

Description of the Functions, IQnomic Premium

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Description of the Functions

Controls



Controls

The GOLD is controlled to meet various operating conditions via the hand-held micro terminal.

The unit normally operates in the normal operation mode and is then controlled via the internal timer.

It is also possible to externally control the unit to low or high speed outside the ordinary in-operation periods.

Via the hand-held micro terminal, it is possible to shut down the unit or control it to operate at low speed or high speed.

Timer

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

Automatic changeover between summer/winter time to EU Standard has been preset.

Times and days can be set when the unit is to run at high speed, low speed or be shut down.

Eight different time channels can be set. If the same in-operation periods are to apply every day of the week (Mon-Sun), you need only program one time channel.

The year channels make it possible to set deviating operation times for parts of the year, e.g. for longer holidays. Eight different year channels can be set.

Prolonged operation

The control unit inputs for external low speed and external high speed respectively, can be supplemented with a prolonged operation function. Prolonged operation can be used for overtime running activated by a pressing the appropriate key, for example.

Starting sequence

The GOLD has a starting sequence with factory-preset time delay between every step as follows:

1. The damper relay is energized and opens the shut-off damper (if installed).

Time delay: 30 seconds.

2. The extract air fan starts and rotary heat exchanger is controlled to the max. recovery setting. Additional heating (if installed) is activated to generate 40% of its max capacity.

Time delay: 90 seconds.

3. The supply air fan starts up.

Time delay: 180 seconds.

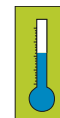
(from the time when the extract air fan has started).

4. The temperature control function begins according to its regular settings.

The starting sequence prevents the extract air fan from starting up if the shut-off damper is closed. By starting the extract air fan first, and controlling the heat exchanger to the max. recovery setting, the system also avoids chilling the premises with cool supply air under cold weather conditions.

Description of the Functions

Temperature Control



ERS Control

ERS control means Extract air temperature-Related Supply air temperature control. 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, for example, by machinery, lighting or people and the premises have supply air devices suitable for discharging air below room temperature.

Control Sequence

The temperature efficiency of the air handling unit's heat exchanger is modulated to provide max. heat recovery. After that, the re-heating coil, if installed, will begin to generate heat.

If an air heater for reheating the supply air is not installed, or if the heating power in the air heater for reheating is not sufficient, the supply air fan or both the supply air and the exhaust air fans will automatically and variably be decelerated to discharge air at the min. flow set point. A neutral zone can be preset, which allows a lower supply air temperature setpoint before the downspeed control function begins.

When the supply airflow is regulated to a lower rate, the heat exchanger will have "excess heat", i.e. warm extract air, giving it capacity to attain and maintain the supply air temperature required.

As the fans are down speed controlled to reduce the supply airflow to a lower rate, the air pressure in the premises becomes sub-atmospheric and this instead causes outdoor air to be sucked in through leakage points such as doors and windows. The ordinary heating system of the premises must be sized for heating this outdoor air.

ERS CONTROL 1

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

- 1) Breakpoint in °C (based on the extract air temperature).
- 2) Select the temperature differential **above** the breakpoint in four steps.
- 3) Select the temperature differential **below** the breakpoint in °C.

See the chart to the right.

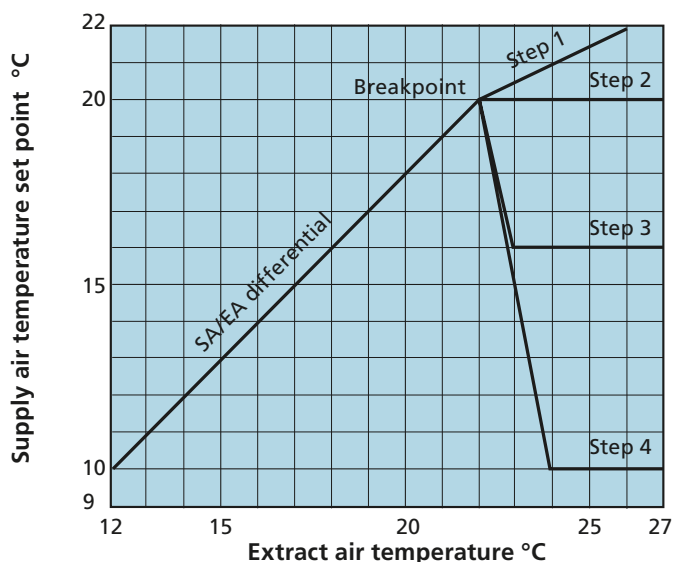
ERS CONTROL 2

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. It may be necessary to install a post-heating coil depending on whatever settings are entered.

An individually adjusted curve makes it possible to regulate the supply air/extract air temperature ratio.

See the chart to the right.

ERS Control 1



Factory setting:

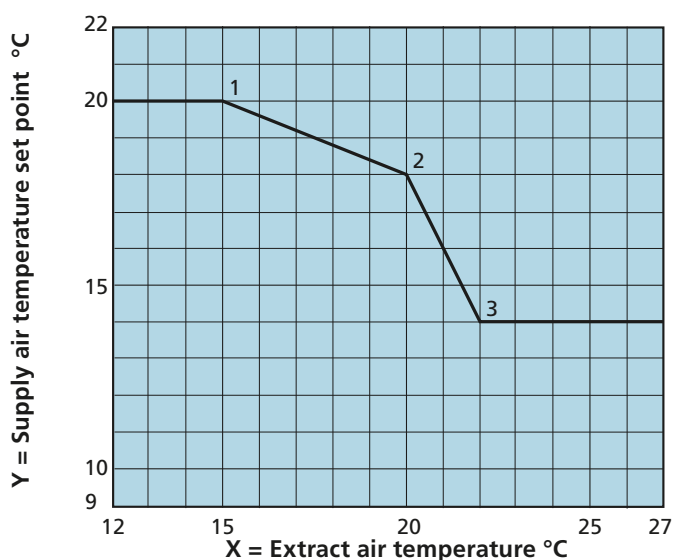
Step 3. Breakpoint 22 °C. SA/EA differential 2 °C.

Involves:

If the extract air temperature is below 22 °C (breakpoint), the supply air temperature setpoint will be automatically regulated to be 2 °C (EA/SA differential) lower.

If the extract air temperature is above 22 °C, the supply air temperature setpoint will be constantly 16 °C (step 3).

ERS control 2



Factory settings - breakpoints:

X1 = 15 °C. X2 = 20 °C. X3 = 22 °C.

Y1 = 20 °C. Y2 = 18 °C. Y3 = 14 °C.

