Installation Guide

ECL Comfort 210 / 310, application A214 / A314

1.0 Table of Contents

1.1 Important safety and product information

1.1.1 Important safety and product information

This Installation Guide is associated with ECL Application Key A214 (order code no. 087H3811).

The A214 Key contains two sets of applications:
one set (A214.1 / A214.2 / A214.3 / A214.4 / A214.5)
and another set (A314.1 / A314.2 / A314.3).

The functions can be realized in:
ECL Comfort 210 (A214) for simple solutions or
ECL Comfort 310 (A214 / A314) for advanced solutions, e.g. M-bus, Modbus and Ethernet (Internet) communication.

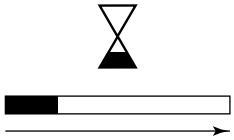
A Remote Control Unit, ECA 30, can be connected and the built-in room temperature sensor can be utilized.

The A314 applications demand the internal input / output module ECA 32 for utilizing the analog output.

The applications A214 / A314 comply with ECL Comfort controllers 210 / 310 as of software version 1.36 (visible at start-up of the controller and in 'Common controller settings' in 'System').

Additional documentation for ECL Comfort 210 and 310, modules and accessories is available on *http://den.danfoss.com/*.

Automatic update of controller software:
The software of the controller is updated automatically when the key is inserted (as of controller version 1.11). The following animation will be shown when the software is being updated:



Progress bar

During update:
- Do not remove the KEY
- Do not disconnect the power

Safety Note
To avoid injury of persons and damages to the device, it is absolutely necessary to read and observe these instructions carefully.

Necessary assembly, start-up, and maintenance work must be performed by qualified and authorized personnel only.

The warning sign is used to emphasize special conditions that should be taken into consideration.

This symbol indicates that this particular piece of information should be read with special attention.

As this Installation Guide covers several system types, special system settings will be marked with a system type. All system types are shown in the chapter: 'Identifying your system type'.

°C (degrees Celsius) is a measured temperature value whereas K (Kelvin) is a number of degrees.

The ID no. is unique for the selected parameter.

Example	First digit	Second digit	Last three digits
11174	1	1	174
	-	Circuit 1	Parameter no.
12174	1	2	174
	-	Circuit 2	Parameter no.

If an ID description is mentioned more than once, it means that there are special settings for one or more system types. It will be marked with the system type in question (e.g. 12174 - A266.9).

Disposal Note

This product should be dismantled and its components sorted, if possible, in various groups before recycling or disposal.

Always follow the local disposal regulations.

2.0 Installation

2.1 Before you start

The Application Key **A214** contains several applications, mainly related to ventilation systems with heating or cooling or a combination of these. The applications in the A214 key offer a wide range of possibilities (see the examples).

The application **A214.1** is very flexible. These are the basic principles:

Cooling with room temperature control:

Typically, the duct temperature is adjusted according to your requirements. The duct temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M2 (controlling the cooling transfer) is opened gradually when the duct temperature is higher than the desired duct temperature and vice versa.

Room temperature:

If the measured room temperature (S4 or ECA 30) does not equal the desired room temperature, the desired temperature at S3 can be adjusted.

By means of a week schedule (up to 3 'Comfort' periods / day), the cooling circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired room temperature).

The desired room temperature determines a correction of the desired temperature at S3.

If the room temperature is not measured, the desired room temperature equals (will be) the desired temperature at S3. In this case, the setting of the 'Balance temperature' is not considered (or: has no influence).

The fan (F1) is ON / OFF controlled according to the schedule and cooling demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to cooling demand.

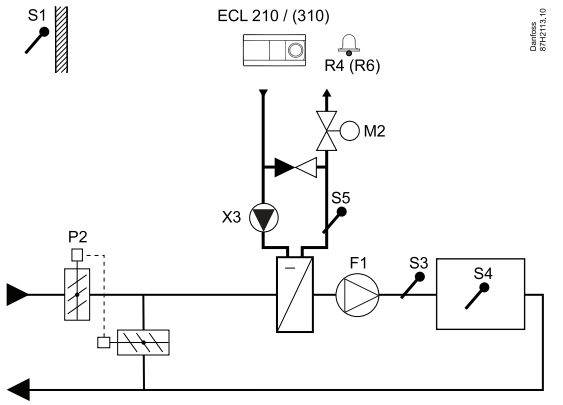
Return temperature (optional):

If the measured return temperature (S5) does not equal the limitation value (typically, the return temperature becomes lower than the limitation value), the desired temperature at S3 can be adjusted (typically to a higher value). This results in a gradual closing of the motorized control valve.

A simple frost protection (via S5) can be established. Furthermore, it is expected that the cooling exchanger (fan coil) circuit contains brine.

For a description of alarms and compensation temperature, please read the section 'A214 and A314 in general'.

Typical A214.1 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Duct temperature sensor*
S4	*Room temperature sensor / ECA 30*
S5	*Return temperature sensor*
S8	*Fire alarm input (not illustrated)*
M2	*Motorized control valve, cooling*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R4	*Relay output, alarm, ECL Comfort 210*
(R6)	*Relay output, alarm, ECL Comfort 310*

The application **A214.2** is very flexible. These are the basic principles:

Heating with duct temperature control:

Typically, the heating temperature is adjusted according to your requirements. The flow temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating supply temperature) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa.

Duct temperature:

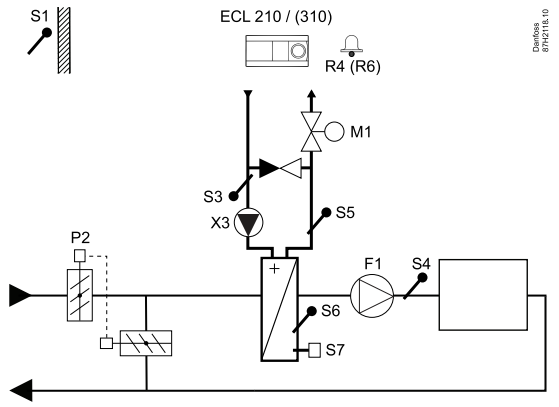
If the measured duct temperature (S4) does not equal the desired duct temperature, the desired temperature at S3 can be adjusted.

By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired duct temperature). The desired duct temperature determines a correction of the desired temperature at S3.

The fan (F1) is ON / OFF controlled according to the schedule and heating demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A214.2 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Flow temperature sensor*
S4	*Duct temperature sensor*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R4	*Relay output, alarm, ECL Comfort 210*
(R6)	*Relay output, alarm, ECL Comfort 310*

The application **A214.3** is very flexible. These are the basic principles:

Heating with room temperature control:

Typically, the duct temperature is adjusted according to your requirements. The duct temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating supply) is opened gradually when the duct temperature is lower than the desired duct temperature and vice versa.

Room temperature:

If the measured room temperature (S4 or ECA 30) does not equal the desired room temperature, the desired temperature at S3 can be adjusted.

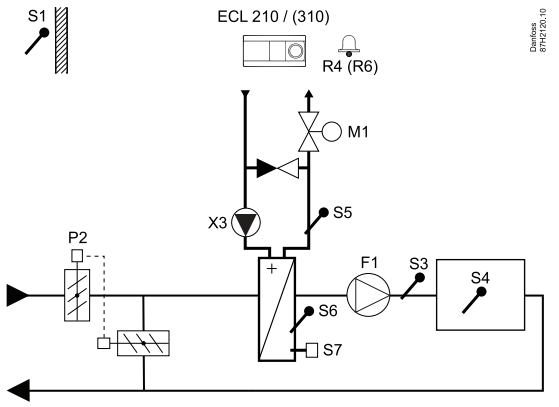
By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired room temperature).

The desired room temperature determines a correction of the desired temperature at S3.

The fan (F1) is ON / OFF controlled according to the schedule and heating demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A214.3 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Duct temperature sensor*
S4	*Room temperature sensor / ECA 30*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R4	*Relay output, alarm, ECL Comfort 210*
(R6)	*Relay output, alarm, ECL Comfort 310*

The application **A214.4** is very flexible. These are the basic principles:

Heating and cooling with duct temperature control:

Typically, the heating and cooling temperature is adjusted according to your requirements.

The flow temperature sensor S3 in the heating circuit is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating temperature) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa. At cooling, the motorized control valve M2 controls the cooling temperature.

Duct temperature:

A too low duct temperature (S4) will activate the heating circuit (M1), whereas a too high duct temperature will activate the cooling circuit (M2).

At heating demand, the duct temperature (S4) can adjust the desired temperature at S3 when not being equal to the desired duct temperature. At cooling demand, the duct temperature (S4) is controlled according to the desired duct temperature.

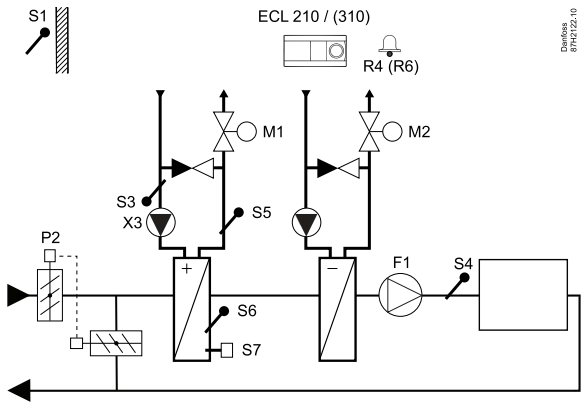
By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired duct temperature).

The desired duct temperature determines a correction of the desired temperature at S3 in heating mode. In cooling mode the cooling is OFF during 'Saving'.

The fan (F1) is ON / OFF controlled according to the schedule and heating / cooling demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A214.4 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Flow temperature sensor, heating circuit*
S4	*Duct temperature sensor*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating*
M2	*Motorized control valve, cooling*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R4	*Relay output, alarm, ECL Comfort 210*
(R6)	*Relay output, alarm, ECL Comfort 310*

The application **A214.5** is very flexible. These are the basic principles:

Heating and cooling with room temperature control:

Typically, the heating and cooling temperature in the duct is adjusted according to your requirements. The duct temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating temperature) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa. At cooling, the motorized control valve M2 controls the cooling temperature.

Room temperature:

If the measured room temperature (S4) does not equal the desired room temperature, the desired temperature at S3 can be adjusted. A too low room temperature will activate the heating circuit (M1), whereas a too high room temperature will activate the cooling circuit (M2).

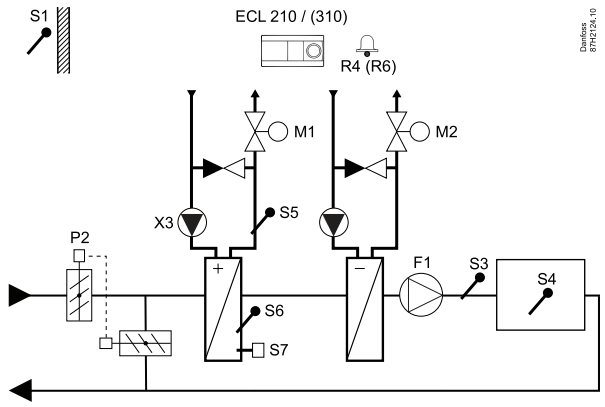
By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired duct temperature).

The desired duct temperature determines a correction of the desired temperature at S3 in heating mode. In cooling mode the cooling is OFF during 'Saving'.

The fan (F1) is ON / OFF controlled according to the schedule and heating / cooling demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A214.5 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Duct temperature sensor*
S4	*Room temperature sensor / ECA 30*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating*
M2	*Motorized control valve, cooling*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R4	*Relay output, alarm, ECL Comfort 210*
(R6)	*Relay output, alarm, ECL Comfort 310*

The application **A314.1** is very flexible. These are the basic principles:

Heating and (passive) cooling with duct temperature control:

Typically, the heating and the cooling temperature is adjusted according to your requirements.

The flow temperature sensor S3 in the heating circuit is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating temperature) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa. At cooling, the motorized control valve M2 controls the cooling temperature.

The cooling section can be passive (re-circulation) or active.

Duct temperature:

A too low duct temperature (S4) will activate the heating circuit (M1), whereas a too high duct temperature will activate the (passive) cooling circuit (M2).
At heating demand, the duct temperature (S4) can adjust the desired temperature at S3 when not being equal to the desired duct temperature. At passive cooling demand, the duct temperature (S4) is controlled according to the desired duct temperature.

The M1 is 3-point controlled, whereas the M2 is 0-10 V controlled.

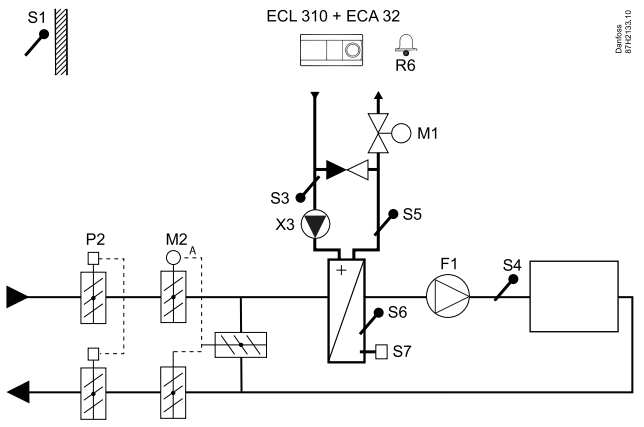
By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired duct temperature).

The desired duct temperature determines a correction of the desired temperature at S3 in heating mode. In cooling mode the cooling is OFF during 'Saving'.

The fan (F1) is ON / OFF controlled according to the schedule and heating / cooling demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A314.1 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Flow temperature sensor, heating circuit*
S4	*Duct temperature sensor*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating, 3–point controlled*
M2	*Motorized control valve, re-circulation / passive cooling, 0–10 V controlled*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R6	*Relay output, alarm*

The application **A314.2** is very flexible. These are the basic principles:

Heating and cooling with room temperature control:

Typically, the heating and cooling temperature in the duct is adjusted according to your requirements. The duct temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating temperature) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa. At cooling, the motorized control valve M2 controls the cooling temperature.

The cooling section can be passive (re-circulation) or active.

Room temperature:

If the measured room temperature (S4) does not equal the desired room temperature, the desired temperature at S3 can be adjusted. A too low room temperature will activate the heating circuit (M1), whereas a too high room temperature will activate the cooling circuit (M2).

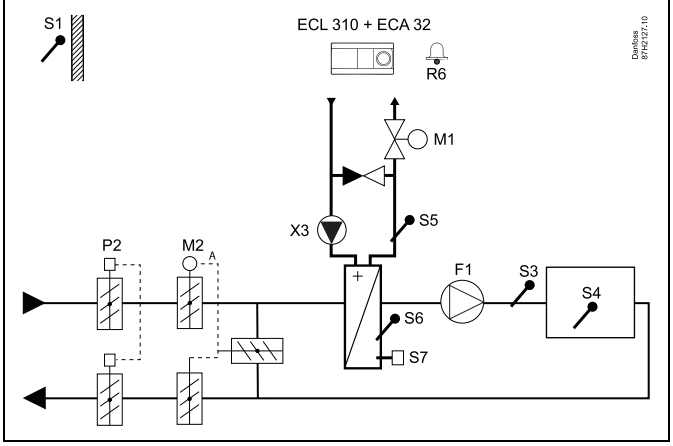
By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired duct temperature).

The desired duct temperature determines a correction of the desired temperature at S3 in heating mode. In cooling mode the cooling is OFF during 'Saving'.

The fan (F1) is ON / OFF controlled according to the schedule and heating / cooling demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A314.2 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Compensation temperature sensor (not illustrated)*
S3	*Duct temperature sensor*
S4	*Room temperature sensor / ECA 30*
S5	*Return temperature sensor*
S6	*Frost temperature sensor*
S7	*Frost thermostat*
S8	*Fire alarm input (not illustrated)*
M1	*Motorized control valve, heating, 3–point controlled*
M2	*Motorized control valve, re-circulation / passive cooling, 0–10 V controlled*
F1	*Fan*
P2	*Damper*
X3	*Circulation pump*
R6	*Relay output, alarm*

The application **A314.3** is very flexible. These are the basic principles:

Heating with room temperature control:

Typically, the duct temperature is adjusted according to your requirements. The duct temperature sensor S3 is the most important sensor. The desired temperature at S3 is set in the ECL Comfort controller as the 'Desired balance temperature'.

The motorized control valve M1 (controlling the heating supply) is opened gradually when the duct temperature is lower than the desired duct temperature and vice versa.

Room temperature:

If the measured room temperature (S4 or ECA 30) does not equal the desired room temperature, the desired temperature at S3 can be adjusted.

By means of a week schedule (up to 3 'Comfort' periods / day), the heating circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for desired room temperature).

The desired room temperature determines a correction of the desired temperature at S3.

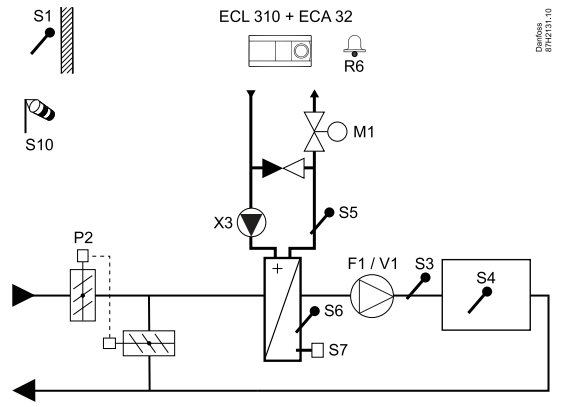
The fan (F1) is ON / OFF controlled according to the schedule and heating demand. The damper (P2) is ON / OFF controlled according to schedule. The circulation pump (X3) is ON / OFF controlled according to heating demand.

Variable fan speed (optional):

The fan (V1) can be speed controlled in relation to the measured wind speed (S10). The fan speed control signal is a 0–10 volt signal, generated by the internal input / output module ECA 32. A menu in the ECL Comfort 310 contains settings for relationship between actual wind speed and desired fan speed.

For a description of alarms, compensation temperature, return temperature limitation (S5) and frost protection (S6 and S7), please read the section 'A214 and A314 in general'.

Typical A314.3 application:



The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

- *S1 Outdoor temperature sensor*
- *S2 Compensation temperature sensor (not illustrated)*
- *S3 Duct temperature sensor*
- *S4 Room temperature sensor / ECA 30*
- *S5 Return temperature sensor*
- *S6 Frost temperature sensor*
- *S7 Frost thermostat*
- *S8 Fire alarm input (not illustrated)*
- *S10 Wind speed signal*
- *M1 Motorized control valve, heating, 3–point controlled*
- *V1 Fan speed, 0–10 V controlled*
- *F1 Fan, ON / OFF controlled*
- *P2 Damper*
- *X3 Circulation pump*
- *R6 Relay output, alarm*

A214 and A314 in general:

Compensation temperature (optional):

If the measured compensation temperature (S1 or S2) is higher or lower than the limitation value, the desired temperature at S3 can be adjusted. The compensation temperature can be measured by the outdoor temperature sensor or for example an additional room temperature sensor.

Override possibilities:

Unused input can, by means of an override switch, be used to override the schedule to a fixed 'Comfort' or 'Saving' mode.

Alarm functions:

The alarm (relay 4 in ECL 210, relay 6 in ECL 310) is activated:

1. If an unaccepted deviation between the desired and actual S3 temperature occurs.
2. If a frost thermostat (S7) is activated.
3. If a frost temperature is detected at S5 or S6.
4. If the fire alarm (S8) is activated.
5. If a temperature sensor or its connection disconnects / short circuits.

A214.2, A214.3, A214.4, A214.5, A314.1, A314.2 and A314.3:

Return temperature (optional):

If the measured return temperature (S5) does not equal the limitation value (typically, the return temperature becomes higher than the limitation value), the desired temperature at S3 can be adjusted (typically to a lower value). This results in a gradual closing of the motorized control valve.

Frost protection (optional):

Temperature sensor S6 and / or frost thermostat S7 can protect the heat exchanger against frost.

Furthermore, if the S5 temperature becomes too low, it also can enable the frost protection.

An activated frost protection will start the alarm, stop the fan F1, close the damper P2 and fully open the motorized control valve M1.

Fire alarm (optional):
An activated fire alarm input will start the alarm, stop the fan F1, close the damper P2 and close the motorized control valves.

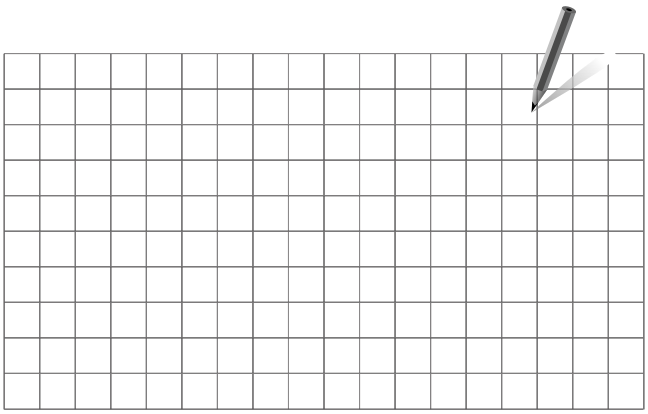
The controller is pre-programmed with factory settings that are shown in the relevant chapters of this guide.

2.2 Identifying the system type

Sketch your application

The ECL Comfort controller series is designed for a wide range of heating, domestic hot-water (DHW) and cooling systems with different configurations and capacities. If your system differs from the diagrams shown here, you may want to make a sketch of the system about to be installed. This makes it easier to use the Installation Guide, which will guide you step-by-step from installation to final adjustments before the end-user takes over.

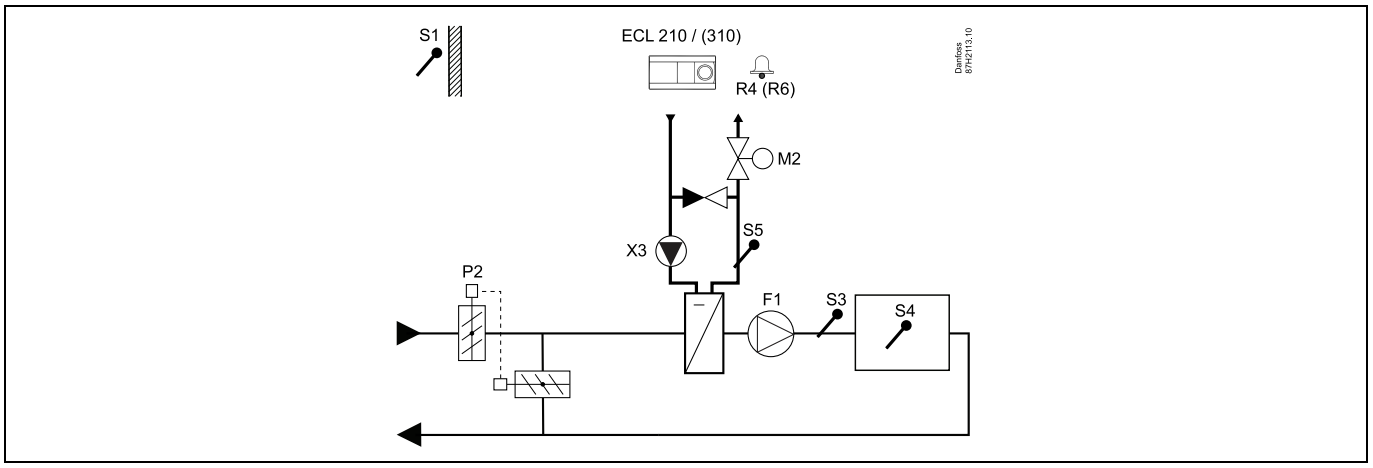
The ECL Comfort controller is a universal controller that can be used for various systems. Based on the shown standard systems, it is possible to configure additional systems. In this chapter you find the most frequently used systems. If your system is not quite as shown below, find the diagram which has the best resemblance with your system and make your own combinations.



The circulation pump(s) in heating circuit(s) can be placed in the flow as well as the return. Place the pump according to the manufacturer's specification.

A214.1 example a

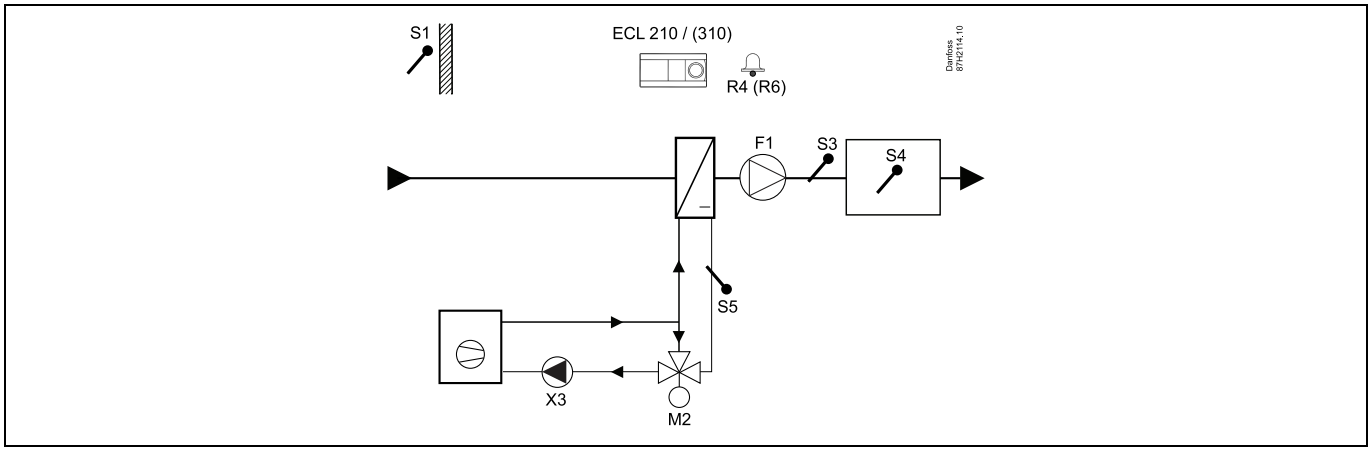
Ventilation system with cooling and constant room temperature control



Setting advice:
Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 12 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

A214.1 example b

Ventilation system with cooling and constant room temperature control. Chiller has constant flow.

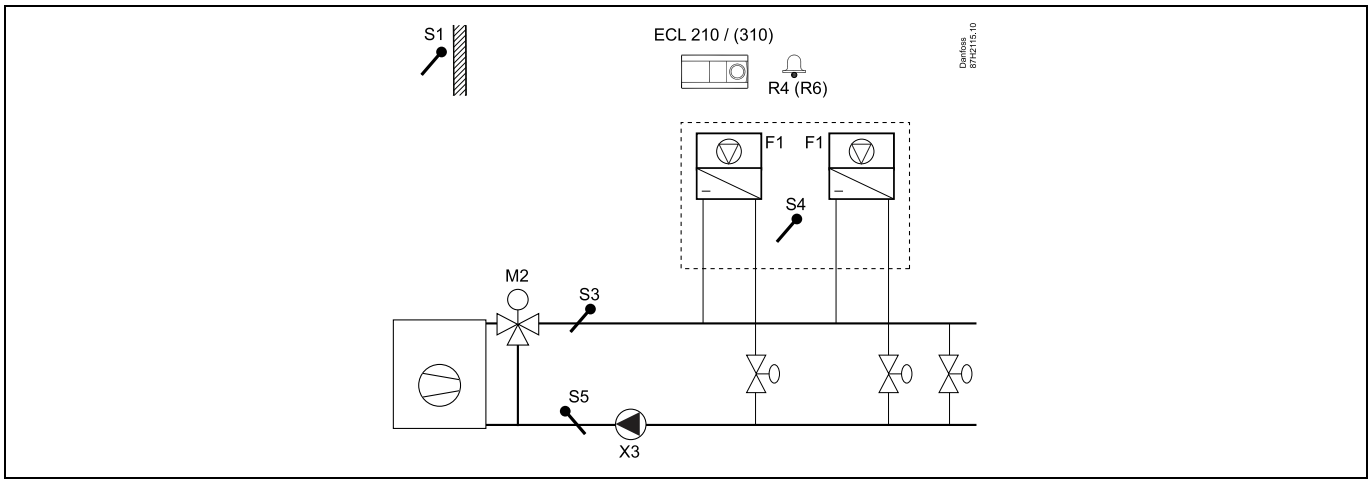


Setting advice:

Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 12 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

A214.1 example c

Ventilation system (fan coils) with cooling and constant room temperature control

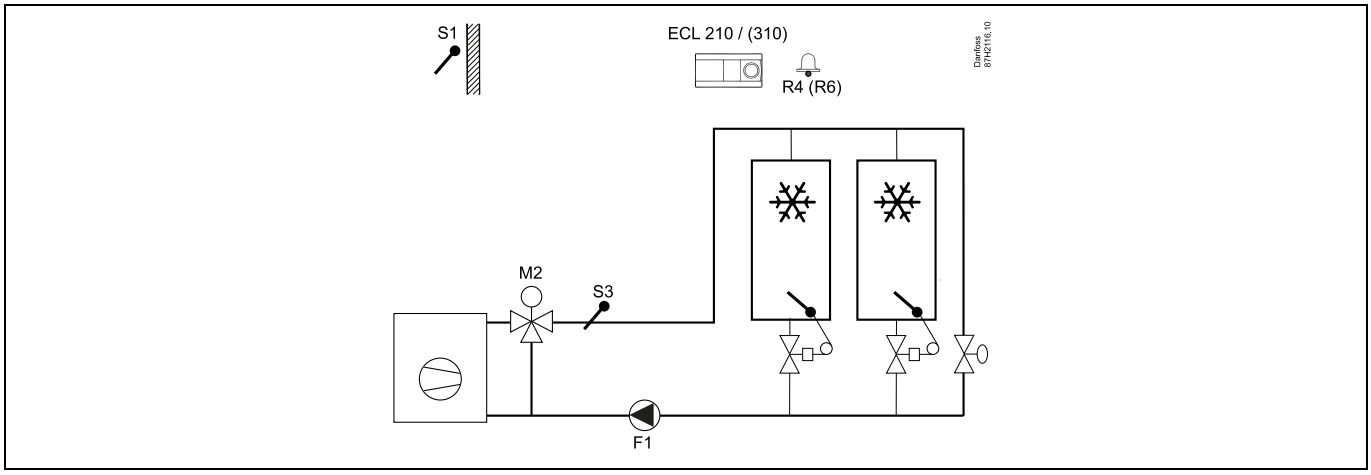


Setting advice:

Set desired room temperature, for example 5 °C.
Set desired balance temperature, for example 1 °C.
If a room temperature sensor is not connected, the desired flow temperature at S3 will correspond to the desired room temperature.

A214.1 example d

Cooling system with constant flow temperature control



Setting advice:

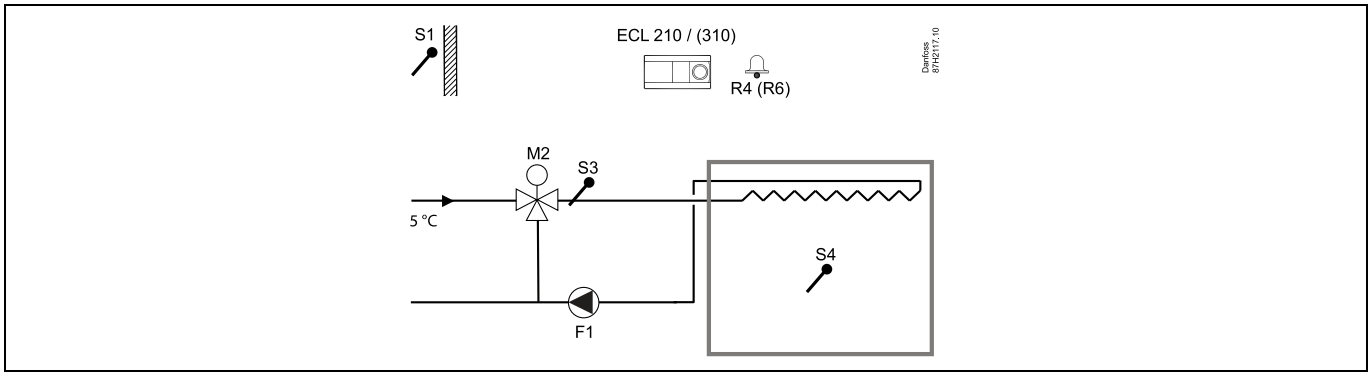
Set desired room temperature, for example 1 °C.

