Programming instruction for MicaFlex FHC, Fume Hood face velocity control system ver. 5

FHC ver. 5

Mi-298gb rev 2013-05-23

NOTE !
Read the entire instruction carefully before start.

Interface:
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" for normal velocity, "Emergency" for fully open damper, "Setback" for fume hood when not in use and the “Mute"-key.

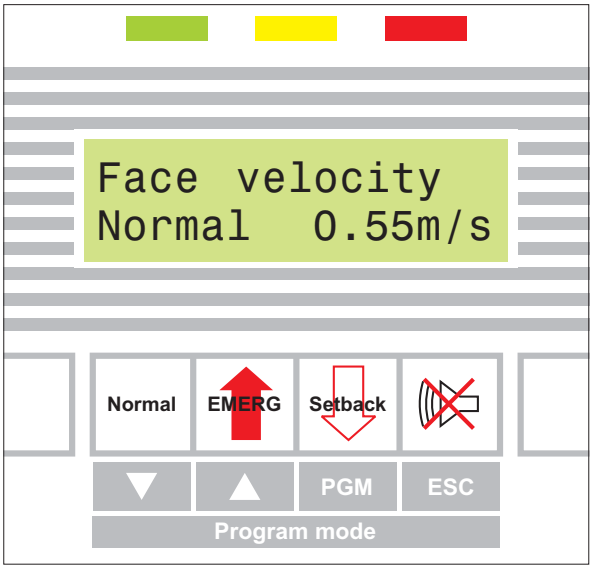


figure 1

The fume hood is only safe when display indicate a velocity exceeding 0,50 m/s and the green LED is lit. The green LED indicate that the velocity is inside the limits for normal velocity. A yellow LED is lit when the velocity is beyond normal limit but within the set time delay. Flashing yellow LED indicate setback-mode and flashing red LED indicate Alarm condition.

Programming:
The function of the keypad is changed to programming mode by pressing the "Setback"-key for a period of 5 seconds. Before change of function the control mode is changed to ‘Normal’ then the display shows:

MF - FHC
PROGRAM - MENU

The keys change function to ▼, ▲, **PGM, ESC.**

NOTE !
If the Access code is activated a logon screen 'Enter Code' is shown. Enter the 4 digit code to proceed to the Program menu.

Parameter groups:
With the ▼▲-keys it is possible to change between the different parameter groups.

1. Internals

2. Calibration

3. Alarm 1

4. Alarm 2

5. Controller

6. Sash settings

7. System settings

8. Communication (if installed)

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.

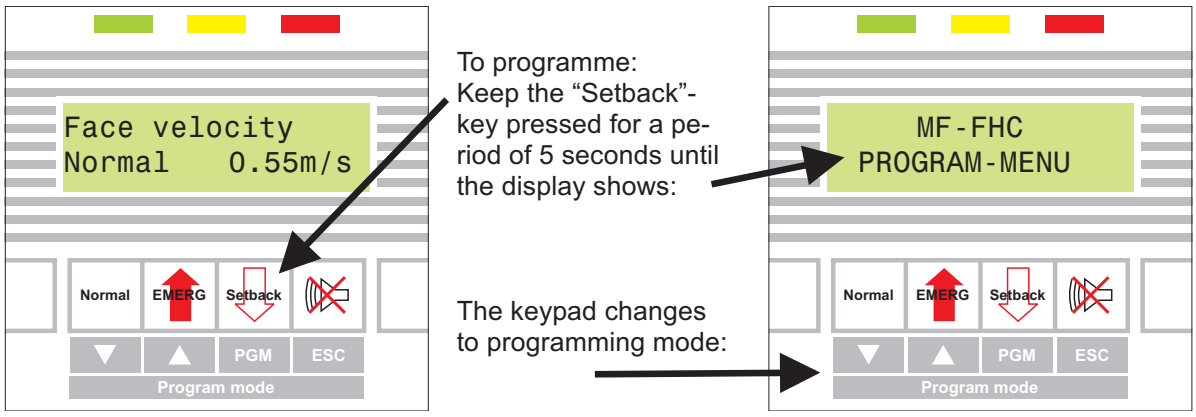
To abort an incorrect programming push **ESC** and then **PGM** to start a new programming.

