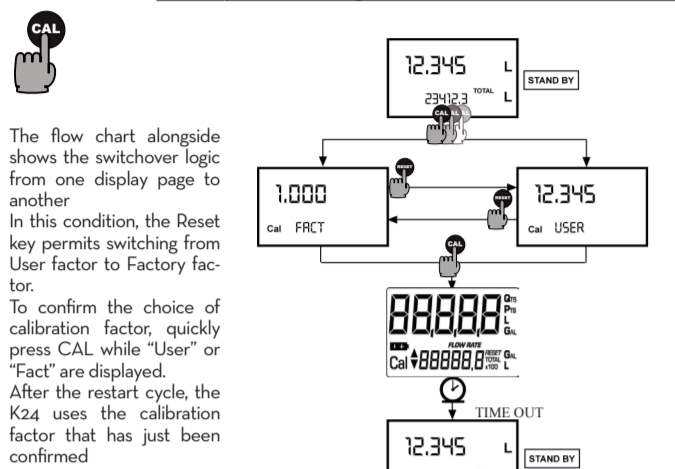


1.2.1 DISPLAY OF CURRENT CALIBRATION FACTOR AND RESTORING FACTORY FACTOR.

By pressing the CAL key while the appliance is in Standby, the display page appears showing the current calibration factor used. If no calibration has ever been performed, or the factory setting has been restored after previous calibrations, the following display page will appear: The word "Fact" abbreviation for "factory" shows that the factory calibration factor is being used.

If, on the other hand, calibrations have been made by the user, the display page will appear showing the currently used calibration factor (in our example 0.998). The word "user" indicates a calibration factor set by the user is being used.



NOTICE When the Factory Factor is confirmed, the old User factor is deleted from the memory

1.2.2 IN FIELD CALIBRATION

FOREWORD This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.

NOTICE For correct K24 calibration, it is most important to:

- When the Factory Factor is confirmed, the old User factor is deleted from the memory
- use a precise Sample Container with a capacity of not less than 5 litres, featuring an accurate graduated indicator.
- ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
- Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);
- after dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the Real value at the end of this stage, during which the level in the container could drop.
- Carefully follow the procedure indicated below.

1.2.2.1 IN-FIELD CALIBRATION PROCEDURE

| ACTION | DISPLAY |
|--|------------------------------|
| 1 NONE Meter in Standby | 12.345 L 1345 TOTAL L |
| 2 LONG CAL key keying The Meter enters calibration mode, shows "CAL" and displays the calibration factor in use instead of partial. The words "Fact" and "USER" indicate which of the two factors (factory or user) is currently in use. Important: This factor is that which the instrument also uses for fluid calibration measurement operations | 1.000 L CAL FRCT (USER) L |
| 3 LONG RESET key keying The Meter shows "CAL" and the partial at zero. The Meter is ready to perform in-field calibration. | 0.000 L CAL FIELD L |
| 4 DISPENSING INTO SAMPLE CONTAINER Without pressing any key, start dispensing into the sample container. Dispensing can be interrupted and started again at will. Continue dispensing until the level of the fluid in the sample container has reached the graduated area. There is no need to reach a preset quantity. | 9.800 L CAL FIELD L |
| 5 SHORT RESET key keying The Meter is informed that the calibration dispensing operation is finished. Make sure dispensing is correctly finished before performing this operation. To calibrate the Meter, the value indicated by the partial totality (example 9.800) must be forced to the real value marked on the graduated sample container. In the bottom left part of the display an arrow appears (upwards and downwards), that shows the direction (increase or decrease) of the value change displayed when the following operations 6 or 7 are performed. | 9.800 L CAL FIELD L |
| 6 SHORT RESET key keying The arrow changes direction. The operation can be repeated to alternate the direction of the arrow. | 9.800 L CAL FIELD L |
| 7 SHORT/LONG CAL key keying The indicated value changes in the direction indicated by the arrow - one unit for every short CAL key keying - continuously if the CAL key is kept pressed. The speed increase rises by keeping the key pressed. If the desired value is exceeded, repeat the operations from point (6). | 9.860 L CAL FIELD L |
| 8 LONG RESET key keying The Meter is informed that the calibration procedure is finished. Before performing this operation, make sure the INDICATED value is the same as the REAL value. | ----- L CAL FIELD L |
| 9 NO OPERATION At the end of the calculation, the new USER K FACTOR is shown for a few seconds, depending on the correction to be made. ATTENTION: If this operation is performed after action (6), without changing the indicated value, the USER K FACTOR would be the same as the FACTORY K FACTOR, thus it is ignored. | 1.015 L CAL FIELD L |

