Operating and Installation Manual

iM50

Fume hood monitor face velocity

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DECLARATION OF CONFORMITY

SCHNEIDER Elektronik GmbH hereby declares that the device:

FUME HOOD MONITOR iM50

complies with the basic requirements of the European Council Directive for electromagnetic compatibility (89/336/EEC) and the CE Marking Directive (93/68/EEC).

You may request a copy of the declaration of conformity at the address given below.

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1.0 SAFETY INSTRUCTIONS

Before installing and using the **iM50 fume hood monitor**, please read and follow this operating and installation manual carefully.

- Installation and wiring may only be done by qualified specialists.
- Check whether the operating voltage shown on the nameplate corresponds with the supply voltage at the site where the device will be installed.
- During installation, wiring and operation, recognised technical precepts, particularly regulations regarding safety and accident prevention, must be followed.
- The device should only be returned to the manfacturer for repair in the original box.
- **When you see the symbol CAUTION, we recommend that you pay careful attention to the explanatory text and notes.**

ELECTRICAL CONNECTION

- The electrical connection must be done by a qualified electrician in accordance with the safety precautions.
- The following rules and regulations must be followed:
  VDE guidelines
  Local power supplier regulations
  Manufacturer wiring instructions and terminal connection diagrams
- Connect the iM50 fume hood monitor to its own, separate circuit to protect against overload.
- Do not do any electrical work on the device when the power supply is switched on.
- **Follow the safety regulations at all times:**
  - **Disconnect the iM50 fume hood monitor**
  - **Ensure that the fume hood monitor cannot be switched on again**
  - **Ensure that the fume hood monitor is voltage-free**

OPERATING SAFETY

- Do not use the iM50 device immediately after bringing it from an unheated room into a warm room. Condensation on the electronic circuits can lead to severe damage. The device reaches room temperature after approximately 2 hours.
- **Always pull the mains plug or disconnect the device from the power** if objects or fluids have permeated the device or if you notice a smell or smoke. Have the manufacturer check the device.
- **Always pull the mains plug or disconnect the device from the power supply if the case or lid of the device has to be opened.**

PROPER USE

- The iM50 fume hood monitor is intended solely for controlling and monitoring volume flows in fume hoods in accordance with EN 14175, Part 2.
- Do not use the iM50 fume hood monitor in areas that are vulnerable to explosion.

CE-NOTE

The iM50 fume hood monitor complies with the safety requirements of the EMC law and the CE Marking Directive and therefore disposes of a CE Marking.

TABLE OF CONTENTS 1.1

2.0 FUNCTIONAL DESCRIPTION

For use as a monitoring and alarm system for face velocities in various applications, such as fume hoods, safety cabinets and other extraction units.

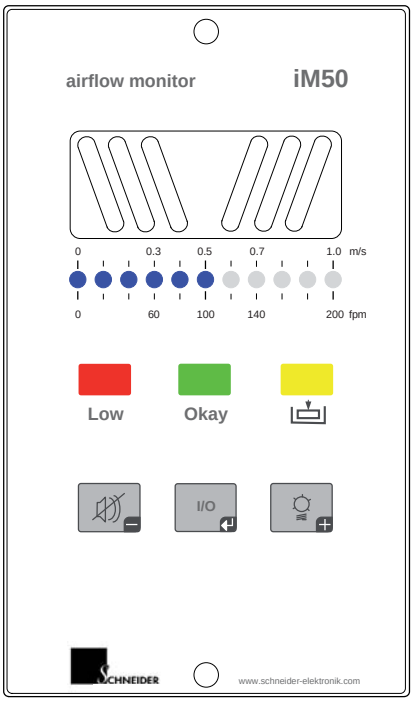
Microprocessor controlled security system with integrated air flow sensor for monitoring the containment-safe operating status of fume hoods. An acoustic and optical alarm is activated as soon as the face velocity falls below the programmed threshold value.

The iM50 Airflow Monitor fulfills the **EN 14175** standard. That means safety for the laboratory worker. iM50 is suitable for all types of fume hood, making it easy to implement new installations and retrofit existing fume hoods. Installation is very easy and is done directly on the side bar (pilaster) of the fume hood. The face velocity in the fume hood is identical to the face velocity measured in the bypass with the integrated air flow sensor of the iM50 Airflow Monitor.

The face velocity is also displayed via an LED bar graph, so it is possible to directly read off the actual value in m/s und ft/min.

The red LED, together with an acoustic alarm, signals the alarm operating status (insufficient face velocity). The green LED signals the safe operating status (face velocity is OK). The yellow LED signals the status "Sash > 50 cm" (only with an additional switch provided by the customer).

