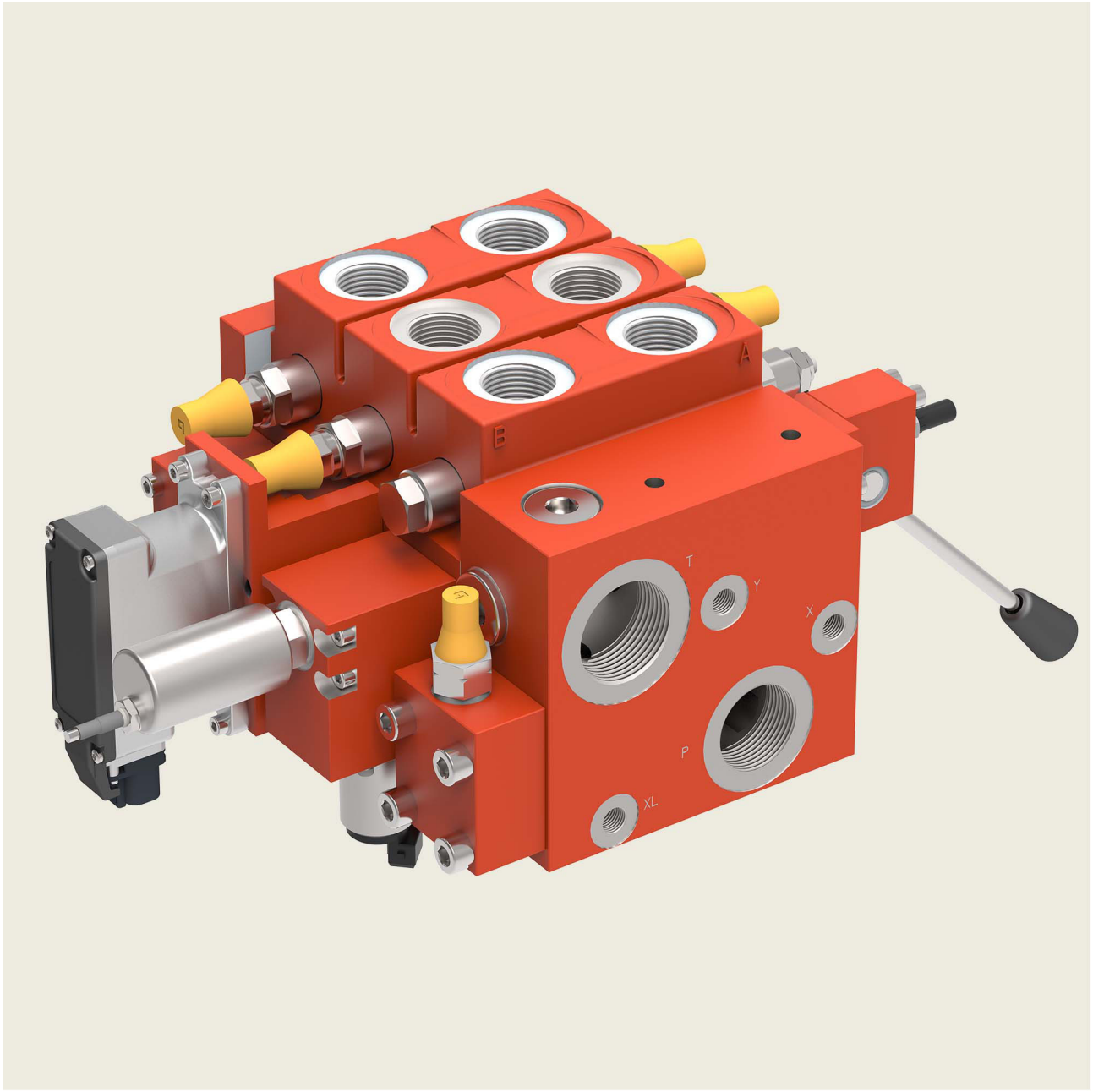
BUCHER hydraulics

Proportional Directional Valve System

in Sectional Design
Series SC 18



BUCHER hydraulics

Contents Page

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 (up to eight) 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 sensing
- 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 cranes
- Ground drilling rigs
- Container forklifts
- Applications with explosion-protection reqiuirements (special design; please contact Bucher Hydraulics)

2 Technical data

General characteristics	Unit	Description, value
Design		Proportional valves, sectional design, max. 8 sections
Types of operators		• Electrohydraulic proportional • Hydraulic • Manual (oil-tight enclosure) • Electrohydraulic proportional - manual, combined • Electrohydraulic proportional - hydraulic, combined • For other types, please contact Bucher
Port type		• Threaded ports to DIN 3852 (for ISO 6162 please enquire) • SAE flange
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 contact Bucher Hydraulics
Hydraulic fluid temperature range	°C	-20 … +80 , recommended +20 … +60
Viscosity range	$mm^2/_s$ [cSt]	10 … 380, recommended 15…250
Minimum fluid cleanliness level 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

Hydraulic characteristics	Unit	Description, value
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
Maximum pressure rating of pilot circuit	bar	50

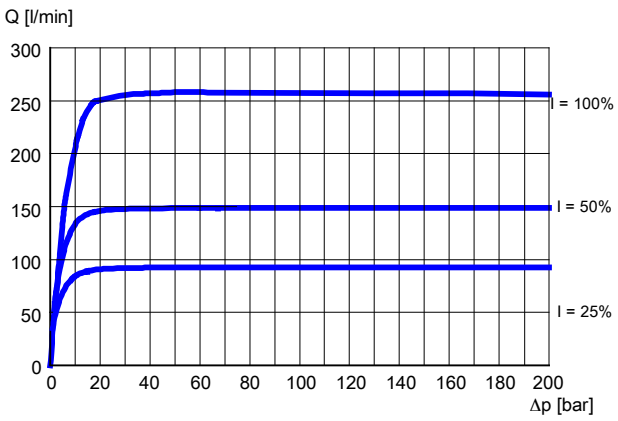
Port type		Threaded port	SAE flanged port	UNF threads
Actuator	A / B	G 1”	¾” 6000 PSI	available
Pump	P	G 1¼”	1” 6000 PSI	available
Tank	T	G 1½”	1¼” 3000 PSI	available
Load sensing	XL	G ¼”	G ¼”	available
Pump for pilot stage	X	G ¼”	G ¼”	available
Tank for pilot stage	Y	G ¼”	G ¼”	available
Test point for 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 (% of 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 Characteristic curves

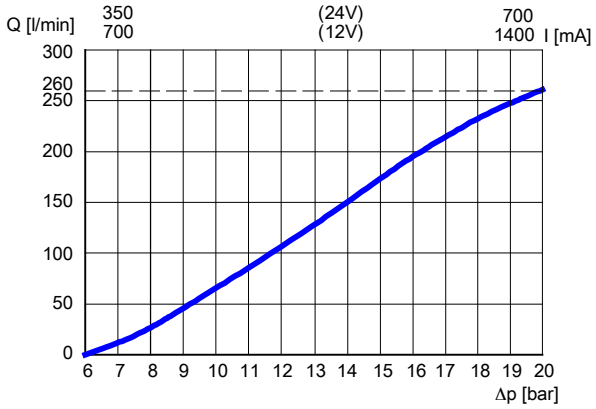
3.1 Flow control characteristics

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



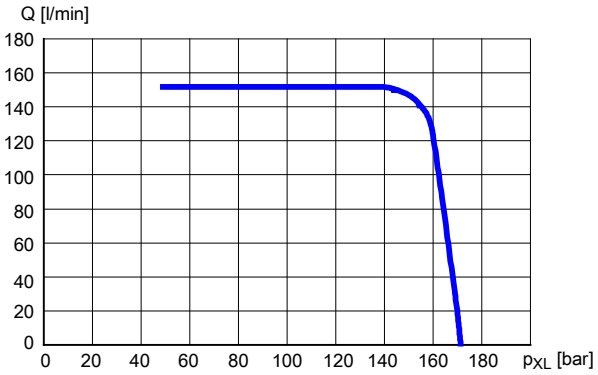
3.2 Control characteristics

Control type: electrohydraulic - proportional



3.3 Primary pressure relief

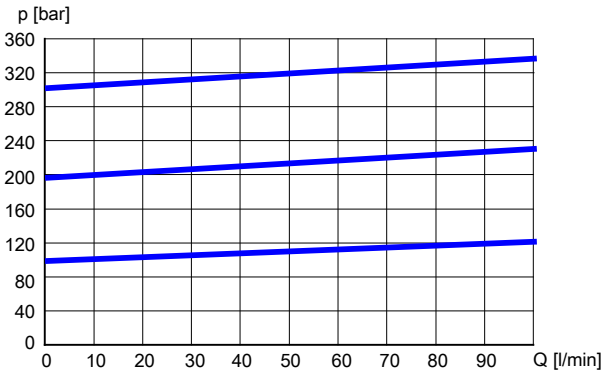
Q = Actuator flow rate at A and B
pxl = Load pressure



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.