Denotes:

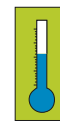
If the extract air temperature is below 15 °C (X1) the setpoint for supply air temperature is constantly 20 °C (Y1).

If the extract air temperature is 20 °C (X2) the supply air temperature set point will be 18 °C (Y2).

If the extract air temperature is above 22 °C (X3), the supply air temperature setpoint will be constantly 14 °C (Y3).

Description of the Functions

Temperature Control



Supply air control

Supply air control involves keeping a constant supply air temperature without consideration to the load in the premises.

This type of control can be used when the load and temperatures of the premises are predictable. In most cases a reheating coil has to be installed; possibly a cooling coil as well.

Control sequence

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

After that, the post-heating coil, if installed, will begin to generate heat.

If an air heater for reheating the supply air is not installed, or if the heating power in the air heater for reheating is not sufficient, the supply air fan or both the supply air and the exhaust air fans will automatically and variably be decelerated to discharge air at the min. flow set point.

A neutral zone can be preset, which allows a lower supply air temperature setpoint before control to a lower flow rate begins.

When the supply airflow is controlled to the min. set point, the heat exchanger will have "excess heat", i.e. warm extract air, giving it capacity to maintain the supply air temperature required.

As the supply airflow is controlled to a lower rate, the air pressure in the premise becomes sub-atmospheric and this instead causes outdoor air to be sucked in through leakage points such as doors and windows. The ordinary heating system of the premises must be sized for heating this outdoor air.

Extract air control

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

The lowest and the highest permissible supply air temperatures are specified while the GOLD is keeping the extract air temperature constant.

The result will be a uniform temperature in the premises regardless of the load. Extract air control requires the installation of a post-heating coil; possibly a cooling coil as well.

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

Control sequence

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

After that, the post-heating coil, if installed, will begin to generate heat.

Outdoor compensation

Temperature

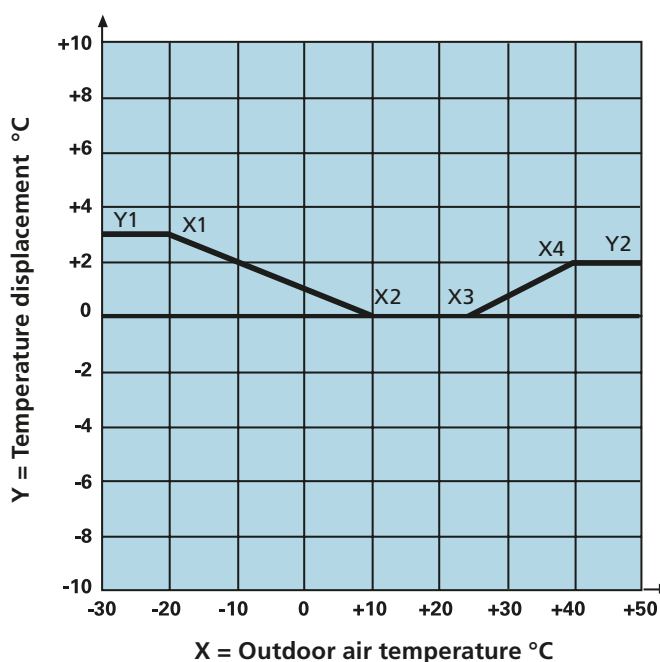
Outdoor compensation can be activated if the premises are affected to an unusually high degree by heat and cold, for example via large windows.

If the function is selected, the temperature set point is displaced relative to the outdoor temperature according to a summer or a winter curve. It is possible to set the slope of the curves and their starting and terminal points. In conjunction with supply air or extract air control only.

See the chart below.

It is also possible to preset negative summer compensation.

Outdoor compensation



Winter compensation according to the factory settings involves:

Outdoor temperature +10 °C (Breakpoint X2): Compensation starts and gradually proceeds between 0-3 °C down to an outdoor air temperature of -20 °C.

Outdoor air temperature -20 °C (Breakpoint X1): Constant compensation takes place with 3 °C (temperature displacement Y1). Summer compensation in accordance with factory settings involves:

Outdoor temperature +25 °C (Breakpoint X3): Compensation starts and gradually takes place between 0-2 °C up to an outdoor temperature of +40 °C.

Outdoor temperature +40 °C (Breakpoint X4): Constant compensation takes place with 2 °C (temperature displacement Y2).

Description of the Functions

Temperature Control



Xzone Temperature control

Xzone temperature control is intended for use when more than one temperature zone is needed in a ventilation system. Different temperature loads in different sections of a building may be due to their proximity to the north or south perimeter wall of the building or diverse operations conducted inside, for instance.

The Xzone function requires the TBLZ-1-50 zone control box accessory.

The TBVA valve kit can be used for the air heater/air cooler for hot/chilled water.

The TBPA pump set can be used if a pump is required.

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

The type of temperature control for the Xzone should be selected separately.

The following options can be selected:

ERS Control 1

ERS Control 2

Supply air temperature control

Room/Extract air temperature control.

If an electric air heater is used, the system includes an alarm function for the overheating monitor and postcooling the air heater if the air handling unit has shut down. If an air heater/air cooler for hot/chilled water is fitted, it is possible to control how the pump operates. The settings for exercising will then be common with the main zone.

Functions that affect both zones

Freeze protection monitor function

Settings for alarm limit and heat retaining function are common for the main zone and Xzone.

Summer night cooling

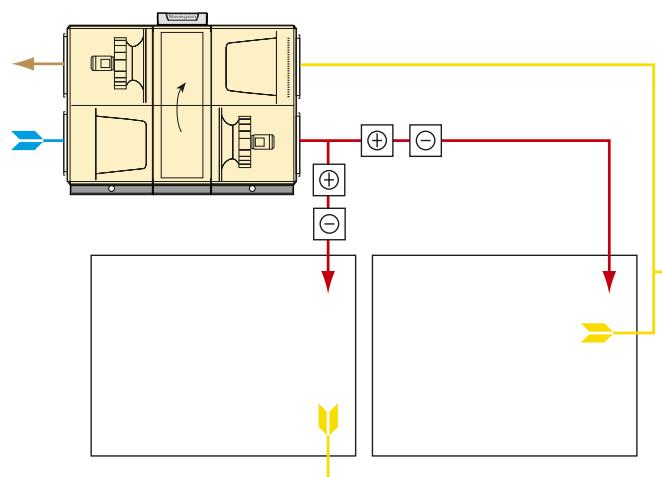
Room temperature sensors are placed in the main zone. The supply air temperature setpoint is common for both zones.

