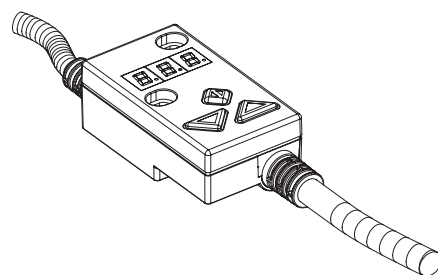


**Digital amplifier electronics PD2**

- For 1 proportional or switching solenoid
- With cable outlet for free choice of the valve connection plug
- Protection class IP 67
- Interface:     - analog  
                  - CANopen/J1939
- 1 analog input
- 1 digital input
- Adjustable with push-buttons and display directly on the device or via PC


**DESCRIPTION**

Amplifier with cable outlet for free choice of the connection plug such as DIN EN 175301-803/ISO 4400, AMP Junior Timer or Deutsch DT04-2P. Protection class IP67. The connection and solenoid cable are mounted fixed in the device. The voltage range enables the control of 12 VDC and 24VDC devices. The amplifier is also available mounted directly on the solenoid.

**FUNCTION**

The electronics has a Pulse-Width-Modulated current output. The solenoid output can also be parameterised for switching solenoids. The parameterisation is carried out directly on the device by means of push-buttons and display, or by means of the parameterisation and diagnostics software "PASO" of Wandfluh.

**APPLICATION**

Due to its water spray resistant execution, the amplifier is suitable for most diverse applications. Easy connection enables assembly and commissioning with conventional tools. All settings can be carried out easily and quickly.

**TYPE CODE**

P D2 3 0 1 D8 0 - A   #

Connector

Digital

Adjustable with  
Push-buttons / display and PASO

Basic amplifier

1-solenoid execution

Supply voltage               8...32 VDC

Analog input                 Voltage / current (not for fieldbus)

10-bit resolution

Option fieldbus:

- without fieldbus          **A**
- with CANopen            **C**
- with J1939                **J**       (On request)

Connection cable length

- 1,5 m
- 7,5 m                    **7.5**       (Not for fieldbus)

Design index (subject to change)

