

# Description of the functions, IQlogic

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## Description of the functions

### General

#### Control

The hand-held terminal controls the GOLD to the various operating modes.

The air handling unit normally operates in the automatic operation mode and is then controlled via the internal switch clock.

It is also possible to remote control the air handling unit to operate in the low speed or high speed mode beyond the ordinary operating times.

Via the hand-held terminal, you can manually stop the air handling unit or control it to operate in the low speed or high speed mode.

External disconnection stops the air handling unit, making it possible to stop the unit from a remote location.

Control and power supply (24 V) for dampers are provided via terminal blocks on the GOLD unit's control unit. Dampers open on starting the air handling unit and close on shutting down the air handling unit.

#### Status

Actual operating readings such as flows, temperatures, the output values of the regulation sequences, status of the inputs and outputs, filter pressures, SFPv values as well as alarm history, etc, can be viewed under the relevant function in the hand-held terminal.

## Description of the functions

### General

#### IQnavigator Hand-held Terminal and Image Management

The IQnavigator hand-held terminal features a 7" multi-touch screen and is very simple and easy-to-use. Commissioning and the entering of settings are managed intuitively and in steps; flow images and help texts are always at hand.

The hand-held terminal is equipped with a three metre long connection cable that can be connected via quick-fit connector to the air handling unit's control unit (standard). Wireless communication between the hand-held terminal and the GOLD unit can also take place via WLAN (requires the IQnavigator hand-held terminal accessory with WLAN).

The air handling unit's control unit is as standard equipped with a WLAN antenna. This makes it possible to simply connect a computer, tablet computer or mobile telephone via Wi-Fi, and get the same image management as that in the hand-held terminal.

The preset values are stored and will not be unaffected in the event of a power failure.



#### Dashboard

The dashboard is normally shown in the handheld terminal if no other image has been selected.

#### Flow chart

The flow chart shows the set points/actual values and can be set to show the air handling unit's current configuration.

#### Current operation status

Current operation status can be read.

#### Changing the operating mode

You can start and stop the air handling unit or change over to manual or automatic operation from the dashboard.

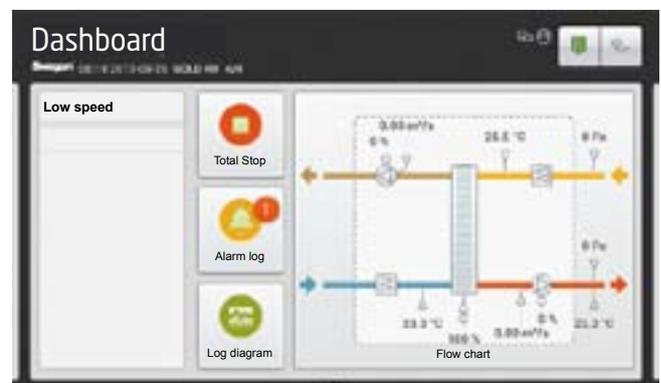
#### Alarm log

Active alarms, pending alarms and alarm history (50 latest) can be viewed under Alarm log.

#### Main setup

Main setup can be selected when installing the AHU and is an aid for configuring and starting up the AHU.

Time and date, air flow unit, airflow regulation mode, airflow operation level, temperature regulation, temperature settings and fan position settings can be entered here.



## Description of the Functions

### General

#### Log diagram

A number of parameters can be read in diagram form. Up to four signals can be freely selected and read. The log diagram's time interval can be selected as follows: 4 hours, day, week, month or year.

It is also possible to choose to mark one of the signals to display it with a thicker line in the log diagram.

The program automatically adjusts the resolution of the signals. This means that the program adapts the amplitude of the signal to the height of the diagram within the selected time interval.

The Log diagram can be selected in two types: History or Real time.

The GOLD air handling unit's control unit is as standard equipped with an SD card that long-term stores all the parameters.

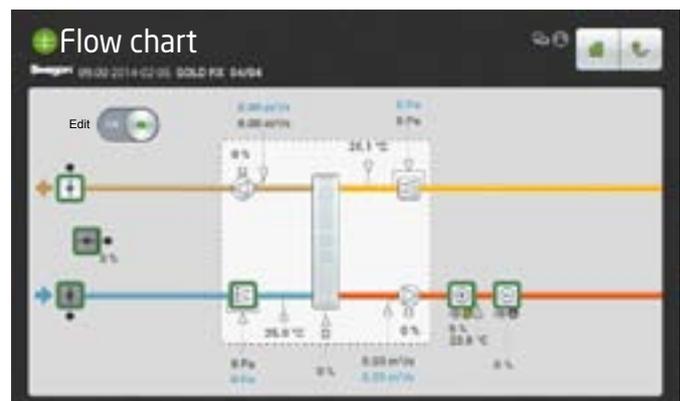


#### Flow chart

The flow chart is editable.

The positions of all the components are interchangeable, for example the mutual order between the air heater and the air cooler.

Components that are not automatically generated and be selected.



#### Main setup

Main setup can be selected when installing the AHU and is an aid for configuring and starting up the AHU.

Time and date, airflow unit, airflow regulation mode, airflow operation level, temperature regulation, temperature settings and fan position settings can be entered here.

## Description of the functions

### Air flow



#### Regulation mode

The regulation mode can be selected individually for the supply air or the extract air respectively.

#### Air flow

Flow regulation involves operating the air handling unit to keep the preset airflow constant. The speed of the fans is automatically regulated to provide correct airflow even if the filters begin to become clogged, if air diffusers become blocked, etc.

A constant airflow is advantageous, since the airflow is always at the level preset from the beginning.

#### Duct pressure

The airflow automatically varies to provide constant pressure in the ducting. This regulation mode is therefore also called VAV Regulation (Variable Air Volume).

Pressure regulation is used when e.g. damper operations increase the air volume in sections of the ventilation system.

The duct pressure is measured by an external pressure sensor in the ductwork. The set point required (separate for low speed and high speed) is preset in Pa.

The function can be limited so that the fan speed will not exceed the preset max. values.

#### Demand

The flow demand is regulated via an external sensor, such as a carbon dioxide sensor that is wired to control unit. The desired set point, separate for operation in the low speed mode and high speed mode, is preset as a percentage of the input signal.

The function can be limited so that the flow will not be higher or lower than the preset max. and min. permissible values respectively.

#### Slave

The flow is constantly regulated to the same value as the other fan. If one fan is pressure-controlled or demand-controlled, the other one can be controlled as a slave to generate the same airflow.

The performance of the slave fan can be restricted if its maximum flow is set to a lower airflow rate.

It is not possible to control both fans as slaves. If you select one fan to operate as a slave, you lose the option to select the other fan as a slave.

#### Boost

Boost can be used e.g. in assembly halls, where a higher rate of air change is needed under full-load conditions.

The airflow is regulated between two flows from an external signals, e.g. from a potentiometer.

The IQlogic<sup>+</sup> module, TBIQ-3-2, accessory is required.

The function is activated only when the AHU fans operate at high speed.

#### Unit

The desired airflow unit (l/s, m<sup>3</sup>/s, m<sup>3</sup>/h or cfm) can be preset.

#### Air adjustment

The speed of the fans can be locked for up to 72 hours. When the function is activated, the speed is locked at the current speed of operation. This is practical when making airflow adjustments in the duct system and air terminals.

## Description of the functions

### Air flow

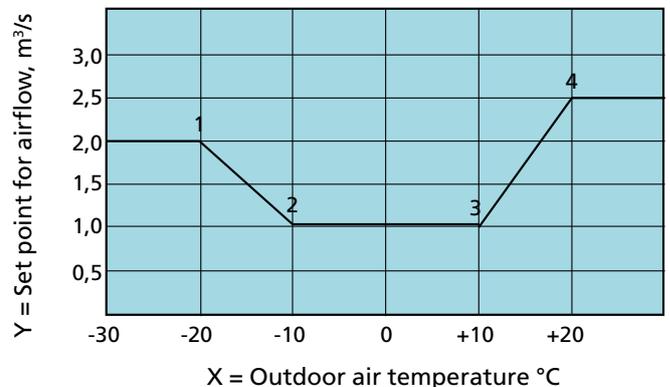


#### Outdoor air compensation

Outdoor air compensation of the airflow can be activated if you want to change the airflow for specific outdoor air temperatures. An individually adjusted curve regulates the ratio between the airflow and the outdoor air temperature. The curve has four adjustable breakpoints.

If the function is selected solely for low speed or high speed operation, the curve will regulate only one of these. The airflow for the operating case that has not been selected will then be according to the preset set point for airflow/duct pressure.

In the flow regulation mode, the current set point for airflow is changed. When pressure regulation is selected, the current set point for pressure is changed. The function has no effect if the airflow is demand-controlled.



*Example:*

*Flow regulated air handling unit* The same principle can be applied to a pressure regulated AHU, however this will cause a reduction in pressure in Pa.

*If the outdoor air temperature is under -20 °C (X1), the flow set point will be a constant 2.0 m³/s (Y1).*

*If the outdoor air temperature is between -20 °C (X1) and -10 °C (X2), the airflow will decrease from 2.0 m³/s (Y1) to 1.0 m³/s (Y2) as shown in the curve.*

*If the outdoor air temperature is between -10 °C (X2) and 10 °C (X3), the flow set point will be a constant 1.0 m³/s (Y2 and Y3).*

*If the outdoor air temperature is between 10 °C (X3) and 20 °C (X4), the airflow will increase from 1.0 m³/s (Y3) to 2.5 m³/s (Y4) as shown in the curve.*

*If the outdoor air temperature is over 20 °C (X4), the flow set point will be a constant 2.5 m³/s.*

#### Booster diffusers

The function for Booster diffusers is used for controlling the air damper inside the air terminal and can be activated for heating or cooling. Heating or cooling is modulated depending on whether the supply air is warmer or colder than the room/extract air. An indicator is displayed if heating or cooling is active.