If a room temperature sensor is not connected, the desired flow temperature at S3 will correspond to the desired room temperature.

Set 'Fan cut-in delay' (ID no. 11086 — 'Settings', 'Fan / acc. control') to 0 seconds.

A214.1 example e

Cooling system in ceiling and constant room temperature control in for example a wine cellar



Setting advice:

Set desired room temperature, for example 14 °C.

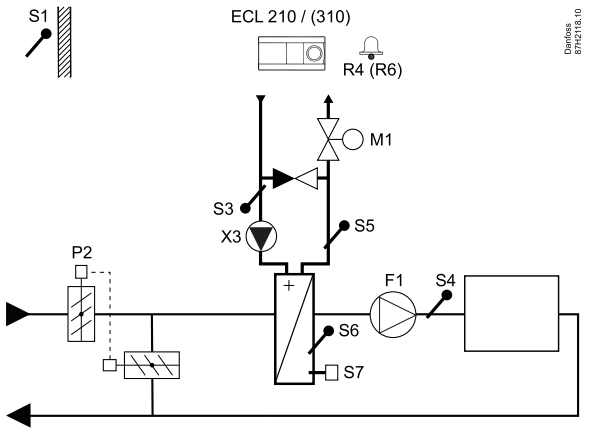
Set desired balance temperature, for example 10 °C.

If a room temperature sensor is not connected, the desired flow temperature at S3 will correspond to the desired room temperature.

Set 'Fan cut-in delay' (ID no. 11086 — 'Settings', 'Fan / acc. control') to 0 seconds.

A214.2 example a

Ventilation system with heating and constant duct temperature control



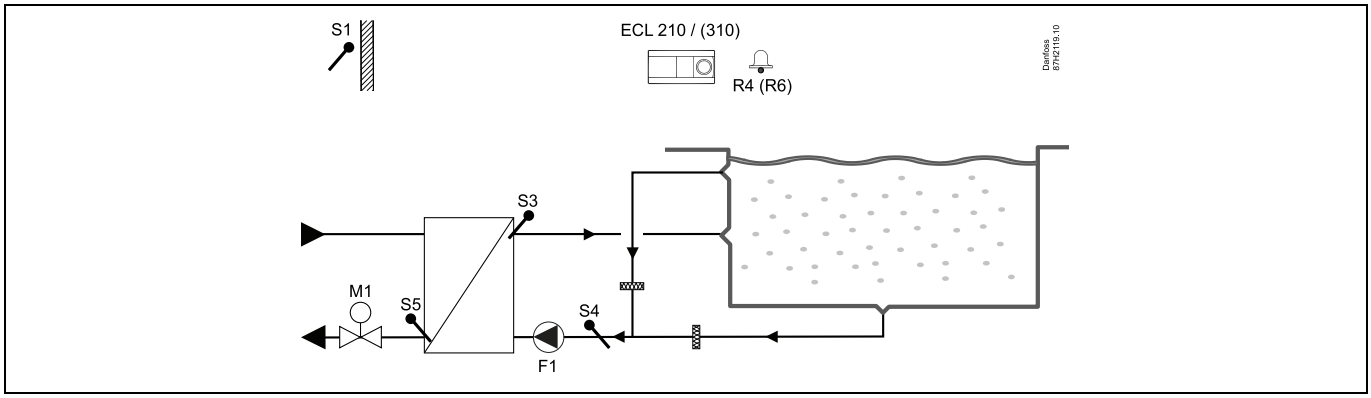
Sensor advice:

Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valve (M1) close.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.2 example b

Heating of a swimming pool, constant water temperature control



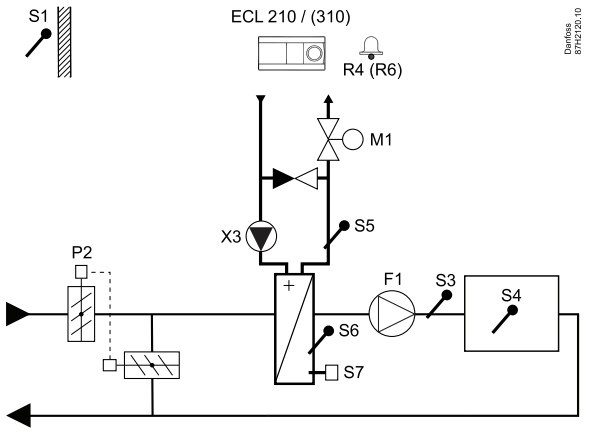
Sensor advice:

Sensor S3 and S4 must be connected. If not, the pump (F1) stops and motorized control valve (M1) closes.

Navigation:	**ID no.:**	**Recommended setting:**
Special settings for sensors / thermostats used as frost protection:		
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1
Other settings:		
Fan cut-in delay — MENU \ Settings \ Fan / acc. control	11086	0

A214.3 example a

Ventilation system with heating and constant room temperature control



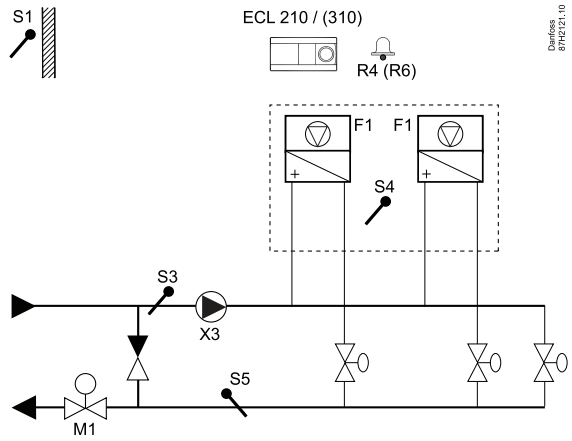
Setting advice:

Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.3 example b

Ventilation system (fan coils) with heating and constant room temperature control

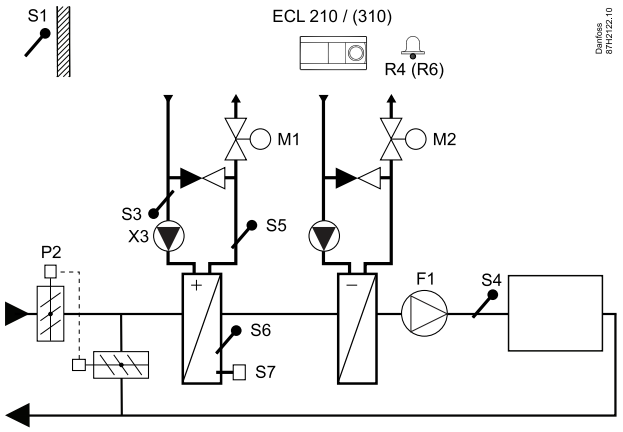


Setting advice:
Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 35 °C.
If a room temperature sensor is not connected, the desired flow temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.4 example a

Ventilation system with heating, cooling and constant duct temperature control



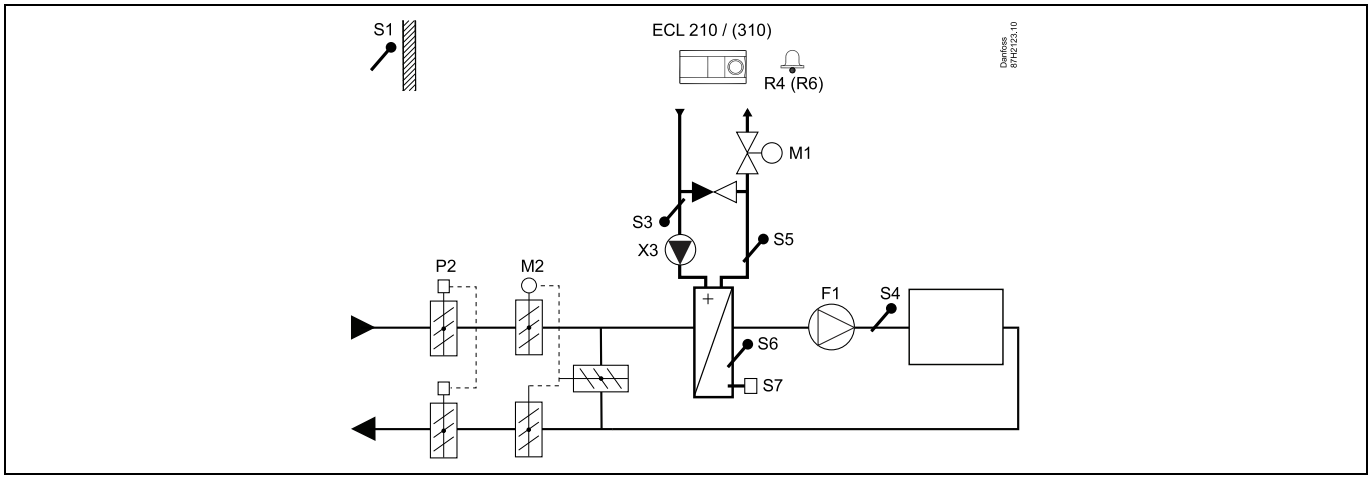
Sensor advice:

Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valves (M1 / M2) close.

Navigation:	**ID no.:**	**Recommended setting:**
Special settings for sensors / thermostats used as frost protection:		
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.4 example b

Ventilation system with heating, passive cooling (outside air) and constant duct temperature control



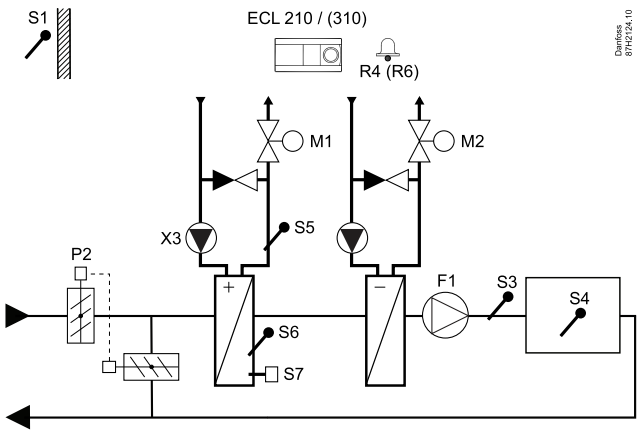
Sensor advice:

Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valves (M1 / M2) close.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.5 example a

Ventilation system with heating, cooling and constant room temperature control



Setting advice:

Set desired room temperature, for example 20 °C.

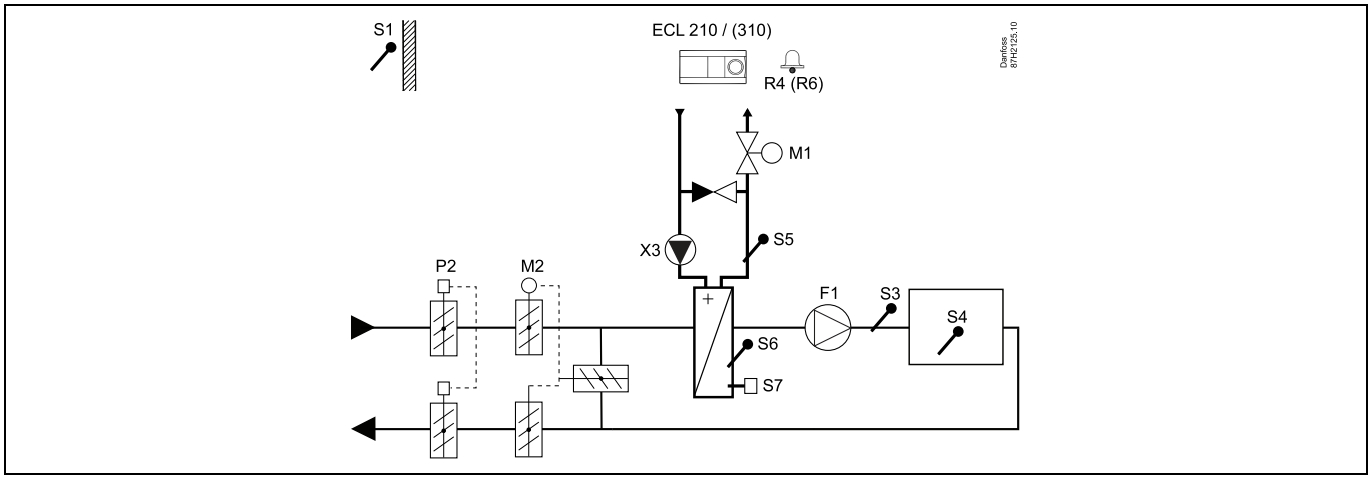
Set desired balance temperature, for example 20 °C.

If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.5 example b

Ventilation system with heating, passive cooling (outside air) and constant room temperature control



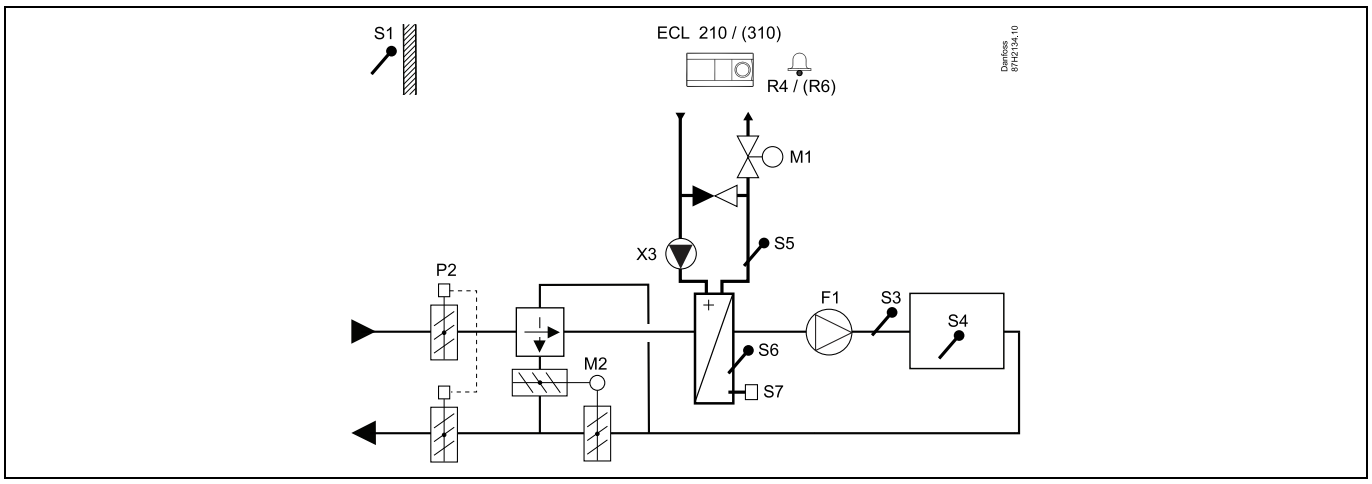
Setting advice:

Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A214.5 example c

Ventilation system with heating, cross-flow heat exchanger control and constant room temperature control



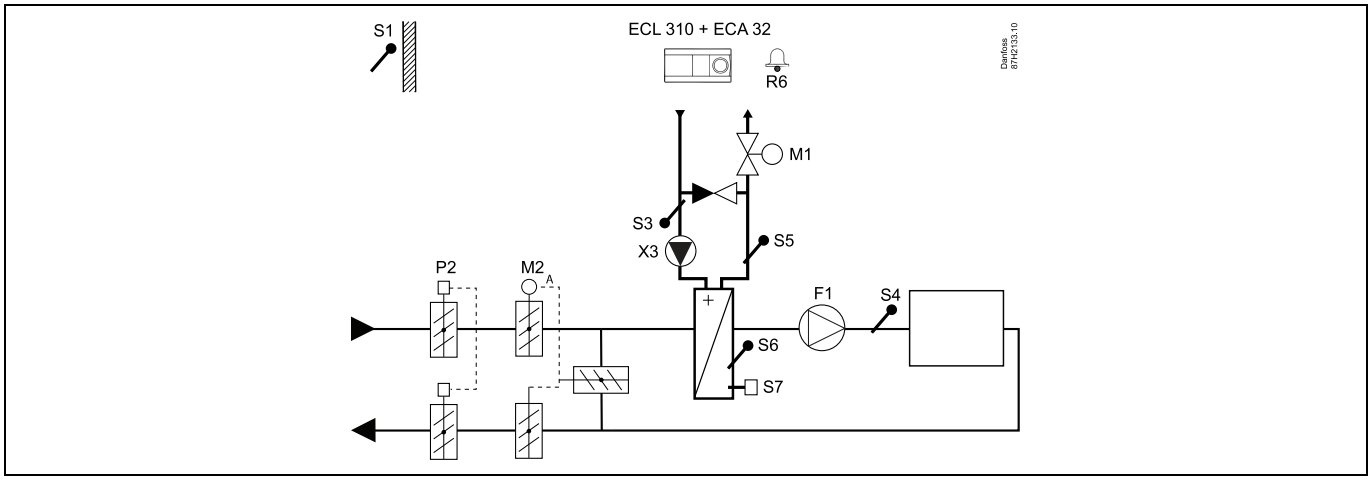
Setting advice:

Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.1 example a

Ventilation system with heating, passive cooling (outside air) and constant duct temperature control. Analog controlled passive cooling (M2).

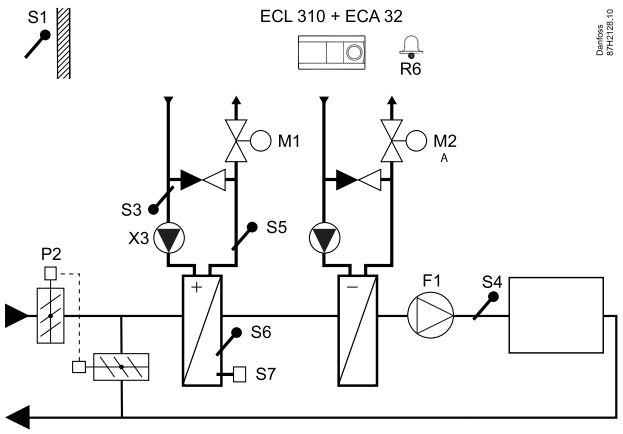


Sensor advice:
Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valves (M1 / M2) close.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.1 example b

Ventilation system with heating, cooling and constant duct temperature control. Analog controlled cooling (M2).



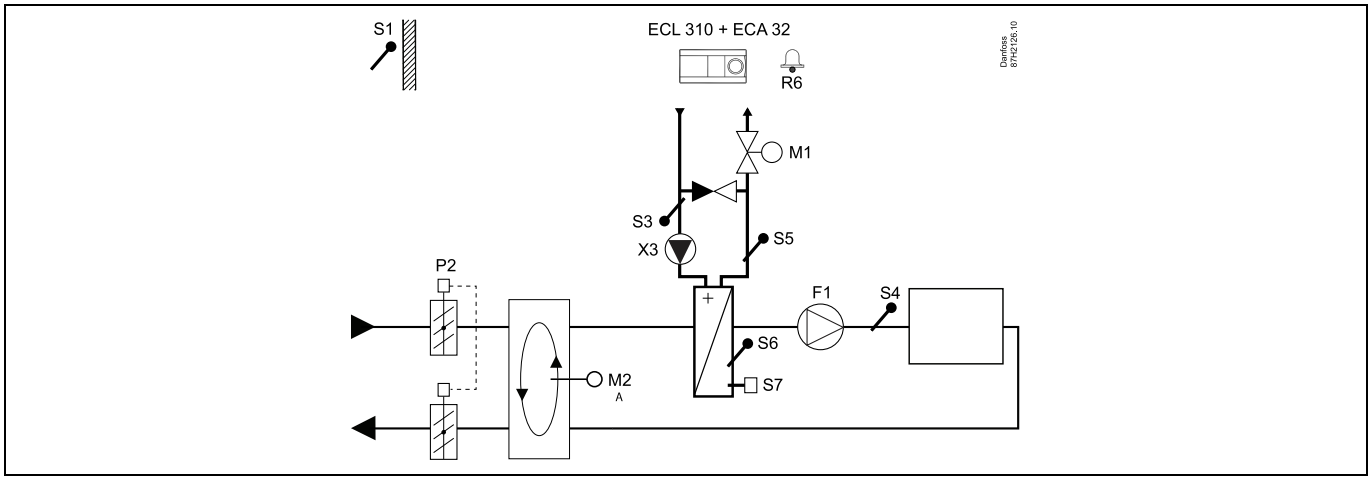
Sensor advice:

Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valves (M1 / M2) close.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.1 example c

Ventilation system with heating, passive cooling (outside air) and constant duct temperature control. Analog controlled speed of rotary heat exchanger (M2) for heat recovery.



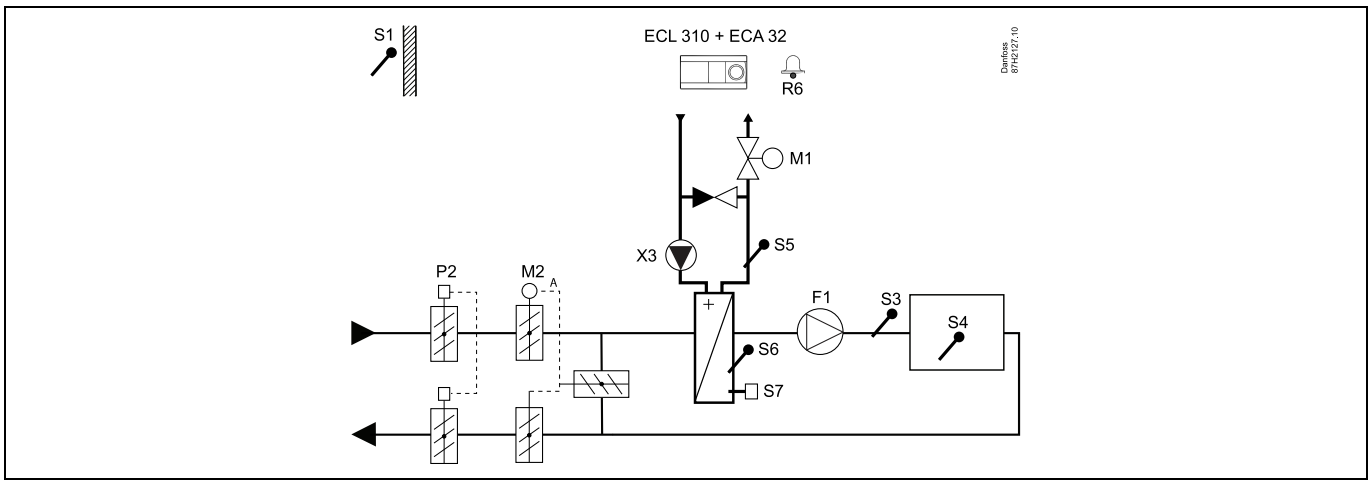
Sensor advice:

Sensor S3 and S4 must be connected. If not, the fan (F1) stops, the damper (P2) and motorized control valve (M1) close. The rotary heat exchanger (M2) stops.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.2 example a

Ventilation system with heating, passive cooling (outside air) and constant room temperature control. Analog controlled passive cooling (M2).

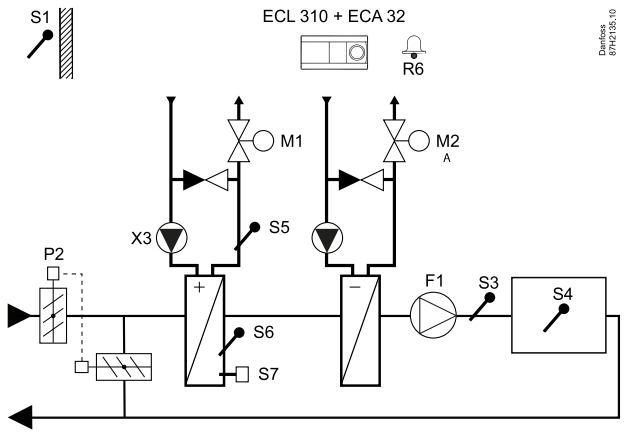


Setting advice:
Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.2 example b

Ventilation system with heating, cooling and constant room temperature control. Analog controlled cooling (M2).



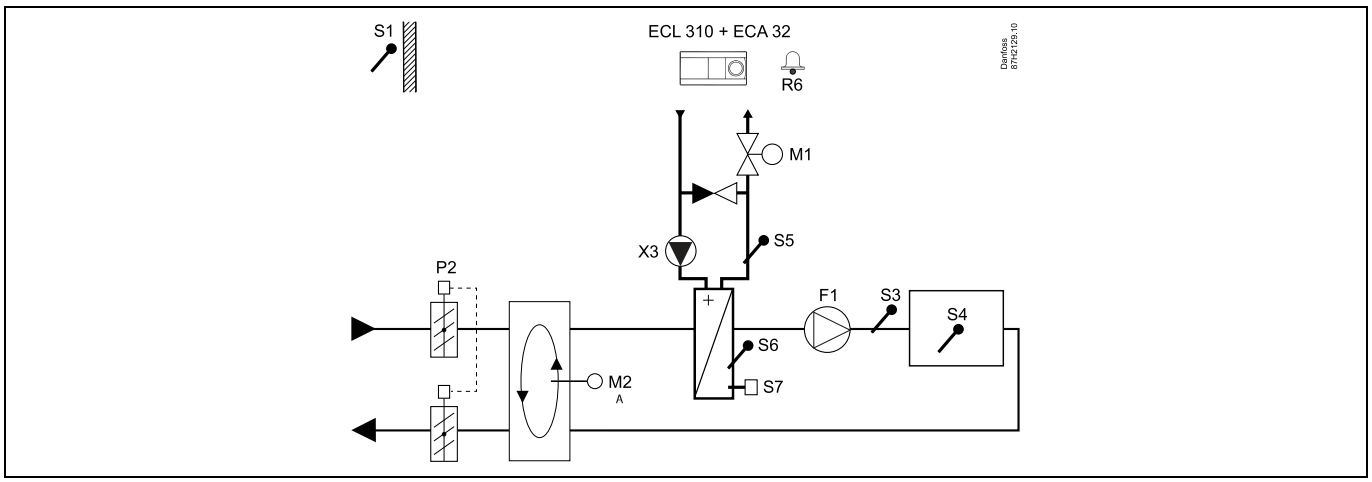
Setting advice:

Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.2 example c

Ventilation system with heating, passive cooling (outside air) and constant room temperature control. Analog controlled speed of rotary heat exchanger (M2) for heat recovery.

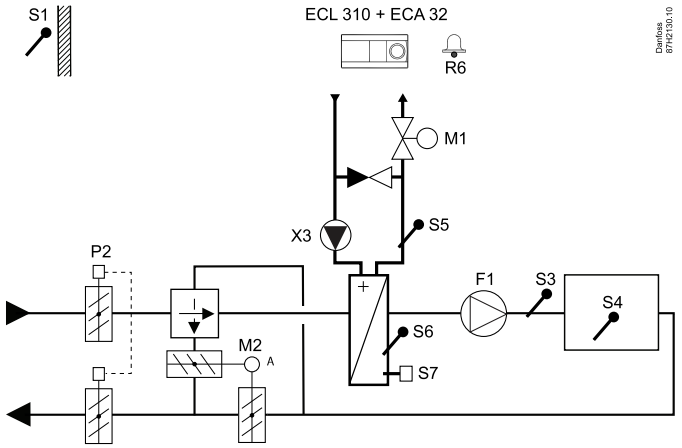


Setting advice:
Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 20 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.2 example d

Ventilation system with heating, analog controlled cross-flow heat exchanger (M2) and constant room temperature control



Setting advice:

Set desired room temperature, for example 20 °C.

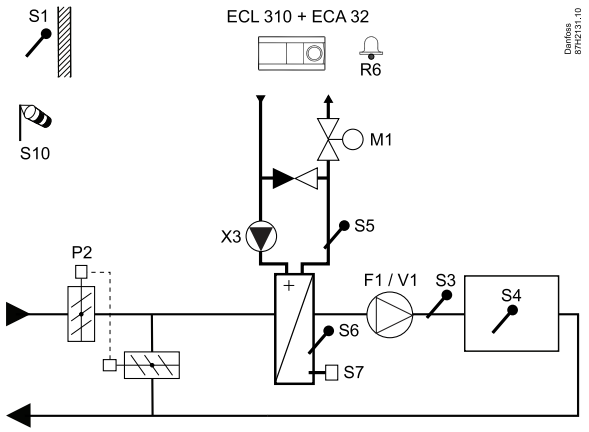
Set desired balance temperature, for example 20 °C.

If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.3 example a

Ventilation system with heating and constant room temperature control. Analog controlled fan speed (V1) based on outdoor wind speed.



Setting advice:

Set desired room temperature, for example 20 °C.

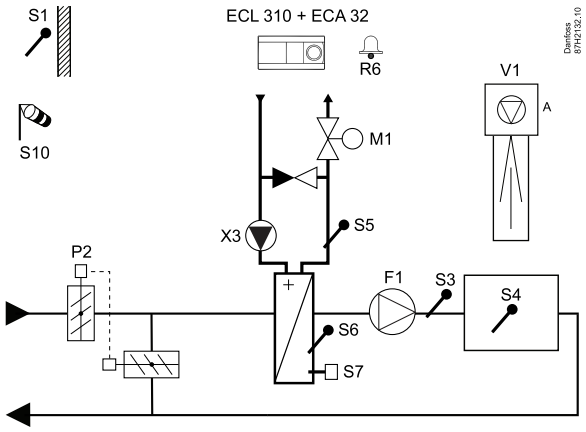
Set desired balance temperature, for example 35 °C.

If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation:	**ID no.:**	**Recommended setting:**
Special settings for sensors / thermostats used as frost protection:		
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

A314.3 example b

Ventilation system with heating and constant room temperature control. Analog controlled air curtain (V1) speed based on outdoor wind speed.



Setting advice:
Set desired room temperature, for example 20 °C.
Set desired balance temperature, for example 35 °C.
If a room temperature sensor is not connected, the desired duct temperature at S3 will correspond to the desired room temperature.

Navigation: **Special settings for sensors / thermostats used as frost protection:**	**ID no.:**	**Recommended setting:**
S6* frost temperature sensor — MENU \ Alarm \ Frost T \ Alarm value	11676	5 °C
S5 return temperature sensor — MENU \ Alarm \ Limit T frost \ Alarm value	11656	5 °C
Closing contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	0
Opening contact of the S7* frost thermostat — MENU \ Alarm \ Frost thermostat \ Alarm value	11616	1
* both frost protection methods, by means of S6 and / or S7, can be used		
Special settings for thermostats used as fire alarm:		
Closing contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	0
Opening contact of the S8 fire thermostat — MENU \ Alarm \ Fire safety \ Alarm value	11636	1

2.3 Mounting

2.3.1 Mounting the ECL Comfort controller

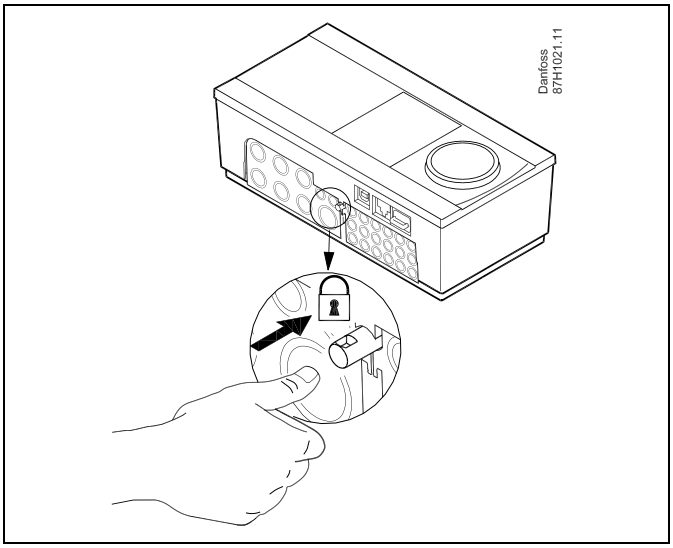
For easy access, you should mount the ECL Comfort controller near the system. Select one of the following methods using the same base part (code no. 087H3220 (ECL Comfort 210) or 087H3230 (ECL Comfort 310):

- Mounting on a wall
- Mounting on a DIN rail (35 mm)

The ECL Comfort 210 can be mounted in the ECL Comfort 210 / 310 base part.
The ECL Comfort 310 can only be mounted in the ECL Comfort 310 base part.

