MN metrinet

multi-parameter monitoring

Modular, multi-parameter water quality monitors for networks

ATi
ANALYTICAL TECHNOLOGY

Pioneering Breakthrough in Water Quality Monitoring

Introducing ATi's pioneering breakthrough in water quality monitoring, the MetriNet, a brand new approach to smart sensor technology, with amazing capabilities. The MetriNet offers a sustainable solution to meet the complex challenges currently facing the water sector. It will ultimately help drive down complaints, increase water companies' SIM scores and result in pro-active network management to safeguard water quality for customer use.

- Chlorine
- Turbidity
- pH
- Conductivity
- Dissolved oxygen
- ORP
- Pressure
- Temperature...and many more!

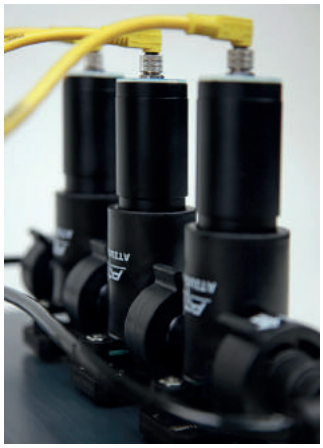
The MetriNet is a low-power, modular system for monitoring water quality and collecting data at remote locations. This pioneering system utilises all the experience and expertise that ATi has earned over four decades of working closely with water utilities around the world.

The MetriNet system features sensors that have the same accuracy and reproducibility as our well-known and proven Q-Series sensors, combined with ultra-compact, full featured monitors in one small housing unit.

M-Nodes

At the heart of the system are ATi's new series of smart digital sensors, the industry-leading M-Nodes, a complete sensor and transmitter housed in a miniaturized body. M-Nodes are complete water quality monitors equivalent in most respects to full function instruments.
The M-Nodes are connected to the water supply using a purpose designed 'click-connect' flow cell arrangement. Sensors are connected in series to minimise water usage and can run at pressures up to 6 bar. This means they can be used in closed bypass arrangement to completely eliminate water loss. M-Nodes are ultra low-powered and run autonomously for years at a time on small batteries. Alternatively they can be powered from a local plc or telemetry system.

Flexibility is key with the M-Node sensors - they can be connected to any data gathering system. The modular nature enables users to assemble a monitoring package that fit individual site requirements. All nodes plug directly into MetriNet system and are powered directly from the communications bus.



MetriNet User Interface

For a complete solution, M-Nodes can also be connected to the MetriNet User Interface (MUI). The MUI connects to up to 8 M-Node sensors and connects to the outside world in via any 'ftp' based system – operating as independent modules that can be linked via a communication bus. The MUI also has on board data-logging with vast data storage capabilities. All M-Nodes plug directly into MetriNet systems and are powered directly from the communications bus. M-Nodes may be added or removed as needed and removal of a node will not affect system measurements. Sensor and bus connectors are IP-67 rated for maximum signal protection.

The MetriNet UI also allows setup and calibration of M-Nodes, as well as storing data and transmitting data to either local or remote locations. Electronic assemblies are galvanically isolated from both the power supply and communication link.

Data sampling rates are user selectable to minimize power consumption. Data is stored locally in standard .csv file format for easy manipulation with spreadsheet programs. Cellular data transmission may be directed to commercial storage sites or directly to customer site.

MetriNet benefits

- Ability to measure anywhere means closer to customer. Can foresee potential issues by advising early, which avoids complaints and allows you to take mitigating action
- Future-proof in terms of communication so it will be useful for a long time
- Economics of purchase and install allow massive installation. The data value increase as the number of measuring points increase because they have a better picture of the whole network
- Zero and span data stored internally so calibration can be done anywhere
- Internal clock records total run time on the sensor
- Calibration timer can alert users when calibration is due
- Two alarm set points are available
- Sensor diagnostics report problems in clear message form
- 16 character user defined 'Tag' name

MetriNet Features

Designed specifically for applications in water distribution networks, the MetriNet allows 'no compromise' continuous measurement of all the main water quality parameters needed to measure in distribution networks.

M-Nodes

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- Internal clock records total run time on the sensor
- Calibration timer can alert users when calibration is due
- Two alarm set points are available
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Controller

- Accepts up to 8 M-Node sensor inputs
- Stores data at user defined intervals from 0.1-60 minutes
- Stores over 300K values, or 30 days of data for 8 sensors at 1 minute data interval
- Options for cellular modem, Wi-Fi, or wired Modbus, Ethernet/IP, or Profibus DP
- Internal Micro-SD RAM card provides data backup in the event of communication problems
- Addition of a low power solenoid valve allows intermittent sample flow
- Solenoid controlled by MetriNet UI which also shuts down all M-Nodes to conserve power

Water Conservation

A typical MetriNet system that is connected to a continuous sample flow of 200 ml/min will consume about 300litres per day in continuous mode. In many cases, this amount of water consumption will not be significant. However, in some cases, the user may wish to minimize the amount of water consumed by the MetriNet system. The MetriNet controller provides a cyclic operating mode that allows the user to minimize the daily water consumption. When the solenoid valve is closed, there is no flow to the system and no measurements are taken. At user specified intervals, the solenoid valve is opened to allow fresh water into the system. Sample continues to flow for a selectable amount of time, then a measurement is taken and data is stored locally. When this cycle is complete, the solenoid is returned to a closed position and flow is once again restricted from the system. Cyclic sampling can reduce water consumption to less than 12 litres per day at most sites.

