RE 64276/2019-08-27
Replaces: 02.2019

rexroth
A Bosch Company

Load-sensing control block in mono block/sandwich plate design M4-12

- Size 12, series 2X
- Nominal pressure
  - on the pump side 400 bar
  - on the consumer side 420 bar
- Maximum flow
  - on the pump side 300 l/min
  - on the consumer side
    130 l/min with pressure compensator type **S**, **F**
    140 l/min with pressure compensator type **C**, **Q**
    150 l/min with pressure compensator type **T**

Features

- Flow control independent on load pressure
  - Open center for fixed pump
  - Closed center for variable pump
- Sandwich plate design with up to 20 directional valve sections
- Mono block (inlet and directional valve function), expandable by up to 9 directional valve sections
- Type of actuation: mechanical, hydraulic, electrohydraulic (switching, proportional or with on-board electronics)
- Pressure limitation
  - Inlet plate: pilot operated pressure valves with large nominal width
  - Directional valve/consumer ports: compact shock valves with feed function
- LS pressure relief
  - Adjustable per consumer port
  - External pressure setting per consumer port possible
  - Electro-proportional per section

Fields of application

- Truck applications
- Drilling equipment
- Forestry machinery
- High-capacity forklifts and teleforklifts
- Municipal vehicles
- Cranes
- Construction machinery
- Aerial work platforms
- Heavy duty vehicles
- Marine engineering
- Mining applications
- Stationary applications

Contents

Functional description

Control block M4-12

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

Consumer control

The control spool (**2**) is used to determine the flow direction and the flow level that reaches the consumer ports (**A** or **B**).
Pressure reducing valves (**10**) control the position of the control spool (**2**). The size of the electric current on the pressure reducing valve determines the level of the pilot pressure in the spring chambers (**9**) and thereby the stroke of the control spool (**P** → **A**; **P** → **B**).
Position-controlled stroke of the control spool is available with CPM actuation (see page 51).
The pressure compensator (**3**) keeps the pressure differential on the control spool (**2**) and thereby the flow to the consumers constant.

Load pressure compensation

The pressure compensator (**3**) regulates pressure changes on the consumers or on the pump. The flow to the consumers remains constant, including with varying loads.

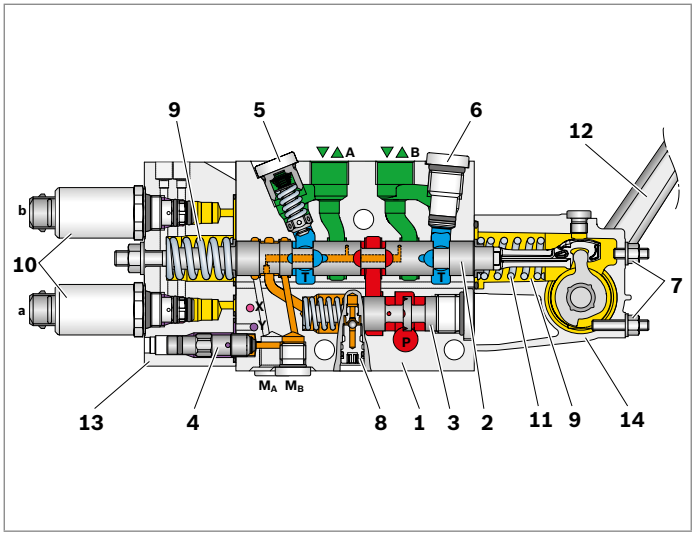
Flow limitation

The maximum flow can be individually set mechanically at the factory according to the ordering code using the stroke limitations (**7**).

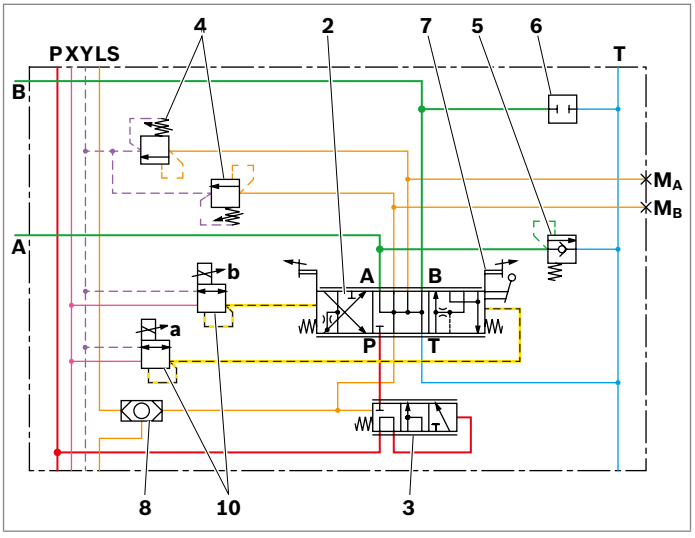
Pressure limitation

The LS pressure for each consumer port can optionally be overridden internally via the LS pressure relief valves (**4**), electro-proportionally for each section or externally via the LS ports $\mathbf{M_A}$, $\mathbf{M_B}$.
Shock valves with large nominal widths with combined feed function (**5**) protect consumer ports **A** and **B** against pressure peaks.
The highest load pressure on the pump is reported via the LS line and the integrated shuttle valve (**8**).

▼ **Sectional view M4-12**



▼ **Symbol M4-12**



1 Housing
2 Control spool
3 Pressure compensator
4 LS pressure relief valve
5 Shock valve with feed function
6 Threaded plug
7 Stroke limiter
8 LS shuttle valve
9 Spring chamber
10 Pressure reducing valve
11 Compression spring
12 Hand lever
13 Cover A side
14 Cover B side

Technical data

General										
Weight	Inlet plate			**P**	**SP**	**J**	**SJ**	**JZ**	**JK**
			kg	6	11.4	4.3	11	8.4	11
	Mono block			**PM**	**JM**				
			kg	5.6	3.8				
	Directional valve section			**M**	**H**	**W**	**CPS**		
			kg	4.9	4.2	4.5	4.6		
	Hand lever surplus weight		kg	0.6					
	End plate			**LA**	**LAPT**	**LA...**	**LA... ...**	**LZ**	**LZPT**
			kg	3	4.3	3.8	3.8	2.8	4.4
				LU	**LU...**	**L8**	**TI**		
			kg	3.5	4	4.5	6.3		
Installation position				Ideally horizontal to the spool axis. For versions with spool position sensor, horizontal to the spool axis or vertical, with the sensor cable on the bottom.					
Consumer line connections				Pipe thread according to ISO 228/1 (inches), ISO 11926-1 (UNF) or JIS B 2351-1 (on request)					
Ambient temperature range		ϑ	°C	–20 to +80 (–40 to +100 °C on request)					
Priming (standard)				One-coat paint RAL 5010 (more on request)					
Surface protection according to DIN EN 60068-2-11	Standard priming		h	96					
	Special painting		h	480					
	Painting for **SO-038**		h	1000					

Mechanical			
Actuating force on the hand lever (encapsulated)	Mechanically operated	N	< 20
	Mechanical override (with parallel hydraulic actuation)	N	< 70
	Mechanical override (with parallel electrohydraulic actuation)	N	< 50
Actuating force for control spool (not encapsulated)	Tongue	N	< 250
	Detent with tongue	N	< 350

Hydraulic				
Maximum working pressure at port	**P**	p_{max}	bar	400 (420 on request)
	A, B	p_{max}	bar	420
	LS	p_{max}	bar	385
	T	p_{max}	bar	30 (20 with mechanical actuation only)
	Y	p_{max}	bar	Must be routed to reservoir without pressure
Maximum pilot pressure at port	**a, b**	p_{St}	bar	35
	X	p_{St}	bar	35
Pilot pressure range	hydraulic	p_{St}	bar	8.5 to 22.5
	electrohydraulic	p_{St}	bar	6.5 to 17.2
Required differential pressure control Δp on the control block	Version **S**, **C**, **F**, **D**	p	bar	18
	Version **T**	p	bar	25
Recommended hydraulic pilot control devices				TH6 control curve 97, see data sheet 64552 or 64555

Hydraulic									
Required pump controller				Controller without LS connection to reservoir, e.g. DFR1, DRS					
Maximum primary pressure relief		p	bar	370 (set at the factory according to ordering code), min. 20 bar above the pressure cut-off value of the pump					
LS pressure relief		p	bar	50 to 385 (set at the factory according to ordering code) The highest reduce response pressure of the valve block LS pressure relief valves set at the factory must be at least 20 bar lower than the pressure cut-off value of the pump.					
Maximum flow	Inlet plate			**P**	**P ... P100**	**SP**	**J**	**SJ**	
	Port **P**	q_{Vmax}	l/min	150	100	120	150	150	
				JZ	**JK**	**PM**	**JM**	**VZ**	
		q_{Vmax}	l/min	200	300	130	150	200	
	Directional valve section Port **A**, **B**	q_{Vmax}	l/min	130 with pressure compensator type **S**, **F** 140 with pressure compensator type **C**, **Q** 150 with pressure compensator type **T**					
	End plate			**LAPT**	**LZPT**				
	Port **P**	q_{Vmax}	l/min	100	100				
Hydraulic fluid				Mineral oil (HL, HLP) according to DIN 51524, HEES (synthetic ester) according to ISO 15380 and other hydraulic fluids on request					
Hydraulic fluid temperature range		ϑ	°C	–20 to +80 –40 to +100 on request					
Viscosity range		ν	mm²/s	10 to 380					
Maximum admissible degree of contamination of hydraulic fluid Cleanliness level per ISO 4406 (c)				Class 20/18/15, we recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$					

Electric		
Electrical pilot control valves		FTWE2K..., see data sheet 58007[1)] FTDRE2K..., see data sheet 58032[1)]
Recommended amplifier (other actuating options on request)		RA 1-0/10 (1 section), see data sheet 95230 RA 2-1/10, (4 to 6 sections), see data sheet 95230 BODAS controllers
Connector version	**1** and **3**	Junior timer, 2-pin (AMP)
	8 and **9**	DT04-2P (DEUTSCH)
Type of protection according to ISO 20653	Connector version **1** and **3**	IP6K5[1)]
		IP6K7 and IP6K9K [1)] (only with Rexroth type R901022127 and R900313533)
	Connector version **8** and **9**	IP6K5, IP6K7 and IP6K9K [1)]
On-board electronics (CPM)		Data from page 51; see also instruction manual 64819-B or 64820-B
Spool position sensor		PSM, see data sheet 95190

Notice

- For applications outside these values, please consult us!
- The technical data were determined at a viscosity of ν = 32 mm²/s (HLP46: 50 °C).

1) With installed and locked plug-in connector. Plug-in connectors are not included in the scope of delivery and must be ordered separately, see page 54.

Modular system

Control blocks in the M4-12 series have a modular structure. They can be combined to provide the perfect solution for the application at hand.

Control block with lateral inlet plate

1. Inlet plate
- A: Closed center with spool position sensor **SJ**
- B: Mono block **JM** (Inlet and direction valve function)
- C: Open center **P**
- D: Closed center **J**

2. Directional valve sections

2.1 LS pressure relief

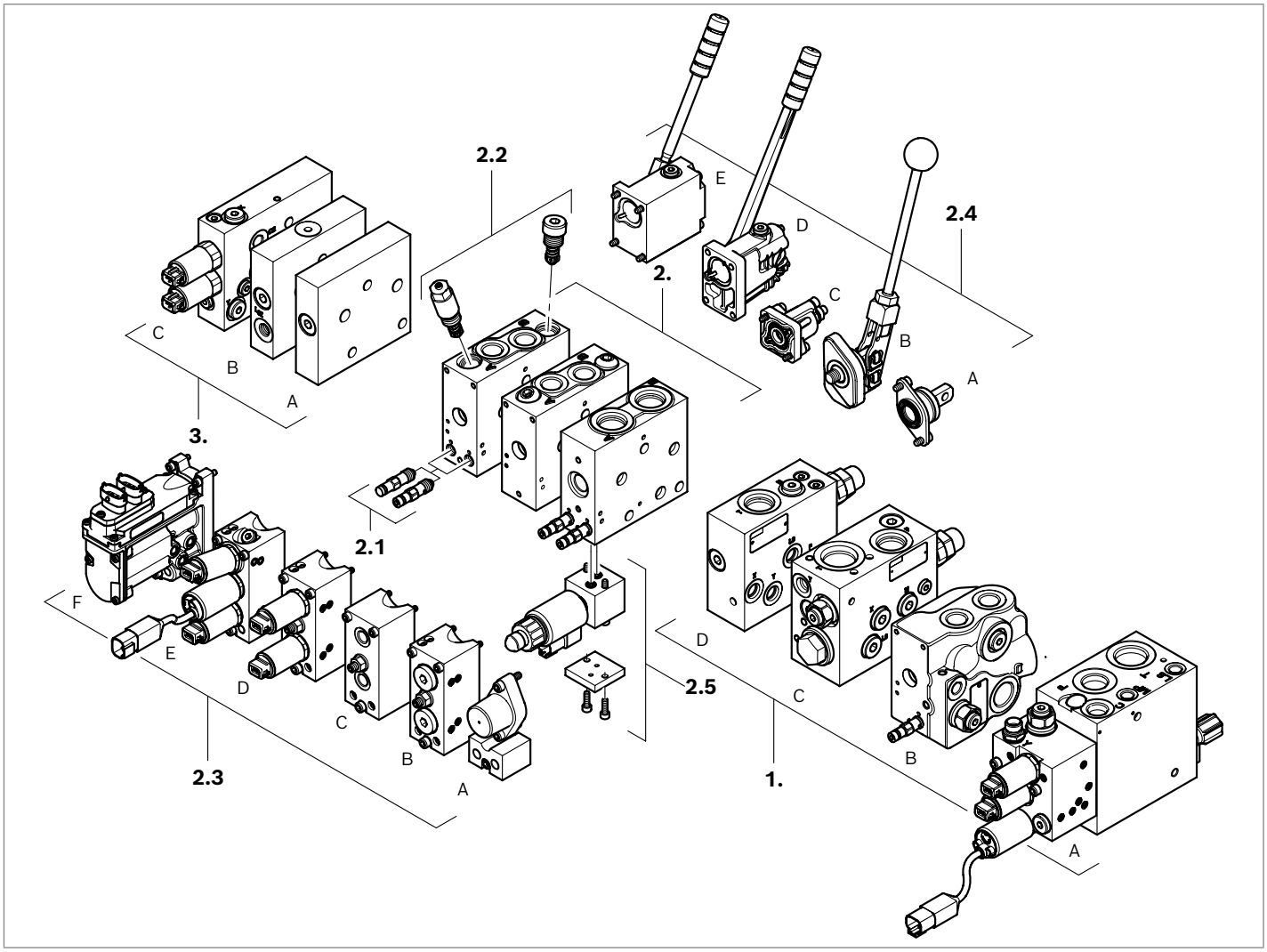
2.2 Secondary pressure relief

2.3 Actuation A side
- A: Mechanical actuation **A**
- B: Mechanical actuation **M**
- C: Hydraulic actuation **H**
- D: Electrohydraulic actuation **W**
- E: Electrohydraulic actuation **W** with spool position sensor
- F: Electrohydraulic actuation with on-board electronics CPM **CPS**

2.4 Actuation B side
- A: Mechanical actuation **Z** with tongue
- B: Mechanical actuation **N** with hand lever
- C: Standard cover **–**
- D: Mechanical actuation **K** with hand lever
- E: Mechanical actuation **B2** with clamping piece and hand lever (aluminum-free)

2.5 Electro-proportional LS pressure relief

3. End plate
- A: With LS relief **LA**
- B: With LS port **LZ**
- C: With two installation bores **LAW...W...**



Control block with central inlet plate

1. Central inlet plate JZ

2. Directional valve sections

2.1 LS pressure relief

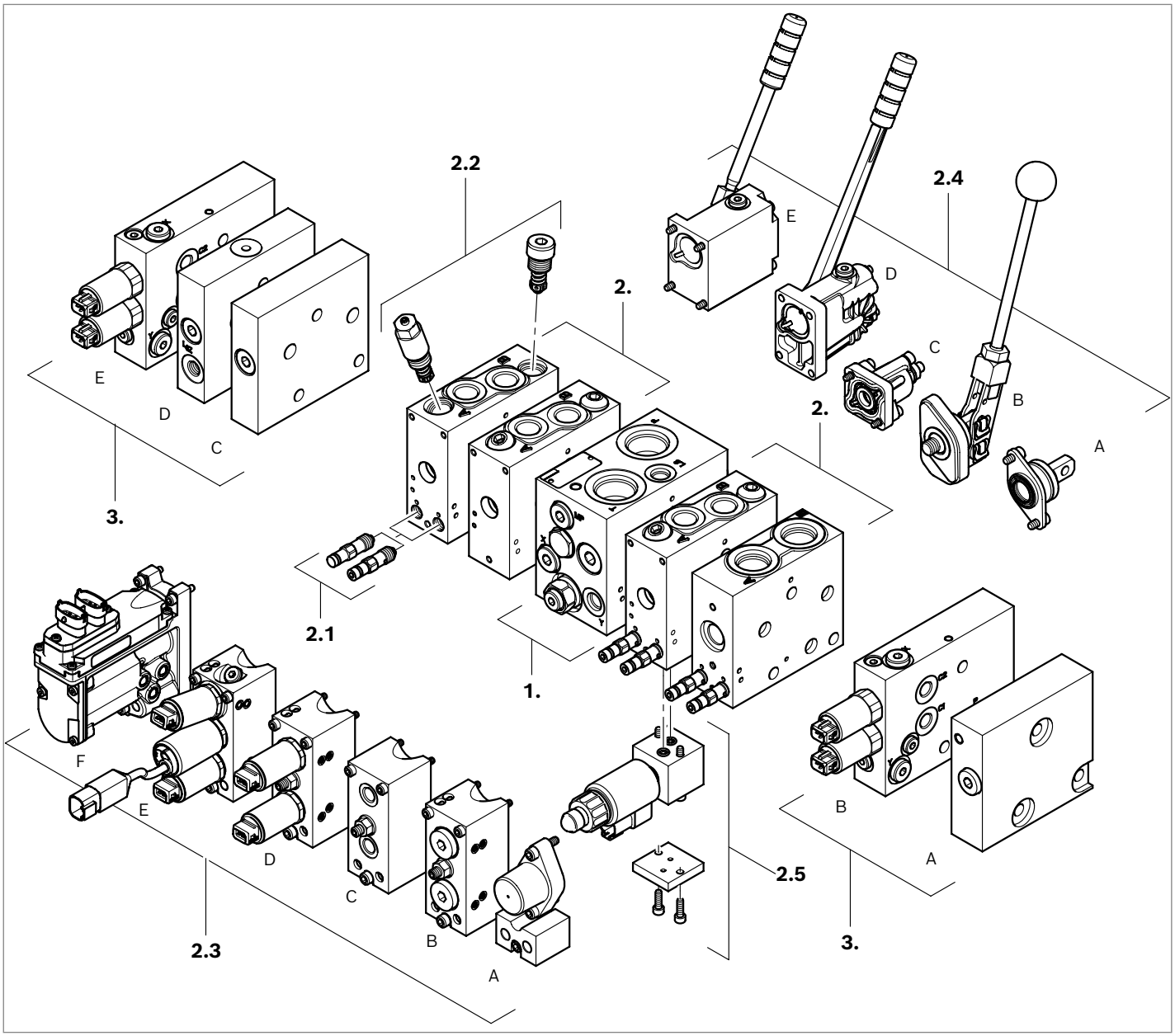
2.2 Secondary pressure relief

2.3 Actuation A side
- A: Mechanical actuation **A**
- B: Mechanical actuation **M**
- C: Hydraulic actuation **H**
- D: Electrohydraulic actuation **W**
- E: Electrohydraulic actuation **W** with spool position sensor
- F: Electrohydraulic actuation with on-board electronics CPM **CPS**

2.4 Actuation B side
- A: Mechanical actuation **Z** with tongue
- B: Mechanical actuation **N** with hand lever
- C: Standard cover **–**
- D: Mechanical actuation **K** with hand lever
- E: Mechanical actuation **B2** with clamping piece and hand lever (aluminum-free)

2.5 Electro-proportional LS pressure relief

3. End plate
- A: Diversion plate **LU**
- B: With two installation bores **LUW...W...**
- C: With LS relief **LA**
- D: With LS port **LZ**
- E: With two installation bores **LAW...W...**



Mono block

1. Mono block PM, JM

(Inlet and direction valve function and end plate)

1.1 LS pressure relief

1.2 Secondary pressure relief

1.3 Primary pressure relief

1.4 Electro-proportional LS pressure relief

1.5 LS switch-off

1.6 Actuation A side

A: Mechanical actuation **A**

B: Mechanical actuation **M**

C: Hydraulic actuation **H**

D: Electrohydraulic actuation **W**

E: Electrohydraulic actuation **W** with spool position sensor

F: Electrohydraulic actuation with on-board electronics CPM **CPS**

1.7 Actuation B side

A: Mechanical actuation **Z** with tongue

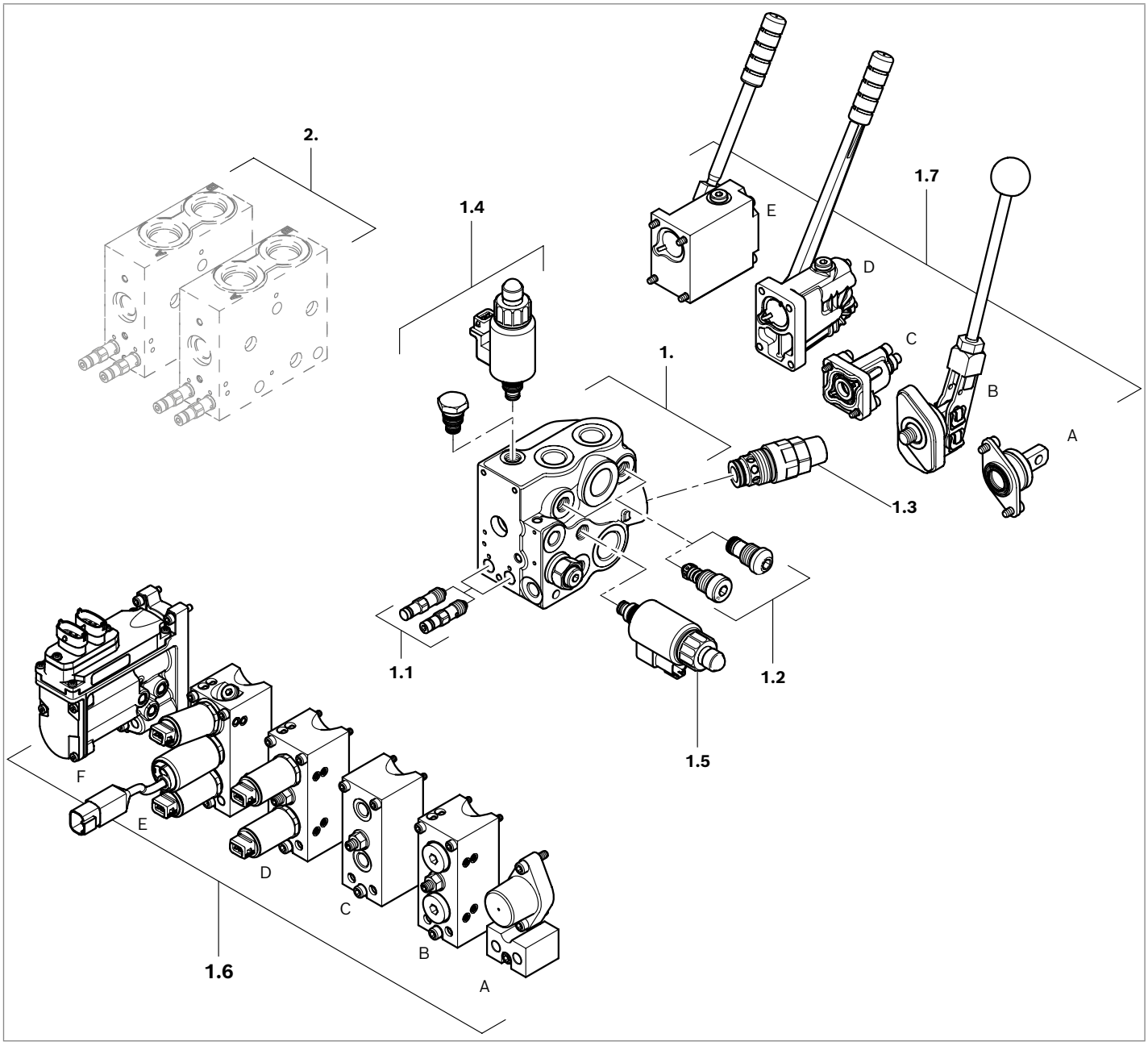
B: Mechanical actuation **N** with hand lever

C: Standard cover **–**

D: Mechanical actuation **K** with hand lever

E: Mechanical actuation **B2** with clamping piece and hand lever (aluminum-free)

2. Flange-mountable directional valve sections



Ordering code

Specifications on the name plate

The ordering code is used to record the technical features and requirements.
The Rexroth sales organization uses the ordering code to derive a short type and a material number.

