Installation Guide

ECL Comfort 210 / 310, application A217 / A317

1.0 Table of Contents

1.1 Important safety and product information

1.1.1 Important safety and product information

This Installation Guide is associated with ECL Application Key A217 (order code no. 087H3807).

The A217 Key contains two sets of applications: one set (A217.1 / A217.2 / A217.3) and another set (A317.1 / A317.2).

The functions can be realized in:
ECL Comfort 210 (A217) for simple solutions or
ECL Comfort 310 (A217 / A317) for advanced solutions, e.g. M-bus, Modbus and Ethernet (Internet) communication.

The applications A217 / A317 comply with ECL Comfort controllers 210 / 310 as of software version 1.11 (visible at start-up of the controller and in 'Common controller settings' in 'System').

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

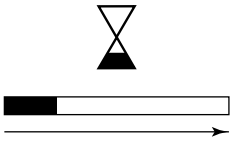
⚠

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

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

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

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



Progress bar

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

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

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

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

The ID no. is unique for the selected parameter.

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

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

Disposal Note

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

Always follow the local disposal regulations.

2.0 Installation

2.1 Before you start

The two applications, **A217.1 / A317.1** are almost identical. However, A317.1 has some extra functions which are described separately.

The applications A217.1 / A317.1 are very flexible. These are the basic principles:

Domestic Hot Water (DHW):

By means of a week schedule (up to 3 'Comfort' periods / day), the DHW circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for the desired DHW temperature at S6).

The heating / charging temperature sensor S3 is the most important sensor.

If the measured DHW temperature (S6) gets lower than the desired DHW temperature, the DHW heating / charging pump (P1) is switched ON.

The motorized control valve (M1) is controlled in order to maintain the heating / charging temperature at S3. This temperature is typically 5–10 degrees higher than the desired DHW temperature. A max. value can be set.

DHW tank with 1 temperature sensor (S6):
If the measured DHW temperature (S6) gets higher than the desired DHW temperature, the DHW heating / charging pump (P1) is switched OFF. The post-run time can be set.

DHW tank with 2 temperature sensors (S6 and S8):
If the measured DHW temperature (S6) gets higher than the desired DHW temperature and the lower temperature (at S8) gets higher than the cut-out temperature, the DHW heating / charging pump (P1) is switched OFF. The post-run time can be set.

In charging applications the DHW circulation can be through the DHW tank (connection A) or through the heat-exchanger (connection B).

The solution with connection A results in closing of the motorized control valve after the DHW tank charging procedure.
The solution with connection B is used to compensate for the heat loss in the DHW circulation pipe. Furthermore, after DHW tank charging, the circulation temperature (at S3) is controlled according to the desired DHW temperature.

The return temperature (S5) to the district heating supply should not be too high. If so, the desired charging temperature can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve.

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

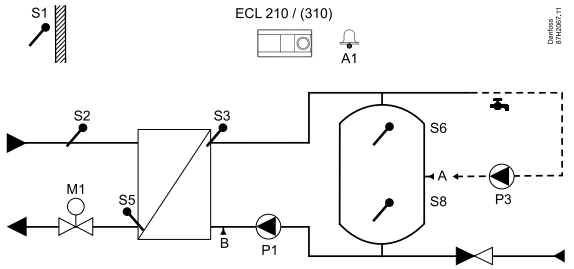
The supply temperature, S2, is used for adjusting the proportional band (Xp) in order to give a stable temperature control.

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

The outdoor temperature sensor S1 is used to protect the circulation circuit against frost.

The DHW circulation pump (P3) has a week schedule for up to 3 ON-periods per day.

Typical A217.1. / A317.1 application:



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

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Supply temperature sensor*
S3	*Charging temperature sensor*
S5	*Return temperature sensor*
S6	*DHW tank temperature sensor, upper*
S8	*DHW tank temperature sensor, lower*
P1	*DHW charging pump (DHW heating pump)*
P3	*DHW circulation pump*
M1	*Motorized control valve*
A1	*Relay output, alarm*

Application A217.1 (used in ECL Comfort 210) / A317.1 (used in ECL Comfort 310) in general:

A Remote Control Unit, the ECA 30, can be connected in order to control the ECL controller remotely.

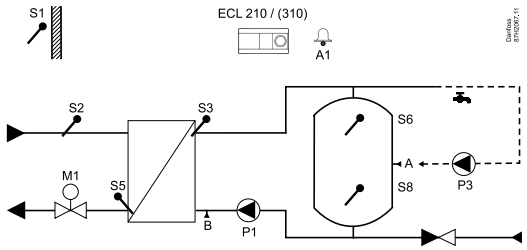
A connected flow or energy meter (in ECL Comfort 210 it is based on pulse signals and in ECL Comfort 310 based on M-bus signal) can limit the flow or energy to a set maximum.

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

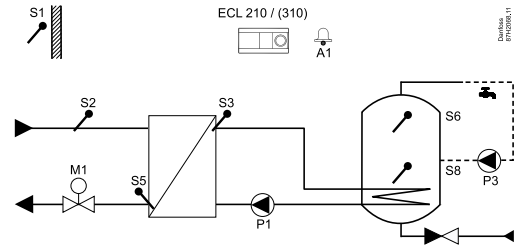
Modbus communication to a SCADA system can be established. In ECL Comfort 310 the M-bus data can furthermore be transferred to the Modbus communication.

Alarm relay (in ECL Comfort 210 it is R4 and in ECL Comfort 310 R6) can be activated if the actual flow temperature at S3 differs from the desired DHW charging temperature.

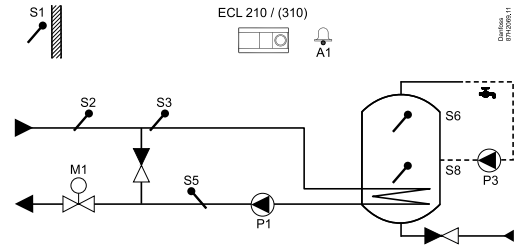
A217.1 / A317.1 example a:



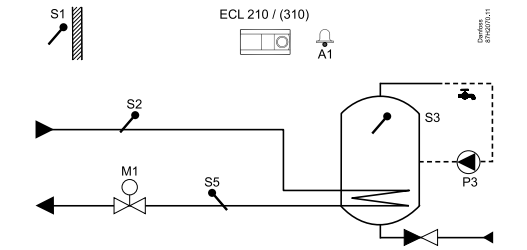
A217.1 / A317.1 example b:



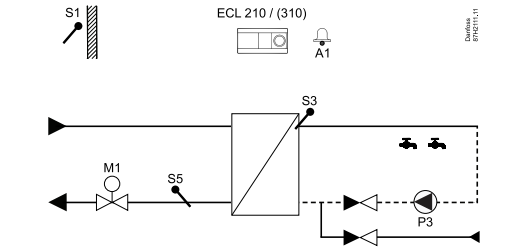
A217.1 / A317.1 example c:



A217.1 / A317.1 example d:



A217.1 / A317.1 example e:



The two applications, **A217.2 / A317.2** are almost identical. However, A317.2 has some extra functions which are described separately.

The applications A217.2 / A317.2 are very flexible. These are the basic principles:

Domestic Hot Water (DHW):

By means of a week schedule (up to 3 'Comfort' periods / day), the DHW circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for the desired DHW temperature at S6).

The DHW heating temperature sensor S3 and the charging temperature sensor S4 are the most important sensors.

If the measured DHW temperature (S6) gets lower than the desired DHW temperature, the DHW heating pump (P1) is switched ON. The motorized control valve (M1) is controlled in order to maintain the DHW heating temperature at S3. The DHW heating temperature is determined by the desired DHW charging temperature at S4.

When the DHW heating temperature is reached, the DHW charging pump P2 is switched ON.

If the DHW charging temperature at S4 can not be reached, the ECL controller gradually increases the desired DHW heating temperature at S3 in order to obtain the charging temperature. A max. value can be set.

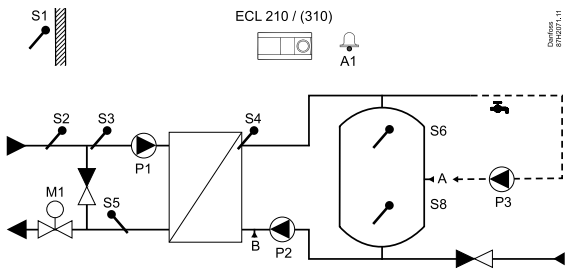
The DHW charging temperature at S4 is typically 5–10 degrees higher than the desired DHW temperature.

DHW tank with 1 temperature sensor (S6):
If the measured DHW temperature (S6) gets higher than the desired DHW temperature, the DHW heating pump (P1) and the DHW charging pump (P2) are switched OFF. The post-run time can be set.

DHW tank with 2 temperature sensors (S6 and S8):
If the measured DHW temperature (S6) gets higher than the desired DHW temperature and the lower temperature (at S8) gets higher than the cut-out temperature, the DHW heating pump (P1) and the DHW charging pump (P2) are switched OFF. The post-run time can be set.

In charging applications the DHW circulation can be through the DHW tank (connection A) or through the heat-exchanger (connection B).
The solution with connection A results in closing of the motorized control valve after the DHW tank charging procedure.
The solution with connection B is used to compensate for the heat loss in the DHW circulation pipe.
Furthermore, after DHW tank charging, the circulation temperature (at S4) is controlled according to the desired DHW temperature.

Typical A217.2. / A317.2 application:



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

All named components are connected to the ECL Comfort controller.

List of components:

S1	*Outdoor temperature sensor*
S2	*Supply temperature sensor*
S3	*DHW heating temperature sensor*
S4	*DHW charging temperature sensor*
S5	*Return temperature sensor*
S6	*DHW tank temperature sensor, upper*
S8	*DHW tank temperature sensor, lower*
P1	*DHW heating pump*
P2	*DHW charging pump*
P3	*DHW circulation pump*
M1	*Motorized control valve*
A1	*Relay output, alarm*

The return temperature (S5) to the district heating supply should not be too high. If so, the desired charging temperature can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve.
In boiler-based heating supply the return temperature should not be too low (same adjustment procedure as above).

