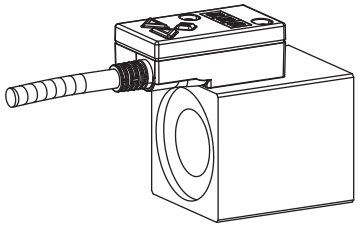
Solenoid coil acc. to VDE 0580
- **With integrated amplifier electronics PD2**
- **Protection class IP 67**



DESCRIPTION
Solenoid coil with integrated amplifier electronics. Protection class is IP67. The electronics are fix mounted on the solenoid coil. The construction corresponds to standard VDE 0580. The steel housing is zinc nickel coated.

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 solenoid coil is suitable for most diverse applications.
It can be used on all proprtional valves with 19 mm, 23 mm resp. 31 mm armature tube diameters.
Easy connecting enables assembly and commissioning with conventional tools. All settings can be carried out easily and quickly.

TYPE CODE

M P □ - P 1 - □ - □ # □

Metal housing square				
Integrated amplifier electronics				
Coil execution				
Square 35 mm	S35/19x50	Square 60 mm	S60/31x72	
Square 45 mm	S45/23x50	Square 60 mm	A60/31x72	*
Connection cable vaway from the solenoid				
1-solenoid execution				
Nominal voltage U_N	12 VDC	12		
	24 VDC	24		
Analogue input	voltage / current (0...5 V factory preset)		A1	
CANopen acc. to DSP-408			C1	
with J1939			J1	(on request)
Design index (subject to change)				

* only for proportional spool valve NG10

GENERAL SPECIFICATIONS

Connections	Connection cable	5 x 0,34 mm², Exterior coating PVC length = 1,5 m
	USB interface	via connection «Digital input» requires the Wandfluh USB adapter PD2
Dimensions	See drawing page 3	
Ambient temperature	-20...+85 °C	

SAFE OPERATION

Caution: To avoid overheating the coil may only be energised when mounted on an armature tube and valve.

Note: For maximum power development the coil has to be installed in its preferred direction. A reversed installation can lead to lower hydraulic values.

