

As the most economical member of the American Auto-Matrix® line of direct digital controllers, the MC1™ provides powerful stand-alone or networkable direct digital control (DDC) and monitoring. The MC1 provides built-in control functions such as closed-loop direct digital control for applications requiring floating setpoint actuation, fully modulating analog outputs, thermostatic control of digital outputs, output supervision, run-time totalization, and scheduling. The MC1 can be configured to control direct-digital ventilators, fan-coil units, small air handlers, heat pumps, pressure-dependent variable air volume (VAV) boxes, and thermostatic devices.

CONTROL CAPABILITIES

For stand-alone environmental control, the MC1 can be configured using the *SoloPro for Windows*™ software interface. *SoloPro for Windows* can also be used for system monitoring and changing system setpoints. The MC1 can be connected to the SOLOStat™ room-monitoring module which provides zone-temperature sensing and setpoint adjustment. These values can then be read by the supervising controller.

Five Proportional+Integral+Derivative (PID) loops are provided for controlling two floating-setpoint motor-positioning control blocks and three analog-output control blocks. These PID loops provide the following features: they are reset-selectable from one of the eight analog inputs, the SOLOStat input, one of the three pseudo-inputs, or the output from a PID loop. The measured variable is selectable from one of the eight analog inputs, the SOLOStat input, or one of the three pseudoinputs. The control sign is also selectable with the option of using the summer/winter input. Additionally, two floating setpoint motor-positioning loops are provided for controlling the four triac outputs by using a pair of outputs for each motor-control loop. Two types of motor control are provided: floating setpoint and pulse-width modulation. Either type can be controlled manually or automatically through a PID loop.

INPUTS

- ▼ **Eight universal inputs:** 0-5VDC, 0-20 mA, configurable as analog or digital inputs
- ▼ **Four digital inputs:** contact closure; created by using two 8-bit universal inputs
- ▼ **Resolution:** Six inputs with 8-bit; two inputs with 15-bit
- ▼ **Thermistor type:** Precon type-3, 10k
- ▼ **Input protection:** R-C filter plus transient protection

Each analog input is selectable for linear scaling, 4 to 20-mA linear scaling, piecewise linear approximation, or piecewise linear approximation for a Precon type-3 thermistor. Linear scaling uses linear interpolation between minimum and maximum engineering values for determining the current value. Each analog input also provides one set of programmable high- and low-alarm limits. Two of the 8-bit universal inputs may be used as four digital inputs (two digital inputs each) for interlocking and alarming purposes. Digital inputs may generate off-to-on, on-to-off, change-of-state,

fire, run-limit, or freeze alarms. The four digital inputs are able to generate supervisory alarms for their respective digital outputs.

Three pseudoinput channels are provided for receiving outside-air-temperature, relative-humidity, or outside-air-enthalpy broadcasts on the Public Unitary Protocol™ (PUP) network. These pseudo-inputs may also receive values from any one of the universal-input channels.

OUTPUTS

- ▼ **Four digital outputs:** solid-state triacs, 24VAC at 1 A up to 50°C, and 24VAC at 0.5 A up to 70°C; current sinking
- ▼ **Three analog outputs:** 0 to 10VDC, 15-bit resolution

Each analog output can be programmed to operate in manual or automatic mode. If automatic mode is chosen, the output value is received from the corresponding PID control loop. Each digital output can be programmed to operate in one of five modes: manual, thermostatic, pulsed-pair, motor control, or scheduled.



MC1™

CONTROL CAPABILITIES

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NETWORKING

Although the MC1 provides stand-alone control, it is compatible with the entire family of American Auto-Matrix products. For applications where alarm detection, real-time data trending, or color graphics are paramount, the MC1—via an area controller such as the SF1™ or SAGE^{MAX}™—can be networked to the *Auto-Pilot*™ software that enables a PC-compatible computer to provide a user-friendly interface with a network of distributed controllers.

The MC1 networks, through direct connection to the SAGE^{MAX} or SF1 area controllers, to higher level control systems for monitoring and control applications. Up to 128 MC1 direct digital controllers can be networked to a single SAGE^{MAX} port.

- ▼ **Line signalling:** EIA-485
- ▼ **Wiring:** shielded, twisted pair

- ▼ **Network protection:** dual tranzorbs, PTCs
- ▼ **Communications speed:** 1,200 to 38.4k baud, programmable
- ▼ **Network configuration:** multidrop up to 5,000 ft. (1.5 km)
- ▼ **Protocol:** PUP

SPECIFICATIONS

Mounting

- ▼ flat surface with screws
- ▼ rugged steel shroud

Terminations

- ▼ fixed 0.2 in. (5.08 mm) terminal block for inputs, outputs, and network communications
- ▼ pluggable terminal block for power

Input Supply

- ▼ NEC class II transformer
- ▼ 24VAC, 50/60 Hz, 6 VA maximum, 4 VA typical
- ▼ PTC provided for direct-digital protection

Operating Environment

- ▼ 32 to 158°F (0 to 70°C)
- ▼ 0 to 95% RH noncondensing

Dimensions

- ▼ overall size: 7.4 x 4.4 x 1.6 in. (18.8 x 11.24 x 4.1 cm)
- ▼ shipping weight: 1.3 lb. (0.6 kg)

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part no. 1E-05-00-0046