Installation Guide

ECL Comfort 210 / 310, application A266

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 A266 (order code no. 087H3800).

The ECL Application key A266 contains 3 subtypes: **A266.1, A266.2 and A266.9** which are almost identical.

The described functions are realized in ECL Comfort 210 for basic solutions and in ECL Comfort 310 for advanced solutions, e.g. M-bus, Modbus and Ethernet (Internet) communication.

The application A266 complies with ECL Comfort controllers 210 and 310 as of software version 1.11 (visible at start-up of the controller and in 'Common controller settings' in 'System').

ECL Comfort 210 is available as:

- ECL Comfort 210, 230 volt a.c. (087H3020)
- ECL Comfort 210B, 230 volt a.c. (087H3030)

ECL Comfort 310 is available as:

- ECL Comfort 310, 230 volt a.c. (087H3040)
- ECL Comfort 310B, 230 volt a.c. (087H3050)
- ECL Comfort 310, 24 volt a.c. (087H3044)

The B-types have no display and dial. The B-types are operated by means of the remote control unit ECA 30 / 31:

- ECA 30 (087H3200)
- ECA 31 (087H3201)

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

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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.

Local legislations must be respected. This comprises also cable dimensions and type of isolation (double isolated at 230 V).

A fuse for the ECL Comfort installation is max. 10 A typically.

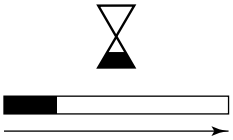
The ambient temperature range for the ECL Comfort in operation is 0 - 55 °C. Exceeding this temperature range can result in malfunctions.

Installation must be avoided if there is a risk for condensation (dew).

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.

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
  If the key is removed before the hour-glass is shown, you have to start afresh.
- Do not disconnect the power
  If the power is interrupted when the hour-glass is shown, the controller will not work.

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) often is used for temperature differences.

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).			

Parameters indicated with an ID no. like "1x607" mean a universal parameter.

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 ECL Application key A266 contains 3 subtypes, **A266.1, A266.2 and A266.9** which are almost identical.

The application **A266.1** is very flexible. These are the basic principles:

Heating (circuit 1):
Typically, the flow temperature is adjusted according to your requirements. The flow temperature sensor (S3) is the most important sensor. The desired flow temperature at S3 is calculated in the ECL controller, based on the outdoor temperature (S1) and the desired room temperature. The lower the outdoor temperature, the higher the desired flow temperature.

By means of a week schedule, the heating circuit can be in 'Comfort' or 'Saving' mode (two values for the desired room temperature). In Saving mode the heating can be reduced or switched off totally.

The motorized control valve (M2) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa.

The return temperature (S5) can be limited, for example not to be too high. If so, the desired flow temperature at S3 can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve. Furthermore, the return temperature limitation can be dependent on the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted return temperature.

In boiler-based heating supply the return temperature should not be too low (same adjustment procedure as above).

If the measured room temperature does not equal the desired room temperature, the desired flow temperature can be adjusted.

The circulation pump, P2, is ON at heat demand or at frost protection.

The heating can be switched OFF when the outdoor temperature is higher than a selectable value.

A connected flow or energy meter based on pulses (S7) can limit the flow or energy to a set maximum value. Furthermore the limitation can be in relation to the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted flow / power. When the A266.1 is used in an ECL Comfort 310 the flow / energy signal can alternatively come as an M-bus signal.

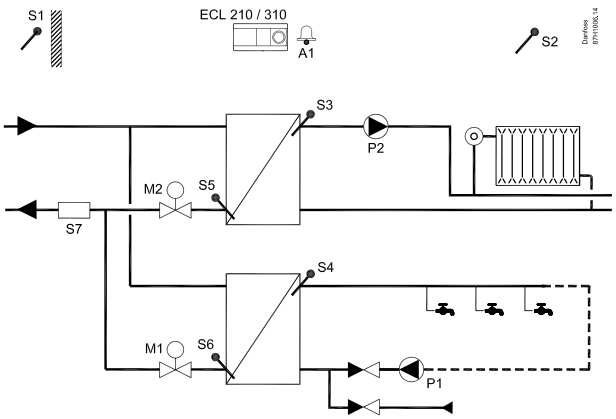
The frost protection mode maintains a selectable flow temperature, for example 10 °C.

DHW (circuit 2):
If the measured DHW temperature (S4) is lower than the desired DHW temperature, the motorized control valve (M1) is opened gradually and vice versa.

The return temperature (S6) can be limited to a fixed value.

By means of a week schedule, the DHW circuit can be in 'Comfort' or 'Saving' mode (two values for the desired DHW temperature).

Typical A266.1 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:

ECL 210 / 310	*Electronic controller ECL Comfort 210 or 310*
S1	*Outdoor temperature sensor*
S2	*(Optional) Room temperature sensor*
S3	*Flow temperature sensor, circuit 1*
S4	*DHW flow temperature sensor, circuit 2*
S5	*(Optional) Return temperature sensor, circuit 1*
S6	*(Optional) DHW return temperature sensor, circuit 2*
S7	*(Optional) Flow / energy meter (pulse signal)*
P1	*Circulation pump, DHW, circuit 2*
P2	*Circulation pump, heating, circuit 1*
M1	*Motorized control valve (3-point controlled), circuit 2 Alternative: Thermo actuator (Danfoss type ABV)*
M2	*Motorized control valve (3-point controlled), circuit 1 Alternative: Thermo actuator (Danfoss type ABV)*
A1	*Alarm*

An anti-bacteria function is available for activation on selected days of the week.

If the desired DHW temperature cannot be reached, the heating circuit can be closed gradually to allow more energy to the DHW circuit.

A266.1, in general:

Alarm A1 (= relay 4) can be activated if the actual flow temperature differs from the desired flow temperature.

The application **A266.2** is very flexible. These are the basic principles:

Heating (circuit 1):
Typically, the flow temperature is adjusted according to your requirements. The flow temperature sensor (S3) is the most important sensor. The desired flow temperature at S3 is calculated in the ECL controller, based on the outdoor temperature (S1) and the desired room temperature. The lower the outdoor temperature, the higher the desired flow temperature.

By means of a week schedule, the heating circuit can be in 'Comfort' or 'Saving' mode (two values for the desired room temperature). In Saving mode the heating can be reduced or switched off totally.

The motorized control valve (M2) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa.

The return temperature (S5) can be limited, for example not to be too high. If so, the desired flow temperature at S3 can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve. Furthermore, the return temperature limitation can be dependent on the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted return temperature.

In boiler-based heating supply the return temperature should not be too low (same adjustment procedure as above).

If the measured room temperature does not equal the desired room temperature, the desired flow temperature can be adjusted. The circulation pump, P2, is ON at heat demand or at frost protection.

The heating can be switched OFF when the outdoor temperature is higher than a selectable value.

A connected flow or energy meter based on pulses (S7) can limit the flow or energy to a set maximum value. Furthermore the limitation can be in relation to the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted flow / power. When the A266.2 is used in an ECL Comfort 310 the flow / energy signal can alternatively come as an M-bus signal.

The frost protection mode maintains a selectable flow temperature, for example 10 °C.

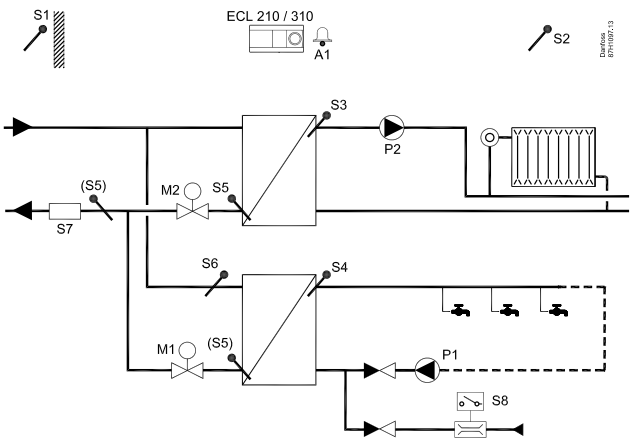
DHW (circuit 2):
The DHW temperature at S4 is maintained at 'Comfort' level at a DHW draw-off (DHW tapping) (the flow switch (S8) is activated). If the measured DHW temperature (S4) is lower than the desired DHW temperature, the motorized control valve (M1) is opened gradually and vice versa.

The DHW temperature control is in relation to actual supply temperature (S6). In order to compensate for the reaction time, the motorized control valve can be pre-activated at the start of a DHW draw-off (DHW tapping). An idle temperature can be maintained at either S6 or S4 when there is no draw-off (DHW tapping).

The return temperature (S5) can be limited to a fixed value.

By means of a week schedule, the DHW circuit can be in 'Comfort' or 'Saving' mode (two values for the desired DHW temperature).

Typical A266.2 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:

ECL 210 / 310	*Electronic controller ECL Comfort 210 or 310*
S1	*Outdoor temperature sensor*
S2	*(Optional) Room temperature sensor*
S3	*Flow temperature sensor, circuit 1*
S4	*DHW flow temperature sensor, circuit 2*
S5	*(Optional) Return temperature sensor, circuit 1, circuit 2 or both circuits*
S6	*(Optional) Supply temperature sensor, circuit 2*
S7	*(Optional) Flow / energy meter (pulse signal)*
S8	*Flow switch, DHW draw-off, circuit 2*
P1	*Circulation pump, DHW, circuit 2*
P2	*Circulation pump, heating, circuit 1*
M1	*Motorized control valve (3-point controlled), circuit 2 Alternative: Thermo actuator (Danfoss type ABV*
M2	*Motorized control valve (3-point controlled), circuit 1 Alternative: Thermo actuator (Danfoss type ABV*
A1	*Alarm*

An anti-bacteria function is available for activation on selected days of the week.

If the desired DHW temperature cannot be reached, the heating circuit can be closed gradually to allow more energy to the DHW circuit.

A266.2, in general:

Alarm A1 (= relay 4) can be activated:

- if the actual flow temperature differs from the desired flow temperature
- if the temperature at S3 exceeds an alarm value

The application **A266.9** is very flexible. These are the basic principles:

Heating (circuit 1):
Typically, the flow temperature is adjusted according to your requirements. The flow temperature sensor (S3) is the most important sensor. The desired flow temperature at S3 is calculated in the ECL controller, based on the outdoor temperature (S1) and the desired room temperature. The lower the outdoor temperature, the higher the desired flow temperature.

By means of a week schedule, the heating circuit can be in 'Comfort' or 'Saving' mode (two values for the desired room temperature). In Saving mode the heating can be reduced or switched off totally.

The motorized control valve (M2) is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa.

The return temperature (S5) can be limited, for example not to be too high. If so, the desired flow temperature at S3 can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve. Furthermore, the return temperature limitation can be dependent on the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted return temperature.

In boiler-based heating supply the return temperature should not be too low (same adjustment procedure as above).

The circulation pump, P2, is ON at heat demand or at frost protection.

The heating can be switched OFF when the outdoor temperature is higher than a selectable value.

The secondary return temperature (S2) is used for monitoring. The pressure measuring (S7) is used to activate an alarm if the actual pressure is higher or lower than the chosen settings.

When the A266.9 is used in an ECL Comfort 310, a connected flow or energy meter based on M-bus signal can limit the flow or energy to a set maximum value. Furthermore the limitation can be in relation to the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted flow / power.

The frost protection mode maintains a selectable flow temperature, for example 10 °C.

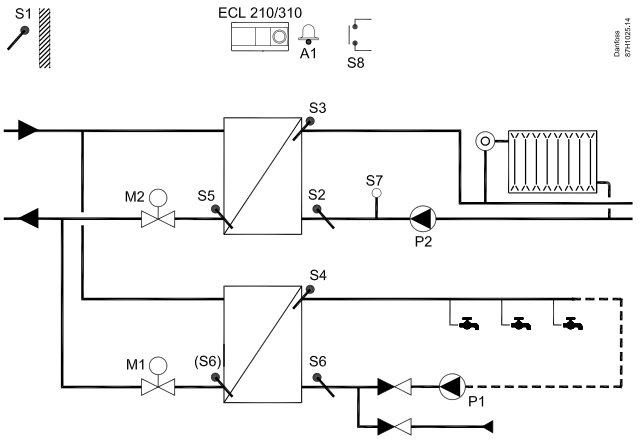
DHW (circuit 2):
If the measured DHW temperature (S4) is lower than the desired DHW temperature, the motorized control valve (M1) is opened gradually and vice versa. If the desired DHW temperature cannot be reached, the heating circuit can be closed gradually to allow more energy to the DHW circuit.

The return temperature S6 can measure, for monitoring purpose, the return temperature on the secondary side. An alternative position for S6 can be in the return on the primary side in order to limit the return temperature to a fixed value.

By means of a week schedule, the DHW circuit can be in 'Comfort' or 'Saving' mode (two values for the desired DHW temperature).

An anti-bacteria function is available for activation on selected days of the week.

Typical A266.9 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:

ECL 210 / 310	*Electronic controller ECL Comfort 210 or 310*
S1	*Outdoor temperature sensor*
S2	*(Optional) Return temperature sensor, circuit 1, for monitoring*
S3	*Flow temperature sensor, circuit 1*
S4	*DHW flow temperature sensor, circuit 2*
S5	*(Optional) Return temperature sensor, circuit 1*
S6	*(Optional) Return temperature sensor, secondary side, circuit 2. Alternative position: Return, primary side*
S7	*(Optional) Pressure transmitter, circuit 1*
S8	*(Optional) Alarm input*
P1	*Circulation pump, DHW, circuit 2*
P2	*Circulation pump, heating, circuit 1*
M1	*Motorized control valve, circuit 2*
M2	*Motorized control valve, circuit 1*
A1	*Alarm*

A266.9, in general:

Alarm A1 (= relay 4) can be activated:

- if the temperature at S3 exceeds an alarm value
- if the pressure at S7 is not inside an acceptable pressure range

A266, in general:

Up to two Remote Control Units, ECA 30 / 31 can be connected to one ECL controller in order to control the ECL controller remotely.

Exercise of circulation pumps and control valve in periods without heating demand can be arranged.

Additional ECL Comfort controllers can be connected via the ECL 485 bus in order to utilize common outdoor temperature signal, time and date signals. The ECL controllers in the ECL 485 system can work in master - slave system.

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

Modbus communication to a SCADA system can be established.

The M-bus data (ECL Comfort 310) can furthermore be transferred to the Modbus communication.

Alarm A1 (= relay 4) can be activated:

- if a temperature sensor or its connection disconnects / short circuits. (See: Common controller settings > System > Raw input overview).

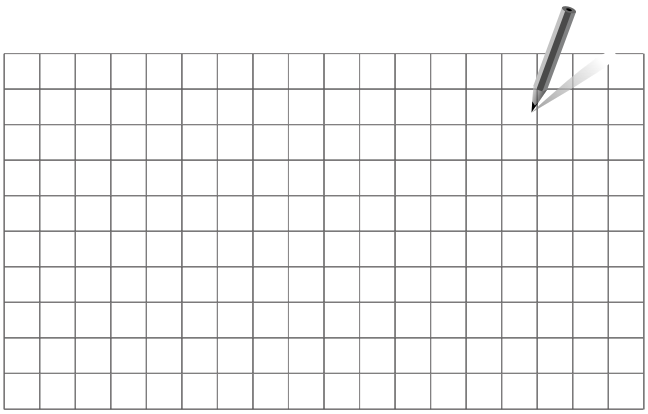
The controller is pre-programmed with factory settings that are shown in the relevant chapters of this guide.

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.

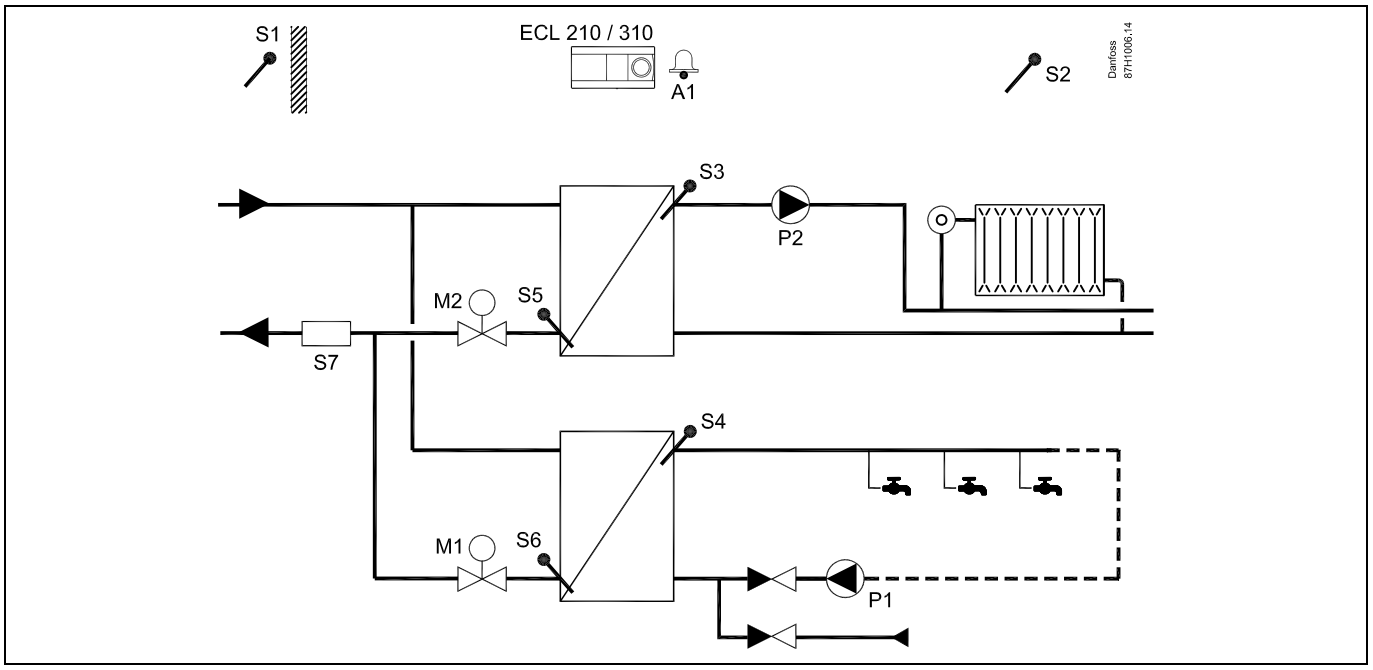
The ECL Comfort controller is a universal controller that can be used for various systems. Based on the shown standard systems, it is possible to configure additional systems. In this chapter you find the most frequently used systems. If your system is not quite as shown below, find the diagram which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

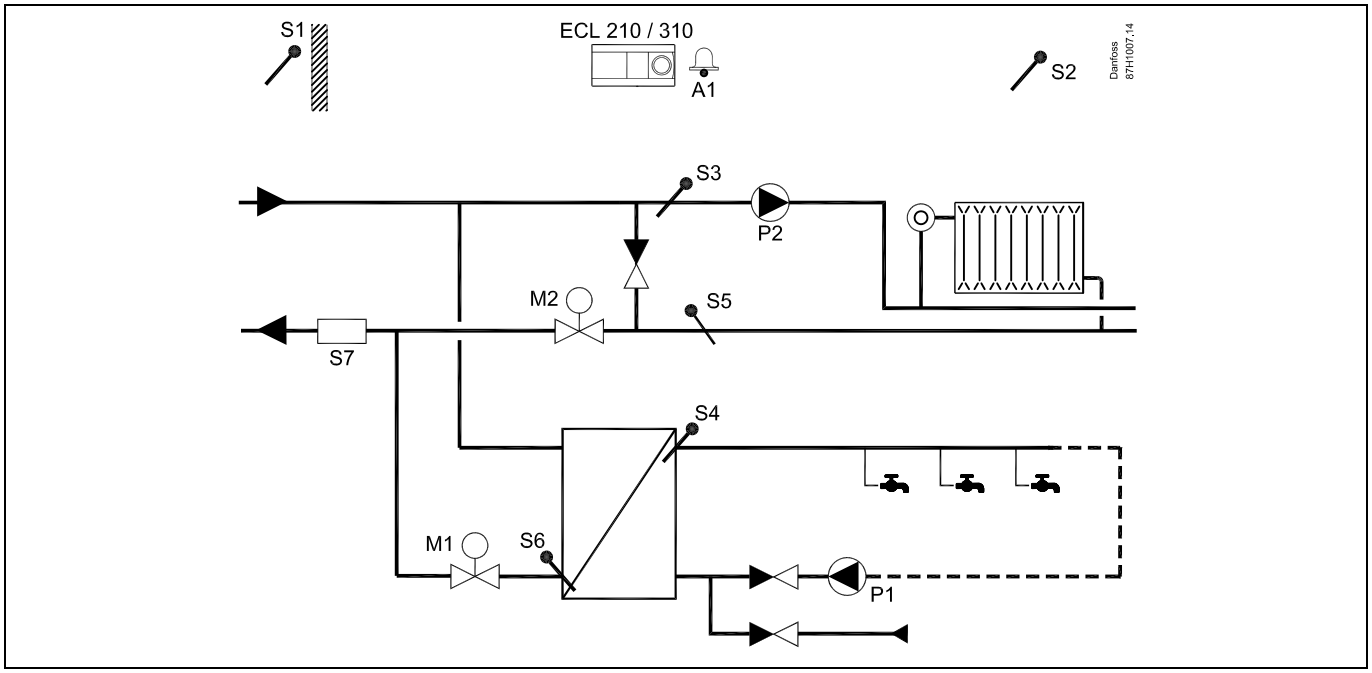
A266.1, ex. a:

Indirectly connected heating and DHW system (typically district heating):



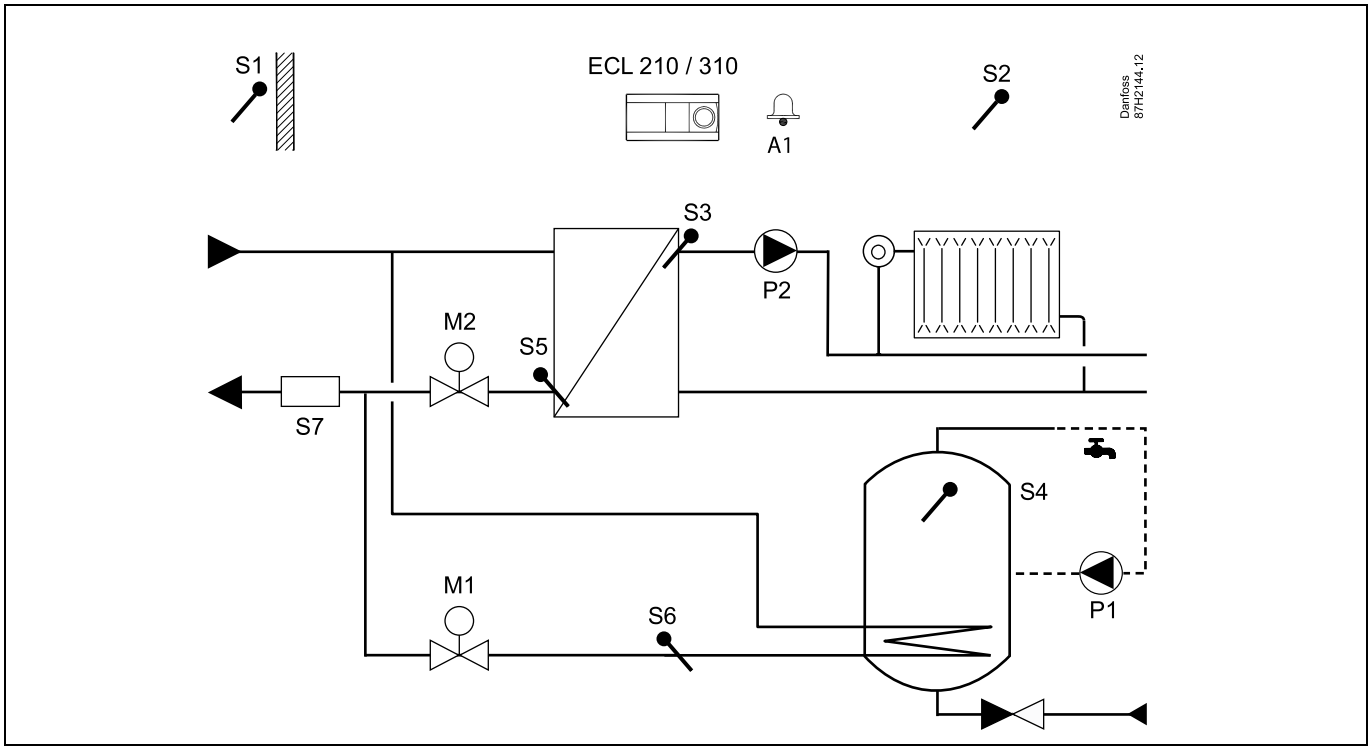
A266.1, ex. b:

Directly connected heating and indirectly connected DHW system:



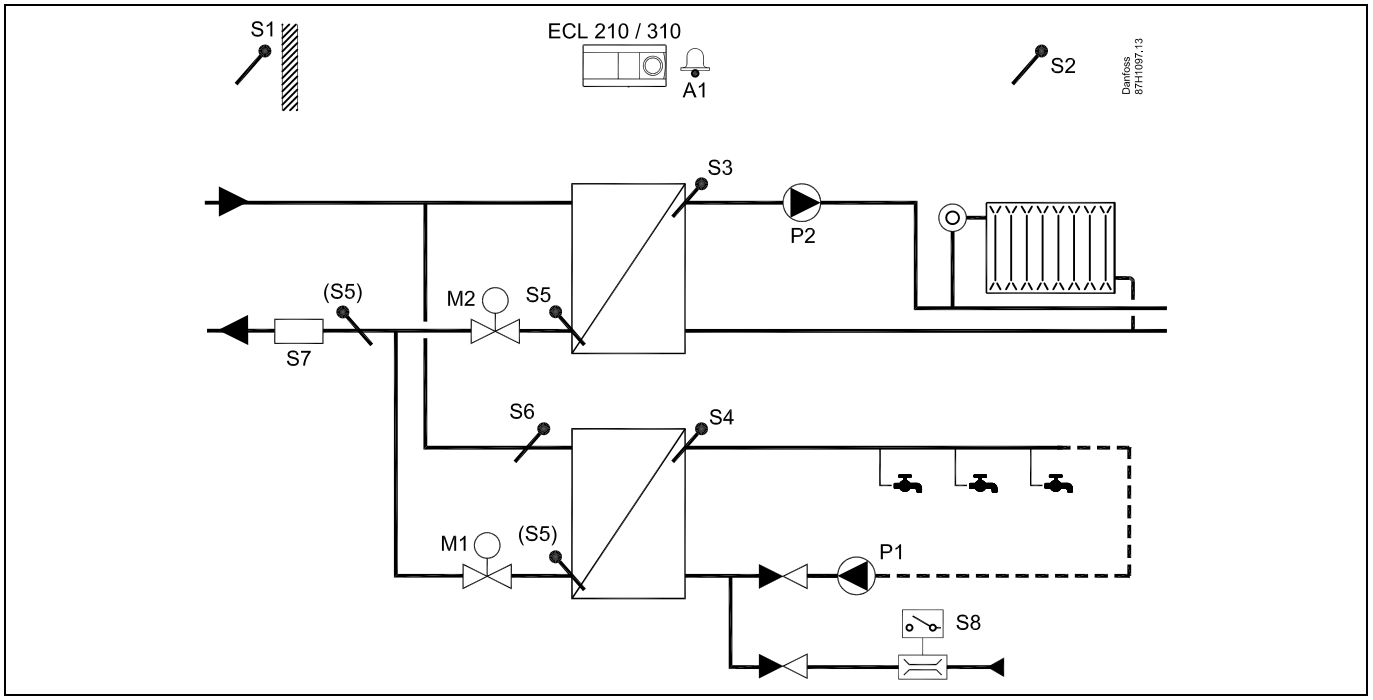
A266.1, ex. c:

Indirectly connected heating system and directly connected DHW tank heating:



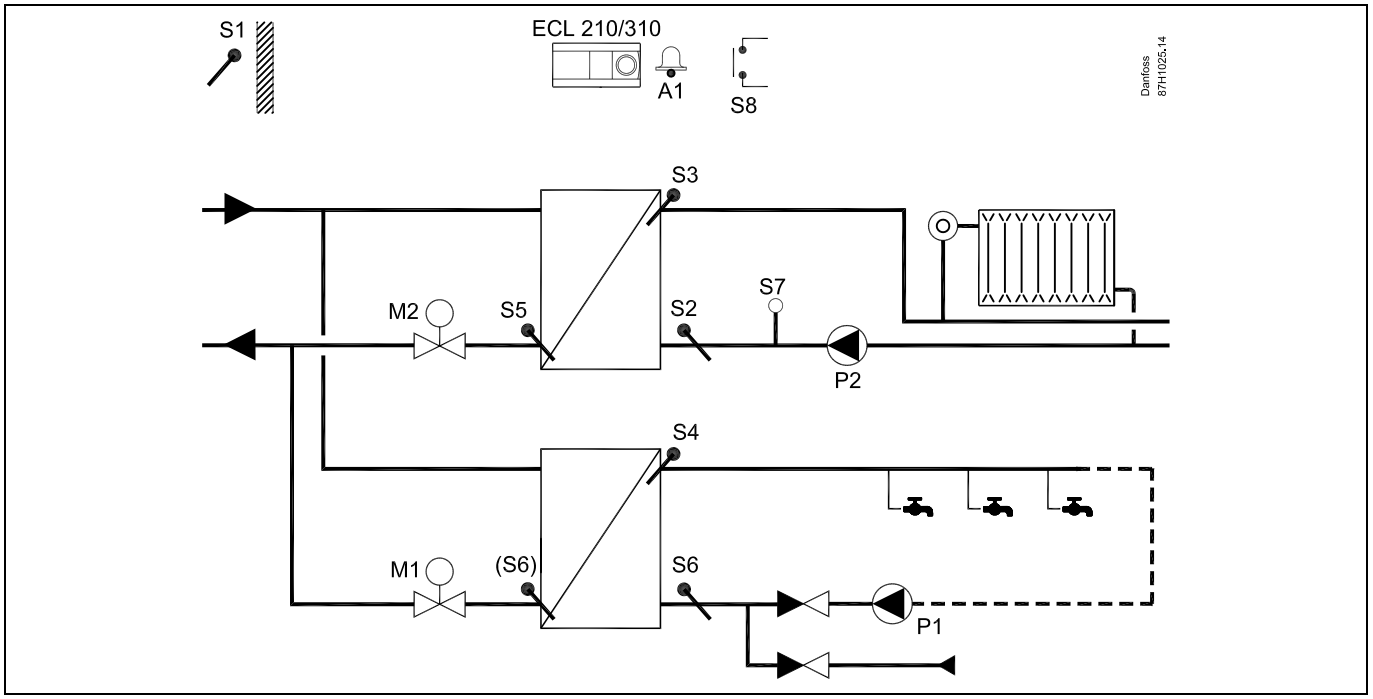
A266.2, ex. a:

Indirectly connected heating and DHW system with flow switch:



A266.9, ex. a:

Indirectly connected heating and DHW system with pressure transmitter and universal alarm switch:



2.3 Mounting

2.3.1 Mounting the ECL Comfort controller

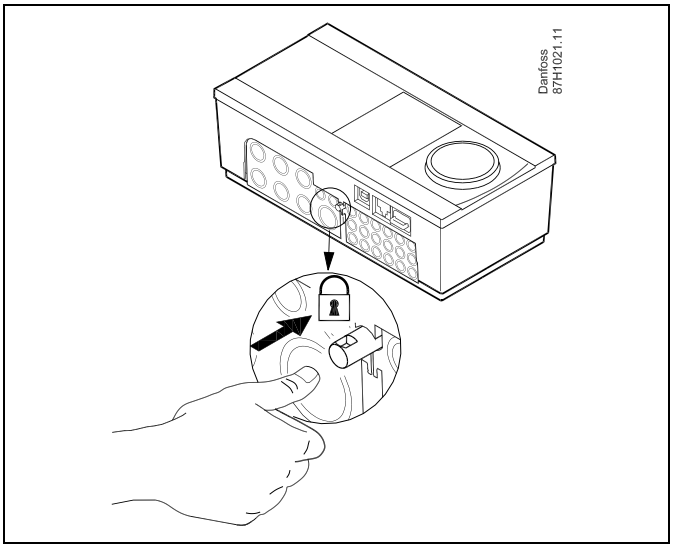
For easy access, you should mount the ECL Comfort controller near the system. Select one of the following methods using the same base part (code no. 087H3220):

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

ECL Comfort 210 can be mounted in an ECL Comfort 310 base part (for future upgrade).