The supply temperature, S2, is used for adjusting the proportional band (Xp) in order to give a stable temperature control.

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

The outdoor temperature sensor S1 is used to protect the circulation circuit against frost.

The DHW circulation pump (P3) has a week schedule for up to 3 ON-periods per day.

Application A217.2 (used in ECL Comfort 210) / A317.2 (used in ECL Comfort 310) in general:

A Remote Control Unit, the ECA 30, can be connected in order to control the ECL controller remotely.

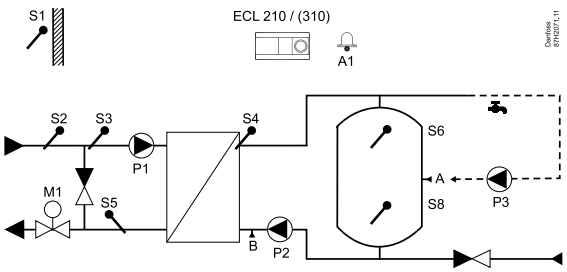
A connected flow or energy meter (in ECL Comfort 210 it is based on pulse signals and in ECL Comfort 310 based on M-bus signal) can limit the flow or energy to a set maximum.

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

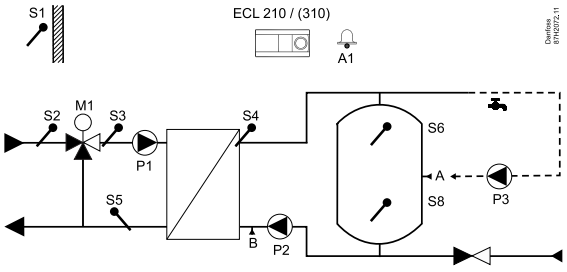
Modbus communication to a SCADA system can be established. In ECL Comfort 310 the M-bus data can furthermore be transferred to the Modbus communication.

Alarm relay (in ECL Comfort 210 it is R4 and in ECL Comfort 310 R6) can be activated if the actual flow temperature at S3 differs from the desired DHW heating temperature.

A217.2 / A317.2 example a:



A217.2 / A317.2 example b:



The application **A217.3** is very flexible. These are the basic principles:

Domestic Hot Water (DHW), example a:

By means of a week schedulee (up to 3 'Comfort' periods / day), the DHW circuit can be in 'Comfort' or 'Saving' mode (two different temperature values for the desired DHW temperature at S3). The DHW temperature sensor S3 is the most important sensor.

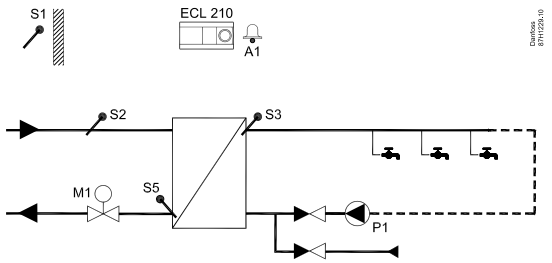
If the measured DHW temperature (S3) is lower than the desired DHW temperature, the motorized control valve (M1) is opened gradually and vice versa.

The return temperature (S5) to the district heating supply should not be too high. If so, the desired flow temperature can be adjusted (typically to a lower value) thus resulting in a gradual closing of the motorized control valve, i.e. the return temperature will decrease.

The circulation pump, P1, is controlled by means of a separate week schedule (up to 3 'Comfort' periods / day).

If a supply temperature sensor S2 is connected, the proportional band Xp is adapted to the actual supply temperature in order to avoid control instability.

Typical A217.3 application, example a:



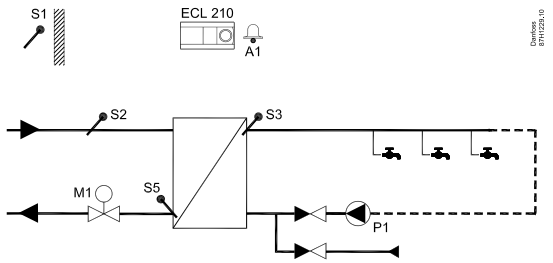
The shown diagram is a fundamental and simplified example and does not contain all components that are necessary in a system.

All named components are connected to the ECL Comfort controller.

List of components:

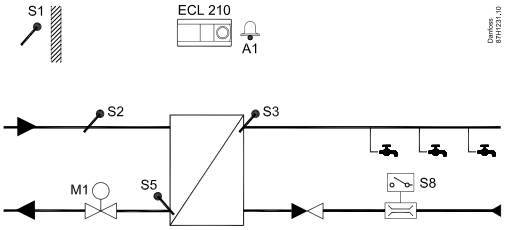
S1	*Outdoor temperature sensor*
S2	*Supply temperature sensor*
S3	*DHW supply temperature sensor*
S5	*Return temperature sensor*
S8	*(Flow switch — examples b, c, d)*
P1	*DHW circulation pump*
M1	*Motorized control valve*
A1	*Relay output, alarm*

A217.3 example a:



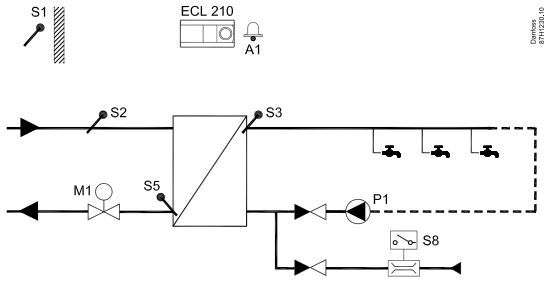
Example b:
A flow switch signal (S8) can be applied in order to heat the DHW on demand (DHW tapping / DHW draw-off). An idle temperature for the supply temperature (at S2) can be maintained to minimize the heat-up time for the DHW.

A217.3 example b:



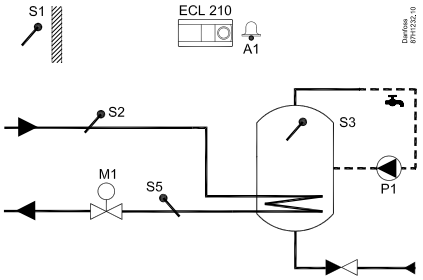
Example c:
A flow switch signal (S8) can be applied in order to heat the DHW on demand (DHW tapping / DHW draw-off). The temperature at S3 is maintained during the comfort times of the circulation pump P1. An idle temperature for the supply temperature (at S2) can be maintained to minimize the heat-up time for the DHW.

A217.3 example c:



Example d:
The DHW tank is directly heated. The setting of the return temperature limitation (at S5) can avoid a too high flow in the heating coil. An idle temperature for the supply temperature (at S2) can be maintained to minimize the heat-up time for the DHW.

A217.3 example d:

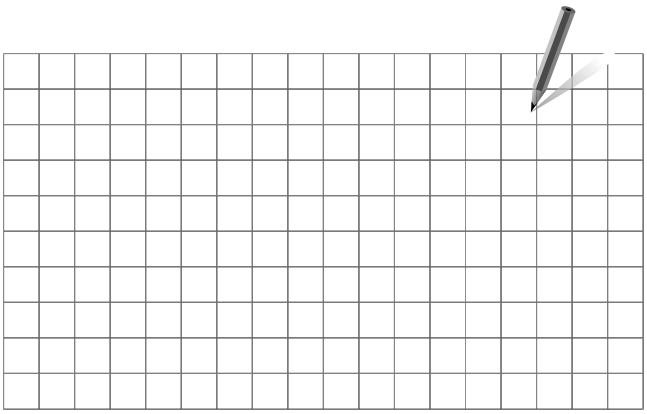


The controller is pre-programmed with factory settings that are shown in the relevant chapters of this guide.

2.2 Identifying the system type

Sketch your application

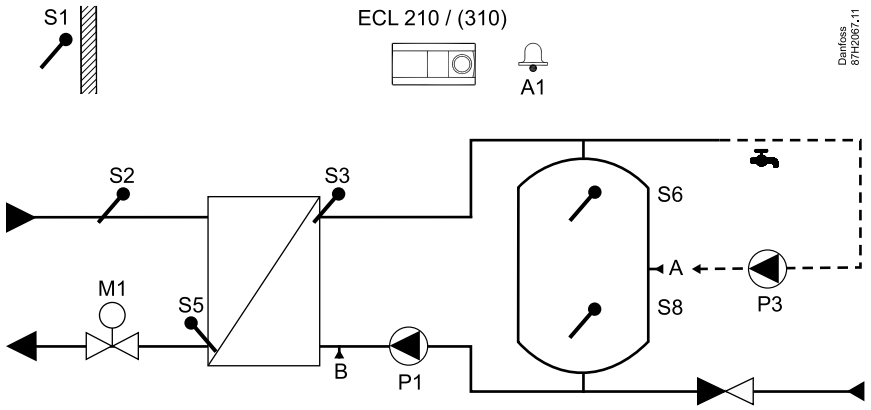
The ECL Comfort controller series is designed for a wide range of heating, domestic hot-water (DHW) and cooling systems with different configurations and capacities. If your system differs from the diagrams shown here, you may want to make a sketch of the system about to be installed. This makes it easier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



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

A217.1 / A317.1, example a

Indirectly connected DHW charging system. DHW circulation through DHW tank or heat exchanger.



