

Programming instruction for MicaFlex Fume Hood average face velocity control system

Fume Hood Control

Mi-213gb_2005-10-27

NOTE !

Read the entire instruction carefully before start.

Programming

MicaFlex Fume hood controller is a programmable system for continuous measuring, control and monitoring of the face velocity in the fume hood sash opening.

The operator has a keypad with 4 keys to his help: "Normal Flow", "High Flow", "Low Flow" and "Test/Reset".

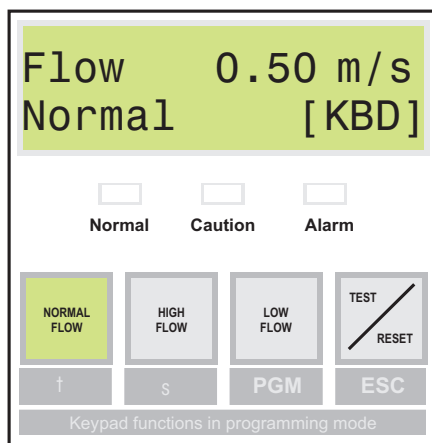


figure 1

The function of the keypad is changed to programming mode by pushing the "Low Flow"-key for a period of 20 seconds.

Before change of function the control mode is changed to 'Normal Flow' then the display shows:

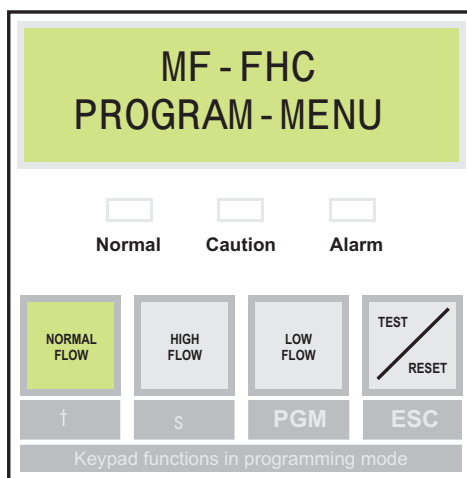


figure 2

NOTE ! The "Low Flow"-key must be kept pressed until the above menu is shown.

With the -keys it is possible to change between the different parameter groups.

1. Current values
2. System settings
3. Outputs
4. Pressure
5. Flow
6. Alarms
7. PI2 controller
8. Communication
9. Internals

When the parameter group to be programmed or checked is shown, push the **PGM**-key. When the groups first parameter is shown, select by the parameter to be programmed and push the **PGM**-key.

Programming of digits

Each digit is programmed separately. The digit to be programmed is flashing. Push to change value of the digit. Push the **PGM**-key to get to the next digit. When all digits are programmed push **PGM** and the entire row will flash.

To abort an incorrect programming push **ESC** and then **PGM** to start a new programming.

Unit or value programming

Push to change unit/value. After selection push **PGM** and the entire row will flash.

To stop programming

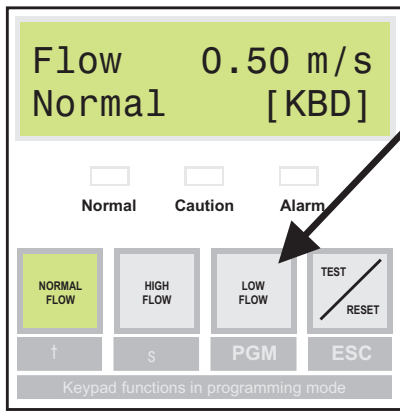
Push **ESC** to return to the parameter group. Push **ESC** to leave programming mode and return back to the operator menu.

NOTE ! It is always possible to abort an incorrect programming with **ESC** if you have not pushed the **PGM**-key.