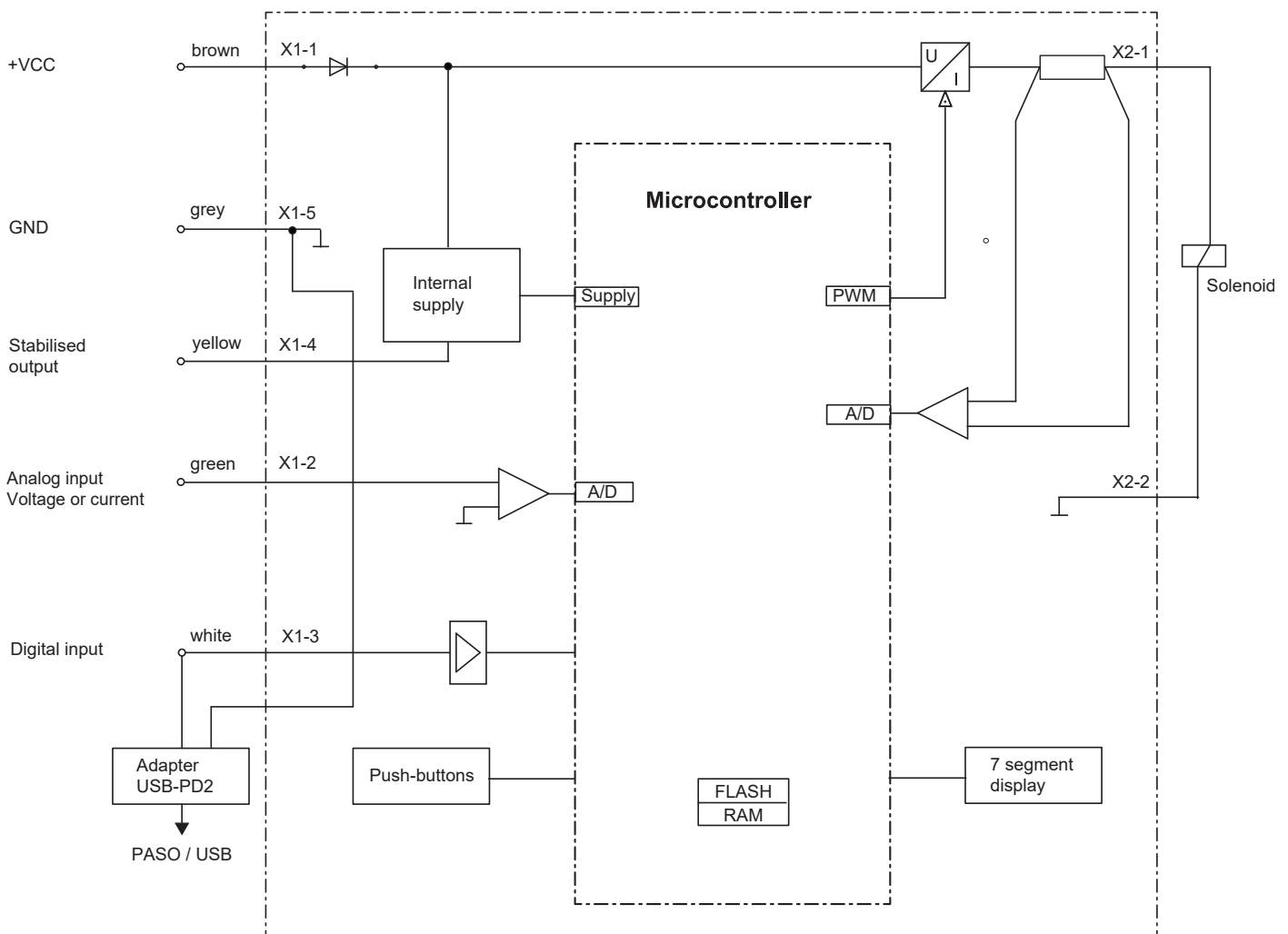
**GENERAL SPECIFICATIONS**

Execution	With cable outlet for free choice of the valve connection plug	
Connections	Connection cable	5 x 0,34 mm <sup>2</sup> , Exterior coating PVC length = 1,5 m or 7,5 m
	Solenoid cable	2 x 0,34 mm <sup>2</sup> , Exterior coating PVC length = 0,5 m
	USB interface	Via connection «Digital input» requires the Wandfluh USB adapter PD2
	Dimensions	See drawing page 2
Ambient temperature	-40...+85 °C	
Installation	2 screws M3x20, tightening torque 0.1 Nm	