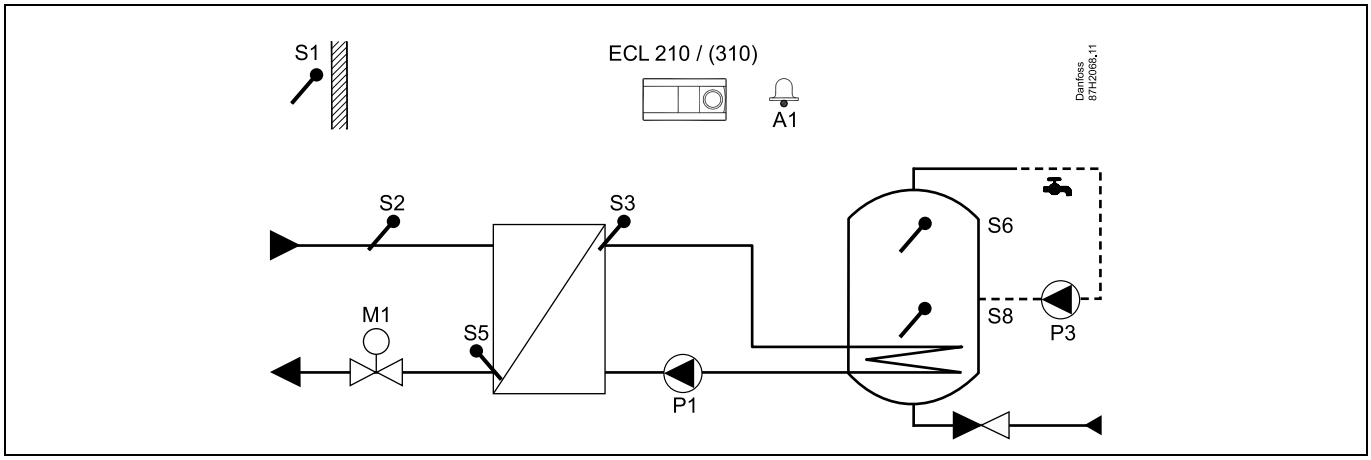
Special settings for type A217.1 / A317.1 example a:

The DHW circulation pipe can be connected to the DHW tank at 'A' for internal circulation or to the heat exchanger at 'B' for external circulation.

Navigation:	ID no.:	Recommended setting:
(Internal DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	OFF
(External DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	ON

A217.1 / A317.1 example b

Indirectly connected DHW tank heating system



If only one temperature sensor is required in the DHW tank, S6 must be used.

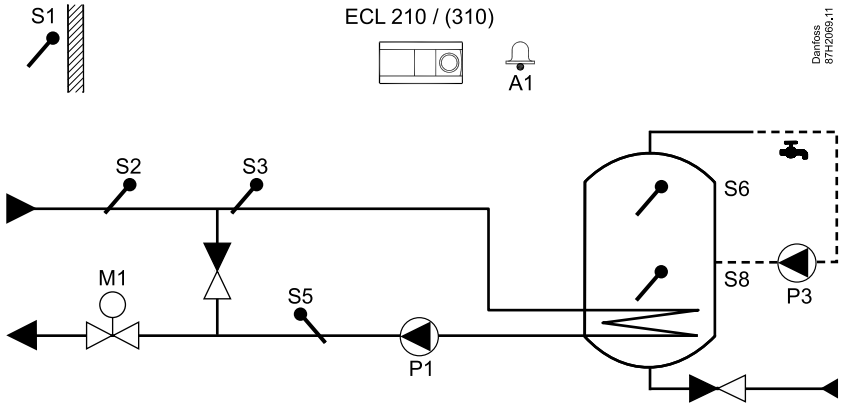
Special settings for type A217.1 / A317.1 example b:

The DHW circulation pipe is connected to the DHW tank for internal circulation.

Navigation:	ID no.:	Recommended setting:
(Internal DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	OFF

A217.1 / A317.1 example c

Directly connected DHW tank heating system



If only one temperature sensor is required in the DHW tank, S6 must be used.

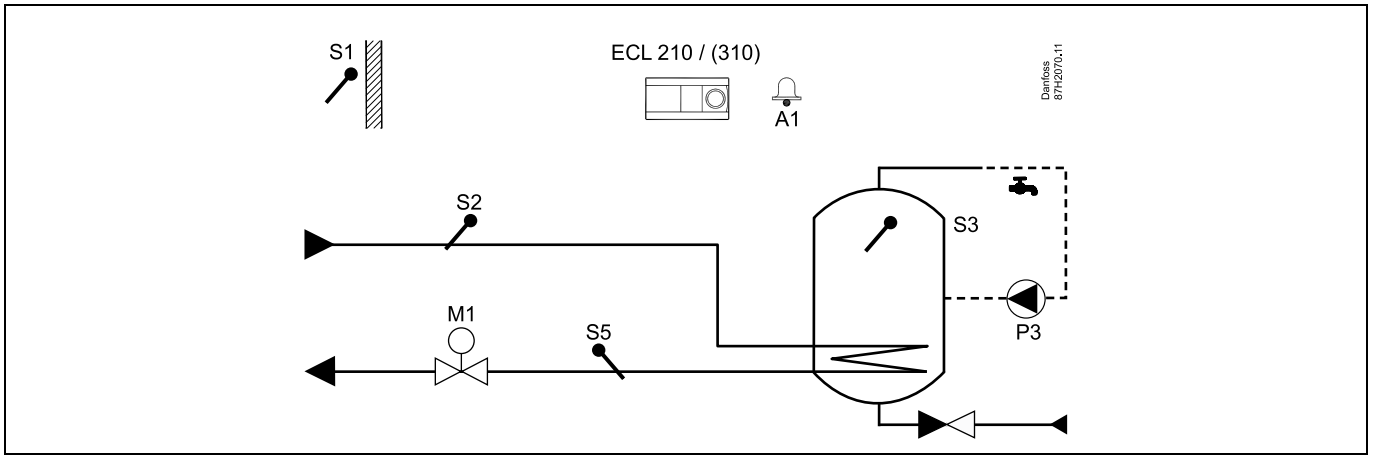
Special settings for type A217.1 / A317.1 example c:

The DHW circulation pipe is connected to the DHW tank for internal circulation.

Navigation:	ID no.:	Recommended setting:
(Internal DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	OFF

A217.1 / A317.1 example d

Directly connected DHW tank heating system



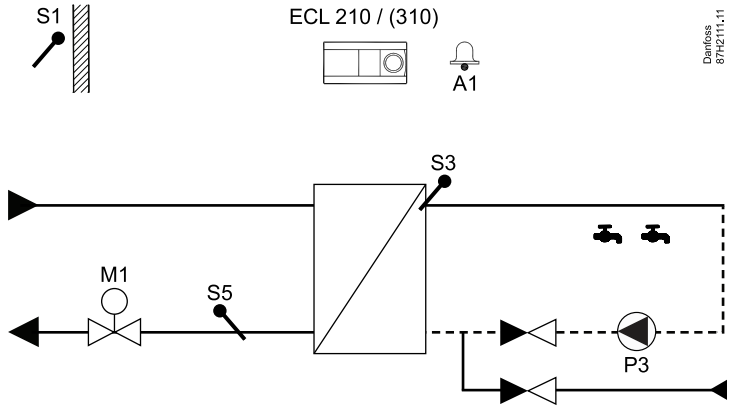
When the circulation pump P3 is in comfort mode, the temperature at S3 can be controlled.

Special settings for type A217.1 / A317.1 example d:

Navigation:	ID no.:	Recommended setting:
MENU \ Settings \ Application: 'Cont. T control'	11054	ON

A217.1 / A317.1 example e

Directly connected DHW heating system



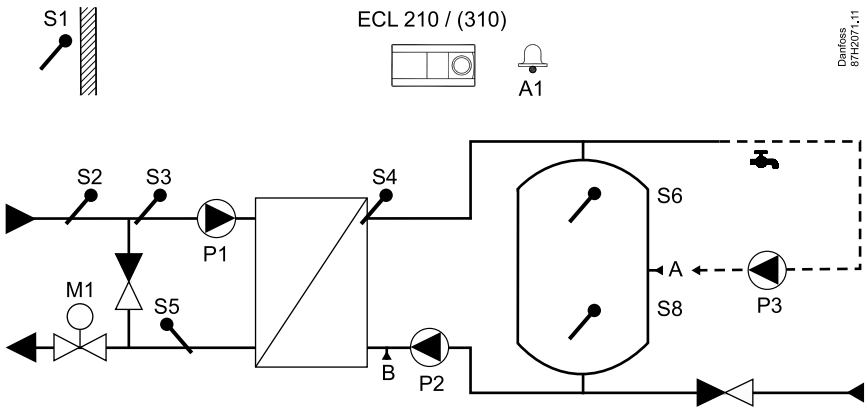
When the circulation pump P3 is in comfort mode, the temperature at S3 can be controlled.

Special settings for type A217.1 / A317.1 example e:

Navigation:	ID no.:	Recommended setting:
MENU \ Settings \ Application: 'Cont. T control'	11054	ON

A217.2 / A317.2 example a

Indirectly connected DHW charging system with controlled heating temperature. DHW circulation through DHW tank or heat exchanger.



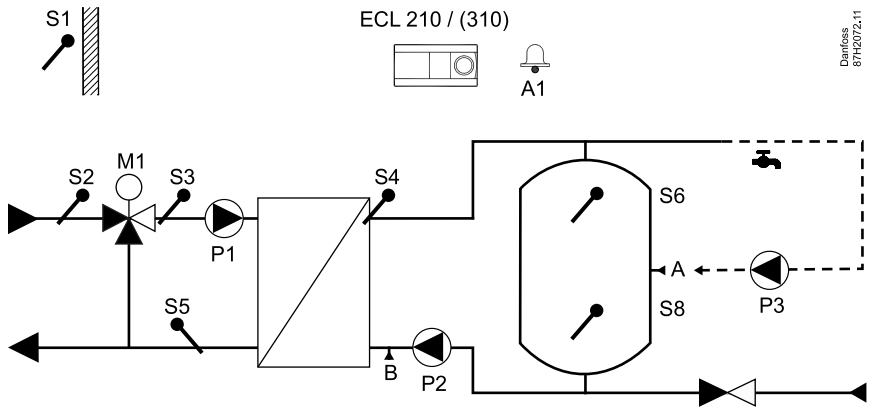
Special settings for type A217.2 / A317.2 example a:

The DHW circulation pipe can be connected to the DHW tank at 'A' for internal circulation or to the heat exchanger at 'B' for external circulation.