The complete control block is defined as per the type code according to DCCS 46001-10.
For recording the ordering code, the M4 configurator is alternatively available at: www.boschrexroth.com/m4

Example: M4-12 control block with three directional valve sections

01		02		03	04		05	06	07	08	09	10	11	12
M4	**–**	**G12345**	**–**	**2**	**0**	**/**	**3**	**M4-12**	**J**	**W21**	**–**	**V**	**01**	**–450**

01	Series: Load-sensing control block M4
02	6-digit control block number
03	Series 2X (unchanged installation and connection dimensions)
04	Series amendment status
05	Total number of directional valve sections (1 to 20)[1)]
06	Directional valve size
07	Inlet plate
08	A side actuation (primarily)
09	B side actuation (primarily)
10	Sealing material
11	Line connections
12	Optional: Special designation

1) Each side can support up to 10 directional valve sections. Always indicate "9" for 10 or more directional valves.

Inlet plate

	01	02	03	04	05
M4-12-2X /					

Design, system

01	Open center	Lateral inlet plate	**P**
	Closed center	Lateral inlet plate	**J**
		Lateral inlet plate with integrated change-over axis	**SJ**
		Central inlet plate	**JZ**
		Central inlet plate for combination M4-12/M4-15	**JK**
		Central inlet plate with priority valve	**VZ**
	Mono block	Open center (installation of further directional valves is not possible)	**PM**
		Closed center (installation of further directional valves is possible; available only in variants **...M...**)	**JM**

Primary pressure limitation

02	Without primary pressure relief valve (cannot be retrofitted, only for inlet **JZ** and **PM**)	**Z**
	Without primary pressure relief valve (can be retrofitted, not possible with open center inlet **P**)	**Q**
	With primary pressure relief valve (specified pressure in bar, 3-digit, not possible with open center mono block **PM**)	**...**

Pilot oil supply

03	With internal pilot oil supply	**Y**
	For external pilot oil supply	**X**

Options for inlet P

04	With LS switch off			**A**
	With LS damping nozzle Nozzle diameter parameter in mm	LS to pressure compensator	Pressure compensator to LS	
		Ø0.6	Ø0.6	**S0.6–0.6**
		Ø0.6	Ø1.2	**S0.6–1.2**
		Ø0.4	Ø1.2	**S0.4–1.2**
	Without LS damping nozzle (retrofittable)			**N**
05	With unloading function, max. flow on the pump side 100 l/min			**P100**

Options for inlet J

04	With LS switch off	**A**

Options for inlet SJ

04	Spool position sensor	With	**E**
		Without	**B**
05	External flow at port **C**	8 l/min	**Q008**
		26 l/min	**Q026**
		40 l/min	**Q040**
		90 l/min	**Q090**
		150 l/min	**Q150**

Options for inlet VZ

04	Priority valve	Static	**A**
		Dynamic	**B**
05	LS pressure relief Priority valve	Specified pressure in bar, 3-digit	**...**

= preferred program

Directional valve section

	01	02	03	04	05	06	07	08	09	10	11	12	13
M4-12-2X /													*

1st directional valve section

													*

2nd directional valve section

													*

3rd directional valve section, etc.

Pressure compensator

01	With pressure compensator, with load holding function	**S**
	Without pressure compensator, with load holding function (not in conjunction with **PM**)	**C**
	Without pressure compensator, without load holding function	**Q**
	With sensitive pressure compensator, with load holding function	**F**
	With pressure compensator, without load holding function	**T**
	With 3-way pressure compensator (in conjunction with **PM** only)	**D**
	Without pressure compensator bore for change-over axis	**Z**

LS pressure relief and housing variant[1)]

		02	03	04
02 04	Without LS pressure relief valve (LS-PRV cannot be retrofitted; only **Z** or **U** are possible)	**Z**		**Z**
	With threaded plug (**Z** not possible)	**Q**		**Q**
	With LS pressure relief valve (specified pressure in bar, 3-digit; **Z** not possible)	**...**		**...**
	With **1** LS pressure relief valve for same pressure setting in **A** and **B** (specified pressure in bar, 3-digit)	**=**		**...**
	LS relief plug	**B**		**B**
03	Housing with measuring ports		**M**	
	Housing without measuring ports		**Z**	
	Housing for change-over axis (only combination **ZUZ** possible)[2)]		**U**	
	Housing for electro-proportional LS pressure relief or switchable directional valves[3)]		**K**	
	– 210 bar, decreasing characteristic curve[3)]		**L**	
	– 210 bar, increasing characteristic curve[3)]		**J**	
	– 350 bar, decreasing characteristic curve[3)]		**R**	
	– 350 bar, increasing characteristic curve[3)]		**N**	
	Housing for hydraulic pressure control, with LS and PST outlet[3)]		**C**	

Spool type[4)]

05	Control spool **E**	**E**
	Control spool **J**	**J**
	Control spool **Q**	**Q**
	Control spool with regeneration function	**R**
	Plunger cylinder as a consumer[2)]	**P**
	Floating position spool[2)]	**W**
	Floating position spool[2)]	**Y**

Flow

06	Flow in consumer port **A** and **B** (parameter in l/min, 3-digit)	**...–...**
	Control spool with pressure function **T** (only in conjunction with **E**, **J** or **Q**)[2)]	**...T...**
	Control spool with pressure function **T** (only in conjunction with **E**)[2)]	**...M...**

1) For possible housing/secondary valve combinations, see page 33
2) Please consult our technical sales department
3) Exact specifications in plain text, see information from page 28
4) For symbols, see "Control spool" on page 21

= preferred program

Actuation A side

07	Mechanical only	Spring-centered	**A**
		With detent in 1	**B1**
		With detent in 2	**B2**
		With detent in 1, 2	**B4**
	Mechanical[5]	Encapsulated, spring-centered	**M**
	Hydraulic[6]		**H**
	Electrohydraulically proportional	Standard	**W2**
		With measuring ports, on both sides	**W8**
		With damping nozzle and check valve for hydraulic superposition	**G2**
	Electrohydraulically switchable	Standard	**W4**
		With damping nozzles, on both sides	**W5**
		With measuring ports, on both sides	**W6**
		With damping nozzle, with measuring ports, on both sides	**W7**
		With damping nozzle and check valve for hydraulic superposition	**G4**
	Electrohydraulic with digital On-board electronics (CPM)	CANopen control (Flange-mountable wiring variant in the plain text)	**CPS**

Supply voltage and connector version[7]

		24 V	12 V
08	Junior timer, 2-pin (AMP)	**1**	**3**
	DT04-2P (DEUTSCH)	**8**	**9**

Actuation B side

09	Mechanical only, spool end with tongue		**Z**
	Mechanical only, spool end with tongue and hand lever[2]		**N**
	Standard cover		**–**
	Cover with hand lever[8]	revolving	non-revolving
	Without hand lever	**R**	**X**
	Hand lever position 60°	**K**	**N**
	Hand lever position 0°	**L**	**O**
	Hand lever position –60°	**M**	**P**

Secondary valves for consumer ports A and B[1]

10 11	Without[9]	Consumer port G 3/4	**Z**
		Consumer port G 1/2	**X**
		With threaded plug (secondary valves can be retrofitted)	**Q**
	With	Shock/feed valve, adjustable	**A...**
		Shock/feed valve, non-adjustable	**H...**

Optional special designation

12	One-sided actuation, two switching positions	**–011**
	With spool position sensor	**–100**

13	Further details in plain text	*

5) Always in conjunction with revolving hand lever
6) For combination with mechanically superposed actuation (B side), Bosch Rexroth recommends a non-revolving hand lever
7) Parameter only required with electrohydraulic proportional/ switching actuation and with electro-proportional LS pressure relief
8) For more details and versions, see "Variant overview" on page 25
9) Secondary valves must be present in the hydraulic circuit

= preferred program

End plate, additional information

	01	02	03	04	05	06
M4-12-2X /						*

End plate

01	With LS relief	**LA**						
	With additional **P** and **T** port	**LAPT**						
	With two installation bores	**LA**						
	Threaded plug		**Q**	**Q**				
	Electrohydraulically proportional		**W2**	**W2**				
	Electrohydraulically switchable		**W4**	**W4**				
	With three installation bores	**LA**						
	Threaded plug		**Q**	**Q**	**Q**	**Q**	**Q**	**Q**
	Pressure reducing valve (specified pressure in bar, 3-digit)		**...**		**...**		**...**	
	4/2-way spool valve according to data sheet 18136-05 (specifications in plain text)			**KKDER...**		**KKDER...**		**KKDER...**
	Without LS relief	**LZ**						
	With additional **P** and **T** port	**LZPT**						
	Mono block, no end plate	**LM**						
	Intermediate plate for SP-08 directional valves + inlet pressure relief (specified pressure in bar, 3-digit)	**L8**						
	Intermediate plate for ED1 and ED2 valves[1]	**TI**						
	Diversion plate for use with central inlet plate	**LU**						
	With two installation bores	**LU**						
	Threaded plug		**Q**	**Q**				
	Electrohydraulically proportional		**W2**	**W2**				
	Electrohydraulically switchable		**W4**	**W4**				

Sealing material

02	FKM (fluoroelastomer)	**V**
	NBR (nitrile rubber), FKM (fluoroelastomer)	**MV**
	NBR/FKM (nitrile rubber and fluoroelastomer) for low temperature range down to −40 °C (on request)	**MT**

Pipe thread line connections

03	Inches according to ISO 228/1[2]	**01**
	UNF according to ISO 11926/-1[3]	**19**
	JIS B 2351-1 (on request)	**64**

Supply voltage and connector version[4]		24 V	12 V
04	Junior timer, 2-pin (AMP)	**1**	**3**
	DT04-2P (DEUTSCH)	**8**	**9**

Optional special designation

05	Increased corrosion protection (seawater-resistant)[1]	**–038**
	Aluminum-free	**–450**
	For safety-related applications	**–S**

06	Further details in plain text	*

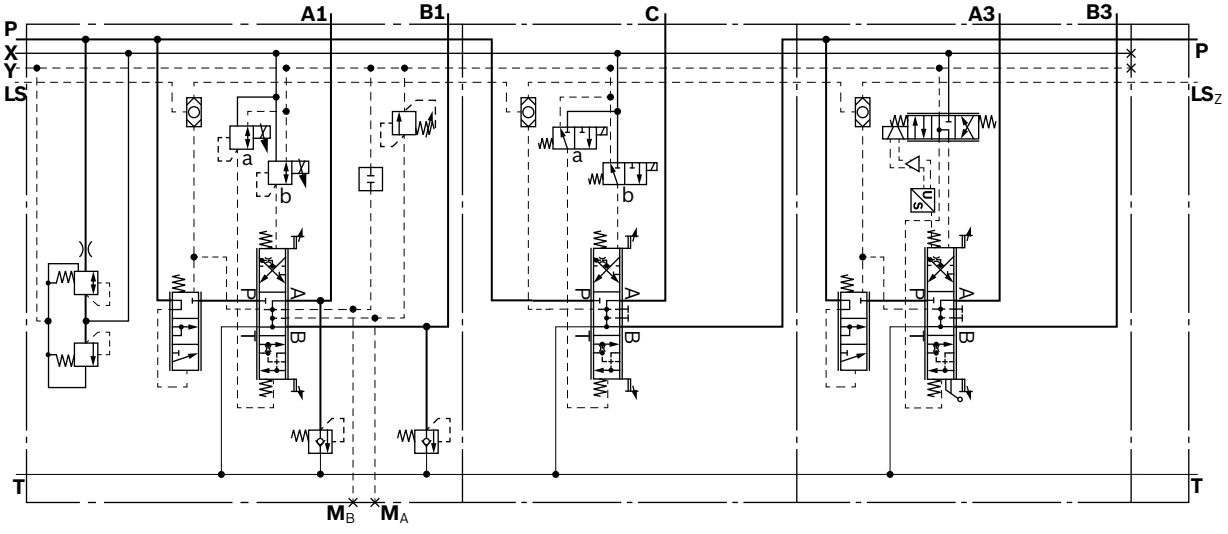
1) Please consult our technical sales department
2) See "Line connections" on page 36.
3) For UNF thread, see data sheet RA 64276.
4) Parameter only required with electrohydraulic actuation and with electro-proportional LS pressure relief

= preferred program

Order examples

Closed center with mono block and change-over axis

Example:	– 3-fold control block with 3 directional valve sections – Variable pump $q_{V,\,max}$ = 150 l/min via inlet + 100 l/min via end plate is possible	**Ordering code:**
Inlet, combined with 1st directional valve section	– Closed center, mono block – Without primary pressure relief valve – With internal pilot oil supply – With pressure compensator, with load holding function – With LS pressure relief valve for consumer port **A** 180 bar, consumer port **B** plugged – Spool symbol J – Flow in **A** and **B** 100 l/min – Type of actuation: electrohydraulically proportional – With Junior Timer, 2-pin (AMP) 24 V – Secondary valves: Pressure/feed valve, consumer port A and B 350 bar (not adjustable)	Short type, inlet 01 02 03 **3 M4 – 12 – 2X / JM Z Y** 1st directional valve section 01 02 03 04 05 06 07 08 09 10 11 **S 180 M Q J 100-100 W2 1 – H350 H350**
2nd directional valve section	– 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 consumers – Type of actuation: electrohydraulic switchable – With Junior Timer, 2-pin (AMP) 24 V – Without secondary valve (cannot be retrofitted)	2nd directional valve section 01 02 03 04 05 06 07 08 09 10 11 **Z Z U Z J 065-090 W4 1 – Z Z**
3rd directional valve section	– With pressure compensator, with load holding function – Without LS pressure relief valve bore – Spool symbol J – Flow in **A** and **B** 85 l/min – Type of actuation: digital OBE – Overriding hand lever (revolving) – Without secondary valve (cannot be retrofitted)	3rd directional valve section 01 02 03 04 05 06 07 09 10 11 **S Z Z Z J 085-085 CPS K Z Z**
End plate, additional information	– Without internal LS relief, with **LS** port, with **P** and **T** port – FKM seals – Pipe thread connections	End plate, additional information 01 02 03 **LZPT V 01**



Open center with lateral inlet plate

Example:	– 3-fold control block with 3 directional valve sections – Fixed pump $q_{V,\,max}$ = 150 l/min
Inlet plate	– Open center, lateral – With primary pressure relief valve, set to 300 bar – With internal pilot oil supply
1st directional valve section	– Without pressure compensator, with load holding function – With LS pressure relief valve for consumer port **A** 250 bar and LS relief plug in **B** – Spool symbol E – Flow in **A** 50 l/min, port **B** plugged – Type of actuation: mechanical, spring-centered, not encapsulated, with tongue – Secondary valve: adjustable shock/feed valve for actuator port **A** 230 bar, secondary valve bore **B** plugged
2nd directional valve section	– Without pressure compensator, without load holding function – With 1 LS pressure relief valve for consumer ports **A** and **B** 275 bar – Spool symbol E – Flow in **A** and **B** 100 l/min – Type of actuation: hydraulic – Secondary valve: non-adjustable shock/feed valve for actuator port **A** 100 bar, adjustable shock/feed valve for consumer port **B** 230 bar
3rd directional valve section	– With pressure compensator, with load holding function – Without LS pressure relief valve bore – Spool symbol J – Flow in **A** and **B** 70 l/min – Type of actuation: electrohydraulically switchable, with damping nozzle, with measuring ports – With DT04-2P connector (DEUTSCH) 24 V – Hand lever cover, not revolving, without hand lever – Without secondary valve (cannot be retrofitted)
End plate, additional information	– With internal LS relief – FKM seals – Pipe thread connections

Ordering code:

Short type, inlet plate

01	02	03							
3	**M4**	**–**	**12**	**–**	**2X**	**/**	**P**	**300**	**Y**

1st directional valve section

01	02	03	04	05	06	07	09	10	11
C	**250**	**M**	**B**	**E**	**050-000**	**A**	**Z**	**A230**	**Q**

2nd directional valve section

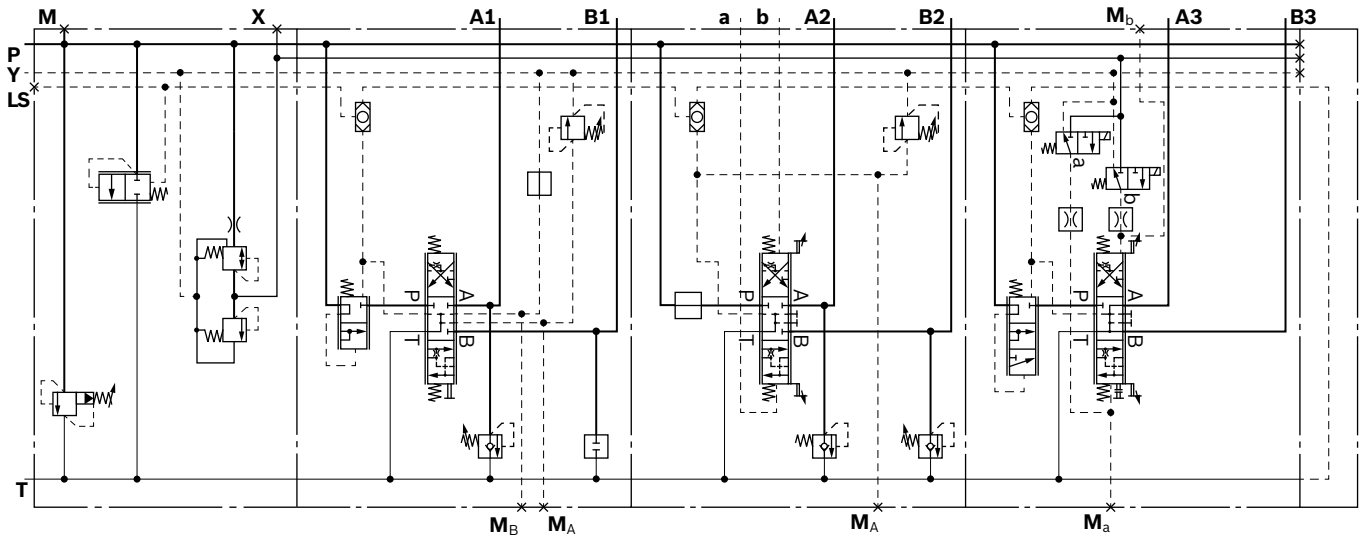
01	02	03	04	05	06	07	09	10	11
Q	**=**	**M**	**275**	**E**	**100-100**	**H**	**–**	**H100**	**A230**

3rd directional valve section

01	02	03	04	05	06	07	08	09	10	11
S	**Z**	**Z**	**Z**	**J**	**070-070**	**W7**	**8**	**X**	**Z**	**Z**

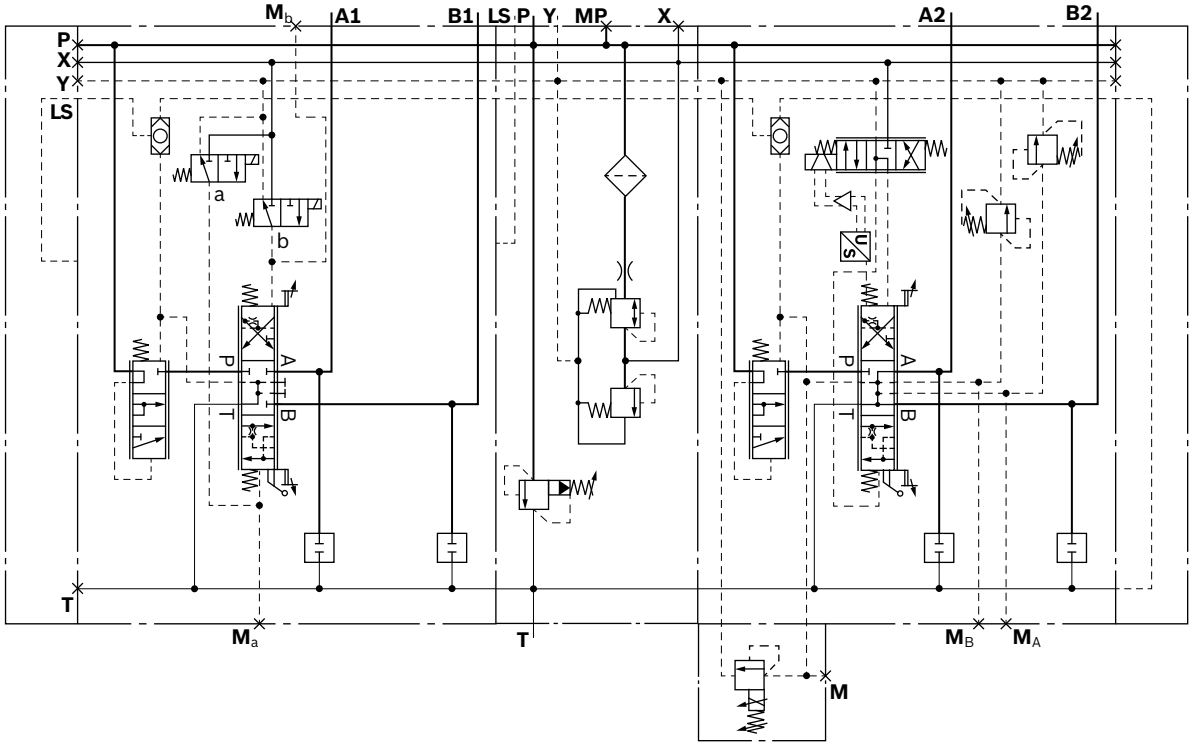
End plate, additional information

01	02	03
LA	**V**	**01**



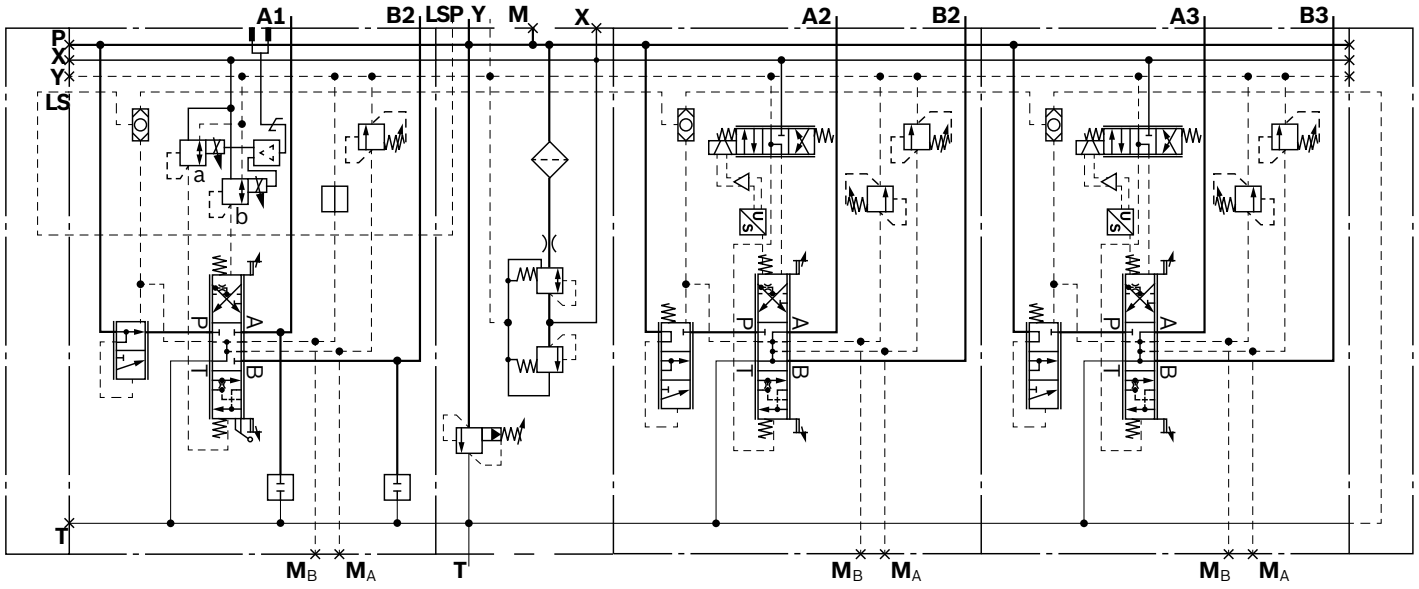
Closed center with central inlet plate

Example:	– 2-fold control block with 2 directional valve sections – Variable pump $q_{V,\,max}$ = 200 l/min	**Ordering code:**
Short type, diversion plate	– Diversion plate	Short type, diversion plate 01 **2 | M4 | – | 12 | – | 2X | / | LU**
1st Directional valve section	– With pressure compensator, with load holding function – Without LS pressure relief valve bore – Spool symbol E – Flow in **A** and **B** 100 l/min – Type of actuation: electrohydraulically proportional with measuring ports on both sides – With Junior Timer, 2-pin (AMP) 24 V – Overriding hand lever (revolving) – Secondary valve bores plugged	1st directional valve section 01 02 03 04 05 06 07 08 09 10 11 **S | Z | Z | Z | E | 100-100 | W6 | 1 | K | Q | Q**
Inlet plate	– Closed center, central – With primary pressure relief valve, set to 300 bar – With internal pilot oil supply	Inlet plate 01 02 03 **JZ | 300 | Y**
2nd Directional valve section	– With pressure compensator, with load holding function – With LS pressure relief valve for consumer port **A** 270 bar, consumer port **B** 300 bar – With electro-proportional LS pressure relief, 210 bar (decreasing characteristic curve) – Spool symbol E – Flow in **A** and **B** 90 l/min – Type of actuation: digital OBE – Overriding hand lever (revolving) – Secondary valve bores plugged	2nd directional valve section 01 02 03 04 05 06 07 09 10 11 13 **S | 270 | L | 300 | E | 090-090 | CPS | K | Q | Q | KBPSL8BA**
End plate, additional information	– With internal LS relief – FKM seals – Pipe thread connections	End plate, additional information 01 02 03 **LA | V | 01**



