

# MODEL 994 Universal Process Controller



- 3/16 DIN Enclosure
- Universal Input & Output Capability
- Easy Setup & Programming
- Onboard Data Logging
- Multiple Alarm Sources
- Local and Remote Operation/Reporting
- LWAN Communication

The 994 is an innovative, technically superior, high quality, reliable, full-featured precision multi-port instrumentation system, supporting monitoring control and data logging capabilities using four independent, advanced technology input ports.

output ports, multiplexed input port expansion, and extensive local and remote information communication. The 994 combines superior technology with operating simplicity, versatility, and ruggedness. Easy to install and easy to operate. Exclusive open architecture offers a wide range of special operating capabilities organized to meet the needs of any precision measurement and data reporting application.

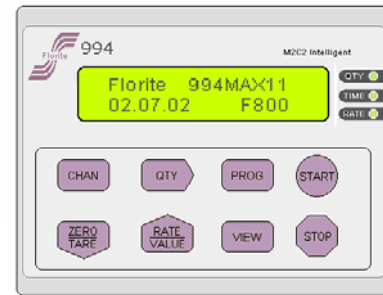
## The Technology

The 994 is microcomputer based, employing surface mount technology that supports powerful floating point digital signal processing arithmetic. It is capable of remote or local feature upgrade for easy future enhancements — eliminating product obsolescence. Special built-in test capabilities offer simple installation and enhanced operating reliability. The 994's ruggedized package is modularly architecture, comprising the ideal solution for use in demanding applications and tough environments. Options allow panel or desk mounting.

The **994** System is modular with independent ports to meet present and future instrumentation requirements. Ports are the measurement inputs and outputs for the system, which have modules installed that may be intermixed as desired. Inputs provide for value accumulation or value scaling of process frequency, voltage or current. Independent input smoothing and quick-tune filters compensate for erratic signals from sources such as metering pumps, or reject electrical noise when inputting low level signals over extended cable distances. Output ports provide voltage or current, relay or pulse support. Inputs provide programmable sensor excitation voltages and currents. Input port measurements may be user programmed to drive output ports, detect alarm limit conditions, and provide information to be sent periodically to local or remote host computers.

## Process Control

Process control functions have been built into your 994 Instrument System, including proportional-integral-differential (PID), batch, dose, manual and monitor, and are completely controlled either manually using the keypad and display or by using serial computer commands. Monitor allows the output of rescaled process measurements linked from an input port and relay contact states. Batch discontinuously controls delivery of programmed amounts. Dose con-



## Onboard Data Logging

Data logging may be optionally installed in the 994 Instrument System, and supports date-time stamped storage for 131,040 sequential records acquired from input ports at a programmed frequency rate. Operation is completely controlled from the keypad, or by local or remote serial computer commands. The logging controls include Start, Stop, Clear, or Send records.

## Communication

Communications services provide for data acquisition, command and control functions, and support information reporting and alarm signaling. The standard **994** has a built-in RS-232 repeater interface, and is configurable for LAN RS-485 multidrop, Ethernet, DeviceNet, and remote WAN modem communications. The WAN facility supports collision avoidance and retry capabilities and may be user programmed with separate network access addresses for alternate host or disaster recovery. Communication is initiated by command, by scheduled reports based on the date-time clock, or by alarms. All communications are error corrected and networkable. Communication resources are shared by input ports, which are individually programmed to send information over a local or remote link to central host sites.

## Multiple Alarms

Independent user programmable thresholds are available for every measurement variable for every input port including quantity, scalar value, process rate, process input, and service time. Alarms may be programmed to activate audio and lamp indicators and cause relay or analog outputs. Alarms are independently programmed for each input port to invoke local and remote communications.

## Indicators

The Model 994 features a large backlit liquid crystal alphanumeric display, visible from a distance even in low light. The multi-colored lamps and audio indicator provide quick and easy status reporting.

## Operator Controls

The 994 has no power switch to be accidentally turned off. Operation can be completely controlled from the integral eight key pad when used to program and review values. Key inputs can be single-touch activated, or multiply-activated when continued to be depressed. The keypad features splash proofing and is resistant to heavy weather.