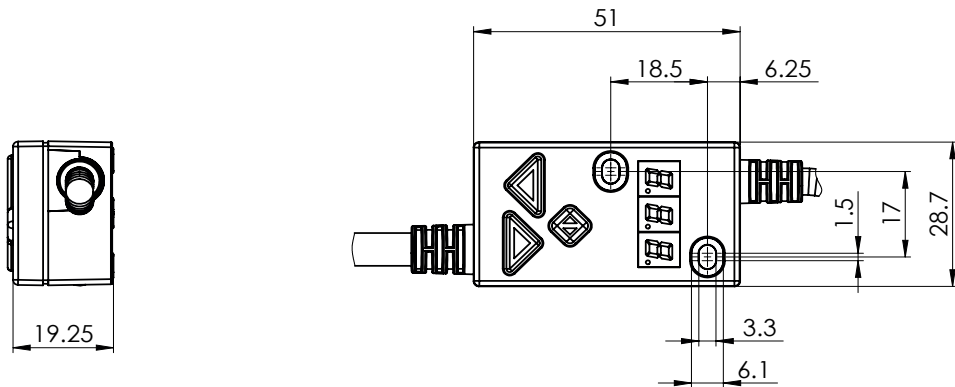
## Amplifier with analog interface

**ELECTRICAL SPECIFICATIONS**

Protection class Supply voltage Residual ripple Fuse No-load current Max. current consumption Analog input	IP67 acc. to EN 60 529 8...32 V < +/-5 % Low Approx. 20 mA No-load current + 2,5 A per solenoid 1 input non-differential Voltage / current (switchable by means of parameter) 0...+/- 10V or 0/4...20mA 10-bit Voltage input >100 kΩ (Input current < 5 mA) Load for current input = 124 Ω 5 VDC Max. load 20 mA <b>Solenoid current:</b> • Minimal current $I_{min}$ Adjustable 0... $I_{max}$ mA Factory setting 150 mA • Maximal current $I_{max}$ Adjustable $I_{min}$ ...2450 mA Factory setting 700 mA	Dither Temperature drift Digital inputs Ramps USB interface EMV Immunity Emission	Frequency adjustable 4...500 Hz Factory setting 80 Hz Level adjustable 0...400 mA Factory setting 180 mA <1% at $\Delta T = 40^\circ C$ 1 input high-active, no pull-up/down Switching threshold high 6...32 VDC Switching threshold low 0...1 VDC Usable as frequency input (frequency 5...5000 Hz) and as PWM input (automatic frequency recognition) Adjustable 0...500 s Via digital input Requires the Wandfluh USB adapter EN 61 000-6-2 EN 61 000-6-4
--	---	--	---

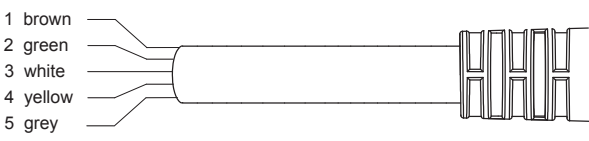
**BLOCK DIAGRAM**


**DIMENSIONS**



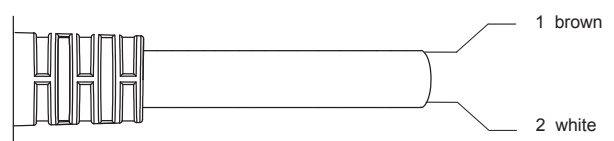
**CONNECTOR ASSIGNMENT**

Connection cable (X1)



- 1 = + VCC
- 2 = Command value
- 3 = Dig Inp
- 4 = Stab out
- 5 = GND

Solenoid cable (X2)



- 1 = Solenoid +
- 2 = Solenoid -

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier electronics 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-PD2» Parameterisation software
- Operating instruction (\*.pdf)

**ADDITIONAL INFORMATION**

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

**ACCESSORIES**

USB-adapter PD2	Article no. 726.9900
incl. USB-cable, type A-B 1,8 m (for parameterisation via PASO)	

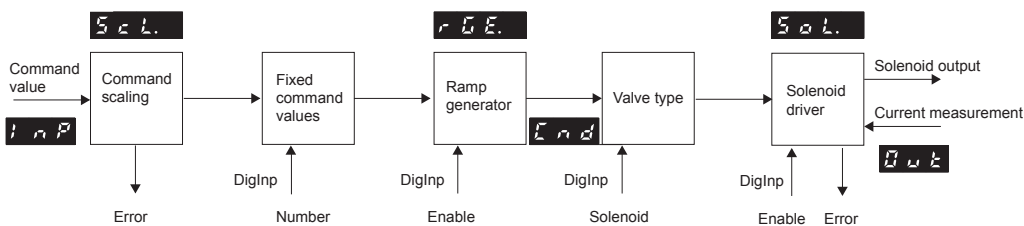
**ADJUSTMENTS**

The PD2 electronics have push-buttons and a 7 segment display which enable setting the most important parameters. In addition, the digital input can be used as a communication interface, through which, by means of the parameterisation software "PASO-PD2", the complete parameterisation and diagnostics can be carried out. For this, the Wandfluh USB-PD2 adapter is required. (not included in the delivery)



**Important:** During the communication, the digital input cannot be used.

**FUNCTION DESCRIPTION**



**PD2 AMPLIFIER WITH ANALOG INTERFACE**

**Command value scaling**

The command value can be applied as a voltage, current, digital, frequency or PWM signal. The scaling takes place via the parameter „Interface“. Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

**Fixed command value**

There is 1 fixed command value available, which can be selected via the digital input. This function has to be configured before in PASO.

