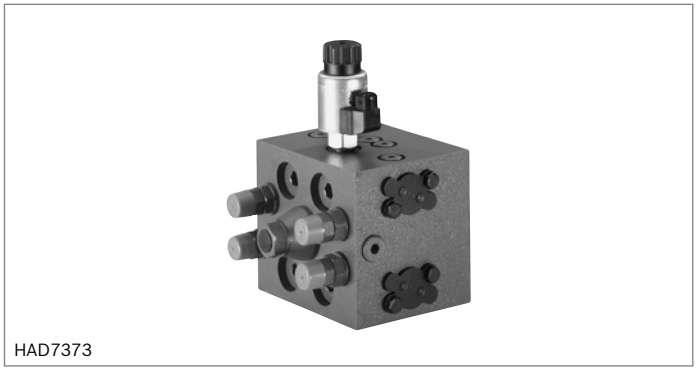
Traction module (Flow divider)
RTM

RE 64592
Edition: 08.2016
Replaces: 05.2015



HAD7373

- Series 1X
- Sizes 16 and 25
- Nominal pressure 500 bar
- Maximum flow
  - 160 l/min (size 16)
  - 440 l/min (size 25)

Features

- Protects hydraulic motors from overspinning in control operation
- Synchronous operation of parallel consumers in a wide flow range
- Variable division accuracy can be preselected or adjusted using proportional orifice
- Double-acting (dividing and summing) flow divider
- Constant division ratio for summating flow division
- Division ratio variably selectable for each consumer
- Suitable for open and closed circuits
- Optionally with or without free-wheel operation
- Can be switched in all functions
- Built-in pressure relief/feed valves for protecting hoses and preventing cavitation
- Switchable or electro-proportional control of the measurement edge

Fields of application (examples)

- Road rolling
- Rollers
- Special machines

Contents

Type code

01	02	03	04	05	06		07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
RTM		S		–	1X	/									S	S			S		V	4	*

Series

01	Traction module RTM	**RTM**

Size

02	Size 16	**16**
	Size 25	**25**

Division type

03	Summation division	**S**

Number of consumers

04	2 consumers	**2**
	3 consumers	**3**
	4 consumers	**4**

Division ratio of consumers [%] (further on request)

05	2-fold			3-fold				4-fold				
	A	**B**		**A**	**B**	**C**		**A**	**B**	**C**	**D**	
	50	50	**A**	33.33	33.33	33.33	**A**	25	25	25	25	**A**
				25	50	25	**M**					

Series

06	10 to 19 (unchanged installation and connection dimensions)	**1X**

Nominal flow

07	Size 16	80 l/min	**080**
		160 l/min	**160**
	Size 25	220 l/min	**220**
		440 l/min	**440**

Secondary valves

08	Pressure relief/feed valve (standard)	350 bar	**H350**
		420 bar	**H420**
		450 bar	**H450**
		460 bar	**H460**
	Threaded plug		**QZZZ**

Nozzle diameter, fixed orifice

09	4.5 mm	**A**
	2.8 mm	**B**
	2.2 mm	**C**
	1.5 mm	**D**
	1.4 mm	**E**
	1.2 mm	**F**
	1.8 mm	**G**

Free-wheel function

10	Without free-wheel	**1**
	With free-wheel	**2**

Valve for control of division accuracy

			11	12	13	14
11	Without valve	With threaded plug	**Z**	**Z**	**Z**	**Z**
	With valve (with proportional nozzle)	4.5 mm – 1.2 mm	**A**			
		4.5 mm – 1.4 mm	**B**			
12	Actuation	proportional		**9**		
		switching		**7**		
13	Supply voltage	24 V			**1**	
		12 V			**3**	
14	Electric port[1)]	Device connector DT04-2PA (Deutsch) (K40)				**1**
		Device connector Junior timer (AMP) (C4)				**2**

Housing

15	Standard	**S**

Pressure compensator

			16	17	18
16	Pressure compensator spool (standard)		**S**		
17	Pressure compensator spring	Size 16		**A**	
		Size 25		**B**	
18	Division deviation (T)	T small			**1**
		T medium			**2**
		T large			**3**

Metering orifice

			19	20
19	Metering orifice (standard)		**S**	
20	Size 16	T small		**1**
		T large (standard)		**2**
	Size 25	T small		**3**
		T large (standard)		**4**

Sealing material

21	FKM (fluoroelastomer)	**V**

Line connections (see page 21)

22	Flange according to DIN ISO 6162-2	**4**

23	Further specifications in plain text	*

Note
Not all combinations according to the type code are possible. Design by technical sales.

1) Plug-in connectors are not included and must be ordered separately, see page 22.

Type code (old version)

Note
Traction modules that were created before 01/01/2016 are encrypted according to the following code.

01	02	03	04	05	06	07		08	09	10	11	12	13	14	15	16	17
RTM		**S**				**1X**	**/**							**K40**	**V**	**11**	*****

Series

01	Traction module RTM	**RTM**

SIze

02	SIze 16	**16**
	SIze 25	**25**

Division type

03	Summation division	**S**

Number of consumers

04	2 consumers	**2**
	3 consumers	**3**
	4 consumers	**4**

Division ratio of consumers [%]

05	2-fold			3-fold				4-fold				
	A	**B**		**A**	**B**	**C**		**A**	**B**	**C**	**D**	
	50	50	**A**	33	33	33	**A**	25	25	25	25	**A**
	60	40	**B**	34	32	34	**F**	33	17	33	17	**H**
	75	25	**C**	25	50	25	**M**	27	23	27	23	**K**
				30	40	30	**T**	30	20	30	20	**V**

Free-wheel spool

06	Standard	**–**
	Special spool	**Y**

Series

07	10 to 19 (unchanged installation and connection dimensions)	**1X**

Nominal flow

08	SIze 16	80 l/min	**080**
		160 l/min	**160**
	SIze 25	220 l/min	**220**
		440 l/min	**440**

***Δp* control**

09	Electro-proportional orifice or orifice with electrical change-over orifice (adjustable orifice)	**P**
	Fixed orifice (without proportional valve)	**F**

Free-wheel function

10	Without free-wheel	**1**
	With free-wheel	**2**

Secondary valves

11	Pressure relief/feed valve (standard)	420 bar	**H420**
		460 bar	**H460**
	Threaded plug		**Q**

Orifice diameter of fixed orifice or Operation with adjustable orifice

12	Orifice diameter of fixed orifice, e.g. F12 = Ø1.2 mm	**F . .**
	Operation with adjustable orifice, electro-hydraulic proportional	**W9**
	Operation with adjustable orifice, electro-hydraulic switchable	**W7**

Supply voltage

13	U = 24 V	**1**
	U = 12 V	**3**

Electric port

14	Device connector DT04-2PA (Deutsch), Standard	**K40**

Sealing material

15	FKM (Fluor-Kautschuk)	**V**

Line connections

16	Flange according to DIN ISO 6162-2	**11**

17	Special configuration	*****

Functional description

The RTM traction module is a flow divider for controlling hydraulic motors ensuring synchronous and free-wheel operation. It can be used for 2-, 3- and 4-wheel drives (multiple drives available upon request). It can be operated in open and closed circuits

Design

The RTM basically comprises of a housing (**1**) metering orifice (**2**), the proportional valve (**3**), free-wheel function (**4**) and pressure compensator (**5**).
In the housing (**1**) the sleeve is radially fixed into position (**2.1**) with the fixed orifice (**3.2**) thought it can be moved about its axes. According to the selected division/ summation ratio, metering orifices are integrated in the sleeve- these are used to divide the output flows into channels **A**, **B**, **C** and **D**. To compensate for differences in load pressure across the different consumer ports, pressure compensators (**5.2**) have been integrated.
The main flow moves the main spool(**2.2**) against the pre-tensioned springs (**2.3**). So, depending on the size of the flow, this alters the cross section of the metering orifice and the hydraulic fluid passes through the holes (**5.1**) to the pressure compensator spool (**5.2**) and then on to channels **A**, **B**, **C** and **D**. When needing to increase the division accuracy, the pressure in the spring chamber (**2.4**) must be increased by actuating the valve electrically (**3.1**) so that the pressure compensator spool (**5.2**) begins controlling earlier, increasing the traction accuracy of the vehicle. The division accuracy can also or alternatively be adjusted by replacing the nozzle (**3.2**).
To automatically switch from the division to the summation function, the directional valve (**5.3**) changes from the right to the left stop.
With optional activation (**4.2**), the differential lock is activated when there is a high pressure (external 3/2 directional valve not included in scope of delivery) at port **X**. Without the activation function, the threaded plug (**4.1**) is used without port **X**.

