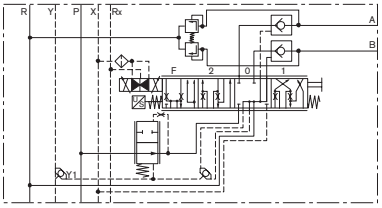
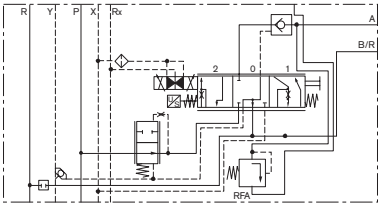
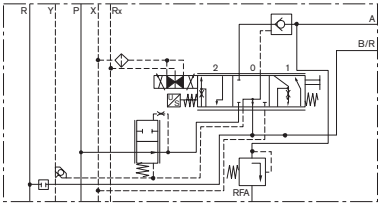
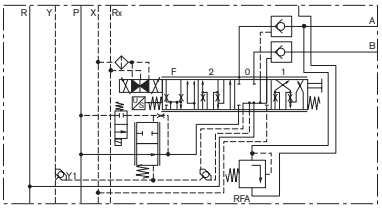
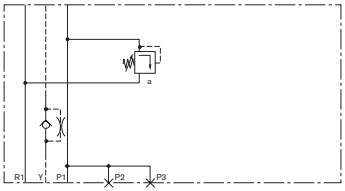
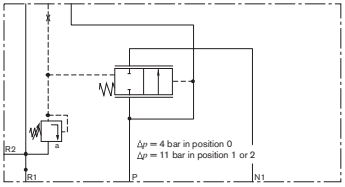
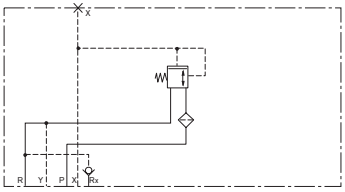
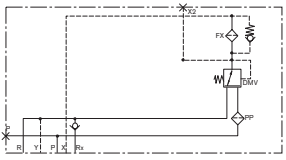
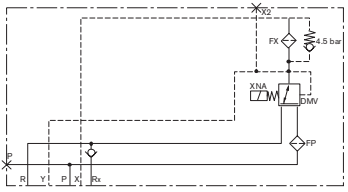
Order details

SB33-EHS1	Flow Q	Ports/ design	Comments	Part number
	140 l/min	A, B = M22x1.5 / III	Manual auxiliary actuation of the Thermo PRV main spool	**R917007956***)
		A, B = M22x1.5 / III	Thermo PRV	**R917007957***)
		Coupling flange M6	Manual auxiliary actuation of the Thermo PRV main spool	**R917007958***)
		Coupling flange M6	Thermo PRV	**R917007959***)
EHR33-EHS1 SA				
	100 l/min	A, B = M22x1.5 / II	With RfA on O-ring side Manual auxiliary actuation of the main spool With manual lowering and emergency manual function incl. IPC inhibition	**R917006990***)
	100 l/min	A, B = M22x1.5 / II	With RfA opposite the O-ring side Manual auxiliary actuation of the main spool With manual lowering and emergency manual function incl. IPC inhibition	**R917007936***)
EHR33-EHS1 DA				
	100 l/min	A, B = M22x1.5 / II	With RfA on O-ring side Manual auxiliary actuation of the main spool With manual lowering and emergency manual function incl. IPC inhibition	**R917006784***)

*) Consultation required regarding technical specification and requirements

Order details (continued)

SBx3-EHS1 port plate for variable pump	Ports/ design	Comments	Part number
	**P1 = M27x2/ III** **P2 = M27x2/ III** **P3 = M10x1/ I** **R1 = M33x2/ III** **Y = M12x1.5**	With PRV; P2 port M27x2 plugged; P3 port M10x1 open; screw-in thread for tie bolts; fastening feet with M8 thread, Th-CV 1527410132 screwed into Y-port	**R917007235**
SBx3-EHS1 port plate for fixed pump			
	**P = M22x1.5/ II** **R1 = M27x2/ II** **R2 = M27x2/ II** **N1 = M22x1.5/ II**	With PRV	**R917007203**
SBx3-EHS1 end plate use for variable pump			
	**X: M12x1.5/ III**	Pilot pressure 18 bar (fixed setting) Pilot pressure port: X-port plugged; with sintered metal filter in P line;	**R917007578**
	**X: 9/16-18 UNF; ISO 11926** **P: M12x1.5/ III**	Pilot pressure 18 bar (fixed setting) Pilot pressure port: X-port plugged; with sintered metal filter in P line; fine filter	**R917005923**
SBx3-EHS1 end plate use for fixed pump			
	**X: M10x1/ I** **P: M22x1.5/ III**	Pilot pressure 18 bar, switchable Pilot pressure port: X-port plugged; with sintered metal filter in P line; fine filter	**R917007249**
SBx3-EHS1 intermediate plate			
		Disc width: L = 13 mm	**R917005302**
		Disc width: L = 15 mm	**R917006220**
		Disc width: L = 22 mm	**R917007130**
		Disc width: L = 16 mm	**R917007583**

Threaded ports – design

Version I
DIN 3852-1, DIN 3852-2
For sealing ring seal

Version II
ISO 11926-1
For O-ring seal

Version III
EN ISO 6149-1
Without marking on female thread
For O-Ring seal

Unit dimensions

SB33-EHS1

Tie bolts

When using port plate(s)		R917007235, R917002924; R917007203	
End plate(s)		R917007578, R917005923	
Valve segments Length L [mm]		**Tie bolts Ordering no.**	**Tie bolt length [mm]**
from	to		
40	42	1 523 502 096	131
44	44	R 917 000 013	133
80	80	1 523 502 097	171
91	98	R 917 000 538	187
99	106	1 523 502 087	195
107	114	R 917 005 260	203
115	122	1 523 502 098	211
128	133	1 523 502 125	223
140	145	1 523 502 088	235
146	149	R 917 005 261	239
156	161	1 523 502 099	251
162	167	R 917 003 101	257
168	172	R 917 005 949	263
174	178	R 917 004 775	269
180	184	1 523 502 089	275
196	200	1 523 502 100	291
209	212	1 523 502 129	304
215	218	R 917 005 950	310
220	223	1 523 502 090	315
236	239	1 523 502 101	331
249	251	1 523 502 130	344
260	262	1 523 502 091	355
276	278	1 523 502 102	371

Installing the control block in the machine.

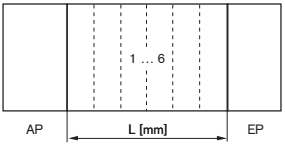
The SB33-EHS1 control block, consisting of:

- Port plate
- 1 ...6 valve segments
- 3 tie bolts, 5 tie bolts optional
- End plate

Port plate, valve segments and end plates are secured during control block installation by tie bolts.

The control block is fixed to the port- and/or end plate in the machine.

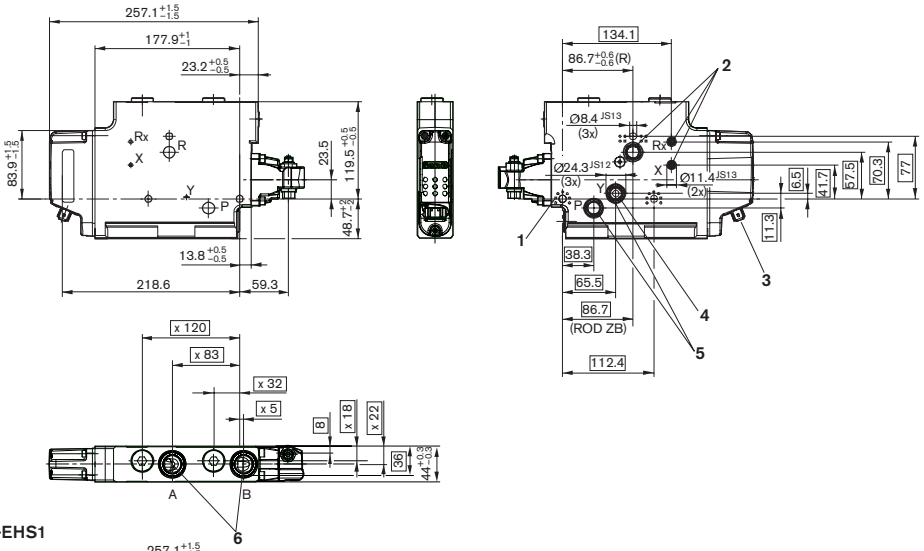
The number of fasteners and the number of tie bolts depend on the number of valve segments and the expected vibrational load in the machine. At least
3 tie bolts are needed to secure a control block. Depending on loading, 5 tie bolts may be needed.



