

# **Diverter Valves**

**TECHNICAL CATALOGUE**



**Additional information**

This catalogue shows the product in the most standard configurations.  
Please contact our Sales Dpt. for more detailed information or special requests.

**WARNING!**

All specifications of this catalogue 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.

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4<sup>th</sup> edition May 2022

MECHANICAL CONTROL MONOBLOCK DIVERTER VALVES					
Type	Nr of ways	Type	Max. flow rating	Max. pressure	Page
			l/min (US gpm)	bar (psi)	
<b>DF5</b>	2 - 3 - 6	lever, cam, hydraulic, pneumatic	60 (15.9)	315 (4600)	<b>5</b>
<b>DFC050</b>	2 - 3 - 6	cam	60 (15.9)	315 (4600)	<b>19</b>
<b>DF10</b>	3 - 6	lever, cam, hydraulic, pneumatic	90 (23.5)	315 (4600)	<b>25</b>
<b>DFC100</b>	3 - 6	cam	90 (23.5)	315 (4600)	<b>35</b>
<b>DF20</b>	3 - 6	lever, cam, hydraulic, electrohydraulic, pneumatic	140 (37)	315 (4600)	<b>41</b>
<b>DF25</b>	3	lever, cam, hydraulic, electrohydraulic, pneumatic	280 (74)	315 (4600)	<b>55</b>
<b>DF250</b>	6	hydraulic	250 (66)	350 (5100)	<b>67</b>
<b>DF350</b>	6	hydraulic	350 (92.5)	350 (5100)	<b>71</b>

SOLENOID CONTROL DIVERTER VALVES								
Type	Nr of ways	Type	Max. flow rating	Max. pressure		Supply voltage	Nominal power solenoid	Page
				without drain	with drain			
				l/min (US gpm)	bar (psi)			
<b>DFE052</b>	2 - 3 - 6 - 8	monoblock	60 (15.9)	200 (2900)	315 (4600)	12-14-24-48-98-110	38W	<b>75</b>
<b>DFE102</b>	3 - 6	monoblock	90 (23.5)	200 (2900)	315 (4600)	12-24-48-94-110-192	60W	<b>87</b>
<b>DFE20</b>	3 - 6	monoblock	140 (37)	200 (2900)	315 (4600)	12-20-24-94-192	60W	<b>95</b>
<b>DFE085</b>	4	monoblock for special applications	25 (6.6)	210 (3000)	-	12-14-24-48-98-110	38W	<b>103</b>
<b>DFE110</b>	12	monoblock for special applications	90 (23.5)	210 (3000)	315 (4600)	12-20-24-94-192	60W	<b>109</b>
<b>DFE141</b>	6 - 8	monoblock for special applications	80 (21)	250 (3600)	315 (4600)	12-20-24-94-192	60W	<b>115</b>
<b>DFE080</b>	6 - 8 - 10	sectional	25 (6.6)	210 (3000)	315 (4600)	12-14-24-48-98-110	38W	<b>123</b>
<b>DFE100</b>	6 - 8 - 10	sectional	50 (13)	210 (3000)	315 (4600)	12-14-24-48-98-110	38W	<b>131</b>
<b>DFE140</b>	6 - 8 - 10	sectional	80 (21)	210 (3000)	315 (4600)	12-20-24-94-192	60W	<b>139</b>

# Diverter valves

## Index

ROTARY CONTROL DIVERTER VALVES					
Type	Nr of ways	Type	Max. flow rating	Max. pressure	Page
			l/min (US gpm)	bar (psi)	
<b>DHZ5</b>	3 - 4 - 6 - 8	mechanical rotary	60 (15.9)	315 (4600)	<b>149</b>
<b>DHZ10</b>	3 - 4 - 6 - 8	mechanical rotary	90 (23.5)	315 (4600)	<b>149</b>
<b>DHZ20</b>	3 - 4 - 6 - 8	mechanical rotary	140 (37)	315 (4600)	<b>149</b>
<b>DH25</b>	3 - 4 - 6 - 8	mechanical rotary	200 (52.8)	250 (3600)	<b>149</b>
<b>DH30</b>	3 - 6	mechanical rotary	280 (74)	210 (3000)	<b>149</b>
<b>DDF3V-S</b>	3	mechanical rotary	120 (31.7)	450 (6520)	<b>155</b>
<b>RSAP2V</b>	2	ball type valves	180 (47.5)	500 (7250)	<b>157</b>
<b>RSAP3V</b>	3	ball type valves	160 (42)	380 (5510)	<b>157</b>

## Reference standards

		BSP	UN-UNF	NPTF	METRIC
THREAD		ISO 228/1	ISO 263	ANSI B1.20.3	ISO 262
ACCORDING TO		BS 2779	ANSI B1.1 unified		ISO 262
	ISO	1179-1	11926-1		9974-1
	SAE		J1926-1	J476a	J2244
CAVITY					3852-2
ACCORDING TO	DIN	3852-2 shape X or Y			shape X or Y



## DF5

### Mechanical control monoblock diverter valves

- 2 - 3 - 6 ways configuration
- Mechanical lever, cam, hydraulic, pneumatic controls

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		2 - 3 - 6
Max. flow rating		60 l/min (15.8 US gpm)
Max. pressure		315 bar (4600 psi)
Internal leakage A(B)⇒T	Δp=100 bar (1450 psi)	5 cm <sup>3</sup> /min (0.31 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		21/19/16 - ISO 4406 - NAS 1638 - class 10
Ambient temperature for working conditions	with mechanical controls	from -40°C to 60°C (from -40°F to 140°F)
	with hydraulic and pneumatic controls	from -30°C to 60°C (from -22°F to 140°F)

NOTE - For different working conditions please contact Sales Dept.

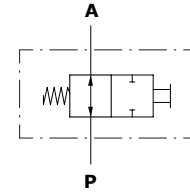
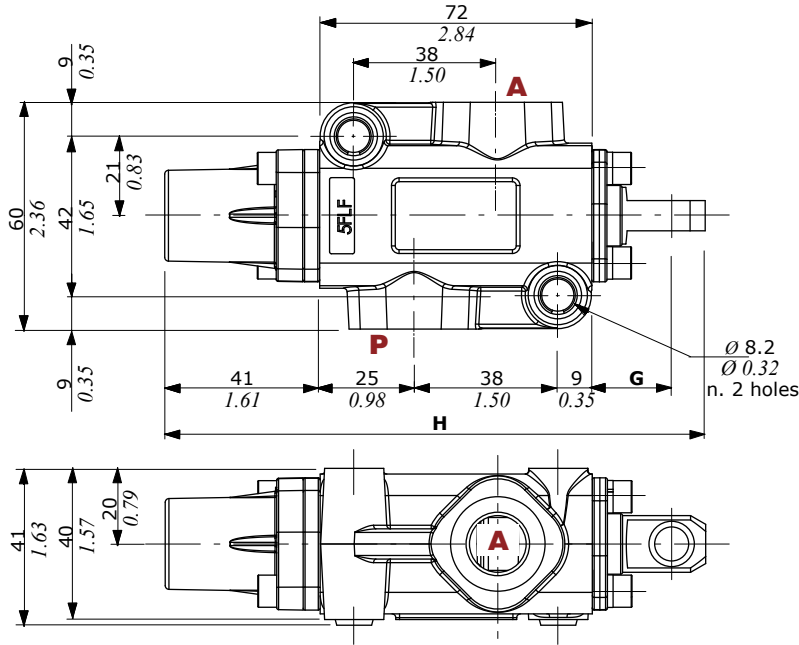
### Available threads

PORTS THREAD				
ALL PORTS	BSP	UN-UNF	METRIC* (ISO 9974-1)	METRIC* (ISO 6149)
<b>DF5</b>	G 3/8	3/4-16 (SAE 8)	M18x1.5	M18x1.5
PILOT PORTS				
Pneumatic	NPT 1/8-27	NPT 1/8-27	NPT 1/8-27	NPT 1/8-27
Hydraulic	G 1/4	9/16-18 (SAE 6)	-	-

(\*) Optional threads  
for availability contact Sales  
Department

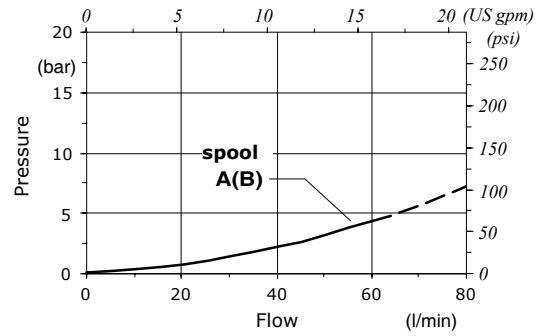
Dimensional data - hydraulic circuit - performance data

2 ways



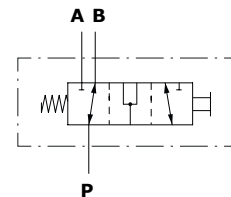
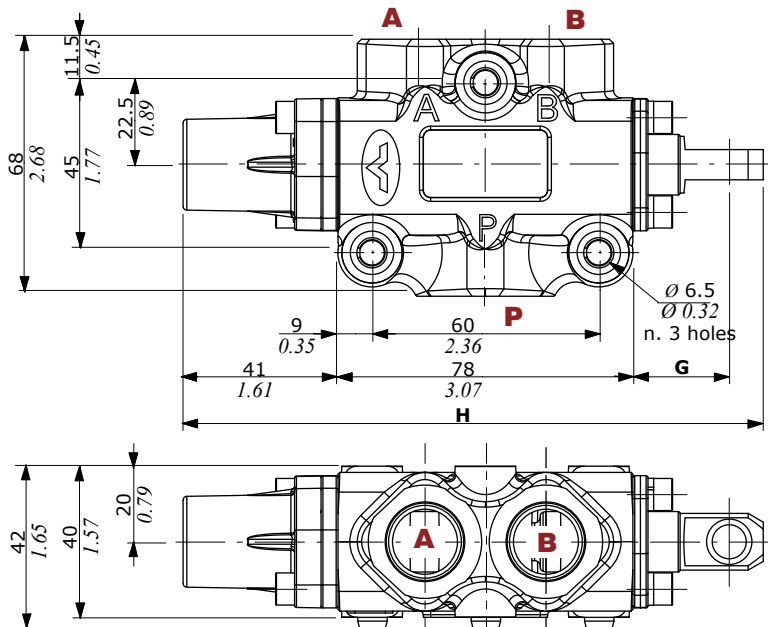
Pressure drop versus flow

P → A



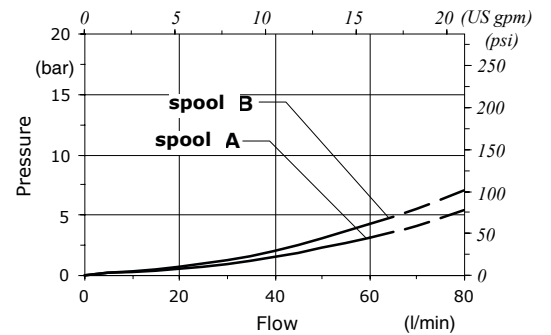
	G	H
With spool out	25.5 mm 1.00 in	147.5 mm 5.81 in
With spool in	14.5 mm 0.57 in	136.5 mm 5.37 in

3 ways

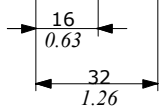


Pressure drop versus flow

P → A(B)

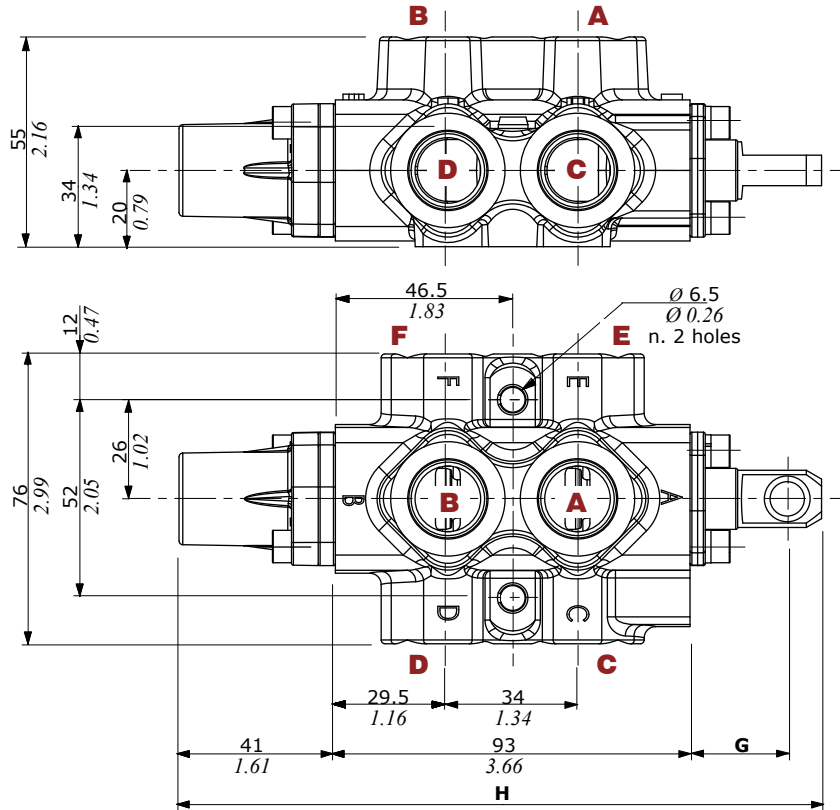


	G	H
With spool out	25.5 mm 1.00 in	153.5 mm 6.04 in
With spool in	14.5 mm 0.57 in	142.5 mm 5.60 in



**Dimensional data - hydraulic circuit - performance data**

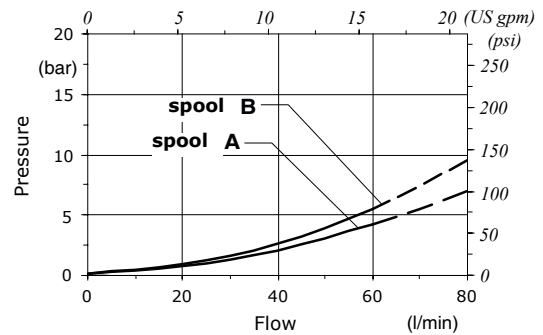
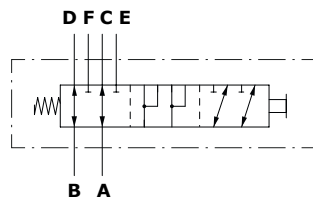
**6 ways**



	<b>G</b>	<b>H</b>
With spool out	25.5 mm 1.00 in	168.5 mm 6.63 in
With spool in	14.5 mm 0.57 in	157.5 mm 6.20 in

**Pressure drop versus flow**

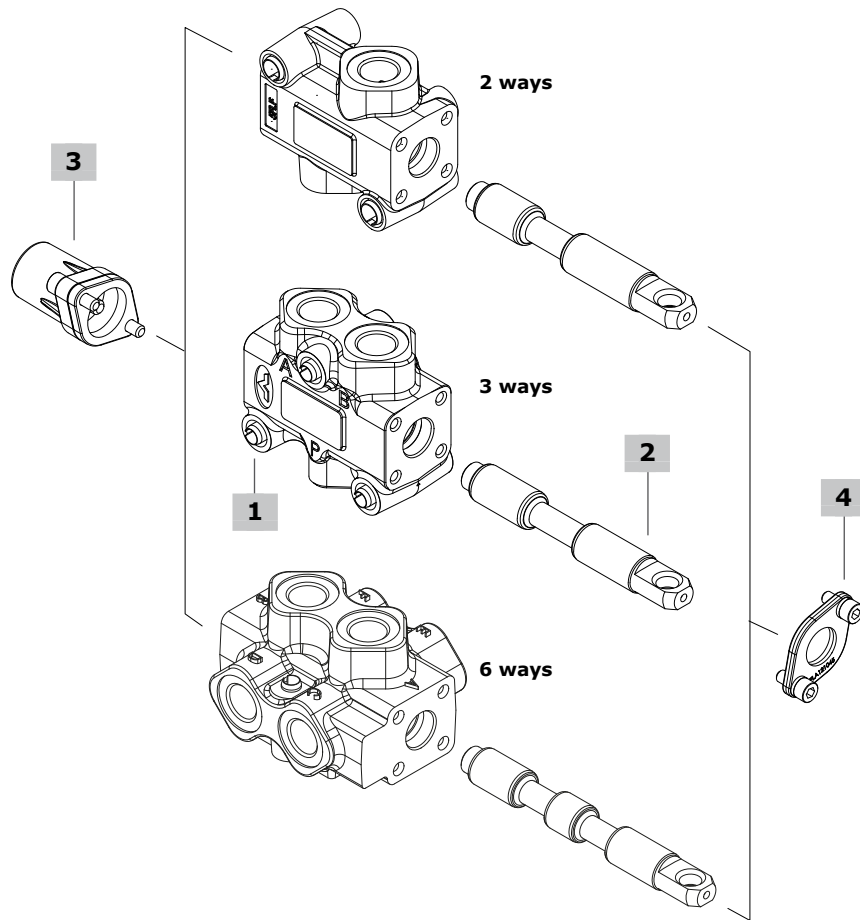
**A → C(E)**



## Part ordering codes

Example:

**DF5/3**   **A**   **17**   **SLP**   -   **SAE**   -   **(CVN)**  
1   2   3   4   5   Painted with one layer of black Primer antirust





**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DF5/2</b>	5CO2220700	2 ways body kit
<b>DF5/3</b>	5CO2221700	3 ways body kit
<b>DF5/6</b>	5CO2222700	6 ways body kit

**2 Spools**

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TYPE	CODE	DESCRIPTION
<b>for DF5/2:</b>		
<b>A</b>	3CAS105210	Open port in neutral position
<b>B</b>	3CAS105110	Closed port in neutral position
<b>AT</b>	3CAS105230	As type A, with spherical end
<b>BT</b>	3CAS105130	As type B, with spherical end
<b>AC</b>	3CAS105220	As type A, for cam control
<b>BC</b>	3CAS105120	As type B, for cam control
<b>V</b>	3CAS105115	With load check valve
<b>VT</b>	3CAS105135	As type V, with spherical end
<b>for DF5/3:</b>		
<b>A</b>	3CAS105310	Flow in B in pos. 1. Ports connected in transit position
<b>B</b>	3CAS105410	Flow in B in pos. 1. Ports closed in transit position
<b>AT</b>	3CAS105330	As type A, with spherical end
<b>AC</b>	3CAS105320	As type A, for cam control
<b>BC</b>	3CAS105420	As type B, for cam control
<b>D</b>	3CAS105511	Flow in A and B in pos. 1. Without transit position: need 17A control type for reduced spool stroke
<b>for DF5/6:</b>		
<b>A</b>	3CAS105610	Flow in C and D. E and F closed in pos. 1. Ports connected in transit position
<b>B</b>	3CAS105710	Flow in C and D. E and F closed in pos. 1. Ports closed in transit position
<b>AC</b>	3CAS105620	As type A, for cam control
<b>BC</b>	3CAS105720	As type B, for cam control

**3 "A" side spool positioners**

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TYPE	CODE	DESCRIPTION
<b>12</b>	5V12105000	Detent in positions 1 and 2
<b>17</b>	5V17105000	Spring return in position 1
<b>17WPOA</b>	5V17105002	As kit 17, waterproof type with plug for oil drain
<b>17A</b>	5V17105050	Spring return in pos. 1, it must be coupled to spool <b>D</b> (DF5/3)
<b>17ME</b>	5V17305000	As kit 17, with heavier spring type E
<b>17MEWPO</b>	5V17305002	As kit 17, with heavier spring type E waterproof type
<b>17YME</b>	5V17305003	As kit 17, with heavier spring type E
<b>18ME</b>	5V18405110	Spring return in pos. 2, with heavier spring type E

**With microswitch**

<b>17MEMG2(NO)</b>	5V17305680	Spring return in pos. 1, microswitch in pos. 2, with heavier spring type E
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Pneumatic controls: must be coupled to the control kit side B with lever, with plate or cap

<b>17PNB</b>	5V17105718	On/off with spring return in position 1, waterproof type
<b>18PNB</b>	5V18105718	On/off with spring return in position 2, waterproof type

Hydraulic controls: must be coupled to the control kit side B with lever, with plate or cap

<b>18IA1</b>	5V18105850*	On/off high pressure hydraulic control with spring return in position 2
<b>18IB1N</b>	5V18105870*	On/off low pressure hydraulic control with spring return in position 2

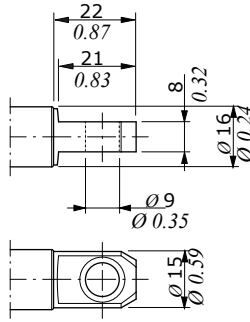
**4 "B" side options**

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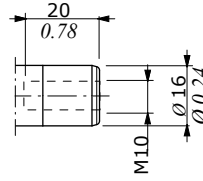
TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP105000	Without lever box, with dust-proof plate kit
<b>SLC</b>	5COP205000	Without lever box, with cap
<b>L</b>	5LEV105000	Aluminum lever box
<b>CA</b>	5CAM105000	Steel ball bearing cam operation
<b>CB</b>	5CAM105020	Bronze cam operation
<b>CAX/S5</b>	5CAM105030	Inox steel cam operation
<u>Hydraulic controls</u>		
<b>IA2</b>	5IDR505700*	On/off with high pressure pilot, need 17YME control type
<b>IB2</b>	5IDR705700*	On/off with low pressure pilot, need 17YME control type

**5 Body threading**Specify threading always when it is different from **BSP** standard(\*) - Codes are referred to **UN-UNF** thread

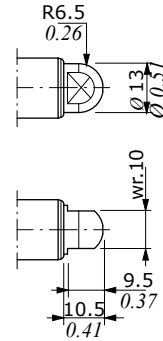
Spool end



Standard:  
spool type **A, B, D, V**



Rotary cam arrangement:  
spool type **AC, BC**



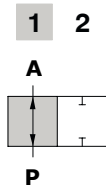
Spherical end:  
spool type **AT, BT, VT**

Spool circuits

**2 ways**

**Type A/AT/AC**

Open port in neutral position

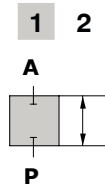


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B/BT/BC**

Closed port in neutral position

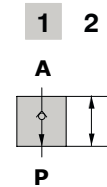


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type V/VT**

With load check valve



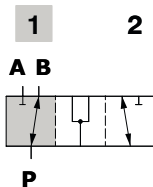
**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**3 ways**

**Type A/AT/AC**

Ports connected in transit position

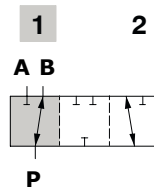


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B/BC**

Ports closed in transit position

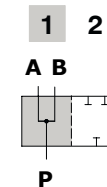


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type D**

Without transit position  
Ports connected in neutral



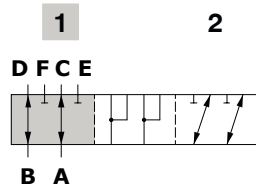
**Spool stroke**

Position 2: - 5.5 mm (- 0.21 in)

**6 ways**

**Type A/AC**

Flow in C and D. E and F closed in pos. 1  
Ports connected in transit position

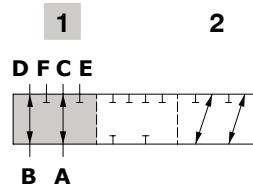


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B/BC**

Flow in C and D. E and F closed in pos. 1  
Ports closed in transit position



**Spool stroke**

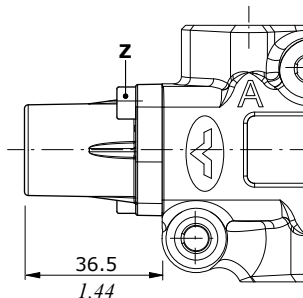
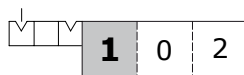
Position 2: - 11 mm (- 0.43 in)

**"A" side spool positioners**

**With detent**

**Type 12**

Detent in positions 1 and 2



**Wrenches and tightening torque**

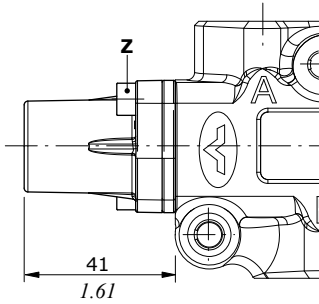
Z = wrench 4 - 6.6 Nm (4.9 lbf<sup>t</sup>)

"A" side spool positioners

With spring return in position 1

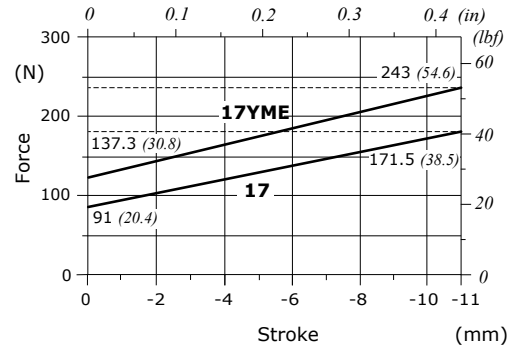
Available with standard or heavier spring type "E"

Type 17-17ME-17YME



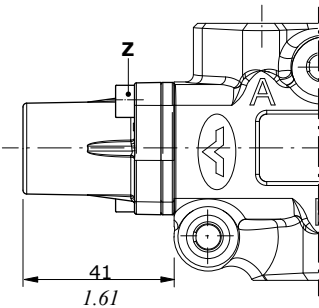
**Wrenches and tightening torque**  
 Z = wrench 4 - 6.6 Nm (4.9 lbf)

Force-Stroke diagram



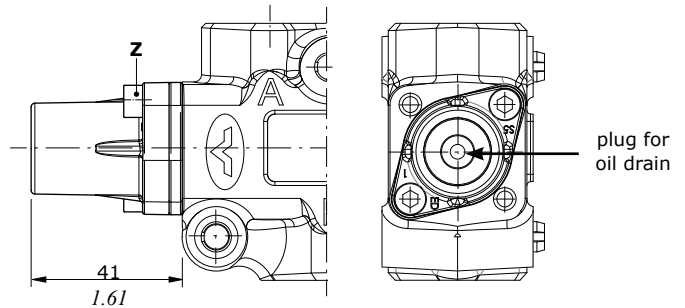
Type 17MEWPO

With water proof sealing



Type 17WPOA

With water proof sealing and plug for oil drain

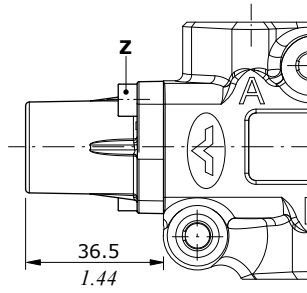


**"A" side spool positioners**

**With spring return in position 1**

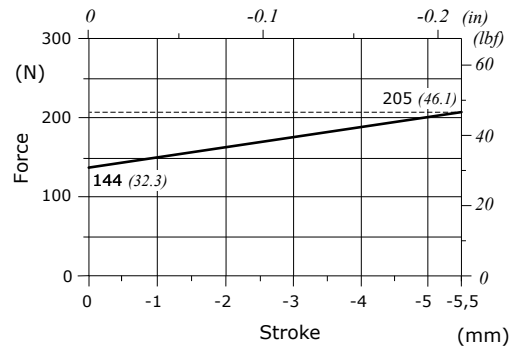
**Type 17A**

As type 17, for spool type D



**Wrenches and tightening torque**  
**Z** = wrench 4 - 6.6 Nm (4.9 lbf<sub>t</sub>)

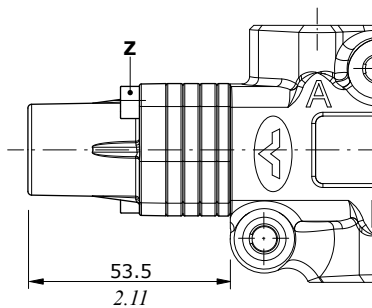
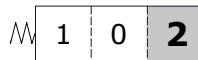
**Force-Stroke diagram**



**With spring return in position 2**

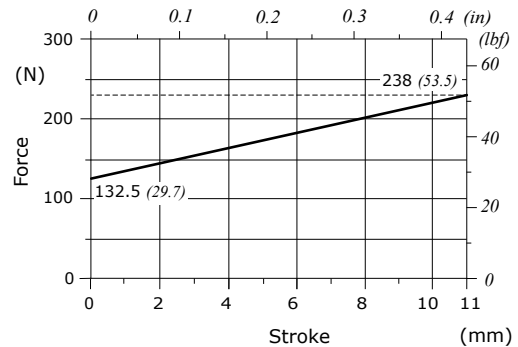
With heavier spring type "E"

**Type 18ME**



**Wrenches and tightening torque**  
**Z** = wrench 4 - 6.6 Nm (4.9 lbf<sub>t</sub>)

**Force-Stroke diagram**

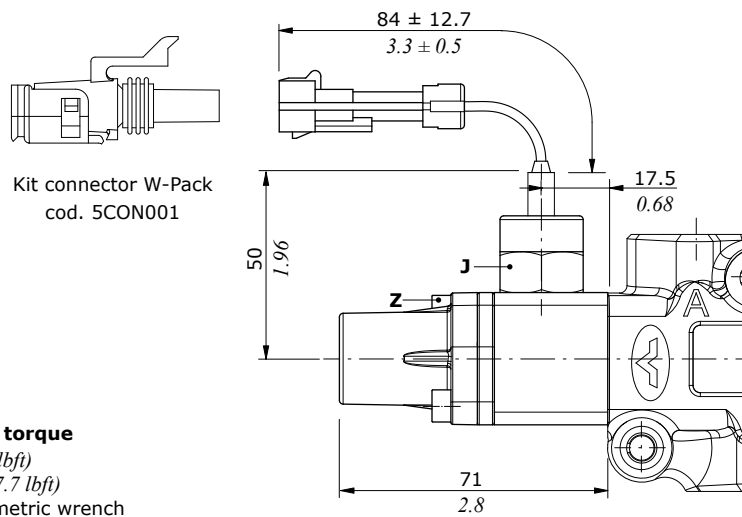
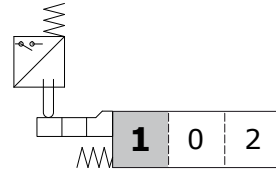


"A" side spool positioners

With spool position sensor

**Type 17MEMG2(NO)**

As type 17ME, with microswitch operated in pos. 1



**Wrenches and tightening torque**

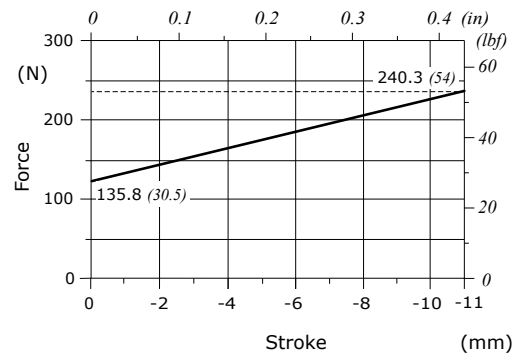
**Z** = wrench 4 - 6.6 Nm (4.9 lbft)

**J\*** = wrench 22 - 24 Nm (17.7 lbft)

(\*Tightening with dynamometric wrench

Complete controls			
Microswitch operation			
Circuit	pos. 1 17MG1	pos. 2 17MEMG2	pos. 2 17MG2
(NO)	5V17105673	5V17305680	-
(NC)	-	-	5V17105672

**Force-Stroke diagram**



**Features**

MICROSWITCH

Mechanical life ..... : 5x10<sup>5</sup> operations

Electrical life (resistive load)...: 10<sup>5</sup> oper. - 7A / 13.5VDC  
 : 5x10<sup>4</sup> oper. - 10A / 12VDC  
 : 5x10<sup>4</sup> oper. - 3A / 28VDC

Connector ..... : Packard Weather-pack

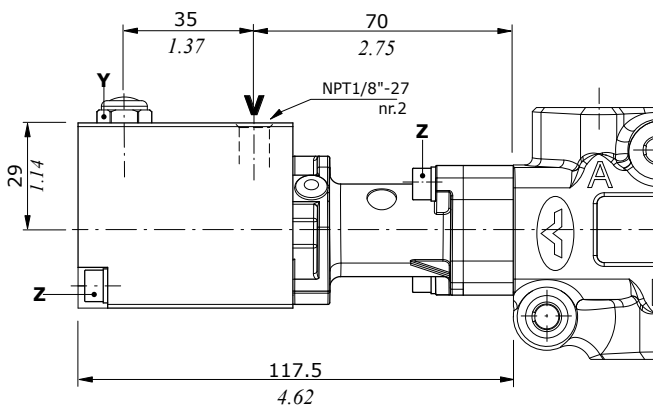
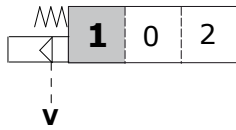
Mating connector cod. 5CON001, not included

**"A" side spool positioners**

**ON/OFF pneumatic controls**

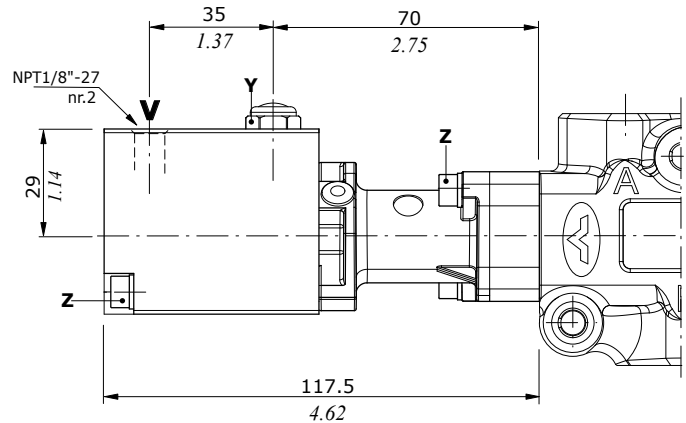
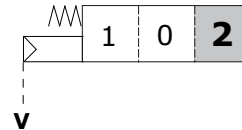
**Type 17PNB**

Spring return in pos. 1, waterproof type



**Type 18PNB**

Spring return in pos. 2, waterproof type



**Wrenches and tightening torque**

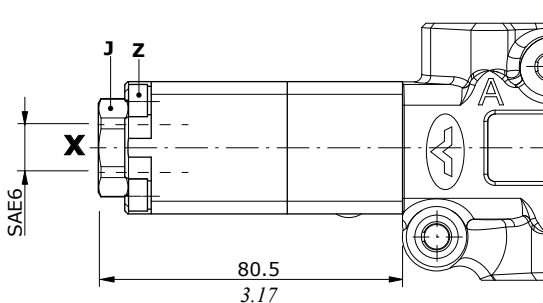
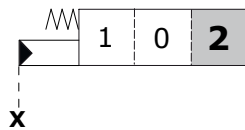
Z = wrench 4 - 6.6 Nm (4.9 lbft)

Y = wrench 13 - 9.8 Nm (7.2 lbft)

**Hydraulic controls**

**Type 18IA1**

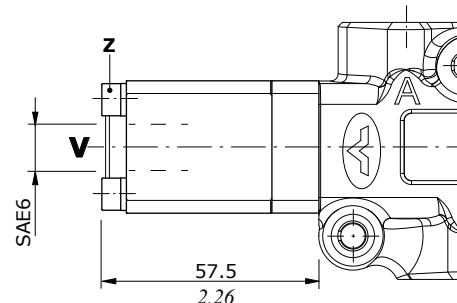
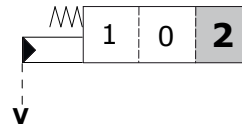
High pressure hydraulic control with spring return in position 2



Pilot pressure max. = 250 bar (3620 psi)

**Type 18IB1N**

Low pressure hydraulic control with spring return in position 2



Pilot pressure max. = 50 bar (725 psi)

**Wrenches and tightening torque**

Z = wrench 4 - 6.6 Nm (4.9 lbft)

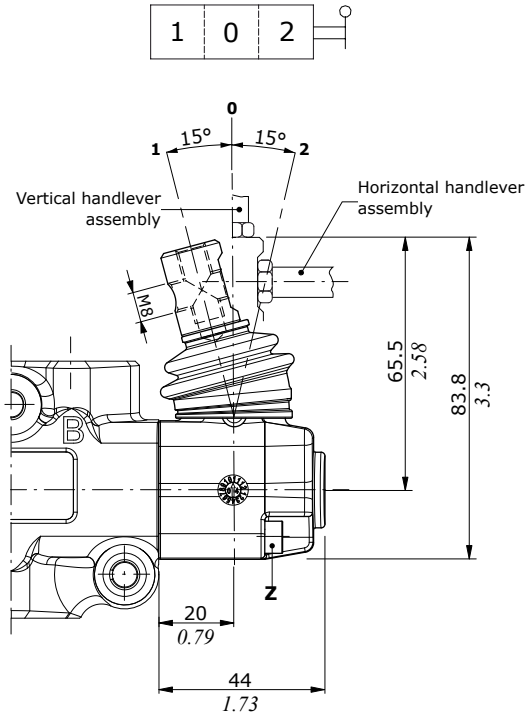
J = wrench 24 - 42 Nm (31 lbft)

"B" side options

**Lever control kit**

Aluminium with protection boot lever pivot box; it can be rotated 180° (execution **L180**)

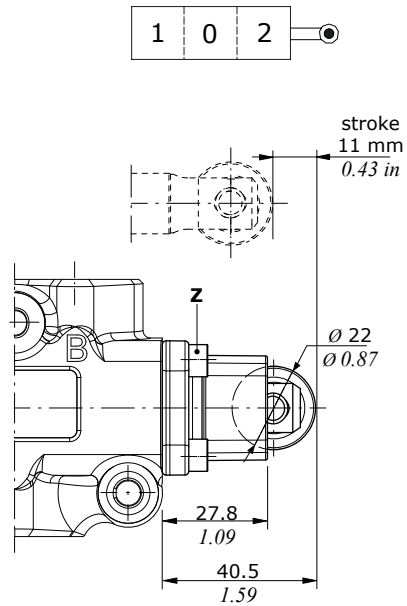
**Type L**



**Cam control kit**

Steel ball bearing cam operation (CA), and bronze cam operation (CB) or inox steel cam operation (CAX); it must be coupled to 17 control kit

**Type CA-CB-CAX**

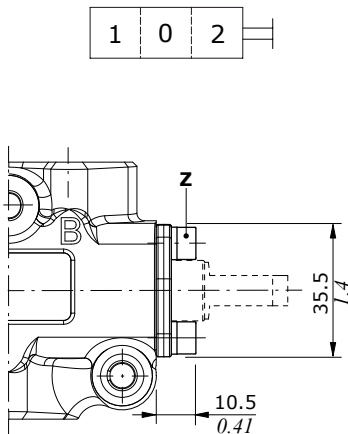


**Wrenches and tightening torque**

Z = wrench 4 - 6,6 Nm (4.9 lbft)

**Without lever, with flange**

**Type SLP**



**Wrenches and tightening torque**

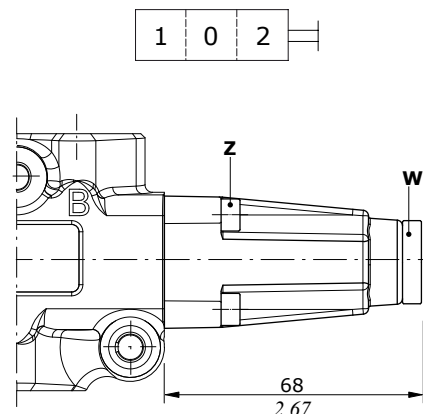
Z = wrench 4 - 6.6 Nm (4.9 lbft)

W = wrench 8 - 24 Nm (17.7 lbft)

**Without lever, with cap**

Protection cap to use with pneumatic and hydraulic spool positioner kits

**Type SLC**

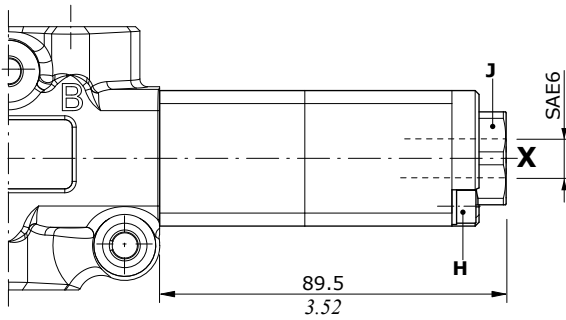
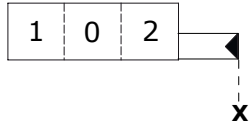




**Hydraulic controls**

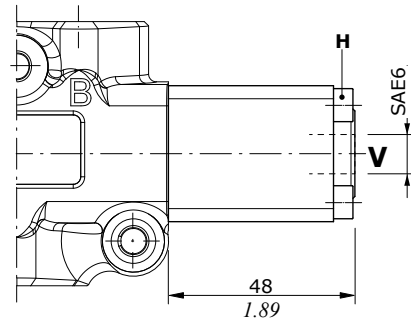
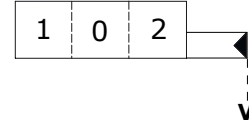
ON/OFF controls with high and low pressure pilot it must be only coupled to 17YME control kit

**Type IA2**  
High pressure pilot



Pilot pressure max. = 250 bar (3620 psi)

**Type IB2**  
Low pressure pilot



Pilot pressure max. = 50 bar (725 psi)

**Wrenches and tightening torque**

- H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)
- J** = wrench 24 - 42 Nm (31 lbf<sub>t</sub>)





## DFC050

### Mechanical control monoblock diverter valves

- 2 - 3 - 6 way configuration
- Cam controls
- Especially suitable for use in external environments

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		2 - 3 - 6
Max. flow rating		60 l/min (15.8 US gpm)
Max. pressure		315 bar (4600 psi)
Internal leakage A(B)⇒T	$\Delta p = 100 \text{ bar (1450 psi)}$	5 cm <sup>3</sup> /min (0.31 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature		from -20°C to 80°C (from -4°F to 176°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		21/19/16 - ISO 4406 - NAS 1638 - class 10
Ambient temperature for working conditions		from -40°C to 60°C (from -40°F to 140°F)

NOTE - For different working conditions please contact Sales Dept.

## Available threads

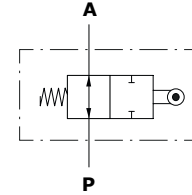
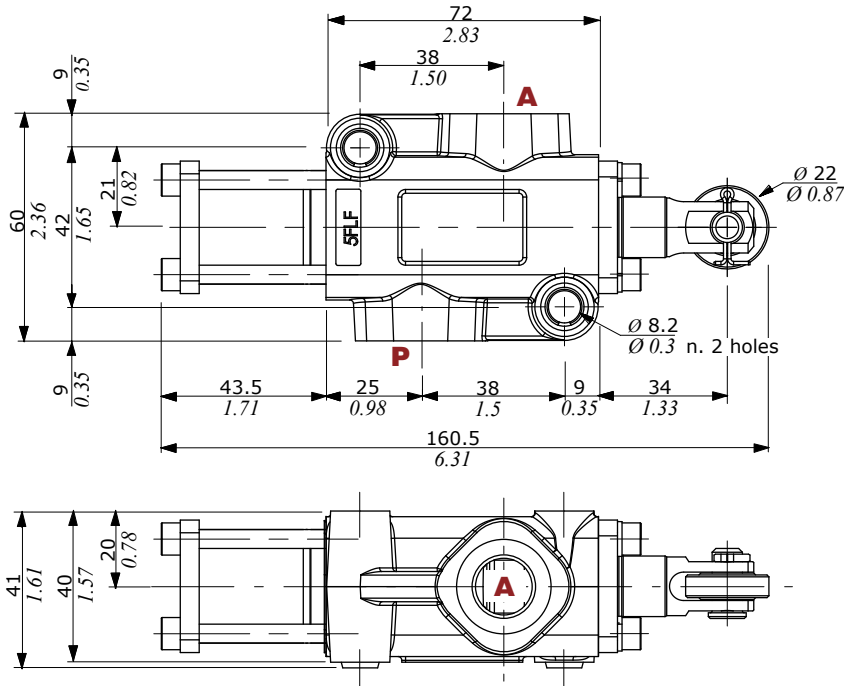
PORTS THREAD				
ALL PORTS	BSP	UN-UNF	METRIC(*) (ISO 9974-1)	METRIC(*) (ISO 6149)
<b>DFC050</b>	G 3/8	3/4-16 (SAE 8)	M18x1.5	M18x1.5

(\*) Optional threads  
for availability contact Sales  
Department

## Dimensional data - hydraulic circuit - performance data

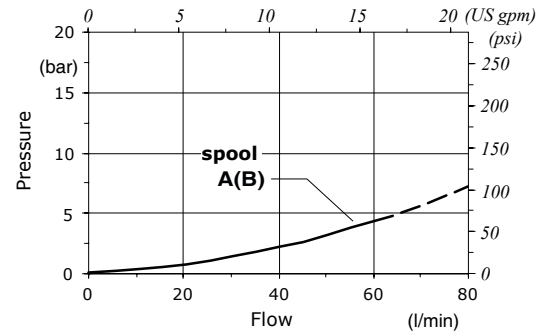
Cam spool control suggested for severe applications; it requires a special body, spool and control kit.

### 2 ways

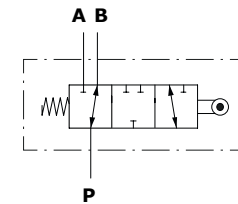
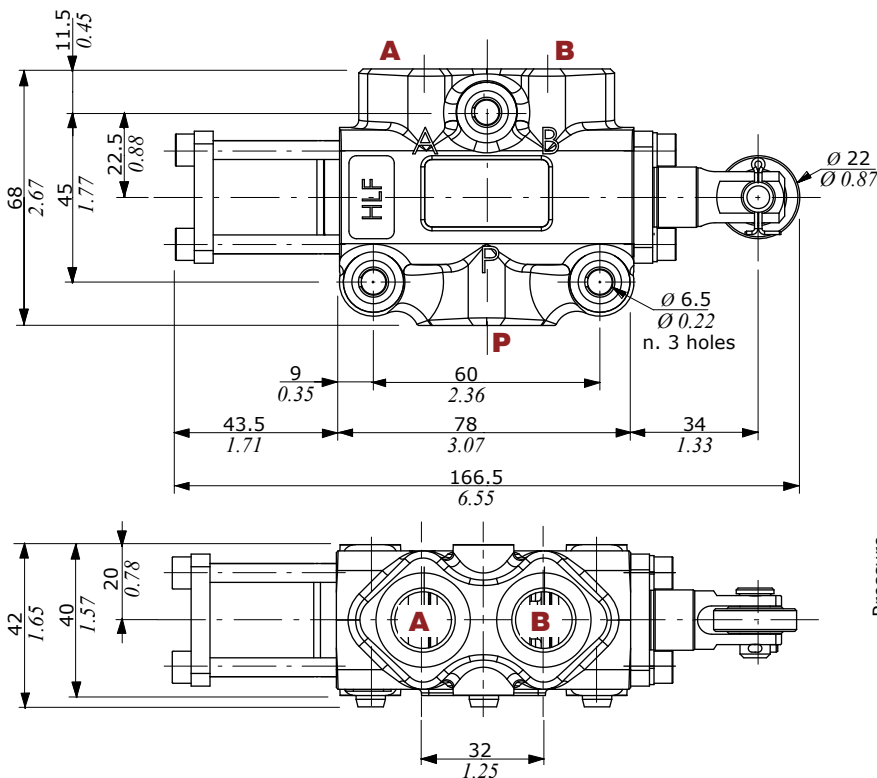


Pressure drop versus flow

P → A

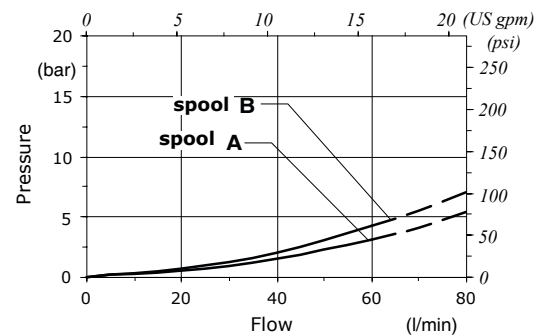


### 3 ways



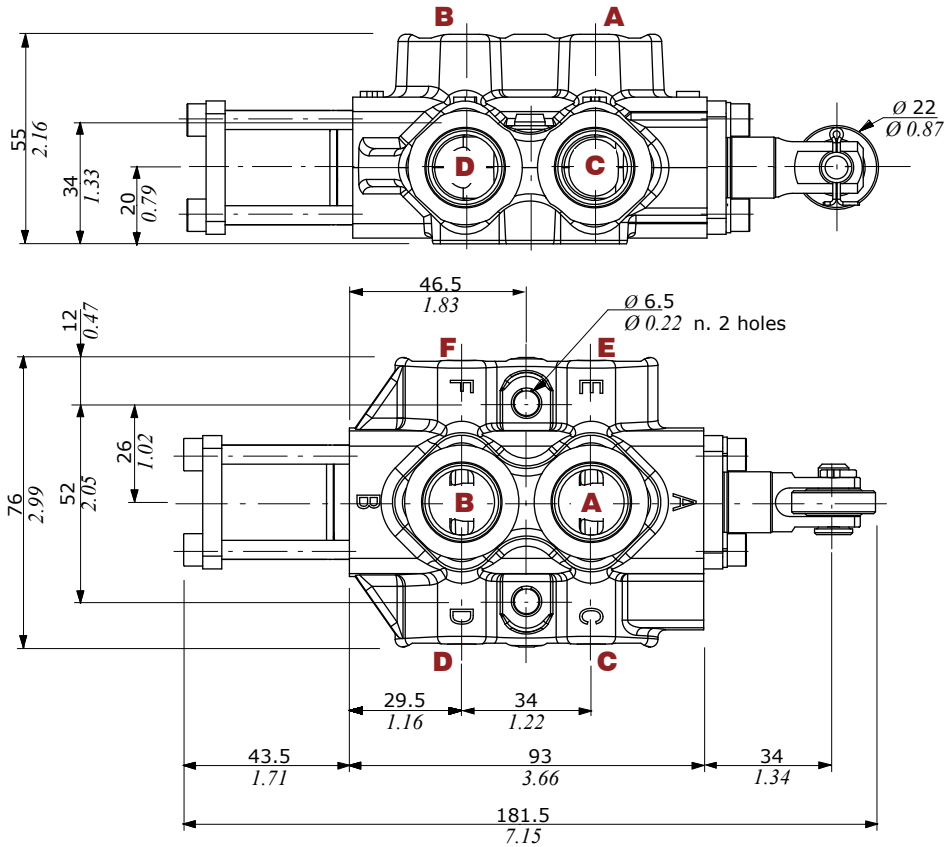
Pressure drop versus flow

P → A(B)



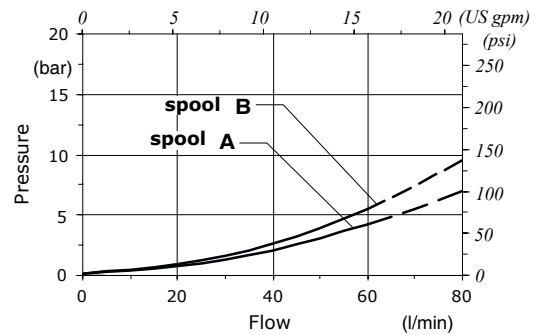
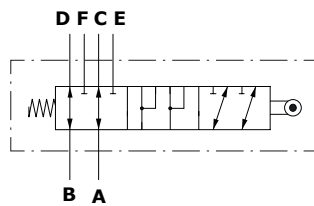
**Dimensional data - hydraulic circuit - performance data**

**6 ways**



**Pressure drop versus flow**

**A → C(E)**



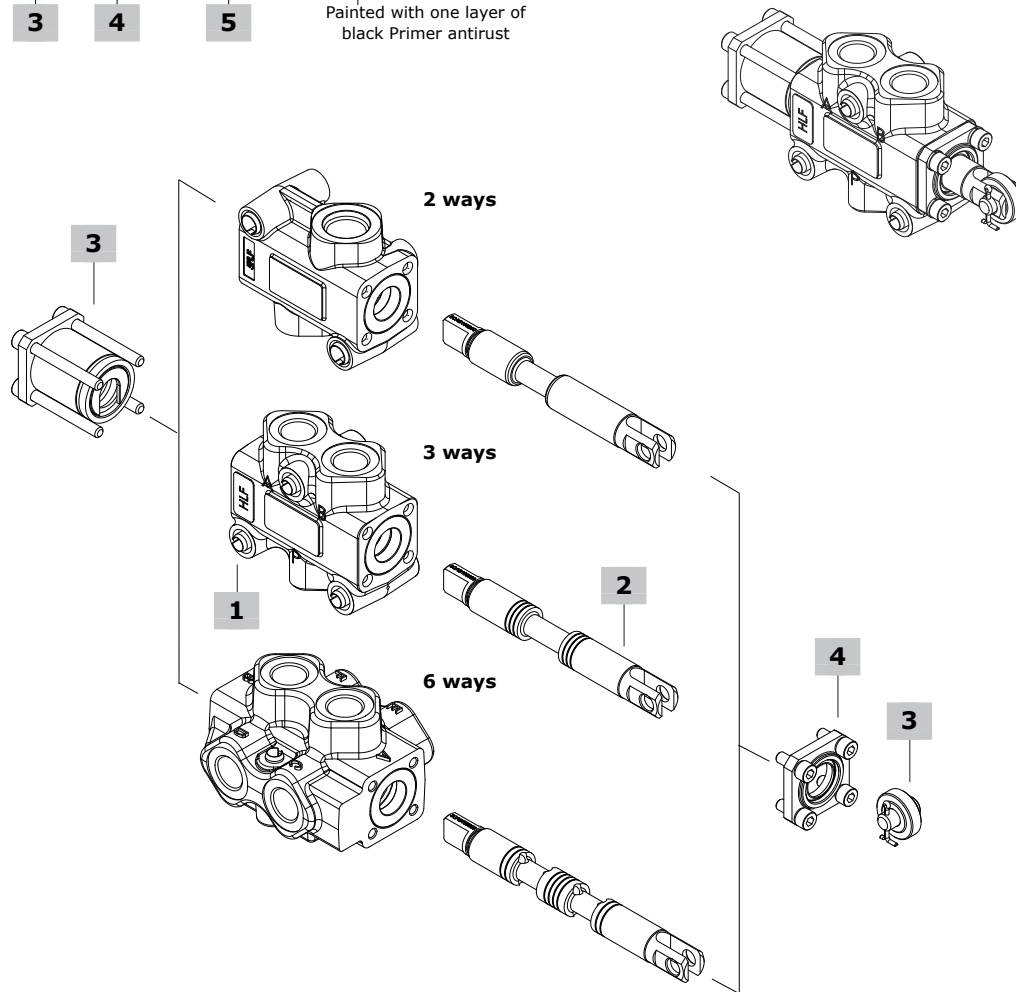
## Part ordering codes

Example:

**DFC050/3**   **A**   **17G**   **SLP**   -   **SAE**   -   **(CVN)**

1  
 2  
 3  
 4  
 5

Painted with one layer of black Primer antirust



### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DFC050/2</b>	5CO2220730	2 ways body kit
<b>DFC050/3</b>	5CO2221713	3 ways body kit
<b>DFC050/6</b>	5CO2222711	6 ways body kit

### 2 Spools page 23

TYPE	CODE	DESCRIPTION
<b>for DFC050/2:</b>		
<b>A</b>	3CAS105200	Open port in neutral position
<b>B</b>	3CAS105100	Closed port in neutral position
<b>for DFC050/3:</b>		
<b>A</b>	3CAS105323	Flow in B in pos. 1. Ports connected in transit position
<b>B</b>	3CAS105422	Flow in B in pos. 1. Ports closed in transit position
<b>for DFC050/6:</b>		
<b>A</b>	3CAS105660	Flow in C and D. E and F closed in pos. 1. Ports connected in transit position
<b>B</b>	3CAS105721	Flow in C and D. E and F closed in pos. 1. Ports closed in transit position

### 3 Complete controls page 24

TYPE	CODE	DESCRIPTION
<b>17G</b>	5V17905000	Cam control with spring return in pos. 1
<b>17GCAX</b>	5V17905001	Inox steel cam control with spring return in pos. 1

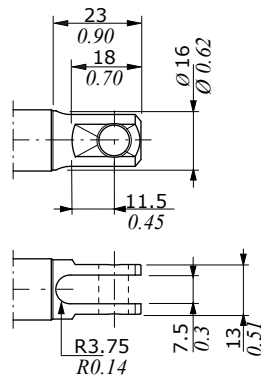
### 4 "B" side options page 24

TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP107000	with dust-proof plate

### 5 Body threading

Specify threading always when it is different from **BSP** standard

(\*) - Codes are referred to **UN-UNF** thread

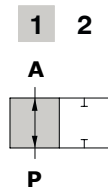


Rotary cam arrangement:  
spool type **A, B**

**2 ways**

**Type A**

Open port in neutral position

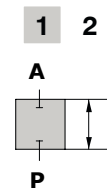


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B**

Closed port in neutral position



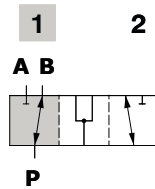
**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**3 ways**

**Type A**

Ports connected  
in transit position

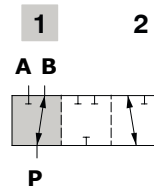


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B**

Ports closed  
in transit position



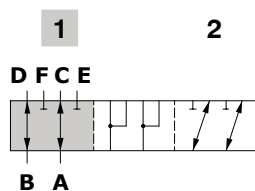
**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**6 ways**

**Type A**

Flow in C and D. E and F closed in pos. 1  
Ports connected in transit position

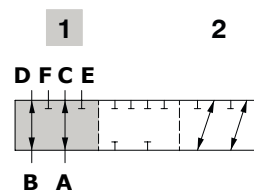


**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

**Type B**

Flow in C and D. E and F closed in pos. 1  
Ports closed in transit position



**Spool stroke**

Position 2: - 11 mm (- 0.43 in)

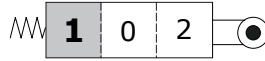
## Complete controls

### Cam control kit

17G type cam control available with stainless steel bearing (type 17GCAX).  
It must be coupled with type SLP flange on valve B side

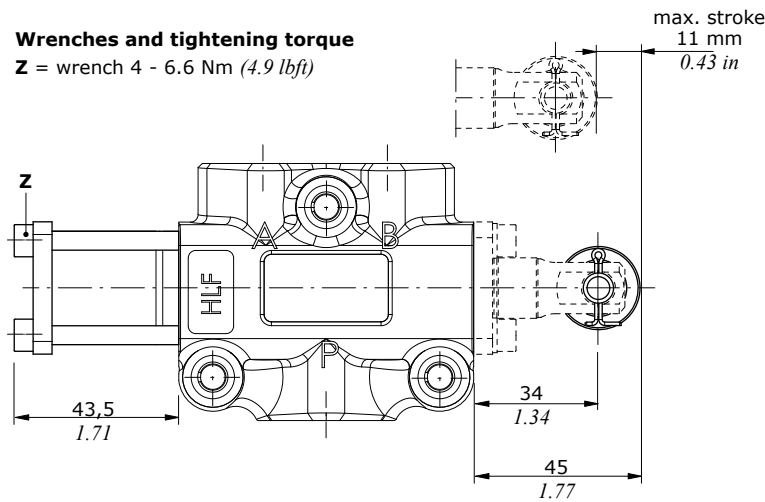
#### Type 17G - 17GCAX

Spring return in position 1

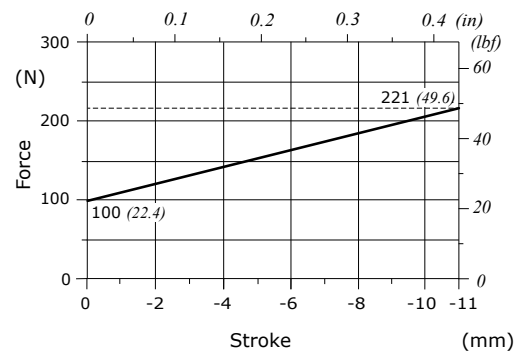


#### Wrenches and tightening torque

Z = wrench 4 - 6.6 Nm (4.9 lbf)



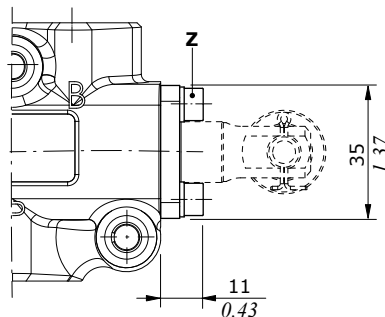
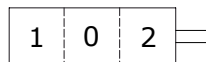
#### Force-Stroke diagram



## "B" side options

### Without lever, with flange

#### Type SLP



#### Wrenches and tightening torque

Z = wrench 4 - 6.6 Nm (4.9 lbf)





## DF10

### Mechanical control monoblock diverter valves

- 3 - 6 ways configuration
- Mechanical lever, cam, hydraulic, pneumatic controls

This catalogue 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.

#### WORKING CONDITIONS

N. of available ways	3 - 6	
Max. flow rating	90 l/min (23.7 US gpm)	
Max. pressure	315 bar (4600 psi)	
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm <sup>3</sup> /min (0.31 in <sup>3</sup> /min)
Fluid	Mineral based oil	
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination	21/19/16 - ISO 4406 - NAS 1638 - class 10	
Ambient temperature for working conditions	with mechanical controls	from -40°C to 60°C (from -40°F to 140°F)
	with hydraulic and pneumatic controls	from -30°C to 60°C (from -22°F to 140°F)

NOTE - For different working conditions please contact Sales Dept.

