

**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.

<b>WORKING CONDITIONS</b>		
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.

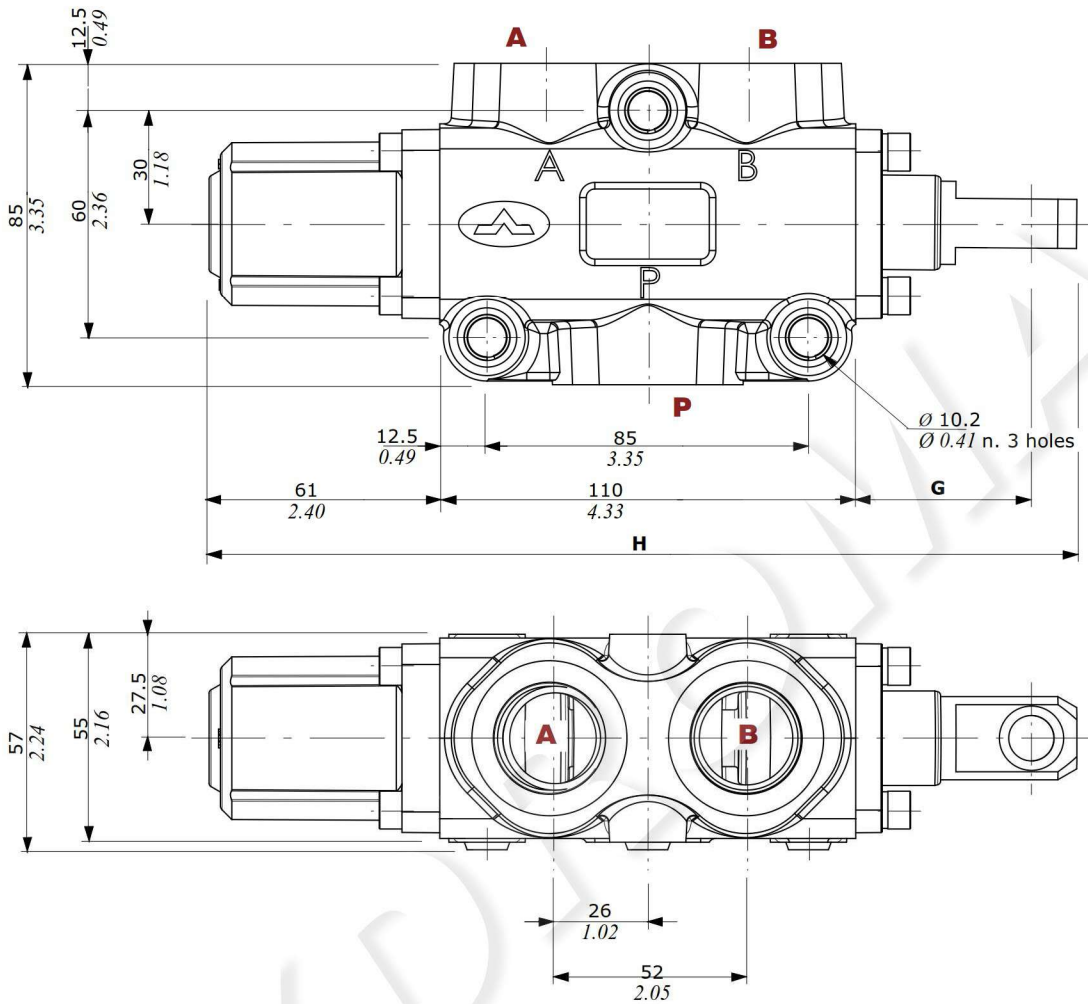
**Available threads**

<b>PORTS THREAD</b>		
ALL PORTS	BSP	UN-UNF
<b>DF20</b>	G 3/4	1" 1/16-12 (SAE 12)
<b>PILOT PORTS</b>		
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

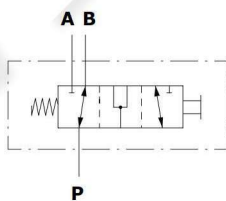
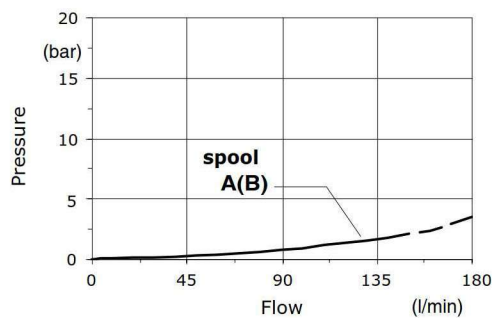
It's possible to obtain 2 ways diverter valve plugging port



