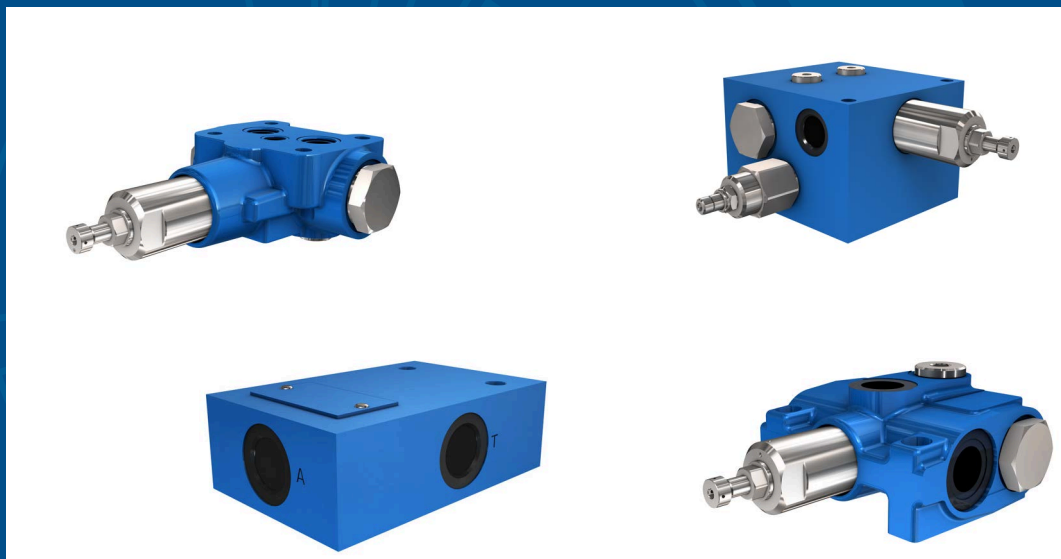
EXCHANGE VALVES

Flush oil from the close loop hydraulic system

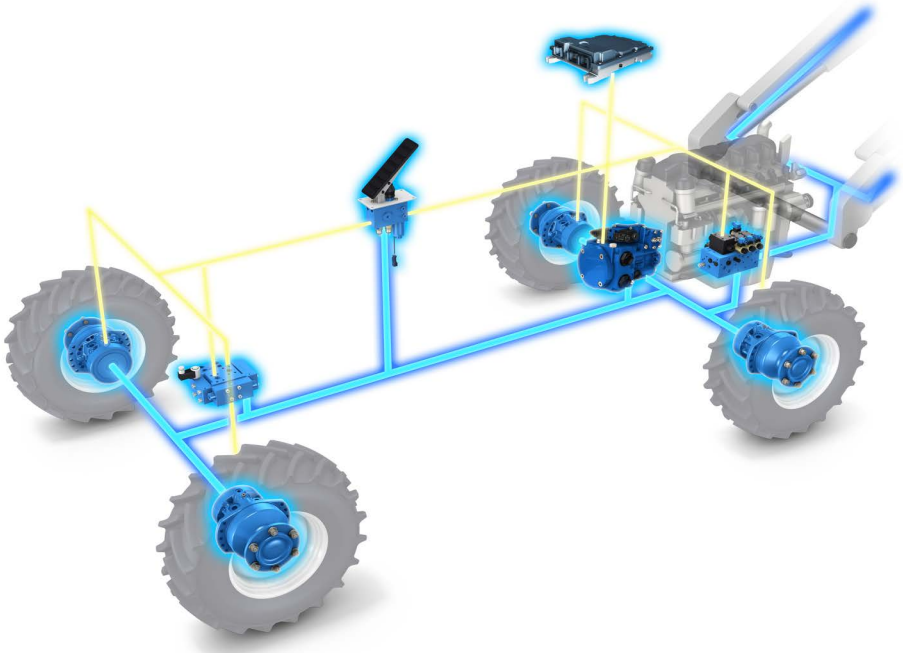


TECHNICAL CATALOG

POCLAIN Hydraulics

INTRODUCTION

Exchange function is an essential function of every hydraulic close-loop system. Compact exchange valves bleed hot oil from the low pressure side of a hydrostatic transmission circuit to be cooled, filtered or used as a source of oil for flushing pump and motor cases.



RELIABILITY	• VE30 and VE60 up to 500 bar *[7 251PSI]* • VE10 and VES60 up to 450 bar *[6 526 PSI]*
SIMPLICITY	• All except VE10, can be tuned by customer.
COMPACT	• Compact design
LARGE RANGE	• VE30 and VE60 available in piped and flanged versions. • VES60 with integrated high pressure relief valves.

For additional support and more information about valves and their solutions with other Poclain valves and products contact your nearest sales representative.

For correct installation refer to the Poclain Hydraulics recommendations – Installation Guides.



Methodology :

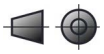
This document is intended for manufacturers of machines that incorporate Poclain Hydraulics products. It describes the technical characteristics of Poclain Hydraulics products and specifies installation conditions that will ensure optimum operation.
This document includes important comments concerning safety as well as the installation guide that must be read before any installation (https://poclain.com/resources). Important comments are indicated in the following way:

	**Safety comment.**

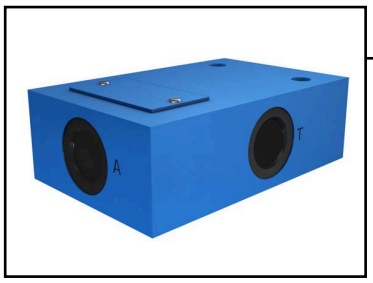
This document also includes essential operating instructions for the product and general information. These are indicated in the following way:

	**Essential instructions.**
	**General information.**
	**Information on the model number.**
	**Weight of component without oil.**
	**Volume of oil.**
	**Units.**
	**Tightening torque.**
	**Screws.**
	**Information intended for Poclain-Hydraulics personnel.**

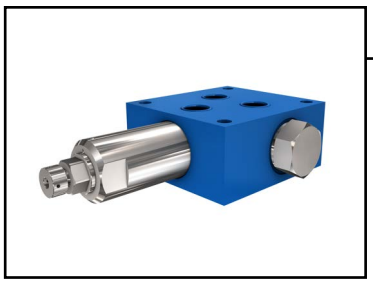
The views in this document are created using metric standards.
The dimensional data is given in mm and in inches (inches are given in brackets in italics).



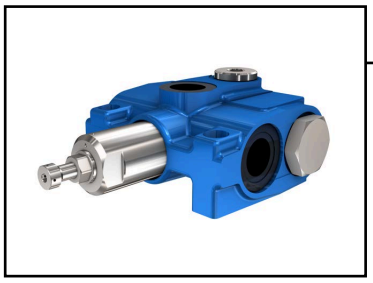
EXCHANGE VALVES



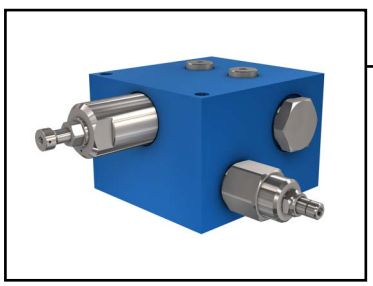
Exchange valve VE10 6



Exchange valve VE30 9



High performance Exchange valve VE60 13



Exchange and High pressure relief valve VES60 18

EXCHANGE VALVE VE10

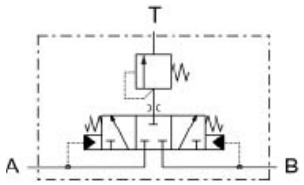
- **Compact**
- **Heavy duty**



Operation

Exchange valves are for use in bleeding hot oil from the low pressure side of a hydrostatic transmission circuit. The hot oil can be cooled, filtered or used as a source of oil for flushing other pump and motor case.

