

Solenoid coil MKY45/18x60
For explosion-hazard zones
Protection class IP65/IP66/IP67/IP68/IP69K
Optional with integrated amplifier
electronics

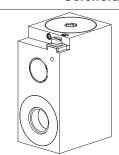
Ex db IIC T6, T4 Gb (Zone 1)
Ex tb IIIC T80°C, T130°C Db (Zone 21)
Ex db I Mb

 $\langle E_{x} \rangle$  II 2 G Ex db IIC T6, T4

⟨Ex⟩ II 2 D Ex tb IIIC T80°C, T130°C

 $\langle \mathcal{E}_{x} \rangle$  I M2 Ex db I Mb

Class I, Divison I, Group A, B, C, D, T6 or T4
Class II & III, Division I, Group E, F, G, T6 or T4



## **DESCRIPTION**

Solenoid coil for explosion-hazard zones. The flameproof enclosures 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	х	х	х	х	х	х
IECEx	х	х	х	х	х	х
USA / CANADA	х		х	х	х	х
CCC	х	Х	х	х	х	х
EAC	х	х	х	х	х	х
AUSTRALIA	х	х	х	х		
MA		х	х			х
PESO	х		х	х	х	х

The certificates can be found on www.wandfluh.com

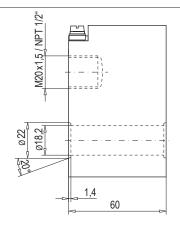
# **TYPE CODE**

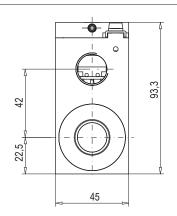
		M K Y 45 / 18 x 60 / #	<u> </u>
Mobile execution, metal hou	using		
Terminal box without cable			
Explosion proof version Ex	d		
Housing width 45 mm			
Internal coil diameter 18 mr	n		
Coil length 60 mm			
Nominal voltage U <sub>N</sub>	12 VDC G12 24 VDC G24	115 VDC R115 230 VAC R230	
Nominal power P <sub>N</sub>	5 W L5 6 W L6	9 W L9 15 W L15 21 W L21	
Certification AT	EX, UKEX, IECEx, EAC, CCC Australia MA	USA / Canada UC (without M254)  AUS India PE  MA (only G24/L15 and G24/L15-M248)	
Cable gland connection Temperature range	M 20 NPT 1/2" -25 °C to -40 °C to -60 °C to	M187 M224 M238	
Function	Amplifier Freewheel diode Bipolar protecting diode Power reduction	M248 only G12 or G24 / up to max. L15 / not for M238 only G12 or G24 / do not use for proportional functions	
Design-Index (Subject to ch	ange)		
1 1-183			



## **DIMENSIONS**

without amplifier electronics





## **CHARACTERISTICS**

Coil winding isolation class H

Protection class

acc. to EN 60529

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Relative duty factor

Reference temperature L5 / L6 L5 / L6 L9 L9 ling to the housing and correct installation 100  $\!\%$  DF, combined with armature tube

IP65/IP66/IP67/IP68/IP69K, with correpon-

ding cable gland with front side O-ring sea-

and valve

**Execution L5 / L6 / L9:** -25...+50 °C (operation as T1...T6/T80 °C)

-25...+100 °C (operation as T1...T4/T130 °C) -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...+60°C (operation as T1...T4/T130°C) Steel housing, zinc-/nickel-coated max. 95% (not dew-forming) Salt spray test in accordance with EN ISO 9227 > = 1000 hours

Corrosion protection

Maximum operating

Relative humidity factor

voltage

Housing

Nominal frequency Standard

Standard nominal voltages

Nominal voltage +10 %

in acc. with name plate  $\pm 2\%$  U<sub>N</sub> = 12 VDC

 $U_{N} = 24 \text{ VDC}$   $U_{N} = 115 \text{ VAC}$   $U_{N} = 230 \text{ VAC}$ 

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

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

Standard  $P_{N} = 5 \text{ W}$  with M272  $P_{R} = 3.8 \text{ W}$  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	18,5	13,5	9,9	7,1
Minimum resistance	24	18	12,5	9,6	6,9
Recommended rated	1000	1600	2000	2500	4000
current for fuse inserts (mA)					
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	65,7	49,25	39,4	29
Minimum resistance	96	64,1	48	38,5	28,2
Recommended rated	400	800	800	1250	2000
current for fuse inserts (mA)					
Limiting current (mA)	200	300	370	450	600
(Proportional function)					
	115 VAC				
Nominal power (W)	6	9	12	15	21
Nominal resistance $(\Omega)$	1840	1390	1125	720	517
Minimum resistance	1800	1350	1095	702	502
Recommended rated	100	200	200	315	400
current for fuse inserts (mA)					
	230 VAC				
Nominal power (W)	6	9	12	15	21
Nominal resistance $(\Omega)$	7280	4850	3650	2910	2080
Minimum resistance	7090	4725	3541	2840	2020
Recommended rated	100	100	100	160	200
current for fuse inserts (mA)					

M272 reduces the nominal power ( $P_N$ ) after 500ms to a reduced power ( $P_R$ ). M272a after 160ms. 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 MKY45/18 x 60 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

