GESPASA

M METERS

High Flow Volumetric Meter

INSTRUCTION MANUAL AND WARRANTY



INSTRUCTION MANUAL
HIGH FLOW VOLUMETRIC METER

M METERS

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1. DESCRIPTION AND OPERATION

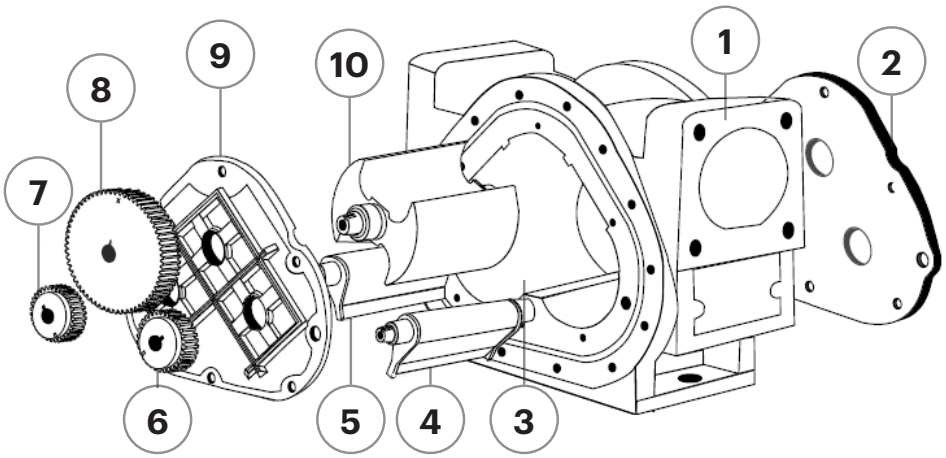
Operating principle for measuring body

These meters are positive displacement meters. They are designed for liquid measurement in both custody-transfer and process-control applications. They can be installed in pump or gravity flow systems. Because of their simple design, they are easy to maintain and easy to adapt to a variety of systems.

The meter housing is designed with three cylindrical bores. Three rotors, the blocking rotor and two displacement rotors, turn in synchronized relationship within the bores. The three rotors are supported by bearing plates. The ends of the rotors protrude through the bearing plates. The blocking rotor gear is placed on the end of the blocking rotor. The displacement rotor gears are placed on the ends of the displacement rotors. These gears create the synchronized timed relationship between the three rotors.

The vane-displacement rotors reciprocate through the two half-cylinder bores of the meter element, while the single-lock rotor rotates within its bore in such a way as to produce a continuous capillary seal between the non-metered product towards up and the average product down.

At one end of each shaft is a timing gear. The lock rotor gear, which has twice as many teeth as each of the shift rotor gears, rotates at half the rpm of the shift rotors.



1	Meter Housing
2	Bearing Plate
3	Cylindrical bores
4-5	Displacement Rotor
6-7	Displacement Rotor Gears
8	Blocking Rotor Gear
9	Bearing Plate
10	Blocking Rotor

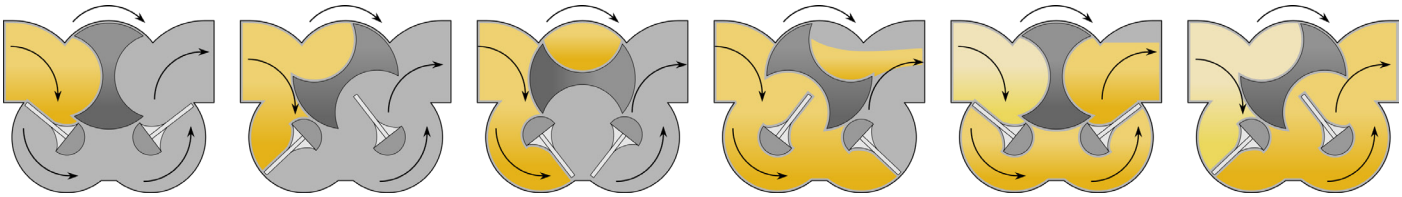
As fluid moves through the meter housing, the rotor assembly turns. The liquid is broken into uniform sections by the turning rotors. Fluid displacement occurs simultaneously. As fluid enters, another portion of the fluid is being partitioned and measured. At the same time, the fluid ahead of it is displaced out of the meter and into the discharge line. Since the volume of the bores is known, and the same amount of fluid passes through the meter during each revolution of the blocking rotor, the exact volume of liquid that has passed through the meter can be determined with a high degree of accuracy.

This true rotary motion is transmitted through the packing gland, the face gear, the adjuster drive shaft, and the adjuster to the register stack and counter. True rotary motion output means consistent accuracy, since the register indication is in precise agreement with the actual volume throughput at any given instant. At any position in the cycle, the meter body, the blocking rotor, and at least one of the displacement rotors form a continuous capillary seal between the unmetered upstream product and the metered downstream product.

Because the product is separated by the capillary seal, no metal-to-metal contact is required within the metering element. This means no wear, and no wear means no increase in slippage, which means no deterioration in accuracy. Throughout the metering element, the mating surfaces are either flat surfaces or cylindrical faces and sections that are accurately machined. These relatively simple machining operations, plus the fact that there is no oscillating or reciprocating motion within the device, permits extremely close and consistent tolerances within the GESPASA meter.

The product flowing through the meter exerts a dynamic force that is at right angles to the faces of the displacement rotors. The meter is designed so that the rotor shafts are always in a horizontal plane. These two facts result in no axial thrust. Therefore, GESPASA meters do not need thrust washers or thrust bearings, and the rotors automatically seek the centre of the stream between the two bearing plates–eliminating wear between the ends of the rotors and the bearing plates. Once again, no wear results means no metal fatigue and no friction.

M METERS





Blocking Rotors



Displacement Rotors

GESPASA meters are made of a variety of materials to suit a variety of products. Because of their no-wear design, capillary seals, and unique rotary metering, GESPASA meters provide unequalled accuracy, long operating life, and exceptional dependability.

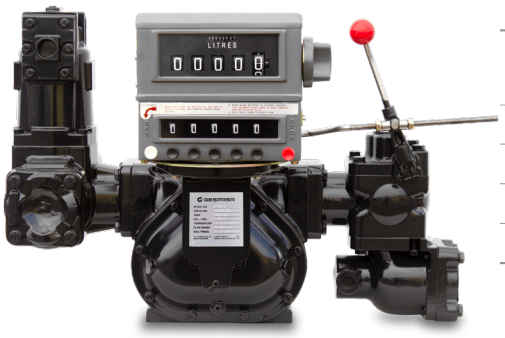
2. MODELS & ACCESSORIES



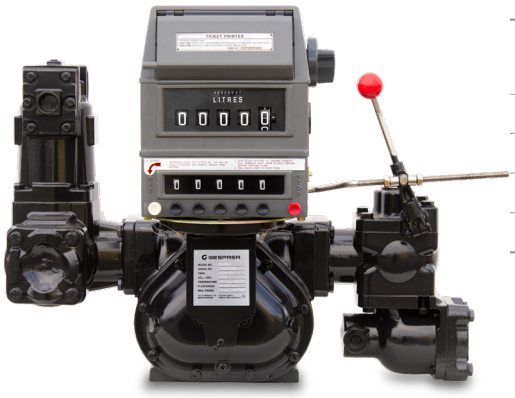
METER WITH MECHANICAL REGISTER	Code
M-40 1 1/2" · 25-250 l/min	32735-CF00004
M-40 1 1/2" · 7-66 gpm	32735-CF00014
M-50 2" · 55-550 l/min	32745-CF00004
M-50 2" · 15-145 gpm	32745-CF00014
M-80 3" · 115-1,150 l/min	32725-CF00004
M-80 3" · 30-304 gpm	32725-CF00014
M-100 4" · 170-1,700 l/min	32715-CF00004
M-100 4" · 44-449 gpm	32715-CF00014
M-150 6" · 300-3,000 l/min	-