3.4 Secondary pressure relief

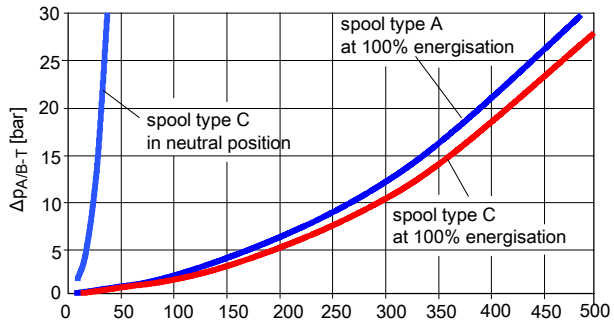
Secondary pressure – flow rate characteristic curve



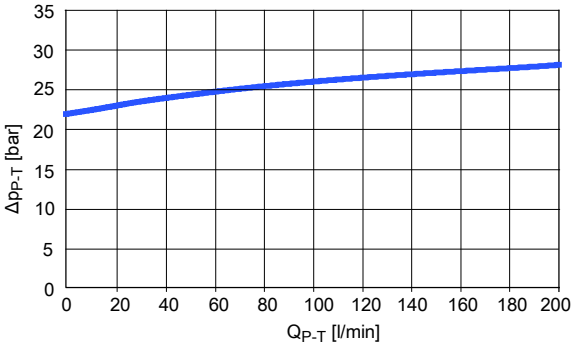
3.5 Pressure differential A/B - T

Q = Actuator flow rate at A and B

Δp = Actuator pressure - tank pressure

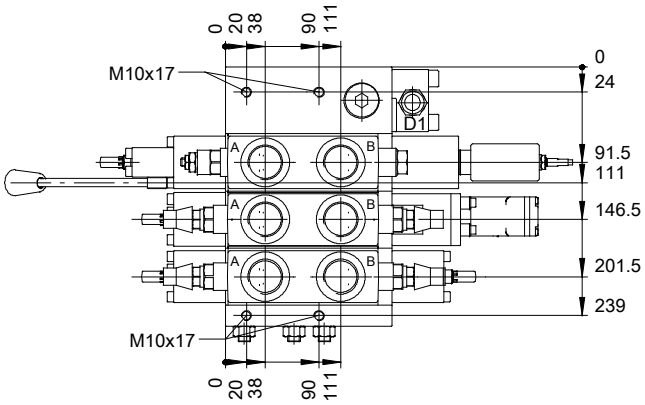


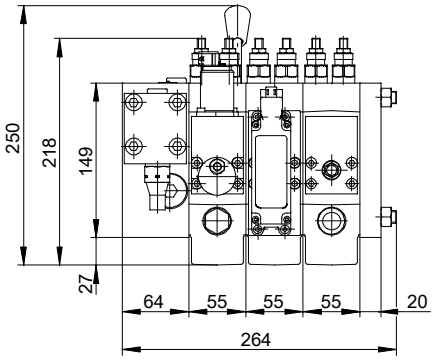
3.6 Circulation pressure difference

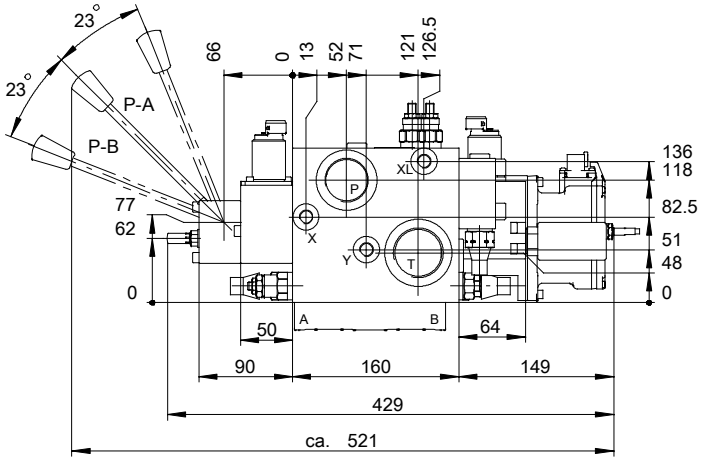


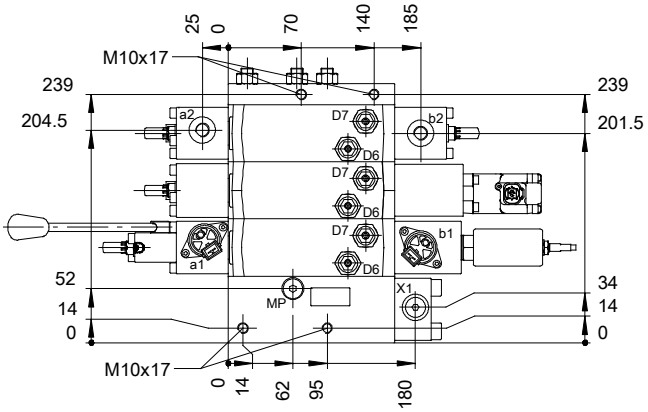
4 Complete valve example

4.1 Dimensions

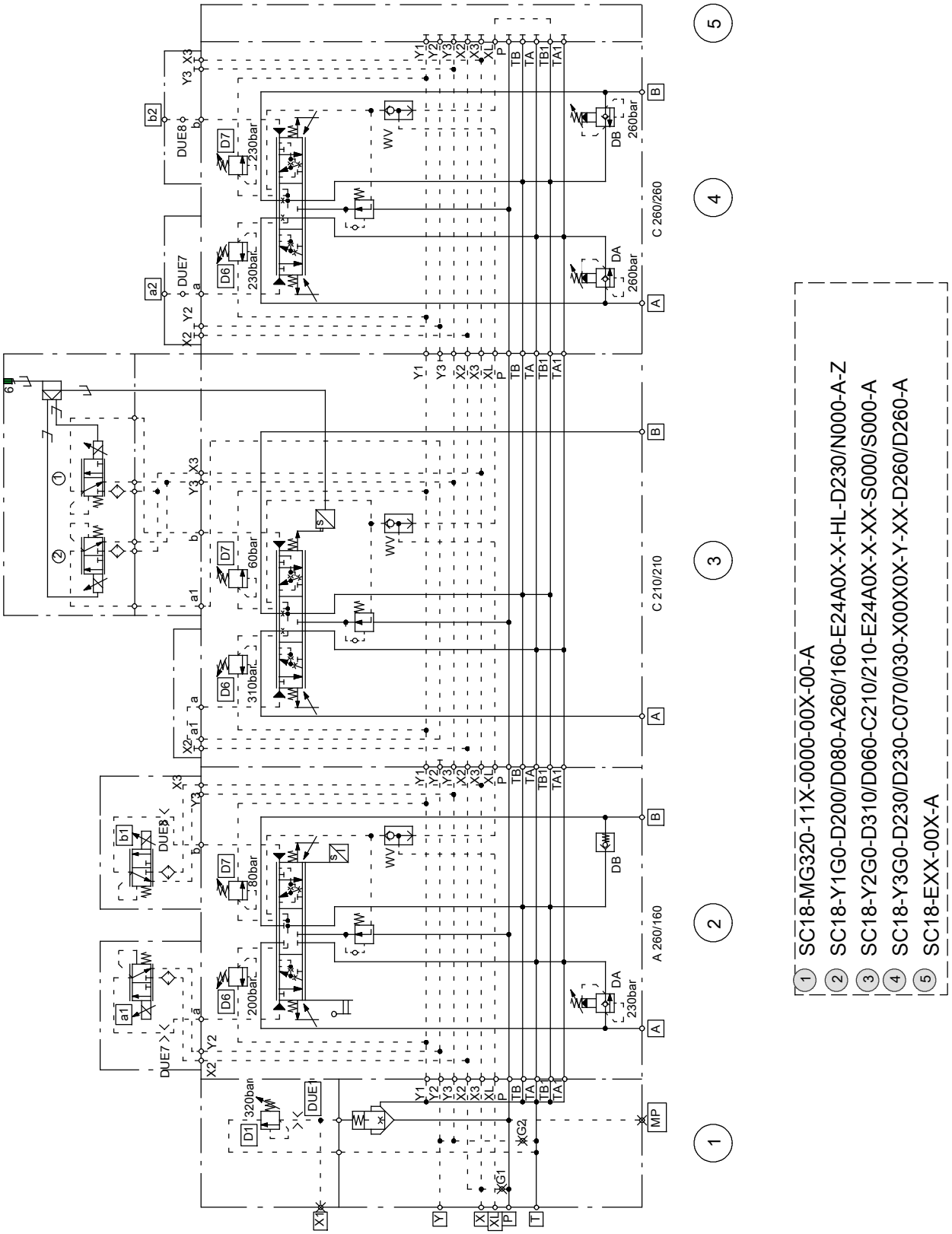






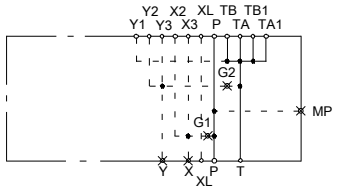
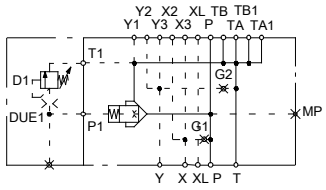
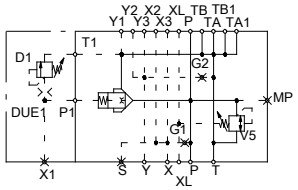
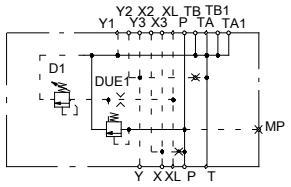
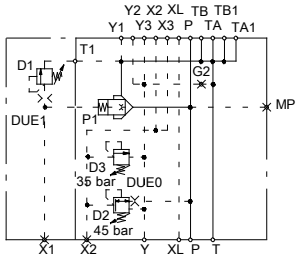


4.2 Circuit diagram (example)



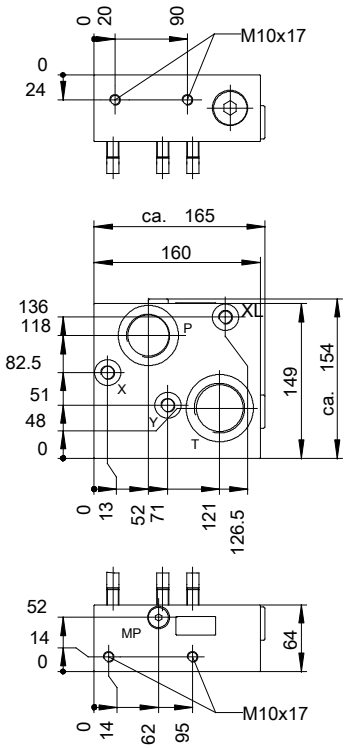
5 Inlet modules

