GAS ELIMINATOR FOR LIQUID METER

GE 0,6

OPERATION MANUAL

Version 1.0

TECHNOTON

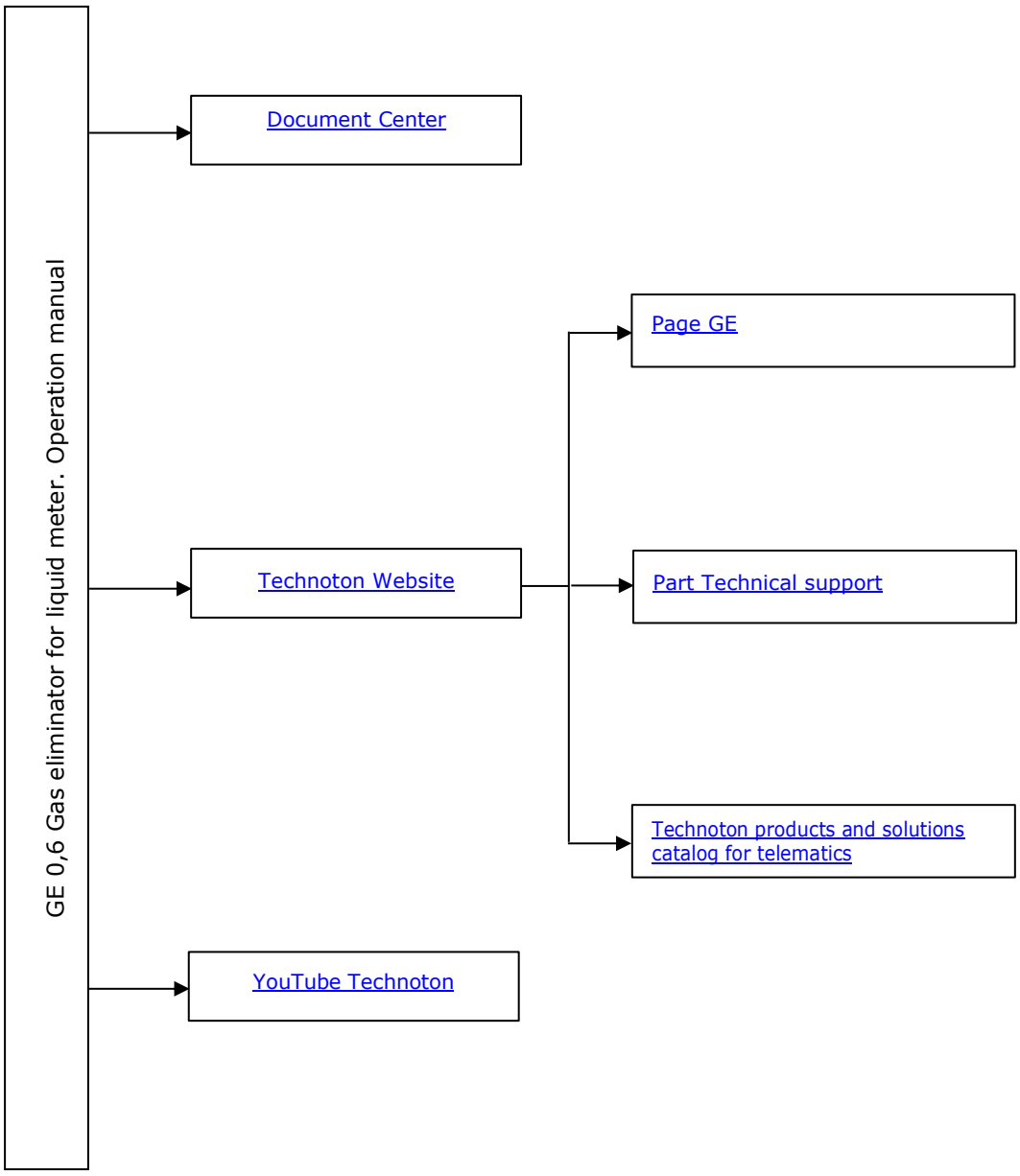
ADVANCED MACHINERY TELEMATICS

Contents

Revision history

Version	Date	Editor	Description of changes
1.0	11.2024	OD	Basic version.

Structure of external links



Introduction

Recommendations and rules set out in this Operation manual are related to **GE 0,6 Gas eliminator of a fluid meter** (further on — GE Gas eliminator) manufactured by Technoton company.

This document contains information on the purpose, advantages, design, principle of operation, specifications, as well as mounting and operation instructions for GE Gas eliminator.

GE Gas eliminator is an accessory for counters of non-aggressive fluids which is mounted at the counter input, to remove air from the working fluid and to enhance measurements accuracy.

Advantages of GE Gas eliminator:

- high efficiency of gas elimination of the working fluid— up to 100 % of the air is removed;
- enhancement of measurement accuracy of counters within a wide range of operation consumptions (up to 600 l/hour);
- full compatibility with mounting kits of counters;
- metal shock-proof, dust- and moisture-protected casing (IP68), wide range of working temperatures — suitable for severe operating conditions;
- provides even process of fuel combustion, improvement of environmental indicators, reducing CO2, soot and other hazardous substances emissions into the air;
- extension of the fuel system service life, elimination of excessive fuel pump wear, increasing power output and faultless operation of power units;
- convenient fixing elements for mounting;
- sealing protection from unauthorized interference;
- complies with international standards;
- provided with high-quality technical support and documentation.

To ensure correct operation of GE Gas eliminator, its mounting must be carried out by certified personnel who have undergone training in the company.

ATTENTION: It is strongly recommended to follow strictly the instructions of the present Manual when using, mounting or maintaining GE Gas eliminator.

The Manufacturer guarantees GE Gas eliminator compliance with the requirements of technical regulations subject to the conditions of storage, transportation and operation set out in this Manual.

ATTENTION: Manufacturer reserves the right to modify GE Gas eliminator specifications that do not lead to a deterioration of the consumer qualities without prior customer notice.

