Water Quality Monitor

MetriNet Q52 Multi-Parameter Monitor

OVERVIEW

MetriNet, derived from Network Metrics, is a low-power, modular system for monitoring water quality parameters and collecting data at remote locations. This system is ideal for monitoring drinking water distribution systems, greenhouse water delivery systems, produce section misting systems and other clean water applications.

MetriNet provides a monitoring package of up to eight different parameters and provides reliable collection and transmission of the acquired data. The system provides several methods for delivering this information including: cellular modem, wired Modbus, Modbus TCP/IP or Ethernet/IP, as well as cloud-based data storage.

At the heart of the MetriNet system is a series of smart digital sensors. M-Nodes are a complete sensor and transmitter housed in a miniaturized body. M-Nodes operate as independent modules that can be linked via a communication bus.
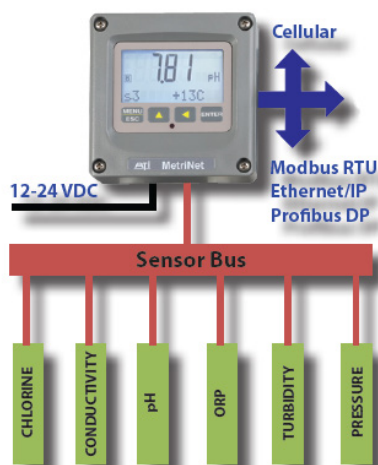

Figure 1: MetriNet system

Sensor and bus connectors are IP67 rated for maximum signal protection. Communication between M-Node sensors and the user data collection system is handled by the MetriNet controller. The controller allows set up and calibration of M-Nodes, as well as storing data and transmitting data to either local or remote locations.

Flexibility is the key to the MetriNet system. The modular nature enables users to assemble a monitoring package that fits individual site requirements. All nodes plug directly into MetriNet systems and are powered directly from the communications bus. Nodes may be added or removed as needed, and removal of a node does not affect system measurements.

The flowcells, sensors (except Nitrite) and panels (14 × 14, 14 × 20) are certified to NSF 61, 372.

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 can be directed to commercial storage sites or directly to the customer site.

METRINET FEATURES

M-Nodes

- Complete sensor and transmitter housed in a miniaturized body.
- Electronic assemblies are galvanically isolated from the power supply and communication link.
- 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.

Controller

- Has options for cellular modem or wired Modbus, Modbus TCP/IP or Ethernet/IP.
- 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.
- Accepts up to 8 M-Node sensor inputs.
- Internal Micro-SD RAM card provides data backup in the event of communication problems.
- Addition of low power solenoid valve allows intermittent sample flow.
- Solenoid controlled by MetriNet UI, which also shuts down all M-Nodes to conserve power.

Badger Meter

Product Data Sheet

WATER CONSERVATION

A typical MetriNet system connected to a continuous sample flow of 200 ml/min consumes about 75 gallons per day. In many cases, this amount of water consumption is not significant. However, in some cases, the user may want 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 5 gallons per day at most sites.

MODULAR FLOW SYSTEM

MetriNet flow cells are modular, allowing assembly of 1…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 flow cell to control sample flow to 0.2 LPM over a fixed and stable pressure value in the range of 10…50 psi (0.7…3.4 bar), 20…30 psi recommended. A compact external pressure reducing valve and mesh filter assembly is available for proper pressure stability control. The first flow chamber is supplied with a push-to-connect fitting for rigid 1/4 inch O.D. tubing.

Badger Meter can supply an optional PRV/Valve/Strainer Assembly for applications where a stable input pressure within 10…50 psi cannot be achieved.

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.

Figure 2: MetriNet flow cells

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…24V DC 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.

