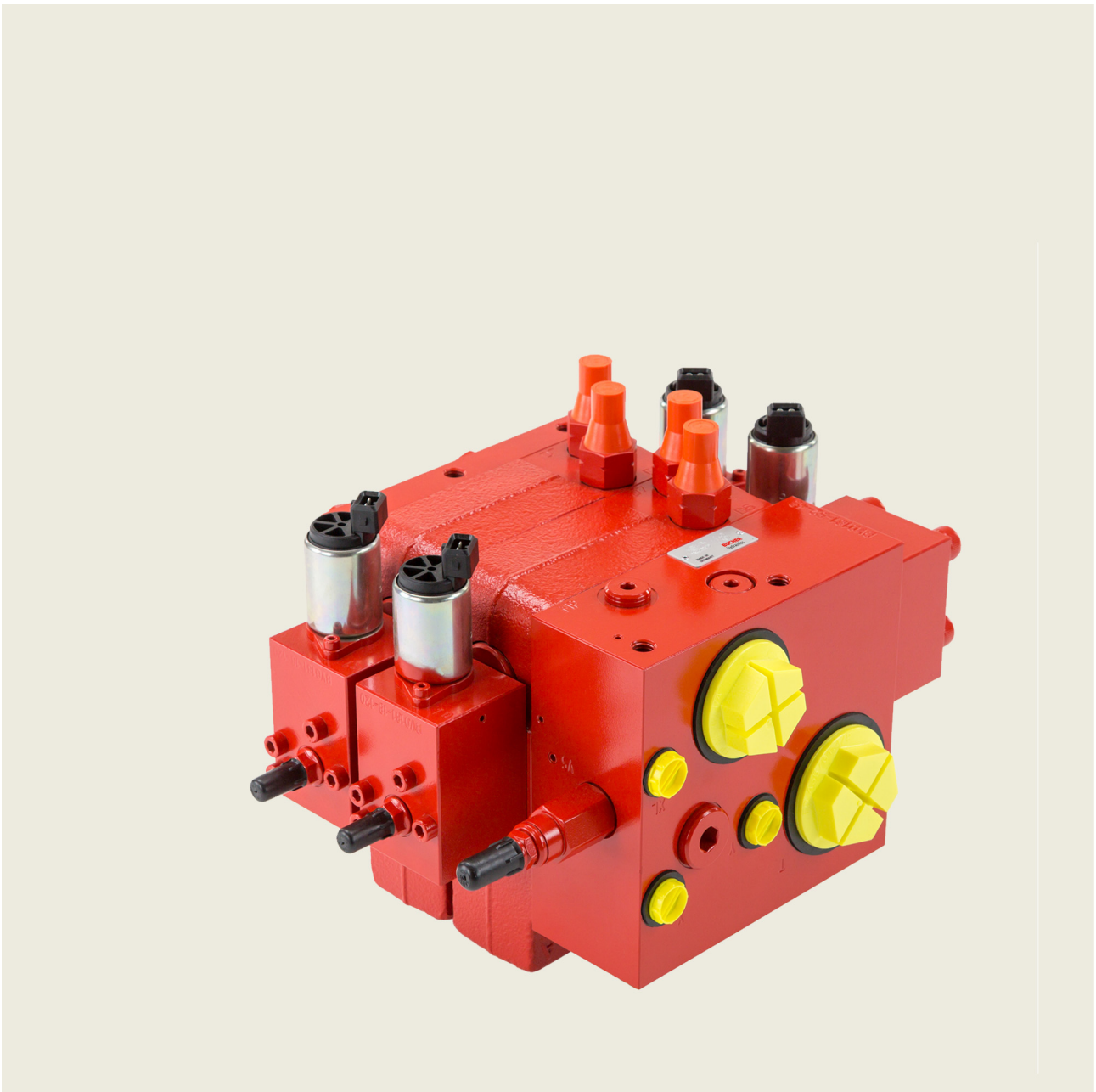


## Proportional Directional Valve System

in Sectional Design  
Series SC 18



**Contents**

Page

<b>1</b>	<b>General</b> .....	<b>3</b>
	1.1 Description .....	3
	1.2 Application examples .....	3
<b>2</b>	<b>Technical data</b> .....	<b>3</b>
<b>3</b>	<b>Performance graphs</b> .....	<b>5</b>
	3.1 Flow control characteristics .....	5
	3.2 Control characteristics .....	5
	3.3 Primary-pressure cut-off .....	5
	3.4 Secondary pressure relief .....	5
<b>4</b>	<b>Circuit diagram (example)</b> .....	<b>6</b>
<b>5</b>	<b>Dimensions</b> .....	<b>7</b>
	5.1 Complete valve example .....	7
	5.2 Inlet module .....	8
	5.3 End module .....	9
	5.4 Manual operator .....	9
<b>6</b>	<b>Ordering code</b> .....	<b>10</b>
	6.1 Inlet modules .....	10
	6.2 End module .....	11
	6.3 Actuator module .....	12
<b>7</b>	<b>Symbols</b> .....	<b>14</b>
	7.1 Inlet modules .....	14
	7.2 End module .....	15
	7.3 Actuator modules .....	16
	7.4 Modules configuration .....	17
	7.5 Control spool type .....	18
	7.6 Preferential combinations of flow rate [l/min] .....	18
<b>8</b>	<b>Fluid</b> .....	<b>19</b>
<b>9</b>	<b>Note</b> .....	<b>19</b>
<b>10</b>	<b>Fluid cleanliness</b> .....	<b>19</b>

# 1 General

## 1.1 Description

Our sectional proportional valves regulate the flow rate to the actuator by means of an internal closed-loop control system. Load-independent flow control is guaranteed by individual pressure compensators upstream of each proportional directional valve (load-sensing principle). The highly adaptable modular system consists of an inlet module, actuator modules (with up to eight sections) and an end module. The System is specially designed for use in mobile hydraulics. The user can be assured that the right system is always available for every application.