Navigation:	ID no.:	Recommended setting:
(Internal DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	OFF
(External DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	ON

A217.2 / A317.2 example b

Indirectly connected DHW charging system with controlled heating temperature. DHW circulation through DHW tank or heat exchanger.



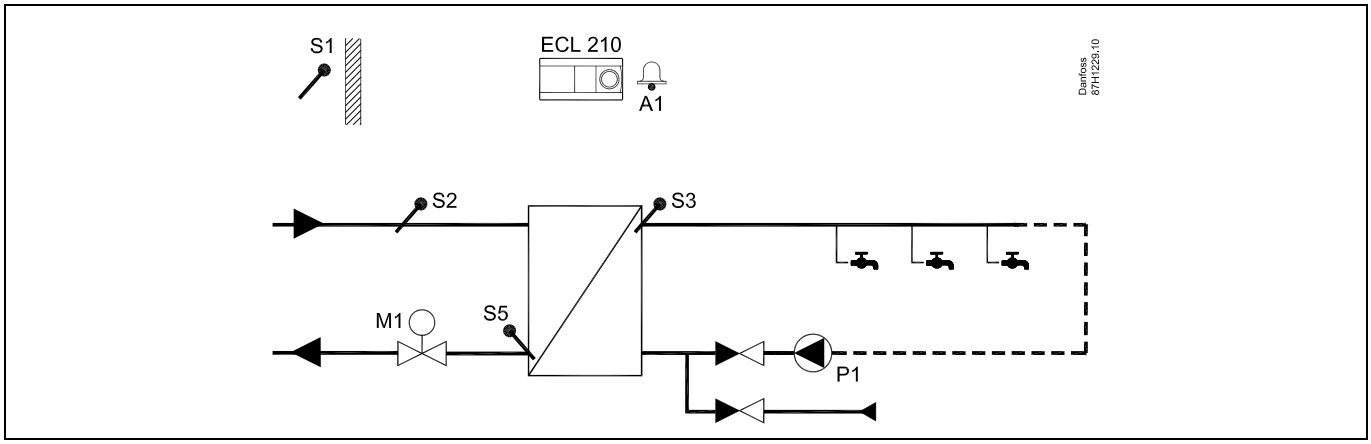
Special settings for type A217.2 / A317.2 example b:

The DHW circulation pipe can be connected to the DHW tank at 'A' for internal circulation or to the heat exchanger at 'B' for external circulation.

Navigation:	ID no.:	Recommended setting:
(Internal DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	OFF
(External DHW circulation) MENU \ Settings \ Application: 'Cont. T control'	11054	ON

A217.3 example a

Indirectly connected DHW heating system. DHW circulation through heat exchanger.



When the circulation pump P1 is in comfort mode, the desired temperature at S3 can be controlled.

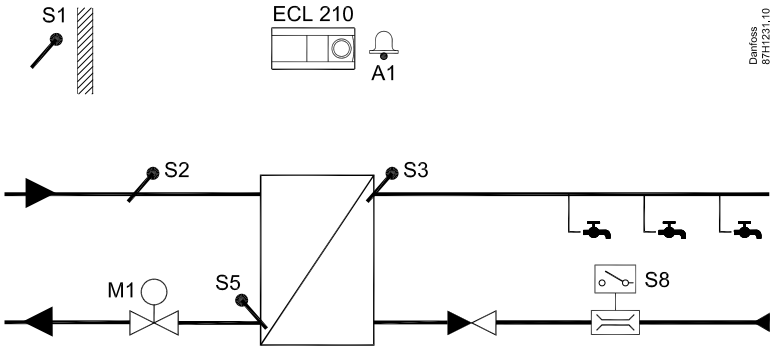
The desired DHW temperature at S3 can be controlled according to 'Schedule'.
The DHW circulation pump is controlled by 'Schedule circ. pump'.

Special settings for type A217.2 / A317.2 example a:

Navigation:	ID no.:	Recommended setting:
(Disabling flow switch function) MENU \ Settings \ Control par.: 'Open time'	11094	OFF

A217.3 example b

Indirectly connected DHW heating system. DHW heating on demand via flow switch (S8).



The desired DHW temperature at S3 is the 'Comfort temperature' level as long as a flow is detected by the flow switch S8.
The 'Saving temperature' level is kept at S2 for idle purpose.
The Function selector must be in Scheduled mode.

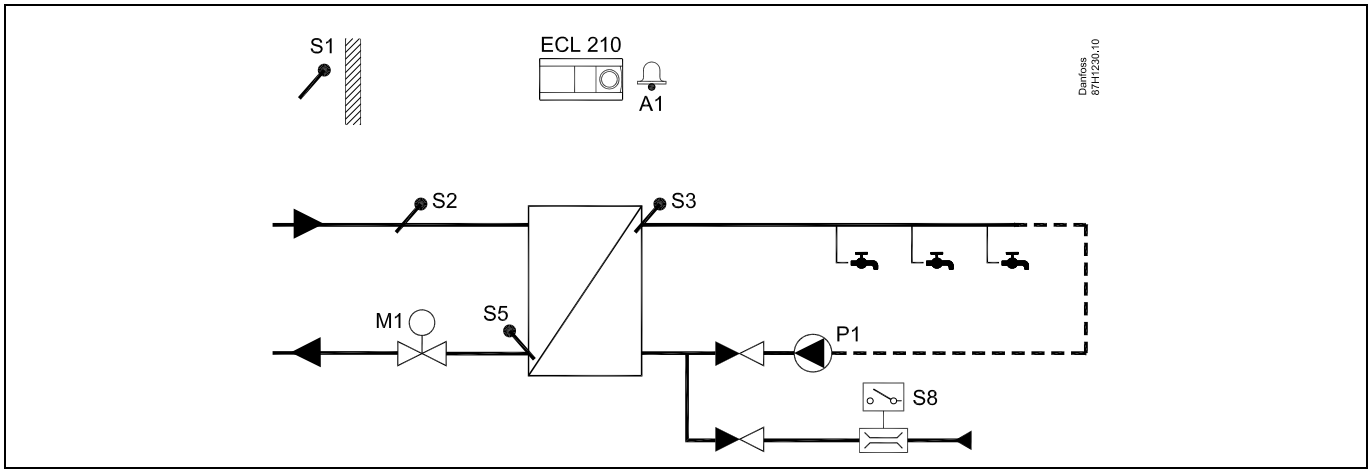
Special settings for type A217.3 example b:

Navigation:	ID no.:	Recommended setting:
(Enabling flow switch function) MENU \ Settings \ Control par.: 'Open time'	11094	time in sec *)
(Enabling flow switch function) MENU \ Settings \ Control par.: 'Close time"	11095	time in sec *)
(Idle temperature at S2) MENU \ Settings \ Control par.: 'Supply T (idle)'	11096	ON

*) Time in which the control valve is commanded to open / close when the flow switch is activated / deactivated.

A217.3 example c

Indirectly connected DHW heating system. DHW circulation through heat exchanger.

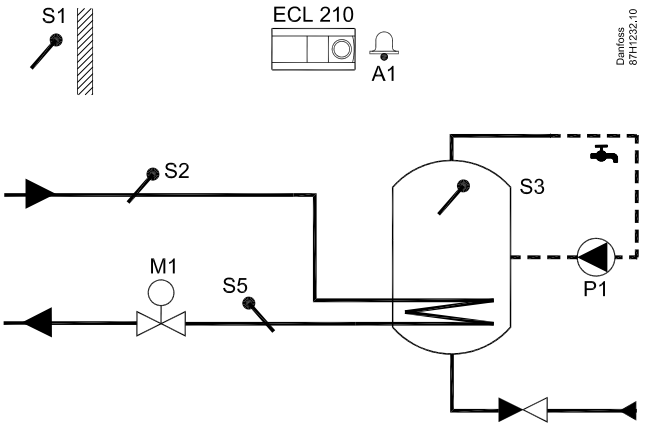


Special settings for type A217.3 example c:

Navigation:	ID no.:	Recommended setting:
(Enabling flow switch function) MENU \ Settings \ Control par.: 'Open time'	11094	time in sec *)
(Enabling flow switch function) MENU \ Settings \ Control par.: 'Close time"	11095	time in sec *)
(Idle temperature at S3) MENU \ Settings \ Control par.: 'Supply T (idle)'	11097	OFF

A217.3 example d

Directly heated DHW tank. DHW circulation through DHW tank.



The desired DHW temperature at S3 is determined by the 'Comfort temperature' and 'Saving temperature' level.

Special settings for type A217.3 example d:

Navigation:	ID no.:	Recommended setting:
(Setting return temperature limitation) MENU \ Settings \ 'Return lim.'	11030	Limitation value
(Disabling flow switch function) MENU \ Settings \ Control par.: 'Open time'	11094	OFF

2.3 Mounting

2.3.1 Mounting the ECL Comfort controller

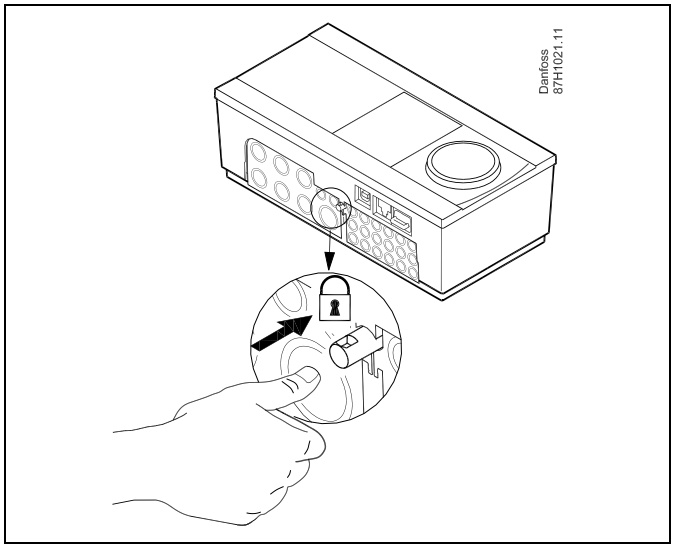
For easy access, you should mount the ECL Comfort controller near the system. Select one of the following methods using the same base part (code no. 087H3230):

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

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

Screws, PG cable glands and rawlplugs are not supplied.

