NESTOR

The brain of the complete climate management system

GENERAL

NESTOR is the new groundbreaking access point for a complete Swegon climate management system.

NESTOR connects intelligent Swegon products in the building to one single point.

NESTOR uses the full intelligence of all connected products, creates common alarm lists, sets heating and cooling priority and helps to continuously optimise heating and cooling temperatures and air volumes for up to 8 sub-systems in the building.

NESTOR can also be used for a virtual internal network of up to eight buildings to centrally control ventilation and indoor climate.

MAIN OBJECTIVES

- Single point of access to all climate products
- Connects up to 8 GOLD to 1 Swegon Chiller/Heat pump
- No internal climate demarcation lines
- Simplicity and clarity
- Total overview
- Easy and fast design and installation
- Cost effective
- One supplier for hardware and software
- Common alarm handling
- Time channels/Year time channels

Swegon

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Terminology

CMS   Climate Management System

AHU   Air Handling Unit

FIFO   First In First Out

BMS   Building Management System

Digital output   An output, which is high or low i.e. closed or open circuit. It can also be referred to as an independent contact. Digital indicates that it should be treated as 1 or 0.

ERS   Extract air temperature Related Supply air temperature control

General information

NESTOR is a product that connects GOLD air handling units with a Swegon Chiller/Heat pump. It also provides a "single point of access" to a system made up of several (different) Swegon climate control products.

NESTOR can be configured to set the system in "occupancy mode" at a certain time or at a given signal. The user selects which functions to activate in GOLD and on the Swegon Chiller/Heat pump while in occupancy mode.

The three main objectives when using NESTOR are:

• Control of a Swegon Chiller/Heat pump based on the cooling and heating demands from up to 8 GOLD units and external demands

• A single point of access to the Swegon system

• Provides a web interface where the user can observe all active alarms in the system

Storage of documentation/project information

NESTOR can be obtained with an SD-card (accessory) for central storage of documentation and relevant project information.

Operational log data from underlying products, such as Super WISE and GOLD, will not be transferred to NESTOR. These products can also be equipped with an SD-card (as accessory), for logging operational data.

Technical data

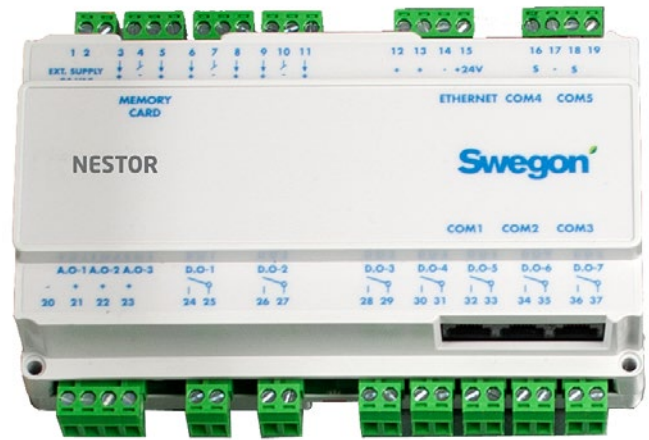|	
Supply voltage	230 V AC, max. 10 A
CE-approved to	EN 61000-6-2, EN 61000-6-3
Enclosure class	IP 65
Ambient temperature at relative humidity	-20 – +40°C 10 – 95%
Dimensions (W x H x D)	300 x 400 x 120 mm
Weight	8000 g

Interfaces

Figure 1: I/Os on the NESTOR hardware. Note the controller has additional I/Os which are not used.

I/O	Type	Description
DI 1	Digital input for independent contact	Used for Operation Mode
DI 2	Digital input for independent contact	External heating demand
DI 3	Digital input for independent contact	External cooling demand
DI 6	Digital input for independent contact	Total factory setting
DO 1	Digital output (independent contact)	External heating
DO 2	Digital output (independent contact)	External cooling
DO 3	Digital output (independent contact)	Time channel controlled output
DO 4	Digital output (independent contact)	Alarm notification
DO 5	Digital output (independent contact)	Current water type (hot/cold)

Table 1: Summary of all electrical inputs and outputs.

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System types

Any combination of the following products can be connected to NESTOR:

- 1-8 GOLD unit (TCP/IP)
- 1–8 Super WISE (TCP/IP)
- 1 Swegon Chiller/Heat pump (Modbus EIA485)
- AQUA Link (Modbus EIA485)
- External heating and/or cooling source can also be connected through digital outputs 1 and 2 to be controlled on/off.

GOLD only

When a GOLD unit is connected, NESTOR collects all GOLD alarms. Time channels can be set in NESTOR to control operation modes and a common outdoor temperature sensor can be used for all GOLD units.

All GOLD web pages can be accessed from the NESTOR web interface.

Super WISE only

When a Super WISE is connected, NESTOR collects all alarms from Super WISE and its underlying zone and room products.

All GOLD web pages can be accessed from the NESTOR web interface.

GOLD and Super WISE

All features available when using GOLD only or Super WISE only are available in this system. Any Super WISE unit selected as connected to a particular GOLD unit (configured via the NESTOR web interface) is displayed as wired to that GOLD on the NESTOR system overview web page.

Swegon Chiller/Heat pump and GOLD

In this type of system all GOLD only features are available.

Some basic parameters from the Swegon Chiller/Heat pump controller are displayed via the NESTOR web interface and any Chiller/Heat pump alarm is shown as one of three alarms in the alarm list.

Furthermore, it is possible to let the Chiller/Heat pump feed any GOLD heating and/or cooling coils with hot and/or cold water. NESTOR registers the heating and/or cooling demand from each GOLD unit, or when there is an external demand, and controls the Swegon Chiller/Heat pump depending on the demand. If there is a simultaneous cooling and heating demand (and the Chiller/Heat pump is reversible), NESTOR includes a priority function which determines whether to provide cooling or heating.

All Swegon Chillers/Heat pumps, in GOLD Function Guide SMART Link/AQUA Link, that are possible to combine in a GOLD-Chiller/Heat pump one to one system are also possible to connect to NESTOR.

Swegon Chiller/Heat pump, GOLD and Super WISE

In this type of system, all features available for GOLD and Super WISE systems and Swegon Chiller/Heat pump and GOLD systems can be used.

AQUA Link and GOLD

An AQUA Link can be used in combination with a standard Swegon Chiller. The function is similar to when using GOLD to one AQUA Link (see GOLD Function Guide SMART Link/AQUA Link for more information), but in this case NESTOR manages the AQUA Link circulation pump and alarm.

The AQUA Link provides any GOLD Supply Air cooling coils and **one** AYC cooling with cold water at an optimised temperature.

AQUA Link, GOLD and Super WISE

In this type of system, all features available for GOLD and Super WISE systems and AQUA Link and GOLD systems are possible to use.

External heating and external cooling

Primary source

External heating, e.g. district heating, can be used as the primary heating source, instead of Swegon heating. The source is controlled with an on/off signal by digital output 1, and is activated as soon as there is a heating demand in any GOLD unit or when there is an external demand.

