Swegon

Fault tracing malfunctions without tripped alarms GOLD			Document No. I-12250	Revision 001	Page 1 (11)
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Overview

1 General

This troubleshooting instruction is intended for use as a troubleshooting aid if the GOLD air handling unit is not operating in a satisfactory manner and without tripping the alarm.
If an alarm has tripped and an alarm number and text are shown in the hand-held terminal, we refer to Instructions no. I-11373 "Instructions for troubleshooting the GOLD".

The instructions are formulated so that the various conceivable fault symptoms are grouped under the various sections.

2 The GOLD unit will not start

2.1 No text is shown in the display of the hand-held terminal

2.1.1 Check the voltage of the power supplied to the control unit

- Use a voltmeter to check that there is 230V input voltage between wiring terminals 68 and 70 on the control unit. See Fig. 1.
- If there is no voltage, check that the double-pole control circuit fuse in the air handling unit is in the switched on position.
- If there still is no voltage, check that the main switch of the air handling unit is switched on and that power is being supplied to the air handling unit. Use a voltmeter to measure the incoming voltage on the underside of the main switch or on the protective motor switches or the fuses. Check that all the phases are wired forward to the air handling unit.

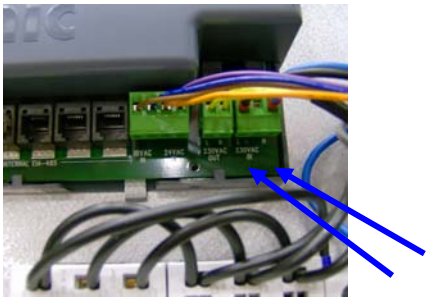


Fig. 1

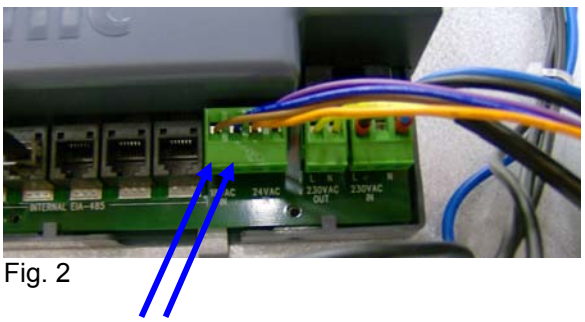


Fig. 2

2.1.2 Check that 18 V AC control voltages are being supplied forward to the control unit

- Use a voltmeter to check that there is 18 V AC input voltage between wiring terminals 62 and 63 on the control unit. See Fig. 2.
- If there is no voltage, use a voltmeter to check that there is 230V output voltage between wiring terminals 66 and 67 on the control unit.
- If there is no voltage, check the glass tube fuse on the control unit.
  The power supplied from the control unit flows to the transformer where it is transformed to the control voltages used by the GOLD control systems. 18 V AC and 24 V AC for the control unit and 36 V AC for the heat exchanger controller.
- 230 V power is supplied to the transformer, but 18 V AC is lacking between wiring terminals 62 and 63 on the control unit. The transformator has built-in thermal fuses in the windings. Open the green wiring terminal row 62-65 on the control unit, in order to check with a voltmeter whether voltage returns when the thermal fuse has had time to cool down.
- If 18 V AC voltage returns on the loose wiring terminal 62-63, the fault is in the control unit or the components connected to the control unit are faulty.

2.2 The display in the hand-held terminal starts up, but the text on the screen disappears after a little while

2.2.1 Check that the 18 V AC control voltages forward to the control unit do not disappear

- Use a voltmeter to check that there is 18 V AC input voltage between wiring terminals 62 and 63 on the control unit. See Fig. 2.
- If the voltage is not constant, the transformer is probably overloaded causing the internal thermal fuse to trip.
- Disconnect all the external connections from the control unit and check whether 18 V AC remains constant. The fault lies with one of the external wired connections or components.

