

# Ningbo Hyforce Hydraulic Machinery Co., Ltd

## Industrial Hydraulic Valves



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# Ningbo Hyforce Hydraulic Machinery Co., Ltd

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## Directional Control Valve Series

### 4WE4 Series Solenoid Directional Control Valves



### Technical data

Model		4WE4
Max. flow rate (l/min)		25
Max. working pressure (MPa)	A, B, P port	31.5
	T port	10
Weight (kgs)	Single solenoid type	0.85
	Double solenoids type	1.2
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

### How to order

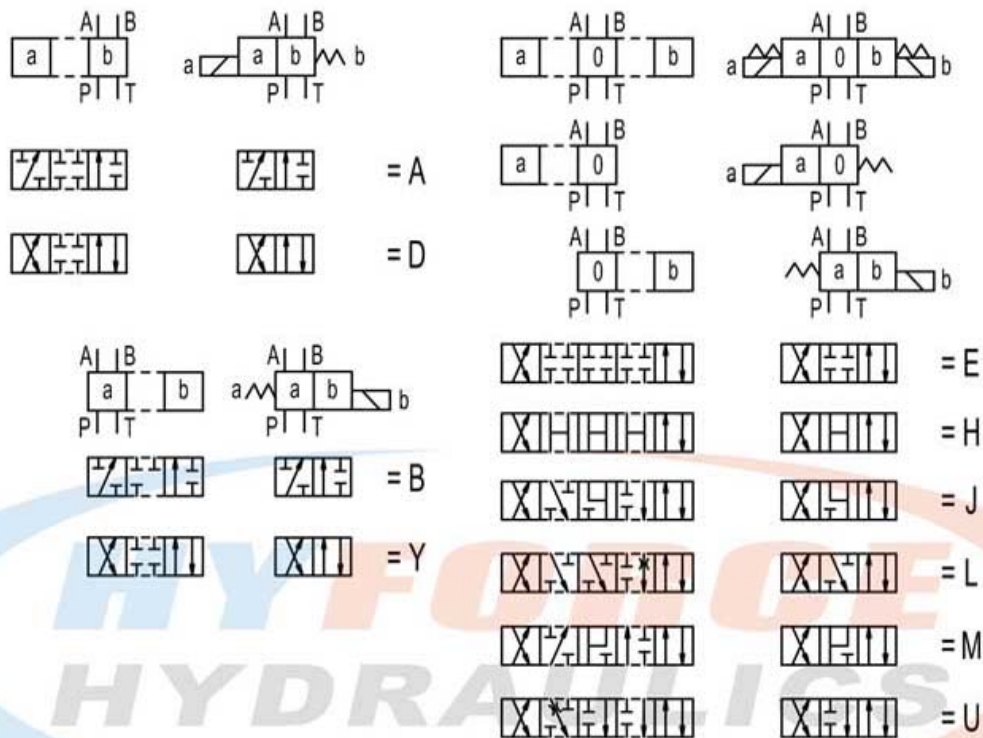
4WE	4	E	6X	O	G24	Z5L
Product type	Size	Spool symbol	Series number	Spool return type	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	4: NG4	Refer to spool symbols	6X series	No code: Spring return O: Without spring return	G12: DC12 G24: DC24	Z4: Standard plug-in connector Z5L: Plug-in connector with light



## Directional Control Valve Series

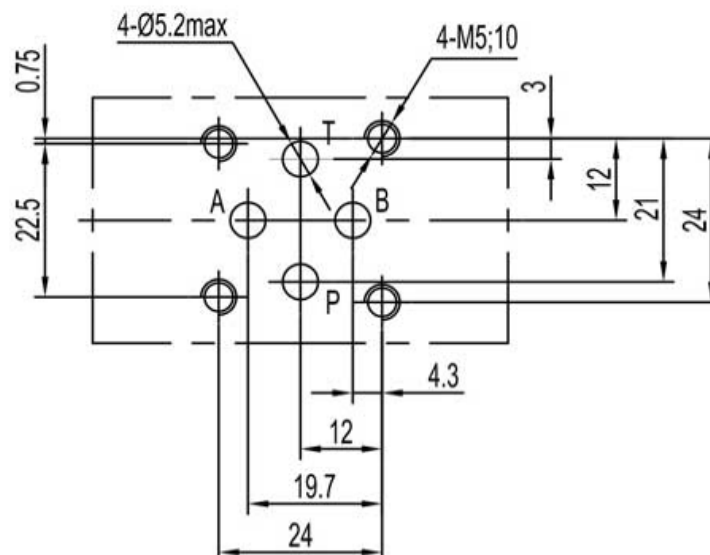
### A2

#### Spool symbols



#### 4WE4 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WE5 Series Solenoid Directional Control Valves



### Technical data

Model		4WE5
Max. flow rate (l/min)		14
Max. working pressure (MPa)	A, B, P port	25
	T port	10
Weight (kgs)	Single solenoid type	1.1
	Double solenoids type	1.6
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

### How to order

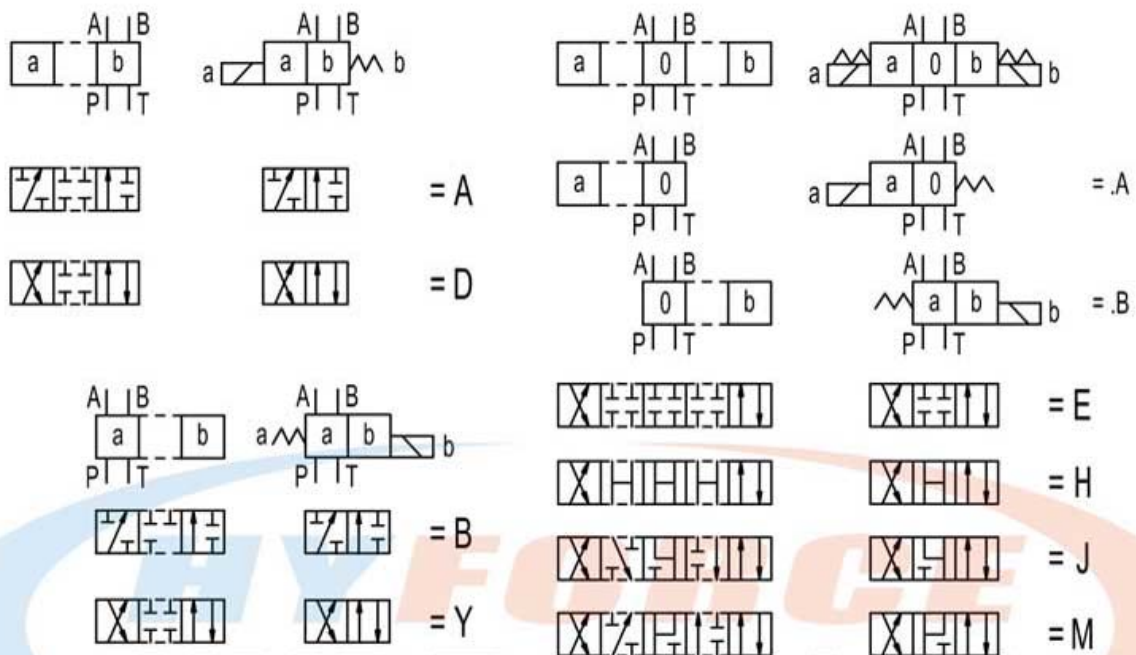
4WE	5	E	6X	O	G24	Z5L
Product type	Size	Spool symbol	Series number	Spool return type	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	5: NG5	Refer to spool symbols	6X series	No code: Spring return O: Without spring return	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light



## Directional Control Valve Series

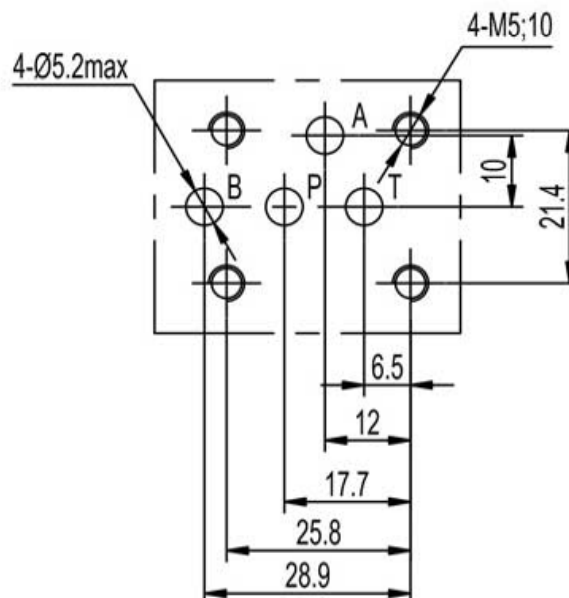
### A4

#### Spool symbols



#### 4WE5 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WE6 Series Solenoid Operated Directional Control Valves



### Technical data

Model		4WE6
Max. flow rate (l/min)		80
Max. working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	1.6
	Double solenoids type	2.2
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

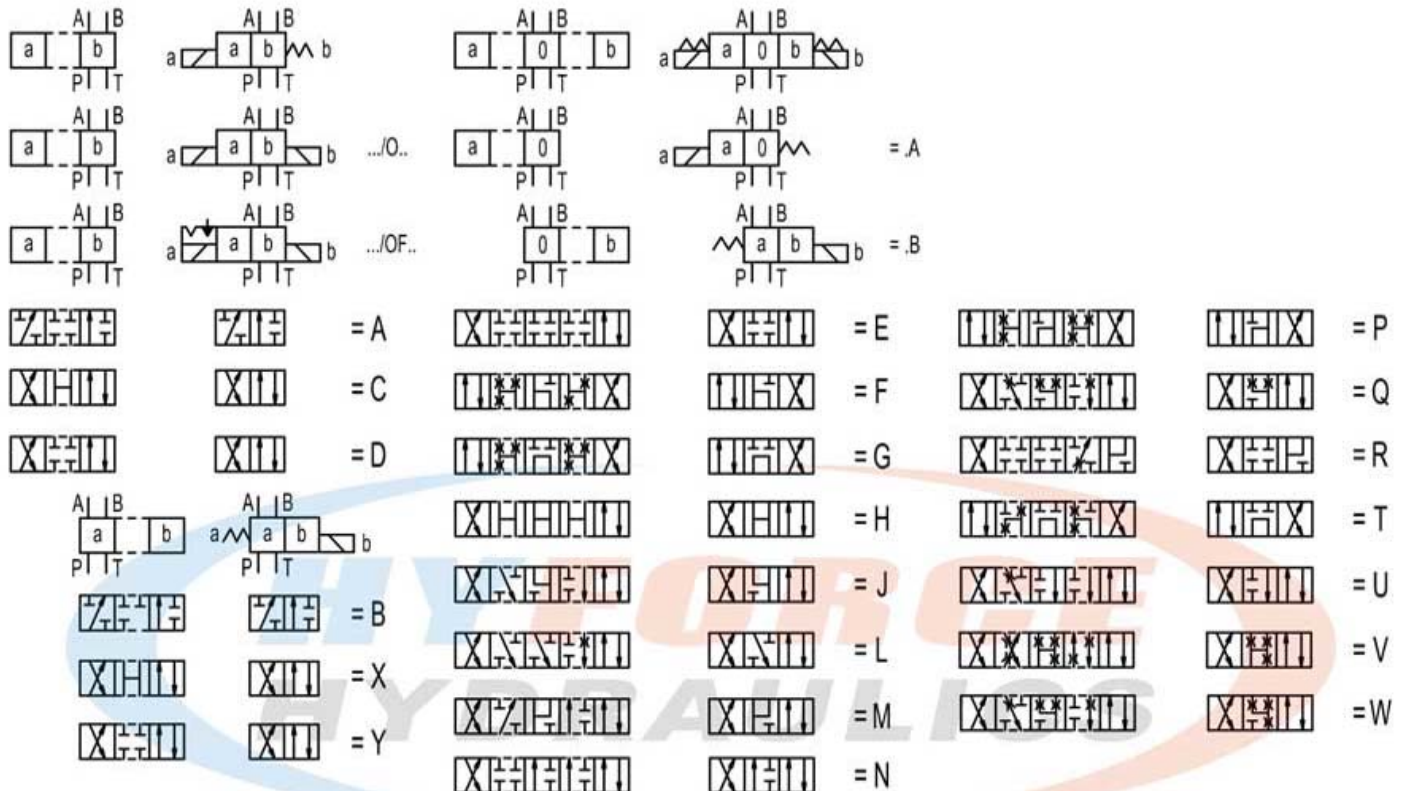
### How to order

4WE	6	E	6X	O	G24	Z5L
Product type	Size	Spool symbol	Series number	Spool return type	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	6: NG6	Refer to spool symbols	6X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light ZJ: AMP junior coil

## Directional Control Valve Series

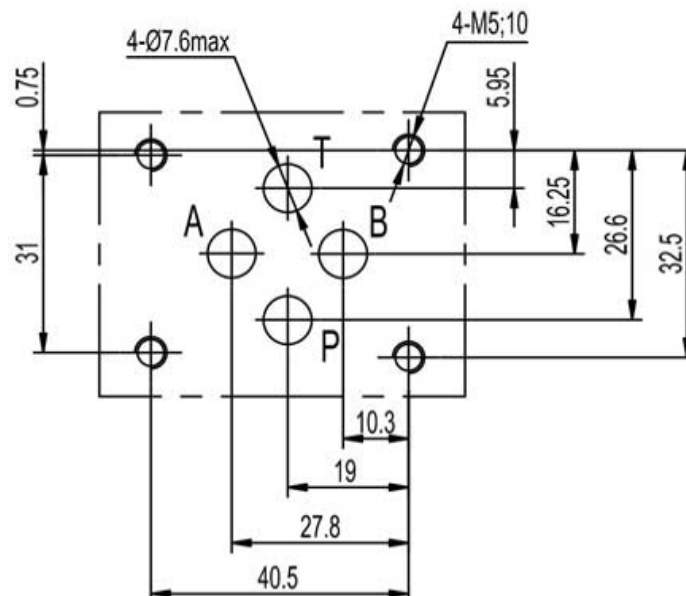
### A6

#### Spool symbols



#### 4WE6 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WE10 Series Solenoid Directional Control Valves



### Technical data

Model		4WE10
Max. flow rate (l/min)		120
Max. working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	4.7
	Double solenoids type	6.2
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

### How to order

4WE	10	E	3X	O	G24	Z5L
Product type	Size	Spool symbol	Series number	Spool return type	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	10: NG10	Refer to spool symbols	3X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light

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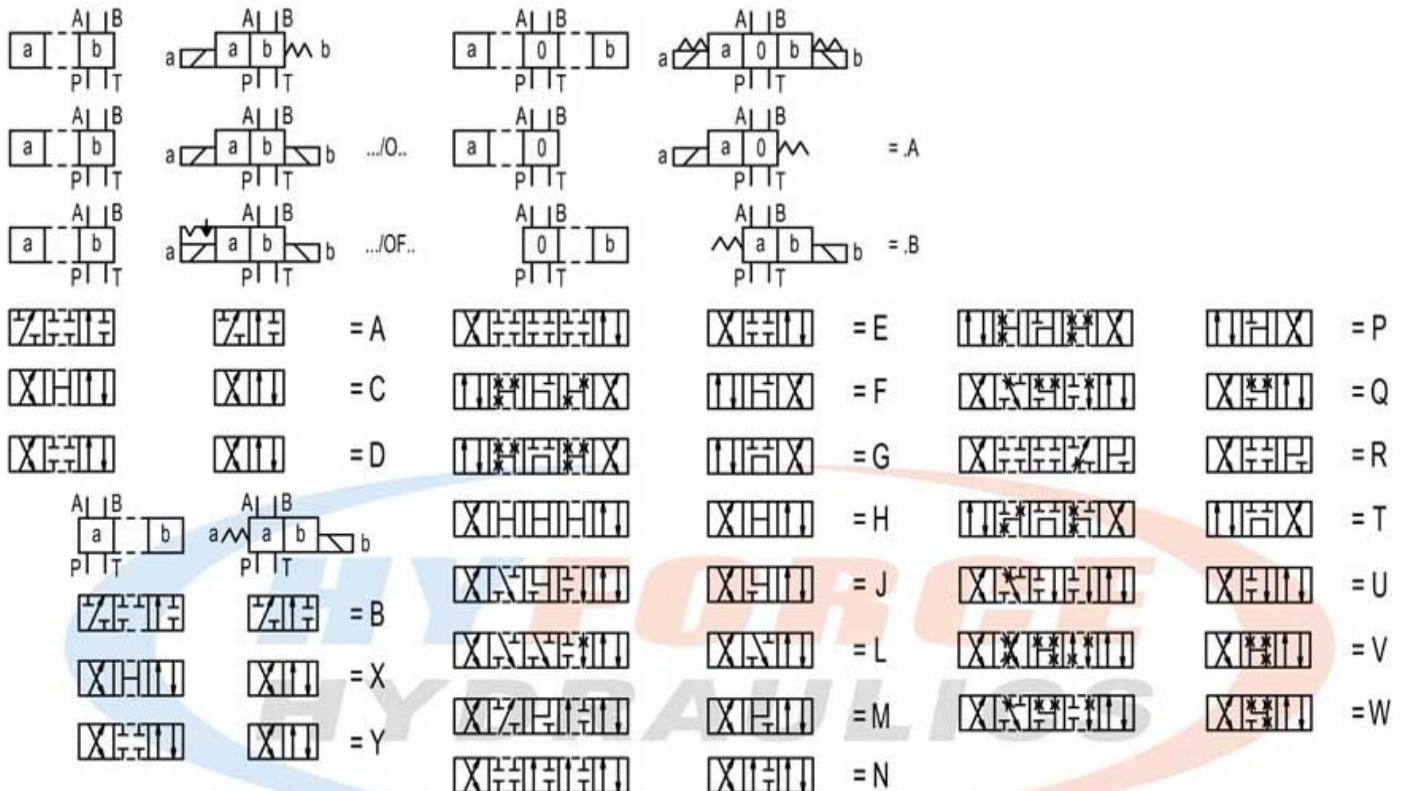
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## Directional Control Valve Series

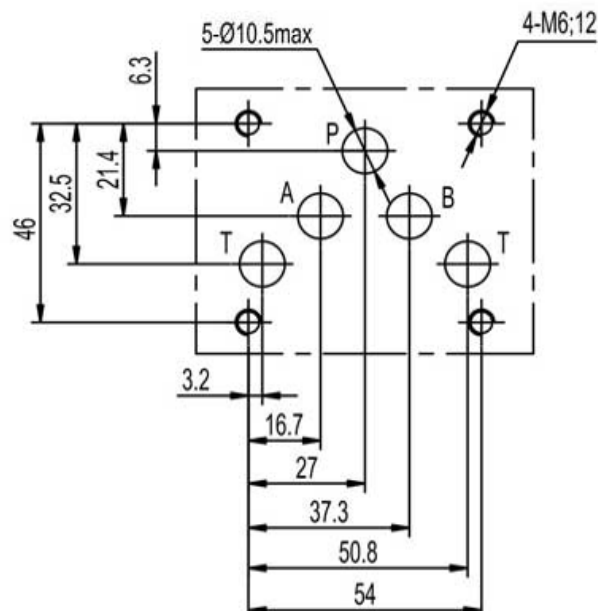
### A8

#### Spool symbols



#### 4WE10 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WEH10 Series Solenoid Pilot Operated Directional Control Valves 4WH10 Series Hydraulic Operated Directional Control Valves



#### Technical data

Model			4WEH10
Max. flow rate (l/min)			160
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid		1.6
	Pilot valve with double solenoids		2.2
	4WH10 valve		4.8
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm2/s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

#### How to order

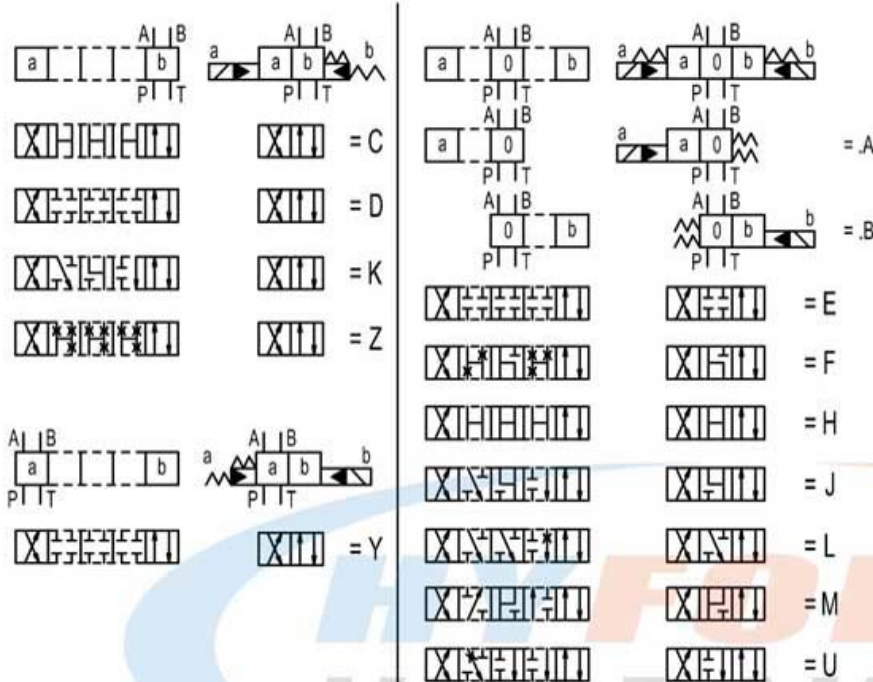
4WEH	10	E	3X	O	G24
Product type	Size	Spool symbol	Series number	Spool return type	Input Voltage
4WEH: Solenoid pilot operated directional control valve 4WH: Hydraulic operated directional control valve	10: NG10	Refer to spool symbols	3X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220

ET	S	Z5L
Oil control type	Shifting time adjustment	Connector type
Refer to oil control list in page A10	No code: Without shifting time adjustment S: Shifting time adjustment as meter-in control S2: Shifting time adjustment as meter-out control	Z4: Standard plug-in connector Z5L: Plug-in connector with light

## Directional Control Valve Series

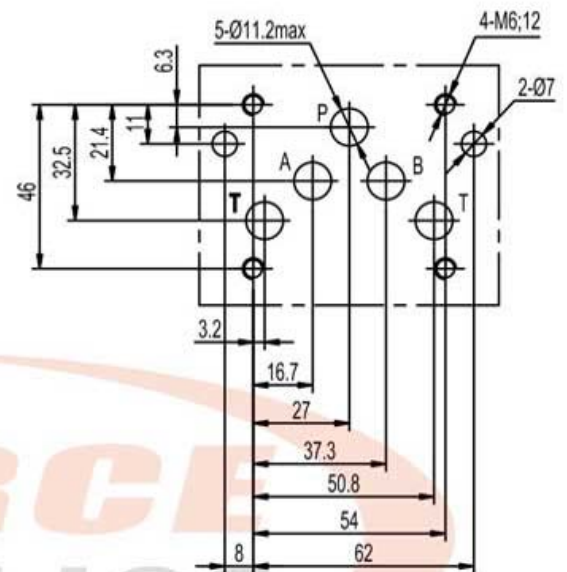
### A10

#### Spool symbols



#### 4WEH10/4WH10 subplate installation dimensions

Unit: mm



#### Oil control list

Valve with spring centered zero position	External pilot pressure external pilot drain (no code)	Internal pilot pressure external pilot drain (E)	Internal pilot pressure internal pilot drain (ET)	External pilot pressure internal pilot drain (T)
Pilot valve with 3 spool positions (J)				
Pilot valve with 2 spool positions (JA)				
Pilot valve with 2 spool positions (JB)				
Pilot valve with 2 spool positions (D)				
Pilot valve with 2 spool positions (Y)				



## Directional Control Valve Series

### 4WEH16 Series Solenoid Pilot Operated Directional Control Valves 4WH16 Series Hydraulic Operated Directional Control Valves



#### Technical data

Model			4WEH16
Max. flow rate (l/min)			300
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid		1.6
	Pilot valve with double solenoids		2.2
	4WH16 valve		6.3
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

#### How to order

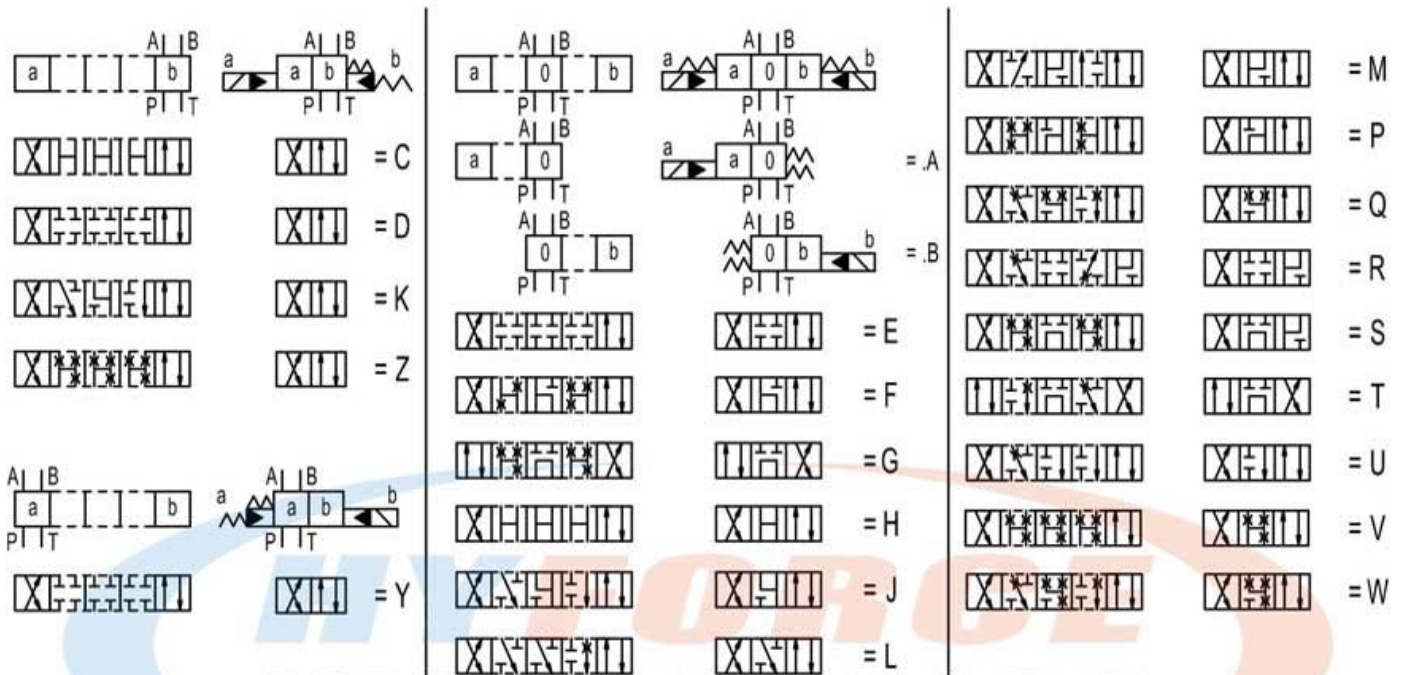
4WEH	16	E	6X	O	G24
Product type	Size	Spool symbol	Series number	Spool return type	Input Voltage
4WEH: Solenoid pilot operated directional control valve 4WH: Hydraulic operated directional control valve	16: NG16	Refer to spool symbols	6X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220

ET	S	Z5L	P4.5
Oil control type	Shifting time adjustment	Connector type	Pre-load valve
Refer to oil control list in page A10	No code: Without shifting time adjustment S: Shifting time adjustment as meter-in control S2: Shifting time adjustment as meter-out control	Z4: Standard plug-in connector Z5L: Plug-in connector with light	No code: Without pre-load valve P4.5: With pre-load valve

## Directional Control Valve Series

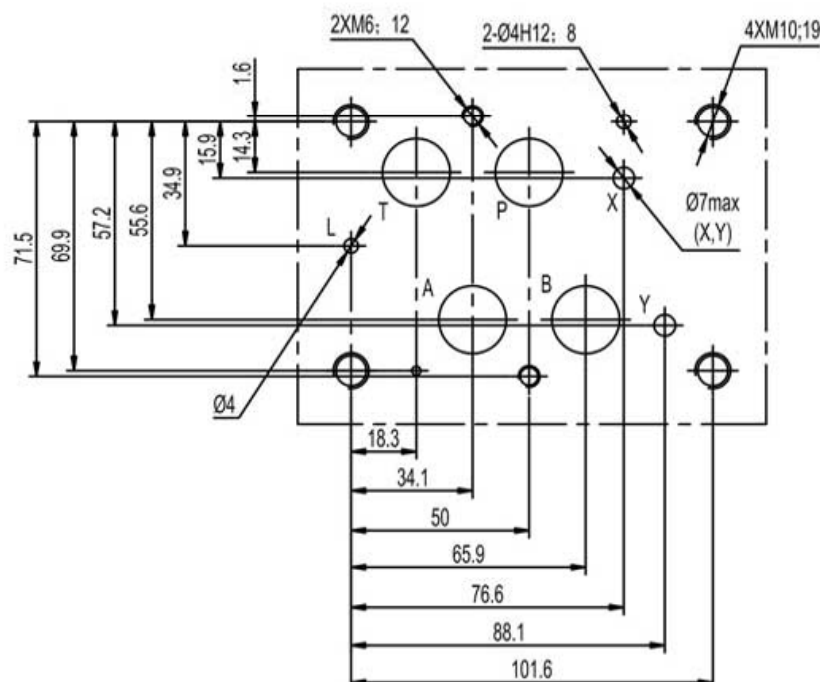
### A12

#### Spool symbols



#### 4WEH16/4WH16 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WEH25 Series Solenoid Pilot Operated Directional Control Valves 4WH25 Series Hydraulic Operated Directional Control Valves



#### Technical data

Model			4WEH25
Max. flow rate (l/min)			500
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid		1.6
	Pilot valve with double solenoids		2.2
	4WH25 valve		16
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

#### How to order

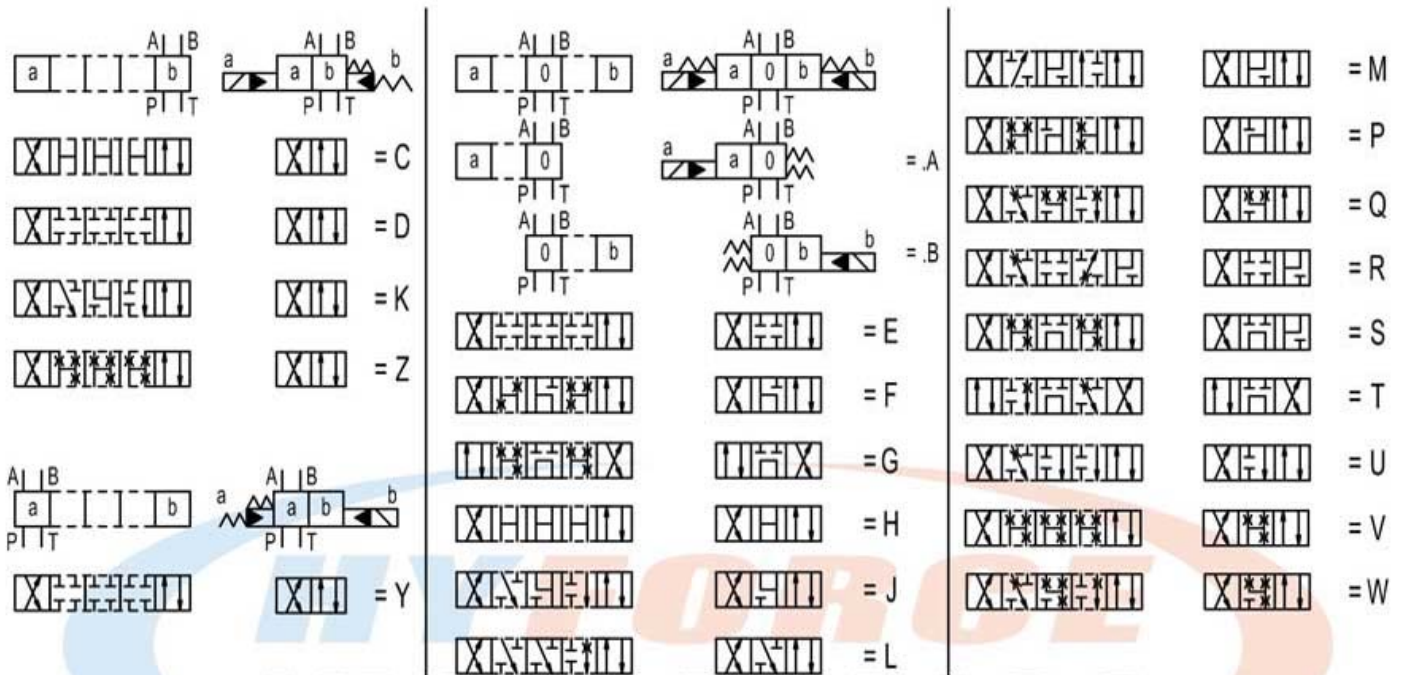
4WEH	25	E	6X	O	G24
Product type	Size	Spool symbol	Series number	Spool return type	Input Voltage
4WEH: Solenoid pilot operated directional control valve 4WH: Hydraulic operated directional control valve	25: NG25	Refer to spool symbols	6X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220

ET	S	Z5L	P4.5
Oil control type	Shifting time adjustment	Connector type	Pre-load valve
Refer to oil control list in page A10	No code: Without shifting time adjustment S: Shifting time adjustment as meter-in control S2: Shifting time adjustment as meter-out control	Z4: Standard plug-in connector Z5L: Plug-in connector with light	No code: Without pre-load valve P4.5: With pre-load valve

## Directional Control Valve Series

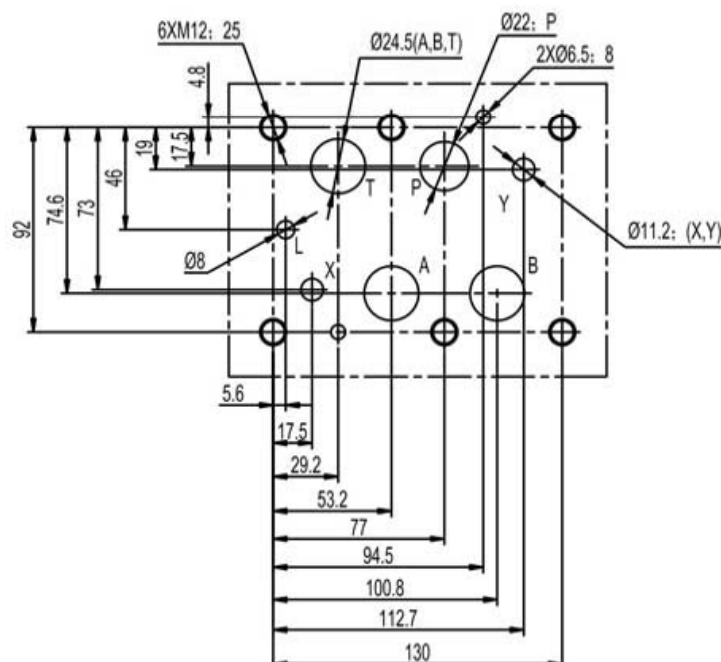
### A14

#### Spool symbols



#### 4WEH25/4WH25 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### 4WEH32 Series Solenoid Pilot Operated Directional Control Valves 4WH32 Series Hydraulic Operated Directional Control Valves



#### Technical data

Model			4WEH32
Max. flow rate (l/min)			1100
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid		1.6
	Pilot valve with double solenoids		2.2
	4WH32 valve		38
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

#### How to order

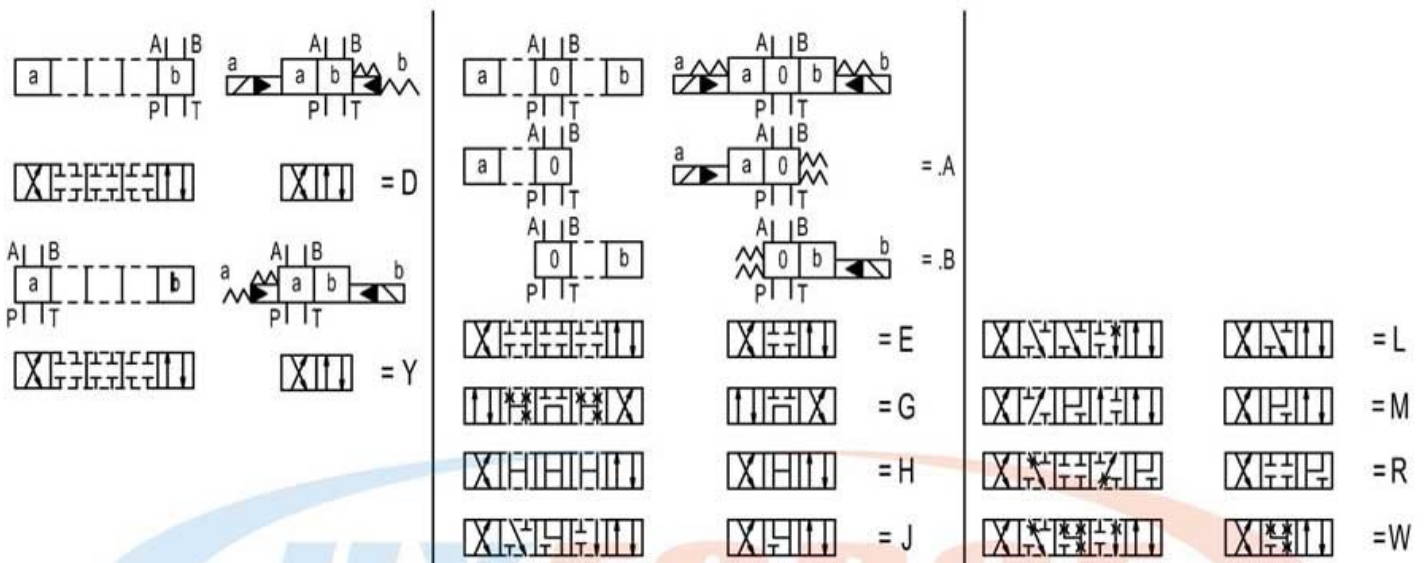
4WEH	32	E	6X	O	G24
Product type	Size	Spool symbol	Series number	Spool return type	Input Voltage
4WEH: Solenoid pilot operated directional control valve 4WH: Hydraulic operated directional control valve	32: NG32	Refer to spool symbols	6X series	No code: Spring return O: Without spring return OF: Without spring return with detent.	G12: DC12 G24: DC24 W110: AC110 W220: AC220