Closed center with combination inlet plate for M4-12 and M4-15 directional valve sections

Example:	– 3-fold control block with 3 directional valve sections – Variable pump $q_{V,\,max}$ = 200 l/min	**Ordering code:**
Short type, diversion plate	– Diversion plate	Short type, diversion plate 01 **3 | M4 | – | 15 | – | 2X | / | LU**
1st directional valve section M4-15	– With pressure compensator, without load holding function – With LS pressure relief valve for consumer port **A** 230 bar and LS relief plug in **B** – Spool symbol E – Flow in **A** 190 l/min, port **B** plugged – Type of actuation: digital OBE – Overriding hand lever (revolving) – Secondary valve bores plugged	1st directional valve section 01 02 03 04 05 06 07 09 10 11 **T | 230 | M | B | E | 190-000 | CPS | K | Q | Q**
Inlet plate	– Central closed center for M4-12/M4-15 – With primary pressure relief valve, set to 280 bar – With internal pilot oil supply	Inlet plate 01 02 03 **JK | 280 | Y**
2nd and 3rd directional valve section M4-12	– With pressure compensator, with load holding function – With LS pressure relief valve for consumer port **A** 180 bar, consumer port **B** 120 bar – Spool symbol E – Flow in **A** and **B** 90 l/min – Type of actuation: digital OBE – Without secondary valve bores	2nd directional valve section 01 02 03 04 05 06 07 09 10 11 **S | 180 | M | 120 | E | 090-090 | CPS | – | Z | Z** 3rd directional valve section 01 02 03 04 05 06 07 09 10 11 **S | 180 | M | 120 | E | 090-090 | CPS | – | Z | Z**
End plate, additional information	– With internal LS relief – FKM seals – Pipe thread connections	End plate, additional information 01 02 03 **LA | V | 01**



Inlet plates

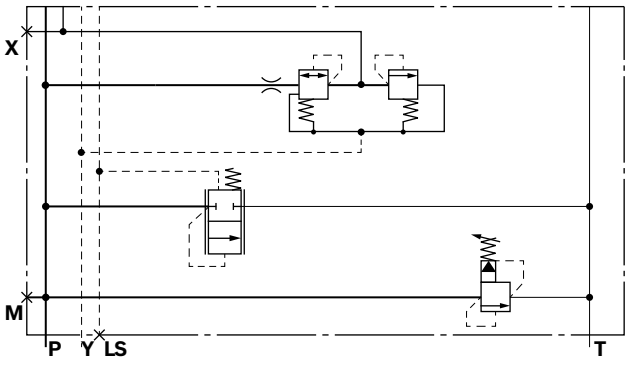
Open center (P)

With primary pressure relief valve, with internal pilot oil supply

Ordering code:

P	...	Y

- Specified pressure in bar required after **P** (3-digit)

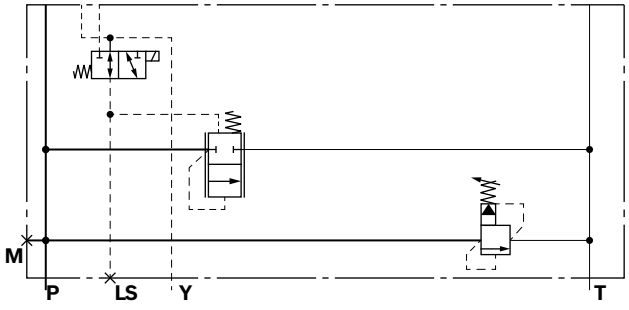


With LS switch off

Ordering code:

P	...	X	A

- LS line connected to the Y-line to the reservoir in de-energized condition
- All downstream M4-12 directional valve sections remain in load holding

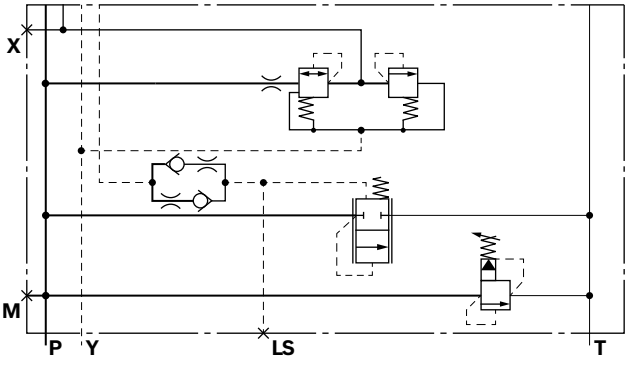


With LS damping nozzle and sensitive pressure compensator

Ordering code:

P	...	Y	S0.6–0.6	P100

- Nozzle diameter parameter in mm required after **S** (standard: 0.6–0.6)
- Sensitive unloading function
- Maximum flow 100 l/min on the pump side



Pilot oil supply (Y)

- Pressure limitation 45 bar
- Pilot pressure max. 30^{+5} bar

Notice

With internal pilot oil supply, pilot oil for other consumers can also be directed via the **X** port. However, this can affect the switching times on the M4-12. Please consult technical sales for information about potential impacts. With an external pilot oil supply, the **X** port is not generally plugged. It must be plugged if it is not in use (e.g. with hydraulic control **H**).

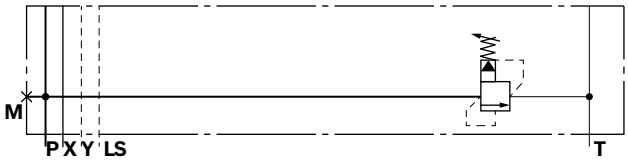
Closed center (J)

With primary pressure relief valve, for external pilot oil supply

Ordering code:

J	...	X

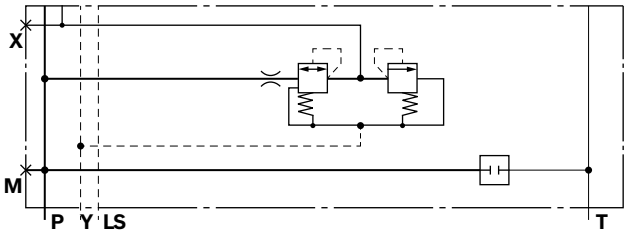
- Specified pressure in bar required after **J** (3-digit)



Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

J	Q	Y

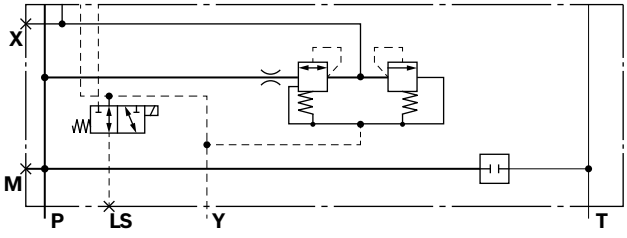


Without primary pressure relief valve, with internal pilot oil supply, with LS switch-off

Ordering code:

J	Q	Y	A

- LS line connected to the Y-line to the reservoir in de-energized condition
- All downstream M4-12 directional valve sections remain in load holding

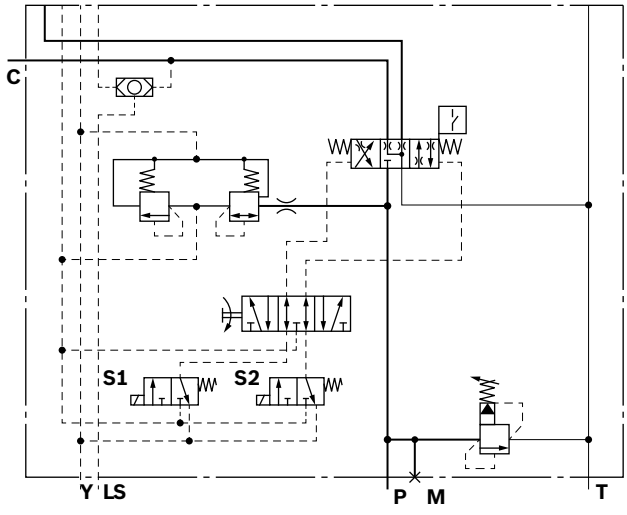


With integrated change-over axis, primary pressure relief valve and internal pilot oil supply

Ordering code:

SJ	350	Y	E	Q080

- Specified pressure in bar required after **SJ** (3-digit)
- With switching position detection of the integrated change-over axis
- For external flow (port **C**) of 80 l/min
- Change-over axis actuation with on/off valves type FTWE2K according to data sheet 58007
- Further information is available on request



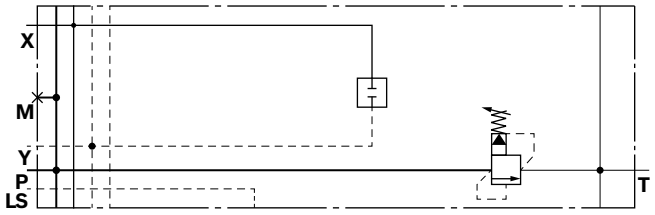
Central closed center inlet plates (JZ, JK, VZ)

With primary pressure relief valve, for external pilot oil supply

Ordering code:

JZ	...	X

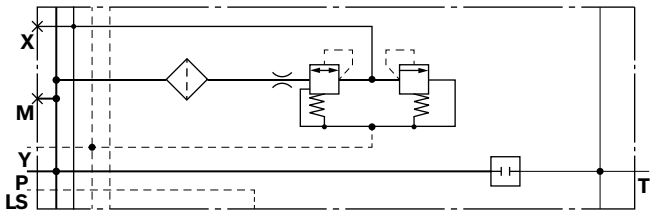
- Specified pressure in bar required after **JZ** (3-digit)



Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

JZ	Q	Y

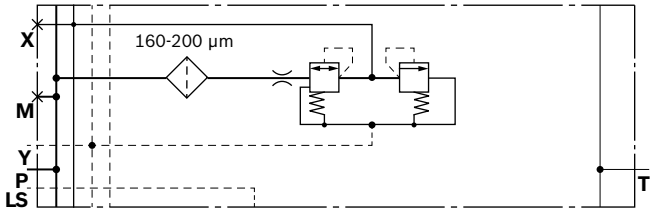


Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

JZ	Z	Y

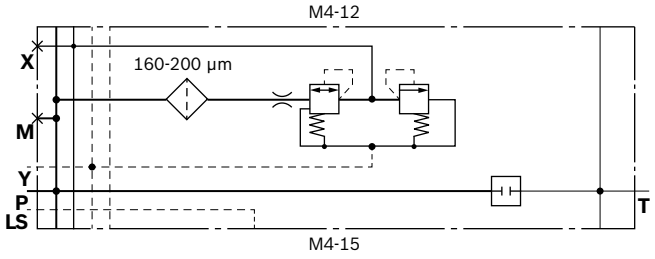
- Primary pressure relief valve is not retrofittable



For connection of directional valve sections of size 12 and 15, without primary pressure relief valve, with internal pilot oil supply

Ordering code:

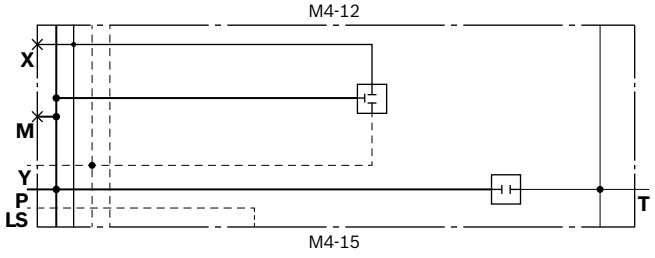
JK	Q	Y



For connection of directional valve sections of size 12 and 15, without primary pressure relief valve, for external pilot oil supply

Ordering code:

JK	Q	X

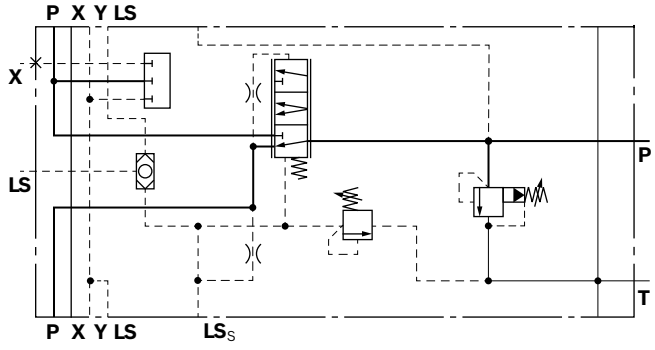


With primary pressure relief valve, with priority valve, with internal pilot oil supply

Ordering code:

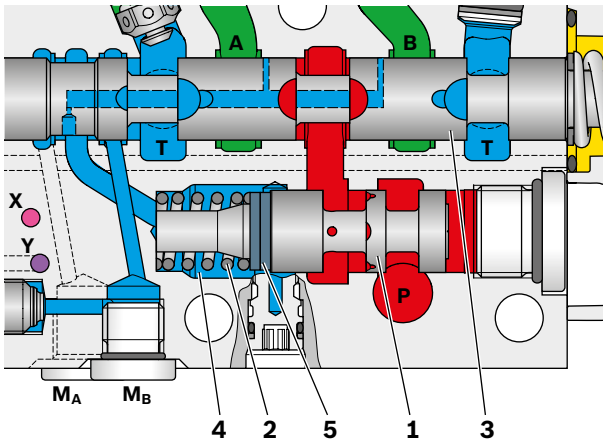
VZ	...	Y	A	...

- Specified pressure in bar required after **VZ** (3-digit)
- Specified pressure in bar required after **A** for LS pressure relief priority valve (3-digit)
- Priority consumer is limited to a pressure compensator Δp of max. 19 bar

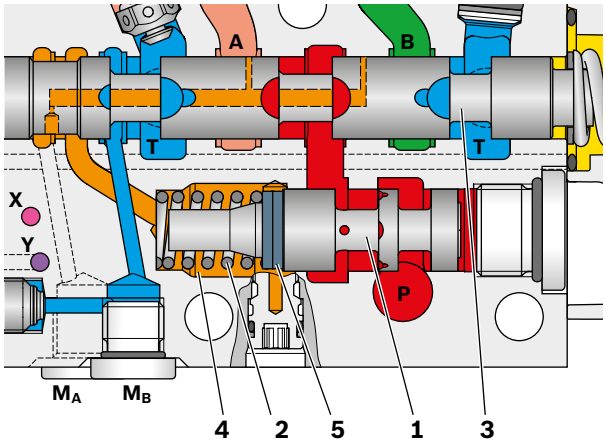


Pressure compensator

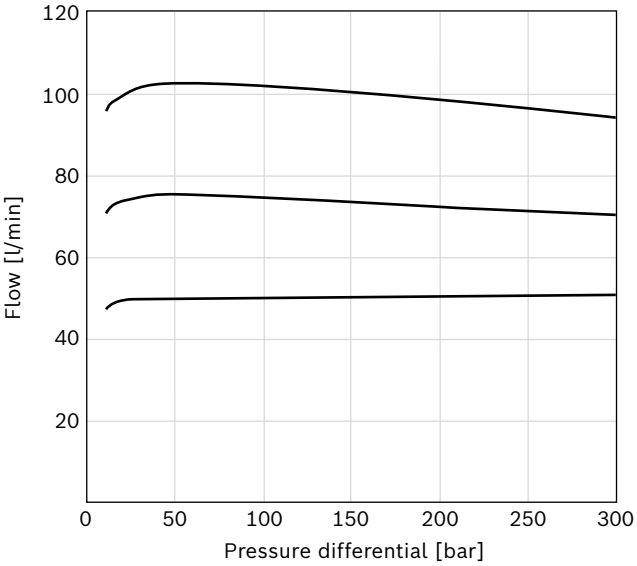
▼ **Control spool in central position**



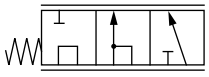
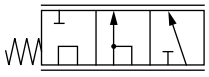
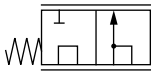
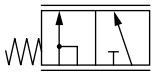
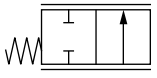
▼ **Control spool actuated**



▼ **Flow control by pressure compensator**

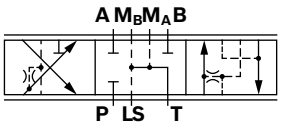
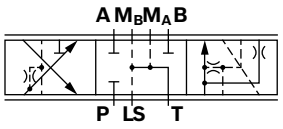
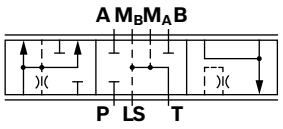
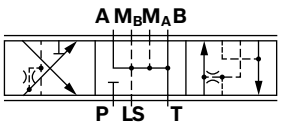
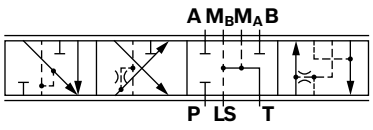
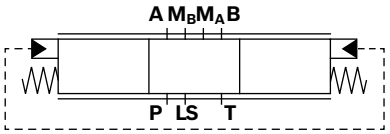
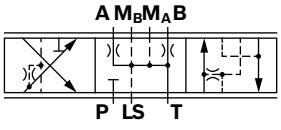
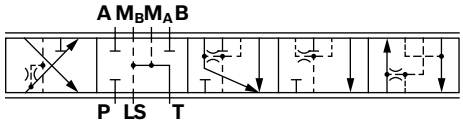
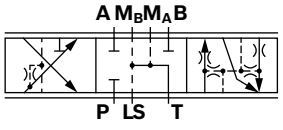


In the control spool central position there is no connection from **P** to the consumer ports **A** and **B**. Pump pressure shifts the compensator spool (**1**) to the left against the spring (**2**) in this operating condition.
When the control spool (**3**) (= metering orifice) is actuated, the LS pressure reaches the spring chamber (**4**) and shifts the pressure compensator spool to the right into the control position. The flow is also kept constant in parallel operation of consumers with different load pressures.
The pressure compensator **S** is equipped with load holding function. This function is not free of leakage oil.
It is equipped with one ring (**5**) as standard. The number of rings fitted depends on the required flow.

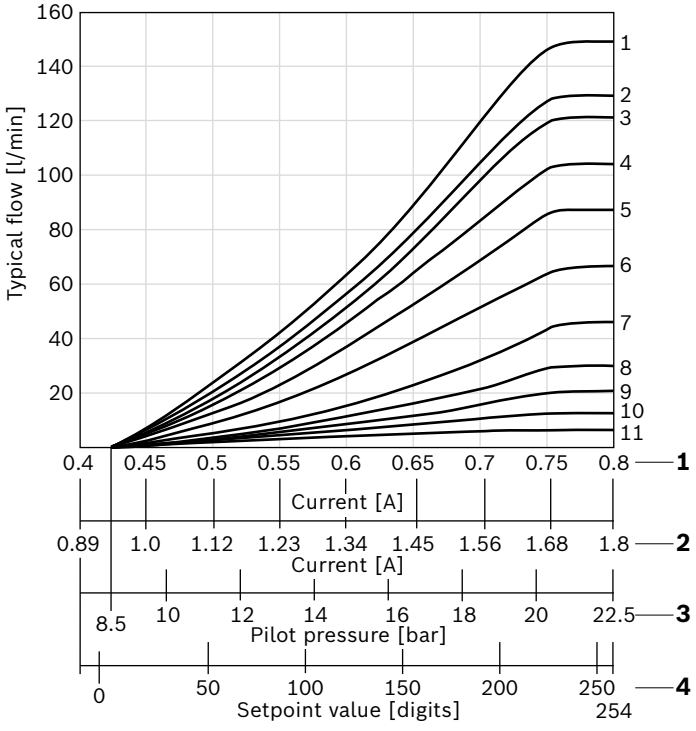
Type	Summary	Symbol
S	▶ With pressure compensator ▶ With load holding function[1)] ▶ Maximum flow 130 l/min	
F	▶ With pressure compensator ▶ With load holding function[1)] ▶ Maximum flow 130 l/min ▶ Sensitive to flows up to 20 l/min	
C	▶ Without pressure compensator ▶ With load holding function[1)] ▶ Maximum flow 140 l/min	
Q	▶ Without pressure compensator ▶ Without load holding function ▶ Maximum flow 140 l/min	
T	▶ With pressure compensator ▶ Without load holding function[1)] ▶ Maximum flow 150 l/min	
D[2)]	▶ With open center pressure compensator	

1) This load holding function is not leak-free
2) Only in conjunction with mono block design PM

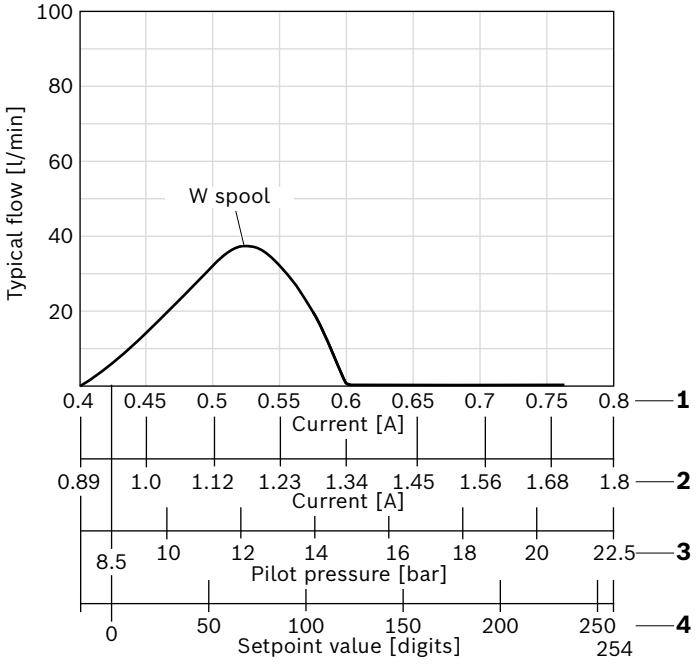
Control spool

Hydraulic cylinder as consumer	Regeneration function (P, B → A)	Plunger cylinder as consumer
E 	**R** 	**P** 
Hydraulic motors as consumers	**Floating position**	**Spool with pressure function**[1]
J 	**W** 	**(E, J, Q) ...T...** 
Application with defined residual opening (A/B → T), consumer port unloaded in neutral position	**Floating position**[1]	**Spool with pressure function in connection with lowering brake valve**[1]
Q 	**Y** 	**(E) ...M...** 

▼ **Characteristic curves symmetric control spools P → A/B**



▼ **Characteristic curves floating position spool P → A/B**



1 Electrohydraulic actuation, 24 V control
2 Electrohydraulic actuation, 12 V control
3 Hydraulic actuation
4 Digital on-board electronics (CPM, default characteristic curve)

1) Design by technical sales.

