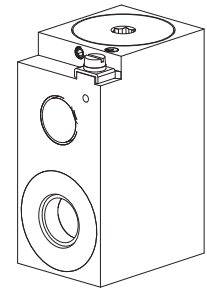


**Solenoid coil MKY45/18x60**  
**For explosion-hazard zones**  
**Protection class IP65/66/67**  
**Optional with integrated amplifier electronics**

**Ex db IIC T6/T4 Gb**  
**Ex tb IIIC IP65 T80°C/T130°C Db**  
**Ex db I Mb**

**Ex II 2 G Ex db IIC T6/T4**  
**Ex II 2 D Ex tD A21 IP65 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 bis...	M224 -40°C bis...	M238 -60°C bis...	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		
Inmetro	x	x	x	x	x	x
Nepsi	x		x	x	x	
MA		x	x			x

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

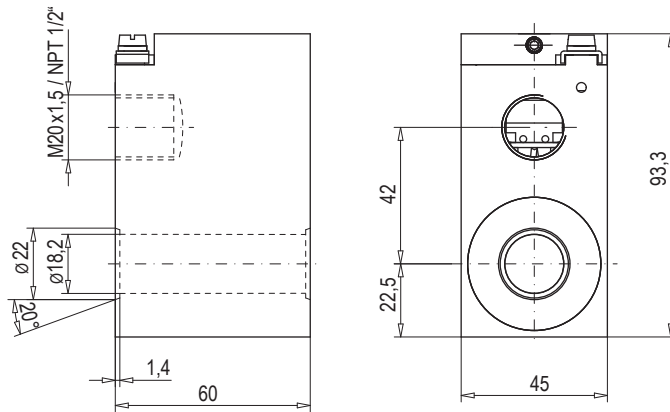
**TYPE CODE**

		M K Y 45 / 18 x 60 - <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/> - <input type="checkbox"/> # <input type="checkbox"/>					
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 <sub>N</sub>	12 VDC <input type="checkbox"/> G 12	115 VAC <input type="checkbox"/> R 115	24 VDC <input type="checkbox"/> G 24	230 VAC <input type="checkbox"/> R 230			
Nominal power P <sub>N</sub>	9 W <input type="checkbox"/> L 9	15 W <input type="checkbox"/> L 15	21 W <input type="checkbox"/> L 21				
Certification	ATEX, IECEX, EAC <input type="checkbox"/>	Australia <input type="checkbox"/> AUS	Inmetro <input type="checkbox"/> IM	NEPSI <input type="checkbox"/> NP	MA <input type="checkbox"/> MA	(only for G24/L15)	
Cable gland		<input type="checkbox"/> M187	Thread NPT 1/2"				
Temperature range	-25 °C bis ... <input type="checkbox"/>	-40 °C bis ... <input type="checkbox"/> M224	-60 °C bis ... <input type="checkbox"/> M238				
Function	Amplifier <input type="checkbox"/> M248	only G12 or G24 / up to max. L15 / not for M238					
	Freewheel diode <input type="checkbox"/> M256	only G12 or G24 / do not use for proportional functions					
	Bipolar protecting diode <input type="checkbox"/> M264	only G24					

Design-Index (Subject to change)

**DIMENSIONS**

without amplifier electronics


**CHARACTERISTICS**

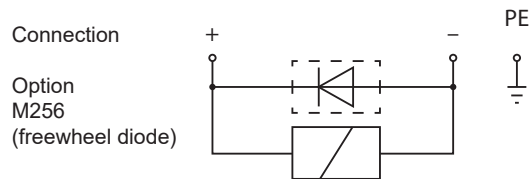
Coil winding isolation class	H
Protection class acc. to EN 60529	IP65/66/67, with corresponding cable gland and correct installation
Relative duty factor	100 % DF, combined with armature tube and valve
Reference temperature	Execution L9: -25...+40 °C (operation as T1...T6/T80 °C) -25...+90 °C (operation 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 ±2 %
Standard nominal voltages	$U_N = 12 \text{ VDC}$ $U_N = 24 \text{ VDC}$ $U_N = 115 \text{ VAC}$ $U_N = 230 \text{ VAC}$ Other nominal voltages in the ranges of 12–230 VDC and 24–230 VAC on request
Standard nominal powers	$P_N = 9 \text{ W}$ $P_N = 15 \text{ W}$ $P_N = 21 \text{ W}$

