MARTEK® MARK 20 ULTRAPURE WATER MONITORING SYSTEM

MARTEK INSTRUMENTS INC. MANUFACTURERS OF WATER QUALITY INSTRUMENTATION

... for accurate, continuous, in situ monitoring of multiple ultrapure water parameters

- ***CONDUCTIVITY***
- ***pH***
- ***DISSOLVED OXYGEN***
- ***ORP***
- ***ACID/CAUSTIC CONCENTRATION***

The Martek Mark 20 Ultrapure Water Monitor provides laboratory accuracy in a multi-channel, multi-parameter on-line instrument for continuous monitoring of high purity water quality. Designed for maximum flexibility and ease-of-use, the Mark 20 provides real-time measurement of up to eight separate parameter inputs to permit custom configurations for a variety of process applications. Data is displayed in direct engineering units on the large front panel readout while simultaneous digital and analog signals are available for external recording instruments or control devices. The ability to collect, process, and transmit real-time data make the Mark 20 ideal for high purity water processes in nuclear and high-performance fossil fuel power plants; condensate polishing systems and demineralizers, semiconductor and pharmaceutical manufacturing plants; and other industrial applications.

"Total Engineering" incorporated in the Mark 20's design.

"Total Engineering" refers to the concept of designing a product that meets all of the needs of the end-user for a variety of applications.

The Mark 20 represents over twenty years of input from people directly involved in monitoring high purity process systems. Its design reflects the experiences and suggestions from hundreds of chemists, engineers, and technicians – the people responsible for maintaining control of a process system.

Examples of this "Total Engineering" Concept are demonstrated in the following Mark 20 design features.

■ The Mark 20 automatically knows which sensor type is installed at each of its eight channels and whether or not that channel has been correctly calibrated for that type of sensor.

■ Each channel is configurable to dual alarm set points. Channels are continually scanned for alarm conditions. An alarm light on the front panel activates whenever any of the monitored channels recognize an alarm state.

■ The Mark 20 presents temperature, raw parameter data, and temperature corrected parameter data simultaneously in its large, well-lighted display. This important feature allows the operator to immediately determine whether changes in parameter values are due to constituents in the process stream or simply temperature fluctuations.

■ User-selectable temperature compensation formulas plus slope compensation for conductivity and pH measurements eliminate the need for additional modified circuitry or computer-generated correction factors. The Mark 20 resident processor easily applies these scientific formulas mathematically to the final readout measurement.

■ Autoranging is performed on each of the three sets of dual conductivity ranges as well as through the set of four dissolved oxygen ranges.

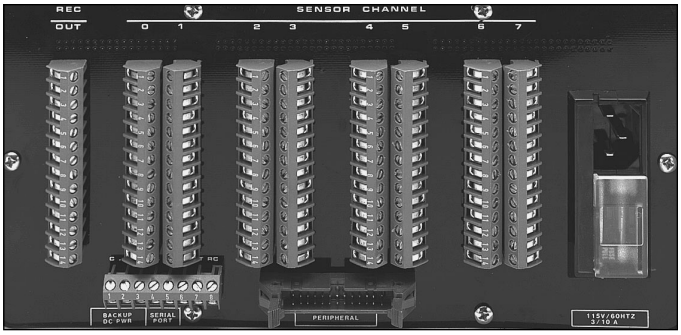
■ Differential analysis between any two channels of the same parameter provides instant performance evaluation of system efficiency for components such as dearators or condensate polishers.

■ Standard RS232 digital serial port can be augmented with user-selectable analog outputs of 0 -1, 0 - 5 volt, or 4 - 20 mA for each separate channel. Up to ten Mark 20's (80 channels) can be multiplexed to one personal computer. The Mark 20 can even accept analog signals from other parameter analyzers and convert them to a digital output as well as indicate the data on its display.