Dither

USB 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**

G12: 12 V +10 %, G24: 24 V +10 % Supply voltage

Residual ripple < +/-5%

Fuse low

No-load current approx. 20 mA Max current

consumption No-load current + limiting

current of the solenoid

Analogue input 1 input non-differential

Voltage / current (switchable by means of parameter)

0...+/- 10V or 0/4...20mA

10-Bit Resolution

Voltage input >100 kΩ Input resistance

(Input current < 5 mA)

Load for current input = 124  $\Omega$ 

5 VDC Stabilised output

max. load 20 mA voltage

Solenoid current:

Adjustable 0...I<sub>max</sub> mA Factory setting 30 mA • Minimal current I<sub>min</sub>

• Maximal current I max G24/L15 Adjustable I<sub>min</sub>...510 mA

Factory setting 450 mA

G12/L15 Adjustable I<sub>min</sub>...1020 mA

Factory setting 960 mA

G24/L9 Adjustable I<sub>min</sub>...510 mA

Factory setting 600 mA

G12/L9 Adjustable I<sub>min</sub>...685 mA

Factory setting 610 mA

Frequency adjustable 4...500 Hz

Factory setting 80 Hz Level adjustable 0...400 mA Factory setting 150 mA

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)

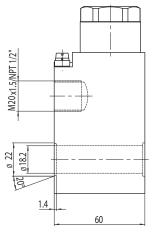
Via digital input Requires the Wandfluh USB adapter PD2

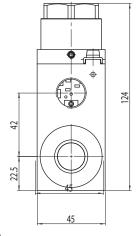
**EMC Immunity** EN 61 000-6-2

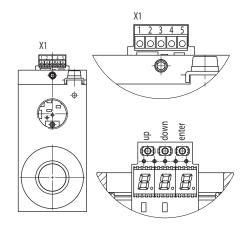
**Emission** EN 61 000-6-4

# **DIMENSIONS**

with amplifier electronics







# **CONNECTOR ASSIGNMENT (X1)**

1 = + VCC

2 = Command value

3 = Dig Inp

4 = Stab out

5 = GND

### **GENERAL SPECIFICATIONS**

Execution

Connections Screw terminal

USB interface

Electronics board built-in directly

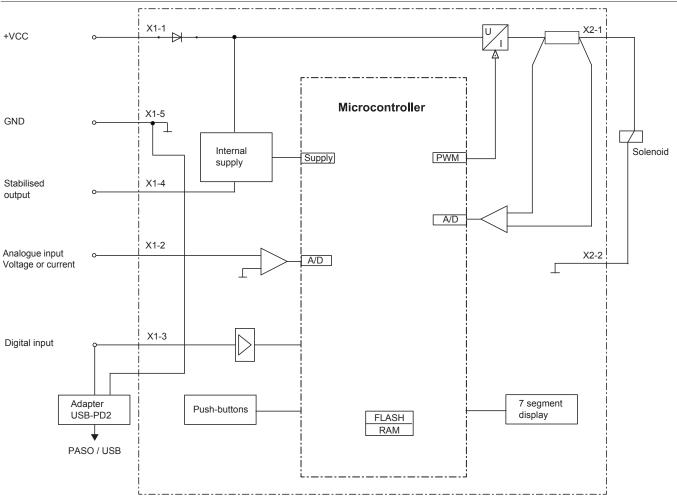
in solenoid housing

5-pole, max 1,0 mm<sup>2</sup>

via connection «Digital Input» requires an additional Wandfluh adapter PD2



## **BLOCK DIAGRAM**



#### START-UE

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

ADDITIONAL INI ONMATION					
	Wandfluh	fluh documentation			
Proportional spool valve	register	1.10			
Proportional pressure valves	register	2.3			
Proportional flow control valves	register	2.6			

#### **ACCESSORIES**

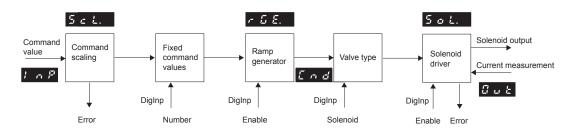
USB adapter PD2 incl. USB cable type A-B, 1,8 m (for parameterisation via PASO) Article no. 726.9900

# 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 configurated before in PASO.

# Ramp generator

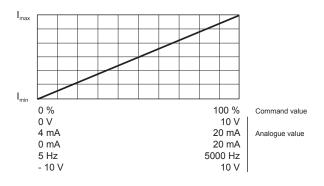
Two linear ramps for up and down are available which can be adjusted separately.

### 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

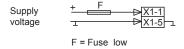
The device is enabled as per factory setting. Via PASO or menu item, the digital input can the enabling can be set "on", "out" or "external" (digital input).

#### Hints:

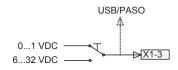
Digital input: if not wired, the state of the digital input is not defined Analogue input: if not wired, the voltage input will read 1.11 V constantly.

### **CONNECTION EXAMPLES**

## Supply voltage



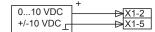
# Digital input as function input



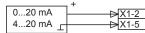
## Analogue input with potentiometer



### Analogue input voltage with external voltage source



# Analogue input current with external current source



# Digital input as USB interface

