Rexroth
Bosch Group

Load-sensing control block in mono and sandwich plate design

RA 64276/11.10 1/52

Model M4-12

Nominal size 12
Unit series 2X
Nominal pressure 350 bar (pump side)
Nominal pressure 420 bar (actuator side)
Maximum flow
– Pump side: 200 l/min for central inlet element
150 l/min for lateral inlet element
– Actuator side: 130 l/min with pressure compensator and load holding function

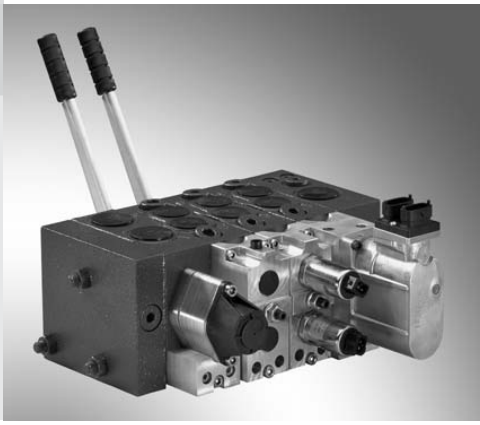


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Features

System:

– Load pressure-independent flow control
  • Open center for fixed displacement pump
  • Closed center for variable displacement pump

Type:

– Sandwich plate design
  • Inlet element
  • Up to 10 directional valve elements
  • End element

Types of operation

– Mechanical:
  • Handle-operated lever
  • Tongue
– Hydraulic
– Electrohydraulic (on/off, proportional)
– Electrohydraulic with on-board electronics (EPM2)

Flow

– Load pressure compensated
– High repeatability
– Low hysteresis
– Adjustable via stroke limitation (not available with mechanical operated sections)

Pressure relief function

– Inlet element:
  • Pilot-operated pressure relief valve
– Directional valve element / actuator ports
  • Compact shock valves with feed function

LS pressure relief function

– Adjustable for each actuator port
– External pressure adjustment for each actuator port possible
– Electro-proportional per section

Areas of application

– Truck applications
– Drilling machinery
– Forestry machines
– Large-size and telescopic forklifts
– Mining applications
– Cranes
– Construction machines
– Lifting platforms
– Heavy load vehicles
– Ship engineering
– Municipal vehicles
– Stationary applications

Function

Control block M4-12

The directional valves are proportional valves according to the load-sensing principle.

Actuator control

The flow direction and magnitude of flow reaching the actuator ports (A or B) is determined by the main spool (**2**).

Pressure reducing valves (**9**) control the position of the main spool (**2**). The level of electric current at the pressure reducing valve determines the level of pilot pressure in the spring chambers (8) and therefore also the stroke of the main spool (P → A; P → B).

The pressure difference at the main spool (**2**), and consequently the flow to the actuator, is maintained constant via the pressure compensator (**3**).

Load pressure compensation

Pressure changes at the actuators or at the pump are compensated by the pressure compensator (**3**). The flow to the actuator remains constant even if the load varies.

Flow limitation

The maximum flow can be set mechanically and individually via stroke limitations (**6**).

Pressure relief function

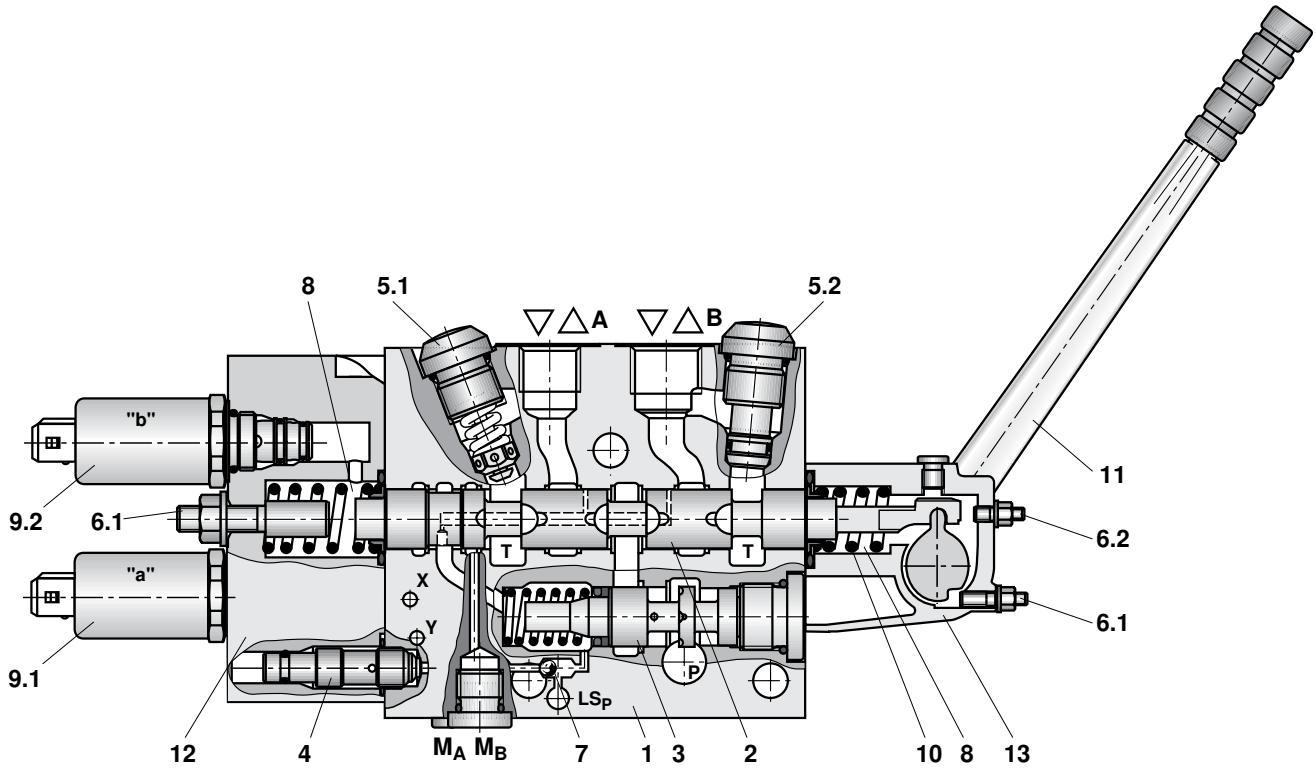
The LS pressure as per actuator port can be adjusted internally via the LS pressure relief valves (**4**) or externally via the LS ports MA, MB.

Shock valves with combined feed function (**5**) protect the actuator ports A and B from pressure peaks.

The highest load pressure is signaled to the pump via the LS line and the integrated shuttle valves (**7**).

Cross-section

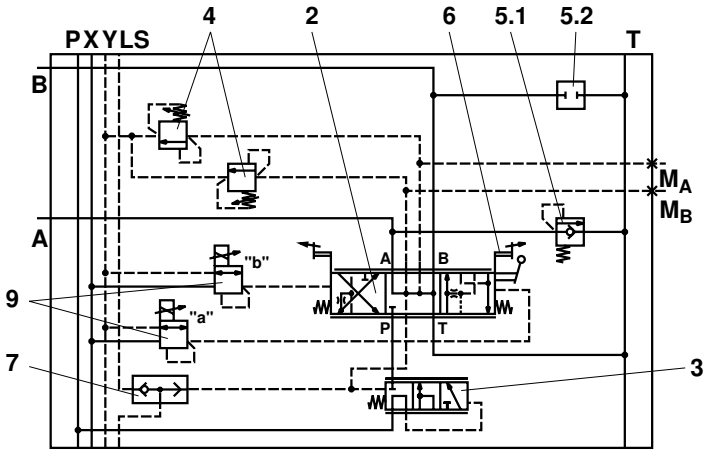
1 Housing
2 Main spool
3 Pressure compensator
4 LS pressure relief valves
5.1 Shock valve with feed function
5.2 Plug screw
6.1 A side stroke limitation
6.2 B side stroke limitation
7 LS shuttle valve
8 Spring chamber
9.1 Pressure reducing valve (pilot valve “a”)
9.2 Pressure reducing valve (pilot valve “b”)
10 Compression spring
11 Handle-operated lever
12 Cover A
13 Cover B



Symbol

Connections:

P	Pump
A, B	Actuator
T	Tank
X	Pilot oil supply
Y	Tank, depressurized
LS	Load-sensing (LS)
M_A, M_B	External LS ports



Technical data (Please inquire in case the intended use of unit is outside the given values!)

General

Installation position					Any		
Type of connection					SAE J1626 or ISO 11926-1		
Mass	– Inlet element:	Closed center J		kg	4.3		
		Open center P		kg	6.0		
	Central inlet element:	Closed center JZ		kg	8.4		
	Directional valve element				Operation		
					Mechanical	Hydraulic	El.-hydraulic	with EPM2
				kg	4.9	4.2	4.5	4.8
	Excess weight of handle-operated lever			kg	0.6		
	End element			kg	2.6		
Hydraulic fluid and ambient temperature range			ϑ	°C	–20 to +80		
Painting					Consult factory		

Hydraulic

max. flow at port	P	$q_{V\,max}$	l/min	200 with central inlet element
			l/min	150 with lateral inlet element
	A, B	$q_{V\,max}$	l/min	140
Nominal pressure		p_{nom}	bar	350 (400 on inquiry)
max. operating pressure at port	P	*p*max	bar	350 (400 on inquiry)
	A, B	*p*max	bar	420
	LS	*p*max	bar	330
	T	*p*max	bar	30, or 20 for purely mechanic model
	Y	*p*max	bar	Depressurized to the tank
max. pilot pressure at port	X	*p*ctrl	bar	35
	a, b	*p*ctrl	bar	35
Pilot pressure range	Hydraulic	*p*ctrl	bar	8.5 to 22.5
	Electrohydraulic	*p*ctrl	bar	6.5 to 17.2
Required control Δp at the control block	Versions S; C	*p*	bar	18
Recommended hydraulic pilot control units				TH 6 characteristic curve 97, see RE 64552
LS pressure relief function (adjustment ranges)			bar	50 to 149; 150 to 330 (selected in the factory)
Hydraulic fluid				Mineral oil (HL, HLP) according to DIN 51524, other hydraulic fluids, such as HEES (synthetic esters) according to VDMA 24568 as well as hydraulic fluids as specified under RE 90221, on inquiry
Viscosity range		ν	mm²/s	10 to 380
Maximum permitted degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)				Class 20/18/15, for this we recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$

Electrical

Electrical pilot control valves	FTWE 2 K...; see RE 58007 [1)] FTDRE 2 K...; see RE 58032 [1)]
Recommended amplifiers (further control options on inquiry)	RA 1-0/10; 1 axis, see RE 95230 RA 2-1/10; 4 to 6 axes, see RE 95230 Control units RC see RE 95200
On-board electronics (EPM2)	Data from page 49; see also RE 64815-B

1) Plug-in connectors are not included in the scope of supply and need to be ordered separately, see page 34.

2) Projected

☞ Note!

The technical data were determined with a viscosity of $\nu = 32$ mm²/s (HLP46: 50 °C).

☞ Note!

You can find more information on using the hydraulic products of Bosch Rexroth in our publication “Hydraulic valves for mobile applications – General information,” RE 64020-B1.

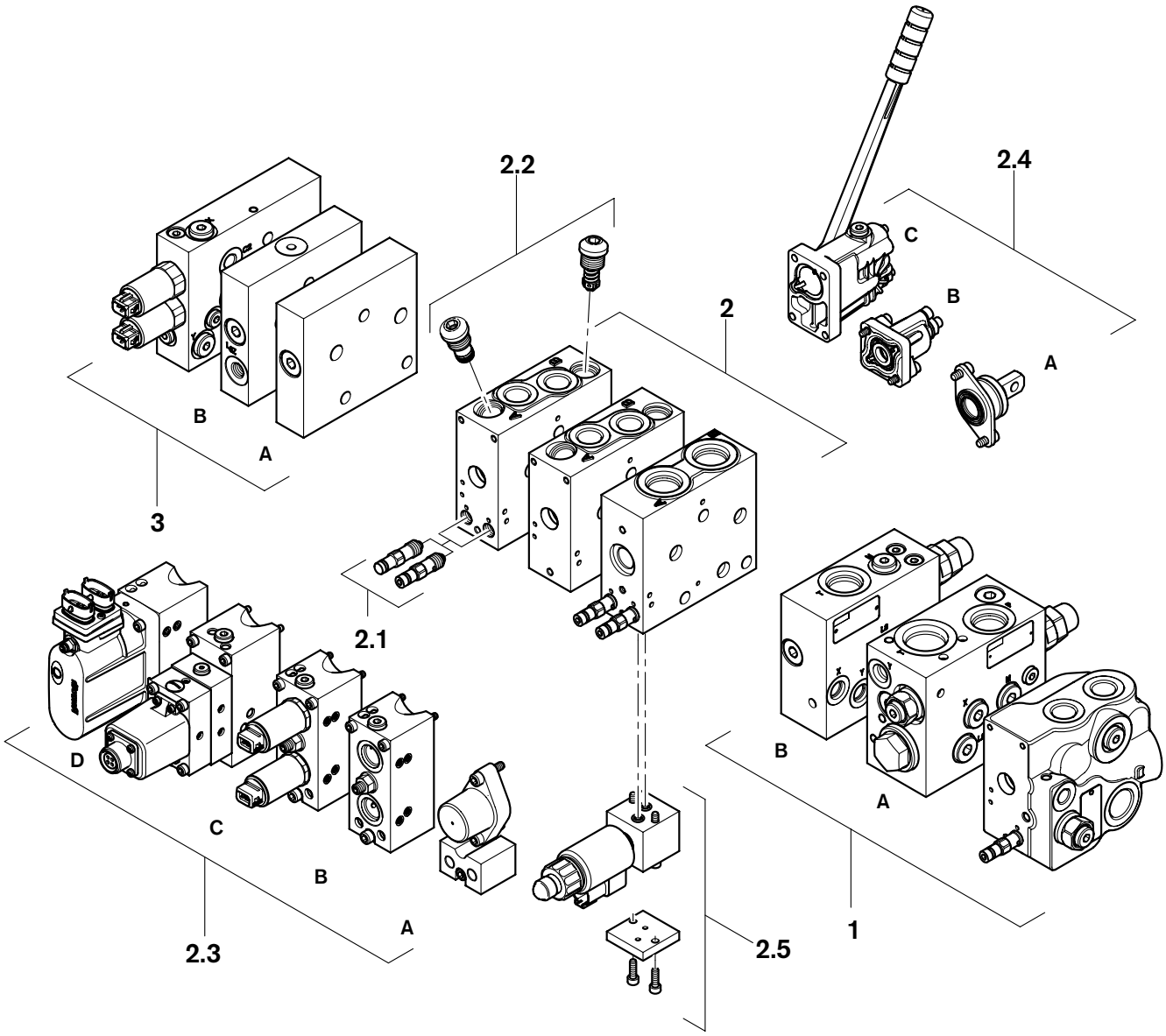
Modular structure: Control block with lateral inlet element

Control blocks of the series M4-12 have a modular structure. They can be combined without problems for the specific application.

1 Inlet element
- A: Open center “P”
- B: Closed center “J”

2 Directional valve elements
- **2.1** LS pressure relief function
- **2.2** Secondary valves
- **2.3** Operation cover “A”
  - A: Mechanical operation “A”
  - B: Hydraulic operation “H”
  - C: Electrohydraulic operation “W”
  - D: Electrohydraulic operation with on-board electronics EPM2 “CBA”
- **2.4** Operation cover “B”
  - A: Mechanical operation “Z”
  - B: Standard cover “–”
  - C: Mechanical operation “K” with handle-operated lever
- **2.5** Electro-proportional LS pressure relief function

3 End element
- A: with LS unloading “LA”
- B: with LS port “LZ”



Modular structure: Control block with lateral inlet element

1 Central inlet element “JZ”

2 Directional valve elements

2.1 LS pressure relief function

2.2 Secondary valves

2.3 Operation cover “A”

A: Mechanical operation “A”
B: Hydraulic operation “H”
C: Electrohydraulic operation “W”
D: Electrohydraulic operation with on-board electronics EPM2 “CBA”

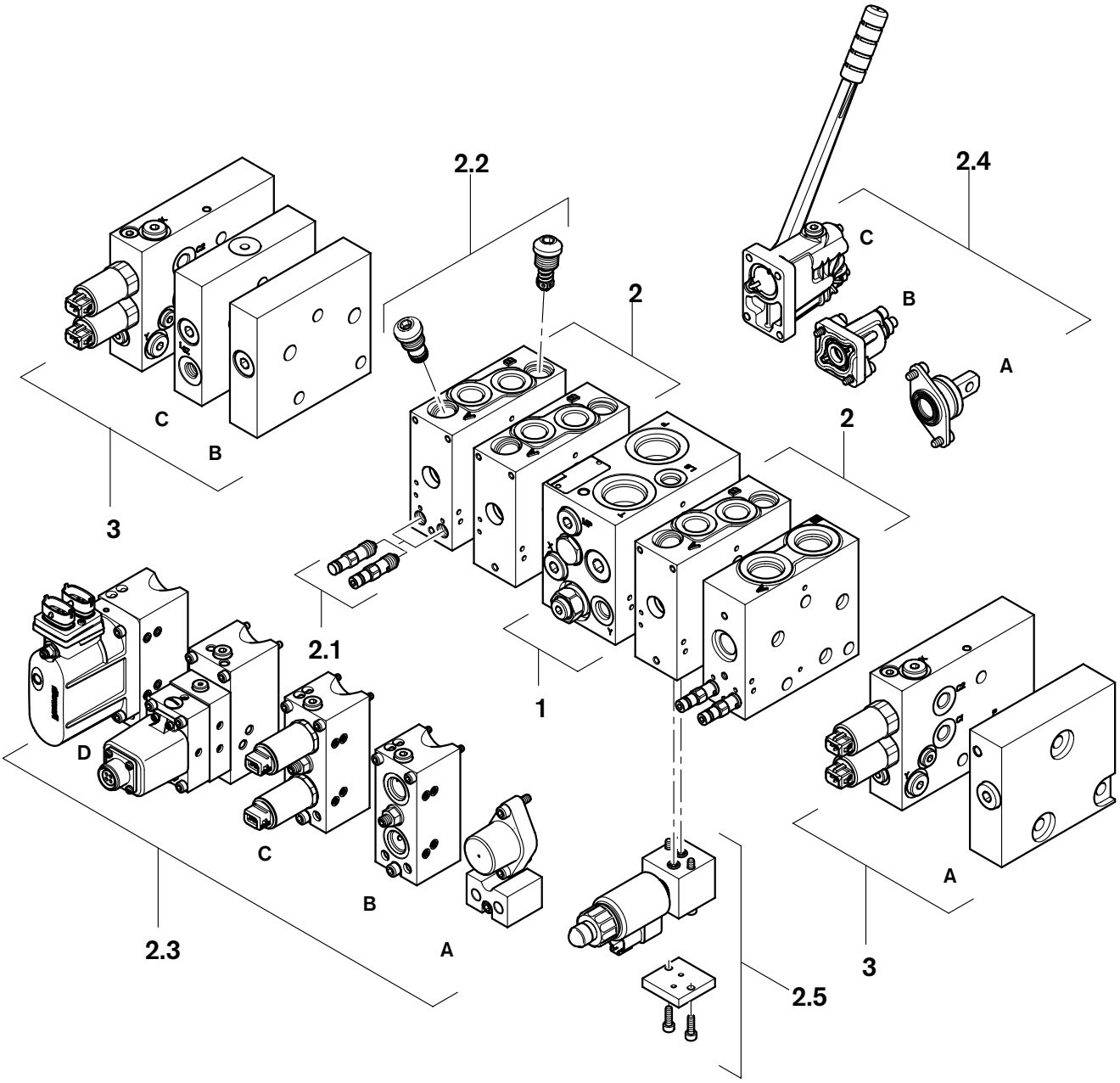
2.4 Operation cover “B”

A: Mechanical operation “Z”
B: Standard cover “–”
C: Mechanical operation “K” with handle-operated lever