**Ramp generator**

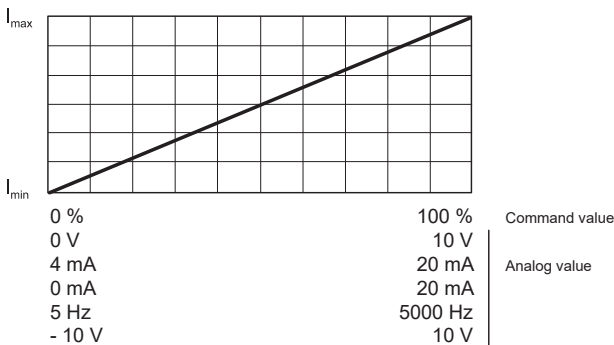
Two linear ramps for up and down are available which can be adjusted separately.

**Valve type**

Adjustment possibilities: switching solenoid or proportional solenoid.

**Mode of operation „Command value unipolar/bipolar (1-Sol)“**

Dependent on a command value signal (voltage, current, digital, frequency or PWM), the solenoid is driven (e.g. 0...10V correspond to 0...100 % command value, 0...+100 % command value correspond to I<sub>min</sub>...I<sub>max</sub> solenoid driver)



**Signal recording**

Furthermore, the „PD2“ amplifier electronics have a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid current, etc., which can be represented on a common time axis.

**Solenoid driver**

A Pulse-Width-Modulated current output is available. A dither signal is superimposed, whereby the dither frequency and the dither level are separately adjustable. The minimum (I<sub>min</sub>) and maximum (I<sub>max</sub>) current can be adjusted. The solenoid output can also be configured as switching solenoid output. In this case, a power reduction can be adjusted.

**Optimisation of characteristic curve**

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

**Channel enabling**

As per factory setting, the device is enabled („on“). This „enable channel“ can be set to „on“, „off“ or „external“ (digital input) via PASO or via menu item.



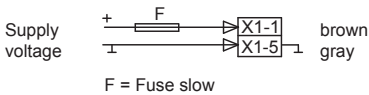
**Important!**

Digital input: If deenergised, not wired, the state is not defined

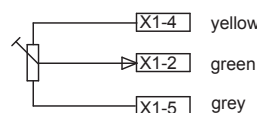
Analog input: If deenergised, the voltage input will read 1.11 V constantly

**CONNECTION EXAMPLES**

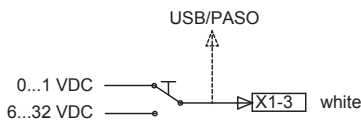
**Supply voltage**



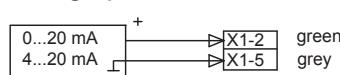
**Analog input with potentiometer**



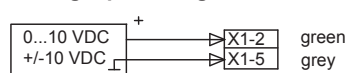
**Digital input as function input**



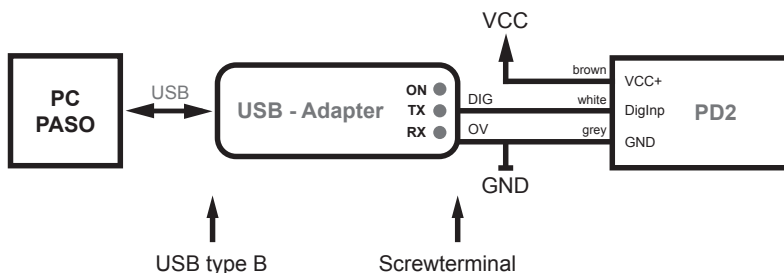
**Analog input current with external current source**



