



Counterbalance valves

Index

Hydraulic diagram	Type	Description	Maximum flow up		Maximum pressure		Page
			l/min	US gpm	bar	psi	
	VOSLP/CC	Single counterbalance valves, external pilot operated type, line mounting and suitable for closed centre, cartridge construction	100	26	350	5100	39
	VOSLP/SC/CC	Single counterbalance valves, external pilot operated type, line mounting for closed centre	180	48			
	CC	Single counterbalance valves for closed centre, line mounting, not affected by pressure	90	24			

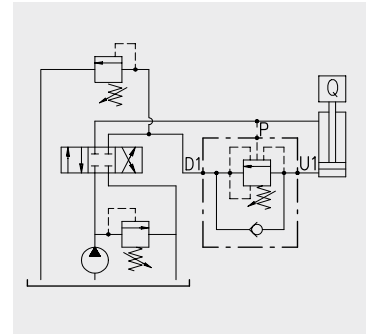
Operation

The oil flow is allowed from D1 to U1 and is stopped in the opposite way (from U1 to D1) up to the spring setting value. Free oil flow from U1 to D1 is strictly possible when the pilot pressure in P is strong enough to pilot the valve poppet.

Use the following formula to assert the applicable pilot pressure:
(valve setting - load pressure) ÷ pilot ratio = pilot pressure

For example: if your pilot ratio is 1:4, your setting pressure is 250 bar (3600 psi) and your load pressure is 130 bar (430 psi) then you will need 30 bar (430 psi) pilot pressure in order to displace the load. [(250 bar-3600 psi - 130 bar-1900 psi) ÷ 4 = 30 bar-430 psi].

Counterpressure in D1 may negatively affect the pilot pressure (1:1 ratio).



Performance

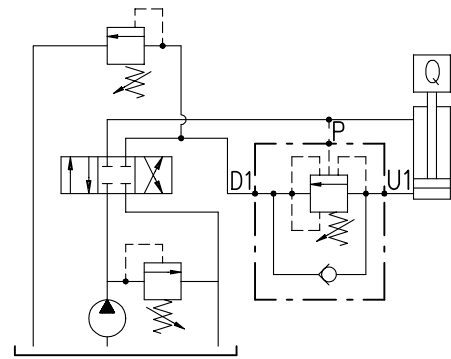
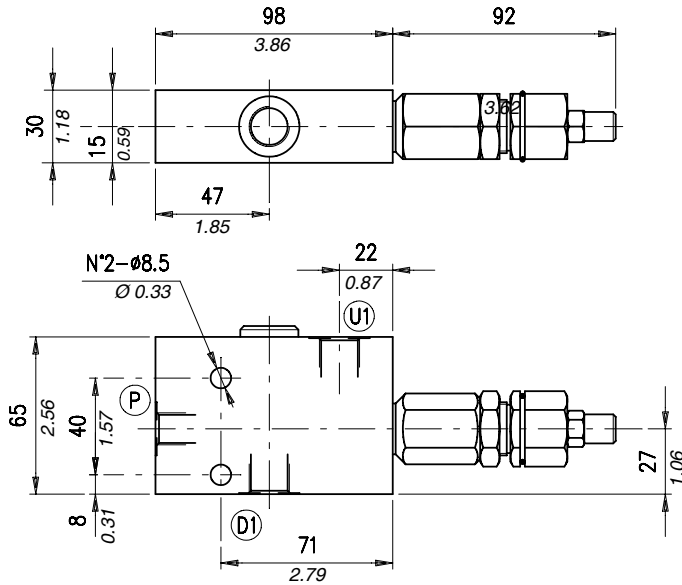
Body Valves

Type	Max. flow		Max. pressure		Application range with standard springs	Oil leakage from U1 to D1	Pilot ratio	Weight		
	l/min	US gpm	bar	psi				kg	lb	
VOSLP/CC 38	35	9.2	350	5100	5-210 bar-72.5÷725 psi (test setting: 170 bar-2500 psi at 5 l/min.-1.3 US gpm)	0,25 cm ³ /min -15x10 ⁻³ in ³ /min (5 drops) at 210 bar-3050 psi and 80% of the spring setting value with oil viscosity of 46 cSt.	1:4 (standard type) 1:3 (on request only)	0,75	1.65	
aluminium	1.49	3.28								
	steel									
VOSLP/CC 12	70	18						1:7 (standard type) 1:3 (on request only)	0,96	2.12
									aluminium	
1.86	4.10									
steel										
VOSLP/CC 34	100	26					1:4 (standard type) 1:3 (on request only)		1,75	3.86
									aluminium	
5.96	13.14									
steel										
VOSLP/SC/CC 38	40	10						1:7 (standard type) 1:3 (on request only)	0,70	1.54
			aluminium							
1.43	3.15									
steel										
VOSLP/SC/CC 12	75	19	1:4 (standard type) 1:3 (on request only)	1,00	2.20					
				aluminium						
2.08	4.58									
steel										
VOSLP/SC/CC 34	120	32		1:7 (standard type) 1:3 (on request only)	1,40	3.09				
					aluminium					
3.20	7.05									
steel										
VOSLP/SC/CC 100	180	48	1:4 (standard type) 1:3 (on request only)		2,78	6.13				
					aluminium					
6.60	14.55									
steel										

Cartridges

Type	Maximum flow		Maximum pressure		Application range with standard springs*	Oil leakage from 2 to 3	Pilot ratio	Weight		Cavities and tools
	l/min	US gpm	bar	psi				kg	lb	
CC10A	30	7.9	350	5100	5-220 bar-72.5÷3200 psi (test setting 180 bar-2600 psi at 5 l/min.-1.3 US gpm)	0,25 cm ³ /min -15x10 ⁻³ in ³ /min (5 drops) at 210 bar -3050 psi and 80% of the spring setting value with oil viscosity of 46 cSt.	1:4	0,28	0.62	SAE 10-3 page 171
CC12A	60	16			180-350 bar-2600÷5100 psi (test setting 250 bar-3600 psi at 5 l/min.-1.3 US gpm)			0,38	0.84	SAE 12-3 page 171
CC16A	90	24			300-700 bar-4350÷10150 psi (test setting 350 bar-5100 psi at 5 l/min.-1.3 US gpm)			0,72	1.59	SAE 16-3 page 171

Dimensions and hydraulic circuit

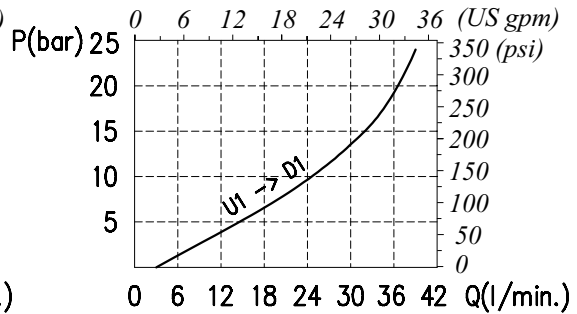
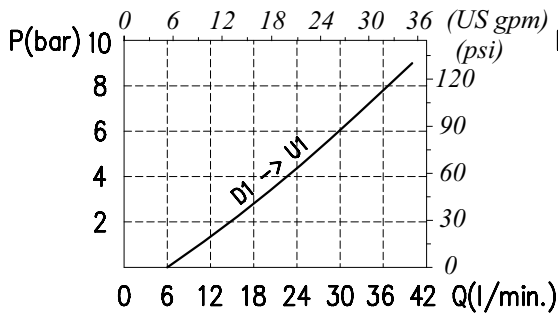


D1-U1	P
G 3/8	G 1/4

Rating diagrams

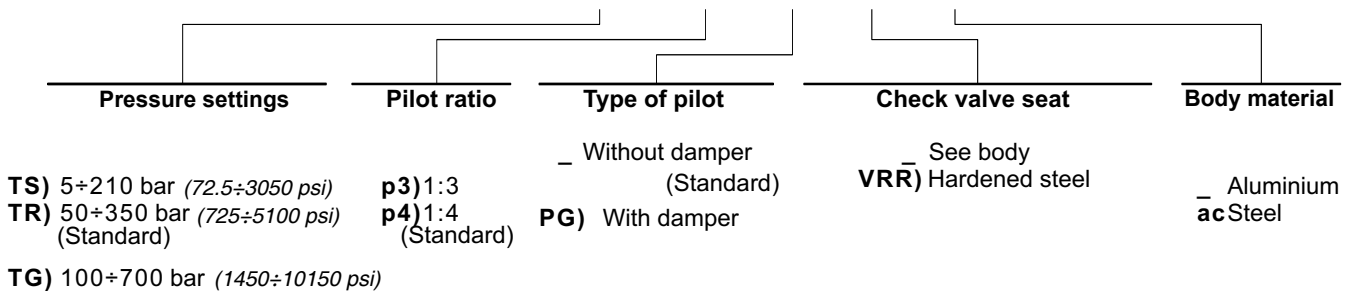
Typical pressure drop vs. flow characteristics