#### Available threads

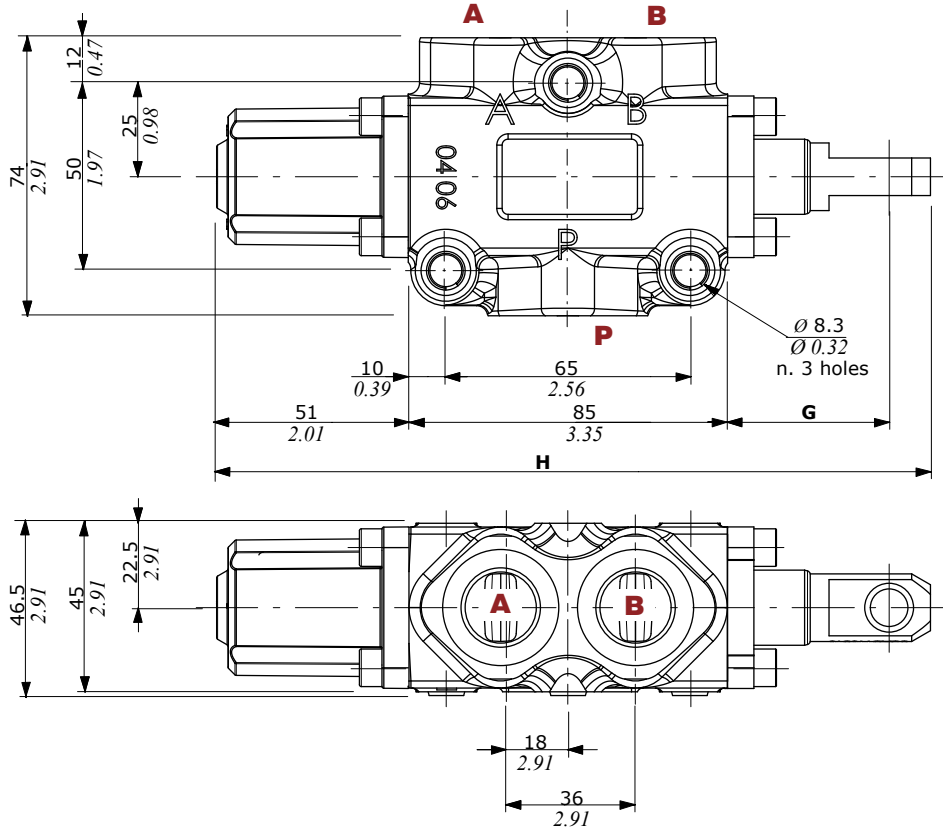
PORTS THREAD			
ALL PORTS	BSP	UN-UNF	METRIC* (ISO 9974-1)
<b>DF10</b>	G 1/2	7/8-14 (SAE 10)	M22x1.5
BOCCHIE PILOTAGGI			
Pneumatic	NPT 1/8-27	NPT 1/8-27	NPT 1/8-27
Hydraulic	G 1/4	9/16-18 (SAE 6)	-

(\* ) Optional threads  
for availability contact Sales  
Department

## Dimensional data - hydraulic circuit - performance data

### 3 ways

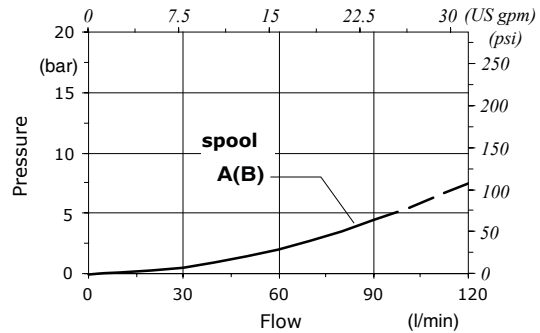
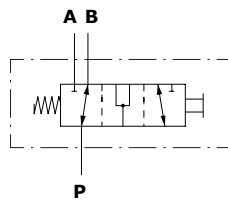
It's possible to obtain 2 ways diverter valve plugging port



	G	H
With spool out	43 mm 1.69 in	190 mm 7.48 in
With spool in	29 mm 1.14 in	176 mm 6.92 in

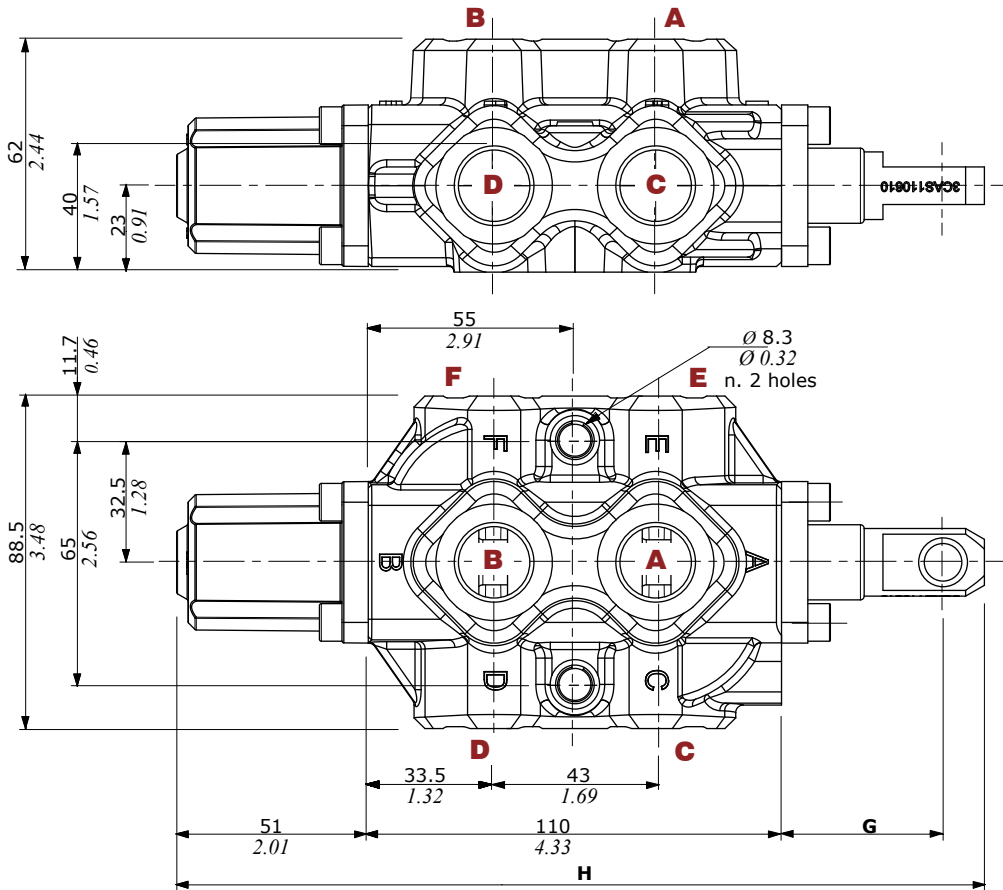
### Pressure drop versus flow

P → A(B)



**Dimensional data - hydraulic circuit - performance data**

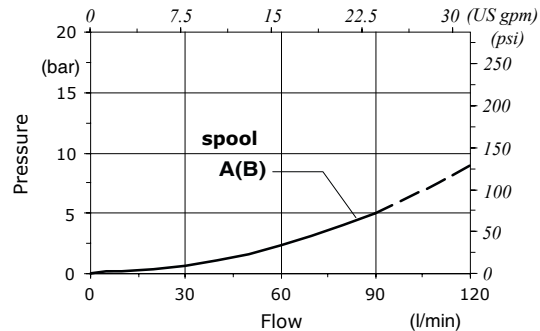
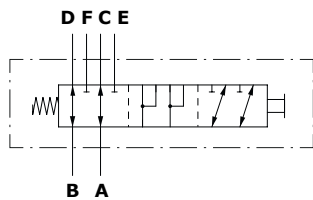
**6 ways**



	G	H
With spool out	43 mm 1.69 in	215 mm 8.46 in
With spool in	29 mm 1.14 in	201 mm 7.91 in

**Pressure drop versus flow**

**A → C(E)**



## Part ordering codes

Example:

**DF10/3**   **A**   **17**   **SLP**   -   **SAE**   -   **(CVN)**

**1**

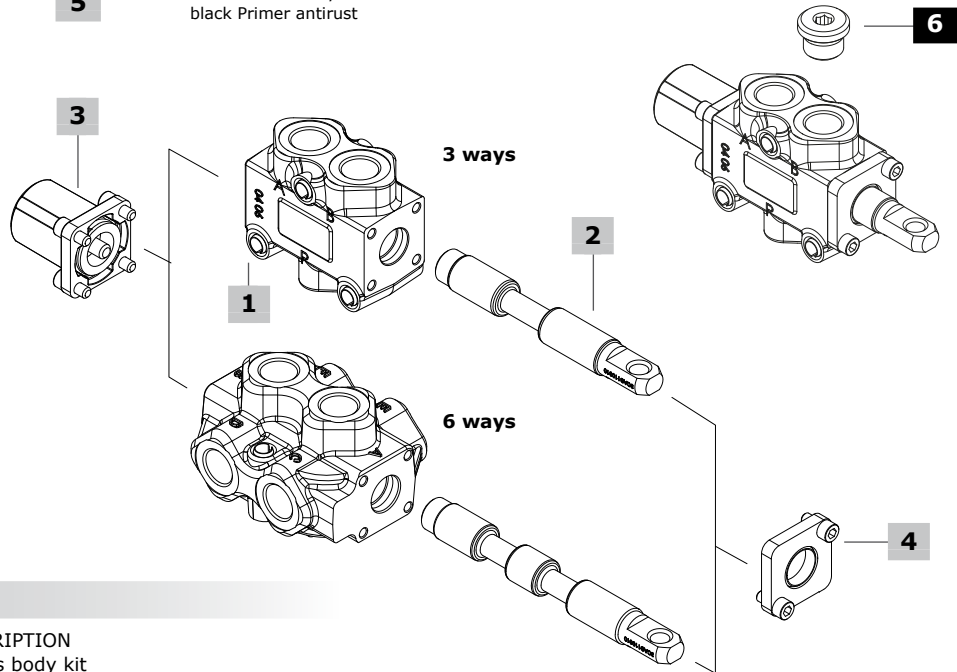
**2**

**3**

**4**

**5**

Painted with one layer of black Primer antirust



### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DF10/3</b>	5CO2241700	3 ways body kit
<b>DF10/6</b>	5CO2242700	6 ways body kit

### 2 Spools

page 29

TYPE	CODE	DESCRIPTION
<b>for DF10/3:</b>		
<b>A</b>	3CAS110310	Flow in B in pos. 1. Ports connected in transit position
<b>B</b>	3CAS110410	Flow in B in pos. 1. Ports closed in transit position
<b>AT</b>	3CAS110330	As type A, with spherical end
<b>AC</b>	3CAS110320	As type A, for cam control
<b>BC</b>	3CAS110420	As type B, for cam control
<b>DC</b>	3CAS110520	Flow in A, B in pos. 1. Without transit position, for cam control

**for DF10/6:**

<b>A</b>	3CAS110610	Flow in C and D. E and F closed in pos. 1. Ports connected in transit position
<b>B</b>	3CAS110710	Flow in C and D. E and F closed in pos. 1. Ports closed in transit position
<b>AC</b>	3CAS110620	As type A, for cam control
<b>BC</b>	3CAS110720	As type B, for cam control

### 3 "A" side spool positioners

page 30

TYPE	CODE	DESCRIPTION
<b>12</b>	5V12110000	Detent in positions 1 and 2
<b>17</b>	5V17110000	Spring return in position 1
<b>17ME</b>	5V17310000	As kit 17, with heavier spring type E
<b>18</b>	5V18110000	Spring return in position 2
<u>Pneumatic controls: must be coupled to the control kit side B with lever, with plate or cap</u>		
<b>17P</b>	5V17110700	On/off, with spring return in pos. 1
<b>18P</b>	5V18110710	On/off, with spring return in pos. 2
<u>Hydraulic controls: must be coupled to the control kit side B with lever, with plate or cap</u>		
<b>18IA1</b>	5V18110850*	On/off high pressure hydraulic kit with spring return in position 2
<b>18IB1</b>	5V18110870*	On/off low pressure hydraulic kit with spring return in position 2

### 4 "B" side options

page 33

TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP110000	Without lever box, with dust-proof plate kit
<b>SLC</b>	5COP210000	Without lever box, with cap
<b>L</b>	5LEV110000	Aluminum lever box
<b>CA</b>	5CAM110000	Steel ball bearing cam operation
<b>CB</b>	5CAM110020	Bronze cam operation
<u>Hydraulic controls</u>		
<b>IA2</b>	5IDR510701*	On/off with high pressure pilot, need 17ME control type
<b>IB2</b>	5IDR710700*	On/off with low pressure pilot, need 17ME control type

### 5 Body threading

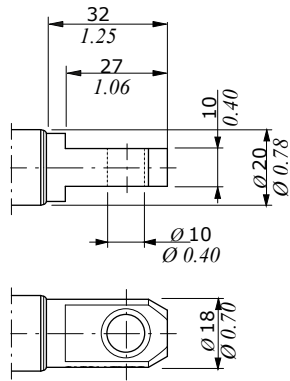
Specify threading always when it is different from **BSP** standard

### 6 Port plugs\*

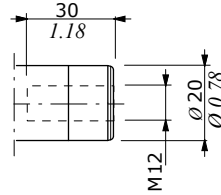
CODE	DESCRIPTION
3XTAP826160	SAE10 plug

It's possible to obtain 2 ways diverter valve plugging DF10/3 port

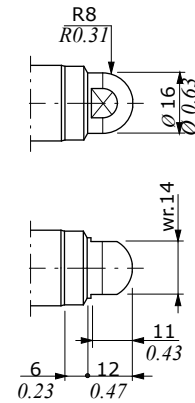
(\* ) - Codes are referred to **UN-UNF** thread



Standard:  
spool type **A, B**



Rotary cam arrangement:  
spool type **AC, BC, DC**



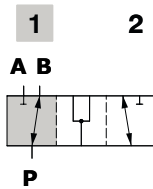
Spherical end:  
spool type **AT**

**Spool circuits**

**3 ways**

**Type A/AT/AC**

Ports connected  
in transit position

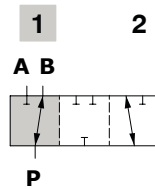


**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**Type B/BC**

Ports closed  
in transit position

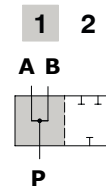


**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**Type DC**

Without transit position  
Ports connected in neutral



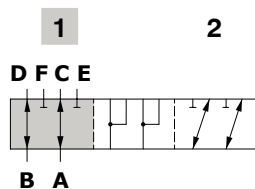
**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**6 ways**

**Type A/AC**

Flow in C and D. E and F closed in pos. 1  
Ports connected in transit position

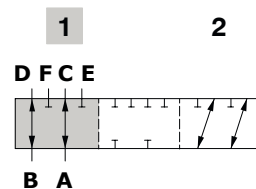


**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**Type B/BC**

Flow in C and D. E and F closed in pos. 1  
Ports closed in transit position



**Spool stroke**

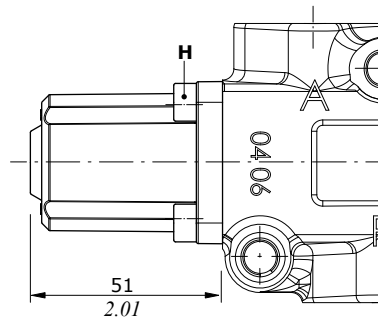
Position 2: - 14 mm (- 0.55 in)

"A" side spool positioners

With detent

**Type 12**

Detent in positions 1 and 2



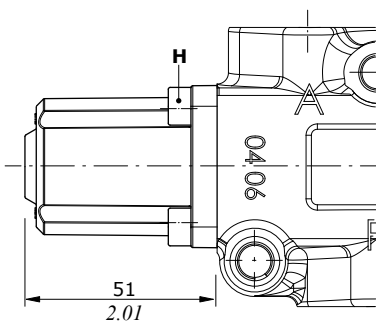
**Wrenches and tightening torque**

H = wrench 5 - 9.8 Nm (7.2 lbf)

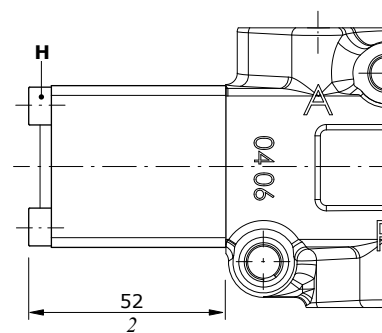
With spring return in position 1

With heavier spring type "E"

**Type 17**



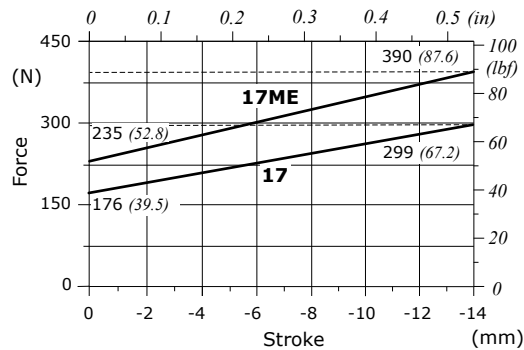
**Type 17ME**



**Wrenches and tightening torque**

H = wrench 5 - 9.8 Nm (7.2 lbf)

**Force-Stroke diagram**



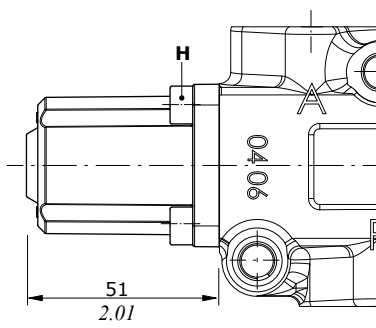
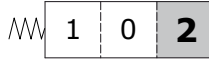
**"A" side spool positioners**

**With spring return in position 2**

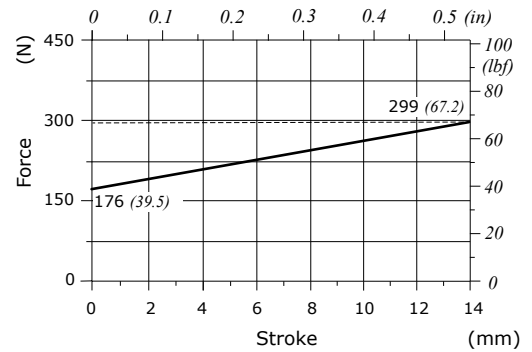
**Type 18**

**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)



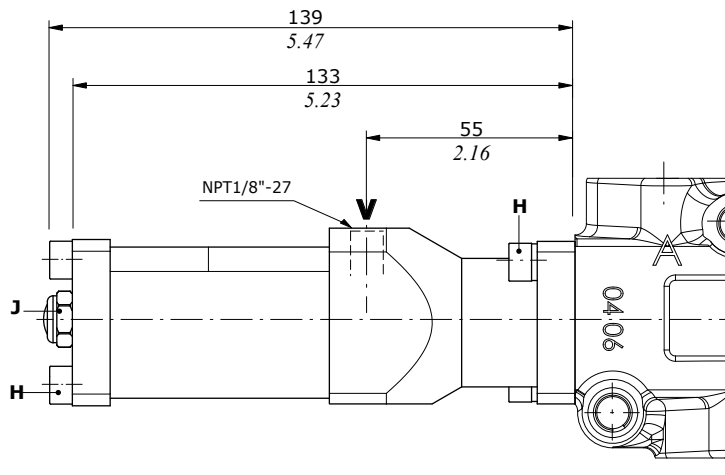
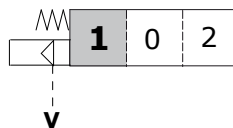
**Force-Stroke diagram**



**ON/OFF pneumatic controls**

**Type 17P**

Spring return in pos. 1



**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

**J** = wrench 13 - 9.8 Nm (7.2 lbf<sub>t</sub>)

Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

**"A" side spool positioners**

**ON/OFF pneumatic controls**

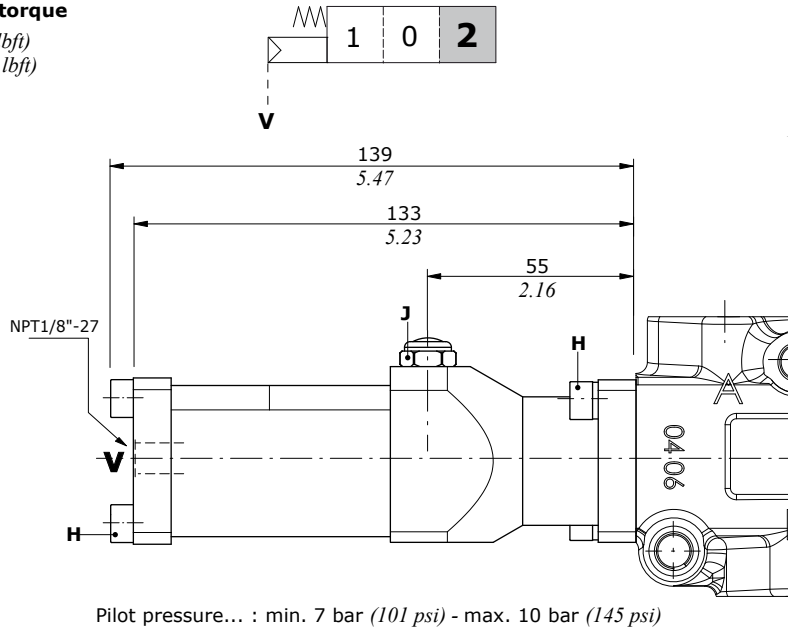
**Type 18P**

Spring return in pos. 2

**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

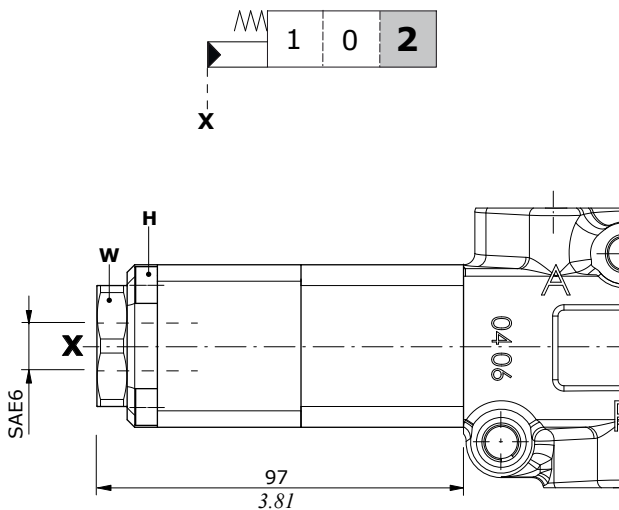
**J** = wrench 13 - 9.8 Nm (7.2 lbf<sub>t</sub>)



**Hydraulic controls**

**Type 18IA1**

High pressure hydraulic kit with spring return in position 2



Pilot pressure max. = 250 bar (3620 psi)

**Wrenches and tightening torque**

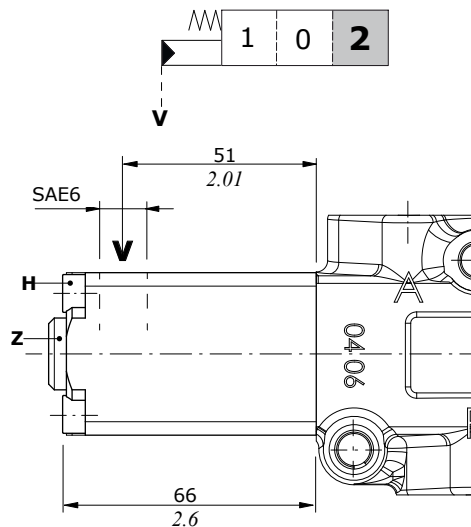
**H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

**Z** = wrench 6 - 24 Nm (17.7 lbf<sub>t</sub>)

**W** = wrench 32 - 42 Nm (31 lbf<sub>t</sub>)

**Type 18IB1**

Low pressure hydraulic kit with spring return in position 2



Pilot pressure max. = 50 bar (725 psi)

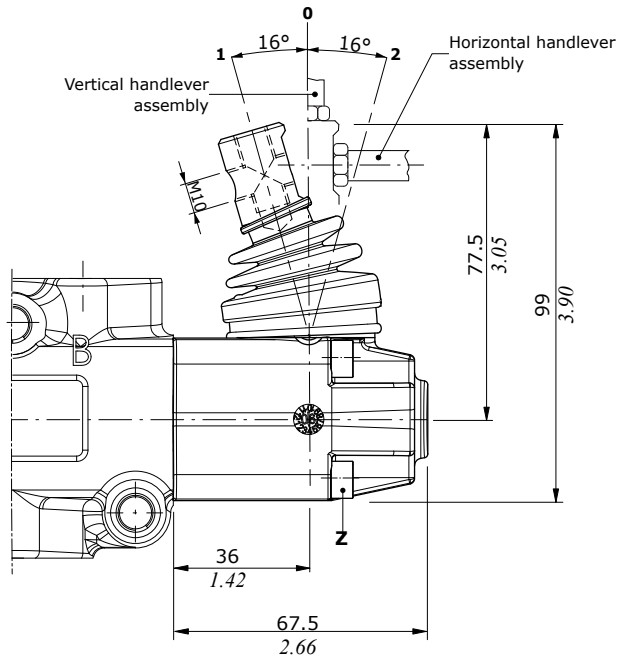
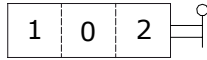


**"B" side options**

**Lever control kit**

Aluminium with protection boot lever pivot box; it can be rotated 180° (execution **L180**)

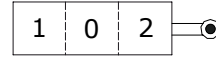
**Type L**



**Cam control kit**

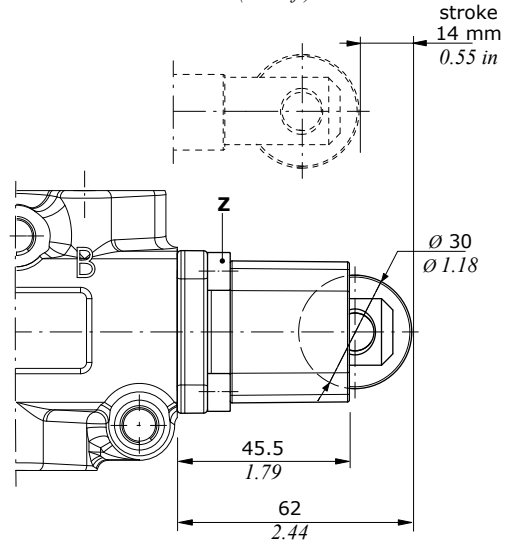
Steel ball bearing cam operation (CA), and bronze cam operation (CB); it must be coupled to 17 control kit

**Type CA-CB**



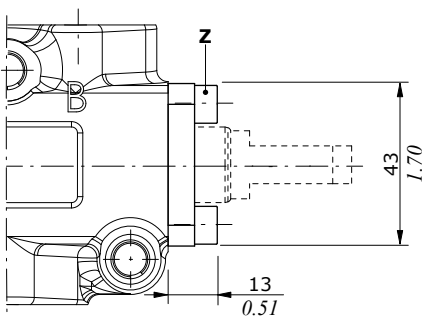
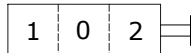
**Wrenches and tightening torque**

**Z** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)



**Without lever, with flange**

**Type SLP**



**Wrenches and tightening torque**

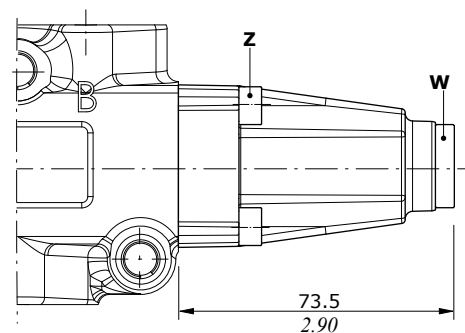
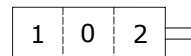
**Z** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

**W** = wrench 8 - 24 Nm (17.7 lbf<sub>t</sub>)

**Without lever, with cap**

Protection cap to use with pneumatic and hydraulic spool positioner kits

**Type SLC**



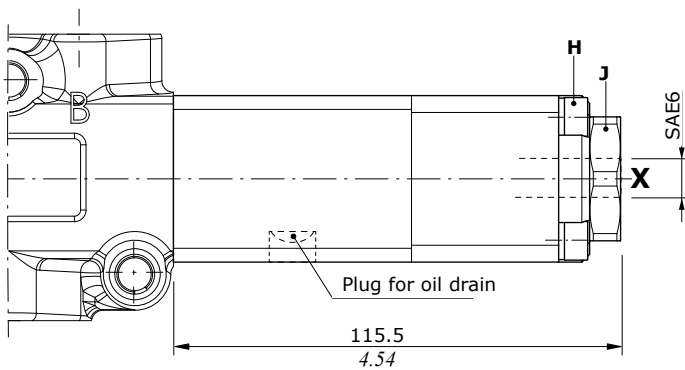
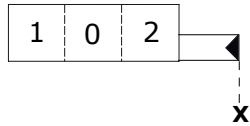
## "B" side options

### Hydraulic controls

ON/OFF controls with high and low pressure pilot it must be only coupled to 17ME control kit

#### Type IA2

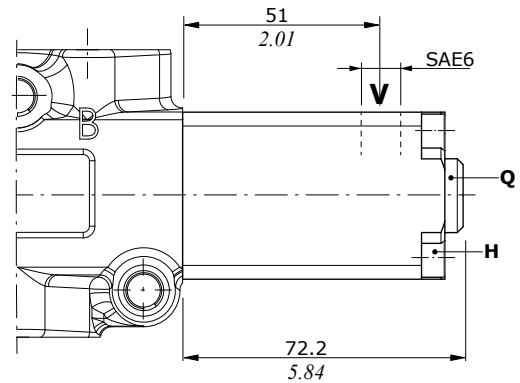
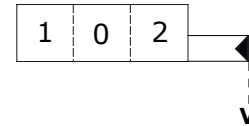
High pressure pilot



Pilot pressure max. = 250 bar (3620 psi)

#### Type IB2

Low pressure pilot



Pilot pressure max. = 50 bar (725 psi)

#### Wrenches and tightening torque

**H** = wrench 5 - 9.8 Nm (7.2 lbft)

**J** = wrench 24 - 42 Nm (31 lbft)

**Q** = wrench 6 - 24 Nm (17.7 lbft)



## DFC100

### Mechanical control monoblock diverter valves

- 3 - 6 ways configuration
- Cam control kit
- Especially suitable for use in external environments

This catalogue 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.

#### WORKING CONDITIONS

N. of available ways	3 - 6	
Max. flow rating	90 l/min (23.7 US gpm)	
Max. pressure	315 bar (4600 psi)	
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm <sup>3</sup> /min (0.31 in <sup>3</sup> /min)
Fluid	Mineral based oil	
Fluid temperature	from -20°C to 80°C (from -4°F to 176°F)	
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination	21/19/16 - ISO 4406 - NAS 1638 - class 10	
Ambient temperature for working conditions	from -40°C to 60°C (from -40°F to 140°F)	

NOTE - For different working conditions please contact Sales Dept.

#### Available threads

##### PORTS THREAD

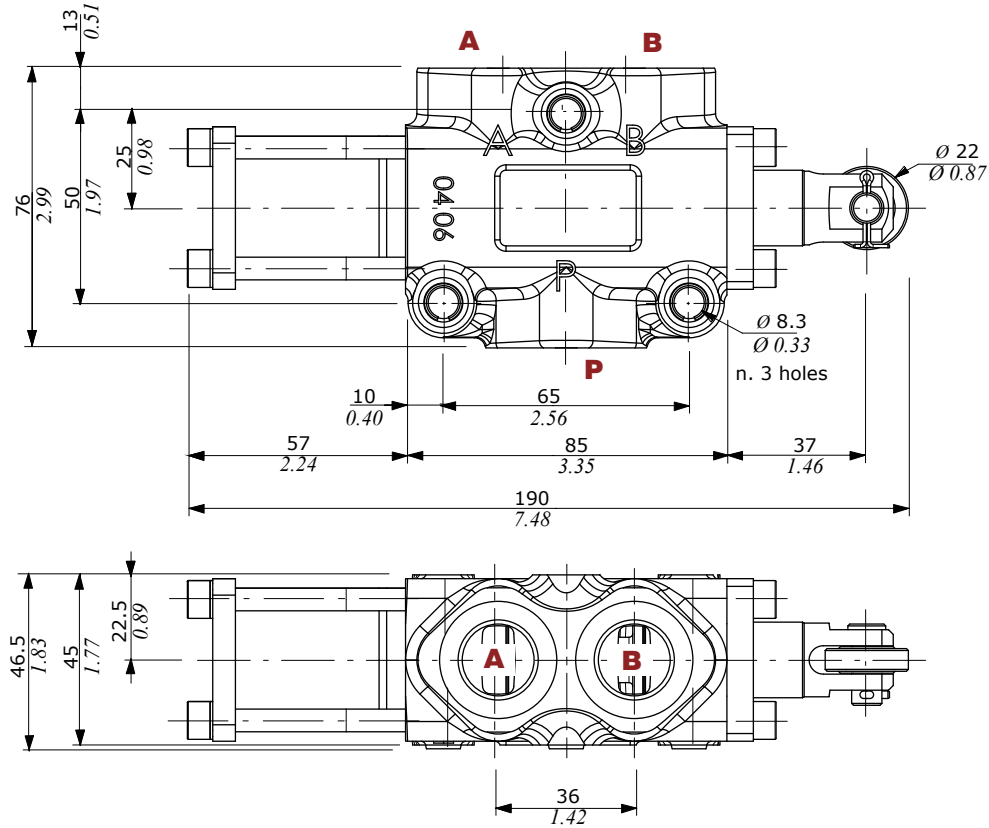
ALL PORTS	BSP	UN-UNF	METRIC* (ISO 9974-1)
<b>DFC100</b>	G 1/2	7/8-14 (SAE 10)	M22x1.5

(\* ) Optional threads  
for availability contact Sales  
Department

## Dimensional data - hydraulic circuit - performance data

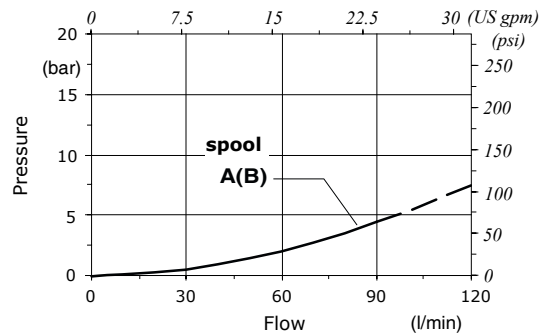
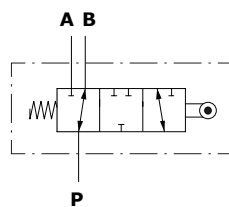
Cam spool control suggested for severe applications; it requires a special body, spool and control kit.

### 3 way



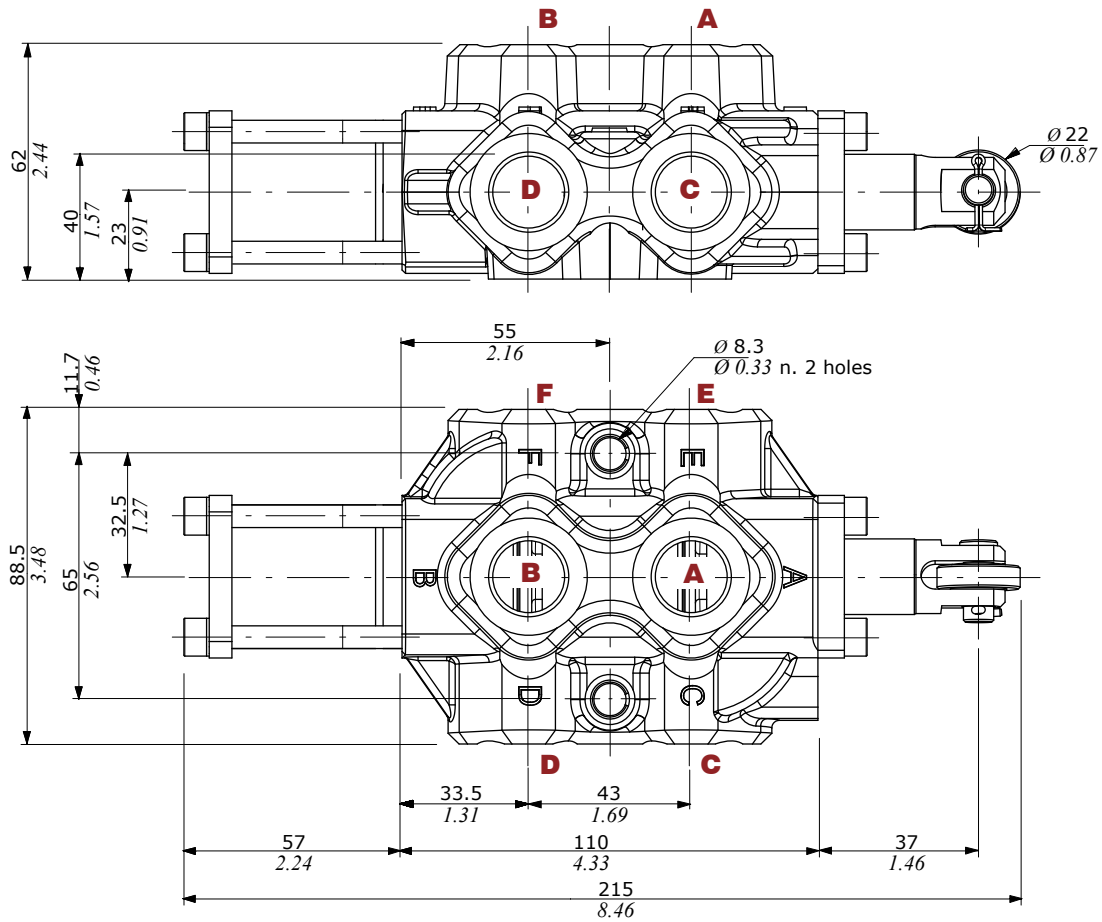
Pressure drop versus flow

P → A(B)



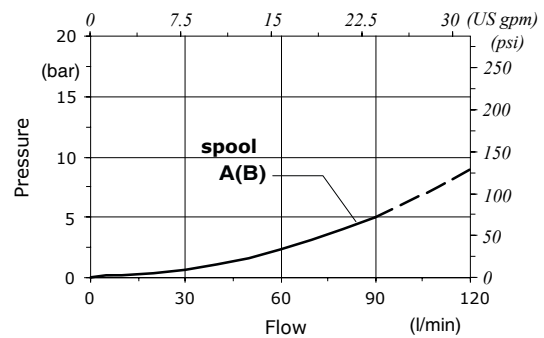
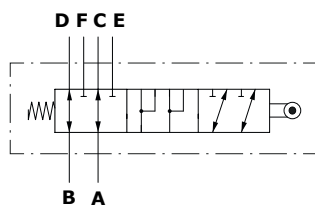
**Dimensional data - hydraulic circuit - performance data**

**6 way**



**Pressure drop versus flow**

**A → C(E)**



## Part ordering codes

Example:

**DFC100/3** **B** **17G** **SLP** - **SAE** - **(CVN)**

**1**

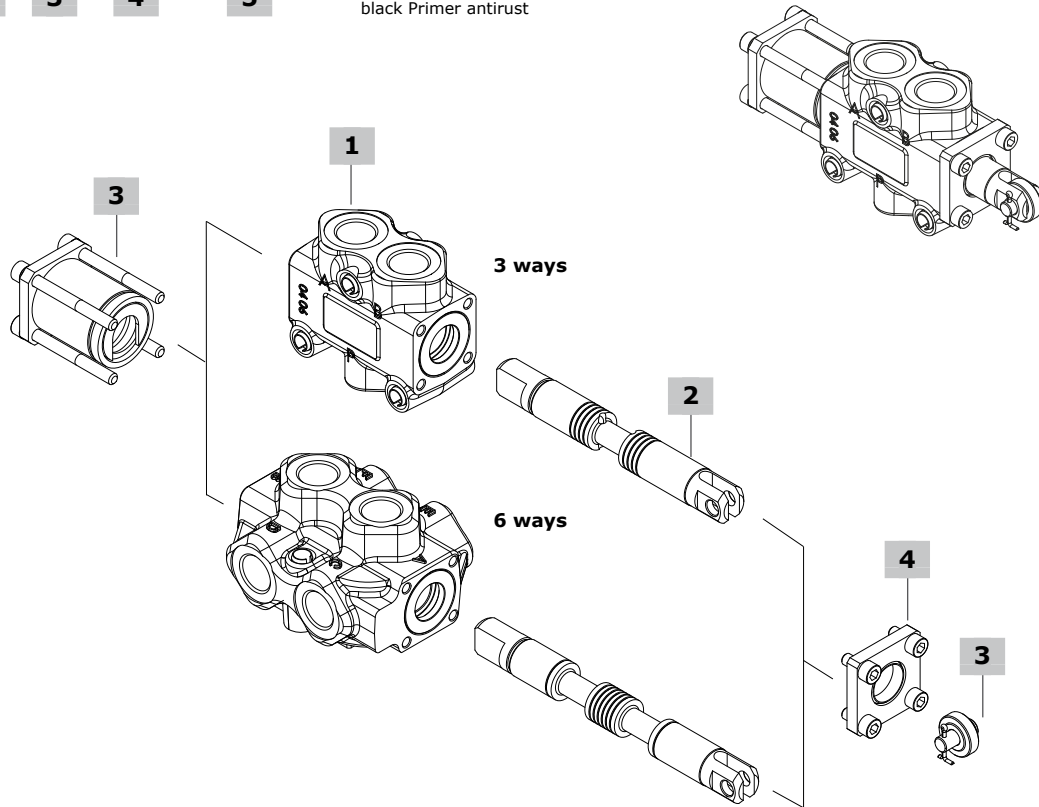
**2**

**3**

**4**

**5**

Painted with one layer of black Primer antirust



### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DFC100/3</b>	5CO2241713	3 ways body kit
<b>DFC100/6</b>	5CO2242711	6 ways body kit

### 2 Spools page 39

TYPE	CODE	DESCRIPTION
<b>for DFC100/3:</b>		
<b>A</b>	3CAS110312	Ports connected in transit position
<b>B</b>	3CAS110421	Ports closed in transit position
<b>for DFC100/6:</b>		
<b>A</b>	3CAS110711	Flow in C and D. E and F closed in pos. 1 Ports connected in transit position
<b>B</b>	3CAS110721	Flow in C and D. E and F closed in pos. 1 Ports closed in transit position

### 3 Complete controls page 40

TYPE	CODE	DESCRIPTION
<b>17G</b>	5V17910000	Cam control with spring return in pos. 1
<b>17GCAX</b>	5V17910001	Inox steel cam control with spring return in pos. 1

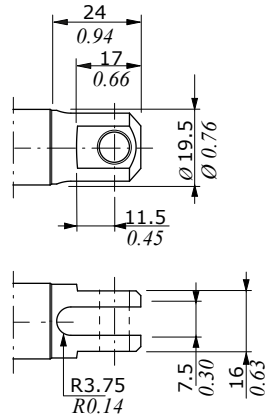
### 4 "B" side options page 40

TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP110005	with dust-proof plate

### 5 Body threading

Specify threading always when it is different from **BSP** standard

(\* ) - Codes are referred to **UN-UNF** thread

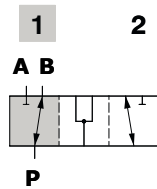


Rotary cam arrangement:  
spool type **A, B**

**3 ways**

**Type A**

Ports connected  
in transit position

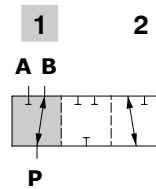


**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**Type B**

Ports closed  
in transit position



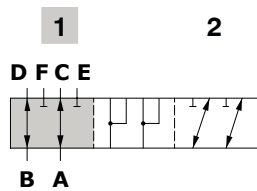
**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**6 ways**

**Type A**

Flow in C and D. E and F closed in pos. 1  
Ports connected in transit position

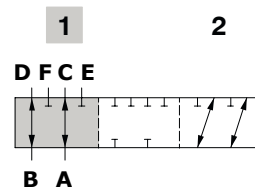


**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

**Type B**

Flow in C and D. E and F closed in pos. 1  
Ports closed in transit position



**Spool stroke**

Position 2: - 14 mm (- 0.55 in)

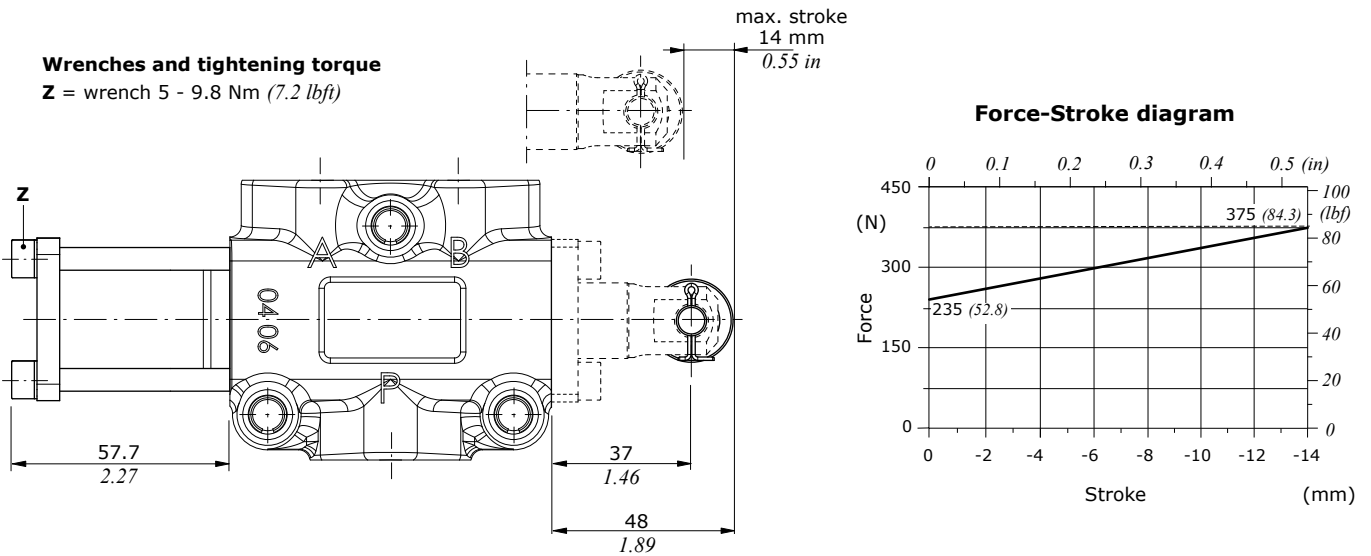
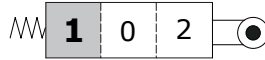
## Complete controls

### Cam control kit

17G type cam control available with stainless steel bearing (type 17GCAX).  
It must be coupled with type SLP flange on valve B side

#### Type 17G - 17GCAX

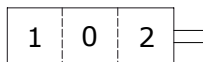
Spring return in pos.1



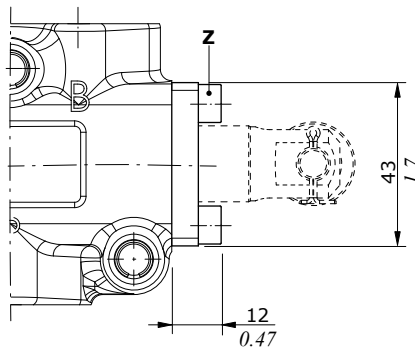
## "B" side options

### Without lever, with flange

#### Type SLP



**Wrenches and tightening torque**  
Z = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)







## DF20

### Mechanical control monoblock diverter valves

- 3 - 6 ways configuration
- Mechanical lever, cam, hydraulic, electrohydraulic, pneumatic controls

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		3 - 6
Max. flow rating		140 l/min (37 US gpm)
Max. pressure		315 bar (4600 psi)
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	8 cm <sup>3</sup> /min (0.48 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		21/19/16 - ISO 4406 - NAS 1638 - class 10
Ambient temperature for working conditions	with mechanical controls	from -40°C to 60°C (from -40°F to 140°F)
	with hydraulic and pneumatic controls	from -30°C to 60°C (from -22°F to 140°F)
	with electric controls	from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

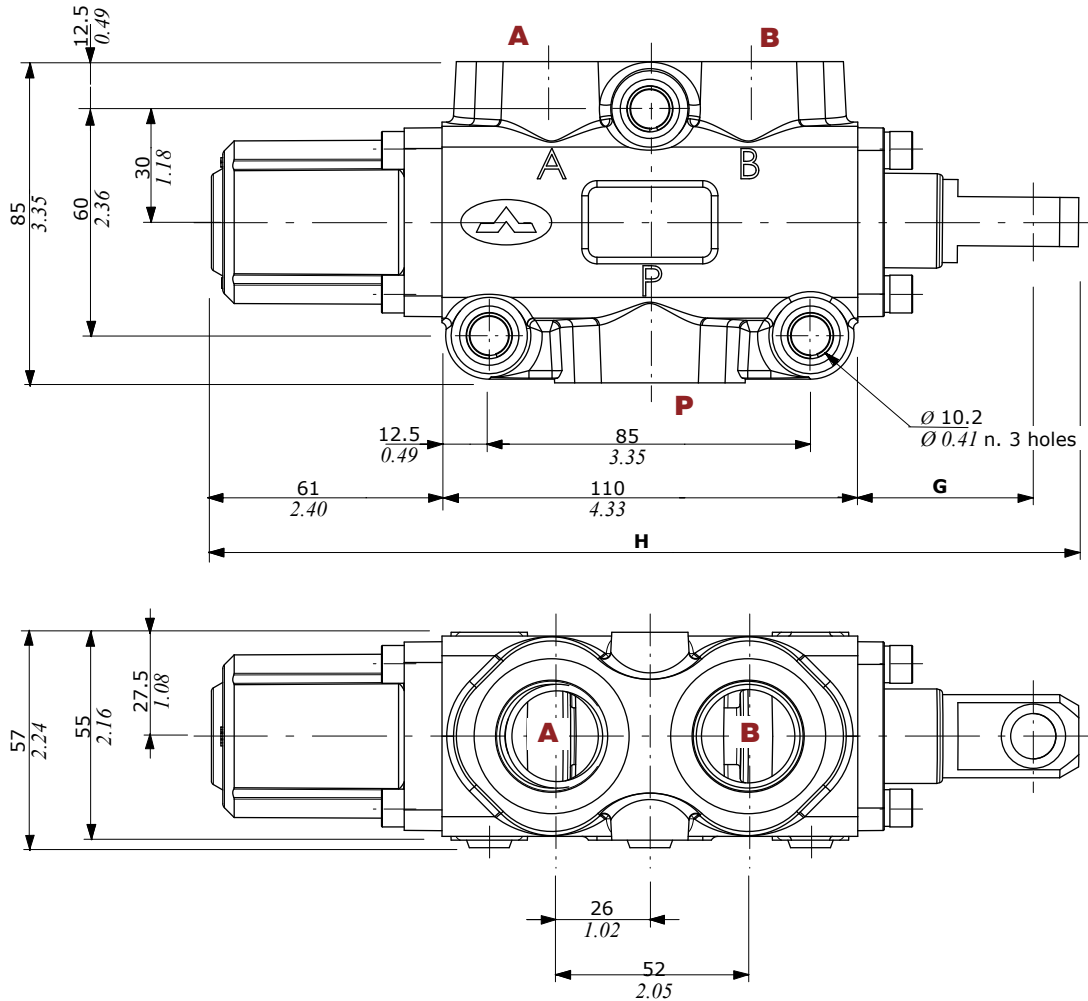
### Available threads

PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DF20</b>	G 3/4	1" 1/16-12 (SAE 12)
PILOT PORTS		
Pneumatic	NPT 1/8-27	NPT 1/8-27
Hydraulic	G 1/4	9/16-18 (SAE 6)

## Dimensional data - hydraulic circuit - performance data

### 3 ways

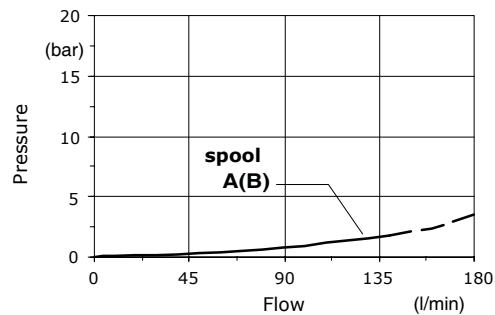
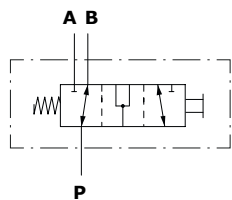
It's possible to obtain 2 ways diverter valve plugging port



	G	H
With spool out	55 mm 2.16 in	238 mm 9.37 in
With spool in	35 mm 1.37 in	218 mm 8.58 in

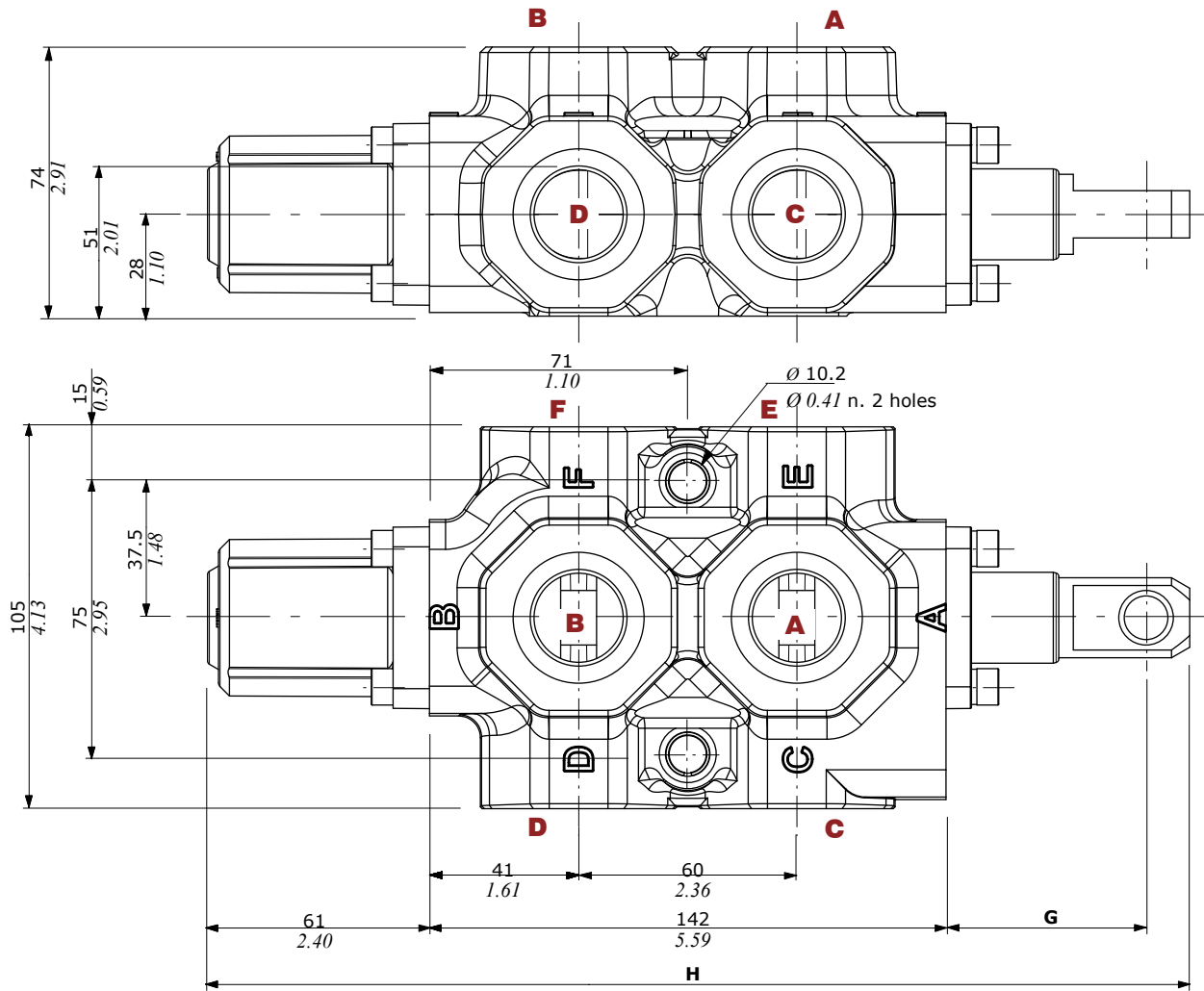
Pressure drop versus flow

P → A(B)



Dimensional data - hydraulic circuit - performance data

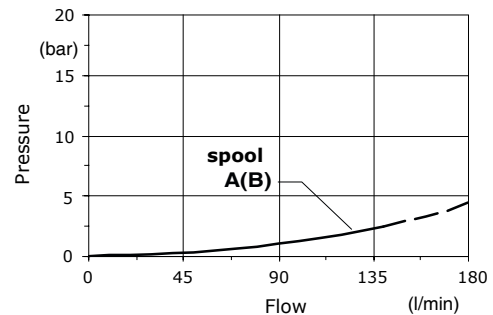
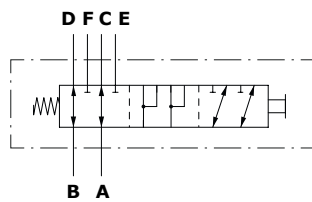
6 ways



	G	H
With spool out	55 mm 2.16 in	270 mm 10.6 in
With spool in	35 mm 1.37 in	250 mm 9.84 in

Pressure drop versus flow

A → C(E)



## Part ordering codes

Example:

**DF20/3**   **A**   **17**   **SLP**   -   **SAE**   -   **(CVN)**

**1**

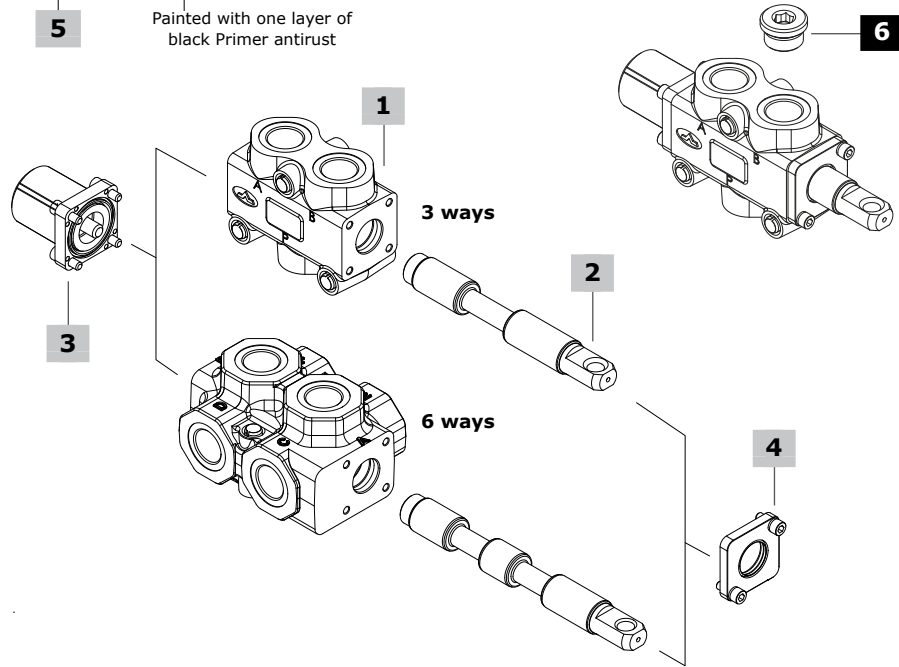
**2**

**3**

**4**

**5**

Painted with one layer of black Primer antirust



### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DF20/3</b>	5CO2261700	3 ways body kit
<b>DF20/6</b>	5CO2263700	6 ways body kit

### 2 Spools

page 45

TYPE	CODE	DESCRIPTION
<b>for DF20/3:</b>		
<b>A</b>	3CAS120310	Flow in B in pos. 1. Ports connected in transit position
<b>B</b>	3CAS120410	Flow in B in pos. 1. Ports closed in transit position
<b>AC</b>	3CAS120320	As type A, for cam control
<b>BC</b>	3CAS120420	As type B, for cam control

### for DF20/6:

<b>A</b>	3CAS120610	Flow in C and D. E and F closed in pos. 1. Ports connected in transit position
<b>B</b>	3CAS120710	Flow in C and D. E and F closed in pos. 1. Ports closed in transit position
<b>AC</b>	3CAS120620	As type A, for cam control

### 3 "A" side spool positioners

page 46

TYPE	CODE	DESCRIPTION
<b>12</b>	5V12120000	Detent in positions 1 and 2
<b>17</b>	5V17120000	Spring return in position 1
<b>17ME</b>	5V17320000	As kit 17, with heavier spring type E
<b>18</b>	5V18120000	Spring return in position 2

Pneumatic controls: must be coupled to the control kit side B with lever, with plate or cap

<b>17P</b>	5V17110700	On/off, with spring return in pos. 1
<b>18P</b>	5V18120700	On/off, with spring return in pos. 2
<b>18PNCWP</b>	5V18120713	On/off, with spring return in pos. 2, waterproof

### 3 "A" side spool positioners (cont.) page 46

Hydraulic controls: must be coupled to the control kit side B with lever, with plate or cap

<b>18IA1</b>	5V18120825*	On/off high pressure hydraulic kit with spring return in position 2
<b>18IB1</b>	5V18120815*	On/off low pressure hydraulic kit with spring return in position 2

Electrohydraulic controls: must be coupled to the control kit side B with lever, with plate or cap

Control requires collector kit; see page 50

<b>18E11</b>	5V18120350	Spring return in pos. 2, 12VDC
	5V18120351	Spring return in pos. 2, 24VDC

### 4 "B" side options

page 51

TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP120000	Without lever box, with dust-proof plate kit
<b>SLC</b>	5COP220000	Without lever box, with cap
<b>L</b>	5LEV120000	Aluminum lever box
<b>CA</b>	5CAM120000	Steel ball bearing cam operation
<b>CB</b>	5CAM120020	Bronze cam operation

Hydraulic controls

<b>IA2</b>	5IDR520700*	On/off with high pressure pilot, need 17ME control type
<b>IB2</b>	5IDR720700*	On/off with low pressure pilot, need 17ME control type

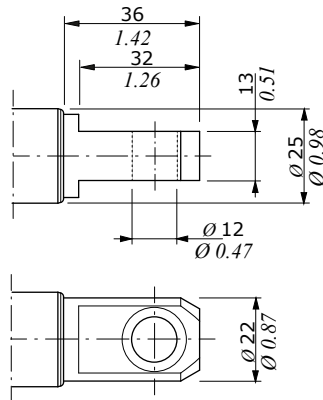
### 5 Body threading

Specify threading always when it is different from **BSP** standard

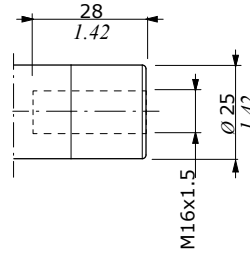
### 6 Port plugs\*

CODE	DESCRIPTION
3XTAP832200	SAE12 plug

(\* ) - Codes are referred to **UN-UNF** thread



Standard:  
spool type **A, B**



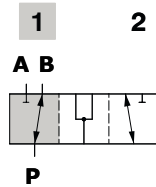
Rotary cam arrangement:  
spool type **AC, BC**

**Spool circuits**

**3 ways**

**Type A/AC**

Ports connected  
in transit position

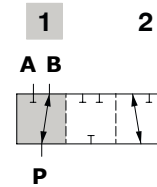


**Spool stroke**

Position 2: - 20 mm (- 0.78 in)

**Type B/BC**

Ports closed  
in transit position



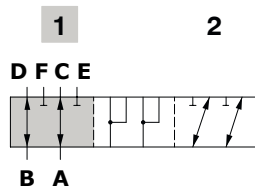
**Spool stroke**

Position 2: - 20 mm (- 0.78 in)

**6 ways**

**Type A/AC**

Flow in C and D. E and F closed in pos. 1  
Ports connected in transit position

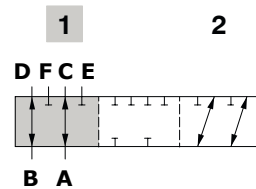


**Spool stroke**

Position 2: - 20 mm (- 0.78 in)

**Type B**

Flow in C and D. E and F closed in pos. 1  
Ports closed in transit position



**Spool stroke**

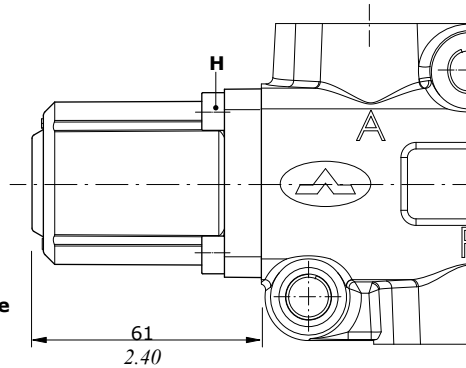
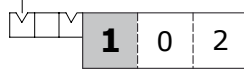
Position 2: - 20 mm (- 0.78 in)

"A" side spool positioners

With detent

**Type 12**

Detent in positions 1 and 2

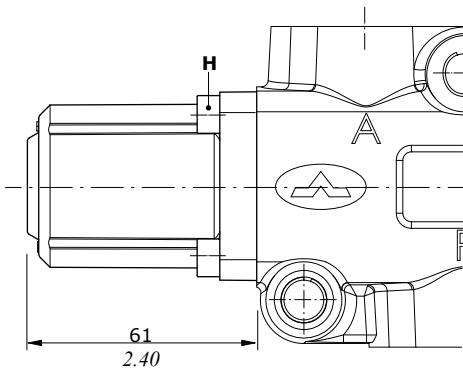


**Wrenches and tightening torque**  
 H = wrench 5 - 9.8 Nm (7.2 lbf)

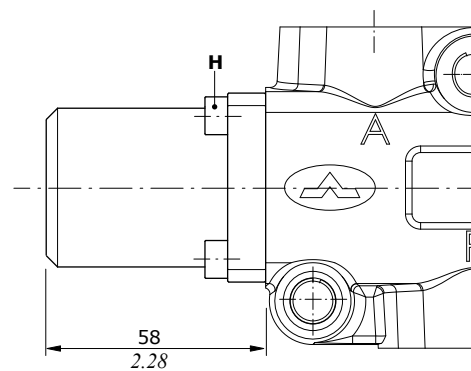
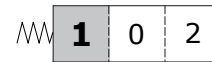
With spring return in position 1