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



⚠

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

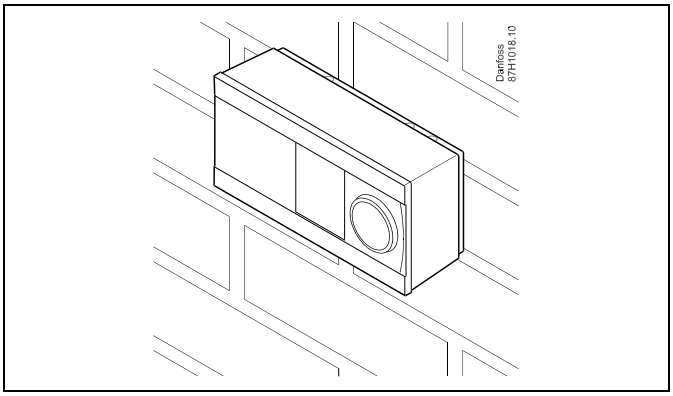
⚠

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

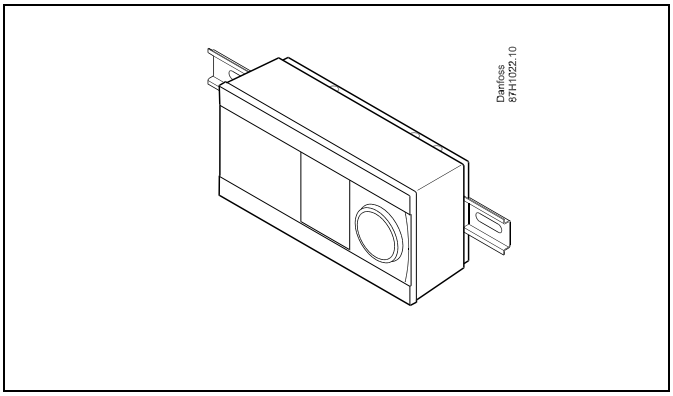
⚠

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

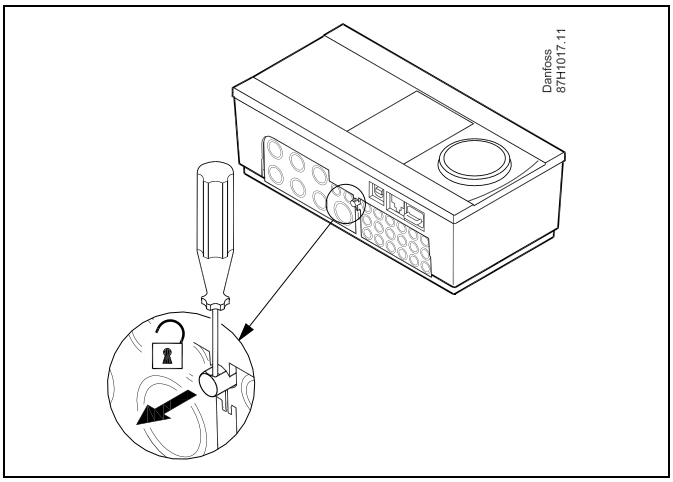
Mounting on a wall
Mount the base part on a wall with a smooth surface. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



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



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



⚠

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

⚠

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

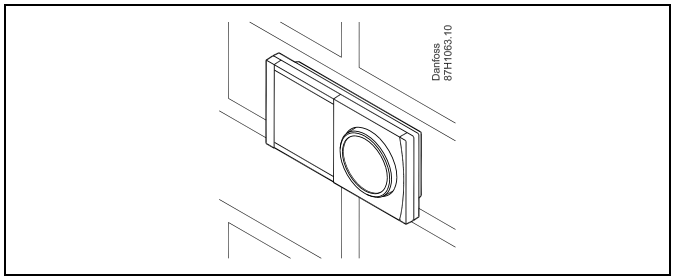
2.3.2 Mounting the Remote Control Units ECA 30/31

Select one of the following methods:

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

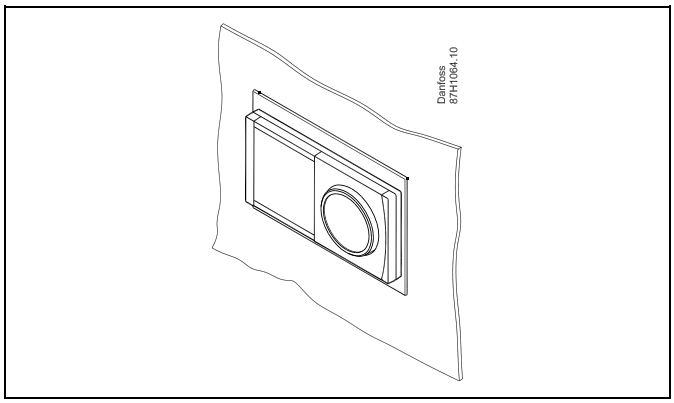
Screws and rawlplugs are not supplied.

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



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

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



2.4 Placing the temperature sensors

2.4.1 Placing the temperature sensors

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

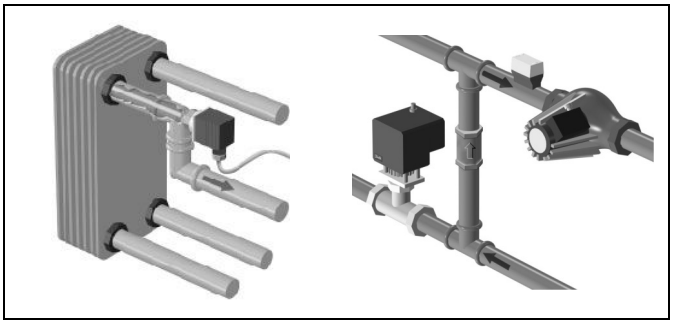
The temperature sensor mentioned below are sensors used for the ECL Comfort 210 and 310 series which not all will be needed for your application!

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

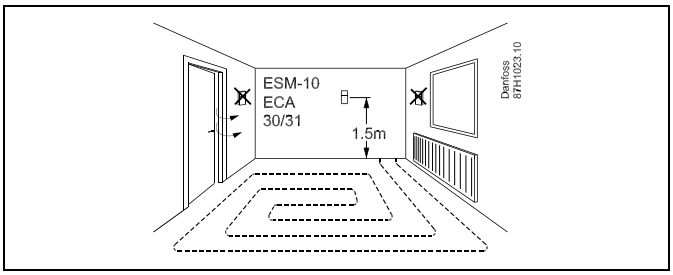
Flow temperature sensor (ESMU, ESM-11 or ESMC)
Place the sensor max. 15 cm from the mixing point. In systems with heat exchanger, Danfoss recommends that the ESMU-type to be inserted into the exchanger flow outlet.

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

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



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



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

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

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

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

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

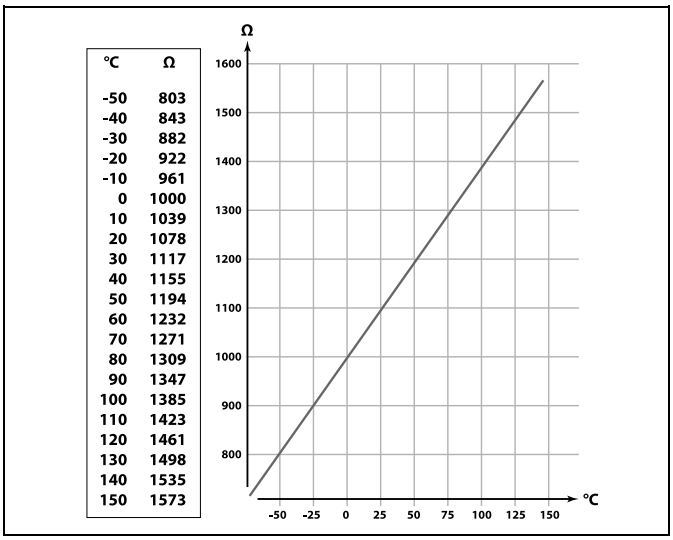
ESM-11, ESMC and ESMB-12: Use heat conducting paste for quick measurement of the temperature.

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

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

Relationship between temperature and ohmic value:

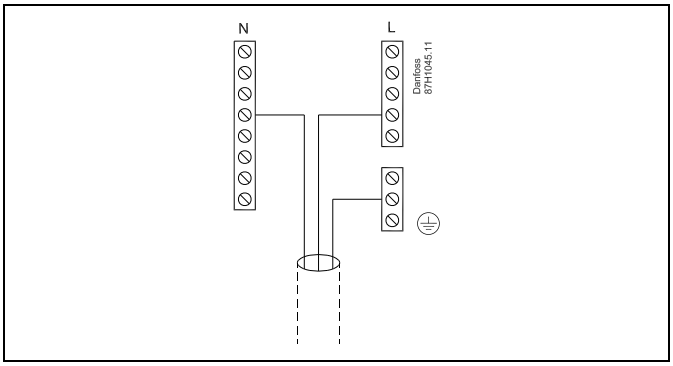
°C	Ω
-50	803
-40	843
-30	882
-20	922
-10	961
0	1000
10	1039
20	1078
30	1117
40	1155
50	1194
60	1232
70	1271
80	1309
90	1347
100	1385
110	1423
120	1461
130	1498
140	1535
150	1573