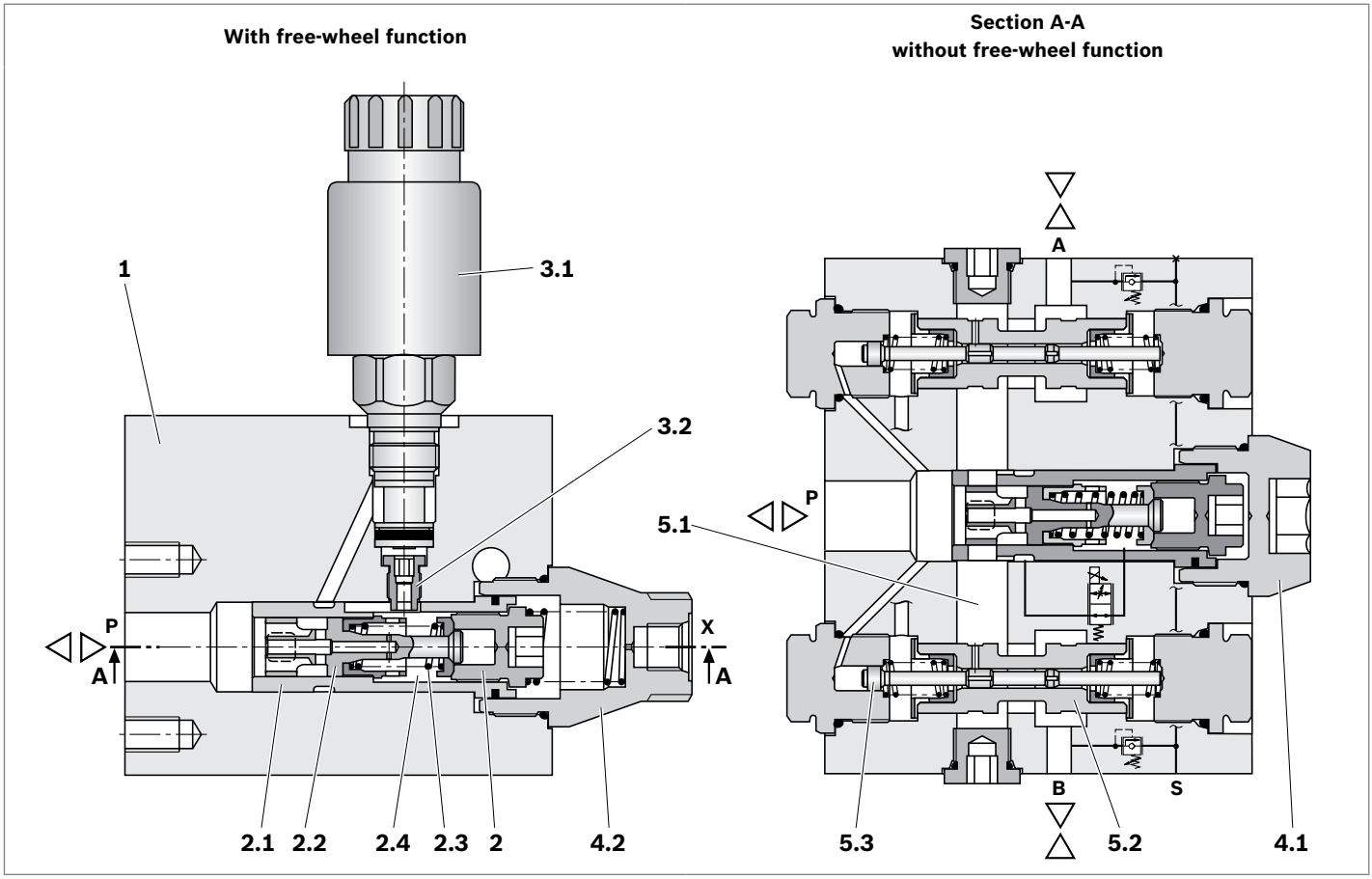
Note

The necessary actuation pressure at **X** is the high pressure present in the hydraulic circuit of the RTM. Switching is by means of an external directional valve
(order separately).

- **X** pressure-less→ free-wheel, divider deactivated
- **X** pressurized→ synchronism, divider activated
- A flushing valve is to be provided between the pump and RTM.
  (No flushing valve between engines and RTM!)
  External directional valve: see data sheet 18136-21
  flushing valve: see data sheet 95512)

Ports	
P	Pump
A, B, C, D	Consumer
S	Boost pressure
X	Free-wheel

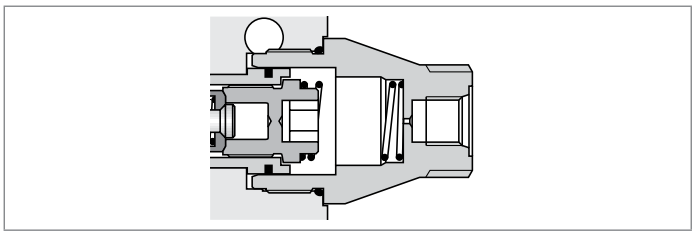
▼ **Design RTM...S2...**



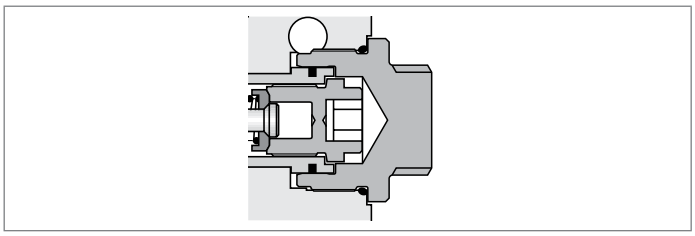
1 Housing
2 Metering orifice
2.1 Sleeve
2.2 Main spool
2.3 Compression spring
2.4 Spring chamber
3 Proportional valve
3.1 Valve
3.2 Fixed orifice
4 Free-wheel function
4.1 Threaded plug (without free-wheel)
4.2 Reducing piece (for free-wheel)
5.1 Bore
5.2 Pressure compensator spool
5.3 Directional valve

Free-wheel function

▼ **With free-wheel**



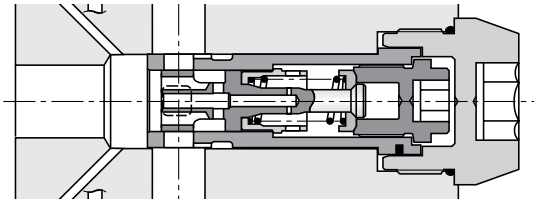
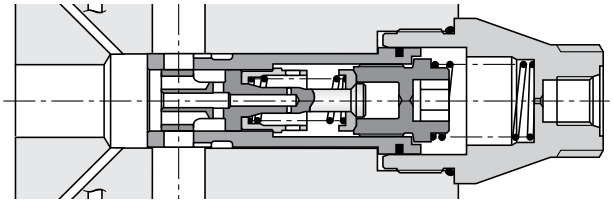
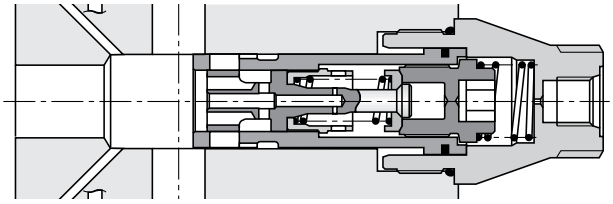
▼ **Without free-wheel**



Actuation via external directional valve:

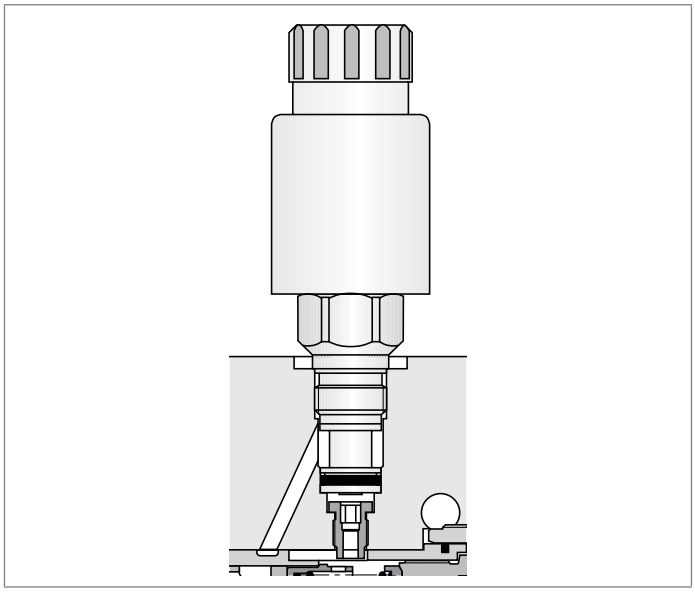
- ▶ **X** pressure-less → free-wheel, divider deactivated
- ▶ **X** pressurized → synchronism, divider activated

(see Notes on page 6)

Free-wheel function		electro-proportional orifice	Electrical switchover orifice	Fixed orifice
Without	RTM active 	Proportional solenoid de-energized (I = 0) proportional increase in division accuracy Proportional solenoid energized ($I = I_{max}$)	Switching solenoid de-energized, low division accuracy Switching solenoid energized, high division accuracy	Division accuracy defined via fixed orifice
With	**X** pressurized RTM active 	Proportional solenoid de-energized (I = 0) proportional increase in division accuracy Proportional solenoid energized ($I = I_{max}$)	Switching solenoid de-energized, low division accuracy Switching solenoid energized, high division accuracy	Division accuracy defined via fixed orifice
With	**X** depressurized RTM inactive 	RTM in free-wheel mode; electro-proportional valve has no effect	RTM in free-wheel mode; electrical switchover orifice has no effect	RTM in free-wheel mode; fixed orifice has no effect

Δp control

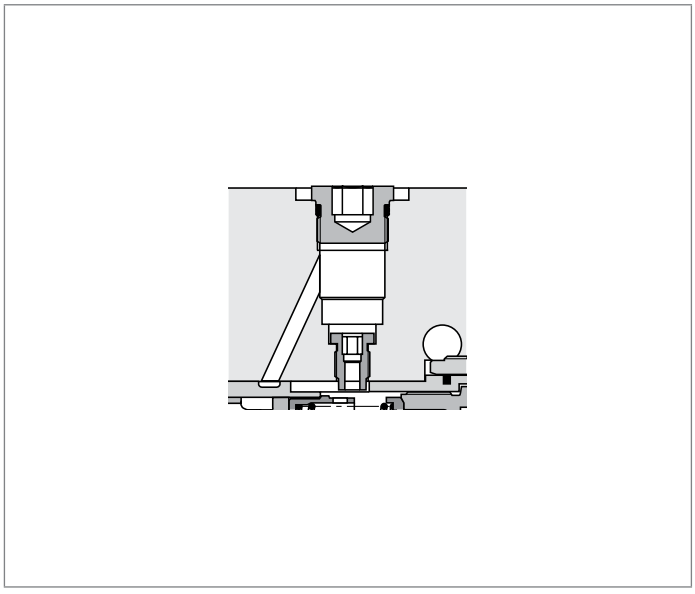
▼ W**ith valve**



Actuation

- ▶ Electrohydraulically proportional, or
- ▶ Electrohydraulically switchable

▼ **With fixed orifice**



- ▶ With threaded plug

Technical data

General									
Size				**16**			**25**		
Weight				**Summation division**			**Summation division**		
				S2	**S3**	**S4**	**S2**	**S3**	**S4**
	Without free-wheel		kg	14.0	18.2	18.2	29.9	37.4	37.4
	With free-wheel		kg	14.1	18.3	18.3	30.0	37.5	37.5
Installation position				Horizontal (preferred)					
Connection type				SAE flange connection according to ISO 6162-2					
Mounting type				Surface connection					
Ambient temperature range		θ	°C	–25 to +80					
Priming (standard)				RAL 5010					

Hydraulic					
Maximum working pressure at port	P, A, B, C, D	p	bar	500	
	S	p	bar	40	
Max. flow at port	P	q_{Vmax}	l/min	80 or 160	220 or 440
Hydraulic fluid				Mineral oil (HL, HLP) according to DIN 51524, other hydraulic fluids on request	
Hydraulic fluid temperature range		θ	°C	-20 to + 80	
Viscosity range		v	mm²/s	10 to 380	
Maximum permissible degree of contamination of the hydraulic fluid Cleanliness level according to ISO 4406 (c)				Class 20/18/15, we recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$	

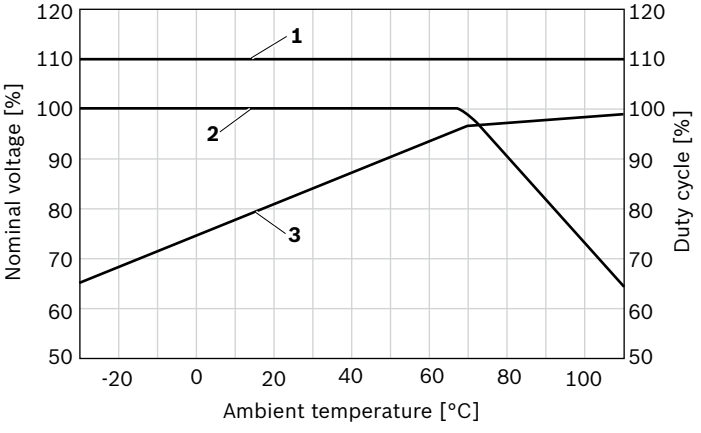
Note

- Please contact us if the unit is to be used outside the specified range of values.
- The technical data were determined at a viscosity of 30 mm²/s (HLP46: 50 °C).
- For the “K40” electrical connection, an protective earth (PE ⏚) connection is mandatory based on the specification.

Electrical proportional orifice (proportional control)				
Voltage type			DC voltage	
Supply voltage		V	**12**	**24**
Max. control current (nominal current)		A	1.76	1.2
Magnetic coil resistance	Cold value at 20 °C	Ω	2.3	4.8
	max. warm value	Ω	3.8	7.9
Duty cycle		%	100	
Max. flushing temperature[1)]		°C	150	
Type of protection according to VDE 0470-1, DIN 40050-9	Design “K40”		IP67 with installed and locked plug-in connector	
	Design “C4”		IP66 with installed and locked plug-in connector	
			IP69K with Rexroth plug-in connector, Mat-No. R901022127	
Electronic controls			Mobile amplifier VT-MSPA1-100 Plug amplifier VT-SSPA1-1.., see data sheet 30116	

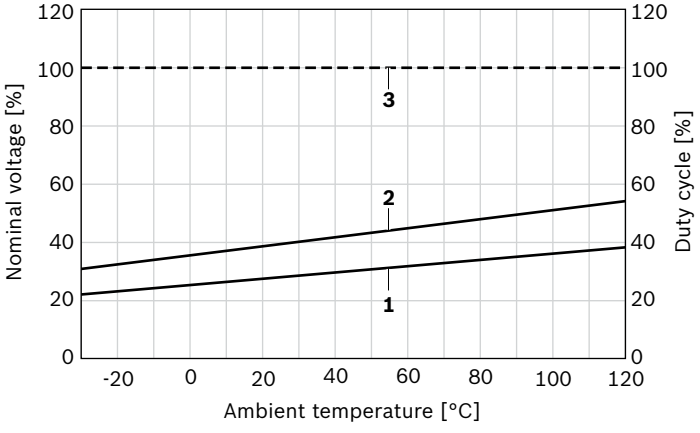
Electrical proportional orifice (switch controlled)				
Voltage type	U		DC voltage	
Supply voltage		V	**12**	**24**
Voltage tolerance over ambient temperature			See the diagram	
Power consumption		W	22	
Duty cycle			See the diagram	
Switching time according to ISO 6403 (solenoid horizontal)	ON	ms	≤ 80	
	OFF	ms	≤ 50	
Max. switching frequency		Switches/h	15000	
Max. flushing temperature[1)]		°C	150	
Type of protection according to VDE 0470-1, DIN 40050-9	Design “K40|”		IP67 with installed and locked plug-in connector	
	Design “C4”		IP66 with installed and locked plug-in connector	
			IP69K with Rexroth plug-in connector, Mat-No. R901022127	
Electronic controls			Mobile amplifier VT-MSPA1-100 Plug amplifier VT-SSPA1-1.., see data sheet 30116	

