



Shut-off flap valve **MAG-3 (MAG-3 BIO)**

designed to operate with gas detectors, electromagnetically triggered

2/2 way type **ZBK-50k i ZBK-100k**

Class A

Group 1

Diameters range	flanged connection DN50 i DN100	counterflanges DN32 ÷ DN100
Media	gas fuels (gases as per PN-EN 437)	

FEATURES:

- unidirectional flap valve with explosion-proof design (Ex)
- available with two types of solenoid triggers: WEx or COD-3/A
- very low flow resistance (comparable with ball valves)
- low weight (mass)
- bistable - in lack of voltage condition the valve could stay in one of stable position: **open or close**. Control voltage is necessary for valve closing only.
- opened **only** with use of special key
- closed with electrical impulse
- has the option for manual closing with bottom
- adapted for external application
- equipped with valve position sensor (indicator) -option
- conforms to **PN-EN 161:2011+A3:2013**
- meets applicable requirements of Regulation (UE) 2016/426 from 9 march 2016 year (GAR) and Directives UE: **2014/35/UE** (LVD); **2014/30/UE** (EMC) and **2014/34/UE** (ATEX)

VERSIONS:

- **MAG-3** type **ZBK-50k i ZBK-100k** - standard design
- **MAG-3 BIO** type **ZBK-50k BIO i ZBK-100k BIO** - dedicated for biogases originated from waste dumps or waste water treatment plants. All internal elements of valve were performed from materials highly resistant for corrosion.
z materiałów wysoce odpornych na korozję.

APPLICATION:

- in **Gas Safety Systems** installed: gas boiler rooms, industrial facilities, public utility buildings, domestic installations (i.e. one family houses and multi-family houses, farmsteads, private use recreational buildings), reducing-measuring stations, biogas plants, etc. itp. - **as an actuator** that surely and effectively cuts off the gas supply to faulty installations when a gas presence is detected in supervised by **System** compartments
- in gas installations supplied in conformance with appropriate regulations from low and medium pressure gas grid
- in zone 1 or 2 hazardous areas with gases and flammable vapours assigned to explosive class IIB, temperature class T1, T2, T3, T4, under condition that „**Special usage conditions (ATEX)**” will be assured
- additionally valve can be used as manual stopcock, however it can not act as gas installation **main stopcock**
- together with gas detection system, valve can perform a function of lock-up for devices that burn gas fuels and are intended for use inside the buildings and utility compartments. Such a lock-up prevents from accumulation of burning gas in mentioned buildings and compartments

TECHNICAL DATA - (also applicable for MAG-3 BIO)

Valve

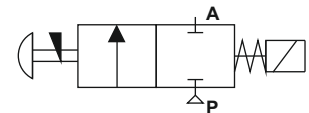
nominal diameter of valve.....	DN50	valve type	ZBK-50k
	DN100	valve type	ZBK-100k
nominal diameter of counterflanges	DN32; DN40; DN50	for ZBK-50k	
	DN65; DN80; DN100	for ZBK-100k	
explosion protection type.....	constructional safety "c"		
designation according to ATEX directive.....	II 2G c IIB T4		
maximum operating pressure.....	P _{MAX} = 5 bar		
safe static pressure	P _S = 6,5 bar		
closing time	< 1s		
ambient and media temperature	-30°C ÷ 60°C		
ambient temperature (Ex).....	-30°C ÷ 50°C		
pipe flange connection	keeps compatibility of flange connection dimensions [PN16, 01, B] in acc. with PN-EN 1092-1		
degree of protection (acc. PN-EN 60529).....	IP4X (for valve)		
mounting direction	any		

Solenoid trigger COD-3/A - powered only from module MD...Z... from GAZEX

explosion-proof construction type	reinforcement "e"
designation according to ATEX Directive....	II 2G Ex eb IIC T4 Gb
rated voltage U _N - impulse	12V ÷ 16V
ambient temperature	-30°C ÷ 50°C
operation type	impulse
degree of protection (acc. PN-EN 60529)...	IP66/67
design (integrated).....	resin-molded coil



