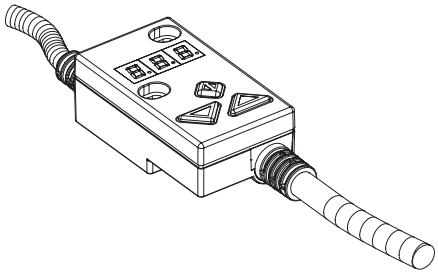
Digital amplifier electronics PD2

- **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 mm², Exterior coating PVC length = 1,5 m or 7,5 m
	Solenoid cable	2 x 0,34 mm², Exterior coating PVC length = 0,5 m
	USB interface	Via connection «Digital input» requires the Wandfluh USB adapter PD2

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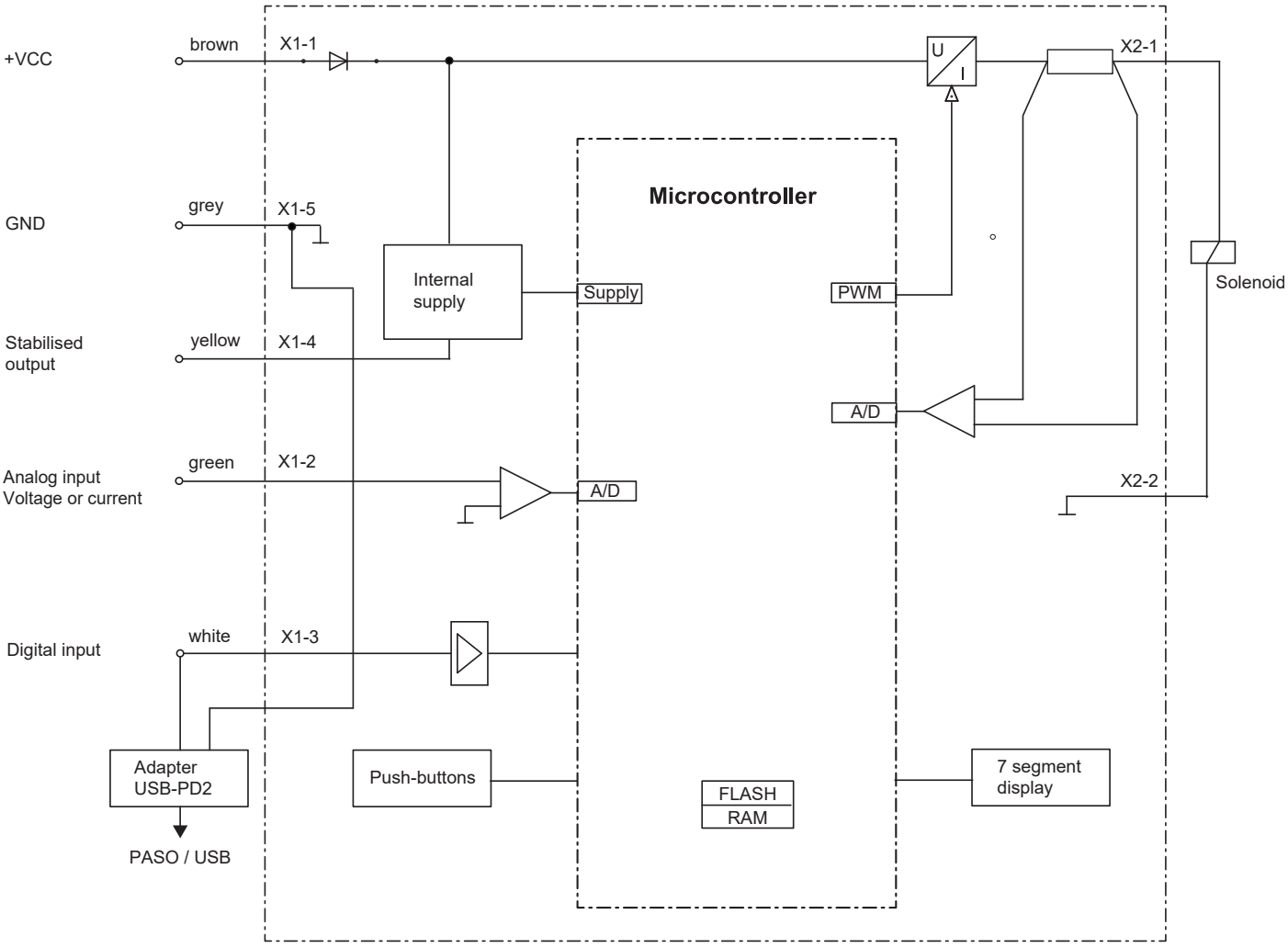
https://wandfluh.nt-rt.ru/ || wha@nt-rt.ru

