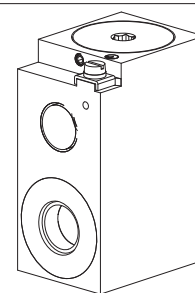


Solenoid coil MKY45/18x60
For explosion-hazard zones
Protection class IP65/66/67
Optional with integrated amplifier electronics

Ex db IIC T6, T4 Gb
Ex tb IIIC T80°C, T130°C Db
Ex db I Mb

Ex II 2 G Ex db IIC T6, T4
Ex II 2 D Ex tb IIIC T80°C, T130°C
Ex I M2 Ex db I Mb



DESCRIPTION

For explosion-hazard zones

Solenoid coil in acc. with directive 2014/34/EU (ATEX) for explosion-hazard zones.

The flameproof enclosures (acc. to EN/IEC 60079-1/31) prevents an explosion in the interior from getting outside.

The design prevents a surface temperature capable of igniting.

The steel housing is zinc-/nickel-coated

Optional with integrated amplifier electronics.

FUNCTION

In combination with an armature tube, the function of a switching solenoid or of a proportional solenoid results. Solenoid coils in AC – construction have an integrated rectifier. All cable threaded joints certified for this explosion protection class with a protection class of at least IP65 can be used.

The optional amplifier electronics have an analogue interface and can be adjusted by means of push-buttons and 7 segment display or by means of the parameterisation software PASO.

APPLICATION

The solenoid coil is suitable for use in all explosion-hazard zones, open cast and also in mines.

This signifies, that the coils are certified for applications in zones with explosion-hazard gas, steam, vapour, air and dust mixtures of the zones 1/21 and 2/22.

Valves for explosion-hazard zones are utilised in:

- the shipping- and offshore industries
- the oil- and gas industries
- the chemical industry
- wood processing
- grain mills
- the mining application

CERTIFICATES

	Surface	Mining	Standard -25°C to...	M224 -40°C to...	M238 -60°C to...	M248 Electronic
ATEX	x	x	x	x	x	x
IECEX	x	x	x	x	x	x
EAC	x	x	x	x	x	x
Australia	x	x	x	x		
MA		x	x			x

The certificates can be found on www.wandfluh.com

TYPE CODE

M K Y 45 / 18 x 60 - ☐ / ☐ / ☐ / ☐ - ☐ # ☐

Mobile execution, metal housing

Terminal box without cable

Explosion proof version Ex d

Housing width 45 mm

Internal coil diameter 18 mm

Coil length 60 mm

Nominal voltage U_N 12 VDC ☐ G 12 115 VAC ☐ R 115
 24 VDC ☐ G 24 230 VAC ☐ R 230

Nominal power P_N 6 W ☐ L 6 9 W ☐ L 9 15 W ☐ L 15 21 W ☐ L 21

Certification ATEX, IECEx, EAC ☐
 Australia ☐ AUS
 MA ☐ MA (only for G24/L15)

Cable gland ☐ M187 Thread NPT 1/2"

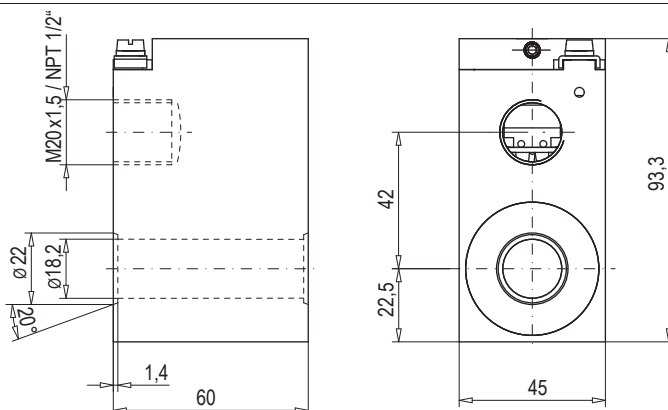
Temperature range -25 °C to ... ☐
 -40 °C to ... ☐ M224
 -60 °C to ... ☐ M238

Function Amplifier ☐ M248 only G12 or G24 / up to max. L15 / not for M238
 Freewheel diode ☐ M256 only G12 or G24 / do not use for proportional functions
 Bipolar protecting diode ☐ M264 only G24
 Power reduction ☐ M272 only L6

Design-Index (Subject to change)

DIMENSIONS

without amplifier electronics



CHARACTERISTICS

Coil winding isolation class H

Protection class

acc. to EN 60529

IP65/66/67, with corresponding cable gland with front side O-ring sealing to the housing and correct installation

Relative duty factor

100 % DF, combined with armature tube and valve

Reference temperature

Execution L6 / L9:

-25...+40 °C (operation as T1...T6/T80 °C)

-25...+90 °C (operation as T1...T4/T130 °C)

Execution L15 / L12:

Temperature range „-25° to ...“

-25...+70 °C (operation as T1...T4/T130 °C)

Temperature range „-40° to ...“

-40...+70 °C (operation as T1...T4/T130 °C)

Temperature range „-60° to ...“

-60...+70 °C (operation as T1...T4/T130 °C)

Execution L 21:

-25...+50 °C (operation as T1...T4/T130 °C)

At $U_N < 20V$ the max. ambient temperature has to be reduced by 10 °C.

