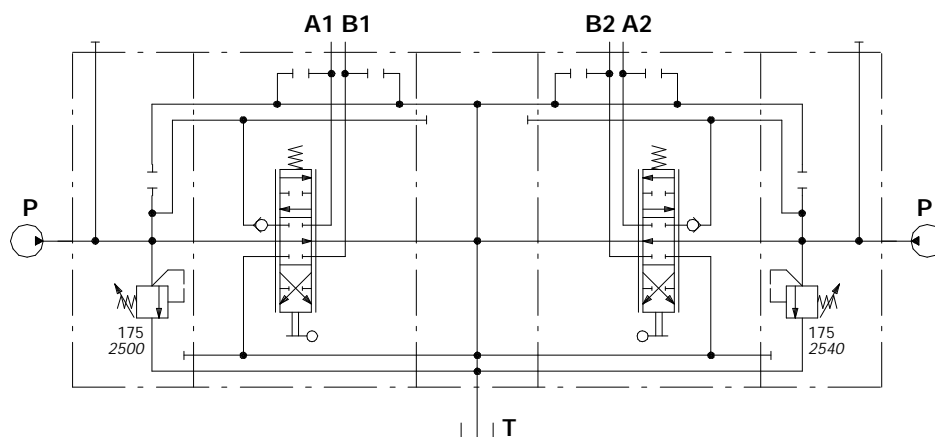
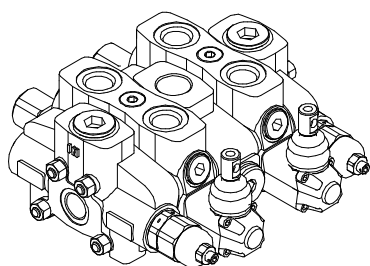
Ex.: SD16/2/AC(YG3-175)/18L/18L/RC

## Intermediate pressure compensated flow divider section



Ex.: SD16/2/AC(YG3-175)/18L/DFG/18L/RC

## 2 inlet cover and mid return manifold section

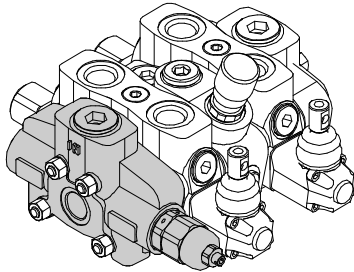


Ex.: SD16/2/AC(YG3-175)/18L/CS1/18L/BC(YG3-175)

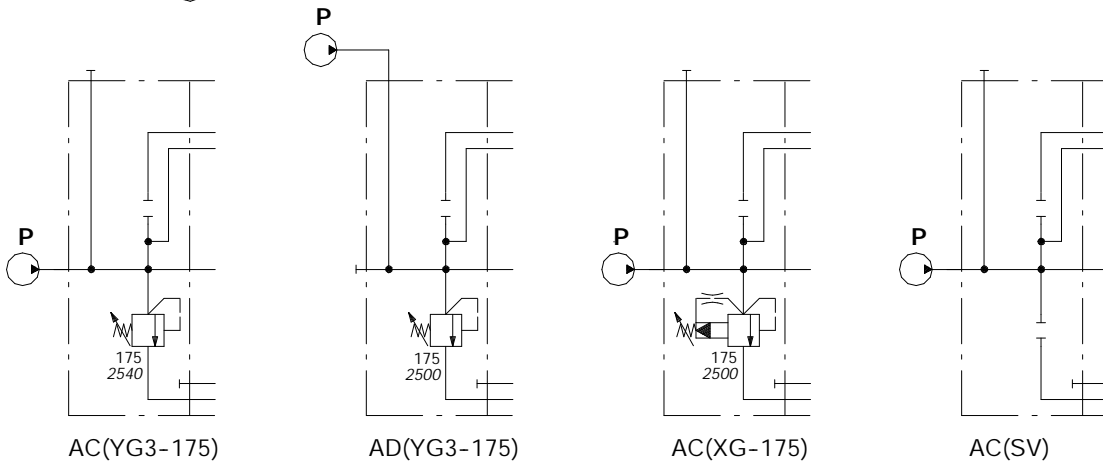
# SD16

## Hydraulic circuit

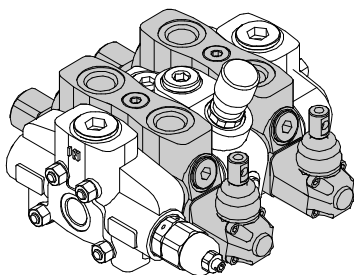
### Inlet cover



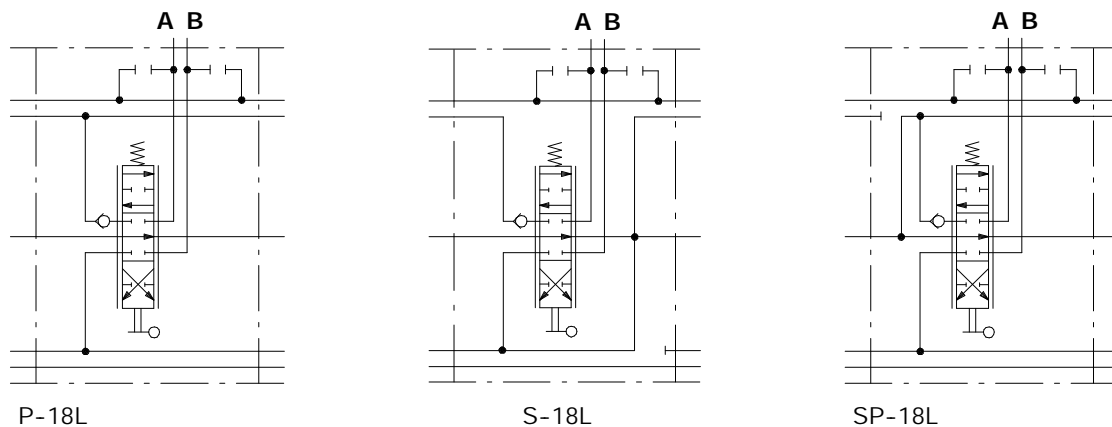
TYPE	CODE	DESCRIPTION
<b>AC(YG3)</b>	615205005	Side inlet with direct pressure relief valve
<b>AD(YG3)</b>	615205001	Top inlet with direct pressure relief valve
<b>AC(XG)</b>	615205003	Side inlet with pilot operated pressure relief valve
<b>AC(SV)</b>	615205006	Side inlet with relief valve blanking plug