Outdoor temperature compensation

If the function is activated, the settings for both zones apply.

Intermittent night-time operation

Room temperature sensors are placed in the main zone. The settings are applicable to the main zone. In the intermittent night-time operation mode, the Xzone has the same temperature setpoint as it does when the system is operating during the day.



Morning Boost

Both zones conform to the same temperature setpoint as that used during daytime operation.

Heating Boost

The function is controlled by the main zone only.

Cooling Boost

The function is controlled by conditions in the main zone only.

Description of the Functions

Temperature Control



Summer night cooling

The lower temperature at night is utilized to cool down the building structure. This reduces the cooling load during the first hours of the day. If a cooling unit is installed, its in-operation hours will be minimized, thus offering savings. If no cooling unit is installed, a certain cooling effect will still be achieved.

Set point displacement

Set point displacement is used for changing the set point for supply air and extract air temperatures. The temperature can be increased or decreased at certain times of the day by means of an external timer or potentiometer, for instance.

The set point can be influenced by ± 5 °C by means of 0 - 10 V external control.

Extra control sequence

The extra control sequence is used for extra control functions, together with the ordinary sequence for temperature control.

The extra control sequence can be used for utilizing existing heating or cooling sources, such as from a cooling unit. The function can also be used for an extra cooling or heating coil.

The maximal output signal can be limited from 100 % down to 0 %.

The extra control sequence can be selected as a heating or cooling sequence.

Can be combined with intermittent night-time operation.

Enhanced heating sequence.

If functions in the extra heating control sequence are not sufficient, the enhanced heating sequence can be utilized. The function requires the TBIQ IQnomic Plus module accessory.

Enhanced heating sequence makes it possible to simultaneously control two air heaters in the following combinations: waterborne – electric, waterborne – waterborne, electric – electric. The air heater for hot water can be with or without anti-freeze guard function.

In the event that the capacity of the first air heater is not enough, the other one is automatically sequentially switched in.

The start-up sequence, anti-freeze guard function, pump control function, re-cooling, electric air heater and other functionality are provided.

The settings for the start-up sequence, anti-freeze guard function, exercising function and re-cooling are the same as those for ordinary reheating.

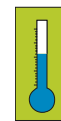
Seasonal Heating

When both the standard function for reheating and enhanced heating sequence is activated, it is possible to inactivate one of these via a digital input or communication.

Example: Warm water is only available in the wintertime. In the summertime, an electrical air heater is used as a backup to meet a possible reheating load. Switching takes place via an external thermostat, an external clock function or the like.

Description of the Functions

Temperature Control



External temperature sensors

One external outdoor sensor or room sensor

There is provision for connecting external sensors, which can be used when the internal sensor of the unit does not provide representative values.

External Extract air/Room measures the extract air temperature in a larger room or in the duct system, instead of the temperature inside the air handling unit.

External Outdoor measures the outdoor air temperature outdoors, instead of the temperature inside the air handling unit.

The GOLD RX units also have provision for connecting an external temperature sensor for alarms. In the GOLD CX/PX and SD units, it is possible to use the existing sensor in the supply air path for air density-based corrections. The alarm limit in °C and alarm delay are adjustable.

Two to four external room temperature sensors (multisensor)

Up to four external room temperature sensors can be wired to the air handling unit's control circuit card. The function requires TBLZ-1-24-2 room temperature sensor accessories.

Locate the room temperature sensors at appropriate places to obtain representative measured values.

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

Preheating the air

Reheating the supply air when the outdoor air is cold and the humidity is high can prevent condensation from forming in the filters of the air handling unit.

Preheating may also be necessary to heat the air if it is extremely cold outdoors.

The air preheating function requires the following accessories:

TBLF/TCLF air heater including TBLZ-1-53-1 set of components for controlling or, if an air heater other than the TBLF/TCLF is used, TBLZ-1-53-a for the controls for the additional heater.

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

The following types of air heater can be selected:

Electric air heater of pause/pulse type

Electric air heater, 0–10V

Air heater for hot water with freeze protection monitor function

Air heater for hot water without freeze protection monitor function

Control function

Temperature sensors in the ducts keep the preset temperature constant.

The setpoint required can be set in the hand-held micro terminal.

Freeze protection monitor function

The alarm limit and heat retaining function settings are common for the preheating coil and the ordinary air heater in the supply air ductwork.

Pump control

Provision is available for controlling pump operation. The settings for exercising will then be common with the ordinary air heater in the supply air ductwork.

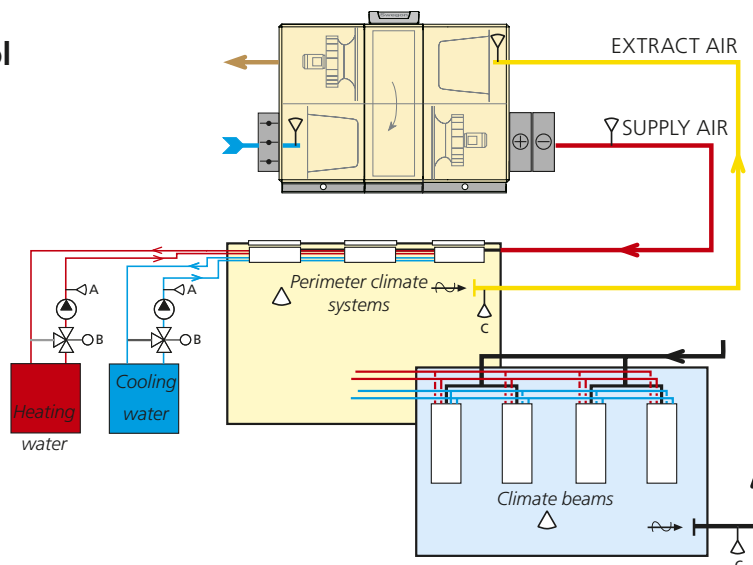
Electric air heater

Overheating monitor and postcooling whenever the air handling unit stops.

Description of the Functions

Temperature Control

Temperature control All Year Comfort



The All Year Comfort function is designed for use in controlling the primary water circuit for cooling and/or heating to climate beams, perimeter climate systems, etc. This function requires the TBLZ-1-59 electrical equipment cubicle accessory. The TBLZ-1-31-2 humidity sensor accessory is also required for dew point regulation.

Other requisite equipment can be a valve actuator, 3-way valve, circulation pump, etc.

The function keeps the cooling or heating water temperature constant in the connected cooling and heating system at the desired value.

The water temperature is measured by means of two strap-on temperature sensors (see A in the illustration above) that are mounted on the water pipe downstream of the regulating valve (see B in the illustration above). See also Dehumidification Control under Humidity.