Hydraulic symbol

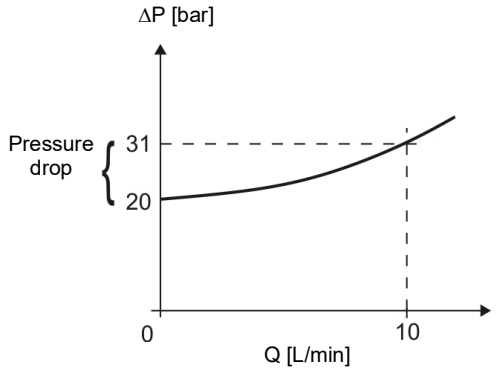


Features

Max. pressure	bar *[PSI]*	450 *[6 526]*
Exchange relief valve setting	bar *[PSI]*	12; 14; 16; 18; 20 *[174; 203; 232; 261; 290]*
Selector spool switching pressure	bar *[PSI]*	8,5 *[123]*
Exchange flow (11 bar *[160 PSI]* ΔP)	L/min *[GPM]*	max.15 *[3.96]* (ΔP A→T or B→T)
Exchange direction		Forward and/or reverse
Type of hydraulic connections		ISO 9974-1 (BSPP) / ISO 1179-1 (Metric) / ISO 11926-1 (UNF)
Mass	kg *[lbs]*	1,1 *[2.43]*

Operation

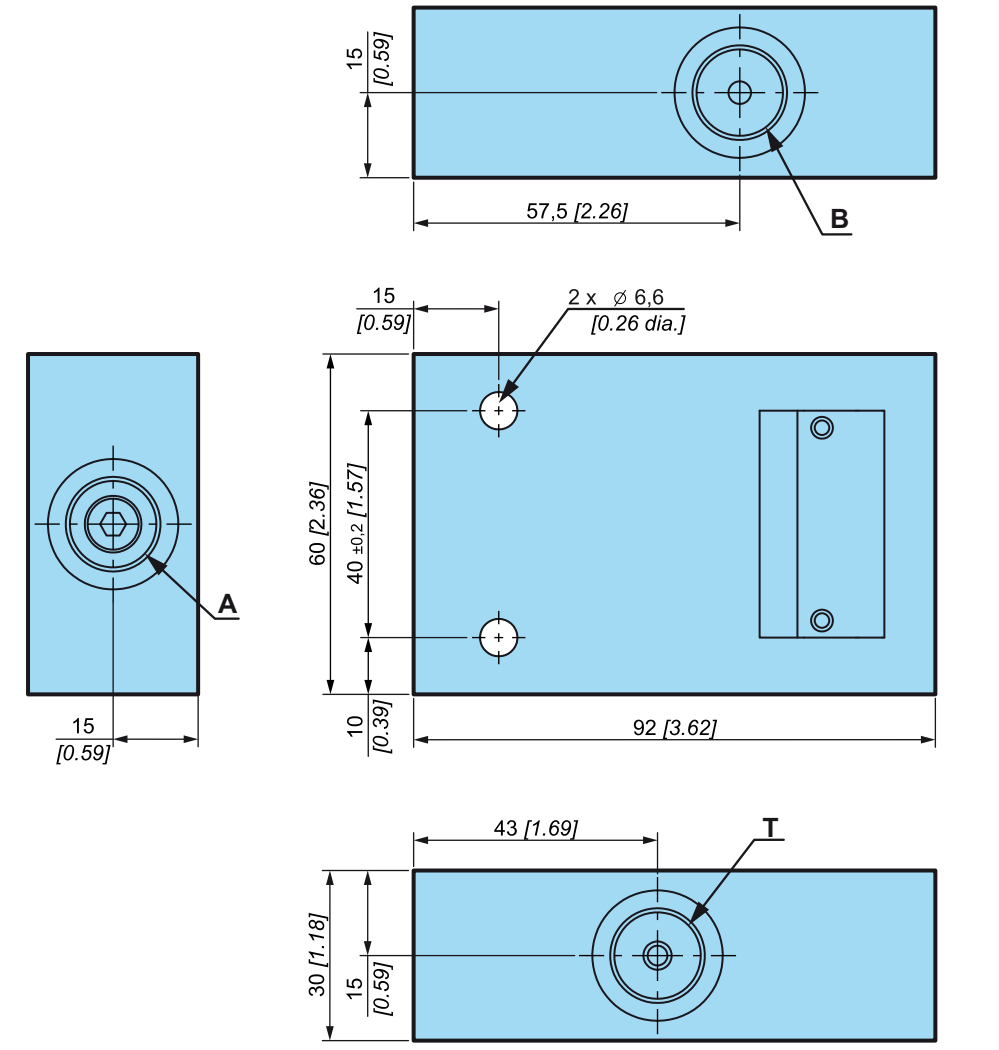
Example: relief valve set at 20 bar *[290 PSI]*





Dimensions

T				P						C					M			S			
1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	1	2	3	1	2	3	4
V	E	1	0	-				0		-	0	0	0	0	-	1		0	-			



Hydraulic connections

Port	Function	Connections			Max. pressure bar *[PSI]*
		ISO 9974-1 (Metric) Type N	ISO 1179-1 (BSPP) Type N	ISO 11926-1 (UNF)	
A	HP/LP connection	M18 x 1.5	G3/8	9/16-18 UNF-2B	450 *[6 526]*
B	HP/LP connection				
T	Tank connection				5 *[72.5]*

Model code

T				P						C					M			S			
1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	1	2	3	1	2	3	4
V	E	1	0	-				0		-	0	0	0	0	-	1		0	-			

T1 - T2 Type

Valve	**V**
Exchange	**E**

T3 - T4 Max. flow

10 L/min *[2.64 GPM]*	**10**

P1 - Exchange direction

Unidirectional (A→T)	**A**
Bidirectional	**C**

P2 - P3 Exchange opening pressure

12 bar *[174 PSI]*	**12**
14 bar *[203 PSI]*	**14**
16 bar *[232 PSI]*	**16**
18 bar *[261 PSI]*	**18**
20 bar *[290 PSI]*	**20**

P4 - Type of exchange

Relief valve not adjustable	**0**

P5 - P6 Restrictor diameter

Without	**00**
1,0 mm *[0.039 in]*	**10**
1,2 mm *[0.047 in]*	**12**
1,4 mm *[0.055 in]*	**14**
1,6 mm *[0.063 in]*	**16**
1,8 mm *[0.071 in]*	**18**

C1 - C5 Mechanic setting range

Without	**00000**

M1 - Assembly version

Piped block	**1**

M2 - Hydraulic connections

ISO 1179-1 (BSPP)	G3/8 BSPP	**3**
ISO 9974-1 (Metric)	M18x1.5	**4**
ISO 11926-1 (UNF)	9/16-18 UNF-2B	**A**

M3 - Pressure gauge port

Without	**0**

S1 - S4 Options

Without	**0**
Special painting	**D**
Zinc coated	**B**
Customized name plate	**P**
Customized *	**F**

* Further description on interface drawing

EXCHANGE VALVE VE30

- **Compact**
- **Adjustable**
- **Heavy duty**



Piped valve

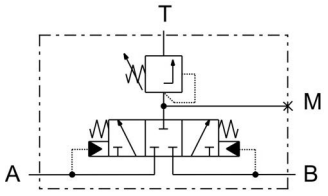


Flanged valve

Features

Exchange valves are for use in bleeding hot oil from the low pressure side of a hydrostatic transmission circuit. The hot oil can be cooled, filtered or used as a source of oil for flushing other pump and motor case.