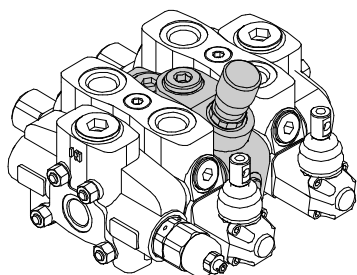
### Working sections



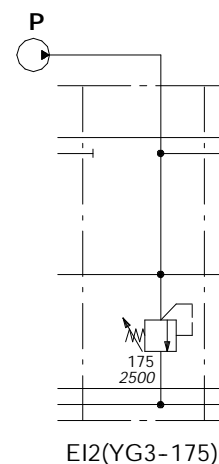
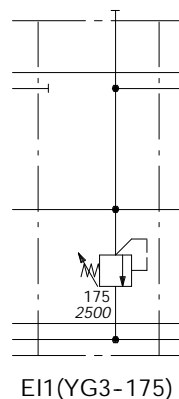
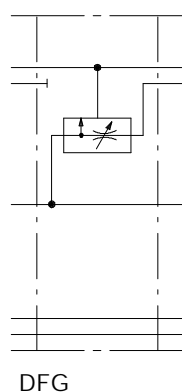
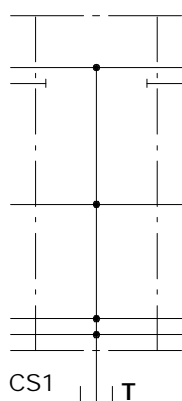
TYPE	CODE	DESCRIPTION
<b>P-18L</b>	615105001	Parallel
<b>S-18L</b>	615115001	Series
<b>SP-18L</b>	615125001	Tandem



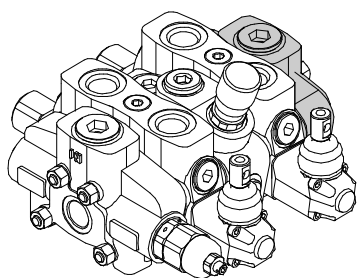
Intermediate sections



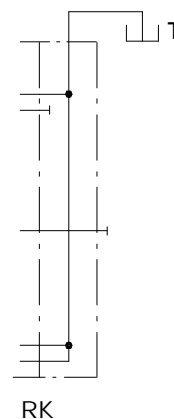
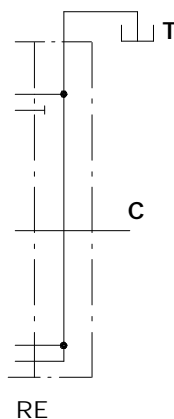
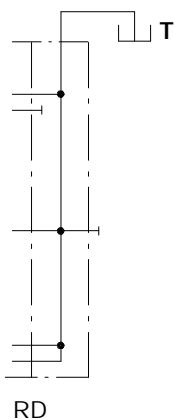
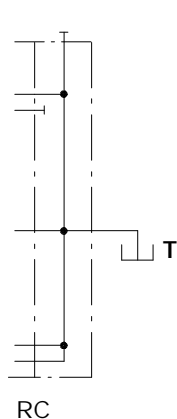
TYPE	CODE	DESCRIPTION
CS1	615405010	Mid return manifold section
DFG	615411020	Pressure compensated flow divider section
EI1(YG3)	615425010	Secondary direct operated pressure relief valve
EI2(YG3)	615425000	Mid inlet with secondary direct operated pressure relief valve



Outlet cover



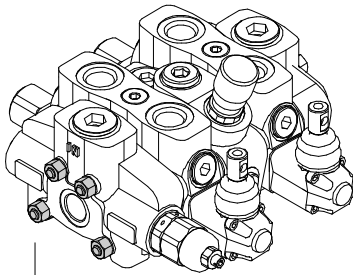
TYPE	CODE	DESCRIPTION
RC	615305003	Side outlet
RD	615305001	Top outlet
RE	615305002	Top outlet with power beyond
RK	615305005	Top outlet with closed center



NOTE - Codes are referred to **UN-UNF** thread.

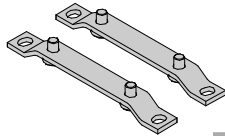
# SD16

## Assembling parts



1.

M10 nut - wrench 17



2.

