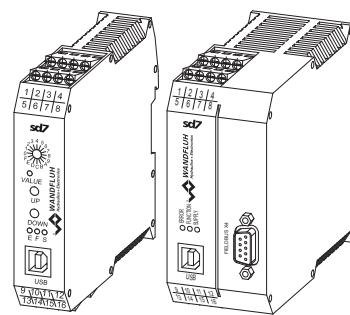


## Digital amplifier module SD7

- for 1 or 2 proportional solenoids
- Interface:
  - analogue
  - CANopen/J1939
  - Profibus DP
  - HART
- max. 4 analogue differential inputs
- max. 8 digital inputs
- Fixed command values
- Adjustable via PC
  - (optionally with manual operation on front panel)
- for snapping on to dome rail
- also available as controller module (see data sheet 1.13-106)



### DESCRIPTION

Digital amplifier module for installation on dome rail for driving proportional or black/white valves with one or two solenoids. The parameterisation takes place by means of menu-controlled parameterisation- and diagnostics software «PASO» from Wandfluh (USB-interface) or optionally with a manual control on the front panel. Separate ramps for up and down as well as fixed adjustable command values are integrated in the amplifier module as standard. The electronics are optionally available with different field bus interfaces.

### FUNCTION

The amplifier module has one, resp., two Pulse-Width-Modulated current outputs with superimposed dither signal. The solenoid outputs can also be parameterised for black/white solenoids. The analogue and digital inputs as well as the digital outputs can be programmed individually. With this device control tasks can be solved in a very simple manner. The field bus connection enables reading the command value signal as well as the parameterisation directly via the field bus.

### APPLICATION

As snap-on module, the amplifier module is mainly utilised in the industrial field. The module can be mounted on dome-rails. The connection with terminal screws enables commissioning without special tools in a short time. The amplifier module is particularly suitable for applications with additional functions such as ramps, fixed command values, etc. Customer-specific requirements can be implemented in a simple manner.

### CONTENT

GENERAL SPECIFICATIONS.....	1
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BASIC AMPLIFIER WITH CANopen INTERFACE.....	7
BASIC AMPLIFIER WITH PROFIBUS INTERFACE .....	13
BASIC AMPLIFIER WITH HART INTERFACE .....	19
ENHANCED AMPLIFIER WITH ANALOGUE INTERFACE .....	23
ENHANCED AMPLIFIER WITH CANopen INTERFACE.....	28
ENHANCED AMPLIFIER WITH PROFIBUS INTERFACE.....	34
ENHANCED AMPLIFIER WITH HART INTERFACE .....	40

### GENERAL SPECIFICATIONS

Execution	Module for electrical control cubicle housing made of plastic
Dimensions	
• Basic amplifier analogue	105 x 114 x 22,5 mm
• Basic amplifier CANopen/J1939	105 x 114 x 45 mm
• Basic amplifier Profibus DP	105 x 114 x 45 mm
• Basic amplifier HART	105 x 114 x 45 mm
• Enhanced amplifier analogue	105 x 114 x 45 mm
• Enhanced amplifier CANopen/J1939	105 x 114 x 45 mm
• Enhanced amplifier Profibus DP	105 x 114 x 45 mm
• Enhanced amplifier HART	105 x 114 x 45 mm
Installation	for 35 mm dome rail acc. to EN 60715
Weight	
• Basic amplifier analogue	130 g
• Basic amplifier CANopen/J1939	220 g
• Basic amplifier Profibus DP	220 g
• Basic amplifier HART	220 g
• Enhanced amplifier analogue	220 g
• Enhanced amplifier CANopen/J1939	240 g
• Enhanced amplifier Profibus DP	240 g
• Enhanced amplifier HART	240 g
Connections	Screw terminals, max. cable cross-section 2,5 mm <sup>2</sup>
Working temperature	-20...+70 °C

The accumulated current of the simultaneously powered solenoid depends on the ambient temperature.  
Further information can be found in the operating instructions.

**TYPE CODE**

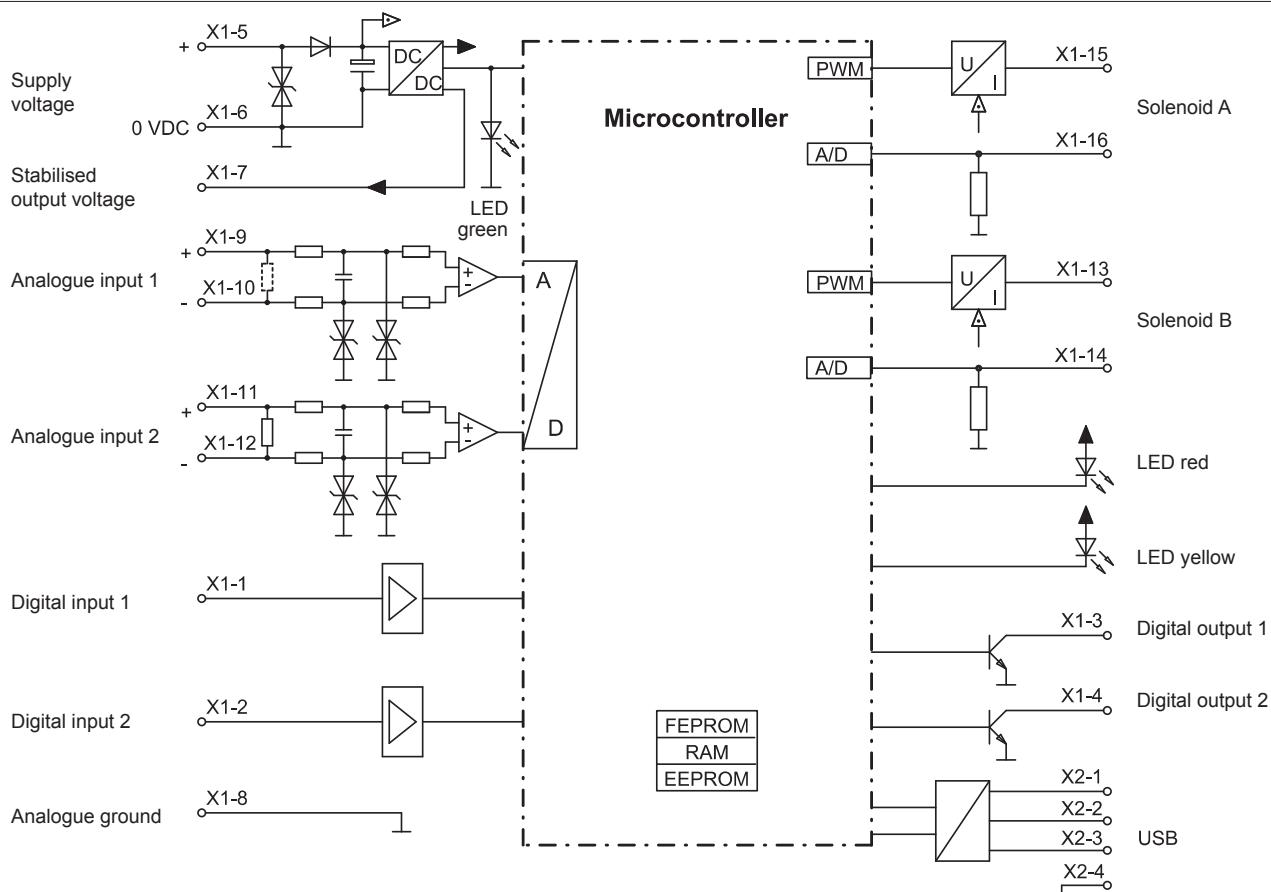
	S	D7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>	<input type="checkbox"/>	#	<input type="checkbox"/>
Module for electrical control cubicle												
Digital												
Adjustable with:												
• PASO and manual operation			<input checked="" type="checkbox"/>									
• PASO without manual operation			<input checked="" type="checkbox"/>									
Software configuration (function of card):												
• Basic amplifier			<input checked="" type="checkbox"/>									
• Enhanced amplifier			<input checked="" type="checkbox"/>									
1-solenoid version				<input checked="" type="checkbox"/>								
2-solenoid version				<input checked="" type="checkbox"/>								
Supply voltage:	24 VDC		<input checked="" type="checkbox"/>									
	12 VDC		<input checked="" type="checkbox"/>									
Basic amplifier:												
• Analogue input 1: voltage			<input checked="" type="checkbox"/>									
2: current			<input checked="" type="checkbox"/>									
• Analogue input 1 and 2: both voltage			<input checked="" type="checkbox"/>									
• Analogue input 1 and 2: both current			<input checked="" type="checkbox"/>									
Analogue input 3: always current (only with HART)			<input checked="" type="checkbox"/>									
Enhanced amplifier:												
• Analogue input 1 and 3: both voltage			<input checked="" type="checkbox"/>									
Analogue input 2 and 4: both current			<input checked="" type="checkbox"/>									
• Analogue input 1 to 4: all voltage			<input checked="" type="checkbox"/>									
• Analogue input 1 to 4: all current			<input checked="" type="checkbox"/>									
• Analogue input 1 and 2: both voltage			<input checked="" type="checkbox"/>									
Analogue input 3 and 4: both current			<input checked="" type="checkbox"/>									
• Analogue input 1 and 2: both current			<input checked="" type="checkbox"/>									
Analogue input 3 and 4: both voltage			<input checked="" type="checkbox"/>									
Basic amplifier without HART										<input checked="" type="checkbox"/>		
• Analogue input 1 and 2: 10-Bit resolution									<input checked="" type="checkbox"/>			
Basic amplifier with HART									<input checked="" type="checkbox"/>			
• Analogue input 1 and 2: 10-Bit resolution								<input checked="" type="checkbox"/>				
• Analogue input 3: 16-Bit resolution								<input checked="" type="checkbox"/>				
Enhanced amplifier									<input checked="" type="checkbox"/>			
• Analogue input 1 and 2: 10-Bit resolution								<input checked="" type="checkbox"/>				
• Analogue input 3 and 4: 16-Bit resolution								<input checked="" type="checkbox"/>				
Option field bus:									<input checked="" type="checkbox"/>			
• without field bus								<input checked="" type="checkbox"/>				
• with CANopen								<input checked="" type="checkbox"/>				
• with Profibus DP								<input checked="" type="checkbox"/>				
• with J1939								<input checked="" type="checkbox"/>				
• with HART								<input checked="" type="checkbox"/>				
Design-Index (Subject to change)												

## Basic amplifier with analogue interface

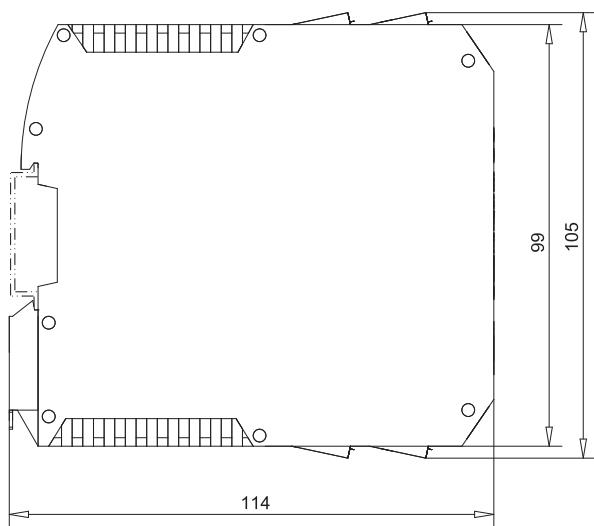
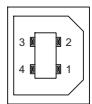
### ELECTRICAL SPECIFICATIONS

Protection class	IP30 acc. to EN 60 529	Solenoid current:	
Supply voltage	24 VDC or 12 VDC	• Minimal current $I_{min}$	Adjustable 0...950 mA
Voltage range:		• Maximal current $I_{max}$	Factory setting 150 mA Adjustable $I_{min}...1,8\text{A}$ (with 24 VDC) $I_{min}...2,3\text{A}$ (with 12 VDC)
• 24 VDC	21...30 V	• Accumulated current limitation	Factory setting 700 mA
• 12 VDC	10,5...15 V		The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
Residual ripple	<10%		Frequency adjustable 20...500 Hz
Fuse	low	Dither	Factory setting 100 Hz
Current consumption:			Level adjustable 0...400 mA
• No-load current	approx. 40 mA	Temperature drift	Factory setting 100 mA
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Digital inputs	<1 % at $\Delta T = 40^\circ\text{C}$
Command value signal:	Selectable with software	Digital outputs	Switching threshold high 6...30 VDC
	Differential input not galvanically separated, for ground potential differences up to 1,5 V		Switching threshold low 0...1 VDC
Resolution	4...+20 mA/0...+20 mA	Ramps adjustable	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$
Input resistance	0...+10 V (1- or 2-solenoid version)	Serial interface	$I_{max} = -700 \text{ mA}$
	-10...+10 V (only 2-solenoid version)		0...500 s
Stabilised output voltage	10-Bit		USB (receptacle type B)
	Voltage input >18 kΩ		for parameterising with «PASO»
	Load for current input = 250 Ω	EMV	EN 61 000-6-2
	10 VDC (with 24 VDC)	Immunity	
	8 VDC (with 12 VDC)	Emission	EN 61 000-6-4
	max. load 30 mA		

### BLOCK DIAGRAM



**DIMENSIONS**
**Type: SD73**

**Type: SD72**

**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB-interface, USB Type B X2**


- 1 = VBUS
- 
- 2 = D-
- 
- 3 = D+
- 
- 4 = GND

**PIN-assignment X1**


- 1 = Digital input 1
- 
- 2 = Digital input 2
- 
- 3 = Digital output 1
- 
- 4 = Digital output 2
- 
- 5 = Supply voltage +
- 
- 6 = Supply voltage 0 VDC
- 
- 7 = Stabilised output voltage
- 
- 8 = Analogue ground
- 
- 9 = Analogue input 1+
- 
- 10 = Analogue input 1-
- 
- 11 = Analogue input 2+
- 
- 12 = Analogue input 2-
- 
- 13 = Output solenoid driver 2 +
- 
- 14 = Output solenoid driver 2 -
- 
- 15 = Output solenoid driver 1 +
- 
- 16 = Output solenoid driver 1 -


**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Configuration analogue input**

Type description	Analogue input 1	Analogue input 2
SD7x0xDx0-AA	Voltage	Current
SD7x0xDx1-AA	Voltage	Voltage
SD7x0xDx2-AA	Current	Current

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:

[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parameterisation software
- Operating instructions (\*pdf)

**ADDITIONAL INFORMATION**

Wandfluh electronics general

Wandfluh documentation register 1.13

Proportional spool valves  
Proportional pressure valves  
Proportional flow control valves

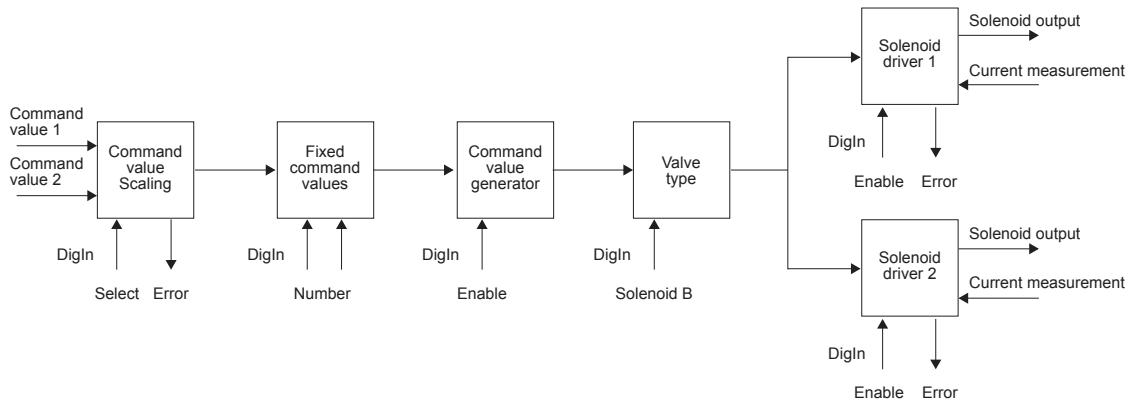
register 1.10  
register 2.3  
register 2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. Optionally the amplifier

module is equipped with a manual control, which enables the setting of the most important parameters by means of rotary selector switch and push-buttons and therefore makes a commissioning of the amplifier module possible without a PC.

## FUNCTION DESCRIPTION



## SD7 BASIC AMPLIFIER WITH ANALOGUE INTERFACE

### Command value scaling

The command value can be applied as a voltage, current or digital signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for voltage and digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 3 fixed command values available, which can be selected via 2 digital inputs.

### Command value generator

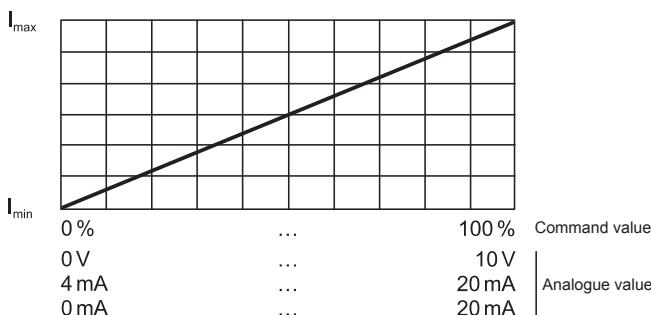
For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

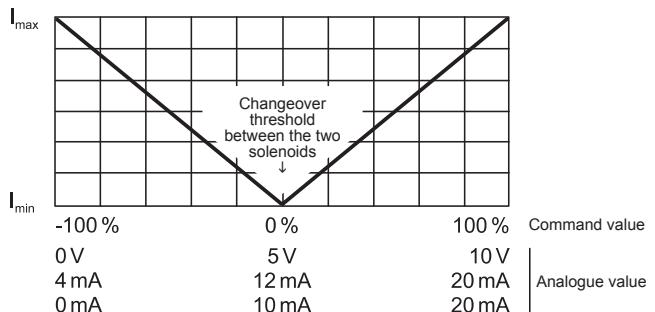
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value (voltage, current), the solenoid is driven (e.g. 0...10V correspond to 0...100 % command value, 0...100 % command value correspond to Imin...Imax solenoid driver 1).