The accessory, IQlogic+ module TBIQ-3-2, is required.

#### Automatic functions

##### Density-corrected airflow

The density of the air is different at different temperatures. This means that a specific volume of air changes at various air densities. The AHU automatically corrects this, so that correct air volume is always obtained.

The control equipment always displays the corrected airflow.

##### Pressure balance corrected extract airflow

The extract airflow is corrected by continuously measuring the pressure balance across the rotary heat exchanger. The extract airflow is guaranteed with consideration given to the air purging and leakage air flow.

## Description of the functions

### Temperature



#### General

If only GOLD SD supply air handling units are installed, they require an external room sensor for ERS, ORE and extract air regulation.

#### ERS Regulation (control)

ERS regulation refers to Extract air temperature-Related Supply air temperature regulation. This means that the temperature of the supply air is regulated in relation to the temperature of the extract air.

Under normal circumstances, the supply air temperature is regulated to be a few degrees lower than the extract air temperature. In this way, the heat exchanger will provide optimal performance, and this means excellent operating economy. ERS control is suitable for use when there is surplus heat in the premises generated e.g. by machinery, lighting or people, and the premises have supply air diffusers suitable for discharging air below room temperature.

#### ERS Regulation 1

The control unit regulates the ratio between the supply air and extract air temperature according to a factory-preset curve.

See the diagram to the right.

The step in the curve, breakpoint and differential can be changed.

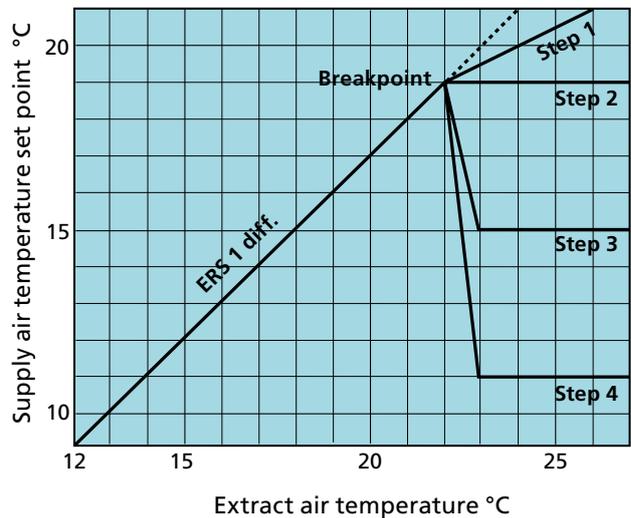
#### ERS Regulation 2

Used if the factory preset performance curve in the ERS Control 1 function does not provide the results desired to meet special needs and conditions. Depending on which setting have been entered, the installation of an air heater for reheating may be required.

An individually adjusted curve regulates the ratio between the supply air and the extract air temperature. The curve has four adjustable breakpoints.

See the diagram to the right.

#### ERS Regulation 1

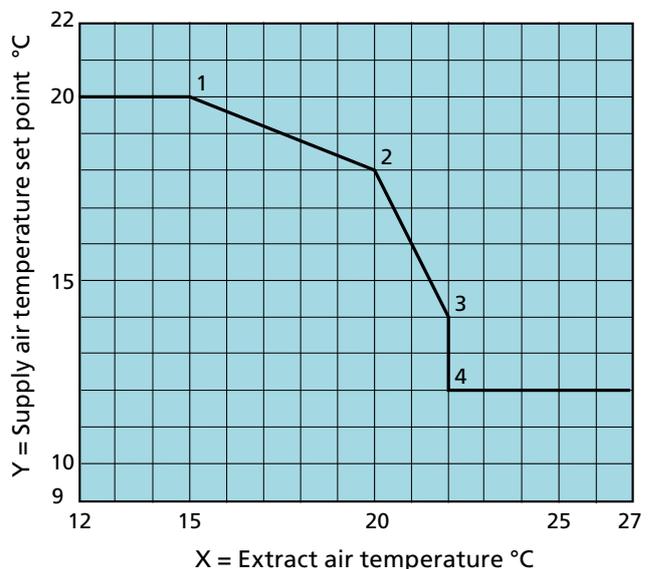


Factory setting means:

If the extract air temperature is below 22 °C (breakpoint), the supply air temperature set point will be automatically regulated to be 3 K (diff.) lower.

If the extract air temperature is above 22 °C, the supply air temperature set point will constantly be 19 °C (step 2).

#### ERS Regulation 2



Breakpoints according to factory setting involve the following:

If the extract air temperature is below 15°C (X1), the supply air temperature set point will constantly be 20 °C (Y1).

If the extract air temperature is between 15 °C (X1) and 20 °C (X2), the supply air temperature set point is regulated from 20 °C (Y1) down to 18 °C (Y2) as shown in the curve.

If the extract air temperature is between 20 °C (X2) and 22 °C (X3), the supply air temperature set point is regulated from 18 °C (Y2) down to 14 °C (Y3) as shown in the curve.

When the extract air temperature is 22 °C (X4), the supply air temperature set point is regulated from 14 °C (Y3) down to 12 °C (Y4).

If the extract air temperature is over 22 °C (X4), the supply air temperature set point will constantly be 12 °C (Y4).

## Description of the functions

### Temperature



#### Supply air regulation

Supply air regulation involves maintaining a constant supply air temperature without consideration to the load in the premises.

Supply air regulation can be used when the load and temperatures of the premises are predictable. In most cases this requires the installation of an air heater for reheating, possibly an air cooler as well.

#### Extract air regulation

Extract air control involves maintaining a constant temperature in the extract air duct (the premises), by regulating the supply air temperature.

The lowest and the highest permitted supply air temperatures are specified, while the GOLD unit keeps the extract air temperature constant.

The result will be a uniform temperature in the premises regardless of the load. Extract air regulation requires the installation of an air heater for reheating, possibly an air cooler as well.

The extract air temperature is measured by the temperature sensor inside the GOLD unit. If this internal temperature sensor does not give sufficiently representative extract air temperature readings, an external room temperature sensor can be installed and connected to the control unit.

# Description of the functions

## Temperature

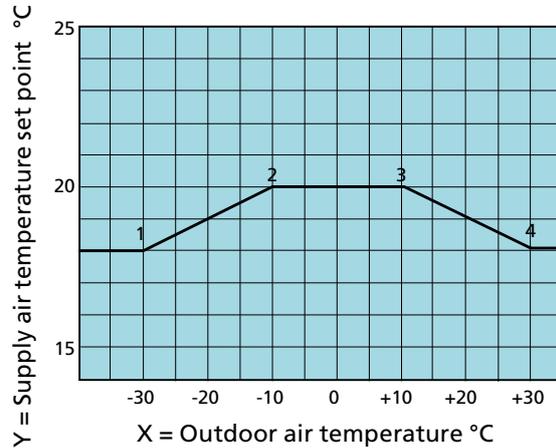


### ORS regulation

ORE regulation refers to Outdoor air temperature-Related Supply air temperature regulation. This means that the temperature of the supply air is regulated in relation to the temperature of the outdoor air.

An individually adjusted curve regulates the ratio between the supply air and the outdoor air temperature. The curve has four adjustable breakpoints.

### ORS regulation



Example:

If the outdoor air temperature is under -30 °C (X1), the supply air temperature set point will constantly be 18 °C (Y1).

If the outdoor air temperature is between -30 °C (X1) and -10 °C (X2), the supply air temperature set point is regulated from 18 °C (Y1) up to 20 °C (Y2) as shown in the curve.

If the outdoor temperature is between -10 °C (X2) and +10 °C (X3) the supply air set point will constantly be 20 °C (Y3).

If the outdoor air temperature is between +10 °C (X3) and +30 °C (X4), the supply air temperature set point is regulated from 20 °C (Y3) down to 18 °C (Y4) as shown in the curve.

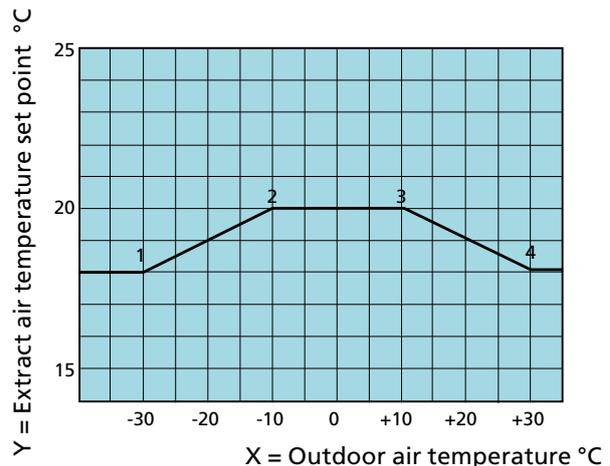
If the outdoor air temperature is over 30 °C (X4), the supply air temperature set point will constantly be 18 °C (Y4).