- Compact sectional design
- Load feedback
- Individual supply cut-off for each actuator port
- Actuator modules with individual pressure compensators and optional pressure relief valve, primary or secondary
- Load-independent flow control, even with parallel operation of several actuators
- Can be used with fixed displacement pumps and load sensing pumps

## 1.2 Application examples

- Mobile Crane
- Ground Drilling
- Ground Drilling
- Application in explosion protection areas (please consult Bucher Hydraulics)

# 2 Technical data

General characteristics	Unit	Description, value
Design		Proportional valves, sectional design, spool type
Types of operators		<ul style="list-style-type: none"> <li>• electro-hydraulic proportional</li> <li>• hydraulic</li> <li>• manual (oil-tight enclosure)</li> <li>• electro-hydraulic proportional - manual, combined</li> <li>• electro-hydraulic proportional - hydraulic, combined</li> <li>• for other types, please consult Bucher</li> </ul>
Port type		<ul style="list-style-type: none"> <li>• threaded ports to DIN 3852 and DIN ISO 6162</li> <li>• SAE flange</li> </ul>
Mounting attitude		unrestricted, but ensure good air-bleeding
Ambient temperature range	°C	-30 ... +60

Hydraulic characteristics	Unit	Description, value
Hydraulic fluid		HL and HLP mineral oil to DIN 51524; for other fluids please consult BUCHER HYDRAULICS GmbH
Hydraulic fluid temperature range	°C	-20 ... +80 , recommended +20 ... +60
Viscosity range	mm <sup>2</sup> /s (cSt)	10 ... 500 ,recommended 15...250
Maximum fluid cleanliness Cleanliness class to ISO 4406 : 1999		Class 20/18/15
Maximum inlet flow rate	l/min	400
Maximum actuator flow rate	l/min	260
Maximum pump pressure	bar	370
Maximum load pressure	bar	420
Maximum tank pressure, port T	bar	50
Maximum tank pressure for electrohydraulic pilot stage	bar	5 (port Y or T)

Hydraulic operation	Unit	Description, value
Pilot-pressure range	bar	6 ... 20
Pressure rating of pilot circuit	bar	max. 50

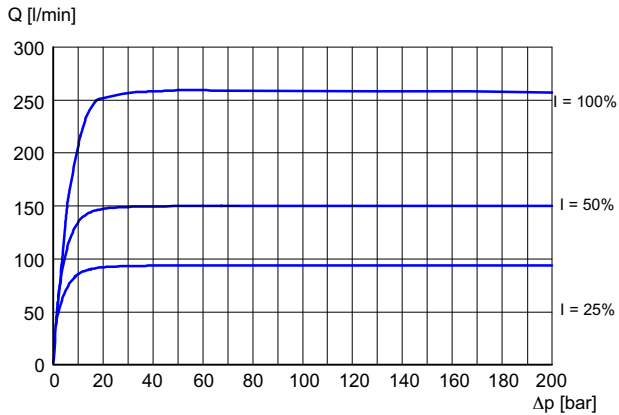
Size		with threaded ports	with SAE flanged ports	UNF
Actuator	A / B	G 1"	¾" 6000 PSI	available
Pump	P	G 1¼"	1" 6000 PSI	available
Tank	T	G 1½"	1¼" 3000 PSI	available
Load sensing	XL	G ¼"	G ¼"	available
Pump for pilot stage	X	G ¼"	G ¼"	available
Tank for pilot stage	Y	G ¼"	G ¼"	available
Test point for pump pressure	MP	G ¼"	G ¼"	available
Test point for tank pressure	MT	G ¾"	G ¾"	available

Electrical characteristics	Unit	Description, value
Control current at opening point 24 V 12 V	mA	350 700
Control current at max. stroke 24 V 12 V	mA	700 1400
Hysteresis with 100 Hz PWM signal (from control current at max. stroke)		± 3 %
Protection class to EN 60 529		IP 65
Insulation class to VDE 0580		H
Supply voltage	V DC	24 / 12
Coil resistance at 20 °C 24 V 12 V	Ω	21.2 ± 5 % 5.3 ± 5 %
Coil resistance at 60 °C 24 V 12 V		24.5 ± 5 % 6.1 ± 5 %
Power consumption at max. spool stroke (coil resistance at 60 °C)	VA	10.4
Maximum current for 100 % relative duty cycle with: 24 V 12 V	mA	750 1500