	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

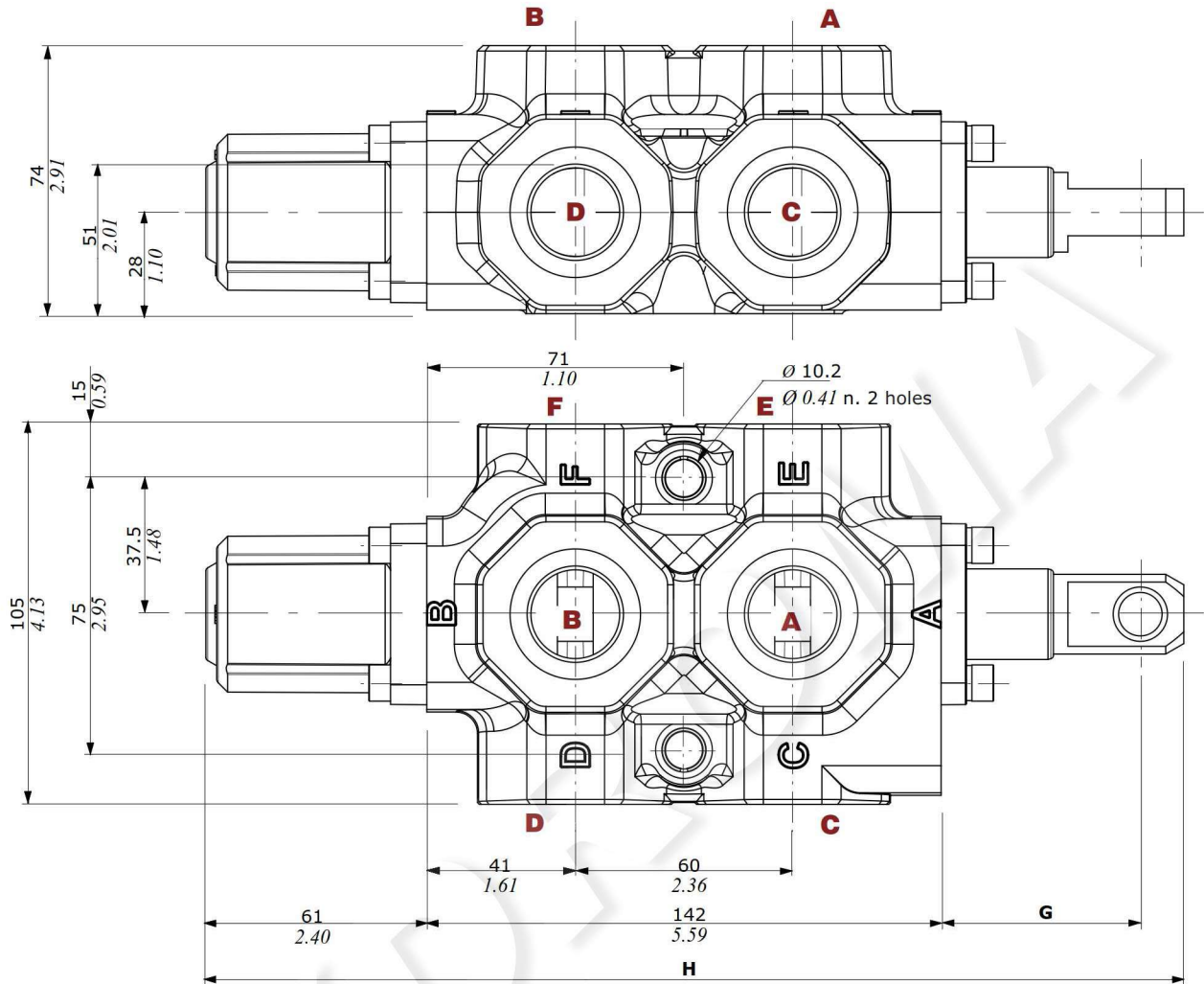
Pressure drop versus flow

P → A(B)



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

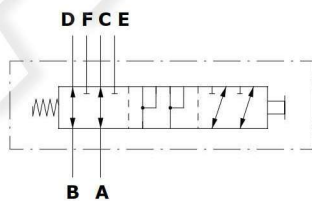
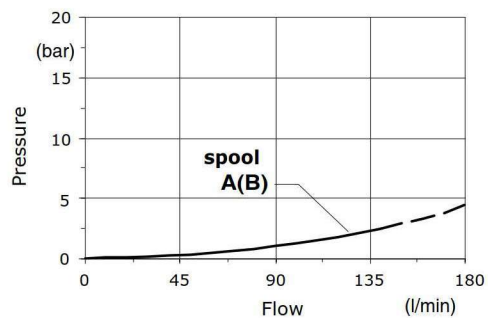
**6 ways**



