# KSL

## Compact Electronic Air Flow Switch

**PRODUCT DATA**


## GENERAL

These highly reliable compact electronic flow switches are designed for detecting air flow in ducts or pipes.

The device's sensitivity is adjusted using a potentiometer. When the air flow speed reaches a customer-preselected threshold value (switchpoint), the device switches an electronic circuit. The switching state is indicated by an LED.

## FEATURES

- PG7 connection for easy mounting directly to ducts.
- No moveable parts in the detection zone.
- Temperature-compensated operating range.
- Highly resistant to contamination and corrosion.

## DIMENSIONS

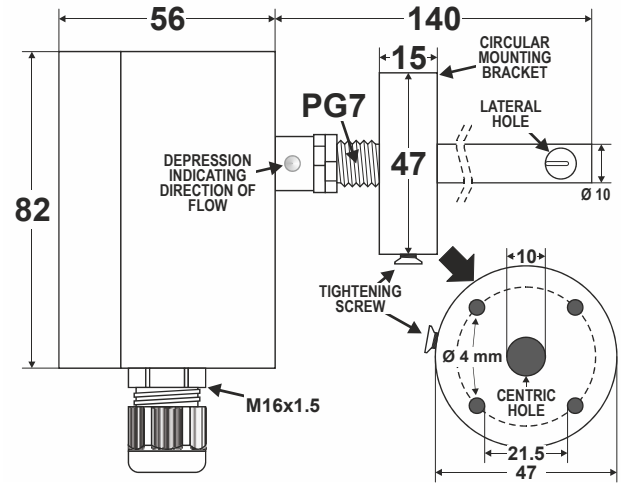


**Fig. 1. KSL, dimensions (mm)**

## SPECIFICATIONS

| Type | KSL-230 | KSL-24 |
|---|---|---|
| Media | air | air |
| Power supply | 230/240 VAC ±10% | 24 VAC/DC ±10% |
| Power indication | green "voltage" LED | green "voltage" LED |
| Power consump. | 4 VA | 4 VA |
| Ambient temp. | -20 ... +60 °C | -20 ... +60 °C |
| Medium temp. | -10 ... +80 °C | -10 ... +80 °C |
| Relay contact | SPDT | SPDT |
| Contact load | 250 VAC, 10(2) A | 250 VAC, 10(2) A |
| Switch indication | yellow "air flow" LED | yellow "air flow" LED |
| 60-sec electrical outage protection | ON/OFF (jumper) | ON/OFF (jumper) |
| Outage prot. ind. | Yellow "time" LED | Yellow "time" LED |
| Setpt. adjustment | potentiometer | potentiometer |
| Range | 0.1 … 30 m/sec | 0.1 … 30 m/sec |
| Response time | 1…10 sec | 1…10 sec |
| Immersion depth | 130 mm | 130 mm |
| Max. pressure | 10 bar | 10 bar |
| Process connec-tion | PG7 + circular mounting bracket | PG7 + circular mounting bracket |
| Housing IP | IP 65 | IP 65 |
| Sensor IP | IP 67 | IP 67 |
| Protection class | II | II |
| Wiring terminals | 5 x 2.5 $mm^2$ | 5 x 2.5 $mm^2$ |
| Probe material | MS58 nickel-plated | MS58 nickel-plated |
| Weight | 400 g | 400 g |

## MOUNTING

- Select a mounting location in an area of calm flow. Specifically, the device should not be mounted immediately upstream or downstream from bends (upstream calming distance = approx. 5X the duct diameter; downstream calming distance = approx. 3X the duct diameter). Vertical and horizontal mounting possible.
- After selecting an appropriate mounting location, securely fix the circular mounting bracket into place on the duct using at least two screws.
- Now slide the probe through the 10-mm centric hole in the circular mounting bracket until the tip of the probe is at the proper depth (in the middle of the duct).
- Rotate the device to ensure that the air flows through the lateral opening at the tip of the probe. Specifically, the small depression (see Fig. 1) should face *towards* the oncoming air.
- Finally, securely fix the device in place using the tightening screw (see Fig. 1).
- Maintenance: The sensor should be cleaned regularly by immersion in soapy warm water for about 10 minutes under warm water flow using a clean rag. Do not use screwdrivers or other hard tools to clean the sensor!

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## FIELD WIRING

In the case of 230 VAC or 24 VAC power supply, connect the power supply to terminals L (+) and N (-).