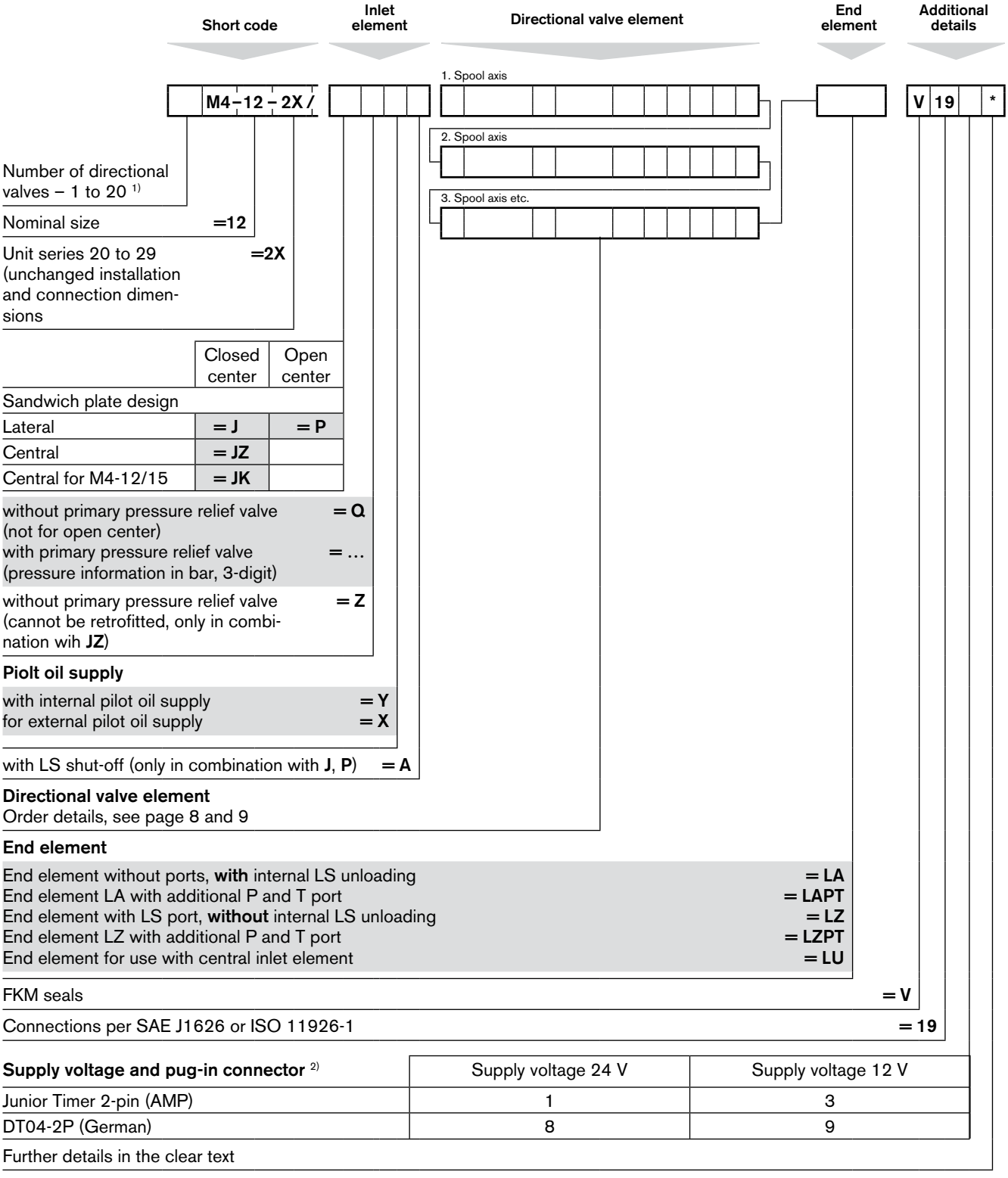
2.5 Electro-proportional LS pressure relief function

3 End element

A: Diversion plate “LU”
B: with LS unloading “LA”
C: with LS port “LZ”



Order details



= Standard product range (M4 configurator)

1) Max. 10 elements

2) Information required only for electrohydraulic operation and electroproportional pressure relief function.

☞ **Note!**

Plug-in connectors are not included in the scope of supply and need to be ordered separately; see page 34.

Short code

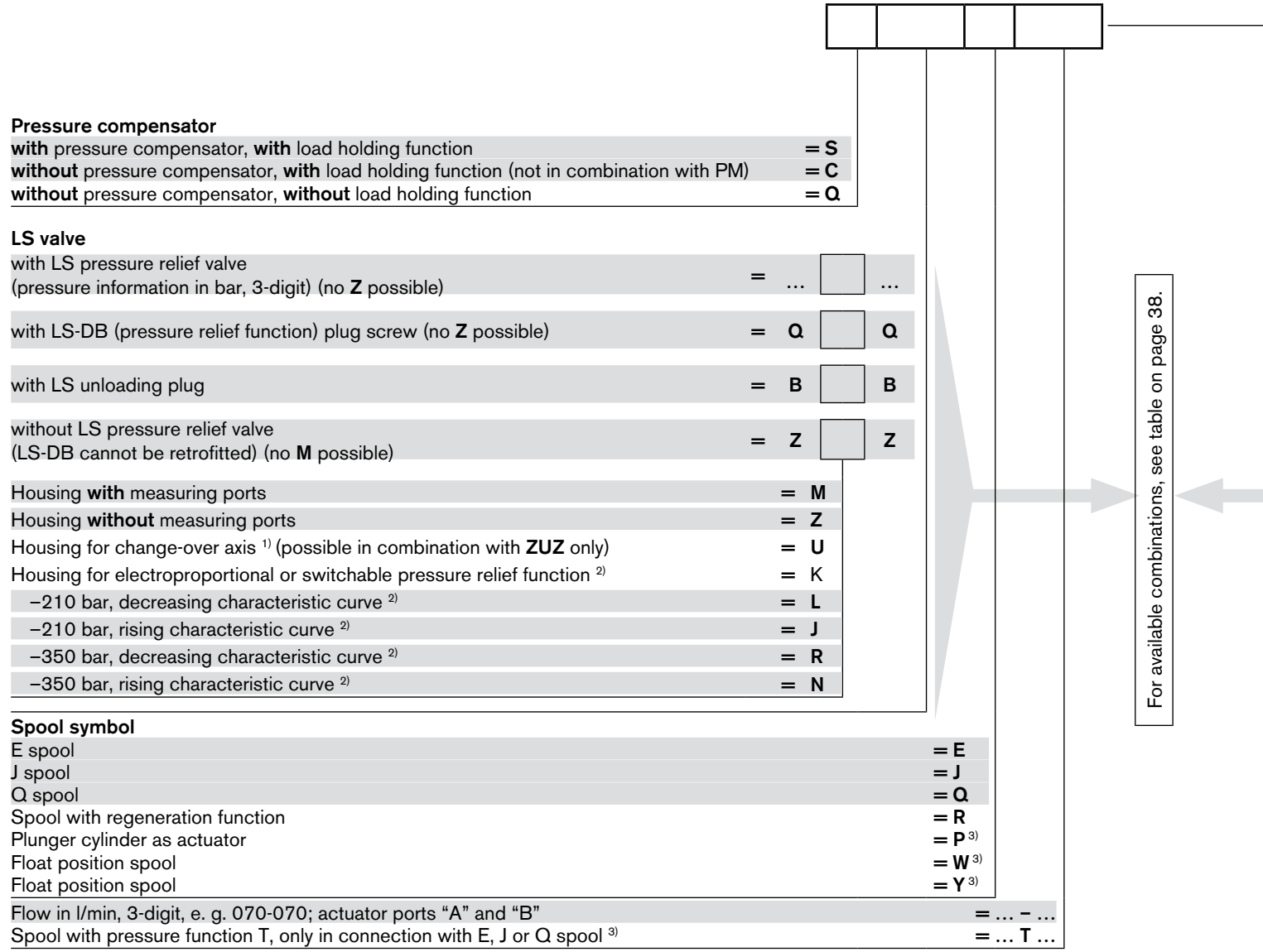
Complete control blocks are defined according to type key.

The order text is for detailing the technical features and requirements.

The order text is used by the Rexroth sales department to derive a short code as well as a material number.

See page 10.

Order details for directional valve element



Pressure compensator

with pressure compensator, **with** load holding function	= **S**
without pressure compensator, **with** load holding function (not in combination with PM)	= **C**
without pressure compensator, **without** load holding function	= **Q**

LS valve

with LS pressure relief valve (pressure information in bar, 3-digit) (no **Z** possible)	= …		…
with LS-DB (pressure relief function) plug screw (no **Z** possible)	= **Q**		**Q**
with LS unloading plug	= **B**		**B**
without LS pressure relief valve (LS-DB cannot be retrofitted) (no **M** possible)	= **Z**		**Z**

Housing **with** measuring ports	= **M**
Housing **without** measuring ports	= **Z**
Housing for change-over axis [1] (possible in combination with **ZUZ** only)	= **U**
Housing for electroproportional or switchable pressure relief function [2]	= K
–210 bar, decreasing characteristic curve [2]	= **L**
–210 bar, rising characteristic curve [2]	= **J**
–350 bar, decreasing characteristic curve [2]	= **R**
–350 bar, rising characteristic curve [2]	= **N**

Spool symbol

E spool	= **E**
J spool	= **J**
Q spool	= **Q**
Spool with regeneration function	= **R**
Plunger cylinder as actuator	= **P** [3]
Float position spool	= **W** [3]
Float position spool	= **Y** [3]

Flow in l/min, 3-digit, e. g. 070-070; actuator ports “A” and “B”	= … – …
Spool with pressure function T, only in connection with E, J or Q spool [3]	= … **T** …

For available combinations, see table on page 38.

= Standard product range (M4 configurator)

1) Rating by Technical Sales.

2) Detailed information in plain text, see data starting on page 22; see also data sheet RE 18139.

3) At request only. Rating by Technical Sales.

Order details for directional valve element

						*

Actuator port "A" / Actuator port "B"

Further information in the clear text

Secondary valves

F =	Flange surface [3]
A … =	Shock/Feed valve, adjustable
H … =	Shock/Feed valve, non-adjustable
Q =	Plug screw (secondary valves can be retrofitted)
Z =	SAE – 12 without secondary valve (cannot be retrofitted)

Operation B side cover

– =	Standard cover

Position of handle-operated lever			without Handle-operated lever	Encapsulated operation
60°	0°	–60°		
K	**L**	**M**	**R**	Handle-operated lever following
N	**O**	**P**	**X**	Handle-operated lever, non-following

see notes on page 42 further versions

purely mechanical operation

Z =	Tongue [5]
N =	Tongue with lever [3; 5]

Supply voltage 24 V	Supply voltage 12 V	**Supply voltage and plug-in connector** [6]
1	**3**	Junior Timer 2-pin (AMP)
8	**9**	DT04-2P (Deutsch)

Encapsulated, spring centered	**Purely mechanical** [5]				**Operation A side cover**
	Spring centered	Detent in			
		A	B	A and B	
M	**A**	**B1**	**B2**	**B4**	Mechanical

H = Hydraulic

Standard	with damping orifice, both sides	with measuring ports, both sides	with damping orifice, with measuring ports, both sides	Orifice + check valve for hydraulic superposition)	
W2		**W8**		**G2**	Electrohydraulically proportional
W4	**W5**	**W6**	**W7**	**G4**	Electrohydraulically switchable

Standard	
CBA	Electrohydraulic with digital on-Board electronics (EPM2) [4]

= Standard product range (M4 configurator)

[3] At request only. Rating by Technical Sales.

[4] Further ordering codes according to operating instructions RE 64815-B. Consult factory. The supply includes daisy chain cabling.

[5] Not available aluminum-free.

[6] Information required only for electrohydraulic operation and electroproportional pressure relief function.

☞ **Note!**
Plug-in connectors are not included in the scope of supply and need to be ordered separately; see also page 34.

Designation of M4-12 valves; type code

Complete control blocks are to be defined in accordance with the type code. The ordering text is used to collate the technical features and requirements.

The Bosch Rexroth Sales Organization derives a short code as well as a material number on the basis of the ordering text.

Preferred variants were defined by the Bosch Rexroth organization for the assembly of M4-12 valves worldwide.

Certain versions are not provided for assembly outside the central production location Augsfeld.

Please see data sheet RA 64 278 for the designation of all component codes.

Supplement the designation by your unit/factory number according to ZN 01215.

Example

M4 – 1234 – 00 / 3M4-12 – 7871

- Control block no.
- Series
- No. of directional valve elements
- Bethlehem

Order example closed center with lateral inlet element and change-over axis

Example:
– 3-fold control block
– Variable displacement pump $q_{V\,max} = 150$ l/m

Directional valve number, inlet element
– Closed Center with lateral primary pressure relief valve, set to 250 bar, internal pilot oil supply

1. Spool axis
– with pressure compensator, with load holding function
– without LS pressure relief valve bore
– Spool symbol J, flow in A and B 100 l/min
– Types of operation: Electrohydraulically proportional
– Junior Timer 2-pin (AMP) 24 V
– without secondary valves (cannot be retrofitted)

2. Spool axis
– without pressure compensator, change-over axis
– without LS pressure relief valve bore
– Housing for change-over axis
– Spool symbol J, flow in C 65 l/min, 90 l/min for internal actuators
– Types of operation: Electrohydraulically switchable
– Junior Timer 2-pin (AMP) 24 V
– without secondary valves (cannot be retrofitted)

3. Spool axis
– with pressure compensator, with load holding function
– with LS pressure relief valve for actuator port A 180 bar, Actuator port B closed
– Spool symbol J, flow in A and B 85 l/min
– Types of operation: Digital OBE
– Overriding handle-operated lever (following)
– Secondary valves: Pressure relief/feed valves, actuator port A and B 350 bar (non-adjustable)

End element, additional information
– with internal LS unloading, FKM seals, SAE threaded connections

Ordering codes:

3	M4 – 12 – 2X / J250Y

1. Spool axis

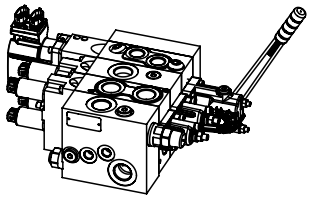
S	Z Z Z	J	100-100	W2	1	–	Z	Z

2. Spool axis

Z	Z U Z	J	065-090	W4	1	–	Z	Z

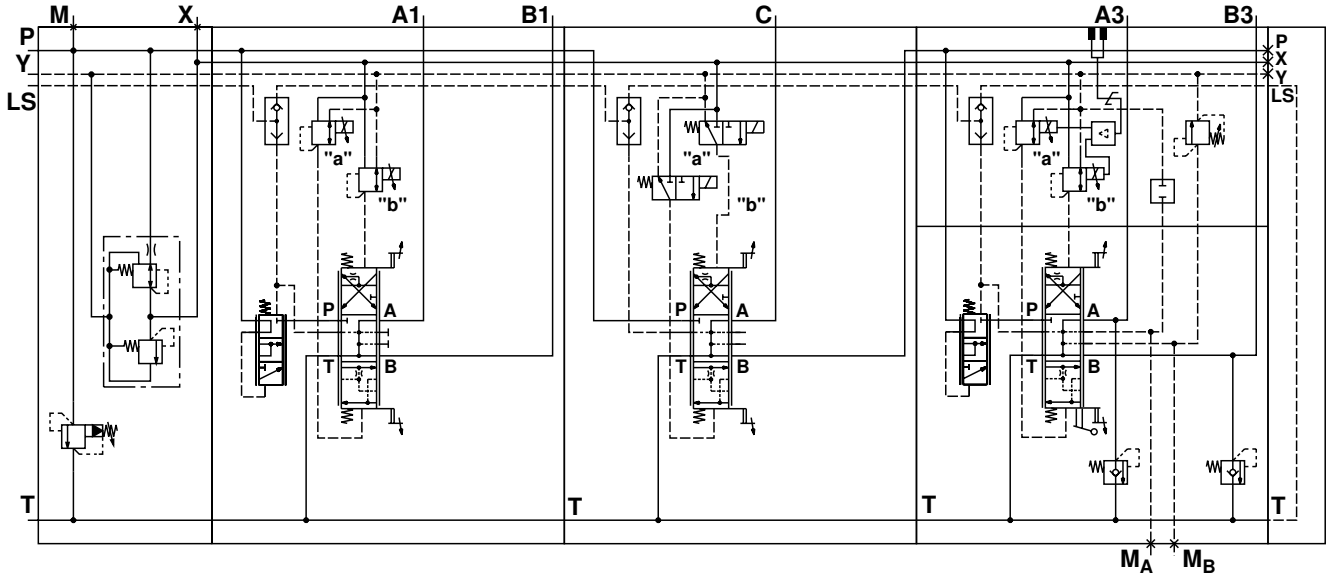
3. Spool axis

S	180 M Q	J	085-085	CBA	K	H350	H350



End element

LA	V	19



Order example closed center for central inlet with primary valve

Example:
– 2-fold control block
– Fixed displacement pump $q_{V\,max}$ = 200 l/min

Directional valve number, end element
– Diversion plate

Ordering codes:

2	M4-12-2X/LU

1. Spool axis
– with pressure compensator, with load holding function
– without LS pressure relief valves (cannot be retrofitted)
– Spool symbol E, flow in A and B 100 l/min
– Types of operation: Electrohydraulically proportional with measuring ports on both sides
– Junior Timer 2-pin (AMP) 24 V
– Actuation with handle-operated lever (following)
– Secondary valve bores closed

1. Spool axis

S	ZZZ	E	100-100	W6	1	K	Q	Q

Inlet element
– Central Closed Center with primary pressure relief valve, set to 300 bar
– with internal pilot oil supply

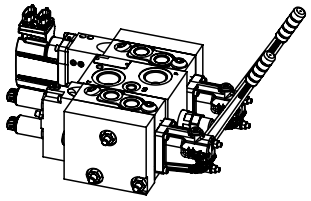
Inlet element

JZ	300	Y

2. Spool axis
– with pressure compensator, with load holding function
– with LS pressure relief valves, actuator port A 270 bar, actuator port B 300 bar
– with electroprop. pressure relief function, pressure relief function, 210 bar (decreasing characteristic curve)
– Spool symbol E, flow in A and B 90 l/min
– Types of operation: Digital OBE
– Overriding handle-operated lever (following)
– Secondary valve bores closed

2. Spool axis

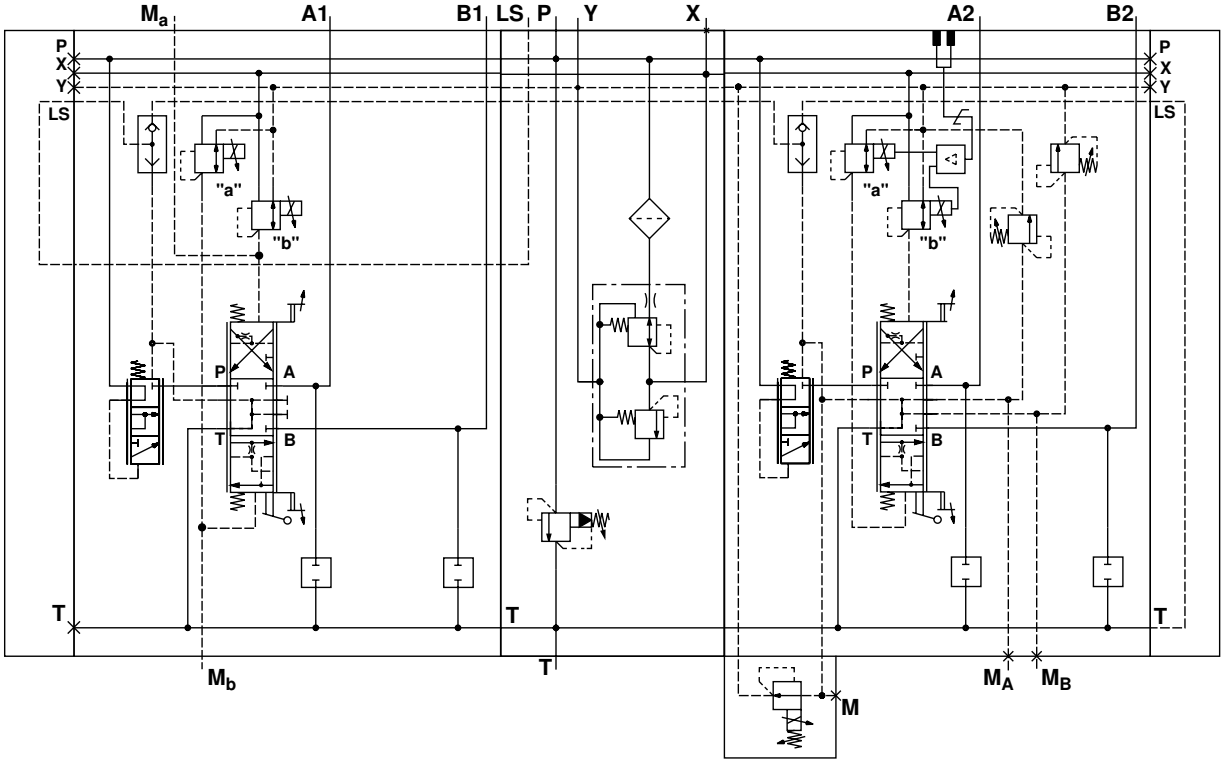
S	270L300	E	090-090	CBA	K	Q	Q	KBPSL8BA



End element, additional information
– with internal LS unloading, FKM seals, SAE threaded connection

