

Manual for Installation, Function Description and Maintenance Instruction

aSENSE™-Relay

CO₂ / temperature transmitter with relay

General

The IAQ-sensor product *aSENSE™-Relay* is used to measure indoor air carbon dioxide concentration and temperature in rooms. It is flexible controller with programmable output for relay control of e.g. mixed air dampers, humidifier and fans. The measured values are shown on the display, option.

The unit is designed for connecting to Direct Digital Control (DDC). The linear output functions are pre-programmed as CO₂ and temperature transmitters with jumper selected outputs 0-10 V / 2-10 V / 0-20 mA / 4-20 mA. The measuring ranges can be modified from a PC (Windows) and use of the software UIP (version 4.3 or higher) together with the communication cable Kabel RS232 A232-05-07 prod.

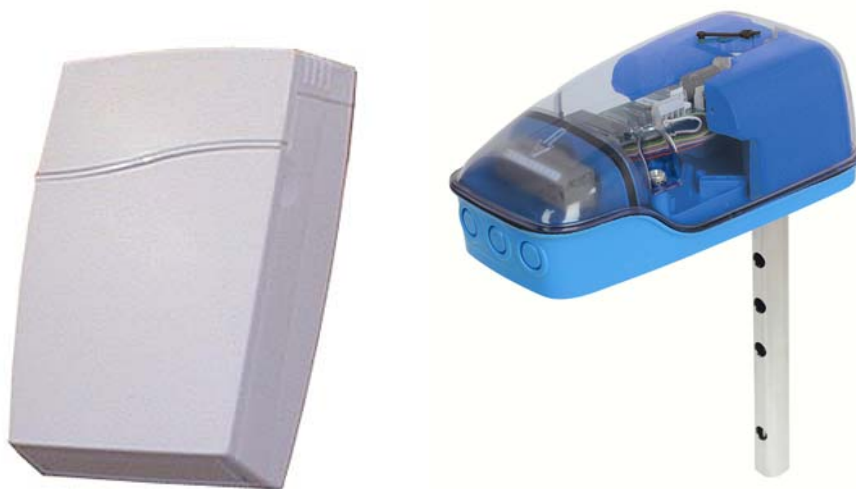


Figure 1. *aSENSE™-Relay* for wall mounting and *UG-aSENSE-Relay* for mounting in ventilation ducts

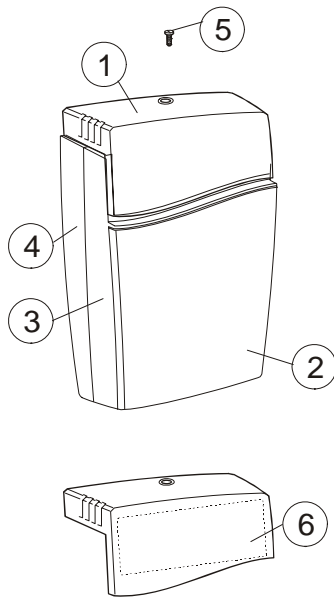
Mounting instruction

Wall mounting of *aSENSE™-Relay*, see below

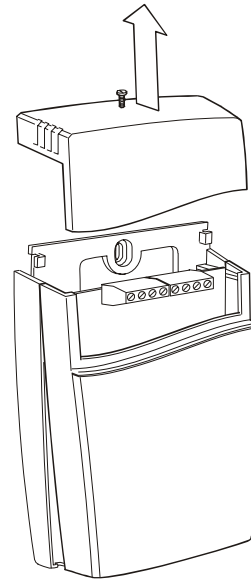
Duct mounting of *UG-aSENSE-Relay*, please see separate mounting instruction.

For electrical installation, see page 4.

