ENGINEERING TOMORROW

Operating Guide

ECL Comfort 310, application A319

1.0 Table of Contents

1.1 Important safety and product information

1.1.1 Important safety and product information

This Operating Guide is associated with the ECL Application Key A319 (code no. 087H3831)

The ECL Application Key A319 contains two subtypes:

- A319.1: Heating supply, directly from buffer
- A319.2: as A319.1, but with mixing circuit after the buffer

See the Installation Guide for electrical connections.

The described functions are realized in ECL Comfort 310 which also allows M-bus, Modbus and Ethernet (Internet) communication.

The Application Key A319 complies with ECL Comfort 310 controllers as of software version 1.11 (visible at start-up of the controller and in 'Common controller settings' in 'System').

Up to two Remote Control Units, ECA 30 or ECA 31, can be connected.

The application A319 works with additional Internal I/O modules:

- The extension module ECA 32 gives 0 - 10 Volt signal for speed control of charging and circulation pumps
- The extension module ECA 35 gives 0 - 10 Volt signal for speed control of charging and circulation pumps. ECA 35 can also give PWM* signal for speed control of charging and circulation pumps.

The ECL Comfort 310 works with either one ECA 32 or one ECA 35. The Internal I/O module in question is placed in the base part of the ECL Comfort 310.

* PWM = Pulse Width Modulation

Together with the ECL Comfort 310 the additional Internal I/O modules can also be used for extra data communication to SCADA:

- Temperature, Pt 1000 (default)
- 0 - 10 volt signals

The set-up of input type can be done by means of the Danfoss Software "ECL Tool".
Navigation: Danfoss.com > Products & Solutions > District Heating and Cooling > Tools & Software > ECL Tool.
The URL is:
https://www.danfoss.com/en/service-and-support/downloads

ECL Comfort 310 is available as:

- ECL Comfort 310, 230 volt a.c. (code no. 087H3040)
- ECL Comfort 310B, 230 volt a.c. (code no. 087H3050)
- ECL Comfort 310, 24 volt a.c. (code no. 087H3044)

The B-type has no display and dial.

The B-type is operated by means of the remote control unit ECA 30 / 31:

- ECA 30 (code no. 087H3200)
- ECA 31 (code no. 087H3201)

Internal I/O modules:

- ECA 32 (code no. 087H3202)
- ECA 35 (code no. 087H3205)

Base part for ECL Comfort 310, 230 volt and 24 volt: (code no. 087H3230).

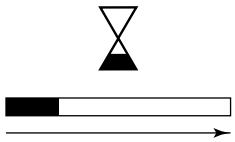
Additional documentation for ECL Comfort 210 and 310, modules and accessories is available on *http://danfoss.com/* or *http://store.danfoss.com*.

Application keys might be released before all display texts are translated. In this case the text is in English.

Automatic update of controller software (firmware):
The software of the controller is updated automatically when the key is inserted:

- ECL 210 / 310, as of controller version 1.11
- ECL 296, as of controller version 1.58

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.
- Manual update of controller software (firmware):
  See the section "Automatic / manual update of firmware"

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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 296 / 210 / 310** installation is max. 10 A typically.
A fuse for the **ECL Comfort 120 / 220** installation is **max. 6 A.**

The ambient temperature ranges for ECL Comfort in operation are:
ECL Comfort 120 / 220: –5–50 °C
ECL Comfort 210 / 310: 0–50 °C
ECL Comfort 296: 0 - 45 °C.
Exceeding the 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.

As this Operating 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'.

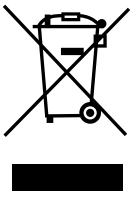
°C (degrees Celsius) is a measured temperature value whereas K (Kelvin) often is used for temperature differences.

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.
x stands for circuit / parameter group.



Disposal Note

This symbol on the product indicates that it may not be disposed of as household waste.

It must be handed over to the applicable take-back scheme for the recycling of electrical and electronic equipment.

- Dispose of the product through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

2.0 Installation

2.1 Before you start

The ECL application key A319 contains 2 subtypes: **A319.1** and **A319.2.**
These heating applications are very flexible.
The basic principles for application **A319.1:**
The function of the storage charging pump P2/V2 can be set for a max. charging capacity with short charging times (max. possible volume flow) or for a min. charging capacity with the longest possible charging times (min. volume flow).

Temperature control of buffer
The buffer temperature S6 is adjusted according to your requirements. The supply temperature sensor S2, the buffer temperature sensors S6 and S8 and the charging temperature sensor S3 are the most important sensors and must be connected.
The desired buffer temperature at S6 is calculated in the ECL controller, based on the demand from the heating circuit (consumer). This demand is a result of the outdoor temperature S1, the heat curve and a desired room temperature. A compensation for the heat loss between buffer tank and consumer can be set as "Demand offset".
The charging temperature at S3 is based on the desired buffer temperature at S6 and a charging difference.

Start buffer charging process:

1. Buffer temperature S6 temperature gets lower than ('Desired buffer temperature' + 'Start difference').

   An example: 60 °C + (-7) = 53 °C

2. X1 is switched ON
3. M1 opens in order to increase the supply temperature S2

   NOTE: When setting of "Wake up level" is ON, M1 will be opening without stop. When parameter is set to numeric value M1 will open x % of actuator run setting.

4. As soon as P2/V2 is started, the pump is controlled within V2min and V2max. For the min. charging capacity (setting adapt time =1-100 s), V2 is reduced again as soon as S6>Desired buffer temperature - Start Diff./2 is reached. The volume flow is reduced until the pump P2/V2 runs at V2min. If S6 value will fall below "Desired buffer temperature - (Start diff./ 2)", controller will adjust output signal accordingly for P2 / V2 and will increase flow. How quickly pump will react can be adjusted via "Adapt. time" setting or can be turned off if needed.
5. M1 controls the charging temperature at S3
6. V2 increases the speed as long as the charging temperature is equal to the desired charging temperature.

Stop buffer charging process:

1. Buffer temperature S6 temperature gets higher than ('Desired buffer temperature' + 'Start difference') **AND**

   Lower buffer temperature S8 gets higher than ('Desired buffer temperature' + 'Stop difference).

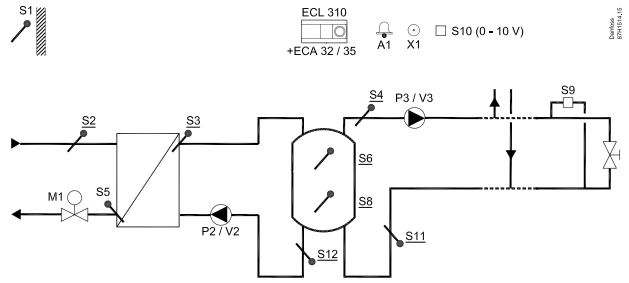
   An example: S6 temperature higher than (60 °C + (-7) = 53 °C) **AND** (60 °C + (-4) = 56 °C)

2. P2 is switched OFF, respecting 'Char. P post-run'. V2 changes to 0 %.

   NOTE: Post-run is respected if charging temperature S3 is lower than desired charging temperature and charging temperature S3 is below desired S6.

3. X1 is switched OFF
4. M1 closes or maintains the desired temperature at S3.

Typical A319.1 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 310	*ECL Comfort 310 controller*
ECA 32	*Built-in extension module, 0 - 10 V outputs*
ECA 35	*Built-in extension module, 0 - 10 V outputs and PWM outputs*
S1	*Outdoor temperature sensor*
S2	*(mandatory) Supply temperature sensor*
S3	*(mandatory) Charging temperature sensor*
S4	*(monitoring only) Flow temperature sensor*
S5	*Return temperature sensor*
S6	*(mandatory) Upper buffer temperature sensor*
S7	*not used*
S8	*(mandatory) Lower buffer temperature sensor*
S9	*Pressure difference transmitter (0 - 10 V)*
S10	*0 - 10 V input for desired temperature at S6*
P2	*Charging pump (ON-OFF controlled)*
V2	*Speed control of charging pump (0 - 10 V or PWM)*
P3	*Circulation pump (ON-OFF controlled)*
V3	*Speed control of circulation pump (0 - 10 V or PWM)*
M1	*Motorized control valve (3-point controlled)*
X1	*Heat demand signal*
A1	*Alarm*
S11 / S12	*For monitoring*

By means of a week schedule, the 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 (M1) is opened gradually when the charging temperature is lower than the desired charging temperature and vice versa.

The return temperature S5 can be limited, for example not to be too high. If so, the desired charging temperature is maintained, but the speed of pump V2 is continuously reduced (possible down to V out min.).
Furthermore, the return temperature limitation can be dependent on the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted return temperature.

The ON-OFF output X1 is ON at heating demand.

The circulation pump P3 is ON at heating demand or at frost protection.

Unused input can, by means of an override switch or relay contact, be used for overriding the schedule to a fixed 'Comfort', 'Saving', 'Frost protection' or 'Constant temperature' mode.

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

The 'Frost protection' mode maintains a selectable temperature, for example 10 °C.

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 bus system can work as master and slaves.

Alarm A1 (= relay 6) can be activated if:

- the actual charging temperature differs from the desired charge temperature
- the supply temperature does not reach the necessary level
- a temperature sensor or its connection disconnects / short circuits. (See: Common controller settings > System > Raw input overview)

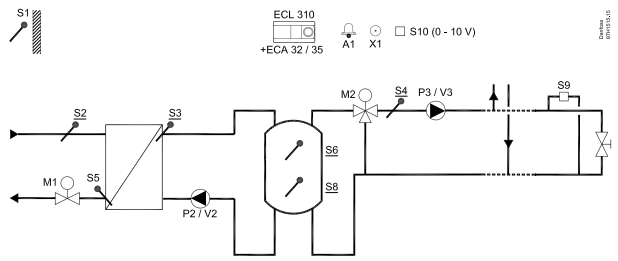
Pressure difference control (optional):
The circulation pump P3 / V3 can, as an alternative to ON-OFF control, be speed controlled by means of a 0 - 10 volt signal or a PWM signal. The desired pressure difference at S9 can be set for the speed control procedure.

The basic principles for application **A319.2:**

The application A319.2 works like A319.1 and with these additional features:

The motorized control valve (M2) is opened gradually when the flow temperature S4 is lower than the desired flow temperature and vice versa.

Typical A319.2 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:

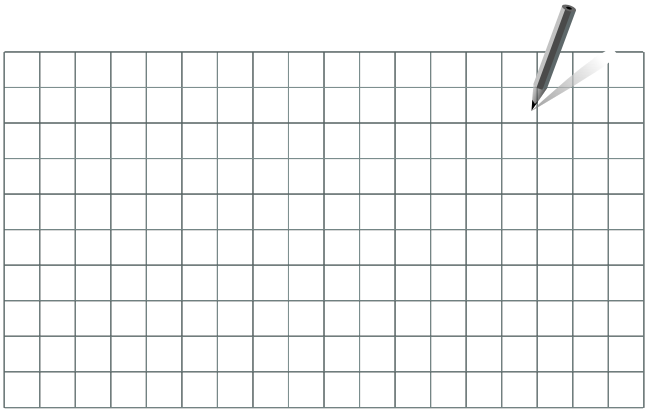
ECL 310	*ECL Comfort 310 controller*
ECA 32	*Built-in extension module, 0 - 10 V outputs*
ECA 35	*Built-in extension module, 0 - 10 V outputs and PWM outputs*
S1	*Outdoor temperature sensor*
S2	*(mandatory) Supply temperature sensor*
S3	*(mandatory) Charging temperature sensor*
S4	*(mandatory) Flow temperature sensor*
S5	*Return temperature sensor*
S6	*(mandatory) Upper buffer temperature sensor*
S8	*(mandatory) Lower buffer temperature sensor*
S9	*Pressure difference transmitter (0 - 10 V)*
S10	*0 - 10 V input for desired temperature at S6*
P2	*Charging pump (ON-OFF controlled)*
V2	*Speed control of charging pump (0 - 10 V or PWM)*
P3	*Circulation pump (ON-OFF controlled)*
V3	*Speed control of circulation pump (0 - 10 V or PWM)*
M1	*Motorized control valve (3-point controlled)*
M2	*Motorized control valve (3-point controlled)*
X1	*Heat demand signal*
A1	*Alarm*

The controller is pre-programmed with factory settings that are shown in the 'Parameter ID overview' appendix.

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 Operating Guide, which will guide you step-by-step from installation to final adjustments before the end-user takes over.



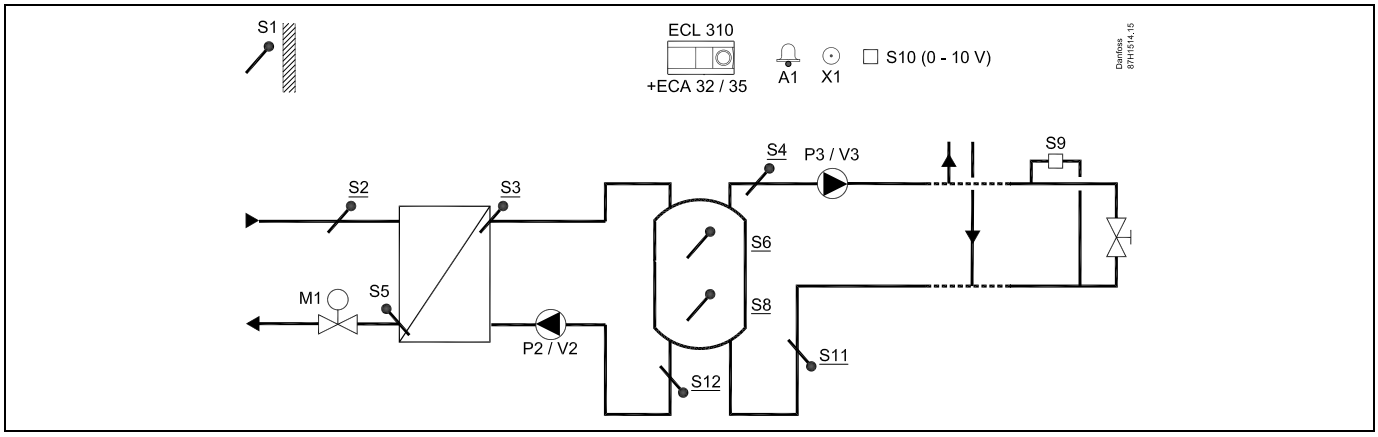
The ECL Comfort controller is a universal controller that can be used for various systems. Based on the shown standard systems, it is possible to configure additional systems. In this chapter you find the most frequently used systems. If your system is not quite as shown below, find the diagram which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

See the Installation Guide (delivered with the application key) for application types / sub-types.

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.

A319.1, ex. a

Charging control of buffer temperature and heating supply directly from buffer. Control of pressure difference.

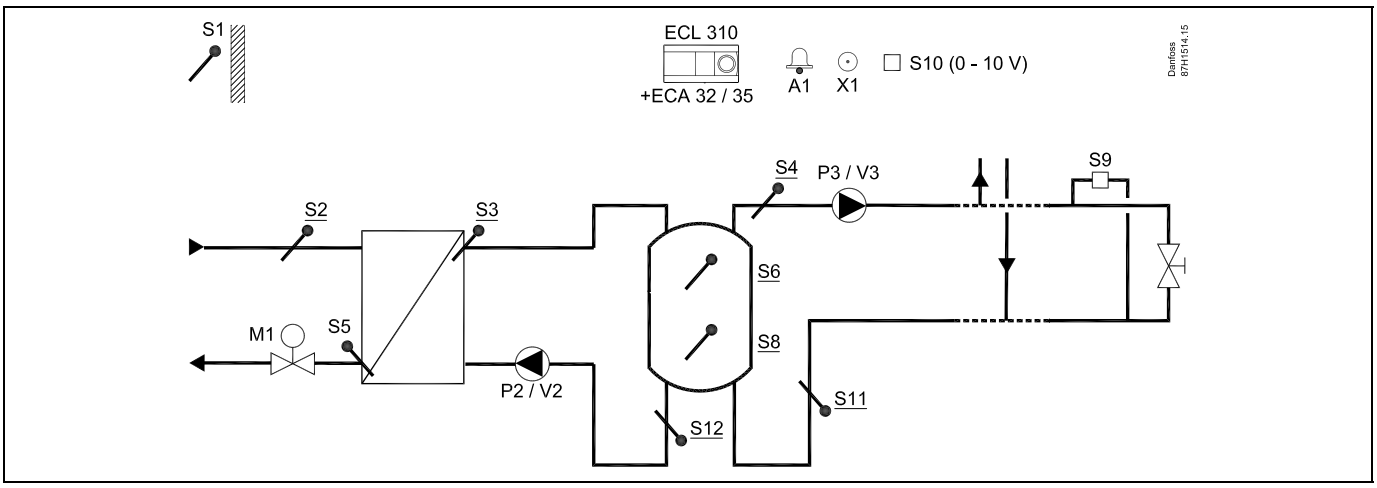


Sensor advice:

Sensor S3, S6 and S8 must be connected. If not, the charging process will not work.
If pressure difference sensor S9 is not connected, the speed control of P3 / V3 is not in action.

A319.2, ex. a

Charging control of buffer temperature and heating supply from buffer via mixing circuit. Control of pressure difference.



Sensor advice:

Sensor S3, S4, S6 and S8 must be connected. If not, the charging process will not work.
If pressure difference sensor S9 is not connected, the speed control of P3 / V3 is not in action.

2.3 Mounting

2.3.1 Mounting the ECL Comfort controller

See the Installation Guide which is delivered together with the ECL Comfort controller.

For easy access, you should mount the ECL Comfort controller near the system.

ECL Comfort 210 / 296 / 310 can be mounted

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

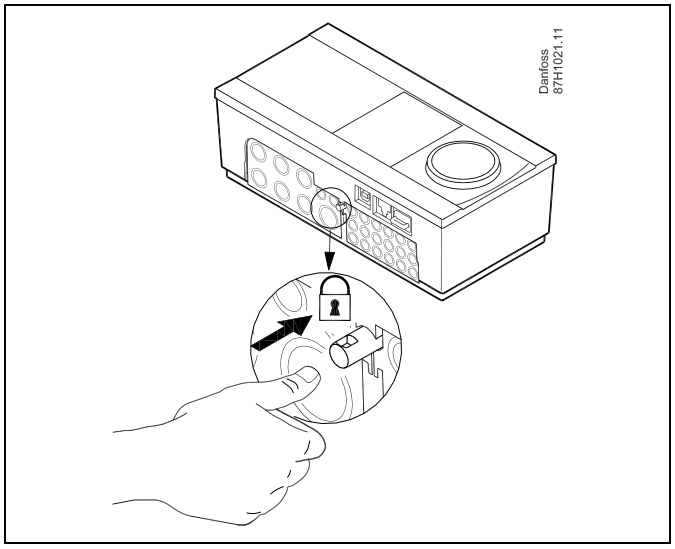
ECL Comfort 296 can be mounted

- in a panel cut-out

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 210 / 310 controller
In order to fasten the ECL Comfort controller to its base part, secure the controller with the locking pin.