With heavier spring type "E"

**Type 17**

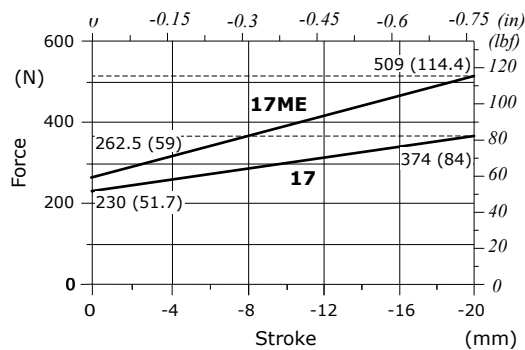


**Type 17ME**



**Wrenches and tightening torque**  
 H = wrench 5 - 9.8 Nm (7.2 lbf)

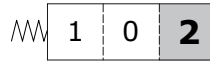
**Force-Stroke diagram**



**"A" side spool positioners**

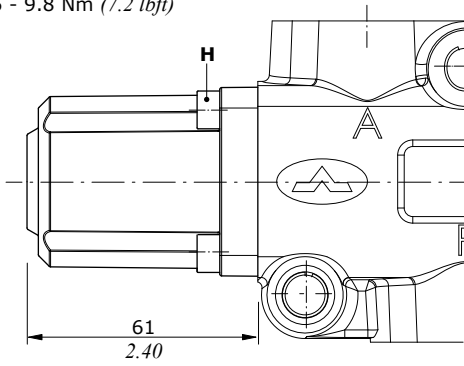
**With spring return in position 2**

**Type 18**

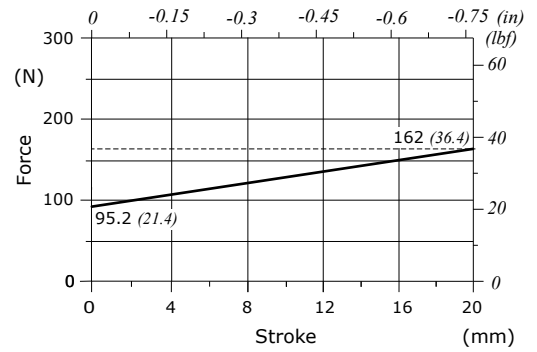


**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)



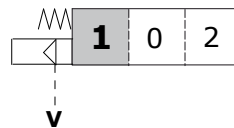
**Force-Stroke diagram**



**ON/OFF pneumatic controls**

**Type 17P**

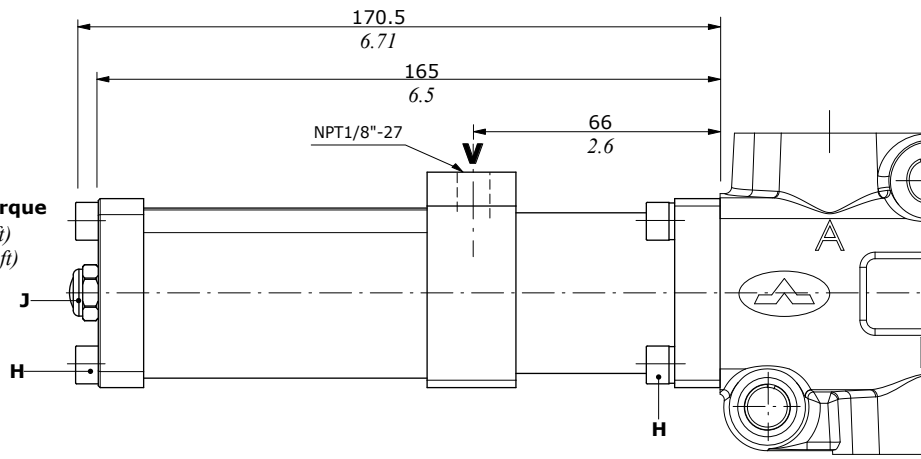
Spring return in position 1



**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)

**J** = wrench 13 - 9.8 Nm (7.2 lbf<sup>t</sup>)



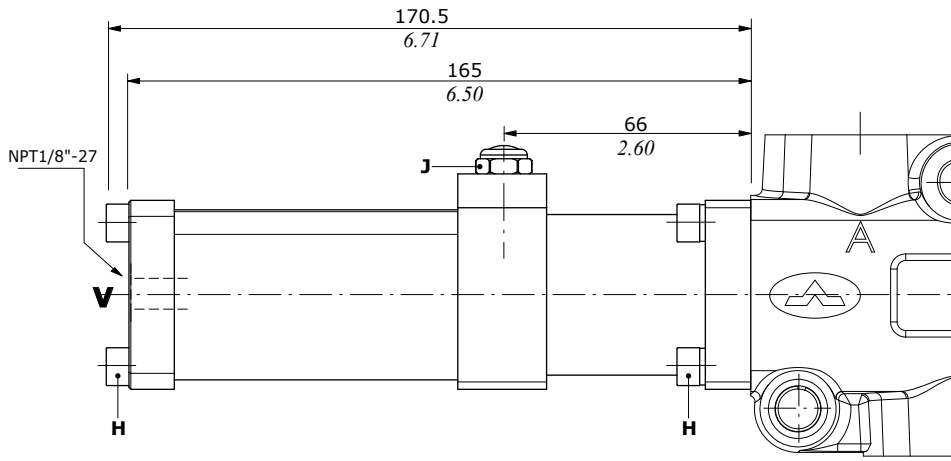
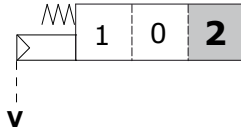
Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

"A" side spool positioners

ON/OFF pneumatic controls

**Type 18P**

Spring return in position 2



Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

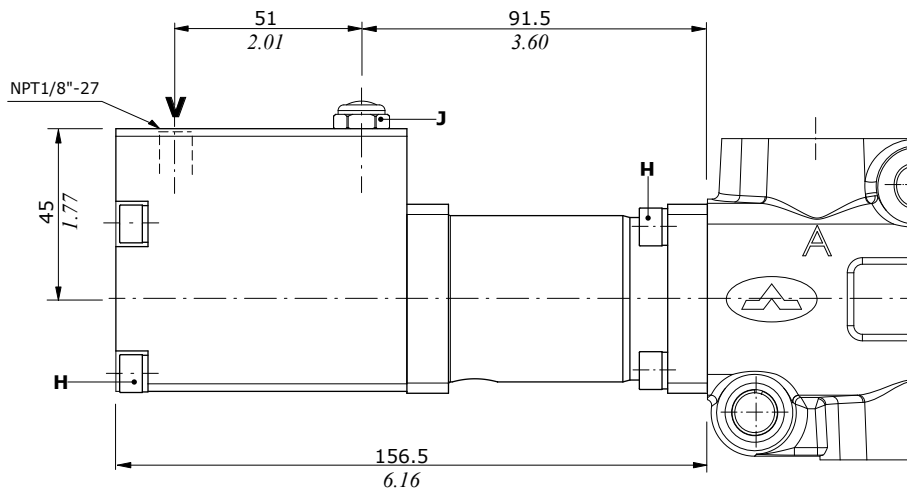
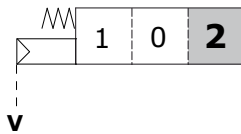
**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbft)

**J** = wrench 13 - 9.8 Nm (7.2 lbft)

**Type 18PNCWP**

Spring return in position 2, waterproof



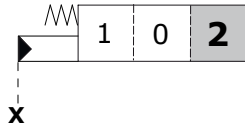


**"A" side spool positioners**

**Hydraulic controls**

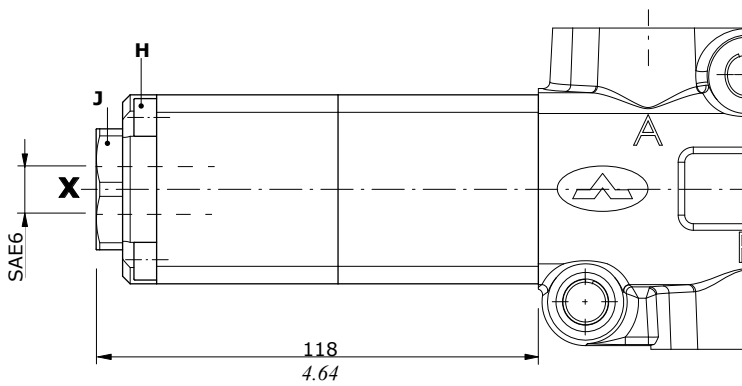
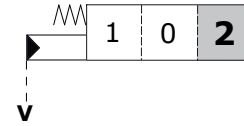
**Type 18IA1**

High pressure hydraulic kit with spring return in position 2

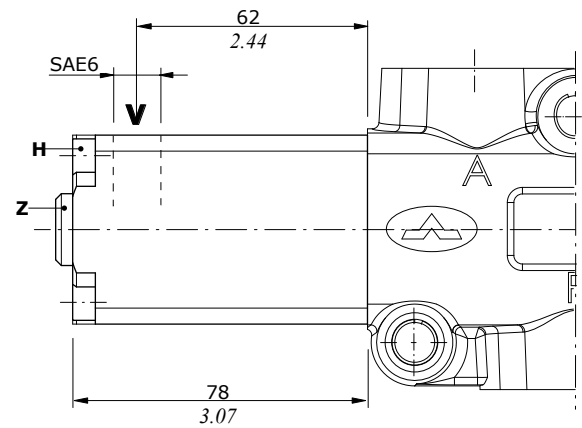


**Type 18IB1**

Low pressure hydraulic kit with spring return in position 2



Pilot pressure max. = 250 bar (3620 psi)



Pilot pressure max. = 50 bar (725 psi)

**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)

**Z** = wrench 6 - 24 Nm (17.7 lbf<sup>t</sup>)

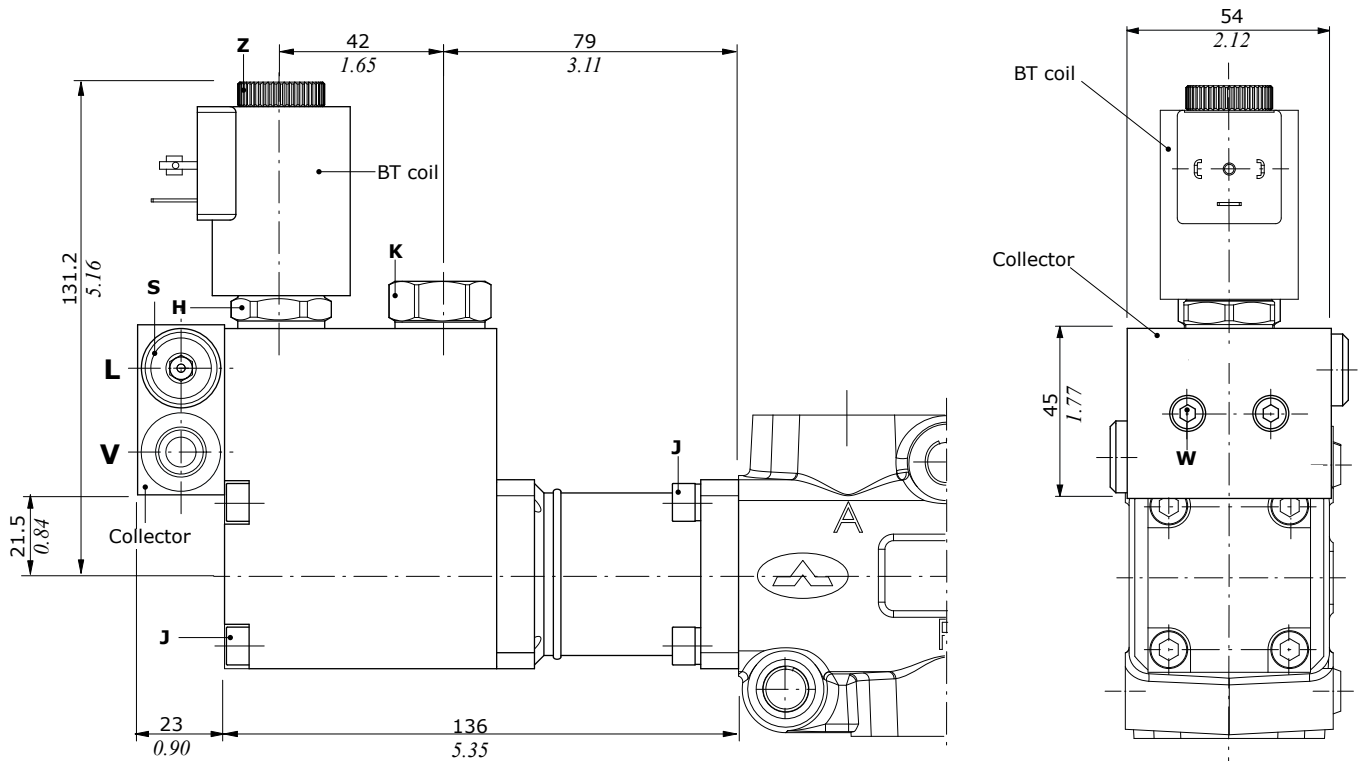
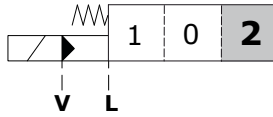
**J** = wrench 32 - 42 Nm (31 lbf<sup>t</sup>)

"A" side spool positioners

ON/OFF electrohydraulic control

**Type 18EI1**

Spring return in pos. 2,  
with external pilot and drain



**Wrenches and tightening torque**

- J = wrench 5 - 9.8 Nm (7.2 lbft)
  - K = wrench 24 - 30 Nm (22.1 lbft)
  - Z = 5 Nm (3.68 lbft)
  - S = wrench 6 - 24 Nm (17.7 lbft)
  - H\* = wrench 24 - 9.8 Nm (7.2 lbft)
  - W = wrench 4 - 6.6 Nm (4.9 lbft)
- (\*)Tightening with dynamometric wrench or screwer

**Collector kit for external pilot and drain**

COLLECTOR KIT CODE		
Type	Code	Description

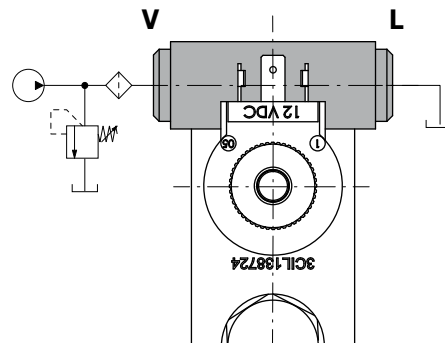
KE1S0 5KE1S00070 kit for 1 section

Codes are referred to UN-UNF thread

**Features**

- Pilot pressure: ..... : min. 10 bar (145) psi
- : max. 50 bar (725) psi
- Max backpressure on drain L... : 25 bar (362.5) psi

**Note:** for complete available BT coils list and features see page 53

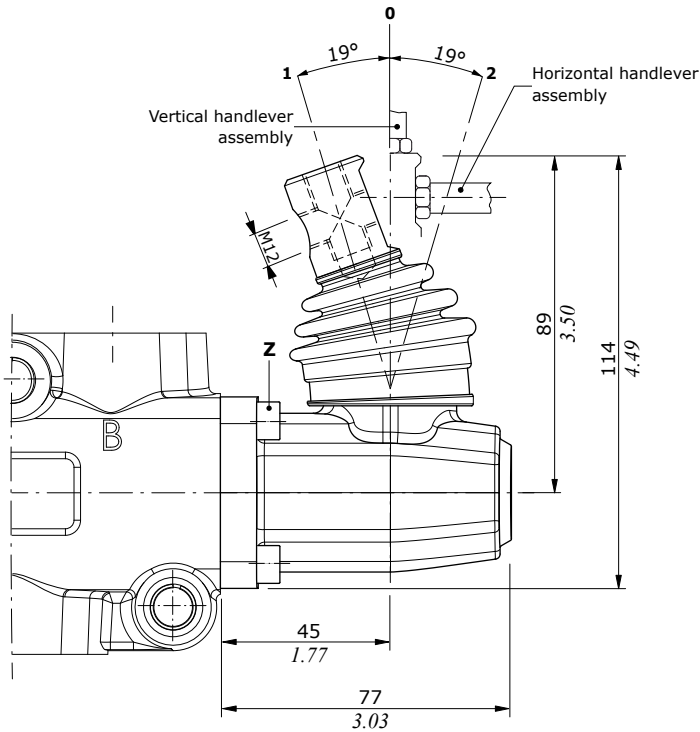
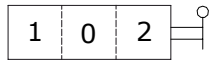


**"B" side options**

**Lever control kit**

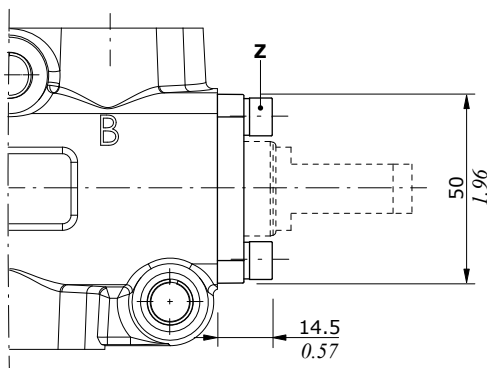
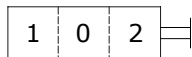
Aluminium with protection boot lever pivot box; it can be rotated 180° (execution **L180**)

**Type L**



**Without lever, with flange**

**Type SLP**



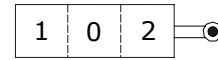
**Wrenches and tightening torque**

**Z** = wrench 5 - 9.8 Nm (7.2 lbf·ft)  
**W** = wrench 8 - 24 Nm (7.2 lbf·ft)

**Cam control kit**

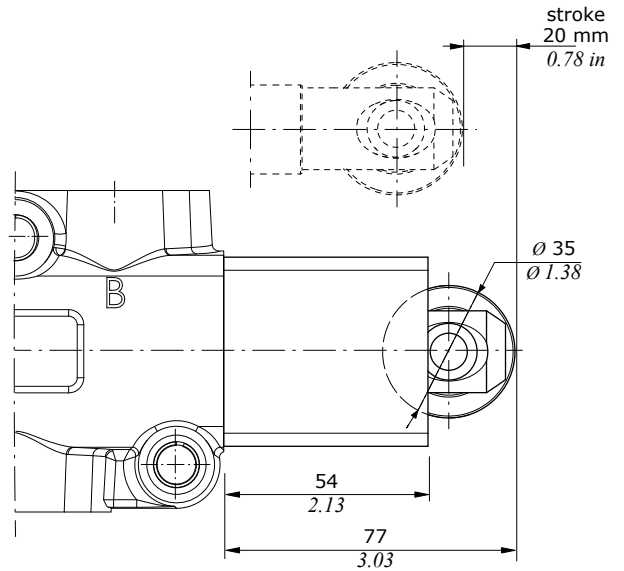
Steel ball bearing cam operation (CA), and bronze cam operation (CB); it must be coupled to 17 control kit

**Type CA-CB**



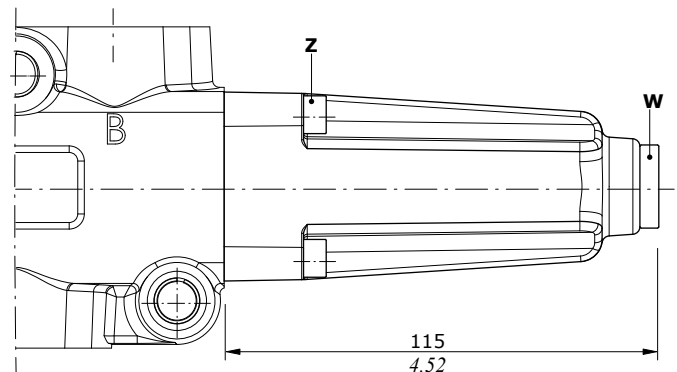
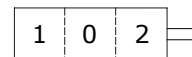
**Wrenches and tightening torque**

**Z** = wrench 5 - 9.8 Nm (7.2 lbf·ft)



**Without lever, with cap**

**Type SLC**

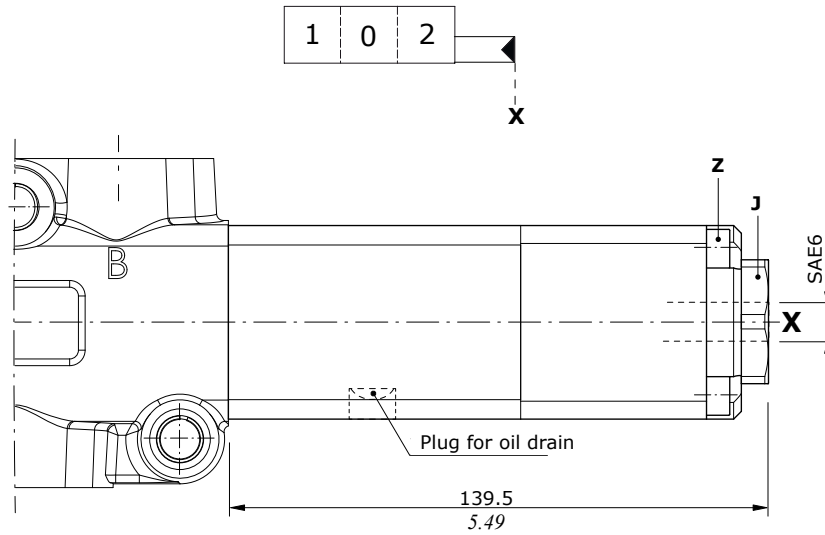


"B" side options

Hydraulic controls

ON/OFF controls with high and low pressure pilot it must be only coupled to 17ME control kit

**Type IA2**  
High pressure pilot

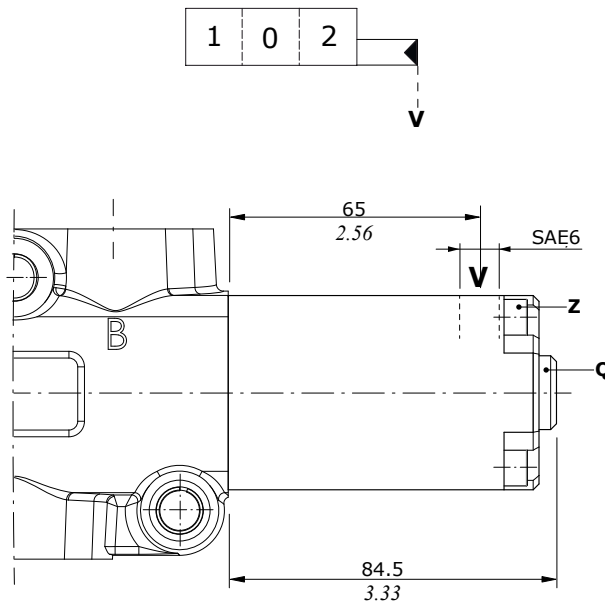


**Wrenches and tightening torque**

- Z = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)
- J = wrench 24 - 42 Nm (31 lbf<sup>t</sup>)
- Q = wrench 6 - 24 Nm (17.7 lbf<sup>t</sup>)

Pilot pressure max. = 250 bar (3620 psi)

**Type IB2**  
Low pressure pilot



Pilot pressure max. = 50 bar (725 psi)

**Coils and accessories for 18E11 control**

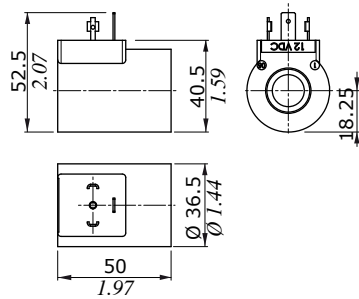
		Ordering codes					
Type	Voltage	Connector types					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
<b>BT</b>	<b>10 VDC</b>	4SL3000100	-	-	-	-	-
	<b>12 VDC</b>	4SL3000120	4SL3000130 <sup>(6)</sup>	4SL3000122 <sup>(5)</sup>	4SL3000124 <sup>(2)</sup>	4SL3000127 <sup>(2)</sup>	4SL300012C
		4SL3000126 <sup>(4)</sup>	4SL3000134 <sup>(3-6)</sup>	4SL3001200 <sup>(3-5)</sup>	-	-	-
	<b>24 VDC</b>	4SL3000240	4SL3000249 <sup>(6)</sup>	4SL3000248 <sup>(5)</sup>	-	-	4SL3000246
		4SL3030240 <sup>(1)</sup>	4SL300024C <sup>(3-6)</sup>	-	-	-	-
	<b>26 VDC</b>	4SL3000260	-	-	-	-	-
	<b>48 VDC</b>	4SL3000480	-	-	-	-	-
		4SL3030480 <sup>(1)</sup>	-	-	-	-	-
<b>110 VDC</b>	4SL3001100	-	-	-	-	-	
	4SL3031100 <sup>(1)</sup>	-	-	-	-	-	
<b>220 VDC</b>	4SLE022000A	-	-	-	-	-	
	4SLE322000A <sup>(1)</sup>	-	-	-	-	-	
<b>Mating connectors</b>							
		4CN1009995	5CON140031	5CON003	5CON001	5CON017	-
With rectifier	<b>24 VDC</b>	4CN3010240	-	-	-	-	-
	<b>48 VDC</b>	4CN3010480	-	-	-	-	-
	<b>110 VDC</b>	4CN3011100	-	-	-	-	-
	<b>220 VDC</b>	4CN3012200	-	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

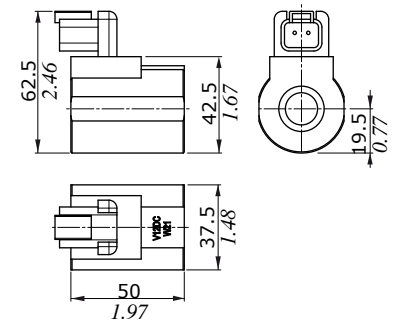
**Features**

- Nominal voltage tolerance: ±10%
- Nominal power..... : 19 W - 10 VDC
- : 21 W - 12/24/26 VDC
- : 20.3 W - 48 VDC
- : 17.3 W - 110 VDC
- : 17.7 W - 220 VDC
- Nominal current..... : 1.9 A @ 10 VDC
- : 1.77 A @ 12 VDC
- : 0.89 A @ 24VDC
- : 0.84 A @ 26 VDC
- : 0.43 A @ 48 VDC
- : 0.16 A @ 110 VDC
- : 0.08 A @ 220 VDC
- Insulation..... : Class F (155°C - 311°F)
- Weather protection... : IP65 - ISO4400 / AMP JPT
- : IP69K - Deutsch DT
- : IP67 - Weatherpack / Metri-pack
- Insertion..... : 100%

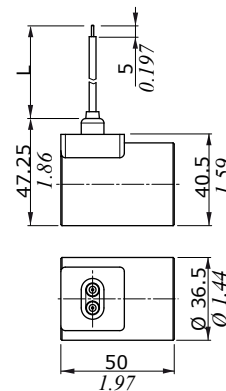
**ISO4400 connector**



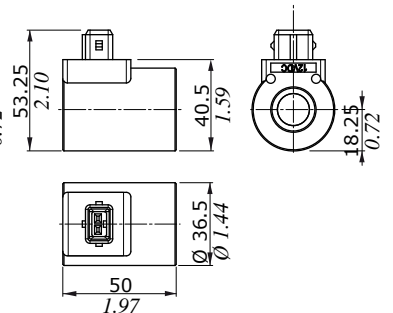
**DEUTSCH DT04 connector (Parallel type)**



**Flying leads**



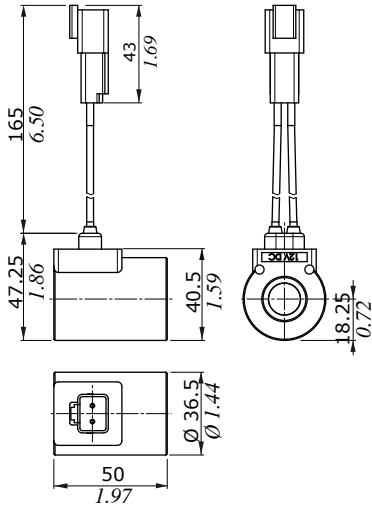
**AMP JPT connector (Perpendicular type)**



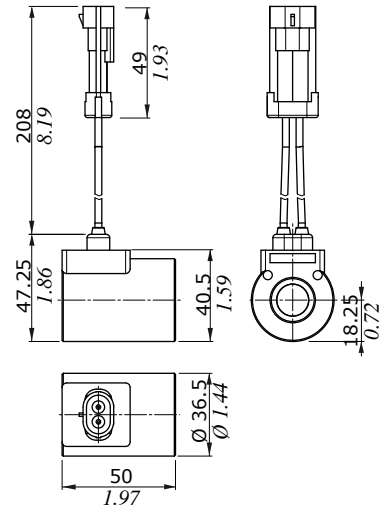
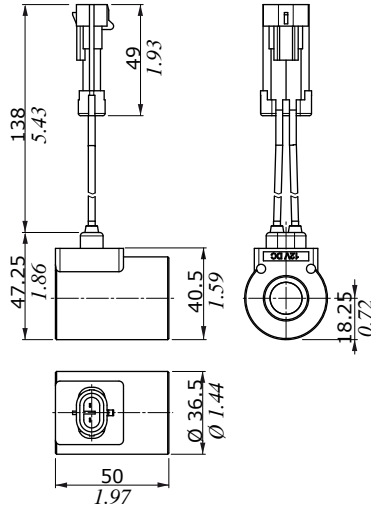
Coil type	L dimension	
	(mm)	(in)
<b>12 VDC</b>	240	9.45
<b>24 VDC</b>	600	23.62

Coils and accessories for 18E11 control

Flying leads with DEUTSCH DT04 connector



Flying leads with PACKARD METRI-PACK connector      Flying leads with PACKARD WEATHER-PACK connector





## DF25

### Mechanical control monoblock diverter valve

- 3 ways configuration
- Mechanical lever, cam, electrohydraulic, pneumatic controls

This catalogue 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.

#### WORKING CONDITIONS

N. of available ways	3	
Max. flow rating	280 l/min (74 US gpm)	
Max. pressure	315 bar (4600 psi)	
Internal leakage A(B)⇒T	$\Delta p = 100 \text{ bar (1450 psi)}$	8 cm <sup>3</sup> /min (0.48 in <sup>3</sup> /min)
Fluid	Mineral based oil	
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination	21/19/16 - ISO 4406 - NAS 1638 - class 10	
Ambient temperature for working conditions	with mechanical controls	from -40°C to 60°C (from -40°F to 140°F)
	with hydraulic and pneumatic controls	from -30°C to 60°C (from -22°F to 140°F)
	with electric controls	from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

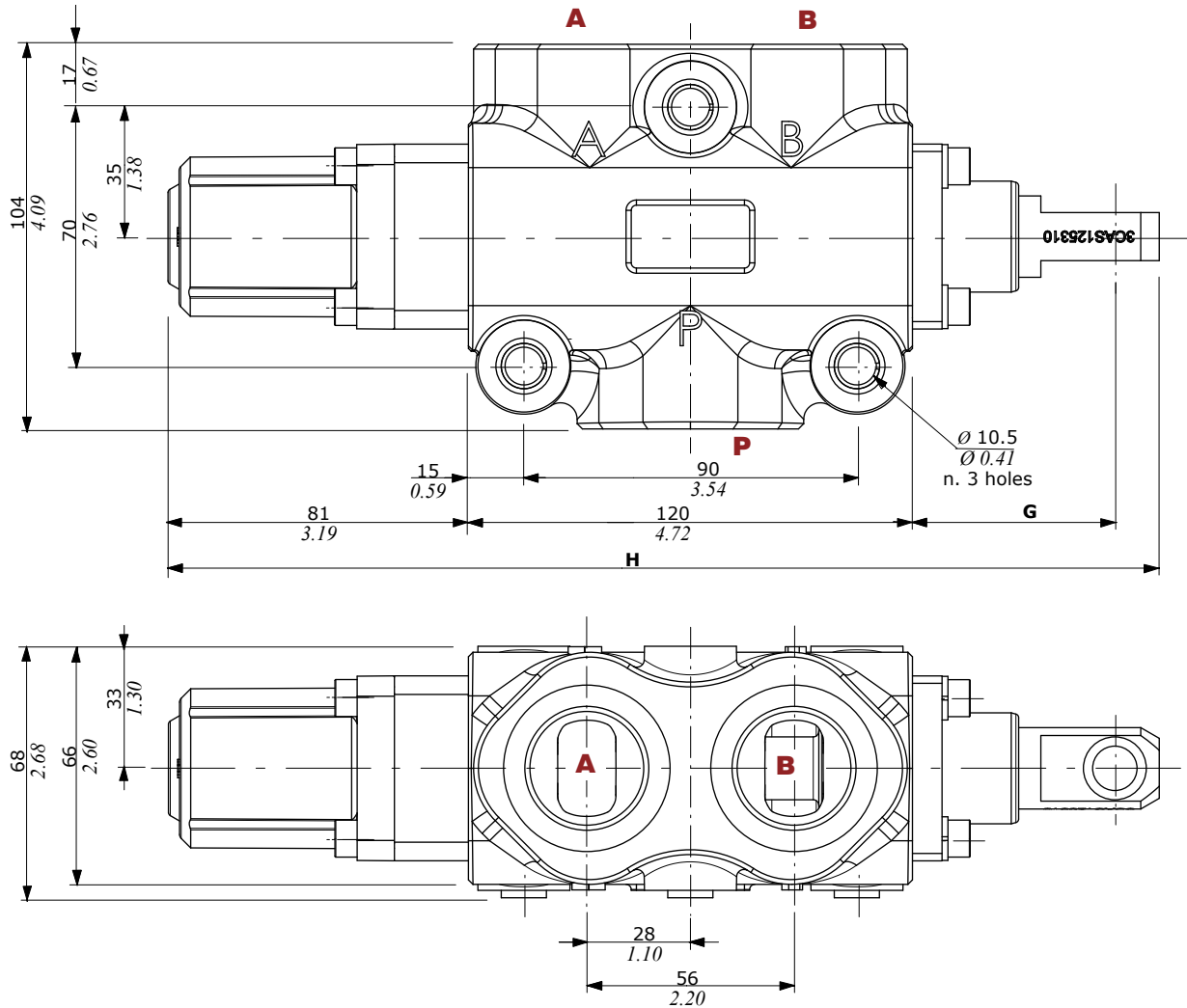
#### Available threads

PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DF25</b>	G 1	1" 5/16-12 (SAE 16)
PILOT PORTS		
Pneumatic	NPT 1/8-27	NPT 1/8-27
Hydraulic	G 1/4	9/16-18 (SAE 6)

## Dimensional data - hydraulic circuit - performance data

### 3 ways

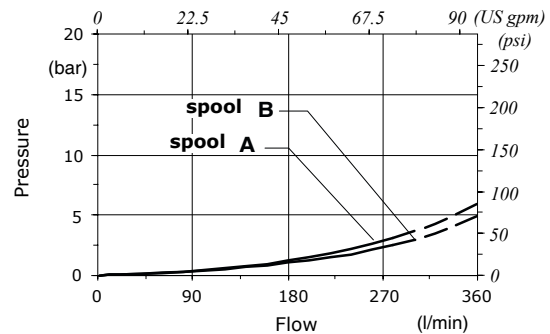
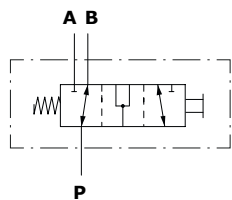
It's possible to obtain 2 ways diverter valve plugging port



	G	H
With spool out	55 mm 2.16 in	268 mm 10.55 in
With spool in	35 mm 1.37 in	248 mm 9.76 in

Pressure drop versus flow

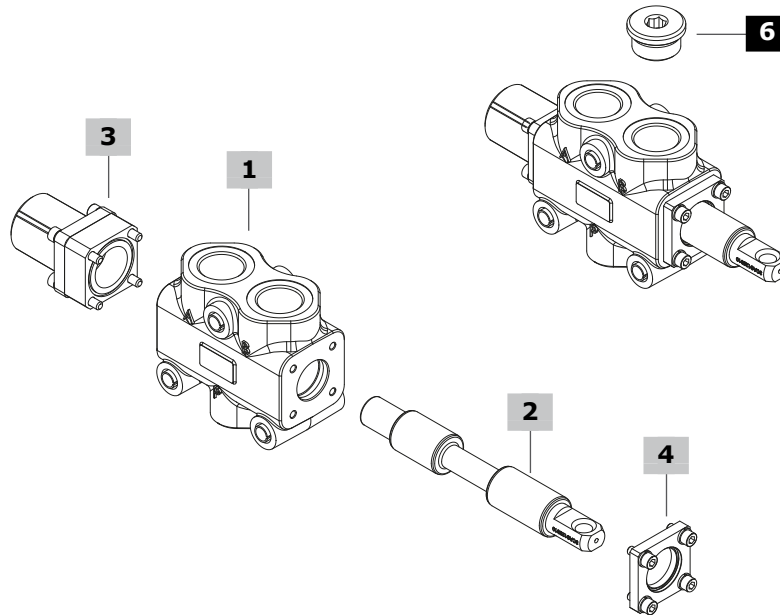
P → A(B)





Example:

**DF25/3**   **A**   **17**   **SLP** - **SAE** - **(CVN)**  
 1   2   3   4   5   Painted with one layer of black Primer antirust



**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DF25/3</b>	5CO2271700	Standard body kit 3 ways

**2 Spools** **pag. 58**

TYPE	CODE	DESCRIPTION
<b>A</b>	3CAS125310	Flow in B in pos. 1. Ports connected in transit position
<b>B</b>	3CAS125410	Flow in B in pos. 1. Ports closed in transit position
<b>AC</b>	3CAS125320	As type A, for cam control

**3 "A" side spool positioners** **pag. 58**

TYPE	CODE	DESCRIPTION
<b>12</b>	5V12125000	Detent in positions 1 and 2
<b>17</b>	5V17125000	Spring return in position 1
<b>17ME</b>	5V17325000	As kit 17, with heavier spring type E
<u>Pneumatic controls: must be coupled to the control kit side B with lever, with plate or cap</u>		
<b>17P</b>	5V17125700	On/off, with spring return in position 1
<b>18P</b>	5V18125700	On/off, with spring return in position 2
<u>Electrohydraulic controls: must be coupled to the control kit side B with lever, with plate or cap</u>		
Control requires collector kit; see page 61		
<b>18E11</b>	5V18125350	Spring return in position 2, 12VDC
	5V18125351	Spring return in position 2, 24VDC

**4 "B" side options** **pag. 62**

TYPE	CODE	DESCRIPTION
<b>SLP</b>	5COP125000	Without lever box, with dust-proof plate kit
<b>SLC</b>	5COP220000	Without lever box, with cap
<b>L</b>	5LEV120000	Aluminum lever box
<b>CA</b>	5CAM125000	Steel ball bearing cam operation
<b>CB</b>	5CAM125020	Bronze cam operation
<u>Hydraulic controls</u>		
<b>IA2</b>	5IDR520700*	On/off with high pressure pilot, need 17ME control type
<b>IB2</b>	5IDR720700*	On/off with low pressure pilot, need 17ME control type

**5 Body threading**

Specify threading always when it is different from **BSP** standard

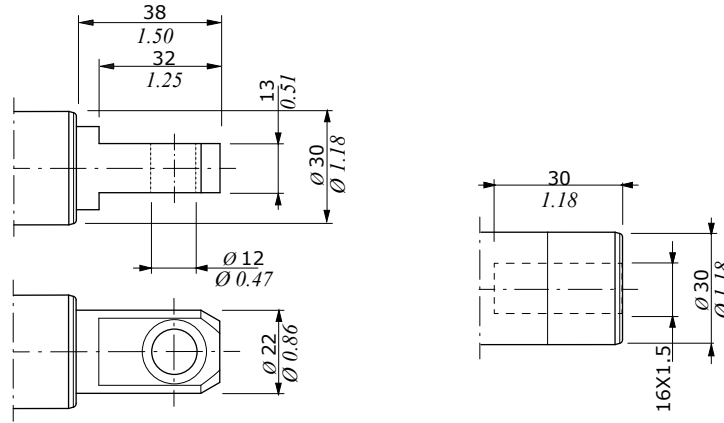
**6 Port plugs\***

CODE	DESCRIPTION
3XTAP838200	SAE16 plug

It's possible to obtain 2 ways diverter valve plugging DF25/3 port

(\*) - Codes are referred to **UN-UNF** thread

Spool end



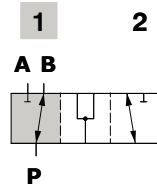
Standard:  
spool type **A, B**

Rotary cam arrangement:  
spool type **AC**

Spool circuits

**Type A/AC**

Ports connected  
in transit position

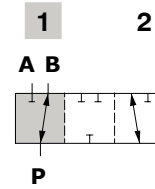


**Spool stroke**

Position 2: - 20 mm (-0.78 in)

**Type B**

Ports closed  
in transit position



**Spool stroke**

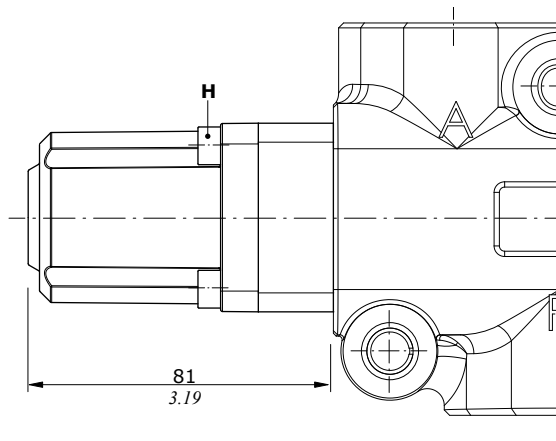
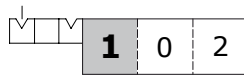
Position 2: - 20 mm (-0.78 in)

"A" side spool positioners

With detent

**Type 12**

Detent in positions 1 and 2



**Wrenches and tightening torque**

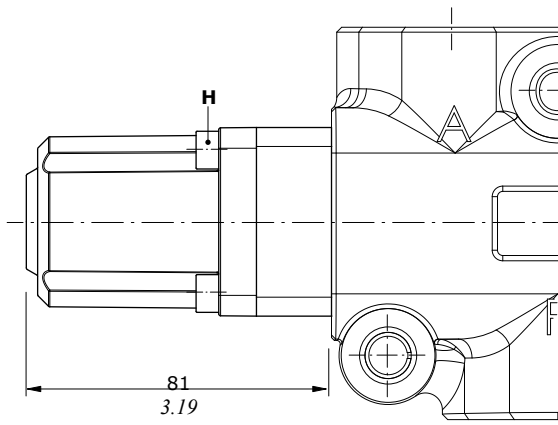
H = wrench 5 - 9.8 Nm (7.2 lbf ft)

**"A" side spool positioners**

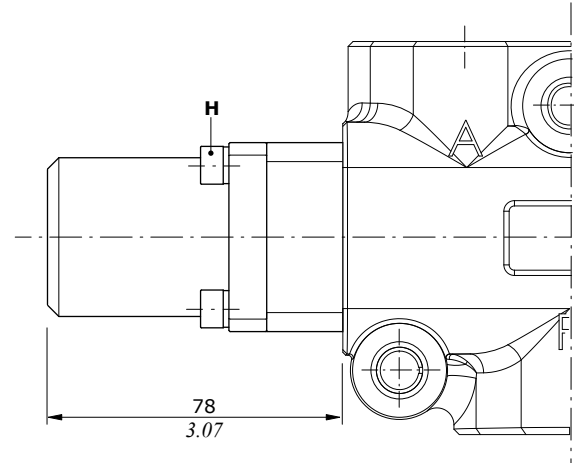
**With spring return in position 1**

With heavier spring type "E"

**Type 17**



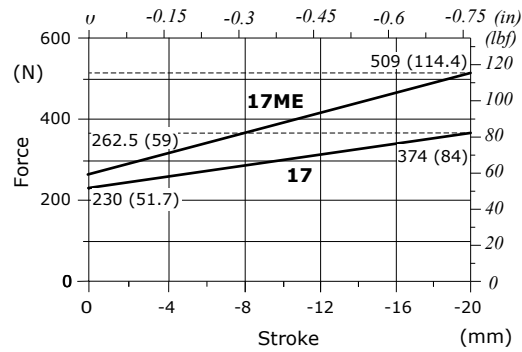
**Type 17ME**



**Wrenches and tightening torque**

**H** = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)

**Force-Stroke diagram**

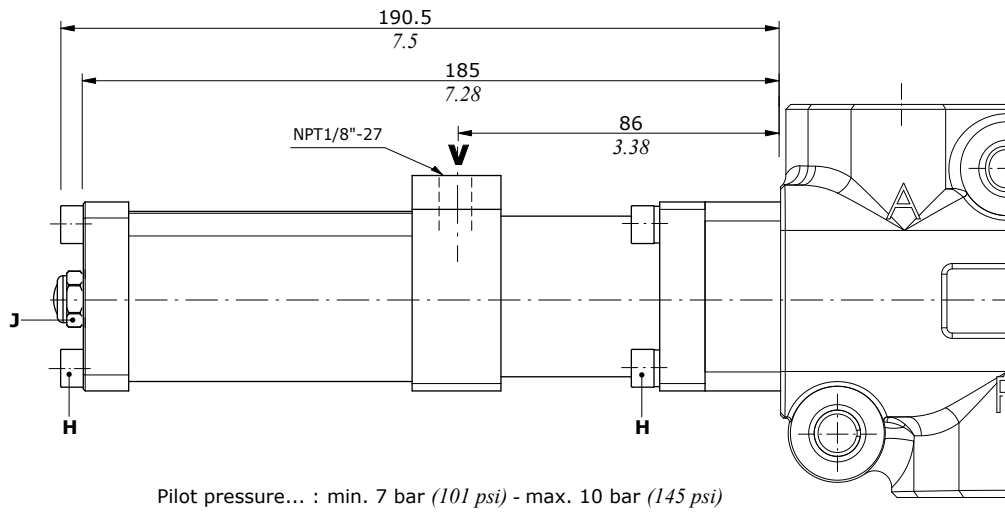
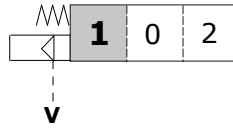


"A" side spool positioners

ON/OFF pneumatic controls

**Type 17P**

Spring return in position 1



Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

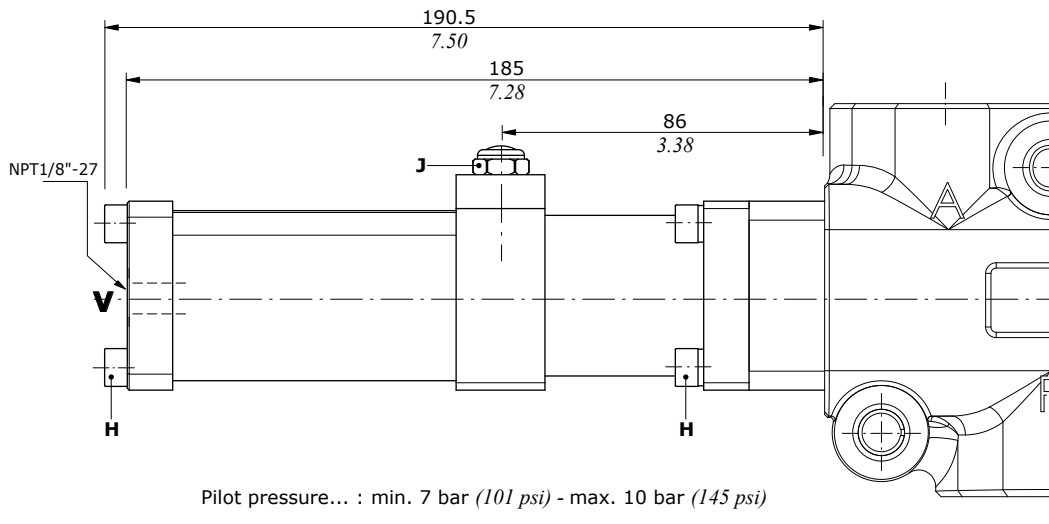
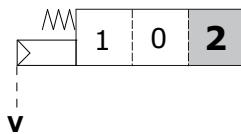
**Wrenches and tightening torque**

H = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)

J = wrench 13 - 9.8 Nm (7.2 lbf<sup>t</sup>)

**Type 18P**

Spring return in position 2



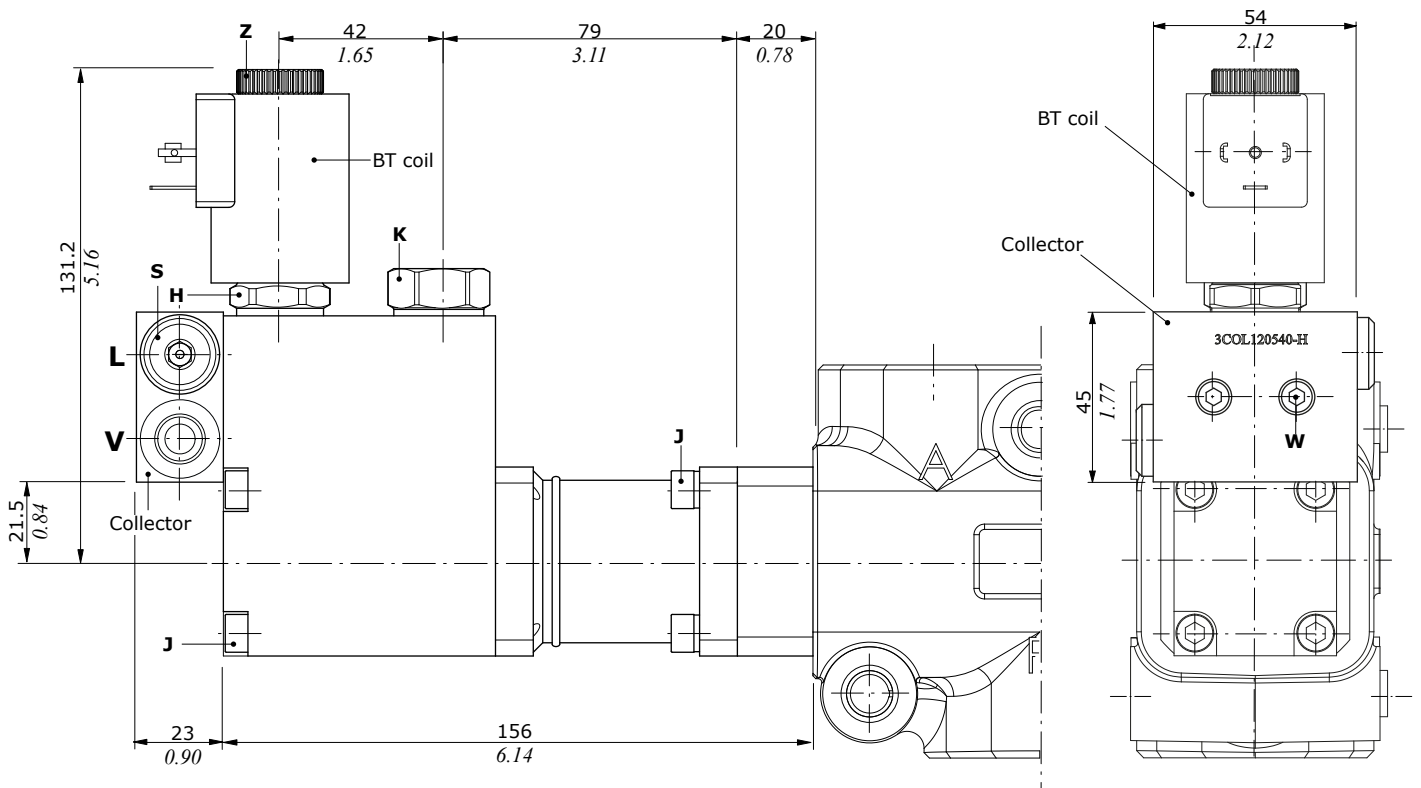
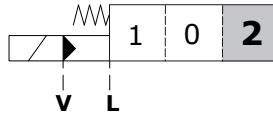
Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

"A" side spool positioners

ON/OFF electrohydraulic control

**Type 18EI1**

Spring return in pos. 2,  
with external pilot and drain



Collector kit for external pilot and drain

**Wrenches and tightening torque**

- J = wrench 5 - 9.8 Nm (7.2 lbft)
  - K = wrench 24 - 30 Nm (22.1 lbft)
  - Z = 5 Nm (3.68 lbft)
  - S = wrench 6 - 24 Nm (17.7 lbft)
  - H\* = wrench 24 - 9.8 Nm (7.2 lbft)
  - W = wrench 4 - 6.6 Nm (4.9 lbft)
- (\*)Tightening with dynamometric wrench or screwer

**Features**

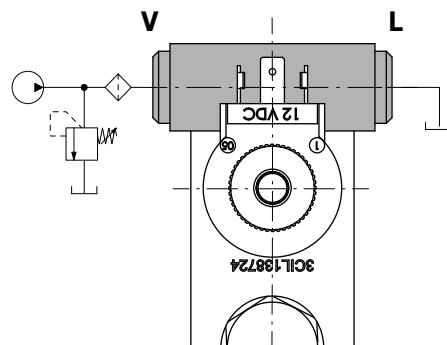
Pilot pressure: ..... : min. 10 bar (145 psi)  
 : max. 50 bar (725 psi)  
 Max backpressure on drain L... : 25 bar (362.5 psi)

**Note: for complete available BT coils list and features see page 64**

COLLECTOR KIT CODE		
Type	Code	Description

KE1S0 5KE1S00070 kit for 1 section

Codes are referred to UN-UNF thread

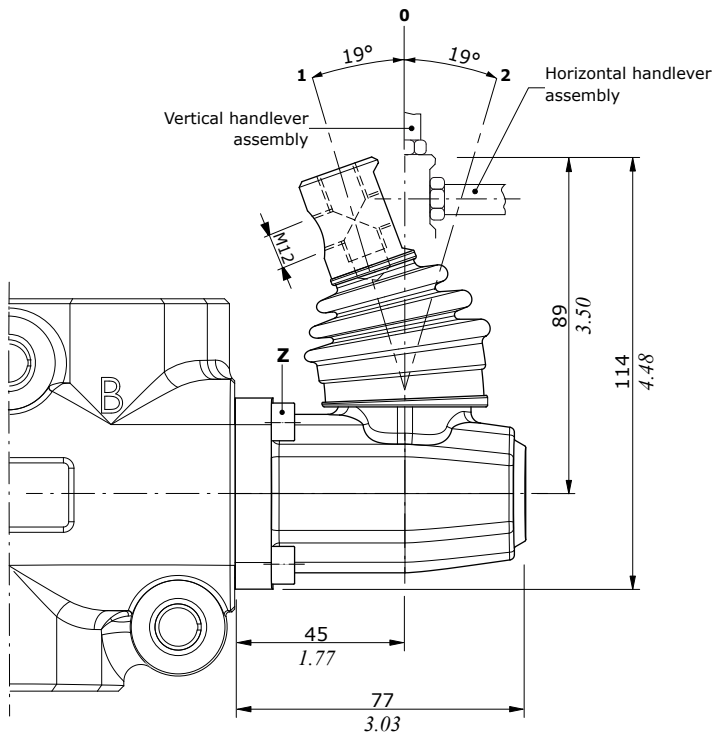
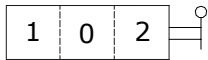


"B" side options

**Lever control kit**

Aluminium with protection boot lever pivot box; it can be rotated 180° (execution **L180**)

**Type L**



**Cam control kit**

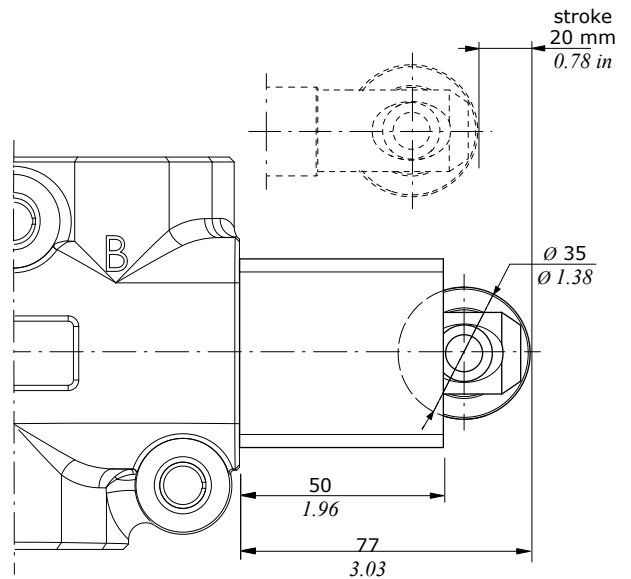
Steel ball bearing cam operation (CA), and bronze cam operation (CB); it must be coupled to 17 control kit

**Type CA-CB**



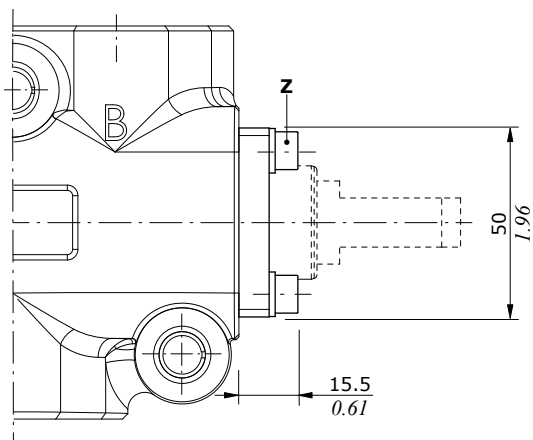
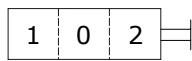
**Wrenches and tightening torque**

**Z** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)



**Without lever, with flange**

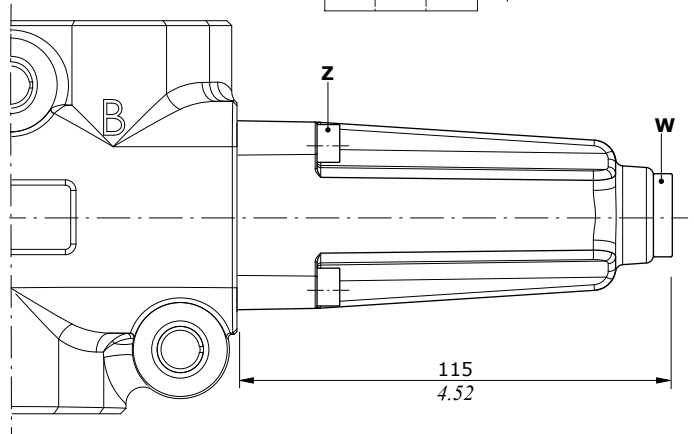
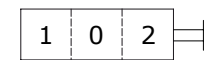
**Type SLP**



**Without lever, with cap**

Protection cap to use with pneumatic, hydraulic and electrohydraulic spool positioner kits

**Type SLC**



**Wrenches and tightening torque**

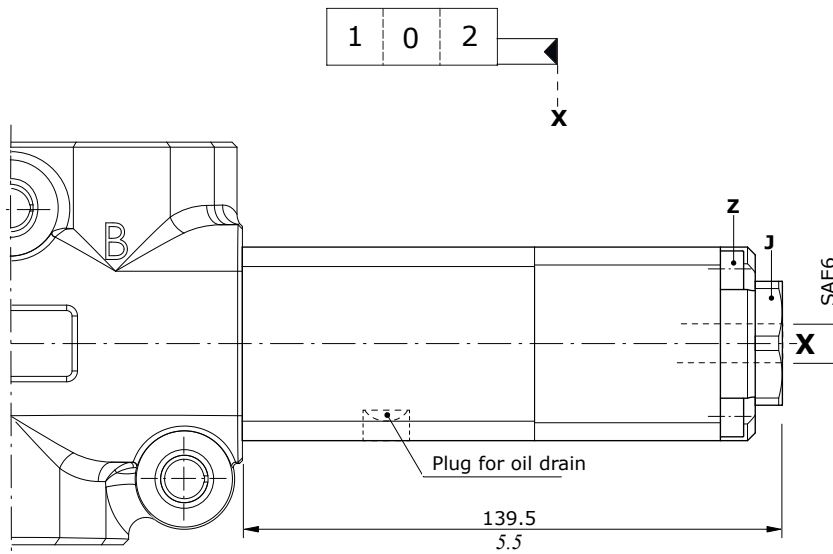
**Z** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

**W** = wrench 8 - 24 Nm (17.7 lbf<sub>t</sub>)

**Hydraulic controls**

ON/OFF controls with high and low pressure pilot it must be only coupled to 17ME control kit

**Type IA2**  
High pressure pilot



Pilot pressure max. = 250 bar (3620 psi)

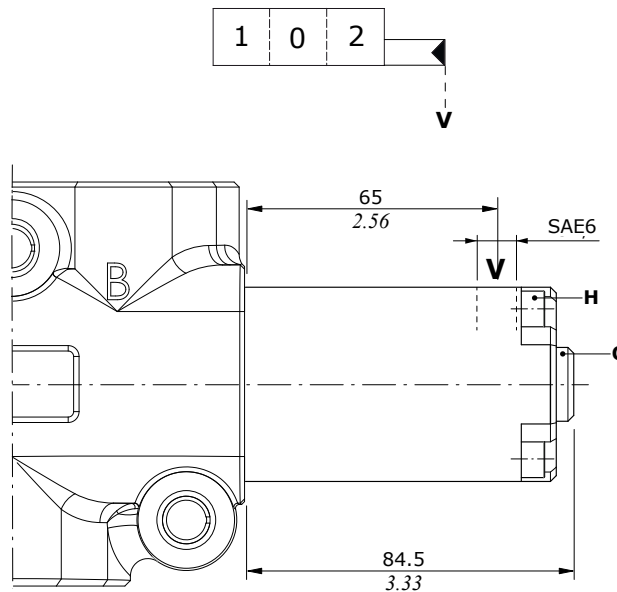
**Wrenches and tightening torque**

**Z** = wrench 5 - 9.8 Nm (7.2 lbf<sup>t</sup>)

**J** = wrench 24 - 42 Nm (31 lbf<sup>t</sup>)

**Q** = wrench 6 - 24 Nm (17.7 lbf<sup>t</sup>)

**Type IB2**  
Low pressure pilot



Pilot pressure max. = 50 bar (725 psi)

## Coils and accessories for 18EI1 control

Type	Voltage	Ordering codes					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
BT	10 VDC	4SL3000100	-	-	-	-	-
	12 VDC	4SL3000120	4SL3000130 <sup>(6)</sup>	4SL3000122 <sup>(5)</sup>	4SL3000124 <sup>(2)</sup>	4SL3000127 <sup>(2)</sup>	4SL300012C
		4SL3000126 <sup>(4)</sup>	4SL3000134 <sup>(3-6)</sup>	4SL3001200 <sup>(3-5)</sup>	-	-	-
	24 VDC	4SL3000240	4SL3000249 <sup>(6)</sup>	4SL3000248 <sup>(5)</sup>	-	-	4SL3000246
		4SL3030240 <sup>(1)</sup>	4SL300024C <sup>(3-6)</sup>	-	-	-	-
	26 VDC	4SL3000260	-	-	-	-	-
	48 VDC	4SL3000480	-	-	-	-	-
		4SL3030480 <sup>(1)</sup>	-	-	-	-	-
110 VDC	4SL3001100	-	-	-	-	-	
220 VDC	4SL3031100 <sup>(1)</sup>	-	-	-	-	-	
	220 VDC	4SLE022000A	-	-	-	-	
		4SLE322000A <sup>(1)</sup>	-	-	-	-	
<b>Mating connectors</b>							
		4CN1009995	5CON140031	5CON003	5CON001	5CON017	-
With rectifier	24 VDC	4CN3010240	-	-	-	-	-
	48 VDC	4CN3010480	-	-	-	-	-
	110 VDC	4CN3011100	-	-	-	-	-
	220 VDC	4CN3012200	-	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

### Features

Nominal voltage tolerance: ±10%

Nominal power..... : 19 W - 10 VDC  
 : 21 W - 12/24/26 VDC  
 : 20.3 W - 48 VDC  
 : 17.3 W - 110 VDC  
 : 17.7 W - 220 VDC

Nominal current..... : 1.9 A @ 10 VDC  
 : 1.77 A @ 12 VDC  
 : 0.89 A @ 24VDC  
 : 0.84 A @ 26 VDC  
 : 0.43 A @ 48 VDC  
 : 0.16 A @ 110 VDC  
 : 0.08 A @ 220 VDC

Insulation..... : Class F (155°C - 311°F)

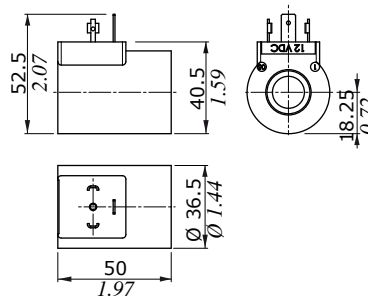
Weather protection... : IP65 - ISO4400 / AMP JPT

: IP69K - Deutsch DT

: IP67 - Weatherpack / Metri-pack

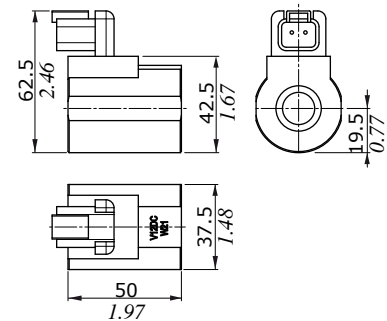
Insertion..... : 100%

### ISO4400 connector

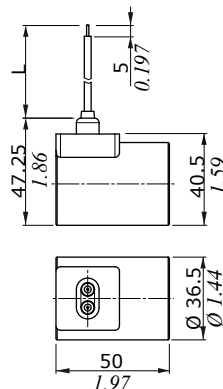


### DEUTSCH DT04 connector

(Parallel type)

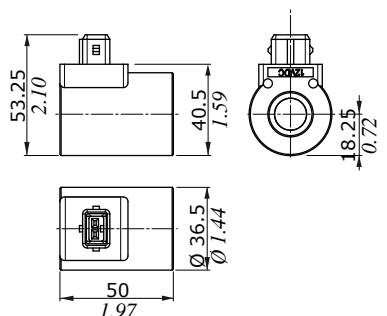


### Flying leads



### AMP JPT connector

(Perpendicular type)

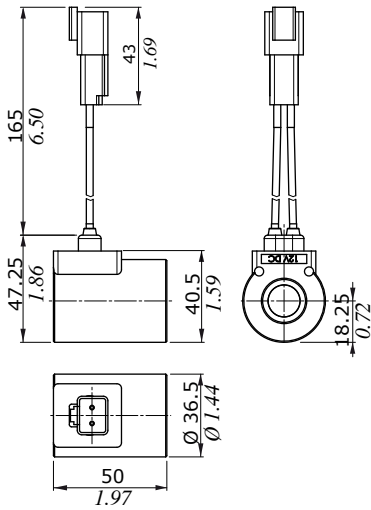


Coil type	L dimension	
	(mm)	(in)
12 VDC	240	9.45
24 VDC	600	23.62

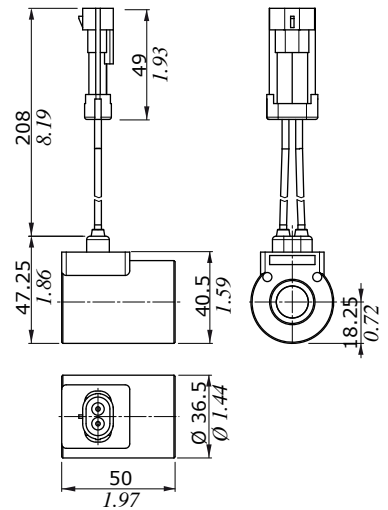
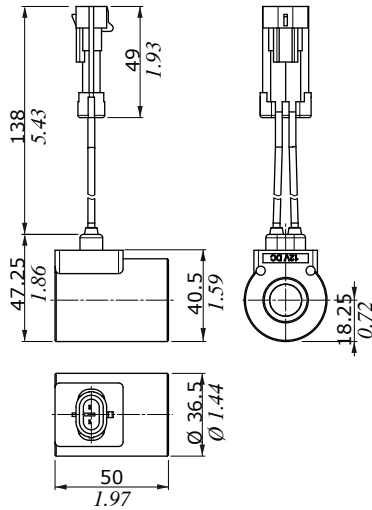


**Coils and accessories for 18E11 control**

**Flying leads with DEUTSCH DT04 connector**



**Flying leads with PACKARD METRI-PACK connector    Flying leads with PACKARD WEATHER-PACK connector**







## DF250

### Hydraulic control monoblock diverter valve

- 6 ways configuration
- Ports with SAE flange connection
- Hydraulic controls
- Galvanized body

This catalogue 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.

