MONOBLOCK DIRECTIONAL CONTROL VALVE

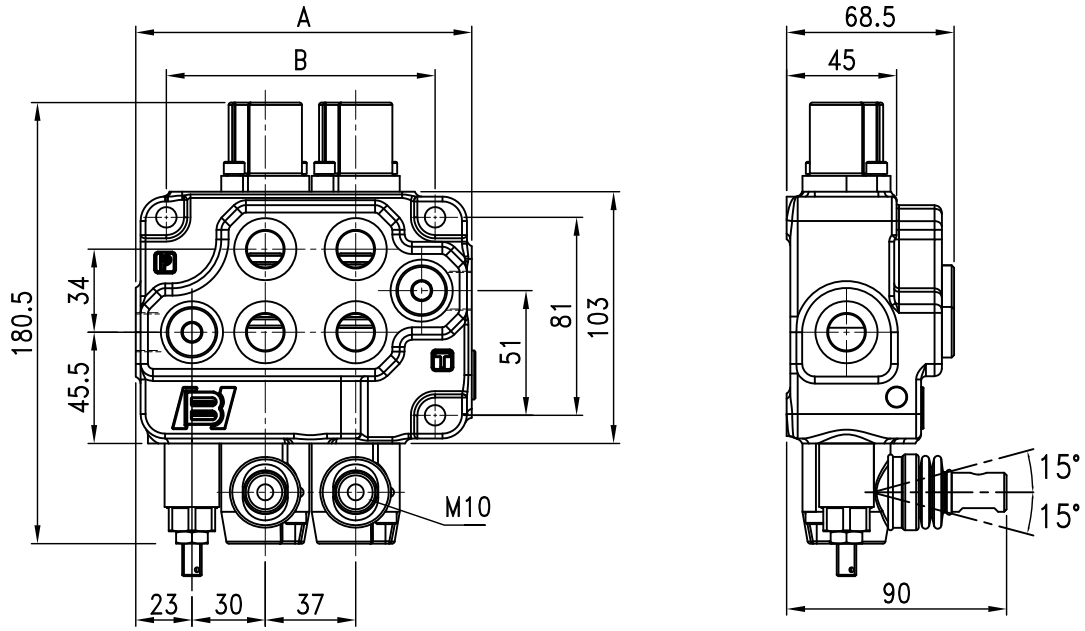
MM060

HYDRAULIC PRODUCT

SYSTEM OF FLUID POWER

Monoblock Directional Control Valves
MM-060

DIMENSIONS



TYPE	DIMENSIONS	
	A	B
MM-060/1	100.5	73
MM-060/2	137.5	110
MM-060/3	174.5	147

TYPE	DIMENSIONS	
	A	B
MM-060/4	211.5	184
MM-060/5	248.5	221
MM-060/6	285.5	258

unit : mm

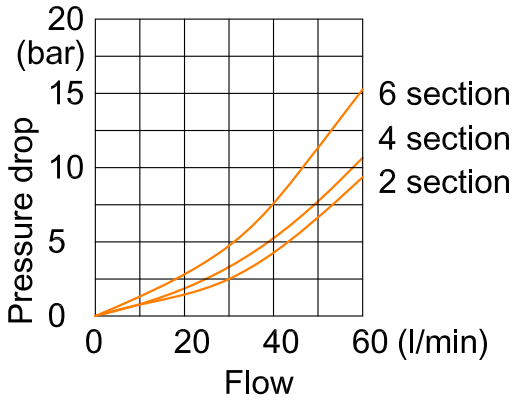
PERFORMANCE

Nominal flow rating : 45 l/min
Operating pressure (Max.) : parallel circuit : 315 bar
series circuit : 210 bar
Back pressure (Max.): 25 bar (on outlet port T)
Oil leaks from A (B) to T: 3 c.c/min at 100 bar (1450 psi)
Fluid: best use mineral oil with viscosity ranging between 15 to 75 mm^2/s
Fluid temperature : Min. -20°C , Max 80°C ,with NBR (BUNA-N) gaskets
Min. -20°C ,Max 100°C ,with FPM (VITON) seals gaskets

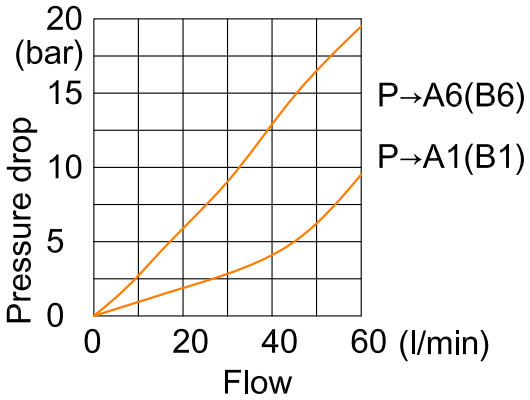
MM-060

RATING DIAGRAM

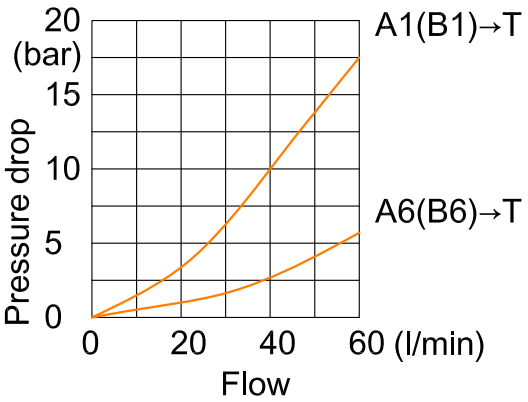
Open centre
From side inlet to side outlet