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

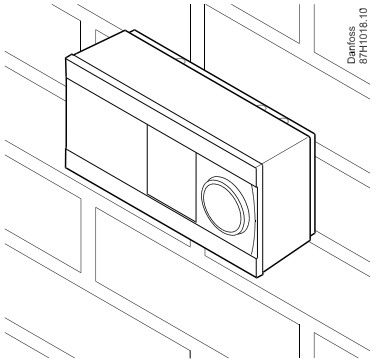
⚠

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

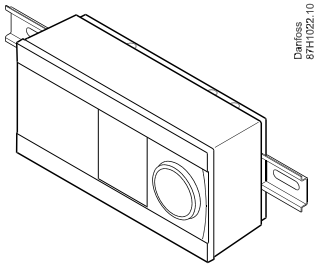
⚠

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

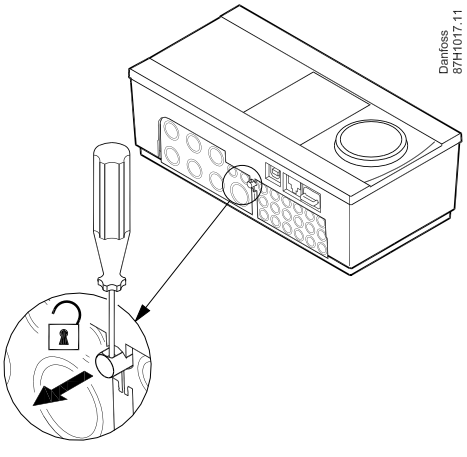
Mounting on a wall
Mount the base part on a wall with a smooth surface. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



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



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



⚠

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

⚠

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

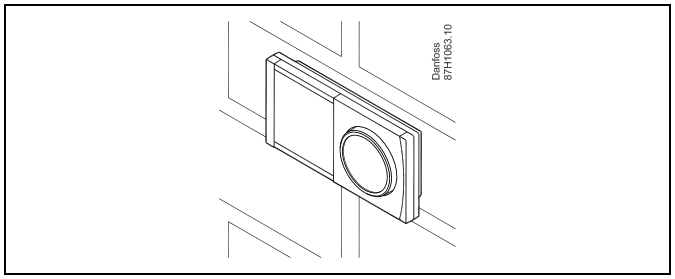
2.3.2 Mounting the Remote Control Units ECA 30 / 31

Select one of the following methods:

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

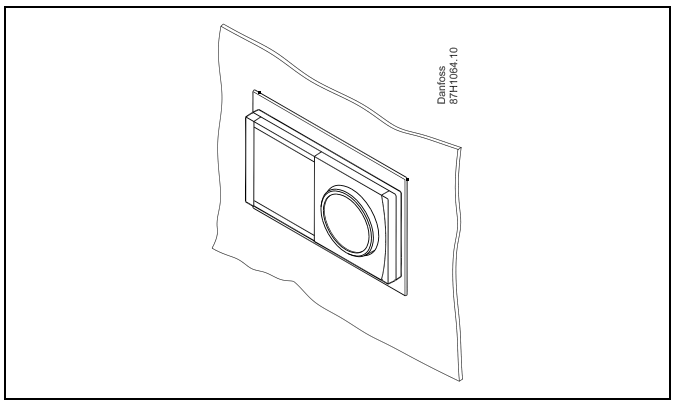
Screws and rawlplugs are not supplied.

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



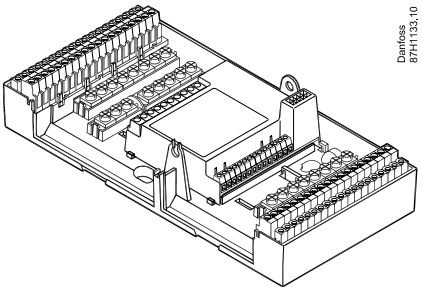
Mounting in a panel
Mount the ECA 30 in a panel using the ECA 30 frame kit (order code no. 087H3236). Establish the electrical connections. Secure the frame with the clamp. Place the ECA 30 in the base part. The ECA 30 can be connected to an external room temperature sensor.

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

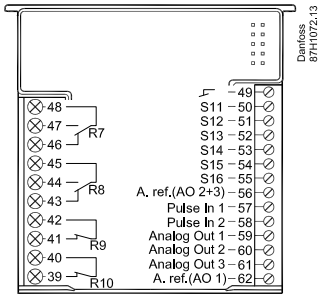


2.3.3 Mounting the internal I/O module ECA 32 or ECA 35

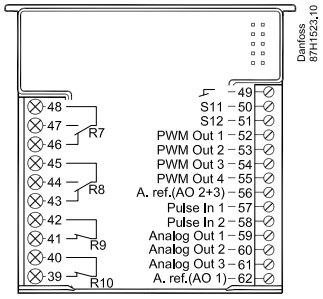
The ECA 32 module (order code no. 087H3202) or ECA 35 module (order code no. 087H3205) can be inserted into the ECL Comfort 310 / 310B base part for additional input and output signals in relevant applications.



ECA 32



ECA 35



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.

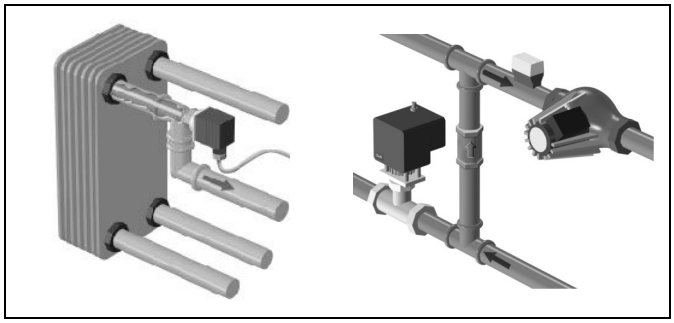
The temperature sensor mentioned below are sensors used for the ECL Comfort 210 / 296 / 310 series which not all will be needed for your application!

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.

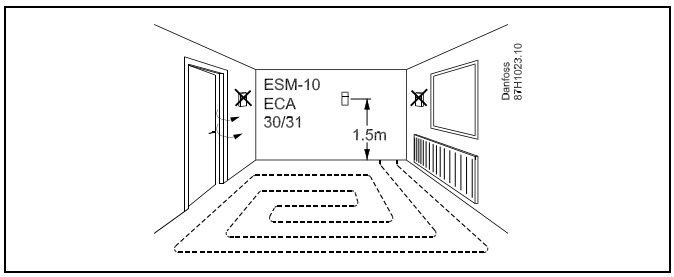
Make sure that the surface of the pipe is clean and even where the sensor is mounted.

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.

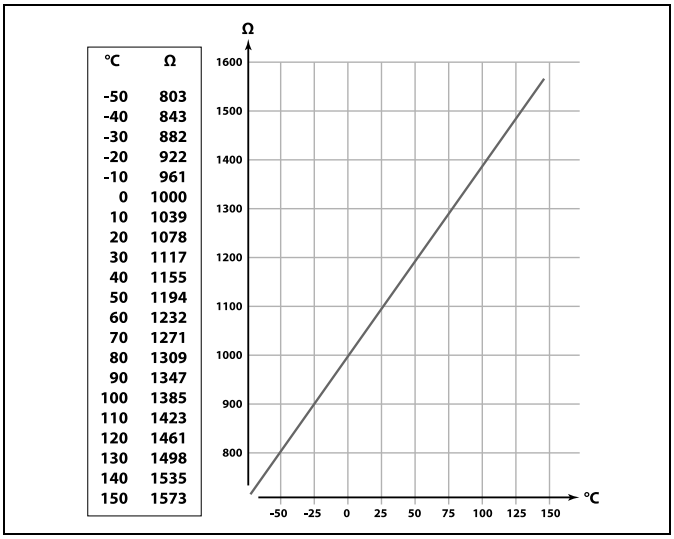
ESM-11, ESMC and ESMB-12: Use heat conducting paste for quick measurement of the temperature.

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.

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Warning

Electric conductors on PCB (**P**rinted **C**ircuit **B**oard) for supply voltage, relay contacts and triac outputs do not have mutual safety distance of minimum 6 mm. The outputs are not allowed to be used as galvanic separated (volt free) outputs.

If a galvanic separated output is needed, an auxiliary relay is recommended.

24 Volt controlled units, for example actuators, are to be controlled by means of ECL Comfort 310, 24 Volt version.

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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).

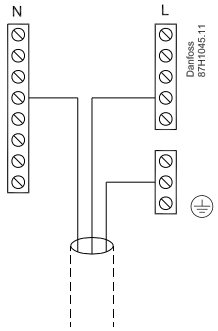
A fuse for the ECL Comfort installation is max. 10 A typically.

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

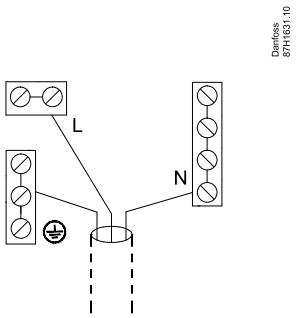
Installation must be avoided if there is a risk for condensation (dew).

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

ECL 210 / 310



ECL 296



Factory established jumpers in the base part:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

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

Connections, in general.

See also the Installation Guide (delivered with the application key) for application specific connections.

Maximum load ratings:

Relay terminals	4 (2) A / 230 V a.c. (4 A for ohmic load, 2 A for inductive load)
Triac (electronic relay) terminals	0,2 A / 230 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.

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

Connections, in general.

See also the Installation Guide (delivered with the application key) for application specific connections.

Maximum load ratings:

Relay terminals	4 (2) A / 24 V a.c. (4 A for ohmic load, 2 A for inductive load)
Triac (electronic relay) terminals	1 A / 24 V a.c.

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.

Electrical connections, ECA 32 / ECA 35

Connections, in general.

See also the Installation Guide (delivered with the application key) for application specific connections.

Maximum load ratings:

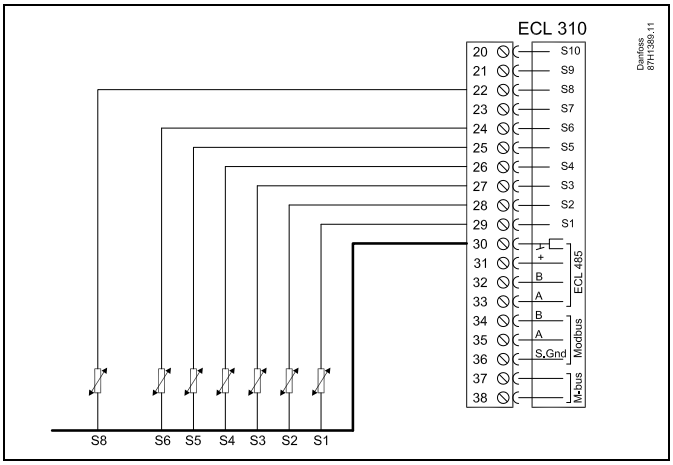
Terminals		
ECA 32	**ECA 35**	
	PWM Out 1 (52)	5 kΩ *
	PWM Out 2 (53)	5 kΩ *
	PWM Out 3 (54)	5 kΩ *
	PWM Out 4 (55)	5 kΩ *
Analog Out 1 (59)	Analog Out 1 (59)	47 kΩ *
Analog Out 2 (60)	Analog Out 2 (60)	47 kΩ *
Analog Out 3 (61)	Analog Out 3 (61)	47 kΩ *
* The value is a minimum.		

2.5.4 Electrical connections, Pt 1000 temperature sensors

See also the Installation Guide (delivered with the application key) for application specific connections.

A319

Terminal	Sensor / description		Type (recom.)
29 and 30	S1	Outdoor temperature sensor *	ESMT
28 and 30	S2	Supply temperature sensor	ESM-11 / ESMB / ESMC / ESMU
27 and 30	S3	Charging temperature sensor **	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	A319.1: Flow temperature sensor, monitoring A319.2: Flow temperature sensor	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	Upper buffer-tank temperature sensor	ESMB / ESMU
23 and 30	S7	not used	
22 and 30	S8	Upper buffer-tank temperature sensor	ESMB / ESMU
21 and 30	S9	Pressure difference transmitter (0 - 10 V)	
20 and 30	S10	0 - 10 Volt as desired temperature	



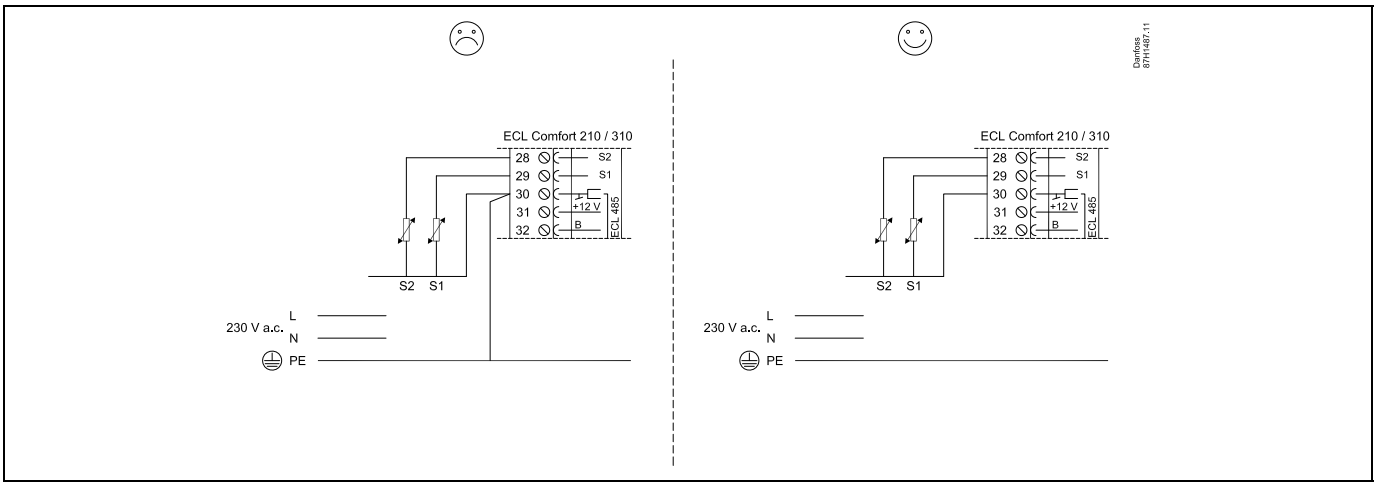
Temperature sensors must be connected in order to have the desired functionality.

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

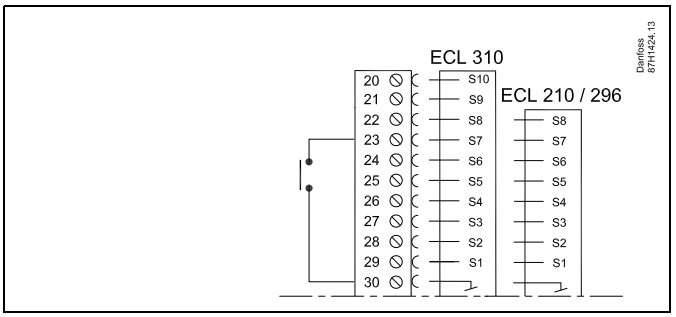
** If the sensor is not connected or the sensor cable is short-circuited, the motorized control valve closes (safety function).

Factory established jumper:
30 to common terminal.

Input connnections

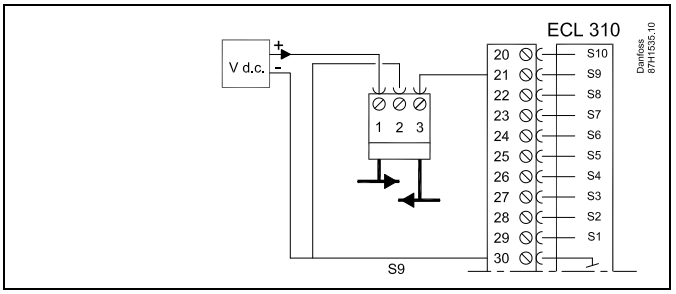


Example of override contact, connected to S7:
(ignore ECL 210)



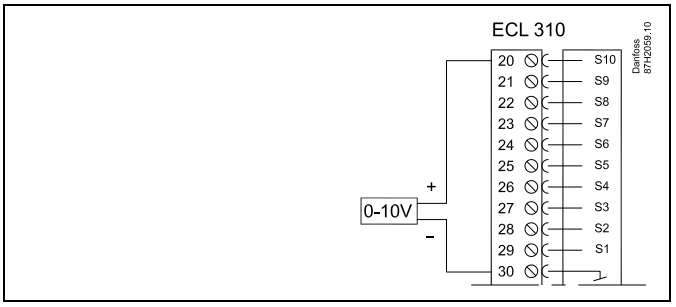
Connection of input S9:

Pressure difference transmitter, 0 - 10 Volt



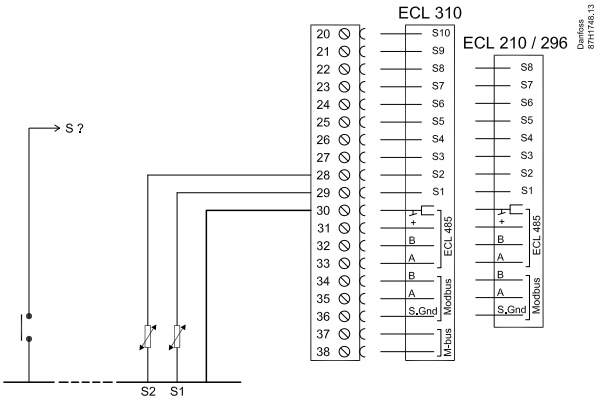
Connection of input S10:

Control voltage for desired temperature



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.

Connection of switch for external override



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).

2.5.5 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 210 / 296 / 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 (firmware) of your ECA does not comply with the software (firmware) 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).

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

ECL 485 bus cable

Maximum recommended length of the ECL 485 bus is calculated like this:

Subtract "Total length of all input cables of all ECL controllers in the master - slave system" from 200 m.

Simple example for total length of all input cables, 3 x ECL:

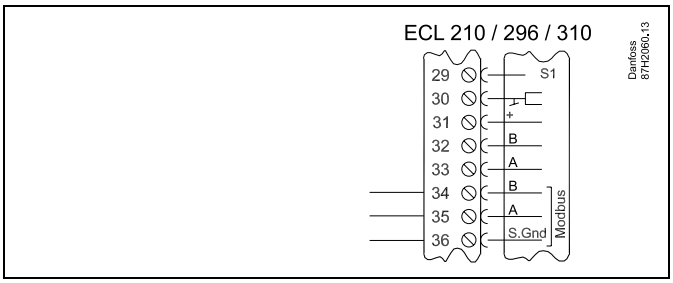
1 x ECL	Outdoor temp. sensor:	15 m
3 x ECL	Flow temp. sensor:	18 m
3 x ECL	Return temp. sensor:	18 m
3 x ECL	Room temp. sensor:	30 m
Total:		81 m

Maximum recommended length of the ECL 485 bus:
200 - 81 m = 119 m

2.5.7 Electrical connections, communication

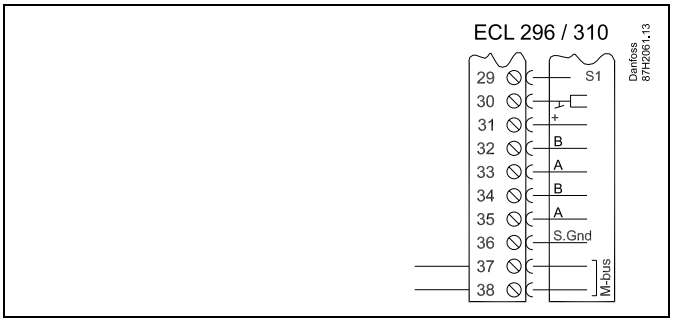
Electrical connections, Modbus

ECL Comfort 210: Non-galvanic isolated Modbus connections
ECL Comfort 296: Galvanic isolated Modbus connections
ECL Comfort 310: Galvanic isolated Modbus connections



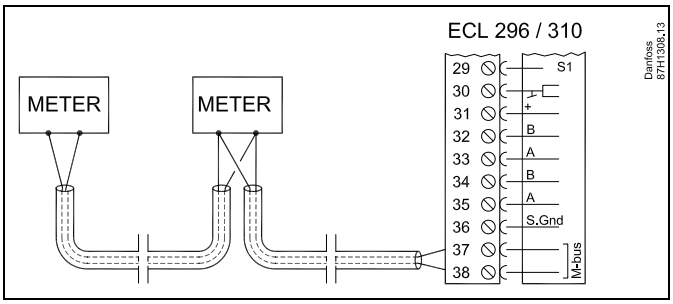
Electrical connections, M-bus

ECL Comfort 210: Not implemented
ECL Comfort 296: On board
ECL Comfort 310: On board



Example, M-bus connections

(ECL Comfort 296 / 310 and 310 B only)



2.6 Inserting the ECL Application Key

2.6.1 Inserting the ECL Application Key

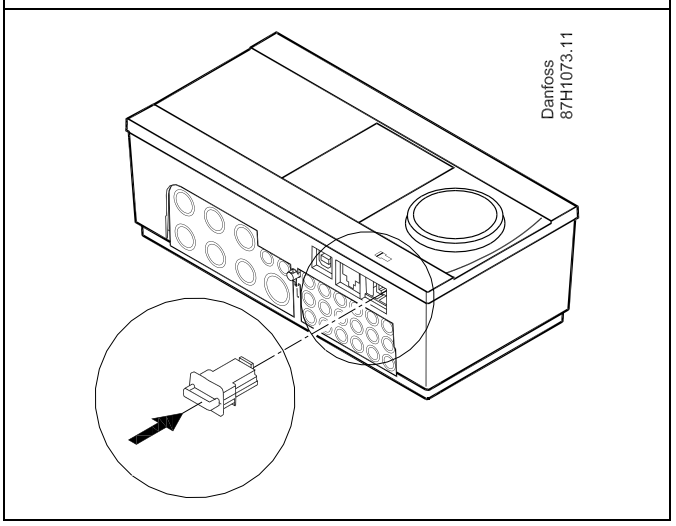
The ECL Application Key contains

- 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.