### ORE regulation

ORE regulation refers to Outdoor air temperature-Related Extract air temperature regulation. This means that the extract air temperature is regulated in relation to the outdoor air temperature.

An individually adjusted curve regulates the ratio between the extract air and the outdoor air temperature. The curve has four adjustable breakpoints.

### ORE regulation



Example:

If the outdoor air temperature is under -30 °C (X1), the extract air temperature set point will constantly be 18 °C (Y1).

If the outdoor air temperature is between -30 °C (X1) and -10 °C (X2), the extract air temperature set point is regulated from 18 °C (Y1) up to 20 °C (Y2) as shown in the curve.

If the outdoor temperature is between -10 °C (X2) and +10 °C (X3) the extract air set point will constantly be 20 °C (Y3).

If the outdoor air temperature is between +10 °C (X3) and +30 °C (X4), the extract air temperature set point is regulated from 20 °C (Y3) down to 18 °C (Y4) as shown in the curve.

If the outdoor air temperature is over 30 °C (X4), the extract air temperature set point will constantly be 18 °C (Y4).

## Description of the functions

### Temperature



#### Temp displacement

Is used to change the setpoint for supply and extract air temperature. For example, the temperature can be increased or decreased at certain times of the day by means of an external timer or potentiometer.

The accessory, IQlogic+ module TBIQ-3-2, is required.

The setpoint can be influenced  $\pm 5^{\circ}\text{C}$  using external control 0 - 10 V.

#### Neutral zone

The neutral zone prevents the cooling and heating systems from counteracting each other.

The preset neutral zone is added to the set point for heating and the sum of these provides the set point for cooling.

When extract air regulation is active, the supply air set point is not affected. The neutral zone has no effect if the unit is operating in the ERS regulation mode.

#### External temperature sensors

Up to four external room temperature and/or outdoor temperature sensors can be wired to the air handling unit's control circuit card when the internal sensor of the unit does not provide representative values..

The TBLZ-1-24-2 room temperature sensor or TBLZ-1-24-3 outdoor temperature sensor is required.

Locate the room temperature sensors in suitable positions to obtain representative measured values.

The air handling unit is controlled in response to a computed mean value of the temperature sensors' readings, alternatively in response to signals from the temperature sensor that measures the lowest or highest value.

## Description of the functions

### Temperature



#### Regulation sequence

##### Heat mode

The mutual order for the heating mode regulation sequence can be selected as specified below.

Functions that have not been selected have no effect on the relevant regulation sequence.

- 1 = HX - Extra regulation sequence - ReCO<sub>2</sub> - Reheat - Down regulation of fan
- 2 = HX - Extra regulation sequence - Reheat - ReCO<sub>2</sub> - Down regulation of fan
- 3 = HX - Reheat - ReCO<sub>2</sub> - Extra regulation sequence - Down regulation of fan
- 4 = HX - Reheat - Extra regulation sequence - ReCO<sub>2</sub> - Down regulation of fan
- 5 = HX - ReCO<sub>2</sub> - Reheat - Extra regulation sequence - Down regulation of fan
- 6 = HX - ReCO<sub>2</sub> - Extra regulation sequence - Reheat - Down regulation of fan

##### HX (heat exchange)

The temperature efficiency of the air handling unit's heat exchanger is modulated to provide max. heat recovery.

##### Extra regulation sequences:

Used in the heating mode for air heater (if required), air recirculation damper, etc.

##### ReCO<sub>2</sub>:

Recirculated air is variably mixed in up to the lowest permissible supply airflow. Assumes inclusion of the TCBR air recirculation section accessory.

##### Re-heat:

Air heater for reheating provides heating capacity.

##### Down regulation of fan:

Down regulation can be selected for supply air only or supply air and extract air.

A neutral zone can be preset, permitting a lower supply air temperature set point before fan down regulation begins.

##### Cool mode

The mutual order for the cooling mode regulation sequence can be selected as specified below.

Functions that have not been selected have no effect on the relevant regulation sequence.

- 1 = Cooling Boost - Extra regulation sequence - ReCO<sub>2</sub> - Cooling
- 2 = Cooling Boost - Extra regulation sequence - Cooling - ReCO<sub>2</sub>
- 3 = Cooling Boost - Cooling - ReCO<sub>2</sub> - Extra regulation sequence
- 4 = Cooling Boost - Cooling - Extra regulation sequence - ReCO<sub>2</sub>
- 5 = ReCO<sub>2</sub> - Cooling Boost - Cooling - Extra regulation sequence
- 6 = ReCO<sub>2</sub> - Cooling Boost - Extra regulation sequence - Cooling

##### Cooling Boost (Economy):

Involves increasing the supply air and extract air airflows to convey more cooling energy to the premises. The flow increase takes place between the current flow and the preset max. flow.

##### Extra regulation sequences:

Used in the cooling mode for air cooler (if required), etc.

##### ReCO<sub>2</sub>:

Recirculated air is variably mixed in up to the lowest permissible supply airflow. Assumes inclusion of the TCBR air recirculation section accessory.

##### Cool:

Air cooler provides cooling capacity.

#### Min. exhaust air (rot. heat exch. only)

The min. exhaust air function can be used whenever the exhaust air temperature is not permitted to be below a predetermined value.

The function controls the heat exchanger rotor speed (efficiency) in order to limit the exhaust air temperature to the required value. The function decelerates the heat exchanger rotor speed from the current level, until the exhaust air temperature reaches the preset minimum permissible setting.

Exhaust air regulation requires a separate TBLZ-1-58-aa temperature sensor (accessory) fitted in the AHU's exhaust air.

#### Morning Boost

The unit is utilised for heating the premises during a preset period prior to the switch-in time set on the timer.

The function is used if an air recirculation section is installed.

The AHU starts up ahead of time and uses the same temperature regulation settings. The airflow / air pressure is adjustable.

When the function starts, the air recirculation damper opens and the supply air fan starts up. The extract air fan and the outdoor air damper remain closed.

## Description of the functions

### Temperature



#### Heating boost

Heating boost (forced heating) means that the air handling unit, operating in the normal flow regulation mode, increases both the supply airflow and the extract airflow in order to carry more heat into the premises.

The fans are permitted to operate in the range between current flow modes or pressure (low speed, high speed) and the preset max speed.

The function operates only when the AHU is operating in the extract air regulation and ORE regulation mode. If demand control or boost is selected in combination with heating boost, the flow is controlled by the function that transmits the highest output signal to the fans.

A regulated ramp function switches in and gradually increases the airflow when there is a heating load, and the supply air temperature is 3 K (preset at factory) lower than the preset max. supply air temperature.

#### Cooling boost

Cooling Boost (forced cooling) means that the air handling unit increases the supply air and extract air airflows from normal flow in order to convey more cool air to the premises.

The fans are permitted to operate in the range between current flow modes or pressure (low speed, high speed) and the preset max speed.

The function can be selected in five variants as follows:

#### Comfort

The cooling outputs are activated if there is a cooling load.

A regulated ramp function switches in and gradually increases the airflow when there is a cooling load, and the supply air temperature is 3 K (preset at factory) higher than the preset max. supply air temperature.

#### Economy

Cooling Boost Economy initially uses a higher airflow to cool the premises, before a start signal is transmitted to chillers.

The function can also operate without the cooling function activated.

In the event of a cooling load, the airflows are slowly increased up to preset maximum flow. When the flows are up to max and if a cooling load is still present, the output contacts for cooling are activated.

The function requires that the outdoor air temperature is at least 2 K lower than the extract air temperature for it to be activated. The normal cooling function is activated if the temperature difference is too small.

#### Sequence

The Cooling Boost Sequence is used if a chiller is sized for a higher cooling flow than normal flow.

If there is a cooling load, the flow is increased up to the preset max. flow at the same time that the cooling function is activated.

The Cooling Boost Sequence is blocked if no cooling function has been selected.

#### Comfort and economy

The comfort variant and the economy variant can be combined. When free cooling is available, the economy function is active; if free cooling is not available, the comfort function is active.

#### Economy and sequence

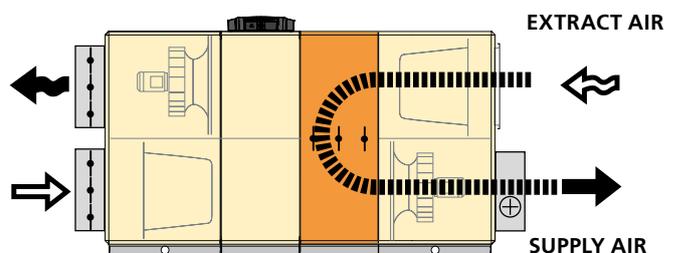
The economy variant and the sequence variant can be combined. When free cooling is available the economy function is active. When free cooling is not available the sequence function is active.

#### Intermittent night heat

The AHU is utilized for heating the premises when it is normally stopped by timer.

the function requires an external room sensor, and that the air handling unit is connected to an air heater for reheating. It also requires the following accessories: air recirculation section and the shut-off damper for outdoor air and exhaust air.

When the function is activated, the air handling unit detects when the room temperature drops below the preset start temperature. The AHU starts the supply air fan to generate the preset flow and regulates the temperature according to the preset set points. The air recirculation damper opens at the same time. The extract air fan and the shut-off damper remain closed.



*Intermittent night heat with air recirculation section:*  
When conditions for start are met, outdoor air and exhaust air shut-off dampers remain closed. The damper in the air recirculation section is opened. The extract air fan is idle.  
The supply air fan operates according to the preset supply airflow and the air heater for reheating operates according to the preset supply air temperature set point, until the conditions for stop are met.