	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** - ... - **(CVN)**

**1**

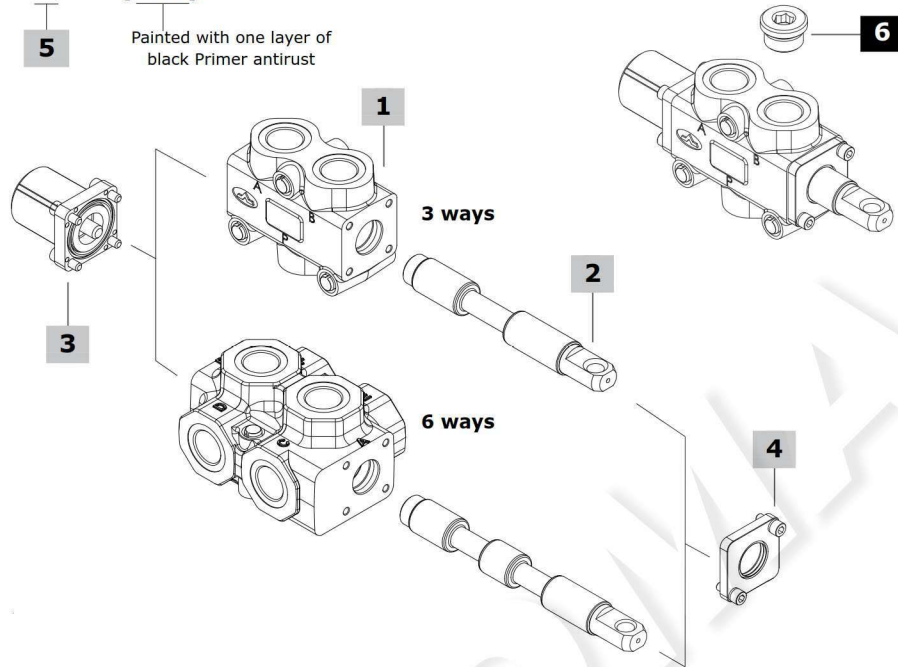
**2**

**3**

**4**

**5**

Painted with one layer of black Primer antirust



### 1 Body kit\*

TYPE	CODE	DESCRIPTION
<b>DF20/3</b>	5CO2261300	3 ways body kit
<b>DF20/6</b>	5CO2262300	6 ways body kit
	5CO2263400	6 ways body kit with G1" ports

### 2 Spools

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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
<b>for DF20/6:</b>		
<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

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

TYPE	CODE	DESCRIPTION
<b>Hydraulic controls: must be coupled to the control kit side B with lever, with plate or cap</b>		
<b>18IA1</b>	5V18120820*	On/off high pressure hydraulic kit with spring return in position 2
<b>18IB1</b>	5V18120810*	On/off low pressure hydraulic kit with spring return in position 2
<b>Electrohydraulic controls: must be coupled to the control kit side B with lever, with plate or cap</b>		
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

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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
<b>Hydraulic controls</b>		
<b>IA2</b>	5IDR520000*	On/off with high pressure pilot, need 17ME control type
<b>IB2</b>	5IDR720000*	On/off with low pressure pilot, need 17ME control type

### 5 Body threading

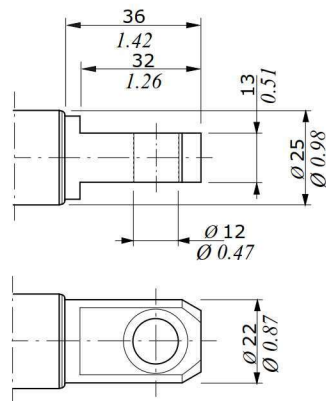
Specify threading always when it is different from **BSP** standard

### 6 Port plugs\*

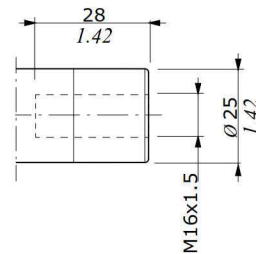
CODE	DESCRIPTION
3XTAP732200	G3/4 plug

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





Standard:  
spool type **A, B**

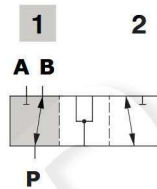


Rotary cam arrangement:  
spool type **AC, BC**

**3 ways**

**Type A/AC**

Ports connected  
in transit position

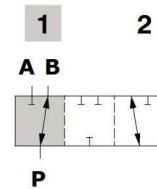


**Spool stroke**

Position 2: - 20 mm (- 0.78 in)

**Type B/BC**

Ports closed  
in transit position



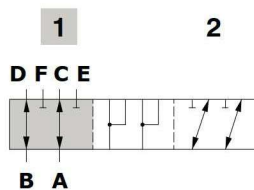
**Spool stroke**

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

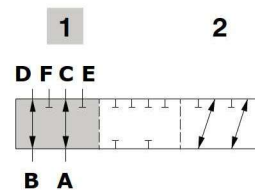


**Spool stroke**

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**

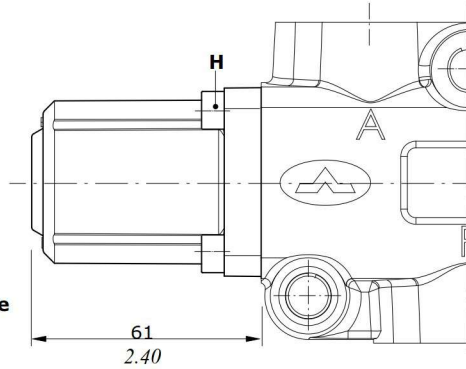
Position 2: - 20 mm (- 0.78 in)