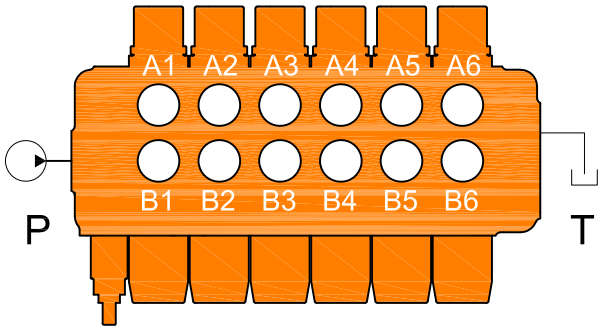


Inlet to work port
From side inlet to A port (spool in position 1) or B port (spool in position 2)



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





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ORDERING CODE NUMBER EXAMPLE

1st section | 2nd section

MM-060/ 1 / S(1-80) / PC / A1 L1 S / A2 L2 E1 / OP / BSP / ECK1/2-CS01

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

1.Body kits page.26

Type	Description
1	Parallel, 1 sections.
1C	Parallel, 1 section, carry-over type, no need for carry-over plug (P.26).
2	Parallel, 2 sections.
2C	Parallel, 2 sections, carry-over type, no need for carry-over plug (P.26).
3	Parallel, 3 sections.
4	Parallel, 4 sections.
5	Parallel, 5 sections.
6	Parallel, 6 sections.

2.Inlet main relief valve page.27

Type	Description
NR	Relief valve blanking plug.
1-80	Range 40 to 80 bar/ 290 to 1160 psi. standard setting 80 bar / 1150psi.
2-120	Range 63 to 200 bar/ 900 to 2900 psi. standard setting 120 bar / 1750psi.
3-220	Range 160 to 315 bar/ 2300 to 4600 psi. standard setting 220 bar / 3200psi.

3.Hydraulic circuit page.28

Type	Description
PC	Parallel circuit.

5."B" side option page.29

Type	Description
L1	Stansdard lever aluminum pivot box. with neoprene gatier.
L1A	Standard lever with an extra screw to adjust either side of spool stroke.
L2	Without lever with L2 dust cover.
L3	joystick lever(+axis) with left fulcrum.
L4	Standard lever set as L1A, able to adjust both side of spool stroke.

5.Spool options page.30

Type	Description
A1	Double acting, 3 positions with A and B closed in neutral position.
A1-3	As Type A1, with flow rate suggested between 15 - 30 l/min.
A1-4	As Type A1, with flow rate suggested between 0 - 15 l/min.
A2	Double acting, 3 positions with A and B open to tank in neutral position.
A3	Single acting on A, 3positions, B plugged requires G3/8 plug.
A4	Double acting, 3 positions with A open to tank in neutral position.
A5	Double acting, 3 positions with B open to tank in neutral position.
A6	Double acting, 3 positions with A and B partially open to tank in neutral position.

6."A" side spool positioners page.31

Type	Description
S	Spring return to neutral.
SA	Adjust single side of spool stroke. Spring return to neutral.
P3	On/off pneumatic control. Min. pressure 5 bar(70 psi) Max. pressure 10 bar (140 psi).
D1R	Detent in positions1.Spring return to neutral.
D2R	Detent in positions2.Spring return to neutral.
D12R	Detent in positions 1 or 2.Spring return to neutral.
D3	Detent in three positions.
LH1	External hydraulic pilot to position 1. Spring return to neutral.
LH2	external hydraulic pilot to position 2. Spring return to neutral.
LH3	external hydraulic pilot to position 1 and 2. Spring return to neutral.
E1	On/off electro-hydraulic control with extrnal pilot and solenoid function to position 1.Spring return to neutral.
E2	On/off electro-hydraulic control with extrnal pilot and solenoid function to position 2.Spring return to neutral.

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ORDERING CODE NUMBER EXAMPLE

6."A" side spool positioners page.31

Type	Description
E3	On/off electro-hydraulic control with extrnal pilot and solenoid function to position 1 and 2.Spring return to neutral.
EP1	On/off electro-pneumatic control with extrnal pilot and solenoid function to position 1. Spring return to neutral.
EP2	On/off electro-pneumatic control with extrnal pilot and solenoid function to position 2. Spring return to neutral.
EP3	On/off electro-pneumatic control with extrnal pilot and solenoid function to position 1 and 2. Spring return to neutral.
SW1	With spring return in neutral position, operation signalling in position 1 ,prearranged for centralized microswitch control.
SW2	With spring return in neutral position, operation signalling in position 2 ,prearranged for centralized microswitch control.
SW3	With spring return in neutral position, operation signalling in position 1 and 2, prearranged for centralized microswitch control.
PP	Proportional hydraulic control.

7.Outlet port options page.35

Type	Description
OP	Open centre plug.
OPC	Open centre with check valves.
CP	Closed centre plug.
COP	Carry-over plug.
COPC	Carry-over plug with check valves.