▼ **Voltage range and duty cycle depending on the ambient temperature/switching solenoid**



1 Maximum voltage
2 Duty cycle
3 Minimum response voltage

▼ **Voltage range and duty cycle depending on the ambient temperature/proportional solenoid**



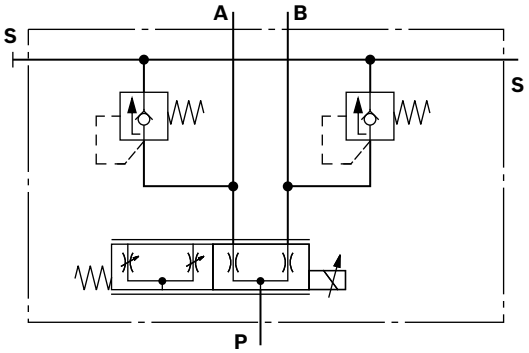
1 Voltage supply measured for 1.2 A (24 V)
2 Voltage supply measured for 1.76 A (12 V)
3 Duty cycle

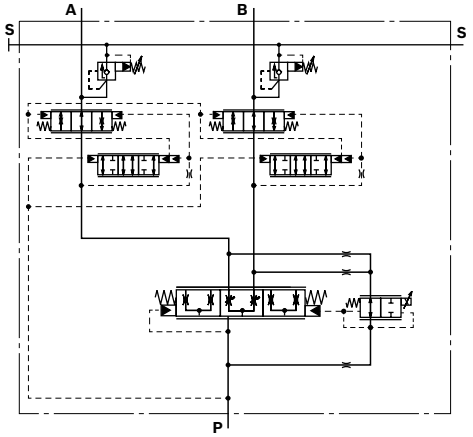
1) Surface temperature of coil housing. Due to the arising surface temperature of the solenoid coil, European standards EN 563 and EN 982 must be observed.

Symbols

Without free-wheel

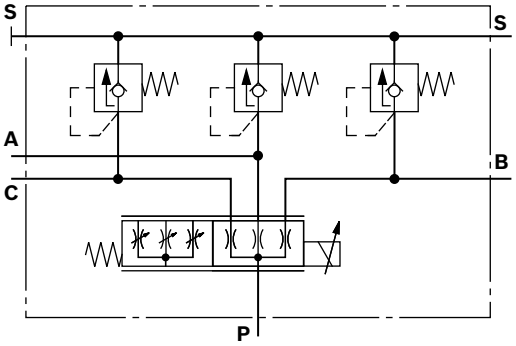
Simplified representation	Extensive representation
2 consumers	
Parameter type code: RTM...S2...1A9 or RTM...S2...1B9	

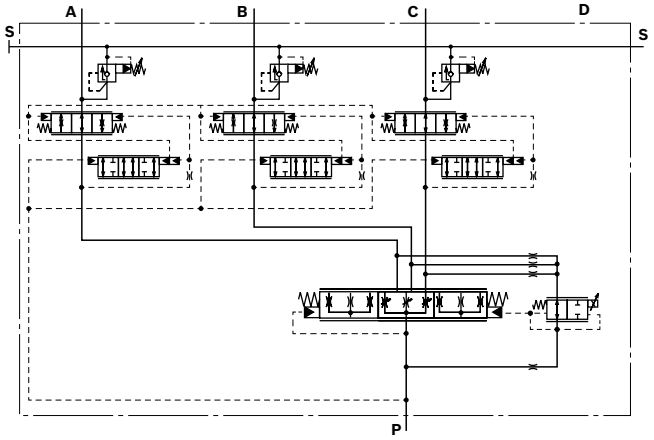




3 consumers

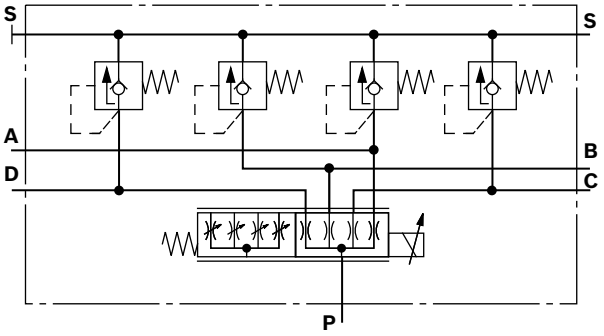
Parameter type code:
RTM...S3...1A9 or
RTM...S3...1B9

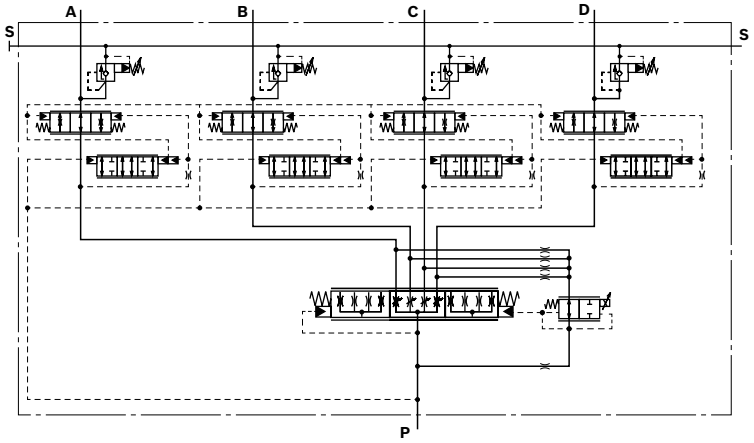




4 consumers

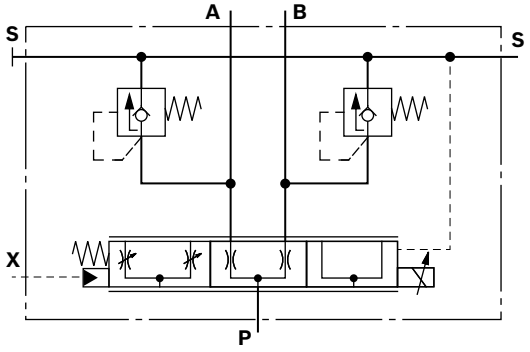
Parameter type code:
RTM...S4...1A9 or
RTM...S4...1B9

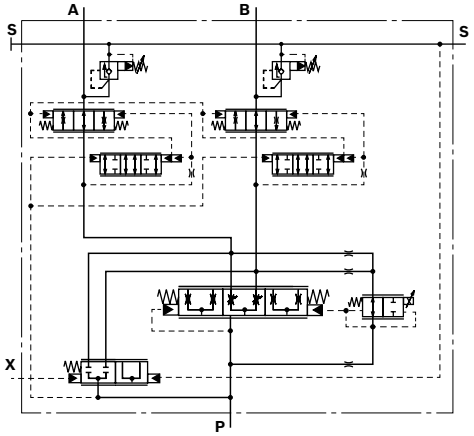




With free-wheel

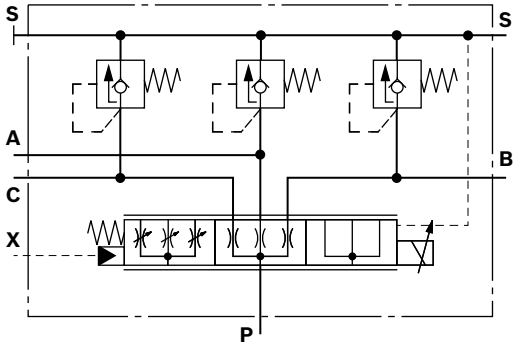
Simplified representation	Extensive representation
2 consumers	
Parameter type code: RTM...S2...2A9 or RTM...S2...2B9	