**Analog input voltage with external voltage source**



**Digital input as USB interface**

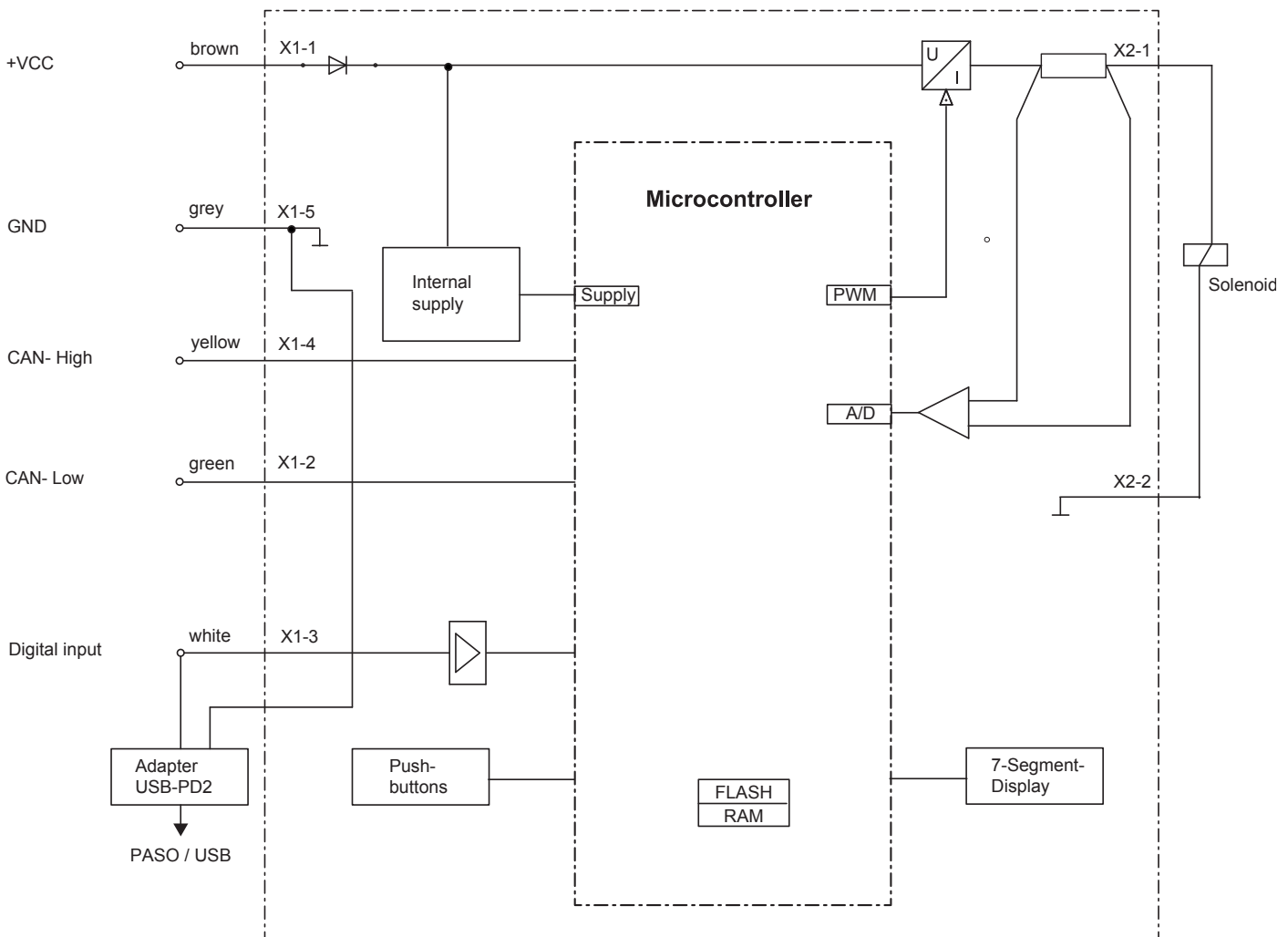


## Amplifier with CANopen interface

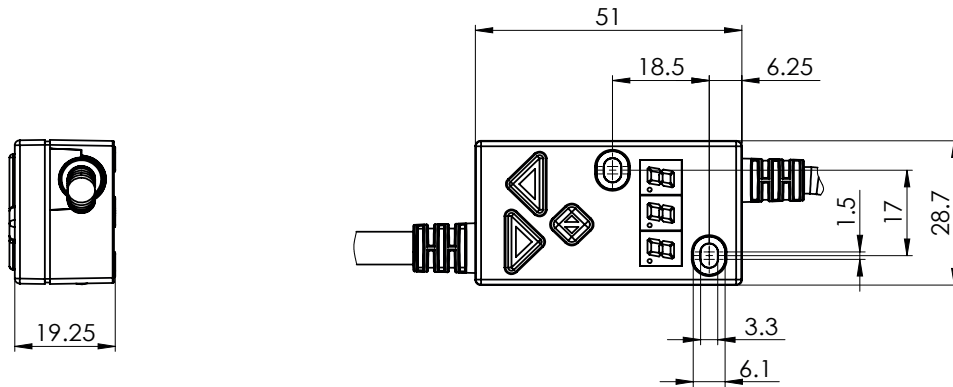
### ELECTRICAL SPECIFICATIONS

Protection class    IP67 acc. to EN 60 529 Supply voltage        8...32 V Residual ripple        < +/-5 % Fuse                      Low No-load current        Approx. 20 mA Max. current consumption    No-load current + 2,5 A per solenoid	Temperature drift     <1% at $\Delta T = 40^\circ C$ Digital inputs 1 input high-active, no pull-up/down Switching threshold high 6...32 VDC Switching threshold low 0...1 VDC Usable as frequency input (frequency 5...5000 Hz) and as PWM input (automatic frequency recognition)	USB interface Via digital input Requires the Wandfluh USB adapter
<b>Solenoid current:</b> • Minimal current $I_{min}$ Adjustable 0... $I_{max}$ mA Factory setting 150 mA • Maximal current $I_{max}$ Adjustable $I_{min}$ ...2450 mA Factory setting 700 mA	EMC Immunity                EN 61 000-6-2 Emission                 EN 61 000-6-4	