Hydraulic symbol

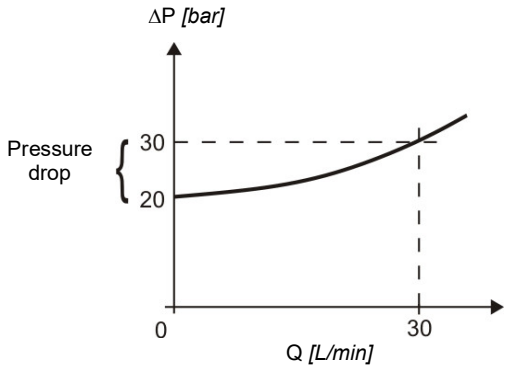


Features

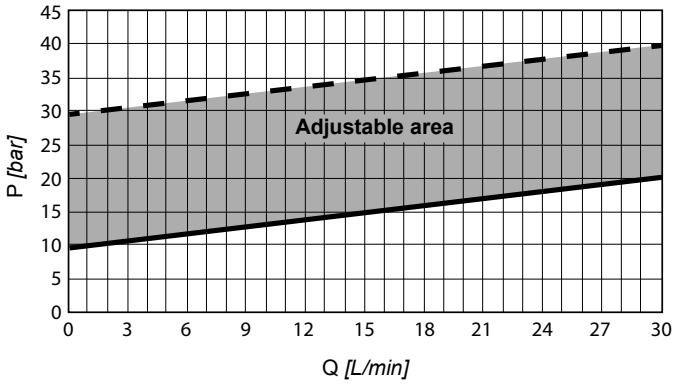
Max. pressure	bar *[PSI]*	500 *[7 252]*
Exchange relief valve setting	bar *[PSI]*	10 to 30 *[145 to 435]*
Selector spool switching pressure	bar *[PSI]*	6,5 *[94]*
Exchange flow (10 bar *[145 PSI]* ΔP)	L/min *[GPM]*	30 *[7.93]* (ΔP A→T or B→T)
Exchange direction		Forward and/or reverse
Type of hydraulic connections		ISO 1179-1 (BSPP) / ISO 9974-1 (Metric) / ISO 11926-1 (UNF)
Mass	kg *[lbs]*	1,5 *[3.31]*

Pressure drop

Example: relief valve set at 20 bar *[290 PSI]*



ΔP-Q Performance curves

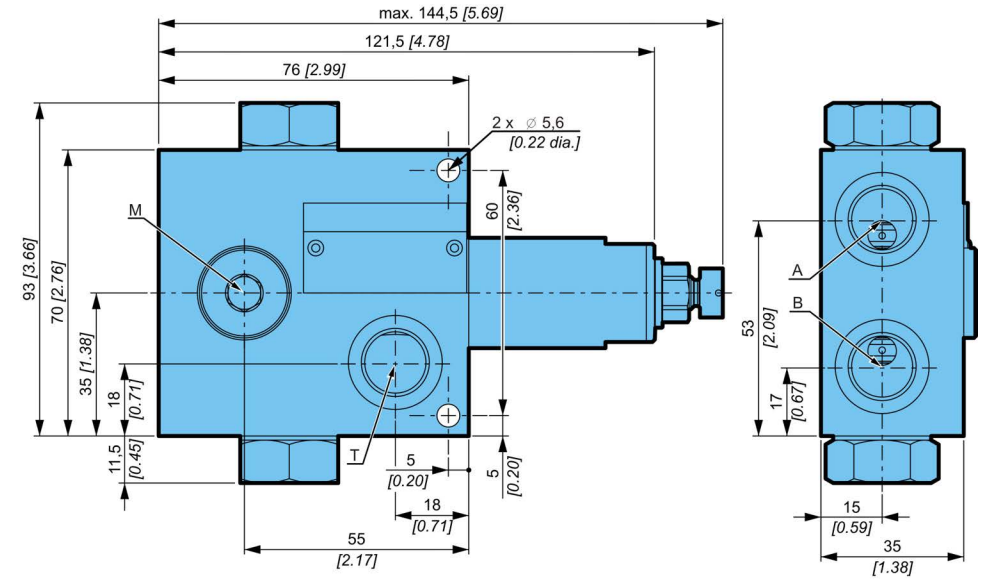


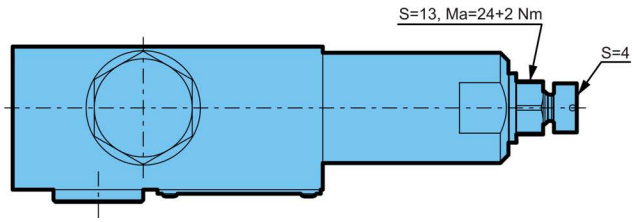
— – A, B to T - 30 bar *[435 PSI]*
——— A, B to T - 10 bar *[145 PSI]*

Dimensions for piped valve

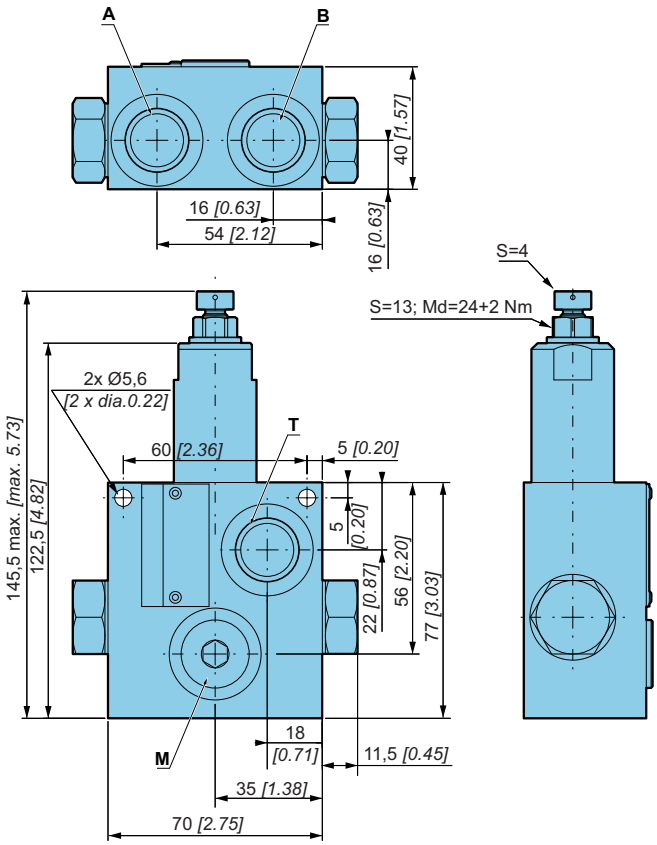
Metric connections

T				P						C					M			S			
1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	1	2	3	1	2	3	4
V	E	3	0	-				0	0	-	0				-	1		-			