METER WITH MECHANICAL REGISTER, DEGASSER AND PREFILTER	Code
M-40 1 1/2" · 25-250 l/min	32735-CF00000
M-40 1 1/2" · 7-66 gpm	32735-CF00010
M-50 2" · 55-550 l/min	32745-CF00000
M-50 2" · 15-145 gpm	32745-CF00010
M-80 3" · 115-1,150 l/min	32725-CF00000
M-80 3" · 30-304 gpm	32725-CF00010
M-100 4" · 170-1,700 l/min	32715-CF00000
M-100 4" · 44-449 gpm	32715-CF00010
M-150 6" · 300-3,000 l/min	32755-CF00000
M-150 6" · 79-792 gpm	32755-CF00010



METER WITH MECHANICAL REGISTER, PRESET, DEGASSER AND PREFILTER	Code
M-40 1 1/2" · 25-250 l/min	32735-CF00001
M-50 2" · 55-550 l/min	32745-CF00001
M-80 3" · 115-1,150 l/min	32725-CF00001
M-100 4" · 170-1,700 l/min	32715-CF00001



METER WITH MECHANICAL REGISTER, PRINTER, PRESET, DEGASSER AND PREFILTER	Code
M-40 1 1/2" · 25-250 l/min	32735-CF00008
M-50 2" · 55-550 l/min	-
M-80 3" · 115-1,150 l/min	32725-CF00008
M-100 4" · 170-1,700 l/min	-

M METERS



M-50-LPG, 2'' · METER WITH MECHANICAL REGISTER, DIFFERENTIAL VALVE, DEGASSER AND PREFILTER FOR LPG	Code
M-50 LPG 2" · 55-550 l/min	-

6" Strainer + FL air eliminator



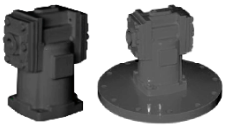
Strainer (Aluminium)



Piston Valve



FL Air Eliminator (Aluminium)



Check Valve



ACCESSORIES	Code
6" Strainer +FL air eliminator	-
2" Differential Valve for LPG	-
Air eliminator	808318041
Filter set + Degasser (M-40 1 1/2")	808318006
Filter set (M-50 2")	808318062
Filter set + Degasser (M-50 2")	808318027
Filter set + Degasser (M-80 3")	808318090
Filter set + Degasser (M-100 4")	808318042
Piston Valve (M-50 2")	808318059
Piston Valve (M-80 3")	808318039
Piston Valve (M-100 4")	-
Check Valve (M-50 2")	808318071
Check Valve (M-80 3")	808318072

Mechanical Register



Preset Register





Mechanical Counter with Ticket Printer

GK-7 Controller



Stainless steel dual-flow solenoid Valve compatible with GK-7 Controller





Pulser

GE Display



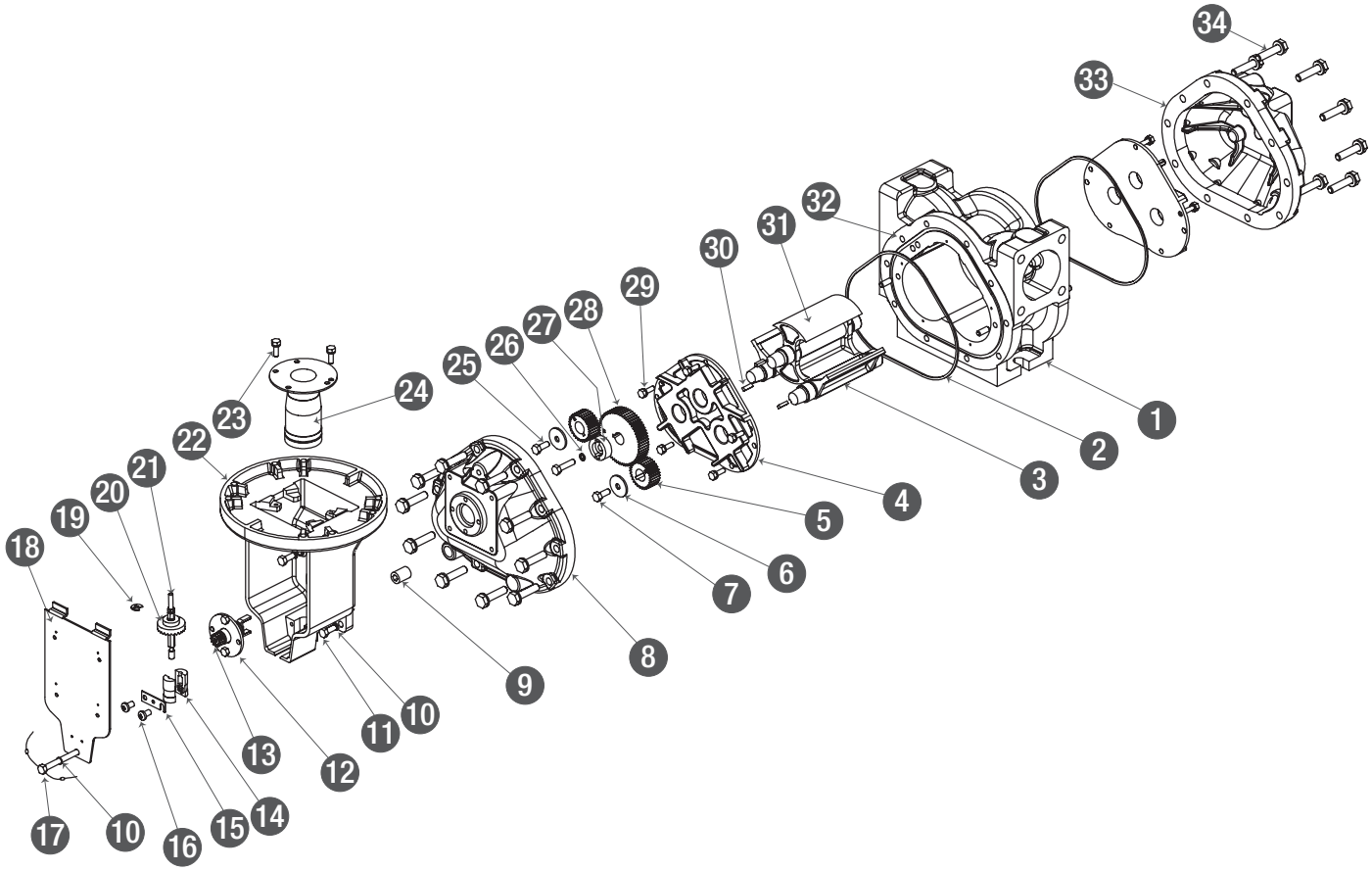
MECHANICAL & ELECTRONIC REGISTER	Code
Mechanical Register	808318038
Mechanical Register (US GAL)	808318053
Preset Register	808318046
Mechanical Counter with Ticket Printer	-
GK-7 · Own consumption controller	25334-CF00000
Stainless steel dual-flow solenoid valve (M-50 · 24 V)	808318047
Stainless steel dual-flow solenoid valve (M-80 · 24 V)	808318048
Stainless steel dual-flow solenoid valve (M-80 · 230 V)	808318057
GE · Electronic Display with Litre Preset	253400200
Encoder Without Counter or Printer	808318026
Pulser	-
Gear Plate (M-50 with preset)	808318058
Gear Plate (M-80 with preset)	808318049
Gear Plate (M-100 with preset)	808318093
Gear Plate (M-50 without preset)	808318051