Dither Frequency adjustable 4...500 Hz Factory setting 80 Hz Level adjustable 0...400 mA Factory setting 180 mA		

### BLOCK DIAGRAM

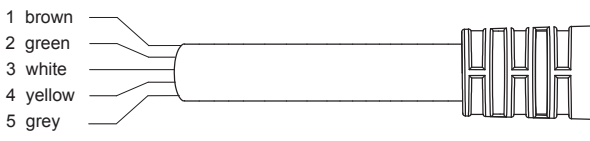


**DIMENSIONS**



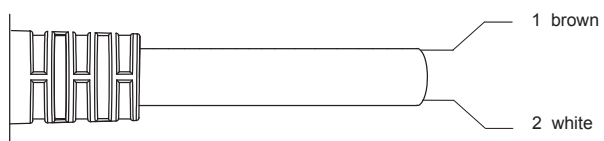
**CONNECTOR ASSIGNMENT**

Connection cable (X1)



- 1 = + VCC
- 2 = CAN-Low
- 3 = Dig Inp
- 4 = CAN-High
- 5 = GND

Solenoid cable (X2)



- 1 = Solenoid +
- 2 = Solenoid -

**START-UP**

Information regarding installation and commissioning are contained in the information leaflet supplied with the amplifier electronics 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-PD2» Parameterisation software
- Operating instruction (\*.pdf)

**ADDITIONAL INFORMATION**

Wandfluh electronics general	Wandfluh documentation-	register	1.13
Proportional spool valve	register		1.10
Proportional pressure valves	register		2.3
Proportional flow control valves	register		2.6