5.1 Overview of the inlet modules

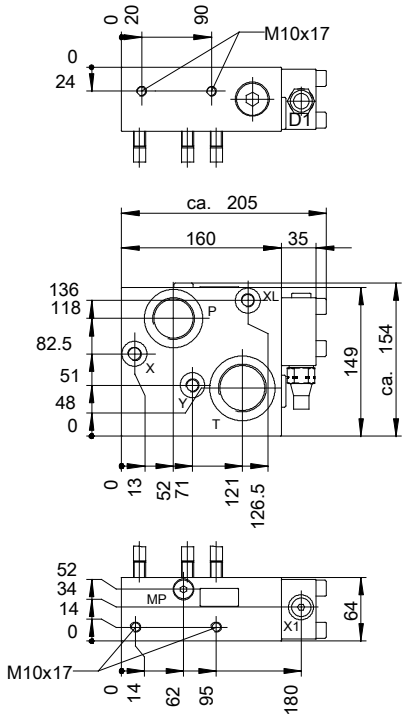
Symbol	Description
	**SC18-GG000-11X-0000-00X-00-B** • Without system pressure relief • Without load-sensing pressure relief • •
	**SC18-MG350-11X-0000-00X-00-B** • System pressure relief • Pressure setting in bar for system pressure relief (3-digit) • •
	**SC18-MG350-11X-0000-00X-20-B** • System pressure relief • Pressure setting in bar for system pressure relief (3-digit) • Pressure-peak reduction valve V5 • Pressure setting in bar for load-sensing pressure relief (3-digit)
	**SC18-VG350-11X-0000-00X-00-B** • Three-way pressure compensator with system pressure relief • Pressure setting in bar for system pressure relief (3-digit) • •
	**SC18-MG350-01X-3545-00X-00-B** • System pressure relief • Pressure setting in bar for system pressure relief (3-digit) • Pilot-pressure conditioning • •

