

MAGFLOW OPERATION & CONFIGURATION IN NON-FULL FLOWING PIPES

APPLICABLE PRODUCTS



This bulletin applies to Aquamonix IR2020, IR2060, and IR2030 flow tubes and transmitter models M300, I300 and I500.

BACKGROUND

For correct operation, pipework should be designed to ensure the magflow flow tube operates full pipe at all times. Occasionally remote metering sites (whether pumped or under gravity flows) may encounter non-pipe full conditions or entrained air entering the meter. In these cases the meter can be user configured to provide reliable operation.

OVERVIEW OF METER OPERATION

The meter conserves power by operating in a sleep / wake mode (default settings: sleep 300 sec, wake 30 sec). On wake up the meter turns on and performs a measurements cycle as follows:

- **PNF Detection** – Meter detects if “Pipe Not Full” (PNF Sensor is located at top inside centre of meter)
 If PNF is enabled and detected, flowrate is set to zero and meter returns back to sleep mode
- **Electrical Conductivity (EC)** – Detects if water present at measuring electrodes. (located at half pipe)
 If no water detected at electrodes – “EC low” flagged and flowrate set to zero – return to sleep.
- **Diagnostic Checks** are performed (signal conditioning, coil current, inductance, resistance etc)
- **Flow Measurement** – Velocity measured and a flow rate calculated using the cross-sectional area.
- **Smoothing** – Averaging of flow readings to remove unsteady flows
- **Sleep** – after completing the measurement cycle the meter re-enters sleep mode (low power mode)

Aquamonix Meters are designed to provide reliable and accurate flow readings across a wide range of sites and applications.

Configuration Settings for Meter Sites Which May Not Always Run Pipe Full

Feature	Meter Runs Full Pipe at all Times	Entrained Air in Meter	Pipework or Flow Meter Does Not Run “Pipe Full”
PNF Enabled	Meter will measure and record flows accurately and reliably at all times.	Meter may intermittently detect PNF condition and occasionally record a zero flow. (risk of under-reading actual flows)	Meter will detect a PNF condition and record a zero flow. (risk of undetected flows)
PNF Disabled	Meter will measure and record flows accurately and reliably at all times.	Meter will measure flowrate assuming pipe is full of water.	If water is above the measuring electrodes the meter will assume full pipe and provide a flow reading. (risk of over measuring flow)
EC Detection (Electrical Continuity Check)	Meter will detect if water is above the measuring electrodes and will measure & record accurate flows.	If the water level drops below the measuring electrodes (< half pipe) the meter will detect an “EC low” fault and will record zero flow.	If water drops below the measuring electrodes (half pipe) an EC fault will force flow to zero. (Possible risk of undetected flows.)

Chart Colour Key

Reliable and accurate operation under all conditions	Possible issues – review hydraulics / pump suction intake, Air relief valves	Review pipework / meter hydraulics to ensure pipe full conditions.
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Pipe Full Conditions or with
Entrained Air**

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Aquamonix Flow Meters fitted with PNF detection and I500 Transmitters minimise any risk of signal noise, meter creep or false flow readings which can affect some other manufacturers' flow meters.