2.2.2 Check whether the 18 V AC control voltages disappear inside the control unit

- Thermal fuses are located inside the control unit below the plastic cover. See Fig. 3.
  The left-hand thermal fuse applies to 18 V AC. N.B! The fuse becomes very warm when it trips.
- Use a voltmeter to check that there is continuous 18 V DC between wiring terminals 36 and 37 on the control unit. See Fig. 4.
- If the voltage is not constant, some component connected to the communications network is probably defective or is short-circuiting.
- Disconnect all the cables connected to Modular connections on the control unit and check whether 10 V DC remains constant. If 10 V DC remains constant, the fault is internal inside the control unit. The control unit must be replaced.
- Does 10 V DC remain constant? Reconnect the cables one at a time to their terminals in order to be able to determine in which cable the fault arises again.

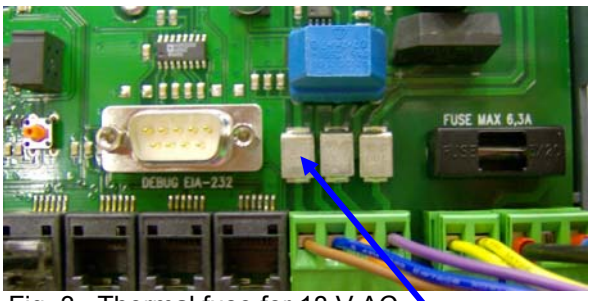


Fig. 3 Thermal fuse for 18 V AC

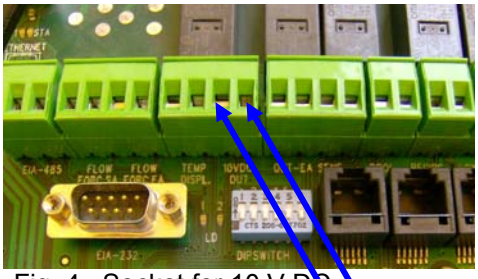


Fig. 4 Socket for 10 V DC

2.3 The display in the hand-held terminal shows X on cable and ?

- When the air handling unit power supply is switched on and the control unit establishes communication with the hand-held terminal and other components in the network, the figure in Fig. 5 is shown in the display.
- If the control unit and the hand-held terminal do not obtain contact, the figure in Fig. 6 is shown. The purpose of the illustration is to symbolise an interruption in communication between the hand-held terminal and the control unit.

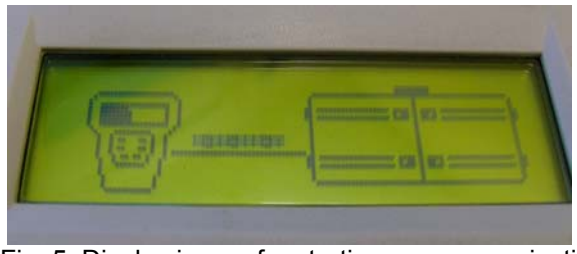


Fig. 5 Display image for starting up communication

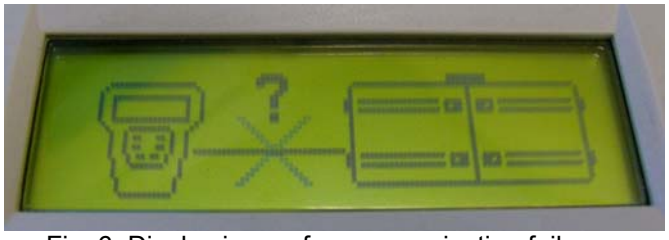


Fig. 6 Display image for communication failure

2.3.1 The interruption in communication arose spontaneously or when a power failure occurred

- Check whether light-emitting diode LD 1, on the control unit, is flashing or begins to flash approx. 1 minute after the control unit is energised. See Fig. 7.
- If LD 1 is not flashing, something has caused the program in the micro processors to stop operating correctly.
  Switch off the power supply to the control unit for approx. 15 seconds. Switch it on again and check whether the control unit begins operating again.
- If the control unit does not start up properly again, the control unit must be replaced.