2.1 FUNCTION DISPLAY AND CONTROL PANEL



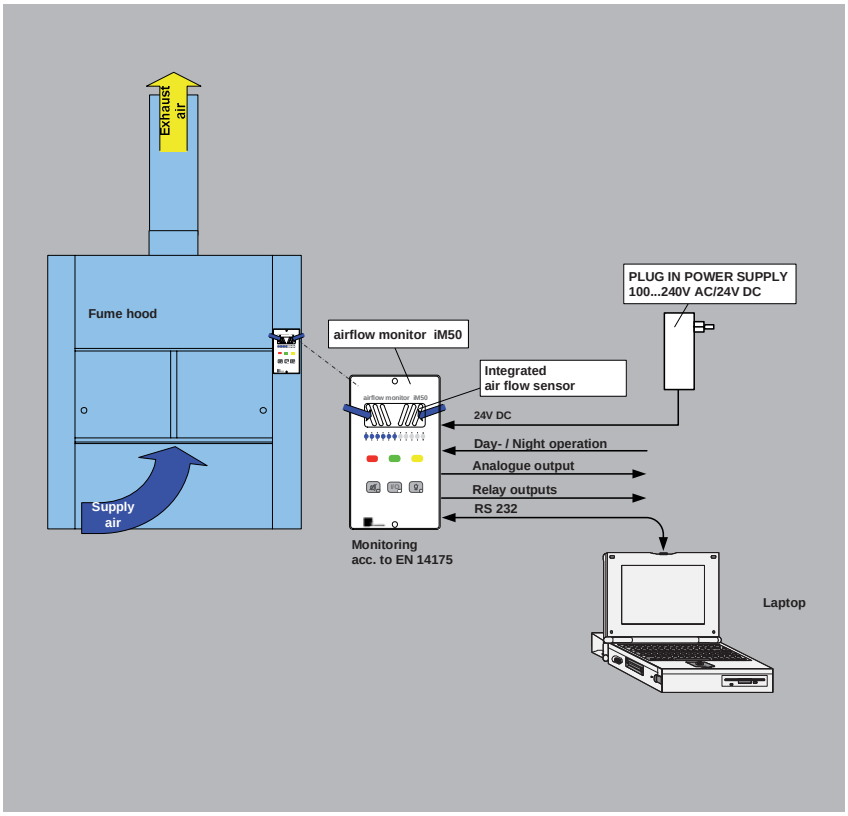
Operating and display panel

The operating and display panel of the Airflow Monitor iM50 has an integrated air flow sensor and is available as a fitted version.

Functions:

- LED bar graph for displaying the actual value of the face velocity
- Acoustic and optical alarm (red LED) for insufficient face velocity
- Optical display (green LED) for sufficient face velocity (safe operation)
- Yellow flashing LED as an optical alarm for the operating status „Sash > 50cm"
- RESET button for acknowledgement of the acoustic alarm
- Button Light ON/OFF (fume hood interior)
- Button ON/OFF for direct actuation of a fan
- Plug for programming via laptop or PC2500 software

FUNCTIONAL DIAGRAM face velocity 2.2



PERFORMANCE FEATURES 2.3

- Microprocessor controlled monitoring system
- Low cost airflow monitor as a compact fitted version
- External mains adapter 100...230V AC/24V DC
- All system data are saved mains voltage failure-safe in the EEPROM
- Integrated password protected operating interface for programming the face velocity alarm values (daytime and night-time operation) and the alarm delay time
- Programming of all system values via laptop with PC2500 software
- Monitoring of supply air and exhaust air systems
- Integrated air flow sensor 0.2...1 m/s for measuring the face velocity
- monitoring of fume hood operation in accordance with EN 14175 with acoustic and optical alarms
- LED bar graph for displaying the actual values of the face velocity m/s und ft/min
- Optical and optionally acoustic alarm for the operating status “Sash > 50cm”
- Programming of a second monitoring value (reduced face velocity during night-time operation)
- Button Light ON/OFF (fume hood interior)
- Button ON/OFF for direct actuation of a fan
- Suitable for all fume hood constructions

3.0 MONITORING THE FACE VELOCITY

Diagram 1 shows the monitoring of the face velocity. The setpoint can be freely programmed and is indicated by the dashed line (e.g. 0.3 m/s).

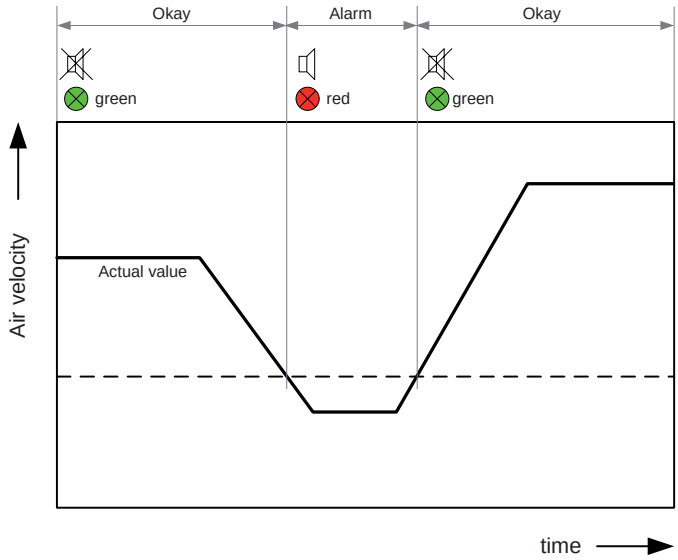


Diagram 1: Monitoring the face velocity

If the actual value measured by the integrated flow sensor ≥ setpoint, the green LED (OK) lights up to signal safe operation of the monitored fume hood. The measured actual value can be read off on the LED bar graph.

If the actual value < setpoint, the red LED (LOW) lights up after the programmable alarm delay time. At the same time, the integrated buzzer signals the unsafe operating status of the fume hood.

The acoustic alarm can be reset with the Alarm Reset button, while the red LED lights up until safe operation has been restored, i.e. actual value ≥ setpoint.

This alarm fulfills the EN 14175 standard.