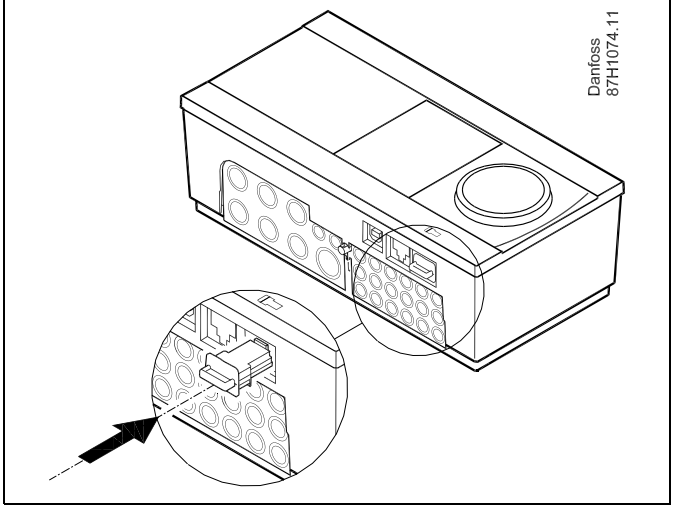
After having powered-up the controller, different situations might be existing:

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.

ECL Comfort 210 / 310



ECL Comfort 210 / 310



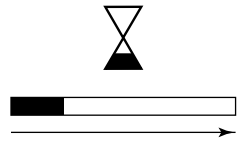
User settings are, among others, desired room temperature, desired DHW temperature, schedules, heat curve, limitation values etc.

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

Automatic update of controller software (firmware):
The software of the controller is updated automatically when the key is inserted:

- ECL 210 / 310, as of controller version 1.11
- ECL 296, as of controller version 1.58

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.
- Manual update of controller software (firmware):
  See the section "Automatic / manual update of firmware"

The “Key overview” does not inform — through ECA 30 / 31 — about the subtypes of the 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.

ECL Comfort 296, controller versions 1.58 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.

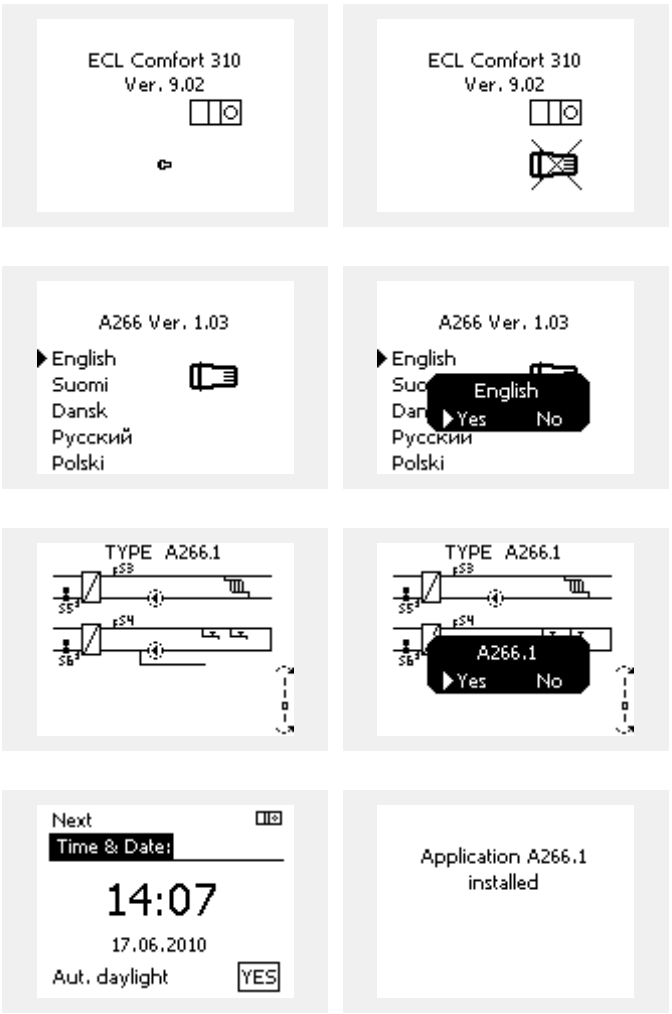
Application Key: Situation 1
The controller is new from the factory, the ECL Application Key is not inserted.

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 (subtype) Some keys have only one 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

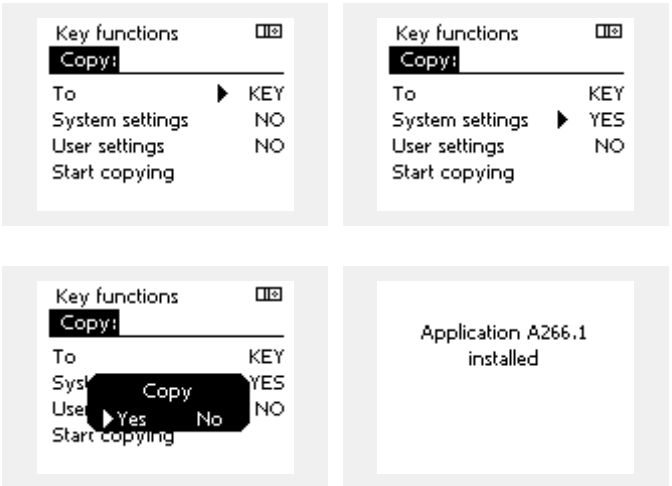


* 'Aut. daylight' is the automatic changeover between summer and winter time.

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.

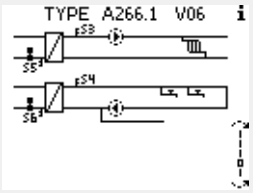
'NO: Only factory settings from the ECL Application Key will be copied to the controller.
'YES*: Special user settings (differing from the factory settings) will be copied to the controller.

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

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

(Example):

The "**i**" in the upper right corner indicates that - besides the factory settings - the subtype also contains special user / systems settings.

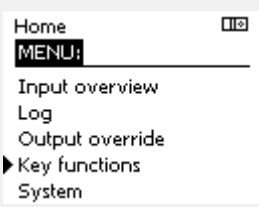


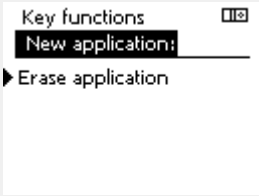
Application Key: Situation 2
The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.

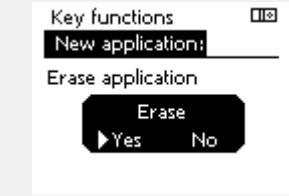
To change to another application on the ECL Application Key, the current application in the controller must be erased (deleted).

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, 296, 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:

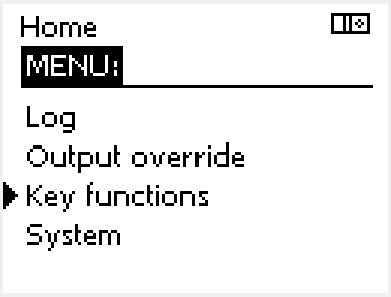
Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	
	Go to 'Key functions'	
	Confirm	
	Choose 'Copy'	
	Confirm	
	Choose 'To'. 'ECL' or 'KEY' will be indicated. Choose 'ECL' 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.	

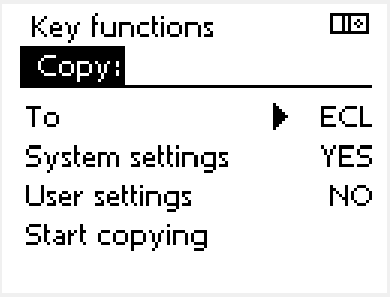
*

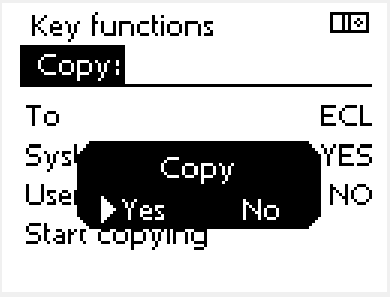
'ECL': Data will be copied from the Application Key to the ECL Controller.
'KEY': Data will be copied from the ECL Controller to the Application Key.

**

'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.







Language

At application upload, a language must be selected.*
If another language than English is selected, the selected language **AND** English will be uploaded into the ECL controller.
This makes service easy for English speaking service people, just because the English language menus can be visible by changing the actual set language into English.
(Navigation: MENU > Common controller > System > Language)

If the uploaded language is not suitable, the application must be erased. User and System settings can be saved on the application key before erasing.
After new upload with preferred language, the existing User and System settings can be uploaded.

*)
(ECL Comfort 310, 24 Volt) If language cannot be selected, the power supply is not a.c. (alternating current).

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).
Furthermore, when the ECL Comfort controller has been uploaded with an application key, minimum version 2.44, it is possible to upload personal settings from application keys, minimum version 2.14.

The "Key overview" does not inform — through ECA 30 / 31 — about the subtypes of the 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.

ECL Comfort 296, controller versions 1.58 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 and 10 (230 V or 24 V).
- ☐ Make sure the correct phase conditions are connected:
  230 V: Live = terminal 9 and Neutral = terminal 10
  24 V: SP = terminal 9 and SN = terminal 10
- ☐ 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 A319

Navigation, A319.1 and A319.2, circuits 1 and 2

Home					A319			
					A319.1		A319.2	
					Circuit		Circuit	
MENU		**ID nos.**		**Function**	**1**	**2**	**1**	**2**
Schedule	Week plan, max. 3 comfort periods / day Factory settings: 00.00 - 08.00, 08.00 - 16.00, 16.00 - 24.00				●		●	
Schedule , Circ. p.	Week plan, max. 3 comfort periods / day Factory settings: 00.00 - 08.00, 08.00 - 16.00, 16.00 - 24.00				●		●	
Settings	Flow temperature			Heat curve	●		●	
		11178		Temp. max.	●		●	
		11177		Temp. min.	●		●	
				Ext. desired T	●		●	
		11004		Desired T	●		●	
	Tank temperature		12195	Start difference		●		●
			12194	Stop difference		●		●
			12371	Pump start diff.		●		●
			12178	Temp. max.		●		●
			12177	Temp. min.		●		●
			12004	Desired T		●		●
	Return limit		12031	High T out X1		●		●
			12032	Low limit Y1		●		●
			12033	Low T out X2		●		●
			12034	High limit Y2		●		●
			12037	Adapt. time		●		●
			12080	Delay		●		●
			12028	Con. T, ret. T lim.		●		●
	Flow / power lim.		12119	High T out X1		●		●
			12117	Low limit Y1		●		●
			12118	Low T out X2		●		●
			12116	High limit Y2		●		●
			12112	Adapt. time		●		●
			12113	Filter constant		●		●
			12109	Input type		●		●
			12115	Units		●		●
	Control par. 1		12184 13184	Xp		●		●
			12185 13185	Tn		●		●
			12186 13186	M run		●		●
			12187 13187	Nz		●		●
			12189 13189	Min. act. time		●		●
			13330	Wake up level		●		●
	Control par. 2		12184 14184	Xp		●	●	●
			12185 14185	Tn		●	●	●
			12186	M run			●	
			12187 14187	Nz		●	●	●
			12189	Min. act. time			●	
			14165	V out max.		●		●
			14167	V out min.		●		●
			14171	Reverse out		●		●
			14037	Adapt. time		●		●

Navigation, A319.1 and A319.2, circuits 1 and 2, continued

Home					A319			
					A319.1		A319.2	
					Circuit		Circuit	
MENU		**ID nos.**		**Function**	**1**	**2**	**1**	**2**
Settings	Control par. 3			Pressure, diff.	●		●	
		11558		Pressure diff. des.	●		●	
		11184		Xp	●		●	
		11185		Tn	●		●	
		11187		Nz	●		●	
		11165		V out max.	●		●	
		11167		V out min.	●		●	
		11171		Reverse out	●		●	
	Application	11500		Send desired T	●		●	
		11077		P frost T	●		●	
		11021		Total stop	●		●	
		11093	12093	Frost pr. T	●	●	●	●
		11141	12141	Ext. input	●	●	●	●
		11142	12142	Ext. mode	●	●	●	●
			12017	Demand offset		●		●
			12042	Char. P post-run		●		●
Holiday					●		●	
Alarm	Charge T		12147	Upper difference		●		●
			12148	Lower difference		●		●
			12149	Delay		●		●
			12150	Lowest temp.		●		●
	Supply T		12340	Delay		●		●
	Alarm overview			Charge T		●		●
				Supply T		●		●
				T sensor defect		●		●
Influence overview								
Des. flow T	Holiday				●		●	
	Ext. override				●	●	●	●
	SCADA offset				●		●	
	Ext. desired T				●	●	●	●
	Slave, demand					●		●
	SCADA override					●		●
	Return limit					●		●
	Flow / power lim.					●		●
	Low flow limitation					●		●

Navigation, A319, Common controller settings

Home		Common controller settings	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Schedule			Selectable
Input overview			Outdoor T
			Flow T
			Charge T
			Supply T
			Prim. return T
			Tank upper T
			Tank lower T
			Return T, A
			Return T, B
			Pressure, diff.
			Ext. desired T
Log	Outdoor T		Log today
	Flow T & desired		Log yesterday
	Pressure, diff. & des.		Log 2 days
	Charge T & des.		Log 4 days
	Return T & limit		
	Supply T		
	Tank T up & des.		
	Tank T up & low.		
	Return T sec. (A319.1 only)		
Output override			M1
			V2
			P2
			M2 (A319.2 only)
			V3
			P3
			X1
			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, A319, Common controller settings, continued

Home		Common controller settings	
MENU		**ID no.**	**Function**
System	ECL version		Code no.
			Hardware
			Software
			Build no.
			Serial no.
			MAC
			Production week
	Extension		2100 Serial no. 2102 Software 2103 Hardware 2104 Code no.
	Ethernet (ECL Comfort 310 only)		2152 Inbound accept 258 Address type 278 IP1 279 IP2 280 IP3 281 IP4 282 Gateway IP1 283 Gateway IP2 284 Gateway IP3 285 Gateway IP4 286 Net Mask 1 287 Net Mask 2 288 Net Mask 3 289 Net Mask 4 2240 DNS 1 IP 1 2241 DNS 1 IP 2 2242 DNS 1 IP 3 2243 DNS 1 IP 4 2244 DNS 2 IP 1 2245 DNS 2 IP 2 2246 DNS 2 IP 3 247 DNS 2 IP 4
	Portal config (ECL Comfort 310 only)		ECL portal
			Setup
			Portal info
	M-bus config (ECL Comfort 310 only)		State
		5998	Command
		5997	Baud
			Energy meter 1
		6000	M-bus address
		6002	Scan time
		6001	Type

Navigation, A319, Common controller settings, continued

Home		Common controller settings	
MENU		**ID no.**	**Function**
	Energy Meters (ECL Comfort 310 only)		ID Energy meter 2 6050 M-bus address 6052 Scan time 6051 Type ID Energy meter 3 6100 M-bus address 6102 Scan time 6101 Type ID Energy meter 4 6150 M-bus address 6152 Scan time 6151 Type ID Energy meter 5 6200 M-bus address 6202 Scan time 6201 Type ID
	Raw input overview		S1 - S10 (S1 - S18 when ECA 32 / 35 is installed)
	Sensor offset		S1 - S10 (S1 - S16 when ECA 32 / 35 is installed)
	Alarm	32:	T sensor defect
	Display	60058	Backlight
		60059	Contrast
	Communication	2048	ECL 485 addr.
		38	Modbus addr.
		39	Baud
		2150	Service pin
		2151	Ext. reset
		2153	Portal Encryption
	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 (↻).

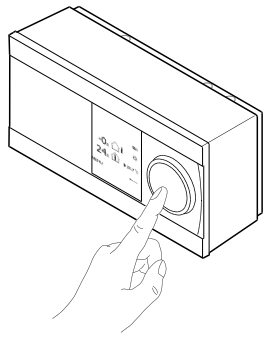
The dial has a built-in accellerator. The faster you turn the dial, the faster it reaches the limits of any wide setting range.

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

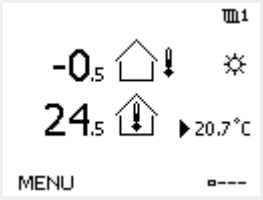
Push the dial to confirm your choices (☝).

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.

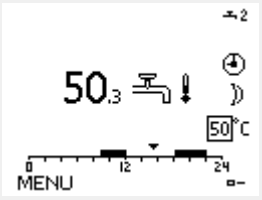
Example shows ECL 210 / 310



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 / 296 / 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 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), influence on desired flow temperature.

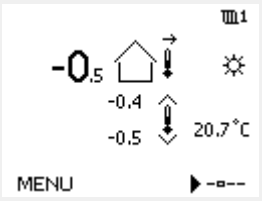
The value above the V2 symbol indicates 0–100% of the analogue signal (0–10 V).

Note:
An actual flow temperature value must be present, otherwise the circuit's control valve will close.

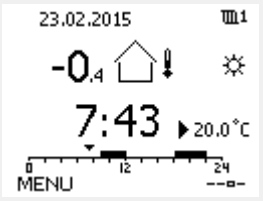
Dependent on the chosen display, the overview displays for the heating circuit inform you about:
- actual outdoor temperature (-0.5)
- controller mode (☼)
- actual room temperature (24.5)
- desired room temperature (20.7 °C)
- trend in outdoor temperature (↗ → ↘)
- min. and max. outdoor temperatures 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))

Overview display 1:

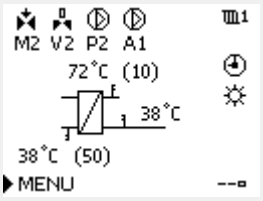
Overview display 2:



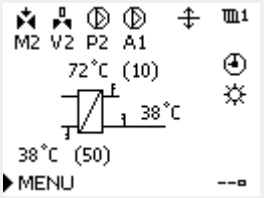
Overview display 3:



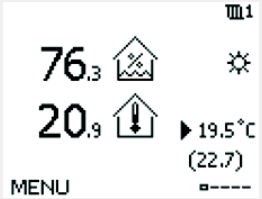
Overview display 4:



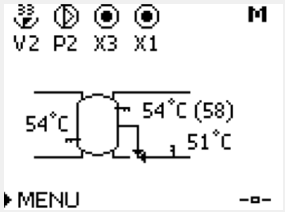
Example of overview display with Influence indication:



Example, favorite display 1 in A230.3, where min. desired room temperature is indicated (22.7):



Example of overview display with state of controlled components, actual state of diverting valve X3 on master circuit, limitations, input request, tank temperature. The value above the V2 symbol indicates 0–100% of the analogue signal (0–10 V).



