SEIKOM ELECTRONIC

User Manual
RLSW®8 (M8) LCD

24 V DC

Version 1

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CONTENTS

1. SAFETY INSTRUCTIONS

Read the product description before commissioning the device. Make sure that the product is suitable for your application without any restrictions.

Improper use or use not in accordance with the intended use can lead to malfunctions of the device or to undesirable effects on your application.

For this reason, the installation, electrical connection, startup, operation and maintenance of the device may only be carried out by trained personnel.

2. GENERAL INFORMATION

The RLSW®8 is a microcontroller-based volume flow meter, which monitors gaseous flows or the volume flow in the range of approximately 0.1 ... 200 m/s (up to 63,000m^3/h, 63,000l/min).

A 4 ... 20 mA and a 0 ... 10 V DC output are available as output signals for the flow. To increase operational safety, the sensor and the evaluation electronics are monitored for function and errors during operation. The sensor connection line is constantly monitored for short circuit and wire breakage.

2.1 Proper Use

The flow monitors of the RLSW®8 series are designed for monitoring gaseous media or the volume flow within the specified technical data. Main fields of application are heating, ventilation and air conditioning in the field of building automation.

2.2 Function Principle

Flow monitors of the RLSW®8 series function according to the calorimetric principle. A unit's relay switches when flow speed reaches a pre-selected threshold value. The calorimetric measuring principle is based on a heated temperature-sensitive resistor. Flow in the medium dissipates heat from the precision resistor, the temperature of the resistor changes and thus its resistance value. This change is evaluated by the unit. However, not only the flow speed of the medium has an influence on the dissipated amount of heat, but also its temperature, therefore a relation between flow and temperature must be established. This is achieved by a second, temperature-dependent precision resistor next to the first one. The second precision resistor (temperature compensation) is not heated and serves to measure the temperature only.

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3. TECHNICAL DATA

Type	RLSW®8 LCD	RLSW®8 M8 LCD
Device construction type	Compact device with permanently mounted probe	Separate sensor and electronics connected by cable
Article-No.	81530	81530M8
Operating voltage	24 V DC	
Voltage tolerance	± 5%	
Overvoltage category	II	
Signal lamp voltage	Mains present, green LED	
Power consumption	4 VA	
Ambient temperature	-20 ... 50°C	
Signal output flow	0 ... 10 V, linear Ra = 0.4 kOhm	
Signaloutput for flow (mA)	4 ... 20 mA, linear Ra = 0.4 kOhm	
Relay output	1 normally open contact (Terminals 8/ 9 close or open in case of flow)	
Switching function at flow rate	Switching point adjustable via potentiometer	
Transistor output (NPN)	Open collector / non-conductive with current, max. 250 mA	
Reproducibility of the output signal	±2%	
Temperature dependence of the output signal	±1%	
Accuracy (reference at 22°C, 35% r. h. 1013 mbar)	±5% of full scale	
Linearity error	±1% of full scale / ± 0.5K / ±1 mbar	
Relay output	200 V AC/DC, 1 A	
Minimum switching load	10 mA / 5 V DC	
Signal lamp flow	LED-indicator und Display	
Standby time (without start-up bypass)	approx. 25 s	
Media temperature range	-25 ... 80°C	-25 ... 80°C (Optionally available up to 250°C or 350°C)
Temperature gradient	30 K/min	
Switching point adjustment	With potentiometer	
Measuring range maximum	0.1 ... 30.0 m/s, optionally to 200,0 m/s	
Speed dimension	m/s, l/min., m^3/h	
Volume flow maximum	63.000m^3/h, 63.000l/min.	
Immersion depth approx.	50 mm, 130 mm, 165 mm, 300 mm, 400 mm, 500 mm (Special lengths optionally available)	
Process connection	PG7, mounting flange (optionally M16x1,5, G 1/2“, M20x1,5)	
Sensor material	MS, nickel-plated, optionally stainless steel	
Pressure resistance	10 bar	
Electrical connection	9 terminals, max. 1,5 mm^2	
Protection category, housing/ sensor	IP54/ IP67	
Pollution class	II	

Housing dimensions (L x W x H)	56 mm x 86 mm x 82 mm

Reference conditions: inflow path 10 x DN, outlet path 10 x DN, laminar flow, at 0°C and 1.013 bar.