End element

LA	V	19



Order example closed center with combined inlet element

Example:
- 3-fold control block
- Fixed displacement pump $q_{V\,max}$ = 200 l/min

Directional valve number, end element
- Diversion plate

1. Spool axis M4-15
- with pressure compensator, without load holding function
- with LS pressure relief valve, actuator port A 230 bar, actuator port B unloaded
- Spool symbol E,
- Flow in A 190 l/min, flow in B 0 l/min, connection closed
- Types of operation: Digital OBE
- Overriding handle-operated lever (following)
- Secondary valve bores closed

Inlet element M4-12/15
- Central inlet element for M4-12/M4-15
- Primary pressure relief valve, set to 280 bar
- with integrated pilot oil supply

2. and 3. spool axis M4-12
- with pressure compensator, with load holding function
- with LS pressure relief valves, actuator port A 180 bar, actuator port B 120 bar
- Spool symbol E
- Flow in A and B 90 l/min
- Types of operation: Digital OBE
- without secondary valve bores

End element M4-12
- with internal LS unloading, FKM seals, SAE threaded connection

Ordering codes:

3	M4–15/12–2X/ LU

1. Spool axis

T	230MB	E	190-000	CBA	K	Q	Q

Inlet element

JK	280	Y

2. Spool axis

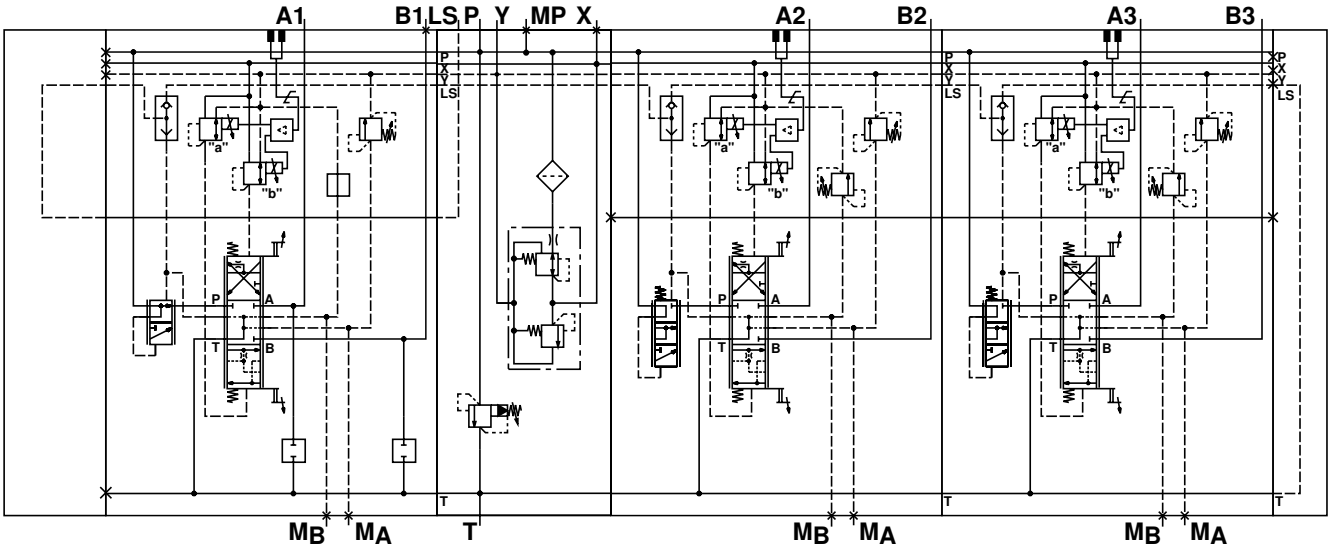
S	180M120	E	090-090	CBA	–	Z	Z

3. Spool axis

S	180M120	E	090-090	CBA	–	Z	Z

End element

LA	V	19



Inlet elements: Closed Center (J) for sandwich plate design

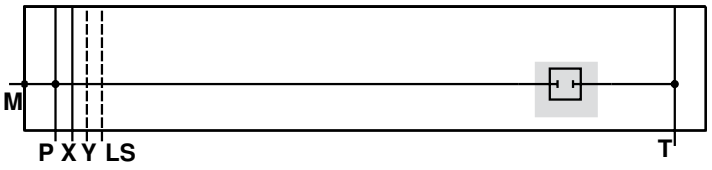
Without primary pressure relief valve, for external pilot oil supply

Ordering code:

M4	–	12	–	2X /	J	Q	X

Short description

– For variable displacement pumps up to 150 l/min



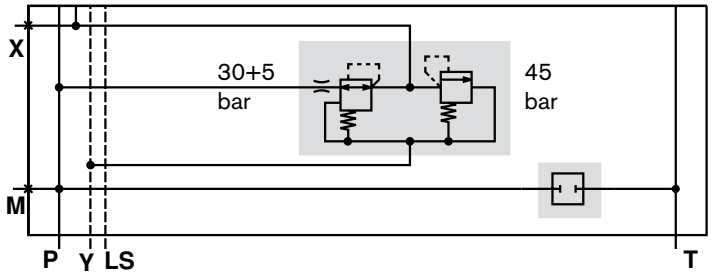
Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

M4	–	12	–	2X /	J	Q	Y

Short description

– For variable displacement pumps up to 150 l/min



With primary pressure relief valve, for external pilot oil supply

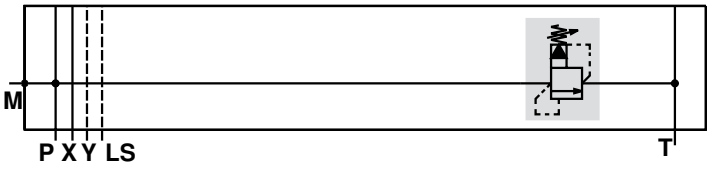
Ordering code:

M4	–	12	–	2X /	J	…	X

Short description

– For variable displacement pumps up to 150 l/min

– Pressure information in bar after J ... required (3-digit)



With primary pressure relief valve, with internal pilot oil supply

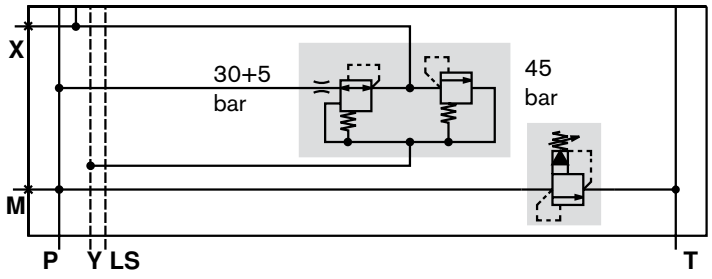
Ordering code:

M4	–	12	–	2X /	J	…	Y

Short description

– For variable displacement pumps up to 150 l/min

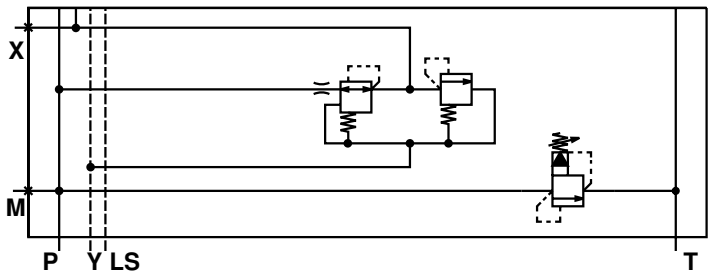
– Pressure information in bar after J ... required (3-digit)



Pilot oil supply (Y)

– Pressure relief function 45 bar

– Pilot pressure max. 30 + 5 bar



⚠ Attention!

In case of internal pilot oil supply, the X connection can also be used to lead way pilot oil for other actuators. However, this may affect the switching times at the M4-12. Consult Technical Sales regarding possible effects.

In case of external pilot oil supply the “X” connection is not closed in general. It needs to be closed when not in use (e. g. in case of hydraulic control “H”).

Central inlet elements Close Center (JZ) for sandwich plate design

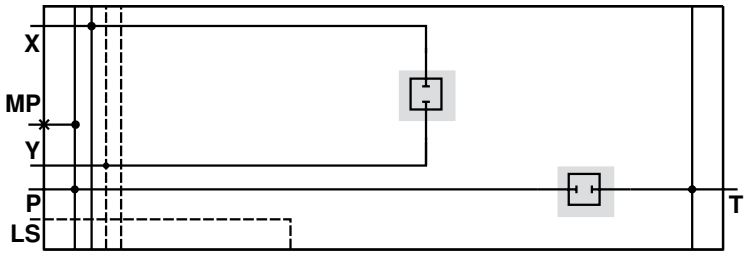
Without primary pressure relief valve, for external pilot oil supply

Ordering code:

M4	–	12	–	2X	/	JZ	Q	X

Short description

– For variable displacement pumps up to 200 l/min



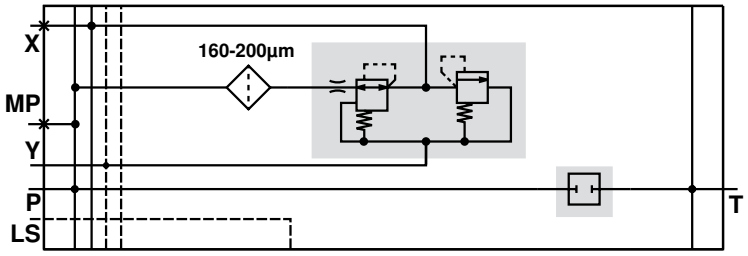
Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

M4	–	12	–	2X	/	JZ	Q	Y

Short description

– For variable displacement pumps up to 200 l/min



With primary pressure relief valve, for external pilot oil supply

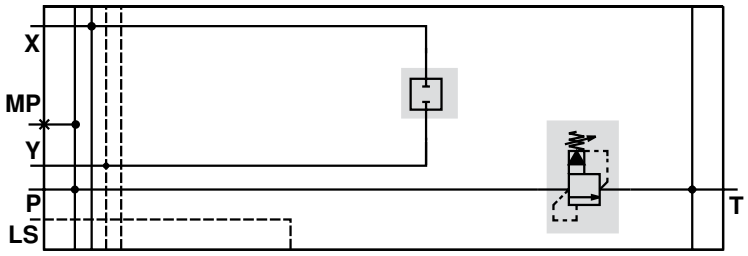
Ordering code:

M4	–	12	–	2X	/	JZ	…	X

Short description

– For variable displacement pumps up to 200 l/min

– Pressure information in bar behind JZ... required (3-digit)



With primary pressure relief valve, with internal pilot oil supply

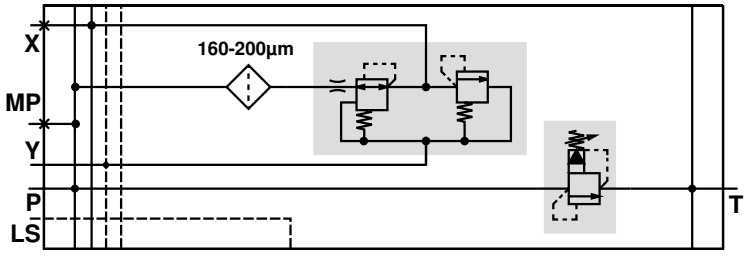
Ordering code:

M4	–	12	–	2X	/	JZ	…	Y

Short description

– For variable displacement pumps up to 200 l/min

– Pressure information in bar behind JZ... required (3-digit)



Central inlet elements Close Center (JZ) for sandwich plate design

Without primary pressure relief valve, with internal pilot oil supply

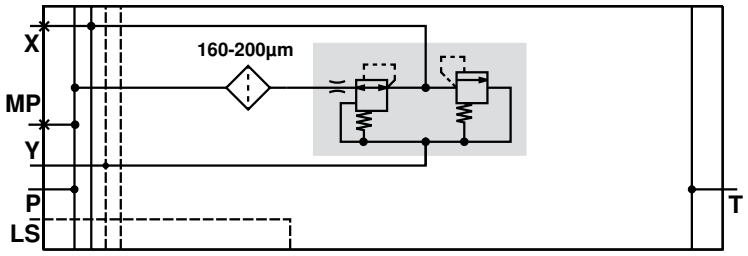
Ordering code:

M4	–	12	–	2X	/	JZ	Z	Y

Short description

– For variable displacement pumps up to 200 l/min

– Primary pressure relief valve cannot be retrofitted



Without primary pressure relief valve, for external pilot oil supply

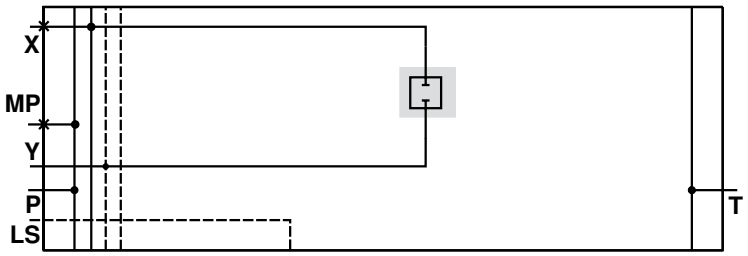
Ordering code:

M4	–	12	–	2X	/	JZ	Z	X

Short description

– For variable displacement pumps up to 200 l/min

– Primary pressure relief valve cannot be retrofitted



Central inlet elements Close Center (JK) for sandwich plate design

For the connection of direction valve elements of sizes 12 and 15

Without primary pressure relief valve, with internal pilot oil supply

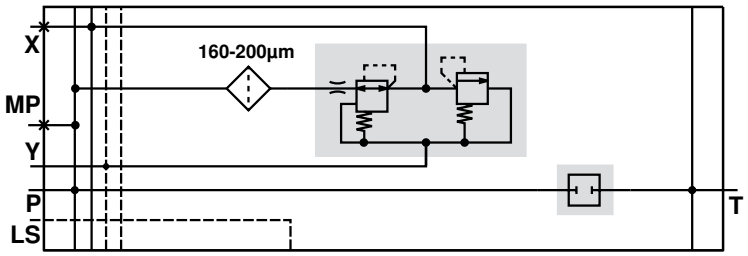
Ordering code:

M4	–	15/12	–	2X	/	JK	Q	Y

Short description

– For variable displacement pumps up to 200 l/min

M4-12



M4-15

For the connection of direction valve elements of sizes 12 and 15

With primary pressure relief valve, with internal pilot oil supply

Ordering code:

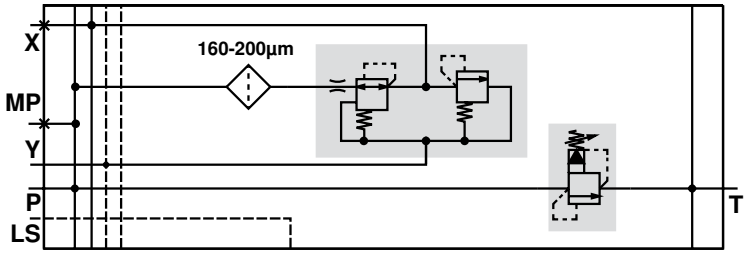
M4	–	15/12	–	2X	/	JK	…	Y

Short description

– For variable displacement pumps up to 200 l/min

– Pressure information in bar behind JK... required (3-digit)

M4-12



M4-15

Inlet elements: Open Center (P) for sandwich plate design

With primary pressure relief valve, for external pilot oil supply

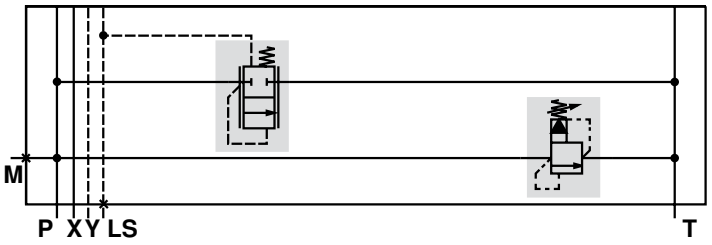
Ordering code:

M4	–	12	–	2X	/	P	…	X

Short description

– For fixed displacement pumps up to 150 l/min

– Pressure information in bar after P ... required (3-digit)



With primary pressure relief valve, for internal pilot oil supply

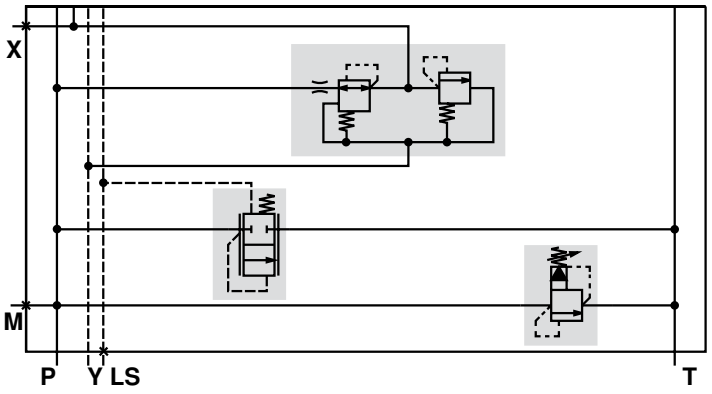
Ordering code:

M4	–	12	–	2X	/	P	…	Y

Short description

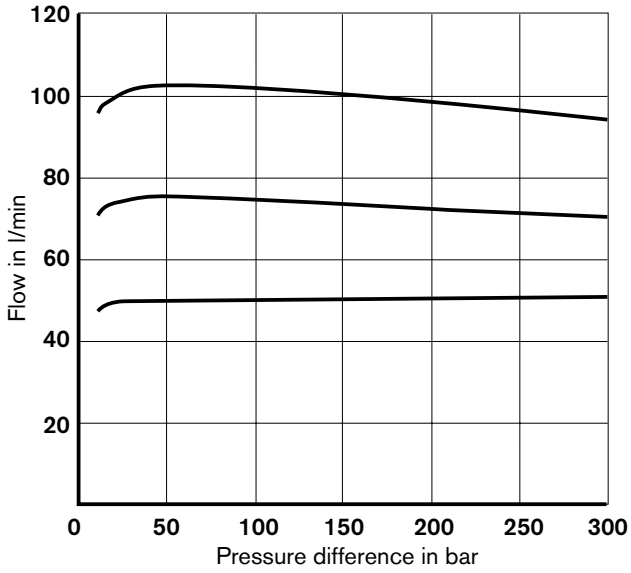
– For fixed displacement pumps up to 150 l/min

– Pressure information in bar after P ... required (3-digit)

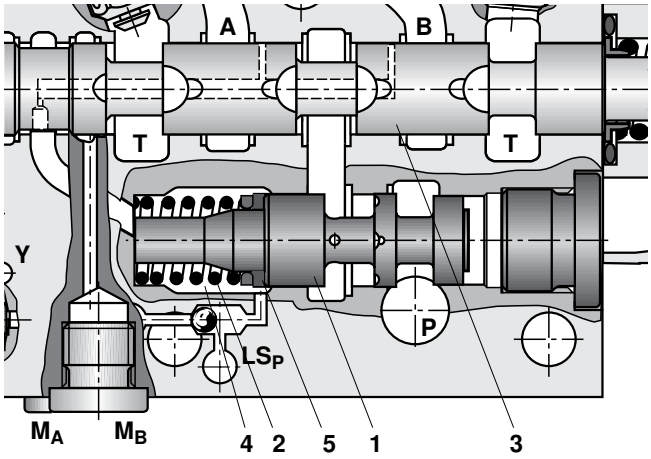


Directional valve elements: Pressure compensator

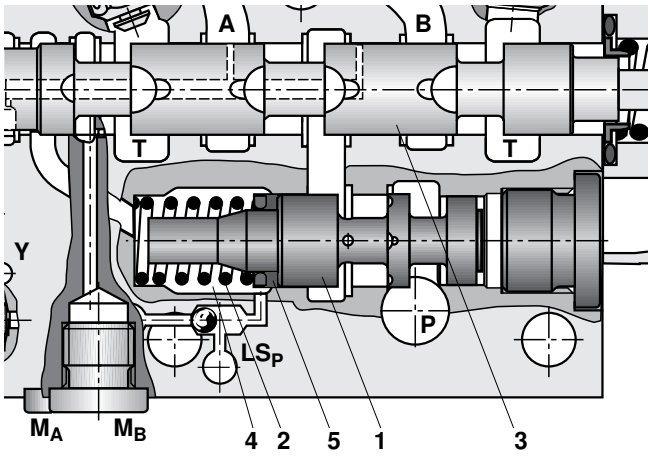
Flow control by pressure compensator



Main spool in central position



Main spool operated



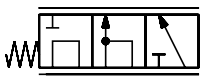
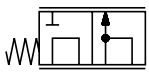
In the central position of the main spool, there is no connection from P to the actuator ports A and B. In this operating state, the pressure compensator spool (**1**) is moved to the left against the spring (**2**) by the pump pressure.