"A" side spool positioners

With detent

**Type 12**

Detent in positions 1 and 2

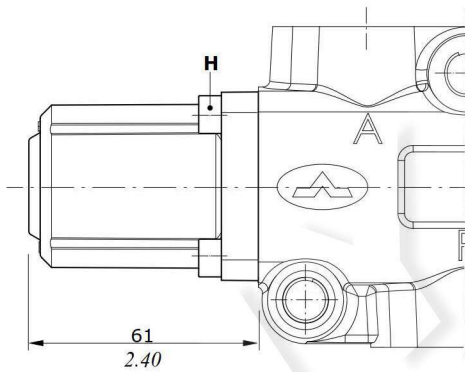


**Wrenches and tightening torque**  
**H** = wrench 5 - 9.8 Nm (7.2 lbf<sub>t</sub>)

With spring return in position 1

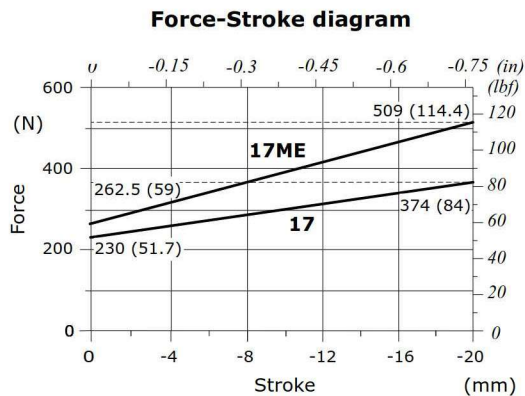
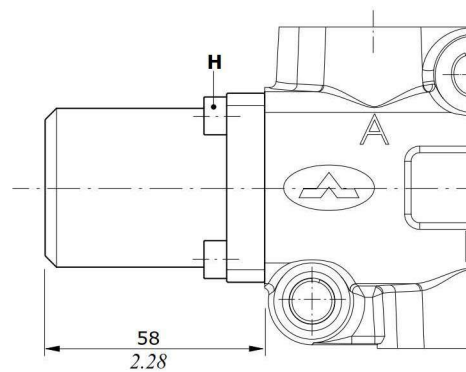
With heavier spring type "E"