PART	CODE	DESCRIPTION
1.	5TIR110170	Tie rod kit for 1 section valve
	5TIR110218	Tie rod kit for 2 sections valve
	5TIR110266	Tie rod kit for 3 sections valve
	5TIR110316	Tie rod kit for 4 sections valve
	5TIR110368	Tie rod kit for 5 sections valve
	5TIR110410	Tie rod kit for 6 sections valve
	5TIR110458	Tie rod kit for 7 sections valve
	5TIR110506	Tie rod kit for 8 sections valve
	5TIR110554	Tie rod kit for 9 sections valve
	5TIR110602	Tie rod kit for 10 sections valve
	5TIR110650	Tie rod kit for 11 sections valve
	5TIR110698	Tie rod kit for 12 sections valve

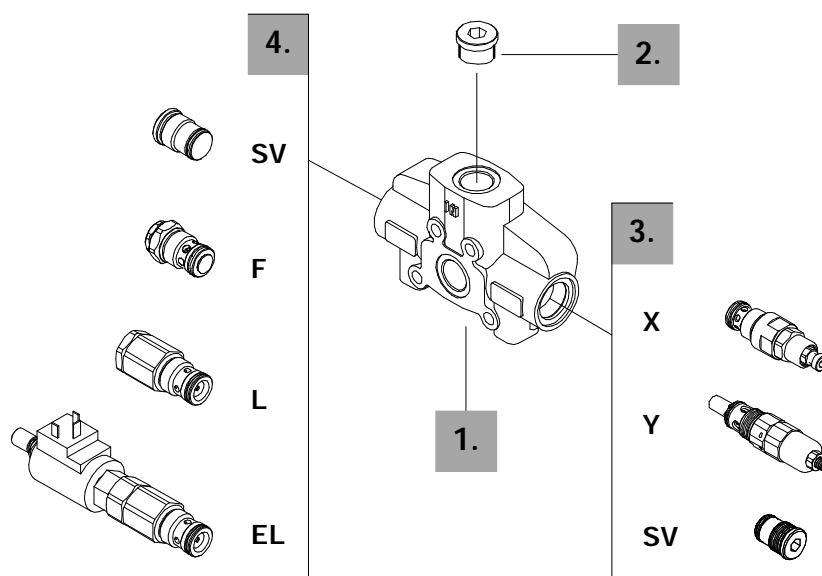
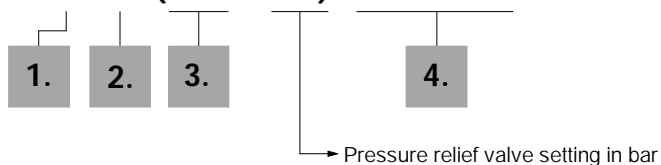
Tie rod tightening torque 40 Nm (29.6 lbf<sup>t</sup>)

2.	5STA125220	Brakets kit
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## Description example:

FE SD16 / A C (YG3 - 175) EL-12VDC - SAE \*

**1. Inlet cover body \***

CODE	DESCRIPTION
3FIA116700	AC-AD type body

**2. Inlet port selection \***

CODE	DESCRIPTION
3XTAP838200	SAE16 plug (n.1 plug required)

**3. Inlet relief options**

TYPE	CODE	DESCRIPTION
<u>VMP20/1 pilot operated pressure relief valve type X</u>		
(XG-120)	X007211120	Range 25 to 315 bar / 360 to 4600 psi standard setting 120 bar / 1750 psi
<u>VMD20/1 direct pressure relief valve type Y (standard)</u>		
(YG2-120)	3XCAR120212	Range 80 to 160 bar / 1160 to 2300 psi standard setting 120 bar / 1750 psi
(YG3-175)	3XCAR120213	Range 125 to 250 bar / 1800 to 3600 psi standard setting 175 bar / 2500 psi

Standard setting is referred to 10 l/min - 2.6 US gpm flow.

SV 3XTAP535410 Relief valve blanking plug

**4. Inlet valves options**

TYPE	CODE	DESCRIPTION
F	5KIT420200	Inlet anti-cavitation valve
L	3XCAR420700	Hydraulic pilot unloader valve (FC1.5)
EL	YCAR420305	12 VDC electromagnetic controlled unloader valve
	YCAR420310	24 VDC electromagnetic controlled unloader valve
SV	3XTAP535410	Relief valve blanking plug

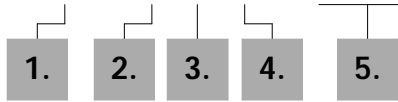
NOTE (\*) - Items are referred to **UN-UNF** thread.

# SD16

## Working section options

### Description example:

EL SD16 / P - 1 8 L . P 1 (G3 - 100) - SAE \*



- 1 mounted on A port.
- 2 mounted on B port.
- 3 mounted on A and B ports.

→ Port relief valve setting in bar

### 1. Working section kits \*

TYPE	CODE	DESCRIPTION
P	5EL1167000	Parallel
S	5EL2167000	Series
SP	5EL3167000	Tandem

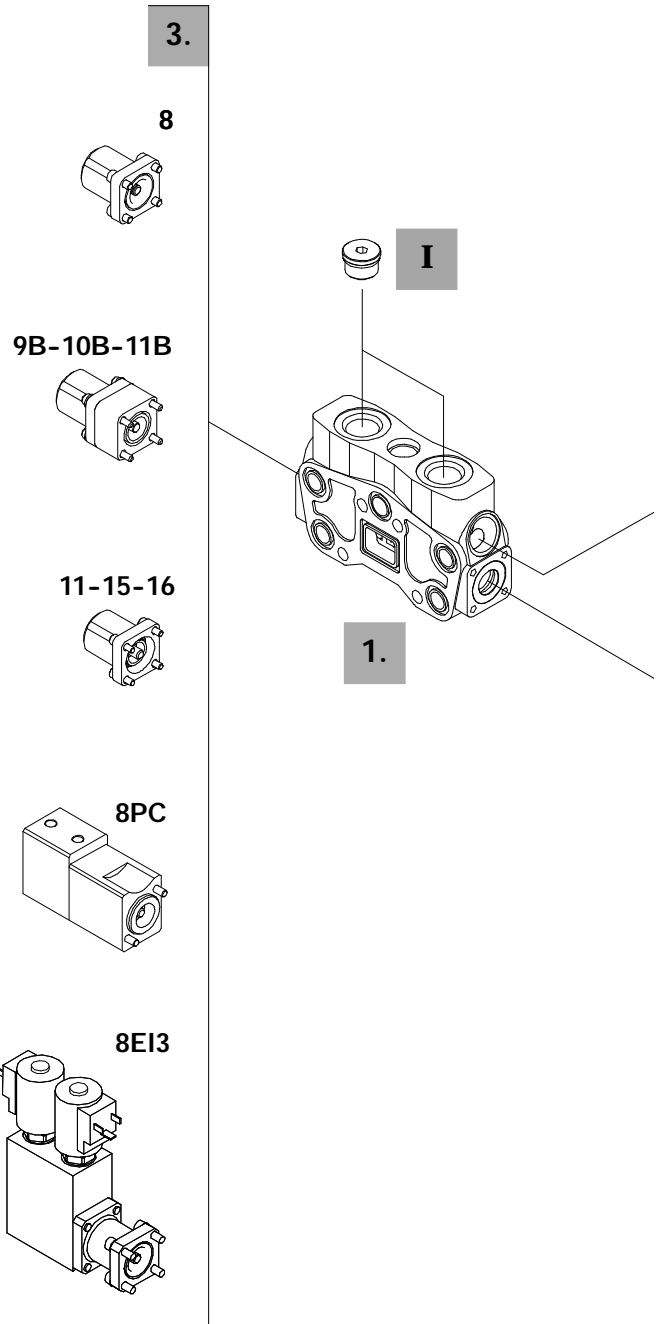
Include boby, seals, rings and load check valve.