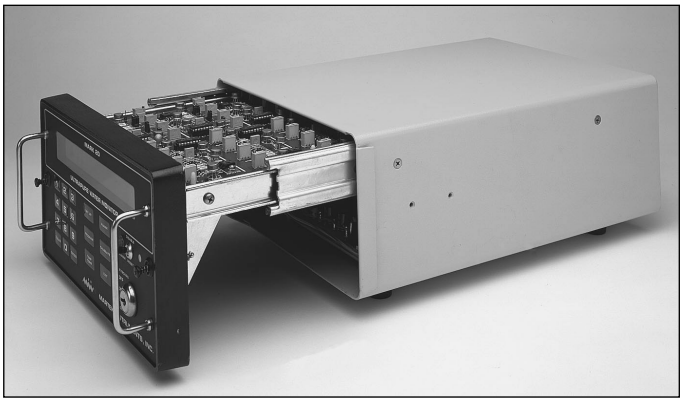
Installation and maintenance are easy with readily accesible components.

Controls on the Mark 20 are simple and direct. Separate keys list individual functions that allow the Mark 20 to be configured to a specific application while security measures such as a password and key lock prevent unauthorized use.

The Mark 20's eight channel capability eliminates the need to calibrate and maintain eight separate monitors, while its small panel signature make it ideal for applications allowing only a minimum of panel space.



Even after installation, the Mark 20's internal components are accessible without special tools or instructions. The entire electronic chassis slides outside of the enclosure so vital components can be checked or the monitor calibrated. Software upgrades and analog recorder outputs can be changed quickly while the Mark 20's modular construction permits rapid component replacement and limits the necessity for excessive spare parts.



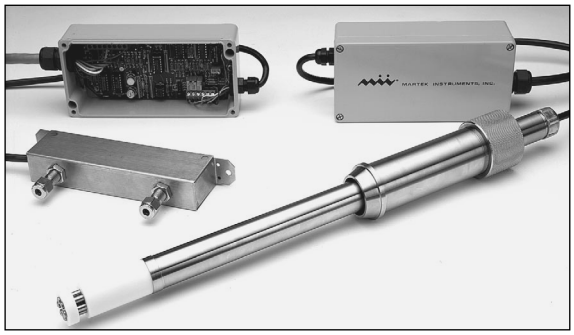
Martek sensors are built to the most exacting standards.

Each sensor comes complete with its own electronic circuitry secured in a separate NEMA 4X enclosure. This signal conditioning module or preamp permits transmission of interference-free signals over long distances (up to 2,000 feet) and provides electronic calibration for each specific sensor.

All conductivity sensors feature Type 316 Stainless Steel and Teflon materials while pH and dissolved oxygen sensors are manufactured from temperature and corrosion resistant plastics and precious metals. In addition, all sensors require minimum sample volumes eliminating the need for bulky flow chambers.

CONDUCTIVITY - Specifications

Operating Temperature	2.0 to 100.0˚C @ 20 psi
Maximum Pressure	150 psi @ 50.0˚C
Flow Requirement	50.0 to 450.0 ml/min
Electrode Type	Type 316 Stainless Steel two-element cell



180-21-1
180-21-2
180-22
"Flow-Thru" Conductivity Sensor Assembly includes electronic preamp with 10 ft. (3m) cable from sensor to preamp and and standard 10 ft. cable from preamp to Mark 20.

180-28
180-29
Type 316 SS Insertion-style Caustic (0 -10% NaOH) or Acid (0 -10% H_2SO_4) or (0 -10% HCl) Sensor Assembly includes electronic preamp with 10 ft. (3m) cable from sensor to preamp and standard 10 ft. cable from preamp to Mark 20.

pH / ORP - Specifications

Operating Temperature	2.0 to 50.0˚C
Operating Range	0 to 14 pH, ± 1400 mV ORP
Maximum Pressure	150 psi @ 50.0˚C
Flow Requirement	45.0 to 150.0 ml/min
Electrode Type	pH - Glass measuring and ceramic double junction. ORP - platinum measuring and ceramic double junction. Reference Electrode - silver - silver chloride, gel-filled

180-24
180-26
pH/ORP Sensor Assembly includes electronic preamp and Type 316SS adapter plug with combination pH / ORP electrode and temperature element.

180-51
Type 316 SS Flow Chamber with mounting bracket for use with pH or ORP sensor assemblies.