8.Port threads option page.36

Type	Description
BSP	G.
SAE	UN-UNF.

9.EL control pilot kit page.37

Type	Description
ECK1/1-6	Compele kit for connection to the main circuit.
ECKS/1-6	Manifold kit to feed low pressure circuit, with X pilot and Y drain.

10.Coli series page.38

Type	Description
CS01	Connection:DIN EN 175 301-803-A/ISO 4400 (43650) Voltage: 12-24VDC
CS02	Connection:Lead wires Voltage: 12-24VDC
CS03	Connection:AMP Junior Voltage: 12-24VDC
CS04	Connection:Kostal M24x1 Voltage: 12-24VDC
EP	Connection:lead wires connection Voltage : 12-24VDC ("A" side has to be used with EP)

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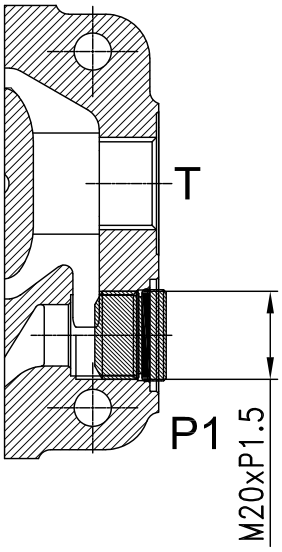
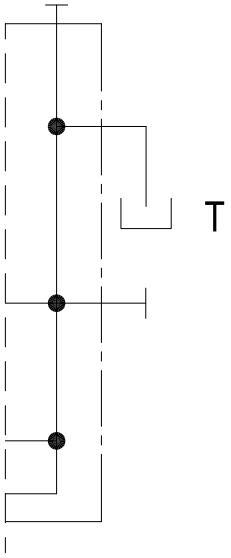
1.Body kits option

Comparison between the standard and carry-over section

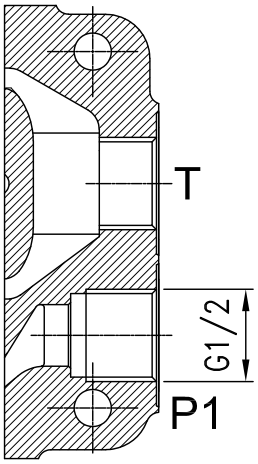
standard section

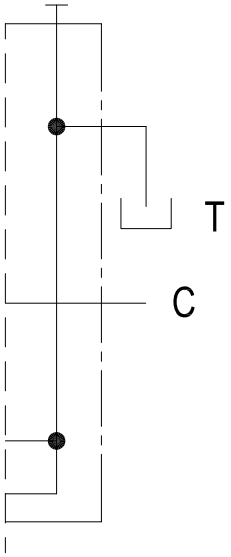




standard section
P1 open to tank
M20xP1.5 plug

carry-over section





P1 not open to tank
No need for carry-over plug
This option only for
MM060/1 and /2.

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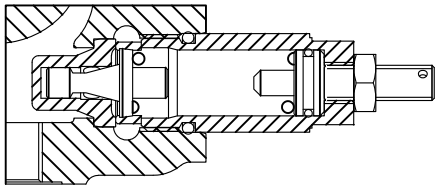
2.Inlet main relief valve

Main relief valve

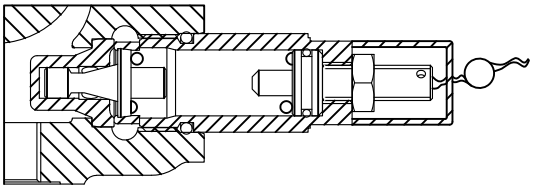
S (1 - 80)

1. Adjustment type.(S , L , NR)
2. Spring type.
3. Standard pressure setting in bar.

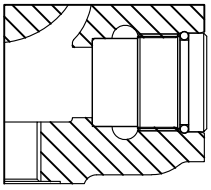
Spring Type	01	02	03
Maximum	80	200	315
Minimum	40	63	160
Standard Setting	80	120	220



S : with screw adjustment



L : valve set and locked



NR : Relief valve blanking plug

A fixed operating pressure can be customized as required.

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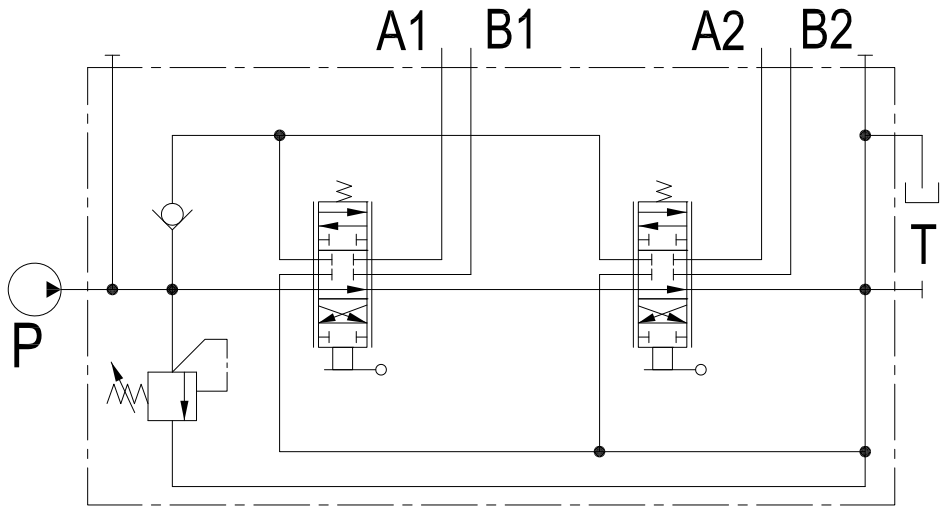
3.Hydraulic circuit