### 2. Spool options

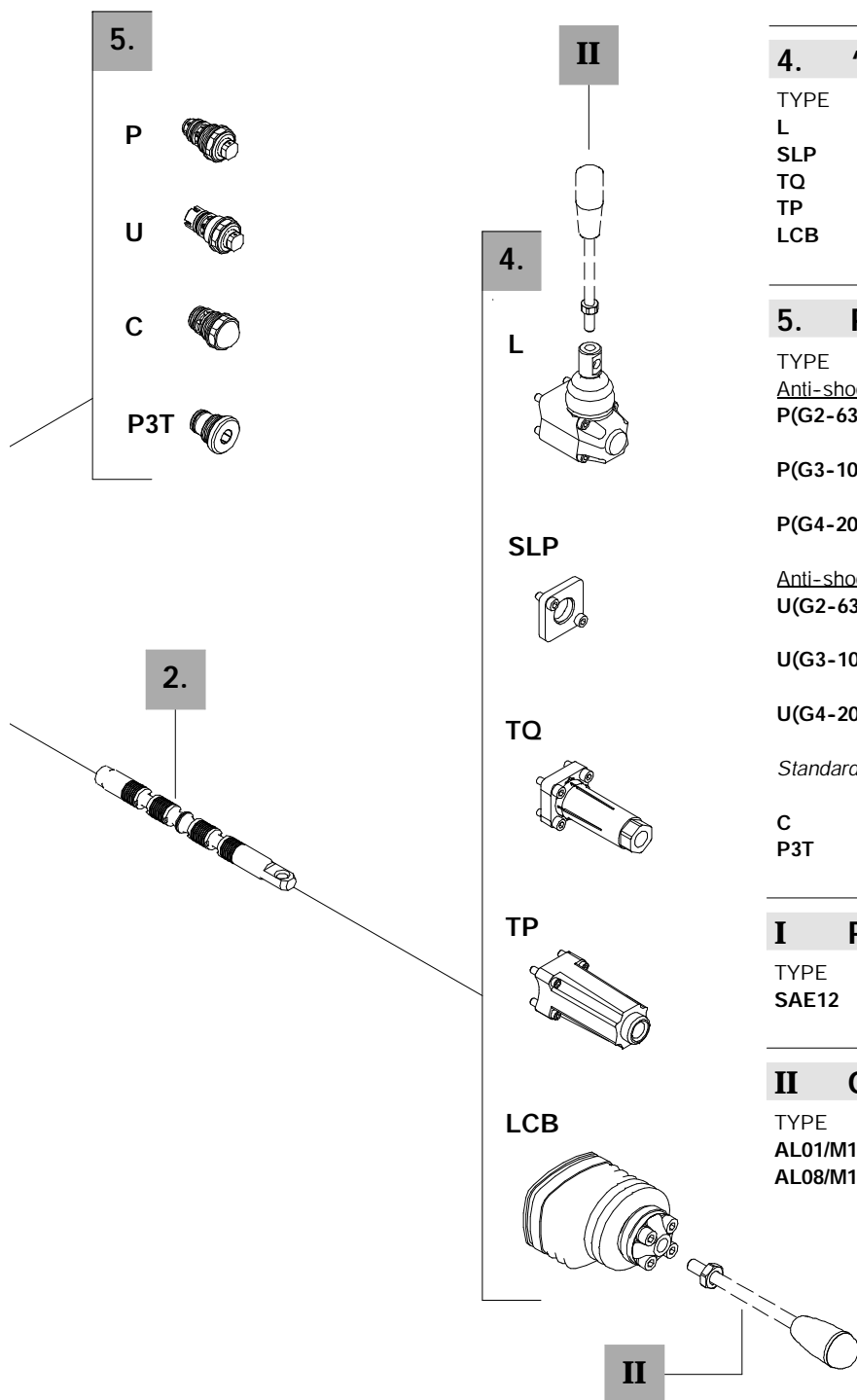
TYPE	CODE	CIRCUIT DESCRIPTION
1	3CU2510100	Double acting, 3 positions, with A and B closed in neutral position
1CS	3CU2510200	Double acting, 3 positions, with A and B closed in neutral position, metering type
1A	3CU2521100	Double acting, 3 positions, with A open to tank in neutral position
1B	3CU2522100	Double acting, 3 positions, with B open to tank in neutral position
2	3CU2525100	Double acting, 3 positions, with A and B open to tank in neutral position
3	3CU2531100	Single acting on A, 3 positions, B plugged; requires SAE 12 plug (see part I)
4	3CU2535100	Single acting on B, 3 positions, A plugged; requires SAE 12 plug (see part I)