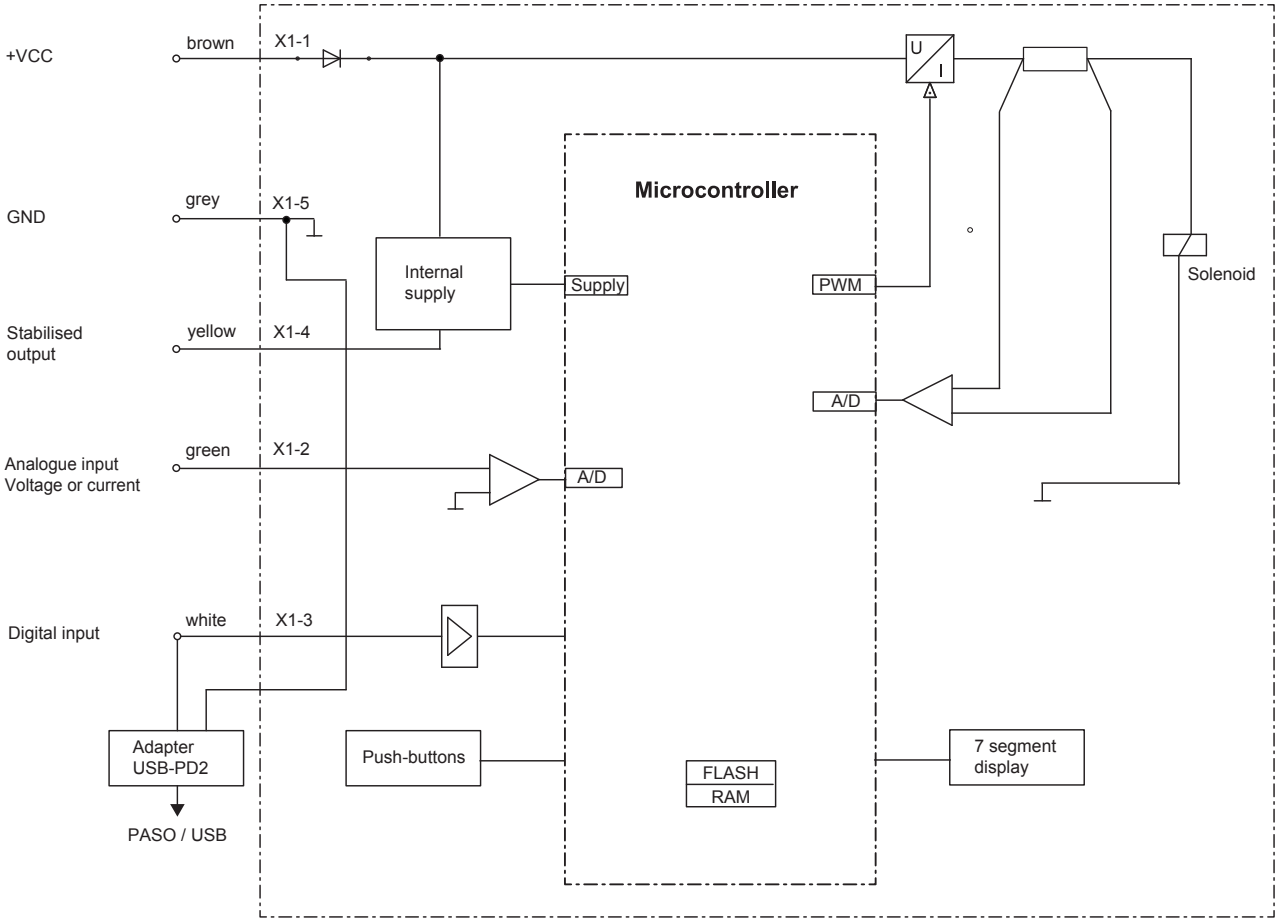
Amplifier with analogue interface

ELECTRICAL SPECIFICATIONS

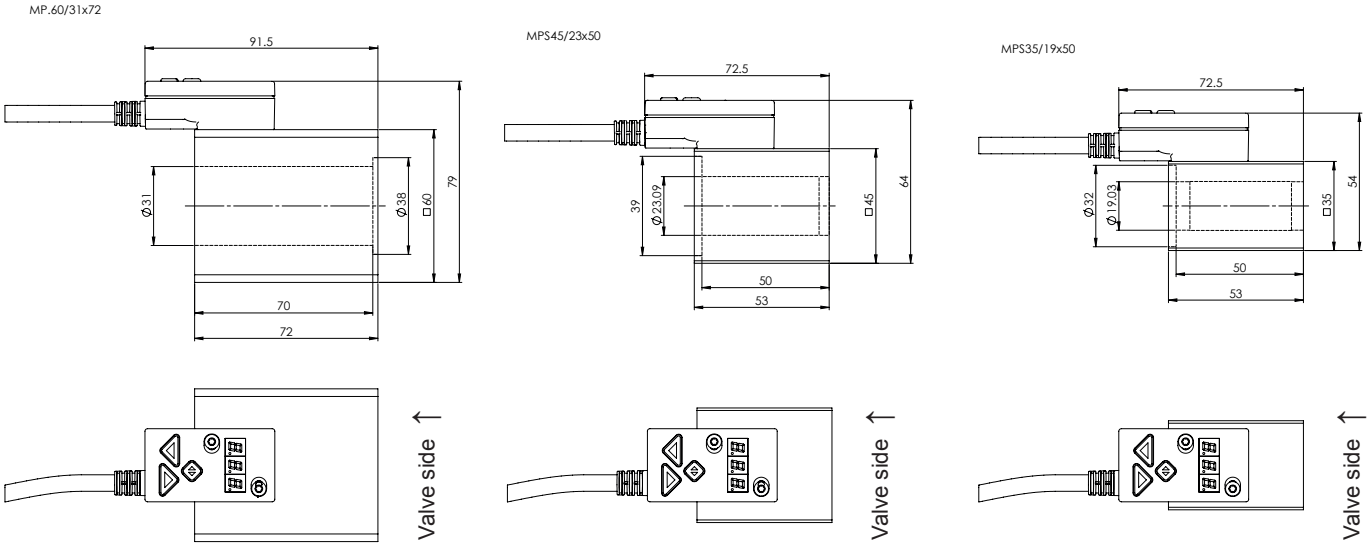
Protection class	IP 67 acc. to EN 60 529
Supply voltage	8…32 V
Residual ripple	< +/-5 %
Fuse	low
No-load current	approx. 20 mA
Max. current consumption	No-load current + 2,5 A per solenoid
Analogue input	1 input non-differential Voltage / current (switchable by means of parameter) 0...+/- 10V or 0/4...20mA
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 30 mA
• Maximal current I_{max}	Adjustable I_{min}…2450 mA MP35/19x50-..-12, Factory setting 1360 mA MP35/19x50-..-24, Factory setting 680 mA MP45/23x50-..-12, Factory setting 1490 mA MP45/23x50-..-24, Factory setting 780 mA MPS60/31x72-..-12, Factory setting 2290 mA MPA60/31x72-..-12, Factory setting 2290 mA MPS60/31x72-..-24, Factory setting 1140 mA MPA60/31x72-..-24, Factory setting 1140 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
EMV	
Immunity	EN 61 000-6-2
Emission	EN 61 000-6-4