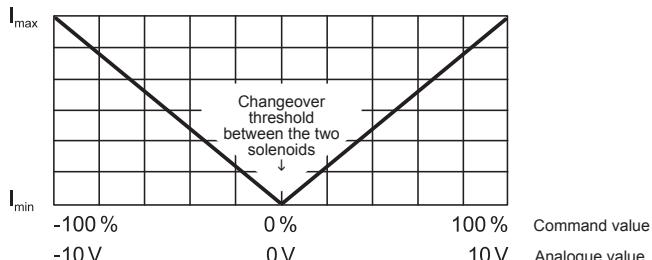
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value (voltage, current), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal (e.g. 0...10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

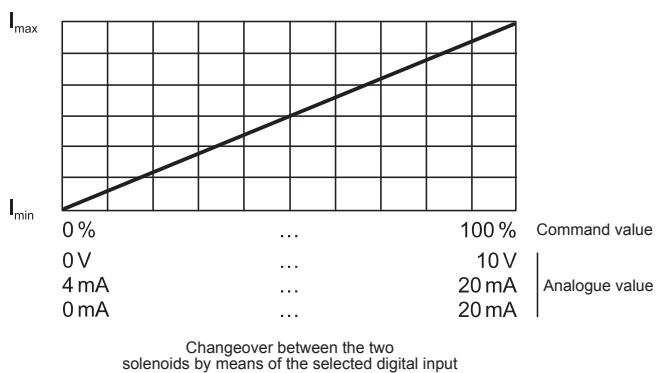


**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10...+10V correspond to -100...+100% command value, -100...0% command value correspond to Imin...Imax solenoid driver 2, 0,...+100% command value correspond to Imin...Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0...10V correspond to 0...100% command value, 0...100% command value correspond to Imin...Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function, This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

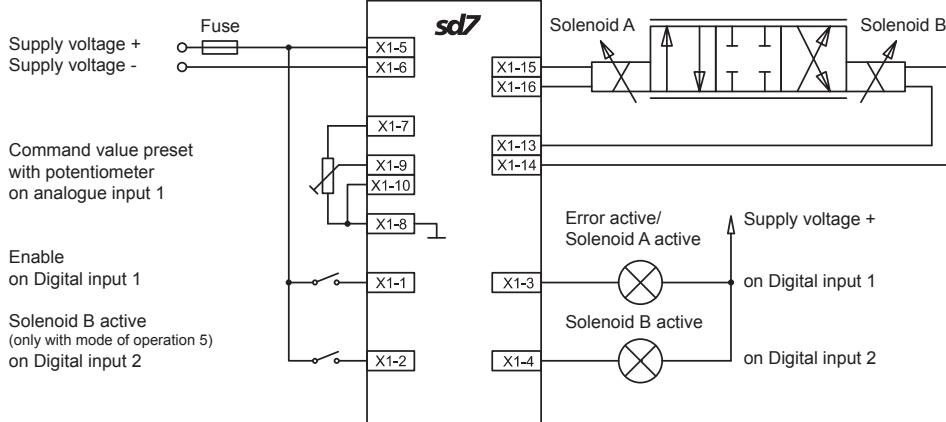
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configurated as switching outputs. Therewith for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

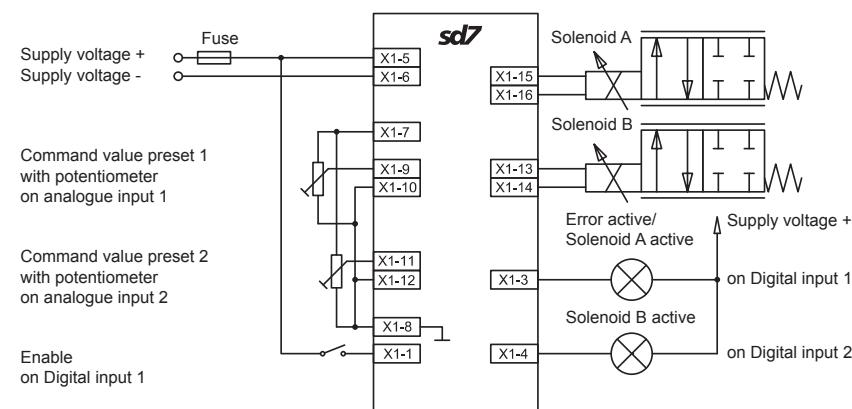
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



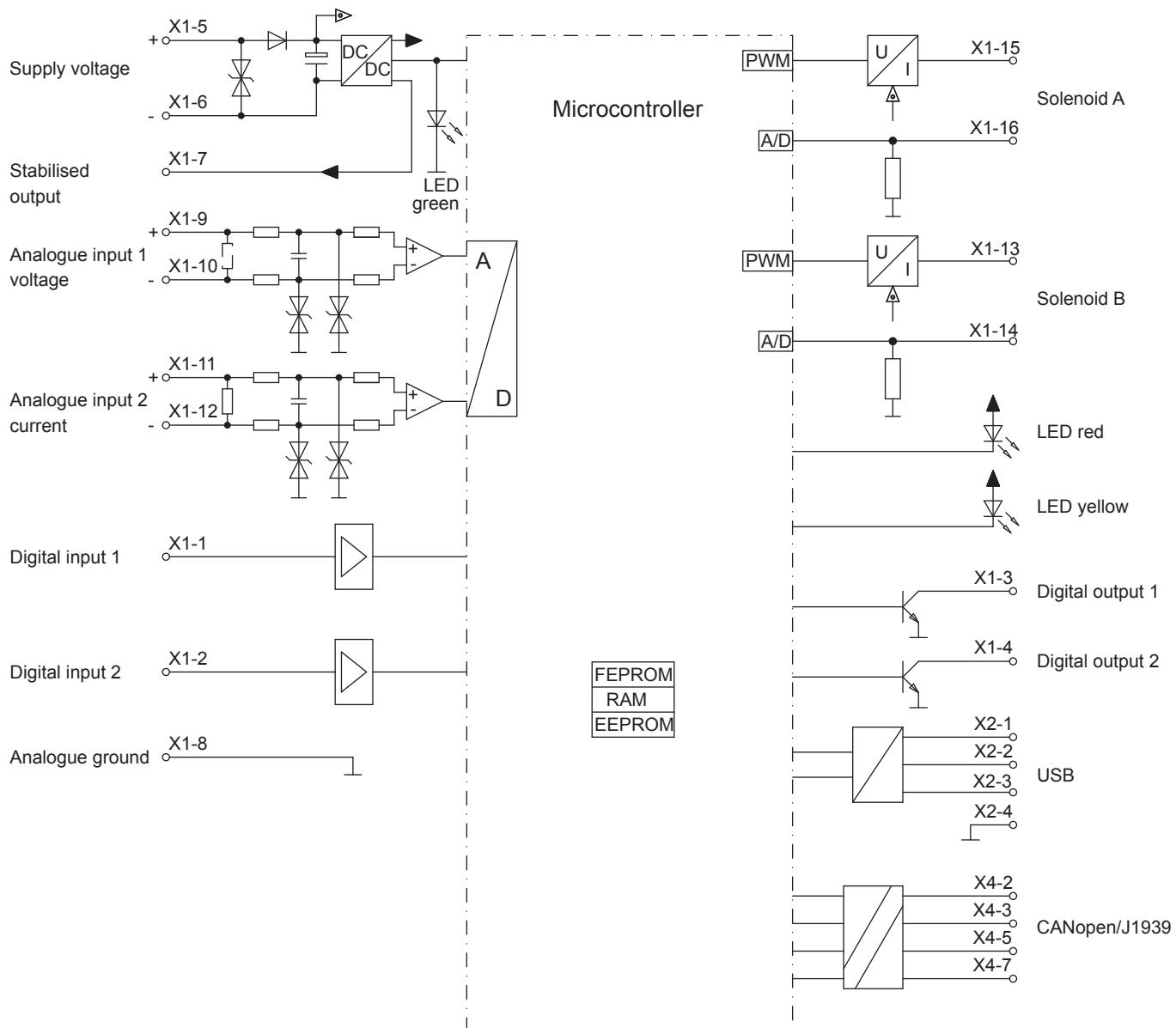
Mode of operation „command value unipolar (1-Sol)“

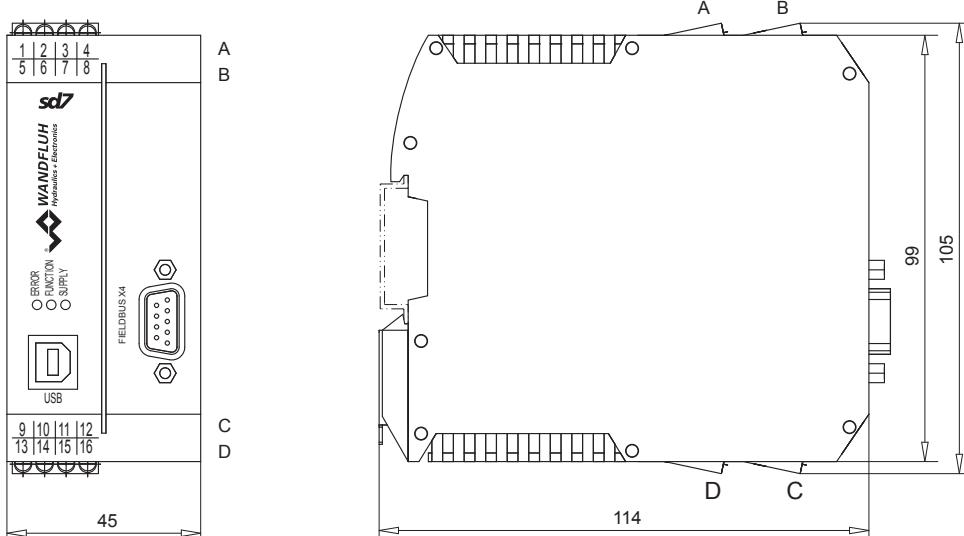
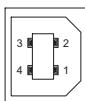


## Basic amplifier with CANopen/J1939 interface

### ELECTRICAL SPECIFICATIONS

Protection class	IP30 acc. to EN 60 529	• Minimal current $I_{min}$	Adjustable 0...950 mA Factory setting 150 mA
Device receptacle		• Maximal current $I_{max}$	Adjustable $I_{min}...1,8\text{ A}$ (with 24 VDC) $I_{min}...2,3\text{ A}$ (with 12 VDC)
CANopen (male)	DSUB, 9-pole		Factory setting 700 mA
Mating connector	Plug (female) DSUB, 9-pole	• Accumulated current limitation	The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
Supply voltage	24 VDC or 12 VDC		Frequency adjustable 2...500 Hz Factory setting 100 Hz
<i>Voltage range:</i>			Level adjustable 0...400 mA Factory setting 100 mA
• 24 VDC	21,0...30,0 VDC	Dither	<1 % at $\Delta T = 40^\circ\text{C}$
• 12 VDC	10,5...15,0 VDC		Switching threshold high 6...30 VDC Switching threshold low 0...1 VDC
Residual ripple	<10 %	Temperature drift	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$
Fuse	low	Digital inputs	Adjustable 0...500 s USB (receptacle type B)
<i>Current consumption:</i>		Digital outputs	
• Non-load current	approx. 40 mA	Ramps adjustable	
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Serial interface	EN 61 000-6-2
Analogue inputs:	Selectable with software Differential input not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version) -10...+10 V (only 2-solenoid version)	EMV	EN 61 000-6-4
Resolution	10-Bit	Immunity	
Input resistance	Voltage input >18 k $\Omega$	Emission	
Stabilised output voltage	Load for current input = 250 $\Omega$ 10 VDC (with 24 VDC) 8 VDC (with 12 VDC) max. load 30 mA		
Bus topology	Line, differential signal transmission		
Potential separation	CANopen/J1939 to «SD7»-electronics 500 VDC		
<i>Solenoid current:</i>			

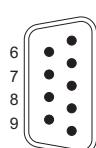
**BLOCK DIAGRAM**


**DIMENSIONS**

**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB-interface, USB-Typ B X2**


- 1 = VBUS  
2 = D -  
3 = D +  
4 = GND

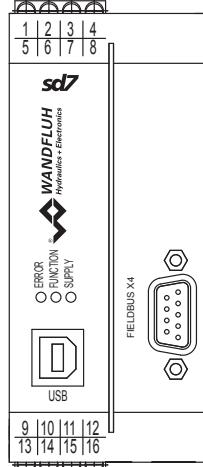

**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Device receptacle CANopen (male) X4**


- CANOPEN/J1939**
- |   |             |   |            |
|---|-------------|---|------------|
| 1 | = Reserved  | 6 | = Reserved |
| 2 | = CANLow    | 7 | = CANHigh  |
| 3 | = CANGnd    | 8 | = Reserved |
| 4 | = Reserved  | 9 | = Reserved |
| 5 | = CANShield |   |            |

The mating connector (plug female, DSUB, 9-pole) is not included in the delivery.

**PIN Assignment X1**


- 1 = Digital input 1  
2 = Digital input 2  
3 = Digital output 1  
4 = Digital output 2  
5 = Supply Analogue input +  
6 = Supply voltage 0 VDC  
7 = Stabilised output voltage  
8 = Analogue ground  
9 = Analogue input 1 +  
10 = Analogue input 1 -  
11 = Analogue input 2 +  
12 = Analogue input 2 -  
13 = Output solenoid 2 +  
14 = Output solenoid 2 -  
15 = Output solenoid 1 +  
16 = Output solenoid 1 -

**Configuration Analogue input**

Type description	Analogue input 1	Analogue input 2
SD730xDx0-AC	Voltage	Current
SD730xDx1-AC	Voltage	Voltage (only 0...10V possible)
SD730xDx2-AC	Current	Current

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parameterisation software
- Operating instructions (\*.pdf)
- EDS-file «WAGOB8E.eds»

**ADDITIONAL INFORMATION**

Wandfluh electronics general

Wandfluh documentation register 1.13

Proportional directional valves  
Proportional pressure valves  
Proportional flow control valves

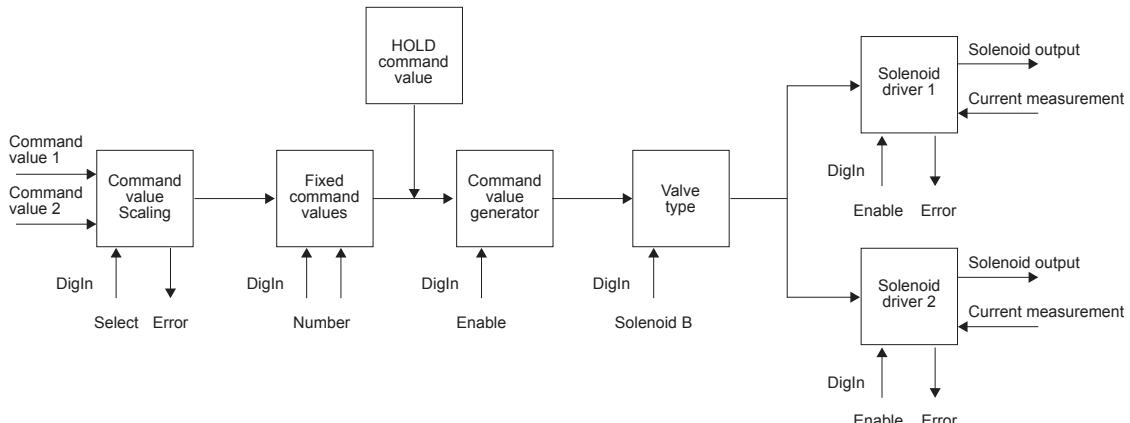
register 1.10  
register 2.3  
register 2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. The device control

(enable, etc.) as well as the command value setting can be preset via the CANopen/J1939 or locally via digital, resp. analogue inputs. Furthermore the parameterisation as well as an analysis/diagnostic are possible via the CANopen (with J1939 on request).

## FUNCTION DESCRIPTION



## SD7 BASIC AMPLIFIER WITH CANOPEN/J1939 INTERFACE

### Command value scaling

The command value can be applied via the CANopen/J1939 or as a voltage, current or digital signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for CANopen/J1939, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 3 fixed command values available, which can be selected via 2 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

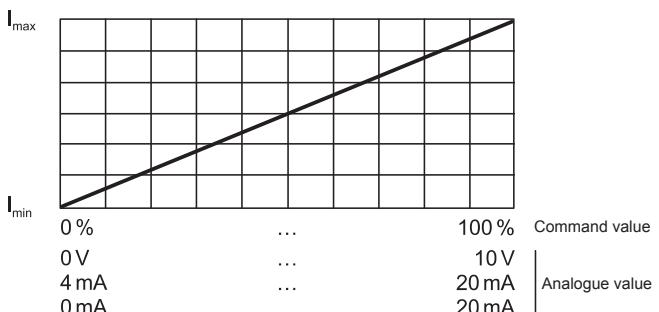
If via CANopen/J1939 the device is put into the “HOLD” condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

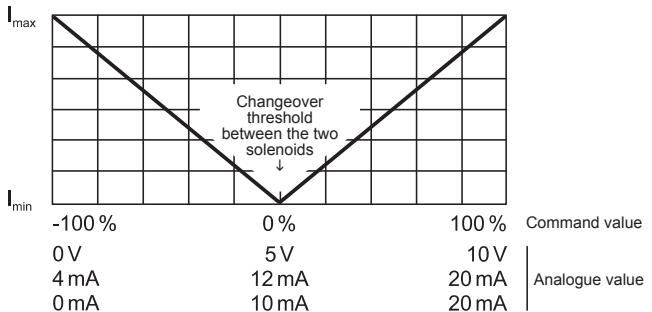
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven (e.g. 0....10V correspond to 0....100 % command value, 0....100 % command value correspond to Imin....Imax solenoid driver 1).