1 General information and technical specifications

1.1 Purpose of use, functions, application area, operation principle

GE Gas eliminator — **is designed to remove gases from the working fluid, before it is supplied to the measuring chamber of the consumption counter.**

Basic functions:

- **Prevention of excessive consumption indicators:** Gas inclusions and foam increase the volume of fluid passing through the measuring chamber of the counter; this leads to higher consumption indicators. The Gas eliminator prevents it by supplying the fluid cleaned from air bubbles into the measuring chamber. This is particularly important, to enhance the fluid measurements accuracy in technology systems or in commercial consumption accounting.
- **Protection of the counter from excessive wear and damage:** Too much foam may contribute to excessive wear and cause damage of measuring mechanisms of the counter. The Gas eliminator minimizes foam penetration into the measuring chamber, thus protecting its internal components and extending the counter service life; this reduces the costs of maintenance and repair.
- **Stabilization of the fluid flow:** The Gas eliminator provides stable fluid flow into the measuring chamber without interruptions and gaps; this is particularly important for high-accuracy measurements. Removing gas inclusions also enables the counter to record more reliable data at high flow rates and in case of pressure spikes.
- **Correct operation of counters in varying operating conditions:** The Gas eliminator provides measurements accuracy during abrupt changes of the fluid pressure and temperature. This is quite essential, for instance, in monitoring systems of fuel consumption in Diesel engines.
  Penetration of air into the fuel system may result in the engine operation malfunction, up to its total inoperability. As a rule, considerable volumes of air and foam form in the reverse fuel line of the engine equipped with Common Rail system. This is determined by the great pressure difference before and after the high-pressure fuel pump. Also, foam formation is typical of fuel systems in which fuel is used for cooling the engine.
  The air contained in the reverse fuel line entails incorrect fuel consumption readings, when using main line meters. Also, in case of excessive foaming, the content of hazardous substances in the exhaust gas is increasing, thus resulting in deterioration of the environmental profile of the engine operation.

Areas of application:

The Gas eliminator is employed in case of mounting liquid meters in systems in which foam formation takes place in the reverse line, particularly in powerful Diesel engines of mobile and fixed assets: generator units, quarry and construction equipment, farming equipment, railway, water, road transport, special equipment, in power units of mining, oil and gas industries, liquid fuel boilers, burners etc.
The Gas eliminator **is highly recommended** for use to eliminate foam formation in the reverse line together with the main line counters of volumetric consumption.

The key element of GE Gas eliminator is the deaeration chamber (see 1.3) containing a cascade of channels to slow down the rate of the working fluid flow and the lever-and-float mechanism for automatic release of the separated air.

Fuel supplied into the deaeration chamber through the input fitting fills all its channels one after another, up to the top level. If there are no air bubbles in the fuel, the drain fitting is shut and the fuel flows out of the deaeration chamber through the output fitting.

In case there are air bubbles in the fuel which accumulate in the upper portion of the chamber, the air makes the float sink. The drain fitting automatically releases the air. A small amount of the working fluid drops is admissible in the released air; they are recommended to return to the main tank. The deaerated working fluid is removed from the deaeration chamber through the output fitting (see figure 1).

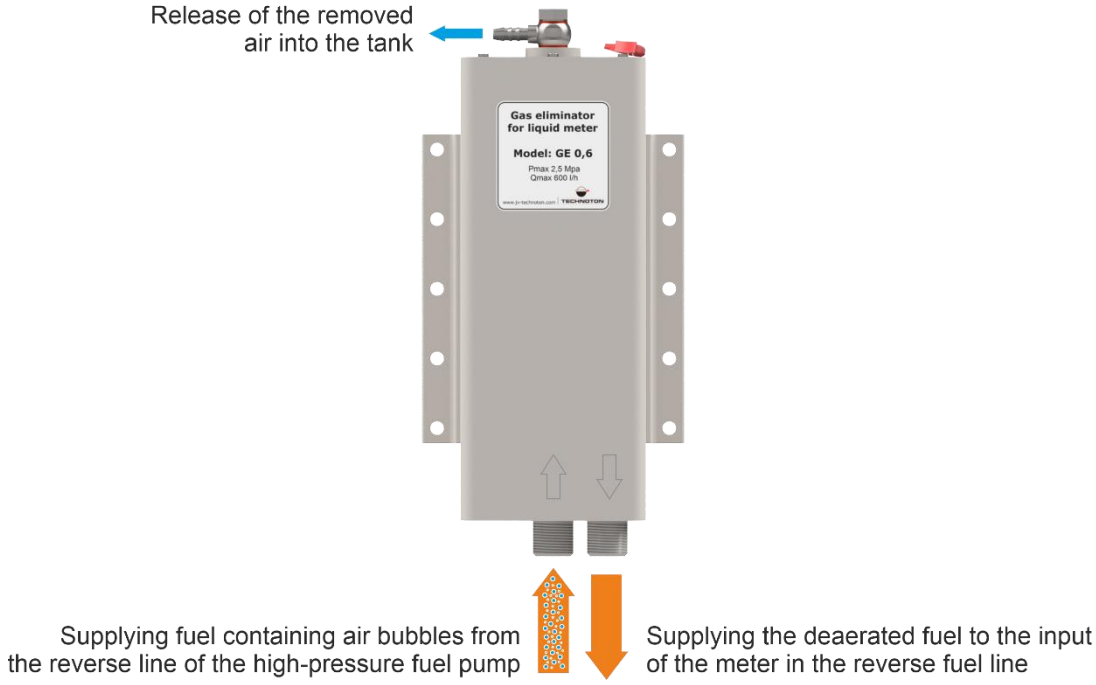
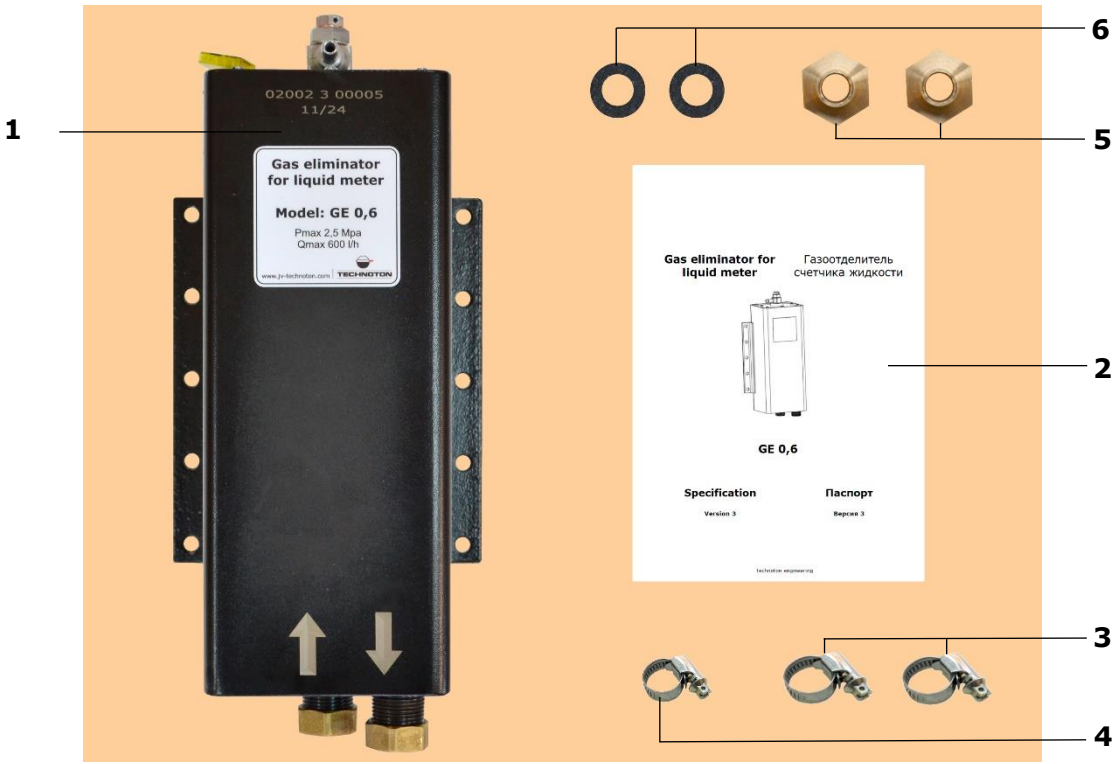