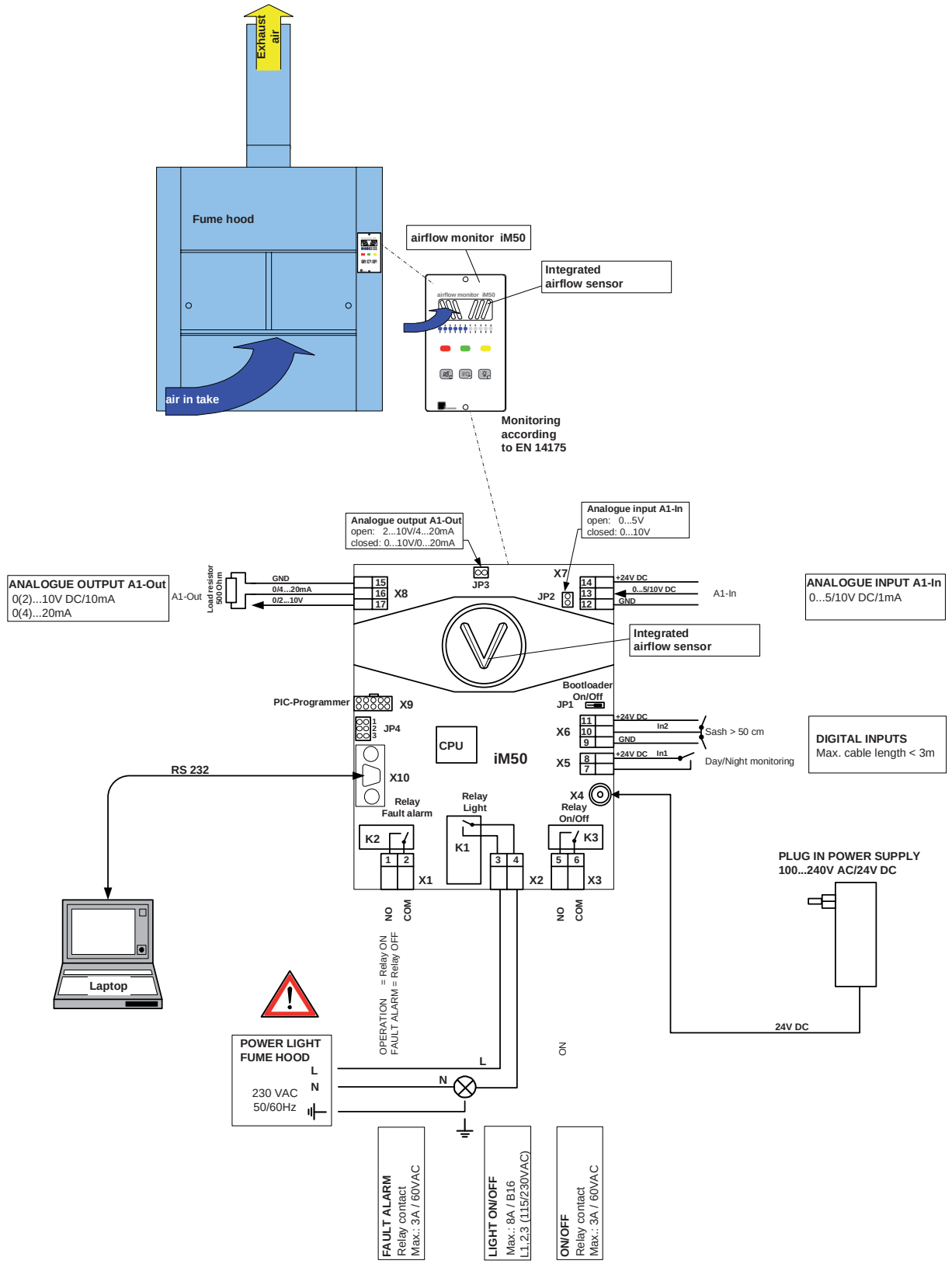
4.0 SCOPE OF DELIVERY

SCOPE OF DELIVERY FUME HOOD MONITOR iM50
Standard model

The scope of delivery of the standard iM50 model (face velocity) includes the following components:

Pos.	Number	Object
1	1	Control electronics with integrated air flow sensor, LED bar graph and function keys in installation housing
2	1	External mains adapter 100...240V AC
3	1	Hose connection to the fume hood interior with an end piece

TERMINAL DIAGRAM 5.0



FUME HOOD MONITOR acc. to EN 14175
with integrated airflow sensor

Terminal diagram, complete	**iM50**
SCHNEIDER ELEKTRONIK	Rev.: 1.0 / Date: 15. Dec. 2008

6.0 INSTALLATION • THE FIRST THREE STEPS

ALWAYS FOLLOW THE MOUNTING INSTRUCTIONS!

The following mounting methods are permissible for the iM50 fume hood controller:

- Variable fitting of the iM50 monitor in the fume hood side bar.
- Make sure that the integrated air flow sensor is not directly influenced by turbulent air (e.g. air outlets in the laboratory, in the vicinity of doors, windows, etc.).

CAUTION! With all other types of mounting the measuring signal of the air flow sensor can be unstable.

In all cases, after mounting the evaluation electronics during commissioning, a reference measurement with a hydrometric vane and possibly calibration of the air flow sensor must be carried out.

During installation and operation it is essential to ensure that no shavings, dirt or contaminants get into the air flow sensor. Fit the hose connection of the evaluation electronics in the fume hood interior in such a way that condensation cannot permeate the air flow sensor.

STEP 1

6.1 FITTING THE MONITOR

Install the iM50 in a visible position on the fume hood side bar. The display with the bar graph should be mounted at eye-level for easy reading. The fitting position is variable, but preferably vertical.

STEP 2

6.2 MOUNTING THE CONNECTING HOSE

The connecting hose from the evaluation electronics (air flow sensor) to the fume hood interior that is included in the delivery must be careful connected without buckles or bends.

The connecting hose must fit exactly on the end piece nozzle and on the air flow sensor nozzle. Untight mounting results in imprecise measuring results as a result of infiltrated air.

IMPORTANT! 

Ensure that the air can flow freely through the flow sensor. If the flow pipe (connecting pipe) or the inflow vents are dirty or covered, the measuring result may be falsified.

The end piece with the connecting hose must be visible in the fume hood interior and must not be covered up (e.g. behind baffles or deflectors, etc.).

The evaluation electronics with the integrated air flow sensor must not be mounted in the vicinity of air outlets. Ensure a laminar flow of air without hindrances in the flow sensor.

STEP 3	
POWER SUPPLY	6.3

Plug the mains adapter cable into plug X4 on the iM50 control board (rear side) and plug the mains adapter into the mains socket.

When the supply voltage (100...240V AC) has been switched on, the LOW or OK LED (depending on the face velocity) must light up and the LED bar graph must display the actual value.

The components required for the monitoring operating mode (face velocity) have now been connected.

If no further additional functions or relay outputs are needed, you can now move on to the programming instructions (Chapter 9.0). After all important parameters have been programmed in accordance with Chapter 9.0, the iM50 fume hood monitor is ready for operation.

The terminal connections for the additional functions and relay outputs are described in chapter 7.0.