Amplifier with analog interface

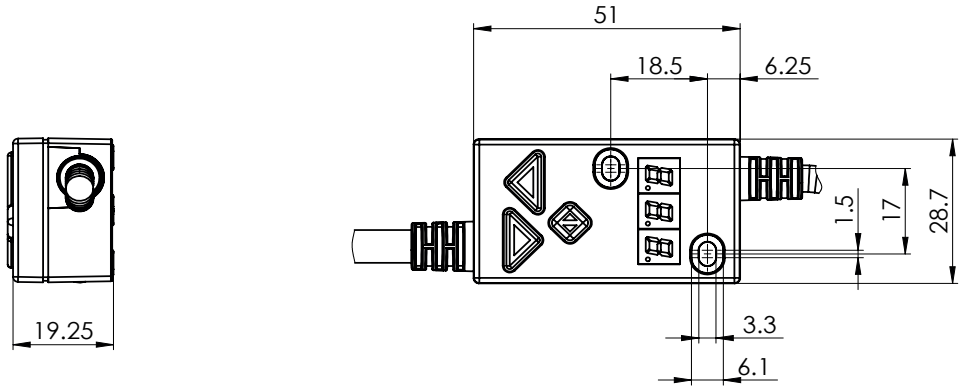
ELECTRICAL SPECIFICATIONS

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
Analog input	1 input non-differential Voltage / current (switchable by means of parameter) 0...+/- 10V or 0/4...20mA
Resolution	10-bit
Input resistance	Voltage input >100 kΩ (Input current < 5 mA) Load for current input = 124 Ω
Stabilised output voltage	5 VDC Max. load 20 mA
Solenoid current:	
• 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	Frequency adjustable 4…500 Hz Factory setting 80 Hz Level adjustable 0…400 mA Factory setting 180 mA
Temperature drift	<1 % at ΔT = 40 °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)
Ramps	Adjustable 0…500 s
USB interface	Via digital input Requires the Wandfluh USB adapter
EMV	
Immunity	EN 61 000-6-2
Emission	EN 61 000-6-4

BLOCK DIAGRAM

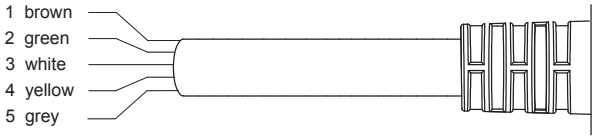


DIMENSIONS



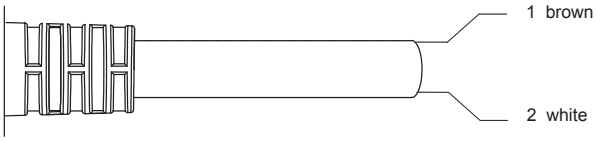
CONNECTOR ASSIGNMENT

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.

Free-of-charge download:
- «PASO-PD2» Parameterisation software
- Operating instruction (*.pdf)

ADDITIONAL INFORMATION

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

ACCESSORIES

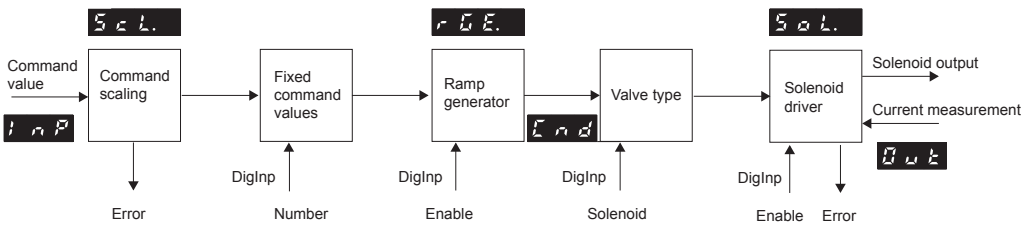
USB-adapter PD2 Article no. 726.9900
incl. USB-cable, type A-B 1,8 m
(for parameterisation via PASO)

