Function Guide for the GOLD version E/F, $ReCO_2$

1. General

The *$ReCO_2$* function is designed for ensuring the correct air quality or air temperature, by means of recirculating extract air and minimizing the inflow of outdoor air flow.

The function can be used in ventilation systems in which recirculated air intermixture is acceptable.

The function implies that outdoor air damper and damper in air recirculation section, are provided wih modulated damper actuator.

Lowering the outdoor air and exhaust air flows as well as lowering the speed of the extract air enables the unit to consume less power. The air quality of the ventilation system is continuously measured by a separate air quality sensor or VOC sensor.

The *$ReCO_2$* function can be used in AHUs GOLD RX 004-008 split version, GOLD RX 011-120 and GOLD CX 035-120.

The function can be preset for checking the CO_2/ppm content and/or temperature.

$ReCO_2$ – CO_2/VOC. The control can be set to control the recirculation and outdoor air dampers only, or both regulate the recirculation and outdoor air dampers + increase the airflow rate.

$ReCO_2$ – temperature. The control of the recirculation damper can be set for cooling sequence, heating sequence or both, and to work prior to post heating/cooling control or after post heating/cooling control (see section *Adjustment*).

$ReCO_2$ – CO_2/VOC and $ReCO_2$ – temperature. The control can be set to control air quality and temperature at the same time. If the air quality or the temperature will be dominant depends on which one of them requiring the largest amount of outdoor air flow.

The Heating Boost and Cooling Boost functions can be activated if increased supply airflow for a heating or cooling load is required.

2. Material Specification

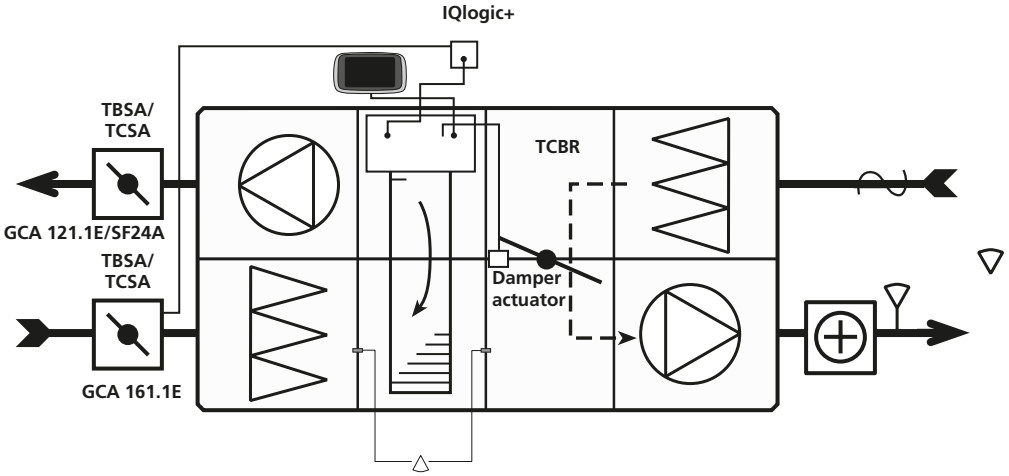
Requirements:

Air handling unit	**GOLD RX 004-008 in split version** **GOLD RX 011-120** **GOLD CX 035-120**
Air recirculation section with damper, modulated damper actuator and spring return.	**TCBR**
Outdoor air damper, modulated damper actuator and spring return.	**TBSA/TCSA**
Set of components for $ReCO_2$	**TBLZ-2-51**

Consists of: IQlogic+, TBIQ-3-1
Communication cable, BC1-1 (L=250mm)
Pressure sensor, TBLZ-2-23
Communication cable, TBLZ-1-26-03 (L=3m)
Hose, transparent, (L=2m)

If the CO_2/VOC function is used:

Air quality sensor	**ELQZ-2-504** **or TBLZ-1-74-a**
VOC sensor	**or TBLZ1-60-2-2**



3. Operation

The *ReCO$_2$* function requires that a modulating actuator on the air recirculation damper and a modulating actuator for the outdoor air damper be wired to the IQlogic and IQlogic+ module.

The CO$_2$/VOC function also requires an air quality sensor or VOC sensor wired to the IQlogic (AHU control circuit card).

The function always requires wiring a TBLZ-2-23 pressure sensor to the bus connection, and connecting hoses to the tappings provided in the supply airflow path for measuring the pressure drop across the heat exchanger. The outdoor airflow is calculated on the basis of readings of the pressure drop across the heat exchanger

From stop, start the air handling unit as normal and with the recirculation damper closed and the outdoor air damper open.

When the start up phase is completed, the selected *ReCO$_2$* function takes over control.