## Description of the functions

### Temperature



#### Summer night cool

The lower temperature at night is utilised to cool down the building structure. This reduces the cooling load during the first hours of the day. If a cooling unit is installed, it will not need to be operated, thus offering savings. If no cooling unit is installed, a certain cooling effect will still be achieved.

#### Down regulation (airflow/pressure)

Down regulation of the supply air flow is the last step in the regulation sequence for heating. The supply air fan or both the supply air and extract air fan can be selected. The extract air fan only cannot be selected.

An adjustable reduction in temperature permits a lower supply air temperature set point, before down regulation comes into effect (Neutral zone).

## Description of the functions

### Time and schedule



#### Time and schedule

The built-in timer enables you to control the AHU's operating mode/time. Certain other oversteering functions such as external timer, communication, etc. affect the preset operating modes.

There are five different operating modes:

**Total stop** = The AHU is completely stopped, no internal automatic functions or external control commands can start the AHU.

**Normal Stop** = The AHU has stopped, however all the internal and external automatic functions oversteer the stop.

**Extended Normal Stop** = The AHU has stopped, however all the internal and external automatic functions, with exception of Summer night cool, oversteer the stop.

**Low speed** = The AHU is running at the preset low speed setting.

**High speed** = The AHU is running at the preset high speed setting.

#### Time/Date

The current date and time can be set and adjusted if needed. The timer automatically takes leap years into consideration.

The system is preset for automatic changeover between summer time/winter time according to EU Standard (an indicator is displayed under summer time). It is possible to block this changeover function.

The relevant time zone can be set.

Time source can be set to manual or via SNTP and BACnet.

#### Schedule settings

Under Schedule setup, you can set an operating mode base level, at which the air handling unit always operates during non-programmed time, under Day schedule and Exceptions schedule.

It is also possible to select a specific period (date interval, weekday or time interval) when the Day schedule and Exceptions schedule shall apply. At other times, outside the selected period, the air handling unit operates at the preset base level.

#### Day schedule

Times and days can be set when the unit is to run in the high speed mode, low speed mode or be switched off.

For every day (Monday - Sunday) six different events can be set to occur at a given point in time. Here, it is also possible to set six different events for two exceptions.

#### Exceptions schedule

The times, when possible exceptions shall apply, are determined in the Exceptions schedule. Here you can determine on which date or weekday the relevant exception shall apply. It is also possible to associate both exceptions to Calendar 1 or 2. See next section.

#### Calendar 1 and 2

The specific days or date interval when Exceptions schedule 1 or 2 shall apply can be set in Calendars 1 and 2. On condition that Calendar 1 or 2 is selected, see previous section. In other cases, these settings will have no effect.

There is a total of ten possible settings under each calendar and various functions can be selected for each.

#### Prolonged operation

The control unit inputs for external low speed and external high speed respectively, can be supplemented with Prolonged operation. They can be used for overtime running activated by a pushbutton, for example.

## Description of the functions

### Energy monitoring



#### Energy monitoring

Readings indicating the amount of power consumed by fans, heat exchangers and air handling units can be viewed. SFP status for the AHU fans and the efficiency on heat transfer of the rotary heat exchanger can also be viewed.

### Filters



#### Filter monitoring

The GOLD unit's filter is supplied with a pressure sensor that continuously measures the filters' current pressure drop. Together with an efficient filter monitoring function, this offers optimum filter utilisation.

#### Status

Current pressure drop and calculated alarm limit can be read in the hand held terminal.

#### Alarm limit of the filters

As the filters become soiled, the pressure drop across them increases (the speed of the fans automatically increases to compensate for the resistance caused by the clogged filter medium). The alarm limit must be continuously calculated and automatically changed depending on the current flow. An alarm is initiated when the preset alarm limit for each filter is exceeded. The desired alarm limit can be preset in the hand-held micro terminal.

#### To calibrate the filters

An automatic filter test is activated for measuring the initial pressure drop across the filters in the air handling unit. Calibration is carried out when the unit is commissioned and when the filters are changed.

#### Pre-filters

Prefilters can be used in installations where the extract air or supply air is heavily polluted, in order to prevent the fine filter in unit from becoming clogged after a short time.

The following accessories are required for the prefilter function:

Prefilter, TBFA or another type. If another type of prefilter other than TBFA is used, the TBLZ-1-23 pressure sensor can be selected for filter monitoring.

The potential for taking readings and setting the alarm limit is available on the GOLD control panel.

#### End filter

An end filter can be used in installations where further filtering of the supply air is required.

The following accessories are required for the post-filter function:

End filter section, TCFB or another type. If another type of end filter other than TCFB is used, the TBLZ-1-23 pressure sensor can be selected for filter monitoring.

The potential for taking readings and setting the alarm limit is available on the GOLD control panel.

## Description of the functions

### Software



#### Software

The current program versions for the IQlogic control unit, IQnavigator hand-held terminal and the component units on the communications bus can be viewed and updated from the SD circuit card.

### Alarm priorities



#### Alarms, general

Alarms are displayed by a flashing red LED in the hand-held terminal. Active alarms, pending alarms and alarm history (50 latest) can be viewed under Alarm log in the handheld terminal.

Type A alarms transmit an alarm signal to the output for alarm relay A. Type B alarms transmit an alarm signal to the output for alarm relay B. Alarms can be forwarded with different priority via these relays.

Alarms with manual resetting can be reset from the hand-held terminal.

Alarms that reset themselves automatically will do so as soon as the fault has been remedied.

Alarms can also be reset via the communication network.

Further information about alarms is available in the Operating and maintenance instructions for GOLD. The instructions can be found at [www.swegon.se](http://www.swegon.se) (com).

#### Fire alarms

##### Internal fire alarm

The air handling unit's internal temperature sensors serve as fire protection thermostats. An alarm is initiated if the supply air temperature sensor registers more than 70 °C or when the extract air temperature sensor registers more than 50 °C.

##### External fire alarm 1 and 2

Used for external fire-control equipment.

##### After cool

After cooling of the electric air heater can be individually activated for each type of alarm.

##### Fan operation on a fire alarm

The fans of the air handling unit can be used for evacuating smoke, etc. The activated function operates together with the external fire/smoke function or internal fire alarm. It is possible to individually select the type of fan operation for each type of alarm and which fan(s) are to be operating and at what speed.

##### Priority

In connection with fan operation in the event of fire alarms, the mutual priority of the internal and the external fire alarms can be set.

#### External alarms

External alarms can be used for external functions.

Typical uses:

- Motor protection for the circulation pump in the heating or cooling circuit.
- Service alarm actuated by smoke detectors.

Set the following: Manual or automatic alarm reset, Delay time for electric air heater and whether the alarm shall be activated on a closed or open circuit. The alarm can be time delayed.

#### Temperature guard

In the GOLD PX and CX units, the sensor in the inlet of the supply air fan can be used as a temperature monitor. The alarm priority and whether the AHU should stop or not in the event of an alarm, can be preset.

It is possible to use a separate sensor for the GOLD RX.

#### Temperature alarm limits

##### Pre-heat below set point

You can preset how much the temperature downstream of the pre-heater should be permitted to be below the temperature set point before an alarm is initiated.

##### Supply air below/above set point

You can preset how much the supply air temperature shall be permitted to be below or above the supply air temperature set point before an alarm is initiated.

##### Extract air below the alarm limit

You can preset how much the extract air temperature shall be permitted to be below the extract air temperature set point before an alarm is initiated.

##### Outdoor temperature limit stop

If the outdoor air temperature is above this stop limit, only an alarm will be initiated and if it is below the stop limit, the AHU will stop and an alarm will be initiated.

#### Alarm priority

For all the alarms, it is possible to select whether the alarm shall have A or B priority. For certain alarms it is also possible to select whether the GOLD unit should stop. Certain alarms can be activated or be blocked.

## Description of the functions

### Log



The log file time period can be set and a log sender function which can e-mail the log file to an optional e-mail address and/or FTP address, can be activated.

### Air handling unit



#### Settings

The air handling unit can be given a specific name (e.g. the unit's serial number). The given name is then shown in all the images in the hand-held terminal and web page.

The AHU's fan position can be viewed and set.

The fan position in the flow chart can be read and set according to the AHU's actual configuration.

#### Operation time

In operation times (in days) can if applicable be viewed for fan controls, heat exchanger/cooling recovery, preheating, extra heating regulation sequence, Xzone heating, AHU reheating, ReCO<sub>2</sub> heating, extra cooling regulation sequence, Xzone cooling, AHU cooling, ReCO<sub>2</sub> cooling, AYC heating water and AYC cooling water.

#### Automatic functions

##### Start up sequence

The air handling unit has a start up sequence with a factory-preset time delay between each step as follows:

1. The damper relay is energized and opens the shut-off damper (if installed). The heat exchanger is controlled to max. heat recovery (not the GOLD SD without heat exchanger). The valve for reheating opens to 40% (if installed)  
Time delay: 30 seconds.
2. The extract air fan starts in the current operating mode (not for ventilation systems with GOLD SD supply air handling unit only)  
Time delay: 60 seconds.
3. The supply air fan starts (not for ventilation systems with GOLD SD extract air handling unit only)  
Time delay: 30 seconds.
4. The reheating function is ramped up or down depending on the heating load. Ramp time: 180 seconds. After that the heat exchanger is ramped up or down depending on the heating load. Ramp time: 180 seconds.