**Type 17**



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

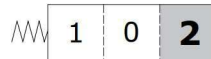
**Type 17ME**



**"A" side spool positioners**

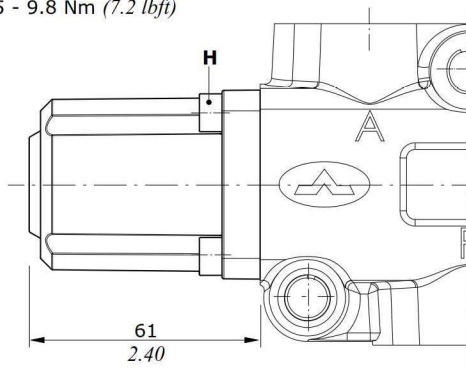
**With spring return in position 2**

**Type 18**

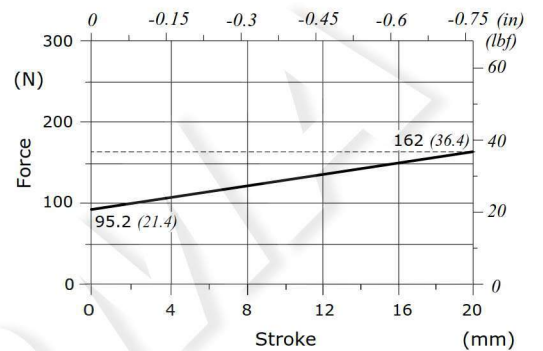


**Wrenches and tightening torque**

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



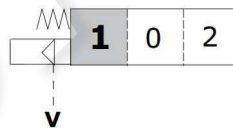
**Force-Stroke diagram**



**ON/OFF pneumatic controls**

**Type 17P**

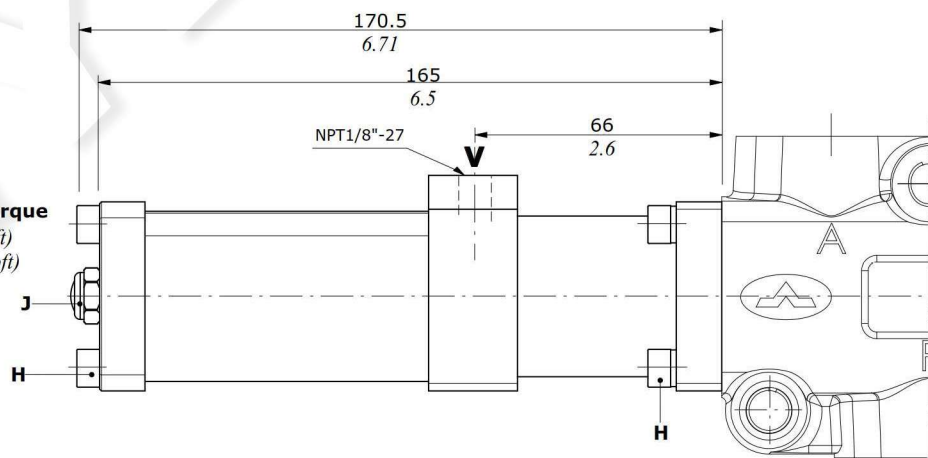
Spring return in position 1



**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>)



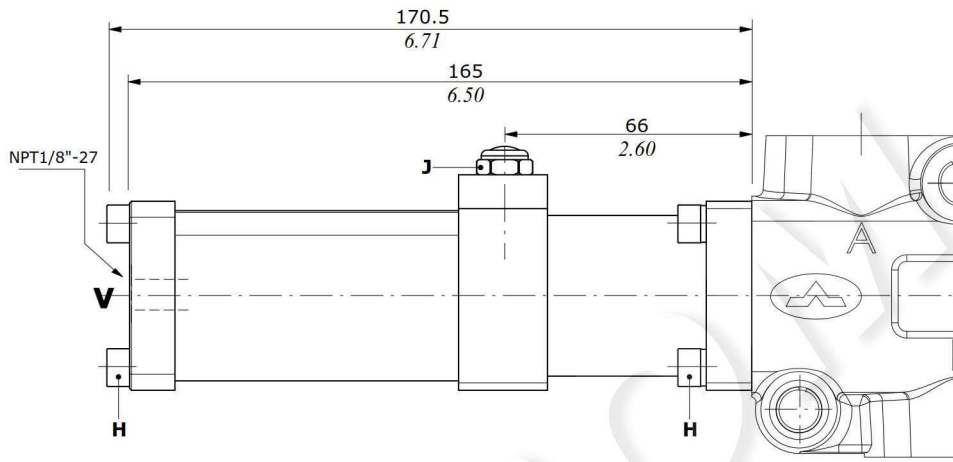
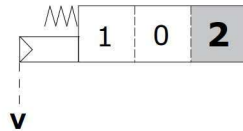
Pilot pressure... : min. 7 bar (101 psi) - max. 10 bar (145 psi)

"A" side spool positioners

ON/OFF pneumatic controls

**Type 18P**

Spring return in position 2



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

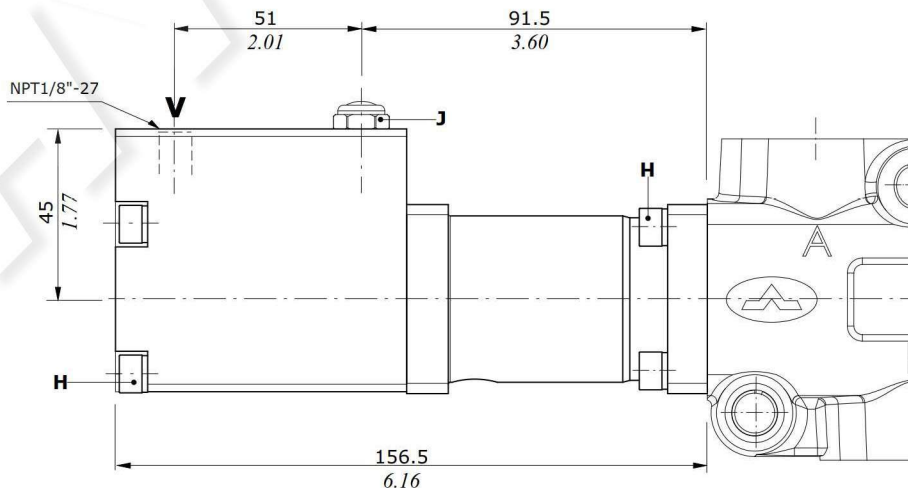
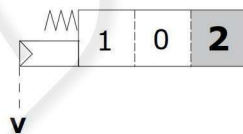
**Wrenches and tightening torque**

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

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

**Type 18PNCWP**

Spring return in position 2, waterproof



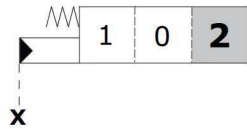


**"A" side spool positioners**

**Hydraulic controls**

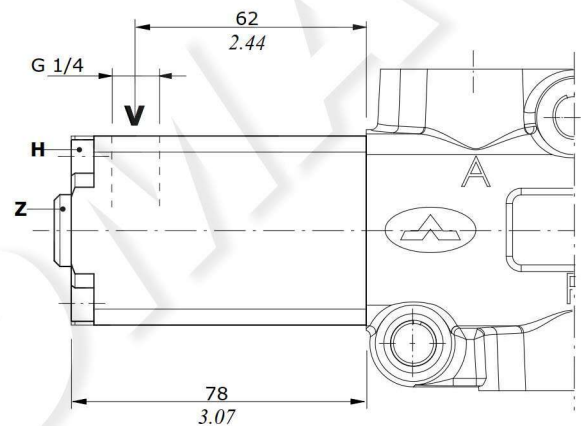
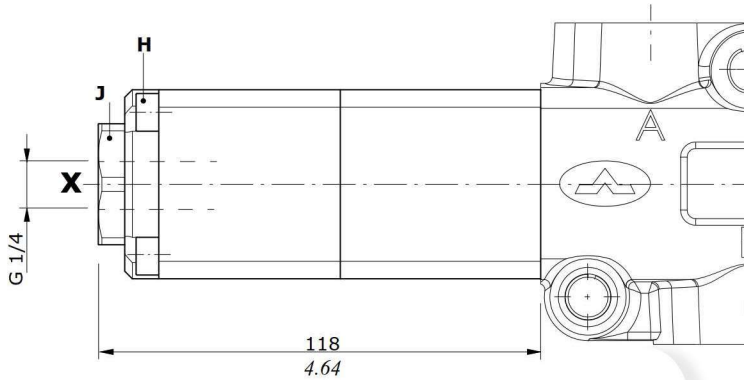
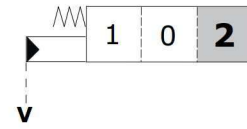
**Type 18IA1**