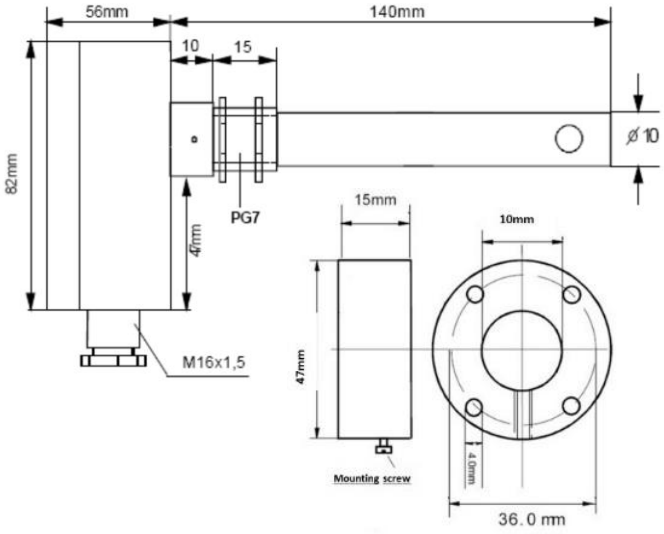
Increased operational safety for your machine/plant through continuous monitoring of the sensor, the sensor elements and the connecting cable for short circuits and wire breaks during operation. In addition, the electronics are continuously monitored by internal test routines. If one of the aforementioned errors occurs, the outputs drop out and the error is indicated by means of an error code in the display and on the LED bar.

After switching on the operating voltage, the following processes are displayed:

LCD line 1: start 10s Time may vary depending on the setting.
LCD line 2: version xxx

After the start time has elapsed, the device goes into monitoring mode. Any errors that occur (see "Explanations of the error code") are displayed and saved. All outputs drop out. Displayed errors are cleared by a restart (disconnect from the mains for at least 4 seconds).

3.1 Dimensions



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4. INSTALLATION AND COMMISSIONING

Installation and commissioning must be performed by authorized and qualified personnel.

Connections to main supply (L, N) must be made by means of a protected isolating switch with usual fuses. As a matter of principle, the General VDE regulations must be complied with (VDE 0100, VDE 0113, VDE 0160). If the potential-free contact is connected to an extra-low safety voltage, sufficient insulation must be provided for the connecting cables up to the terminal, since otherwise the double insulation to the mains voltage side may be impaired. The current load capacity of the potential-free contact is limited to 6 A. Therefore, the circuit of the potential-free contact must be protected with a 6.3 A fuse.

4.1 Installation Conditions

To avoid malfunctions, please observe the following points:

- The tip of the sensor should be as close as possible to the center of the pipe. If necessary, determine the area of strongest flow in the pipe cross-section and correct the sensor position. The through-hole in the shaft of the sensor must be completely inside the duct.
- There is a small indentation in the metal at the end of the probe. This mark is intended as a mounting aid and should be placed in the direction from which the flow is coming.
- For vertical pipes, the direction of flow should be upwards, especially for small air flows (up to 1 m/s), in order to avoid influences from thermally rising air.
- The sensor needs ideally 10xD (inside pipe diameter) of free inlet and 10xD (inside pipe diameter) of outlet path to avoid false measurement due to turbulence.
- Screw in the flow monitor only via the sensor tube / the hexagon of the sensor housing.
- Dew formation and contamination in the medium can falsify the measurement result.
- Check electrical connection.
- The volumetric meter must be started before the fan (flow generator / compressed air...).

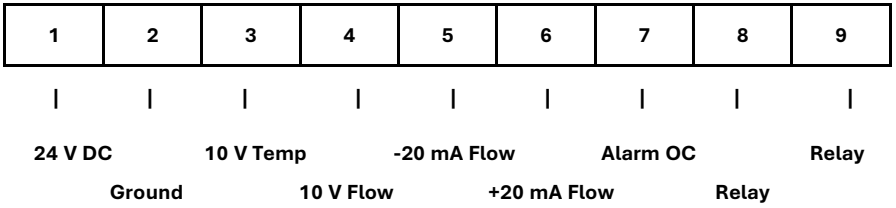
Optimum measurement results can only be achieved if the sensor is installed in the optimum position and the inlet and outlet distances are observed. At high and borderline temperatures, the radiant heat of the pipe network can possibly influence the signal output. The device also works despite non-observance of inlet distances, whereby the reproducibility, accuracy and linearity errors may, however, have tolerances.

Probe and device are calibrated in pairs and are intended for use together only. Interchanging can cause malfunctions.

The cable must not be shortened, lengthened or exchanged, this may cause malfunctions. A longer sensor connection cable is available if required.

The remote probe must not be removed from the device before or during operation.

4.2 Electrical Connections / Terminal assignment



Terminals 2 and 5 must not be bridged.

4.3 Setting the Switching Point

The device is already preset at the factory and can be put into operation immediately after mounting and wiring without any further settings. Please refer to the device description on the delivery note for the preset parameters. An adjustment is possible at any time for the version with LCD display and can be made as shown in the menu description.