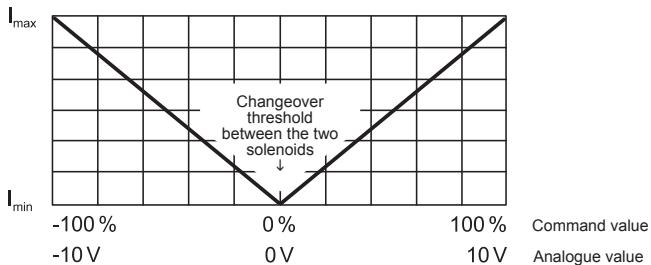
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value signal (voltage, current), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

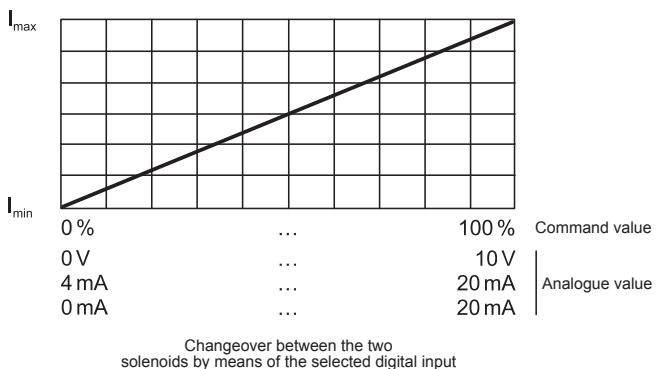


**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10....+10V correspond to -100....+100% command value, -100....0% command value correspond to Imin....Imax solenoid driver 2, 0....+100% command value correspond to Imin....Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0....10V correspond to 0....100% command value, 0....100% command value correspond to Imin....Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function, This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

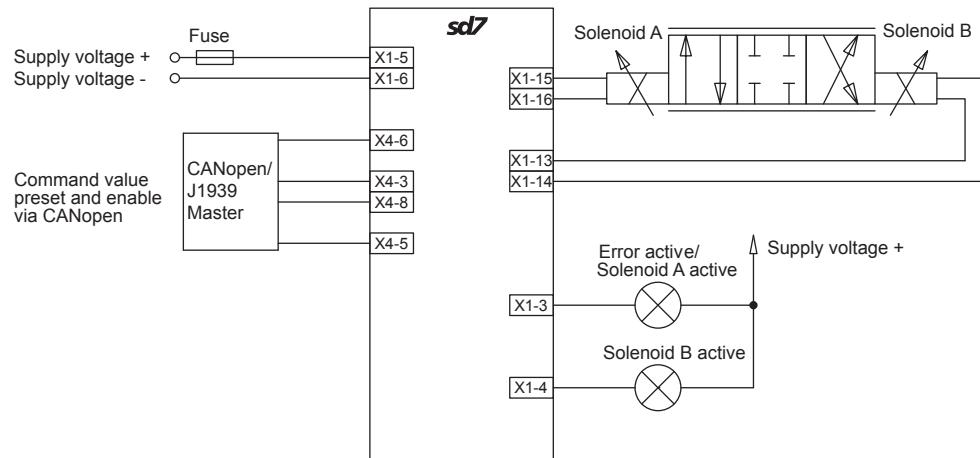
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configured as switching outputs. The rewrites for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

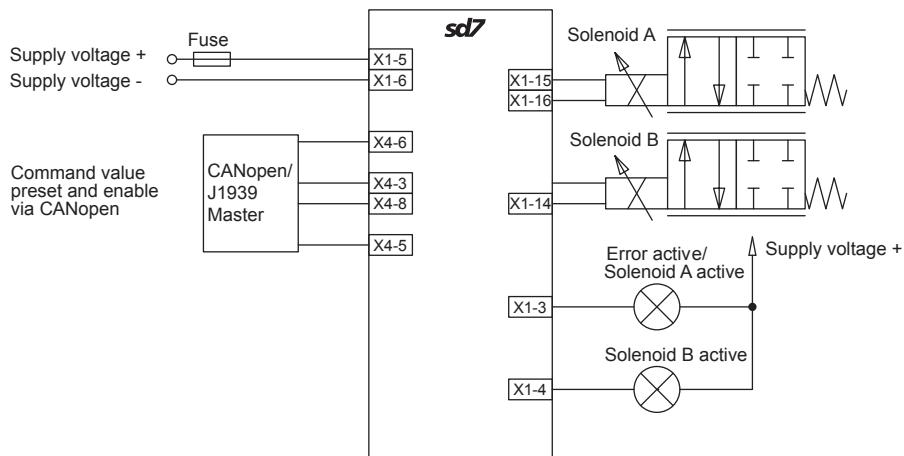
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



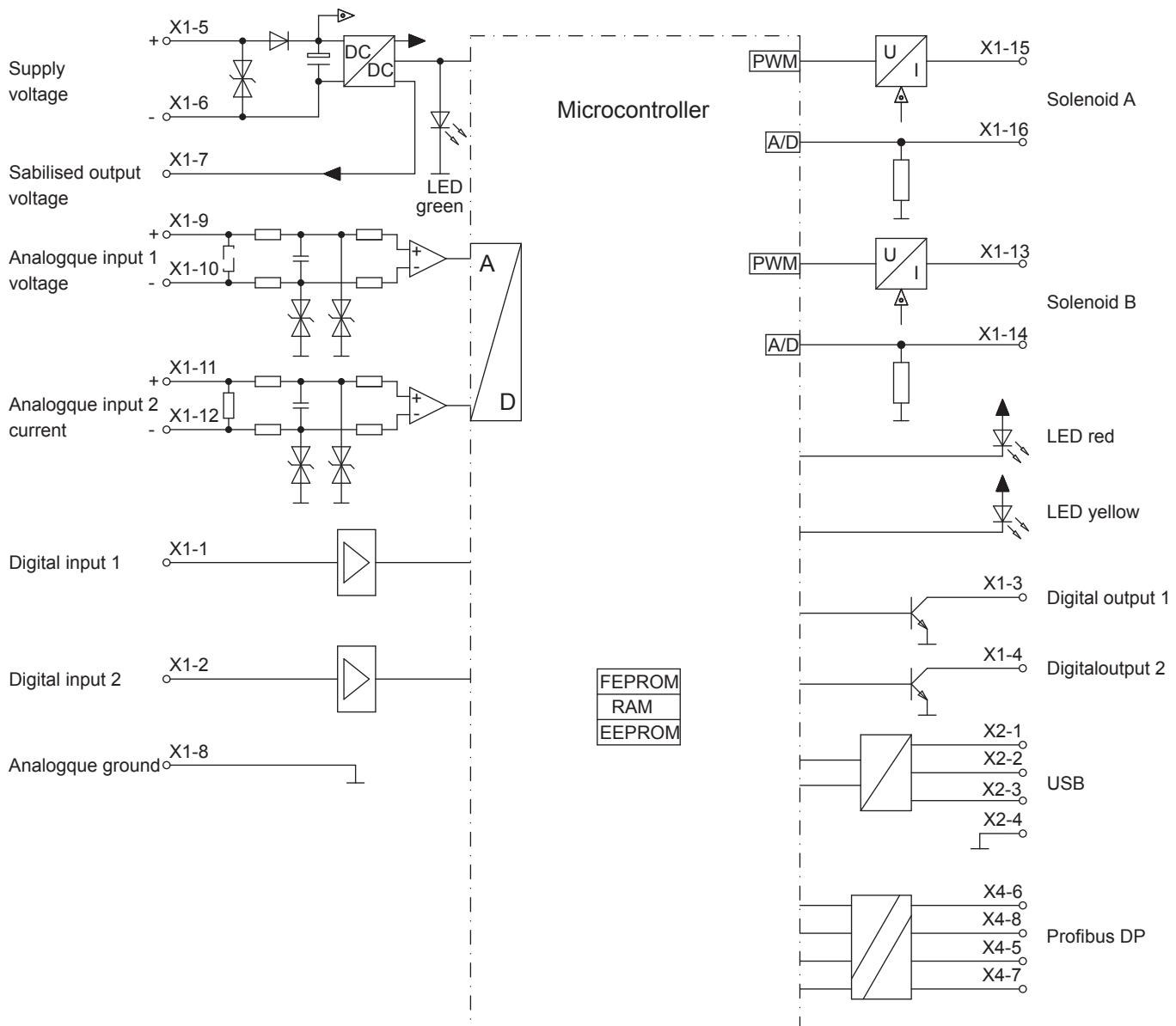
Mode of operation „command value unipolar (1-Sol)“

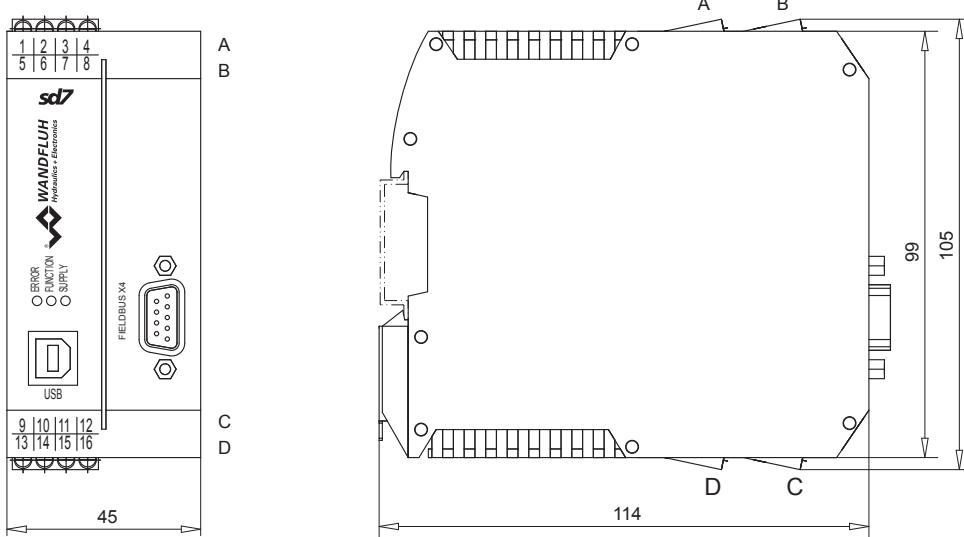
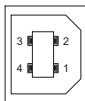


## Basic amplifier with Profibus DP interface

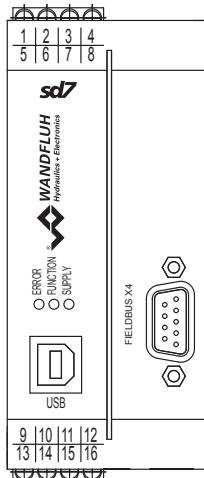
### ELECTRICAL SPECIFICATIONS

Protection class	IP30 acc. to EN 60 529	Solenoid current:	
Device receptacle		• Minimal current $I_{min}$	Adjustable 0...950 mA
Profibus (female)	DSUB, 9-pole	• Maximal current $I_{max}$	Factory setting 150 mA
Mating connector	Plug (male) DSUB, 9-pole		Adjustable $I_{min}...1,8\text{ A}$ (with 24 VDC) $I_{min}...2,3\text{ A}$ (with 12 VDC)
Supply voltage	24 VDC or 12 VDC		Factory setting 700 mA
Voltage range:		• Accumulated current-limitation	The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
• 24 VDC	21...30 V		Frequency adjustable 20...500 Hz
• 12 VDC	10,5...15 V		Factory setting 100 Hz
Residual ripple	<10 %		Level adjustable 0...400 mA
Fuse	low		Factory setting 100 mA
Current consumption:			<1 % at $\Delta T = 40^\circ\text{C}$
• No-load current	approx. 40 mA	Dither	Switching threshold high 6...30 VDC
• Maximum current-consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)		Switching threshold low 0...1 VDC
Command value signal:	Selectable with software	Temperature drift	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$
	Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version) -10...+10 V (only 2-solenoid version)	Digital inputs	0...500 s
Resolution	10-Bit	Ramps adjustable	USB (receptacle type B)
Eingangswiderstand	Voltage input >18 k $\Omega$ Load for current input = 250 $\Omega$	Serial interface	
Stabilisierte Ausgangsspannung	10 VDC (with 24 VDC) 8 VDC (with 12 VDC) max. load 30 mA	EMV Immunity Emission	EN 61 000-6-2 EN 61 000-6-4
Bus topology	Line, differential signal transmission		
Potential separation	Profibus to «SD7» electronics 500 VDC		

**BLOCK DIAGRAM**


**DIMENSIONS**

**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB-interface, USB-Typ B X2**


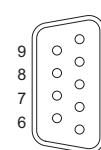
- 1 = VBUS  
2 = D -  
3 = D +  
4 = GND

**PIN-assignment X1**


- 1 = Digital input 1  
2 = Digital input 2  
3 = Digital output 1  
4 = Digital output 2  
5 = Supply Analogue input +  
6 = Supply voltage 0 VDC  
7 = Stabilised output voltage  
8 = Analogue ground  
9 = Analogue input 1 +  
10 = Analogue input 1 -  
11 = Analogue input 2 +  
12 = Analogue input 2 -  
13 = Output solenoid 2 +  
14 = Output solenoid 2 -  
15 = Output solenoid 1 +  
16 = Output solenoid 1 -


**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Device receptacle Profibus (female) X4**

**PROFIBUS**

- |   |               |               |
|---|---------------|---------------|
| 5 | 1 = Reserved  | 6 = VP        |
| 4 | 2 = Reserved  | 7 = Reserved  |
| 3 | 3 = RxD/TxD-P | 8 = RxD/TxD-N |
| 2 | 4 = Reserved  | 9 = Reserved  |
| 1 | 5 = DGND      |               |

The mating connector (plug male, DSUB, 9-pole) is not included in the delivery.

**Configuration Analogue input**

Type description	Analogue input 1	Analogue input 2
SD730xDx0-AP	Voltage	Current
SD730xDx1-AP	Voltage	Voltage (only 0...10V possible)
SD730xDx2-AP	Current	Current

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parameterisation software
- Operating instructions (\*.pdf)
- GSD-file «WAGO8E.gsd»

**ADDITIONAL INFORMATION**

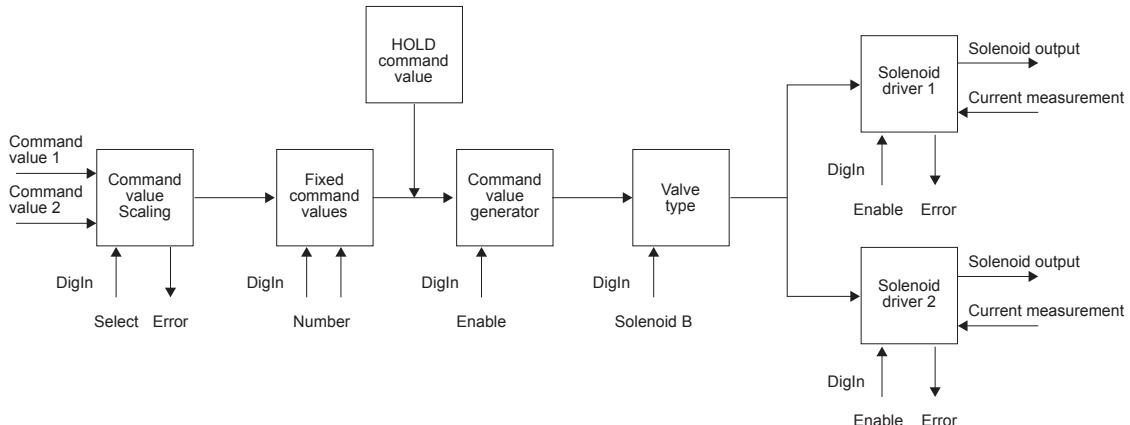
Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. The device control

(enable, etc.) as well as the command value setting can be preset via the Profibus DP or locally via digital, resp. analogue inputs. Furthermore the parameterisation as well as an analysis diagnostic are possible via the Profibus DP.

## FUNCTION DESCRIPTION



## SD7 BASIC AMPLIFIER WITH PROFIBUS DP INTERFACE

### Command value scaling

The command value can be applied via the Profibus DP or as a voltage, current or digital signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for Profibus DP, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 3 fixed command values available, which can be selected via 2 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

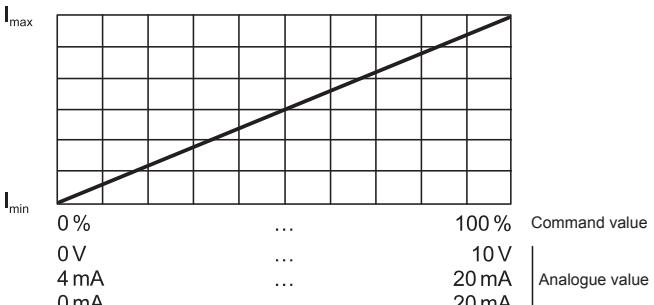
If via Profibus DP the device is put into the "HOLD" condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

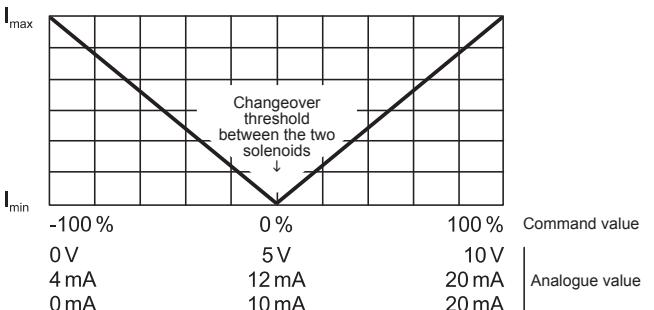
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven (e.g. 0....10V correspond to 0....100 % command value, 0....100 % command value correspond to Imin....Imax solenoid driver 1).