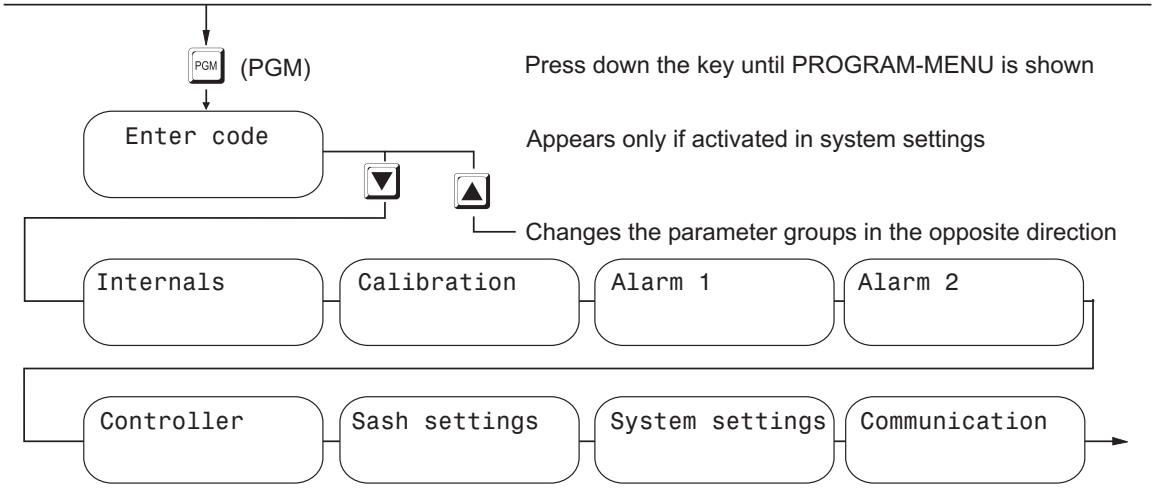
To stop programming
Push **ESC** to return to the parameter group.
Push **ESC** to leave programming mode and return to the operator menu.