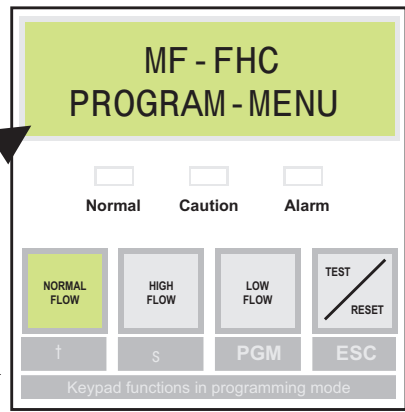
Parameter list

Par. no:	Lead text	Range	Value	
			Preset	New
Internals				
0	Prog ver	0.00...9.99		
Current values				
100	dP	-32768...32767		
101	Flow	-32768...32767		
102	PI2	0.00...100.00		
103	PI2 CSP	-32768...32767		
105	Mute Input	OPEN CLOSED		
106	SPD1 Input	OPEN CLOSED		
107	SPD2 Input	OPEN CLOSED		
System settings				
5	Damping[s]	0.0...9.9	0.1	
Outputs				
20	Signal 1	0..10V 2..10V 0..20mA 4..20mA	0...10V	
22	Signal 2	0..10V 2..10V 0..20mA 4..20mA	0...10V	
Pressure				
23	MinCal[Pa]	-32768...32767	00000	
24	MaxCal[Pa]	-32768...32767	00004	
Flow				
32	Max flow	0.00...327.67	2.00	
33	Scale flw	0.00...327.67	1.0000	
34	Set flow	0.00...327.67	0	
Alarms				
6	Alarm 1	OFF HIGH LOW	LOW	
8	Lvl 1 N	-3276.8...3276.7	0.5000	
65	Lvl 1 H	-3276.8...3276.7	0.5000	
66	Lvl 1 L	-3276.8...3276.7	0.5000	
9	BepDly1[s]	0...3600	6	
74	RelDly1[s]	0...3600	0	
10	Reset 1	OFF ON	ON	
11	Alarm 2	OFF HIGH LOW	LOW	
13	Lvl 2 N	-3276.8...3276.7	0.5000	
67	Lvl 2 H	-3276.8...3276.7	0.5000	
68	Lvl 2 L	-3276.8...3276.7	0.5000	
14	BepDly2[s]	0...3600	6	
75	RelDly2[s]	0...3600	0	
15	Reset 2	OFF ON	ON	