Schematic symbol



ELECTRICAL TERMINATION

Solenoid trigger (Ex)

- a) type **COD-3/A** can be powered exclusively by control module type MD...Z... manufactured by GAZEX
- b) type **WEx** has to be powered from module MD...Z... manufactured by GAZEX, to comply with explosion-proof requirements (ATEX) in order to enable it application in zone 1 and 2 of explosion hazardous areas
- triggers has two wire, non-detachable power supply conductor (2x1,5 mm²) 2m long, conducted out of the valve through a rubber - sleeve in valve's housing
- electrical connection between the valve and the steering module should be executed with a solid-core two wire cable through an additional, leak-proof junction box with protection degree IP54 or higher. If connection is located in explosion hazardous area, explosion protected (Ex) junction box should be applied.
- connection wire size depends on the distance to module MD - see **Service Manual** of applied control module. Size and allowable length could be also determined assuming as admissible 10% voltage drop on conductor (calculated from rated voltage 12V)
- polarization of wire in conductor is indifferent

Valve closing element position indicator (Ex) - option

- limit switch has three wire (3x0,75mm²,) non detachable, **black**, connecting conductor with length of 3 m., conducted out of the valve through a rubber-sleeve in valve's housing
- change-over contact (1NO+1NC) act as connecting element



Solenoid trigger WEx

explosion-proof construction type	rugged "e"
designation acc. to ATEX Directive.....	II 2G Ex eb IIC T5 Gb
rated current - impulse	6A
rated voltage $U_{N\ pul}$ - impulse	12V DC 12V ÷ 16V
max. voltage $U_{m\ pul}$ - impulse	24V
minimal impulse time (necessary for closing the valve)	0,2s
ambient temperature range	$-30^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}/+60^{\circ}\text{C}$
operation type	impulse
control impulse parameters	see - „Special usage conditions (ATEX)“
protection degree (acc. PN-EN 60529)	IP66

ambient temperature	$-30^{\circ}\text{C} \div 50^{\circ}\text{C}$
design (integrated).....	resin-molded coil

Valve closing element indicator - option

limit switch BARTEK 07-2511-5330/01	fire-proof housing „d“ II 2G Ex d IIC T6 Gb
explosion-proof construction type.....	change-over contact (1NO+1NC)
designation acc. to ATEX directive	AC-15, DC-13
connecting element	AC-15: 1A / 250V
usage category	DC-13: 0,15A / 250V
rated connecting voltage/current	0,03A/230V (for inductive load $L/R=3\mu\text{s}$ and $T_a=40^{\circ}\text{C}$)
mechanical durability	$> 2 \times 10^6$ cycles
safety class	II
protection degree (acc. PN-EN 60529)	IP66

Special usage conditions (ATEX)

- applicable only for : natural gas, propane-butane
- when valve installed in explosion hazardous area, its housing should be connected to electrical potential equalization system of conductive parts in zone (earthing)

Valve with trigger COD-3/A

- ambient temperature range: $-30^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$
- trigger COD-3/A can be powered exclusively by control module type MD...Z... manufactured by GAZEX

Valve with trigger WEx

- 1) For ambient temperature range: $-30^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$
 - duration of single triggering impulse or sum of impulses series:

$$t_{pul} \leq 1s$$

- time interval between impulses (series of impulses):

$$t_p \geq 30s$$

- 2) For ambient temperature range: $-30^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$
 - duration of single triggering impulse or sum of impulses series:

$$t_{pul} \leq 3s$$

- time interval between impulses (series of impulses):

$$t_p \geq 60s$$

- trigger WEx has to be powered from control modules type MD...Z... manufactured by GAZEX

OVERALL DIMENSIONS (mm), WEIGHT (kg)