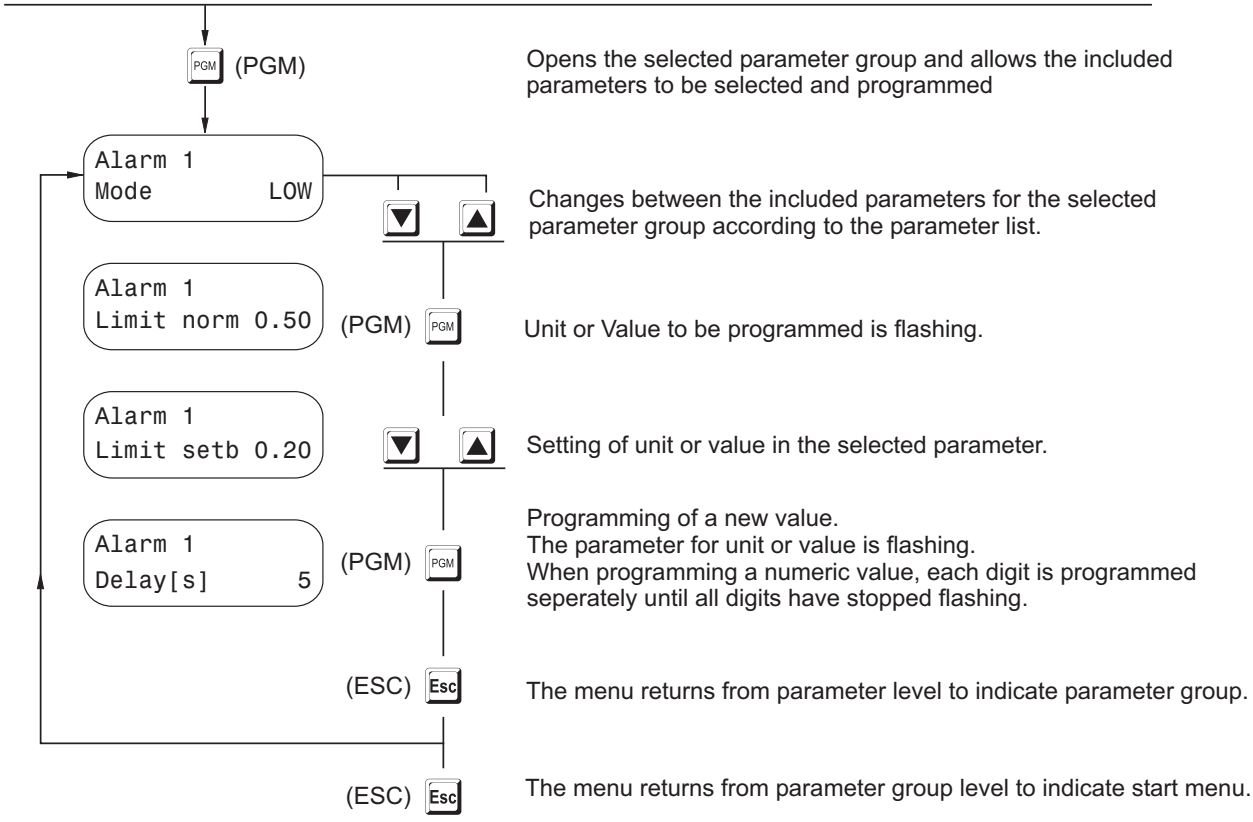
Parameter list

No	Lead text	Range/Option	Unit	Preset
Internals				
00	SW: I/O	software version		
01	SW: FHI	software version		
Calibration				
02	Zero adjust	NO / YES		NO
03	Set velo.	0.10…1.00	m/s	0.55
Alarm 1				
04	Mode	OFF / HIGH / LOW		LOW
05	Limit Norm.	0.00…1.00	m/s	0.50
06	Limit Setb.	0.00…1.00	m/s	0.20
07	Delay [s]	0…999	s	5
08	Reset	MANUAL / AUTO		AUTO
09	Beeper	OFF / ON		ON
10	Mute	BEEP / BEEP&RELAY		BEEP
11	Mute time	0…999	s	0
Alarm 2				
12	Mode	OFF / HIGH / LOW		LOW
13	Limit Norm.	0.00…1.00	m/s	0.50
14	Limit Setb.	0.00…1.00	m/s	0.20
15	Delay [s]	0…999	s	5
16	Reset	MANUAL / AUTO		AUTO
17	Beeper	OFF / ON		ON
18	Mute	BEEP / BEEP&RELAY		BEEP
19	Mute time	0…999	s	0
Controller				
20	Mode	3PC / PI		3PC
21	SP Normal	0.00…1.00	m/s	0.55
22	SP Setback	0.00…1.00	m/s	0.30
23	NZ [m/s]	0.01…0.20	m/s	0.06
24	Pulse [s]	0.01…1.00	s	0.25
25	Pause [s]	0.01…1.00	s	0.07
26	I-time [s]	00.0…99.9	s	1.5
27	BZ [m/s]	0.01…0.20	m/s	0.08
28	Pulse BZ	0.01…1.00	s	0.04
29	Pause BZ	0.01…1.00	s	1.00
30	I-time BZ	00.0…99.9	s	5.0
31	Output	DIRECT / REVERSE		REVERSE
32	Min output	0…50	%	0
33	Max output	30…100	%	100

Sash settings				
34	Input	POT / SWITCH		SWITCH
35	Source	HEIGHT / FLOW		HEIGHT
36	Limit Alarm	0…999	cm or l/s	0
37	Delay [s]	0…999	s	0
38	Beeper	OFF / ON		OFF
39	Mute time	0…999	s	0
40	Set width	0…999	cm	0
41	Cal point 05	NO / YES		NO
42	Cal point 40	NO / YES		NO
System settings				
43	Setback key	OFF / ONCE / ON		OFF
44	Output	VELO / FLOW		VELO
45	Access code	0000…9999		0000
Communication				
46	Address	1…247		1
47	Baud	OFF / 600/ .. /128000		34800
48	Parity	NONE / ODD / EVEN		EVEN
49	Protect	NO / YES		NO







FHC ver 5.x
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 “Setback”-key until display shows:

MF - FHC PROGRAM - MENU

If the access code is activated enter the 4-digit code in the logon screen before.