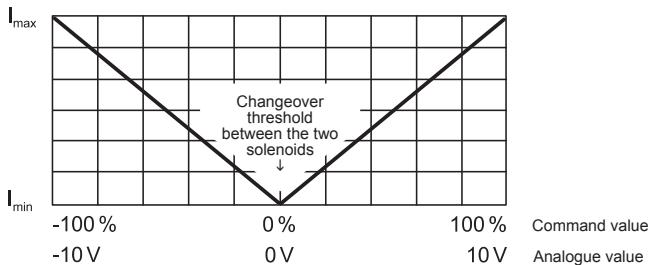
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value signal (voltage, current), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

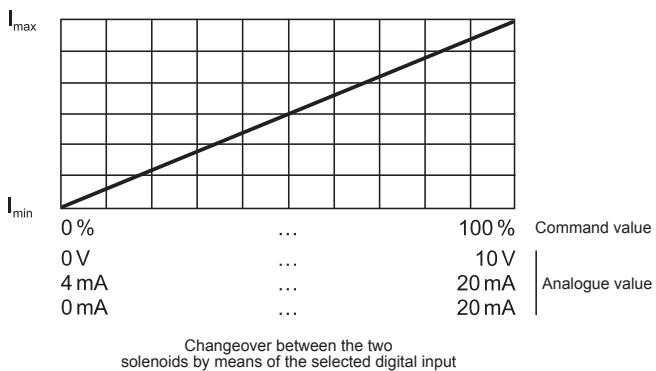


**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10....+10V correspond to -100....+100% command value, -100....0% command value correspond to Imin....Imax solenoid driver 2, 0....+100% command value correspond to Imin....Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with Digin)“**

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0....10V correspond to 0....100% command value, 0....100% command value correspond to Imin....Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

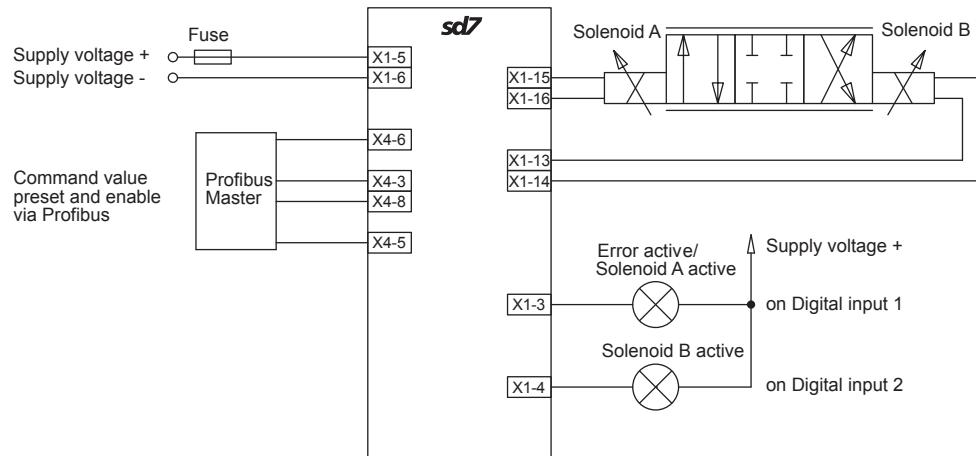
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configured as switching outputs. The rewrites for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

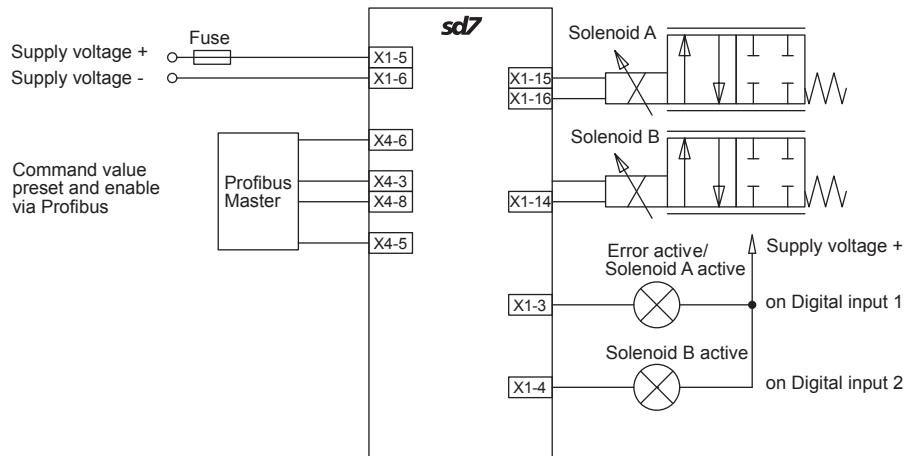
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



Mode of operation „command value unipolar (1-Sol)“

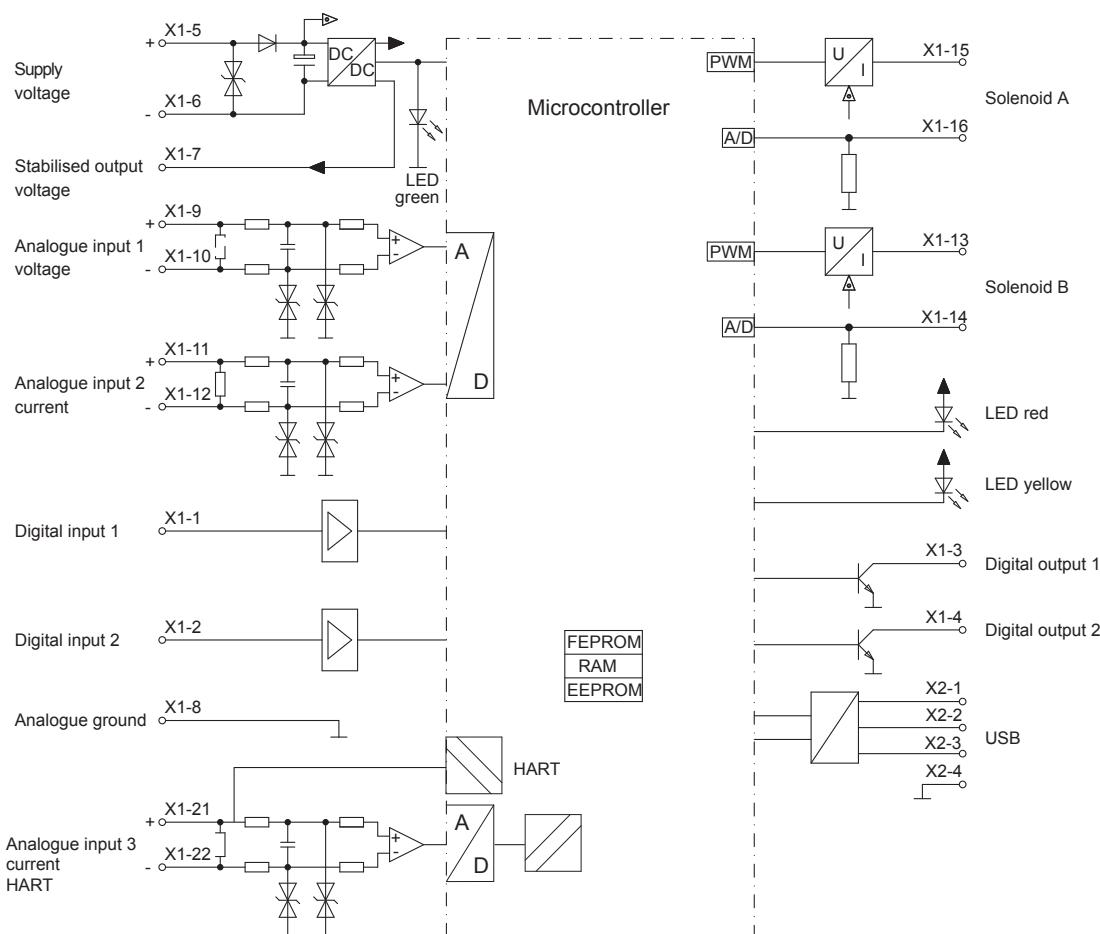


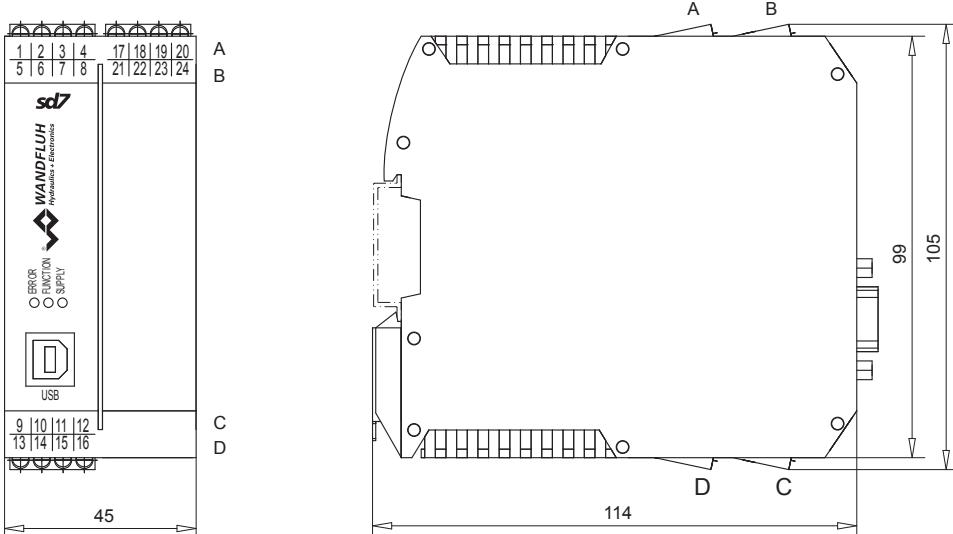
## Basic amplifier with HART interface

### ELECTRICAL SPECIFICATIONS

Protection class	IP30 acc. to EN 60 529	HART input	via analogue inputs 3
Supply voltage	24 VDC or 12 VDC	Solenoid current:	
Voltage range:		<ul style="list-style-type: none"> <li>Minimal current <math>I_{min}</math></li> <li>Maximal current <math>I_{max}</math></li> </ul>	
• 24 VDC	21...30 V	$I_{min}$	Adjustable 0...950 mA
• 12 VDC	10,5...15 V	$I_{max}$	Factory setting 150 mA
Residual ripple	<10%		Adjustable $I_{min}...1,8A$ (with 24 VDC)
Fuse	low		$I_{min}...2,3A$ (with 12 VDC)
Current consumption:			Factory setting 700mA
• No-load current	approx. 40 mA	Accumulated current-limitation	The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
• Maximum current-consumption	non-load current + 1.8 A per solenoid (with 24 VDC) non-load current + 2.3 A per solenoid (with 12 VDC)		Frequency adjustable 20...500 Hz Factory setting 100 Hz Level adjustable 0...400 mA Factory setting 100 mA <1 % at $\Delta T = 40^{\circ}\text{C}$ Switching threshold high 6...30 VDC Switching threshold low 0...1 VDC
Command value signal:	Selectable with software	Dither	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$ 0...500 s
	Inputs 1 and 2: Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version, not input 3) -10...+10 V (only 2-solenoid version, not input 3)	Temperature drift	USB (receptacle type B)
	Input 3: galvanically separated for HART Signal 4 ... +20 mA / 0 ... +20 mA	Digital inputs	
Resolution	10-Bit (Analogue inputs 1 and 2) 16-Bit (Analogue inputs 3)	Digital outputs	
Input resistance	Voltage input >18 kΩ	Ramps adjustable	
	Load for current input = 250 Ω	Serial interface	
Stabilised output-voltage	10 VDC (with Version 24 VDC) 8 VDC (with version 12 VDC)	EMV	EN 61 000-6-2
	max. load 30 mA	Immunity	EN 61 000-6-4

### BLOCK DIAGRAM



**DIMENSIONS**

**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB interface, USB Type B X2**


- 1 = VBUS  
 2 = D-  
 3 = D+  
 4 = GND

**PIN Assignment X1**

1   2   3   4	17   18   19   20		
5   6   7   8	21   22   23   24		
sd7			
WANDFLUH Hydraulics + Electronics			
ERROR FUNCTION SUPPLY			
USB			
9   10   11   12			
13   14   15   16			
D			

- 1 = Digital input 1  
 2 = Digital input 2  
 3 = Digital output 1  
 4 = Digital output 2  
 5 = Supply voltage +  
 6 = Supply voltage 0 VDC  
 7 = Stabilised output voltage  
 8 = Analogue ground  
 9 = Analogue input 1+  
 10 = Analogue input 1-  
 11 = Analogue input 2+  
 12 = Analogue input 2-  
 13 = Output solenoid driver 2 +  
 14 = Output solenoid driver 2 -  
 15 = Output solenoid driver 1 +  
 16 = Output solenoid driver 1 -  
 21 = Analogue input 3 + HART  
 22 = Analogue input 3 - HART


**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Configuration Analogue input**

Type description	Analogue input 1	Analogue input 2	Analogue input 3
SD7x0xDx0-BH	Voltage	Current	Current
SD7x0xDx1-BH	Voltage	Voltage	Current
SD7x0xDx2-BH	Current	Current	Current

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parameterisation software
- Operating instructions (\*.pdf)

**ADDITIONAL INFORMATION**

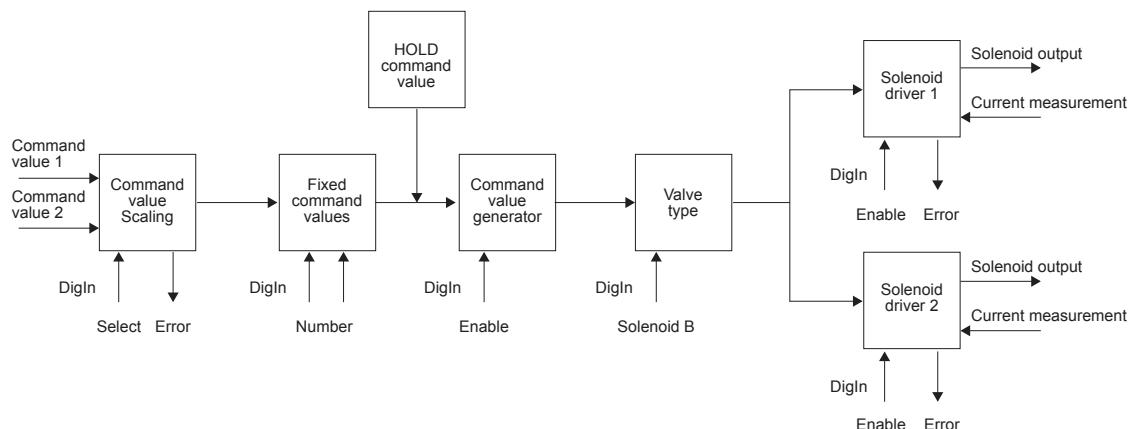
Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. Optionally the amplifier

module is equipped with a manual control, which enables the setting of the most important parameters by means of rotary selector switch and push-buttons and therefore makes a commissioning of the amplifier module possible without a PC.

## FUNCTION DESCRIPTION



## SD7 BASIC AMPLIFIER WITH HART INTERFACE

### Command value scaling

The command value can be applied via HART or as a voltage, current or digital signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for HART, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 3 fixed command values available, which can be selected via 2 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

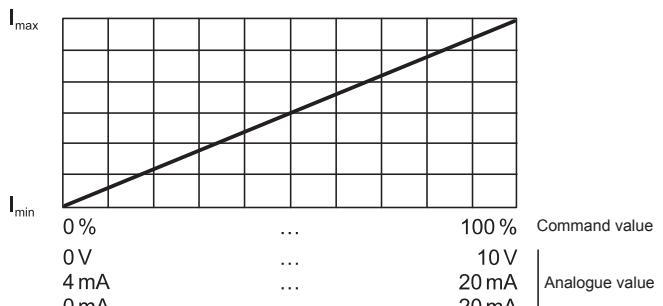
If via CANopen/J1939 the device is put into the "HOLD" condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

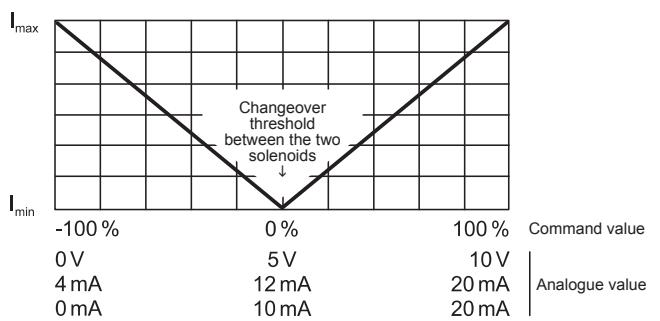
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven (e.g. 0....10V correspond to 0....100 % command value, 0....100 % command value correspond to Imin....Imax solenoid driver 1).



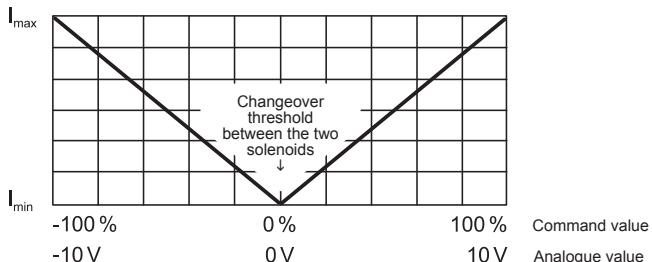
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value signal (voltage, current), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

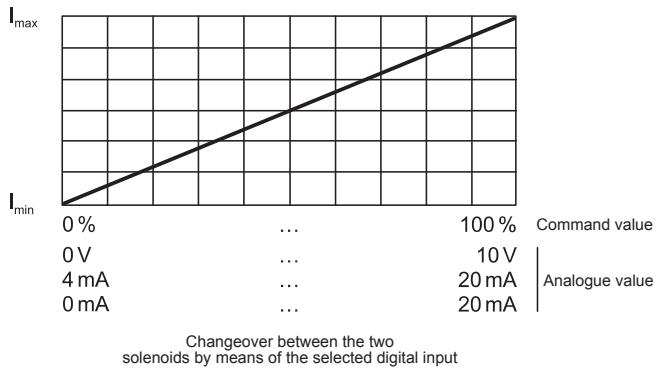


**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10...+10V correspond to -100...+100% command value, -100...0% command value correspond to Imin....Imax solenoid driver 2, 0....+100% command value correspond to Imin....Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0....10V correspond to 0....100% command value, 0....100% command value correspond to Imin....Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

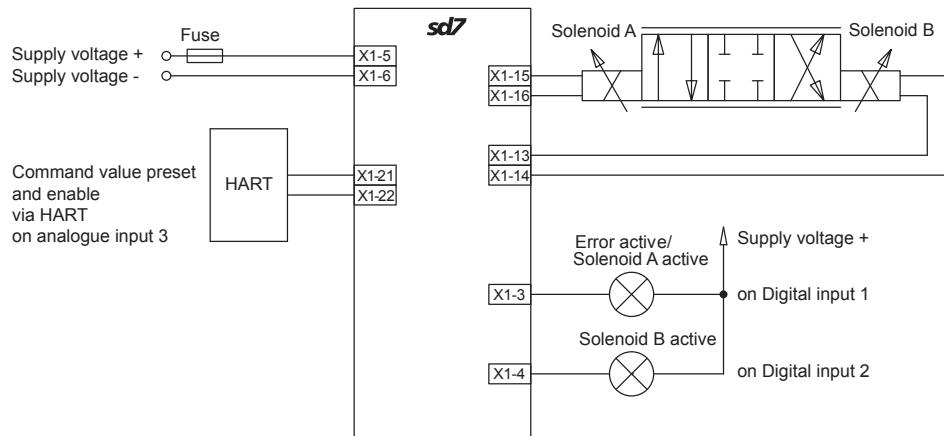
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configurated as switching outputs. The rewriter for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

