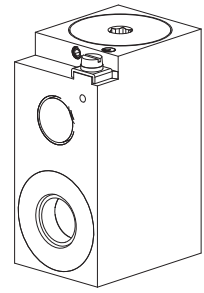


**Solenoid coil MKY45/18x60**  
**For explosion-hazard zones**  
**Protection class IP65/IP66/IP67**  
**Optional with integrated amplifier electronics**

**Ex db IIC T6, T4 Gb (Zone 1)**  
**Ex tb IIIC T80°C, T130°C Db (Zone 21)**  
**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**

**Class I, Division I, Group A, B, C, D T4**  
**Class II & III, Division I, Group E, F, G T4**


**DESCRIPTION**

Solenoid coil for explosion-hazard zones. The flameproof enclosure 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. 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.

**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.

**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 / UKEX	x	x	x	x	x	x
IECEX	x	x	x	x	x	x
USA / Canada	x		x	x	x	x
CCC	x	x	x	x	x	x
EAC	x	x	x	x	x	x
Australia	x	x	x	x		
MA		x	x			x
PESO	x		x	x	x	x

The certificates can be found on [www.wandfluh.com](http://www.wandfluh.com)

**TYPE CODE**

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

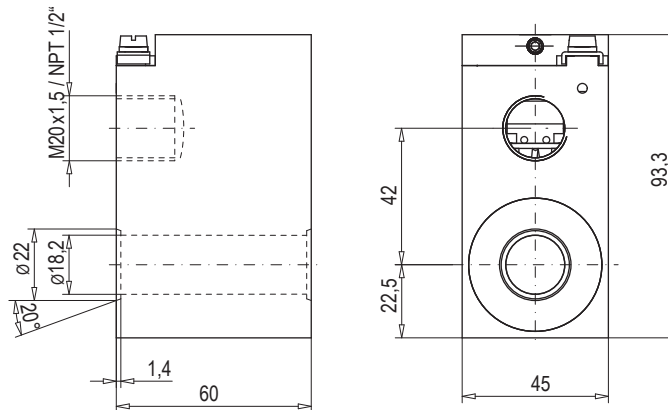
Mobile execution, metal housing	<input type="checkbox"/>					
Terminal box without cable	<input type="checkbox"/>					
Explosion proof version Ex d	<input type="checkbox"/>					
Housing width 45 mm	<input type="checkbox"/>					
Internal coil diameter 18 mm	<input type="checkbox"/>					
Coil length 60 mm	<input type="checkbox"/>					
Nominal voltage U <sub>N</sub>	12 VDC <input type="checkbox"/>	<input type="checkbox"/>	115 VDC <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	24 VDC <input type="checkbox"/>	<input type="checkbox"/>	230 VAC <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nominal power P <sub>N</sub>	6 W <input type="checkbox"/>	9 W <input type="checkbox"/>	15 W <input type="checkbox"/>	21 W <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Certification	ATEX, UKEX, IECEx, EAC, CCC <input type="checkbox"/>		USA / Canada <input type="checkbox"/>		(without M254)	
	Australia <input type="checkbox"/>		India <input type="checkbox"/>		<input type="checkbox"/>	
	MA <input type="checkbox"/>		(only G24/L15 and G24/L15-M248)			
Cable gland connection	M 20 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature range	NPT 1/2" <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	-25 °C to ... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	-40 °C to ... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	-60 °C to ... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function	Amplifier <input type="checkbox"/>	<input type="checkbox"/>	only G12 or G24 / up to max. L15 / not for M238			
	Freewheel diode <input type="checkbox"/>	<input type="checkbox"/>	only G12 or G24 / do not use for proportional functions			
	Bipolar protecting diode <input type="checkbox"/>	<input type="checkbox"/>	only G24			
	Power reduction <input type="checkbox"/>	<input type="checkbox"/>	only L6			

Design-Index (Subject to change)