Housing

Steel housing, zinc-/nickel-coated

Relative humidity factor

max. 95 % (not dew-forming)

Corrosion protection

Salt spray test in accordance with EN ISO 9227 > = 1000 hours

Maximum operating voltage

Nominal voltage +10 %

Nominal frequency

in acc. with name plate $\pm 2\%$

Standard

$U_N = 12\text{ VDC}$

nominal voltages

$U_N = 24\text{ VDC}$

$U_N = 115\text{ VAC}$

$U_N = 230\text{ VAC}$

Other nominal voltages in the ranges of 12–230 VDC and 24–230 VAC on request

Standard nominal powers

$P_N = 6\text{ W}$

with M272 $P_R = 3,8\text{ W}$

$P_N = 9\text{ W}$

$P_N = 15\text{ W}$

$P_N = 21\text{ W}$

	12 VDC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	24,75	16,5	13,5	9,9	7,1
Recommended rated current for fuse inserts (mA)	1000	1600	2000	2500	4000
Limiting current (mA)	400	610	720	960	1230
(Proportional function)					

	24 VDC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	98,5	64	49,2	38,5	27,5
Recommended rated current for fuse inserts (mA)	400	800	800	1250	2000
Limiting current (mA)	200	300	370	450	600
(Proportional function)					

	115 VAC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	1840	1180	869	700	500
Recommended rated current for fuse inserts (mA)	100	200	200	315	400

	230 VAC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	7280	4750	3370	2850	2050
Recommended rated current for fuse inserts (mA)	100	100	100	160	200

M272 reduces the nominal power (P_N) after 500ms to a reduced power (P_R)

OPERATION SECURITY



The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent.

In case of non-observance, no liability can be assumed.

A corresponding fuse in accordance with its design current has to be connected in series as short-circuit protection for every solenoid coil.

INSTALLATION

For stack assembly please observe the remarks in the operating instructions.

ACCESSORIES

– The operating instructions incl. the EC declaration of conformity for solenoid coils of the type MKY45/18x60 is supplied in German, English and French (download under www.wandfluh.com)

– Type test certifications
(download under www.wandfluh.com)

– EC-declaration of conformity
(download under www.wandfluh.com)

– Recognition of production quality assurance
QAN: SEV ATEX 4130, QAR: CH/SEV/QAR16.0001
(download under www.wandfluh.com)

With amplifier electronics and with analogue interface

Digital amplifier electronics to MKY...M248

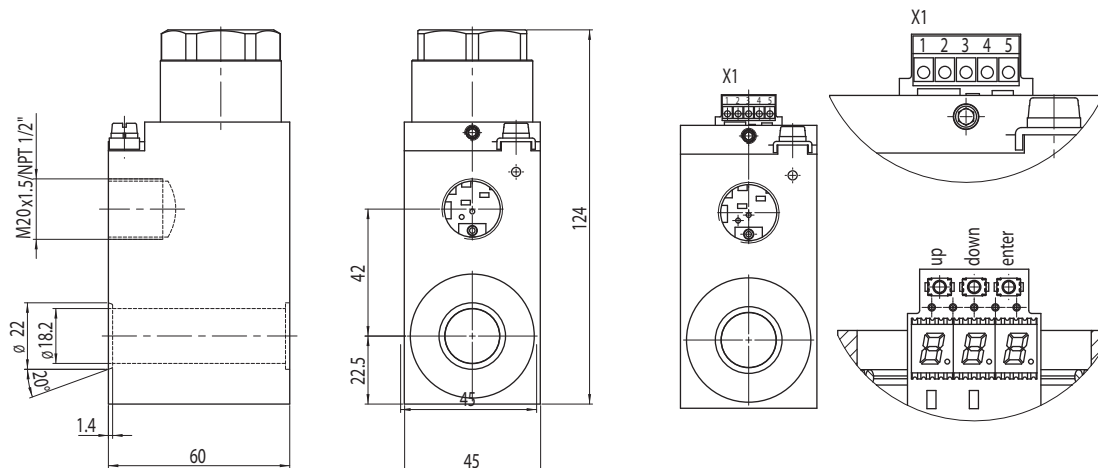
- Electronics integrated in solenoid housing
- For proportional or switching valves
- Screw terminals for simple assembly
- 1 analogue input
- 1 digital input
- Adjustable with push-buttons and display directly on the device or via PC