BLOCK DIAGRAM

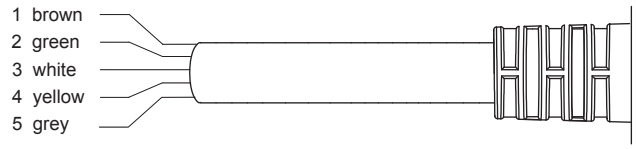


ABMESSUNGEN



CONNECTOR ASSIGNMENT

Connection cable



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

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**»

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

ADDITIONAL INFORMATION

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

ACCESSORIES

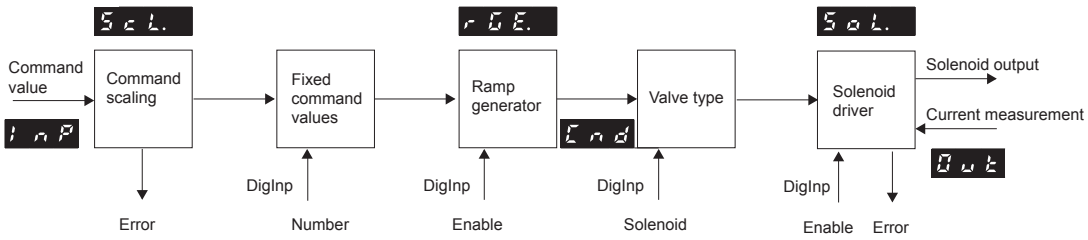
USB-adapter PD2 Article no. 726.9900
incl. USB-cable type A-B, 1,8 m
(for parameterisation via PASO)

PARAMETER SETTINGS

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)

Attention: During the communication, the digital input cannot be used.

FUNCTION DESCRIPTION



PD2-AMPLIFIER WITH ANALOGUE INTERFACE

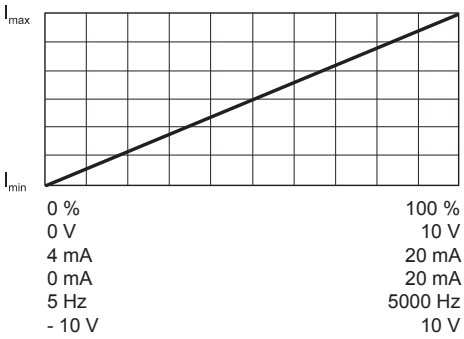
Command value scaling
The command value can be applied as a voltage, current, digital, frequency or PWM signal. The scaling takes place via the parameter "Interface". Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

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)



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.

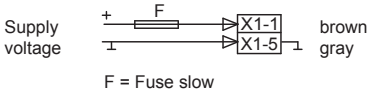
Optimisation of characteristic curve
An adjustable characteristic curve „Command value input – solenoid current output" enables an optimised (e.g. linearised) characteristic of the hydraulic system.