In the same way, an external cooling source can be used when no Swegon cooling is used.

Backup source

External heating, e.g. district heating, can be used as backup heating when the Swegon Chiller/Heat pump for some reason fails to provide hot water. The source feeds either a second heating coil or a three way valve which is also fed by the Swegon Chiller/Heat pump. The valve is controlled by the digital output 1, to switch between Swegon heating and external heating.

In the same way, an external cooling source can be used for backup.
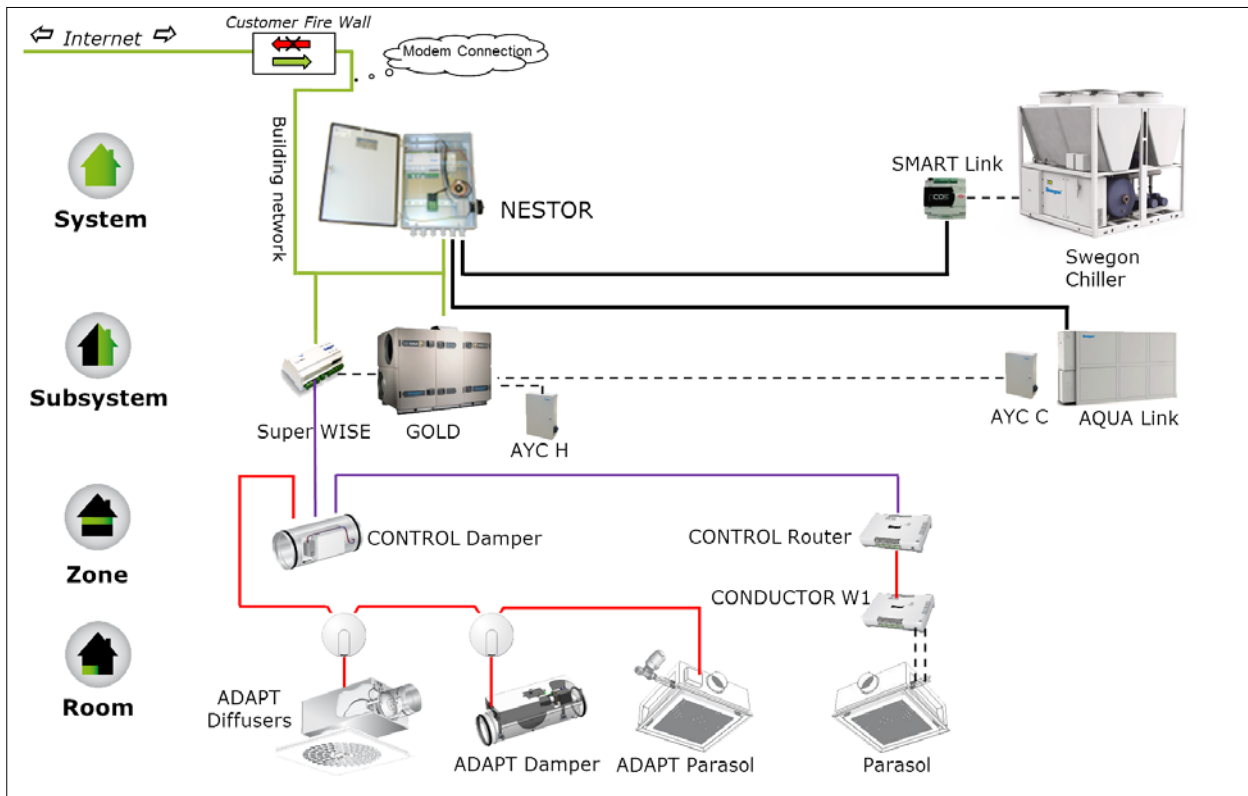
System examples

Figure 2:   A system with AQUA Link can only include one AYC Cool system.
             AYC for cooling is associated with AQUA Link
             AYC for heating is separate. AYC always communicates directly with GOLD
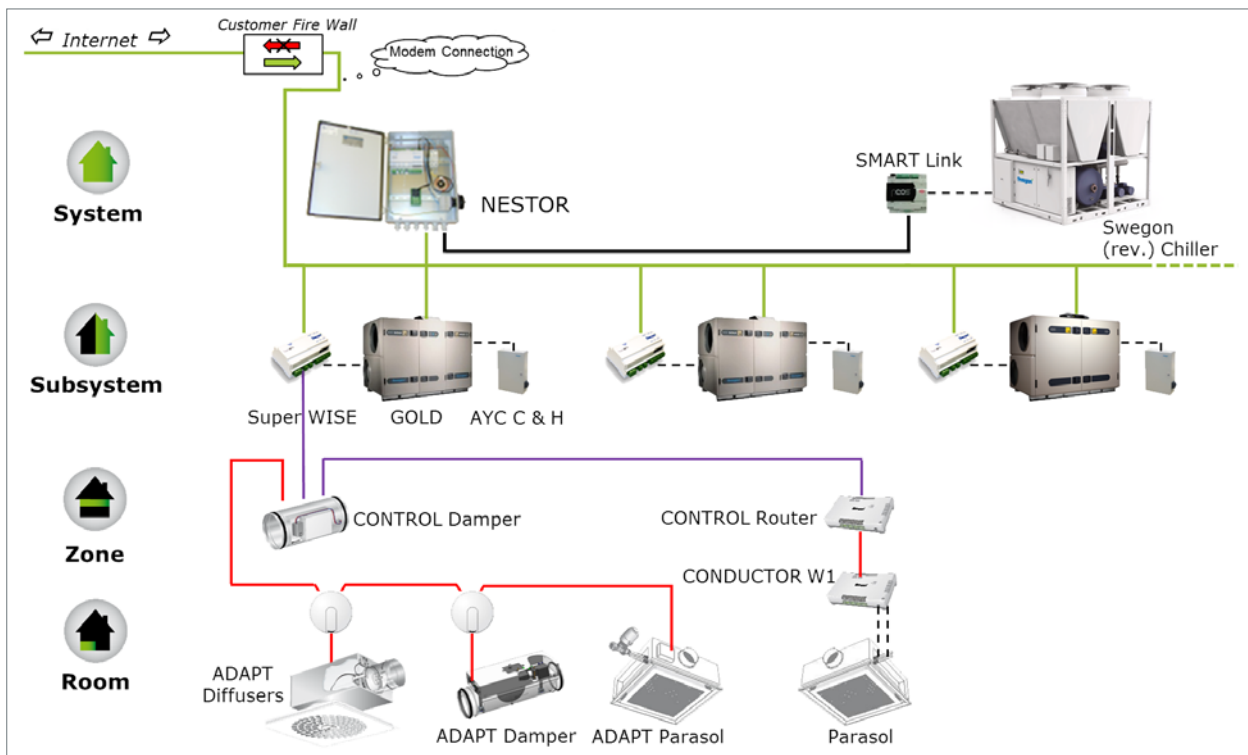

Figure 3:   A system with GOLD and Super WISE can include up to 8 subsystems with or without Super WISE and AYC.
             AYC for cooling & heating is connected to each GOLD.