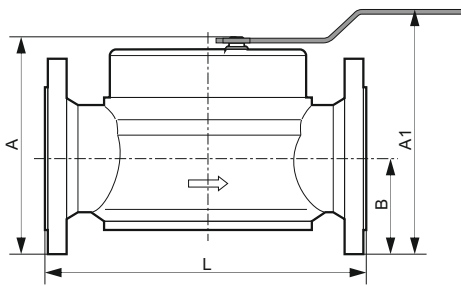


Fig. A. Flow direction →

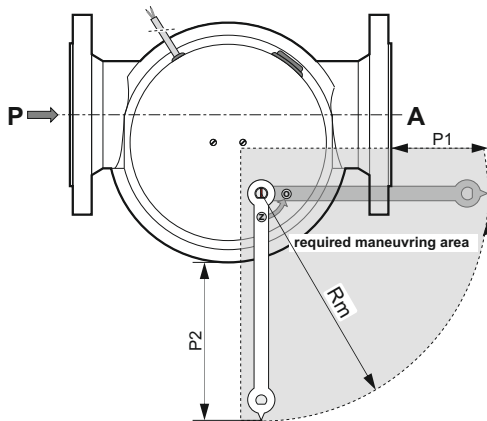
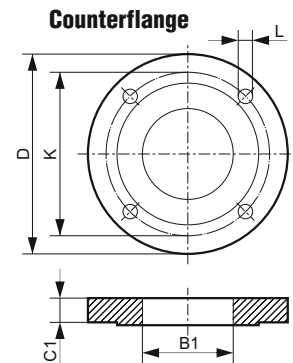
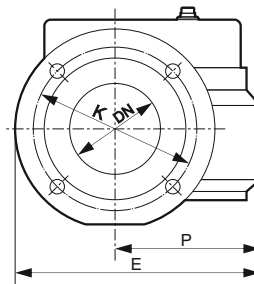
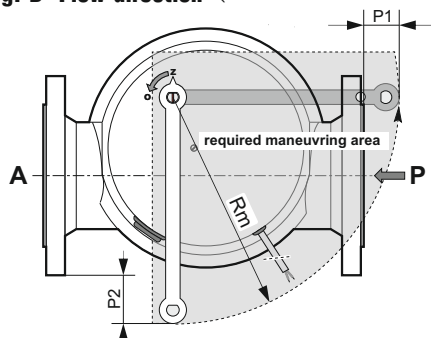


Fig. B Flow direction ←



Type		ZBK-50k*	ZBK-100k*
		flange connections [PN16, 01, B]	
Valve	DN	50	100
	K	φ125	φ180
	A	183	255
	A1	~204	~255
	B	78	103
	E	165	256
	L	230	325
	P	83	146
Fig. A	Weight	5,3	14,8
	P1	~105	~190
	P2	~150	~255
Fig. B	Rm	~197	~320
	P1	~65	~107
	P2	~72	~122
Counterflanges	Rm	~197	~317
	Nom.Diam.	DN32 DN40 DN50 DN65 DN80 DN100	
	D	φ165	φ220
	K	φ125	φ180
	L	φ18	
	B1	φ43 φ49 φ61,5 φ77 φ89 φ109	
	C1	18	
Screws	4 x M16		

(*) - also applicable for valves MAG-3 BIO

Note: For ZBK-100k* (DN100) valve only 4 flange connection screws (instead of 8) applied

