



# BENZ FLOW



## Installation, use and maintenance (translation of original instructions)



## TABLE OF CONTENTS

1	CONFORMITY
	1.1 DECLARATION OF CONFORMITY (2014/34/UE, All. X)
2	MACHINE DESCRIPTION
	2.1 DEFINITION OF CLASSIFIED ZONES
	2.2 INTENDED USE
	2.3 HANDLING AND TRANSPORT
3	GENERAL WARNINGS
4	FIRST AID RULES
5	GENERAL SAFETY RULES
6	TECHNICAL DATA
7	OPERATING CONDITIONS
	7.1 ENVIRONMENTAL CONDITIONS
	7.2 FLUIDS PERMITTED
8	INSTALLATION
9	CALIBRATION
10	EVERY DAY USE
11	MAINTENANCE
12	DISASSEMBLING REASSEMBLING
13	PROBLEMS, CAUSES AND SOLUTIONS
14	DEMOLITION AND DISPOSAL
15	EXPLODED VIEW

## 1 CONFORMITY

### 1.1 DECLARATION OF CONFORMITY (2014/34/UE, ALL. X)

The manufacturer: Adam Pumps S.p.A.  
Via Resistenza 46/48  
41011 Campogalliano (MO) Italy

Declares under its own and sole responsibility that the machine:

Type: **Meter**  
Model: **BenzFlow**

Year of manufacture: refer to the year of production shown on the CE plate affixed to the product.

CERTIFIES THAT

comply with all relevant provisions of the following directives:

- **2014/34/UE**

and the following harmonized standards, applied standards and/or technical specifications:

UNI EN 1127-1:2011; UNI EN 80079-36:2016; UNI EN 80079-37:2016

Technical File deposited with receipt no. **CESI B8024255R**

This equipment is classified as follows:

Group II, category 2G Ex h IIB T6 Gb

Read the Use and Maintenance manual before using the pump.

Place: Campogalliano (MO)

Date: 28/11/2018

*Davide Stassi*

Davide Stassi  
 Legal Representative

## 2 MACHINE DESCRIPTION

BenzFlow is mechanical flow meter with nutating disk, designed to allow a precise measurement of Diesel oil or other fluids compatible with the manufacturing material. The nutating disk of the metering chamber (seediagram 1, drawing "15"), which is set in motion by the fluid itself, drives the gear train located in the cover of the meter body (drawing "8") which transmits the motion to the meter (pos. "6"). The meter is equipped with a non-resettable litre totaliser and a batch register which can be reset by means of a knob (Pos. "2") whose unit digit is provided with marks for the readout of the tenths of a litre.

**WARNING**



To ensure a proper and safe use of the meter it is necessary to read and follow the instructions and warnings contained in this manual. An improper installation or use of the meter may cause damage to objects and people.

**2.1**

**DEFINITION OF CLASSIFIED ZONES**

**FOREWORD**

Definition of zones as shown in directive 99/92/CE

**ZONE 0**



Place where an explosive atmosphere made up of a mix of air and inflammable substances in the form of gas, vapour or mist is continuously present, either for long periods or frequently.

Note: Generally speaking, said conditions, when they occur, involve the inside of tanks, pipes and containers, etc.

**ZONE 1**



Place where it is probable that an explosive atmosphere, made up of a mix of air and inflammable substances in the form of gas, vapour or mist, can occur occasionally during normal operation.

Note: Said zone can also include:

- places in the immediate vicinity of zone 0;
- places in the immediate vicinity of supply openings;
- places in the immediate vicinity of filling and emptying openings;
- places in the immediate vicinity of appliances, protection systems and fragile glass and ceramic components, or components made of other similar materials;
- places in the immediate vicinity of inadequately sealed stuffing boxes, e.g. on pumps and valves with stuffing box.

**ZONE 2**



Place where it is improbable that an explosive atmosphere, made up of a mix of air and inflammable substances in the form of gas, vapour or mist, can occur during normal operation, but which, if it does occur, only persists for a short time.