3. TECHNICAL DATA

Model	**M-40**	**M-50**	**M-80**	**M-100**	**M-150**
Size	40 mm / 1 ½''	50 mm / 2''	80 mm / 3''	100 mm / 4''	150 mm / 6'' or 100 mm / 4'' (*optional*)
Flow *(l/min)*	25 - 250	55 - 550	115 - 1,150	170 - 1,700	300 - 3,000
Volume per revolution	0.309 L	0.681 L	1.839 L	5.102 L	9.507 L
Max. Pressure	10 bar (145 PSI)				
Accuracy	±0.2%				
Repeatability	≤0.07 %				
Temperature	-30 ºC to +70 ºC				
Standard Measurement	Litre / US GAL / IMP GAL *(please, ask for it when ordering)*				
ATEX Category	II 2G Ex h IIB T5 Gb				
Packaging size LxWxH *(approx.)*	510 x 460 x 490 mm	510 x 460 x 490 mm	580 x 500 x 610 mm	760 x 640 x 720 mm	800 x 650 x 790 mm
Net weight *(approx.)*	23 kg	26 kg	40 kg	70 kg	130 kg
Gross weight *(approx.)*	25 kg	28 kg	47 kg	93 kg	180 kg

4. SPARE PARTS

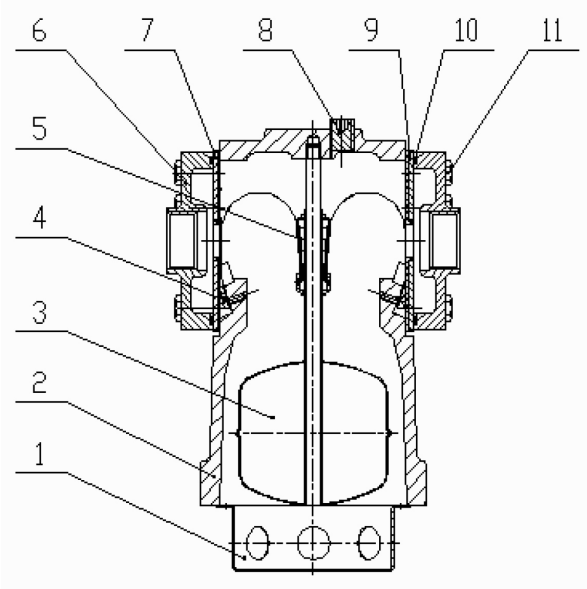
4.1. Meter



No.	DESCRIPTION
1	Housing
2	O-Ring (2)
3	Displacement Rotor Assembly
4	Bearing Plate
5	Gear Displacement Pinion (2)
6	Rotor Gear Washer (2)
7	Screw (2)
8	Front Cover
9	Plug
10	Flat Washer (5)
11	Screw (4)
12	Packing Gland Assembly
13	Packing Gland Gear
14	Drive Shaft Bushing
15	Bearing Retainer
16	Screw (2)
17	Screw (1)

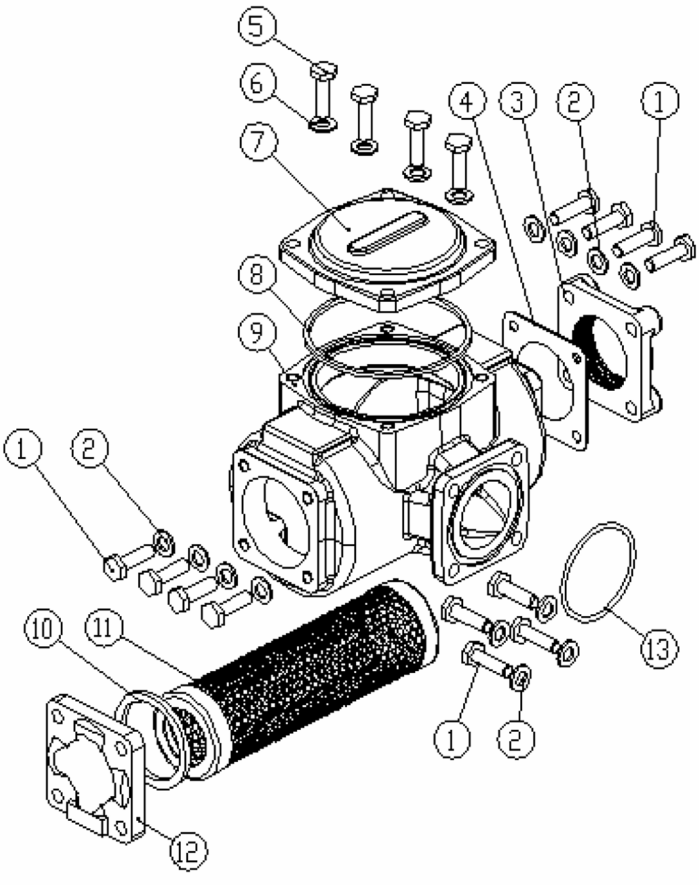
No.	DESCRIPTION
18	Dust Cover Plate
19	Retaining Pin
20	Pinion Gear
21	Shaft
22	Counter Bracket
23	Screw (3)
24	Adjuster Assembly
25	Screw (1)
26	Lock washer
27	Driver Packing Gland
28	Blocking Rotor Gear
29	Screw (8)
30	Stainless Steel Key
31	Blocking Rotor Assembly
32	Pin Dowel
33	Rear Cover
34	Screw (20)

4.2. Air Eliminator



No.	DESCRIPTION
1	Cup, Baffle
2	Housing
3	Float and Stop
4	Screw (2)
5	Valve Reed (2)
6	Cover, Air Elimination (2)
7	Valve Plate Assembly
8	Plug
9	Valve Plate
10	Seal Ring, Outlet (2)
11	Screw (12)