Screws, PG cable glands and rawlplugs are not supplied.

Locking the ECL Comfort controller
In order to fasten the ECL Comfort controller to its base part, secure the controller with the locking pin.



⚠

To prevent injuries to persons or the controller, the controller has to be securely locked into the base. For this purpose, press the locking pin into the base until a click is heard and the controller no longer can be removed from the base.

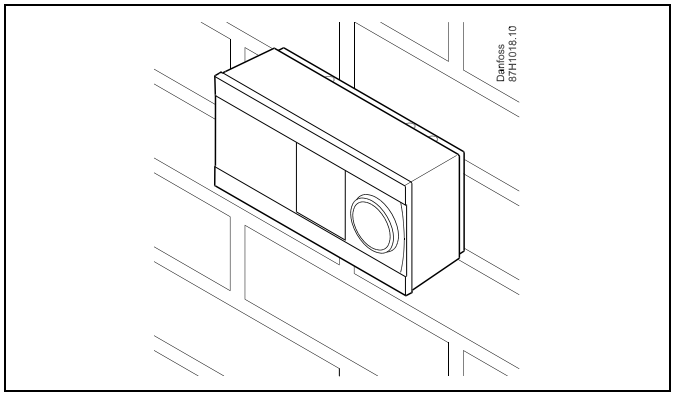
⚠

If the controller is not securely locked into the base part, there is a risk that the controller during operation can unlock from the base and the base with terminals (and also the 230 V a.c. connections) are exposed. To prevent injuries to persons, always make sure that the controller is securely locked into its base. If this is not the case, the controller should not be operated!

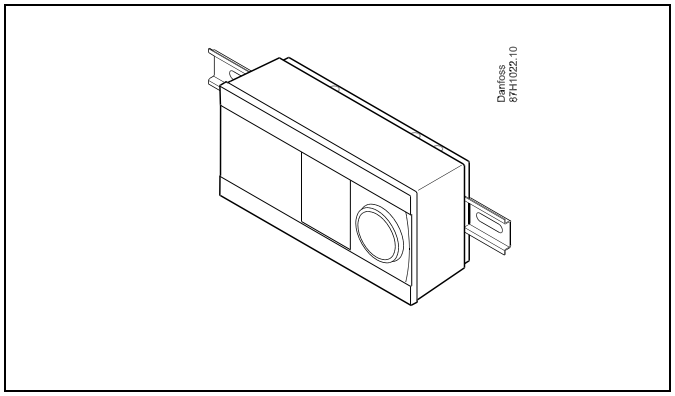
⚠

The easy way to lock the controller to its base or unlock it is to use a screw driver as lever.

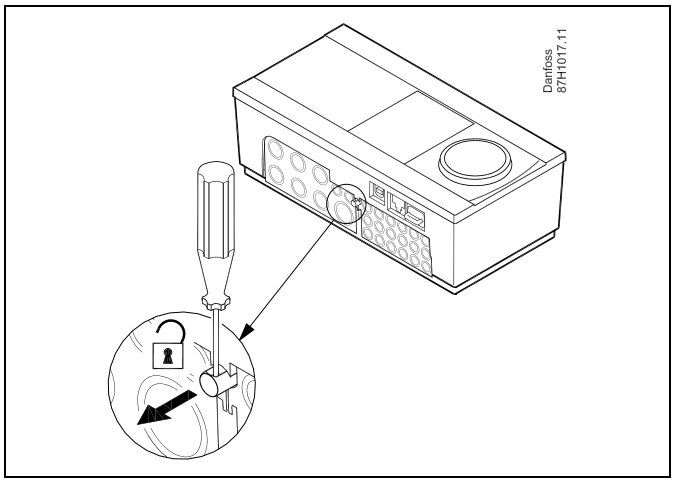
Mounting on a wall
Mount the base part on a wall with a smooth surface. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



Mounting on a DIN rail (35 mm)
Mount the base part on a DIN rail. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



Dismounting the ECL Comfort controller
In order to remove the controller from the base part, pull out the locking pin by means of a screwdriver. The controller can now be removed from the base part.



⚠

The easy way to lock the controller to its base or unlock it is to use a screw driver as lever.

⚠

Before removing the ECL Comfort controller from the base part, ensure that the supply voltage is disconnected.

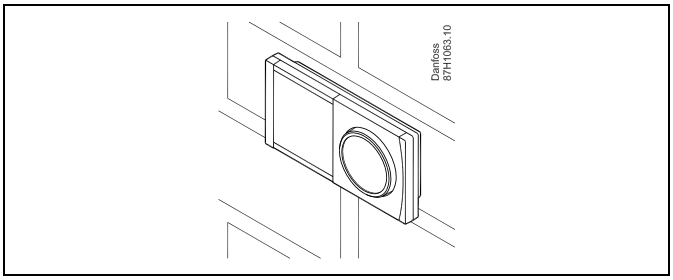
2.3.2 Mounting the Remote Control Units ECA 30/31

Select one of the following methods:

- Mounting on a wall, ECA 30 / 31
- Mounting in a panel, ECA 30

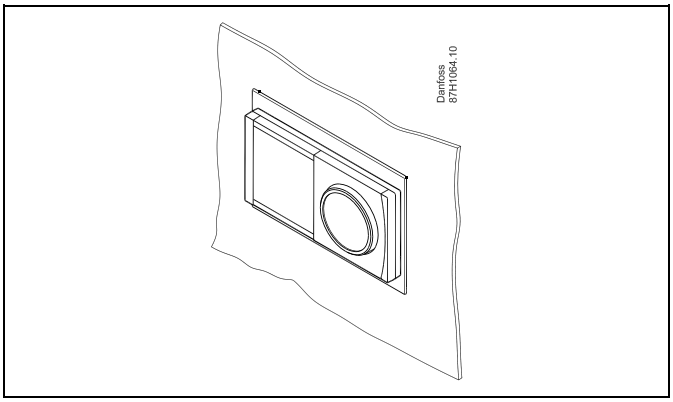
Screws and rawlplugs are not supplied.

Mounting on a wall
Mount the base part of the ECA 30 / 31 on a wall with a smooth surface. Establish the electrical connections. Place the ECA 30 / 31 in the base part.



Mounting in a panel
Mount the ECA 30 in a panel using the ECA 30 frame kit (order code no. 087H3236). Establish the electrical connections. Secure the frame with the clamp. Place the ECA 30 in the base part. The ECA 30 can be connected to an external room temperature sensor.

The ECA 31 must not be mounted in a panel if the humidity function is to be used.



2.4 Placing the temperature sensors

2.4.1 Placing the temperature sensors

It is important that the sensors are mounted in the correct position in your system.

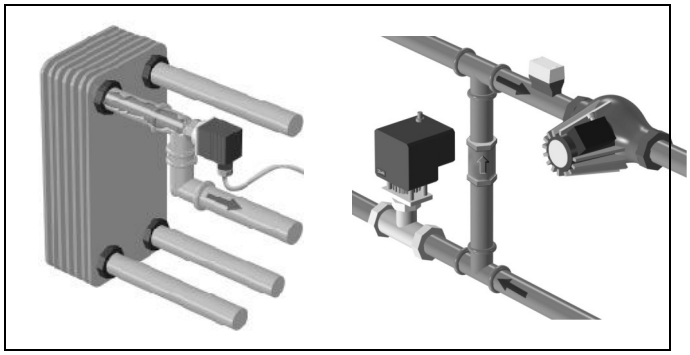
The temperature sensor mentioned below are sensors used for the ECL Comfort 210 and 310 series which not all will be needed for your application!

Outdoor temperature sensor (ESMT)
The outdoor sensor should be mounted on that side of the building where it is less likely to be exposed to direct sunshine. It should not be placed close to doors, windows or air outlets.

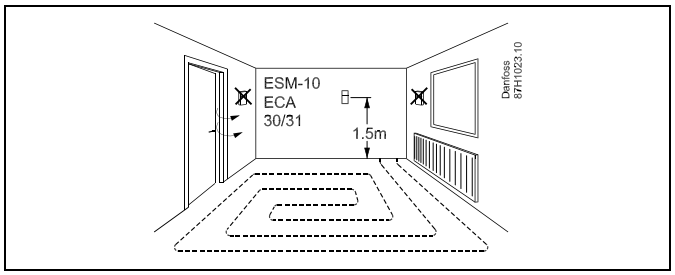
Flow temperature sensor (ESMU, ESM-11 or ESMC)
Place the sensor max. 15 cm from the mixing point. In systems with heat exchanger, Danfoss recommends that the ESMU-type to be inserted into the exchanger flow outlet.

Make sure that the surface of the pipe is clean and even where the sensor is mounted.

Return temperature sensor (ESMU, ESM-11 or ESMC)
The return temperature sensor should always be placed so that it measures a representative return temperature.



Room temperature sensor (ESM-10, ECA 30 / 31 Remote Control Unit)
Place the room sensor in the room where the temperature is to be controlled. Do not place it on outside walls or close to radiators, windows or doors.



Boiler temperature sensor (ESMU, ESM-11 or ESMC)
Place the sensor according to the boiler manufacturer's specification.

Air duct temperature sensor (ESMB-12 or ESMU types)
Place the sensor so that it measures a representative temperature.

DHW temperature sensor (ESMU or ESMB-12)
Place the DHW temperature sensor according to the manufacturer's specification.

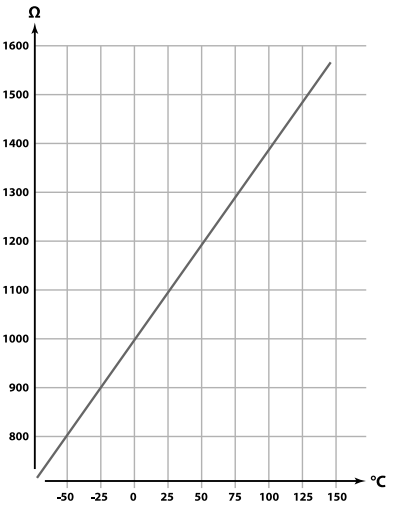
Slab temperature sensor (ESMB-12)
Place the sensor in a protection tube in the slab.

ESM-11: Do not move the sensor after it has been fastened in order to avoid damage to the sensor element.

Pt 1000 temperature sensor (IEC 751B, 1000 Ω / 0 °C)

Relationship between temperature and ohmic value:

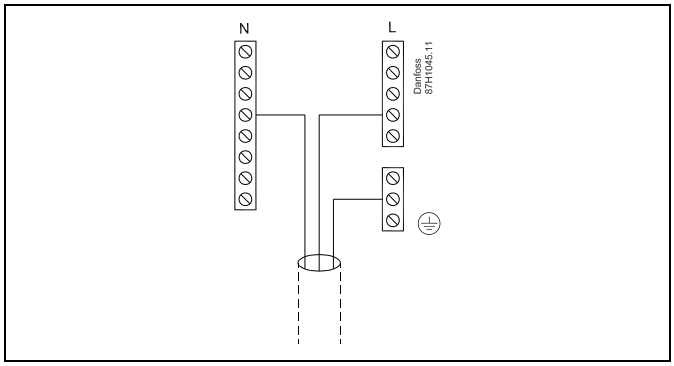
°C	Ω
-50	803
-40	843
-30	882
-20	922
-10	961
0	1000
10	1039
20	1078
30	1117
40	1155
50	1194
60	1232
70	1271
80	1309
90	1347
100	1385
110	1423
120	1461
130	1498
140	1535
150	1573



2.5 Electrical connections

2.5.1 Electrical connections 230 V a.c. in general

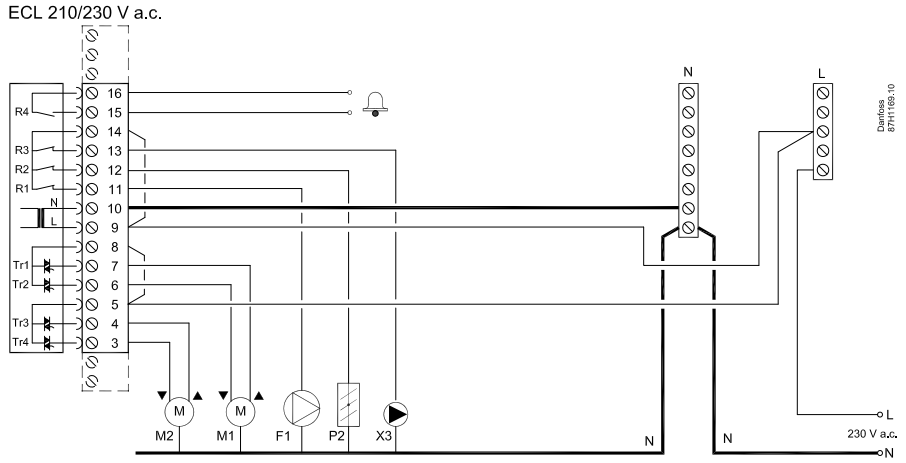
The common ground terminal is used for connection of relevant components (pumps, motorized control valves).



2.5.2 Electrical connections, 230 V a.c., power supply, pumps, motorized control valves etc.

In general, the drawing and description below apply to all A214 applications.

However, please note that:
A214.1 is without M1
A214.2 / A214.3 are without M2

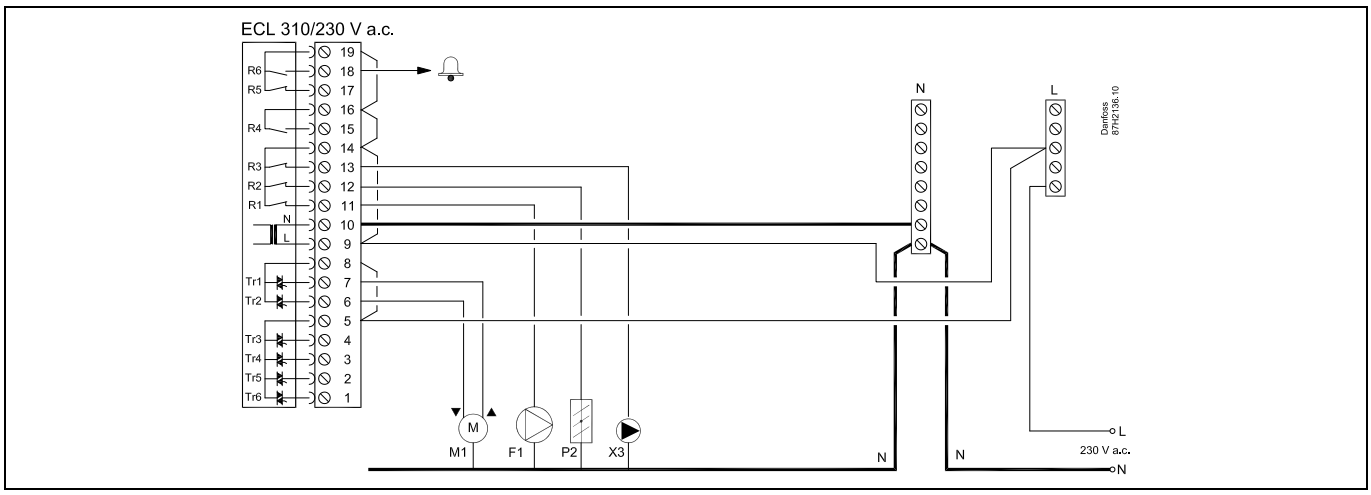


Terminal		Description	Max. load
16		Alarm	4 (2) A / 230 V a.c.*
15			
14		Phase for control of connected units	
13	X3	Circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12	P2	Damper ON / OFF	4 (2) A / 230 V a.c.*
11	F1	Fan / pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5	M2	Phase for motorized control valve output	
4	M2	Motorized control valve - opening	0.2 A / 230 V a.c.
3	M2	Motorized control valve - closing	0.2 A / 230 V a.c.
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

A314:



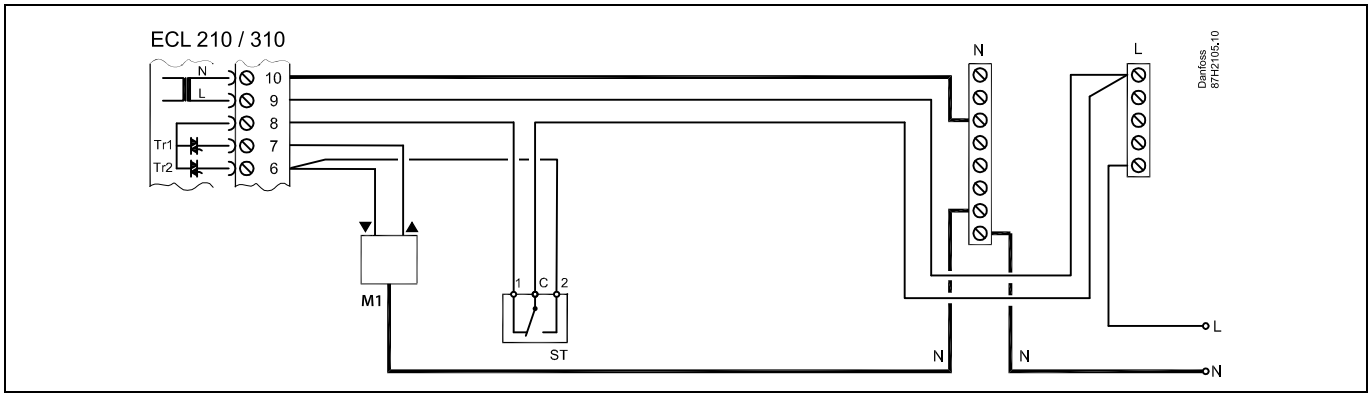
Terminal		Description	Max. load
19		Phase for alarm output	
18	R6	Alarm	4 (2) A / 230 V a.c.*
17		Not to be used	
16		Not to be used	
15		Not to be used	
14		Phase for control of connected units	
13	X3	Circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12	P2	Damper ON / OFF	4 (2) A / 230 V a.c.*
11	F1	Fan / pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

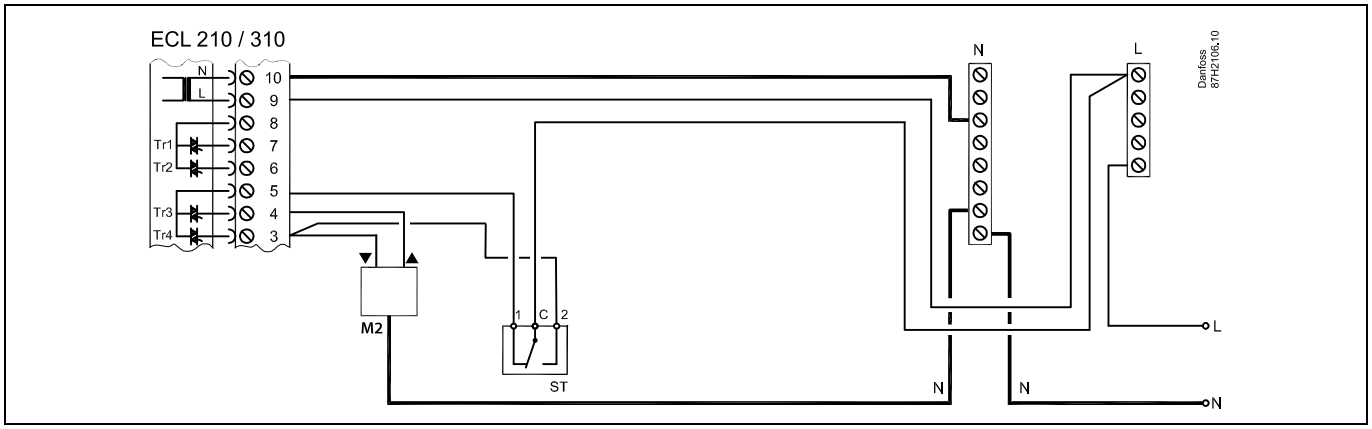
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

Wire cross section: 0.5 - 1.5 mm^2
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm^2 wires can be inserted into each screw terminal.

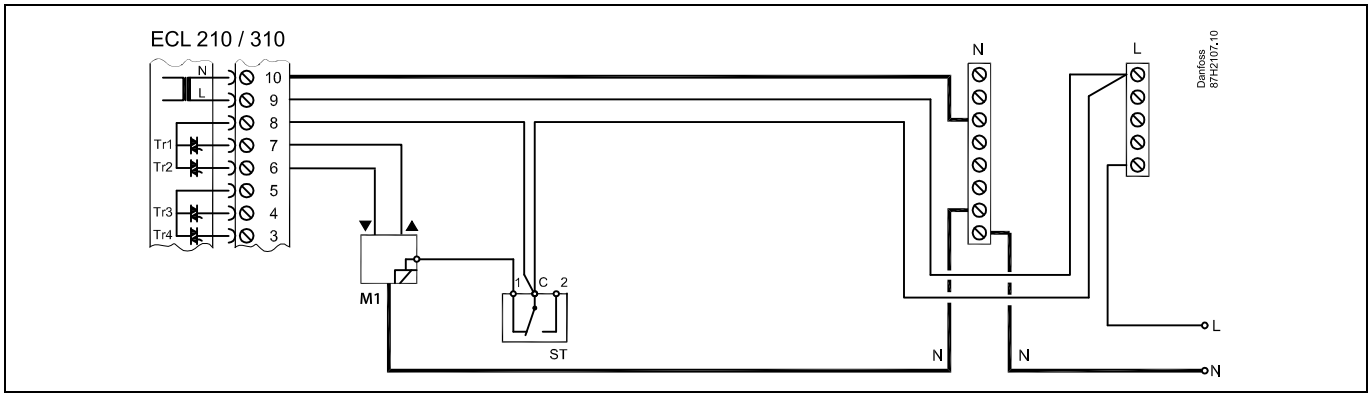
2.5.3 Electrical connections, safety thermostats, 230 V a.c. or 24 V a.c.

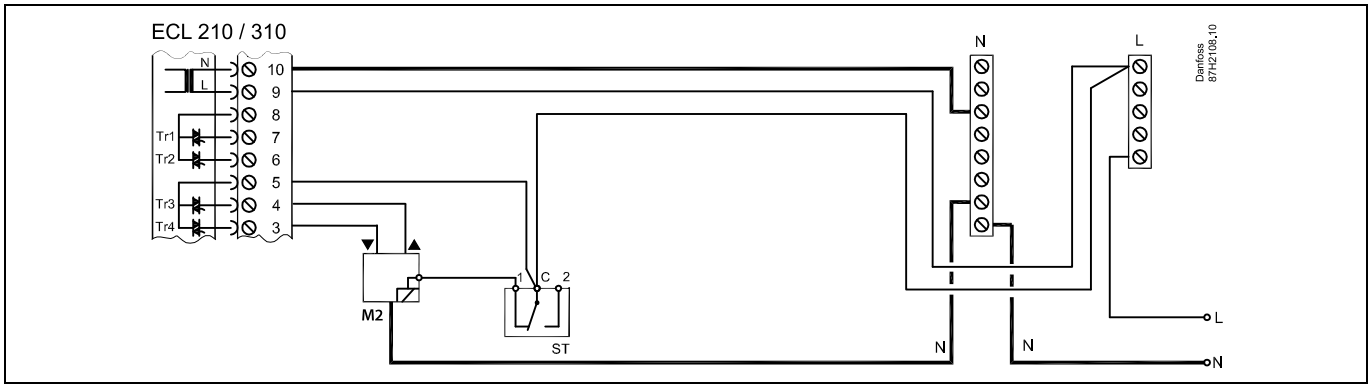
With safety thermostat, 1–step closing:
Motorized control valve without safety function



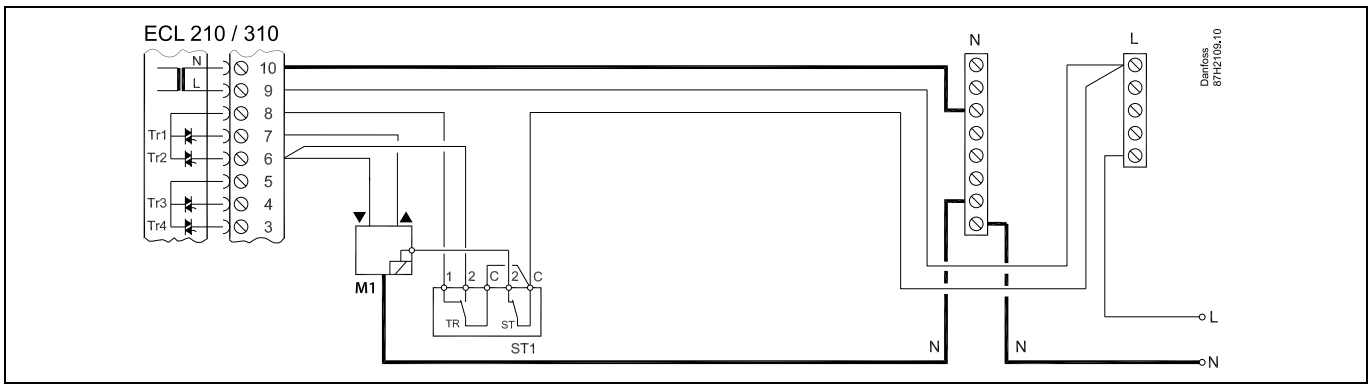


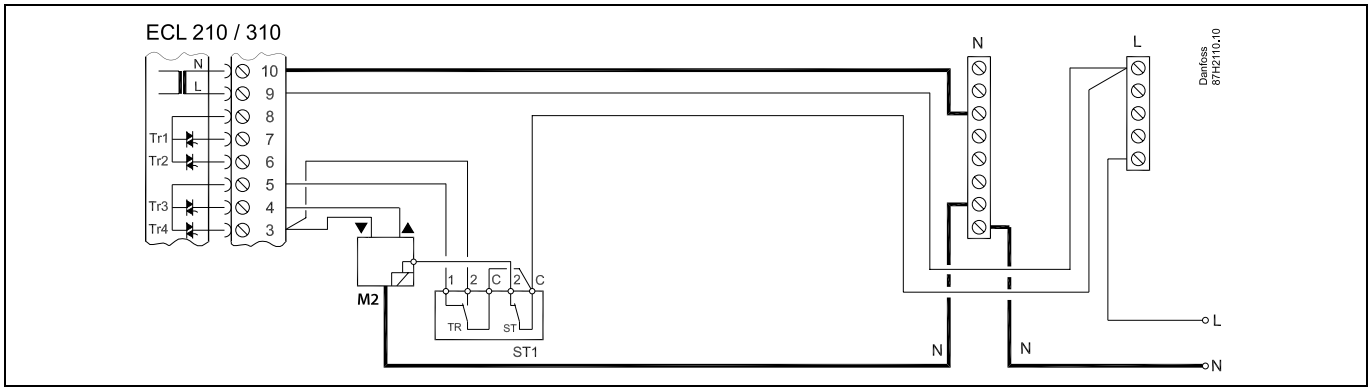
With safety thermostat, 1–step closing:
Motorized control valve with safety function





With safety thermostat, 2–step closing:
Motorized control valve with safety function





When ST is activated by a high temperature, the safety circuit in the motorized control valve closes the valve immediately.

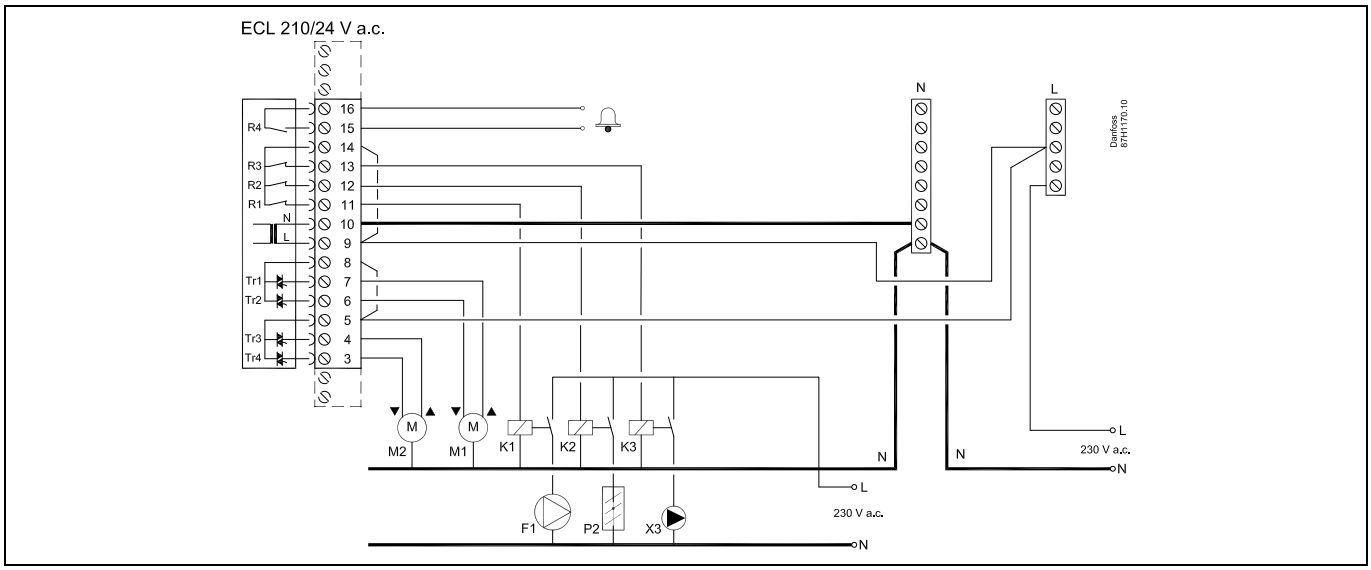
When ST1 is activated by a high temperature (the TR temperature), the motorized control valve is closed gradually. At a higher temperature (the ST temperature), the safety circuit in the motorized control valve closes the valve immediately.

Wire cross section: 0.5 - 1.5 mm^2
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm^2 wires can be inserted into each screw terminal.

2.5.4 Electrical connections, 24 V a.c., power supply, pumps, motorized valves etc.

In general, the drawing and description below apply to all A214 applications.

