SGU 100: Sash sensor

Improving energy efficiency

Together with ASV115CF152, the VAV compact controller for critical areas, it enables energy-saving and safe air volume control according to needs in fume cupboards.

Features

- Infinitely-variable measurement of the position of the vertical front sash on laboratory fume cupboards
- · Accurate detection of sash position, with no wear and tear
- · Fast control of the air volume; no oscillation
- Easy fitting, preferably on the counterweight of the front sash
- · Teach-in function for adjusting the travel of the front sash
- · Easy to program using the SAUTER CASE Sensors software
- · Integrated excess-travel alarm
- Power cable 2.5 m long, 7 × 0.32 mm², fixed to housing
- · Fitted with halogen-free cable as standard
- Remote access and remote maintenance: commissioning and service via bus or external push-button
- · 3-colour LED status indicator
- · Acoustic status and alarm elements (can be deactivated)

Technical data

Power supply		
	Power supply 24 V~	±20%, 5060 Hz
	Power supply 24 V=	±20%
	Power consumption 24 V~ ¹⁾	Typically: 2 VA, 0.75 W, inactive buzzer, max.: 4 VA, 1.5 W, active buzzer
	Power consumption 24 V= ²⁾	Typically: 0.6 W, inactive buzzer, max.: 1.1 W, active buzzer
-		
Parameters		
	Linearity error	Max. 1.5% based on working range, e.g.: 210 V = 8 V
	Hardware response time ³⁾	< 100 ms
	Filter time constant	05, 22 s, variable using SAUTER CASE Sensors
Ambient conditions		
	Operating temperature	055 °C
	Storage and transport temperature	–2070 °C
	Humidity	85% rh, no condensation
Inputs/Outputs		
	Digital input	l _{out_source} max.: 1 mA, V _{out} max.: 18 V at R _{Load} = ∞
	Alarm output	I_{sink} max.: 2 mA, open collector out- put, 100 mV at I_{sink} 2 mA, V_{in} max.: 24 V=, 20% at I_{sink} = 0 mA
	Voltage output ⁴⁾	0/210 V, 1 mA max., V _{out} max.: 11.5 V, can be parametr- ised, Default 210 V
	Typical overall error	2.5% (unlinearity, hysteresis, offset, amplified; based on working range)
	Temperature influence	< 0.04 %/K

¹⁾ Default is buzzer active

- ²⁾ Inactive/active buzzer: Default is buzzer active
- ³⁾ The set filter time constant must be added

⁴⁾ Protected against short circuits and excess voltage to 24~



SGU100F01*



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Construction				
		Weight		0.68 kg
		Length of cable without bus tion ⁵⁾	termina-	Up to 200 m, Ø 0.5 mm
Standards and d	irectives			
		Type of protection		IP 10 (EN 60529), IP 20 (EN 60529)
		Protection class		III (EN 60730)
		Software		A (EN 60730)
		EMC directive 2004/108/EC		EN 61000-6-1, EN 61000-6-2 EN 61000-6-3, EN 61000-6-4
Overview of typ	bes			
Туре	Working range		Resolutio	on of working stroke
SGU100F010	200…800 mm for boards (max. sprir	bench-mounted fume cup- ng travel 1000 mm)	< 1 mm	
SGU100F011	4001600 mm for walk-in fume cupboards (max. spring travel 2000 mm)		< 2 mm	
Accessories				
Туре	Description			
0300360001	USB connection se	et		

Additional information

Manual	7010081001 C

Description of operation

The path to be measured (sash opening of the fume cupboard) creates a force on a spring converter. The resulting movement of the spring is converted into an electrical signal by an inductive sash sensor. The signal from the opening of the sash is passed to the VAV return-air controller for fume cupboards as a command variable via the monitoring unit. Within seconds, the air volume is regulated in proportion to the sash opening. This increases the ability of the fume cupboard to prevent the escape of noxious/toxic gases. The output signal is adjustable over the range and linear with respect to the path. The correct direction of operation is automatically assigned through the teach-in function. For product safety, the output signal is set to the value of the maximum volume flow if the spring force falls below a minimum value (for example if the spring breaks).

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product documents must also be adhered to. Changing or converting the product is not admissible.