| | |
|---|-----------------------------|
| 9 NO OPERATION At the end of the calculation, the new USER K FACTOR is shown for a few seconds, after which the restart cycle is repeated to finally achieve standby condition. IMPORTANT: From now on, the indicated factor will become the calibration factor used by the Meter and will continue to remain such even after a battery change | 1.015 L CAL FIELD L |
| 10 NO OPERATION The Meter stores the new work calibration factor and is ready to begin dispensing, using the USER K FACTOR that has just been calculated. | 0.000 L CAL 1345 TOTAL L |

1.2.3 DIRECT MODIFICATION OF K FACTOR

If normal Meter operation shows a mean percentage error, this can be corrected by applying to the currently used calibration factor a correction of the same percentage. In this case, the percentage correction of the USER K FACTOR must be calculated by the operator in the following way

$$\text{New cal. Factor} = \text{Old Cal Factor} \cdot \left(\frac{100 - E\%}{100} \right)$$

Example:

Error percentage found: E% = 0.9 %

CURRENT calibration factor: 1.000

New USER K FACTOR: $1.000 \cdot [(100 - (-0.9))/100] = 1.000 \cdot [(100 + 0.9)/100] = 1.009$

If the Meter indicates less than the real dispensed value (negative error) the new calibration factor must be higher than the old one as shown in the example. The opposite applies if the Meter shows more than the real dispensed value (positive error).

| ACTION | DISPLAY |
|---|------------------------------|
| 1 NONE METER in Standby. | 12.345 L 1345 TOTAL L |
| 2 LONG CAL KEY KEYING Meter enters calibration mode, shows "CAL" and displays the calibration factor in use instead of partial. The words "Fact" and "User" indicate which of the two factors (factory or user) is currently being used. | 1.000 L CAL FRCT (USER) L |
| 3 LONG RESET KEY KEYING The Meter shows "CAL" and the zero partial total. Meter is ready to perform in-field calibration by dispensing - see previous paragraph. | 1.000 L CAL FIELD L |
| 4 LONG RESET KEY KEYING We now go on to Direct change of the calibration factor: the word "Direct" appears together with the Currently Used calibration factor. In the bottom left part of the display, an arrow appears (upwards or downwards) defining the direction (increase or decrease) of change of the displayed value when subsequent operations 5 or 6 are performed. | 1.000 L CAL DIRECT L |
| 5 SHORT RESET KEY KEYING Changes the direction of the arrow. The operation can be repeated to alternate the direction of the arrow. | 1.000 L CAL DIRECT L |
| 6 SHORT/LONG CAL KEY KEYING The indicated value changes in the direction indicated by the arrow - one unit for every short CAL key keying - continuously if the CAL key is kept pressed. The speed increase rises by keeping the key pressed. If the desired value is exceeded, repeat the operations from point (5). | 1.003 L CAL DIRECT L |
| 7 LONG RESET KEY KEYING The Meter is informed that the calibration procedure is finished. Before performing this operation, make sure the INDICATED value is that required. | ----- L CAL FIELD L |
| 8 NO OPERATION At the end of the calculation, the new USER K FACTOR is shown for a few seconds, after which the restart cycle is repeated to finally achieve standby condition. IMPORTANT: From now on, the indicated factor will become the calibration factor used by the Meter and will continue to remain such even after a battery change | 1.003 L CAL FIELD L |
| 9 NO OPERATION The Meter stores the new work calibration factor and is ready to begin dispensing, using the USER K FACTOR that has just been changed. | 0.000 L CAL 1345 TOTAL L |