ET	S	Z5L	P4.5
Oil control type	Shifting time adjustment	Connector type	Pre-load valve
Refer to oil control list in page A10	No code: Without shifting time adjustment S: Shifting time adjustment as meter-in control S2: Shifting time adjustment as meter-out control	Z4: Standard plug-in connector Z5L: Plug-in connector with light	No code: Without pre-load valve P4.5: With pre-load valve

## Directional Control Valve Series

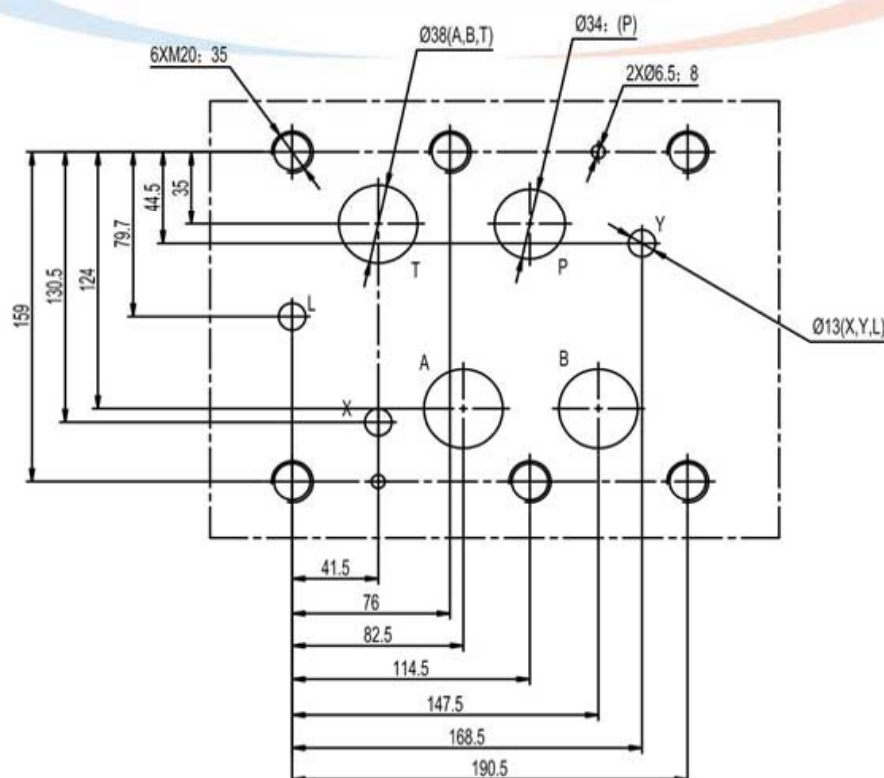
# A16

### Spool symbols



### 4WEH32/4WH32 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### DSG-02 Series Solenoid Directional Control Valves



### Technical data

Model		DSG-02
Max. flow rate (l/min)		63
Working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid DL type	1.55
	Single solenoid LW type	1.8
	Double solenoids DL type	2.1
	Double solenoids LW type	2.5
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

### How to order

DS	G	02	3C2	D24	DL
Product type	Mounting type	Size	Spool symbol	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	Subplate Mounting	02: NG6	Refer to spool symbols	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light

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## Directional Control Valve Series

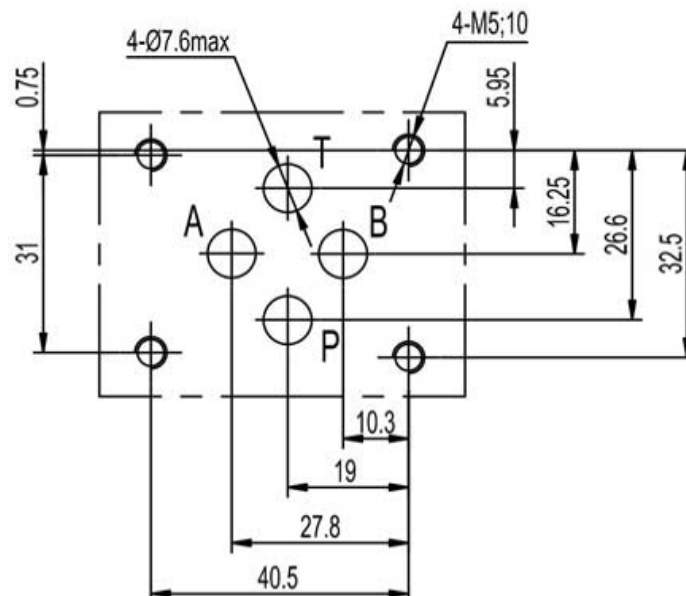
# A18

### Spool symbols

2B2BL		3C2		2B2B		2B2A		2B2AL	
2B3BL		3C3		2B3B		2B3A		2B3AL	
2B4BL		3C4		2B4B		2B4A		2B4AL	
2B5BL		3C5		2B5B		2B8A		2B8AL	
2B60BL		3C60		2B60B		2B2		2B2L	
2B8BL		3C8		2B8B		2B3		2B3L	
2B9BL		3C9		2B9B		2B8		2B8L	
2B10BL		3C10		2B10B		2L2		2L2L	
2B11BL		3C11		2B11B		2D2			
2B12BL		3C12		2B12B					
2B25BL		3C25		2B25B					
2B29BL		3C29		2B29B					

### DSG-02 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### DSG-03 Series Solenoid Directional Control Valves



### Technical data

Model		DSG-03
Max. flow rate (l/min)		120
Working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid DL type	3.8
	Single solenoid LW type	4
	Double solenoids DL type	5
	Double solenoids LW type	5.2
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

### How to order

DS	G	03	3C2	D24	DL
Product type	Mounting type	Size	Spool symbol	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve	Subplate Mounting	03: NG10	Refer to spool symbols	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light

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## Directional Control Valve Series

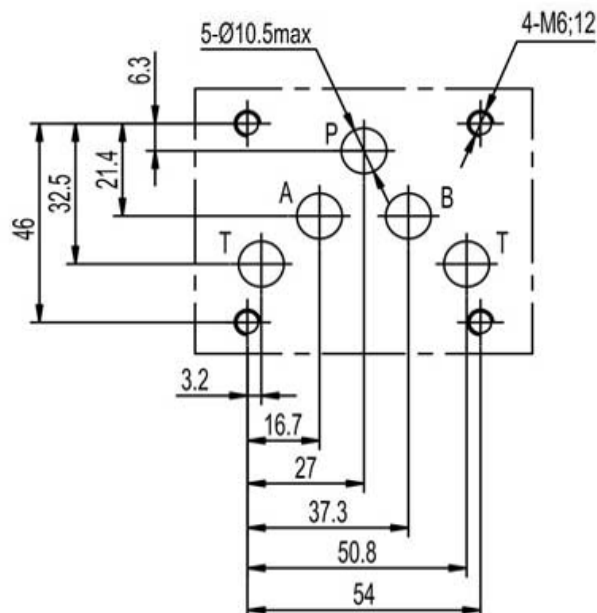
# A20

### Spool symbols

2B2BL		3C2		2B2B		2B2A		2B2AL	
2B3BL		3C3		2B3B		2B3A		2B3AL	
2B4BL		3C4		2B4B		2B4A		2B4AL	
2B5BL		3C5		2B5B		2B8A		2B8AL	
2B60BL		3C60		2B60B		2B2		2B2L	
2B8BL		3C8		2B8B		2B3		2B3L	
2B9BL		3C9		2B9B		2B8		2B8L	
2B10BL		3C10		2B10B		2L2		2L2L	
2B11BL		3C11		2B11B		2D2			
2B12BL		3C12		2B12B					
2B25BL		3C25		2B25B					
2B29BL		3C29		2B29B					

### DSG-03 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

DSHG-04 Series Solenoid Pilot Operated Directional Control Valves  
DHG-04 Series Hydraulic Operated Directional Control Valves



### Technical data

Model			DSHG-04
Max. flow rate (l/min)			300
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid DL type		1.55
	Pilot valve with single solenoid LW type		1.8
	Pilot valve with double solenoids DL type		2.1
	Pilot valve with double solenoids LW type		2.5
	DHG-04 valve		6.3
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

### How to order

DSH	G	04	3C2	ET	D24	LW	AB
Product type	Mounting type	Size	Spool symbol	Oil control type	Input voltage	Connector type	Stroke adjustment
DSH: Solenoid pilot operated directional control valve DH: Hydraulic operated directional control valve	Subplate mounting	04: NG16	Refer to spool symbols	Refer to oil control list	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light	No code: Standard AB: Both sides A: A side B: B side

## Directional Control Valve Series

# A22

### Spool symbols

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## Directional Control Valve Series

### DSHG-06 Series Solenoid Pilot Operated Directional Control Valves DSHG-06 Series Hydraulic Operated Directional Control Valves



#### Technical data

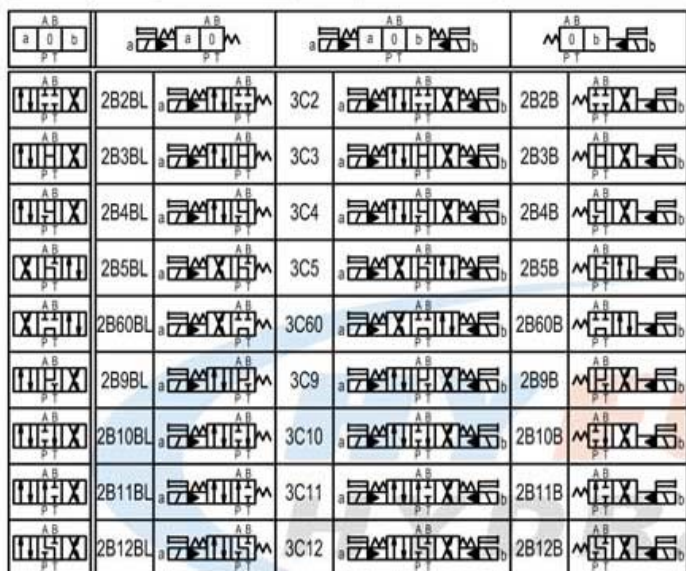
Model			DSHG-06
Max. flow rate (l/min)			500
Max. working pressure (MPa)	A, B, P port		31.5
	T port	External drain	25
		Internal drain	16
	Y port	External control	16
Weight (kgs)	Pilot valve with single solenoid DL type		1.55
	Pilot valve with single solenoid LW type		1.8
	Pilot valve with double solenoids DL type		2.1
	Pilot valve with double solenoids LW type		2.5
	DHG-06 valve		11.7
Hydraulic fluid / Seal material			Mineral oil / NBR seals
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)			-30 to +80 / 2.8 to 500
Oil cleanliness class according to ISO4406			Class 20/18/15

#### How to order

DSH	G	06	3C2	ET	D24	LW	AB
Product type	Mounting type	Size	Spool symbol	Oil control type	Input voltage	Connector type	Stroke adjustment
DSH: Solenoid pilot operated directional control valve DH: Hydraulic operated directional control valve	Subplate mounting	06: NG25	Refer to spool symbols	Refer to oil control list	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light	No code: Standard AB: Both sides A: A side B: B side

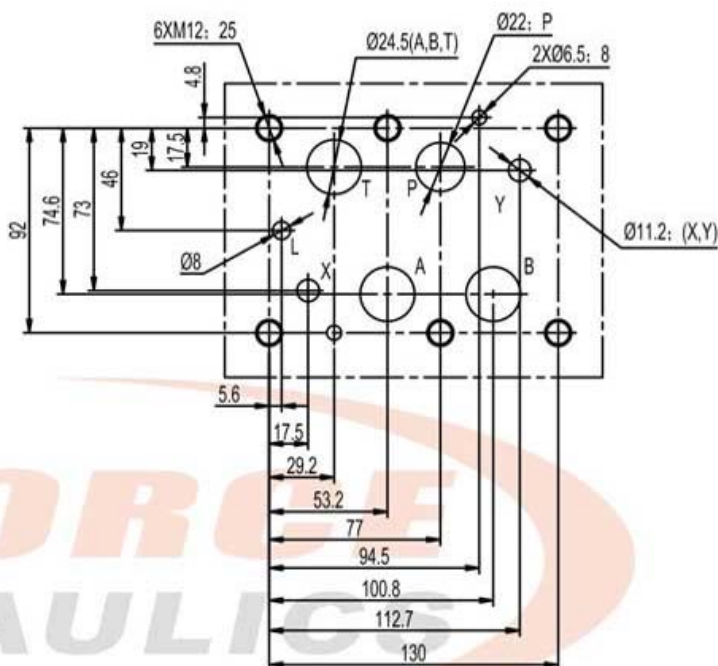
## A24

## Spool symbols



## DSHG-06/DHG-06 subplate installation dimensions

Unit: mm



## Oil control list

Internal pilot pressure internal pilot drain (T)	External pilot pressure internal pilot drain (ET)	Internal pilot pressure external pilot drain (no code)	Internal pilot pressure external pilot drain (E)



## Directional Control Valve Series

### LB4WE6 Series Solenoid Operated Directional Control Valves



#### Technical data

Model		LB4WE6
Max. flow rate (l/min)		80
Working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	1.65
	Double solenoids type	2.3
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

LB4WE	6	E	6X	G24	Z5L
Product type	Size	Spool symbol	Series number	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve with emergency locked button	6: NG6	Refer to spool symbols	6X series	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light ZJ: AMP junior coil

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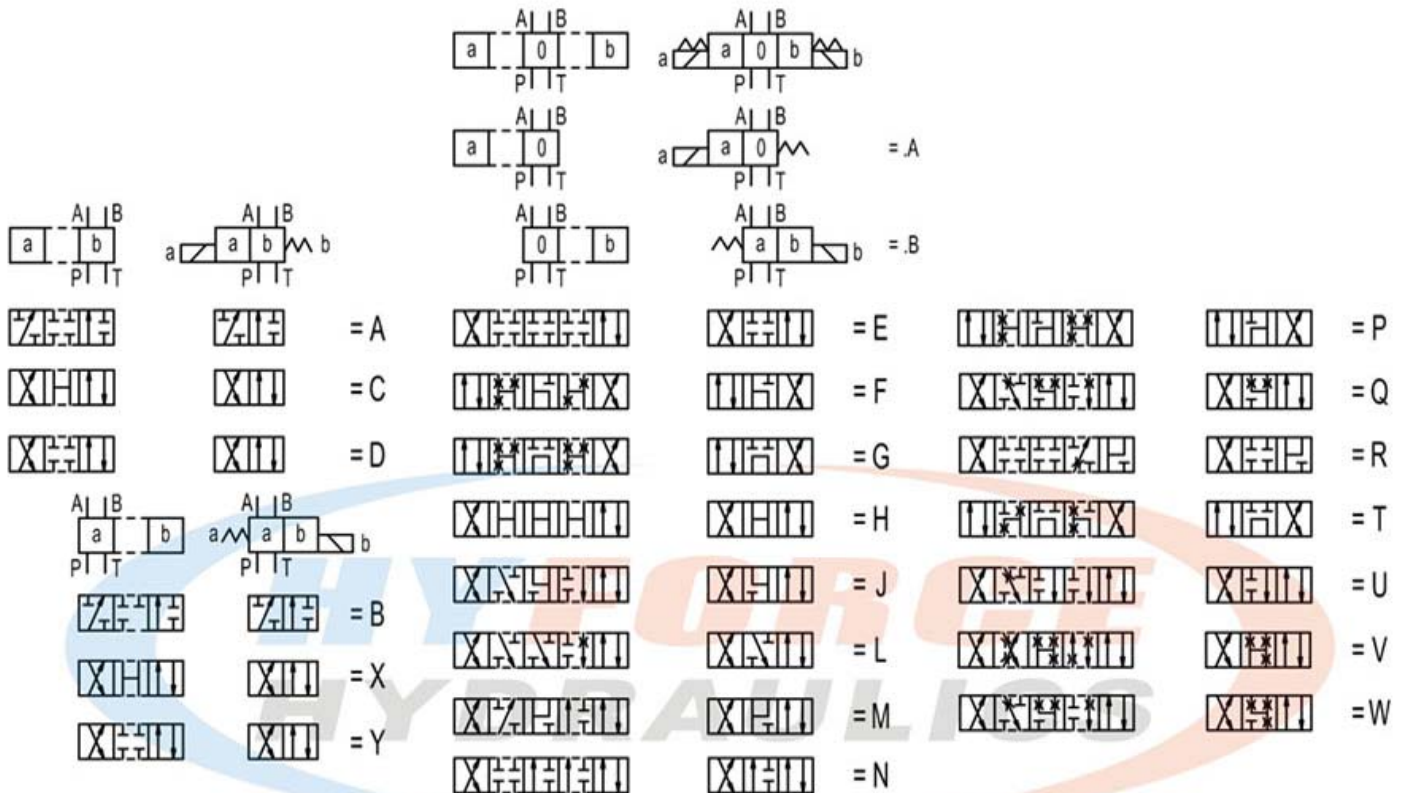
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## Directional Control Valve Series

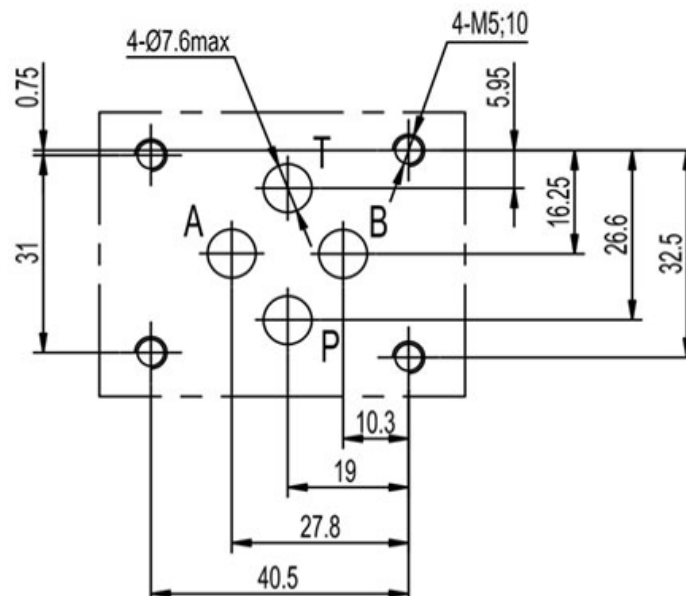
### A26

#### Spool symbols



#### LB4WE6 subplate installation dimensions

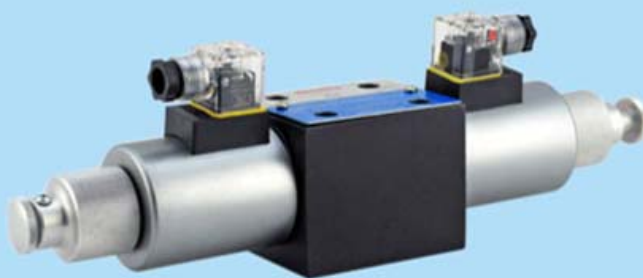
Unit: mm





## Directional Control Valve Series

### LB4WE10 Series Solenoid Operated Directional Control Valves



#### Technical data

Model		LB4WE10
Max. flow rate (l/min)		120
Working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	4.8
	Double solenoids type	6.4
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

LB4WE	10	E	3X	G24	Z5L
Product type	Size	Spool symbol	Series number	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve with emergency locked button	10: NG10	Refer to spool symbols	3X series	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light

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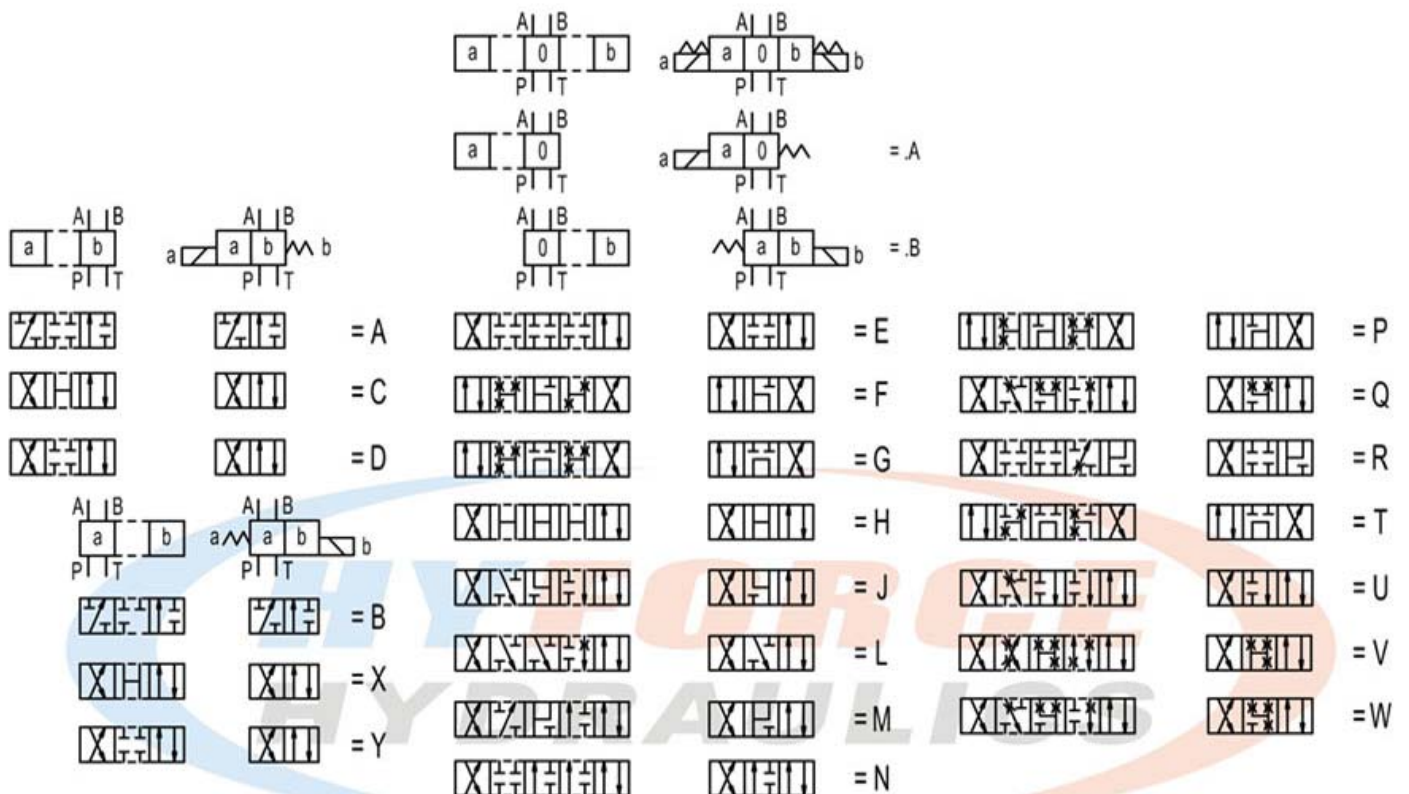
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## Directional Control Valve Series

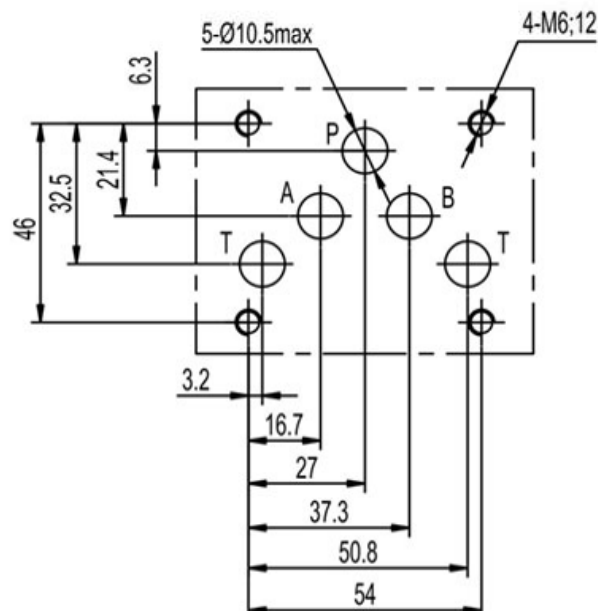
### A28

#### Spool symbols



#### LB4WE10 subplate installation dimensions

Unit: mm





## Directional Control Valve Series

### DS4WE Series Solenoid Operated Directional Control Stackable Valves



#### Technical data

Model		DS4WE4
Max. flow rate (l/min)		20
Max. working pressure (MPa)	A, B, P port	25
	T port	16
Weight (kgs)	Single solenoid type	0.9
	Double solenoids type	1.05
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

DS4WE	4	E	G24	Z5L
Product type	Thread size	Spool symbol	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control stackable valve	4: BSP1/4"	Refer to spool symbols	G12: DC12 G24: DC24	Z4: Standard plug-in connector Z5L: Plug-in connector with light

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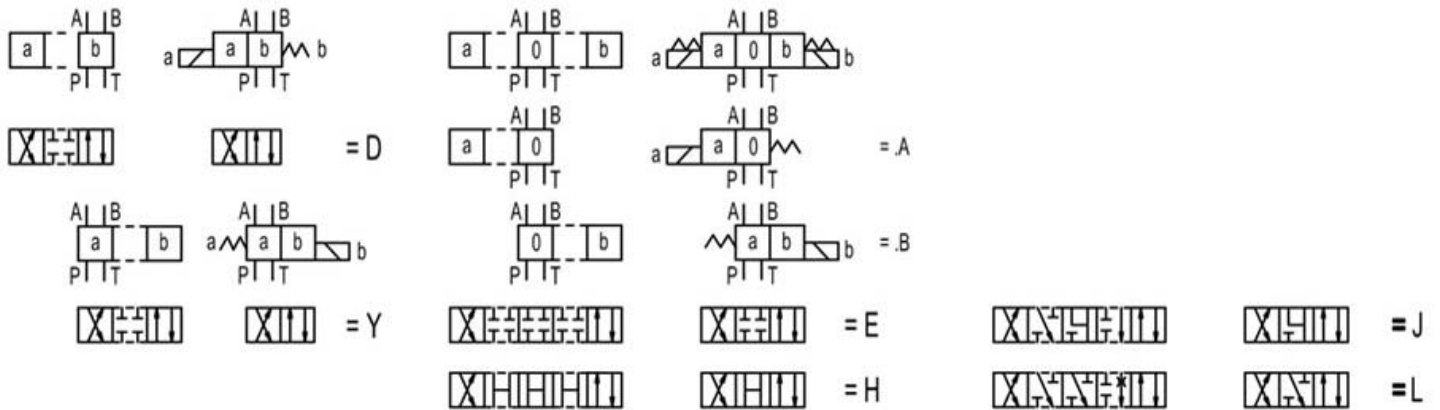
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## Directional Control Valve Series

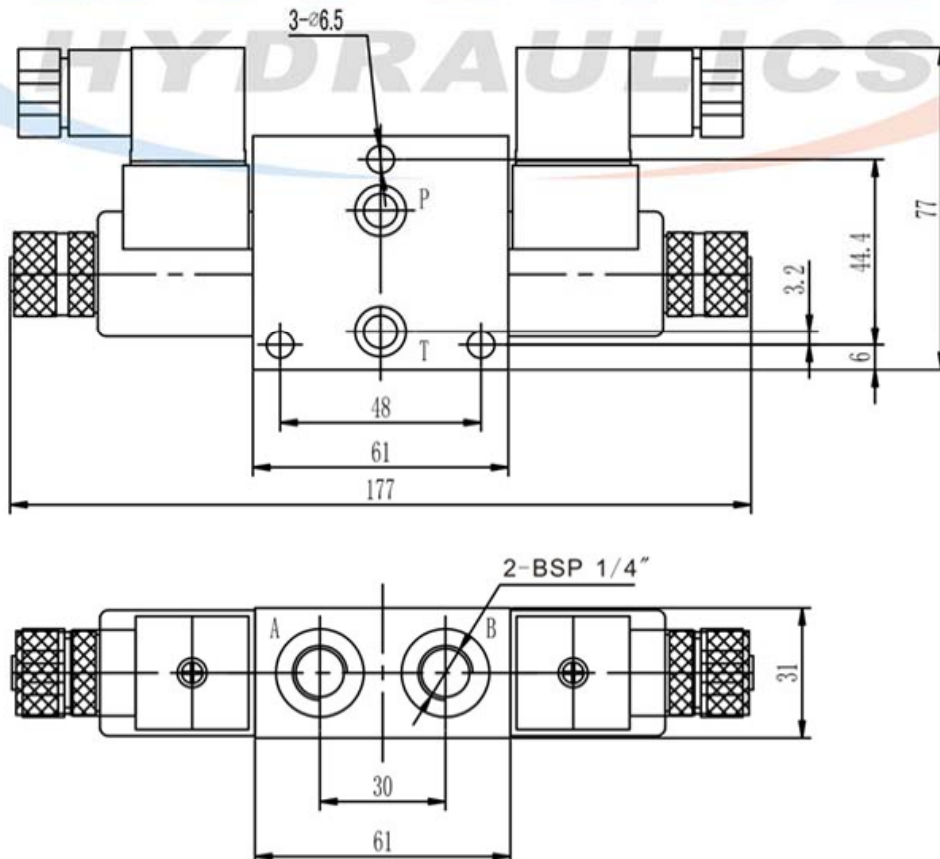
# A30

### Spool symbols



### DS4WE stackable valve dimensions

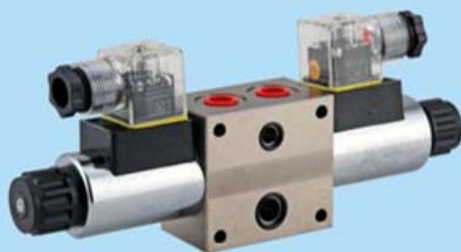
Unit: mm





## Directional Control Valve Series

### DM4WE Series Solenoid Operated Directional Control Stackable Valves



#### Technical data

Model		DM4WE4
Max. flow rate (l/min)		30
Max. working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	1.1
	Double solenoids type	1.6
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

DM4WE	4	E	G24	Z5L
Product type	Thread size	Spool symbol	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control stackable valve	4: BSP1/4"	Refer to spool symbols	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light

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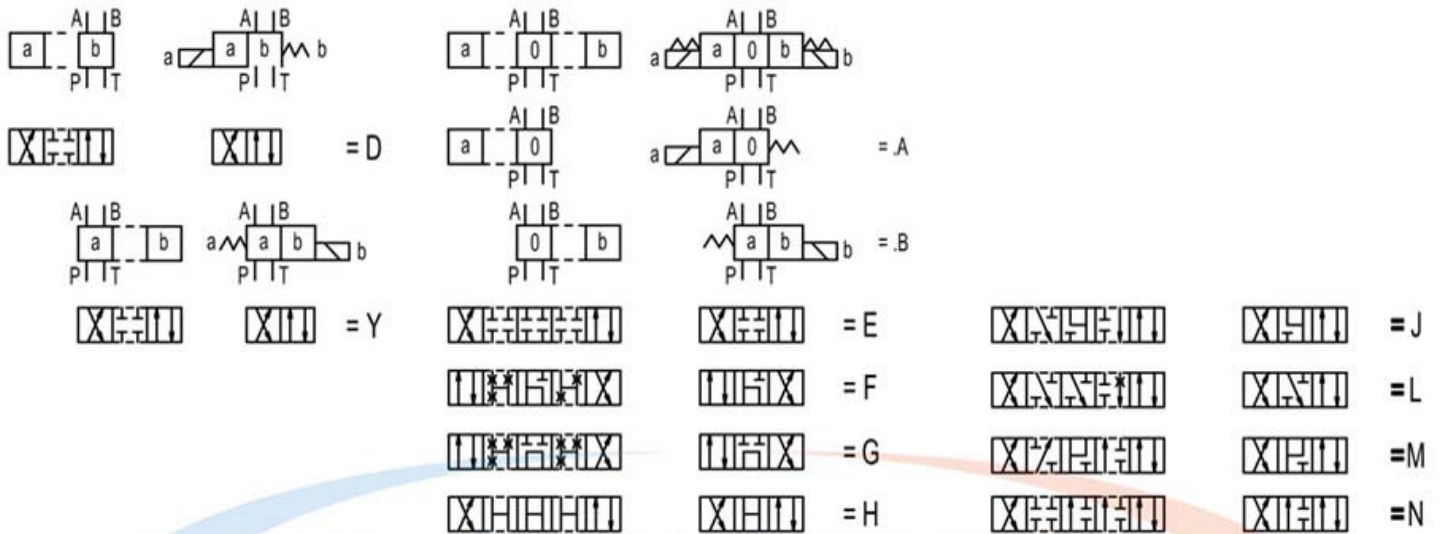
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## Directional Control Valve Series

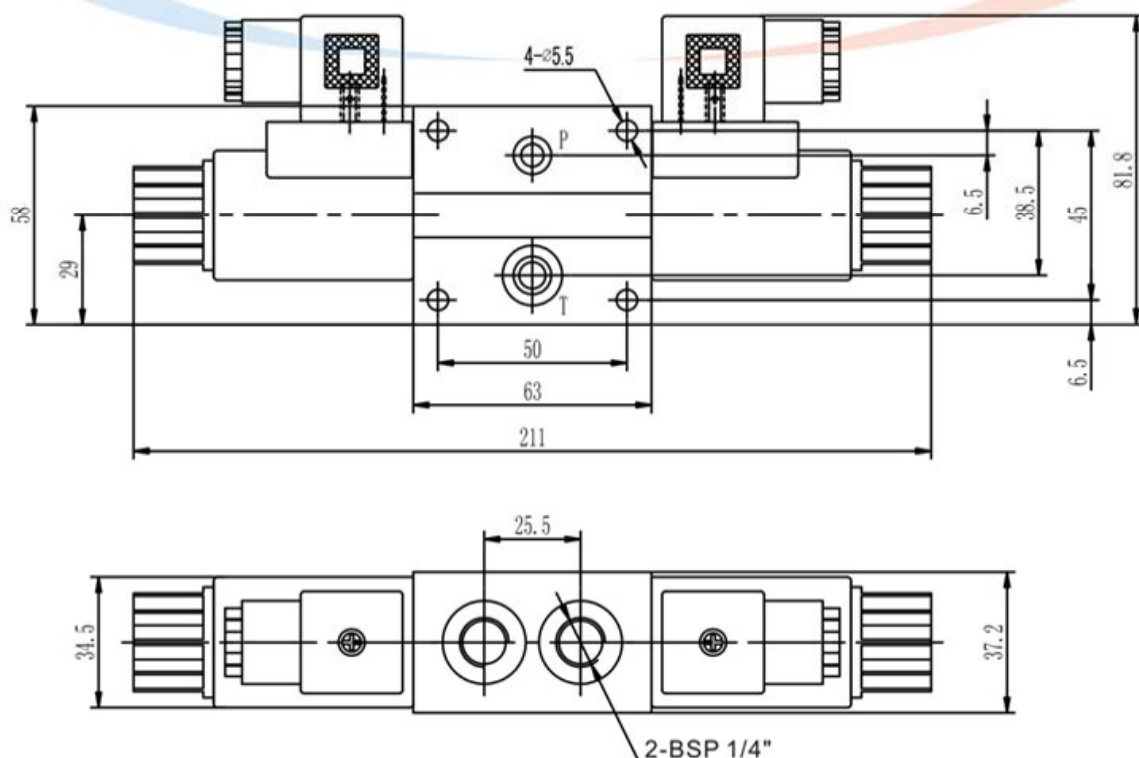
# A32

### Spool symbols



### DM4WE stackable valve dimensions

Unit: mm





## Directional Control Valve Series

### DL4WE Series Solenoid Operated Directional Control Stackable Valves



#### Technical data

Model		DL4WE
Max. flow rate (l/min)		50
Max. working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)	Single solenoid type	2
	Double solenoids type	2.6
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

DL4WE	6	E	G24	Z5L
Product type	Thread size	Spool symbol	Input voltage	Connector type
4/3 & 4/2 Solenoid directional control stackable valve	4: BSP 1/4" 6: BSP 3/8"	Refer to spool symbols	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light ZJ: AMP junior coil

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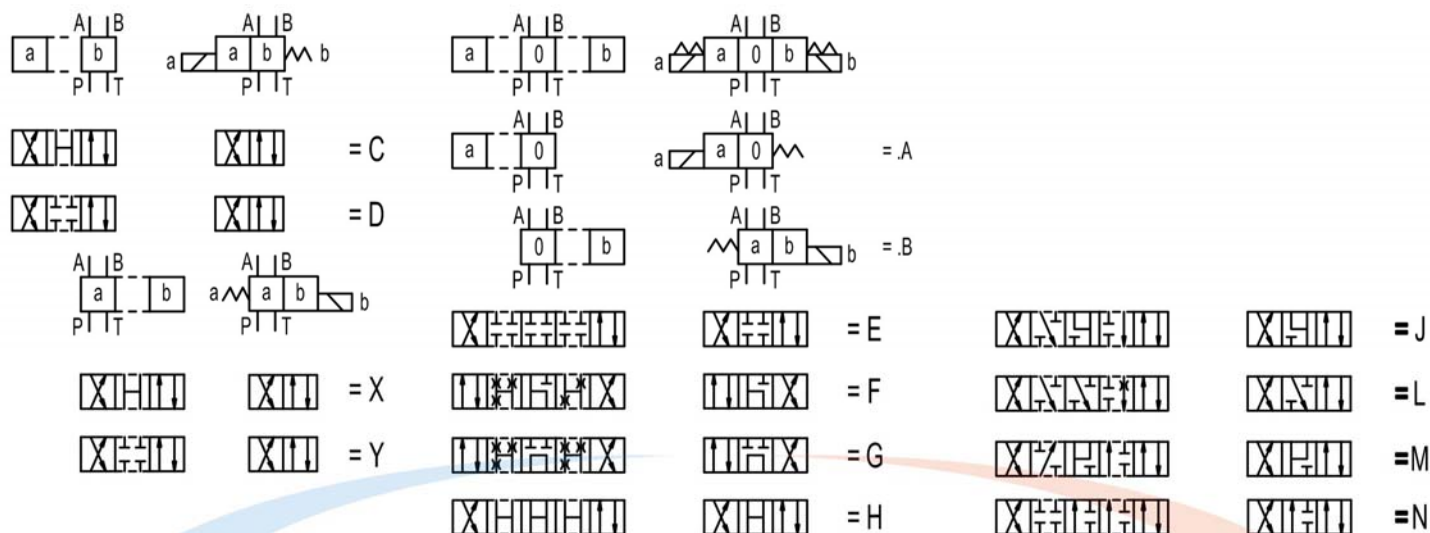
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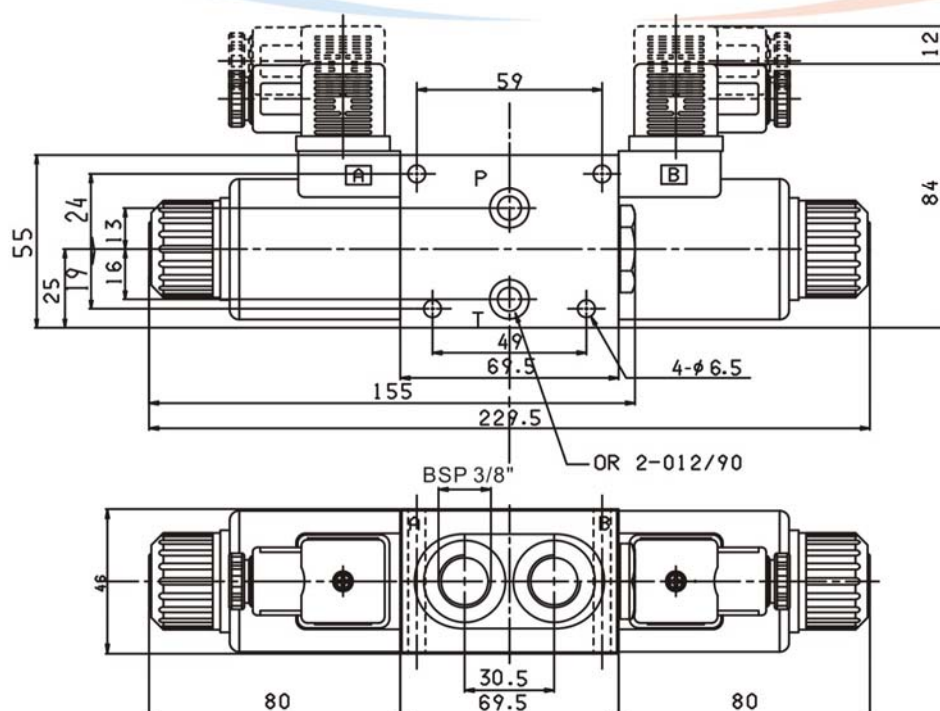
## A34

## Spool symbols



## DL4WE stackable valve dimensions

Unit: mm



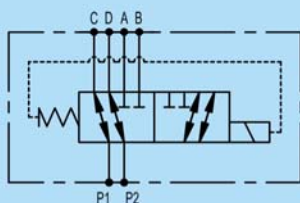
Z4: Standard plug-in connector



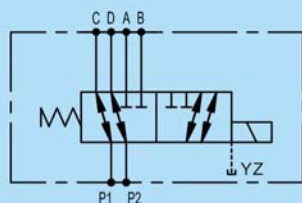
## Directional Control Valve Series

### KVH Series Solenoid Operated Directional Control Stackable Valves

#### Symbol



KVH...