ELECTRICAL SPECIFICATIONS

Supply voltage	G12: 12 V +10 %, G24: 24 V +10 %		G24/L9 Adjustable I_{\min} ...510 mA
Residual ripple	< +/-5 %		Factory setting 600 mA
Fuse	low		G12/L9 Adjustable I_{\min} ...685 mA
No-load current	approx. 20 mA		Factory setting 610 mA
Max. current consumption	No-load current + limiting current of the solenoid	Dither	Frequency adjustable 4...500 Hz
Analogue input	1 input non-differential Voltage / current (switchable by means of parameter) 0...+/- 10V or 0/4...20mA	Temperature drift	Factory setting 80 Hz
Resolution	10-Bit	Digital inputs	Level adjustable 0...400 mA
Input resistance	Voltage input >100 k Ω (Input current < 5 mA)		Factory setting 150 mA
Stabilised output voltage	5 VDC max. load 20 mA		<1 % at $\Delta T = 40^{\circ}C$
Solenoid current:		USB interface	1 input high-active, no pull-up/down
• Minimal current I_{\min}	Adjustable 0... I_{\max} mA Factory setting 30 mA	EMC	Switching threshold high 6...32 VDC
• Maximal current I_{\max}	G24/L15 Adjustable I_{\min} ...510 mA Factory setting 450 mA	Immunity	Switching threshold low 0...1 VDC
	G12/L15 Adjustable I_{\min} ...1020 mA Factory setting 960 mA	Emission	Usable as frequency input (frequency 5...5000 Hz) and as PWM input (automatic frequency recognition)
			Via digital input
			Requires the Wandfluh USB adapter PD2

DIMENSIONS

with amplifier electronics



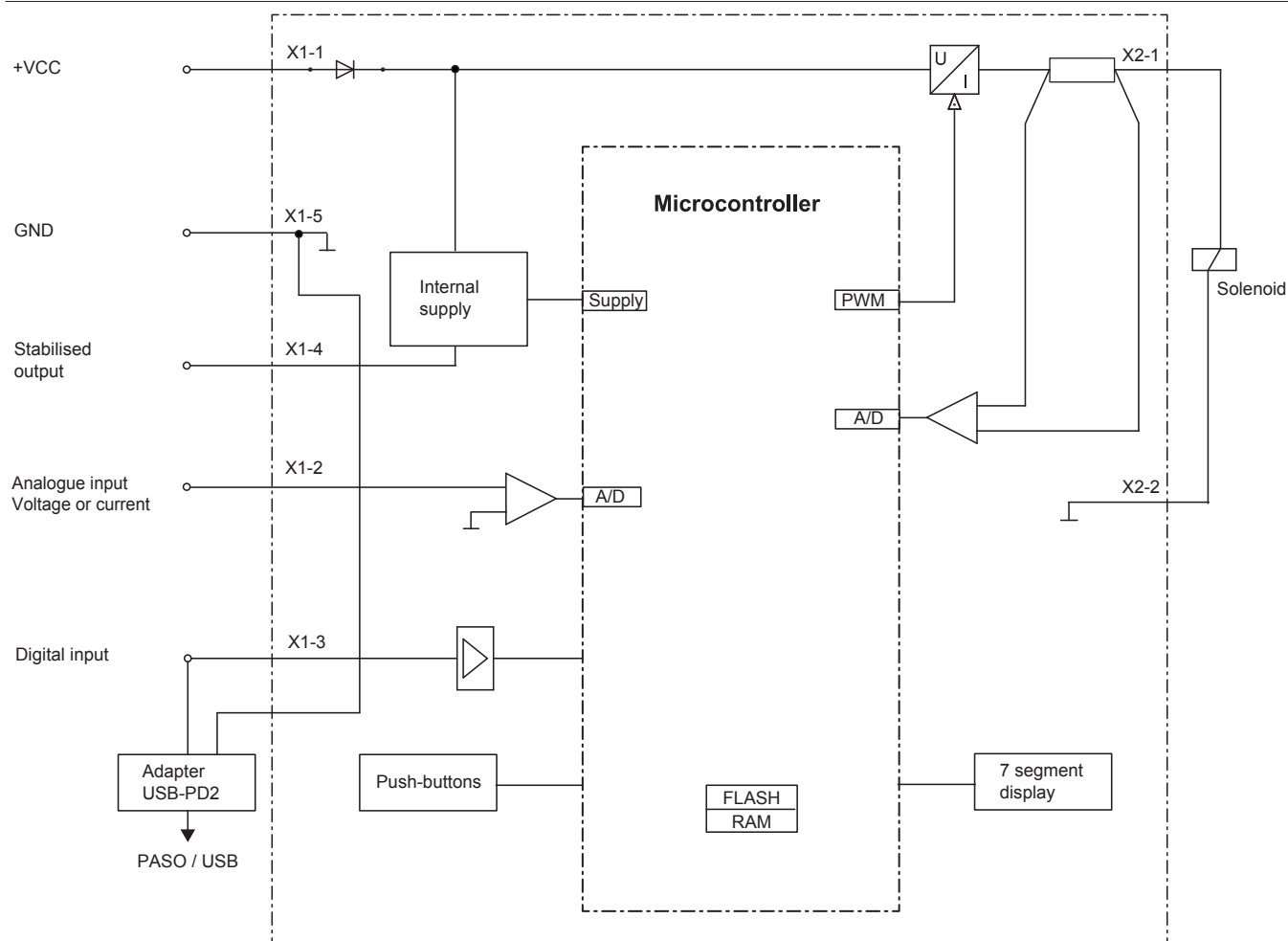
CONNECTOR ASSIGNMENT (X1)