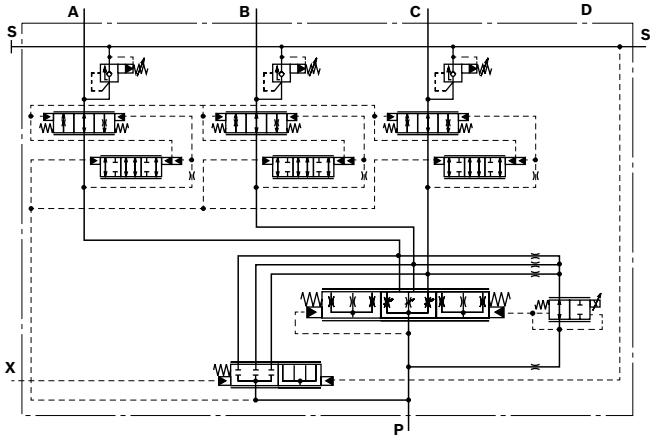




3 consumers

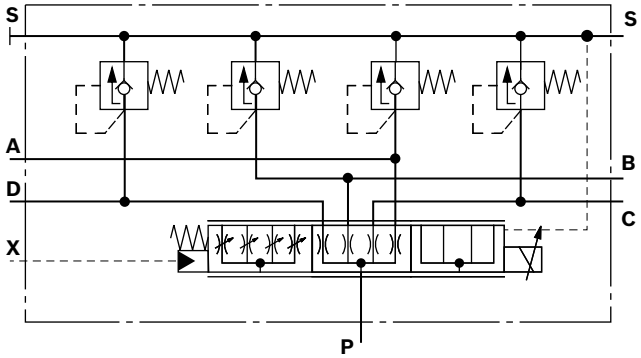
Parameter type code:
RTM...S3...2A9 or
RTM...S3...2B9

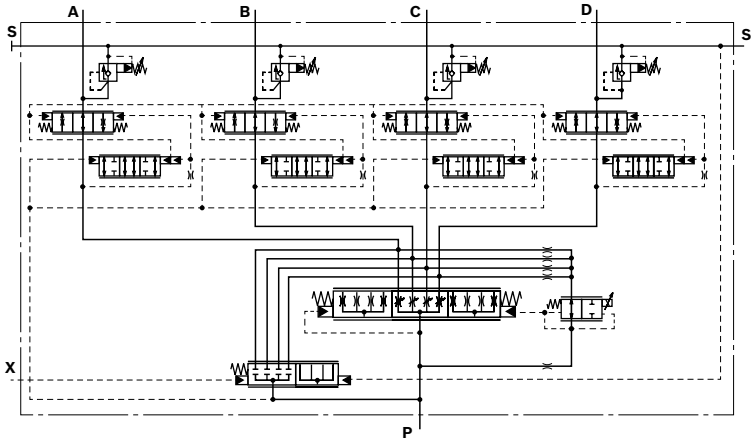




4 consumers

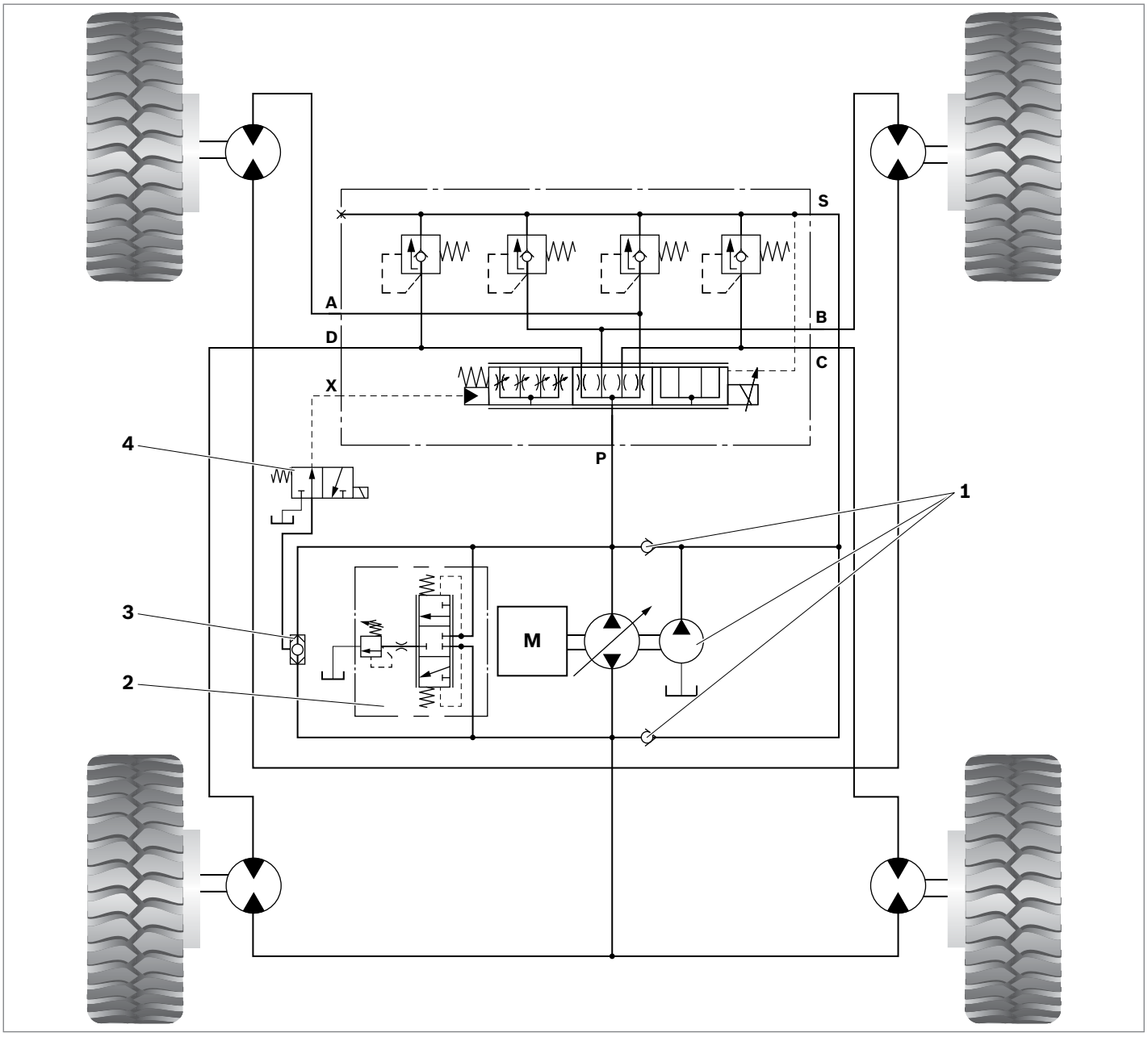
Parameter type code:
RTM...S4...2A9 or
RTM...S4...2B9