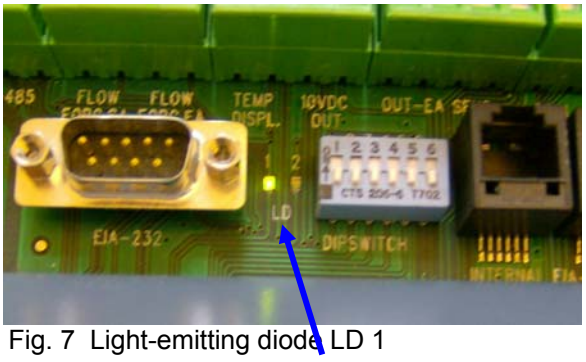


Fig. 7 Light-emitting diode LD 1

Fig. 8 To connect the cable of the hand-held terminal

2.3.2 The interruption in communication arose while the program in the control unit was being updated

- Check whether light-emitting diode LD 1, on the control unit, is flashing or begins to flash approx. 1 minute after the control unit is energised. See Fig. 7.
- If LD 1 is not flashing, something has caused the program in the micro processors to stop operating correctly.
  Switch off the power supply to the control unit for approx. 15 seconds. Switch it on again and check whether the control unit begins operating again.
- Check that the cable from the hand-held terminal is connected to the HMI connection as shown in Fig. 8. As from and including program version 5.09 the cable to the hand-held terminal **must** be connected to the

HMI socket outlet.
In the previous program versions the hand-held terminal could also be connected to other connections of the internal network.

- Switch off the power supply to the control unit for approx. 15 seconds. Switch it on again and check whether the control unit begins operating again.
  If the control unit does not start up properly again, the control unit must be replaced.

2.4 The display in the hand-held terminal returns to showing the text: "Stop"

- The GOLD unit returns to Stop in the display despite that the Auto Operation, Manual Low speed or Manual High speed mode has been selected.
- Check that "Ext. Hand-held Terminal" is **not** written on the decal on the backside of the hand-held terminal . If it is, this indicates that the hand-held terminal is a slave and cannot be used for starting the air handling unit. The air handling unit can only be started from the main terminal marked with the text: "Main Hand-held Terminal" on the decal.

2.5 The text: ”Communication stop” is displayed in the hand-held terminal

- The GOLD unit is or has been connected up to a main system via communication.
  The main system has ordered GOLD unit to stop operating.
- Is the communication system still operating? Check in the main system why it is transmitting a stop command to the GOLD unit.
- If communication with the main system has been interrupted, The "Communication stop" command can only be reset via a command under Service level in the hand-held terminal.
  At ”Service level” go down to the ”COMM. STOPP/LF/HF” line, then go in and change the function by OPERATION: to Auto.
  The internal operation functions of the air handling unit will then work correctly again.

3 The flow in the GOLD unit is wrong

3.1 The flow is not consistent with the measurements in the connected ducts

3.1.1 Check that the flow in the duct system is measured in a satisfactory way

- If the flow in the main duct is being measured, it is important that the length of straight ducting upstream of the point of measurement is at least 5 times the diameter/diagonal dimension of the duct and the length of straight ducting downstream of the point of measurement is at least 2 times the same.
- If a number of values from branch ducts or air terminal devices are added together, consideration must be given to the sum of all the individual measuring inaccuracies before a comparison with the flow of the GOLD unit can be made.

3.1.2 Check that the pressure sensors show 0 Pa when the air handling unit has been stopped

- Stop the air handling unit. Check in the hand-held terminal, at ”Installation level” (code=1111), under ”Readings” and ”Fans” that ”Fan pressure” for the relevant fan shows a value that is within the +/-5 Pa limits.
- Is a value outside the +/-5 Pa limits shown? Disconnect both tubes from the tappings on the pressure sensor for flow measurement.
- If a pressure reading of +/-5 Pa is now shown, this indicates that there is moisture or dirt inside the tubes - the tubes must be cleaned.
- If a pressure reading of +/-25 Pa is now shown, this indicates that system has not been completely zero-point calibrated.
  Switch off the power supply to the air handling unit and then switch it on again. Calibration will automatically begin and the Zero-point calabration text will appear in the display. Wait until the calibration

function has finished. The pressure is adjusted only 7 - 8 Pa each time calibration is carried out, therefore this procedure may have to be repeated a few times.