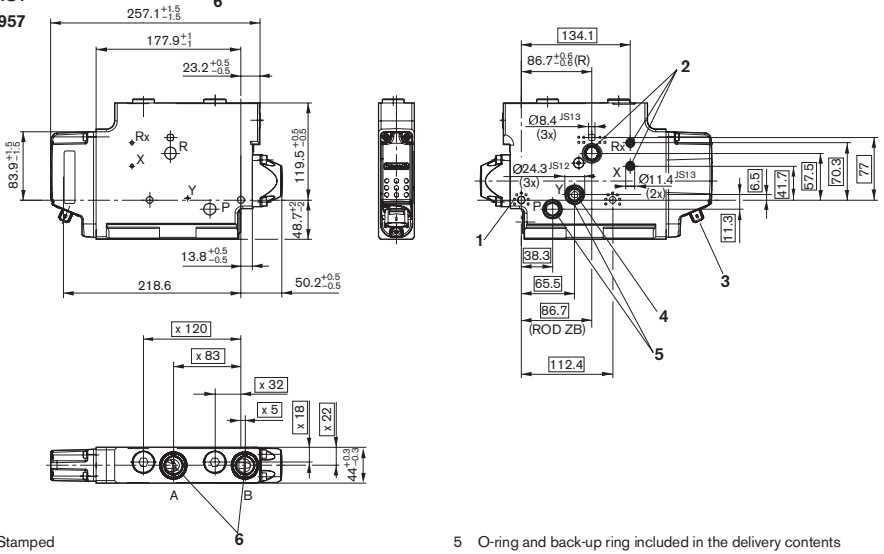
Valve segments

Unit dimensions

SB33-EHS1
R917007956*)



SB33-EHS1
R917007957

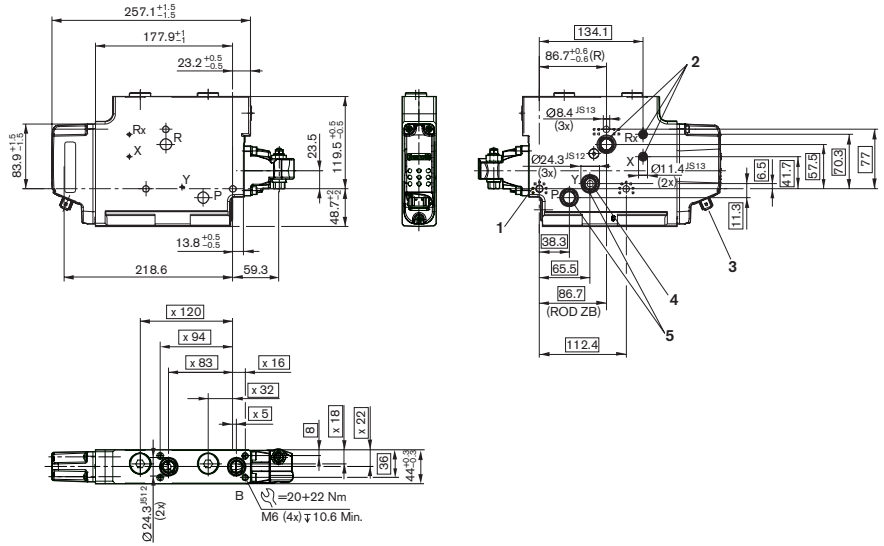


1 Stamped
2 O-ring included in the delivery contents
3 Pull off protective cap R917001694 before connecting
4 Shuttle valve included in the delivery contents
5 O-ring and back-up ring included in the delivery contents
6 Acc. to Z206800990-ETZ M22x1.5 design 3 similar to DIN ISO 6149-1

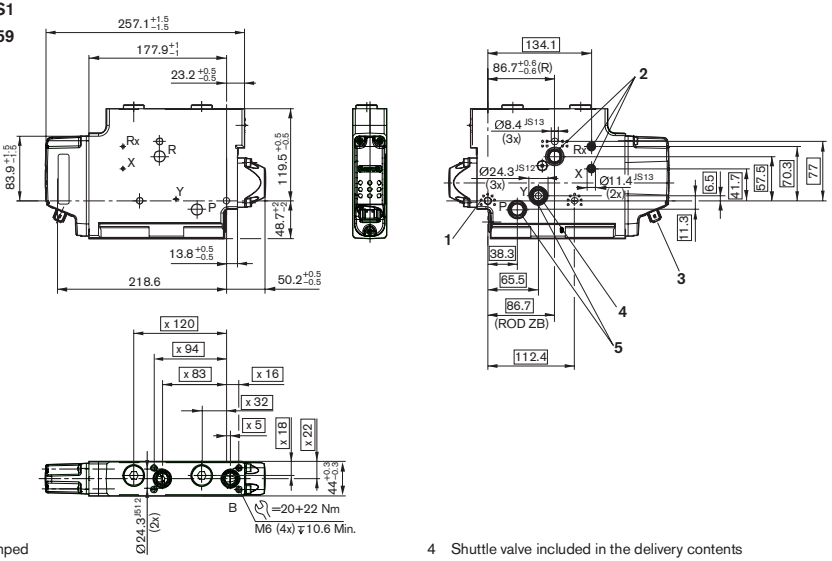
*) Consultation required regarding technical specification and requirements

Unit dimensions

SB33-EHS1
R917007958*)



SB33-EHS1
R917007959

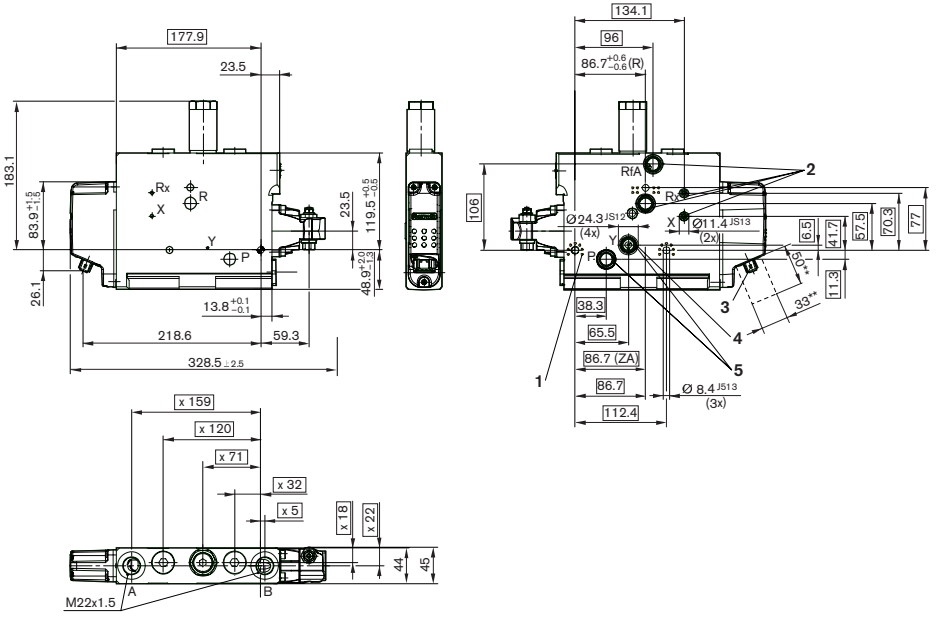


1 Stamped
2 O-ring included in the delivery contents
3 Pull off protective cap R 917 001 694 before connecting
4 Shuttle valve included in the delivery contents
5 O-ring and back-up ring included in the delivery contents

*) Consultation required regarding technical specification and requirements

Unit dimensions

Control valve EHR33-EHS1
R917007990*)

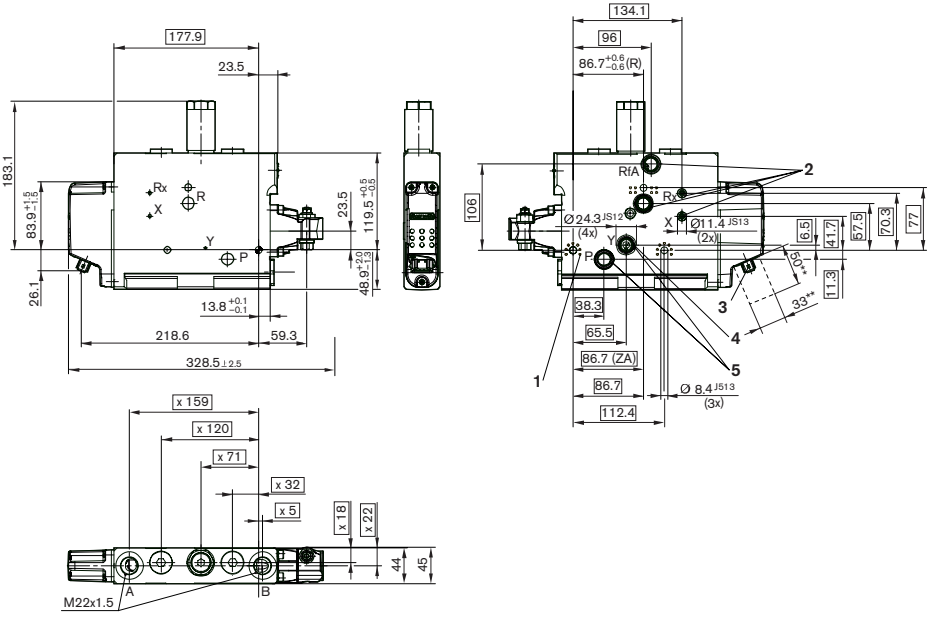


1 Stamped
2 O-ring included in the delivery contents
3 Pull off protective cap R 917 001 694 before connecting
4 Shuttle valve included in the delivery contents
5 O-ring and back-up ring included in the delivery contents