SLC-RS485 interface function

The SGU 100 is equipped with an RS-485 interface that is not electrically isolated. The baud rate used is 115.2 kbit/s and is a fixed setting. The SAUTER Local Communication (SLC) protocol specifies the master-slave bus access method, with a maximum of 31 devices permitted in a network segment.



Note

►All bus users must be on the same potential!

The SAUTER CASE Sensors software is used to parameterise every individual device and to configure the devices within the network segment. The physical access to the bus system is via separate leads on the end of the cable.

For further information, see operating instructions P100006869.

⁵⁾ Cable length of bus termination on both sides 120 Ω : 200...500 m, Ø 0.5 mm

Example functional diagram

Analogue output mode: 2...10 V = 0...100% spring travel



Key

Pos. Description

- P1 Start position
- P2 Nominal position
- P3 Trigger position for excess-travel alarm
- A Direction of operation of the measuring spring: Increasing spring length indicates opening of front sash
- B Direction of operation of the measuring spring: Increasing spring length indicates closing of front sash

Engineering and fitting notes

The sash sensor can be fitted in any position (including a hanging position). When fastening the spring under pressure, the spring may recoil and damage the measuring system. To prevent this, we recommend attaching the loose end of the spring with the minimum possible spring deflection. The spring must be fitted so that its travel is unrestricted, in other words without any neighbouring parts. It is not permitted to remove, shorten or permanently deform the spring, and doing so invalidates the warranty, as it is no longer ensured that the device will operate correctly.

For reasons of personal safety, the sensor is delivered ex works with a range of 2...10 V. Therefore, the standard configuration of the ASV115CF152 ensures safe operation when the front sash is closed (minimum volume flow V_{min}).

If the sash sensor is configured with 0...10 V and in the ASV 115 the Damper CLOSED function is assigned to the logical status LOW Voltage, the damper closes and the volume flow falls towards zero. The fume cupboard is in an unsafe condition!

If the minimum volume flow V_{min} is greater than 20%, it is advisable to set the output to freely configurable and to configure the output voltage according to the volume flow specifications.

Indicators: Flashing and sound patterns

The various operating statuses are indicated by means of visual and acoustic signals. The acoustic signals can be deactivated using SAUTER CASE Sensors.

Function		LED			Buzzer		
		Colour	Duration (s)	Interval ON/OFF (s)/(s)		Duration 6) (s)	Interval ON/OFF (s)/(s)
1.	Power supply above minimum value; SGU status: Ready	Green	_	0.1/1.9	OFF	-	0.1/1.9
2.	Power supply present, but below the minimum value	Orange	-	0.1/1.9	OFF	-	0.1/1.9
3.	(Factory setting)						
4.	Learning phase, front sash closed. Measurement of start position, P1	Orange	10	0.5/0.5	ON	10	0.5/0.5
5.	Learning phase, position change	Orange	< 60	ON	ON	< 60	ON
6.	Learning phase, front sash open; measurement of nominal position, P2	Orange	10	0.25/0.25	ON	10	0.25/0.25
7.	Learning phase, completed successfully	Green	3	ON	ON	3	ON
8.	Learning phase not completed correctly	Red	3	0.1/0.1	ON	3	ON
9.	No valid learning values available	Orange	-	ON	ON	4 per 60	0.5/0.5
10.	Measurement error	Red	-	ON	ON	10 per 300	0.1/0.1
11.	Temporary SLC operating mode (SAUTER CASE Sensors; temporary manual op- eration) ⁷⁾	Alternating Red - green	20 ⁸⁾	0.5/0.5	ON	20	0.1/1.9
12.	Broken spring, insufficient travel or excess travel	Orange - red	-	0.5/0.5	9)		

A measurement error is present when the internal measured values are outside the expected range. Possible reasons are:

• Sensor error caused by a shock

• Excessive or insufficient spring travel

· Electrical interference from abnormal external source

Adaptation of the working range (teach-in)



During the adaptation of the start and nominal positions, do not operate the front sash!

⁶⁾ Deactivation possible using SAUTER CASE Sensors

⁷⁾ If there is a measurement error, the output voltage is set to the voltage of the open sash.