Note: Said zone can include, among others, places surrounding the zones 0 or 1.

**ZONE 20**



Place where an explosive atmosphere in the form of a cloud of combustible powders in the air is continuously present, either for long periods or frequently.

Note: Generally speaking, said conditions, when they occur, involve the inside of tanks, pipes and containers, etc.

**ZONE 21**



Place where it is probable that an explosive atmosphere, in the form of a cloud of combustible powders in the air, can occur occasionally during normal operation.

Note: Said zone can include, for example, among others, places in the immediate vicinity of powder loading and emptying points and places where powder layers form or which, during normal operation, could produce an explosive concentration of combustible powders mixed with the air.

**ZONE 22**



Place where it is improbable that an explosive atmosphere, in the form of a cloud of combustible powders in the air, occur during normal operation but which, if it does occur, only persists for a short time.

Note: This zone can comprise, among others, places near appliances, protections systems and components containing powder, out of which the powder can come out due to leaks with the formation of powder deposits (e.g., milling salt, where the powder comes out of the mills and deposits).

**ZONE 1**



**ZONE 0**

**ZONE 20**

**ZONE 21**



**ZONE 2**

**2.2**

**INTENDED USE**

**WARNING INTENDED USE**



**APPLIANCE FOR THE MEASUREMENT OF FUEL SUITABLE FOR OPERATING IN ZONES CLASSIFIED "1" AND "2", ACCORDING TO DIRECTIVE 99/92/CE**

**THE DETERMINATION OF THE AREAS (ZONES) IS TO BE CARRIED OUT BY THE USER**

**FORBIDDEN USE**

Using the appliance for fluids other than those listed at paragraph "7.2 - Fluids permitted" and for uses other than those described at the item "authorised use" is forbidden.

**PLANT OPERATION RESTRICTIONS IT IS FORBIDDEN:**

- 1 To use the appliance in a construction configuration other than that contemplated by the manufacturer
- 2 To use the appliance with fixed guards tampered with or removed.
- 3 To use the appliance in places where there is risk of explosion and/or fires classified in the following zones: 0; 20; 21; 22
- 4 To integrate other systems and/or equipment not considered by the manufacturer in the executive project.
- 5 To connect the appliance up to energy sources other than those contemplated by the manufacturer
- 6 To use the commercial devices for purposes other than those indicated by the manufacturer.
- 7 Use in presence of lightnings

### 2.3 HANDLING AND TRANSPORT

Due to the limited weight and dimensions of the METERS, special lifting equipment is not required to handle them. THE APPLIANCES ARE CAREFULLY PACKED before dispatch. Check the packing when receiving the material and store in a dry place.

## 3 GENERAL WARNINGS

### Important precautions Symbols used in the manual

To ensure operator safety and to protect instrument from potential damage, workers must be fully acquainted with this instruction manual before performing any operation.

The following symbols will be used throughout the manual to highlight safety information and precautions of particular importance:

**WARNING: Important note for guaranteed safety in classified zones**

 **WARNING** *WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury*

 **NOTICE** *NOTICE is used to address practices not related to personal injury*

### Manual preservation

This manual should be complete and legible throughout. It should remain available to end users and specialist installation and maintenance technicians for consultation at any time.

### Reproduction rights


All reproduction rights are reserved by Adam Pumps S.p.A. The text cannot be reprinted without the written permission of Adam Pumps S.p.A. © Adam Pumps S.p.A.

**THIS MANUAL IS THE PROPERTY OF Adam Pumps S.p.A. ANY REPRODUCTION, EVEN PARTIAL, IS FORBIDDEN.**

This manual belongs to Adam Pumps S.p.A., which is the sole proprietor of all rights indicated by applicable laws, including, by way of example, laws on copyrights. All the rights deriving from such laws are reserved to Adam Pumps S.p.A.: the reproduction, including partial, of this manual, its publication, change, transcription and notification to the public, transmission, including using remote communication media, placing at disposal of the public, distribution, marketing in any form, translation and/or processing, loan and any other activity reserved by the law to Adam Pumps S.p.A..