1.1-183

**DIMENSIONS**

without amplifier electronics


**CHARACTERISTICS**

Coil winding isolation class H	
Protection class acc. to EN 60529	IP65/IP66/IP67, 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	<b>Execution L6 / L9:</b> -25...+40 °C (operation as T1...T6/T80 °C) -25...+90 °C (operation as T1...T4/T130 °C) <b>Execution L15 / L12:</b> 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) <b>Execution L 21:</b> -25...+60 °C (operation as T1...T4/T130 °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 ±2 %
Standard nominal voltages	U <sub>N</sub> = 12 VDC U <sub>N</sub> = 24 VDC U <sub>N</sub> = 115 VAC U <sub>N</sub> = 230 VAC Other nominal voltages in the ranges of 12–230 VDC and 24–230 VAC on request

Standard nominal powers	P <sub>N</sub> = 6 W	with M272	P <sub>R</sub> = 3,8 W
	P <sub>N</sub> = 9 W		
	P <sub>N</sub> = 15 W		
	P <sub>N</sub> = 21 W		

	12 VDC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	24,75	18,5	13,5	9,9	7,1
Minimum resistance	24	18	12,5	9,6	6,9
Recommended rated current for fuse inserts (mA)	1000	1600	2000	2500	4000
Limiting current (mA) (Proportional function)	400	610	720	960	1230
	24 VDC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	98,5	65,7	49,25	39,4	29
Minimum resistance	96	64,1	48	38,5	28,2
Recommended rated current for fuse inserts (mA)	400	800	800	1250	2000
Limiting current (mA) (Proportional function)	200	300	370	450	600
	115 VAC				
Nominal power (W)	6	9	12	15	21
Nominal resistance (Ω)	1840	1390	1125	720	517
Minimum resistance	1800	1350	1095	702	502
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	4850	3650	2910	2080
Minimum resistance	7090	4725	3541	2840	2020
Recommended rated current for fuse inserts (mA)	100	100	100	160	200

For further details see installation and operating instructions no. 990.8001.

M272 reduces the nominal power (P<sub>N</sub>) after 500ms to a reduced power (P<sub>R</sub>)  
 Values are valid at 20 °C

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

– Type test certifications  
 (download under [www.wandfluh.com](http://www.wandfluh.com))

– EC-declaration of conformity  
 (download under [www.wandfluh.com](http://www.wandfluh.com))

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

## With amplifier electronics and with analogue interface

**Digital amplifier electronics to MKY...M248**

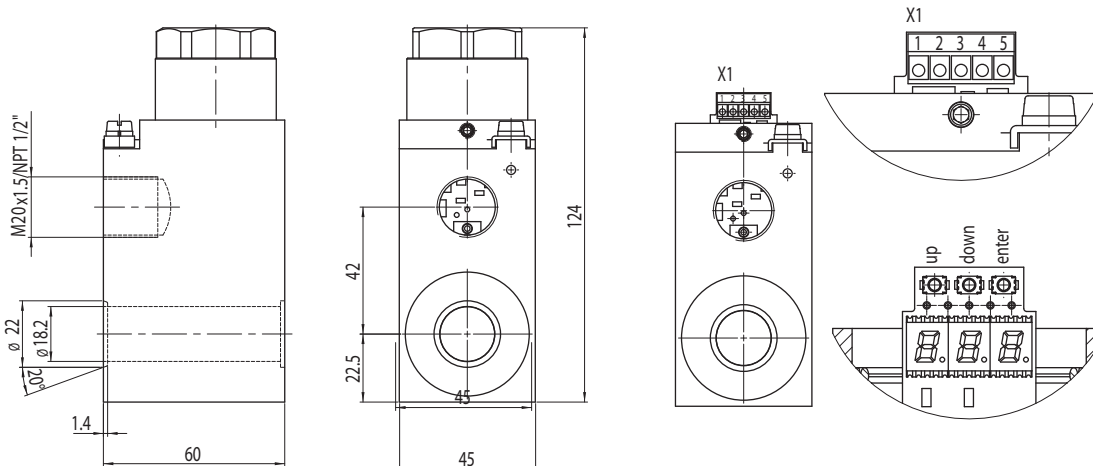
- Electronics integrated in solenoid housing
- For proportional or switching valves
- Screw terminals for simple assembly
- 1 analogue input
- 1 digital input
- Adjustable with push-buttons and display directly on the device or via PC