1. Internals

00	SW: I/O	software version		5.xx
01	SW: FHI	software version		1.xx

Shows the present software version of the controller I/O-box (FHC) and the operator interface (FHI).

2. Calibration

02	Zero adjust	NO / YES		NO
03	Set velo.	0.10…1.00	m/s	0.55

Zero adjust: Put a tape over the velocity sensor inside the fume hood. Press **PGM** and select with the ▼ -key 'YES'. Press **PGM** to make the calibration.

Set velo: open the sash approx. 20 cm and check the velocity with a reference instrument in several points. If the average value differ from the setpoint 'SP Normal' enter the new value into the parameter.

3. Alarm 1

04	Mode	OFF / HIGH / LOW		LOW
05	Limit Norm.	0.00…1.00	m/s	0.50
06	Limit Setb.	0.00…1.00	m/s	0.20
07	Delay [s]	0…999	s	5
08	Reset	MANUAL / AUTO		AUTO
09	Beeper	OFF / ON		ON
10	Mute	BEEP / BEEP&RELAY		BEEP
11	Mute time	0…999	s	0

Program the alarm functions and levels in parameter 04..07..

Reset AUTO: the alarm is reset when the velocity is within limits.

Reset MANUAL: the alarm must be muted by the mute-key or digital input when the velocity is within limits.

Mute BEEP or Mute BEEPER and RELAY can be muted as above.

Mute time: Enter the time [in seconds] for how long the alarm should be muted before it is repeated again. Entering a value of '000' mute the alarm until the alarm is within limits again and a new alarm occur.

4. Alarm 2

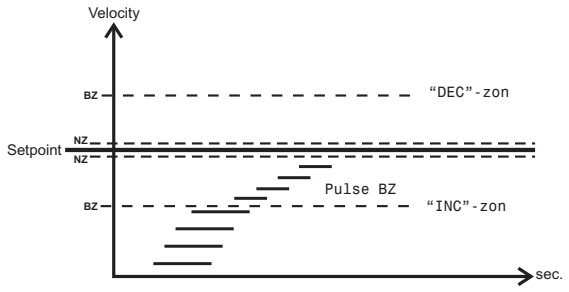
12	Mode	OFF / HIGH / LOW		LOW
13	Limit Norm.	0.00…1.00	m/s	0.50
14	Limit Setb.	0.00…1.00	m/s	0.20
15	Delay [s]	0…999	s	5
16	Reset	MANUAL / AUTO		AUTO
17	Beeper	OFF / ON		ON
18	Mute	BEEP / BEEP&RELAY		BEEP
19	Mute time	0…999	s	0

The same functions and settings as in alarm 1.

5. Controller
When selecting the control function, 3-point or PI control, the parameter list is changing in accordance with the control function selected.

5.1 3-point control (3PC)

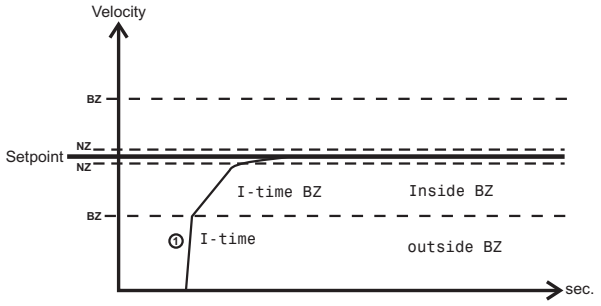
20	Mode	3PC / PI		3PC
21	SP Normal	0.00…1.00	m/s	0.55
22	SP Setback	0.00…1.00	m/s	0.30
23	NZ [m/s]	0.01…0.20	m/s	0.06
24	Pulse [s]	0.01…1.00	s	0.25
25	Pause [s]	0.01…1.00	s	0.07
27	BZ [m/s]	0.01…0.20	m/s	0.08
28	Pulse BZ	0.01…1.00	s	0.04
29	Pause BZ	0.01…1.00	s	1.00
31	Output	DIRECT / REVERSE		REVERSE



If the control is unstable, decrease the 'Pulse' [P24] outside the 'BZ' from 0.25 to 0.1 or to a setting between. If this isn´t enough to achieve a stable control, the 'Pause' [P25] can be increased to 0.2 or a setting between.