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 lbft)

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

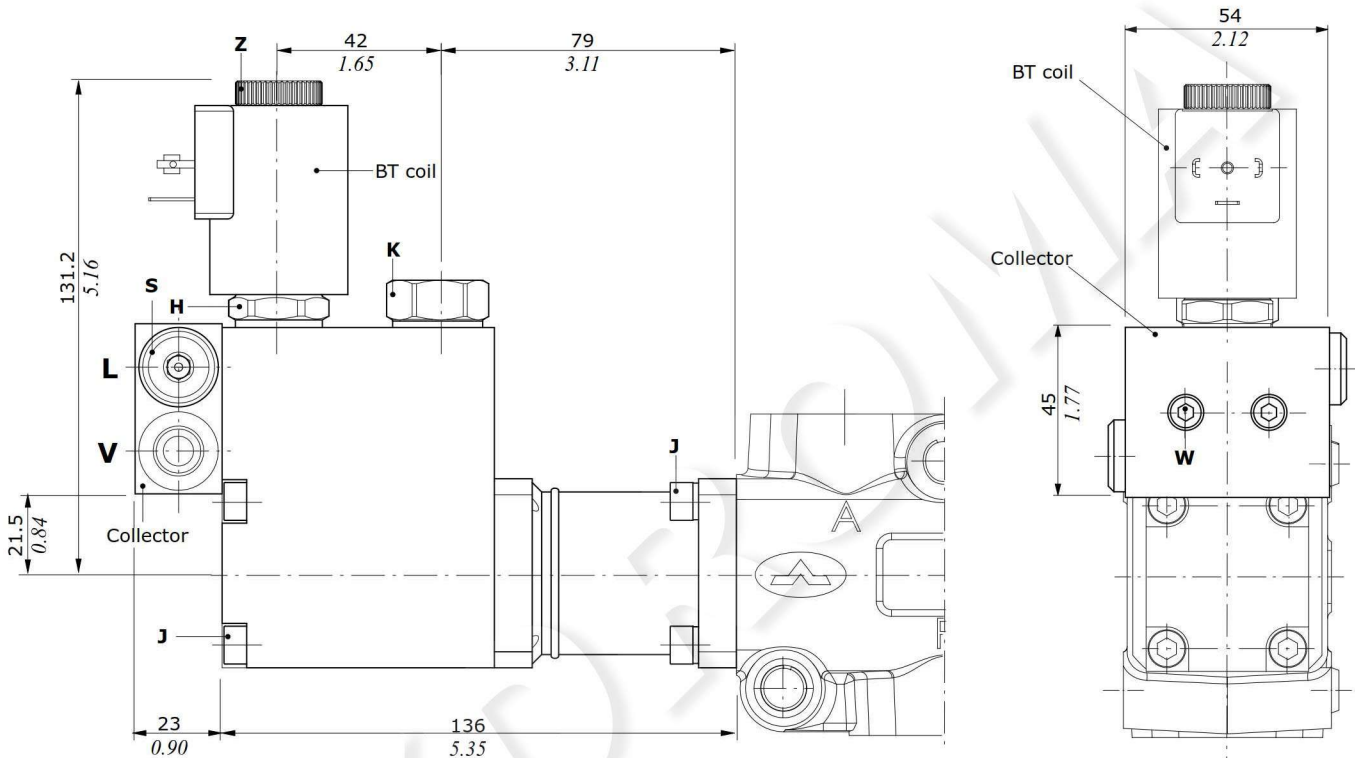
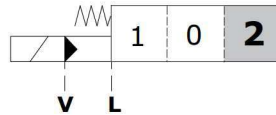
**J** = wrench 32 - 42 Nm (31 lbft)

"A" side spool positioners

ON/OFF electrohydraulic control

**Type 18E11**

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
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KE1S0	5KE1S00030	kit for 1 section
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Codes are referred to BSP thread