Typical pressure drop vs. flow characteristics

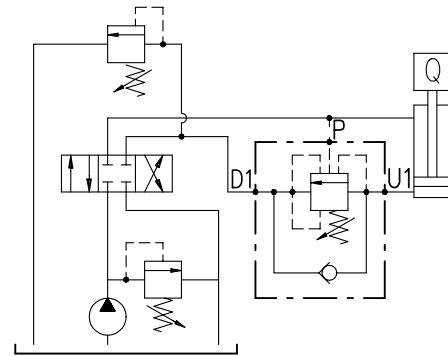
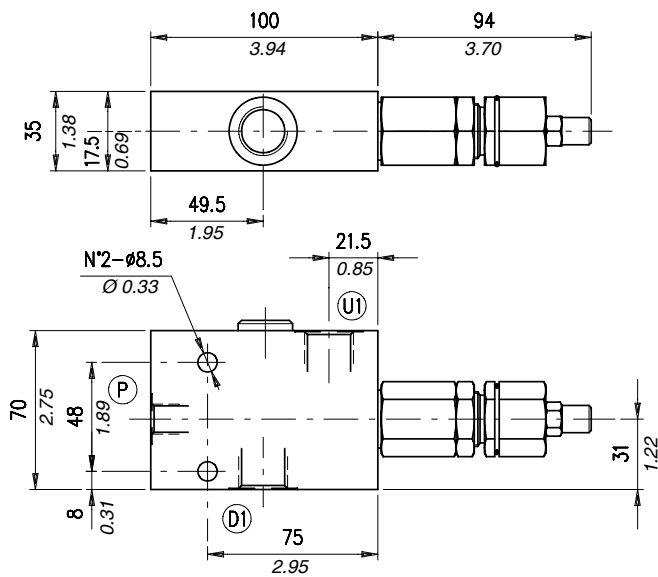


Order code

VOSLP / CC 38 / □ . S . □□ . □□ . □□ / □□



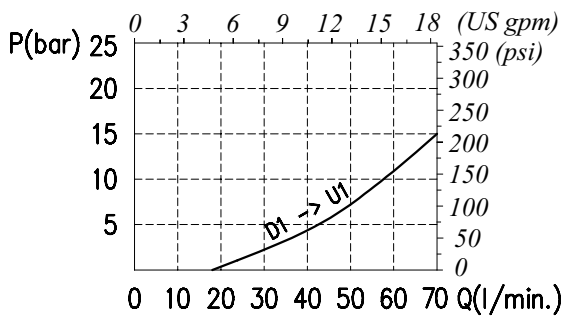
Dimensions and hydraulic circuit



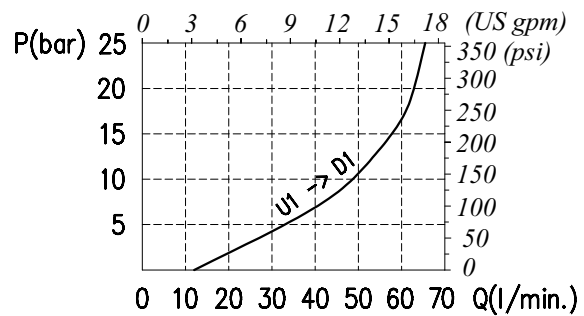
D1-U1	P
G 1/2	G 1/4

Rating diagrams

Typical pressure drop vs. flow characteristics



Typical pressure drop vs. flow characteristics



Order code

VOSLP / CC 12 / □ . S . □□ . □□ . □□ / □□

Pressure settings

Pilot ratio

Type of pilot

Check valve seat

Body material

TS) 5÷210 bar (72.5÷3050 psi)

TR) 50÷350 bar (725÷5100 psi)
(Standard)

TG) 100÷700 bar (1450÷10150 psi)

p3) 1:3

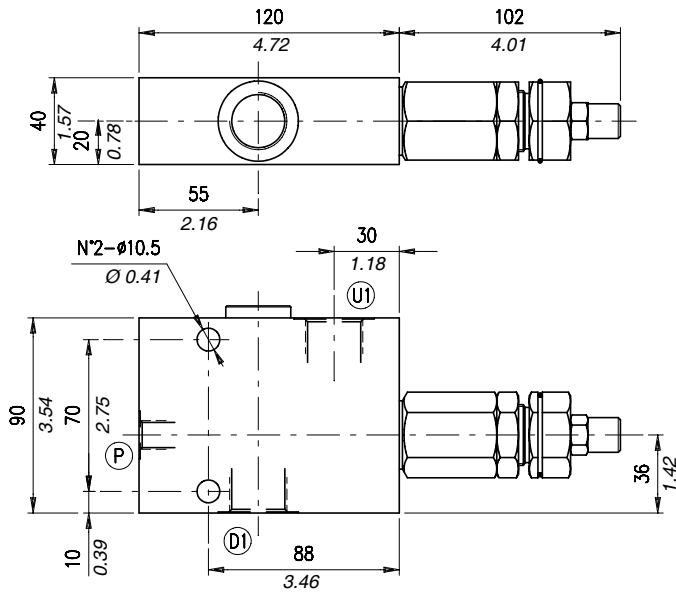
p7) 1:7
(Standard)

— Without damper
(Standard)
PG) With damper

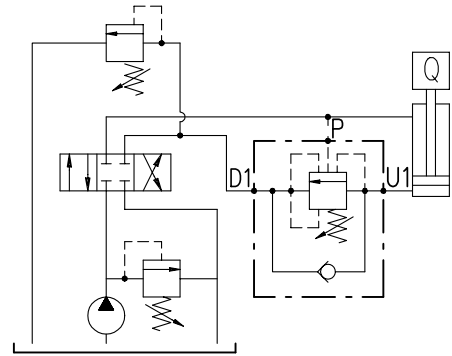
See body
VRR) Hardened steel

— Aluminium
ac Steel

Dimensions and hydraulic circuit

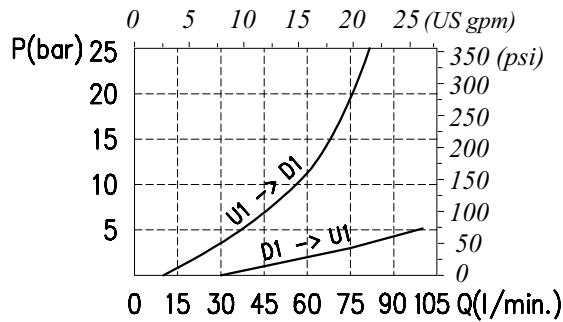


D1-U1	P
G 3/4	G 1/4



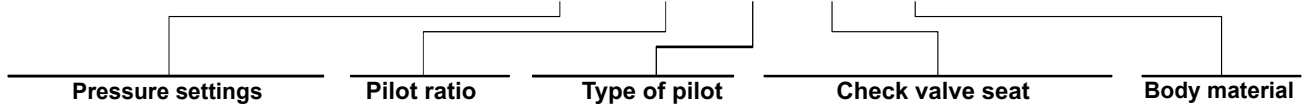
Rating diagrams

Typical pressure drop vs. flow characteristics



Order code

VOSLP/CC 34 / □ . S . □□ . □□ . □□ / □□



TS 5÷210 bar (72.5÷3050 psi)
TR 50÷350 bar (725÷5100 psi)
 (Standard)

p3 1:3
p7 1:7
 (Standard)