### 3 Performance graphs

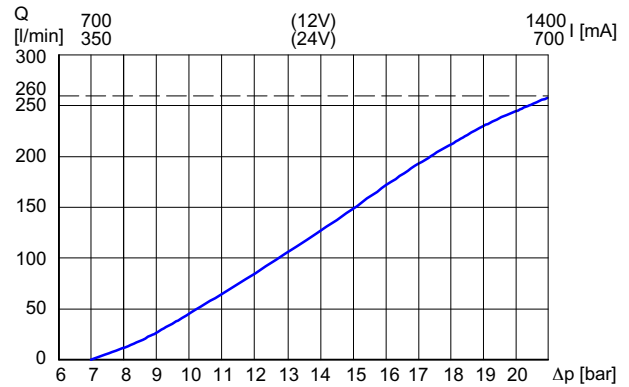
#### 3.1 Flow control characteristics

$$\Delta p = p_{\text{pump}} - p_{\text{Load}} \text{ [bar]}$$



#### 3.2 Control characteristics

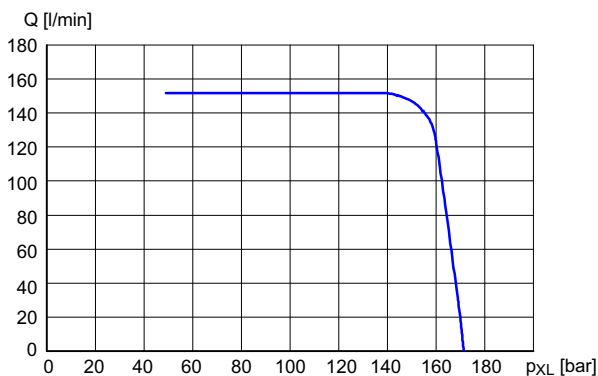
Electrohydraulic - proportional



#### 3.3 Primary-pressure cut-off

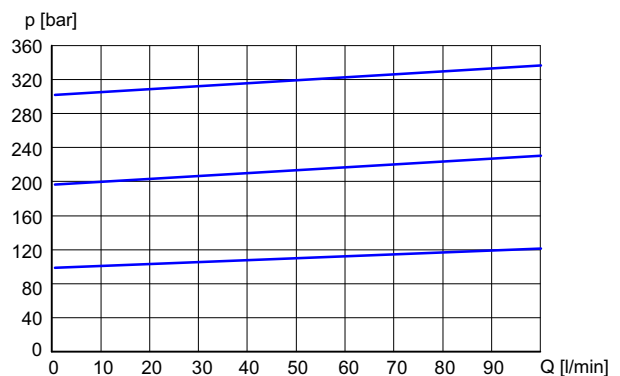
Q = Actuator flow rate at A and B

p<sub>XL</sub> = Load pressure



#### 3.4 Secondary pressure relief

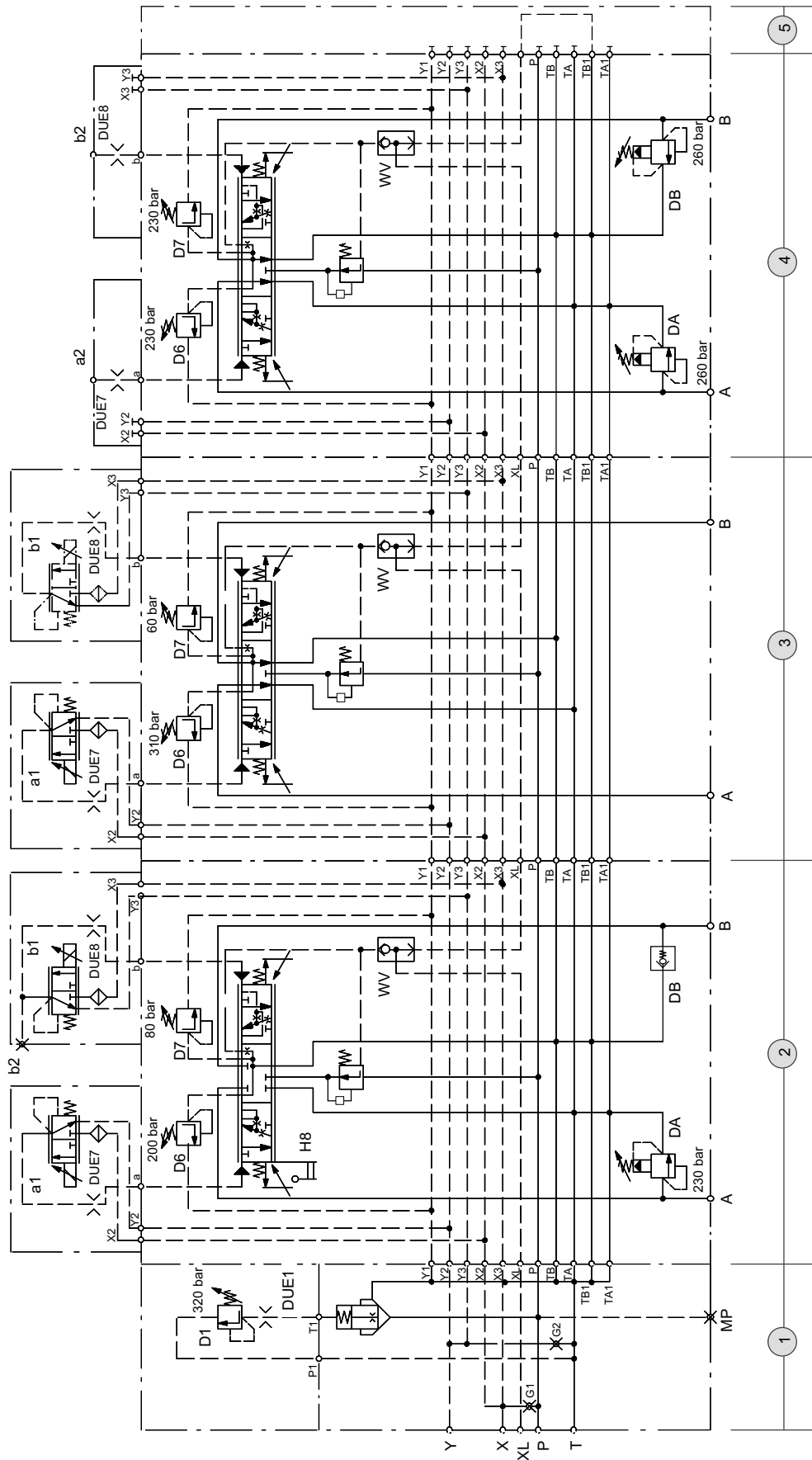
Secondary pressure - flow rate - characteristic curve



**IMPORTANT!**

The cross-sectional geometry of the spool and the pressure-differential setting are factory-set so that the valve's working range lies within the characteristic diagram.