The interrelation between flow speed and resistance change of the precision resistors is not linear. In the lower range (low rates of flow) the relative change of resistance is large. In the upper range, the change of resistance at identical deviations in flow speed becomes increasingly smaller. When setting the switching point, it must first be determined what change is to be monitored, since some settings result in certain disadvantages. The following requirements must be taken into consideration:

Low change in the rate of flow in the high flow speed range: the switching point must be chosen very close to the measuring value of the normal flow, since the change of measuring values is very small when the rate of flow changes. Since the temperature compensation exhibits a certain amount of delay in comparison to the actual change of temperature, such a setting of the switching point is possible only with slow changes of temperature.

Low change in the rate of flow in the low flow speed range: the switching point may be selected at a greater distance from the measuring value of the normal rate of flow, since the changes of the measuring values are larger when the rate of flow changes. A change in temperature has no effect on the switching behaviour.

Large change in the rate of flow: in most cases like this a simple yes/no statement is desired (e. g. ventilator is running or ventilator stopped). Therefore, a larger safety margin may be selected, so that neither temperature changes nor turbulence have any influence on the switching behaviour.

The switching point is set via the potentiometer on the evaluation unit of the air flow monitor. An LED flashing twice per second in the ten-part LED chain indicates the set switching point.

The current air flow is displayed relative to the maximum air flow via the LED chain (e.g.: maximum air flow = 10m/s, three lit LEDs correspond to 30% of the maximum air flow. Thus, 3 m/s air flow is measured).

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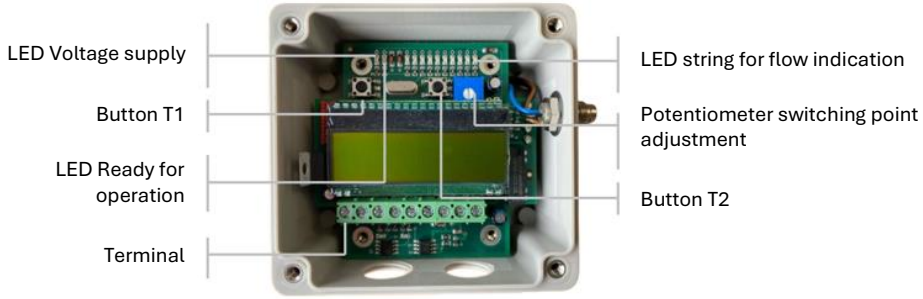
If the percentage value is constantly above 100%, the LED on the far right flashes at a high frequency. Then an adjustment in the menu item "Speed Max" is useful.

If the air flow is permanently at a very low level, the LED on the far left flashes at a low frequency.



Other switching point setting options 1 (optional): Relative

If the switching point is set to "flow%" under menu item 4: "Alarm", you will be prompted to set a number between 1 and 99 when you press T1. This number corresponds to the switching point in percent of the set maximum flow, e.g.: Maximum flow = 10 m/s, switching point 50%, real switching point is then 5 m/s.

Additional switching point setting options 2 (optional): Reference

If the switching point is set to "ref%" under menu item 4: "Alarm", you are prompted to set a number between 1 and 99 by pressing T1. This number corresponds to the switching point in percent of a value, which is automatically acquired as soon as the menu is left or the device is restarted. The acquisition takes 120 s. During this time the flow is measured and at the end of the time an average value is formed. The switching point is determined from this average value

4.4 Menu settings

You enter the programming mode by pressing and holding (approx. 3 s) T1. Please note that the number and type of menu items may vary depending on the specification and version. The program sequence is fixed and cannot be changed by the user.

Step	Display German	Display English	Selection	Meaning
1	Language	language	german/english	Menu language customization
2	geschw dim	flow dim	m/s, m^3/h, l/min	Air flow dimension
3	geschw max	flow max	0...70m/s	Maximum air flow
4	Rohr Durchm	pipe diam	1...2500mm	Pipe diameter in mm
5	Alarm	alarm	Pot, flow%	Alarm selection
6	alarm hyst	alarm hyst	0...99%	Alarm hysteresis
7	alarm verz	alarm del	0...255s	Alarm delay
8	start verz	start del	3...300s	Start delay
9	kal fakt	cal fact	30...255%	Calibration factor
10	RelaisFkt	RelayFct	NOP/NOC	Relay behavior

Menu control via button T1 and button T2 (T1 = weiter/ continue, T2 = wähle/ select).

To finish your programming, exit the menu under "Display ok" with "save and exit", otherwise the data will be lost.