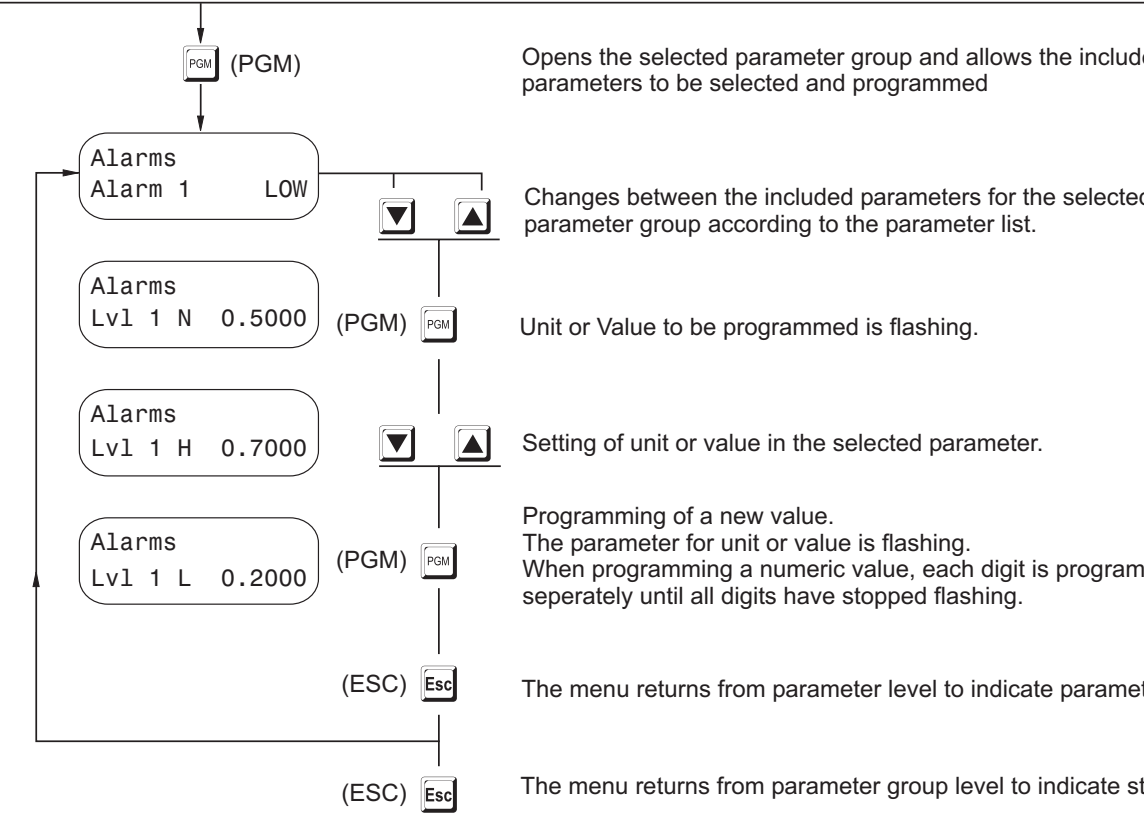
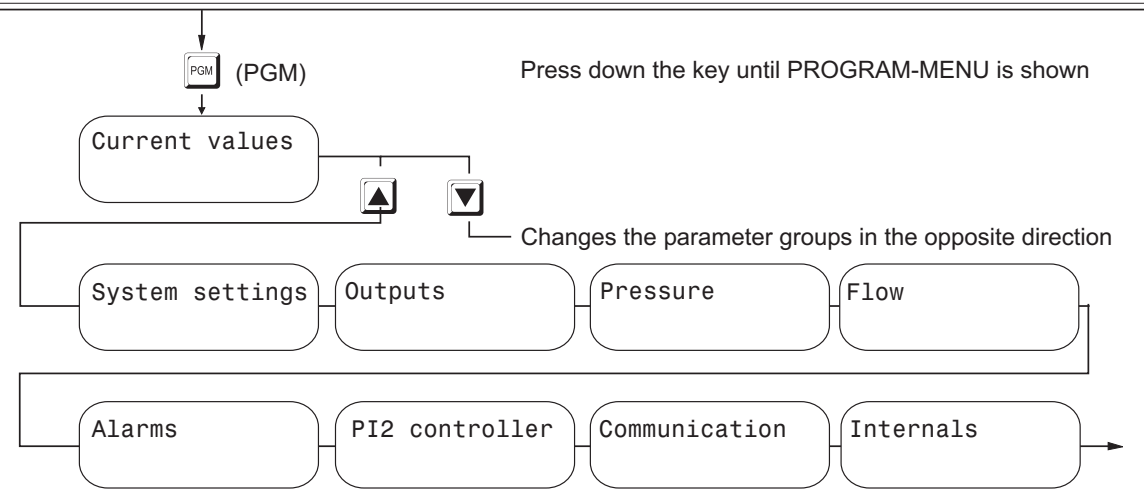
Par. no:	Lead text	Range	Value	
			Preset	New
16	Res hold	FOREVER TIMED	FOREVER	
17	Hold [s]	0...3600	0	
18	Beeper	OFF ALARM 1 ALARM 2 AL1+AL2	AL1+AL2	
PI2 controller				
36	Mode	AUTO HAND	AUTO	
37	Output	DIRECT REVERSE	REVERSE	
53	SP Normal	-32768...32767	0.5500	
55	SP High	-32768...32767	0.5500	
62	SP Low	-32768...32767	0.5500	
57	SPD1 In	OFF SP HIGH FORCE HI	SP HIGH	
63	SPD2 In	OFF SP LOW FORCE LO	SP LOW	
58	ForceHi	0.00...100.00	100.00	
64	ForceLo	0.00...100.00	0.00	
39	NZ [%]	1...50	6	
40	P-band	0...9999	0	
41	I-time[s]	0...999	3	
42	BZ	0...100	10	
43	I-time BZ	0...999	6	
Communication				
47	Address	1...247	21	
48	Location	0...32767	00000	
49	Protocol	COMLI	COMLI	
50	Baud	600 b 1200 b 2400 b 4800 b 9600 b	4800 b	
51	Protect	NO YES	NO	