Application example

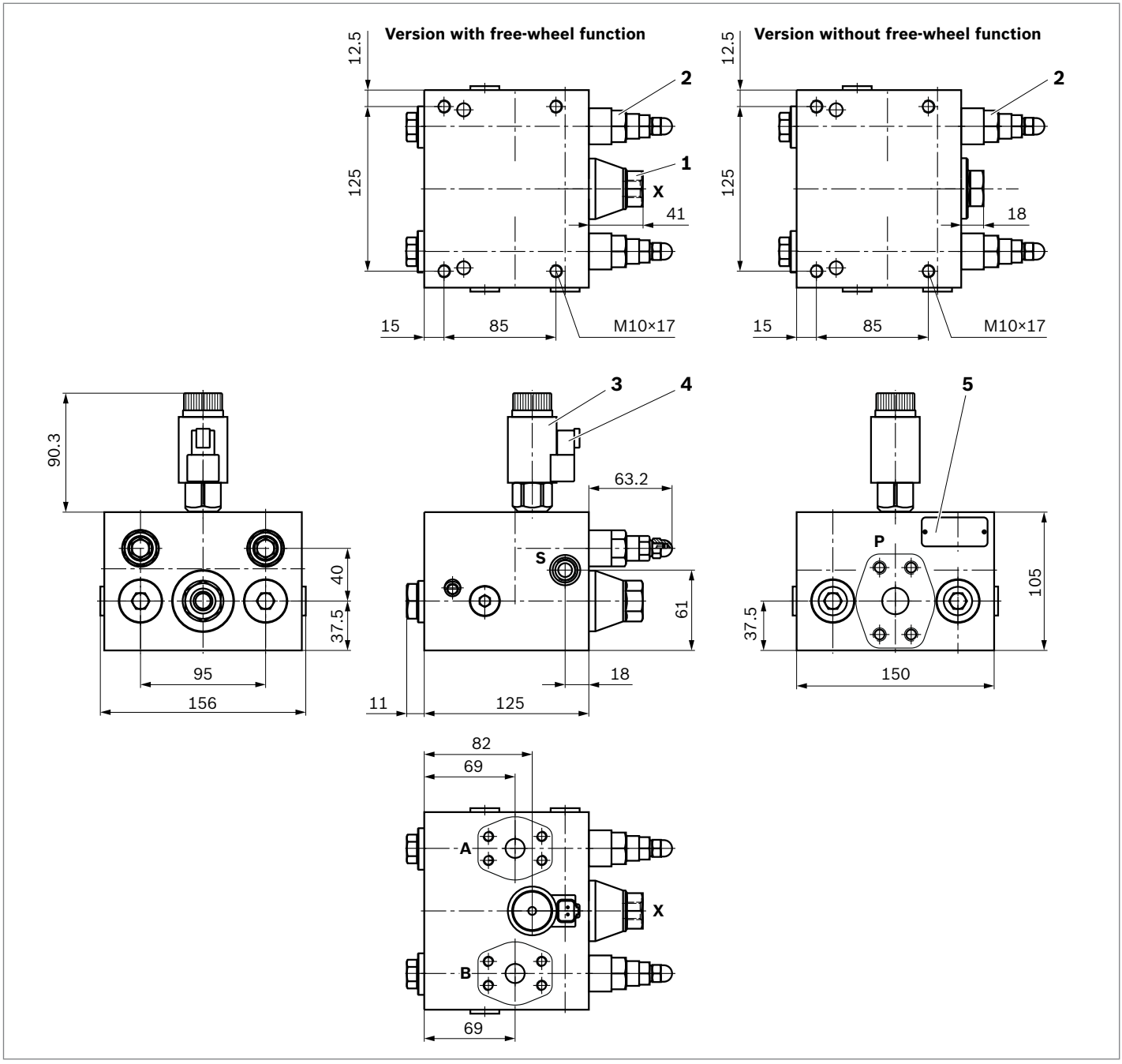
▼ **RTM...S4 with free-wheel function (electro-proportional orifice), closed circuit**



1 Check valves, normally integrated in pump
2 Flushing valve, positioning at pump, not at engines
3 Shuttle valve, partly integrated in pump (port MH)
4 Option: separate valve for free-wheel function high-pressure port (see Pos. 3)

Dimensions

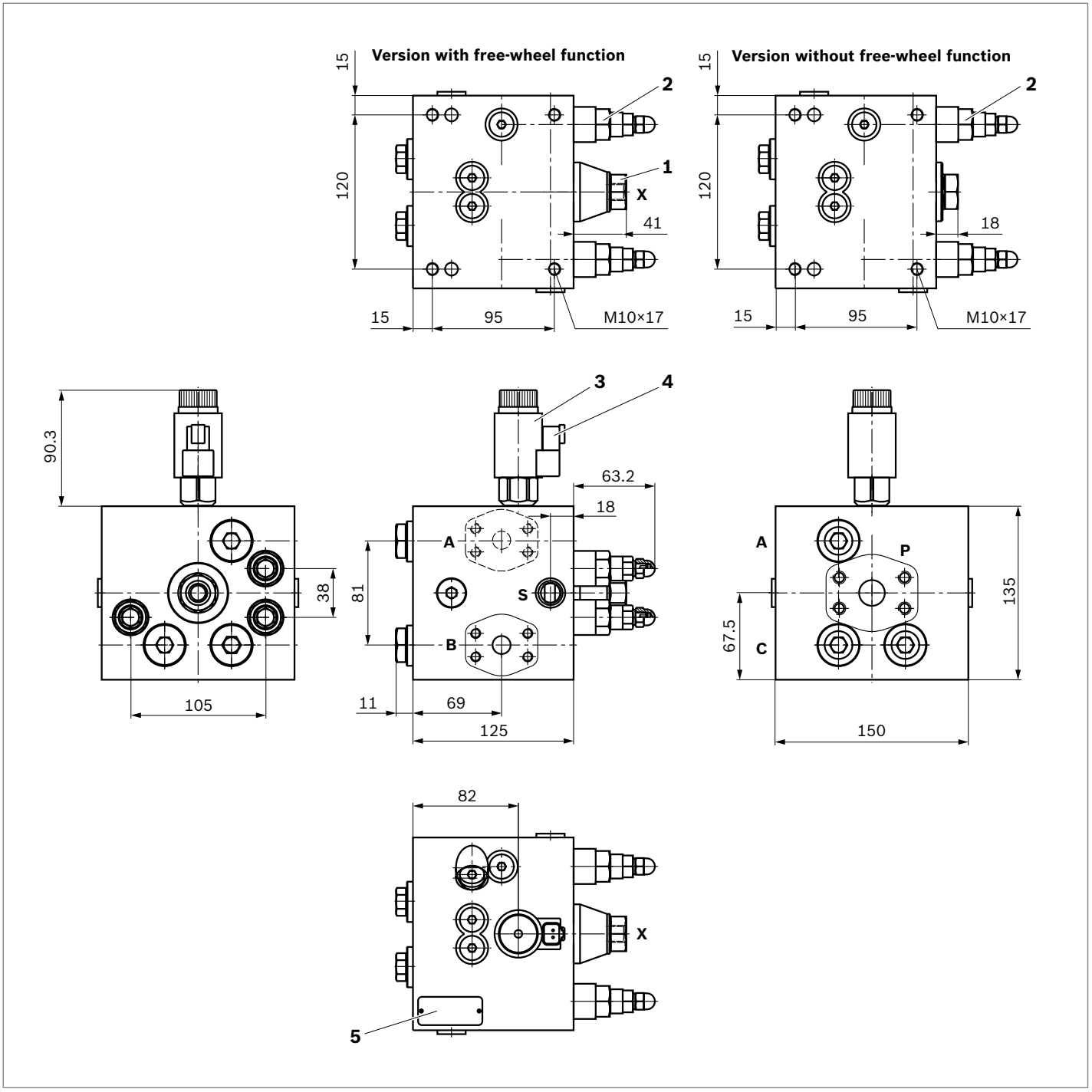
▼ **RTM 16 S2**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve (preset, this setting must not be changed)
3 Proportional valve
4 Electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

