RE 30362
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rexroth
A Bosch Company

Connector switching amplifier with pulse width modulation (PWM)

Type VT-SSBA1

- Component series 1X

CE

Features

- Fast switching: Control of hydraulic on/off valves with 12 V solenoids
- Energy savings: Power reduction in the control of hydraulic on/off valves with 24 V solenoids
- Reduction in the coil temperature of at least 30°K with 100% duty cycle (with energy savings)
- Suitable for the control of on/off valves of the type WE 6 and WE 10 with 12 V and/or 24 V direct current solenoids with the control spools described in the data sheet.
- For valves with connector K4 according to EN 175301-803
- Potted-in cable with open end
- 3-conductor connection, power supply and enable input separated
- Short-circuit-proof output
- Status display of the switching status with LED

Contents

Ordering code

01		02	03		04	05
VT-SSBA1-PWM	**–**	**1X**	**/**		**/**		*****

01	Connector switching amplifier with pulse width modulation (PWM)	**VT-SSBA1-PWM**
02	Component series 10 ... 19 (10 ... 19: unchanged technical data and pin assignment)	**1X**
03	Power reduction to 100 ms for fast switching for 12 V solenoids	**V001**
	Power reduction to 300 ms for energy savings for 24 V solenoids	**V002**

Cable length

04	5 m	**5**
	10 m	**10**
	15 m	**15**
05	Further details in the plain text	*****

Function

The connector switching amplifier type VT-SSBA1 is directly mounted at the K4 connector of the valve.
It is supplied with 24 V direct voltage. If at wire 2 (enable "IN"), a high-signal is applied, the voltage profile is applied at the valve according to the functional diagram.
If the enable input is switched, the status display LED is flashing yellow.

Fast switching ("V001")
As fast switching amplifier, the connector switching amplifier type VT-SSBA1 considerably reduces the switching time of standard directional valves in connection with 12 V solenoids.
On switching on, the solenoid is overexcited with 24 V by 100%. Afterwards, the voltage is reduced and the required holding current is set via pulse width modulation.

Energy savings ("V002")
If 24 V standard directional valves are used, the connector switching amplifier considerably reduces the continuous current to save energy.
After a defined power supply time and the connected hydraulic switching of the valve, the system switches to pulse width modulation and the power is considerably reduced. This leads to a holding power under the power of a 24 V valve at 24 V supply voltage.

Assignment of valves with their voltage version to versions "V001" and "V002", see page 6 and 7.

Technical data

(For applications outside these values, please consult us!)

General			
Weight (incl. cable), approx.		g	350
Housing			Valve connector K4 according to DIN EN 175301-803
Ambient temperature range		°C	–20 ... +60
Storage temperature range		°C	–20 ... +60

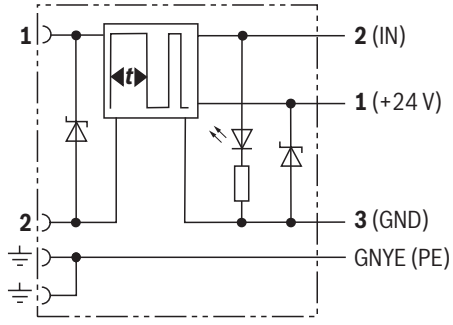
Electric [1]			
Voltage type			Direct voltage
Operating voltage		V	24 ±10%
Holding current		A	2
Control voltage (enable "IN")	▶ ON	V	10 ... 30
	▶ OFF	V	<3.5
Galvanic separation			no
Control current (enable “IN”)		mA	2.5 ... 12
Maximum switching frequency		Hz	≤1
PWM frequency		Hz	PWM operation 300 ... 500
Protection class according to EN 60529			IP65, IP67
Cable connection			Potted-in cable with open end
Cable type			See table below
Duty cycle	▶ "V001" (fast switching)	ms	100 ... 115
	▶ "V002" (energy savings)	ms	300 ... 330
PWM duty factor	▶ "V001" (fast switching)	%	40 ±5 on
	▶ "V002" (energy savings)	%	60 ±5 on
Conformity	▶ CE according to EMC directive 2014/30/EU, tested according to		EN 61000-6-2:2005, EN 61000-6-3:2007 + A1:2011