Outdoor Compensation

The inlet flow temperature set point is adjusted to follow the outdoor temperature according an adjustable curve. This makes it possible to adapt the primary water circuit temperature to the design of the building and the outdoor temperature. Three setable points are provided for adjusting the curve to meet various conditions.

Room Compensation

If extra cooling or heating is required, the inlet flow temperature for the cooling or heating water can be adjusted. The inlet flow temperature set point is influenced by the room temperature. The set point for heating water regulation is lowered if the room temperature exceeds the preset limit. The controller increases the set point for cooling water regulation if the room temperature drops below the preset limit.

Night blocking enables you to block the function at night.

Night Compensation

If the premises are not utilised at night, the water temperature can be adjusted to save energy..

The controller decreases the inlet flow temperature set point (heating circuit) or increases it (cooling circuit) during the preset period.

Two time schedulers are provided making it possible to set periods for night and weekends/holidays.

Dew Point Compensation (cooling water only)

The humidity and temperature in the extract air (see C in the illustration above) are measured in order to ensure that condensation precipitation will not form on cold metal surfaces.

By means of relative humidity and temperature readings, the current dew point (the temperature at which moisture condenses) is calculated. When the dew point exceeds the cooling water temperature, the controller raises the cooling water set point to counteract condensate precipitation.

To compensate for the loss in cooling power as the cooling water temperature rises, the air flow can be increased to carry away surplus heat.

Pumps/Valves

The pump in the heating circuit is switched on and off according to preset outdoor temperature limits.

The pump in the cooling circuit is operated together with the GOLD unit and is switched off when the air handling unit is shut down. Provision is available to stop the pump in the cooling circuit in the event that the outdoor temperature drops below the preset limit.

The pumps can be monitored with in-service alarm and the valves are monitored by means of alarms that warn the operator of nonconforming valve position.

To prevent clogging in the pumps and the valves during periods of standstill, the pumps and valves can be exercised at preset time intervals.

Description of the Functions

Air recirculation section



Intermittent night-time heating

The unit is utilized to heat the premises when it is normally stopped by the timer.

The function requires that an external room sensor is connected and that a post-heating coil be installed downstream of the air handling unit. The function works best if the GOLD is equipped with an air recirculation section and shut-off dampers for the outdoor air and the exhaust air.

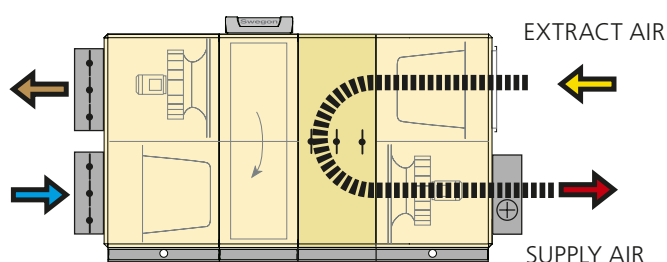
When the function is activated, the air handling unit detects when the room temperature drops below the preset start temperature. The unit starts with preset flows and the supply air temperature setpoint.

Morning BOOST

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

Morning BOOST is used if an air recirculation section is installed.

The unit starts ahead of time and uses the same operation and temperature control settings as it would at the regular start time with the only exception that the air is recirculated through the air handling unit.



Intermittent night-time heating with air recirculation section:

If the extract airflow is set to 0 and the output to the damper is not activated, the following will take place:

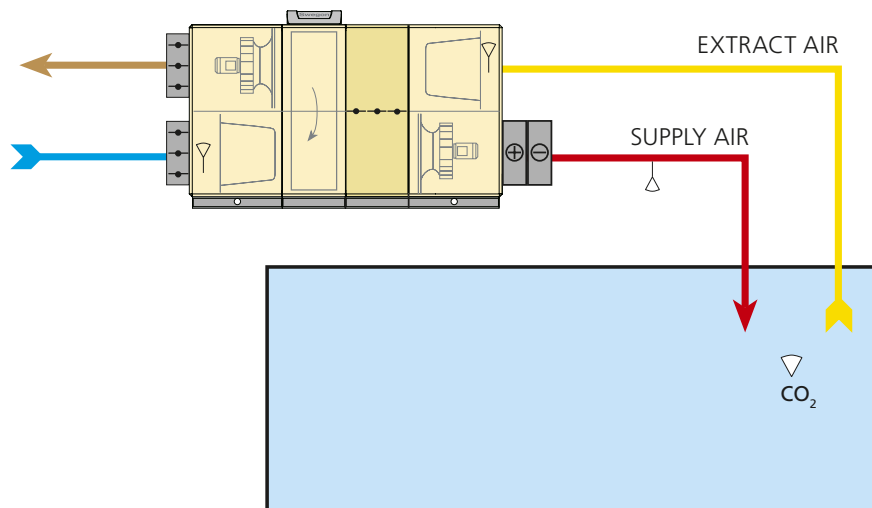
When the conditions for start are met, outdoor air and exhaust air shut-off dampers remain closed. The damper in the air recirculation section is opened. The extract air fan is idle.

The supply air fan operates according to the preset supply airflow and the post-heating coil downstream of the air handling unit operates according to the preset supply air temperature setpoint until the conditions for stop are met.

Description of the Functions

Air recirculation section

ReCO₂



ReCO₂ can be used in applications in which the use of recirculated air is acceptable, and in which heating and cooling require larger air flows than what the demands on air quality do.

ReCO₂ ensures air quality and air temperature, but does not consume more fan power than necessary

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

ReCO₂ requires the following accessories:

TCBR air recirculation section, complete with modulated damper actuator and spring return.

TBSA/TCSA outdoor air damper with modulated damper actuator and spring return.

ELQZ-2-504 Air quality sensor (select this sensor if the function is intended for controlling air quality).

TBLZ-1-51 complete set of components for controlling the ReCO₂.

The function can be selected for the CO₂ function or the temperature function.

CO₂

The supply air and extract air flows are constant and conform to the airflow preset in the hand-held micro terminal. The recirculation damper steplessly opens and closes to achieve the preset air quality. The min. outdoor and extract air volumes must be set in the hand-held micro terminal. The pressure sensor and the modulated outdoor damper ensure that the outdoor air volume* and balance in the air handling unit are correct.

CO₂ + Flow

The supply air and extract air flows are constant and conform to the airflow preset in the hand-held micro terminal. The recirculation damper steplessly opens and closes to achieve the preset air quality.