5.2 Dimensions

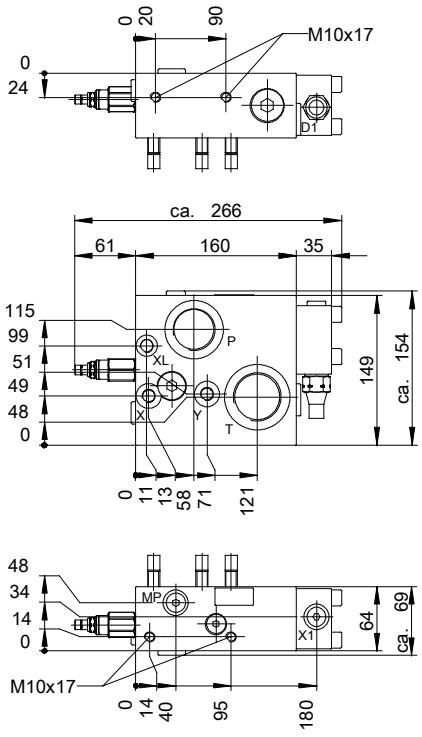
5.2.1 SC18-GG000-11X-0000-00X-00-B



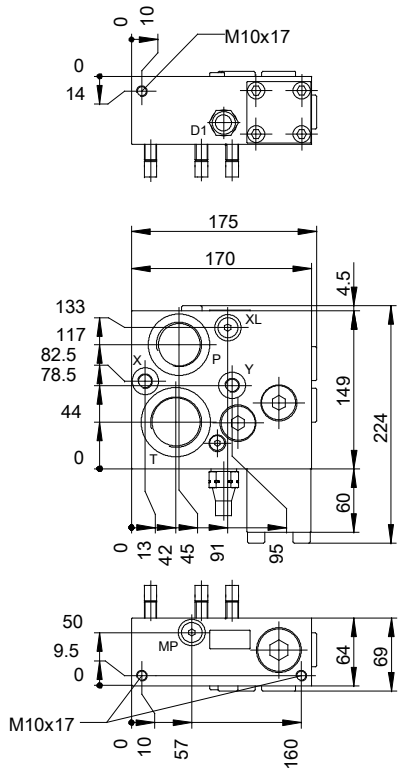
5.2.2 SC18-MG350-11X-0000-00X-00-B



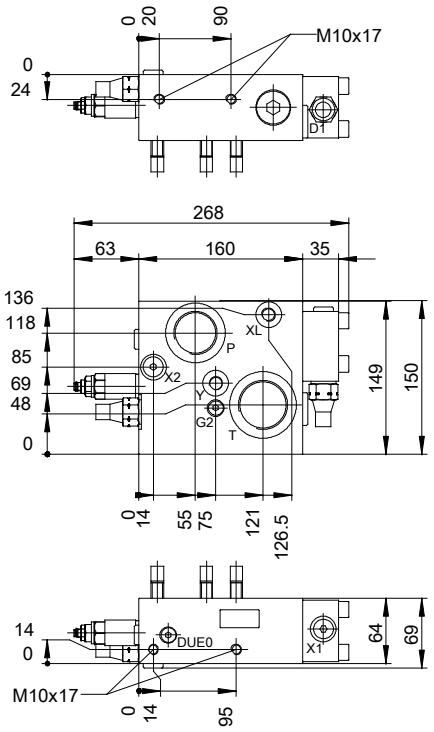
5.2.3 SC18-MG350-11X-0000-00X-20-B



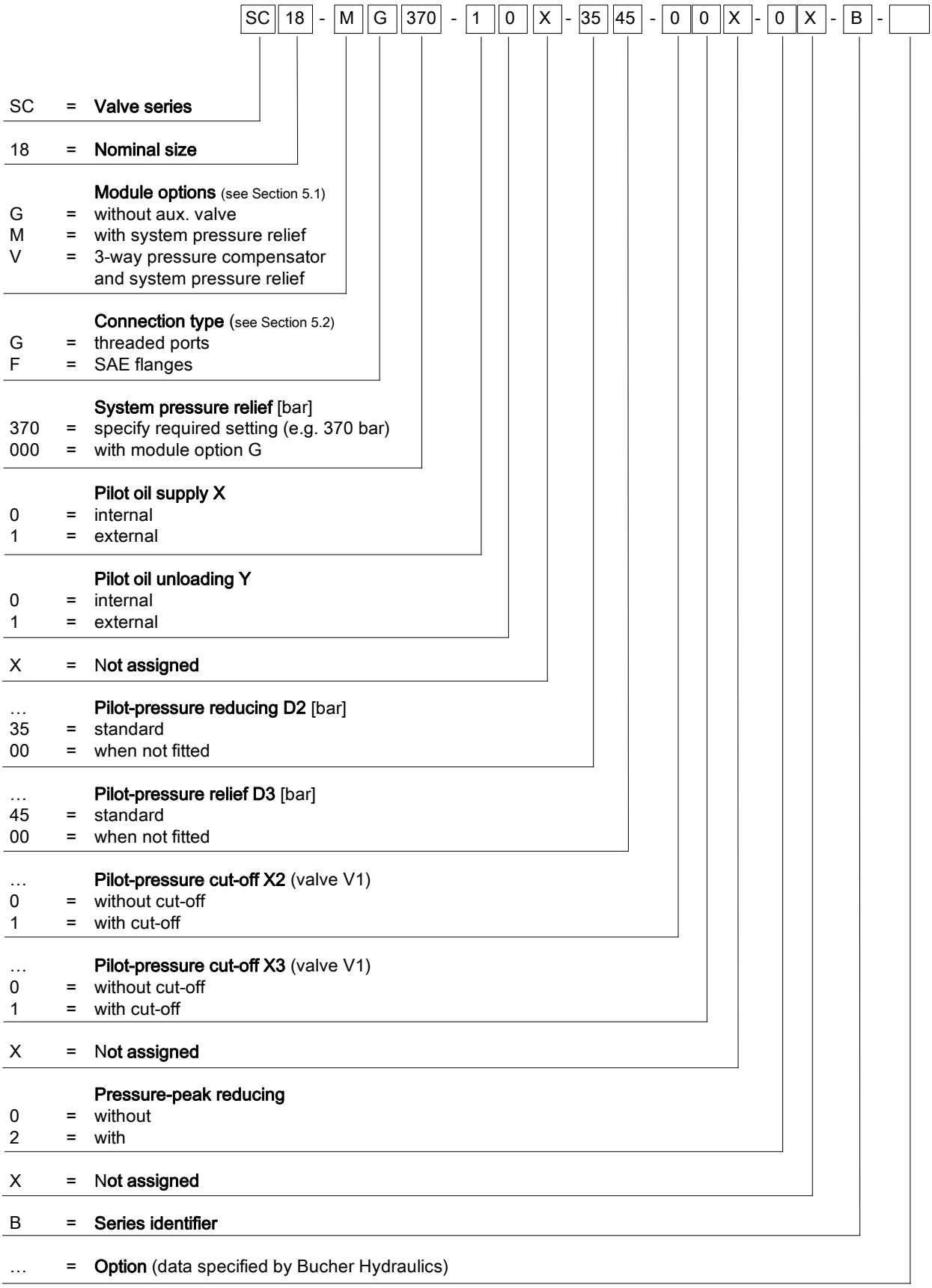
5.2.4 SC18-VG350-11X-0000-00X-00-B



5.2.5 SC18-MG350-01X-3545-00X-00-B

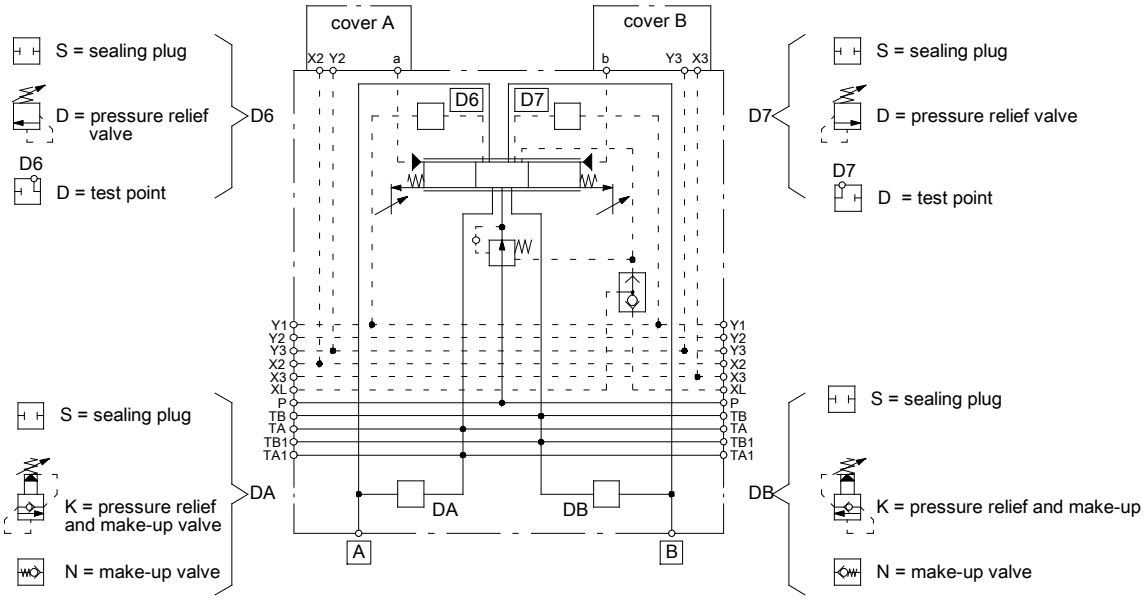


5.3 Ordering code

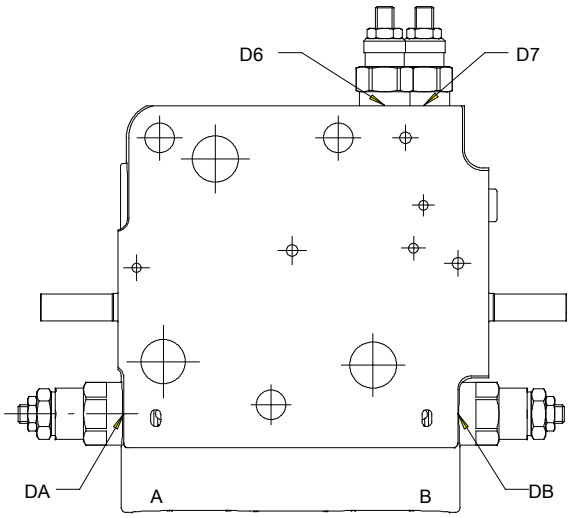


6 Actuator modules

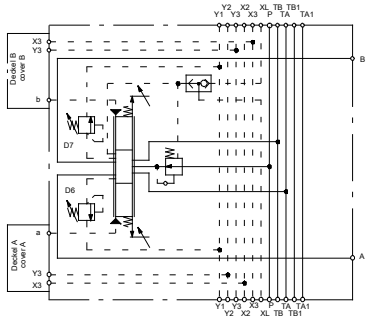
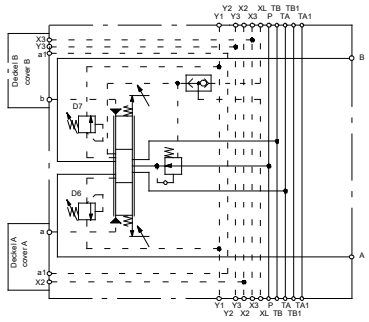
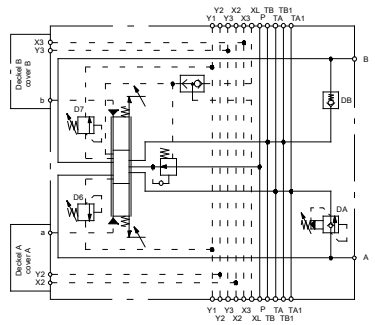
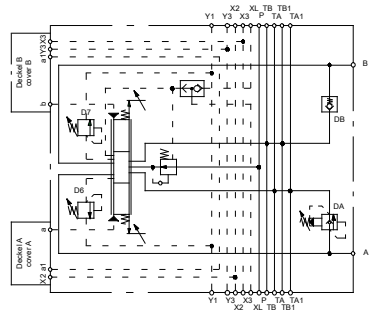
6.1 Module configuration