Figure 1 — Example of GE Gas eliminator operation, when it is deaerating the fuel in the reverse fuel line of the Diesel engine

Fuel deaeration using the Gas eliminator provides the following advantages:

- elimination of foam in the fuel line;
- enhancement of measurements accuracy of jointly used fluid counters;
- supporting environmental parameters of the engine operation, efficient fuel combustion, reducing soot discharge, pollution of environment;
- optimal conditions for the fuel pump operation and extension of the fuel system lifetime;
- improvement of the engine power characteristics;
- smaller fuel consumption by the consumer.

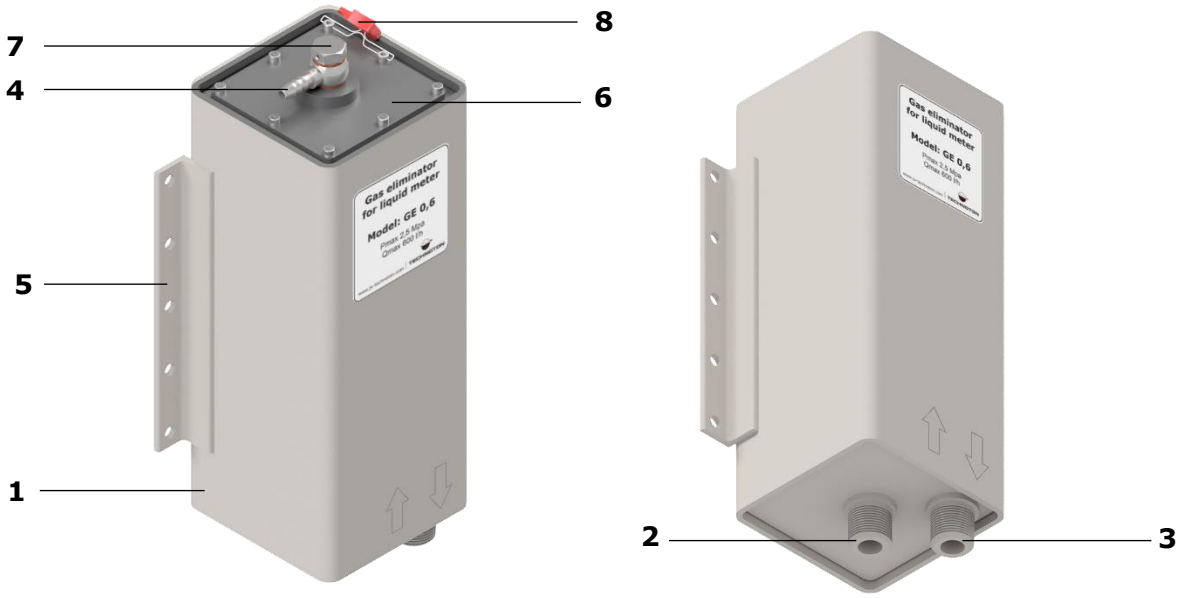
1.2 External view of the delivery set



1	GE 0,6 Gas eliminator for liquid meter	– 1 pc.;
2	Specification	– 1 pc.;
3	Worm gear clamp 20-32	– 2 pcs.;
4	Worm gear clamp 12-20	– 1 pc.;
5	Brass fitting	– 2 pcs.;
6	Gasket	– 2 pcs.

Figure 2 — External view of the delivery set of GE Gas eliminator

1.3 Design



a) top view *b) bottom view*

1 Deaeration chamber casing.

2 Input fitting ⇧ to supply the fluid containing air bubbles (e.g. fuel from the reverse line of the engine fuel system).

3 Output fitting ⇩ to return the deaerated fluid.

4 **AIR** drain fitting to release the air removed in the process of deaeration (e.g. to the fuel tank).