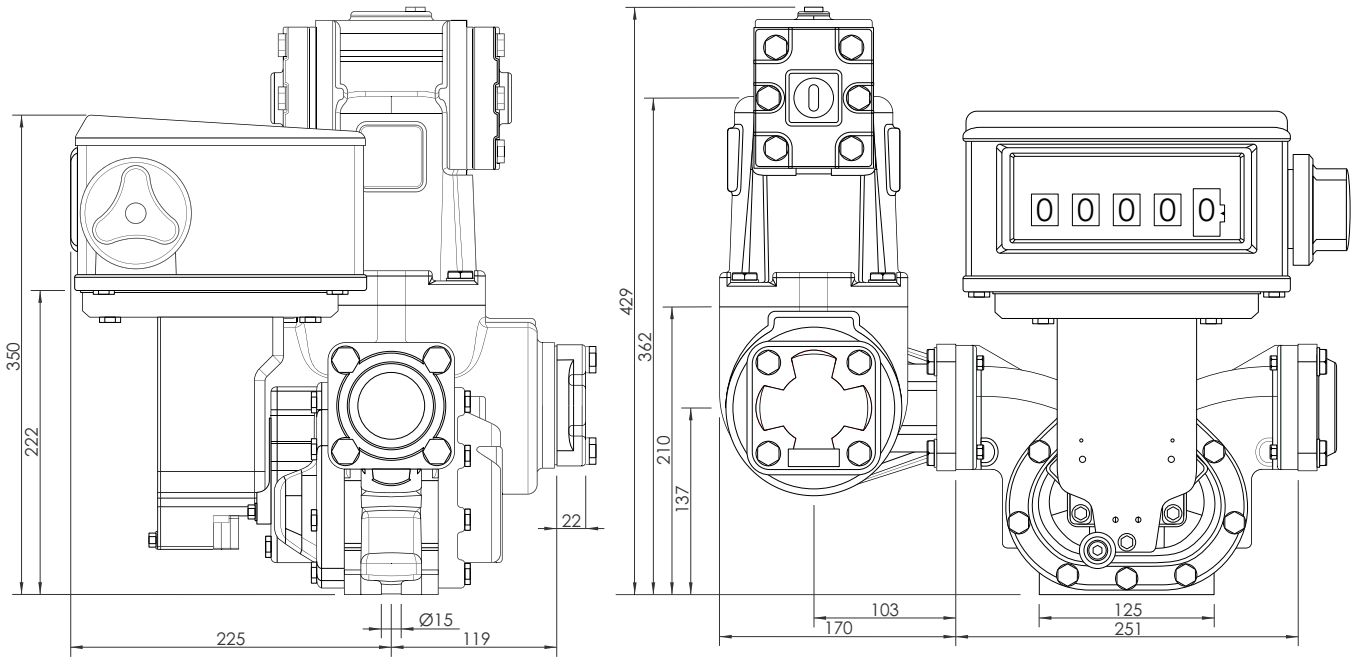
4.3. Filter



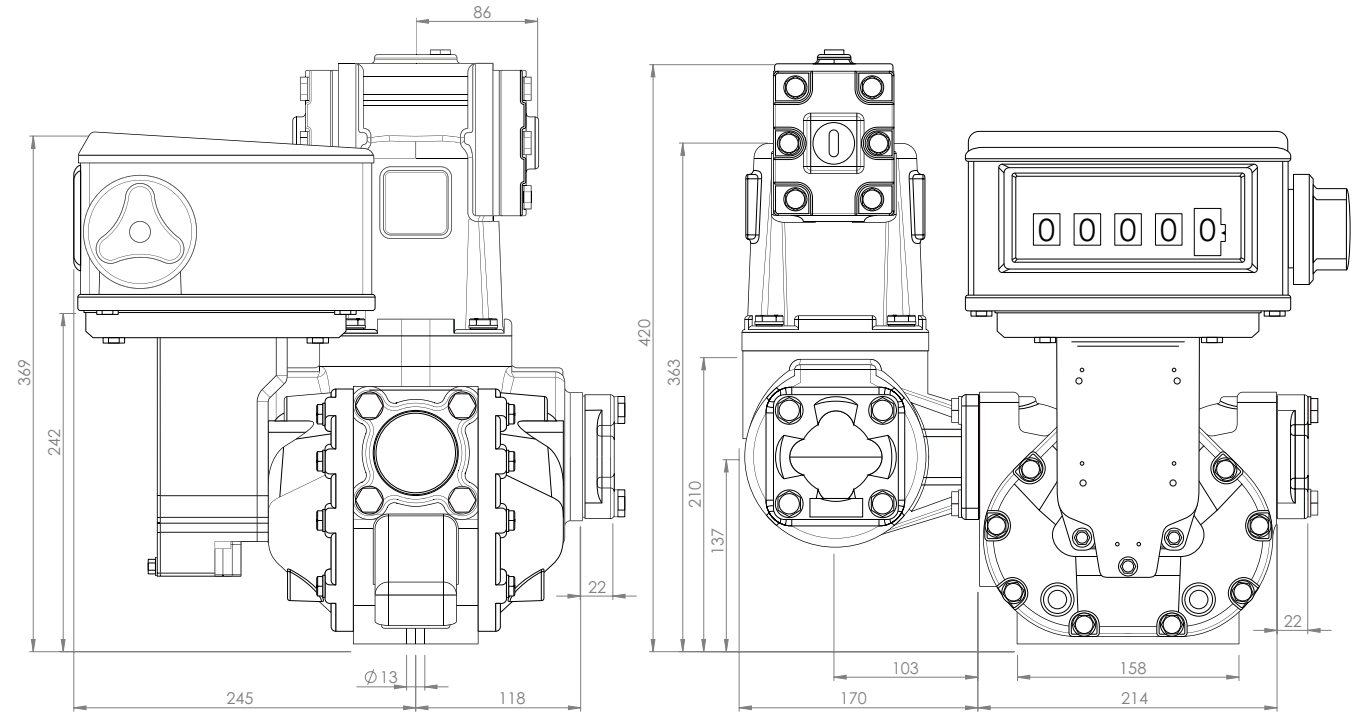
No.	DESCRIPTION
1	Screw (12)
2	Washer (12)
3	Flange
4	Flange Gasket
5	Screw (8)
6	Washer (8)
7	Cover
8	O-Ring
9	Housing
10	Gasket
11	Strainer
12	Cover