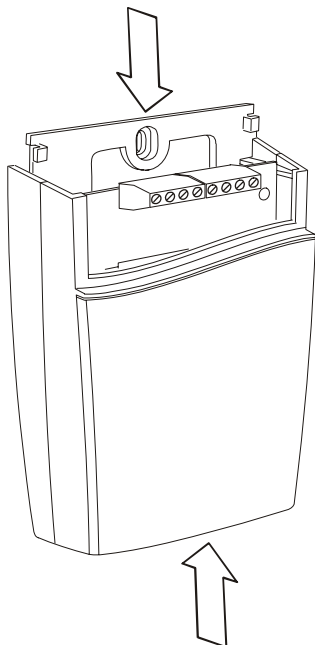
Dismounting of the sensor



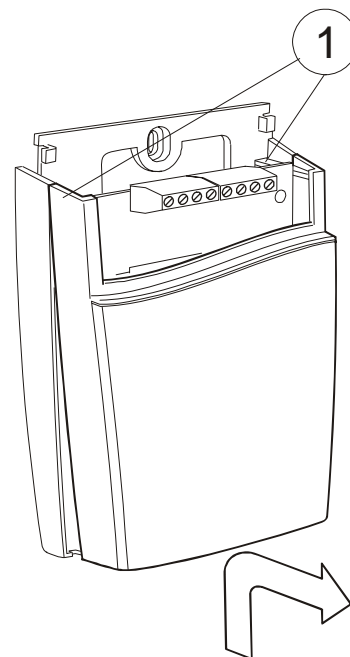
- | |
|---|
| <p>1 top part
 2 lid
 3 front part
 4 wall plate
 5 screw
 6 label with settings
 inside the top part</p> |
|---|



Pull the top part upwards

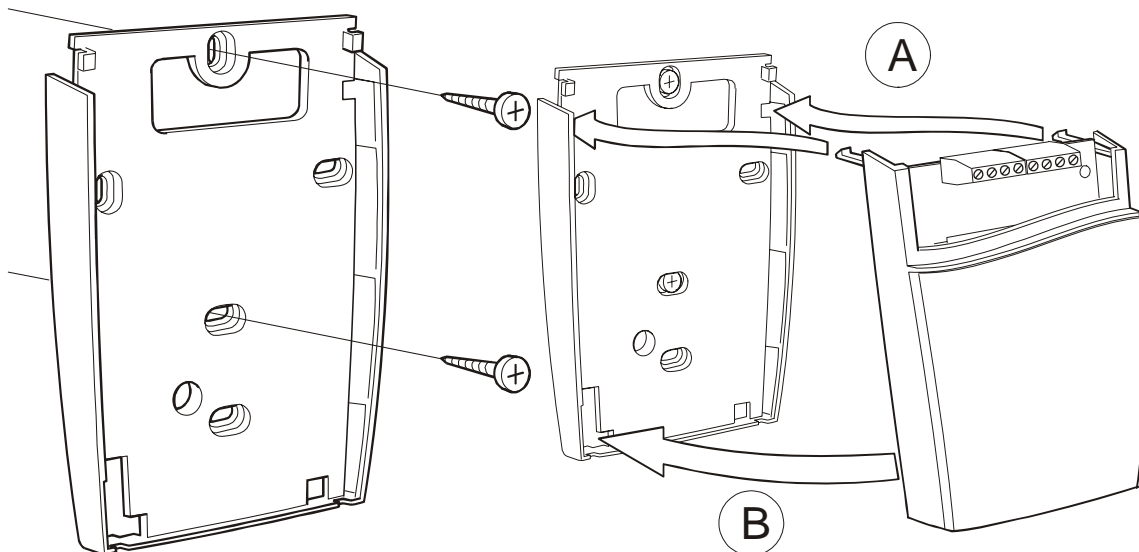


Push the front part with the lid upwards while keeping the wall plate steady



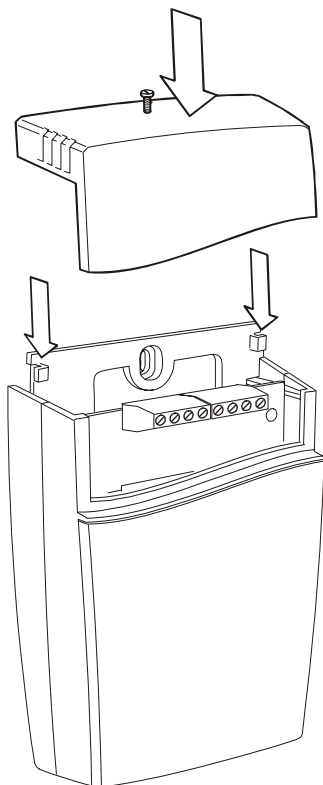
Fold the front part with the lid forwards and loose it from the hooks (#1)