- Shows a value above +/-50 Pa, when no tubes are connected this indicates that the pressure sensor has become defective and should be replaced.

3.1.3 Does the air handling unit have a rotary heat exchanger? Check that the pressure balance inside the unit has been correctly adjusted

- The purging airflow and the internal leakage around the rotary heat exchanger of the air handling unit are included in the calculation that corrects the setpoint of the extract air fan in relation to the preset setpoint. If the internal pressure balance is not correct, Swegon cannot guarantee that the supply air and extract airflows will be kept within the specified tolerances of +/-5%.
- Check and, if needed, adjust the pressure balance as described in the section for "Adjusting the pressure balance" in the Operation and Maintenance instructions.

3.1.4 The fan speed is not stable but instead fluctuates up and down

- Check the control responce speed of the fans at "Service level".
  First go in at the ”Installation level” (code=1111) and then the ”Service level” (code=1112). Then Control response speed and Flow/Pressure.
- Check that the "SA Flow range", "SA Pressure range", "EA Flow range", "EA Pressure range" values do not deviate too much from the factory-preset value of 5.0. The C-Factors should be approx. 0.100.
  Adjust manually if a single value has been changed. If all the values are changed, this has occurred due to some interference and the operator should reinstate the unit's original factory settings.
- Record all entered settings in a journal for the air handling unit, so that you can restore these settings after you are finished with the factory settings.
- Stop the air handling unit. Go in the hand-held terminal to the ”Installation level” (code=1111), and ”Hand terminal? Under ”Basic settings?selects ”Factory settings" and ”Activating?
  The control system now sets all the values to the original ones.
- Restore the settings for Temperatures, Flows, Time switch and other functions.
  Start the air handling unit and check how the fans perform.

4 The GOLD unit does not control the reheating coil correctly

4.1 The control system cannot detect that the reheating coil is connected

4.1.1 Check in the hand-held terminal that the control unit has registered connected heating coil

- Check at "Installation level" (code=1111), under "Readings" and "Control signals" whether the text line "REHEAT xx%" is included on the list.
- If REHEAT is not included on the list, the control system will not understand that any reheat coil is connected and the heating sequence will not be controlled.

4.1.2 Check in the hand-held terminal whether the control unit has registered the correct type of heating coil

- Check at "Service level" (code=1112), under "Reheat" and "Coil type" whether the type of coil specified is the same as the coil connected.
- If the type of coil shown is not correct, the control system will not understand the correct resistance reading from the resistor connected to the 8-pole reheat cable.
- Use an Ohmmeter to check whether the resistor has the correct value. Check the 8-pin modular connector whether the Ohmmeter has such thin test probes, that the resistance reading is correct there as well.

Type of coil.	Resistor	Type of signal	Remarks
1.	390Ω	pause/pulse	Electric air heater with overheating protection function
2.	470Ω	pause/pulse	Electric air heater with overheating protection function
3.	560Ω	pause/pulse	Electric air heater with overheating protection function
4.	680Ω	0-10V	Electric air heater with overheating protection function
5.	820Ω	0-10V	Electric air heater with overheating protection function
6.	1000Ω	0-10V	Electric air heater with overheating protection function
9.	1800Ω	0-10V	Water coil/electric air heater without frost guard or overheating protection
10.	2200Ω	0-10V	Water coil with frost guard function
11.	2700Ω	0-10V	Electric air heater with overheating protection function
12.	3300Ω	0-10V	Electric air heater with overheating protection function
13.	3900Ω	0-10V	Electric air heater with overheating protection function
14.	4700Ω	0-10V	Electric air heater with overheating protection function
15.	5600Ω	0-10V	Electric air heater with overheating protection function

