Guide to the GOLD version E/F/G functions, SMART Link DX

1. General

The *SMART Link DX function* is intended to be used for controlling the supply air temperature by connecting one GOLD unit to one to four EPSILON Sky cooling units/heat pumps.

The function can be activated for all GOLD versions, but the functionality is optimised for units with rotary heat exchanger (GOLD RX).

NOTE! When using Smart Link DX together with PX plate heat exchanger a preheater, such as an electric air heater for example, must be installed before the air heater/cooler. This is because of the low temperatures in the supply air duct when the plate heat exchanger is defrosting.

There are air heaters/coolers for the function, especially adapted for EPSILON Sky LE, that take into account the recommended internal pressure drop, etc.

1.1 Installation

All the necessary control functions are ready to be activated. On selecting the type of unit, the control system automatically activates the extra regulation sequence. No IQlogic+ module is required.

For particulars of the Modbus ID of each unit: See the diagrammatic sketch below.

See also the separate installation instructions for the GOLD and EPSILON Sky respectively.

2. Material Specification

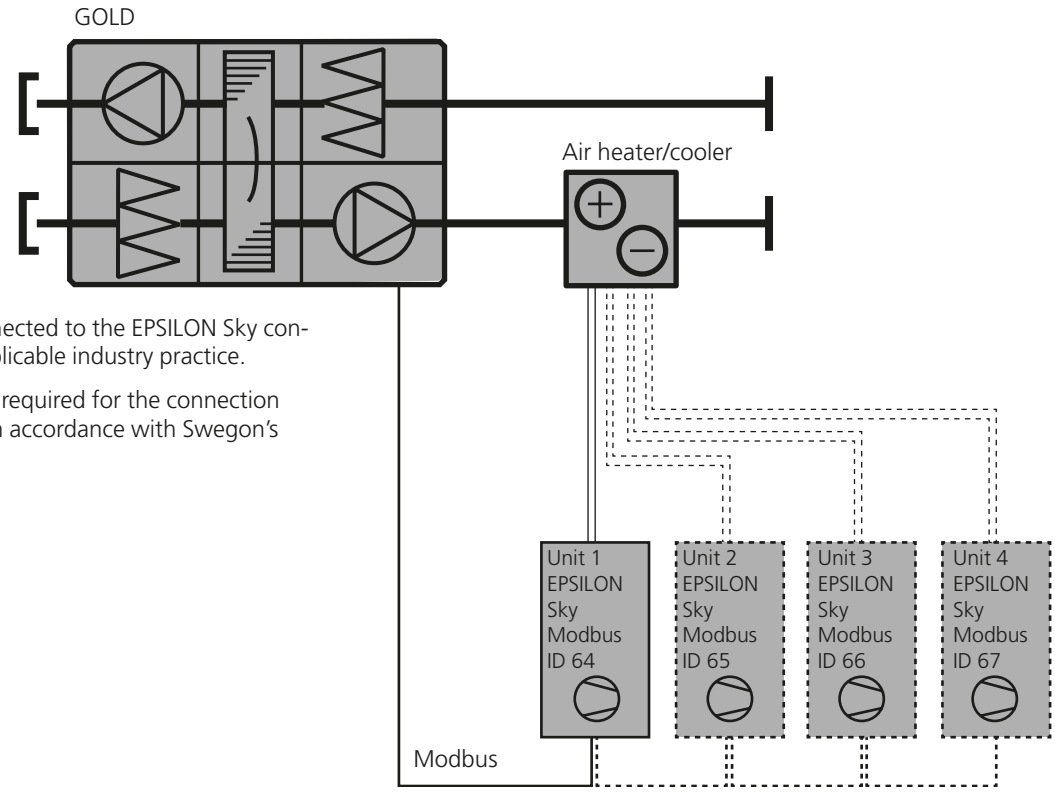
Air handling unit **GOLD RX**
The function is optimised for GOLD RX, but the possibility of activation is also available for GOLD PX/CX/SD.

Condensing unit(1-4 units) **EPSILON Sky /LE or /LE/HP**

Air heater/cooler **According to Swegon's recommendation**

Cable adapter **TBLZ-1-64**

1.2 Diagrammatic sketch



Air heater/cooler is connected to the EPSILON Sky condensing units as per applicable industry practice.

A coil in a split design is required for the connection of more than one unit in accordance with Swegon's recommendations.

3. Function

3.1 General

Operation is performed according to the GOLD unit's extra regulation sequence function. See the Operation and Maintenance Instructions for the GOLD.

The speed of rotation of the EPSILON Sky unit is 0-100% controlled between min. and max.speed of rotation. The min. speed is about 20-30 % of the max speed.

Start at low power requirement can be avoided. This is performed via the handheld terminal/web page at service level (contact Swegon for the password) under the Functions/Core/Temperature/Neutral zone.