The entire start up sequence can be followed in the dashboard image.

The start up sequence prevents the extract air fan from starting up if the shut-off damper is closed. By first starting up the extract air fan and the heat exchanger, you can avoid chilling the premises with supply air on a start up under cold weather conditions.

##### Zero point calibration

The zero value of the pressure sensors is checked and if the value is not correct, a new calibration is carried out. Engages automatically every time the fans are stopped for more than three minutes. The fans cannot start while calibration is in progress.

## Description of the functions

### Heat



#### Preheating the air

Preheating the air, if the outdoor temperature is cold and the humidity is high, can prevent condensation from forming in the air handling unit's filters. Preheating may also be necessary to heat the air during extremely cold weather.

The accessories below can be used for the air pre-heat function:

TBLF/TCLF air heater (including TBLZ-2-53-1 for controlling the air heater) or, if an air heater other than the TBLF/TCLF is used, controlling air heater preheating with TBLZ-2-53-a.

The TBVL valve set can be used for the air heater for hot water, and if a pump is required, the TBPA pump set can be used.

The TBLE/TCLE standard electric air heater can be used together with the TBLZ-2-53-0 air pre-heat control function in an air handling unit installed indoors.

See also the Pre-heat function guide for more detailed information.

#### Extra regulation sequence

Is used for extra control functions, together with the regular sequence for temperature regulation.

The function can be used for utilising existing heating or cooling sources, such as from a chiller. The function can also be used for an extra air heater or air cooler.

It can also be used for controlling dampers for recirculation, if required.

The output signal of the extra regulation sequence is controlled from the TBIQ-3-2 IQlogic<sup>®</sup> module accessory.

The extra regulation sequence makes it possible to control two air heaters at the same time in the following combinations: water - electricity, water - water, electricity - electricity (Season heat). The air heater for hot water is available without or without frost guard function.

When the output of the first air heater is not sufficient, the second is automatically brought into the sequence.

A start-up sequence, frost guard function, pump control, post-cooling for electric air heater and other functionality are available.

#### Season Heat

When both the standard function for reheating and the extra heating sequence are activated, it is possible to alternate between these via a digital input or communication.

Example: Hot water is only available in the winter. In the summer, any reheating load is backed up by an electric air heater. Changeover can be done manually or via external thermostat, external clock function or the like.

#### Re-heat

The air heater is equipped with a quick-fit connector for connection to the AHU's control unit which automatically senses the type of air heater in use.

#### Air heater for hot water

When there is a reheating load, and the the function Periodic operation of pump or of pump+valve is selected, the circulation pump of the air heater starts.

If the outdoor temperature is low, the pump output contact is continuously activated. During other times, the pump output contact is activated 3 min./day (factory setting) for periodic operation of the circulation pump.

#### Frost guard function, air heater for water

The frost guard function is always active if an air heater for hot water has been supplied by Swegon.

The function activates a heating device that keeps the temperature in the coil at 13 °C while the air handling unit is operating and 25 °C in the coil when the unit is stopped. An alarm is initiated and stops the AHU if the temperature sensor senses a temperature below 7 °C.

#### Electrical heaters

If the electric air heater has been in operation, the air heater is post-cooled for about 3 minutes (factory setting) when stop has been activated.

#### Capacity reduction of the electric air heater

Only in combination with Swegon's electric air heater.

A min. permissible air velocity of 2.0 m/s is required for preventing the electric heating elements from becoming overheated when they are generating full heating output.

If the air handling unit supply airflow drops below the value that corresponds to an air velocity of 2.0 m/s across the heat exchanger, the heating output of the air heater will be automatically reduced.

## Description of the functions

### Heat



#### Xzone temperature regulation

Xzone temperature regulation is used when more than one temperature zone is needed in a ventilation system. Examples of various temperature loads, in various parts of a building, can be the north and south facade of the building or diverse operations.

Xzone requires the TBLZ-3-50 control box accessory for Xzone.

Standard TBLA/TCLA air heaters for water or TBLE/TCLE electric air heaters can be used.

The TBVL valve kit can be used for air heaters for water. The TBPA pump kit is used if a pump is needed.

The function is designed for one extra temperature zone, max.

The type of temperature regulation should be selected separately for Xzone.

The following choices are possible:

- ERS Regulation 1
- ERS Regulation 2
- Supply air regulation
- Extract air regulation
- ORS regulation
- ORE regulation

If an electric air heater is fitted, there is an alarm function for the overheat guard as well as the air heater after cool function if the air handling unit stops,

If an air heater for water is fitted, it is possible to control the operation of the pump. The settings for exercising will then be common with the main zone.

#### Functions that influence both zones

##### *Electrical heaters*

The after cool time setting is common for the main zone and Xzone.

##### *Summer night cool*

The room temperature sensor is placed in the main zone. The supply air temperature set point is common for both zones,

##### *Intermittent night op.*

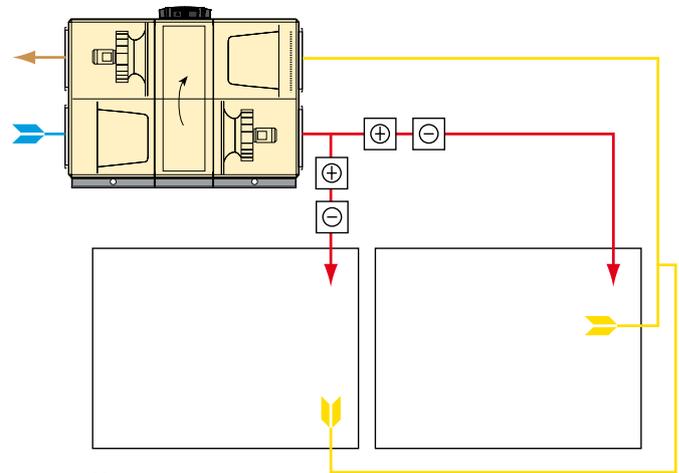
The room temperature sensor is placed in the main zone. The settings apply to the main zone. When intermittent night operation is activated, Xzone has the same temperature set point as that used during day operation.

##### *Morning Boost*

Both zones run on the same temperature set point as that used during day operation

##### *Heating boost*

The function is controlled by the main zone only.



Xzone example

## Description of the functions

### Cool



#### Extra regulation sequence

Is used for extra control functions, together with the regular sequence for temperature regulation.

The function can be used for utilizing existing heating or cooling sources, such as from a chiller. The function can also be used for an extra air heater or air cooler.

It can also be used for controlling dampers for recirculation, if required.

The output signal of the extra regulation sequence is controlled from the TBIQ-3-2 IQlogic<sup>+</sup> module accessory.

#### Cool

##### Air cooler, water

The valve actuator of the air cooler for water is equipped with a quick-fit connector for connection to the AHU's control unit which automatically activates the cooling function. The valve actuator is controlled steplessly 0-100% (0-10V) when the cooling load increases. A temperature sensor is connected for reading the water temperature.

##### DX air cooler

###### 1 step

Used when cooling in 1 step is connected. The cooling controller of the AHU regulates the cooling output according to the cooling load, 0-100 %. The cool relay is energized when cooling is required.

###### 2 steps

Used when cooling in 2 steps is connected. The cooling controller of the AHU regulates the cooling output according to the cooling load, 0-100 %.

Cool relays 1 and 2 are energized in sequence when cooling is required.

###### 3 steps binary

Used when cooling with two inputs controlled with three binary steps is connected. The cooling controller of the AHU regulates the cooling output according to the cooling load, 0-100 %.

Cool relays 1 and 2 operate in binary mode. Cool relay 1 is energized first and on increased cooling load cool relay 1 is de-energized and cool relay 2 is energized. Both cool relays 1 and 2 are energized on a full cooling load.

## Description of the functions

### Cool



#### Xzone temperature regulation

Xzone temperature regulation is used when more than one temperature zone is needed in a ventilation system. Examples of various temperature loads, in various parts of a building, can be the north and south facade of the building or diverse operations.

Xzone requires the TBLZ-3-50 control box accessory for Xzone.

TBKA/TCKA standard air cooler for water and TBKC/TCKC DX air cooler can be used.

The TBVL valve kit can be used for air coolers for water. The TBPA pump kit is used if a pump is needed.

The function is designed for one extra temperature zone, max.

The type of temperature regulation should be selected separately for Xzone.

The following choices are possible:

- ERS Regulation 1
- ERS Regulation 2
- Supply air regulation
- Extract air regulation
- ORS regulation
- ORE regulation

If an air cooler for water is fitted, it is possible to control the operation of the pump. The settings for exercising will then be common with the main zone.

For further information, see the Guide to Xzone Functions.

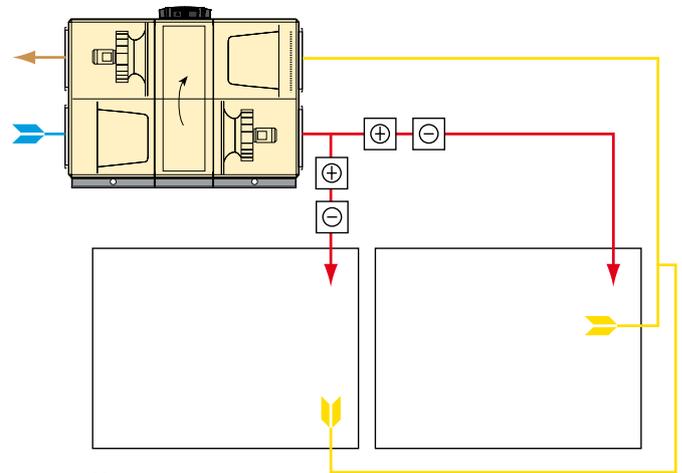
#### Functions that influence both zones

##### Summer night cool

The room temperature sensor is placed in the main zone. The supply air temperature set point is common for both zones,

##### Cooling boost

The function is controlled by the main zone only.