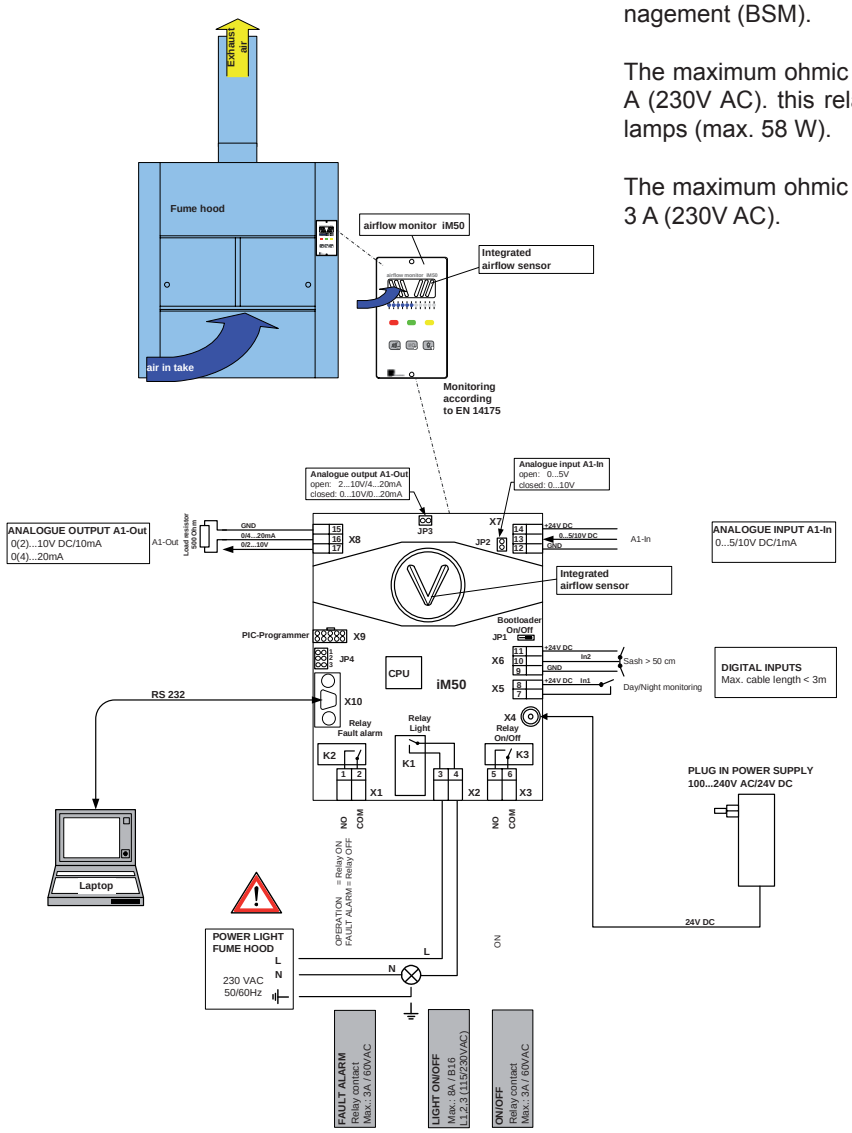
7.0 CONNECTING ADDITIONAL FUNCTIONS

7.1 CONNECTING THE RELAY OUTPUTS

In the full construction a maximum of three relays are populated on the iM50 control board. The relay outputs are potential-free and are intended for malfunction notification and feedback to the building services management (BSM).

The maximum ohmic contact load of the relay Light K1 is 12 A (230V AC). this relay is for direct actuation of fluorescent lamps (max. 58 W).

The maximum ohmic contact load of the relays K2 and K3 is 3 A (230V AC).



Important!

Ensure that connected constant loads are properly protected against short circuiting!

The meaning of the relay outputs K1 to K3 is as follows:

7.1.1 CONNECTING THE RELAY CONTACT LIGHT K1

The Light relay (K1) pulls in when the Light on/off button on the function display and control panel is pressed and drops out when the button is pressed again.

This relay switches the lighting in the fume hood on and off.

The phase (L) for the fume hood light is supplied on terminal X2.3 and switched via the K1 relay contact on terminal X2.4. Neutral (N) and protective earth are connected directly to the fume hood light.

CONNECTING THE RELAY CONTACT MALFUNCTION NOTIFICATION K2 — 7.1.2

In the case of a group alarm, the malfunction notification relay (K2) drops out and thus signals the malfunction status. Malfunctions may be, for example, insufficient exhaust air volume and internal errors.

CONNECTING THE RELAY CONTACT MOTOR ON/OFF K3 — 7.1.3

The relay Motor on/off K3 pulls in when the iM50 fume hood monitor is switched on. This is done by pressing the I/O (on/off) button on the function display and control panel.

This relay switches, for example, an exhaust air fan on or off (via a separate contactor, which is actuated by the K3 relay). The relay contact can then be used as an on/off notification for the building services management (BSM).

7.2 CONNECTING THE DIGITAL INPUT SASH > 50 cm

Is only connected if sash monitoring is desired. The input is not galvanically separated and is suitable for direct actuation with potential-free contacts.

The yellow LED "Close sash" flashes when the sash is opened more than 50 cm and thus warns the user that the fume hood is an unsafe operating status (insufficient exhaust air volume flow).

The LIMIT SWITCH SASH > 50 cm on terminals X6.9 to X6.11 signals the sash position > 50 cm. Optionally a potential-free contact or an electronic proximity switch can be connected.

The Sash digital input is not galvanically separated. Actuation is done directly via potential-free contacts.

The maximum cable length is limited to 3m.

The input current is ≤ 2mA per input.

MOUNTING THE LIMIT SWITCH SASH > 50 cm

The LIMIT SWITCH SASH > 50 cm should preferably be mounted such that it is directly activated by the sash (e.g. bistable dry reed contact). If the sash is > 50 cm open, the bistable reed contact remains closed (normally closed contact) or open (normally open contact) until the sash underruns the opening height of 50 cm.

The switch type (normally open or normally closed) can be programmed in the settings menu.

7.3 CONNECTING THE DIGITAL INPUT DAY/NIGHT

Is only connected if day/night monitoring is desired. The input is not galvanically separated and is suitable for direct actuation with potential-free contacts.

During daytime or night-time operation the corresponding programmed face velocity is monitored and if it is underrun (actual value < setpoint), an error alarm is signaled (red LED and buzzer).

Switching from daytime to night-time operation is done via the X5.7 and X5.8 terminals (daytime operation = contact open).

The maximum cable length is limited to 3m.

The input current is ≤ 2mA per input.

7.4 CONNECTING THE ANALOGUE OUTPUT

The analogue output on terminal X8.15 (GND) and terminal X8.17 (+) provides the exhaust air actual value as an analogue signal (0)2 ... +10 VDC. The current load may not exceed a maximum of 10mA.