We reserve the right to alter specifications.   20160310
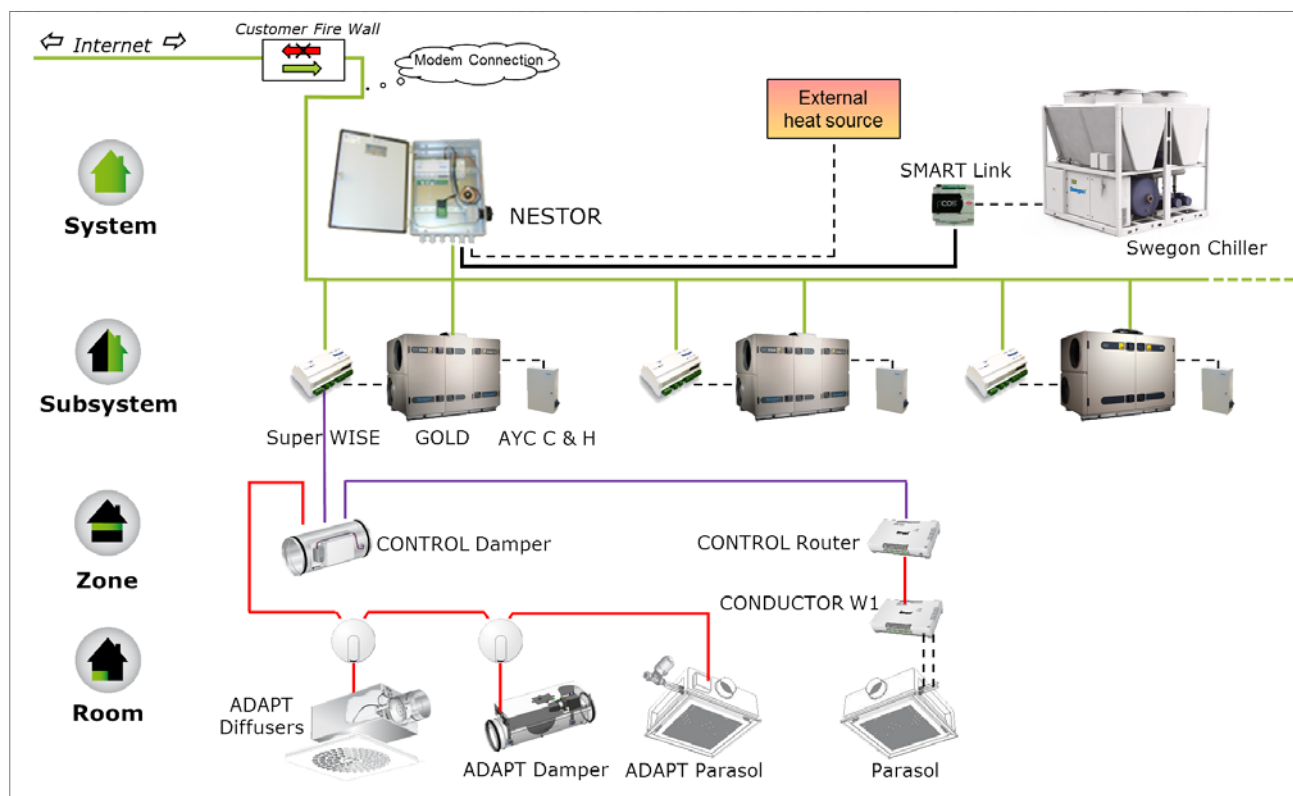
Swegon

System examples

Figure 4:   A system with a Chiller and an external heat source can be supplied with heating and cooling simultaneously.
NESTOR issues start and stop signals to the external heat source through an independent contact.
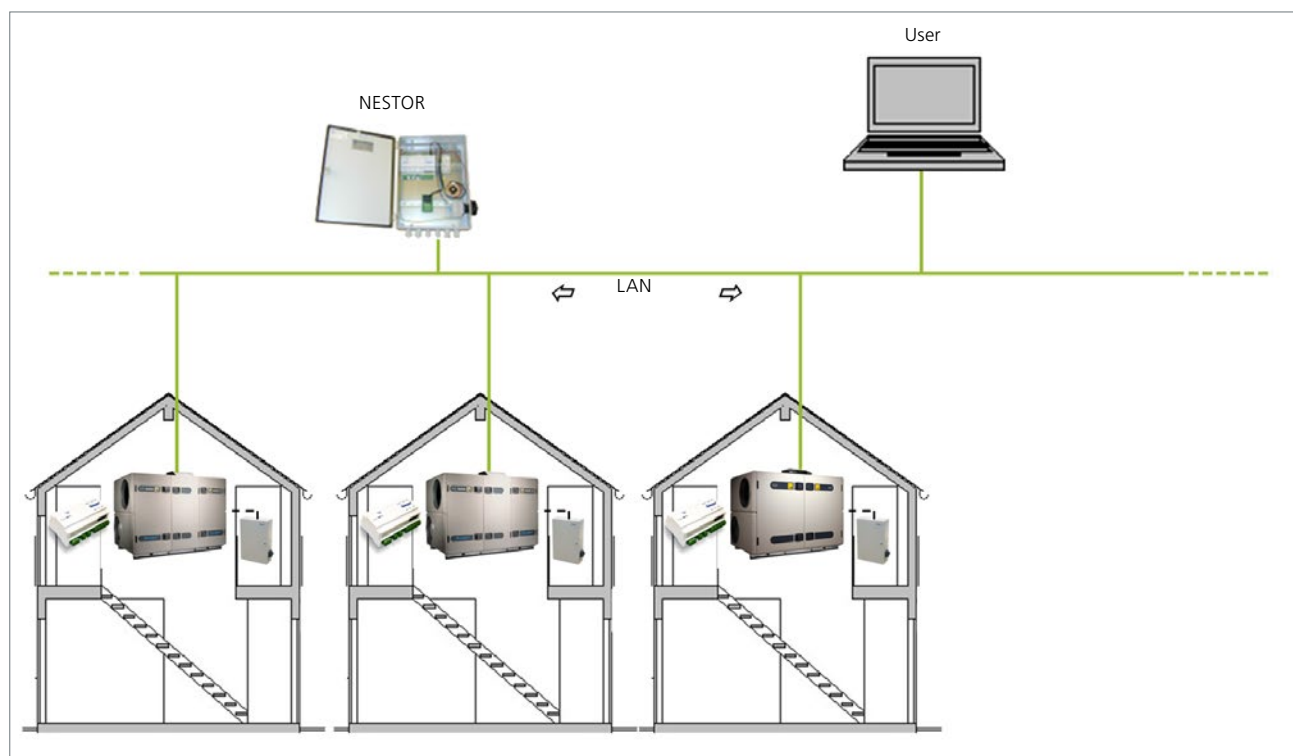

Figure 5:   A building owner with a virtual internal network between multiple buildings can use NESTOR to connect up to 8 buildings to
the same NESTOR. In this case, control of cooling and heating production is handled locally by GOLD and AYC.