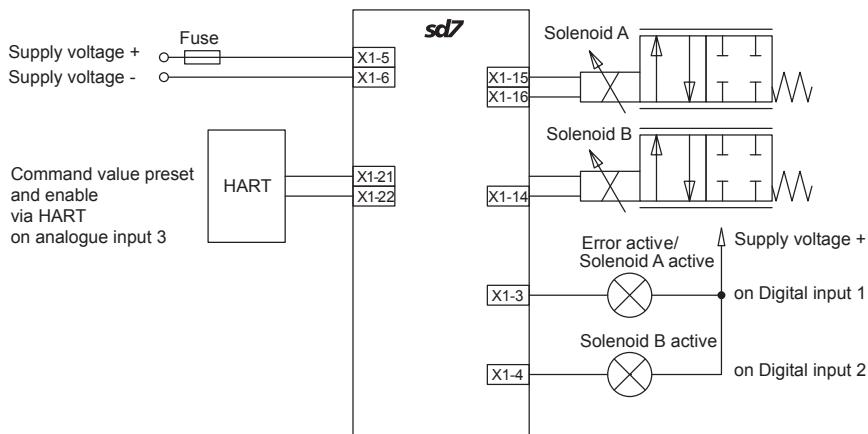
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



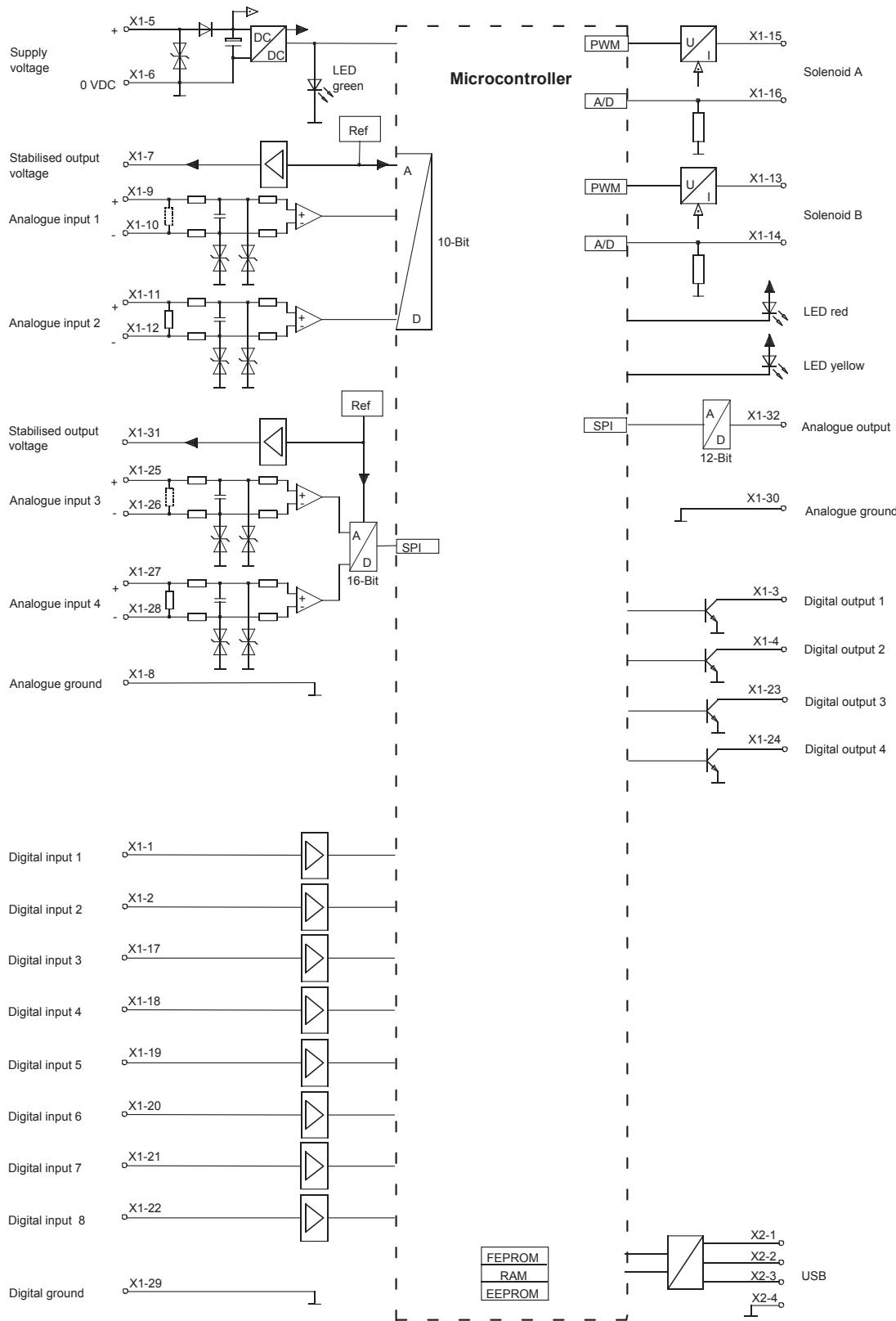
Mode of operation „command value unipolar (1-Sol)“

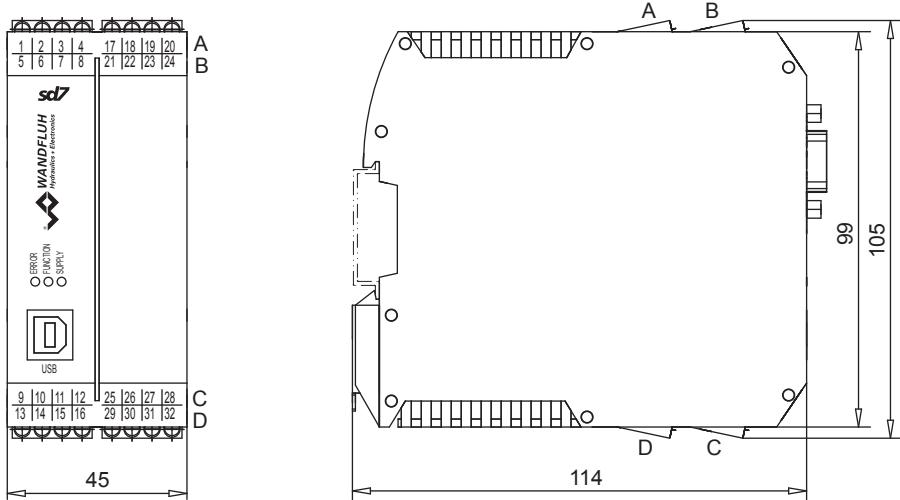


## Enhanced amplifier with analogue interface

### ELECTRICAL SPECIFICATIONS

Protection class	IP30 acc. to EN 60 529	Solenoid current:	
Supply voltage	24 VDC or 12 VDC	• Minimal current $I_{min}$	Adjustable 0...950 mA
Voltage range:		• Maximal current $I_{max}$	Factory setting 150 mA Adjustable $I_{min}...1,8\text{A}$ (with 24 VDC) $I_{min}...2,3\text{A}$ (with 12 VDC)
• 24 VDC	21...30 V	• Accumulated current limitation	Factory setting 700 mA
• 12 VDC	10,5...15 V		The accumulated current of the simultaneously powered solenoids depends on the ambient temperature.
Residual ripple	<10%		Further information can be found in the operating instructions.
Fuse	low	Dither	Frequency adjustable 20...500 Hz Factory setting 100 Hz
Current consumption:		Temperature drift	Level adjustable 0...400 mA Factory setting 100 mA
• No-load current	approx. 40 mA	Digital inputs	<1 % at $\Delta T = 40^\circ\text{C}$ Switching threshold high 6...30 VDC Switching threshold low 0...1 VDC
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Digital outputs	Digital input 5–7 can be used as frequency input (frequencies 0...5 kHz) and as PWM input (automatic frequency recognition) Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$ 0...500 s USB (receptacle type B)
Command value signal:	Selectable with software Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version) -10...+10 V (only 2-solenoid version)	Ramps adjustable	EN 61 000-6-2
Resolution	10-Bit (Analogue inputs 1 and 2) 16-Bit (Analogue inputs 3 and 4)	Serial interface	EN 61 000-6-4
Input resistance	Voltage input >18 k $\Omega$ Load for current input = 250 $\Omega$	EMV	
Analogue output	Voltage output $\pm 10$ VDC max. Current output $\pm 3$ mA	Immunity	
Stabilised output voltage	10 VDC (with 24 VDC) 8 VDC (with 12 VDC) max. load 30 mA	Emission	

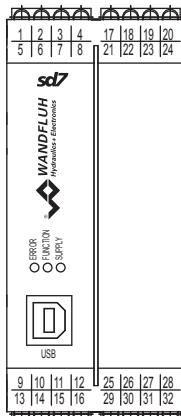
**BLOCK DIAGRAM**


**DIMENSIONS**

**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB interface, USB Type B X2**


- 1 = VBUS  
 2 = D -  
 3 = D +  
 4 = GND


**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**PIN Assignment X1**


- 1 = Digital input 1  
 2 = Digital input 2  
 3 = Digital output 1  
 4 = Digital output 2  
 5 = Supply Analogue input +  
 6 = Supply voltage 0 VDC  
 7 = Stabilised output voltage  
 8 = Analogue ground  
 9 = Analogue input 1 +  
 10 = Analogue input 1 -  
 11 = Analogue input 2 +  
 12 = Analogue input 2 -  
 13 = Output solenoid 2 +  
 14 = Output solenoid 2 -  
 15 = Output solenoid 1 +  
 16 = Output solenoid 1 -  
 17 = Digital input 3  
 18 = Digital input 4  
 19 = Digital input 5  
 20 = Digital input 6  
 21 = Digital input 7  
 22 = Digital input 8  
 23 = Digital output 3  
 24 = Digital output 4  
 25 = Analogue input 3 +  
 26 = Analogue input 3 -  
 27 = Analogue input 4 +  
 28 = Analogue input 4 -  
 29 = Digital ground  
 30 = Analogue ground  
 31 = Stabilised output voltage  
 32 = Analogue output

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-DSV/SD7» Parameterisation software
- Operating instructions (\*.pdf)

**Configuration Analogue input**

Type description	Analogue inputs			
	Nr. 1	Nr. 2	Nr. 3	Nr. 4
SD731xDx4-BA	Voltage	Current	Voltage	Current
SD731xDx5-BA	Voltage	Voltage	Voltage	Voltage
SD731xDx6-BA	Current	Current	Current	Current
SD731xDx7-BA	Voltage	Voltage	Current	Current
SD731xDx8-BA	Current	Current	Voltage	Voltage

**ADDITIONAL INFORMATION**

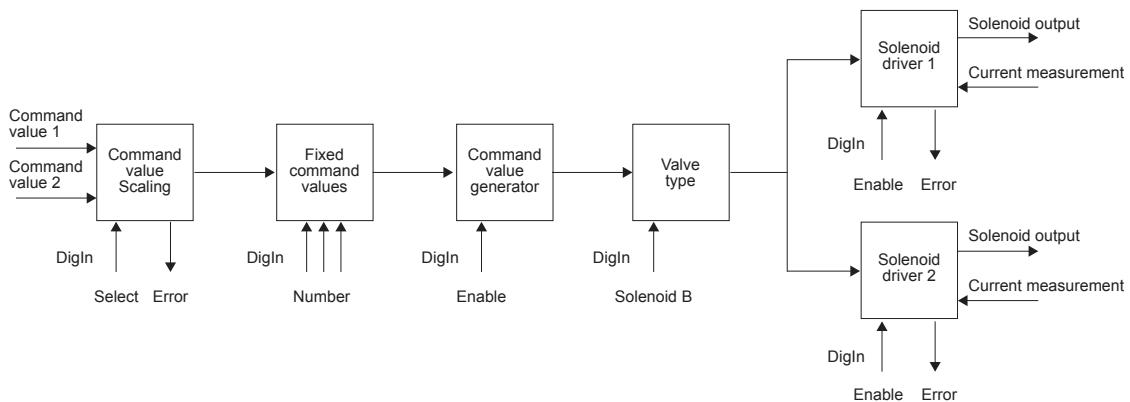
Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible.

The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit.

## FUNCTION DESCRIPTION



## SD7 ENHANCED AMPLIFIER WITH ANALOGUE INTERFACE

### Command value scaling

The command value can be applied as a voltage, current, digital, frequency or PWM signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for voltage and digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 7 fixed command values available, which can be selected via 3 digital inputs.

### Command value generator

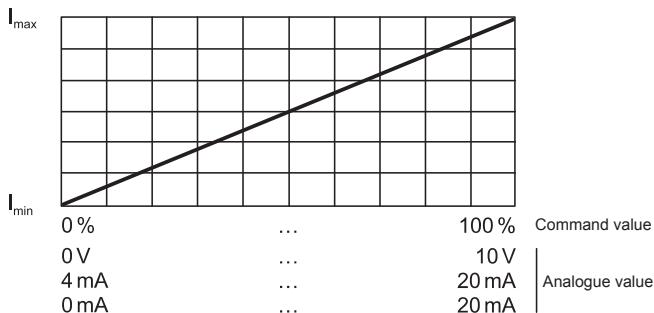
For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

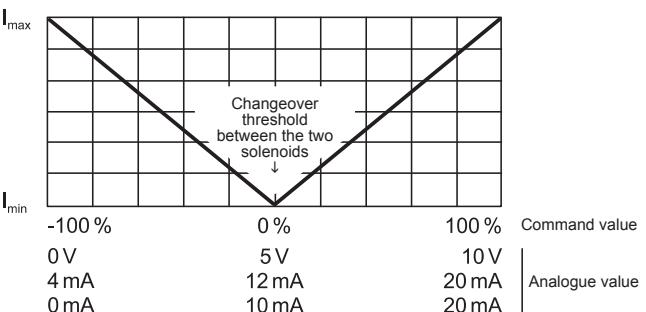
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven (e.g. 0...10V correspond to 0...100% command value, 0...100% command value correspond to Imin...Imax solenoid driver 1).



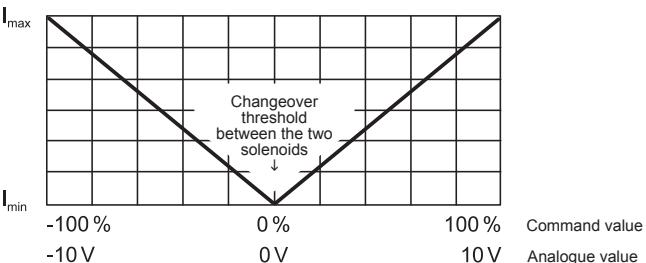
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100% command value, -100....0% command value correspond to Imin...Imax solenoid driver 2, 0....+100% command value correspond to Imin...Imax solenoid driver 1).



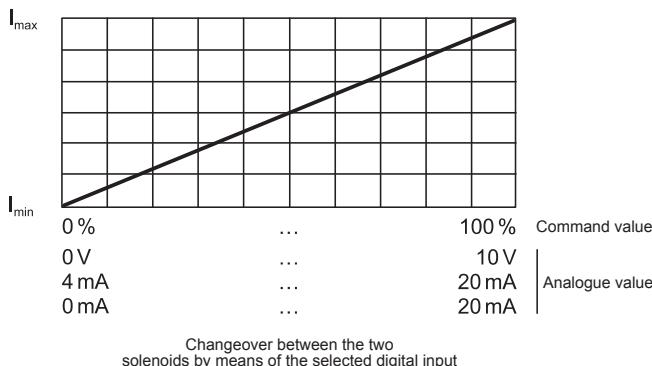
### Mode of operation „Command value bipolar (2-Sol)“

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10....+10V correspond to -100....+100% command value, -100....0% command value correspond to Imin...Imax solenoid driver 2, 0....+100% command value correspond to Imin...Imax solenoid driver 1).



**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0...10V correspond to 0...100 % command value, 0...100 % command value correspond to Imin...Imax solenoid driver 1 or 2).


**Solenoid driver**

Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configured as switching outputs. The rewrites for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

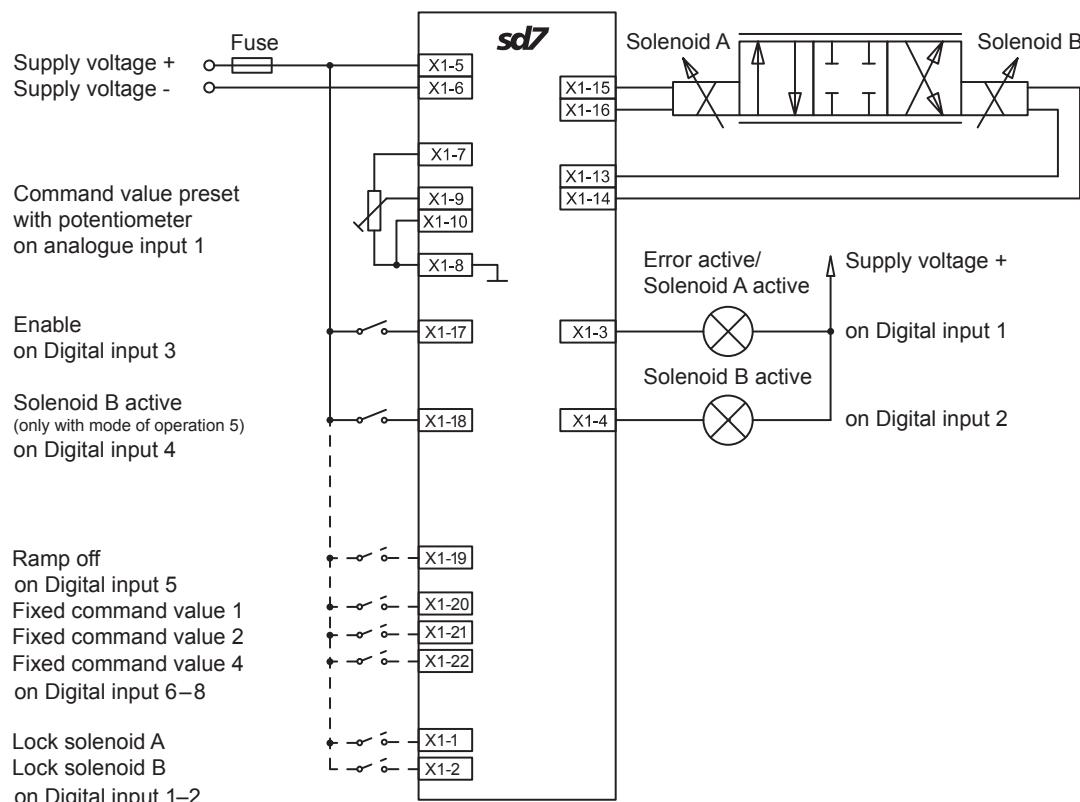
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**Signal recording**

The SD7 amplifier module has a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“