#### WORKING CONDITIONS

N. of available ways	6	
Max. flow rating	250 l/min (66 US gpm)	
Max. pressure	350 bar (5100 psi)	
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	8 ÷ 12 cm <sup>3</sup> /min (0.48 ÷ 0.73 in <sup>3</sup> /min)
Fluid	Mineral based oil	
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 10 to 300 mm <sup>2</sup> /s (from 10 to 300 cSt)
Max. level of contamination	20/18/15 - ISO 4406 - NAS 1638 - class 9	
Ambient temperature for working conditions	from -40°C to 60°C (from -40°F to 140°F)	

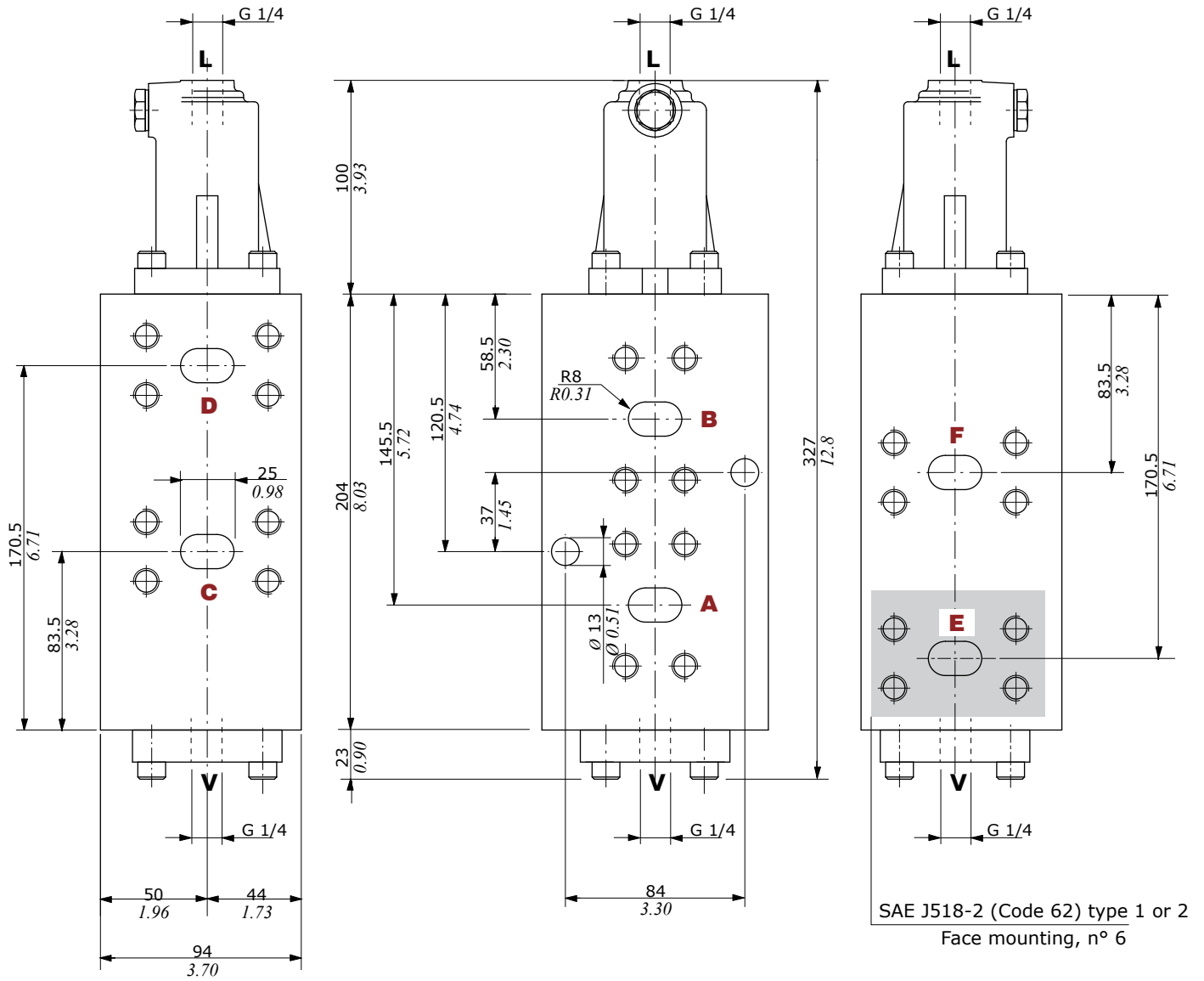
NOTE - For different working conditions please contact Sales Dept.

#### Available threads

#### FLANGE CONNECTION (ASSEMBLING SCREW)

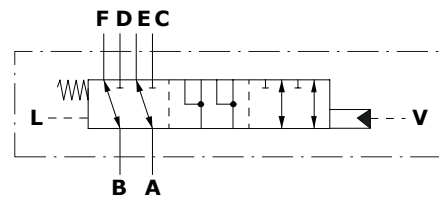
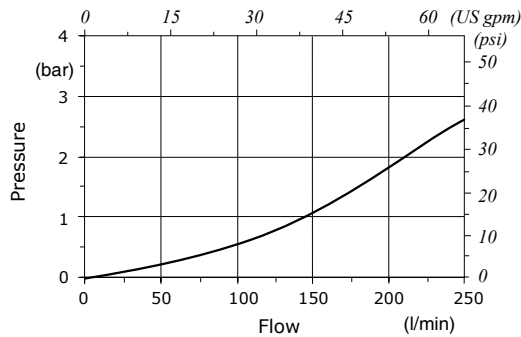
Type	ISO6162-2 / SAE J518-2 (Codice 62) Tipo 1	SAE J518-2 (Codice 62) Tipo 2
<b>DF250</b>	DN25 (M12) 1" (M12)	1" (7/16-14 UNC)

## Dimensional data - hydraulic circuit - performance data



Pressure drop versus flow

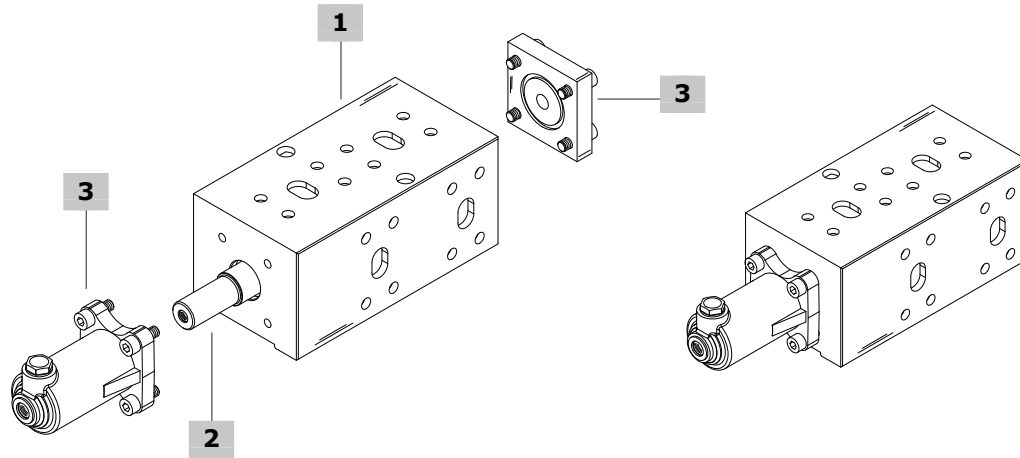
P → A(B)



**Part ordering codes**

Example:

**DF250 / W025A - H005 - DB S35 - (CRZ)**  
 1                      2                      3                      1                      1                      Galvanized body



**1 Body kit**

TYPE: **DF250-DB-S35**      CODE: 430035002  
 DESCRIPTION: 6 ways body kit, DN25/1", ISO6162-2 / SAE J518-2  
 (Code 62) Type 1 flange  
 TYPE: **DF250-DB-S36**      CODE: 430035003  
 DESCRIPTION: 6 ways body kit, DN25/1", SAE J518 (Code 62)  
 Type 2 flange

**2 Spools** pag. 69

TYPE	CODE	DESCRIPTION
<b>W025A</b>	421235002	Flow in E and F. C and D closed in pos. 1 Ports connected in transit position
<b>W026A</b>	421235001	Flow in E and F. C and D closed in pos. 1 Ports closed in transit position

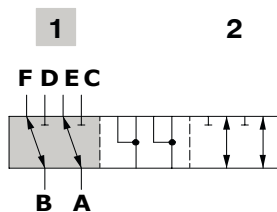
**3 Complete controls**

TTYPE	CODE	DESCRIPTION
<b>H005</b>	320535001	Hydraulic control, with G1/4 port
	430035001	Flange kit for hydraulic control, with G1/4 port Pilot pressure: min = 7.8 bar (113 psi) max = 23.4 bar (339 psi)
<b>H031</b>	320535002	Hydraulic control, with G1/4 port
	430035001	Flange kit for hydraulic control, with G1/4 port Pilot pressure: min = 5.8 bar (84 psi) max = 11.4 bar (165 psi)

**Spool circuits**

**Type W025A**

Flow in E and F. C and D closed in pos. 1  
Ports connected in transit position

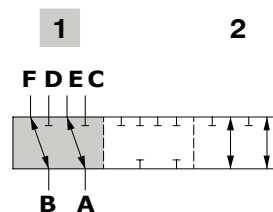


**Spool stroke**

Position 2: + 10 mm (0.39 in)

**Type W026A**

Flow in E and F. C and D closed in pos. 1  
Ports closed in transit position



**Spool stroke**

Position 2: + 10 mm (0.39 in)





## DF350

### Hydraulic control monoblock diverter valve

- 6 ways configuration
- Ports with SAE flange connection
- Hydraulic controls
- Galvanized body

This catalogue 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.

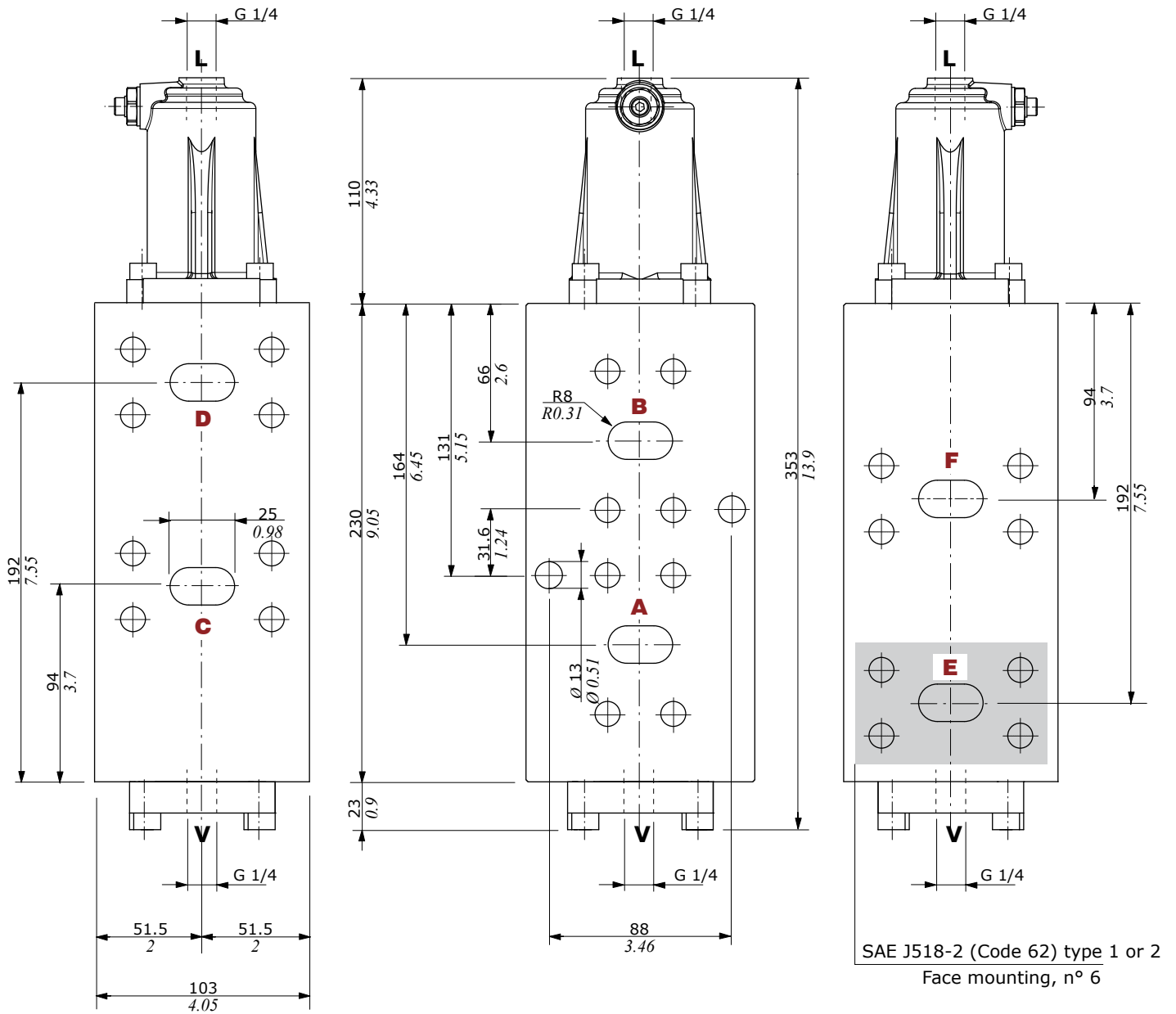
WORKING CONDITIONS		
N. of available ways		6
Max. flow rating		350 l/min (92.4 US gpm)
Max. pressure		350 bar (5100 psi)
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	8 ÷ 12 cm <sup>3</sup> /min (0.48 ÷ 0.73 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 10 to 300 mm <sup>2</sup> /s (from 10 to 300 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -40°C to 60°C (from -40°F to 140°F)

NOTE - For different working conditions please contact Sales Dept.

## Available threads

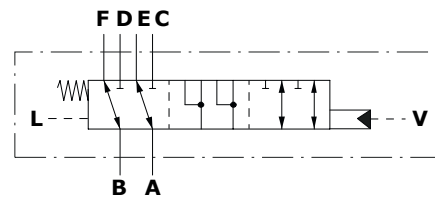
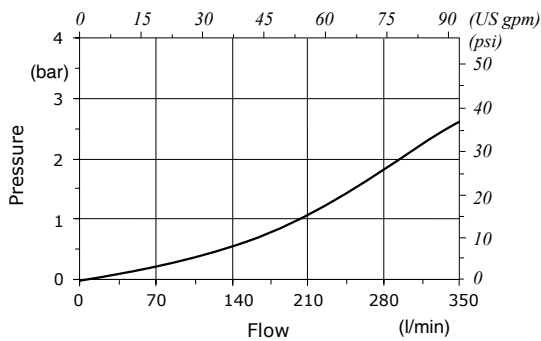
FLANGE CONNECTION (ASSEMBLING SCREW)		
Type	ISO6162-2 / SAE J518-2 (Code 62) Type 1	SAE J518-2 (Code 62) Type 2
DF350	DN32 (M12) 1" 1/4 (M12)	1" 1/4 (1/2-13 UNC)

## Dimensional data - hydraulic circuit - performance data



Pressure drop versus flow

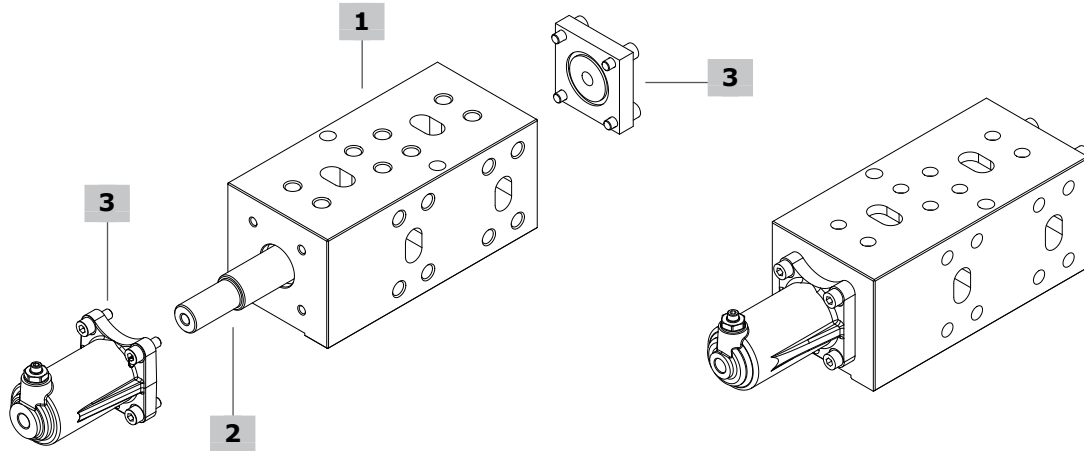
P → A(B)





Example:

**DF350 / W025A - H005 - DB S37 - (CRZ)**  
 1                      2                      3                      1                      1                      Galvanized body



**1 Body kit**

TYPE: **DF350-DB-S37**                      CODE: 430036002  
 DESCRIPTION: 6 ways body kit, DN32/1" 1/4, ISO6162-2 / SAE J518-2 (Code 62) Type 1 flange  
 TYPE: **DF350-DB-S38**                      CODE: 430036003  
 DESCRIPTION: 6 ways body kit, DN32/1" 1/4, SAE J518 (Code 62) Type 2 flange

**3 Complete controls**

TYPE	CODE	DESCRIPTION
<b>H005</b>	320536002	Hydraulic control, with G1/4 port
	430036001	Flange kit for hydraulic control, with G1/4 port

Pilot pressure: min = 4.4 bar (64 psi) / max = 20.8 bar (302 psi)

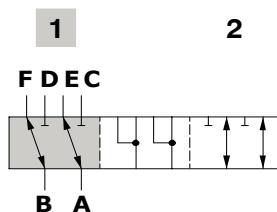
**2 Spools** **page 73**

TYPE	CODE	DESCRIPTION
<b>W025A</b>	421236002	Flow in E and F. C and D closed in pos. 1 Ports connected in transit position
<b>W026A</b>	421236001	Flow in E and F. C and D closed in pos. 1 Ports closed in transit position

**Spool circuits**

**Type W025A**

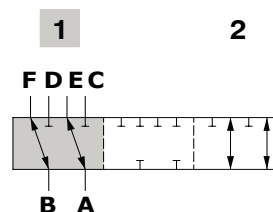
Flow in E and F. C and D closed in pos. 1  
Ports connected in transit position



**Spool stroke**  
Position 2: + 13 mm (0.51 in)

**Type W026A**

Flow in E and F. C and D closed in pos. 1  
Ports closed in transit position



**Spool stroke**  
Position 2: + 13 mm (0.51 in)





## DFE052

### Solenoid control monoblock diverter valves

- 2 - 3 - 6 - 8 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		2 - 3 - 6 - 8
Max. flow rating		60 l/min (15.8 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 85
Nominal power		38 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	7 cm <sup>3</sup> /min (0.42 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

### Available threads

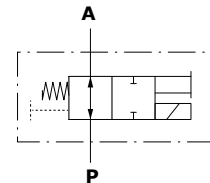
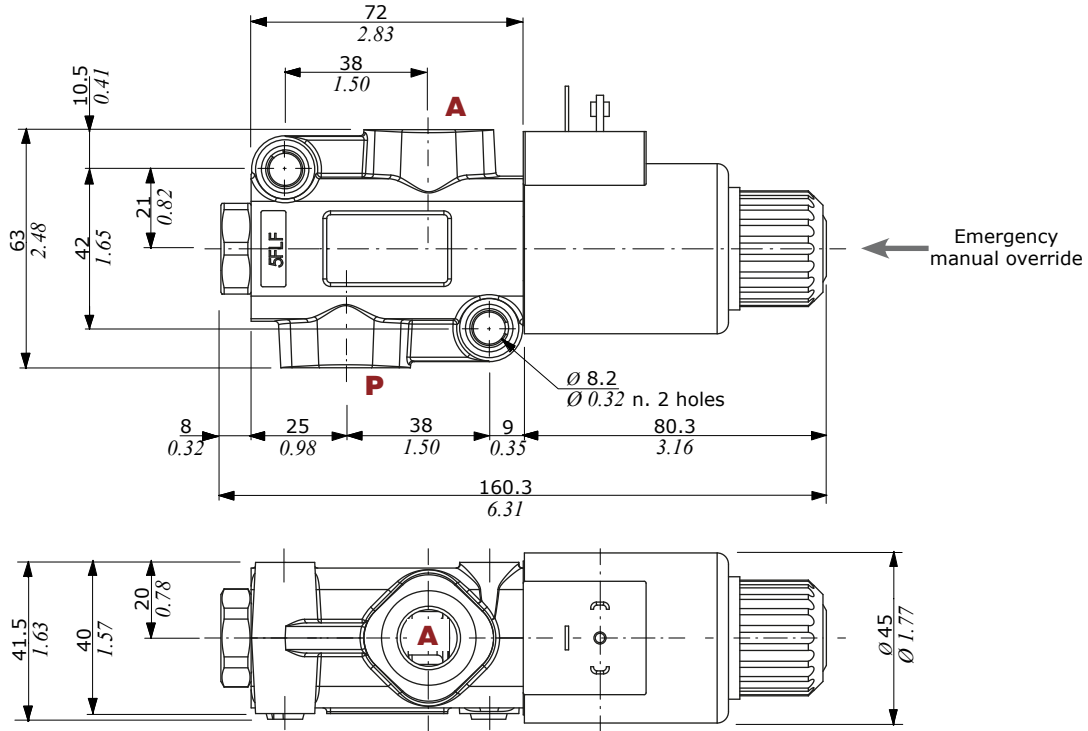
PORTS THREAD			
ALL PORTS	BSP	UN-UNF	METRIC* (ISO 9974-1)
<b>DFE052</b>	G 3/8	3/4-16 (SAE 8)	M18x1.5
PILOT PORTS			
<b>L</b>	G 1/4	9/16-18 (SAE 6) 7/16-20 (SAE 4)**	M12x1.5

(\*\*): for DFE052/8 diverter valves

(\*): Optional threads  
for availability contact Sales  
Department

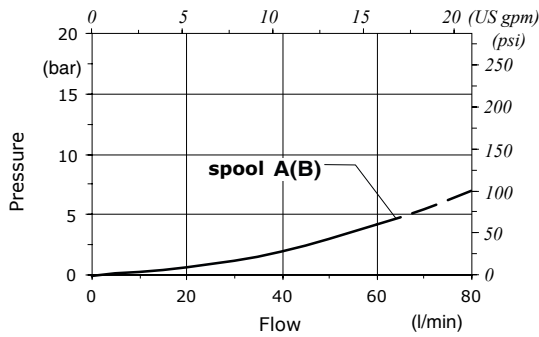
Dimensional data - hydraulic circuit - performance data

2 ways



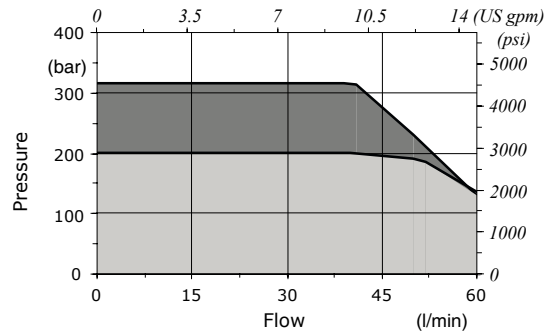
Pressure drop versus flow

P → A



Minimum dynamic conditions

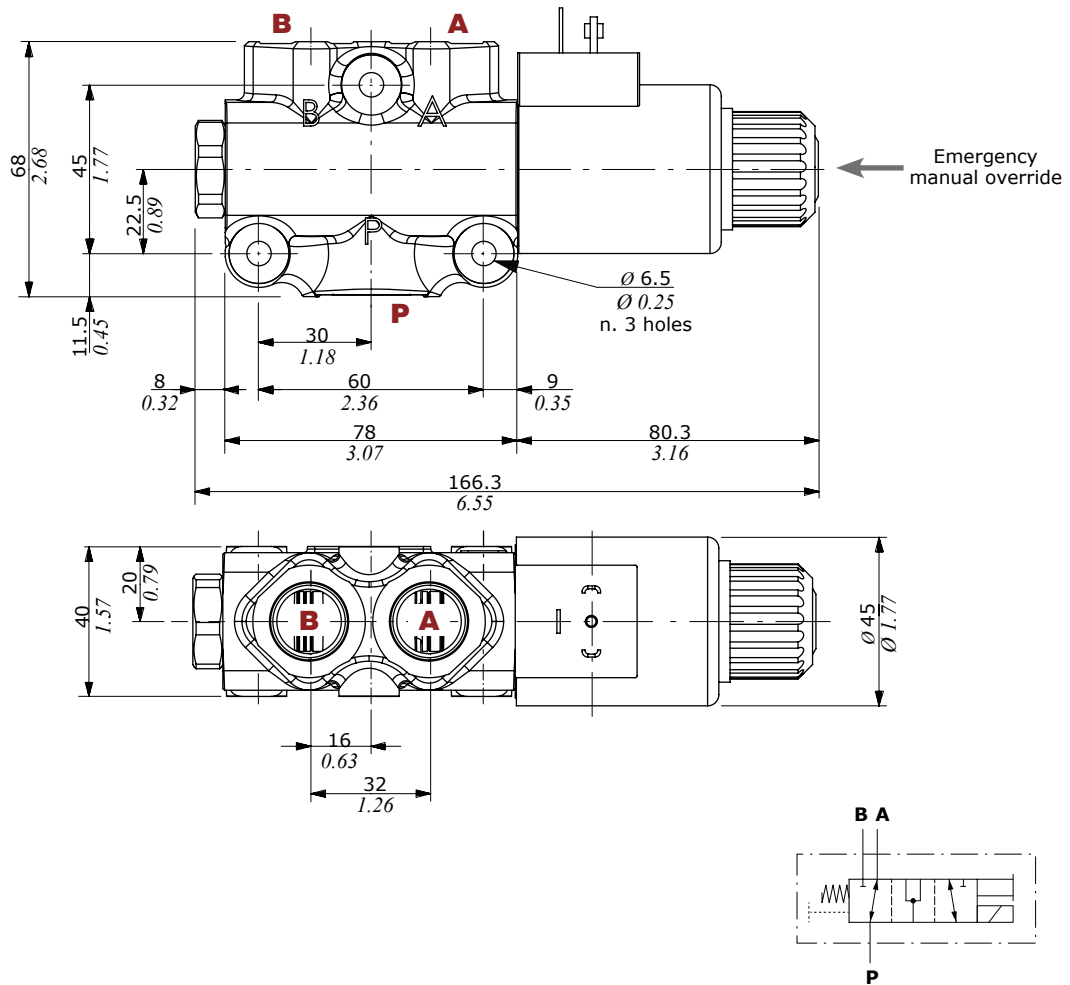
(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ With drain  
■ Without drain

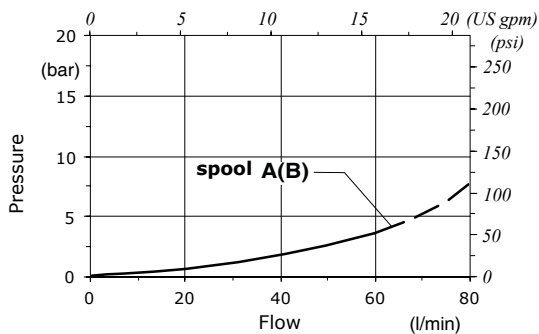
**Dimensional data - hydraulic circuit - performance data**

**3 ways**



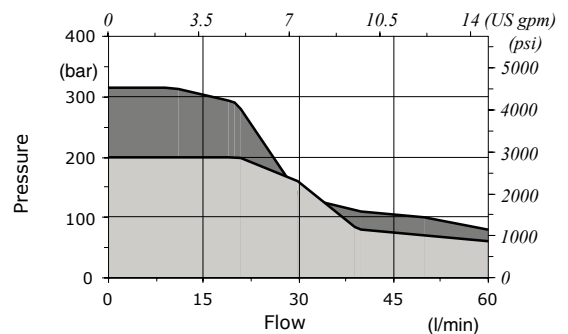
**Pressure drop versus flow**

**P → A(B)**



**Minimum dynamic conditions**

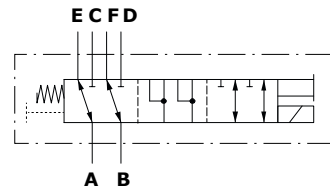
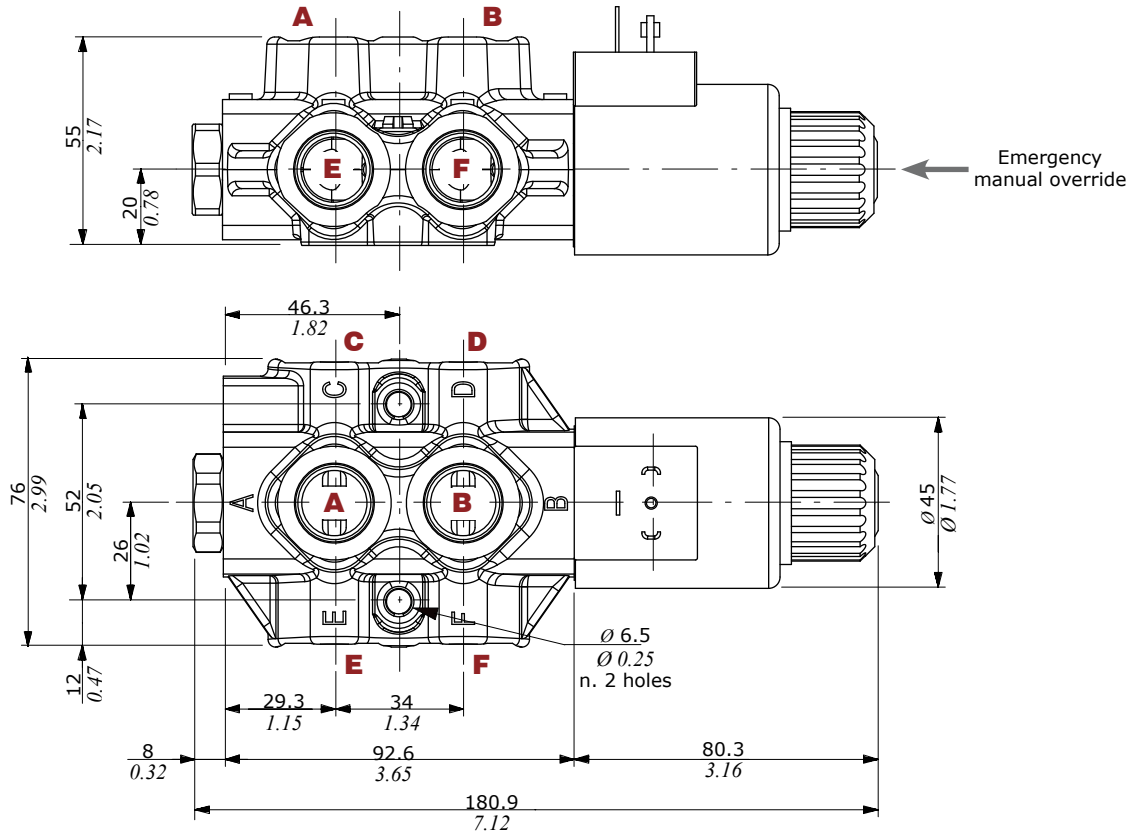
(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ With drain  
■ Without drain

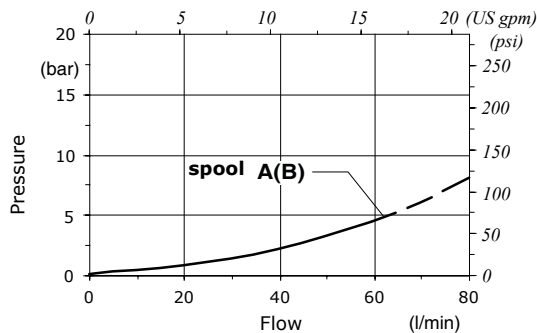
Dimensional data - hydraulic circuit - performance data

6 ways



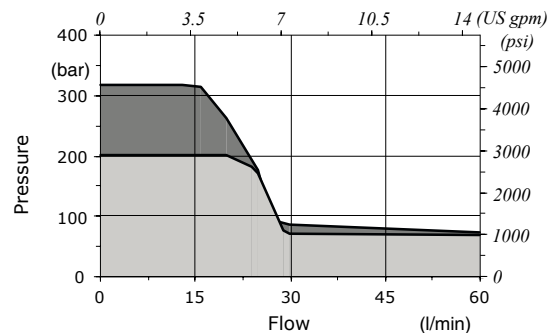
Pressure drop versus flow

A → C(E)



Minimum dynamic conditions

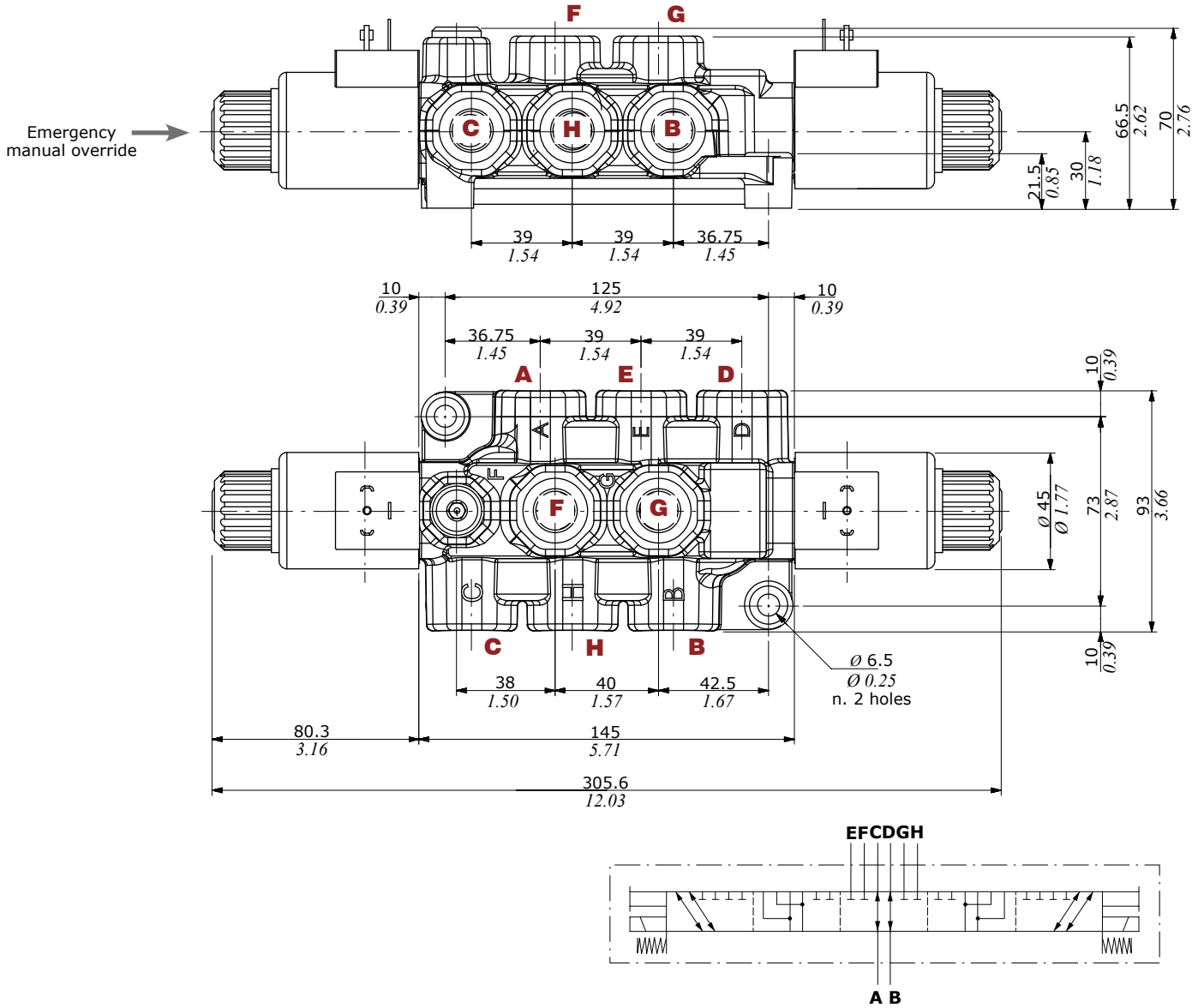
(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ With drain  
 ■ Without drain

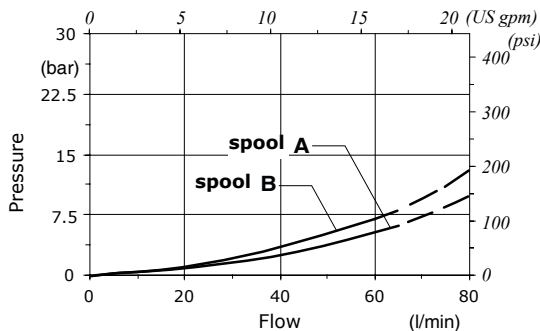
**Dimensional data - hydraulic circuit - performance data**

**8 ways**



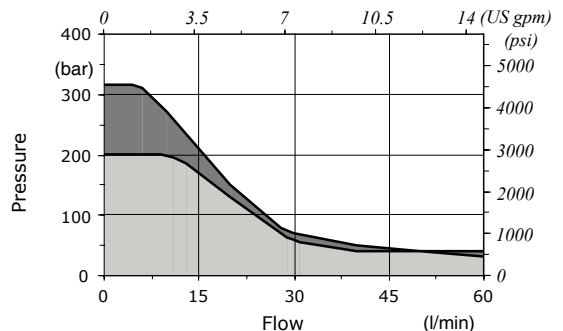
**Pressure drop versus flow**

**A → C**



**Minimum dynamic conditions**

(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ With drain  
■ Without drain

## Part ordering codes

Example:

For description composition see the text below

**DFE052/3 A 18 ES - W 2 0 2 - 12VDC - SAE - (CRZ)**

1 2 3 4 3 4 5 6 Galvanized body

**... 2 0 (300) DB 2 - 12VDC - ...**

**Coil**  
1 = without coil  
2 = with coil

**Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

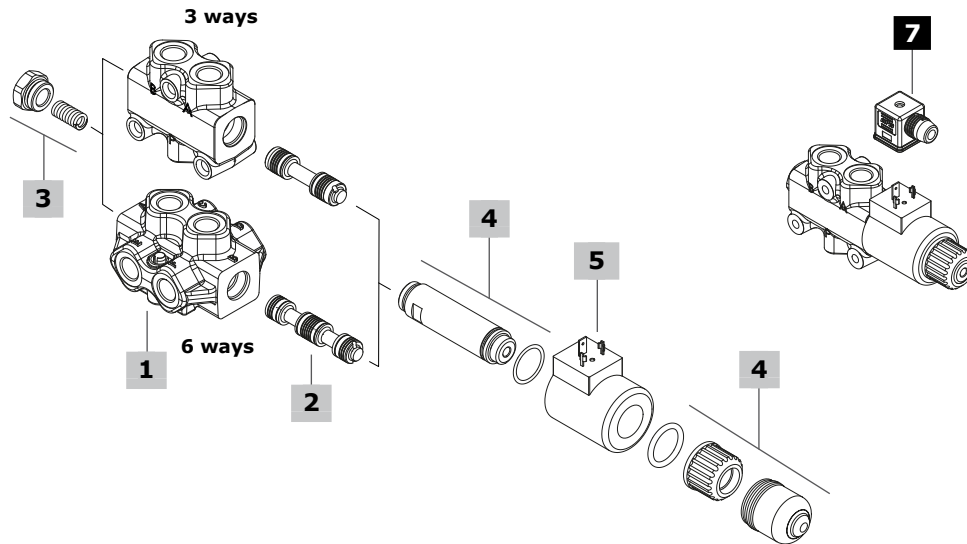
**Lenght cables**  
(only if it's present)  
Lenght is in mm

**Diode\***  
(text omitted if diode is not present)  
DB = bidirectional diode

**Bellow**  
1 = without bellow  
2 = with bellow

**Coil voltage**

(\*) - For diodes and connector options see coils table on page 85



1 Body kit*			3 Positioner kit			page 83
TYPE	CODE	DESCRIPTION	TYPE	CODE	DESCRIPTION	
<b>DFE052/3</b>	3CO2221725Z	3 ways body kit	<b>18...W</b>	5TAP001	Spring return in pos. 1	
<b>DFE052/6</b>	3CO2222725Z	6 ways body kit	<b>18...Y</b>	5GIU003*	Spring return in pos. 1, with SAE6 drain port	
2 Spools			4 Solenoid kit			page 84
TYPE	CODE	DESCRIPTION	TYPE	CODE	DESCRIPTION	
<b>for DFE052/2:</b>			<b>ES</b>	5SOL515000	Tube assembly without protective bellow	
<b>A</b>	3CAS105245	Open port in neutral	-	4ACC515	Optional tube assembly protective bellow	
<b>B</b>	3CAS105145	Closed port in neutral				
<b>for DFE052/3:</b>						
<b>A</b>	3CAS105345	Flow in A in neutral. Ports connected in transit position				
<b>B</b>	3CAS105445	Flow in A in neutral. Ports closed in transit position				
<b>D</b>	3CAS105546	Closed ports in neutral and connected in transit position				
<b>for DFE052/6:</b>						
<b>A</b>	3CAS105645	Flow in E and F. C and D closed in pos. 1 Ports connected in transit position				
<b>B</b>	3CAS105746	Flow in E and F. C and D closed in pos. 1 Ports closed in transit position				
<b>H</b>	3CAS105845	D<->C in pos. 1, F<->E in pos. 2 Ports closed in transit position				
5 Coil			7 Accessories			
For list of available coils see pages 85			For list of available connectors see pages 85			

(\*) - Codes are referred to **UN-UNF** thread

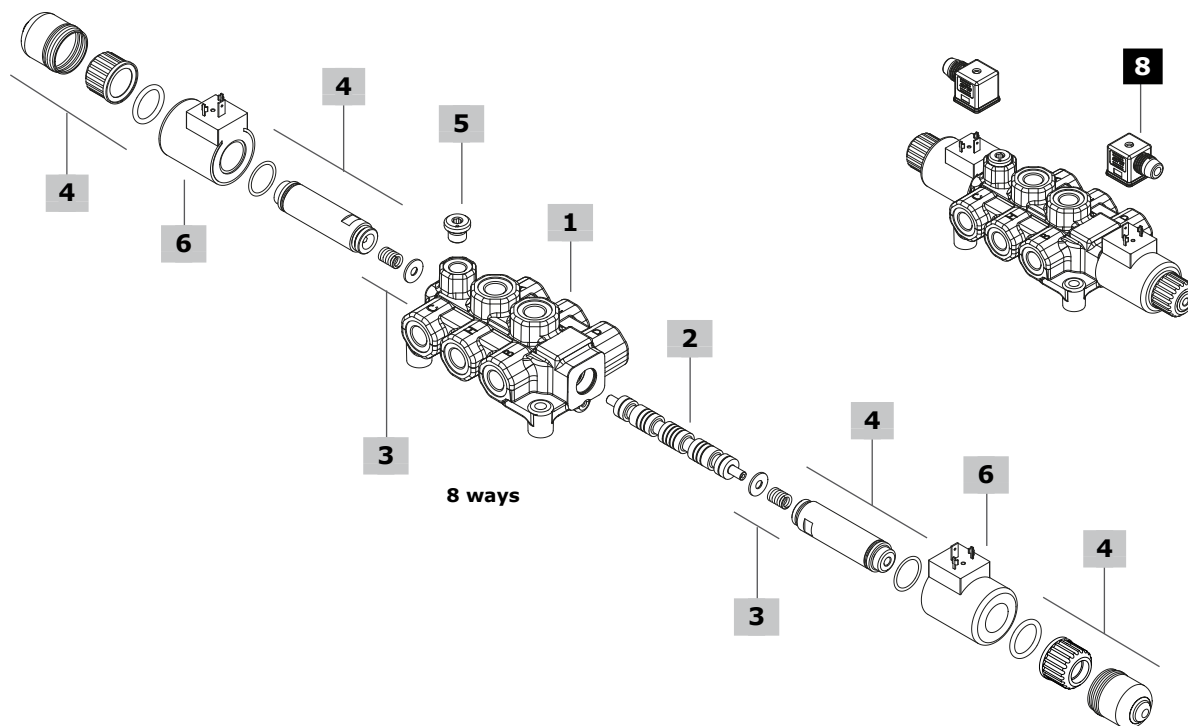


**Part ordering codes**

For description composition  
see the text on previous page

**DFE052/8**   **B**   **8**   **ES3**   -   **W**   **2 0 2**   -   **12VDC**   -   **SAE**   -   **(CRZ)**

1            2    3            4            5            4    6            7            Galvanized body



**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DFE052/8</b>	3CO2224750MZ	8 ways body kit

**2 Spools** **page 83**

TYPE	CODE	DESCRIPTION
<b>A</b>	3CAS105A70M	Flow in C and D. E, F, G and H closed in pos. 0. Ports connected in transit position
<b>B</b>	3CAS105B70M	Flow in C and D. E, F, G and H closed in pos. 0. Ports closed in transit position
<b>I</b>	3CAS105I70M	Flow in C and D. E, F, G and H closed in pos. 0.

**3 Positioner kit** **page 84**

TYPE	CODE	DESCRIPTION
<b>8 (ES)</b>	5V080528	Spring return in pos. 0

**4 Solenoid kit** **page 84**

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL515000	Tube assembly without protective bellow
-	4ACC515	Optional tube assembly protective bellow

**5 Drain\*** **page 84**

TYPE	CODE	DESCRIPTION
<b>W</b>	3XTAP814120	Without drain, with plug SAE4
<b>Y</b>	-	With SAE4 drain port

**6 Coil**

For list of available coils see pages 85

**7 Body threading**

Specify threading always when it is different from **BSP** standard

**8 Accessories**

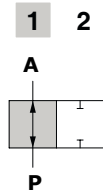
For list of available connectors see pages 85

(\*) - Codes are referred to **UN-UNF** thread

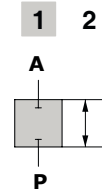
Spool circuits

**2 ways**

**Type A** Open port in neutral position      **Type B** Closed port in neutral position



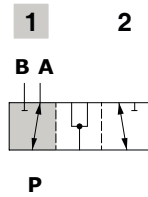
**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)



**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

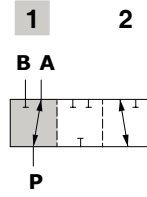
**3 ways**

**Type A**  
Ports connected in transit position



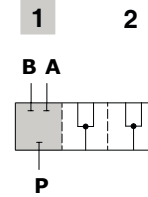
**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

**Type B**  
Ports closed in transit position



**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

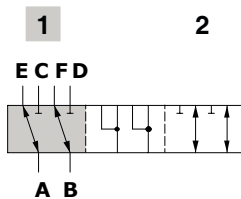
**Type D**  
Closed ports in neutral and connected in transit position



**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

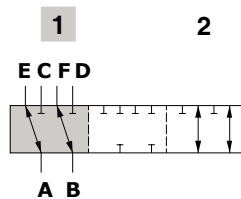
**6 ways**

**Type A**  
Flow in E and F. C and D closed in pos. 1  
Ports connected in transit position



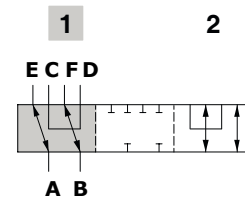
**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

**Type B**  
Flow in E and F. C and D closed in pos. 1  
Ports closed in transit position



**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

**Type H**  
D<->C in pos. 1, F<->E in pos. 2  
Ports closed in transit position



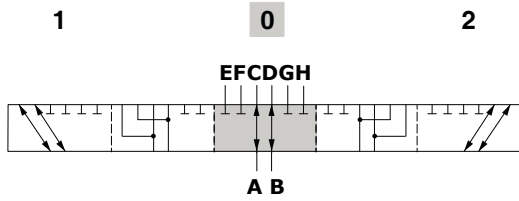
**Spool stroke**  
Position 2: - 4 mm (- 0.15 in)

**Spool circuits**

**8 ways**

**Type A**

Flow in C and D. E, F, G and H closed in pos. 0. Ports connected in transit position

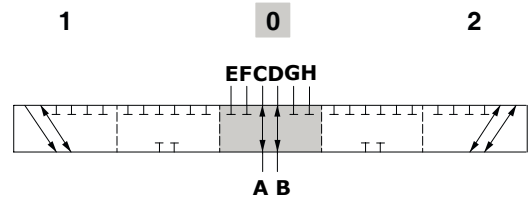


**Spool stroke**

Position 1: + 3.4 mm (0.13 in)  
Position 2: - 3.4 mm (-0.13 in)

**Type B**

Flow in C and D. E, F, G and H closed in pos. 0. Ports closed in transit position

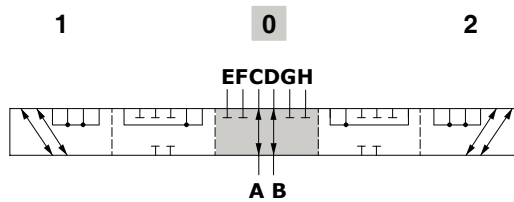


**Spool stroke**

Position 1: + 3.4 mm (0.13 in)  
Position 2: - 3.4 mm (-0.13 in)

**Type I**

Flow in C and D. E, F, G and H closed in pos. 0.