Parallel circuit



PC

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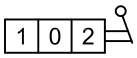
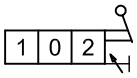
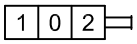
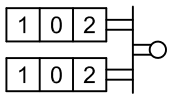
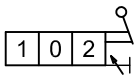
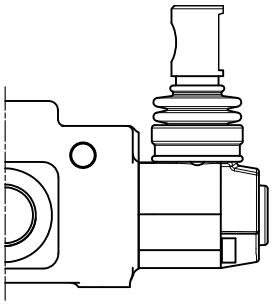
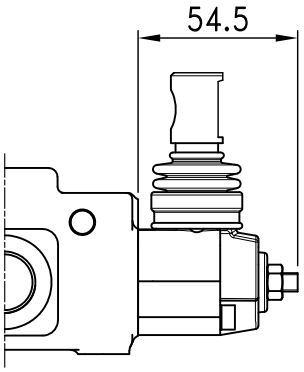
4."B" side option

Spool control B port side

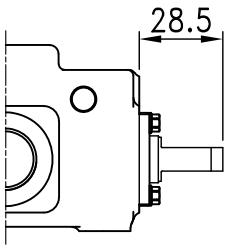
Type	Scheme	Description	Type	Scheme	Description
L1		Standard lever aluminum pivot box with neoprene gaiter.	L1A		Standard lever with an extra screw to adjust either side of spool stroke
L2		Without lever with L2 dust cover.	L3		"L3 of 4 Type" joystick lever(+ axis) with left fulcrum.
L4		Standard lever set as L1A, able to adjust both side of spool stroke			



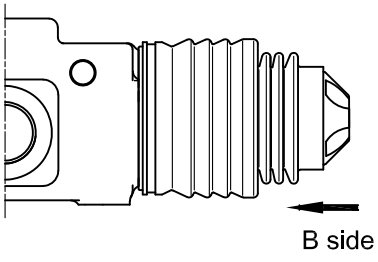
L1



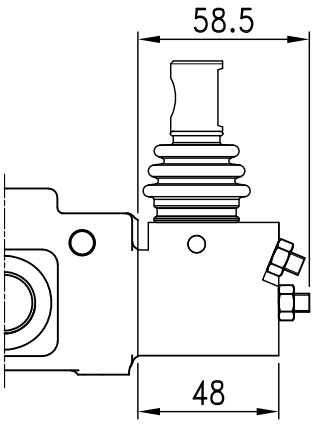
L1A



L2



L3



L4

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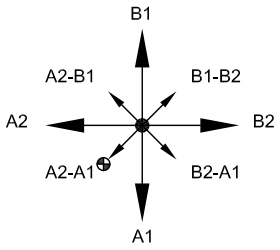
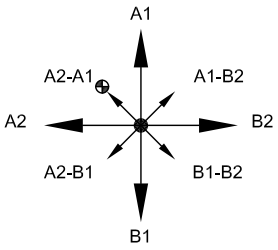
L3-1 View from B side L3-3*

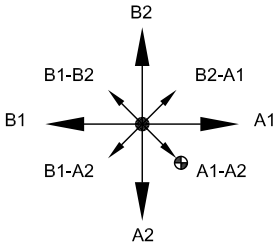


Bottom fulcrum

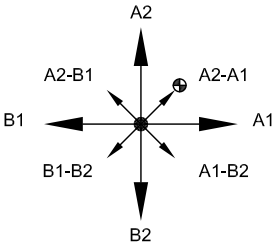


Top fulcrum

L3-2 View from B side L3-4*



Bottom fulcrum

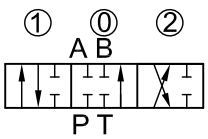
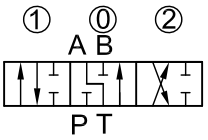
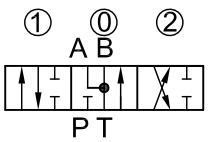
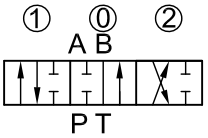
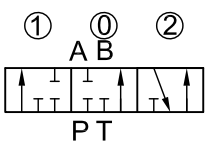
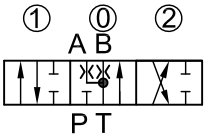


Top fulcrum

Note: * Configurations not available with service port valve.