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.

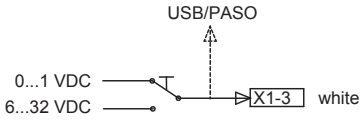
Hints:
Digital input: if not wired, the state of the digital input is not defined
Analogue input: if not wired, the voltage input will read 1.11 V constantly.

CONNECTION EXAMPLES

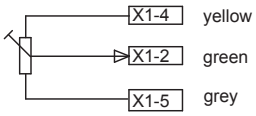
Supply voltage



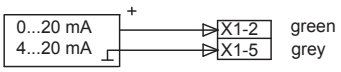
Digital input as function input



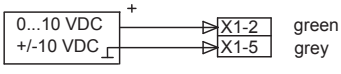
Analogue input with potentiometer



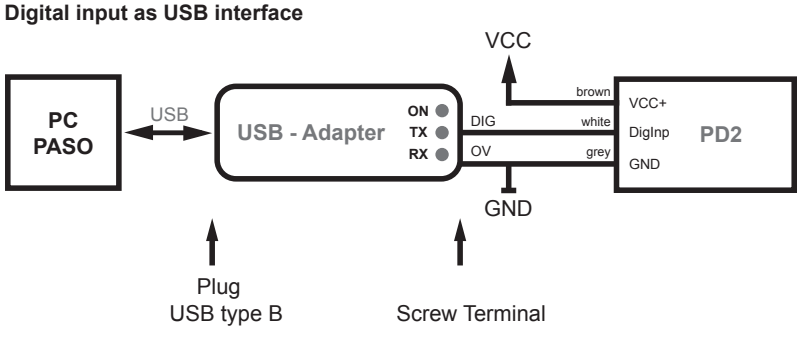
Analogue input current with external current source