2.5 Electrical connections

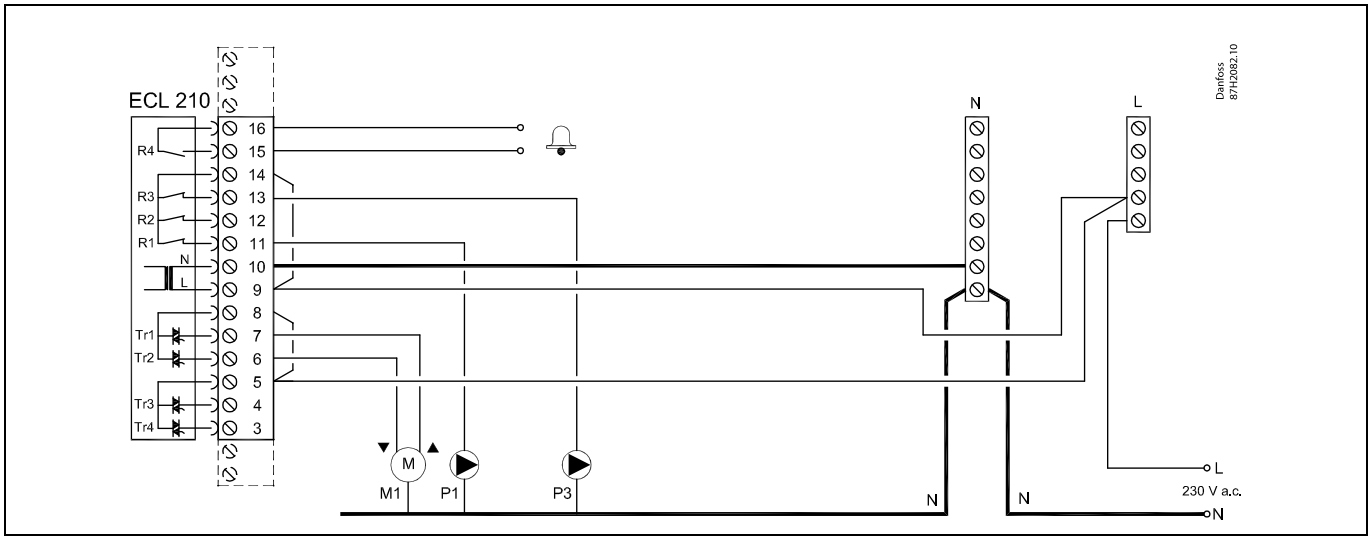
2.5.1 Electrical connections 230 V a.c. in general

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



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

Application A217.1

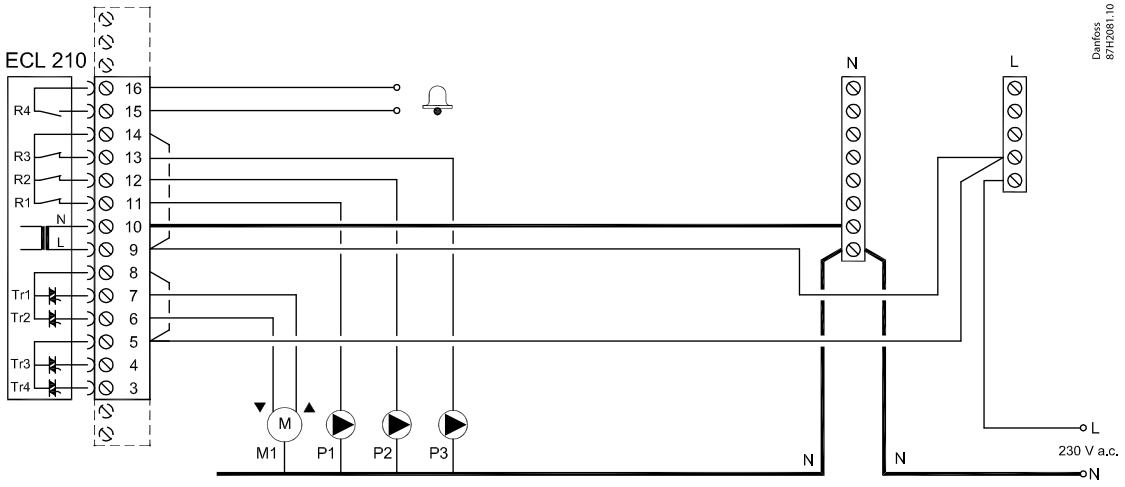


Terminal		Description	Max. load
16		Alarm	4 (2) A / 230 V a.c.*
15			
14		Phase for control of pumps	
13	P3	DHW circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12		Not to be used	
11	P1	DHW heating / charging pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

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

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

Application A217.2

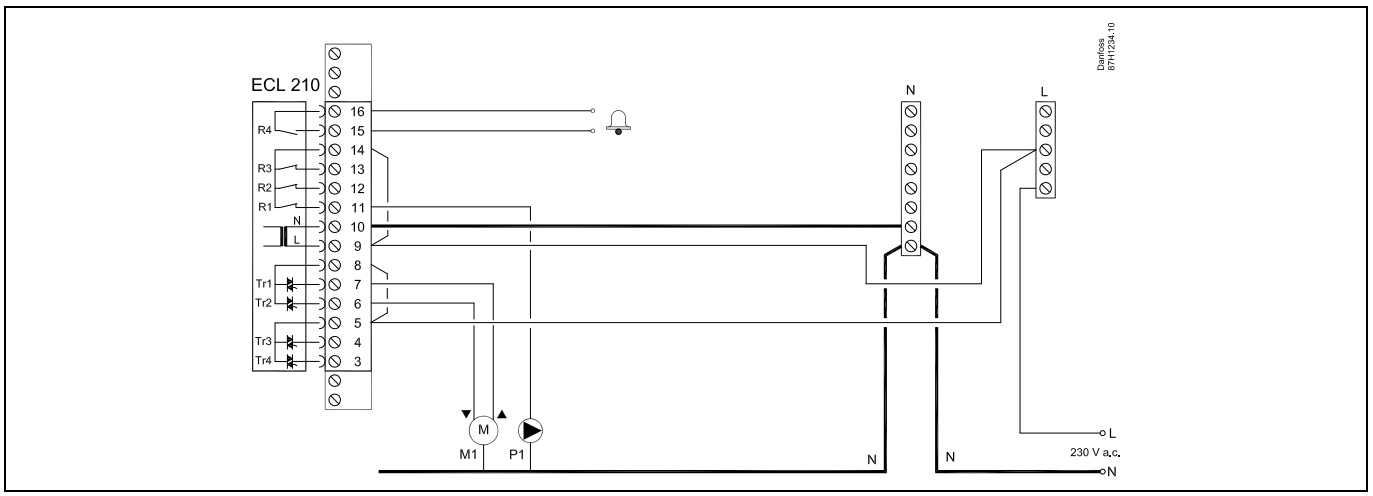


Terminal		Description	Max. load
16		Alarm	4 (2) A / 230 V a.c.*
15			
14		Phase for control of pumps	
13	P3	DHW circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12	P2	DHW charging pump ON / OFF	4 (2) A / 230 V a.c.*
11	P1	DHW heating pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

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

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

Application A217.3

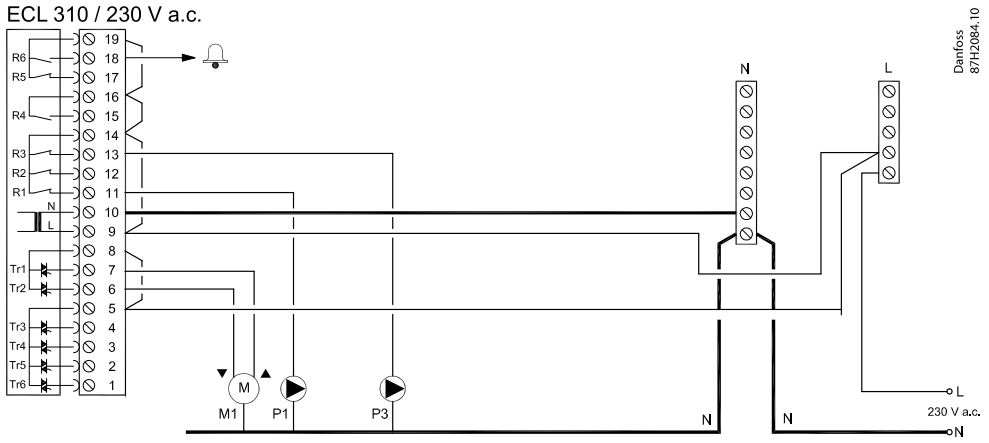


Terminal		Description	Max. load
16		Alarm	4 (2) A / 230 V a.c.*
15			
14		Phase for control of pump	
13			
12			
11	P1	DHW circulation pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

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

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

Application A317.1

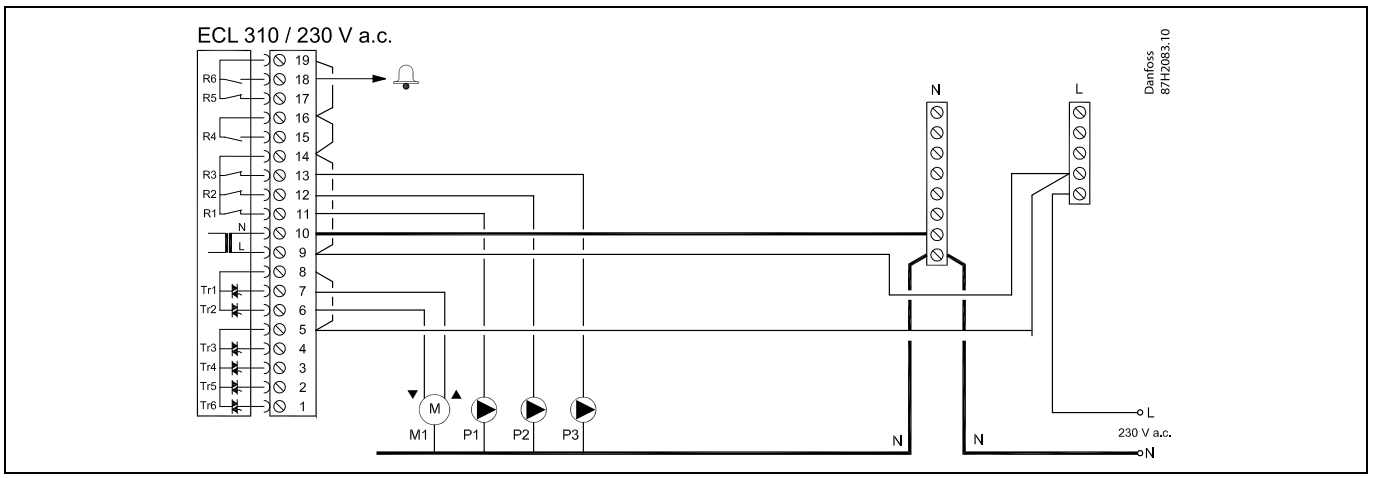


Terminal		Description	Max. load
19		Phase for alarm output	
18	A1	Alarm	4 (2) A / 230 V a.c.*
17		Not to be used	
16		Interconnection for phase	
15		Not to be used	
14		Phase for control of pumps	
13	P3	DHW circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12		Not to be used	
11	P1	DHW heating / charging pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