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

If the temperature value is displayed as

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

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

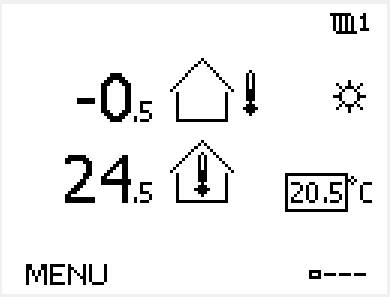
Setting the desired temperature

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

Setting the desired room temperature

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

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



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

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

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

Setting the desired room temperature, ECA 30 / ECA 31

The 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	
	Fan ON	
	Fan OFF	
	Actuator opens	
	Actuator closes	
42	Actuator, analogue control signal	
45	Pump / fan speed	
	Damper ON	
	Damper OFF	

Symbol	Description
	Alarm
	Letter
	Event
	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 (-)
1 2	Number of heat exchangers

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

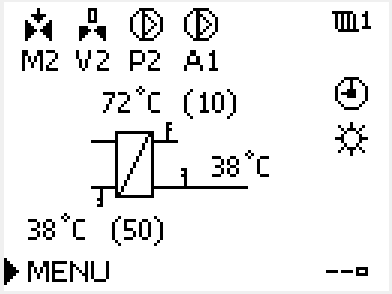
This section describes the function in general for the ECL Comfort 210 / 296 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

Heating circuit

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

Display example:

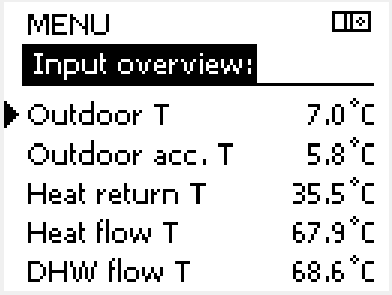
49 °C	Flow temperature
(31)	Desired flow temperature
24 °C	Return temperature
(50)	Return temperature limitation



Input overview

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

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



3.5 Influence overview

This section describes the function in general for the ECL Comfort 210 / 296 / 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.

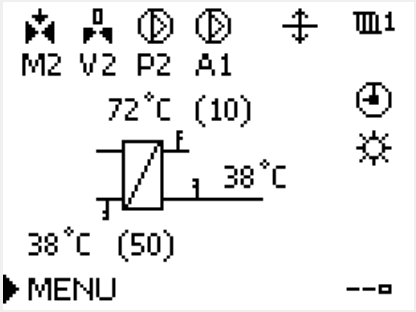
Arrow-up:
The parameter in question increases the desired flow temperature.

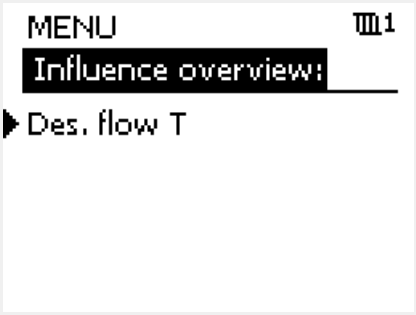
Double-arrow:
The parameter in question creates an override (e.g. Holiday).

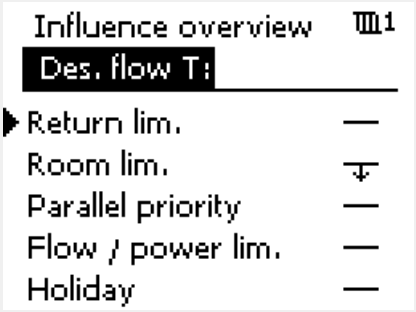
Straight line:
No active influence.

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.

Example of overview display with Influence indication:







3.6 Manual control

This section describes the function in general for the ECL Comfort 210 / 296 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

It is possible to manually control the installed components.

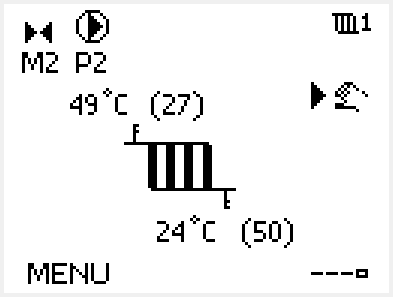
Manual control can only be selected in favorite displays in which the symbols for the controlled components (valve, pump etc.) are visible.

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

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

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

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!

Manual control of 0 – 10 Volt / PWM controlled pump speed:
The V1 and V2 symbols have a value (in %) which can be changed. The % value is corresponding to a voltage / PWM in the range 0 – 10 Volt / 0 - 100 % PWM.

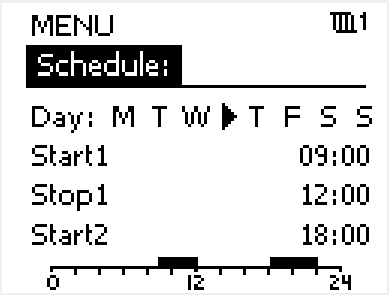
3.7 Schedule

3.7.1 Set your schedule

This section describes the schedule in general for the ECL Comfort 210 / 296 / 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:

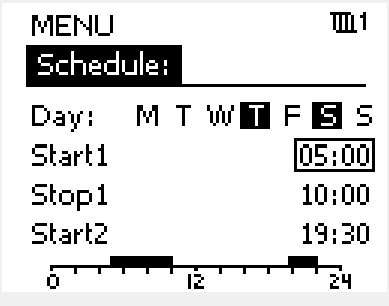
M = Monday
T = Tuesday
W = Wednesday
T = Thursday
F = Friday
S = Saturday
S = Sunday

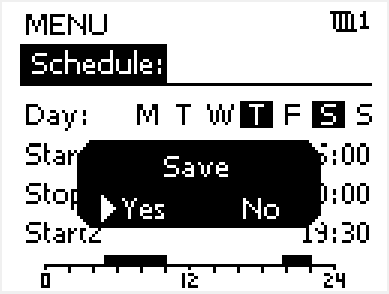


The schedule will day-by-day show you the start and stop times of your comfort periods (heating / DHW circuits).

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

For factory settings and setting range, see appendix “Parameter ID overview”.
Parameters indicated with an ID no. like "1x607" mean a universal parameter. x stands for circuit / parameter group.

Setting	ID	Page	Factory settings in circuit(s)	
			1	2
Heat curve		53		
Ext. desired T — (ECL Comfort 310)		53		
Actual (actual flow or power)		60		
Pressure, diff.		65		
Desired T (Desired flow temperature)	1x004	54		
Desired T (Desired flow temperature)	1x004	78		
Demand offset	1x017	71		
Total stop	1x021	71		
Con.T, re. T lim. (Constant temperature mode, return temperature limitation)	1x028	57		
High T out X1 (return temp. limitation, high limit, X-axis)	1x031	57		
Low limit Y1 (return temp. limitation, low limit, Y-axis)	1x032	58		
Low T out X2 (return temp. limitation, low limit, X-axis)	1x033	58		
High limit Y2 (return temp. limitation, high limit, Y-axis)	1x034	58		
Adapt. time (adaptation time)	1x037	58		
Char. P post-run (Charging pump, post-run)	1x042	72		
P frost T (circulation pump, frost protection temp.)	1x077	72		
Delay	1x080	58		
Frost pr. T (frost protection temp.)	1x093	73		
Input type	1x109	60		
Limit (limitation value)	1x111	61		
Adapt. time (adaptation time)	1x112	61		
Filter constant	1x113	61		
Units	1x115	61		
High limit Y2 (flow / power limitation, high limit, Y-axis)	1x116	62		
Low limit Y1 (flow / power limitation, low limit, Y-axis)	1x117	62		
Low T out X2 (flow / power limitation, low limit, X-axis)	1x118	62		
High T out X1 (flow / power limitation, high limit, X-axis)	1x119	62		
Ext. input (external override)	1x141	73		
Ext. mode (external override mode)	1x142	74		
Upper difference	1x147	81		
Lower difference	1x148	82		
Delay	1x149	82		
Lowest temp.	1x150	83		
V out max.	1x165	66		
V out min.	1x167	66		
Reverse out	1x171	66		
Temp. min.	1x177	55		
Temp. max.	1x178	55		

Setting	ID	Page	Factory settings in circuit(s)	
			1	2
Xp (proportional band)	1x184	67		
Tn (integration time constant)	1x185	67		
M run (running time of the motorized control valve)	1x186	67		
Nz (neutral zone)	1x187	68		
Min. act. time (min. activation time gear motor)	1x189	68		
Stop difference	1x194	78		
Start difference	1x195	79		
Wake up level	1x330	68		
Delay	1x340	83		
Pump start diff.	1x371	80		
Send desired T	1x500	76		
Pressure diff. des. (Pressure difference, desired)	1x558	68		

5.0 Settings

5.1 Introduction to Settings

Descriptions of settings (parameter's functions) are divided into groups as used in the ECL Comfort 210 / 296 / 310 controller's menu structure. Examples: "Flow temperature", "Room limit" and so on. Each group starts with a general explanation.

The descriptions of each parameter are in numeric order, related to the parameter's ID numbers. You might come across differences between the order in this Operating Guide and the ECL Comfort 210 / 296 / 310 controllers.

Some parameter descriptions are related to specific application subtypes. This means that you might not see the related parameter in the actual subtype in the ECL controller.

The note "See Appendix …" refers to the Appendix at the end of this Operating Guide, where parameter's setting ranges and factory settings are listed.

The navigation hints (for example MENU > Settings > Return limit …) cover multiple subtypes.

5.2 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 temperature: (factory settings)	Your settings
-30 °C	**75 °C**	
-15 °C	**70 °C**	
-5 °C	**65 °C**	
0 °C	**60 °C**	
5 °C	**60 °C**	
15 °C	**60 °C**	

MENU > Settings > Flow temperature

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

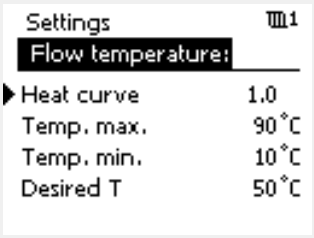
Change the value of the slope:
Push the dial to enter / change the slope value of the heat curve (example: 1.0).

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

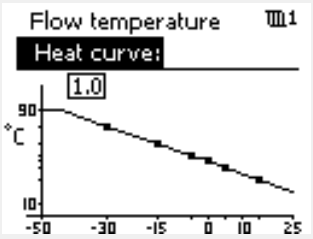
Change the coordinates:
Push the dial to enter / change the coordinates of the heat curve (example: -30,75).

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.



Slope changes



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.

External signal for desired flow temperature

A voltage (0 - 10 V) can be applied to the input terminal S10 in order to determine the desired flow temperature.

The measured voltage on input S10 must be converted to a temperature value by the controller. When the voltage gets higher, the desired flow temperature increases.

The following settings set up the scaling.

MENU > Settings > Flow temperature

Ext. desired T — (ECL Comfort 310)		
Circuit	*Setting range*	*Factory setting*
1	**Read-out only**	
The actual desired flow temperature is indicated by the unit °C.		

Read-out:

- - : External voltage signal is not connected..

°C : External voltage signal converted to desired flow temperature.

Push the dial to see the graph and enter the value sets for the input voltage (1 and 10 volt) and displayed desired flow temperature.

Desired flow temperature: 10 ... 120 °C

Fixed voltage settings: 1 V and 10 V

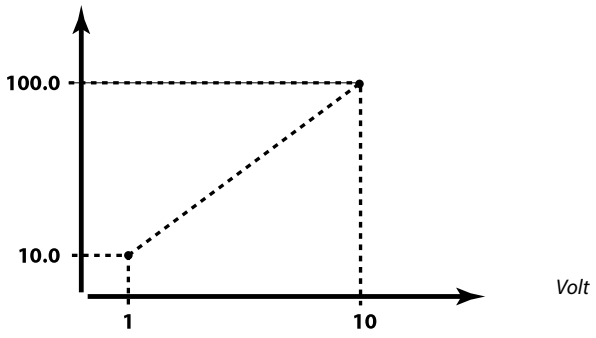
Factory settings: (1,10) and (10,100)

This means that the 'Desired flow temperature' is 10 °C at 1.0 V and 100 °C at 10 V.

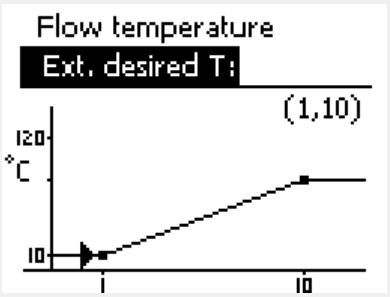
Typically, the higher the voltage, the higher the displayed desired flow temperature.

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

Example: Relationship between input voltage and displayed desired flow temperature



This example shows that 1 volt corresponds to 10.0 °C and 10 volt correspond to 100 °C.



The external voltage signal must be higher than 1.0 V in order to activate the override.

MENU > Settings > Flow temperature

Desired T (Desired flow temperature)	1x004
When the ECL Comfort is in override mode, type "Const. T", the desired flow temperature can be set. *A "Const. T" related return temperature limitation can also be set. See MENU > Settings > Return limit > 'Con. T, ret. T lim.'*	

See Appendix “Parameter ID overview”

Override mode
When ECL Comfort is in Scheduled mode, a contact (switch) signal can be applied to an input in order to override to Comfort, Saving, Frost Protection or Constant temperature. As long as the contact (switch) signal is applied, the override is active.

The "Desired T" value can be influenced by:

- temp. max.
- temp. min.
- room temp. limit
- return temp. limit
- flow / power limit

MENU > Settings > Flow temperature

Temp. min.	1x177

See Appendix “Parameter ID overview”

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.’.

MENU > Settings > Flow temperature

Temp. max.	1x178

See Appendix “Parameter ID overview”

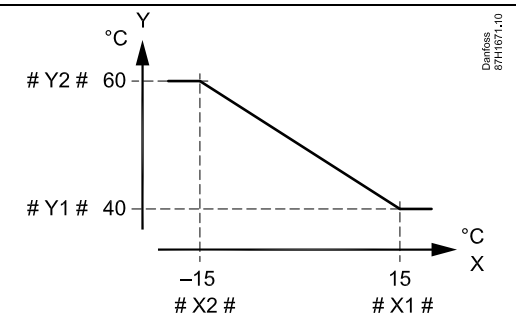
Set the max. flow temperature for the system. The desired temperature will not be higher than this setting. Adjust the factory setting, if required.

The setting of ‘heat curve’ is possible for heating circuits only.

The setting for ‘Temp. max.’ has higher priority than ‘Temp. min.’.

5.3 Return limit

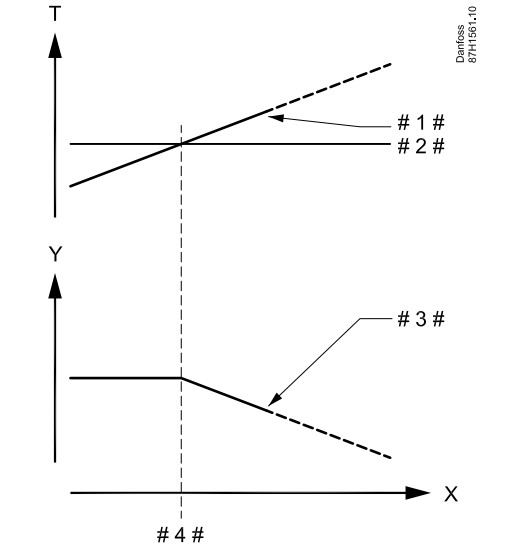
The return temperature limitation is based on the outdoor temperature. Typically in district heating systems a higher return temperature is accepted at a decrease in outdoor temperature. The relationship between the return temperature limits and outdoor temperature is set in two coordinates.
The outdoor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



X = Outdoor temperature
Y = Limitation temperature
 # X1 # = High T out (1x031)
 # X2 # = Low T out (1x033)
 # Y1# = Low limit (1x032)
 # Y2 # = High limit (1x034)

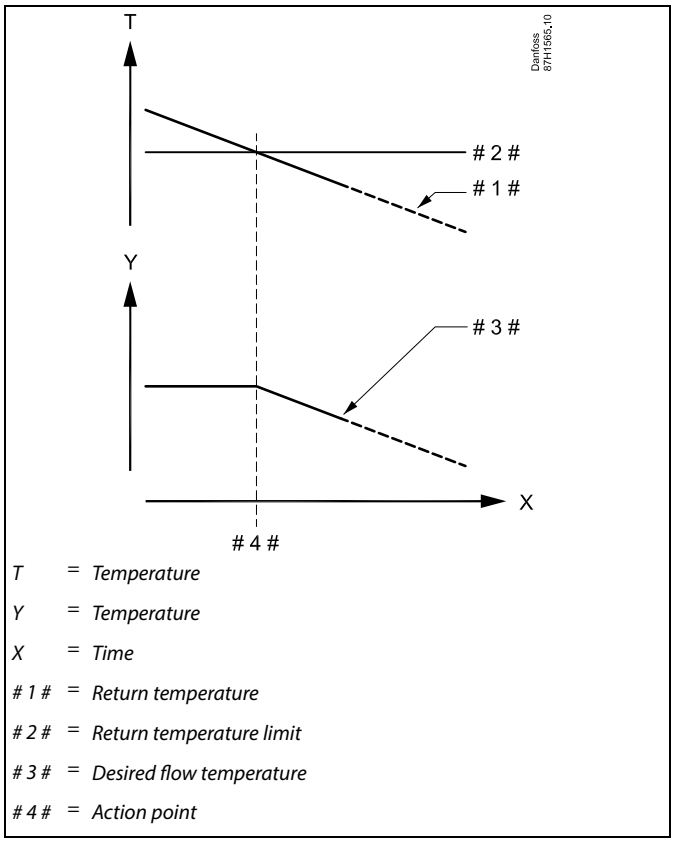
The calculated limit is shown in brackets ( ) in the monitoring display. See the section "Monitoring temperatures and system components".

Example, maximum return temperature limitation; return temperature gets higher than limit



T = Temperature
Y = Temperature
X = Time
 # 1 # = Return temperature
 # 2 # = Return temperature limit
 # 3 # = Desired flow temperature
 # 4 # = Action point

Example, minimum return temperature limitation;
return temperature gets lower than limit



T = *Temperature*
Y = *Temperature*
X = *Time*
 # 1 # = *Return temperature*
 # 2 # = *Return temperature limit*
 # 3 # = *Desired flow temperature*
 # 4 # = *Action point*

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

MENU > Settings > Return limit

Con.T, re. T lim. (Constant temperature mode, return temperature limitation)	**1x028**
The "Con. T, ret. T limit" is the return temperature limitation value when the circuit is set to override mode type "Const. T" (= Constant temperature).	

See Appendix “Parameter ID overview”

Value: Set the return temperature limitation

MENU > Settings > Return limit

High T out X1 (return temp. limitation, high limit, X-axis)	**1x031**
Set the outdoor temperature value for the low return temperature limitation.	

See Appendix "Parameter ID overview"

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

MENU > Settings > Return limit

Low limit Y1 (return temp. limitation, low limit, Y-axis)	**1x032**
Set the return temperature limitation referring to the outdoor temperature value set in 'High T out X1'.	

See Appendix "Parameter ID overview"

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)	**1x033**
Set the outdoor temperature value for the high return temperature limitation.	