6.2 Module example

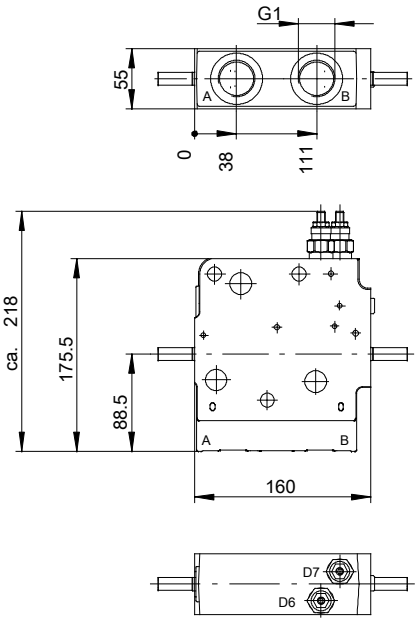


6.3 Overview of the actuator modules

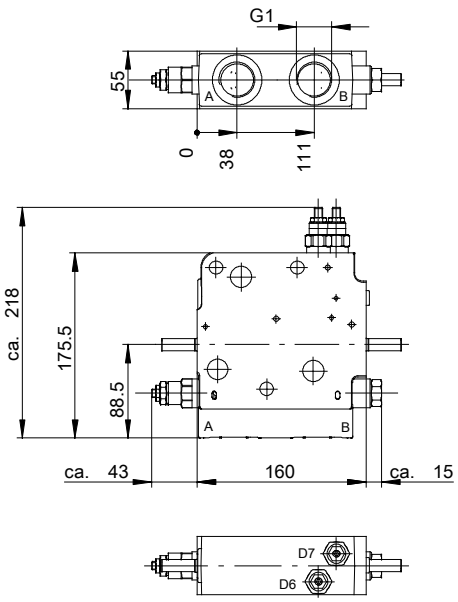
Symbol	Description
	**SC18 - Y_G0 -_D350/D350 - C260/260 - _ _ _ _ _ _ - _ - _ _ - X000/X000 - B** • Actuator module standard version • Primary pressure relief A (D6), pressure setting in bar (3-digit) • Primary pressure relief B (D7), pressure setting in bar (3-digit) •
	**SC18 - Y_G0 -_D350/D350 - C260/260 - _ _ _ _ _ _ - _ - _ _ - X000/X000 - B** • Actuator module in combination with E24B (EHA) • Primary pressure relief A (D6), pressure setting in bar (3-digit) • Primary pressure relief B (D7), pressure setting in bar (3-digit) •
	**SC18 - Y_G0 -_D350/D350 - C260/260 - _ _ _ _ _ _ - _ - _ _ - K200/N000 - B** • Actuator module, standard • Pressure relief / make-up, secondary, A-side, pressure setting in bar (3-digit) • Make-up, secondary, B-side •
	**SC18 - Y_G0 -_D350/D350 - C260/260 - _ _ _ _ _ _ - _ - _ _ - K200/N000 - B** • Actuator module in combination with E24B (EHA) • Pressure relief / make-up, secondary, A-side, pressure setting in bar (3-digit) • Make-up, secondary, B-side •

6.4 Dimensions

6.4.1 SC18 -Y _G0-D350/D350 - C260/260 - _ _ _ _ - _ - _ _ - X000/X000 - B

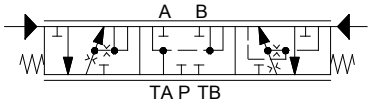
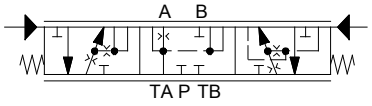
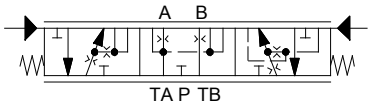
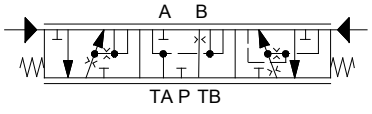


6.4.2 SC18 -Y _G0-D350/D350 - C260/260 - _ _ _ _ - _ - _ _ - K200/N000 - B



6.5 Main valve spool

6.5.1 Spool type

Type and symbol	Description
	• Spool type A (closed neutral position) • Flow rate data in l/min for actuator port A (3-digit) • Flow rate data in l/min for actuator port B (3-digit)
	• Spool type B • Flow rate data in l/min for actuator port A (3-digit) • Flow rate data in l/min for actuator port B (3-digit)
	• Spool type C (throttled-open neutral position) • Flow rate data in l/min for actuator port A (3-digit) • Flow rate data in l/min for actuator port B (3-digit)
	• Spool type D • Flow rate data in l/min for actuator port A (3-digit) • Flow rate data in l/min for actuator port B (3-digit)

Note: For a spool with 2 operating positions (spool position 1), the flow rate for actuator port A is used to specify the flow rate for actuator port B.

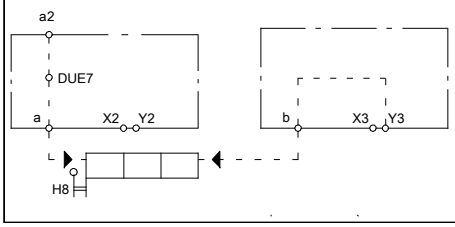
6.5.2 Preferred combinations of flow rate [l/min]

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	210/160	160/110	110/70	70/30	30/15
260/160	210/110	160/70	110/30		
260/110					

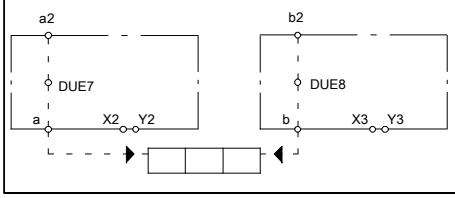
For other combinations contact Bucher Hydraulics.

6.6 Types of operation

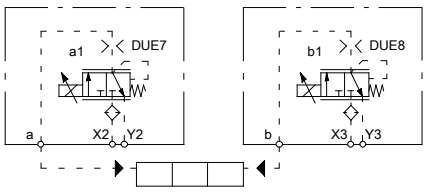
6.6.1 Manual “H”

Symbol	Description
	• Manual operation of the main spool, mounted on the A-port side • Without electrical operation • Without hydraulic operation • All lever positions can be supplied (A, L, Z) • Control at a and b • Follower-type hand lever

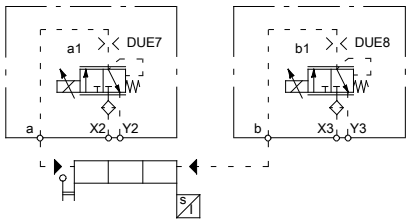
6.6.2 Hydraulic “Y”

Symbol	Description
	• Hydraulic operation of main spool • Without electrical operation • Without manual operation • Without damping orifice • Control at a and b

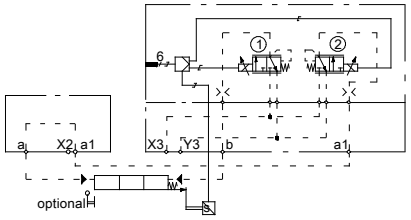
6.6.3 Electrohydraulic proportional “E”

Symbol	Description
	• Proportional pressure reducing valves • Without displacement sensor • Without hydraulic operation • Without manual operation • Damping orifice at both sides • Control at a and b