Neutral zone function heating respective cooling is selected as the start limit. Temperature (start limit) for Extra regulation sequence heating respective cooling is stated. The EPSILON Sky unit is then not permitted to start until the supply air temperature (in the cooling case) exceeds or (in the heating case) is below the set point with the set temperature (start limit).

For extract air regulation or outdoor air related extract air regulation the start limit can ideally be set to 3 Kelvin or more to produce economic operation.

When the start limit prevents cooling or heating, the system will be adjusted automatically as soon as the extract air temperature starts to deviate, as the extract air regulation is cascade connected to the supply air regulation.

There is a minimum air flow of 50 % of the air handling unit's maximum flow (factory setting, can be adjusted), which ensures sufficient supply air flow for the correct operation of EPSILON Sky.

This minimum air flow cannot be set lower than EPSILON Sky parameter SML38, see below.

Model	Min. air flow limit (l/s)
6	225
12	375
18	500
24	825
30	1000
36	1600
45	1950

If the supply air flow drops below the minimum air flow, alarm 49 in EPSILON Sky is activated and it switches off. This triggers alarm 24:13 in GOLD with a 10 minute delay.

The alarm resets automatically in both EPSILON Sky and GOLD as soon as the air flow rises above the minimum air flow.

When several EPSILON Sky units are used, the ones that are active are always run in parallel (same speed of rotation).

For a system with more than one EPSILON Sky unit, the EPSILON Sky unit with the lowest total operating time is always started first.

If the GOLD unit is shut down, it is run in an overtime operating sequence (afterrun) for 2 minutes with the EPSILON Sky units switched-off.

When an alarm (even a communication alarm) is initiated by a EPSILON Sky unit, this unit is switched off and a new EPSILON Sky unit is started, provided that one is available.

The supply air temperature is likely to drop during the defrost cycle. An air heater for reheating (TBLA/TCLA/TBLE/TCLE) can then be used for heating the supply air temperature to ensure comfort.

3.2 Limitations

The dehumidification function does not work for a system with ordinary cooling in sequence, with combined air cooler/air heater, connected to a EPSILON Sky reversible unit.

The function can be activated for all GOLD versions, but functionality is optimised for units with rotary heat exchanger (GOLD RX).

NOTE! When using Smart Link DX together with PX plate heat exchanger a preheater, such as an electric air heater for example, must be installed before the air heater/cooler. This is because of the low temperatures in the supply air duct when the plate heat exchanger is defrosting.

The supply air temperature is likely to drop during the defrost cycle. An air heater for reheating (TBLA/TCLA/TBLE/TCLE) can be used to ensure the supply air temperature.

3.3 Active units

Increasing and decreasing the number of active units takes place according to preset values in the EPSILON Sky control system. These values are always read in Unit 1 (ID 64), if no communication alarm has tripped. If a communication alarm trips, the values in Unit 2 (ID 65) are used, etc. The control system of the GOLD unit uses the same limits for all the EPSILON Sky units, irrespective of whether they are set differently.

Both the heat/cool demand and the actual speed of rotation of all the active EPSILON Sky units are required to be within the limits that enable an increase or decrease in the number of active units.

During every change in the number of active units, the control system freezes the number of active units for 4 minutes (factory setting, resettable). The reason for this is to stabilize the regulation function before a new decision to change the number of units can be made.

During this delay, the rotary heat exchanger is permitted to regulate down or up (depending on the heat/cool capability across the heat exchanger) in order to compensate possible differences in supply air temperature.

This delay also applies if you switch to 0 active units, which means that the shortest time in stopped mode during switching between cool and heat for reversible EPSILON Sky units is 4 minutes (factory setting, resettable).

Swegon reserves the right to alter specifications.

3.4 Operating modes

Available operating modes:

0. STOP
1. STANDARD OPERATION
2. STABILIZING
3. COMFORT
4. DEFROST DELAY
5. DEFROSTING
6. OIL RECOVERY
7. AFTERRUN

3.4.1 STOP
Occurs when the GOLD unit has stopped.

3.4.2 STANDARD OPERATION
Denotes ordinary operation. In the STARDARD OPERATION mode only, the number of active units can be changed irrespective of the cool or heat demand.

3.4.3 STABILIZING
When the number of active units is changed, the control system freezes the number active units for 4 minutes (factory setting, resettable) so that the regulation function will stabilize. (For a more in-depth description, see Section 3.3.)

3.4.4 COMFORT (GOLD RX only)
When little capacity is needed (one active unit operating at min. speed), the system locks in a so-called comfort mode for 30 minutes (factory setting, resettable).

During this period the number of active units is locked to 1 and the rotary heat exchanger is permitted, if possible, to compensate for possible excess heat or cooling. This means that if the capacity demand rapidly decreases, a period in the comfort mode will still have to run its course. The only way to leave the comfort mode faster is to stop and restart the air handling unit.