5 Fixing elements (2 pcs.) for mounting.

6 Deaeration chamber cover.

7 Cap with a hole for sealing.

8 Plastic seal to prevent unauthorized interference.

Figure 3 — Design of GE Gas eliminator

1.4 Technical specifications

Table 1 — GE Gas eliminator specifications

Parameter, measuring unit	Value
Working fluids	- diesel fuel; - biodiesel fuel; - kerosene; - gasoline; - mineral oil; - any non-aggressive fluids (hydrocarbon fuel, hydraulic systems fluids, industrial oils etc.).
Maximum fuel pressure, MPa	2.5
Optimal fuel consumption l/h, no more than	600
Maximum allowed fuel consumption, l/h	1000
Connecting male thread of the input and output fittings, inches	3/4
Temperature range, °C	-20…+85
Level of sealing protection from dust and moisture	IP68
Overall dimensions, mm, not more than	see figure 4
Weight, kg, not more than	7.5
Recommended service life, years, not more than	5

1.5 Overall dimensions

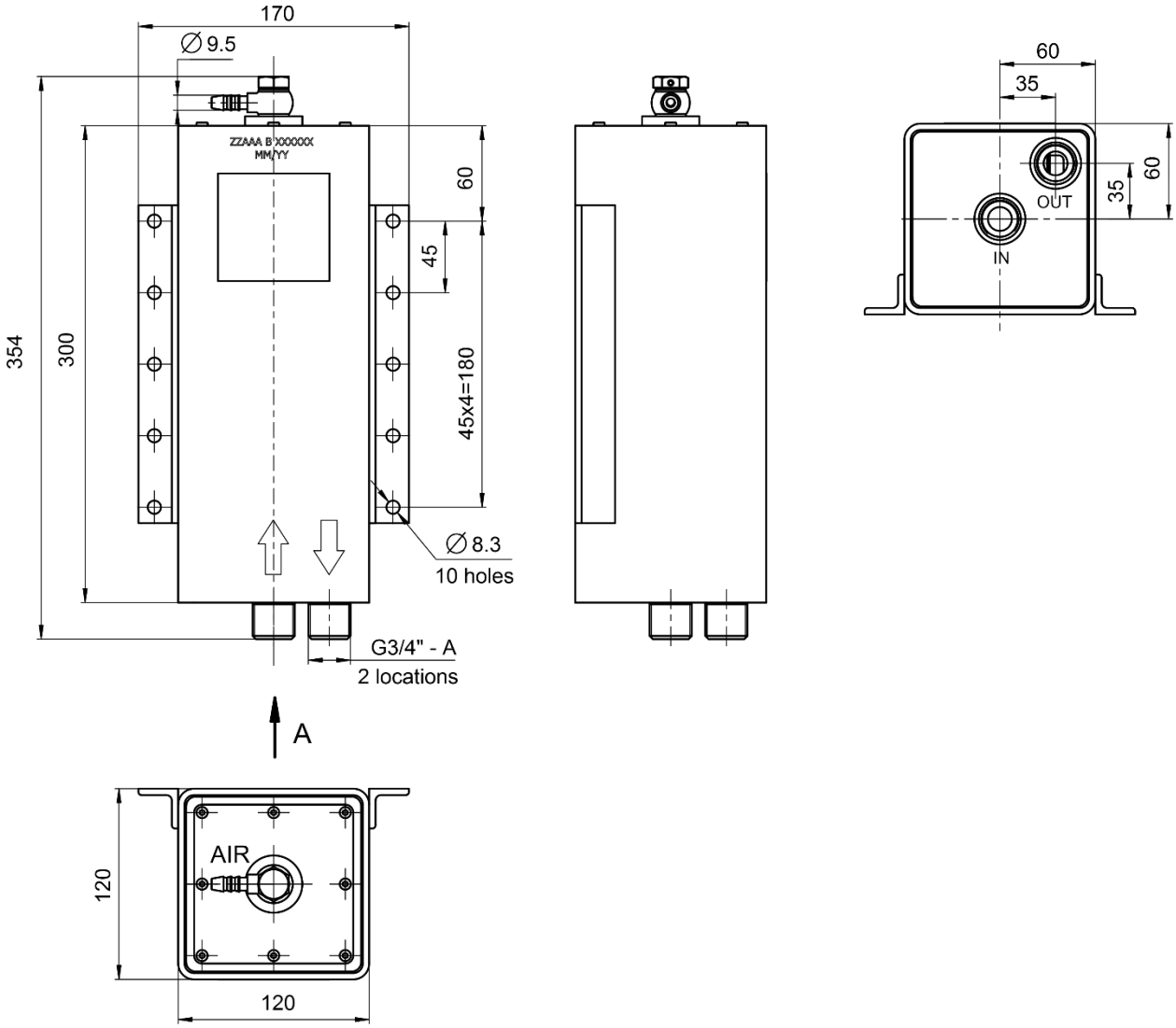


Figure 4 — Overall dimensions of GE Gas eliminator

2 Mounting

Particular cases of mounting the Gas eliminator are discussed in this chapter.

The fact of air content in the supply or reverse fuel line of the Diesel engine presents the grounds for GE Gas eliminator application.

Air bubbles contained in the fuel can be visually detected, when the engine is running, with the help of transparent fuel tubes (see figure 5) or by detecting the release of foam from the reverse fuel line junction pipe; one end of this junction pipe is plunged into the fuel tank below the fuel level.