4 Circuit diagram (example)

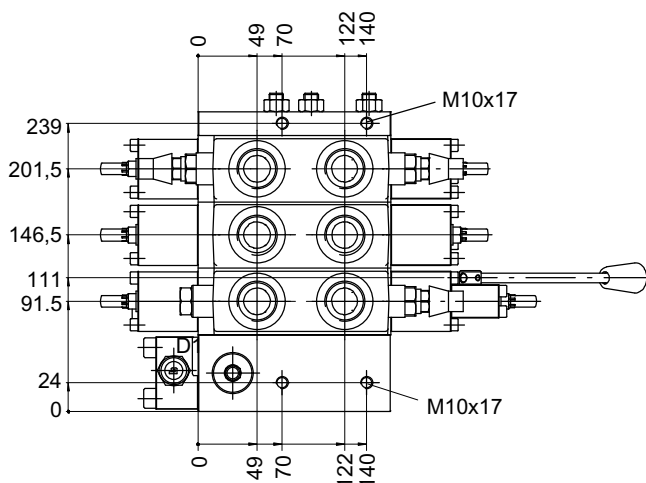
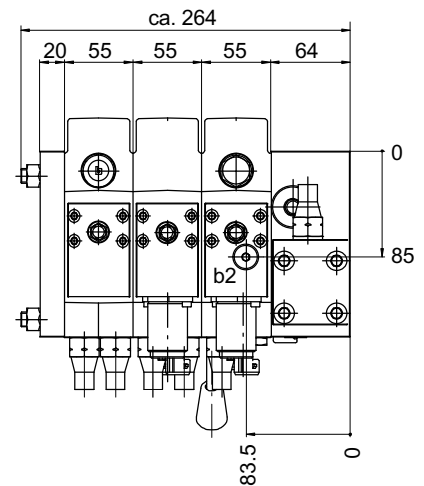
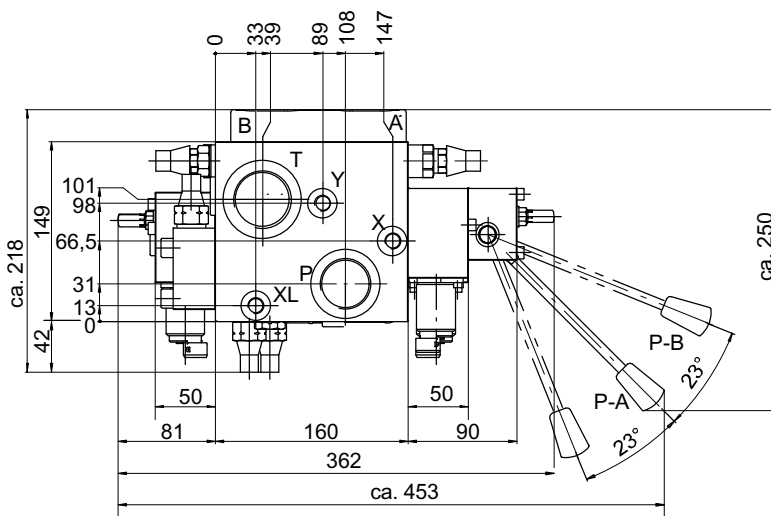
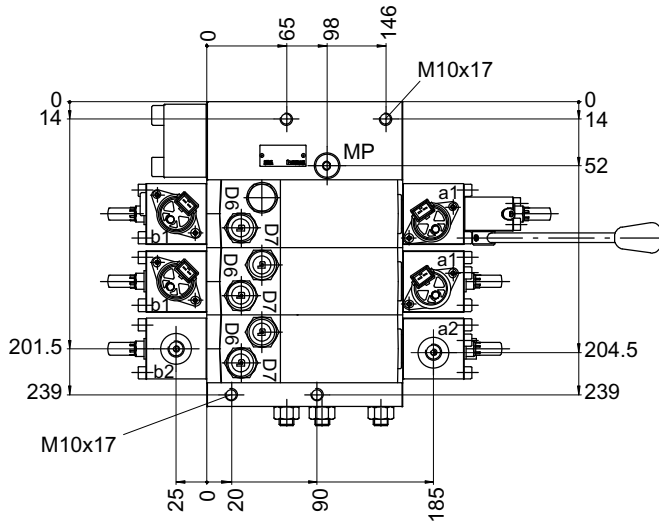


Ordering example SC18

- ① SC18-MG320-11X-0000-00X-00-A
- ② SC18-Y1G0-D200/D080-A260/160-E24A0X-X-HL-D230/N000-A-Z (Option Z = additional control port, actuator A)
- ③ SC18-Y2G0-D310/D060-C210/210-E24A0X-X-XX-S000/S000-A
- ④ SC18-Y3G0-D230/D230-C070/030-X00X0X-Y-XX-D260/D260-A
- ⑤ SC18-EXX-00X-A

