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

- Designed to operate with gas detectors, electromagnetically triggered
- 2/2 way type ZBK-50k | ZBK-100k

### TECHNICAL DATA

#### 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 or opening
- Designed for external application
- Equipped with valve position sensor (indicator) - option
- Meets applicable requirements of Regulation (UE) 2016/426 from 9 March 2016 year (GAR) and Directives UE: 2014/35/UE (LV), 2014/30/UE (EMC) and 2014/34/UE (ATEX)
- Conforms to 2014/30/UE year (GAR) and Directives UE:
- ATEX directive... II 2G Ex e IIB T4
- MEETS APPLICABLE REQUIREMENTS OF REGULATION (UE) 2016/426 FROM 9 MARCH 2016 YEAR (GAR) AND DIRECTIVES UE: 2014/35/UE (LV); 2014/30/UE (EMC) AND 2014/34/UE (ATEX)
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#### VERSIONS:
- **MAG-3** type ZBK-50k | ZBK-100k - standard design
- **MAG-3 BIO** type ZBK-50k BIO | 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 II B, 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

<table>
<thead>
<tr>
<th>Nominal Diameter of Valve</th>
<th>DN50</th>
<th>DN100</th>
<th>DN32</th>
<th>DN40</th>
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<td>Closing Time</td>
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<td>Ambient and Media Temperature</td>
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<td>Pipe Flange Connection</td>
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<td>Degree of Protection</td>
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<td>Mounting Direction</td>
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#### Solenoid trigger COD-3/A

- Powered only from module MD...Z...
- Manufactured by GAZEX
- Can be powered exclusively by control module type MD...Z...
- Equipped with valve position sensor (indicator) - option
- Meets applicable requirements of Regulation (UE) 2016/426 from 9 March 2016 year (GAR) and Directives UE: 2014/35/UE (LV); 2014/30/UE (EMC) and 2014/34/UE (ATEX)

#### ELECTRICAL TERMINATION

- **Solenoid trigger (Ex)**
  - a) Type COD-3/A can be powered exclusively by control module type MD...Z...
  - 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 have 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 admissible10% 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

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MAG-3 - data sheet
release 02/2019/KK

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**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 $\div$ 16V
- max. voltage $U_{m,pul}$ - impulse: 24V
- minimal impulse time (necessary for closing the valve): 0.2s
- ambient temperature range: -30°C $\leq$ $Ta$ $\leq$ +50°C/$+60°C
- operation type: impulse
- control impulse parameters: see "Special usage conditions (ATEX)"
- protection degree (acc. PN-EN 60529): IP66
- ambient temperature: -30°C $+$ 50°C
- design (integrated): resin-molded coil

**Valve closing element indicator** - option

- limit switch: BARTEK 07-2511-5330/01
- explosion-proof housing: "d" fire-proof housing
- change-over contact: (1NO+1NC)
- AC-15: DC-13... AC-15: 1A / 250V... DC-13: 0.15A / 250V... 0.03A/230V (for inductive load $L/R=3\mu s$ and $Ta=40°C$)
- mechanical durability: $> 2 \times 10^6$ cycles
- safety class: II
- protection degree (acc. PN-EN 60529): IP66

**OVERALL DIMENSIONS (mm), WEIGHT (kg)**

![Fig. A. Flow direction](image1)

![Fig. B. Flow direction](image2)

**Valve with trigger COD-3/A**

- ambient temperature range: $-30°C \leq Ta \leq +50°C$
- 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: $-30°C \leq Ta \leq +60°C$
   - duration of single triggering impulse or sum of impulses series: $t_{pul} \leq 1s$
   - time interval between impulses (series of impulses): $t_{pul} \geq 30s$
2. For ambient temperature range: $-30°C \leq Ta \leq +60°C$
   - duration of single triggering impulse or sum of impulses series: $t_{pul} \leq 3s$
   - time interval between impulses (series of impulses): $t_{pul} \geq 60s$
   - trigger WEx has to be powered from control modules type MD...Z... manufactured by GAZEX

**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: $-30°C \leq Ta \leq +50°C$
- trigger COD-3/A can be powered exclusively by control module type MD...Z... manufactured by GAZEX

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

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**MAG-3 - data sheet**

**release 02/2019/KK**

**page 2/4**
CONSTRUCTION

1. ratchet mechanism (control-trigging)
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 movable part shutting off gas flow

Constructional materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve body</td>
<td>Aluminium alloy (1)</td>
</tr>
<tr>
<td>Bonet</td>
<td>Galvanized steel (1)</td>
</tr>
<tr>
<td>Flap body</td>
<td>Aluminium alloy (2)</td>
</tr>
<tr>
<td>Flap gasket</td>
<td>Nitrile-butadiene rubber NBR (2)</td>
</tr>
<tr>
<td>Flap lever</td>
<td>Galvanized steel (1)</td>
</tr>
<tr>
<td>Pressing spring</td>
<td>Stainless steel (1)</td>
</tr>
<tr>
<td>Trigger spring</td>
<td>Stainless steel (1)</td>
</tr>
<tr>
<td>Valve seat</td>
<td>Aluminium alloy (1)</td>
</tr>
<tr>
<td>Sealing</td>
<td>Nitrile-butadiene rubber NBR (2)</td>
</tr>
<tr>
<td>Other elements</td>
<td>Brass, stainless steel or galvanized steel</td>
</tr>
<tr>
<td>Trigger coil</td>
<td>Copper</td>
</tr>
</tbody>
</table>

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

Valve pictorial cross-section

- Closed valve
  - Valve head (12) in closed position
  - Valve seat (10)
- Opened valve
  - Pressing spring (9)
  - Straining mandrel (5)
  - Valve head (12) in opened position

Valve view without housing

- Solenoid trigger (15)
- Button "MANUAL CLOSE" (16)
- Earthing clamp (7)
- Connection point to electrical potential equalization system

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**

Base conditions:
- +15°C
- 1,013 bar dry

![Graph showing flow characteristic with data points for air, natural gas (methane), and propane-butane]

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

**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 building:
  - If necessary, take into account the pressure surplus that may occur at the valve inlet in case of failure to 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 (e.g., 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:

  - For DN 50: $T_{MAX} = 250$ Nm, $M_{MAX} = 520$ Nm
  - For DN 100: $T_{MAX} = 400$ Nm, $M_{MAX} = 950$ Nm

- 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 airtightness test of installation including MAG-3 valve using compressed air or inert gas (oxygen use is forbidden)
- Test pressure cannot exceed $P_{MAX} = 6.5$ 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

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**Release 02/2019/KK**

**MAG-3 - data sheet**

**Page 4/4**