*) Consultation required regarding technical specification and requirements

Unit dimensions

Control valve EHR33-EHS1
R917007936*)

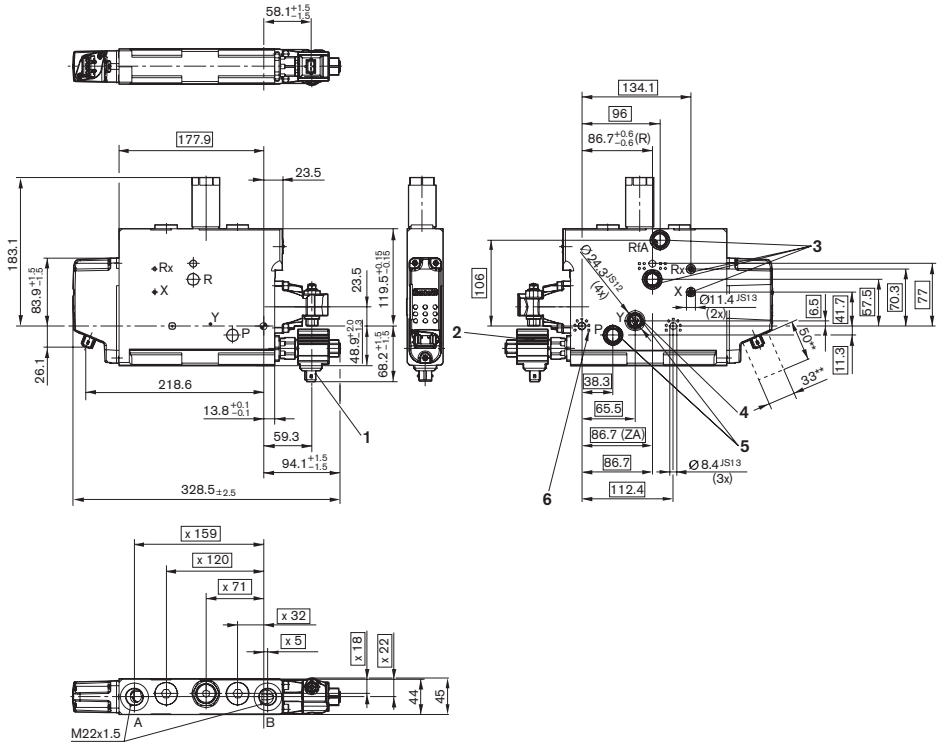


1 Stamped
2 O-ring included in the delivery contents
3 Pull off protective cap R 917 001 694 before connecting
4 Shuttle valve included in the delivery contents
5 O-ring and back-up ring included in the delivery contents

*) Consultation required regarding technical specification and requirements

Unit dimensions

Control valve EHR33-EHS1
R917006784*)

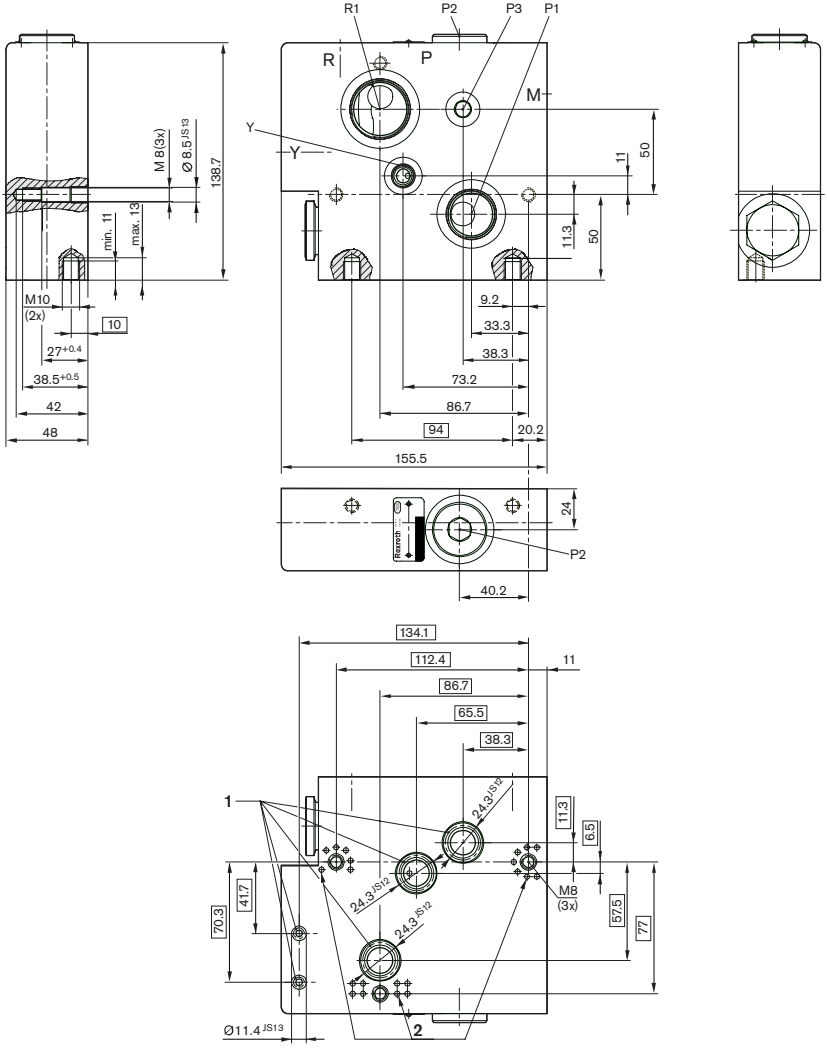


1 Connector 4
2 2/2-solenoid valve
3 O-ring included in the delivery contents
4 Shuttle valve included in the delivery contents
5 O-ring and back-up ring included in the delivery contents
6 Stamped