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

The min. outdoor and exhaust air volumes must be set in the hand-held micro terminal. The pressure sensor and the modulated outdoor damper ensure that the outdoor air volume* and balance in the air handling unit will be correct. When the damper is completely closed for recirculated air and the preset air quality is not achieved, the air flow will steplessly increase to achieve the preset air quality setting. The airflow can be increased up to the preset max. flow setting.

Temperature

Recirculated air is mixed into the supply air in sequence with heating and cooling. The user has the option of selecting whether the heating sequence is active or inactive. There is also provision for selecting whether recirculated air is to be mixed with supply air before the sequence for the air heater has switched in (economy mode), or if recirculated air is to be mixed in when the sequence for the air heater is 100% and heating is still required (comfort mode).

In the same way as for the cooling sequence, the user has the option of selecting whether the heating sequence is active or inactive. There is also provision for selecting whether recirculated air is to be mixed with supply air before the sequence for the air cooler has switched in (economy mode), or whether recirculated air is to be mixed in when the sequence for the air heater is 100% and cooling is still required (comfort mode).

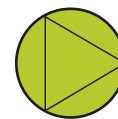
The min. outdoor and exhaust air volumes must be set in the hand-held micro terminal.

The pressure sensor and the modulated outdoor damper ensure that the outdoor air volume* and balance in the air handling unit are correct.

Activate the Heating Boost and Cooling Boost functions in the hand-held micro terminal if increased airflow for a heating or cooling load is required. These functions can be combined with all the functions described above.

Description of the Functions

Flow/pressure



Fan control

The type of control used for the supply air fan or the extract air fan can be selected individually.

Flow control

Flow control 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, air diffusers or grilles are blocked, etc.

Constant airflow is advantageous, since the airflow is always exactly as it was from the beginning.

Pressure control

Pressure control involves automatically varying the airflow to provide constant pressure in the ducting. This type of control is also called VAV control (Variable Air Volume).

Pressure control is used, for example, when damper operations increase the air volume in parts of the ventilation system.

The duct pressure is measured by an external pressure transducer in the ductwork. The setpoint required (separate for low speed and high speed) is adjusted in Pa.

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

Demand control

Demand control involves regulated the flow load via external sensors, such as a carbon dioxide sensor that is wired to the control unit. The setpoint required (separate for low speed and high speed) is adjusted in Pa.

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 control

Slave control involves constantly regulating the flow to be the same from the one fan as from 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 fan controlled as a slave can be restricted if its maximum flow is set to a lower airflow rate.

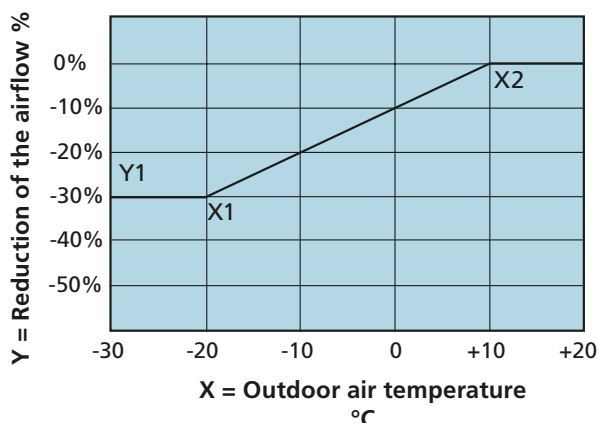
Both fans cannot be controlled as slaves. If both are selected by mistake, the extract air fan will be forced to operate in the flow control mode.

Seasonally compensated airflow

Outdoor temperature compensation of the airflow can be activated if it is desired to reduce the airflow in the wintertime.

Seasonally compensated airflow is an energy-saving function that reduces the costs for operating the fans, post-heating and the ordinary heating system of the building.

This function cannot be combined with flow control or pressure control. The function has no effect if the airflow is demand-controlled.



Outdoor air compensation according to factory settings involves:

Outdoor temperature of +10 °C (Breakpoint X2): Compensation starts and gradually proceeds between 0-30 % down to an outdoor air temperature of -20 °C.

Outdoor air temperature -20 °C (Breakpoint X1): Constant compensation proceeds at 30 % (max reduction Y1).

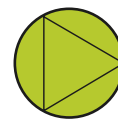
Density-corrected airflow

The density of the air is different at different temperatures. This means that a specific volume of air will change at different air densities.

The GOLD automatically corrects this, so that correct air volume is always obtained.

Description of the Functions

Flow/pressure



Forcing

Forcing can be used, for example, in assembly halls, where a higher rate of air change is needed under full-load conditions.

The airflow is regulated between two flow rate from an external signal, for example a potentiometer.

Forcing is activated only when the unit fans operate at high speed.

Flow/pressure control to min. set point

If the heating load increases while the unit is operating in the ERS control or supply air control mode, then downspeed control to decelerate the fan(s) for reducing the supply airflow or both the supply air and extract air-

flow to the min. set point will serve as the last step in the control sequence.

An adjustable reduction in temperature allows a lower supply air temperature setpoint, before downspeed control is initiated.

Zero calibration

The zero value of the pressure transducer is checked and if the value is not correct, a new calibration is carried out. Switches in automatically every time the fans are stopped for more than three minutes.

OPTIMIZE

The OPTIMIZE function optimizes the GOLD unit's airflow rates for the connected WISE system. See the special documentation for WISE.

Filters



Filter monitoring

The GOLD unit's filters are equipped with pressure transducers that continuously measure the current pressure drop across the filters. Together with an efficient filter monitoring function, this feature offers optimal use of the filters.

Readings

the current pressure drop and the estimated alarm limit can be viewed in the hand-held micro terminal.

Alarm limit for filters

As the filters become fouled, the pressure drop across them increases (the speed of the fans automatically increases to compensate the resistance of the clogged filter medium. The alarm limit is continuously computed and automatically changed depending on the current flow. When the preset alarm limit for each filter is exceeded, an alarm is initiated. The alarm limit desired can be preset in the hand-held micro terminal.

Filter calibration

An automatic filter test is activated for measuring the initial pressure drop. Calibration is carried out in connection with commissioning and filter replacement.

Prefilter

The prefilter can be used in ventilation systems, in which the extract air or supply air is heavily polluted, to prevent the fine filter in the air handling unit from becoming clogged after a short period.

The prefilter function requires the following accessories: Prefilter, TBFA or other type. If a type of prefilter other than the TBFA is used, the TBLZ-1-23 pressure sensor can be selected for monitoring the performance of the filter.

Provision for viewing readings and alarm limit setting is available in the hand-held micro terminal.