Flow

This is an overview of the preferred spool types. Further spool types are available on request. Individual adaptation of the spool and groove geometry for the desired control behavior is possible.

Symmetric control spools

Spool type	Pressure compensator	Flow in l/min							
E, J, Q	S	130–130 (2)	100–100	073–073	052–052	034–034	023–023	014–014	007–007
		120–120 (3)	085–085 (5)	065–065 (6)	045–045 (7)	030–030 (8)	020–020 (9)	012–012 (10)	006–006 (11)
		100–100 (4)	070–070	057–057	038–038	026–026	017–017	010–010	005–005
	C, Q	140–140	115–115	090–090	063–063	042–042	028–028	017–017	008–008
	T	150–150 (1)							

(1)... (10) Note on spool characteristic curve page 21.

Asymmetric control 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, Q	115–090	115–063	063–042	042–028	028–017

Floating position, regeneration and plunger spools[1)]

Spool type	Pressure compensator	Flow in l/min (others on request)				
W	S	030–030	045–045	065–040		
Y		030–030	065–065	065–045	065–085	085–100
R		130–101	085–030	065–025	130–140	
P		185–000				

Notice
Design by technical sales.

Example:

- Spool type J
- Pressure compensator S
- Setpoint value: $q_{consumers}$ = 90 l/min

Solution:

- 85-liter spool + 2 rings = 100 l/min
- Set 90 liters via stroke limiter.

Spool type	Pressure compensator	Flow in l/min	Number of rings
E, J, Q	S	100–100	With 2 rings (pressure compensator Δp = 8.5 to 11.5 bar)
		085–085	With 1 ring (pressure compensator Δp = 6 to 9.5 bar)
		070–070	Without ring (pressure compensator Δp = 4 to 7 bar)

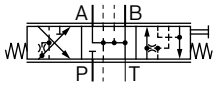
Notice
Place directional valve sections with maximum flow as close as possible to the inlet plate.

1) Flow parameter corresponds to 1 ring

Types of actuation

Mechanical only (not encapsulated) with tongue

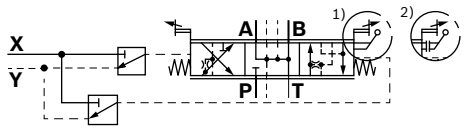
AZ



- Centering in central position by means of springs in case of non-actuation.

Mechanical (encapsulated)

M

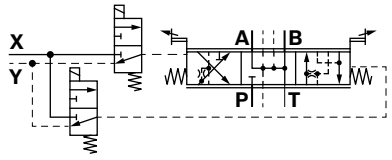


- Centering in central position by means of springs in case of non-actuation.
- All hand lever position options are possible, cf. also ordering code on page 25.

1) Revolving hand lever
2) Non-revolving hand lever

Electrohydraulically switchable

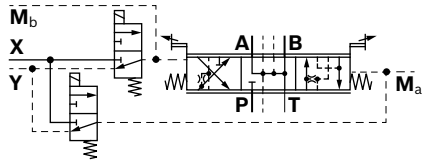
W4



- FTDRE2K on/off valve according to data sheet 58007

Electrohydraulically switchable with measuring ports on both sides

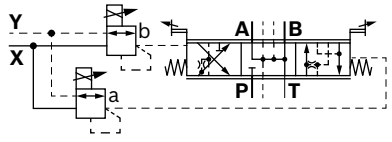
W6



- FTDRE2K on/off valve according to data sheet 58007

Electrohydraulically proportional

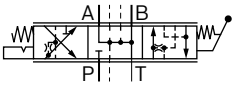
W2



- FTDRE2K proportional pressure reducing valve according to data sheet 58032

Mechanical only (not encapsulated) with hand lever and detent

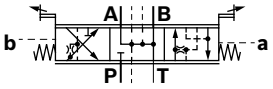
B1N



- Centering in central position by means of springs in case of non-actuation.
- For variants, see page 24.

Hydraulic

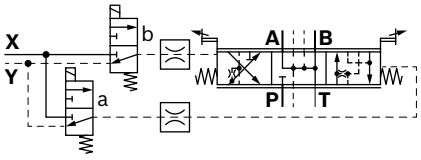
H



- Centering in central position by means of springs in case of non-actuation.
- Recommended hydraulic pilot control devices: Type 2TH6 and 4TH6 according to data sheet 64552 or 64555

Electrohydraulically switchable with damping nozzle on both sides

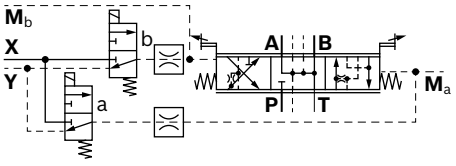
W5



- FTDRE2K on/off valve according to data sheet 58007

Electrohydraulically switchable with damping nozzle, with measuring ports on both sides

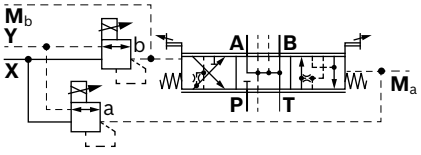
W7



- FTDRE2K on/off valve according to data sheet 58007

Electrohydraulically proportional with measuring ports on both sides

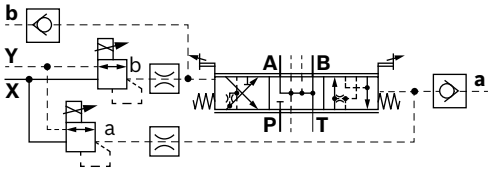
W8



- FTDRE2K proportional pressure reducing valve according to data sheet 58032

Electrohydraulically proportional with damping nozzle and check valve for hydraulic superposition

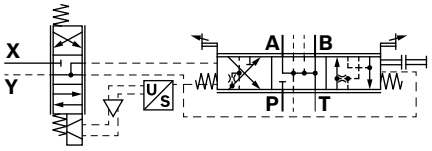
G2



- FTDRE2K proportional pressure reducing valve according to data sheet 58032

CAN bus-controlled pilot module

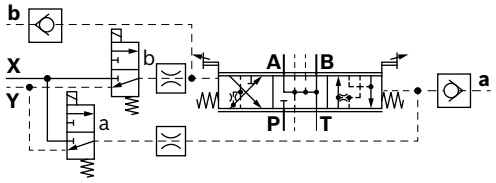
CPS



- Digital interface with electronics and position sensor for stricter requirements regarding EMC and functional safety, see instruction manual 64819-B or 64820-B and as of page 51

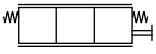
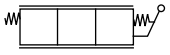
Electrohydraulically switchable with damping nozzle and check valve for hydraulic superposition

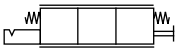
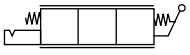
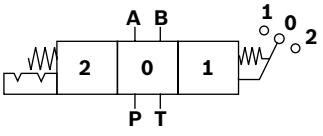
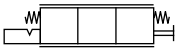
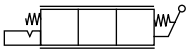
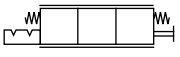
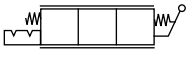
G4



- FTDRE2K on/off valve according to data sheet 58007

Variant overview for mechanical actuation only (not encapsulated)

Spring-centered + tongue		Spring-centered + tongue with lever	
	**A Z**		**A N**

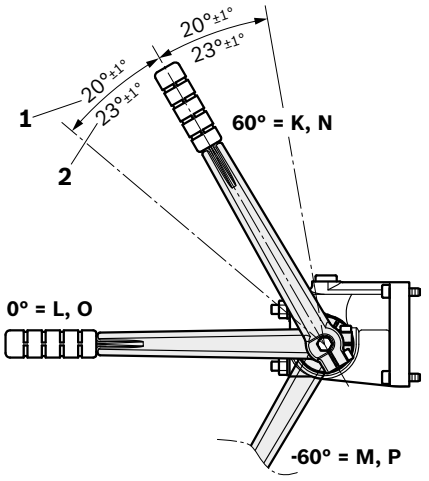
Detent + tongue		Detent + tongue with lever		Lever position		
	**B1 Z**		**B1 N**		**B1**	= detent in 1
	**B2 Z**		**B2 N**		**B2**	= detent in 2
	**B4 Z**		**B4 N**		**B4**	= detent in 1, 2

Actuating force:

Tongue < 250 N (for control spool)

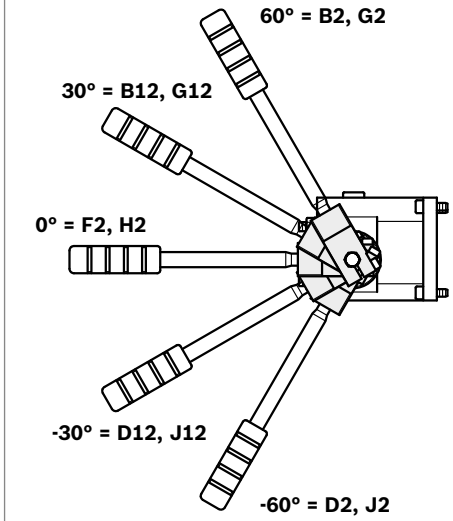
Variant overview for mechanical actuation with hand lever (encapsulated)

▼ **Standard cover with hand lever**

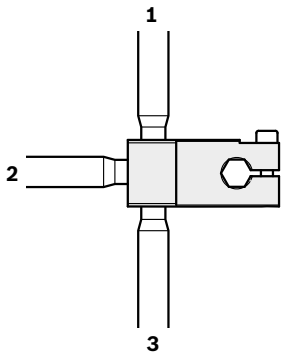


1 Actuation angle for revolving lever
2 Actuation angle for non-revolving lever

▼ **Cover with clamping piece and hand lever, aluminum-free**
(Example: Lever screw fitting in position 2)



▼ **Lever screw fitting on the clamping piece**



Ordering code

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

Actuating force (on the hand lever)

- ▶ Mechanical < 20 N
- ▶ Mechanical override (with parallel hydraulic actuation) < 70 N
- ▶ Mechanical override (with parallel electrohydraulic actuation) < 50 N

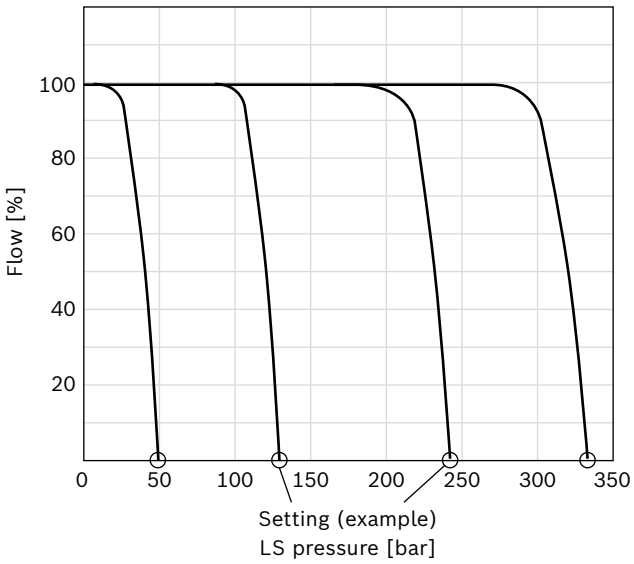
= preferred program

Notice

- ▶ Revolving hand lever:
  Mechanical actuation can override the electrohydraulic actuation. The hand lever is directly connected to the control spool and follows the spool movement in electrohydraulic control.
- ▶ Non-revolving hand lever:
  The hand lever is connected to the control spool via a coupling. If the control spool is in the central position, the hand lever can be snapped into place. With electrohydraulic control, it does not follow the spool movement in this way.

LS pressure relief

▼ **Consumer flow reduction by LS pressure relief**



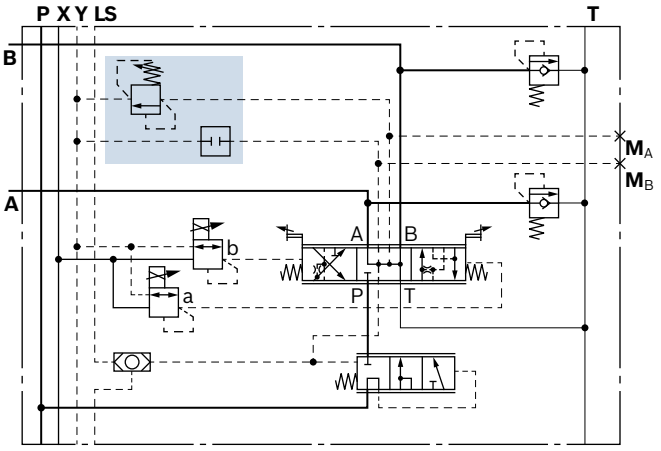
Minimum setting: 50 bar
Maximum setting: 385 bar

With LS pressure relief valve and LS threaded plug

Ordering code:

S	...	M	Q	J	...–...	W2	1	–	H...	H...

- Specified pressure in bar for consumer port **A** (3-digit)
- Threaded plug for consumer port **B**
- With the **QMQ** version, LS pressure relief can be retrofitted onto the directional valve.
- The LS pressure can be influenced externally via ports $\mathbf{M_A}$ and $\mathbf{M_B}$. These ports can also be used as measuring ports.

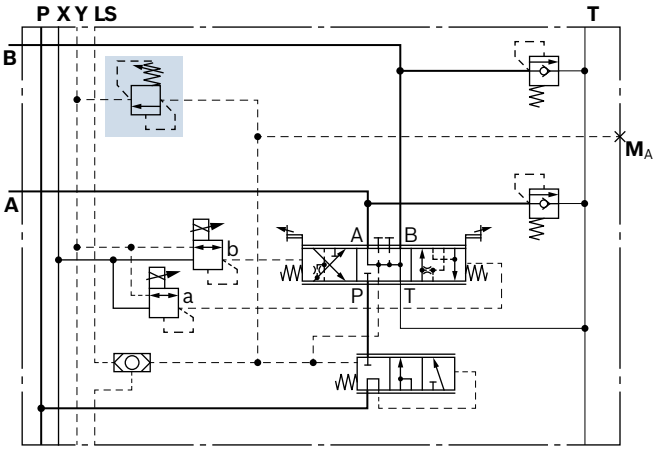


With 1 LS pressure relief valve

Ordering code:

S	=	M	...	J	...–...	W2	1	–	H...	H...

- Only 1 LS-PRV for the same pressure setting in **A** and **B**, specified pressure in bar (3-digit)
- 1 measuring port

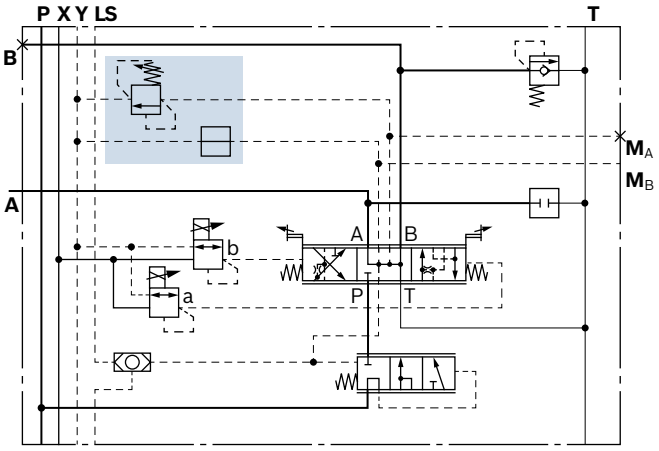


With LS pressure relief valve and relief plug

Ordering code:

S	...	M	B	J	...–000	W2	1	–	H...	Q

- Specified pressure in bar for consumer port **A** (3-digit)
- Relief plug for consumer port **B**
- E.g., for cylinders actuated on one side

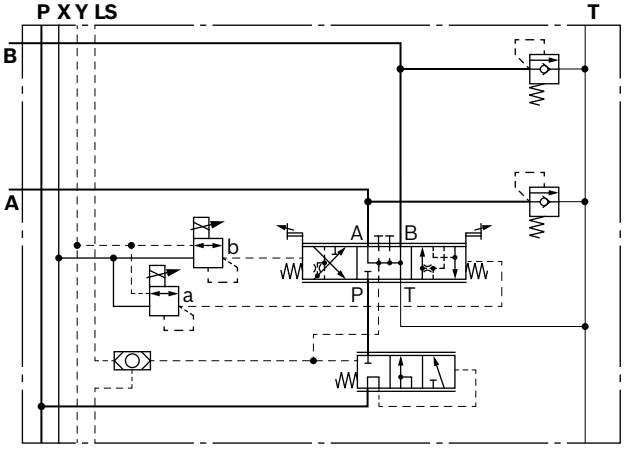


Without LS pressure relief valves

Ordering code:

S	Z	Z	Z	J	...–...	W2	1	–	H...	H...

- LS-PRV cannot be retrofitted
- Housing without measuring ports

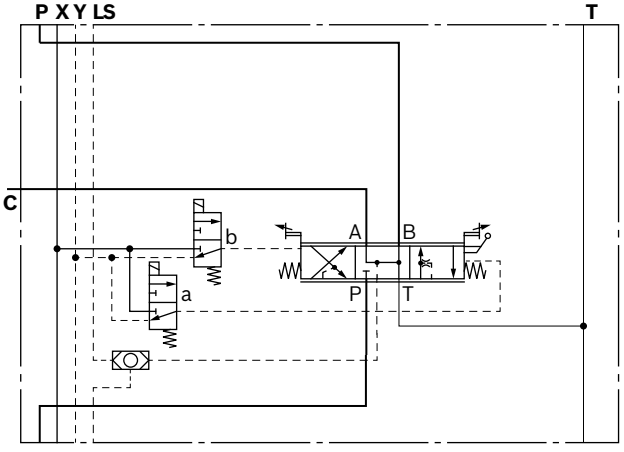


Housing for change-over axis

Ordering code:

Z	Z	U	Z	J	...–...	W4	1	K	Z	Z

- Housing for change-over axis
- Maximum flow of internal consumers 90 l/min

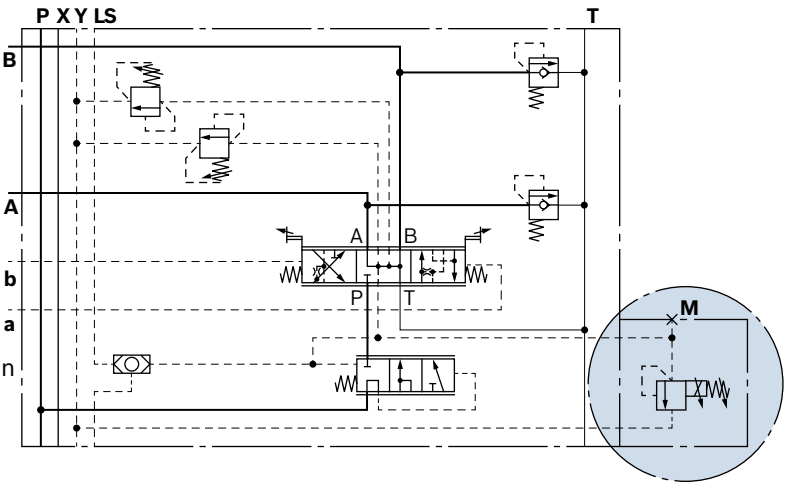


Housing for electro-proportional LS pressure relief/ hydraulically switchable directional valves

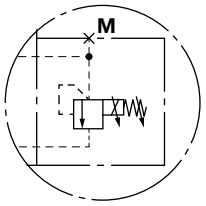
Distinction between:

1. Type KBPS
2. Housing KBPS and plug
3. Porting pattern KBPS and cover plate
4. Type MH2DAD and type KBPS
5. Type KKDE
6. Type MHDRD2

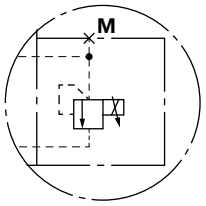
The exact designation of the valve must be specified in plain text as follows.



1. KBPS electro-proportional LS pressure relief valve
(see also data sheet 18139-04, 18139-05)



KBPS...BA:
Decreasing characteristic curve



KBPS...AA:
Increasing characteristic curve

Preferred program:

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**

Supplementary program, e.g.:

S	**...**	**K**	**...**	**J**	**...–...**	**H**	**–**	**H...**	**H...**	**KBPSH8BA**	**–033**

	Decreasing characteristic curve	**Increasing characteristic curve**	**Add. 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	

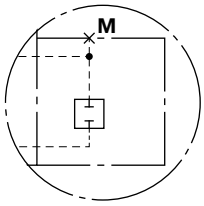
= preferred program

Notice

Based on the electrical setpoint value, these valves can be used to continuously adjust the load pressure. The setpoint value depends on the load pressure Δp of the pressure compensator and the liter volume of the control spool.
Characteristic curves, see KBPS data sheet 18139-04 (increasing characteristic curve) or 18139-05 (decreasing characteristic curve).

2. Housing KBPS and plug

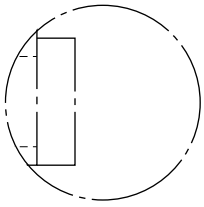
S	...	K	...	J	...–...	H	–	H...	H...	Q



Plug

3. Porting pattern KBPS and cover plate

S	...	K	...	J	...–...	H	–	H...	H...	A

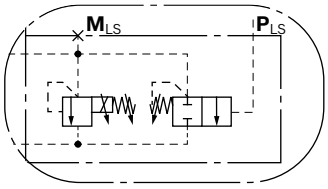


Cover plate

4. LS pressure cut-off valve type MH2DAD and electro-proportional LS pressure relief valve type KBPS
(see also data sheet 64586, 18139-04, 18139-05)

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

S	...	K	...	J	...–...	H	–	H...	H...	MH2DAD+Q

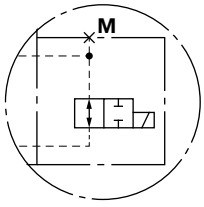


5. 2/2-way spool valve type KKDE
(see also data sheet 18136-08)

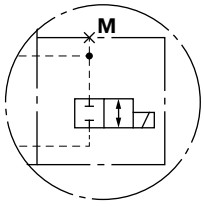
S	...	K	...	J	...–...	H	–	H...	H...	KKDER8PA

- Normally open: KKDER8PA
- Normally closed: KKDER8NA

Notice
The consumer pressure is not depressurized!



KKDE...PA:
Normally open

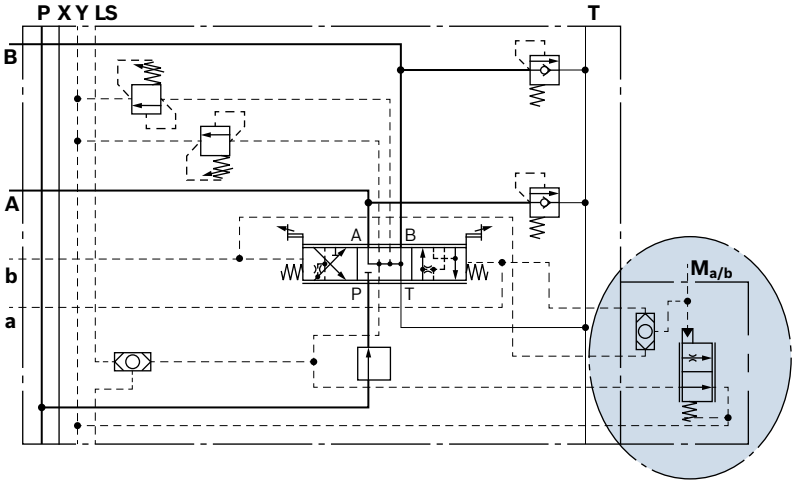


KKDE...NA:
Normally closed

6. Hydraulic pressure control MHDRD2

Q	...	C	...	J	...–...	H	–	H...	H...	MHDRD2

- Pressure distortion of the LS signal related to the pilot pressure
- Application example: Slew drive in the crane
- Design by technical sales.