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System limitations

- Only Swegon Chiller/Heat pumps of a type possible to connect directly to a GOLD unit, according to GOLD Function Guide SMART Link/AQUA Link, are possible to use in a NESTOR system
- AQUA Link can be used if there is one, and only one, AYC cooling in the system
- It is not possible to use CoolDX in a GOLD unit system connected to NESTOR
- Optimisation of the water temperature is not available for cooling and heating coils connected to one GOLD unit using Extract Air control (ERS 2 may be a good substitute to the EA control). Applicable to the GOLD, Version D only
- Hybrid systems are controlled on/off only

System requirements

- NESTOR, all GOLD units and all Super WISE units must be connected to the same TCP/IP network
- Software version 6.09 or later is required for all Version D GOLD units connected to NESTOR
- Software version 1.10 or later is required for all Version E GOLD units connected to NESTOR
- Software version 1.14 or later is required for all Super WISE units connected to NESTOR
- There must be at least one GOLD unit that measures a valid outdoor temperature when a Swegon Heat pump or Reversible heat pump is used
- When a (clean) heating coil is supplied by a reversible system, the digital output 5 must be used to control a switch valve that protects the heating coil from receiving cold water
- When a (clean) cooling coil is supplied by a reversible system, the digital output 5 must be used to control a switch valve that protects the cooling coil from receiving hot water
- The digital output 1 must be used to control a switch valve switching between Swegon Heat pump and External heating if they both supply the same heating coil
- The digital output 2 must be used to control a switch valve switching between Swegon Chiller and External cooling if they both supply the same cooling coil
- When a common outdoor temperature is used, the external sensor must be attached to the GOLD unit selected as the source unit. Sensor 1 must be used for the Version E GOLD units whereas sensors 2 – 4 are optional

Functions

Alarms

NESTOR collects all system alarms, both active and recovered, and displays the 200 most recent on the Alarm list page. If there are more than 200 alarms in the system, recovered alarms will be deleted from the Alarm list page.

An example of the alarm list is shown in figure 6. Active alarms are shown in red and the date and time of appearance and recovery are displayed. The type of unit, the local alarm number and the alarm priority (A or B, A is the highest priority) are also displayed. A classification is displayed for each unit type, which is used to configure the type of alarms that should generate e-mail or digital output notifications. The priority and classification of each unit type is explained in Table 2.

A location ID is also displayed for each alarm, this is used to indicate which connected unit is generating the alarm. Single numbers (1-8) indicate a System level product, which can be a GOLD unit, a Super WISE or a Swegon Chiller/Heat pump.

Zone controllers are shown with three numbers as A-B-C where A is the number of the Super WISE it is connected to, B is the zone number and C is the duct/damper number in that zone.

Room controllers are shown with four numbers as A-B-C-D where A, B and C indicate the same as for a zone controller and D is the room number.

Room slave controllers are shown with five numbers as A-B-C-D-E where A, B, C and D indicate the same as for a room controller and E is the slave number.

Some examples are listed in the section Alarms web page.

The user can add a comment to each alarm post.

The alarm list can be sorted on any of the above mentioned data e.g. by location ID or by Priority. There is a possibility to hide all recovered alarms and to reset the alarm buffer. Note that a reset will not remove the alarm in the unit it is associated to. Hence, if an alarm is active when a reset is made it will reappear in the list.

For more information about the alarms generated by a product in the NESTOR system, see the user documentation for the specific product.

Alarms generated by NESTOR are shown in Table 3.

Alarms - Chiller/Heat pump

A Swegon Chiller generates three alarms. These are summary alarms on three levels. All of these are classified as a Cooling/Heating production alarm with priority A.

Alarms - GOLD

The Version E GOLD unit generates up to 100 groups with up to 15 alarms in each group, whereas a Version D GOLD unit can generate up to 200 alarms classified as alarms for Air production.

Each alarm is prioritised as an A or B alarm, but they can also be individually deactivated.

Device	Classification	Priority	Comment
NESTOR	System products	A	
Swegon Chiller/Heat pump	Cooling/Heating production	A	
GOLD unit	Air production	According to GOLD settings	The priority of each alarm is read from GOLD.
Super WISE	Climate supply	A	
Zone controllers	Climate supply	A(/B)	The priority is default A, but this is possible to change to B.
Room controllers	Climate supply	B	
Room slave controllers	Climate supply	B	

Table 2: Classification and alarm priority for each product possible to connect to a NESTOR CMS system.

Alarm no	Name	Description/Trigger
1	No outdoor temperature	No system outdoor temperature available.
2	Swegon heat limitation	The heating is limited due to low outdoor temperature OR low supply water temperature.
3	No communication to IQnomic Plus module no. 5	AQUA Link IQnomic Plus module 5 does not respond on request
4	AQUA Link circ. pump alarm (cooling)	AQUA Link circulation pump alarm (cooling)
5	AQUA Link circ. pump alarm (heating)	AQUA Link circulation pump alarm (heating)
10	No Chiller/Heat pump comm.	Communication lost to Swegon Chiller/Heat pump
11-18	No comm. to GOLD x	Communication lost to GOLD unit x.
21-28	No comm. to Super WISE x	Communication lost to Super WISE x.

Table 3: NESTOR alarms.

Alarms - Super WISE

Each Super WISE can generate up to three alarms. Super WISE local alarms are classified as Climate supply alarms with priority A.

A Super WISE can manage a system with a total of 10 zones with a maximum of 60 rooms each.

The Super WISE stores up to 100 zone and room controller alarms in a FIFO buffer, which are collected by NESTOR.

Functions

Figure 6: Example of an alarm list sorted by date. This is the default setting to sort the list when the alarm list is opened.

Location ID examples

Example 1: location ID 2-3-2-05-2 indicates (from right to left) the 2nd room controller slave in the 5th room, connected to the 2nd damper in the 3rd zone of Super WISE number 2.

Example 2: location ID 2-3-2-05 indicates (from right to left) the room controller in the 5th room connected to the 2nd damper in the 3rd zone of Super WISES number 2.

Example 3: location ID 3-5-2 indicates (from right to left) zone damper number 2 in the 5th zone of Super WISE 3.

Example 4: location ID 3 indicates GOLD OR Super WISE unit number 3. The device type is required in order to determine which one the location ID is associated to. In this case Super WISE.