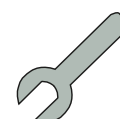
Final filter

The final filter section can be used in ventilation systems where further supply air filtration is required.

The final filter function requires the following accessories: TCFB or another type of final filter section. If another type of final filter section and not a TCFB is used, select a TBLZ-1-23 pressure sensor for filter supervision.

Facilities for reading and setting an alarm limit are provided in the hand-held micro terminal.

Airflow adjustments



Airflow adjustments

The speed of the fans can be locked for up to 72 hours. This is practical when making air adjustments in the duct system and air diffusers and grilles.

The period desired is preset but can be interrupted earlier by selecting STOP in the menu or by changing the time setting to 0.

Description of the Functions

Rotary heat exchanger

Controls

The rotary heat exchanger starts up on a heating load. On an increasing heating load, the control system variably and with linear gain regulates the rotation speed of the heat exchanger rotor to achieve max. efficiency on heat recovery.

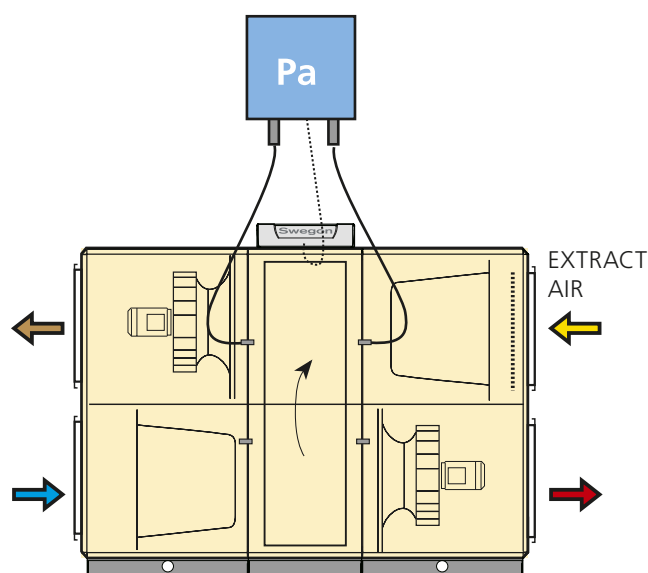
Defrosting

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 condensate from freezing in the rotor passages and clogging them.

The function requires connection of a separate pressure transducer.

When the function is activated the pressure drop across the heat exchanger is continuously measured. If the pressure drop exceeds the preset limit value, a defrosting sequence is carried out. This involves, decreasing the rotor speed to allow warm extract air to melt any possible frost.

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



Principle of the defrosting function with separate pressure transducer.

Exhaust air regulation

The exhaust air regulation 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 drops to the preset min. permissible setting.

Exhaust air regulation requires a separate temperature sensor (TBLZ-1-58-aa; accessory) fitted in the air handling unit exhaust air path.

Cooling energy recovery.

The heat exchanger rotates at max. speed and in this way recovers the relative cooling energy available inside the premises. Switches in when there is a cooling load and when the outdoor air temperature is higher than the extract air temperature. Cannot be used with the CoolDX cooling unit.

Air purging operation

The air purging function prevents clogging in the air passages inside the heat exchanger rotor. Purging operation is activated 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 purge its surfaces clean of impurities.

Carry-over Control

Whenever the fans generate low airflows, the speed of the rotary heat exchanger is reduced to an appropriate level for correct purging airflow through the heat exchanger.

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.

Prolonged heat exchanger operation

After the unit has been ordered to stop, the fans continue to operate for a certain period before they come to a stop.

To prevent the supply air from chilling down the premises when the unit is shut down, the rotary heat exchanger automatically continues to rotate for about one minute.

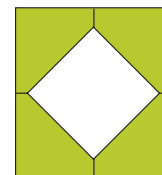
Efficiency calculations

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



Description of the Functions

Plate heat exchanger



Controls

The by-pass valve closes and the shut-off valve opens when heat recovery is needed. This occurs steplessly to provide max. efficiency on heat recovery.

Anti-frost protection

In cold weather, and if the extract air is humid, there is risk of frosting in plate heat exchangers. The GOLD PX is equipped with extremely effective 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 by-pass and shut-off dampers are then controlled to prevent the temperature from dropping below this limit.

Coil heat exchanger



Controls

The pipework package pump starts and the control valve opens when heat recovery is needed. The control valve opens steplessly to provide max. efficiency on heat recovery.

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

Anti-frost protection

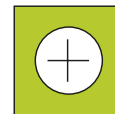
In cold weather, and if the extract air is humid, there is risk of frosting in coil heat exchangers. The GOLD PX is equipped with extremely effective anti-frost protection.

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 liquid temperature without risk of frosting inside the coil. The pipework package valve is then controlled to prevent the temperature from dropping below this limit.

Description of the Functions

Heating



Post-heating

Air heater for hot water

The function is automatically activated if the TBLA air heater is connected.

On a heating load, the valve and actuator are controlled in sequence with the heat exchanger.

Pump control

The circulation pump starts when there is a heating load and if the outdoor temperature is low. Other times, the pump is exercised at regular intervals.

Anti-frost monitor

The air handling unit is stopped if freezing inside the coil is likely. The anti-frost function keeps the coil warm, i.e. 13°C while the air handling unit is in operation and 25°C in the coil when the unit is shut down.

Electric air heater

The function is automatically activated when the TBLE air heater is connected.

On a heating load, the power supply to the air heater is controlled in sequence with the heat exchanger.

Whenever the air velocity through the unit is low, the power supply is automatically reduced to prevent the electric heating elements from becoming overheated.

Post-cooling

If the electric air heater has been in operation, on stopping the unit, the fans continue to run for a period required to cool the electric heating elements. When the air handling unit is shut down, the post-cooling period is three minutes.

Reduction in output

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.

Heating BOOST

Heating boost 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 allowed to work in the range between current flows (low speed, high speed) and preset max speed flow.

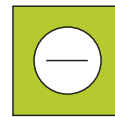
The function only works if the air handling unit is operating in the extract air regulation mode. If demand control or boost is selected in combination with heating boost, the flow is controlled by the function that transmits the highest output signal to the fans.

This function cannot be combined with pressure control.

A regulated ramp function begins and increases the airflow if the temperature exceeds its set point and it differs by 2-10°C (3°C is the factory preset value) to the preset Max supply air temperature. The control reaction speed (ramp time = percentage of flow increase per minute) can be set. The highest possible airflow is limited by the max airflow.

Description of the Functions

Cooling



Controls

For particulars of controlling the CoolDX cooling unit and Blue Box, see the section on Accessories.