### 3. "A" side spool positioners

TYPE	CODE	DESCRIPTION
8	5V08110000	With spring return in neutral position
9B	5V09110000	With detent in position 1 and spring return in neutral position
10B	5V09110000	With detent in position 2 and spring return in neutral position
11	5V11110000	With detent in position 1, neutral and 2
11B	5V11210000	With detent in position 1 and 2, spring return in neutral position
15	5V15110000	With detent in position 1 and neutral
16	5V16110000	With detent in position 2 and neutral
8PC	5V08111709	Proportional pneumatic kit
8EI3	5V08110350	12 VDC ON/OFF electro-hydraulic kit
	5V08110351	24 VDC ON/OFF electro-hydraulic kit

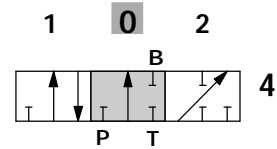
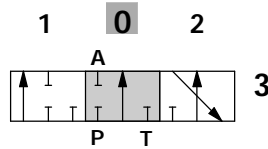
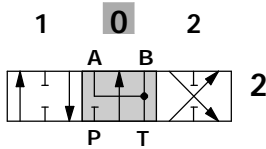
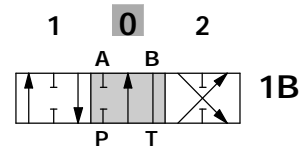
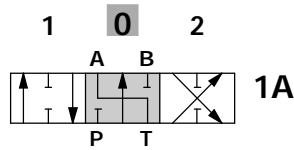
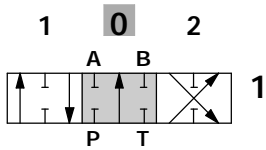


NOTE (\*) - Items are referred to UN-UNF thread.



For special configurations see pages 13 and 14

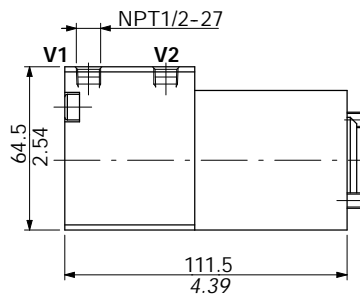
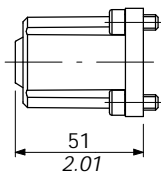
## Spools options



"B" port plugged

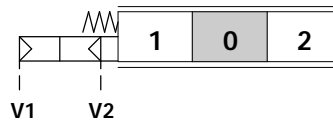
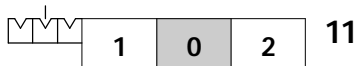
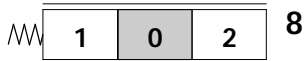
"A" port plugged

## "A" side spool positioners



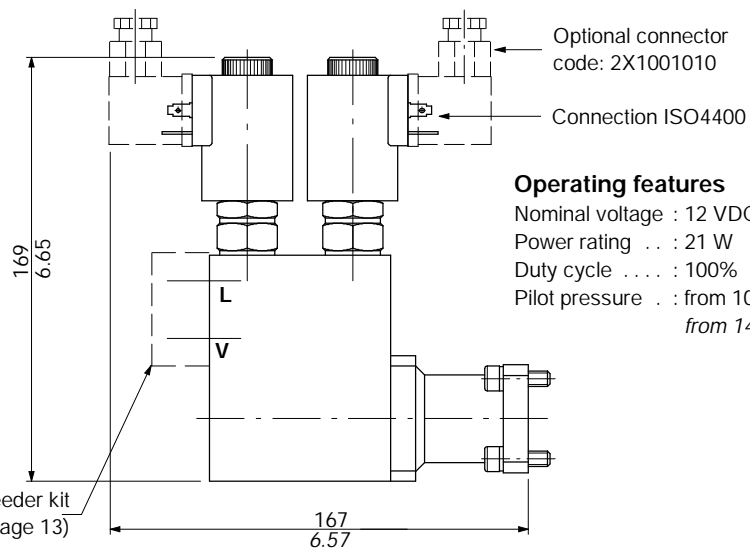
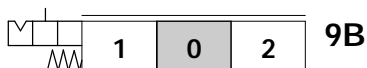
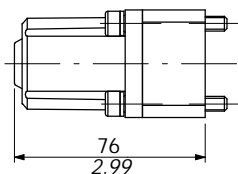
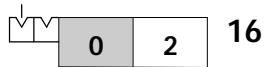
### Operating features

Adjustment range : from 1 to 5.5 bar  
from 14.5 to 79.8 psi  
diagram 501A  
Max.pilot pressure : 10 bar / 145 psi



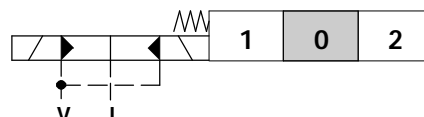
### 8PC

Proportional pneumatic kit



### Operating features

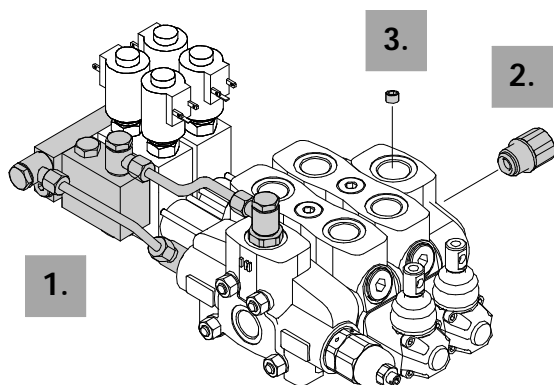
Nominal voltage : 12 VDC / 24 VDC  
Power rating . . . : 21 W  
Duty cycle . . . . : 100%  
Pilot pressure . . : from 10 to 50 bar  
from 145 to 725 psi



