At a certain time (depending on the type of media, its contamination and local operating conditions), the valve should be partially dismantled for cleaning and maintenance of its internal parts. Performing these activities should be entrusted to the manufacturer’s service department or a person with appropriate qualifications. The re-commissioning

11. Standard kit content
Valves MAG-3 are sold together with counterflanges. Standard kit includes:
- 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

Available counterflanges diameters DN:
- for valve ZBK-50k ⇒ DN32, DN40, DN50
- for valve ZBK-100 ⇒ DN65, DN80, DN100

12. Accessories - option (available on order)
- valve closing element position indicator
- colour

13. Storage guidelines
Valve should be stored in a dry place, in a vibration, dust or gas and noxious fumes free environment. The storage room’s temperature should not be lower than +5°C.

14. Overall dimensions (mm); Weight (kg)

<table>
<thead>
<tr>
<th>Type</th>
<th>ZBK-50k</th>
<th>ZBK-100k</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>K</td>
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<td>A</td>
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<td>A1</td>
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<td>~255</td>
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<td>146</td>
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<tr>
<td>P1</td>
<td>~105</td>
<td>~190</td>
</tr>
<tr>
<td>P2</td>
<td>~150</td>
<td>~255</td>
</tr>
<tr>
<td>Rm</td>
<td>~197</td>
<td>~320</td>
</tr>
<tr>
<td>Weight</td>
<td>5.3</td>
<td>12.8</td>
</tr>
</tbody>
</table>

(*) connecting flanges - see p. 3. Data sheet (**) see also fig. A and B (page 6)

ATTENTION: For ZBK-100k (DN100) valve only 4 flange connection screw holes applied
1. Description

Shut-off valve MAG-3 is a full flow, quick-closing flap valve designed to operate with gas detectors (detection systems).

The valve can only be opened manually, however it may be closed either by an electrical impulse (or manually by a dedicated button).

The valve does not require power supply either in opened or closed position. In operating mode the valve is fully opened allowing an unrestricted medium passage. The valve is triggered filling in a cylinder of the gas supply to the installation immediately by an electrical impulse from the detection system sensing the gas presence in protected areas. The impulse is only generated when the gas concentration exceeds a predefined level.

MAG-3 valve features:
- 2/2-way, flap, unidirectional, intended to use in explosion hazardous areas (Ex)
- available with two types of solenoid triggers: WEx or COD-3/A
- Construction and principle of operation
- Electrical connection
- Flow characteristic

1.1. Special conditions of use (ATEX)

Applicable only for: natural gas, propane-butane.
When valve installed into explosion hazardous area, its housing should be connected to electrical potential equalization system of conductive parts in zone (earthing) - see p. 7.1.

A) Valve with solenoid trigger WEx (information on valve MAG-3 housing label)
1) Ambient temperature range: -30°C ≤ Ta ≤ 60°C
   Duration of single triggering impulse or sum of impulses series:
   \[ t_{\text{up}} ≤ 1\text{s} \]  Time interval between impulses or series of impulses \[ t ≥ 10\text{s} \]
   B) Ambient temperature range: -30°C ≤ Ta ≤ 50°C
   Duration of single triggering impulse or sum of impulses series:
   \[ t_{\text{up}} ≤ 3\text{s} \]  Time interval between impulses or series of impulses \[ t ≥ 60\text{s} \]
   Trigger WEx has to be powered from control modules type MD...Z... manufactured by GAZEX.

B) Valve with solenoid trigger COD-3/A (information on valve MAG-3 housing label)
Ambient temperature range: -30°C ≤ Ta ≤ 50°C.
Trigger COD-3/A can be powered exclusively by control module type MD...Z... manufactured by GAZEX.

2. Application

- in Gas Safety Systems installed in: gas boiler rooms, industrial facilities, public utility buildings, domestic installations (i.e. one family houses and multi-family houses, farmsteads, private use recreational buildings), gas reduction - measuring stations, etc. i.e. 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

7.1. Installation in explosive hazardous area - additional requirements

- valve body should be connected to electrical potential equalization system of conductive parts (earthings) could be done in one of possible ways:
  - a) by use of conductor with cross section of 4 mm², connected to dedicated earthing clamp (12) on valve body
  - b) by a permanent mechanical connection (also ensuring reliable and permanent electrical contact) of the valve body with an external structural element, electrically connected in a reliable and durable manner with such a potential equalization system.