CONSTRUCTION

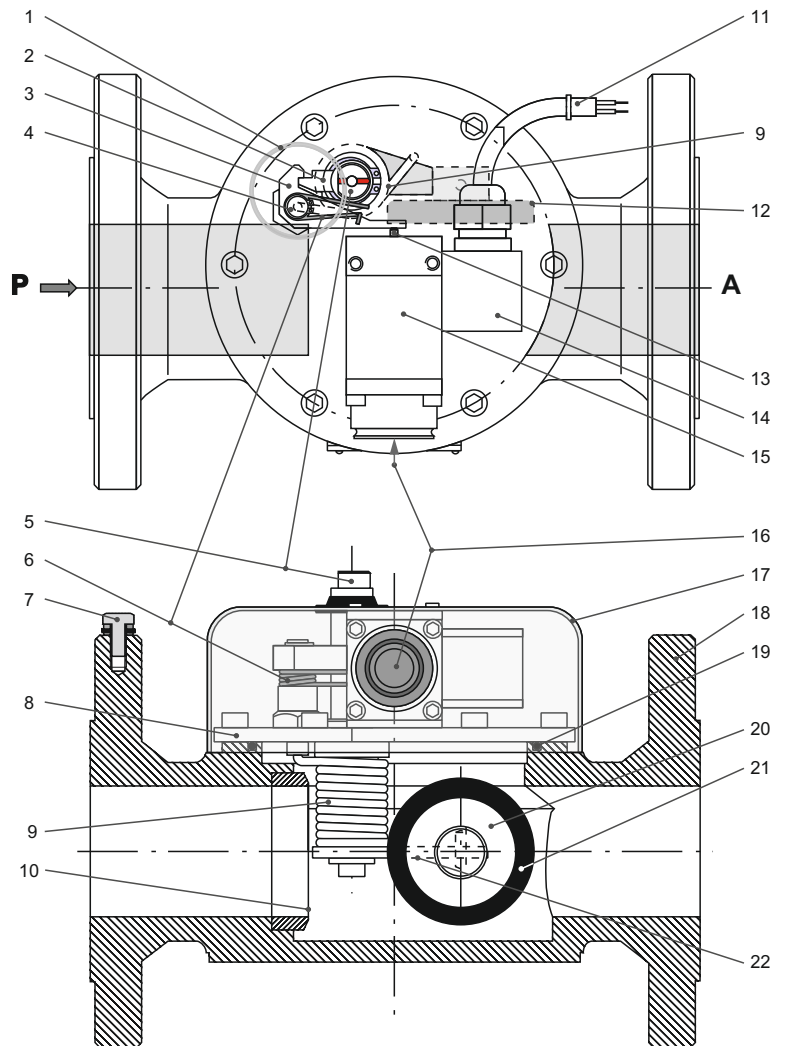
1. ratchet mechanism (control-triggering)
2. detent
3. trigger lever
4. trigger mandrel
5. straining mandrel
6. trigger spring
7. earthing clamp
8. bonnet
9. pressing spring (screw-twisting)
10. valve seat
11. power supply cable (non-detachable)
12. valve head
13. solenoid trigger movable mandrel
14. power supply socket (non-dismountable)
15. solenoid trigger
16. manual close button
17. housing
18. valve body
19. bonnet sealing ring (o-ring)
20. valve flap
21. flap gasket
22. flap lever

(*) - valve head: valve movable part shutting off gas flow

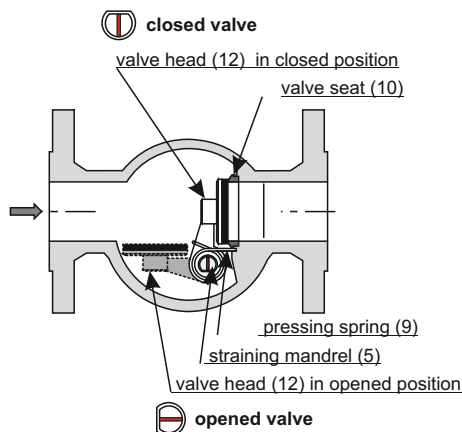
Constructional materials

valve body	aluminium alloy
bonnet	galvanized steel ⁽¹⁾
flap body	aluminium alloy
flap gasket	nitrile-butadiene rubber NBR ⁽²⁾
flap lever	galvanized steel ⁽¹⁾
pressing spring	stainless steel
trigger spring	stainless steel
valve seat	aluminium alloy ⁽¹⁾
sealing	nitrile-butadiene rubber NBR ⁽²⁾
other elements	brass, stainless steel or galvanized steel
trigger coil	copper