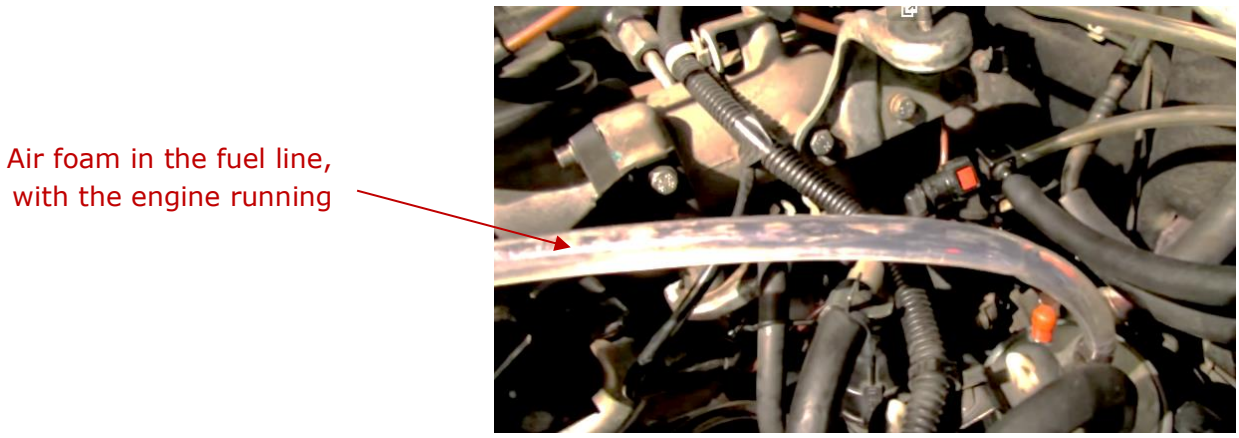


Figure 5 — Visual detection of air content in the fuel

To ensure the Gas eliminator correct operation, its mounting should be carried out by certified specialists who have passed corporate technical training.

ATTENTION:
1) When mounting Gas eliminator, you must strictly follow safety rules for repair works on the fuel consumer to be equipped, as well as health and safety rules established at the customer company.
2) Before you start mounting operations, please, study carefully the technical documentation of the asset to be equipped.
3) We highly recommend to carry out mounting operations of Gas eliminator at the ambient air temperature above zero.

2.1 Exterior inspection prior to works start

Prior to mounting operations, you should conduct the exterior inspection of Gas eliminator for the following possible defects that might have occurred during transportation, storage or careless use (e.g. visible damaging the casing, thread of the input/output fitting, drain fitting).

Contact the product supplier if there any defects.

2.2 General mounting instructions

1) GE Gas eliminator is mounted in the engine compartment of the asset which is equipped **in the strictly vertical position** (**AIR** drain fitting must be on top). The deviation angle of the mounted Gas eliminator along the vertical axis must not exceed **11°** (see figure 6).

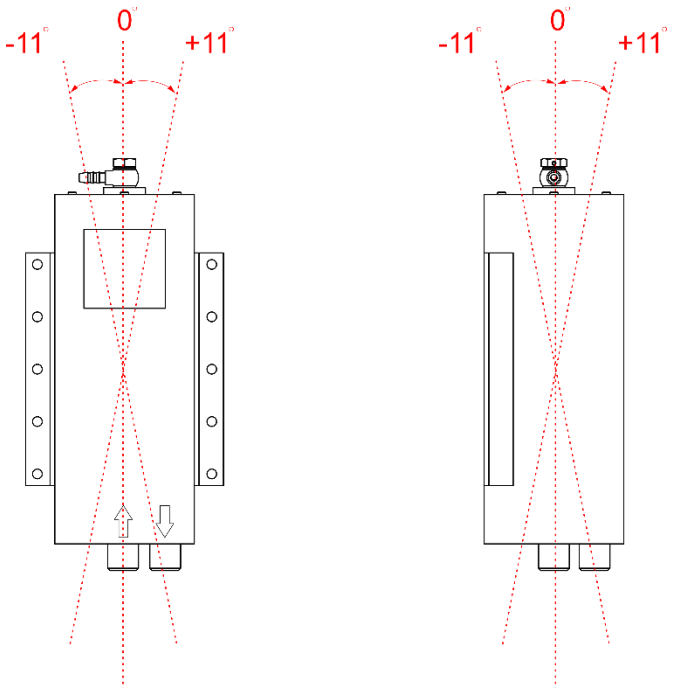


Figure 6 — Permissible deviation angles from the vertical axis of the mounted GE Gas eliminator

2) Mounting the Gas eliminator is not allowed in locations with no natural inflow of air. The working ambient temperature at the mounting location must not exceed **+85°C**. We do not recommend to mount Gas eliminator on the engine parts that are subject to severe vibration and heating. The distance between the Gas eliminator and heated and/or moving engine parts must be no less than **30 cm**.

3) During the Gas eliminator mounting **it is forbidden to drill the vehicle frame!** The Gas eliminator mounting elements are screwed with self-tapped screws to the side wall of the engine compartment of the asset to be equipped. In case the Gas eliminator cannot be mounted using self-tapped screws, spot weld is allowed.

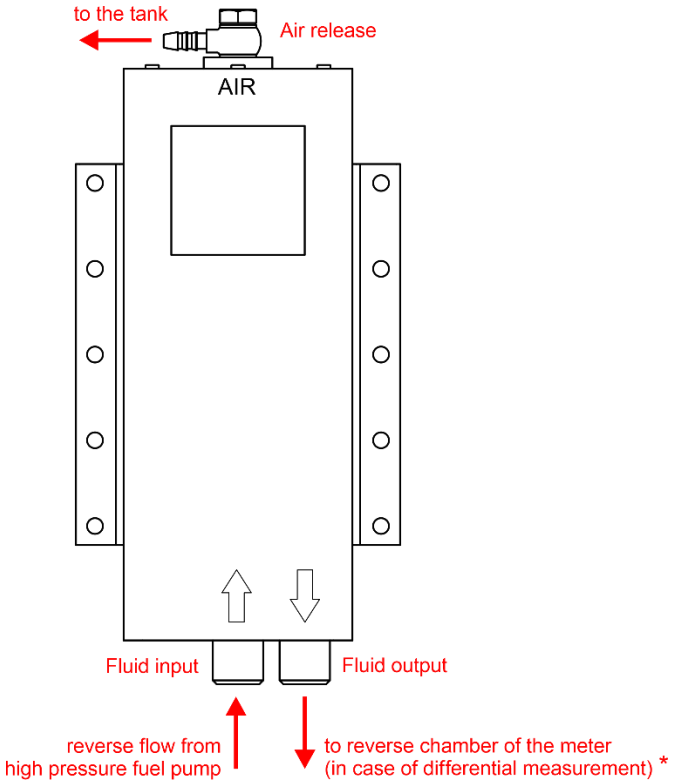
4) Generally, the hoses of fuel lines are connected to the Gas eliminator according to figure 7.