KVH...E...



#### Technical data

Model	KVH4	KVH6	KVH8
Max. flow rate (l/min)	20	50	
Max. working pressure (MPa)		25	
Weight (kgs)	2.9	2.7	
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

KVH	6	G24	Z5L
Product type	Thread size	Input voltage	Connector type
6/2 Solenoid directional control stackable valve	6: BSP 3/8"	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light ZJ: AMP junior coil

Remark: Oil drain port is not available for model KVH8.

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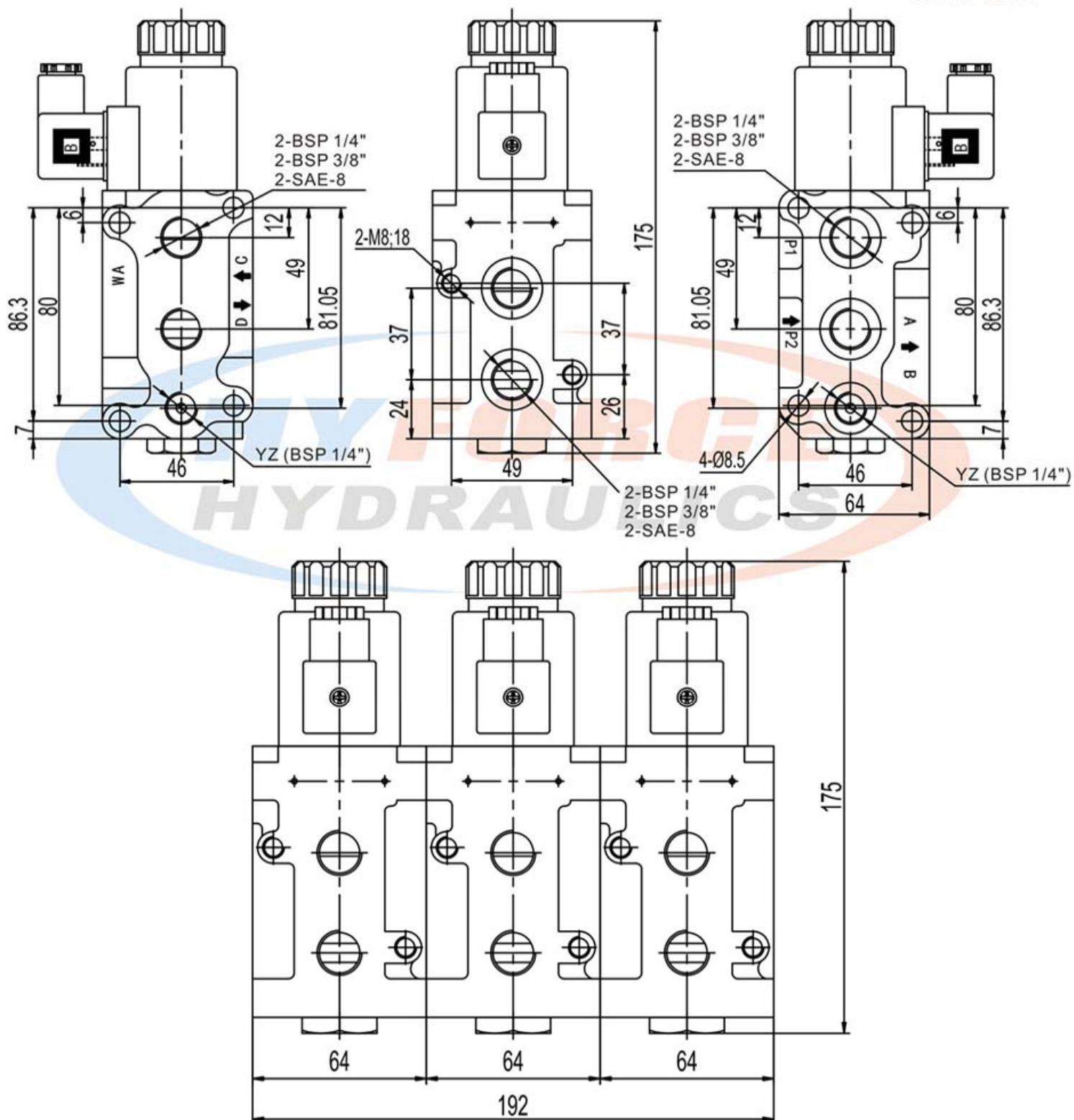
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## Directional Control Valve Series

# A36

### KVH4/6/8 stackable valve dimensions

Unit: mm





## Directional Control Valve Series

### YJ4WE Series Solenoid Operated Directional Control Valves with Manual Control Lever



#### Technical data

Model		YJ4WE6	YJ4WE10
Max. flow rate (l/min)		80	120
Max. working pressure (MPa)	A, B, P port	31.5	
	T port	16	
Weight (kgs)		3	8
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

#### How to order

YJ4WE	6	E	6X	G24	Z5L
Product type	Size	Spool symbol	Series number	Input voltage	Connector type
4/3 Solenoid operated directional control valve with manual control lever	6: NG6 10: NG10	Refer to spool symbols	6X for NG6 3X for NG10	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light ZJ: AMP junior coil (Only for NG6)

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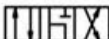
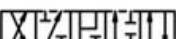
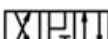


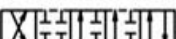
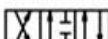

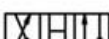
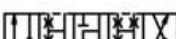
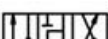


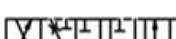
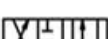
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## Directional Control Valve Series

# A38

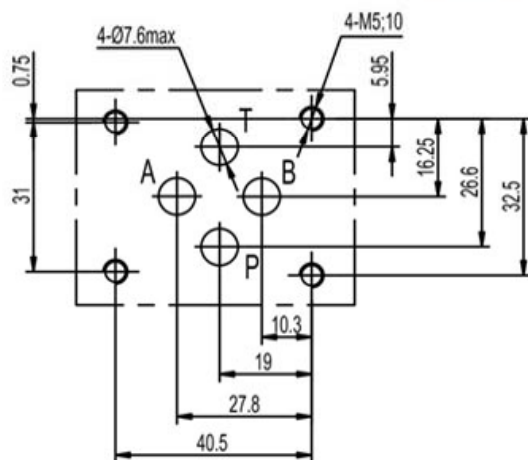
### Spool symbols



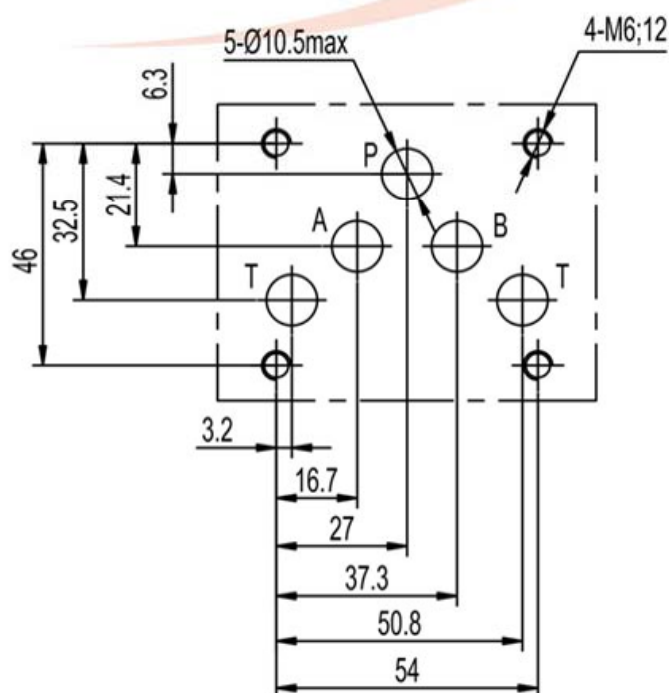
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		= G			= N
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### YJ4WE subplate installation dimensions

YJ4WE6



YJ4WE10





## Directional Control Valve Series

### DMG Series Manual Operated Directional Control Valves



### Technical data

Model		DMG-02	DMG-03
Max. flow rate (l/min)		60	100
Max. working pressure (MPa)	A, B, P port	31.5	
	T port	16	
Weight (kgs)		1.5	4
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

### How to order

DM	G	02	3C2	W	B
Product type	Mounting type	Size	Spool symbol	Spool return	Handle position
Manual operated directional control valve	G: Subplate mounting	02: NG6 03: NG10	Refer to spool symbols	W: Spring return O: With detent	A: Handle on A port side B: Handle on B port side

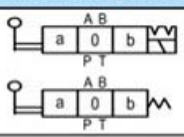
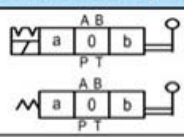










A39

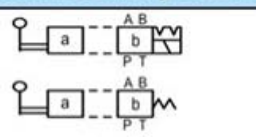
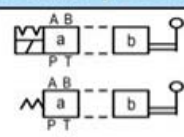






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## Directional Control Valve Series

### A40

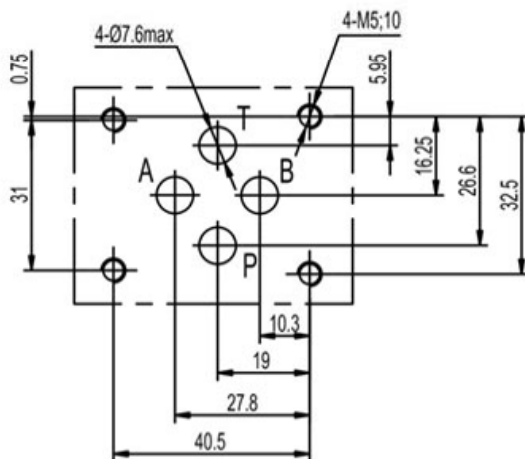
#### Spool symbols

3 spool positions Handle on A port side		3 spool positions Handle on B port side	
			
3C2		3C8	
3C3		3C9	
3C4		3C10	
3C5		3C11	
3C60		3C12	

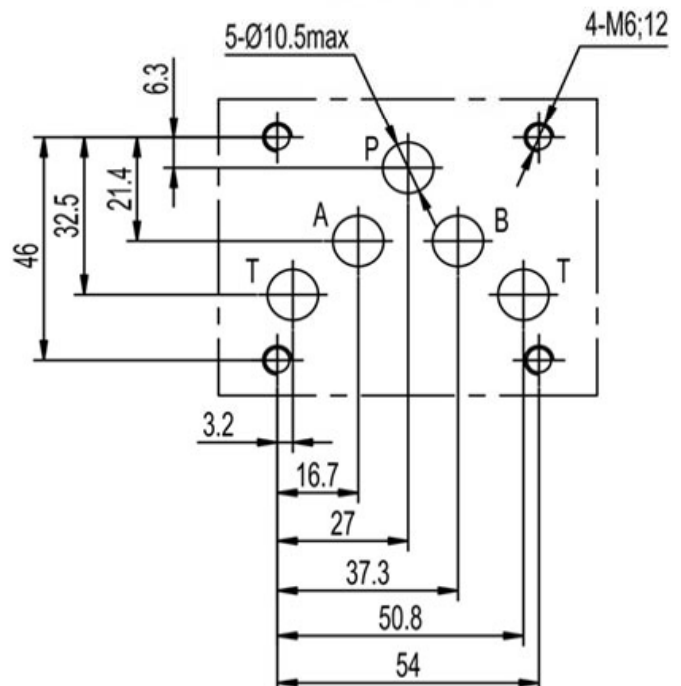
2 spool positions Handle on A port side		2 spool positions Handle on B port side	
			
2B2		2B2L	
2B3		2B3L	
2B8		2B8L	

#### DMG subplate installation dimensions

DMG-02



DMG-03





## Directional Control Valve Series

### DMT Series Manual Operated Directional Control Valves



#### Technical data

Model		DMT-03
Max. flow rate (l/min)		100
Max. working pressure (MPa)	A, B, P port	31.5
	T port	16
Weight (kgs)		4.7
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

#### How to order

DM	T	03	3C2	W	B
Product type	Mounting type	Thread size	Spool symbol	Spool return	Handle position
Manual operated directional control valve	T: Threaded connection	03: PT 3/8"	Refer to spool symbols	W: Spring return O: With detent	A: Handle on A port side B: Handle on B port side

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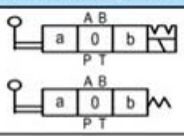
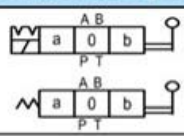
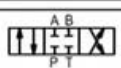
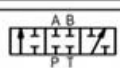








O

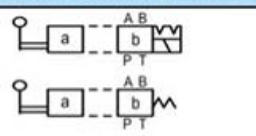
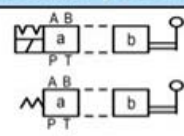






P

## Directional Control Valve Series

### A42

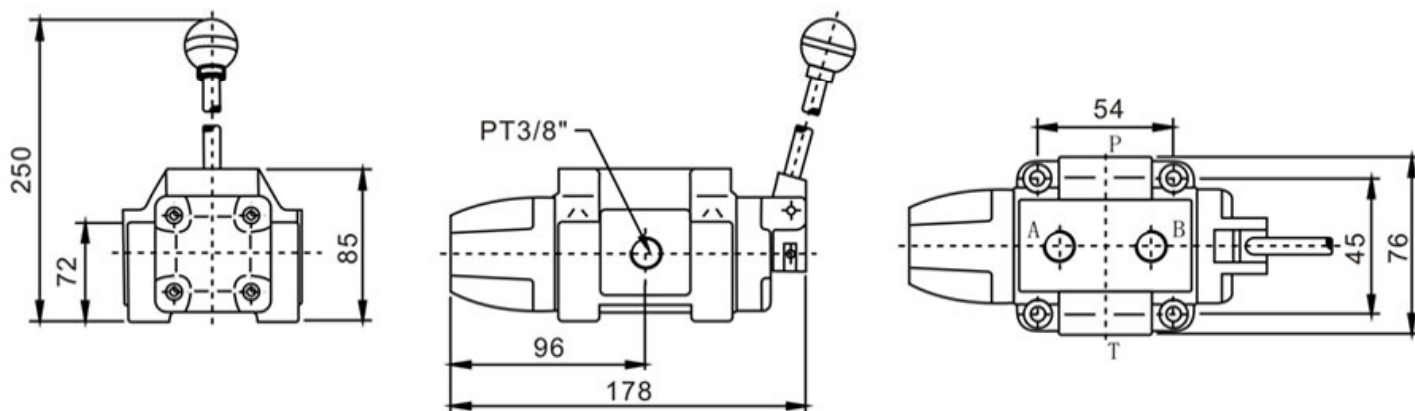
#### Spool symbols

3 spool positions Handle on A port side		3 spool positions Handle on B port side	
			
3C2		3C8	
3C3		3C9	
3C4		3C10	
3C5		3C11	
3C60		3C12	

2 spool positions Handle on A port side		2 spool positions Handle on B port side	
			
2B2		2B2L	
2B3		2B3L	
2B8		2B8L	

#### DMT-03 series valve dimensions

Unit: mm





## Directional Control Valve Series

### 4WMM Series Manual Operated Directional Control Valves



#### Technical data

Model		4WMM16	4WMM25
Max. flow rate (l/min)		300	650
Working pressure (MPa)	A, B, P port	31.5	
	T port	16	
Weight (kgs)		9	19.5
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

#### How to order

4WMM	16	E	7X	OF
Product type	Size	Spool symbol	Series number	Spool return
Manual operated directional control valve	16: NG16 25: NG25	Refer to spool symbols	7X series	No code: Spring return OF: With detent

A43

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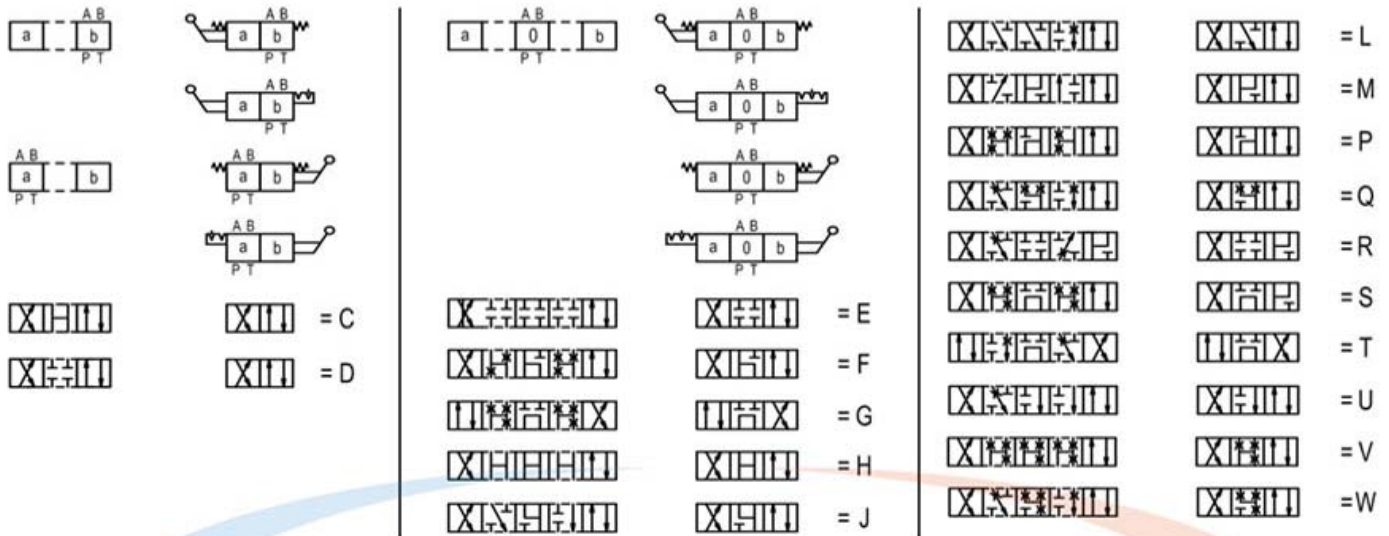
O

P

## Directional Control Valve Series

### A44

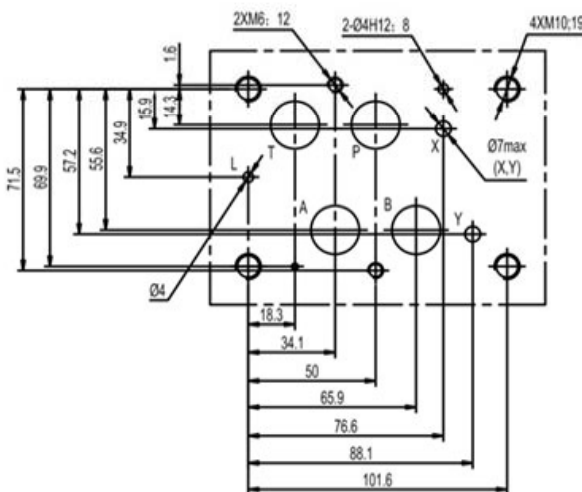
#### Spool symbols



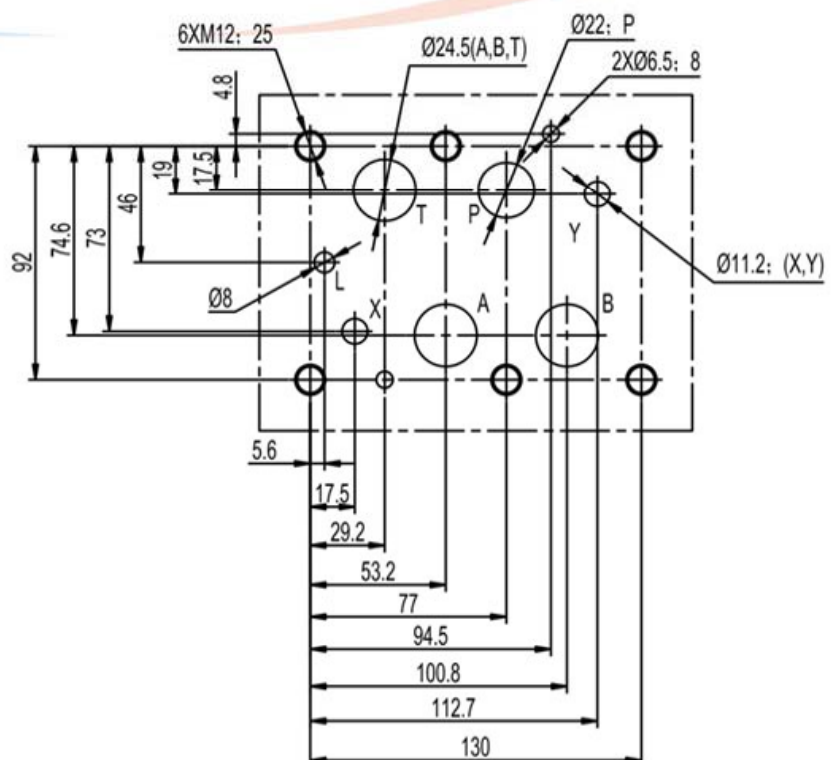
#### 4WMM subplate installation dimensions

Unit: mm

##### 4WMM16



##### 4WMM25





## Directional Control Valve Series

### DCG Series Mechanical Operated Directional Control Valves



#### Technical data

Model		DCG-02	DCG-03
Max. flow rate (l/min)		30	100
Working pressure (MPa)	A, B, P port	21	25
	T port	7	10
Weight (kgs)		1.2	3.8
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

#### How to order

DC	G	02	2B2	P
Product type	Mounting type	Size	Spool symbol	Roller position
Mechanical operated directional control valve	Subplate mounting	02: NG6 03: NG10	Refer to spool symbols	P: Towards P port T: Towards T port Y: Towards nameplate

A45

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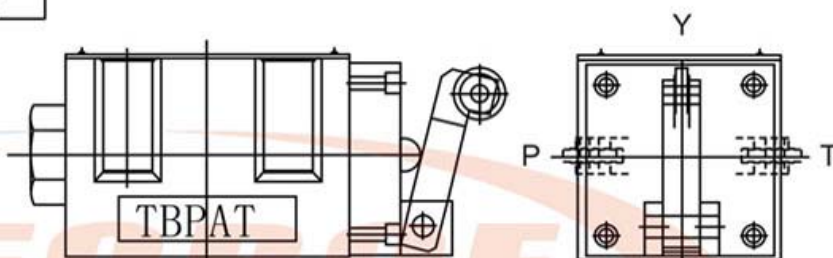
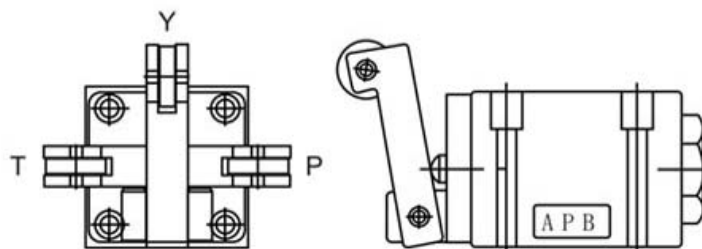
## Directional Control Valve Series

### A46

#### Spool symbols

2B2		2B2L	
2B3		2B3L	
2B8		2B8L	

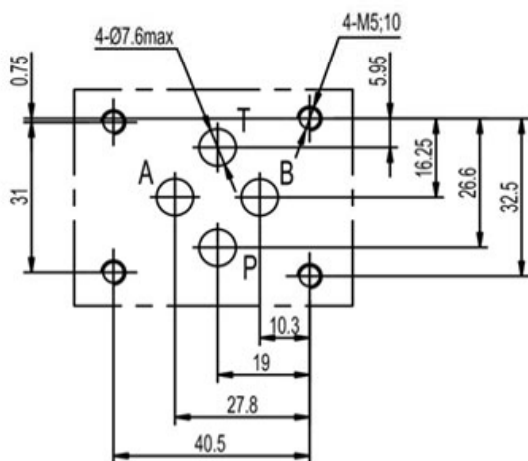
#### Roller position



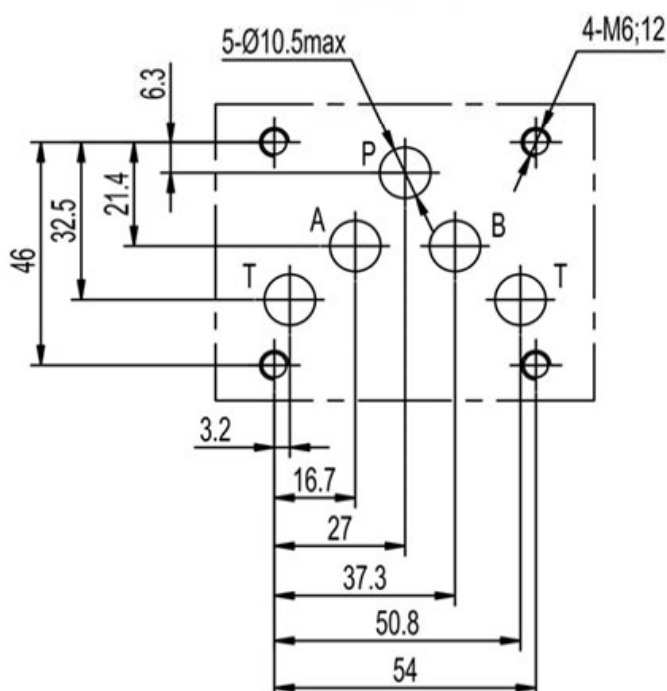
#### DCG subplate installation dimensions

Unit: mm

##### DCG-02



##### DCG-03

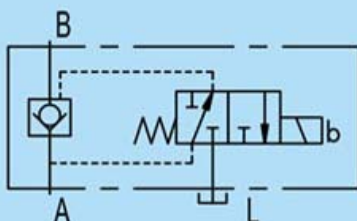




## Directional Control Valve Series

### SW Series Solenoid Operated Check Valves

#### Symbol



#### Technical data

Model	SW20	SW30
Max. flow rate (l/min)	100	170
Max. working pressure (MPa)	31.5	
Weight (kgs)	5.5	8.7
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

SW	20	P	G24	Z5L
Product type	Size	Mounting type	Input voltage	Connector type
Solenoid operated check valve	20: NG20 30: NG30	Suplate mounting	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light

A47

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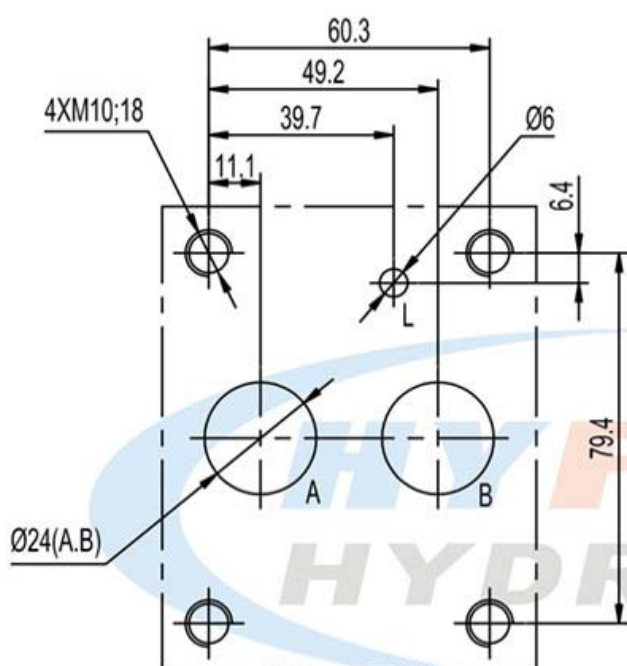
## Directional Control Valve Series

# A48

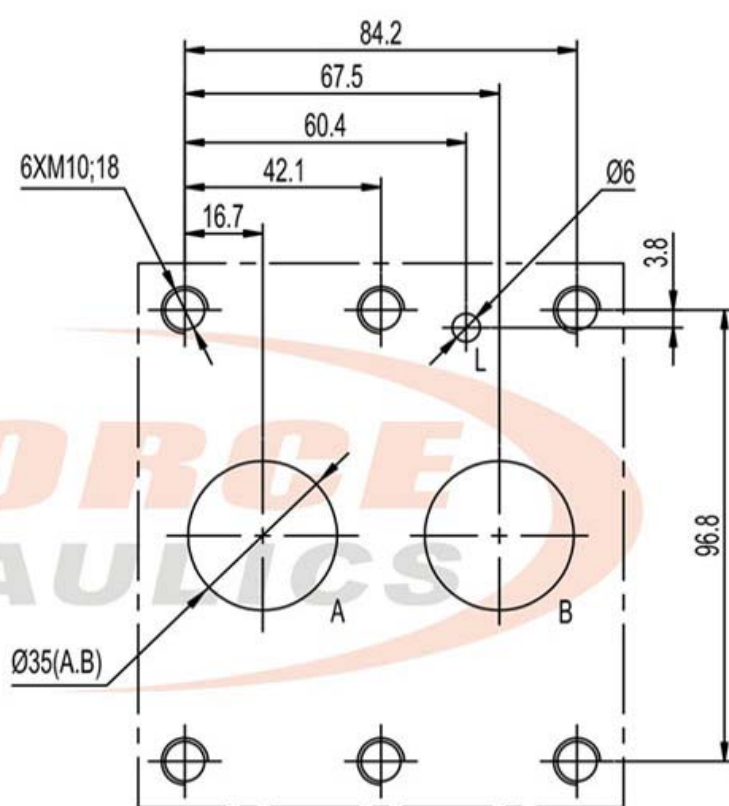
### SW subplate installation dimensions

Unit: mm

**SW20P**



**SW30P**

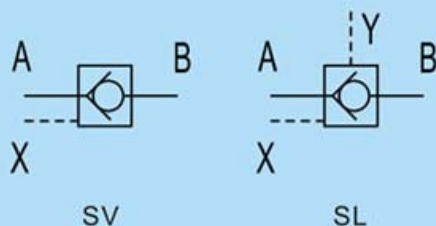




## Directional Control Valve Series

### SV/SL Series Pilot Operated Check Valves

#### Symbols



#### Technical data

Model	SV10	SL10	SV20	SL20	SV30	SL30
Max. flow rate (l/min)	80		150		300	
Max. working pressure (MPa)	31.5					
Weight (kgs)	1.8		4.7		7.8	
Hydraulic fluid	Mineral oil					
Seal material	NBR seals					
Temperature range (°C)	-30 to +80					
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
Oil cleanliness class according to ISO4406	Class 20/18/15					

#### How to order

S	V	10	P	A	05	4X
Product type	Oil drain type	Size	Mounting type	Pilot valve	Cracking pressure	Series number
Pilot operated check valve	V: Internal pilot oil drain L: External pilot oil drain	10: NG10 20: NG20 30: NG32	P: Subplate mounting	A: With pilot valve B: Without pilot valve	05:0.5bar 50:3.5bar	4X series

A49

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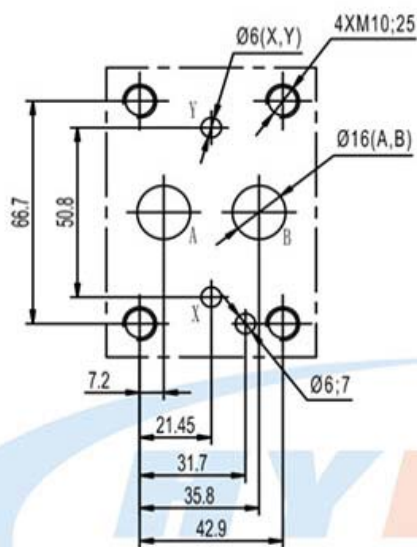
## Directional Control Valve Series