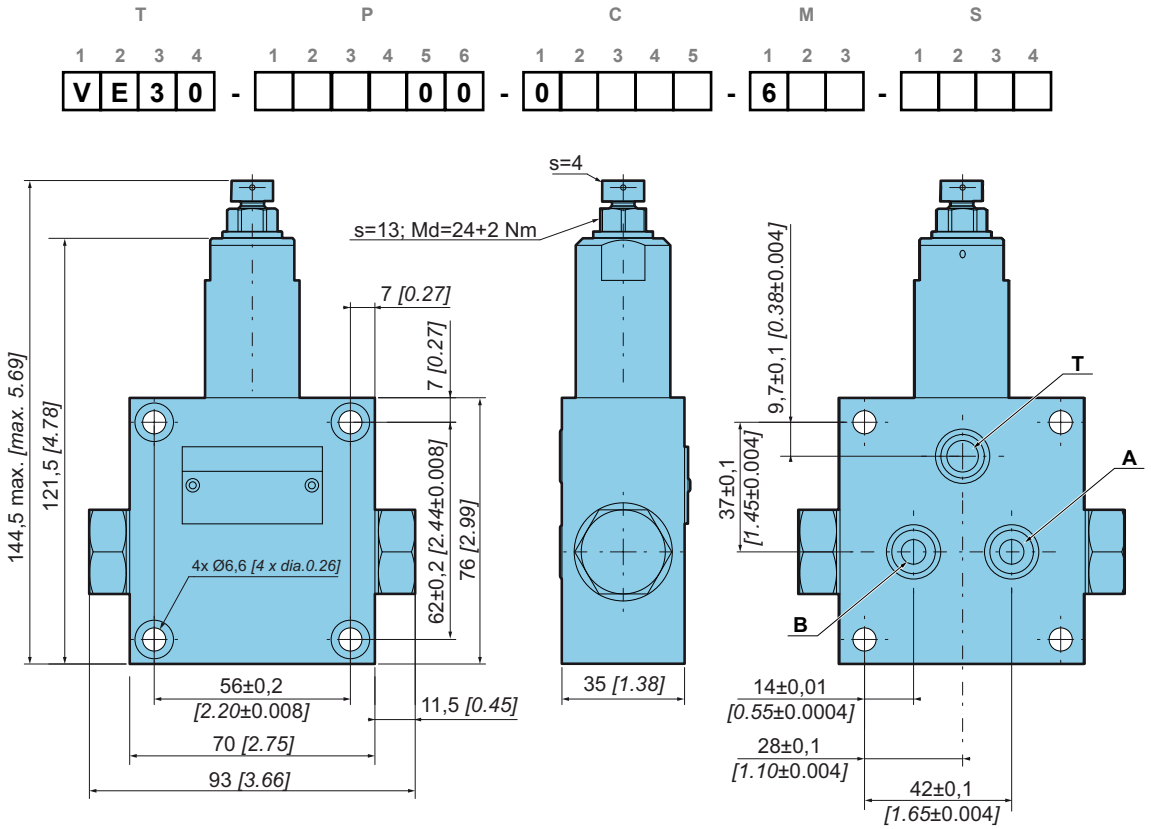
UNF connections



Hydraulic connections

Port	Function	Connection			Max. pressure bar *[PSI]*
		ISO 9974-1 (Metric) Type N	ISO 1179-1 (BSPP) Type N	ISO 11926-1 (UNF)	
A	HP/LP connection	M18 x 1.5	G3/8	3/4-16 UNF-2B	500 *[7 252]*
B	HP/LP connection				
M	pressure measurement or service connection				
T	Tank connection				5 *[72.5]*

Dimensions for flanged valve



Hydraulic connections

Port	Function	Connection	Max. pressure bar *[PSI]*
A	HP/LP connection	Ø 7 mm *[dia. 0.27 in]*	500 *[7 252]*
B	HP/LP connection		
T	Tank connection	Ø 9 mm *[dia. 0.35 in]*	5 *[72.5]*

Model code

T				P						C					M			S			
1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	1	2	3	1	2	3	4
V	E	3	0	-				0	0	-					-			-			

T1 - T2 Type

Valve	**V**
Exchange	**E**

T3 - T4 Max. flow

30 L/min *[7.93 GPM]*	**30**

P1 - Exchange direction

Unidirectional (A→T)	**A**
Unidirectional (B→T)	**B**
Bidirectional	**C**

P2 - P3 Exchange opening pressure

10 bar *[145 PSI]*	**10**
12 bar *[174 PSI]*	**12**
14 bar *[203 PSI]*	**14**
16 bar *[232 PSI]*	**16**
18 bar *[261 PSI]*	**18**
20 bar *[290 PSI]*	**20**
22 bar *[319 PSI]*	**22**
24 bar *[348 PSI]*	**24**
26 bar *[348 PSI]*	**26**
28 bar *[406 PSI]*	**28**
30 bar *[435 PSI]*	**30**

P4 - Type of exchange

Relief valve not adjustable - fixed by wire	**0**
Relief valve adjustable	**A**

P5 - P6 Restrictor diameter

Without	**00**

C1 - C5 Mechanic setting range

Low range: 10 to 20 bar *[145 to 290 PSI]*	**01020**
High range: 20 to 30 bar *[290 to 435 PSI]*	**02030**

M1 - Assembly version

Piped block	**1**
Flanged block (A, B, T)	**6**

M2 - Hydraulic connections

Without (when M1=6)	**0**
ISO 1179-1 (BSPP)	**3**
ISO 9974-1 (Metric)	**4**
ISO 11926-1 (UNF)	**A**

M3 - M port

Without	**0**
Open **	**M**

** Only available with piped valve

S1 - S4 Options

Without	**0**
Special painting	**D**
Zinc coated	**B**
Customized name plate	**P**
Customized *	**F**

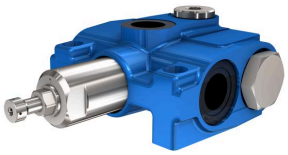
* Further description on interface drawing

HIGH PERFORMANCE EXCHANGE VALVE VE60

- **Compact**
- **Adjustable**
- **Heavy duty**



Flanged version



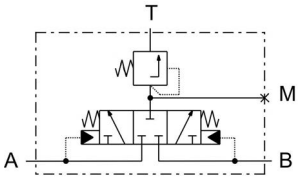
Piped version

Operation

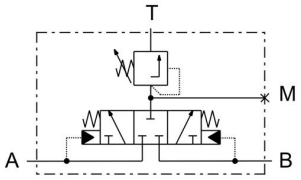
Exchange valves are for use in bleeding hot oil from the low pressure side of a hydrostatic transmission circuit. The hot oil can be cooled, filtered or used as a source of oil for flushing other pump and motor case.

Hydraulic symbols

Type of exchange: F



Type of exchange: 0 and A

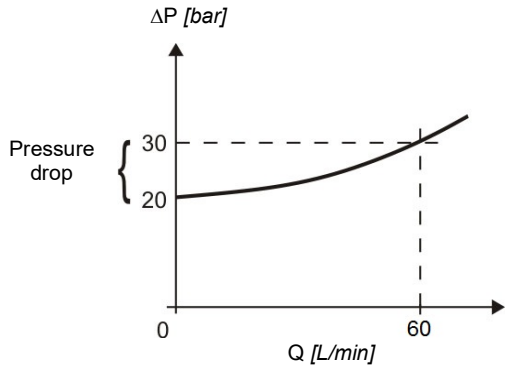


Features

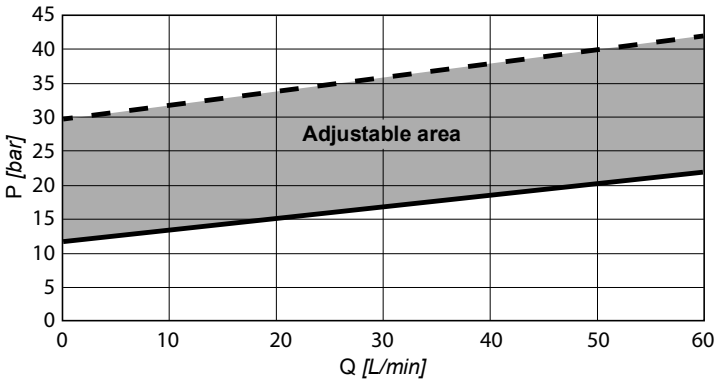
		Flanged version	Piped version
Max. pressure	bar *[PSI]*	500 *[7 252]*	
Exchange relief valve setting	bar *[PSI]*	12 to 30 *[174 to 435]*	
Selector spool switching pressure	bar *[PSI]*	6,5 *[94]*	
Exchange flow (10 bar *[145 PSI]* ΔP)	L/min *[GPM]*	60 *[15.9]*	
Exchange direction		Forward and/or reverse	
Type of hydraulic connections		ISO 1179-1 (BSPP) / ISO 9974-1 (Metric) / ISO 11926-1 (UNF)	
Mass	kg *[lbs]*	2,4 *[5.29]*	3,2 *[7.05]*

Pressure drop

Example: Relief valve set at 20 bar *[290 PSI]*.