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

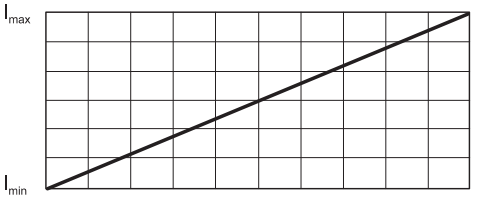
Command value scaling
The command value can be applied as a voltage, current, digital, frequency or PWM signal. The scaling takes place via the parameter „Interface". Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

Fixed command value
There is 1 fixed command value available, which can be selected via the digital input. This function has to be configurated 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 Imin….Imax solenoid driver)



0 %	100 %	Command value
0 V	10 V	
4 mA	20 mA	Analog value
0 mA	20 mA	
5 Hz	5000 Hz	
- 10 V	10 V	

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 (Imin) and maximum (Imax) current can be adjusted. The solenoid output can also be configurated as switching solenoid output. In this case, a power reduction can be adjusted.

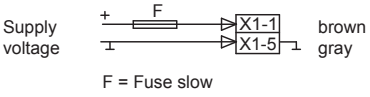
Optimisation of characteristic curve
An adjustable characteristic curve „Command value input – solenoid current output" enables an optimised (e.g. linearised) characteristic of the hydraulic system.

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.

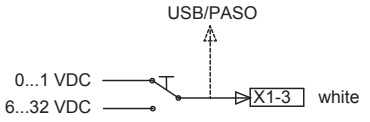
Important!
Digital input: If deenergised, not wired, the state is not defined
Analog input: If deenergised, the voltage input will read 1.11 V constantly