Secondary valves

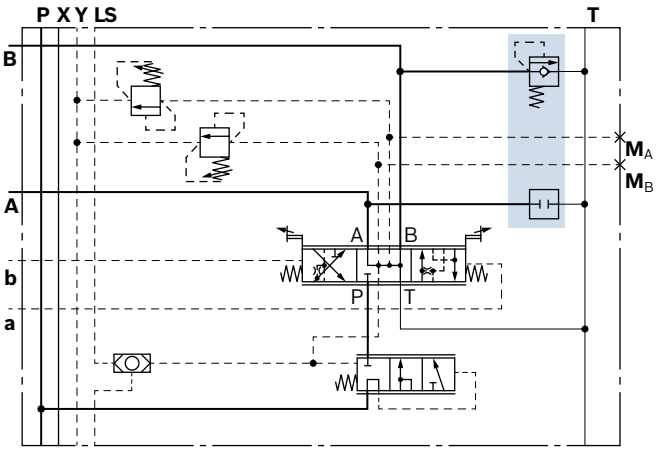
Shock/feed valves, non-adjustable

Ordering code:

S	...	M	...	J	...–...	H	–	Q	H...

- Non-adjustable shock/feed valve (type VMA7.050, see data sheet 18329-12)
- Specified pressure in bar required after **H** (3-digit), see table below for possible values
- **Example: Q H150**
  Q: Threaded plug for consumer port **A**
  H150: Shock/feed valve, fixed setting to 150 bar for consumer port **B**

Notice
Only suitable for reduction of pressure peaks, not to be used as a pressure relief valve!



Possible pressure settings for shock valves with feed function

Pressure setting in bar for consumer port A and B			
H025 =25 bar	H125 =125 bar	H210 =210 bar	H320 =320 bar
H035 =35 bar	H140 =140 bar	H230 =230 bar	H350 =350 bar
H050 =50 bar	H150 =150 bar	H240 =240 bar	H380 =380 bar
H063 =63 bar	H160 =160 bar	H250 =250 bar	H405 =405 bar
H080 =80 bar	H175 =175 bar	H280 =280 bar	H420 =420 bar
H100 =100 bar	H190 =190 bar	H300 =300 bar	

Notice
Shock valves have a fixed setting!

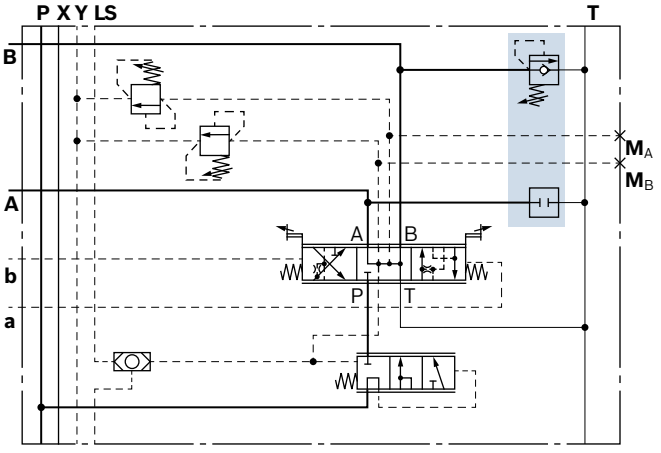
Shock/feed valves, adjustable

Ordering code:

S	...	M	...	J	...–...	H	–	Q	A...

- Adjustable shock/feed valve (type VRA1.050, see data sheet 18329-32)
- Specified pressure in bar required after **A** (3-digit)
- **Example: Q A200**
  Q: Threaded plug for consumer port **A**
  A200: Shock/feed valve, set to 200 bar for consumer port **B**

Notice
Only suitable for reduction of pressure peaks, not to be used as a pressure relief valve!



Adjustable pressure stages in bar for consumer port A and B	
10 – 70	201 – 270
71 – 120	271 – 320
121 – 200	321 – 380

Without secondary valves

Ordering code:

S	...	M	...	J	...–...	H	–	Z	Z

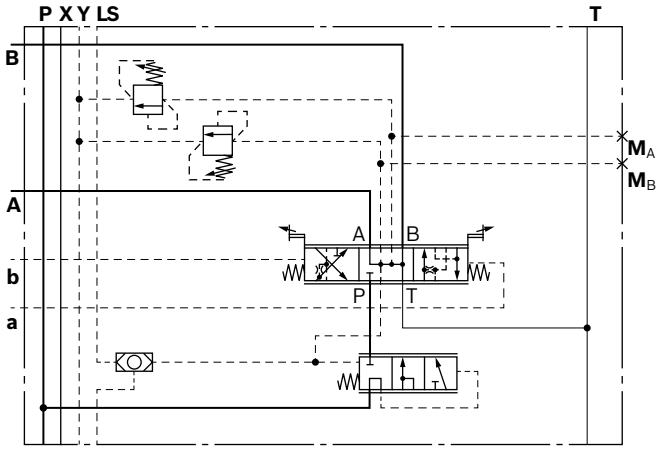
- Secondary valves are not retrofittable
- Consumer port G 3/4

Ordering code:

S	...	M	...	J	...–...	H	–	X	X

- Secondary valves are not retrofittable
- Consumer port G 1/2

Notice
Secondary pressure limitation must be provided by the customer if necessary.



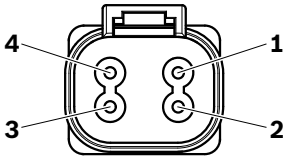
Options

Electrohydraulic, with spool position sensor type PSM

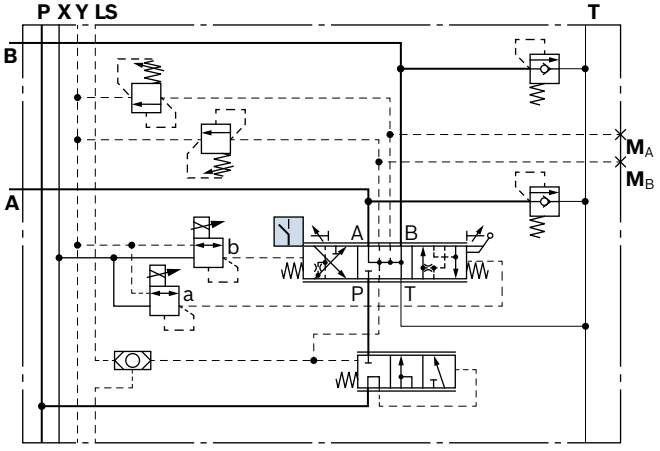
Ordering code:

S	...	M	...	J	...–...	W2	1	K	H...	H...	–100

- Control spool neutral position and A and B direction of motion detected and monitored by an analogue voltage output signal
- Pin assignment for connector (Connector version DT04-4P, DEUTSCH)



Pin 1: $+V_{Batt}$
Pin 2: GND
Pin 3: Sensor signal for flow direction of consumer port **B**
Pin 4: Sensor signal for flow direction of consumer port **A**



Notice
For further information, see PSM data sheet 95190.

Mono block

Mono block open center, without primary pressure relief valve, with internal pilot oil supply

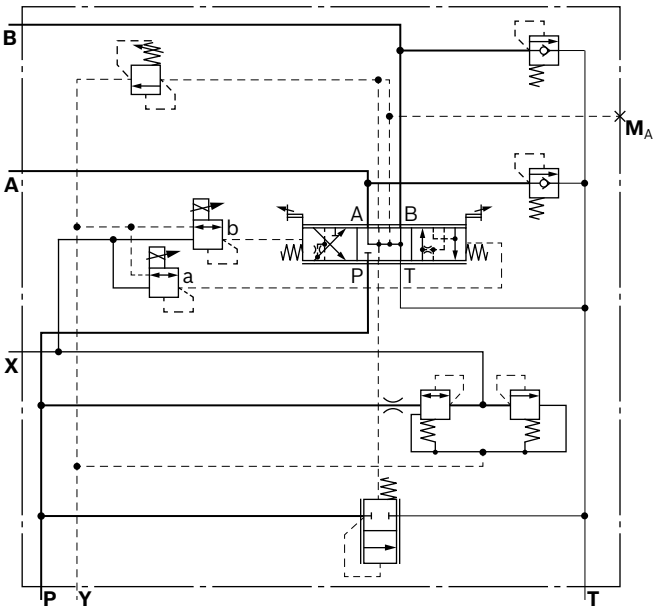
Ordering code:

PM	Z	Y

D	=	M	...	J	...-...	W2	1	–	H...	H...

LM	V	01

- Primary pressure limitation via pressure compensator and LS-PRV



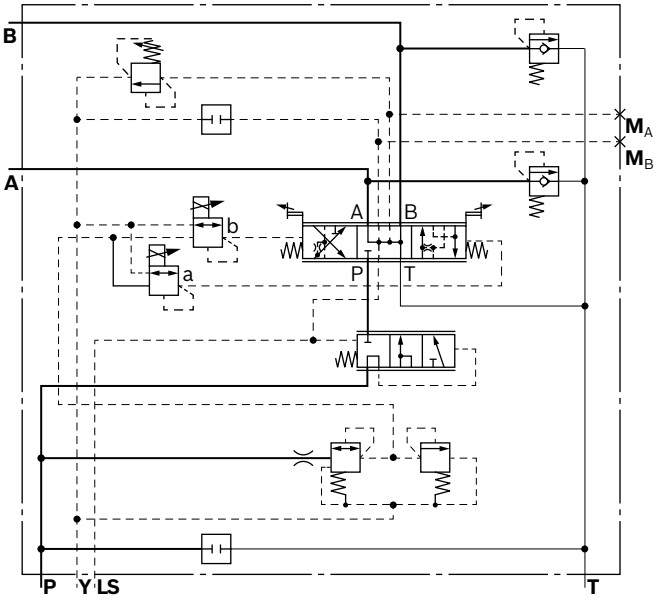
Mono block closed center, without primary pressure relief valve, with internal pilot oil supply

Ordering code:

JM	Q	Y

S	Q	M	...	J	...-...	W2	1	–	H...	H...

LM	V	01



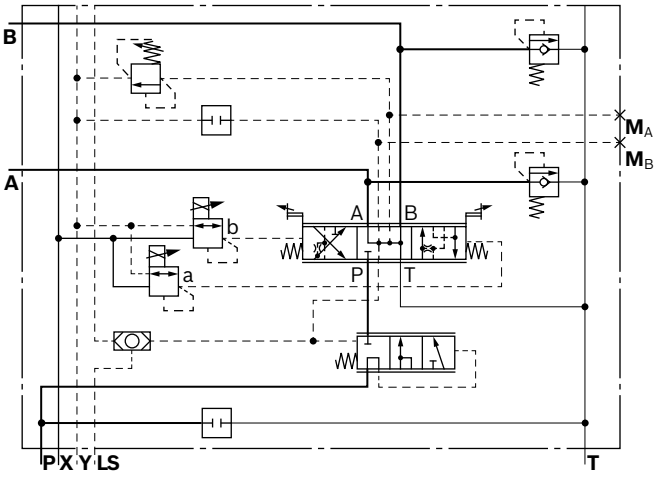
Mono block closed center, without primary pressure relief valve, for external pilot oil supply, for installation of further directional valve sections

Ordering code:

JM	Q	X

S	Q	M	...	J	...-...	W2	1	–	H...	H...

Notice
Design by technical sales.



Available housing variants

			With secondary valve options (retrofittable)	**Without secondary valve** (cannot be retrofitted)	**Without secondary valve** (cannot be retrofitted)
			Q, A..., H...	**XX**	**ZZ**
		A, B =	**G ¹/₂**	**G ¹/₂**	**G ³/₄**
Standard	Without LS pressure relief valves (LS-PRV cannot be retrofitted)	**ZZZ**	●	●	●
	Without LS pressure relief valves for change-over axis (LS-PRV cannot be retrofitted)	**ZUZ**			●
	With only 1 LS pressure relief valve for same pressure setting in **A** and **B**	**= M...**	●	●	
	With 2 LS pressure relief valves (specified pressure in bar, 3-digit)	**...M...**	●	●	●
	With LS pressure relief valves (specified pressure in bar, 3-digit) Housing for electro-proportional or switchable LS pressure relief	**...K...**	●		●
Mechanical only	Without LS pressure relief valves (LS-PRV cannot be retrofitted)	**ZZZ**	●		●
	With 2 LS pressure relief valves (specified pressure in bar, 3-digit)	**...M...**	●		●
	Without LS pressure relief valves (LS-PRV cannot be retrofitted) Housing for electro-proportional or switchable LS pressure relief	**ZKZ**		●	
	Housing for hydraulic pressure control, with LS and PST outlet	**...C...**	●		

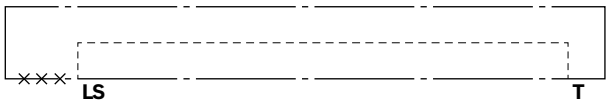
● = available

End plates

With LS relief

Ordering code:

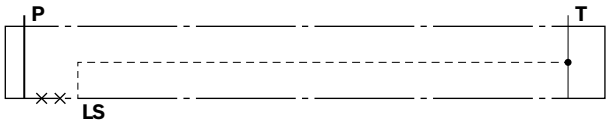
LA



End plate LA with additional P and T port

Ordering code:

LAPT

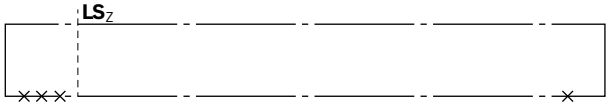


With LS port

Ordering code:

LZ

- LS relief must be provided externally

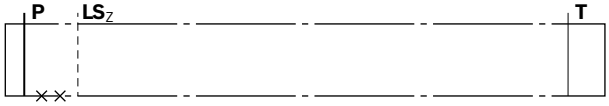


End plate LZ with additional P and T port

Ordering code:

LZPT

- LS relief must be provided externally

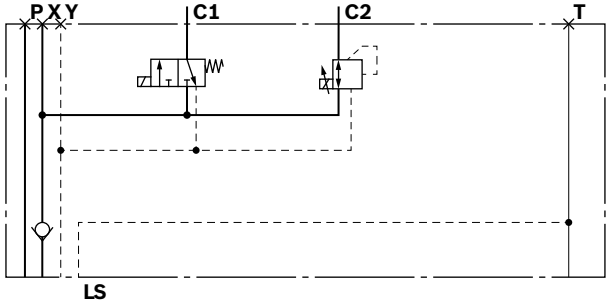


End plate LA with two installation bores for FTDRE4K, FTWE4K[1)]

Ordering code:

LA	W4	W2

- For 30 bar pilot pressure
- See also data sheet 58038 and/or 58008

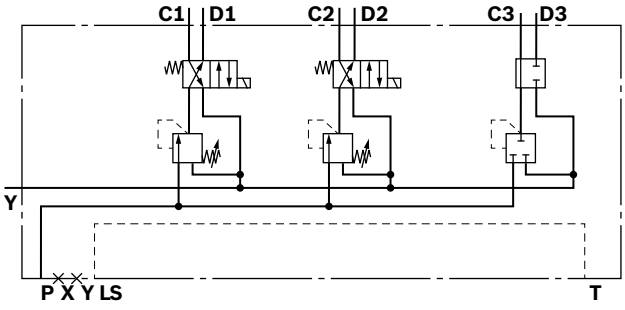


End plate LA with three installation bores for pressure reducing valve, KKDER... [1)]

Ordering code:

LA	...	KKDER...	...	KKDER...	Q	Q

- Max. 40 l/min per working port
- See also data sheet 18136-05

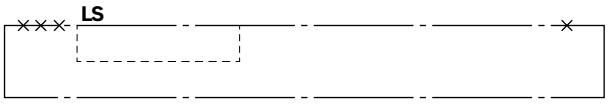


1) Please consult our technical sales department

Diversion plate for use with central inlet plate

Ordering code:

LU

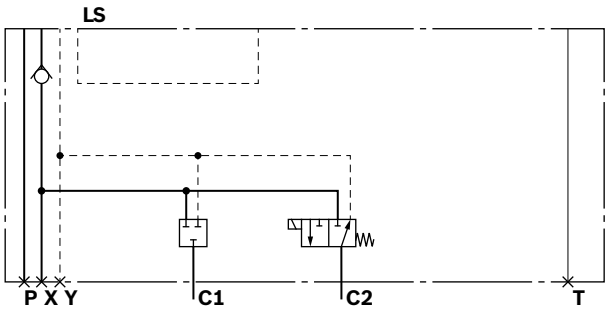


Diversion plate LU with two installation bores for FTDRE4K, FTWE4K[1)]

Ordering code:

LU	Q	W4

- For 30 bar pilot pressure
- See also data sheet 58038 and/or 58008

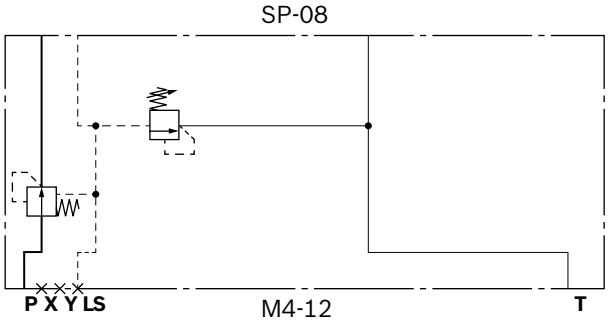


Intermediate plate for SP-08 directional valve sections

Ordering code:

L8	210

- With integrated 2-way pressure compensator
- With LS pressure relief valve, set to 210 bar
- Ordering code for flanged SP-08 directional valves in accordance with data sheet 64139
- A maximum of 7 directional valve sections M4-12 are permissible

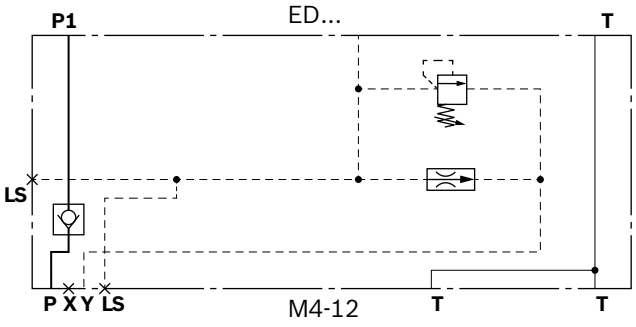


Intermediate plate for Bosch Rexroth Oil Control ED valves

Ordering code:

TI

- Please consult technical sales for ordering code for flanged ED directional valves.



Dimensions

Line connections

Ports			
P	Pump port	**LS**	Load sensing signal
A, B	Consumer port	**LS_Z**	LS supply
a, b	Pilot oil port	**M**	Pump measuring port
T	Tank port	**M_A, M_B**	LS pressure measuring port
X	Pilot oil supply	**M_b, M_b**	Pilot pressure measuring port
Y	Pilot oil return	**C**	External consumers

Pipe thread line connections (version **01**)

		P	**T**	**A, B**	**a, b**	**LS**	**X, Y**	**M, M_A, M_B**	**M_a, M_b**	**C, C1...C6**
Inlet plate	P	G 3/4	G 1	–	–	G 1/4	G 1/4	G 1/4	–	–
	J	G 3/4	G 3/4	–	–	G 1/4	G 1/4	G 1/4	–	–
	JZ	G 1	G 1	–	–	G 1/4	G 1/4	G 1/4	–	–
	JK	G 1 1/4	G 1 1/4	–	–	G 1/4	G 1/4	G 1/4	–	–
Mono block	PM, JM	G 3/4	G 3/4	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	–	–
Directional valve section	With secondary valves	–	–	G 1/2	G 1/4	–	–	G 1/4	G 1/8	–
	Without secondary valve (ZZ)	–	–	G 3/4	G 1/4	–	–	G 1/4	G 1/8	G 3/4
	Without secondary valve (XX)	–	–	G 1/2	G 1/4	–	–	G 1/4	G 1/8	–
End plate	LZ	–	–	–	–	G 1/4				–
	LAPT, LZPT	G 3/4	G 3/4	–	–	G 1/4	–	–	–	–
	LA... ...	G 1/2	G 3/8	–	–	G 1/4	G 1/4	–	–	G 1/4
	LU... ...	G 1/2	G 3/8	–	–	G 1/4	G 1/4	–	–	G 1/4

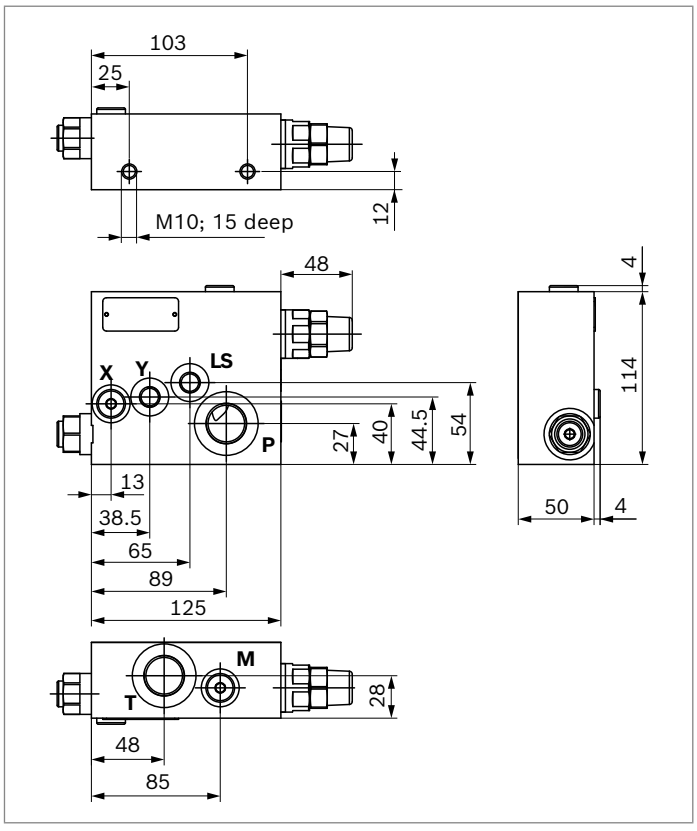
Mounting bolts M10 according to EN ISO 4762 or EN ISO 4014:

Property class	8.8	10.9
Tightening torque	$41^{\pm 2}$ Nm	$60^{\pm 3}$ Nm

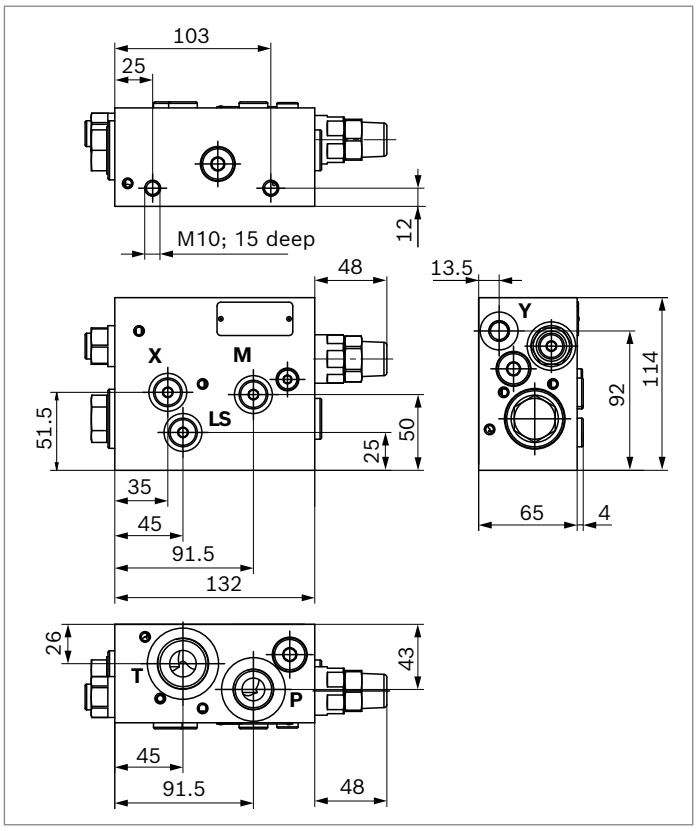
Ports according to ISO 1179-1

Inlet plates

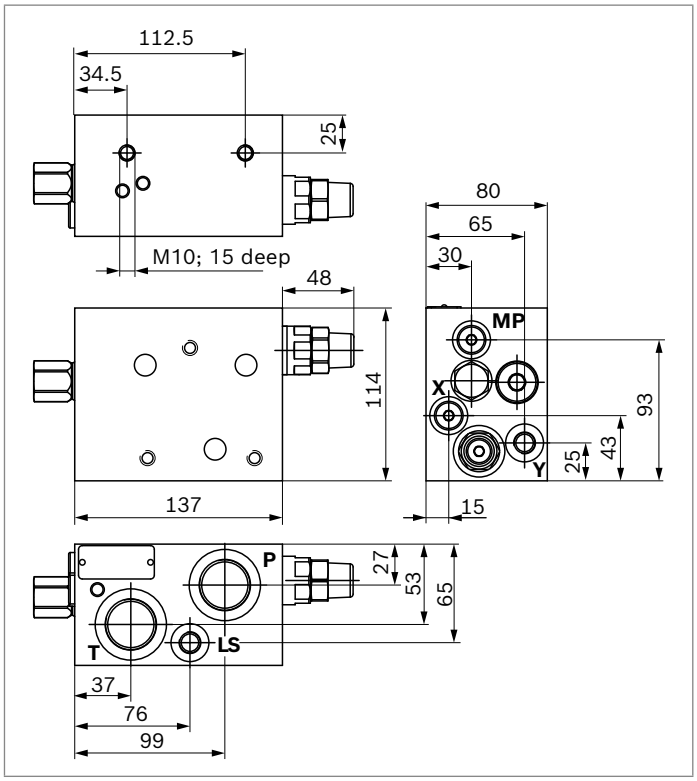
▼ Lateral inlet plate J...Y



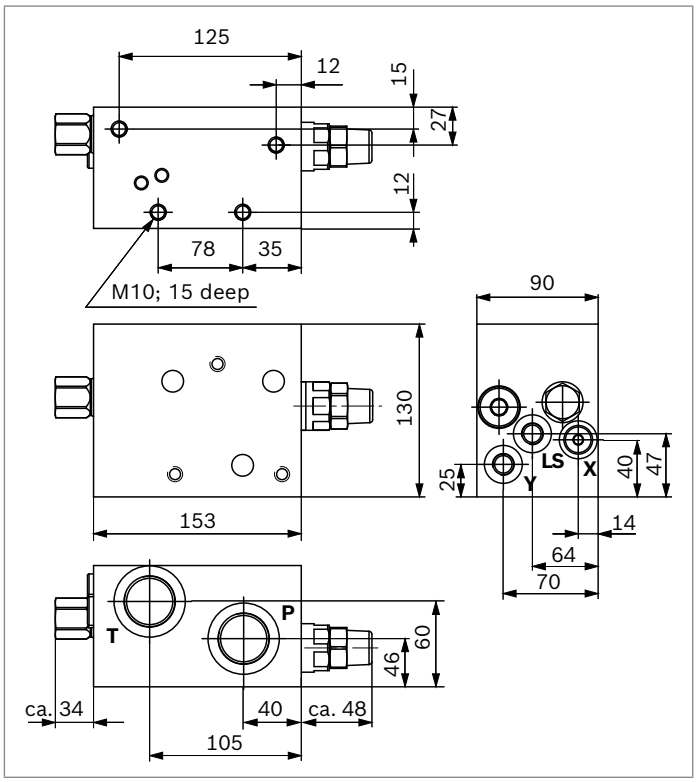
▼ Lateral inlet plate P...Y



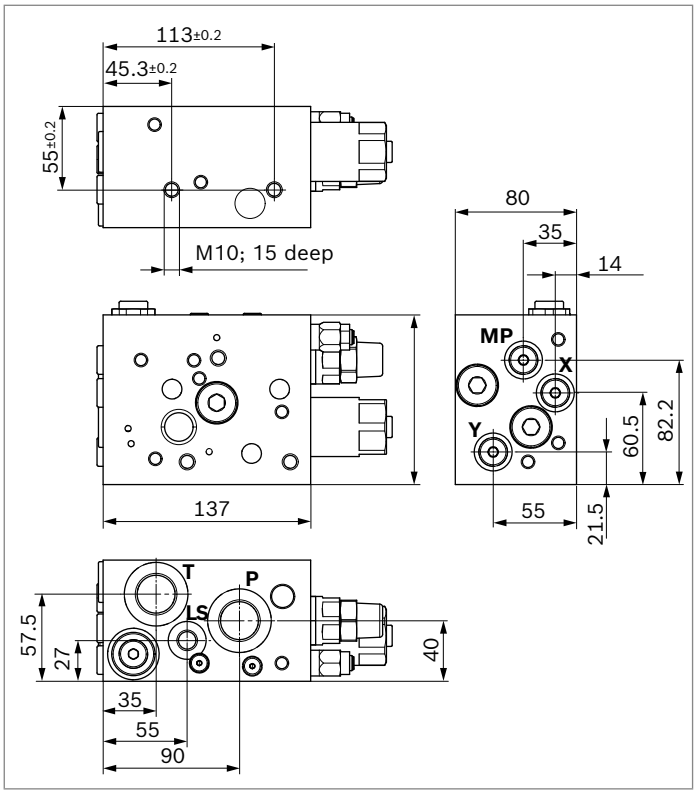
▼ Central inlet plate JZ



▼ Central inlet plate JK

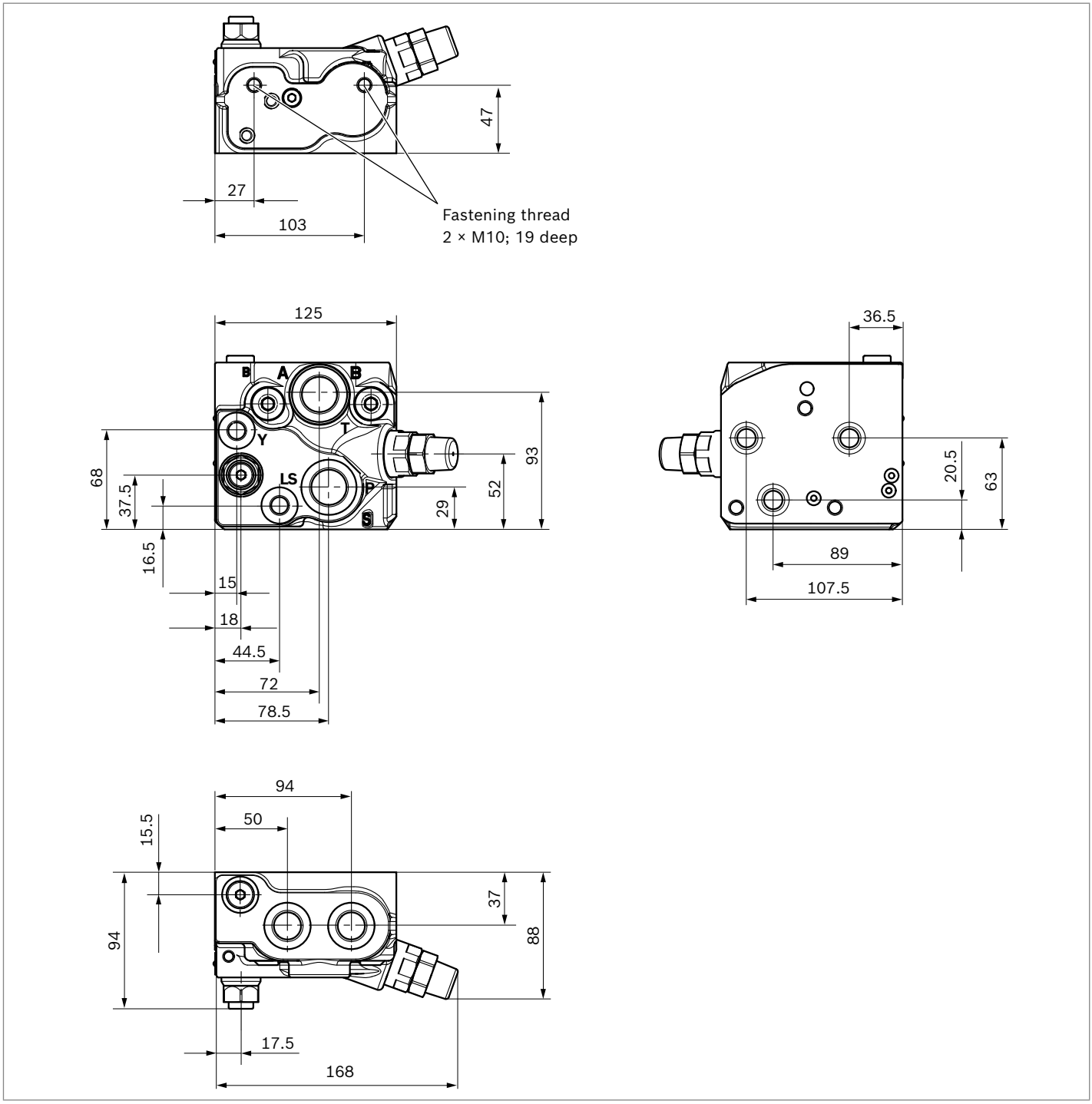


▼ Central inlet plate VZ

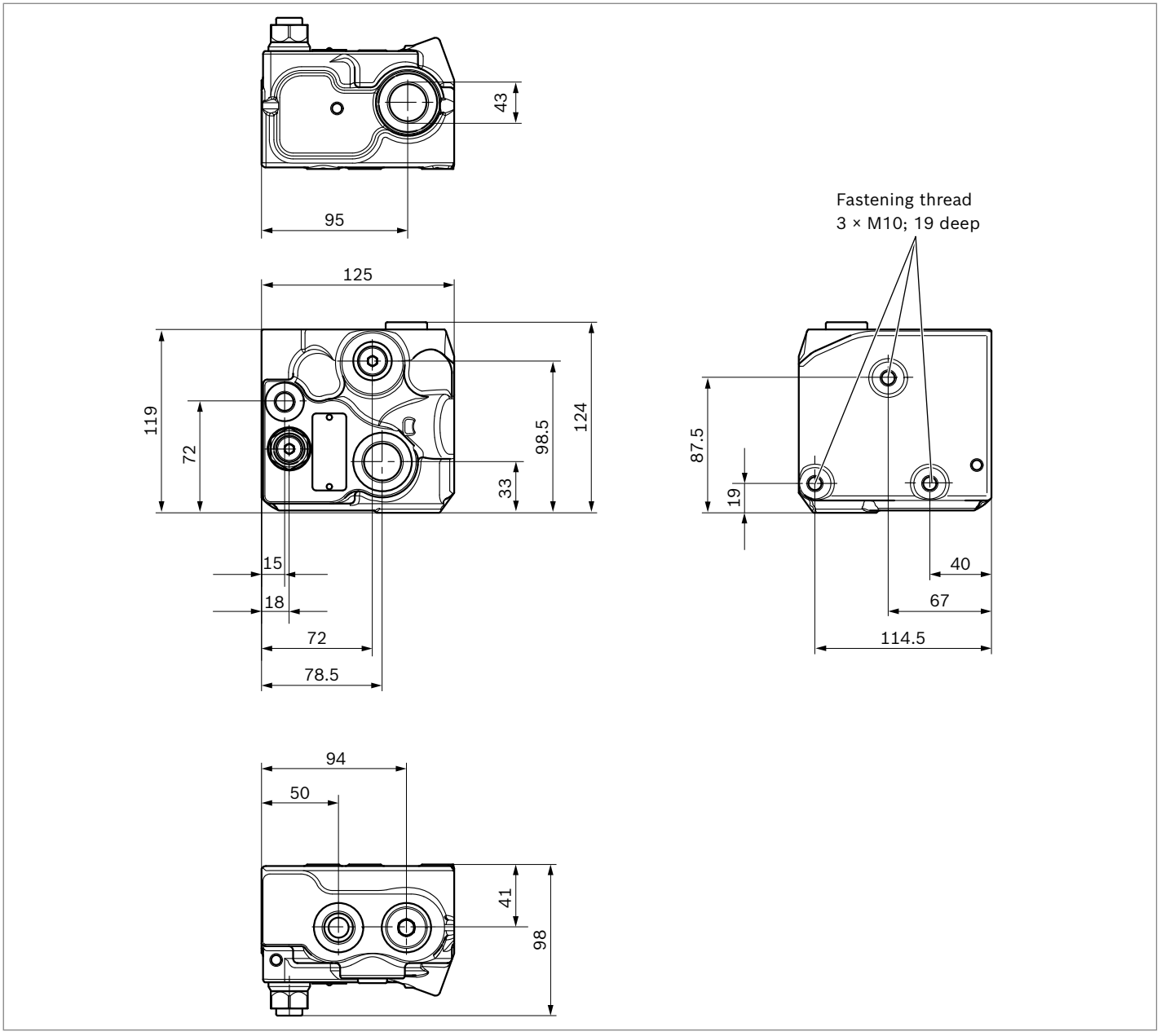


Mono block

▼ **JM closed center standard mono block (inlet and direction valve function), additional directional valve sections flange-mountable**



▼ **PM open center standard mono block** (installation of further directional valve sections is not possible)

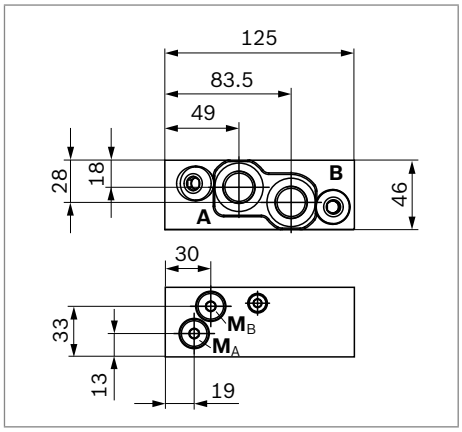


Directional valve sections

▼ **Housing with secondary valve bore, consumer port G 1/2**

Ordering code:

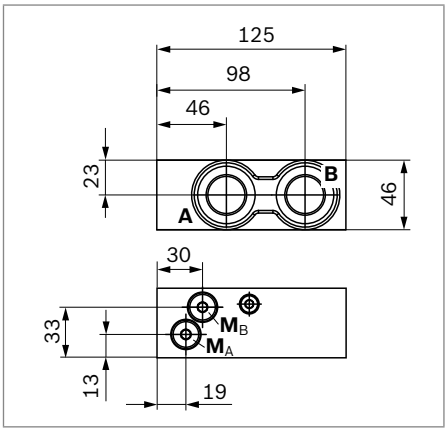
...	A...	A...	...
...	H...	H...	...
...	Q	Q	...



▼ **Housing without secondary valve bore, consumer port G 3/4 or G 1/2**

Ordering code:

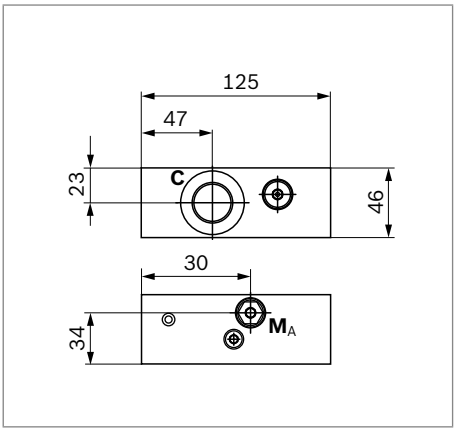
...	Z	Z	...
...	X	X	...



▼ **Housing for change-over axis, consumer port G 3/4**

Ordering code

...	ZUZ	...	Z	Z	...

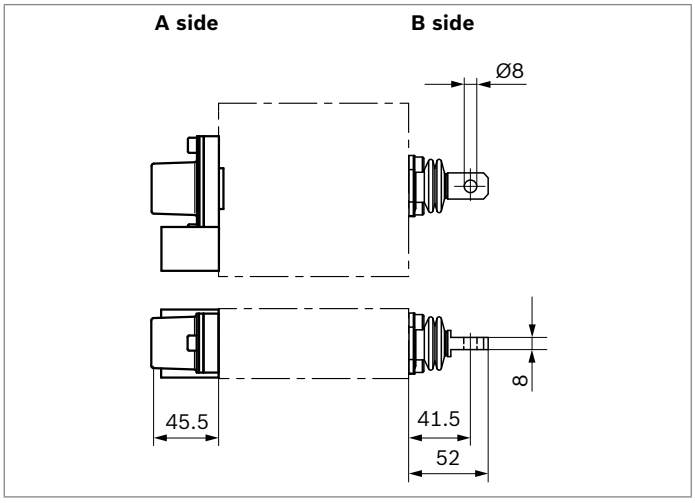


Actuation

▼ Mechanical actuation only, spring-centered with tongue

Ordering code:

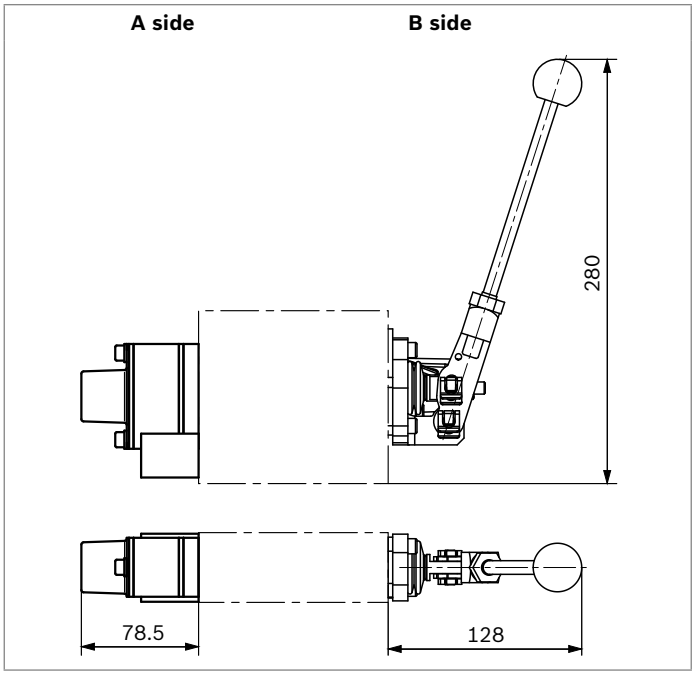
...	A	Z	...



▼ Mechanical actuation only with detent, tongue and lever

Ordering code:

...	B1	N	...

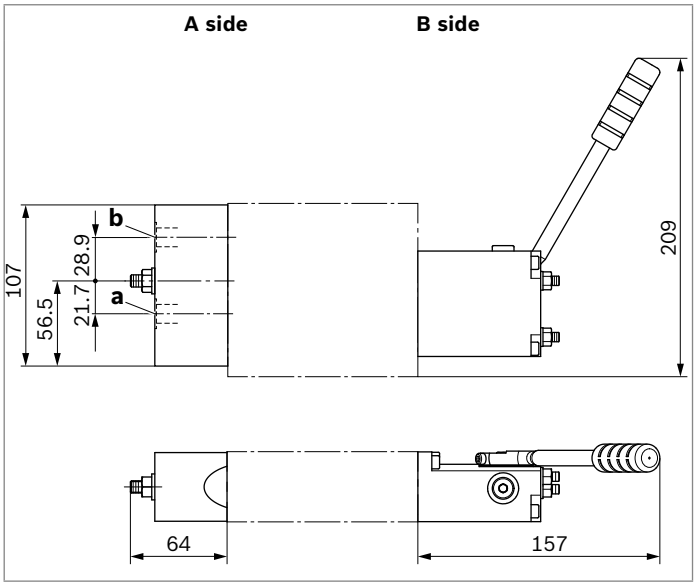


▼ Mechanical/hydraulic actuation with cover with clamping piece and hand lever (encapsulated), aluminum-free

Ordering code:

...	M	B2	...

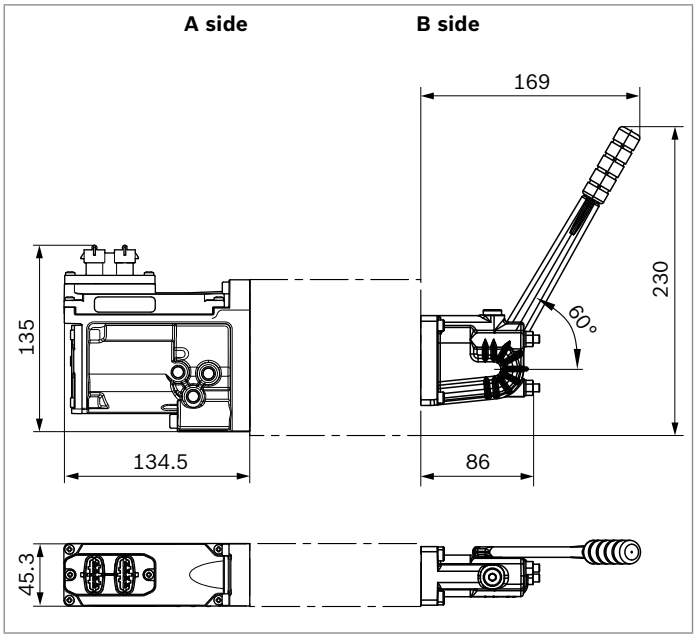
...	H	B2	...



▼ Electronic pilot module CPM with hand lever (encapsulated)

Ordering code:

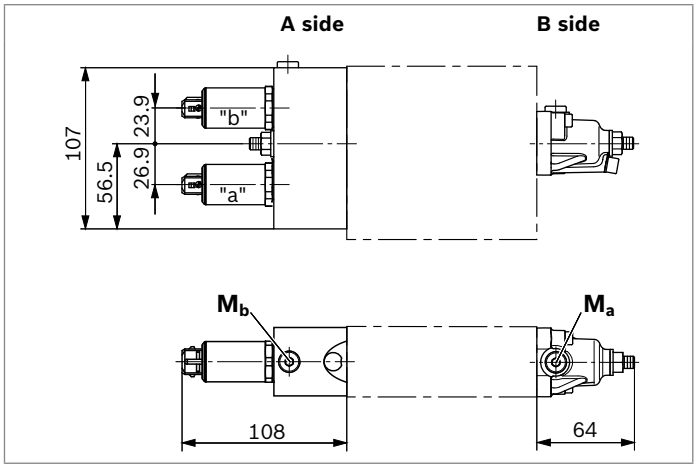
...	CPS	K	...



▼ **Electrohydraulic actuation with standard cover**

Ordering code:

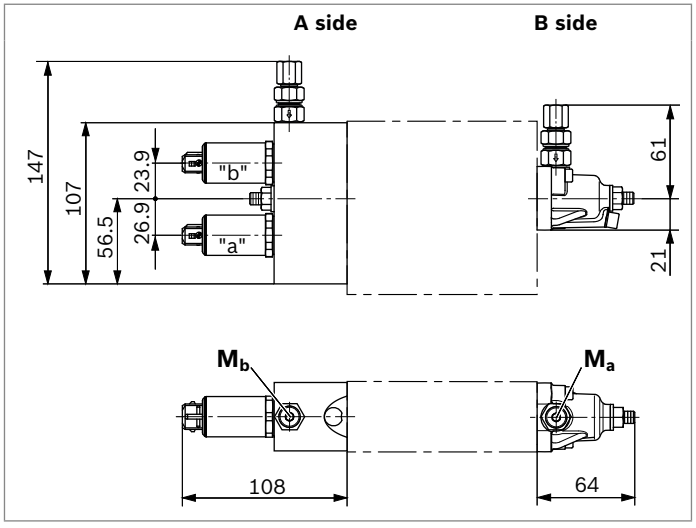
...	W	–	...



▼ **Electrohydraulic actuation with check valve for hydraulic superposition**

Ordering code:

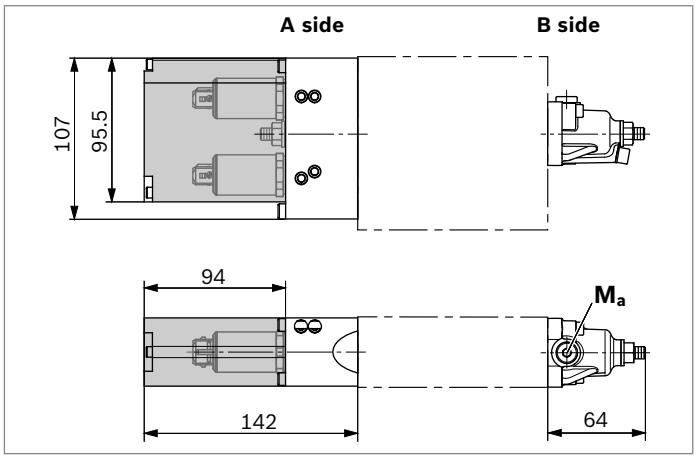
...	G	–	...



