


Operating Manual Extension for Vane Anemometer MiniAir6/60/64-Ex

Article no.: 93.xxxx
 Type: g.641.6xs-yyy Micro
 g.642.6xs-yyy Mini
 g.648.6xs-yyy Macro

 II (1/2) G [Ex ia] IIC

Issue date: June 2008

For Sensor and	Article-no: 93.	Type: Micro <input type="checkbox"/>	Mini <input type="checkbox"/>	Macro <input type="checkbox"/>
Electronics:	Serial-no:	Type: MiniAir:	-Ex, Range:	m/s



Table of contents

1.	Introduction	3
2.	Content of Delivery	5
3.	Intended Use	5
4.	Method of Measurement.....	6
4.1	Flow Sensor Type f.6xx.....	6
4.2	Power Supply / Transmitter, Type g.64x.	7
5.	Technical Data.....	8
5.1	Power Supply and Transmitter.....	8
5.2	Flow Measurement.....	8
5.3	Intrinsically Safe Power Circuit.....	9
5.4	Calibration certificates.....	9
6.	Plug Assignment.....	10
6.1	Sensor Port (Input/Output).....	10
6.2	Power Supply and Signal Output (Input/Output)	11
6.3	Potential Equalisation Port	11
7.	Measures, weights and IP-protection	12
8.	Assembly.....	12
9.	Operation and Maintenance	12
10.	Warranty	12

1. Introduction

Dear Customer

Thank you for trusting in our products. This Instrument has been produced, calibrated, inspected and packed using our high quality standards based on ISO 9001:2000, EN 13980 (ATEX) and ISO/IEC 17025 (SCS 046, Airflow).

The MiniAir6x-Ex is an instrument certified for use in different zones according to the 2 certificates, attached at the end of this manual extension - one for the Sensor (for use in zone 1) and one for the electronics (for use strictly outside of any hazardous zone). The certificates are integral parts of this manual extension and its contents will have absolute priority in case of discrepancies between manual extension and certificates.

This User Manual Extension and the certificates are extensions to the standard Operating Instructions for "MiniAir6", "MiniAir60" and "MiniAir64" products. The instructions, maximum ratings and technical data in the different delivered documents, must be read and/or understood in the following ranking:

- Priority 1: All certificates
- Priority 2: This manual extension
- Priority 3: The standard Operating Instruction

Therefore, to maintain the perfect condition of the Schiltknecht Messtechnik AG (SMAG) instrument (sensor(s), electronics and optional parts) and to guarantee an error-free function, application and operating safety, we strongly recommend to read carefully all manuals (operating instructions), manual extensions and certificates before starting any installation and operation of this instrument. Also, please take care of the following additional important instructions.

Important notes and instructions

(please also see the "Important notes" in the standard Operating Instruction)

- The following documents should be part of the package content:
 - a.) The standard "Operating Instruction" for your MiniAir6, 60 or 64
 - b.) This User Manual Extension for MiniAir6x-Ex products (including all copies of certificates)
 - c.) Copy of the ATEX Quality Inspection Protocol (QM form 15.02.07) for your instrument.
 - d.) SM- or SCS-Calibration Certificate (if you ordered one of these options).

Please inform your SMAG sales office or agent immediately, if you didn't receive all above listed documents.

Do not install and operate the [Ex] instrument, if you don't have at least the documents according to letter a.) to c.), listed above.