**Spool stroke**

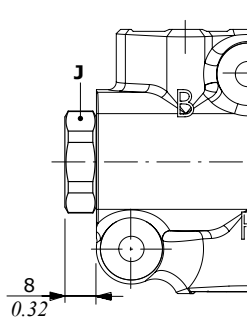
Position 1: + 3.4 mm (0.13 in)  
Position 2: - 3.4 mm (-0.13 in)

**Positioner kit**

**With spring return in position 1**

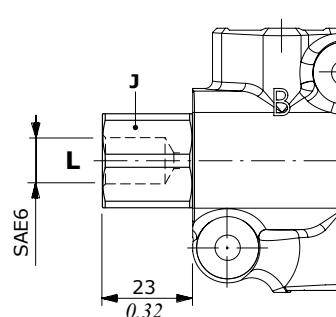
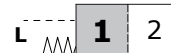
**Type 18W**

With plug



**Type 18Y**

With SAE6 drain port

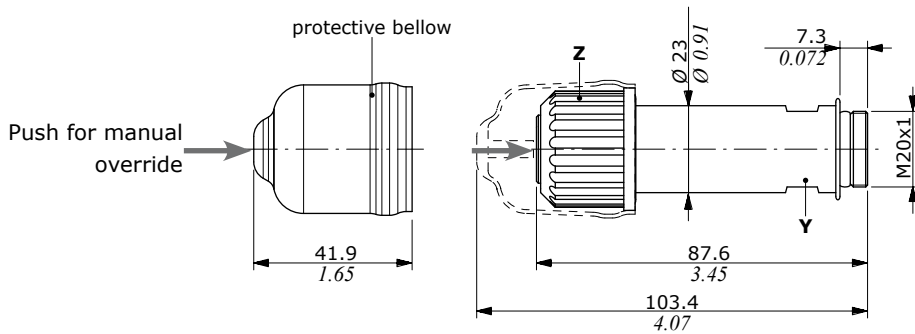


**Wrenches and tightening torque**

J = wrench 24 - 24 Nm (17.7 lbft)

**Solenoid kit**

**ES tube assembly kit**

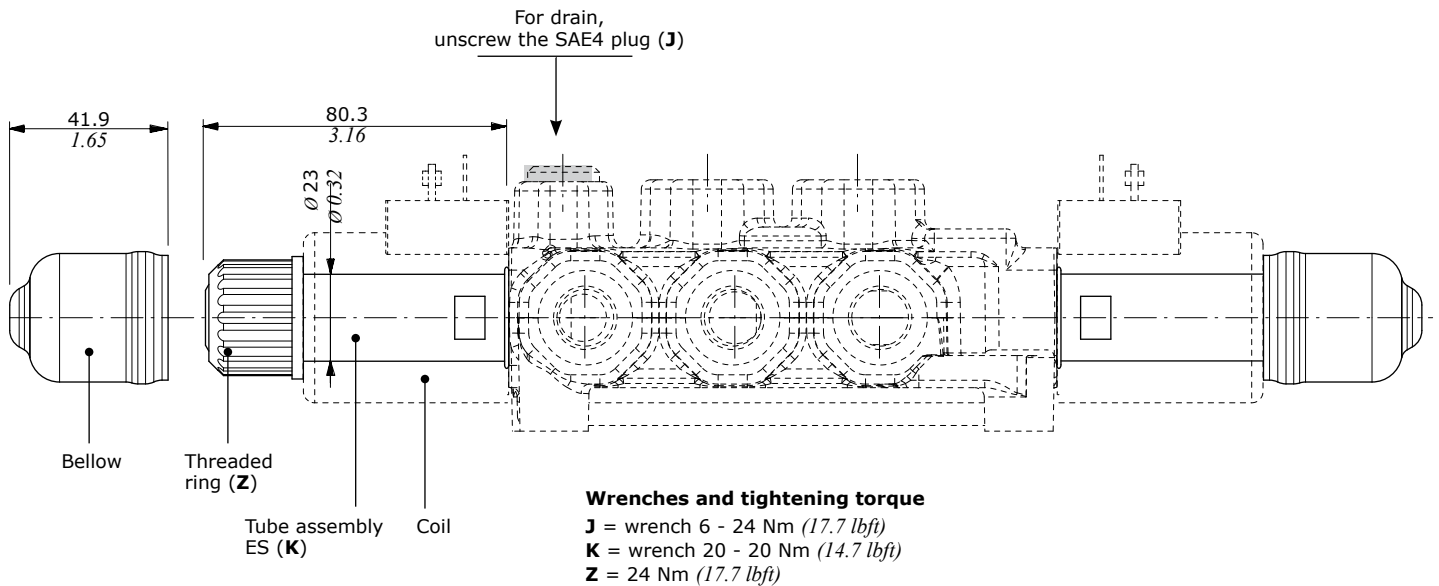
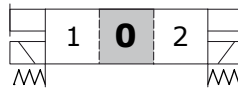


**Wrenches and tightening torque**  
**Y** = wrench 20 - 20 Nm (14.7 lbf)  
**Z** = 24 Nm (17.7 lbf)

**Positioner kit and solenoid kit - DFE052/8**

**With spring return in position 0**

**Tipo 8ES3**



**Coils and accessories**

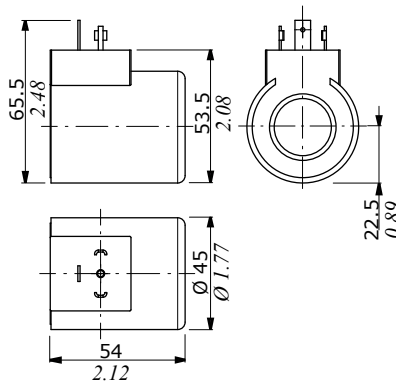
Type	Voltage	Ordering codes					
		Connector types					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
<b>D15</b>	<b>12 VDC</b>	4SOL515012	4SOL515011 <sup>(2)</sup> 4SOL515014A <sup>(3-6)</sup>	4SOL515016 <sup>(5)</sup>	-	-	-
	<b>14 VDC</b>	-	4SOL515014B <sup>(3-6)</sup>	4SOL515016A <sup>(5)</sup>	-	-	-
	<b>24 VDC</b>	4SOL515024	4SOL515025A <sup>(3-6)</sup> 4SOL515021 <sup>(2)</sup>	-	-	-	-
	<b>48 VDC</b>	4SOL515048	-	4SOL515049 <sup>(2)</sup>	-	-	-
	<b>98 VDC</b>	4SOL515098	-	-	-	-	-
	<b>110 VDC</b>	4SOL515110	-	-	-	-	-
<b>Mating connectors</b>							
		4CN1009995	5CON140031	5CON003	-	-	-

Notes: (1) supply with AC and use only with rectifier connector - (2) with flying leads - (3) with bidirectional diode - (4) with unidirectional diode (5) integrated perpendicular type - (6) integrated parallel type

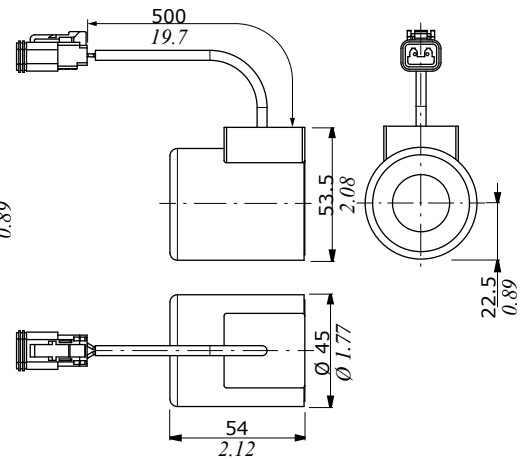
**Features**

- Nominal voltage tolerance: ±10%
- Nominal power.....: 38 W  
12/14/24/48/98/110 VDC
- Nominal current..... : 3.16 A @ 12 VDC  
: 2.9 A @ 14 VDC  
: 1.58 A @ 24 VDC  
: 0.79 A @ 48 VDC  
: 0.41 A @ 98 VDC  
: 0.35 A @ 110 VDC
- Insulation.....: Class H (180°C - 356°F)
- Weather protection.....: IP65 - ISO4400  
: IP69K - Deutsch DT  
: IP65 - AMP JPT
- Insertion.....: 100%

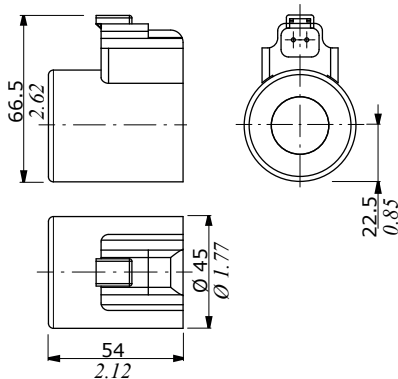
**ISO4400 connector**



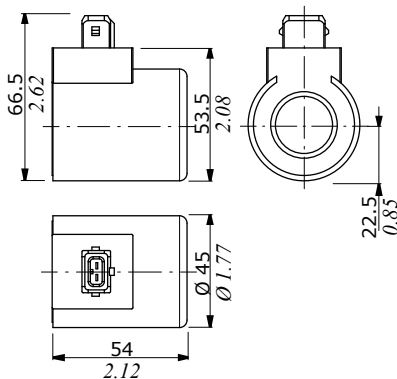
**Flying leads with DEUTSCH DT04 connector**



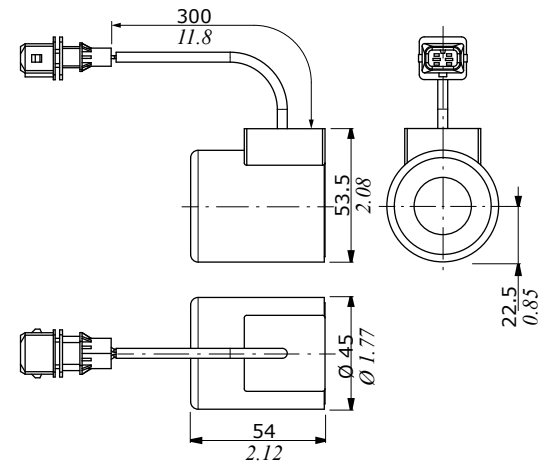
**DEUTSCH DT04 connector (Parallel type)**



**AMP JPT connector (Perpendicular type)**



**Flying leads with AMP JPT connector**







## DFE102

### Solenoid control monoblock diverter valves

- 3 - 6 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		3 - 6
Max. flow rating		90 l/min (23.7 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 94
Nominal power		60 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	10 cm <sup>3</sup> /min (0.61 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

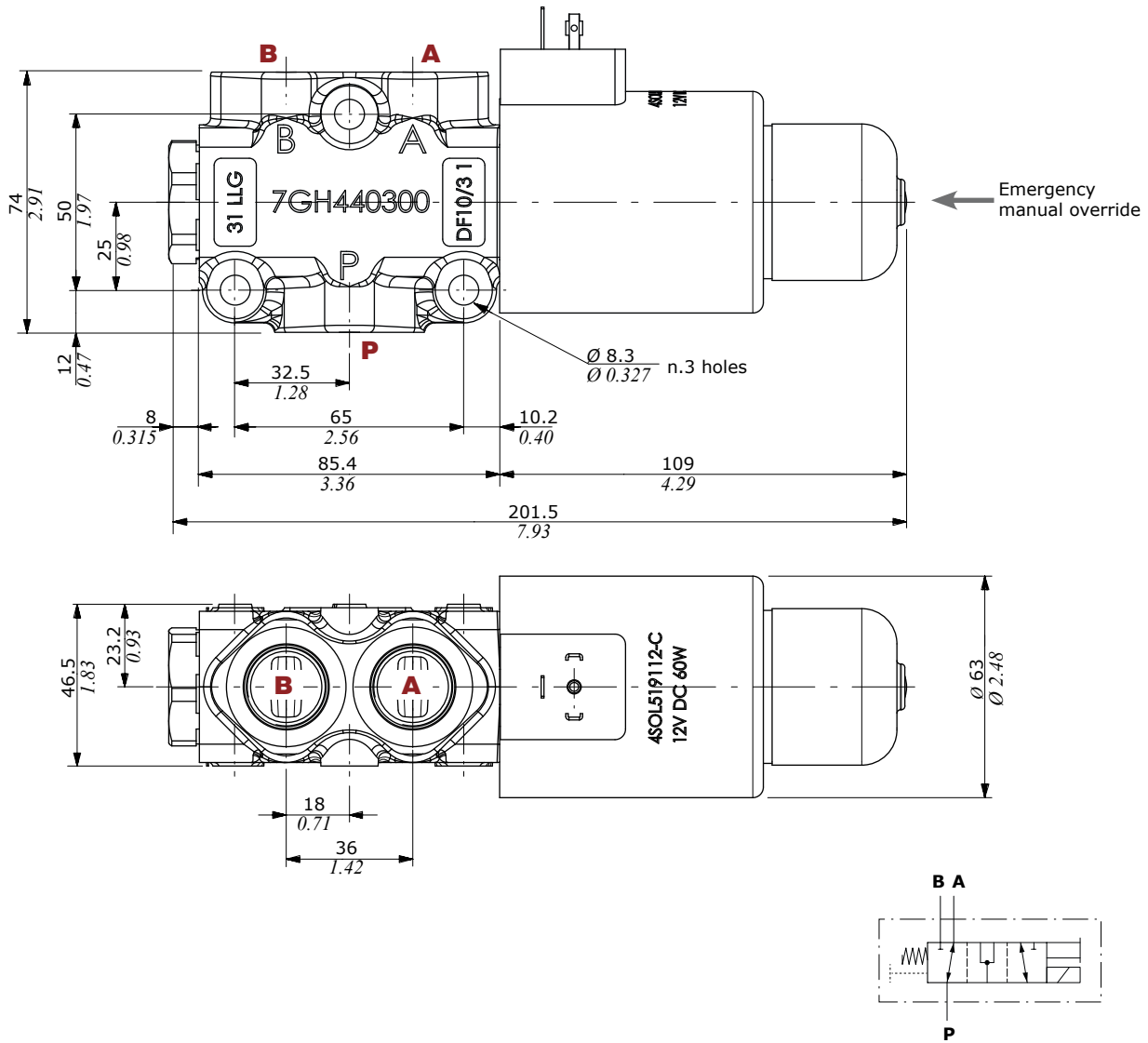
### Available threads

PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DFE10</b>	G 1/2	7/8-14 (SAE 10)
PILOT PORTS		
<b>L</b>	G 1/4	9/16-18 (SAE 6)

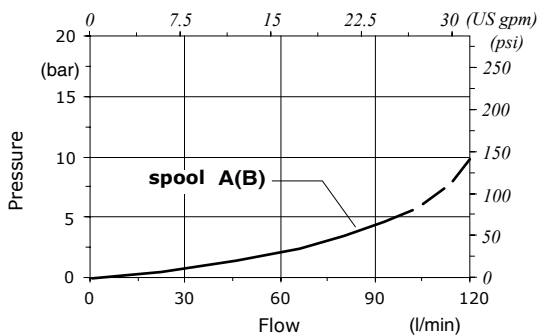
## Dimensional data - hydraulic circuit - performance data

### 3 ways

It's possible to obtain 2 ways diverter valve plugging port

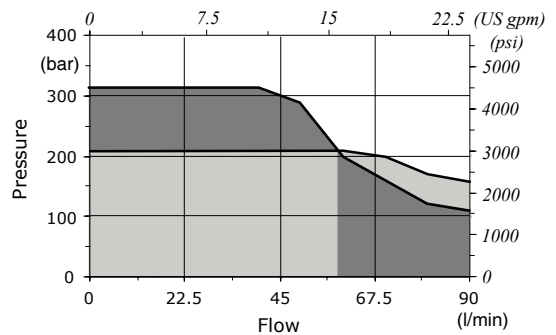


**Pressure drop versus flow**  
P → A(B)



**Minimum dynamic conditions**

(Supply = Vn-10%, coil at 70 °C - 158 °F)

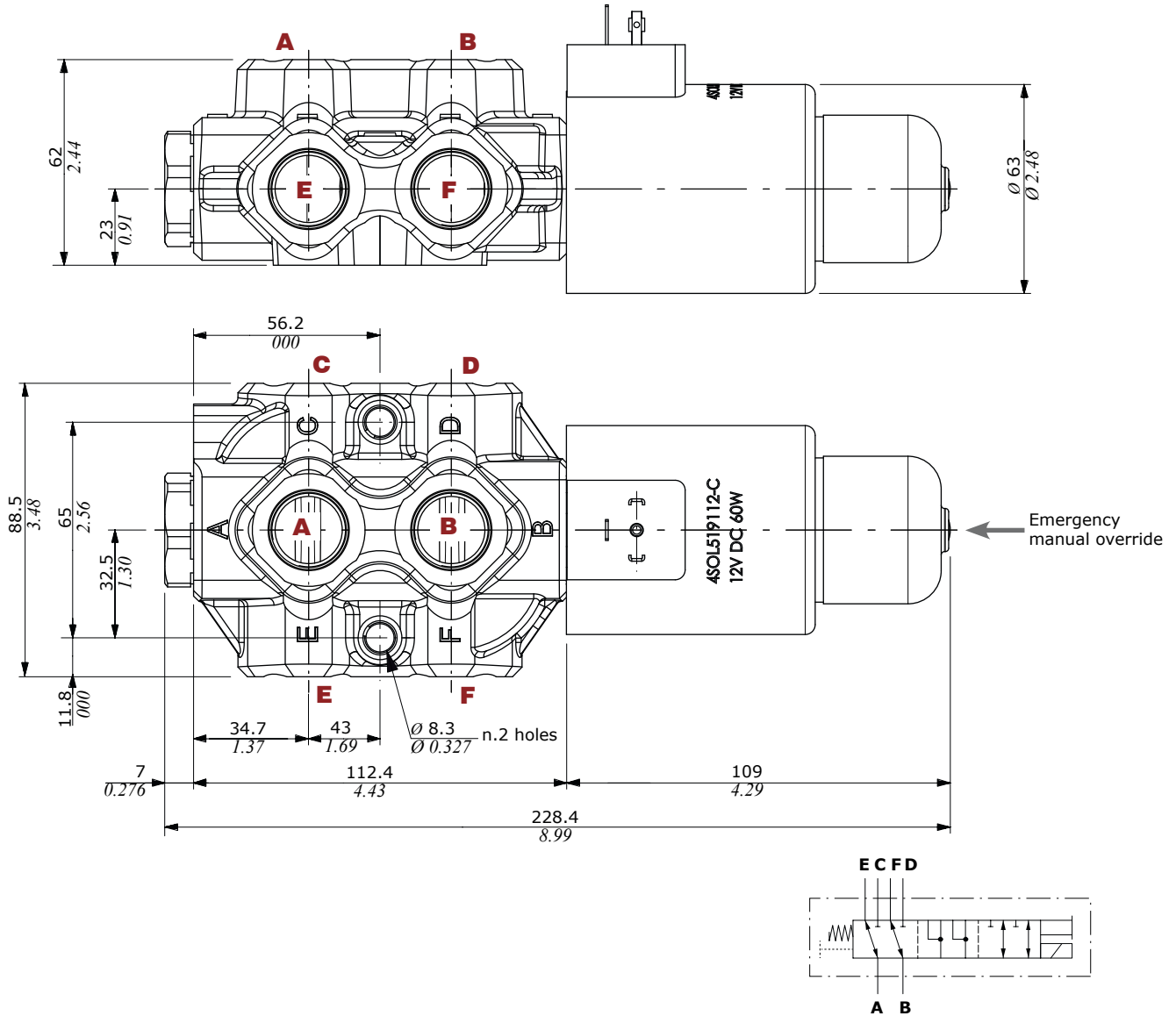


■ With drain  
■ Without drain



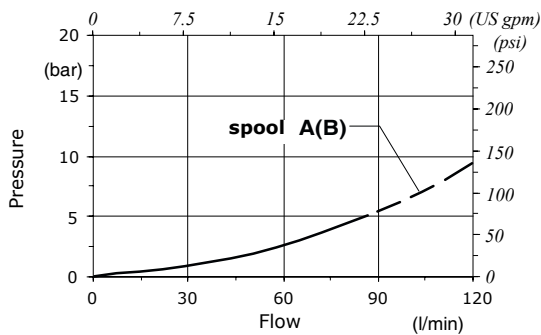
**Dimensional data - hydraulic circuit - performance data**

**6 ways**



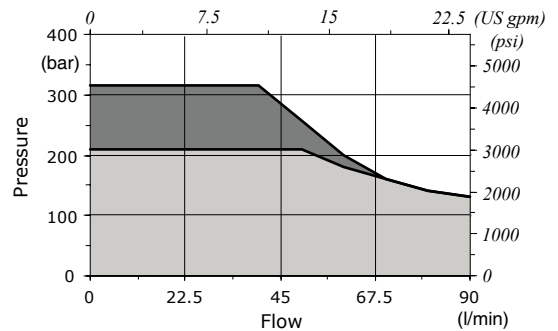
**Pressure drop versus flow**

**A → C(E)**



**Minimum dynamic conditions**

(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ With drain  
■ Without drain

## Part ordering codes

Example:

DFE102/3    A    18    ES    -    W    2 0 2 - 12VDC    -    SAE    -    CRZ

For description composition see the text below

Galvanized body

... 2 0 (300) 2 - 12VDC - ...

**Coil**  
1 = without coil  
2 = with coil

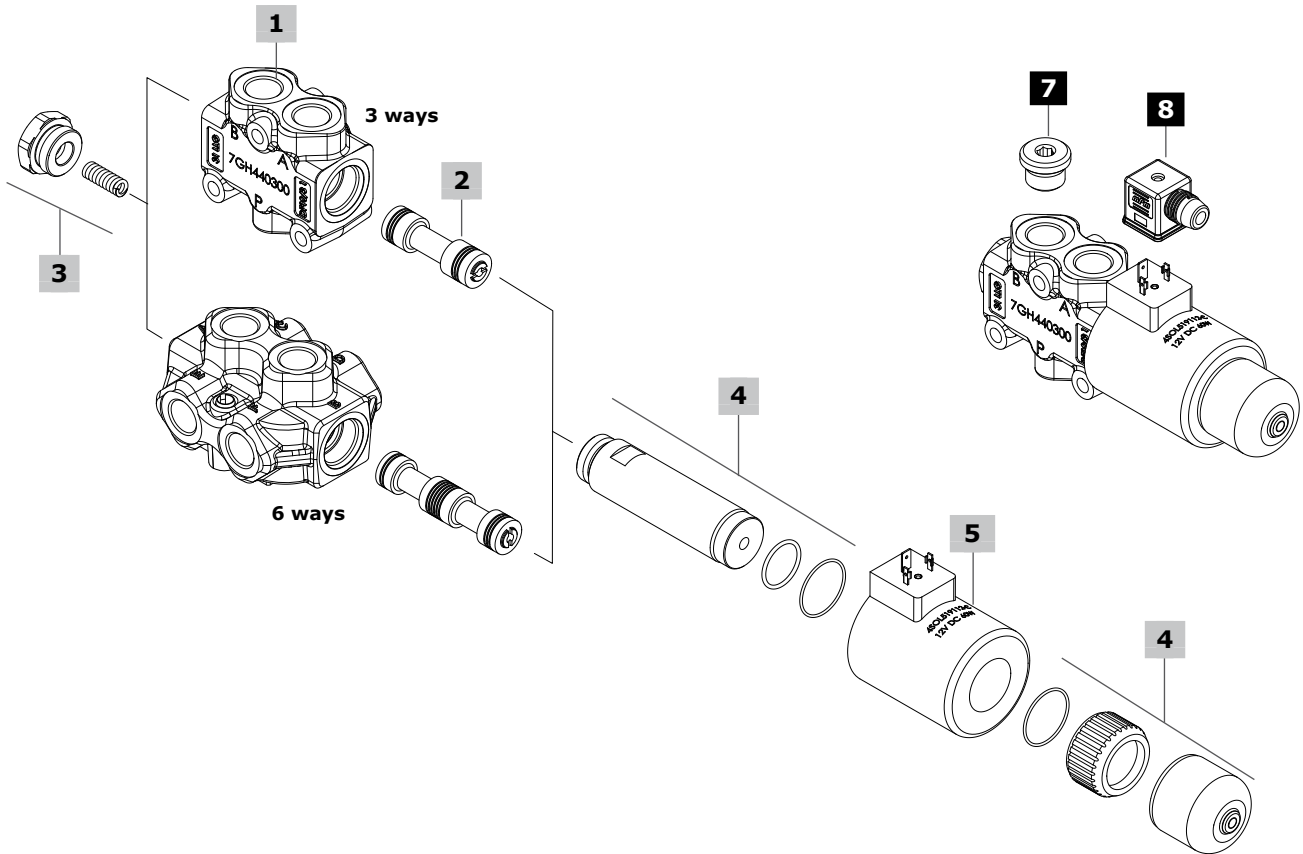
**Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

**Lenght cables**  
(only if it's present)  
Lenght is in mm

**Bellow**  
1 = without bellow  
2 = with bellow

**Coil voltage**

(\* ) - For connector options see coils table on page 94



**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DFE102/3</b>	3CO2241720Z	3 ways body kit
<b>DFE102/6</b>	3CO2242721Z	6 ways body kit

**2 Spools** **page 92**

TYPE	CODE	DESCRIPTION
<b>For DFE102/3:</b>		
<b>A</b>	3CAS110342	Flow in A in neutral. Ports connected in transit position
<b>B</b>	3CAS110442	Flow in A in neutral. Ports closed in transit position
<b>D</b>	3CAS110541	Closed ports in neutral and connected in transit position

**For DFE102/6:**

<b>A</b>	3CAS110642	Flow in E and F. C and D closed in pos. 1 Ports connected in transit position
<b>B</b>	3CAS110742	Flow in E and F. C and D closed in pos. 1 Ports closed in transit position
<b>H</b>	3CAS110843	D<->C in pos. 1, F<->E in pos. 2 Ports closed in transit position

**3 Positioner kit** **page 93**

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP011	Spring return in pos. 1
<b>18...Y</b>	5GIU018*	Spring return in pos. 1, with SAE6 drain port

**4 Solenoid kit** **page 93**

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL519004-C	Tube assembly without protective bellow
<b>ES</b>	5SOL519004A-C	Tube assembly with protective bellow
-	4ACC519-C	Optional protective bellow for tube assembly

**5 Coil**

For list of available coils see pages 94

**6 Body threading**

Specify threading always when it is different from **BSP** standard

**7 Port plugs\***

It's possible to obtain 2 ways diverter valve plugging port of DFE102/3

CODE	DESCRIPTION
3XTAP826160	SAE10 plug

**8 Accessories**

For list of available connectors see pages 94

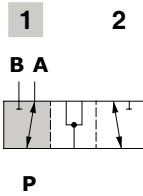
(\*) - Codes are referred to **UN-UNF** thread

Spool circuits

**3 ways**

**Type A**

Ports connected in transit position

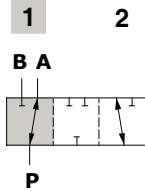


**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

**Type B**

Ports closed in transit position

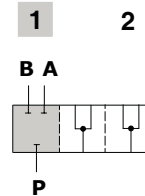


**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

**Type D**

Closed ports in neutral and connected in transit position



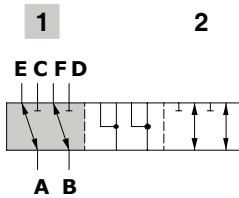
**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

**6 ways**

**Type A**

Flow in E and F. C and D closed in pos. 1  
Ports connected in transit position

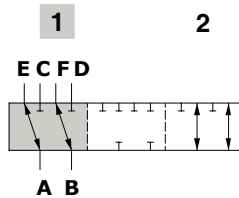


**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

**Type B**

Flow in E and F. C and D closed in pos. 1  
Ports closed in transit position

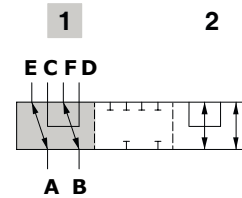


**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

**Type H**

D<->C in pos. 1, F<->E in pos. 2  
Ports closed in transit position



**Spool stroke**

Position 2: - 4.6 mm (- 0.18 in)

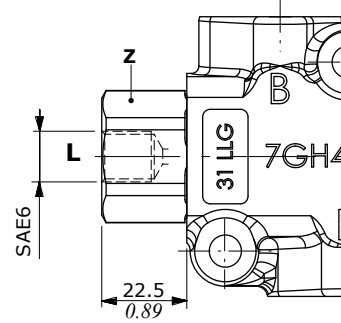
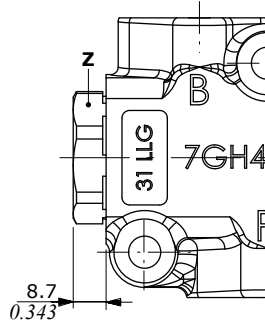
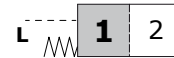
**Positioner kit**

**With spring return in position 1**

**Type 18W**  
With plug

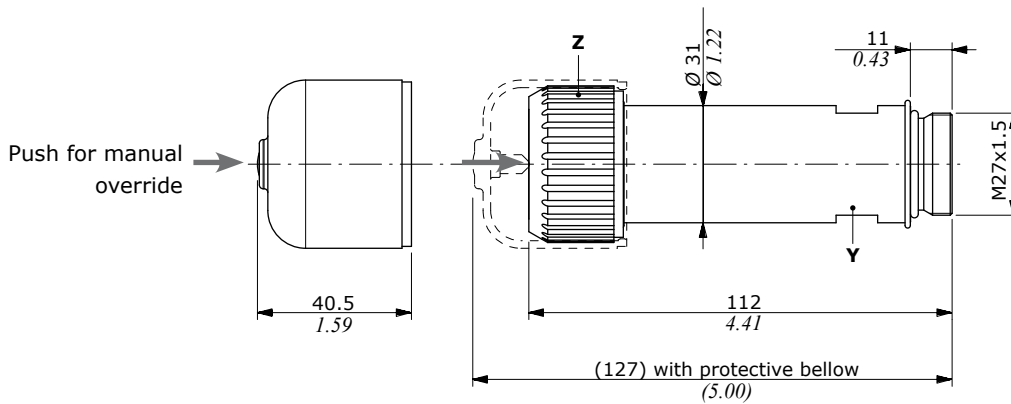
**Type 18Y**  
With SAE6 drain port

**Wrenches and tightening torque**  
Z = wrench 32 - 42 Nm (31 lbft)



**Solenoid kit**

**ES tube assembly kit**



**Wrenches and tightening torque**  
Y = wrench 27 - 24 Nm (17.7 lbft)  
Z = 24 Nm (17.7 lbft)

## Coils and accessories

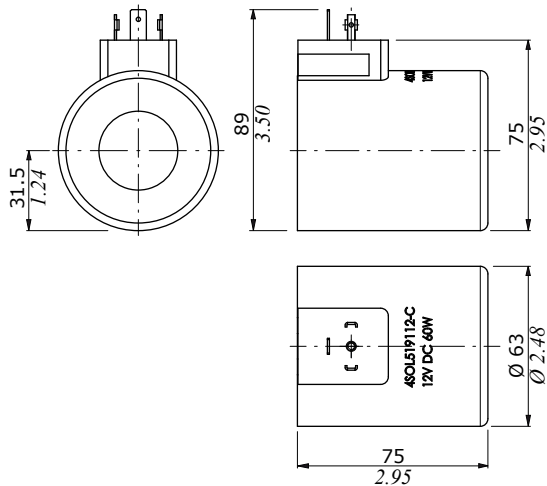
Type	Voltage	Ordering codes					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
D19C	12 VDC	4SOL519112-C	4SOL519402-C <sup>(6)</sup> 4SOL519413-C <sup>(2)</sup>	-	-	-	4SOL519113-C
	24 VDC	4SOL519124-C	4SOL519404-C <sup>(6)</sup> 4SOL519425-C <sup>(2)</sup>	-	-	-	-
	28 VDC	-	4SOL519128-C <sup>(6-3)</sup>	-	-	-	-
<b>Mating connectors</b>							
		4CN1009995	5CON140031	-	-	-	-

Notes: (1) supply with AC and use only with rectifier connector - (2) with flying leads - (3) with bidirectional diode - (4) with unidirectional diode (5) integrated perpendicular type - (6) integrated parallel type

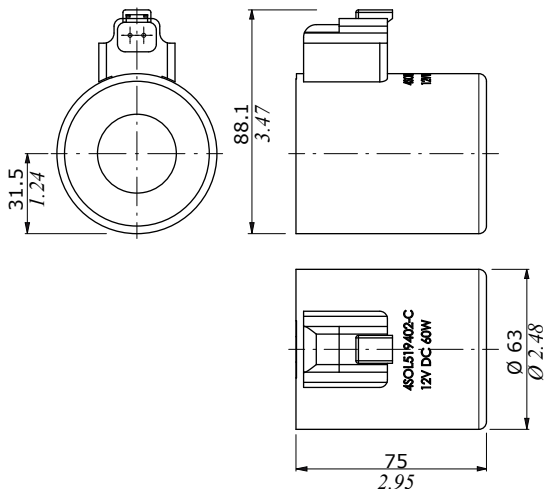
### Features

Nominal voltage tolerance : ±10%  
 Nominal power ..... : 60 W - 12/24/28 VDC  
 Nominal current ..... : 5 A @ 12 VDC / 2.5 A @ 24 VDC / 2.14 A @ 28 VDC  
 Insulation ..... : Class H (180°C)  
 Weather protection ..... : IP65 - ISO4400 / IP69K - Deutsch DT  
 Insertion ..... : 100%

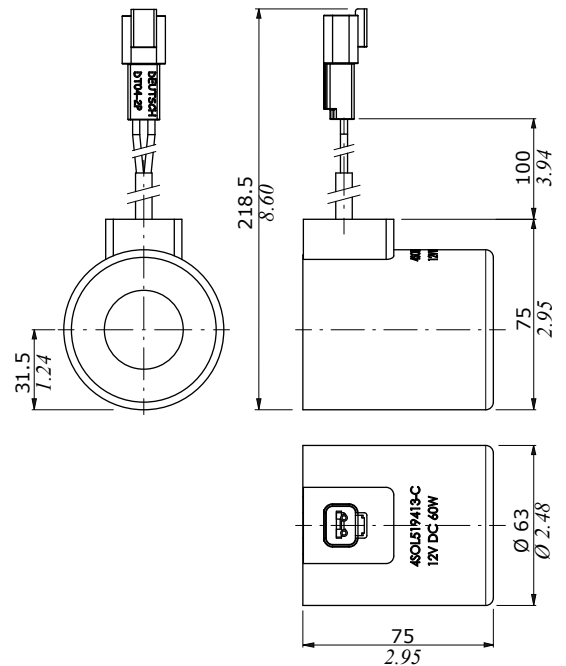
#### ISO4400 connector



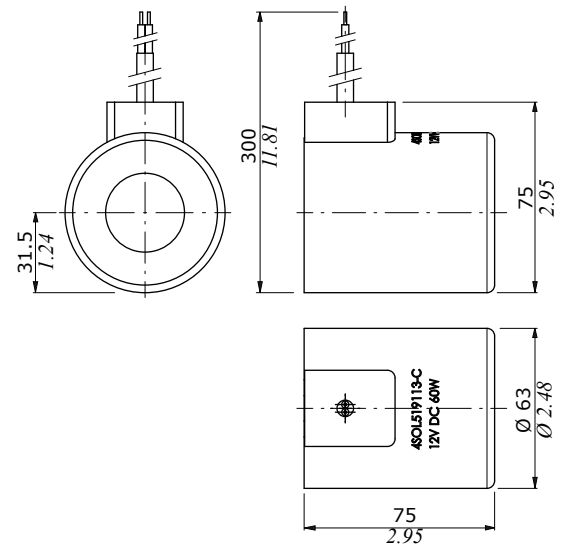
#### DEUTSCH DT04 connector (Parallel type)



#### Flying leads with DEUTSCH DT04 connector



#### Flying leads





## DFE20

### Solenoid control monoblock diverter valves

- 3 - 6 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		3 - 6
Max. flow rating		140 l/min (36.9 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 102
Nominal power		60 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	15 cm <sup>3</sup> /min (0.91 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

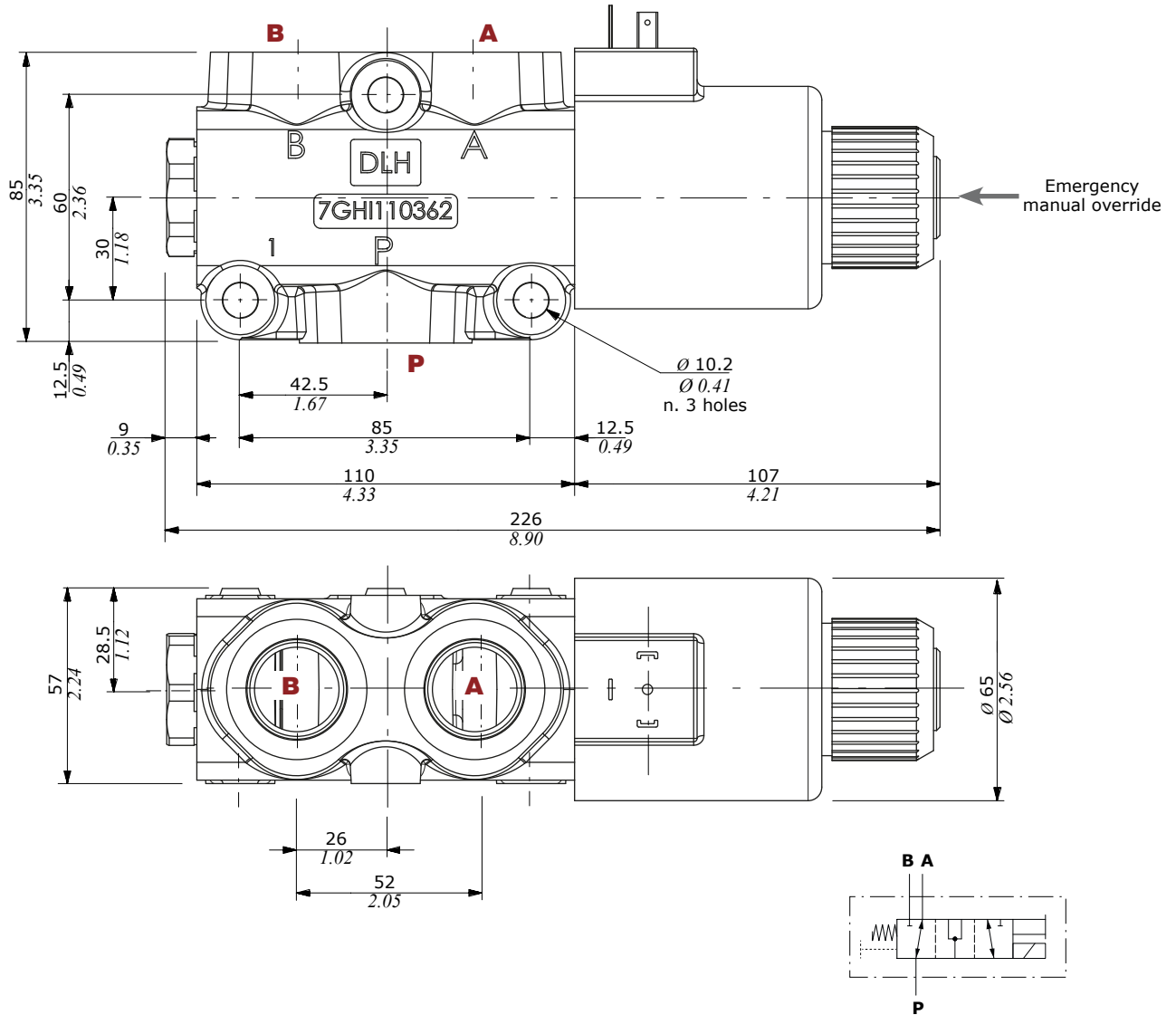
### Available threads

PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DFE20</b>	G 3/4	1" 1/16-12 (SAE 12)
PILOT PORTS		
<b>L</b>	G 1/4	7/16-20 (SAE 4)

Dimensional data - hydraulic circuit - performance data

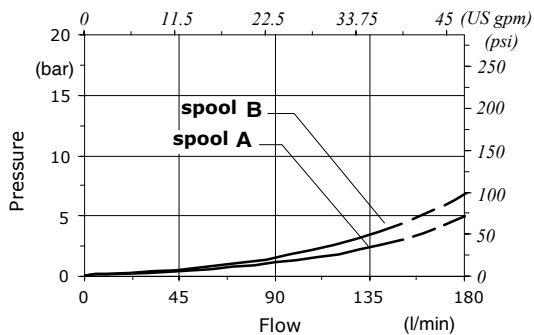
3 ways

It's possible to obtain 2 ways diverter valve plugging port



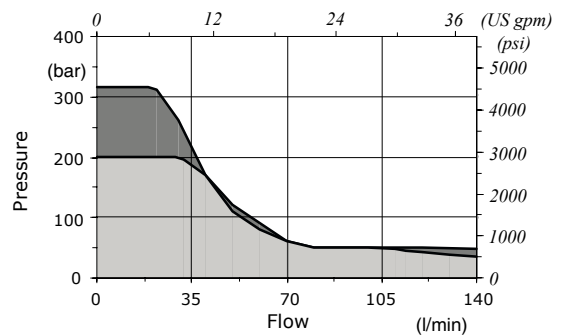
Pressure drop versus flow

P → A(B)



Minimum dynamic conditions

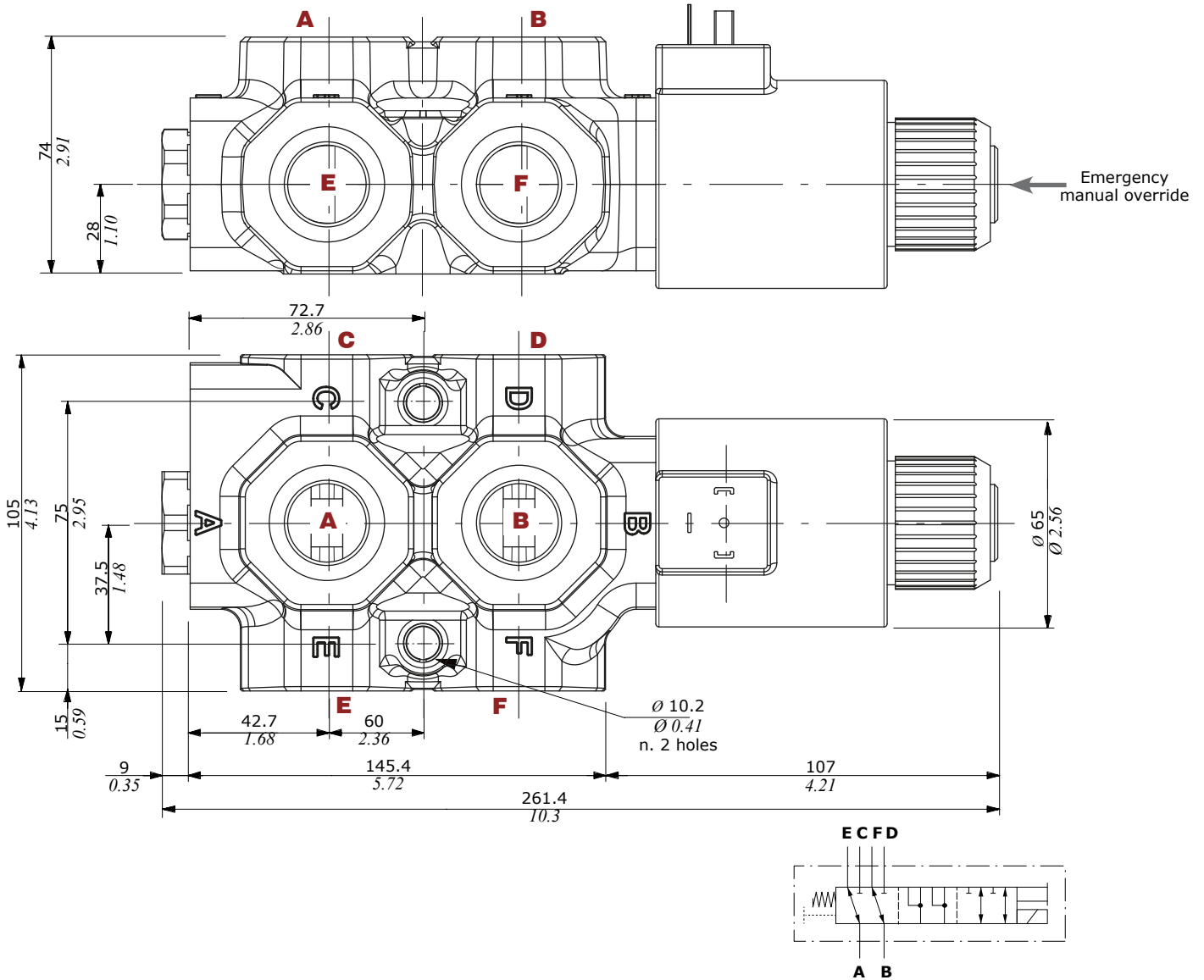
(Supply = Vn-10%, coil at 70 °C - 158 °F)



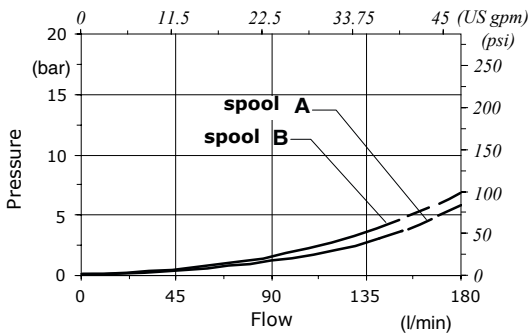


**Dimensional data - hydraulic circuit - performance data**

**6 ways**

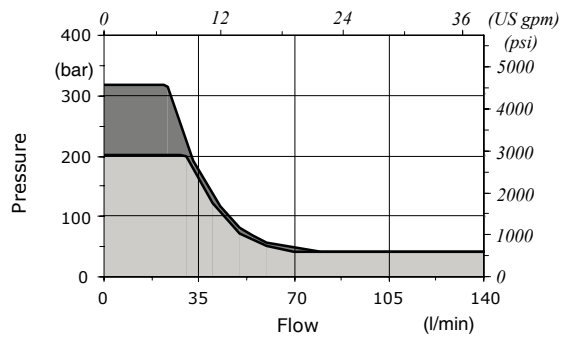


**Pressure drop versus flow**



**Minimum dynamic conditions**

(Supply = Vn-10%, coil at 70 °C - 158 °F)



■ **With drain**  
 ■ **Without drain**

## Part ordering codes

Example:

For description composition  
see the text below

**DFE20/3 A 18 ES - W 2 0 0 - 12VDC - SAE - (CRZ)**

1            2    3    4            3            4    5            6            Galvanized body

... **2 0 0 - 12VDC - ...**

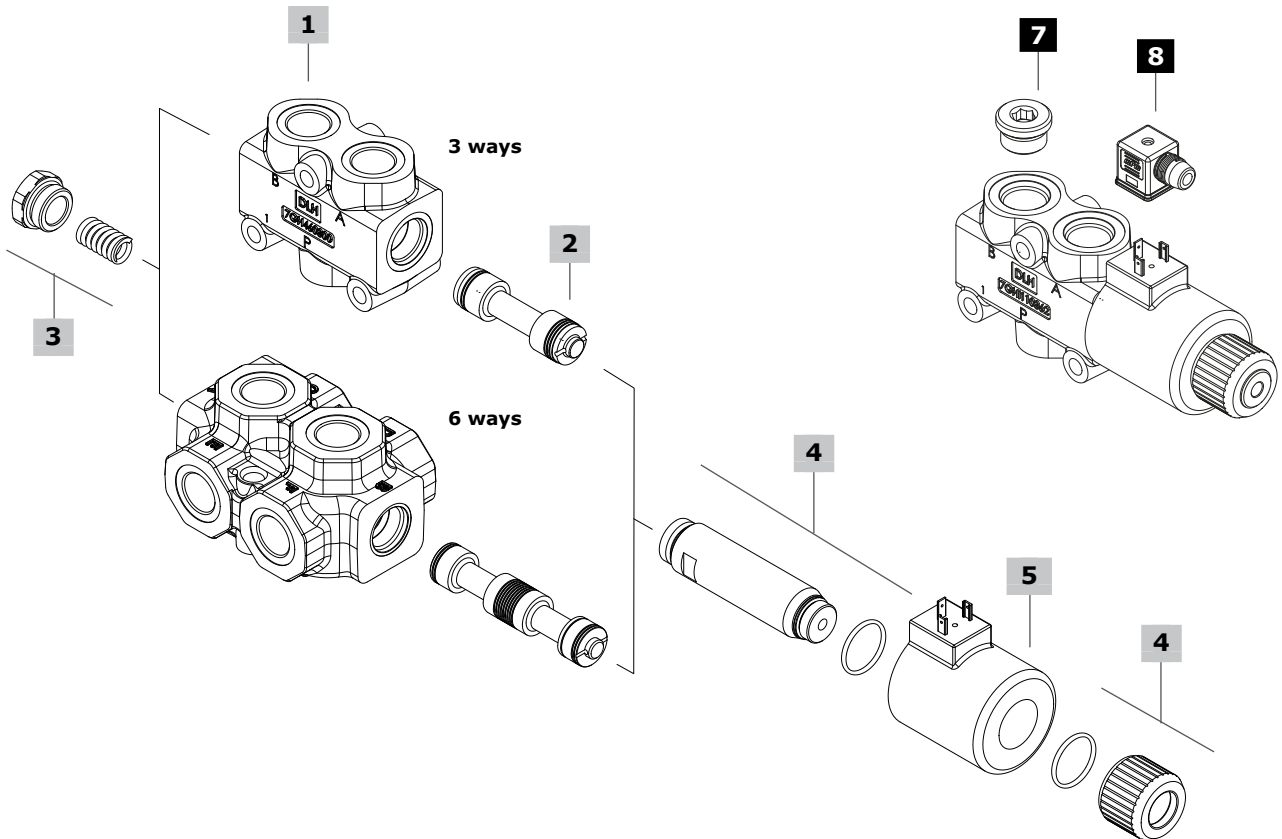
**Coil**  
1 = without coil  
2 = with coil

**Coil voltage**

**Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

**Bellow**  
0 = bellow not available

(\*) - For connector options see coils table on page 102



**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DFE20/3</b>	3CO2261721Z	3 ways body kit
<b>DFE20/6</b>	3CO2263720Z	6 ways body kit

**2 Spools** **page 100**

TYPE	CODE	DESCRIPTION
<b>for DFE20/3:</b>		
<b>A</b>	3CAS120341	Flow in A in neutral. Ports connected in transit position
<b>B</b>	3CAS120441	Flow in A in neutral. Ports closed in transit position
<b>for DFE20/6:</b>		
<b>A</b>	3CAS120641	Flow in E and F. C and D closed in pos. 1 Ports connected in transit position
<b>B</b>	3CAS120741	Flow in E and F. C and D closed in pos. 1 Ports closed in transit position
<b>H</b>	3CAS120841	D<->C in pos. 1, F<->E in pos. 2 Ports closed in transit position

**3 Positioner kit** **page 101**

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP003	Spring return in pos. 1
<b>18...Y</b>	5GIU008Z*	Spring return in pos. 1, with SAE4 drain port

**4 Solenoid kit** **page 101**

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL519003	Tube assembly without protective bellow

**5 Coil**

For list of available coils see pages 102

**6 Body threading**

Specify threading always when it is different from **BSP** standard

**7 Port plugs\***

It's possible to obtain 2 ways diverter valve plugging port of DFE20/3

CODE	DESCRIPTION
3XTAP832200	SAE12 plug

**8 Accessories**

For list of available connectors see pages 102

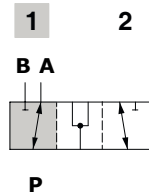
(\*) - Codes are referred to **UN-UNF** thread

Spool circuits

**3 ways**

**Type A**

Ports connected in transit position

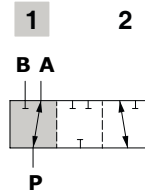


**Spool stroke**

Position 2: - 4.5 mm (- 0.18 in)

**Type B**

Ports closed in transit position



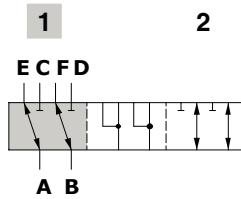
**Spool stroke**

Position 2: - 4.5 mm (- 0.18 in)

**6 ways**

**Type A**

Flow in E and F. C and D closed in pos. 1  
Ports connected in transit position

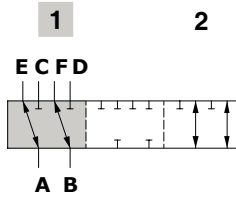


**Spool stroke**

Position 2: - 4.5 mm (- 0.18 in)

**Type B**

Flow in E and F. C and D closed in pos. 1  
Ports closed in transit position

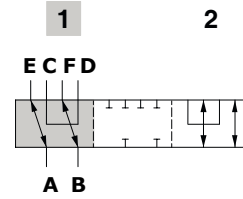


**Spool stroke**

Position 2: - 4.5 mm (- 0.18 in)

**Type H**

D->C in pos. 1, F->E in pos. 2  
Ports closed in transit position



**Spool stroke**

Position 2: - 4.5 mm (- 0.18 in)

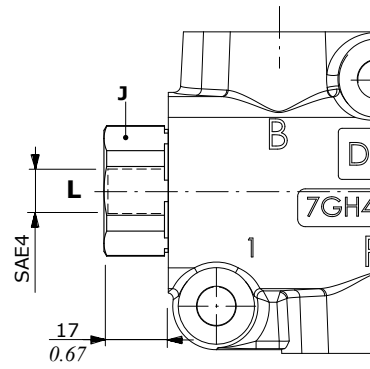
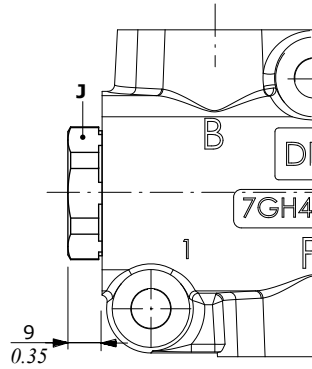
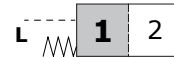
**Positioner kit**

**With spring return in position 1**

**Type 18W**  
With plug

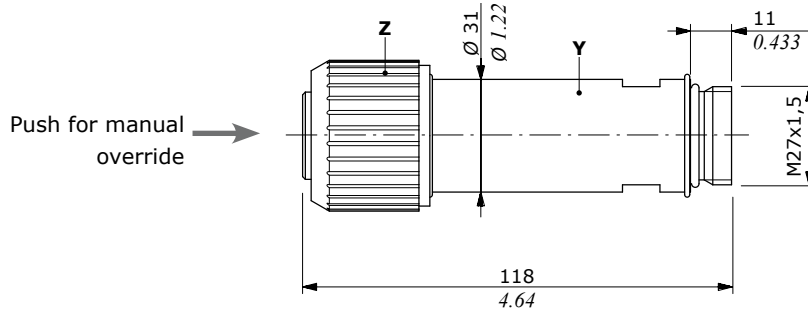
**Type 18Y**  
With SAE6 drain port

**Wrenches and tightening torque**  
J = wrench 32 - 42 Nm (31 lbft)



**Solenoid kit**

**ES tube assembly kit**



**Wrenches and tightening torque**  
Y = wrench 27 - 24 Nm (17.7 lbft)  
Z = 24 Nm (17.7 lbft)

## Coil and accessories

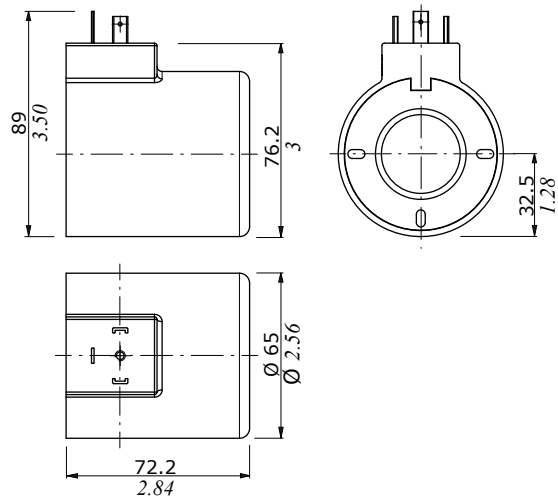
		Ordering codes					
Type	Voltage	Connector types					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
<b>D19</b>	<b>12 VDC</b>	4SOL519112	4SOL519402 <sup>(6)</sup>	-	-	-	-
	<b>20 VDC</b>	4SOL519120	-	-	-	-	-
	<b>24 VDC</b>	4SOL519124	4SOL519404 <sup>(6)</sup>	-	-	-	-
	<b>94 VDC</b>	4SOL519194	-	-	-	-	-
	<b>192 VDC</b>	4SOL519292	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

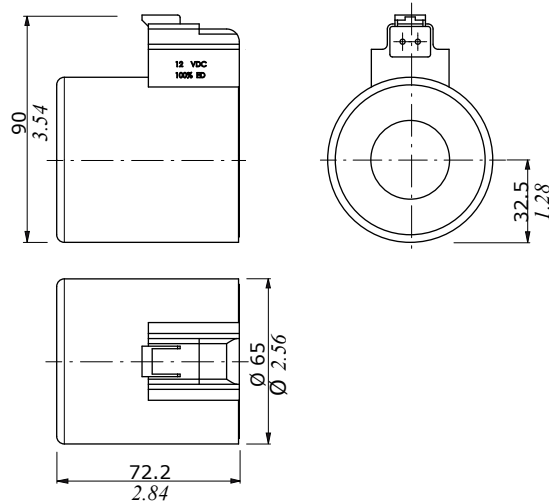
### Features

Nominal voltage tolerance: ±10%  
 Nominal power.....: 60 W  
                                   12/20/24/94/192 VDC  
 Nominal current.....: 5 A @ 12 VDC  
                                   : 3 A @ 20 VDC  
                                   : 2.5 A @ 24 VDC  
                                   : 2.5 A @ 94 VDC  
                                   : 0.31 A @ 192 VDC  
 Insulation.....: Class H (180°C - 356 °F)  
 Weather protection.....: IP65 - ISO4400  
                                   : IP69K - Deutsch DT  
 Insertion.....: 100%

### ISO4400 connector



### DEUTSCH DT04 connector (Parallel type)





## DFE085

Solenoid control monoblock diverter valve for special applications

- 4 ways configuration
- Galvanized body designed for in-line mounting
- Specific design for steering applications
- Mechanical detent on working position

This catalogue 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.

### WORKING CONDITIONS

N. of available ways	4	
Max. flow rating	25 l/min (6.6 US gpm)	
Max. pressure	210 bar (3045 psi)	
Available supply voltage	VDC	see reference page 108
Nominal power	38 W	
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	7 cm <sup>3</sup> /min (0.42 in <sup>3</sup> /min)
Fluid	Mineral based oil	
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination	20/18/15 - ISO 4406 - NAS 1638 - class 9	
Ambient temperature for working conditions	from -40°C to 60°C (from -40°F to 140°F)	

NOTE - For different working conditions please contact Sales Dept.

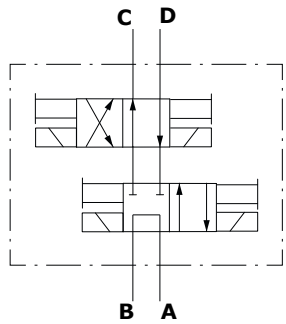
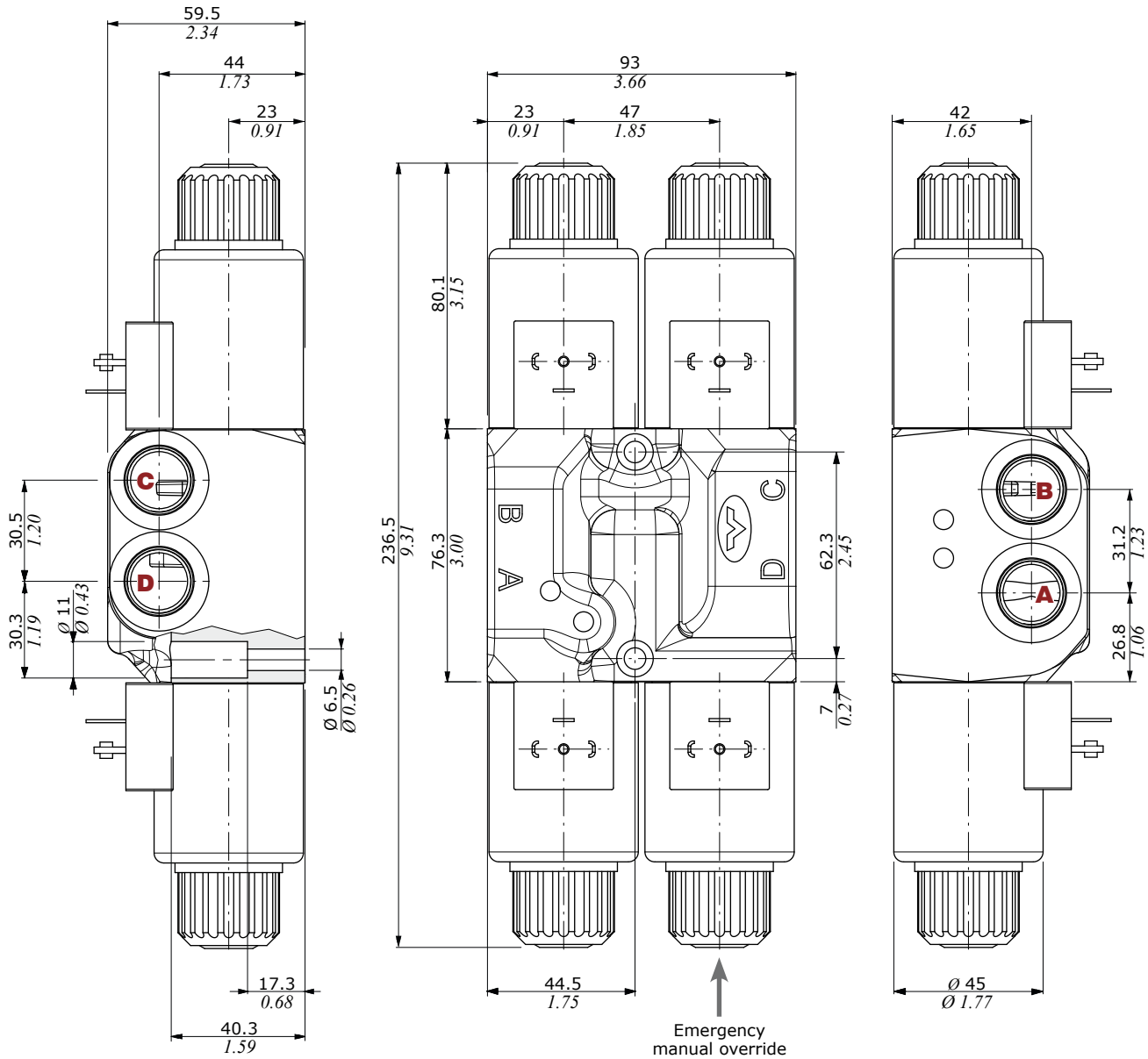
### Available threads

PORTS THREAD			METRIC*	METRIC*
	BSP	UN-UNF	(ISO 9974-1)	(ISO 6149)
ALL PORTS				
<b>DFE085</b>	G 3/8	3/4-16 (SAE 8)	M16x1.5	M16x1.5

(\* ) Optional threads  
for availability contact Sales  
Department

## Dimensional data and hydraulic circuit

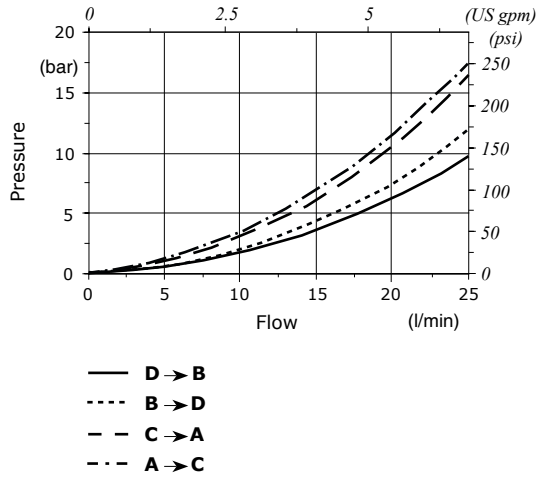
### 4 ways



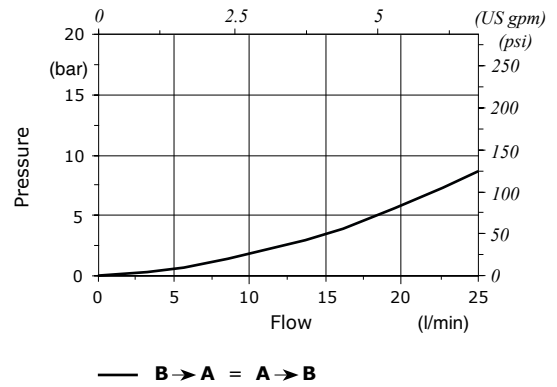


**Pressure drop versus flow :**

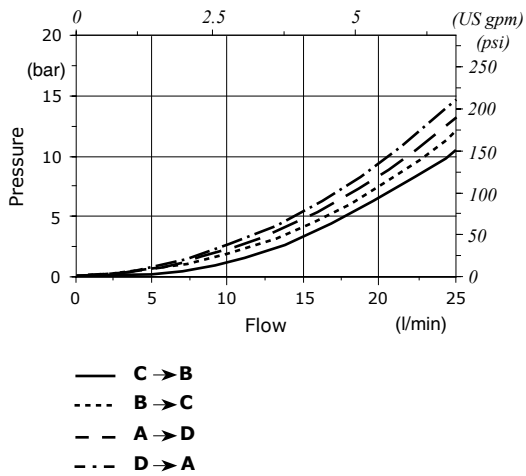
**"Crab" function**



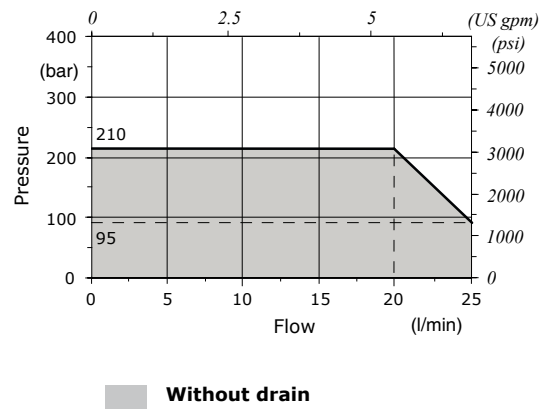
**"Anterior" function**



**"Leading" function**



**Minimum dynamic conditions**  
(Supply = Vn-10%, coil at 70 °C - 158 °F)



## Part ordering codes

Example:

For description composition  
see the text below

**DFE085/4** **BAB 01** **16ES3** / **BCD 01** **16ES3** - **2 0 2** - **12VDC** - **SAE** - **(CRZ)**

1   
 2   
 3   
 /   
 2   
 3   
 -   
 2   
 0   
 2   
 -   
 **12VDC**   
 -   
 5   
 -   
 **(CRZ)**  
Galvanized body

**Coil**

- 1 = without coil
- 2 = with coil

**Connection\***

- 0 = ISO (Std)
- 2 = AMP-JPT
- 3 = Deutsch DT06
- 4 = Deutsch DT04-2P Male
- 5 = Deutsch DT04-4P Female
- 6 = Metri-Pack Female
- 7 = Metri-Pack Male
- 8 = WeatherPack Male
- 9 = WeatherPack Female

**Connector orientation\***

- Std (omitted)
- PD = connector perpendicular to coil axis
- PL = connector parallel to coil axis

**Diode\***

- (text omitted if diode is not present)
- DB = bidirectional diode

**Length cables**

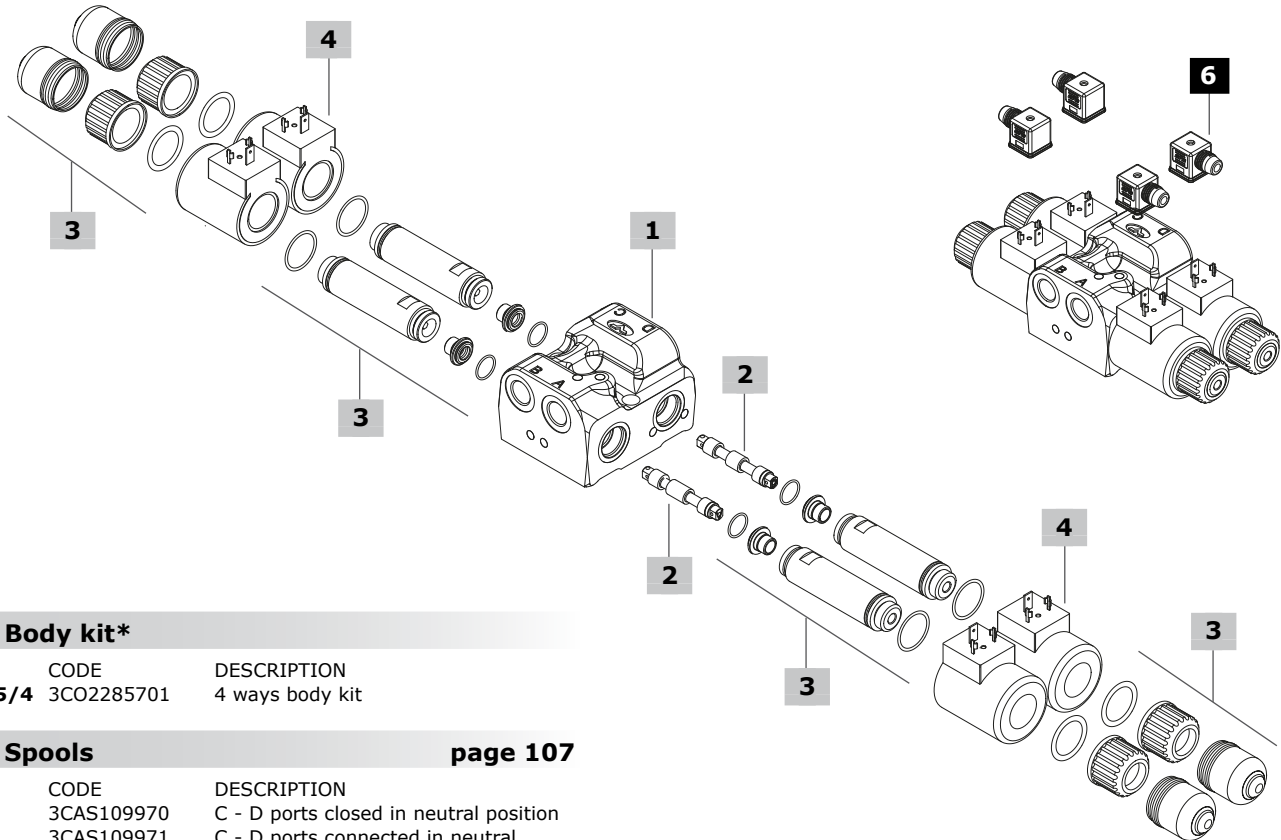
- (only if it's present)
- Length is in mm/in

**Coil voltage**

**Bellow**

- 1 = without bellow
- 2 = with bellow

(\*) - For diode and connector options see coils table on page 108



1 Body kit*		
TYPE	CODE	DESCRIPTION
<b>DFE085/4</b>	3CO2285701	4 ways body kit

**2 Spools** page 107

TYPE	CODE	DESCRIPTION
<b>AB</b>	3CAS109970	C - D ports closed in neutral position
<b>CD</b>	3CAS109971	C - D ports connected in neutral position

**3 Complete controls** page 107

TYPE	CODE	DESCRIPTION
<b>16ES3</b>	5CAN160850	Spring return in pos. 2, without protective bellow
-	4ACC515	Optional assembly tube protective bellow

**4 Coil**

For list of available coils see pages 108

**5 Body threading**

Specify threading always when it is different from **BSP** standard

**6 Accessories**

For list of available connectors see pages 108

(\*) - Codes are referred to **UN-UNF** thread

**Spool circuits**

**Type A-B**

C - D ports closed  
in neutral position

**1 2**

**C D**



**B A**

**Spool stroke**

Position 2: + 3 mm (0.11 in)