**NOTE**  ***THIS MANUAL IS VALID ONLY FOR BENzFlow METER***

**WARNING**  ***BEFORE PROCEEDING WITH THE REFUELLING OF THE AIRCRAFT, ENSURE THAT THE SYSTEM INTENDED FOR SUCH ACTION COMPLIES WITH THE REGULATIONS IN FORCE IN THE COUNTRY OF USE***

**WARNING**  ***USE THE METER ONLY WITH FLUIDS PERMITTED. DO NOT USE WITH FLUIDS NOT PERMITTED TO AVOID DAMAGING THE INSTRUMENT. THE GUARANTEE LAPSES IN CASE OF MISUSE OF THE FLUID.***

***DO NOT USE THE METER WITH LIQUID FOOD PRODUCTS AND/OR WATER-BASED FLUIDS.***

***Before connection, make sure that the piping and the suction tank are free of dirt and solid residue that could damage the METER and its accessories. NEVER COLLECT THE FLUID FROM THE BOTTOM OF THE TANK SINCE IT MAY CONTAIN IMPURITIES***


***BEFORE USING THE PUMP SWITCH OFF ALL THE ELECTRONIC DEVICES ( I.E. MOBILE PHONES, BEEPERS ETC.)***



## 4 FIRST AID RULES

### Contact with the product

In the event of problems developing following EYE/SKIN CONTACT, INHALATION or INGESTION of the treated product, please refer to the SAFETY DATA SHEET of the fluid handled.



<b>NOTE</b>		<b>Please refer to the safety data sheet for the product</b>
-------------	---	--

### SMOKING PROHIBITED



**DO NOT SMOKE NEAR THE METER AND DO NOT USE THE INSTRUMENT NEAR FLAMES.**

## 5 GENERAL SAFETY RULES

<b>WARNING</b>		<b>IT IS ESSENTIAL TO GET TO KNOW AND UNDERSTAND THE INFORMATION CONTAINED IN THIS MANUAL.</b>
<b>USER'S RESPONSIBILITY</b>		<b>IT IS ESSENTIAL TO GET TO KNOW AND OBSERVE THE SAFETY SPECIFICATIONS FOR FLAMMABLE LIQUIDS.</b>
		<b>BEFORE USING THE METER IT'S IMPORTANT TO TRAIN OPERATORS, INSTALLERS AND MAINTENANCE STAFF TO LET THEM WORK IN A PARTICULAR AREA NO. 1 AS MENTIONED BY DIRECTIVE 2014/34/UE</b>

### Essential protective equipment characteristics

IN CASE OF CONTACT WITH THE PRODUCT AND FOR GOOD STANDARD OF BEHAVIOUR, wear protective equipment which is:

- suited to the operations that need to be performed;
- resistant to products used

TO DO SO, PLEASE REFER TO THE RELEVANT TECHNICAL DATASHEETS OF THE FLUID USED.

### Personal protective equipment that must be worn



safety shoes



close-fitting clothing



protection gloves



safety goggles

### Necessary safety devices




instructions manual

### Protective gloves



Prolonged contact with the treated product may cause skin irritation; always wear protective gloves during dispensing.

<b>NOTE</b>		<b>TO PREVENT ELECTRIC SHOCK AND DETONATION OF SPARKS, ALL PUMPING SYSTEM MUST HAVE PROPER GROUNDING, INCLUDING TANK AND ANY ACCESSORIES.</b>
-------------	---	---