*) Consultation required regarding technical specification and requirements

Unit dimensions

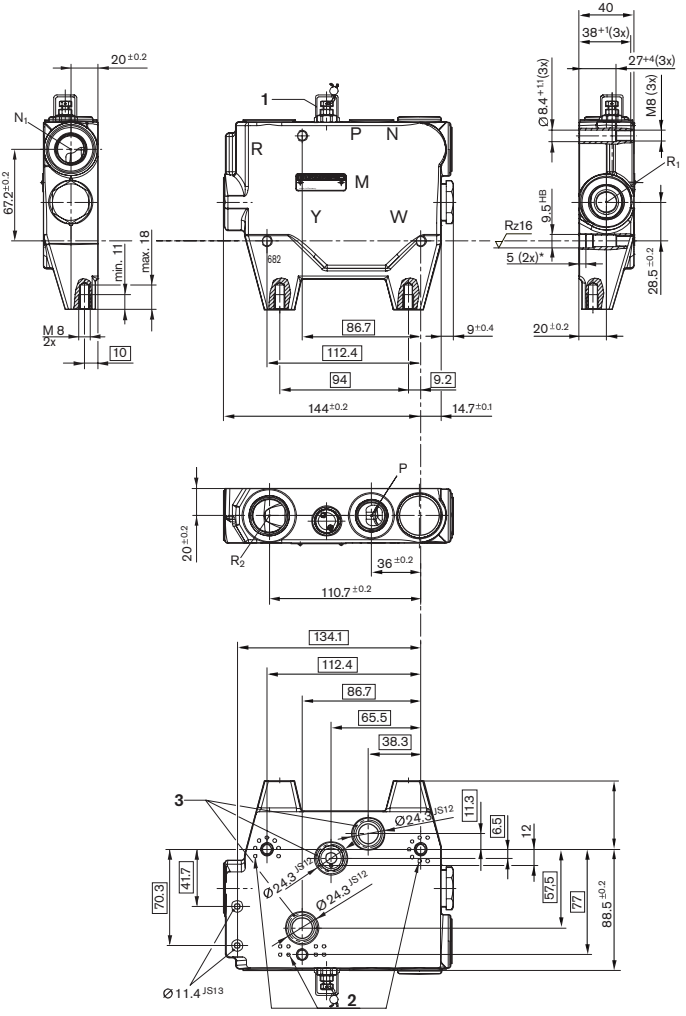
Port plate for variable pump
R917007235



1 Seal rings are included in the delivery contents
2 Stamped

Unit dimensions

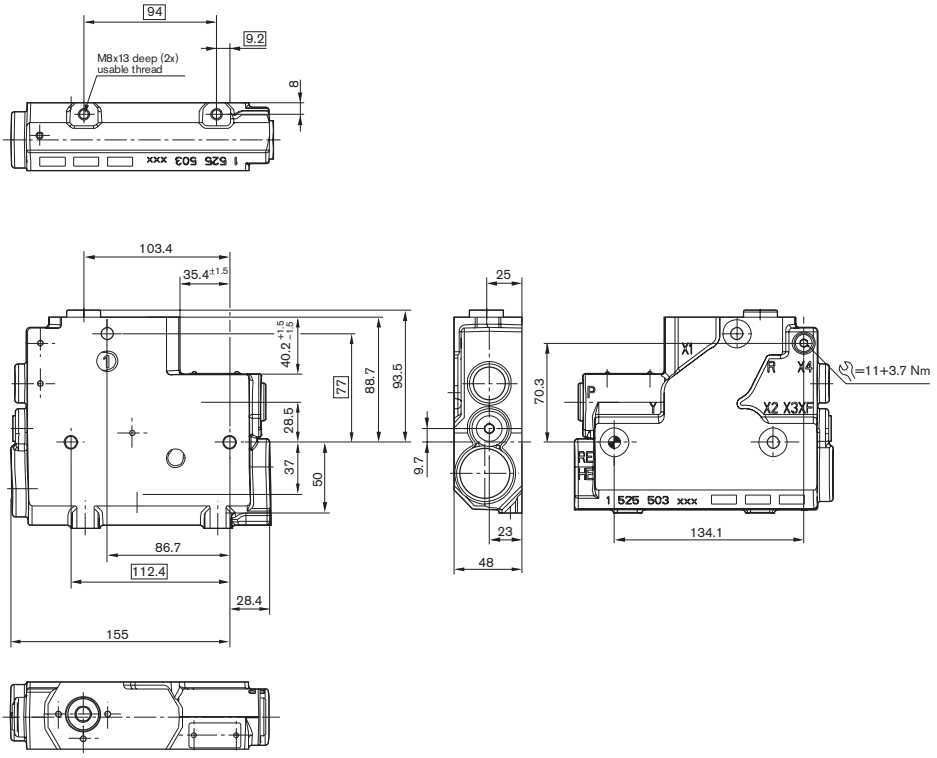
Port plate for fixed pump
R917007203



1 Protective cap (sealable)
2 Stamped
3 Seal rings are included in the delivery contents

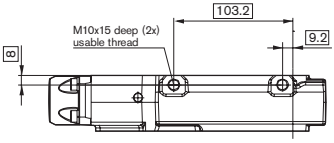
Unit dimensions

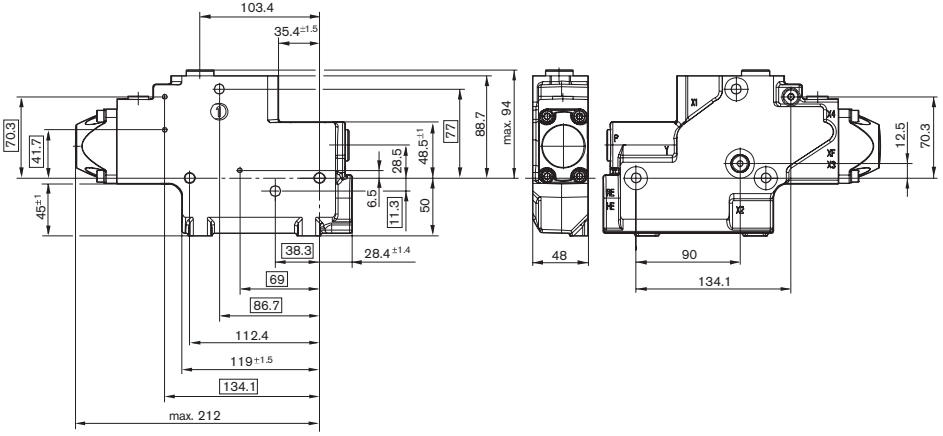
End plate for variable pump
R917007578



Unit dimensions

End plate for variable pump
R917005923

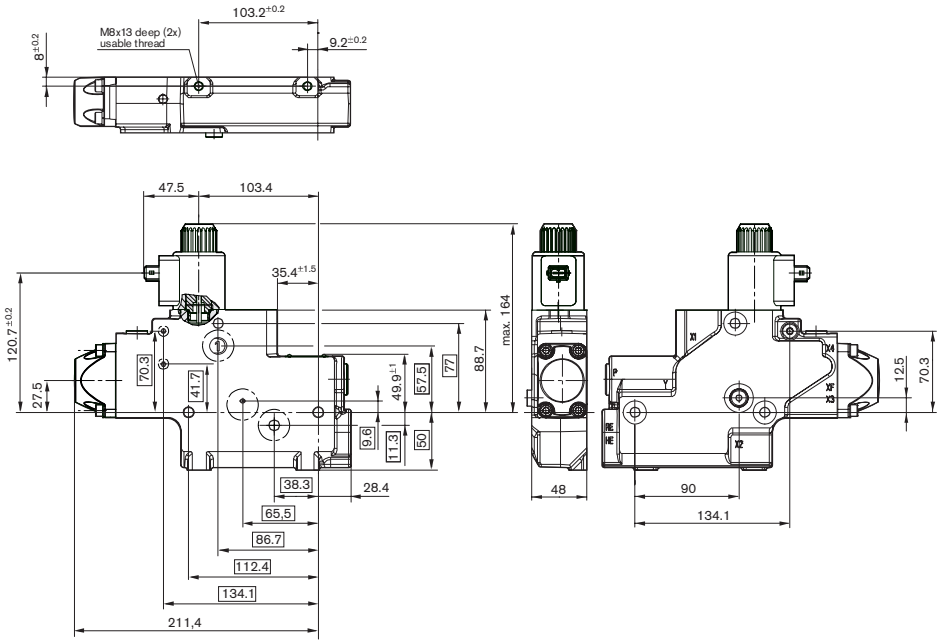




2

Unit dimensions

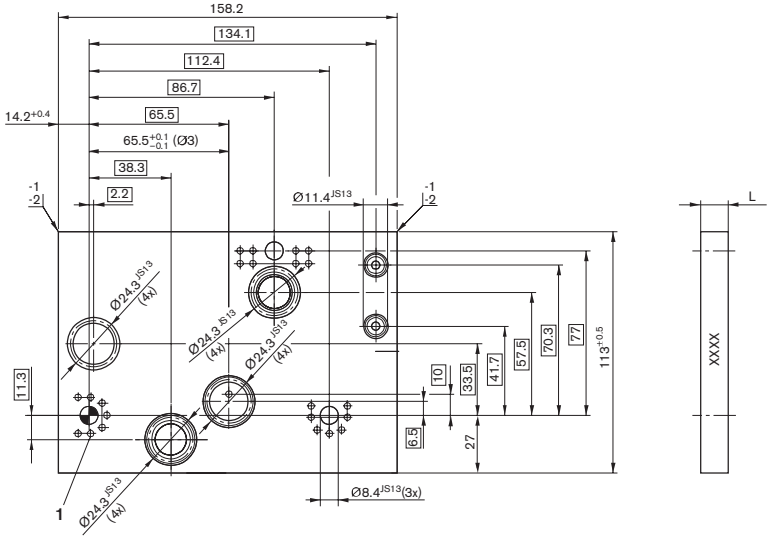
End plate for fixed pump
R917007249



Unit dimensions

Intermediate plate

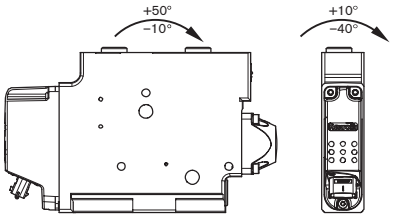
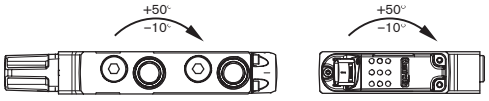
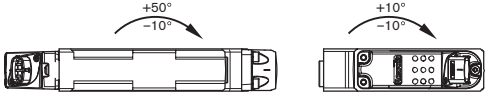
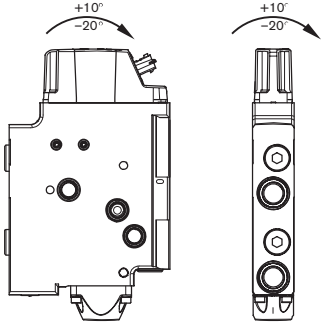
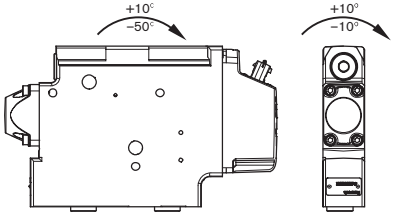
R917005302 (L = 13 mm)
R917006220 (L = 15 mm)
R917007130 (L = 22 mm)
R917007583 (L = 16 mm)



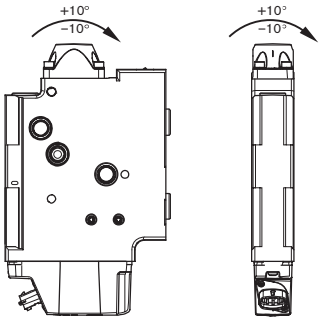
1 Stamped

Installation position

SB33-EHS1 control valve – different installation positions*)

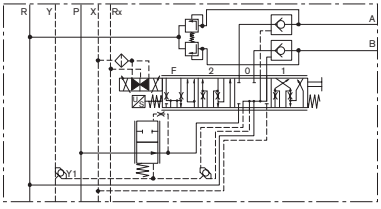
Installation position	Graphical depiction, permissible rotation around axis vertical to image axis
1	
2	
3	
4	
5	

*) The permissible installation positions are can be found in the respective, valid project drawings

Installation position	Graphical depiction, permissible rotation around axis vertical to image axis
6	 *) The permissible installation positions are can be found in the respective, valid project drawings