See Appendix "Parameter ID overview"

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

MENU > Settings > Return limit

High limit Y2 (return temp. limitation, high limit, Y-axis)	**1x034**
Set the return temperature limitation referring to the outdoor temperature value set in 'Low T out X2'.	

See Appendix "Parameter ID overview"

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

MENU > Settings > Return limit

Adapt. time (adaptation time)	**1x037**
Controls how fast the return temperature adapts to the desired return temperature limit (Integration control).	

See Appendix "Parameter ID overview"

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

Minor value: The desired temperature is adapted quickly.

Major value: The desired temperature is adapted slowly.

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

MENU > Settings > Return limit

Delay	**1x080**
When the charging pump has been switched ON, the controller awaits the set 'Delay' before activating the return temperature limitation.	

See Appendix “Parameter ID overview”

5.4 Flow / power limit

Heating circuit

A flow or energy meter can be connected to the ECL controller in order to limit the flow or consumed power.

Flow or power limitation only via M-Bus.

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

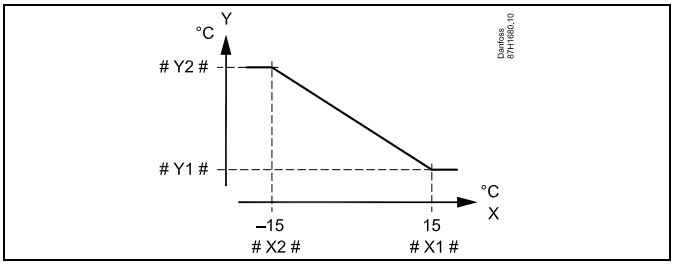
The flow / power limitation can be based on the outdoor temperature. Typically, in district heating systems a higher flow or power is accepted at lower outdoor temperatures.

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

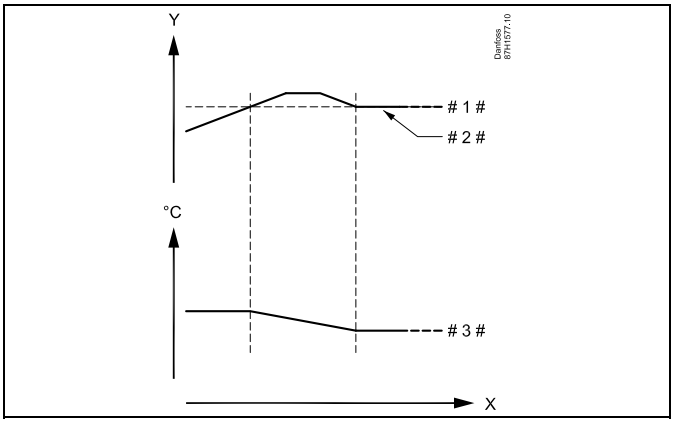
The outdoor temperature coordinates are set in 'High T out X1' and 'Low T out X2'.

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.

If the flow rate or power exceeds the calculated limit value, the controller reduces the speed of pump P2/V2. As a result, the motor control valve M1 is also gradually closed in order to achieve an acceptable maximum flow rate or heat output.



X	=	Outdoor temperature
Y	=	Limitation, flow or power
# X1 #	=	High T out (1x119)
# X2 #	=	Low T out (1x118)
# Y1#	=	Low limit (1x117)
# Y2#	=	High limit (1x116)



X	=	Time
Y	=	Flow or power
# 1 #	=	Flow or power limit
# 2 #	=	Actual flow or energy
# 3 #	=	Desired flow temperature

MENU > Settings > Flow / power limit

Input type	**1x109**
Choice of input type from flow / energy meter	

See Appendix “Parameter ID overview”

OFF: No input

EM1 - EM5: Flow / energy signal from M-bus meter.

MENU > Settings > Flow / power limit

Actual (actual flow or power)
The value is the actual flow or power based on the signal from flow / energy meter.

MENU > Settings > Flow / power limit

Limit (limitation value)	**1x111**
This value is in some applications a calculated limitation value, based on the actual outdoor temperature. *In other applications the value is a selectable limitation value.*	

See Appendix “Parameter ID overview”

MENU > Settings > Flow / power limit

Adapt. time (adaptation time)	**1x112**
Controls how fast the flow / power limitation adapts to the desired limitation.	

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

See Appendix “Parameter ID overview”

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

Minor value: The desired temperature is adapted quickly.

Major value: The desired temperature is adapted slowly.

MENU > Settings > Flow / power limit

Filter constant	**1x113**
The value of the filter constant determines the dampening of the measured value. *The higher the value, the more dampening.* *By this, a too quick change of the measured value can be avoided.*	

See Appendix “Parameter ID overview”

Minor value: Lower dampening

Major value: Higher dampening

MENU > Settings > Flow / power limit

Units	**1x115**
Choice of units for measured values.	

See Appendix “Parameter ID overview”

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' when M-bus connection to flow or energy meter:
l / h
m^3/h
kW
MW
GW

MENU > Settings > Flow / power limit

High limit Y2 (flow / power limitation, high limit, Y-axis)	**1x116**
Set the flow / power limitation referring to the outdoor temperature set in 'Low T out X2'.	

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

Low limit Y1 (flow / power limitation, low limit, Y-axis)	**1x117**
Set the flow / power limitation referring to the outdoor temperature set in 'High T out X1'.	

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

Low T out X2 (flow / power limitation, low limit, X-axis)	**1x118**
Set the outdoor temperature value for the high flow / power limitation.	

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

High T out X1 (flow / power limitation, high limit, X-axis)	**1x119**
Set the outdoor temperature value for the low flow / power limitation.	

See Appendix “Parameter ID overview”

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

5.5 Control parameters

Control of valves

The motorized control valves are controlled by means of 3-point control signal.

Valve control:
The motorized control valve is opened gradually when the flow temperature is lower than the desired flow temperature and vice versa.
The water flow through the control valve is managed by means of an electric actuator. The combination "actuator" and "control valve" is also called motorized control valve. The actuator can in this way gradually increase or decrease the flow in order to change the supplied energy. Different types of actuators are available.

3-point controlled actuator:
The electric actuator contains a reversible gear-motor. Electric "open" and "close" signals come from the electronic outputs of the ECL Comfort controller in order to manage the control valve. The signals are in the ECL Comfort controller expressed as "Arrow-up" (open) and "Arrow-down" (close) and displayed at the valve symbol. When the flow temperature (for example at S3) is lower than the desired flow temperature, short open-signals come from the ECL Comfort controller in order to gradually increase the flow. By this, the flow temperature will align with the desired temperature. Oppositely, when the flow temperature is higher than the desired flow temperature, short close-signals come from the ECL Comfort controller in order to gradually reduce the flow. Again, the flow temperature aligns with the desired temperature.
Neither open-signals nor close-signals will come as long as the flow temperature corresponds to the desired temperature.

Speed control of circulation pump

The circulation pump P3 can be speed controlled by means of a 0 - 10 volt signal or a PWM (Pulse Width Modulation) signal. The speed control signal, as 0 - 10 V, comes from the "Analog Out 3" (terminals 61 and 56) on the ECA 32 or 35 module.

The speed control signal, as PWM, comes from the output "PWM Out 3" (terminals 54 and 49) on the ECA 35 module.

A desired pressure difference at S9 is set for the speed control procedure.

The control voltage / PWM is expressed as a % value and displayed at the V3 symbol.

When the pressure difference gets lower than the desired pressure difference, the control voltage is gradually increased in order to increase the speed of the circulation pump more than the moment before. By this, the pressure difference aligns with the desired pressure difference.

The control voltage / PWM remains on a stable value as long as the pressure difference corresponds to the desired pressure difference.

The control voltage / PWM can be limited to a maximum and a minimum % value.

Furthermore, the control signal can be reversed; this means the higher the % value, the lower the speed.

Speed control of charging pump

The charging pump P2 can be speed controlled by means of a 0 - 10 volt signal or a PWM (Pulse Width Modulation) signal. The speed control signal, as 0 - 10 V, comes from the "Analog Out 2" (terminals 60 and 56) on the ECA 32 or 35 module.

The speed control signal, as PWM, comes from the output "PWM Out 2" (terminals 53 and 49) on the ECA 35 module.

When the charging temperature at S3 is less than 2 K below the desired charging temperature, the speed will be increased gradually.

The control voltage / PWM is expressed as a % value and displayed at the V2 symbol.

When the difference between charging temperature and desired charging temperature becomes more than 2 K, the speed will be decreased gradually.

The control voltage / PWM can be limited to a maximum and a minimum % value.

Furthermore, the control signal can be reversed; this means the higher the % value, the lower the speed.

The control parameters are used for different issues, for example temperature and pump speed control.

Parameters Xp (proportional band) with ID 11184 and 14184 are specifically used for pump speed control.

Parameters Tn (integration time constant) with ID 11185 and 14185 are specifically used for pump speed control.

Parameters Nz (neutral zone) with ID 11187 and 14187 are specifically used for pump speed control.

Parameters V out max. and V out min. (ID 1x165 and 1x167) are setting the limits for the control voltage as well as for the PWM control.

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

MENU > Settings > Control parameters

Pressure, diff.		
Circuit	*Setting range*	*Factory setting*
	Read-out	**2.0 Volt = 0.0 bar** **10.0 Volt = 10.0 bar**
Pressure difference measured at S9. Voltage from pressure difference transmitter is converted to a pressure difference value in bar. *Setting of scale at 2.0 Volt and 10.0 Volt.*		

The pressure difference is measured by means of a 0 - 10 volt signal. The measured voltage must be converted to a pressure difference value by the controller.

The following procedure sets up the conversion:
Push the dial to see the graph and enter the value sets for the 2 input voltages and related pressure difference values.
Pressure difference value range: 0.0 - 20.0 bar.
The factory set voltage values (2.0 volt and 10.0 volt) cannot be changed.
Factory settings: 2 , 0 (= 2 V / 0.0 bar) and 10 , 10.0 (= 10 V / 10.0 bar).
This means that the "Pressure difference " is 0.0 bar at 2 V and 10.0 bar at 10 V.
Typically, the higher the voltage, the higher the displayed pressure difference.

MENU > Settings > Control parameters

V out max.	**1x165**
The output voltage can be limited to a maximum value.	

See Appendix “Parameter ID overview”

The value in % expresses the maximum voltage for the output in question.

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

MENU > Settings > Control parameters

V out min.	**1x167**
The output voltage can be limited to a minimum value.	

See Appendix “Parameter ID overview”

The value in % expresses the minimum voltage for the output in question.

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

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

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

MENU > Settings > Control parameters

Reverse out	1x171
Valid only when the internal I / O module ECA 35 is used: The analog output (0-10 volt) can be a rising or a falling voltage for rising pressure difference demand. Also the PWM signal can be reversed.	

See Appendix "Parameter ID overview"

OFF: The analog output voltage will rise at a rising pressure difference demand.
The PWM signal will rise in % at a rising pressure difference demand.

ON: The analog output voltage will fall at a rising pressure difference demand.
The PWM signal will fall in % at a rising pressure difference demand.

MENU > Settings > Control parameters

Xp (proportional band)	1x184

See Appendix "Parameter ID overview"

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

Special for the parameters 11184 / 14184:
Set the proportional band for the speed control. A higher value will result in a stable, but slow control of the speed.

MENU > Settings > Control parameters

Tn (integration time constant)	1x185

See Appendix "Parameter ID overview"

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.

Special for 11185 / 14185:
Set the integration time for the speed control. Set a higher value (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 parameters

M run (running time of the motorized control valve)	1x186
'M run' is the time in seconds it takes the controlled component to move from fully closed to fully open position.	

See Appendix "Parameter ID overview"

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 parameters

Nz (neutral zone)	1x187
When the actual flow temperature is within the neutral zone, the controller does not activate the motorized control valve.	

See Appendix "Parameter ID overview"

Set the acceptable flow temperature deviation.

Set the neutral zone to a high value if you can accept a high variation in flow temperature.

Special for 11187 / 14187:
Set the acceptable pressure difference deviation / temperature deviation.
When the actual pressure difference / temperature is within the neutral zone, the controller does not change the pump speed.

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 parameters

Min. act. time (min. activation time gear motor)	1x189
The min. pulse period of 20 ms (milliseconds) for activation of the gear motor.	

See Appendix "Parameter ID overview"

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 parameters

Wake up level	1x330
Setting is regarding the opening of M1 when charging is started. M1 will be opening without stop when set to ON. When parameter is set to numeric value M1 will open x% of actuator run setting.	

See Appendix "Parameter ID overview"

ON: M1 will be opening without stop.

1...100 (%) : M1 is opening x% of the motor run setting.

When the parameter is set to 20% and charging procedure starts then the motor will run for a period 20% of Mrun.
If Mrun (1x186) is 100s then it will run without interruption for 20 seconds with open command.
Afterwards the actuator will be controlled according to reference point.

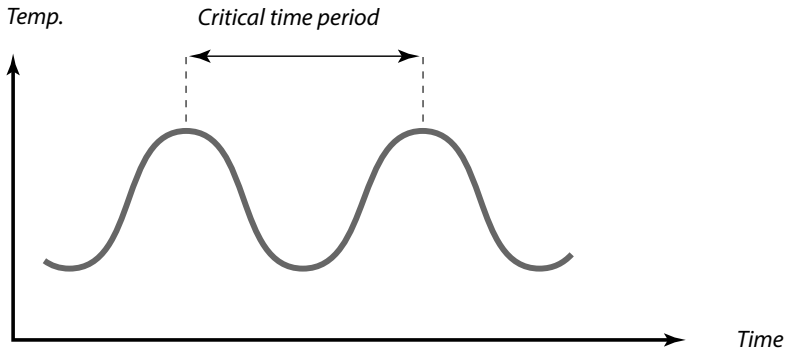
MENU > Settings > Control parameters

Pressure diff. des. (Pressure difference, desired)	**1x558**
Setting the desired pressure difference.	

See Appendix “Parameter ID overview”

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.

5.6 Application

The section "Application" describes specific application related issues.
Some of the parameter descriptions are universal for different application keys.

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

MENU > Settings > Application

Demand offset	**1x017**
The desired flow temperature in circuit 2 can be influenced by the demand for a desired flow temperature from another circuit or another controller (slave).	

See Appendix “Parameter ID overview”

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

1 ... 20: The desired flow temperature is increased by the set value in ‘Demand offset’, if the demand of another circuit or controller (slave) is higher.

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

MENU > Settings > Application

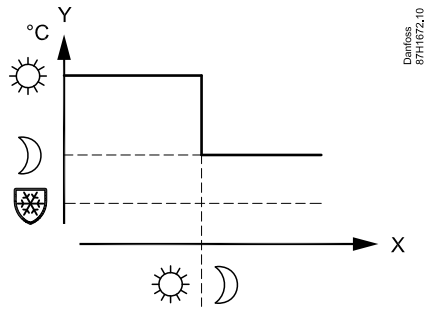
Total stop	**1x021**
Decide whether you want a total stop during the saving temperature period.	

See Appendix “Parameter ID overview”

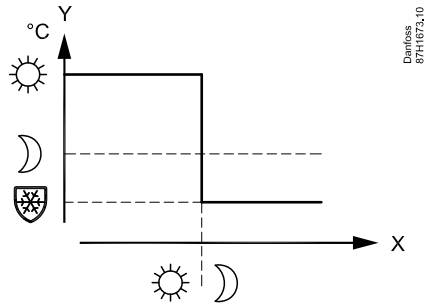
OFF: No total stop. The desired flow temperature is reduced according to:
- desired room temperature in saving mode
- auto saving

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'.

Total stop = OFF



Total stop = ON



X = Time
Y = Desired flow temperature
= Comfort temperature
= Saving temperature
= Frost protection

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

MENU > Settings > Application

Char. P post-run (Charging pump, post-run)	**1x042**
Set the charging pump post-run time. *The charging pump can continue to be switched ON for a few seconds after the buffer heating procedure stops in order to utilize the remaining heat in the heat exchanger.*	

See Appendix “Parameter ID overview”

0 ... 250: Set the number of seconds for the post-run.

The 'Charging pump, post-run' is respected if the charging temperature S3 is lower than the desired charging temperature.

MENU > Settings > Application

P frost T (circulation pump, frost protection temp.)	**1x077**
Frost protection, based on the outdoor temperature. When the outdoor temperature gets below the set temperature value in 'P frost T', the controller automatically switches ON the circulation pump (for example P1 or X3) to protect the system.	

See Appendix "Parameter ID overview"

OFF: No frost protection.

Value: 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.

⚠

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

MENU > Settings > Application

Frost pr. T (frost protection temp.)	**1x093**
Set the desired flow temperature at temperature sensor S3 to protect the system against frost (at heating cut-out, total stop etc.). When the temperature at S3 gets lower than the setting, the motorized control valve opens gradually.	

See Appendix "Parameter ID overview"

The frost protection temperature can also be set in your favorite display when the mode selector is in frost protection mode.

Override mode functions:

The following settings describe the function in general for the ECL Comfort 210 / 296 / 310 series. The explained modes are typical and not application related. They might differ from the override modes in your application.

MENU > Settings > Application

Ext. input (external override)	**1x141**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to 'Comfort', 'Saving', 'Frost protection' or 'Constant temperature' mode.	

See Appendix "Parameter ID overview"

OFF: No inputs have been selected for external override.

S1 ... S16: Input selected for external override.

If S1... S6 is chosen as override input, the override switch must have gold-plated contacts.
If S7 ... S16 is chosen as override input, the override switch can be a standard contact.

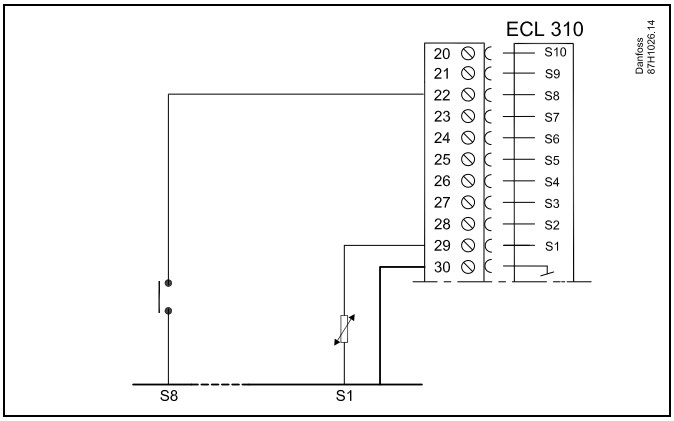
See the drawings for connection examples of override switch and override relay to input S8.

S7...S16 are recommended for override switch.

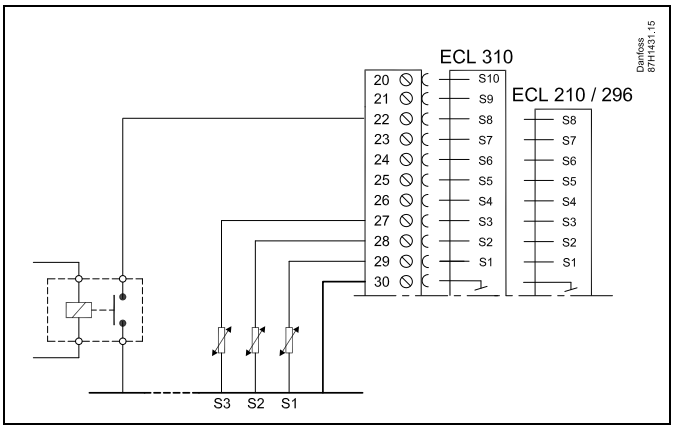
If ECA 32 is mounted, also S11... S16 can be used.

If ECA 35 is mounted, also S11 or S12 can be used.

Example: Connection of an override switch



Example: Connection of an override relay



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'.