_ Without damper
 (Standard)
PG With damper

_ See body
VRR Hardened steel

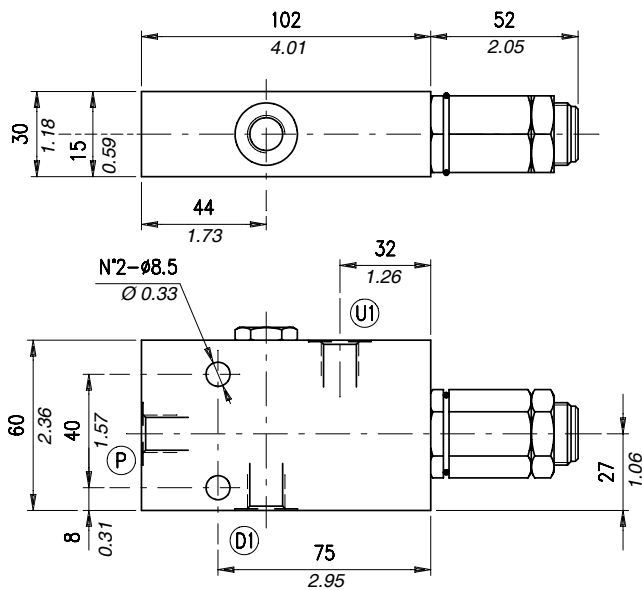
_ Aluminium
ac Steel

TG 100÷700 bar (1450÷10150 psi)

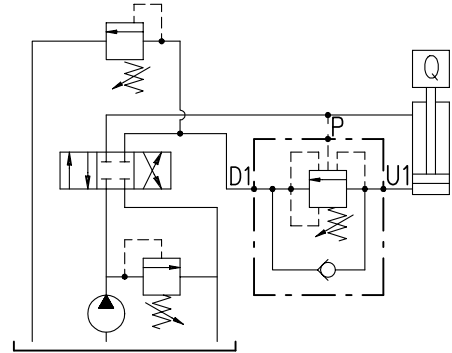
Type VOSLP/SC/CC 38

Single overcenter valve, external pilot operated type, line mounting and suitable for closed centre, cartridge construction

Dimensions and hydraulic circuit

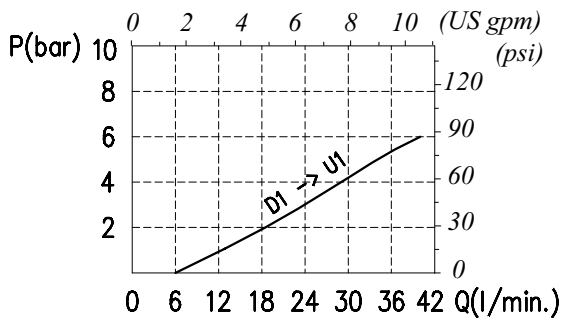


D1-U1	P
G 3/8	G 1/4

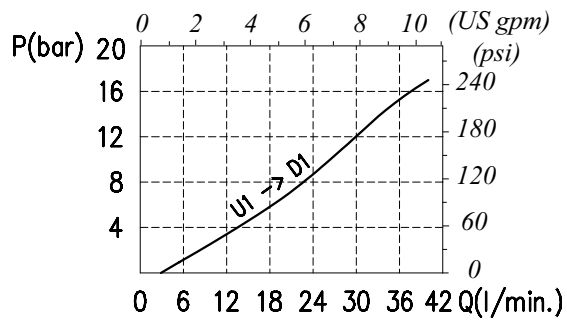


Rating diagrams

Typical pressure drop vs. flow characteristics

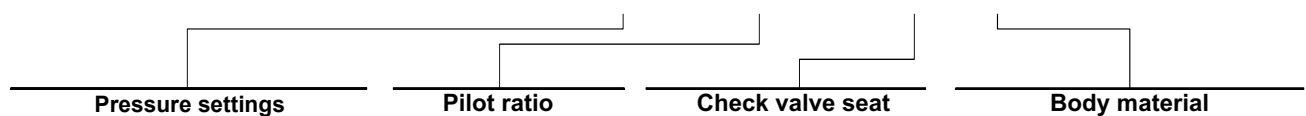


Typical pressure drop vs. flow characteristics



Order code

VOSLP / SC / CC 38 / □□ . S . □□ . PG . □□ / □□



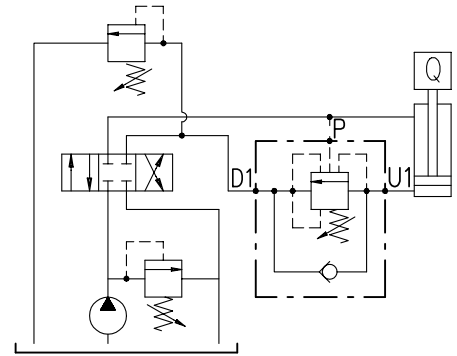
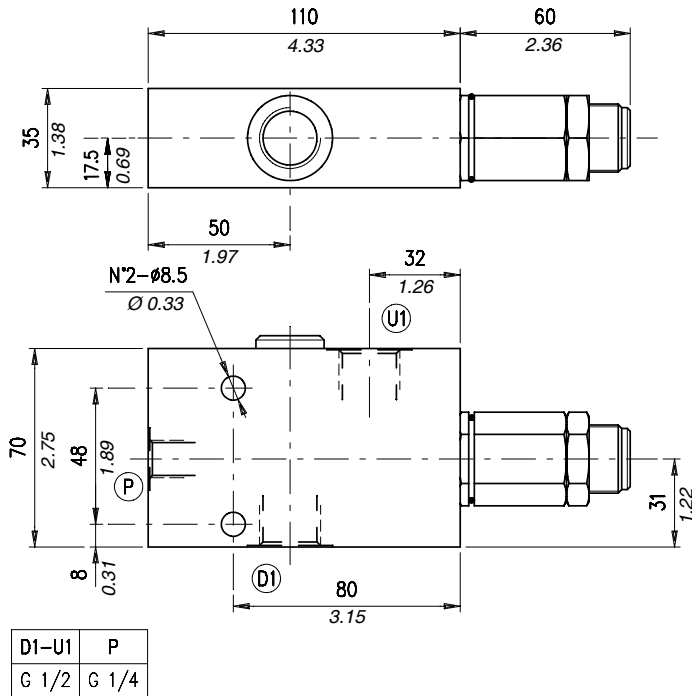
TS 5÷210 bar (72.5÷3050 psi)
TR 50÷350 bar (725÷5100 psi)
 (Standard)
TG 100÷700 bar (1450÷10150 psi)

p3 1:3
p4 1:4 (Standard)