Hydraulic functions

Standard	Optional
Load-compensated check valve for oil flows from A, B to R	
Work ports / threaded ports: M22x1.5 / ISO 6149, O-ring seal	M22x1.5 / DIN 3852, flat sealed quick-release couplings: flange surface for coupling housing with M6 fixing thread M6 preferred, M8 optional
Spring cap	Manual actuation
Main spool with 4 switch positions	Various oil flows
2-way individual pressure compensator	Individual pressure compensator inhibition (IPC) for EHR33
	Thermo PRV: Assembly as cartridge valve for ports A and B. It prevents an impermissibly high pressure build-up that can arise through thermal expansion in a closed volume
Position sensor for position control of the main spool and for diagnostic purposes	

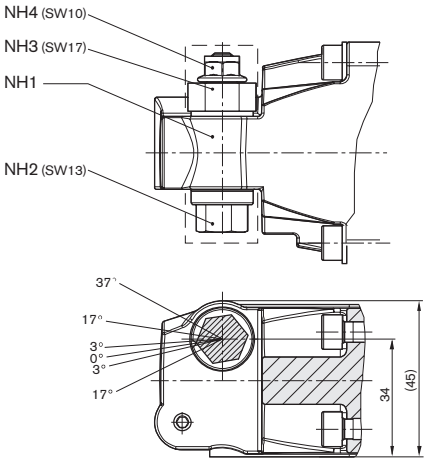


Circuit diagram: SB33-EHS1 with Thermo PRV

Manual auxiliary actuation for directional valve spool (optional)

– Mechanical manual actuation
– Operated with standard tools (WAF 13 hexagon)
– Control spool can be locked in neutral

Caution:
Valves with manual auxiliary actuation must be actuated mechanically after painting. The actuation force needed to crack the paint layer between the rotating positioning shaft and case could be too great for electrohydraulic actuation. The configuration of the valves in the tractor must be selected so that dirt cannot accumulate on the positioning shaft that could cause the main spool to seize.

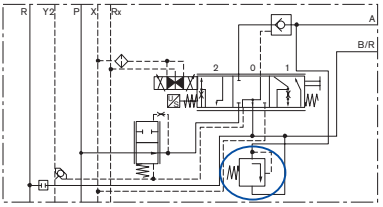


Regular operation	NH3 against NH4
Actuation	NH2 without pilot pressure, MA: 4.5 $^{+1.0}_{-1.0}$ Nm NH2 against pilot pressure, MA: 9.5 $^{+1.0}_{-1.0}$ Nm
Clamping	NH3 against NH1, MA: 20 Nm
Resumption of normal operation	NH4 against NH2, MA: 9 Nm

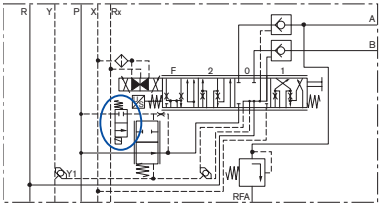
Caution: "Increased risk upon actuation of the manual auxiliary actuation without pilot oil supply"
• Together with pilot pressure cutoff during diagnostics (deflected control spool), also LS signal to switch off pump. Reason: Without pilot pressure, check valve A or B will close to R and the pump will bring an additional maximum pump pressure to the cylinder. Without such a switch, very high pressures could arise on the load side: load pressure + pump pressure x cylinder area ratio.

EHR functions

No Thermo PRV can be integrated in EHR variants (EHR33).



Pressure relief valve for EHR function in A (secondary PRV in support connection; optional)
Fixed setting.
Standard: 230 bar
(227...253 bar at 5 l/min,
...278 bar at 50 l/min)



2/2 proportional solenoid valve for IPC inhibition (optional)
When this 2/2 solenoid valve switches, the individual pressure compensator (IPC) is inhibited so that, depending on pump pressure, there is only a very small oil flow to the load (as with single-acting lowering)

Connector type: Jet connector, 2-pin, standard encoding

For details on the 2/2 solenoid valve, see RE18136-16

Function restriction:
- No inhibitor function with undersupply with low pressure.
- No inhibitor function with insufficient input control pressure Δp

2

Pilot oil supply

Not a component of the directional valve (block or system component)

When using manual auxiliary actuation without pilot oil supply and unrestricted pump supply, impermissible pressure increases may occur since without pilot pressure the check valves do not open for lowering.

Remedy: Through appropriate machine design, such pressure increase can be avoided (e.g. through additional auxiliary pilot oil supply or by switching off the LS signal to pump/port plate.

Reason: Without pilot pressure, check valve A or B will close to R and the pump will bring an additional maximum pump pressure to the cylinder. Without such a switch, very high pressures could arise on the load side:
load pressure + pump pressure x cylinder area ratio.

Required pilot oil flow per SB-/EHR33 segment:

Values for viscosity 30 mm²/s:
In neutral position: typically 250 ml/min, maximum 460 ml/min
When lifting or lowering: typically 600 ml/min, maximum 900 ml/min
In float: typically 250 ml/min, maximum 460 ml/min
During step function (lift or lower): typically 3.5 l/min (response time approx. 40 ms, no time ramp)
During step function (float): typically 4.4 l/min (response time ca. 75 ms)

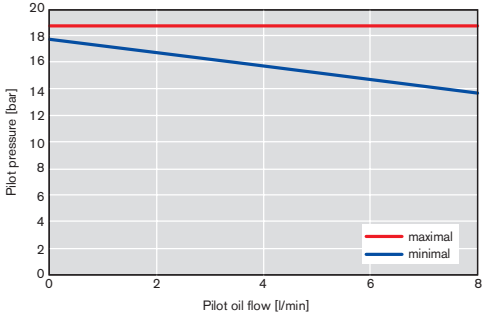
Requirement peaks in the pilot oil can be limited by preventing simultaneous activation of several consumers (response time lag + safety margin). or by programming the time ramps accordingly.

Pilot pressure referencing

Note that pilot pressure pX is to be referenced to the highest return pressure of all SB33/EHR33 valves (p_X absolute = $p_X + p_{R\,max}$). If this referencing is not performed, the calibration of inflow and return oil flow will be shifted to such an extent that the inflow pressure could rise to PRV pressure. Depending on load characteristics, this could result in impermissibly high pressures in the work port.

Pilot pressure

$p_x = 18^{\pm 0.8}$ bar (response point at pilot oil flow 0.8 to 1.2 l/min)



The pilot pressure acc. to the diagram must be available solely to the SB33 valves as full valve performance is not otherwise ensured.

Pilot oil fine filter

Pay close attention to oil cleanliness, particularly with respect to the pilot oil supply; use an additional pilot oil fine filter if necessary.

Flows

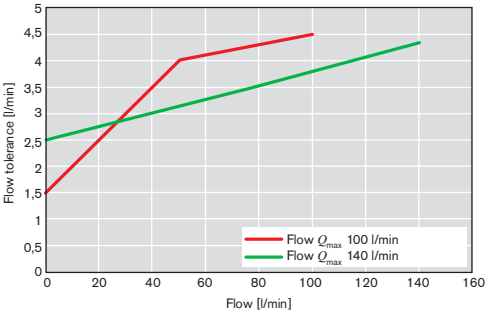
Standard valve oil flow variants:
• Standard: P – A, B = 100 l/min, A, B – R = 200 l/min, cylinder area ratio = 2
• Optional: P – A, B = 140 l/min, A, B – R = 250 l/min, cylinder area ratio = 1.8

As standard, valves are configured for a cylinder surface ratio of 2 or 1.8 with arbitrary connection possibility at one cylinder. That means that the return flow is 2x or 1.8x the inflow. Other designs on request.
If not specified otherwise, the following parameters apply for an oil viscosity of $\nu = 30$ mm²/s.

Flow tolerance

The tolerance characteristics apply for inflow oil flow with standard calibration.

Other calibration (return flow) possible. Special versions may have different tolerances.

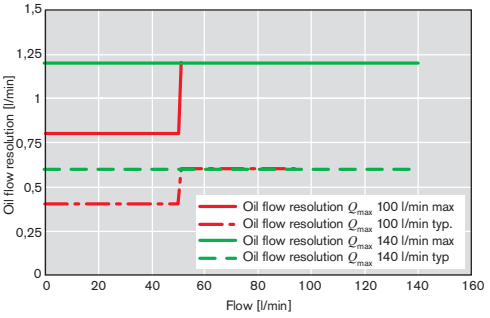


Hysteresis

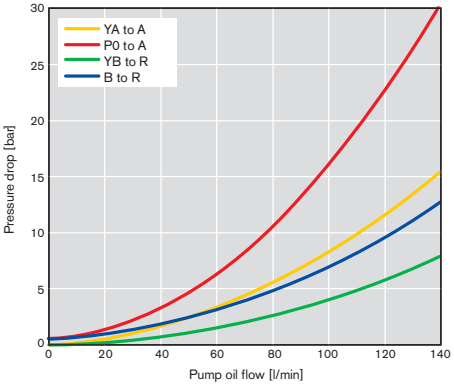
With respect to oil flow: typically approx. 1 % of Q_{max} (in oil flow range up to 80 % of Q_{max})

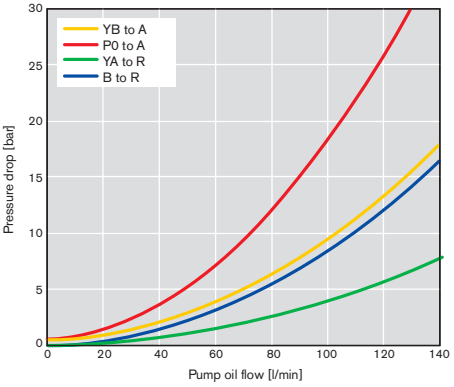
Oil flow resolution

The characteristics apply for the inlet oil flow with standard calibration. Different tolerances may arise for special versions.