6.6.4 Electrohydraulic proportional and hand lever “E” + “H”

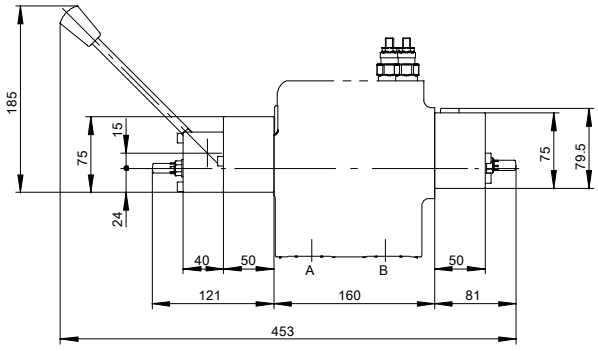
Symbol	Description
	• Proportional pressure reducing valves • With displacement sensor • Without hydraulic operation • Manual operation • Follower-type hand lever • All lever positions can be supplied • Damping orifice at both sides • Control at a and b

6.6.5 Electrohydraulic proportional with Onboard Electronics “E24B”

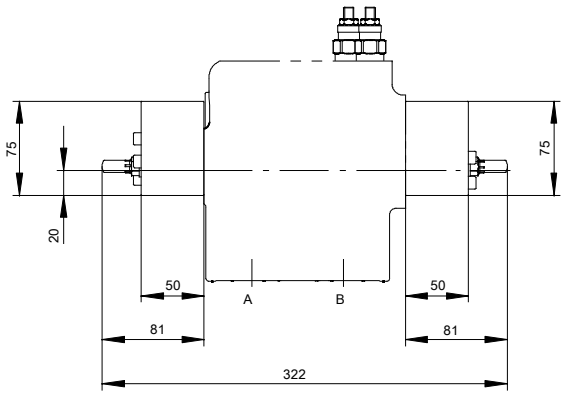
Symbol	Description
	• Digital interface with displacement sensor • Electronic pilot module EHA • Without hydraulic operation • Manual operation can be fitted as option • Damping orifice at both sides • Caution: maximum supply pressure to the Onboard Electronics: 50 bar

6.6.6 Dimensions of the operation types

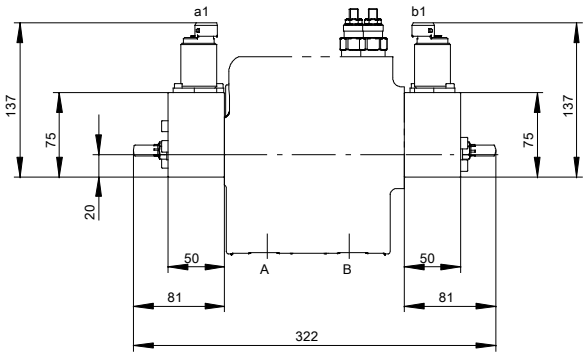
6.6.6.1 Manual “H”



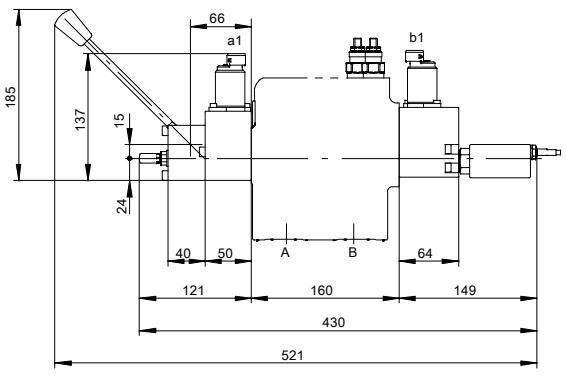
6.6.6.2 Hydraulic ”Y“



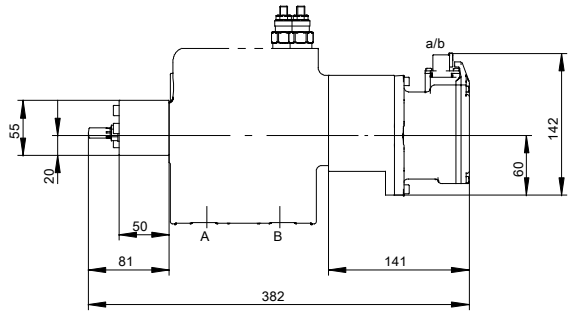
6.6.6.3 Electrohydraulic proportional ”E“



6.6.6.4 Electrohydraulic proportional and hand lever “E“ + ”H“

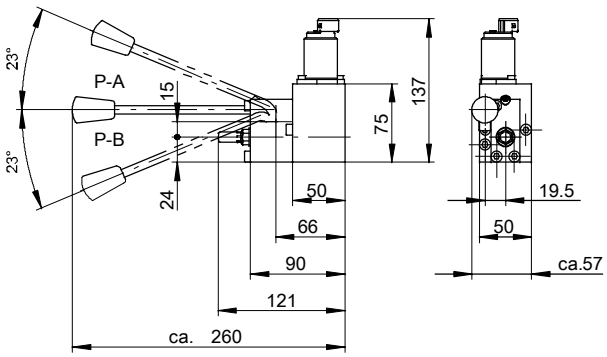


6.6.6.5 Electrohydraulic proportional with electro-hydraulic actuator (EHA) "E24B"

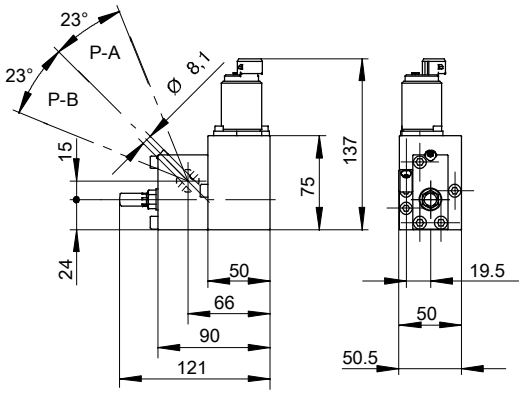


6.7 Dimensions of lever positions

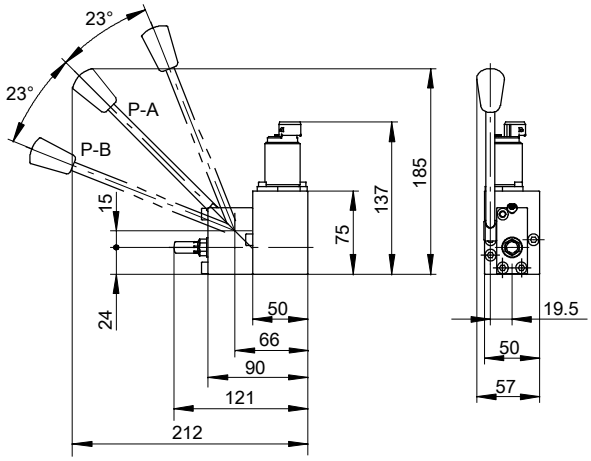
6.7.1 Lever position "A"



6.7.1.1 Without lever "Z"



6.7.2 Lever position "L"

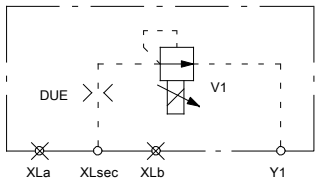
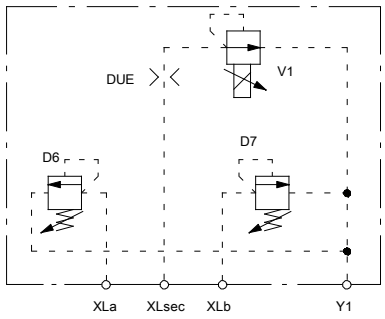
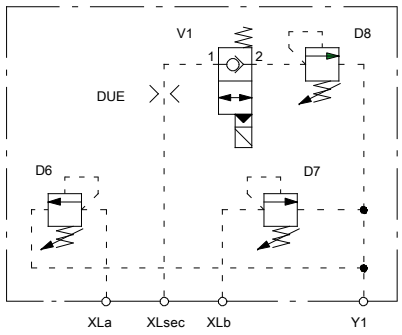
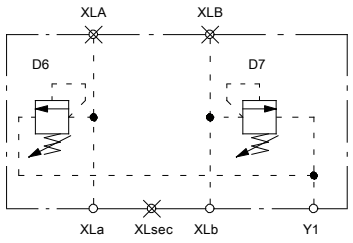