If the dimension of the display is changed (e.g. from m/s to l/min), it is absolutely necessary to readjust the switching threshold and, if necessary, the measuring range. If, for example, 5 m/s was previously set, the device will also react to the value "5" in the new dimension.

When ordering, please specify whether you want to change the dimension and/or which dimension should be displayed. The default setting can be made at the factory on request.

There is a protective film on the LCD module at the factory that protects the display from scratches. This can be removed carefully to increase the contrast.

4.5 Presentation of the measurement results on the display

The RLSW®8 LCD offers various options for displaying the current air flow/volume flow and the media temperature. By default, the relative flow is displayed in the first line. The second line is used to display the absolute air flow. By pressing T2 the display can be changed over.

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Outputs

The output relay provides a normally open contact: The contact closes when the set switching threshold is reached and exceeded/ terminal 8/9.

The switching threshold of the transistor output (alarm OC/ open collector/) is also set via the potentiometer analog to the relay output.

The following analog linear outputs are also available:

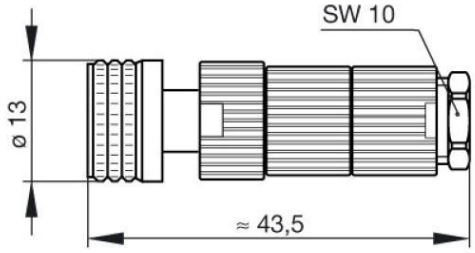
Output	Dependency	Electrical connection
0 ... 10 V DC	Air flow / volume flow	Terminal 4 (+) and 2 (Ground)
4 ... 20 mA	Air flow / volume flow	Terminal 6 (+) and 5 (-)

Information on the RLSW®8 M8 with remote sensor

The RLSW®8 is also available with a remote probe. The supplied probe has a connection cable with a length of 2.5 m as standard (special lengths available on request). This length must not be changed due to calibration. The connection is made via an M8 plug. The plug must not be removed from the line.

When mounting the evaluation unit, please ensure that neither the plug nor the cable are kinked. Only the supplied mounting set may be used for mounting! Please allow sufficient space for the plug during installation!

Dimensions M8 connector



5. MAINTENANCE INSTRUCTIONS

The flow sensor should be serviced at regular intervals, i.e., the flow sensor should be cleaned when used in heavily contaminated media. The following procedure is expedient:

- Dismantle flow monitor.
- Carefully soak the flow monitor in lukewarm soapy water for approx. 10 minutes (depending on the degree of soiling).
- Carefully rinse the flow monitor with lukewarm water.
- Install the flow monitor.
- Put the flow monitor into operation and, if necessary, carry out a new calibration with the evaluation electronics

Do not clean the sensor tip with a screwdriver, wire brush or similar. There is a high risk of damage.

6. ERROR MESSAGES

The following instructions are intended as first level support in case your flow monitor is not working properly.

Problem	Potential Cause	Solution
Device does not work at all.	Missing or wrong supply voltage.	Check supply voltage and connection.
Device does not detect a flow.	Sensor is not installed properly. Flow is outside of the measurement range	Review if the sensor was installed with its marking positioned towards the airflow source and close to the duct's center. Adjust the tube's diameter to increase or decrease the flow.
Device detects flow when no flow is present.	Flow is present even at standstill e.g., due to ventilation flaps through which air enters from the outside.	Adjust the sensor's switching point.
Device shows delayed reaction behavior.	Sensor tip is polluted. Sensor is not installed correctly	Carefully clean the sensor with water. Check the installation conditions. Connect sensors to device according to assignment.

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Device has no output signal	Terminal 2 + 5 bridged	Disconnect terminal 2 + 5 and restart device. If the error message appears again, contact SEIKOM support.
Device switches in the event of a rapid media temperature increase.	Temperature gradient is outside of technical specifications.	Turn the potentiometer a little further clockwise. Set switching point in hot media environment.

7. EU DECLARATION OF CONFORMITY

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EU-Declaration of Conformity

The EU declaration of conformity applies to the following unit:

RLSW®8 (M8) LCD

This declaration of conformity is issued under the sole responsibility of the manufacturer.
We confirm the conformity to the essential requirements of the European directives:

2014/30/EU (EMV-Richtlinie)
2014/35/EU (Niederspannungsrichtlinie)
2011/65/EU (Beschränkung gefährlicher Stoffe)
2015/863/EU (Ergänzung RoHS 3)

The following standards were applied:

DIN EN IEC 63000: 2019-05
DIN EN IEC 61000-6-2: 2019-11
DIN EN 61000-6-3: 2021-03

Wülfrath, 28th March 2023

Philipp Hein
Managing Director

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Our product portfolio

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