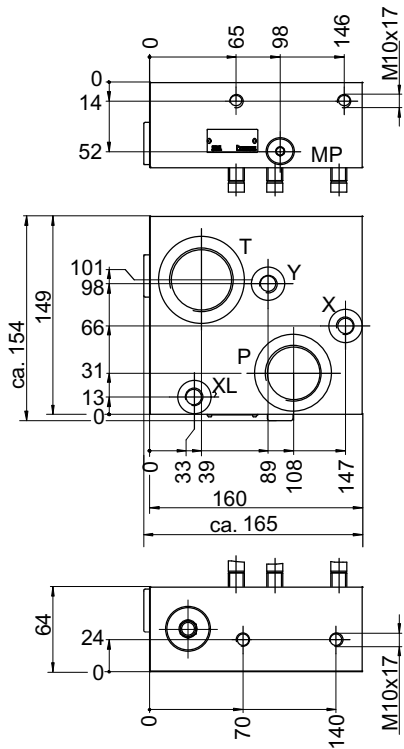
## 5 Dimensions

### 5.1 Complete valve example

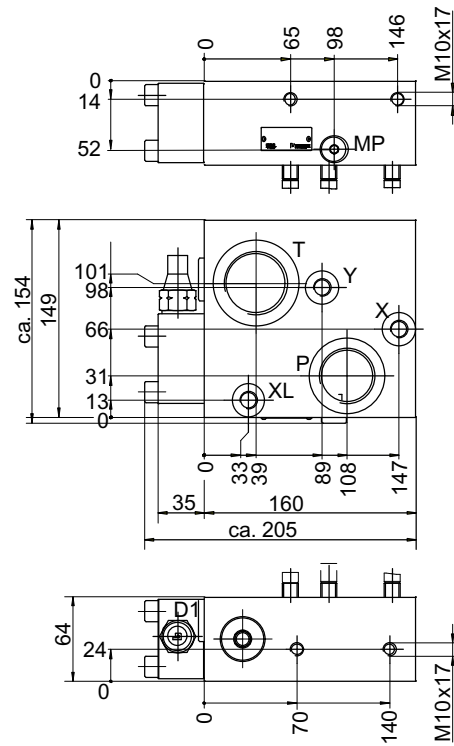


5.2 Inlet module

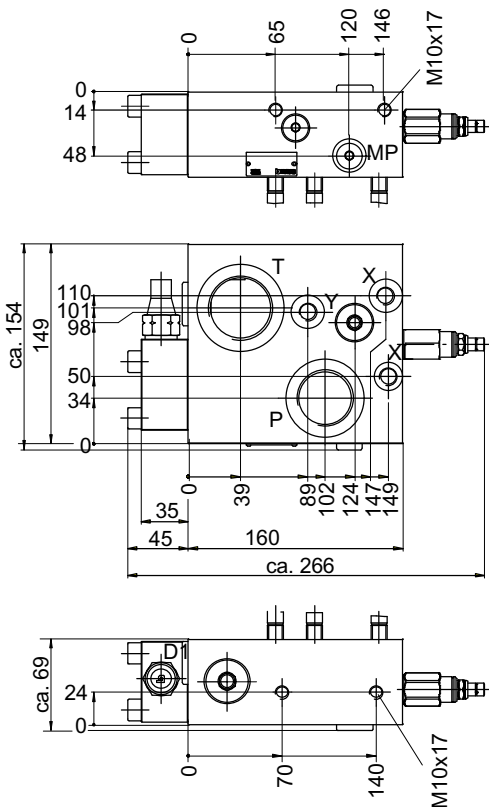
5.2.1 SC18-GG000-11X-0000-00X-00-A



5.2.2 SC18-MG320-00X-0000-00X-00-A



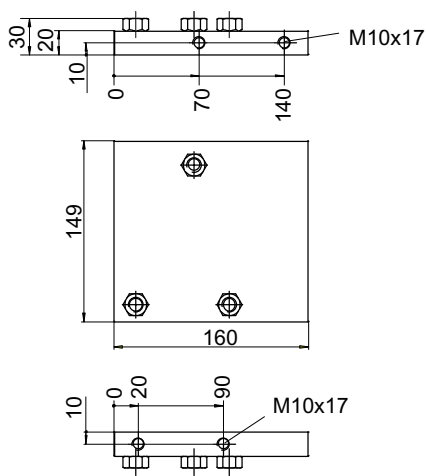
5.2.3 SC18-MG350-11X-0000-00X-20-A



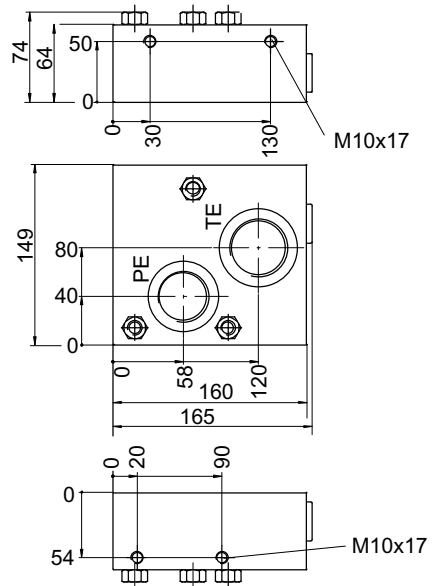


### 5.3 End module

#### 5.3.1 SC18-EXX-00X-0000-A

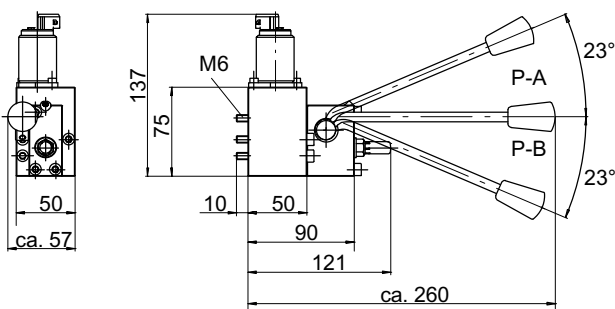


#### 5.3.2 SC18-EGX-11X-0000-A

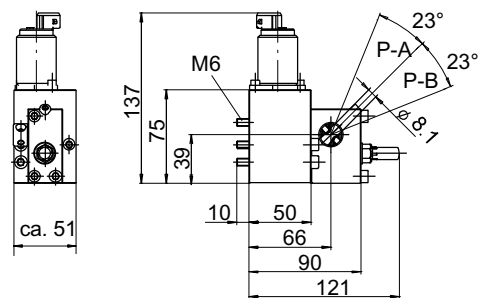


### 5.4 Manual operator

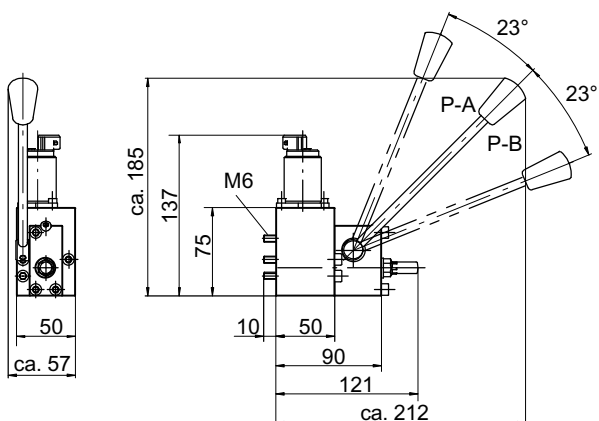
#### 5.4.1 Hand lever in position "A"



#### 5.4.2 Without hand lever = "Z"



#### 5.4.3 Hand lever in position "L"



### 6 Ordering code

#### 6.1 Inlet modules

SC 18 - M G 370 - 1 0 X - 35 45 - 0 0 X - 1 0 - A -

SC = Proportional valve in sectional design

18 = Nominal size

Circuit options (see Section 7.1):

G = without aux. valve

M = with system pressure relief, EUM<sup>1)</sup> optional

V = 3-way pressure compensator

Ports:

G = threaded ports to DIN 3852 and DIN ISO 6162

F = SAE flanges

System pressure relief:

370 = note desired setting [bar]

000 = with circuit option G

Pilot oil supply X:

0 = internal

1 = external

Pilot oil unloading Y:

0 = internal

1 = external

X = Unaccounted

Pilot-pressure reducing D2 [bar]:

35 = standard

00 = if not available

Pilot-pressure limitation D3 [bar]:

45 = standard

00 = if not available

Pilot-pressure cut-off X2 (valve V1):

0 = without

1 = with pilot-pressure cut-off (not in combination with EUM<sup>1)</sup>)

Pilot-pressure cut-off X3 (valve V1):

0 = without

1 = with pilot-pressure cut-off (not in combination with EUM<sup>1)</sup>)

X = Unaccounted

Pressure-peak reducing (not in combination with EUM<sup>1)</sup>):

0 = without

1 =  $V_2 \leq 5 \text{ l}$

2 =  $V_2 \geq 5 \text{ l}$

EUM<sup>1)</sup>

0 = without EUM<sup>1)</sup>

1 = with EUM<sup>1)</sup> (can be not combined with pressure-peak reducing and pilot-pressure cut-off)

A = Series Identifier (e.g. A)

... = Option (e.g. A)

1) EUM = Electronic Undersupply Management

Prevents stand still of loads in undersupply situations. More informations see data sheet 301-P-9050091

## 6.2 End module

SC 18 - E G X - 0 0 X - XX XX - A -

SC = Proportional valve in sectional design

18 = Nominal size

**Section type:**

E = end plate

**Ports:**

G = threaded ports to DIN 3852 and DIN ISO 6162

F = SAE flanges

X = without

X = Unaccounted

**Port P:**

0 = closed or not existing

1 = P-port open

**Port T:**

0 = closed or not existing

1 = T-port open

X = Unaccounted

XX = Unaccounted

XX = Unaccounted

A = Series identifier (e.g. A)

... = Option

### 6.3 Actuator module

#### 6.3.1 Ordering code part 1

SC 18 - Y 3 G 0 - D 330 / S 000 - C 200 / 160 - E 24 A 0 X - Y - H L - -

SC = Sectional design

18 = Nominal size

Y = Actuator section

3 = Actuator section number  
(max.8)

Ports:  
G = Threaded ports  
to DIN 3852 and DIN ISO 6162  
F = SAE flanges

Section for SAE design:  
0 = Threading type /  
SAE flanges > 55 mm  
1 = SAE flanges DIN ISO 6162

Load sensing A (D6):  
D = Primary pressure relief D6,  
manual setting  
S = Closing plug  
M = Measuring point

... = Pressure cut-off port A, primary [bar]  
000 = when pressure adjustment not fitted

Load sensing B (D7):  
D = Primary pressure relief D6, manual setting  
S = Closing plug  
M = Measuring point

... = Pressure cut-off port B, primary [bar]  
000 = when pressure adjustment not fitted

C = Spool type (see section 7.2.3)

210 = Flow rate Port A [l/min] e.g. 210

160 = Flow rate Port B [l/min] e.g. 160

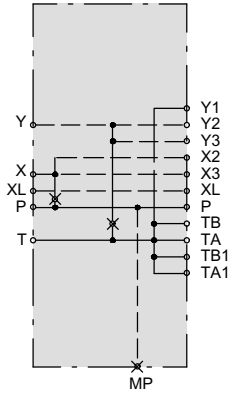
## 6.3.2 Ordering code part 2

SC	18	-	Y	3	G	0	-	D	330	/	S	000	-	C	200	/	160	-	E	24	A	0	X	-	Y	-	H	L	-	D	150	/	K	200	-	A	-				
		<b>Operation:</b>																																							
E	=	electro-hydraulic proportional																																							
X	=	without																																							
		<b>Supply voltage:</b>																																							
00	=	without																																							
12	=	12 V DC																																							
24	=	24 V DC																																							
		<b>Plug connector (solenoid):</b>																																							
A	=	AMP Junior Power Timer																																							
D	=	Deutsch DT04-2P																																							
X	=	without (solenoid)																																							
1	=	Manual emergency operation (only with operation E)																																							
0	=	without																																							
X	=	Unaccounted																																							
Y	=	Hydraulic operation																																							
X	=	without																																							
H	=	Manual operation																																							
X	=	without																																							
		<b>Lever position with manual operation (see section 5.4)</b>																																							
A	=	hand-lever position A																																							
L	=	hand-lever position L																																							
Z	=	without hand-lever																																							
X	=	without manual operation																																							
		<b>Pressure relief / make up, A-side (secondary):</b>																																							
D	=	pressure relief																																							
N	=	make-up																																							
K	=	pressure relief and make up																																							
S	=	closing plug																																							
X	=	without																																							
200	=	Pressure setting [bar], B-side (N,S and X = 000)																																							
		<b>Pressure relief / make up, B-side (secondary):</b>																																							
D	=	pressure relief																																							
N	=	make-up																																							
K	=	pressure relief and make up																																							
S	=	closing plug																																							
X	=	without																																							
160	=	Pressure setting [bar], B-side (N,S and X = 000)																																							
A	=	Series identifier (e.g. A)																																							
...	=	Option																																							