When the main spool (**3**) is operated (= metering orifice), the LS pressure reaches the spring chamber (**4**) and moves the pressure compensator spool to the right into the control position. The flow is kept constant even in case of parallel operation of actuators with different load pressures.

The pressure compensator “S” boasts a load holding function. This function is not free of leak oil.

In its standard version it is equipped with one ring (**5**). The number of the rings inserted depends on the required flow.

Pressure compensator spool variants

Ordering code	Short description	Symbol
S	with pressure compensator with load holding function [1] max. flow 130 l/min	
C	without pressure compensator with load holding function [1] max. flow 140 l/min	
Q	without pressure compensator without load holding function max. flow 140 l/min	

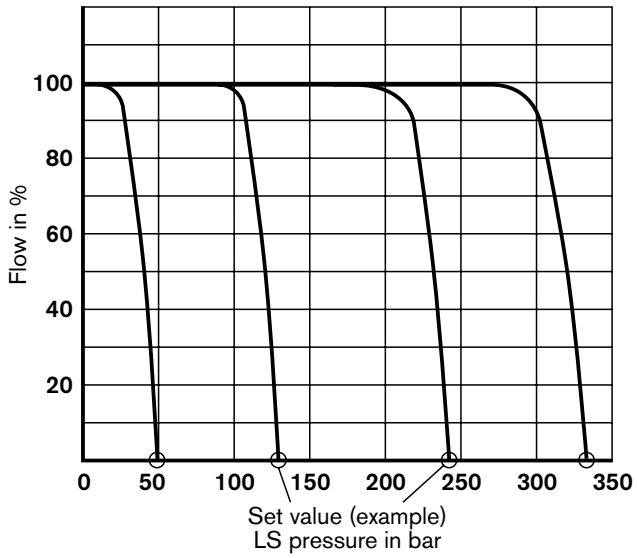
[1] The load holding function is not free of leak oil.

Directional valve elements: LS pressure relief function

Characteristic curves

Reduction of the actuator flow through LS pressure relief function

Minimum setting: 50 bar
Maximum setting: 330 bar



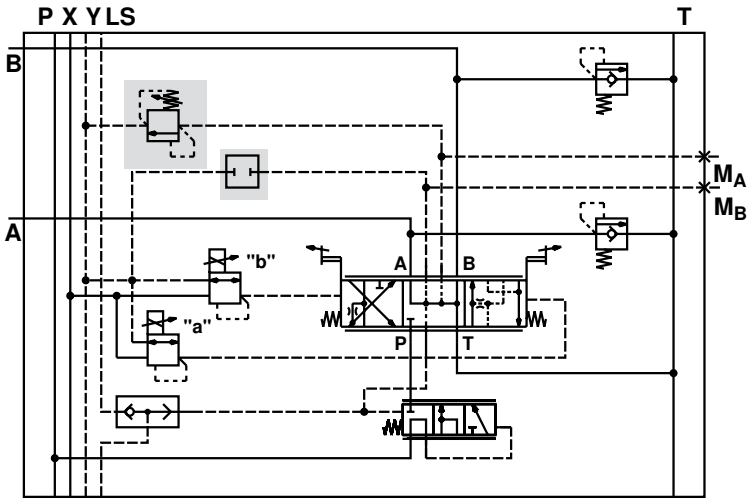
With LS pressure relief valve and LS plug screw

Ordering code:

S	…	M	Q	J	… – …	W2	1	–	H…	H…

Short description

- Pressure information in bar for actuator port A (3-digit)
- Plug screw for actuation port B
- For the QMQ version, the LS pressure relief function can be retrofitted at the directional valve element.
- The LS pressure can be influenced externally via the ports MA and MB. These ports can also be used as measuring ports.



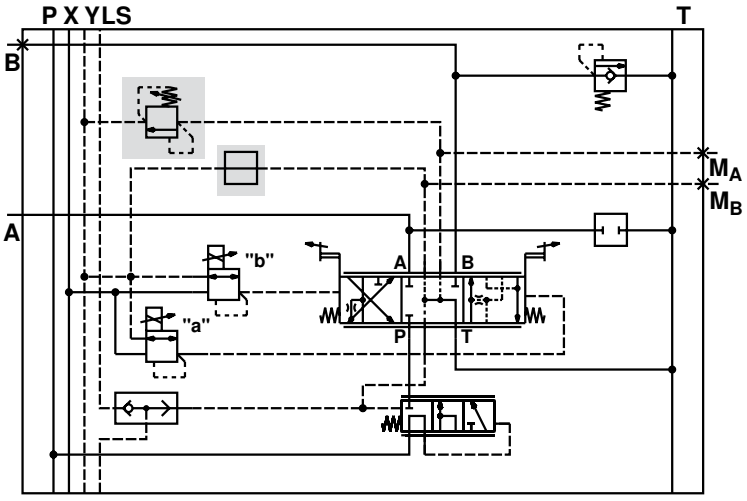
With LS pressure relief valve and Unloading plugs

Ordering code:

S	…	M	B	E	… – 000	W2	1	–	H…	Q

Short description

- Pressure information in bar for actuator port A (3-digit)
- Unloading plug for actuator port B
- e.g. for cylinders with one-sided operation



☞ **Note!**

Please consult Technical Sales.

Directional valve elements: LS pressure relief function

Without LS pressure relief valves

Ordering code:

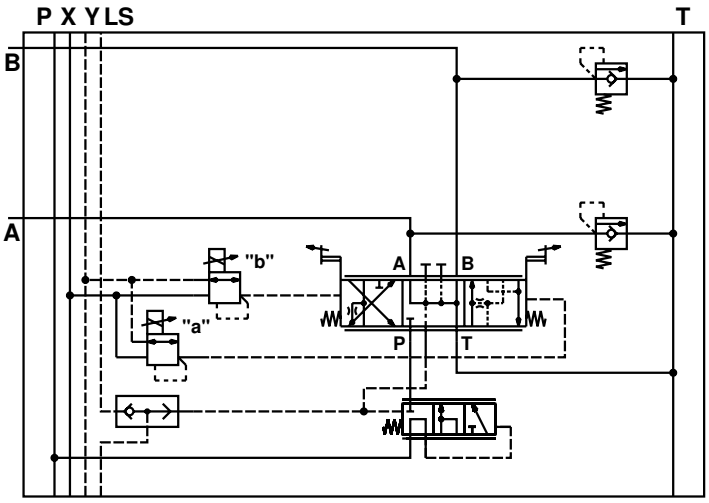
S	**Z Z Z**	**J**	**…–…**	**W2**	**1**	**–**	**H…**	**H…**

Short description

– LS-DB cannot be retrofitted

– Housing without measuring ports

– Max. flow of internal actuators 90 l/min



Directional valve elements: LS pressure relief function

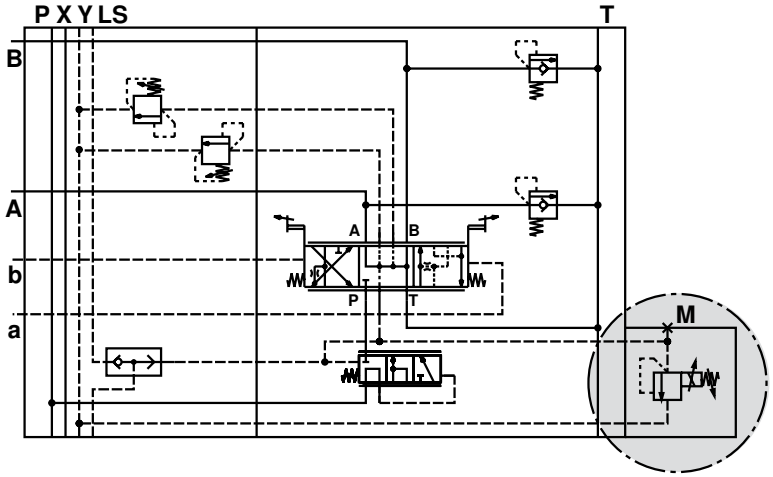
Electroproportional / hydraulically switchable pressure relief function

Short description

Differentiation between:

1. Type KBPS – electrohydraulically proportional
2. Type MH2DAD and Type KBPS
2. Type KKDE – electrohydraulically switchable
3. Porting pattern KBPS and cover plate
4. Housing KBPS and plug

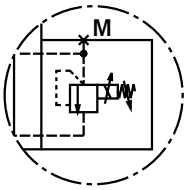
The exact description of the valve is to be **clear text** as follows.



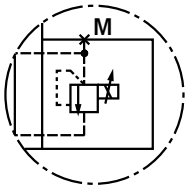
1. Electroproportional pressure relief valve Type KBPS
(see also data sheet RE 18139-04; RE 18139-05)

Standard product range:

S	… L …	J	…–…	H	–	H…	H…	KBPSL8BA
S	… J …	J	…–…	H	–	H…	H…	KBPSL8AA
S	… R …	J	…–…	H	–	H…	H…	KBPSR8BA
S	… N …	J	…–…	H	–	H…	H…	KBPSR8AA



KBPS…BA:
Decreasing characteristic curve



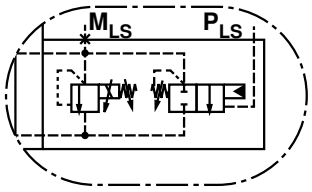
KBPS…AA:
Rising characteristic curve

Extension program, such as:

S	… K …	J	…–…	H	–	H…	H…	KBPSH8BA	-033

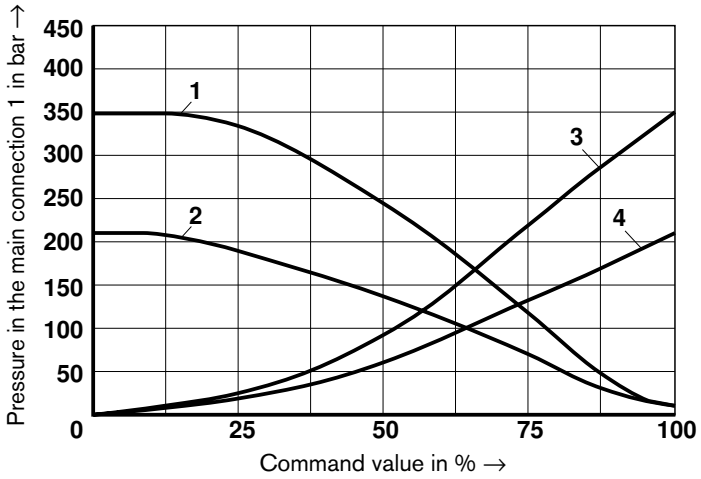
2 Pressure cut-off valve, type MH2DAD, and electroproportional pressure relief valve, type KBPS
(see also data sheet RE 64586; RE 18139-04; RE 18139-05)

S	… K …	J	…–…	H	–	H…	H…	MH2DAD+KBPSH8BA



Directional valve elements: LS pressure relief function

Pressure control through electroproportional LS pressure relief function



	Falling characteristic curve	Rising characteristic curve	Addition SO no. (Option: 24 V; 0.8 A)
50 bar	KBPS**C**8BA	KBPS**C**8AA	–033
100 bar	KBPS**F**8BA	KBPS**F**8AA	
150 bar	KBPS**H**8BA	KBPS**H**8AA	
210 bar	KBPS**L**8BA (2)	KBPS**L**8AA (4)	
250 bar	KBPS**N**8BA	KBPS**N**8AA	
315 bar	KBPS**P**8BA	KBPS**P**8AA	
350 bar	KBPS**R**8BA (1)	KBPS**R**8AA (3)	
420 bar	KBPS**T**8BA	KBPS**T**8AA	

= Standard product range

Technical data KBPS (see also RE 18139-04)

Electrical			**Standard**	
Supply voltage		V	12 DC	24 DC
Maximum control current		mA	max. nominal current 1,760 mA	max. nominal current 1,200 mA
Coil resistance	– Cold value with 20°C	Ω	2.3	4.8
	– max. hot value	Ω	3.65	7.2
Duty cycle		%	100 [1]	
Maximum coil temperature [2]		°C	150	
Protection type acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version “K4”		IP 65 with plug-in connector mounted and locked	
	– Version “C4”		IP 66 with plug-in connector mounted and locked	
			IP 69K with Rexroth plug-in connector (Material No. R901022127)	
	– Version “K40”		IP 69K with plug-in connector mounted and locked	

[1] If use > 2,000 m via NN, we recommend consulting the manufacturer.

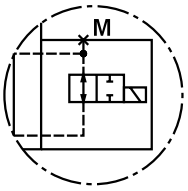
[2] Due to the surface temperatures of solenoid coils, the standards EN 563 and EN 982 must be adhered to!

Directional valve elements: LS pressure relief function

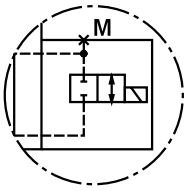
3. 2/2 directional spool valve type KKDE

S	… K …	J	…–…	H	–	H…	H…	KKDER8PA

De-energized open	De-energized closed
KKDER8PA	KKDER8NA



KKDE…PA:
De-energized open



KKDE…NA:
De-energized closed

Technical data KKDE (see also RD 18136-08)

Electrical			**Standard**	
Type of voltage			Direct voltage	
Supply voltage		V	12 DC	24 DC
Voltage tolerance and ambient temperature			See characteristic curve RE 18136-08 page 5	
Power consumption		Ω	22	
Duty cycle		%	See characteristic curve RE 18136-08 page 5	
Maximum coil temperature [2]		°C	150	
Switching time according to ISO 6403 (solenoid horizontal)	– ON	ms	≤ 80	
	– OFF	ms	≤ 150	
Maximum switching frequency	cy/h		15,000	
Protection type acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version “K4”		IP 65 with plug-in connector mounted and locked	
	– Version “C4”		IP 66 with plug-in connector mounted and locked	
			IP 69K with Rexroth plug-in connector (material no. R901022127)	
	– Version “K40”		IP 69K with plug-in connector mounted and locked	

[1] If use > 2000 m via NN, we recommend consulting the manufacturer.

[2] Due to the surface temperatures of the solenoid coils, the European standards EN 563 and EN 982 must be adhered to!

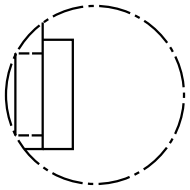
At the electrical connection “K4”, the protective earth conductor (PE ⏚) must be connected correctly.

☞ **Note!**

Consumer pressure does not become depressurized!

4. Porting pattern KBPS and cover plate

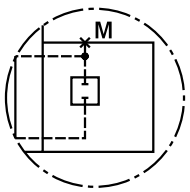
S	… K …	J	…–…	H	–	H…	H…	A



Cover plate

5. Housing KBPS and plug

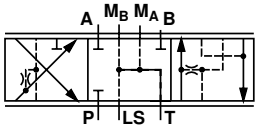
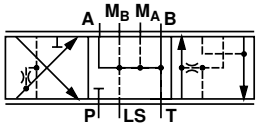
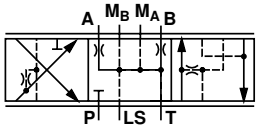
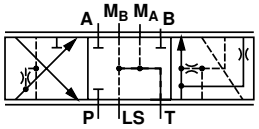
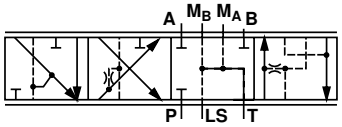
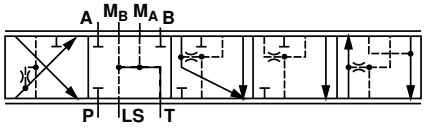
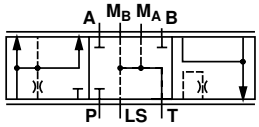
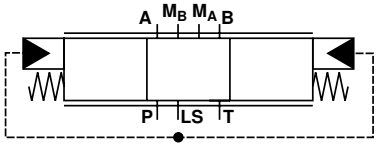
S	… K …	J	…–…	H	–	H…	H…	Q



Plug

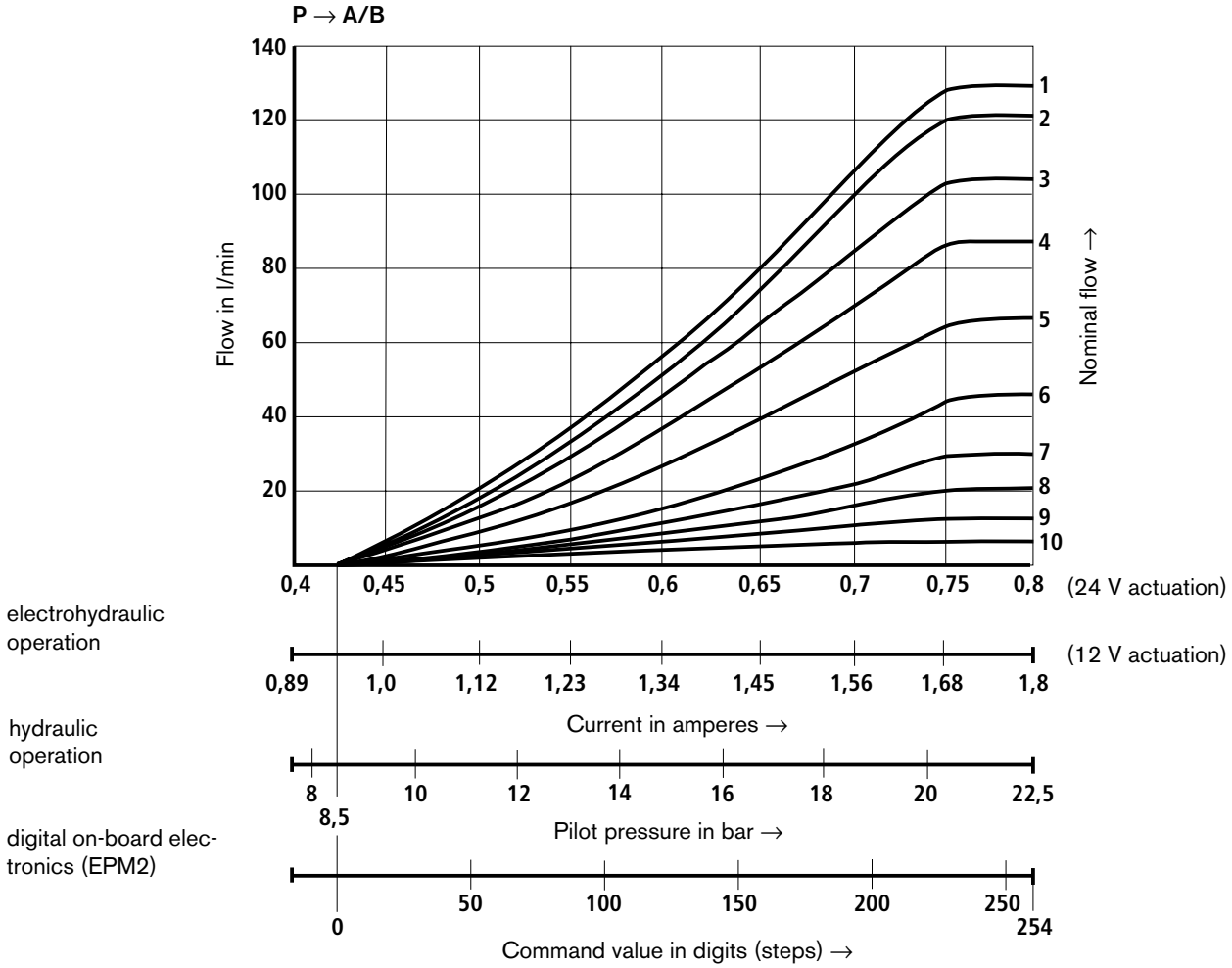
Directional valve elements: Main spool

Main spool variants

Ordering code Flow information in l/min	Main use	Symbol
E … – …	Hydro cylinder as actuator	
J … – …	Hydro motors as actuator	
Q … – …	Application with defined residual opening (A/B → T) Actuator port unloaded in neutral position	
R … – …	Regeneration function (P, B → A)	
W … – …	Float position	
Y … – …	Float position	
P … – …	Plunger cylinder as actuator	
(E, J, Q) … T …	Spool with pressure function	

Directional valve elements: Main spool

Spool characteristic curves (symmetric spools)



Directional valve elements: Flow

Symmetric spools

Spool type	Pressure compensator	Flow in l/min (spool characteristic curve see page 11)							
E, J, Q	S	130–130 (1)	100–100	073–073	052–052	034–034	023–023	014–014	007–007
		120–120 (2)	085–085 (4)	065–065 (5)	045–045 (6)	030–030 (7)	020–020 (8)	012–012 (9)	006–006 (10)
		100–100 (3)	070–070	057–057	038–038	026–026	017–017	010–010	005–005
	C	140–140	115–115	090–090	063–063	042–042	028–028	017–017	008–008

Asymmetric spools

Spool type	Pressure compensator	Flow in l/min				
E, J, Q	S	100–073	100–052	052–034	034–023	023–014
		085–065	085–045	045–030	030–020	020–012
		070–057	070–038	038–026	026–017	017–010
	C	115–090	115–063	063–042	042–028	028–017

Float position, regeneration and plunger spools

Spool type	Pressure compensator	Nominal flow in l/min (more on inquiry)			
W	S	016–016	065–040	075–045	
Y	S	065–045	065–085	085–100	030–030
R	S	130–101	085–030	065–025	
P	S	140–000			

(1)… (10) Notes on spool characteristic curve, page 26.