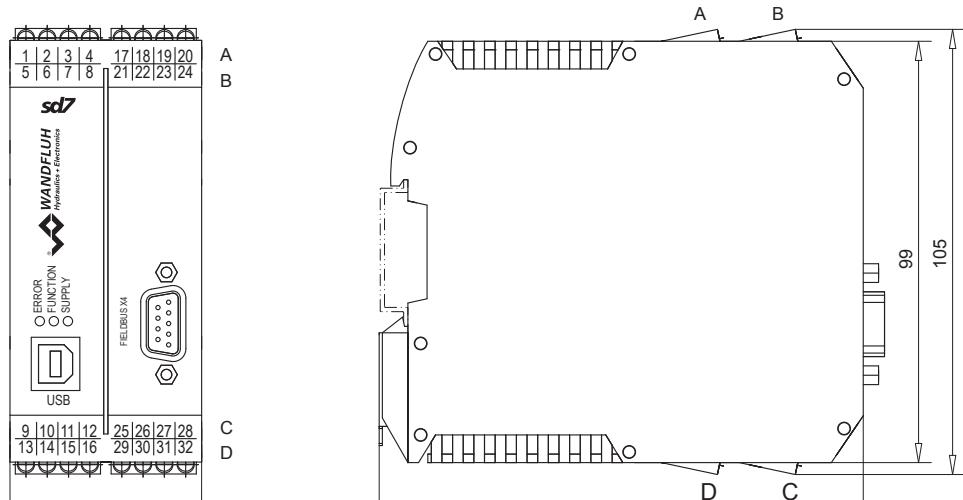


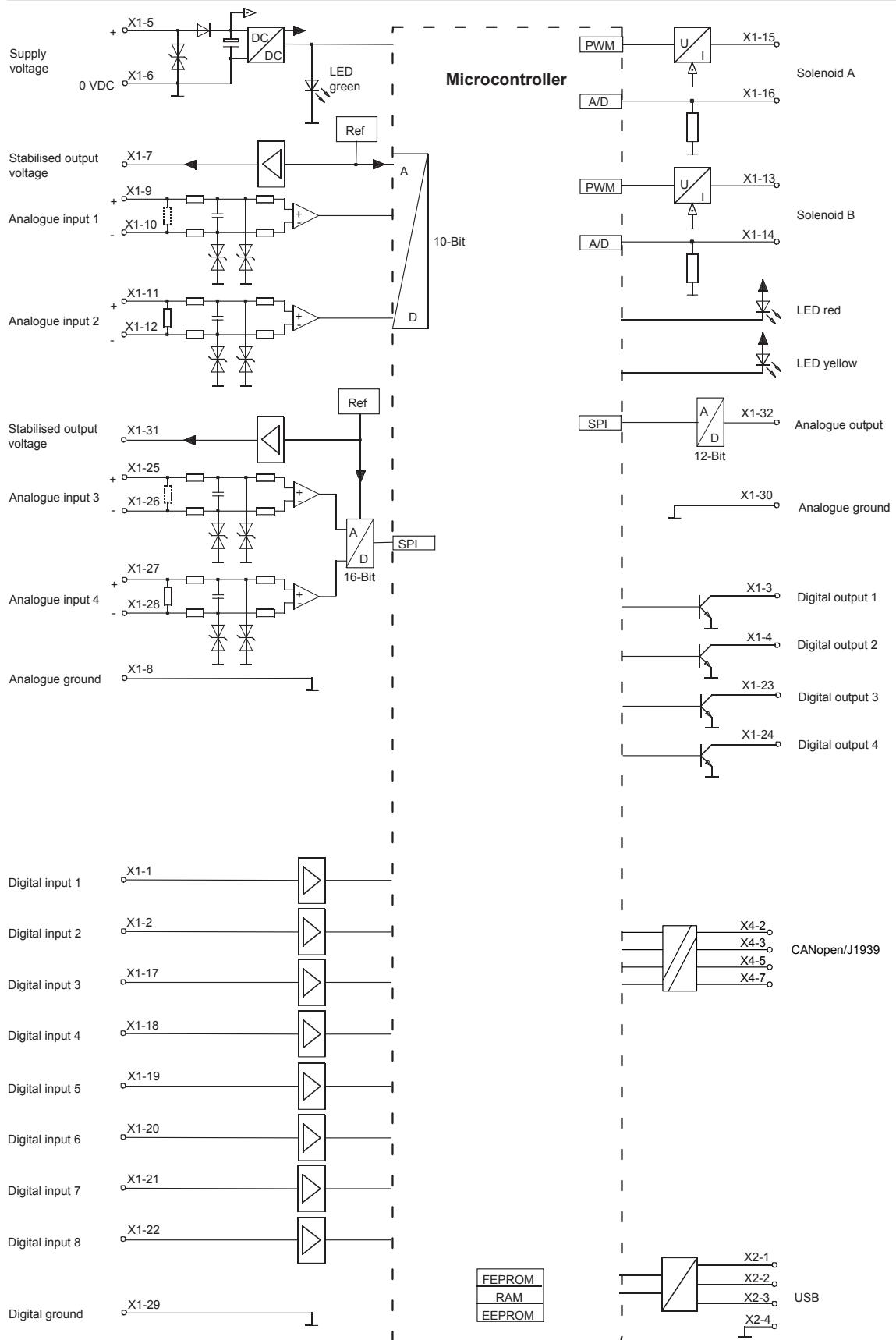
## Enhanced amplifier with CANopen/J1939 interface

### ELECTRICAL SPECIFICATIONS

Protection class	IP 30 acc. to EN 60 529	Solenoid current:	
Device receptacle		• Minimal current $I_{min}$	Adjustable 0...950 mA
CANopen (male)	DSUB, 9-polig	• Maximal current $I_{max}$	Factory setting 150 mA
Mating connector	Plug (female) DSUB, 9-pole	• Accumulated current-limitation	Adjustable $I_{min}...1,8\text{ A}$ (with 24 VDC) $I_{min}...2,3\text{ A}$ (with 12 VDC)
Supply voltage	24 VDC or 12 VDC		Factory setting 700 mA
Voltage range:			The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
• 24 VDC	21,0...30,0 VDC		Frequenz adjustable 2...500 Hz
• 12 VDC	10,5...15,0 VDC		Factory setting 100 Hz
Residual ripple	<10 %		Level adjustable 0...400 mA
Fuse	low		Factory setting 100 mA
Current consumption:			<1 % at $\Delta T = 40^\circ\text{C}$
• Non-load current	approx. 40 mA		Switching threshold high 6...30 VDC
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Dither	Switching threshold low 0...1 VDC
Analogue inputs:	Selectable with software Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version) -10...+10 V (only 2-solenoid version)	Temperaturdrift Digital inputs	Digital input 5–7 can be used as frequency input (frequencies 0...5 kHz) and as PWM input (automatic frequency recognition)
Resolution	10-Bit (Analogue inputs 1 and 2) 16-Bit (Analogue inputs 3 and 4)	Digital outputs	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$
Input resistance	Voltage input >18 k $\Omega$		Adjustable 0...500 s
Analogue output	Load for current input = 250 $\Omega$ Voltage output $\pm 10 \text{ VDC}$	Ramps adjustable Serial interface	USB (receptacle type B)
Stabilised output voltage	max. current output $\pm 3 \text{ mA}$ 10 VDC (with 24 VDC) 8 VDC (with 12 VDC) max. load 30 mA	EMV • Immunity • Emission	EN 61 000-6-2 EN 61 000-6-4
Bus topology	Line, differential signal transmission		
Potential separation	CANopen/J1939 to «SD7» electronics 500 VDC		

### DIMENSIONS



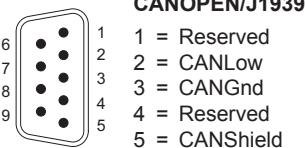
**BLOCK DIAGRAM**


**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB interface, USB Type B X2**


- 1 = VBUS  
2 = D -  
3 = D +  
4 = GND

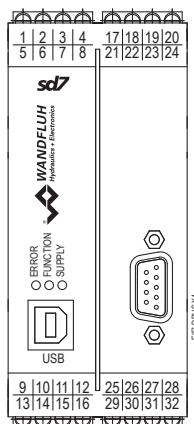

**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Device receptacle CANopen/J1939 (male) X4**


- |   |               |              |
|---|---------------|--------------|
| 1 | 1 = Reserved  | 6 = Reserved |
| 2 | 2 = CANLow    | 7 = CANHigh  |
| 3 | 3 = CANGnd    | 8 = Reserved |
| 4 | 4 = Reserved  | 9 = Reserved |
| 5 | 5 = CANShield |              |

The mating connector (plug male, DSUB, 9-pole) is not included in the delivery.

**PIN Assignment X1**


- 1 = Digital input 1  
2 = Digital input 2  
3 = Digital output 1  
4 = Digital output 2  
5 = Supply Analogue input +  
6 = Supply voltage 0 VDC  
7 = Stabilised output voltage  
8 = Analogue ground  
9 = Analogue input 1 +  
10 = Analogue input 1 -  
11 = Analogue input 2 +  
12 = Analogue input 2 -  
13 = Output solenoid 2 +  
14 = Output solenoid 2 -  
15 = Output solenoid 1 +  
16 = Output solenoid 1 -  
17 = Digital input 3  
18 = Digital input 4  
19 = Digital input 5  
20 = Digital input 6  
21 = Digital input 7  
22 = Digital input 8  
23 = Digital output 3  
24 = Digital output 4  
25 = Analogue input 3 +  
26 = Analogue input 3 -  
27 = Analogue input 4 +  
28 = Analogue input 4 -  
29 = Digital-ground  
30 = Analog-Masse  
31 = Stabilised output voltage  
32 = Analogue output

**Configuration Analogue input**

Type description	Analogue inputs			
	No. 1	No. 2	No. 3	No. 4
SD7362Dx4-BC	Voltage	Current	Voltage	Current
SD7362Dx5-BC	Voltage	Voltage	Voltage	Voltage
SD7362Dx6-BC	Current	Strom	Current	Current
SD7362Dx7-BC	Voltage	Spannung	Current	Current
SD7362Dx8-BC	Current	Current	Voltage	Voltage

**ADDITIONAL INFORMATION**

Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

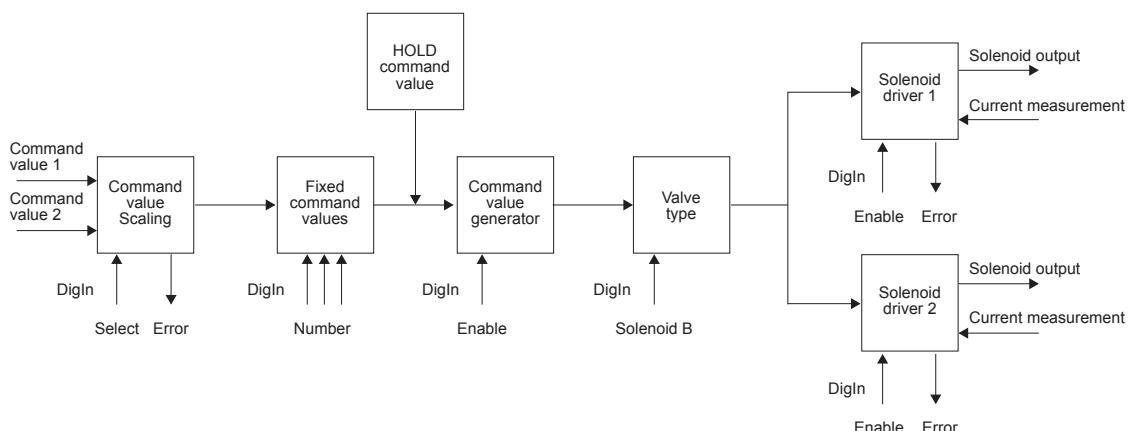
- «PASO-SD7» Parameterisation software
- Operating instructions (\*.pdf)
- EDS-file «WAGOB8E.eds»

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. The device control

(enable, etc.) as well as the command value setting can be preset via the CANopen/J1939 or locally via digital, resp. analogue inputs. Furthermore the parameterisation as well as an analysis/diagnostic are possible via the CANopen (with J1939 on request).

## FUNCTION DESCRIPTION



## SD7 ENHANCED AMPLIFIER WITH CANopen/J1939 INTERFACE

### Command value scaling

The command value can be applied via the CANopen/J1939 or as a voltage, current, digital, frequency or PWM-signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for CANopen/J1939, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 7 fixed command values available, which can be selected via 3 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

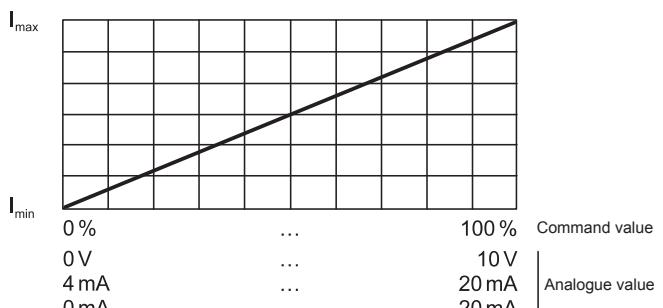
If via CANopen/J1939 the device is put into the "HOLD" condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven (e.g. 0....10V correspond to 0....100 % command value, 0....100 % command value correspond to Imin....Imax solenoid driver 1).

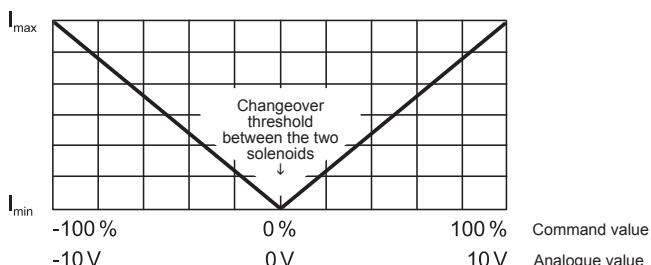


### Mode of operation „Command value unipolar (2-Sol)“

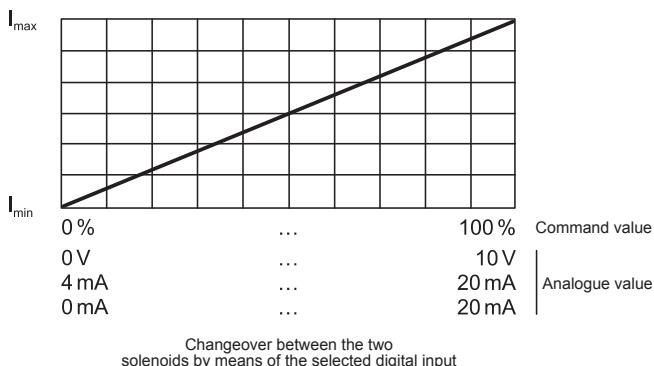
Dependent on a unipolar command value signal (voltage, current, frequency or PWM), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10...+10V correspond to -100...+100% command value, -100...0% command value correspond to Imin....Imax solenoid driver 2, 0....+100% command value correspond to Imin....Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0....10V correspond to 0....100% command value, 0....100% command value correspond to Imin....Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

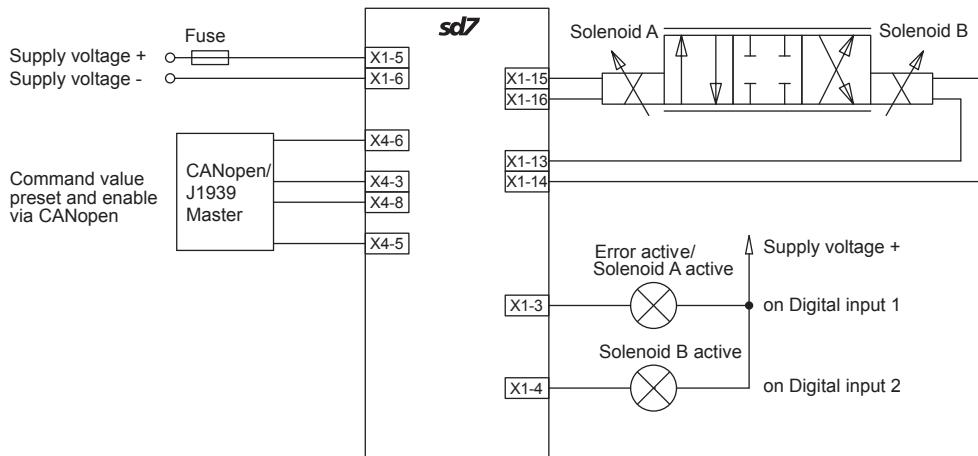
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configured as switching outputs. The rewriter for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

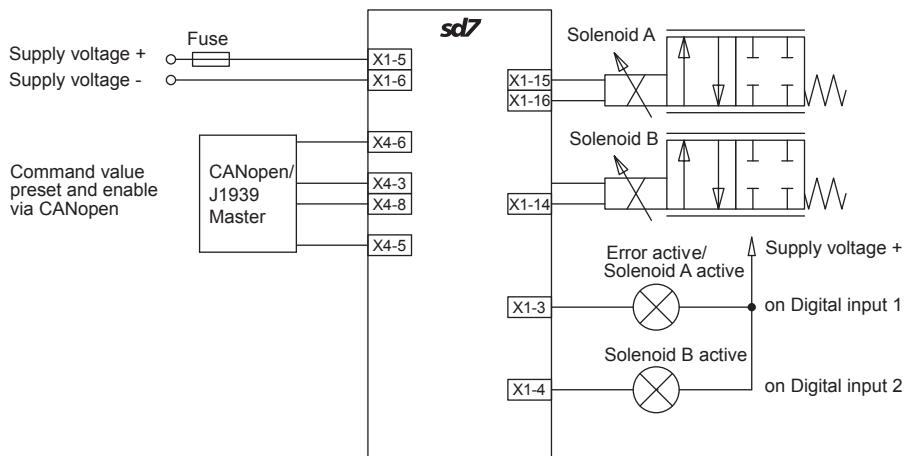
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