[1] The specified values refer to an operating voltage of 24 V

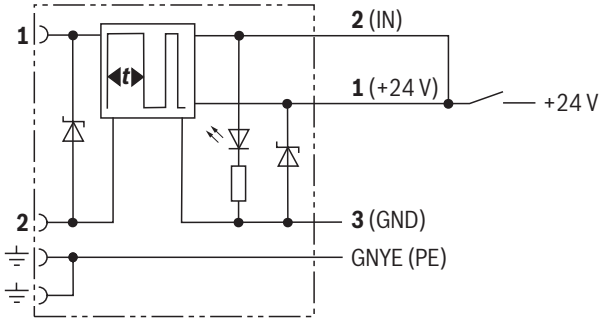
Cable type

Jacket material	**Jacket color**	**Lead insulation**	**Wire color**	**Wires** in mm^2	**Jacket diameter** in mm
PUR-JZ	Black	PP	BK, GNYE	4 x 0.75	6.5

Block diagram / pin assignment



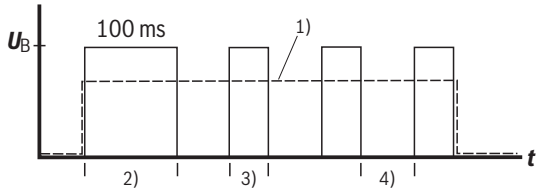
2-conductor port



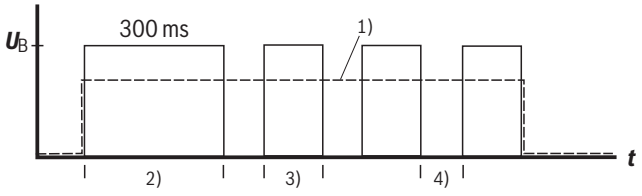
1 Operating voltage "+U_B" (+24 V)
2 Enable “IN”
3 Operating voltage "GND"
GNYE Protective grounding conductor "PE"

Functional diagram

Version "V001" (ratio on/off = 40/60)

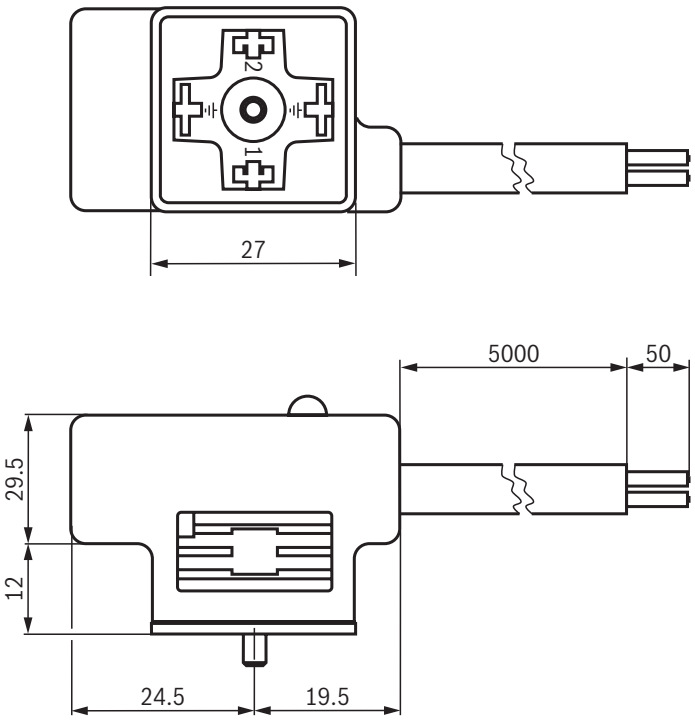


Version "V002" (ratio on/off = 60/40)



1) Enable signal
2) Duty cycle
3) On time
4) Off time

Dimensions (dimensions in mm)



- M3 mounting screw, tightening torque M_A = 0.4 Nm
- Contacting according to DIN EN 175301-803

Switching times: Version "V001"

Comparison of 24 V coil (control standard 24 V signal) **with 12 V coil** (control via VT-SSBA1...V001)

Directional spool valves type 4WE 10 ... (3 chambers)

Symbol	Coil	Switching time in ms	
		ON	OFF
C	24 V	58	48
	12 V; "V001"	26	48
D	24 V	78	28
	12 V; "V001"	29	28
E	24 V	55	35
	12 V; "V001"	22	35
E67	24 V	84	31
	12 V; "V001"	24	31
J	24 V	63	51
	12 V; "V001"	28	51
J2	24 V	47	31
	12 V; "V001"	24	31
Y	24 V	57	31
	12 V; "V001"	23	31
Y11	24 V	46	50
	12 V; "V001"	28	50

Directional spool valves type 4WE 6 ...