- Never install and/or operate an [Ex] certified instrument in zone 1, when it has been obviously damaged during transportation.
- Never expose the instrument in ambient conditions which are not covered by the specifications in the standard "Operating Instruction".
- A licensed and specially trained electrician is required to install [Ex] certified equipment.
- Maximum Ratings for temperature and humidity: please see standard "Operating Instructions" under title "Technical Data"
- For the guarantee provisions, please see standard "Operating Instructions" under "Guarantee".
- Other applied standards:
 - EMC
 - EN 1127-1: 2007

2. Content of Delivery

The content of delivery (each package unit) consists of the following:

- 1 Flow sensor MiniAir6x, Type f.6xx with assembled LEMO connector
- 1 Explosion protection certificate for the flow sensor MiniAir6x
- 1 Signal converter unit MiniAir6x-Ex, Type g.64x
 - with intrinsically safe power circuit
 - installed in an aluminum housing; dimensions: 130 x 175 x 45mm
- 1 Explosion protection certificate for the signal converter unit MiniAir6x-Ex
- 1 Connecting screw terminal, 6-pole, Combicon
- 1 Operating instructions, User Manual Extension (this document), other Certificates

3. Intended Use

This device measures the air flow in [Ex] zone 1 from 0 to 20, 40, or 80 m/s (other ranges are optional) using a sensor with an impeller, having explosion protection certification.

The signal converter (electronics) has a built-in intrinsically safe barrier. Strictly mount these electronics only outside hazardous zones.

Do not use the instrument in an application where any air velocities higher than 120% of the specified full scale must be expected.

Do not use the instrument for gases and air with a temperature higher than specified by the [Ex]-certificate and/or the "Operating Manual".

The instrument has mechanically very sensitive bearings. Also the impeller is sensitive against mechanical shocks; therefore:

- Never touch the impeller with hands or other solid parts.
- Never try to adjust yourself the manufacturer settings of the bearings.

Sensor, cable and LEMO connector are one unit specified by the [Ex]-certificate. Never do shorten or extend the cable yourself.

Never use the instrument to measure any types of liquids.

4. Method of Measurement

4.1 Flow Sensor Type f.6xx

The snap head converts the air velocity into a rotation of the impeller, whose RPM is mainly proportional to the air velocity.

Depending on the number of blades and the size of the snap head a frequency can be detected with electronic means. The frequency detecting sensor operates with a magnetic field of high frequency (>1 MHz) and is free of any reactivity to the impeller's rotational frequency. The measured frequency will be transmitted to the electronics:

MiniAir6 : having a voltage output (typ. 0*...2 volts)

MiniAir60 : having a frequency output (typ. 0...XXXX Hz**)

MiniAir64 : having a current output (typ. 4*...20 mA)

[*] plus corresponding start-up value according to the table under par. 5.2

Since flow velocities below the mechanical start-up of the impeller cannot be measured, this missing part is added to the output signal (voltage and current outputs only). Consequently there is no absolute zero output (0.0 volts or 4.00 mA), even if the air velocity is zero or below the impeller's start-up value (the impeller is at a standstill).

[**] Typical frequencies [Hz @ 15 m/s] for different snap heads and its full scale ranges:

Full scale ranges:	20m/s	40m/s	80m/s
Micro snap head:	2180	1070	515
Mini snap head:	1336	666	334
Macro snap head:	710	355	NA



Micro



Mini



Macro

4.2 Power Supply / Transmitter, Type g.64x.

This unit contains the sensor power supply and signal converter electronics for the velocity measurement. The analyzing unit converts the input signal from the sensor into a frequency, voltage, or current according to the measuring range of the sensor.

The intrinsically safe power circuit limits the voltage and current to values at which the sensors with the same values can be used in the intrinsically safe type of protection in explosive atmospheres.


Type designation of the possible variants:

MiniAir6	g.64x.6s-yyy	Voltage output signal
MiniAir60	g.64x.60s-yyy	Frequency output signal
MiniAir64	g.64x.64s-yyy	Current output signal

The full scale value of the analogue output signal for the current or voltage output is always the same for all impeller sizes and measuring ranges. The frequency output varies for all types. The output signals can also be customised to have other values (like 0-20mA, 0-5Vdc, or 0-10Vdc).

