SENSIRION

Design-in Guide SGD43S-M3-Sx

For SGD43S-M3-Sx Refrigerant Detection System

The SGD4x sensor family is Sensirion's series of gas concentration sensors designed for the HVACR industry. The sensor is fully calibrated and compensated for maximum accuracy and ease of integration. This document aims at helping the proper design-in of a refrigerant sensor / detection system in HVACR appliances.

Contents

Scan me to provide feedback

1 Select the right SGD43S-M3-Sx variant for your application

SGD43S-M3-Sx comes in two variants, covering the most common A2L refrigerants:

- SGD43S-M3-S**5**: R-32 / R-454B
- SGD43S-M3-S**7**: R-454A / R-454C / R-455A

Each variant is calibrated for the listed refrigerants. During installation, the installer does not need to select which refrigerant will be used, as the calibration is valid for all the listed refrigerants simultaneously. Further details on the calibration are given in the Multigas Calibration application note.

2 Sensor & Refrigerant Detection System Operation

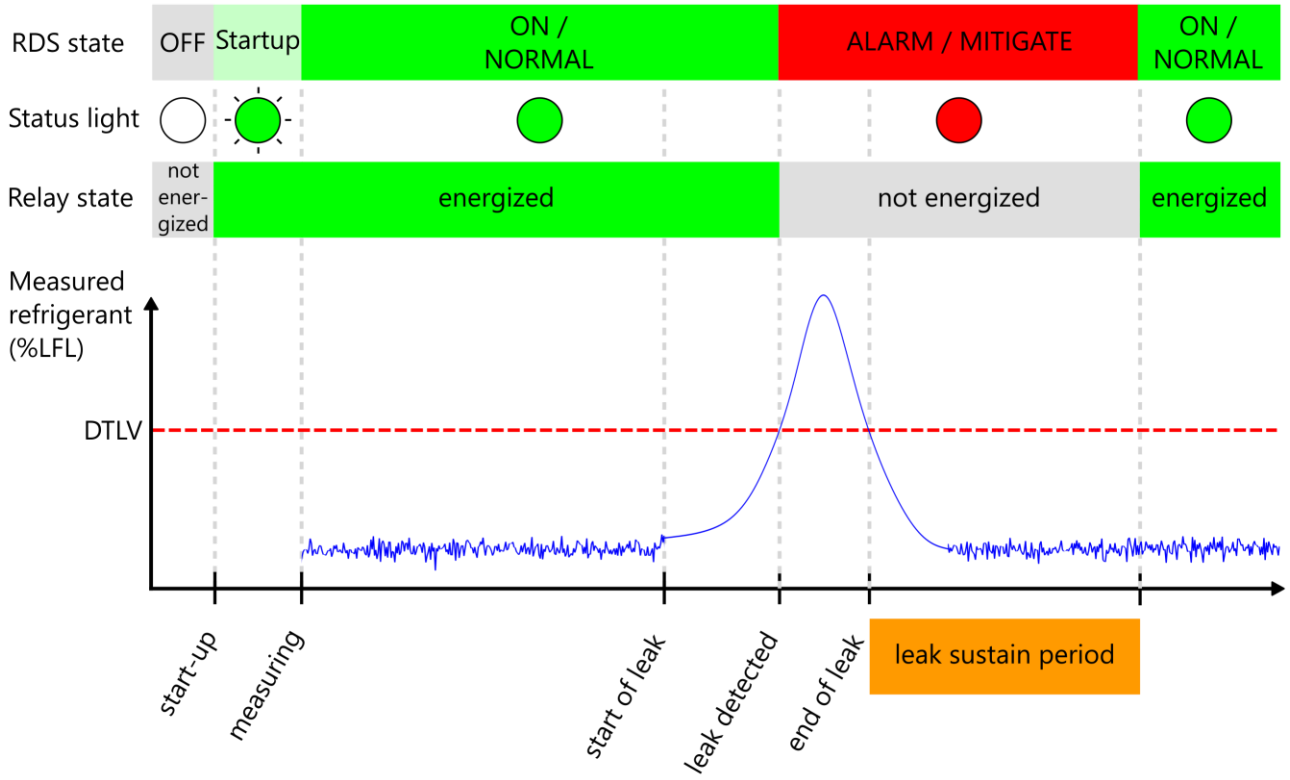


Figure 1: Timeline of the operation of the SGD43S-M3-Sx, with a leak event. The resulting Refrigerant Detection System (RDS) states, status light and relay states are depicted on the upper part. The sensor's refrigerant concentration reading is plotted on the bottom part.

3 Mechanical Considerations

3.1 Appliance Integration

The appliance manufacturer is responsible for designing the proper location of the A2L sensor in the appliance, according to the relevant norms. A2L refrigerants are typically denser than air and will therefore tend to accumulate in the lower part of an appliance during a leak event. As a result, it is recommended to position the sensor as low as possible within the appliance whenever possible. Proper sensor location must be confirmed by testing by the appliance manufacturer.