Xzone example

#### COOL DX

##### COOL DX - Economy (without heat exchanger)

Used when the COOL DX chiller is connected. Both cooling relays of the air handling unit operate in parallel with the corresponding relay on the IQlogic+ module in the COOL DX chiller.

##### COOL DX - Comfort

Used when the COOL DX chiller is connected. The heat exchanger in the AHU operates in sequence with the cooling unit to even out the supply air temperature.

##### COOL DX Top

Used when the COOL DX Top chiller is connected. Both cooling relays of the air handling unit operate in parallel with the corresponding relay on the IQlogic+ module in the COOL DX chiller.

#### Delay time

The restart time, step switch time and stop/start times can be preset.

#### Outdoor air limits

Provision is available for setting an outdoor temperature-related blocking function in 3 steps. If the outdoor temperature is below each step limit, the function of the cooling relays will be blocked. The function is used for preventing the relevant compressors from being switched on and off too many times.

#### Air flow limits

The cooling function is blocked if the supply or extract airflows for are lower than the preset limit.

## Description of the functions

### Heat exchange



#### Control

##### GOLD RX

The rotary heat exchanger starts up in the event of a heating load. If the heating load increases, the control system regulates the rotation speed of the heat exchanger rotor, variably and linearly to maximum heat recovery.

##### GOLD PX

The bypass damper closes and the shut-off damper opens when heat recovery is required. This is performed steplessly to max. efficiency on heat recovery.

##### GOLD CX

The pipework package's pump starts and the regulating valve opens when heat recovery is required. The regulating valve opens steplessly to max. efficiency on heat recovery.

If heat recovery is not needed for more than 24 hours, the pump is exercised once a day.

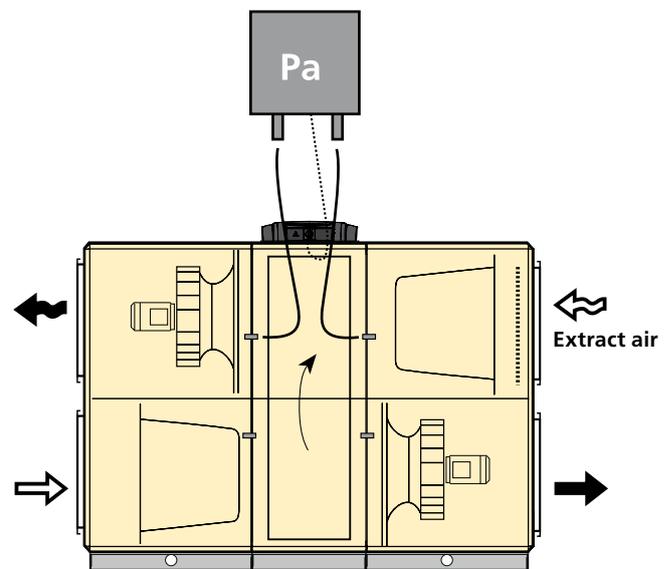
#### Defrost (rot. heat exch.)

In environments where the extract air can occasionally be humid, the defrosting function can be activated to protect the heat exchanger from frosting. The function continuously monitors the condition of the heat exchanger rotor to prevent it from becoming clogged due to condensate that has frozen inside the exchanger.

The function requires the connection of a separate pressure sensor.

When the defrosting function is activated the pressure drop across the heat exchanger is continuously measured and the reading is compared with the calibration reading. If the pressure drop exceeds the preset limit value, a defrosting sequence is implemented in which the rotor speed is gradually ramped down to the speed at which the pressure drop across the heat exchanger decreases to half of the preset limit value. During the defrosting process, the warm extract air thaws any possible ice that has formed on surfaces.

Note that the heat exchanger performs less efficiently while defrosting is in progress and that the supply air temperature will also drop downstream of the heat exchanger.



Connection principle for the defrosting function with separate pressure sensor.

## Description of the functions

### Heat exchange



#### Automatic functions

##### **GOLD RX (rotary heat exchanger)**

###### *Purging operation*

The air purging function prevents clogging of the heat exchanger's air ducts. It switches in when the unit is operating but there is no heating load and the heat exchanger rotor is idle. The heat exchanger rotor then rotates for 10 seconds every 10 minutes to perform purging.

###### *Calculation of the efficiency*

The efficiency is calculated and displayed (0 – 100%).

###### *Cooling energy recovery*

The heat exchanger rotates at max. speed in order to recover the relative cooling energy available inside the premises. It engages when there is a cooling load and when the outdoor air temperature is higher than the extract air temperature. It cannot be used with the CoolDX cooling unit.

###### *Overtime heat exchanger operation*

If the AHU stops, the heat exchanger automatically continues to recover heat for about 1 minute. It takes a little time for the fans to stop rotating after a stop has been ordered and this prevents the supply air from chilling the premises.

###### *Rotation monitor*

The rotation monitor sensor continuously monitors the heat exchanger. If a malfunction forces the heat exchanger to stop, an alarm is initiated and the air handling unit is stopped if the outdoor temperature is low.

###### *Carry over control*

If the fans are generating low airflows, the rotary heat exchanger is decelerated to an appropriate speed to ensure a correct purging airflow through the heat exchanger.

##### **GOLD CX/SD (coil heat exchanger)**

###### *Pump control, coil heat exchanger*

The pump of the pipework package starts when heat recovery is needed. If heat recovery is not needed for more than 24 hours, the pump is exercised once a day.

###### *Anti-frost protection*

In cold weather, and if the extract air is humid, there is risk of frosting in the coil heat exchanger. The GOLD CX/SD is equipped with anti-frosting protection.

The temperature of the liquid circulated to the extract air coil and the humidity in the extract air are measured.

Taking the humidity into consideration, the control system calculates the lowest permissible temperature without risk of frosting inside the coil. The valve in the pipework package is then regulated to prevent the circulated liquid from dropping below this temperature.

##### **GOLD PX (plate heat exchanger)**

###### *Anti-frost protection*

In cold weather, and when the extract air is humid, there is risk of frosting in the plate heat exchanger. The GOLD PX is equipped with anti-frost protection.

The temperature inside the heat exchanger's "cold corner" and the humidity in the extract air are measured.

Taking the humidity into consideration, the control system calculates the lowest permissible temperature without risk of frosting inside the heat exchanger. The bypass damper is then regulated to prevent the air from dropping below this temperature.

## Description of the functions

### SMART Link



#### SMART Link

The SMART Link function is intended for use for optimum control of the temperature and operation as well as the reading of alarms and the values for a Swegon chiller/heat pump.

For more information concerning waterborne heat pumps chillers, see the Guide to the SMART Link/AQUA Link Functions.

For more information concerning DX heat pumps chillers (Celest+), see the Guide to the SMART Link DX Functions (GOLD RX only).

#### Energy-saving functions (waterborne)

##### *Verification of the supply air temperature/inlet flow temperature*

By comparing the supply air temperature downstream of the fan with the inlet supply temperature of the water entering the coil, the equipment sees to it that the valve of the coil only opens if water has a temperature that will furnish energy to the air passing through the coil.

This means that if heating is required and the water temperature is lower than the supply air temperature, which can occur during defrosting cycles, the valve is not permitted to open. The reverse applies if cooling is required.

##### *Optimisation function*

A chiller/heat pump becomes more efficient if the difference between the outdoor temperature and the water temperature is as small as possible. This reduces energy consumption.

The supply of energy to a water coil is controlled by a valve. Optimizing the valve's position, so that it always strives to be fully open, and instead controlling the water temperature, offers energy savings.

##### *AQUA Link*

AQUA Link supplies chilled water to both air handling units and comfort modules. Even here, energy savings can be achieved by letting the cooling load control the water temperature.

Depending on which need exists (dehumidification, cooling the supply air, cooling the rooms via comfort modules), the temperature of the cooling water can vary and the controller ensures that the chiller will not produce colder water than necessary.

#### Installation

The installation work is quick and simple compared with other systems.

All the necessary control functions are ready to be activated.

One supplier for all the equipment

## Description of the functions

### Humidity



#### Humidifying

##### Evaporative humidification (On/Off)

This function is suitable together with an evaporative humidifier (not Swegon).

The function requires the TBIQ-3-1 IQlogic<sup>+</sup> module accessory and one TBLZ-31-2 humidity sensor. See separate installation instructions. Install the humidity sensor in the extract air duct (or in the premises), see drawing.

The humidity in the extract air duct (the premises) is regulated between adjustable start and stop limits.

Note that if evaporative humidification is used, this will also influence the supply air temperature. When sizing an air heater, you must take this into consideration.

##### Steam humidification (0 - 10V)

The function is appropriate for operation together with a steam humidifier (not Swegon) and is a variable control system via a 0-10 V control signal, as well as a contact function which interlocks the humidifier if the air handling unit stops, if Summer night cool is used or if the humidity in the extract air exceeds the set point by more than 10%.