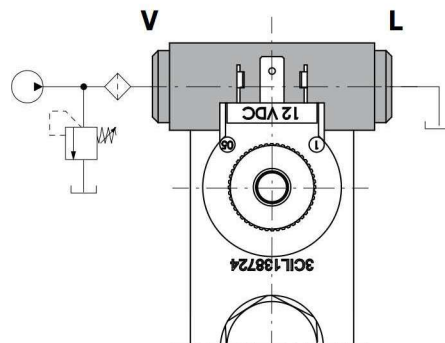
**Features**

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**

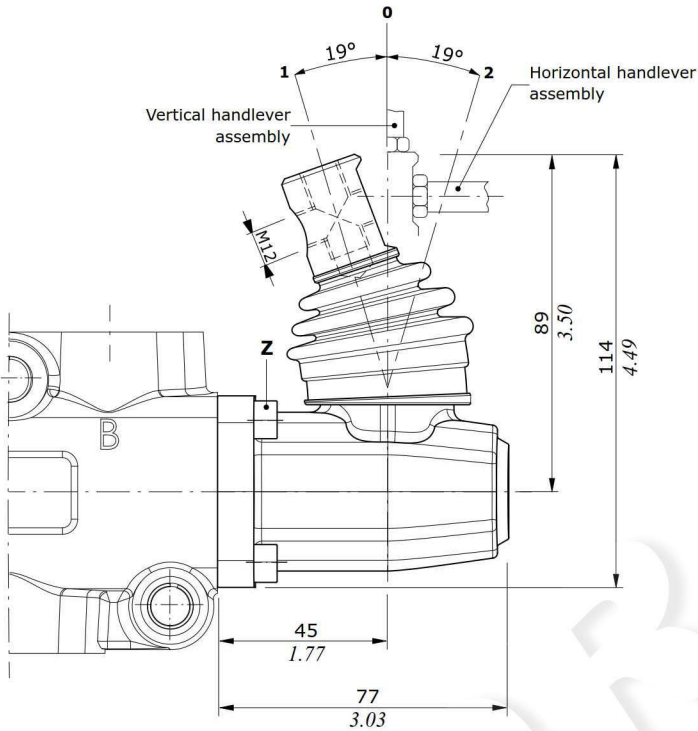
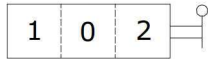


**"B" side options**

**Lever control kit**

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

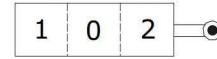
**Type L**



**Cam control kit**

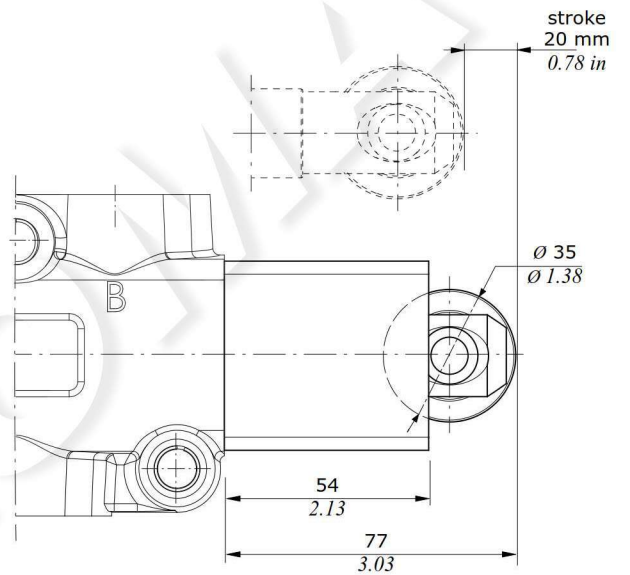
Steel ball bearing cam operation (CA), and bronze cam operation (CB); it must be coupled to 17 control kit

**Type CA-CB**



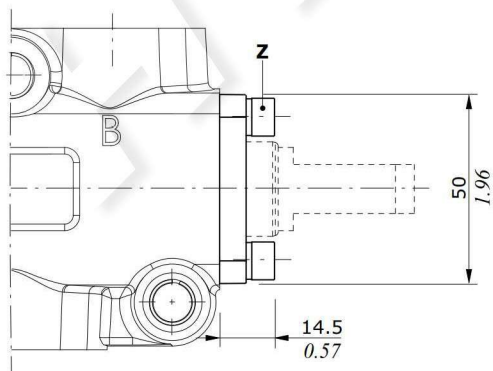
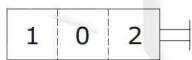
**Wrenches and tightening torque**

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



**Without lever, with flange**

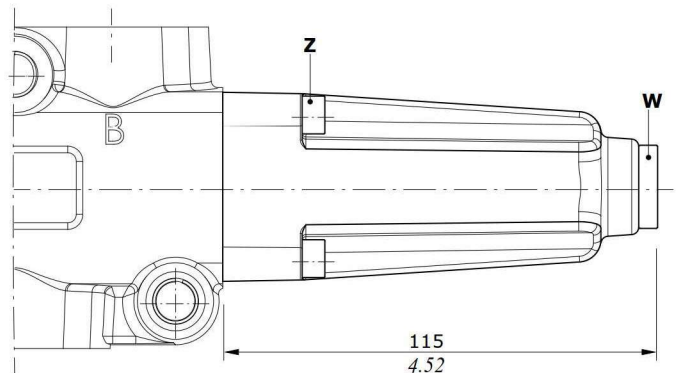
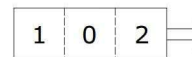
**Type SLP**



**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 lbft)

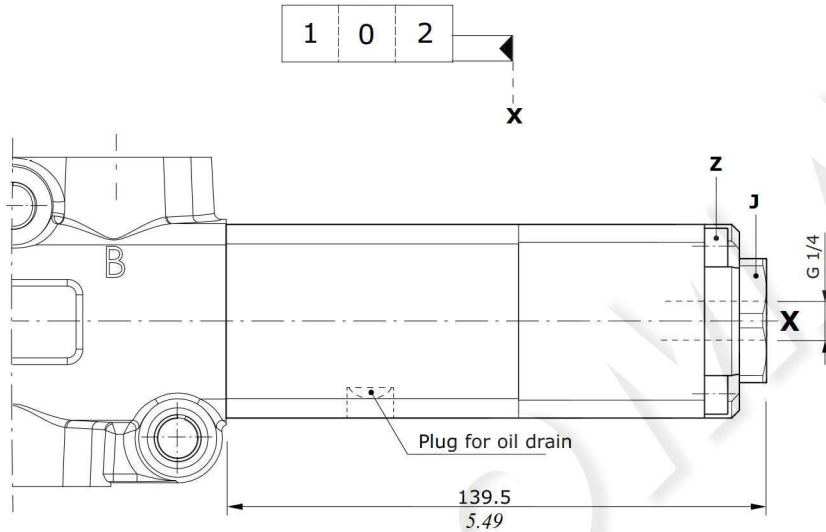
**W** = wrench 8 - 24 Nm (7.2 lbft)