For other types of cooling systems, the following control possibilities are available:

1. DX-cooling, 1 step

Connection to independent contacts for starting/stopping the cooling unit.

2. DX-cooling, 2 steps

Connection to two independent contacts for controlling cooling in two steps.

3. DX-cooling, 3 steps, binary mode

Connection to two independent contacts for controlling cooling in three steps.

4. Stepless control, 0-10 V DC

Connection to a 0-10 V DC control signal for variable control of a cooling coil/cooling unit. A 24 V DC power supply is also ready-to-use in the GOLD.

5. Stepless control, 10-0 V DC

Same as item 4, but the control signal is inverted where a 10 V output signal means a 0% cooling load.

Functions

Cooling, min. airflow

If the unit's airflow is lower than this limit, the cooling function will be blocked.

Restarting period

The restarting period is the period from when the cooling unit has stopped until when it can start up again. This time delay prevents the cooling unit from starting and stopping continuously.

Neutral zone

The neutral zone is the temperature at which the set point for cooling is higher than the set point for heating. The neutral zone prevents the cooling and heating systems from operating too closely to one other.

Outdoor temperature limited start

If DX cooling is used, it is possible to set the outdoor temperature limit at which the cooling unit is allowed to start. Each step has a separate minimum permissible outdoor temperature setting for starting the cooling unit.

Pump control

If an air cooler for chilled water is used, there is provision for controlling the pump. Other times, the pump is exercised at regular intervals.

Control reaction speed

As the controller switches in the various cooling steps, the next step is delayed e.g. to give a compressor time to achieve design cooling capacity for that step before the next step is switched in.

Cooling BOOST

Cooling BOOST means that the supply air and extract air airflows are increased to convey more cooling energy to the premises.

The flow increase occurs between the current flow and preset max. flow.

The function can be selected in three variants as follows:

Comfort

The outputs for a cooling coil/cooling unit are activated if there is a cooling load.

When the temperature is higher than its setpoint and the supply air temperature is within the preset limits, a regulated ramp function begins which increases the flow. The control reaction speed (ramp time = percentage of flow increase per minute) can be set. The highest possible airflow is limited by the max airflow.

Economy

Cooling BOOST Economy first uses a higher airflow to cool the premises, before a start signal is transmitted to the cooling machines.

The function can also operate without the cooling function being activated.

On a cooling load, the flows are slowly increased up to preset maximum flow. When the flows are up to max and if a cooling load is still present, the cooling coil/cooling unit are activated.

The function requires that the outdoor air temperature is at least 2 °C lower than the extract air temperature in order to be activated. Normal cooling operation is activated if the temperature difference is too small.

Sequence

The cooling BOOST Sequence is used if a cooling machine 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 before the cooling function is activated. The cooling function is delayed 1 minute after the airflow is increased.

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

Comfort + Economy

The comfort variant and the economy variant can be combined.

Economy + Sequence

The economy variant and the sequence variant can be combined.

Description of the Functions

Humidity



If the dehumidification and humidification functions are activated at the same time, dehumidification has priority and the possible settings for humidification are limited to being the same or lower than the dehumidification control settings. There is a 5 minute delay from when dehumidification control has stopped until when humidification starts up (and vice versa).

Dehumidification

The dehumidification control function controls the humidity in the supply air duct by switching in and switching out an air cooler and an air heater for postheating.

The function requires the installation of an air cooler upstream of an air heater in the supply air duct.

A TBLZ-1-31-1 moisture sensor should be installed in the supply air duct and its cable should be connected to the GOLD unit.

Cooling energy is modulated to condense the moisture in the supply air flow, which then is heated to the desired supply air temperature. This reduces the moisture content in the supply air.

The cooling unit must be sized for cooling the supply air to a temperature below the dew point, otherwise no condensation will occur and the air will not be dehumidified.

Humidification

Evaporative humidification

The function is appropriate for operation together with an evaporative humidifier (not Swegon).

The function requires the TBIQ IQnomic Plus module accessory and the TBLZ-31 humidity sensor. The sensor can be installed in the extract air duct or the supply air duct.

The function regulates the humidity in the extract air duct (from the rooms) or the supply air duct between the settable start and stop limits.

Steam humidification

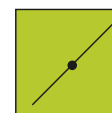
The function is appropriate for operation together with a steam humidifier (not Swegon) and is a variable control system via a 0-10 V control signal, as well as a contact function which interlocks the humidifier if the air handling unit stops, if summer night cooling is used or if the humidity in the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

The function requires the TBIQ IQnomic Plus module accessory and two TBLZ-31 humidity sensors. The sensors can be installed in the extract air duct and the supply air duct respectively.

The function keeps the humidity in the extract air duct (from the rooms) constant by regulating the humidity in the supply air.

In order to prevent the humidity in the supply air from becoming too high, this humidity is limited so as not to exceed the max. permissible level.

Dampers



Damper control

Control and measurement (230 V) of the dampers takes place via terminal connections on the control unit of the GOLD air handling unit.

Dampers open on starting the air handling unit and close on shutting down the air handling unit.

Readings

Using a special Readings menu, it is possible to read current operating values such as flows, temperatures, control sequence output values, status on the inputs and outputs, filter pressure, SFPv values, alarm history, etc.

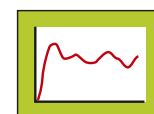


Manual test

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

Used when the air handling unit is first installed or while tracing faults to make sure that all the connections have been correctly wired.

Most alarms, functions and normal control modes will be blocked while manual testing is in progress.



Description of the Functions

Alarm settings

Fire alarms

External fire alarm

Used for external fire-control equipment.

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.

Fan operation in the event of a fire

The fans of the air handling unit can be used for evacuating smoke, etc. The activated function works together with the external fire/smoke function or internal fire alarm.

Fan speed in the event of a fire

Will be activated automatically if the fans have been activated in event of fire. Makes it possible to restrict the max. speed of the fans.

External Alarms

EXTERNAL ALARMS 1 and 2

External alarms can be used for external functions.

Typical uses:

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

For setting a time delay and for setting whether the alarm shall be activated on closure or disconnection of the input.

Alarm limits

Alarm limits can be preset for the following:

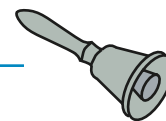
- Nonconforming supply air temperature.
- Min. extract air temperature.
- Filters.
- Heat exchangers.
- Service period.

Alarm priority

It is possible to choose whether any alarm (of all the alarms) shall have priority A or B, and whether or not the red alarm LED on the hand-held micro terminal shall light up in the event of an alarm. For certain alarms it is also possible to choose whether or not the GOLD unit will be shut down if this alarm is initiated.