	12 VDC			
Nominal power (W)	9	12	15	21
Nominal resistance (Ω)	16,5	13,5	9,9	7,1
Recommended rated current for fuse inserts (mA)	1600	2000	2'500	4'000
Limiting current (mA) (Proportional function)	610	720	960	1'230

	24 VDC			
Nominal power (W)	9	12	15	21
Nominal resistance (Ω)	64	49,2	38,5	27,5
Recommended rated current for fuse inserts (mA)	800	800	1'250	2'000
Limiting current (mA) (Proportional function)	300	370	450	600

	115 VAC			
Nominal power (W)	9	12	15	21
Nominal resistance (Ω)	1'180	869	700	500
Recommended rated current for fuse inserts (mA)	200	200	315	400

	230 VAC			
Nominal power (W)	9	12	15	21
Nominal resistance (Ω)	4'750	3'370	2'850	2'050
Recommended rated current for fuse inserts (mA)	100	100	160	200


**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 SEV 16 ATEX 4130 (download under [www.wandfluh.com](http://www.wandfluh.com))

## With amplifier electronics and with analogue interface

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

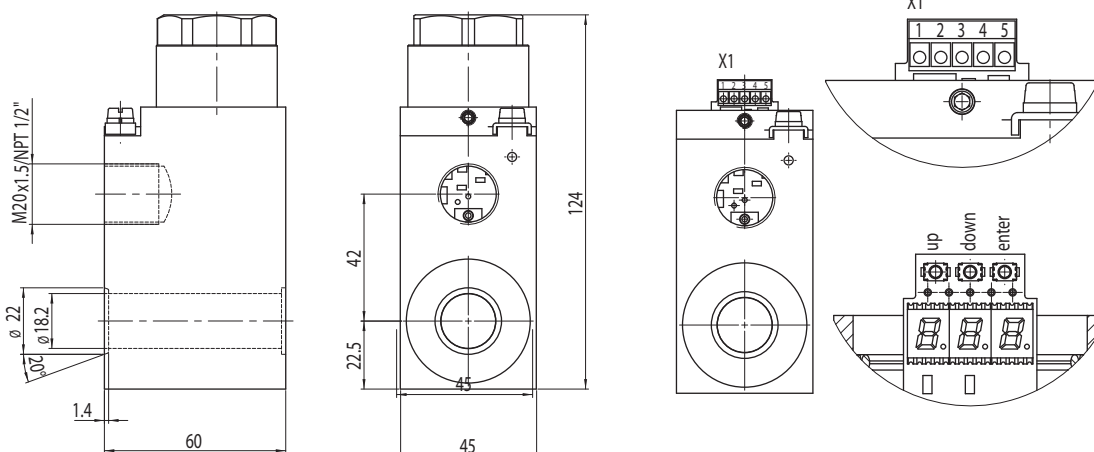
- Electronics integrated in solenoid housing
- For proportional or switching valves
- Screw terminals for simple assembly
- Protection IP 65/66/67
- 1 analogue input
- 1 digital input
- Adjustable with push-buttons and display directly on the device or via PC