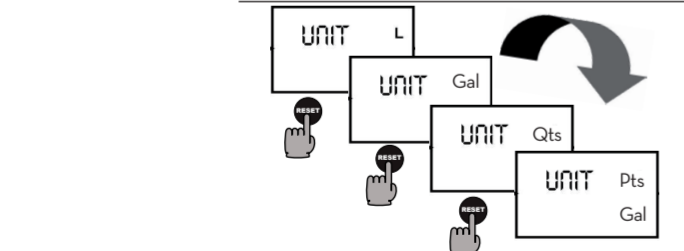
L METER CONFIGURATION

The METER feature a menu with which the user can select the main measurement unit, Quarts (Qts), Pints (Pts), Litres (Lit), Gallons (Gal). The combination of the unit of measurement of the Partial register and that of the Totals is predefined according to the following table:

| Combination no. | Unit of Measurement Partial Register | Unit of Measurement Totals Register |
|-----------------|--------------------------------------|-------------------------------------|
| 1 | Litres (L) | Litres (L) |
| 2 | Gallons (Gal) | Gallons (Gal) |
| 3 | Quarts (Qts) | Gallons (Gal) |
| 4 | Pints (Pts) | Gallons (Gal) |

To choose between the 4 available combinations:

- Wait for the METER to go to Standby
- Then press the CAL and RESET keys together. Keep these pressed until the word "UNIT" appears on the screen together with the unit of measurement set at that time (in this example Litres / Litres)
- Every short press of the RESET key, the various combinations of the units of measurements are scrolled as shown below.



By pressing the CAL key at length, the new settings will be stored, the METER will pass through the start cycle and will then be ready to dispense in the set units.

NOTICE The Reset Total and Total registers will be automatically changed to the new unit of measurement. NO new calibration is required after changing the Unit of Measurement.

M MAINTENANCE

BATTERY REPLACEMENT Use only Piusi Battery code *18021

WARNING To reduce risk of ignition of a flammable or explosive atmosphere do not use Volt meter or similar powered tools during the live maintenance.

WARNING The warranty and the safety of the product is insured only with the use of battery Piusi code *18021 PIUSI S.p.A. DENIES LIABILITY FOR DAMAGES CAUSED BY THE USE OF BATTERIES NOT SUITABLE. K24 should be installed in a position allowing the batteries to be replaced without removing it from the system.

BATTERIES Check the batteries and terminals at least every year to ensure proper operation. It is strongly recommended that terminals be cleaned annually

K24 features two low-battery alarm levels. When the battery charge falls below the first level on the LCD, the fixed battery symbol appears. In this condition, K24 continues to operate correctly, but the fixed icon warns the user that it is ADVISABLE to change the batteries.

If K24 operation continues without changing the batteries, the second battery alarm level will be reached which will prevent operation. In this condition the battery icon starts to flash and is the only one to remain visible on the LCD.

WARNING During meter removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.

WARNING Ensure all liquid is drained from the meter. This could include draining the hose, meter, nozzle or pipe. Wear protective clothing as necessary, loosen both ends of the meter. Use a wrench only on the meter's flat metal surfaces.

WARNING If the meter is not immediately installed again, cap the hose end or pipe to prevent spills. To reduce the risk of ignition of a flammable or explosive atmosphere, batteries must only be changed in a non-hazardous location.