### 8E13

ON/OFF electro-hydraulic kit

Electro-hydraulic feeder kit



PART	TYPE	CODE	DESCRIPTION
1.	KE1R3	5KE1R31570	kit for 1 section
	KE2R3	5KE2R31570	kit for 2 sections
	KE3R3	5KE3R31570	kit for 3 sections
	KE4R3	5KE4R31570	kit for 4 sections
	KE5R3	5KE5R31570	kit for 5 sections
	KE6R3	5KE6R31570	kit for 6 sections
2.	VRE	3XGIU641700	SAE 16 back-pressure valve (power beyond configuration)
3.	RE	4TAP318010	M18x1.5 plug

NOTE - Codes are referred to **UN-UNF** thread.

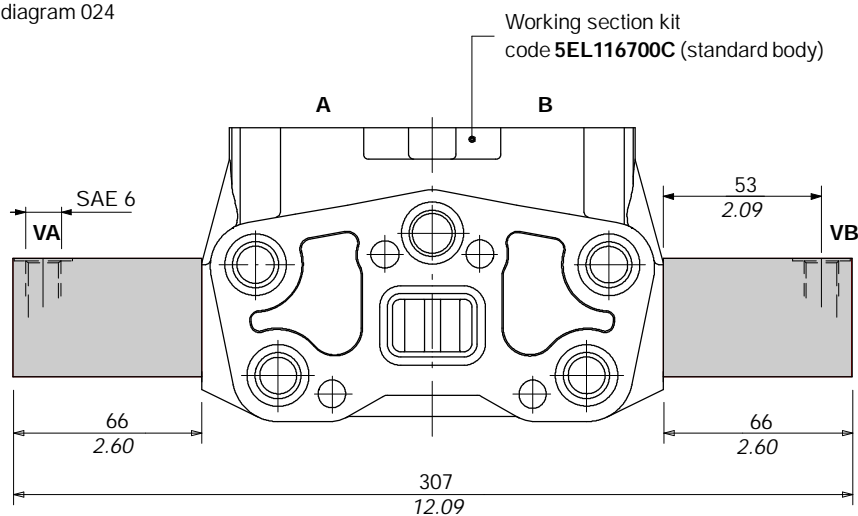
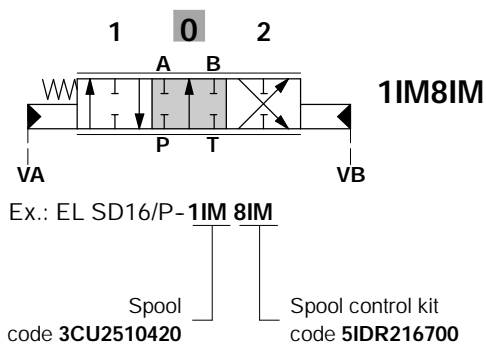
Special configurations

Hydraulic spool control

Operating features

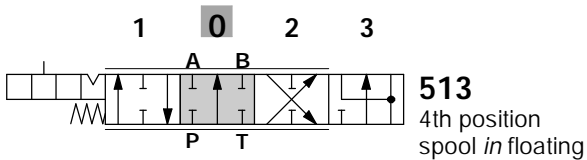
Adjustment range : from 5.8 to 19 bar / 84 to 276 psi - diagram 024

Max.pilot pressure : 100 bar / 1450 psi



## Special configuration

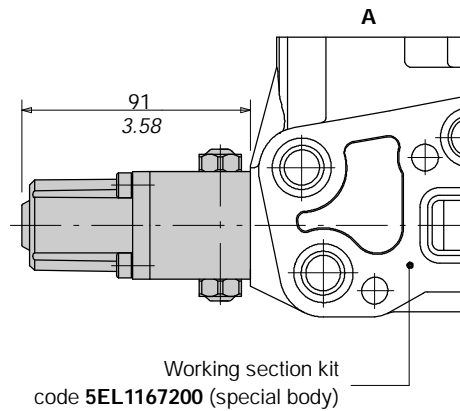
### 4<sup>th</sup> position floating circuit



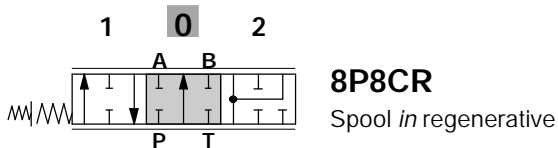
Ex.: EL SD16/P-5 13...

Spool  
code **3CU2541100**

Spool control kit  
code **5V13116000**



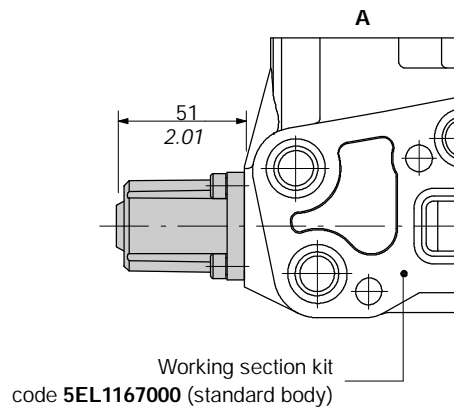
### Regenerative circuit



Ex.: EL SD16/P-8P 8CR...