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!

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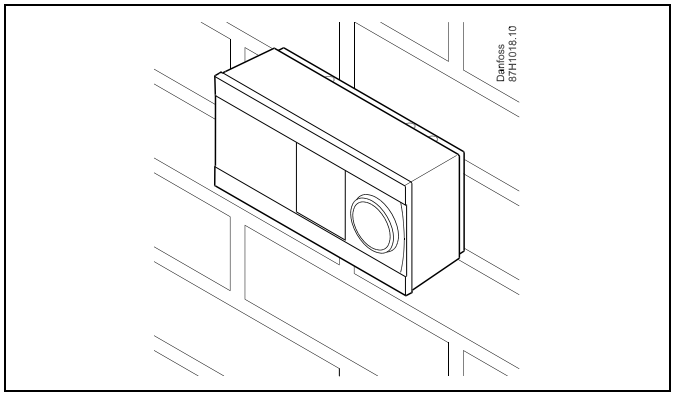
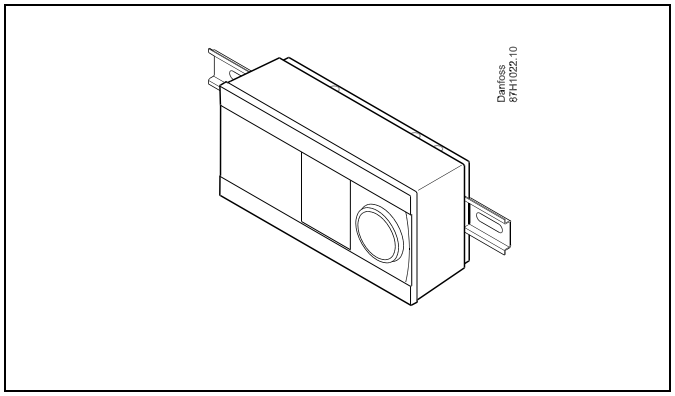
The easy way to lock the controller to its base or unlock it is to use a screw driver as lever.

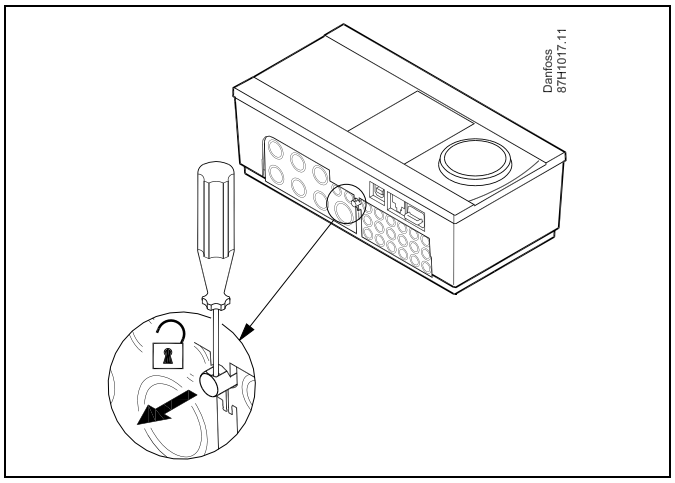
Mounting on a wall
Mount the base part on a wall with a smooth surface. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



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.

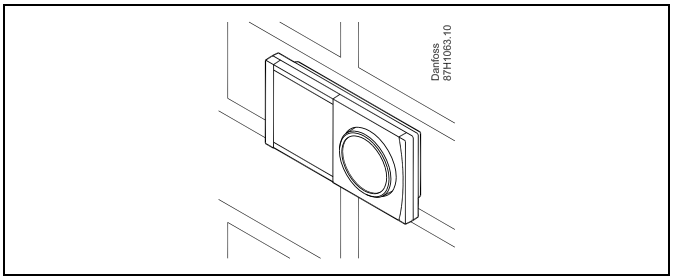
2.3.2 Mounting the Remote Control Units ECA 30 / 31

Select one of the following methods:

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

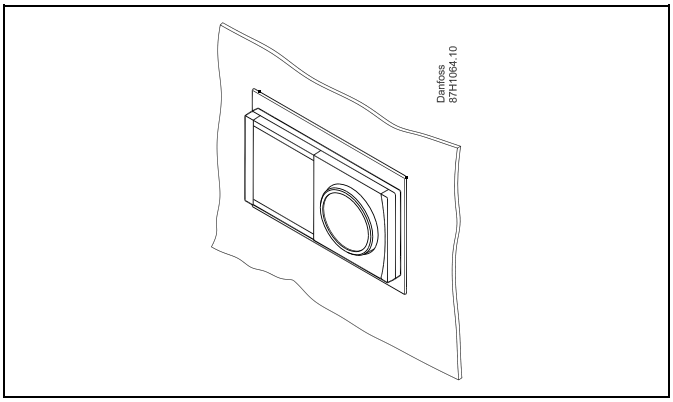
Screws and rawlplugs are not supplied.

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.

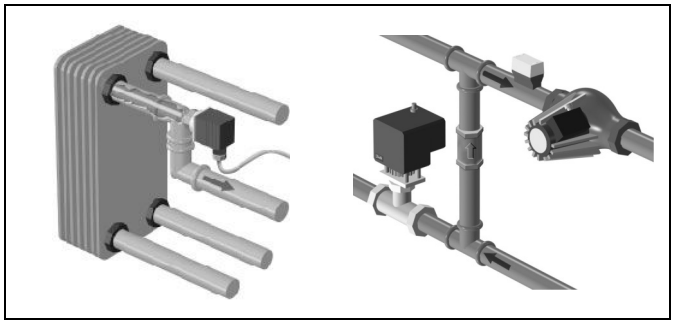
The temperature sensor mentioned below are sensors used for the ECL Comfort 210 and 310 series which not all will be needed for your application!

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.

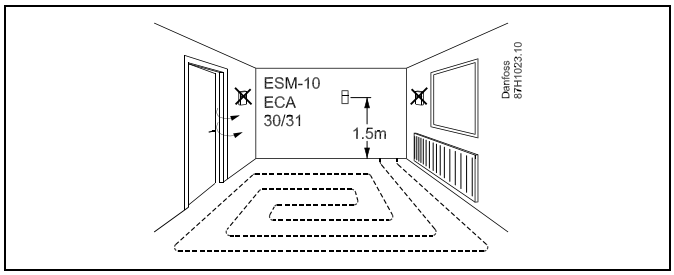
Make sure that the surface of the pipe is clean and even where the sensor is mounted.

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.

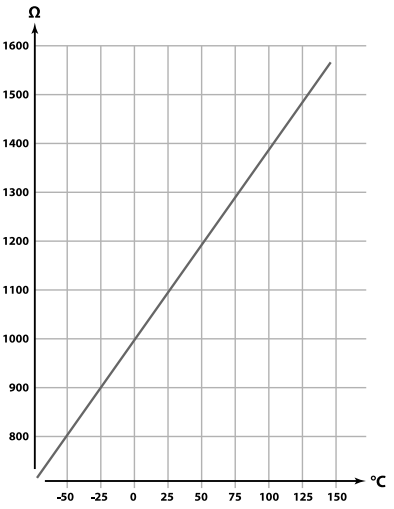
ESM-11, ESMC and ESMB-12: Use heat conducting paste for quick measurement of the temperature.

ESMU and ESMB-12: Using a sensor pocket to protect the sensor will, however, result in a slower temperature measurement.

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

⚠

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

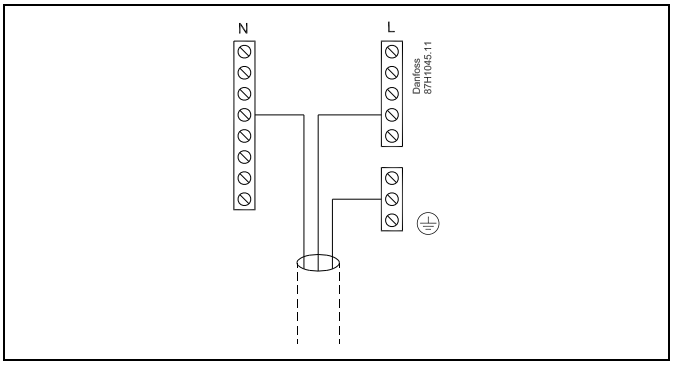
Local legislations must be respected. This comprises also cable size and isolation (reinforced type).

A fuse for the ECL Comfort installation is max. 10 A typically.

The ambient temperature range for the ECL Comfort in operation is 0 - 55 °C. Exceeding this temperature range can result in malfunctions.

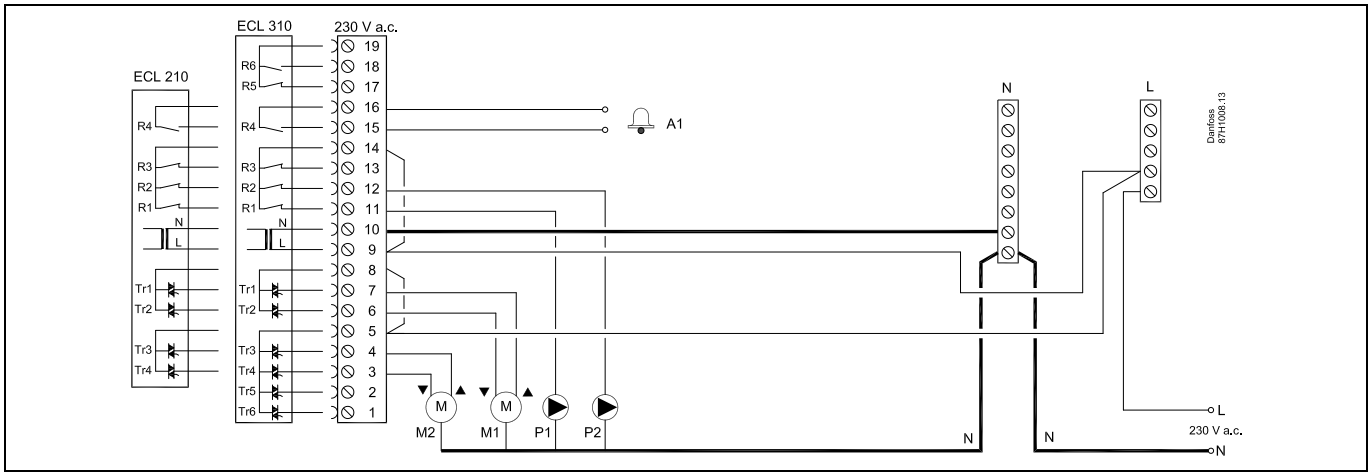
Installation must be avoided if there is a risk for condensation (dew).

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.

Application A266.1 / A266.2 / A266.9



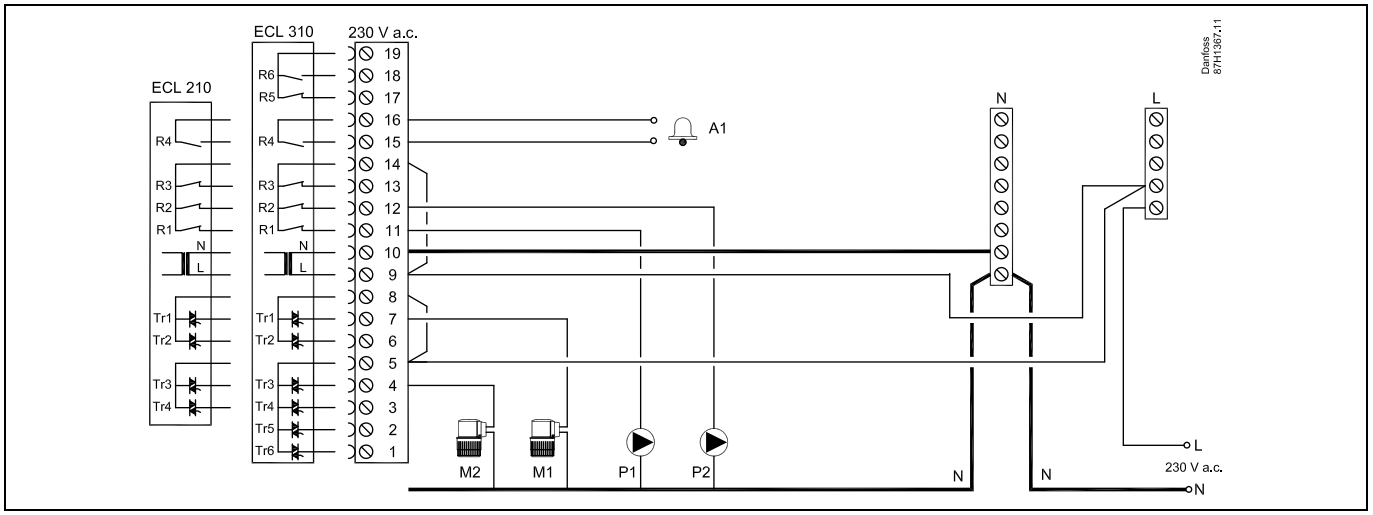
Terminal		Description	Max. load
19		Not used, not to be connected	
18		Not used, not to be connected	4 (2) A / 230 V a.c.*
17		Not used, not to be connected	4 (2) A / 230 V a.c.*
16		Phase for alarm	
15	A1	Alarm	4 (2) A / 230 V a.c.*
14		Phase for circulation pump	
13		Not used, not to be connected	
12	P2	Circulation pump ON / OFF, circuit 1	4 (2) A / 230 V a.c.*
11	P1	Circulation pump ON / OFF, circuit 2	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		Phase for motorized control valve output, circuit 2	
7	M1	Actuator - opening	0.2 A / 230 V a.c.
6	M1	Actuator - closing	0.2 A / 230 V a.c.
5		Phase for motorized control valve output, circuit 1	
4	M2	Actuator - opening	0.2 A / 230 V a.c.
3	M2	Actuator - closing	0.2 A / 230 V a.c.
2		Not used, not to be connected	
1		Not used, not to be connected	
* 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, 230 V a.c., power supply, pumps, control valves with thermo actuator (Danfoss type ABV)

Application A266.1 / A266.2 / A266.9



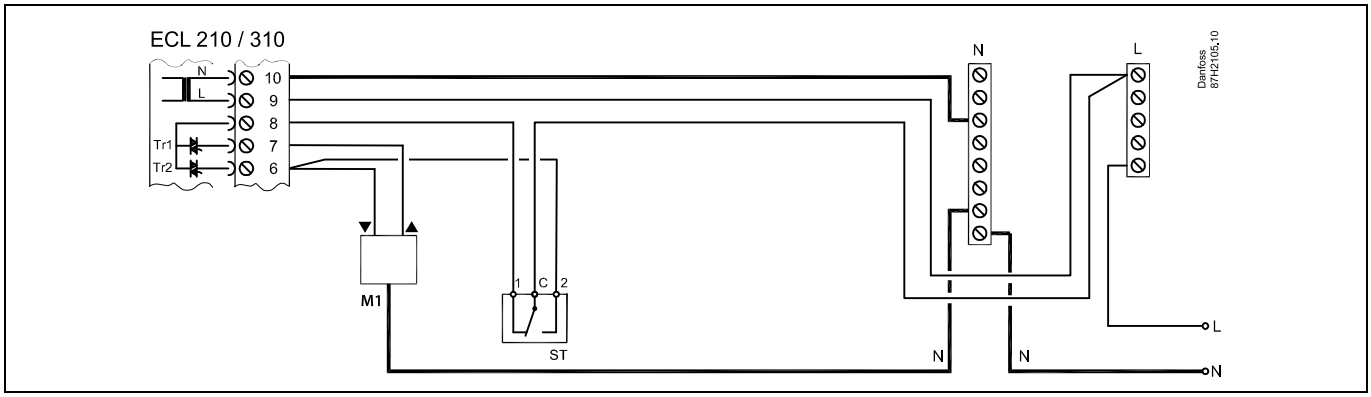
Terminal		Description	Max. load
19		Not used, not to be connected	
18		Not used, not to be connected	4 (2) A / 230 V a.c.*
17		Not used, not to be connected	4 (2) A / 230 V a.c.*
16		Phase for alarm	
15	A1	Alarm	4 (2) A / 230 V a.c.*
14		Phase for circulation pump	
13		Not used, not to be connected	4 (2) A / 230 V a.c.*
12	P2	Circulation pump	4 (2) A / 230 V a.c.*
11	P1	Circulation pump	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		Phase for thermo actuator (Danfoss type ABV), control valve M1	
7	M1	Thermo actuator, DHW circuit (circuit 2)	0.2 A / 230 V a.c.
6		Not used, not to be connected	
5		Phase for thermo actuator (Danfoss type ABV), control valve M2	
4	M2	Thermo actuator, heating circuit (circuit 1)	0.2 A / 230 V a.c.
3		Not used, not to be connected	
2		Not used, not to be connected	
1		Not used, not to be connected	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

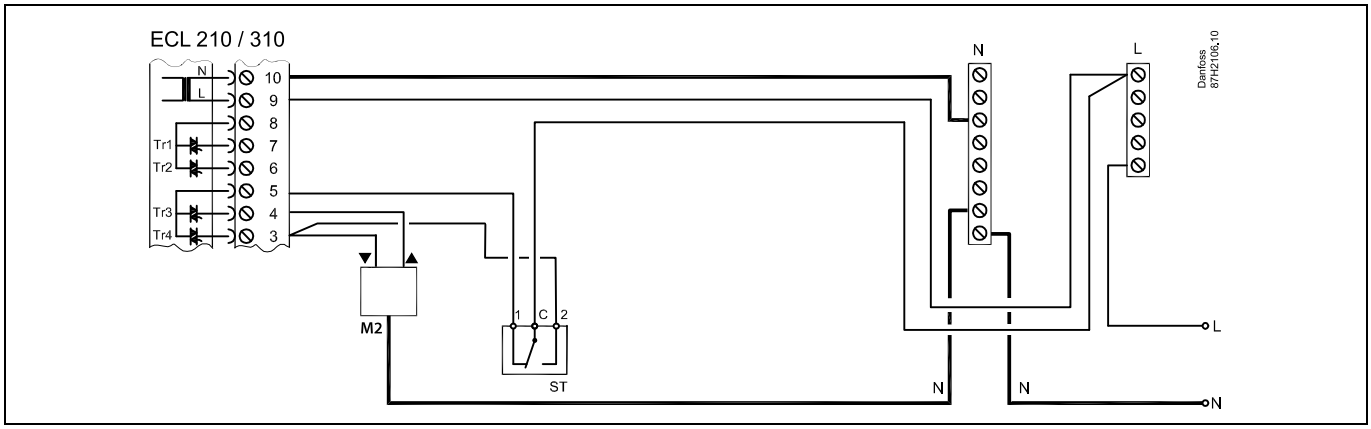
Factory established jumpers:
5 to 8, 9 to 14 , L to 5 and L to 9, N to 10

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.

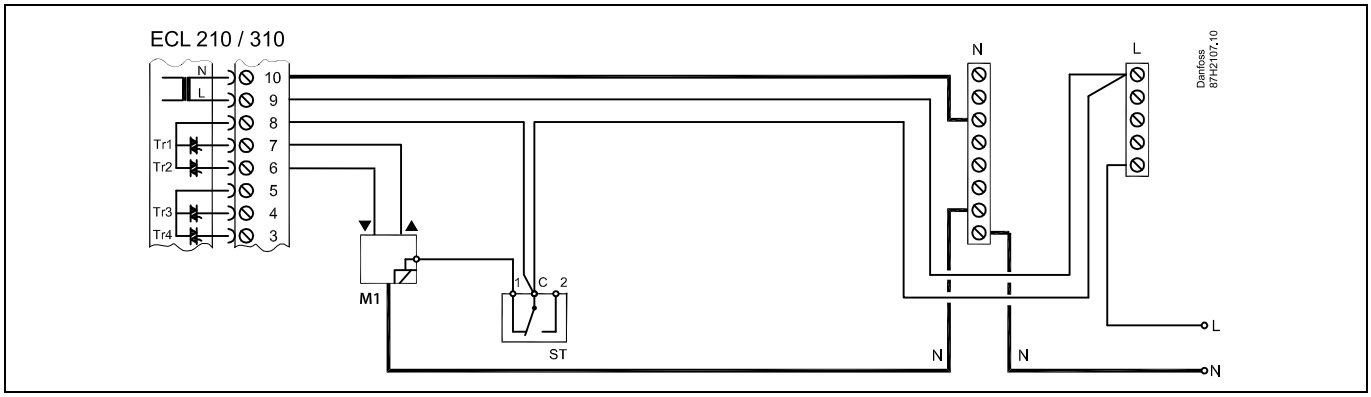
2.5.4 Electrical connections, safety thermostats, 230 V a.c. or 24 V a.c.

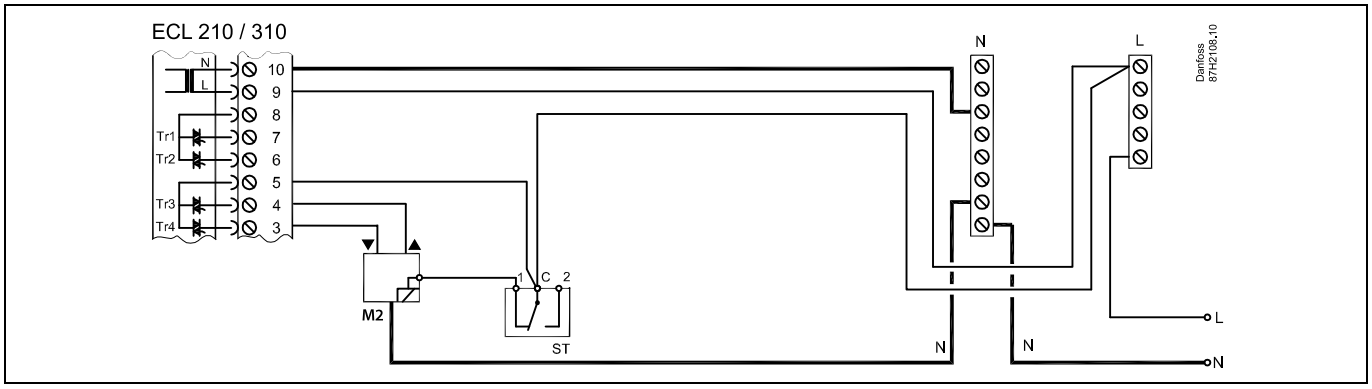
With safety thermostat, 1–step closing:
Motorized control valve without safety function



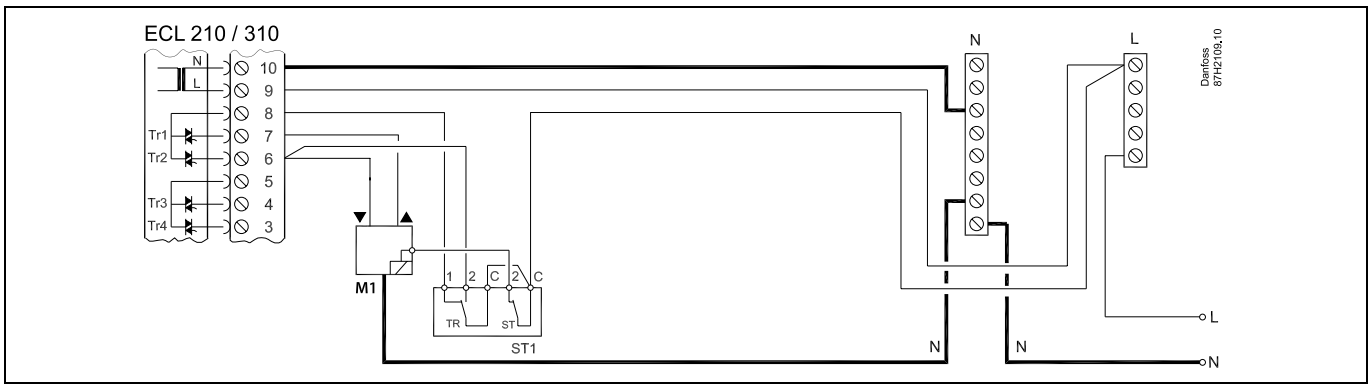


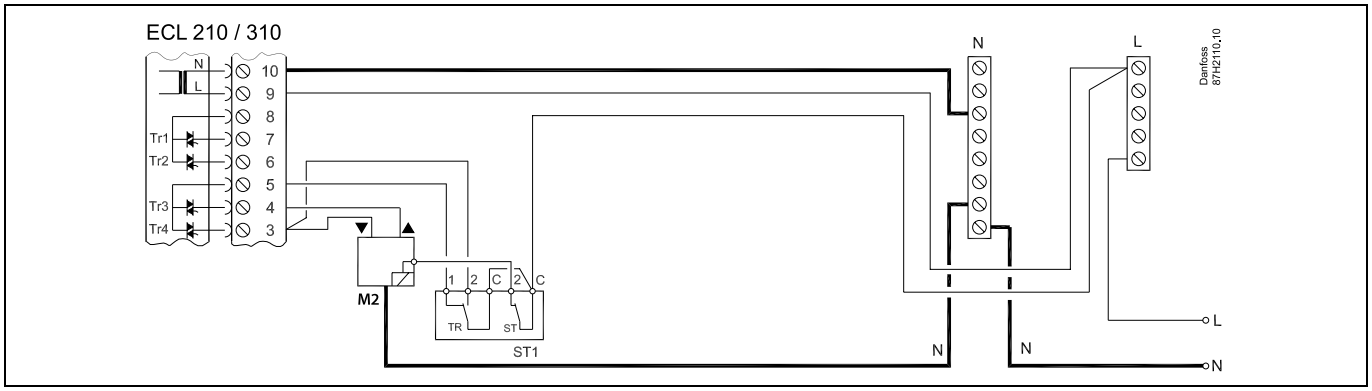
With safety thermostat, 1–step closing:
Motorized control valve with safety function





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





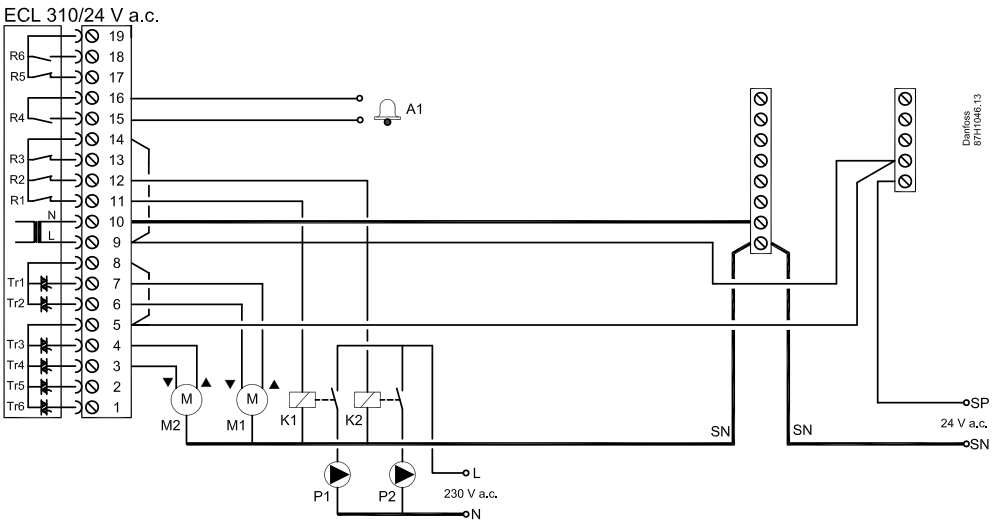
When ST is activated by a high temperature, the safety circuit in the motorized control valve closes the valve immediately.