The function requires the following accessories: TBIQ-3-1 IQlogic Plus module and two TBLZ-31-2 humidity sensors (for extract air regulation) or one TBLZ-31-1/2 humidity sensor (for supply air regulation). Install the humidity sensors in the extract air duct and the supply air duct respectively. See drawing.

The function keeps the humidity level constant in the extract air duct (the premises) by regulating the humidity in the supply air. In order to prevent the humidity in the supply air from being too high, it is restricted to a maximum limit.

Alternatively the humidity in the supply air duct can be kept constant by selecting a regulating humidity sensor in the supply air.

##### Humidifier alarm

The alarm input can be selected to closed circuit, open circuit or contactor function.

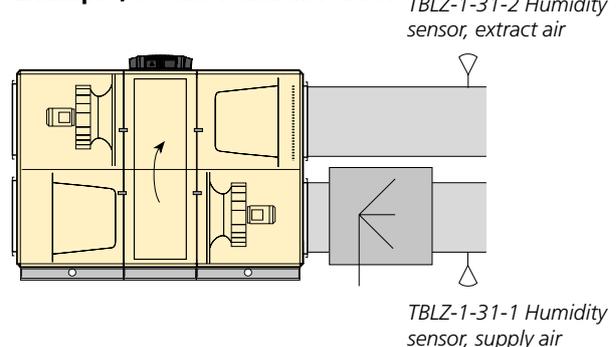
##### Dehumidifying

The function is intended for dehumidifying the supply air in order to prevent condensation in the supply air duct or in connected air conditioning products.

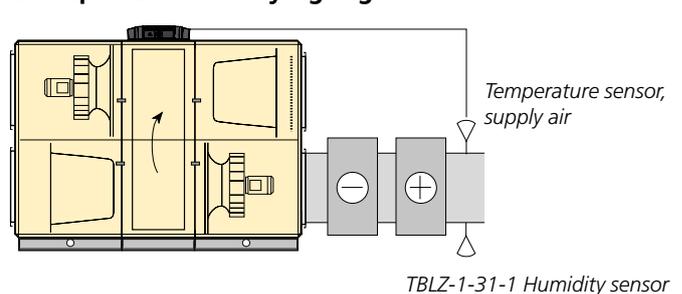
The function Dehumidifying regulation controls the humidity in the supply air duct, by means of an air cooler and an air heater for reheating.

The function requires that an air cooler be mounted upstream of the air heater in the supply air duct. See the example to the right.

#### Example, steam humidification



#### Example: Dehumidifying regulation



The TBLZ-1-31-1 moisture sensor is mounted in the supply air duct and its cable is connected to the appropriate terminal on the unit.

Cooling energy is emitted to condense the moisture in the supply airflow, which then is heated to the desired supply air temperature. This causes a reduction in the moisture content of the supply air.

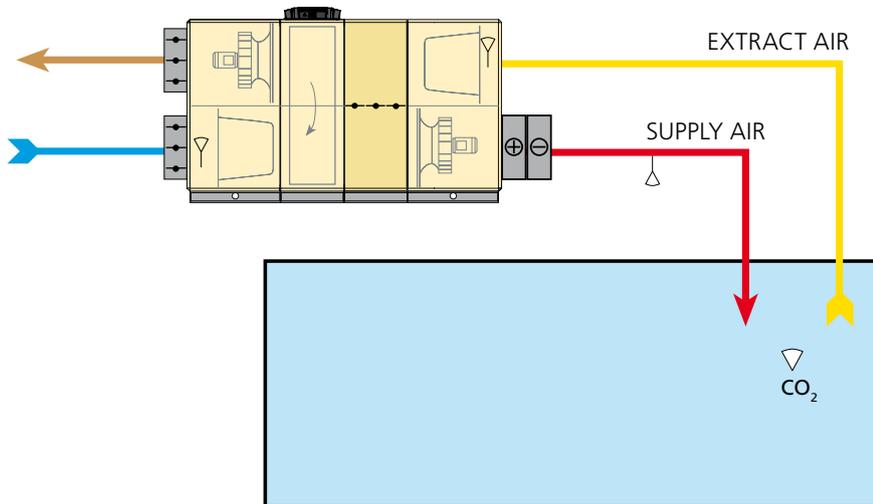
The cooling unit used must be sized so that the temperature of the supply air will be below the dew point, otherwise no condensation will arise and no dehumidification will occur.

## Description of the functions

### ReCO<sub>2</sub>



### ReCO<sub>2</sub>



ReCO<sub>2</sub> can be used where recirculated air is accepted, and where heating and cooling require larger airflows than that demanded by the requirement for air quality.

ReCO<sub>2</sub> ensures air quality and air temperature, but consumes no more fan energy than necessary.

The function can be used for GOLD RX/CX, sizes 12-120

The function can be selected for CO<sub>2</sub> function or temperature function.

For more information, see the ReCO<sub>2</sub> function guide.

### CO<sub>2</sub>

The supply and extract airflow is constant according to the preset airflow in the hand-held terminal. The recirculation damper opens and closes variably in order to obtain the preset air quality. The minimum outdoor and exhaust air volumes are set in the hand-held terminal. The pressure sensor and the modulating outdoor air damper ensure the correct outdoor air volume\* and balance in the unit.

### CO<sub>2</sub> + Flow

The supply and extract airflow is constant according to the preset airflow in the hand-held terminal. The recirculation damper opens and closes variably in order to obtain the preset air quality. The minimum outdoor and exhaust air volumes are set in the hand-held terminal. The pressure sensor and the modulating outdoor air damper ensure the correct outdoor air volume\* and balance in the unit. When the damper is completely closed for return air and the preset air quality is not achieved, the airflow will be steplessly increased to achieve the preset air quality. The airflow can be increased up to the preset max flow.

\* The minimum permissible outdoor air volume is affected by the total pressure drop in the ventilation system and therefore must be calculated.

### Temperature

The mixture of return air takes place in sequence with heating and cooling. For the heating sequence, it is possible to select whether the function is active or not active. It is also possible to select whether the mixture of return air should take place before the sequence for the air heater has engaged (economy function), or whether the mixture of return air should take place when the sequence for the air heater is at 100% and there is still a heating requirement (comfort function).

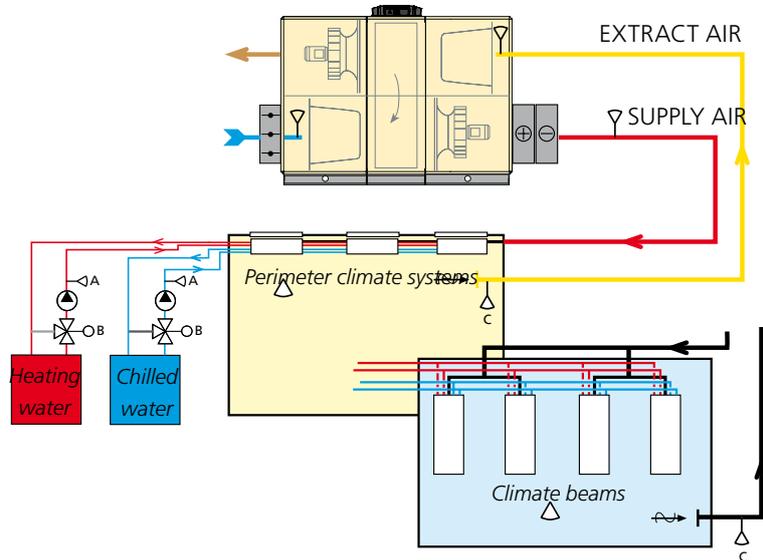
For the cooling sequence, it is possible to select in the same way whether the function is to be active or not active. It is also possible to select whether the mixture of return air should take place before the sequence for the air cooler has engaged (economy function), or whether the mixture of return air should take place when the sequence for the air cooler is at 100% and there is still a cooling requirement (comfort function).

The minimum outdoor and exhaust air volumes are set in the hand-held terminal. The pressure sensor and the modulating outdoor air damper ensure the correct outdoor air volume\* and balance in the unit.

The Heating Boost and Cooling Boost functions are activated in the hand-held terminal if an increased supply airflow is required in the event of a heating or cooling load. These functions can be combined with all the functions described above.

## Description of the functions

### All Year Comfort



The All Year Comfort function is designed for controlling the primary water circuit for supplying chilled water and/or heated water to climate beams, perimeter climate systems, etc..

This function requires the TBLZ-2-59 control box (accessory). This function also requires the TBLZ-1-31-2 humidity sensor accessory for dew-point regulation.

Other necessary equipment can be valve actuators, 3-way valves, circulation pump, etc.

The function keeps the chilled water and hot water temperature constant at the required setting in the connected cooling and heating systems respectively.

Two strap-on temperature sensors measure the water temperature (see A in the figure above). The sensors are fitted on the water pipe downstream of the regulating valve (see B in the figure above).

See also Dehumidification control under Humidity.

For more information, see the All Year Comfort Function Guide.

#### Outdoor compensation

To make it possible to adapt the primary water circuit temperature to the design of the building and the outdoor temperature, the supply flow temperature's setpoint must be adjusted in line with the outdoor temperature according to an adjustable performance curve. The curve can be adapted to various conditions by means of four adjustable points.

#### Room compensation

In the event of an extra cooling or heating load, the supply flow temperature for the cold or hot water respectively can be adjusted.