Differential pressure (typical values)





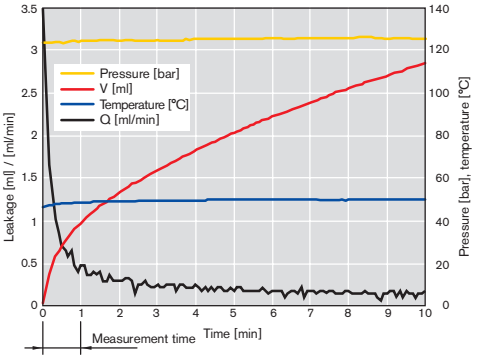
Temperature drift in oil flow
The temperature-dependence of the oil flow is electronically compensated for in the temperature range 30°C to 90°C

Pressure drift in oil flow
Pressure drift of the oil flow (pressure increase due to increased pressure in parallel operation) is compensated for by the individual pressure balance.

Internal leakage

A, B to R (with $p = 125$ bar, $\nu = 30$ mm²/s, T = 50°C,
$t_{wait\ time} = 15$ s, $t_{measurement\ time} = 60$ s)
In neutral: < 2 cm³/min
Higher values for variants with:
Secondary PRV: + ~ 1 cm³/min
Thermo PRV: + ~ 0.3 cm³/min

Typical leakage curve:



Leakage at check valve
vs. time

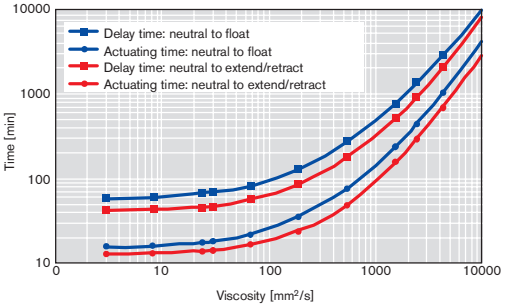
- P to R (with $p = 200$ bar, $\nu = 30$ mm²/s, T = 50°C)
- in pos. 0: typically: 60 cm³/min, maximum: 110 cm³/min
- in pos. 1, 2: typically: 250 cm³/min, maximum: 450 cm³/min
- in pos. F typically: 60 cm³/min, maximum: 200 cm³/min

Higher values may occur for special spool variants.
- Y to R in (with $p = 200$ bar, $\nu = 30$ mm²/s, T = 50°C)
- All pos. typically: 60 cm³/min, maximum: 110 cm³/min

Response time / dynamics

Cutoff frequency with respect to spool stroke
approx. 17 Hz for change in target value
from 0 to 100 %

Step function:
see characteristic



Electronic functions

Standard	Optional
CAN control	PWM (pulse-width-modulated voltage signal) on request

General electrical details

Supply voltage	Standard on 12-V vehicle battery voltage; on request: 24 V	
Overvoltage resistance	Power supply: 48 V, duration 5 min	
Polarity reversal protection	Test voltage –48 V, duration 5 min	
Protection against short circuit	Protection against short circuit against 36 V, against ground, as well as between the individual inputs and outputs.	
Level of protection	IP69K (electronics), with mating connector plugged in	
EMC irradiation	ISO 11452-2 EMC irradiation measurement 0.2 MHz to 1000 MHz, frequency according to ISO 14982: 1998 Reference limit values: • TEM cell 100 V/m • Stripline 150 V/m	
EMC emission	ISO 14982: 1998	
ESD	ISO 10605: 2008 Unpowered test: relay discharge: ± 8 kV, air discharge ± 15 kV, $R_i = 2000\ \Omega$, C = 150 p_F (table C1, category 1) Powered up test: relay discharge: ± 8kV, air discharge ± 15kV, $R_i = 2000\ \Omega$, C = 330 p_F (table C2, category 1)	
Line-bound interference	ISO 7637-2:2004	
Electr. power input		$U_{Bat} = 14V$ Typ. [W] / Max. [W]
	in neutral position	0.4 / 0.6
	at max. adjustment speed	/ 12
	in switch or intermediate position	3.6 / 5.0
	in float	6 / 12
Input signal	CAN, physical layer acc. to ISO 11898 “High Speed”, standard transmission rate 250 kBaud	
Connections	Compact connector Pin 1 = ground Pin 2 = CAN high Pin 3 = CAN low Pin 4 = U_{Bat}	Jet connector Pin 1 = U_{Bat} Pin 2 = CAN low Pin 3 = CAN high Pin 4 = ground
Sinusoidal vibration test	DIN EN 60068-2-6, 10 Hz – 2000 Hz, 57,5 – > 2000 Hz, 6.93 g rms 10 Hz – > 57.5 Hz, 1.5 mm pp	
Broadband noise test	DIN EN 60068-2-64, 5 Hz – 2000 Hz, a_{eff} 86.9 m/s^2	
Shock test	DIN EN 60068-2-27, a = 500 m/s^2, 11 ms, 60 cycles DIN EN 60068-2-29, a = 400 m/s^2, 6 ms, 300 cycles	

Reading out the error code with the EHS diagnostic tool, error interpretation

The EHS Diagnostics Tool is a software program specially developed for troubleshooting in EHS systems in vehicles or on the test bed. The diagnostic tool is used for identifying and diagnosing individual valves or all valves in the block / tractor. The technical data and error memory of the valves can be read out via RS232 (individual valve only) or CAN (together). For the RS232, the baudrate is set to 9600 baud; for the CAN, the baudrate is automatically calculated

Overview for internal diagnostics

Special measures for protecting against malfunctions resulting from contamination, material defects and similar are not specified. The equipment does not perform any safety function without additional measures on the part of the user.

Fail-safe	In the event of a power failure, short circuit or failure in the oil supply, the actuator will automatically switch the pilot spool to neutral (spool is spring-centered)	
Error detection	Error	Reaction in case of error:
Internal error:	– Control spool not in neutral position when switching on	– CAN: diagnostic message via CAN bus Caution: Uncontrolled load shifts possible, system must be shut down.
	– Spool not deflected far enough	– Valve switched to neutral, optionally only error message
	– Control spool deflected too far or does not return to neutral (e.g. spool held or stuck)	– If countersteering does not help, the actuator will be de-energized. – CAN: diagnostic message via CAN bus Caution: Uncontrolled load shifts possible, system must be shut down.
	– Displacement pick up defective	– Valve is not actuated
	– Current measurement defective	– Valve is not actuated
	– Output stage defective	– Valve is not actuated.
	– Checksum error via – Main program – EEPROM customer area	 – Valve is not actuated – Checksum test, optionally only error message or shutdown
	– RAM error	– Test, either for error message or shutdown
	– Computer error	– Error due to interference peaks: A second attempt is only permissible if the setpoint was first set to neutral. – Other computer errors: – CAN: diagnostic message via CAN bus – Caution: Uncontrolled load shifts possible, system must be shut down.
External errors:	– Supply voltage below permissible range	– Valve is not actuated (with CAN: above Bosch limit, optionally only error message)
	– Supply voltage above permissible range	– Valve is not actuated (with CAN: below Bosch limit, optionally only error message)
	– Setpoint voltage below permissible range	– Valve is not actuated
	– Setpoint voltage above permissible range	– Valve is not actuated
	– No setpoint message (only with CAN)	– Valve is not actuated
	– Implausible setpoint message (only with CAN)	– Valve is not actuated
	– No configuration message (only with CAN)	– Valve is not actuated
	– Manual actuation (on manual lever of the valve)	– Valve remains switched off, no counter reaction, no electric control possible
Visual error display	Diagnostics LED in device plug	Flash code indicates type of error (see flash code)
Fault diagnostics with CAN	The error is transmitted via CAN with an error code. The transmission message diagnostics is sent up to 5 times directly after the error occurs, then every 100 ms (adjustable). The error code is transmitted (see CAN message description).	

General information on CAN control

The EHS valve can be easily controlled via the serial CAN interface. A message can be used here to specify the operation modes “Neutral”, “Lift”, “Lower”, “Float” as well as the oil-flow setpoint. A second message can be used for both “Lift” and “Lower” (different for each) to set the characteristic shape, characteristic gradient and ramp times. Conversely, the valve can use an error code to provide detailed information to the higher-order control panel about any errors which have occurred.
Finally, the valve can be permanently reprogrammed with the parameterization messages (CAN baudrate and identifier, battery voltage limits, valve number, etc.).