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 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

2.5.5 Electrical connections, 24 V a.c. (ECL 310 only), power supply, pumps, motorized valves etc.

Application A266.1 / A266.2 / A266.9



Terminal		Description	Max. load
19		Not used, not to be connected	
18		Not used, not to be connected	4 (2) A / 24 V a.c.*
17		Not used, not to be connected	4 (2) A / 24 V a.c.*
16		Phase for alarm	
15	A1	Alarm	4 (2) A / 24 V a.c.*
14		Phase for circulation pump	
13		Not used, not to be connected	
12	K2	Relay for 230 V a.c. circulation pump, circuit 1	4 (2) A / 24 V a.c.*
11	K1	Relay for 230 V a.c. circulation pump, circuit 2	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. (SN)	
9		Supply voltage 24 V a.c. (SP)	
8		Phase for motorized control valve output, circuit 2	
7	M1	Actuator - opening	1 A / 24 V a.c.
6	M1	Actuator - closing	1 A / 24 V a.c.
5		Phase for motorized control valve output, circuit 1	
4	M2	Actuator - opening	1 A / 24 V a.c.
3	M2	Actuator - closing	1 A / 24 V a.c.
2		Not used, not to be connected	
1		Not used, not to be connected	
*		Relay contacts: 4 A for ohmic load, 2 A for inductive load Auxilliary relays K1 and K2 have a 24 V a.c. coil voltage	

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

⚠

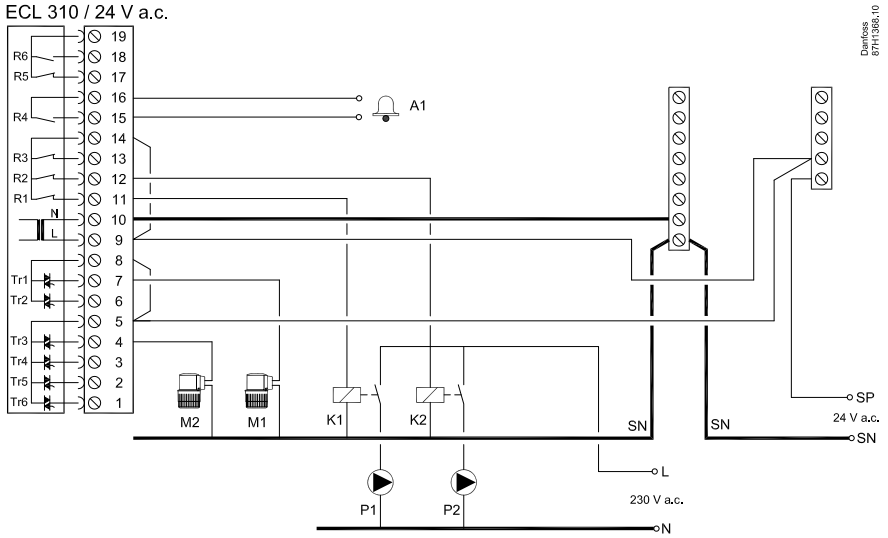
Do not connect 230 V a.c. powered components to a 24 V a.c. power supplied controller directly. Use auxilliary relays (K) to separate 230 V a.c. from 24 V a.c.

☝

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.

2.5.6 Electrical connections, 24 V a.c. (ECL 310 only), power supply, pumps, control valves with thermo actuator (Danfoss type ABV)

Application A266.1 / A266.2 / A266.9



Terminal		Description	Max. load
19		Not used, not to be connected	
18		Not used, not to be connected	4 (2) A / 24 V a.c.*
17		Not used, not to be connected	4 (2) A / 24 V a.c.*
16		Phase for alarm	
15	A1	Alarm	4 (2) A / 24 V a.c.*
14		Phase for circulation pumps	
13		Not used, not to be connected	4 (2) A / 24 V a.c.*
12	P2	Circulation pump	4 (2) A / 24 V a.c.*
11	P1	Circulation pump	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. (SN)	
9		Supply voltage 24 V a.c. (SP)	
8		Phase for thermo actuator (Danfoss type ABV), control valve M1	
7	M1	Thermo actuator, DHW circuit (circuit 2)	0.2 A / 24 V a.c.
6		Not used, not to be connected	
5		Phase for thermo actuator (Danfoss type ABV), control valve M2	
4	M2	Thermo actuator, heating circuit (circuit 1)	0.2 A / 24 V a.c.
3		Not used, not to be connected	
2		Not used, not to be connected	
1		Not used, not to be connected	
*		Relay contacts: 4 A for ohmic load, 2 A for inductive load Auxilliary relays K1 and K2 have a 24 V a.c. coil voltage	

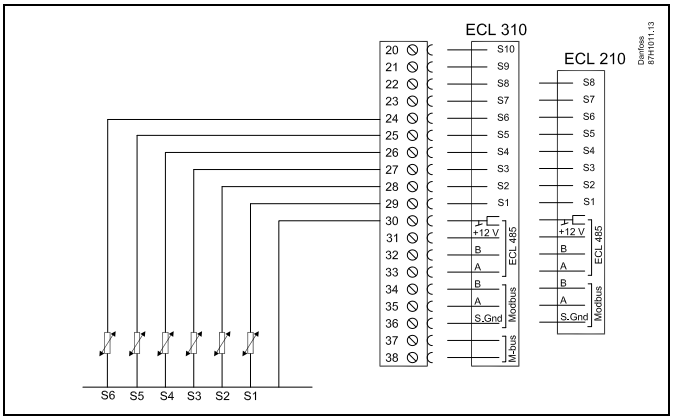
Factory established jumpers:
5 to 8, 9 to 14 , L to 5 and L to 9, N to 10

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.

2.5.7 Electrical connections, Pt 1000 temperature sensors and signals

A266.1:

Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor*	ESMT
28 and 30	S2	Room temperature sensor**	ESM-10
27 and 30	S3	Flow temperature sensor***, circuit 1, heating	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	Flow temperature sensor***, circuit 2, DHW	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor, circuit 1, heating	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	Return temperature sensor, circuit 2, DHW	ESM-11 / ESMB / ESMC / ESMU
23 and 30	S7	Flow / heat meter, (pulse signal)	
22 and 30		Not used	



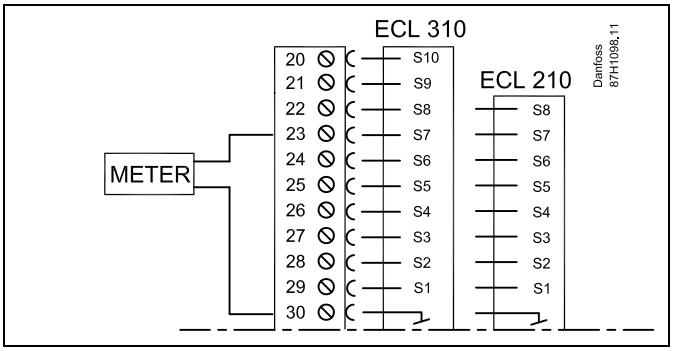
* If the outdoor temperature sensor is not connected or the cable is short-circuited, the controller assumes that the outdoor temperature is 0 (zero) °C.

** Only for room temperature sensor connection. The room temperature signal can also be available from a Remote Control Unit (ECA 30 / 31). See 'Electrical connections, ECA 30 / 31'.

*** The flow temperature sensor must always be connected in order to have the desired functionality. If the sensor is not connected or the cable is short-circuited, the motorized control valve closes (safety function).

Factory established jumper:
30 to common terminal.

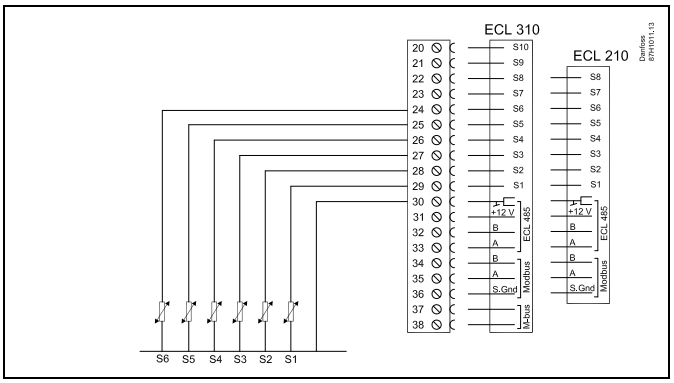
Connection of flow / heat meter with pulse signal



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).

A266.2:

Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor*	ESMT
28 and 30	S2	Room temperature sensor**	ESM-10
27 and 30	S3	Flow temperature sensor***, circuit 1, heating	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	Flow temperature sensor***, circuit 2, DHW	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor, circuit 1, heating or	ESM-11 / ESMB / ESMC / ESMU
	(S5)	Return temperature sensor, circuit 2, DHW or	ESM-11 / ESMB / ESMC / ESMU
	(S5)	Common return temperature sensor	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	Supply temperature sensor	ESM-11 / ESMB / ESMC / ESMU
23 and 30	S7	Flow / heat meter, (pulse signal)	
22 and 30	S8	Flow switch	



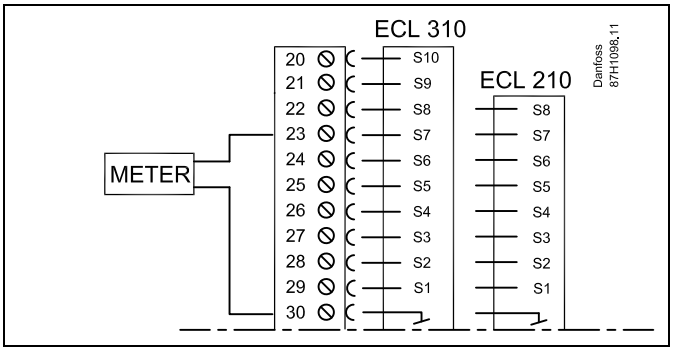
* If the outdoor temperature sensor is not connected or the cable is short-circuited, the controller assumes that the outdoor temperature is 0 (zero) °C.

** Only for room temperature sensor connection. The room temperature signal can also be available from a Remote Control Unit (ECA 30 / 31). See 'Electrical connections, ECA 30 / 31'.

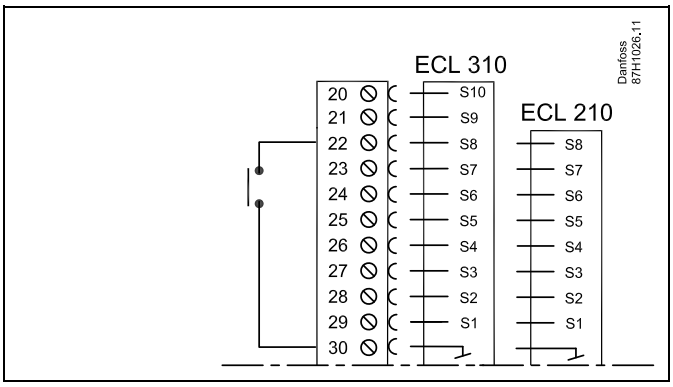
*** The flow temperature sensor must always be connected in order to have the desired functionality. If the sensor is not connected or the cable is short-circuited, the motorized control valve closes (safety function).

Factory established jumper:
30 to common terminal.

Connection of flow / heat meter with pulse signal



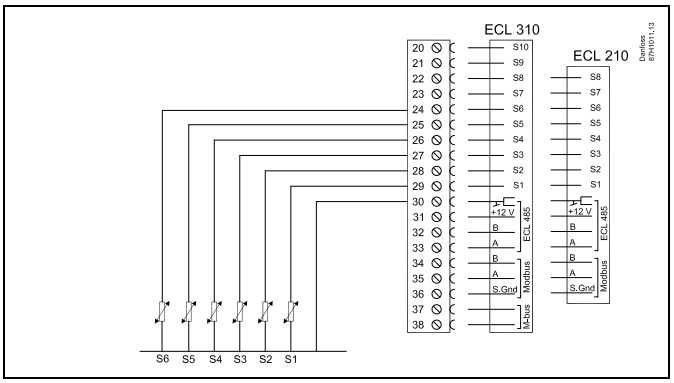
Connection of flow switch



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).

A266.9:

Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor*	ESMT
28 and 30	S2	Return temperature sensor, circuit 1, heating (secondary side)	ESM-11 / ESMB / ESMC / ESMU
27 and 30	S3	Flow temperature sensor**, circuit 1, heating	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	Flow temperature sensor**, circuit 2, DHW	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor, circuit 1, heating	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	Return temperature sensor, circuit 2, DHW	ESM-11 / ESMB / ESMC / ESMU
23 and 30	S7	Pressure transmitter 0-10 V or 4-20 mA	
22 and 30	S8	Alarm switch	

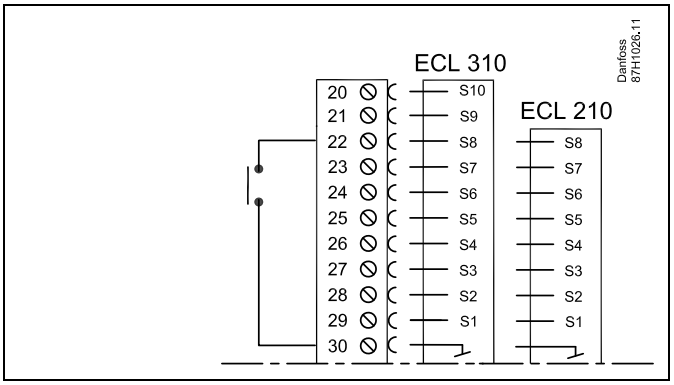


* If the outdoor temperature sensor is not connected or the cable is short-circuited, the controller assumes that the outdoor temperature is 0 (zero) °C.

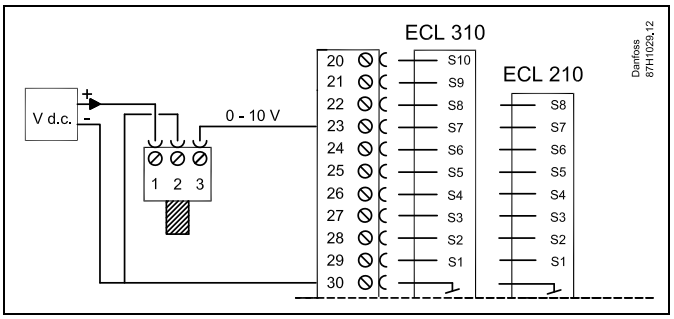
** The flow temperature sensor must always be connected in order to have the desired functionality. If the sensor is not connected or the cable is short-circuited, the motorized control valve closes (safety function).

Factory established jumper:
30 to common terminal.

Connection of alarm switch

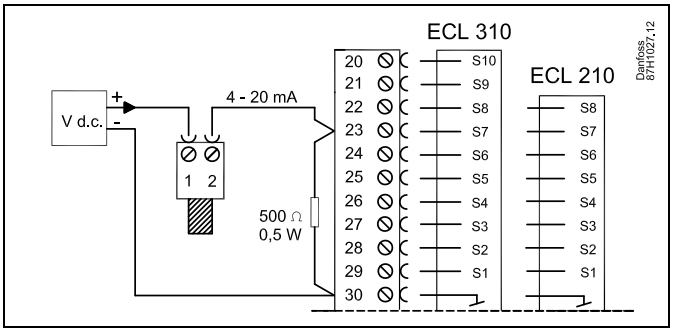


Connection of a pressure transmitter with 0-10 V output
V d.c.: The pressure transmitter is powered with 12 - 24 V d.c.



Connection of a pressure transmitter with 4-20 mA output
V d.c.: The pressure transmitter is powered with 12 - 24 V d.c.

The 4-20 mA signal is converted to a 2-10 V signal by means of the 500 ohm (0,5 W) resistor.



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).

2.5.8 Electrical connections, ECA 30 / 31

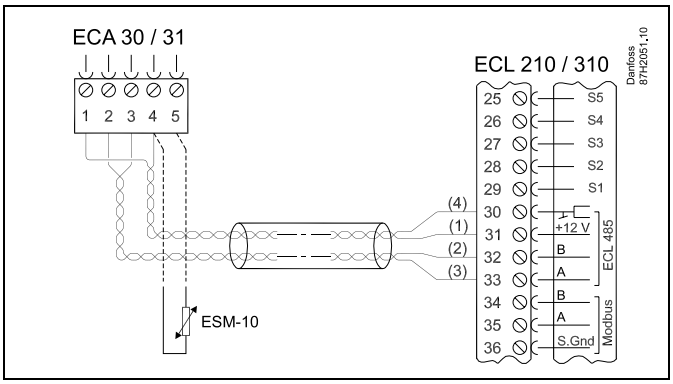
Terminal ECL	Terminal ECA 30 / 31	Description	Type (recomm.)
30	4	Twisted pair	Cable 2 x twisted pair
31	1		
32	2	Twisted pair	
33	3		
	4	Ext. room temperature sensor*	ESM-10
	5		

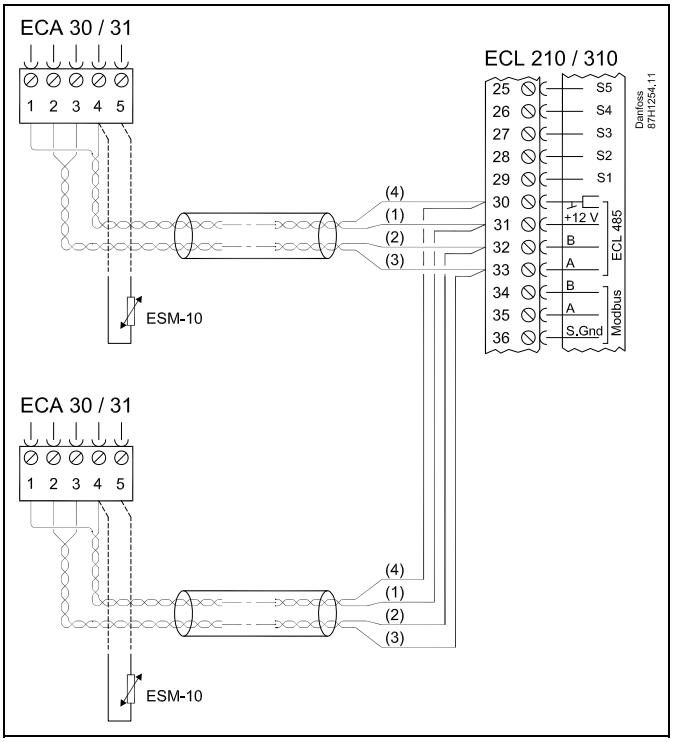
* After an external room temperature sensor has been connected, ECA 30 / 31 must be repowered.

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.





If the actual application contains two heating circuits, it is possible to connect an ECA 30 / 31 to each circuit. The electrical connections are done in parallel.

Max. 2 ECA 30 / 31 can be connected to an ECL Comfort 310 controller or to ECL Comfort 310 controllers in a master-slave system.

Setup procedures for ECA 30 / 31: See section 'Miscellaneous'.

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.

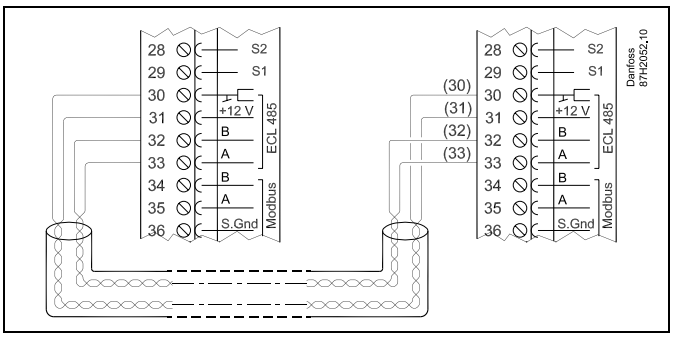
Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus).
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.9 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	B, ECL 485 communication bus	
33	A, ECL 485 communication bus	
* Only for ECA 30 / 31 and master / slave communication		

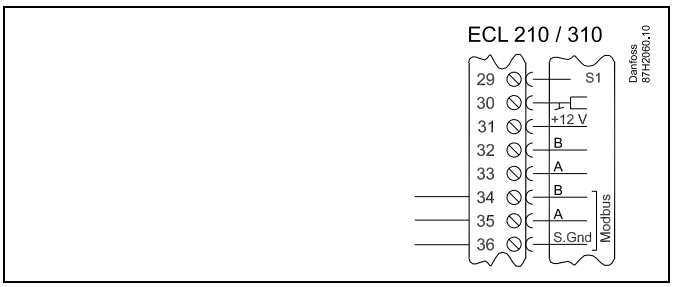


Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus).
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.10 Electrical connections, communication

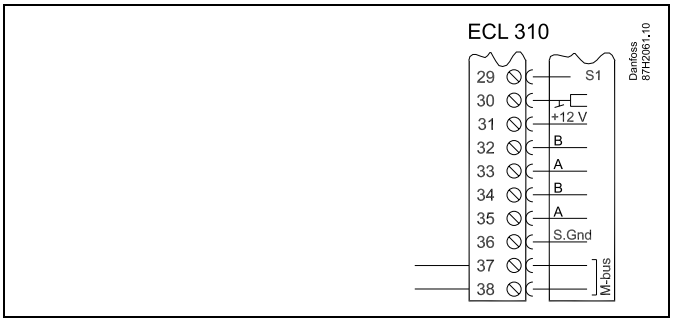
Electrical connections, Modbus

ECL Comfort 210: Non-galvanic isolated Modbus connections
ECL Comfort 310: Galvanic isolated Modbus connections



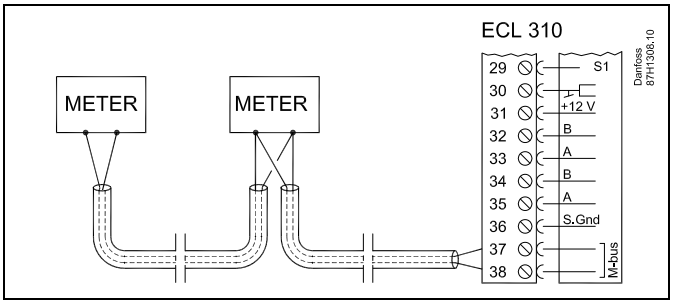
Electrical connections, M-bus

(ECL Comfort 310 and 310 B only)



Example, M-bus connections

(ECL Comfort 310 and 310 B only)



2.6 Inserting the ECL Application Key

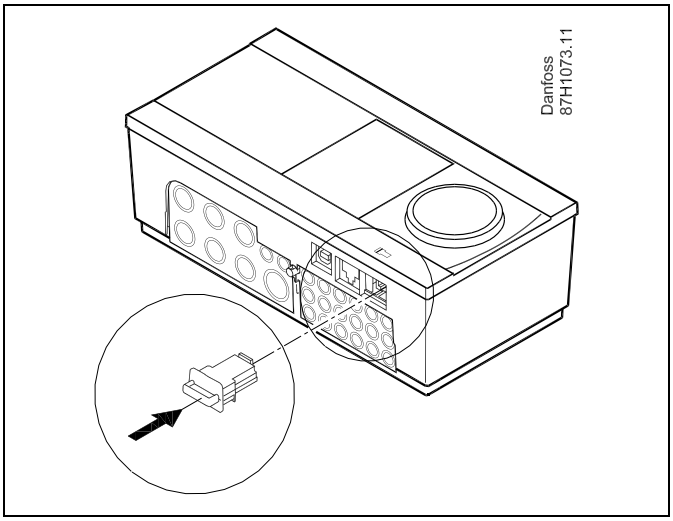
2.6.1 Inserting the ECL Application Key

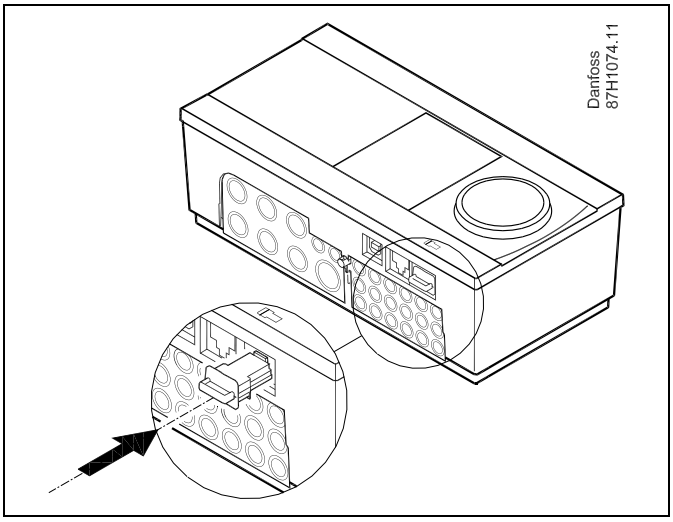
The ECL Application Key contains

- 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.

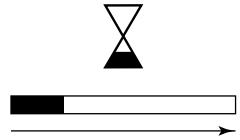




User settings are, among others, desired room temperature, desired DHW temperature, schedules, heat curve, limitation values etc.

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
  If the key is removed before the hour-glass is shown, you have to start afresh.
- Do not disconnect the power
  If the power is interrupted when the hour-glass is shown, the controller will not work.

Key inserted / not inserted, description:

ECL Comfort 210 / 310, controller versions lower than 1.36:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; for 20 minutes settings can be changed.

ECL Comfort 210 / 310, controller versions 1.36 and up:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; settings cannot be changed.

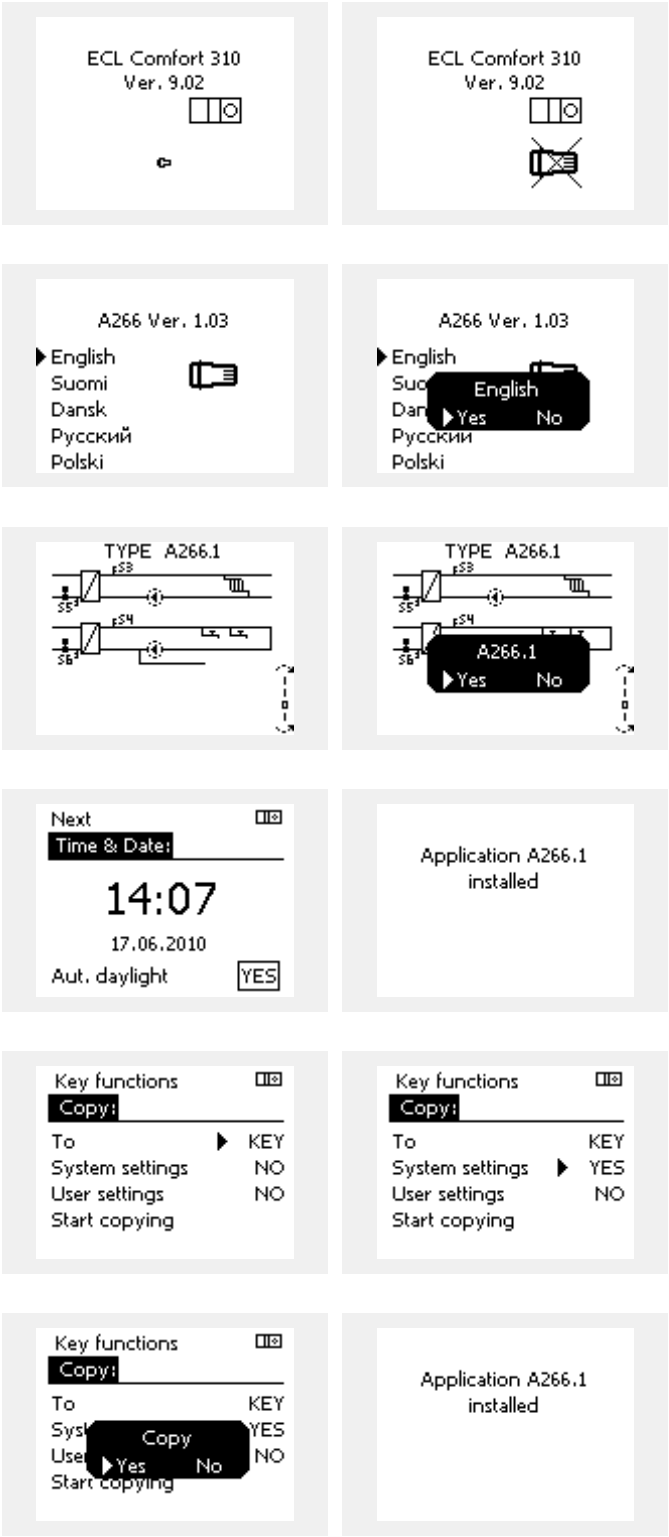
Application Key: Situation 1
The controller is new from the factory, the ECL Application Key is not inserted.

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.

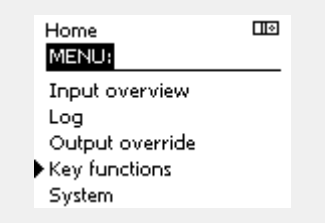
Choose 'Start copying' and confirm with 'Yes'.

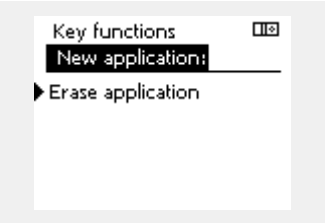
Application Key: Situation 2
The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.

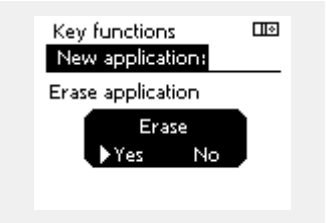
To change to another application on the ECL Application Key, the current application in the controller must be erased (deleted).

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.