However, please note that:
A214.1 is without M1
A214.2 / A214.3 are without M2



Terminal		Description	Max. load
16		Alarm	4 (2) A / 24 V a.c.*
15			
14		Phase for control of connected units	
13	R3 (K3)	Circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12	R2 (K2)	Damper ON / OFF	4 (2) A / 24 V a.c.*
11	R1 (K1)	Fan / pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5	M2	Phase for motorized control valve output	
4	M2	Motorized control valve - opening	1 A / 24 V a.c.
3	M2	Motorized control valve - closing	1 A / 24 V a.c.
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

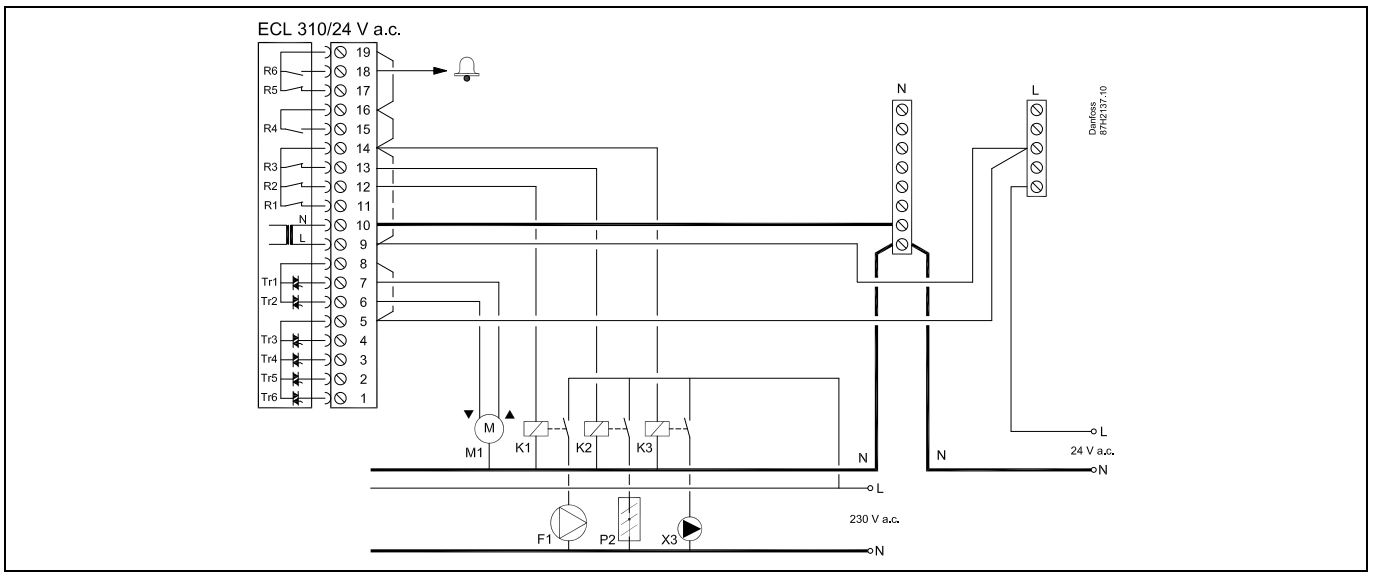
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

⚠

Do not connect 230 V a.c. powered components to a 24 V a.c. power supplied controller directly. Use auxilliary relays (K) to seperate 230 V a.c. from 24 V a.c.

A314:



Terminal		Description	Max. load
19		Phase for alarm output	
18	R6	Alarm	4 (2) A / 24 V a.c.*
17		Not to be used	
16		Not to be used	
15		Not to be used	
14		Phase for control of connected units	
13	R3 (K3)	Circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12	R2 (K2)	Damper ON / OFF	4 (2) A / 24 V a.c.*
11	R1 (K1)	Fan / pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

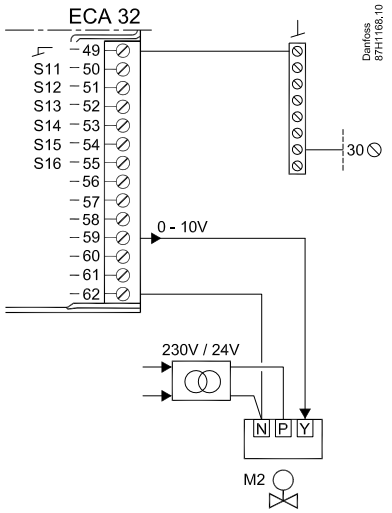
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

⚠

Do not connect 230 V a.c. powered components to a 24 V a.c. power supplied controller directly. Use auxilliary relays (K) to seperate 230 V a.c. from 24 V a.c.

A314— ECA 32:



230V / 24V

Double-insulated (two-chamber) transformer

Terminal	Description	Max. load
49	Common terminal (connected to terminal 30 in the ECL Comfort controller)	
56	Analog reference for Analog Out 2 and 3	
57	Not to be used	
58	Not to be used	
59 M2	Analog Out 1	47 kΩ*
60	Analog Out 2 (not used)	
61	Analog Out 3 (not used)	
62	Analog reference for Analog Out 1	

* The value must be 47 kΩ as a minimum.

Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

Do not connect 230 V a.c. powered components to a 24 V a.c. power supplied controller directly. Use auxilliary relays (K) to seperate 230 V a.c. from 24 V a.c.

2.5.5 Electrical connections, Pt 1000 temperature sensors and signals

A214/ A314:

Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor*	ESMT
28 and 30	S2	Compensation temperature sensor**	ESM-11 / ESMB / ESMC / ESMU / ESMT
27 and 30	S3	Duct / flow temperature sensor***	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	Room temperature sensor (A214.1 / A214.3 / A214.5 / A314.2 / A314.3) Duct temperature sensor (A214.2 / A214.4 / A314.1)	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	Frost temperature sensor **** (not in A214.1)	
23 and 30	S7	Frost thermostat *****	
22 and 30	S8	Fire thermostat ***** (fire alarm)	
21 and 30		ECL 310 only: Not used	
20 and 30		ECL 310 only: Wind speed sensor (only in A314.3)	

* If the outdoor temperature sensor is not connected or the cable is short-circuited, the controller assumes that the outdoor temperature is 0 (zero) °C.

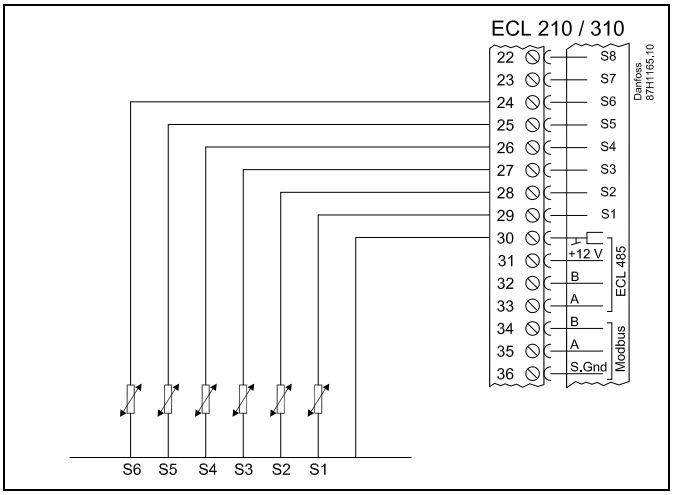
** Could for example be an extra room temperature sensor.

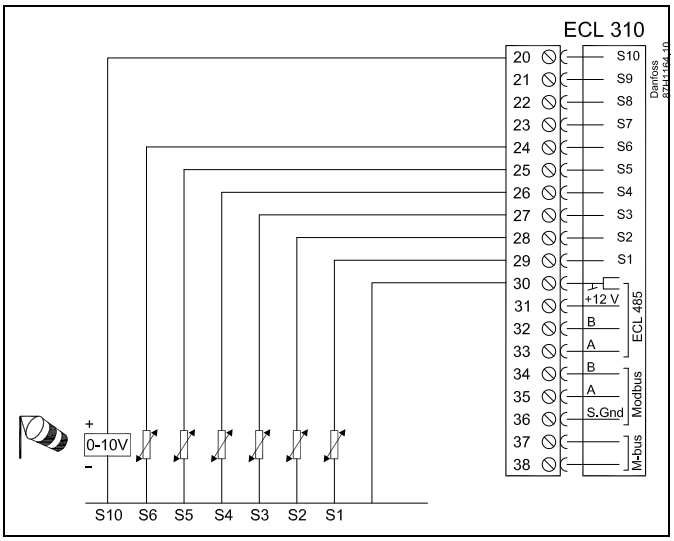
*** If the sensor is not connected or the cable is short-circuited, the motorized control valve closes (safety function).

**** Both frost protection methods can be used.

***** Can be set up to react on a closing or an opening contact.

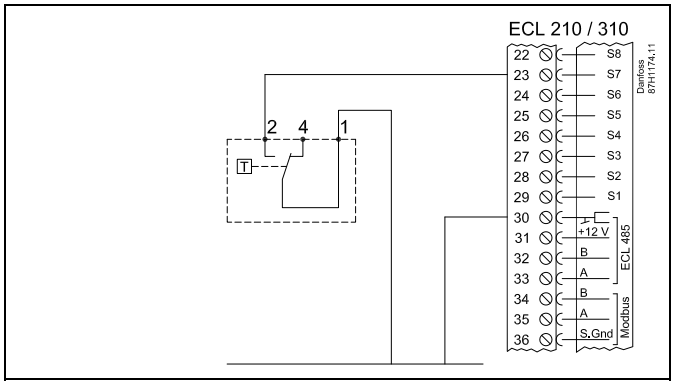
Factory established jumper:
30 to common terminal.



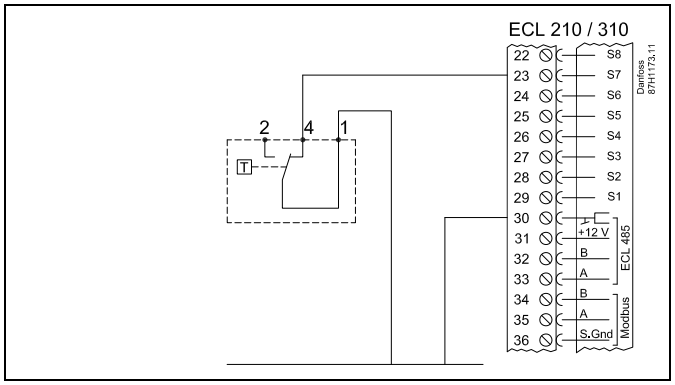


Connection of frost thermostats, S7

When frost (too low temperature) is detected, contacts 1-2 close.

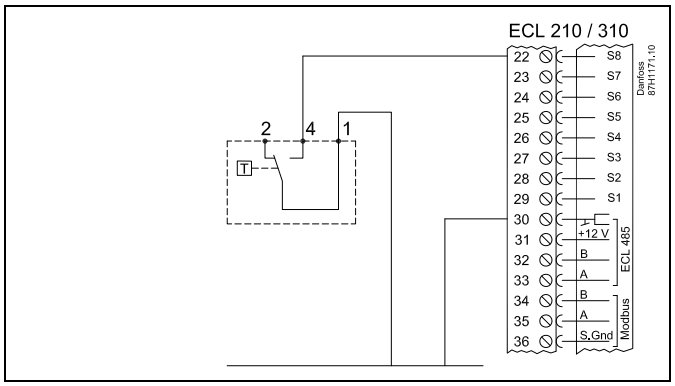


When frost (too low temperature) is detected, contacts 1-4 open.

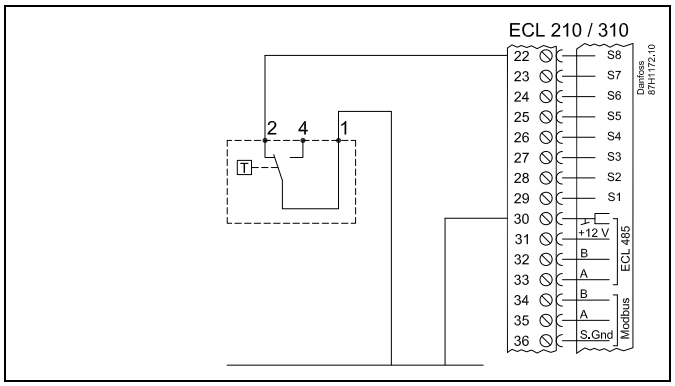


Connection of fire thermostats, S8

When fire (too high temperature) is detected, the contacts 1-4 close.



When fire (too high temperature) is detected, the contacts 1-2 open.



Wire cross section for sensor connections: Min. 0.4 mm².
Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus)
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.6 Electrical connections, ECA 30 / 31

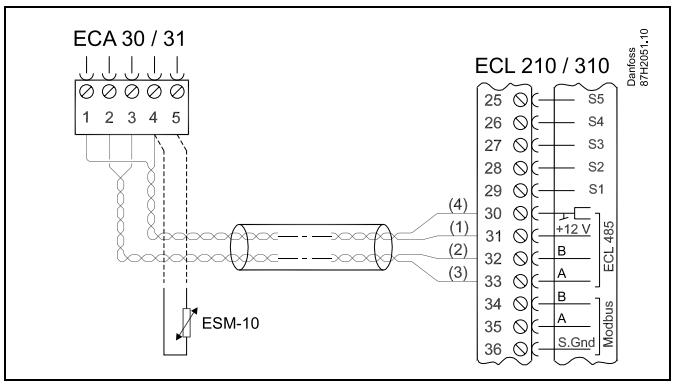
Terminal ECL	Terminal ECA 30 / 31	Description	Type (recomm.)
30	4	Twisted pair	Cable 2 x twisted pair
31	1		
32	2	Twisted pair	
33	3		
	4	Ext. room temperature sensor*	ESM-10
	5		

* After an external room temperature sensor has been connected, ECA 30 / 31 must be repowered.

The communication to the ECA 30 / 31 must be set up in the ECL Comfort controller in 'ECA addr.'

The ECA 30 /31 must be set up accordingly.

After application setup the ECA 30 / 31 is ready after 2–5 min. A progress bar in the ECA 30 / 31 is displayed.



ECA information message:
'Application req. newer ECA':
The software of your ECA does not comply with the software of your ECL Comfort controller. Please contact your Danfoss sales office.

Some applications do not contain functions related to actual room temperature. The connected ECA 30 / 31 will only function as remote control.

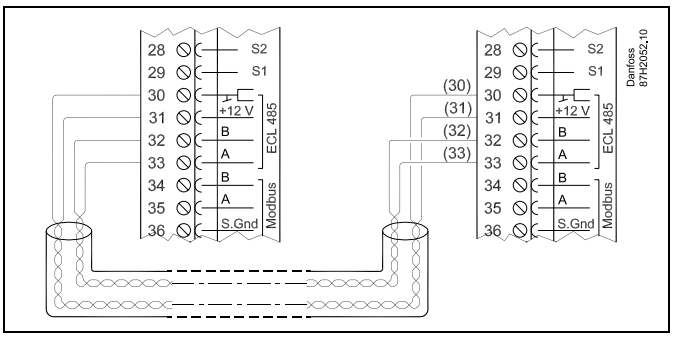
Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus).
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.7 Electrical connections, master / slave systems

The controller can be used as master or slave in master / slave systems via the internal ECL 485 communication bus (2 x twisted pair cable).

The ECL 485 communication bus is not compatible with the ECL bus in ECL Comfort 110, 200, 300 and 301!

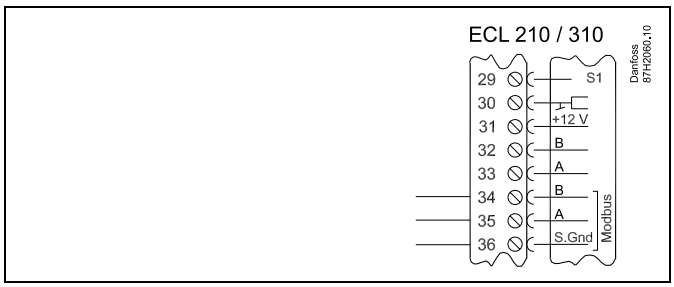
Terminal	Description	Type (recomm.)
30	Common terminal	Cable 2 x twisted pair
31*	+12 V*, ECL 485 communication bus	
32	A, ECL 485 communication bus	
33	B, ECL 485 communication bus	
* Only for ECA 30 / 31 and master / slave communication		



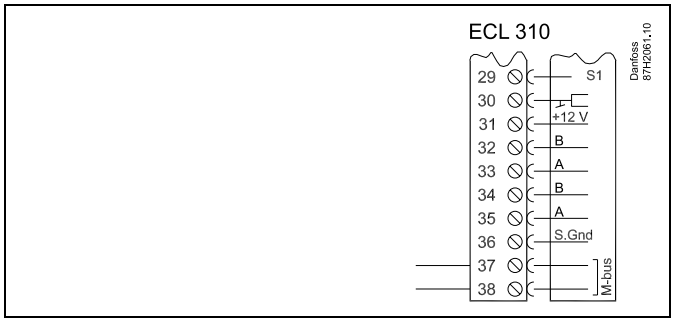
Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus).
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.8 Electrical connections, communication

Electrical connections, Modbus



Electrical connections, M-bus



2.6 Inserting the ECL Application Key

2.6.1 Inserting the ECL Application Key

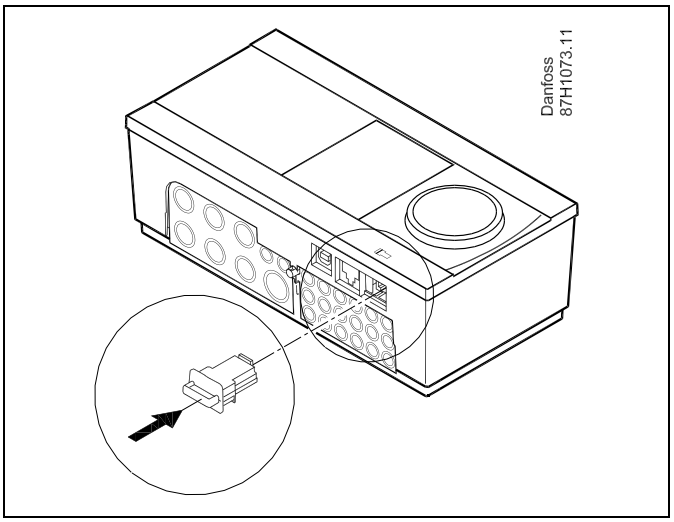
This section describes the function in general for the ECL Comfort 210 / 310 series and is not application related.

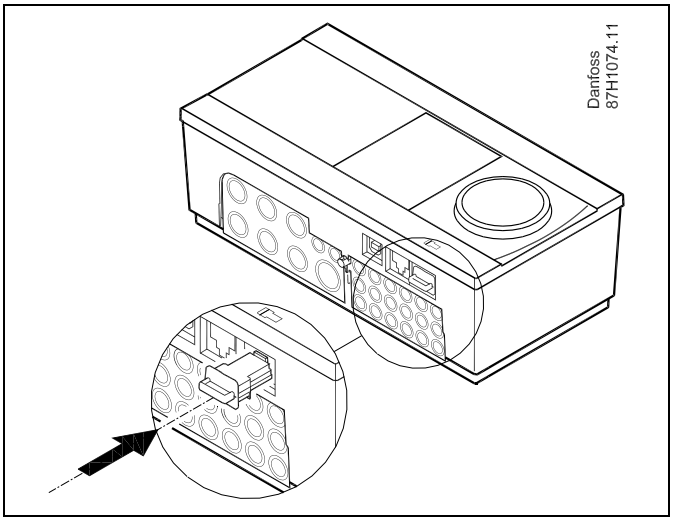
The ECL Application Key contains

- the application and its subtypes,
- currently available languages,
- factory settings: e.g. schedules, desired temperatures, limitation values etc. It is always possible to recover the factory settings,
- memory for user settings: special user / system settings.

After having powered-up the controller, different situations might be existing:

1. The controller is new from the factory, the ECL Application Key is not inserted.
2. The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.
3. A copy of the controllers settings is needed for configuring another controller.

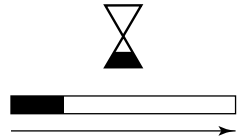




User settings are, among others, desired room temperature, desired DHW temperature, schedules, heat curve, limitation values etc.

System settings are, among others, communication set-up, display brightness etc.

Automatic update of controller software:
The software of the controller is updated automatically when the key is inserted (as of controller version 1.11). The following animation will be shown when the software is being updated:



Progress bar

During update:
- Do not remove the KEY
- Do not disconnect the power

Application Key: Situation 1
The controller is new from the factory, the ECL Application Key is not inserted.

An animation for the ECL Application Key insertion is displayed. Insert the Application Key .

Application Key name and Version is indicated (example: A266 Ver. 1.03).

If the ECL Application Key is not suitable for the controller, a "cross" is displayed over the ECL Application Key-symbol.

Action:	Purpose:	Examples:
	Select language	
	Confirm	
	Select application	
	Confirm with 'Yes'	
	Set 'Time & Date' Turn and push the dial to select and change 'Hours', 'Minutes', 'Date', 'Month' and 'Year'. Choose "Next'	
	Confirm with 'Yes'	
	Go to 'Aut. daylight'	
	Choose whether 'Aut. daylight´ * should be active or not	YES or NO

* 'Aut. daylight' is the automatic changeover between summer and winter time.

Depending on the contents of the ECL Application Key, procedure A or B is taking place:

A
The ECL Application key contains factory settings:
The controller reads / transfers data from the ECL Application Key to ECL controller.

The application is installed, and the controller resets and starts up.

B
The ECL Application key contains changed system settings:
Push the dial repeatedly.

'NO': Only factory settings from the ECL Application Key will be copied to the controller.

'YES*: Special system settings (differing from the factory settings) will be copied to the controller.

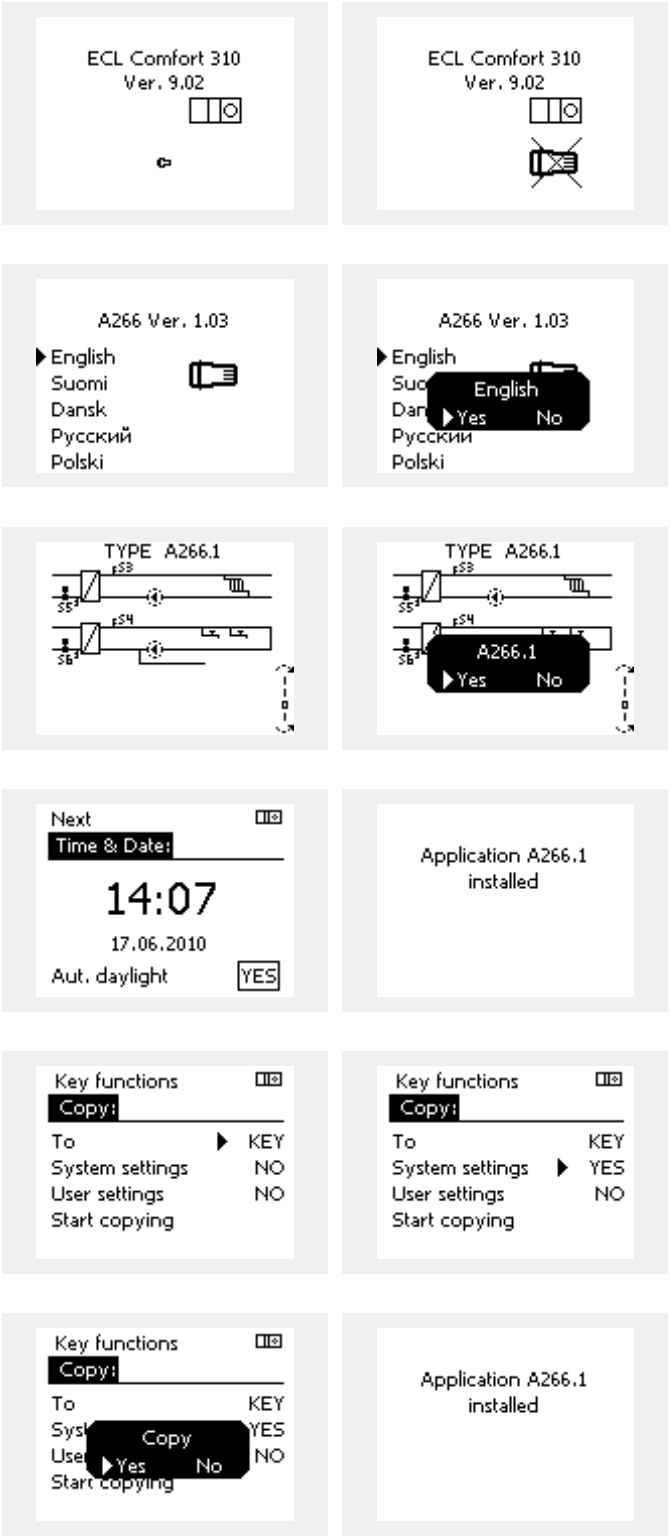
If the key contains user settings:
Push the dial repeatedly.

'NO: Only factory settings from the ECL Application Key will be copied to the controller.

'YES*: Special user settings (differing from the factory settings) will be copied to the controller.

* If 'YES' cannot be chosen, the ECL Application Key does not contain any special settings.

Choose 'Start copying' and confirm with 'Yes'.

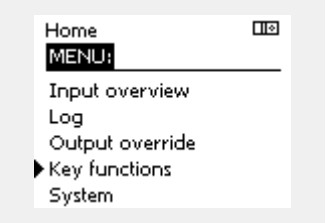


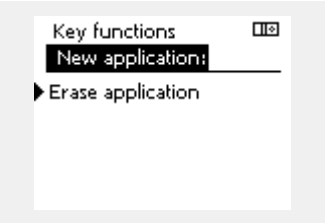
Application Key: Situation 2
The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.

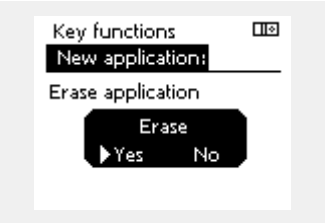
To change to another application on the ECL Application Key, the current application in the controller must be erased (deleted).

Be aware that the Application Key must be inserted.

Action:	Purpose:	Examples:
	Choose 'MENU' in any circuit	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	
	Choose 'Key functions'	
	Confirm	
	Choose 'Erase application'	
	Confirm with 'Yes'	







The controller resets and is ready to be configured.

Follow the procedure described in situation 1.

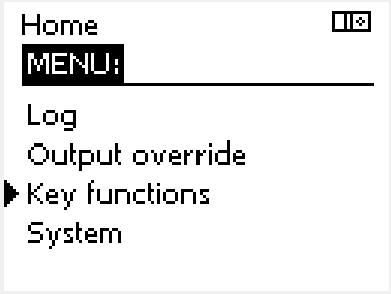
Application Key: Situation 3
A copy of the controllers settings is needed for configuring another controller.

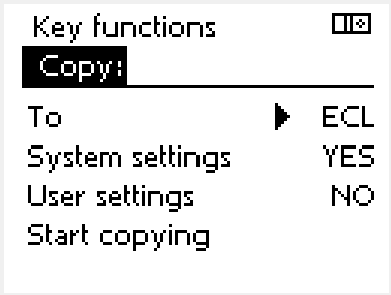
This function is used

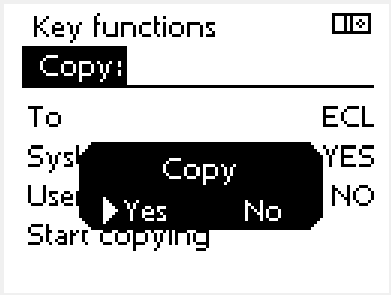
- for saving (backup) of special user and system settings
- when another ECL Comfort controller of the same type (210 or 310) must be configured with the same application but user / system settings differ from the factory settings.

How to copy to another ECL Comfort controller:

Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	
	Go to 'Key functions'	
	Confirm	
	Choose 'Copy'	
	Confirm	
	Choose 'To'. 'ECL' or 'KEY' will be indicated. Choose 'ECL' or KEY'	* 'ECL' or 'KEY'.
	Push the dial repeatedly to choose copy direction	
	Choose 'System settings' or 'User settings'	** 'NO' or 'YES'
	Push the dial repeatedly to choose 'Yes' or 'No' in 'Copy'. Push to confirm.	
	Choose 'Start copying'	
	The Application Key or the controller is updated with special system or user settings.	







*

'ECL': Data will be copied from the Application Key to the ECL Controller.
'KEY': Data will be copied from the ECL Controller to the Application Key.

**

'NO': The settings from the ECL controller will not be copied to the Application Key or to the ECL Comfort controller.
'YES': Special settings (differing from the factory settings) will be copied to the Application Key or to the ECL Comfort controller. If YES can not be chosen, there are no special settings to be copied.

2.6.2 ECL Application Key, copying data

General principles
When the controller is connected and operating, you can check and adjust all or some of the basic settings. The new settings can be stored on the Key.

How to update the ECL Application Key after settings have been changed?
All new settings can be stored on the ECL Application Key.

How to store factory setting in the controller from the Application Key?
Please read the paragraph concerning Application Key, Situation 1: The controller is new from the factory, the ECL Application Key is not inserted.

How to store personal settings from the controller to the Key?
Please read the paragraph concerning Application Key, Situation 3: A copy of the controllers settings is needed for configuring another controller

As a main rule, the ECL Application Key should always remain in the controller. If the Key is removed, it is not possible to change settings.

Factory settings can always be restored.

Make a note of new settings in the 'Settings overview' table.

Do not remove the ECL Application Key while copying. The data on the ECL Application Key can be damaged!

It is possible to copy settings from one ECL Comfort controller to another controller provided that the two controllers are from the same series (210 or 310).

2.7 Check list

Is the ECL Comfort controller ready for use?

- ☐ Make sure that the correct power supply is connected to terminals 9 (Live) and 10 (Neutral).
- ☐ Check that the required controlled components (actuator, pump etc.) are connected to the correct terminals.
- ☐ Check that all sensors / signals are connected to the correct terminals (see 'Electrical connections').
- ☐ Mount the controller and switch on the power.
- ☐ Is the ECL Application Key inserted (see 'Inserting the Application Key').
- ☐ Is the correct language chosen (see 'Language' in 'Common controller settings').
- ☐ Is the time & date set correctly (see 'Time & Date' in 'Common controller settings').
- ☐ Is the right application chosen (see 'Identifying the system type').
- ☐ Check that all settings in the controller (see 'Settings overview') are set or that the factory settings comply with your requirements.
- ☐ Choose manual operation (see 'Manual control'). Check that valves open and close, and that required controlled components (pump etc.) start and stop when operated manually.
- ☐ Check that the temperatures / signals shown in the display match the actual connected components.
- ☐ Having completed the manual operation check, choose controller mode (scheduled, comfort, saving or frost protection).