**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	Factory setting 80 Hz Level adjustable 0...400 mA Factory setting 150 mA
Resolution	10-Bit	Temperature drift <1 % at $\Delta T = 40^\circ C$
Input resistance	Voltage input >100 k $\Omega$ (Input current < 5 mA) Load for current input = 124 $\Omega$	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)
Stabilised output voltage	5 VDC max. load 20 mA	USB interface Via digital input Requires the Wandfluh USB adapter PD2
<b>Solenoid current:</b>		EMC
• Minimal current $I_{min}$	Adjustable 0... $I_{max}$ mA Factory setting 30 mA	Immunity
• Maximal current $I_{max}$	G24/L15 Adjustable $I_{min}$ ...510 mA Factory setting 450 mA G12/L15 Adjustable $I_{min}$ ...1020 mA Factory setting 960 mA	Emission
		EN 61 000-6-2
		EN 61 000-6-4

**DIMENSIONS**

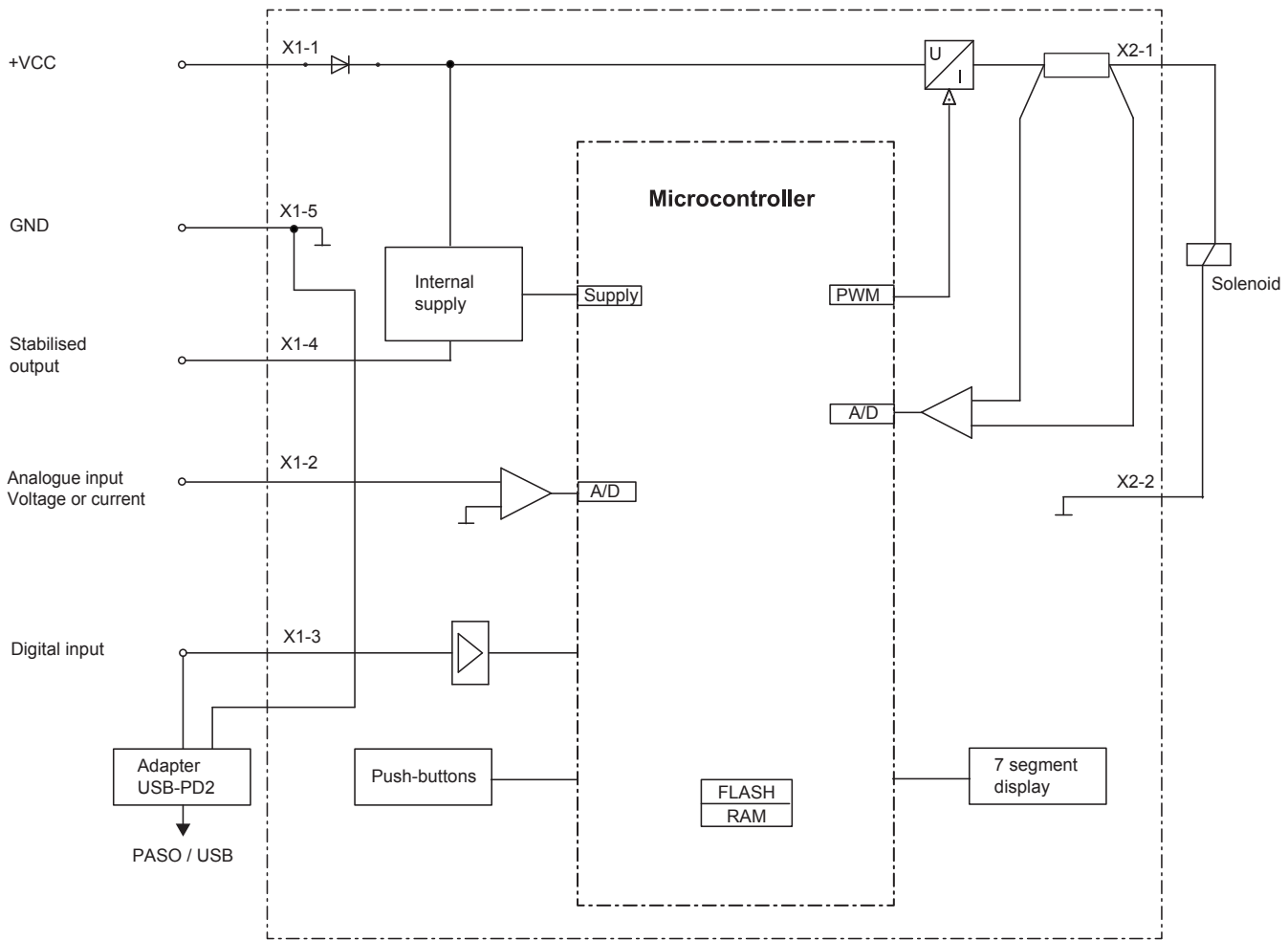
with amplifier electronics


**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	5-pole, max 1,0 mm <sup>2</sup>
Screw terminal	via connection «Digital Input»
USB interface	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](http://www.wandfluh.com)»