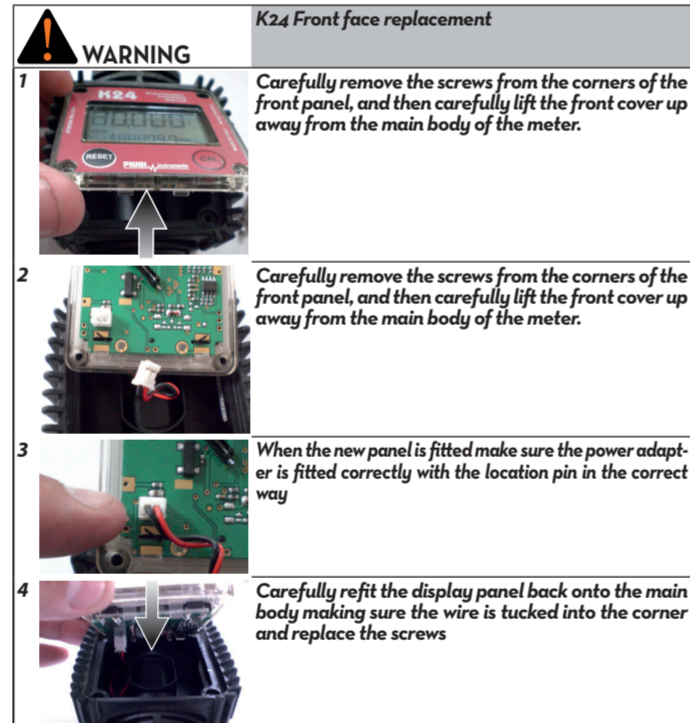
WARNING To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing. Press RESET to update all the totals. Loosen the 4 fixing screws of the lower cover. Remove the old batteries and disconnect the plug. Place the new batteries in the same position as the old ones (sure to put the battery in the correct way). Close the cover again, by positioning the rubber protection as a gasket. K24 will switch on automatically and normal operation can be resumed.

WARNING The K24 will display the same Reset Total, the same Total and the same Partial indicated before the batteries were changed. After changing the batteries, the meter does not need calibrating again.

WARNING Only one operation is necessary to clean the k24. After removing k24 from the plant where it was built in, any residual elements can be removed by washing or mechanically-handling. If this operation does not restore a smooth rotation of the turbine, it will have to be replaced.

WARNING Do not discard the old batteries in the environment. Refer to local disposal regulations. Do not use compressed air onto the turbine in order to avoid its damage because of an excessive rotation.

WARNING Follow the liquid manufacturer's instructions for the disposal of contaminated cleaning solvents



N MALFUNCTIONS (EN60079-19)

| Problem | Possible cause | Remedial Action |
|---|---|---|
| LCD: no indication | Bad battery contact | Check battery contacts |
| Not enough measurement precision | Wrong K FACTOR | With reference to paragraph H, check the K FACTOR. |
| Reduced or zero flow rate | The meter works below minimum acceptable flow rate. | Increase the flow rate until an acceptable flow rate has been achieved. |
| The meter does not count, but the flow rate is correct | TURBINE blocked | Clean the TURBINE |
| K24 is switched off | Incorrect installation of gears after cleaning | Repeat the reassembly procedure |
| | Possible electronic card problems | Contact your dealer |
| | Battery discharged or installed in the wrong way | Check battery charge and/or check the battery position |

O DISPOSAL

Foreword

If the system needs to be disposed, the parts which make it up must be delivered to companies that specialize in the recycling and disposal of industrial waste and, in particular:

Disposing of packing materials: The packaging consists of biodegradable cardboard which can be delivered to companies for normal recycling of cellulose.

Metal Parts Disposal: Metal parts, whether paint-finished or in stainless steel, can be consigned to scrap metal collectors.

Disposal of electric and electronic components: These must be disposed of by companies that specialize in the disposal of electronic components, in accordance with the indications of directive 2012/19/CE (see text of directive below).

Information regarding the environment for clients residing within the European Union: European Directive 2012/19/EC requires that all equipment marked with this symbol on the product and/or packaging not be disposed of together with non-differentiated urban waste. The symbol indicates that this product must not be disposed of together with normal household waste. It is the responsibility of the owner to dispose of these products as well as other electric or electronic equipment by means of the specific refuse collection structures indicated by the government or the local governing authorities.