8. Setting up procedure - opening the valve

Attention! The valve is delivered in closed state.
- check if the valve is closed, the red marker on the stretching pin should be in perpendicular position to the arrow indicating direction of the flow.
- put the proper end of the wrench on straining mandrel:
  - "arrow" on the wrench end indicates "Z" (see fig. A) in "hole" on the end of the wrench "Z" is located (see fig. B)
  - open the valve by rotating the wrench in accordance with the direction indicated by arrow "L" and inscription "OPENING" (counterclockwise), till the valve’s internal mechanism is interlocked in "O" position by a latch.
- remove the wrench from a straining mandrel

The wrench should be kept in a dedicated place, available only for authorized personnel.
- the valve is ready to operate when the red marker on stretching pin is in a parallel position with the arrow indicating the direction of the flow.

Attention! The wrench must not be left on a straining mandrel, it can be located there only during opening the valve procedure.
- removing the wrench on straining mandrel can cause serious damage to health of all who are near the installation while valve receives a „close” signal
- under no circumstances force attempting of manual movement with a wrench key (not related to opening the valve) - beyond the extreme "O" and "Z" positions are not allowed.

This may damage the ratchet mechanism and result in the loss of warranty rights.

9. Valve manual closing

The valve construction enables its manual closing, without electrical impulse generated by gas leak detection system. For this purpose:
- press button (2) "MANUAL CLOSE" located on the housing

Attention! The valve cannot be closed using the wrench - see p. 8.2

10. Periodical inspection and service

The flap MAG shut-off valve is a device that does not require other maintenance activities other than operation ones. It also does not require interference in internal mechanisms - the housing has been sealed. It is only necessary to take care of periodic removal of accumulated dust, at least during periodical inspections of correctness of operation.

Checking the correct operation of the valve consists of two attempts to close the valve:
- the signal generated by the System (detector, control module). The method of performing this test is given in the Safety System Operation Manual by the manufacturer of this system
- by a dedicated earthing clamp (12) on valve body

After re-opening the valve according to the procedure described in point 8, it can be considered that the MAG valve is working properly and is ready for operation.

Required frequency of periodical inspections:
- after the first month of operation
- then around every 3 months, but not longer than every 6 months

<table>
<thead>
<tr>
<th>Torque [Nm]</th>
<th>DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>
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

assembly should be performed in professional way with use of proper tools

- install downstream the main tap, upstream or downstream the gas meter

- assembly to installation according to the gas flow arrow on 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!**

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)

> **Fig. A**<br>
> **Fig. 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)
- ensure that the valve is mounted rigidly so as to avoid any vibration
- no part of the valve should be used as a lever to facilitate the installation
- 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
- it is required to blow installation just before valve assembly

**during valve installation, attention should be paid to the following:**
- putting a lot of emphasis to keep interiors of the installation clean
- thoroughly cleaning the pipes from carbon deposits, filings and corrosion products etc.
- ensuring no stresses on the valve during the installation
- protecting lateral surfaces of the flanges from mechanical damage
- flange reparation by welding is not admissible
- leave counterflanges lightened to the valve only during the initial part of the welding procedure (positioning the valve). The actual welding of counterflanges must be carried out without the valve (after it is disassembled).
- ensuring the inside of the valve is clean before its reassembly
- ensure correct positioning of the gasket

> **Fig. A**<br>
> **Fig. B**

3. Technical data

<table>
<thead>
<tr>
<th>valve class</th>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>group</td>
<td>explosion protection type (ignition)</td>
<td>IIG</td>
</tr>
<tr>
<td>C1</td>
<td>C2</td>
<td></td>
</tr>
<tr>
<td>material</td>
<td>sealing material</td>
<td>nitrile-butadiene rubber NBR</td>
</tr>
<tr>
<td>internal elements</td>
<td>internal elements</td>
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<tr>
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<td>aluminium alloy, brass, stainless steel or galvanized steel</td>
</tr>
<tr>
<td>media</td>
<td>media</td>
<td>gas fuels (natural gas, propane, butane)</td>
</tr>
<tr>
<td>maximum operating pressure</td>
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</tr>
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<td>safe static pressure</td>
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<td>P = 6,5 bar</td>
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<td>closing the valve</td>
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</tr>
<tr>
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<td>ambient and medium temperature</td>
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<tr>
<td>closing time</td>
<td>closing time</td>
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<tr>
<td>impulse duration or sum of impulses series</td>
<td>impulse duration or sum of impulses series</td>
<td>Up to 1 s/3s</td>
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<tr>
<td>protection degree</td>
<td>protection degree</td>
<td>IP4X (for valve)</td>
</tr>
</tbody>
</table>

3.1. Electrical parameters

**Solenoid trigger (Ex):**

- explosion-proof construction type | rugged "e"
- designation acc. to ATEX Directive | II 2 G Ex e IIC T5 Gb 6A
- rated current | 12 V DC
- max voltage | 24 V
- min impulse time | Up to 0.5 ms
- ambient temperature range | -30°C - +50°C
- impulse duration | Up to 1 s/3s
- time interval between impulses or series of impulses | Tp ≤ 10/60s
- protection degree | IP66
- opening element | IPX4