▼ **Electrohydraulic actuation (seawater-resistant) with standard cover**

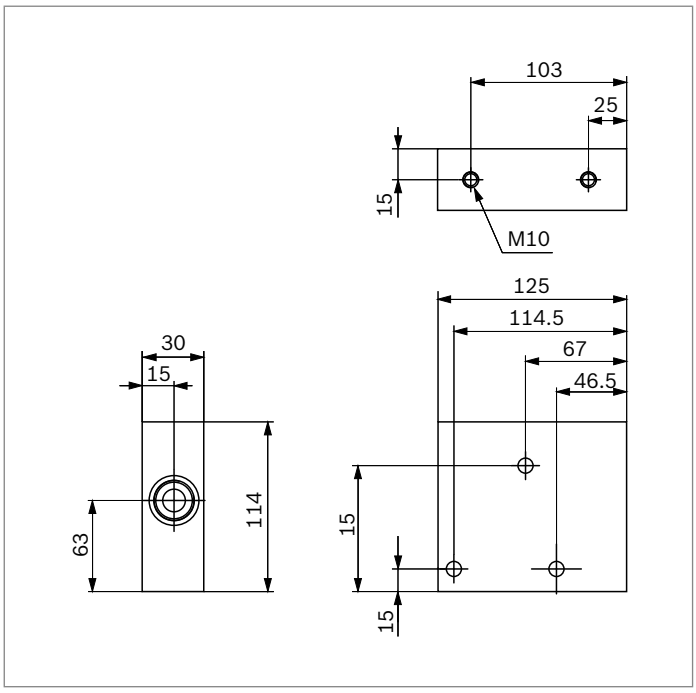
Ordering code:

...	W	–	...	–038

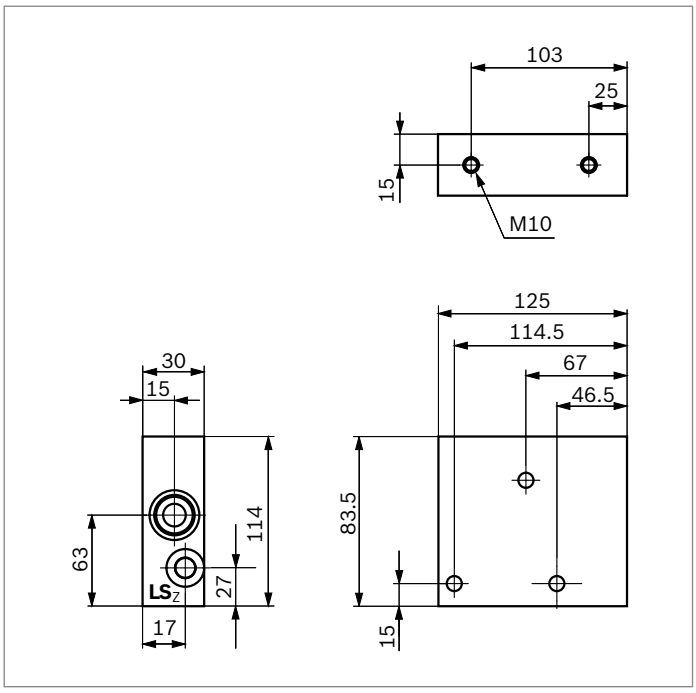


End plates

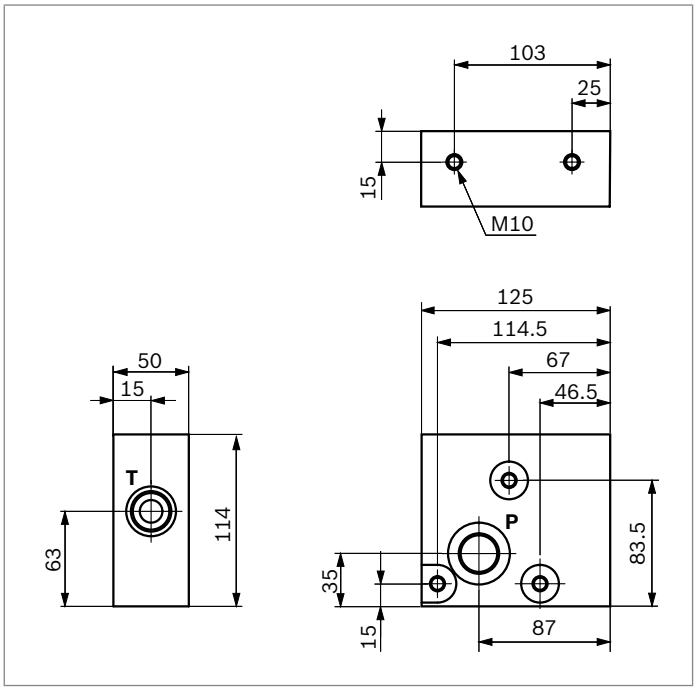
End plate LA



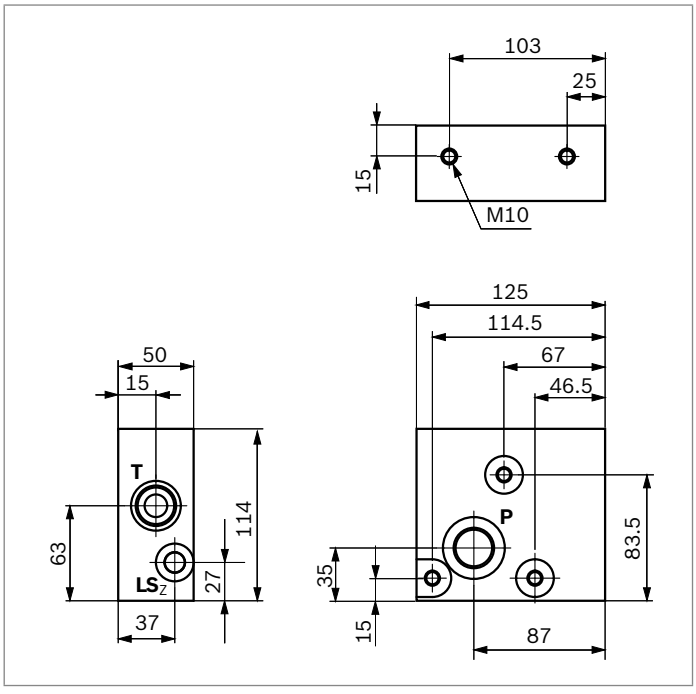
End plate LZ



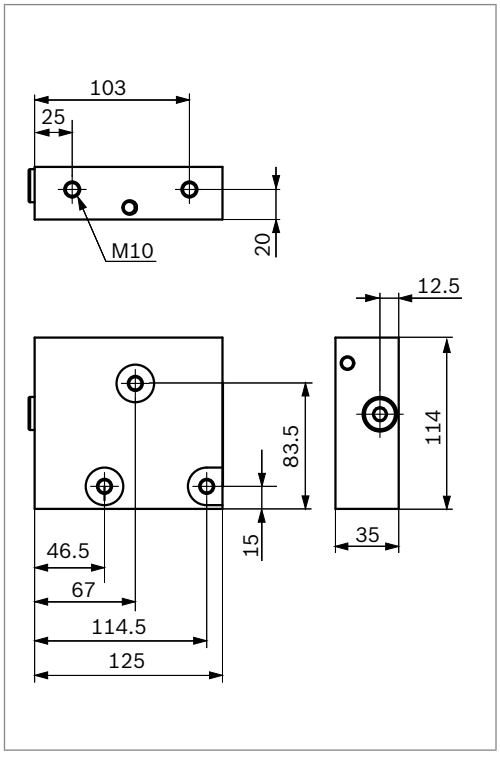
End plate LAPT



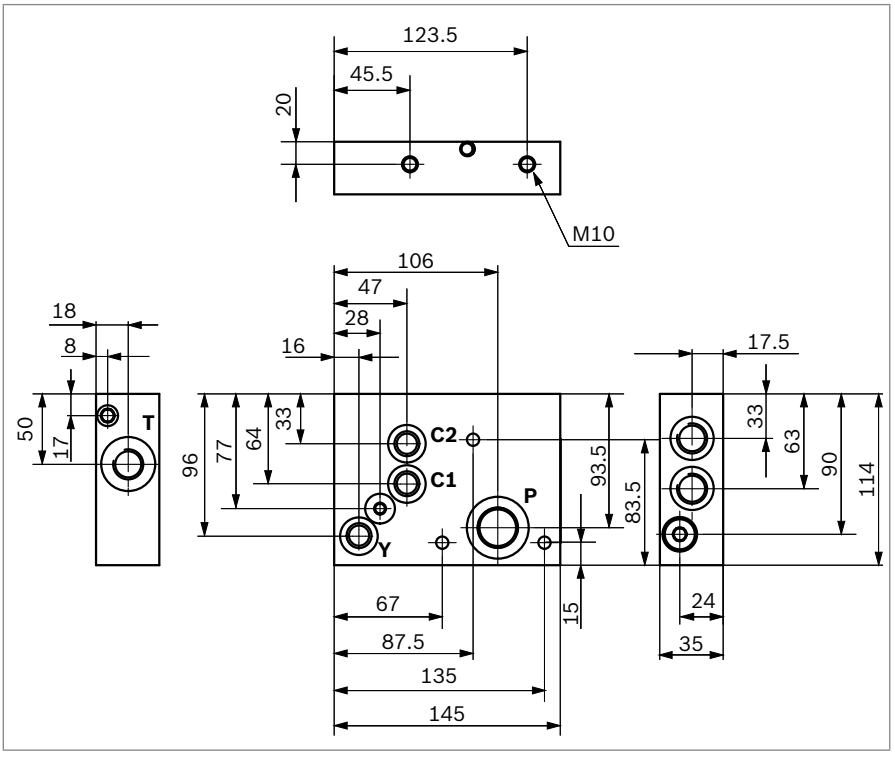
End plate LZPT



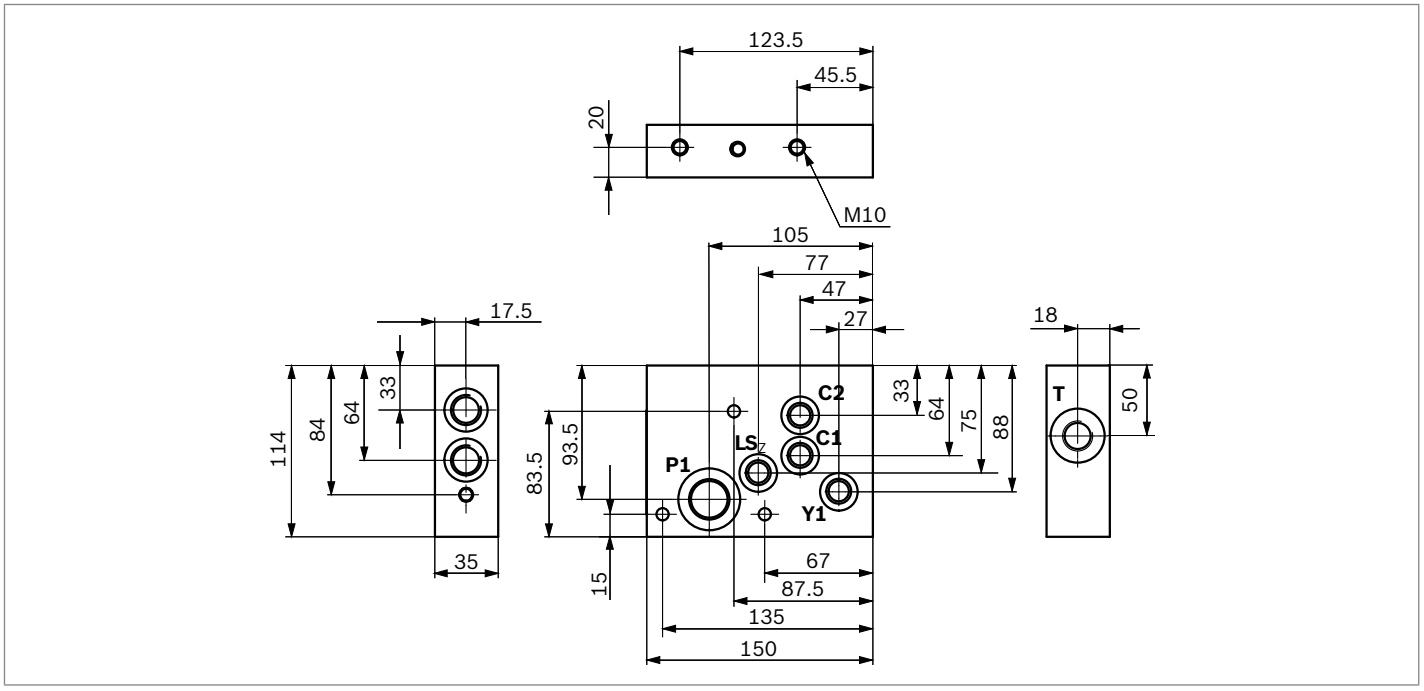
▼ **Diversion plate LU**



▼ **Diversion plate LU with two installation bores**

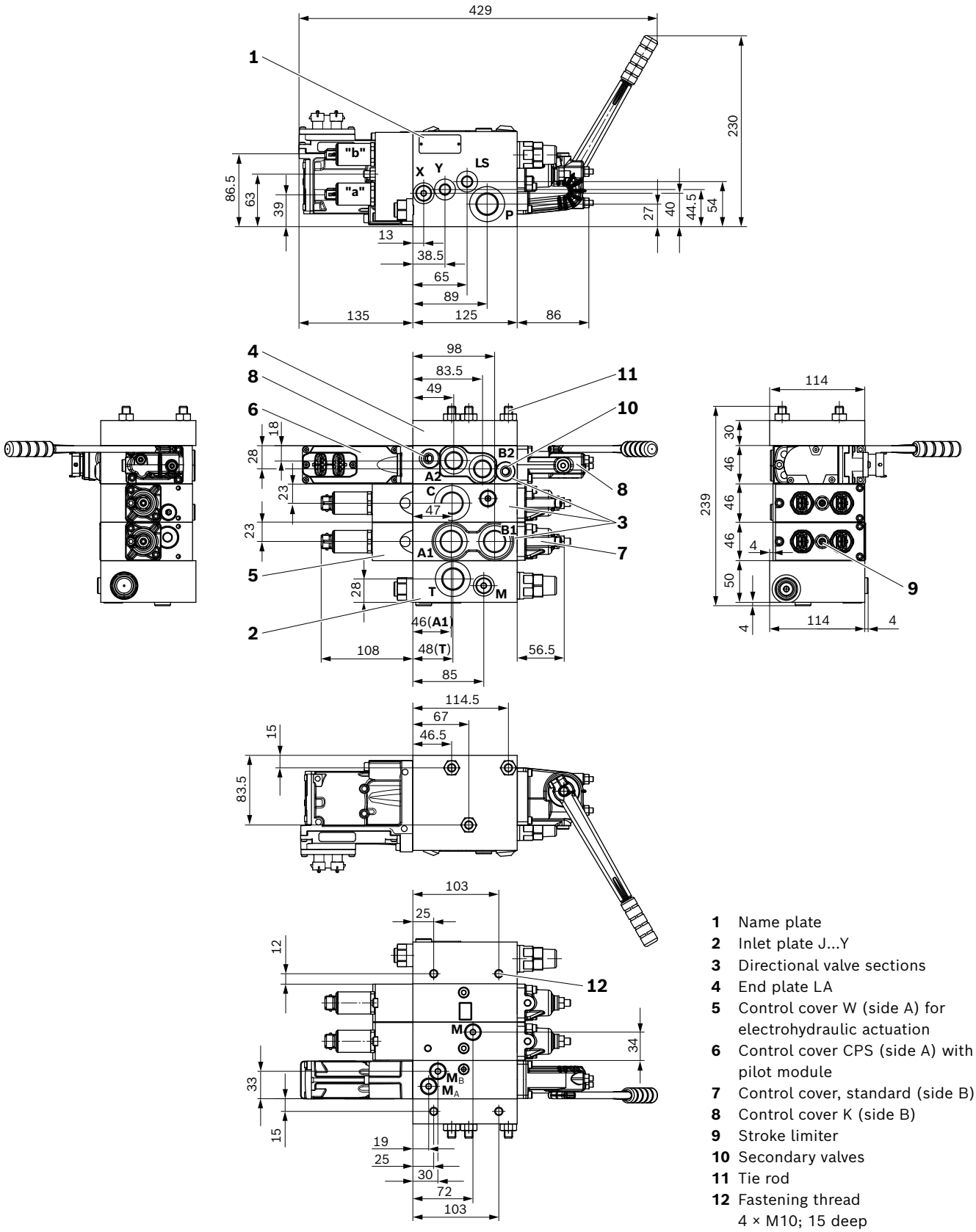


▼ **End plate LA with two installation bores**

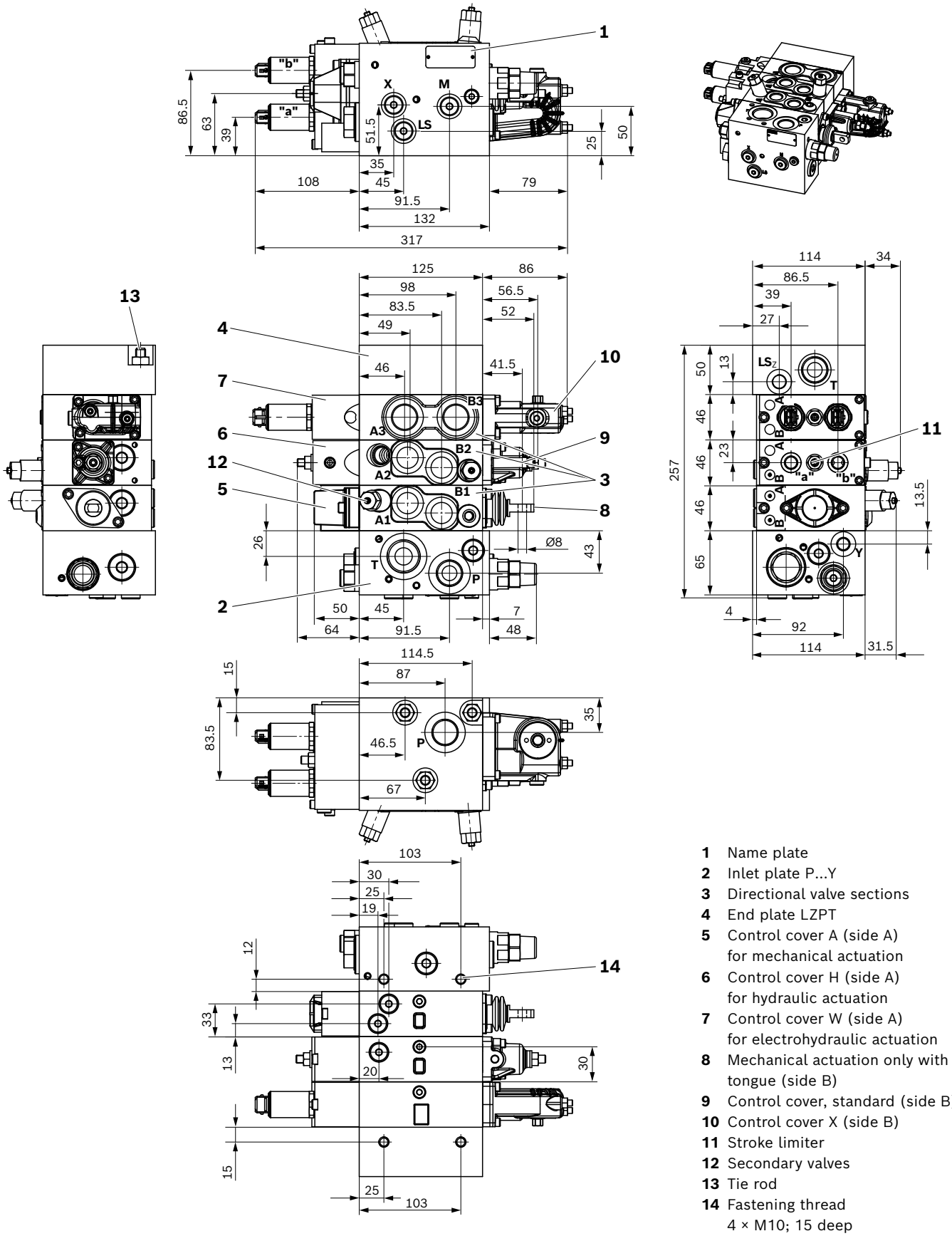


Order examples

▼ **Closed center control block with lateral inlet plate** (according to order example on page 13)

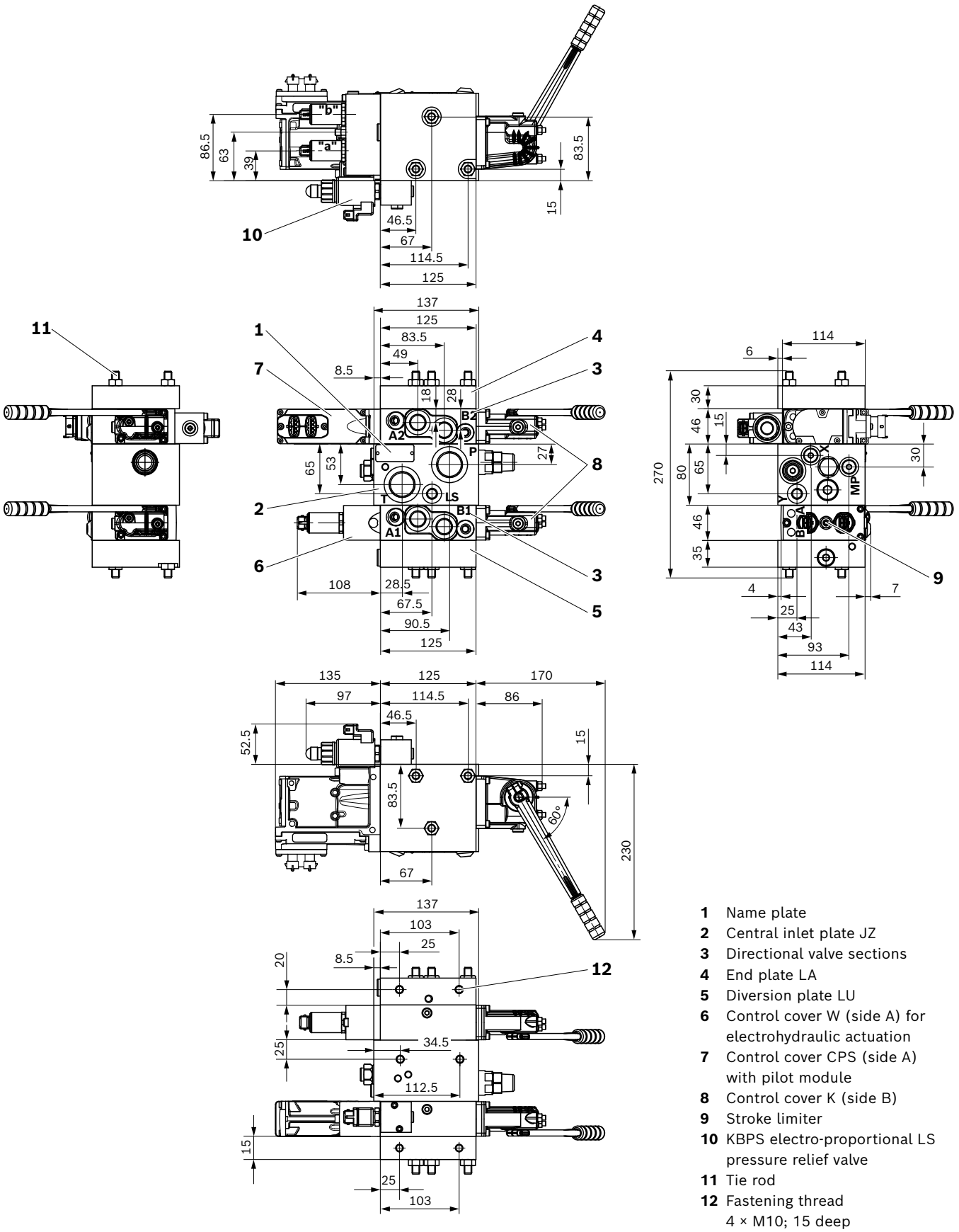


▼ **Open center control block with lateral inlet plate** (according to order example on page 14)