**A50**

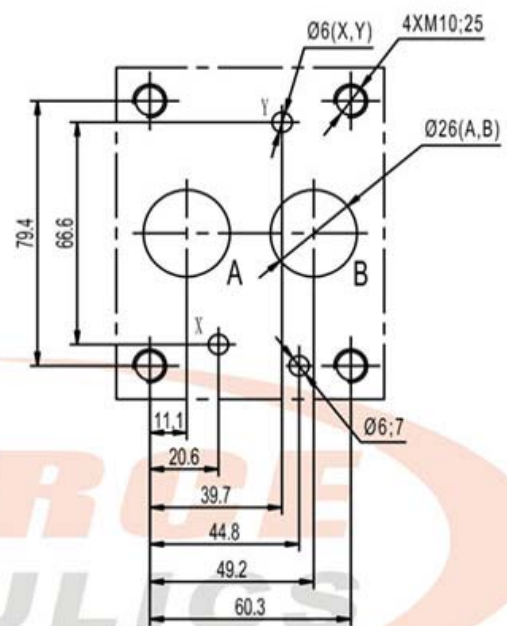
### SV/SL subplate installation dimensions

Unit: mm

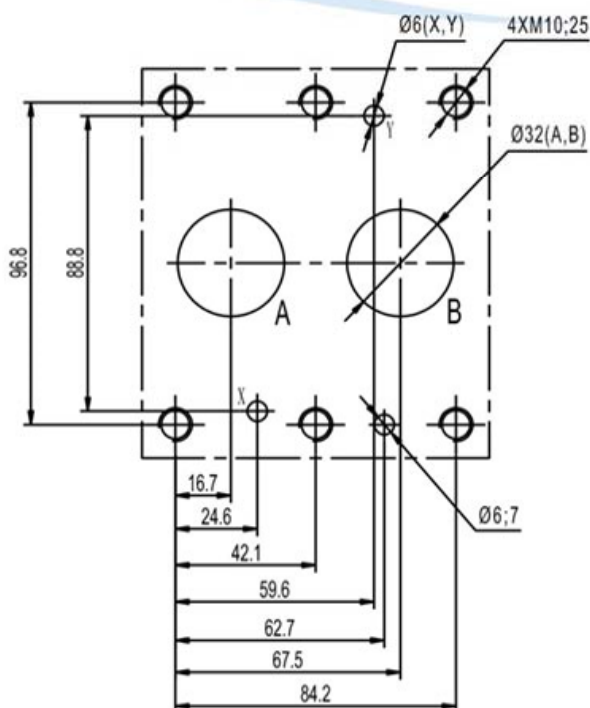
**SV10/SL10**



**SV20/SL20**



**SV30/SL30**





## Directional Control Valve Series

### CRG Series Right Angle Check Valves

#### Symbol



#### Technical data

Model	CRG-03	CRG-06	CRG-10	CRG-03	CRG-06	CRG-10
Mounting surface standard	None ISO standard			ISO standard		
Max. flow rate (l/min)	40	100	200	40	100	200
Max. working pressure (MPa)	31.5					
Weight (kgs)	1.6	4.1	7.5	1.7	3.4	6.1
Hydraulic fluid	Mineral oil					
Seal material	NBR seals					
Temperature range (°C)	-30 to +80					
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
Oil cleanliness class according to ISO4406	Class 20/18/15					

#### How to order

CR	G	03	05	10
Product type	Mounting type	Size	Cracking pressure	Mounting surface standard
Right angle check valve	Subplate mounting	03: NG10 06: NG20 10: NG30	05: 0.35bar 50: 3.5bar	10: None ISO standard 20: ISO standard

A51

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## Directional Control Valve Series

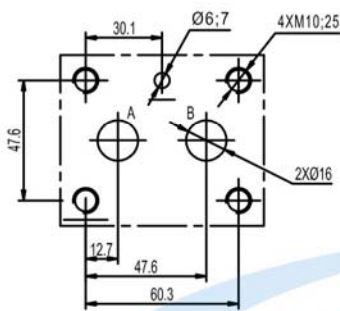
# A52

### CRG subplate installation dimensions

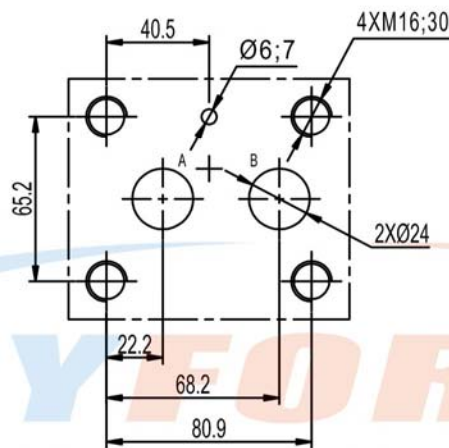
Unit: mm

#### None ISO standard

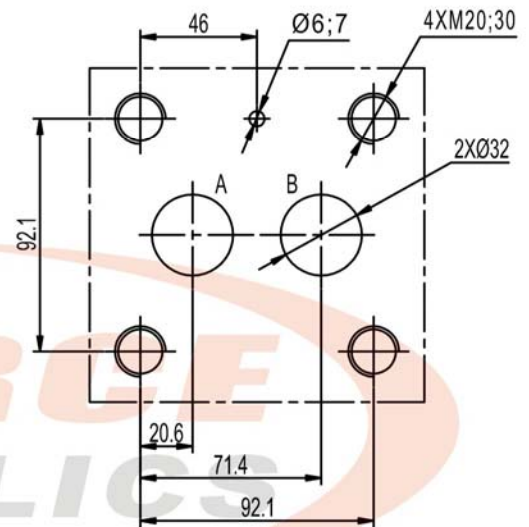
**CRG-03**



**CRG-06**

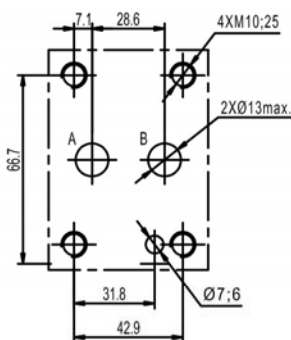


**CRG-10**

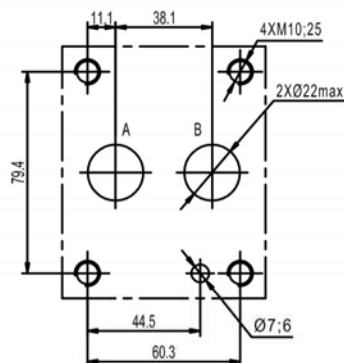


#### ISO standard

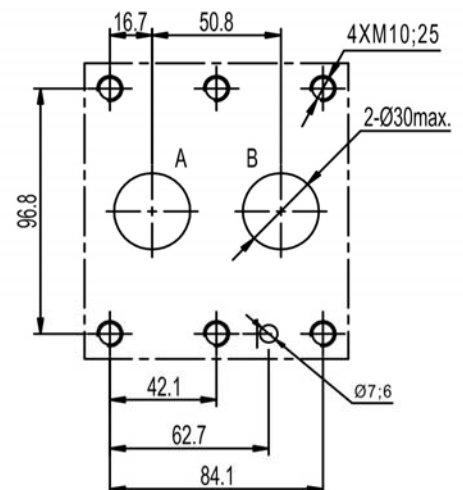
**CRG-03**



**CRG-06**



**CRG-10**





## Directional Control Valve Series

### S Series Check Valves

#### Symbol



#### Technical data

Model	S6A	S8A	S10A	S15A	S20A	S25A	S30A	S20P	S30P
Max. flow rate (l/min)	15	30	40	120	200	300	400	100	170
Max. working pressure (MPa)	31.5								
Weight (kgs)	0.1	0.2	0.3	0.5	1	2.1	2.5	4.7	8
Hydraulic fluid	Mineral oil								
Seal material	NBR seals								
Temperature range (°C)	-30 to +80								
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500								
Oil cleanliness class according to ISO4406	Class 20/18/15								

#### How to order

S	10	A	05	2
Product type	Size	Mounting type	Cracking pressure	Thread type
Check valve	6: NG6 8: NG8 10: NG10 15: NG15 20: NG20 25: NG25 30: NG30	A: Threaded connection (for all size) P: Subplate mounting (only for size 20 & 30)	05:0.35bar 50:3.5bar	No code: BSP thread 1: NPT thread 2: Metric thread

A53

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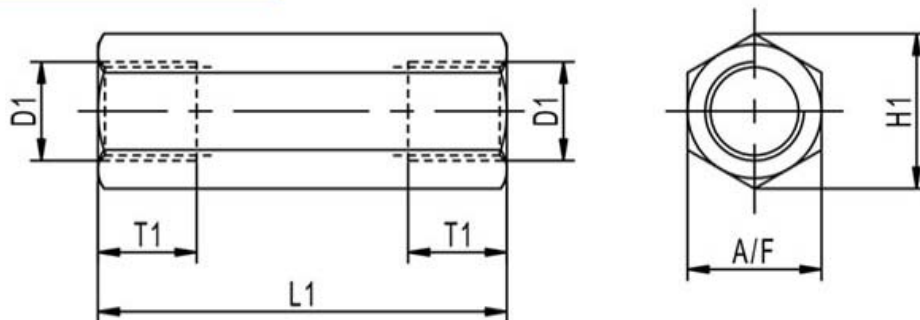
O

P

## Directional Control Valve Series

# A54

### S\*A series valve dimensions



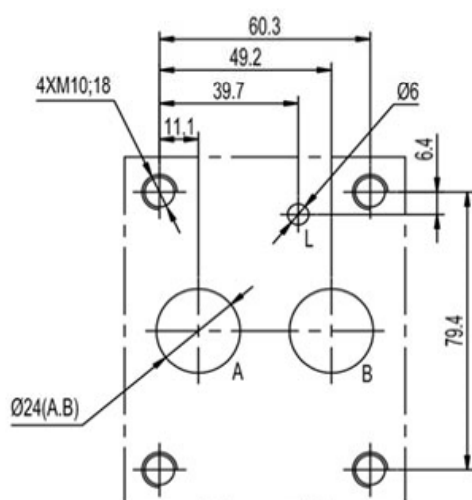
Unit: mm

Model	S6A	S8A	S10A	S15A	S20A	S25A	S30A
D1	BSP thread	G1/4"	G3/8"	G1/2"	G3/4"	G1"	G1 1/4"
	NPT thread	Z1/4"	Z3/8"	Z1/2"	Z3/4"	Z1"	Z1 1/4"
	Metric thread	M14X1.5	M18X1.5	M22X1.5	M27X2	M33X2	M42X2
H1	22	28	34.5	41.5	53	69	75
L1	58	58	73	85	98	120	132
T1	12	12	14	16	18	20	22
A/F	19	24	30	36	46	60	65

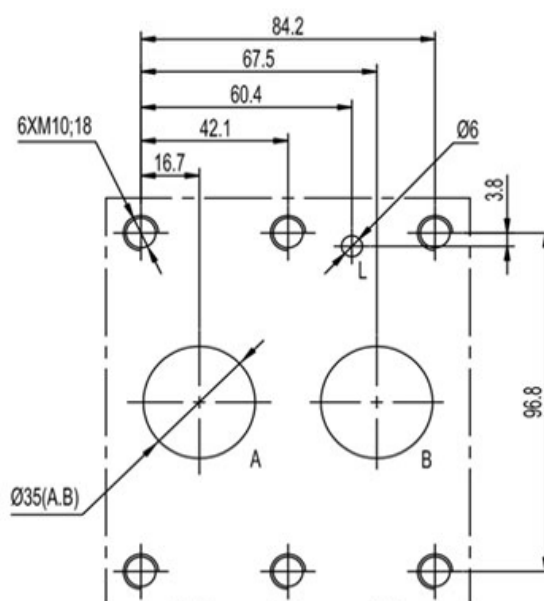
### S20P/S30P subplate installation dimensions

Unit: mm

**S20P**



**S30P**

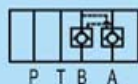




## Modular Valve Series

### Z2S Series Modular Pilot Operated Check Valves

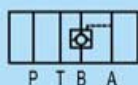
#### Symbols



Z2S\*



Z2S\*A



Z2S\*B



6X Series



7X Series

#### Technical data

Model	Z2S		
Series number	6X		7X
Max. flow rate (l/min)	35	70	50
Max. working pressure (MPa)	31.5		35
Weight (kgs)	0.8	2.1	1
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

Z2S	6	A	1	6X
Product type	Size	Function port	Cracking pressure	Series number
Modular pilot operated check valve	6: NG6 10: NG10	A: A port B: B port No code: A&B port	1: 1.5bar 3: 6bar	6X: 6X series 7X: 7X series (Only for NG6 and A&B function port)

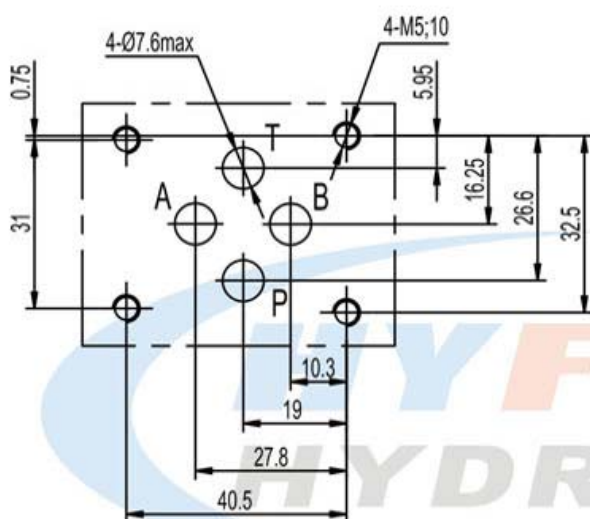
## Modular Valve Series

**B2**

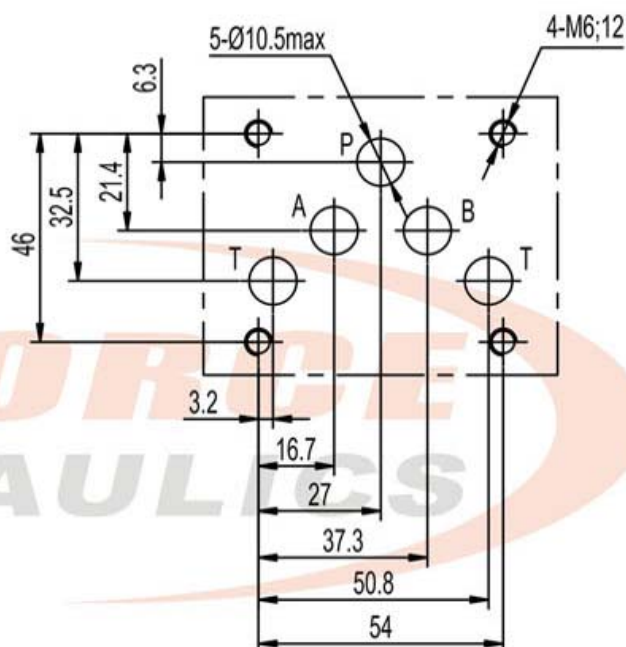
### Z2S subplate installation dimensions

Unit: mm

**Z2S6**



**Z2S10**

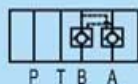




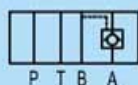
## Modular Valve Series

### MPCV Series Modular Pilot Operated Check Valves

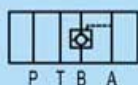
#### Symbols



MPCV--W



MPCV--A



MPCV--B



#### Technical data

Model	MPCV-01	MPCV-02	MPCV-03	MPCV-04	MPCV-06
Max. flow rate (l/min)	15	35	70	200	450
Max. working pressure (MPa)	31.5				
Weight (kgs)	0.55	1.1	2.6	5.5	12.5
Hydraulic fluid	Mineral oil				
Seal material	NBR seals				
Temperature range (°C)	-30 to +80				
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500				
Oil cleanliness class according to ISO4406	Class 20/18/15				

#### How to order

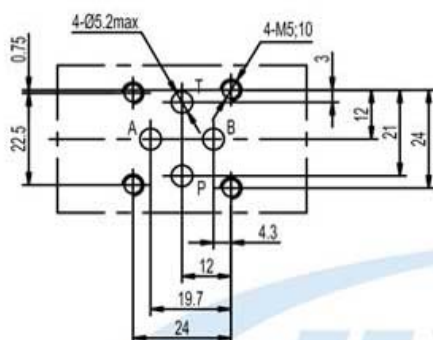
MPCV	02	A	05
Product type	Size	Function port	Cracking pressure
Modular pilot operated check valve	01: NG4 02: NG6 03: NG10 04: NG16 06: NG25	A: A port B: B port W: A&B port	05: 0.35bar 50: 3.5bar

### B4

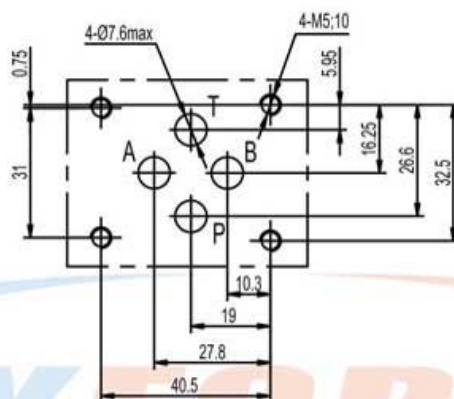
### MPCV subplate installation dimensions

Unit: mm

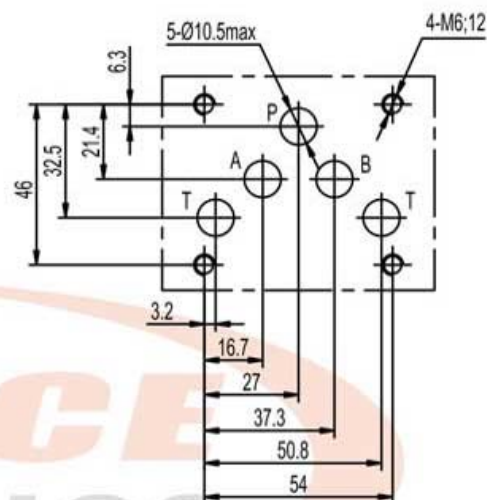
**MPCV-01**



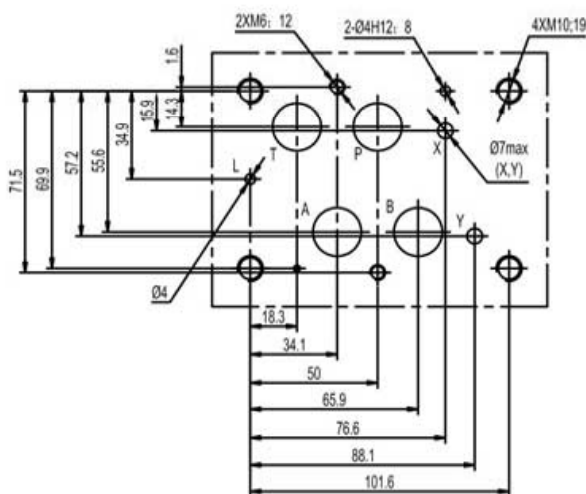
**MPCV-02**



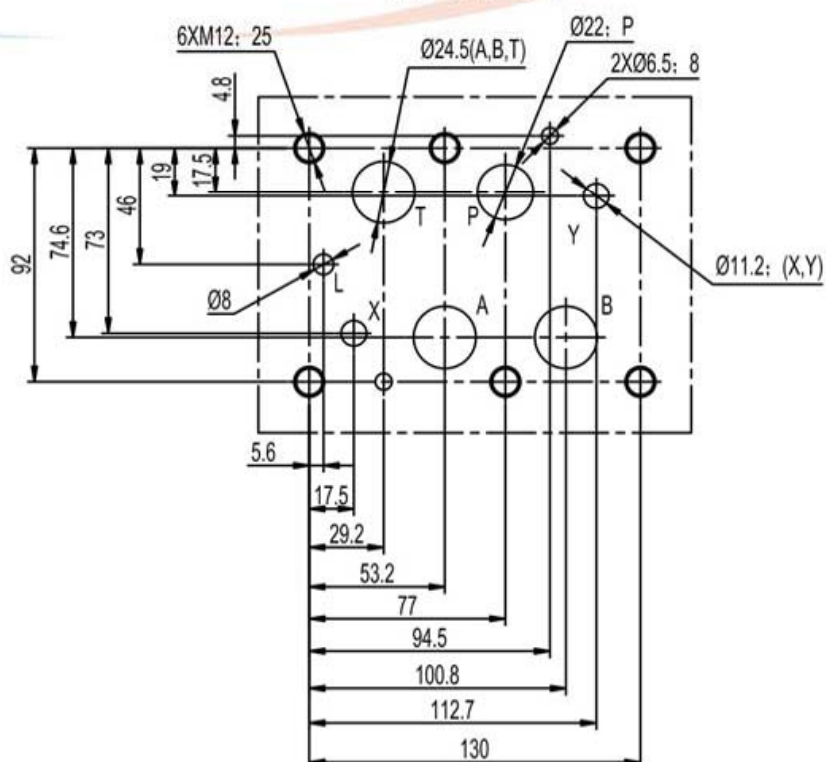
**MPCV-03**



**MPCV-04**



**MPCV-06**

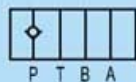




## Modular Valve Series

### MCV Series Modular Check Valves

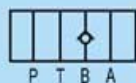
#### Symbols



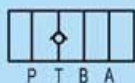
MCV--P



MCV--A



MCV--B



MCV--T



MCV--W



#### Technical data

Model	MCV-02	MCV-03	MCV-04	MCV-06
Max. flow rate (l/min)	35	70	300	450
Max. working pressure (MPa)	25			
Weight (kgs)	1.1	2.5	4.8	10.5
Hydraulic fluid	Mineral oil			
Seal material	NBR seals			
Temperature range (°C)	-30 to +80			
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500			
Oil cleanliness class according to ISO4406	Class 20/18/15			

#### How to order

MCV	02	A	05
Product type	Size	Function port	Cracking pressure
Modular check valve	02: NG6 03: NG10 04: NG16 06: NG25	P: P port A: A port B: B port T: T port W: A & B port	05: 0.35bar 50: 3.5bar

A

B5

C

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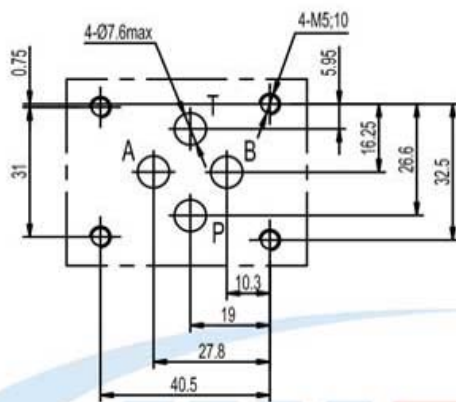
## Modular Valve Series

**B6**

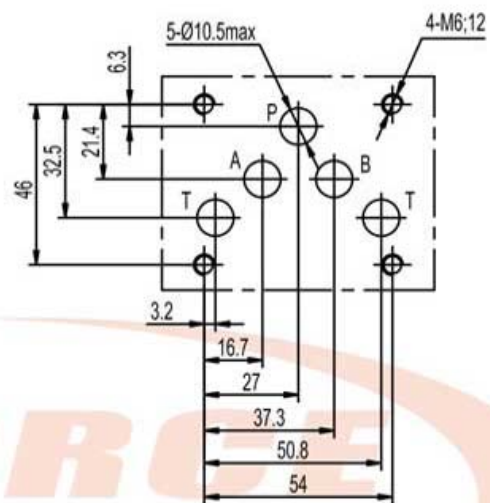
### MCV subplate installation dimensions

Unit: mm

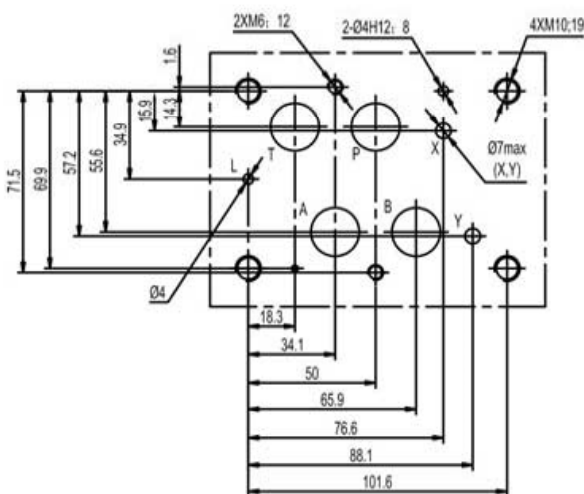
**MCV-02**



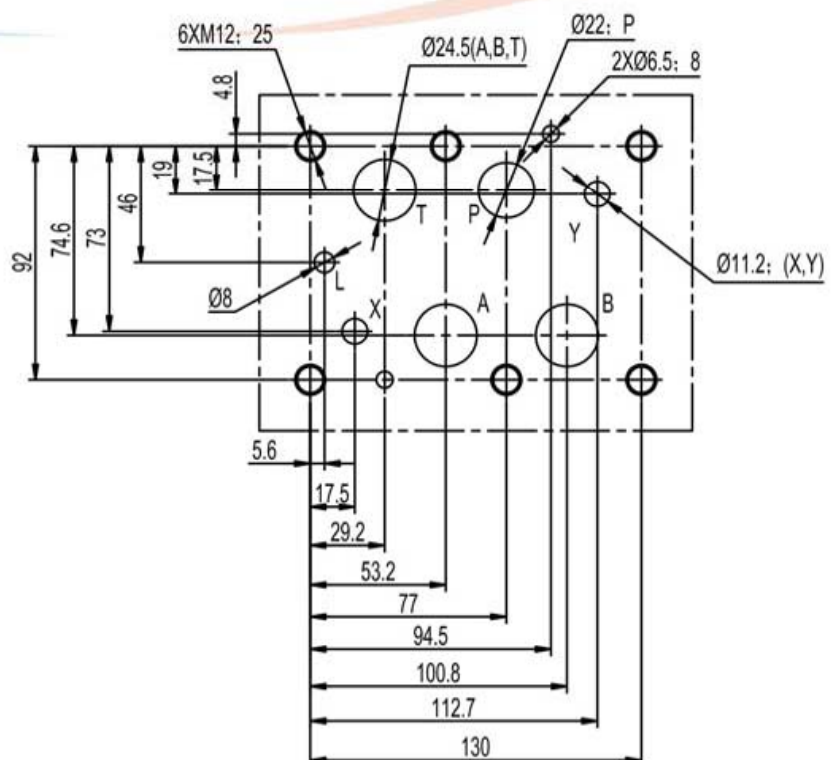
**MCV-03**



**MCV-04**



**MCV-06**

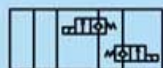




## Modular Valve Series

### MSC Series Modular Solenoid Operated Check Valves

#### Symbols



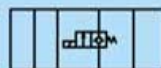
P T B A

MSC-\*W-NC



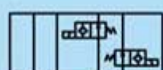
P T B A

MSC-\*A-NC



P T B A

MSC-\*B-NC



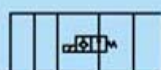
P T B A

MSC-\*W-NO



P T B A

MSC-\*A-NO



P T B A

MSC-\*B-NO



#### Technical data

Model		MSC-02	MSC-03
Max. flow rate (l/min)		20	45
Max. working pressure (MPa)		25	
Weight (kgs)	A, B	1.3	2.9
	W	1.6	3.3
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

#### How to order

MSC	02	A	NC	A220
Product type	Size	Function port	Normal state	Input voltage
Modular solenoid operated check valve	02: NG6 03: NG10	A: A port B: B port W: A&B port	NO: Normally open NC: Normally closed	D12: DC12 D24: DC24 A110: AC110 A220: AC220

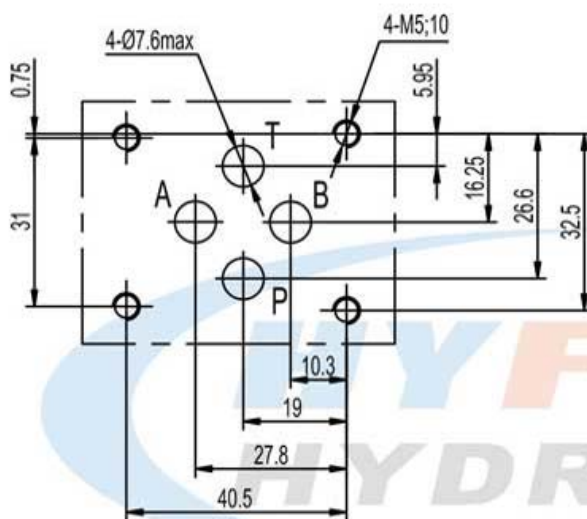
## Modular Valve Series

**B8**

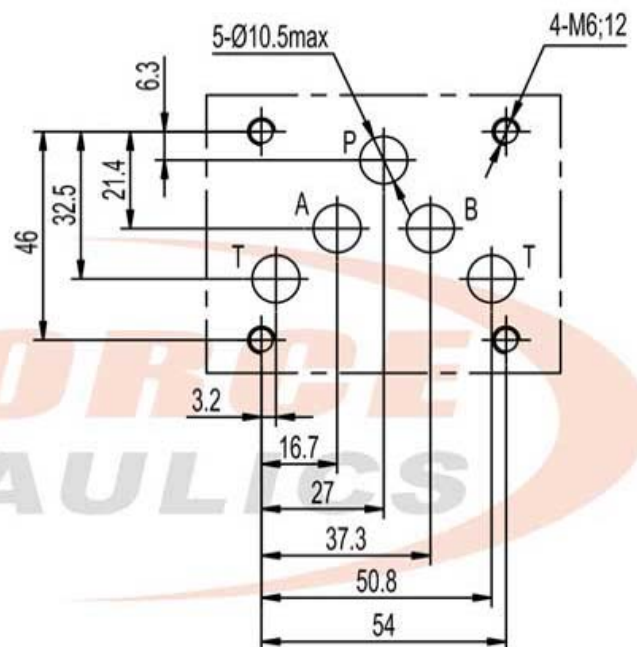
### MSC subplate installation dimensions

Unit: mm

**MSC-02**



**MSC-03**

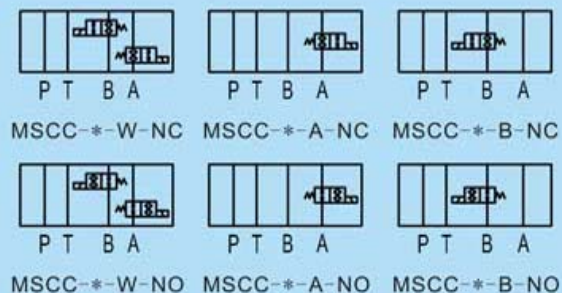




## Modular Valve Series

### MSCC Series Modular Solenoid Operated Double Direction Check Valves

#### Symbols



#### Technical data

Model		MSCC-02	MSCC-03
Max. flow rate (l/min)		20	75
Max. working pressure (MPa)		25	
Weight (kgs)	A, B	1.4	3
	W	1.7	3.4
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

#### How to order

MSCC	02	A	NC	A220
Product type	Size	Function port	Normal state	Input voltage
Modular solenoid operated double direction check valve	02: NG6 03: NG10	A: A port B: B port W: A&B port	NO: Normally open NC: Normally closed	D12: DC12 D24: DC24 A110: AC110 A220: AC220

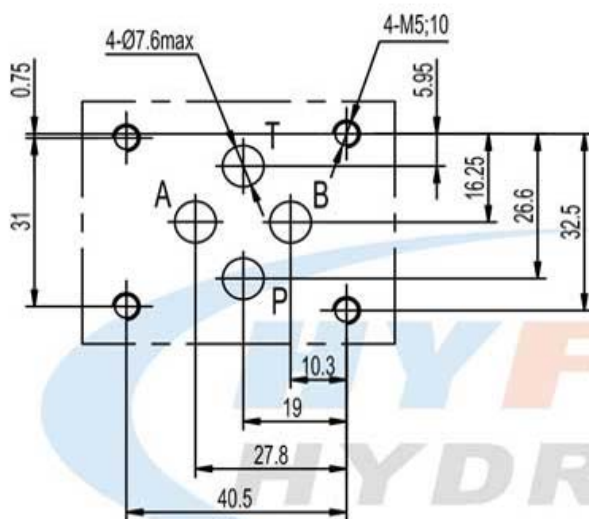
## Modular Valve Series

# B10

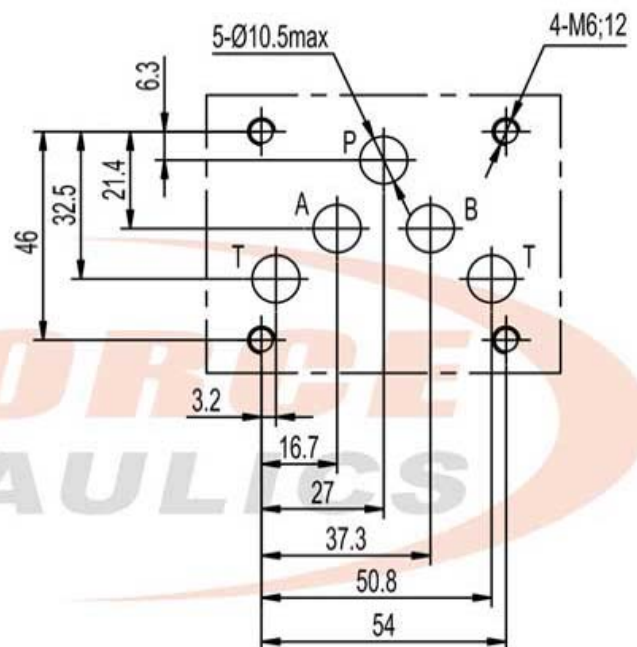
### MSCC subplate installation dimensions

Unit: mm

**MSCC-02**



**MSCC-03**

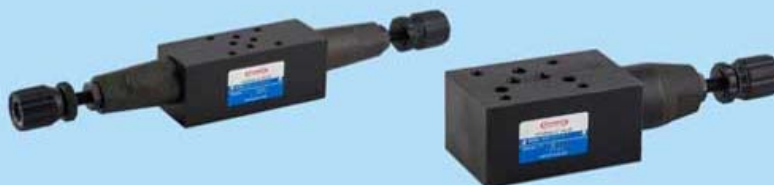
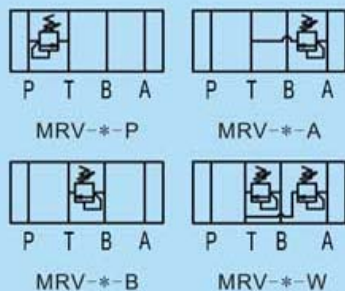




## Modular Valve Series

### MRV Series Modular Relief Valves

#### Symbols



#### Technical data

Model		MRV-02	MRV-03	MRV-04
Max. flow rate (l/min)		35	70	200
Weight (kgs)	A, B, P	1.5	3.4	5.2
	W	2.5	4.5	—
Hydraulic fluid		Mineral oil		
Seal material		NBR seals		
Temperature range (°C)		-30 to +80		
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500		
Oil cleanliness class according to ISO4406		Class 20/18/15		

#### How to order

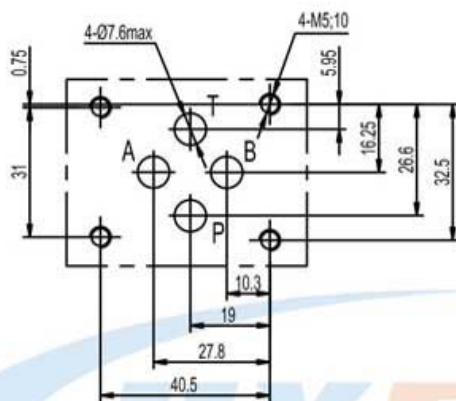
MRV	02	A	K	1
Product type	Size	Function port	Adjustment type	Pressure adjustment range
Modular relief valve	02: NG6 03: NG10 04: NG16	P: P→T A: A→T B: B→T W: A→T & B→T	No code: Without knob K: With plastic knob	1: 8~70bar 2: 35~140bar 3: 70~250bar 4: 100~315bar

## B12

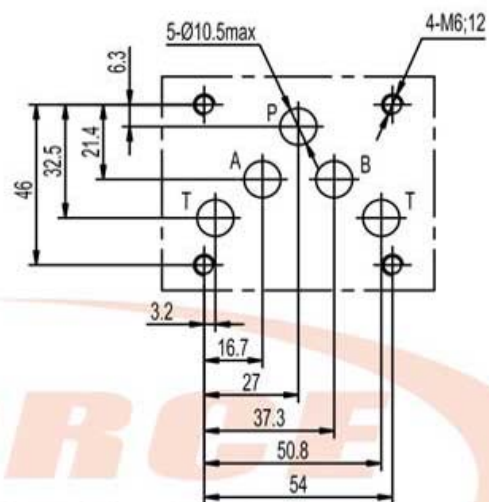
### MRV subplate installation dimensions