4.2 The feed-back control in the control system modulates output signals but the reheat coil does not supply heat

4.2.1 Check in the hand-held terminal whether the control unit has a control signal on the output

- Check at "Installation level" (code=1111), under "Manual test" and "Reheat" that the 0-10 V DC signal transmitted to the reheat coil follows the percentage as set for ”REHEAT xx%”.
  0%=0 V DC and 100%=10.0 V DC.
  Note that the 8-pole cable must be connected in order for the Reheat line to be shown on the screen.
- If there is no 0-10 V DC signal between the Orange cable and the White-blue cable in the electric air heater or between the Yellow and Brown (Green) by the valve actuator, something is wrong with the control unit or the 8-pole cable.
- Disconnect the 8-pole cable from the control unit. Measure on the control unit between soldering point 2 (-) and 3 (+) from the left, whether there is a 0-10 V DC signal on the output on the circuit card. See Fig. 8.
  N.B! Thin test probes are required to avoid short-circuiting the outputs.

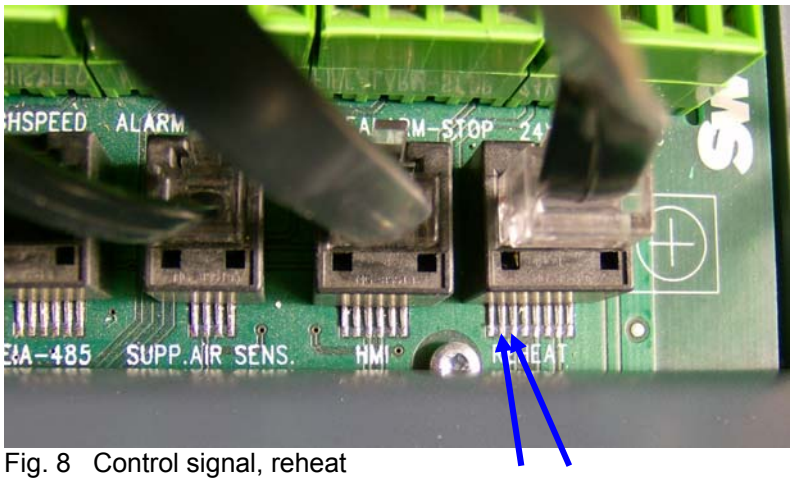


Fig. 8 Control signal, reheat

- If 0-10 V DC is not on the output there, the control unit is physically broken and must be replaced.

4.2.2 Check that the control signal for reheat reaches the coil or actuator

- Check at "Installation level" (code=1111), under "Manual test" and "Reheat" that the 0-10 V DC signal transmitted to the reheat coil reaches the coil through the 8-pole control cable. Change the percentage for ”REHEAT xx%? 0%=0 V DC and 100%=10.0 V DC
- Check that there is a 0-10 V DC signal between the Orange cable and the White-blue cable in the electric air heater or between the Yellow and Brown/Green) by the valve actuator. If the control signal cannot reach out to the coil/actuator, something is wrong with the 8-pole cable.
- Check that the 8-pole Modular connector is correctly clamped onto the flat cable. All 8 wires in the cable must be run all the way to the Modular connector as shown in Fig. 9, see arrow.
- Check that all 8 contact surfaces are completely pressed down as shown in Fig. 10.
- Check also that the plastic partitions between the contact surfaces are intact and parallel, so that no contact surface becomes blocked. See Fig. 9 and 10. N.B! The elastic section of the contact surface in the Modular connector on the control unit is not so large that it manages to gain contact if the connection is damaged in any way.