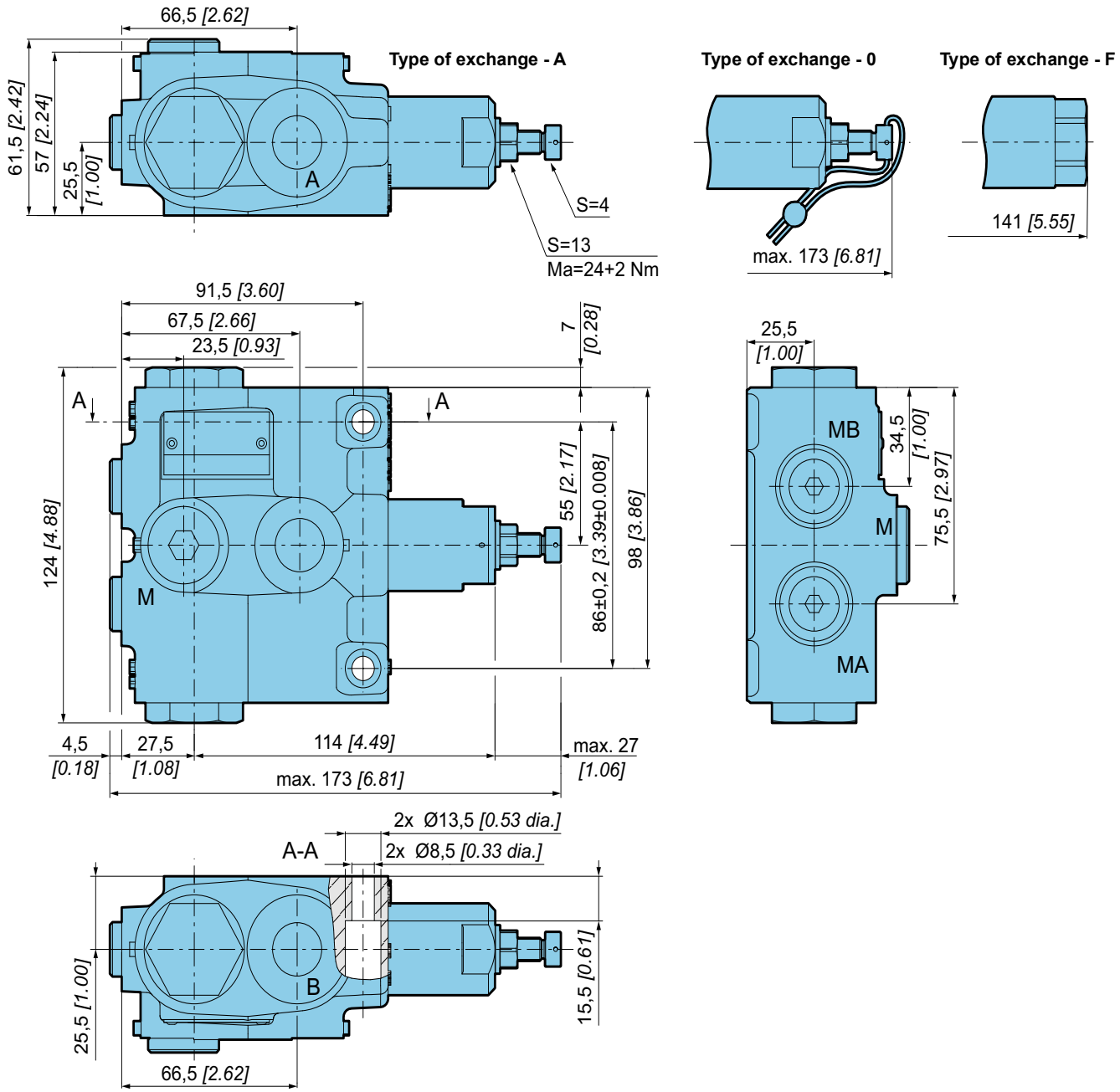
ΔP-Q Performance curves



— — A, B to T - 30 bar *[435 PSI]*
——— A, B to T - 12 bar *[173 PSI]*

Dimensions for piped version

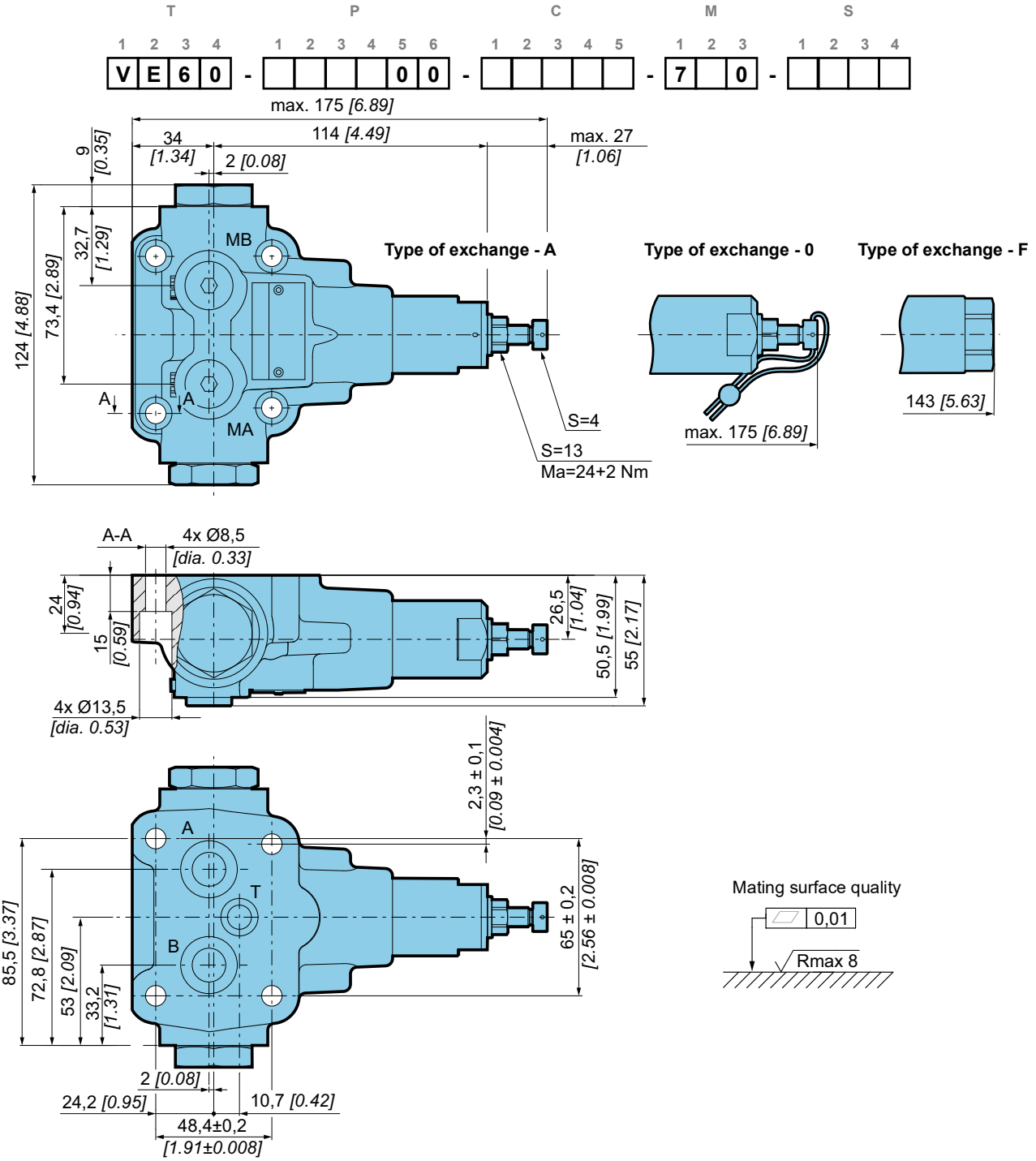
T				P						C					M			S			
1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	1	2	3	1	2	3	4
V	E	6	0	-				0	0	-					-	2		-			