In the case of 24 VDC power supply, connect common 15, normally-closed 16, and normally-open 18, accordingly.

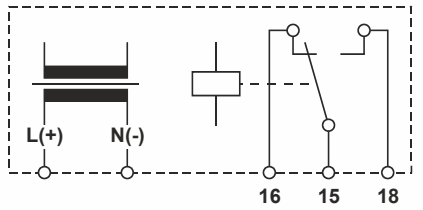


**Fig. 2. Wiring diagram**

**NOTE:** To ensure IP rating, use only cables having diameters of 6…9 mm.

## MEASURING PRINCIPLE

The KSL operates according to the principle of the hot-wire anemometer, and consists of two identical resistive sensors located inside a probe. One sensor measures the temperature of the air. The second sensor, located in the lateral opening and so directly exposed to the air flow, heats up to a controlled permanent temperature.

When there is no air flow, the temperature of this second, heated sensor remains stable, but as soon as air flows, its temperature drops. The resultant change is registered by the built-in electronics, which attempt to re-establish its original temperature by increasing the electrical current. The extra current required to do this is proportional to the air speed.

## COMMISSIONING

1. If Electrical Outage Protection (see section "60-Second Electrical Outage Protection") is desired, insert the jumper (see Fig. 3). Otherwise, remove the jumper.
2. Next, set the potentiometer (marked "Sensitivity" – see Fig. 3) to the lowest sensitivity (i.e., to the left limit stop).
3. Now connect mains voltage; the green "Voltage" LED will light up.

**NOTE:** If the jumper was set, Electrical Outage Protection will now be in effect (see section "60-Second Electrical Outage Protection"), and for the next 60 seconds, besides the green "Voltage" LED, both yellow LEDs ("Time" and "Air Flow") will also light up, and the device's relay will behave as though the blower were running and minimum air flow were present. You must therefore now wait until the 60 seconds have elapsed and the two yellow LEDS have gone dark before continuing adjustment.

4. Now switch on the blower and provide for nominal air flow.
5. Setpoint adjustment: Slowly turn the potentiometer CW until the yellow "Air Flow" LED lights up.
6. To achieve a stable switch point, turn the potentiometer slightly past the switching point.
7. To verify function, reduce or completely cut off the air flow. The yellow "Air Flow" LED should go dark and the internal relay should switch.

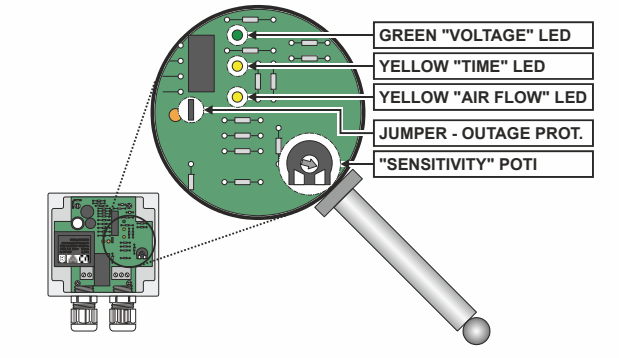


**Fig. 3. KSL 24 (cover removed)**

### 60-Second Electrical Outage Protection

The following description of relay behavior assumes that one wishes to monitor the *minimum* flow (the usual case). During normal operation, when the air flow exceeds the setpoint, the device's relay contact will then *close*.

To avoid malfunctioning when power is restored after a system-wide outage (affecting both the blower ***and*** the sensor), select Electrical Outage Protection by setting the jumper. When restoring power after an outage (or when starting up; see section "Commissioning"), the relay will then remain closed for an additional 60 seconds, as though minimum air flow were still present.

After the 60-sec period has elapsed, normal operation and relay behavior will resume: Thus, if the air flow has returned to above the setpoint, the relay will remain closed; if the air flow has dropped to below the setpoint, the relay will open. This function can be disabled by removing the jumper.

## TROUBLESHOOTING

| Problem | Possible cause | Correction |
|---|---|---|
| Device does not function at all. | No or wrong mains voltage connected. | Check mains voltage and connection. |
| Device does not detect air flow. | Sensor installed incorrectly. | Check installation conditions. |
| Switching behavior changes. | Sensor heavily soiled by medium. | Carefully clean sensor with water. |
| Device switches at rapid temperature increase. | Temp. range is outside technical specifications. | Turn poti slightly farther CW. Check temp. range of system. |