ReCO$_2$ – temperature. The ordinary temperature control mode continues to operate and the recirculation of extract air with a decrease in the amount of outdoor air are switched in at selected places in the control sequence.

Free cooling is enabled (factory default, can be disabled). Free cooling means that recirculation with outdoor air starts when there is a cooling requirement and the outdoor temperature is at least 1K lower than the extract air temperature. Free cooling stops when the outdoor temperature rises above the extract air temperature.

ReCO$_2$ – CO$_2$/VOC. The setpoint of the outdoor airflow is reduced, if the air is of sufficiently good quality: First by opening the recirculation damper for intermixing recirculated air. If the outdoor airflow is still too high when the recirculation damper is completely open, the outdoor air damper begins to close.

The control adjusts the flow setpoint of the extract air fan down to the same percentage as the outdoor airflow, in order to maintain the balance between the exhaust air and outdoor air.

If the air quality becomes worse, controller first opens the outdoor damper and then closes the recirculation damper.

Free cooling can be enabled (factory default, not enabled). Free cooling means that recirculation with outdoor air starts when there is a cooling requirement and the outdoor temperature is at least 1K lower than the extract air temperature. Free cooling stops when the outdoor temperature rises above the extract air temperature.

ReCO$_2$ – CO$_2$/VOC+flow, function in the same way as ReCO$_2$ – CO$_2$, except that the increase in flow is added in the control sequence.

If the air quality still isn't adequate, when the outdoor air damper is fully open and the recirculation damper is fully closed, the airflow setpoint is increased for both the supply air and the extract air fans. This increases the air volume in order to achieve a higher rate of air change with outdoor air.

ReCO$_2$ – CO$_2$/VOC and ReCO$_2$ – temperature
If both functions are active at the same time, they'll operate individually as earlier described.

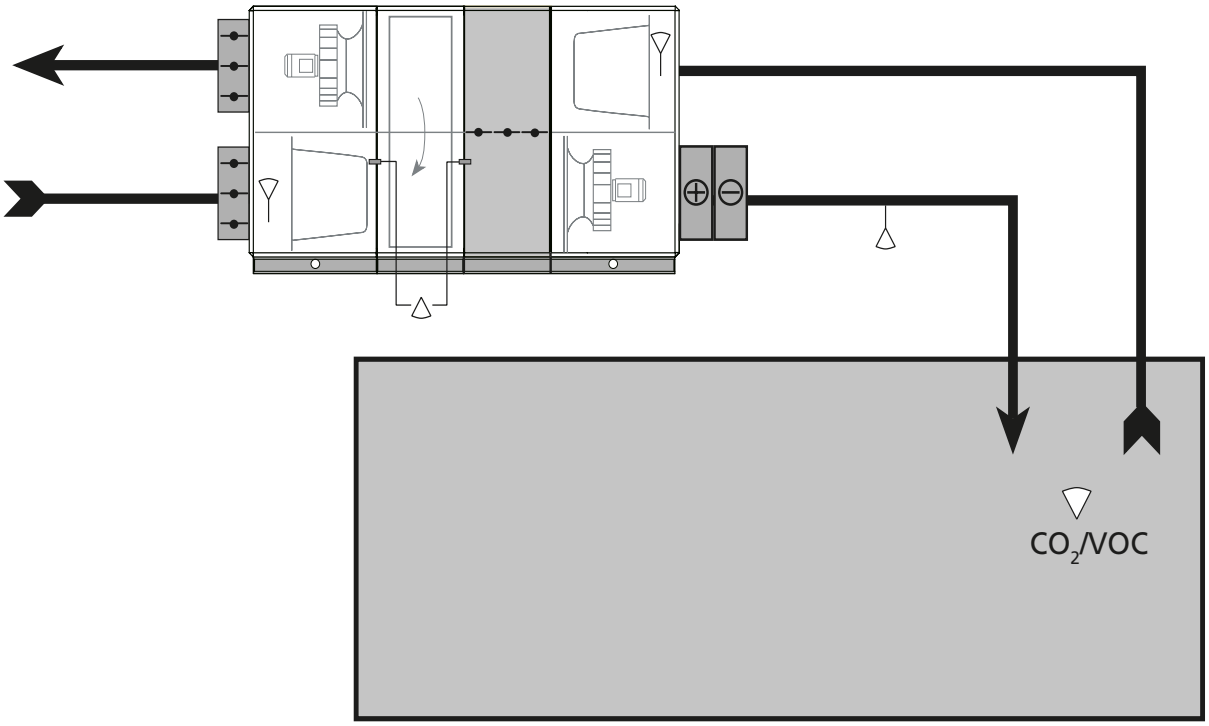
The dominating function, that will control the dampers in any given moment, is the one requiring the smallest amount of recirculation (largest amount of outdoor air flow) .