Unit: mm

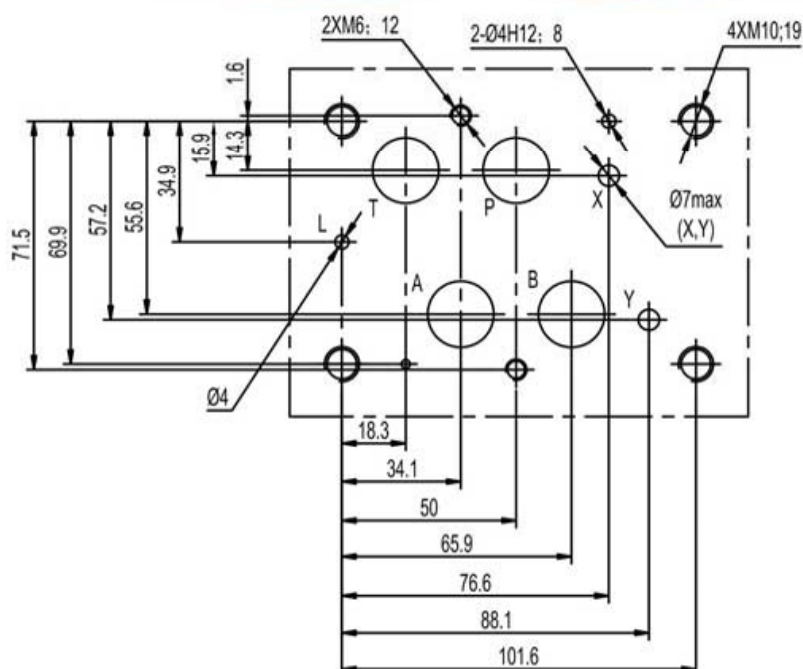
MRV-02



MRV-03



MRV-04

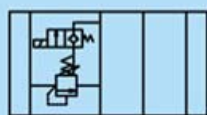




## Modular Valve Series

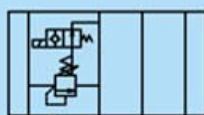
### MSRV Series Modular Solenoid Operated Relief Valves

#### Symbols



P T B A

MSRV--P-NC



P T B A

MSRV--P-NO



#### Technical data

Model	MSRV-02	MSRV-03
Max. flow rate (l/min)	20	
Weight (kgs)	1	3.7
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

MSRV	03	P	NC	K	1	A220
Product type	Size	Function port	Normal state	Adjustment type	Pressure adjustment range	Input voltage
Modular solenoid operated relief valve	02: NG6 03: NG10	P: P→T	NO: Normal open NC: Normal closed	No code: Without knob K: With plastic knob	1: 8~70bar 2: 35~140bar 3: 70~250bar 4: 100~315bar	D12: DC12 D24: DC24 A110: AC110 A220: AC220

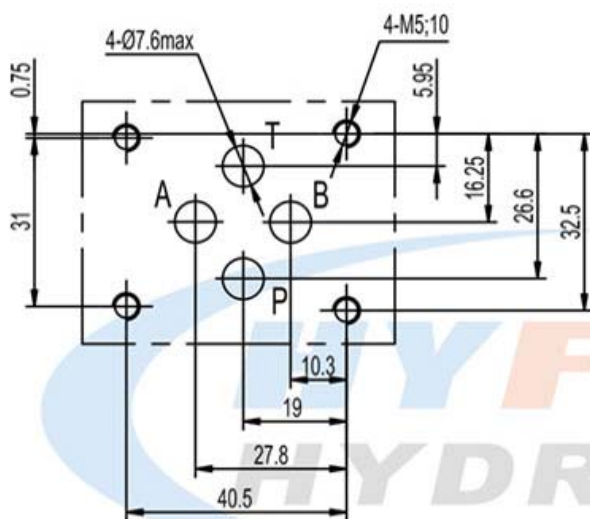
A  
B13  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## B14

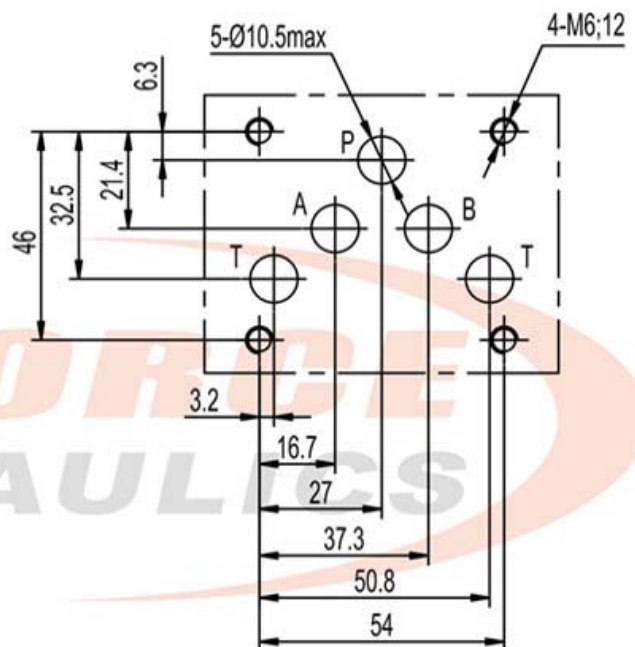
### MSRV subplate installation dimensions

Unit: mm

**MSRV-02**



**MSRV-03**

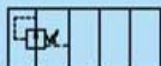




## Modular Valve Series

### MPRV Series Modular Pressure Reducing Valves

#### Symbols



P T B A

MPRV--P



P T B A

MPRV--A



P T B A

MPRV--B



#### Technical data

Model	MPRV-02	MPRV-03	MPRV-04
Max. flow rate (l/min)	35	70	300
Weight (kgs)	1.3	3.4	6
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

MPRV	02	A	K	1
Product type	Size	Function port	Adjustment type	Pressure adjustment range
Modular pressure reducing valve	02: NG6 03: NG10 04: NG16	P: P→T A: A→T B: B→T	No code: Without knob K: With plastic knob	1: 8~70bar 2: 35~140bar 3: 70~250bar 4: 100~315bar

A  
B15  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

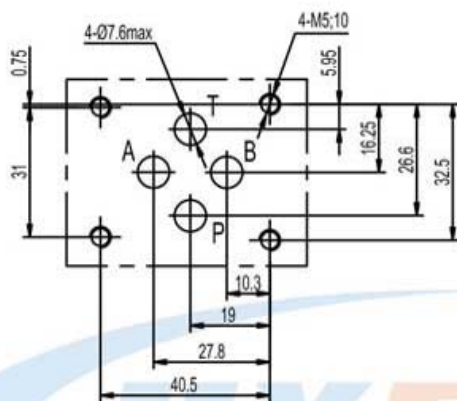
## Modular Valve Series

**B16**

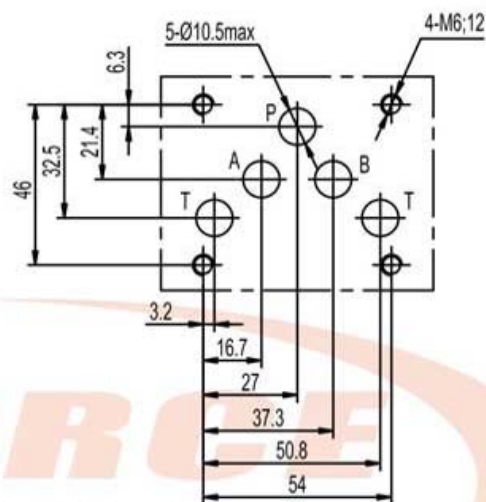
### MPRV subplate installation dimensions

Unit: mm

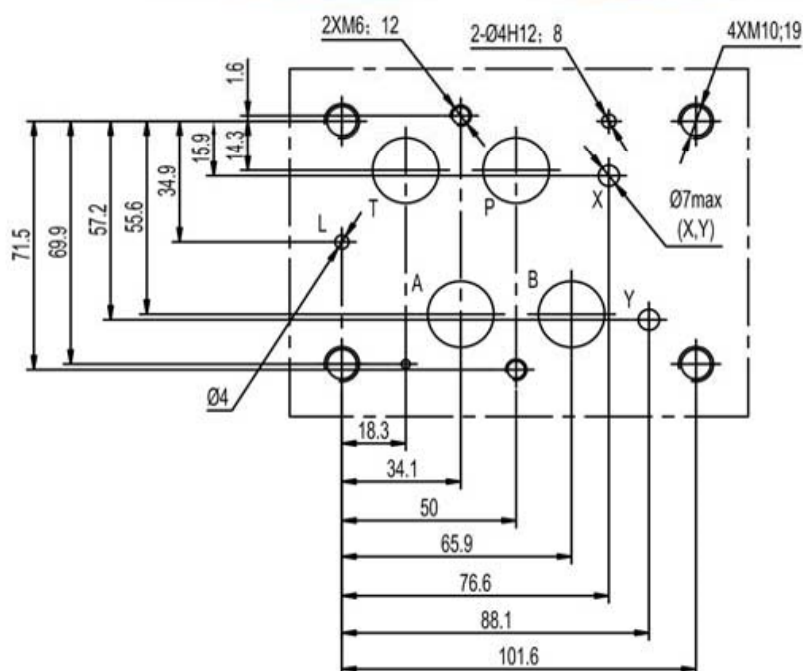
**MPRV-02**



**MPRV-03**



**MPRV-04**





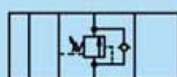
## Modular Valve Series

### MBV Series Modular Balance Valves

#### Symbols



P T B A  
MBV-02-A



P T B A  
MBV-02-B



#### Technical data

Model	MBV-02
Max. flow rate (l/min)	35
Weight (kgs)	1.3
Hydraulic fluid	Mineral oil
Seal material	NBR seals
Temperature range (°C)	-30 to +80
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500
Oil cleanliness class according to ISO4406	Class 20/18/15

#### How to order

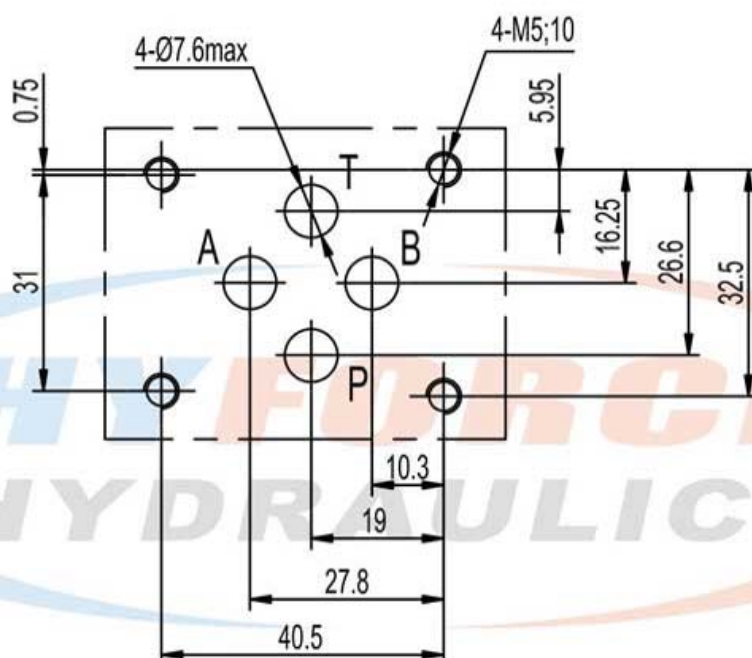
MBV	02	A	K	1
Product type	Size	Function port	Adjustment type	Pressure adjustment range
Modular balance valve	02: NG6	A: A→T B: B→T	No code: Without knob K: With plastic knob	1: 8~70bar 2: 35~140bar 3: 70~250bar 4: 100~315bar

A  
B17  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## B18

### MBV subplate installation dimensions

Unit: mm





## Modular Valve Series

### Z2FS Series Modular Throttle Check Valves

#### Symbols



P T B A

Z2FS...S



P T B A

Z2FS...S2



6X Series



7X Series

#### Technical data

Model	Z2FS6		
Series number	6X		7X
Max. flow rate (l/min)	35	70	30
Max. working pressure (MPa)	31.5		35
Weight (kgs)	0.95	2	1
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

Z2FS	6	6X	S
Product type	Size	Series number	Flow direction control
Modular throttle check valve	6: NG6 10: NG10	6X: 6X series 7X: 7X series (Only for NG6 & S2)	S: Meter in S2: Meter out

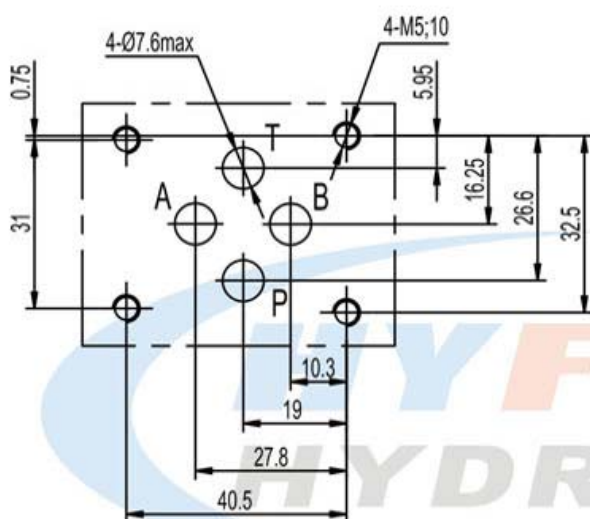
A  
B19  
C  
D  
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F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## B20

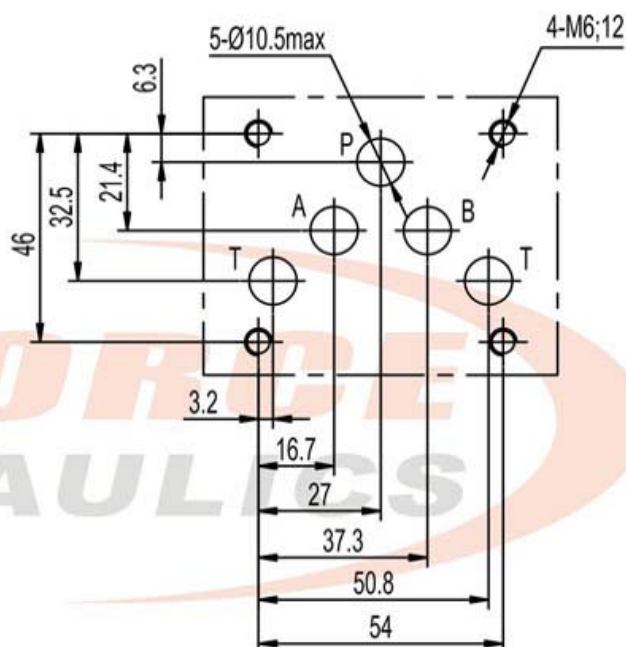
### Z2FS subplate installation dimensions

Unit: mm

**Z2FS6**



**Z2FS10**

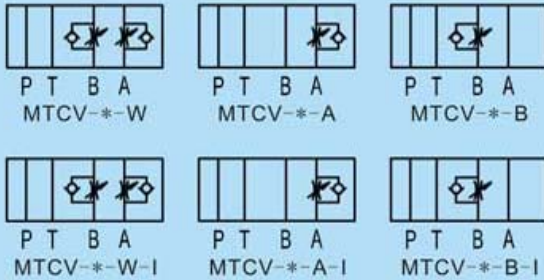




## Modular Valve Series

### MTCV Series Modular Throttle Check Valves

#### Symbols



#### Technical data

Model		MTCV-01	MTCV-02	MTCV-03	MTCV-04	MTCV-06
Max. flow rate (l/min)		15	35	70	300	400
Max. working pressure (MPa)		31.5				
Weight (kgs)	A, B	0.55	1.2	2.6	5.2	12.7
	W	0.6	1.4	2.8	5.5	13.5
Hydraulic fluid		Mineral oil				
Seal material		NBR seals				
Temperature range (°C)		-30 to +80				
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500				
Oil cleanliness class according to ISO4406		Class 20/18/15				

#### How to order

MTCV	02	A	K	I
Product type	Size	Function port	Adjustment type	Flow direction control
Modular throttle check valve	01: NG4 02: NG6 03: NG10 04: NG16 06: NG25	A: A port B: B port W: A&B port	No code: Without knob K: With plastic knob (Not available for size 01)	No code: Meter out I: Meter in

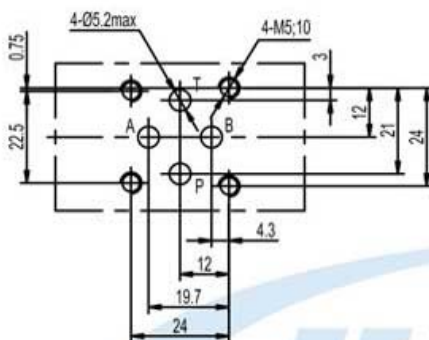
## Modular Valve Series

# B22

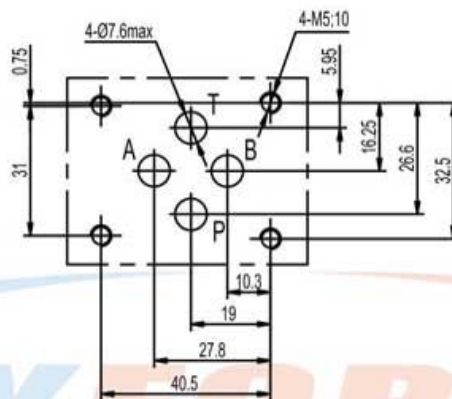
### MTCV subplate installation dimensions

Unit: mm

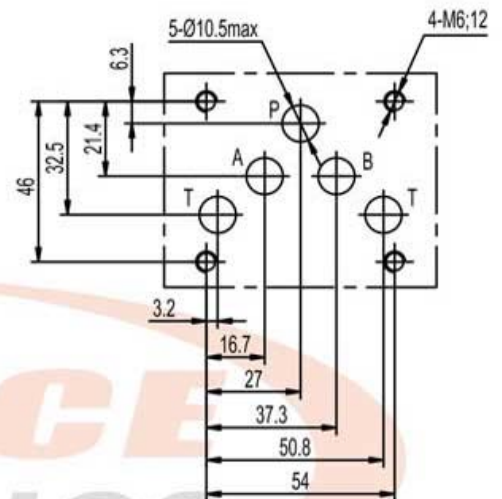
**MTCV-01**



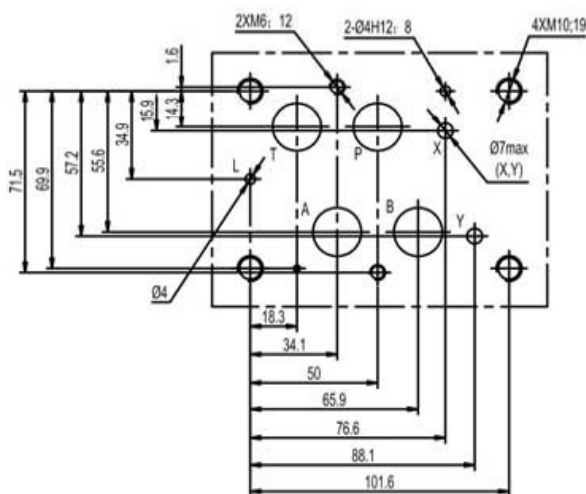
**MTCV-02**



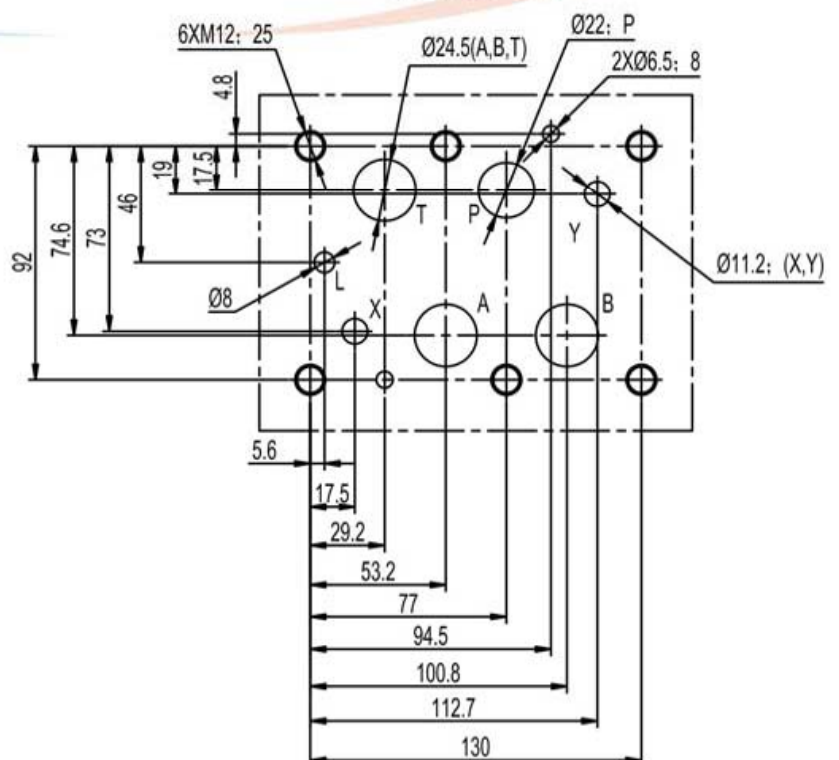
**MTCV-03**



**MTCV-04**



**MTCV-06**

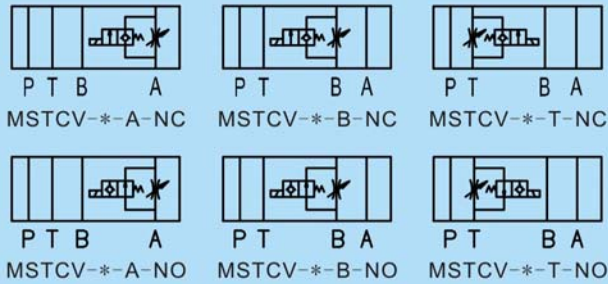




## Modular Valve Series

### MSTCV Series Modular Solenoid Operated Throttle Check Valves

#### Symbols



#### Technical data

Model	MSTCV-02	MSTCV-03
Max. flow rate (l/min)	20	45
Working pressure (MPa)	25	
Weight (kgs)	1.5	2.8
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

MSTCV	02	A	K	NC	A220
Product type	Size	Function port	Adjustment type	Normal state	Input voltage
Modular solenoid operated throttle check valve	02: NG6 03: NG10	A: A port B: B port T: T port	No code: Without knob K: With plastic knob	NO: Normal open NC: Normal closed	D12: DC12 D24: DC24 A110: AC110 A220: AC220

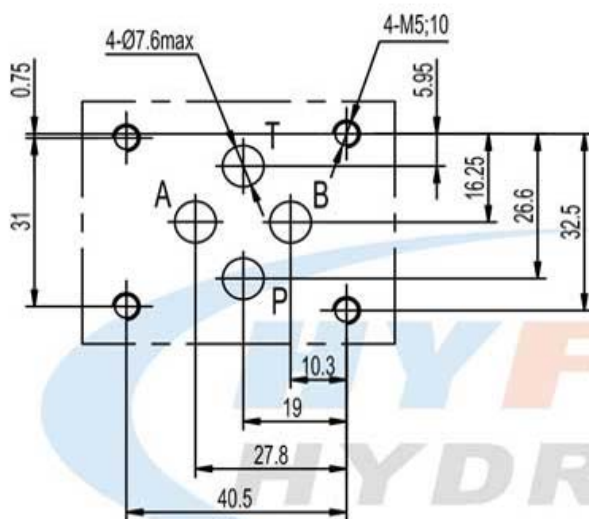
A  
 B23  
 C  
 D  
 E  
 F  
 G  
 H  
 I  
 J  
 K  
 L  
 M  
 N  
 O  
 P

## B24

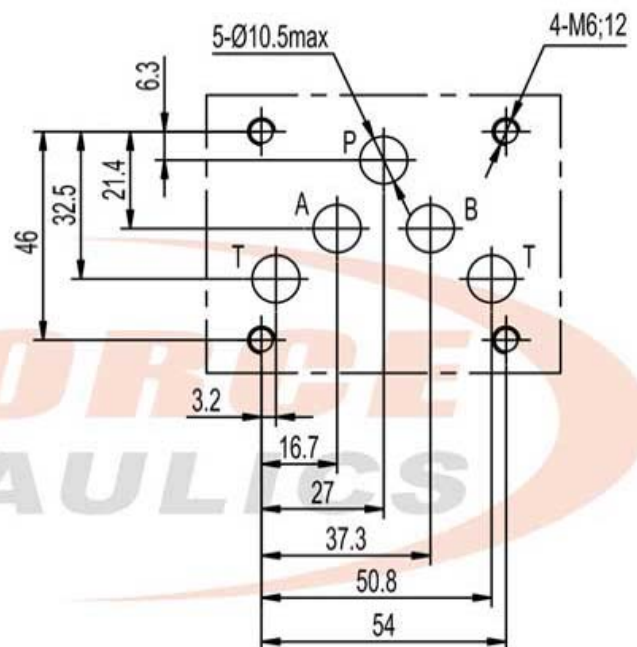
### MSTCV subplate installation dimensions

Unit: mm

**MSTCV-02**



**MSTCV-03**





## Modular Valve Series

### MTV Series Modular Throttle Valves

#### Symbols



P T B A

MTV--P



P T B A

MTV--T



#### Technical data

Model	MTV-02	MTV-03
Max. flow rate (l/min)	35	70
Max. working pressure (MPa)	31.5	
Weight (kgs)	1.2	2.4
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

MTV	02	P	K
Product type	Size	Function port	Adjustment type
Modular throttle valve	02: NG6 03: NG10	P: P port T: T port	No code: Without knob K: With plastic knob

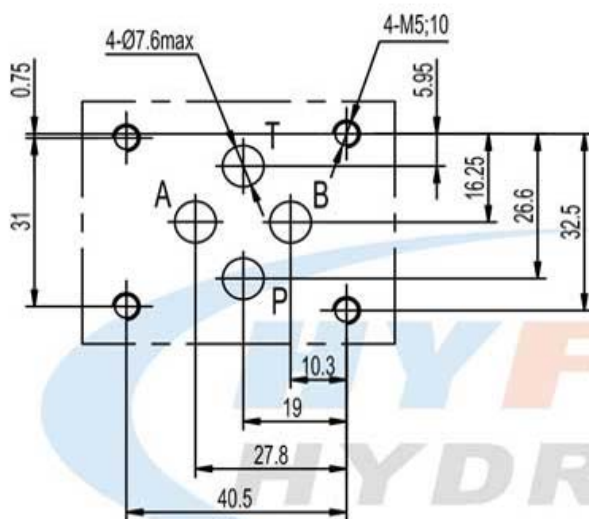
A  
B25  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## B26

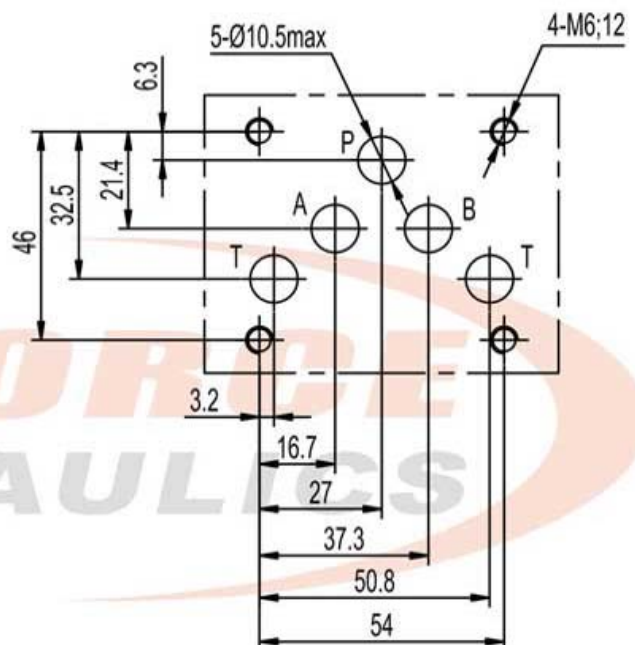
### MTV subplate installation dimensions

Unit: mm

**MTV-02**



**MTV-03**



## Modular Valve Series

### MSTV Series Modular Solenoid Operated Throttle Valves

#### Symbols



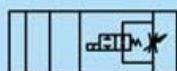
P T B A  
MSTV--A-NC



P T B A  
MSTV--B-NC



P T B A  
MSTV--T-NC



P T B A  
MSTV--A-NO



P T B A  
MSTV--B-NO



P T B A  
MSTV--T-NO



#### Technical data

Model	MSTV-02	MSTV-03
Max. flow rate (l/min)	20	45
Max. working pressure (MPa)	25	
Weight (kgs)	1.5	2.8
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

MSTV	02	A	K	NC	A220
Product type	Size	Function port	Adjustment type	Normal state	Input voltage
Modular solenoid operated throttle valve	02: NG6 03: NG10	A: A port B: B port	No code: Without knob K: With plastic knob	NO: Normally open NC: Normally closed	D12: DC12 D24: DC24 A110: AC110 A220: AC220

A

B27

C

D

E

F

G

H

I

J

K

L

M

N

O

P

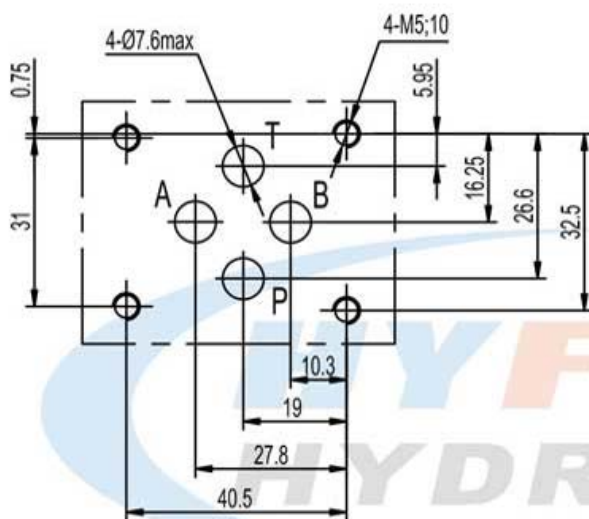


## B28

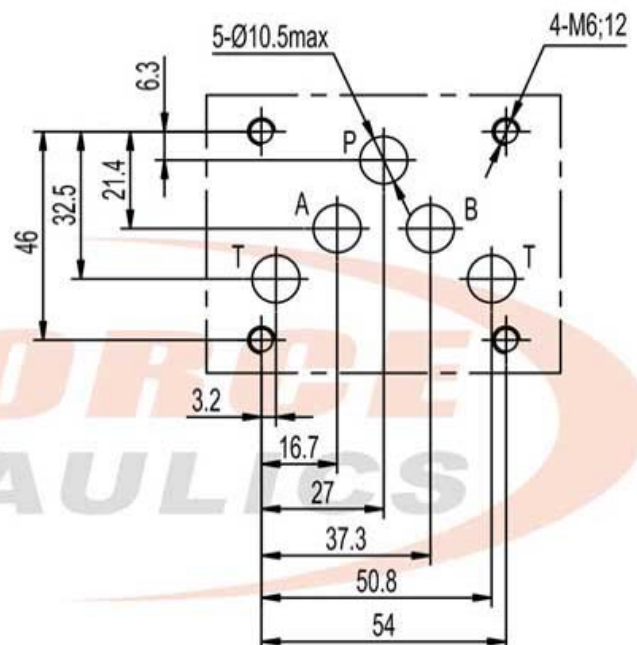
### MSTV subplate installation dimensions

Unit: mm

**MSTV-02**



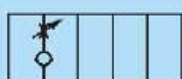
**MSTV-03**



## Modular Valve Series

### MCTV Series Modular Check Throttle Valves

#### Symbols



P T B A

MCTV \* P



#### Technical data

Model	MCTV-02	MCTV-03
Max. flow rate (l/min)	35	70
Max. working pressure (MPa)	31.5	
Weight (kgs)	1.2	2.4
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

MCTV	02	P	K
Product type	Size	Function port	Adjustment type
Modular check throttle valve	02: NG6 03: NG10	P: P port	No code: Without knob K: With plastic knob

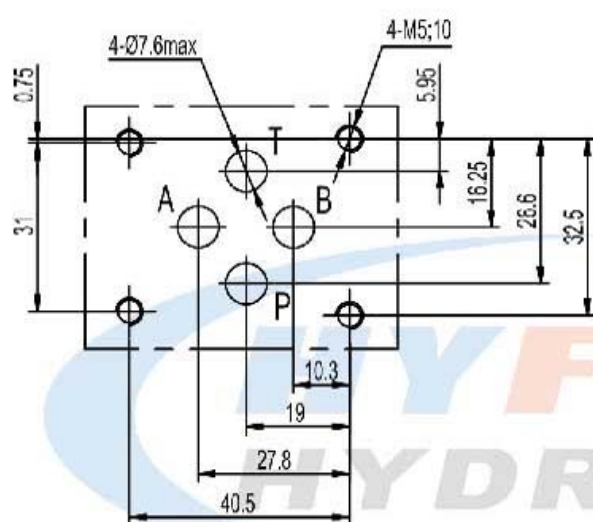
A  
B29  
C  
D  
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F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## B30

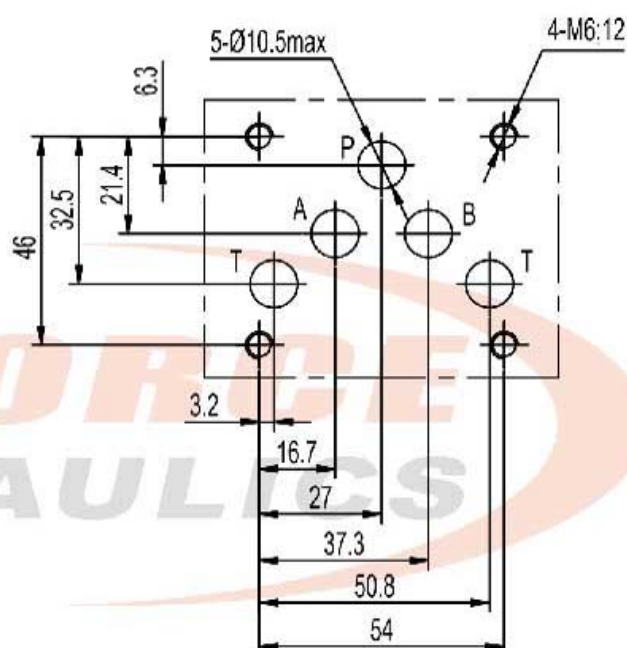
### MCTV subplate installation dimensions

Unit: mm

**MCTV-02**



**MCTV-03**

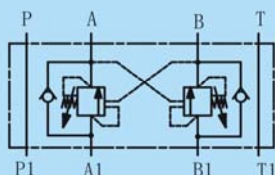




## Modular Valve Series

### MCBV Series Modular Counter Balance Valves

#### Symbols



MCBV-02-W



#### Technical data

Model	MCBV-02-W
Pilot ratio	4.2:1
Max. flow rate (l/min)	30
Max. working pressure (MPa)	35
Weight (kgs)	2.5
Hydraulic fluid	Mineral oil
Seal material	NBR seals
Temperature range (°C)	-30 to +80
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500
Oil cleanliness class according to ISO4406	Class 20/18/15

#### How to order

MCBV	02	W
Product type	Size	Function port
Modular counter balance valve	02: NG6	W: A&B port

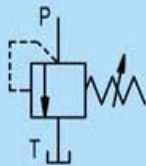
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## Pressure Control Valve Series

### DBD Series Direct Operated Relief Valves

#### Symbol



#### Technical data

Model		DBD- *-6	DBD- *-8	DBD- *-10	DBD- *-15	DBD- *-20
Max. flow rate (l/min)		35	60	80	150	200
Weight (kgs)	K	0.4	—	0.5	—	0.9
	P	1.55	—	3.6	—	7.1
	G	1.6	3.7	3.6	7	6.9
Hydraulic fluid		Mineral oil				
Seal material		NBR seals				
Temperature range (°C)		-30 to +80				
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500				
Oil cleanliness class according to ISO4406		Class 20/18/15				

#### How to order

DBD	H	6	K	100	2
Product type	Adjustment type	Size	Mounting type	Pressure range	Thread type
Direct operated relief valve	S: Bushing with hexagon and protective cap H: Rotary knob	6: NG6 8: NG8 10: NG10 15: NG15 20: NG20	K: Screw-in cartridge valve G: Threaded connection P: Subplate mounting	100: 100bar 200: 200bar 315: 315bar	No code: BSP thread 2: Metric thread

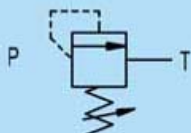




## Pressure Control Valve Series

### DG/DT Series Direct Operated Relief Valves

#### Symbol



#### Technical data

Model	DG-01	DG-02	DT-01	DT-02
Max. flow rate (l/min)	2	16	2	16
Weight (kgs)	1.5	1.55	1.6	1.5
Hydraulic fluid	Mineral oil			
Seal material	NBR seals			
Temperature range (°C)	-30 to +80			
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500			
Oil cleanliness class according to ISO4406	Class 20/18/15			

#### How to order

D	G	02	1
Product type	Mounting type	Size	Pressure adjustment range
Direct operated relief valve	G: Subplate mounting T: Threaded connection	01: NG3 02: NG6	1: 8~70bar 2: 35~140bar 3: 70~250bar

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## Pressure Control Valve Series