Setpoint for the supply flow temperature is influenced by the room temperature. The setpoint for regulating the hot water is reduced when the room temperature exceeds the preset limit value. The setpoint for regulating the cold water is increased when the room temperature drops below the preset limit value.

Night blocking makes it possible to block the function at night.

#### Night compensation

If the premises are not utilised at night and on weekends, the water temperature can be adjusted in order to save energy.

The supply flow temperature setpoint is decreased (heating circuit) or increased (cooling circuit) during the preset period.

It is possible to set two periods for night and weekends respectively via two time channels.

#### Dew point compensation (cooling water only)

The moisture content and temperature of the extract air (see C in the figure above) are measured in order to ensure that no condensation forms on cold metallic surfaces.

On the basis of the measured values for relative humidity and temperature, the current dew point (the temperature at which the moisture in the air condenses) is calculated. When the dew point exceeds the cooling water temperature, the cooling water setpoint is raised to counteract condensation precipitation.

To compensate for any losses in cooling capacity in the event of an increasing cooling water temperature, the airflow can be increased to extract more surplus heat.

#### Pump/valve

The pump for the heating circuit is started and stopped according to preset outdoor limit temperatures.

The pump for the cooling circuit is operated together with the GOLD unit and is stopped when the air handling unit is shut down. It is also possible to stop the pump for the cooling circuit if the outdoor temperature is below the preset setpoint.

The alarm for the pumps can be monitored, and the valves can be monitored by means of an alarm in the event the valve position is incorrect.

In order to prevent the pumps and valves from becoming clogged, in the event of a prolonged period of downtime, they can be exercised at preset time intervals.

## Description of the Functions

### MIRU Control



#### MIRUVENT – GOLD

The MIRUVENT power roof ventilator is controlled by the MIRU Control unit which can also be connected to a GOLD air handling unit. The control equipment of the GOLD unit is fully pre-programmed for controlling the MIRUVENT. You need only connect one BUS cable from the GOLD to the MIRU Control unit. The TBLZ-1-64 connection kit accessory for the GOLD is required.

Below is a description of what functions are possible to act upon/obtain information about, via the GOLD unit hand-held micro terminal or via communication with a main control system. The individual functions are described in more detail in the catalogue for MIRUVENT.

#### Control

Up to ten power roof ventilators with MIRU Control equipment can be connected to one GOLD air handling unit by means of bus communication.

It is possible in the hand-held micro terminal to select whether the power roof ventilator should be controlled in parallel with the GOLD unit, and whether it should follow the low-speed/high-speed operating modes of the air handling unit.

All the time channels available in MIRU Control can be set separately for each connected power roof ventilator via the GOLD unit hand-held micro terminal.

#### Balanced ventilation

The balanced ventilation function can be used if the power roof ventilators are used for variable flow. It is then possible to select which power roof ventilator(s) is/are to be included in the function.

In the case of balanced extract air, all the airflows of the activated power roof ventilators are added together. The extract airflow in the GOLD unit is decreased by the corresponding volume. In this way the supply airflow will be the same as the total extract airflow and balanced ventilation will be achieved inside the building.

In the case of balanced supply air, all the airflows of the activated power roof ventilators are added together. The supply airflow in the GOLD unit is increased by the corresponding volume. In this way the supply airflow will be the same as the total extract airflow and balanced ventilation will be achieved inside the building.

The function presupposes that pressure sensors for flow measurement and possible pressure regulation are connected to MIRO Control.

#### Flow/pressure regulation

Depending on the function selected in MIRU Control, it is possible to set the desired set point for pressure or flow, low speed and high speed, in the GOLD unit hand-held micro terminal.

#### Status

The following values can be read in the GOLD unit hand-held micro terminal for each power roof ventilator:

Airflow\*. Duct pressure\*. Current set point for flow/pressure\*. Temperature\*. SFP. Power. Power consumption in kWh. Operating mode. Common fault alarm 0/1.

*\*Shown depending on which sensor is connected to MIRU Control.*

#### Communication

When MIRU Control is connected to the GOLD unit control equipment, this also offers you the opportunity of communication with a main control system via Modbus TCP, Modbus RTU, Exoline or BACnet IP for all the connected power roof ventilators.

You can then read and set the values for pressure and flow. All of the time channels can be set for each power roof ventilator. Provision for viewing the energy, temperature and common fault alarm readings.

Limited communication with all the connected power roof ventilators is also obtainable by connecting accessories for LON Works communication to the GOLD air handling unit.

Pressure, flow, temperature, energy status and alarm readings can also be viewed via the LON.

## Description of the functions

### Inputs / Outputs



#### External supervision

Can for example be used if the air handling unit will be controlled/monitored via the dashboard. In some cases a signal from certain specific functions can also be desirable, for example the blocking/activation of periphery equipment.

Up to two IQlogic+ modules (accessory, TBIQ-3-2) can be used for external operating functions.

#### Outputs

Each IQlogic+ module has two relay-controlled outputs.

These functions can be selected in the hand-held terminal.

With an IQlogic+-module a maximum of two of the functions below can be combined as standard. With an additional IQlogic+-module the number of combinations can be increased to four.

- Air handling unit in operation
- Air handling unit in auto operation
- Air handling unit in manual operation
- Air handling unit in low speed operation
  
- Air handling unit in high speed operation
- A-alarm
- B-alarm
- Damper relay
- Heat exchange
- Heat exchange defrost
- Re-heat
- Re-heat power reduction
- Heating boost
- Morning Boost
- Intermittent night op.
- Air flow down regulation
- Extra reg. sequence heat
- Extra reg. sequence cool
- Cool
- Cooling Boost
- Summer night cool
- Supply air fan in operation
- Extract air fan in operation

#### Inputs

##### Digital inputs

Each IQlogic+-module has two digital inputs.

These functions can be selected in the hand-held terminal.

With an IQlogic+-module a maximum of two of the functions below can be combined as standard. With an additional IQlogic+-module the number of combinations can be increased to four.

- Alarm reset.
- External stop of AYC chilled water regulation.
- External stop of AYC heated water regulation.

##### Analogue inputs

Each IQlogic+-module has two analogue inputs.

These functions can be selected in the hand-held terminal.

With an IQlogic+-module a maximum of two of the functions below can be combined as standard. With an additional IQlogic+-module the number of combinations can be increased to four.

- Temperature setpoint displacement
- Supply airflow boost.
- Extract airflow boost.

## Description of the functions

### Communication



#### Communication

Provision for communication and supervision is integrated as standard into GOLD.

Communication can be established via Ethernet without software other than an ordinary web browser, such as Internet Explorer.

The air handling unit is ready to be connected via EIA-485 for monitoring via the existing system.

The following protocols can currently be obtained as standard without an extra communication unit: Modbus TCP, Modbus RTU, Metasys N2, Exoline and BACnet IP.

#### Communication via internal network

The GOLD has a built-in web server that makes it possible to communicate with the air handling unit via an internal network. This provides access to a dynamic flow diagram for reading and setting temperatures, flows, etc., as well as a mail function for forwarding alarms. All that is needed is an ordinary computer with web browser, such as Internet Explorer.

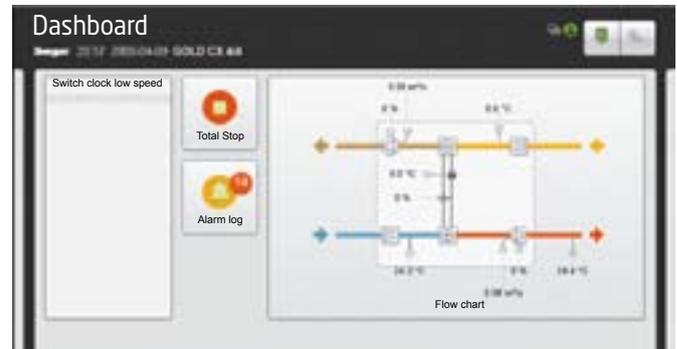
#### Wi-Fi

The AHU's control unit is, as standard, equipped with Wi-Fi function and can be connected to e.g. a wireless hand-held terminal (accessory), portable computer or smart phone. This provides the same image management as that in the hand-held terminal.

#### Communication via existing monitoring system

The scope available for communication is conditional on the software and its programming. The GOLD unit in itself offers possibility for overall communication of readings, settings and functions.

Further information about interfaces, protocols and configuration is available at [www.swegon.se](http://www.swegon.se) (com).



Example of a flow chart from the built-in web server.

## Description of the functions

### Base setting



#### Base setting

Used for saving, loading and restoring the settings.

Date and time for the latest saved backup copy can be viewed.

The AHU's settings/communication settings are saved/loaded to/from the control unit's internal memory or external SD circuit card that can be inserted into the control unit.

### Manual test



#### Manual test

Manual test operation can take place for testing the inputs and outputs, fans and heat exchanger, etc.

Used for installation or troubleshooting to test that wired connections and functions operate correctly.

Only accessible via the hand-held terminal (not the webpage).

### IQnavigator



#### IQnavigator (hand-held terminal)

The hand-held terminal can be set to four different back-light brightness settings (Auto/Low/Medium/High).

Only accessible via the hand-held terminal (not the webpage).

### File manager



Files on the SD card can be handled in the file manager. Log files, air handling settings and communications settings can be saved or deleted, for instance.

The SD card should be placed in the air handling unit's control circuit card (not the hand-held terminal).

Only accessible via the webpage (not the hand-held terminal).