See body
VRR Hardened steel

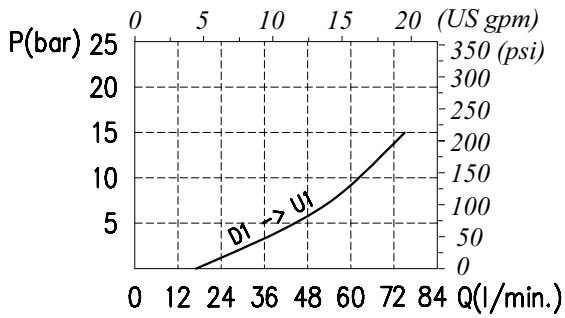
Aluminium
ac Steel

Dimensions and hydraulic circuit

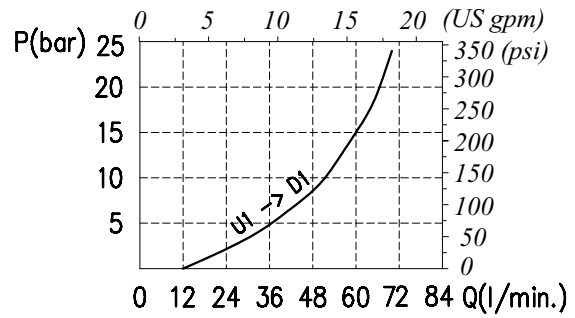


Rating diagrams

Typical pressure drop vs. flow characteristics

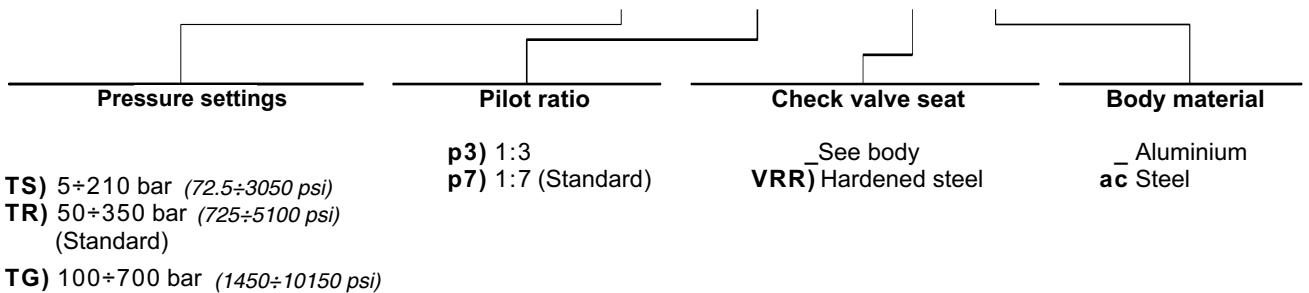


Typical pressure drop vs. flow characteristics



Order code

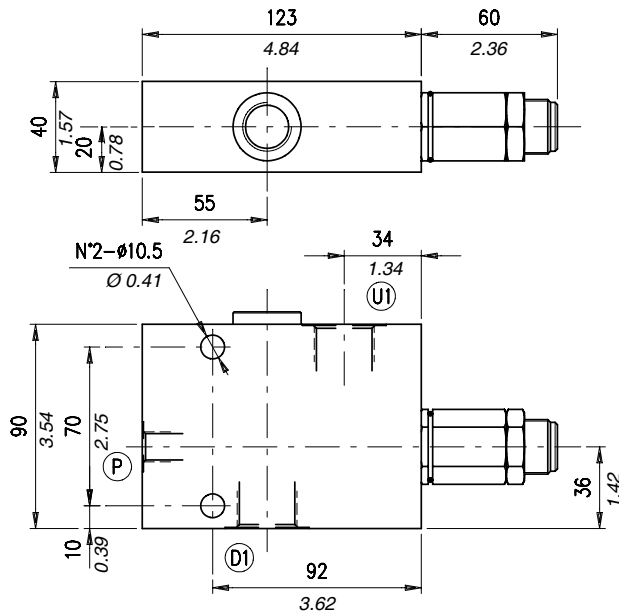
VOSLP / SC / CC 12 / □□ . S . □□ . PG . □□ / □□



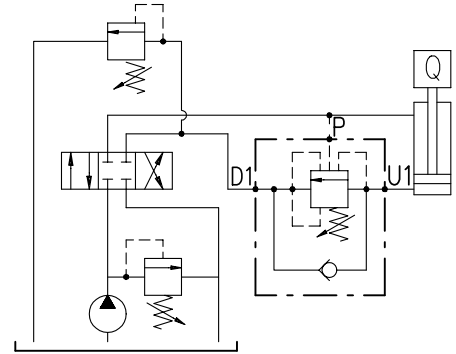
Type VOSLP/SC/CC 34

Single overcenter valve, external pilot operated type, line mounting for closed centre

Dimensions and hydraulic circuit

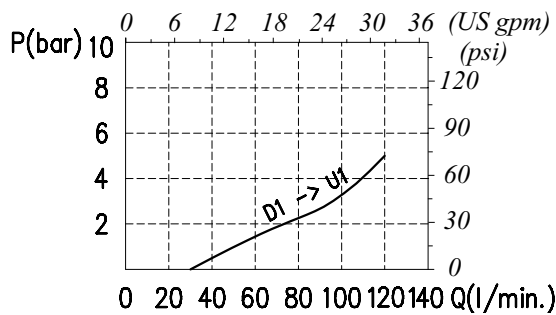


D1-U1	P
G 3/4	G 1/4

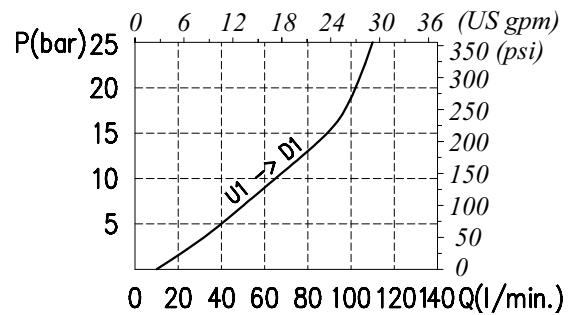


Rating diagrams

Typical pressure drop vs. flow characteristics



Typical pressure drop vs. flow characteristics



Order code

VOSLP / SC / CC 34 / □□ . S . □□ . PG . □□ / □□

Pressure settings

Pilot ratio

Check valve seat

Body material

TS) 0÷210 bar (0÷3050 psi)
TR) 50÷350 bar (725÷5100 psi)
(Standard)

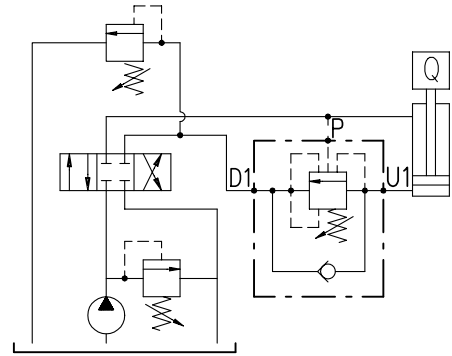
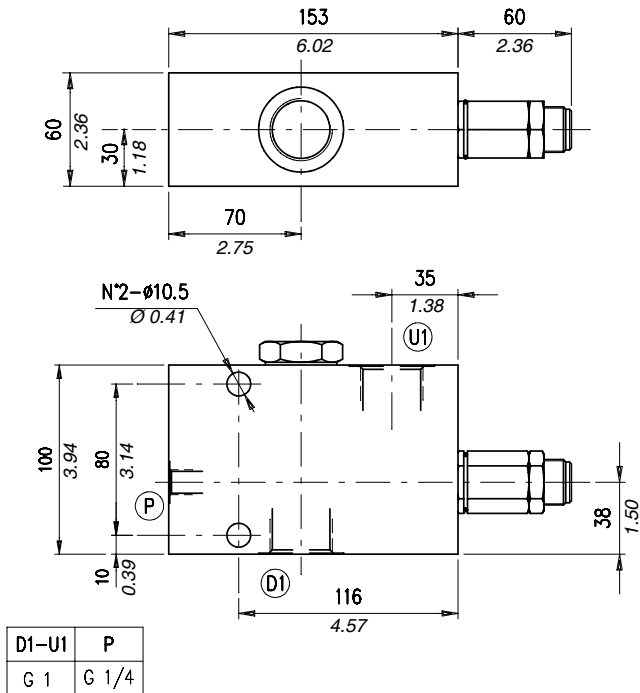
p3) 1:3
p7) 1:7 (Standard)

_See body
VRR) Hardened steel

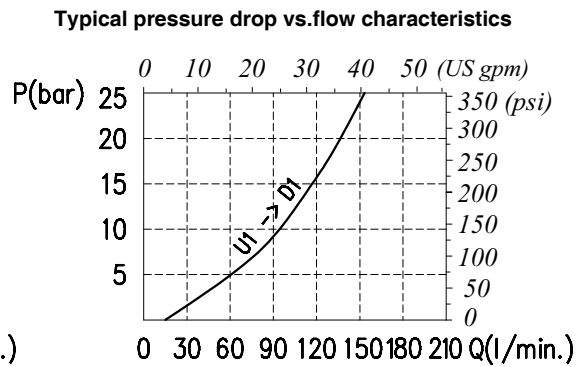
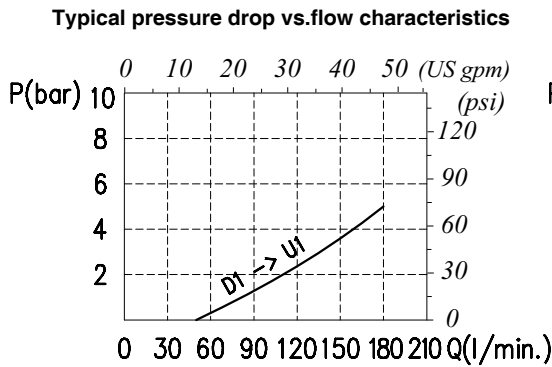
_ Aluminium
ac Steel

TG) 100÷700 bar (1450÷10150 psi)

Dimensions and hydraulic circuit

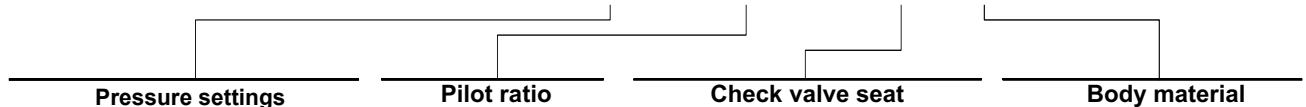


Rating diagrams



Order code

VOSLP/SC/CC 100 / □□ . S . □□ . PG . □□ / □□



TS 5÷210 bar (72.5÷3050 psi)
TR 50÷350 bar (725÷5100 psi)
 (Standard)

TG 100÷700 bar (1450÷10150 psi)

p3) 1:3
p7) 1:7 (Standard)