☞ **Note!**

Please consult Technical Sales.

Example:

- Spool type J
- Pressure compensator S
- Command value: $Q_{Actuator}$ = 90 l/min

Solution:

→ 85 liter spool + 2 washers = 100 l/min

→ Set 90 liters via stroke limitation.

Spool type	Pressure compensator	Flow in l/min
E, J, Q	S	100–100
		085–085
		070–070

Flow without washer (pressure compensator Δp = 4 to 7 bar) ◄

Flow with 1 washer (pressure compensator Δp = 6 to 9.5 bar) ◄

Volume flow with 2 washers (pressure compensator Δp = 8.5 to 11.5 bar) ◄

☞ **Note!**

Position directional valve elements with maximum flow as close as possible to the inlet element.

Directional valve elements: Types of operation Cover A – mechanical

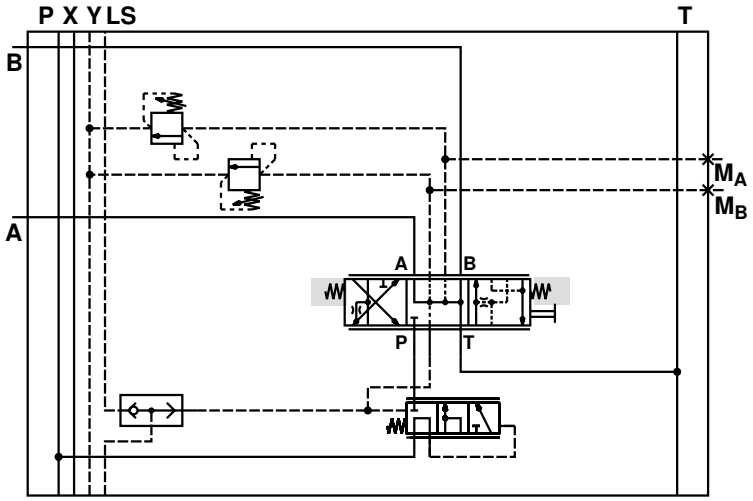
Purely mechanical (non-encapsulated) with tongue

Ordering code:

S	Z Z Z	J	…–…	A	Z	Z	Z

Short description

– Mechanical operation of the main spool. In case of non-operation centering in central position by springs



Purely mechanical (non-encapsulated) with handle-operated lever and detent

Ordering code:

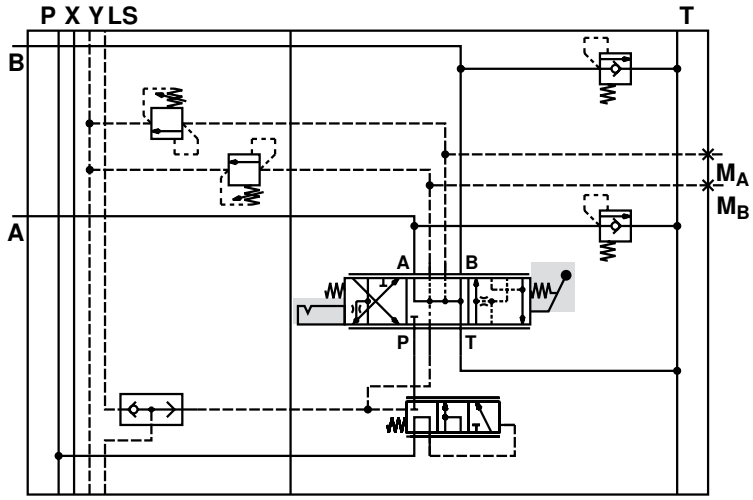
S	… M …	J	…–…	B1	N	H…	H…

Short description

– Mechanical operation of the main spool. In case of non-operation centering in central position by springs

☞ **Note!**

Handle-operated lever setting, please consult Technical Sales.



Mechanical (encapsulated)

Ordering code:

S	… M …	J	…–…	M	K	H…	H…

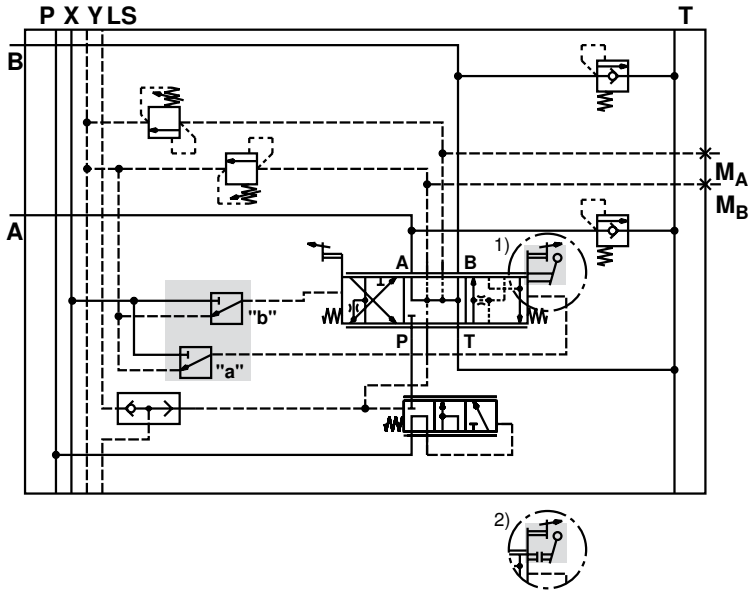
Short description

– Mechanical operation of the main spool. In case of non-operation centering in central position by springs

– All handle-operated lever position options are available (K, L, M etc.) comp. also type key on page 10

1) Following handle-operated lever

2) Non-following handle-operated lever



Directional valve elements: Types of operation Cover A – hydraulic

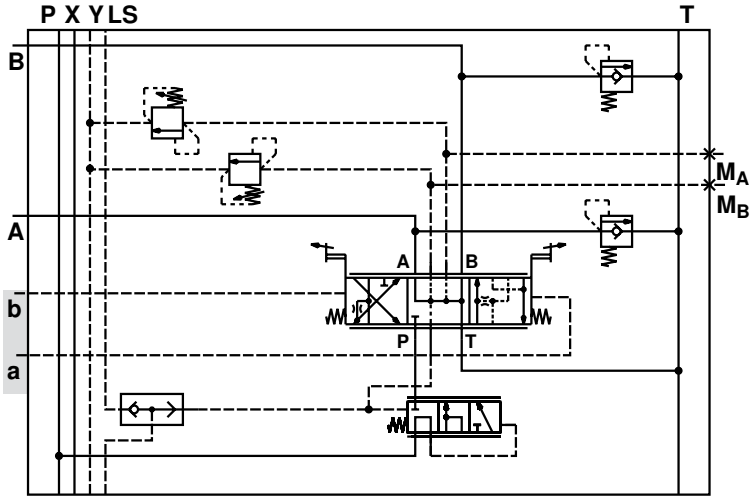
Hydraulic

Ordering code:

S	**… M …**	**J**	**…–…**	**H**	**–**	**H…**	**H…**

Short description

– Recommended hydraulic pilot control units:
  Type TH 6 curve 97 according to RE 64555



Directional valve elements: Types of operation Cover A – electrohydraulically on/off

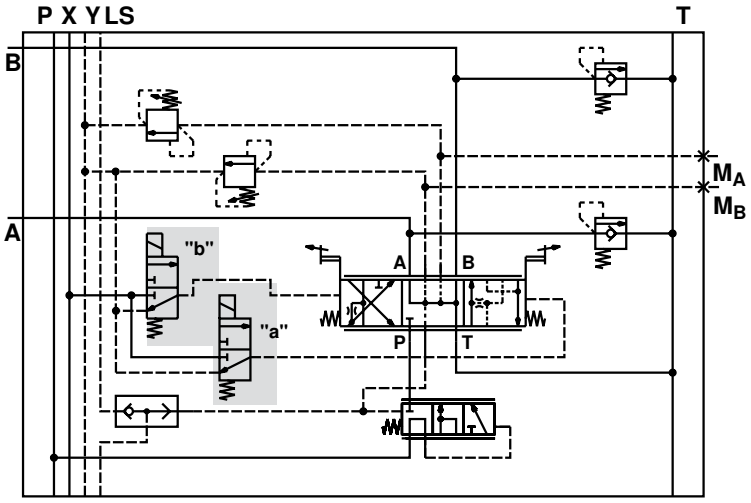
Electrohydraulically on/off

Ordering code:

S	**… M …**	**J**	**…–…**	**W4**	**1**	**–**	**H…**	**H…**

Short description

– On/off valves, type FTWE 2 K according to RE 58007



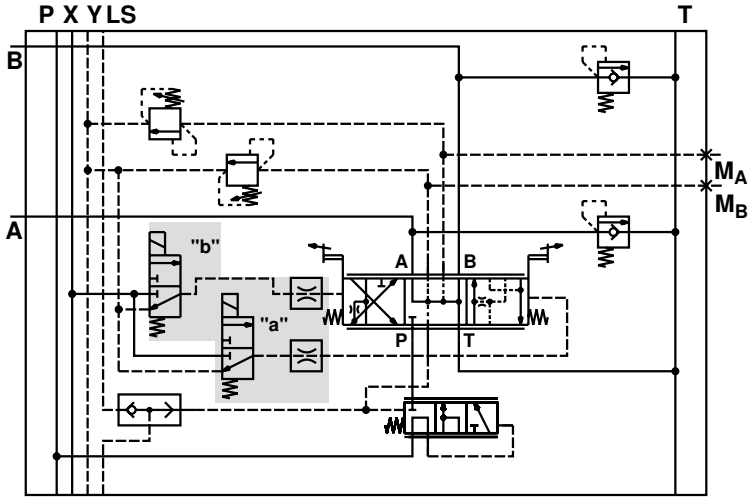
Electrohydraulically on/off with damping orifice on both sides

Ordering code:

S	**… M …**	**J**	**…–…**	**W5**	**3**	**–**	**H…**	**H…**

Short description

– On/off valves, type FTWE 2 K according to RE 58007



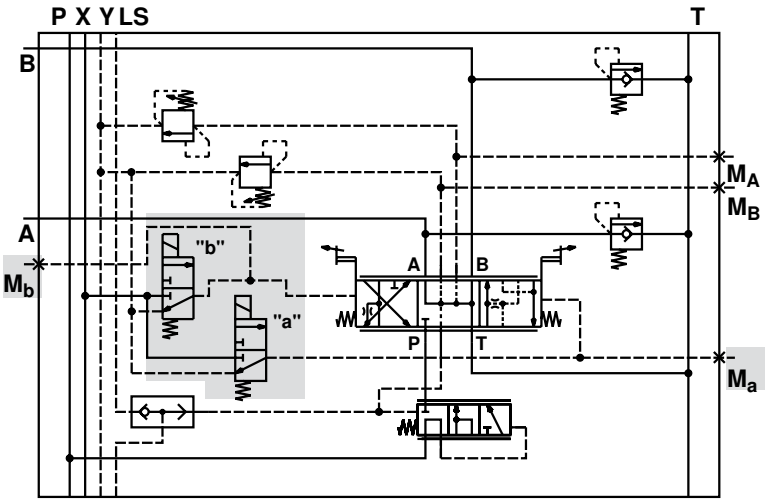
Electrohydraulically on/off with measuring ports on both sides

Ordering code:

S	**… M …**	**J**	**…–…**	**W6**	**3**	**–**	**H…**	**H…**

Short description

– On/off valves, type FTWE 2 K according to RE 58007



Directional valve elements: Types of operation Cover A – electrohydraulically on/off

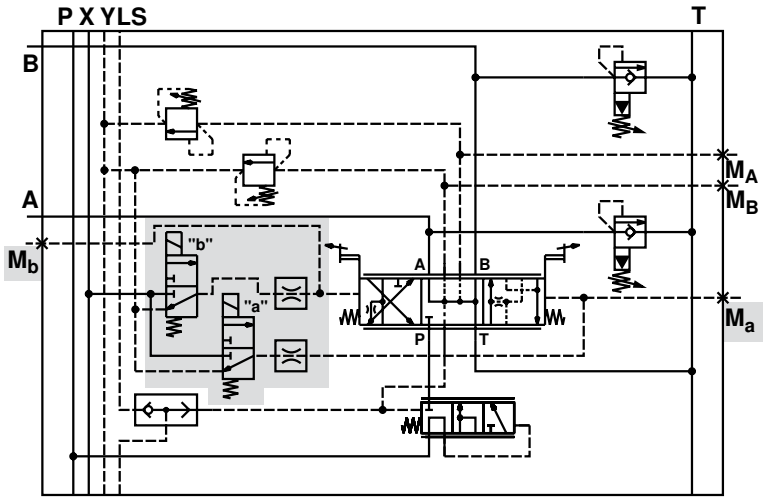
Electrohydraulically on/off with damping orifice, with measuring ports on both sides

Ordering code:

S	… M …	J	…–…	W7	1	–	H…	H…

Short description

– On/off valves, type FTWE 2 K according to RE 58007



Technical data FTWE 2K (see also RE 58007)

Electrical				
Type of voltage			Direct voltage	
Nominal voltage		V	12	24
Power consumption at 20°C		W	14.4	14.4
Coil resistance R20		Ω	10	40
Duty cycle		%	100	
Switching time	*t*on	ms	≤ 20	
	*t*off	ms	≤ 30	
Protection type according to DIN 40050-9	– Solenoid		IP 69K	
	– Electrical connection	C4 K40	IP 69K [1] IP 69K [1]	
Switching frequency		Hz	5	

[1] Recommended plug-in connector see page 34.

Directional valve elements: Types of operation Cover A – electrohydraulically proportional

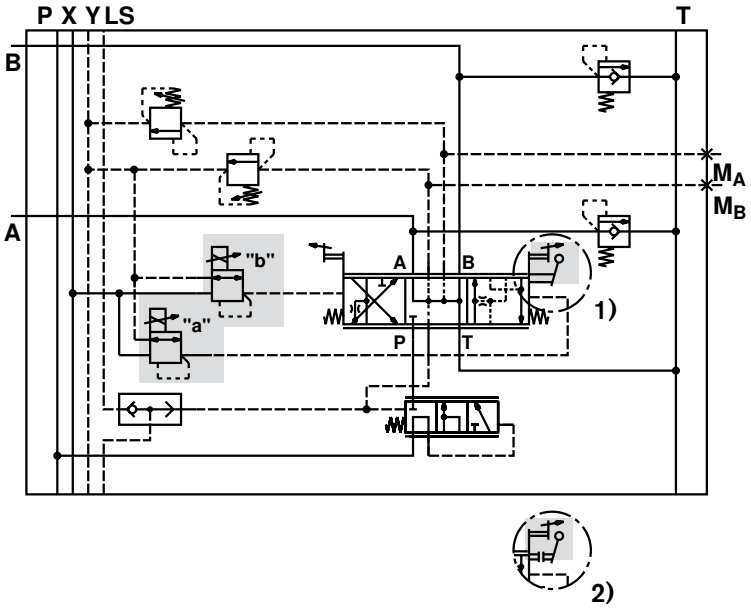
Electrohydraulically proportional with handle-operated lever (encapsulated)

Ordering code:

S	… M …	J	…–…	W2	1	K	H…	H…

Short description

– Proportional pressure reducing valve
Type FTDRE 2 K according to RE 58032



Safety notes!

1) Following handle-operated lever: Electrohydraulic operation can be overruled by mechanical operation. The handle-operated lever is connected directly with the main spool and follows the spool movement in case of electrohydraulic control.
2) Non-following handle-operated lever: The handle-operated lever is connected with the main spool via a coupling. When the main spool is in central position, the handle-operated lever can be detented. Thus, it does not follow the movement of the spool in case of electrohydraulic operation.

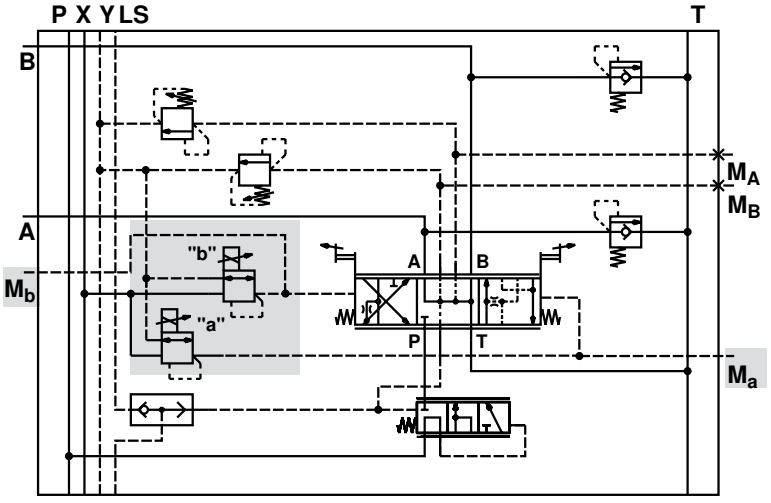
Electrohydraulically proportional with measuring ports on both sides

Ordering code:

S	… M …	J	…–…	W8	9	–	H…	H…

Short description

– Proportional pressure reducing valve,
type FTDRE 2 K according to RE 58032



Directional valve elements: Types of operation Cover A – electrohydraulically proportional

Technical data FTDRE 2K (see also RE 58032)

Electrical				
Type of voltage			Direct voltage	
Nominal voltage of the amplifier		V	12	24
Maximum control current		A	1.8	0.8
Coil resistance (20 °C)		Ω	2.4	12
Duty cycle (with amplifier)		%	100	
Electrical connection			See ordering codes	
Protection type according to DIN 40050-9	– Solenoid		IP 69K	
	– Electrical connection	C4	IP 69K [1]	
		K40	IP 69K [1]	
PWM frequency (recommended) [1]		Hz	150	

[1] The PWM frequency is to be optimized depending on the individual application. In this regard, the operating temperature must be taken into account.

Recommended plug-in connector see page 34.

Directional valve elements: Types of operation Cover A – on-board electronics

Electronic pilot module

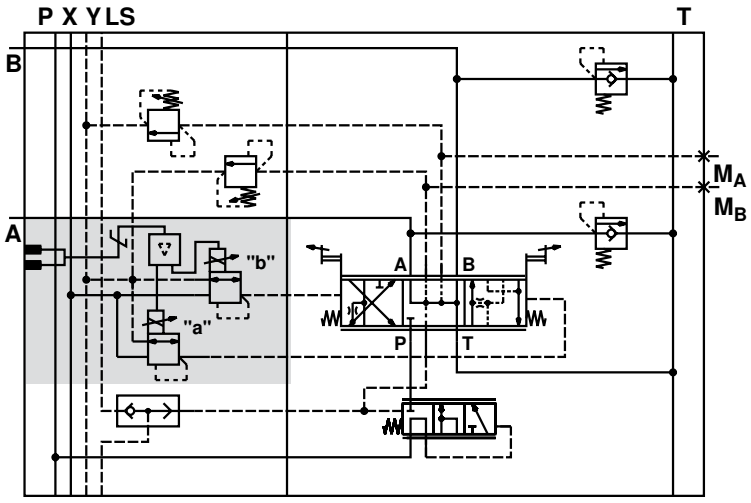
Ordering code:

S	… M …	J	…–…	CBA	–	H…	H…

Short description

– Digital interface, standard see RE 64815-B

– Recommended connections see page 50.