5. DIMENSIONS

M-40

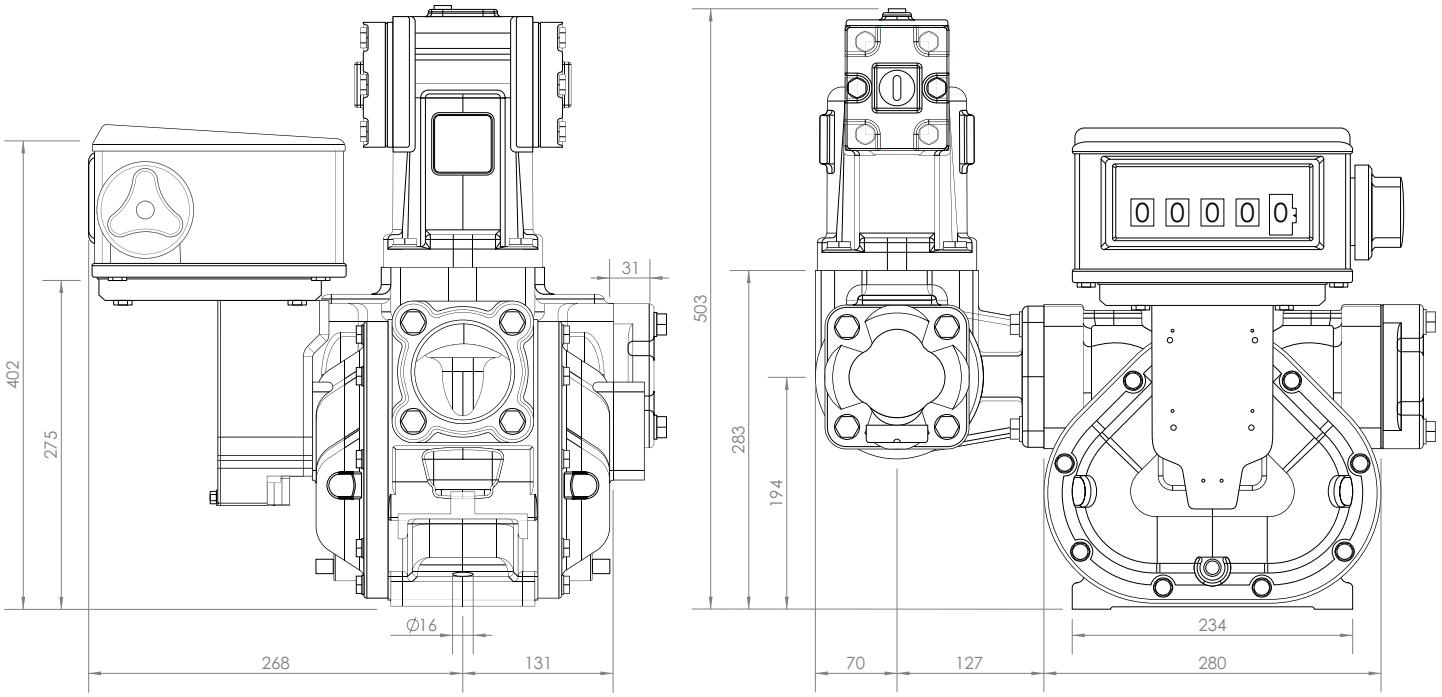


M-50

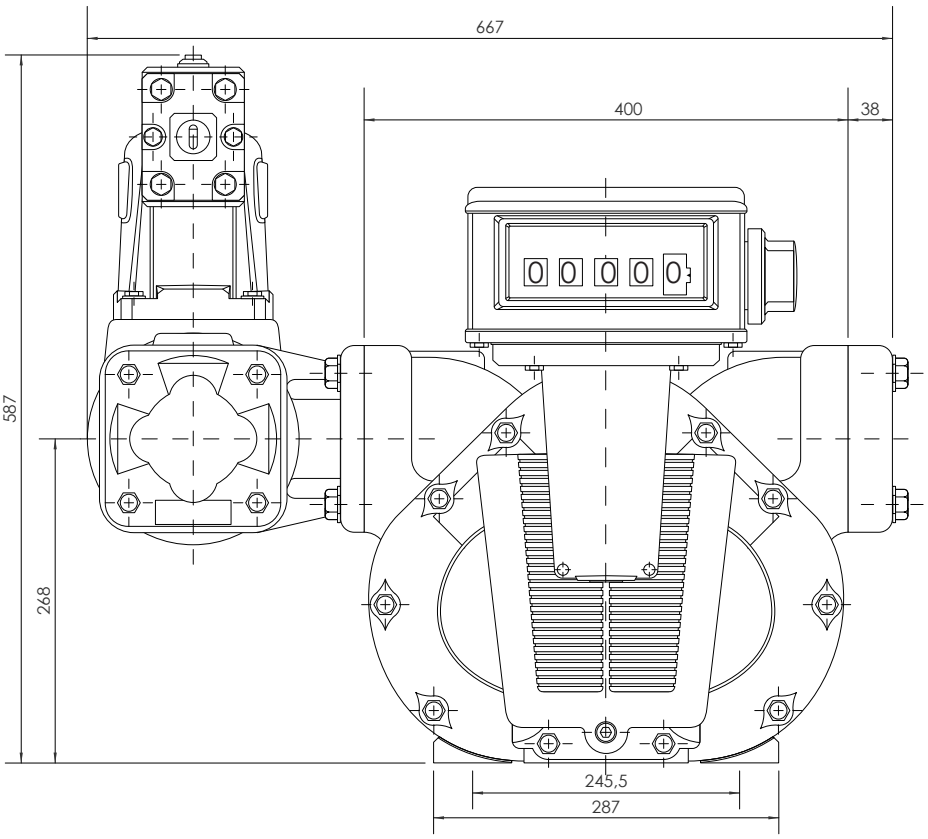


M METERS

M-80

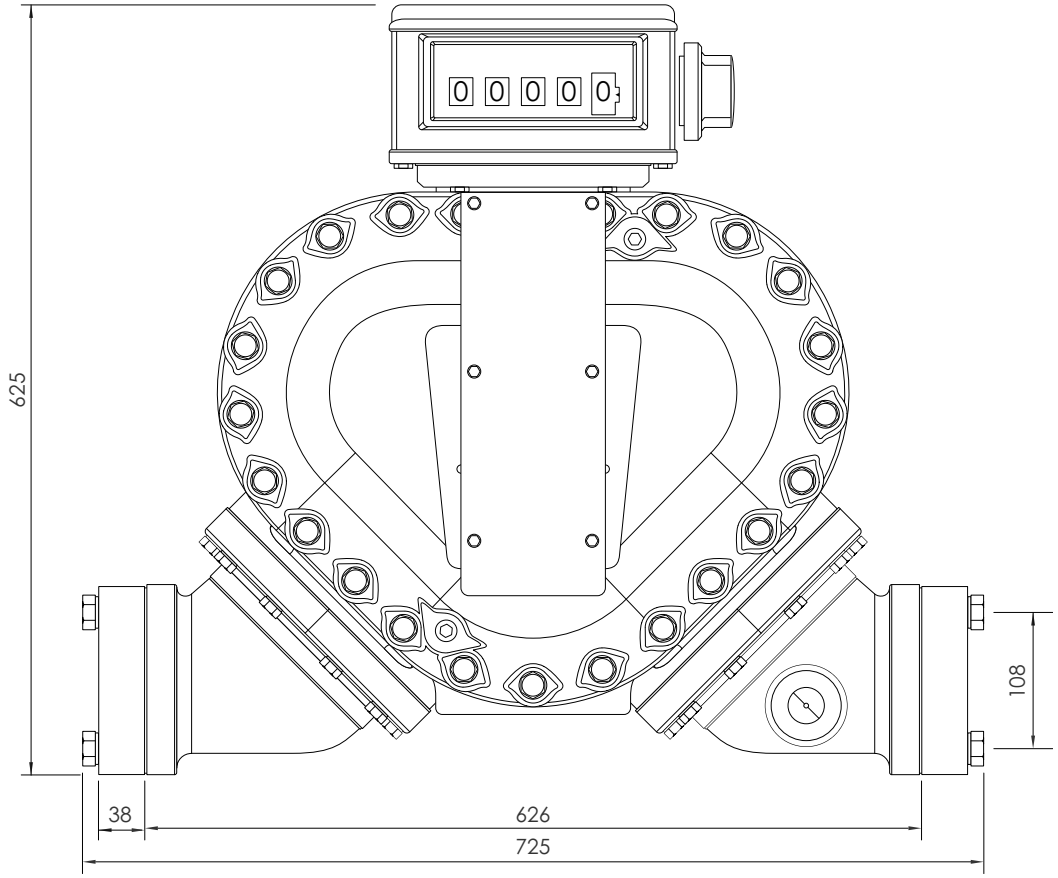


M-100



M METERS

M-150



6. TYPICAL APPLICATION

- Check of loading/unloading operations of fuel and petrochemical products in fuel bulk plants and/or refineries
- On truck tanker for fuel/LPG transport and delivery
- Heavy duty fuel dispensing system for big vehicles and airplanes

Typical Application of Aluminium Construction

Class 1 meter: refined petroleum products, such as gasoline, fuel oil, diesel fuel, kerosene, ethylene glycol, motor oils and rotogravure ink.

Class 2 meter: aviation petrol and jet fuels.

Class 3 meter: a wide variety of products such as: liquid sugars, corn syrup, corn sweeteners, dextrose, fructose, sucrose, maltose, Lactose, corn oil, soy bean oil, cotton seed oil, coconut oil, and shortening's etc. rate of flow is based on viscosity to pressure loss relationship.

Class 10 meter: liquefied petroleum gas (LPG) including butane, isobutene, pentane, ethane, Freon and propane.

Class 14 meter: crude oil, also for heated and/or viscous liquids including animal fats, resins, #6 oil and non-abrasive asphalt emulsions.

Class 15 meter: for metering oil or water based latex products, polyester resins, and adhesives (neutral pH). Also available for metering herbicides and nitrogen fertilizer solutions (requires Viton and Teflon seals).