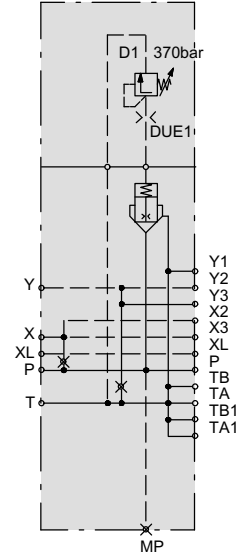
## 7 Symbols

### 7.1 Inlet modules

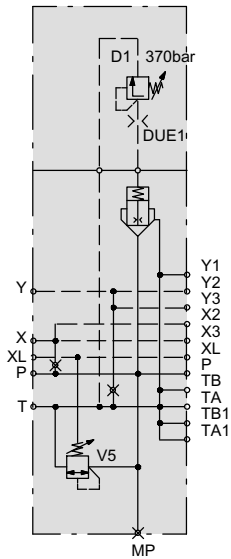
7.1.1 SC18-G\*-000-11X-0000-00X-00-A



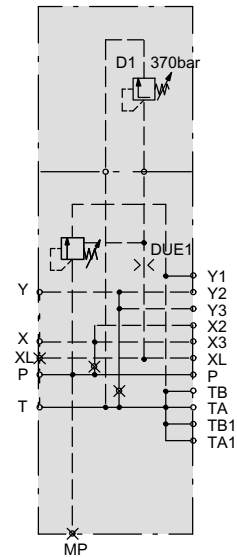
7.1.2 SC18-M\*-11X-\*-00X-00-A



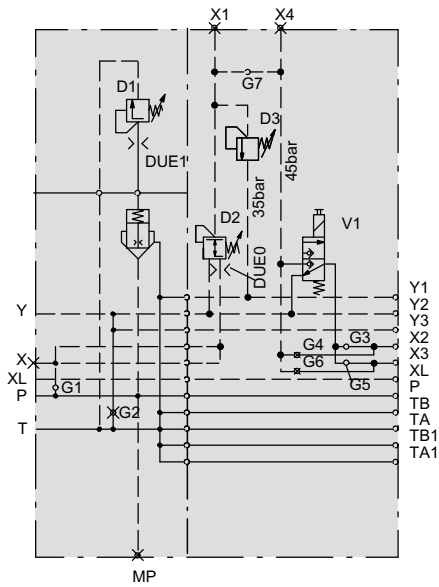
7.1.3 SC18-M\*-11X-\*-00X-20-A



7.1.4 SC18-V\*-11X-\*-00X-00-A

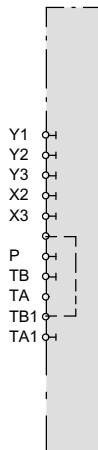


7.1.5 SC18-M\*-01X-3545-11X-00-A

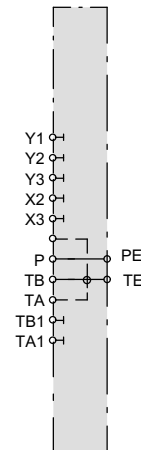


7.2 End module

7.2.1 SC18-EXX-00X-XXXX-A



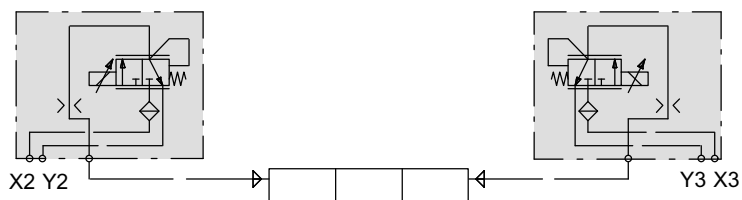
7.2.2 SC18-E\*X-11X-XXXX-A



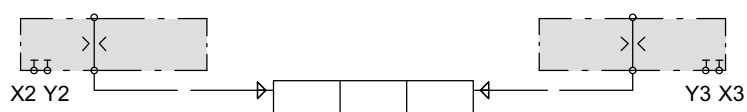
### 7.3 Actuator modules

#### 7.3.1 Operating selection

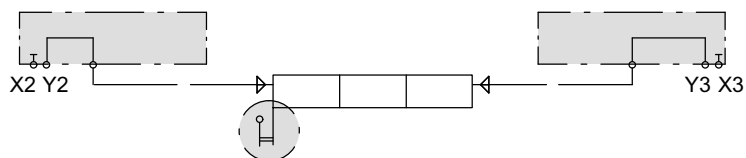
Proportional electrohydraulically = E



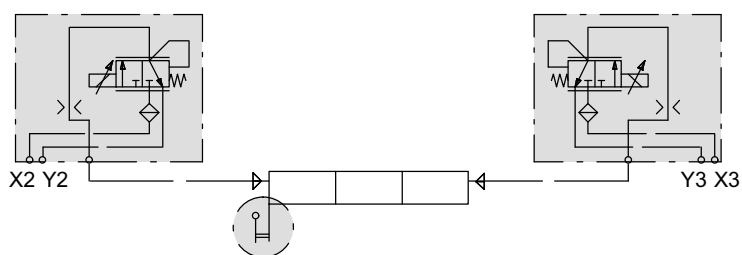
Hydraulically = Y



Manually = H

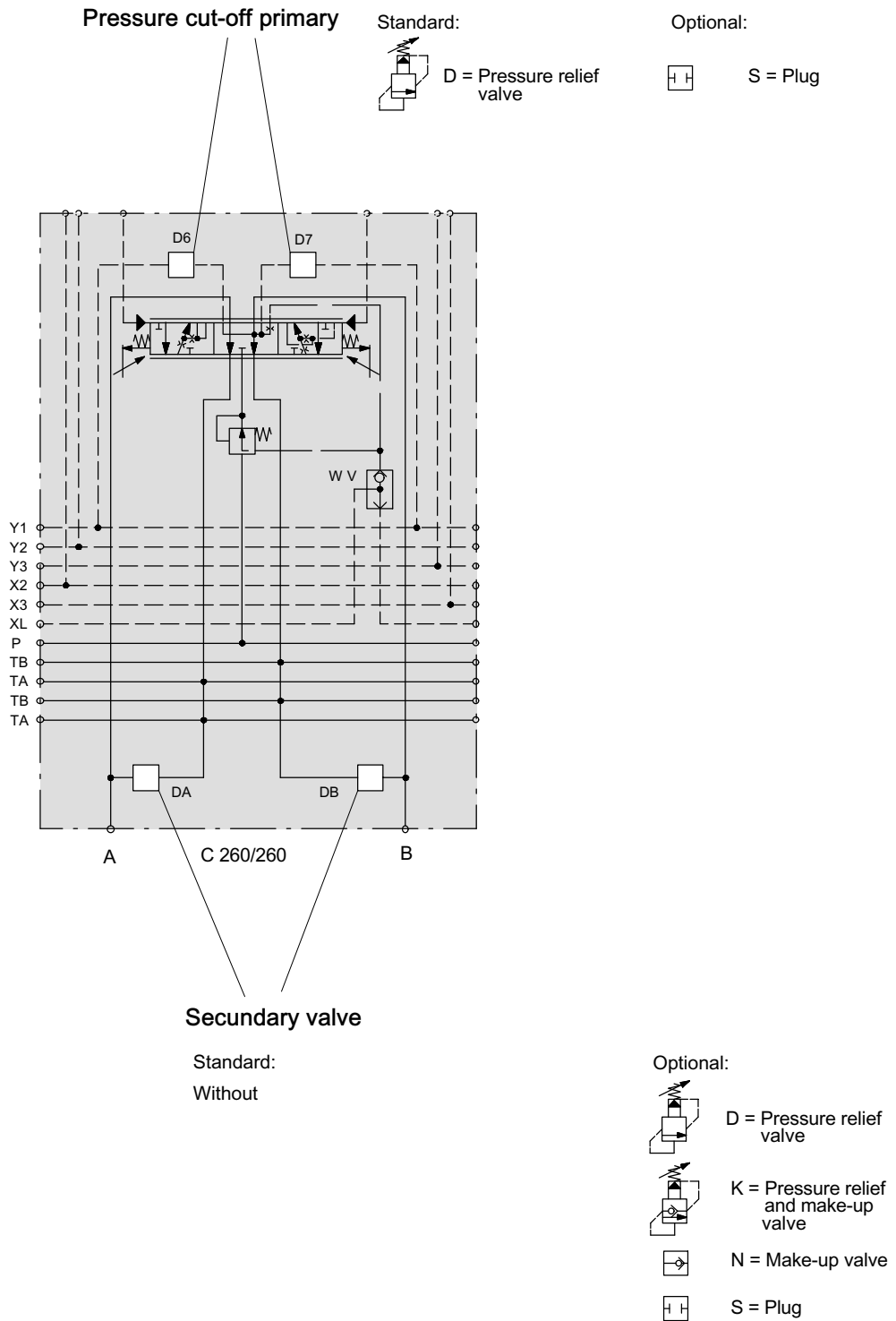


Proportional electrohydraulically and manually = E + H

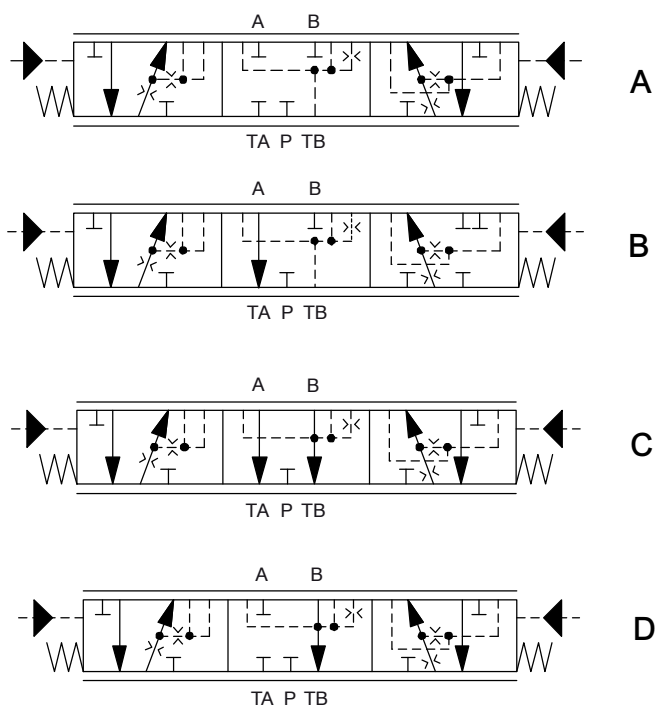




7.4 Modules configuration



### 7.5 Control spool type



### 7.6 Preferential combinations of flow rate [l/min]

$Q_A/Q_B$	$Q_A/Q_B$	$Q_A/Q_B$	$Q_A/Q_B$	$Q_A/Q_B$	$Q_A/Q_B$
260/260	210/210	160/160	110/110	70/70	30/30
260/210	210/110	160/110	110/70	70/30	
260/160		160/70			
260/110					

For other combinations consult Bucher Hydraulics

## 8 Fluid

The oil for the proportional valves must have a minimum cleanliness level of 20/18/15 to ISO 4406 or class 9 to NAS 1638.