The analogue output A1-Out is not galvanically separated.

When making the electrical connection it is essential to ensure correct + and – (GND) polarity!

Optionalls the A1-Out analogue output is also available as a current interface. The current is tapped 0/4...20 mA via terminal X8.15 (GND) and terminal X8.16 (0/4...20 mA).

Connect load resistor 500Ω on terminal X8.15 and X8.16 if the current output is unused!

7.5 CONNECTING THE SERIAL INTERFACE RS232

The entire programming of the iM50 monitor is done via the RS232 serial interface on the 9-pole plug X10 using the PC2500 PC software installed on a laptop. All values can be clearly and easily read out and programmed. In addition to the laptop, programming can also be done via the integrated operating level.

7.6 CONNECTING THE ANALOGUE INPUT

The analogue input on terminal X7.12 (GND) and terminal X7.13 can be switched between 0...5V DC or 0...10V DC. To do this, the JP2 jumper must be open (0...5V DC) or connected (0...10V DC).

The analogue input is reserved for special functions.

8.0 FUNCTION DISPLAY AND CONTROL PANEL

The function display with integrated operating panel has an LED bar graph for displaying the actual value of the face velocity.

Access to the system level is via a password (numerical value). At the system level the most important parameters for the device can be set via the integrated operating panel. This direct quick access via the system level particularly makes sense when a laptop with the PC2500 programming software is not available.

This blue LED bar graph displays the actual value of the face velocity from 0...1.0 m/s or 0...200 fpm.

This green LED lights up in the normal operating state, i.e. the fume hood is operating with sufficient exhaust air volume flow and is therefore within a safe range.

This red LED lights up to signal a malfunction, i.e. the fume hood is operating with insufficient face velocity and is therefore not contaminent-safe. With the RESET button the acoustic alarm (malfunction due to insufficient face velocity) can be acknowledged. The optical alarm cannot be acknowledged and is only reset when sufficient volume flow is available.

This yellow LED flashes to signal an optical alarm when the sash is opened >50cm. This LED warns the user that operation of the fume hood may be unsafe. The sash must be closed.

With the LIGHT button the interior lighting of the fume hood can be switched on and off. At system level this entry key has the function (+).

With the RESET/QUIT button the acoustic alarm (malfunction due to insufficient face velocity) can be acknowledged. The optical alarm cannot be acknowledged and is only reset when sufficient exhaust air volume flow is available. At system level this entry key has the function (-).

With the I/O key the monitor is switched on and off. The operating mode of the LED bar graph shows that the monitor is switched on. At system level this input key has the function (ENTER).

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9.0 PROGRAMMING INSTRUCTIONS • iM50 PARAMETERS VIA INTERNAL SYSTEM LEVEL

Programming of the internal system level via a second key assignment

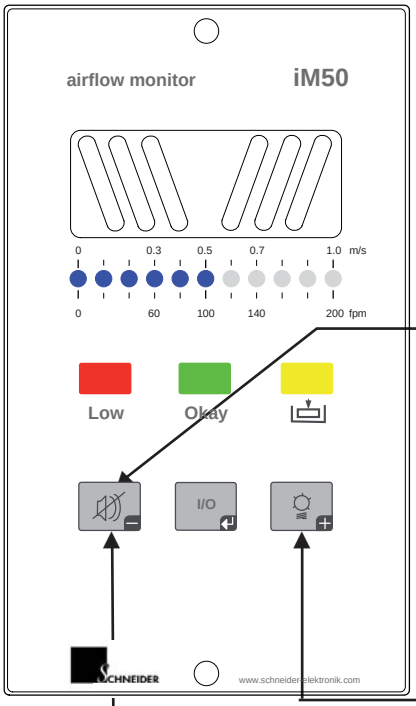
Setting the iM50 parameters is done via the password-protected integrated system level or with a laptop with the PC2500 software installed.

The following sections describe the programming of the parameters via the internal system level, as this is most suitable for use in the field. If you use a laptop with the PC2500 software to program the parameters, you can also follow the programming instructions described here. The menu items and settings have the same meaning.

SWITCH THE iM50 ON (POWER ON)

When the iM50 power supply is switched on (Power ON) and after the internal self-test, the face velocity actual value appears on the LED bar graph and, depending on the operating status, also the red (LOW) or green (OK) LED.

If the face velocity cannot be measured or is below the defined setpoint, or if the connecting hose to the fume hood interior is not correctly installed, after a short time the red status LED (LOW) lights up and signals insufficient face velocity. Der LED bar graph displays the actual value 0...0.1 m/s.



At the same time the acoustic alarm is sounded, which can be reset

with the key: **RESET**

If there is sufficient face velocity, the green status LED (OK) lights up and the LED bar graph displays the actual value. The acoustic alarm is automatically reset if there is sufficient face velocity.

Access to programming is password-protected.

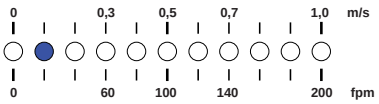
ENTERING THE PASSWORD FOR ACCESS TO THE SYSTEM LEVEL

By pressing the keys  and  at the same time, you move to the screen for entry of the password.

Keep the Minus and Plus keys pressed for at least 3 s. The red, green and yellow LEDs go out. The left blue LED of the LED bar graph flashes.

With the Plus key you can move the flashing cursor to the right, with the Minus key to the left in order to set the password.

Entering the programming password



If the cursor is positioned over an LED that is switched on, it flashes rapidly, if it is positioned over an LED that is switched off, it flashes slowly. By briefly pressing the Enter

key  the LED is switched on or off.

The LEDs that are switched on represent the password.
Currently you only have to set the LED at 0.1 m/s. By pressing the Enter key for a long time (>1 s) 

the password is confirmed and you move automatically to the first parameter "Face velocity - Night-time operation".

Setpoint face velocity 9.1

Face velocity Night-time operation (reduced operation) 9.1.1

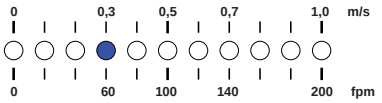
Here you can set the threshold for underrun of the face velocity during nighttime operation (reduced operation).