Analogue input voltage with external voltage source



Digital input as USB interface

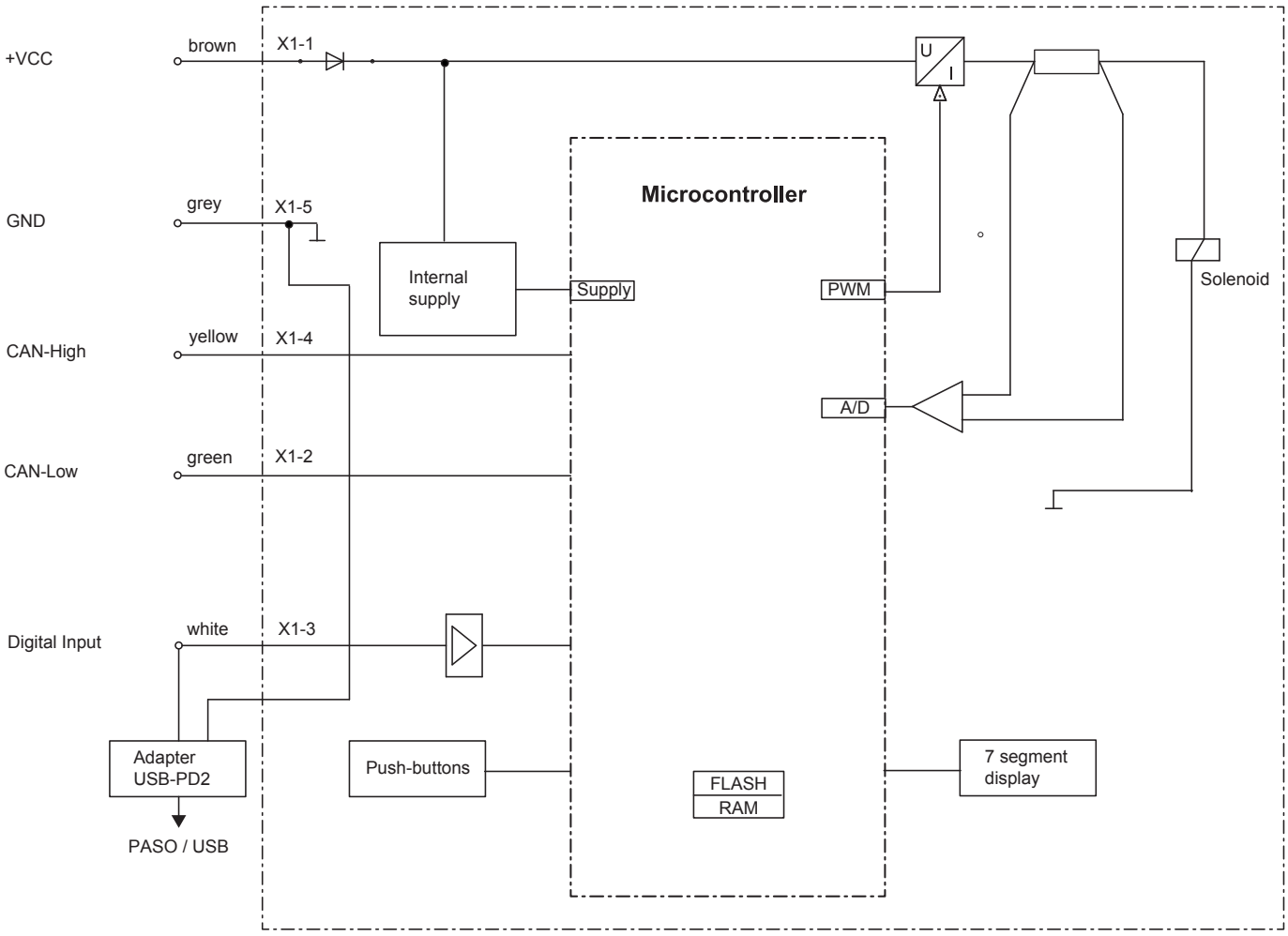


Amplifier with CANopen interface

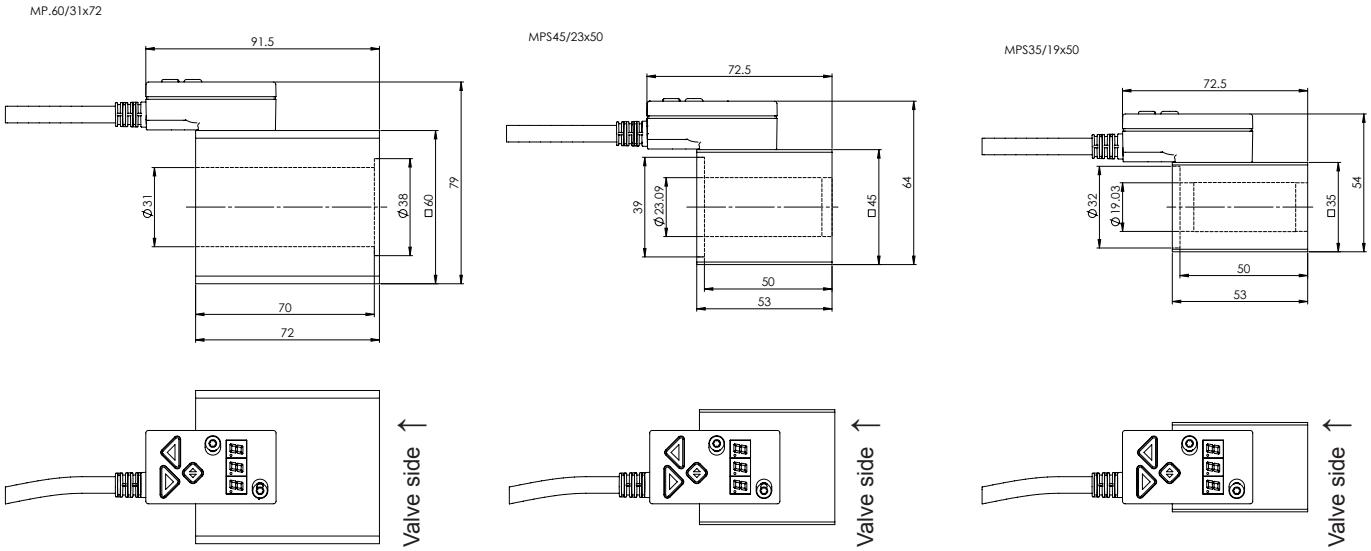
ELECTRICAL SPECIFICATIONS

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 30 mA
• Maximal current I_{max}	Adjustable I_{min}…2450 mA MP35/19x50-..-12, Factory setting 1360 mA MP35/19x50-..-24, Factory setting 680 mA MP45/23x50-..-12, Factory setting 1490 mA MP45/23x50-..-24, Factory setting 780 mA MPS60/31x72-..-12, Factory setting 2290 mA MPA60/31x72-..-12, Factory setting 2290 mA MPS60/31x72-..-24, Factory setting 1140 mA MPA60/31x72-..-24, Factory setting 1140 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
EMV	
Immunity	EN 61 000-6-2
Emission	EN 61 000-6-4

BLOCK DIAGRAM

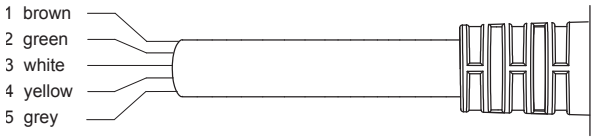


DIMENSIONS



ANSCHLUSSBELEGUNG

Anschlusskabel



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

START-UP

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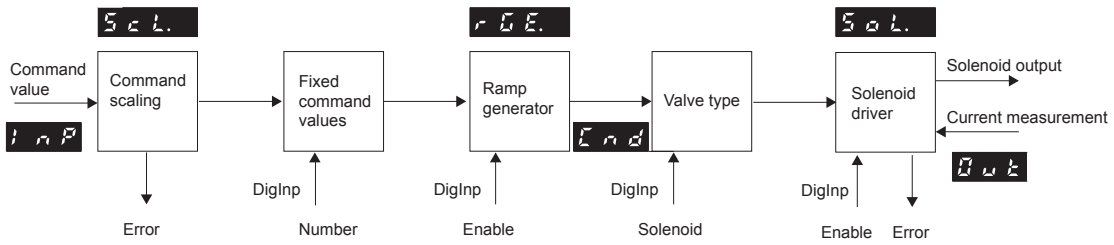


PD2-AMPLIFIER WITH CANopen INTERFACE