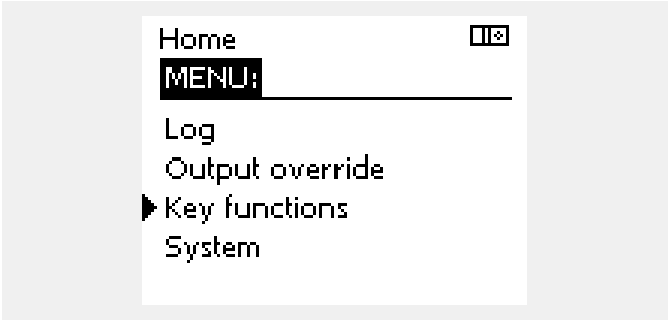
Application Key: Situation 3
A copy of the controllers settings is needed for configuring another controller.

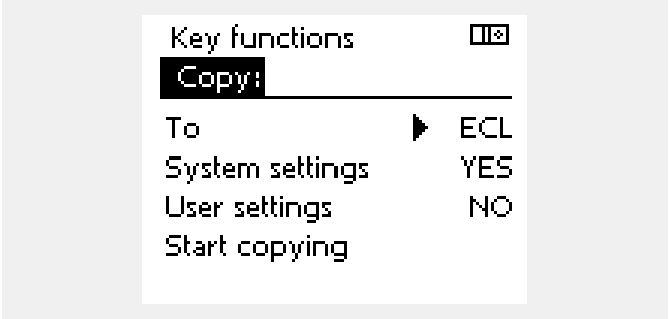
This function is used

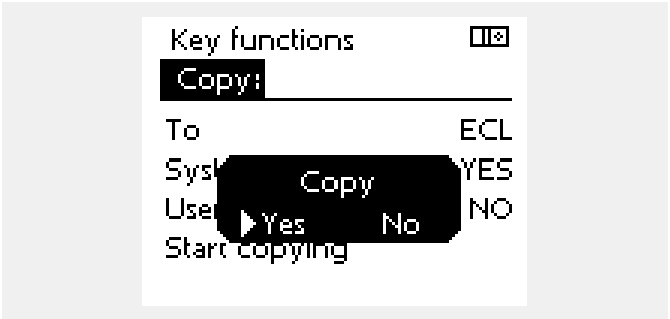
- for saving (backup) of special user and system settings
- when another ECL Comfort controller of the same type (210 or 310) must be configured with the same application but user / system settings differ from the factory settings.

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).

Key inserted / not inserted, description:

ECL Comfort 210 / 310, controller versions lower than 1.36:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; for 20 minutes settings can be changed.

ECL Comfort 210 / 310, controller versions 1.36 and up:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; settings cannot be changed.

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').
- ☐ Does the ECL Comfort controller contain an existing application (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 A266

Navigation, A266.1, circuit 1 and 2

Home		Circuit 1, Heating		Circuit 2, DHW	
		ID no.	Function	ID no.	Function
MENU					
Schedule			Selectable		Selectable
Settings	Flow temperature		Heat curve		
		11178	Temp. max.	12178	Temp. max.
		11177	Temp. min.	12177	Temp. min.
	Room limit	11015	Adapt. time		
		11182	Infl. - max.		
		11183	Infl. - min.		
	Return limit			12030	Limit
		11031	High T out X1		
		11032	Low limit Y1		
		11033	Low T out X2		
		11034	High limit Y2		
		11035	Infl. - max.	12035	Infl. - max.
		11036	Infl. - min.	12036	Infl. - min.
		11037	Adapt. time	12037	Adapt. time
		11085	Priority	12085	Priority
		11029	DHW, ret. T limit		
	Flow / power limit		Actual		Actual
			Limit	12111	Limit
		11119	High T out X1		
		11117	Low limit Y1		
		11118	Low T out X2		
		11116	High limit Y2		
		11112	Adapt. time	12112	Adapt. time
		11113	Filter constant	12113	Filter constant
		11109	Input type	12109	Input type
		11115	Units	12115	Units
		11114	Pulse	12114	Pulse
	Optimization	11011	Auto saving		
		11012	Boost		
		11013	Ramp		
		11014	Optimizer		
		11026	Pre-stop		
		11020	Based on		
		11021	Total stop		
		11179	Summer, cut-out		
		11043	Parallel operation		

Navigation, A266.1, circuit 1 and circuit 2 continued

Home		Circuit 1, Heating		Circuit 2, DHW	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Settings	Control par.			12173	Auto tuning
		11174	Motor pr.	12174	Motor pr.
		11184	Xp	12184	Xp
		11185	Tn	12185	Tn
		11186	M run	12186	M run
		11187	Nz	12187	Nz
		11189	Min. act. time	12189	Min. act. time
		11024	Actuator	12024	Actuator
	Application	11010	ECA addr.		
		11017	Demand offset		
		11050	P demand		
		11500	Send desired T	12500	Send desired T
		11022	P exercise	12022	P exercise
		11023	M exercise	12023	M exercise
		11052	DHW priority		
		11077	P frost T	12077	P frost T
		11078	P heat T	12078	P heat T
		11040	P post-run	12040	P post-run
		11093	Frost pr. T	12093	Frost pr. T
		11141	Ext. input	12141	Ext. input
		11142	Ext. mode	12142	Ext. mode
	Heat cut-out	11393	Sum. start, day		
		11392	Sum. start, month		
		11179	Summer, cut-out		
		11395	Summer, filter		
		11397	Winter start, day		
		11396	Win. start, month		
		11398	Winter, cut-out		
		11399	Winter, filter		
	Anti-bacteria				Day
					Start time
					Duration
					Desired T
Holiday			Selectable		Selectable
Alarm	Temp. monitoring	11147	Upper difference	12147	Upper difference
		11148	Lower difference	12148	Lower difference
		11149	Delay	12149	Delay
		11150	Lowest temp.	12150	Lowest temp.
	Alarm overview		Selectable		Selectable

Navigation, A266.1, circuit 1 and circuit 2 continued

Home		**Circuit 1, Heating**		**Circuit 2, DHW**	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Influence overview	Des. flow T		Return lim.		Return lim.
			Room lim.		
			Parallel priority		
			Flow / power lim.		Flow / power lim.
			Holiday		Holiday
			Ext. override		Ext. override
			ECA override		Anti-bacteria
			Boost		
			Ramp		
			Slave, demand		
			Heating cut-out		
			DHW priority		
			SCADA offset		SCADA offset

Navigation, A266.1, Common controller settings

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Holiday			Selectable
Input overview			Outdoor T
			Outdoor acc. T
			Room T
			Heat flow T
			DHW flow T
			Heat return T
			DHW return T
Log (sensors)	Outdoor T		Log today
	Room T & desired		Log yesterday
	Heating flow T & des.		Log 2 days
	DHW flow T & des.		Log 4 days
	Heat return T & limit		
	DHW return T & limit		
Output override			M1
			P1
			M2
			P2
			A1
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		

Navigation, A266.1, Common controller settings continued

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
System	ECL version		Code no. Hardware Software Serial no. Production date
	Extension		
	Ethernet (ECL Comfort 310 only)		Address type
	Portal config (ECL Comfort 310 only)		ECL portal Portal status Portal info
	M-bus config (ECL Comfort 310 only)	5998 6000	Command M-bus address
	Energy Meters (ECL Comfort 310 only)		Energy Meter 1....5
	Raw input overview		S1 - S8 (ECL Comfort 210) S1 - S10 (ECL Comfort 310) S1 - S18 (ECL Comfort 310 with ECA 32)
	Alarm	32:	T sensor defect
	Display	60058 60059	Backlight Contrast
	Communication	38 2048	Modbus addr. ECL 485 addr.
	Language	2050	Language

Navigation, A266.2, circuit 1 and 2

Home		Circuit 1, Heating		Circuit 2, DHW	
		ID no.	Function	ID no.	Function
MENU					
Schedule			Selectable		Selectable
Settings	Flow temperature		Heat curve		
		11178	Temp. max.	12178	Temp. max.
		11177	Temp. min.	12177	Temp. min.
	Room limit	11015	Adapt. time		
		11182	Infl. - max.		
		11183	Infl. - min.		
	Return limit			12030	Limit
		11031	High T out X1		
		11032	Low limit Y1		
		11033	Low T out X2		
		11034	High limit Y2		
		11035	Infl. - max.	12035	Infl. - max.
		11036	Infl. - min.	12036	Infl. - min.
		11037	Adapt. time	12037	Adapt. time
		11085	Priority	12085	Priority
		11029	DHW, ret. T limit		
	Flow / power limit		Actual		Actual
			Limit	12111	Limit
		11119	High T out X1		
		11117	Low limit Y1		
		11118	Low T out X2		
		11116	High limit Y2		
		11112	Adapt. time	12112	Adapt. time
		11113	Filter constant	12113	Filter constant
		11109	Input type	12109	Input type
		11115	Units	12115	Units
		11114	Pulse	12114	Pulse
	Optimization	11011	Auto saving		
		11012	Boost		
		11013	Ramp		
		11014	Optimizer		
		11026	Pre-stop		
		11020	Based on		
		11021	Total stop		
		11179	Summer, cut-out		
		11043	Parallel operation		

Navigation, A266.2, circuit 1 and circuit 2 continued

Home		Circuit 1, Heating		Circuit 2, DHW	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Settings	Control par.			12173	Auto tuning
		11174	Motor pr.	12174	Motor pr.
		11184	Xp		Xp actual
		11185	Tn	12185	Tn
		11186	M run	12186	M run
		11187	Nz	12187	Nz
				12097	Supply T (idle)
				12096	Tn (idle)
				12094	Open time
				12095	Close time
		11189	Min. act. time	12189	Min. act. time
		11024	Actuator	12024	Actuator
	Application	11010	ECA addr.		
		11017	Demand offset		
		11050	P demand		
		11500	Send desired T	12500	Send desired T
		11022	P exercise	12022	P exercise
		11023	M exercise	12023	M exercise
		11052	DHW priority		
		11077	P frost T	12077	P frost T
		11078	P heat T	12078	P heat T
		11040	P post-run	12040	P post-run
		11093	Frost pr. T	12093	Frost pr. T
		11141	Ext. input	12141	Ext. input
		11142	Ext. mode	12142	Ext. mode
	Heat cut-out	11393	Sum. start, day		
		11392	Sum. start, month		
		11179	Summer, cut-out		
		11395	Summer, filter		
		11397	Winter start, day		
		11396	Win. start, month		
		11398	Winter, cut-out		
		11399	Winter, filter		
	Anti-bacteria				Day
					Start time
					Duration
					Desired T
Holiday			Selectable		Selectable

Navigation, A266.2, circuit 1 and circuit 2 continued

Home		Circuit 1, Heating		Circuit 2, DHW	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Alarm	Temp. monitoring	11147	Upper difference	12147	Upper difference
		11148	Lower difference	12148	Lower difference
		11149	Delay	12149	Delay
		11150	Lowest temp.	12150	Lowest temp.
	Max. temperature	11079	Max. flow T		
		11080	Delay		
	Alarm overview		Selectable		Selectable
Influence overview	Des. flow T		Return lim.		Return lim.
			Room lim.		
			Parallel priority		
			Flow / power lim.		Flow / power lim.
			Holiday		Holiday
			Ext. override		Ext. override
			ECA override		Anti-bacteria
			Boost		
			Ramp		
			Slave, demand		
			Heating cut-out		
			DHW priority		
			SCADA offset		SCADA offset

Navigation, A266.2, Common controller settings

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Holiday			Selectable
Input overview			Outdoor T
			Outdoor acc. T
			Room T
			Heat flow T
			DHW flow T
			Return T
			Supply T
			Flow switch
Log (sensors)	Outdoor T		Log today
	Room T & desired		Log yesterday
	Heating flow & des.		Log 2 days
	DHW flow & des.		Log 4 days
	Heat return T & limit		
	DHW return T & limit		
	Supply T		
Output override			M1
			P1
			M2
			P2
			A1
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		

Navigation, A266.2, Common controller settings continued

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
System	ECL version		Code no.
			Hardware
			Software
			Serial no.
			Production date
	Extension		
	Ethernet (ECL Comfort 310 only)		Address type
	Portal config (ECL Comfort 310 only)		ECL portal
			Portal status
			Portal info
	M-bus config (ECL Comfort 310 only)	5998	Command
		6000	M-bus address
	Energy Meters (ECL Comfort 310 only)		Energy Meter 1....5
	Raw input overview		S1 - S8 (ECL Comfort 210) S1 - S10 (ECL Comfort 310) S1 - S18 (ECL Comfort 310 with ECA 32)
	Alarm	32:	T sensor defect
	Display	60058	Backlight
		60059	Contrast
	Communication	38	Modbus addr.
		2048	ECL 485 addr.
	Language	2050	Language

Navigation, A266.9, circuit 1 and 2

Home		**Circuit 1, Heating**		**Circuit 2, DHW**	
		ID no.	**Function**	**ID no.**	**Function**
MENU					
Schedule			Selectable		Selectable
Settings	Flow temperature		Heat curve		
		11178	Temp. max.	12178	Temp. max.
		11177	Temp. min.	12177	Temp. min.
	Return limit			12030	Limit
		11031	High T out X1		
		11032	Low limit Y1		
		11033	Low T out X2		
		11034	High limit Y2		
		11035	Infl. - max.	12035	Infl. - max.
		11036	Infl. - min.	12036	Infl. - min.
		11037	Adapt. time	12037	Adapt. time
		11085	Priority		
		11029	DHW, ret. T limit		
	Flow / power limit		Actual		Actual
			Limit	12111	Limit
		11119	High T out X1		
		11117	Low limit Y1		
		11118	Low T out X2		
		11116	High limit Y2		
		11112	Adapt. time	12112	Adapt. time
		11113	Filter constant	12113	Filter constant
		11109	Input type	12109	Input type
		11115	Units	12115	Units
	Optimization	11011	Auto saving		
		11012	Boost		
		11013	Ramp		
		11014	Optimizer		
		11026	Pre-stop		
		11021	Total stop		
		11179	Summer, cut-out		

Navigation, A266.9, circuit 1 and circuit 2 continued

Home		Circuit 1, Heating		Circuit 2, DHW	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Settings	Control par.			12173	Auto tuning
		11174	Motor pr.	12174	Motor pr.
		11184	Xp	12184	Xp
		11185	Tn	12185	Tn
		11186	M run	12186	M run
		11187	Nz	12187	Nz
		11189	Min. act. time	12189	Min. act. time
		11024	Actuator	12024	Actuator
	Application	11017	Demand offset		
		11050	P demand		
		11500	Send desired T	12500	Send desired T
		11022	P exercise	12022	P exercise
		11023	M exercise	12023	M exercise
		11052	DHW priority		
		11077	P frost T	12077	P frost T
		11078	P heat T	12078	P heat T
		11040	P post-run	12040	P post-run
		11093	Frost pr. T	12093	Frost pr. T
		11141	Ext. input	12141	Ext. input
		11142	Ext. mode	12142	Ext. mode
	Heat cut-out	11393	Sum. start, day		
		11392	Sum. start, month		
		11179	Summer, cut-out		
		11395	Summer, filter		
		11397	Winter start, day		
		11396	Win. start, month		
		11398	Winter, cut-out		
		11399	Winter, filter		
Alarm	Pressure	11614	Alarm high		
		11615	Alarm low		
		11617	Alarm time-out		
		11607	Low X		
		11608	High X		
		11609	Low Y		
		11610	High Y		
	Digital	11636	Alarm value		
		11637	Alarm time-out		
	Max. temperature	11079	Max. flow T		
		11080	Delay		
	Alarm overview		Selectable		

Navigation, A266.9, circuit 1 and circuit 2 continued

Home		**Circuit 1, Heating**		**Circuit 2, DHW**	
MENU		**ID no.**	**Function**	**ID no.**	**Function**
Influence overview	Des. flow T		Return lim.		Return lim.
			Flow / power limit		Flow / power limit
			Ext. override		Ext. override
			Boost		
			Ramp		
			Slave, demand		
			Heating cut-out		
			DHW priority		
			SCADA offset		SCADA offset

Navigation, A266.9, Common controller settings

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Input overview			Outdoor T
			Outdoor acc. T
			Heat return T
			Heat flow T
			DHW flow T
			Prim. return T
			DHW return T
			Pressure
			Digital
Log (sensors)	Heating flow & des.		Log today
	Heating return		Log yesterday
	DHW flow & des.		Log 2 days
	DHW return		Log 4 days
	Outdoor T		
	Heating pressure		
Output override			M1
			P1
			M2
			P2
			A1
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		

Navigation, A266.9, Common controller settings continued

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
System	ECL version		Code no. Hardware Software Serial no. Production date
	Extension		
	Ethernet (ECL Comfort 310 only)		Address type
	Portal config (ECL Comfort 310 only)		ECL portal Portal status Portal info
	M-bus config (ECL Comfort 310 only)	5998 6000	Command M-bus address
	Energy Meters (ECL Comfort 310 only)		Energy Meter 1....5
	Raw input overview		S1 - S8 (ECL Comfort 210) S1 - S10 (ECL Comfort 310) S1 - S18 (ECL Comfort 310 with ECA 32)
	Alarm	32:	T sensor defect
	Display	60058 60059	Backlight Contrast
	Communication	38 2048	Modbus addr. ECL 485 addr.
	Language	2050	Language

3.0 Daily use

3.1 How to navigate

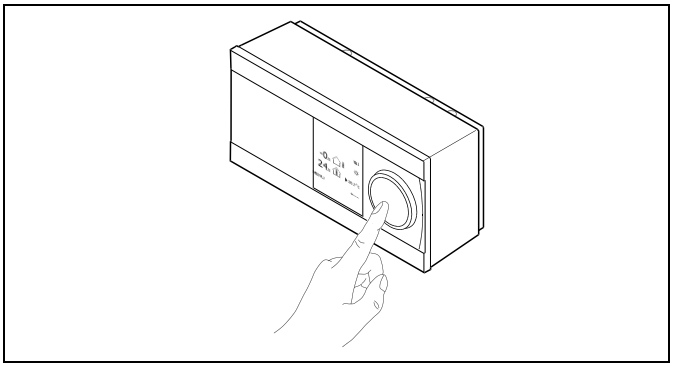
You navigate in the controller by turning the dial left or right to the desired position ().

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

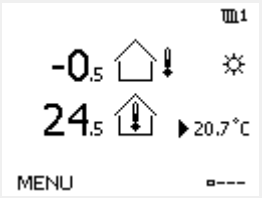
The position indicator in the display (▶) will always show you where you are.

Push the dial to confirm your choices ().

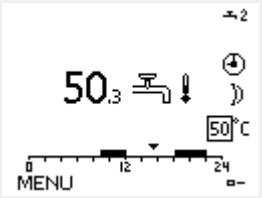
The display examples are from a two-circuit application: One heating circuit () and one domestic hot-water (DHW) circuit (). The examples might differ from your application.



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.

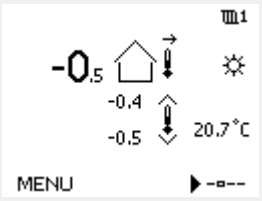
To shift between displays: Turn the dial until you reach the display selector (▫---) at the bottom right side of the display. Push the dial and turn to choose your favorite overview display. Push the dial again.

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:

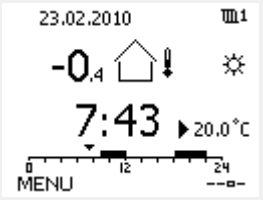
Overview display 2:



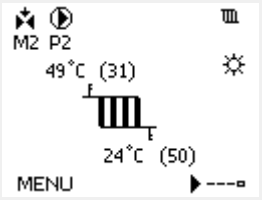
Overview display 3 informs about:
date, actual outdoor temperature, controller mode, time, desired room temperature as well as shows the comfort schedule of the current day.

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.

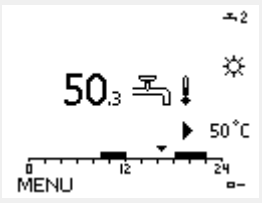
"- - -" the sensor connection is short-circuited.

DHW circuit

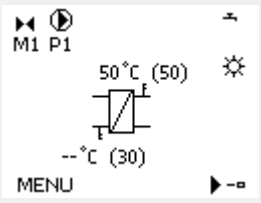
Overview display 1 informs about:
actual DHW temperature, controller mode, desired DHW temperature as well as the comfort schedule of the current day.

Overview display 2 informs about:
state of the controlled components, actual DHW temperature, (desired DHW temperature), controller mode, return temperature (limitation value).

Overview display 1:



Overview display 2:



Dependent on chosen display, the overview displays for the DHW circuit inform you about:
- actual DHW temperature (50.3)
- controller mode (☼)
- desired DHW temperature (50 °C)
- comfort schedule of the current day(0 - 12 - 24)
- state of the controlled components (M1, P1)
- actual DHW temperature (50 °C), (desired DHW temperature (50))
- return temperature (- - °C) (limitation temperature (30))

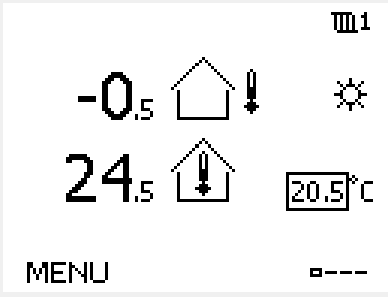
Setting the desired temperature

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.

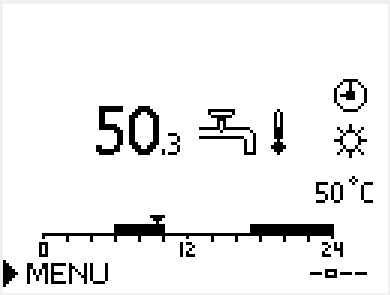
The display example is for comfort mode. If you want to change the desired room temperature for saving mode, choose the mode selector and select saving.

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

Setting the desired DHW temperature

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

Action:	Purpose:	Examples:
	Desired DHW temperature	50
	Confirm	
	Adjust the desired DHW temperature	55
	Confirm	



In addition to the information about desired and actual DHW temperature, the today's schedule is visible.

The display example indicates that the controller is in scheduled operation and in comfort mode.

Setting the desired room temperature, ECA 30 / ECA 31

The desired room 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
	Relative humidity indoor	
	Room temp.	
	DHW temp.	
	Position indicator	
	Scheduled mode	Mode
	Comfort mode	
	Saving mode	
	Frost protection mode	
	Manual mode	
	Standby	
	Cooling mode	
	Active output override	
	Optimized start or stop time	
	Heating	Circuit
	Cooling	
	DHW	
	Common controller settings	
	Pump ON	Controlled component
	Pump OFF	
	Actuator opens	
	Actuator closes	
42	Actuator, analogue control signal	

Symbol	Description
	Alarm
	Monitoring temperature sensor connection
	Display selector
	Max. and min. value
	Trend in outdoor temperature
	Wind speed sensor
--	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
15	Connection address (master: 15, slaves: 1 - 9)
	Day off
	Holiday
	Relaxing (extended comfort period)
	Going out (extended saving period)

In ECA 30 / 31 only the symbols that are relevant to the application in the controller are displayed.

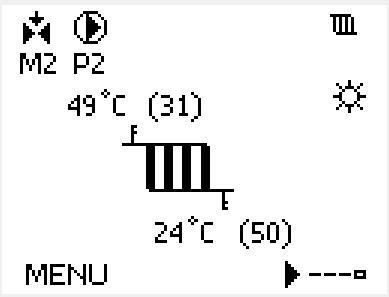
3.4 Monitoring temperatures and system components

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



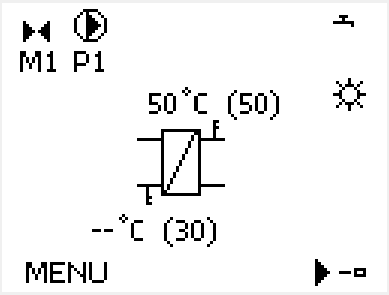
DHW circuit

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

Display example (heat exchanger):

50 °C	Flow temperature
(50)	Desired flow temperature
- -	Return temperature: sensor not connected
(30)	Return temperature limitation

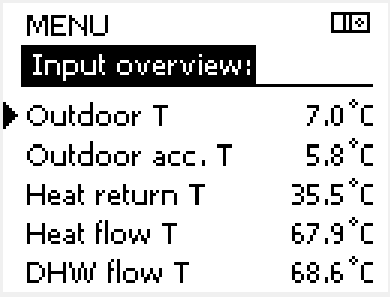
Display example with heat exchanger:



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:

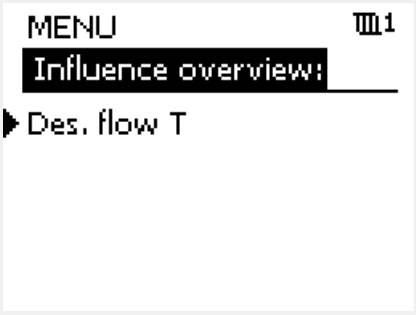
Arrow-down:
The parameter in question reduces the desired flow temperature.

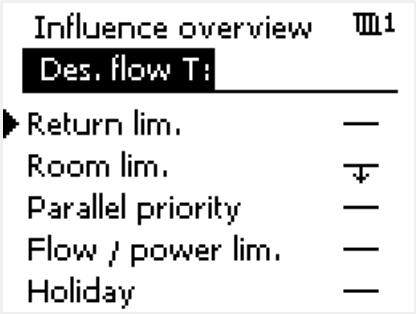
Arrow-up:
The parameter in question increases the desired flow temperature.

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

It is possible to manually control the installed components.

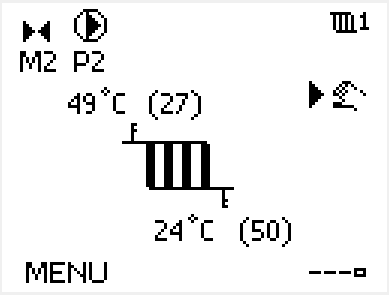
Manual control can only be selected in favorite displays in which the symbols for the controlled components (valve, pump etc.) are visible.

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.

Controlled components *Circuit selector*



During manual operation:

- All control functions are deactivated
- Output override is not possible
- Frost protection is not active

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

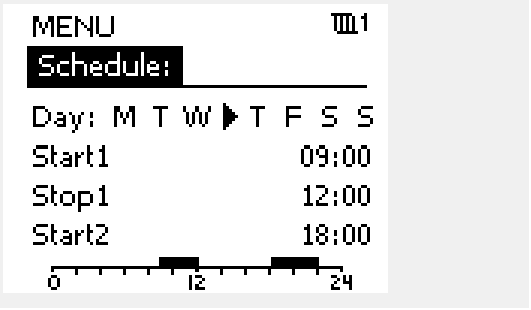
3.7 Schedule

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:

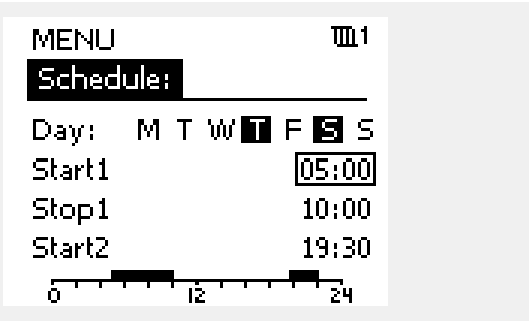
M = Monday
T = Tuesday
W = Wednesday
T = Thursday
F = Friday
S = Saturday
S = Sunday

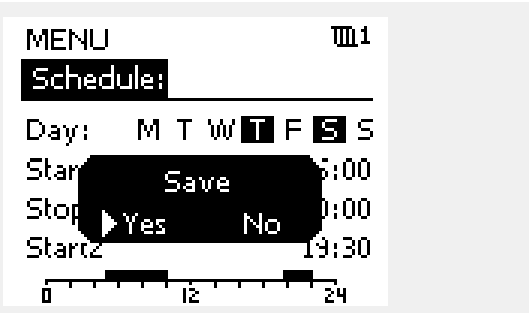


The schedule will day-by-day show you the start and stop times of your comfort periods (heating / DHW circuits).