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

GENERAL SPECIFICATIONS

Execution	Electronics board built-in directly in solenoid housing
Connections	
Screw terminal	5-pole, max 1,0 mm ²
USB interface	via connection «Digital Input» requires an additional Wandfluh adapter PD2

BLOCK DIAGRAM



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

Proportional spool valve	Wandfluh documentation register	1.10
Proportional pressure valves	register	2.3
Proportional flow control valves	register	2.6

ACCESSORIES

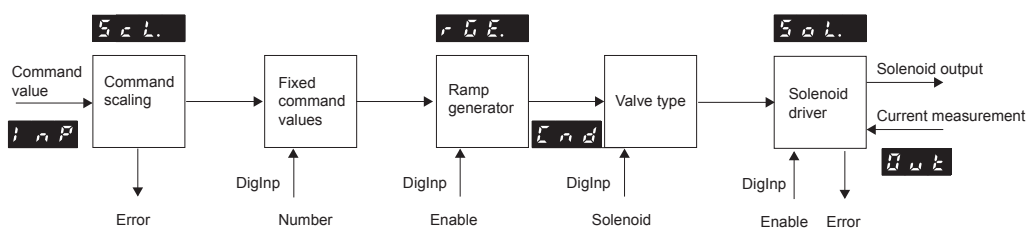
USB adapter PD2	Article no. 726.9900
incl. USB cable type A-B, 1,8 m (for parameterisation via PASO)	

PARAMETER SETTINGS

The MKY electronics have push-buttons and a 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



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 configured before in PASO.

Ramp generator

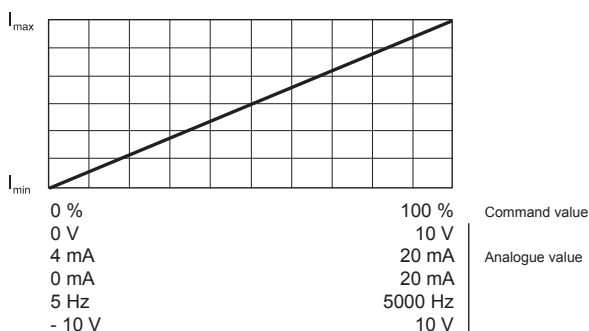
Two linear ramps for up and down are available which can be adjusted separately.

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 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 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

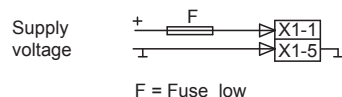
The device is enabled as per factory setting. Via PASO or menu item, the digital input can the enabling can be set „on“, „out“ or „external“ (digital input).

Hints:

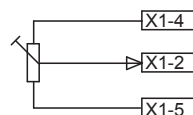
Digital input: if not wired, the state of the digital input is not defined
Analogue input: if not wired, the voltage input will read 1.11 V constantly.

CONNECTION EXAMPLES

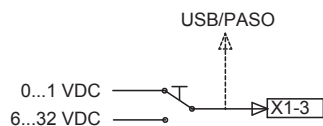
Supply voltage



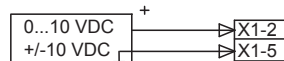
Analogue input with potentiometer



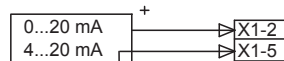
Digital input as function input



Analogue input voltage with external voltage source



Analogue input current with external current source



Digital input as USB interface