Spool  
code **3CU2561210**

Spool control kit  
code **5V08110020**

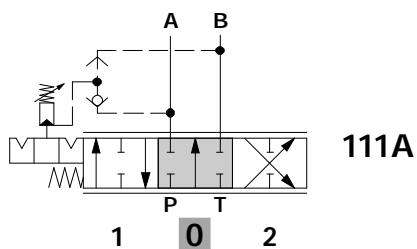


### Fixed double acting kick-out spool control

#### Operating features

Kick-out pressure range . . . : from 20 to 125 bar  
: from 290 to 1800 psi

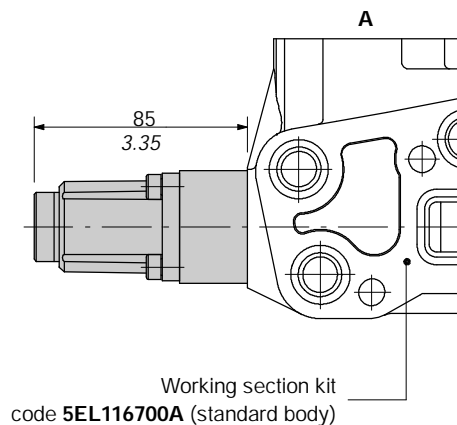
Kick-out standard pressure . . : 100 bar / 1450 psi



Ex.: EL SD16/P-1 11A(100)...

Spool  
code **3CU2510321**

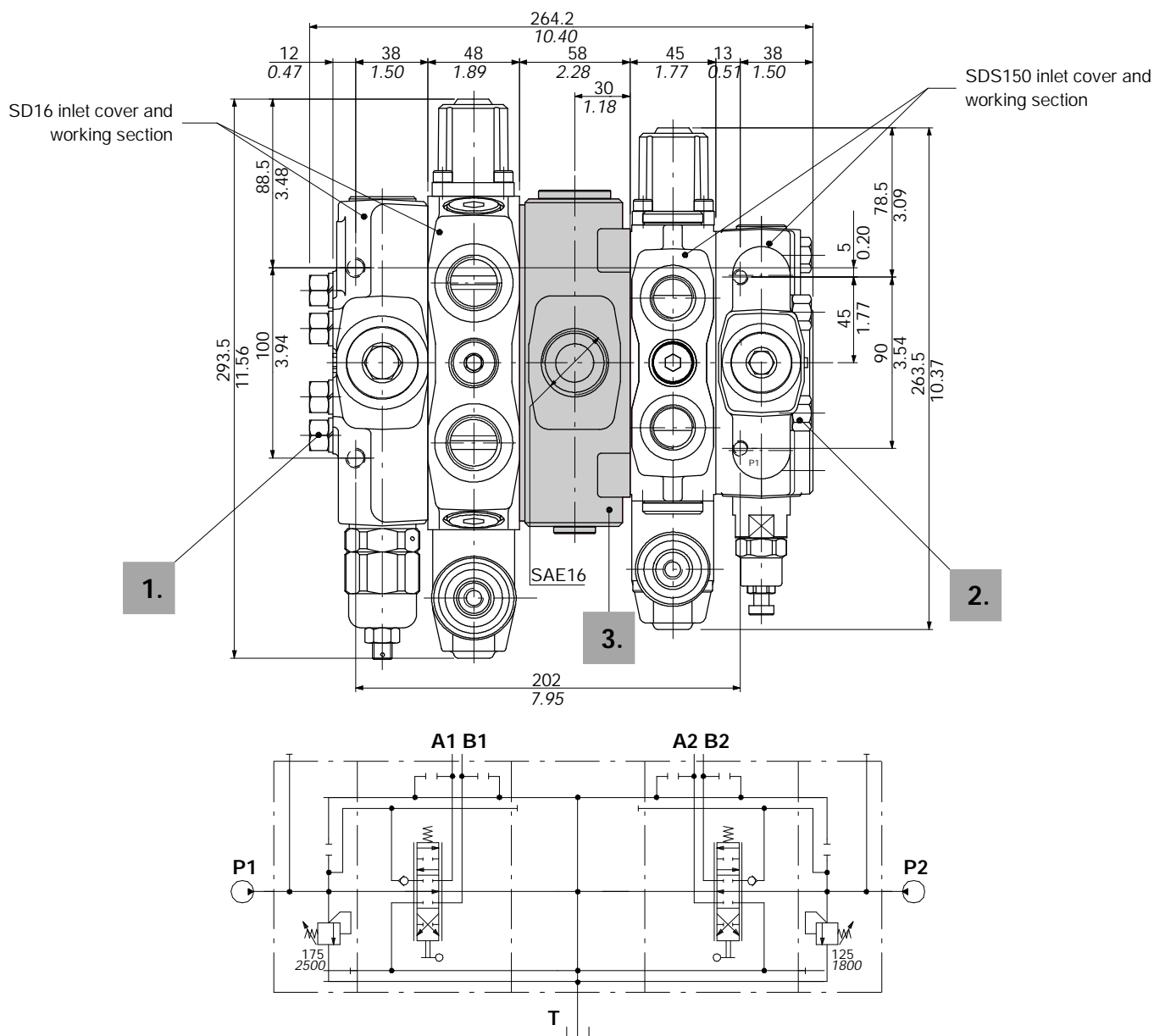
Spool control kit  
code **5V11510100**



## CS3

Mid return manifold.

To assemble different sizes of valve. Tie rods are special. Available combination SD16 / SDS150.