The red LED flashes. The blue LED shows the last value that was entered, e.g. 0.3 m/s or 60 fpm. With the Plus key you can move the blue LED to the right, with the Minus key to the left in order to set a new value.

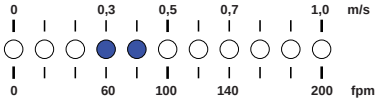
The incremental step size is 0.05 m/s or 10 fpm. For example, to represent 0.35 m/s the LEDs light up at 0.3 m/s and 0.4 m/s.

With the Enter key (press > 1 s) I/O the new value is confirmed and you move automatically to the next parameter "Face velocity - daytime operation".

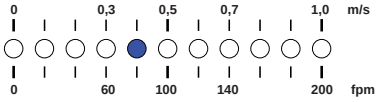
Setting: 0.3 m/s or 60 fpm



Setting: 0.35 m/s or 70 fpm



Setting: 0.4 m/s or 80 fpm



Face velocity Daytime operation (normal operation) 9.1.2

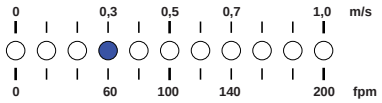
Here you can set the threshold for underrun of the face velocity during daytime operation (normal operation).

The green LED flashes. The blue LED shows the last value that was entered e.g. 0.3 m/s or 60 fpm. With the Plus key you can move the blue LED to the right, with the Minus key to the left in order to set a new value.

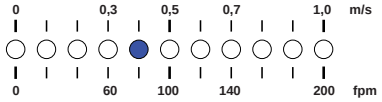
The incremental step size is 0.05 m/s or 10 fpm. For example, to represent 0.35 m/s the LEDs light up at 0.3 m/s and 0.4 m/s.

With the Enter key (press > 1 s) I/O the new value is confirmed and you move automatically to the next parameter "Enter the alarm delay time".

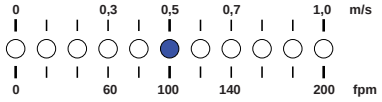
Setting: 0.3 m/s or 60 fpm



Setting: 0.4 m/s or 80 fpm



Setting: 0.5 m/s or 100 fpm



9.2 System values

9.2.1 Alarm delay time

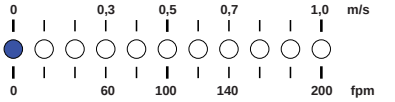
The alarm delay time defines how long the predefined day/night setpoint must be underrun before an alarm is signalled.

The yellow LED flashes. The blue LED shows the last value that was entered e.g. 35 s. With the Plus key  you can move the blue LED to the right, with the Minus key  to the left in order to set a new value.

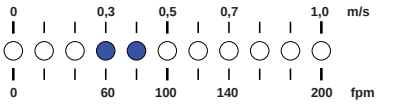
The incremental step size of the alarm delay is 5 s. For example, to represent 35 s the LEDs light up at 30 s and 40 s.

With the Enter key (press > 1 s)  the new value is confirmed and you move automatically to the next parameter "Delay of the inputs and switch type definition".

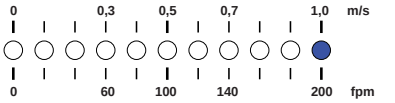
No alarm delay



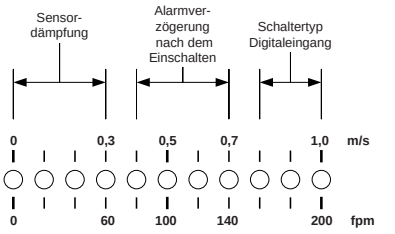
35 s alarm delay



100 s alarm delay



9.2.2 Delay of the inputs and switch type definition



In this input mode the LED bar graph is divided into three different input groups. With the four LEDs 0...0.3 you can set the sensor attenuation, with the four LEDs 0.4...0.7 the alarm delay time after switching on and with the three LEDs 0.8...1.0 the switch type for the digital inputs.

The red and green LEDs flash. The blue LEDs show the last value that was entered.

With the Plus key  you can move the flashing cursor to the right, with the Minus key  to the left in order to set a new value.

If the cursor is positioned over an LED that is switched on, it flashes rapidly, if it is positioned over an LED that is switched off, it flashes slowly. By briefly pressing the Enter key  the LED is switched on or off.

By pressing the Enter key for a long time (>1 s)  all settings are confirmed and you move automatically to the next parameter "Calibration of the sensor".

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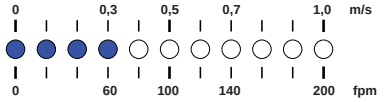
Sensor attenuation 9.2.2.1

The sensor signal of the air flow sensor is attenuated by a low-pass filter. The time constant of the low-pass filter can be adjusted. After it has passed through the low-pass filter, the signal is displayed and can be tapped on terminal X8. The time constant can be set with an increment of 0.625 s within the range of 0...9.375 s.

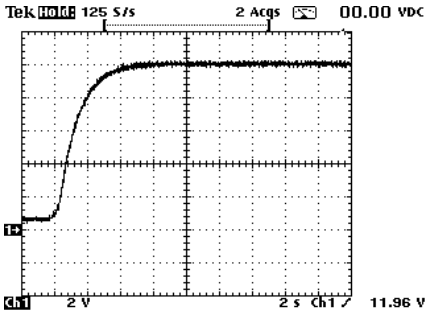
Setting: 9.375 s attenuation

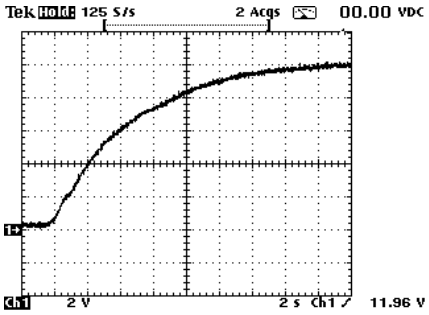


LED	State	Meaning
0.0 m/s	ON	Increases the time constant by 0.625 s
0.1 m/s	ON	Increases the time constant by 1.25 s
0.2 m/s	ON	Increases the time constant by 2.5 s
0.3 m/s	ON	Increases the time constant by 5.0 s

Example 1:
Analogue output 10 V
LED 0.2 m/s = ON
Time constant = 2.5 s

Example 2:
Analogue output 10 V
LED 0+0.1+0.2+0.3 m/s = ON
Time constant = 9.375 s





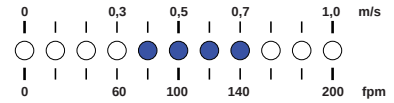
Alarm delay after switching on 9.2.2.2

After switching on, the red LED (LOW=underrun) always lights up first. When the face velocity reaches or exceeds the underrun threshold, the green LED (OK) lights up and the red LED goes out.