- During connecting fuel lines, you should make sure the flanges and threaded connections are clean. For mounting, you are to purchase and use only **new** copper tightening washers.
- In order to connect the Gas eliminator fittings to the fuel lines, you may additionally need to purchase and use hoses, elbow fittings or straight-through fittings. The hoses are fixed with collars or upset tubing of the necessary diameter.

- All fuel lines must be reliably protected from any possible external damaging impact.
- It is not allowed to downsize the fuel lines internal cross-cuts in bending sections.
- The fuel lines must be fixed on the Vehicle with clampbands each 0.5 m.
- The fuel lines must have a little extra length for thermal compensation of the length variations.
- After mounting Gas eliminator, you need to purge air from the fuel system.

5) In case you detect air inflow into the fuel supply line, (with the entire fuel system operable), you may additionally mount Gas eliminator into the fuel supply line, in the section before the entry into the liquid meter chamber.

IMPORTANT: After mounting GE Gas eliminator, check the fuel system for its hermeticity. **The fuel lines and their connections must be completely hermetic!**



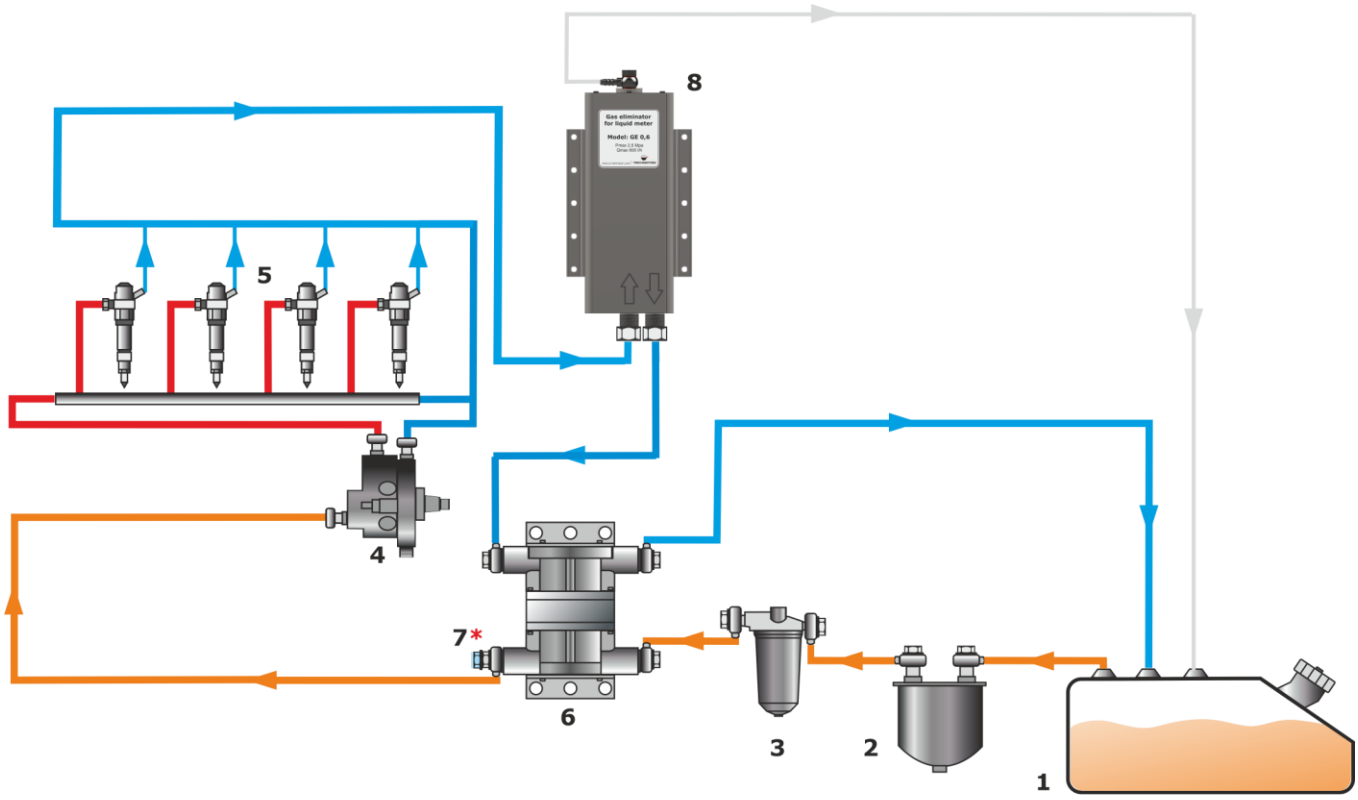
* To the low pressure fuel pump, in the connection scheme "before the pump", using the single-chamber meter.

Figure 7 — Typical scheme of fuel lines connection to GE Gas eliminator

2.3 Examples of connection schemes for GE Gas eliminator

1) Example of the Gas eliminator connection to the fuel system with Common Rail:

For mounting the Gas eliminator, you need to select the section of the fuel line between the output of the total reverse flow of the high pressure fuel pump, injectors and the input of the reverse chamber of a differential meter (see figure 8).