Description example: SD16/1/AC(YG3-175)/18L/CS3/18L/BC(XG-125)/SDS150/1

### 1. Tie rod kits for SD16

CODE	DESCRIPTION
5TIR4161	Kit for 1 section
5TIR4162	Kit for 2 sections
5TIR4163	Kit for 3 sections
5TIR4164	Kit for 4 sections

### 2. Tie rod kits for SDS150

CODE	DESCRIPTION
5TIR41501	Kit for 1 section
5TIR41502	Kit for 2 sections
5TIR41503	Kit for 3 sections
5TIR41504	Kit for 4 sections

### 3. Intermediate sections \*

CODE	DESCRIPTION
615445010	Mid return manifold section

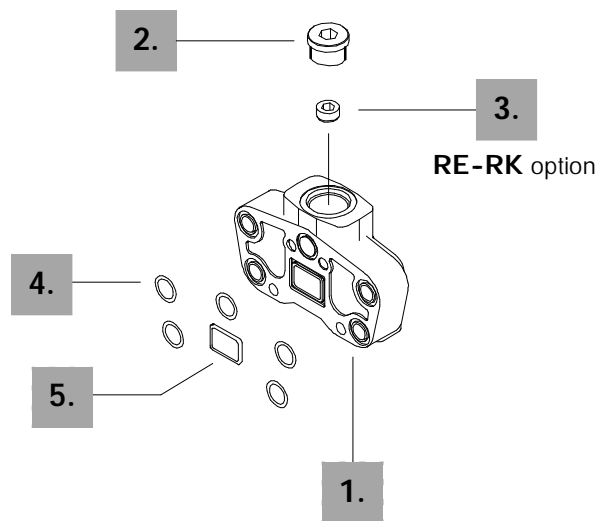
NOTE (\*) - Code are referred to **UN-UNF** thread.

# SD16

## Outlet cover options

Description example:

FS SD16 / RC - SAE \*



### Outlet section parts

PART	CODE	QTY	DESCRIPTION
1.	3FIA216700	1	Outlet section body *
2.	3XTAP838200	1	SAE 16 plug *
4.	4GUA118726	5	18.72x2.62 NBR 70 SH O-Ring seal
5.	4GUA134626	1	34.60x2.62 NBR 70 SH O-Ring seal

### Circuit option

PART	CODE	QTY	DESCRIPTION
3.	4TAP318010	1	M18x1.5 plug for power beyond (RE) and closed center (RK) configuration

NOTE (\*) - Items are referred to **UN-UNF** thread.

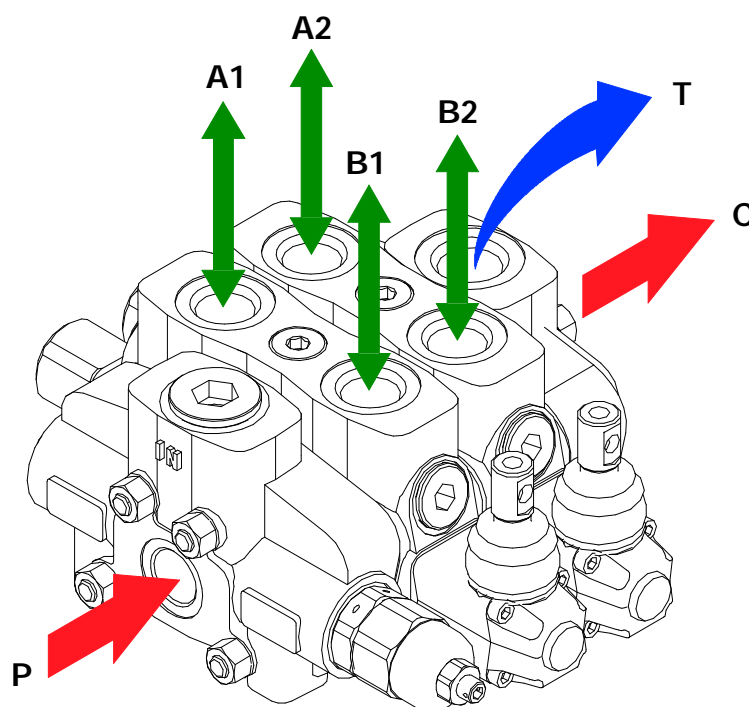


## Installation and maintenance

The SD16 valve is assembled and tested as per the technical specification of this catalog.

Before the final installation on your equipment, follow the below recommendations:

- the valve can be assembled in any position, in order to prevent working sections deformation and spools sticking mount the product on a flat surface;
- in order to prevent the possibility of water entering the lever box and spool control kit, do not use high pressure wash down directly on the valve;
- prior to painting, ensure plastic port plugs are tightly in place.



**Power beyond configuration**

### Fitting tightening torque - Nm / lbft

THREAD TYPE	P port	A and B ports	T and C ports
BSP (ISO 228/1)	G 3/4	G 3/4	G 1
With O-Ring seal	70 / 51.6	70 / 51.6	100 / 73.7
With copper washer	70 / 51.6	70 / 51.6	90 / 66.3
With steel and rubber washer	70 / 51.6	70 / 51.6	100 / 73.7
UN-UNF (ISO 11926-1)	1 5/16-12 UN-2B (SAE 16)	1 1/16-12 UN-2B (SAE 12)	1 5/16-12 UN-2B (SAE 16)
With O-Ring seal	150 / 110.6	95 / 70	150 / 110.6

NOTE - These torque are recommended. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish. The manufacturer shall be consulted.

# SD16

## Notes

The SD16 valve can be supplied with one coat of opaque black paint (**CVN** configuration).

Example of specification: SD16/2/AC(YG3-175)/18L/18L/RC-<**CVN**>

NOTE - *For different color consult Customer Service.*





**WALVOIL S.P.A.**

42100 REGGIO EMILIA • ITALY • VIA ADIGE, 13/D  
TEL. +39.0522.932411 • FAX +39.0522.300984  
E-MAIL: INFO@WALVOIL.COM • HTTP: //WWW.WALVOIL.COM

**SALES DEPARTMENT**

TEL. +39.0522.932555 • FAX +39.0522.932455

DBC004A