System Type	ON Always, Full Power Mode (12V)	ON/OFF CYCL Mode (12V)
12...24v DC with modem, Backlight ON, SD IN	24 mA + 3 mA/node, ON always	23 mA + 3 mA/node, ON Cycle 21 mA, OFF Cycle
12...24V DC without modem, Backlight ON, SD IN	24 mA + 3 mA/node, ON always	23 mA + 3 mA/node, ON Cycle 21 mA, OFF Cycle
12V Battery with modem, Backlight OFF, SD OUT	6 mA + 3 mA/node, ON always	3 mA + 3 mA/node, ON Cycle 1.3 mA, OFF Cycle (sleep)
12V Battery without modem, Backlight OFF, SD OUT	6 mA + 3 mA/node, ON always	3 mA + 3 mA/mode, ON Cycle 1.3 mA, OFF Cycle (sleep)

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 three minutes.

SITE LOCATION

MetriNet controllers record user entered fixed latitude/longitude location information, which is used to identify an instrument's exact location on cloud data sites or servers.

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 IP67 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.

Figure 3: M-Node sensors

PART NUMBERS

M-Nodes

Part Number	Parameter	Range	Resolution
00-1847	Free Chlorine	0…5.00 ppm	0.01 ppm
00-1854	Combined Chlorine	0…5.00 ppm	0.01 ppm
00-1855	Total Chlorine	0…5.00 ppm	0.01 ppm
00-1849	pH	2…12 pH	0.01 pH
00-1848	Conductivity	0…2000 µS	1 µS
00-1850	ORP	0…1000 mV	1 mV
00-1851	Dissolved Oxygen	0…20.00 ppm	0.01 ppm
00-1856	Fluoride	0.1…10.00 ppm	0.01 ppm
00-1852	Dissolved Ozone	0…5.00 ppm	0.01 ppm
00-1857	Chlorine Dioxide	0…5.00 ppm	0.01 ppm
00-1858	Peracetic Acid	0…200 ppm	1 ppm
00-1859	Hydrogen Peroxide	0…20.00 ppm	0.01 ppm
00-1853	Turbidity	0…40.00 NTU	0.01 NTU
00-1861	Nitrite	0…2.00 ppm	0.001 ppm
00-1864	Pressure	0…300 PSIG	1 PSIG
00-1863	4E Conductivity	0…2000 mS	1 µS

BUS Assemblies

Part Number	
03-0495	4-Node bus bar
31-0202	Node to bus bar cable
31-0212	Bus bar jumper cable (for 2 bus bar assemblies)

Panel Assembly

Part Number	
03-0515	MetriNet 14 × 14 in. assembled panel for up to 4 nodes
03-0519	MetriNet 14 × 20 in. assembled panel for 5…8 nodes

PART NUMBERS, CONTINUED

Flow Assemblies

Part Number	
00-2008	Latching solenoid value, 12V DC
03-0488	Flow chamber with inlet and fitting
03-0489	Additional flow chamber
03-0491	Flow assembly outlet with flow regulator, 90° fitting
03-0490	Flow assembly outlet without flow regulator, 90° fitting
05-0166	Inlet assembly with mesh filter, PRV valve and ball valve shutoff

Power Supply Options

Part Number	
00-1816	12V DC power supply, 100…240V AC input
00-1817	MetriNet alkaline battery box (for 8 D-cells)
00-1822	MetriNet lithium battery box (for 4 D-cells)
31-0208	Power supply interface cable, 12 in.

MetriNet Controller

Part Number	
*	MetriNet controller, 12…24V DC with SD card
00-1798	Portable M-Node calibrator
*	MetriNet controller, 12V battery with SD card
*	MetriNet controller, 12…24 VDC with Modbus RTU
*	MetriNet controller, 12…24 VDC with Ethernet/IP
*	MetriNet controller, 12…24 VDC with Modbus TCP/IP
*	MetriNet controller, 12…24 VDC with SD card & Global LTE modem
*	MetriNet controller, 12V battery with SD card & Global LTE modem

* Consult factory for item number of electronic assemblies.