Symbol	Coil	Switching time in ms	
		ON	OFF
C	24 V	27	14
	12 V; "V001"	17	14
D	24 V	42	11
	12 V; "V001"	25	11
E	24 V	32	11
	12 V; "V001"	22	11
E67	24 V	39	12
	12 V; "V001"	21	12
G	24 V	33	11
	12 V; "V001"	28	11
J	24 V	37	17
	12 V; "V001"	17	17
L	24 V	36	15
	12 V; "V001"	21	15
M	24 V	47	26
	12 V; "V001"	33	26
X7	24 V	62	13
	12 V; "V001"	47	13

Directional spool valves type 5-4WE 10 ... (5 chambers)

Symbol	Coil	Switching time in ms	
		ON	OFF
J2	24 V	170	23
	12 V; "V001"	44	23
X84	24 V	39	67
	12 V; "V001"	20	67

Shut-off valves type Z-4WE 6 ...

Symbol	Coil	Switching time in ms	
		ON	OFF
E63	24 V	27	14
	12 V; "V001"	15	14
E68	24 V	27	14
	12 V; "V001"	15	14
X250	24 V	31	20
	12 V; "V001"	16	20
X252	24 V	47	13
	12 V; "V001"	17	13

Notices:

- Additional valves on request.
- If the connector switching amplifier is used, the power limit may be improved. The degree of improvement depends on the respective symbol of the valve. Further information on request.
- When switching on and off, an additional dead time of approx. 2 ms must be taken into account (applies at signal level 24 V).
- The specified switching times correspond to the time of signaling until a pressure change of 5%.
- The switching times are specified for the same power limits as documented in data sheets (see 23178, 23340 and 23352) and for a horizontal installation position.
- The use of version "V001" is not possible in connection with valves with amplified spring.

Energy savings: Version "V002"

Energy savings with valves with 24 V coils using connector amplifier VT-SSBA1..V002

Directional spool valves type 4WE 10 ... (3 chambers)

Symbol	Energy consumption in W	
	24 V coil (standard)	**24 V coil with "V002"**
C; D; E; E67; J; J2; Y; Y11	40	24

Directional spool valves type 4WE 6 ...

Symbol	Energy consumption in W	
	24 V coil (standard)	**24 V coil with "V002"**
C; D; E; E67; G; J; L; M; X7	30	18

Directional spool valves type 5-4WE 10 ... (5 chambers)

Symbol	Energy consumption in W	
	24 V coil (standard)	**24 V coil with "V002"**
J2; X84	40	24

Shut-off valves type Z-4WE 6 ...

Symbol	Energy consumption in W	
	24 V coil (standard)	**24 V coil with "V002"**
E63; E68; X250; X252	30	18

☞ **Notices:**
- Additional valves on request.
- If the connector switching amplifier is used, the power limit may be improved. The degree of improvement depends on the respective symbol of the valve. Further information on request.
- The use of version "V001" is not possible in connection with valves with amplified spring.
- Reduction of the coil temperature by at least 30 K.

Project planning and maintenance instructions

- The connector switching amplifier may only operated in accordance with the limits and applications defined in the data sheet.
- Sufficient distance to radios and mobile phones is required (>1 m).
- In case of overload or short-circuit, the output is de-energized. Before switching it on again, enable signal "IN" has to be switched to "OFF" (<3.5 V).
- There is no galvanic separation between the input and output.
- If used as power reducer, the power in PWM operation is not sufficient for repeated switching of the valve after exceeding the power limit in switched state.
- In an error case, the temperature of the valve solenoid may increase. Take external monitoring measures to ensure that the maximum surface temperature of the solenoid is complied with.
- The connector switching amplifier type VT-SSBA1 is no safety-relevant part of a control system according to EN ISO 13849-1:2006.
  To comply with safety requirements, the following points must be observed:
  - In case the safety function is required, the voltage supply and the enable input of the connector switching amplifiers type VT-SSBA1 is to be switched off by a suitable switching element with appropriate reliability.
  - If persons have to enter the danger zone with activated connector switching amplifier type VT-SSBA1, additional measures for guaranteeing their safety have to be taken for the reasons specified above.

Further information

▶ Mating connectors and cable sets for valves and sensors	Data sheet 08006
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Information on available spare parts	www.boschrexroth.com/spc

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