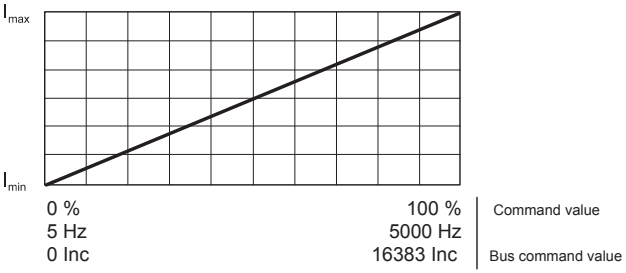
Command value scaling
The command value can be applied as a CAN-bus, digital, frequency or PWM signal. The scaling takes place via the parameter „Interface". Furthermore, the command value can be monitored for a cable break. A dead band can also be set.

Fixed command value
There is 1 fixed command value available, which can be selected via the digital input. This function has to be 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)



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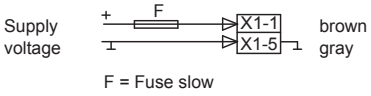
Optimisation of characteristic curve
An adjustable characteristic curve „Command value input – solenoid current output" enables an optimised (e.g. linearised) characteristic of the hydraulic system.

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.

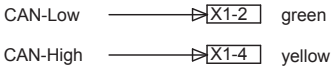
Hint:
Digital input if not wired, the state of the digital input is not defined

CONNECTION EXAMPLES

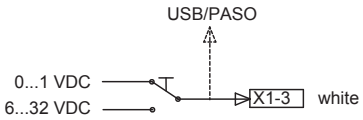
Supply voltage



CAN connection



Digital input as function input



Digital input as USB interface