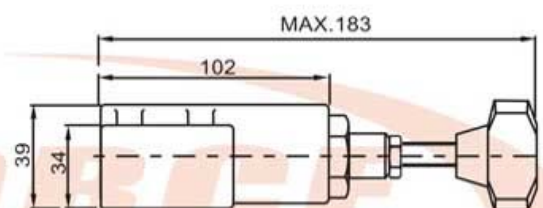
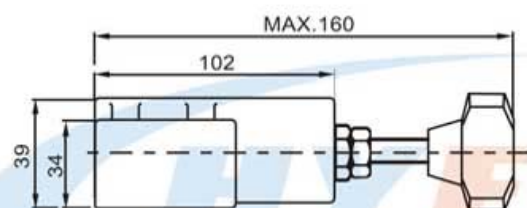
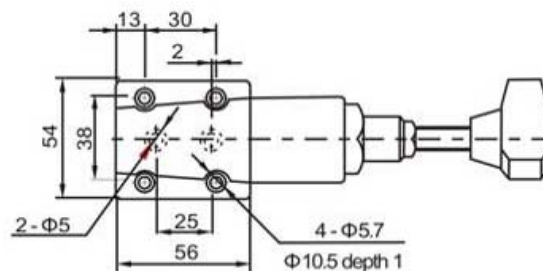
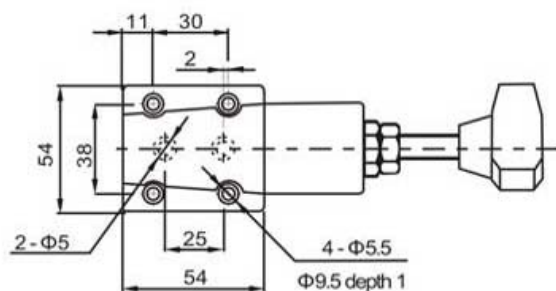
### DG series valve dimensions

**C4**

**DG-01**

**DG-02**

Unit: mm

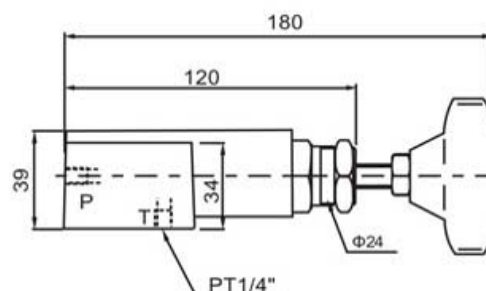
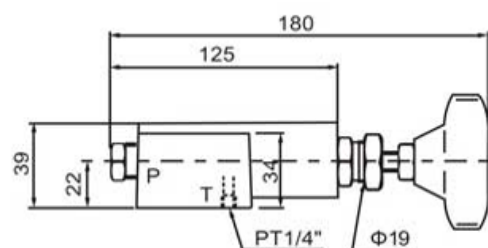
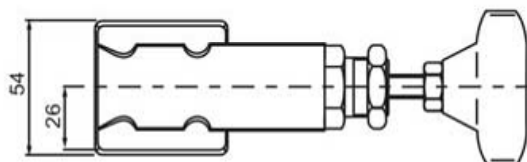
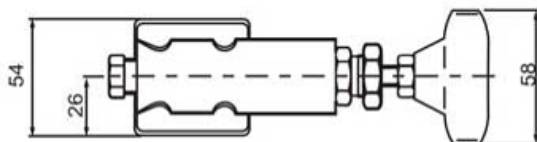


### DT series valve dimensions

**DT-01**

**DT-02**

Unit: mm

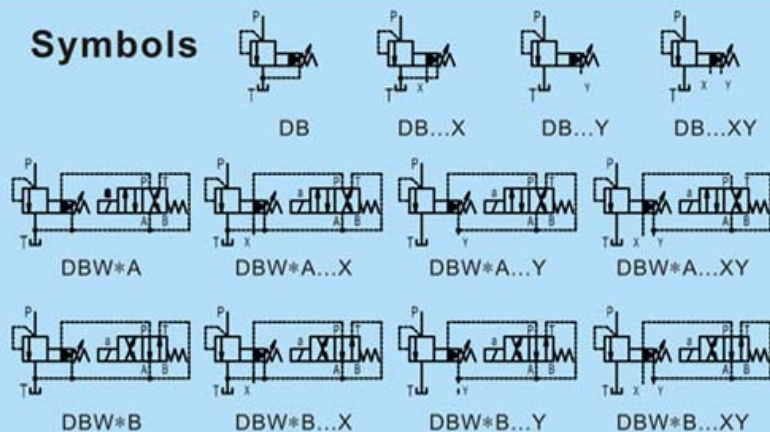




## Pressure Control Valve Series

### DBW Series Solenoid Operated Relief Valves DB Series Pilot Operated Relief Valves

#### Symbols



#### Technical data

Model		DB-10	DB-15	DB-20	DB-25	DB-30
Max. flow rate (l/min)	Subplate mounting	250	—	500	—	650
	Threaded connection	250	450	500	550	600
Weight (kgs)	Subplate mounting	3.2	—	4	—	5.3
	Threaded connection	4.3	4.1	4	5.4	5.2
	Pilot solenoid valve	1.6				
Hydraulic fluid / Seal material		Mineral oil / NBR seals				
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)		-30 to +80 / 2.8 to 500				
Oil cleanliness class according to ISO4406		Class 20/18/15				

#### How to order

DBW	10	B	G
Product type	Size	Normal state	Mounting type
DBW: Solenoid operated relief valve DB: Pilot operated relief valve	Subplate mounting 10: NG10 — 20: NG20 — 30: NG30	10: G1/2" M22×1.5 15: G3/4" M27×2 20: G1" M33×2 25: G1 1/4" M42×2 30: G1 1/2" M48×2	A: Normally closed B: Normally open
			No code: Subplate mounting G: Threaded connection

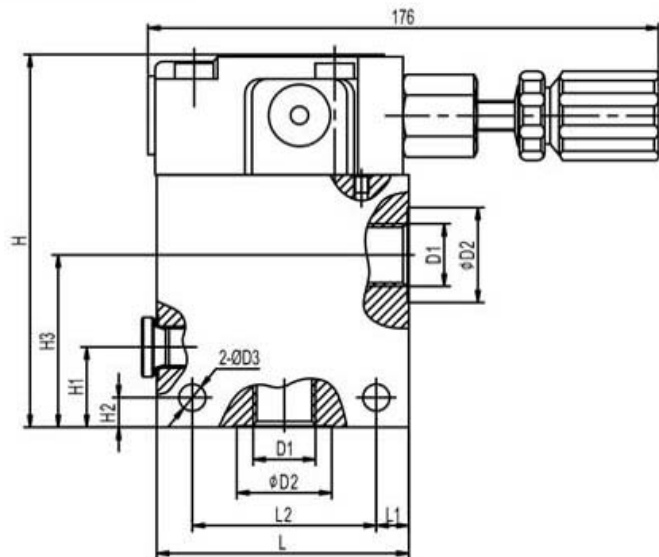
5X	100	XY	U	G24	Z5L
Series number	Setting pressure	Oil control type	Cracking pressure	Input voltage	Connector type
5X series	50: 5MPa 100: 10MPa 200: 20MPa 315: 31.5MPa 350: 35MPa	Refer to symbols	No code: 0.5MPa U: 0.25MPa	G12: DC12 G24: DC24 W110: AC110 W220: AC220	Z4: Standard plug-in connector Z5L: Plug-in connector with light

## Pressure Control Valve Series

### DB\*G series valve dimensions

Unit: mm

**C6**

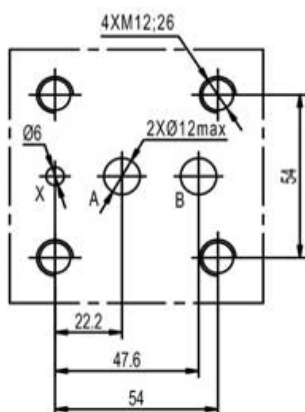


Model	D1		D2	D3	L	L1	L2	H	H1	H2	H3
	BSP thread	Metrice thread									
DB10G	G1/2"	M22×1.5	34	9	85	14	62	125	27	10	62
DB15G	G3/4"	M27×2	42								
DB20G	G1"	M33×2	47								
DB25G	G1 1/4"	M42×2	56		100	18	72	138	40	13	66
DB30G	G1 1/2"	M48×2	61								

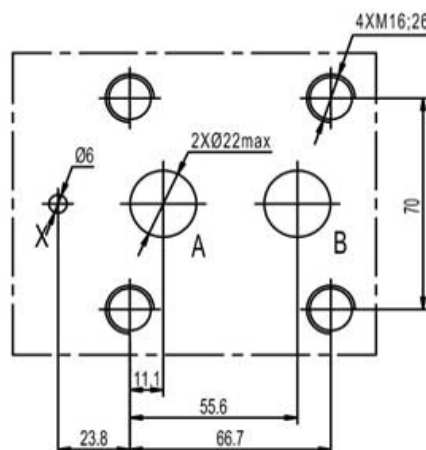
### DB/DBW subplate installation dimensions

Unit: mm

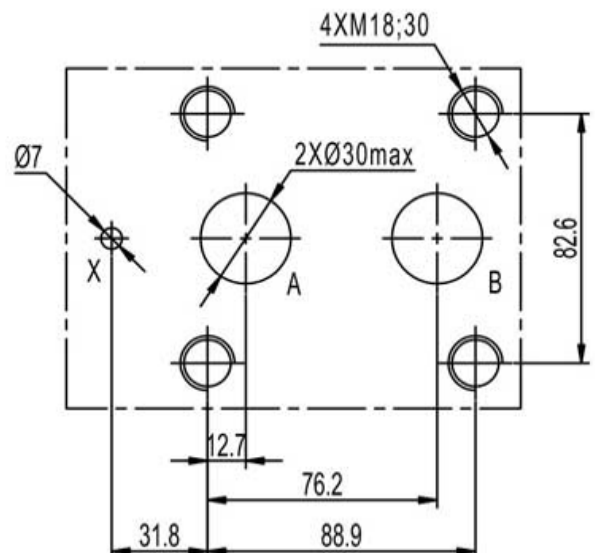
**DB/DBW10**



**DB/DBW20**



**DB/DBW30**

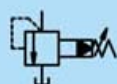




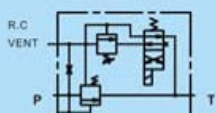
## Pressure Control Valve Series

### SBSG Series Solenoid Operated Relief Valves BSG Series Pilot Operated Relief Valves

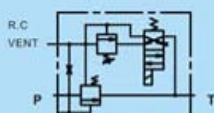
#### Symbols



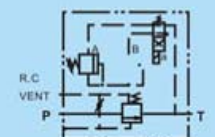
BSG



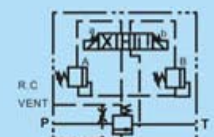
SBSG--NO



SBSG--NC



SBSG--2P



SBSG--2PN



#### Technical data

Model	BSG-03	SBSG-03	2P	2PN	BSG-06	SBSG-06	2P	2PN
Max. flow rate (l/min)	100				200			
Weight (kgs)	4.7	6.3	7.5	8	5.7	7.3	8.5	9
Hydraulic fluid	Mineral oil							
Seal material	NBR seals							
Temperature range (°C)	-30 to +80							
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500							
Oil cleanliness class according to ISO4406	Class 20/18/15							

#### How to order

SBS	G	03	NC	1	A220	DL
Product type	Mounting type	Size	Normal state	Pressure adjustment range	Input voltage	Connector type
BS:Pilot operated relief valve SBS:Solenoid operated relief valve	Subplate mounting	03: NG10 06: NG20	NO: Normal open NC: Normal closed 2P: 2 pressure control 2PN: 2 pressure control normal open	1: 8~70bar 2: 35~140bar 3: 70~250bar	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW:Wire box with light DL:Plug-in connector with light



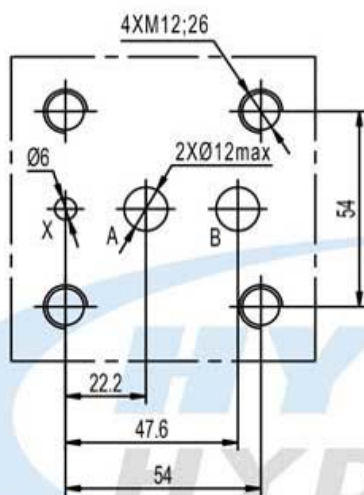
## Pressure Control Valve Series

### BSG/SBSG subplate installation dimensions

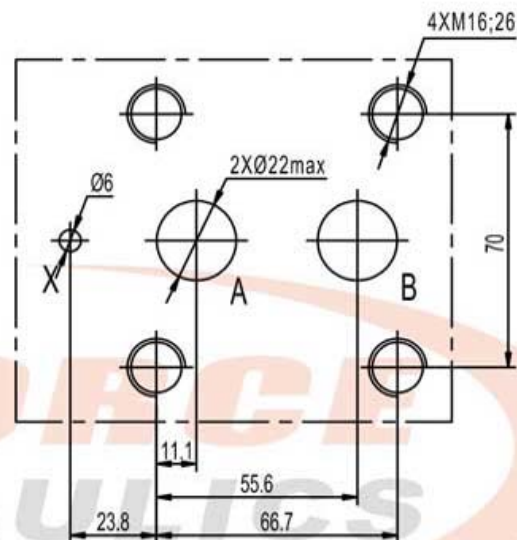
Unit: mm

**C8**

**BSG/SBSG-03**



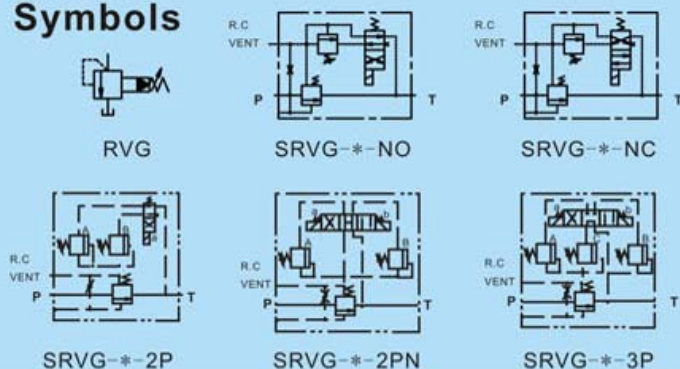
**BSG/SBSG-06**



## Pressure Control Valve Series

### SRVG Series Solenoid Operated Relief Valves RVG Series Pilot Operated Relief Valves

#### Symbols



#### Technical data

Model	RVG-03	SRVG-03	2P	2PN	3P	RVG-06	SRVG-06	2P	2PN	3P
Max. flow rate (l/min)	100					200				
Weight (kgs)	4.7	6.3	7.5	8	9.2	6.3	7.9	9	9.5	10.7
Hydraulic fluid	Mineral oil									
Seal material	NBR seals									
Temperature range (°C)	-30 to +80									
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500									
Oil cleanliness class according to ISO4406	Class 20/18/15									

#### How to order

SRV	G	03	NC	1	A220	DL
Product type	Mounting type	Size	Normal state	Pressure adjustment range	Input voltage	Connector type
RV: Pilot operated relief valve SRV: Solenoid operated relief valve	Subplate mounting	03: NG10 06: NG20	NO: Normal open NC: Normal closed 2P: 2 pressure control 2PN: 2 pressure control normal open 3P: 3 pressure control	1: 8~70bar 2: 35~140bar 3: 70~250bar	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light

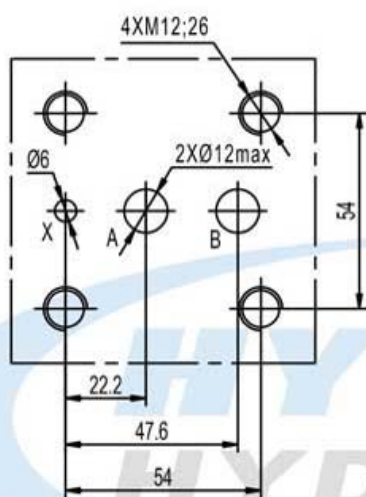
## Pressure Control Valve Series

## RVG/SRVG subplate installation dimensions

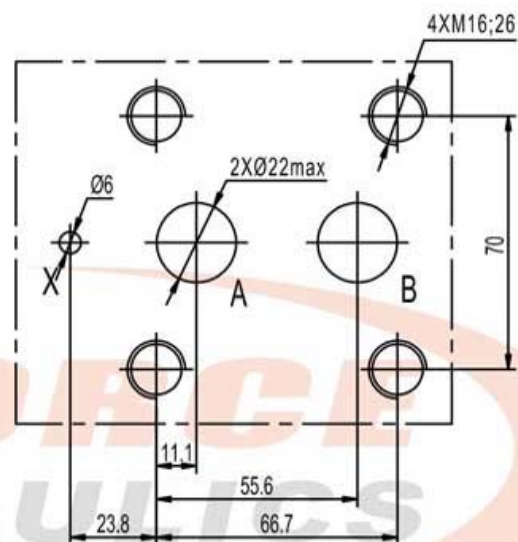
Unit: mm

**C10**

RVG/SRVG-03



RVG/SRVG-06

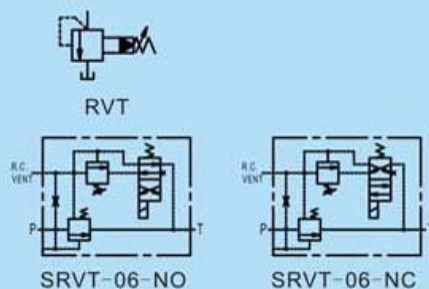




## Pressure Control Valve Series

### SRVT Series Solenoid Operated Relief Valves RVT Series Pilot Operated Relief Valves

#### Symbols



#### Technical data

Model	RVT-04	RVT-06	SRVT-06
Max. flow rate (l/min)	100	200	
Weight (kgs)	2.4	4	5.6
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

SRV	T	04	NC	1	A220	DL
Product type	Mounting type	Size	Normal state	Pressure adjustment range	Input voltage	Connector type
RV: Pilot operated relief valve SRV: Solenoid operated relief valve (only for size 06)	Threaded connection	04: PT1/2" 06: PT3/4"	NO: Normally open NC: Normally closed	1: 8~70bar 2: 35~140bar 3: 70~250bar	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light

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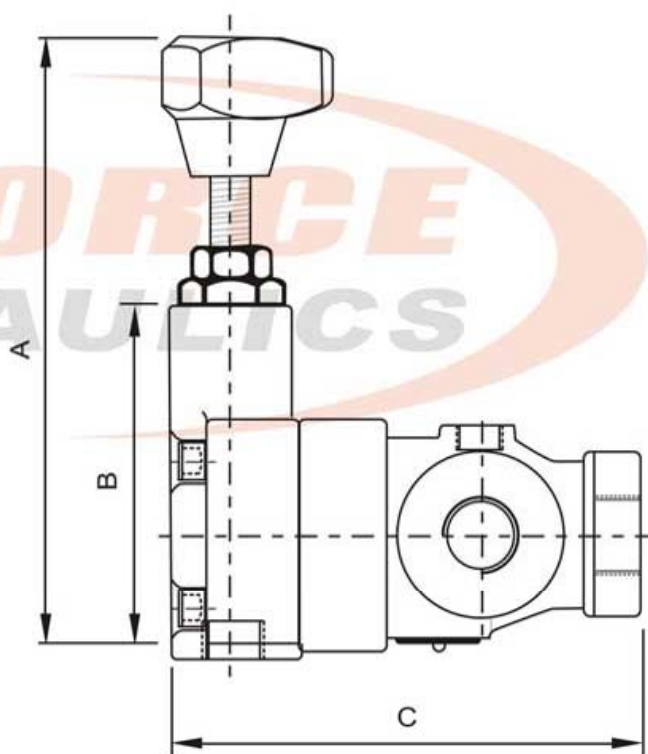
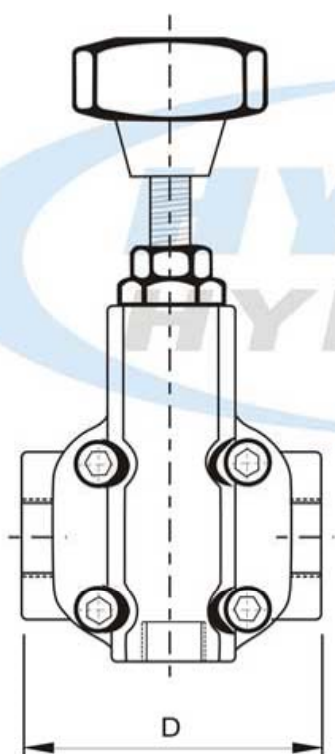
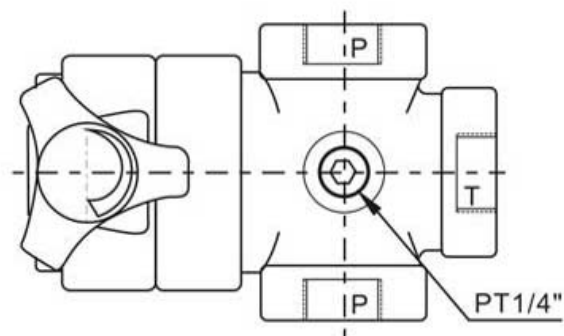
## Pressure Control Valve Series

### RVT series valve dimensions

Unit: mm

**C12**

Model	A	B	C	D	P	T
RVT-04	Max. 142	92	111	84.5	PT 1/2"	PT 1/2"
RVT-06	Max. 148	102	140	103	PT 3/4"	PT 3/4"

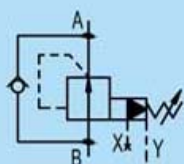




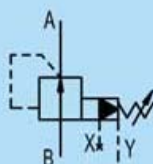
## Pressure Control Valve Series

### DR Series Pilot Operated Pressure Reducing Valves

#### Symbols



DR...Y



DR...YM



#### Technical data

Model	DR-10	DR-20
Max.flow rate (l/min)	150	300
Working pressure (MPa)	35	
Input pressure (MPa)	35	
Output pressure (MPa)	1 to 35	
Back pressure Y port (MPa)	35 (Only used for without check valve)	
Weight (kgs)	3.4	5.3
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

DR	10	6X	100	Y	M
Product type	Size	Series number	Pressure adjustment range	Oil control	Without check valve
Pilot operated pressure reducing valve	10: NG10 20: NG20	6X series	50: 5MPa 100: 10MPa 200: 20MPa 315: 31.5MPa 350: 35MPa	Internal control external drain	No code: With check valve M: Without check valve



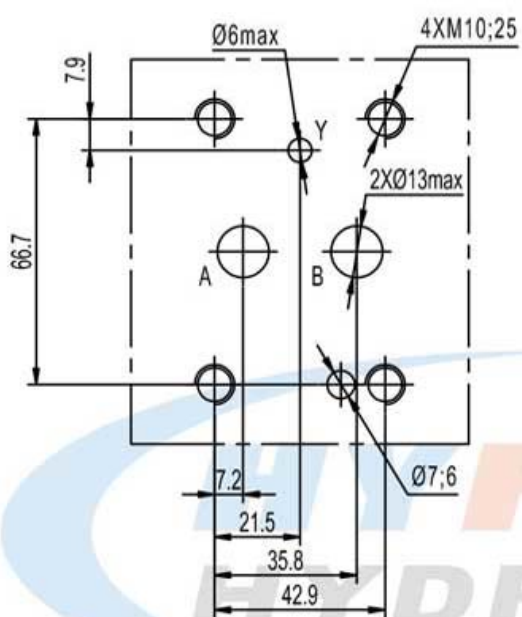
## Pressure Control Valve Series

### DR subplate installation dimensions

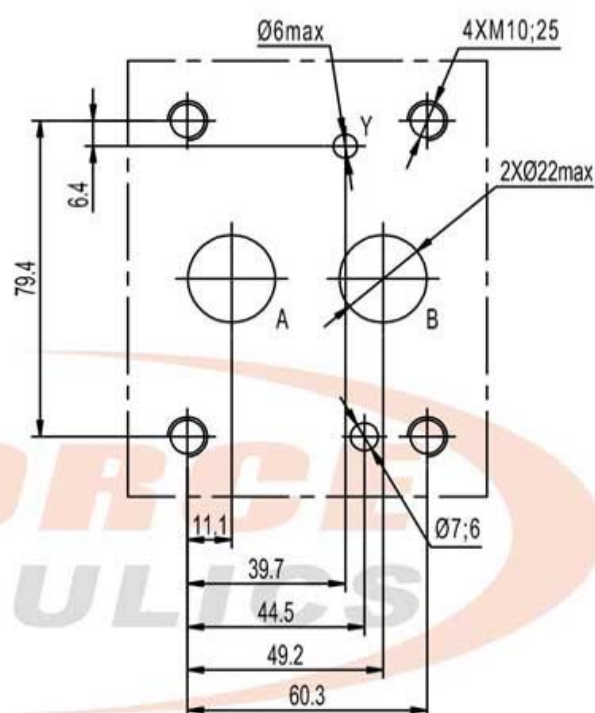
Unit: mm

**C14**

**DR10**



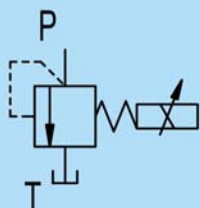
**DR20**



## Proportional Control Valve Series

### EDG Series Proportional Direct Operated Relief Valves

#### Symbol



#### Technical data

Model	EDG-01	
Max. flow rate (l/min)	2	
Min. flow rate (l/min)	0.3	
Pressure adjustment range (bar)	2~140	3~210
Rated current (mA)	900	950
Coil resistance (Ω)	10	
Hysteresis	<3%	
Repeatability	1%	
Weight (kgs)	2.2	
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range (°C)	-30 to +80	
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

ED	G	01	C
Product type	Mounting type	Size	Pressure adjustment range
Proportional direct operated relief valve	Subplate mounting	01: NG3	C: 2~140bar H: 3~210bar

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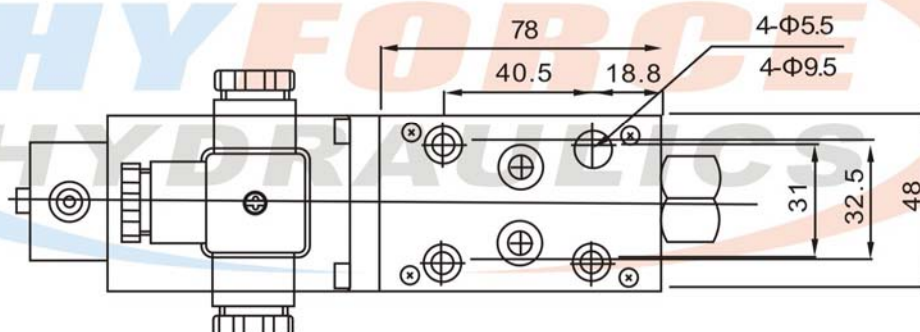
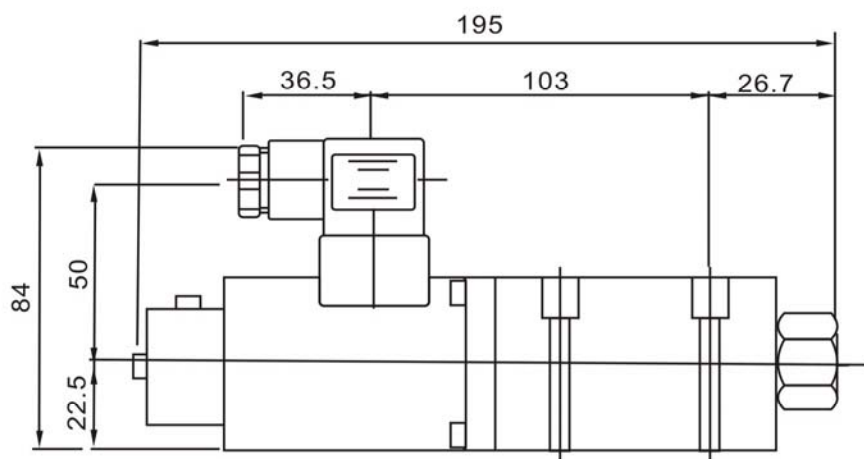


## Proportional Control Valve Series

### EDG series valve dimensions

Unit: mm

D2

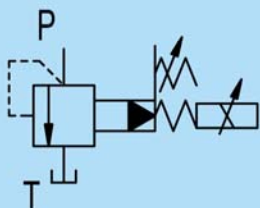




## Proportional Control Valve Series

### EBG Series Proportional Pilot Operated Relief Valves

#### Symbol



#### Technical data

Model	EBG-03		EBG-06	
Max. flow rate (l/min)	100		200	
Pressure adjustment range (bar)	2~140	3~210	2~140	3~210
Rated current (mA)	700	820	750	800
Coil resistance (Ω)	10		10	
Hysteresis	<2%		<2%	
Repeatability	1%		1%	
Weight (kgs)	6.7		7.9	
Hydraulic fluid	Mineral oil			
Seal material	NBR seals			
Temperature range (°C)	-30 to +80			
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500			
Oil cleanliness class according to ISO4406	Class 20/18/15			

#### How to order

EB	G	03	C
Product type	Mounting type	Size	Pressure adjustment range
Proportional pilot operated relief valve	Subplate mounting	03: NG10 06: NG20	C: 2~140bar H: 3~210bar

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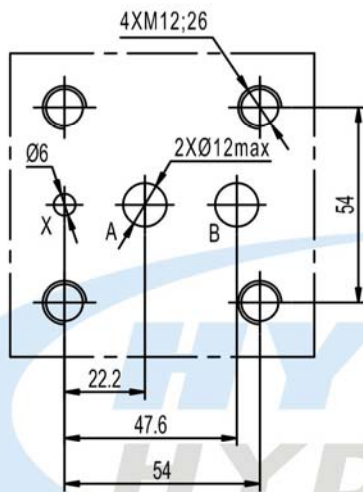
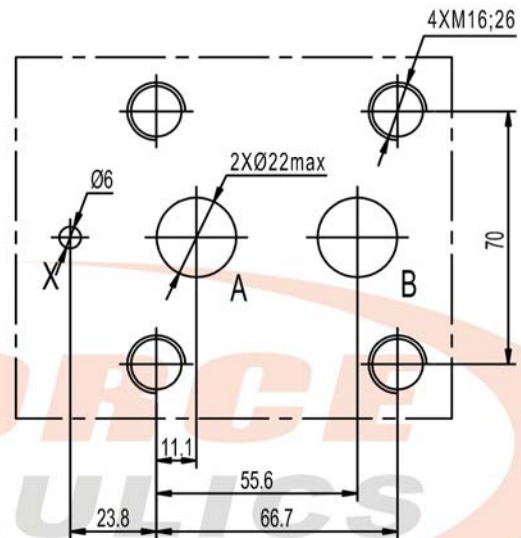
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## Proportional Control Valve Series

## EBG subplate installation dimensions

Unit: mm

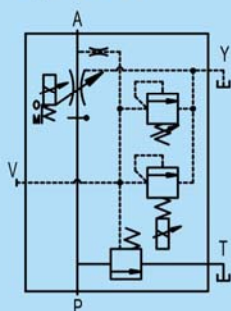
## D4

**EBG-03****EBG-06**

## Proportional Control Valve Series

### EFBG Series Proportional Pressure & Flow Control Valves

#### Symbol



#### Technical data

Model	EFBG-03			EFBG-06		
Flow and pressure adjustment range	1-125l/min	8-140bar	10-210bar	1-250l/min	8-140bar	10-210bar
Rated current (mA)	750	780	820	750	780	820
Coil resistance (Ω)	40	10		40	10	
Hysteresis	<7%	<3%		<7%	<3%	
Repeatability	1%			1%		
Weight (kgs)	17.5			30		
Hydraulic fluid	Mineral oil					
Seal material	NBR seals					
Temperature range (°C)	-30 to +80					
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
Oil cleanliness class	ISO4406, class 20/18/15					

#### How to order

EFB	G	03	125	C
Product type	Mounting type	Size	Max. flow	Pressure adjustment range
Proportional pressure & flow control valve	Subplate mounting	03: NG10 06: NG20	125: 125l/min 250: 250l/min	C: 2~140bar H: 3~210bar

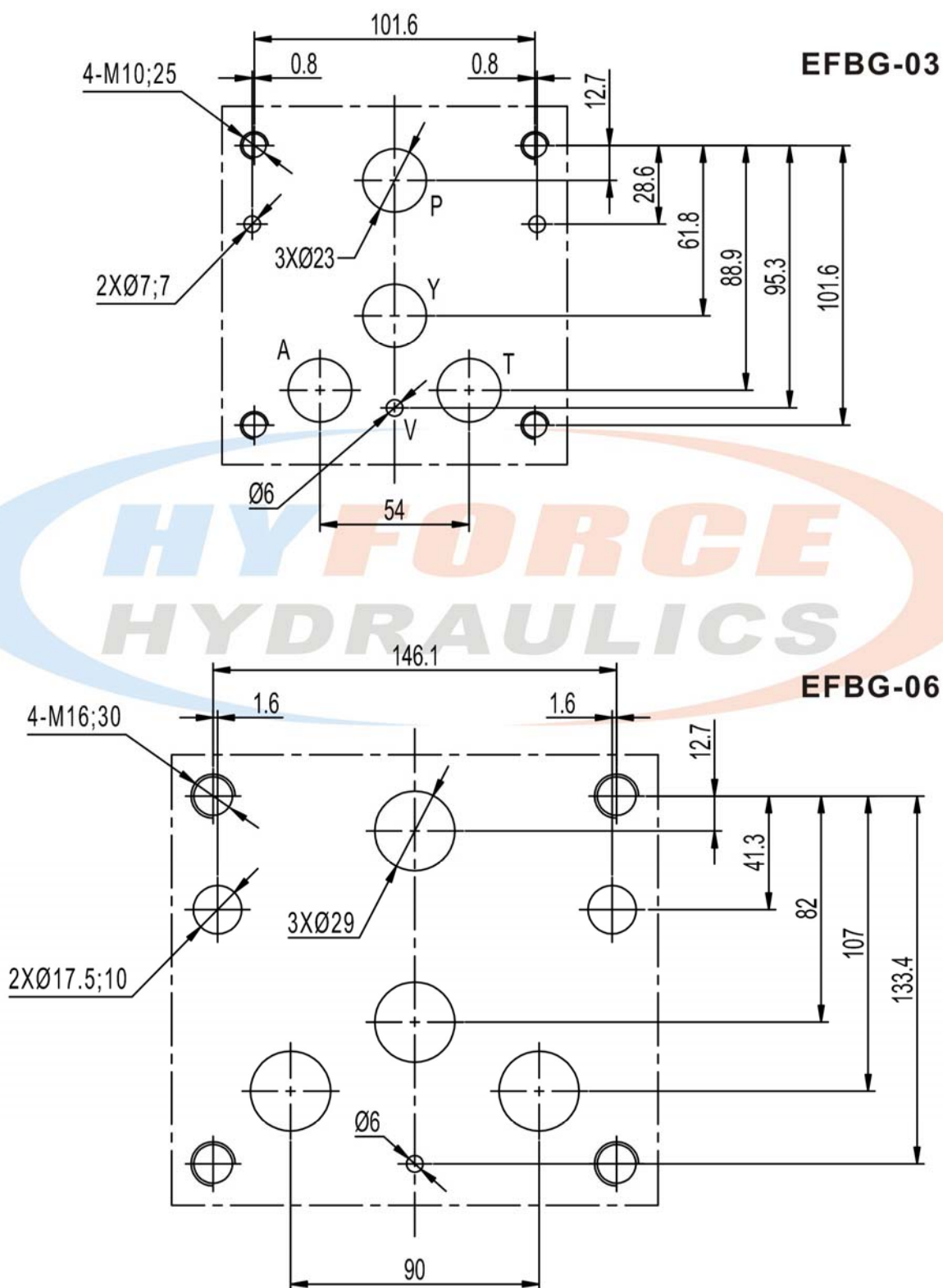


## Proportional Control Valve Series

### EFBG subplate installation dimensions

Unit: mm

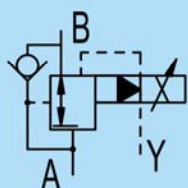
**D6**



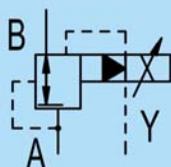
## Proportional Control Valve Series

### DRE Series Proportional Pilot Operated Pressure Reducing Valves

#### Symbol



DRE...Y



DRE...YM



#### Technical data

Model	DRE-03	DRE-06
Max. flow rate (l/min)	80	200
Rated current (mA)	800	
Coil resistance ( $\Omega$ )	19.5	
Hysteresis	<2.5%	
Repeatability	2%	
Weight (kgs)	5.6	7.5
Hydraulic fluid	Mineral oil	
Seal material	NBR seals	
Temperature range ( $^{\circ}\text{C}$ )	-30 to +80	
Viscosity range ( $\text{mm}^2/\text{s}$ )	2.8 to 500	
Oil cleanliness class according to ISO4406	Class 20/18/15	

#### How to order

DRE	03	C	M	Y
Product type	Size	Pressure adjustment range	Without check valve	Oil control
Proportional pilot operated pressure reducing valve	03: NG10 06: NG20	C: 2~140bar H: 3~210bar	No code: With check valve M: Without check valve	Internal control external drain