6.8 Bolt-on plates

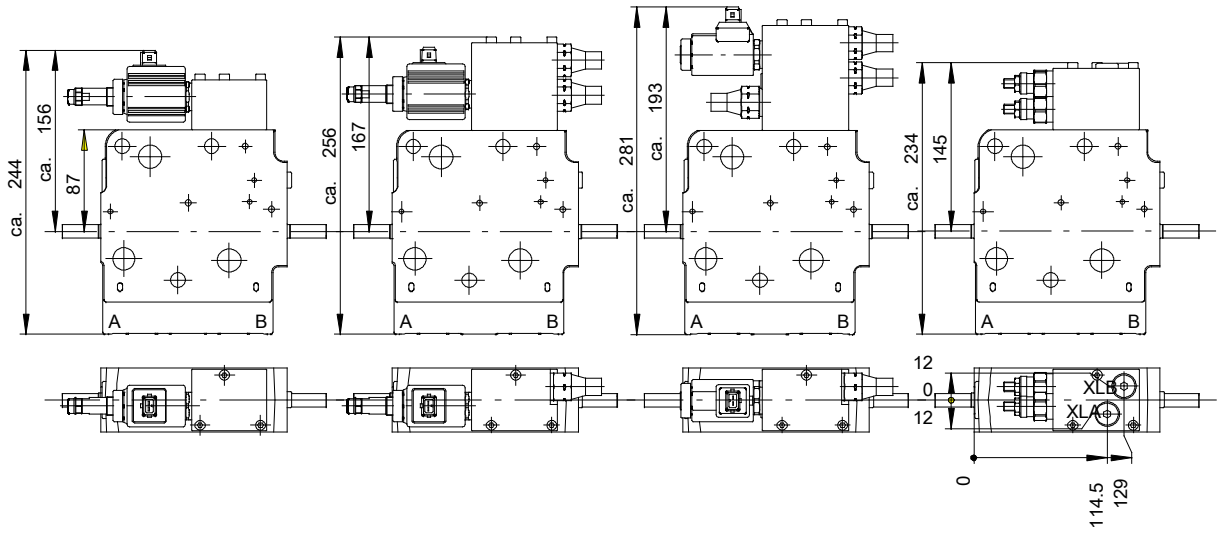
6.8.1 Description

The bolt-on plates contain various functions for influencing the load sensing function in the section. These include, for example, a proportional pressure cut-off, a switchable pressure stage, or ports for an external pressure relief valve. For more detailed information, please refer to the following overview.

6.8.2 Overview of the bolt-on plates

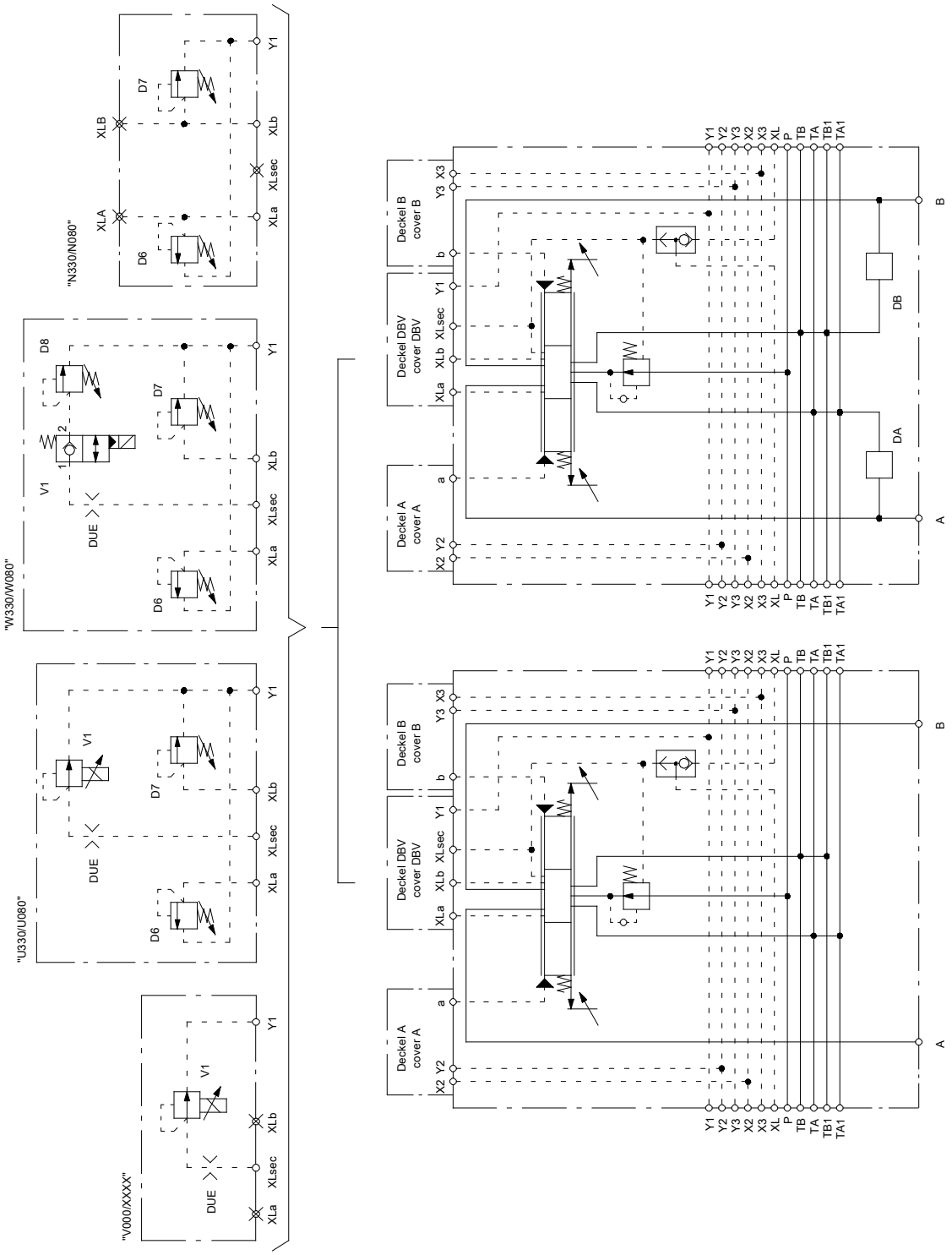
Symbol	Description
	**SC18-GG000-11X-0000-00X-00-B V000/XXXX** • Electroproportional pressure cut-off with rising characteristic for A and B • Pressure range 350 bar • 24 V DC
	**SC18-MG350-11X-0000-00X-00-B U330/U080** • Primary pressure relief A (D6), pressure setting in bar (3-digit) • Primary pressure relief B (D7), pressure setting in bar (3-digit) • Electroproportional primary pressure relief with rising characteristic for A and B • Pressure range 350 bar • 24 V DC
	**SC18-MG350-11X-0000-00X-20-B W330/W080** • Primary pressure relief A (D6), pressure setting in bar (3-digit) • Primary pressure relief B (D7), pressure setting in bar (3-digit) • Switchable, low pressure stage D8 for A and B, pressure setting in bar (3-digit) • 24 V DC
	**SC18-VG350-11X-0000-00X-00-B N330/N080** • Primary pressure relief A (D6), pressure setting in bar (3-digit) • Primary pressure relief B (D7), pressure setting in bar (3-digit) • Port XLA, G1/4", for connecting an external pressure relief valve or to use as a test point • Port XLB, G1/4", for connecting an external pressure relief valve or to use as a test point

6.8.3 Dimensions of bolt-on plates



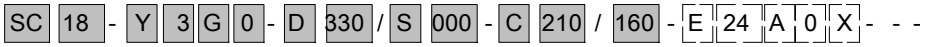
6.8.4 Body combinations

Important
Bolt-on plates can only be combined with certain bodies. See circuit diagram below.