Alarm blocking

The function makes it possible to activate or block certain alarms, for example temperature and airflow alarms.



Alarms

Alarms are indicated by an alarm text and flashing LED in the hand-held micro terminal. Fire alarms and frost alarms are shown in all the menu images. Other alarms are only shown if you are in the Main menu.

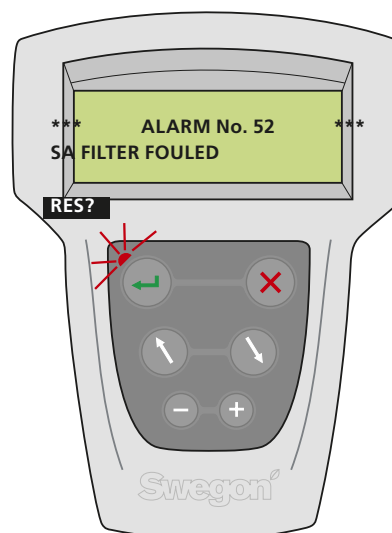
Type A alarms transmit an alarm signal to the alarm relay A output. Type B alarms transmit an alarm signal to the alarm relay B output. Via these, alarms can be transmitted further with various priority.

Alarms that require manual resetting can be reset from the hand-held micro terminal.

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

Alarms can also be reset via a communication network.

For further particulars about alarms, see the Operation and Maintenance Instructions for the GOLD. Further information about interfaces, protocol and configuration is available at www.swegon.se (com) under Products/Air handling units/GOLD/Documentation.



Description of the Functions

Communication



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

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

The unit is ready to be connected via TCP/IP, EIA-232 and EIA-485 for supervision via existing system.

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

Communication can also be established via LON and Trend using the communication unit (extra accessory).

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 gives the user access to a dynamic flow chart for reading and setting temperatures, flows, etc. as well as an e-mail function for forwarding alarms. All that is needed is an ordinary computer with web browser, such as Internet Explorer.

It is also possible to connect directly to a modem, analogue or GSM, for remote connection. Several units can be connected to the same modem.

Communication via existing supervisory system

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

Communication unit (extra accessory)

The Communication unit is used for communication via LON and Trend.

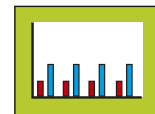
Further information about interfaces, protocol and configuration is available at www.swegon.se (com) under Products/Air handling units/GOLD/Documentation.



Typical flow chart from the built-in web server.

Description of the Functions

Logging function

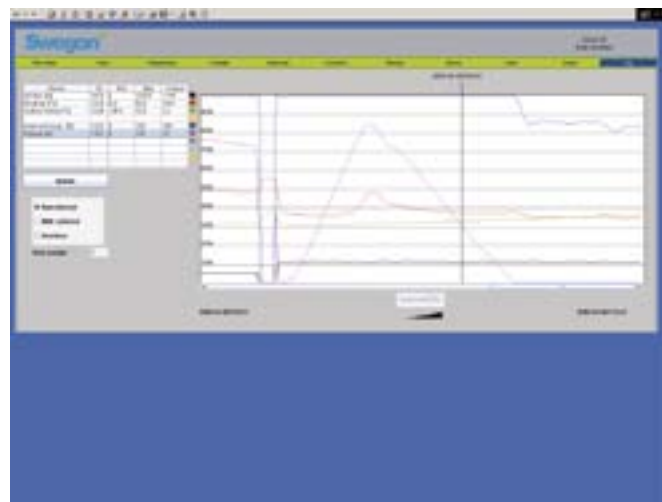


The control system in the GOLD has a built-in logging function.

If communication is carried out via the built-in web server, logged values for the parameters desired can be selected. The values are presented in the form of a curve chart that allows the user to review prior changes made back in time.

Logging can also be carried out by connecting an MMC card to the control unit of the GOLD air handling unit.

The log files can then be opened in the Microsoft Excel program, by means of a standard MMC card reader. Depending on the memory capacity of the MMC card, values can be stored 100 days or more.



Typical logging function presentation.

Other external operational functions

Air handling unit in operation

Independent contacts close when the air handling unit fans operate at high or low speed. They open when the unit is shut down or if an alarm has tripped. They can be used for in-operation indication, for example.

Air handling unit fans operating at high speed

Independent contacts close when the air handling unit fans operate at high speed. They can be used for in-operation indication, for example.

Air handling unit operating at low speed

Independent contacts close when the air handling unit fans operate at low speed. They can be used for in-operation indication, for example.

Stopping the air handling unit from another location

Externally actuated disconnection from another location shuts down the air handling unit. Makes it possible to shut down the unit from a remote location.

External fire/smoke function

Disconnection actuated from an external fire or smoke detector system shuts down the air handling unit and initiates an alarm in the hand-held micro terminal.

Description of the Functions

IQnomic Plus

IQnomic Plus is a name given to an auxiliary module for extra control functions.

Certain specific control functions require this auxiliary module, among others: Swegon Solutions.

It can also be used for external supervision.

Functions that can be wired to the terminal connection of the auxiliary module for external supervision:

EA Flow indication -- SA Flow indication

0 - 10 V DC as a function of current flow.

External alarm acknowledgement

Remote resetting of alarms is possible via external contact closure function. The function operates in parallel with the reset key on the hand-held micro terminal.

Indications

Two optional independent contacts can be selected for indicating two of the following functions:

- Cooling BOOST
- Heating BOOST
- Cooling load
- Heating load, heat exchanger
- Heating load, post-heating
- Supply air, control to the min. set point
- Electric air heater capacity reduction
- Intermittent night-time heating
- Summer night cooling
- Morning BOOST
- Defrosting the rotary heat exchanger

Swegon Solutions

Swegon Solutions are special control functions for the whole ventilation system.

For further particulars, see the documentation on this topic.

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 system

Up to ten power roof ventilators with MIRU Control equipment can be connected to one GOLD air handling unit by means of bus communication. Each power roof ventilator obtains its own menu group in the hand-held micro terminal of the GOLD unit.

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.

Readings

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. Capacity. Power consumption in kWh. Operating level. Group 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 the time channels can be set for each power roof ventilator. Provision for viewing the energy status, temperature and group 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.

Web page

There is a tab on the GOLD unit's built-in web page for navigating to the MIRUVENT power roof ventilators. The required power roof ventilator (1-10) can be selected under this tab for entering and reading the settings.

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 group alarm readings.

You also have the capability via the web page to manually control, stop, set to unit for low speed, high speed and manually reset tripped alarms.