# Model 994 Technical Specifications

|                                  |  |                           |  |
|----------------------------------|--|---------------------------|--|
| <b>Control Functions</b>         | PID, batch, dose, manual, monitor  | <b>Process Rate Range</b> | 0.00±9,999,999.99 units/time base      |
| <b>Service Time Range</b>        | 0–65,535 hrs   | <b>Totalizer Ranges</b>   | 0–99,999,999.99 units                  |
| <b>Process Input</b>             | Hz, volts, mA  | <b>Measurement Type</b>   | Rate-Total or Scaler                   |
| <b>Programmable Values</b>       |  |                           |  |
| Quantity 1 and 2 Limits          | 0.00–99,999,999.99 units   | Service Time Limit        | 0–65,535 hrs                           |
| High and Low Rate Limits         | 0.00±9,999,999.99 units  | Meter Constant            | 0–999,999 (pulse/quantity ratio)       |
| WAN Numbers                      | 2 each, 16 Chars (0-9, *, #, A, B, C, D, T, P, ', ') Measure Units   | Quantity 1 and 2 Preset   | 3 Chars, (a-z, 0–9, A-Z, other common) |
| Answer Rings                     | 0–255  | Ctrl Amount               | 0–99,999,999.99                        |
| Network Address                  | 0–65,535   | Analog Input and Output   | 0.00±9,999,999.99 units                |
| Date–Time                        | Day/month/year, hrs/min/sec  | Rate Time Base            | Low/High Value=0–10.000/20.00,         |
| Comm Port Select                 | SIO (main)/WAN/LAN, Report/Alarm   | Port Select               | Low/High=0.00±9,999,999.99 units       |
| Report/Log/Frequency             | 0–999 sec/min/hrs/days/months  |                           | Sec/min/hrs                            |
| Rate/Value Filter                | 0 to –20 dbHz, Smoothing Ratio=4:1   |                           | Input, output, off                     |
| <b>Factory Functions</b>         | Keypad Security (on/off), Report Message Response Retry (on/off), analog cal, default set  |                           |  |
| <b>Runtime Operations</b>        | Clock and LAN/WAN installation status  |                           |  |
| <b>Scaler TARE Function</b>      | [RST/TARE] key saves immediate input value as a zero reference, applied as offset to subsequent measured values, permanently saved   |                           |  |
| <b>Indicators</b>                | Backlit, liquid crystal super-twist nematic 2x16 alphanumeric dot matrix, ±20 degree view, yel-grn, 122x44 mm  |                           |  |
| Display                          | 2.0 KHz, 85 db @ 10 cm   |                           |  |
| Audio                            | LED, Quantity/Rate/Time, each red/green/orange   |                           |  |
| Lamps                            | 8-key, metal dome tactile — Chan, qty, prog, view, start, stop, zero/tare, rate/value  |                           |  |
| Keypad                           |  |                           |  |
| <b>Input Port</b>                | >85 dbv (nom.)   |                           |  |
| Interchannel Isolation           | 3.5mm plug, sleeve=gnd, ring=signal, tip=+excitation or wire terminal plugs  |                           |  |
| Interface                        | 0–24 V, 2.4 V threshold (typical), Z-in=8.7K tied to excitation voltage, excitation=5 or 12 VDC regulated, 24.570 KHz, ±0.01%, Hall effect open collector TTL/CMOS switch contacts |                           |  |
| Digital Pulse                    | Levels=0/1–10.000 volts, Z-in=10.0K, ±0.024% (12 bits), Excitation=5 or 12 VDC regulated, 2.300 mA constant  |                           |  |
| Analog Voltage                   | Levels=0/4–20.000 mA, Z-in=100 ohms, ±0.024% (12 bits), Excitation=unregulated supply voltage  |                           |  |
| Analog Current                   |  |                           |  |
| <b>Output Port</b>               | 3.5mm plug or wire terminal plugs  |                           |  |
| Interface                        | 0/4–20.000 mA, Z-out=60.4 ohms, ±0.024%, source or sink (sleeve=neg, ring=n/c, tip=pos.)   |                           |  |
| Analog Current                   | 0/1–10.000 Volts, Z-out=1.0 ohm, ±0.024%, (sleeve=neg., ring=n/c, tip=pos.)  |                           |  |
| Analog Voltage                   | Form "C," 28 VAC, 5 A., ISO=1,000 V, (sleeve=N.O., ring=N.C., tip=common)  |                           |  |
| Relay Rating                     | RJ-11, tip/ring, FCC Subpart "H," modem, V.22 bis full duplex  |                           |  |
| <b>WAN Port</b>                  | EIA/TIA 232D (RS-232C), full duplex, 3.5 mm audio stereo plug  |                           |  |
| <b>Local Serial Ports</b>        | Sleeve=gnd, ring=TXD, input tip=RXD  |                           |  |
| DTE                              | Sleeve=gnd, ring=RXD, input tip=TXD  |                           |  |
| DCE                              | EIA/TIA485 multidrop master/slave dual jack plug-on card (option), Ethernet or DeviceNet   |                           |  |
| <b>LAN Port</b>                  | Non-volatile EEROM 100 year retention without power, Capacity=64x8 (external)/512x8 (internal), Write=1.0 ms/106 writes, Error detect algorithm                                    |                           |  |
| <b>Value Memory</b>              | Memory checksums, installation, local serial, telecommunication  |                           |  |
| <b>Diagnostics</b>               | 12–24 VDC, 65–33 mA (no options), 110–130 VAC, 50–60 Hz, U.S. standard wall adapter, 2.0 mm (center post positive) DC power jack, UL/CSA (VDE 220) VAC, 50 Hz Europe option        |                           |  |
| <b>Power Required</b>            | 0.78 watts (no options)  |                           |  |
| Consumption                      | 3.0 VDC, 35 mA/hr lithium, 9 years   |                           |  |
| Clock-Calendar Battery           | 0–55° C (30–132° F) 0–95% RH non-condensing, Shipping/Storage: –20° to +85° C (warm up to rated accuracy = 30 min.)  |                           |  |
| <b>Operating Environment</b>     | NEMA 4X panel or desk mount, aluminum anodized, 3/16 DIN (96 x 72 x 111 mm)  |                           |  |
| <b>Enclosure</b>                 | 1.865 lbs. (847 gm.) weight  |                           |  |
| <b>Weight</b>                    | FCC Part 15 Class A verified, FCC Part 68 5TUUSA-23969-DT-E, UL and CSA: Power Adapter, Foreign: CSA and CE mark (as required)   |                           |  |
| <b>Regulatory Qualifications</b> |  |                           |  |

## Application Example