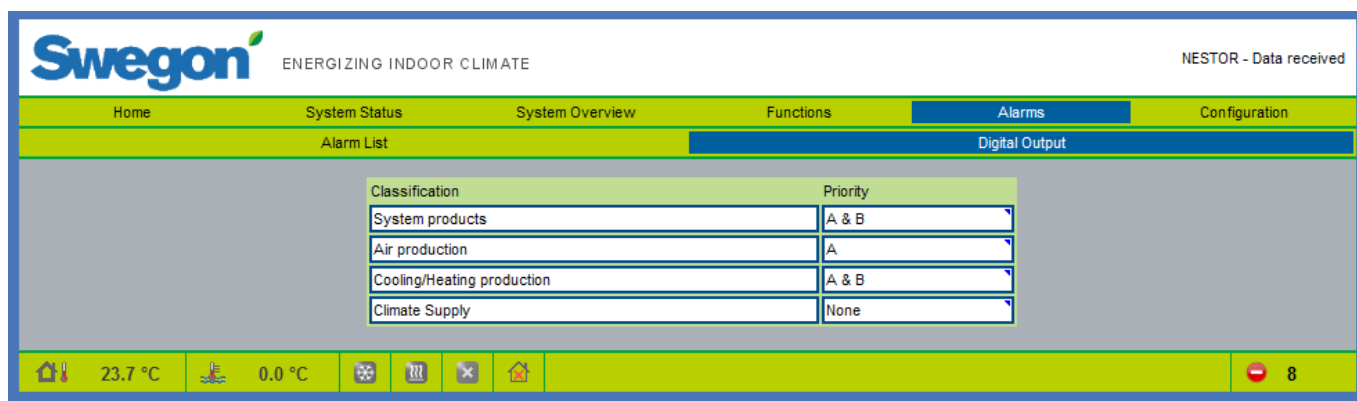**Example 5:** location ID "–" indicates the Swegon Chiller or NESTOR.

Functions

Figure 7: Example of the web page where the alarm configuration that sets a digital output is selected. The Class fields are static, but the Priority field can be used to select one of A, A&B or None.

Alarm notifications

It is possible to send e-mail notifications for a selected alarm class and priority.

An example of how to configure which alarm classifications and priorities set digital output 4 is shown in the Alarm notification figure above.

The output will be activated if an alarm with A priority is active for any class except Climate Supply, or if an alarm with B priority is active for a system product or a Heating/Cooling product.

An e-mail server can be configured from which alarm notifications are sent on the Configuration/E-mail settings page.

The type of alarms that generate an e-mail to a user are configured in the same way as setting the digital output (see the figure above). These settings are found on the Configuration/User page when selecting "Edit->Alarm notifications" for each user. The field to add an e-mail address for the user is also found here.

Functions

Common Outdoor Temperature

The user can choose to use a common outdoor temperature for all connected GOLD units. This is selected on the Functions/Temperature control page. Entering 0 means no common temperature is used. Entering 1, 2 ... 7 or 8 means that the GOLD number selected is the source and the temperature is communicated to the other GOLD units. The external temperature sensor must be connected to the GOLD unit selected as the source. Sensor 1 must be used for the Version E GOLD units whereas sensors 2 – 4 are optional.

There is a setting for each GOLD unit that indicates whether or not the unit should obtain and use the common outdoor air temperature. If not, the GOLD unit will use its own temperature setting according to a standard routine.

If for some reason the external temperature sensor on the source GOLD unit is not available (sensor error or sensor missing) the first found available, reliable and valid internal GOLD sensor for outdoor temperature is used as the source until the selected sensor is available again. A sensor is available when no alarms are active. The sensor is reliable when the GOLD unit is NOT stopped, and there is a setting for each GOLD unit that indicates whether or not the sensor is valid.

The common outdoor temperature is displayed in the bottom left corner of the status field on the NESTOR web page. If no common temperature is used, it is still displayed as the one used for the cooling and heating function. The first found reliable internal sensor on all connected GOLD units is then used.

Swegon Chillers/Heat pumps use their own integrated outdoor temperature sensor.

System operating mode

The system operation mode is used to set the NESTOR system in different modes at specified time channels and/or at a given input signal. It changes the airflow settings on the GOLD units (auto, low speed or high speed) and can turn off comfort cooling (no cooling demand activates the chiller). The two available modes are No occupancy and Occupancy. The default mode is No occupancy. It is possible to set the system in the Occupancy mode either from digital input 1 (DI 1) or from a time channel.

In order to be able to use the NESTOR Time and Year channels the controlled GOLD units must be set in Auto mode using the hand terminals. Any GOLD unit set to Low speed/High speed or STOP using the hand terminal will not be affected by the NESTOR operation mode.

There are 8 separate time channels to set the system in Occupancy mode. Occupancy mode will repeat at the given time each week by selecting one or more weekdays. This is similar to the method currently used on GOLD units.

It is possible to configure operation mode actions for the time channels according to any of the options in Table 4.

The options associated to "No occupancy - Occupancy" e.g. "Auto, No cooling - Low Speed" mean that the GOLD units will run in Auto mode and cooling is prevented in No occupancy mode while Low speed is used in Occupancy mode. The set option is valid for all week based time channels and digital input 1.

There are also 8 separate Year channels to set the system in occupancy mode. Occupancy mode is only activated once at the given date and time by selecting a start date and time and an end day and time. The Year channels override Week channels. It is possible to select one of the options in table 5, for each of the Year channels.

The options associated to Occupancy mode e.g. "High speed, No cooling" mean that if the year channel is active, all GOLD units will run at High speed mode and cooling is not possible. There is one option for each of the 8 year channels.

For each connected GOLD unit, the System operation mode can be set as "Applied" or "Not applied". A GOLD for which the operation mode is applied will receive the NESTOR operation mode.

The operation modes are prioritised increasingly as "Low speed, High speed, Stop" (Stop has the highest priority). This means that if a particular GOLD unit has individual time channels which currently set it in High speed mode and NESTOR sets Low speed, it will run at high speed. If NESTOR then changes to Stop, the GOLD unit will stop.

Time channels

Option (no occupancy-occupancy)	Action
Auto-Auto	Each GOLD works according to individual time channel settings.
Auto, No cooling – Auto	The chiller is not allowed to produce cooling in No occupancy mode. Using this setting and no time channels results in cooling never being activated.
Auto-Low speed	In No occupancy mode, each GOLD works according to individual time channel settings. In Occupancy mode, they run at low speed.
Auto, No cooling – Low speed	Same as above but the chiller is not allowed to produce cooling in No occupancy mode.
Auto-High speed	In No occupancy mode, each GOLD works according to individual time channel settings. In Occupancy mode, they run at high speed.
Auto, No cooling – High speed	Same as option 5, but the chiller is not allowed to produce cooling in No occupancy mode
Low speed - High speed	In No occupancy mode, GOLD unit runs at low speed. In Occupancy mode, they run at high speed
Low speed, No cooling - High speed	Same as option 7, but the chiller is not allowed to produce cooling in No occupancy mode.

Table 4: Alternative actions when weekly based time channels are used.

Year time channels

Option	Action
Time channel off	The time channel is inactive
Stop	Each GOLD and the chiller is stopped
Auto	Each GOLD is set to Auto and works according to individual time channel settings.
Auto, No Cooling	As option 3, but the Swegon Chiller is not allowed to produce cooling.
Low speed	Each GOLD is set to Low speed.
Low speed, No Cooling	As option 5, but the Swegon Chiller is not allowed to produce cooling.
High speed	Each GOLD is set to High speed.
High speed, No Cooling	As option 7, and the Swegon Chiller is not allowed to produce cool.