6.9 Ordering code

6.9.1 Ordering code part 1



SC = **Valve series**

18 = **Nominal size**

Y = **Actuator section**

3 = **Actuator section number** (max.8)

Connection type
G = threaded ports
F = SAE flanges

Intermediate section for SAE design
0 = threaded type / SAE flange width ≤ 55 mm
1 = intermediate section for SAE flanges to ISO 6162

Load sensing A (D6)
D = primary pressure relief D6, manual setting
S = sealing plug
M = test point
pressure cut-off electrically adjustable
in accordance with separate specification
N = manually set, and with test point
U = electrical and manual pressure setting
V = electroproportional adjustment (identical for load sensing A/B)
W = electrical on/off adjustment

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

Load sensing B (D7)
D = primary pressure relief D7, manual setting
S = sealing plug
M = test point
pressure cut-off electrically adjustable
in accordance with separate specification
N = manually set, and with test point
U = electrical and manual pressure setting
V = electroproportional adjustment (identical for load sensing A/B)
W = electrical on/off adjustment

… = **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 in l/min**
specify the required flow rate e.g. 210

160 = **Flow rate, port B in l/min**
specify the required flow rate e.g. 160

6.9.2 Ordering code part 2

E = **Electrical operation**
X = not fitted

Supply voltage
00 = no electrical operation
12 = 12 V DC
24 = 24 V DC

Plug connector (solenoid)
A = AMP Junior Timer
B = Deutsch DT14-6EP (EHA) [2]
D = Deutsch DT04-2P
X = without solenoid

1 = **Manual emergency operation**
(only with electrical operation type E)
0 = not fitted

X = **Not assigned**

Y = **Hydraulic operation**
X = not fitted

H = **Manual operation**
X = not fitted

Lever position
A = hand-lever position A
L = hand-lever position L
Z = without hand-lever
X = manual operation not fitted

Pressure relief / make up secondary [bar], A-side
D = pressure relief
N = make-up
K = pressure relief and make up
S = sealing plug
X = not fitted

150 = **Pressure setting secondary [bar], A-side** (N,S and X = 000)

Pressure relief / make up secondary [bar], B-side:
D = pressure relief
N = make-up
K = pressure relief and make up
S = sealing plug
X = not fitted

200 = **Pressure setting secondary [bar], B-side** (N,S and X = 000)

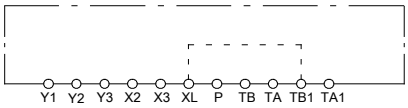
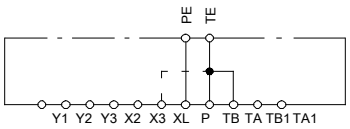
B = **Series identifier**

… = **Option** (data specified by Bucher Hydraulics)

EHA = ElectroHydraulic Actuator. For further information, see data sheet 100-E-000191.

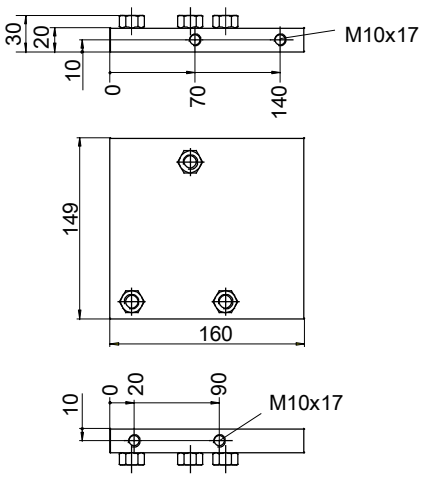
7 End modules

7.1 Overview of the modules

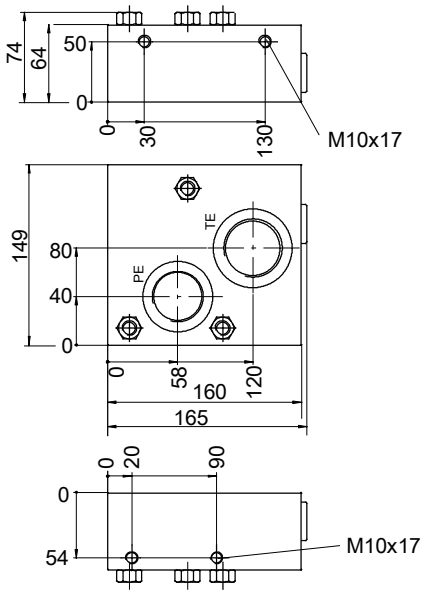
Symbol	Description
	**SC18-EXX-00X-XXXX-B** • No control function
	**SC18-EGX-11X-XXXX-B** • Tank bridge

7.2 Dimensions

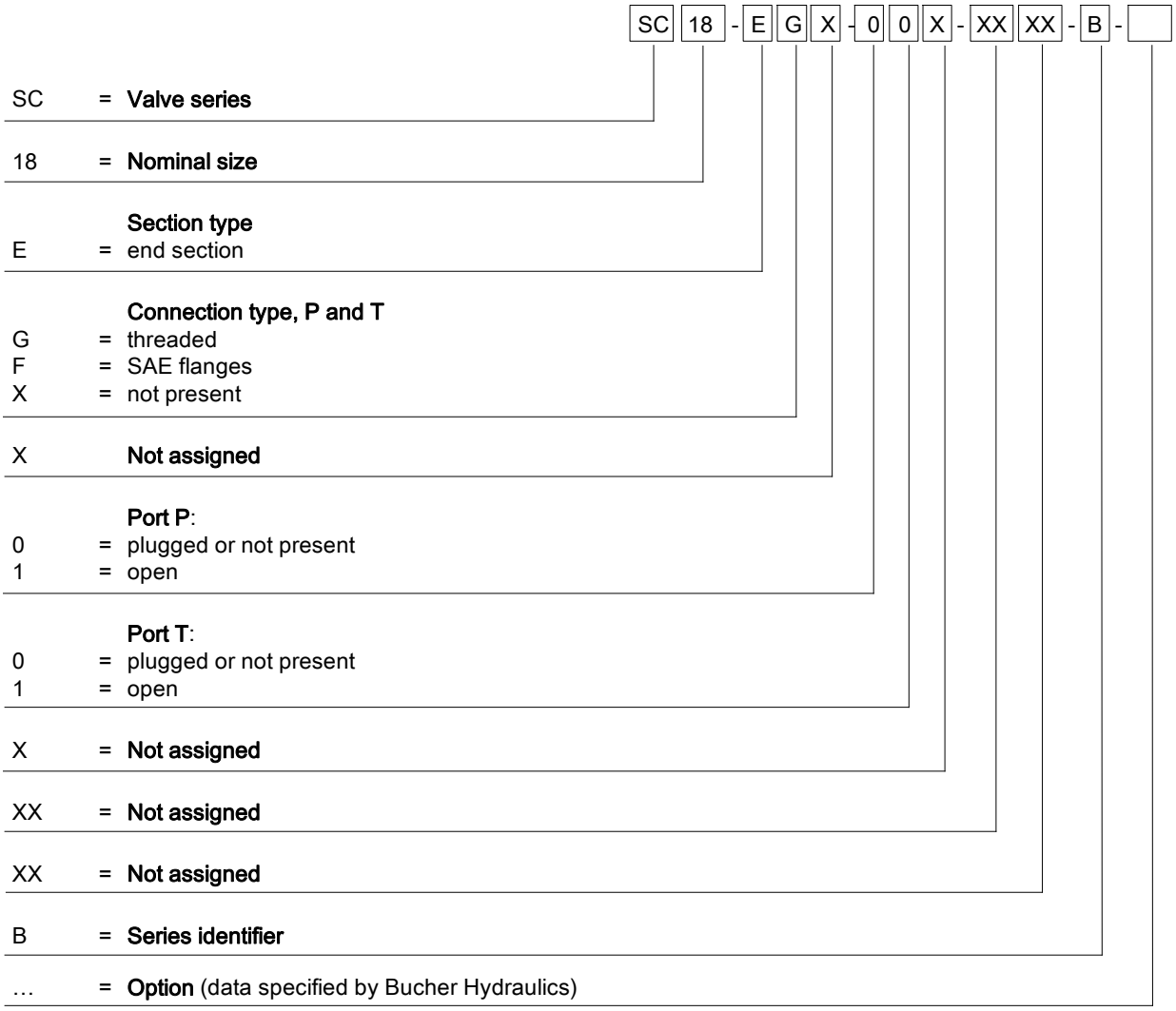
7.2.1 SC18-EXX-00X-XXXX-B



7.2.2 SC18-EGX-00X-XXXX-B



7.3 Ordering code



8 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 contact Bucher Hydraulics.

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