⚠	**WARNING:** The appliance manufacturer is responsible for defining the proper sensor location in the appliance, according to the relevant norms. Norm compliant location must be confirmed by testing by the appliance manufacturer.

3.2 Sensor Orientation

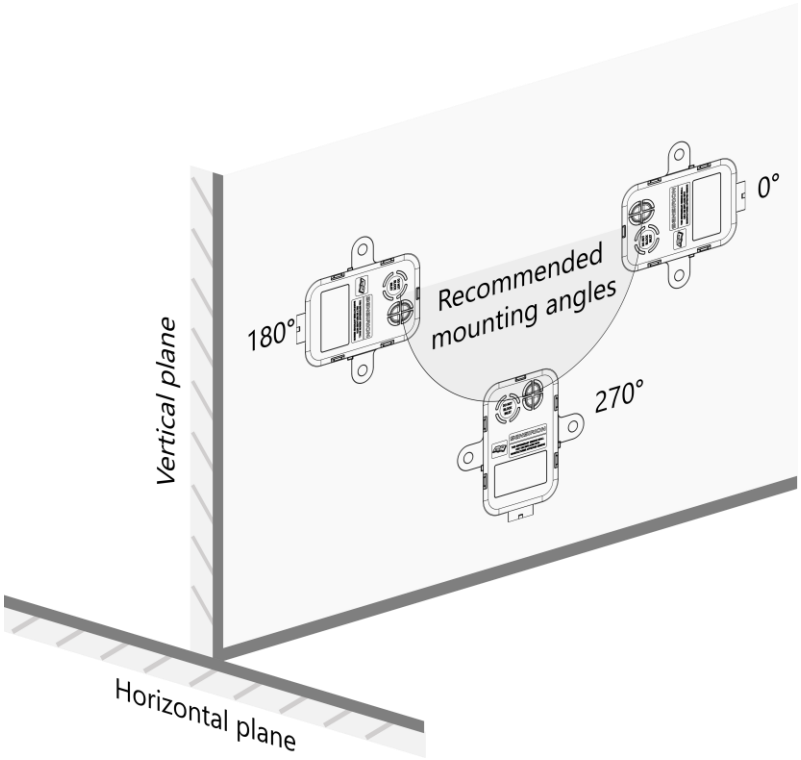
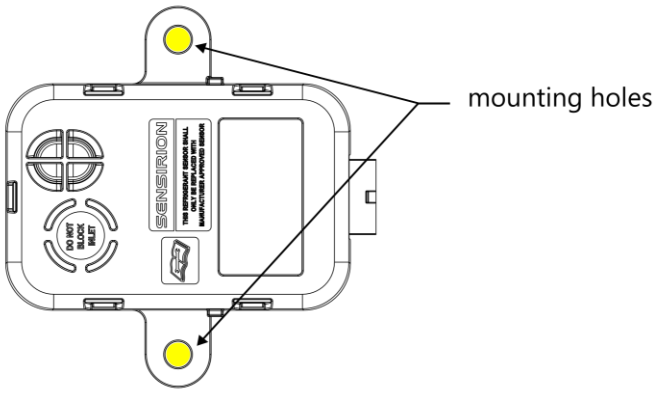


Figure 2: Recommended mounting orientation of the SGD43S-M3-Sx.

⚠	**WARNING:** The sensor must not be installed with the gas inlet facing upwards in situations where water might accumulate on or in the sensor. Accumulated water on or in the sensor may delay or inhibit the sensor's response to refrigerant.
ℹ	**NOTICE:** The sensor should not be installed with the connector facing upwards, especially in situations where water or condensate may be dripping on the sensor from above.

3.3 Sensor Mounting

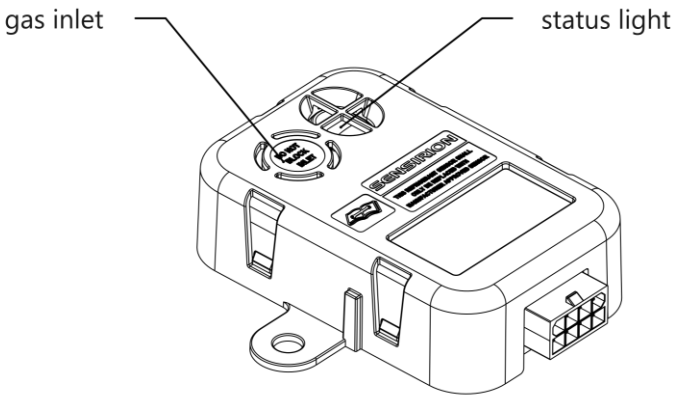
SGD43S-M3-Sx comes with a mounting bracket. The appliance manufacturer must use the provided mounting bracket, or a UL-tested mounting bracket according to the relevant norms.