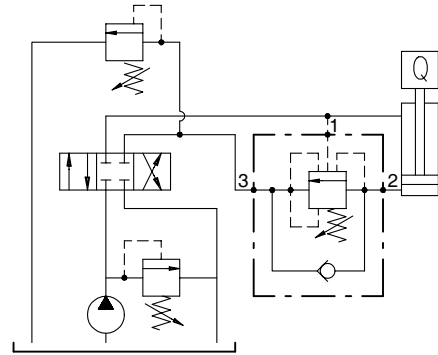
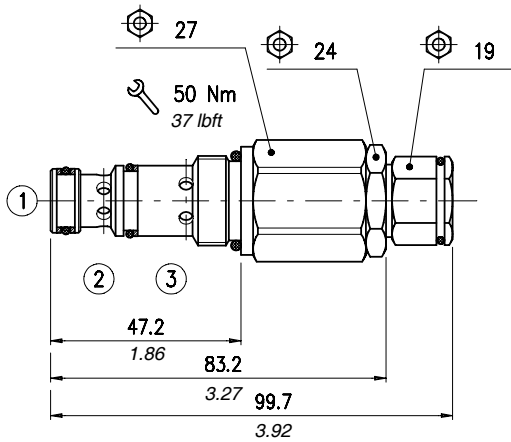
See body
VRR) Hardened steel

Aluminium
ac Steel

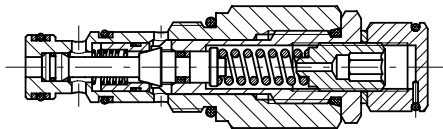
Type CC10A

Single overcenter valve, for closed centre, line mounting. Not affected by pressure

Dimensions and hydraulic circuit

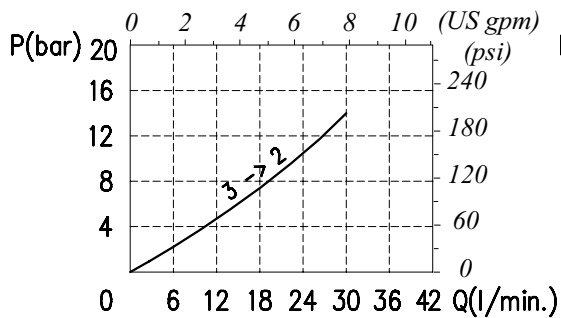


Section

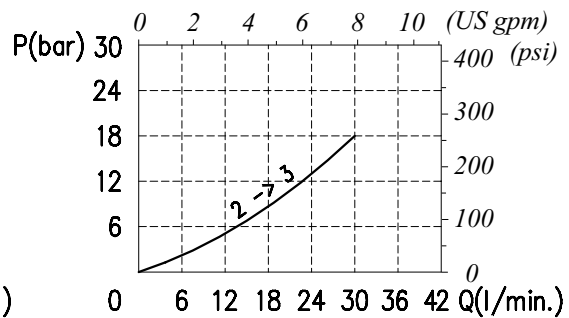


Rating diagrams

Typical pressure drop vs. flow characteristics

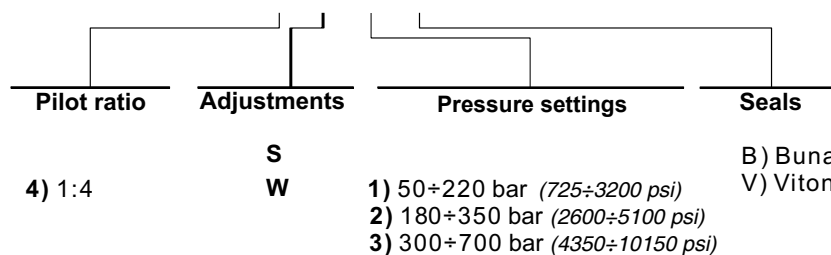


Typical pressure drop vs. flow characteristics

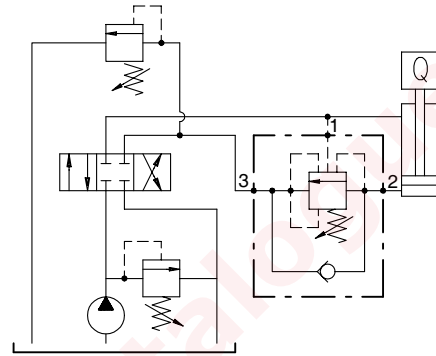
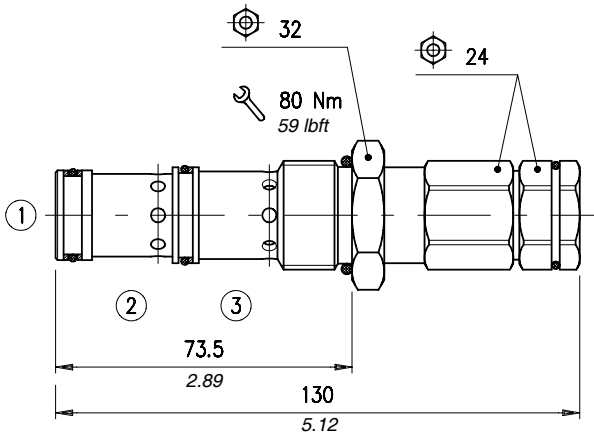


Order code

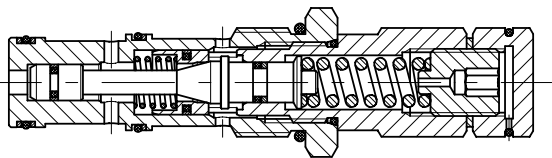
CC10A / □ - □ - □ - □



Dimensions and hydraulic circuit

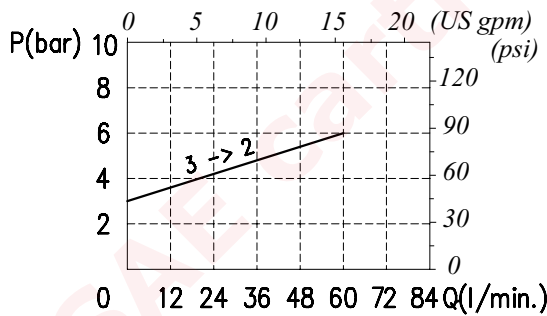


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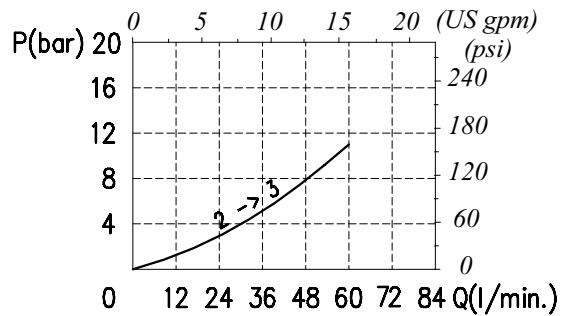


Rating diagrams

Typical pressure drop vs. flow characteristics

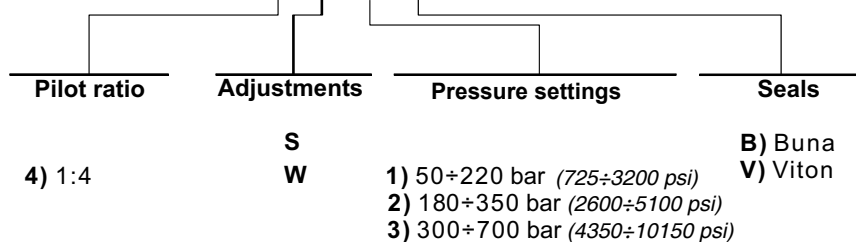


Typical pressure drop vs. flow characteristics

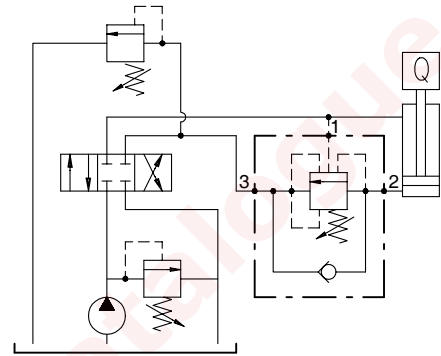
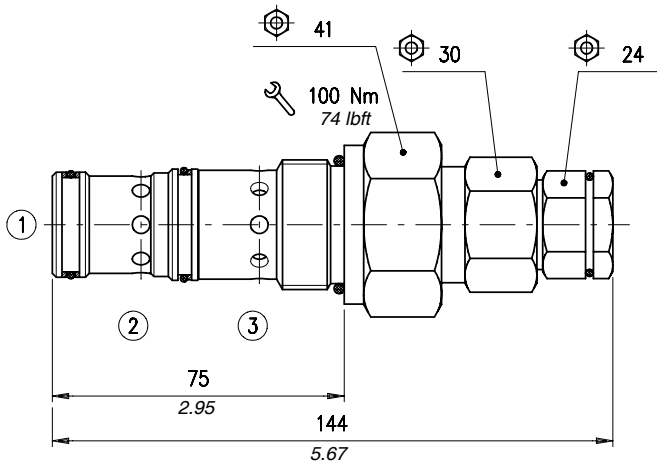