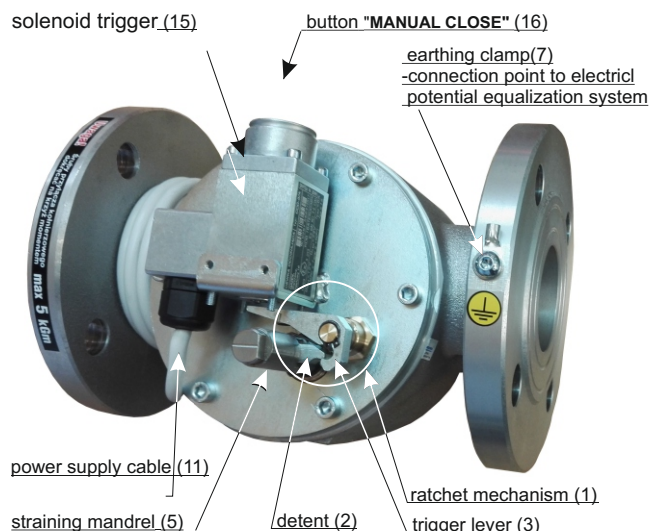
- (1) - stainless steel for valve **MAG-3 BIO**
 (2) - VITON - option for valve **MAG-3 BIO**



Valve pictorial cross-section



Valve view without housing



BASIC EQUIPMENT

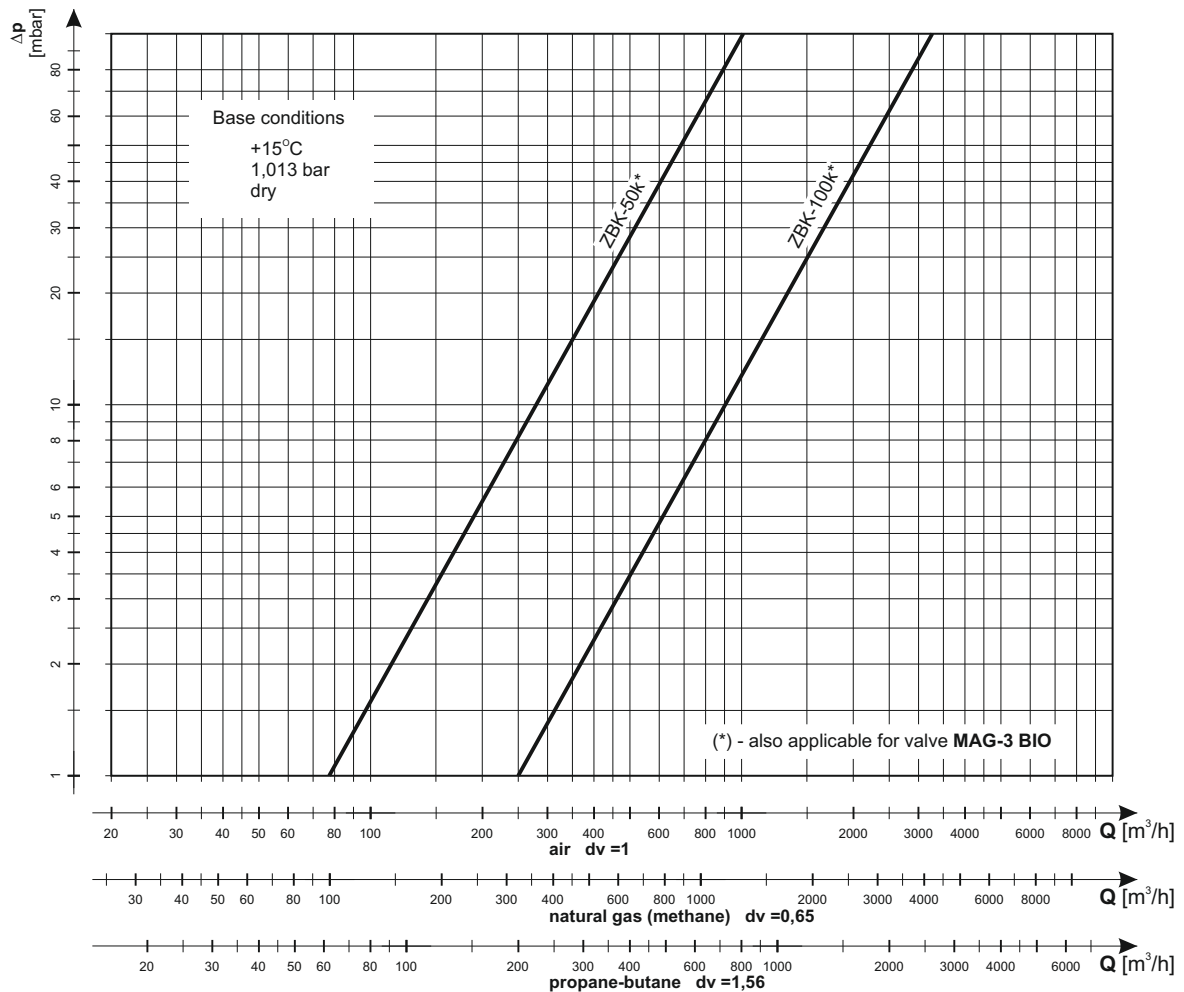
Valves MAG-3 are sold together with counterflanges .
 Available counterflanges diameters DN:

- for valve ZBK-50k ⇒ DN32, DN40, DN50
- for valve ZBK-100 ⇒ DN65, DN80, DN100

Standard kit content:

- valve + dedicated, two-sided wrench
- two counterflanges + two seals
- 8 x M16 screws with washers and nuts
- crimped-on ring terminal (6mm²) - for clamping cable connected to electrical potential equalization system of conducting parts (earthing) - required if valve application in zone 1 or 2 of explosion hazardous areas

FLOW CHARACTERISTIC



INSTALLATION - basic assembly requirements:

- valve can be installed:
 - outside the buildings - in the junction box protecting against direct influence of atmospheric factors

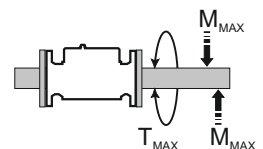
Attention! Valve is not waterproof!!!

It should be installed in such a box and in such a way that it is completely protected against dripping water during rain and snowfall.

- inside the buildings
- install downstream the main tap, upstream or downstream the gas meter (according to the gas flow arrow on the valve)
- it is necessary to anticipate and take into account the pressure surplus that may occur at the valve inlet in case of failure of components in the system located upstream the valve
- mounting position - any
- direct contact of the valve with wall, ground, etc. is unacceptable; keep the minimum distance - about 1 cm
- location of the MAG-3 valve should be selected so as to ensure free access needed to its operation (for persons authorized to do so)
- attention should be paid so that after valve installation there is enough space left (**maneuvering area**) for free operation with the attached tightening wrench, in the full rotation range necessary to open the valve
- Attention!** Valve is delivered with a dedicated wrench that enables (according to the current needs) setting the flow direction of the valve through opening valve in one of two available positions. This feature makes the adaptation of the valve to the installation much easier especially for already existing installations (see fig. A and B)
- ensure proper rigidity of the installation in the place where the valve is installed (Group 1 valve). This can be achieved by using rigid supports to the bending and torsional stress exerted by the piping system in the installation (eg due to the lack of alignment of the of the pipeline at the inlet and outlet of the valve)

- maximum moments: turning T_{MAX} and bending M_{MAX} cannot exceed the values:

	DN	50	100
T_{MAX} [Nm] $t \leq 10s$		250	400
M_{MAX} [Nm] $t \leq 10s$		520	950



- ensure that valve is mounted rigidly so as to avoid any vibration
- tighten the flange screws crosswise
- Attention:** maximum torque of **50 Nm (~5 kGm)**
- a strainer which protects from mechanical impurities should be fitted upstream the valve in the gas installation. Maximum dimension of strainer openings should not exceed 0,2 mm
- valve's assembly should be finalized with carrying out an leaktightness test of installation including **MAG-3** valve using compressed air or inert gas (oxygen use is forbidden)
Test pressure cannot exceed **$P_S = 6,5 \text{ bar}$**
- during operation valve:
 - cannot be exposed to dilatation nor dynamic forces
 - need to have ensured correct operating temperature (ambient and media)
 - should be protected against strong dustiness and water flooding

ORDERING

Necessary information while ordering valve MAG-3:

- valve type
- counterflanges diameter DN

example: MAG-3 typ ZBK-50k / DN40