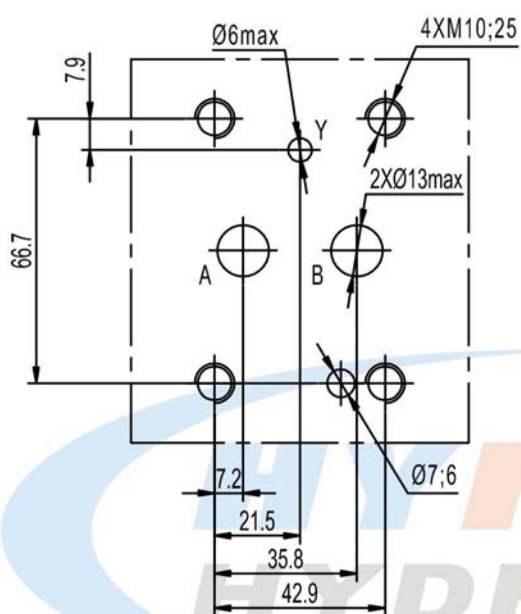
## Proportional Control Valve Series

## DRE subplate installation dimensions

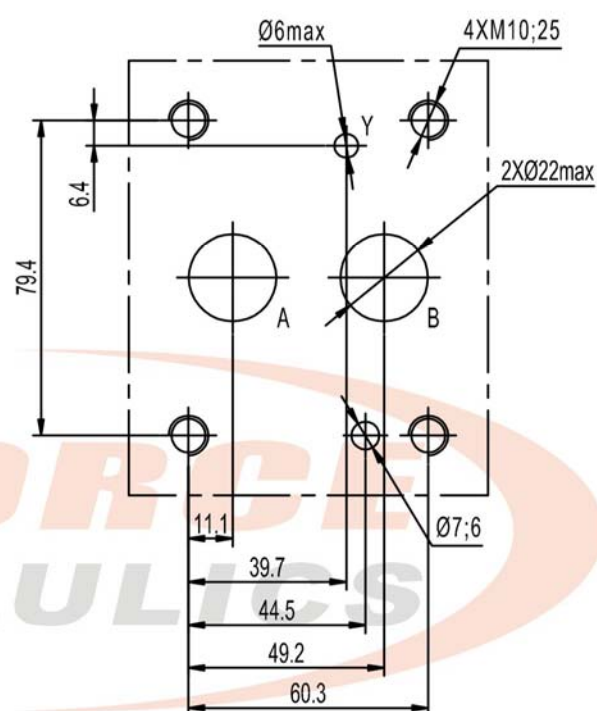
Unit: mm

D8

**DRE-03**



**DRE-06**







## Proportional Control Valve Series

### 4WRA Series Proportional Directional Control Valves



#### Technical data

Model		4WRA6
Max. flow rate (l/min)		18
Max. working pressure (MPa)	A, B, P port	25
	T port	16
Weight (kgs)	Single solenoid type	1.9
	Double solenoids type	2.8
Hydraulic fluid		Mineral oil
Seal material		NBR seals
Temperature range (°C)		-30 to +80
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500
Oil cleanliness class according to ISO4406		Class 20/18/15

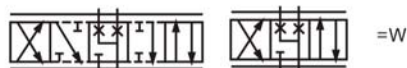
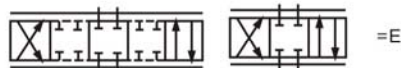
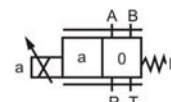
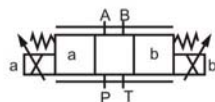
#### How to order

4WRA	6	E	2X	G24
Product type	Size	Spool symbol	Series number	Input voltage
Proportional directional control valve	6: NG6	Refer to spool symbols	2X series	G24: DC24

A  
B  
C  
D9  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P

## Proportional Control Valve Series

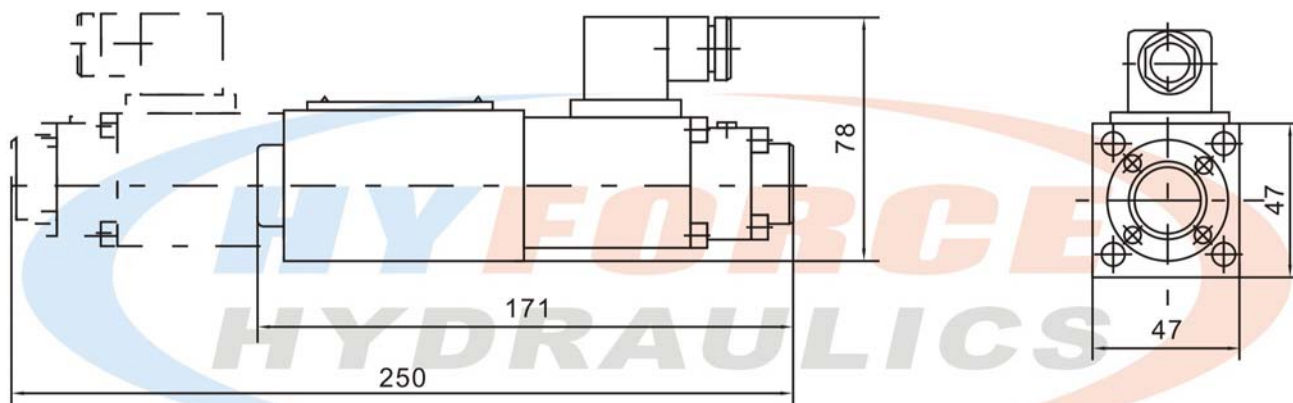
### Spool symbols



**D10**

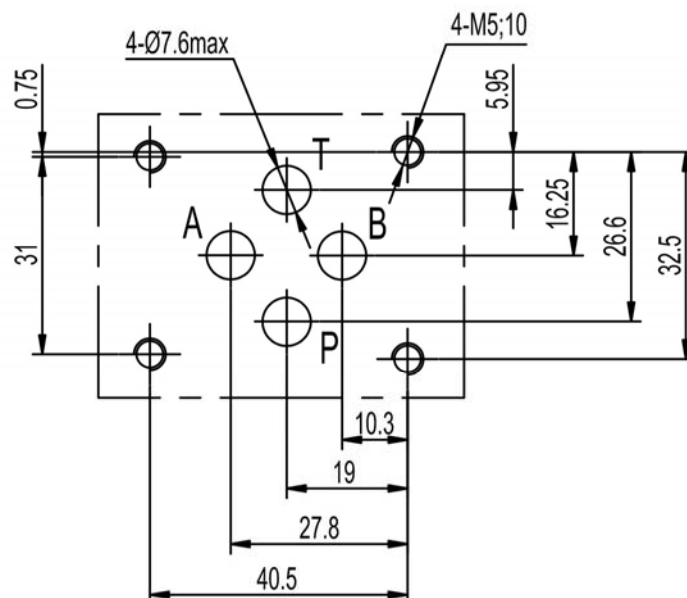
### 4WRA6 series valve dimensions

Unit: mm



### 4WRA6 subplate installation dimensions

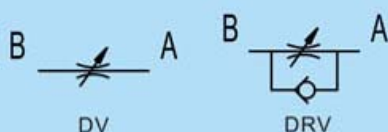
Unit: mm



## Flow Control Valve Series

### DRV Series Throttle Check Valves DV Series Throttle Valves

#### Symbols



#### Technical data

Size		6	8	10	12	16	20	25
Max. flow rate (l/min)		15	25	35	50	120	200	300
Max. working pressure (MPa)		35						
Weight (kgs)	DV	0.28	0.46	0.45	0.8	1.07	2	3.5
	DRV	0.28	0.46	0.45	0.8	1.07	2	3.5
Hydraulic fluid		Mineral oil						
Seal material		NBR seals						
Temperature range (°C)		-30 to +80						
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500						
Oil cleanliness class according to ISO4406		Class 20/18/15						

#### How to order

DRV	6	2
Product type	Size	Thread type
DV: Throttle valve DRV: Throttle check valve	6: NG6 8: NG8 10: NG10 12: NG12 16: NG16 20: NG20 25: NG25	No code: BSP thread 1: NPT thread 2: Metric thread

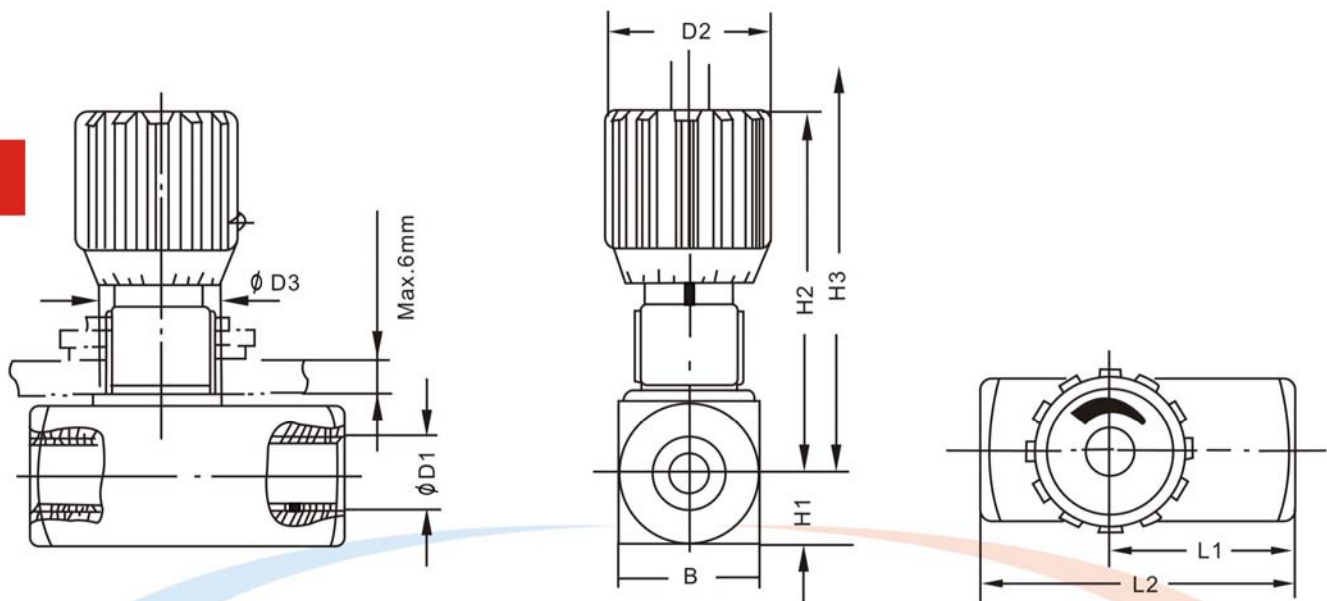


## Flow Control Valve Series

### DV/DRV series valve dimensions

Unit: mm

**E2**

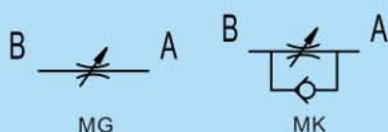


Size	B	D1			D2	D3	H1	H2	H3	L1	L2
		BSP thread	NPT thread	Metrice thread							
6	15	G1/8"	Z1/8"	M10×1	24	16	8	50	55	26	45
8	25	G1/4"	Z1/4"	M14×1.5	29	19	12.5	65	72	33.5	
10	30	G3/8"	Z3/8"	M18×1.5	38	23	15	67	74	41	65
12	35	G1/2"	Z1/2"	M22×1.5			17.5	82	92	44	73
16	45	G3/4"	Z3/4"	M27×2			22.5	96	106	57	85
20	50	G1"	Z1"	M33×2	49	38	25	128	145	77	127
25	60	G1 1/4"	Z1 1/4"	M48×2			30	133	150	93	143

## Flow Control Valve Series

### MK Series Throttle Check Valves MG Series Throttle Valves

#### Symbols



#### Technical data

Size	6	8	10	15	20	25	30
Max. flow rate (l/min)	15	30	50	140	200	300	400
Max. working pressure (MPa)	31.5						
Cracking pressure (bar)	0.5						
Weight (kgs)	0.3	0.4	0.7	1.1	1.9	3.2	4.1
Hydraulic fluid	Mineral oil						
Seal material	NBR seals						
Temperature range (°C)	-30 to +80						
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500						
Oil cleanliness class according to ISO4406	Class 20/18/15						

#### How to order

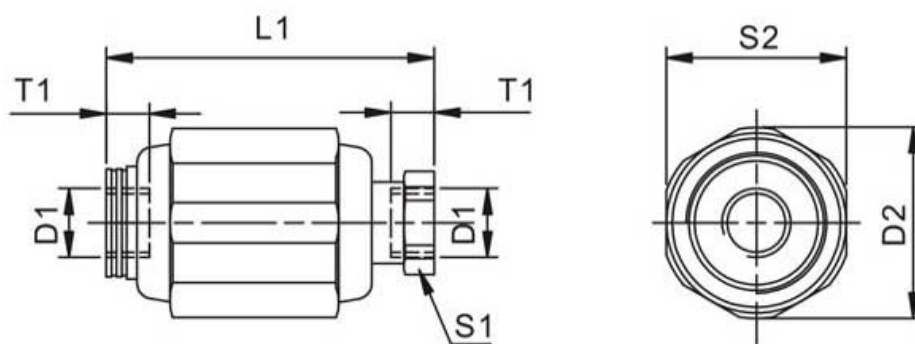
MG	6	G	1.2	2
Product type	Size	Mounting type	Serial number	Thread type
MG: Throttle valve MK: Throttle check valve	6: NG6 8: NG8 10: NG10 15: NG15 20: NG20 25: NG25 30: NG30	Threaded connection	1.0~1.9 serial number unchanged installation and connection dimensions	No code: BSP thread 2: Metric thread

## Flow Control Valve Series

### MG/MK series valve dimensions

Unit: mm

E4



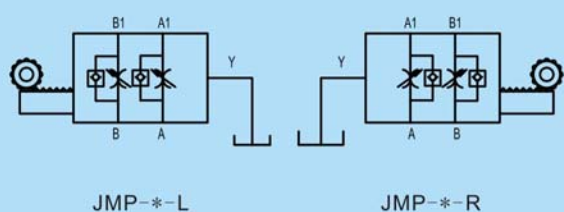
Size	D1		D2	L1	S1	S2	T1
	BSP thread	Metrice thread					
6	G1/4"	M14×1.5	34	65	22	32	12
8	G3/8"	M18×1.5	38	65	24	36	12
10	G1/2"	M22×1.5	48	80	30	46	14
15	G3/4"	M27×2	58	100	41	55	16
20	G1"	M33×2	72	110	46	70	18
25	G1 1/4"	M42×2	87	130	55	85	20
30	G1 1/2"	M48×2	93	150	60	90	22



## Flow Control Valve Series

### JMP Series Mechanical Operated Throttle Check Valves

#### Symbols



#### Technical data

Model	JMP-03	JMP-04	JMP-06
Max. flow rate (l/min)	200	250	300
Working pressure (MPa)	31.5		
Weight (kgs)	6	12	11.8
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

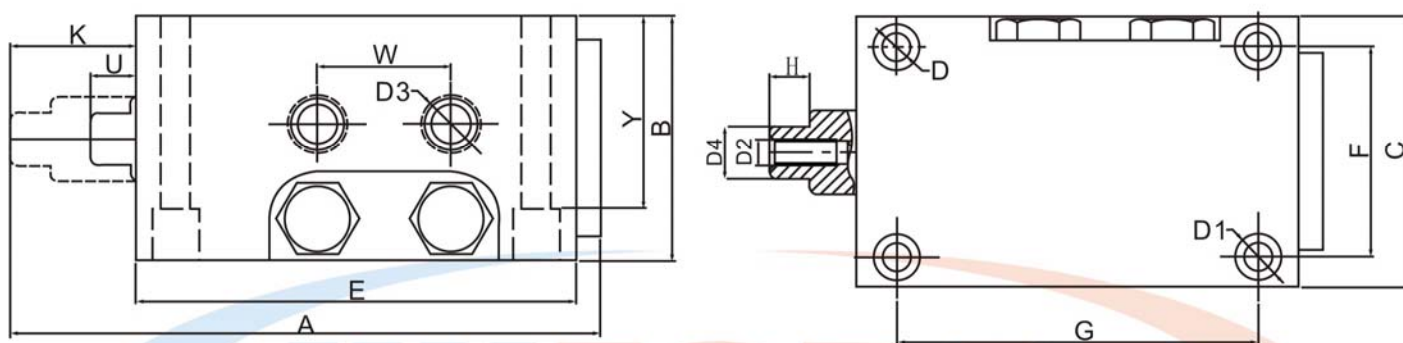
JMP	03	L
Product type	Size	Handwheel position
Mechanical operated throttle check valve	03: PT3/8" 04: PT1/2" 06: PT3/4"	L: Left R: Right

## Flow Control Valve Series

### JMP series valve dimensions

Unit: mm

### E6

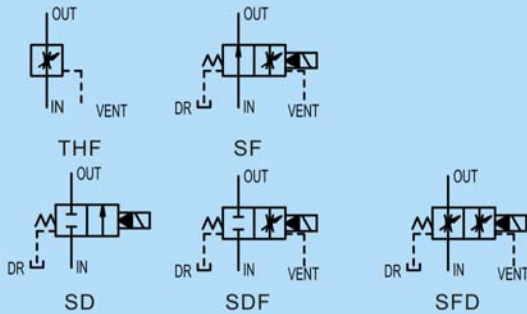


Model	A	B	C	D	D1	D2	D3	D4	E	F	G	H	K	U	Y	W
JMP-03	138	82	82	9	14	M8	PT 3/8"	120	18	62	76	10	27	12	72	39
JMP-04	207	93	103	11	17.5	M10	PT 1/2"	165	20	80	135	15	47	17	73	50
JMP-06							PT 3/4"									

## Flow Control Valve Series

### SF/SD/SDF/SFD Series Solenoid Operated Flow Control Valves THF Series Throttle Valves

#### Symbols



#### Technical data

Model	THFG-06	SFG-06	SDG-06	SDFG-06	SFDG-06
Max. flow rate (l/min)			120		
Max. working pressure (MPa)			25		
Weight (kgs)	5.1	6.7	6.3	6.7	7.1
Hydraulic fluid	Mineral oil				
Seal material	NBR seals				
Temperature range (°C)	-30 to +80				
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500				
Oil cleanliness class according to ISO4406	Class 20/18/15				

#### How to order

SF	G	06	D24	DL
Product type	Mounting type	Size	Input voltage	Connector type
THF: Throttle valve SF/SD/SDF/SFD: Solenoid operated flow control valve	Subplate Mounting	06: NG20	D12: DC12 D24: DC24 A110: AC110 A220: AC220	LW: Wire box with light DL: Plug-in connector with light

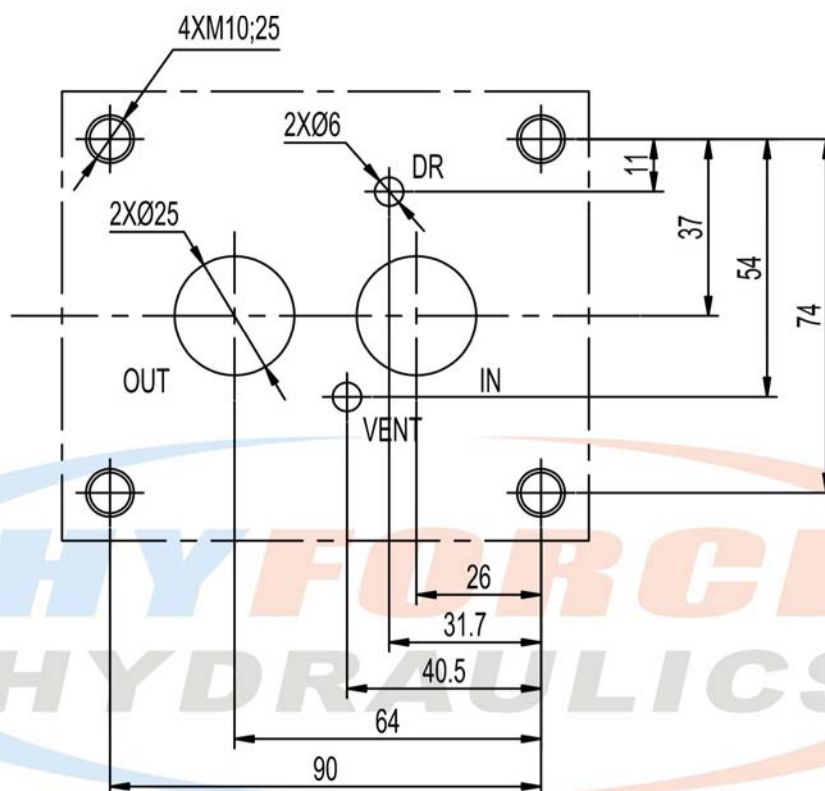


## Flow Control Valve Series

THF/SF/SD/SDF/SFDG-06 subplate installation dimensions

Unit: mm

E8



## Flow Control Valve Series

### QDB Series Throttle Valves

#### Symbols



#### Technical data

Model	QDB-10	QDB-20	QDB-30
Max. flow rate (l/min)	250	500	650
Max. working pressure (MPa)	35		
Weight (kgs)	3	3.7	5
Hydraulic fluid	Mineral oil		
Seal material	NBR seals		
Temperature range (°C)	-30 to +80		
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500		
Oil cleanliness class according to ISO4406	Class 20/18/15		

#### How to order

QDB	10
Product type	Size
Throttle valve	10: NG10 20: NG20 30: NG30

A

B

C

D

E9

F

G

H

I

J

K

L

M

N

O

P

## Flow Control Valve Series

### QDB subplate installation dimensions

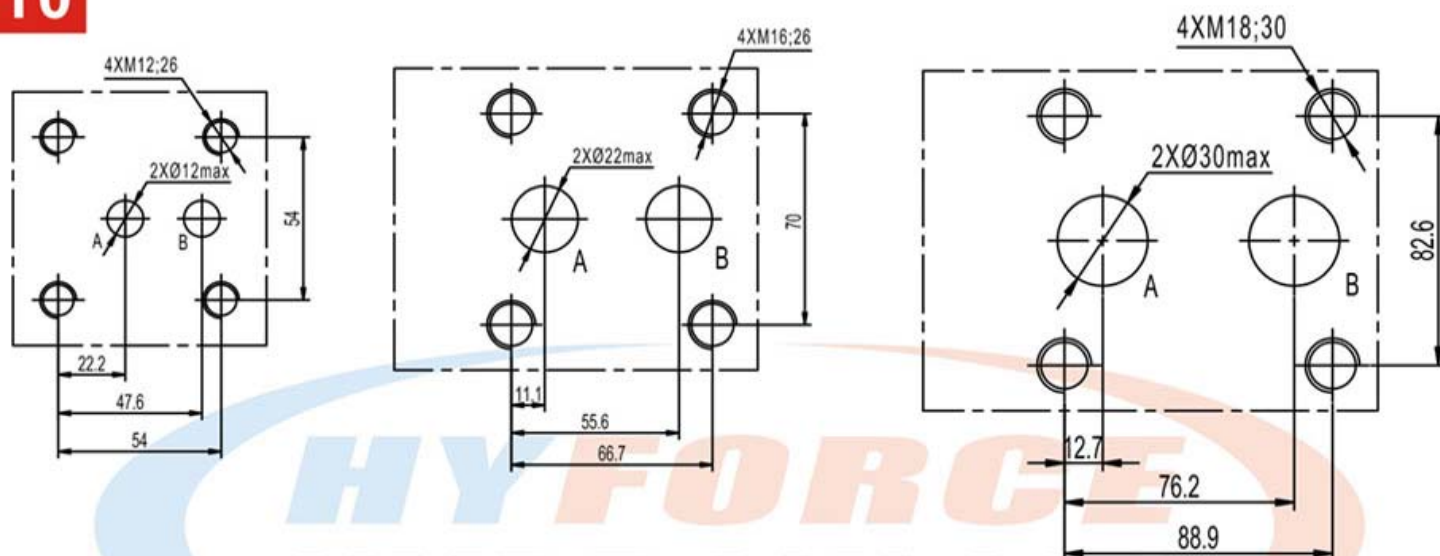
Unit: mm

**QDB10**

**QDB20**

**QDB30**

**E10**

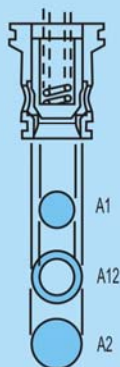
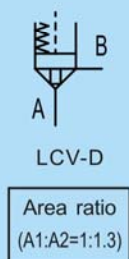
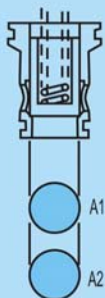
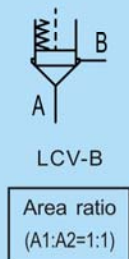




## Logical Valve & Control Cover Series

### LCV Series Logical Valves

#### Symbols



#### Technical data

Size	16	25	32	40	50	63
Max. flow rate (l/min)	130	350	500	850	1400	2100
Max. working pressure (MPa)	31.5					
Weight (kgs)	0.17	0.43	0.9	1.7	2.76	6.7
Hydraulic fluid	Mineral oil					
Seal material	NBR seals					
Temperature range (°C)	-30 to +80					
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
Oil cleanliness class according to ISO4406	Class 20/18/15					

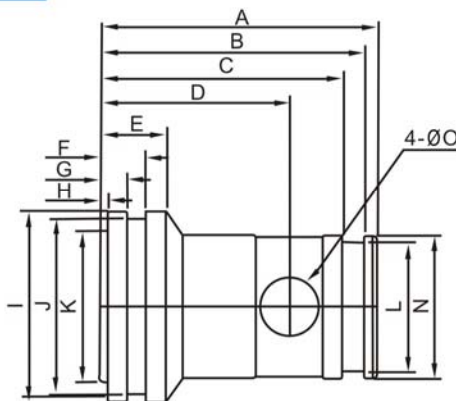
#### How to order

LCV	B	32	NO	05	D
Product type	Control type	Size	Normal state	Cracking pressure	Damping nose
Logical valve	B: Pressure control D: Directional control	16: NG16 25: NG25 32: NG32 40: NG40 50: NG50 63: NG63	NO: Normally open (Only available for LCV-D) No code: Normally closed	00: 0bar (Without spring) 05: 0.5bar 10: 1bar 20: 2bar 40: 4bar	No code: Valve poppet without damping nose D: Valve poppet with damping nose (Only available for LCV-D)

## Logical Valve & Control Cover Series

### LCV series valve dimensions

Unit: mm

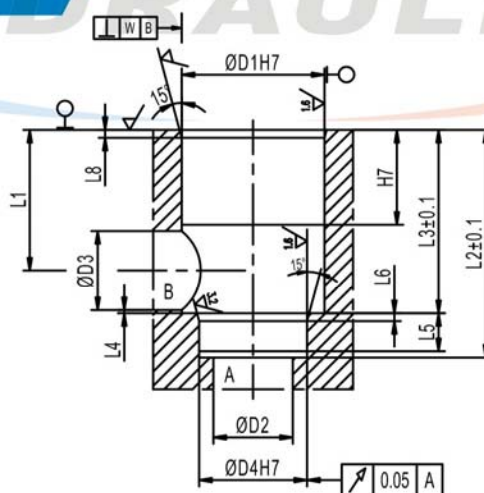


F2

Size	A	B	C	D	E	F	G	H	I	J	K	L	N	O
16	56	52	46.5	37	16	10.5	7	2.4	32	29.2	23.7	22.2	25	10
25	72	69	62.6	43	16	13.5	8.8	1.8	45	40.8	37	29.8	34	14
32	85	81	74.6	58	20	13.6	8	2.4	60	55	47.5	40.8	45	18
40	105	97	90.6	66.5	24	15.6	10	2.4	75	70	62	50.8	55	23.5
50	122	114	107.6	83	20	14.6	9	2.4	90	85	76.8	63.8	68	28
63	155	145.5	134	115	27	21	12	4.6	120	110	94	80	90	25

### LCV series cavity dimensions

Unit: mm



Size	D1	D2	D3	D4	L1	L2	L3	L4	L5	L6	L7	L8	W
16	32	16	16	25	34	56	43	0.5	11	2	20	2	0.05
25	45	25	25	34	44	72	58	1	12	2.5	30	2.5	0.05
32	60	32	32	45	52	85	70	1.5	13	2.5	30	2.5	0.1
40	75	40	40	55	64	105	87	2.5	15	3	30	3	0.1
50	90	50	50	68	72	122	100	2.5	17	3	35	4	0.1
63	120	63	63	90	95	155	130	3	20	4	40	4	0.2

## Logical Valve & Control Cover Series

### F Series Control Covers



### Technical data

Size	16	25	32	40	50	63
Max. working pressure (MPa)	31.5					
Weight (kgs)	1.2	1.6	2.3	3.3	6.2	17.1
Hydraulic fluid	Mineral oil					
Seal material	NBR seals					
Temperature range (°C)	-30 to +80					
Viscosity range (mm <sup>2</sup> /s)	2.8 to 500					
Oil cleanliness class according to ISO4406	Class 20/18/15					

### How to order

F	01A	H	32	a
Product type	Function symbol code	Pressure level code	Size	Extra option for cover with relief valve
Control cover	Refer to function symbol list	H: 315bar	16: NG16 25: NG25 32: NG32 40: NG40 50: NG50 63: NG63	a: 8~70bar b: 35~140bar c: 70~210bar d: 140~315bar



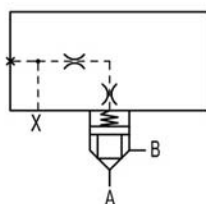
## Logical Valve & Control Cover Series

### Function symbol list

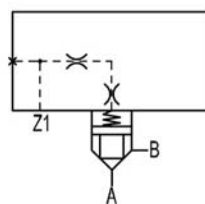
#### Function symbol for standard control cover

F4

01A

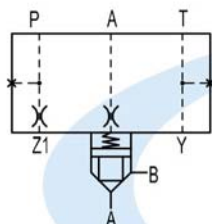


01B

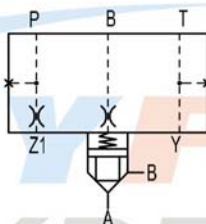


#### Function symbol for control cover with size NG6 pilot interface

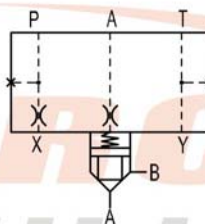
02A



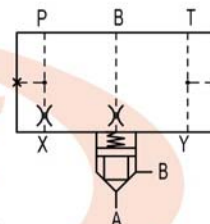
02B



02C

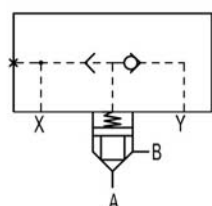


02D

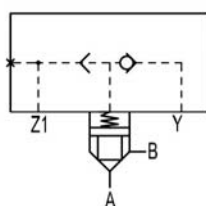


#### Function symbol for control cover with shuttle valve

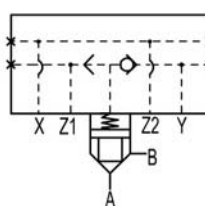
03A



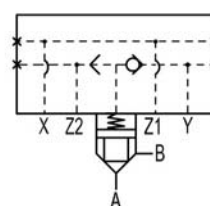
03B



03C

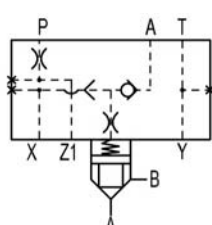


03D

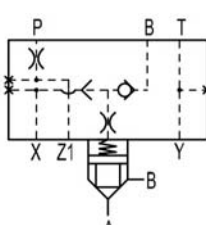


#### Function symbol for control cover with shuttle valve and size NG6 pilot interface

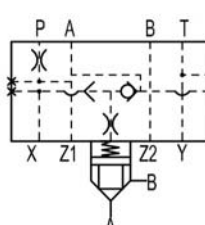
04A



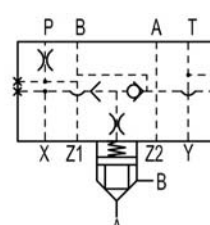
04B



04C



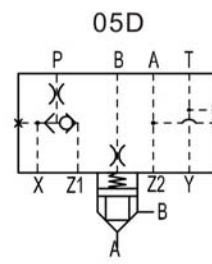
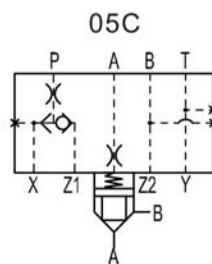
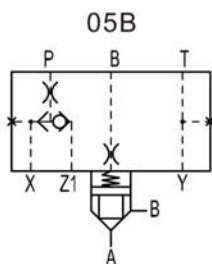
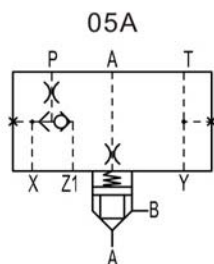
04D



## Logical Valve & Control Cover Series

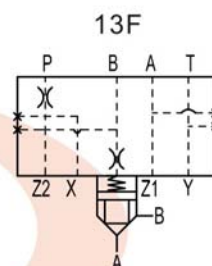
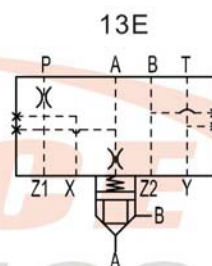
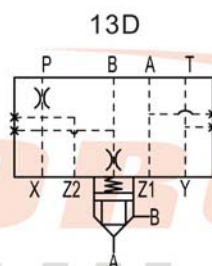
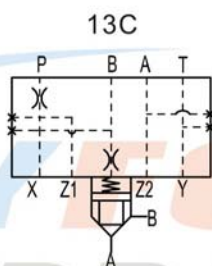
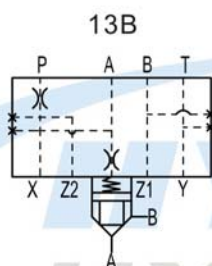
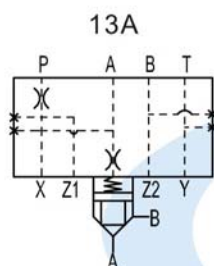
### Function symbol list

#### Function symbol for control cover with shuttle valve and size NG6 pilot interface

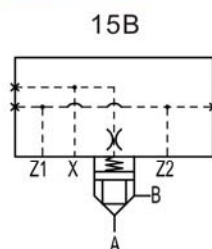
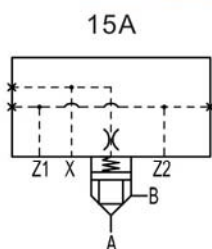


**F5**

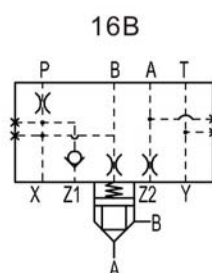
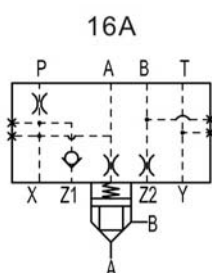
#### Function symbol for compound control cover with size NG6 pilot interface



#### Function symbol for compound control cover



#### Function symbol for compound control cover with check valve and size NG6 pilot interface

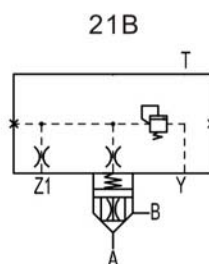
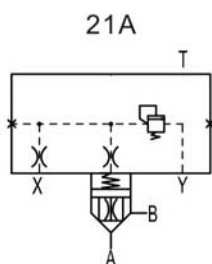


## Logical Valve & Control Cover Series

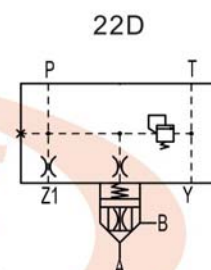
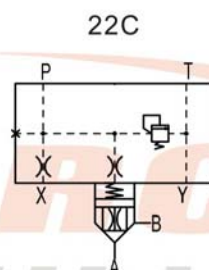
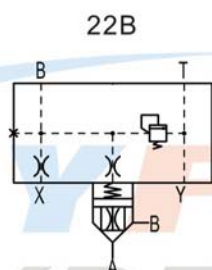
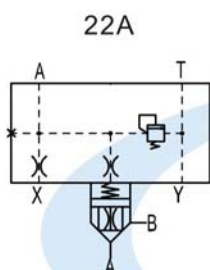
### Function symbol list

#### Function symbol for control cover with relief valve

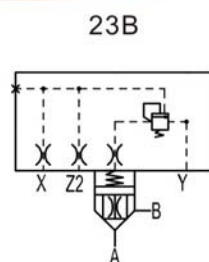
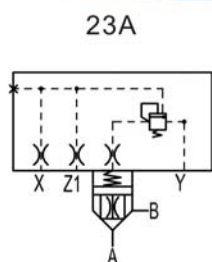
**F6**



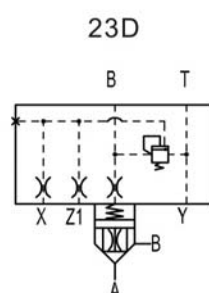
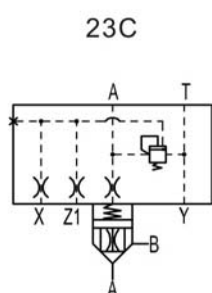
#### Function symbol for control cover with relief valve and size NG6 pilot interface