Modular Flow System

MetriNet flow cells are modular, allowing assembly of from 1 to 8 flow chambers. Each chamber holds one M-Node sensor with a simple bayonet connection. A rotating lock-ring clamps flow chambers together for easy assembly. A flow control device is integrated into the outlet fitting of the MetriNet flowcell to control sample flow to 0.2 LPM over 10-100 PSIG (70-700 kPa) inlet pressure range. The first flow chamber is supplied with a push-to-connect fitting for rigid ¼“ o.d. tubing. An internal mesh screen protects the flow element from particles larger than 100 micron that might enter the system, and is easily removed for inspection and cleaning, if necessary. DIN rail mounting clips attached to each MetriNet flow chamber allow assembled flow systems to be easily rail mounted.

Power Options

Power consumption requirements of traditional water quality monitors prevent their use in locations where AC power is not available. The low power design of the MetriNet system allows these monitors to operate on 12-24 VDC power, as well as battery power, without sacrificing reliability. To further improve power consumption, the MetriNet system allows users to operate in either continuous or cycle modes. In full continuous mode, power is constantly applied to M-Nodes and measurements are continuously taken. When operating in cycle mode, the measurement nodes are placed in "sleep mode" for much of the time. Every 15 minutes, the Nodes are switched to "full power" for about 15 seconds in order to take a reading and store data. Operation in cycle mode extends battery life considerably.

The table below provides an estimate of power/battery requirements for the system.

System Type	Full Power Mode (at 12V)	Low Power Mode
12-24 VDC with modem	43 mA + 3 mA/node	15 mA + 3 mA/node
12-24 VDC without modem	30 mA + 3 mA/node	15 mA + 3 mA/node
12 V battery with modem	12 mA + 3 mA/node	4 mA + 3 mA/node
12 V battery without modem	26 mA + 3 mA/node	4 mA + 3 mA/node

Note: During modem operation, power draw can spike to about 150 mA for the duration of the data transfer.
A typical daily data transfer takes about 3 minutes.

Site Location

MetriNet controllers contain a GPS module so that users may automatically identify the exact location of an installation. Using the GPS data, sites can be easily tied to map locations. If a controller is moved to another location, the position change is again updated. The MetriNet controller provides a cyclic operating mode that allows the user to specify how much flow to allow before each measurement cycle, stopping flow during the time period between measurement. Cyclic sampling can reduce water consumption to less than 3 gallons per day at most sites. An external latching solenoid on the sample inlet is activated periodically and then shut off to minimize sample usage.

Available M-Nodes

M-Node sensors are available for a variety of water quality parameters. Users simply select the parameters required for a specific location and assemble them into an integrated system. All Nodes communicate on a common RS-485 sensor bus using Modbus protocol. Each M-Node has an IP-67 M8 water-tight connector for external communication. Power for the M-Node system is also supplied via the RS-485 bus. Nodes may even be used independently by system integrators who wish to communicate directly with the nodes using their own PLC system.

M-Nodes

Part Number	Parameter	Range	Resolution
00-1733	Free Chlorine	0-4.00 ppm	0.01 ppm
00-1734	Total Chlorine	0-4.00 ppm	0.01 ppm
00-1735	Turbidity	0-40.00 NTU	0.01 NTU
00-1736	pH	0-14 pH	0.01 pH
00-1737	Conductivity	0-2000 µS	1 µS
00-1738	ORP	0-1000 mv.	1 mv.
00-1739	Dissolved Oxygen	0-20.00 ppm	0.01 ppm
00-1780	Fluoride	0.1-10.00 ppm	0.01 ppm
00-1781	Dissolved Ozone	0-4.00 ppm	0.01 ppm
00-1782	Chlorine Dioxide	0-4.00 ppm	0.01 ppm
00-1783	Peracetic Acid	0-200 ppm	1 ppm
00-1784	Hydrogen Peroxide	0-20.00 ppm	0.01 ppm

Flow System Components

03-0488	Flow Chamber wit Additional Flow Chamber
03-0491	Flow Assembly Outlet with flow regulator, 90° tube fitting
03-0490	Flow Assembly Outlet without regulator, 90° tube fitting
03-0495	4-position bus bar
31-0202	IP-67 bus cable, one required per node

MetriNet Controller

00-1795	MetriNet Controller, 12-24 VDC with SD Card
00-1796	MetriNet Controller, 12-24 VDC with SD Card & 3G modem
00-1811	MetriNet Controller, 12V Battery with SD Card
00-1814	MetriNet Controller, 12-24 VDC with SD Card & 2G modem
00-1812	MetriNet Controller, 12V Battery with SD Card & 3G modem
00-1815	MetriNet Controller, 12V Battery with SD Card & 2G modem
00-1798	Portable M-Node Calibrator

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