MENU > Settings > Application

Ext. mode (external override mode)	**1x142**
The mode override can be activated for Saving, Comfort, Frost pr. or Constant T mode. *For override, the controller mode must be in scheduled mode.*	

See Appendix “Parameter ID overview”

Choose an override mode:

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

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

FROST PR.: The heating or DHW circuit closes, but is still frost protected.

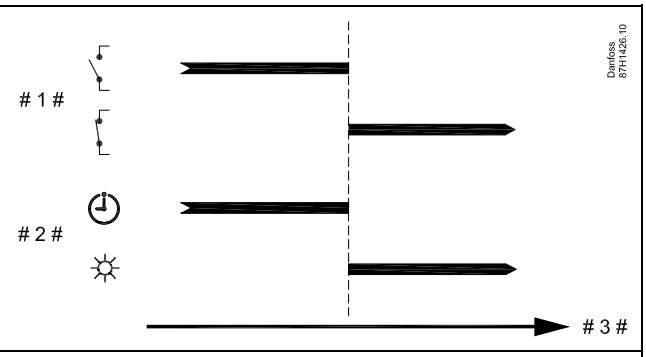
CONSTANT T: The circuit in question controls a constant temperature *)

*) See also 'Desired T' (1x004), setting of desired flow temperature (MENU > Settings > Flow temperature)
See also ' Con. T, ret. T lim.' (1x028), setting of return temperature limitation (MENU > Settings > Return limit)

The process diagrams show the functionality.

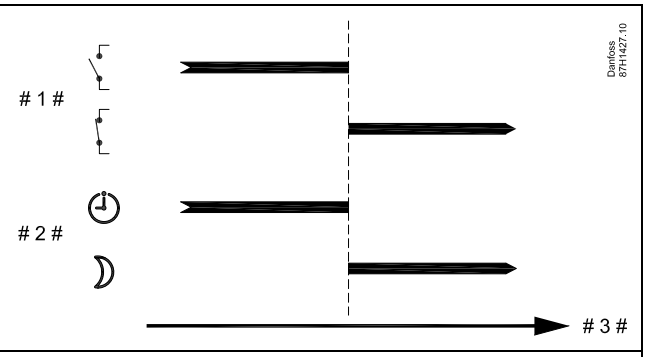
See also ‘Ext. input’.

Example: Override to Comfort mode



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Comfort)
3 # = Time

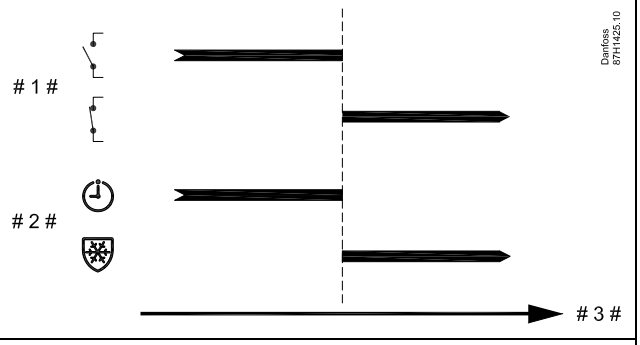
Example: Override to Saving mode



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Saving)
3 # = Time

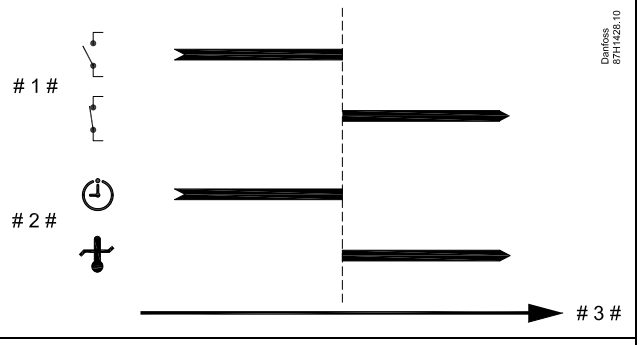
The result of override to 'Saving' mode depends on the setting in 'Total stop'.
Total stop = OFF: Heating reduced
Total stop = ON: Heating stopped

Example: Override to Frost protection mode



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Frost pr.)
3 # = Time

Example: Override to Constant temperature mode



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Const. T)
3 # = Time

The "Const. T" value can be influenced by:

- temp. max.
- temp. min.
- room temp. limit
- return temp. limit
- flow / power limit

MENU > Settings > Application

Send desired T	**1x500**
When the controller acts as a slave controller in a master / slave system, information about the desired flow temperature can be sent to the master controller via the ECL 485 bus. *Stand-alone controller:* *Sub-circuits can send the desired flow temperature to the master circuit.*	

See Appendix “Parameter ID overview”

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.

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’).

5.7 Tank temperature

Please note:
The buffer tank temperature sensors S6 and S8 must be connected.

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

MENU > Settings > Tank temperature

Desired T (Desired flow temperature)	**1x004**
When the ECL Comfort is in override mode, type "Const. T", the desired flow temperature can be set. *A "Const. T" related return temperature limitation can also be set. See MENU > Settings > Return limit > 'Con. T, ret. T lim.'*	

See Appendix “Parameter ID overview”

Override mode
When ECL Comfort is in Scheduled mode, a contact (switch) signal can be applied to an input in order to override to Comfort, Saving, Frost Protection or Constant temperature. As long as the contact (switch) signal is applied, the override is active.

The "Desired T" value can be influenced by:

- temp. max.
- temp. min.
- room temp. limit
- return temp. limit
- flow / power limit

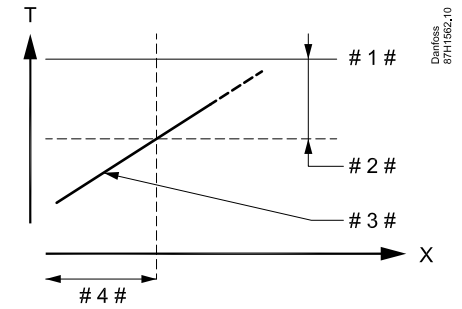
MENU > Settings > Tank temperature

Stop difference	**1x194**
Set the number of degrees below the desired buffer tank temperature, which will stop the buffer tank charging. *The charging stop process is related to the lower buffer tank temperature sensor.*	

See Appendix “Parameter ID overview”

–50 ... –1: Set the number of degrees.

Example with ‘Stop difference’ value:



X = Time

T = Temperature

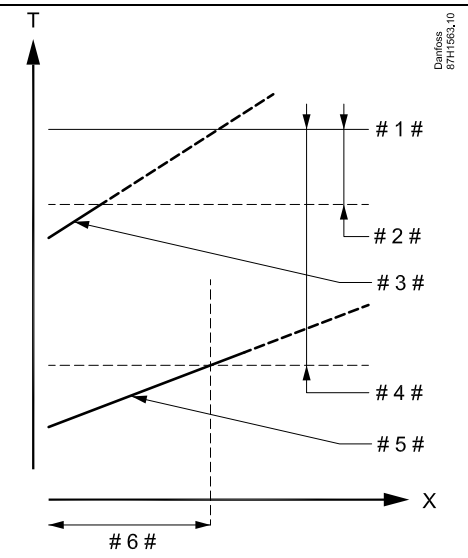
 # 1 # = Desired buffer tank temperature

 # 2 # = 'Stop difference'

 # 3 # = Lower buffer tank temperature

 # 4 # = Buffer tank charging

Example showing stop conditions:



X = Time

T = Temperature

 # 1 # = Desired buffer tank temperature

 # 2 # = ‘Start difference'

 # 3 # = Upper buffer tank temperature

 # 4 # = 'Stop difference'

 # 5 # = Lower buffer tank temperature

 # 6 # = Buffer tank charging

MENU > Settings > Tank temperature

Start difference	**1x195**
Set the number of degrees below the desired buffer tank temperature, which will start the buffer tank charging. *The charging start process is related to the upper buffer tank temperature sensor.*	

See Appendix “Parameter ID overview”

-50 ... –1: Set the number of degrees.

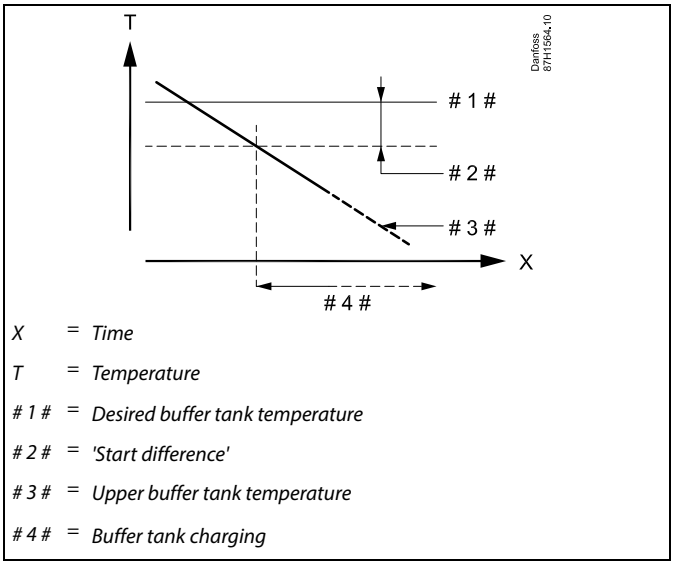
Example:

Desired buffer tank temp.: 60°C

Start difference: -3 K

Result:
The buffer tank charging starts when the temperature measured by the upper buffer tank temperature sensor gets lower than 57 °C.

Example with ‘Start difference’ value:



X = Time

T = Temperature

 # 1 # = Desired buffer tank temperature

 # 2 # = 'Start difference'

 # 3 # = Upper buffer tank temperature

 # 4 # = Buffer tank charging

MENU > Settings > Tank temperature

Pump start diff.	**1x371**
Charging pump P2 is switched ON when supply temperature S2 gets higher than ('Desired buffer temperature' + 'Pump start diff.'). *Example: 60 °C + 3 K = 63 °C*	

See Appendix “Parameter ID overview”

5.8 Alarm

The section "Alarm" describes specific application related issues.

Application A319 offers different types of alarms:

1. Actual charging temperature differs from the desired charging temperature
2. Supply temperature is too low or too high
3. Disconnection or short-circuiting of a temperature sensor or its connection

The alarm functions activate A1 (relay 6) and the alarm bell-symbol.

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

The alarm symbol / relay is activated:

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

Alarm type 1:
If the charging temperature deviates more than the set differences from the desired charging temperature, the alarm symbol / relay will be activated.
If the charging temperature becomes acceptable, the alarm symbol / relay will be de-activated.

Alarm type 2:
If the supply temperature does not get above (desired charging temp. + the setting 'Pump start diff.' (ID 12371)), the alarm symbol / relay will be activated.
There is a delay ('Supply T, - Delay') which must elapse before the alarm is activated.
NOTE: To reset the alarm: Set 'Supply T, - Delay' to 0 minutes.

Alarm type 3:
Selected temperature sensors can be monitored.
Should the connection to the temperature sensor be disconnected, short-circuited or the sensor gets defective, the alarm symbol / relay will be activated. In the "Raw input overview" (MENU > Common controller settings > System > Raw input overview) the sensor in question is marked and the alarm can be reset.

Alarm overview
1: Charge temp.
3: Supply temp.
32: T sensor defect

Parameters indicated with an ID no. like "1x607" mean a universal parameter.
x stands for circuit / parameter group.

MENU > Settings > Alarm

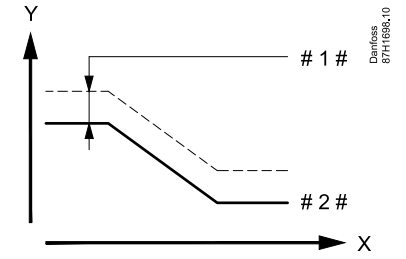
Upper difference	1x147
The alarm is activated if the actual flow temperature increases more than the set difference (acceptable temperature difference above the desired flow temperature). See also 'Delay'.	

See Appendix "Parameter ID overview"

OFF: The related alarm function is not active.

Value: The alarm function is active if the actual temperature gets above the acceptable difference.

Upper difference



X = *Time*
Y = *Temperature*
 # 1 # = *Upper difference*
 # 2 # = *Desired flow temperature*

MENU > Settings > Alarm

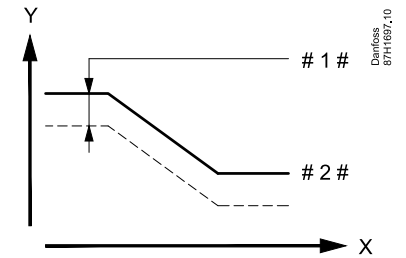
Lower difference	1x148
The alarm is activated if the actual flow temperature decreases more than the set difference (acceptable temperature difference below the desired flow temperature). See also 'Delay'.	

See Appendix "Parameter ID overview"

OFF: The related alarm function is not active.

Value: The alarm function is active if the actual temperature gets below the acceptable difference.

Lower difference



X = *Time*
Y = *Temperature*
 # 1 # = *Lower difference*
 # 2 # = *Desired flow temperature*

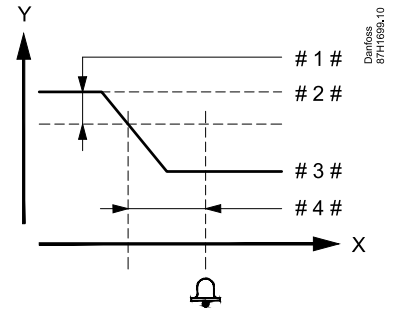
MENU > Settings > Alarm

Delay	**1x149**
If an alarm condition from either 'Upper difference' or 'Lower difference' is present for a longer time than the set delay (in minutes), the alarm function is activated.	

See Appendix “Parameter ID overview”

Value: The alarm function will be activated if the alarm condition remains after the set delay.

Delay, example



X = *Time*
Y = *Temperature*
 # 1 # = *Lower difference*
 # 2 # = *Desired flow temperature*
 # 3 # = *Actual flow temperature*
 # 4 # = *Delay (ID 1x149)*

MENU > Settings > Alarm

Lowest temp.	**1x150**
The alarm function will not be activated if the desired flow temperature is lower than the set value.	

See Appendix “Parameter ID overview”

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

MENU > Settings > Alarm

Delay	**1x340**
The alarm is activated if the supply temperature S2 does not get higher than ('Desired buffer temperature' + 'Pump start diff.'). *Example: 60 °C + 3 K = 63 °C*	

See Appendix “Parameter ID overview”

5.9 Alarm overview

MENU > Alarm > Alarm overview
This menu shows the alarm types, for example:

- "2: Temp. monitor"
- "32: T sensor defect"

The alarm has been activated if the alarm symbol (a bell) (🔔) 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")
Move cursor to the line in question.
Push dial.

Alarm overview:

Alarm sources are listed in this overview menu.

Some examples:
"2: Temp. monitor"
"5: Pump 1"
"10: Digital S12"
"32: T sensor defect"

Related to the examples, the numbers 2, 5 and 10 are used in the alarm communication to the BMS / SCADA system.
Related to the examples, "Temp. monitor", "Pump 1" and "Digital S12" are the alarm points.
Related to the examples, "32: T sensor defect" indicates the monitoring of connected sensors.
Alarm numbers and alarm points might differ depending on actual application.

6.0 Common controller settings

6.1 Introduction to 'Common controller settings'

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

To enter 'Common controller settings':

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

Circuit selector

6.2 Time & Date

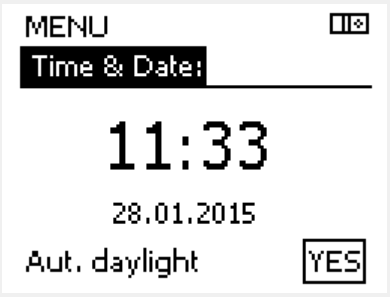
It is only necessary to set the correct date and time in connection with the first use of the ECL Comfort controller or after a power break of more than 72 hours.

The controller has a 24 hour clock.

Aut. daylight (Daylight saving time changeover)

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

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



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

How to set time and date:

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 'Time & Date'	
	Confirm	
	Place the cursor at the position to be changed	
	Confirm	
	Enter the desired value	
	Confirm	
	Move the cursor to the next position to be changed. Continue until 'Time & Date' has been set.	
	Finally move the cursor to 'MENU'	
	Confirm	
	Move the cursor to 'HOME'	
	Confirm	

6.3 Holiday

This section describes the function in general for the ECL Comfort 210 / 296 / 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.

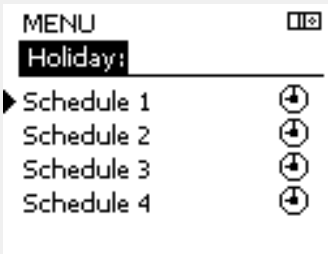
Selectable modes are Comfort, Saving, Frost protection or Comfort 7-23 (before 7 and after 23, the mode is scheduled).

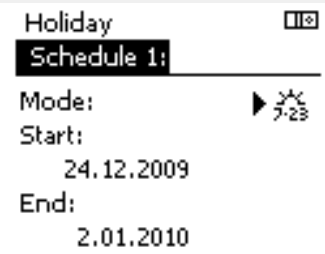
How to set your holiday schedule:

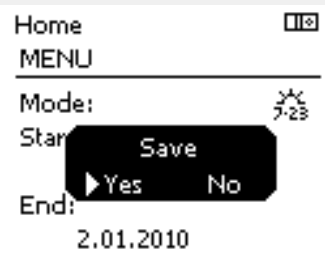
Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose a circuit or 'Common controller settings'	
	Heating	
	DHW	
	Common controller settings	
	Confirm	
	Go to 'Holiday'	
	Confirm	
	Choose a schedule	
	Confirm	
	Confirm choice of mode selector	
	Choose mode	
	· Comfort	
	· Comfort 7–23	
	· 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

Holiday, deleting a set period:

- Choose the Schedule in question
- Change the mode to "Clock"
- Confirm

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":

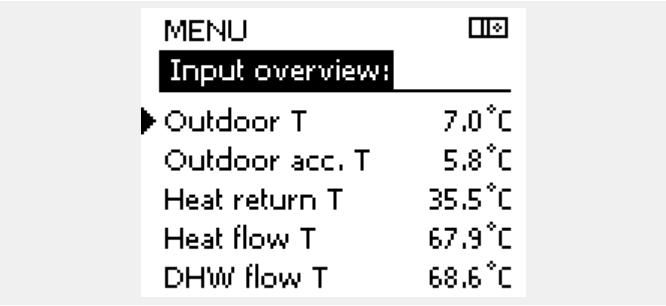
1. Go to ECA MENU
2. Move cursor to "Clock" symbol
3. Select the "Clock" symbol
4. Choose and select one of 4 override functions
5. Below the override symbol: Set hours or date
6. Below hours / date: Set desired room temperature for the override period

6.4 Input overview

This section describes the function in general for the ECL Comfort 210 / 296 / 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.

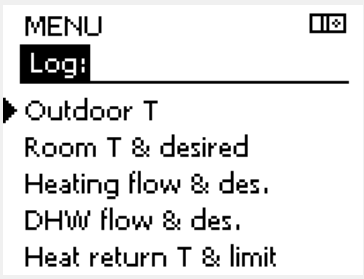
6.5 Log

This section describes the function in general for the ECL Comfort 210 / 296 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

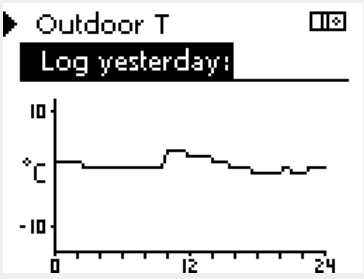
The log function (temperature history) allows you to monitor the logs of today, yesterday, the past 2 days as well as the past 4 days for the connected sensors.