<b>WARNING</b>		<b>FAILURE TO OBSERVE THE ABOVE MENTIONED RULES CAN CAUSE SERIOUS ACCIDENTS</b>
----------------	---	---

## 6 TECHNICAL DATA


Technical data		Mod. BenzFlow		
<b>Meter Mechanism</b>		Nutating disk		
<b>Flow rate</b>	(range)	20 · 120 litres/min		
<b>Operating pressure</b>	(max)	3,5 bar		
<b>Burst pressure</b>	(min)	28 bar		
<b>Storage temperature</b>	(range)	-20 +80 °C		
<b>Storage humidity</b>	(max)	95 % RU		
<b>Operating temperature</b>	(range)	-10 +60 °C		
<b>Pressur loss with diesel oil</b>	<b>Flow rate (l/min)</b>	30	60	90
	<b>Pressur loss (bar)</b>	0.005	0.2	0.4
<b>Accuracy after calibration</b>		+/- 1%		
<b>Repeatability</b>	(typical)	+/- 0,3%		
<b>Batch total readout</b>		3 digits height 18 mm		
<b>Totaliser readout</b>		6 digits height 6mm		
<b>Readout resolution</b>		0.1 litri		

<b>Connections</b>	<b>(inlet/outlet)</b>	1" BSP	
<b>Weight</b>	<b>(approximate)</b>	1.8 Kg	1.9 Kg
<b>Package dimensions</b>	185x185x170 mm		
<b>Optional features</b>	Registration in US gallons female threaded inlet/outlet 1"NPT		


## 7 OPERATING CONDITIONS

### 7.1 ENVIRONMENTAL CONDITIONS

<b>AMBIENT TEMPERATURE</b>	min. +14 °F / max +140 °F
<b>FLUID TEMPERATURE</b>	min. -10 °C / max +60°C
<b>RELATIVE HUMIDITY</b>	min. +14 °F / max +140 °F
	min. -10 °C / max +60°C
	max. 90%

<b>WARNING</b>		<i>The temperature limits shown apply to the METER components and must be respected to avoid possible damage or malfunction.</i>
----------------	---	--

### 7.2 FLUIDS PERMITTED

<b>WARNING</b>		<b>THE PUMP CAN BE USED ONLY WITH THE FOLLOWING FLUIDS:</b>
		- DIESEL - KEROSENE - AVGAS 100/100LL - JET A / A1
		- PETROL - PETROL ALCOHOL MIXED MAX 20% (E20) - ASPEN 2/4

## 8 INSTALLATION


### FOREWORD

The meters BenzFlow can be installed in any position, on rigid pipelines or flexible hoses, directly on pumps or tanks. The meter flow direction is fixed and indicated by an arrow. The meter is supplied in the standard configuration (A). The meter and the cover (see diagram, pos. "3") can be rotated by 90° to 90° in respect to the body in order to carry out the different configurations shown (B, C, D). The reset knob can be installed either on the right side or on the left side of the meter. In order to modify the standard configuration follow the instructions given in section "Disassembling / Re-assembling". The meter body is equipped with 4 blind holes (see diagram 2) which can be threaded (M5) for a possible fastening. If solid particles enter the measuring chamber the correct working of the rotating disk may be affected. Always filter the fluid by installing a filter on the meter inlet (recommended filter 400).



<b>WARNING</b>		<b>BEFORE ANY OPERATION, ENSURE TO BE OUT OF POTENTIALLY EXPLOSIVE AREAS</b> <i>The meter must never be operated before the delivery and suction lines have been connected.</i>
----------------	---	--

<b>PRELIMINARY CHECK</b>	- Verify that all components are present. Request any missing parts from the manufacturer. - Check that the meter has not suffered any damage during transport or storage.
--------------------------	---

<b>WARNING</b>		<b>IF VALVES IN THE CIRCUIT ARE TO BE INSTALLED, MAKE SURE THEY ARE EQUIPPED WITH OVERPRESSURE SYSTEM.</b> <b>CLEAN THE TANK AND MAKE SURE IT IS WELL-VENTILATED (RECOMMENDED OPENING PRESSURE: 3 psi)</b> <b>APPLY THE QUICK COUPLING TO THE TANK CORRECTLY AND SAFELY</b>
----------------	---	---

## 9 CALIBRATION

### FOREWORD

BenzFlow are pre-calibrated in factory to be used with Diesel oil. As specific operating conditions (such as real flow rate, nature and temperature of the measured fluid) may affect the meter accuracy, a re-calibration should be carried out after the installation has been completed. A new calibration is necessary each time the meter is disassembled for maintenance operations or when it is used to measure fluids that differ from Diesel oil.