We recommend the use of fluids that contain anti-wear additives for operation with boundary lubrication. Fluids without appropriate additives reduce the service life of valves. The user is responsible for maintaining, and regularly checking, the fluid quality. Bucher Hydraulics recommends a Brugger EN/DIN 51347 load capacity  $\geq 30 \text{ N/mm}^2$ .

## 9 Note

This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described herein in order to ensure that all of the conditions necessary for the safety and proper functioning of the system are fulfilled. If you have any doubts or questions concerning the use of these valves, please consult Bucher Hydraulics.

## 10 Fluid cleanliness

Cleanliness class (RK) onto ISO 4406 and NAS 1638

Code ISO 4406	Dirt particle number / 100 ml			NAS 1638
	$\leq 4 \mu\text{m}$	$\leq 6 \mu\text{m}$	$\leq 14 \mu\text{m}$	
23/21/18	8000000	2000000	250000	12
22/20/18	4000000	1000000	250000	-
22/20/17	4000000	1000000	130000	11
22/20/16	4000000	1000000	64000	-
21/19/16	2000000	500000	64000	10
20/18/15	1000000	250000	32000	9
19/17/14	500000	130000	16000	8
18/16/13	250000	64000	8000	7
17/15/12	130000	32000	4000	6
16/14/12	64000	16000	4000	-
16/14/11	64000	16000	2000	5
15/13/10	32000	8000	1000	4

[info.kl@bucherhydraulics.com](mailto:info.kl@bucherhydraulics.com)

[www.bucherhydraulics.com](http://www.bucherhydraulics.com)

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Classification: 430.300.