Table 5: Alternative actions when year time channels are used.

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Functions

Time channel controlled output

Digital output 3 is set according to the time channels in a similar manner to the way operation mode is configured. 3 weekly based time channels and 3 time channels set the output once (each).

If the actual time and date is within any of the 6 channels, digital output 3 will be set.

Cooling and Heating

If a Swegon Chiller/Heat pump is connected to the system, the type (chiller, heat pump or reversible) is selected on the Configuration/System product connection page.

It is also possible to use external heating and/or cooling as the primary or backup source, which is selected from the Configuration/System product connection page. Selecting external heating will automatically set it as the backup heating source if the Swegon Chiller/Heat pump type is Heat pump or Reversible. Otherwise it is used as the primary (and only) heating source. The same principle applies for external cooling, but it is used as the backup source when the Swegon Chiller/Heat pump type is Chiller or Reversible.

For a Swegon Chiller/Heat pump, NESTOR controls the water temperature by calculating and transmitting a system heating and system cooling set point. For external sources, NESTOR only controls these on/off.

Any heating and/or cooling coil, controlled by a heating and/or cooling sequence in table 6, can be fed by a NESTOR controlled heating and/or cooling source. Using up to 8 GOLD and 9 sequences results in a NESTOR cooling and heating source feeding up to 72 cooling and heating coils.

Cooling/Heating Sequence	Abbreviation	Controlled temperature	Type
Ordinary heating	OH	Supply air	Heating
Extra heating	EH	Supply air	Heating
Xzone heating	XH	Xzone supply air	Heating
All Year Comfort Heating	AYCH or AH	AYC heating water temperature (to or from radiators or heating coils/beams)	Heating
Preheating	PH	Outdoor air (to AHU)	Heating
Ordinary cooling	OC	Supply air	Cooling
Extra cooling	EC	Supply air	Cooling
Xzone cooling	XC	Xzone supply air	Cooling
All Year Comfort Cooling	AYCC or AC	AYC cooling water temperature (to or from chilled beams)	Cooling

Table 6: Heating and cooling coil control

An AQUA Link can be used only when a Swegon Chiller is used. Activation and the type of alarm signal are set on the Functions/Temperature control page.

If more than one GOLD unit is used in a NESTOR system with an AQUA Link, only one of the units can use AYC cooling.

Cooling and heating demands

NESTOR monitors the local demand for each used heating coil in each GOLD unit. These are combined into a system heating demand which will be true if any of the local heating demands are true.

The system cooling demand is determined in the same way.

One heating and one cooling set point are configured for each GOLD unit.

The system heating set point value is the highest heating set point value set on all GOLD units with a heating demand.

The system cooling set point value is the lowest cooling set point value set on all GOLD units with a cooling demand.

If Extract air control is used, optimisation cannot be used (GOLD ver. D). If optimisation is activated (individual configuration for each GOLD unit), NESTOR optimises the cooling and heating set points for that GOLD unit with respect to its demands. The cooling and heating set point values are then used to set the correct set point values on the Swegon Chiller/Heat pump.

The figure on the next page shows an example of how the cooling demand and set point value is determined when two GOLD units are used.

External heating and cooling demand

External demands are indicated by closure of the DI 2 (heating) and DI 3 (cooling) inputs. The function is activated and is possible to invert. Fixed temperature set points are used for both an external heating demand and an external cooling demand. When there are no other demands (no heating or cooling demands from GOLD units) the system uses the preset set points set for the external demands.

It is possible to choose between two operating modes: Economy and Comfort.

Functions

Swegon Cooling

If a Swegon Chiller is used, NESTOR sends the chiller the system cooling demand and the system cooling set point value. An example is shown in the figure below.

If there is an active alarm from the Swegon Chiller, external cooling is used if available.

Swegon Heating

If a Swegon Heat pump is used, NESTOR sends the heat pump the system heating demand and the system heating set point value.

If there is an active alarm from the Swegon Heat pump, external heating is used if available.

Protection is also provided against a too low outdoor temperature or a too low supply flow temperature. This is referred to as Heat limitation. For further information, see the section Heat limitation.

Reversible Chiller

If a Swegon Chiller of type reversible is used, NESTOR activates the chiller if any of the system heating or cooling demands are true and supplies it with the system heating and cooling set point values. The chiller is also set to produce heating (heating mode) OR cooling (cooling mode). If there is a system heating demand, but not a cooling demand, the chiller mode is heating and vice versa.

When a cooling and heating demand occurs at the same time, the chiller mode is cooling if the outdoor temperature is higher than the configured value. Otherwise heating is activated.

There is a limitation as to how often the chiller is able to switch between cooling and heating. This is configured in days and hours on the Temperature control web page. The mode is not possible to switch until at least this number of days and hours has elapsed.

There is a prioritised mode (heating or cooling) which can be selected to prevent the Swegon Chiller from "getting stuck" in an undesired mode. If the mode is cooling and there is a system heating demand and the priority is heating, the Chiller/Heat pump is forced to produce heat if the time since the last switching operation is more than the time configured for prioritised switching. This time should be set much lower than the ordinary minimum time between switching.

To force the Swegon Chiller/Heat pump to switch (e.g. during service), set the minimum switch time (hours, days) to zero and then back to normal again. This forces switching from cooling to heating or vice versa if the current demand is different from that being produced at the time.

When a reversible Chiller feeds combi coils controlled by Extra regulation sequence, there is built-in temperature protection in the GOLD units which protects against heating with cold water or vice versa. When feeding any other coil, using any other sequence in TABLE 6, an external protection is required. It is then highly recommended to place a two way valve before the coil. The valve is controlled with an on/off signal by digital output 5 (DO 5) which switches high/low according to the production of heated/chilled water. The output is possible to reverse.