2.8 Navigation, ECL Application Key A214 / A314

Navigation, A214, applications A214.1, A214.2, A214.3, A214.4 and A214.5

Home		Applications A214						
MENU		ID no.	Function	A214.1	A214.2	A214.3	A214.4	A214.5
Schedule			Selectable					
Settings	Flow temperature	11008	Desired balance T	●	●	●	●	●
		11178	Temp. max.	●	●	●	●	●
		11177	Temp. min.	●	●	●	●	●
		11009	Dead zone				●	●
	Room limit	11182	Infl. - max.	●		●		●
		11183	Infl. - min.	●		●		●
		11015	Adapt. time	●		●		●
	Duct T limit	11182	Infl. - max.		●		●	
		11183	Infl. - min.		●		●	
		11015	Adapt. time		●		●	
	Return limit	11030	Limit	●	●	●	●	●
		11035	Infl. - max.	●	●	●	●	●
		11036	Infl. - min.	●	●	●	●	●
		11037	Adapt. time	●	●	●	●	●
	Limit T safety	11108	Limit T frost		●	●	●	●
		11105	Infl. - min.		●	●	●	●
		11107	Adapt. time		●	●	●	●
	Compensation 1		Actual comp. T	●	●	●	●	●
		11060	Limit	●	●	●	●	●
		11062	Infl. - max.	●	●	●	●	●
		11063	Infl. - min.	●	●	●	●	●
		11061	Adapt. time	●	●	●	●	●
	Compensation 2		Actual comp. T	●	●	●	●	●
		11064	Limit	●	●	●	●	●
		11066	Infl. - max.	●	●	●	●	●
		11067	Infl. - min.	●	●	●	●	●
		11065	Adapt. time	●	●	●	●	●
	Control par. (1)	11174	Motor pr.	●	●	●	●	●
		11184	Xp	●	●	●	●	●
		11185	Tn	●	●	●	●	●
		11186	M run	●	●	●	●	●
		11187	Nz	●	●	●	●	●
		11189	Min. act. time	●	●	●	●	●

Navigation, A214, applications A214.1, A214.2, A214.3, A214.4 and A214.5 continued

Home		Applications, A214						
MENU		ID no.	Function	A214.1	A214.2	A214.3	A214.4	A214.5
Settings	Control par. 2	12174	Motor pr.				●	●
		12184	Xp				●	●
		12185	Tn				●	●
		12186	M run				●	●
		12187	Nz				●	●
		12189	Min. act. time				●	●
	Fan / acc. control	11088	Fan output func.	●	●	●	●	●
		11086	Fan cut-in delay	●	●	●	●	●
		11137	Fan function		●	●	●	●
		11089	Acc. output func.	●	●	●	●	●
		11087	Acc. cut-in delay	●	●	●	●	●
		11091	Acc. time control	●	●	●	●	●
		11090	Optional function	●	●	●	●	●
		11077	P frost T	●	●	●	●	●
		11027	Room T diff.			●		
	Application	11010	ECA addr.	●		●		●
		11500	Send desired T	●	●	●	●	●
		11021	Total stop	●	●	●	●	●
		11140	Comp. T select	●	●	●	●	●
		11093	Frost pr. T		●		●	
		10304	S4 filter		●		●	
		11082	Accum. filter				●	●
		11141	Ext. input	●	●	●	●	●
		11142	Ext. mode	●	●	●	●	●

Navigation, A214, applications A214.1, A214.2, A214.3, A214.4 and A214.5 continued

Home		Applications A214						
MENU		ID no.	Function	A214.1	A214.2	A214.3	A214.4	A214.5
Holiday			Selectable	●	●	●	●	●
Alarm	Frost T	11676	Alarm value	●	●	●	●	●
	Limit T frost	11656	Alarm value		●	●	●	●
	Frost thermostat	11616	Alarm value		●	●	●	●
		11617	Alarm time-out		●	●	●	●
	Fire safety	11636	Alarm value	●	●	●	●	●
		11637	Alarm time-out	●	●	●	●	●
	Temp. monitor.	11147	Upper difference		●	●	●	●
		11148	Lower difference		●	●	●	●
		11149	Delay		●	●	●	●
		11150	Lowest temp.		●	●	●	●
	Alarm overview		Frost T	●	●	●	●	●
			Limit T frost		●	●	●	●
			Frost thermostat		●	●	●	●
			Fire safety	●	●	●	●	●
			Temp. monitor.		●	●	●	●
			Flow T sensor	●	●	●	●	●
Influence overview	Des. flow T		Return lim.	●	●	●	●	●
			Room lim.	●		●		●
			Duct T limit		●		●	
			Compensation 1	●	●	●	●	●
			Compensation 2	●	●	●	●	●
			Limit T safety		●	●	●	●
			Holiday	●	●	●	●	●
			Ext. override	●	●	●	●	●
			ECA override	●		●		●
			SCADA offset	●	●	●	●	●

Navigation, A214, applications A214.1, A214.2, A214.3, A214.4 and A214.5, Common controller settings

Home		Applications A214, Common controller settings						
MENU		ID no.	Function	A214.1	A214.2	A214.3	A214.4	A214.5
Time & Date			Selectable	●	●	●	●	●
Schedule			Selectable	●	●	●	●	●
Input overview			Outdoor T	●	●	●	●	●
			Compensation T	●	●	●	●	●
			Flow T	●	●	●	●	●
			Room T	●		●		●
			Duct T		●		●	
			Return T	●	●	●	●	●
			Frost T	●	●	●	●	●
			Accumulated T				●	●
			Frost thermostat		●	●	●	●
			Fire safety	●	●	●	●	●
Log (sensors)	Log today		Outdoor T	●	●	●	●	●
	Log yesterday		Flow T & desired	●	●	●	●	●
	Log 2 days		Duct T & desired		●		●	
	Log 4 days		Room T & desired	●		●		●
			Return T & limit	●	●	●	●	●
			Compensation T	●	●	●	●	●
			Frost T	●	●	●	●	●
Output override			M1		●	●	●	●
			F1	●	●	●	●	●
			M2	●			●	●
			P2	●	●	●	●	●
			X3	●	●	●	●	●
			A1	●	●	●	●	●

Navigation, A214, applications A214.1, A214.2, A214.3, A214.4 and A214.5, Common controller settings, continued

Home		Applications A214, Common controller settings						
MENU		ID no.	Function	A214.1	A214.2	A214.3	A214.4	A214.5
Key functions	New application		Erase application	●	●	●	●	●
	Application			●	●	●	●	●
	Factory setting		System settings	●	●	●	●	●
			User settings	●	●	●	●	●
			Go to factory	●	●	●	●	●
	Copy		To	●	●	●	●	●
			System settings	●	●	●	●	●
			User settings	●	●	●	●	●
			Start copying	●	●	●	●	●
	Key overview			●	●	●	●	●
System	ECL version		Code no.	●	●	●	●	●
			Hardware	●	●	●	●	●
			Software	●	●	●	●	●
			Build no.	●	●	●	●	●
			Serial no.	●	●	●	●	●
			Production date	●	●	●	●	●
	Extension			●	●	●	●	●
	Ethernet			●	●	●	●	●
	Portal config			●	●	●	●	●
	M-bus config			●	●	●	●	●
	Energy Meters			●	●	●	●	●
	Raw input overview			●	●	●	●	●
	Alarm		Temp. monitor.	●	●	●	●	●
	Display	60058	Backlight	●	●	●	●	●
		60059	Contrast	●	●	●	●	●
	Communication	38	Modbus addr.	●	●	●	●	●
		2048	ECL 485 addr..	●	●	●	●	●
		2150	Service pin	●	●	●	●	●
		2151	Ext. reset	●	●	●	●	●
	Language	2050	Language	●	●	●	●	●

Navigation, A314, applications A314.1, 314.2 and A314.3

Home		Application A314				
MENU		**ID no.**	**Function**	**A314.1**	**A314.2**	**A314.3**
Schedule			Selectable			
Settings	Flow temperature	11008	Desired balance T	●	●	●
		11178	Temp. max.	●	●	●
		11177	Temp. min.	●	●	●
		11009	Dead zone	●	●	
	Room limit	11182	Infl. - max.		●	●
		11183	Infl. - min.		●	●
		11015	Adapt. time		●	●
	Duct T limit	11182	Infl. - max.	●		
		11183	Infl. - min.	●		
		11015	Adapt. time	●		
	Return limit	11030	Limit	●	●	●
		11035	Infl. - max.	●	●	●
		11036	Infl. - min.	●	●	●
		11037	Adapt. time	●	●	●
	Limit T safety	11108	Limit T frost	●	●	●
		11105	Infl. - min.	●	●	●
		11107	Adapt. time	●	●	●
	Compensation 1		Actual comp. T	●	●	●
		11060	Limit	●	●	●
		11062	Infl. - max.	●	●	●
		11063	Infl. - min.	●	●	●
		11061	Adapt. time	●	●	●
	Compensation 2		Actual comp. T	●	●	●
		11064	Limit	●	●	●
		11066	Infl. - max.	●	●	●
		11067	Infl. - min.	●	●	●
		11065	Adapt. time	●	●	●
	Control par. (1)	11174	Motor pr.	●	●	●
		11184	Xp	●	●	●
		11185	Tn	●	●	●
		11186	M run	●	●	●
		11187	Nz	●	●	●
		11189	Min. act. time	●	●	●

Navigation, A314, applications A314.1, A314.2 and A314.3

Home		Applications A314				
MENU		ID no.	Function	A314.1	A314.2	A314.3
Settings	Control par. 2	12174	Motor pr.	●	●	
		12184	Xp	●	●	
		12185	Tn	●	●	
		12186	M run	●	●	
		12187	Nz	●	●	
		12189	Min. act. time	●	●	
		12165	V out max.	●	●	
		12167	V out min.	●	●	
		12171	Reverse out	●	●	
	Fan / acc. control		Wind actual			●
		11081	Filter constant			●
			Control voltage			●
		11088	Fan output func.	●	●	●
		11086	Fan cut-in delay	●	●	●
		11137	Fan function	●	●	●
		11089	Acc. output func.	●	●	●
		11087	Acc. cut-in delay	●	●	●
		11091	Acc. time control	●	●	●
		11090	Optional function	●	●	●
		11077	P frost T	●	●	●
		11027	Room T diff.			●
	Application	11010	ECA addr.		●	●
		11500	Send desired T	●	●	●
		11021	Total stop	●	●	●
		11140	Comp. T select	●	●	●
		11093	Frost pr. T	●		
		10304	S4 filter	●		
		11082	Accum. filter	●	●	
		11141	Ext. input	●	●	●
		11142	Ext. mode	●	●	●

Navigation, A314, applications A314.1, A314.2 and A314.3 continued

Home		Applications A314				
MENU		ID no.	Function	A314.1	A314.2	A314.3
Holiday			Selectable	●	●	●
Alarm	Frost T	11676	Alarm value	●	●	●
	Limit T frost	11656	Alarm value	●	●	●
	Frost thermostat	11616	Alarm value	●	●	●
		11617	Alarm time-out	●	●	●
	Fire safety	11636	Alarm value	●	●	●
		11637	Alarm time-out	●	●	●
	Temp. monitor.	11147	Upper difference	●	●	●
		11148	Lower difference	●	●	●
		11149	Delay	●	●	●
		11150	Lowest temp.	●	●	●
	Alarm overview		Frost T	●	●	●
			Limit T frost	●	●	●
			Frost thermostat	●	●	●
			Fire safety	●	●	●
			Temp. monitor.	●	●	●
			Flow T sensor	●	●	●
Influence overview	Des. flow T		Return lim.	●	●	●
			Room lim.		●	●
			Duct T limit	●		
			Compensation 1	●	●	●
			Compensation 2	●	●	●
			Limit T safety	●	●	●
			Holiday	●	●	●
			Ext. override	●	●	●
			ECA override		●	●
			SCADA offset	●	●	●

Navigation, A314, applications A314.1, A314.2, A314.3, A314.4 and A314.5, Common controller settings

Home		Applications A314, Common controller settings				
MENU		**ID no.**	**Function**	**A314.1**	**A314.2**	**A314.3**
Time & Date			Selectable	●	●	●
Schedule			Selectable	●	●	●
Input overview			Outdoor T	●	●	●
			Compensation T	●	●	●
			Flow T	●	●	●
			Room T		●	●
			Duct T	●		
			Return T	●	●	●
			Frost T	●	●	●
			Accumulated T	●	●	
			Frost thermostat	●	●	●
			Fire safety	●	●	●
Log (sensors)	Log today		Outdoor T	●	●	●
	Log yesterday		Flow T & desired	●	●	●
	Log 2 days		Duct T & desired	●		
	Log 4 days		Room T & desired		●	●
			Return T & limit	●	●	●
			Compensation T	●	●	●
			Frost T	●	●	●
			Wind speed			●
Output override			M1	●	●	●
			F1	●	●	●
			V1			●
			M2	●	●	
			P2	●	●	●
			X3	●	●	●
			A1	●	●	●

Navigation, A314, applications A314.1, A314.2, A314.3 and A314.4, Common controller settings, continued

Home		Applications A314, Common controller settings				
MENU		ID no.	Function	A314.1	A314.2	A314.3
Key functions	New application		Erase application	●	●	●
	Application			●	●	●
	Factory setting		System settings	●	●	●
			User settings	●	●	●
			Go to factory	●	●	●
	Copy		To	●	●	●
			System settings	●	●	●
			User settings	●	●	●
			Start copying	●	●	●
	Key overview			●	●	●
System	ECL version		Code no.	●	●	●
			Hardware	●	●	●
			Software	●	●	●
			Build no.	●	●	●
			Serial no.	●	●	●
			Production date	●	●	●
	Extension			●	●	●
	Ethernet			●	●	●
	Portal config			●	●	●
	M-bus config			●	●	●
	Energy Meters			●	●	●
	Raw input overview			●	●	●
	Alarm		Temp. monitor.			
	Display	60058	Backlight	●	●	●
		60059	Contrast	●	●	●
	Communication	38	Modbus addr.	●	●	●
		2048	ECL 485 addr.	●	●	●
		2150	Service pin	●	●	●
		2151	Ext. reset	●	●	●
	Language	2050	Language	●	●	●

3.0 Daily use

3.1 How to navigate

This section describes the function in general for the ECL Comfort 210 / 310 series and is not application related.

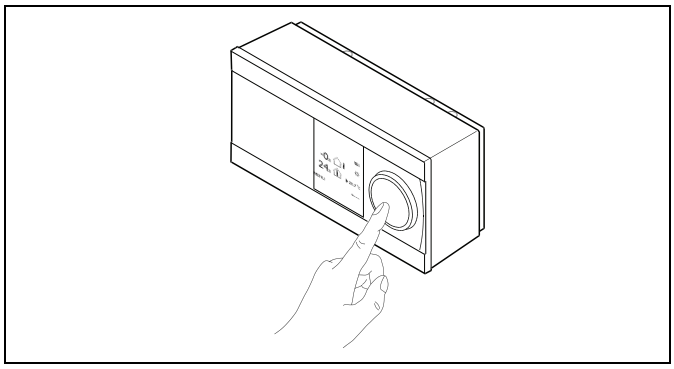
You navigate in the controller by turning the dial left or right to the desired position ( ).

The dial has a built-in accellerator. The faster you turn the dial, the faster it reaches the limits of any wide setting range.

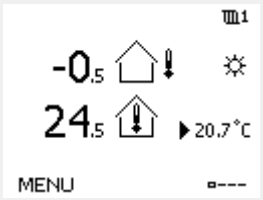
The position indicator in the display (▶) will always show you where you are.

Push the dial to confirm your choices ( ).

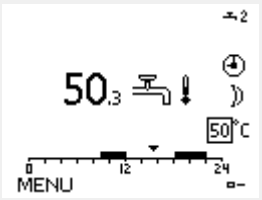
The display examples are from a two-circuit application: One heating circuit ( ) and one domestic hot-water (DHW) circuit ( ). The examples might differ from your application.



Heating circuit ( ):



DHW circuit ( );



Some general settings which apply to the entire controller are located in a specific part of the controller.

To enter 'Common controller settings':

Action:	Purpose:	Examples:
	Choose 'MENU' in any circuit	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	

Circuit selector

3.2 Understanding the controller display

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

Choosing a favorite display
Your favorite display is the display you have chosen as the default display. The favorite display will give you a quick overview of the temperatures or units that you want to monitor in general.

If the dial has not been activated for 20 min., the controller will revert to the overview display you have chosen as favorite.

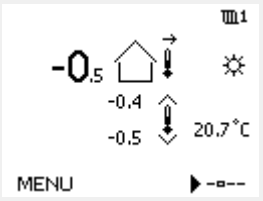
To shift between displays: Turn the dial until you reach the display selector (▫---) at the bottom right side of the display. Push the dial and turn to choose your favorite overview display. Push the dial again.

Heating circuit
Overview display 1 informs about:
actual outdoor temperature, controller mode,
actual room temperature, desired room temperature.

Overview display 2 informs about:
actual outdoor temperature, trend in outdoor temperature, controller mode, max. and min. outdoor temperatures since midnight as well as desired room temperature.

Overview display 1:

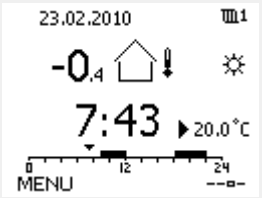
Overview display 2:



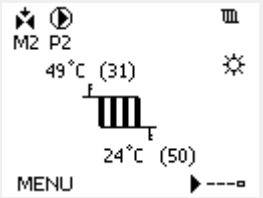
Overview display 3 informs about:
date, actual outdoor temperature, controller mode, time, desired room temperature as well as shows the comfort schedule of the current day.

Overview display 4 informs about:
state of the controlled components, actual flow temperature, (desired flow temperature), controller mode, return temperature (limitation value).

Overview display 3:



Overview display 4:



Dependent on the chosen display, the overview displays for the heating circuit inform you about:
- actual outdoor temperature (-0.5)
- controller mode (☼)
- actual room temperature (24.5)
- desired room temperature (20.7 °C)
- trend in outdoor temperature (↗→↘)
- min. and max. outdoor temperatures since midnight (◊)
- date (23.02.2010)
- time (7:43)
- comfort schedule of the current day (0 - 12 - 24)
- state of the controlled components (M2, P2)
- actual flow temperature (49 °C), (desired flow temperature (31))
- return temperature (24 °C) (limitation temperature (50))

The setting of the desired room temperature is important even if a room temperature sensor / Remote Control Unit is not connected.

If the temperature value is displayed as

"- -" the sensor in question is not connected.

"- - -" the sensor connection is short-circuited.

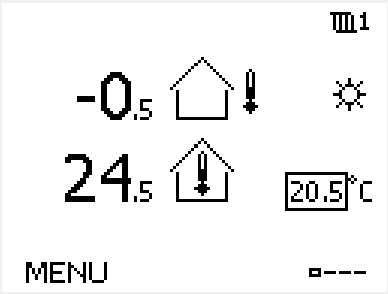
Setting the desired temperature

Depending on the chosen circuit and mode, it is possible to enter all daily settings directly from the overview displays (see also the next page concerning symbols).

Setting the desired room temperature

The desired room temperature can easily be adjusted in the overview displays for the heating circuit.

Action:	Purpose:	Examples:
	Desired room temperature	20.5
	Confirm	
	Adjust the desired room temperature	21.0
	Confirm	



This overview display informs about outdoor temperature, actual room temperature as well as desired room temperature.

The display example is for comfort mode. If you want to change the desired room temperature for saving mode, choose the mode selector and select saving.

The setting of the desired room temperature is important even if a room temperature sensor / Remote Control Unit is not connected.

Setting the desired room temperature, ECA 30 / ECA 31

The room desired temperature can be set exactly as in the controller. However, other symbols can be present in the display (please see 'What do the symbols mean?').

With the ECA 30 / ECA 31 you can override the desired room temperature set in the controller temporarily by means of the override functions:

3.3 A general overview: What do the symbols mean?

Symbol	Description	
	Outdoor temp.	Temperature
	Room temp.	
	DHW temp.	
	Position indicator	
	Scheduled mode	Mode
	Comfort mode	
	Saving mode	
	Frost protection mode	
	Manual mode	
	Standby — cooling mode	
	Heating	Circuit
	DHW	
	Common controller settings	
	Pump ON	Controlled component
	Pump OFF	
	Actuator opens	
	Actuator closes	
	Alarm	
	Monitoring temperature sensor connection	
	Display selector	
	Max. and min. value	
	Trend in outdoor temperature	
	Wind speed sensor	

Symbol	Description
--	Sensor not connected or not used
---	Sensor connection short-circuited
7-23	Fixed comfort day (holiday)
	Active influence
	Heating active
	Cooling active

Additional symbols, ECA 30 / 31:

Symbol	Description
	ECA Remote Control Unit
	Relative humidity indoor
	Day off
	Holiday
	Relaxing (extended comfort period)
	Going out (extended saving period)

3.4 Monitoring temperatures and system components

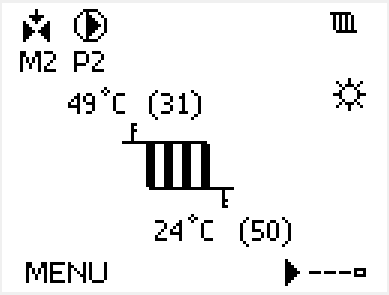
This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

Heating circuit

The overview display in the heating circuit ensures a quick overview of the actual and (desired) temperatures as well as the actual state of the system components.

Display example:

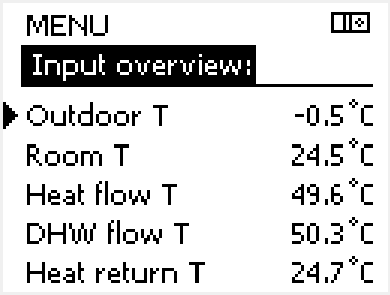
49 °C	Flow temperature
(31)	Desired flow temperature
24 °C	Return temperature
(50)	Return temperature limitation



Input overview

Another option to get a quick overview of measured temperatures is the 'Input overview' which is visible in the common controller settings (how to enter the common controller settings, see 'Introduction to common controller settings'.)

As this overview (see display example) only states the measured actual temperatures, it is read-only.



3.5 Influence overview

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

The menu gives an overview of the influences on the desired flow temperature. It differs from application to application which parameters are listed. It can be helpful in a service situation to explain unexpected conditions or temperatures among others.

If the desired flow temperature is influenced (corrected) by one or more parameters, it is indicated by a small line with arrow-down, arrow-up or double-arrow:

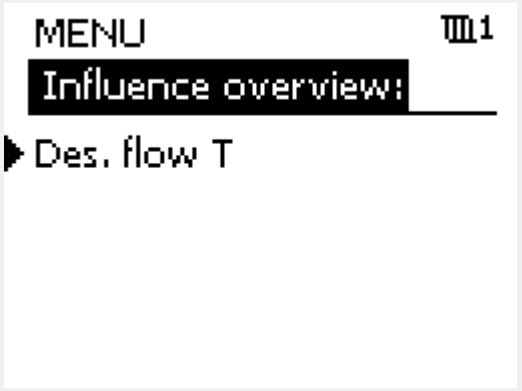
Arrow-down:
The parameter in question reduces the desired flow temperature.

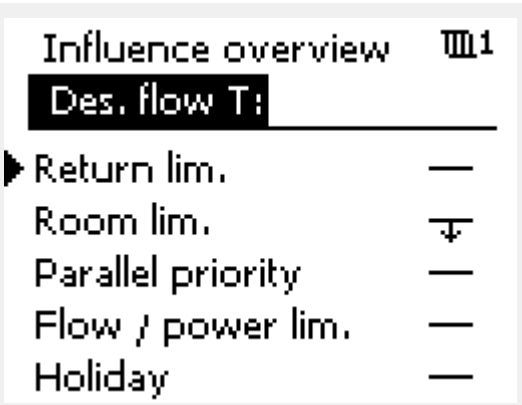
Arrow-up:
The parameter in question increases the desired flow temperature.

Double-arrow:
The parameter in question creates an override (e.g. Holiday).

Straight line:
No active influence.

In the example, the arrow in the symbol points downwards for 'Room lim.'. This means that the actual room temperature is higher than the desired room temperature which again results in a decrease of the desired flow temperature.





3.6 Manual control

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

It is possible to manually control the installed components.

Manual control can only be selected in favorite displays in which the symbols for the controlled components (valve, pump etc.) are visible.

Action:	Purpose:	Examples:
	Choose mode selector	
	Confirm	
	Choose manual mode	
	Confirm	
	Choose pump	
	Confirm	
	Switch ON the pump	
	Switch OFF the pump.	
	Confirm pump mode	
	Choose motorized control valve	
	Confirm	
	Open the valve	
	Stop opening the valve	
	Close the valve	
	Stop closing the valve	
	Confirm valve mode	

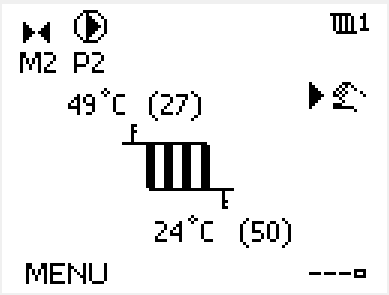
To leave manual control, use the mode selector to select the desired mode. Push the dial.

Manual control is typically used when commisioning the installation. The controlled components, valve, pump etc., can be controlled for correct function.

Manual control of analog output for M2 in the applications A314.1 / A314.2:
M2 is controlled by the analog signal 0-10 volt, indicated as 0-100%. Select M2 and change the value.

Manual control of analog output for V1 in the application A314.3:
V1 is controlled by the analog signal 0-10 volt, indicated as 0-100%. Select V1 and change the value.

Controlled components *Circuit selector*



During manual operation, all control functions are deactivated. Frost protection is not active.

When manual control is selected for one circuit, it is automatically selected for all circuits!

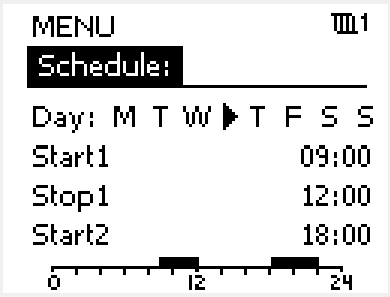
3.7 Schedule

3.7.1 Set your schedule

This section describes the schedule in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application. In some applications, however, there might be more than one schedule. Additional schedules can be found in 'Common controller settings'.

The schedule consists of a 7-day week:

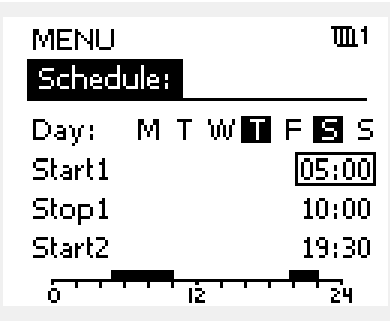
M = Monday
T = Tuesday
W = Wednesday
T = Thursday
F = Friday
S = Saturday
S = Sunday

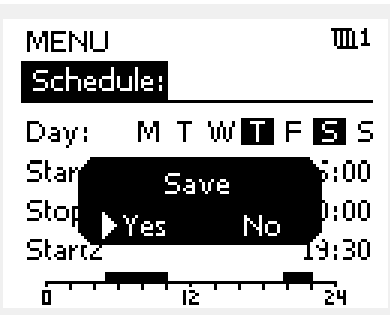


The schedule will day-by-day show you the start and stop times of your comfort periods (heating / DHW circuits).

Changing your schedule:

Action:	Purpose:	Examples:
	Choose 'MENU' in any of the overview displays	MENU
	Confirm	
	Confirm the choice 'Schedule'	
	Choose the day to change	▶
	Confirm*	T
	Go to Start1	
	Confirm	
	Adjust the time	
	Confirm	
	Go to Stop1, Start2 etc. etc.	
	Return to 'MENU'	MENU
	Confirm	
	Choose 'Yes' or 'No' in 'Save'	
	Confirm	





* Several days can be marked

The chosen start and stop times will be valid for all the chosen days (in this example Thursday and Saturday).

You can set max. 3 comfort periods a day. You can delete a comfort period by setting start and stop times to the same value.

Each circuit has its own schedule. To change to another circuit, go to 'Home', turn the dial and choose the desired circuit.

The start and stop times can be set in half-hourly (30 min.) intervals.

4.0 Settings overview

It is recommendable to make a note of any changed settings in the empty columns.

Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
Desired balance T	11008	84	20 °C							
Desired balance T — A214.1	11008	84	20 °C							
Temp. max. (flow / duct temp. limit, max.) — A214 / A314 in general	11178	84	40 °C							
Temp. max. (flow / duct temp. limit, max.) — A214.1	11178	84	40 °C							
Temp. max. (flow / duct temp. limit, max.) — A214.3	11178	84	20 °C							
Temp. min. (flow / duct temp. limit, min.)	11177	85	10 °C							
Temp. min. (flow / duct temp. limit, min.) — A214.1	11177	85	5 °C							
Dead zone	11009	85	5.0 K							
Infl. - max. (room temp. limitation, max.)	11182	86	-2.0							
Infl. - min. (room temp. limitation, min.)	11183	87	2.0							
Adapt. time (adaption time)	11015	87	OFF							
Infl. - max. (duct temp. limitation, max.)	11182	88	-2.0							
Infl. - min. (duct temp. limitation, min.)	11183	88	2.0							
Adapt. time (adaption time)	11015	88	OFF							
Limit (return temp. limitation)	11030	89	25 °C							
Limit (return temp. limitation) — A214.1	11030	89	10 °C							
Infl. - max. (return temp. limitation - max. influence)	11035	90	0.0							
Infl. - min. (return temp. limitation - min. influence)	11036	90	0.0							
Adapt. time (adaptation time)	11037	90	25 s							
Limit T frost (sliding frost protection)	11108	91	10 °C							
Infl. - min. (min. influence)	11105	91	2.0							
Adapt. time (adaptation time)	11107	91	OFF							
Limit (compensation temp., 1. point)	11060	92	5 °C							
Infl. - max. (compensation temp., 1. point)	11062	92	0.0							
Infl. - min. (compensation temp., 1. point)	11063	92	0.0							
Adapt. time (adaptation time)	11061	93	OFF							
Limit (compensation temp., 2. point)	11064	94	25 °C							
Infl. - max. (compensation temp., 2. point)	11066	94	0.0							
Infl. - min. (compensation temp., 2. point)	11067	94	0.0							
Adapt. time (adaptation time)	11065	95	OFF							
Motor pr. (motor protection)	11174	97	OFF							
Xp (proportional band)	11184	97	80 K							
Tn (integration time constant)	11185	97	30 s							
M run (running time of the motorized control valve)	11186	97	30 s							
Nz (neutral zone)	11187	98	3 K							
Min. act. time (min. activation time gear motor)	11189	98	3							
Motor pr. (motor protection)	12174	100	OFF							
Xp (proportional band)	12184	100	80 K							
Tn (integration time constant)	12185	100	30 s							
M run (running time of the motorized control valve)	12186	100	30 s							
Nz (neutral zone)	12187	101	3 K							

Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
Min. act. time (min. activation time gear motor)	12189	101	10							
V out max. — A314.1 / A314.2	12165	102	100%							
V out min. — A314.1 / A314.2	12167	103	0%							
Reverse out — A314.1 / A314.2	12171	103	ON							
Fan output func. (relay 1, F1)	11088	104	1							
Fan cut-in delay (relay 1, F1)	11086	104	30 s							
Fan cut-in delay (relay 1, F1) — A214.1	11086	104	5 s							
Fan cut-in delay (relay 1, F1)— A314.3	11086	104	10 s							
Fan function (relay 1, F1) — A214.1	11137	105	OFF							
Fan function (relay 1, F1) — A214.2 / A214.3	11137	105	OFF							
Fan function (relay 1, F1) — A214.4 / A214.5 / A314.1 / A314.2	11137	105	OFF							
Fan function (relay 1, F1) — A314.3	11137	105	ON							
Acc. output func. (relay 2, P2)	11089	106	1							
Acc. cut-in delay (relay 2, P2)	11087	106	0 s							
Acc. time control (relay 2, P2)	11091	106	1							
Optional function (relay 3, X3)— A214.1	11090	106	0							
Optional function (relay 3, X3)— A214.2	11090	107	0							
Optional function (relay 3, X3)— A214.3 / A314.3	11090	107	0							
Optional function (relay 3, X3)— A214.4 / A214.5 / A314.1 / A314.2	11090	107	0							
P frost T (pump frost protection temperature)	11077	108	2 °C							
Room T diff. — A214.3 / A314.3	11027	108	–2.0 K							
Wind actual		109								
Filter constant	11081	109	50							
Control voltage		110								
ECA addr. (choice of Remote Control Unit) — A214.1 / A214.3 / A214.5 / A314.2 / A314.3	11010	111	OFF							
Send desired T	11500	111	ON							
Total stop	11021	112	OFF							
Comp. T select	11140	114	ON							
Frost pr. T (frost protect. temp.) — A214.2 / A214.4 / A314.1	11093	114	6 °C							
S4 filter — A214.2 / A214.4 / A314.1	10304	115	8							
Accum. filter — A214.4 / A214.5 / A314.1 / A314.2	11082	115	25 s							
Ext. input (external override), ECL 210	11141	116	OFF							
Ext. input (external override) — ECL 310	11141	117	OFF							
Ext. mode (external override mode)	11142	118	COM-FORT							
Alarm value	11676	119	–20 °C							
Alarm value — A214.1	11676	119	2 °C							
Alarm value	11656	120	6 °C							
Alarm value	11616	120	0							
Alarm time-out	11617	120	0 s							
Alarm value — A214	11636	120	0							
Alarm time-out	11637	121	0 s							
Upper difference	11147	121	OFF							
Lower difference	11148	121	OFF							
Delay	11149	121	10 m							

Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
Lowest temp.	11150	122	30 °C							
Alarm overview, in general		122								
Backlight (display brightness)	60058	132							5	
Contrast (display contrast)	60059	132							3	
Modbus addr.	38	133							1	
ECL 485 addr. (master / slave address)	2048	133							15	
Service Pin	2150	133							0	
Ext. reset	2151	134							0	
Language	2050	134							English	

5.0 Settings, applications A214 / A314

5.1 Flow temperature

The temperature, measured by S3, can be a flow or a duct temperature. The desired temperature at S3 is the desired balance temperature, 'Desired balance T'.