The length of the period in the comfort mode can be set down to 0 minutes. (However, a changed length of period will not be valid until the system is no longer in the comfort mode.)

3.4.5 DEFROST DELAY
If defrost is required in a EPSILON Sky unit operating in the heat mode, a delay of 180 seconds (factory setting, resettable) must elapse before the defrost cycle starts. If the need for defrost disappears some time during this delay, the defrost cycle is cancelled.

When the defrost delay begins, one more EPSILON Sky unit will immediately start, provided that one is available.

The supply air flow is compared with a limit value read from the EPSILON Sky which needs to be defrosted. This limit value is found as parameter Gfc 52 in EPSILON Sky.

If the actual supply air flow drops below 110% of the limit value, the GOLD air handling unit regulates the supply air and extract air flow up to the specified limit value. This occurs irrespective of the air regulation mode selected in GOLD.

3.4.6 DEFROSTING
The defrost cycle takes a maximum of 7 minutes (excluding the defrost delay) and it never occurs in more than one EPSILON Sky unit at a time.

The supply air flow is maintained as described in 3.4.5 during the entire defrosting.

Detection that the flow is kept above the specified limit value in EPSILON Sky starts at the same time as defrosting. If the supply air flow drops below the specified limit value for more than 30 seconds, alarm 50 in EPSILON Sky is activated. Defrosting is interrupted and EPSILON Sky stops. The alarm resets automatically in EPSILON Sky after 1 minute. If this occurs 5 times during a period of 60 minutes, the alarm in EPSILON Sky must be reset manually.

Alarm 81:2 is activated with a 70 minute delay if it is EPSILON Sky number 1, alarm 82:2 if it is EPSILON Sky number 2, etcetera. This means that the GOLD air handling unit shows the alarm first after it has occurred repeatedly.

The table of factory values for the air flow limit's defrosting (parameter SML39 in EPSILON Sky):

For factory values for the air flow limit's defrosting (parameter SML39 in EPSILON Sky), see the table below.

EPSILON Sky size	Air flow limit (l/s)
6	360
12	600
18	880
24	1320
30	1760
36	3120
45	4000

3.4.7 OIL RECOVERY
During longer periods of operation at low speeds of rotation, there is risk of insufficient oil circulation in the EPSILON Sky circuit. The unit and the system are then put in the OIL RECOVERY operating mode, i.e. the EPSILON Sky unit increases its speed to 60% (of the maximum speed of rotation) for 4 minutes. The GOLD unit then permits the rotary heat exchanger to regulate down or up. Following operation in the OIL RECOVERY mode, the unit will stabilize for 4 minutes (factory setting, resettable).

3.4.8 AFTERRUN
On an order to shut down, the GOLD unit will run in an overtime operating sequence (afterrun) for 2 minutes with the EPSILON Sky unit(s) switched off.

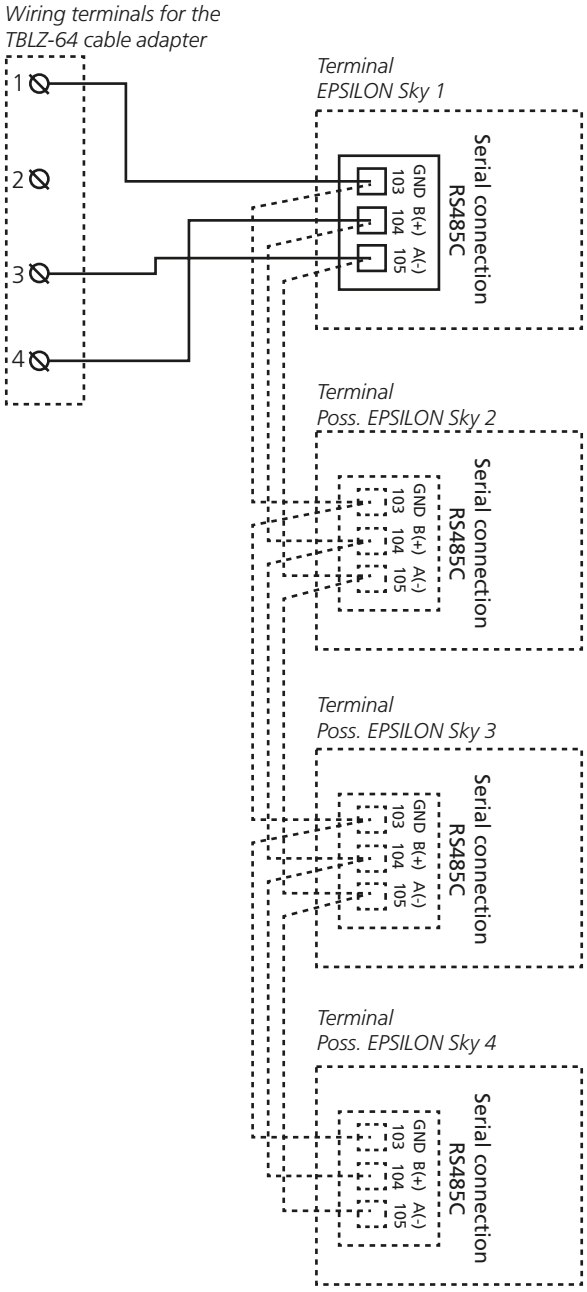
4. Electrical connections.