**"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

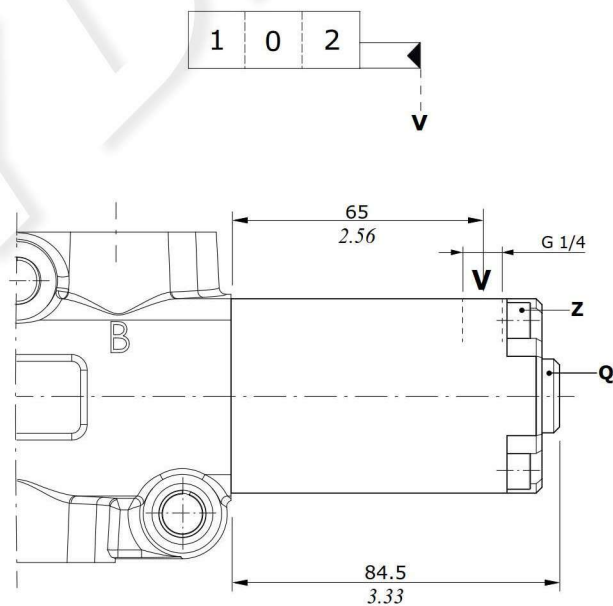


**Wrenches and tightening torque**

- 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 18EI1 control**

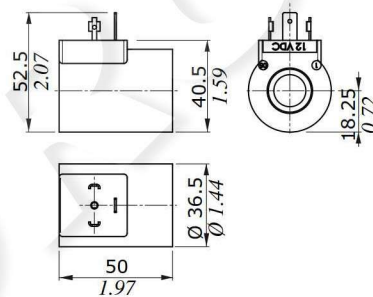
Type	Voltage	Ordering codes					Flying leads without connector
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	
<b>BT</b>	<b>10 VDC</b>	4SL3000100	-	-	-	-	-
	<b>12 VDC</b>	4SL3000120	4SL3000130 <sup>(6)</sup>	4SL3000122 <sup>(5)</sup>	4SL3000124 <sup>(2)</sup>	4SL3000127 <sup>(2)</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>							
With rectifier		4CN1009995	5CON140031	5CON003	5CON001	5CON017	-
	<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

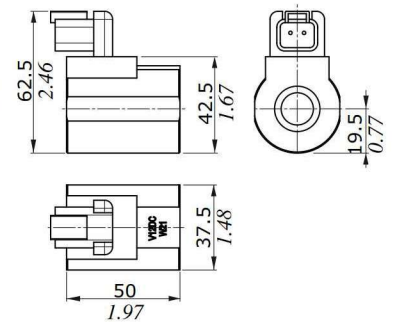
**Features**

- 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%

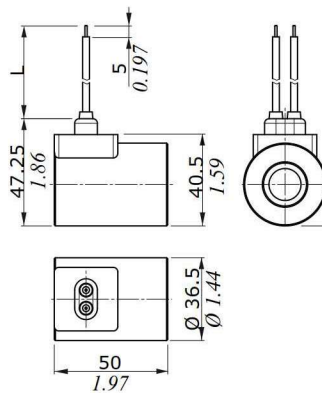
**ISO4400 connector**



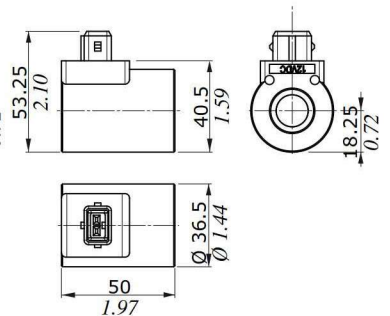
**DEUTSCH DT04 connector (Parallel type)**



**Flying leads**



**AMP JPT connector (Perpendicular type)**

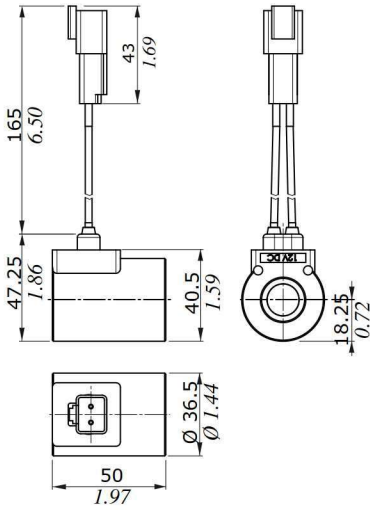


Coil type	L dimension	
	(mm)	(in)
<b>12 VDC</b>	240	9.45
<b>24 VDC</b>	600	23.62



## Coils and accessories for 18EI1 control

Flying leads with DEUTSCH DT04 connector



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

