Micatrone®

Product data sheet

System for Fume Hood Control ver 5.x
FHI / FHC / FHT / HSA24-3P

Fume Hood Control

md-1336gb rev 2013-08-15

Fume Hood Control

The FHC system for fume hood face velocity control is developed for continuous measuring, control and monitoring of the face velocity of the fume hood sash opening and by that, guarantee the safety of the operator and laboratory personnel.
The control also offers the lowest possible energy cost when the inflow is kept at lowest possible value of 0,5 m/s irrespective of the level of the fume hood sash opening

The system consists of:

- ✓ **Operator interface FHI**
- ✓ **Control unit FHC ver 5**
- ✓ **Velocity sensor FHT**
- ✓ **Actuator HSA24-3P**

Design

The operator interface, FHI, is mounted on the front of the fume hood.

The control unit, FHC, is mounted on top of the fume hood or some other suitable location.

The damper control is performed very rapidly and accurately by the actuator, HSA24-3P, a 3-point 24 VAC synchronous motor with built-in triac control, 90° in 1.5 seconds.

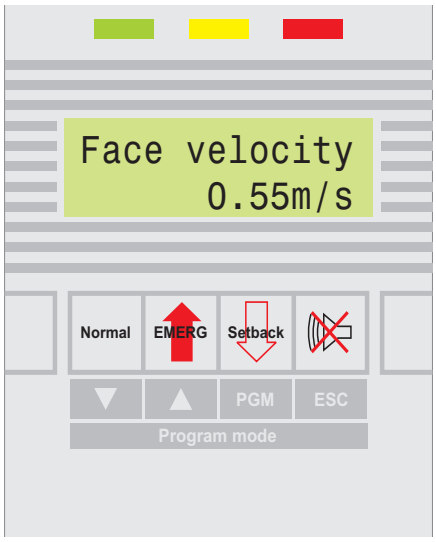
The velocity sensor, FHT, is mounted on the side of the fume hood or on the top according to instructions.

The system also consists of special dampers with low friction. These are available in zinc plated, epoxy coated steel and in plastic.

Operator Interface FHI

System components

Operator monitor FHI



The monitor indicates normal condition with green LED and only when the velocity is normal. When entering into alarm condition the green LED is switched off and a yellow LED is lit to indicate warning, after set time delay the red LED is lit and the buzzer will sound. The display indicate which alarm has occurred together with current velocity.

With the operator interface, following operating modes are selectable with on the keypad:

1. 'Normal' when the fume hood is in use. Low- and high alarm accessible.

2. 'Emergency' force the damper to open position and activates the acoustic alarm. A push at the 'Mute' button restores the sound alarm during 30 seconds and after that the alarm repeats.

3. 'Setback' for fume hood not in use. Low- and high alarm accessible. The key is possible to program active or non active (without function). It is also possible to switch from 'Normal' to 'Setback' mode using a voltage-free closing contact connected to the control unit, FHC. Voltage-free input for deactivating an alarm (acoustic and relay).

Accessing the programming mode is done by pressing the 'Setback'-key. Unauthorized programming is possible to prevent by an access code.

The monitor is communicating with the central unit through an I2C interface. Connection between the units are made with a 4-wire cable.

Control unit FHC

The control unit has two analogue inputs. Input for the velocity sensor and potentiometer for sash opening.

3 voltage-free inputs for selection of 'Emergency', 'Setback' or Alarm reset

1 analogue output for velocity or flow l/s with connected sash opening potentiometer

2 digital control output, 0/10 VDC to control the actuator. Control output can also be programmed for continuous control signal for actuators with 0...10 VDC input

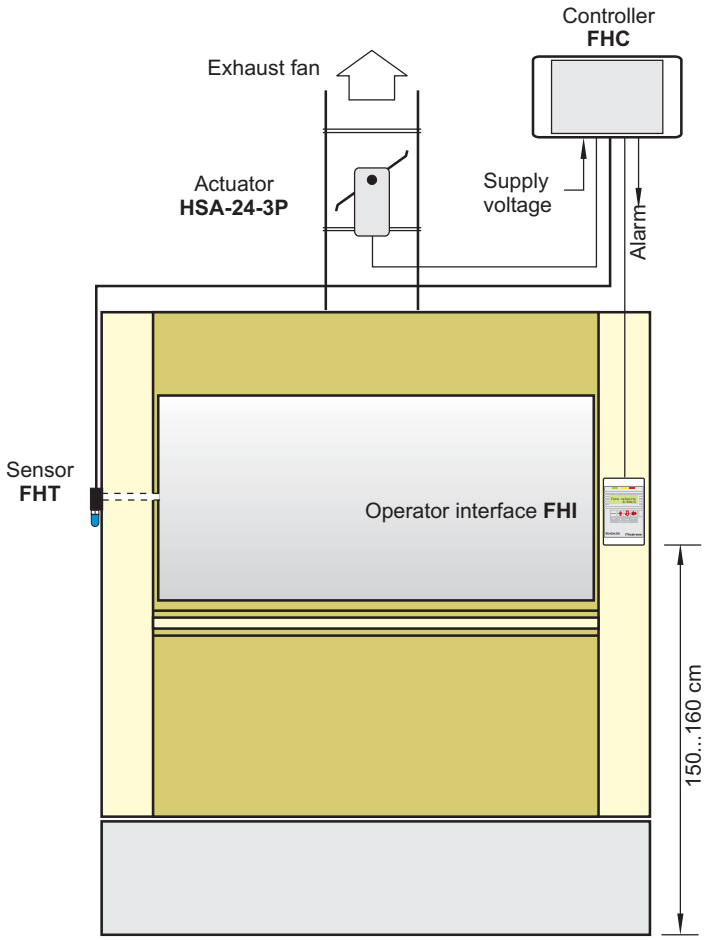
Two alarm relays with NO/NC contacts max 48 VAC/VDC.
Alarm is possible to program for manual or automatic reset. At manual reset the demand for electric interlock is secured by that reset is only possible when the velocity is back to normal.
The control unit can be fitted with data communication expansion card using the MODBUS protocol.