5. Technical Data

5.1 Power Supply and Transmitter

Art. No.:	93.xxxx
Type:	Micro: g.641.6xs-yyy
	Mini: g.642.6xs-yyy
	Macro: g.648.6xs-yyy
Type of explosion protection:	 II (1/2) G [Ex ia] IIC
Serial No. (SN):	(please see first page)
Power supply:	Voltage output: +9.0 to 24 V _{DC} , smoothed (U _m =250V)
	Current output: +9.0 to 24 V _{DC} , smoothed (U _m =250V)
	Frequency output: +5.0 to 24 V _{DC} , smoothed (U _m =250V)
Current consumption:	
	Voltage output: approx. 15 mA
	Current output: approx. 35 mA
	Frequency output: approx. 15 mA (approx. 10 mA for front LED included)

5.2 Flow Measurement

Standard measuring ranges (optional: others on special request):

	Micro:	0.6 to 20 m/s 0.8 to 40 m/s 1.0 to 80 m/s
	Mini:	0.4 to 20 m/s 0.6 to 40 m/s 0.8 to 80 m/s
	Macro:	0.2 to 20 m/s 0.4 to 40 m/s NA
Output signal:	Current (MiniAir64-Ex):	4.00 (+ start-up value) to 20 mA Load resistor: ≤ 500 Ohm
	Voltage (MiniAir6-Ex):	0.0 (+ start-up value) to 2.0 V _{DC}
	Frequency (MiniAir60-Ex):	0.0 to xx Hz (according to vane and measuring range)

5.3 Intrinsically Safe Power Circuit

Type:	9001/01-086-010-101
U_0 :	8.6 V
I_0 :	10 mA
P_0 :	21.5 mW
L_0 /IIC	300 mH
C_0 /IIC:	6.2 μ F
R_S :	899 Ohm
Fuse:	160 mA, medium-lag

5.4 Calibration certificates

Optional and on demand Certificates of calibration according to ISO/IEC 17025 (SCS 046, Airflow) are available for MiniAir6-Ex, 60-Ex or 64-Ex instruments.



6. Plug Assignment

6.1 Sensor Port (Input/Output)



LEMO socket, Pin assignment:

Pin 1:	NC (not used)
Pin 2:	GND
Pin 3:	Sensor signal
Plug housing:	Screen

Important: The input/output sensor is conducted through an intrinsically safe power circuit -> see 5.3.

On one hand Pin 3 is used to supply intrinsically safe the sensor. On the other hand the sensor is modulating the current consumption at Pin 3 with the frequency generated by the impeller's rotation speed.

This is valid for all types of sensors. The conversion into a voltage-, TTL- or current-signal will be carried out in the MiniAir transmitter.

6.2 Power Supply and Signal Output (Input/Output)

Combicon screw terminal (see picture below)

Terminal 1:	Power supply + [U ⁺]
Terminal 2:	Power supply – [GND]
Terminal 3:	Flow-signal
Terminal 4:	Flow-signal [GND]
Terminal 5:	GND
Terminal 6:	Shield

Note to terminal 3: Depending on the type MiniAir (6, 60 or 64) terminal 3 has a voltage, frequency or current output.

6.3 Potential Equalisation Port

Screw terminal (see picture below)

Terminal PA:	Potential equalization
--------------	------------------------



7. Measures, weights and IP-protection

Power supply and Transmitter

Weight:	600 gr.
Measures:	130 x 175 x 45 mm (LxWxH)
IP-protection:	IP 40

8. Assembly

The device can be attached using the four boreholes in the corners of the housing. The sensor is inserted into the 3-pole LEMO socket. The power supply and signal output are connected to the screw terminal. During installation and operation, the potential equalisation terminal must be connected to earth with at least 4mm². The device may be used only outside of potentially explosive atmospheres.

9. Operation and Maintenance

After the connection of the ports described above, the device is immediately ready for operation. A green LED signalises the state "ready for operation".

Please also refer to the standard "Operating Instruction"

Please note: This device is a precision measurement device and should be handled accordingly.

10. Warranty

For warranty information please refer to the standard "Operating Instruction".