If there is an active alarm from the Swegon reversible Chiller, external heating or cooling is used if available.
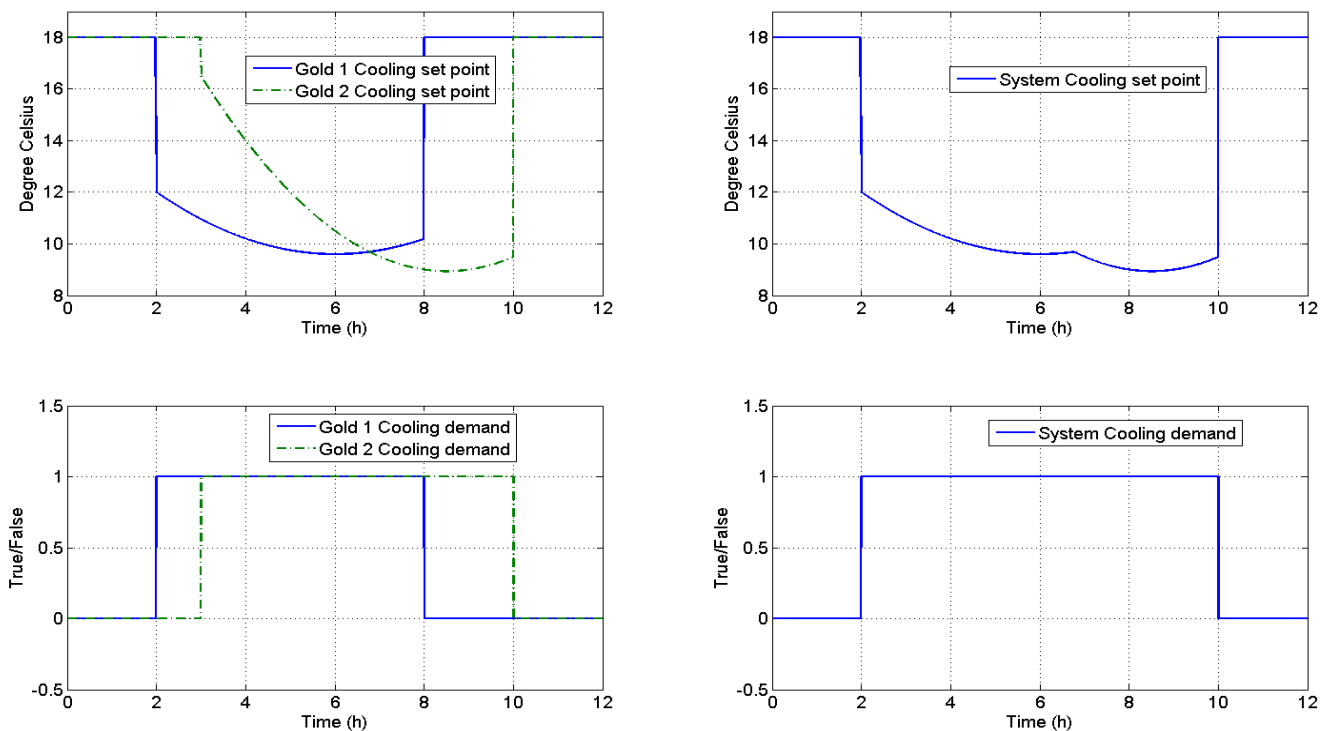

Figure 8: An example of 2 GOLD units with a cooling demand. Fig. A shows the cooling set point values for two GOLD units and Fig. C shows the system's cooling set point. Fig. B shows the cooling demand signal for two GOLD units and Fig. D shows the signal for system cooling demands. Note that the activation delay here is zero.

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Functions

Swegon Chiller/Heat pump heat limitation

If the Swegon Chiller/Heat pump type is heat pump or reversible, there is a protection function for heating production when the outdoor temperature is too low or the supply water temperature is too low.

The user can activate this function and choose between the two detection types on the Temperature control web page.

If the outdoor temperature option is used, Heat limitation mode is entered when the outdoor temperature falls below a configured limit value. Recovery from Heat limitation occurs when the outdoor temperature is more than 3 Kelvin higher than the limit value.

If the supply water temperature option is used, Heat limitation mode is entered when heating is active and the supply water temperature drops below a difference from the current heating set point value for more than a specified amount of time. The temperature difference is configured on the Temperature control web page. Note that one of the two values must be set high during system start up to avoid an undesired heat limitation i.e. when the supply water temperature for obvious reasons is much lower than the set point value.

Recovery from heat limitation mode occurs when heating is active and the supply water temperature is higher than the system heating set point value. It can also recover if heating is not active and the outdoor temperature has increased by 3 Kelvin since entering heat limitation mode.

The action taken during heat limitation is selected on the Temperature control web page. If None is selected, the Swegon Chiller/Heat pump is turned off (no heating will be produced). The option "Change" activates external heating source (if enabled) and turns off the Chiller/Heat pump. The option "Both", activates external heating source and the Swegon Chiller/Heat pump remains enabled.

Hybrid System

A hybrid system can produce heating and cooling at the same time. The water temperature is not controlled and NESTOR acts exactly as if Swegon Chiller/Heat pump type is "None" and both external heating and cooling is used.

External heating

If external heat is used, the digital output 1 is set whenever there is a system heating demand, and at least one of the following is true:

1. Swegon Chiller/Heat pump type is set to None or Cool

2. There is one active Chiller/Heat pump alarm or one active AQUA Link alarm

3. The Swegon Chiller/Heat pump type is Reversible and is running in cooling mode, or has been stopped due to time limit before switching to heating mode

4. The Heat limitation is active, and Heat limit action is "Change" or "Both"

When the Swegon Chiller/Heat pump type is Hybrid system, the digital output 1 is set as soon as there is a heating demand.

If external heating is used as backup, there are two variants of connection to the heating coils. For the supply air heating, the Swegon Heat pump/Swegon Reversible machine feeds one of the sequences (Ordinary heating and Extra heating) and the external (backup) heating source feeds the other one.

For radiators and Xzone there is only one sequence each (AYC heating and Xzone heating). A three way valve must be used, connected to the Swegon Heat pump/Reversible machine (1), the external heating source (2) and the heating coil (3). The digital output 1 (DO 1) controls switches between (1) and (2) to feed (3).
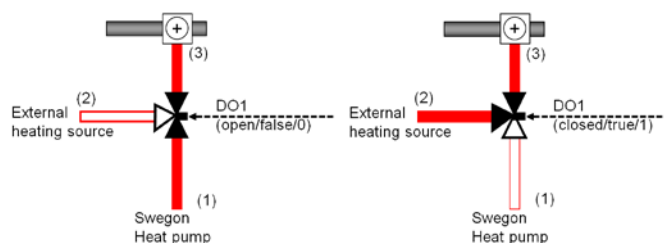

Figure 9: External heating used as backup. To the left the DO 1 is open, and the Swegon Heat pump feeds the heating coil. To the right the DO 1 is closed, and the external heating feeds the heating coil

External cooling

If external cooling is used, the digital output 2 is set whenever there is a system cooling demand, and at least one of the following is true:

1. Swegon Chiller/Heat pump type is set to None or Heat.

2. There is one active Chiller/Heat pump alarm or one active AQUA Link alarm

3. The Swegon Chiller/Heat pump is Reversible and is running in heating mode, or has been stopped due to time limit before switching to cooling mode, and Heat limit action is "Change" or "Both"

When the Swegon Chiller/Heat pump type is Hybrid system, the digital output 2 is set as soon as there is a cooling demand.

If external cooling is used as backup, there are two variants of connection to the cooling coils. For the supply air cooling, the Swegon Chiller/Swegon Reversible machine feeds one of the sequences (Ordinary cooling and Extra cooling) and the external (backup) cooling source feeds the other one.

Installation

System configuration

The Swegon software Golden Gate Config is used to detect and perform basic network configurations in Nestor. See NESTOR web manual for more information. System configuration is performed either over Modbus TCP or from the web instance via the Configuration page.