**Type C-D**

C - D ports connected  
in neutral position

**1 2**

**C D**



**B A**

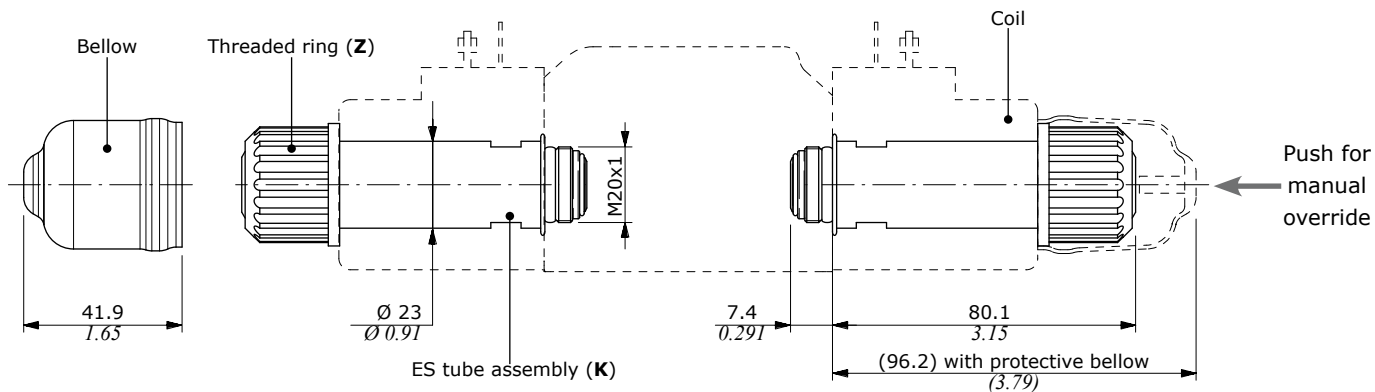
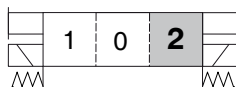
**Spool stroke**

Position 2: + 3 mm (0.11 in)

**Complete controls**

**With spring return in position 2**

**Type 16ES3**



**Wrenches and tightening torque**

**K** = wrench 20 - 20 Nm (14.7 lbf<sup>t</sup>)

**Z** = 24 Nm (17.7 lbf<sup>t</sup>)

## Coils and accessories

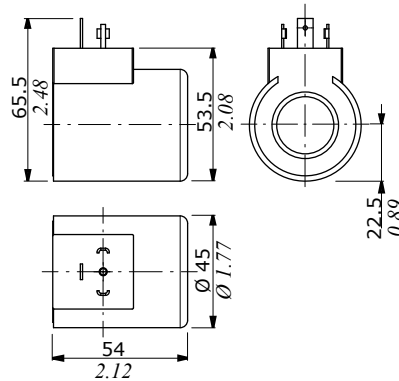
Type	Voltage	Ordering codes					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
<b>D15</b>	<b>12 VDC</b>	4SOL515012	4SOL515011 <sup>(2)</sup> 4SOL515014A <sup>(3-6)</sup>	4SOL515016 <sup>(5)</sup>	-	-	-
	<b>14 VDC</b>	-	4SOL515014B <sup>(3-6)</sup>	4SOL515016A <sup>(5)</sup>	-	-	-
	<b>24 VDC</b>	4SOL515024	4SOL515025A <sup>(3-6)</sup> 4SOL515021 <sup>(2)</sup>	-	-	-	-
	<b>48 VDC</b>	4SOL515048	-	4SOL515049 <sup>(2)</sup>	-	-	-
	<b>98 VDC</b>	4SOL515098	-	-	-	-	-
	<b>110 VDC</b>	4SOL515110	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	5CON003	-	-	-

Notes: (1) supply with AC and use only with rectifier connector - (2) with flying leads - (3) with bidirectional diode - (4) with unidirectional diode (5) integrated perpendicular type - (6) integrated parallel type

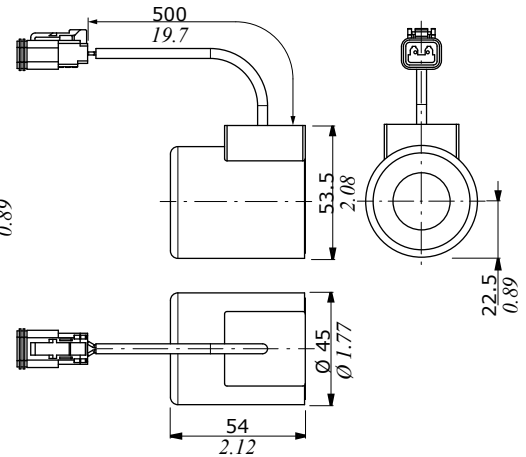
### Features

Nominal voltage tolerance: ±10%  
 Nominal power.....: 38 W  
 12/14/24/48/98/110 VDC  
 Nominal current.....: 3.16 A @ 12 VDC  
 : 2.9 A @ 14 VDC  
 : 1.58 A @ 24 VDC  
 : 0.79 A @ 48 VDC  
 : 0.41 A @ 98 VDC  
 : 0.35 A @ 110 VDC  
 Insulation.....: Class H (180°C - 356°F)  
 Weather protection.....: IP65 - ISO4400  
 : IP69K - Deutsch DT  
 : IP65 - AMP JPT  
 Insertion.....: 100%

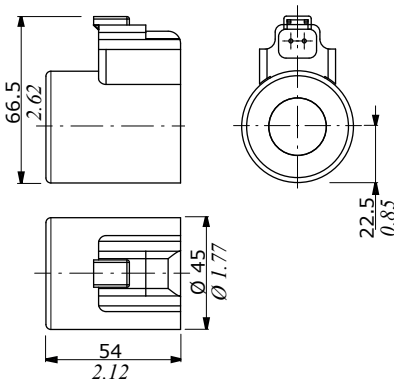
### ISO4400 connector



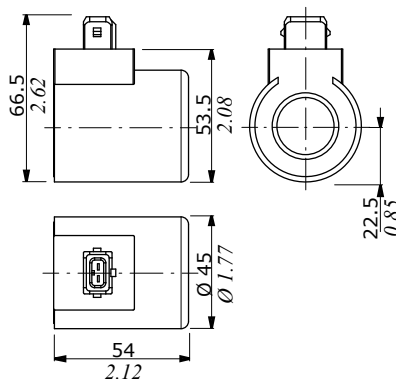
### Flying leads with DEUTSCH DT04 connector



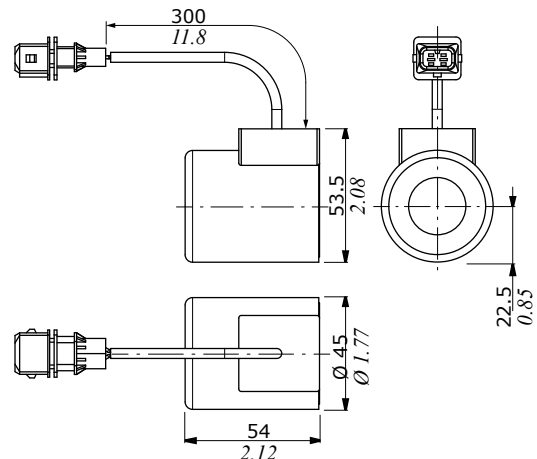
### DEUTSCH DT04 connector (Parallel type)



### AMP JPT connector (Perpendicular type)



### Flying leads with AMP JPT connector





## DFE110

Solenoid control monoblock diverter valve for special applications

- 12 ways configuration
- Designed for Front-end Loader Applications

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		12
Max. flow rating		90 l/min (23.7 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 114
Nominal power		60 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	10 cm <sup>3</sup> /min (0.61 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

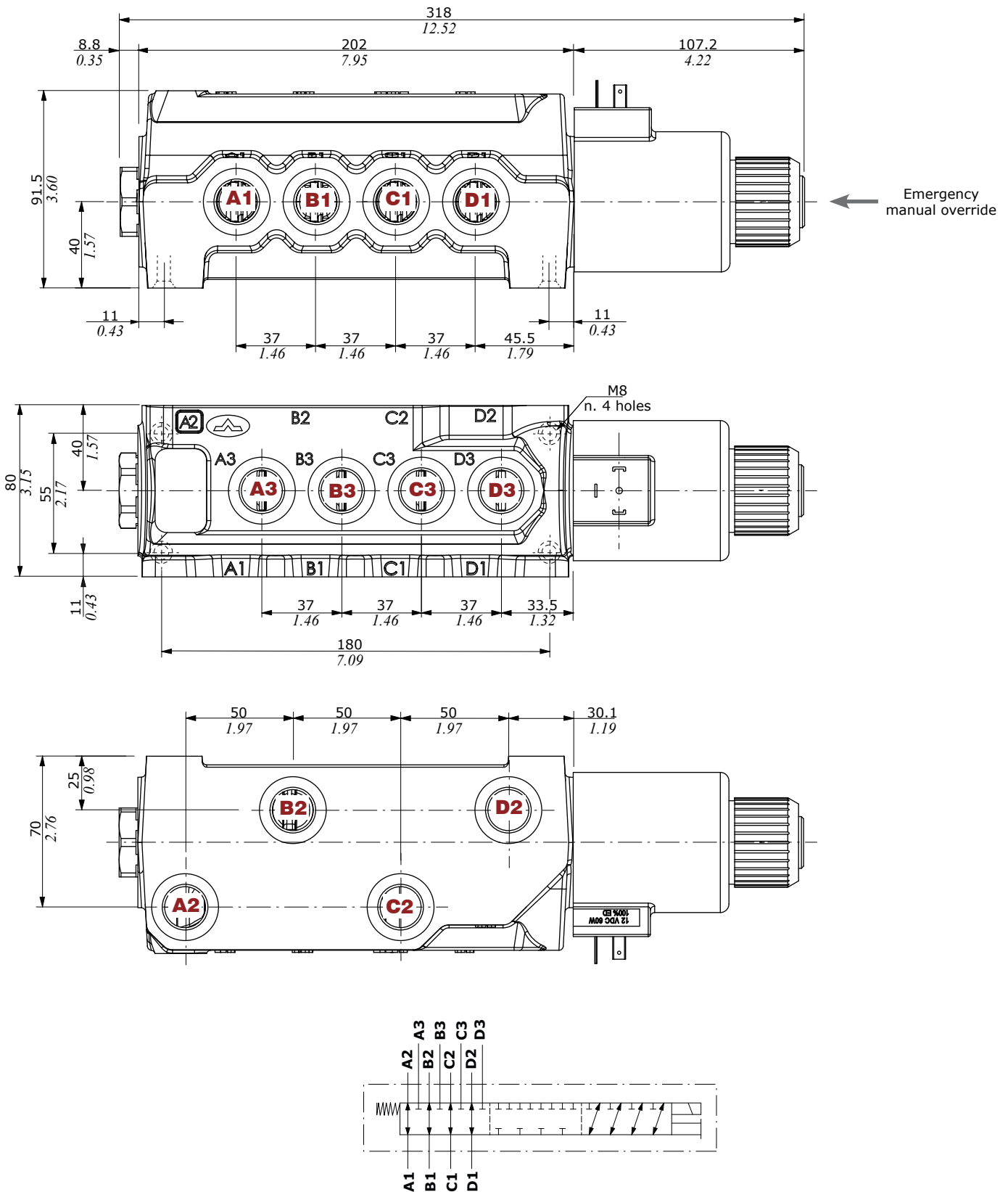
### Available threads

PORTS THREAD				
	BSP	UN-UNF	METRIC* (ISO 9974-1)	METRIC* (ISO 6149)
ALL PORTS				
<b>DFE110</b>	G 1/2	7/8-14 (SAE 10)	M22x1.5	M22x1.5
<b>PILOT PORTS</b>				
<b>L</b>	G 1/4	9/16-18 (SAE 6)	M12x1.5	M12x1.5

(\* ) Optional threads  
for availability contact Sales  
Department

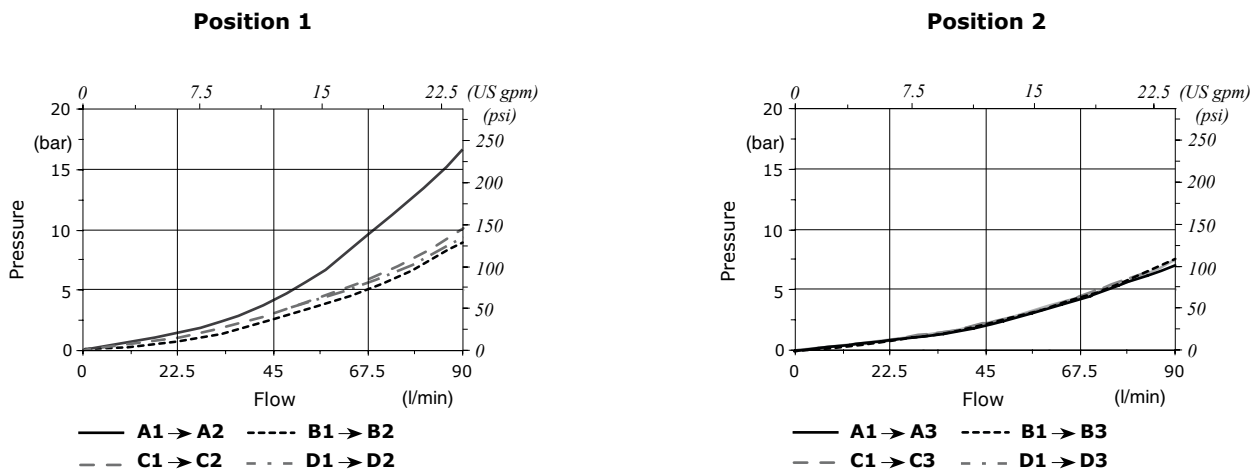
## Dimensional data and hydraulic circuit

### 12 ways



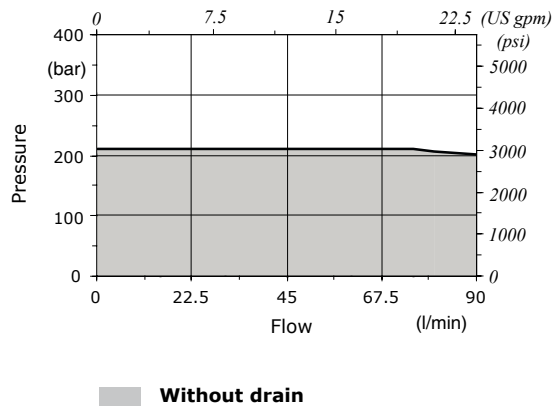
**Performance data**

**Pressure drop versus flow**



**Minimum dynamic conditions**

(Supply = Vn-10%, coil at 70 °C - 158 °F)



## Part ordering codes

Example:

For description composition  
see the text below

**DFE110/12**   **B**   **18**   **ES**   -   **W**   **2 0 0 - 12VDC**   -   **SAE**   -   **(CVN)**

1  
 2  
 3  
 4  
 -  
 3  
 4  
 5  
 -  
 6  
 Painted with one layer of black Primer antirust

... **2 0 0 - 12VDC - ...**

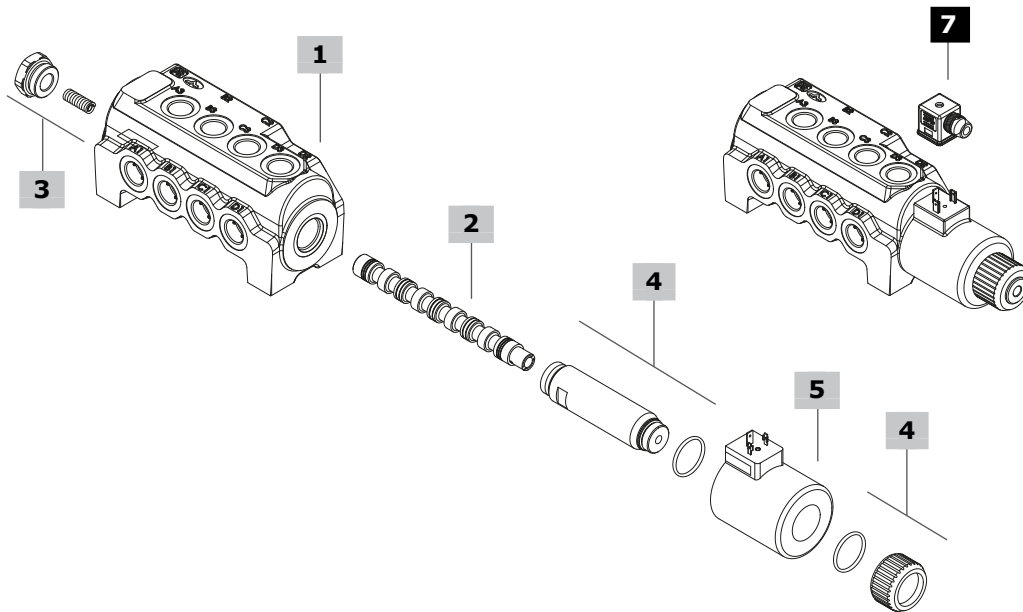
**Coil**  
1 = without coil  
2 = with coil

**Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

**Bellow**  
0 = bellow not available

**Coil voltage**

(\*) - For connector options see coils table on page 114



### 1 Body kit\* page 113

TYPE	CODE	DESCRIPTION
<b>DFE110/12</b>	3CO2243720	12 ways body kit

### 2 Spool page 113

TYPE	CODE	DESCRIPTION
<b>B</b>	3CAS108H40	A1->A2, B1->B2, C1->C2, D1->D2 in pos. 1, A1->A3, B1->B3, C1->C3, D1->D3 in pos. 2. Ports closed in transit position

### 3 Positioner kit page 113

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP005	Spring return in pos. 1
<b>18...Y</b>	5GIU011*	Spring return in pos. 1, with SAE6 drain port

### 4 Solenoid kit page 113

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL519003	Tube assembly without protective bellow

### 5 Coil

For list of available coils see pages 114

### 6 Body threading

Specify threading always when it is different from **BSP** standard

### 7 Accessories

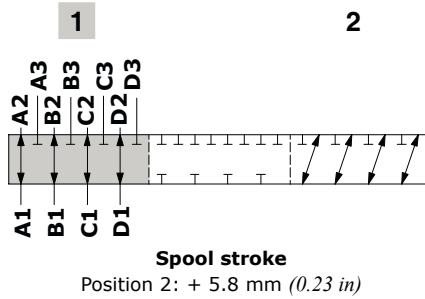
For list of available connectors see pages 114

(\*) - Codes are referred to **UN-UNF** thread



**Spool circuit**

**Type B**  
Ports closed  
in transit position



**Positioner kit**

**With spring return in position 1**

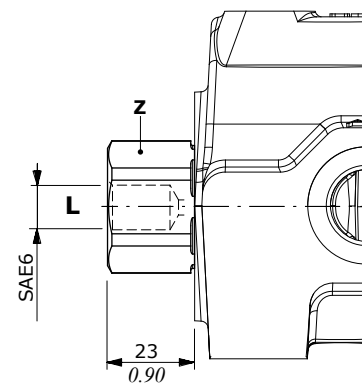
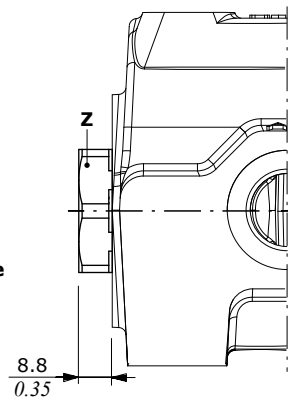
**Type 18W**  
With plug



**Type 18Y**  
with SAE6 drain port

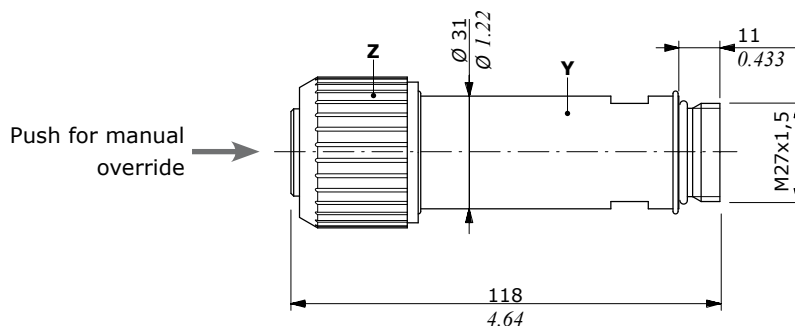


**Wrenches and tightening torque**  
Z = wrench 32 - 42 Nm (31 lbft)



**Solenoid kit**

**ES tube assembly kit**



**Wrenches and tightening torque**  
Y = wrench 27 - 24 Nm (17.7 lbft)  
Z = 24 Nm (17.7 lbft)

## Coil and accessories

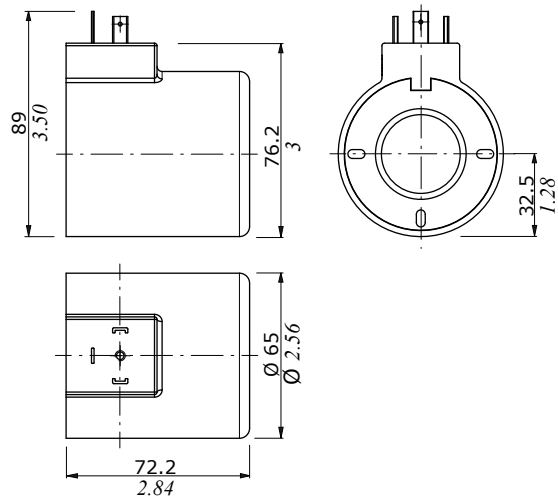
		Ordering codes					
Type	Voltage	Connector types					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
<b>D19</b>	<b>12 VDC</b>	4SOL519112	4SOL519402 <sup>(6)</sup>	-	-	-	-
	<b>20 VDC</b>	4SOL519120	-	-	-	-	-
	<b>24 VDC</b>	4SOL519124	4SOL519404 <sup>(6)</sup>	-	-	-	-
	<b>94 VDC</b>	4SOL519194	-	-	-	-	-
	<b>192 VDC</b>	4SOL519292	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

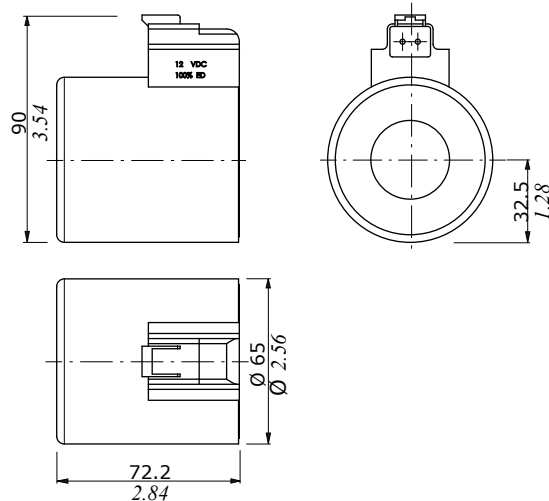
### Features

Nominal voltage tolerance:  $\pm 10\%$   
 Nominal power.....: 60 W  
                                   12/20/24/94/192 VDC  
 Nominal current.....: 5 A @ 12 VDC  
                                   : 3 A @ 20 VDC  
                                   : 2.5 A @ 24 VDC  
                                   : 2.5 A @ 94 VDC  
                                   : 0.31 A @ 192 VDC  
 Insulation.....: Class H (180°C - 356 °F)  
 Weather protection.....: IP65 - ISO4400  
                                   : IP69K - Deutsch DT  
 Insertion.....: 100%

### ISO4400 connector



### DEUTSCH DT04 connector (Parallel type)





## DFE141

Solenoid control monoblock diverter valve for special applications

- 6 - 8 ways configuration
- Antishock valves with cross return
- Double outlet ports in neutral position; for nr. 2 cylinder connection
- Designed for Front-end Loader Applications

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		6 - 8
Max. flow rating		80 l/min - (21.1 US gpm)
Max. pressure		250 bar - (3625 psi)
	D1-D2-C1-C2 ports	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 122
Nominal power		60 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm <sup>3</sup> /min (0.31 in <sup>3</sup> /min)
Fluid		Mineral based oil
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -40°C to 60°C (from -40°F to 140°F)

NOTE - For different working conditions please contact Sales Dept.

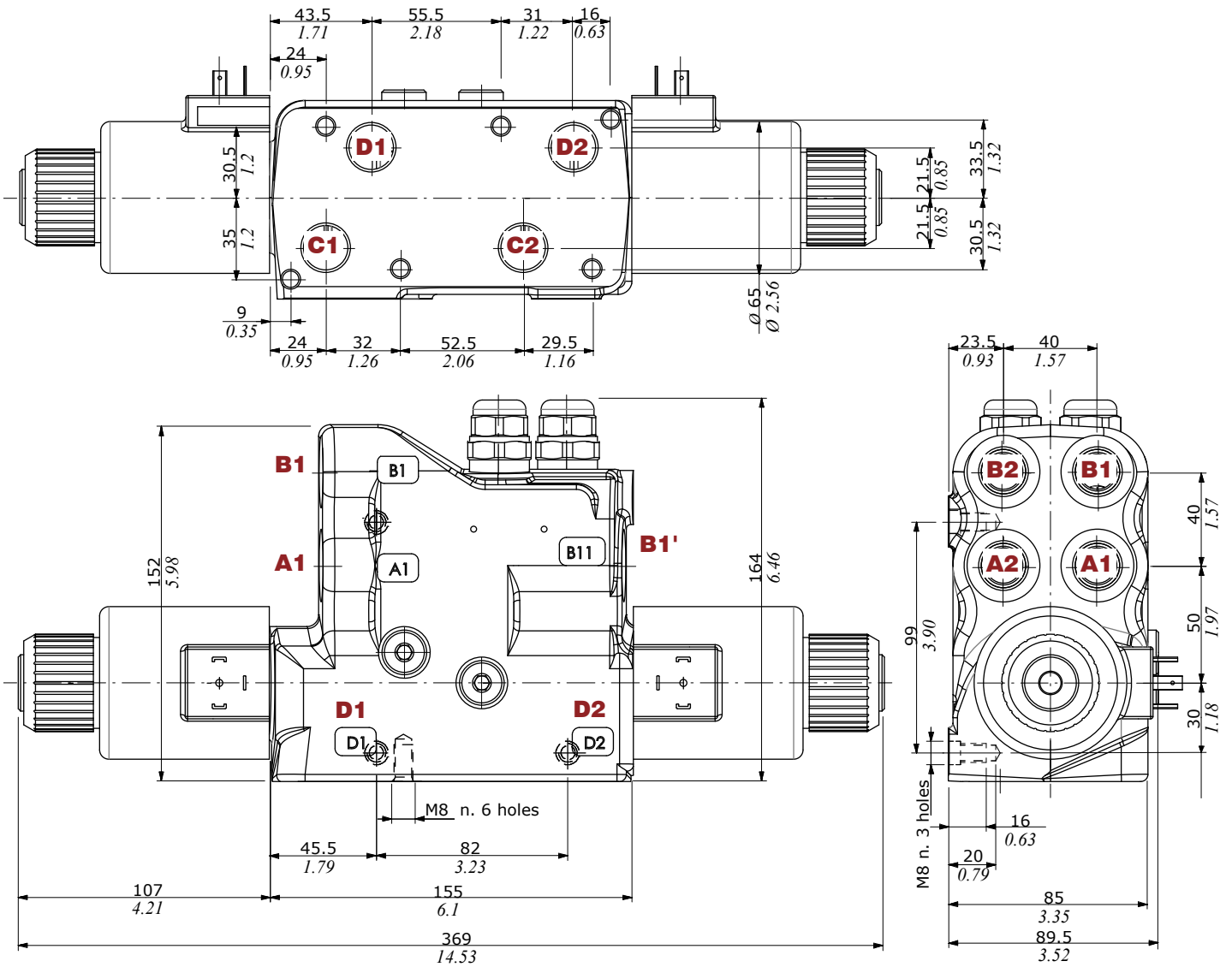
## Available threads

PORTS THREAD	
ALL PORTS	<b>BSP</b>
<b>DFE141</b>	G 1/2

## Dimensional data - hydraulic circuit - performance data

8 ways

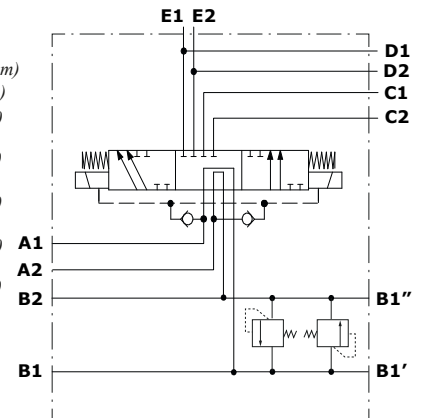
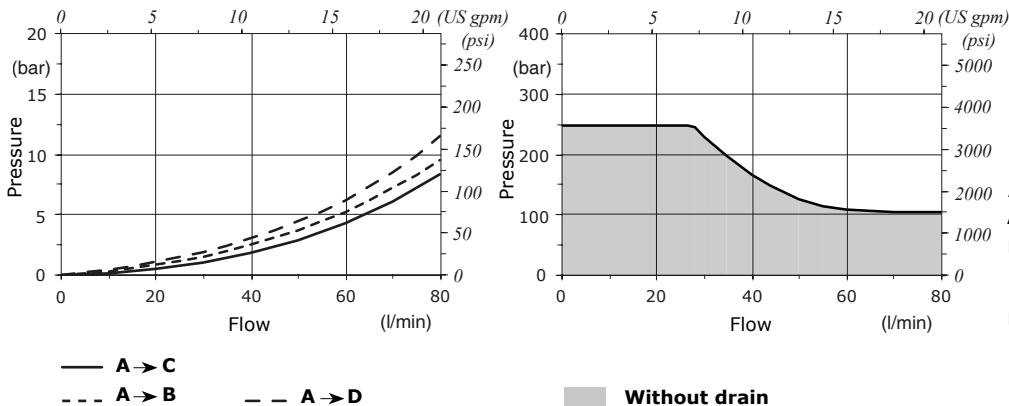
8ES3 configuration



### Minimum dynamic conditions

Pressure drop versus flow

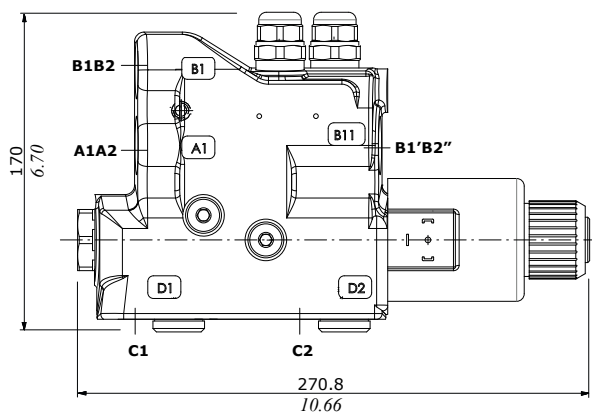
(Supply = Vn-10%, coil at 70 °C - 158 °F)



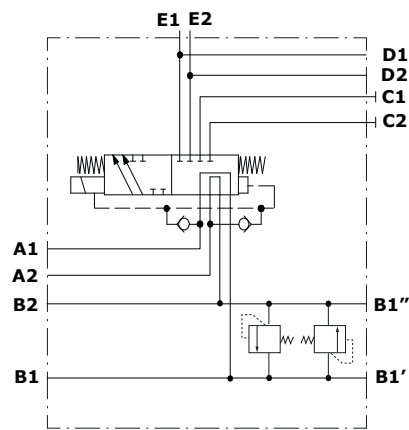
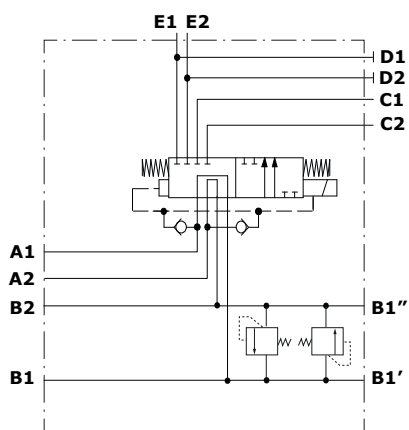
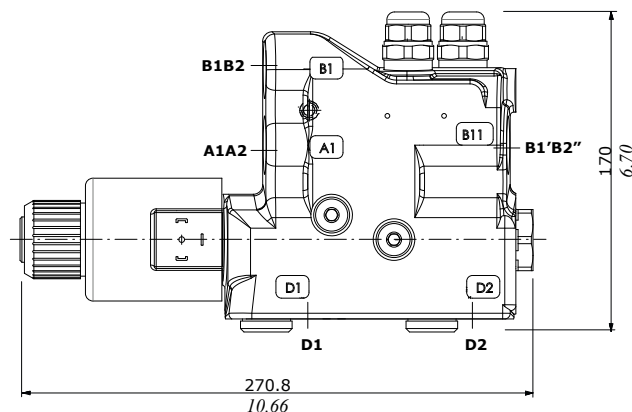
**Dimensional data and hydraulic circuit**

**6 ways**

**8ES1 configuration**



**8ES2 configuration**



## Part ordering codes

8 ways standard configuration example (ES3):

For description composition  
see next page

**DFE141/8 B 8 ES3 - P3(D4-210) - 2 0 0 - 12VDC - ... - (CVN)**



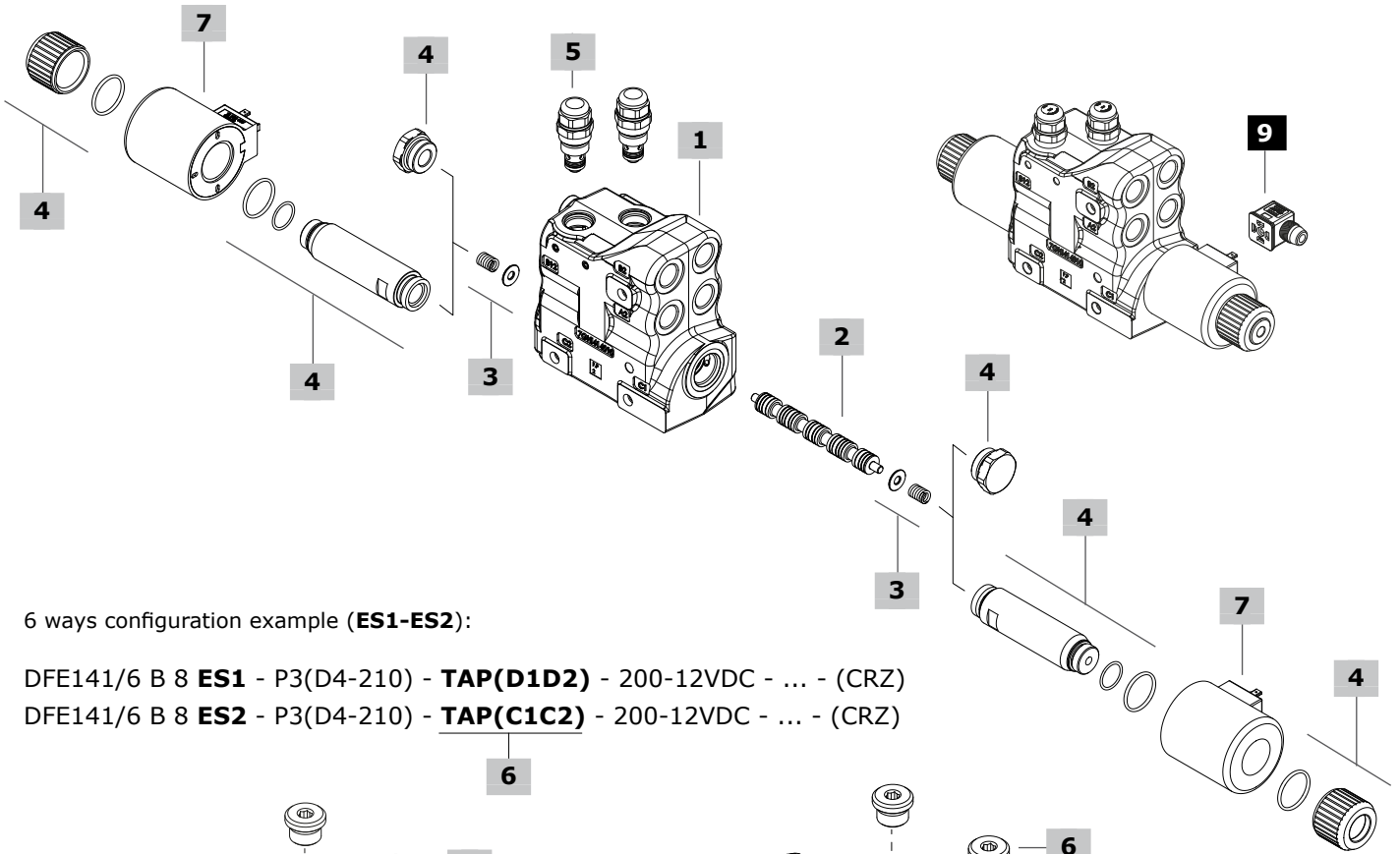
Coil  
1 = without coil  
2 = with coil

- Connection\*  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

Bellow  
0 = bellow not available

Coil voltage

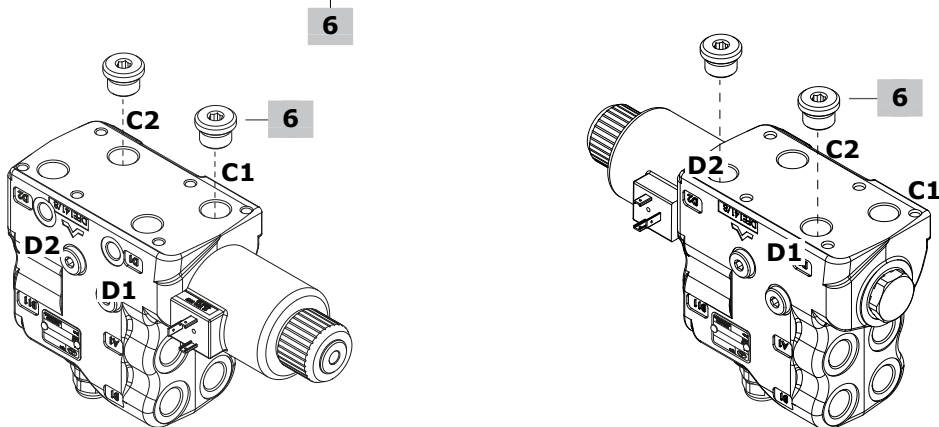
(\* ) - For connector options see  
coils table on page 122



6 ways configuration example (ES1-ES2):

DFE141/6 B 8 **ES1** - P3(D4-210) - **TAP(D1D2)** - 200-12VDC - ... - (CRZ)

DFE141/6 B 8 **ES2** - P3(D4-210) - **TAP(C1C2)** - 200-12VDC - ... - (CRZ)



8ES2 control

8ES1 control

**Part ordering codes**

**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DFE141/8</b>	5CO2231351	8 ways body kit

**2 Spool** **page 119**

TYPE	CODE	DESCRIPTION
<b>B</b>	3CAS110B71	A1↔B1, A2↔B2 and D1, D2, C1, C2 ports closed in pos. 0 A1↔D1, A2↔D2 and B1, B2, C1, C2 ports closed in pos. 1 A1↔C1, A2↔C2 and D1, D2, B1, B2 ports closed in pos. 2

**3 Positioner kit**

TYPE	CODE	DESCRIPTION
<b>8</b>	5V08001	Spring return in pos. 0

**4 ES control kit** **page 120**

TYPE: **ES3** CODE: 5SOL519003 (n°2)  
DESCRIPTION: 3 positions control for 8-way configuration (ports C1C2-D1D2 open), without protective bellow  
TYPE: **ES1** CODE: 5SOL519003+XTAP332190  
DESCRIPTION: 2 positions control for 6-way configuration (ports D1 e D2 plugged), without protective bellow  
TYPE: **ES2** CODE: 5SOL519003+XTAP332190  
DESCRIPTION: 2 positions control for 6-way configuration (ports C1 e C2 plugged), without protective bellow

**5 Antishock valves** **page 121**

With fixed setting: setting is referred to valve opening

TYPE	CODE	DESCRIPTION
<b>P(D2-80)</b>	X005125095	Setting 80 bar (1150 psi)
<b>P(D2-110)</b>	X005125110	Setting 110 bar (1590 psi)
<b>P(D3-125)</b>	X005125145	Setting 125 bar (1800 psi)
<b>P(D3-140)</b>	X005125155	Setting 140 bar (2050 psi)
<b>P(D3-170)</b>	X005125190	Setting 170 bar (2450 psi)
<b>P(D4-185)</b>	X005125216	Setting 185 bar (2700 psi)
<b>P(D4-210)</b>	X005125245	Setting 210 bar (3050 psi)
<b>P(D4-240)</b>	X005125270	Setting 240 bar (3500 psi)
<b>P1T - P2T</b>	3XTAP524290	Blanking plug P1-P2

**6 Plug for ES1 - ES2 controls**

TYPE	CODE	DESCRIPTION
-	3XTAP727180	G1/2 Plug for ES1-ES2 execution

**7 Coil**

For list of available coils see pages 122

**8 Body threading**

Specify threading always when it is different from **BSP** standard

**9 Accessories**

For list of available connectors see pages 122

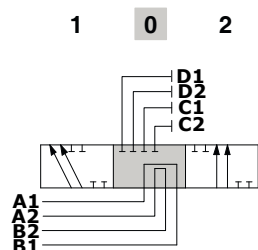
(\* ) - Codes are referred to **BSP** thread

**Spool circuits**

**Type B**

**8 way configuration (ES3)**

A1↔B1, A2↔B2 and  
D1, D2, C1, C2 ports closed in pos. 0

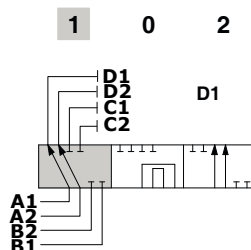


**Spool stroke**

Position 1: + 5.8 mm (0.23 in)  
Position 2: - 5.8 mm (- 0.23 in)

**6 way configuration (ES1)**

A1↔D1, A2↔D2 and  
B1, B2, C1, C2 ports closed in pos. 1

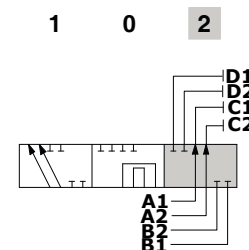


**Spool stroke**

Position 2: - 5.8 mm (- 0.23 in)

**6 way configuration (ES2)**

A1↔C1, A2↔C2 and  
D1, D2, B1, B2 ports closed in pos. 2



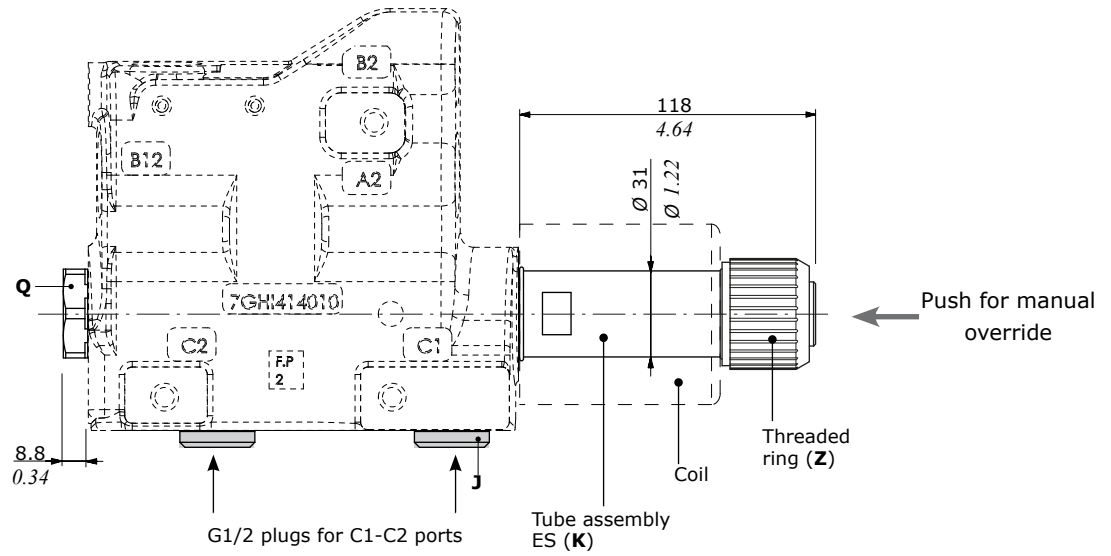
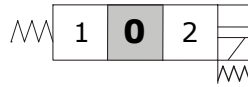
**Spool stroke**

Position 1: + 5.8 mm (0.23 in)

## ES control kit

With spring return in position 0

### Tipo 8ES2



#### Wrenches and tightening torque

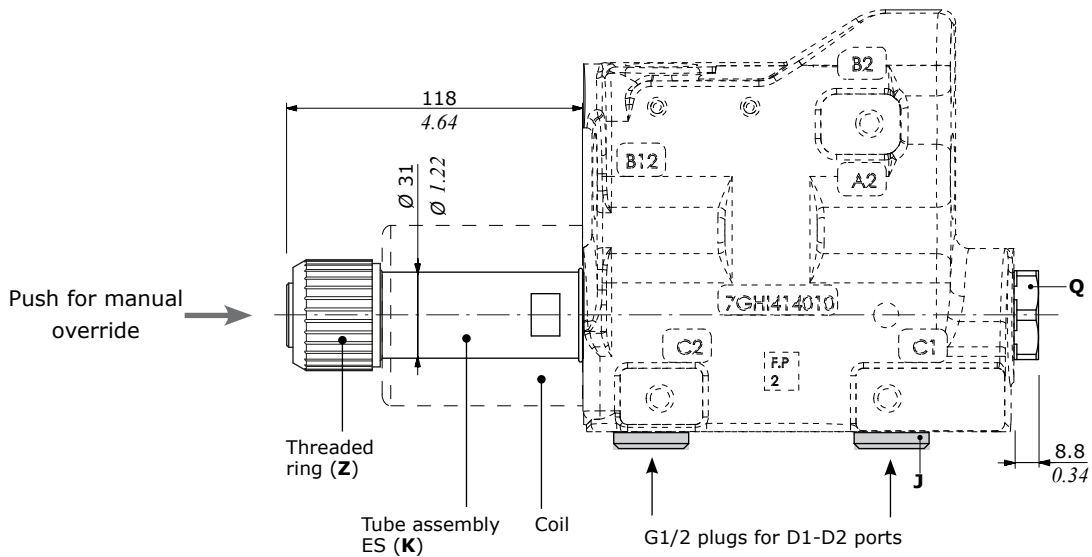
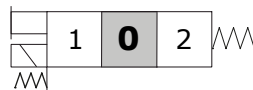
**J** = wrench 8 - 24 Nm (17.7 lbf<sup>t</sup>)

**K** = wrench 27 - 24 Nm (17.7 lbf<sup>t</sup>)

**Z** = 24 Nm (17.7 lbf<sup>t</sup>)

**Q** = wrench 32 - 42 Nm (31 lbf<sup>t</sup>)

### Tipo 8ES1



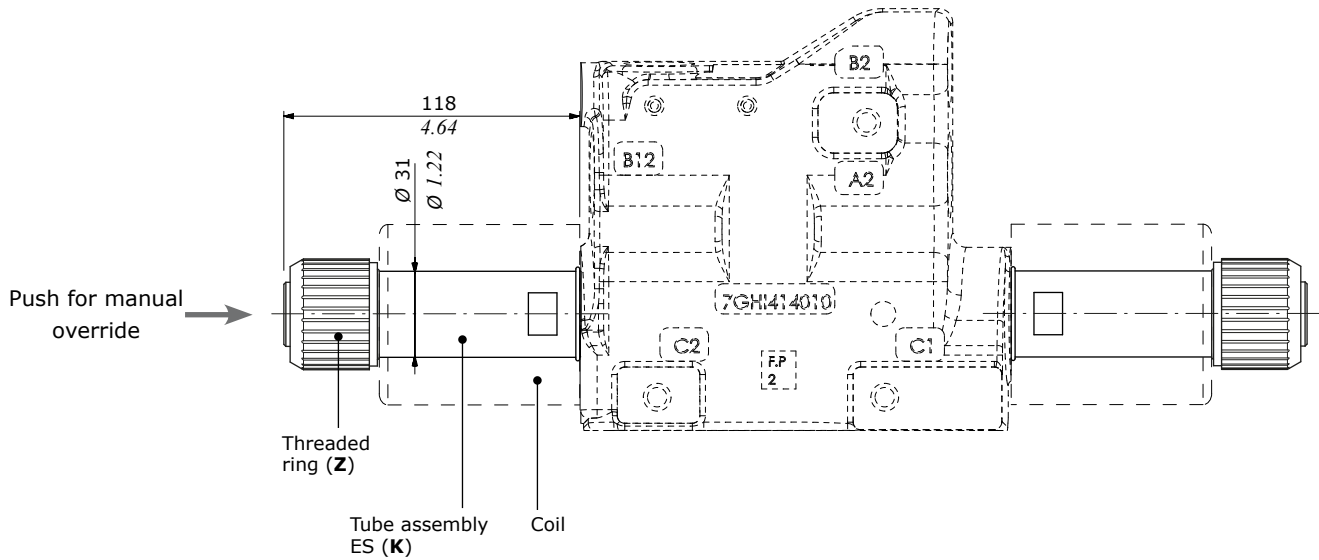
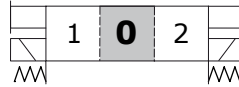


**With spring return in position 0**

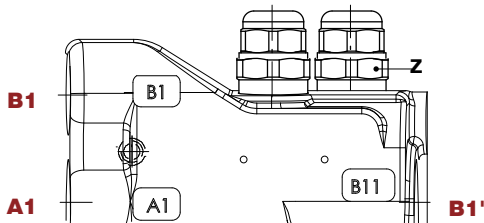
**Tipo 8ES3**

**Wrenches and tightening torque**

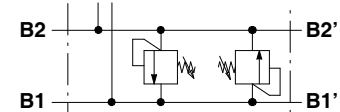
- J** = wrench 8 - 24 Nm (17.7 lbft)
- K** = wrench 27 - 24 Nm (17.7 lbft)
- Z** = 24 Nm (17.7 lbft)
- Q** = wrench 32 - 42 Nm (31 lbft)



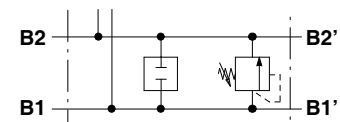
**Antishock valves**



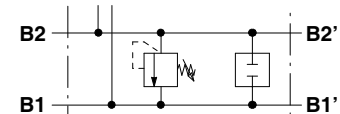
**Configuration with valve on each workport (P3)**



**Configuration with valve on workport B1 (P1)**



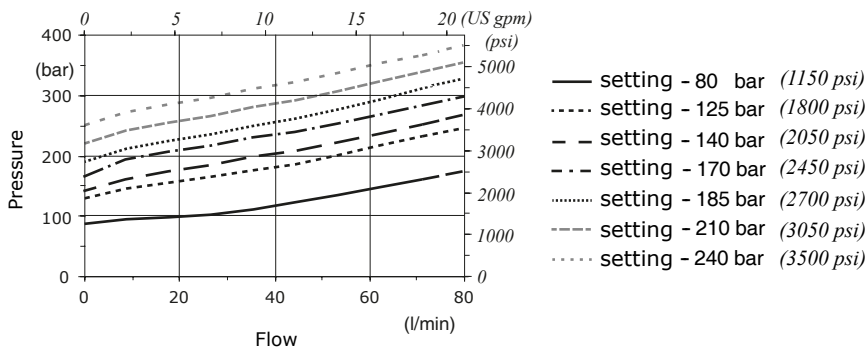
**Configuration with valve on workport B2 (P2)**



**Wrenches and tightening torque**

- Z** = wrench 27 - 42 Nm (31 lbft)

**Antishock valves performance data**



## Coils and accessories

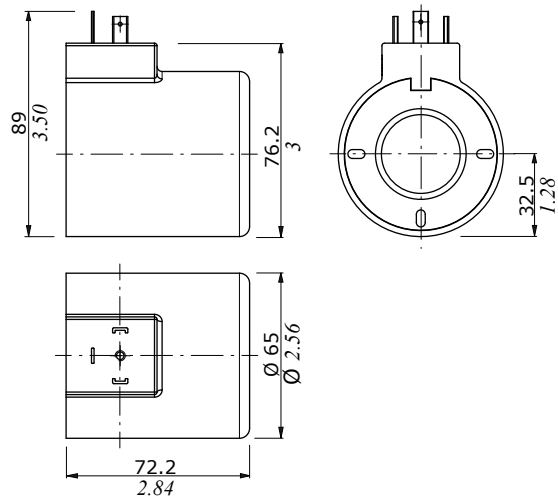
Type	Voltage	Ordering codes					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
<b>D19</b>	<b>12 VDC</b>	4SOL519112	4SOL519402 <sup>(6)</sup>	-	-	-	-
	<b>20 VDC</b>	4SOL519120	-	-	-	-	-
	<b>24 VDC</b>	4SOL519124	4SOL519404 <sup>(6)</sup>	-	-	-	-
	<b>94 VDC</b>	4SOL519194	-	-	-	-	-
	<b>192 VDC</b>	4SOL519292	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

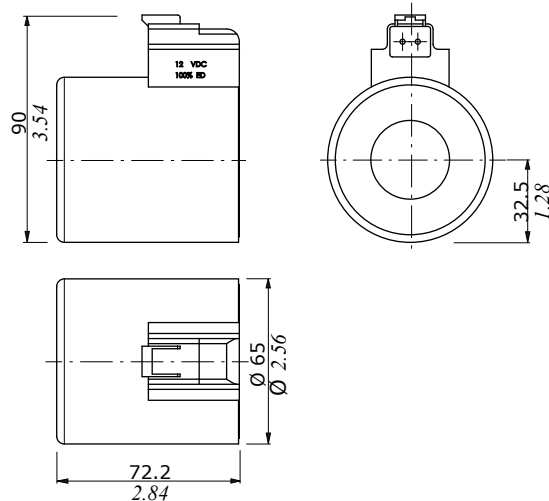
### Features

Nominal voltage tolerance:  $\pm 10\%$   
 Nominal power.....: 60 W  
                                   12/20/24/94/192 VDC  
 Nominal current.....: 5 A @ 12 VDC  
                                   : 3 A @ 20 VDC  
                                   : 2.5 A @ 24 VDC  
                                   : 2.5 A @ 94 VDC  
                                   : 0.31 A @ 192 VDC  
 Insulation.....: Class H (180°C - 356 °F)  
 Weather protection.....: IP65 - ISO4400  
                                   : IP69K - Deutsch DT  
 Insertion.....: 100%

### ISO4400 connector



### DEUTSCH DT04 connector (Parallel type)





## DFE080

### Solenoid control sectional diverter valves

- 6 - 8 - 10 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		6 - 8 - 10
Max. flow rating		25 l/min (6.6 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 130
Nominal power		38 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	7 cm <sup>3</sup> /min (0.42 in <sup>3</sup> /min)
Fluid		Mineral based oil
Tie rod tightening		9.8 Nm (7.22 lbft)
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

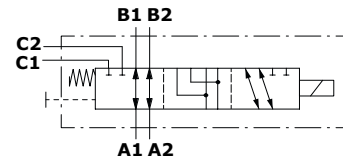
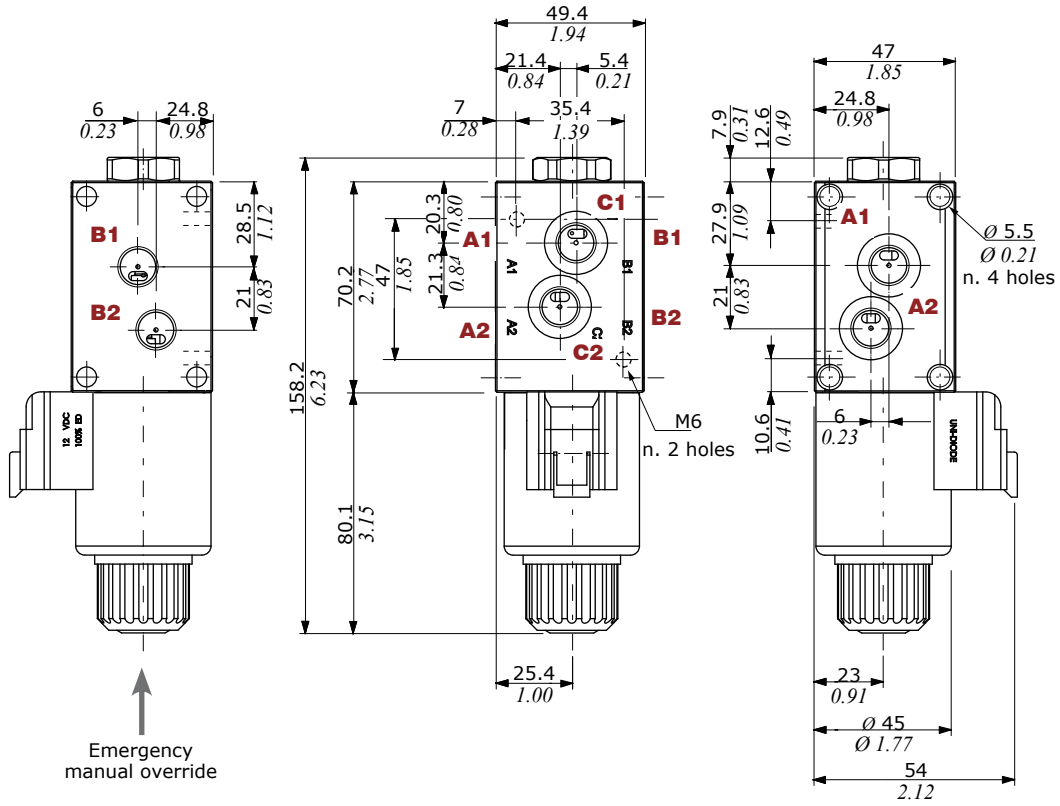
NOTE - For different working conditions please contact Sales Dept.