Hydraulic connections

Port	Function	Connection			Max. pressure bar *[PSI]*
		ISO 9974-1 (Metric) Type N	ISO 1179-1 (BSPP) Type N	ISO 11926-1 (UNF)	
A	HP/LP connection	M22x1.5	G1/2	7/8-14 UNF-2B	500 *[7 251]*
B	HP/LP connection				
T	Tank connection				5 *[72.5]*
MA	Pressure measurement (A)	M14x1.5	G1/4	9/16-18 UNF-2B	500 *[7 251]*
MB	Pressure measurement (B)				
M	Pressure measurement or service connection	M22x1.5	G1/2	7/8-14 UNF-2B	500 *[7 251]*

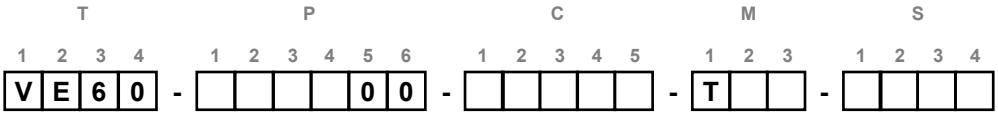
Dimensions for flanged version

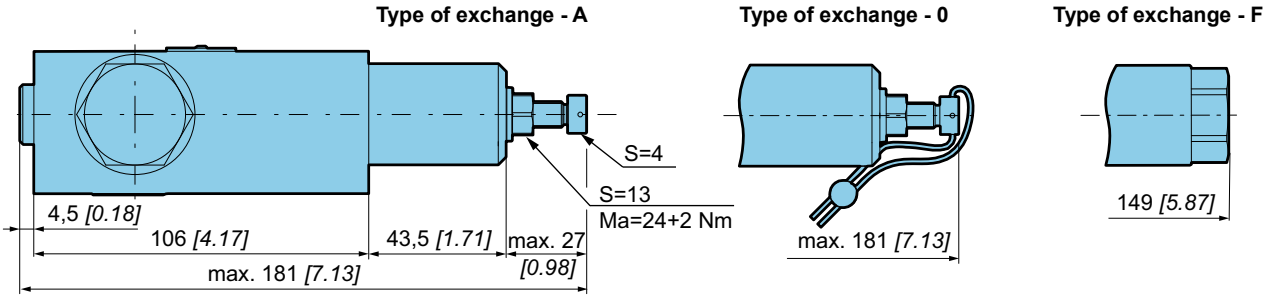


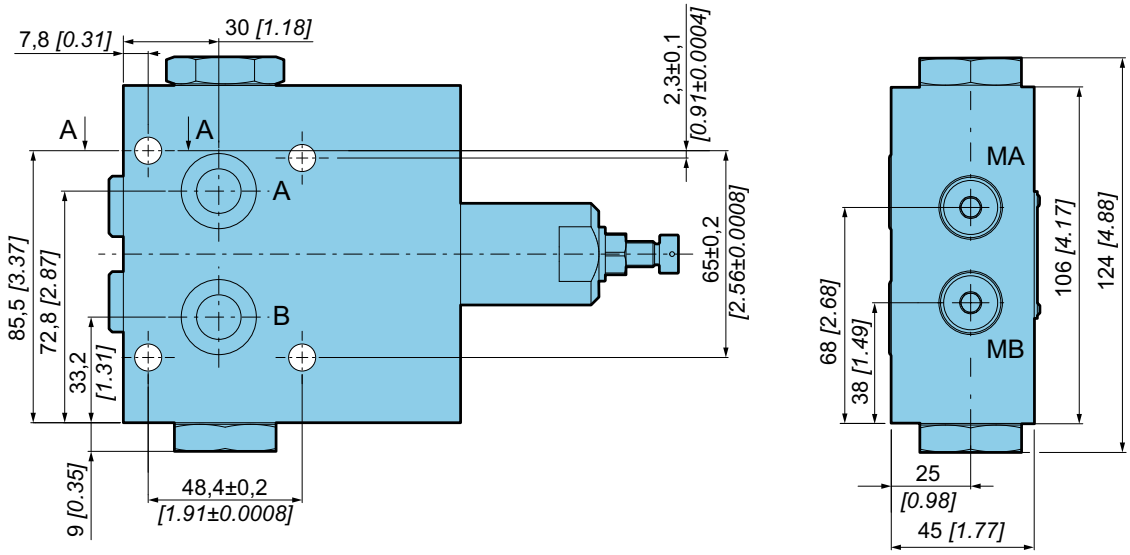
Hydraulic connections

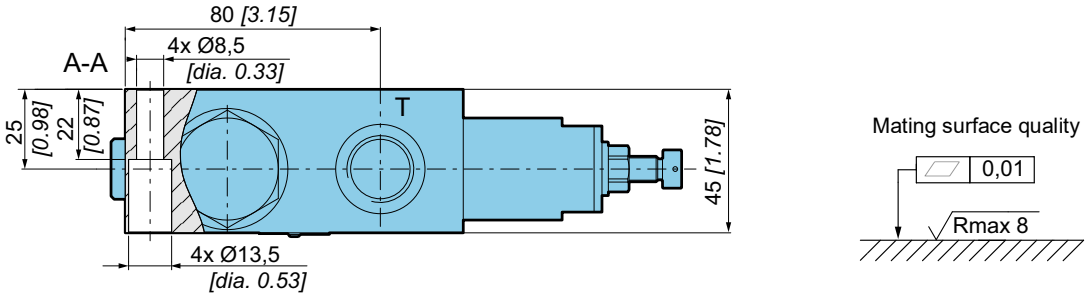
Port	Function	Connection			Max. pressure bar *[PSI]*
		ISO 9974-1 (Metric) Type N	ISO 1179-1 Type N	ISO 11926-1	
A	HP/LP connection	Ø14 mm *[dia. 0.55 in]*	Ø14 mm *[dia. 0.55 in]*	Ø14 mm *[dia. 0.55 in]*	500 *[7 251]*
B	HP/LP connection				
T	Tank connection	Ø10 mm *[dia. 0.39 in]*	Ø10 mm *[dia. 0.39 in]*	Ø10 mm *[dia. 0.39 in]*	5 *[72.5]*
MA	Pressure measurement (A)	M14x1.5	G1/4 BSPP	9/16-18 UNF-2B	500 *[7 251]*
MB	Pressure measurement (B)				

Dimensions with T port piped - optional





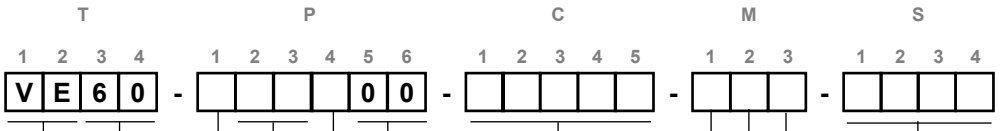




Hydraulic connections

Port	Function	Connection			Max. pressure bar *[PSI]*
		ISO 9974-1 (Metric) Type N	ISO 1179-1 (BSPP) Type N	ISO 11926-1 (UNF)	
A	HP/LP connection	Ø14 mm *[dia. 0.55 in]*	Ø14 mm *[dia. 0.55 in]*	Ø14 mm *[dia. 0.55 in]*	500 *[7 251]*
B	HP/LP connection				
T	Tank connection	M22x1.5	G1/2 BSPP	7/8-14 UNF-2B	5 *[72.5]*
MA	Pressure measurement (A)	M14x1.5	G1/4 BSPP	9/16-18 UNF-2B	500 *[7 251]*
MB	Pressure measurement (B)				

Model code



T1 - T2 Type

Valve	V
Exchange	E

T3 - T4 Max. flow

60 L/min *[15.85 GPM]*	60

P1 - Exchange direction

Unidirectional (A→T)	A
Unidirectional (B→T)	B
Bidirectional	C

P2 - P3 Exchange opening pressure

12 bar *[174 PSI]*	12
14 bar *[203 PSI]*	14
16 bar *[232 PSI]*	16
18 bar *[261 PSI]*	18
20 bar *[290 PSI]*	20
22 bar *[319 PSI]*	22
24 bar *[348 PSI]*	24
26 bar *[377 PSI]*	26
28 bar *[406 PSI]*	28
30 bar *[435 PSI]*	30