**ELECTRICAL SPECIFICATIONS**

Protection class Supply voltage Residual ripple Fuse No-load current Max. current consumption Analogue input Resolution Input resistance Stabilised output voltage Solenoid current: • Minimal current $I_{min}$ • Maximal current $I_{max}$	IP65/66/67 acc. to EN 60 529 G12: 12 V +10%, G24: 24 V +10 % < +/-5 % low approx. 20 mA No-load current + limiting current of the solenoid 1 input non-differential Voltage / current (switchable by means of parameter) 0...+/- 10V or 0/4...20mA 10-Bit Voltage input >100 k $\Omega$ (Input current < 5 mA) Load for current input = 124 $\Omega$ 5 VDC max. load 20 mA Adjustable 0... $I_{max}$ mA Factory setting 30 mA G24/L15 Adjustable $I_{min}$ ...510 mA Factory setting 450 mA G12/L15 Adjustable $I_{min}$ ...1020 mA Factory setting 960 mA	G24/L9 Adjustable $I_{min}$ ...510 mA Factory setting 600 mA G12/L9 Adjustable $I_{min}$ ...685 mA Factory setting 610 mA Frequency adjustable 4...500Hz Factory setting 80Hz Level adjustable 0...400mA Factory setting 150 mA <1% at $\Delta T = 40^\circ C$ 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 Emission
	Dither Temperature drift Digital inputs USB interface EMC	EN 61 000-6-2 EN 61 000-6-4