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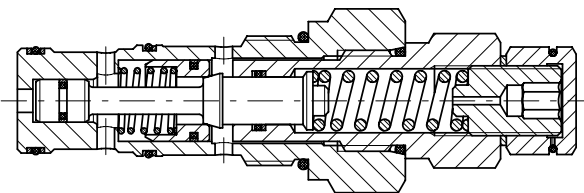
CC12A / □ - □ - □ - □



Dimensions and hydraulic circuit

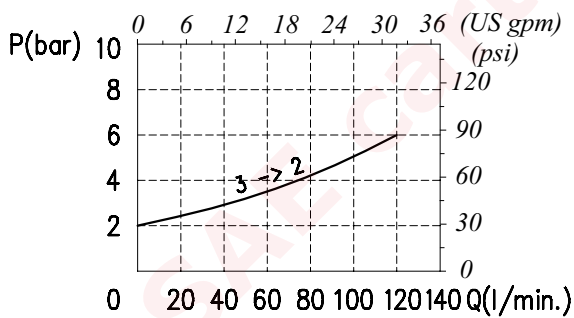


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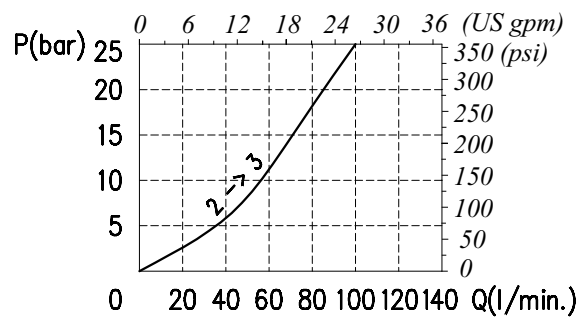


Rating diagrams

Typical pressure drop vs. flow characteristics

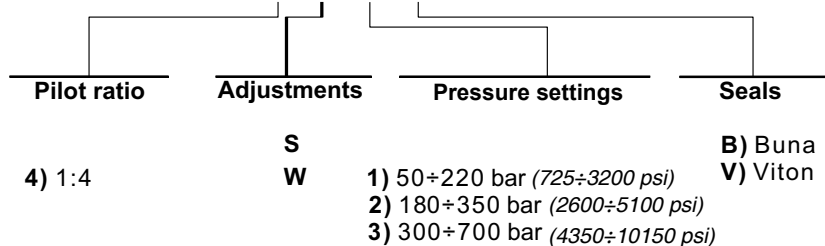


Typical pressure drop vs. flow characteristics

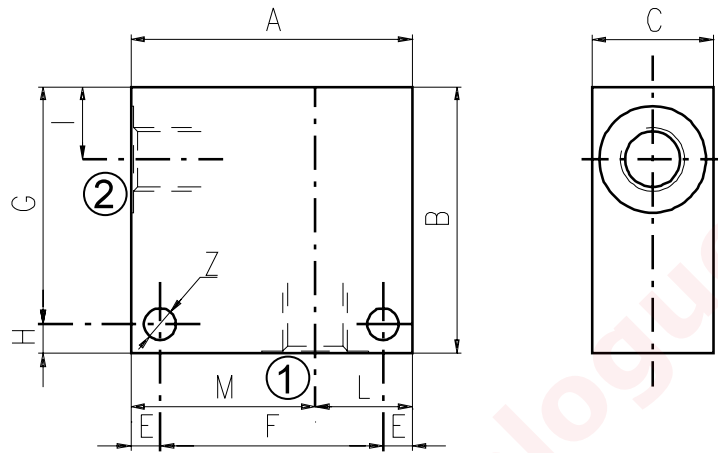


Order code

CC16A / □ - □ - □ - □



Material	Max. pressure	
	bar	psi
Alluminium	210	3050
Steel	350	5100

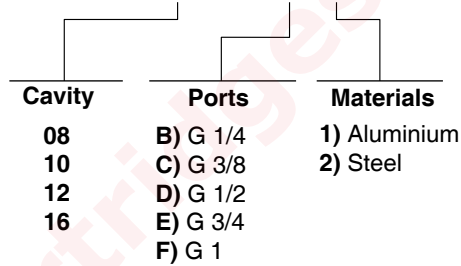


Cavity	Ports	A	B	C	E	F	G	H	I	L	M	Z	
SAE 8/2	G 1/2	mm	70	65	35	7	56	53	12	14,5	35	35	6,5
		in	2.75	2.56	1.38	0.27	2.20	2.09	0.47	0.57	1.38	1.38	0.25
	G 1/4	mm	50	50	30	6	38	44	6	14,8	20	30	6,5
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.25
	G 3/8	mm	50	50	30	6	38	44	6	14,8	20	30	6,5
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.25
	SAE6	mm	50	50	30	6	38	44	6	14,8	20	30	6,5
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.25
SAE 10/2	G 1/4	mm	60	60	35	6	48	54	6	18,8	25	35	6,5
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.25
	G 3/8	mm	60	60	35	6	48	54	6	18,8	25	35	6,5
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.25
	G 1/2	mm	60	60	35	6	48	54	6	18,8	25	35	6,5
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.25
	SAE8	mm	60	70	35	6	48	64	6	18,8	25	35	6,5
		in	2.36	2.75	1.38	0.24	1.89	2.52	0.24	0.74	0.98	1.38	0.25
	SAE10	mm	70	70	35	6	58	64	6	18,5	35	35	6,5
		in	2.75	2.75	1.38	0.24	2.28	2.52	0.24	0.73	1.38	1.38	0.25
	SAE12	mm	70	70	40	8	54	62	8	22	30	40	8,5
		in	2.75	2.75	1.57	0.31	2.12	2.44	0.31	0.87	1.18	1.57	0.33
SAE 12/2	G 1/2	mm	70	80	40	8	54	72	8	25	30	40	8,5
		in	2.75	3.15	1.57	0.31	2.12	2.83	0.31	0.98	1.18	1.57	0.33
	G 3/4	mm	70	90	40	8	54	82	8	25	30	40	8,5
		in	2.75	3.54	1.57	0.31	2.12	3.23	0.31	0.98	1.18	1.57	0.33
	SAE10	mm	70	85	40	8	54	77	8	25	30	40	8,5
		in	2.75	3.35	1.57	0.31	2.12	3.03	0.31	0.98	1.18	1.57	0.33
	SAE12	mm	70	85	40	8	54	77	8	25	30	40	8,5
		in	2.75	3.35	1.57	0.31	2.12	3.03	0.31	0.98	1.18	1.57	0.33

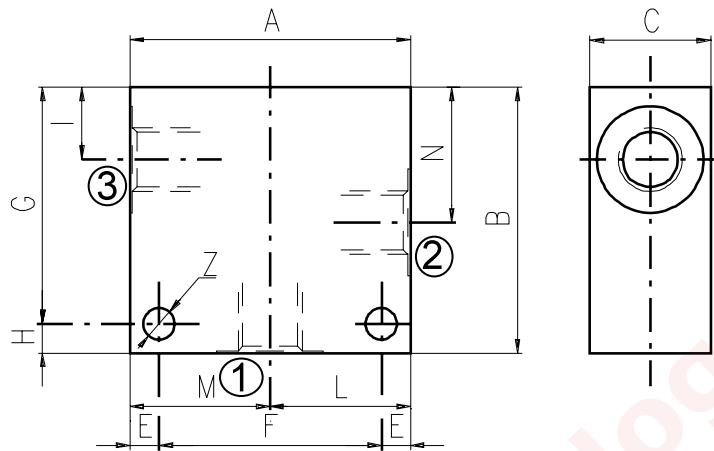
Cavity	Ports	A	B	C	E	F	G	H	I	L	M	Z	
SAE 16/2	G 1/2	mm	80	90	50	10	60	80	10	25	35	45	10,5
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41
	G 3/4	mm	80	90	50	10	60	80	10	25	35	45	10,5
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41
	G 1	mm	85	100	60	10	65	90	10	23,5	40	45	10,5
		in	3.35	3.94	2.36	0.39	2.56	3.54	0.39	0.92	1.57	1.77	0.41
	SAE12	mm	80	90	50	10	60	80	10	25	35	45	10,5
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41
	SAE16	mm	80	100	50	10	60	90	10	25	35	45	10,5
		in	3.15	3.94	1.97	0.39	2.36	3.54	0.39	0.98	1.38	1.77	0.41