#### Function symbol for control cover with unloading valve



#### Function symbol for control cover with unloading valve and size NG6 pilot interface

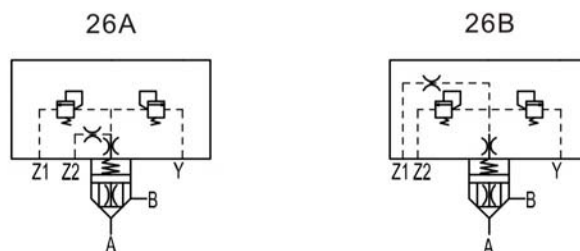




## Logical Valve & Control Cover Series

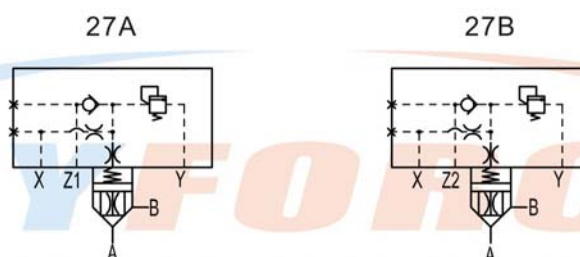
### Function symbol list

#### Function symbol for control cover with two sets of relief valves

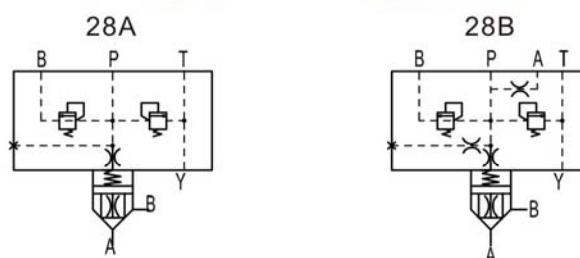


**F7**

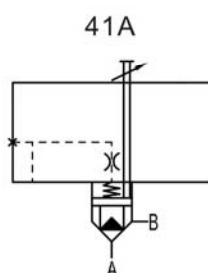
#### Function symbol for control cover with check valve and relief valve



#### Function symbol for control cover with two sets of relief valves and size NG6 pilot interface



#### Function symbol for control cover with throttle valve

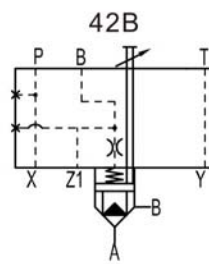
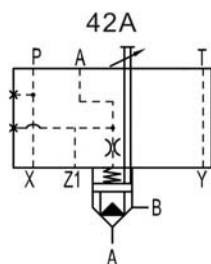


## Logical Valve & Control Cover Series

### Function symbol list

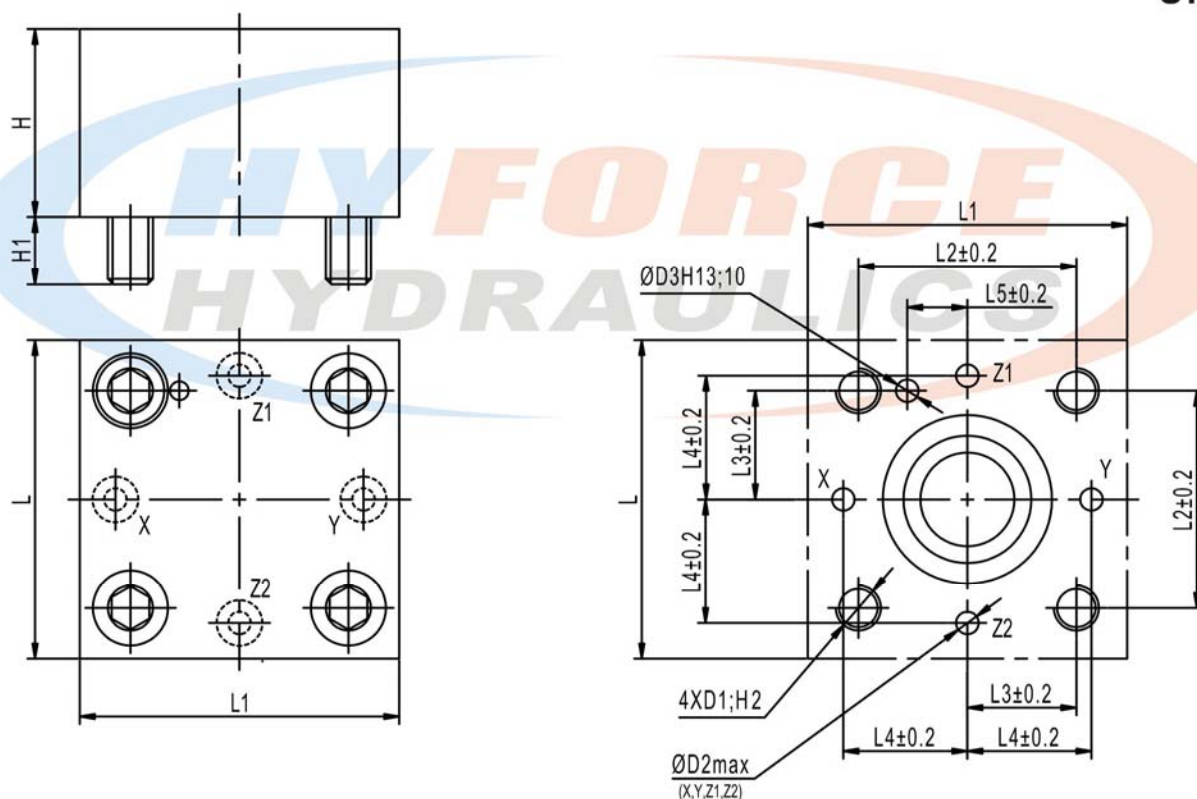
#### Function symbol for control cover with throttle valve and size NG6 pilot interface

**F8**



### F series control cover dimensions

Unit: mm



Size	H	H1	H2	L	L1	L2	L3	L4	L5	D1	D2max	D3
16	40/50	14	20	65	65/75	46	23	25	10.5	M8	4	4
25	50	18	25	85	85	58	29	33	16	M12	6	6
32	50	22	35	102	102	70	35	41	17	M16	8	6
40	60	31	45	125	125	85	42.5	50	23	M20	10	6
50	70	31	45	140	140	100	50	58	30	M20	10	8
63	80	41	65	180	180	125	62.5	75	38	M30	12	8

## Safety Valve Series

### G4WE Series Explosion Proof Solenoid Directional Control Valves



### Technical data

Model		G4WE6	G4WE10
Max. flow rate (l/min)		80	120
Max. working pressure (MPa)	A, B, P port	31.5	31.5
	T port	16	16
Weight (kgs)	Single solenoid type	2.6	6.6
	Double solenoids type	4.2	10
Used on the electrical equipment of underground coal mine underground		Exd I	
Used on the electrical equipment of ground plant like petrochemical plant etc		Exd II BT4	
Hydraulic fluid		Mineral oil	
Seal material		NBR seals	
Temperature range (°C)		-30 to +80	
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500	
Oil cleanliness class according to ISO4406		Class 20/18/15	

### How to order

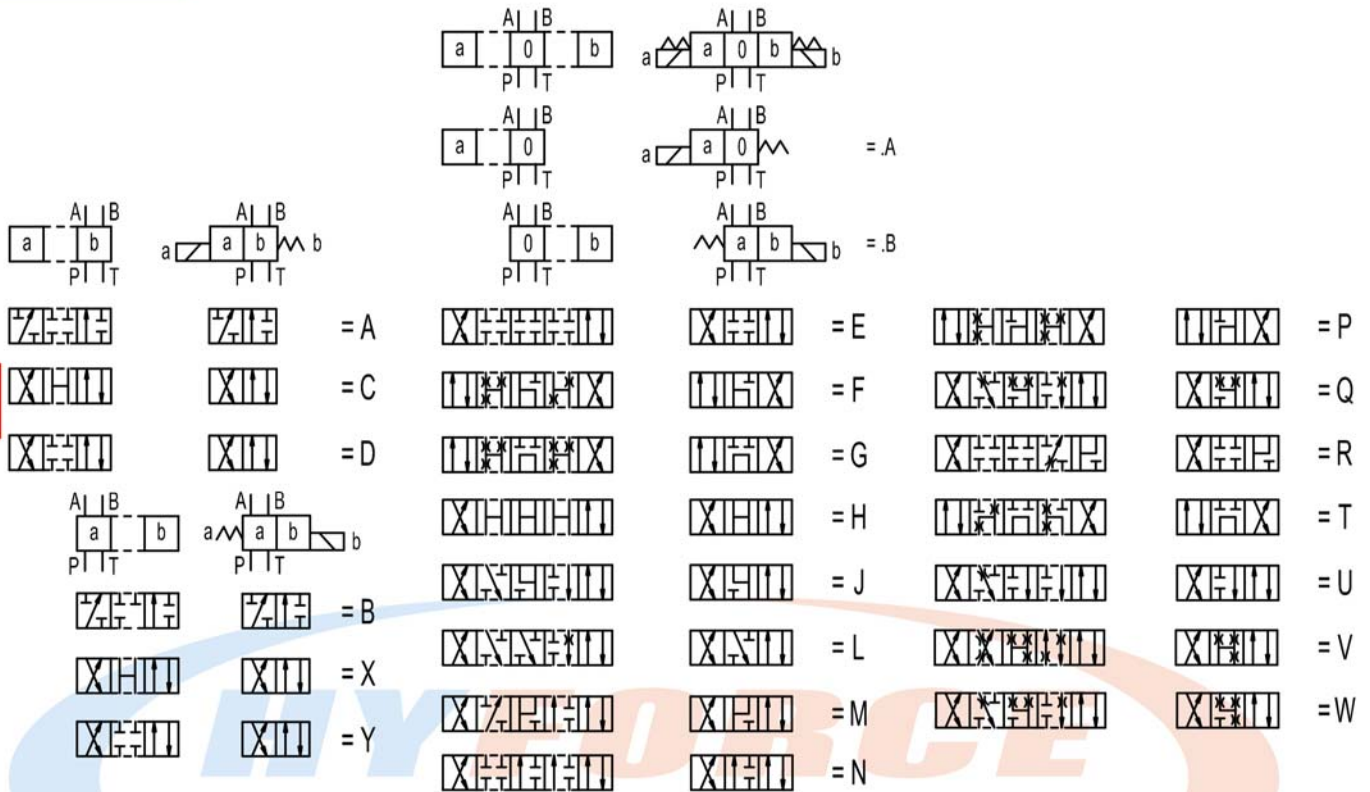
G4WE	6	E	G24
Product type	Size	Spool symbol	Input voltage
4/3 & 4/2 Explosion proof solenoid operated directional control valve	6: NG6 10: NG10	Refer to spool symbols	G24: DC24 W36: AC36 W127: AC127 W220: AC220



## Safety Valve Series

### Spool symbols

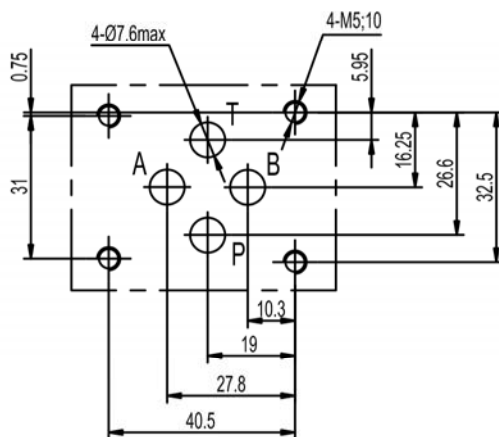
**G2**



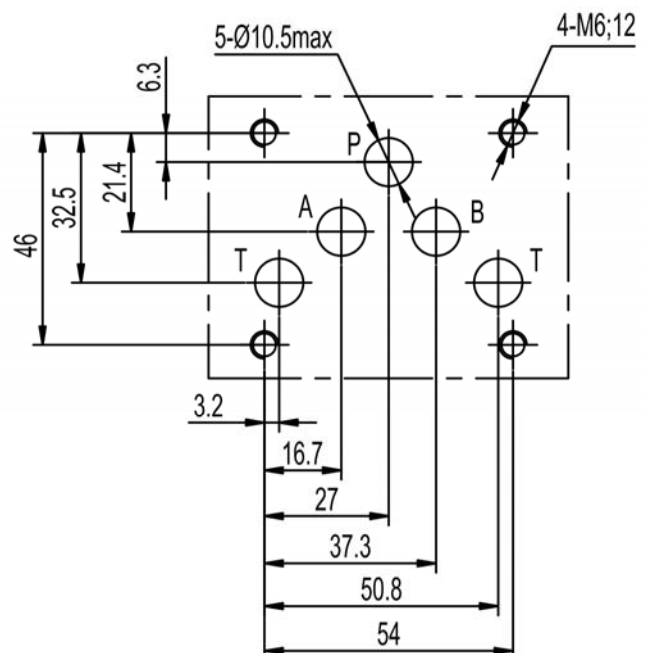
### G4WE subplate installation dimensions

Unit: mm

**G4WE6**

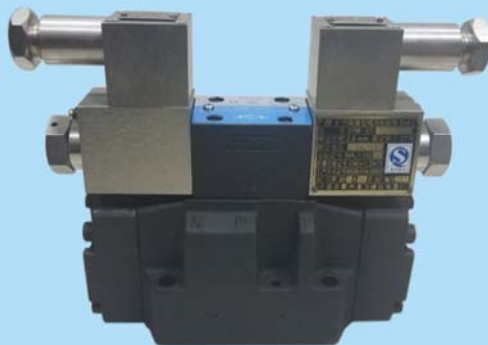


**G4WE10**



## Safety Valve Series

### G4WEH Series Explosion Proof Solenoid Pilot Operated Directional Control Valves



#### Technical data

Model			G4WEH16	G4WEH25
Max. flow rate (l/min)			300	500
Working pressure (MPa)	A, B, P port		31.5	31.5
	T port	External drain	25	25
		Internal drain	16	16
	Y port	External control	16	16
Max. operating pressure (MPa)			25	25
Weight (kgs)	Pilot valve with single solenoid		2.6	2.6
	Pilot valve with double solenoids		4.2	4.2
	4WH16 valve		9.5	16
Used on the electrical equipment of underground coal mine underground			Exd I	
Used on the electrical equipment of ground plant like petrochemical plant etc			Exd II BT4	
Hydraulic fluid / Seal material			Mineral oil / NBR seals	
Temperature range (°C) / Viscosity range (mm2/s)			-30 to +80 / 2.8 to 500	
Oil cleanliness class according to ISO4406			Class 20/18/15	

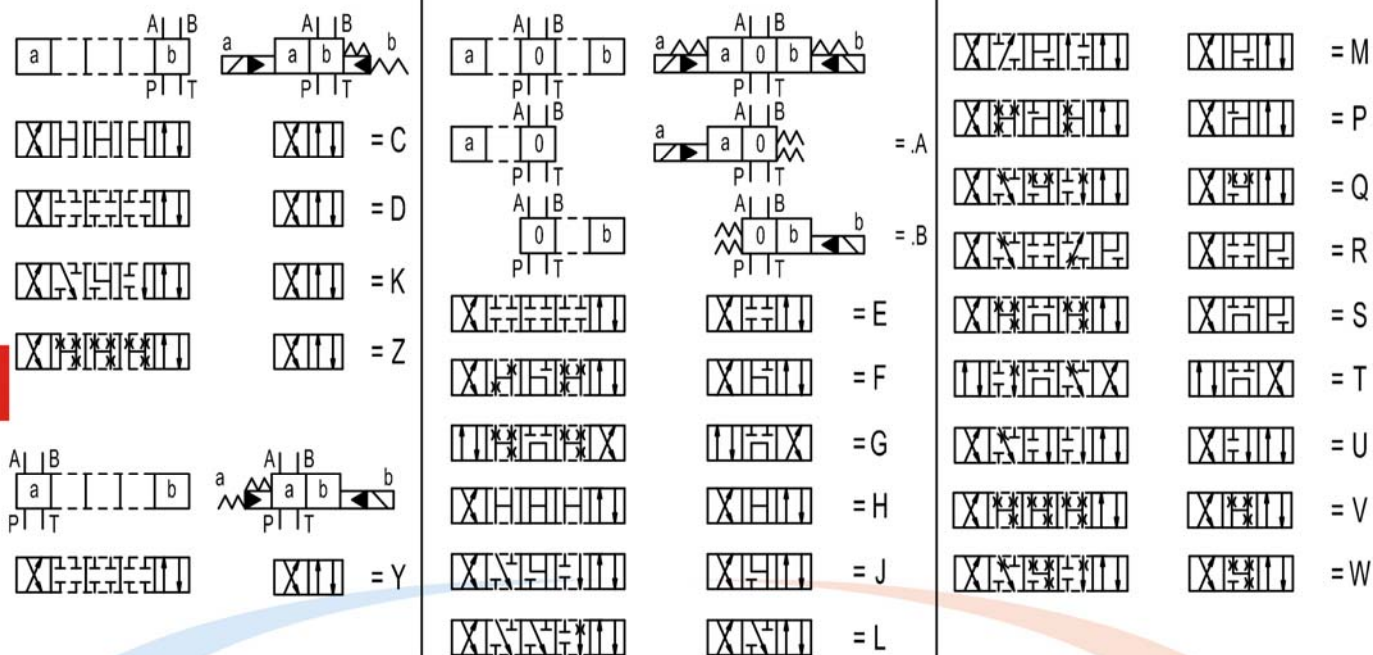
#### How to order

G4WEH	16	E	G24	ET	P4.5
Product type	Size	Spool symbol	Input Voltage	Oil control type	Pre-load valve
Explosion proof solenoid pilot operated directional control valve	16: NG16 25: NG25	Refer to spool symbols	G24: DC24 W36: AC36 W127: AC127 W220: AC220	Refer to oil control list in page A10	No code: Without pre-load valve P4.5: With pre-load valve

## Safety Valve Series

### Spool symbols

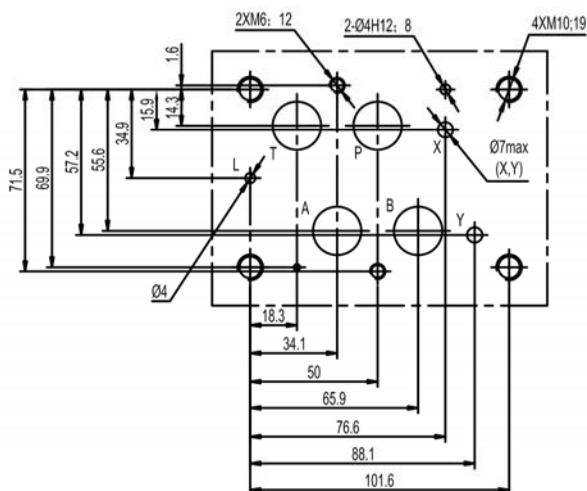
**G4**



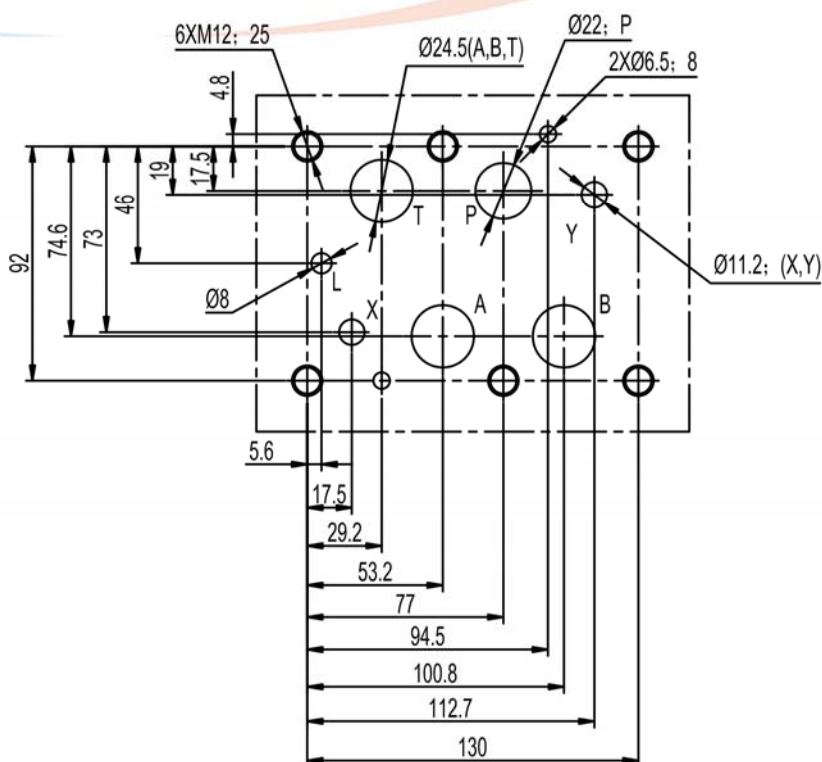
### G4WEH subplate installation dimensions

Unit: mm

**G4WEH16**



**G4WEH25**

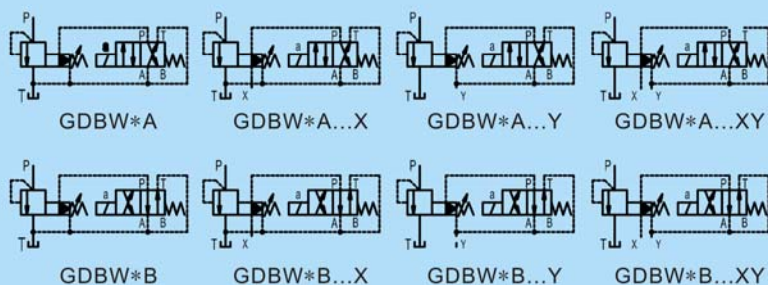




## Safety Valve Series

### GDBW Series Explosion Proof Solenoid Operated Relief Valves

#### Symbols



#### Technical data

Model		GDBW10	GDBW15	GDBW20	GDBW25	GDBW30
Max. flow rate (l/min)	Subplate mounting	250	—	500	—	650
	Threaded connection	250	450	500	550	600
Weight (kgs)	Subplate mounting	5.8	—	6.6	—	7.9
	Threaded connection	6.9	6.7	6.6	8	7.8
Hydraulic fluid / Seal material		Mineral oil / NBR seals				
Temperature range (°C) / Viscosity range (mm <sup>2</sup> /s)		-30 to +80 / 2.8 to 500				
Oil cleanliness class according to ISO4406		Class 20/18/15				
Used on the electrical equipment of underground coal mine underground					Exd I	
Used on the electrical equipment of ground plant like petrochemical plant etc					Exd II BT4	

#### How to order

GDBW	10	B	G
Product type	Size	Normal state	Mounting type
Explosion proof solenoid operated relief valve	Subplate mounting	A: Normally closed B: Normally open	No code: Subplate mounting G: Threaded connection
	10: NG10		
	15: G1/2" M22×1.5		
	20: G1" M33×2		
	25: G1 1/4" M42×2		
	30: G1 1/2" M48×2		

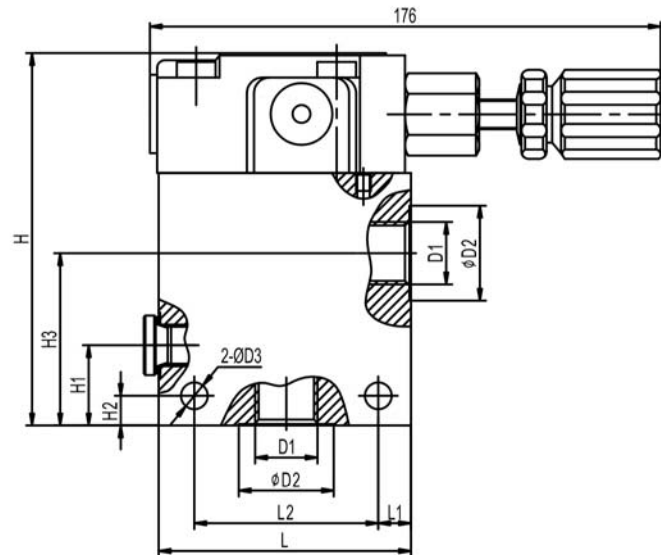
5X	100	XY	U	G24
Series number	Setting pressure	Oil control type	Cracking pressure	Input voltage
5X series	50: 5MPa 100: 10MPa 200: 20MPa 315: 31.5MPa 350: 35MPa	Refer to symbols	No code: 0.5MPa U: 0.25MPa	G24: DC24 W36: AC36 W127: AC127 W220: AC220

## Safety Valve Series

### DB\*G series valve dimensions

Unit: mm

**G6**

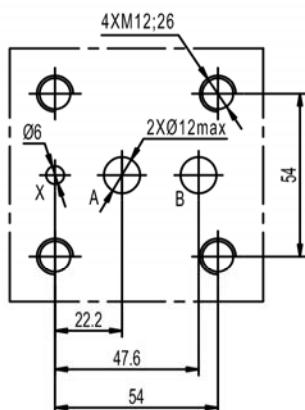


Model	D1		D2	D3	L	L1	L2	H	H1	H2	H3
	BSP thread	Metrice thread									
DB10G	G1/2"	M22×1.5	34	9	85	14	62	125	27	10	62
DB15G	G3/4"	M27×2	42								
DB20G	G1"	M33×2	47								
DB25G	G1 1/4"	M42×2	56								
DB30G	G1 1/2"	M48×2	61		100	18	72	138	40	13	66

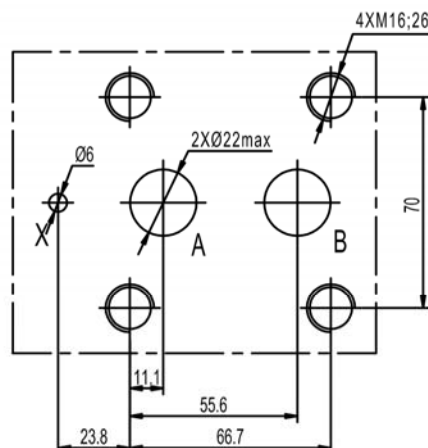
### GDBW subplate installation dimensions

Unit: mm

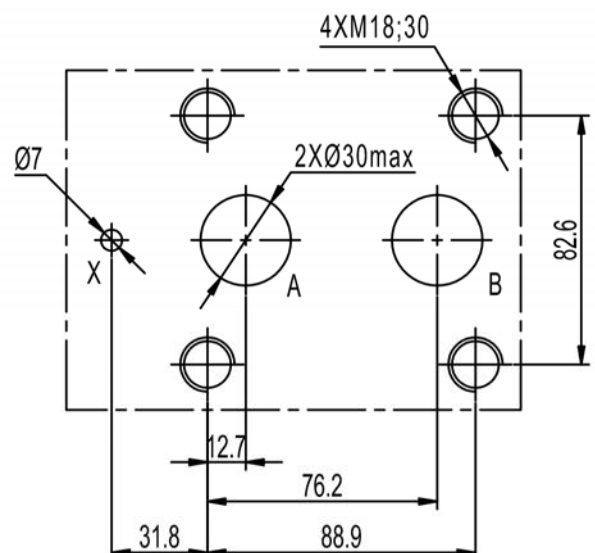
#### GDBW10



#### GDBW20



#### GDBW30





## Safety Valve Series

### 4WEJ Series Solenoid Operated Directional Control Valves with Spool Position Detector



#### Technical data

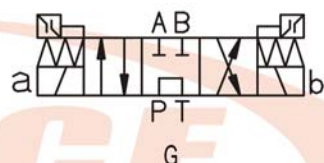
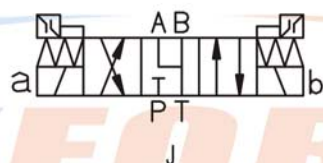
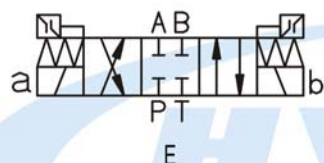
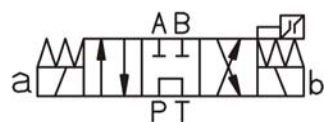
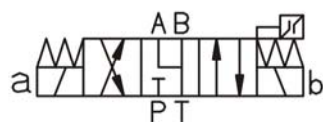
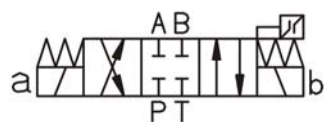
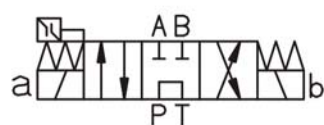
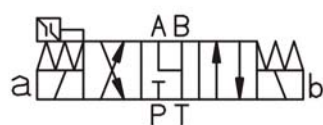
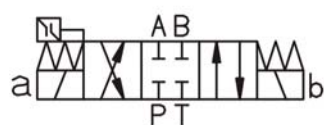
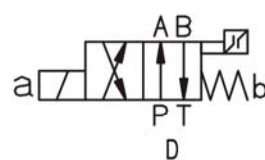
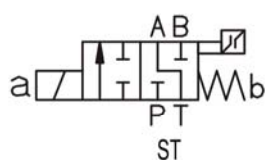
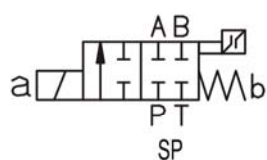
Model		4WEJ6		4WEJ10	
Max. flow rate (l/min)		60		100	
Max. working pressure (MPa)	A, B, P port	31.5			
	T port	16			
Weight (kgs)		2 position	3 position	2 position	3 position
		2.2	3.4	6.2	9.2
Switch type		Inductive position switch (double contact)			
Hydraulic fluid		Mineral oil			
Seal material		NBR seals			
Temperature range (°C)		-30 to +80			
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500			
Oil cleanliness class according to ISO4406		Class 20/18/15			

#### How to order

4WEJ	6	E	JS	G24	Z5L
Product type	Size	Spool symbol	Detector position	Input voltage	Connector type
4/3 & 4/2 Solenoid operated directional control valve with spool position detector	6: NG6 10: NG10	Refer to spool symbols	JA: A side JB: B side JS: Both sides (Only available for 3 position valve)	G24: DC24	Z4: Standard plug-in connector Z5L: Plug-in connector with light



**G8**



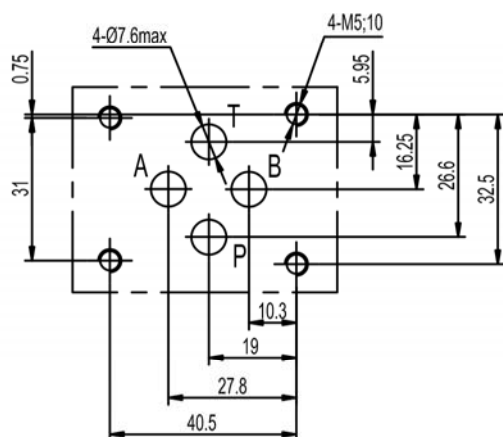
**JA**

JB

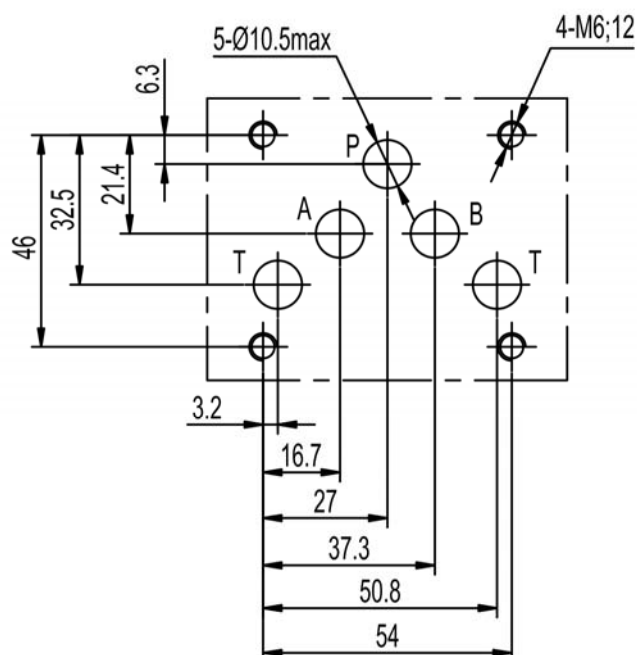
JS

## Unit: mm

**4WEJ6**



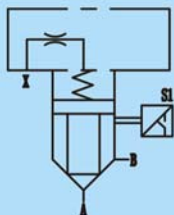
**4WEJ10**



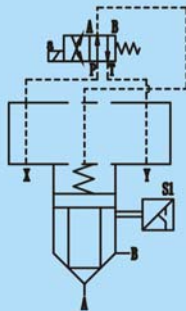
## Safety Valve Series

### FJ Series Logical Valve & Control Cover with Poppet Position Detector

#### Symbols



FJ



FJD



#### Technical data

Size		16	25	32	40	50	63
Max. working pressure (MPa)		31.5					
Weight (kgs)	Logical valve	0.17	0.43	0.9	1.7	2.76	6.7
	Control cover with poppet position detector	1.2	2.3	3.3	6.2	9	17.1
	Pilot solenoid directional control valve	1.6					
Switch type		Inductive position switch (double contact)					
Hydraulic fluid		Mineral oil					
Seal material		NBR seals					
Temperature range (°C)		-30 to +80					
Viscosity range (mm <sup>2</sup> /s)		2.8 to 500					
Oil cleanliness class according to ISO4406		Class 20/18/15					

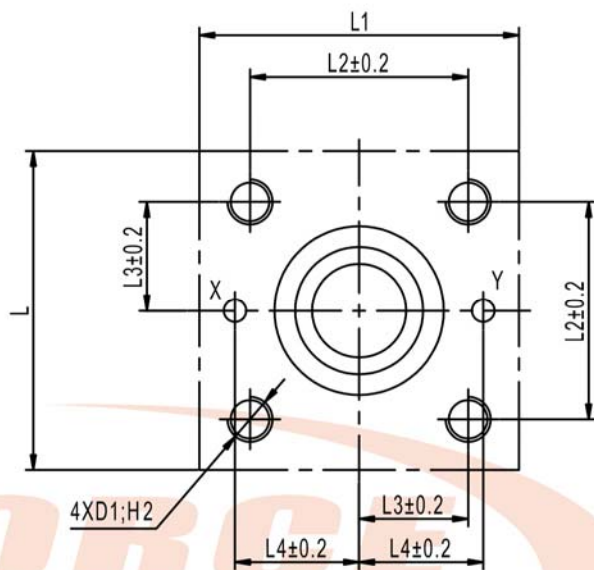
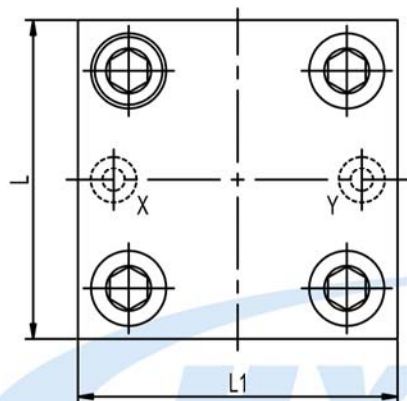
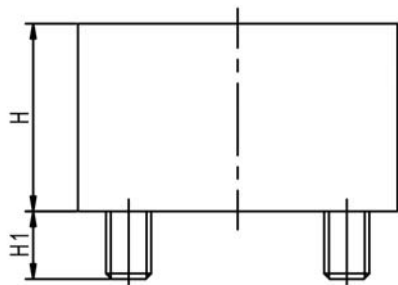
#### How to order

FJ	D	32	05	G24	Z5L
Product type	Pilot solenoid control	Size	Cracking pressure	Input voltage	Connector type
Logical valve & control cover with poppet position detector	No code: Omit D: With pilot solenoid directional control valve	16: NG16 25: NG25 32: NG32 40: NG40 50: NG50 63: NG63	05: 0.5bar 10: 1bar 20: 2bar 40: 4bar	G24: DC24	Z4: Standard plug-in connector Z5L: Plug-in connector with light

## Safety Valve Series

### FJ series control cover dimensions

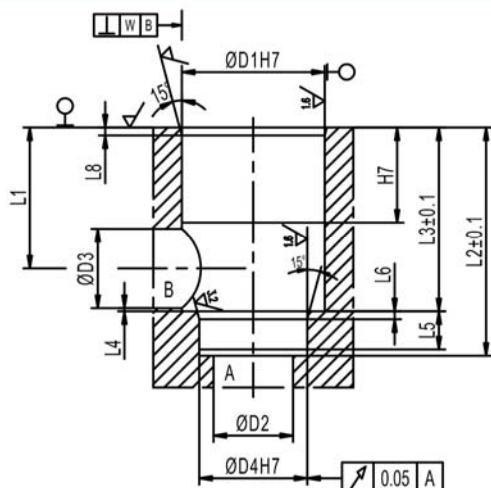
Unit: mm



Size	H	H1	H2	L	L1	L2	L3	L4	D1
16	40	14	20	65	65	46	23	25	M8
25	50	18	25	85	85	58	29	33	M12
32	50	22	35	102	102	70	35	41	M16
40	60	31	45	125	125	85	42.5	50	M20
50	70	31	45	140	140	100	50	58	M20
63	80	41	65	180	180	125	62.5	75	M30

### FJ series cavity dimensions

Unit: mm



Size	A	B	C	D	E	F	G	H	I	J	K	L	N	O
16	56	52	47	37	16	11	7	2.4	32	29	24	22	25	10
25	72	69	63	43	16	14	8.8	1.8	45	41	37	30	34	14
32	85	81	75	58	20	14	8	2.4	60	55	48	41	45	18
40	105	97	91	67	24	16	10	2.4	75	70	62	51	55	24
50	122	114	108	83	20	15	9	2.4	90	85	77	64	68	28
63	155	146	134	115	27	21	12	4.6	120	110	94	80	90	25