Class 16 meter: for general solvent metering, such as methanol, toluene, xylem, naphtha, acetone, MEK, MIBK, and alcohols including ethanol.

7. INSTALLATION REQUIREMENT

WARNING

In normal operation, no part of the LPG system should be subjected to pressures in excess of the rated working pressure without an automatic safety valve to vent the excess pressure to a safe location away from the operator and other persons.

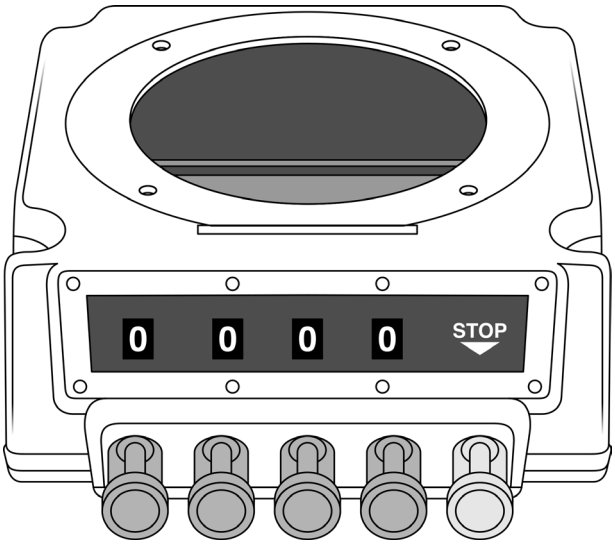
Failure to provide such safety relief may result in leakage or rupture of one or more components in the system. This could result in personal injury or death from either the leakage or the debris from the rupture.

- Ensure that all safety regulations regarding room ventilation, temperature control, fire prevention and fire extinguishing systems have been observed.
- Make all connections to ensure that the meter and the earthing system are equipotential.
- Ensure easy access to fire extinguishers for your product. Consult your local fire brigade for proper information about fire problems and mandatory regulations.
- Install the meter and its accessories in accordance with the applicable electrical and safety standards.
- Before installing the meter, flush the entire piping system with a fluid compatible with the meter's construction.
- Keep the external surfaces of the meter clean so that any defects can be easily detected.
- The meter must be securely fastened to a platform or other support regardless of its mounting position. Never hand the meter to the piping system and take all necessary measures to prevent piping stresses, such as material expansion due to temperature, flange bolt stress, etc., from being transmitted to the meter assembly. Expansion joints at both the inlet and outlet of the meter assembly will protect it from these stresses.
- Calculate suitable working areas for maintenance work. Remember that you will need a support where the meter will be mounted.
- Meters are made of special materials depending on the liquid(s) they are used with. Their compatibility with a particular class of liquid is indicated on the M series label. Meters should not be used with other fluids. If in doubt, request information on M Series meters.
- If necessary, run the pipework downstream of the meter to a bench tester for calibration and/or metrological check.
- If there is no strainer in the assembly, install a suitable strainer upstream of the meter to remove any foreign matter (weld spatter, dirt, etc.) Foreign matter above a certain size may enter the rotors and cause them to seize up.
- If the meter assembly is equipped with an air eliminator, connect the two outlet threads (or only one if the assembly has an air check valve) to the tank of the liquid being metered or to another sealed container at ambient pressure. This is to prevent contamination of the environment.
- There is a reciprocal relationship between the direction of flow of the liquid in the meter and the correct indication of the delivered quantity on the register display; if you want the register to count down, you must reverse the position of the adjustment drive gear.
- New or repaired pipework can be a source of weld spatter or foreign material that can clog or break the strainer mesh. The screen must be checked daily for the first 100 hours of operation.
- Frequent inspection and cleaning of the strainer is necessary to maintain good performance. Locate the strainer on the inlet side of the meter. Screw the strainer firmly onto the meter flange. Attach the piping to the strainer.
- The meter and its accessories must not support the weight of the piping system. There is enough space to remove the air eliminator.
- Mount the air eliminator on the inlet side of the meter. Always mount the air eliminator vertically. Screw the air eliminator to the strainer coupling flange. Connect and secure the piping to the air eliminator.

8. OPERATION REQUIREMENTS

- The meter must be kept full of product at all times. An easy way to achieve this is to place the meter assembly in the line below the centre line of the pipe. This requires the addition of elbows and flanges prior to meter installation. The meter should be installed in a bypass loop below the centreline of the pipe with block valves upstream and downstream. A block valve should be located in the main flow and marked as the bypass valve. Mounting the meter in this way allows the meter to be kept full of liquid at all times and to be isolated for service or calibration if required, while still allowing flow through the bypass valve.
- Attention: Any part of the pipework that could stop and/or isolate the flow should be fitted with a pressure relief device to prevent damage from thermal expansion.
- Upstream pipes must be kept full to prevent air entering the meter. If the upstream or inlet pipework is designed to allow reverse flow, foot valves or non-return valves must be installed.
- Underground tanks fitted with a submersible pump will eliminate many of the problems that occur with positive displacement (suction) if the suction pipework is incorrectly sized or the lift is too great.
- Pay careful attention to your system pumping equipment and pipework as they will affect the liquid being measured as it enters the meter assembly. Systems should be free from conditions that cause or introduce entrained air or vapour.
- When installing pumps, fully follow the manufacturer's recommendations. Pay particular attention to factors such as: use of foot valve, size of pipe to inlet and compliance with net positive suction head conditions where suction pumping is required.
- For volatile liquids, such as light hydrocarbons, which tend to flash or vaporise easily at higher ambient temperatures, it is desirable to use flooded suction and pipework larger than the normal pump size.
- If the meter is located under a tank (on road tankers), the course of the suction pipe will affect the metering accuracy. The pipework should have a constant slope towards the pump to avoid goosenecks.
- Hydraulic shock is harmful to all components of an operating system, including valves, pump and meter. Meters, in particular, must be protected from shock due to their need to measure with high accuracy. In general, the best protection is prevention, which can be easily achieved by adjusting valve closing rates so that shock does not occur.
- Thermal expansion, such as hydraulic shock, is a phenomenon that can easily damage meters and systems in general. Care should be taken when designing the system to include pressure relief valves in any part or branch of the system that could be shut off by closing the service valve or block valves.
- The meter shall not operate in a dry (no liquid) condition for more than 5 minutes.
- The meter shall operate within the recommended flow range. Only in some exceptional cases it may be allowed to operate at a flow rate 20% higher than the nominal flow rate and only for a short time.
- During start-up, the system must be slowly filled with liquid. There must be no air at this stage. Take care not to damage the meter. Use gravity or a pump to fill the system.
- Fill the system using a pump. Contact the pump manufacturer for information on charging. Once the pump has been charged with liquid, proceed as follows:
  - Ensure that the downstream valve is closed.
  - The meter counter will start to rotate.
  - When the meter has started to count volume, open the valve fully.
  - At this stage the meter should not be running faster than 20% of its rated flow. Once the product is flowing out of the end of your system, the outlet valve can be opened fully, provided the system is designed not to exceed the flow rate marked on the meter.
- Never use the meter or system if it is not completely filled with liquid or if air bubbles or compressed air/vapour are present. If this is not possible, use devices to remove air/vapour.