Mode of operation „command value unipolar (1-Sol)“

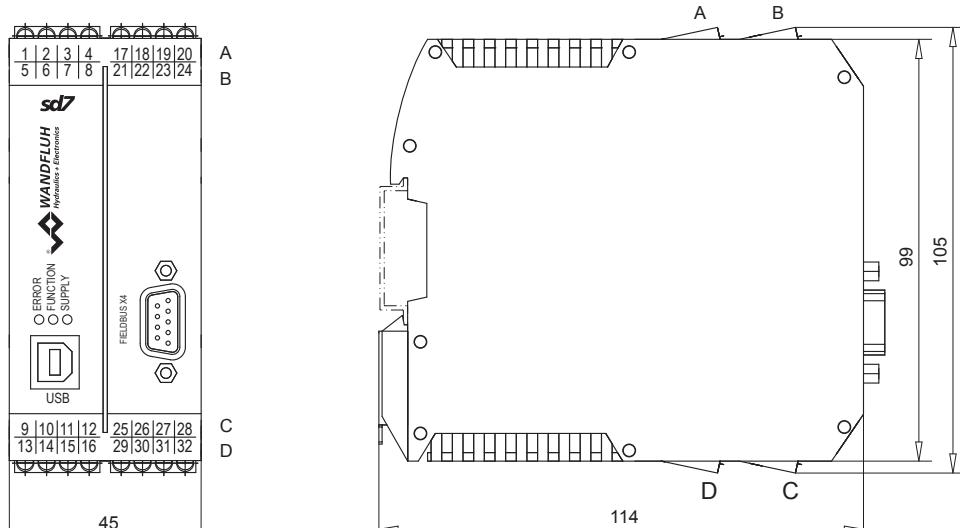


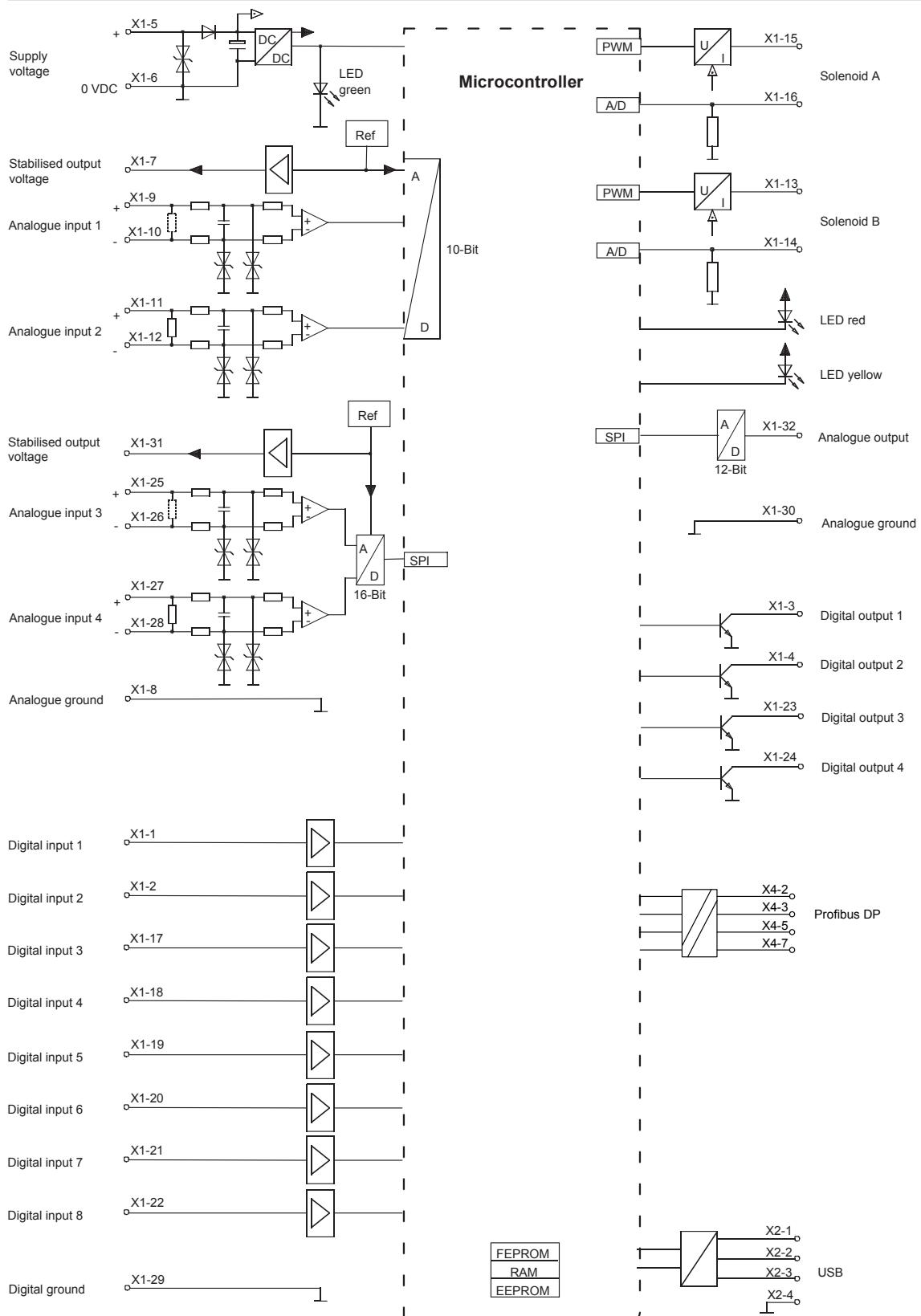
## Enhanced amplifier with Profibus DP interface

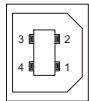
### ELECTRICAL SPECIFICATIONS

Protection class	IP 30 acc. to EN 60 529	• Minimal current $I_{min}$	Adjustable 0...950 mA Factory setting 150 mA
Device receptacle		• Maximal current $I_{max}$	Adjustable $I_{min}...1,8\text{A}$ (with 24 VDC) $I_{min}...2,3\text{A}$ (with 12 VDC)
Profibus (female)	DSUB, 9-pole		Factory setting 700 mA
Mating connector	Plug (male), DSUB, 9-pole	• Accumulated current limitation	The accumulated current of the simultaneously powered solenoids depends on the ambient temperature. Further information can be found in the operating instructions.
Supply voltage	24 VDC or 12 VDC		Frequency adjustable 20...500 Hz Factory setting 100 Hz
Voltage range:		Dither	Level adjustable 0...400 mA Factory setting 100 mA
• 24 VDC	21...30 V		<1 % at $\Delta T = 40^\circ\text{C}$
• 12 VDC	10,5...15 V	Temperature drift	Switching threshold high 6...30 VDC
Residual ripple	<10 %	Digital inputs	Switching threshold low 0...1 VDC
Fuse	low		Digital input 5-7 can be used as frequency input (frequencies 0...5 kHz) and as PWM input (automatic frequency recognition)
Current consumption:		Digital outputs	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$ 0...500 s
• Non-load current	approx. 40 mA		USB (receptacle type B)
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Ramps adjustable	
Command value signal:	Selectable with software	Serial interface	
	Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V	EMV	EN 61 000-6-2
	4...+20 mA/0...+20 mA	Immunity	EN 61 000-6-4
	0...+10 V (1- or 2-solenoid version)	Emission	
Resolution	-10...+10 V (only 2-solenoid version)		
Input resistance	10-Bit (Analogue inputs 1 and 2)		
Analogue output	16-Bit (Analogue inputs 3 and 4)		
Stabilised output voltage	Voltage input >18 k $\Omega$		
Bus topology	Load for current input = 250 $\Omega$		
Potential separation	Voltage output $\pm 10 \text{ VDC}$		
Solenoid current:	max. current output $\pm 3 \text{ mA}$		
	10 VDC (with 24 VDC)		
	8 VDC (with 12 VDC)		
	max. load 30 mA		
	Line, differential signal transmission		
	Profibus to «SD7» electronics 500 VDC		

### DIMENSIONS



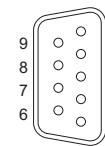
**BLOCK DIAGRAM**


**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB interface, USB Type B X2**


- 1 = VBUS  
2 = D -  
3 = D +  
4 = GND

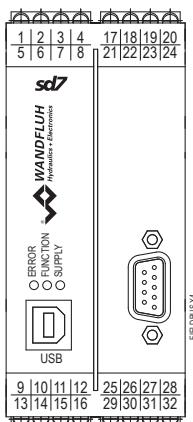

**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**Device receptacle Profibus DP (female) X4**


- PROFIBUS**
- |   |               |               |
|---|---------------|---------------|
| 9 | 1 = Reserved  | 6 = VP        |
| 8 | 2 = Reserved  | 7 = Reserved  |
| 7 | 3 = RxD/TxD-P | 8 = RxD/TxD-N |
| 6 | 4 = Reserved  | 9 = Reserved  |
| 5 | 5 = DGND      |               |

The mating connector (plug male, DSUB, 9-pole) is not included in the delivery.

**PIN Assignment X1**


- 1 = Digital input 1  
2 = Digital input 2  
3 = Digital output 1  
4 = Digital output 2  
5 = Supply Analogue input +  
6 = Supply voltage 0 VDC  
7 = Stabilised output voltage  
8 = Analog ground  
9 = Analogue input 1 +  
10 = Analogue input 1 -  
11 = Analogue input 2 +  
12 = Analogue input 2 -  
13 = Output solenoid 2 +  
14 = Output solenoid 2 -  
15 = Output solenoid 1 +  
16 = Output solenoid 1 -  
17 = Digital input 3  
18 = Digital input 4  
19 = Digital input 5  
20 = Digital input 6  
21 = Digital input 7  
22 = Digital input 8  
23 = Digital output 3  
24 = Digital output 4  
25 = Analogue input 3 +  
26 = Analogue input 3 -  
27 = Analogue input 4 +  
28 = Analogue input 4 -  
29 = Digital ground  
30 = Analogue ground  
31 = Stabilised output voltage  
32 = Analogue output

**Configuration Analogue input**

Type description	Analogue inputs			
	No. 1	No. 2	No. 3	No. 4
SD7362Dx4-BP	Voltage	Current	Voltage	Current
SD7362Dx5-BP	Voltage	Voltage	Voltage	Voltage
SD7362Dx6-BP	Current	Current	Current	Current
SD7362Dx7-BP	Voltage	Voltage	Current	Current
SD7362Dx8-BP	Current	Current	Voltage	Voltage

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parameterisation software
- Operating instructions (\*.pdf)
- GSD-file «WAGO8E.gsd»

**ADDITIONAL INFORMATION**

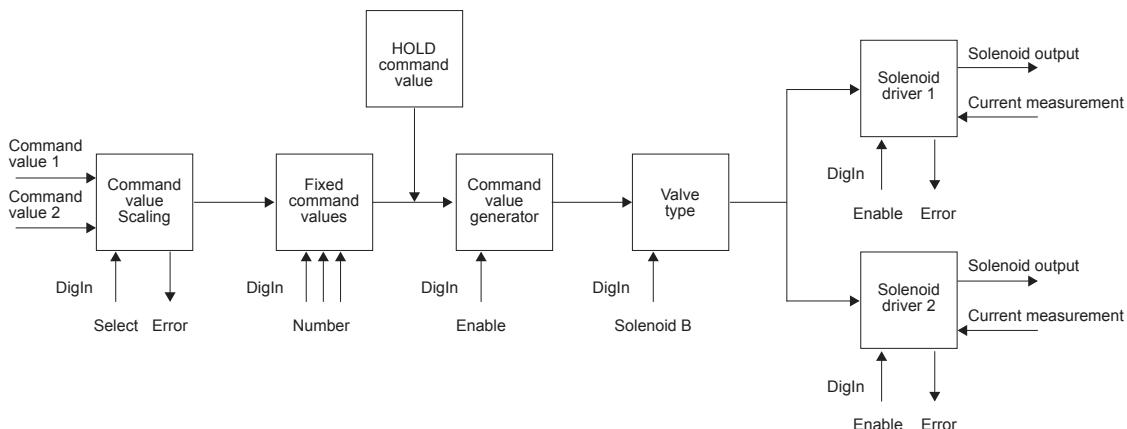
Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Windows XP, Vista and Windows 7 with 32/64-Bit. The device control

(enable, etc.) as well as the command value setting can be preset via the Profibus DP or locally via digital, resp. analogue inputs. Furthermore the parameterisation as well as an analysis/diagnostic are possible via the Profibus DP.

## FUNCTION DESCRIPTION



## SD7 ENHANCED AMPLIFIER WITH PROFIBUS DP INTERFACE

### Command value scaling

The command value can be applied via the Profibus DP or as a voltage, current, digital, frequency or PWM signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for Profibus DP, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 7 fixed command values available, which can be selected via 3 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

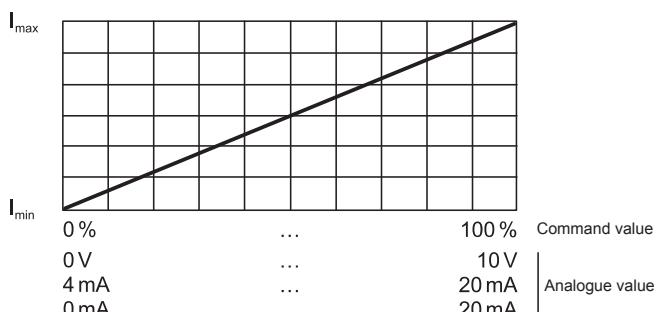
If via Profibus DP the device is put into the "HOLD" condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

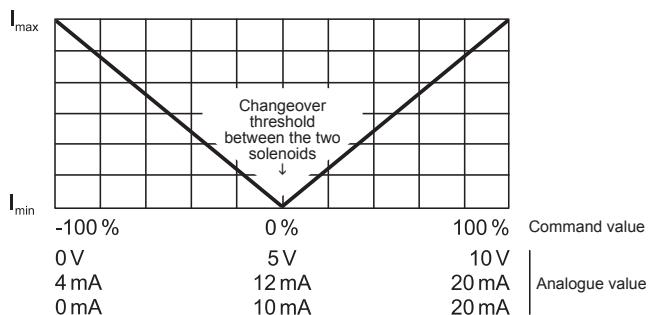
### Mode of operation „Command value unipolar (1-Sol)“

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven (e.g. 0....10V correspond to 0....100 % command value, 0....100 % command value correspond to Imin....Imax solenoid driver 1).



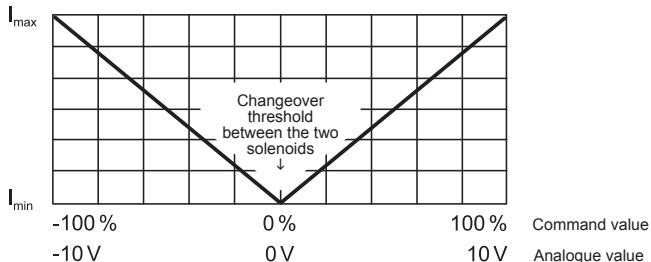
### Mode of operation „Command value unipolar (2-Sol)“

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is in the middle of the values range of the command value signal. (e.g. 0....10V correspond to -100....+100 % command value, -100....0 % command value correspond to Imin....Imax solenoid driver 2, 0....+100 % command value correspond to Imin....Imax solenoid driver 1).

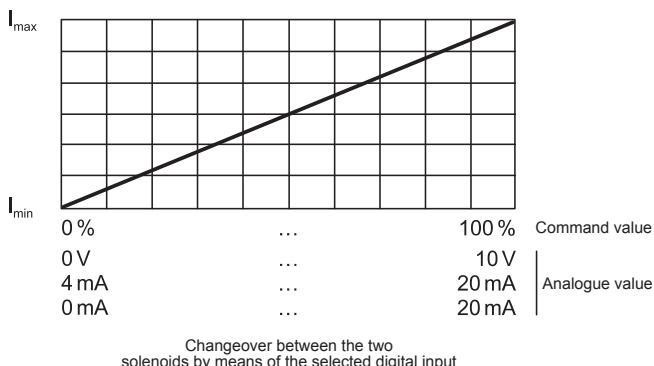


**Mode of operation „Command value bipolar (2-Sol)“**

Dependent on a bipolar command value signal (voltage), one of the two solenoids is driven, acc. to the signal level. The changeover threshold between the two solenoids as standard is at 0V (e.g. -10...+10V correspond to -100...+100% command value, -100...0% command value correspond to Imin...Imax solenoid driver 2, 0...+100% command value correspond to Imin...Imax solenoid driver 1).


**Mode of operation „Command value unipolar (2-Sol with DigIn)“**

Dependent on a unipolar command value signal (voltage, current, frequency or PWM), the solenoid is driven by solenoid driver 1, when the selected digital input is „not activated“, resp. the solenoid by the solenoid driver 2, when the selected digital input is „activated“ (e.g. 0...10V correspond to 0...100% command value, 0...100% command value correspond to Imin...Imax solenoid driver 1 or 2).


**Signal recording**

The SD7 amplifier module has a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid currents, etc., which can be represented on a common time axis.

**Solenoid driver**

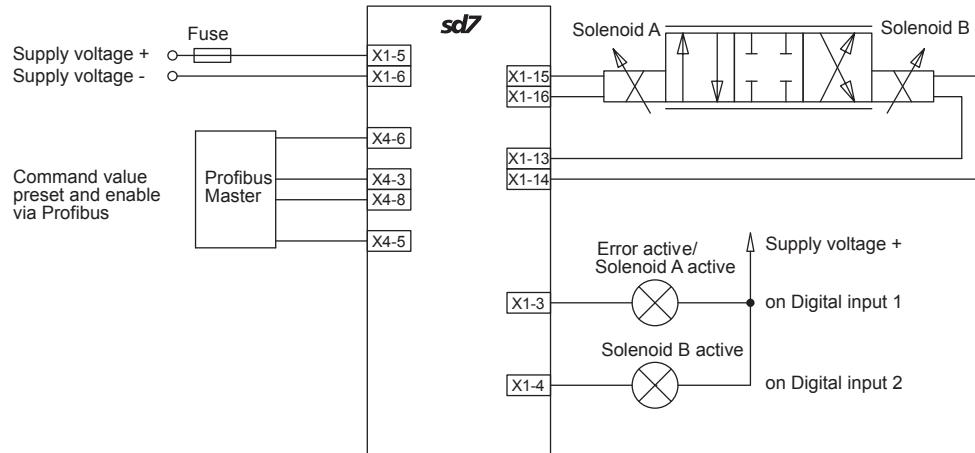
Two Pulse-Width-Modulated current outputs are available. To each output, a dither signal is superimposed, whereas dither frequency and dither level can be adjusted separately. For each output, the minimum (Imin) and maximum (Imax) current can be adjusted separately. The solenoid outputs can also be configured as switching outputs. The rewriter for each output a power reduction can be adjusted separately.