5.Spool option

Spool

Type	Scheme	Type	Scheme
A1 A1-3 A1-4		A4	
A2		A5	
A3		A6	

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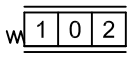
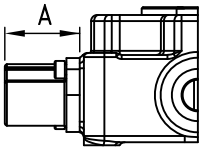
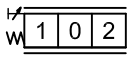
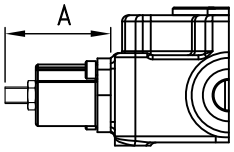
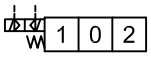
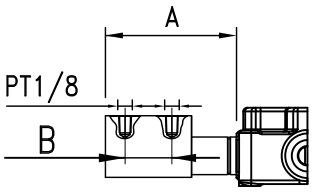
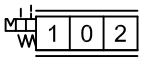
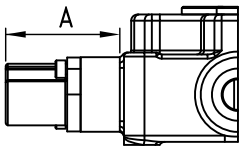
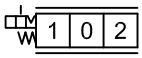
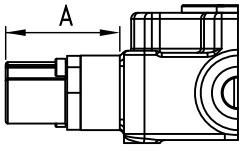
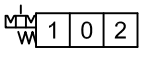
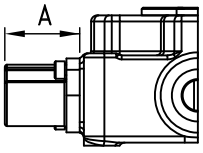
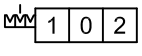
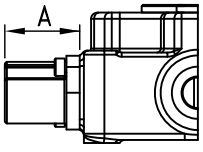
6."A" side spool positioners

Spool control A port side

Type	Scheme	Description	Dimensions	
S		S = Spring return to neutral.		37 (1.46)
SA		SA = Spring return to neutral. Adjust single side of spool stroke.		52(MAX) (2.05)
P3		P3 = On/off pneumatic control. Min. pressure 5 bar(70psi) Max. pressure 10 bar(140psi)		A 106.5 (4.19) B 38 (1.5)
D1R		D1R = Detent in positions1. Spring return to neutral.		68 (2.68)
D2R		D2R = Detent in position2. Spring return to neutral.		68 (2.68)
D12R		D12R = Detent in positions1 or 2. Spring return to neutral.		37 (1.46)
D3		D3 = Detent in three positions.		37 (1.46)

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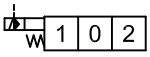
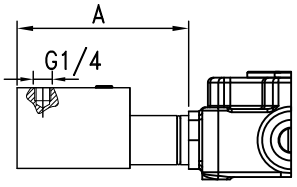
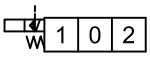
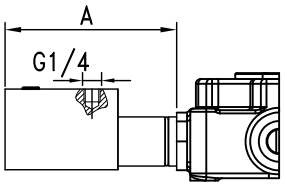
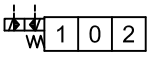
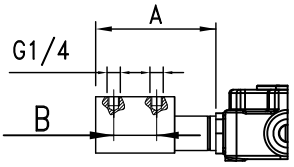
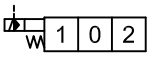
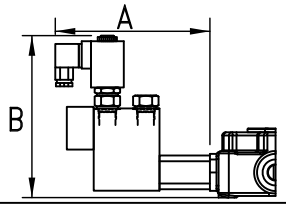
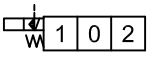
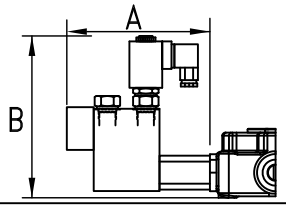
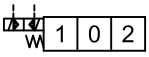
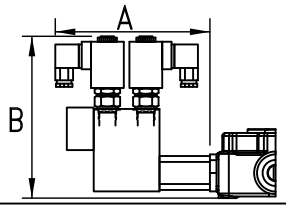
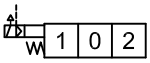
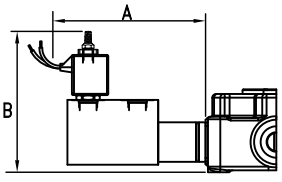
6."A" side spool positioners

Spool control A port side

Type	Scheme	Description	Dimensions	
LH1		LH1 = External hydraulic pilot to position 1. Spring return to neutral.		106.5 (4.19)
LH2		LH2 = External hydraulic pilot to position 2. Spring return to neutral.		106.5 (4.19)
LH3		LH3 = External hydraulic pilot to position 1 and 2. Spring return to neutral.		A 106.5 (4.19) B 38 (1.5)
E1		E1=On/off electro-hydraulic control with extrnal pilot and solenoid function to position 1. Spring centered. Voltage:12VDC,24VDC		A 150 (5.90) B 150 (5.90)
E2		E2=On/off electro-hydraulic control with extrnal pilot and solenoid function to position 2. Spring centered. Voltage:12VDC,24VDC		A 140 (5.51) B 150 (5.90)
E3		E3=On/off electro-hydraulic control with extrnal pilot and solenoid function to position 1 and 2. Spring centered. Voltage:12VDC,24VDC		A 150 (5.90) B 150 (5.90)
EP1		EP1=On/off electro-pneumatic control with extrnal pilot and solenoid function to position 1. Spring centered. Voltage:12VDC,24VDC		A 120 (4.72) B 110 (4.33)