Mounting of the sensor



*The wall plate is screwed onto the wall
The screw heads should be max 4 mm*

*A Put the top tabs of the front part into the top holes of the wall plate.
B Press the lower edge of the case onto the wall plate to latch*



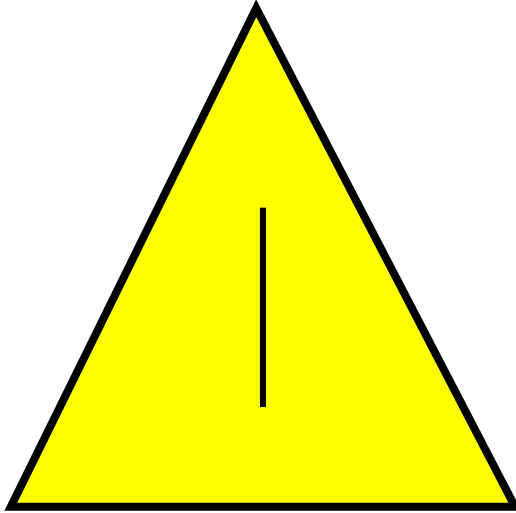
The top part is pushed under the locking hooks of the wall plate and is secured with a screw



If for some reason the PCB must be removed it must be handled carefully and protected from electrostatic discharge! Normally, removing the PCB is not required.

Electrical connections

The power supply has to be connected to G+ and G0. G0 is considered as system ground. If the analogue output is connected to a controller *the same ground reference has to be used for the aSENSE™-Relay unit and for the control system!* Unless different transformers are used, special precautions need to be taken.



PLEASE NOTE! The *aSENSE™-Relay* signal ground *is not* galvanically separated from the *aSENSE™-Relay* power supply!

PLEASE NOTE!
The same ground reference has to be used for the *aSENSE™-Relay* unit and for the control system!

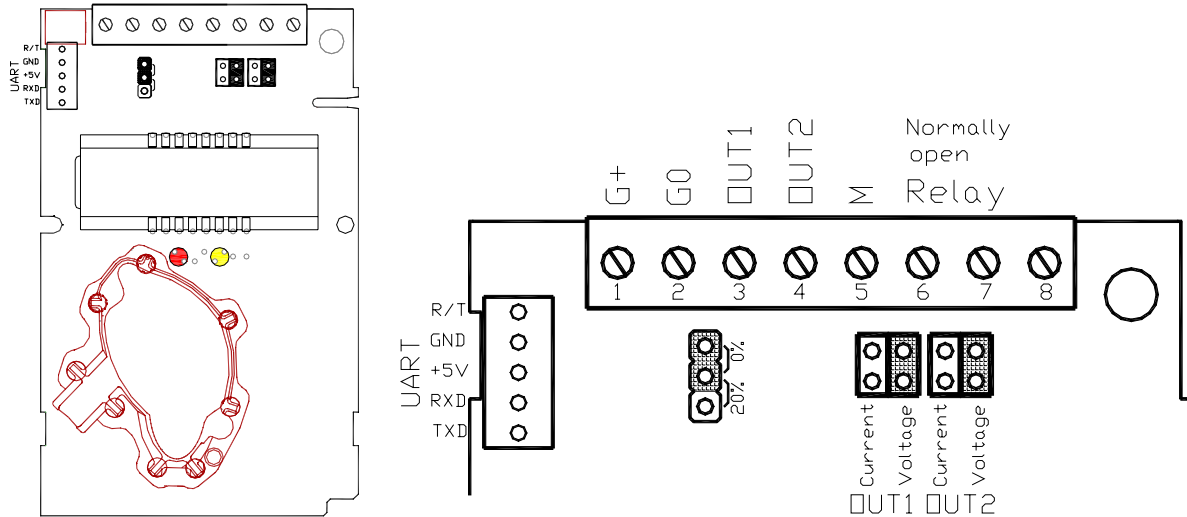
If possible keep the sensor powered up after mounting. Connect the analogue output before measuring.