**DIMENSIONS**

with amplifier electronics

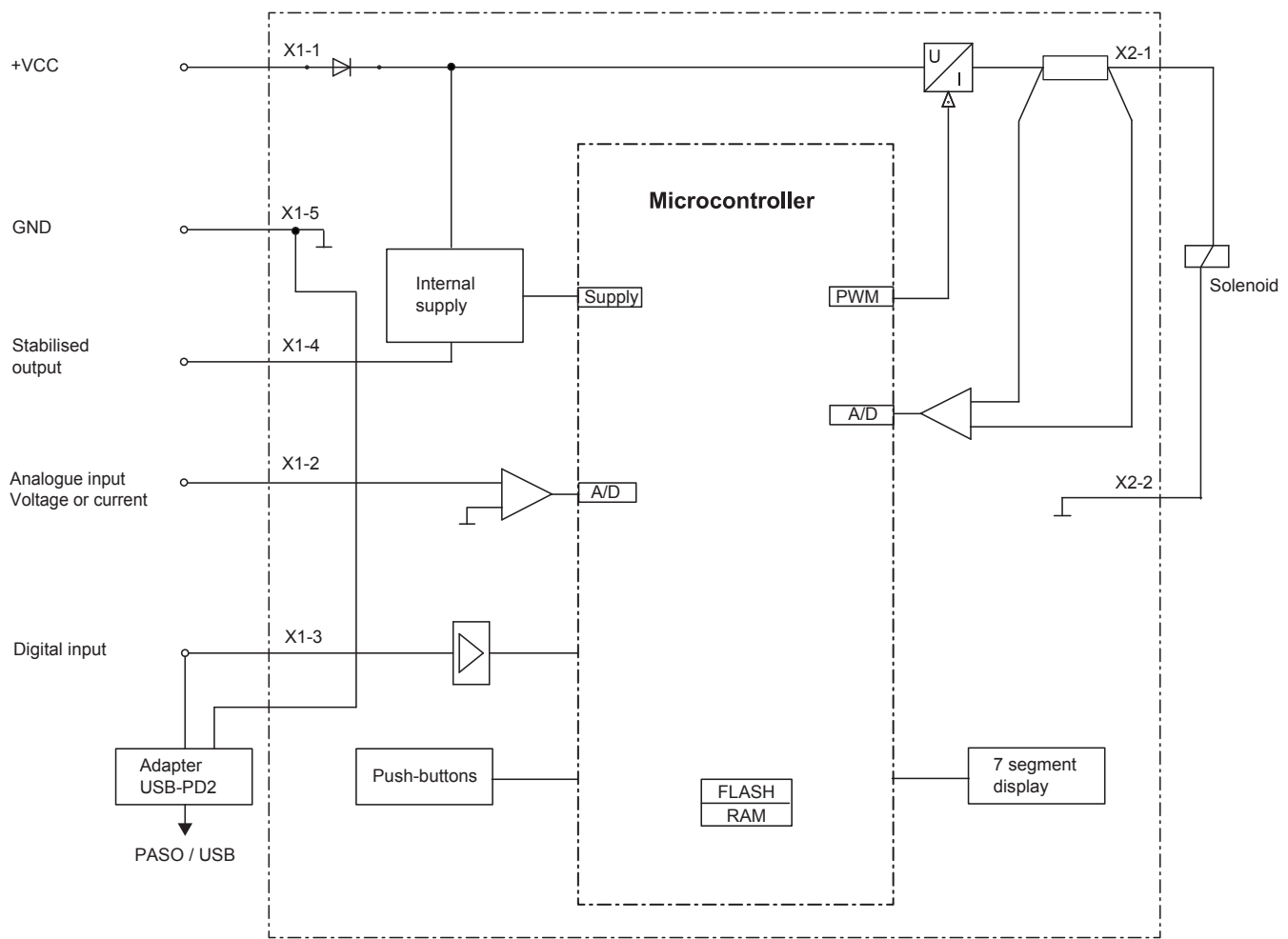

**CONNECTOR ASSIGNMENT (X1)**

- 1 = + VDC
- 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> via connection «Digital Input», requires an additional Wandfluh adapter PD2
Screw terminal	
USB interface	

**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**

Proportional spool valve  
Proportional pressure valves  
Proportional flow control valves

Wandfluh documentation	
register	1.10
register	2.3
register	2.6

**ACCESSORIES**

USB adapter PD2  
incl. USB cable type A-B, 1,8 m  
(for parameterisation via PASO)

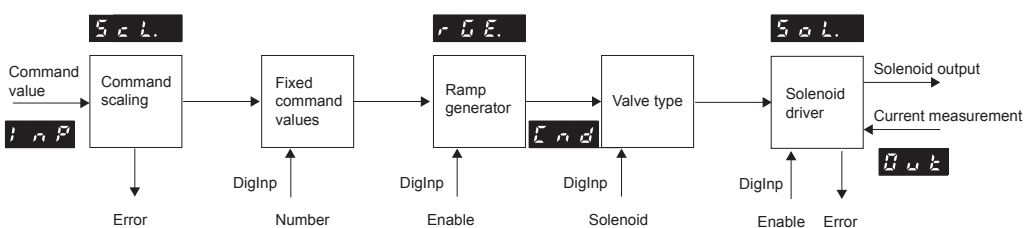
Article no. 726.9900

**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 configured before in PASO.

**Ramp generator**

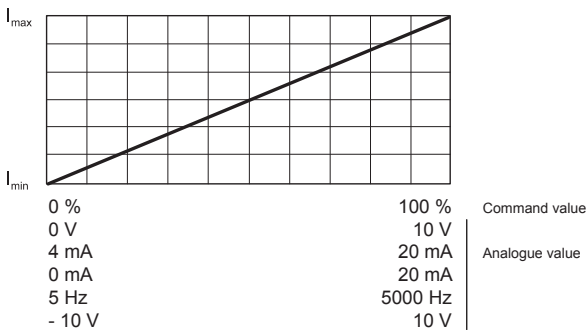
Two linear ramps for up and down are available which can be adjusted separately.

**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**

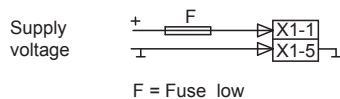
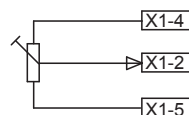
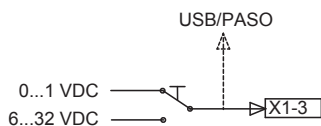
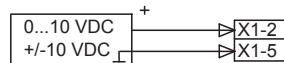
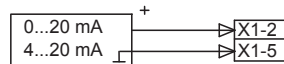
An adjustable characteristic curve „Command value input – solenoid current output“ enables an optimised (e.g. linearised) characteristic of the hydraulic system.

**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**