Desired balance T		**11008**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 110 °C**	**20 °C**

In all applications, the S3 temperature sensor is the most important sensor and must always be connected.

Set the desired temperature at S3.

Desired balance T — A214.1		**11008**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 110 °C**	**20 °C**

In all applications, the S3 temperature sensor is the most important sensor and must always be connected.

Set the desired temperature at S3.

Temp. max. (flow / duct temp. limit, max.) — A214 / A314 in general		**11178**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 150 °C**	**40 °C**

The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

Set the max. flow / duct temperature for the system. The desired temperature at S3 will not be higher than this setting. Adjust the factory setting, if required.

Temp. max. (flow / duct temp. limit, max.) — A214.1		**11178**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 110 °C**	**40 °C**

The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

Set the max. flow / duct temperature for the system. The desired temperature at S3 will not be higher than this setting. Adjust the factory setting, if required.

Temp. max. (flow / duct temp. limit, max.) — A214.3		**11178**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 150 °C**	**20 °C**

The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

Set the max. flow / duct temperature for the system. The desired temperature at S3 will not be higher than this setting. Adjust the factory setting, if required.

Temp. min. (flow / duct temp. limit, min.)		11177
Circuit	*Setting range*	*Factory setting*
1	**5 ... 150 °C**	**10 °C**

Set the min. flow / duct temperature for the system. The desired temperature at S3 will not be lower than this setting. Adjust the factory setting, if required.

The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

The setting of 'Temp. min.' is also valid during cooling mode.

Temp. min. (flow / duct temp. limit, min.) — A214.1		11177
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 110 °C**	**5 °C**

Set the min. flow / duct temperature for the system. The desired temperature at S3 will not be lower than this setting. Adjust the factory setting, if required.

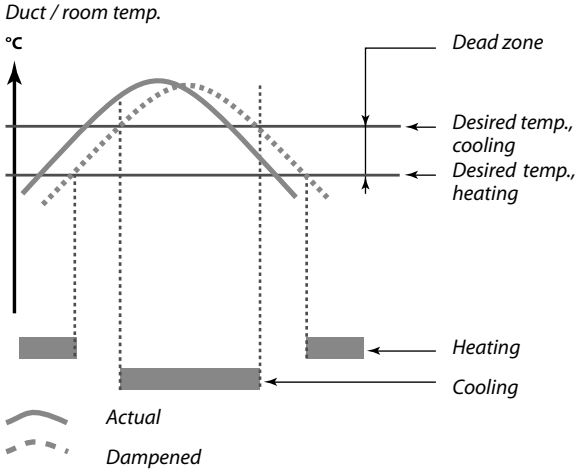
The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

Dead zone		11009
Circuit	*Setting range*	*Factory setting*
1	**OFF / 0.5 ... 25.0 K**	**5.0 K**

When the application runs in combined heating / cooling mode or as 2-stage heating, the desired duct or room temperature is increased with the dead zone value when in cooling mode.
This setting prevents unexpected changes (instability) between heating and cooling operation.

OFF: No dead zone between heating and cooling operation or 2-stage heating.

0.5 ... 25.0: The number of degrees between the desired duct or room temperature in heating mode and the desired duct or room temperature in cooling mode.



Example

Desired duct / room temperature: 20 °C

Dead zone: 5 K

When the duct / room temperature rises above 20 °C, heating stops.
When the duct / room temperature rises above 25 °C, cooling starts.
When the duct / room tempeture falls below 25 °C, cooling stops.
When the duct / room tempeture falls below 20 °C, heating starts.

5.2 Room limit

This section is only relevant if the A214 application works with room temperature signal (a room temperature sensor or a Remote Control Unit) is used. The applications are: A214.1, A214.3, A214.5, A314.2 and A314.3.

The controller adjusts the desired flow / duct temperature to compensate for the difference between the desired and the actual room temperature.

If the room temperature is higher than the desired value, the desired flow temperature can be reduced.

The 'Infl. -max.' (Influence, max. room temp.) determines how much the desired flow temperature should be reduced.

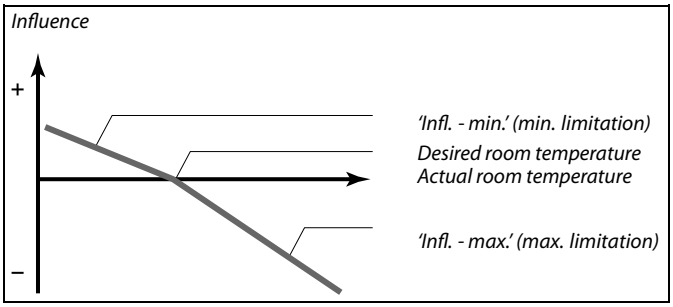
Use this influence type to avoid a too high room temperature.

If the room temperature is lower than the desired value, the desired flow temperature can be increased.

The 'Infl. -min.' (Influence, min. room temperature) determines how much the desired flow temperature should be increased.

Use this influence to avoid a too low room temperature. The controller will allow for free heat gains, i.e. solar radiation etc.

A typical setting will be -4.0 for 'Infl. -max.' and 4.0 for 'Infl. -min.'



The 'Infl. - max.' and 'Infl. - min.' determine how much the room temperature should influence the desired flow / duct temperature.

If the 'Infl.' factor is too high and / or the 'Adapt. time' too low, there is a risk of unstable control.

Example 1:
The actual room temperature is 2 degrees too high.
The 'Infl. - max.' is set to -4.0.
The 'Infl. - min.' is set to 3.0.
Result:
The desired flow / duct temperature is decreased by 2 x -4.0 = 8.0 degrees.

Example 2:
The actual room temperature is 3 degrees too low.
The 'Infl. - max.' is set to -4.0.
The 'Infl. - min.' is set to 3.0.
Result:
The desired flow / duct temperature is increased by 3 x 3.0 = 9.0 degrees.

Infl. - max. (room temp. limitation, max.)		**11182**
Circuit	*Setting range*	*Factory setting*
1	**–30.0 ... 0.0**	**-2.0**
Determines how much the desired flow / duct temperature at S3 will be influenced (decreased) if the actual room temperature is higher than the desired room temperature (P control).		

-30.0: The room temperature has a big influence.

-2.0: The room temperature has a minor influence.

0.0: The room temperature has no influence.

Infl. - min. (room temp. limitation, min.)		11183
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 30.0**	**2.0**
Determines how much the desired flow / duct temperature at S3 will be influenced (increased) if the actual room temperature is lower than the desired room temperature (P control).		

0.0: The room temperature has no influence.

2.0: The room temperature has a minor influence.

30.0: The room temperature has a big influence.

Adapt. time (adaption time)		11015
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
Controls how fast the actual room temperature adapts to the desired room temperature (I control).		

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired room temperature is adapted quickly.

50: The desired room temperature is adapted slowly.

The adaptation function can correct the desired flow / duct temperature with max. 8 K.

5.3 Duct T limit

This section is only relevant for A214 applications without room temperature control. The applications are: A214.2, A214.4 and A314.1.

Infl. - max. (duct temp. limitation, max.)		**11182**
Circuit	*Setting range*	*Factory setting*
1	**–30.0 ... 0.0**	**-2.0**
Determines how much the desired flow temperature at S3 will be influenced (decreased) if the actual duct temperature is higher than the desired duct temperature (P control).		

-30.0: The duct temperature has a big influence.

-2.0: The duct temperature has a minor influence.

0.0: The duct temperature has no influence.

Infl. - min. (duct temp. limitation, min.)		**11183**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 30.0**	**2.0**
Determines how much the desired flow temperature at S3 will be influenced (increased) if the actual duct temperature is lower than the desired duct temperature (P control).		

0.0: The duct temperature has no influence.

2.0: The duct temperature has a minor influence.

30.0: The duct temperature has a big influence.

Adapt. time (adaption time)		**11015**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
Controls how fast the actual duct temperature adapts to the desired duct temperature (I control).		

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired duct temperature is adapted quickly.

50: The desired duct temperature is adapted slowly.

The adaptation function can correct the desired flow temperature with max. 8 K.

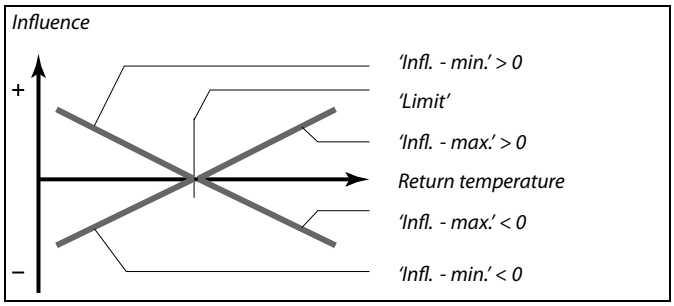
5.4 Return limit

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

The return temperature limitation is based on a constant temperature value.

The controller automatically changes the desired flow temperature to obtain an acceptable return temperature when the return temperature falls below or gets higher than the set limit.

This limitation is based on a PI regulation where P ('Infl.' factor) responds quickly to deviations and I ('Adapt. time') responds slower and over time removes the small offsets between the desired and actual values. This is done by changing the desired flow temperature.



If the 'Infl.' factor is too high and / or the 'Adapt. time' too low, there is a risk of unstable control.

Limit (return temp. limitation)		**11030**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 110 °C**	**25 °C**
Set the return tempeature you accept for the system.		

When the return temperature falls below or gets higher than the set value, the controller automatically changes the desired flow temperature to obtain an acceptable return temperature. The influence is set in 'Infl. - max.' and 'Infl. - min.'.

Limit (return temp. limitation) — A214.1		**11030**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 110 °C**	**10 °C**
Set the return tempeature you accept for the system.		

When the return temperature falls below or gets higher than the set value, the controller automatically changes the desired flow temperature to obtain an acceptable return temperature. The influence is set in 'Infl. - max.' and 'Infl. - min.'.

Infl. - max. (return temp. limitation - max. influence)		11035
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the return temperature is higher than the calculated limit.		

Influence higher than 0:
The desired flow temperature is increased, when the return temperature gets higher than the calculated limit.

Influence lower than 0:
The desired flow temperature is decreased, when the return temperature gets higher than the calculated limit.

Example
The return limit is active above 50 °C.
The influence is set to -2.0.
The actual return temperature is 2 degrees too high.
Result:
The desired flow temperature is changed by -2.0 x 2 = -4.0 degrees.

Normally, this setting is lower than 0 in district heating systems to avoid a too high return temperature.
Typically, this setting is 0 in boiler systems because a higher return temperature is acceptable (see also 'Infl. - min.').

Infl. - min. (return temp. limitation - min. influence)		11036
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the return temperature is lower than the calculated limit.		

Influence higher than 0:
The desired flow temperature is increased, when the return temperature gets below the calculated limit.

Influence lower than 0:
The desired flow temperature is decreased, when the return temperature gets below the calculated limit.

Example
The return limit is active below 50 °C.
The influence is set to -3.0.
The actual return temperature is 2 degrees too low.
Result:
The desired flow temperature is changed by -3.0 x 2 = -6.0 degrees.

Normally, this setting is 0 in district heating systems because a lower return temperature is acceptable.
Typically, this setting is higher than 0 in boiler systems to avoid a too low return temperature (see also 'Infl. - max.').

Adapt. time (adaptation time)		11037
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**25 s**
Controls how fast the return temperature adapts to the desired return temperature limit (I control).		

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired temperature is adapted quickly.

50: The desired temperature is adapted slowly.

The adaptation function can correct the desired flow temperature with max. 8 K.

5.5 Limit T safety

The temperature sensor S5 can, besides operating as return temperature limitation sensor, act as frost protection sensor. When the S5 temperature becomes lower than the set value, the desired flow temperature will be increased (the motorized control valve opens gradually). The influence can be set.

Limit T frost (sliding frost protection)		**11108**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 0 ... 50 °C**	**10 °C**

OFF: Sliding frost protection, based on the temperature at sensor S5, is inactive.

0 ... 50: Temperature at which the sliding frost protection is active.

Infl. - min. (min. influence)		**11105**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 9.9**	**2.0**
Determines how much the desired flow / duct temperature will be increased if the S5 temperature is lower than the set value for 'Limit T frost'.		

Example
The sliding frost protection is active below 10 °C.
The influence is set to 3.0.
The actual S5 temperature is 2 degrees too low.
Result:
The desired flow / duct temperature is increased with 3.0 x 2 = 6.0 degrees.

0.0: The desired flow / duct temperature will not be increased if the S5 temperature is lower than 'Limit T frost'

0.1 ... 9.9: The desired flow / duct temperature will be increased if the S5 temperature is lower than 'Limit T frost'.

Adapt. time (adaptation time)		**11107**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
Controls how fast the S5 temperature adapts to the desired 'Limit T frost' (I control).		

The adaptation function can correct the desired flow / duct temperature with max. 8 K.

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired temperature is adapted quickly.

50: The desired temperature is adapted slowly.

5.6 Compensation 1

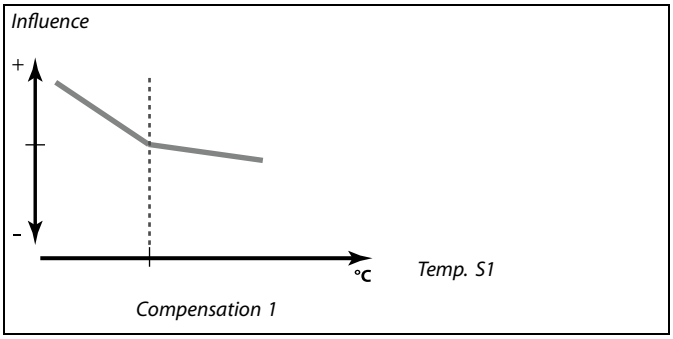
The desired flow / duct temperature can be influenced by a compensation temperature, measured by S1 or S2. The choice between S1 and S2 is made by means of a set-up menu. The following describes the compensation by means of S1.

The desired flow temperature can be influenced by a compensation temperature, measured by S1. The compensation temperature is often the outdoor temperature but could for example be a room temperature.

This application contains 2 compensation temperature limits: Compensation 1 (Comp. 1) and Compensation 2 (Comp. 2).

Limit (compensation temp., 1. point)		**11060**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 80 °C**	**5 °C**
Set the compensation temperature limit point 1.		

When the temperature measured by S1 falls below or gets higher than the set value, the controller automatically changes the desired flow temperature. The influence is set in 'Infl. - max.' and 'Infl. - min.'.



Compensation 1

Infl. - max. (compensation temp., 1. point)		**11062**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the compensation temperature is higher than the set limit.		

Example
The limit value is set to 5 °C.
'Infl. max.' is set to -1.5.
The actual compensation temperature is 7°C (2 degrees above the limit value).
Result:
The desired flow temperature is changed by -1.5 x 2 = -3.0 degrees.

Influence higher than 0:
The desired flow temperature is increased, when the compensation temperature gets above the set limit.

Influence lower than 0:
The desired flow temperature is decreased, when the compensation temperature gets above the set limit.

Infl. - min. (compensation temp., 1. point)		**11063**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the compensation temperature is lower than the set limit.		

Example
The limit value is set to 5 °C.
'Infl. min.' is set to 2.5.
The actual compensation temperature is 2°C (3 degrees below the limit value).
Result:
The desired flow temperature is changed by 2.5 x 3 = 7.5 degrees.

Influence higher than 0:
The desired flow temperature is increased, when the compensation temperature gets below the set limit.

Influence lower than 0:
The desired flow temperature is decreased, when the compensation temperature gets below the set limit.

Adapt. time (adaptation time)		11061
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
Controls how fast the compensation temperature influences the desired flow temperature.		

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired flow temperature is adapted quickly.

50: The desired flow temperature is adapted slowly.

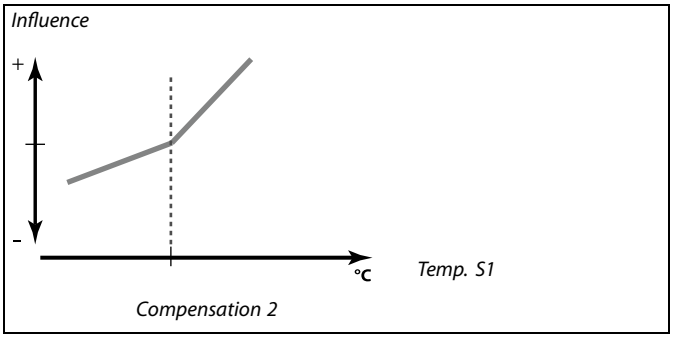
The adaptation function can correct the desired flow temperature with max. 8 K.

5.7 Compensation 2

This extra compensation temperature setting makes it possible to change the desired flow temperature in relation to a second limitation point.

Limit (compensation temp., 2. point)		**11064**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 80 °C**	**25 °C**
Set the compensation temperature limit point 2.		

When the temperature measured by S1 falls below or gets higher than the set value, the controller automatically changes the desired flow temperature. The influence is set in 'Infl. - max.' and 'Infl. - min.'.



Compensation 2

Infl. - max. (compensation temp., 2. point)		**11066**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the compensation temperature is higher than the set limit.		

Example
The limit value is set to 25 °C.
'Infl. max.' is set to 2.5.
The actual compensation temperature is 28 °C (3 degrees above limit value).
The desired flow temperature is changed by 2.5 x 3 = 7.5 degrees.

Influence higher than 0:
The desired flow temperature is increased, when the compensation temperature gets above the set limit.

Influence lower than 0:
The desired flow temperature is decreased, when the compensation temperature gets above the set limit.

Infl. - min. (compensation temp., 2. point)		**11067**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**0.0**
Determines how much the desired flow temperature will be influenced if the compensation temperature is lower than the set limit.		

Example
The limit value is set to 25 °C.
'Infl. min.' is set to 0.5.
The actual compensation temperature is 23 °C (2 degrees below the limit value).
Result:
The desired flow temperature is changed by 0.5 x 2= 1.0 degree.

Influence higher than 0:
The desired flow temperature is increased, when the compensation temperature gets below the set limit.

Influence lower than 0:
The desired flow temperature is decreased, when the compensation temperature gets below the set limit.

Adapt. time (adaptation time)		11065
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
Controls how fast the compensation temperature influences the desired flow temperature.		

OFF: The control function is not influenced by the 'Adapt. time'.

1: The desired flow temperature is adapted quickly.

50: The desired flow temperature is adapted slowly.

The adaptation function can correct the desired flow temperature with max. 8 K.

Combination of two compensation temperature limit points:

Compensation 1 and 2 can be combined to give a compensation at 2 different compensation temperatures. This can for instance be used to avoid a too big difference between the indoor and outdoor temperatures.

Regarding compensation temperatures, example 1 shows that below Comp. 1 and above Comp. 2, the desired flow temperature will be increased, but with different values.

Example 1:

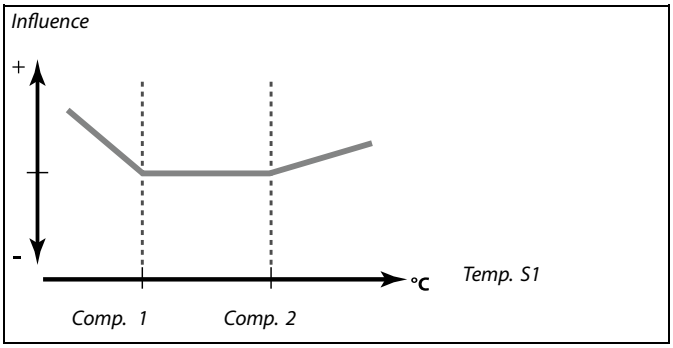
Comp. 1 value is set to 21 °C and Comp. 2 value is set to 25 °C.

'Infl. min.' for Comp. 1 is set to 2.5 and 'Infl. max.' for Comp. 1 is set to 0.0.

'Infl. min.' for Comp. 2 is set to 0.0 and 'Infl. max.' for Comp. 2 is set to 1.5.

The desired flow temperature is kept on a constant level as long as the compensation temperature is between 21 and 25 °C, but the desired flow temperature will rise if the the compensation temperature gets above 25 °C or below 21 °C.

Example 1:



Example 2:

A special set-up:
If 'Infl. max / min' is set between the Comp. 1 and Comp. 2 values, the result will be a combination of the settings.

The desired flow temperature is set to 8 °C.

The Comp. 1 value is set to 20 °C and the Comp. 2 value is set to 25 °C.

'Infl. min.' for Comp. 1 is set to 0.0 and 'Infl. max.' for Comp. 1 is set to 2.0.

'Infl. min.' for Comp. 2 is set to -1.0 and 'Infl. max.' for Comp. 2 is set to 0.0.

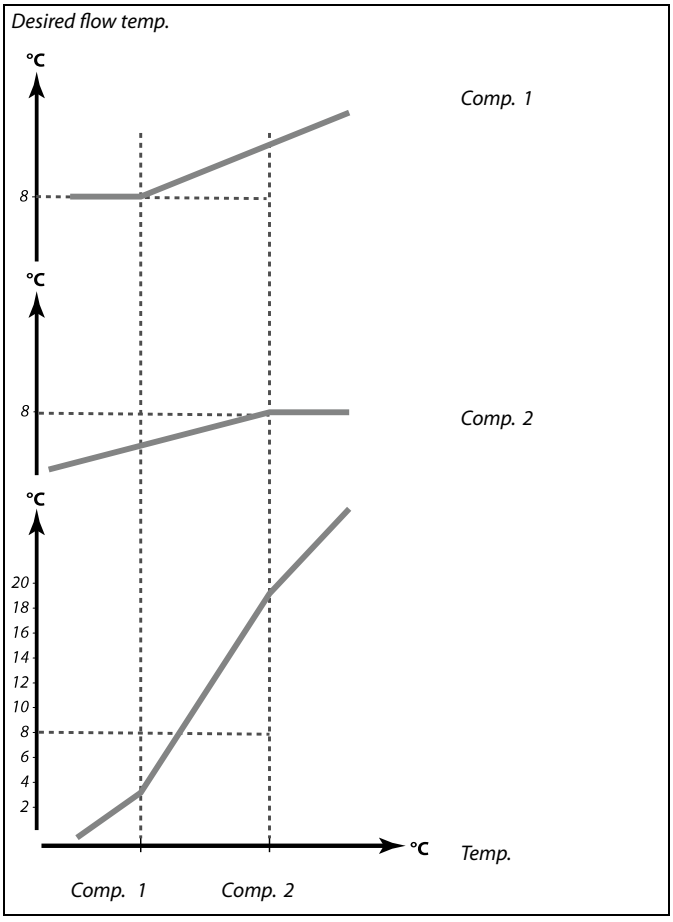
The desired flow temperature is influenced by a combination of the above influence factors.

Result:
The influence factor is 1.0 when the compensation temperature is lower than Comp. 1.

The influence factor is 3.0 when the compensation temperature is higher than Comp. 1.

The influence factor is 2.0 when the compensation temperature is higher than Comp. 2.

Example 2:



5.8 Control parameters (1)

Motor pr. (motor protection)		11174
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 ... 59 m**	**OFF**
Prevents the controller from unstable temperature control (and resulting actuator oscillations). This can occur at very low load. The motor protection increases the lifetime of all involved components.		

Recommended for duct systems with variable load.

OFF: Motor protection is not activated.

10 ... 59: Motor protection is activated after the set activation delay in minutes.

Xp (proportional band)		11184
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 K**	**80 K**

Set the proportional band. A higher value will result in a stable but slow control of the flow / duct temperature.

Tn (integration time constant)		11185
Circuit	*Setting range*	*Factory setting*
1	**1 ... 999 s**	**30 s**

Set a high integration time constant (in seconds) to obtain a slow but stable reaction to deviations.

A low integration time constant will make the controller react fast but with less stability.

M run (running time of the motorized control valve)		11186
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**30 s**

'M run' is the time in seconds it takes the controlled component to move from fully closed to fully open position. Set the 'M run' according to the examples or measure the running time by means of a stop watch.

How to calculate the running time of a motorized control valve
The running time of the motorized control valve is calculated using the following methods:

Seated valves

Running time = Valve stroke (mm) x actuator speed (sec. / mm)

Example: 5.0 mm x 15 sec. / mm = 75 sec.

Rotating valves

Running time = Turning degrees x actuator speed (sec. / degr.)

Example: 90 degr. x 2 sec. / degr. = 180 sec.

Nz (neutral zone)		11187
Circuit	*Setting range*	*Factory setting*
1	**1 ... 9 K**	**3 K**

Set the acceptable flow /duct temperature deviation.

Set the neutral zone to a high value if you can accept a high variation in flow temperature. When the actual flow / duct temperature is within the neutral zone, the controller does not activate the motorized control valve.

The neutral zone is symmetrical around the desired flow / duct temperature value, i.e. half the value is above and half the value is below this temperature.

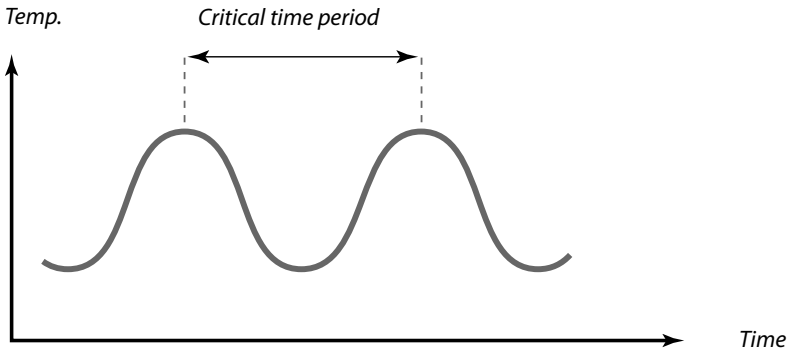
Min. act. time (min. activation time gear motor)		11189
Circuit	*Setting range*	*Factory setting*
1	**2 ... 50**	**3**
The min. pulse period of 20 ms (milliseconds) for activation of the gear motor.		

Setting example	Value x 20 ms
2	40 ms
10	200 ms
50	1000 ms

The setting should be kept as high as acceptable to increase the lifetime of the actuator (gear motor).

If you want to tune the PI regulation precisely, you can use the following method:

- Set the 'Tn' (integration time constant) to its max. value (999 sec.).
- Decrease the value for the 'Xp' (proportional band) until the system starts hunting (i.e. gets unstable) with a constant amplitude (it might be necessary to force the system by setting an extreme low value).
- Find the critical time period on the temperature recorder or use a stop watch.



This critical time period will be characteristic for the system, and you can evaluate the settings from this critical period.

'Tn' = 0.85 x critical time period

'Xp' = 2.2 x proportional band value in the critical time period

If the regulation seems to be too slow, you can decrease the proportional band value by 10%. Make sure there is a consumption when you set the parameters.

5.9 Control parameters (2)

Motor pr. (motor protection)		12174
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 ... 59 m**	**OFF**
Prevents the controller from unstable temperature control (and resulting actuator oscillations). This can occur at very low load. The motor protection increases the lifetime of all involved components.		

OFF: Motor protection is not activated.

10 ... 59: Motor protection is activated after the set activation delay (minutes).

Xp (proportional band)		12184
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 K**	**80 K**

Set the proportional band. A higher value will result in a stable but slow control of the flow / duct temperature.

Tn (integration time constant)		12185
Circuit	*Setting range*	*Factory setting*
1	**1 ... 999 s**	**30 s**

Set a high integration time constant to obtain a slow but stable reaction to deviations.

A low integration time constant (in seconds) will make the controller react fast but with less stability.

M run (running time of the motorized control valve)		12186
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**30 s**

'M run' is the time in seconds it takes the controlled component to move from fully closed to fully open position. Set the 'M run' according to the examples or measure the running time by means of a stop watch.

How to calculate the running time of a motorized control valve
The running time of the motorized control valve is calculated using the following methods:

Seated valves

Running time = Valve stroke (mm) x actuator speed (sec. / mm)

Example: 5.0 mm x 15 sec. / mm = 75 sec.

Rotating valves

Running time = Turning degrees x actuator speed (sec. / degr.)

Example: 90 degr. x 2 sec. / degr. = 180 sec.

Nz (neutral zone)		12187
Circuit	*Setting range*	*Factory setting*
1	**1 ... 9 K**	**3 K**

Set the acceptable flow / duct temperature deviation.

Set the neutral zone to a high value if you can accept a high variation in flow / duct temperature. When the actual flow / duct temperature is within the neutral zone, the controller does not activate the motorized control valve.

The neutral zone is symmetrical around the desired flow / duct temperature value, i.e. half the value is above and half the value is below this temperature.

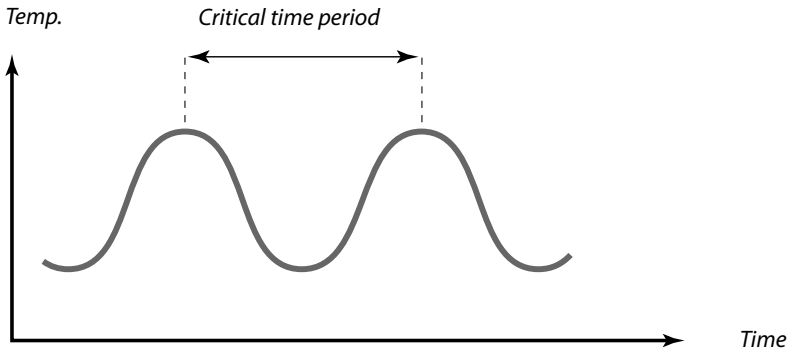
Min. act. time (min. activation time gear motor)		12189
Circuit	*Setting range*	*Factory setting*
1	**2 ... 50**	**10**
The min. pulse period of 20 ms (milliseconds) for activation of the gear motor.		

Setting example	Value x 20 ms
2	40 ms
10	200 ms
50	1000 ms

The setting should be kept as high as acceptable to increase the lifetime of the actuator (gear motor).

If you want to tune the PI regulation precisely, you can use the following method:

- Set the 'Tn' (integration time constant) to its max. value (999 sec.).
- Decrease the value for the 'Xp' (proportional band) until the system starts hunting (i.e. gets unstable) with a constant amplitude (it might be necessary to force the system by setting an extreme low value).
- Find the critical time period on the temperature recorder or use a stop watch.



This critical time period will be characteristic for the system, and you can evaluate the settings from this critical period.

'Tn' = 0.85 x critical time period

'Xp' = 2.2 x proportional band value in the critical time period

If the regulation seems to be too slow, you can decrease the proportional band value by 10%. Make sure there is a consumption when you set the parameters.

Analog output
In A314 applications, the M2 output is an analog signal (0-10 volt). The analog signal is expressed as a percentage (%). For example 45% corresponds to 4.5 volt.

M2 is controlled from the analog output on the internal module ECA 32.

V out max. — A314.1 / A314.2		**12165**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 100%**	**100%**
The output voltage can be limited to a maximum value.		

Example
A setting of 60% means that the output voltage will be 6 volt as a maximum.

0 ... 100: The value in % expresses the maximum voltage for controlling the output for the M2 actuator.

V out min. — A314.1 / A314.2		12167
Circuit	*Setting range*	*Factory setting*
1	**0 ... 100%**	**0%**
The output voltage can be limited to a minimum value.		

0 ... 100: The value in % expresses the minimum voltage for controlling the output for the M2 actuator.

Example:
A setting of 20% means that the output voltage will be 2 volt as a minimum.

The setting 'Reverse out' has no influence on the 'V out max' or 'V out min' settings.

The 'V out min' setting has higher priority than 'V out max'.

Reverse out — A314.1 / A314.2		12171
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
The analog output (0-10 volt) can be a rising or a falling voltage for rising cooling demand.		

OFF: The analog output voltage will fall at a rising cooling demand.

ON: The analog output voltage will rise at a rising cooling demand.