Connection Terminal	Function	Electrical Data	Remarks
G+	Power (+)	24 VAC/DC+ (+-20%), 3W	2W without output load See note 1!
G0	Power ground (-)	24 VAC/DC-	
OUT 1	Analogue Output 1 (+)	0-10 VDC or 0-20 mA, 2-10 VDC or 4-20 mA,	0...2000 ppm CO ₂
OUT 2	Analogue Output 2 (+)	Same as Output 1	0...50 °C According to positions of OUT1 and OUT2 and start point jumpers. See note 2!
M	Signal Ground (-)	Connected to G0 via PTC fuse	See note 1!
Relay	Normally open	Contact free relay minimum load 1mA/5V rated load 0,5A/125VAC; 1A/24VDC	Closed > 1000 ppm CO ₂
Relay			Open < 900 ppm CO ₂ Triggered by register OUT3

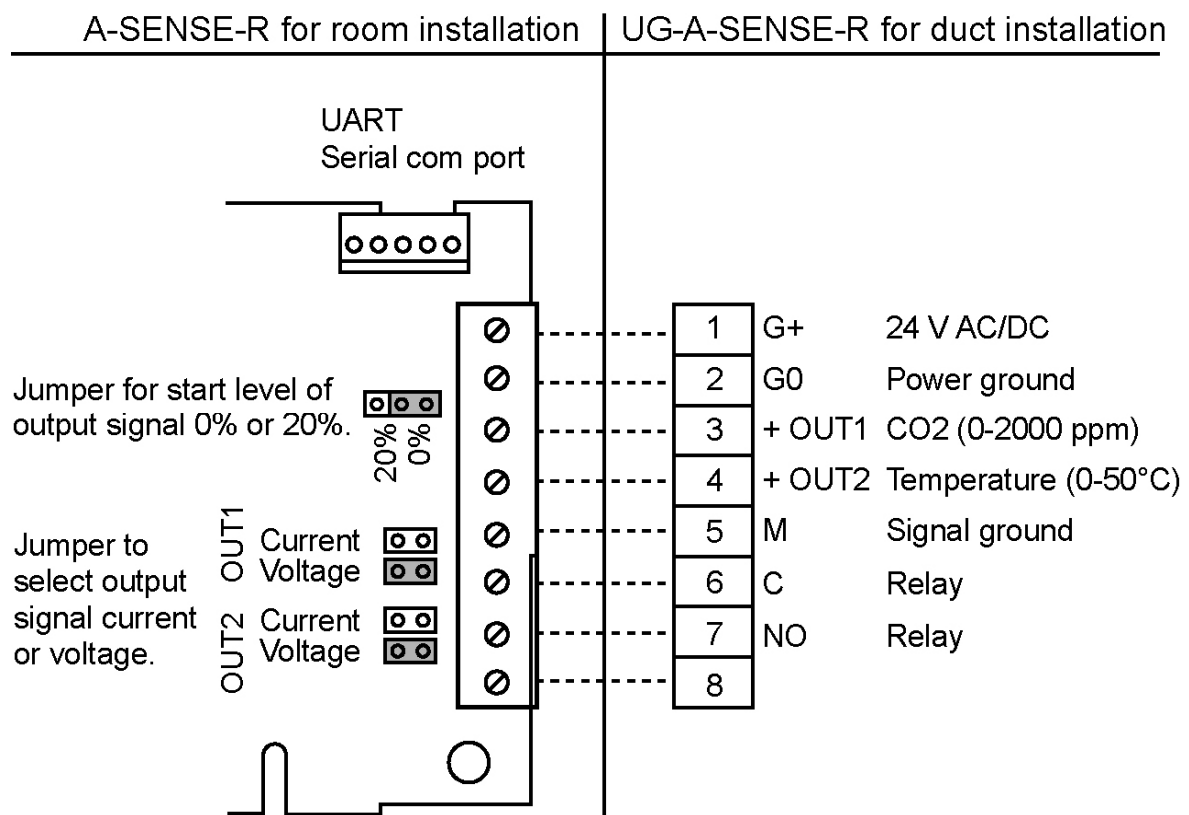
Table I. Electrical terminal connections for *aSENSE™-Relay*

Note 1: The ground terminal is used as negative power supply DC input or AC phase ground G0 (halfwave rectifier). The signal ground M, protected by a PTC resistor, is the same as power ground G0 (permitting a "3-wire" configuration). A single transformer may be used for the entire system.

