

The Auto-Flow system is designed specifically for the fume hood, laboratory, and clean room market. One of the keys to the superior response speed of the Auto-Flow system is the HC2*, a microprocessor-based, high-speed controller for fume hood applications.

The HC2 can control the face velocity of a single fume hood based on direct face velocity measurement. Designed for optimum rapid loop response, the HC2 is suitable for PID (Proportional + Integral + Derivative) applications requiring response time as low as 50 ms. In fume hood applications the HC2 can exhibit 90% recovery within one second or less in response to a change in sash position, with a maximum of $\pm 5\%$ steady state stability. The HC2 modulates a damper located in the exhaust duct-work in order to maintain a specified face velocity setpoint. An optional control loop is provided to control an auxiliary supply air damper for makeup air or any associated single process loop. All of the HC2's hood control parameters are programmable. The HC2 also provides inputs for emergency override of each fume hood and other equipment associated with the laboratory environment.

While the HC2 provides stand-alone control, it is fully compatible with the complete range of Auto-Flow laboratory and fume hood control products. For stand-alone operation, the SOLOPro* software interface package can be used for initial system configuration, system monitoring, or changing setpoints.

INPUTS

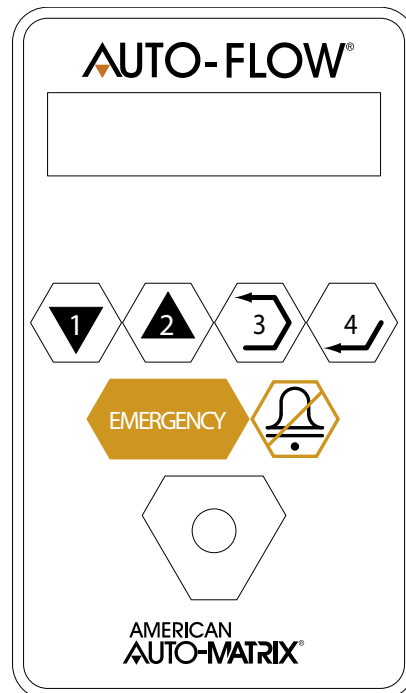
- ▼ **2 Analog Inputs For Sash Monitoring:** 5 Vdc, 8-bit resolution
- ▼ **1 Analog Input For Face Velocity:** 5 Vdc, 0-10 Vdc, 0-20 mA (switch selectable), 16-bit resolution
- ▼ **2 Analog Inputs For Exhaust Flow & Auxiliary:** 5 Vdc, 0-20 mA (switch selectable), 12-bit resolution
- ▼ **1 Pulse Input:** 5 VDC, 15-bit resolution, 35 ms time period
- ▼ **5 Digital Inputs:** external emergency button, sash limit, and actuator faults
- ▼ **Input Protection:** R-C filter plus automotive-grade transient clamp device
- ▼ **Pulse Input Protection:** magnetically and optically isolated

Damper modulation is based on an analog input signal that is switch selectable for 0-10 Vdc, 0-20 mA, or 4-20 mA. Nonlinear control actuators are supported through two programmable piecewise linearization tables.

Inputs are provided for face velocity, exhaust flow, and auxiliary sensors and are supported by three programmable linearization tables.

A group of HC2's can be connected to another controller to handle airflow tracking and control via a cascaded flow input. This input passes the exhaust flow input value between HC2s or to another device. When connected in this manner, the exhaust flow sensor input value is added to the cascaded flow input value, and the result is then written to the cascaded flow output.

Other inputs include a sash limit switch input to indicate that the sash is in the closed position, and a digital input to generate an alarm when an actuator fault has occurred.



OUTPUTS

- ▼ **1 Digital Output For External Alarm:** 24 Vdc, 0.5 A, current sinking
- ▼ **2 Analog Outputs For Exhaust and Auxiliary Dampers:** 10 Vdc/0-20 mA current sourcing, 12-bit resolution
- ▼ **1 Digital Output for Automatic Sash Closure:** 120 Vac, 2.0 A, Form C
- ▼ **1 Pulse Output For Cascade Flow Totalization:** 5 Vdc, 15-bit resolution, 35 ms time period

The digital output mimics an audible alarm and is used for external alarming purposes. The HC2 supports PUP alarming and will respond to any poll for alarms from a monitoring device such as a PUP host device.

AF-HC2

OPERATOR INTERFACE

The HC2 contains an integral keypad and a backlit, 2-line x 16-column LCD for input monitoring and parameter modification.

The status light at the bottom of the HC2 is a bicolor LED, capable of three different color states (off, red, green).

The operator interface is menu-driven with password access and English language text. The menu structure allows parameters of the HC2 and other PUP devices to be examined interactively and modified or adjusted. All modification and examination functions may be configured to require one of several password codes.

NETWORKING

The HC2 can network to higher level control systems for both monitoring and control applications.

- ▼ **Line signalling:** EIA-485
- ▼ **Wiring:** shielded, twisted pair
- ▼ **Network Protection:** dual Tranzorbs, optical and magnetic isolation, PTC
- ▼ **Communications Speed:** 1200 to 38.4 K baud, programmable
- ▼ **Network Configuration:** daisy chain; up to 4000 ft. (1.2 km) total
- ▼ **Protocol:** Public Unitary Protocol (PUP)
- ▼ Various additional protocols supported via networkable protocol converter (optional)

FEATURES

- ▼ UL listed 916, Enclosed Energy Management Equipment
- ▼ Complies with FCC rules Part 15, Class A Computing Device
- ▼ Compatible with AF-LC1 and AF-LC2 digital controllers
- ▼ Stand-alone or networked operation
- ▼ Response time of 1 second or less with proper actuation, with a maximum of $\pm 5\%$ steady state stability
- ▼ PID control of damper position, updated every 50 ms
- ▼ PID control of auxiliary output, updated every 200 ms
- ▼ Fume hood control based on face velocity
- ▼ Optional external alarm/emergency indicator

SPECIFICATIONS

Mounting

- ▼ Display Module: low profile surface mount
- ▼ Base module: surface mount on top of fume hood or above ceiling

Terminations

- ▼ Pluggable 0.2 in. (5 mm) terminal blocks

Input Supply

- ▼ 24 VAC
- ▼ 50/60 Hz, .83 A maximum

Operating Environment

- ▼ 32 to 122°F (0 to 50°C)
- ▼ 0 to 95% Rh noncondensing

Dimensions

Keypad & Display

- ▼ Dimensions: 2.80 x 5.35 x 0.75 in. (7.11 x 13.59 x 1.91 cm)
- ▼ Shipping Weight: 0.8 lb. (0.4 kg)

Base Module

- ▼ Dimensions: 12.90 x 7.65 x 4.05 in. (32.77 x 19.43 x 10.29 cm)
- ▼ Shipping Weight: 9.8 lb. (4.4 kg)
- ▼ Encased in galvanized metal enclosure

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