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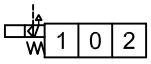
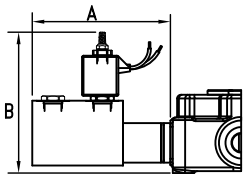
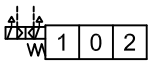
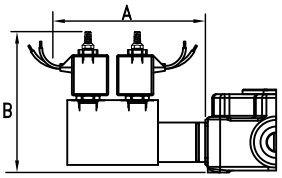
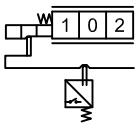
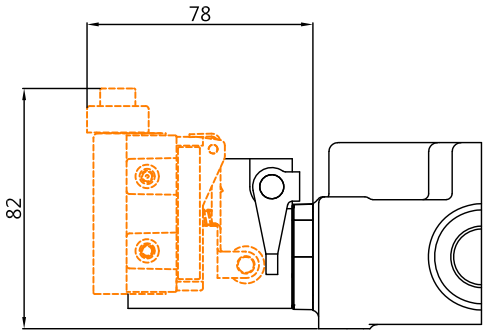
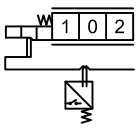
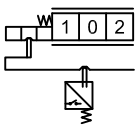
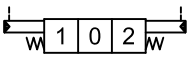
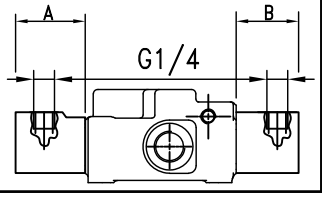
6."A" side spool positioners

Spool control A port side

Type	Scheme	Description	Dimensions	
EP2		EP2=On/off electro-pneumatic control with extrnal pilot and solenoid function to position 2. Spring centered. Voltage:12VDC,24VDC		A 110 (4.33) B 110 (4.33)
EP3		EP3=On/off electro-pneumatic control with extrnal pilot and solenoid function to position 1 and 2. Spring centered. Voltage:12VDC,24VDC		A 120 (4.72) B 110 (4.33)

Type	Scheme	Description	Dimensions
SW1		SW1=With spring return in neutral position,operation signalling in position 1 ,prearranged for centralized microswitch control	
SW2		SW2=With spring return in neutral position,operation signalling in position 2 ,prearranged for centralized microswitch control	
SW3		SW3=With spring return in neutral position,operation signalling in position 1 and 2 ,prearranged for centralized microswitch control	

Spool control A and B-port side

PP		PP = Proportional hydraulic control.		A 47.5 (1.87) B 42.5 (1.67)

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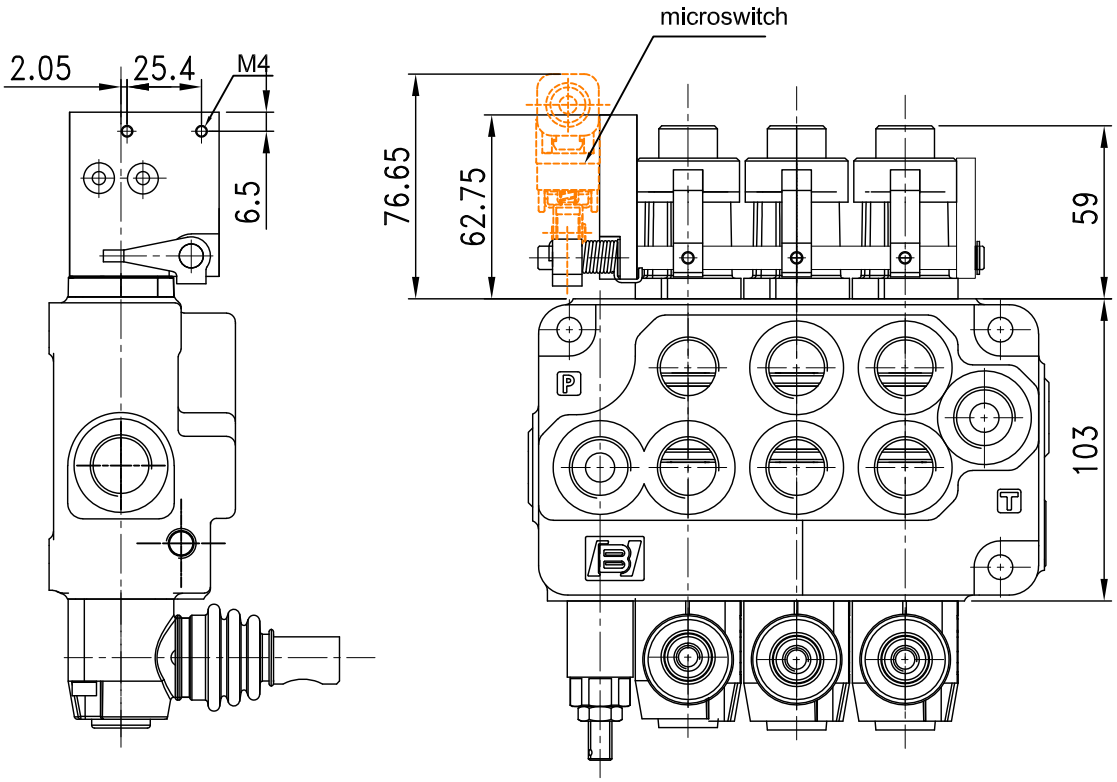
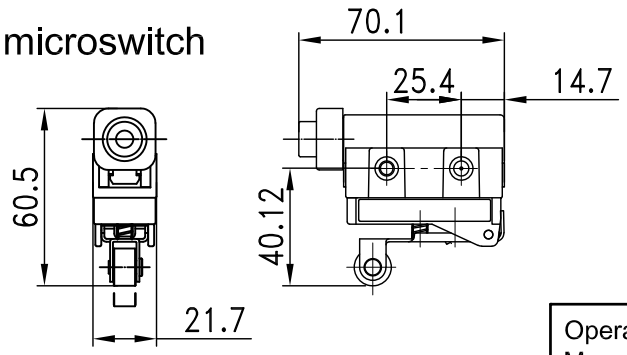
6."A" side spool positioners

Spool control A port side

Centralized control for microswich

Assembly example of a 3 section directional control valve, with SW kit.