Order code _____

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Material	Max. pressure	
	bar	psi
Alluminium	210	3050
Steel	350	5100

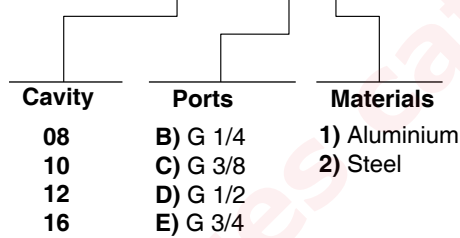


Cavity	Ports		A	B	C	E	F	G	H	I	L	M	N	Z
SAE 8/3	G 1/4	mm	60	60	30	7	46	48	12	14,8	30	30	29,1	6,5
		in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.58	1.18	1.18	1.14	0.25
	G 3/8	mm	60	60	30	7	46	48	12	14,5	30	30	29,1	6,5
		in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.57	1.18	1.18	1.14	0.25
	G 1/2	mm	70	65	35	7	56	53	12	14,5	35	35	29,1	6,5
		in	2.75	2.56	1.38	0.27	2.20	2.09	0.47	0.57	1.38	1.38	1.14	0.25
SAE6	mm	60	60	30	7	46	48	12	14,5	30	30	29,1	6,5	
	in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.57	1.18	1.18	1.14	0.25	
SAE 10/3	G 1/4	mm	60	65	35	6	48	59	6	18	30	30	34,5	7
		in	2.36	2.56	1.38	0.24	1.89	2.32	0.24	0.70	1.18	1.18	1.36	0.27
	G 3/8	mm	60	65	35	6	48	59	6	18,8	30	30	34,5	7
		in	2.36	2.56	1.38	0.24	1.89	2.32	0.24	0.74	1.18	1.18	1.36	0.27
	G 1/2	mm	65	70	35	6	53	64	6	18,8	32,5	32,5	34,5	7
		in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27
SAE6	mm	65	70	35	6	53	64	6	18,8	32,5	32,5	34,5	7	
	in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27	
SAE8	mm	65	70	35	6	53	64	6	18,8	32,5	32,5	34,5	7	
	in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27	
SAE 12/3	G 1/2	mm	70	100	40	8	54	92	8	25	35	35	53,5	8,5
		in	2.75	3.94	1.57	0.31	2.12	3.6	0.31	0.98	1.38	1.38	2.10	0.33
	G 3/4	mm	90	100	50	10	70	90	10	25,1	45	45	53,5	10,5
		in	3.54	3.94	1.97	0.39	2.75	3.54	0.39	0.99	1.77	1.77	2.11	0.41
	SAE10	mm	80	100	40	8	64	92	8	25	40	40	53,5	8,5
		in	3.15	3.94	1.57	0.31	2.52	3.6	0.31	0.98	1.57	1.57	2.11	0.33
SAE12	mm	80	100	45	8	64	92	8	25	40	40	53,5	8,5	
	in	3.15	3.94	1.77	0.31	2.52	3.6	0.31	0.98	1.57	1.57	2.11	0.33	

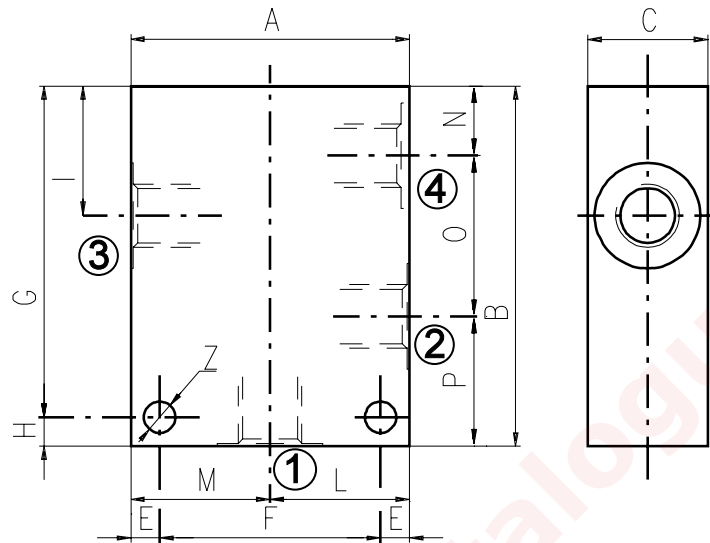
Cavity	Ports	A	B	C	E	F	G	H	I	L	M	N	Z	
SAE 16/3	G 3/4	mm	90	100	50	10	70	90	10	25,1	45	45	53,5	10,5
		in	3.54	3.94	1.97	0.39	2.75	3.54	0.39	0.99	1.77	1.77	2.11	0.41
	SAE12	mm	90	105	50	10	70	95	10	25,1	45	45	53,5	10,5
		in	3.54	4.13	1.97	0.39	2.75	3.74	0.39	0.99	1.77	1.77	2.11	0.41
	SAE16	mm	90	105	50	10	70	95	10	25,1	45	45	53,5	10,5
		in	3.54	4.13	1.97	0.39	2.75	3.74	0.39	0.99	1.77	1.77	2.11	0.41

Order code _____

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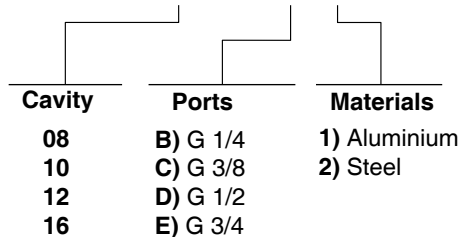
Material	Max. pressure	
	bar	psi
Alluminium	210	3050
Steel	350	5100



Cavity	Ports		A	B	C	E	F	G	H	I	L	M	N	O	P	Z
SAE 8/4	G 1/4	mm	60	75	30	7	46	63	12	29,1	30	30	14,8	29,1	31,1	6,5
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.58	1.14	1.22	0.25
	SAE6	mm	60	75	30	7	46	63	12	29,1	30	30	14,8	29,1	31,1	6,5
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.58	1.14	1.22	0.25
SAE 10/4	G 3/8	mm	60	85	35	6	48	79	6	34,5	30	30	18,8	31,7	34,5	7
		in	2.36	3.35	1.38	0.24	1.89	3.11	0.24	1.36	1.18	1.18	0.74	1.25	1.36	0.27
	G 1/2	mm	70	85	35	6	58	79	6	34,5	35	35	18,8	31,7	34,5	7
		in	2.75	3.35	1.38	0.24	2.28	3.11	0.24	1.36	1.38	1.38	0.74	1.25	1.36	0.27
	SAE6	mm	60	85	35	6	48	79	6	34,5	30	30	18,8	31,7	34,5	7
		in	2.36	3.35	1.38	0.24	1.89	3.11	0.24	1.36	1.18	1.18	0.74	1.25	1.36	0.27
SAE8	mm	70	85	35	6	58	79	6	34,5	35	35	18,8	31,7	34,5	7	
	in	2.75	3.35	1.38	0.24	2.28	3.11	0.24	1.36	1.38	1.38	0.74	1.25	1.36	0.27	
SAE 12/4	G 1/2	mm	80	115	40	8	64	107	8	44	40	40	22	44,5	48,5	8,5
		in	3.15	4.53	1.57	0.31	2.52	4.21	0.31	1.73	1.57	1.57	0.87	1.75	1.9	0.33
	SAE10	mm	80	115	40	8	64	107	8	44	40	40	22	44,5	48,5	8,5
		in	3.15	4.53	1.57	0.31	2.52	4.21	0.31	1.73	1.57	1.57	0.87	1.75	1.9	0.33
SAE 16/4	G 3/4	mm	100	130	50	10	80	120	10	53,5	50	50	25,1	56,9	48	10,5
		in	3.94	5.12	1.97	0.39	3.15	4.72	0.39	2.11	1.97	1.97	0.99	2.24	1.89	0.41