During the predefined alarm delay time the malfunction relay K2 does not drop out even if the volume of air is too low. It is only activated after the predetermined time (0 to 150s). This applies to the following methods of switching on or over:

- Connecting the power supply
- Button On/Off
- Switch to day/night

Setting: 150 s alarm delay



This function does not generate an alarm for example, if the exhaust fan is switched on but only reaches its full suction capacity after a specific period of time. The alarm delay time after switching on is given in seconds and can be set at increments of 10 s within the range 0...150 s.

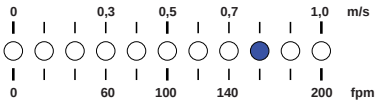
LED	State	Meaning
0.4 m/s	ON	Increases the alarm delay by 10 s
0.5 m/s	ON	Increases the alarm delay by 20 s
0.6 m/s	ON	Increases the alarm delay by 40 s
0.7 m/s	ON	Increases the alarm delay by 80 s

Example 3:
LED 0.4+0.6 m/s = ON
alarm delay = 50 s

9.2.2.3 Contact inversion Malfunction notification relay

The contact of the malfunction notification relay on terminal X1 can be inverted.

Setting: Contact inverted

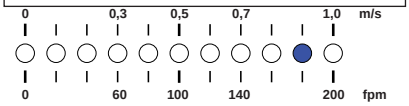


LED	State	Meaning
0.8 m/s	ON	Inverted. If there is a malfunction, the malfunction notification contact is closed. If there is no malfunction or if the iM50 is without current, the contact is open.
0.8 m/s	OFF	Not inverted. If there is no malfunction, the contact is closed. If the iM50 is without current or if there is a malfunction, the malfunction notification contact is open.

9.2.2.4 Switch type Sash >50 cm

The switch type on terminal X6 is defined as a normally closed contact or a normally open contact.

Setting: Contact = normally closed



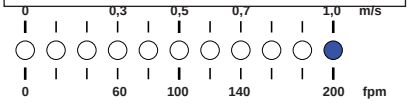
According to EN 14175 fume hood sashes must be equipped with a mechanical lock at a sash opening of 50cm. If the sash is opened more than 50cm, the mechanical lock must be released. In accordance with this standard, a flashing yellow LED on the display signals the state „Sash opening > 50cm“ (alarm).

LED	State	Meaning
0.9 m/s	ON	Switch type = normally closed Contact closed = yellow LED flashes (>50cm) Contact open = yellow LED off
0.9 m/s	OFF	Switch type = Normally open Contact closed = yellow LED off Kontact open = yellow LED flashes (>50cm)

9.2.2.5 Switch type Day/night

The switch type on terminal X5 is defined as a normally closed contact or a normally open contact.

Setting: Contact = normally closed



Switching from daytime to night-time operation is done via the X5 terminal. During daytime or night-time operation the respective programmed face velocity is monitored.

LED	State	Meaning
1.0 m/s	OFF	Switch type = normally closed Contact closed = Night-time operation Contact open = Daytime operation
1.0 m/s	ON	Switch type = Normally open Contact closed = Daytime operation Contact open = Night-time operation

Calibration of the sensor 9.3

The green and yellow LEDs flash. The current measuring value (actual value) of the face velocity is indicated by the blue LEDs.

With the Plus key  the measuring value is increased. It may be necessary to

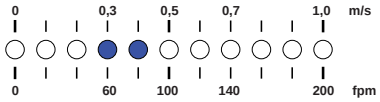
press the Plus key several times. With the Minus key  the

measuring value is decreased. It may be necessary to press the Minus key several times.

Pressing the Enter key for a long time (>1 s)  confirms the settings.

Programming is now completed. You are returned automatically to the operating mode (monitoring mode).

Actual value: face velocity



End of programming

For calibration the sensor must be fitted in a suitable location on the fume hood and connected. With the sash open 10 cm, the fume hood is set using a damper to e.g. 0.5 m/s. This value must be checked with an anemometer measurement on the sash.

By pressing the Plus or Minus key, the measuring value of the iM50 is calibrated to the value displayed by the anemometer.

Settings on delivery 9.4

On delivery the following configurations are set:

iM50 Settings on delivery	
Face velocity night-time operation	0.3 m/s
Face velocity daytime operation	0.6 m/s
Alarm delay time in the case of an underrun	10 s
Response time of the sensor	1.25 s
Alarm delay time after switching on	60 s
Inversion of the malfunction notification relay	Not inverted
Switch type for Close sash	Normally open
Switch type for day/night switching	Normally closed

10.0 iM50-TROUBLESHOOTING ERRORS

Error:	**Flow sensor not functioning properly.**
Cause:	**The flow sensor is faulty.**
Error correction:	Replace the iM50 device.
Check:	Select the menu item Calibration of the sensor (see Chapter 9.3). Check the actual value when the sash and slide windows are shut (approx. 0.5...>1m/s). When a slide window or the sash is opened the actual value must initially decrease. If an external controller is connected, depending on the sash position, a specific value is regulated.
Cause:	**The flow velocity is not displayed properly.**
Error correction:	Adjust the offset face velocity (calibration with redundant measurement in the sash area).
Check:	Calibrate the flow sensor. Under the menu item Calibration of the sensor (see chapter 9.3), adjust the flow sensor so that the value in the open sash area - redundantly measured with a calibrated anemometer - corresponds to the displayed face velocity value of the flow sensor. Depending on how it is fitted, the flow sensor of the iM50 must be calibrated accordingly.
Note:	The flow sensor is calibrated. The face velocity (m/s) displayed on the LED bar graph must be the same as the redundantly measured face velocity in the area of the open sash.
Cause:	**The connecting hose of the flow sensor is not correctly mounted.**
Error correction:	The connecting hose must be fed into the fume hood interior without buckles or bends and must be precisely fitted to its end pieces. The end of the pipe (inflow into the fume hood) must be visible from the interior of the fume hood. It must not, for example, be mounted behind an air baffle. There should be no air flow or turbulence directly in front of the iM50 air inlet grate (e.g. directly underneath air vents in the ceiling). Make sure that the inflow area and the end of the pipe (inflow into the fume hood) are not dirty, blocked or covered.
Check:	Select the menu item Calibration of the sensor (see Chapter 9.3). Check the actual value when the sash and slide windows are shut (approx. 0.5...>1m/s). When a slide window or the sash is opened the actual value must initially decrease. If an external controller is connected, depending on the sash position, a specific value is regulated.
Note:	The flow sensor is calibrated. The face velocity (m/s) displayed on the LED bar graph must be the same as the redundantly measured face velocity in the area of the open sash.