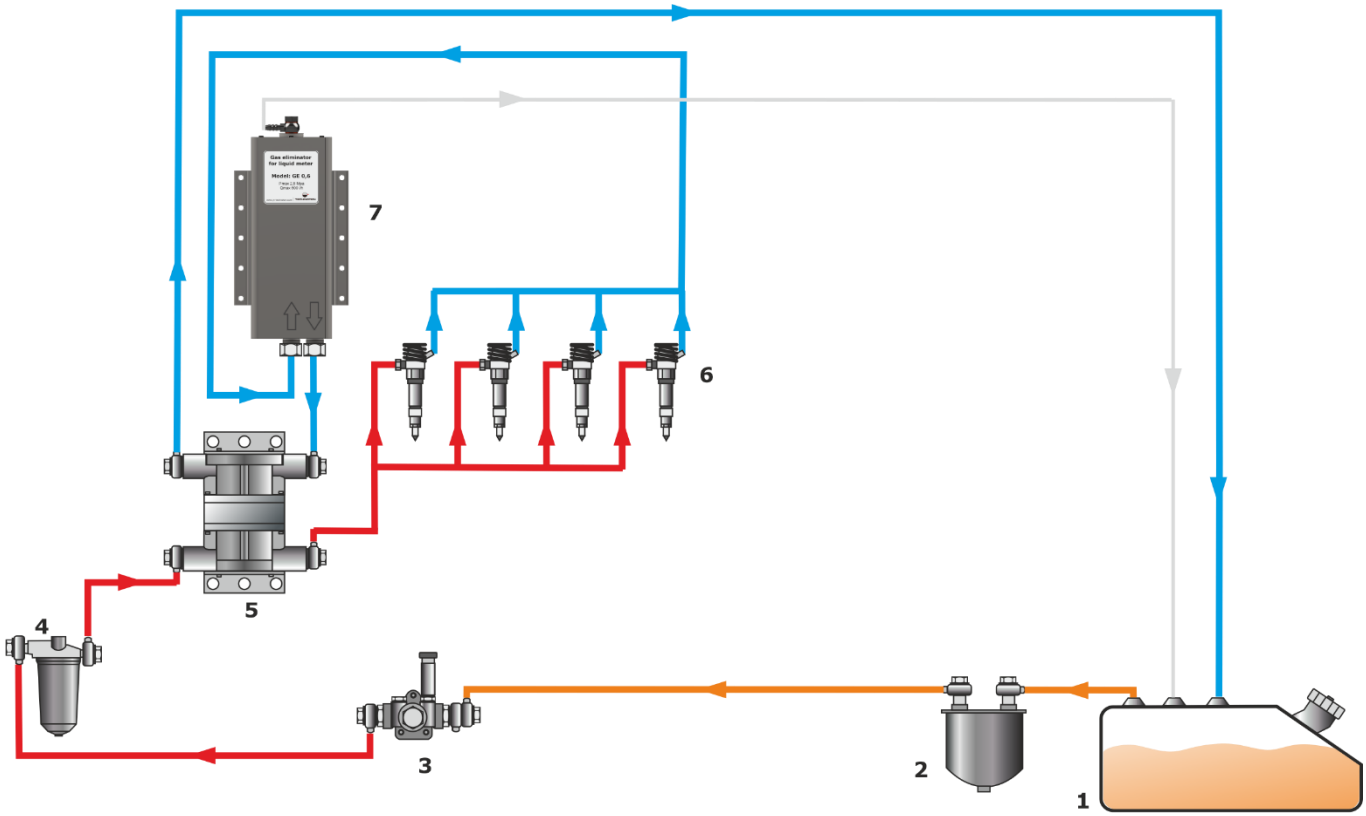
1 – Fuel tank; **2** – Rough filter; **3** – Fine filter; **4** – Common Rail high pressure fuel pump; **5** – Injectors; **6** – Liquid meter (e.g. differential meter); **7** – Non-return valve; **8** – GE 0,6 Gas eliminator.

* Is used only against hydro shocks (if any in the system).

Figure 8 — Using GE Gas eliminator to enhance measurements accuracy of a differential meter which operates using the connection scheme "Differential, before the pump"

2) Example of the Gas eliminator connection to the fuel system equipped with pump-injector units:

To mount the Gas eliminator, you need to select the section of the fuel line between the output of the reverse fuel line of the pump-injector units and the input of the reverse chamber of a differential meter (see figure 9).

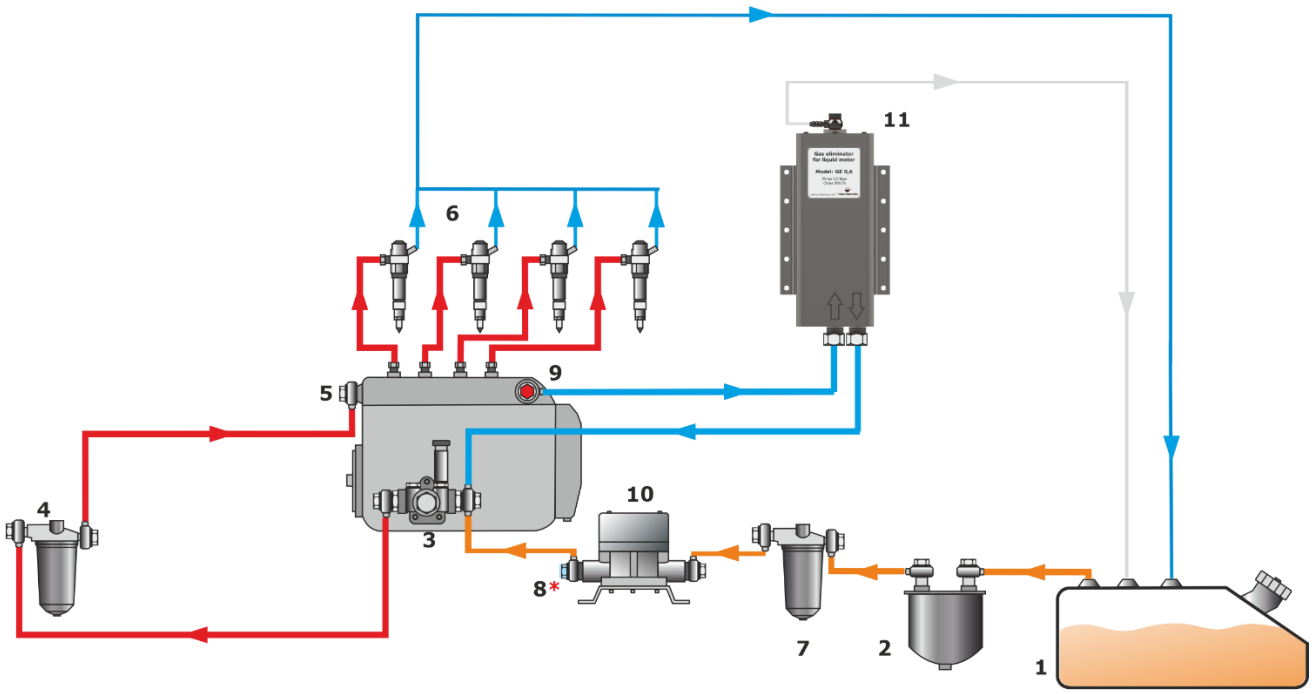


1 – Fuel tank; **2** – Rough filter; **3** – Low pressure fuel pump; **4** – Fine filter;
5 – Liquid meter (e.g. differential meter); **6** – Pump-injector units;
7 – GE 0,6 Gas eliminator.