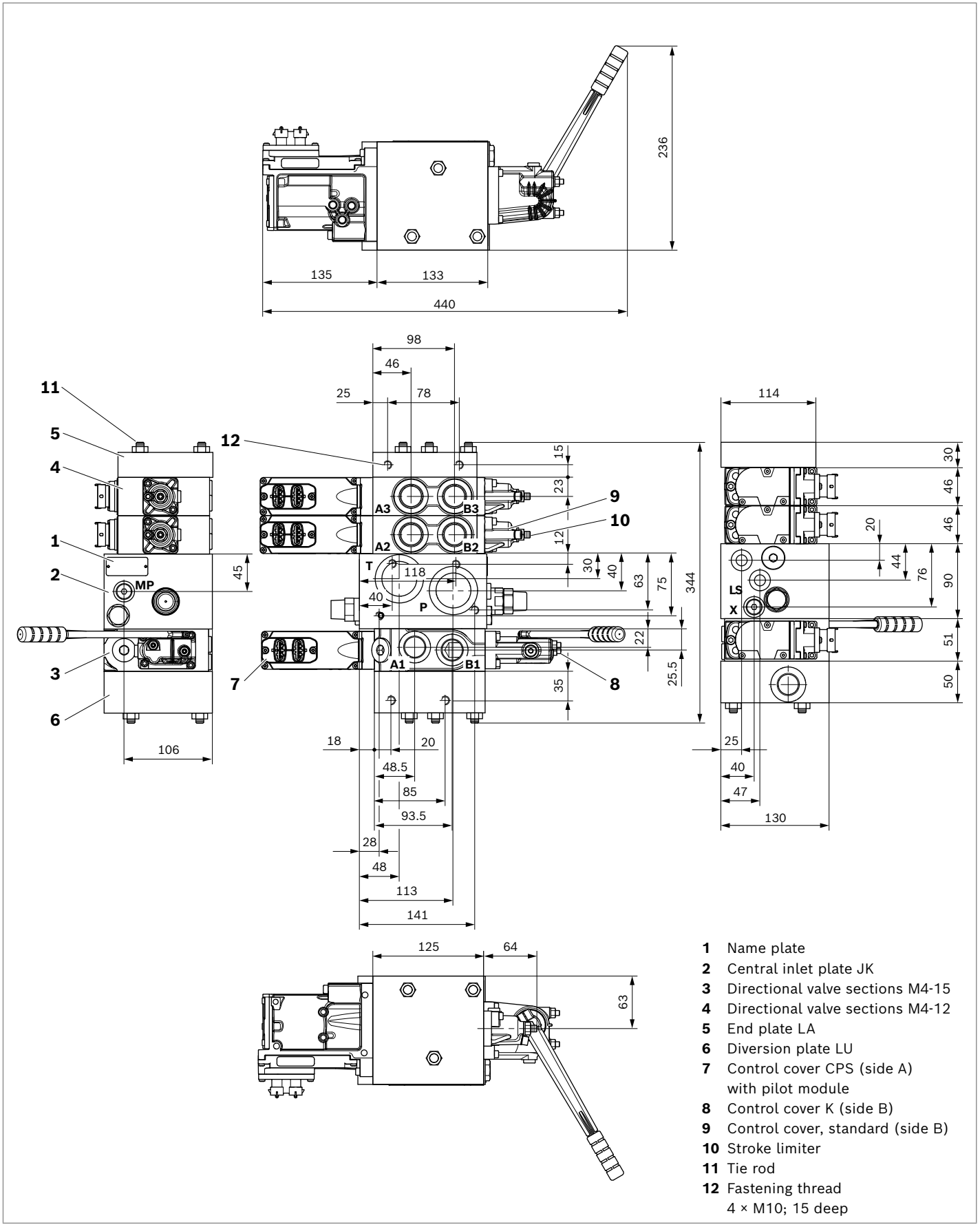
1 Name plate
2 Inlet plate P...Y
3 Directional valve sections
4 End plate LZPT
5 Control cover A (side A) for mechanical actuation
6 Control cover H (side A) for hydraulic actuation
7 Control cover W (side A) for electrohydraulic actuation
8 Mechanical actuation only with tongue (side B)
9 Control cover, standard (side B)
10 Control cover X (side B)
11 Stroke limiter
12 Secondary valves
13 Tie rod
14 Fastening thread 4 × M10; 15 deep

▼ **Closed center control block with central inlet plate** (according to order example on page 15)



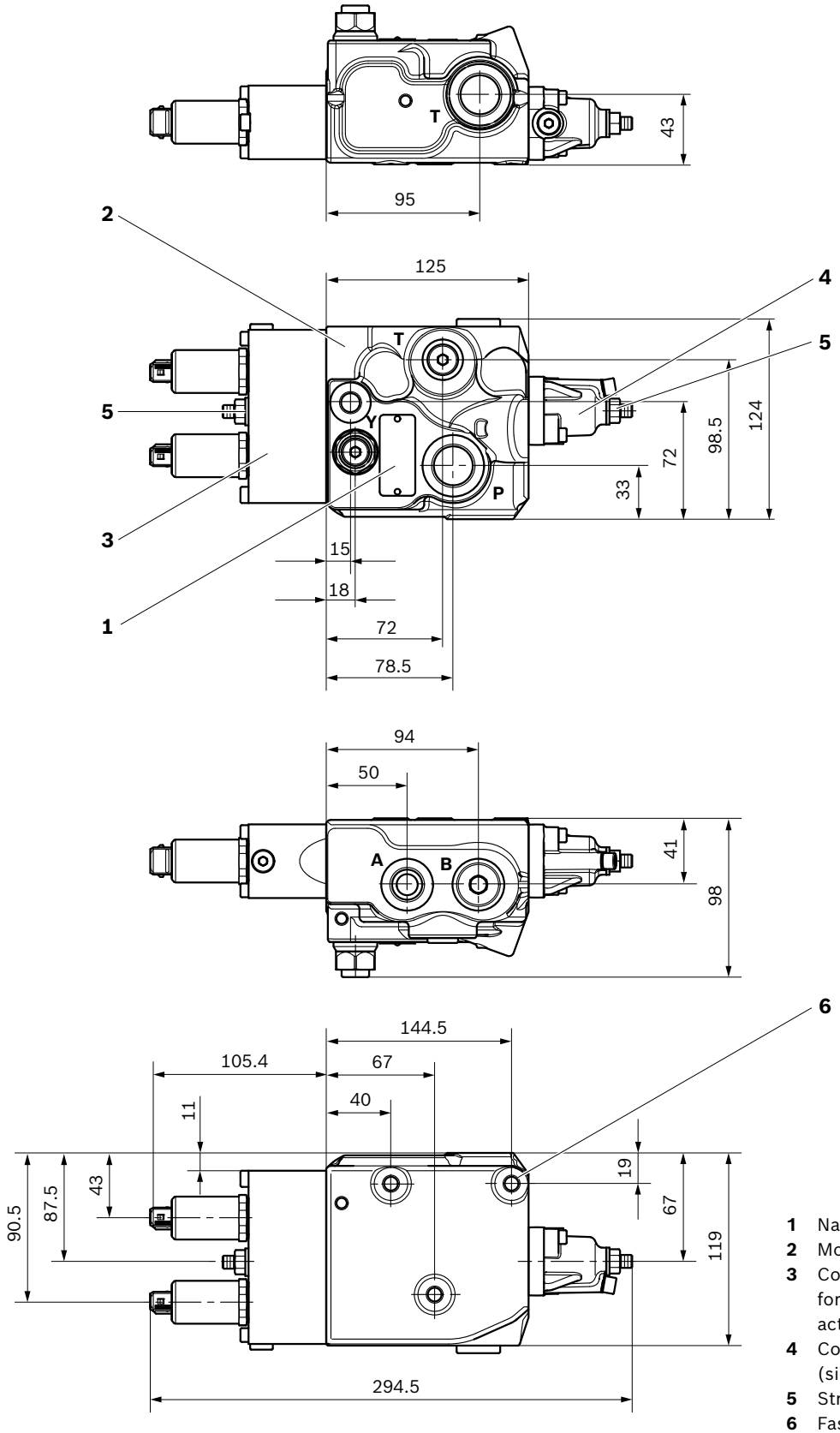
1 Name plate
2 Central inlet plate JZ
3 Directional valve sections
4 End plate LA
5 Diversion plate LU
6 Control cover W (side A) for electrohydraulic actuation
7 Control cover CPS (side A) with pilot module
8 Control cover K (side B)
9 Stroke limiter
10 KBPS electro-proportional LS pressure relief valve
11 Tie rod
12 Fastening thread 4 × M10; 15 deep

▼ **Closed center control block with combination inlet plate** (according to order example on page 16)



1 Name plate
2 Central inlet plate JK
3 Directional valve sections M4-15
4 Directional valve sections M4-12
5 End plate LA
6 Diversion plate LU
7 Control cover CPS (side A) with pilot module
8 Control cover K (side B)
9 Control cover, standard (side B)
10 Stroke limiter
11 Tie rod
12 Fastening thread 4 × M10; 15 deep

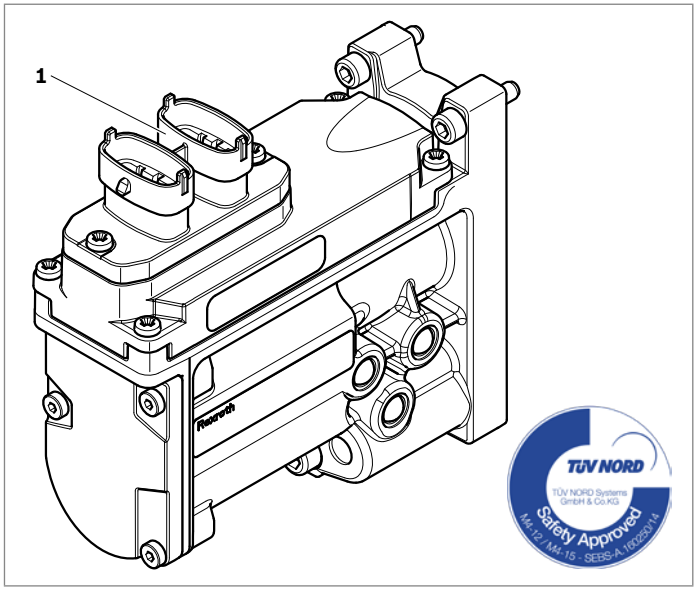
▼ **PM open center mono block** (installation of further directional valve sections is not possible)



1 Name plate
2 Mono block PM
3 Control cover W (side A) for electrohydraulic actuation
4 Control cover, standard (side B)
5 Stroke limiter
6 Fastening thread 3 × M10; 19 deep

On-board electronics: CAN bus-controlled pilot module CPM

▼ **CAN bus-controlled pilot module CPM**



Function

The electronic pilot module provides the flow control on M4-12 control block via a digital electrical signal.
The digital (CAN bus) input signal is compared in the pilot module electronics with the signal of the integrated position transducer and the control spool is set to the desired position.
With the CAN bus control, a looping of the electrical connection via the second plug-in connection to the next pilot module is possible (daisy-chain wiring).
The entire control block is then connected via the 4-pin Bosch Compact 1 connector of the first pilot module to the machine control.
At the outlet of the last pilot module, additional CAN bus devices or an alternative end plug with optional resistor can be connected (see also 64819-B or 64820-B). Please observe impedances and voltage drops in your CAN bus system. For this purpose, resistances exceeding 120 Ohm may need to be selected.

Time functions (ramp functions), characteristic curve form and increase can be configured or changed directly via the CAN bus during the working cycle. Various diagnostic functions monitor the correct functioning of the pilot module.

In the basic version, the following is monitored:
- Correct reception of a valid command value signal
- Stability of the connection to the setpoint value transmitter
- Compliance with the defined limits of the supply voltage
- Function of the pilot valves (short circuit, cable break)

Malfunctions are displayed externally via a visible light-emitting diode (LED) (**1**) displayed in the form of an error code (flashing code) at Bosch compact connector.
In case of an error, it is transmitted to the control unit via error code (see 64819-B or 64820-B) in the CAN telegram of the pilot module for evaluation.

Features

- Only 1 connection cable per CAN bus chain required (interconnections by daisy-chain)
- Volumetric control with position control (closed loop)
  - High precision
  - High dynamics
  - Low flow hysteresis
- Separate selectable time ramps for each valve output A and B, opening and closing
- Separate changeable characteristic curves from linear to progressive sequence for A and B
- Linear characteristic curve reduction in operation and consequent linear reduction of total quantity
- Selectable monitoring limits of the operating voltage can be configured via CAN bus
- Extensive parameterizability according to customer requirements from the plant by Bosch Rexroth (see parameter sheet 64820-01)
- On request, safety-relevant values are available according to ISO 13849
- CAN interface/protocols:
  - CANopen standard
- Service/commissioning:
  - Self-diagnostics (electronic and hydraulic) and fault memory
  - Operation via BODAS service
- Downwards compatibility to previous module EPM2
- Functional safety for multi-axle operation:
  - Development in accordance with ISO 13849. Use in systems with up to 8 simultaneous movements to Performance Level d by means of two-channel electric pilot module hardware

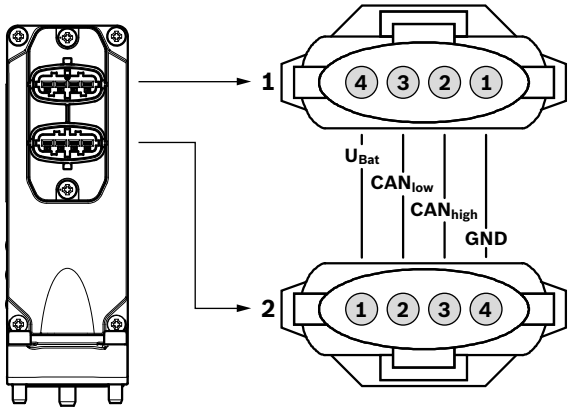
Parameterization specifications

For the parameterization specifications form, see project planning help 64820-01.
It serves to adjust the electronic pilot module to the customer's request upon delivery.

CAN connector pin assignment

Connection via Bosch compact connector coding 1. When using the CAN control, a connection to the next module or to another CAN participant is possible via the second Bosch compact connector, coding 2.

▼ **Pin assignment on the Bosch compact connector**

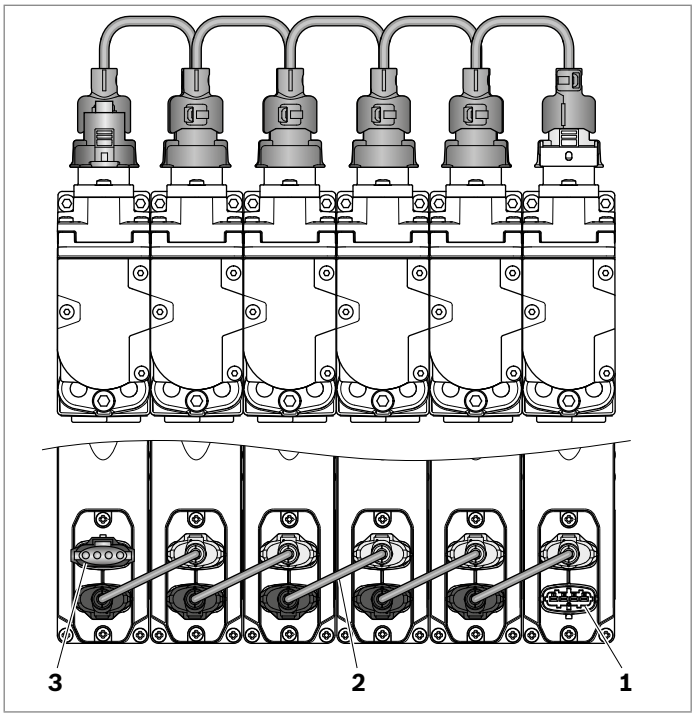


1 Bosch compact, coding 1 (black)
2 Bosch compact, coding 2 (gray)

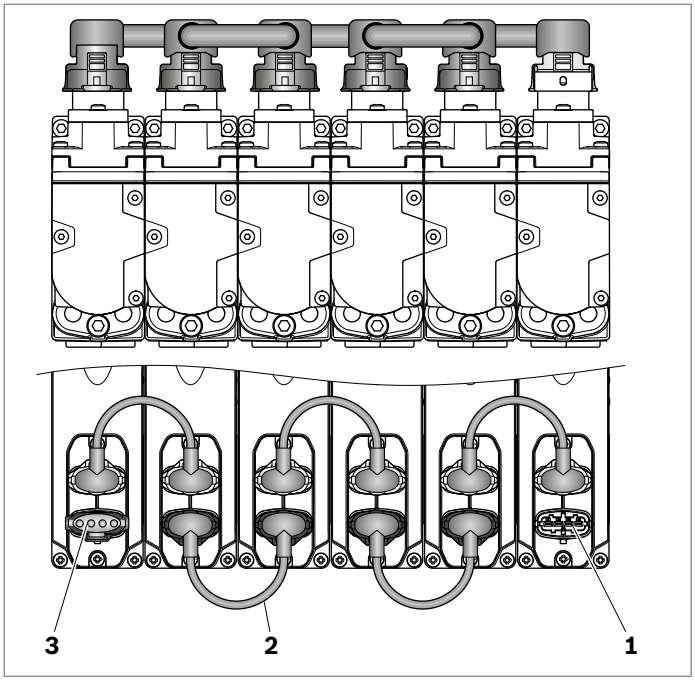
Notice
Connection cable and end plug are included in scope of delivery (see "Accessories" on page 53).
Bosch Rexroth guarantees the correct function of the device, as described in instruction manual 64819-B or 64820-B. Bosch Rexroth assumes no liability for the safe operation of the machine or system of which this device forms part.

Recommended connector sets for connection to the machine electronics, see "Accessories" on page 53

▼ **Daisy-chain wiring, standard version**



▼ **Daisy-chain wiring, compact version**



1 Open connector for connection to the machine electronics
2 Daisy-chain wiring
3 Connector with terminal resistor

Accessories

Cables and connectors for CPM

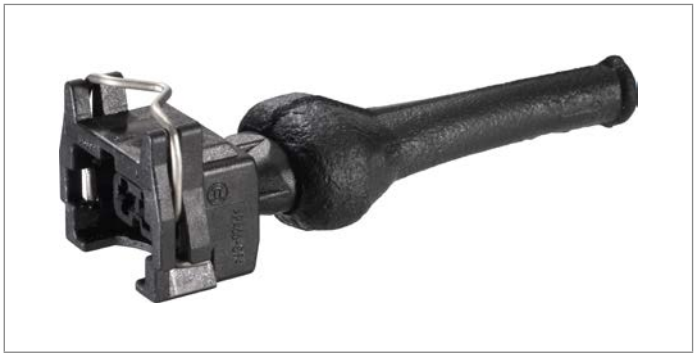
	Material number	Type	Description	Length
Daisy-chain cable, standard version				
	R917c02581 R917c02599 R917c02628	Cable Cable Cable	For connection of two pilot modules (standard) For connection of two pilot modules For connection of two pilot modules via central inlet	190 mm 240 mm 370 mm
Daisy-chain cable, compact version				
	R917c05332	Cable	With two connectors, coding 1 (black) 90°	
	R917c05333	Cable	With two connectors, coding 2 (gray) 90°	
Connection cable				
	R917c02724	Cable	With one connector, coding 1 (black)	4000 mm
Connector and connector sets				
	R917c05459 R917c02627	Connector Connector	Coding 1 (black), dummy connector Coding 2 (gray), dummy connector	
	R917c05458	Connector	Coding 1 (black), dummy connector with integrated terminal resistor	
	R900785606	Connector set	Bosch compact, coding 1 (black)	
	R900785607	Connector set	Bosch compact, coding 2 (gray)	

Plug-in connector for FTDRE... and FTWE...

Recommended plug-in connector version 1 and 3
Junior timer, 2-pin (AMP)

- Material number: R900313533
  - For conductor cross section from 0.5 to 1 mm² and for an insulation diameter of the individual seals from 1.2 to 2.1 mm
- Material number: R901022127
  - For conductor cross section from 0.5 to 1 mm² and for an insulation diameter of the individual seals from 2.2 to 3 mm

▼ **Recommended plug-in connector for Junior Timer, 2-pin (AMP)**



Recommended plug-in connector version 8 and 9
DT04 (DEUTSCH)

- Material number: R900733451
  - For conductor cross section from 1.3 to 2.08 mm² and for an insulation diameter of the individual seals from 1.35 to 3.05 mm
- Material number: R901017847
  - For conductor cross section from 0.83 to 1.3 mm² and for an insulation diameter of the individual seals from 1.35 to 3.05 mm

▼ **Recommended plug-in connector for DT04 (DEUTSCH)**

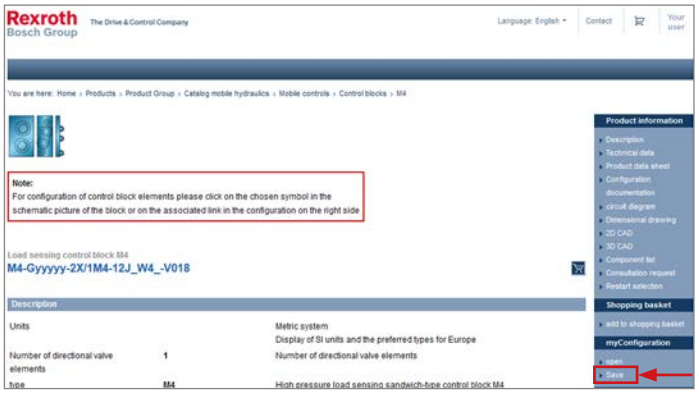
M4 configurator

The M4 configurator is available online. It helps to efficiently utilize the flexibility and versatility of the valve right from the design and engineering phase for new machines.
This user-friendly and intuitive program asks systematic questions about the specific requirements for the system. It then assembles the corresponding control block from individual components. Technical data sheets, parts lists, circuit diagrams, and both 2D and 3D information are instantly available and speed up the development process for the working machine.
The M4 configurator is linked to the Bosch Rexroth eShop. The order of the configured control block can be placed immediately.
Link: `www.boschrexroth.com/m4-configurator`

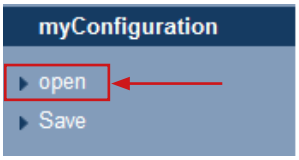
Generate projects
In simple steps, personal control blocks can be configured, saved and the configuration be transferred to Bosch Rexroth:

1. Create and register users

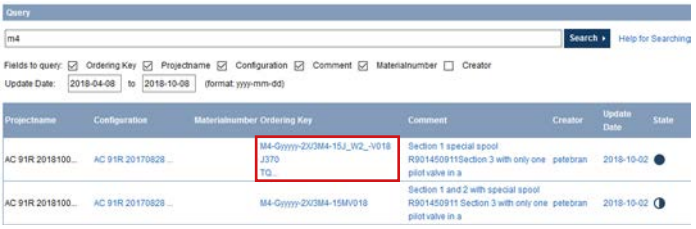
2. Configure control block and save project



3. Open project via data base



4. Select project, copy hyperlink and send to Bosch Rexroth



Related documentation

Product-specific documentation

Document type	Title	Document number
Instruction manual	Control blocks for mobile applications	64025-B
	Load-sensing control block M4-12 for safety-related applications	64276-01-B
Spare parts list	Load-sensing control block M4-12	64276-E
Repair manual	Load-sensing control block M4-12	64276-01-R

Documentation for mounted components

Document type	Title	Document number
Instruction manual	CAN bus-controlled pilot module CPM (CANopen standard communication)	64820-B
	CAN bus-controlled pilot module CPM (CANopen special communication)	64819-B
Project planning help	Parameter sheet CAN bus-controlled pilot module CPM	64820-01
Data sheet	Spool position sensor PSM for control blocks for mobile applications	95190
	Directional spool valve FTWE2K	58007
	Directional spool valve FTWE4K	58008
	Proportional pressure reducing valve FTDRE2K	58032
	Proportional pressure reducing valve FTDRE4K	58038
	2/2-way spool valve KKDE (directional valve section)	18136-08
	3/2-way spool valve KKDE (inlet plate)	18136-09
	4/2-way spool valve (end plate)	18136-05
	Proportional pressure relief valve, increasing characteristic curve KBPS.8A	18139-04
	Proportional pressure relief valve, decreasing characteristic curve KBPS.8B	18139-05
	2-way logic element MH2DAD	64586
	Load-sensing control block SP-08	64139

Documentation for control components

Document type	Title	Document number
Data sheet	Hydraulic pilot control device 2TH6	64552
	Hydraulic pilot control devices 4TH5, 4TH6, 4TH6N	64555
	Analog amplifier RA	95230
Brochure	BODAS controllers RC	98231

Documentation for hydraulic fluids

Document type	Title	Document number
Data sheet	Hydraulic fluids based on mineral oils and related hydrocarbons	90220
	Environmentally acceptable hydraulic fluids	90221

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