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

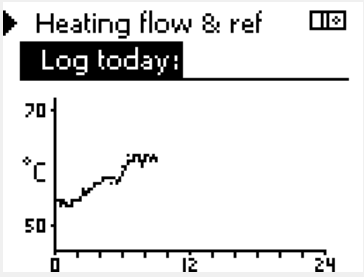
The log function is only available in the 'Common controller settings'.



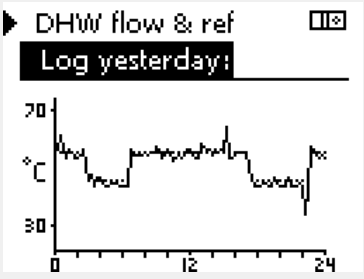
Example 1:
1 day log for yesterday showing the development in outdoor temperature during the past 24 hours.



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



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



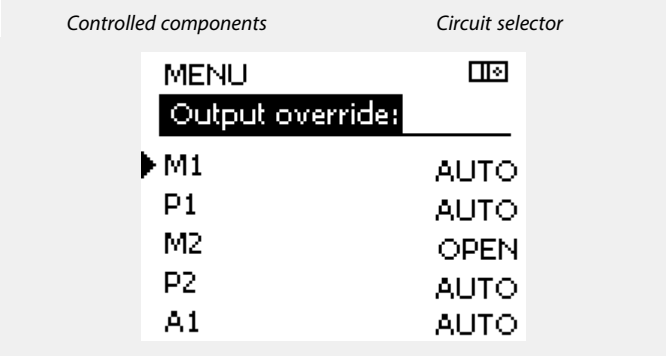
6.6 Output override

This section describes the function in general for the ECL Comfort 210 / 296 / 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.



"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.

6.7 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'.

The “Key overview” does not inform — through ECA 30 / 31 — about the subtypes of the 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.

ECL Comfort 296, controller versions 1.58 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.

6.8 System

6.8.1 ECL version

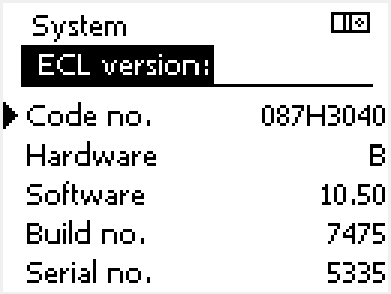
In 'ECL version' you will always be able to find an overview of the data related to your electronic controller.

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

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

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

Example, ECL version



6.8.2 Extension

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

6.8.3 Ethernet

ECL Comfort 296 / 310 / 310B have a Modbus/TCP communication interface that allows the ECL controller to be connected to an Ethernet network. This allows remote access to the ECL 296 / 310 / 310B controller based on standard communication infrastructures.

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

6.8.4 Portal config

ECL Comfort 296 / 310 / 310B have a Modbus/TCP communication interface that allows the ECL controller to be monitored and controlled via the ECL Portal.

ECL Portal related parameters are set here.

Documentation for ECL Portal: See *https://ecl.portal.danfoss.com*

6.8.5 M-bus config

ECL Comfort 296 / 310 / 310B have an M-bus communication interface that allows energy meters to be connected as slaves.

M-bus related parameters are set here.

6.8.6 Energy meter and M-bus, general information

ECL Comfort 296 / 310 / 310B only

When using the Application Key in the ECL Comfort 296 / 310 / 310B, up to 5 energy 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.

Many applications with control of heating, DHW or cooling circuit have the possibility to react on energy meter data.
To verify if actual application key can be set to react on energy meter data:
See Circuit > MENU > Settings > Flow / power.

The ECL Comfort 296 / 310 / 310B can always be used for monitoring purpose of up to 5 energy meters.

The ECL Comfort 296 / 310 / 310B act 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.

Energy meter data acquisition from ECL Portal is possible without setting up the M-bus configuration.

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 296 / 310 / 310B 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.

Baud (bits per second)		**5997**
Circuit	*Setting range*	*Factory setting*
-	300 / 600 / 1200 / 2400	300
The communication speed between ECL Comfort 296 / 310 / 310B and the connected energy meter(s).		

Typically, 300 or 2400 baud is used.
If ECL Comfort 296 / 310 / 310B are 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.

Command		**5998**
Circuit	*Setting range*	*Factory setting*
-	NONE / INIT / SCAN / GATEW	NONE
The ECL Comfort 296 / 310 / 310B are M-bus masters. 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 296 / 310 / 310B detect 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 296 / 310 / 310B act 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.

M-bus address Energy meter 1 (2, 3, 4, 5)		**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.

Type Energy meter 1 (2, 3, 4, 5)		**6001**
Circuit	*Setting range*	*Factory setting*
-	0 - 4	0
Selecting data range from the M-bus telegram..		

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.

See also Appendix for detailed description of "Type".

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

Scan time **Energy meter 1 (2, 3, 4, 5)**		**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.

ID **Energy meter 1 (2, 3, 4, 5)**		**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.*		

6.8.7 Raw input overview

Measured temperatures, input status and voltages are displayed.

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

Monitoring the sensors:
Choose the sensor which measures a temperature, for example the S5. When the dial is pressed, a magnifying glass appears in the selected line. The S5 temperature is now being monitored.

Alarm indication:
Should the connection to the temperature sensor be disconnected, short-circuited or the sensor itself be defective, the alarm function is activated.

In the "Raw input overview" an alarm symbol is shown at the defective temperature sensor in question.

Resetting the alarm:
Choose the sensor (S number) for which you want to clear the alarm. Press the dial. The magnifying glass and alarm symbols disappear.

When the dial is pressed again, the monitoring function is reactivated.

The temperature sensor inputs have a measuring range from -60 ... 150 ° C.

If a temperature sensor or its connection breaks, the value indication is " - - ".

If a temperature sensor or its connection is short-circuited, the value indication is " - - - ".

6.8.8 Sensor offset (new functionality as from firmware 1.59)

The measured temperature can be offset adjusted in order to compensate for cable resistance or a not-optimum place for the temperature sensor. The adjusted temperature can be seen in "Raw input overview" and "Input overview".

Common controller > System > Sensor offset

Sensor 1 . . . (temperature sensor)		
Circuit	*Setting range*	*Factory setting*
□|○	*	*
Setting the offset of the measured temperature.		

Positive offset value: The temperature value is increased

Negative offset value: The temperature value is decreased

6.8.9 Display

Backlight (display brightness)		**60058**
Circuit	*Setting range*	*Factory setting*
□|○	0 ... 10	5
Adjust the brightness of the display.		

0: Weak backlight.

10: Strong backlight.

Contrast (display contrast)		**60059**
Circuit	*Setting range*	*Factory setting*
□|○	0 ... 10	3
Adjust the contrast of the display.		

0: Low contrast.

10: High contrast.

6.8.10 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.		

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).

Service Pin		2150
Circuit	*Setting range*	*Factory setting*
	0 / 1	0
This setting is only used in connection with set-up of Modbus communication. **Not applicable for the time being and reserved for future use!**		

Ext. reset		2151
Circuit	*Setting range*	*Factory setting*
	0 / 1	0
This setting is only used in connection with set-up of Modbus communication.		

0: Reset not activated.

1: Reset.

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).

In a system with MASTER / SLAVE controllers, only one MASTER controller with address 15 is allowed.

If by mistake more MASTER controllers are present in an ECL 485 communication bus system, decide which controller is to be MASTER. Change the address in the remaining controllers. However, the system will operate but not be stable with more than one MASTER controller.

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

6.8.11 Language

Language		**2050**
Circuit	*Setting range*	*Factory setting*
☐	English / 'Local'	English
Choose your language.		

Local language is selected during installation. If you want to change to another local language, the application must be reinstalled. However, it is always possible to change between the local language and English.

7.0 Miscellaneous

7.1 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

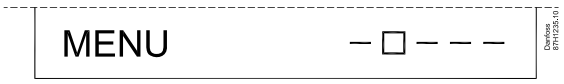
ECA settings: Offset adjustment of the measured room temperature.

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.

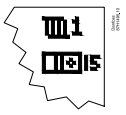
The ECA 30 / 31 will display this information (an X on the ECA 30 / 31 symbol) if the application in the ECL controller does not comply with the ECA 30 / 31:

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.

Display part of ECA 30 / 31:



Newer versions of ECA 30 / 31 indicate the address number of the connected ECL Comfort controller.
Address number can be changed in the ECA MENU.
A stand-alone ECL Controller has the address 15.

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.	

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.

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

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.	

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.

Example:

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

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.	

OFF: Simple remote control, no room temperature signal.

ON: Remote control, room temperature signal is available.

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

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).

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 / 296 / 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 30 / 31:

15	Connection address (master: 15, slaves: 1 - 9)

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.

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.

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

7.2 Override function

The ECL 210 / 296 / 310 controllers can receive a signal in order to override the existing schedule. The override signal can be a switch or a relay contact.

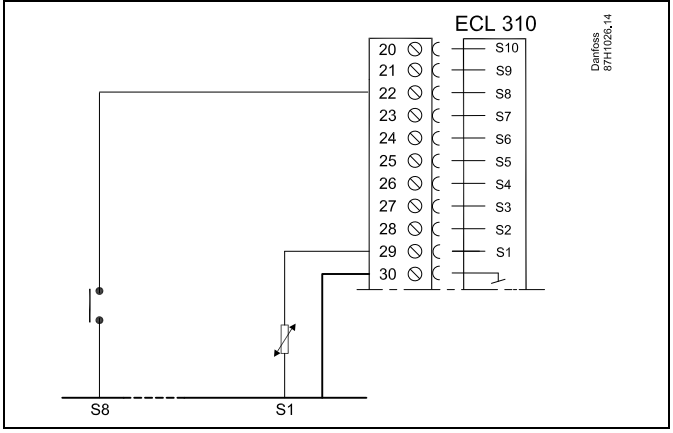
Different override modes can be selected, depending on application key type.

Override modes: Comfort, Saving, Constant temperature and Frost protection.

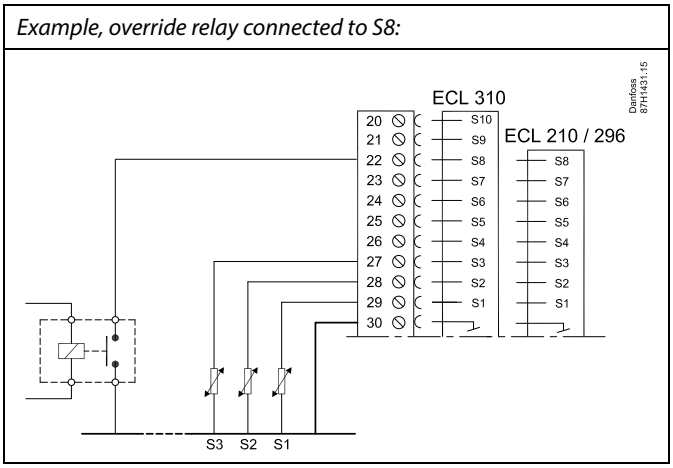
"Comfort" is also called normal heating temperature.
"Saving" can be reduced heating or heating stopped.
"Constant temperature" is a desired flow temperature, set in the menu "Flow temperature".
"Frost protection" stops the heating totally.

Override by means of override switch or relay contact is possible when the ECL 210 / 296 / 310 is in scheduled mode (clock).

Example, override switch connected to S8:



Example, override relay connected to S8:



Example 1

ECL in Saving mode, but in Comfort mode at override.

Choose an unused input, for example S8. Connect the override switch or override relay contact.

Settings in ECL:

1. Select circuit > MENU > Settings > Application > Ext. input:

   Select the input S8 (the wiring example)
2. Select circuit > MENU > Settings > Application > Ext. mode:

   Select COMFORT
3. Select circuit > MENU > Schedule:

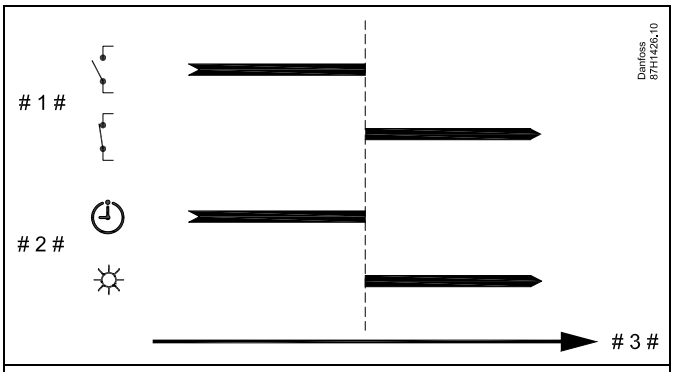
   Select all weekdays

   Set "Start1" to 24.00 (this disables Comfort mode)

   Exit menu and confirm by "Save"
4. Remember to set the circuit in question in scheduled mode ("clock").

Result: When the override switch (or the relay contact) is ON, the ECL 210 / 296 / 310 will operate in Comfort mode.

When the override switch (or the relay contact) is OFF, the ECL 210 / 296 / 310 will operate in Saving mode.



1 # = Override switch or relay contact (not activated / activated)
2 # = Function mode (Schedule / Comfort)
3 # = Time

Example 2

ECL in Comfort mode, but in Saving mode at override.

Choose an unused input, for example S8. Connect the override switch or override relay contact.

Settings in ECL:

1. Select circuit > MENU > Settings > Application > Ext. input:

   Select the input S8 (the wiring example)
2. Select circuit > MENU > Settings > Application > Ext. mode:

   Select SAVING
3. Select circuit > MENU > Schedule:

   Select all weekdays

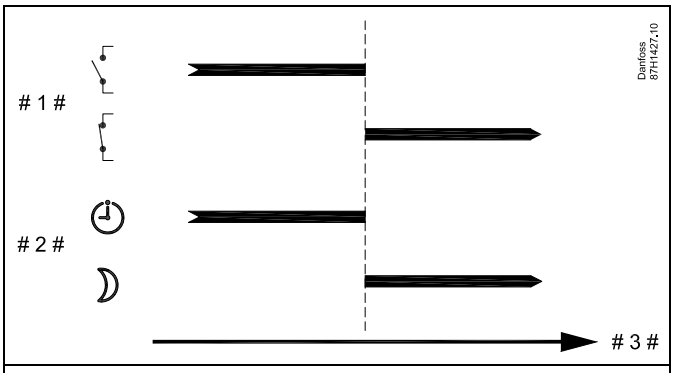
   Set "Start1" to 00.00

   Set "Stop1" to 24.00

   Exit menu and confirm by "Save"
4. Remember to set the circuit in question in scheduled mode ("clock").

Result: When the override switch (or the relay contact) is ON, the ECL 210 / 296 / 310 will operate in Saving mode.

When the override switch (or the relay contact) is OFF, the ECL 210 / 296 / 310 will operate in Comfort mode.



1 # = Override switch or relay contact (not activated / activated)
2 # = Function mode (Schedule / Saving)
3 # = Time

Example 3

The week schedule for the building is set with comfort periods Monday - Friday: 07.00 - 17.30. Sometimes, a team meeting takes place in the evening or in the week-end.

An override switch is installed and heating must be ON (Comfort mode) as long as the switch is ON.

Choose an unused input, for example S8. Connect the override switch.

Settings in ECL:

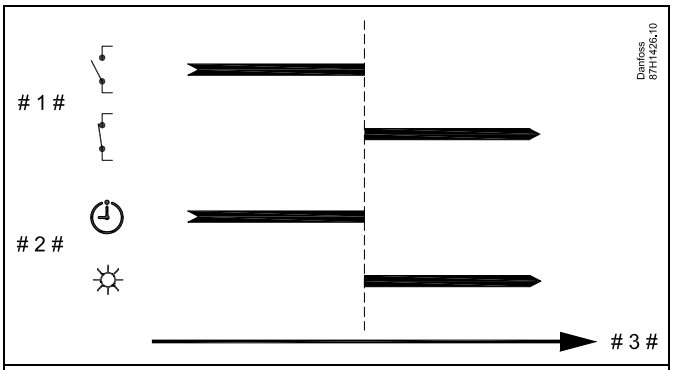
1. Select circuit > MENU > Settings > Application > Ext. input:

   Select the input S8 (the wiring example)
2. Select circuit > MENU > Settings > Application > Ext. mode:

   Select COMFORT
3. Remember to set the circuit in question in scheduled mode ("clock").

Result: When the override switch (or a relay contact) is ON, the ECL 210 / 296 / 310 will operate in Comfort mode.

When the override switch is OFF, the ECL 210 / 296 / 310 will operate according to the schedule.



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Comfort)
3 # = Time

Example 4

The week schedule for the building is set with comfort periods all weekdays: 06.00 - 20.00. Sometimes, the desired flow temperature must be constant on 65 °C.

An override relay is installed and the flow temperature must be 65 °C as long as the override relay is activated.

Choose an unused input, for example S8. Connect the contacts of the override relay.

Settings in ECL:

1. Select circuit > MENU > Settings > Application > Ext. input:

   Select the input S8 (the wiring example)
2. Select circuit > MENU > Settings > Application > Ext. mode:

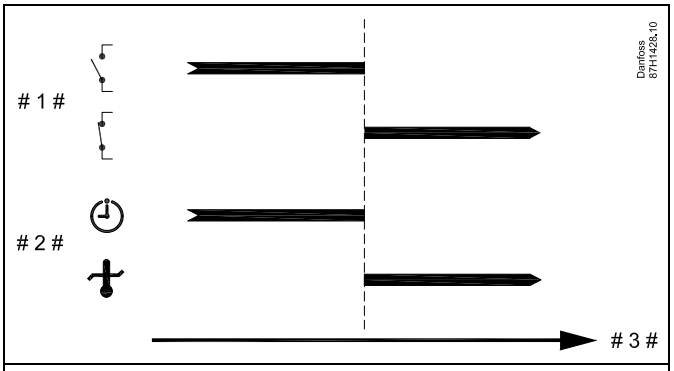
   Select CONST. T
3. Select circuit > MENU > Settings > Flow temperature >

   Desired T (ID 1x004):

   Set to 65 °C
4. Remember to set the circuit in question in scheduled mode ("clock").

Result: When the override relay is activated, the ECL 210 / 296 / 310 will operate in Const. temp. mode and control a flow temperature of 65 °C.

When the override relay is not activated, the ECL 210 / 296 / 310 will operate according to the schedule.



1 # = Override switch (not activated / activated)
2 # = Function mode (Schedule / Const. temp.)
3 # = Time

7.3 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

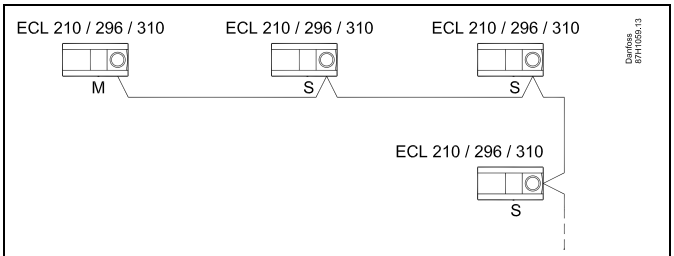
Situation 1:
SLAVE controllers: How to make use of the outdoor temperature signal sent from the MASTER controller

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.

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



ECL 485 bus cable
Maximum recommended length of the ECL 485 bus is calculated like this:

Subtract "Total length of all input cables of all ECL controllers in the master - slave system" from 200 m.

Simple example for total length of all input cables, 3 x ECL:

1 x ECL	Outdoor temp. sensor:	15 m
3 x ECL	Flow temp. sensor:	18 m
3 x ECL	Return temp. sensor:	18 m
3 x ECL	Room temp. sensor:	30 m
Total:		81 m

Maximum recommended length of the ECL 485 bus:
200 - 81 m = 119 m

In a system with MASTER / SLAVE controllers, only one MASTER controller with address 15 is allowed.

If by mistake more MASTER controllers are present in an ECL 485 communication bus system, decide which controller is to be MASTER. Change the address in the remaining controllers. However, the system will operate but not be stable with more than one MASTER controller.