Operating features:
Max. current / voltage : 5 A / 250 VAC
0.25 A / 230VDC
Weather protection: IP67
Mechanical durability: 10,000,000 operations min.

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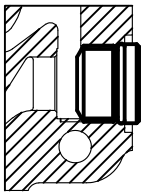
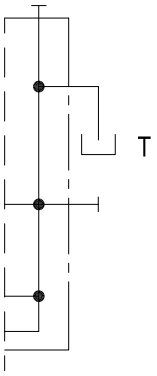
7.Outlet port options

Plug option

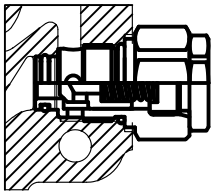
Open centre plug



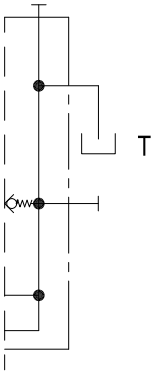
OP



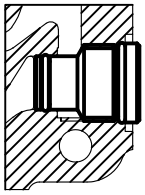
Open centre
with check valves



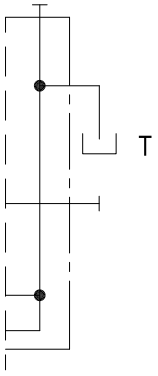
OPC



Closed centre plug



CP



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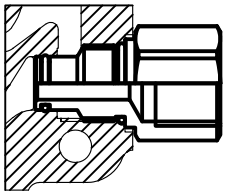
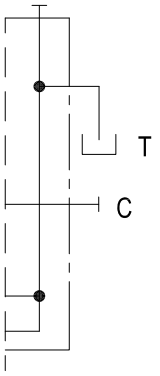
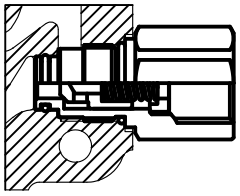
Carry-over plug



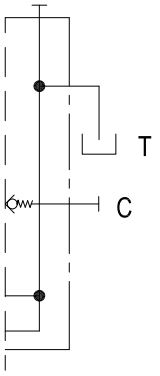
COP



Carry-over plug with check valves



COPC



8.Port threads option

Port threads

PORT	BSP	SAE
P	G1/2	3/4-16UNF
A and B port	G1/2	9/16-18UNF
T	G1/2	3/4-16UNF

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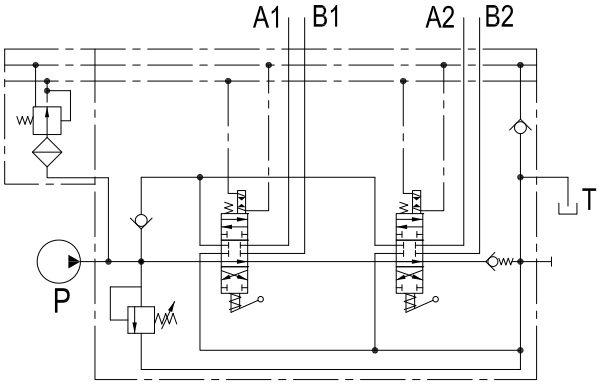
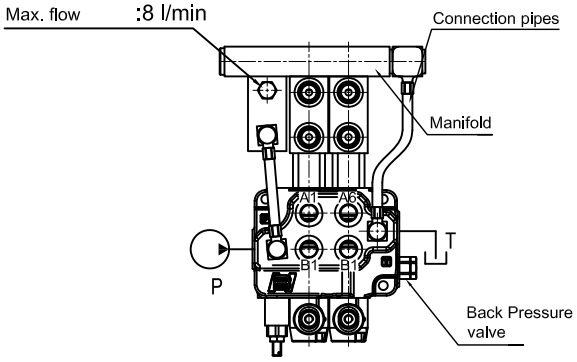
9.EL control pilot kit

EL control pilot kit



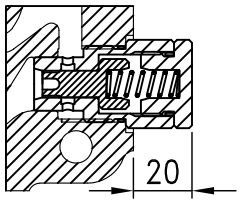
Pressure reducing valve
Outlet pressure :20Bbar/290psi
Max. flow :8 l/min



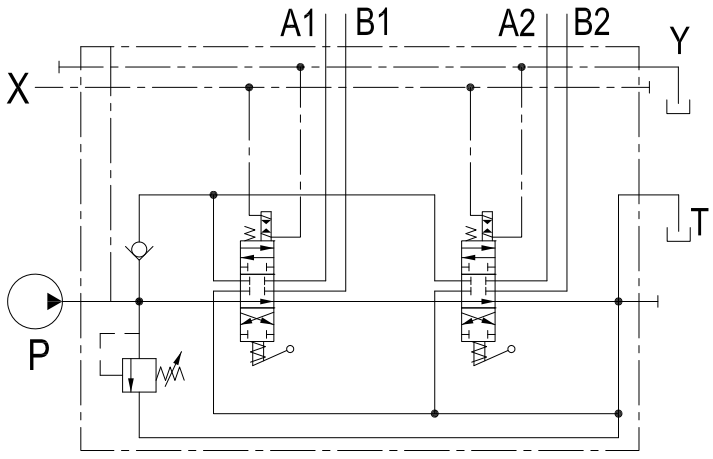
(Outlet port options should be OPC or COPC)
(Back Pressure valve works presssure: 10bar)

Compele kit for connection to the main circuit.