The sensor shall be mounted on a flat surface using the provided mounting holes of the bracket, using a suitable method depending on the application. If mounted by screws, a #10-32 screw must be used, and the torque applied must not exceed 0.7 Nm.

3.4 Inlets

SGD43S-M3-Sx is equiped with a gas inlet and a status light inlet.



⚠	**WARNING:** The sensor's gas inlet must not be blocked. A blocked or restricted gas inlet may delay or inhibit the sensor's response to refrigerant.

3.5 Vibration

It is recommended to mount the sensor in areas with limited vibration. Vibration for extended amounts of time may lead to failure of the mounting bracket, which may lead the sensor to fall off the intended mounting location.

3.6 Sunlight

Do not expose sensor to direct sun. Exposing SGD43S-M3-Sx to direct sunlight might introduce temperature gradients and accelerate aging.

4 Electrical considerations

4.1 Connector

SGD43S-M3-Sx is compatible with the mating connector TE 794821-1.
https://www.te.com/en/product-794821-1.html

4.2 Power supply

When incorporating SGD43S-M3-Sx, it is necessary to check the electric specifications according to the sensor datasheet. Incorrect power supply may lead to slow start-up of the sensor, faults or permanently damage to the sensor.

4.3 Multicomponent System

Multiple SGD43S-M3-Sx can be daisy chained onto the same RS-485 line, in appliances where multiple sensing locations are required to achieve a norm-compliant response time of the system. Communication with each distinct sensor requires each device to have a dedicated address. The device address can be modified using the Modbus interface described in the sensor datasheet.

5 Revision History

Date	Version	Pages	Changes
April 2025	1.0	all	Initial version

Important Notices

Warning, Personal Injury

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury (including death). Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.

If the Buyer purchases or uses SENSIRION products for any unintended or unauthorized application, Buyer shall defend, indemnify and hold harmless SENSIRION and its officers, employees, subsidiaries, affiliates and distributors against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if SENSIRION is allegedly negligent with respect to the design or the manufacture of the product.

ESD Precautions

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product. See application note "ESD, Latchup and EMC" for more information.

Warranty

SENSIRION solely warrants to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product is of the quality, material and workmanship defined in SENSIRION's published specifications of the product. Within such period, if proven to be defective, SENSIRION shall as sole and exclusive remedy, in SENSIRION's discretion, repair this product or send a replacement product, free of charge to the Buyer, provided that:

- notice in writing describing the defects shall be given to SENSIRION within fourteen (14) days after their appearance;
- such defects shall be found, to SENSIRION's reasonable satisfaction, to have arisen from SENSIRION's faulty material or workmanship;
- the defective product shall be returned to SENSIRION's factory at the Buyer's expense; and
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

The Buyer shall at its own expense arrange for any dismantling and reassembly that is necessary to repair or replace the defective product. This warranty does not apply to any product which has not been installed or used within the specifications recommended by SENSIRION. EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH HEREIN, SENSIRION MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE PRODUCT. ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED AND DECLINED.

SENSIRION is only liable for defects of this product arising under the conditions of operation provided for in the data sheet and proper use of the goods. SENSIRION explicitly disclaims all warranties, express or implied, if the goods are operated or stored not in accordance with the technical specifications.

SENSIRION does not assume any liability arising out of any application or use of any product or circuit and specifically disclaims any and all liability, including without limitation indirect, consequential, and incidental damages, and loss of profit. No obligation or liability shall arise or grow out of SENSIRION's rendering of technical advice, consulting, or implementation instructions or guidelines. All operating parameters, including without limitation recommended parameters, must be validated for each Buyer's applications by Buyer's technical experts. Recommended parameters can and do vary in different applications.

SENSIRION reserves the right, without further notice, (i) to change the product specifications and/or the information in this document and (ii) to improve reliability, functions and design of this product.

Headquarters and Subsidiaries

Sensirion AG
Laubisruetistr. 50
CH-8712 Staefa ZH
Switzerland
phone: +41 44 306 40 00
fax: +41 44 306 40 30
info@sensirion.com
www.sensirion.com

Sensirion Inc., USA
phone: +1 312 690 5858
info-us@sensirion.com
www.sensirion.com

Sensirion Korea Co. Ltd.
phone: +82 31 337 7700~3
info-kr@sensirion.com
www.sensirion.com/kr

Sensirion Japan Co. Ltd.
phone: +81 45 270 4506
info-jp@sensirion.com
www.sensirion.com/jp

Sensirion China Co. Ltd.
phone: +86 755 8252 1501
info-cn@sensirion.com
www.sensirion.com/cn

Sensirion Taiwan Co. Ltd
phone: +886 2 2218-6779
info@sensirion.com
www.sensirion.com

To find your local representative, please visit
www.sensirion.com/distributors