DISSOLVED OXYGEN - Specifications

Operating Temperature	2.0 to 50.0˚C
Maximum Pressure	1 Atmosphere (14.7 psi)
Flow Requirement	50.0 to 250.0 ml/min
Electrode Type	Galvanic cell with platinum-lead electrodes

180-27
Dissolved Oxygen Sensor Assembly includes electronic preamp and dissolved oxygen probe.

180-51
Type 316 SS Flow Chamber with mounting bracket for use with dissolved oxygen sensor assembly.

Value and service are a Martek tradition.

For over thirty years, the name of Martek Instruments has been synonymous with innovation and quality. Martek backs all of its systems with extensive warranties and our staff of engineers and marketing representatives are readily available to answer technical questions or assist in application requirements and set up.

MARTEK MARK 20 SPECIFICATIONS

Parameter	Range	Resolution	Accuracy	Sensor Type
Temperature	0 to100˚C	0.01˚C	±0.05˚C	Thermolinear array
Conductivity	0 to 2.0000µS / cm 0 to 20.000µS / cm 0 to 20.000µS / cm 0 to 200.00µS / cm 0 to 200.00µS / cm 0 to 2000.0µS / cm	0.0001µS / cm 0.001µS / cm 0.001µS / cm 0.01µS / cm 0.01µS / cm 0.1µS / cm	±0.001µS / cm ±0.01µS / cm ±0.01µS / cm ±0.1µS / cm ±0.1µS / cm ±1µS / cm	2-element cell Type 316 SS
pH ORP	0 to14 pH ±1400 mV	0.01 pH ±1.0 mV	±0.1 pH ±10.0 mV	Combination glass electrode with double junction reference
Dissolved Oxygen	0 to 20 ppm 0 to 2 ppm 0 to 200 ppb 0 to 20 ppb	0.01 ppm 0.001 ppm 0.01 ppb 0.01 ppb	±0.1 ppm ±0.01 ppm ±1 ppb ±0.1 ppb	Galvanic cell with platinum-lead electrode
HCl, H_2SO_4 or NaOH	0 to 10% by weight	0.01%	±0.2%	2-element insertion-style cell. Type 316 SS

Power User-selectable 120 / 240 volts AC, 50 / 60 Hz with fuse protection and 12 volt DC hookup

Printer Output Serial ASCII RS232C standard. Isolated analog outputs of 0 -1, 0 - 5 volts, or 4 - 20mA DC full scale for each parameter optional

Alarm Output Signals DPDT Relay Contact Closures rated for 3 amps at 120 volts

Case Dimensions 9.70 inches (24.6cm) width X 4.90 inches (12.5cm) height X 13.0 inches (33.0cm) depth behind front surface panel

Case Weight 18.5 pounds (8.4 kg)

Mounting Hardware supplied for panel or bench mounting

Construction NEMA 12 aluminum enclosure coated to MIL SPECS

ORDERING INFORMATION

P/N	
180-10	Mark 20 Monitor (eight channel) with RS232 serial output signal
180-11	Analog Recorder Output Circuit Board (eight channel) with 0 -1, 0 - 5 volt or 4 - 20mA output per channel
180-21-1	Conductivity Flow-thru Sensor with preamp for ranges 0 - 2 & 0 - 20 µS / cm
180-21-2	Conductivity Flow-thru Sensor with preamp for ranges 0 - 20 & 0 - 200 µS / cm
180-22	Conductivity Flow-thru Sensor with preamp for ranges 0 - 200 & 0 - 2000 µS / cm
180-24	pH Sensor Assembly with preamp

P/N	
180-26	ORP Sensor Assembly with preamp
180-27	Dissolved Oxygen Sensor with preamp
180-28	NaOH (Caustic) Insertion Cell with preamp
180-29	H_2SO_4 (Acid) Insertion Cell with preamp
180-29H	HCl (Acid) Insertion cell with preamp
180-51	Type 316 SS Flow Chamber for pH / DO sensor

NOTE: All prices FOB Factory and include the following waranties against defects in materials or workmanship: **Analyzer and Preamps-5 years, Conductivity Sensors-Lifetime, Dissolved Oxygen sensors-5 years**. Consult factory for specific warranty information. Specifications and prices subject to change without prior notice.

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