General CAN conventions:

	Standard setting
Baudrate	250 kBaud, to ≤ 1 MBaud possible
Sensing	Single sensing action
Time of sensing action	At 3/4 of the bit length
Synchronization edges	Only edges from recessive to dominant
Synchronization steps	SJW = 1 BTL cycle

Caution: The maximum baudrate must always be tested in the vehicle and is dependent on:
- Data traffic on the bus
- Effectiveness of the internal hardware identifier filter, affected e. g. by:
  - Allocation of the CAN identifiers which do not affect the valves
    CAN identifier set, see TKU: Z 206 E00 444

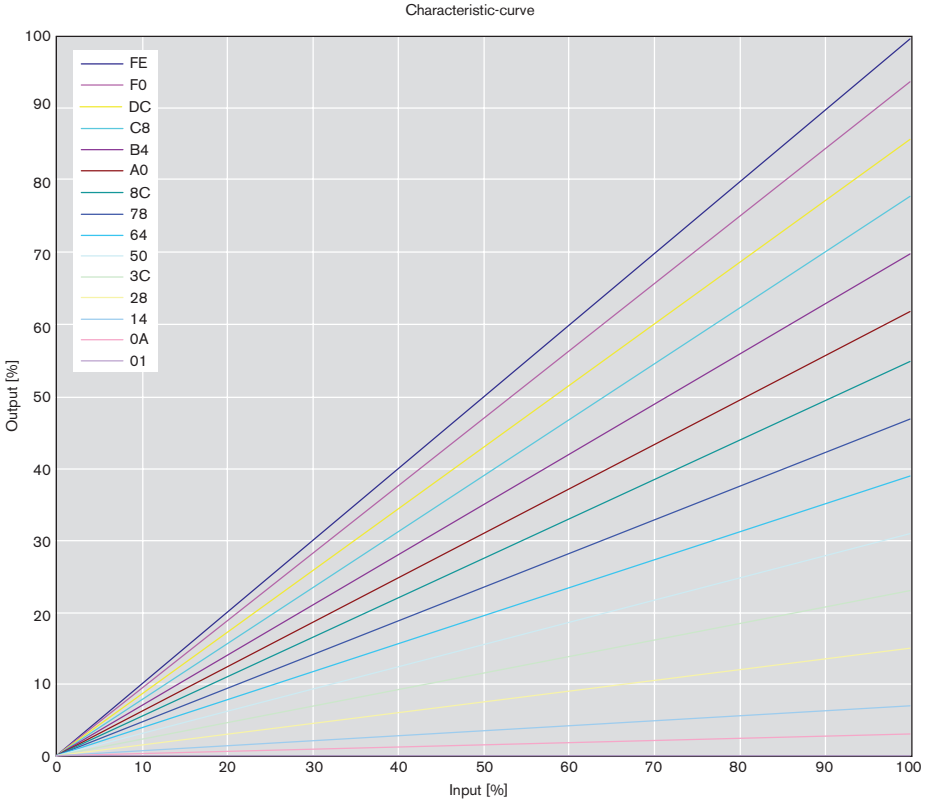
Characteristics for forming target values and time ramps

Characteristic gradient

The characteristic gradient can be used to linearly reduce valve deflection from 100 % to 0 %.

255 steps can be programmed: 00hex, 01hex, 02hex.....FEhex
0 %, 0.39 %, 0.78 %, ...100 %

In CAN mode, the value of the characteristic gradient is transferred in the configuration message; in PWM mode, it is in the valve EEPROM and can be programmed. Standard setting is 100 %. The characteristic gradient should preferably selected with values as shown.



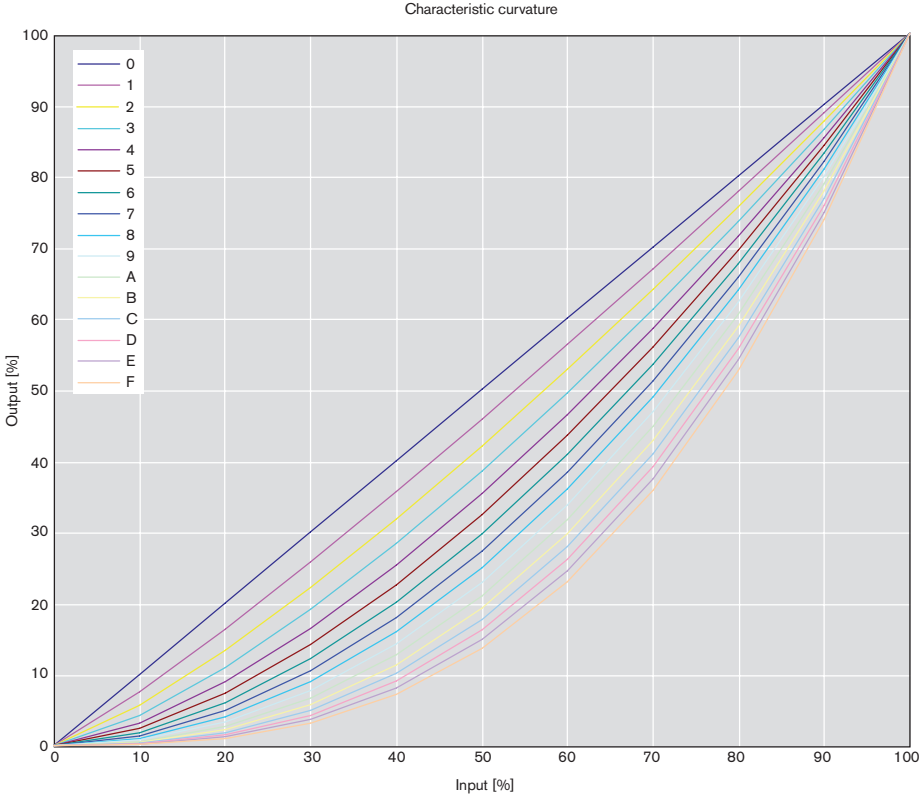
For CAN control, the input corresponds to the oil-flow target value. For PWM control, input = 0...100 % corresponds to a PWM pulse-duty factor of 53...85 % for lowering or 47...15 % for lifting (with standard characteristic vertices). Output corresponds to the oil flow at the directional valve.

Characteristic-curve shape

The characteristic shape can change from linear to heavily progressive. If needed, the valve's fine control characteristic can be changed.

15 steps can be programmed separately for lifting and lowering: 0_{hex}, 1_{hex}, 2_{hex}.....E_{hex}
linear.....progressive

In CAN mode, the value for the characteristic shape is transferred in the configuration message. In PWM mode it is in the valve EEPROM and can be programmed.



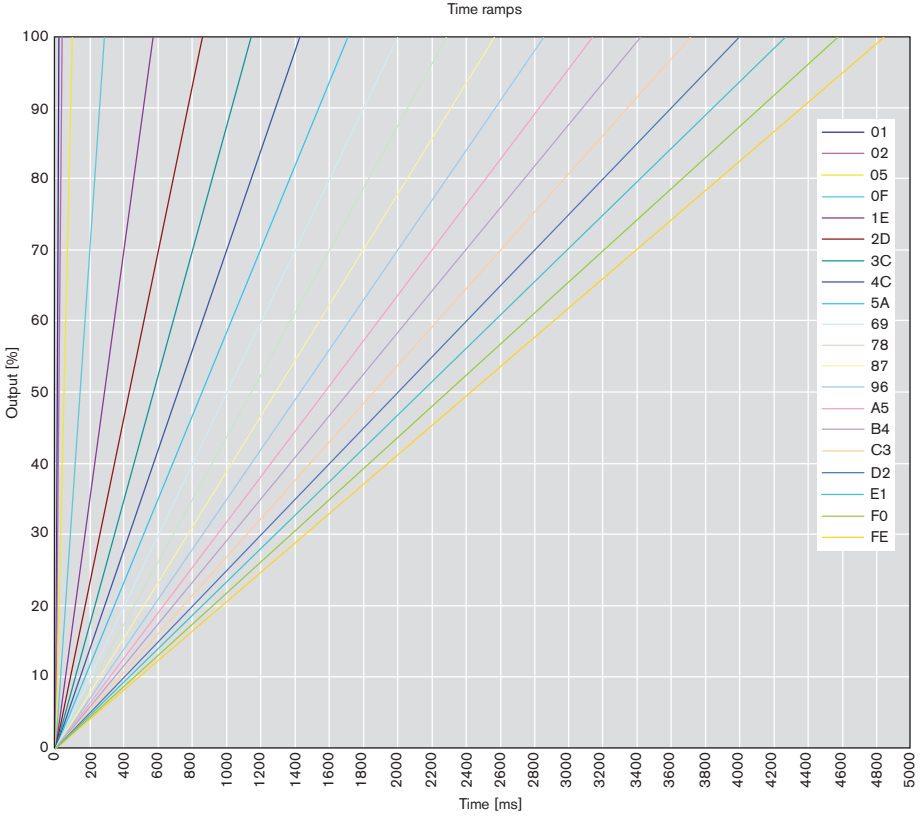
For CAN control, the input corresponds to the oil-flow target value. For PWM control, input = 0...100 % corresponds to a signal voltage or a PWM pulse-duty factor of 53...85 % for lowering or 47...15 % for lifting (with standard characteristic curve vertices). Output corresponds to the oil flow at the directional valve.