Important!

To ensure that a certain degree of air change with outdoor air will always occur, a "min. outdoor airflow" through the heat exchanger and a "min. exhaust airflow" generated by the extract air fan can be preset via the hand-held micro terminal.

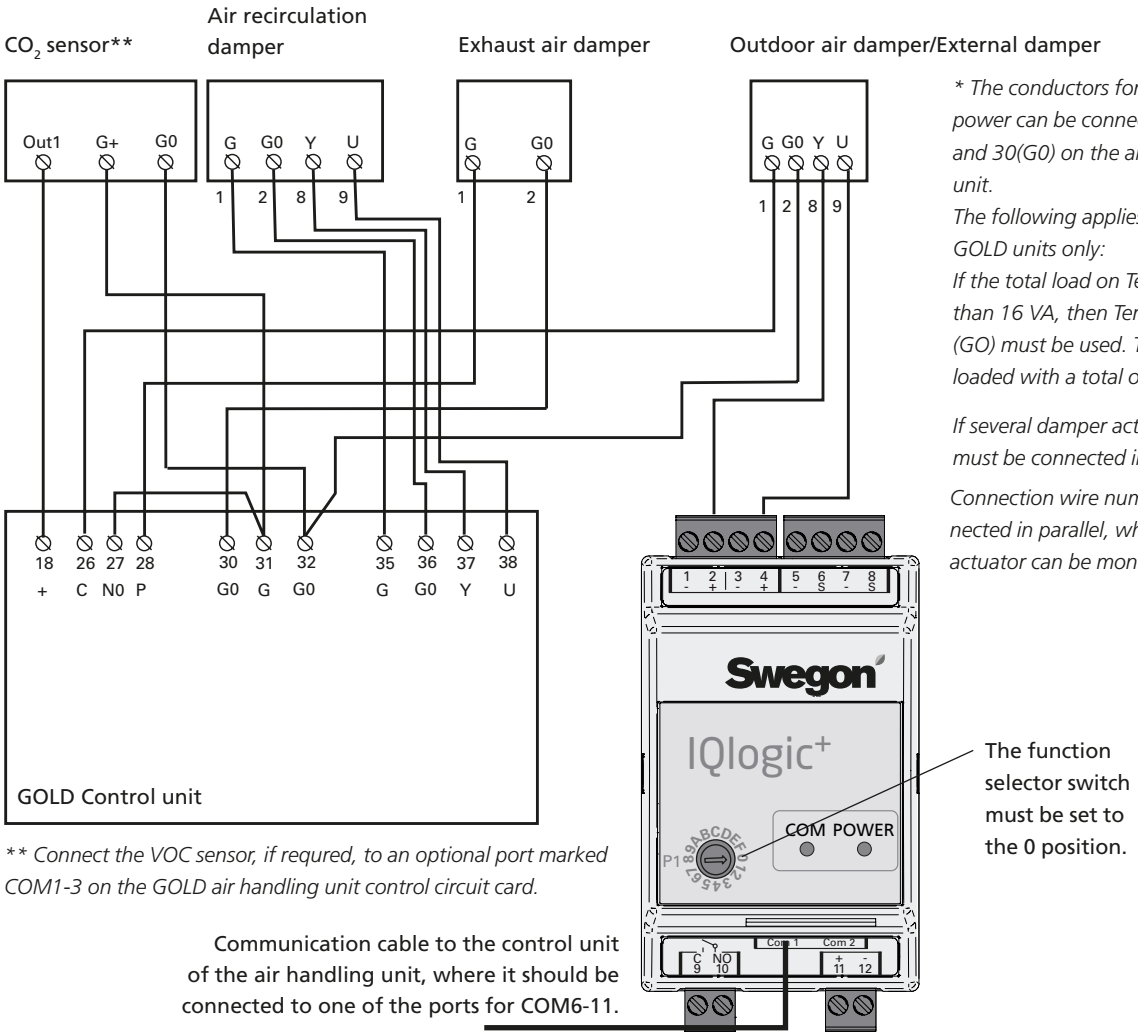
For calculation of appropriate "min. outdoor airflow" to a specific installation, pls. contact your sales office.

If the min. outdoor airflow is set so high that that it is equal to the current airflow, this will block the air recirculation function.



4. Connections

IQlogic+ module



*** The conductors for supplying 24 V AC power can be connected to Terminals 28 (P) and 30(G0) on the air handling unit's control unit.*
The following applies to the size 100/120 GOLD units only:
If the total load on Terminals 28-30 is higher than 16 VA, then Terminals 201 (G) and 202 (GO) must be used. Terminals 201-202 can be loaded with a total of max. 48 VA.

If several damper actuators are used, they must be connected in parallel.

Connection wire number 9 must not be connected in parallel, which means that only one actuator can be monitored.