**ACCESSORIES**

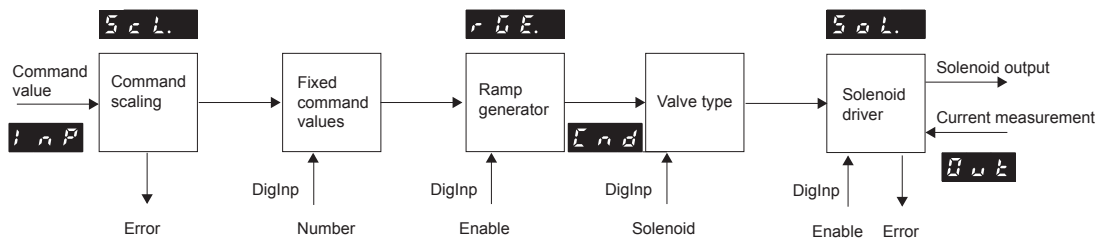
USB-adapter PD2	Article no. 726.9900
incl. USB-cable, type A-B, 1,8 m (for parameterisation via PASO)	

**ADJUSTMENTS**

The PD2 electronics have push-buttons and a 7 segment display which enable setting the most important parameters. In addition, the digital input can be used as a communication interface, through which, by means of the parameterisation software „PASO-PD2“, the complete parameterisation and diagnostics can be carried out. For this, the Wandfluh USB-PD2 adapter is required. (not included in the delivery)

 **Important:** During the communication, the digital input cannot be used.

**FUNCTION DESCRIPTION**



**PD2 AMPLIFIER WITH CANopen INTERFACE**
**Command value scaling**

The command value can be applied as a CAN-bus-, digital, frequency or PWM signal. The scaling takes place via the parameter „Interface“. Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

**Fixed command value**

There is 1 fixed command value available, which can be selected via the digital input. This function has to be configured before in PASO.

**Ramp generator**

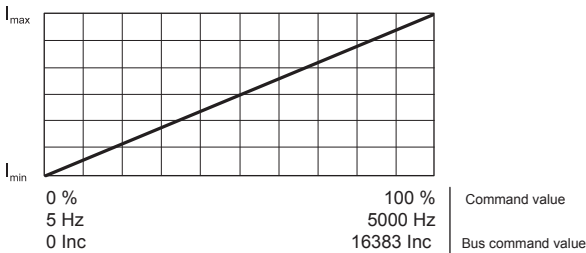
Two linear ramps for up and down are available which can be adjusted separately.

**Valve type**

Adjustment possibilities: switching solenoid or proportional solenoid.

**Mode of operation „Command value unipolar/bipolar (1-Sol)**

Dependent on a command value signal (CAN-bus, digital, frequency or PWM), the solenoid is driven (e.g. 0...16383 CAN-command correspond to 0...100 % command value, 0...+100 % command value correspond to I<sub>min</sub>...I<sub>max</sub> solenoid driver)


**Signal recording**

Furthermore, the „PD2“ amplifier electronics have a signal recording function. This, by means of PASO, enables the recording of various system signals, such as command value, solenoid current, etc., which can be represented on a common time axis.

**Solenoid driver**

A Pulse-Width-Modulated current output is available. A dither signal is superimposed, whereby the dither frequency and the dither level are separately adjustable. The minimum (I<sub>min</sub>) and maximum (I<sub>max</sub>) current can be adjusted. The solenoid output can also be configured as switching solenoid output. In this case, a power reduction can be adjusted.

**Optimisation of characteristic curve**

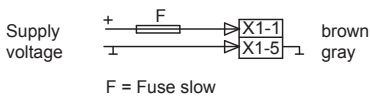
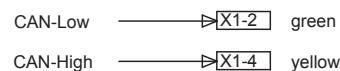
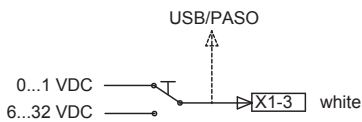
An adjustable characteristic curve „Command value input – solenoid current output“ enables an optimised (e.g. linearised) characteristic of the hydraulic system.

**Channel enabling**

As per factory setting, the device can be enabled via CAN-bus. This „enable channel“ can be set to „bus“, „on“, „off“ or „external“ (digital input) via PASO or via menu item.



**Important!** Digital input: If deenergised, the state of the digital input is not defined

**CONNECTION EXAMPLES**
**Supply voltage**

**CAN connection**

**Digital input as function input**

**Digital input as USB interface**