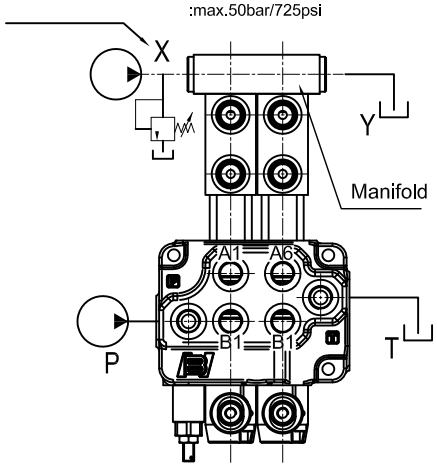
ECK1/1-6



Back Pressure valve
Used for electro-hydraulic control.



Poerating features
Pilot pressure..... :min.10bar/145psi
:max.50bar/725psi



Manifold kit to feed low pressure circuit, with X pilot and Y drain.

ECKS/1-6

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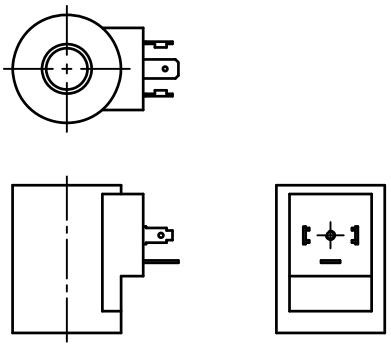
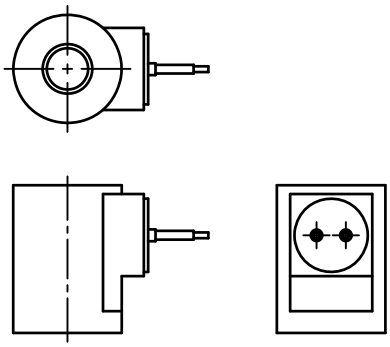
10.Coil Series

Coil series option



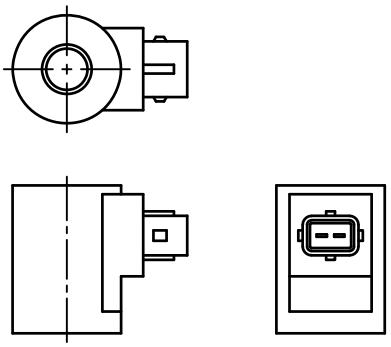
Type : CS01

Connection:DIN EN 175 301-803-A/ISO 4400 (43650)
Voltage: 12-24VDC



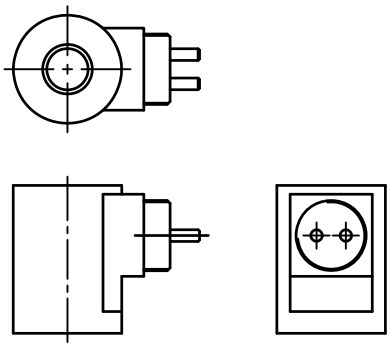
Type : CS02

Connection:Lead wires
Voltage: 12-24VDC



Type : CS03

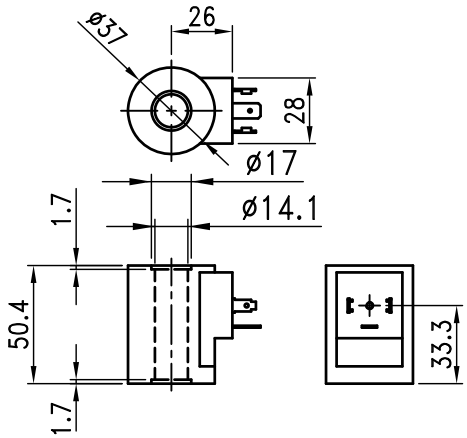
Connection:AMP Junior
Voltage: 12-24VDC

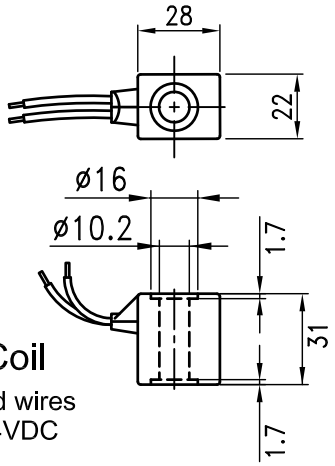


Type : CS04

Connection:Kostal M24x1
Voltage: 12-24VDC

DIMENSIONS





Type : EP Coil

Connection:Lead wires
Voltage: 12-24VDC