### CALIBRATION PROCEDURE

- 1 Unscrew the plug (see diagram 1, pos. "14").
- 2 Purge the system (pump, pipelines, meter) of air by dispensing until the flow stream is full and steady.
- 3 Stop the flow by shutting off the nozzle, but let the pump running
- 4 Reset the batch register by means of the reset knob (pos. "2").
- 5 Dispense at the flow rate which the best accuracy is required at, by using a calibration container having a capacity not lower than 20 litres. Do not reduce the flow in order to reach the graduated zone of the calibration container. The right method is to start and stop the full flow repeatedly until the required filling is obtained.
- 6 Compare the indication of the calibration container (real value) with the one of the meter (indicated value).
  - If the indicated value is higher than the real value, loosen the screw (pos. "12");
  - If the indicated value is lower than the real value, tighten the screw (pos. "12").
- 7 Repeat the operations 4 to 6 until accuracy is satisfactory
- 8 Tighten the plug (pos. "14") again. The O ring which the calibration screw is provided with, has the function to avoid accidental loosening of the adjustment screw but does not have any sealing functions. Therefore it is always necessary to properly fix the plug with the sealing-gasket (pos. "12").

## 10 EVERY DAY USE

### WARNING



**THE WORKING OPERATIONS MUST ALWAYS BE GUARDED BY THE OPERATOR.**

**Should any sealants be used on the suction and delivery circuit of the pump, make sure that these products are not released inside the meter.**

**Foreign bodies in the suction and delivery circuit of the pump could cause malfunctioning and breakage of the meter components.**

**While dispensing, do not inhale the pumped product**

**IF ANY TREATED FLUID LEAKS OUT DURING DISPENSING, TAKE ALL STEPS NECESSARY TO ENSURE THE LEAKED FLUID IS CLEANED UP AND SAFE AS SPECIFIED ON THE PRODUCT TECHNICAL SHEET.**

### USE

After installation and calibration BenzFlow is ready to work. Turn the reset knob (see diagram 1, pos. "12") (clockwise if it is mounted on the left of the meter and anticlockwise if it is mounted on the right) until the batch register is completely reset. The totaliser cannot be reset in any way. Make sure that during use pressure does not exceed the value indicated in section "Technical data".

### USE BY GRAVITY

BenzFlow can also be used in fuel units which are not equipped with pump and where the flow is generated by the difference in fuel level between the tank and the nozzle outlet. As a reference, a system composed of a tank off the ground, with the meter installed right at the bottom of the tank, a 3-m long 1" flexible pipe and a manual nozzle, guarantees a flow rate of approximately 30 litres/minute if the difference in level is higher than 1.5 metres. Longer pipes or nozzles producing higher pressure losses reduce the flow in respect to the existing difference in level. Use by gravity is not recommended with differences in level lower than 1 metre, as the consequent reduced flow rate causes the meter to work outside its guaranteed accuracy range. On field calibration is always advisable in case of gravity installations.

## 11 MAINTENANCE

### FOREWORD

No ordinary maintenance is required provided that the meter BenzFlow is properly installed and used. An incorrect filtering on the meter inlet may block or wear out the measuring chamber, thus affecting the meter accuracy. Should this problem occur (see section "Problem, Causes and Solutions") disassemble the measuring chamber, as shown in section "Disassembling/Reassembling".

Necessary cleaning can be carried out by means of a soft brush or small tool (i.e. a screwdriver). During cleaning be careful not to damage the chamber or the disk. Carefully check the meter and replace the parts which have suffered any possible damage. Only use the original spare part kits shown in diagram 1 "Exploded view and spare part list". A new calibration is always necessary after cleaning or replacing the meter parts.