### Available threads

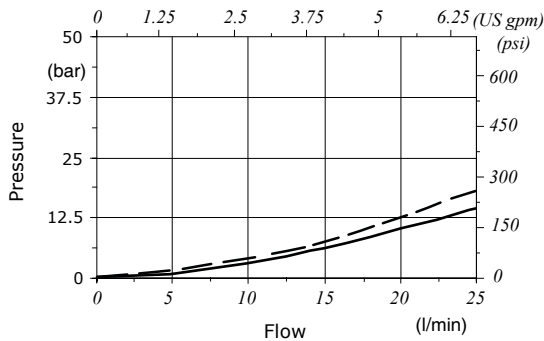
PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DFE080</b>	G 1/4	7/16-20 (SAE 4)
PILOT PORTS		
<b>L</b>	G 1/4	7/16-20 (SAE 4)

## Dimensional data - hydraulic circuit - performance data

6 ways



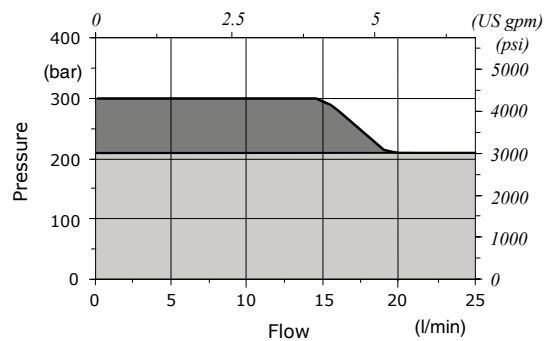
Pressure drop versus flow



— A1 → B1  
 - - A1 → C1

Minimum dynamic conditions

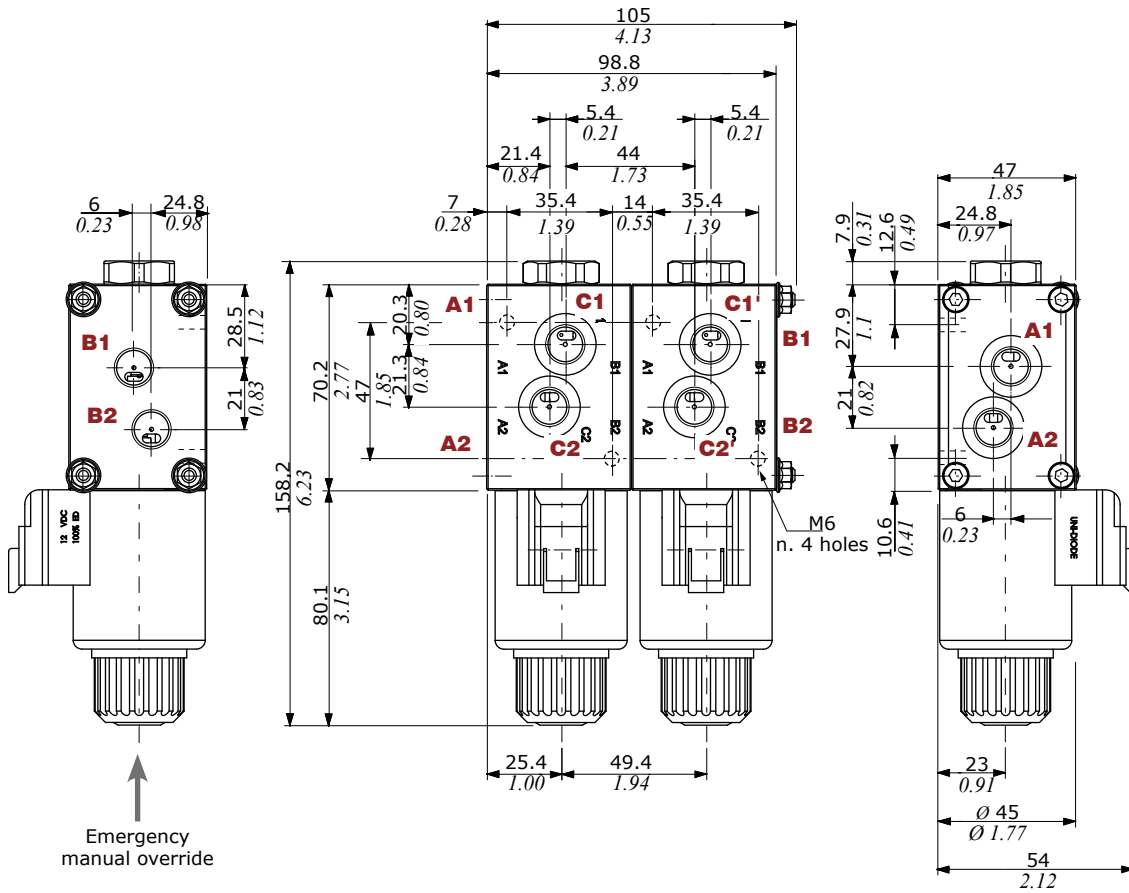
(Supply = Vn-10%, coil at 70 °C - 158 °F)



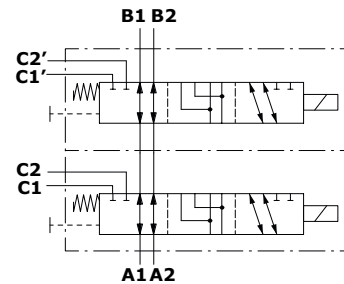
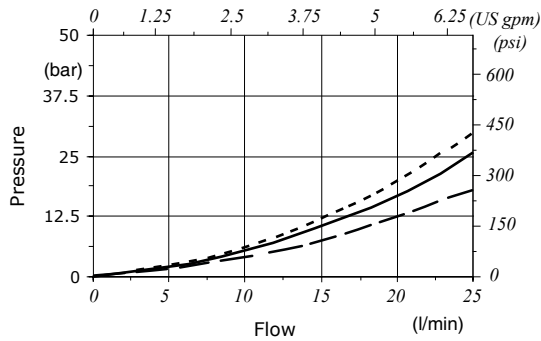
■ With drain  
 ■ Without drain

**Dimensional data - hydraulic circuit - performance data**

**8 ways**



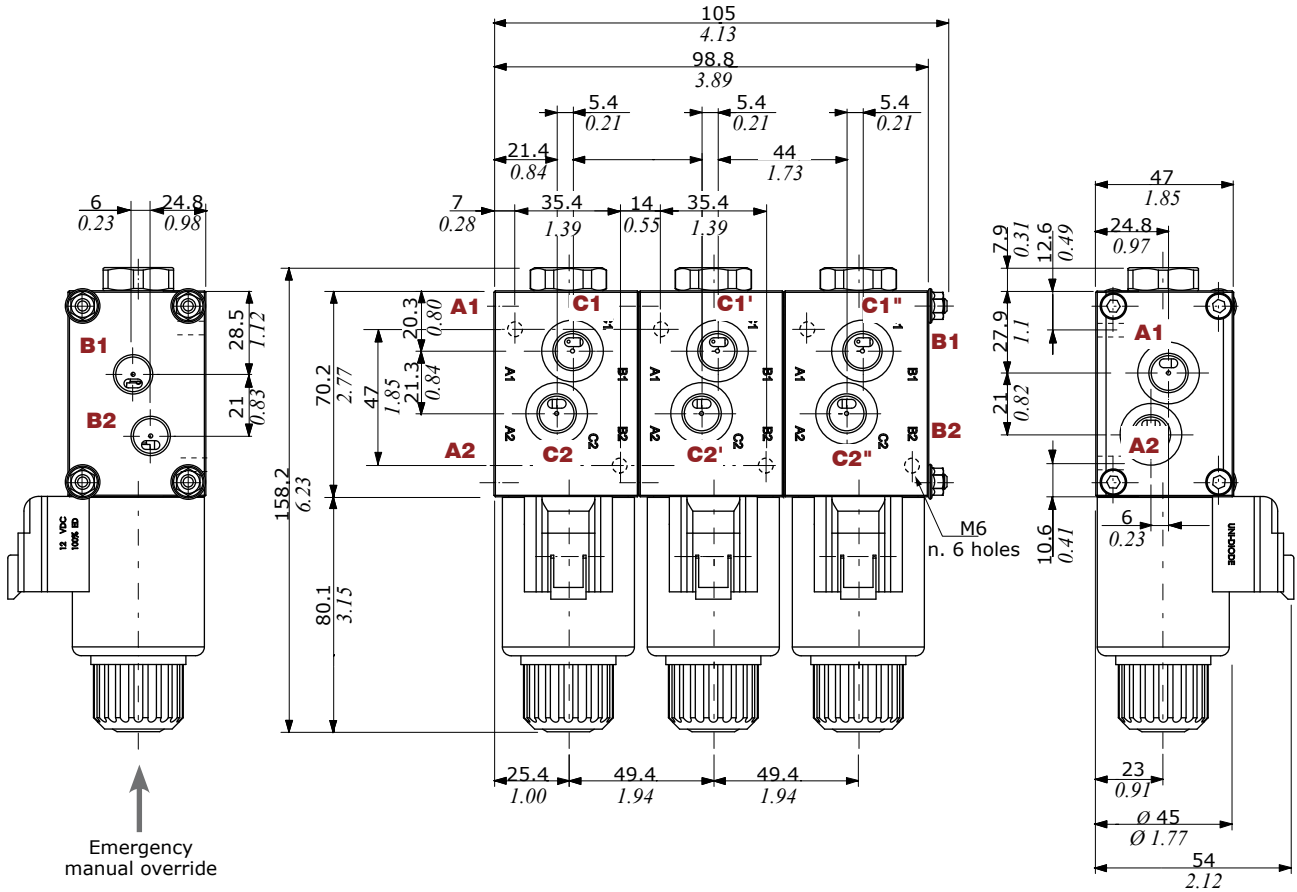
**Pressure drop versus flow**



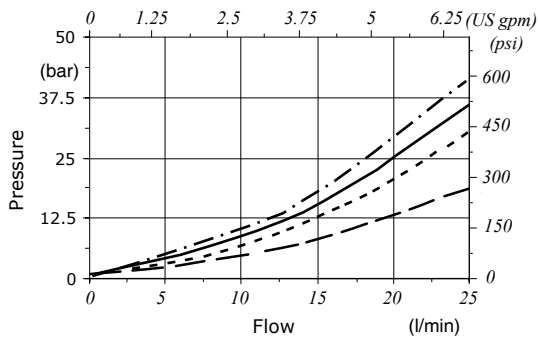
— A1 → B1'      ····· A1 → C1'  
 - - - A1 → C1

## Dimensional data - hydraulic circuit - performance data

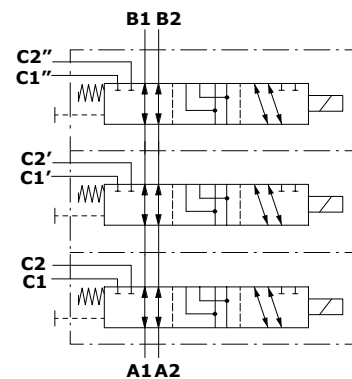
10 ways



Perdite di carico in funzione alla portata

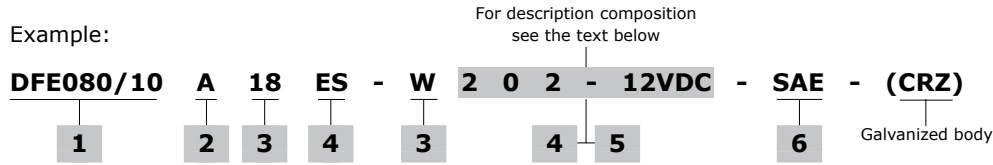


— A1 → B1''      ····· A1 → C1'  
 - - - A1 → C1      - · - · - A1 → C1''

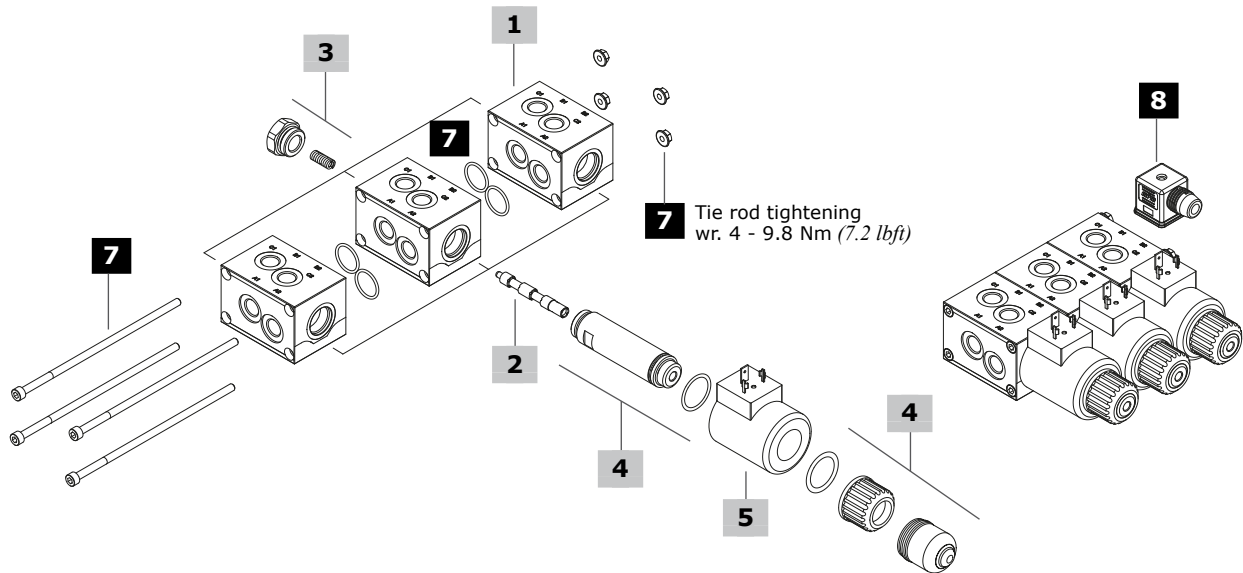


**Part ordering codes**

Example:



- Coil**  
1 = without coil  
2 = with coil
- Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female
- Lenght cables**  
(only if it's present)  
Lenght is in mm
- Diode\***  
(text omitted if diode is not present)  
DB = bidirectional diode
- Bellow**  
1 = without bellow  
2 = with bellow
- Coil voltage**
- (\*) - For diodes and connector options see coils table on page 130



**1 Body kit\*** **page 128**

TYPE	CODE	DESCRIPTION
<b>DFE080/6-8-10</b>	3C02208720	6 ways body kit

**2 Spools** **page 128**

TYPE	CODE	DESCRIPTION
<b>A</b>	3CAS108640	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports connected in transit position
<b>B</b>	3CAS108740	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports closed in transit position
<b>H</b>	3CAS108840	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Port connected to drain in transit position
<b>N</b>	3CAS108940	As type A, for right inlet

**3 Positioner kit** **page 129**

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP007	Spring return in pos. 1
<b>18...Y</b>	5GIU015*	Spring return in pos. 1, with SAE4 drain port

**4 Solenoid kit** **page 129**

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL515000	Tube assembly without protective bellow
-	4ACC515	Optional assembly tube protective bellow

**5 Coil**

For list of available coils see pages 130

**6 Body threading**

Specify threading always when it is different from **BSP** standard

**7 Tie rods kit and O-ring seals**

CODE	DESCRIPTION
5TIR080008	For DFE080/8 diverter valves
5TIR080010	For DFE080/10 diverter valves

**8 Accessories**

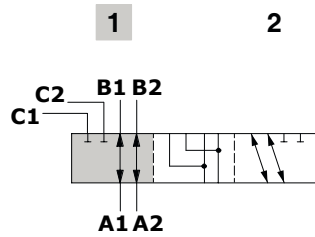
For list of available connectors see pages 130

(\*) - Codes are referred to **UN-UNF** thread

## Spool circuits

### Type A

A1/A2 in B1/B2 in pos. 1.  
Ports connected in transit position

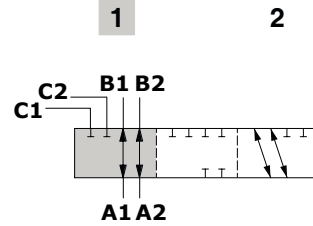


#### Spool stroke

Position 2: + 3.2 mm (0.12 in)

### Type B

A1/A2 in B1/B2 in pos. 1.  
Ports closed in transit position

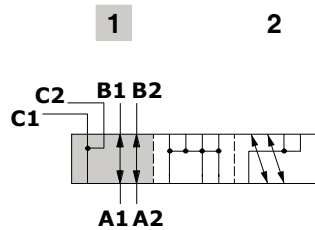


#### Spool stroke

Position 2: + 3.2 mm (0.12 in)

### Type H

A1/A2 in B1/B2 in pos. 1.  
Port connected to drain in transit position

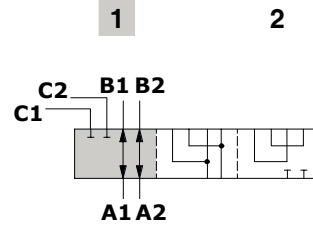


#### Spool stroke

Position 2: + 3.2 mm (0.12 in)

### Type N

As type A, for right inlet



#### Spool stroke

Position 2: + 3.2 mm (0.12 in)



**With spring return in position 1**

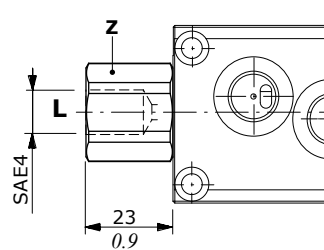
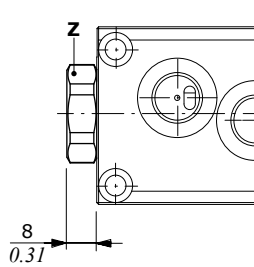
**Type 18W**  
With plug



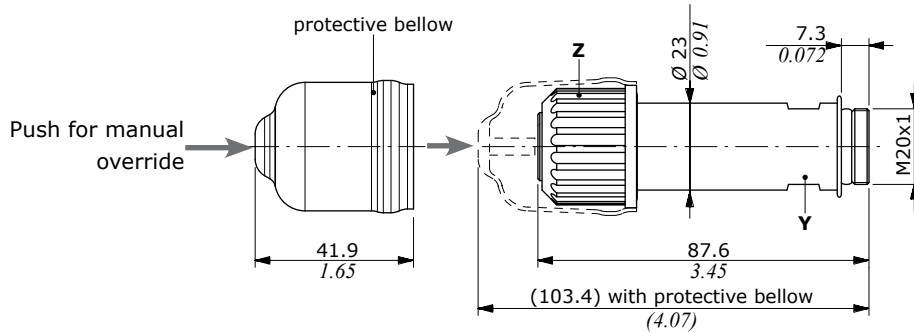
**Type 18Y**  
With SAE4 drain port



**Wrenches and tightening torque**  
Z = wrench 24 - 42 Nm (31 lbft)



**ES tube assembly kit**



**Wrenches and tightening torque**  
Y = wrench 20 - 20 Nm (14.7 lbft)  
Z = 24 Nm (17.7 lbft)

## Coils and accessories

Type	Voltage	Ordering codes					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
<b>D15</b>	<b>12 VDC</b>	4SOL515012	4SOL515011 <sup>(2)</sup> 4SOL515014A <sup>(3-6)</sup>	4SOL515016 <sup>(5)</sup>	-	-	-
	<b>14 VDC</b>	-	4SOL515014B <sup>(3-6)</sup>	4SOL515016A <sup>(5)</sup>	-	-	-
	<b>24 VDC</b>	4SOL515024	4SOL515025A <sup>(3-6)</sup> 4SOL515021 <sup>(2)</sup>	-	-	-	-
	<b>48 VDC</b>	4SOL515048	-	4SOL515049 <sup>(2)</sup>	-	-	-
	<b>98 VDC</b>	4SOL515098	-	-	-	-	-
	<b>110 VDC</b>	4SOL515110	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	5CON003	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

### Features

Nominal voltage tolerance: ±10%

Nominal power.....: 38 W

12/14/24/48/98/110 VDC

Nominal current.....: 3.16 A @ 12 VDC

: 2.9 A @ 14 VDC

: 1.58 A @ 24 VDC

: 0.79 A @ 48 VDC

: 0.41 A @ 98 VDC

: 0.35 A @ 110 VDC

Insulation.....: Class H (180°C - 356°F)

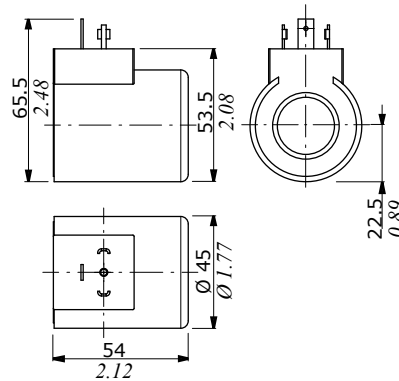
Weather protection.....: IP65 - ISO4400

: IP69K - Deutsch DT

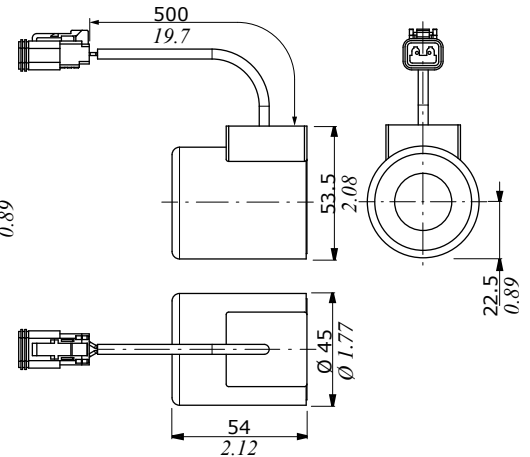
: IP65 - AMP JPT

Insertion.....: 100%

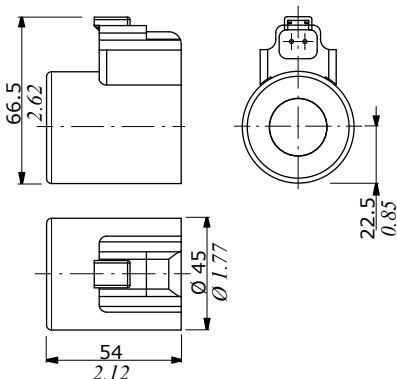
### ISO4400 connector



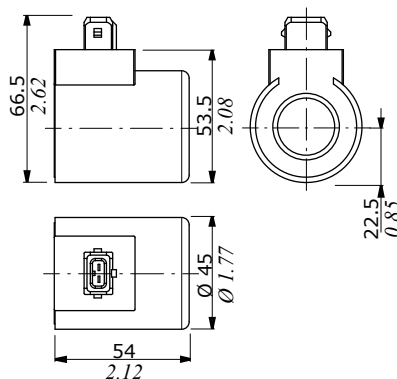
### Flying leads with DEUTSCH DT04 connector



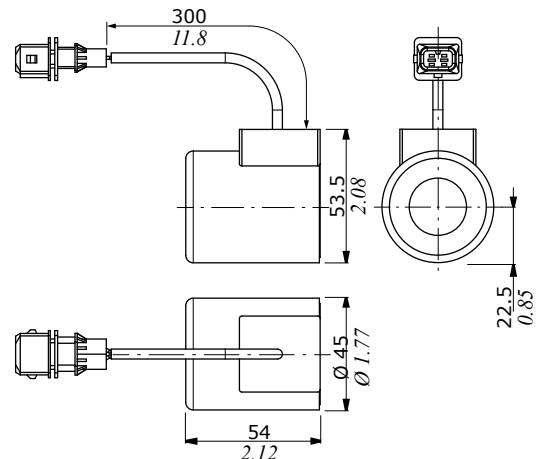
### DEUTSCH DT04 connector (Parallel type)



### AMP JPT connector (Perpendicular type)



### Flying leads with AMP JPT connector





## DFE100

### Solenoid control sectional diverter valves

- 6 - 8 - 10 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		6 - 8 - 10
Max. flow rating		50 l/min (13.2 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 138
Nominal power		38 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	10 cm <sup>3</sup> /min (0.61 in <sup>3</sup> /min)
Fluid		Mineral based oil
Tie rod tightening		18 Nm (13.3 lbft)
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

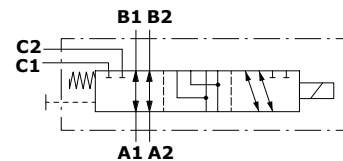
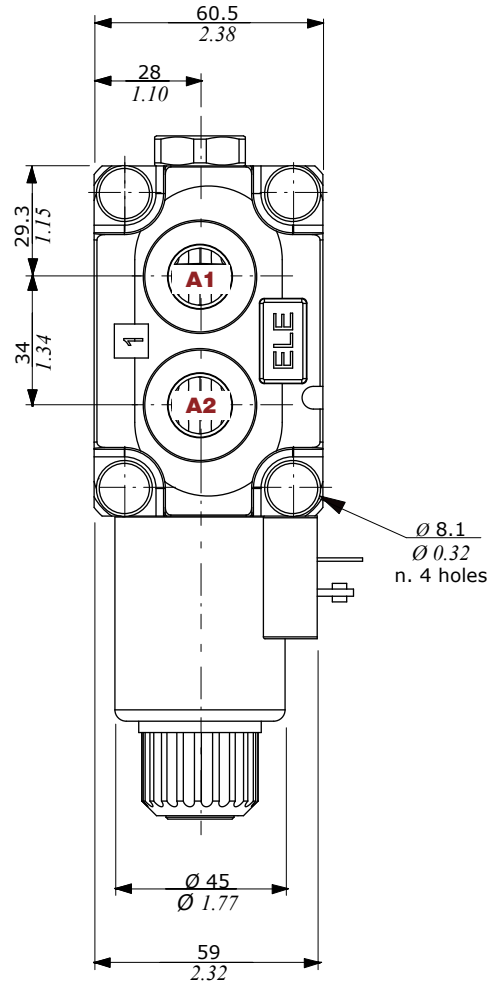
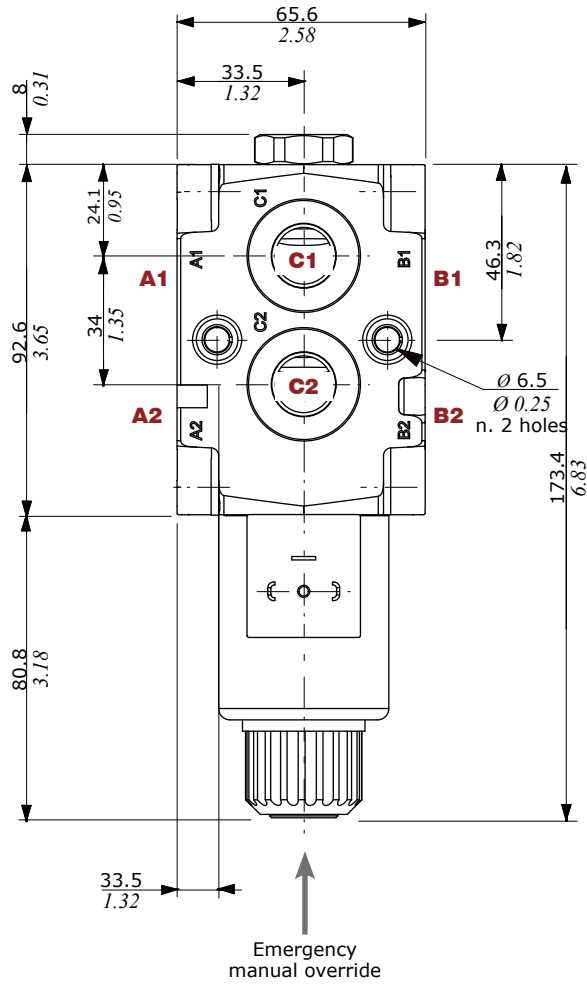
### Available threads

PORTS THREAD				
ALL PORTS	BSP	UN-UNF	METRIC* (ISO 9974-1)	METRIC* (ISO 6149)
<b>DFE100</b>	G 3/8	3/4-16 (SAE 8)	M18x1.5	M18x1.5
PILOT PORTS				
<b>L</b>	G 1/4	9/16-18 (SAE 6)	M12x1.5	M12x1.5

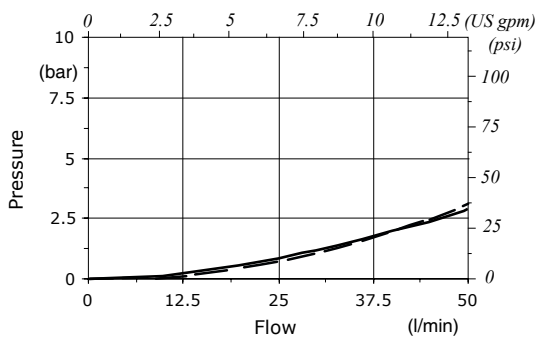
(\* ) Optional threads  
for availability contact Sales  
Department

## Dimensional data - hydraulic circuit - performance data

6 ways



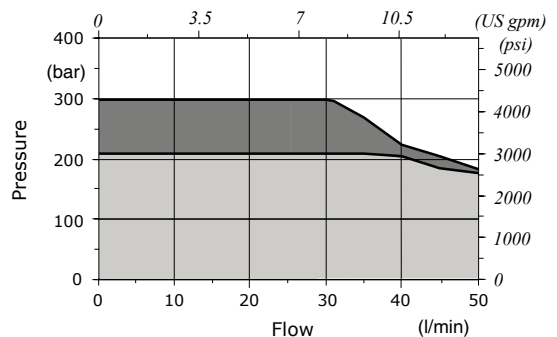
Pressure drop versus flow



— A1 → B1  
 - - A1 → C1

Minimum dynamic conditions

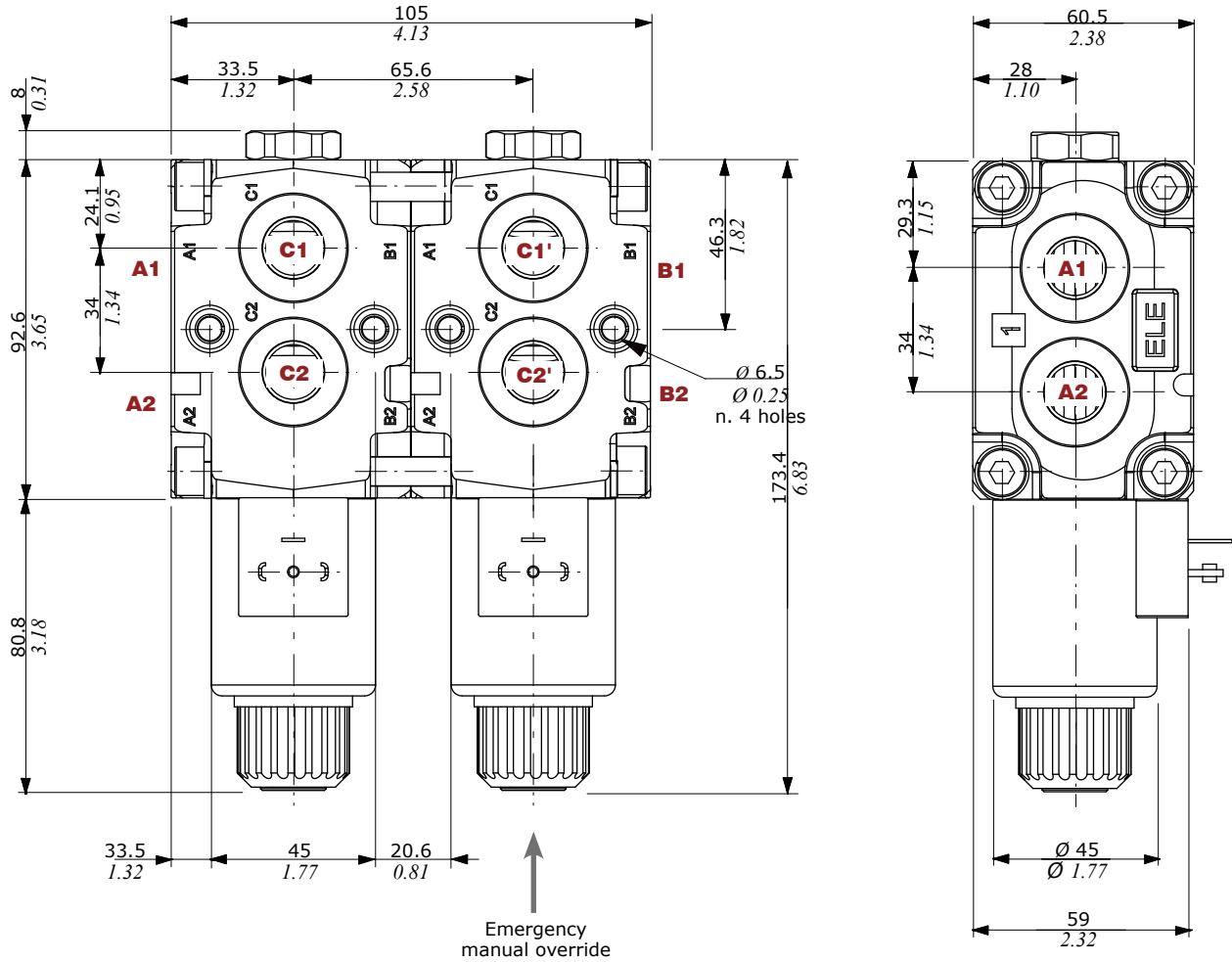
(Supply = Vn-10%, coil at 70 °C - 158 °F)



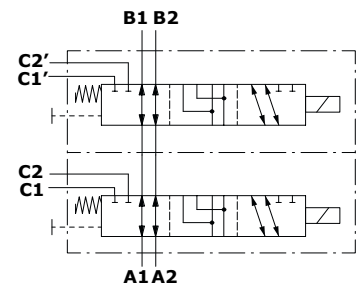
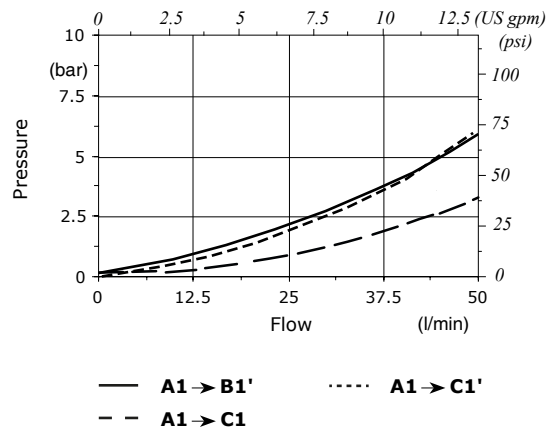
■ With drain  
 ■ Without drain

**Dimensional data - hydraulic circuit - performance data**

**8 ways**

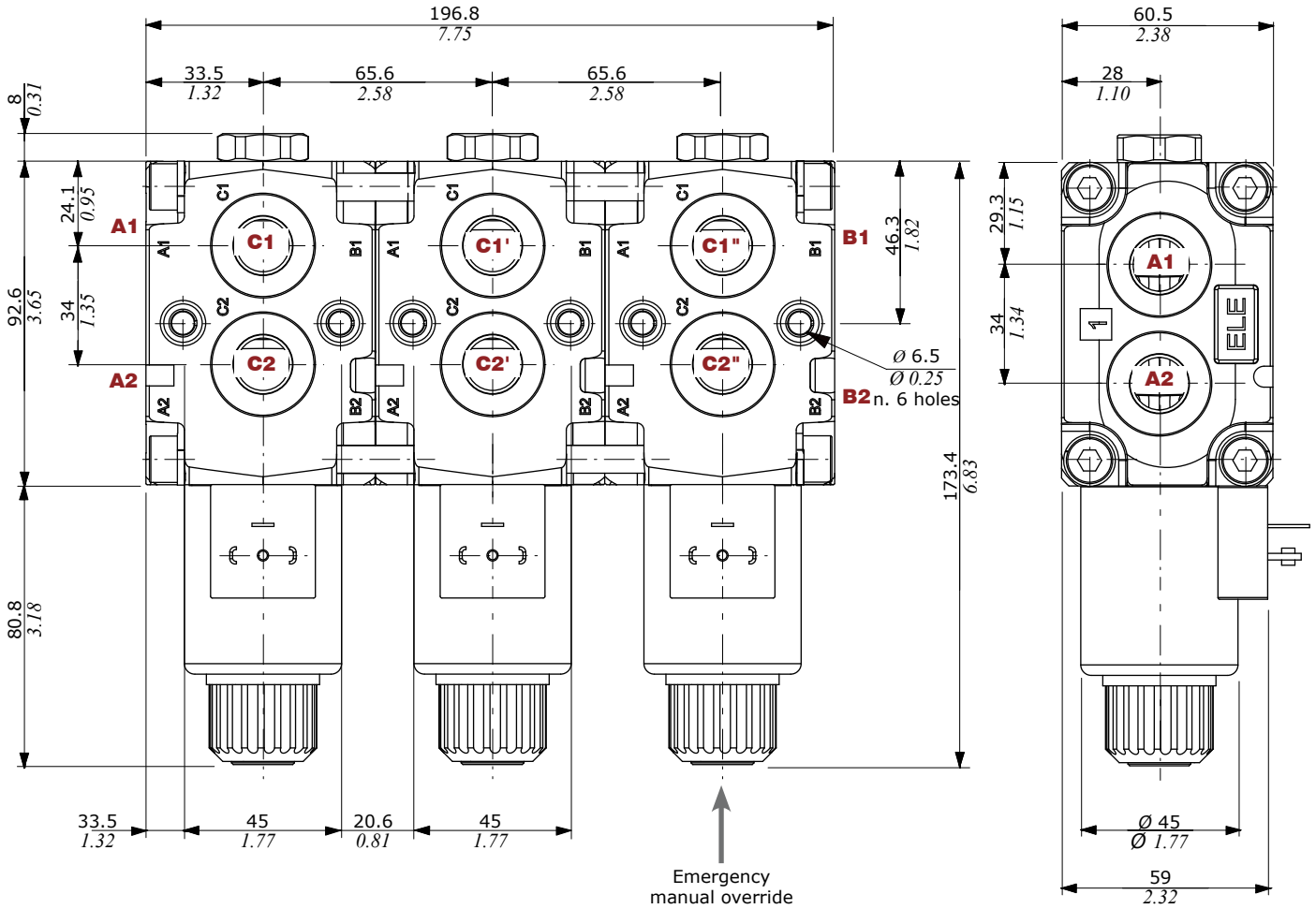


**Pressure drop versus flow**

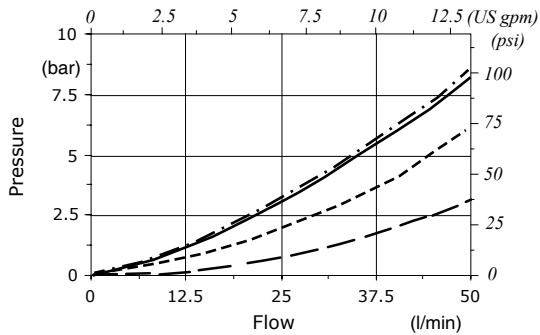


## Dimensional data - hydraulic circuit - performance data

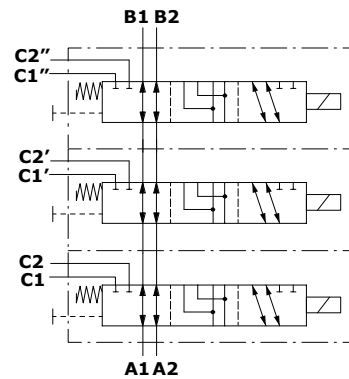
### 10 ways



Pressure drop versus flow



- A1 → B1''      ····· A1 → C1'
- - - A1 → C1      - · - · - A1 → C1''



**Part ordering codes**

Example:

**DFE100/10 A 18 ES - W 2 0 2 - 12VDC - SAE - (CRZ)**

For description composition see the text below

**Coil**  
1 = without coil  
2 = with coil

**Connection\***  
0 = ISO (Std)  
2 = AMP-JPT  
3 = Deutsch DT06  
4 = Deutsch DT04-2P Male  
5 = Deutsch DT04-4P Female  
6 = Metri-Pack Female  
7 = Metri-Pack Male  
8 = WeatherPack Male  
9 = WeatherPack Female

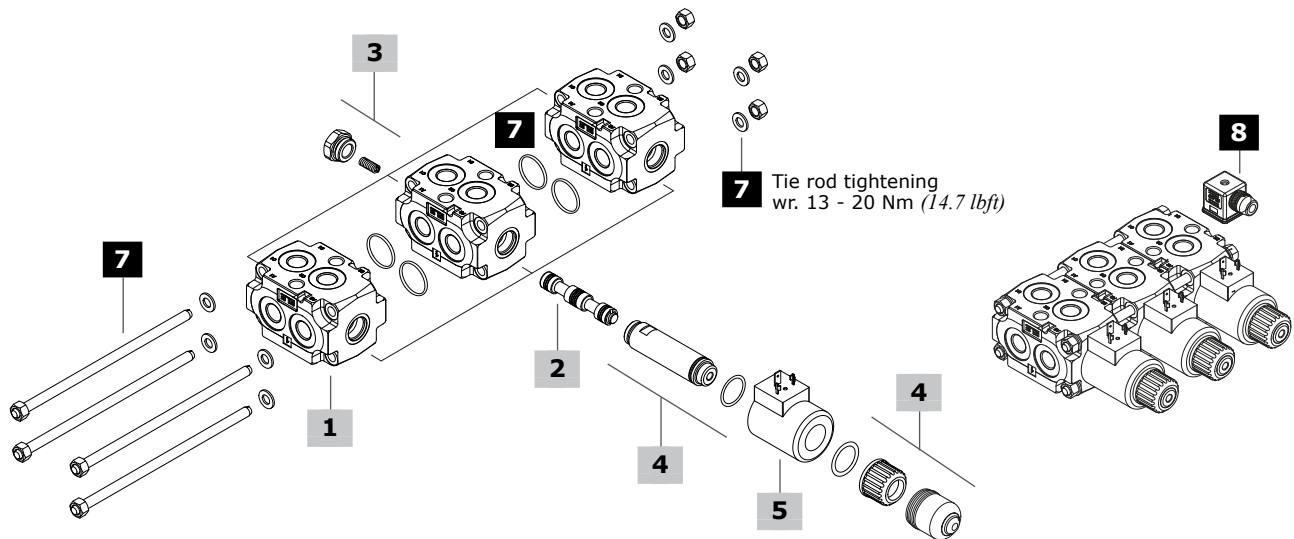
**Diode\***  
(text omitted if diode is not present)  
DB = bidirectional diode

**Lenght cables**  
(only if it's present)  
Lenght is in mm

**Bellow**  
1 = without bellow  
2 = with bellow

**Coil voltage**

(\*) - For diodes and connector options see coils table on page 138



**1 Body kit\***

TYPE	CODE	DESCRIPTION
<b>DFE100/6-8-10</b>	3CO2244721	6 ways body kit

**2 Spools** **page 136**

TYPE	CODE	DESCRIPTION
<b>A</b>	3CAS110647	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports connected in transit position
<b>B</b>	3CAS110747	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports closed in transit position
<b>H</b>	3CAS110847	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Port connected to drain in transit position
<b>N</b>	3CAS110947	As type A, for right inlet

**3 Positioner kit** **page 137**

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP006	Spring return in pos. 1
<b>18...Y</b>	5GIU014*	Spring return in pos. 1, with SAE6 drain port

**4 Solenoid kit** **page 137**

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL515000	Tube assembly without protective bellow
-	4ACC515	Optional assembly tube protective bellow

**5 Coil**

For list of available coils see pages 138

**6 Body threading**

Specify threading always when it is different from **BSP** standard

**7 Tie rods kit and O-ring seals**

CODE	DESCRIPTION
5TIR108132	For DFE100/8 diverter valves
5TIR108198	For DFE100/10 diverter valves

**8 Accessories**

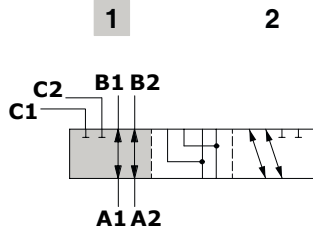
For list of available connectors see pages 138

(\*) - Codes are referred to **UN-UNF** thread

## Spool circuits

### Type A

A1/A2 in B1/B2 in pos. 1.  
Ports connected in transit position

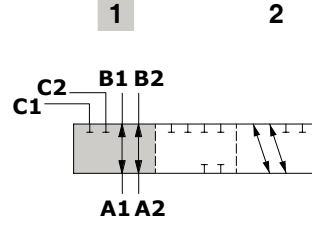


**Spool stroke**

Position 2: + 4 mm (0.15 in)

### Type B

A1/A2 in B1/B2 in pos. 1.  
Ports closed in transit position

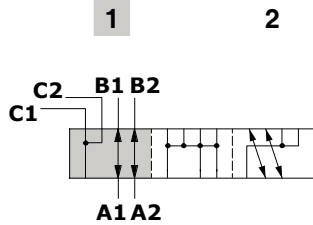


**Spool stroke**

Position 2: + 4 mm (0.15 in)

### Type H

A1/A2 in B1/B2 in pos. 1.  
Port connected to drain in transit position

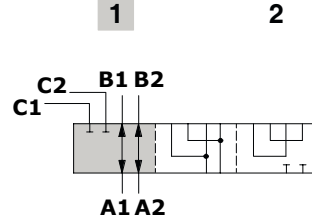


**Spool stroke**

Position 2: + 4 mm (0.15 in)

### Type N

As type A, for right inlet



**Spool stroke**

Position 2: + 4 mm (0.15 in)



**Positioner kit**

**With spring return in position 1**

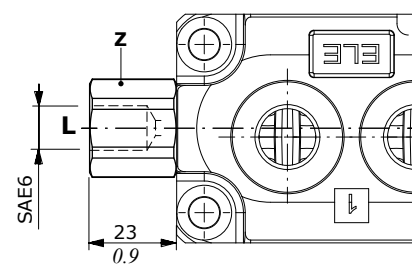
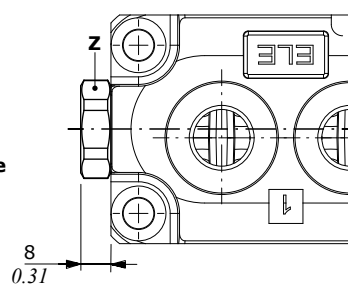
**Type 18W**  
With plug



**Type 18Y**  
With SAE6 drain port

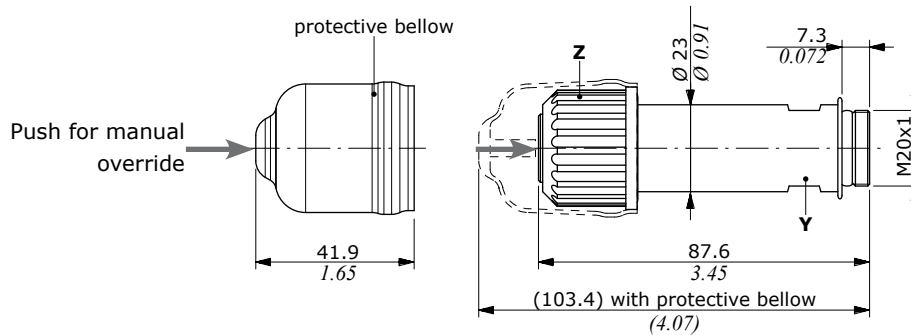


**Wrenches and tightening torque**  
Z = wrench 24 - 42 Nm (31 lbft)



**Solenoid kit**

**ES tube assembly kit**



**Wrenches and tightening torque**  
Y = wrench 20 - 20 Nm (14.7 lbft)  
Z = 24 Nm (17.7 lbft)

## Coils and accessories

Type	Voltage	Ordering codes					
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads without connector
<b>D15</b>	<b>12 VDC</b>	4SOL515012	4SOL515011 <sup>(2)</sup> 4SOL515014A <sup>(3-6)</sup>	4SOL515016 <sup>(5)</sup>	-	-	-
	<b>14 VDC</b>	-	4SOL515014B <sup>(3-6)</sup>	4SOL515016A <sup>(5)</sup>	-	-	-
	<b>24 VDC</b>	4SOL515024	4SOL515025A <sup>(3-6)</sup> 4SOL515021 <sup>(2)</sup>	-	-	-	-
	<b>48 VDC</b>	4SOL515048	-	4SOL515049 <sup>(2)</sup>	-	-	-
	<b>98 VDC</b>	4SOL515098	-	-	-	-	-
	<b>110 VDC</b>	4SOL515110	-	-	-	-	-
<b>Mating connectors</b>		4CN100995	5CON140031	5CON003	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode - <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

### Features

Nominal voltage tolerance: ±10%

Nominal power.....: 38 W

12/14/24/48/98/110 VDC

Nominal current.....: 3.16 A @ 12 VDC

: 2.9 A @ 14 VDC

: 1.58 A @ 24 VDC

: 0.79 A @ 48 VDC

: 0.41 A @ 98 VDC

: 0.35 A @ 110 VDC

Insulation.....: Class H (180°C - 356°F)

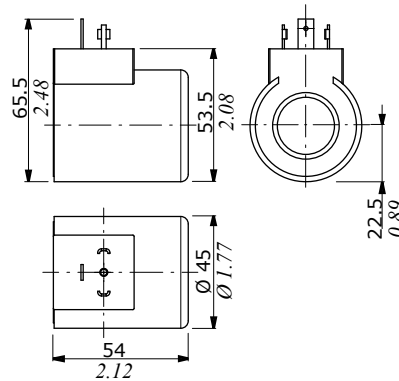
Weather protection.....: IP65 - ISO4400

: IP69K - Deutsch DT

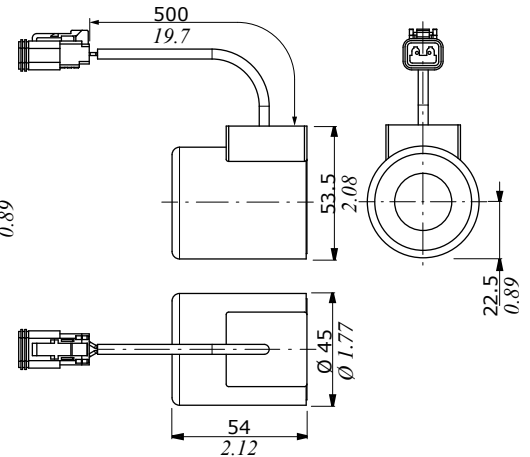
: IP65 - AMP JPT

Insertion.....: 100%

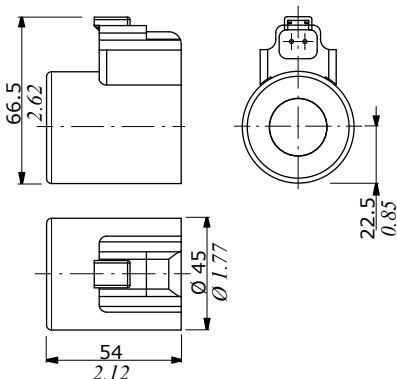
### ISO4400 connector



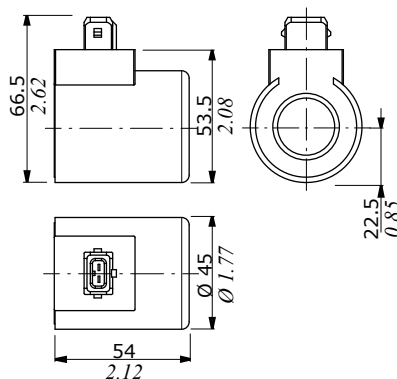
### Flying leads with DEUTSCH DT04 connector



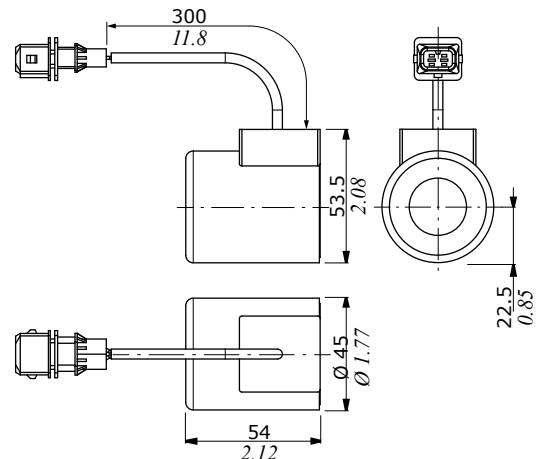
### DEUTSCH DT04 connector (Parallel type)



### AMP JPT connector (Perpendicular type)



### Flying leads with AMP JPT connector





## DFE140

### Solenoid control sectional diverter valves

- 6 - 8 - 10 ways configuration
- Galvanized body
- Antishock valve block stackable with the diverter valve

This catalogue 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.

WORKING CONDITIONS		
N. of available ways		6 - 8 - 10
Max. flow rating		80 l/min (21.1 US gpm)
Max. pressure	without drain	200 bar (2900 psi)
	with drain	315 bar (4600 psi)
Available supply voltage	VDC	see reference page 148
Nominal power		60 W
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	10 cm <sup>3</sup> /min (0.61 in <sup>3</sup> /min)
Fluid		Mineral based oil
Tie rod tightening		25 Nm (18.4 lbft)
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s (from 15 to 75 cSt)
	min.	12 mm <sup>2</sup> /s (12 cSt)
	max.	400 mm <sup>2</sup> /s (400 cSt)
Max. level of contamination		20/18/15 - ISO 4406 - NAS 1638 - class 9
Ambient temperature for working conditions		from -20°C to 50°C (from -4°F to 122°F)

NOTE - For different working conditions please contact Sales Dept.

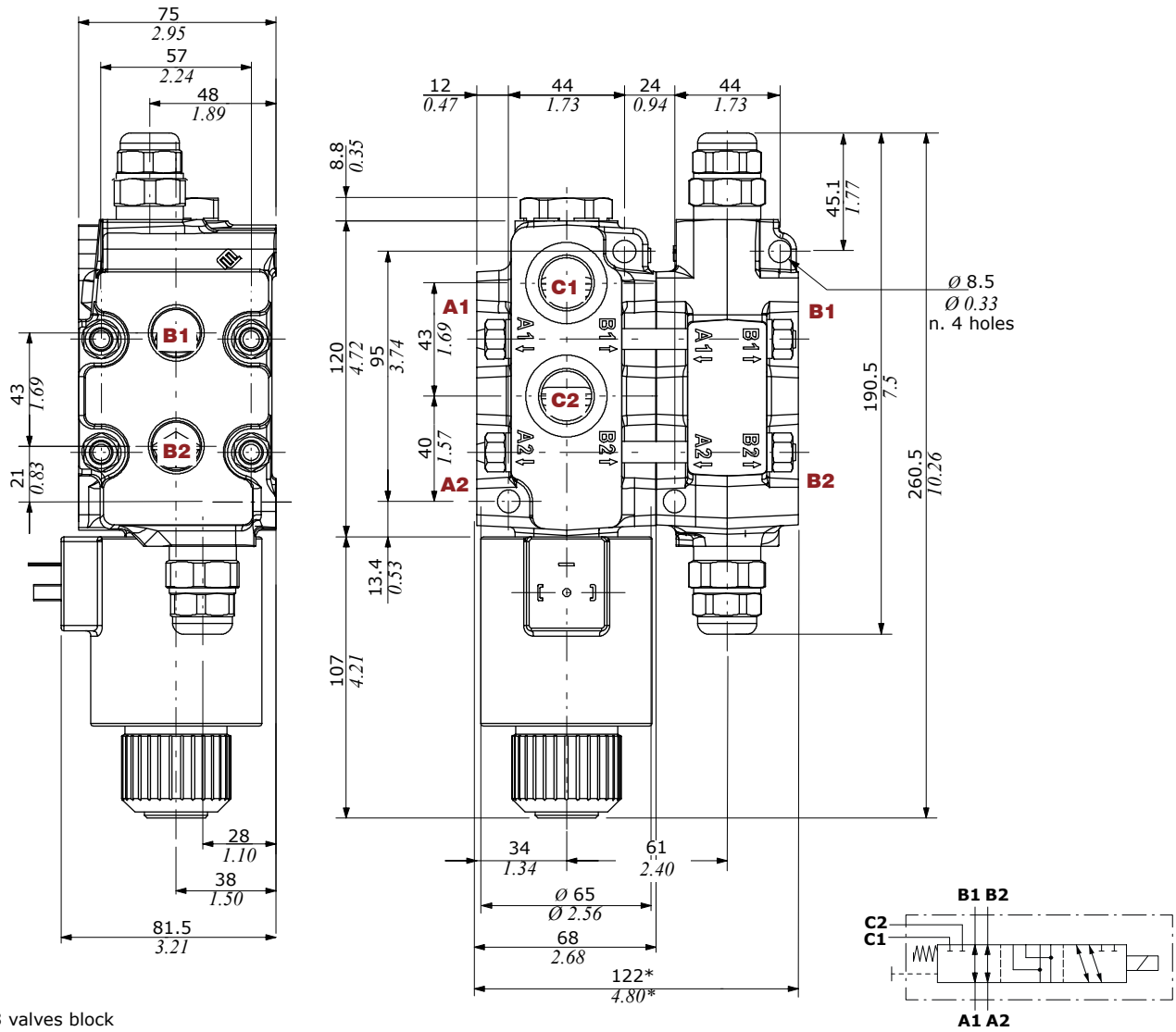
### Available threads

PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DFE140</b>	G 1/2	7/8-14 (SAE 10)
PILOT PORTS		
<b>L</b>	G 1/4	9/16-18 (SAE 6)

## Dimensional data - hydraulic circuit - performance data

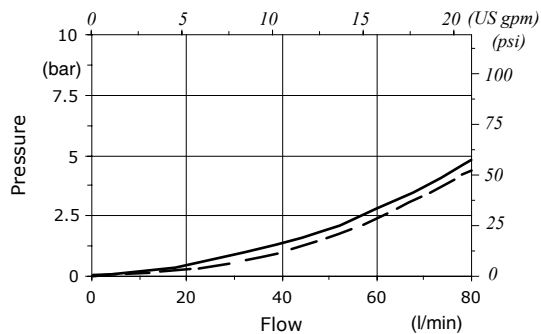
### 6 ways

The drawing below show diverter valve in 6-way configuration with anti-shock valves block



(\*) - with P3 valves block

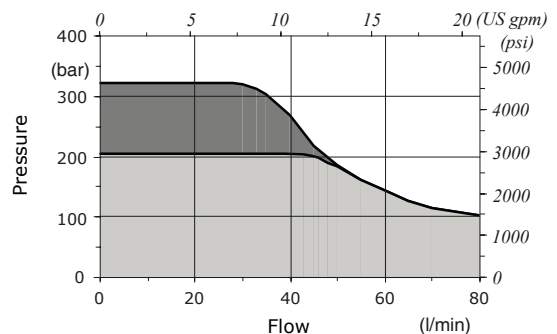
Pressure drop versus flow



— A1 → B1  
 - - - A1 → C1

Minimum dynamic conditions

(Supply = Vn-10%, coil at 70 °C - 158 °F)

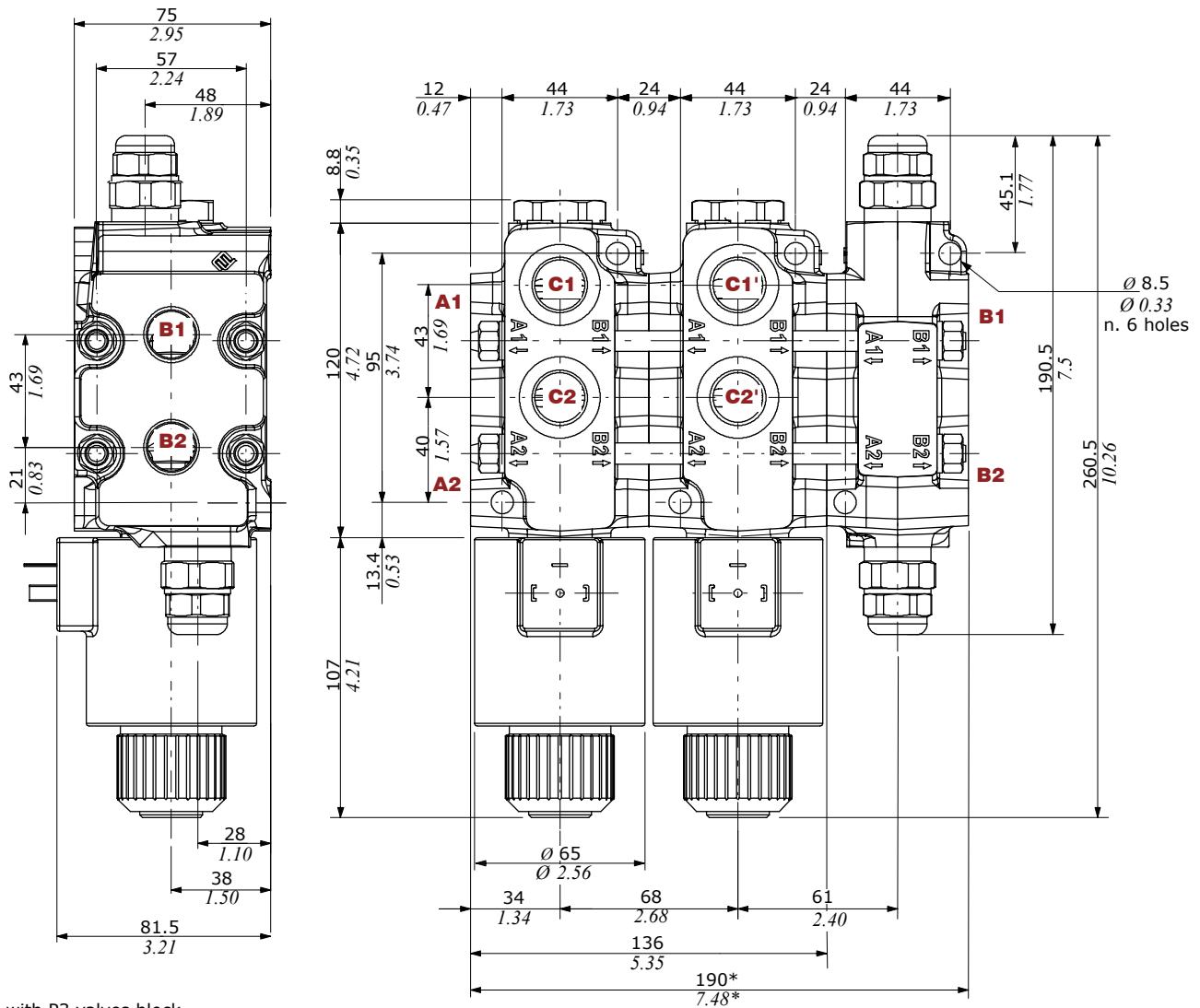


■ With drain  
 ■ Without drain

**Dimensional data - hydraulic circuit - performance data**

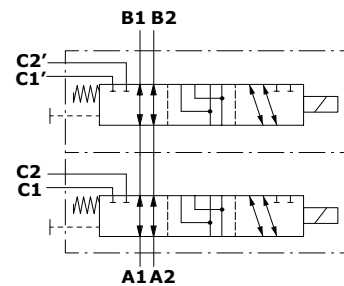
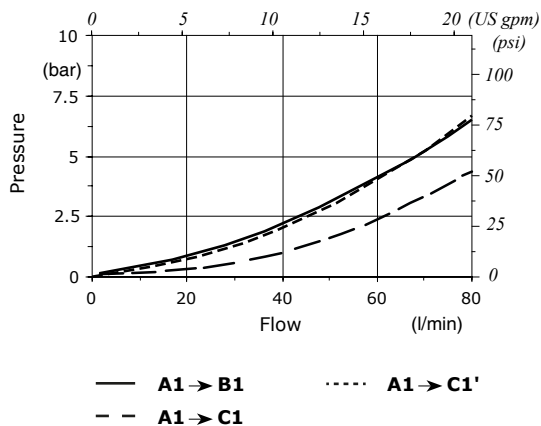
**8 ways**

The drawing below show diverter valve in 8-way configuration with anti-shock valves block



(\*) - with P3 valves block

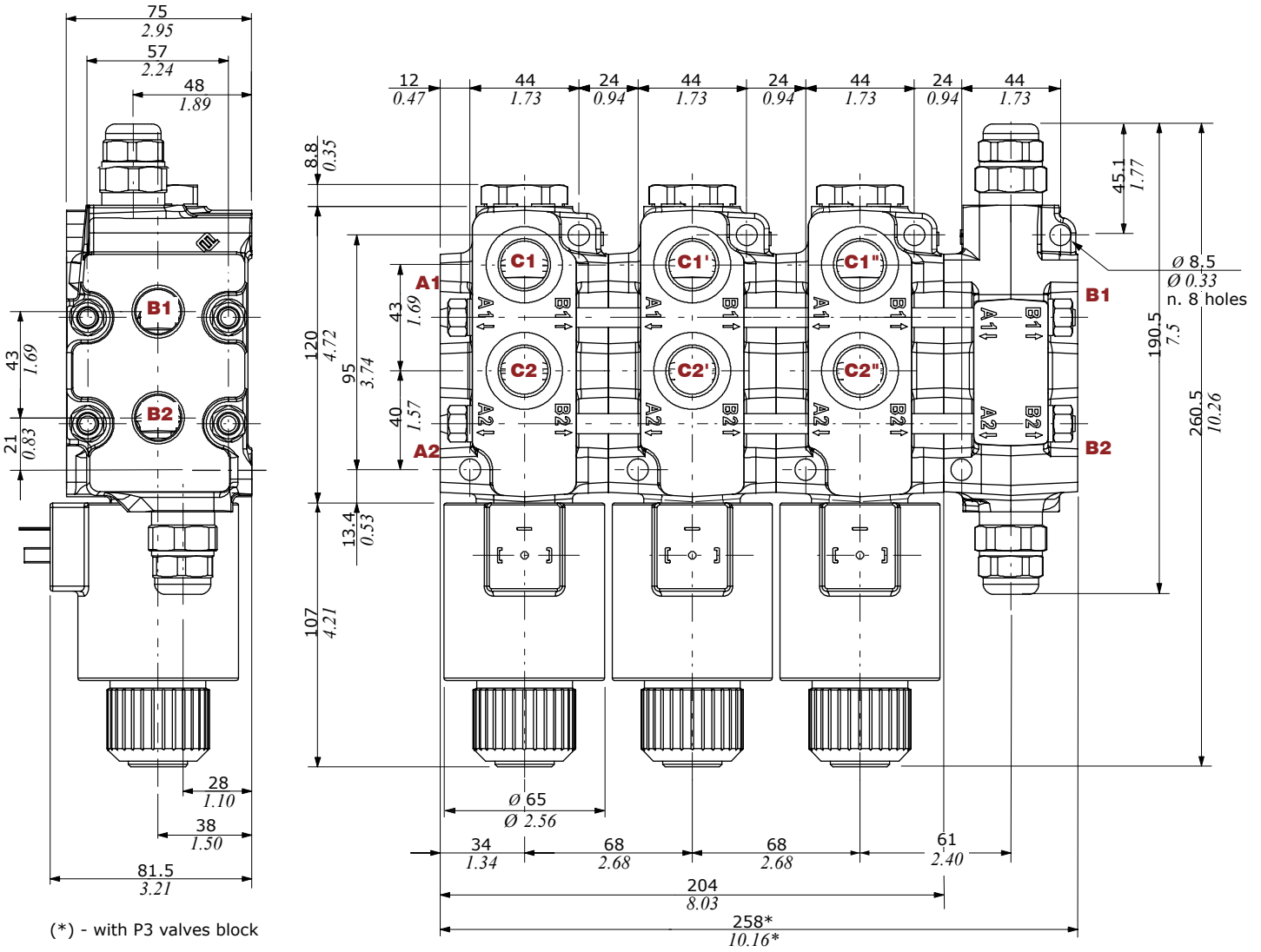
**Pressure drop versus flow**



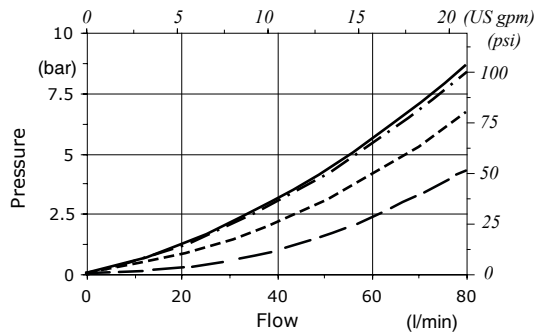
## Dimensional data - hydraulic circuit - performance data

### 10 ways

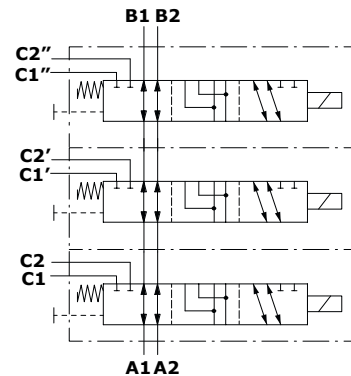
The drawing below show diverter valve in 10-way configuration with anti-shock valves block