Disposing of RAEE equipment as household wastes is strictly forbidden. Such wastes must be disposed of separately.

Any hazardous substances in the electrical and electronic appliances and/or the misuse of such appliances can have potentially serious consequences for the environment and human health.

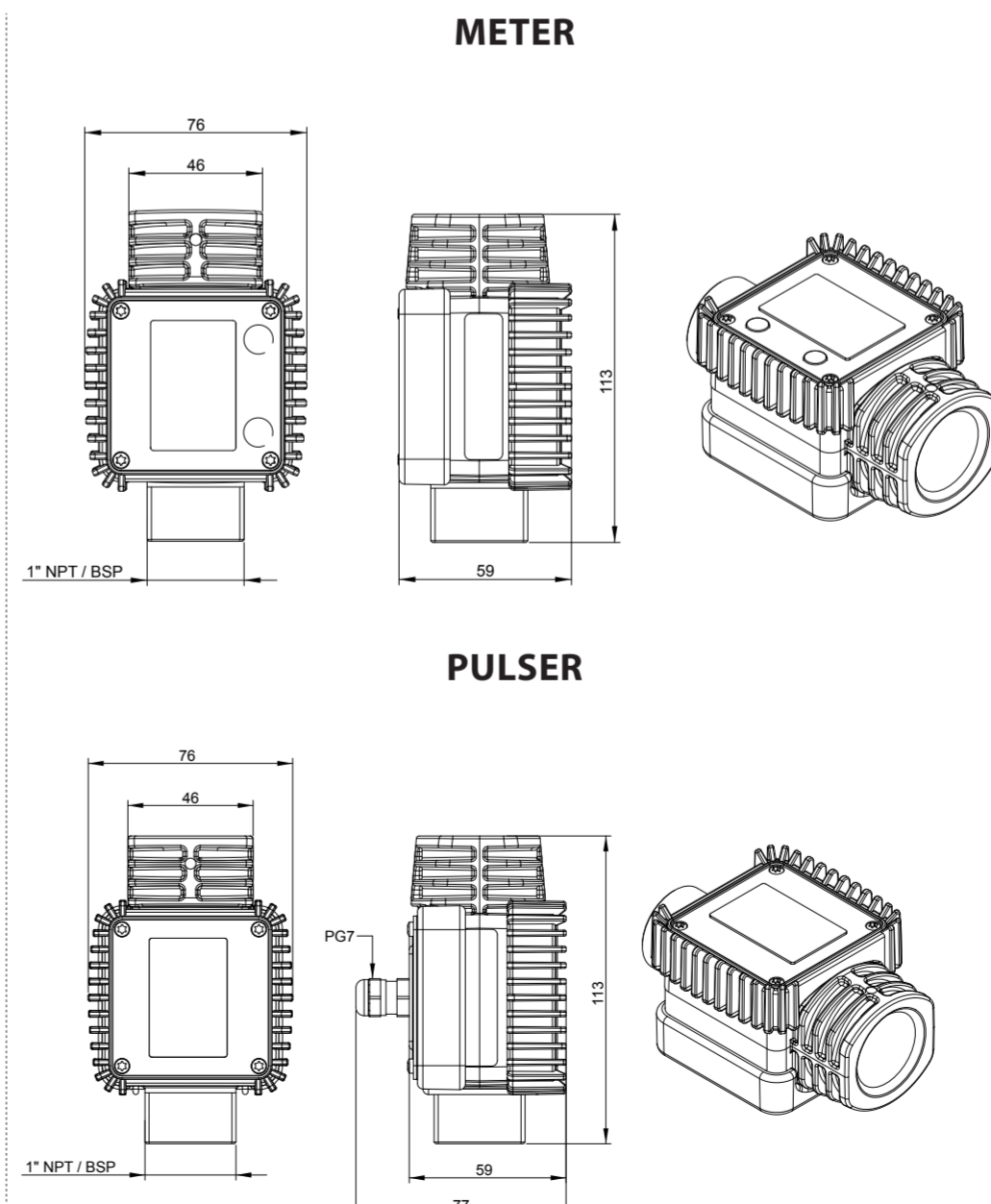
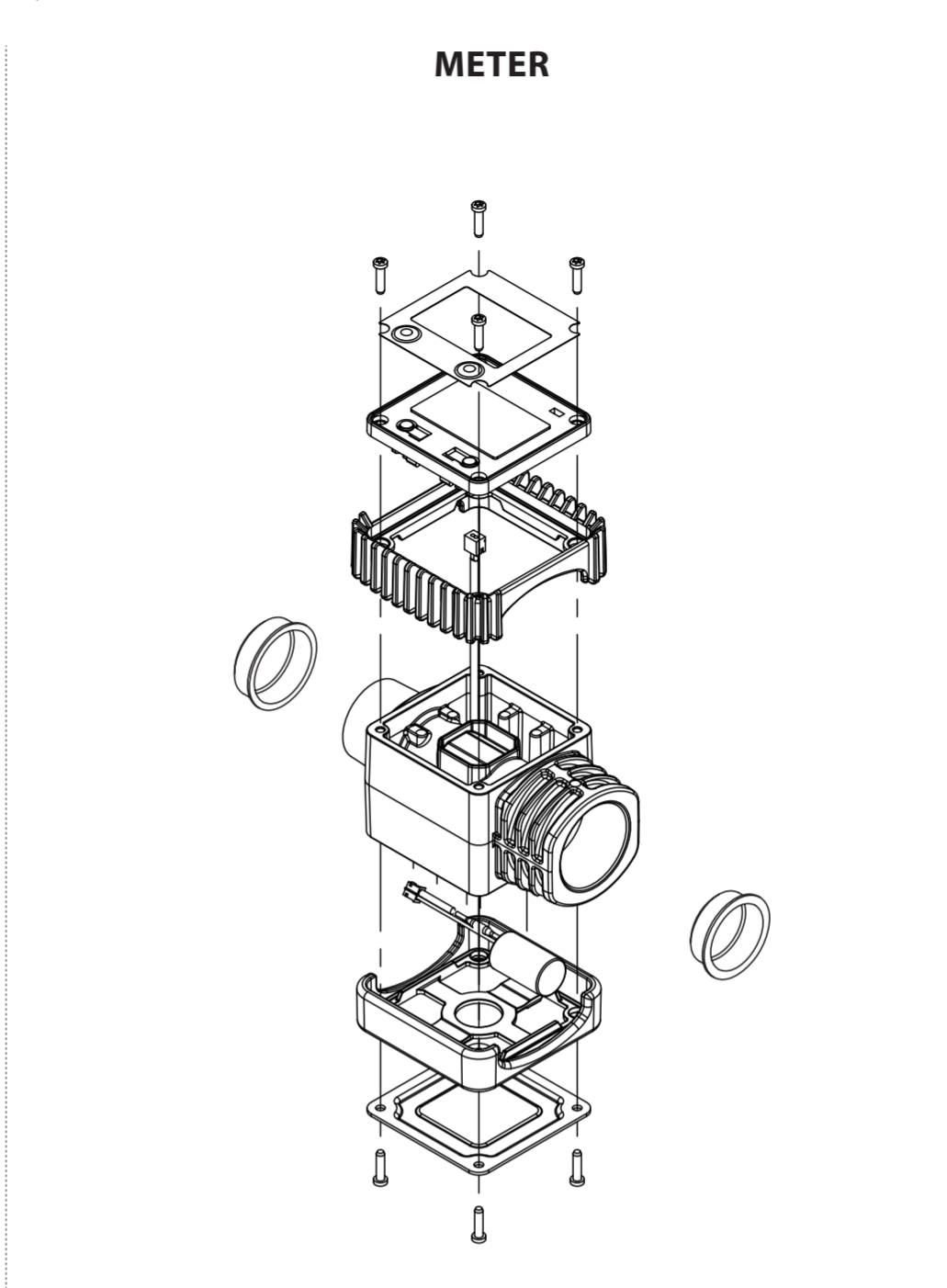
In case of the unlawful disposal of said wastes, fines will be applicable as defined by the laws in force.