Directional valve elements: Voltage supply and plugs

	Plug type	
Supply voltage	**Junior Timer 2-pin (AMP)**	**DT04-2P (Deutsch)**
24 V	1	8
12 V	3	9

This information is required only in case of electrohydraulic operation and / or electroproportional pressure relief function.

Recommended plug-in connector for connector type Junior Timer 2-pin (AMP)

Plug-in connector for FTDRE… and FTWE… protection type IP 69K

Material number: R900313533

For a litz wire cross-section of 0.5 to 1 mm² and for an insulation diameter of the individual seals of 1.2 to 2.1 mm.

Material number: R901022127

For a litz wire cross-section of 0.5 to 1 mm² and for an insulation diameter of the individual seals of 2.2 to 3 mm.



Recommended plug-in connector for connector type Deutsch (K40)

Plug-in connector for FTDRE… and FTWE… protection type IP 69K

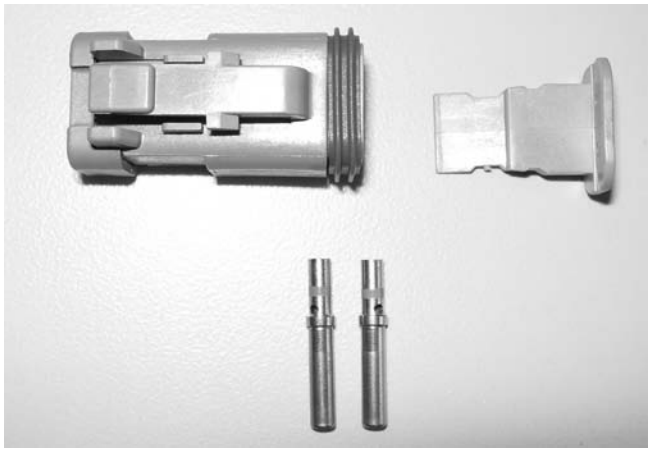
Material number: R900733451

For AWG 14-16 wire cross-section and outer single wire diameter of 1.35 to 3.05 mm².

Material number: R901017847

For AWG 16-18 wire cross-section and outer single wire diameter of 1.35 to 3.05 mm².

See also data sheet RE 08006.

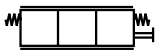
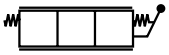
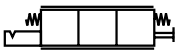
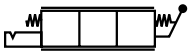
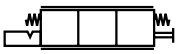
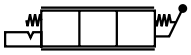
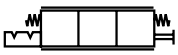
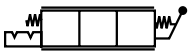


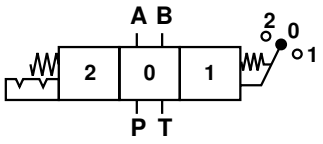
☞ **Note!**

Plug-in connectors are not included in the scope of supply and must be ordered separately.

Directional valve elements: Types of operation Cover B

Mechanical – Non-encapsulated operation (purely mechanical)

Spring centered + Tongue		Spring centered + Tongue with lever	
	A Z		A N
Detent + Tongue		**Detent + Tongue with lever**	
	B1 Z		B1 N
	B2 Z		B2 N
	B4 Z		B4 N



B1	=	Detent in 1
B2	=	Detent in 2
B4	=	Detent in 1, 2

Operating force:

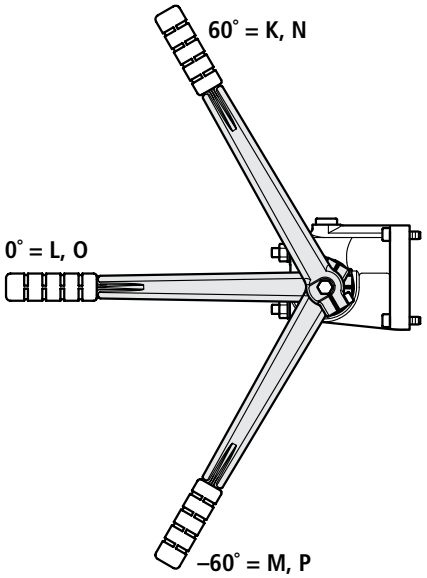
Tongue < 250 N (spool axis)

Note!

Handle-operated lever setting, please consult Technical Sales.

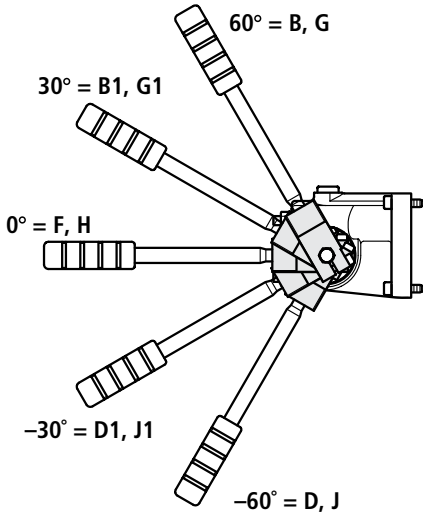
Mechanical – encapsulated operation

Standard lever

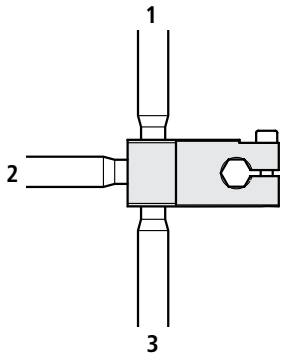


Clamping piece with lever

(example: lever screwing in Pos. 2)



Lever screwing at the clamping piece



		Top, 60°		Top, 30°		Straight, 0°		Bottom, –30°		Bottom, –60°		without lever
Standard	– Revolving	K				L				M		R
	– Non-revolving	N				O				P		X
Clamping piece with lever	– Revolving	B	1	B1	1	F	1	D1	1	D	1	
		B	2	B1	2	F	2	D1	2	D	2	
		B	3	B1	3	F	3	D1	3	D	3	
	– Non-revolving	G	1	G1	1	H	1	J1	1	J	1	
		G	2	G1	2	H	2	J1	2	J	2	
		G	3	G1	3	H	3	J1	3	J	3	
Clamping piece without lever	– Revolving	T		T1		U		V1		V		
	– Non-revolving	Q		Q1		S		C1		C		

Operating force (at the handle-operated lever):

= Standard product range

- Mechanical < 20 N
- Hydraulic, handle-operated lever override < 50 N
- Electrohydraulic, handle-operated lever override < 70 N

Further handle-operated lever options (aluminum-free) on inquiry.

Directional valve elements: Secondary valves

Shock/feed valve, non-adjustable

Ordering code:

S	… M …	J	…–…	W2	1	–	H100	H150

Short description

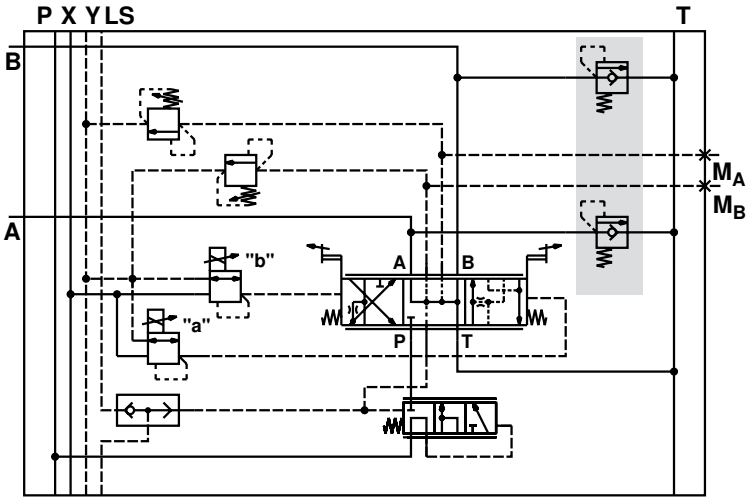
– Non-adjustable shock/feed valve

– Pressure information in bar behind H ... required (3-digit)

Example: H100, H150

H100: Shock/feed valve, set to 100 bar for actuator port A

H150: Shock/feed valve, set to 150 bar for actuator port B



☞ **Note!**

Suitable only to reduce pressure peaks, not to be used as pressure relief valve!

Preferred pressure settings for shock valves with feed function

Pressure setting in bar in the actuator ports A and B			
H050 = 50 bar	H140 = 140 bar	H210 = 210 bar	H280 = 280 bar
H063 = 63 bar	H150 = 150 bar	H230 = 230 bar	H300 = 300 bar
H080 = 80 bar	H160 = 160 bar	H240 = 240 bar	H320 = 320 bar
H100 = 100 bar	H175 = 175 bar	H250 = 250 bar	H350 = 350 bar
H125 = 125 bar	H190 = 190 bar		

☞ **Note!**

Shock valves have a fixed setting!

Shock/Feed valves, adjustable

Ordering code:

S	… M …	J	…–…	W2	1	–	Q	A…

Short description

– Adjustable shock/feed valve

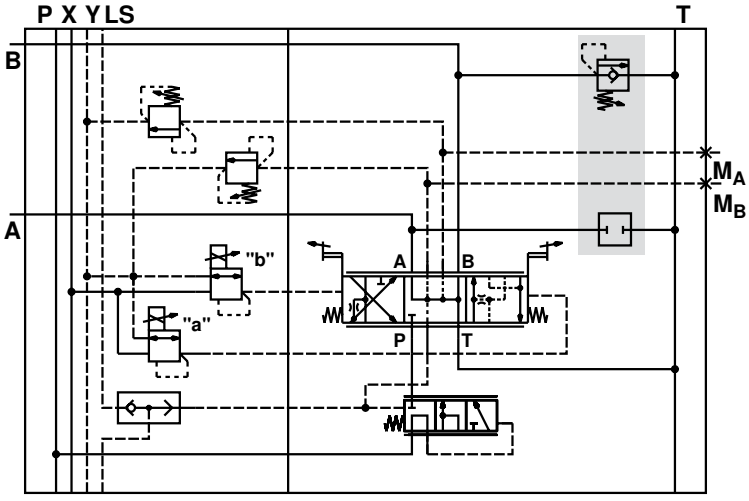
– Pressure information in bar behind A ... required (3-digit)

Example: QA200

Q: Plug screw for actuator side A

A200: Shock/feed valve, set to 200 bar for actuator port B

The directional valve is ready for retroactive fitting of secondary valves.



☞ **Note!**

Suitable only to reduce pressure peaks, not to be used as pressure relief valve!

Adjustable pressure levels in bar in the actuator ports A and B	
10 – 70	201 – 270
71 – 120	271 – 320
121 – 200	321 – 380

Directional valve elements: Secondary valves

Without secondary valves

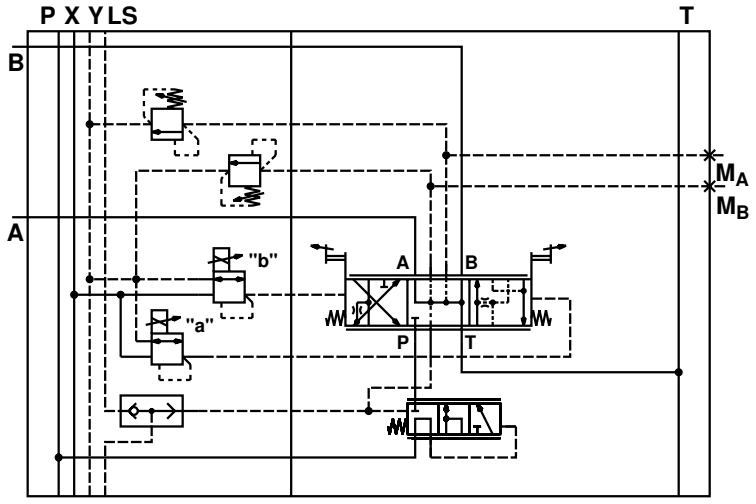
Ordering code:

S	… M …	J	…–…	W2	1	–	Z	Z

Short description

– Secondary valves cannot be retrofitted

– Actuator port SAE – 12



Without secondary valves, with flange surface

Ordering code:

S	… M …	J	…–…	W2	1	–	F	F	…	…

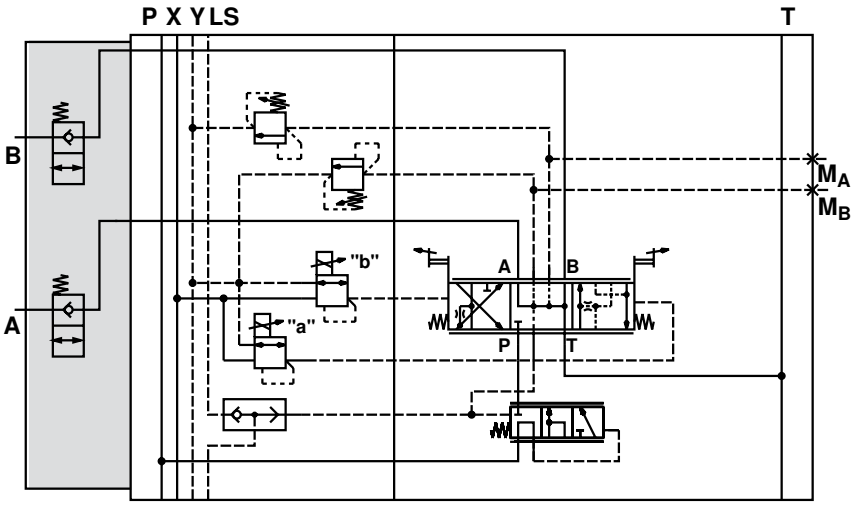
Short description

– Secondary valves cannot be retrofitted

– Information on the flange valves in clear text

☞ **Note!**

Dimensioning of the flanged installation housing with screwable valves by Technical Sales.



Directional valve elements: Housing options that can be ordered

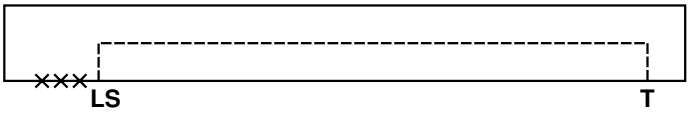
			With secondary valve option (can be retrofitted) SAE – 10	Without secondary valve options (cannot be retrofitted) SAE – 12	Flange surface
			Q, A…, H…	**ZZ**	**FF**
Standard	Without LS pressure relief valves (LS-DB cannot be retrofitted)	**ZZZ**	●	●	
	With 2 LS pressure relief valves (pressure info in bar, 3-digit)	**…M…**	●	●	●
	With LS pressure relief valves (pressure info in bar, 3-digit) Housing for electroproportional or switchable pressure relief function	**…K…**	●	●	
Mechanical	Without LS pressure relief valves (LS-DB cannot be retrofitted)	**ZZZ**	●	●	
	With 2 LS pressure relief valves (pressure info in bar, 3-digit)	**…M…**	●	●	●

End elements

End element with LS unloading

Ordering code:

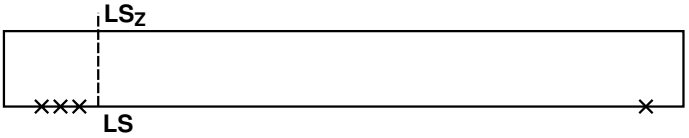
LA



End element with LS port

Ordering code:

LZ



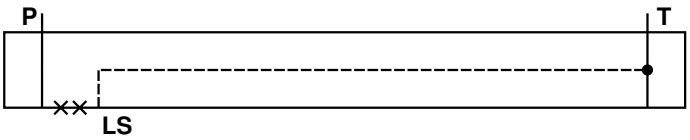
Short description

– LS unloading must be ensured externally

End element LA with additional P and T port

Ordering code:

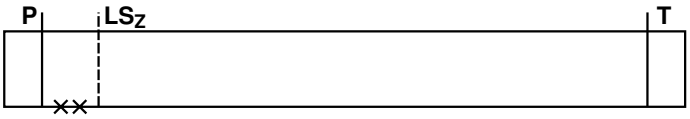
LAPT



End element LZ with additional P and T port

Ordering code:

LZPT



Short description

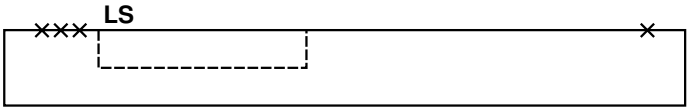
– LS unloading must be ensured externally

End element to be combined with central inlet element

End element for use with central inlet element

Ordering code:

M4 – 12 – 2X / LU



Adapter plate for ED valves from BROC

Use only on inquiry!

Ordering code:

LC

Short description:

– Type key for flange-mounted ED valves according to RIE 00159

⚠ Attention!

Rating by Technical Sales

Dimensions: Line connections

Inlet element, lateral	Closed center	**P**	1-1/16 – 12 UNF
		T	1-1/16 – 12 UNF
		LS	9/16 – 18 UNF
		X, Y	9/16 – 18 UNF
		M	9/16 – 18 UNF
	Open center	**P**	1-1/16 – 12 UNF
		T	1-5/16 – 12 UNF
		LS	9/16 – 18 UNF
		X, Y	9/16 – 18 UNF
		M	9/16 – 18 UNF
Directional valve element	with secondary valves	**A, B**	7/8 – 14 UNF
		a, b	7/16 – 20 UNF
		MA, MB	7/16 – 20 UNF
		Ma, Mb	G 1/8
	without secondary valves	**A, B**	1-1/16 – 12 UNF
		a, b	7/16 – 20 UNF
		MA, MB	7/16 – 20 UNF
		Ma, Mb	G 1/8
End element		**LSZ**	9/16 – 18 UNF
	LAPT, LZPT	**P, T**	1-1/16 – 12 UNF

P = Pump
A, B = Actuator
a, b = Pilot line
T = Tank
X = Pilot oil supply
Y = Tank, depressurized
LS = Load-sensing (LS)
LSZ = LS carry over
M, MP = Pump measuring port
MA, MB = LS pressure measuring ports
Ma, Mb = Pilot pressure measuring ports

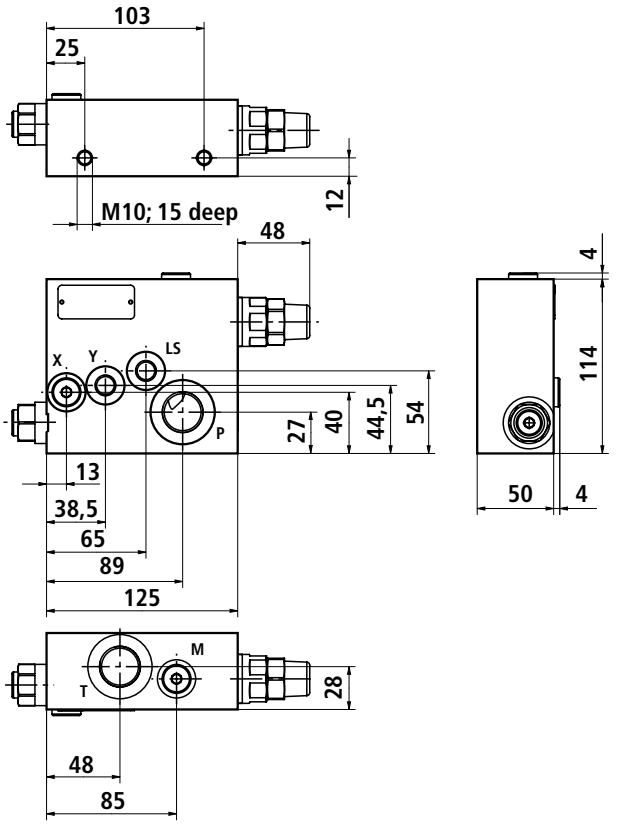
Connections according to SAE J1626 or ISO 11926-1

Fastening screws M10
according to EN ISO 4762 or EN ISO 4014:

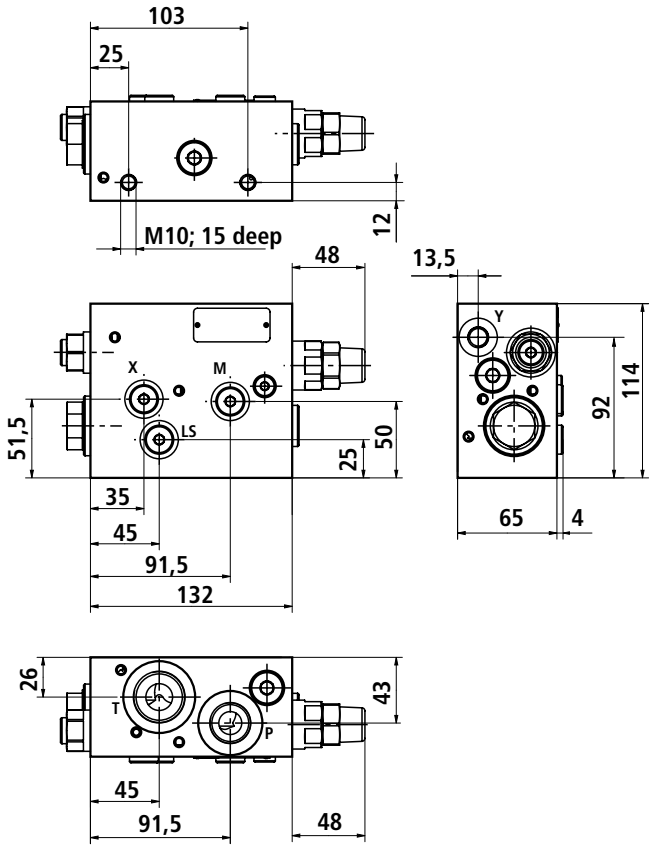
Property class:	8.8	10.9
Fastening torque:	41 ± 2 Nm	60 ± 3 Nm

Dimensions: Inlet elements

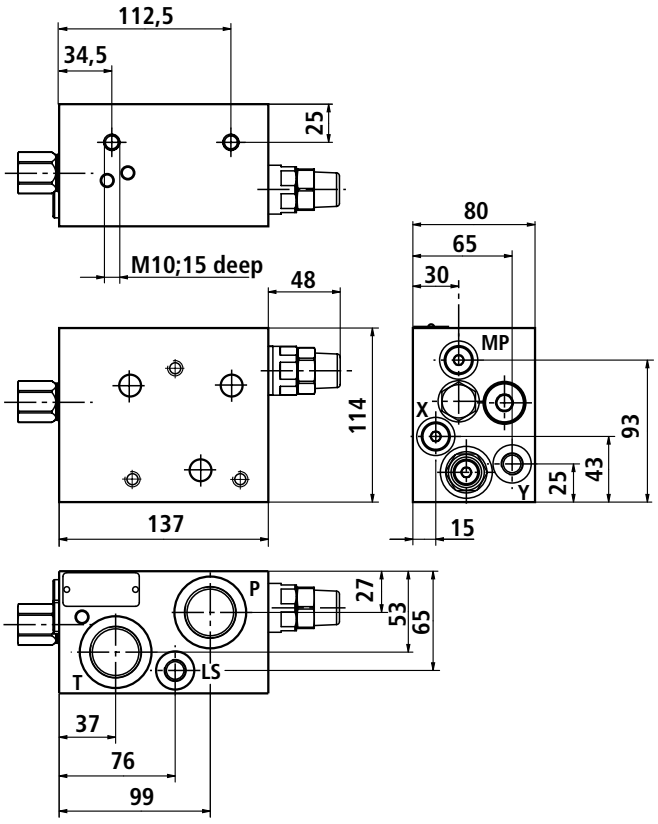
Lateral inlet element J...Y



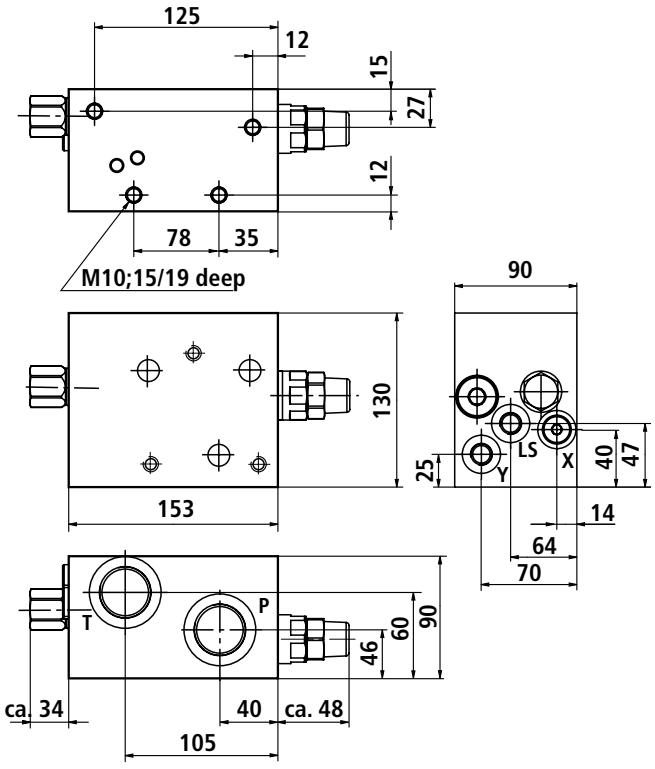
Lateral inlet element P...Y



Central inlet element JZ



Central inlet element JK

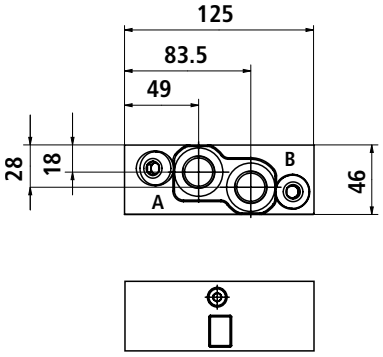


Dimensions: Directional valve elements

Housing with secondary valve bore, actuator port SAE – 10

Ordering code:

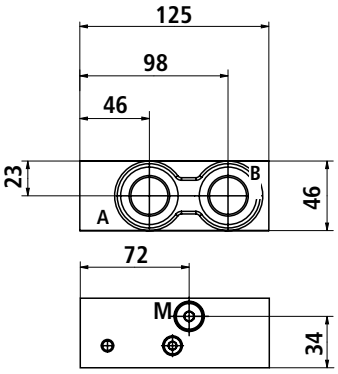
…	A…	A…	…
…	H…	H…	…
…	Q	Q	…



Housing without secondary valve bore, actuator port SAE – 12

Ordering code:

…	Z	Z	…
…	X	X	…



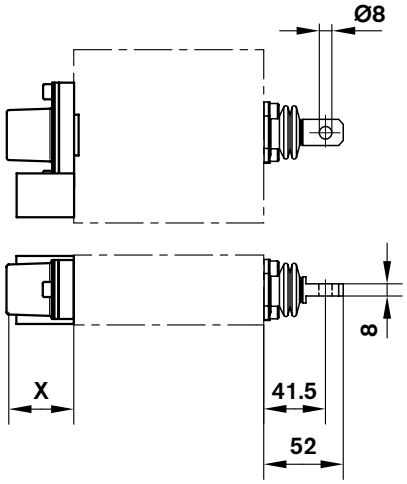
Dimensions: Operation

Purely mechanical operation with tongue

Ordering code:

…	A	Z	…

Cover A **Cover B**

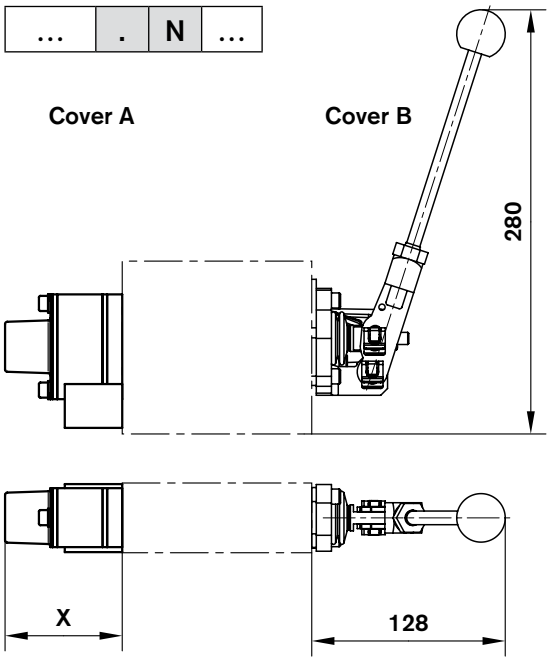


Purely mechanical operation with tongue and lever

Ordering code:

…	.	N	…

Cover A **Cover B**

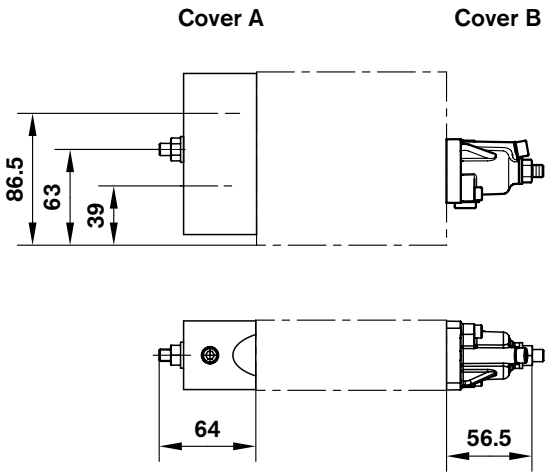


Dimensions: Operation

Mechanical / hydraulic operation with standard cover

Ordering code:

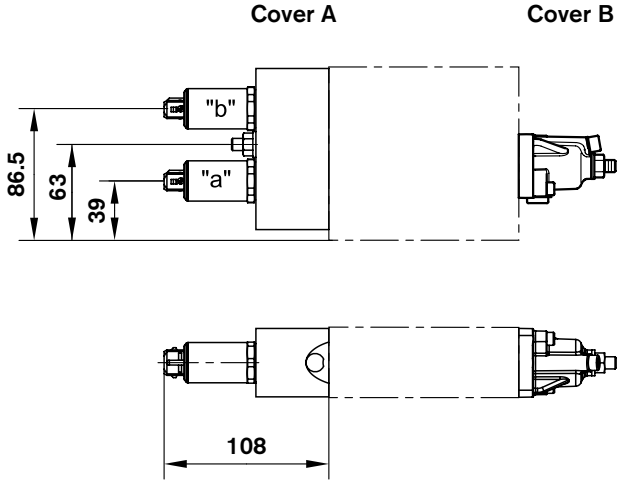
…	**M**	**–**	…
…	**H**	**–**	…



Electrohydraulic operation

Ordering code:

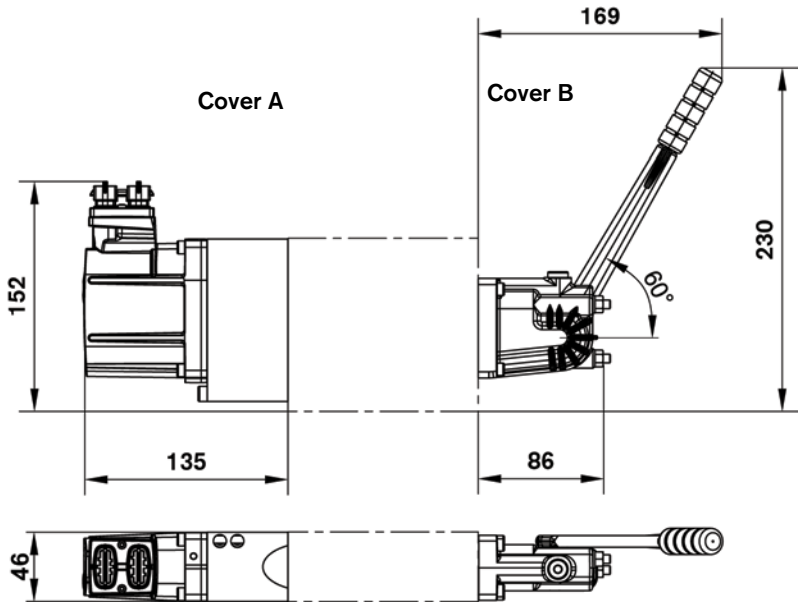
…	**W .**	…



Electronic pilot module EPM2 with handle-operated lever

Ordering code:

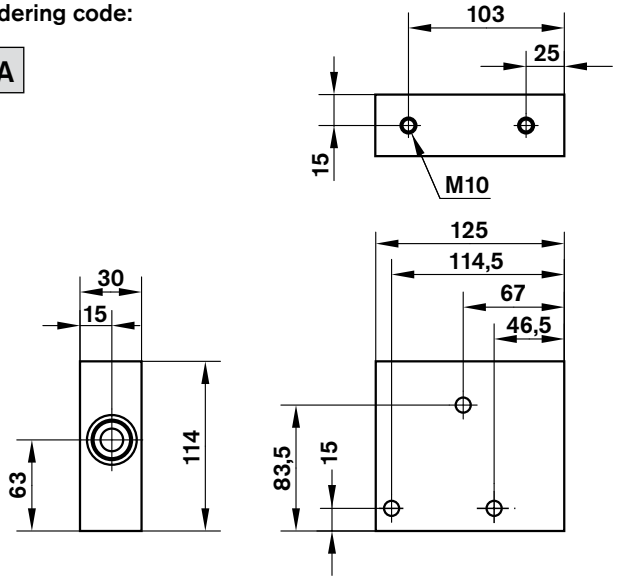
…	**C . A**	**K**	…



Dimensions: End elements

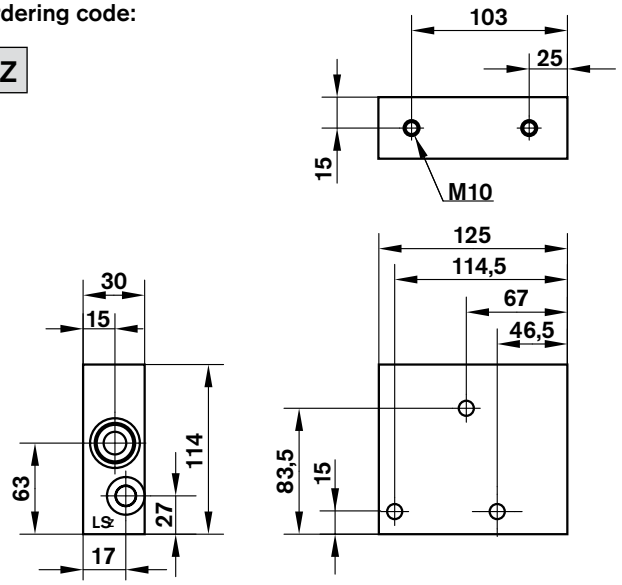
Ordering code:

LA



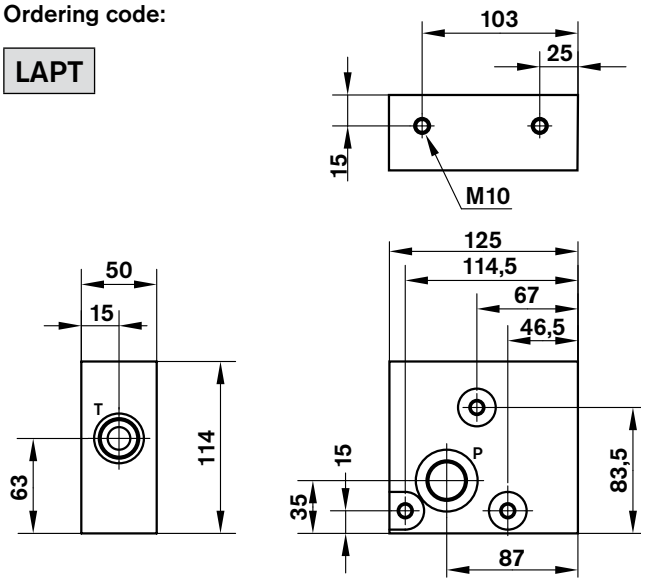
Ordering code:

LZ



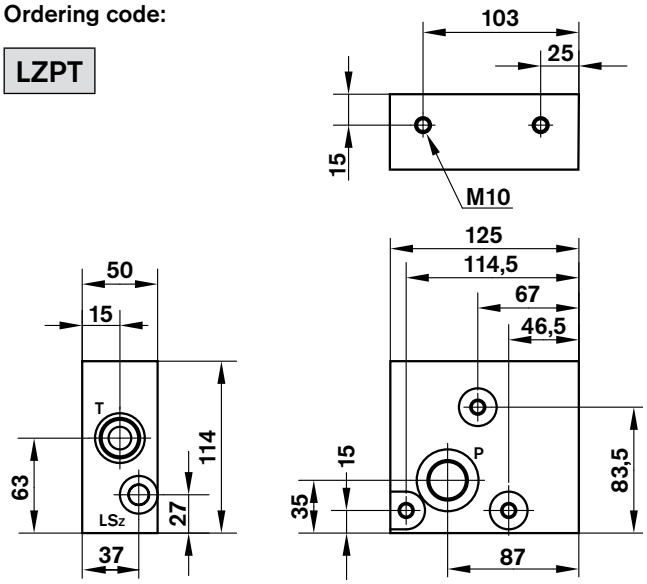
Ordering code:

LAPT



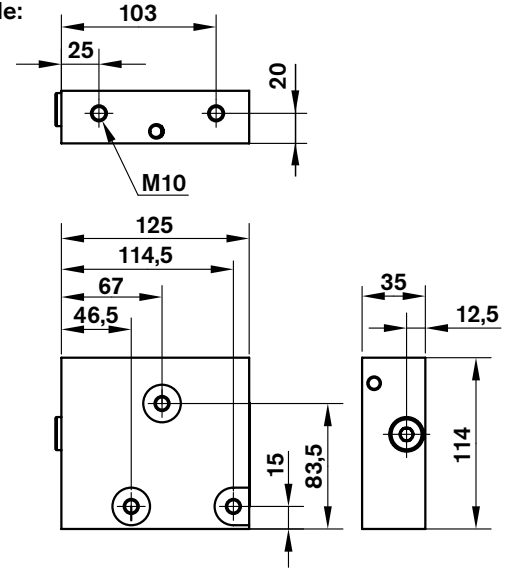
Ordering code:

LZPT



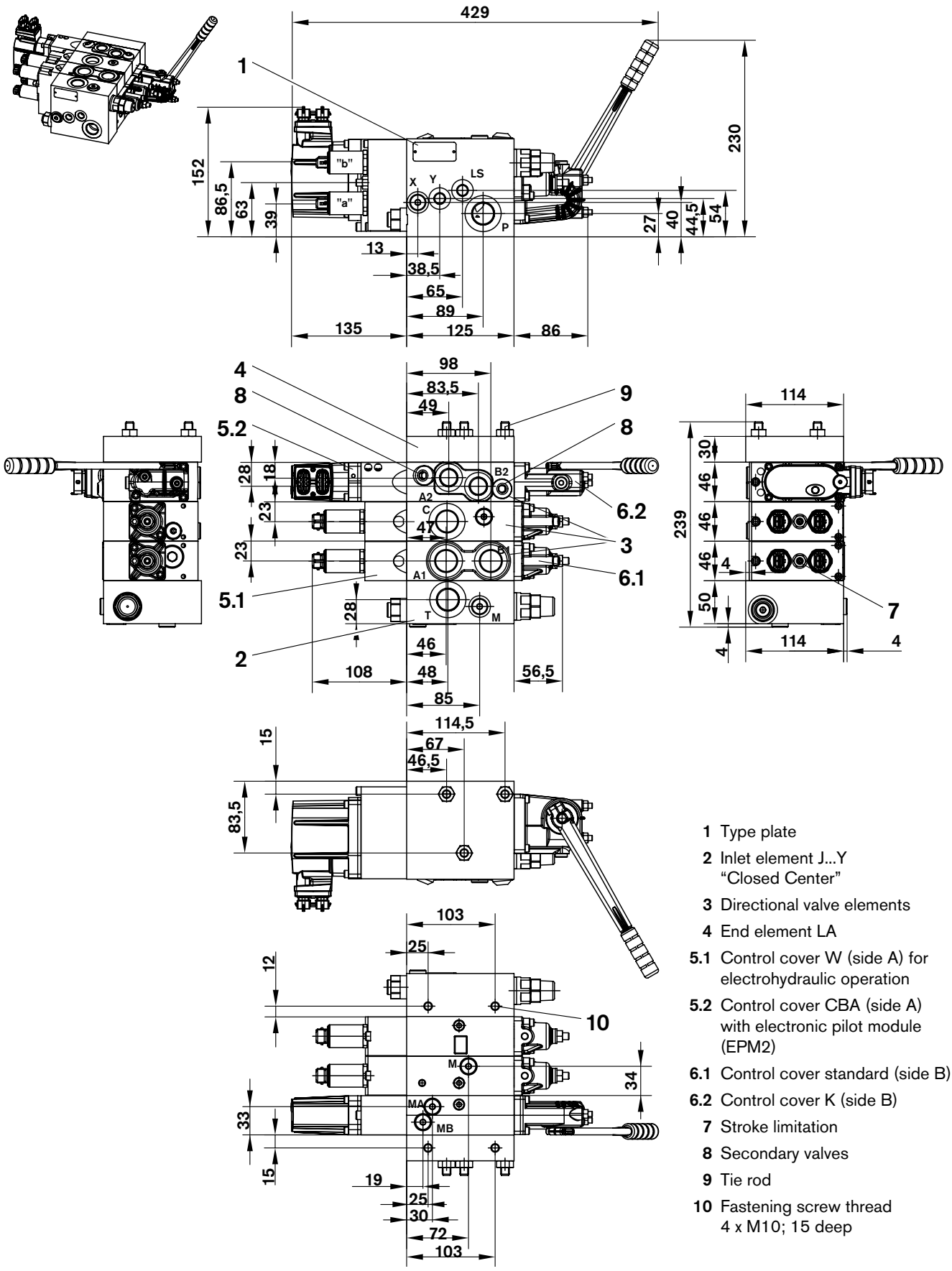
Ordering code:

LU



Dimensions: Control block Closed Center with lateral inlet element

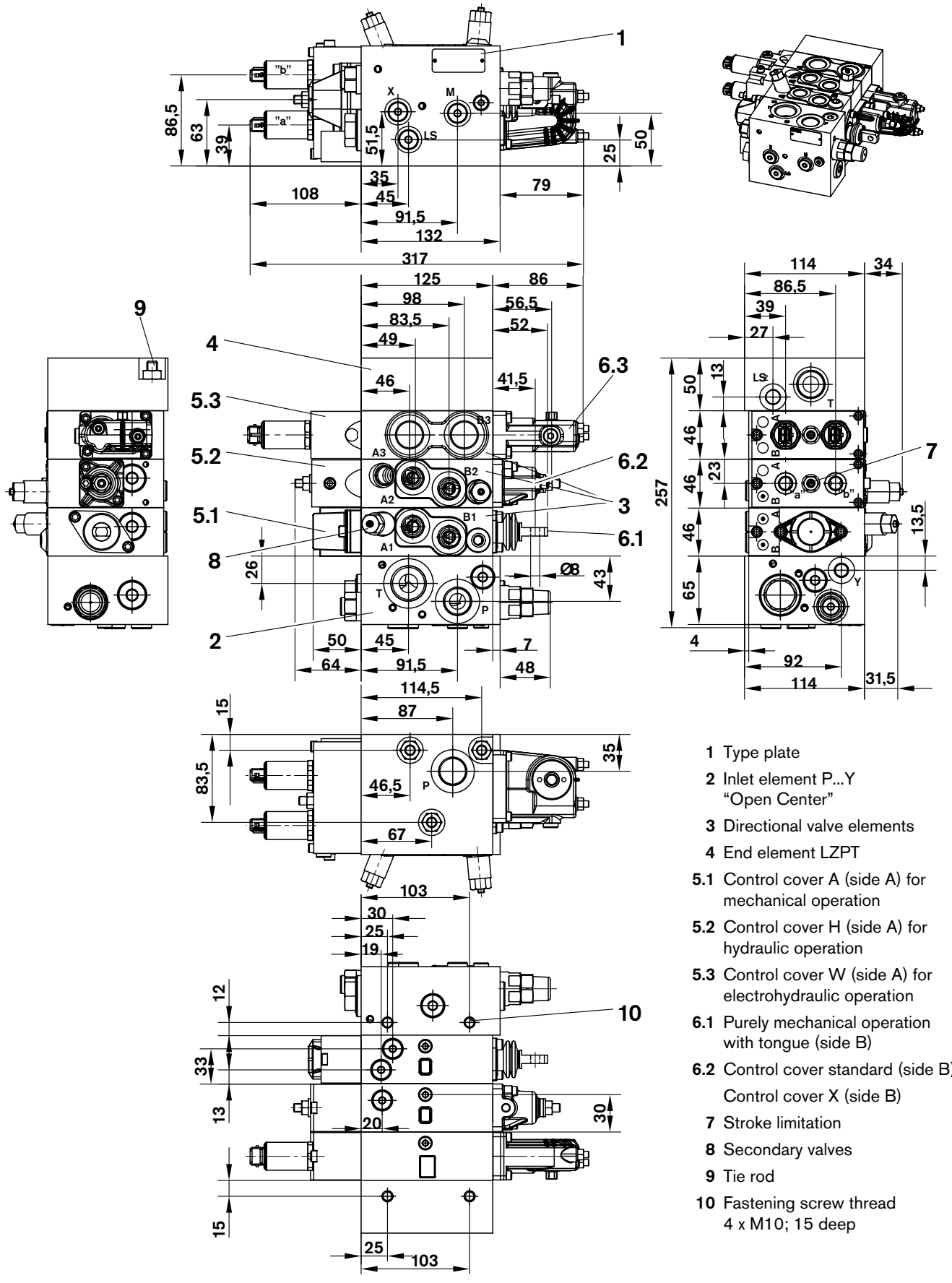
(according to the order example of page 11, dimensions in mm)



1 Type plate
2 Inlet element J...Y “Closed Center”
3 Directional valve elements
4 End element LA
5.1 Control cover W (side A) for electrohydraulic operation
5.2 Control cover CBA (side A) with electronic pilot module (EPM2)
6.1 Control cover standard (side B)
6.2 Control cover K (side B)
7 Stroke limitation
8 Secondary valves
9 Tie rod
10 Fastening screw thread 4 x M10; 15 deep

Dimensions: Control block Open Center with lateral inlet element

(according to the order example of page 12, dimensions in mm)



1 Type plate

2 Inlet element P...Y
"Open Center"

3 Directional valve elements

4 End element LZPT

5.1 Control cover A (side A) for mechanical operation

5.2 Control cover H (side A) for hydraulic operation

5.3 Control cover W (side A) for electrohydraulic operation

6.1 Purely mechanical operation with tongue (side B)

6.2 Control cover standard (side B)
Control cover X (side B)

7 Stroke limitation

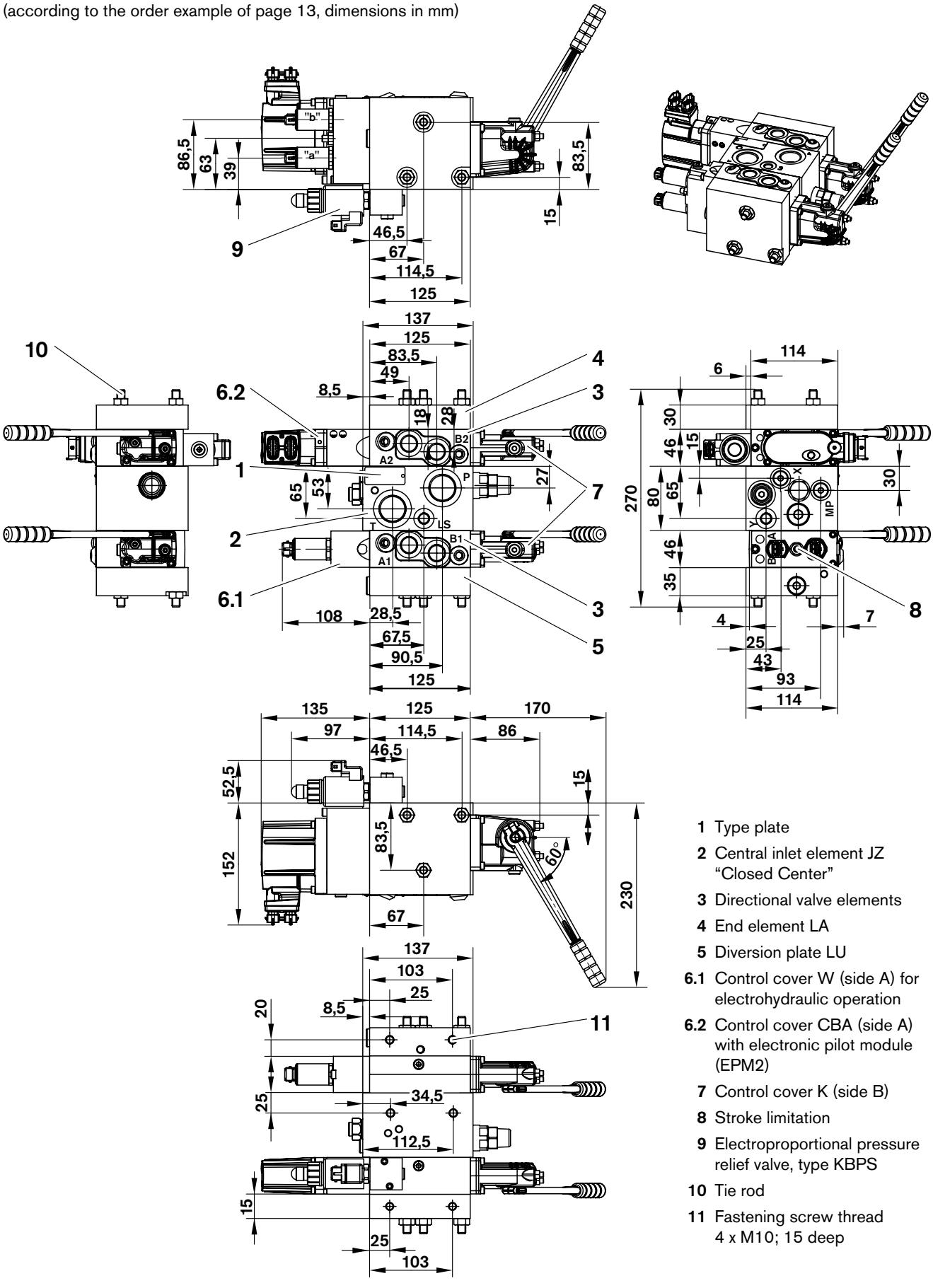
8 Secondary valves

9 Tie rod

10 Fastening screw thread
4 x M10; 15 deep

Dimensions: Control block Closed Center with central inlet element

(according to the order example of page 13, dimensions in mm)



1 Type plate

2 Central inlet element JZ "Closed Center"

3 Directional valve elements

4 End element LA

5 Diversion plate LU

6.1 Control cover W (side A) for electrohydraulic operation

6.2 Control cover CBA (side A) with electronic pilot module (EPM2)

7 Control cover K (side B)

8 Stroke limitation

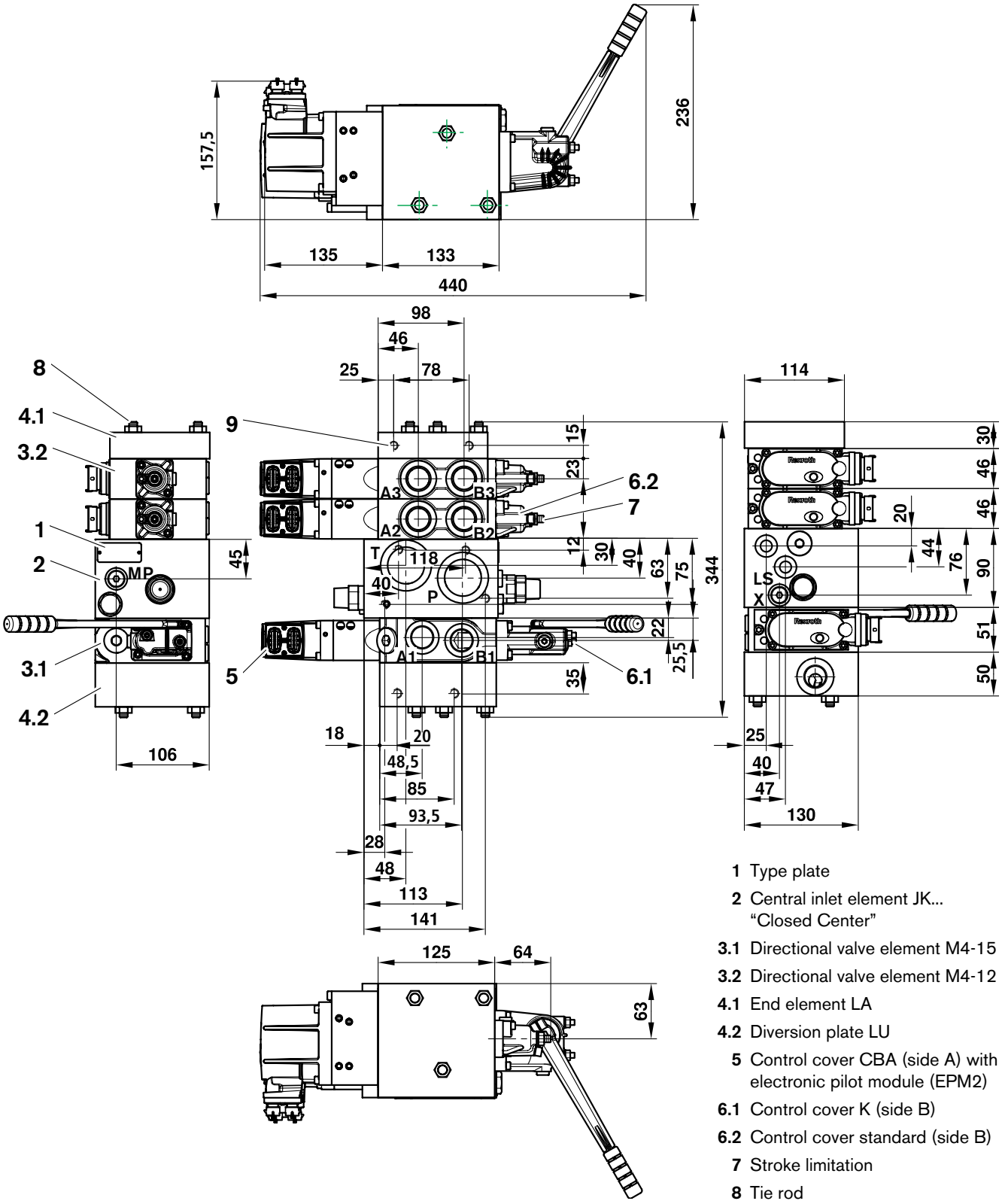
9 Electroproportional pressure relief valve, type KBPS

10 Tie rod

11 Fastening screw thread 4 x M10; 15 deep

Dimensions: Control block Closed Center with combined inlet element

(according to the order example of page 15, dimensions in mm)



1 Type plate

2 Central inlet element JK... “Closed Center”

3.1 Directional valve element M4-15

3.2 Directional valve element M4-12

4.1 End element LA

4.2 Diversion plate LU

5 Control cover CBA (side A) with electronic pilot module (EPM2)

6.1 Control cover K (side B)

6.2 Control cover standard (side B)

7 Stroke limitation

8 Tie rod

9 Fastening screw thread 4 x M10; 15 deep

On-board electronics: Electronic pilot module (EPM)

Function

The electronic pilot module controls the flow at the control block M4-12 by means of an analog or digital electrical signal.

An analog (voltage or PWM signal) or digital (CAN bus) input signal is converted by the pilot module into a pilot pressure via two electrohydraulic pressure reducing valves.

In case of an analog input signal, each pilot module is connected individually to the control electronics of the machine.

In case of CAN bus actuation, it is possible to loop the electrical connection to the next pilot module via a second plug-in connection (daisy chain cabling). The complete valve control block is then connected to the control of the machine via the 4-pin plug of the first pilot module.

The electrical connection is realized via a 4-pin plug of type Bosch Kompakt 1.

It is also possible to connect further CAN bus stations at the output to the last pilot module (see also RE 64815-B).



M4-12 with EPM2

Features

Time functions (ramp functions), the form and gradient of characteristic curves can be parameterized and changed directly during the operating cycle via the CAN bus.

Various diagnosis functions allow to monitor the fault-free operation of the pilot module.

The following elements are monitored in the basic version:

– Correct reception of a valid command value signal
– Stability of the connection with the command value encoder
– Adherence to the defined limits of supply voltage
– Function of the pilot valves (short circuit, cable break)

Malfunctions are indicated in the form of an error code (flashing code) via an LED that can be seen from the outside.

With the analog module, there is a relay output available as error indicator.

With the CAN bus variant, the error code is transferred to the control in the status telegram of the pilot module and can then be analyzed by the control.

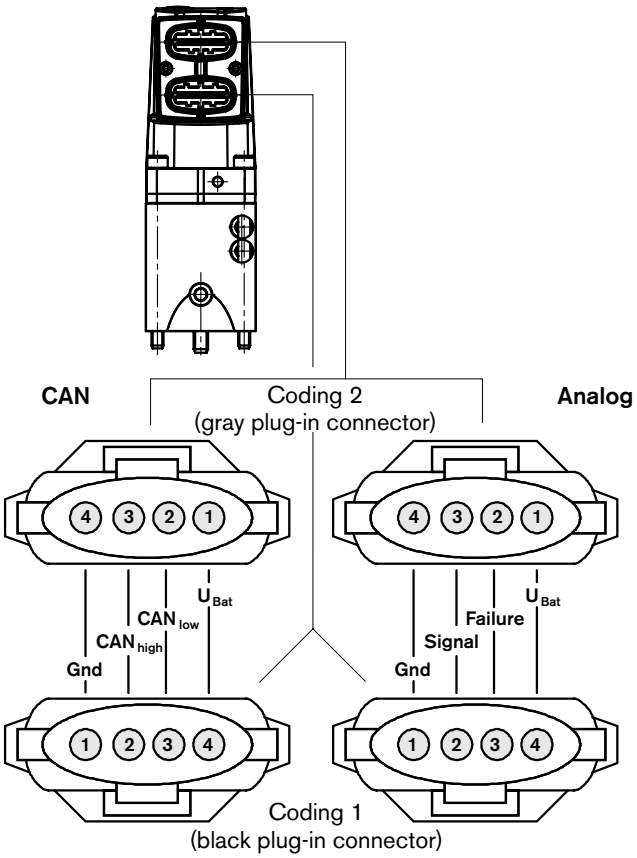
– Reduced cabling effort with CAN wiring through daisy chain
– Controlled output stages with superimposed dither
– Processor-independent watchdog
– Time ramps can be selected separately for valve outputs A and B, Open and Close (only for CAN, fixed parameter for analog module)
– Modifiable characteristic curve from linear to progressive form separately for A and B (only CAN, fixed parameter for analog module)
– Linear reduction of the curve, modifiable in operation, and therefore also linear reduction of the total flow (CAN only, fixed parameter for analog module)
– Selectable time ramps for shutdown in case of error (only for analog module)
– Selectable monitoring limits for operating voltage parameterizable via CAN bus
– Protection type according to EN 60529 IP 69K (only with connected Bosch Kompakt plug-in connectors)
– Condition monitoring
  • Internal saving of temperatures
  • Internal measurement of the operating hours
  • Internal saving of diagnostic data
– Comprehensive options for customized parameterization by Rexroth in the factory

Electronic pilot module – parameterization specifications

You can find the form for the parameterization specifications in the data sheet RE 64815-02.
Its purpose is to set the electronic pilot module according to the requirements of the client on delivery.

Electronic pilot module: Pin assignment

Pin assignment at the Bosch Kompakt plug-in connector



Pin assignment at the CAN plug-in connector

Connection via Bosch Kompakt plug coding 1.

The second Bosch Kompakt plug, coding 2, can be used in conjunction with CAN control to establish a connection to the next module or to another CAN station.

☞ **Note!**
Connecting cables and plugs are not included in the scope of supply and must be ordered separately (see also page 51).

⚠ **Attention!**
Please observe the safety notes of the operating instructions RE 64815-B at all times.

– Bosch Rexroth warrants the correct functioning of the unit as described in the operating instructions RE 64815-B. With this unit, Bosch Rexroth declines any warranty for the safe operation of the machine or plant of which this unit is a part.

Electronic pilot module: Accessories

	Material number	Type	Description	Length
Daisy chain cable				
	R917002581	Cable	For the connection of two pilot modules(standard)	190 mm
	R917002599	Cable	For the connection of two pilot modules	240 mm
	R917002628	Cable	For the connection of two pilot modules via central inlet	370 mm
Special cable				
	R9017005332	Cable	with two plug-in connectors, coding 1 (black) 90°	
	R917005333	Cable	with two plug-in connectors, coding 2 (gray) 90°	
Connecting cable				
	R917002724	Cable	with one plug-in connector, coding 1 (black)	4,000 mm
	R917004484	Cable	with one plug-in connector, coding 2 (gray)	4,000 mm
Plug-in connectors and plug-in connector kits				
	R917005459	Plug-in connector	Coding 1 (black), dummy plug	
	R917002627	Plug-in connector	Coding 2 (gray), dummy plug	
	R917005458	Plug-in connector	Coding 1 (black), dummy plug with integrated final resistance	
	R917004605	Plug-in connector	Coding 2 (gray), dummy plug with integrated final resistance	
	R900785606	Plug-in connector kit	Bosch Kompakt coding 1 (black)	
	R900785607	Plug-in connector kit	Bosch Kompakt coding 2 (gray)	

Notes

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