P4 - Type of exchange

Relief valve adjustable	A
Relief valve not adjustable - fixed by wire	0
Relief valve not adjustable - locked setting	F

P5 - P6 Restrictor diameter

Without	00

C1 - C5 Mechanic setting range

Low range: 12 to 18 bar *[174 to 261 PSI]*	01218
High range: 18 to 30 bar *[261 to 435 PSI]*	01830

M1 - Assembly version

Piped block - casted body	2
Flanged block (A, B, T) - casted body	7
Flanged valve with T port piped	T

M2 - Hydraulic connections

ISO 1179-1 (BSPP)	3
ISO 9974-1 (Metric)	4
ISO 11926-1 (UNF)	A

M3 - M port

Plugged / Without *	0
Open **	M

* Plugged - Only when Piped (M1=2)
Without - Only when Flanged (M1=7)
** Only when Piped (M1=2)

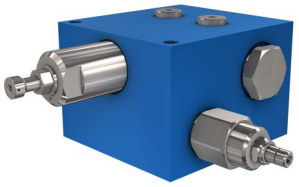
S1 - S4 Options

Without	0
Special painting	D
Zinc coated	B
Customized name plate	P
Customized *	F

* Further description on interface drawing

EXCHANGE AND HIGH PRESSURE RELIEF VALVE VES60

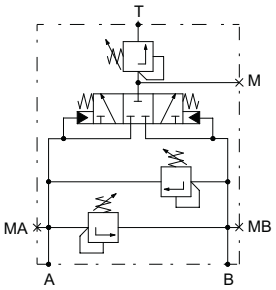
- **Compact**
- **Adjustable**
- **Heavy duty**
- **Integrated High pressure relief valve**



Operation

Exchange valves are for use in bleeding hot oil from the low pressure side of a hydrostatic transmission circuit. The hot oil can be cooled, filtered or used as a source of oil for flushing other pump and motor case.

Hydraulic symbol

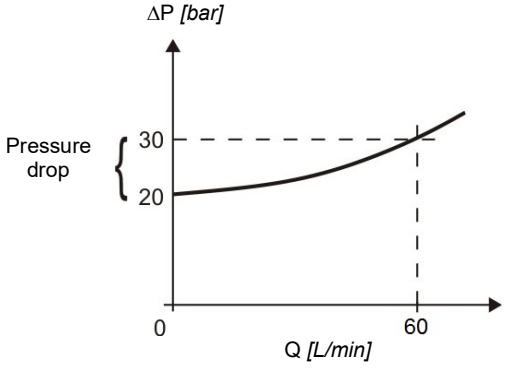


Features

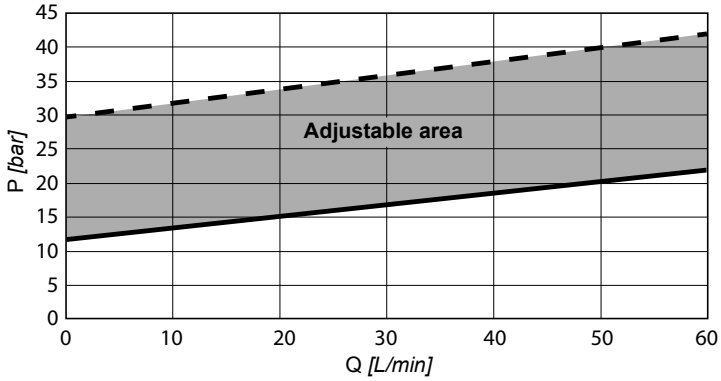
Max. pressure	bar *[PSI]*	450 *[6 526]*
Exchange relief valve setting	bar *[PSI]*	12 to 30 *[174 to 435]*
Selector spool switching pressure	bar *[PSI]*	6,5 *[94]*
Exchange flow (10 bar *[145 PSI]* ΔP)	L/min *[GPM]*	60 *[15.9]*
Exchange direction		Forward and/or reverse
Type of hydraulic connections		ISO 1179-1 (BSPP) / ISO 9974-1 (Metric) / ISO 11926-1 (UNF)
Mass	kg *[lbs]*	7,3 *[16.09]*