5.10 Fan / acc. control (fan / accessory control)

This section describes the functions for relay 1 (F1), relay 2 (P2) and relay 3 (X3).

Fan output func. (relay 1, F1)		**11088**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 3**	**1**
Desired function for relay 1 (F1). F1 is typically the fan. The codes have different meanings.		

Example, code = 1:
The fan is ON during Comfort mode. In case of frost alarm, the fan is switched OFF.

Code:	Description (relay 1 (F1)):		
	Comfort mode	Saving mode	Frost alarm
0	OFF	ON	OFF
1	ON	OFF	OFF
2	OFF	ON	ON
3	ON	OFF	ON

Depending on application, the control of fan F1 can furthermore be related to:
- Saving mode with or without 'Total stop'
- Setting of 'Fan function'

OFF: The connected unit is switched OFF

ON: The connected unit is switched ON

Fan cut-in delay (relay 1, F1)		**11086**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 900 s**	**30 s**
Delay for activating the fan.		

A delay in fan cut-in can prevent frost damages in the heat exchanger.

0 ... 900: Set the delay (in seconds).

Fan cut-in delay (relay 1, F1) — A214.1		**11086**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 900 s**	**5 s**
Delay for activating the fan.		

A delay in fan cut-in can prevent frost damages in the heat exchanger.

0 ... 900: Set the delay (in seconds).

Fan cut-in delay (relay 1, F1)— A314.3		**11086**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 900 s**	**10 s**
Delay for activating the fan.		

A delay in fan cut-in can prevent frost damages in the heat exchanger.

0 ... 900: Set the delay (in seconds).

Fan function (relay 1, F1) — A214.1		11137
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
In this cooling application, the fan can remain switched ON even if saving mode is active.		

OFF: The fan is switched OFF during saving mode.

ON: The fan is switched ON also during saving mode.

Fan function (relay 1, F1) — A214.2 / A214.3		11137
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
In these heating applications, the fan can remain switched ON even if saving mode is active.		

OFF: The fan is switched OFF during saving mode.

ON: The fan is switched ON also during saving mode.

Fan function (relay 1, F1) — A214.4 / A214.5 / A314.1 / A314.2		11137
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
In heating / cooling applications the fan can be switched OFF between heating and cooling mode.		

OFF: The fan is switched OFF between heating and cooling mode.

ON: The fan is still switched ON between heating and cooling mode.

Fan function (relay 1, F1) — A314.3		11137
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
In this heating application, the fan can remain switched ON even if saving mode is active.		

OFF: The fan is switched OFF during saving mode.

ON: The fan is switched ON also during saving mode.

Acc. output func. (relay 2, P2)		**11089**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 3**	**1**
Desired function for relay 2 (P2). P2 is typically the damper. The codes have different meanings.		

Example, code = 1:
The damper is open (switched ON) during Comfort mode. In case of frost alarm, the damper is closed (switched OFF).

Code:	Description (relay 2 (P2)):		
	Comfort mode	Saving mode	Frost alarm
0	OFF	ON	OFF
1	ON	OFF	OFF
2	OFF	ON	ON
3	ON	OFF	ON

OFF: The connected unit is switched OFF

ON: The connected unit is switched ON

Acc. cut-in delay (relay 2, P2)		**11087**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 900 s**	**0 s**
Set the delay for activating the damper (relay 2, P2).		

A delay in opening the damper can prevent frost damages in the heat exchanger.

0 ... 900: Set the delay (in seconds).

Acc. time control (relay 2, P2)		**11091**
Circuit	*Setting range*	*Factory setting*
1	**1 ... 2**	**1**
The connected unit can follow schedule 1 or schedule 2.		

Schedule 2 is found in 'Common controller settings'.

1: Relay 2 follows schedule 1.

2: Relay 2 follows schedule 2.

Optional function (relay 3, X3)— A214.1		**11090**
Circuit	*Setting range*	*Factory setting*
1	**0, 1, 2, 3**	**0**
Desired function for relay 3 (X3). The codes have different meanings.		

Schedule 2 is found in 'Common controller settings'.

Code:	Description:
0	Control of circulation pump in cooling circuit
1	Follows schedule 1
2	Follows schedule 2
3	ON at cooling demand

Optional function (relay 3, X3)— A214.2		**11090**
Circuit	*Setting range*	*Factory setting*
1	**0, 1, 2**	**0**
Desired function for relay 3 (X3). The codes have different meanings.		

Code:	Description:
0	Control of circulation pump in heating circuit
1	Follows schedule 1
2	Follows schedule 2

Optional function (relay 3, X3)— A214.3 / A314.3		**11090**
Circuit	*Setting range*	*Factory setting*
1	**0, 1, 2, 3**	**0**
Desired function for relay 3 (X3). The codes have different meanings.		

Code:	Description:
0	Control of circulation pump in heating circuit
1	Follows schedule 1
2	Follows schedule 2
3	ON if the room temperature is lower than desired room temperature. See the parameter 'Room T diff.'

Optional function (relay 3, X3)— A214.4 / A214.5 / A314.1 / A314.2		**11090**
Circuit	*Setting range*	*Factory setting*
1	**0, 1, 2, 3, 4**	**0**
Desired function for relay 3 (X3). The codes have different meanings.		

Code:	Description:
0	Control of circulation pump in heating circuit
1	Follows schedule 1
2	Follows schedule 2
3	ON at cooling demand
4	Control of circulation pump in cooling circuit

P frost T (pump frost protection temperature)		11077
Circuit	*Setting range*	*Factory setting*
1	**OFF / -10 ... 20 °C**	**2 °C**
Frost protection, based on the outdoor temperature: When the outdoor temperature is below the set temperature in 'P frost T', the controller automatically switches ON circulation pump X3 to protect the system.		

OFF: No frost protection.

-10 ... 20: Circulation pump X3 is ON when the outdoor temperature is below the set value.

⚠

Under normal conditions, your system is not frost protected if your setting is below 0 °C or OFF.
For water-based systems, a setting of 2 °C is recommended.

⚠

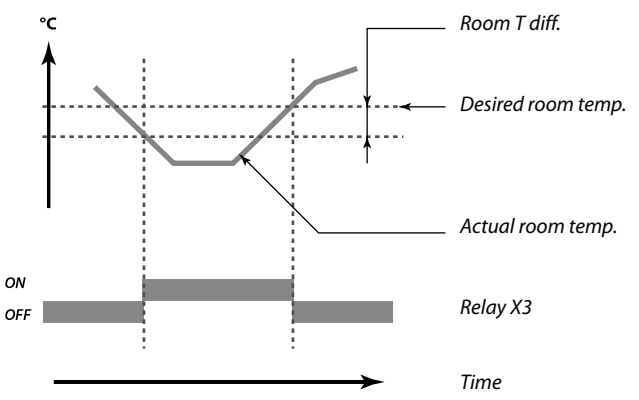
If the outdoor temperature sensor is not connected and the factory setting has not been changed to 'OFF', the circulation pump X3 is always ON.

Room T diff. — A214.3 / A314.3		11027
Circuit	*Setting range*	*Factory setting*
1	**–9.0 ... –0.5 K**	**–2.0 K**
The relay 3 (X3) can be activated when the room temperature gets lower than the desired room temperature. Relay X3 is activated when the difference between the actual room temperature and the desired room temperature is bigger than the set value. Relay X3 is deactivated when the actual room temperature becomes higher than the desired room temperature.		

–9.0 ... –0.5 Set the desired temperature difference.

⚠

In order to activate the relay X3 in relation to room temperature difference, the code setting in 'Optional function' must be "3".



A314.3:

Wind influence on fan speed

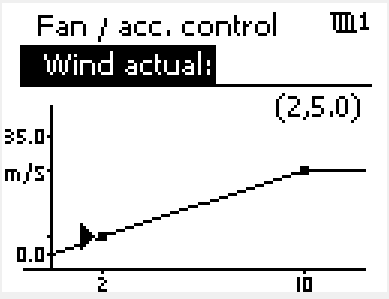
A wind speed sensor can be connected to the ECL controller in order to control the fan speed. Typically, the more windy, the higher the fan speed.

The signal from the wind speed sensor is a 0-10 volt signal which is applied directly to input S10. The voltage rises at higher wind speed.

The measured voltage on input S10 must be converted to a wind speed value by the controller.

The following procedure sets up the scaling.

Wind actual		
Circuit	*Setting range*	*Factory setting*
1	**Read-out only**	
The actual wind speed is indicated by the unit 'm/s' (meter per second).		



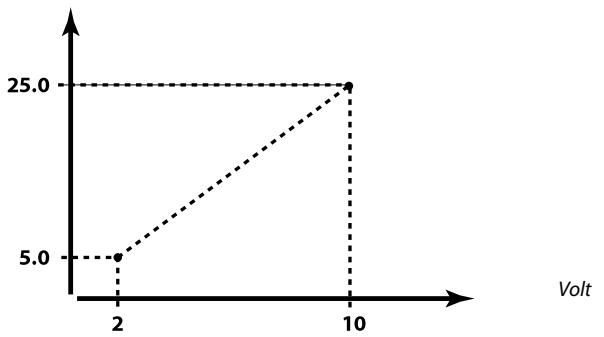
Push the dial to see the graph and enter the value sets for the input voltage (2 and 10 volt) and displayed wind speed.

Wind speed:	0.0 ... 75.0 m/s
Fixed voltage settings:	2 V and 10 V
Factory settings:	(2 , 5.0) and (10 , 25.0)

This means that the 'Wind actual' is 5.0 m/s at 2.0 volt and 25.0 m/s at 10 volt.

Typically, the higher the voltage, the higher the displayed wind speed.

Example: Relationship between input voltage and displayed wind speed



This example shows that 2 volt correspond to 5.0 m/s and 10 volt correspond to 25.0 m/s.

Filter constant		**11081**
Circuit	*Setting range*	*Factory setting*
1	**1 ... 80**	**50**
The filter constant dampens the wind speed input data by the set factor.		

1: Minor dampening (low filter constant)

50: Major dampening (high filter constant)

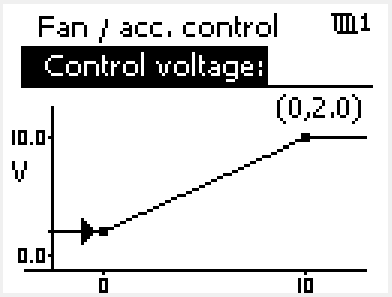
Control voltage		
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 10.0 V**	
Output voltage in relation to measured wind speed.		

The measured and converted wind speed signal controls the output signal 'Control voltage'. Typically, the higher the wind speed, the higher the 'control voltage' for the fan speed.

Push the dial to see the graph and enter the value sets for the wind speed values (0 and 10 m/s) and control voltage.

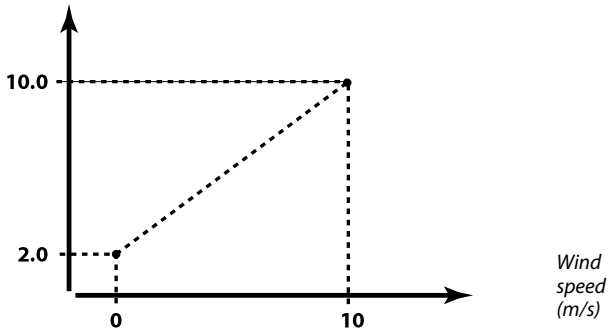
Control voltage: 0.0 ... 10.0 V
Fixed wind speed settings: 0 (zero) m/s and 10 m/s.
Factory settings: (0 , 2.0) and (10 , 10.0).
This means that the 'Control voltage' is 2.0 volt at 0 m/s and 10.0 volt at 10 m/s.

Typically, the higher the wind speed, the higher the 'Control voltage'.



Example: Relationship between displayed wind speed and control voltage

Control voltage



This example shows that 0 (zero) m/s corresponds to 2.0 volt and 10 m/s corresponds to 10.0 volt.

The 'Control voltage' is only available from the internal module ECA 32.

5.11 Application

Depending on application type (heating and / or cooling), the mentioned flow temperature in this section can either be a flow or a duct temperature.

ECA addr. (choice of Remote Control Unit) — A214.1 / A214.3 / A214.5 / A314.2 / A314.3		**11010**
Circuit	*Setting range*	*Factory setting*
1	**OFF / A / B**	**OFF**
Decides the room temperature signal transfer and communication with the Remote Control Unit.		

The Remote Control Unit must be set accordingly (A or B).

OFF: No Remote Control Unit. Only room temperature sensor, if any.

A: Remote Control Unit ECA 30 / 31 with address A.

B: Remote Control Unit ECA 30 / 31 with address B.

Send desired T		**11500**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
When the controller acts as a slave controller in a master / slave system, information about the desired flow temperature can be sent to the master controller via the ECL 485 bus.		

In the master controller, 'Demand offset' must be set to a value in order to react on a desired flow temperature from a slave controller.

When the controller acts as a slave, its address must be 1, 2, 3 ... 9 in order to send the desired temperature to the master (see the section 'Miscellaneous', 'Several controllers in the same system').

OFF: Information about the desired flow temperature is not sent to the master controller.

ON: Information about the desired flow temperature is sent to the master controller.

Total stop		11021
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**

Setting the 'Total stop' to OFF or ON gives different results, depending on the actual application. The conditions are:
- Room temperature controlled applications
- Total stop during the saving temperature period

OFF: No total stop.

Heating applications in general:

Saving mode: The desired flow / duct temperature is reduced according to desired duct / room temperature.

Comfort mode: If the room temperature gets higher than desired room temperature, the heating switches OFF.

See also the heating related examples.

Cooling applications:

Saving mode: The motorized control valve closes.

ON: Total stop.

Heating applications with desired duct temperature:

Saving mode: The desired flow temperature is set to 'Frost pr. T' (Frost protection temperature).

Heating applications with desired room temperature:

Saving mode: The heating is stopped as long as the room temperature is higher than the desired room temperature.

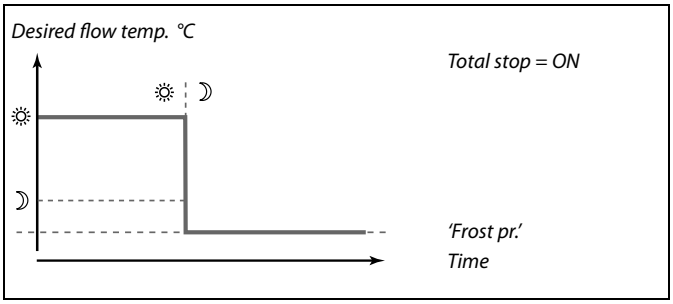
See also the heating related examples.

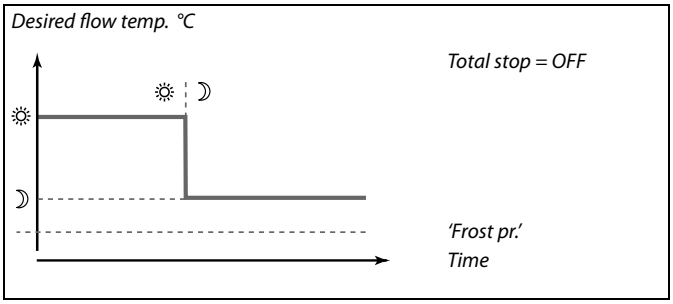
Cooling applications:

Saving mode: The motorized control valve closes.

In general, when total stop is ON, the heating or cooling closes totally when the controller goes into saving mode. However, when 'Total stop' is ON, the controller has room temperature related functions also in comfort mode.

The examples below are related to heating applications:





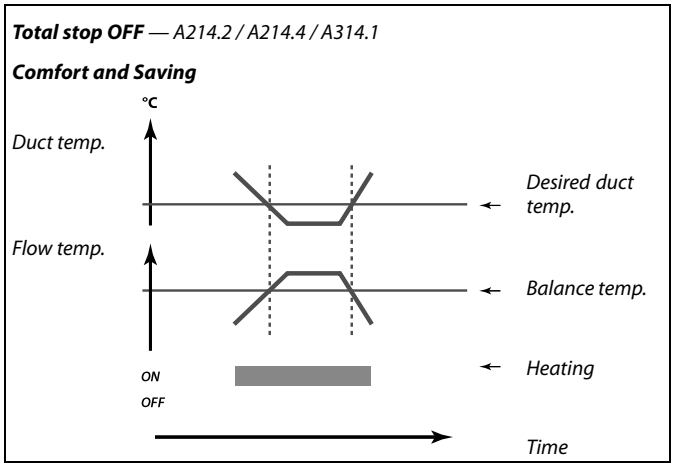
The min. flow temperature limitation ('Temp. min.') is overruled when 'Total stop' is ON.

Total stop, examples:

A214.2 / A214.4 / A314.1:

The heating related example shows the situation when 'Total stop' is set to OFF. Valid for Comfort and Saving mode.

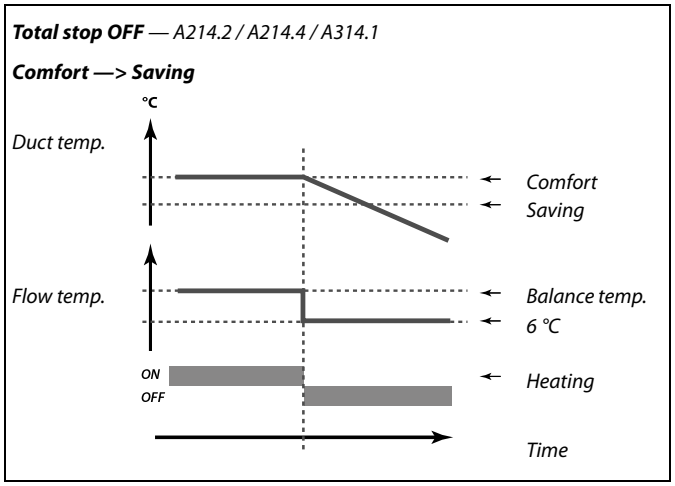
The desired flow temperature is corrected in relation to the duct temperature.



A214.2 / A214.4 / A314.1:

The heating related example shows the situation when 'Total stop' is set to ON and the mode changes from Comfort to Saving.

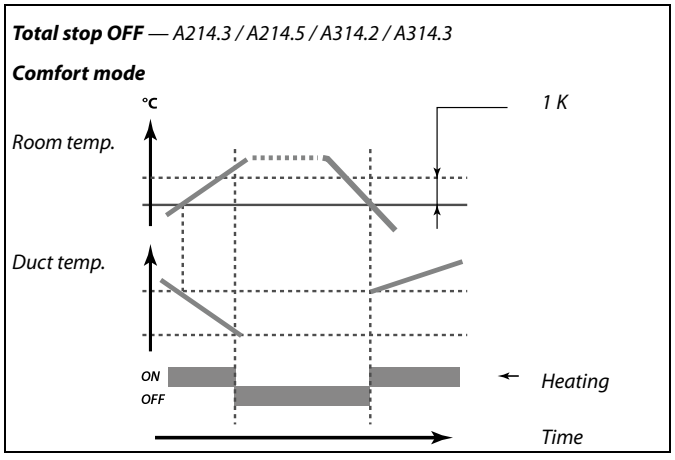
The desired flow temperature is lowered to 6 °C and heating stops.



A214.3 / A214.5 / A314.2 / A314.3:

The heating related example shows the situation when 'Total stop' is set to OFF. Valid for Comfort mode.

The desired duct temperature is corrected in relation to the room temperature. When the room temperature rises more than 1 K above the desired room temperature and the minimum limitation for desired duct temperature is reached as well, heating stops.



A214.3 / A214.5 / A314.2 / A314.3:

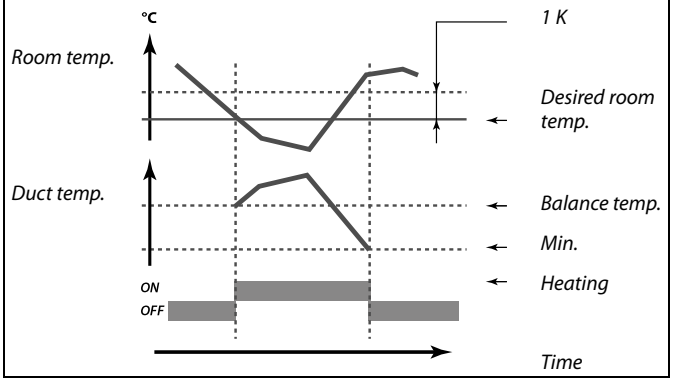
The heating related example shows the situation when 'Total stop' is set to OFF. Valid for Saving mode.

Heating is stopped until the room temperature gets below the desired room temperature. The desired duct temperature is corrected in relation to the room temperature.

When the room temperature rises more than 1 K above the desired room temperature and the minimum limitation for desired duct temperature is reached as well, heating stops.

Total stop OFF *— A214.3 / A214.5 / A314.2 / A314.3*

Saving mode



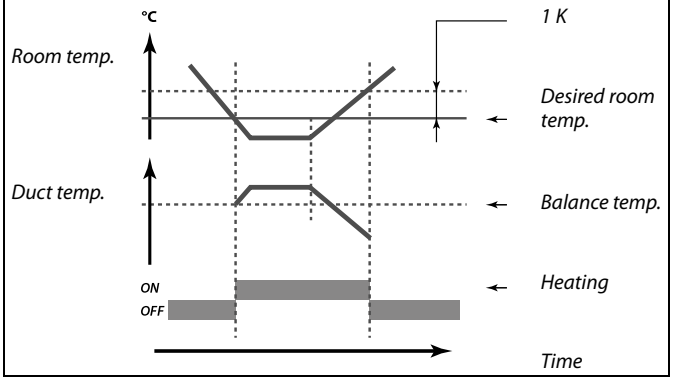
A214.3 / A214.5 / A314.2 / A314.3:

The heating related example shows the situation when 'Total stop' is set to ON. Valid for Comfort and Saving mode.

The desired duct temperature is corrected in relation to the room temperature. When the room temperature rises more than 1 K above the desired room temperature, heating stops.

Total stop ON *— A214.3 / A214.5 / A314.2 / A314.3*

Comfort / saving mode



Comp. T select		**11140**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
Selection of compensation temperature.		

OFF: The compensation temperature is measured by S1 or the S1 value is received from the ECL 485 bus.

ON: The compensation temperature is measured by S2.

Frost pr. T (frost protect. temp.) — A214.2 / A214.4 / A314.1		**11093**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 40 °C**	**6 °C**
Set the desired flow temperature at temperature sensor S3 to protect the system against frost (at heating cut-out, total stop etc.). *When the temperature at S3 gets lower than the setting, the motorized control valve opens gradually.*		

0... 40: Desired frost protection temperature.

The frost protection temperature can also be set in your favorite display 1 or 2 in frost protection mode.

S4 filter — A214.2 / A214.4 / A314.1		10304
Circuit	*Setting range*	*Factory setting*
1	**1 ... 100**	**8**
The filtering of the measured temperature at S4 prevents instability in the control of the duct temperature. *The set value is an indirect time constant. The resulting time constant is listed in the examples below.*		

Low value: Low filtering (minor dampening)

High value: High filtering (major dampening)

The setting values (examples) give the following approximate time constants:

Set value (examples):	Resulting time constant:
1	1 sec
2	1.5 sec
5	4 sec
10	7 sec
20	14 sec
50	35 sec
100	70 sec

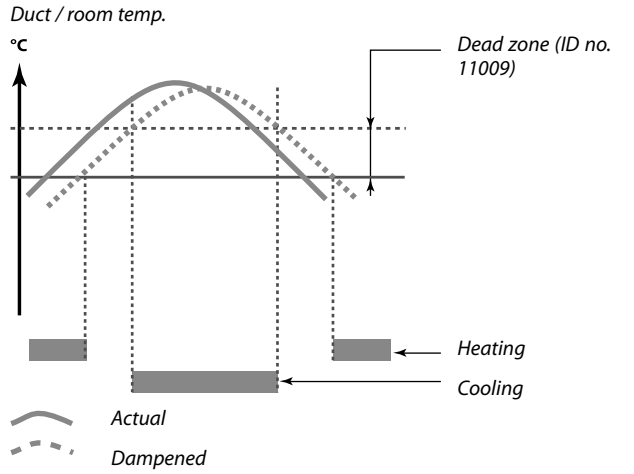
Accum. filter — A214.4 / A214.5 / A314.1 / A314.2		11082
Circuit	*Setting range*	*Factory setting*
1	**1 ... 250 s**	**25 s**
The value determines the filtering of the desired flow / duct temperature in order to change correctly from heating to cooling mode or vice versa. *The set value is an indirect time constant. The resulting time constant is listed in the examples below.*		

Low value: Minor dampening.

High value: Major dampening.

The setting values (examples) give the following approximate time constants:

Set value (examples):	Resulting time constant:
1:	80 sec
2:	160 sec
5:	~ 7 min
10:	~ 14 min
20:	~ 25 min
50:	~ 1 hour
100:	~ 2 hours
200:	~ 4 hours
250:	~ 5.5 hours



The setting of 'Accum. filter' prevents unexpected changes between heating and cooling or changes between heating and passive cooling.

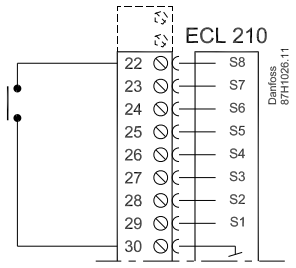
Ext. input (external override), ECL 210		11141
Circuit	*Setting range*	*Factory setting*
1	**OFF / S1 ... S8**	**OFF**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to Comfort or Saving mode.		

OFF: No inputs have been selected for external override.

S1 ... S8: Input selected for external override.

If S1...S6 is chosen as override input, the override switch must have gold-plated contacts.
If S7 or S8 is chosen as override input, the override switch can be a standard contact.

See the drawing for a connection example of an override switch to input S8.



Choose only an unused input for override. If an already used input is applied for override, the functionality of this input is also neglected.

See also 'Ext. mode'.

Ext. input (external override) — ECL 310		11141
Circuit	*Setting range*	*Factory setting*
1	**OFF / S1 ... S10**	**OFF**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to 'Comfort' or 'Saving' mode.		

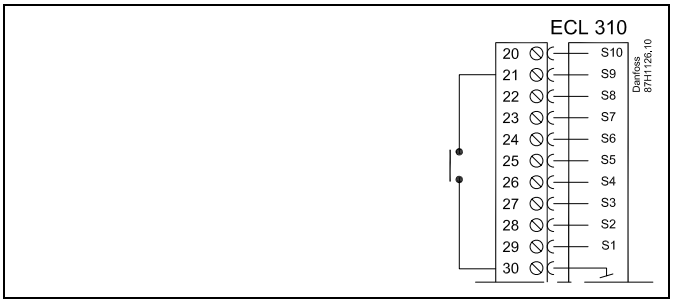
OFF: No inputs have been selected for external override.

S1 ... S10: Input selected for external override.

If S1... S6 is chosen as override input, the override switch must have gold-plated contacts.
If S7 ... S10 is chosen as override input, the override switch can be a standard contact.

See the drawing for a connection example of an override switch to input S9.

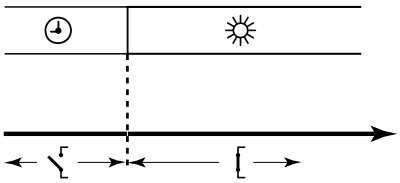
The two drawings (override to comfort mode and override to saving mode) show the functionality.



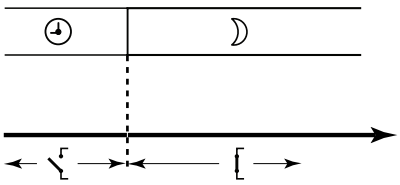
Choose only an unused input for override. If an already used input is applied for override, the functionality of this input is also neglected.

See also 'Ext. mode'.

Override to 'Comfort' mode



Override to 'Saving' mode



The result of override to 'Saving' mode depends on the setting in 'Total stop'.
Total stop = OFF: Heating reduced
Total stop = ON: Heating stopped

Application A314.3:
Setting range for ID no. 11141 is OFF / S1 ... S8.

Ext. mode (external override mode)		11142
Circuit	*Setting range*	*Factory setting*
1	**COMFORT / SAVING**	**COMFORT**
Choose external override mode.		

The mode override can be activated for saving or comfort mode. For override, the controller mode must be scheduled mode.

SAVING: The controller is in saving mode when the override switch is closed.

COMFORT: The controller is in comfort mode when the override switch is closed.

See also 'Ext. input'.

5.12 Alarm

Many applications in the ECL Comfort 210 and 310 series have an alarm function. The alarm function activates relay 4 (A214 applications in ECL Comfort 210 or 310) or relay 6 (A314 applications in ECL Comfort 310).

The alarm relay can activate a lamp, a horn, an input to an alarm transmitting device etc.

Typical alarms, type 1:

- Actual S3 temperature differs from the desired S3 temperature.
- Activation of a frost thermostat (S7).
- Detection of frost temperature at S5 or S6.
- Activation of a fire alarm (S8).

Type 1 alarms are present as long as the alarm reason is present.

Typical alarms, type 2:

- Disconnection or short-circuiting of a temperature sensor or its connection.

Type 2 alarms are present even if the alarm reason no longer is present. To remove the alarm indications, the alarms must be cleared.

When an alarm is activated, the 🔔 appears in the favorite displays.

To find the reason for alarm:

- select MENU
- select 'Alarm'
- select 'Alarm overview'. A 🔔 will be shown at the alarm in question.

If the alarm reason is not found here, the alarm is caused by one of the connected temperature sensors in 'Common controller settings', 'System', 'Raw input overview'.

5.12.1 Frost T

Alarm value		**11676**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 20 °C**	**–20 °C**
When the actual temperature, measured by S6, gets below the set value, the frost alarm will be activated.		

An activated frost alarm opens the control valve fully, closes the damper, starts the circulation pump and stops the fan.

–20 ... 20: Set the frost alarm value.

Alarm value — A214.1		**11676**
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 20 °C**	**2 °C**
When the actual temperature, measured by S6, gets below the set value, the frost alarm will be activated.		

An activated frost alarm opens the control valve fully, closes the damper, starts the circulation pump and stops the fan.

–20 ... 20: Set the frost alarm value.

5.12.2 Limit T frost

Alarm value		11656
Circuit	*Setting range*	*Factory setting*
1	**–20 ... 20 °C**	**6 °C**
When the actual temperature, measured by S5, gets below the set value, the frost alarm will be activated.		

–20 ... 20: Set the frost alarm value.

An activated frost alarm opens the control valve fully, closes the damper, starts the circulation pump and stops the fan.

5.12.3 Frost thermostat

Alarm value		11616
Circuit	*Setting range*	*Factory setting*
1	**0 / 1**	**0**
A frost thermostat can be connected to the S7 input. When the temperature, measured by the frost thermostat, gets below the set value, the S7 input will be activated. *The frost alarm can be activated when the contacts in the frost thermostat open or close.*		

0: The frost alarm is activated when the contacts in the frost thermostat close.

1: The frost alarm is activated when the contacts in the frost thermostat open.

'Alarm value' = 0:
An active frost alarm is indicated by a 🔔 in the display and as OFF in favorite display no. 3.

'Alarm value' = 1:
An active frost alarm is indicated by a 🔔 in the display and as ON in favorite display no. 3.

See also 'Alarm time-out', parameter 11617.

Alarm time-out		11617
Circuit	*Setting range*	*Factory setting*
1	**0 ... 240 s**	**0 s**
The frost alarm, based on the frost thermostat, is activated when the frost thermostat has been activated for a longer time (in seconds) than the set value.		

0 ... 240: Set the alarm time-out value.

5.12.4 Fire safety

Alarm value — A214		11636
Circuit	*Setting range*	*Factory setting*
1	**0 / 1**	**0**
A fire thermostat can be connected to the S8 input. When the temperature, measured by the fire thermostat, gets above the set value, the S8 input will be activated. *The fire alarm can be activated when the contacts in the fire thermostat open or close.*		

0: The fire alarm is activated when the contacts in the fire thermostat close.