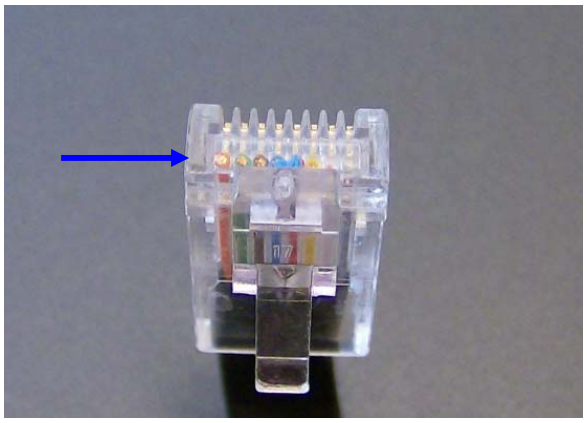


Fig. 9 Modular connector end

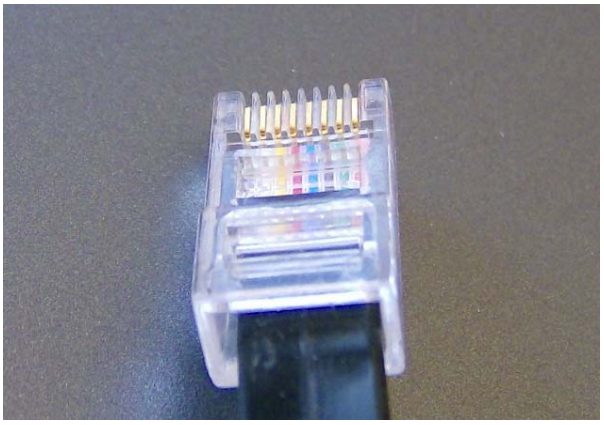


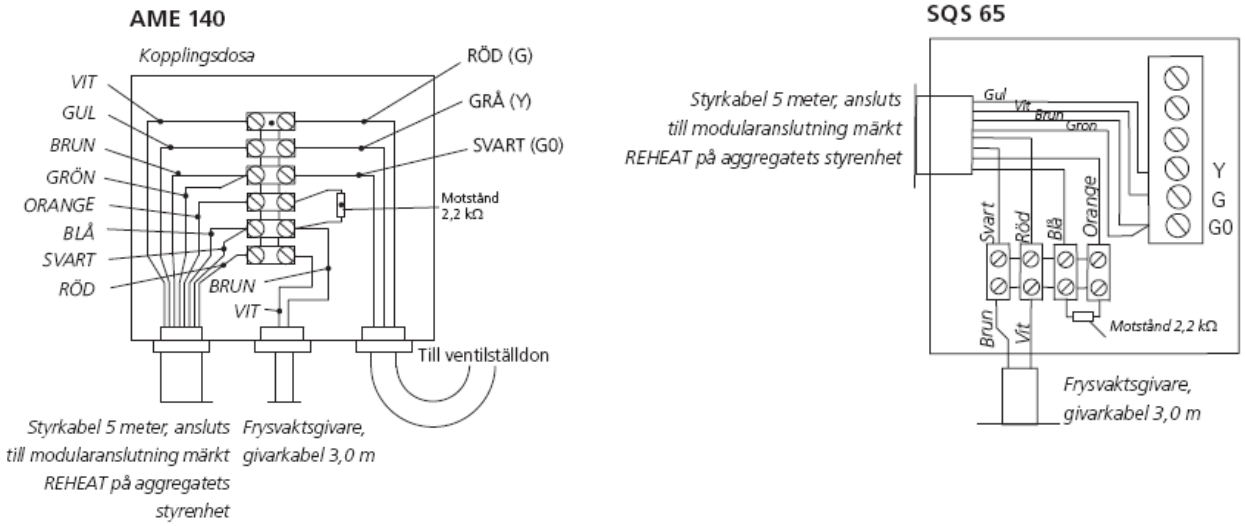
Fig. 10 Modular connector underside

4.2.3 Check that the control signal for reheat reaches the coil or actuator

- First check that the power supply is conducted forward to the wiring terminals of the coil and that all the control circuit fuses are switched on.
- Check at "Installation level" (code=1111), under "Manual test" and "Reheat" that the 0-10 V DC signal reaches forward to the wiring terminals on the internal controls in the reheat coil. Change the percentage for ”REHEAT xx%”. 0%=0 V DC and 100%=10.0 V DC. See on the internal wiring diagram on the inside of the cover for the electric cubicle on the coil where the 0-10 V DC signal should enter.
- Note also that the internal control equipment for the larger coils require 24 V AC. Check that it is supplied, if it is drawn on the wiring diagram.
- If power is supplied and control signals are transmitted forward, then troubleshoot in the electric air heater according to instructions, "Instructions for troubleshooting the GOLD electric air heater".