5.2 PI-control (PI)

20	Mode	3PC / PI		PI
21	SP Normal	0.00…1.00	m/s	0.55
22	SP Setback	0.00…1.00	m/s	0.30
23	NZ [m/s]	0.01…0.20	m/s	0.06
26	I-time [s]	00.0…99.9	s	1.5
27	BZ [m/s]	0.01…0.20	m/s	0.08
30	I-time BZ	00.0…99.9	s	5.0
31	Output	DIRECT / REVERSE		REVERSE
32	Min output	0…50	%	0
33	Max output	30…100	%	100



Increase the I-time outside 'BZ' if the control is unstable. When having a deviation outside the 'BZ' it will take longer time to reach the setpoint. Check that the alarm delay is enough for the new I-time.

6. Sash settings

34	Input	POT / SWITCH		SWITCH
35	Source	HEIGHT / FLOW		HEIGHT
36	Limit Alarm	0…999	cm or l/s	0
37	Delay [s]	0…999	s	0
38	Beeper	OFF / ON		OFF
39	Mute time	0…999	s	0
40	Set width	0…999	cm	0
41	Cal point 05	NO / YES		NO
42	Cal point 40	NO / YES		NO

The Sash settings use different functions depending on the type of sensor used on the Sash. Potentiometer or Switch.

If the Sash have a voltage free contact with a mechanical limit switch [SWITCH] the grey-toned parameters are not visible.

If a Sash potentiometer [POT] is mounted the actual flow is calculated (l/s) and can be used for alarm and output on terminal 13, 0...10 VDC signal.

See separate instruction for Sash potentiometer.

Calibration of Sash potentiometer:
Measure and program the width of the sash opening in centimetre (cm). Zero-set the potentiometer according to the separate instruction.
Set the sash to a 5 cm opening. Press the **PGM**-key, select with the arrow keys ▼▲ to 'YES' and press the **PGM**-key once again.
Set the sash to a 40 cm opening and repeat the programming in the same way.

7. System settings

43	Setback key	OFF / ONCE / ON		OFF
44	Output	VELO / FLOW		VELO
45	Access code	0000…9999		0000

The "Setback" -key can be programmed for three different functions:

OFF: The key is disabled.

ONCE: The key can only be used one time before the parameter function returns to the 'OFF' mode.

ON: The key is always enabled.

The voltage free input on terminal 17 is always activated independent of this.

Output: VELO/FLOW

VELO: the present velocity 0...1.0 m/s = 0..10 VDC output signal on terminal 13. If using a sash potentiometer the output can be air flow 0...999 l/s = 0...10 VDC output signal on terminal 13.

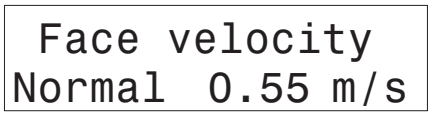
Access Code: With the parameter value set to '0000' the function is inactivated otherwise the programmed 4-digit code must be entered in the logon screen before accessing the Program menu.

8. Communication

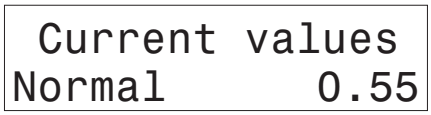
46	Address	1…247		1
47	Baud	OFF 600 1200 2400 4800 7200 9600 14400 19200 38400 57600 115200 128000		34800
48	Parity	NONE / ODD / EVEN		EVEN
49	Protect	NO / YES		NO

This Parameter group is only visible when the Modbus communication module is installed.

Current values
This "Read only" list of parameter values is opened without accessing the Program menu. All settings for "Normal" is activated as in:



Press the "Normal"-key until the text 'current values' are shown on the top row.



Select parameter using the ▼ -key.

- ❑ Sash height in cm if potentiometer is connected
- ❑ Flow in litre/second if potentiometer is connected
- ❑ 3PC mode, 'Inc/NZ/Dec' (if selected in parameter list)
- ❑ PI 'Open' or 'Close' (if selected in parameter list)
- ❑ Mute 'Open' / 'Close'
- ❑ Emerg 'Open' / 'Close'
- ❑ Setback 'Open' / 'Close'

To exit the list, press the **Mute**-key.

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 selection of Emerg. or Setback velocity 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

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	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
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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