Factory established jumpers:
5 to 8, 9 to 14, 14 to 16, 16 to 19, L to 5 and L to 9, N to 10

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

Application A317.2



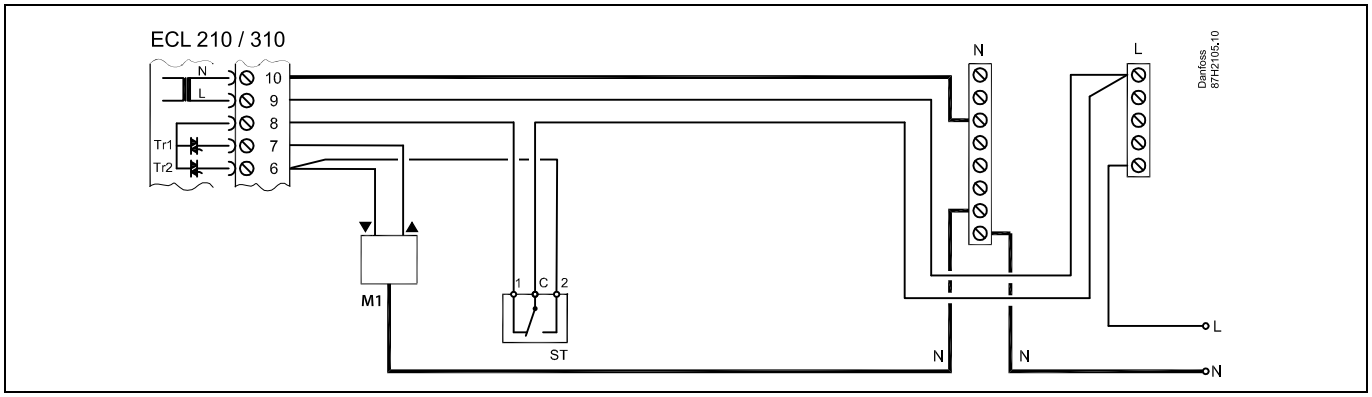
Terminal		Description	Max. load
19		Phase for alarm output	
18	A1	Alarm	4 (2) A / 230 V a.c.*
17		Not to be used	
16		Interconnection for phase	
15		Not to be used	
14		Phase for control of pumps	
13	P3	DHW circulation pump ON / OFF	4 (2) A / 230 V a.c.*
12	P2	DHW charging pump ON / OFF	4 (2) A / 230 V a.c.*
11	P1	DHW heating pump ON / OFF	4 (2) A / 230 V a.c.*
10		Supply voltage 230 V a.c. - neutral (N)	
9		Supply voltage 230 V a.c. - live (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	0.2 A / 230 V a.c.
6	M1	Motorized control valve - closing	0.2 A / 230 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

Factory established jumpers:
5 to 8, 9 to 14, 14 to 16, 16 to 19, L to 5 and L to 9, N to 10

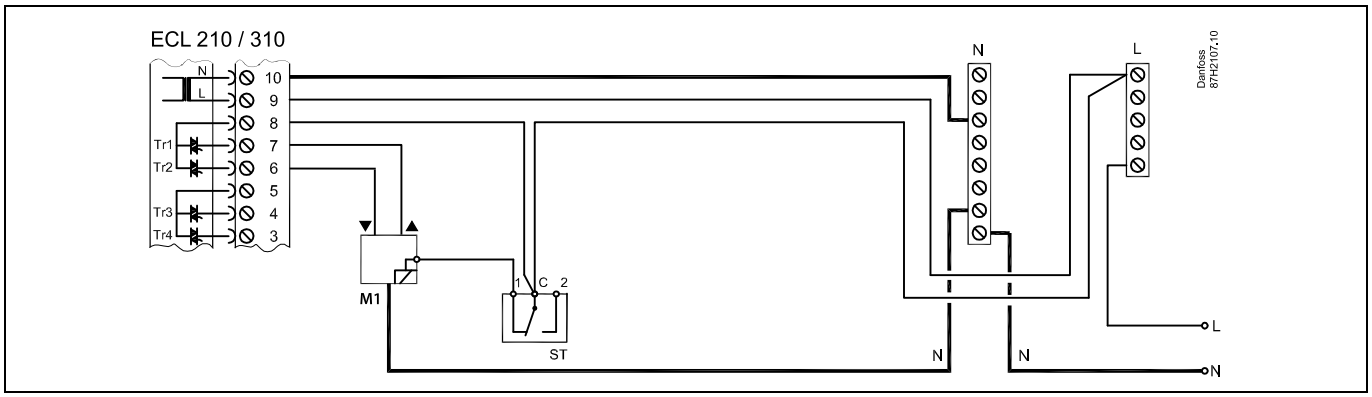
Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

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

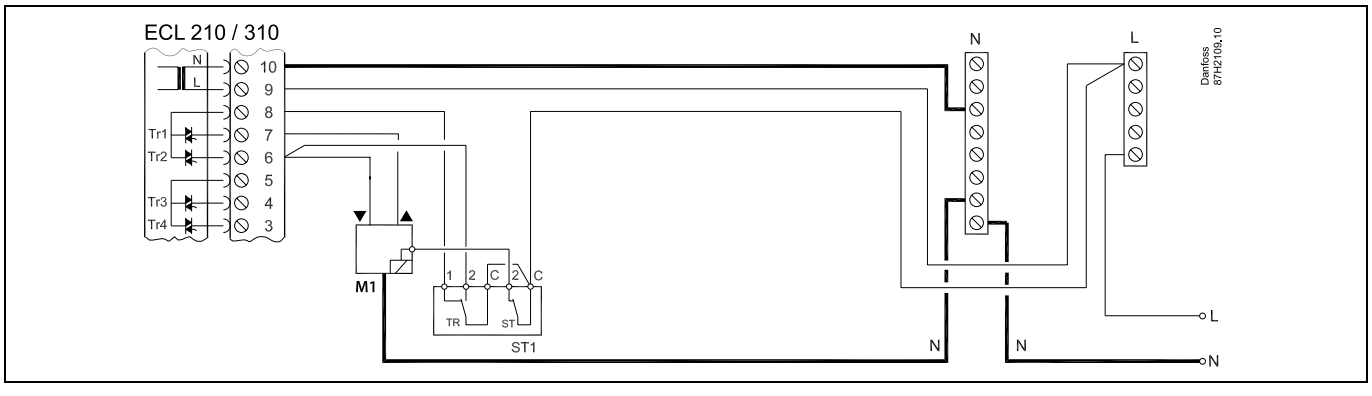
With safety thermostat, 1–step closing:
Motorized control valve without safety function



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



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



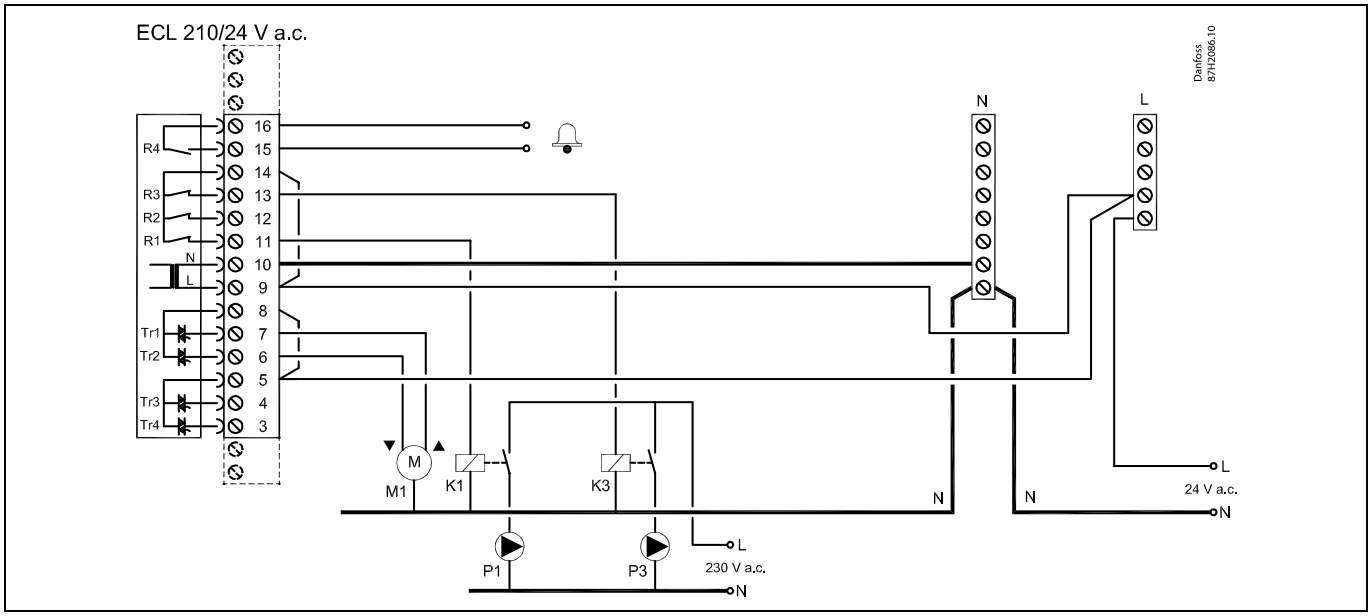
When ST is activated by a high temperature, the safety circuit in the motorized control valve closes the valve immediately.