To programme:
Keep the "Low Flow"-
key pressed for a pe-
riod of 20 seconds un-
til the display shows:



The keypad changes
to programming mode:



FHC Programming guide

Note the programmed values beside each parameter in the parameter list for future reference. Preset values at delivery are stated in 'Preset value' column.

Programming instruction

Push the "Low Flow"-key until display shows:

MF-FHC

PROGRAM - MENU.

1. Current values

100	dP	-32768...32767		
101	Flow	-32768...32767		
102	PI2	0.00...100.00		
103	PI2 CSP	-32768...32767		
105	Mute Input	OPEN CLOSED		
106	SPD1 Input	OPEN CLOSED		
107	SPD2 Input	OPEN CLOSED		

Shows present measure- and control data.

dP	Differential pressure in Pa between fume hood and laboratory.
Flow	Face velocity of fume hood sash opening in m/s.
PI2	Control output in %
PI2 CSP	Present control set value
Mute Input	External reset of alarm
SPD1 Input	Forced operation of high velocity
SPD2 Input	Forced operation of low velocity

2. System settings

5	Damping[s]	0.0...9.9	0.1
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Damping of velocity sensor signal.

Programme actual time constant (damping) for flow measurement 0...9,9 seconds, normally 0,1 seconds.

3. Outputs

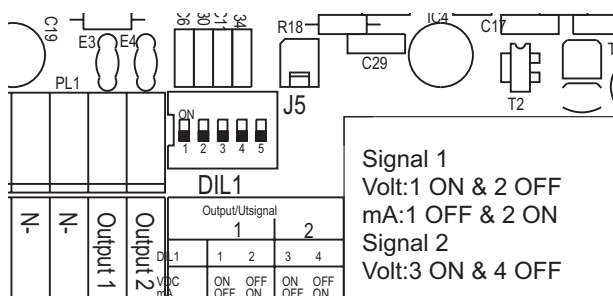
20	Signal 1	0..10V 2..10V 0..20mA 4..20mA	0...10V
22	Signal 2	0..10V 2..10V 0..20mA 4..20mA	0...10V

Signal 1 Set value for velocity in fume hood sash opening.

Select signal according list.

Signal 2 Control output signal to actuator HSA-24SR, 2... 10V.

When changing from Volt to mA output the selector on the printed circuit board also must be changed, see figure below.



4. Pressure

23	MinCal[Pa]	-32768...32767	00000
24	MaxCal[Pa]	-32768...32767	00004

MinCal[Pa] Shows programmed min. value for pressure measurement (0 Pa).

MaxCal[Pa] Shows programmed max. value for pressure measurement (4 Pa).

NOTE! These values are not possible to change.

5. Flow

32	Max flow	0.00...327.67	2.00
33	Scale flw	0.00...327.67	1.0000
34	Set flow	0.00...327.67	0

Max flow Calculated velocity corresponding to 4 Pa, see further 'Set flow'.

Scale flw Scaled flow value for max. output signal and control parameters. Programmed value 1 m/s = max. output signal, this value is possible to change.

Set flow The calculated flow range at 'Max flow' is revised by programming of this parameter.