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			
Heat curve		73	1.0							
Temp. max. (flow temp. limit, max.)	11178	74	90 °C							
Temp. min. (flow temp. limit, min.)	11177	74	10 °C							
Adapt. time (adaption time)	11015	75	OFF							
Infl. - max. (room temp. limitation, max.)	11182	76	-4.0							
Infl. - min. (room temp. limitation, min.)	11183	76	0.0							
High T out X1 (return temp. limitation, high limit, X-axis)	11031	77	15 °C							
Low limit Y1 (return temp. limitation, low limit, Y-axis)	11032	77	40 °C							
Low T out X2 (return temp. limitation, low limit, X-axis)	11033	78	-15 °C							
High limit Y2 (return temp. limitation, high limit, Y-axis)	11034	78	60 °C							
Infl. - max. (return temp. limitation - max. influence)	11035	78	0.0							
Infl. - min. (return temp. limitation - min. influence)	11036	78	0.0							
Adapt. time (adaptation time)	11037	79	25 s							
Priority (priority for return temp. limitation)	11085	79	OFF							
DHW, ret. T limit	11029	79	OFF							
Actual (actual flow or power)	11110	80								
High T out X1 (flow / power limitation, high limit, X-axis)	11119	81	15 °C							
Low limit Y1 (flow / power limitation, low limit, Y-axis)	11117	81	999.9 l/h							
Low T out X2 (flow / power limitation, low limit, X-axis)	11118	81	-15 °C							
High limit Y2 (flow / power limitation, high limit, Y-axis)	11116	81	999.9 l/h							
Adapt. time (adaptation time)	11112	81	OFF							
Filter constant	11113	82	10							
Input type	11109	82	OFF							
Units	11115	82	ml, l/h							
Pulse, ECL Key A2xx	11114	83	10							
Auto saving (saving temp. dependent on outdoor temp.)	11011	84	-15 °C							
Boost	11012	84	OFF							
Ramp (reference ramping)	11013	85	OFF							
Optimizer (optimizing time constant)	11014	85	OFF							
Pre-stop (optimized stop time)	11026	86	ON							
Based on (optimization based on room / outdoor temp.)	11020	86	OUT							
Total stop	11021	86	OFF							
Summer, cut-out	11179	87	20 °C							
Summer, cut-out (limit for heating cut-out) — A266.9	11179	87	18 °C							
Parallel operation	11043	88	OFF							
Motor pr. (motor protection)	11174	89	OFF							
Xp (proportional band)	11184	89	80 K							
Xp (proportional band) — A266.9	11184	89	85 K							
Tn (integration time constant)	11185	90	30 s							
Tn (integration time constant) — A266.9	11185	90	25 s							
M run (running time of the motorized control valve)	11186	90	50 s							

Setting	ID	Page	Factory settings in circuit(s) 1		2		3			
M run (running time of the motorized control valve) — A266.9	11186	90	120 s							
Nz (neutral zone)	11187	91	3 K							
Nz (neutral zone) — A266.9	11187	91	2 K							
Actuator	11024	91	GEAR							
Min. act. time (min. activation time gear motor)	11189	91	10							
ECA addr. (choice of Remote Control Unit)	11010	93	OFF							
Demand offset	11017	93	OFF							
P demand	11050	93	OFF							
Send desired T	11500	94	ON							
P exercise (pump exercise)	11022	94	ON							
M exercise (valve exercise)	11023	94	OFF							
P post-run	11040	94	3 m							
DHW priority (closed valve / normal operation)	11052	95	OFF							
P frost T	11077	95	2 °C							
P heat T (heat demand)	11078	95	20 °C							
Frost pr. T (frost protection temperature)	11093	95	10 °C							
Ext. input (external override)	11141	96	OFF							
Ext. mode (external override mode)	11142	97	SAVING							
Extended heat cut-out setting	11395	99								
Extended winter cut-out setting	11399	99								
Upper difference	11147	101	OFF							
Lower difference	11148	101	OFF							
Delay	11149	102	10 m							
Lowest temp.	11150	102	30 °C							
Alarm high — A266.9	11614	102	2.3							
Alarm low — A266.9	11615	102	0.8							
Alarm time-out — A266.9	11617	102	30 s							
Low X — A266.9	11607	103	1.0							
High X — A266.9	11608	103	5.0							
Low Y — A266.9	11609	103	0.0							
High Y — A266.9	11610	103	6.0							
Alarm value — A266.9	11636	103	1							
Alarm time-out — A266.9	11637	104	30 s							
Max. flow T — A266.2 / A266.9	11079	104	90 °C							
Delay — A266.2	11180	104	5 s							
Delay — A266.9	11180	104	60 s							
Temp. max. (flow temp. limit, max.)	12178	106			90 °C					
Temp. max. (flow temp. limit, max.) — A266.9	12178	106			65 °C					
Temp. min. (flow temp. limit, min.)	12177	106			10 °C					
Temp. min. (flow temp. limit, min.) — A266.9	12177	106			45 °C					
Limit (return temp. limitation)	12030	107			30 °C					
Infl. - max. (return temp. limitation - max. influence)	12035	107			0.0					
Infl. - min. (return temp. limitation - min. influence)	12036	108			0.0					
Adapt. time (adaptation time)	12037	108			25 s					

Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
Priority (priority for return temp. limitation)	12085	108			OFF					
Actual (actual flow or power)	12110	109								
Adapt. time (adaptation time)	12112	109			OFF					
Filter constant	12113	110			10					
Input type	12109	110			OFF					
Units	12115	110			ml, l/h					
Pulse	12114	111			10					
Auto tuning	12173	112			OFF					
Motor pr. (motor protection)	12174	112			OFF					
Xp (proportional band)	12184	112			40 K					
Xp actual — A266.2		113								
Xp (proportional band) — A266.9	12184	113			90 K					
Tn (integration time constant)	12185	113			20 s					
Tn (integration time constant) — A266.9	12185	113			13 s					
M run (running time of the motorized control valve)	12186	114			20 s					
M run (running time of the motorized control valve) — A266.9	12186	114			15 s					
Nz (neutral zone)	12187	114			3 K					
Supply T (idle)— A266.2	12097	116			OFF					
Tn (idle) — A266.2	12096	116			120 s					
Open time— A266.2	12094	116			4.0 s					
Close time— A266.2	12095	116			2.0 s					
Min. act. time (min. activation time gear motor)	12189	116			3					
Actuator	12024	117	GEAR							
Min. act. time (min. activation time gear motor) — A266.9	12189	117			10					
Send desired T	12500	118			ON					
P exercise (pump exercise)	12022	118			OFF					
P exercise (pump exercise) — A266.9	12022	118			ON					
M exercise (valve exercise)	12023	118			OFF					
P frost T	12077	119			2 °C					
P heat T (heat demand)	12078	119			20 °C					
P post-run	12040	119			3 m					
Frost pr. T (frost protection temperature)	12093	119			10 °C					
Ext. input (external override)	12141	120			OFF					
Ext. mode (external override mode)	12142	120			SAVING					
Upper difference	12147	121			OFF					
Lower difference	12148	121			OFF					
Delay	12149	122			10 m					
Lowest temp.	12150	122			30 °C					
Day		124								
Start time		125			00:00					
Duration		125			120 m					
Desired T		125			OFF					
State	Read-out	135							-	
Command	5998	136							NONE	

Setting	ID	Page	Factory settings in circuit(s) 1		2		3			
Baud (bits per second)	5997	136							300	
Energy meter 1 (2, 3, 4, 5)	6000	136							255	
Energy meter 1 (2, 3, 4, 5)	6002	137							60 sec	
Energy meter 1 (2, 3, 4, 5)	6001	137							0	
Energy meter 1 (2, 3, 4, 5)	Read-out	137							-	
Energy meter 1 (2, 3, 4, 5)	Read-out	137							0	
Backlight (display brightness)	60058	138							5	
Contrast (display contrast)	60059	138							3	
Modbus addr.	38	139							1	
ECL 485 addr. (master / slave address)	2048	139							15	
Language	2050	139							English	
Room T Offset		141							0.0 K	
RH offset (ECA 31 only)		142							0.0 %	
Backlight (display brightness)		142							5	
Contrast (display contrast)		142							3	
Use as remote		142							*)	
Slave addr. (Slave address)		143							A	
Connection addr. (Connection address)		143							15	
Override addr. (Override address)		144							OFF	
Override circuit		145							OFF	

5.0 Settings, circuit 1

5.1 Flow temperature

The ECL Comfort controller determines and controls the flow temperature related to the outdoor temperature. This relationship is called the heat curve.

The heat curve is set by means of 6 coordinate points. The desired flow temperature is set at 6 pre-defined outdoor temperature values.

The shown value for the heat curve is an average value (slope), based on the actual settings.

Outdoor temp.	Desired flow temp.			Your settings
	A	B	C	
-30 °C	45 °C	**75 °C**	95 °C	
-15 °C	40 °C	**60 °C**	90 °C	
-5 °C	35 °C	**50 °C**	80 °C	
0 °C	32 °C	**45 °C**	70 °C	
5 °C	30 °C	**40 °C**	60 °C	
15 °C	25 °C	**28 °C**	35 °C	

A: Example for floor heating
B: Factory settings
C: Example for radiator heating (high demand)

Heat curve		
Circuit	*Setting range*	*Factory setting*
1	**0.1 ... 4.0**	**1.0**

The heat curve can be changed in two ways:

1. The value of the slope is changed (see heat curve examples on next page)
2. The coordinates of the heat curve are changed

Change the value of the slope:
Push the dial to enter / change the slope value of the heat curve (example: 1.0).

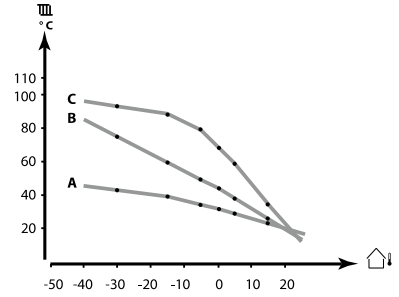
When the slope of the heat curve is changed by means of the slope value, the common point for all heat curves will be a desired flow temperature = 24.6 °C at an outdoor temperature = 20 °C

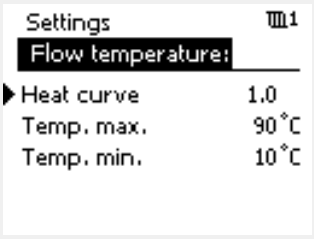
Change the coordinates:
Push the dial to enter / change the coordinates of the heat curve (example: -30,75).

The heat curve represents the desired flow temperatures at different outdoor temperatures and at a desired room temperature of 20 °C.

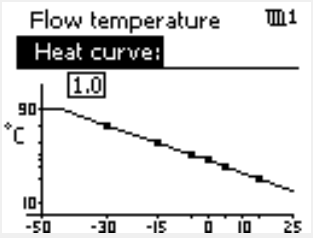
If the desired room temperature is changed, the desired flow temperature also changes:
(Desired room T - 20) × HC × 2.5
where "HC" is the Heat Curve slope and "2.5" is a constant.

Desired flow temperature

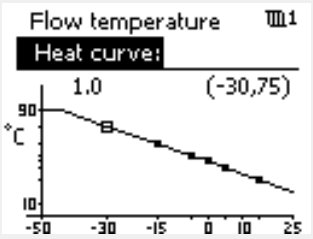




Slope changes



Coordinate changes



The calculated flow temperature can be influenced by the 'Boost' and 'Ramp' functions etc.

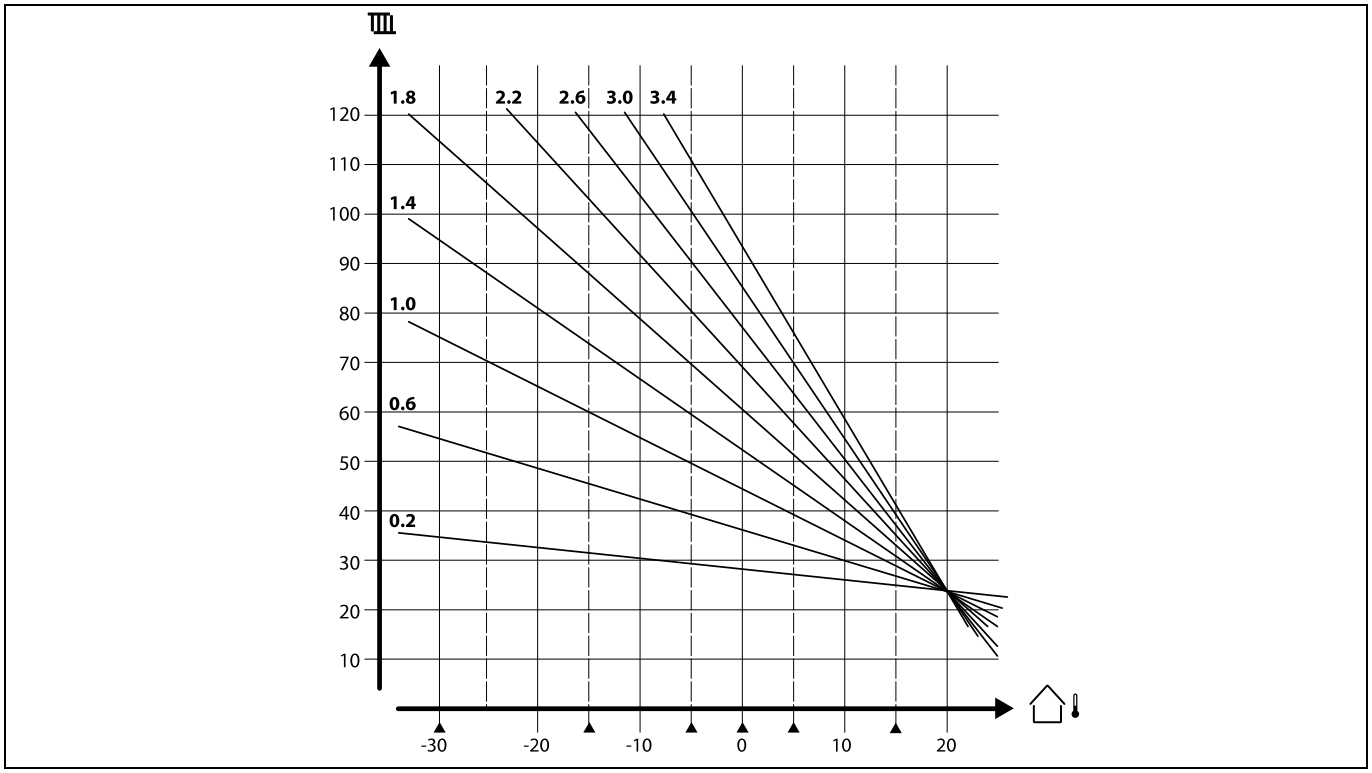
Example:

Heat curve:	1.0
Desired flow temp.:	50 °C
Desired room temp.:	22 °C
Calculation (22–20) × 1.0 × 2.5 =	5

Result:
The desired flow temperature will be corrected from 50 °C to 55 °C.

Choosing a heat curve slope

The heat curves represent the desired flow temperature at different outdoor temperatures and at a desired room temperature of 20 °C.



The small arrows (▲) indicate 6 different outdoor temperature values at which you can change the heat curve.

MENU > Settings > Flow temperature

Temp. max. (flow temp. limit, max.)		**11178**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 150 °C**	**90 °C**

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

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

MENU > Settings > Flow temperature

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

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

'Temp. min.' is overruled if 'Total stop' is active in Saving mode or 'Cut-out' is active.
'Temp. min.' can be overruled by the influence from the return temperature limitation (see 'Priority').

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

5.2 Room limit

This section is only relevant if you have installed a room temperature sensor or a Remote Control Unit.

The controller adjusts the desired flow 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.

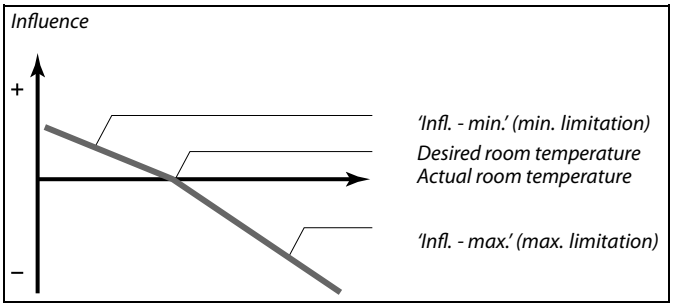
Use this influence type to avoid a too high room temperature. The controller will allow for free heat gains, i.e. solar radiation or heat from a fire place etc.

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 type to avoid a too low room temperature. This could e.g. be caused by windy surroundings.

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 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 0.0.
The slope is 1.8 (see 'Heat curve' in 'Flow temperature').
Result:
The desired flow temperature is changed by (2 x -4.0 x 1.8) –14.4 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 2.0.
The slope is 1.8 (see 'Heat curve' in 'Flow temperature').
Result:
The desired flow temperature is changed by (3 x 2.0 x 1.8) 10.8 degrees.

MENU > Settings > Room limit

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).		

The adaptation function can correct the desired flow temperature with max. 8 K x heat curve value.

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.

MENU > Settings > Room limit

Infl. - max. (room temp. limitation, max.)		**11182**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 0.0**	**-4.0**
Determines how much the desired flow temperature will be influenced (decreased) if the actual room temperature is higher than the desired room temperature (P control).		

-9.9: The room temperature has a big influence.

0.0: The room temperature has no influence.

MENU > Settings > Room limit

Infl. - min. (room temp. limitation, min.)		**11183**
Circuit	*Setting range*	*Factory setting*
1	**0.0 .... 9.9**	**0.0**
Determines how much the desired flow temperature 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.

9.9: The room temperature has a big influence.

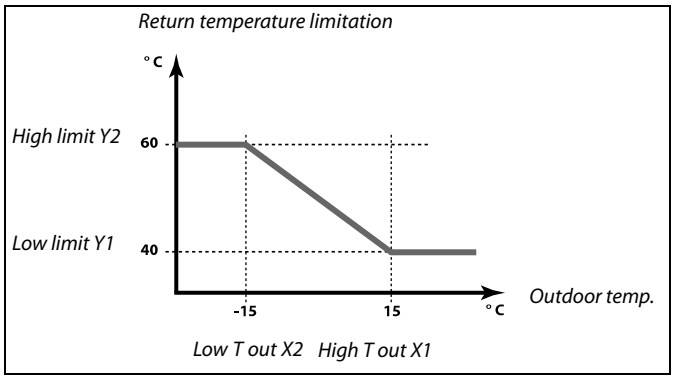
5.3 Return limit

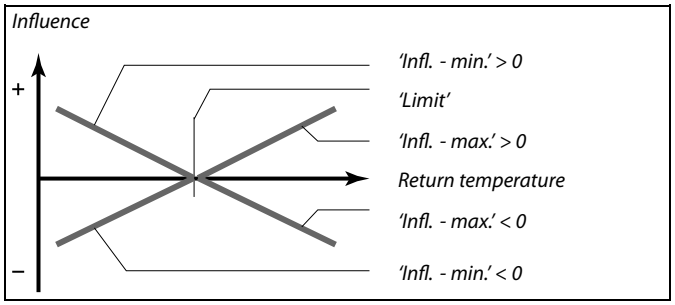
The return temperature limitation is based on the outdoor temperature. Typically in district heating systems a higher return temperature is accepted at a decrease in outdoor temperature. The relationship between the return temperature limits and outdoor temperature is set in two coordinates.

The outdoor temperature coordinates are set in 'High T out X1' and 'Low T out X2'. The return temperature coordinates are set in 'High limit Y2' and 'Low limit Y1'.

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 calculated 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.

MENU > Settings > Return limit

High T out X1 (return temp. limitation, high limit, X-axis)		**11031**
Circuit	*Setting range*	*Factory setting*
1	**-60 ... 20 °C**	**15 °C**
Set the outdoor temperature for the low return temperature limitation.		

The corresponding Y coordinate is set in 'Low limit Y1'.

MENU > Settings > Return limit

Low limit Y1 (return temp. limitation, low limit, Y-axis)		**11032**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 150 °C**	**40 °C**
Set the return temperature limitation referring to the outdoor temperature set in 'High T out X1'.		

The corresponding X coordinate is set in 'High T out X1'.

MENU > Settings > Return limit

Low T out X2 (return temp. limitation, low limit, X-axis)		11033
Circuit	*Setting range*	*Factory setting*
1	**-60 ... 20 °C**	**-15 °C**
Set the outdoor temperature for the high return temperature limitation.		

The corresponding Y coordinate is set in 'High limit Y2'.

MENU > Settings > Return limit

High limit Y2 (return temp. limitation, high limit, Y-axis)		11034
Circuit	*Setting range*	*Factory setting*
1	**10 ... 150 °C**	**60 °C**
Set the return temperature limitation referring to the outdoor temperature set in 'Low T out X2'.		

The corresponding X coordinate is set in 'Low T out X2'.

MENU > Settings > Return limit

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.').

MENU > Settings > Return limit

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.').

MENU > Settings > Return limit

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.

MENU > Settings > Return limit

Priority (priority for return temp. limitation)		**11085**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose whether the return temperature limitation should overrule the set min. flow temperature 'Temp. min.' .		

OFF: The min. flow temperature limit is not overruled.

ON: The min. flow temperature limit is overruled.

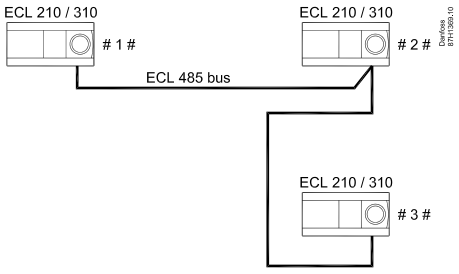
Please also see 'Parallel operation' (ID 11043).

MENU > Settings > Return limit

DHW, ret. T limit		**11029**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 – 110 °C**	**OFF**
When an addressed slave is active in DHW-tank heating / charging, the return temperature limitation in the master can be set. *Notes:* • *The master circuit must be set to react on the desired flow temperature in the slave(s). See "Demand offset" (ID 11017).* • *The slave(s) must be set to send its / their desired flow temperature to the master. See "Send desired T" (ID 1x500).*		

OFF: No influence from slaves. The return temperature limitation is related to settings in "Return limit".

10 – 110 °C: Return temperature limitation value when slave is in DHW tank heating / charging operation.



 # 1 # = Master, example A266, address 15
 # 2 # = Slave, example A237, address 9
 # 3 # = Slave, example A367, address 6

Some examples of applications with DHW-tank heating / charging are:

- A217, A237, A247, A367, A377

5.4 Flow / power limit

A flow or heat meter can be connected to the ECL controller in order to limit the flow or consumed power. The signal from the flow or heat meter is a pulse signal.

When the application runs in an ECL Comfort 310 controller, the flow / power signal can be obtained from a flow / heat meter via the M-bus connection.

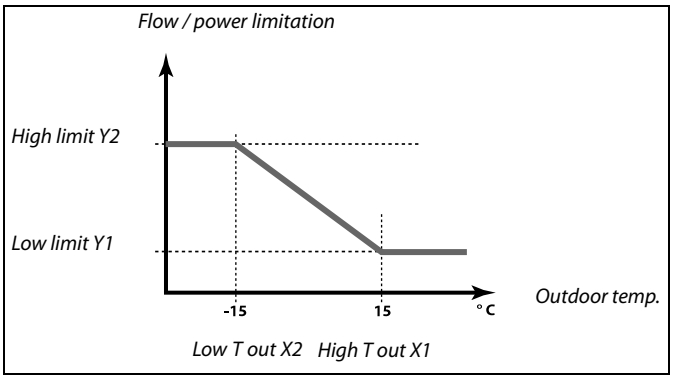
The flow / power limitation can be based on the outdoor temperature. Typically, in district heating systems a higher flow or power is accepted at lower outdoor temperatures.

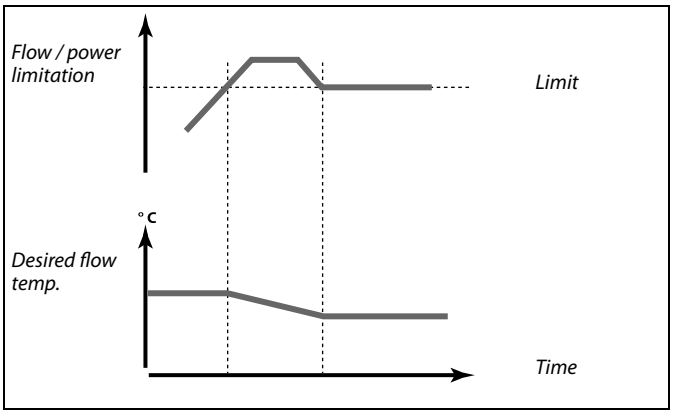
The relationship between the flow or power limits and the outdoor temperature is set in two coordinates.

The outdoor temperature coordinates are set in 'High T out X1' and 'Low T out X2'.

The flow or power coordinates are set in 'Low limit Y1' and 'High limit Y2'. Based on these settings, the controller calculates the limitation value.

When the flow / power gets higher than the calculated limit, the controller gradually reduces the desired flow temperature to obtain an acceptable max. flow or power consumption.





If the 'Adapt. time' is too high, there is a risk of unstable control.

MENU > Settings > Flow / power limit

Actual (actual flow or power)		**11110**
Circuit	*Setting range*	*Factory setting*
1	**Read-out only**	
The value is the actual flow or power based on the signal from flow / energy meter.		

MENU > Settings > Flow / power limit

Limit (limitation value)		**11111**
Circuit	*Setting range*	*Factory setting*
1	**Read-out only**	
The value is the calculated limitation value.		

MENU > Settings > Flow / power limit

High T out X1 (flow / power limitation, high limit, X-axis)		**11119**
Circuit	*Setting range*	*Factory setting*
1	**-60 ... 20 °C**	**15 °C**
Set the outdoor temperature value for the low flow / power limitation.		

The corresponding Y coordinate is set in 'Low limit Y1'.

MENU > Settings > Flow / power limit

Low limit Y1 (flow / power limitation, low limit, Y-axis)		**11117**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 999.9 l/h**	**999.9 l/h**
Set the flow / power limitation referring to the outdoor temperature set in 'High T out X1'.		

The corresponding X coordinate is set in 'High T out X1'.

The limitation function can overrule the set 'Temp. min' of the desired flow temperature.

MENU > Settings > Flow / power limit

Low T out X2 (flow / power limitation, low limit, X-axis)		**11118**
Circuit	*Setting range*	*Factory setting*
1	**-60 ... 20 °C**	**-15 °C**
Set the outdoor temperature value for the high flow / power limitation.		

The corresponding Y coordinate is set in 'High limit Y2'.

MENU > Settings > Flow / power limit

High limit Y2 (flow / power limitation, high limit, Y-axis)		**11116**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 999.9 l/h**	**999.9 l/h**
Set the flow / power limitation referring to the outdoor temperature set in 'Low T out X2'.		

The corresponding X coordinate is set in 'Low T out X2'.

MENU > Settings > Flow / power limit

Adapt. time (adaptation time)		**11112**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 sec**	**OFF**
Controls how fast the flow / power limitation adapts to the desired limitation.		

If the 'Adapt. time' is too high, there is a risk of unstable control.

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

Low value: The desired temperature is adapted slowly.

High value: The desired temperature is adapted quickly.

MENU > Settings > Flow / power limit

Filter constant		**11113**
Circuit	*Setting range*	*Factory setting*
1	**1 ... 50**	**10**
The actual filter dampens the flow / power input data by the set factor.		

1: Minor dampening (low filter constant)

50: Major dampening (high filter constant)

MENU > Settings > Flow / power limit

Input type		**11109**
Circuit	*Setting range*	*Factory setting*
1	**OFF / IM1**	**OFF**
Choice of pulse type from input S7.		

OFF: No input.

IM1: Pulse.

MENU > Settings > Flow / power limit

Units		**11115**
Circuit	*Setting range*	*Factory setting*
1	**See the list**	**ml, l/h**
Choice of units for measured values.		

Units to the left: pulse value.
Units to the right: actual and limitation values.

The value from the flow meter is expressed as ml or l.
The value from the heat meter is expressed as Wh, kWh, MWh or GWh.

The values for the actual flow and the flow limitation are expressed as l/h or m^3/h.

The values for the actual power and the power limitation are expressed as kW, MW or GW.

List for setting range of 'Units':
ml, l/h
l, l/h
ml, m^3/h
l, m^3/h
Wh, kW
kWh, kW
kWh, MW
MWh, MW
MWh, GW
GWh, GW

Example 1:

'Units' (11115): l, m^3/h

'Pulse' (11114): 10

Each pulse represents 10 litres and the flow is expressed as cubic meters (m^3) per hour.

Example 2:

'Units' (11115): kWh, kW (= kilo Watt hour, kilo Watt)

'Pulse' (11114): 1

Each pulse represents 1 kilo Watt hour and the power is expressed in kilo Watt.

MENU > Settings > Flow / power limit

Pulse, ECL Key A2xx		**11114**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 9999**	**10**
Set the value of the pulses from the flow / heat meter.		

OFF: No input.

1 ... 9999: Pulse value.

Example :

One pulse can represent a number of litres (from a flow meter) or a number of kWh (from a heat meter).

5.5 Optimization

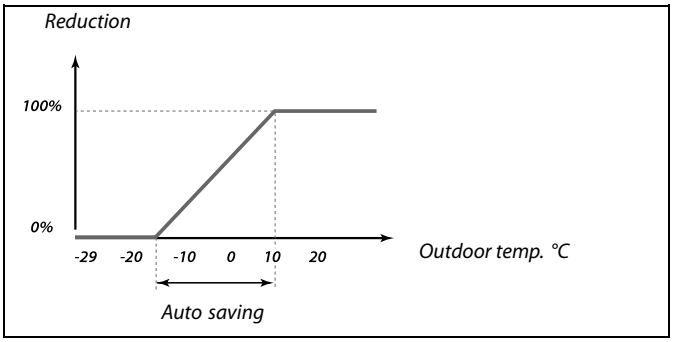
MENU > Settings > Optimization

Auto saving (saving temp. dependent on outdoor temp.)		**11011**
Circuit	*Setting range*	*Factory setting*
1	**OFF / -29 ... 10 °C**	**-15 °C**
Below the set value for the outdoor temperature, the saving temperature setting has no influence. Above the set value for the outdoor temperature, the saving temperature relates to the actual outdoor temperature. The function is relevant in district heating installations in order to avoid a big change in the desired flow temperature after a saving period.		

OFF: The saving temperature does not depend on the outdoor temperature.

-29 ... 10: The saving temperature depends on the outdoor temperature. When the outdoor temperature is above 10 °C, the reduction is 100%. The lower the outdoor temperature, the less the temperature reduction. When the outdoor temperature is below the set limit, there is no temperature reduction.

The comfort and the saving temperatures are set in the display overviews. The difference between the comfort and the saving temperature is considered to be 100%. Depending on the outdoor temperature, the percentage value can be lower according to the set value in 'Auto saving'.



Example:

Outdoor temp.:	–5 °C
Desired room temp. in Comfort mode:	22 °C
Desired room temp. in Saving mode:	16 °C
Setting in 'Auto saving':	–15 °C

The drawing above illustrates that the reduction percentage at an outdoor temperature of –5 °C is 40%.

The difference between Comfort and Saving temperature is (22–16) = 6 degrees.

40% of 6 degrees = 2.4 degrees

The 'Auto saving' temperature is corrected to (22–2.4) = 19.6 °C.

MENU > Settings > Optimization

Boost		**11012**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 99%**	**OFF**
Shortens the heating-up period by increasing the desired flow temperature by the percentage you set.		

OFF: The boost function is not active.

1-99%: The desired flow temperature is increased temporarily with the set percentage.

In order to shorten the heating-up period after a saving temperature period, the desired flow temperature can be increased temporarily (max. 1 hour). At optimizing the boost is active in the optimization period ('Optimizer').

If a room temperature sensor or an ECA 30 / 31 is connected, the boost stops when the room temperature is reached.

