



**Ranhill
SAJ**

**SPECIFICATION
FOR ELECTROMAGNETIC WATER METER**

SPECIFICATION SAJ WM / EM / 001

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SAJ Specification for Electromagnetic Water Meter

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SPECIFICATION FOR ELECTROMAGNETIC WATER METER

1. REQUIREMENTS

A low-power consumption flow meter based on Faraday's electro-magnetic principle for measuring the flow of conductive liquids. The flow meter should be able to measure liquid with a conductivity of more than 50 micro siemens per centimetre. The flow meter shall measure independently of temperature, viscosity, density, solids content and cleanliness of the liquid.

The flow meter shall incorporate a microprocessor based system with no moving parts, to ensure that there is no damage due to suspended particulate matter. The flow meter shall be electromagnetic based technology with the capability of being powered by DC batteries.

The flowmeter shall be based on modern method of electro-magnetic flowmeter construction, uses a pulse dc signal to the flowmeter coils. The signal is nominally 24 volts dc pulsed both positively and negatively. This enables a check to be made every measurement cycle, that the zero has not drifted and if it has drifted to make an automatic zero adjustment. The features of automatic zero adjustment will eliminate zero adjustment to be carrying out at site during commissioning. The meter strictly should not have manual zero adjustment during start-up and commissioning.

The flow sensors need to be submersible and all are built in accordance with the requirements of IP68. The sensor shall also be suitable for installation in underground pipes without the need for a metering chamber/pit (i.e. shall be capable of direct burial). The manufacturer shall upon request provide evidence of satisfactory operation of such sensors for a minimum period of 3 years n buried installations.

The meter shall be available for nominal pipe sizes from 15mm (½ inch) to 600mm (24 inch). The flow meter shall be capable of monitoring and displaying the following: -

- i. Flow Rate
- ii. Forward, Reverse, Net flow totals
- iii. 2 Tariff totals (configurable for combinations of "time of day + day of Week" or "time of day + month of year")
- iv. Water Pressure (via a pressure transducer connected to the electronics unit)
- v. Velocity
- vi. Date & Time

The meter shall be suitable for battery operation via either:

- a) 2 off internal Lithium batteries with a typical operating life of 3 years. It shall be possible to change individual internal batteries in the field.
- b) 1 unit of external battery pack whose cells are Alkaline-Manganese based and which provide a typical operating life of 5 years. It shall be possible to change the battery in the field without re-moving or opening the electronic display/signal converter. The battery will be connected to the electronic display/signal converter via an IP68 screw in plug.

Under battery-powered operation, the flow meter shall have an accuracy of +/- 0.5% of reading down to a pipeline velocity of typically 0.33 m/s, in accordance with ISO 4064 Class C. The flow meter shall maintain 2% accuracy operation and 5% operation in accordance with the flow rates indicated in ISO 4064 Class C.

The electronic display unit shall be protected to IP68 to permit installations in chambers and pits, which are liable to flooding. The meter software shall incorporate

multi-password protection to prevent inadvertent or fraudulent programming/configuration changes. The display unit shall have an inbuilt memory using flash technology to store the entire configuration of the flow meter. The display unit shall not lose its configuration data in the event of battery failure.

There shall be independent totaliser displays to give forward, reverse and net totals, plus the option of 2 tariff totalisers (time-dependent volume totalisers). The meter shall be available with the following optional features: -

- a) Pressure measurement via directly-connected pressure transducer
- b) 2 off internal dataloggers for flowrate and pressure with logging interval adjustable over the range 15 seconds to 18 hours.
- c) 1 off internal logger with daily recording of all totaliser values for 1 year.
- d) Remote communications via GSM for retrieval of logger contents, for meter diagnostics and meter configuration.

The flow sensor shall be intelligent such that any associated electronic display unit can be connected to it without subsequent programming. The volume totaliser values shall be automatically backed up in the intelligent sensor every 5 minutes for total security. The meter configuration shall also be backed up in the intelligent sensor.

The meter shall provide 3 outputs. 2 pulse outputs for forward/reverse flow and one alarm output. These shall be individually isolated solid state switches of ± 35 V dc 50 mA 50 Hz max.

The flow meter shall have a calibration verification system to carry out verification of calibration test for audit and ISO purpose. The testing shall be based on in-situ verification of the flow meter calibration, where a full functional check on flow sensor, signal cable and electronic display are to be done. The verification system should be able to carry out long-term trend analysis and pre-warning of system failure.

2. MATERIALS

The flow sensor should be constructed of a stainless steel tube, with an elastomer lining (insulating material) and has no internal moving parts. Thus, it should be very suitable for use in applications where dirty water would ordinarily cause a build up of matter and cause mechanical measuring techniques to cease functioning effectively. Around the tube are two electromagnetic coils and flush with the inside surface of the liner are two small electrodes. The material of the measuring electrodes shall be non-magnetic stainless steel 316.

3. PACKING

All Water Meter shall be individually packed with proper methods and protected from damage during transit.

4. PRE-DELIVERY INSPECTION AND EVALUATION

- a) It is the responsibility of the tenderer to inform SAJ for inspection purposes during manufacturing and before delivery.

- b) SAJ reserve the right to inspect and witness the testing of product offered without any further notice.
- c) At any time, when requested, the supplier shall provide SAJ a sample of the product offered for evaluation purposes. All costs shall be borne by the supplier.
- d) If at any time the supplier fails to deliver the required sample, the product is deemed fail to meet the specifications.

5. CERTIFICATION

- a) Manufacturer of supplier are required to provide a copy of the certificate and testing report from SIRIM, IKRAM or other recognized certification body.
- b) Tests report required should be those tests conducted within a year period.
- c) SAJ have the right to refuse offer or reject supply if the documents required are not enclosed.