4.1 SMART Link

Connect the bus cable (supplied) between the bus contact, marked COM4, on the control unit of the GOLD unit and an optional bus contact on the cable adapter.

Connect the communication cable between the EPSILON Sky control equipment and the TBLZ-64 cable adapter as illustrated below.

The cable is not included in the supply. A 0.5 mm^2, twisted-pair cable is recommended. Max. permissible cable length: 100 metres.



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5. Settings

For basic facts on how to use the hand-held terminal, see the Operation and Maintenance Instructions for the GOLD Air Handling Unit.

The functions for the chiller/heat pump must be activated manually under the Functions/Extra/SMART Link.

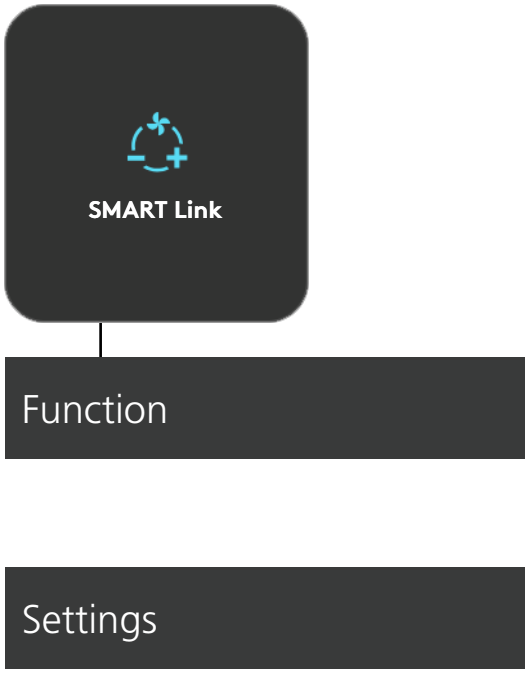
Set the supplied type of EPSILON Sky (DX, heat pump/ DX, chiller or DX, reversible).

Set the number of connected units (EPSILON Sky) which the GOLD air handling unit will control.

Set the required length of the period for operation in the comfort mode, heating and cooling, defrost delay and the time for stabilization.

If necessary, set the min. supply air flow rate during defrosting.

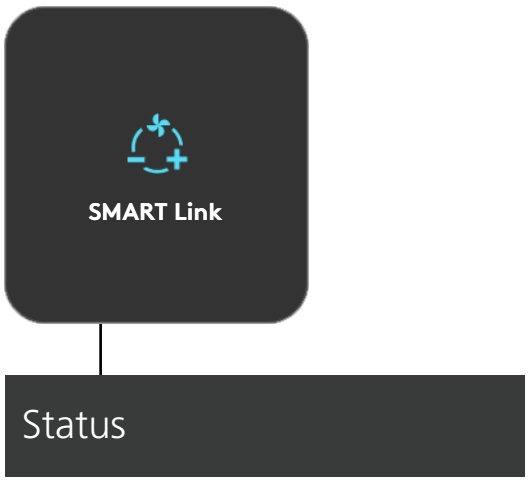
Extra regulation sequence for heat and cool resp. is activated automatically.



6. Status

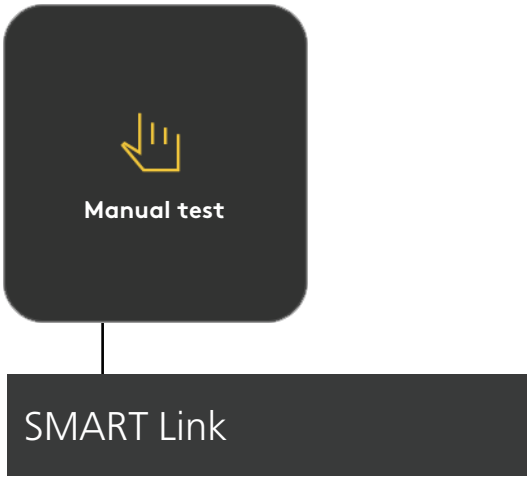
The chiller/heat pump readings can be viewed under Status.

No values can be changed in this menu group.



7. Manual test

The relevant values can be viewed and controlled under INSTALLATION – MANUAL TEST - SMART Link.



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