**Optimisation of characteristic curve**

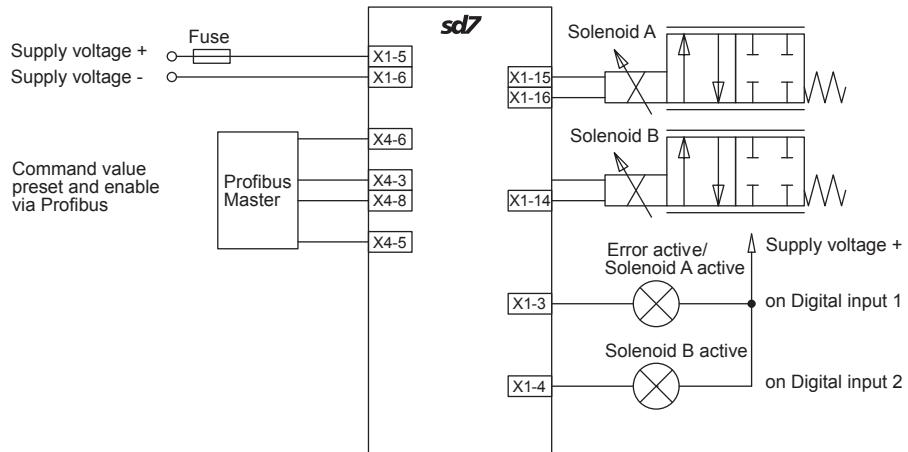
A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



Mode of operation „command value unipolar (1-Sol)“

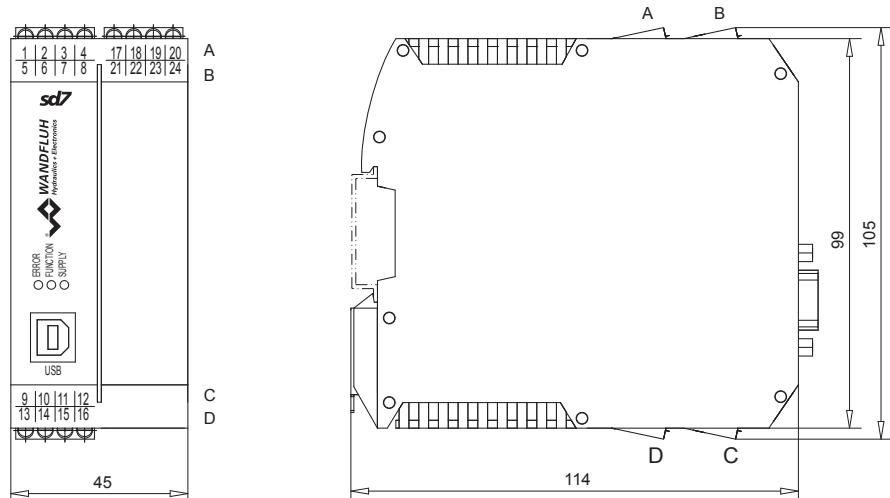


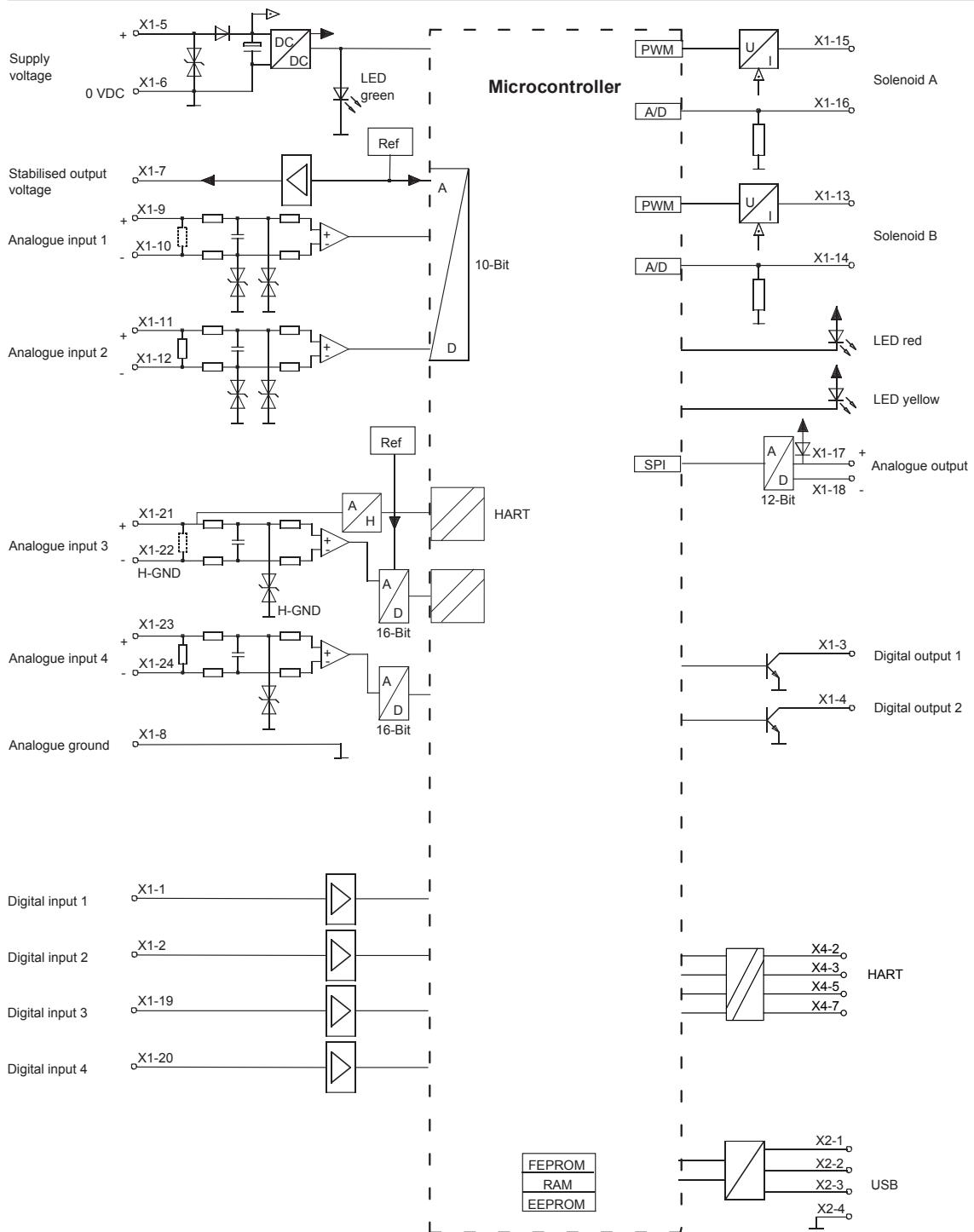
## Enhanced amplifier with HART interface

### ELECTRICAL SPECIFICATIONS

Protection class	IP 30 acc. to EN 60 529	Solenoid current:	
Supply voltage	24 VDC or 12 VDC	• Minimal current $I_{min}$	Adjustable 0...950 mA
Voltage range:		• Maximal current $I_{max}$	Factory setting 150 mA
• 24 VDC	21,0...30,0 VDC	• Accumulated current limitation	Adjustable $I_{min}...1,8\text{ A}$ (with 24 VDC) $I_{min}...2,3\text{ A}$ (with 12 VDC)
• 12 VDC	10,5...15,0 VDC		Factory setting 700 mA
Residual ripple	<10%		The accumulated current of the simultaneously powered solenoids depends on the ambient temperature.
Fuse	low		Further information can be found in the operating instructions..
Current consumption:			Frequency adjustable 2...500 Hz
• Non-load current	approx. 40 mA		Factory setting 100 Hz
• Maximum current consumption	non-load current + 1,8 A per solenoid (with 24 VDC) non-load current + 2,3 A per solenoid (with 12 VDC)	Dither	Level adjustable 0...400 mA
Analogue inputs:	Selectable with software Input 1, 2 and 4: Diff. inputs not galvanically separated, for ground potential differences up to 1,5 V 4...+20 mA/0...+20 mA 0...+10 V (1- or 2-solenoid version) -10...+10 V (only 2-solenoid version) Input 3: galvanically separated for HART Signal 4...+20 mA/0...+20 mA	Temperature drift	Factory setting 100 mA <1 % at $\Delta T = 40^\circ\text{C}$
Resolution	10-Bit (Analogue inputs 1 and 2) 16-Bit (Analogue inputs 3 and 4)	Digital inputs	Switching threshold high 6...30 VDC Switching threshold low 0...1 VDC
Input resistance	Voltage input >18 k $\Omega$	Digital outputs	Low-Side-Switch: $U_{max} = 40 \text{ VDC}$ $I_{max} = -700 \text{ mA}$
Analogue output	Load for current input = 250 $\Omega$	Ramps adjustable	Adjustable 0...500 s
	Current output 0...20 mA	Serial interface	USB (receptacle type B)
Stabilised output voltage	max. Voltage output 12 V	EMV	
HART interface	10 VDC (with 24 VDC) 8 VDC (with 12 VDC) max. load 30 mA	• Immunity	EN 61 000-6-2
	via analogue input 3	• Emission	EN 61 000-6-4

### DIMENSIONS



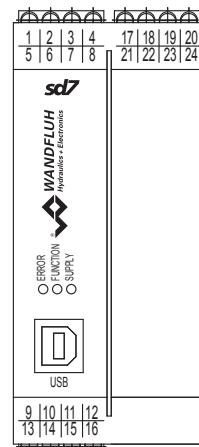
**BLOCK DIAGRAM**


**CONNECTOR WIRING DIAGRAM / PIN ASSIGNMENT**
**USB interface, USB Type B X2**


- 1 = VBUS  
 2 = D -  
 3 = D +  
 4 = GND


**REMARK!**

The parameterisation cable is not part of the scope of supply (commercially available USB-cable, plug type A to plug type B)

**PIN Assignment X1**


- 1 = Digital input 1  
 2 = Digital input 2  
 3 = Digital output 1  
 4 = Digital output 2  
 5 = Supply Analogue input +  
 6 = Supply voltage 0 VDC  
 7 = Stabilised output voltage  
 8 = Analogue ground  
 9 = Analogue input 1 +  
 10 = Analogue input 1 -  
 11 = Analogue input 2 +  
 12 = Analogue input 2 -  
 13 = Output solenoid B +  
 14 = Output solenoid B -  
 15 = Output solenoid A +  
 16 = Output solenoid A -  
 17 = Analogue output +  
 18 = Analogue output -  
 19 = Digital input 3  
 20 = Digital input 4  
 21 = Analogue input 3 + HART  
 22 = Analogue input 3 - HART  
 23 = Analogue input 4 +  
 24 = Analogue input 4 -

**Configuration Analogue input**

Type description	Analogue inputs			
	No. 1	No. 2	No. 3	No. 4
SD7362Dx4-BH	Voltage	Current	Current	Current
SD7362Dx5-BH	Voltage	Voltage	Current	Voltage
SD7362Dx6-BH	Current	Current	Current	Current
SD7362Dx7-BH	Voltage	Voltage	Current	Current
SD7362Dx8-BH	Current	Current	Current	Voltage

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier module and in the operating instructions.

Additional information can be found on our website:  
[www.wandfluh.com](http://www.wandfluh.com)

Free-of-charge download:

- «PASO-SD7» Parametriersoftware
- Operating instructions (\*.pdf)
- EDD-file «WAGSD7.ddl»

**ADDITIONAL INFORMATION**

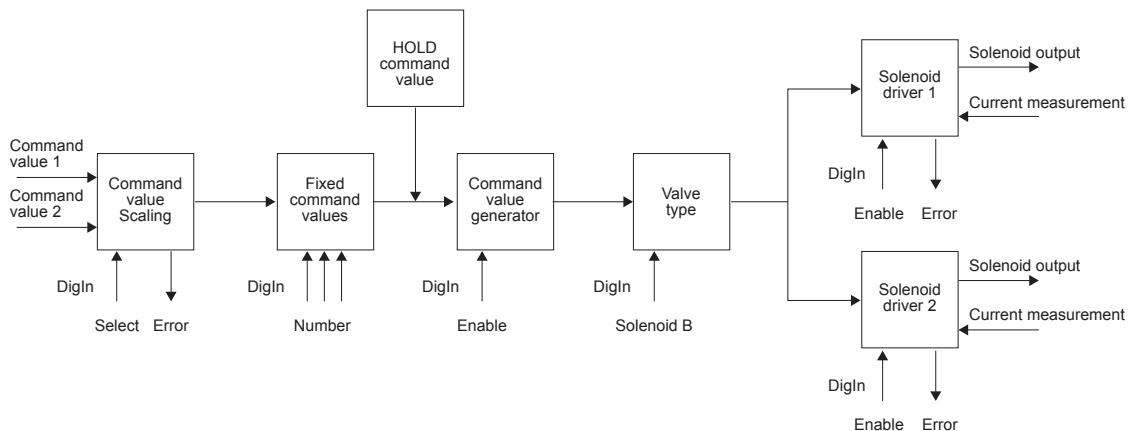
Wandfluh electronics general	Wandfluh documentation register	1.13
Proportional directional valves	register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

## DESIGN

The amplifier module can be parameterised by means of the parameterisation software «PASO-SD7» through the USB-interface. In addition, the parameterisation software makes a data analysis possible. The software «PASO-SD7» is supported by Windows 2000 and Win-

dows XP, Vista and Windows 7 with 32/64-Bit. The device control (enable, etc.) as well as the command value setting can be preset via HART or locally via digital, resp. analogue inputs. Furthermore the parameterisation as well as an analysis/diagnostic are possible via HART.

## FUNCTION DESCRIPTION



## SD7 ENHANCED AMPLIFIER WITH HART INTERFACE

### Command value scaling

The command value can be applied via HART or as a voltage, current or digital signal. For every command value, the input utilised can be selected. The scaling takes place via the parameters „Interface“ and „Reference“. Furthermore every command value can be monitored for a cable break (except for HART, voltage or digital signal). For every command value a dead band can also be set. Optionally one can operate with two command values. The characteristic of these command values can be adjusted.

### Fixed command values

There are 7 fixed command values available, which can be selected via 3 digital inputs.

### Command value generator

For each solenoid output two linear ramps for up and down are available which can be adjusted separately.

### HOLD command value

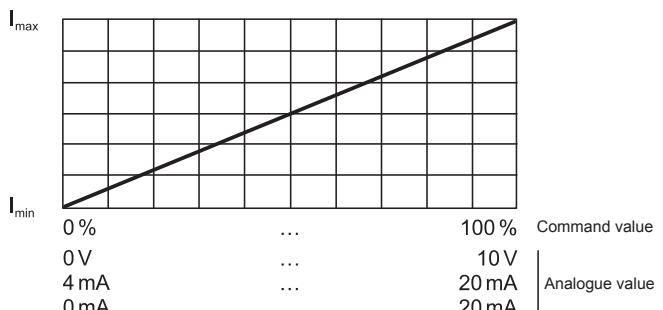
If via CANopen/J1939 the device is put into the "HOLD" condition, the respective command value is activated.

### Valve type

Here the operating mode is set. In addition it can be selected whether proportional or switching solenoids are driven.

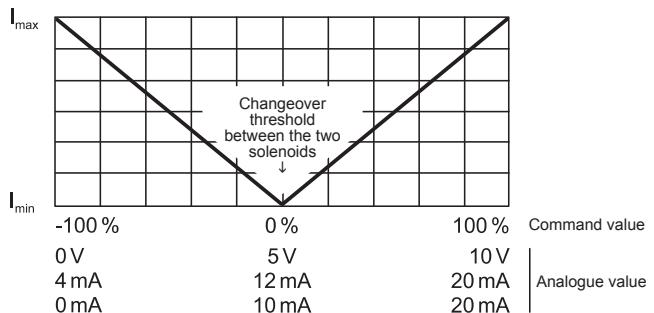
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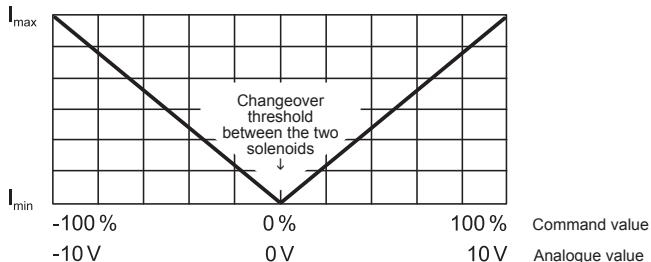
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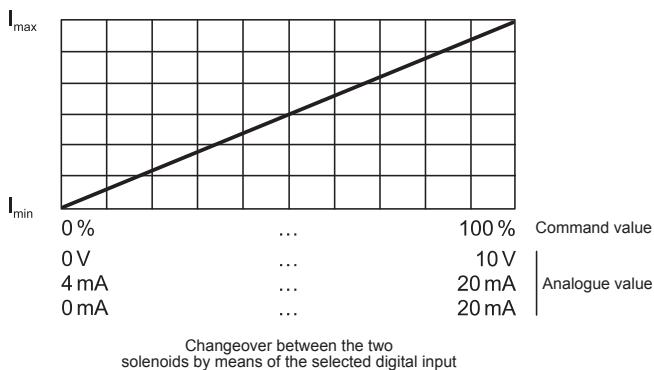


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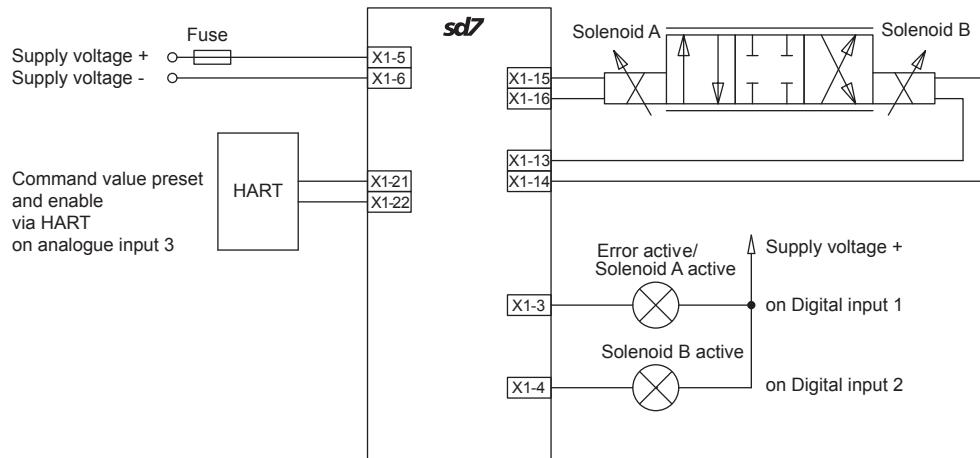
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A characteristic curve adjustable per solenoid „Command value input – solenoid current output“ enables an optimised (e.g., linearised) characteristic of the hydraulic system.

**CONNECTION EXAMPLE**

Mode of operation „command value unipolar (2-Sol)“ or „command value unipolar (2-Sol with DigIn)“



Mode of operation „command value unipolar (1-Sol)“