4.2.4 Check that the control signal can steer the valve actuator

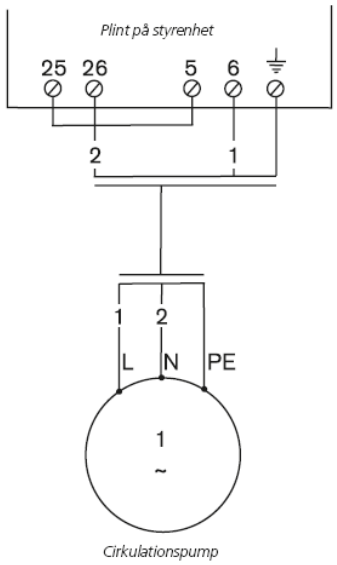
- First check that 24 V AC power is supplied in the 8-pole cable forward to the valve actuator and that the actuator is correctly wired. See the Wiring diagram for the valve actuator below.
- Check that the valve actuator has the strength to operate the valve.
- For AME140 actuators, open the white cover and set DIL switch 1 to the ON position and then back to the OFF position again in order to activate the internal end position check.
  The actuator should then begin operating and try to travel to its end positions in both directions to find the limits of its operation. N.B! The actuator must be mounted on the valve when calibration is carried out.
- For SQS 65 actuators, there is no end position check, therefore the valve must be controlled manually from ”Manuell test” in the hand-held terminal.
  N.B! The actuator should be mounted on the valve when calibration is carried out.
- If the actuator does not have strength to travel to both end positions, something is wrong with the actuator or the valve operates sluggishly.



Wiring diagrams for valve actuators.

4.2.5 Check that the circulation pump for hot water, if fitted, is operating

- Check whether there is any circulation pump in the heating water circuit to be controlled by the GOLD control system.
- Important! The heating relay is only a free, normally-open contact function and has no power supply of its own out to the pump.
- Check that the circulation pump is connected according to the figure.
  The figure applies to single-phase pumps with max 1.5 A power consumption.
  For larger pumps, power must be supplied by an external source or from wiring terminals 101-102 (max 4A) for the control circuit fuse in the GOLD unit.
- Check from "Installation level" (code=1111), under "Manual test" and "Reheat" that the circulation pump starts when ”HEAT OUTPUT” is set to 1.
- Check that water is circulating in the system by measuring the water flow or by touching the piping to sense that the water temperature is advancing in the circuit.
- If the actuator does not have strength to travel to both end positions, something is wrong with the actuator or the valve operates sluggishly.



4.3 The reheat coil produces heat even when heating is not needed

4.3.1 The connected electric air heater produces heat even when heating is not needed

- Check at ”Installation level” (code=1111), under ”Readings” and ”Control signals” whether the output signal from the controller for ”REHEAT” indicates 0%. If some value other than 0 % is shown when the air handling unit is stopped, then there is some defect in the control unit.
- Use a voltmeter in the electic air heater, between the Orange and White-blue cable, to check that the control signal from the GOLD unit is 0 V DC.
- If the control signal is 0 V DC, troubleshoot in the electric air heater according to instructions, "Instructions for troubleshooting the GOLD electric air heater".

4.3.2 The connected water coil with Danfoss AME 140 valve actuator produces heat even when heating is not needed

- Check that the valve actuator is correctly mounted on the valve and that the nut has been tightened.
- Check at ”Installation level” (code=1111), under ”Readings” and ”Control signals” whether the output signal from the controller for ”REHEAT” indicates 0 %. If some value other than 0 % is shown when the air handling unit is stopped, then the heat-retaining function may have taken effect.
- Indicates Reheat 0 %. Check with a voltmeter in the valve actuator's wiring terminal point that 24 V DC current is supplied to the valve actuator. Measure between the Green/Brown (G0) and White (G) conductors in the 8-pole cable.
- Check also that the control voltage between the Yellow (Y) and Green/Brown (G0) conductors is 0 V DC.
- If the control signal is 0 V DC, a calibration of the valve actuator's end positions must be carried out to make sure that the end positions of the valve actuator are in agreement with the end positions of the valve.
- Measure also the temperature of the water upstream and downstream of the valve in order to try to determine whether the valve leaks even if the valve actuator has actuated to closed valve position.