Line connections see page 21

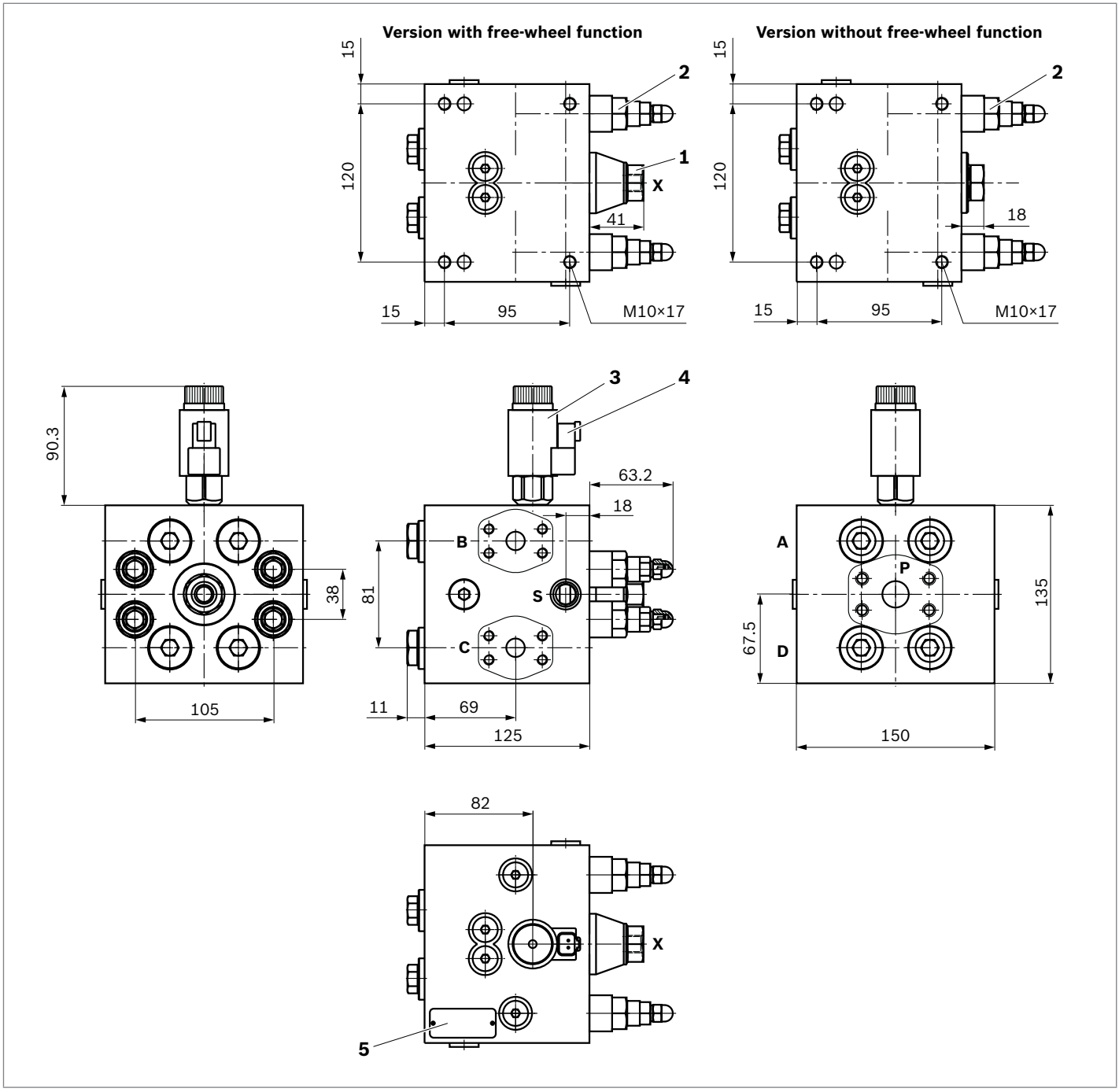
▼ **RTM 16 S3**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve (preset, this setting must not be changed)
3 Proportional valve
4 Electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

Line connections see page 21

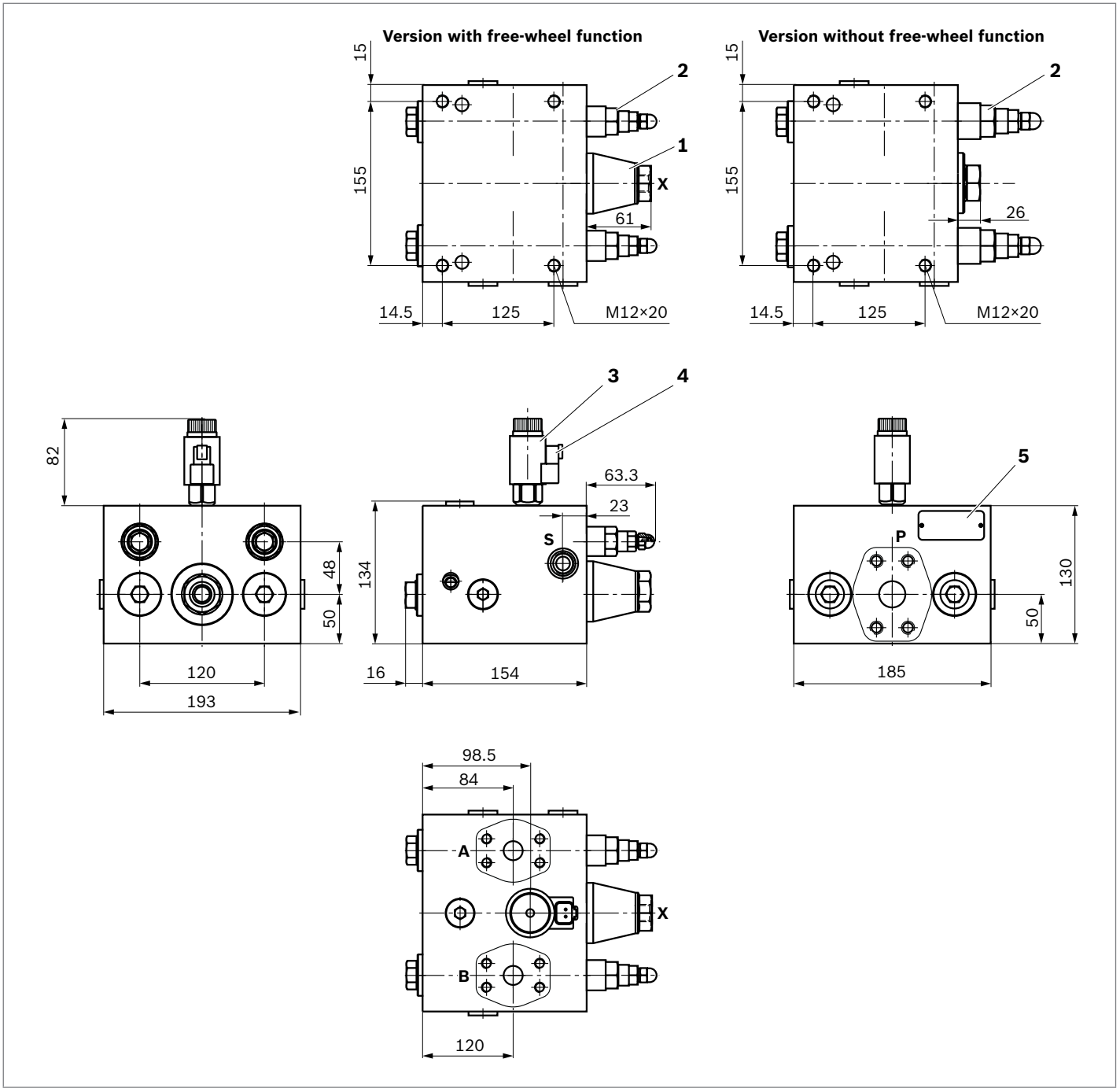
▼ **RTM 16 S4**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve(preset, this setting must not be changed)
3 Proportional valve
4 Electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