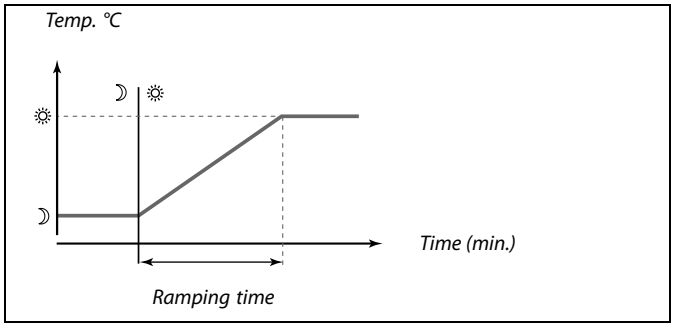
MENU > Settings > Optimization

Ramp (reference ramping)		**11013**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 99 m**	**OFF**
The time (minutes) in which the desired flow temperature increases gradually to avoid load peaks in the heat supply.		

OFF: The ramping function is not active.

1-99 m: The desired flow temperature is increased gradually with the set minutes.

In order to avoid load peaks in the supply network, the flow temperature can be set to increase gradually after a period with saving temperature. This causes the valve to open gradually.



MENU > Settings > Optimization

Optimizer (optimizing time constant)		**11014**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 ... 59**	**OFF**
Optimizes the start and stop times for the comfort temperature period to obtain the best comfort at the lowest energy consumption. *The lower the outdoor temperature, the earlier the heating cut-in. The lower the outdoor temperature, the later the heating cut-out.* *The optimized heating cut-out time can be automatic or disabled. The calculated start and stop times are based on the setting of the optimizing time constant.*		

Adjust the optimizing time constant.

The value consists of a two digit number. The two digits have the following meaning (digit 1 = Table I, digit 2 = Table II).

OFF: No optimization. The heating starts and stops at the times set in the schedule.

10 ... 59: See tables I and II.

Table I:

Left digit	Heat accumulation of the building	System type
1-	light	Radiator systems
2-	medium	
3-	heavy	
4-	medium	Floor heating systems
5-	heavy	

Table II:

Right digit	Dimensioning temperature	Capacity
-0	-50 °C	large
-1	-45 °C	·
·	·	·
-5	-25 °C	normal
·	·	·
-9	-5 °C	small

Dimensioning temperature:
The lowest outdoor temperature (usually determined by your system designer in connection with the design of the heating system) at which the heating system can maintain the designed room temperature.

Example
The system type is radiator, and the heat accumulation of the building is medium.
The left digit is 2.
The dimensioning temperature is -25 °C, and the capacity is normal.
The right digit is 5.

Result:
The setting is to be changed to 25.

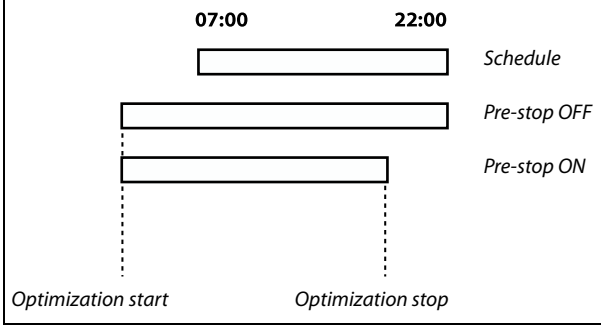
MENU > Settings > Optimization

Pre-stop (optimized stop time)		**11026**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
Disable the optimized stop time.		

OFF: The optimized stop time is disabled.

ON: The optimized stop time is enabled.

Example: Optimization of Comfort from 07:00 - 22:00



MENU > Settings > Optimization

Based on (optimization based on room / outdoor temp.)		**11020**
Circuit	*Setting range*	*Factory setting*
1	**OUT / ROOM**	**OUT**
The optimized start and stop time can be based on either room or outdoor temperature.		

OUT: Optimization based on outdoor temperature. Use this setting if the room temperature is not measured.

ROOM: Optimization based on room temperature, if measured.

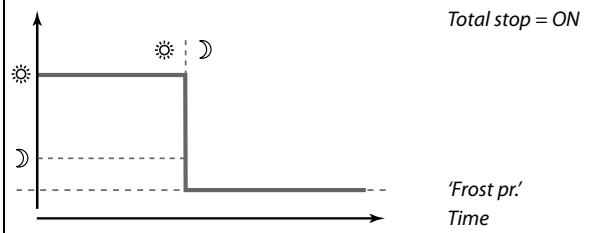
MENU > Settings > Optimization

Total stop		**11021**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Decide whether you want a total stop during the saving temperature period.		

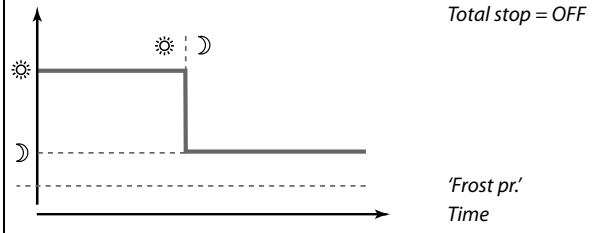
OFF: No total stop. The desired flow temperature is reduced according to:
- desired room temperature in saving mode
- auto saving

ON: The desired flow temperature is lowered to the set value in 'Frost pr.' The circulation pump is stopped but frost protection is still active, see 'P frost T'.

Desired flow temp. °C



Desired flow temp. °C



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

MENU > Settings > Optimization

Summer, cut-out		11179
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 °C**	**20 °C**

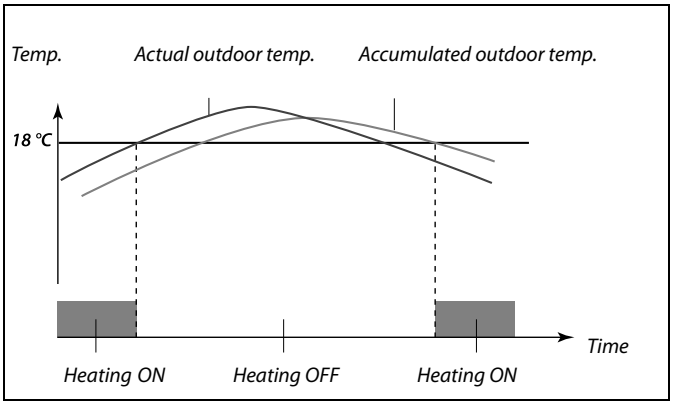
The heating can be switched OFF when the outdoor temperature is higher than the set value. The valve closes and after the post-run time, the heating circulation pump stops. 'Temp. min.' will be overruled.

The heating system switches ON again when the outdoor temperature and the accumulated (filtered) outdoor temperature become lower than the set limit.

This function can save energy.

Set the value for outdoor temperature at which you want the heating system to switch OFF.

See also "Heat cut-out" (MENU > Settings > Heat cut-out).



The heating cut-out is only active when the controller mode is in scheduled operation. When the cut-out value is set to OFF, there is no heating cut-out.

MENU > Settings > Optimization

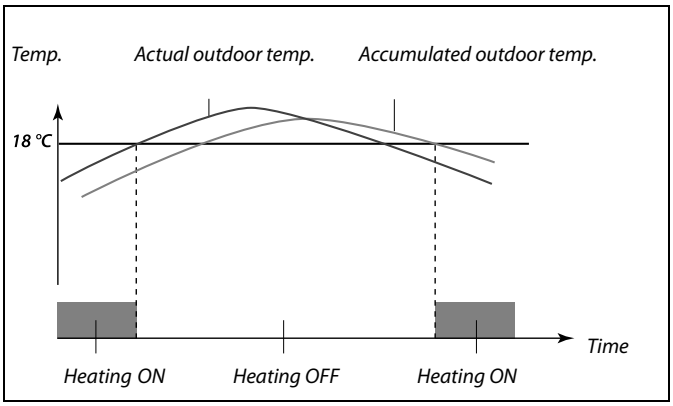
Summer, cut-out (limit for heating cut-out) — A266.9		11179
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 °C**	**18 °C**

The heating can be switched OFF when the outdoor temperature is higher than the set value. The valve closes and after the post-run time, the heating circulation pump stops. 'Temp. min.' will be overruled.

The heating system switches ON again when the outdoor temperature and the accumulated (filtered) outdoor temperature become lower than the set limit.

This function can save energy.

Set the value for outdoor temperature at which you want the heating system to switch OFF.



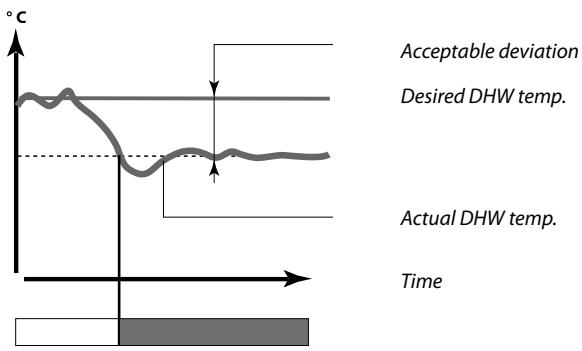
The heating cut-out is only active when the controller mode is in scheduled operation. When the cut-out value is set to OFF, there is no heating cut-out.

MENU > Settings > Optimization

Parallel operation		**11043**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 99 K**	**OFF**
Choose whether the heating circuit is to operate in dependence of the DHW circuit. This function might be useful if an installation has limited power or flow.		

OFF: Independent parallel operation, i.e. the DHW and the heating circuits operate independently of each other. It makes no difference whether the desired DHW temperature can be reached or not.

1 ... 99 K: Dependent parallel operation, i.e. the desired heating temperature depends on the DHW demand. Choose how much the DHW temperature can drop before the desired heating temperature has to be decreased.



100% parallel operation *Parallel operation with decreased heating temp.*

If the actual DHW temperature deviates more than the set value, the gear motor M2 in the heating circuit will gradually close to such an extent that the DHW temperature stabilizes at the lowest acceptable value.

In case the Parallel operation is active (a too low DHW temperature and therefore a reduced heating circuit temperature), a slave's temperature demand will not change the desired flow temperature in the heating circuit.

When dependent parallel operation is in function:

- Desired flow temperature for the heating circuit will be minimum limited, when "Priority for return temperature" (ID 1x085) is set to OFF.
- Desired flow temperature for the heating circuit will not be minimum limited, when "Priority for return temperature" (ID 1x085) is set to ON.

5.6 Control parameters

The application controls the motorized control valve by means of 3-point control.

The motorized control valve is opened gradually when the flow temperature S3 is lower than the desired flow temperature and vice versa.

"Open" and "close" commands come from the electronic outputs of the ECL Comfort controller and control the position of the motorized control valve.

The commands are expressed as "Arrow-up" (open) and "Arrow-down" (close) and displayed (in the right favorite display) at the valve symbol. When the temperature at S3 is lower than the desired temperature, short open-commands come from the ECL Comfort controller in order to open the valve more than the moment before. By this, the S3 temperature aligns with the desired temperature.

Oppositely, when the temperature at S3 is higher than the desired temperature, short close-commands come from the ECL Comfort controller in order to close the valve more than the moment before.

Again, the S3 temperature aligns with the desired temperature. Neither open-commands nor close-commands will come as long as the flow temperature corresponds to the desired temperature.

MENU > Settings > Control par.

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.		

OFF: Motor protection is not activated.

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

Recommended for heating systems with variable load.

MENU > Settings > Control par.

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 temperature.

MENU > Settings > Control par.

Xp (proportional band) — A266.9		**11184**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 K**	**85 K**

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

MENU > Settings > Control par.

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.

MENU > Settings > Control par.

Tn (integration time constant) — A266.9		11185
Circuit	*Setting range*	*Factory setting*
1	**1 ... 999 s**	**25 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.

MENU > Settings > Control par.

M run (running time of the motorized control valve)		11186
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**50 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.

MENU > Settings > Control par.

M run (running time of the motorized control valve) — A266.9		11186
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**120 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.

MENU > Settings > Control par.

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

Set the acceptable flow temperature deviation.

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

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

MENU > Settings > Control par.

Nz (neutral zone) — A266.9		11187
Circuit	*Setting range*	*Factory setting*
1	**1 ... 9 K**	**2 K**

Set the acceptable flow temperature deviation.

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

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

MENU > Settings > Control par.

Actuator		11024
Circuit	*Setting range*	*Factory setting*
1	**ABV / GEAR**	**GEAR**

Selection of valve actuator type.

ABV: Danfoss type ABV (thermo actuator).

GEAR: Gear motor based actuator.

When selecting "ABV", the control parameters:

- Motor protection (ID 11174)
- Xp (ID 11184)
- Tn (ID 11185)
- M run (ID 11186)
- Nz (ID 11187)
- Min. act. time (ID 11189)

are not considered.

MENU > Settings > Control par.

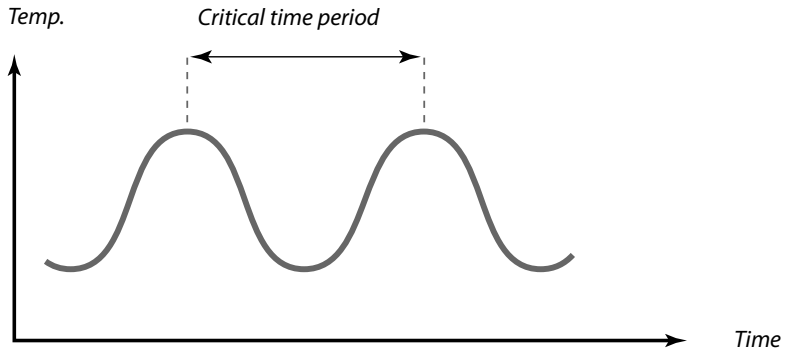
Min. act. time (min. activation time gear motor)		11189
Circuit	*Setting range*	*Factory setting*
1	**2 ... 50**	**10**
The min. pulse period of 20 ms (milliseconds) for activation of the gear motor.		

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.

5.7 Application

MENU > Settings > Application

ECA addr. (choice of Remote Control Unit)		11010
Circuit	*Setting range*	*Factory setting*
1	**OFF / A / B**	**OFF**
Decides the communication with the Remote Control Unit.		

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.

The Remote Control Unit has no influence on the DHW control.

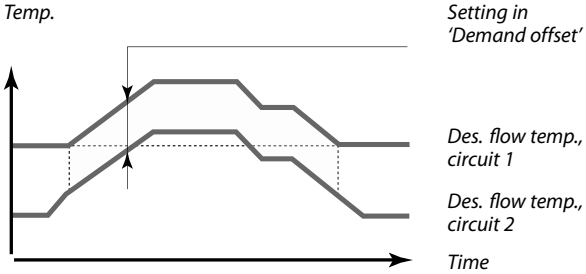
The Remote Control Unit must be set accordingly (A or B).

MENU > Settings > Application

Demand offset		11017
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 20 K**	**OFF**
The desired flow temperature in heating circuit 1 can be influenced by the demand for a desired flow temperature from another controller (slave) or another circuit.		

OFF: The desired flow temperature in circuit 1 is not influenced by the demand of any other controller (slave or circuit 2).

1 ... 20: The desired flow temperature is increased by the set value in 'Demand offset', if the demand of the slave / circuit 2 is higher.



The function of 'Demand offset' can compensate for heat losses between master and slave controlled systems.

When setting "Demand offset" to a value, the return temperature limitation will react according to the highest limitation value (Heating / DHW).

MENU > Settings > Application

P demand		11050
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose conditions for the circulation pump in the heating circuit.		

OFF: The circulation pump is ON when the desired flow temperature in the heating circuit is higher than the value set in 'P heat T'.

ON: The circulation pump is ON when the desired flow temperature from slaves is higher than the value set in 'P heat T'.

The circulation pump is always controlled according to frost protection conditions.

MENU > Settings > Application

Send desired T		**11500**
Circuit	*Setting range*	*Factory setting*
	OFF / ON	**ON**

Sub-circuit in the same ECL controller:
Information about the desired flow temperature can be sent to circuit 1.

The ECL 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.

OFF: Information about the desired flow temperature is not sent to circuit 1 / master circuit / the master controller.

ON: Information about the desired flow temperature is sent to circuit 1 / master circuit / the master controller.

Slave circuits are circuits in other ECL controllers.
Sub-circuits are circuits besides the master or circuit 1 in the ECL controller.

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').

MENU > Settings > Application

P exercise (pump exercise)		**11022**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**

Exercises the pump to avoid blocking in periods without heat demand.

OFF: The pump exercise is not active.

ON: The pump is switched ON for 1 minute every third day at noon (12:14 hours).

MENU > Settings > Application

M exercise (valve exercise)		**11023**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**

Exercises the valve to avoid blocking in periods without heat demand.

OFF: The valve exercise is not active.

ON: The valve opens for 7 minutes and closes for 7 minutes every third day at noon (12:00 hours).

MENU > Settings > Application

P post-run		**11040**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 99 m**	**3 m**

The circulation pump in the heating circuit can be ON for a number of minutes (m) after heating stop (the desired flow temperature gets lower than the setting in 'P heat T' (ID no. 11078)).
This function can utilize the remaining heat in e.g. a heat exchanger.

0: The circulation pump stops immediately after the heating stop.

1 ... 99: The circulation pump is ON for the set time after the heating stop.

MENU > Settings > Application

DHW priority (closed valve / normal operation)		11052
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
The heating circuit can be closed when the controller acts as slave and when DHW heating / charging is active in the master.		

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.
** The desired flow temperature is set to the value set in 'Frost pr. T'*

This setting must be considered if this controller is a slave.

MENU > Settings > Application

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

OFF: No frost protection.

-10 ... 20: The circulation pump 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.

MENU > Settings > Application

P heat T (heat demand)		11078
Circuit	*Setting range*	*Factory setting*
1	**5 ... 40 °C**	**20 °C**
When the desired flow temperature is above the set temperature in 'P heat T', the controller automatically switches ON the circulation pump.		

5 ... 40: The circulation pump is switched ON when the desired flow temperature is above the set value.

The valve is fully closed as long as the pump is not switched on.

MENU > Settings > Application

Frost pr. T (frost protection temperature)		11093
Circuit	*Setting range*	*Factory setting*
1	**5 ... 40 °C**	**10 °C**
Set the desired flow temperature for example at heating cut-out, total stop etc. to protect the system against frost.		

5 ... 40: Desired frost protection temperature.

MENU > Settings > Application

Ext. input (external override)		**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.		

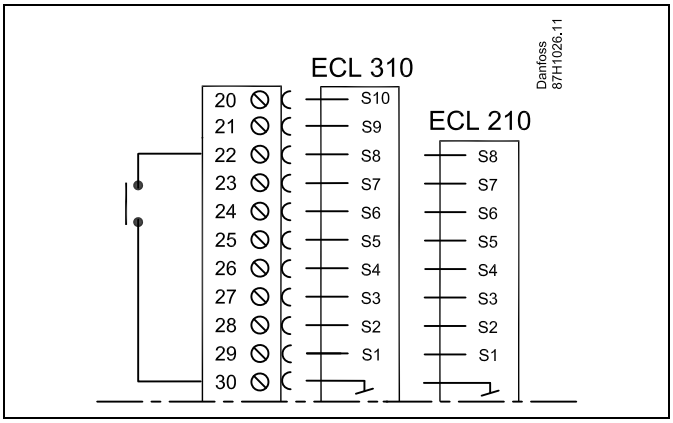
OFF: No inputs have been selected for external override.

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.

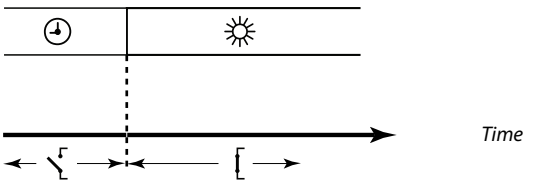
The two drawings (override to comfort mode and override to saving mode) show the functionality.



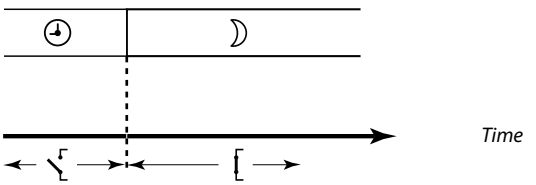
Choose only an unused input for override. If an already used input is applied for override, the functionality of this input is also neglected.

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

MENU > Settings > Application

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

5.8 Heat cut-out

MENU > Settings > Heat cut-out

The setting “Summer cut-out” under “Optimization” for the heating circuit in question determines a heating cut-out when the outdoor temperature exceeds the set value.

A filtering constant for calculating the accumulated outdoor temperature is internally set to a value of "250". This filtering constant represents an average building with solid outer and inner walls (bricks).

An option for differentiated cut-out temperatures, based on a set summer period, can be utilized in order to avoid discomfort at falling outdoor temperature. Furthermore, separate filtering constants can be set.

The factory set values for Summer period start and Winter period start are set to same date: May, 20 (Date = 20, Month = 5).
This means:

- "Differentiated cut-out temperatures" are disabled (not active)
- Separate "Filtering constant" values are disabled (not active)

In order to enable differentiated

- cut-out temperature based on summer / winter period
- filtering constants

the start dates for the periods must be different.

5.8.1 Differentiated heat cut-out

To set differentiated cut-out parameters for a heating circuit for "Summer" and "Winter" go to "Heat cut-out":
(MENU > Settings > Heat cut-out)

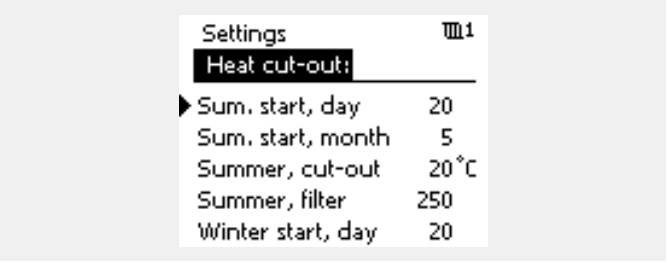
This function is active when the dates for "Summer" and "Winter" are different in the "Heat cut-out" menu.

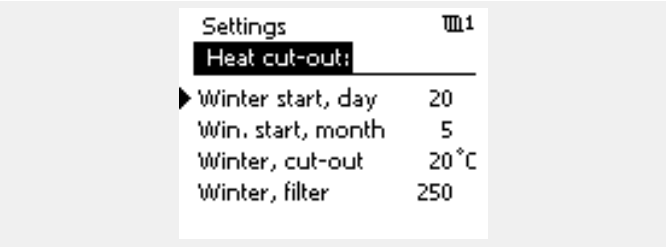
Extended heat cut-out setting			
Parameter	*ID*	*Setting range*	*Factory setting*
Summer day	**11393**	**1 … 31**	**20**
Summer month	**11392**	**1 … 12**	**5**
Summer cut-out	**11179**	**OFF / 1 … 50°C**	**20°C**
Summer filter	**11395**	**OFF / 1 … 300**	**250**

Extended winter cut-out setting			
Parameter	*ID*	*Setting range*	*Factory setting*
Winter day	**11397**	**1 … 31**	**20**
Winter month	**11396**	**1 … 12**	**5**
Winter cut-out	**11398**	**OFF / 1 … 50°C**	**20°C**
Winter filter	**11399**	**OFF / 1 … 300**	**250**

The above settings of the dates for the cut-out function are only to be done in the heating circuit 1 and are valid for other heating circuits in the controller as well, if applicable.

The cut-out temperatures as well as the filter constant are to be set individually per heating circuit.





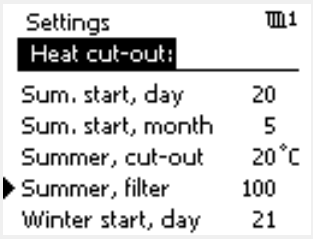
The heating cut-out is only active when the controller mode is in scheduled operation. When the cut-out value is set to OFF, there is no heating cut-out.

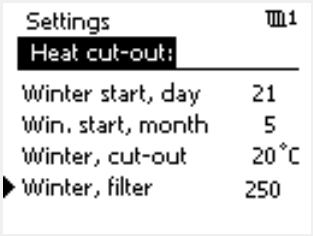
5.8.2 Summer/winter filter constant

The filter constant of 250 is applicable for average buildings. A filter constant of 1 is close switching according to actual outdoor temperature meaning low filtering (very “light” building).

A filter constant of 300 is then to be chosen if a big filtering is needed (very heavy building).

For heating circuits where the heat cut-out is demanded according to the same outdoor temperature for the whole year, but different filtering is wanted, different dates have to be set in the “Heat cut-out” menu enabling a selection of a filter constant different from the factory setting.
These different values have to be set in both the “Summer” and “Winter” menu.





5.9 Alarm

The alarm function activates A1 (relay 4).

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

The alarm relay is activated:

- as long as the alarm reason is present (automatic reset)

or

- even if the alarm reason disappears again (manual reset)

Alarm, possibilities:

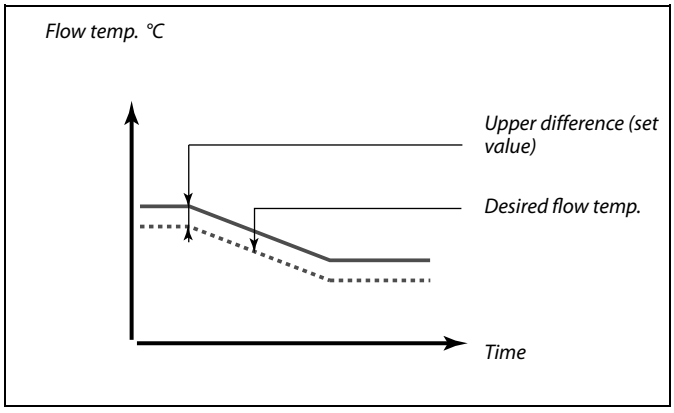
Name:	Description:	Reset:
Temp. monitor (A266.1 / A266.2)	Actual flow temperature differs from the desired flow temperature.	Automatic
Max. temp. (A266.2 / A266.9)	Temperature at S3 higher than accepted.	Automatic
S7 pressure (A266.9)	Too low or too high pressure.	Automatic
Digital (S8) (A266.9)	External alarm	Automatic
Temperature sensor input	Accidental break or short-circuit of connected temperature sensor.	Manual

MENU > Alarm > Temp. monitor

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

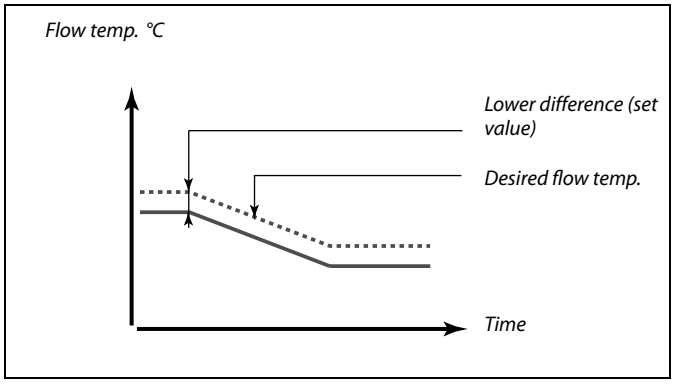


MENU > Alarm > Temp. monitor

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

OFF: The alarm function is not active.

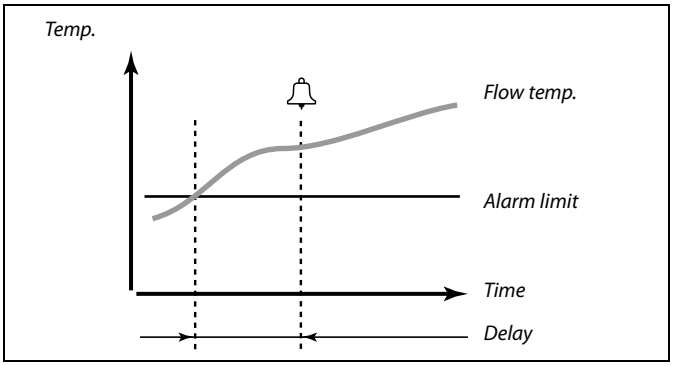
1 ... 30 K: The alarm function is active if the actual temperature gets below the acceptable difference.



MENU > Alarm > Temp. monitor

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.



MENU > Alarm > Temp. monitor

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.

MENU > Alarm > Pressure

Alarm high — A266.9		**11614**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 6.0**	**2.3**
The pressure alarm is activated when the measured signal (see 'Low X', 'High X', 'Low Y' and 'High Y') is above the set limit.		

MENU > Alarm > Pressure

Alarm low — A266.9		**11615**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 6.0**	**0.8**
The pressure alarm is activated when the measured signal (see 'Low X', 'High X', 'Low Y' and 'High Y') is below the set limit.		

MENU > Alarm > Pressure

Alarm time-out — A266.9		**11617**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 240 s**	**30 s**
The pressure alarm is activated when the measured signal has been above or below the limits for a longer time (in seconds) than the set value.		

MENU > Alarm > Pressure

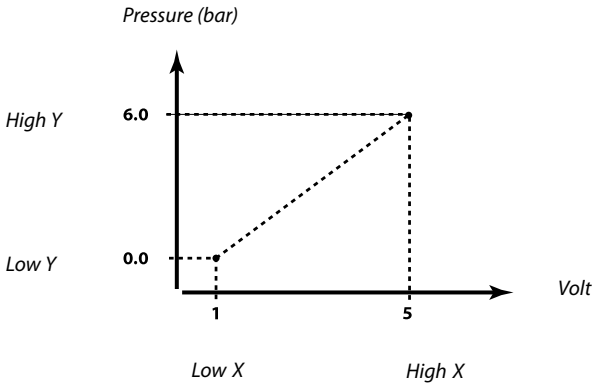
Low X — A266.9		**11607**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 10.0**	**1.0**

The pressure is measured by means of a pressure transmitter. The transmitter sends the measured pressure as a 0-10 V or a 4-20 mA signal.

A voltage signal can be applied directly to input S7. A current signal is converted by means of a resistor to a voltage and then applied to input S7. The measured voltage on input S7 must be converted to a pressure value by the controller. This and following 3 settings set up the scaling.

'Low X' defines the voltage value for the lowest pressure value ('Low Y').

Example: Relationship between input voltage and indicated pressure



This example shows that 1 volt corresponds to 0.0 bar and 5 volt correspond to 6.0 bar.