⁸⁾ 20 s after an interruption to communication, the device automatically switches to normal mode.

⁹⁾ Broken spring, insufficient travel or excess travel cause a volume flow ≥ v_{max}. These conditions are reported via the alarm output.

Procedure diagram



Explanation of the process steps

Pos.	Activity, marking point	Indication ¹⁰⁾	
		LED ¹¹⁾	Buzzer ¹²⁾
0	First adjustment	Orange	Per min 4 s: 0.5/0.5 s ON/OFF
	Adjustment/service	Green 0.1/2 s ON/OFF	
1	Start	Compare pos. "0"	Compare pos. "0"
2	Check sash position		
3	Press internal or external button or use SAUTER CASE Sensors to start <i>Teach-in position</i>	Orange, 0.5/0.5 s ON/OFF	0.5/0.5 s ON/OFF
4	Wait for indication change	Orange, ON	ON
5	Move sash to desired/specified nominal position	Orange, ON	ON
6	Press internal or external button or use SAUTER CASE Sensors to start <i>Teach-in position</i>	Orange, 0.25/0.25 s ON/OFF	0.25/0.25 s ON/OFF
7	Wait for indication change	If OK: Green 3 s ON	If OK: 3 s ON
8	Check performed automatically; if the check criterion is not fulfilled, the starting status is restored automati- cally. Learning phase must be restarted.	Not OK: Red 0.1/0.1 s ON/OFF followed by orange status (no valid teach-in values)	Not OK: 3 s long 0.1/0.1 s ON/OFF
9	Check performed automatically; if data is not accep- ted, the spring installation and the working range must be checked.	Not OK: Red 0.1/0.1 s ON/OFF followed by orange status (no valid teach-in values)	Not OK: 3 s long 0.1/0.1 s ON/OFF
10	Ready for operation	Green 0.1/2 s ON/OFF	

Disposal

When disposing of the product, observe the currently applicable local laws. More information on materials can be found in the Declaration on materials and the environment for this product.

Options for the teach-in



¹⁰ Measurement error is indicated as follows: LED red (permanent), buzzer every 300 s for 10 s 0.5/0.5 s ON/OFF

 $^{^{11\!)}}$ Condition: Power supply in the permitted range, LED lights up every 2 s for 0.1 s.

¹²⁾ Default is buzzer active - can be deactivated using SLC.

SAUTER CASE Sensors



Connection diagram





Block diagram





Dimension drawing

Application example

Return air quantity controlled in proportion to the sash opening of the fume cupboard with SGU 100 sash sensor as setpoint transmitter.

Insufficient travel and a broken spring lead to a volume flow $\geq \dot{v}_{max}$ and are indicated both on the alarm output and via LED.

The contaminant retention level of fume cupboards according to EN 14175 can be ensured by adjusting the volume flow in proportion to the front sash opening of the fume cupboard within seconds - i.e. when the front sash is opened, the setting time for the volume flow control must be very short.

The front sash opening can be determined quickly and reliably with the SGU 100 sash sensor and is passed on to the ASV 115 via the FCIU 100 fume cupboard control unit as command signal cqV.s for the volume flow control loop. The running time of the ASV115CF152 must be parametrised in a range from 3...5 s.

In accordance with the setpoint, the volume flow is adjusted between the parameterised \dot{v}_{min} and \dot{v}_{max} values.

The response times of the entire control loop for the opening and closing of the fume cupboard must comply with EN 14175. For a setpoint/actual value deviation of > 10% V (adjustable on FCIU), a visual and acoustic alarm is triggered on the FCCP 100 fume cupboard control unit, to indicate an unsafe status to the operator.

If the front sash is opened beyond the nominal position (lock off), this is detected by the SGU 100 and an excess-travel alarm (DO, Open Collector) is triggered. A separate switch is no longer necessary. The neutral zone and the switching hysteresis can be seen in the functional diagram (see above) and relate to the working range.



Pos.	Description
1	VAV compact controller ASV115CF152
2	FCCP 100 fume cupboard control unit
3	FCIU 100 interface unit
4	VAV box
5	- (Not used)
6	SGU 100 sash sensor
7	– (Not used)
8	Lighting

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