SEIKOM ELECTRONIC

User Manual
NLSW®45-3

24 V AC/DC, 230 V AC

Version 1

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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 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 calorimetric flow monitors of the NLSW®45-3-series are an economical alternative to common pressure transmitters. The installation of the separately available sensor is simple and quick by means of a flange mount (for channel installation) or by means of a PG7 threaded connector. The switching point can be selected via the integrated potentiometer. In case a flow is present, the switching output is conductive (yellow LED on the unit is on).

2.1 Proper Use

The flow monitors of the NLSW®45-3 series are intended for monitoring gaseous media within the specified technical data. Areas of application are the monitoring of chillers (water shortage), boiler and sprinkler systems, pumps, cooling- and lubricant circuits.

2.2 Function Principle

Flow monitors of the NLSW®45-3 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.

Flow ≥ threshold value	Relay output energized	Yellow LED "Airflow" turns on
Flow < threshold value	Relay output not energized	Yellow LED "Airflow" shuts off

3. TECHNICAL DATA

Type	**NLSW®45-3**	
Article-No.	77029	63377
Operating voltage	24 V AC/DC	230 V AC 50/60 Hz
Voltage tolerance	± 5%	± 6%
Overvoltage category	II	
Signal lamp voltage	Green LED	
Power consumption	3 VA	4,5 VA
Ambient temperature	-20 ... 50°C	
Switching output	Relay, 1 change-over contact	
Switching function at flow	Relay engages	
Relay output	250 V AC, 8 A, 2 kVA	
Minimum switching load	10 mA / 5 V DC	
Signal lamp airflow	Yellow LED	
Start-up delay	Adjustable approx. 5...60 s	
Signal lamp start-up delay	-	
Media temperature range	-25 ... 120°C	
Switching point adjustment	With potentiometer	
Airflow range	0,1 ... 30,0 m/s	
Sensor	Available separately, F2.x, F3.x (recommended), F4.x (made of PTFE)	
Immersion depth (depending on sensor, approx.)	50 mm, 130 mm, 165 mm, 300 mm, 400 mm, 500 mm	
Process connection	PG7, flange	
Sensor material	MS58, nickel-plated, optional stainless steel	
Pressure resistance	10 bar	
Electrical connection	10 terminals, 2.5 mm^2	
Protection category, housing	IP40	
Protection category, terminals	IP20	
Pollution class	2	
Housing dimensions (L x W x H)	120 mm x 45 mm x 73 mm	
Type certification	Type examination TÜV Nord according to DIN EN 61010-1:2011-07	

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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 10 A.

The NLSW®45-3 is designed for mounting on a profile rail (DIN EN 50022-35). If the device should be exposed to greater vibrations, mount it on vibration metal as appropriate. The built-in device according to IP20 (corresponds to VBG4) must be mounted in a housing or in the control cabinet.

4.1 Installation Conditions

To avoid malfunctions, please refer to the following points:

- The tip of the sensor should be as close as possible to the center of the pipe. The traverse hole in the shaft of the sensor must be within the full of the gaseous medium.
- There is a small notch in the metal at the end of the sensor. This mark is intended as a mounting aid and should be placed in the direction from which the current is coming.
- In case of 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 at least 5 x D (inside pipe diameter) of free inlet and 3xD (inside pipe diameter) of outlet path to avoid false measurement due to turbulence.
- Screw in the associated sensor (available separately) only via the hexagon of the sensor housing.
- The device operates independently of the installation position.
- Connect the sensor to the device according to the connection diagram. Reversing the connections will result in malfunctions and possible damage.
- If the sensor line is laid in a duct together with other current-carrying lines (e.g., motors or solenoid valves), we recommend shielding the sensor line (apply shield).
- To avoid malfunctions, the sensor cable must be extended with a cross-section of at least 1.5 mm^2. The maximum cable length should not exceed 50 m.

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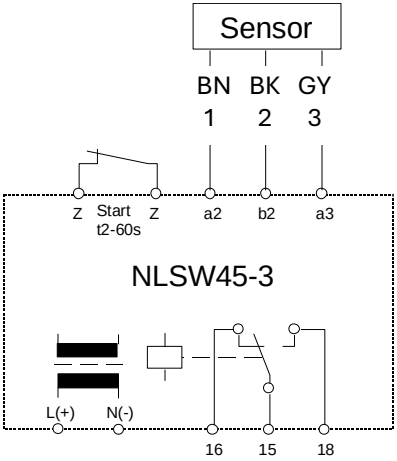
4.2 Electrical Connections



Colors: BN = brown WH = white GN = green YE = yellow

4.3 Setting the Switching Point

The interrelation between air 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 points are set on the evaluation unit of the Flow monitor.

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4.4 Commissioning Instructions

When commissioning and adjusting the device, the following procedure is recommended:

- Install and connect the flow controller in accordance with installation instructions and conditions.
- Align the mark on the end of the sensor with the air stream.
- If necessary. Set jumper for start-up delay.
- Set trimmer “Sensitivity” to minimum sensitivity (left limit stop).
- Connect main voltage. The green LED lights up. When the jumper is set, the start-up delay expires (approx. 5... 60 sec.).
- The yellow LED lights up briefly and goes out again (with maximum set start-up delay, it remains on until the delay time has elapsed. (If terminal Z/Z* is connected, the relay is switched through, the yellow LED lights up and the set delay time only expires after the Z/Z connection is opened).
- Set nominal rate of flow.
- Slowly turn trimmer “sensitivity” clockwise until the yellow LED lights up and the signal output switches. To avoid faulty switching when the flow rate changes slightly, turn the potentiometer slightly beyond the switching point. If the start-up delay is preset, do not make this adjustment until the yellow LED has gone out.
- To check the function of the flow controller, reduce or stop the flow.
- The yellow LED will go off (output relay at NLSW®45-3 is released).

The device is now set to function.

*Function of terminals Z/Z: Time-delayed start of start-up delay: when terminals Z/Z are bridged, the relay is switched through / selected start-up delay time expires after the Z/Z connection is opened.

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.	Carefully clean the sensor with water.
Device switches in the event of a rapid media temperature increase.	Temperature gradient is outside of technical specifications.	Turn the "Sensitivity" potentiometer a little further clockwise. Set switching point in hot media environment.

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7. EU DECLARATION OF CONFORMITY

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EU-Declaration of Conformity

The EU declaration of conformity applies to the following unit:

NLSW®45-3

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

Mettmann, 28th March 2023

Philipp Hein
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Note

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