Line connections see page 21

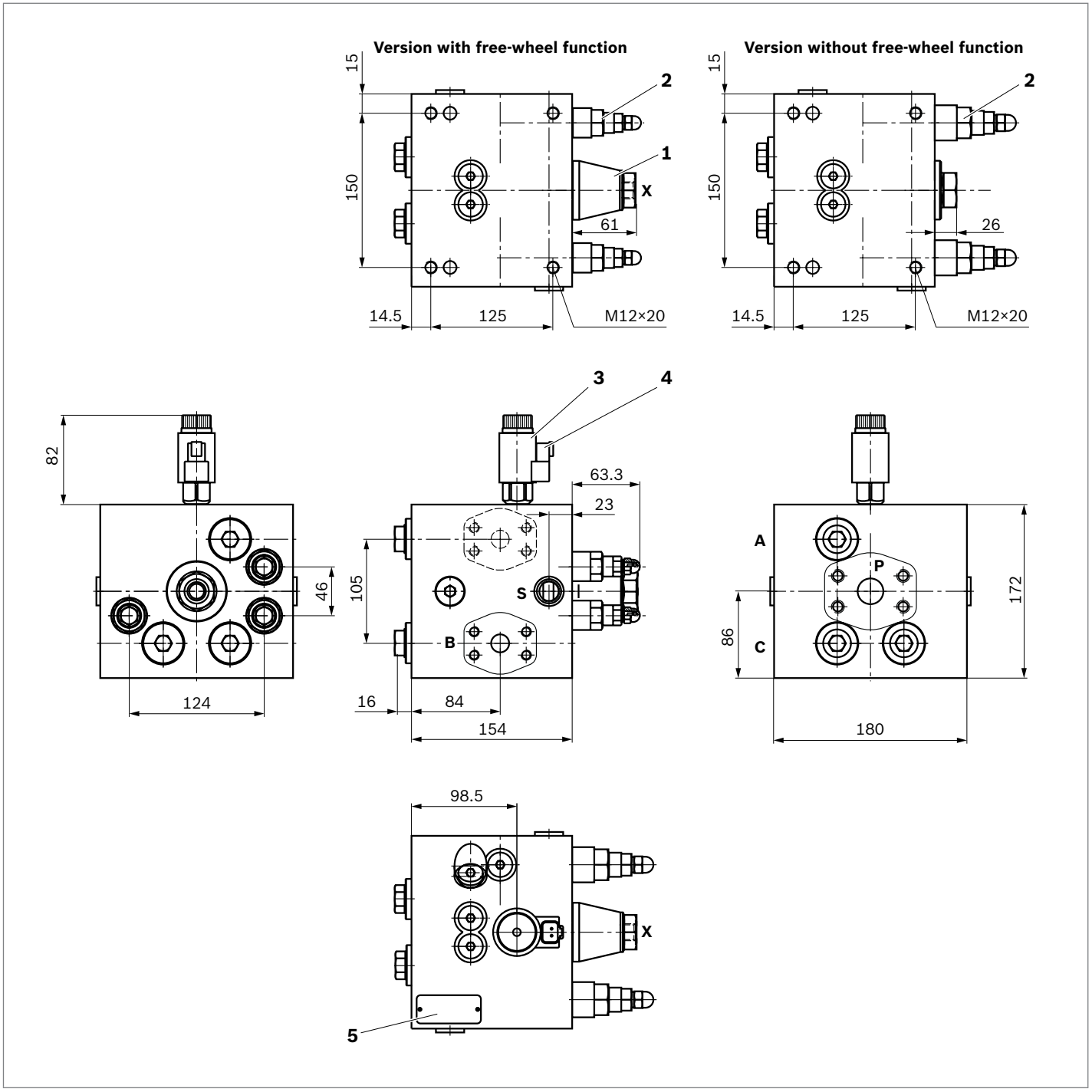
▼ **RTM 25 S2**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve (preset, this setting must not be changed)
3 Proportional valve
4 Electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

Line connections see page 21

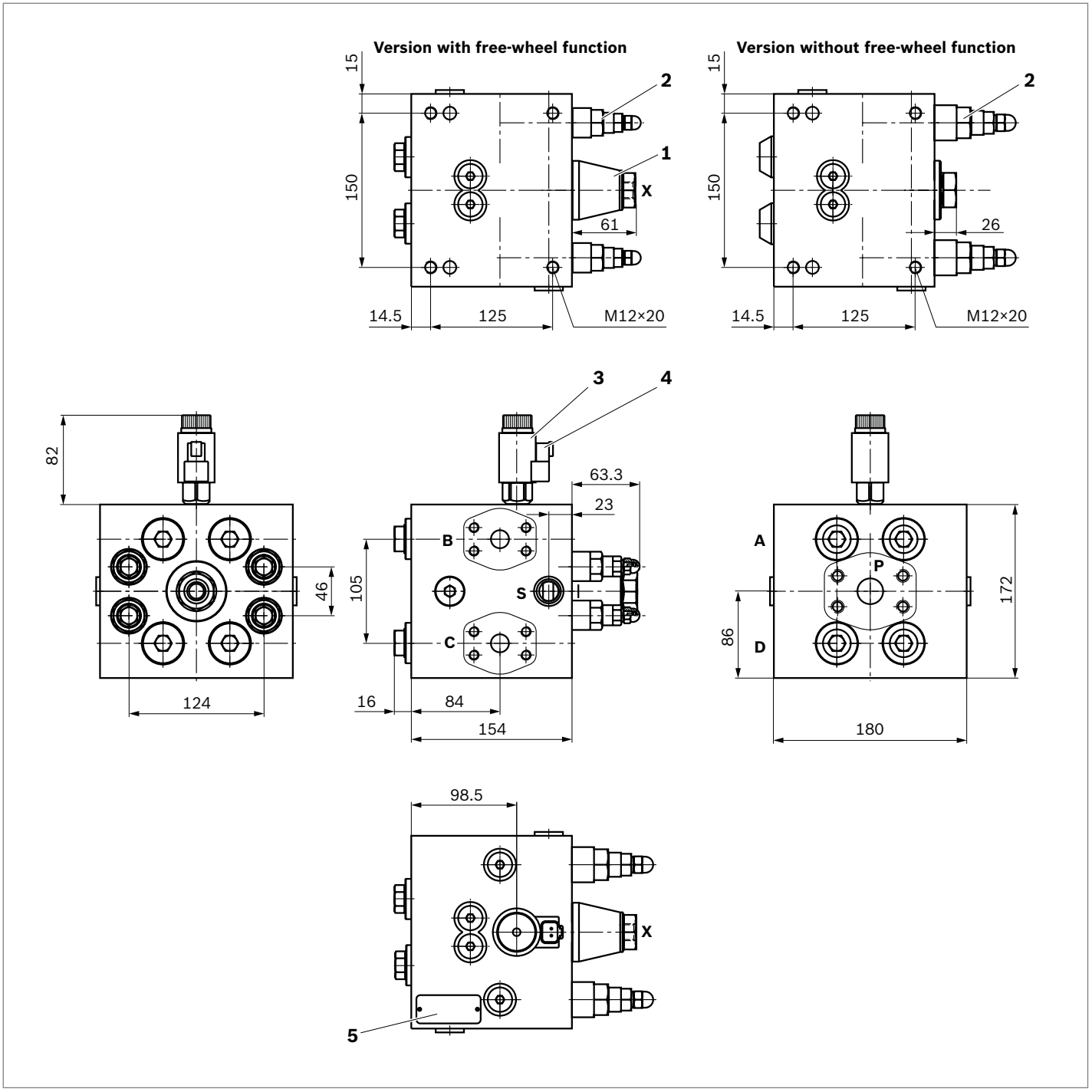
▼ **RTM 25 S3**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve (preset, this setting must not be changed)
3 Proportional valve
4 electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

Line connections see page 21

▼ **RTM 25 S4**



1 Port **X** only on versions with proportional orifice and free-wheel function
2 Pressure relief/feed valve (preset, this setting must not be changed)
3 Proportional valve
4 Electrical connection (mating connector is not included in the delivery contents and must be ordered separately)
5 Name plate

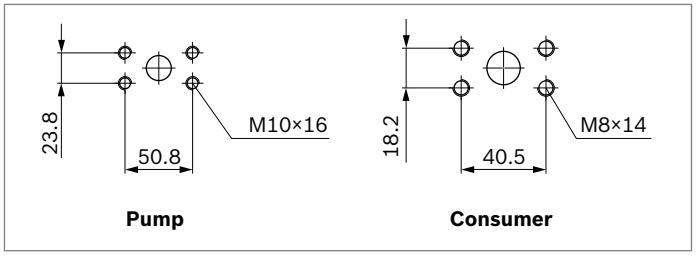
Line connections see page 21

Line connections

Size 16

Connection	Dimension	Standard
P	FC1 × 19	ISO 6162-2
A, B, C, D	FC1 × 13	ISO 6162-2
S	M18 x 1,5	ISO 6149-1
X	M14 x 1,5	ISO 6149-1

▼ **Flange ports, deviation from ISO 6162-2**



Size 25

Connection	Dimension	Standard (similar)
P	FC1 × 32	ISO 6162-2
A, B, C, D	FC1 × 19	ISO 6162-2
S	M22 ×1.5	ISO 6149-1
X	M14 × 1.5	ISO 6149-1

▼ **Flange ports, deviation from ISO 6162-2**