GOLD units and Super WISE units are connected by TCP/ IP (RJ45) and by adding their IP addresses in the configuration part of the NESTOR web page. The connected units can be given customised names displayed in the system overview. However, the number 1-8 are used in alarm lists and e-mail notifications.

Note that on delivery Super WISE, GOLD and NESTOR all have the same default IP address (10.200.1.1). Connect the units one at a time to change the IP address. It is recommendable to use static IP addresses.

A Swegon Chiller/Heat pump is connected by EIA-485 and by adding the correct type in the configuration part of the NESTOR web page.

Users and access privilege levels

There are four user access privilege levels: Administrator, Service, Writer, Reader.

Only the administrator is able to add and manage users. Mobile telephone number, e-mail address and access level can be configured for each user.

The alarm notification settings need to be configured for each user.

Restoring the factory settings

The Reset button on the Configuration/NESTOR page restores all the function parameters to their respective standard values. It is also possible to totally restore the factory settings including restoration of communication settings, for instance. This is done by closing the digital input (DI 6) and switching the power supply off and on. 1 – 2 minutes after switching on the power supply, remove the jumper for DI 6 (open the input). The factory settings will be restored when the input is opened.

Software Update

The NESTOR software is updated through an SD memory card. Insert the card with the software and select "Rescan MMC" on the SW Update web page (Configurations). Select "Update" and wait a few minutes for NESTOR to update and reboot.

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Installation

System access – Communication

A BMS and a customer internal network can communicate with NESTOR and other top level devices in the CMS system. The NESTOR is connected to the bus and web page and gives access to Modbus registers.

NESTOR data

NESTOR provides modbus registers, which contain the alarm FIFO buffer and system level parameters. For more detailed calibration of the system via Modbus TCP, any BMS can communicate to any of the underlying products.

Subsystem access

All top level products can be accessed via TCP/IP as separate slave (server) nodes. Hence, from a BMS point of view, the system is the same as without a NESTOR system. NESTOR just becomes a new node on the bus and happens to act as a master AND slave (slave to the BMS, master to the other nodes). If the network is connected to the internet, all nodes can be accessed from the internet either through the NESTOR web interface, or directly by using their individual IP and Port numbers.

Connections

A computer with web browser and support for Java applications is required for managing and operating NESTOR. The computer can be connected directly to NESTOR, with a cross-connected CAT5 cable with RJ45 connectors or to a network (hub, switch or router) with a straight (not cross-connected) CAT5 cable. Connect the cable to the outlet marked ETHERNET on NESTOR. See Figure 12.

NESTOR is delivered from the factory with a fixed IP address. The first time you communicate with NESTOR, use the Golden Gate Config software that can be downloaded from www.swegon.com. For more detailed information about how to wire NESTOR to underlying systems, intelligent building automation, GOLD unit, Swegon Chiller and Heat pumps, please refer to the installation instructions for the specific product.

Detailed information about communication with NESTOR and using the web page is available in the web page manual, which can be downloaded from www.swegon.com.
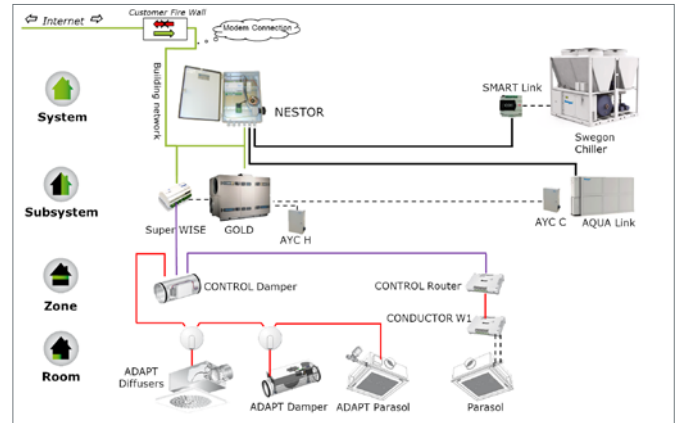

Figure 11: Schematic view of the network (green). The cloud symbolises an external connection, for example, to a dial up modem, from which the web page is accessible. The customer may add a firewall between the Swegon network and its internal network. Note that a Customer firewall and the Modem/Internet connection are not required.
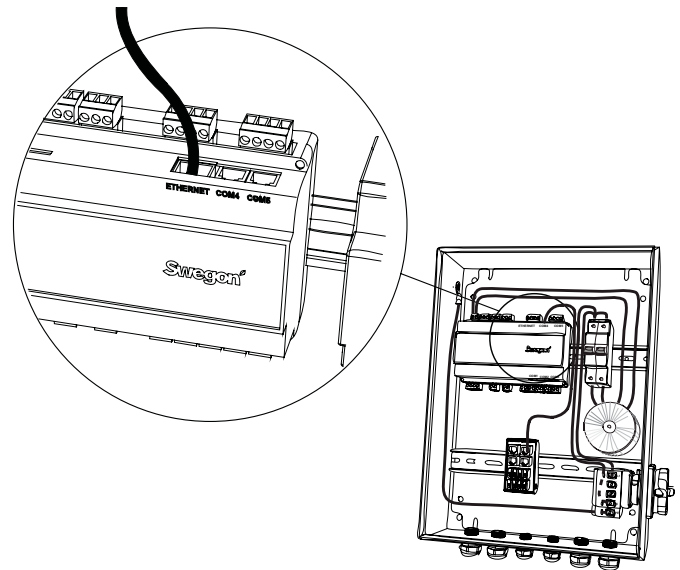

Figure 12: Connecting to NESTOR

User interface

The NESTOR user interface is a web page with sub pages for system status summary, function configuration, alarm list, system overview and administration.

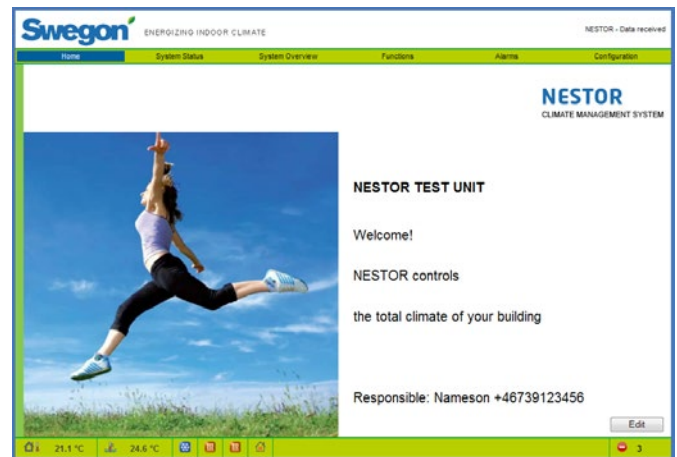The web pages are described thoroughly in the NESTOR web manual, found on www.swegon.com.

Figure 10: Web page in the NESTOR user interface

We reserve the right to alter specifications.   20160310

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Notes