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11.0 iM50-troubleshooting malfunctions

The following table will help you to analyse and correct errors or malfunctions and their possible causes.

Error:	**LEDs or LED bar graph on the function display do not light up.**
Causes:	Power supply (mains adapter) not connected or faulty.
Error:	**The actual value displayed on the LED bar graph is not identical with the externally measured actual value.**
Causes:	Unsuitable or incorrect fitting of the flow sensor.
	Flow sensor not calibrated. Se menu item Calibration of the sensor (Chapter 9.3).
	Connecting hose from the flow sensor to the fume hood interior is not correctly mounted.
Error:	**Function display not working correctly (LOW display always red).**
Causes:	Check the setpoint settings.
	Check if there is sufficient exhaust air.
	Measure the minimum duct pressure - it should be ≥ 100 Pascal (depending on the fume hood construction).
	Check whether the exhaust air pipe on the fume hood has the correctly dimensioned pipe diameter for the required exhaust air volume flow.
Error:	**Function display not working correctly (OKAY display always green).**
Causes:	Check the setpoint settings.
Error:	**Function display not working correctly (yellow LED flashes continuously).**
Causes:	"Sash > 50 cm" contact not connected.
	Switch type "Sash > 50cm“ (N.O., N.C.) incorrectly programmed (see Chapter 9.2.2.4)

Maintenance 12.0

Maintenance of the iM50 fume hood monitor should be done at the same time as the yearly maintenance of the fume hood.

Yearly fume hood maintenance 12.1

During yearly fume hood maintenance, among other things a function test with acoustic and optical alarm must be carried out (cover the sensor air inlet) and the programmed setpoints checked.

After this, compare the actual values displayed by the LED bar graph with a redundantly measured measuring value (hot wire or vane anemometer).

Make sure that the connecting hose from the sensor to the fume hood interior is not damaged or bent and fits tightly on the sensor and the end piece.

13.0 Technical data

■ General

Mains adapter	110/230V AC/50/60Hz/+-15%
Max. charging rate	100 mA
Max. power input	10 VA
Reactivation time	600ms
Operating temperature	0 °C to +55 °C
Humidity	max. 80 % relative, non-condensing

■ Case

Protection type	IP 20
Material	plastic
Colour	white, RAL 9002
Dimensions (LxWxH)	(134 x 80 x 40) mm
Weight	approx. 1.0 kg
Terminals	screw terminal 0.75 mm²

■ Relay outputs

Number	1 relay (K3) for light
Contact type	front contact
Max. switching voltage	250V AC
Max. continuous current	8A for fluorescent lamps (max. 58W)
Number	2 relays (K1, K2)
Contact type	changeover contact
Max. switching voltage	250V AC
Max. continuous current	3A

■ Digital inputs

Number	2 inputs, 24V DC/2mA
Actuation	potential-free contact, maximum cable length < 3m

■ Analogue output

Exhaust air actual value	0(2)...10VDC, 10mA or 0(4)...20mA (load resistor = 500 Ω)

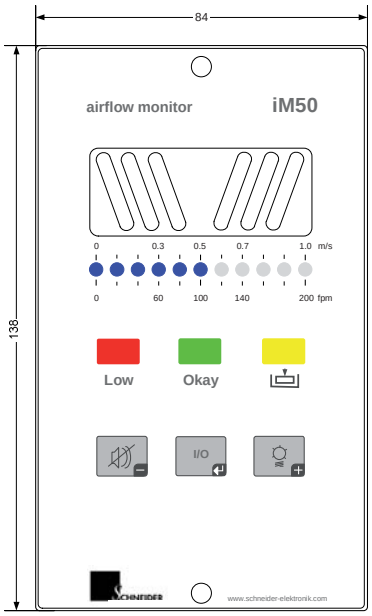
■ Analogue input

Setpoint	0(2)...5/10VDC, 1mA

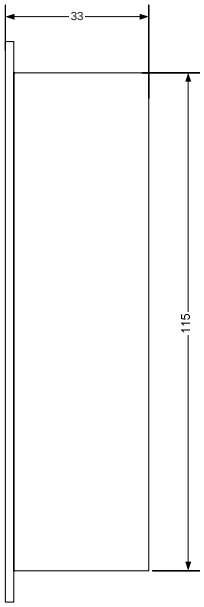
■ Integrated air flow sensor

Measuring principle	dynamic, hot wire anemometric principle
Measuring range	0.2...1 m/s
Response time	<100 ms

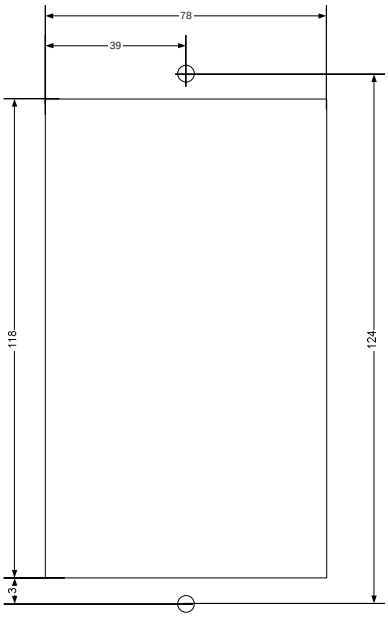
Case iM50: Top view



Case iM50: Side view



Case iM50: Section



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