Other components, such as pipes, rubber gaskets, plastic parts and wires, must be disposed of by companies specializing in the disposal of industrial waste.

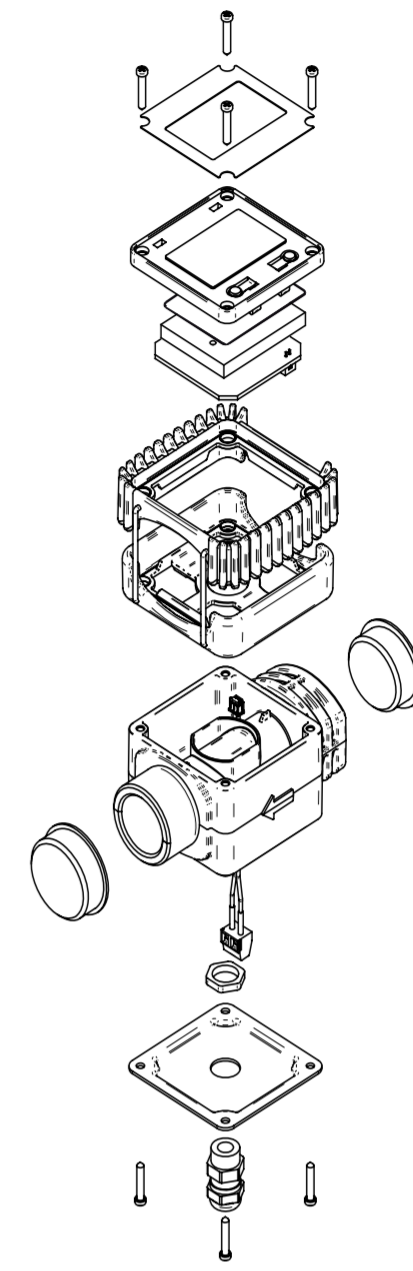
P TECHNICAL DATA

| | |
|--------------------------------------|---|
| Measurement system | TURBINE |
| Resolution (nominal) | 0.010 lit/pulse |
| Flow Rate (Range) | 7-120 (Lit/min) 2-32 (gal/min) |
| Operating pressure (Max) | 20 (Bar) 290 (psi) |
| Bursting pressure (Min) | 100 (Bar) 1450 (psi) |
| Storage temperature (Range) | -20 - +70 (°C) -4 -158 (°F) |
| Storage humidity (Max) | 95 (% RU) |
| Operating temperature (Range) | -10 - +50 (°C) 14 -122 (°F) |
| Flow resistance | 0.30 Bar at 100 lit/min. 4.35 psi at 26.4 gal/min |
| Permissible Viscosity (Range) | 2 - 5.35 cSt/ pulse |
| Accuracy | ±% after calibration within 10-90 (litres/min) 2.65-23.8 (gallons/min) range |
| Reproducibility (Typical) | ±0.3 (%) |
| Screen | Liquid crystals LCD. Featuring: - 5-figure partial - 6-figure Reset Total plus x10 / x100 - 6-figure non reset Total plus x10 / x100 |
| Power Supply | Lithium battery PIUSI code *18021 |
| Battery life | 24 months |
| Weight | 0.4 Kg (included batteries) |
| Protection | IP65 |
| Pulsar Data | UI = 12 V Ii = 100 mA Pi = 0.3 W |

Q EXPLODED VIEWS AND OVERALL DIMENSIONS



PULSER



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