Pressure drop

Example: relief valve set at 20 bar *[290 PSI]*



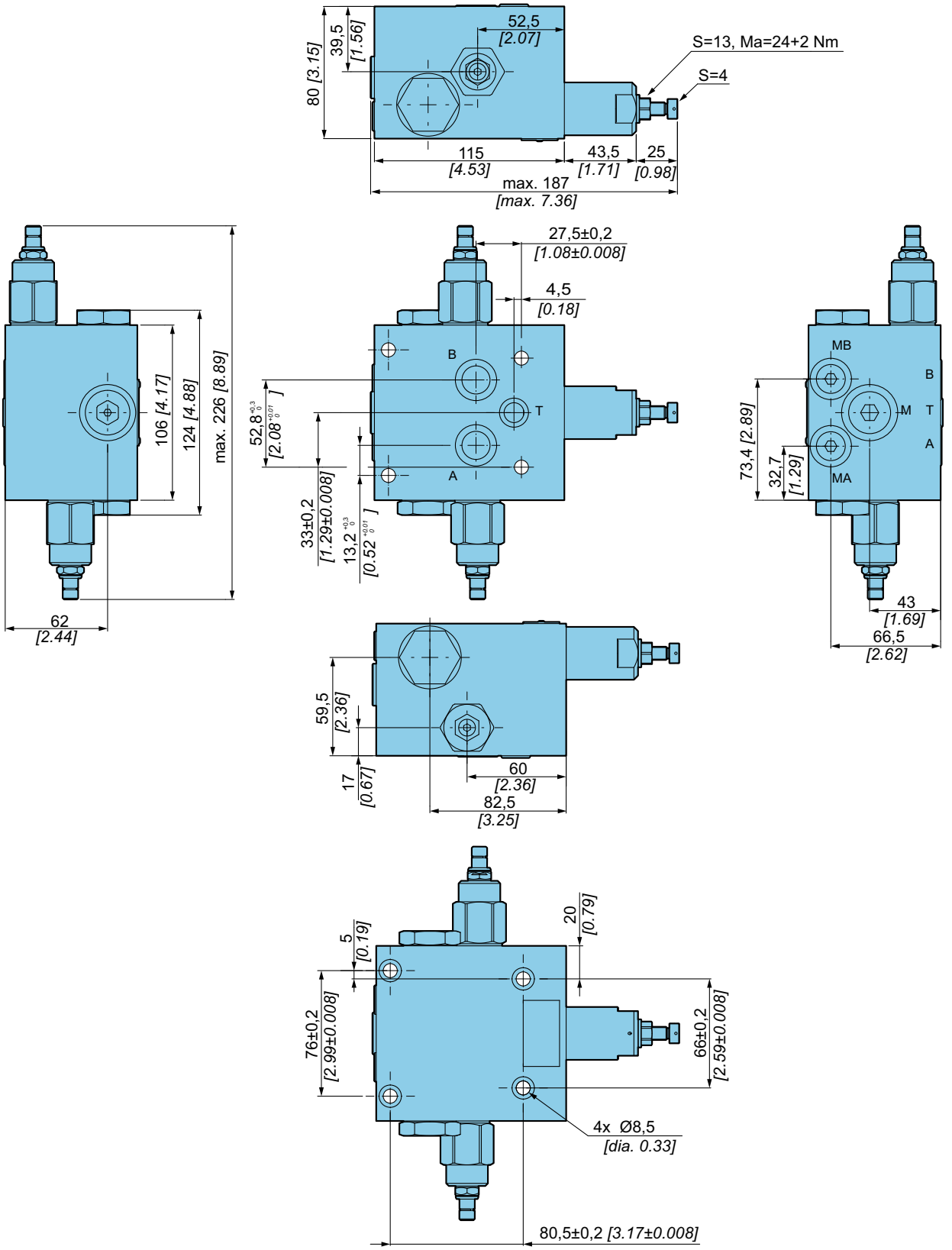
ΔP-Q Performance curves



— – A, B to T - 30 bar *[435 PSI]*
——— A, B to T - 12 bar *[173 PSI]*

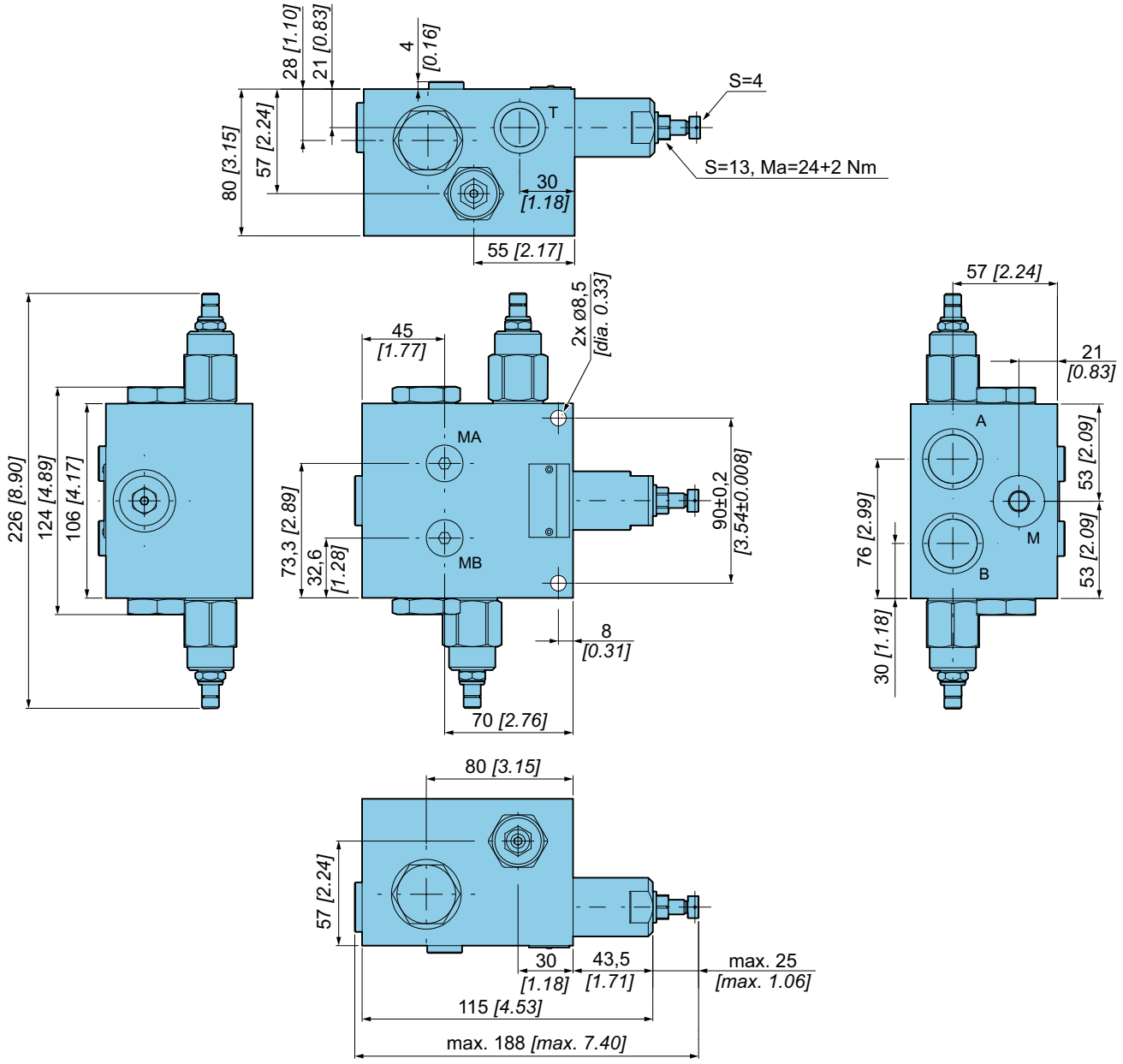
Dimensions for VES60 flanged version

T					P				C	A			B			M			S			
1	2	3	4	5	1	2	3	4	1	1	2	3	1	2	3	1	2	3	1	2	3	4
V	E	S	6	0	-				-	-			-			-	6		-			



Dimensions for VES60 piped version

T					P				C	A			B			M			S			
1	2	3	4	5	1	2	3	4	1	1	2	3	1	2	3	1	2	3	1	2	3	4
V	E	S	6	0	-				-	-			-			-	1		-			



Hydraulic connections

Port	Function	Connection			Max. pressure bar *[PSI]*
		ISO 1179-1 (BSPP) Type N	**ISO 9974-1 (Metric) Type N**	**ISO 11926-1 (UNF)**	
A	HP/LP connection	G3/4	M27x2	1 1/16-12 UNF-2B	450 *[6 526]*
B	HP/LP connection				
T	Tank connection	G1/2	M22x1.5	7/8-14 UNF-2B	5 *[72.5]*
MA	Pressure measurement (A)	G1/4	M14x1.5	9/16-18 UNF-2B	450 *[6 526]*
MB	Pressure measurement (B)				
M	Pressure measurement of service connection	G1/2	M22x1.5	7/8-14 UNF-2B	450 *[6 526]*



Model code

T					P				C	A			B			M			S			
1	2	3	4	5	1	2	3	4	1	1	2	3	1	2	3	1	2	3	1	2	3	4
V	E	S	6	0	-				-	-			-			-			-			

T1 - T3 Type

Valve	V
Exchange	E
Safety	S

T4 - T5 Max. flow

60 L/min *[15.85 GPM]*	60

P1 - Exchange direction

Unidirectional (A→T)	A
Unidirectional (B→T)	B
Bidirectional	C

P2 - P3 Exchange opening pressure

12 bar *[174 PSI]* *	12
14 bar *[203 PSI]* *	14
16 bar *[232 PSI]* *	16
18 bar *[261 PSI]* *	18
20 bar *[290 PSI]* **	20
22 bar *[319 PSI]* **	22
24 bar *[348 PSI]* **	24
26 bar *[377 PSI]* **	26
28 bar *[406 PSI]* **	28
30 bar *[435 PSI]* **	30

* Spring range: Low range=12 - 18 bar *[174 - 261 PSI]*
** Spring range: High range=18-30 bar *[261 - 435 PSI]*

P4 - Exchange relief setting

Not adjustable	0
Adjustable	A

C1 - High pressure relief valve type

A-B; B-A (Adjustable)	3

A1 - A3 High pressure relief valve setting on A

160 bar *[2 320 PSI]*	160
210 bar *[3 045 PSI]*	210
250 bar *[3 625 PSI]*	250
300 bar *[4 351 PSI]*	300
350 bar *[5 076 PSI]*	350
420 bar *[6 091 PSI]*	420

B1 - B3 High pressure relief valve setting on B

160 bar *[2 320 PSI]*	160
210 bar *[3 045 PSI]*	210
250 bar *[3 625 PSI]*	250
300 bar *[4 351 PSI]*	300
350 bar *[5 076 PSI]*	350
420 bar *[6 091 PSI]*	420

M1 - Assembly version

Piped block	1
Flanged block	6

M2 - Hydraulic connections

ISO 1179-1 (BSPP)	3
ISO 9974-1 (Metric)	4
ISO 11926-1 (UNF)	A

M3 - M port

Plugged	0
With *	M

* M thread size = A, B, T

S1 - S4 Options

Without	0
Special painting	D
Zinc coated	B



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Hydraulics

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