Figure 9 — Using GE Gas eliminator to enhance the accuracy of measurements of a differential meter which operates using "after the pump" connection scheme

3) Examples of the Gas eliminator connection to the fuel system equipped with the plunger-type high-pressure fuel pump:

During the operation together with single-chamber meter, for mounting the Gas eliminator, you should select the section of the fuel line between the output of the meter chamber, the reverse output of the high-pressure fuel pump and the input of the low-pressure fuel pump (see figure 10).

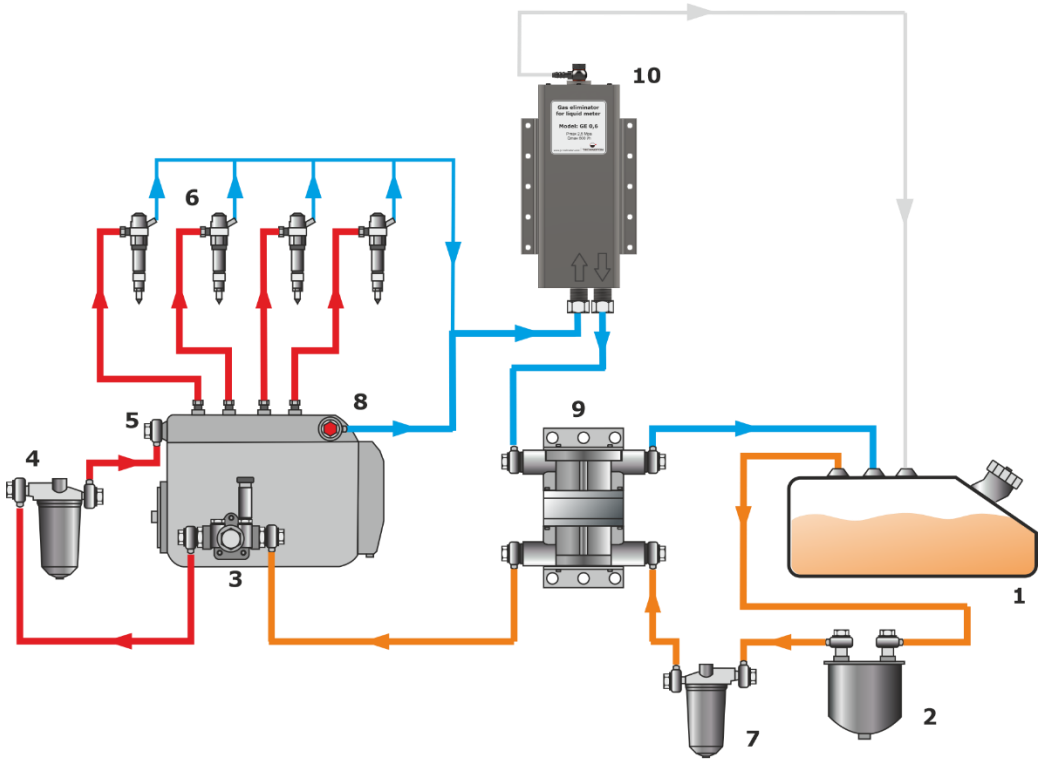


1 – Fuel tank; **2** – Rough filter; **3** – Low pressure fuel pump; **4** – Fine filter; **5** – High pressure fuel pump; **6** – Injectors; **7** – Additional fine filter; **8** – Non-return valve; **9** – Bypass valve; **10** – Liquid meter; **11** – GE 0,6 Gas eliminator.

* Is used only against hydro shocks (if any in the system).

Figure 10 — Using GE Gas eliminator to enhance measurements accuracy of the meter which operates using "before the pump" connection scheme

During operation together with differential meter, to mount the Gas eliminator, you should select the fuel line section between the input of the meter reverse chamber, the reverse flow output of the high-pressure fuel pump and the injectors (see figure 11).



1 – Fuel tank; **2** – Rough filter; **3** – Low pressure fuel pump; **4** – Fine filter;
5 – High pressure fuel pump; **6** – Injectors; **7** – Additional fine filter; **8** – Bypass valve;
9 – Liquid meter (e.g. differential meter); **10** – GE 0,6 Gas eliminator.

Figure 11 — Using GE Gas eliminator to enhance measurements accuracy of the differential meter which operates according to "Differential before the pump" scheme

3 Cleaning

To clean GE Gas eliminator, we recommend to open the deaeration chamber by unscrewing hexagon screws on its cap. After that, fill the space of the deaeration chamber with fuel, rinse and dry it.

The use of aggressive chemicals is not recommended for cleaning GE Gas eliminator!

4 Packaging

The set of GE Gas eliminator is delivered in a carton box (see figure 12).

Figure 12 — GE Gas eliminator packaging

The label containing information on the product name, serial number, manufacturing date, weight, as well as Quality Control seal and QR code is stuck on two sides of GE Gas eliminator package (see figure 13).

Figure 13 — GE Gas eliminator packaging label

Note — Label design and contents can be modified by the Manufacturer.

5 Storage

GE Gas eliminator can be stored in closed and other locations with natural air inflow without artificially adjusted climatic conditions, in non-heated storage facilities.

GE Gas eliminator storage is allowed only in original packaging at temperature range from -50 to +40 °C and relative humidity up to 100 % at 25 °C.

Do not store GE Gas eliminator in the same room with substances that cause metal corrosion and/or contain aggressive impurities.

6 Transportation

GE Gas eliminator is to be transported by any means of transportation which ensures protection from mechanical damaging and prevents from precipitation affecting the package.

Air environment in transportation compartments should not contain acid, alkaline and other aggressive impurities.

7 Utilization/re-cycling

GE Gas eliminator does not contain harmful substances and ingredients that are dangerous to human health and environment during and after the end of life and recycling.

GE Gas eliminator does not contain precious metals in amount that should be recorded.

Contacts

Distribution, technical support and service

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