9. PRESET OPERATION (depending on the model)



1. SINGLE-STAGE OPERATION

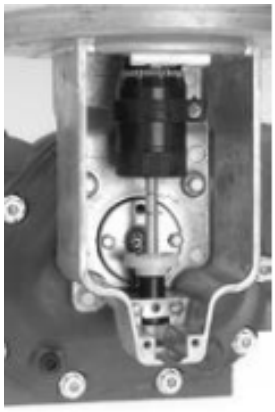
By pressing the four black buttons located on the front of the preset device, the operator selects the quantity to be supplied. Each button controls the number on the wheel above it. There is no need to set the numbers in sequence. Any number can be set first, second, third or fourth.

2. TWO-STAGE OPERATION

Preset operation is basically the same during single or two-stage closure. The quantity desired is set by the operator and the valve is opened to the full flow position. At a predetermined “dwell” period the preset allows the valve to close partially, slowing the flow to approximately 10-20 % of full flow. When the desired quantity has been delivered, the preset releases the valve allowing it to close, completing the delivery.

10. CALIBRATION

1. REMOVE THE DUST COVER



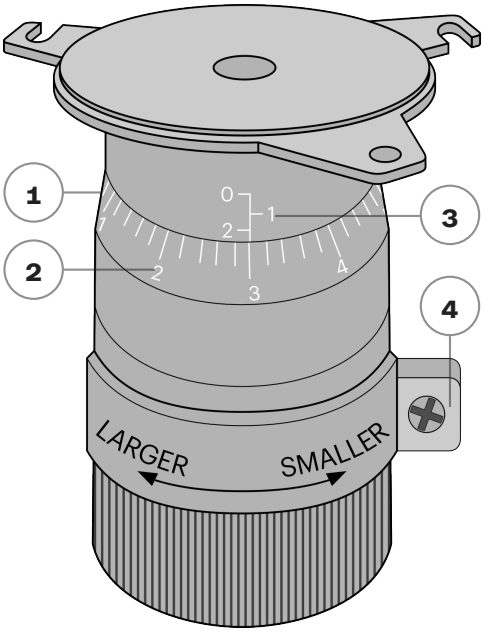
- Cut the dust cover seal wire with side cutters.
- Remove the dust cover screws.
- Remove the dust cover

2. SET THE STANDARD ADJUSTER

- Check meter registration by delivering product to reliable, accurate prover. Perform multiple delivery tests to verify the meter repeatability.
- Record the setting indicated on the adjuster.
- Note the difference between the volume of the prover and the volume indicated on the meter counter. Calculate the % correction required using the formula below.

$$\% \text{ Correction} = \frac{\text{Volume in prover - Volume on meter counter}}{\text{Volume in prover}} \text{ x100}$$

- Loosen the adjuster clamp screw.
- When the prover volume is less than the meter counter volume, add the percentage to the original adjuster setting by turning the thimble towards the arrow marked larger (volume). Correct the original setting by approaching the number desired from the next larger number. For example, if the desired adjuster setting is 2.4, turn the adjuster thimble to the left to number 5, then to the right to obtain the 2.4 setting. Adjuster is currently set at 2.3 in the below drawing.
- When the prover volume is more than the meter counter volume, subtract the percentage from the original adjuster setting by turning the thimble in the direction of the arrow marked smaller volume percent.
- Retighten the adjuster clamp screw. Run product through the meter to allow the adjuster to take a set. Then make several prover runs to check for accuracy.



1	.02% Divisions
2	.1% Divisions
3	1% Divisions
4	Adjuster Clamp Screw

11. SERVICING THE DRIVE COMPONENTS

This section includes the following topics:

- Removing the Dust Cover
- Servicing the Adjuster and Adjuster Drive Assembly
- Servicing the Packing Gland
- Packing Gland Retaining Plate

Before proceeding, it is important to heed the following cautions and warnings.

RELIEVING INTERNAL PRESSURE

All internal pressures must be relieved to zero before disassembling or inspecting the strainer, vapour eliminator, any valves in the system, packing gland and front or rear covers.

Serious injury or death from fire or explosion may occur if maintenance is performed on a system that has not been properly depressurised and evacuated.

Strictly follow this procedure Relieving Internal Pressure Procedure for LPG and NH3 Meters:

1. Close the belly valve of the supply tank.
2. Close the valve on the vapour return line.
3. Close the manual valve on the supply line on the inlet side of the meter. If there is no manual valve on the inlet side, consult the truck manufacturer for procedures to depressurise the system.
4. Slowly open the valve/nozzle at the end of the supply line.
5. When the product has drained, close the valve/nozzle at the end of the supply line.
6. Slowly crack the fitting on top of the differential valve to release the product pressure in the system. Product will drain from the meter system.
7. As the product drains from the differential valve, slowly open and close the discharge line valve/nozzle. Repeat this step until the product stops draining from the differential valve and discharge line valve/nozzle.
8. Leave the pressure line valve/nozzle open while working on the system.

11.1. Removing the Dust Cover

Follow this procedure to remove the Dust Cover:

1. Cut the Dust Cover seal wire with side cutters.
2. Remove the Dust Cover screws with a 5/6'' wrench or slotted screwdriver.
3. Remove the Dust Cover.

11.2. Servicing the Adjuster and Adjuster Drive Assembly

Follow this procedure to remove the adjuster and adjuster drive assembly:

1. Record the setting of the adjuster micrometer and note the position of the adjuster drive gear..

REMEMBER TO REASSEMBLE TO THE ORIGINAL POSITION

When reinstalling, be sure to return the adjuster drive gear to its original position or the counter will run backwards. The gear is set either below or above the gland pinion.

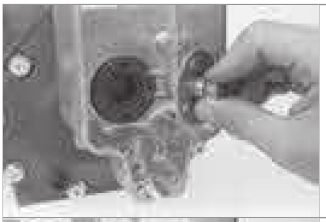
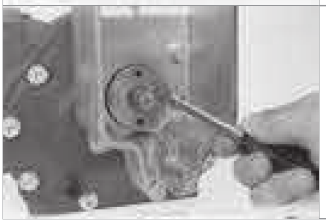
2. Use a standard screwdriver to loosen (or remove) the two retaining spring screws.
3. Swing the retaining spring away from the adjuster drive bushing.
4. Loosen the adjuster mounting clamp screw with a screwdriver.
5. Remove the adjuster from the top of the meter:
   - Remove the screws securing the adjuster mounting plate to the counter adapter.
   - Lift the adjuster mounting plate with the adjuster out of the mating adapter.
   - Remove the adjuster drive assembly from the housing.

6. Remove the adjuster from the front of the meter:
   - Remove the adjuster drive assembly from the adapter and from the housing.
   - Remove the slotted head screw securing the adjuster to the mounting plate.
   - Slowly pull the adjuster out through the front of the meter, rotating it from left to right to release the adjuster mounting plate.
   - Pull the adjuster downwards to remove from the meter.

11.3. Servicing the Packing Gland

After prolonged use, the packing gland may leak from the metering chamber. Leakage is a sign of wear and is caused by the type of product being metered, the operating temperature and other system conditions. If the packing gland is leaking, it should be replaced or repaired. The packing gland can be serviced in the field.

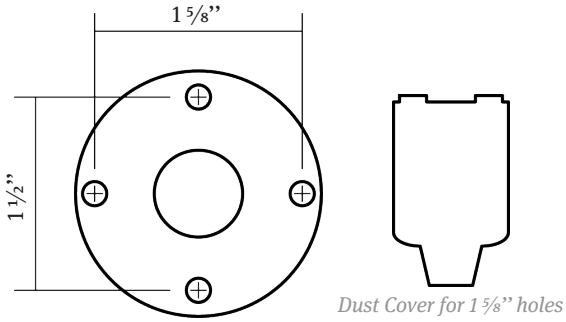
Follow this procedure to remove the packing gland:

	1. Using a 5/16" socket and ratchet spanner or 5/16" nut driver, remove the two screws from the gland retainer plate.		3. Pry off the retaining ring with a standard screwdriver.
	2. Pull out the packing gland.		4. Pull the driver out from the assembly.