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

- In ☐⊙, go to System > Communication > ECL 485 addr.

SLAVE controllers must be set to another address than 15:
Navigation:

- In ☐⊙, go to System > Communication > ECL 485 addr.

'Demand offset' with a value is to be used in the Master controller only.

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.

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

7.4 Frequently asked questions

The definitions apply to the ECL Comfort 210 / 296 / 310 series. Consequently, you might come across expressions that are not mentioned in your guide.

Circulation pump (heating) does not stop as expected
It is in operation at frost protection (outdoor temperature lower than "P frost T" value) and at heat demand (desired flow temperature higher than "P heat T" value)

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 ECL controller type, version code (e.g. 1.52), code no. and application (e.g. A266.1) 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.

What does the "i" in the upper right corner of the display mean?
When uploading an application (subtype) from the application key into the ECL Comfort controller, the "**i**" in the upper right corner indicates that - besides the factory settings - the subtype also contains special user / systems settings.

Why can't the ECL 485 Bus (used in ECL 210 / 296 / 310) and the ECL Bus (used in ECL 100 / 110 / 200 / 300) communicate?
These two communication busses (Danfoss proprietary) are different in connection form, telegram form and speed.

Why can't I select a language when uploading an application?
Reason can be that the ECL 310 is powered with 24 Volt d.c.

Language

At application upload, a language must be selected.*
If another language than English is selected, the selected language **AND** English will be uploaded into the ECL controller.
This makes service easy for English speaking service people, just because the English language menus can be visible by changing the actual set language into English.
(Navigation: MENU > Common controller > System > Language)

If the uploaded language is not suitable, the application must be erased. User and System settings can be saved on the application key before erasing.
After new upload with preferred language, the existing User and System settings can be uploaded.

*)
(ECL Comfort 310, 24 Volt) If language cannot be selected, the power supply is not a.c. (alternating current).

How to set a correct heat curve?

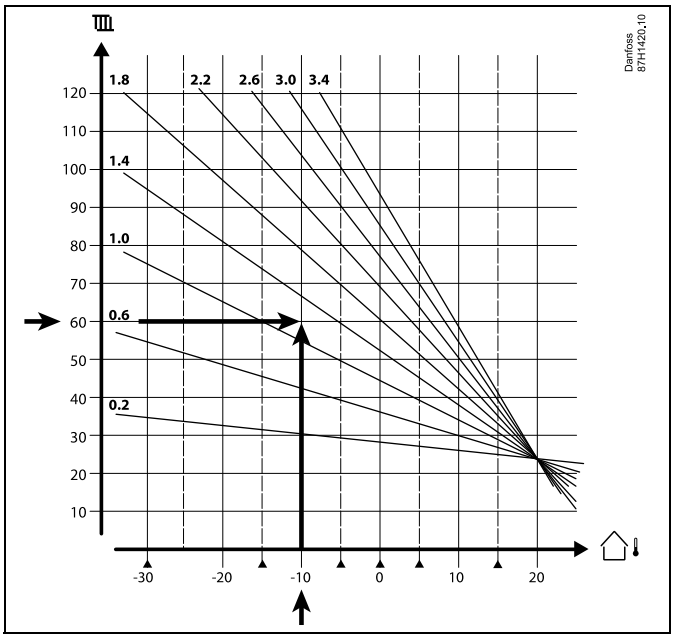
Short answer:
Set the heat curve to the lowest possible value, but still having comfortable room temperature.

The table shows some recommendations:

House with radiators:	Needed flow temp. when the outdoor temp. is -10 °C:	Recommended heat curve value:
Older than 20 years:	65 °C	1.4
Between 10 and 20 years old:	60 °C	1.2
Rather new:	50 °C	0.8
Floor heating systems need, in general, a lower heat curve value		

Technical answer:
In order to save energy, the flow temperature should be as low as possible, but still considering a comfortable room temperature. This means the heat curve slope should have a low value.

See the heat curve slope diagram.



Choose the desired flow temperature (vertical axis) for your heating system at the expected lowest outdoor temperature (horizontal axis) for your area. Pick the heat curve closest to the common point of these two values.

Example: Desired flow temperature: 60 (°C) at outdoor temperature: -10 (°C)
Result: Heat curve slope value = 1.2 (mid-way between 1.4 and 1.0).

In general:

- Smaller radiators in your heating system might require a higher heat curve slope. (Example: Desired flow temperature 70 °C resulting in heat curve = 1.5).
- Floor heating systems require a lower heat curve slope. (Example: Desired flow temperature 35 °C resulting in heat curve = 0.4).
- Corrections of the heat curve slope should be done in small steps when having outdoor temperatures below 0 °C; one step pr. day.
- If required, adjust the heat curve in the six coordinate points.
- Setting of the desired **room** temperature has an influence on the desired flow temperature even if a room temperature sensor / Remote Control Unit is not connected. An example: Increasing the desired **room** temperature results in a higher flow temperature.
- Typically, the desired **room** temperature should be adjusted when having outdoor temperatures above 0 °C.

7.5 Definitions

The definitions apply to the ECL Comfort 210 / 296 / 310 series. Consequently, you might come across expressions that are not mentioned in your guide.

Accumulated temperature value
A filtered (dampened) value, typically for room and outdoor temperatures. Is calculated in the ECL controller and is used to express the heat stored in the walls of the house. The accumulated value does not change so rapidly as the actual temperature.

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.

BMS
Building Management System. A supervisory system for remote control and monitoring.

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).

Duct temperature
Temperature measured in the air duct where the temperature is to be controlled.

ECL 485 Bus
This communication bus is Danfoss proprietary and used for internal communication between ECL 210, ECL 210B, ECL 296, ECL 310, ECL 310B, ECA 30 and ECA 31.
Communication with "ECL Bus", used in ECL 100, ECL 110, ECL 200, ECL 300 and ECL 301, is not possible.

ECL Portal
A supervisory system for remote control and monitoring, locally and via Internet.

EMS
Energy Management System. A supervisory system for remote control and monitoring.

Factory settings
Settings stored on the ECL Application Key to simplify the set up of your controller the first time.

Firmware
is used by the ECL Comfort controller and ECA 30 / 31 to manage display, dial and program execution.

Flow temperature
Temperature measured in the water flow where the temperature is to be controlled.

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 desired 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.

Humidistat
A device, which reacts on the air's humidity. A switch can go ON if the measured humidity gets above a set point.

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.

Inlet temperature
Temperature measured in the inlet air flow where the temperature is to be controlled.

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.

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.

Override mode
When ECL Comfort is in Scheduled mode, a switch or contact signal can be applied to an input in order to override to Comfort, Saving, Frost protection or Constant temperature. As long as the switch or contact signal is applied, the override is active.

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.

Pump control
One circulation pump is working and the other is the spare circulation pump. After a set time, the roles are exchanged.

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
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.

Room temperature sensor
Temperature sensor placed in the room (reference room, typically the living room) where the temperature is to be controlled.

Saving temperature
Temperature maintained in the heating / DHW circuit during saving temperature periods. Typically, the Saving temperature is lower than the Comfort temperature in order to save energy.

SCADA
Supervisory Control And Data Acquisition. A supervisory system for remote control and monitoring.

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.

Software
is used in the ECL Comfort controller to do the application related processes.

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, ON / OFF valve, change-over valve or damper control.

3-point control
Actuator positioning by means of Opening, Closing or No-action signals for the motorized control valve in order to control the flow. No-action means that the actuator remains in its current position.

7.6 Type (ID 6001), overview

	Type 0	Type 1	Type 2	Type 3	Type 4
Address	✓	✓	✓	✓	✓
Type	✓	✓	✓	✓	✓
Scan time	✓	✓	✓	✓	✓
ID / Serial	✓	✓	✓	✓	✓
Reserved	✓	✓	✓	✓	✓
Flow temp. [0.01 °C]	✓	✓	✓	✓	-
Return temp. [0.01 °C]	✓	✓	✓	✓	-
Flow [0.1 l/h]	✓	✓	✓	✓	-
Power [0.1 kW]	✓	✓	✓	✓	-
Acc. Volume	[0.1 m3]	[0.1 m3]	[0.1 m3]	[0.1 m3]	-
Acc. Energy	[0.1 kWh]	[0.1 MWh]	[0.1 kWh]	[0.1 MWh]	-
Tariff1 Acc. Energy	-	-	[0.1 kWh]	[0.1 MWh]	-
Tariff2 Acc. Energy	-	-	[0.1 kWh]	[0.1 MWh]	-
Up time [days]	-	-	✓	✓	-
Current time [M-bus defined structure]	-	-	✓	✓	✓
Error status [energy meter defined bitmask]	-	-	✓	✓	-
Acc. Volume	-	-	-	-	[0.1 m3]
Acc. Energy	-	-	-	-	[0.1 kWh]
Acc. Volume2	-	-	-	-	[0.1 m3]
Acc. Energy2	-	-	-	-	[0.1 kWh]
Acc. Volume3	-	-	-	-	[0.1 m3]
Acc. Energy3	-	-	-	-	[0.1 kWh]
Acc. Volume4	-	-	-	-	[0.1 m3]
Acc. Energy4	-	-	-	-	[0.1 kWh]
Flow MAX	[0.1 l/h]	[0.1 l/h]	[0.1 l/h]	[0.1 l/h]	-
Power MAX	[0.1 kW]	[0.1 kW]	[0.1 kW]	[0.1 kW]	-
Max T forward	✓	✓	✓	✓	-
Max T return	✓	✓	✓	✓	-
Storage * Acc. Energy	[0.1 kWh]	[0.1 kWh]	[0.1 kWh]	[0.1 kWh]	-

7.7 Automatic / manual update of firmware

Info:

- Firmware and application software are on the application key
- ECL Comfort has firmware implemented
- Firmware with Encryption has version 2.00 and up

Situation 1:

ECL Comfort controller, new (= no application installed), from before 10th of July 2018, to be installed:

1. Insert application key.
2. If the firmware on application key is newer than the firmware in the ECL, an update will be done automatically.
3. Hereafter the application can be uploaded.
4. If the firmware in the ECL is newer than the firmware on application key, the application can be uploaded.

Situation 2:

ECL Comfort controller is installed and runs an application.

1. Store all settings on the existing application key *.
2. Erase actual application in the ECL **.
3. Insert an application key with new firmware. The firmware update will be done automatically.
4. When ECL requires language selection, then remove application key.
5. Insert "old" application key.
6. Select language, select application subtype and see an "i" in upper right corner.
7. Set time / date if needed.
8. Choose "Next".
9. In Copy menu, choose YES at System and User settings; then choose "Next".
10. "Old" application is uploaded, ECL restarts and is ready again.

* Navigation: MENU > Common controller settings > Key functions > Copy > "To KEY", System settings = YES, User settings = YES, Start copying: Push dial.
Within 1 sec the settings are stored on the application key.

** Navigation: MENU > Common controller settings > Key functions > New application > Erase application: Push dial.

NOTE: You might come in a situation where the update will not elapse. This is typically when one or two ECA 30 are connected.

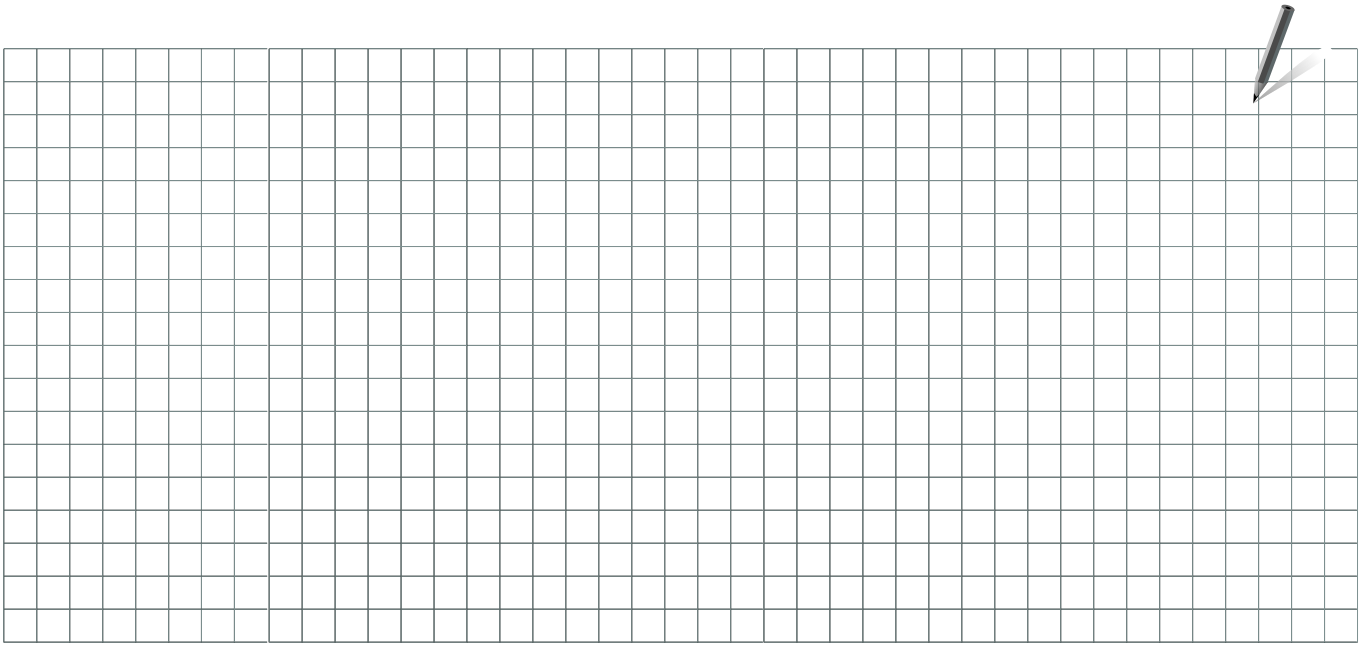
Remedy: Disconnect (remove from its base) the ECA 30. If ECL 310B, then only one ECA 30 should be connected.

7.8 Parameter ID overview

A319.x — **x** refers to the subtypes listed in the column.

ID	Parameter Name	A319.x	Setting range	Factory	Unit	Own settings	
10609	Low Y	1, 2	10 ... 120	10	°C		
10610	High Y	1, 2	10 ... 120	100	°C		
11004	Desired T	1, 2	5 ... 150	50	°C		
11021	Total stop	1, 2	OFF ; ON	OFF			71
11077	P frost T	1, 2	OFF, -10 ... 20	2	°C		72
11093	Frost pr. T	1, 2	5 ... 40	10	°C		73
11141	Ext. input	1, 2	OFF ; S1 ; S2 ; S3 ; S4 ; S5 ; S6 ; S7 ; S8 ; S9 ; S10 ; S11 ; S12 ; S13 ; S14 ; S15 ; S16	OFF			73
11142	Ext. mode	1, 2	COMFORT ; SAVING ; FROST PR. ; CONST. T	COMFORT			74
11165	V out max.	1, 2	0 ... 100	100	%		66
11167	V out min.	1, 2	0 ... 100	20	%		66
11171	Reverse out	1, 2	NO ; YES	NO			66
11177	Temp. min.	1, 2	10 ... 150	60	°C		55
11178	Temp. max.	1, 2	10 ... 150	80	°C		55
11184	Xp	1, 2	0.5 ... 25.0	8.0			67
11185	Tn	1, 2	1 ... 999	30	Sec		67
11187	Nz	1, 2	0.1 ... 2.0	0.4			68
11500	Send desired T	1, 2	OFF ; ON	ON			76
11558	Press. diff., des.	1, 2	0.0 ... 10.0	2.0	Bar		68
11609	Low Y	1, 2	0.0 ... 20.0	0.0	Bar		
11610	High Y	1, 2	0.0 ... 20.0	20.0	Bar		
12004	Desired T	1, 2	5 ... 150	50	°C		
12017	Demand offset	1, 2	OFF, 1 ... 20	OFF	K		71
12028	Con. T, ret. T lim.	1	10 ... 110	70	°C		57
12031	High T out X1	1, 2	-60 ... 20	15	°C		57
12032	Low limit Y1	1, 2	10 ... 150	40	°C		58
12033	Low T out X2	1, 2	-60 ... 20	-15	°C		58
12034	High limit Y2	1, 2	10 ... 150	60	°C		58
12037	Adapt. time	1, 2	OFF, 1 ... 999	OFF	Sec		58
12042	Char. P post-run	1, 2	0 ... 250	10	Sec		72
12080	Delay	1, 2	2 ... 180	20	Sec		58
12093	Frost pr. T	1, 2	5 ... 40	10	°C		73
12109	Input type	1, 2	EM1 ; EM2 ; EM3 ; EM4 ; EM5 ; OFF	OFF			60
12112	Adapt. time	1, 2	OFF, 1 ... 999	OFF	Sec		61
12113	Filter constant	1, 2	1 ... 50	10			61

ID	Parameter Name	A319.x	Setting range	Factory	Unit	Own settings	
12115	Units	1, 2	ml, l/h ; l, l/h ; ml, m3/h ; l, m3/h ; Wh, kW ; kWh, kW ; kWh, MW ; MWh, MW ; MWh, GW ; GWh, GW	ml, l/h			61
12116	High limit Y2	1, 2	0.0 ... 999.9	999.9			62
12117	Low limit Y1	1, 2	0.0 ... 999.9	999.9			62
12118	Low T out X2	1, 2	-60 ... 20	-15	°C		62
12119	High T out X1	1, 2	-60 ... 20	15	°C		62
12141	Ext. input	1, 2	OFF ; S1 ; S2 ; S3 ; S4 ; S5 ; S6 ; S7 ; S8 ; S9 ; S10 ; S11 ; S12 ; S13 ; S14 ; S15 ; S16	OFF			73
12142	Ext. mode	1, 2	COMFORT ; SAVING ; FROST PR. ; CONST. T	COMFORT			74
12147	Upper difference	1, 2	OFF, 1 ... 30	OFF	K		81
12148	Lower difference	1, 2	OFF, 1 ... 30	OFF	K		82
12149	Delay	1, 2	1 ... 99	10	Min		82
12150	Lowest temp.	1, 2	10 ... 50	30	°C		83
12177	Temp. min.	1, 2	10 ... 110	10	°C		55
12178	Temp. max.	1, 2	10 ... 110	80	°C		55
12184	Xp	2	5 ... 250	60			67
12185	Tn	2	1 ... 999	30	Sec		67
12186	M run	2	5 ... 250	30	Sec		67
12187	Nz	2	1 ... 9	1	K		68
12189	Min. act. time	2	2 ... 50	2			68
12194	Stop difference	1, 2	-50 ... -1	-4	K		78
12195	Start difference	1, 2	-50 ... -1	-7	K		79
12340	Delay	1, 2	OFF, 1 ... 90	5	Min		83
12371	Pump start diff.	1, 2	0 ... 40	3	K		80
13184	Xp	1, 2	5 ... 250	80	K		67
13185	Tn	1, 2	1 ... 999	20	Sec		67
13186	M run	1, 2	5 ... 250	100	Sec		67
13187	Nz	1, 2	1 ... 9	2	K		68
13189	Min. act. time	1, 2	2 ... 50	10			68
13330	Wake up level	1, 2	0 ... 100, ON	30	%		68
14037	Adapt. time	1, 2	OFF, 1 ... 100	25	Sec		58
14165	V out max.	1, 2	0 ... 100	100	%		66
14167	V out min.	1, 2	0 ... 100	20	%		66
14171	Reverse out	1, 2	NO ; YES	YES			66
14184	Xp	1, 2	5 ... 250	80	K		67
14185	Tn	1, 2	1 ... 999	30	Sec		67
14187	Nz	1, 2	1 ... 9	1	K		68



Installer:

By:

Date:

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