MENU > Alarm > Pressure

High X — A266.9		**11608**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 10.0**	**5.0**

The measured voltage on input S7 must be converted to a pressure value. High X defines the voltage value for the highest pressure value ('High Y').

MENU > Alarm > Pressure

Low Y — A266.9		**11609**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 10.0**	**0.0**

The measured voltage on input S7 must be converted to a pressure value. Low Y defines the pressure value for the lowest voltage value ('Low X').

MENU > Alarm > Pressure

High Y — A266.9		**11610**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 10.0**	**6.0**

The measured voltage on input S7 must be converted to a pressure value. High Y defines the pressure value for the highest voltage value ('High X').

MENU > Alarm > Digital

Alarm value — A266.9		**11636**
Circuit	*Setting range*	*Factory setting*
1	**0 / 1**	**1**

The alarm is based on a digital input applied to S8.

0: The alarm function is active when the alarm switch closes.

1: The alarm function is active when the alarm switch opens.

MENU > Alarm > Digital

Alarm time-out — A266.9		**11637**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 240 s**	**30 s**
The alarm is activated when the switch has been closed or opened for a longer time (in seconds) than the set value.		

MENU > Alarm > Max. temp.

Max. flow T — A266.2 / A266.9		**11079**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 110 °C**	**90 °C**
When the flow temperature exceeds the set value • *the alarm is activated* • *the circulation pump is switched OFF*		

MENU > Alarm > Max. temp.

Delay — A266.2		**11180**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**5 s**
The alarm is activated when the flow temperature has been above the limit set in 'Max. temperature' for a longer time (in seconds) than the set value.		

MENU > Alarm > Max. temp.

Delay — A266.9		**11180**
Circuit	*Setting range*	*Factory setting*
1	**5 ... 250 s**	**60 s**
The alarm is activated when the flow temperature has been above the limit set in 'Max. temperature' for a longer time (in seconds) than the set value.		

5.10 Alarm overview

MENU > Alarm > Alarm overview

This menu shows the alarm types, for example "2: Temp. monitor".

The alarm is activated if the alarm symbol is present to the right of the alarm type.

Resetting an alarm, in general:

MENU > Alarm > Alarm overview:
Look for alarm symbol in specific line.

(Example: "2: Temp. monitor")
Push dial

6.0 Settings, circuit 2

6.1 Flow temperature

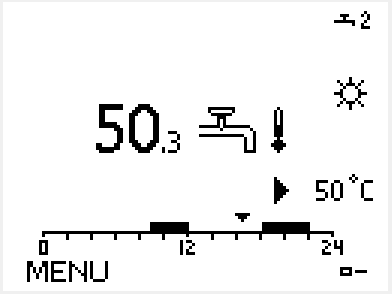
The ECL Comfort 210 / 310 controls the DHW temperature according to the desired flow temperature for example under the influence of the return temperature.

The desired DHW temperature is set in the overview display.

50.3: Actual DHW temperature

50: Desired DHW temperature

Actual DHW temp.



Desired DHW temp.

MENU > Settings > Flow temperature

Temp. max. (flow temp. limit, max.)		**12178**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 150 °C**	**90 °C**

Choose the allowed max. flow temperature for your system.
Adjust the factory setting, if required.

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

MENU > Settings > Flow temperature

Temp. max. (flow temp. limit, max.) — A266.9		**12178**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 150 °C**	**65 °C**

Choose the allowed max. flow temperature for your system.
Adjust the factory setting, if required.

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

MENU > Settings > Flow temperature

Temp. min. (flow temp. limit, min.)		**12177**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 150 °C**	**10 °C**

Choose the allowed min. flow temperature for your system.
Adjust the factory setting, if required.

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

MENU > Settings > Flow temperature

Temp. min. (flow temp. limit, min.) — A266.9		**12177**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 150 °C**	**45 °C**

Choose the allowed min. flow temperature for your system.
Adjust the factory setting, if required.

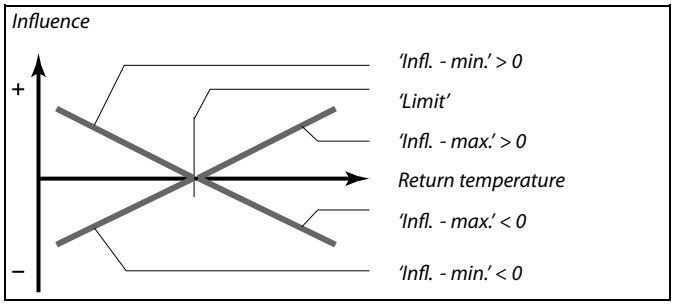
The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

6.2 Return limit

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.

MENU > Settings > Return limit

Limit (return temp. limitation)		**12030**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 150 °C**	**30 °C**
Set the return temperature 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.'.

MENU > Settings > Return limit

Infl. - max. (return temp. limitation - max. influence)		**12035**
Circuit	*Setting range*	*Factory setting*
2	**-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.').

MENU > Settings > Return limit

Infl. - min. (return temp. limitation - min. influence)		**12036**
Circuit	*Setting range*	*Factory setting*
2	**-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.').

MENU > Settings > Return limit

Adapt. time (adaptation time)		**12037**
Circuit	*Setting range*	*Factory setting*
2	**OFF / 1 ... 50 s**	**25 s**
Controls how fast the return temperature adapts to the desired return temperature limit (I control).		

The adaptation function can correct the desired flow 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.

MENU > Settings > Return limit

Priority (priority for return temp. limitation)		**12085**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**OFF**
Choose whether the return temperature limitation should overrule the set min. flow temperature 'Temp. min.'.		

OFF: The min. flow temperature limit is not overruled.

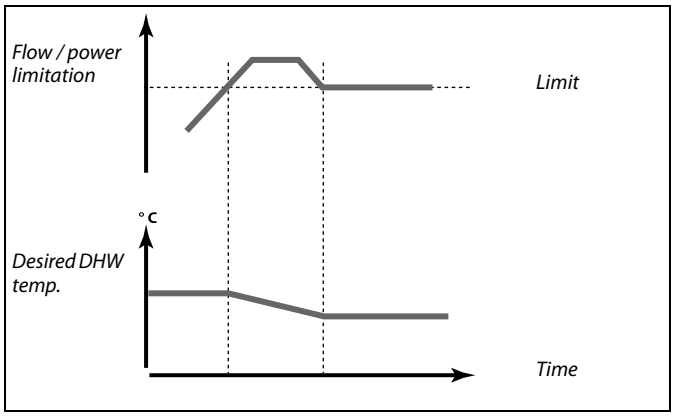
ON: The min. flow temperature limit is overruled.

6.3 Flow / power limit

A flow or heat meter can be connected to the ECL controller in order to limit the flow or consumed power. The signal from the flow or heat meter is a pulse signal.

When the application runs in an ECL Comfort 310 controller, the flow / power signal can be obtained from a flow / heat meter via the M-bus connection.

When the flow / power gets higher than the calculated limit, the controller gradually reduces the desired flow temperature to obtain an acceptable max. flow or power consumption.



MENU > Settings > Flow / power limit

Actual (actual flow or power)		**12110**
Circuit	*Setting range*	*Factory setting*
2	**Read-out only**	
The value is the actual flow or power based on the signal from flow / energy meter.		

MENU > Settings > Flow / power limit

Limit (limitation value)		**12111**
Circuit	*Setting range*	*Factory setting*
2	**0.0 ... 999.9 l/h**	**999.9 l/h**
Set the limitation value.		

MENU > Settings > Flow / power limit

Adapt. time (adaptation time)		**12112**
Circuit	*Setting range*	*Factory setting*
2	**OFF / 1 ... 50 sec**	**OFF**
Controls how fast the flow / power limitation adapts to the desired limitation.		

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

Low value: The desired temperature is adapted slowly.

High value: The desired temperature is adapted quickly.

If the 'Adapt. time' is too low, there is a risk of unstable control.

MENU > Settings > Flow / power limit

Filter constant		**12113**
Circuit	*Setting range*	*Factory setting*
2	**1 ... 50**	**10**
The actual filter dampens the flow / power input data by the set factor.		

1: No filtering.

2: Fast (low filter constant)

50: Slow (high filter constant)

MENU > Settings > Flow / power limit

Input type		**12109**
Circuit	*Setting range*	*Factory setting*
2	**OFF / IM1**	**OFF**
Choice of pulse type from input S7.		

OFF: No input.

IM1: Pulse.

MENU > Settings > Flow / power limit

Units		**12115**
Circuit	*Setting range*	*Factory setting*
2	**See the list**	**ml, l/h**
Choice of units for measured values.		

Units to the left: pulse value.
Units to the right: actual and limitation values.

The value from the flow meter is expressed as ml or l.
The value from the heat meter is expressed as Wh, kWh, MWh or GWh.

The values for the actual flow and the flow limitation are expressed as l/h or m^3/h.

The values for the actual power and the power limitation are expressed as kW, MW or GW.

List for setting range of 'Units':
ml, l/h
l, l/h
ml, m^3/h
l, m^3/h
Wh, kW
kWh, kW
kWh, MW
MWh, MW
MWh, GW
GWh, GW

Example 1:

'Units' (12115): l, m^3/h

'Pulse' (12114): 10

Each pulse represents 10 litres and the flow is expressed as cubic meters (m^3) per hour.

Example 2:

'Units' (12115): kWh, kW (= kilo Watt hour, kilo Watt)

'Pulse' (12114): 1

Each pulse represents 1 kilo Watt hour and the power is expressed in kilo Watt.

MENU > Settings > Flow / power limit

Pulse		**12114**
Circuit	*Setting range*	*Factory setting*
2	**OFF / 1 ... 9999**	**10**
Set the value of the pulses from the flow / heat meter.		

OFF: No input.

1 ... 9999: Pulse value.

Example :

One pulse can represent a number of litres (from a flow meter) or a number of kWh (from a heat meter).

6.4 Control parameters

MENU > Settings > Control par.

Auto tuning		**12173**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**OFF**
Automatically determines the control parameters for the DHW control. 'Xp' 'Tn' and 'M run' do not need to be set, when using auto tuning. 'Nz' must be set.		

OFF: Auto tuning is not activated.

ON: Auto tuning is activated.

The auto tuning function automatically determines the control parameters for DHW control. Thus you do not need to set the 'Xp', 'Tn' and 'M run', as they are automatically set when the auto tuning function is set to ON.

Auto tuning is typically used in connection with the installation of the controller, but it can be activated when needed, e.g. for an extra check of the control parameters.

Before starting the auto tuning, the tapping flow should be adjusted to the relevant value (see table).

If possible, any additional DHW consumption should be avoided during the auto tuning process. Should the tapping load vary too much, the auto tuning and controller will return to the default settings.

Auto tuning is activated by setting the function to ON. When the auto tuning is ended, the function is automatically converted to OFF (default setting). This will be indicated in the display.

The auto tuning process takes up to 25 minutes.

No. of apartments	**Heat transfer (kW)**	**Constant DHW draw-off (l / min)**
1-2	30-49	3 (or 1 tap 25% open)
3-9	50-79	6 (or 1 tap 50% open)
10-49	80-149	12 (or 1 tap 100% open)
50-129	150-249	18 (or 1 tap 100% + 1 tap 50% open)
130-210	250-350	24 (or 2 taps 100% open)

In order to meet the summer- / winter variations, the ECL clock must be set to the correct date for an successful auto tuning.

The motor protection function ('Motor pr.') has to be deactivated during auto tuning. During auto tuning the circulation pump for tap water must be switched off. This is done automatically if the pump is controlled by the ECL controller.

Auto tuning is only applicable in connection with valves that are approved for auto tuning, i.e. the Danfoss types VB 2 and VM 2 with split characteristic as well as logarithmic valves such as VF and VFS.

MENU > Settings > Control par.

Motor pr. (motor protection)		**12174**
Circuit	*Setting range*	*Factory setting*
2	**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 DHW systems with variable load.

OFF: Motor protection is not activated.

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

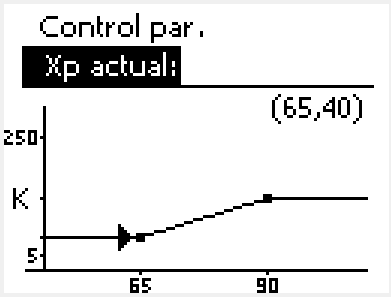
MENU > Settings > Control par.

Xp (proportional band)		**12184**
Circuit	*Setting range*	*Factory setting*
2	**5 ... 250 K**	**40 K**

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

MENU > Settings > Control par.

Xp actual — A266.2		
Circuit	*Setting range*	*Factory setting*
2	**Read-out only**	
'Xp actual' is the read-out of the actual Xp (proportional band) based on the supply temperature. Xp is determined by settings related to the supply temperature. Typically, the higher the supply temperature, the higher the Xp must be in order to achieve a stable temperature control.		



Xp setting range:	5 ... 250 K
Fixed supply temperature settings:	65 °C and 90 °C
Factory settings:	(65,40) and (90,120)

This means that the 'Xp' is 40 K at 65 °C supply temperature, and 'Xp' is 120 K at 90 °C.

Set the desired Xp values at the two fixed supply temperatures.

If the supply temperature is not measured (the supply temperature sensor is not connected), the Xp value at the setting 65 °C is used.

MENU > Settings > Control par.

Xp (proportional band) — A266.9		**12184**
Circuit	*Setting range*	*Factory setting*
2	**5 ... 250 K**	**90 K**

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

MENU > Settings > Control par.

Tn (integration time constant)		**12185**
Circuit	*Setting range*	*Factory setting*
2	**1 ... 999 s**	**20 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.

MENU > Settings > Control par.

Tn (integration time constant) — A266.9		**12185**
Circuit	*Setting range*	*Factory setting*
2	**1 ... 999 s**	**13 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.

MENU > Settings > Control par.

M run (running time of the motorized control valve)		12186
Circuit	*Setting range*	*Factory setting*
2	**5 ... 250 s**	**20 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.

MENU > Settings > Control par.

M run (running time of the motorized control valve) — A266.9		12186
Circuit	*Setting range*	*Factory setting*
2	**5 ... 250 s**	**15 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.

MENU > Settings > Control par.

Nz (neutral zone)		12187
Circuit	*Setting range*	*Factory setting*
2	**1 ... 9 K**	**3 K**

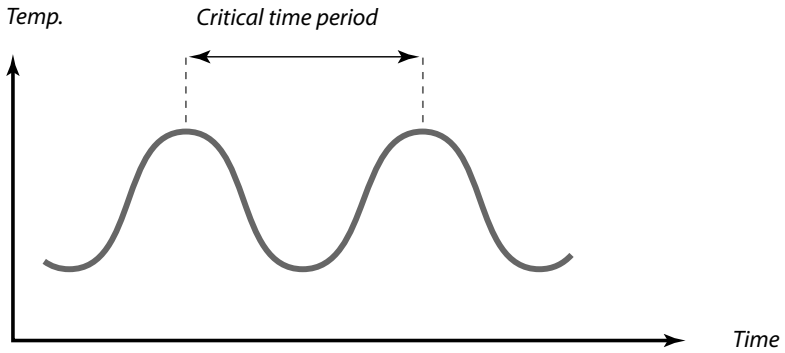
Set the acceptable flow temperature deviation.

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

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

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.

MENU > Settings > Control par.

Supply T (idle)— A266.2		12097
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**OFF**
The 'supply T (idle)' is the supply temperature when there is no DHW tapping. When tapping is not detected (the flow switch is deactivated), the temperature is maintained at a lower level (saving temperature). Choose which temperature sensor is to maintain the saving temperature.		

OFF: The saving temperature is maintained at the DHW flow temperature sensor (S4).

ON: The saving temperature is maintained at the supply temperature sensor (S6).

If the S6 temperature sensor is not connected, the idle supply temperature will be maintained at S4.

MENU > Settings > Control par.

Tn (idle) — A266.2		12096
Circuit	*Setting range*	*Factory setting*
2	**1 ... 999 s**	**120 s**
When no tapping is detected (the flow switch is deactivated), the temperature is maintained at a low level (saving temperature). The integration time 'Tn (idle)' can be set to obtain a slow but stable control.		

MENU > Settings > Control par.

Open time— A266.2		12094
Circuit	*Setting range*	*Factory setting*
2	**OFF / 0.1... 25.0 s**	**4.0 s**
The 'Open time' is the forced time (in seconds) that it takes to open the motorized control valve when a tapping is detected (the flow switch is activated). This function compensates for the delay before the flow temperature sensor measures a change in temperature.		

MENU > Settings > Control par.

Close time— A266.2		12095
Circuit	*Setting range*	*Factory setting*
2	**OFF / 0.1 ... 25.0 s**	**2.0 s**
The 'Close time' is the forced time (in seconds) that it takes to close the motorized control valve when a tapping is stopped (the flow switch is deactivated). This function compensates for the delay before the flow temperature sensor measures a change in temperature.		

MENU > Settings > Control par.

Min. act. time (min. activation time gear motor)		12189
Circuit	*Setting range*	*Factory setting*
2	**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).

MENU > Settings > Control par.

Actuator		**12024**
Circuit	*Setting range*	*Factory setting*
1	**ABV / GEAR**	**GEAR**

Selection of valve actuator type.

ABV: Danfoss type ABV (thermo actuator).

GEAR: Gear motor based actuator.

When selecting "ABV", the control parameters:

- Motor protection (ID 11174)
- Xp (ID 11184)
- Tn (ID 11185)
- M run (ID 11186)
- Nz (ID 11187)
- Min. act. time (ID 11189)

are not considered.

MENU > Settings > Control par.

Min. act. time (min. activation time gear motor) — A266.9		**12189**
Circuit	*Setting range*	*Factory setting*
2	**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).

6.5 Application

MENU > Settings > Application

Send desired T		**12500**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**ON**
Sub-circuit in the same ECL controller: *Information about the desired flow temperature can be sent to circuit 1.* ***The ECL 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.*		

OFF: Information about the desired flow temperature is not sent to circuit 1 / master circuit / the master controller.

ON: Information about the desired flow temperature is sent to circuit 1 / master circuit / the master controller.

Slave circuits are circuits in other ECL controllers.
Sub-circuits are circuits besides the master or circuit 1 in the ECL controller.

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').

MENU > Settings > Application

P exercise (pump exercise)		**12022**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**OFF**
Exercises the pump to avoid blocking in periods without heat demand.		

OFF: The pump exercise is not active.

ON: The pump is switched ON for 1 minute every third day at noon (12:14 hours).

MENU > Settings > Application

P exercise (pump exercise) — A266.9		**12022**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**ON**
Exercises the pump to avoid blocking in periods without heat demand.		

OFF: The pump exercise is not active.

ON: The pump is switched ON for 1 minute every third day at noon (12:14 hours).

MENU > Settings > Application

M exercise (valve exercise)		**12023**
Circuit	*Setting range*	*Factory setting*
2	**OFF / ON**	**OFF**
Exercises the valve to avoid blocking in periods without heat demand.		

OFF: The valve exercise is not active.

ON: The valve opens for 7 minutes and closes for 7 minutes every third day at noon (12:00 hours).

MENU > Settings > Application

P frost T		12077
Circuit	*Setting range*	*Factory setting*
2	**OFF / -10 ... 20 °C**	**2 °C**
When the outdoor temperature is below the set temperature in 'P frost T', the controller automatically switches ON the circulation pump to protect the system.		

OFF: No frost protection.

-10 ... 20: The circulation pump 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.

MENU > Settings > Application

P heat T (heat demand)		12078
Circuit	*Setting range*	*Factory setting*
2	**5 ... 40 °C**	**20 °C**
When the desired flow temperature is above the set temperature in 'P heat T', the controller automatically switches ON the circulation pump.		

5 ... 40: The circulation pump is switched ON when the desired flow temperature is above the set value.

The valve is fully closed as long as the pump is not switched on.

MENU > Settings > Application

P post-run		12040
Circuit	*Setting range*	*Factory setting*
2	**0 ... 99 m**	**3 m**
The circulation pump in the DHW circuit can be ON for a number of minutes (m) after DHW heating stop (the desired flow temperature gets lower than the setting in 'P heat T' (ID no. 12078)). This function can utilize the remaining heat in e.g. a heat exchanger.		

0: The circulation pump stops immediately after the heating stop.

1 ... 99: The circulation pump is ON for the set time after the heating stop.

MENU > Settings > Application

Frost pr. T (frost protection temperature)		12093
Circuit	*Setting range*	*Factory setting*
2	**5 ... 40 °C**	**10 °C**
Set the desired flow temperature to protect the DHW system against frost.		

5 ... 40: Desired frost protection temperature.

MENU > Settings > Application

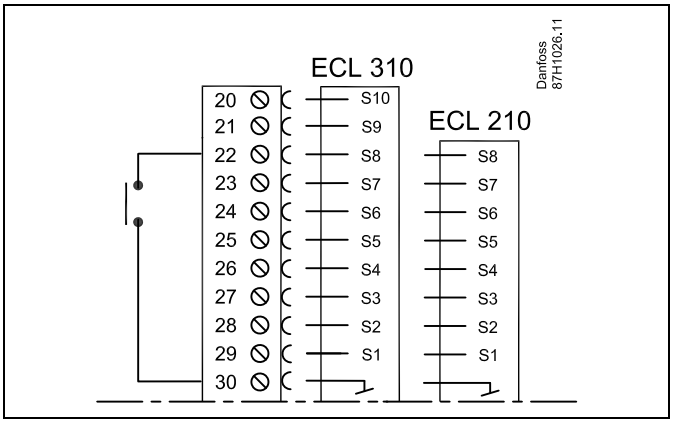
Ext. input (external override)		**12141**
Circuit	*Setting range*	*Factory setting*
2	**OFF / S1 ... S8**	**OFF**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to Comfort or Saving mode.		

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 overridden.

See also 'Ext. mode'.

MENU > Settings > Application

Ext. mode (external override mode)		**12142**
Circuit	*Setting range*	*Factory setting*
2	**COMFORT / SAVING**	**SAVING**
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'.

6.6 Alarm

The alarm function activates A1 (relay 4).

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

The alarm relay is activated:

- as long as the alarm reason is present (automatic reset)

or

- even if the alarm reason disappears again (manual reset)

Alarm, possibilities:

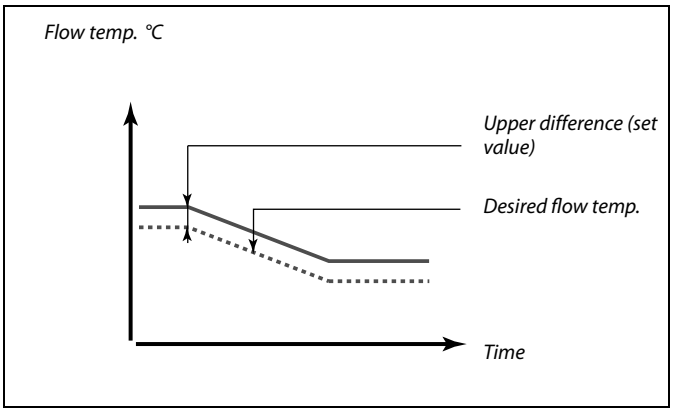
Name:	Description:	Reset:
Temp. monitor (A266.1 / A266.2)	Actual flow temperature differs from the desired flow temperature.	Automatic
Temperature sensor input	Accidental break or short-circuit of connected temperature sensor.	Manual

MENU > Alarm> Temp. monitor.

Upper difference		**12147**
Circuit	*Setting range*	*Factory setting*
2	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow temperature increases more than the set difference (acceptable temperature difference above the desired flow 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.

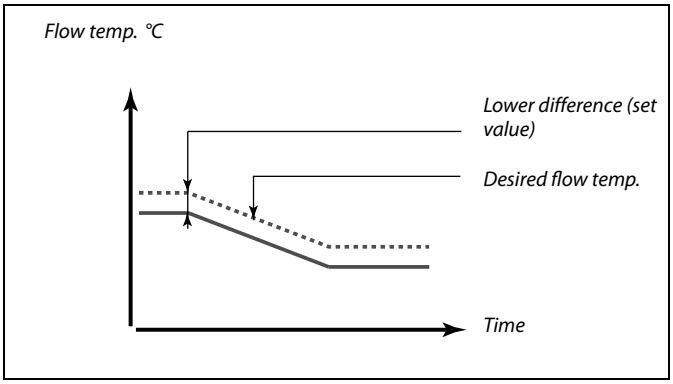


MENU > Alarm> Temp. monitor.

Lower difference		**12148**
Circuit	*Setting range*	*Factory setting*
2	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow temperature decreases more than the set difference (acceptable temperature difference below the desired flow temperature). See also 'Delay'.		

OFF: The alarm function is not active.

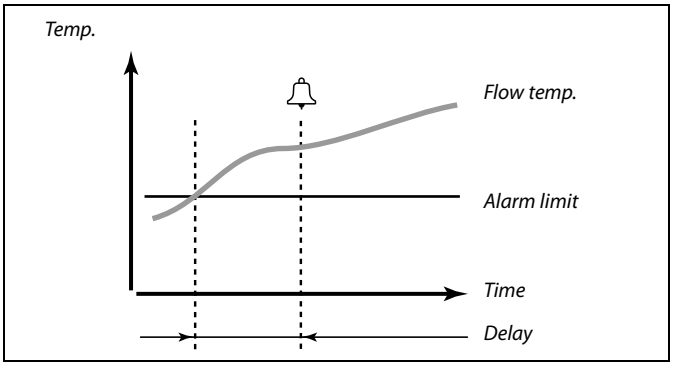
1 ... 30 K: The alarm function is active if the actual temperature gets below the acceptable difference.



MENU > Alarm> Temp. monitor.

Delay		**12149**
Circuit	*Setting range*	*Factory setting*
2	**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.



MENU > Alarm> Temp. monitor.

Lowest temp.		**12150**
Circuit	*Setting range*	*Factory setting*
2	**10 ... 50 °C**	**30 °C**
The alarm function will not be activated if the desired flow temperature is lower than the set value.		

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

6.7 Alarm overview

MENU > Alarm > Alarm overview

This menu shows the alarm types, for example "2: Temp. monitor".

The alarm is activated if the alarm symbol is present to the right of the alarm type.

Resetting an alarm, in general:

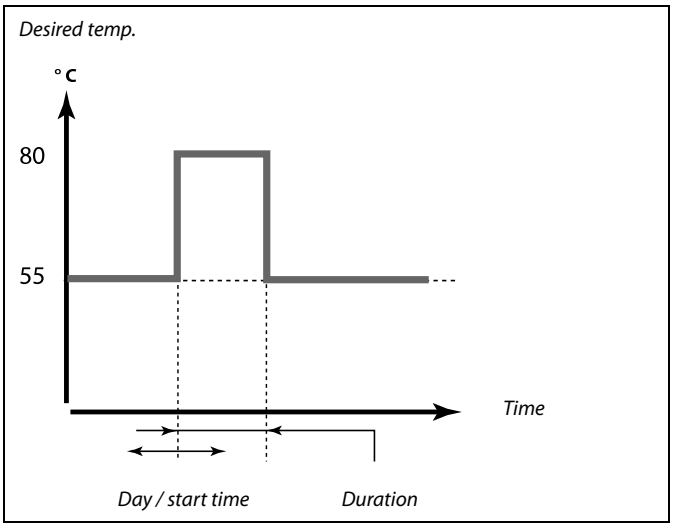
MENU > Alarm > Alarm overview:
Look for alarm symbol in specific line.

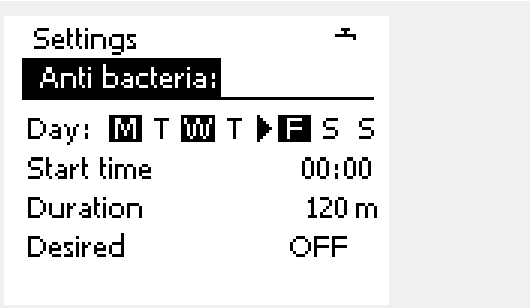
(Example: "2: Temp. monitor")
Push dial

6.8 Anti-bacteria

On selected days during the week the DHW temperature can be increased in order to neutralize bacteria in the DHW system. The desired DHW temperature 'Desired T' (typically 80 °C) will be present for the selected day(s) and duration.

The anti-bacteria function is not active in frost protection mode.





During the anti-bacteria process, the return temperature limitation is not active.

MENU > Settings > Anti-bacteria

Day		
Circuit	*Setting range*	*Factory setting*
2	**Weekdays**	
Select (mark) the day(s) of the week where the anti-bacteria function must be active.		

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

MENU > Settings > Anti-bacteria

Start time		
Circuit	*Setting range*	*Factory setting*
2	**00:00 ... 23:30**	**00:00**
Set the start time for the anti-bacteria function.		

MENU > Settings > Anti-bacteria

Duration		
Circuit	*Setting range*	*Factory setting*
2	**10 ... 600 m**	**120 m**
Set the duration (minutes) for the anti-bacteria function.		

MENU > Settings > Anti-bacteria

Desired T		
Circuit	*Setting range*	*Factory setting*
2	**OFF / 10 ... 110 °C**	**OFF**
Set the desired DHW temperature for the anti-bacteria function.		

OFF: The anti-bacteria function is not active.

10 ... 110: Desired DHW temperature during the anti-bacteria function period.

7.0 Common controller settings

7.1 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

7.2 Time & Date

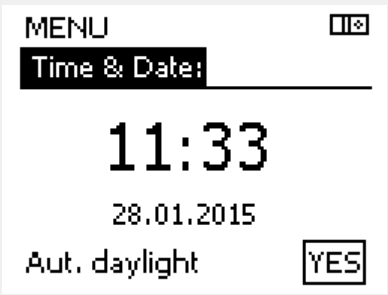
It is only necessary to set the correct date and time in connection with the first use of the ECL Comfort controller or after a power break of more than 72 hours.

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.

7.3 Holiday

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.

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 the end date at 00.00.