Sensor

The sensor follows the principle of a mass flow sensor with very small flow from clean laboratory space to the fume hood.
Measuring range is 0...1 m/s.
The sensor has a very long time stability and needs only to be checked once a year. Zero setting and adjustments is performed by the operator monitor.
The external flow sensor is mounted on the side of the fume hood above a 8-10 mm hole alternative from the top of the fume hood with an extension tube.

Actuator HSA24-3P

The actuator is of the type alternating-current synchronous motor with very high performance at fast control sessions. Supply voltage 24 VAC is connected through the control unit, FHC.
The actuator is controlled by built-in triac's to achieve secure and quick response. The increase/decease signal is indicated by two green LED's. The angle (0...90°) is indicated by a mechanical position indicator.



Function

The velocity sensor measures the pressure difference between the fume hood and the laboratory. The output signal is linearized to a velocity linear signal for 0...1 m/s. The control unit processes the signal and sends a control output signal to the actuator.

The operator use the interface for control and supervision.
Green LED indicate normal velocity.
Yellow LED warns for deviation.
Red LED indicate alarm state and the display indicate current velocity and trigged alarm
The monitor includes a built-in buzzer which is activated at alarm.
Reset of alarm is done with the 'Mute'-key.
The reset can be programmed to be repeated after a set time or until the velocity is back to normal.

The operator selects the mode of operation with the key pad; 'Normal' for normal velocity, 'EMERG' force the damper to open position and 'Setback' for low velocity if the key is programmed active.
Change to 'Setback' mode from 'Normal' mode is possible through a voltage-free contact connected to the control unit, FHC.
The 'Mute'-key is used for test and resetting of alarms.
When closing the laboratory, the alarm function may be blocked remotely through a voltage-free contact.

The control is performed very rapidly. A change in the fume hood sash opening requires only about 1-3 seconds until a correct hood face velocity is established.

The programming is performed through an easy to use menu system.
'Normal' and 'Setback' has separate settings of velocity and separate limits of high- or low alarm.

With a connected sash switch alarm is possible to get if the sash is opened above a fixed position or with a sash potentiometer, alarm can be set for volume flow (l/s).

Technical data

Operator interface FHI:

Display:	Alphanumeric LCD w back-light 2 row x 16 character
LEDs:	Green, yellow and red
Key pad:	4 key for change of operation; -Normal, -Emergency, -Setback and -test/reset of alarm. Programming mode protected by time delay or code.
Connection:	Connection to control unit via 4-wire cable, length 2 metre
Beeper:	85 dB (10 cm)
IP class:	IP-54
Dim:	125x75x35mm

Control unit FHC:

Output:	1 analogue output for velocity or volume flow l/s with connected sash potentiometer 1 analogue output 0...10 V on terminal 11 for PI-Control or 3PC control signals on terminals 11 and 12.
Input:	Analogue input for velocity sensor and potentiometer input for sash area. 3 voltage free inputs for Emergency, Setback and reset of alarm
Alarm:	Two switching relay contacts max 48 VAC-5 A/48 VDC-1,5 A
Power supply:	24 VAC± 15%
Power consumption.:	5 VA
IP class:	IP-65
El-connection:	Max 2 x 0,75 mm2.
Cable entries.:	8x ø12,5 mm hole
Dim:	175x125x60 mm

Sensor FHT:

Type:	Mass flow sensor
Measure range:	0...1 m/s
Accuracy:	< ± 0,05 m/s

Actuator HSA24-3P:

Control signal:	Digital increase/decrease
Speed:	90° in 1.5 s.
Supply voltage:	24 VAC
Power cons.:	12 VA
Torque:	Min 3 Nm
Operating angle:	90°
Protection:	IP-54
Connection:	1 m fixed 4-wire cable
Mech. connection:	Fixed socket for 10x10 mm square shaft on damper
Dimension:	155x71x67 mm

System accessories:

- Transformer
- Sash potentiometer
- IR presence sensor
- Damper, zinc coated, epoxy painted or plastic
- Sensors and controllers for constant pressure control, balancing of supply and exhaust air, zone control and temperature control

Electric connection :

No.	Description	Data
1	Supply 24 VAC	
2	GND	
3	Supply velocity sensor	3,26 VDC
4	Signal from velocity sensor	0,5..2,0 VDC
5	GND	
6	Signal from sash switch/pot.	0..10 VDC
7	10 VDC reference	9,77 VDC
8	15 VDC ext. supply output	15,0 VDC
9	Supply voltage actuator	24 VAC
10	GND	
11	Pi Control signal / 3PC increase	0/10 VDC
12	3PC decrease	0/10 VDC
13	Output signal velocity/flow	0..10 VDC
14	GND	
15	Mute alarm	Voltage free t
16	Emergency	Voltage free
17	Setback	Voltage free
18	GND	
19	To display conn. 1	
20	To display conn. 2	
21	To display conn. 3	
22	To display conn. 4	
23	Alarm relay 1 - Common	COM
24	Alarm relay 1 - Normal	NO
25	Alarm relay 1 - Alarm	NC
26	Alarm relay 2 - Common	COM
27	Alarm relay 2 - Normal	NO
28	Alarm relay 2 - Alarm	NC

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