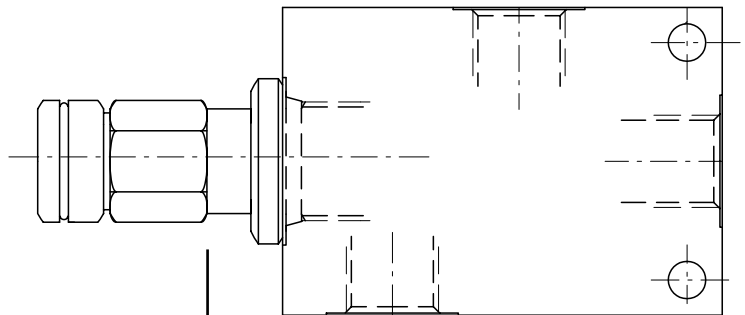
Order code

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Informations

How to order valves with body



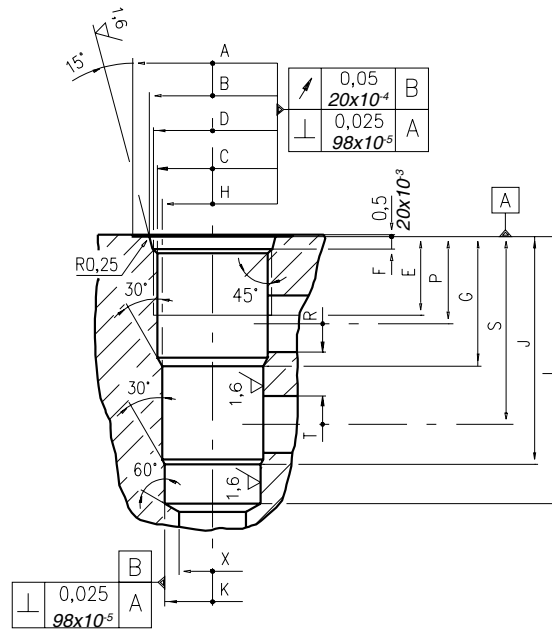
CARTRIDGE CODE

BILLET CODE

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D- 1-1

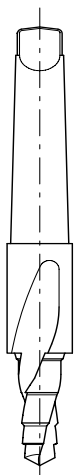
Cavity	Ports	Materials
08	B) G 1/4	1) Aluminium
10	C) G 3/8	
12	D) G 1/2	
16	E) G 3/4	
	F) G 1	
	J) SAE 6	2) Steel
	K) SAE 8	
	L) SAE 10	
	M) SAE 12	
	N) SAE 16	



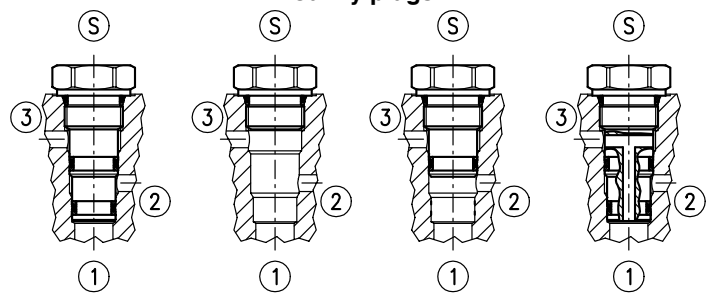
\	A	B ±0,05	C ±0,05	D	E	F	G	H ±0,02	J	K ±0,02	L	M ±0,02	N	P	R øMAX	S	T øMAX	U	V øMAX	X øMAX	Z øMIN	Prof. Z MIN	
08/3	mm	27	20,66	17,42	3/4-16 UNF	12,50	2,5	19,10	15,90	33,30	14,30	43,30	-	-	14,30	5,50	28,60	5,50	-	-	12,50	-	-
	in	1.06	0.81	0.68		0.49	0.10	0.75	0.62	1.31	0.56	1.70			0.56	0.22	1.12	0.22			0.49		
10/3	mm	30	24,00	20,62	7/8-14 UNF	16,00	2,80	23,10	17,50	39,60	15,90	47,60	-	-	18,30	6,50	34,00	6,50	-	-	14,00	-	-
	in	1.18	0.94	0.81		0.63	0.11	0.94	0.69	1.56	0.62	1.87			0.72	0.25	1.34	0.25			0.55		
12/3	mm	38	29,23	24,73	1 1/16-12 UNF	19,00	3,56	36,60	23,82	63,50	22,25	75,40	-	-	24,50	16,00	53,00	16,00	-	-	19,00	-	-
	in	1.50	1.15	0.97		0.75	0.14	1.44	0.94	2.5	0.88	2.97			0.96	0.63	2.09	0.63			0.75		
16/3	mm	45	35,6	31,34	1 5/16-12 UNF	22,00	3,5	36,50	28,62	64,30	27,02	75,38	-	-	24,60	16,00	53,00	16,00	-	-	19,00	-	-
	in	1.77	1.40	1.23		0.87	0.14	1.44	1.13	2.53	1.06	2.97			0.97	0.63	2.09	0.63			0.75		

Cavity plugs

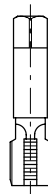
Rougher tool



Finisher tool



Tap

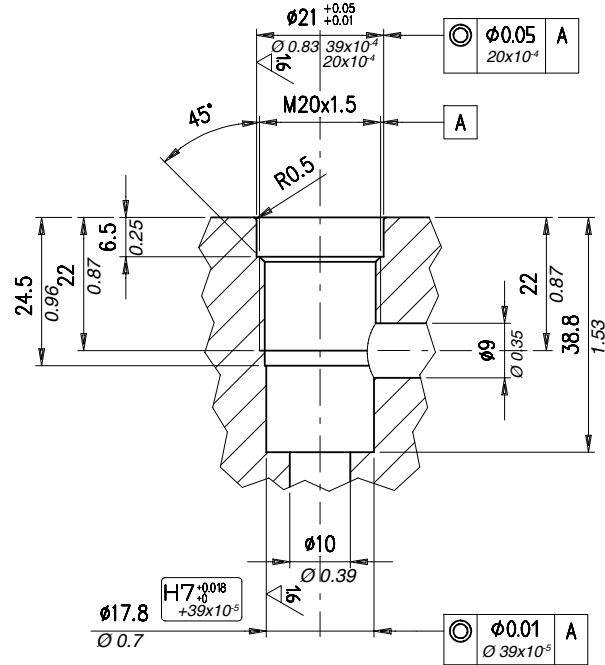


Cavity	Code number
08/3	3UT00052190
10/3	3UT00054170
12/3	3UT00054290
16/3	3UT00054470

Cavity	Code number
08/3	3UT00052740
10/3	3UT00054180
12/3	3UT00054300
16/3	3UT00054480

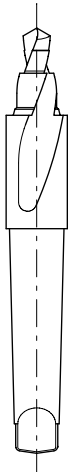
Cavity	Code number
08/3	3UT03416UNF
10/3	3UT07814UNF
12/3	3UT0111612UN
16/3	3UT0151612UN

Dimensions



Rougher tool

Cod.3UT00050050



Finisher

Cod.3UT00055040

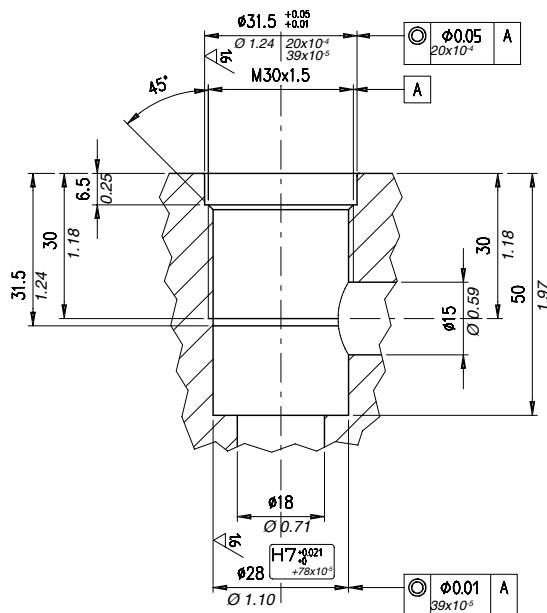


Tap

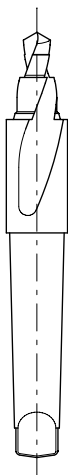
Cod.3UT08A20F150



Dimensions



Rougher tool
Cod.3UT00050100



Finisher
Cod.3UT06A2800P



Tap
Cod.3UT08A30F150