4.3.3 The connected water coil with Siemens SQS 65 valve actuator produces heat even when heating is not needed

- Check that the valve actuator is correctly mounted on the valve and that the nut has been tightened.
- Check at ”Installation level” (code=1111), under ”Readings” and ”Control signals” whether the output signal from the controller for ”REHEAT” indicates 0 %. If some value other than 0 % is shown when the air handling unit is stopped, then the heat-retaining function may have taken effect.
- Indicates Reheat 0 %. Check with a voltmeter in the valve actuator's wiring terminal point that 24 V DC current is supplied to the valve actuator. Measure between the Green/Brown (G0) and White (G) conductors in the 8-pole cable.
- Check also that the control voltage between the Yellow (Y) and Green/Brown (G0) conductors is 0 V DC.
- Measure also the temperature of the water upstream and downstream of the valve in order to try to determine whether the valve leaks even if the valve actuator has actuated to closed valve position.

5 The GOLD unit does not correctly control connected cooling equipment

5.1 The cooling equipment will not start

5.1.1 Check in the hand-held terminal that the cooling control system is correctly activated

- Check at ”Installation level” (code=1111), under Functions – Cooling that Auto Operation is the selected operating mode.
- Check also under Functions – Cooling that the selected function agrees with the type of cooling function connected to the GOLD control system.

- Check also under Functions – Cooling – ”Outdoor temp limit” which blocking limits have been selected for the cooling control system. If the outdoor temperature is below the current temperature limits, the corresponding step in the cooling function is blocked.
- Check also under Functions – Cooling – ”Cooling min flow” which flow limits have been selected. if the currrent flows of the air handling unit below any of the flow limits, then the cooling function is blocked.

5.1.2 Check in the hand-held terminal that the temperature controller is set to meet a cooling load

- Check at ”Installation level” (code=1111), under Readings – Control signals that the value for "Cooling control" is above 5%. If the cooling load is below 5%, Cooling relay 1 and Cooling relay 2 will not begin to operate.

5.2 The cooling function starts but quickly stops again

5.2.1 Check in the hand-held terminal that the temperature drops so that there is no longer any cooling load

- Check at ”Installation level” (code=1111), under Readings – Control signals that the value for "Cooling control" drops below 2% and stops the cooling function again. If the cooling function has stopped, the restarting time takes effect which prevents possible cooling units from starting too often. The delay to restart is 8 minutes, individually for each cooling relay.
- Check how the Supply air temperature sensor is mounted in relation to the cooling coil. The distance between coil and sensor should be at least 1.5 metres so that the air downstream of the coil will have time to mix sufficiently.
- If the cooling unit starts and the temperature in the supply air drops and stops the cooling function again, then one of the functions for Cooling Boost be activated so that the airflow will be higher when cooling is required. The higher air volume may effect the cooling capacity causing the temperature to drop so quickly.

5.3 The ventilation system cools too much

5.3.1 Check in the hand-held terminal whether the Cooling control system is set to meet a cooling load

- Check at ”Installation level” (code=1111), under Readings – Control signals what the value for "Cooling control" is. If the cooling load is below 2%, Cooling relay 1 and Cooling relay 2 should be inactive and the 0-10 V DC cooling signal should be 0 V DC.
- Check by disconnecting the wiring terminals for Cooling relay 1-2 (7-10) and terminals for 0-10V cooling (42-43) on the control unit that cooling is no longer controlled. If cooling does not stop, then there is some defect in the external cooling equipment.
- Is a cooling load shown in Readings – Control signal? Check with an external temperature sensor by the controlled temperature sensor of the air handling unit (SA or EA), That the AHU sensor shows the correct air temperature.
  If an erroneous value is shown, the sensor should be replaced.
- Check that the sensor is located at the right spot downstream of the cooling coil.