Note 2: *aSENSE™-Relay* can deliver a voltage or a current loop for OUT1/OUT2. To change between voltage and current output mode the hardware jumpers are used. There is one jumper for OUT1 and one for OUT2, so that one output can be a voltage output and the other a current output. Both, voltage output and current output, can have start points 0 % (0-10 VDC or 0-20mA) or 20% (2-10 VDC or 4-20mA). The same start point is used for both outputs.



The *aSENSE™-Relay* printed circuit board. The connection terminal area for wall mounted sensors is enlarged at right. Darker positions are default. The terminals and jumpers are placed under the top part.



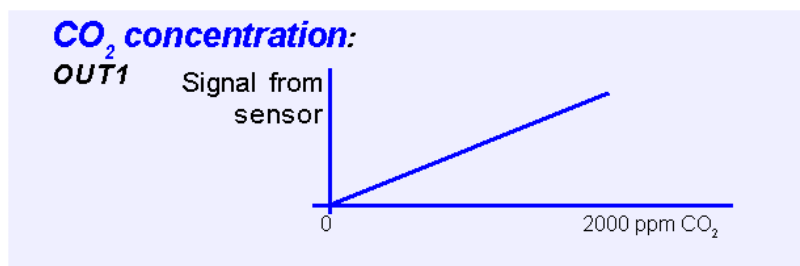
Connection of the *UG-aSENSE-Relay* via screw terminal at duct mounting.

Functional description

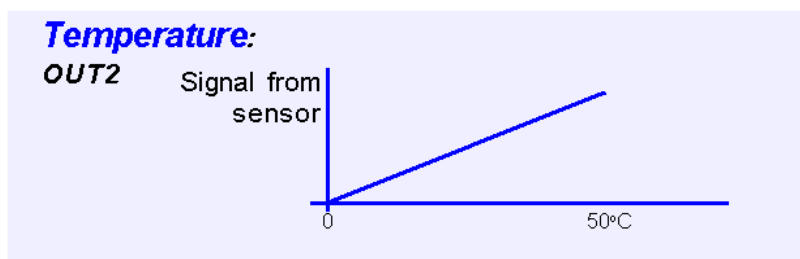
This part describes the function of the standard configuration of *aSENSE™-Relay*. It may be re-programmed before or after the installation by a PC and the standard UIP software (version 4.3 or higher).

- OUT1 = measuring signal of carbon dioxide concentration 0-2000 ppm CO₂
- OUT2 = measuring signal of temperature 0-50°C
- OUT3 = ON/OFF signal of demand of air quality

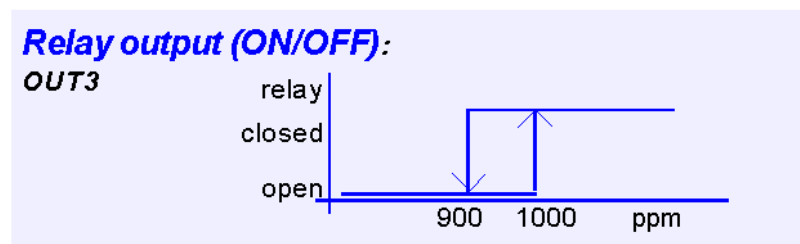
The opening of the relay is controlled by the hysteresis of the relay. See the figure of the relay output.



The measuring signal of carbon dioxide.



The measuring signal of temperature



The relay output

Output Configurations

The sensors/controllers are supplied from the factory (unless otherwise ordered) with 0...10VDC linear outputs for OUT1 and OUT2 (see Table I). If other options are needed for the application, the output jumpers have to be configured before the unit is powered up. Each jumper selection is independent from the others, except for the “Start point selection” jumper, which affects both, OUT1 & OUT2, linear outputs. Alternative measuring ranges of the outputs can be selected with the software UIP (version 4.3 or later).