**WARNING**

**TO MAINTAIN THE SAFETY OF THE APPLIANCE, IT IS MANDATORY TO REPLACE THE DAMAGED PARTS.  
FOR SAFETY PURPOSES, YOU MUST USE ONLY GENUINE SPARE PARTS.**

**Safety instructions**

During maintenance, the use of personal protective equipment (PPE) is compulsory. In any case always bear in mind the following basic recommendations for a good functioning of the METER

**WARNING**

**BEFORE ANY OPERATION, ENSURE TO BE OUT OF POTENTIALLY EXPLOSIVE AREAS**

**Authorised maintenance personnel**

All maintenance must be performed by qualified personnel. Tampering can lead to performance degradation, danger to persons and/or property and may result in the warranty and UL/ATEX CERTIFICATION being voided.

**Measures to be taken**

Check that the labels and plates found on the dispensing system do not deteriorate or become detached over time.

**ONCE A WEEK:**

- Check that the pipe connections are not loose to prevent any leaks;

## 12 DISASSEMBLING REASSEMBLING

**FOREWORD**

BenzFlow METER can be easily disassembled into its main parts without removing the body from the pipes.

**METER UNIT**

To disassemble the meter unit operate as follows:

- A** Remove the reset knob by firmly pulling it axially
- B** Loosen the 4 retaining screws (see diagram 1, pos. "7")
- C** Loosen the 2 screws (pos. "5").

To reassemble the unit reverse the procedure described above.

**RESET KNOB**

To modify the reset knob position:

- A** Perform only the operations a) and b) described above.
- B** Take out the plug (see diagram 1, pos. "4") by pushing it from the inside towards the outside of the cover
- C** Fix again the plug on the opposite hole by placing it inside the cover and pushing it outwards.
- D** Fix again the meter cover and reset knob

**MEASURING CHAMBER**

To enter the measuring chamber operate as follows:

- A** Disassemble the meter unit.
- B** Loosen the eight screws (see diagram 1, pos. "7").
- C** Remove the body cover (pos. "8") together with the gear unit. During this operation be careful not to damage the gasket (pos. "10").
- D** Remove the whole measuring chamber (pos. "11") by lifting it from the meter body and at the same time pulling it back towards the inlet in order to remove the O ring (pos. "16") from its seat at the outlet.

To check the inside of the measuring chamber (pos. "15"), remove the O ring and divide the two half chambers containing the nutating disk. To enter the measuring chamber operate as follows:

- A** Check that the nutating-disk rotates freely in the ASSEMBLED measuring chamber;
- B** Install the gasket seals correctly after having checked and lubricated them;
- C** During the assembly of the lid on the body prevent the needle of the nutating-disk from jamming on the gear that should be free to be able to be correctly drawn from the disk needle;
- D** Properly tighten the screws (position. "7")