CONNECTION EXAMPLES

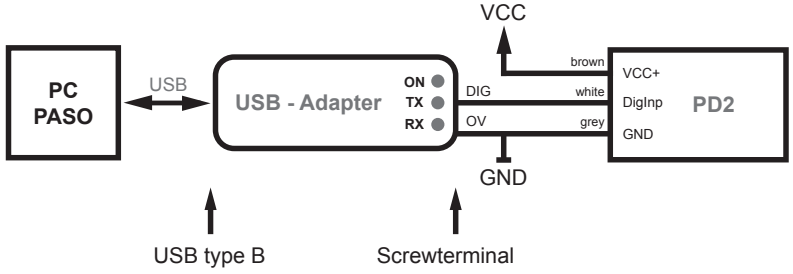
Supply voltage



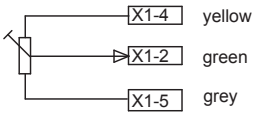
Digital input as function input



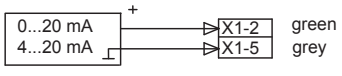
Digital input as USB interface



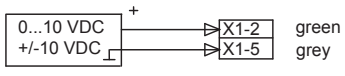
Analog input with potentiometer



Analog input current with external current source



Analog input voltage with external voltage source

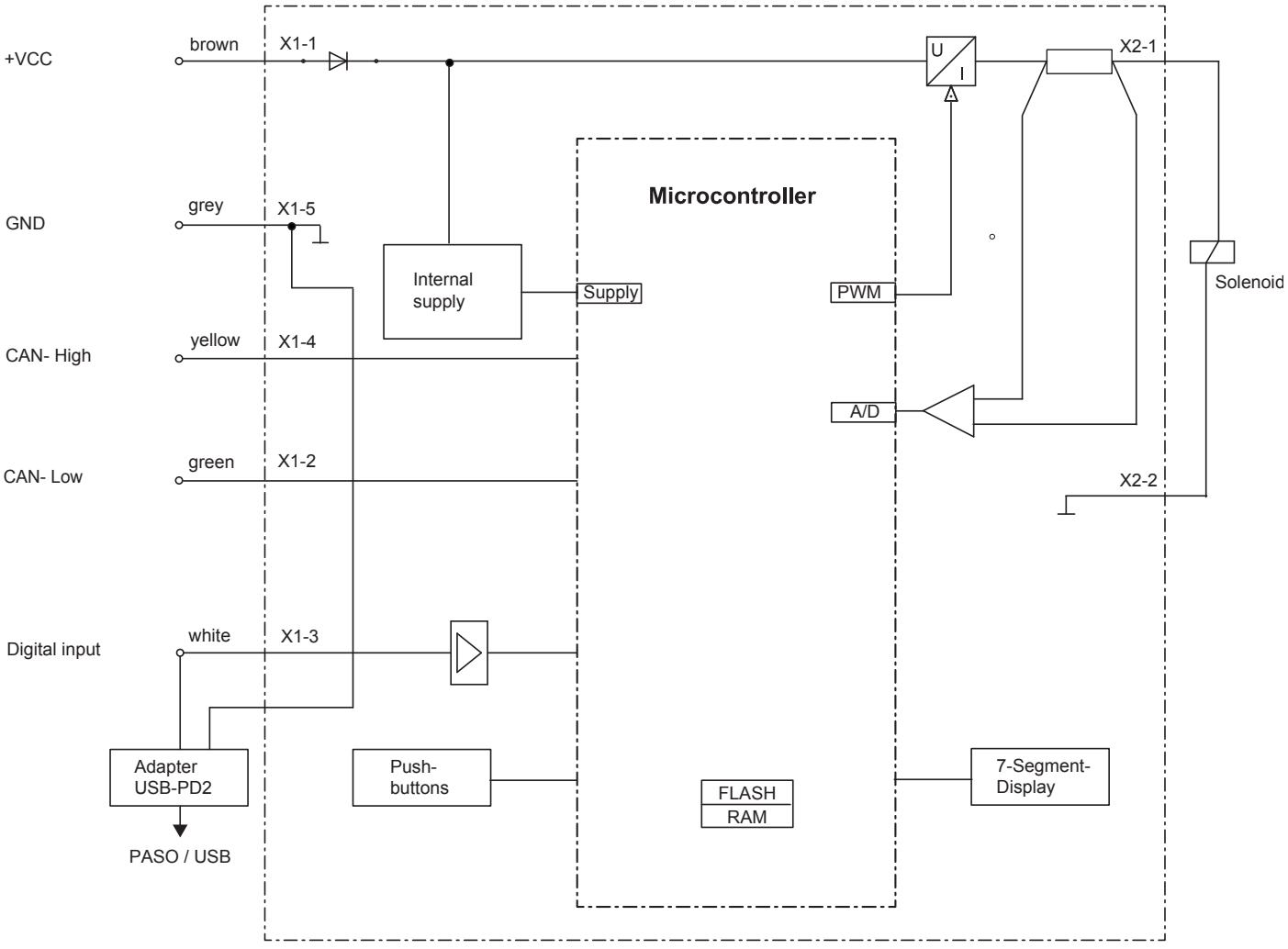


Amplifier with CANopen interface

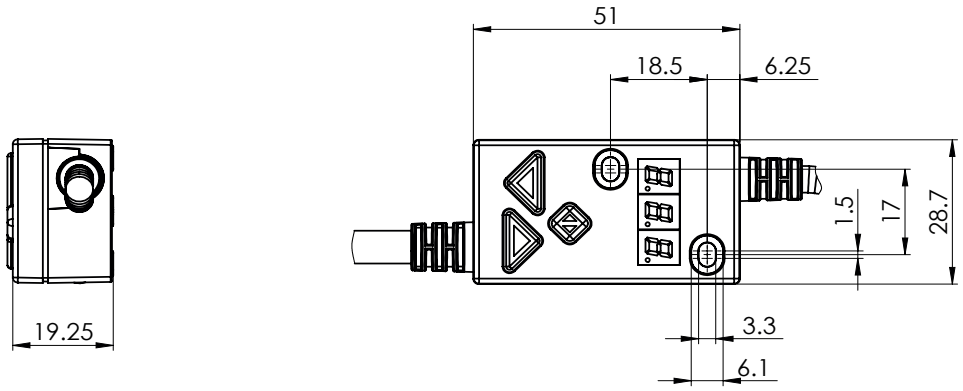
ELECTRICAL SPECIFICATIONS

Protection class	IP 67 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
Solenoid current:	
• 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	Frequency adjustable 4…500 Hz Factory setting 80 Hz Level adjustable 0…400 mA Factory setting 180 mA
Temperature drift	<1 % at ΔT = 40 °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
EMC	
Immunity	EN 61 000-6-2
Emission	EN 61 000-6-4