Free-of-charge download:

- «PASO-PD2» Parameterisation software
- Operating instruction (\*.pdf)

**ADDITIONAL INFORMATION**

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

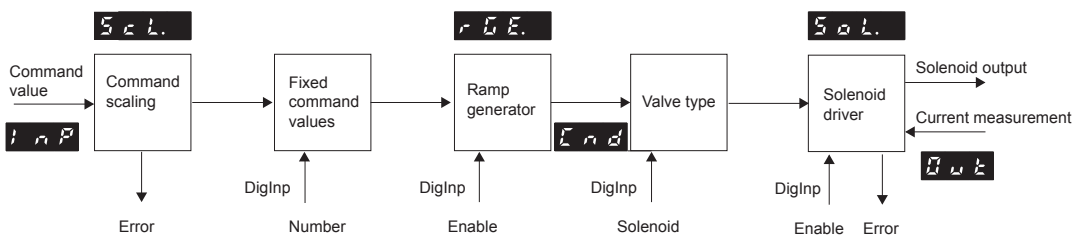
**ACCESSORIES**

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

**PARAMETER SETTINGS**

The 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**

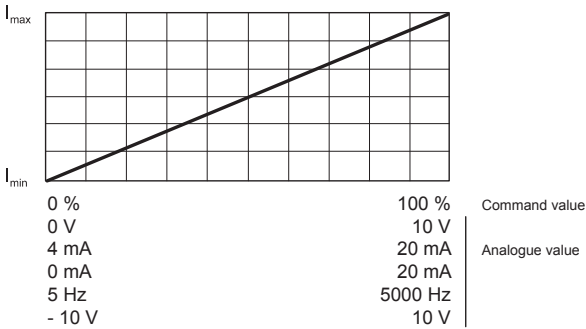
Two linear ramps for up and down are available which can be adjusted separately.

**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 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**

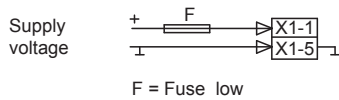
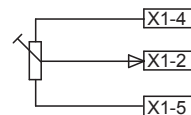
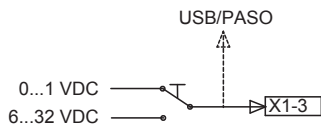
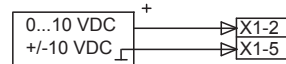
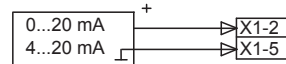
An adjustable characteristic curve „Command value input – solenoid current output“ enables an optimised (e.g. linearised) characteristic of the hydraulic system.

**Channel enabling**

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**