Jumper	Position	Function
Start point selection jumper	0%	Jumper top position provides 0Vdc or 0mA start point for OUT1, OUT2 (0-20mA or 0-10V).
	20%	Jumper bottom position provides 2Vdc or 4mA start point for OUT1, OUT2 (4-20mA or 2-10V).
OUT1	Current	Connection in position Current provides 0/4-20mA output range for OUT1.
	Voltage	Connection in position Voltage provides 0/2-10VDC output range for OUT1.
OUT2	Current	Connection in position Current provides 0/4-20mA output range for OUT2.
	Voltage	Connection in position Voltage provides 0/2-10VDC output range for OUT2.

Table II. Configuration jumpers for *aSENSE™-Relay*

Self diagnostics

The system contains complete self diagnostic procedures. A full system test is executed automatically every time the power is turned on. In addition, constantly during operation, the sensor probes are checked against failure by checking the valid dynamic measurement ranges. All EEPROM updates, initiated by the sensor itself, as well as by external connections, are checked by subsequent memory read back and data comparisons. These different system checks return error bytes to the system RAM. The error codes are available by connecting a PC with a special RS232 cable connected to the UART port slide connector. The error codes are shown in the software UIP (version 4.3 or later). *Warm up* and *Out of Range* are the only bits that are reset automatically after return to normal state. All other error bits have to be reset manually after return to normal by power off/on.

Error code and action plan

Bit #	Error code	Error description	Suggested action
0	N/A	Fatal Error	Try to restart sensor by power OFF/ON. Contact local distributor
1	2	Reserved	
2	4	Algorithm Error. Indicate wrong EEPROM configuration.	Try to restart sensor by power OFF/ON. Check detailed settings and configuration with UIP software version 4.3 and higher. Contact local distributor.
3	8	Output Error Detected errors during output signals calculation and generation.	Check connections and loads of outputs. Check detailed status of outputs with UIP software version 4.3 and higher.
4	16	Self Diagnostic Error. May indicate the need of zero calibration or sensor replacement.	Check detailed self diagnostic status with UIP software version 4.3 and higher. Contact local distributor.

5	32	Out Of Range Error Accompanies most of other errors. Can also indicate overload or failures of sensors and inputs. Resets automatically after source of error disappearance.	Try sensor in fresh air. Check connections of temperature and relative humidity probe. Check detailed status of measurements with UIP software version 4.3 and higher. <i>See Note 1!</i>
6	64	Memory Error Non fatal error during memory operations.	Check detailed settings and configuration with UIP software version 4.3 and higher.
7	128	Warm Up state Is always set after power up or power failure. Resets after restart sequence.	If it doesn't disappear in half a minute, check power stability.

Note 1. Any probe is out of range. Occurs, for instance, during over exposure of CO₂ sensor, in which case the error code will automatically reset when the measurement values return to normal. Could also indicate the need of zero point calibration. If the CO₂ readings are normal, and still the error code remains, the temperature sensor can be defect or the connections to these are broken.

Remark: If several errors are detected at the same time the different error code numbers will be added together into one single error code!

PLEASE NOTE! The sensor accuracy is defined at continuous operation (at least 3 weeks after installation)

Maintenance

The *aSENSE™* is basically maintenance free. An internal self adjusting calibration function takes care of normal long term drift associated to the CO₂ sensor. To secure the highest accuracy, a time interval of five years is recommended between CO₂ calibrations, unless some special situations have occurred. A zero calibration can be performed by use of carbon dioxide free air or nitrogen and a PC together with the *UIP software version 4.3* (or higher). The service bag can be used to produce carbon dioxide free air. The software can be obtained free from Calectro. The cable is to be connected to the UART port slide connector. For change of control parameters and re-calibration (CO₂ and temperature) this PC tool has to be used. The check can be done on site without interfering with the ventilation system.

This product is in accordance with the EMC 2004/108/EC, 92/31/EEG including amendments by the CE-marking Directive 93/68/EEC

The product fulfils the following demands: EN 61000-4-2 level 2,
 EN 61000-4-3 level 2, EN 61000-4-4 level 4, EN 61000-4-6, EN 61000-4-8 level 4,
 EN 55022 class B

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