The function selector switch must be set to the 0 position.

*** Connect the VOC sensor, if requred, to an optional port marked COM1-3 on the GOLD air handling unit control circuit card.*

Communication cable to the control unit of the air handling unit, where it should be connected to one of the ports for COM6-11.

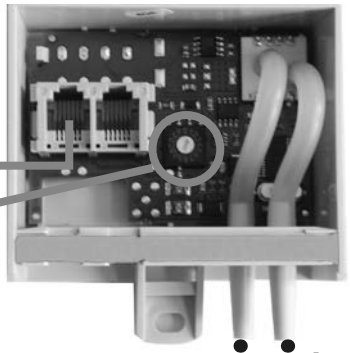
Pressure sensor

The encapsulated pressure sensor is available in two variants, one with a function selector switch (variant 1) and one with a DIP switch (variant 2).

Variant 1. With function selector switch

Communication cable to the control unit of the air handling unit, where it is connected to one of the outlets for COM 6-11.

Addressing
Function selector switches must be set in position 0



Slots for cable routing (2 pcs.)

Connect the hose to the nipple in the side of the heat exchanger facing the supply air fan.

Connect the hose to the nipple in the side of the heat exchanger facing the outdoor air filter.

Variant 2. With DIP switch

Addressing

Function	Switch no. (1=ON 0=OFF) 1	2	3	4	5
ReCO2	0	0	0	0	0

Communication cable to the control unit of the air handling unit, where it is connected to one of the outlets for COM 6-11.

Slots for cable routing (2 pcs.)

Connect the hose to the nipple in the side of the heat exchanger facing the supply air fan.

Connect the hose to the nipple in the side of the heat exchanger facing the outdoor air filter.

Dog

Note: *Make sure that the cable is placed correctly in the slot so that it ends up under the dog. Otherwise, the cable may be clamped and damaged by the cover.*

5. Settings

For basic facts on how to use the hand-held terminal, see the Operation and Maintenance Instructions for the GOLD air handling unit.

The $ReCO_2$ function must be manually activated under Functions/$ReCO_2$.

1. Select CO_2/VOC or CO_2/VOC and Airflow Boost, under CO_2/VOC, operating mode.

2. Select Heat, sequence, Cool, sequence or Heat and cool, sequence under Temperature, Operating mode.

3. Select the setpoint required for the CO_2/VOC signal and the required setpoints for min. airflows, outdoor air and extract air, see also the installation instructions for the ELQZ-2-504 air quality sensor or the TBLZ-1-60-2-2 VOC sensor.

4. To obtain correct operation, set the calibration function to the On position. The pressure drop across the heat exchanger will then be calibrated in relation to the airflow.

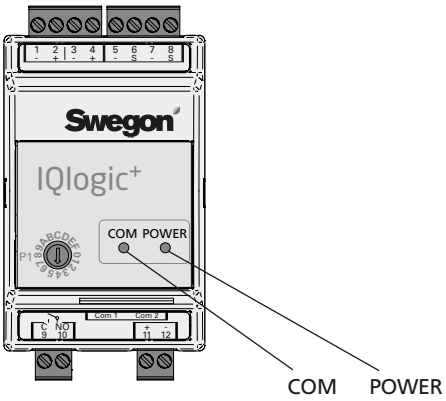
5. The air handling unit starts automatically and operates at calibration air flow for appr. 3 minutes while calibration is carried out.

6. Performance checks

IQlogic+ module:

Light-emitting diode POWER lit with a steady glow indicates that power is being supplied from the GOLD unit's control unit.

A flashing light-emitting diode COM indicates correct communication with the GOLD unit's control unit.



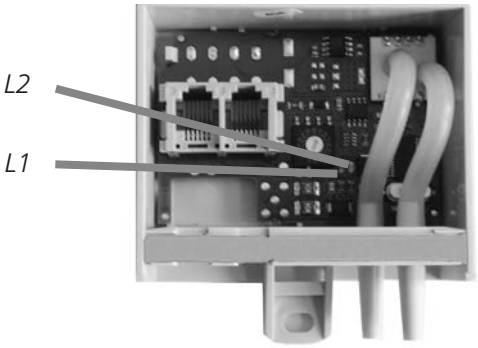
Pressure sensor:

Light-emitting diode L1 lit with a green steady glow indicates that power is being supplied from the GOLD unit's control unit.

A yellow flashing light-emitting diode L2 indicates correct communication with the GOLD unit's control unit.

If the functions are activated but the accessories have not been connected properly, an alarm will be initiated. See the Operation and Maintenance Instructions for the GOLD unit for a description of each alarm.

Variant 1.
Pressure sensor with function selector switch



Variant 2.
Pressure sensor with DIP switch