Adjusting of velocity measurement

Measure the fume hood sash opening velocity with a reference instrument. The measurement must be performed according to standard specifications to achieve a mean value. Programme the actual value into 'Set flow'. When the last digit in 'Set flow' is programmed (the entire row will flash), the value is automatically revised for 'Max flow' in that sense that the measured reference velocity and MicaFlex control velocity corresponds to each other.

6. Alarms

6	Alarm 1	OFF HIGH LOW	LOW
8	Lvl 1 N	-3276.8...3276.7	0.5000
65	Lvl 1 H	-3276.8...3276.7	0.7000
66	Lvl 1 L	-3276.8...3276.7	0.2000
9	BepDly1[s]	0...3600	6
74	RelDly1[s]	0...3600	0
10	Reset 1	OFF ON	ON
11	Alarm 2	OFF HIGH LOW	LOW
13	Lvl 2 N	-3276.8...3276.7	0.5000
67	Lvl 2 H	-3276.8...3276.7	0.5000
68	Lvl 2 L	-3276.8...3276.7	0.5000
14	BepDly2[s]	0...3600	6
75	RelDly2[s]	0...3600	0
15	Reset 2	OFF ON	ON
16	Res hold	FOREVER TIMED	FOREVER
17	Hold [s]	0...3600	0
18	Beeper	OFF ALARM 1 ALARM 2 AL1+AL2	AL1+AL2

FHC has two programmable alarms with two closing relay contacts together with beeper- and visual alarm (LED).

Alarm 1	OFF = the Alarm is off. HIGH = Alarm at high velocity. LOW = Alarm at low velocity.
Lvl 1 N	Limit value normal velocity (m/s).
Lvl 1 H	Limit value forced velocity (m/s).
Lvl 1 L	Limit value low velocity (m/s).
BepDly1[s]	Time delay in seconds before beeper- and visual alarm are triggered.
RelDly1[s]	Time delay in seconds before the relay change after that beeper- and visual alarm are triggered. Reset of beeper- and visual alarm, with the Reset-key or externally, before the relay has changed prevents the relay to change.
Reset 1	ON = Reset-key resets relay and beeper alarm. OFF = Reset-key resets only the beeper alarm. Visual alarm (flashing red light diode) remains as long as the velocity is incorrect independent of the alarm is resetted.
Alarm 2	Same as above

Res hold	FOREVER = Reset is valid until the velocity again is normal, and the alarm is automatically resetted TIMED = The alarm is reactivated after programmed time. When the velocity becomes normal the alarm is automatically resetted.
Hold [s]	Time in seconds to reset alarm if TIMED is selected.
Beeper	Selection of beeper function. At external resetting by closing contact the alarm is resetted as long as the contact is closed.

Interlocking function:

Interlocking contactor is supplied via a normal closed alarm contact. To prevent unwanted interlocking to occur the alarm has two programmable time delays. At beeper alarm the interlocking time delay circuit is activated and after set time the relay changes. When resetting of alarm is performed before the relay has changed the interlocking is prevented to be activated.

At activated interlocking this is resetted manually by pressing the interlocking reset-key.

7. PI2 controller

36	Mode	AUTO HAND	AUTO
37	Output	DIRECT REVERSE	REVERSE
53	SP Normal	-32768...32767	0.5500
55	SP High	-32768...32767	0.5500
62	SP Low	-32768...32767	0.5500
57	SPD1 In	OFF SP HIGH FORCE HI	SP HIGH
63	SPD2 In	OFF SP LOW FORCE LO	SP LOW
58	Force hi	0.00...100.00	100.00
64	Force Lo	0.00...100.00	0.00
39	NZ [%]	1...50	6
40	P-band	0...9999	0
41	I-time[s]	0...999	3
42	BZ	0...100	10
43	I-time BZ	0...999	6

Mode	AUTO = Automatic control HAND = Manually control
Output	Change of control output signal
SP Normal	Set value at normal velocity (m/s)
SP High	Set value at forced velocity (m/s)
SP Low	Set value at low velocity (m/s)
SPD1 In	Digital input for set value influence OFF = No influence. SP HIGH = At closed contacts set value forced velocity is achieved. FORCEHI = At closed contacts the actuator is controlled to programmed position 0...100 %. The position is programmed in 'ForceHi'.