BLOCK DIAGRAM

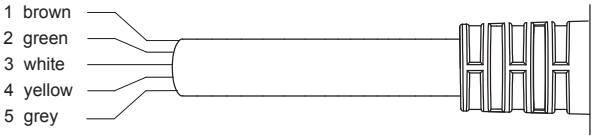


DIMENSIONS



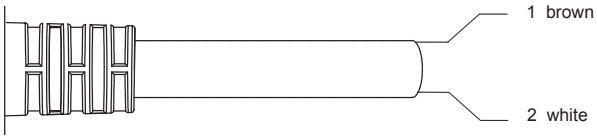
CONNECTOR ASSIGNMENT

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

		Wandfluh documentation-
Wandfluh electronics general	register	1.13
Proportional spool valve	register	1.10
Proportional pressure valves	register	2.3
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Free-of-charge download:
• «PASO-PD2» Parameterisation software
• Operating instruction (*.pdf)

ACCESSORIES

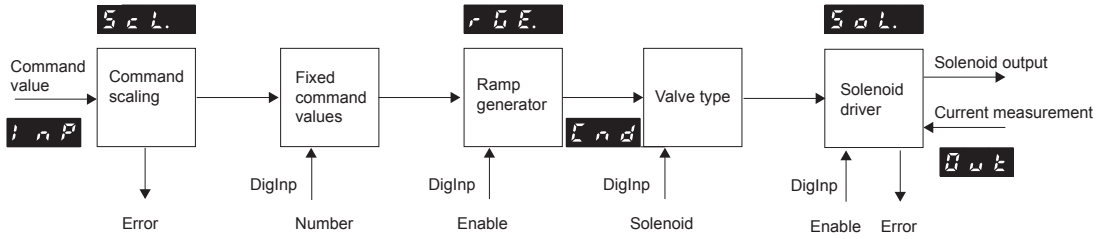
USB-adapter PD2 Article no. 726.9900
incl. USB-cable, type A-B, 1,8 m
(for parameterisation via PASO)

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



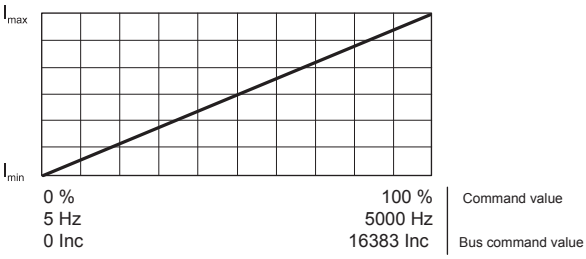
Command value scaling
The command value can be applied as a CAN-bus-, digital, frequency or PWM signal. The scaling takes place via the parameter „Interface". Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

Fixed command value
There is 1 fixed command value available, which can be selected via the digital input. This function has to be configurated 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 Imin….Imax 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 (Imin) and maximum (Imax) current can be adjusted. The solenoid output can also be configurated as switching solenoid output. In this case, a power reduction can be adjusted.

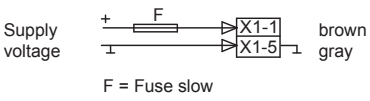
Optimisation of characteristic curve
An adjustable characteristic curve „Command value input – solenoid current output" enables an optimised (e.g. linearised) characteristic of the hydraulic system.

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

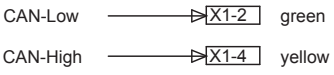
CONNECTION EXAMPLES

Supply voltage

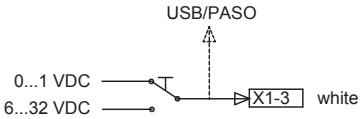


F = Fuse slow

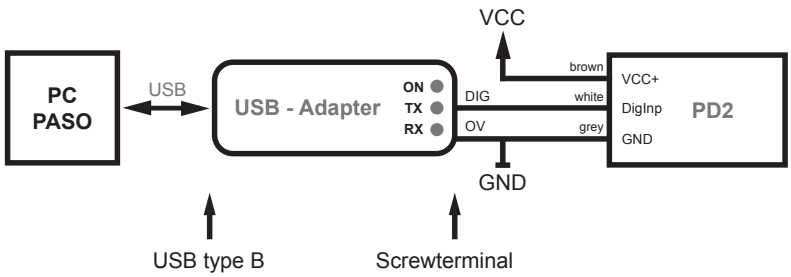
CAN connection



Digital input as function input



Digital input as USB interface



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