**GEAR UNIT**

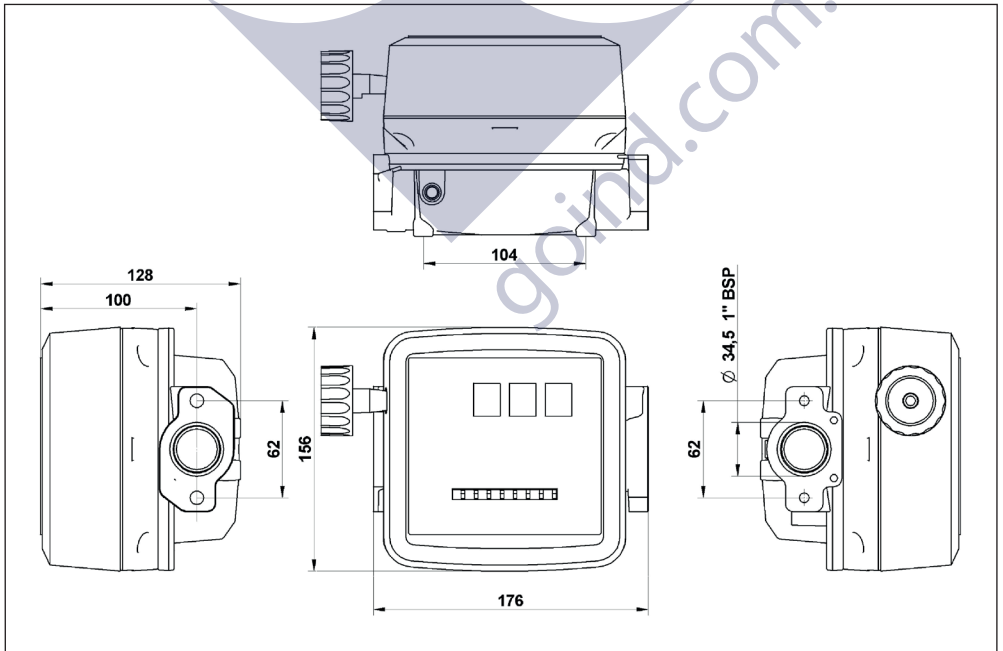
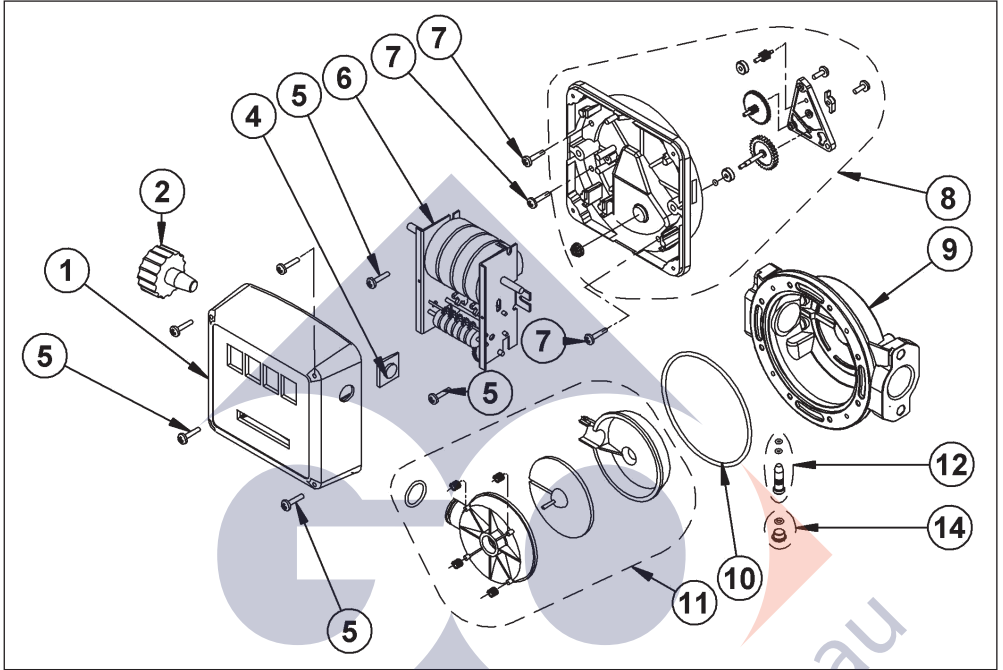
To reach the gear unit components:

- A** Remove the cover
- B** Loosen the screws
- C** Remove the plate. Now all gears can be reached for inspection. Should the gasket be replaced, remove the bevel gear from the shaft by pulling axially, then remove the gear together with the shaft. The gasket replacement always requires the replacement of the bush provided with the spare part kit. To reassemble reverse the above described procedure paying particular attention to:
  - Lubricate the O ring before installation.
  - Check that the gear unit can rotate freely before fixing the cover





# 15 VISTE ESPLOSE EXPLODED VIEWS





[goind.com.au](http://goind.com.au)