1: The fire alarm is activated when the contacts in the fire thermostat open.

'Alarm value' = 0:
An active fire alarm is indicated by a 🔔 in the display.

'Alarm value' = 1:
An active fire alarm is indicated by a 🔔 in the display.

See also 'Alarm time-out', parameter 11637.

Alarm time-out		11637
Circuit	*Setting range*	*Factory setting*
1	**0 ... 240 s**	**0 s**
The fire alarm, based on the fire thermostat, is activated when the fire thermostat has been activated for a longer time (in seconds) than the set value.		

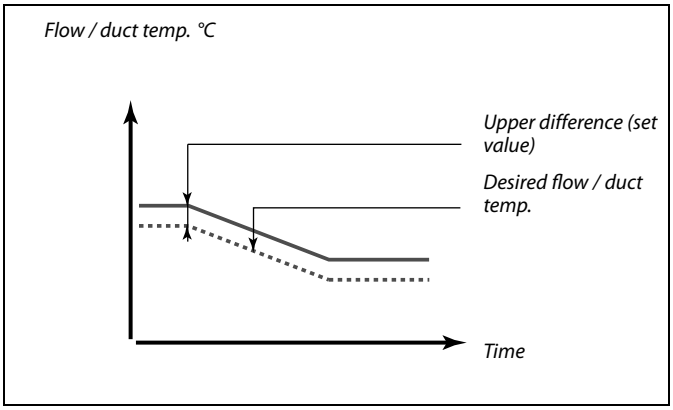
0 ... 240: Set the alarm time-out value.

5.12.5 Temp. monitor.

Upper difference		11147
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow / duct temperature increases more than the set difference (acceptable temperature difference above the desired flow / duct temperature). See also 'Delay'.		

OFF: The alarm function is not active.

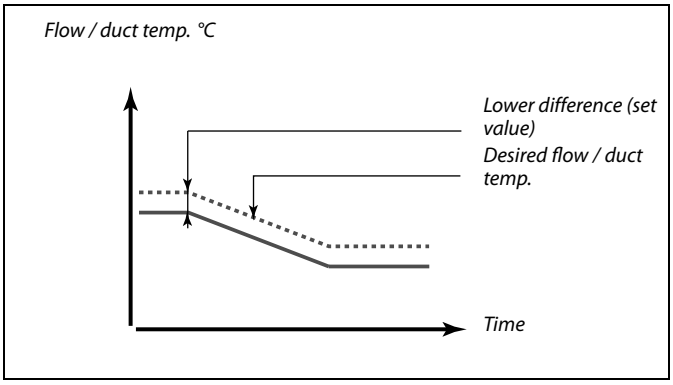
1 ... 30 K: The alarm function is active if the actual temperature gets above the acceptable difference.



Lower difference		11148
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow / duct temperature decreases more than the set difference (acceptable temperature difference below the desired flow / duct temperature). See also 'Delay'.		

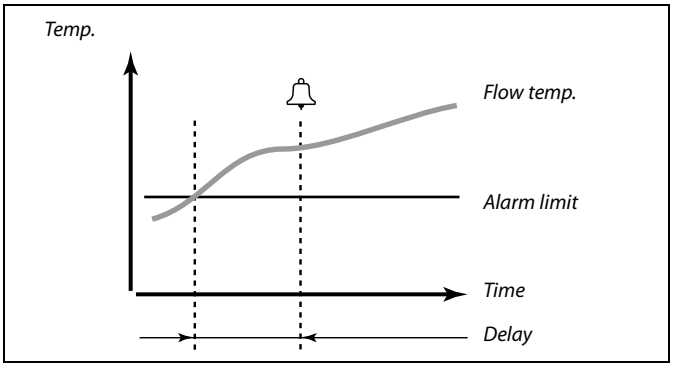
OFF: The alarm function is not active.

1 ... 30 K: The alarm function is active if the actual temperature gets below the acceptable difference.



Delay		11149
Circuit	*Setting range*	*Factory setting*
1	**1 ... 99 m**	**10 m**
If an alarm condition from either 'Upper difference' or 'Lower difference' is present for a longer time than the set delay (in min.), the alarm function is activated.		

1 ... 99 m: The alarm function will be activated if the alarm condition remains after the set delay.



Lowest temp.		**11150**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 50 °C**	**30 °C**
The alarm function will not be activated if the desired flow / duct temperature is lower than the set value.		

If the cause of the alarm disappears, the alarm indication and output also disappear.

Alarm overview, in general		
Circuit	*Setting range*	*Factory setting*
1		
Access to overview showing the alarm number / alarm type. The alarm number is entered into the alarm register and can be obtained from a SCADA system. *Example: "5: Temp. monitor": If an alarm is activated because of conditions in 'Temp. monitor' the alarm number 5 is placed in the alarm register.*		

If the alarm reason is not found here, the alarm is caused by one of the connected temperature sensors in 'System, Raw input overview'

Alarm overview
1: Frost T
2: Limit frost T
3: Frost thermostat
4: Fire safety
5: Temp. monitor
6: Flow T sensor

6.0 Common controller settings

6.1 Introduction to 'Common controller settings'

Some general settings which apply to the entire controller are located in a specific part of the controller.

To enter 'Common controller settings':

Action:	Purpose:	Examples:
	Choose 'MENU' in any circuit	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	

Circuit selector

6.2 Time & Date

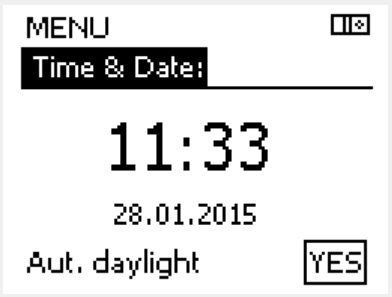
It is only necessary to set the correct date and time in connection with the first use of the ECL Comfort controller or after a power break of more than 72 hours.

The controller has a 24 hour clock.

Aut. daylight (Daylight saving time changeover)

YES: The controller's built-in clock automatically changes + / - one hour on the standardized days for daylight saving time changeover for Central Europe.

NO: You change manually between summer and winter time by setting the clock backward or forward.



When controllers are connected as slaves in a master / slave system (via ECL 485 communication bus), they will receive 'Time & Date' from the master.

6.3 Holiday

This section describes the holiday program in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application. In A214 / A314 applications, however, the holiday program can only be found in circuit 1 but the general description is still valid.

There is a holiday program for each circuit and a holiday program for the common controller.

Each holiday program contains one or more schedules. Each schedule can be set to a start date and an end date. The set period starts on the start date at 00.00 and stops on end date at 24.00.

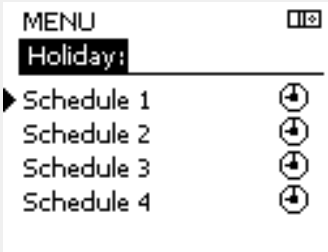
Selectable modes are Comfort, Saving, Frost protection or Comfort 7-23 (before 7 and after 23, the mode is scheduled).

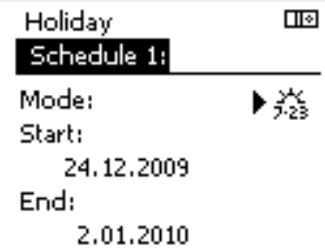
How to set your holiday schedule:

Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose a circuit or 'Common controller settings'	
	Heating	
	DHW	
	Common controller settings	
	Confirm	
	Go to 'Holiday'	
	Confirm	
	Choose a schedule	
	Confirm	
	Confirm choice of mode selector	
	Choose mode	
	· Comfort	
	· Comfort 7–23	
	· Saving	
	· Frost protection	
	Confirm	
	Enter the start time first and then the end time	
	Confirm	
	Go to 'Menu'	
	Confirm	
	Choose 'Yes' or 'No' in 'Save'. Choose the next schedule, if required	

The holiday program in the 'Common controller settings' is valid for all circuits. The holiday program can also be set individually in the heating or DHW circuits.

The end date must be at least be one day later than the start date.





The ECA 30 / 31 cannot override the holiday schedule of the controller temporarily.

However, it is possible to make use of the following options from the ECA 30 / 31 when the controller is in scheduled mode:

 Day off

 Holiday

 Relaxing (extended comfort period)

 Going out (extended saving period)

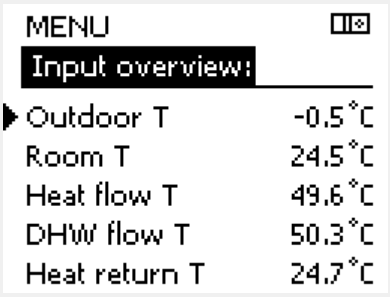
Energy-saving trick:
Use 'Going out' (the extended saving period) for airing purposes (e.g. for ventilating the rooms by means of fresh air from open windows).

6.4 Input overview

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

The input overview is located in the common controller settings.

This overview will always show you the actual temperatures in the system (read-only).



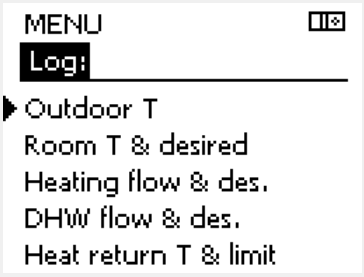
6.5 Log

This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

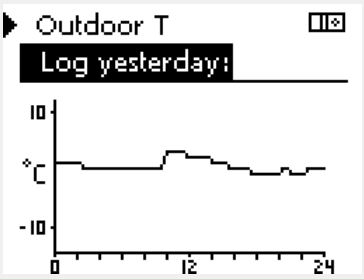
The log function (temperature history) allows you to monitor the logs of today, yesterday, the past 2 days as well as the past 4 days for the connected sensors.

There is a log display for the relevant sensor, showing the measured temperature.

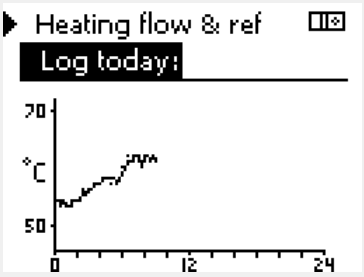
The log function is only available in the 'Common controller settings'.



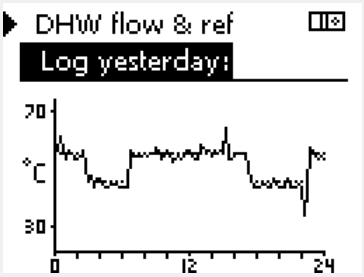
Example 1:
1 day log for yesterday showing the development in outdoor temperature during the past 24 hours.



Example 2:
Today's log for the actual heating flow temperature as well as the desired temperature.



Example 3:
Yesterday's log for the DHW flow temperature as well as the desired temperature.



6.6 Output override

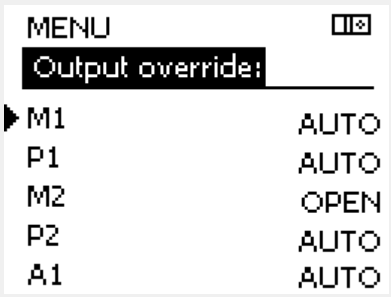
This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

The output override is used to disable one or more of the controlled components. This could among others be useful in a service situation.

Action:	Purpose:	Examples:
	Choose 'MENU' in any of the overview displays	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose common controller settings	
	Confirm	
	Choose 'Output override'	
	Confirm	
	Choose a controlled component	M1, P1 etc.
	Confirm	
	Adjust the status of the controlled component: Motorized control valve: AUTO, STOP, CLOSE, OPEN Pump: AUTO, OFF, ON	
	Confirm status change	

Remember to change the status back again as soon as an override is not required any longer.

Controlled components *Circuit selector*



When the selected controlled component (output) is not 'AUTO', the ECL Comfort controller does not control the component in question (pump or motorized control valve e.g.). Frost protection is not active.

A314.1 and A314.2 only:

The unit M2 is controlled by a 0–10 volt (0–100%) signal. It can be set to AUTO or ON.

AUTO: Normal control (0–100%)

ON: The 0–10 volt signal is set as a percentage.

A314.3 only:

The output V1 is controlled by a 0–10 volt (0–100%) signal. It can be set to AUTO or ON.

AUTO: Normal control (0–100%)

ON: The 0–10 volt signal is set as a percentage.

6.7 Key functions

In 'Key functions' you will always be able to find an overview of the functions related to your ECL Application Key. See also the section 'Inserting the ECL Application Key'.

Please have this information available if you need to contact your Danfoss sales organization concerning the ECL Application Key.

New application:	Erases the currently installed application
Application:	Indicates the currently active application
Factory settings:	Enables choice between factory and user settings
Copy:	Enables copy to and from ECL Application Key
Key overview:	List of available applications on your key

Example, Key functions:

6.8 System

6.8.1 ECL version

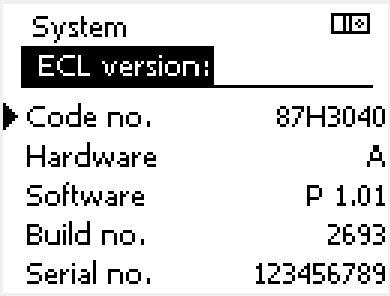
In 'ECL version' you will always be able to find an overview of the data related to your electronic controller.

Please have this information available if you need to contact your Danfoss sales organization concerning the controller.

Information about your ECL Application Key can be found in 'Key functions' and ' Key overview'.

Code no.:	The Danfoss sales and order no. for the controller
Hardware:	Hardware version of the controller
Software:	Software version of the controller
Serial no.:	Unique number for the individual controller
Production week:	Week no. and year (WW.YYYY)

Example, ECL version



6.8.2 Extension

'Extension' will offer you information about additional modules, if any. An example could be the ECA 32 module.

6.8.3 Ethernet

The ECL Comfort 310 has a Modbus/TCP communication interface that allows the ECL controller to be connected to an Ethernet network. This allows remote access to the ECL 310 controller based on standard communication infrastructures.

In 'Ethernet' it is possible to set up the required IP addresses.

6.8.4 Portal config

The ECL Comfort 310 has a Modbus/TCP communication interface that allows the ECL controller to be connected to the internet.

Internet related parameters are set here.

6.8.5 M-bus config

The ECL Comfort 310 has an M-bus communication interface that allows energy meters to be connected as slaves.

M-bus related parameters are set here.

6.8.6 Energy Meters

The ECL Comfort 310 allows communication with up to 5 energy meters via M-bus. In 'Energy Meters' data can be read the from M-bus connected energy meters

6.8.7 Raw input overview

Measured temperatures, input status and voltages are displayed.

In addition, a detection of malfunctions can be chosen for activated temperature inputs.

Monitoring the sensors:
Choose the sensor which measures a temperature, for example the S5. When the dial is pressed, a magnifying glass appears in the selected line. The S5 temperature is now being monitored.

Alarm indication:
Should the connection to the temperature sensor be disconnected, short-circuited or the sensor itself be defective, the alarm function is activated.

In the "Raw input overview" an alarm symbol is shown at the defective temperature sensor in question.

Resetting the alarm:
Choose the sensor (S number) for which you want to clear the alarm. Press the dial. The magnifying glass and alarm symbols disappear.

When the dial is pressed again, the monitoring function is reactivated.

The temperature sensor inputs have a measuring range from -60 ... 150 ° C.

If a temperature sensor or its connection breaks, the value indication is " - - ".

If a temperature sensor or its connection is short-circuited, the value indication is " - - - ".

6.8.8 Display

Backlight (display brightness)		**60058**
Circuit	*Setting range*	*Factory setting*
	0 ... 10	**5**
Adjust the brightness of the display.		

0: Weak backlight.

10: Strong backlight.

Contrast (display contrast)		**60059**
Circuit	*Setting range*	*Factory setting*
	0 ... 10	**3**
Adjust the contrast of the display.		

0: Low contrast.

10: High contrast.

6.8.9 Communication

Modbus addr.		38
Circuit	*Setting range*	*Factory setting*
	1 ... 247	**1**
Set the Modbus address if the controller is part of a Modbus network.		

1 ... 247: Assign the Modbus address within the stated setting range.

The application KEY A214 is also able to communicate via Modbus to Danfoss ADAP-KOOL® Service Manager.

ECL 485 addr. (master / slave address)		2048
Circuit	*Setting range*	*Factory setting*
	0 ... 15	**15**
This settting is relevant if more controllers are working in the same ECL Comfort system (connected via the ECL 485 communication bus) and / or Remote Control Units (ECA 30 / 31) are connected.		

0: The controller works as slave.
The slave receives information about the outdoor temperature (S1), system time, and signal for DHW demand in the master.

1 ... 9: The controller works as slave.
The slave receives information about the outdoor temperature (S1), system time, and signal for DHW demand in the master. The slave sends information about the desired flow temperature to the master.

10 ... 14: Reserved.

15: The ECL 485 communication bus is active.
The controller is master. The master sends information about the outdoor temperature (S1) and system time. Connected Remote Control Units (ECA 30 / 31) are powered.

The total cable length of max. 200 m (all devices incl. the internal ECL 485 communication bus) should not be exceeded.
Cable lengths of more than 200 m may cause noise sensibility (EMC).

The ECL Comfort controllers can be connected via the ECL 485 communication bus to perform a larger system (the ECL 485 communication bus can connect to max. 16 devices).

Each slave must be configured with its own address (1 ... 9).

However, more slaves can have the address 0 if they only have to receive information about outdoor temperature and system time (listeners).

Service Pin		2150
Circuit	*Setting range*	*Factory setting*
	0 / 1	**0**
This setting is only used in connection with set-up of Modbus communication.		

0: Service pin not activated.

1: Activation of service pin.

Ext. reset		2151
Circuit	*Setting range*	*Factory setting*
	0 / 1	**0**
This setting is only used in connection with set-up of Modbus communication.		

0: Reset not activated.

1: Reset.

6.8.10 Language

Language		2050
Circuit	*Setting range*	*Factory setting*
	English / 'Local'	**English**
Choose your language.		

Local language is selected during installation. If you want to change to another local language, the application must be reinstalled. However, it is always possible to change between the local language and English.

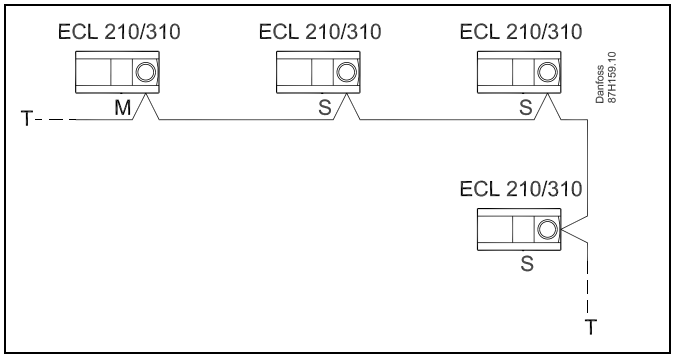
7.0 Miscellaneous

7.1 Several controllers in the same system

When ECL Comfort controllers are interconnected by means of the ECL 485 communication bus (cable type: 2 x twisted pair), the master controller will broadcast the following signals to the slave controllers:

- Outdoor temperature (measured by S1)
- Time and date
- DHW heating activity

Furthermore, the master controller can receive information about the desired flow temperature (demand) from slave controllers.



SLAVE controllers: How to make use of the outdoor temperature signal sent from the MASTER controller

Situation 1:

The slave controllers only receive information about outdoor temperature and date / time.

SLAVE controllers:
Change the factory set address from 15 to address 0.

- In ⊡⊙, go to System > Communication > ECL 485 addr:

ECL 485 addr. (master / slave address)		**2048**
Circuit	Setting range	**Choose**
⊡⊙	0 ... 15	**0**

SLAVE controller: How to react on a DHW heating demand sent from the MASTER controller

Situation 2:
The slave receives information about a DHW heating activity in the master controller and can be set to close the selected heating circuit.

SLAVE controller:
Set the desired function:

- In circuit 1 / circuit 2, go to 'Settings' > 'Application' >'DHW priority':

DHW priority (closed valve / normal operation)		**11052 / 12052**
Circuit	Setting range	**Choose**
1 / 2	OFF / ON	**OFF / ON**

OFF: The flow temperature control remains unchanged during active DHW heating / charging in the master controller.

ON: The valve in the heating circuit is closed during active DHW heating / charging in the master controller.

In a system with MASTER / SLAVE controllers, only one MASTER controller with address 15 is allowed.

If by mistake more MASTER controllers are present in an ECL 485 communication bus system, decide which controller is to be MASTER. Change the address in the remaining controllers. However, the system will operate but not be stable with more than one MASTER controller.

In the MASTER controller, the address in 'ECL 485 addr. (master / slave address)', ID no. 2048, must always be 15.

SLAVE controller: How to make use of the outdoor temperature signal and send information about the desired flow temperature back to the MASTER controller

Situation 3:

The slave controller receives information about outdoor temperature and date / time. The master controller receives information about the desired flow temperature from slave controllers with an address from 1 ... 9:

SLAVE controller:

- In ☐|⊙, go to System > Communication > ECL 485 addr.
- Change the factory set address from 15 to an address (1 ... 9). Each slave must be configured with its own address.

ECL 485 addr. (master / slave address)		**2048**
Circuit	Setting range	**Choose**
☐|⊙	0 ... 15	**1 ... 9**

Furthermore, each slave can send information about the desired flow temperature (demand) in each circuit back to the master controller.

SLAVE controller:

- In the circuit in question, go to Settings > Application > Send desired T
- Choose ON or OFF.

Send desired T		**11500 / 12500**
Circuit	Setting range	**Choose**
1 / 2	OFF / ON	**ON or OFF**

OFF: Information about the desired flow temperature is not sent to the master controller.

ON: Information about the desired flow temperature is sent to the master controller.

MASTER controller:

- In the circuit 1, go to Settings > Application > Demand offset
- Change OFF to a value (for example 5 K) which is added to the highest demand (desired flow temperature) from the slaves.

Demand offset		**11017**
Circuit	Setting range	**Choose**
1	OFF / 1 ... 20 K	**1 ... 20 K**

In the MASTER controller, the address in 'ECL 485 addr. (master / slave address)', ID no. 2048, must always be 15.

7.2 Frequently asked questions

The definitions apply to the Comfort 210 as well as ECL Comfort 310 series. Consequently, you might come across expressions that are not mentioned in your guide.

The time shown in the display is one hour off?
See 'Time and Date'.

The time shown in the display is not correct?
The internal clock may have been reset, if there has been a power break for more than 72 hours.
Go to the 'Common controller settings' and 'Time & Date' to set the correct time.

The ECL Application Key is lost?
Switch the power off and on again to see the system type and the software generation of the controller or go to 'Common controller settings' >'Key functions' > 'Application'. The system type (e.g. TYPE A266.1) and the system diagram is displayed.
Order a replacement from your Danfoss representative (e.g. ECL Application Key A266).
Insert the new ECL Application Key and copy your personal settings from the controller to the new ECL Application Key, if required.

The room temperature is too low?
Make sure that the radiator thermostat does not limit the room temperature.
If you still cannot obtain the desired room temperature by adjusting the radiator thermostats, the flow temperature is too low. Increase the desired room temperature (display with desired room temperature). If this does not help, adjust the 'Heat curve' ('Flow temp.').

The room temperature is too high during saving periods?
Make sure that the min. flow temperature limitation ('Temp. min.') is not too high.

The temperature is unstable?
Check that the flow temperature sensor is correctly connected and in the right place. Adjust the control parameters ('Control par.').
If the controller has a room temperature signal, see 'Room limit'.

The controller does not operate and the control valve is closed?
Check that the flow temperature sensor is measuring the correct value, see 'Daily use' or 'Input overview'.
Check the influence from other measured temperatures.

How to make an extra comfort period in the schedule?
You can set an additional comfort period by adding new 'Start' and 'Stop' times in 'Schedule'.

How to remove a comfort period in the schedule?
You can remove a comfort period by setting start and stop times to the same value.

How to restore your personal settings?
Please read the chapter concerning 'Inserting the ECL Application Key'.

How to restore the factory settings?
Please read the chapter concerning 'Inserting the ECL Application Key'.

Why can't the settings be changed?
The ECL Application Key has been removed.

How to react on alarms?
An alarm indicates that the system is not operating satisfactorily.
Please contact your installer.

What does P and PI control mean?
P control: Proportional control.
By using a P control, the controller will change the flow temperature proportional to the difference between a desired and an actual temperature, e.g. a room temperature.
A P control will always have an offset which not will disappear over time.

PI control: Proportional and Integrating control.
A PI control does the same as a P control, but the offset will disappear over time.
A long 'Tn' will give a slow but stable control, and a short 'Tn' will result in a fast control but with a higher risk of unstability.

7.3 Definitions

The definitions apply to the Comfort 210 as well as ECL Comfort 310 series. Consequently, you might come across expressions that are not mentioned in your guide.

Air duct temperature
Temperature measured in the air duct where the temperature is to be controlled.

Alarm function
Based on the alarm settings, the controller can activate an output.

Anti-bacteria function
For a defined period, the DHW temperature is increased in order to neutralize dangerous bacteria, e.g. Legionella.

Balance temperature
This setpoint is the basis for the flow / air duct temperature. The balance temperature can be adjusted by the room temperature, the compensation temperature and the return temperature. The balance temperature is only active if a room temperature sensor is connected.

Comfort operation
Normal temperature in the system controlled by the schedule. During heating the flow temperature in the system is higher to maintain the desired room temperature. During cooling the flow temperature in the system is lower to maintain the desired room temperature.

Comfort temperature
Temperature maintained in the circuits during comfort periods. Normally during daytime.

Compensation temperature
A measured temperature influencing the flow temperature reference / balance temperature.

Desired flow temperature
Temperature calculated by the controller on basis of the outdoor temperature and influences from the room and / or return temperatures. This temperature is used as a reference for the control.

Desired room temperature
Temperature which is set as the desired room temperature. The temperature can only be controlled by the ECL Comfort controller if a room temperature sensor is installed.
If a sensor is not installed, the set desired room temperature however still influences the flow temperature.
In both cases the room temperature in each room is typically controlled by radiator thermostats / valves.

Desired temperature
Temperature based on a setting or a controller calculation.

Dew point temperature
Temperature at which the humidity in the air condensates.

DHW circuit
The circuit for heating the domestic hot water (DHW).

Factory settings
Settings stored on the ECL Application Key to simplify the set up of your controller the first time.

Flow temperature
Temperature measured in the flow at any time.

Flow temperature reference
Temperature calculated by the controller on basis of the outdoor temperature and influences from the room and / or return temperatures. This temperature is used as a reference for the control.

Heat curve
A curve showing the relationship between actual outdoor temperature and required flow temperature.

Heating circuit
The circuit for heating the room / building.

Holiday schedule
Selected days can be programmed to be in comfort, saving or frost protection mode. Besides this, a day schedule with comfort period from 07.00 to 23.00 can be selected.

Humidity, relative
This value (stated in %) refers to the indoor moisture content compared to the max. moisture content. The relative humidity is measured by the ECA 31 and is used for the calculation of the dew point temperature.

Limitation temperature
Temperature that influences the desired flow / balance temperature.

Log function
The temperature history is displayed.

Master / slave
Two or more controllers are interconnected on the same bus, the master sends out e.g. time, date and outdoor temperature. The slave receives data from master and sends e.g. desired flow temperature value.

Pt 1000 sensor
All sensors used with the ECL Comfort controller are based on the Pt 1000 type (IEC 751B). The resistance is 1000 ohm at 0 °C and it changes with 3.9 ohm / degree.

Optimization
The controller optimizes the start time of the scheduled temperature periods. Based on the outdoor temperature, the controller automatically calculates when to start in order to reach the comfort temperature at the set time. The lower the outdoor temperature, the earlier the start time.

Outdoor temperature trend
The arrow indicates the tendency, i.e. whether the temperature rises or falls.

Refill water function
If the measured pressure in the heating system is too low (e.g. due to a leakage), water can be supplemented.

Return temperature
The temperature measured in the return influences the desired flow temperature.

Room temperature sensor
Temperature sensor placed in the room (reference room, typically the living room) where the temperature is to be controlled.

Room temperature
Temperature measured by the room temperature sensor or the Remote Control Unit. The room temperature can only be controlled directly if a sensor is installed. The room temperature influences the desired flow temperature.

Schedule
Schedule for periods with comfort and saving temperatures. The schedule can be made individually for each week day and may consist of up to 3 comfort periods per day.

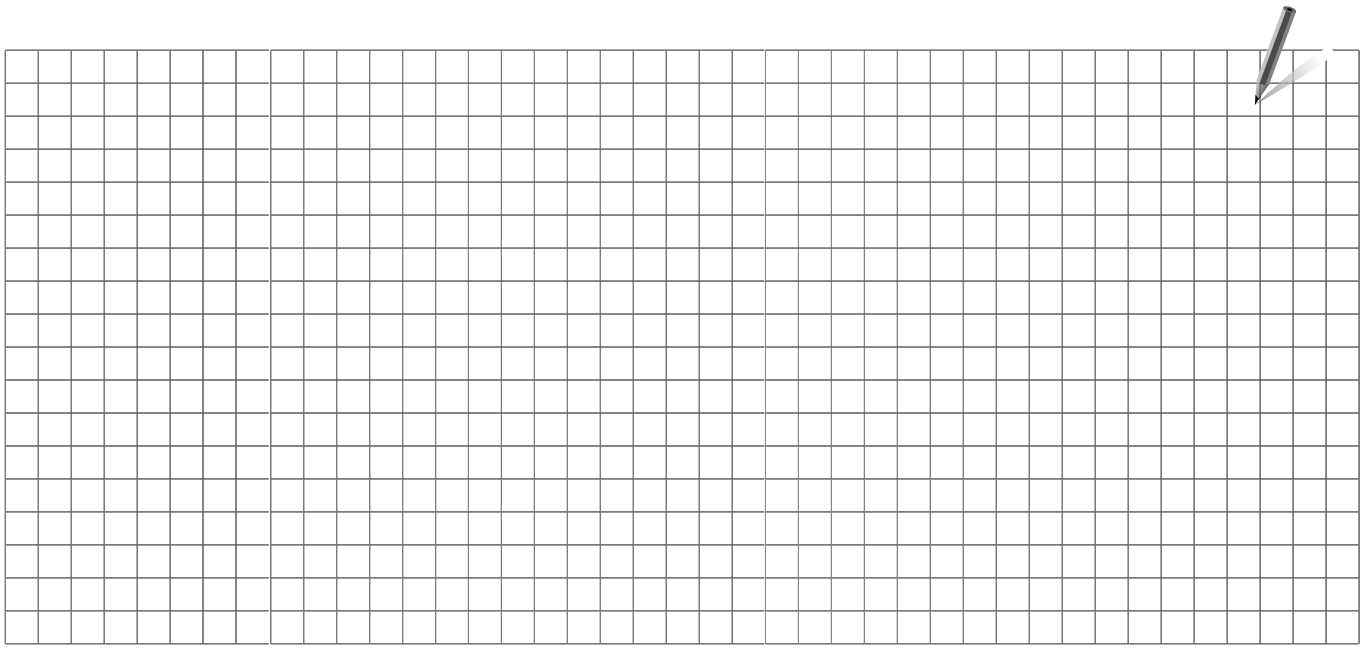
Saving temperature
Temperature maintained in the heating / DHW circuit during saving temperature periods.

Pump control
One circulation pump is working and the other is the spare circulation pump. After a set time, the roles are exchanged.

Weather compensation
Flow temperature control based on the outdoor temperature. The control is related to a user-defined heat curve.

2-point control
ON / OFF control e.g. circulation pump, change-over valve or damper control.

3-point control
Opening, closing or no action of the actuator for the motorized control valve. No action means that the actuator remains in its current position.

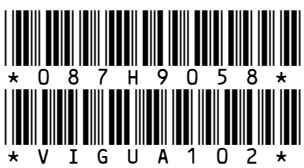


Installer:

By:

Date:

Installation Guide ECL Comfort 210 / 310, application A214 / A314



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