**Valve closing element indicator (Ex):**

- explosion-proof construction type | rugged "e"
- designation acc. to ATEX Directive | II 2 G Ex e IIC T5 Gb 6A
- rated current | 12 V DC
- max voltage | 24 V
- min impulse time | Up to 0.5 ms
- ambient temperature range | -30°C - +50°C
- impulse duration | Up to 1 s/3s
- time interval between impulses or series of impulses | Tp ≤ 10/60s
- protection degree | IP66
- operation type | S3 intermittent running (times given above)
- electrical connection | IPX4
- used in while cable conducted outside
- ambient temperature range | 2x1,5 mm², length -2m
- max voltage U | 250 V
- rated voltage U | 250 V
- rated current | 1 A
- protective enclosure | IPX4

**Connecting elements:**

- connecting element | AC-15, DC-13
- connecting voltage/current | 1A / 250V
- mechanical durability | > 2 x 10⁶ cycles
- electrical connection | IP66
- suitable for use in gas installations
- used in while cable conducted outside
- safety class | IPX4
- protective degree | IPX4

(*) For ZBK-100k (DN100) valve only 4 flange connection screws applied
4. Construction and the principle of operation

The pressing component of valve head (5) to the valve seat (6) is pressing spring (7) element placed on straining mandrel (3). Valve can only be opened manually using a dedicated wrench (4) which is applied on a straining mandrel. Opening the valve procedure is carried out by a quarter-turn of wrench in an indicated direction (counterclockwise) till the ratchet mechanism (9) locks the valve’s closing component in an open position (“O”). Ratchet mechanism consist of among other things trigger lever (10) and detent (11). During valve opening trigger spring (7) is subjected to additional winding. The wrench must be removed from mandrel after opening the valve. Closing the valve (by the trigger spring) occurs when trigger lever (10) release ratchet mechanism. This take place in case receiving an electrical impulse on solenoid trigger (8) or by pressing the "MANUAL CLOSE" button (2).

Valve body has possibility of connection to electrical potential equalization system of conductive parts - very important in explosive hazardous areas. Earthing clamp (12) is located on the flange.

The wrench must be removed from mandrel after opening the valve. Closing the valve (by the trigger spring) occurs when trigger lever (10) release ratchet mechanism. This take place in case receiving an electrical impulse on solenoid trigger (8) or by pressing the "MANUAL CLOSE" button (2).

Valve body has possibility of connection to electrical potential equalization system of conductive parts - very important in explosive hazardous areas. Earthing clamp (12) is located on the flange.

5. Electrical connection, valve control (requirments):

Solenoid trigger (Ex):

a) type COD-3/A
b) type WEx

can be powered exclusively by control module type MD...Z... manufactured by GAZEX parameters of power supply (control impulses) given in p. 3.1 and 1.1. Trigger WEX has to be powered from control modules type MD...Z... manufactured by GAZEX

6. Flow characteristic

7. Installation - assembly requirments

- solenoid trigger has two wire, non-detachable, white power supply conductor (2x1,5mm²) (1) with lenght of app. 1,5m, conducted out of the valve through a rubber-sleeve in valve’s housing

Attention-important! The trigger coil with power supply cable connection is fitted into internal chamber in valve’s housing and has been molded with polyurethane.

This connection cannot be dismantled.

- wire ends of a conductor are separated and terminated with ferrules

- connecting cable of trigger should be:
  - cabling (especially during valve assembly) in ambient temperature not lower than -5°C
  - independently fastened on whole length outside the valve
  - protected against direct impact of sun, rain and other expected hazard

- electrical connection between the valve and the control module should be established with a solid-core two wirecable through an additional, leak-proof junction box with protection degree IP54 or higher. It should be ensured to use explosion protected (Ex) junction box if fitted in explosion hazardous area.

- connecting wire size depends on distance to control module (central)- see data in 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 12 V)

- polarization of wire in conductor is indifferent

- it is not allowed to apply a voltage to solenoid trigger, when it is disassembled from the valve

Valve closing element position indicator (Ex) - Option available on order

- limit switch has 3-wire (3x0,75mm², ) non-detachable, black connecting conductor with lenght app. 3m, conducted out of the valve through a rubber-sleeve in valve’s housing (connector data sheet - see p.3.1.)

- connecting elements is change-over contact (1NO+1NC)

- it is necessary to use explosion protected (Ex) junction box if fitted in explosion hazardous area.

Connection function

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-black</td>
<td>2-grey</td>
<td>3</td>
<td>4-brown</td>
</tr>
<tr>
<td>cable wire-conductors colors</td>
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</table>