SPD2 In Digital input set value influence
 OFF = No influence
 SP LOW = At closed contacts the set value low velocity is achieved.
 FORCELO = At closed contacts the actuator is controlled to programmed position 0...100 %.
 The position is programmed in ForceLo.

ForceHi The actuators position at FORCEHI

ForceLo The actuators position at FORCELO

NZ [%] Dead zone around the set value.
 Half neutral zone on each side of the set value.
 NZ is in % of scaled velocity range (Scale flow).

P-band Not to be used

The controller has two programmable I-times. Close to the set value, within slow down zone (BZ), a longer I-time is programmed and outside the slow down zone a shorter I-time to get a quicker response for a larger deviation.

I-time[s] I-time at larger deviation
 BZ Slow down zone for change of I-time. Half the slow down zone on each side of the set value.
 BZ is in % of scaled velocity range (Scale flow). When the deviation is within the slow down zone I-time BZ is functioning as I-time, and outside slow down zone I-time is functioning as I-time.

I-time BZ I-time at small deviation

Increase the I-time outside slow down zone if the control is unstable. The slow down zone shall be smaller than alarm set points.

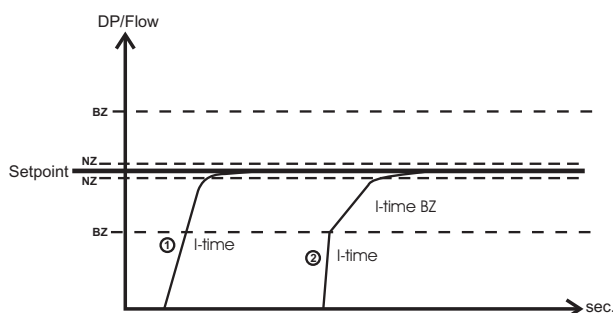
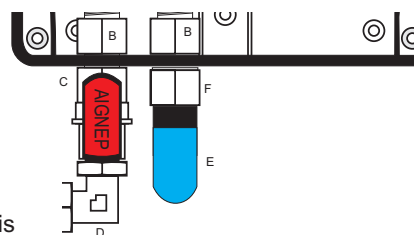


figure 3

Commissioning and check up

These action are performed at first commissioning and at later fixed check up intervals.

Zero calibration of the built in sensor
 Close the calibration valve.



NOTE !
 The valve knob is in running position.

figure 4

Press simultaneously the keys "Normal Flow" and "High Flow".

The display shows "ZERO OFFSET".
 When the text "ADJUSTING" is displayed release the keys. Zero setting is automatically performed. After zero setting open the calibration valve.

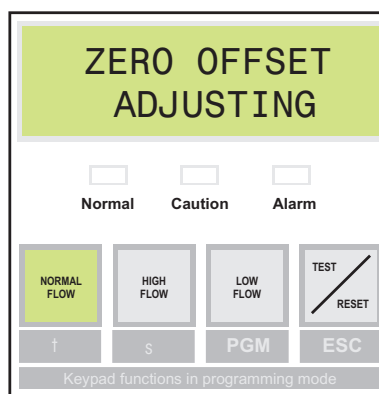


figure 5

Calibration

Depending of the construction of different fume hoods a control and adjustment of the velocity sensor must be performed.

Follow the programming instruction and the position "Set flow".

When the programme menu is activated the velocity is always controlled to set value for normal velocity. Measure fume hood sash opening velocity at several points with a reference instrument. If the velocity deviates from the programmed (0.55 m/s) programme the measured velocity at "Set flow". See also 'Set flow' on page 4.

The calibration is performed, press **ESC** until the operator menu is shown again.

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