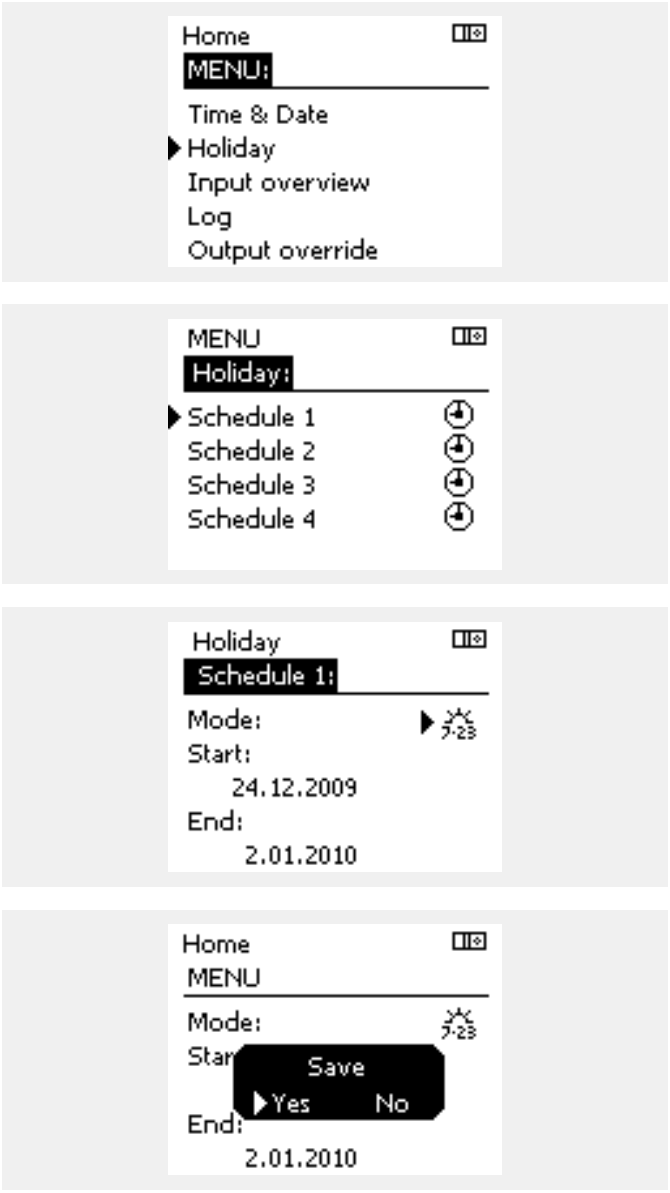
Selectable modes are Comfort, Saving, Frost protection or Comfort 7-23 (before 7 and after 23, the mode is scheduled).

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	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.



Holiday, specific circuit / Common Controller

When setting one holiday program in specific circuit and another holiday program in Common Controller, a priority will be taken into account:

1. Comfort
2. Comfort 7 - 23
3. Saving
4. Frost protection

Example 1:

Circuit 1:
Holiday set to "Saving"

Common Controller:
Holiday set to "Comfort"

Result:
As long as "Comfort" is active in Common Controller, circuit 1 will be in "Comfort".

Example 2:

Circuit 1:
Holiday set to "Comfort"

Common Controller:
Holiday set to "Saving"

Result:
As long as "Comfort" is active in circuit 1, it will be in "Comfort".

Example 3:

Circuit 1:
Holiday set to "Frost protection"

Common Controller:
Holiday set to "Saving"

Result:
As long as "Saving" is active in Common Controller, circuit 1 will be in "Saving".

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).

Connections and setup procedures for ECA 30 / 31:
See section 'Miscellaneous'.

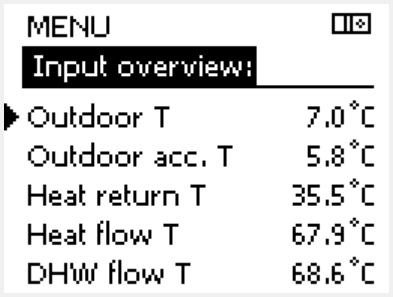
Quick guide "ECA 30 / 31 to override mode":
1. Go to ECA MENU
2. Move cursor to "Clock" symbol
3. Select the "Clock" symbol
4. Choose and select one of 4 override functions
5. Below the override symbol: Set hours or date

7.4 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).



"Outdoor acc. T" means "Accummulated outdoor temperature" and is a calculated value in the ECL Comfort controller.

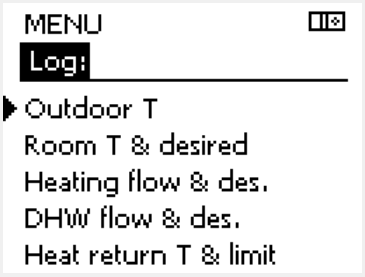
7.5 Log

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.

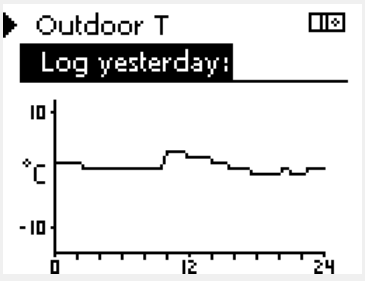
The log function (temperature history) allows you to monitor the logs of today, yesterday, the past 2 days as well as the past 4 days for the connected sensors.

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

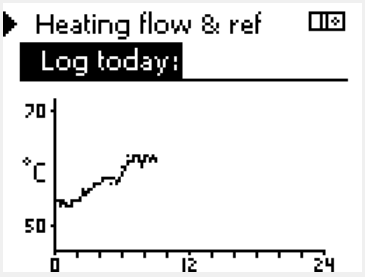
The log function is only available in the 'Common controller settings'.



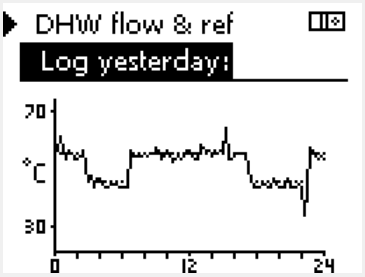
Example 1:
1 day log for yesterday showing the development in outdoor temperature during the past 24 hours.



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.



7.6 Output override

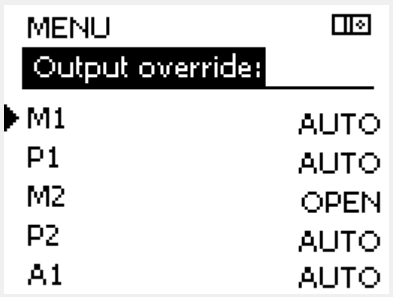
This section describes the function in general for the ECL Comfort 210 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

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*



"Manual control" has higher priority than "Output override".

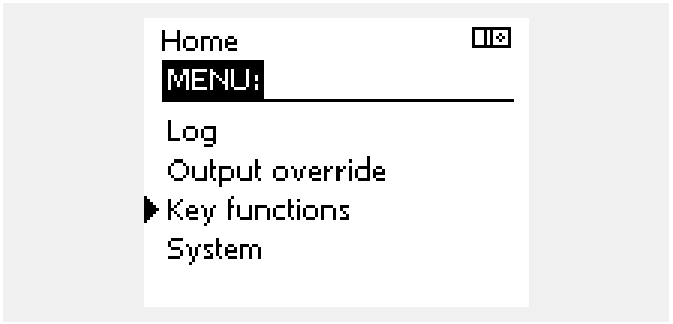
When the selected controlled component (output) is not 'AUTO', the ECL Comfort controller does not control the component in question (pump or motorized control valve e.g.). Frost protection is not active.

When output override of a controlled component is active the symbol '**!**' is shown to the right of the mode indicator in the enduser displays.

7.7 Key functions

New application	**Erase application:** Removes the existing application. As soon as the ECL key is inserted, another application can be chosen.
Application	Gives an overview over the actual application in the ECL controller. Push the dial again to exit the overview.
Factory setting	**System settings:** System settings are, among others, communication set-up, display brightness etc.
	User settings: User settings are, among others, desired room temperature, desired DHW temperature, schedules, heat curve, limitation values etc.
	Go to factory: Restores the factory settings.
Copy	**To:** Copy direction
	System settings
	User settings
	Start copying
Key overview	Gives an overview over the inserted ECL key. (Example: A266 Ver. 2.30). Turn the dial to see the subtypes. Push the dial again to exit the overview.

A more detailed description of how to use the individual 'Key functions' can also be seen in 'Inserting the ECL application key'.



Key inserted / not inserted, description:

ECL Comfort 210 / 310, controller versions lower than 1.36:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; for 20 minutes settings can be changed.

ECL Comfort 210 / 310, controller versions 1.36 and up:

- Take out the application key; for 20 minutes settings can be changed.
- Power up the controller **without** the application key inserted; settings cannot be changed.

7.8 System

7.8.1 ECL version

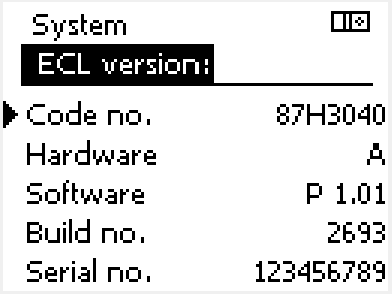
In 'ECL version' you will always be able to find an overview of the data related to your electronic controller.

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



7.8.2 Extension

ECL Comfort 310 only:
'Extension' will offer you information about additional modules, if any. An example could be the ECA 32 module.

7.8.3 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.

7.8.4 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.

7.8.5 Energy meter (heat-meter) and M-bus, general information

When using the Application Key in the ECL Comfort 310 / 310B, up to 5 energy meters (heat-meters) can be connected to the M-bus connections.

Connection of energy meter can:

- limit the flow
- limit the power
- transfer energy meter data to the ECL Portal, via Ethernet, and / or a SCADA system, via Modbus.

The heating circuit, the DHW charging circuit and some cooling circuits can be set to react on energy meter data.
See Circuit > MENU > Settings > Flow / power.

The ECL Comfort 310 acts as an M-bus master and must be set to communicate with connected energy meter(s).
See MENU > Common controller > System > M-bus config.

Technical info:

- The M-bus data are based on standard EN-1434.
- Danfoss recommends AC supplied energy meters in order to avoid battery draining.

MENU > Common controller > System > M-bus config.

State		**Read-out**
Circuit	*Setting range*	*Factory setting*
-	-	-
Information about the current M-bus activity.		

IDLE: Normal state

INIT: The command for initialization has been activated

SCAN: The command for scanning has been activated

GATEW: The command Gateway has been activated

The ECL Comfort 310 will return to IDLE when commands have been completed.
Gateway is used for read-out of energy meter via ECL Portal.

MENU > Common controller > System > M-bus config.

Command		**5998**
Circuit	*Setting range*	*Factory setting*
-	**NONE / INIT / SCAN / GATEW**	**NONE**
The ECL Comfort 310 is M-bus master. In order to verify connected energy meters, different commands can be activated.		

NONE: No command activated

INIT: Initialization is activated

SCAN: Scanning is activated in order to search for connected energy meters. The ECL Comfort 310 detects the M-bus addresses of up to 5 connected energy meters and place these automatically in the "Energy meters" section. The verified address is placed after "Energy meter 1 (2, 3, 4, 5)"

GATEW: The ECL Comfort 310 acts as a gateway between energy meters and ECL Portal. Used only for service.

Scan time can take up to 12 minutes.
When all energy meters are found, the command can be changed to INIT or NONE.

MENU > Common controller > System > M-bus config.

Baud (bits per second)		**5997**
Circuit	*Setting range*	*Factory setting*
-	**300 / 600 / 1200 / 2400**	**300**
The communication speed between ECL Comfort 310 and the connected energy meter(s).		

Typically, 300 or 2400 baud is used.
If ECL Comfort 310 is connected to the ECL Portal, a baud rate of 2400 is recommendable, provided the energy meter allows this.

MENU > Common controller > System > M-bus config.

Energy meter 1 (2, 3, 4, 5) M-bus address		**6000**
Circuit	*Setting range*	*Factory setting*
-	**0 - 255**	**255**
The set or verified address of energy meter 1 (2, 3, 4, 5).		

0: Normally not used

1 - 250: Valid M-bus addresses

251 - 254: Special functions. Use only M-bus address 254 when one energy meter is connected.

255: Not used

MENU > Common controller > System > M-bus config.

Energy meter 1 (2, 3, 4, 5) Scan time		**6002**
Circuit	*Setting range*	*Factory setting*
-	**1 - 3600 sec**	**60 sec**
Setting the scanning time for acquiring data of connected energy meter(s).		

If the energy meter is battery powered, the scan time should be set to a high value to prevent a too fast battery draining.
Oppositely, if the flow / power limitation function is used in the ECL Comfort 310, the scan time should be set to a low value in order to have quick limitation.

MENU > Common controller > System > M-bus config.

Energy meter 1 (2, 3, 4, 5) Type		**6001**
Circuit	*Setting range*	*Factory setting*
-	**0 - 4**	**0**
Setting desired data set type from the energy meter(s).		

0: Small data set, small units

1: Small data set, large units

2: Large data set, small units

3: Large data set, large units

4: Volume and energy data only (example: HydroPort Pulse)

Data examples:

0:
Flow temp., return temp., flow, power, acc. volume, acc. energy.

3:
Flow temp., return temp., flow, power, acc. volume, acc. energy, tariff 1, tariff 2.

See also the "Instructions, ECL Comfort 210 / 310, communication description" for further details.

MENU > Common controller > System > M-bus config.

Energy meter 1 (2, 3, 4, 5) ID		**Read-out**
Circuit	*Setting range*	*Factory setting*
-	-	-
Information about the energy meter's serial no.		

MENU > Common controller > System > Energy meters

Energy meter 1 (2, 3, 4, 5)		**Read-out**
Circuit	*Setting range*	*Factory setting*
-	**0 - 4**	**0**
Information from actual energy meter about, for example, ID, temperatures, flow / volume, power / energy. The shown information depends on the settings made in the "M-bus config." menu.		

7.8.6 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 " - - - ".

7.8.7 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.

7.8.8 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.

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.		

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).

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 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).

7.8.9 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.

8.0 Miscellaneous

8.1 ECA 30 / 31 setup procedures

ECA 30 (code no. 087H3200) is a remote control unit with built-in room temperature sensor.

ECA 31 (code no. 087H3201) is a remote control unit with built-in room temperature sensor and humidity sensor (relative humidity).

An external room temperature sensor can be connected to both types to substitute the built-in sensor.
An external room temperature sensor will be recognized at ECA 30 / 31 power-up.

Connections: See the section 'Electrical connections'.

Max. two ECA 30 / 31 can be connected to one ECL controller or a system (master-slave) consisting of several ECL controllers connected on the same ECL 485 bus. In the master-slave system only one of the ECL controllers is master. The ECA 30 / 31 can, among others, be set to:

- monitor and set the ECL controller remotely
- measure the room temperature and (ECA 31) humidity
- extend comfort / saving period temporarily

After application upload in the ECL Comfort controller, the remote control unit ECA 30 / 31 will after approx. one minute ask to 'Copy application'.
Confirm this in order to upload the application to the ECA 30 / 31.

Menu structure

The menu structure of ECA 30 / 31 is an "ECA MENU" and the ECL menu, copied from the ECL Comfort controller.

The ECA MENU contains:

- ECA settings
- ECA system
- ECA factory

ECA settings: Offset adjustment of the measured room temperature.

Offset adjustment of relative humidity (ECA 31 only).

ECA system: Display, communication, override settings and version info.

ECA factory: Erase of all applications in the ECA 30 / 31, restore to factory settings, reset of ECL address and firmware update.

Part of the ECA 30 / 31 display in ECL mode:

Part of the ECA 30 / 31 display in ECA mode:

If only the "ECA MENU" is shown, it can indicate that the ECA 30 / 31 is not having correct communication address.
See ECA MENU > ECA system > ECA communication: ECL address.
In most cases the ECL address setting must be "15".

Regarding ECA settings:
When ECA 30 / 31 is not used as remote unit, the offset adjustments menu(s) are not present.

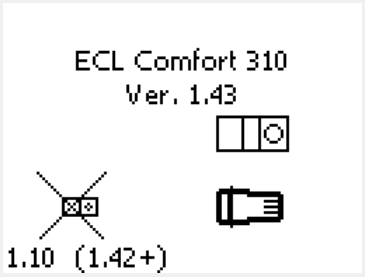
The ECL menus are as described for the ECL controller.

Most of the settings done directly in the ECL controller can be done via the ECA 30 / 31 too.

All settings can be seen even if the application key is not inserted in the ECL controller.
For changing settings, the application key must be inserted.

The Key overview (MENU > 'Common controller settings' > 'Key functions') does not show the applications of the key.

The ECA 30 / 31 will display this information (an X on the ECA 30 / 31 symbol) if the application in the ECL controller does not comply with the ECA 30 / 31:



In the example 1.10 is current version and 1.42 is desired version.

Display part of ECA 30 / 31:

This display indicates that an application has not been uploaded or the communication to the ECL controller (master) is not working properly. An X on the ECL controller symbol indicates wrong setup of communication addresses.

When ECA 30 / 31 is in ECA MENU mode, the date and measured room temperature is displayed.

ECA MENU > ECA settings > ECA sensor

Room T Offset	
Setting range	*Factory setting*
–10.0 ... 10.0 K	**0.0 K**
The measured room temperature can be corrected with a number of Kelvin. The corrected value is used by the heating circuit in the ECL controller.	

Example:

Room T offset:	0.0 K
Displayed room temperature:	21.9 °C
Room T offset:	1.5 K
Displayed room temperature:	23.4 °C

Minus value: The indicated room temperature is lower.

0.0 K: No correction of the measured room temperature.

Plus value: The indicated room temperature is higher.

ECA MENU > ECA settings > ECA sensor

RH offset (ECA 31 only)	
Setting range	*Factory setting*
–10.0 ... 10.0 %	**0.0 %**
The measured relative humidity can be corrected with a number of %-values. The corrected value is used by the application in the ECL controller.	

Example:

RH offset:	0.0 %
Displayed relative humidity:	43.4 %
RH offset:	3.5 %
Displayed relative humidity:	46.9 %

Minus value: The indicated relative humidity is lower.

0.0 %: No correction of the measured relative humidity.

Plus value: The indicated relative humidity is higher.

ECA MENU > ECA system > ECA display

Backlight (display brightness)	
Setting range	*Factory setting*
0 ... 10	**5**
Adjust the brightness of the display.	

0: Weak backlight.

10: Strong backlight.

ECA MENU > ECA system > ECA display

Contrast (display contrast)	
Setting range	*Factory setting*
0 ... 10	**3**
Adjust the contrast of the display.	

0: Low contrast.

10: High contrast.

ECA MENU > ECA system > ECA display

Use as remote	
Setting range	*Factory setting*
OFF / ON	***)**
ECA 30 / 31 can act as a simple or normal remote control for the ECL controller.	

When set to OFF: The ECA menu shows date and time.

When set to ON: The ECA menu shows date and room temperature (and for ECA 31 relative humidity).

OFF: Simple remote control, no room temperature signal.

ON: Remote control, room temperature signal is available.

***):** Differently, depending on chosen application.

ECA MENU > ECA system > ECA communication

Slave addr. (Slave address)	
Setting range	*Factory setting*
A / B	**A**
The setting of 'Slave addr.' is related to the setting 'ECA address' in the ECL controller. In the ECL controller it is selected from which ECA 30 / 31 unit the room temperature signal is received.	

A: The ECA 30 / 31 has the address A.

B: The ECA 30 / 31 has the address B.

For installation of an application in an ECL Comfort 210 / 310 controller the 'Slave addr.' must be A.

If two ECA 30 / 31 are connected in the same ECL 485 bus system, the 'Slave addr.' must be "A" in the one ECA 30 / 31 unit and "B" in the other.

ECA MENU > ECA system > ECA communication

Connection addr. (Connection address)	
Setting range	*Factory setting*
1 ... 9 / 15	**15**
Setting of the address to which ECL controller the communication must run.	

1 .. 9: Slave controllers.

15: Master controller.

An ECA 30 / 31 can in an ECL 485 bus system (master – slave) be set to communicate, one by one, with all addressed ECL controllers.

Example:

Connection addr. = 15:	The ECA 30 / 31 communicates with the ECL master controller.
Connection addr. = 2:	The ECA 30 / 31 communicates with the ECL controller with address 2.

There must be a master controller present in order to broadcast time and date information.

An ECL Comfort controller 210 / 310, type B (without display and dial) cannot be assigned to the address 0 (zero).

ECA MENU > ECA system > ECA override

Override addr. (Override address)	
Setting range	*Factory setting*
OFF / 1 ... 9 / 15	**OFF**
The feature 'Override' (to extended comfort or saving period or holiday) must be addressed to the ECL controller in question.	

OFF: Override not possible.

1 .. 9: Address of slave controller for override.

15: Address of master controller for override.

Override functions:	Extended saving mode:	
	Extended comfort mode:	
	Holiday away from home:	
	Holiday at home:	

Override by means of settings in ECA 30 / 31 are cancelled if the ECL Comfort controller goes into holiday mode or is changed to another mode than scheduled mode.

The circuit in question for override in the ECL controller must be in scheduled mode.
See also the parameter 'Override circuit'.

ECA MENU > ECA system > ECA override

Override circuit	
Setting range	*Factory setting*
OFF / 1 … 4	**OFF**
The feature 'Override' (to extended comfort or saving period or holiday) must be addressed to the heating circuit in question.	

OFF: No heating circuit is selected for override.

1 … 4: The heating circuit number in question.

The circuit in question for override in the ECL controller must be in scheduled mode.
See also the parameter 'Override addr.'.

Example 1:

(One ECL controller and one ECA 30 / 31)		
Override of heating circuit 2:	Set 'Connection addr.' to 15	Set 'Override circuit' to 2

Example 2:

(Several ECL controllers and one ECA 30 / 31)		
Override of heating circuit 1 in ECL controller with the address 6:	Set 'Connection addr.' to 6	Set 'Override circuit' to 1

Quick guide "ECA 30 / 31 to override mode":

1. Go to ECA MENU
2. Move cursor to "Clock" symbol
3. Select the "Clock" symbol
4. Choose and select one of 4 override functions
5. Below the override symbol: Set hours or date
6. Below hours / date: Set desired room temperature for the override period

ECA MENU > ECA system > ECA version

ECA version (read-out only), examples	
Code no.	087H3200
Hardware	A
Software	1.42
Build no.	5927
Serial no.	13579
Production week	23.2012

The ECA version information is useful in service situations.

ECA MENU > ECA factory > ECA clear apps.

Erase all apps. (Erase all applications)
Erase all applications which are in the ECA 30 / 31. After erasing, the application can be uploaded again.

NO: The erase procedure is not done.

YES: The erase procedure is done (await 5 sec.).

After the erase procedure, a pop-up in the display indicates "Copy application". Choose "Yes".
Hereafter the application is uploaded from the ECL controller. An upload bar is shown.

ECA MENU > ECA factory > ECA default

Restore factory
The ECA 30 / 31 is set back to factory settings.
Affected settings by the restore procedure: • Room T offset • RH offset (ECA 31) • Backlight • Contrast • Use as remote • Slave addr. • Connection addr. • Override addr. • Override circuit • Override mode • Override mode end time

NO: The restore procedure is not done.

YES: The restore procedure is done.

ECA MENU > ECA factory > Reset ECL addr.

Reset ECL addr. (Reset ECL address)
If none of the connected ECL Comfort controllers has the address 15, the ECA 30 / 31 can set all connected ECL controllers on the ECL 485 bus back to address 15.

NO: The reset procedure is not done.

YES: The reset procedure is done (await 10 sec.).

The ECL 485 bus related address of the ECL controller is found:
MENU > 'Common controller settings' > 'System' > 'Communication' > 'ECL 485 addr.'

The "Reset ECL addr." cannot be activated if one or more of the connected ECL Comfort controllers has the address 15.

ECA MENU > ECA factory > Update firmware

Update firmware
The ECA 30 / 31 can be updated with new firmware (software). The firmware comes with the ECL application key, when the key version is at least 2.xx. If no new firmware is available, a symbol of the application key is displayed with an X.

NO: The updating procedure is not done.

YES: The updating procedure is done.

The ECA 30 / 31 automatically verifies if a new firmware is present on the application key in the ECL Comfort controller.
The ECA 30 / 31 is automatically updated at new application upload in the ECL Comfort controller.

The ECA 30 / 31 is not automatically updated when connected to an ECL Comfort controller with uploaded application. A manual update is always possible.

Quick guide "ECA 30 / 31 to override mode":

1. Go to ECA MENU
2. Move cursor to "Clock" symbol
3. Select the "Clock" symbol
4. Choose and select one of 4 override functions
5. Below the override symbol: Set hours or date
6. Below hours / date: Set desired room temperature for the override period

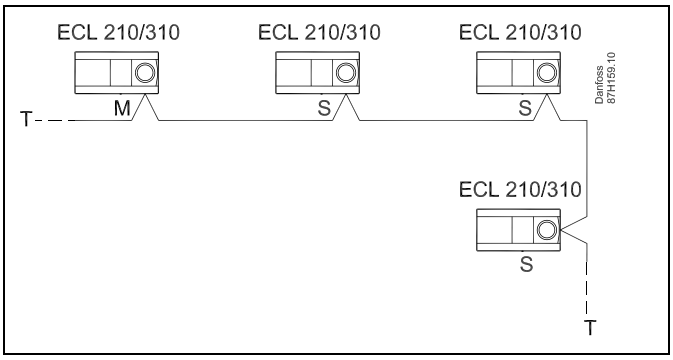
8.2 Several controllers in the same system

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 tank heating / charging activity

Furthermore, the master controller can receive information about:

- the desired flow temperature (demand) from slave controllers
- and (as from ECL controller version 1.48) DHW tank heating / charging activity in slave controllers



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.

Situation 1:
SLAVE controllers: How to make use of the outdoor temperature signal sent from the MASTER controller

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:

In the MASTER controller, the address in 'ECL 485 addr. (master / slave address)', ID no. 2048, must always be 15.

ECL 485 addr. (master / slave address)		**2048**
Circuit	Setting range	**Choose**
⊡⊙	0 ... 15	**0**

Situation 2:
SLAVE controller: How to react on a DHW tank heating / charging activity sent from the MASTER controller

The slave receives information about a DHW tank heating / charging activity in the master controller and can be set to close the selected heating circuit.

ECL controller versions 1.48 (as from August 2013):
The master receives information about DHW tank heating / charging activity in the master controller itself and also slaves in the system.
This status is broadcasted to all ECL controllers in the system and each heating circuit can be set to close the heating.

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 / slave system.

ON: The valve in the heating circuit is closed during active DHW heating / charging in the master / slave system.

Situation 3:
SLAVE controller: How to make use of the outdoor temperature signal and send information about the desired flow temperature back to the MASTER controller

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.

8.3 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.

Why can't an application be selected when inserting the ECL application key into the controller?
The actual application in the ECL Comfort controller must be deleted before a new application (subtype) can be selected.

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.

8.4 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.

Modulating control (0 - 10 V control)
Positioning (by means of a 0 - 10 V control signal) of the actuator for the motorized control valve in order to control the flow.

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.

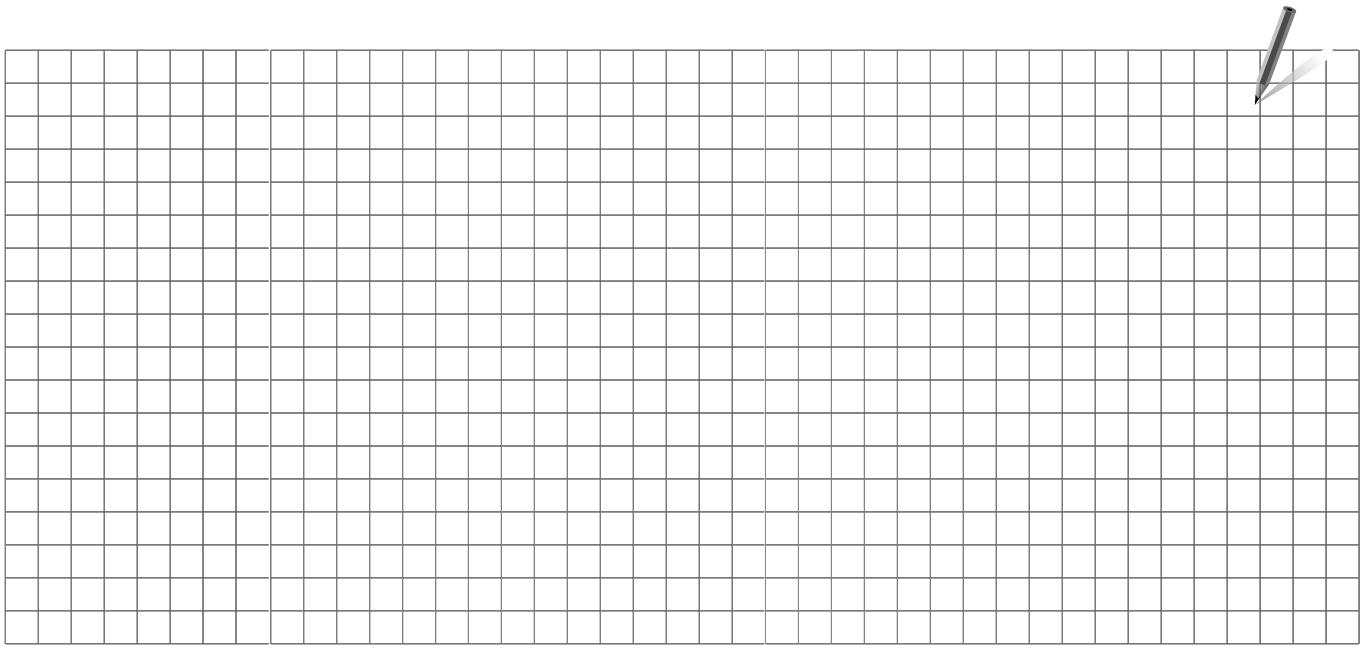
Saving temperature
Temperature maintained in the heating / DHW circuit during saving temperature periods.

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 A266

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