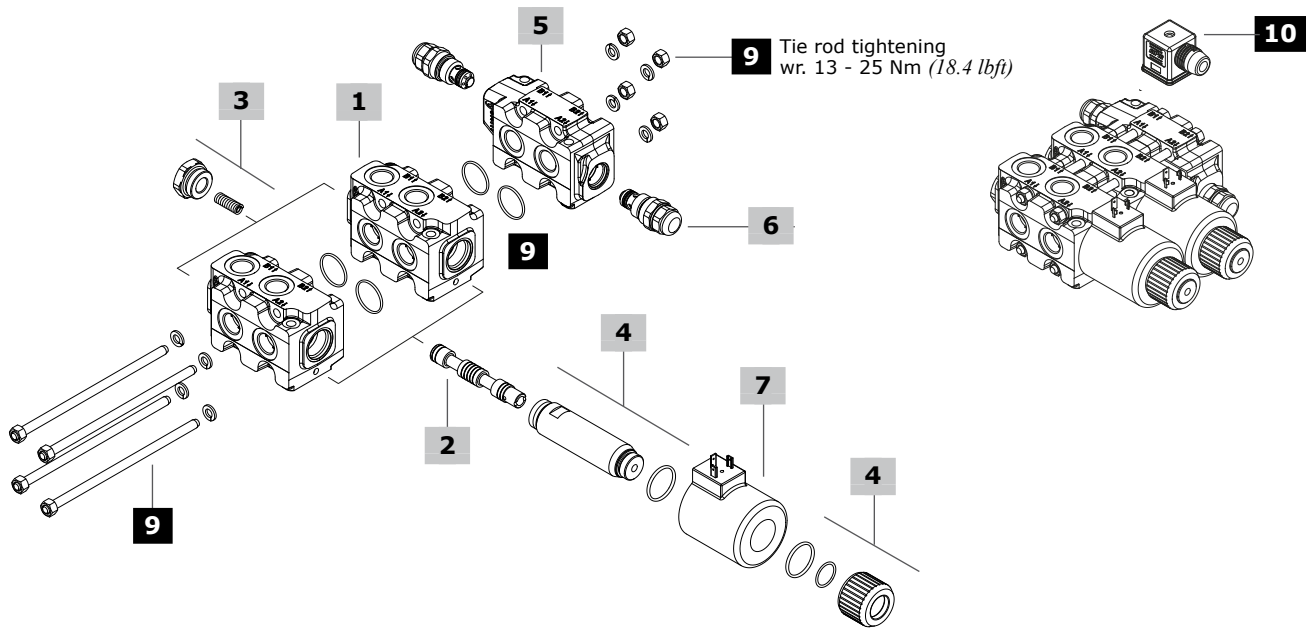
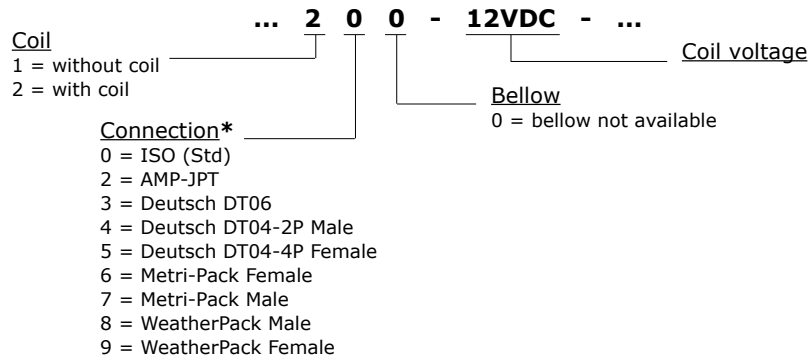
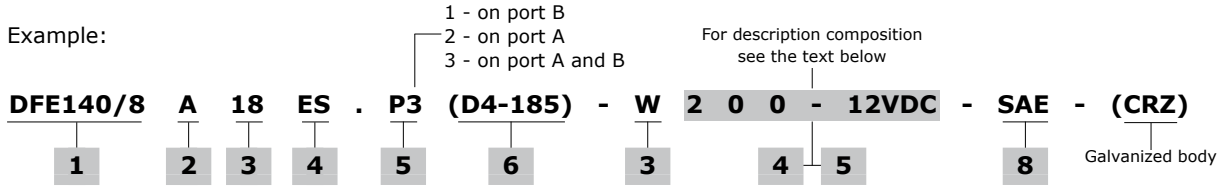
Pressure drop versus flow



- A1 → B1
- ..... A1 → C1'
- - - A1 → C1
- - - A1 → C1''



**Part ordering codes**



## Part ordering codes

### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DFE140/6-8-10</b>	3CO2280703	6 ways body kit

### 2 Spools page 145

TYPE	CODE	DESCRIPTION
<b>A</b>	3CAS110640	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports connected in transit position
<b>B</b>	3CAS110740	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Ports closed in transit position
<b>H</b>	3CAS110845	A1/A2 in B1/B2 in pos. 1. A1/A2 in C1/C2 in pos. 2. Port connected to drain in transit position
<b>N</b>	3CAS110941	As type B, for right inlet

### 3 Positioner kit page 146

TYPE	CODE	DESCRIPTION
<b>18...W</b>	5TAP005	Spring return in pos. 1
<b>18...Y</b>	5GIU011*	Spring return in pos. 1, with SAE6 drain port

### 4 Solenoid kit page 146

TYPE	CODE	DESCRIPTION
<b>ES</b>	5SOL519003	Tube assembly without protective bellow

### 5 Valves block\* page 147

TYPE	CODE	DESCRIPTION
<b>P3</b>	3CO2780700	Cross-over antishock valve body

### 6 Antishock valves page 147

With fixed setting: setting is referred to valve opening

TYPE	CODE	DESCRIPTION
<b>P(D2-80)</b>	X005125095	Setting 80 bar (1150 psi)
<b>P(D2-110)</b>	X005125110	Setting 110 bar (1590 psi)
<b>P(D3-125)</b>	X005125145	Setting 125 bar (1800 psi)
<b>P(D3-140)</b>	X005125155	Setting 140 bar (2050 psi)
<b>P(D3-170)</b>	X005125190	Setting 170 bar (2450 psi)
<b>P(D4-185)</b>	X005125216	Setting 185 bar (2700 psi)
<b>P(D4-210)</b>	X005125245	Setting 210 bar (3050 psi)
<b>P(D4-240)</b>	X005125270	Setting 240 bar (3500 psi)
<b>P1T - P2T</b>	3XTAP524290	Blanking plug P1-P2

### 7 Coil

For list of available coils see pages 148

### 8 Body threading

Specify threading always when it is different from **BSP** standard

### 9 Tie rods kit and O-ring seals

CODE	DESCRIPTION
5TIR108134	For DFE140/8 diverter valves
5TIR108202	For DFE140/10 diverter valves
<b>with valves block:</b>	
5TIR108121	For DFE140/6.P3 diverter valves
5TIR108189	For DFE140/8.P3 diverter valves

### 10 Accessories

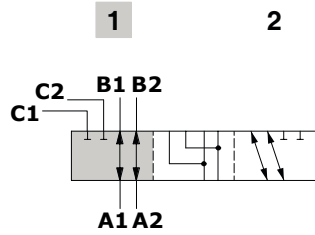
For list of available connectors see pages 148

(\*) - Codes are referred to **UN-UNF** thread



**Type A**

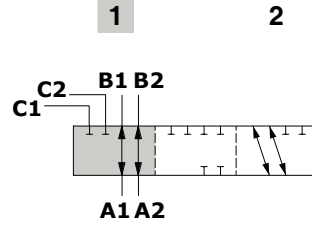
A1/A2 in B1/B2 in pos. 1.  
Ports connected in transit position



**Spool stroke**  
Position 2: + 5.8 mm (0.22 in)

**Type B**

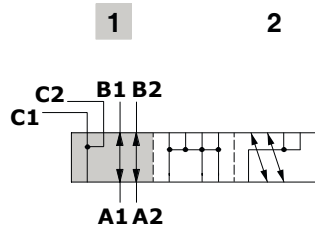
A1/A2 in B1/B2 in pos. 1.  
Ports closed in transit position



**Spool stroke**  
Position 2: + 5.8 mm (0.22 in)

**Type H**

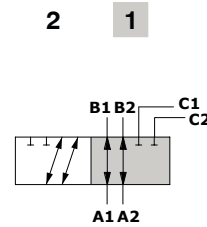
A1/A2 in B1/B2 in pos. 1.  
Port connected to drain in transit position



**Spool stroke**  
Position 2: + 5.8 mm (0.22 in)

**Type N**

As type B, for right inlet



**Spool stroke**  
Position 2: + 5.8 mm (0.22 in)

## Positioner kit

### With spring return in position 1

#### Type 18W

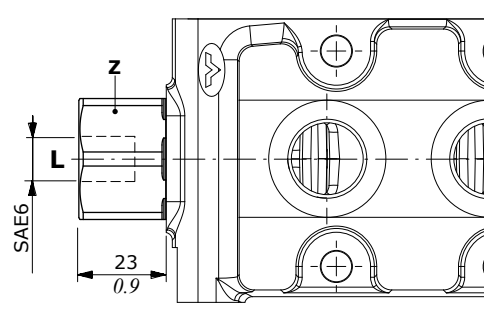
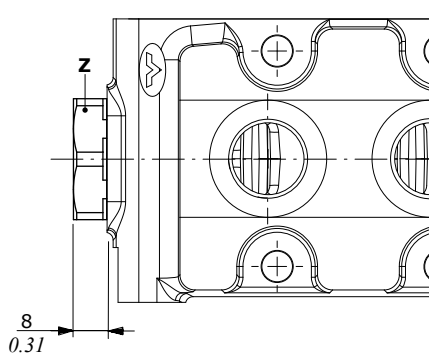
With plug

#### Type 18Y

With SAE6 drain port

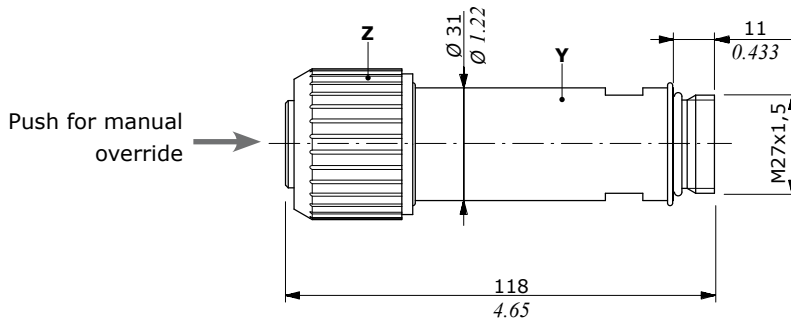
#### Wrenches and tightening torque

Z = wrench 32 - 42 Nm (31 lbft)



## Solenoid kit

### ES tube assembly kit

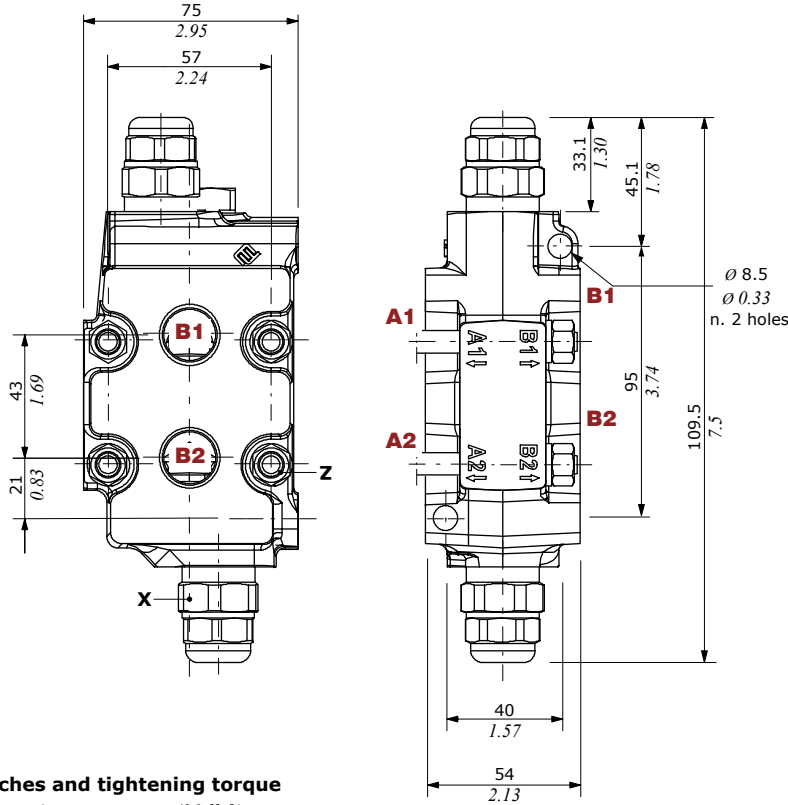


#### Wrenches and tightening torque

Y = wrench 27 - 24 Nm (17.7 lbft)

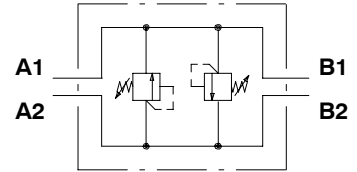
Z = 24 Nm (17.7 lbft)

**P3 block complete with antishock valves**

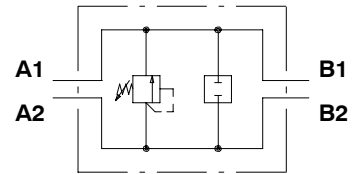


**Wrenches and tightening torque**  
**X** = wrench 27 - 42 Nm (31 lbf<sup>t</sup>)  
**Z** = wrench 13 - 24 Nm (17.7 lbf<sup>t</sup>)

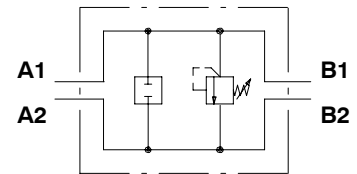
**Configuration with valve on each workport (P3)**



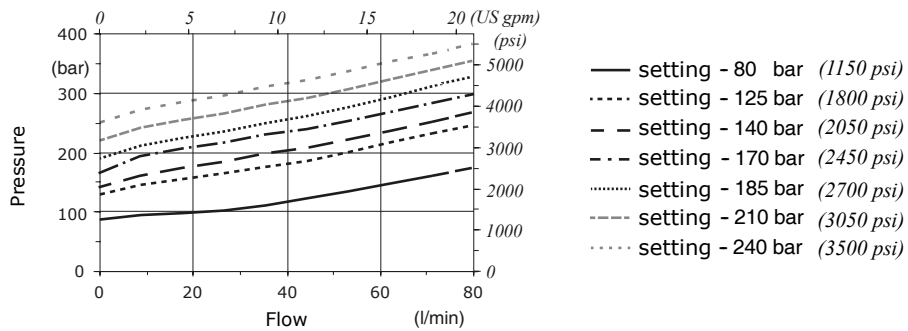
**Configuration with valve on workport A (P2)**



**Configuration with valve on workport B (P1)**



**Antishock valves performance data**



## Coils and accessories

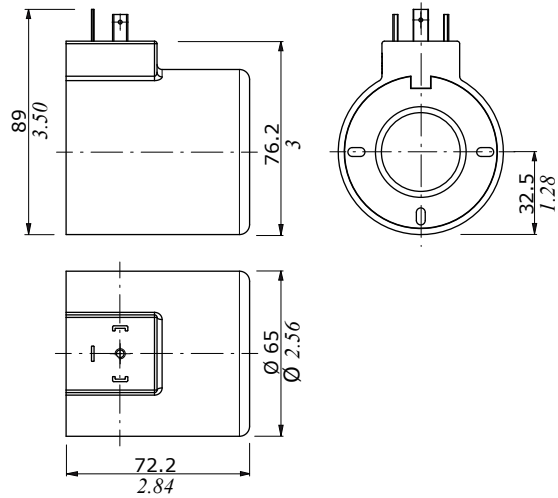
Type	Voltage	Ordering codes					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
<b>D19</b>	<b>12 VDC</b>	4SOL519112	4SOL519402 <sup>(6)</sup>	-	-	-	-
	<b>20 VDC</b>	4SOL519120	-	-	-	-	-
	<b>24 VDC</b>	4SOL519124	4SOL519404 <sup>(6)</sup>	-	-	-	-
	<b>94 VDC</b>	4SOL519194	-	-	-	-	-
	<b>192 VDC</b>	4SOL519292	-	-	-	-	-
<b>Mating connectors</b>		4CN1009995	5CON140031	-	-	-	-

Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector - <sup>(2)</sup> with flying leads - <sup>(3)</sup> with bidirectional diode - <sup>(4)</sup> with unidirectional diode <sup>(5)</sup> integrated perpendicular type - <sup>(6)</sup> integrated parallel type

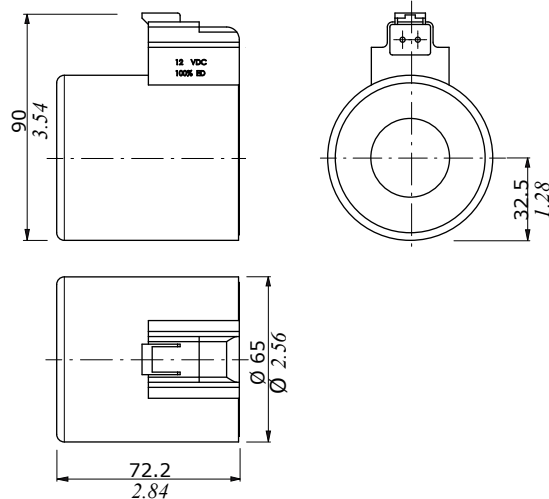
### Features

Nominal voltage tolerance: ±10%  
 Nominal power.....: 60 W  
                                   12/20/24/94/192 VDC  
 Nominal current.....: 5 A @ 12 VDC  
                                   : 3 A @ 20 VDC  
                                   : 2.5 A @ 24 VDC  
                                   : 2.5 A @ 94 VDC  
                                   : 0.31 A @ 192 VDC  
 Insulation.....: Class H (180°C - 356 °F)  
 Weather protection.....: IP65 - ISO4400  
                                   : IP69K - Deutsch DT  
 Insertion.....: 100%

### ISO4400 connector



### DEUTSCH DT04 connector (Parallel type)





## DH-DHZ

### Rotary control diverter valves

- 3 - 4 - 6 - 8 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		DHZ5	DHZ10	DHZ20	DH25	DH30
N. of available ways		3/6 - 4/8	3/6 - 4/8	3/6 - 4/8	3/6 - 4/8	3/6
Max. flow rating		60 l/min (18.5 US gpm)	90 l/min (23.7 US gpm)	140 l/min (37 US gpm)	200 l/min (52.8 US gpm)	280 l/min (74 US gpm)
Max. pressure		315 bar (4600 psi)	315 bar (4600 psi)	315 bar (4600 psi)	250 bar (3600 psi)	210 bar (3050 psi)
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	3 cm <sup>3</sup> /min (0.18 in <sup>3</sup> /min)	3 cm <sup>3</sup> /min (0.18 in <sup>3</sup> /min)	3 cm <sup>3</sup> /min (0.18 in <sup>3</sup> /min)	3 cm <sup>3</sup> /min (0.18 in <sup>3</sup> /min)	3 cm <sup>3</sup> /min (0.18 in <sup>3</sup> /min)
Fluid		Mineral based oil				
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C (from -4°F to 176°F)				
	with FPM (VITON) seals	from -20°C to 100°C (from -4°F to 212°F)				
Viscosity	operating range	da 15 a 75 mm <sup>2</sup> /s (from 15 to 75 cSt)				
	min.	12 mm <sup>2</sup> /s (12 cSt)				
	max.	400 mm <sup>2</sup> /s (400 cSt)				
Max. level of contamination		21/19/16 - ISO 4406 - NAS 1638 - class 10				
Ambient temperature for working conditions		from -40°C to 60°C (from -40°F to 140°F)				

NOTE - For different working conditions please contact Sales Dept.

### Available threads

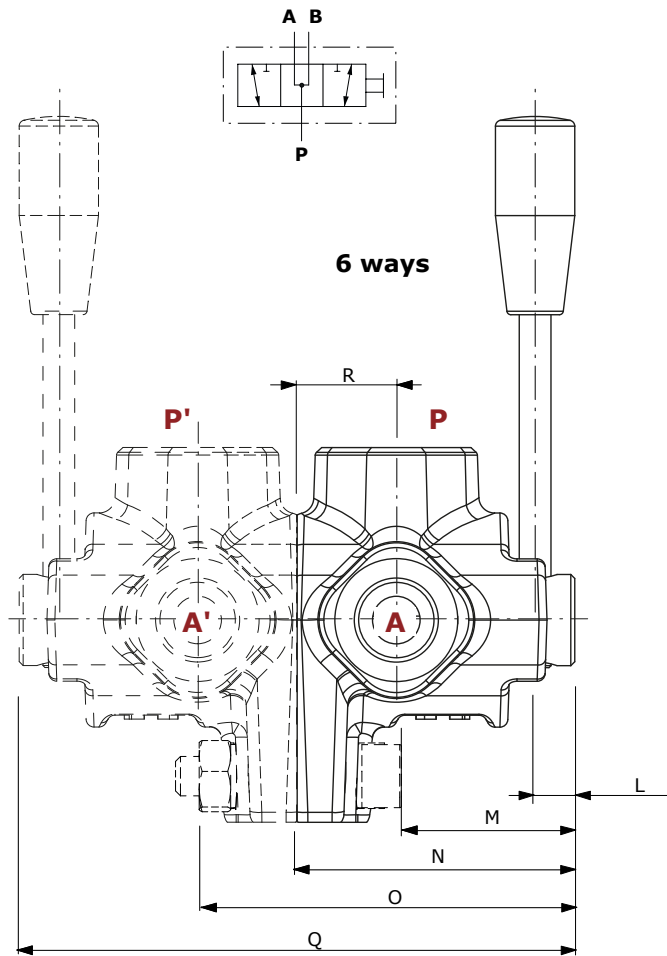
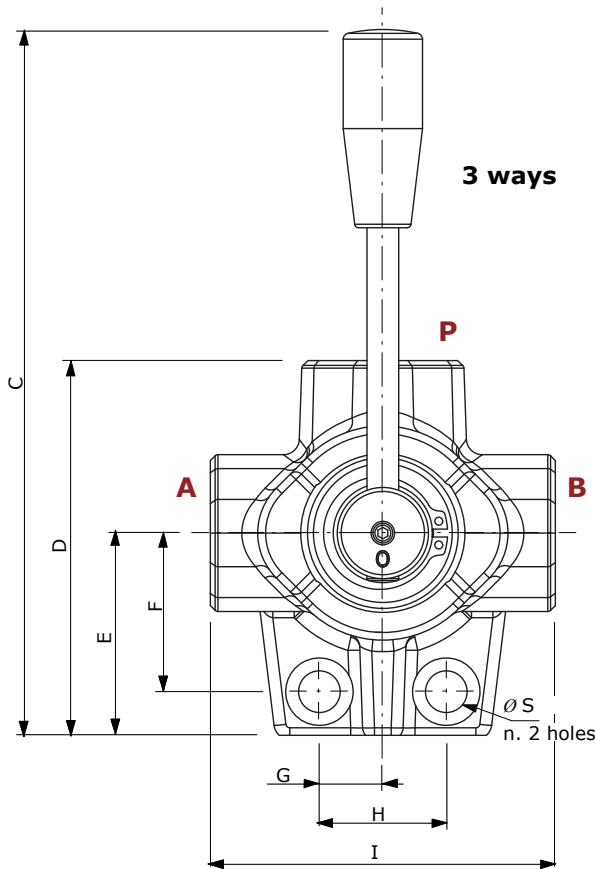
PORTS THREAD		
ALL PORTS	BSP	UN-UNF
<b>DHZ5</b>	G 3/8	3/4-16 (SAE 8)
<b>DHZ10</b>	G 1/2	7/8-14 (SAE 10)
<b>DHZ20</b>	G 3/4	1" 1/16-12 (SAE 12)
<b>DH25</b>	G 1	1" 5/16-12 (SAE 16)
<b>DH30</b>	G 1" 1/2	1" 7/8-12 (SAE 24)

## Dimensional data and hydraulic circuit

### 3 - 6 ways

6-ways diverter valve is obtained by coupling two 3 way bodies with assembling kit

**DHZ10 / 3 A SAE (CRZ)** Galvanized body (only DHZ body)  
 Serie N° ways Spool type Port type (is different from BSP)



Type	C	D	E	F	G	H	I	L	M	N	O	Q	R	Ø S														
	mm* in*																											
<b>DHZ5/3</b>	169.5	6.67	77.5	3.05	40.5	1.59	30	1.18	12.2	0.48	24.5	0.96	74	2.91	10	0.39	42	1.65	63	2.48	-	-	21	0.83	8.5	0.33		
<b>DHZ5/6</b>	169.5	6.67	77.5	3.05	40.5	1.59	30	1.18	12.2	0.48	24.5	0.96	74	2.91	10	0.39	42	1.65	63	2.48	84	3.31	126	4.96	21	0.83	8.5	0.33
<b>DHZ10/3</b>	178	7.01	94.5	3.72	51	2.04	40	1.57	16	0.63	32	1.26	87	3.42	10	0.39	45	1.77	70	2.75	-	-	25	0.98	10.5	0.41		
<b>DHZ10/6</b>	178	7.01	94.5	3.72	51	2.04	40	1.57	16	0.63	32	1.26	87	3.42	10	0.39	45	1.77	70	2.75	95	3.74	140	5.51	25	0.98	10.5	0.41
<b>DHZ20/3</b>	196	7.72	105	4.13	60	2.36	45	1.77	16	0.63	32	1.26	92	3.62	10	0.39	48.5	1.90	78.5	3.1	-	-	30	1.18	10.5	0.41		
<b>DHZ20/6</b>	196	7.72	105	4.13	60	2.36	45	1.77	16	0.63	32	1.26	92	3.62	10	0.39	48.5	1.90	78.5	3.1	108.5	4.27	157	6.18	30	1.18	10.5	0.41
<b>DH25/3</b>	204	8.03	120	4.72	70	2.75	55	2.16	16	0.63	32	1.26	100	3.94	14	0.55	58.5	2.30	93.5	3.68	-	-	35	1.38	10.5	0.41		
<b>DH25/6</b>	204	8.03	120	4.72	70	2.75	55	2.16	16	0.63	32	1.26	100	3.94	14	0.55	58.5	2.30	93.5	3.68	128.5	5.06	187	7.36	35	1.38	10.5	0.41
<b>DH30/3</b>	284	11.18	150	5.9	85	3.35	65	2.56	24.5	0.96	49	1.93	130	5.12	15	0.59	69.5	2.74	115.5	4.55	-	-	46	1.81	10.5	0.41		
<b>DH30/6</b>	284	11.18	150	5.9	85	3.35	65	2.56	24.5	0.96	49	1.93	130	5.12	15	0.59	69.5	2.74	115.5	4.55	161.5	6.36	231	9.09	46	1.81	10.5	0.41

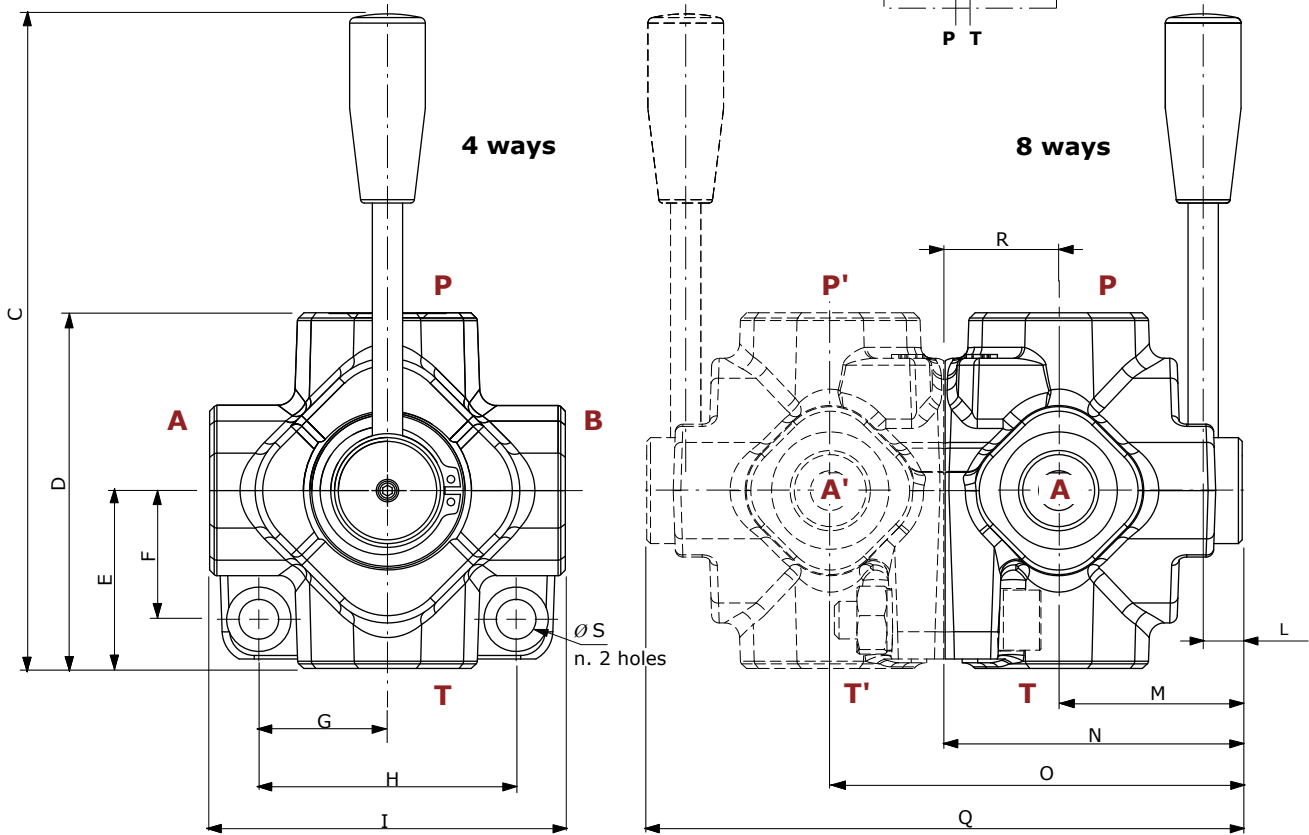
(\* ) - Codes are referred to **UN-UNF** thread

**Dimensional data and hydraulic circuit**

**4 - 8 ways**

8-ways diverter valve is obtained by coupling two 4 way bodies with assembling kit

**DHZ10 / 4 A SAE (CRZ)** Galvanized body (only DHZ body)  
 Serie N° ways Spool type Port type (is different from BSP)

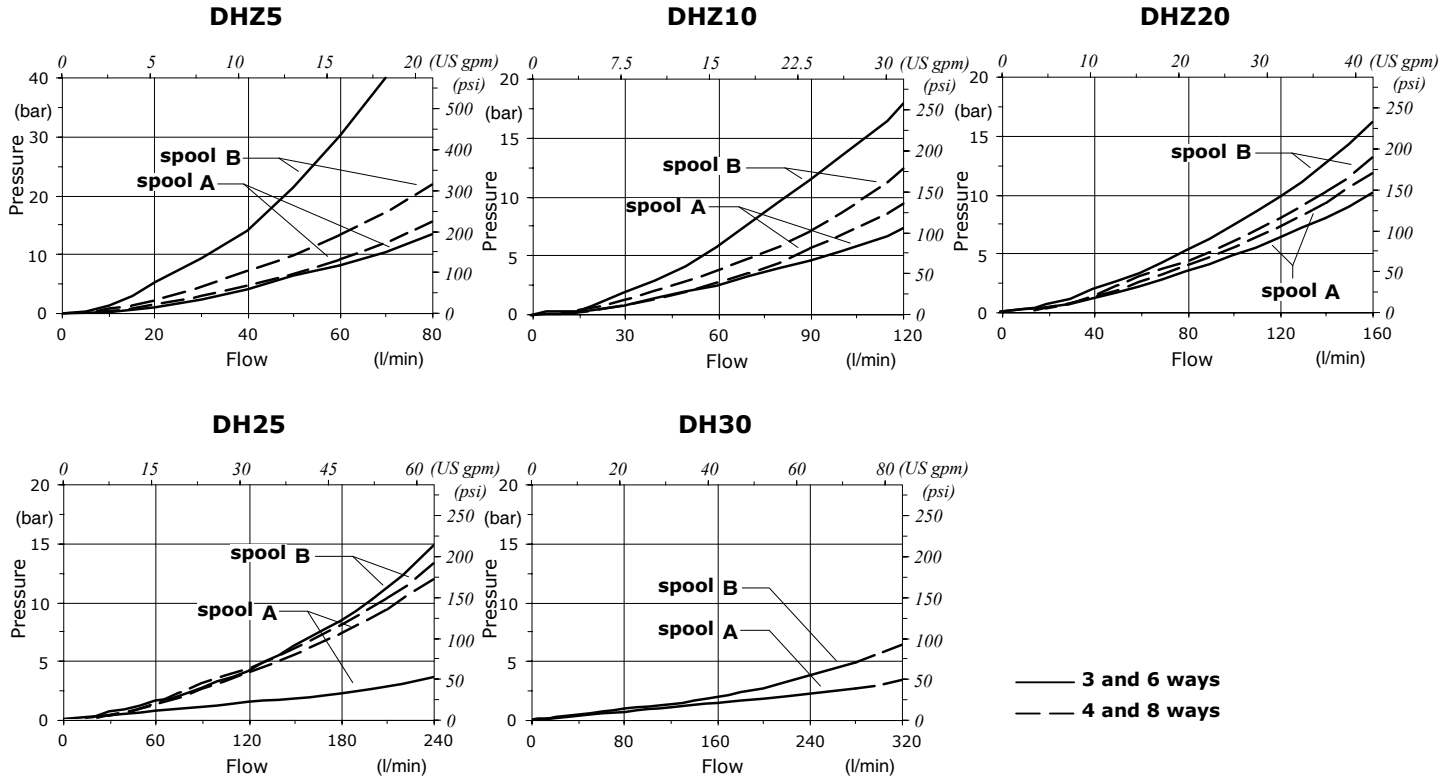


Type	C	D	E	F	G	H	I	L	M	N	O	Q	R	Ø S
	mm* in*													
<b>DHZ5/4</b>	167 6.57	79 3.11	39.5 1.55	27.5 1.08	27 1.06	54 2.12	79 3.11	10 0.39	45 1.77	70 2.75	-	-	25 0.98	8.5 0.33
<b>DHZ5/8</b>	167 6.57	79 3.11	39.5 1.55	27.5 1.08	27 1.06	54 2.12	79 3.11	10 0.39	45 1.77	70 2.75	95 3.74	140 5.51	25 0.98	8.5 0.33
<b>DHZ10/4</b>	173 6.81	94 3.70	47 1.85	34 1.34	34 1.33	68 3.70	94 3.70	10 0.39	48.5 1.91	78.5 3.1	-	-	30 1.18	10.5 0.41
<b>DHZ10/8</b>	173 6.81	94 3.70	47 1.85	34 1.34	34 1.33	68 3.70	94 3.70	10 0.39	48.5 1.91	78.5 3.1	108,5 4.27	157 6.18	30 1.18	10.5 0.41
<b>DH20/4</b>	185 7.28	100 3.94	50 1.97	37 1.46	37 1.45	74 2.91	100 3.94	14 0.55	61 2.40	92 3.62	-	-	31 1.22	10.5 0.41
<b>DH20/8</b>	185 7.28	100 3.94	50 1.97	37 1.46	37 1.45	75 2.95	100 3.94	14 0.55	61 2.40	92 3.62	123 4.84	184 7.24	31 1.22	10.5 0.41
<b>DH25/4</b>	251 9.88	112 4.41	56 2.2	44 1.73	44 1.73	88 3.46	112 4.41	13.5 0.53	60 2.36	95 3.74	-	-	35 1.38	10.5 0.41
<b>DH25/8</b>	251 9.88	112 4.41	56 2.2	44 1.73	44 1.73	88 3.46	112 4.41	13.5 0.53	60 2.36	95 3.74	130 5.12	190 7.48	35 1.38	10.5 0.41

(\*) - Codes are referred to UN-UNF thread

## Performance data

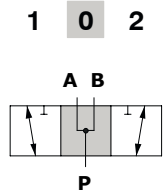
### Pressure drop versus flow P → A(B)



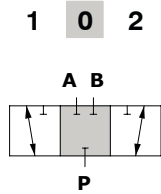
## Spool circuits

### 3 ways

**Type A**  
3 position,  
ports connected in pos. 0

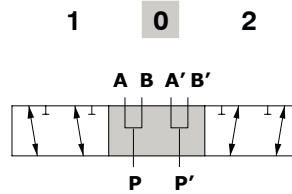


**Type B**  
3 position,  
ports closed in pos. 0

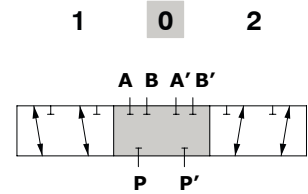


### 6 ways

**Type A**  
3 position, P and P' line flow on  
workports in pos. 0

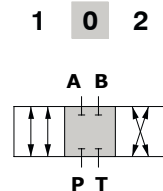


**Type B**  
3 position,  
ports closed in pos. 0

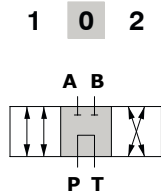


### 4 ways

**Type A**  
3 position,  
ports closed in pos. 0

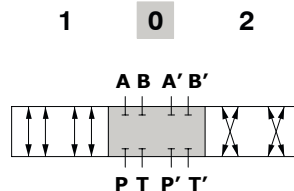


**Type B**  
3 position, P in T,  
ports closed in pos. 0

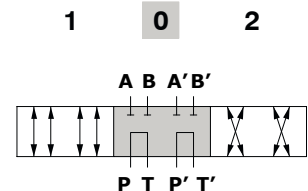


### 8 ways

**Type A**  
3 position,  
ports closed in pos. 0

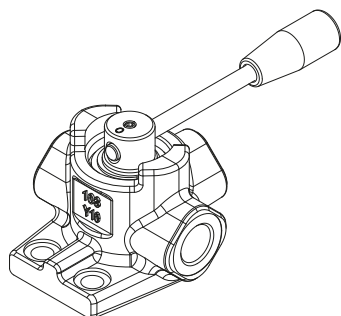


**Type B**  
3 position, P in T, P' in T',  
ports closed in pos. 0

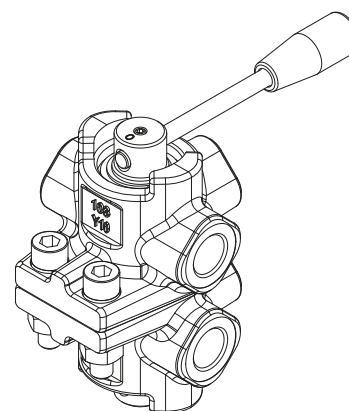




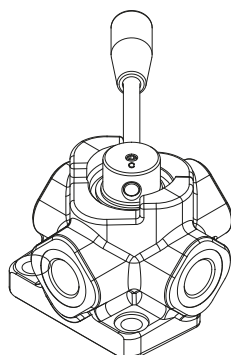
**Valve ordering codes**



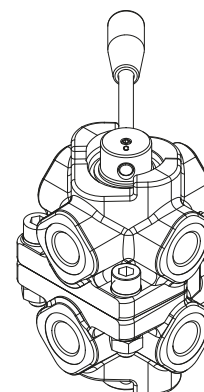
DH-DHZ.../3	
Code*	Description
132Z34110	DHZ5/3A
132Z34210	DHZ5/3B
134Z34110	DHZ10/3A
134Z34210	DHZ10/3B
136Z34110	DHZ20/3A
136Z34210	DHZ20/3B
137034110	DH25/3A
137034210	DH25/3B
139034110	DH30/3A
139034210	DH30/3B



DH-DHZ.../6	
Code*	Description
132Z64110	DHZ5/6A
132Z64210	DHZ5/6B
134Z64110	DHZ10/6A
134Z64210	DHZ10/6B
136Z64110	DHZ20/6A
136Z64210	DHZ20/6B
137064110	DH25/6A
137064210	DH25/6B
139064110	DH30/6A
139061211	DH30/6B



DH-DHZ.../4	
Code*	Description
132Z44110	DHZ5/4A
132Z44210	DHZ5/4B
134Z44111	DHZ10/4A
134Z44211	DHZ10/4B
136044110	DH20/4A
136044210	DH20/4B
137044110	DH25/4A
137044210	DH25/4B



DH-DHZ.../8	
Code*	Description
132Z84110	DHZ5/8A
132Z84210	DHZ5/8B
134Z84110	DHZ10/8A
134Z84210	DHZ10/8B
136084110	DH20/8A
136081211	DH20/8B
137084110	DH25/8A
137084210	DH25/8B

(\*) - Codes are referred to **UN-UNF** thread





## DDF3V-S

### High pressure diverter valves

- 3 ways configuration
- Galvanized body

This catalogue 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.

#### WORKING CONDITIONS

N. of available ways	3			
	TYPE	<b>02</b>	<b>03</b>	<b>04</b>
Max. flow rating		60 l/min (15.9 US gpm)	90 l/min (23.8 US gpm)	120 l/min (31.7 US gpm)
Max. pressure		450 bar (6500 psi)	400 bar (5800 psi)	350 bar (5100 psi)
Internal leakage A(B)⇒T	Δp = 100 bar 1450 psi	30 cm <sup>3</sup> /min (0.30 in <sup>3</sup> /min)		
Fluid	Mineral based oil			
Fluid temperature	with NBR seals	from -20°C to 80°C (from -4°F to 176°F)		
	with FPM seals	from -20°C to 100°C (from -4°F to 212°F)		
Viscosity	operating range	da 15 a 75 mm <sup>2</sup> /s (from 15 to 75 cSt)		
	min.	12 mm <sup>2</sup> /s (12 cSt)		
	max.	400 mm <sup>2</sup> /s (400 cSt)		
Level of contamination	18/16/13 - ISO 4406 - NAS 1638 - class 7			
Ambient temperature for working conditions	from -40°C to 60°C (from -40°F to 140°F)			

NOTE - For different working conditions please contact Sales Dept.

#### Available threads

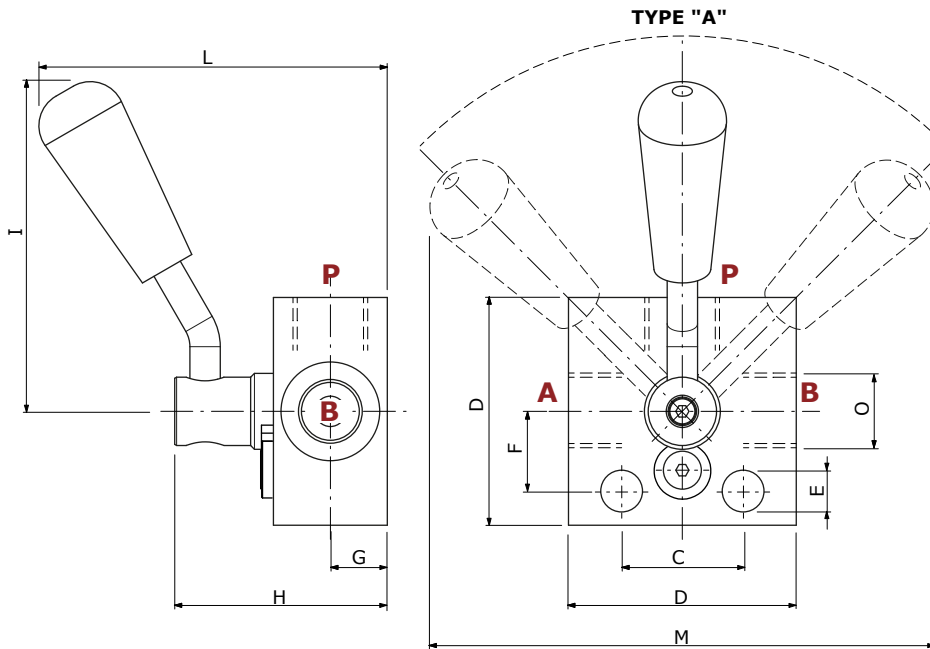
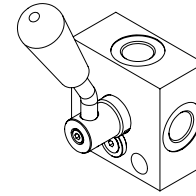
PORTS THREAD			
Dimensions	BSP	NPT (N)	UN-UNF (S)
<b>02</b>	G 3/8	3/8	3/4-16 (SAE 8)
<b>03</b>	G 1/2	1/2	7/8-14 (SAE 10)
<b>04</b>	G 3/4	3/4	1" 1/16-12 (SAE 12)

## Dimensional data and hydraulic circuit

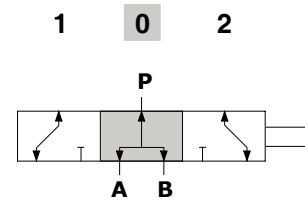
### 3 ways

Example:

**DDF3V-S** 3 ways flow diverter  
**02** Type - dimension  
**A** Hydraulic schema (open center)  
**SAE** Port type - NS (is different from BSP)  
**...** Treatment - ZN (is different from zinc-plated body)  
**...** Lever type - LD (is different from short bent handle)

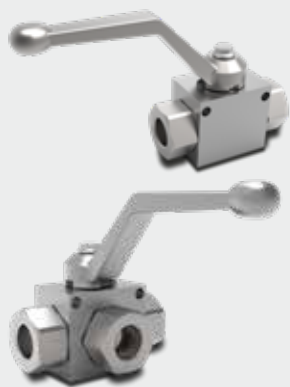


**3 ways, type A**  
 A B and P open in pos. 0.  
 Hand lever turns 90°



Type	C	D	Ø E	F	G	H	I	L	M	O sae
mm* - in*										
<b>02</b>	32 - 1.25	60 - 2.36	11 - 0.43	21 - 0.82	15 - 0.60	56 - 2.20	90 - 3.54	95 - 3.74	135 - 5.31	3/4-16
<b>03</b>	32 - 1.25	60 - 2.36	11 - 0.43	21 - 0.82	15 - 0.60	56 - 2.20	90 - 3.54	95 - 3.74	135 - 5.31	7/8-14
<b>04</b>	32 - 1.25	60 - 0.36	11 - 0.43	26 - 1.02	20 - 0.78	66 - 2.60	90 - 3.54	105 - 4.13	135 - 5.31	1" 1/16-12

(\* ) - Codes are referred to **UN-UNF** thread



## RSAP2V - RSAP3V

### High pressure ball type valves

- 2 - 3 ways configuration
- Galvanized body

This catalogue 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.

WORKING CONDITIONS		RSAP2V					RSAP3V*		
N. of available ways		2					3		
	TYPE	01	015	02	03	04	05	06	07
Max. flow rating	<b>RSAP2V</b>	30 l/min (7.92 US gpm)	30 l/min (7.92 US gpm)	50 l/min (13.2 US gpm)	80 l/min (21.1 US gpm)	120 l/min (31.7 US gpm)	160 l/min (42.2 US gpm)	160 l/min (42.2 US gpm)	180 l/min (47.5 US gpm)
	<b>RSAP3V</b>	30 l/min (7.92 US gpm)	30 l/min (7.92 US gpm)	50 l/min (13.2 US gpm)	80 l/min (21.1 US gpm)	120 l/min (31.7 US gpm)	160 l/min (42.2 US gpm)	160 l/min (42.2 US gpm)	-
Max. pressure	<b>RSAP2V</b>	500 bar (7250 psi)	500 bar (7250 psi)	500 bar (7250 psi)	500 bar (7250 psi)	350 bar (5050 psi)	350 bar (5050 psi)	280 bar (4050 psi)	220 bar (3200 psi)
	<b>RSAP3V</b>	380 bar (5500 psi)	380 bar (5500 psi)	380 bar (5500 psi)	320 bar (4600 psi)	300 bar (4350 psi)	280 bar (4050 psi)	240 bar (3500 psi)	-
Nominal diameter	<b>RSAP2V</b>	6 mm (0.23 in)	6 mm (0.23 in)	10 mm (0.39 in)	13 mm (0.51 in)	20 mm (0.78 in)	25 mm (0.98 in)	25 mm (0.98 in)	25 mm (0.98 in)
	<b>RSAP3V</b>	6 mm (0.23 in)	6 mm (0.23 in)	10 mm (0.39 in)	13 mm (0.51 in)	20 mm (0.78 in)	25 mm (0.98 in)	25 mm (0.98 in)	-
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm <sup>3</sup> /min (0.30 in <sup>3</sup> /min)							
Fluid	Mineral based oil								
Fluid temperature	with NBR seals	from -20°C to 80°C (from -4°F to 176°F)							
	with FPM seals	from -20°C to 100°C (from -4°F to 212°F)							
Viscosity	operating range	da 15 a 75 mm <sup>2</sup> /s (from 15 to 75 cSt)							
	min.	12 mm <sup>2</sup> /s (12 cSt)							
	max.	400 mm <sup>2</sup> /s (400 cSt)							
Level of contamination	max.	18/16/13 - ISO 4406							
Ambient temperature for working conditions	from -40°C to 60°C (from -40°F to 140°F)								

NOTE - For different working conditions please contact Sales Dept.

RSAP3V\*: no back pressure admitted on the closed port

## Available threads

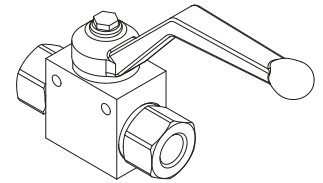
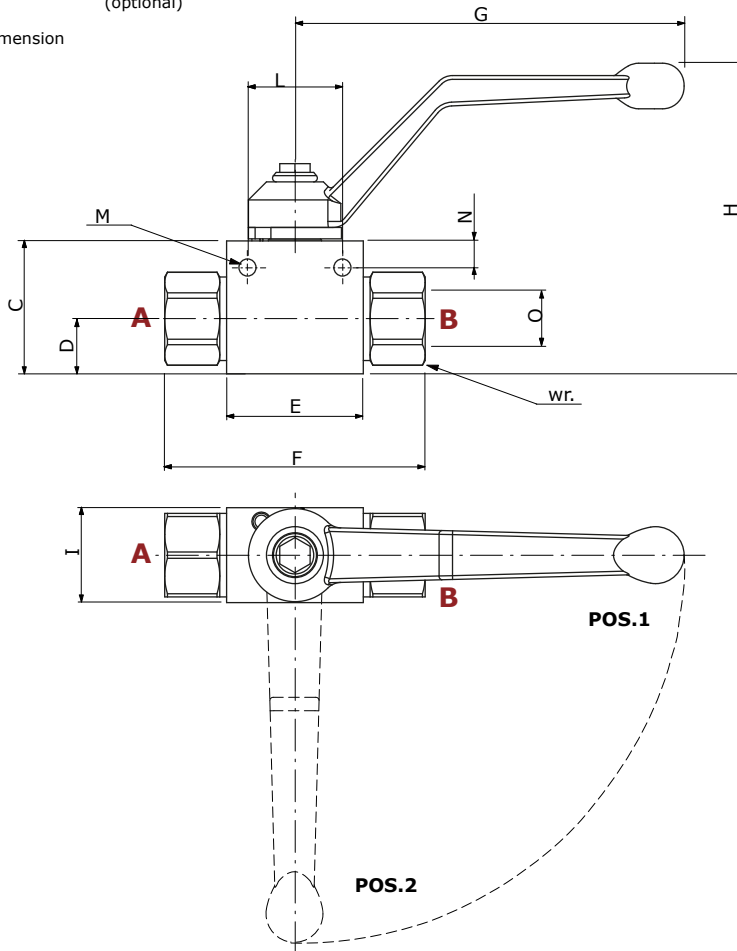
PORTS THREAD						
Dimensions	RSAP2V			RSAP3V		
	BSP	NPT (N)	UN-UNF (S)	BSP	NPT (N)	UN-UNF (S)
<b>01</b>	G 1/4	1/4	-	G 1/4	1/4	-
<b>015</b>	-	-	9/16-18 (SAE 6)	-	-	9/16-18 (SAE 6)
<b>02</b>	G 3/8	3/8	3/4-16 (SAE 8)	G 3/8	3/8	3/4-16 (SAE 8)
<b>03</b>	G 1/2	1/2	7/8-14 (SAE 10)	G 1/2	1/2	7/8-14 (SAE 10)
<b>04</b>	G 3/4	3/4	1" 1/16-12 (SAE 12)	G 3/4	3/4	1" 1/16-12 (SAE 12)
<b>05</b>	G 1	1	1" 5/16-12 (SAE 16)	G 1	1	1" 5/16-12 (SAE 16)
<b>06</b>	G 1" 1/4	1" 1/4	1" 5/8-12 (SAE 20)	G 1" 1/4	1" 1/4	1" 5/8-12 (SAE 20)
<b>07</b>	G 1" 1/2	1" 1/2	1" 7/8-12 (SAE 24)	-	-	-

**Dimensional data and hydraulic circuit**

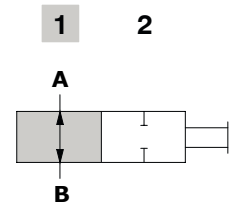
**2 ways - RSAP2V**

Example:

**RSAP2V**   **01**   **FF**   **SAE**   Port type  
 (is different from BSP)  
 2 way HP valve   Mounting holes  
 (optional)  
 Type - dimension



**2 ways**  
 Open ports in pos. 1,  
 closed in pos. 2



Type	C	D	E	F	G	H	I	L	Ø M	N	wr.	O sae
mm* - in*												
<b>01</b>	35 - 1.37	14.5 - 0.57	36 - 1.41	69 - 2.71	103 - 4.05	81 - 3.18	25 - 0.98	25 - 0.98	4.5 - 0.17	7 - 0.27	22 - 0.86	-
<b>015</b>	35 - 1.37	14.5 - 0.57	36 - 1.41	69 - 2.71	103 - 4.05	81 - 3.18	25 - 0.98	25 - 0.98	4.5 - 0.17	7 - 0.27	24 - 0.94	9/16-18
<b>02</b>	40 - 1.57	18 - 0.70	43 - 1.7	73 - 2.87	103 - 4.05	85 - 3.34	30 - 1.18	36 - 1.41	5.2 - 0.20	4 - 0.15	27 - 1.06	3/4-16
<b>03</b>	45 - 1.77	22 - 0.86	47 - 1.85	84 - 3.30	103 - 4.05	91 - 3.58	35 - 1.37	36 - 1.41	5.2 - 0.20	4 - 0.15	30 - 1.18	7/8-14
<b>04</b>	60 - 2.36	27 - 1.06	62 - 2.44	97 - 3.81	181 - 7.12	108 - 4.25	50 - 1.96	45 - 1.77	6.5 - 0.25	6.5 - 0.25	41 - 1.61	1" 1/16-12
<b>05</b>	60 - 2.36	25.5 - 1.00	68 - 2.67	114 - 4.48	181 - 7.12	108 - 4.25	60 - 2.36	45 - 1.77	7 - 0.27	6.5 - 0.25	46 - 1.81	1" 5/16-12
<b>06</b>	60 - 2.36	25.5 - 1.00	68 - 2.67	124 - 4.88	181 - 7.12	108 - 4.25	60 - 2.36	45 - 1.77	7 - 0.27	6.5 - 0.25	50 - 1.96	1" 5/8-12
<b>07</b>	60 - 2.36	25.5 - 1.00	68 - 2.67	132 - 5.19	181 - 7.12	108 - 4.25	60 - 2.36	45 - 1.77	7 - 0.27	6.5 - 0.25	55 - 2.16	1" 7/8-12

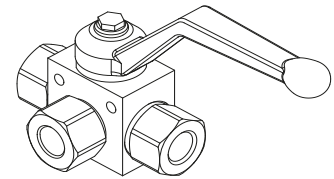
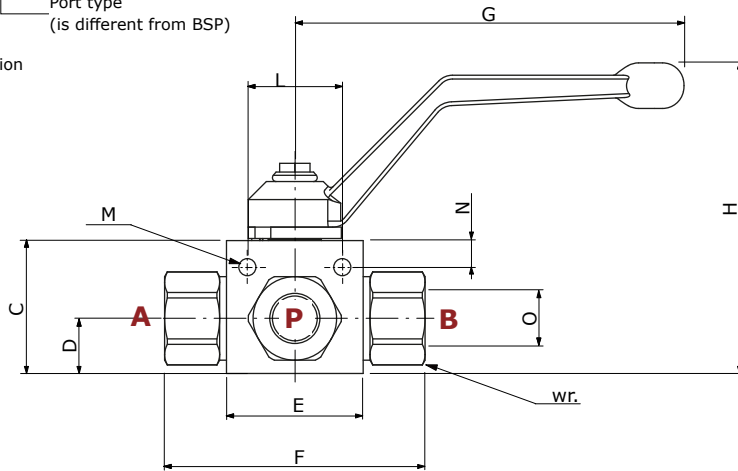
(\*) - Codes are referred to UN-UNF thread

## Dimensional data and hydraulic circuit

### 3 ways - RSAP3V

Example:

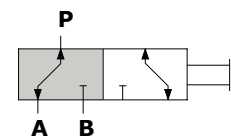
**RSAP3V**   **01**   **SAE**   **T**   Hydraulic scheme  
 3 way HP valve   Port type (is different from BSP)  
 Type - dimension



#### 3 ways, type L

A B and P are partially closed in pos. 0. Hand lever turns 90° only

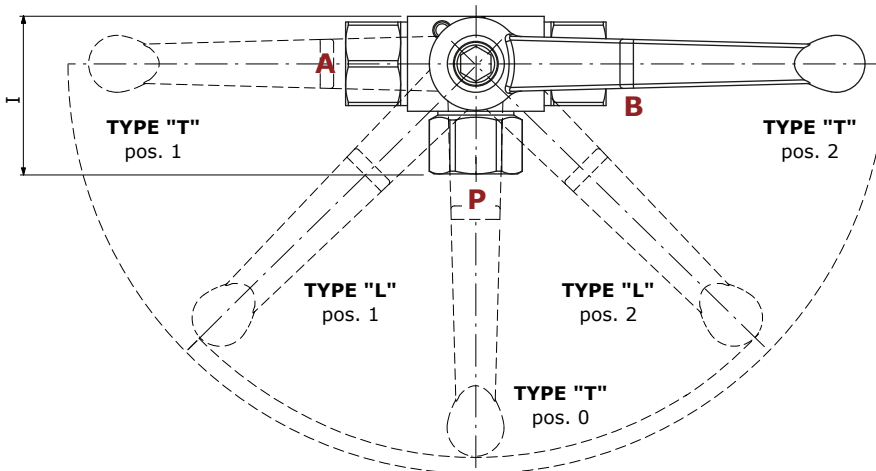
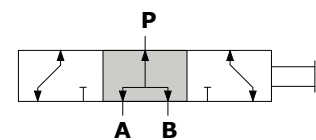
1   2



#### 3 ways, type T

A B and P open in pos. 0. Hand lever turns 180°

1   0   2



Type	C	D	E	F	G	H	I	L	Ø M	N	wr.	O sae
	mm* - in*											
01	35 - 1.37	14.5 - 0.57	36 - 1.41	69 - 2.71	103 - 4.05	81 - 3.18	41.5 - 1.63	25 - 0.98	4.5 - 0.17	7 - 0.27	22 - 0.86	-
015	35 - 1.37	14.5 - 0.57	36 - 1.41	69 - 2.71	103 - 4.05	81 - 3.18	41.5 - 1.63	25 - 0.98	4.5 - 0.17	7 - 0.27	24 - 0.94	9/16-18
02	40 - 1.57	18 - 0.70	43 - 1.7	73 - 2.87	103 - 4.05	85 - 3.34	45 - 1.77	36 - 1.41	5.2 - 0.20	4 - 0.15	27 - 1.06	3/4-16
03	45 - 1.77	22 - 0.86	47 - 1.85	84 - 3.30	103 - 4.05	91 - 3.58	54 - 2.12	36 - 1.41	5.2 - 0.20	4 - 0.15	30 - 1.18	7/8-14
04	60 - 2.36	27 - 1.06	62 - 2.44	97 - 3.81	181 - 7.12	108 - 4.25	68 - 2.47	45 - 1.77	6.5 - 0.25	6.5 - 0.25	41 - 1.61	1" 1/16-12
05	60 - 2.36	25.5 - 1.00	68 - 2.67	114 - 4.48	181 - 7.12	108 - 4.25	84 - 3.30	45 - 1.77	7 - 0.27	6.5 - 0.25	46 - 1.81	1" 5/16-12
06	60 - 2.36	25.5 - 1.00	68 - 2.67	124 - 4.88	181 - 7.12	108 - 4.25	89 - 3.50	45 - 1.77	7 - 0.27	6.5 - 0.25	50 - 1.96	1" 5/8-12

(\* ) - Codes are referred to **UN-UNF** thread



## Installation and maintenance

The diverter valves are assembled and tested as per the technical specification of this catalogue.

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

- the diverter valves can be assembled in any position, in order to prevent body deformation and spool 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 diverter valves;
- prior to painting, ensure plastic port plugs are tightly in place.

### Fittings tightening torque - Nm / lbft

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

#### MECHANICAL CONTROL MONOBLOCK DIVERTER VALVES

THREADS TYPE	DF5-DFC050	DF10-DFC100	DF20	DF25
<b>BSP</b>	G 3/8	G 1/2	G 3/4	G 1
With O-Ring seal	35/25.8	50/37	90/66.4	100/73.8
With copper washer	40/29.5	60/44.3	60/44.3	90/66.4
With steel and rubber washer	30/22	60/44.3	70/51.6	100/73.8
<b>UN-UNF</b>	3/4-16 (SAE 8)	7/8-14 (SAE 10)	1" 1/16-12 (SAE 12)	1" 5/16-12 (SAE 16)
With O-Ring seal	50/37	60/44.3	95/70	150/111

#### SOLENOID CONTROL MONOBLOCK DIVERTER VALVES

THREADS TYPE	DFE052			DFE102		DFE20		DFE085	DFE110		DFE141
	Ports	Drain	Drain*	Ports	Drain	Ports	Drain	Ports	Ports	Drain	Ports
<b>BSP</b>	G 3/8	G 1/4	G 1/4	G 1/2	G 1/4	G 3/4	G 1/4	G 3/8	G 1/2	G 1/4	G 1/2
With O-Ring seal	35/25.8	20/14.8	20/14.8	50/37	20/14.8	90/66.4	20/14.8	35/25.8	50/37	20/14.8	50/37
With copper washer	40/29.5	25/18.4	25/18.4	60/44.3	25/18.4	60/44.3	25/18.4	40/29.5	60/44.3	25/18.4	60/44.3
With steel and rubber washer	30/22	16/11.8	16/11.8	60/44.3	16/11.8	70/51.6	16/11.8	30/22	60/44.3	16/11.8	60/44.3
<b>UN-UNF</b>	3/4-16 (SAE 8)	9/16-18 (SAE 6)	7/16-20 (SAE 4)	7/8-14 (SAE 10)	9/16-18 (SAE 6)	1" 1/16-12 (SAE 12)	7/16-20 (SAE 4)	3/4-16 (SAE 8)	7/8-14 (SAE 10)	9/16-18 (SAE 6)	-
With O-Ring seal	50/37	30/22	15/11	60/44.3	30/22	95/70	15/11	50/37	60/44.3	30/22	

NOTE (\*) - drain for DFE052/8

#### SOLENOID CONTROL SECTIONAL DIVERTER VALVES

THREADS TYPE	DFE080		DFE100		DFE140	
	Ports	Drain	Ports	Drain	Ports	Drain
<b>BSP</b>	G 1/4	G 1/4	G 3/8	G 1/4	G 1/2	G 1/4
With O-Ring seal	20/14.8	20/14.8	35/25.8	20/14.8	50/37	20/14.8
With copper washer	25/18.4	25/18.4	40/29.5	25/18.4	60/44.3	25/18.4
With steel and rubber washer	16/11.8	16/11.8	30/22	16/11.8	60/44.3	16/11.8
<b>UN-UNF</b>	7/16-20 (SAE 4)	7/16-20 (SAE 4)	7/8-14 (SAE 10)	9/16-18 (SAE 6)	7/8-14 (SAE 10)	9/16-18 (SAE 6)
With O-Ring seal	15/11	15/11	50/37	30/22	60/44.3	30/22

#### ROTARY CONTROL DIVERTER VALVES

THREADS TYPE	DHZ5	DHZ10	DHZ20	DH25	DH30
<b>BSP</b>	G 3/8	G 1/2	G 3/4	G 1	G 1" 1/2
With O-Ring seal	35/25.8	50/37	90/66.4	100/73.8	120/44.3
With copper washer	40/29.5	60/44.3	60/44.3	90/66.4	100/73.8
With steel and rubber washer	30/22	60/44.3	70/51.6	100/73.8	120/44.3
<b>UN-UNF</b>	3/4-16 (SAE 8)	7/8-14 (SAE 10)	1" 1/16-12 (SAE 12)	1" 5/16-12 (SAE 16)	1" 7/8-12 (SAE 24)
With O-Ring seal	50/37	60/44.3	95/70	150/111	210/155

Lined area for notes.





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