11.4. Packing Gland Retaining Plate

The retaining plate for the packing gland has four holes:

Two drilled 1½" holes on centre and two drilled 1⅝'' holes on centre. If your meter has a counter adapter Dust Cover shaped like the illustration below, mount the retaining plate using the two 1⅝'' holes. If your meter does not have the counter adapter dust cover like the illustration on the left, mount the retaining plate using the two 1½" holes.

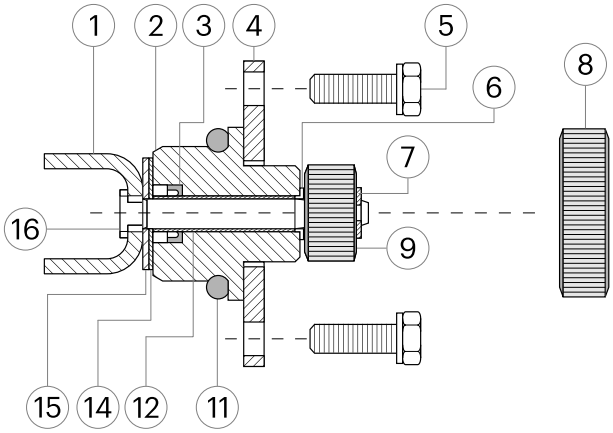


Dust Cover for 1 ⅝'' holes

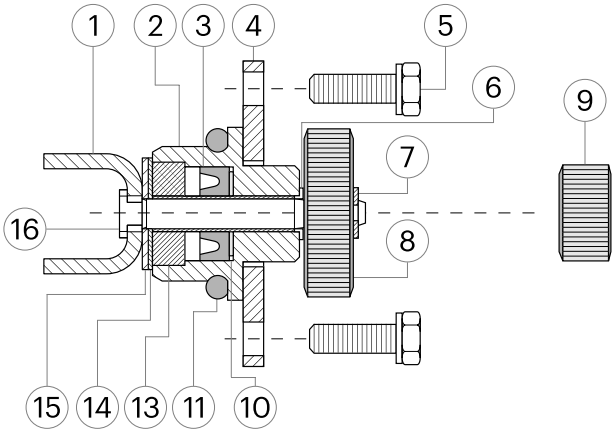
RELIEVING INTERNAL PRESSURE

All internal pressure must be relieved to zero pressure before disassembling or inspecting the strainer, vapour eliminator, any valves in the system, packing gland and the front or rear covers. Refer to Relieving Internal Pressure warning on page 19.

11.5. Packing Gland Components



Standard Packing Gland



LPG Packing Gland

No.	DESCRIPTION	No.	DESCRIPTION
1	Driver	9	Output gear 2:1
2	Aluminium/Stainless housing	10	Nylon washer
3	Buna/Viton/PTFE “U“ Cup	11	Buna/Viton/PTFE O-ring
4	Retaining plate	12	Bushing
5	Two retaining plate screws	13	Carbon guide bearing
6	Stainless steel washer	14	Rulon thrst washer
7	Retaining ring	15	Stainless steel thrust washer
8	Output gear 1:1	16	Shaft

12. TROUBLESHOOTING

No.	PROBLEM	CAUSE & SOLUTION
1	Leakage past packing gland drive shaft housing from internal metering chamber	• The seal has been damaged by pressure or bolts have been screwed incorrectly.
2	Leakage from the cover gasket	• Gasket has been damaged due to shock pressure or cover bolts have not been tightened sufficiently. Replace gasket and tighten cover bolts correctly.
3	Product flows through meter but the register does not operate.	• Check packing gland, and gear train. • If all meter parts are moving then problem is in register. Faulty register should be checked and repaired by trained mechanic. • Remove register from meter. If all meter parts are moving but output shaft of adjuster assembly is not, adjuster is worn and must be replaced. • If totalizer numerals (small numbers) on register are recording, but the big numerals are not moving, register needs repair. • Packing gland gear not turning. Replace the packing gland. This may be caused by starting the flow too rapidly. *For M-80 meters, the drive blade may be sheared.*
4	Product flows through meter but register does not record correctly.	• Adjuster not properly calibrated. • Incorrect gear plate or gear ratio has been installed. • Air is in the system.
5	Breaking teeth on timing gears	• Starting or stopping flow in meter too rapidly. • Pump bypass not adjusted properly.
6	Meter runs too slowly.	• Valve internal mechanism faulty. Valve does not open fully. • Meter gears or rotors partially “salted” enough to slow up rotation of parts. Clean the meter. • Downstream restriction. • Clogged strainer basket.
7	The blocking and displacement rotors do not turn.	• Breaking of the strainer basket likely due to improper maintenance. Replace the strainer basket and follow maintenance procedures. Clean out the meter and its parts. • The gasket got dented so as to cause leaks which allow the intrusion of strange bodies. Replace the gasket. • Blocking and displacement rotor are blocked. Call the technical service.
8	Leak of the product from the strainer lid	• The trouble may be due to seals which are damaged or worn out. Replace the seals. If they are Teflon made, replace them even if still in a good condition. • Dirty surfaces which prevent a perfect sealing by the gaskets. Clean out the gasket housings.
9	Pressure drop in the strainer or flow decrease in the meter	• The basket network is clogged by intruded material. Clean out the strainer body and basket. • The basket network size does not fit the liquid viscosity. Replace the basket with a new one having a proper net size (thicker or looser, with more or less “meshes”).
10	The floater in the air eliminator is crushed.	• The crushing is due to water hammers, the floater is always in position of open slots, letting the liquid leak from them or in the position of closed slots, letting air and vapour go through the meter. Beware water hammers and replace the floater.
11	The floater in the air eliminator is punctured.	• As time goes by the floater can get punctured and fill with product when operating, so that it gets heavy and remains in the position of open slots. This causes the product to leak from the slots. Replace the floater.
12	The reeds in the air eliminator are worn out.	• There is not a perfect sealing with the slots. This cause the product to leak. Replace the reeds.
13	The product leaks from the air eliminator lids.	• The gaskets or the rubber coated plates are worn out. Replace the plates or the gaskets.

13. WARRANTY

1. All the products manufactured by TOT COMERCIAL SA have a WARRANTY of 12 (twelve) months from their purchase, against any manufacturing defect.
2. TOT COMERCIAL SA guarantees, in the warranty period, the change/the devolution of the defective part or product. This material must be sent with prepaid freight to our factory, or any appointed technical service. After our technical inspection, it will be determined whether the responsibility is from the manufacturer, the user, the installer, or the delivery transport.
3. The warranty does not cover: the inadequate use, the negligence, the corrosion, the abuse, the manipulation, or the wrong installation of the products, the use of non-original spare parts or not concerning to the specific model. All the manufactured and/or commercialized equipment must be installed according to the manufacturer's instructions.
4. The accessories and the products not manufactured by TOT COMERCIAL SA are liable for their original manufacturer's warranty.
5. Because of the constant innovations and development, TOT COMERCIAL SA reserves the right to modify the specifications of its products and publicity, without prior notification.

tot comercial, s.a.

Balaguer, June 2025

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*Because of the constant innovations and development, TOT COMERCIAL SA reserves the right to modify their product specifications and publicity, without prior notification.

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