Time ramps

By using time ramps, the dynamics of the valve can be reduced in a well-targeted manner. The ramp time is then the time needed to run through the full stroke (from 0 to 100 % or 100 % to 0 % for lifting or lowering).

255 separate steps can be programmed for lifting and lowering and for switching on and off:
00hex, 01hex, 02hex.....FEhex
0, 16, 32,.....4064ms

In CAN mode, the values for the time ramp are transferred in the configuration message. In PWM mode they are in the valve EEPROM and can be programmed.



Installing the control block

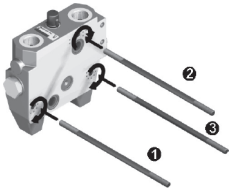
Preparation

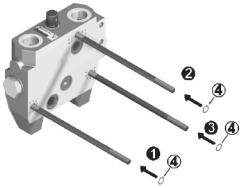
– Install the shuttle valve of the control block segments acc. to chapter 5.5 “Shuttle valve”.
– Install the sealing elements of the control block segments acc. to chapter 5.4 “Repairing flange surface sealing elements”.

If the control block segment flange surface has stamp marks and if they were treated with a whetstone, a spacer disc ④ must be threaded onto tie bolt screws ❶, ❷ and ❸.

Installation of the port plate

1. Use only original M8 tie bolts from Rexroth (hardness class 10.9).
2. Screw in tie bolt screws ❶ to ❸ clockwise by hand to the ground.

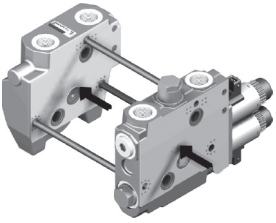


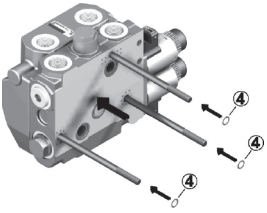


Installation of the port plate

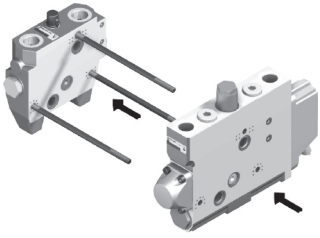
Installation of the control block segments

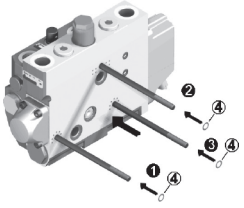
– Push the control block segments over the tie bolts in the specified order, with the flange on the side opposite the O-ring facing the port plate.





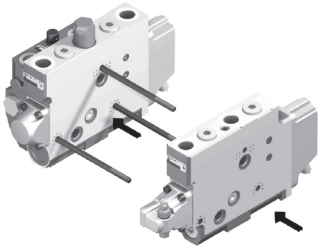
Installation of the EHR23-EM2 control valve

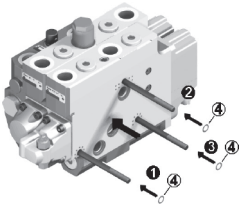


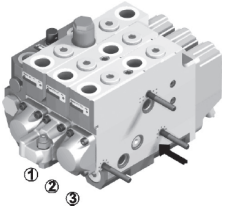


Installation of the EHR33-EHS1 control valve

Installation description







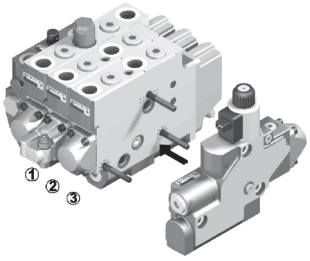
Installation of the SB33-EHS1 control valve

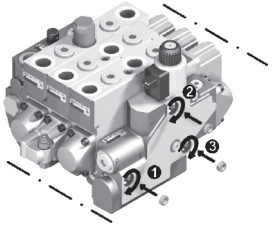
Installation of the end plate

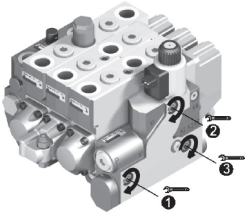
1. Align the end plate with the flange surface to the control block, sliding it over the tie bolts to the stop.
2. Screw the nuts, without washers or retaining discs, onto the tie bolt screws clockwise by hand.
3. Align the control block segments with one another.
4. Pretension nuts with a torque of 5^{+1} Nm.
5. Tighten the nuts clockwise with a torque acc. to the table. Tightening sequence ❶ → ❷ → ❸.

Tightening torques for nuts

	Oiled
❶	$25.5^{+2,5}$ Nm
❷	$25.5^{+2,5}$ Nm
❸	$25.5^{+2,5}$ Nm







Installation of the end plate

Specifications / regulations

The valve itself performs no safety function. It can fail. The tractor manufacturer (customer) must take safety measures as necessary.

Additional notes on operation and commissioning
- For block assembly and installation in the tractor:
- Do not misplace or damage O-rings, back-up rings and shuttle valves.
- Shock-like loads above the specified values may cause invisible concealed damage and must be avoided.
- The installation positions of the valves in the machine must be such that mechanical damage, e.g. due to stones etc., with consequential damage such as housing deformation, jamming, damaged control elements, fractured or damaged cables are avoided.
- Risk in event of drop in pilot pressure
  If, for example, oil from the inlet flows into the system faster than it can flow through the check valves and the main spool, this could cause impermissible pressure spikes. Examine critical operating conditions during commissioning.
- ESD was tested according to ISO 10605: 2008 tables C1 and C2, each in category 1, see “General electrical details”. Adherence to the standard must also be ensured during installation and painting.
- Note: If a hydraulic motor is operated with a directional valve in float position, the motor can turn freely.
  If the hydraulic motor is turned by an external force and is quickly stopped by switching the directional valve to cutoff, the moment of inertia of the hydraulic motor could give rise to very high pressure spikes that could damage the hydraulic system. This could happen, for example, when the machine is switched off or the pilot pressure is cut off. The check valves in the directional valve and the control spool then move to neutral.

For further details, please refer to Bosch Rexroth instruction manual RE-66132-B

Additional documents

	Title	Document number	Document type
🕮	Control block SB33-EHS1, EHR33-EHS1	RE 66132-B	Instruction manual
🕮	Control block SB33-EHS1	RE 66132-10-R	Repair instructions
🕮	Control valve SB33-EHS1	RE 66132-20-R	Repair instructions
🕮	Control valve EHR33-EHS1	RE 66132-30-R	Repair instructions
🕮	On Board Electronic SB33-EHS1	RE 66132-40-R	Repair instructions
🕮	2/2 Solenoid valve	RE 18136-16	Data sheet
🕮	SB33-EHS1 Interface description, Hydraulic	Z 206 800 810	Technical information
🕮	SB33-EHS1 Interface description, Electronic	Z 206 E00 444	Technical information
🕮	Air bleeding directional valves	MH 121	Commissioning notes
🕮	Supplied installation drawing / hydraulic plan	Available from your machine or system manufacturer.	Project drawing
🕮	Hydraulic fluids on mineral oil basis	RE 90220	Data sheet
🕮	Hydraulic fluids on mineral oil basis for axial piston units	RE 90220-1	Data sheet

Abbreviations

The following abbreviations are used in this document:

Abbreviation	Meaning
PP	Port plate
CAN	Controller Area Network
PRV	Pressure relief valve
Th-CV	Throttle check valve
DA	Double-acting
EHR	Electronic and hydraulic hitch control
EHS1	Pilot controlled electro-hydraulic actuator
EP	End plate
SA	Single-acting
IPC	Individual pressure compensator
LS	Load sensing
OBE	On Board Electronic
RfA	Return flange work port A
SB33	Control block, directional valve series 33

Spare parts

Spare parts and material numbers can be found on the Internet at
www.boschrexroth.com/spc

Contacts for accessories and spare parts

Accessories and spare parts are available
• from vehicle manufacturers (specialist dealers),
• from system manufacturers and
• from your BoschRexroth dealer.

The Rexroth sales partners can be found on the Internet at
www.boschrexroth.com/addresses

Address all questions regarding spare parts to your responsible Rexroth Service partner or the service department of the plant that manufactures the control block.

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www.boschrexroth.com/brm

Valve Modules

Designation	Type	Size	Data sheet	Page
Hitch control valves	EHR	5, 23	RE 66125	561
Traction module (flow divider)	RTM	16, 25	RE 64592	577
Slew drive module	MSC	16	RE 64593	603
Check-Q-meter	FD	12…32	RE 27551	615
Stabilising module	RSM2	10	RE 64614	625
Stabilising module	RSM2	16	RE 64617	631
Stabilising module	RSM2	25	RE 64618	635
Multi-way directional valves	MH.W.	6, 20, 30	RE 64638	639
Pressure relief valves			RE 25860	647
Flow control valves			RE 27574	659
Safety valves, type-approved (see RE 90010-04, chapter 4)	0 532 VA…		RE 50153	
Thermal pressure valve	MHDBDT	6	RE 64309	667
Throttle check valve and check valve	MHFS, MHSV	20, 25, 32	RE 64548	671

For the latest information on valve modules, please visit our website:
www.boschrexroth.com/mobile-valves