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

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

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

Application A217.1



Terminal		Description	Max. load
16		Alarm	4 (2) A / 24 V a.c.*
15			
14		Phase for control of pumps	
13	K3	DHW circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12		Not to be used	
11	K1	DHW heating / charging pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

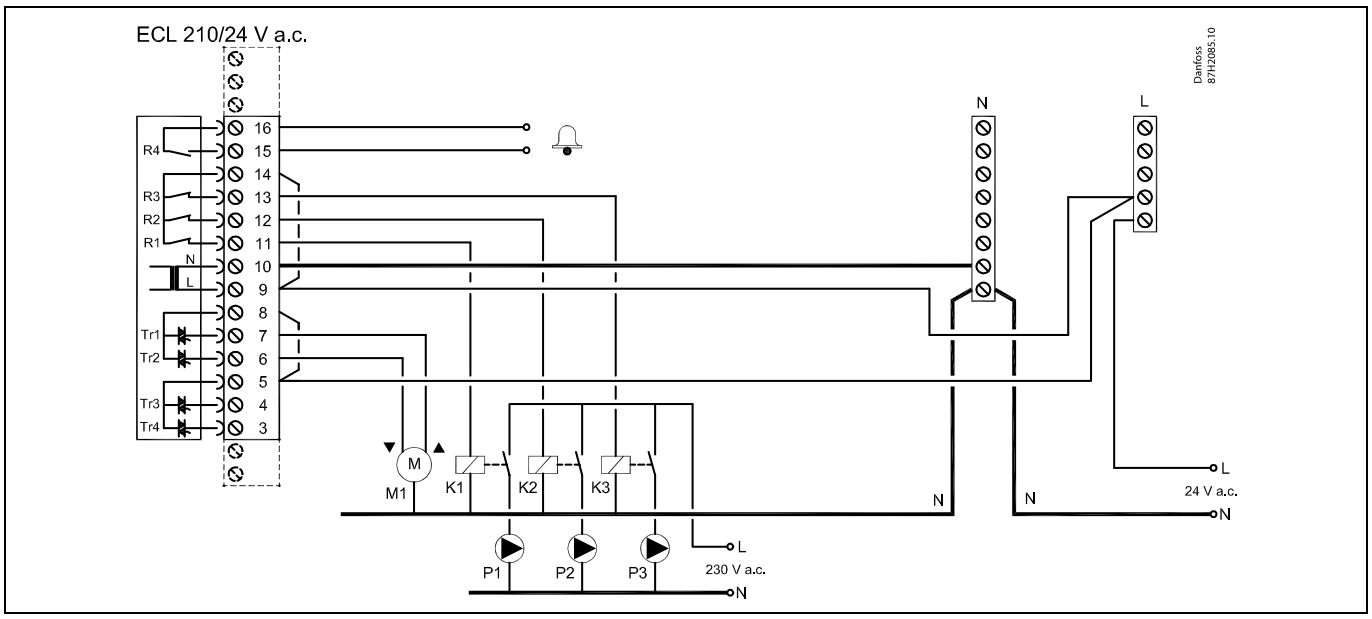
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

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

⚠

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

Application A217.2



Terminal		Description	Max. load
16		Alarm	4 (2) A / 24 V a.c.*
15			
14		Phase for control of pumps	
13	K3	DHW circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12	K2	DHW charging pump ON / OFF	4 (2) A / 24 V a.c.*
11	K1	DHW heating pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

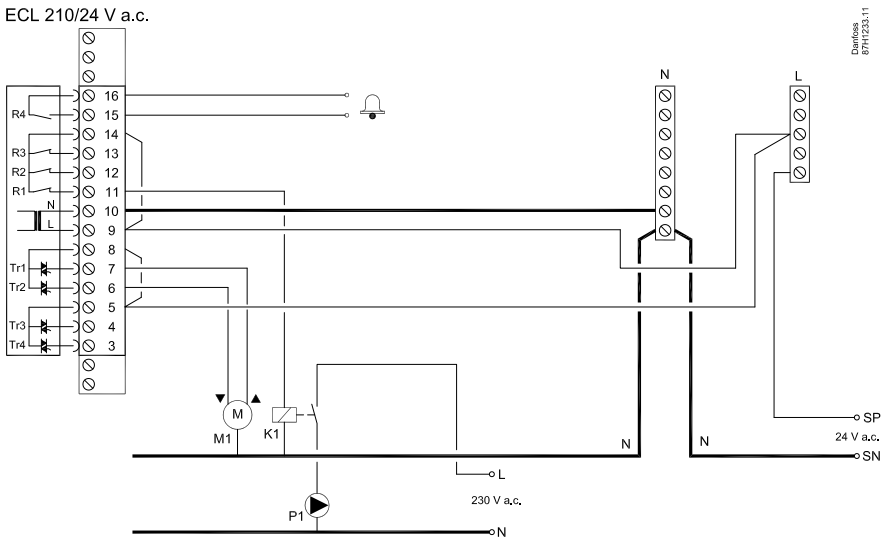
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

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

⚠

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

Application A217.3



Terminal		Description	Max. load
16		Alarm	4 (2) A / 24 V a.c.*
15			
14		Phase for control of pumps	
13			
12			
11	K1	DHW circulation pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

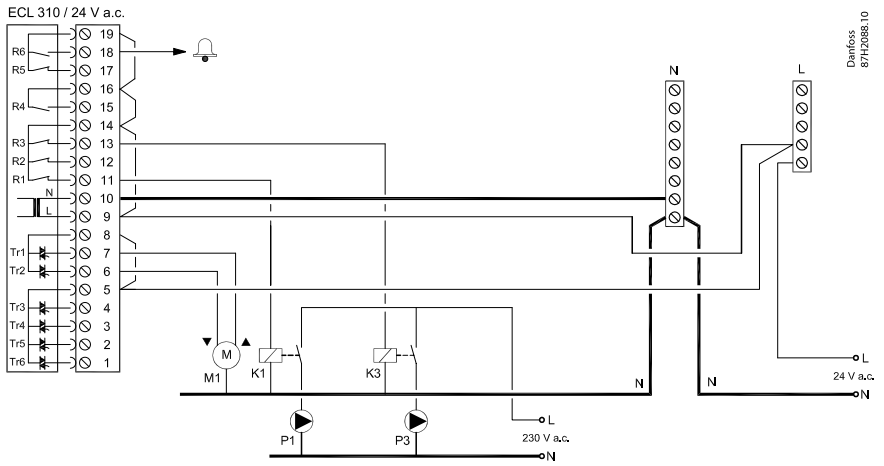
Factory established jumpers:
5 to 8, 9 to 14, L to 5 and L to 9, N to 10

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

⚠

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

Application A317.1



Terminal		Description	Max. load
19		Phase for alarm output	
18	A1	Alarm	4 (2) A / 24 V a.c.*
17		Not to be used	
16		Interconnection for phase	
15		Not to be used	
14		Phase for control of pumps	
13	K3	DHW circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12		Not to be used	
11	K1	DHW heating / charging pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

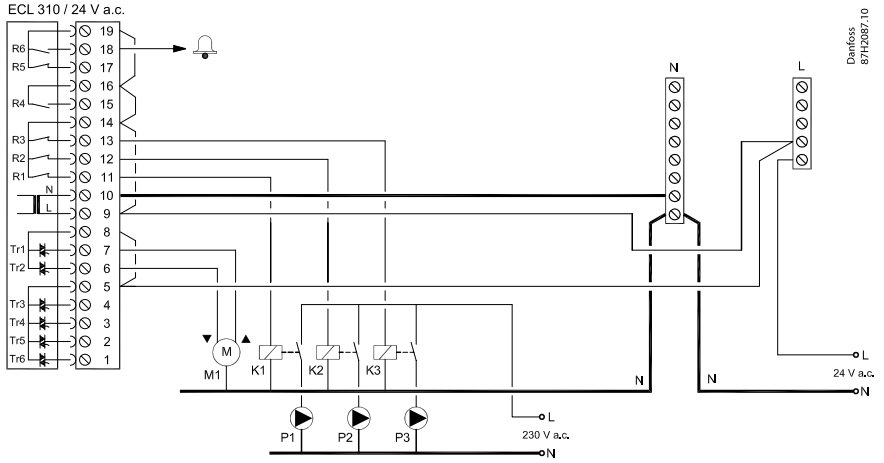
Factory established jumpers:
5 to 8, 9 to 14, 14 to 16, 16 to 19, L to 5 and L to 9, N to 10

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

⚠

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

Application A317.2



Terminal		Description	Max. load
19		Phase for alarm output	
18	A1	Alarm	4 (2) A / 24 V a.c.*
17		Not to be used	
16		Interconnection for phase	
15		Not to be used	
14		Phase for control of pumps	
13	K3	DHW circulation pump ON / OFF	4 (2) A / 24 V a.c.*
12	K2	DHW charging pump ON / OFF	4 (2) A / 24 V a.c.*
11	K1	DHW heating pump ON / OFF	4 (2) A / 24 V a.c.*
10		Supply voltage 24 V a.c. - (N)	
9		Supply voltage 24 V a.c. - (L)	
8	M1	Phase for motorized control valve output	
7	M1	Motorized control valve - opening	1 A / 24 V a.c.
6	M1	Motorized control valve - closing	1 A / 24 V a.c.
5		Not to be used	
4		Not to be used	
3		Not to be used	
2		Not to be used	
1		Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			

Factory established jumpers:
5 to 8, 9 to 14, 14 to 16, 16 to 19, L to 5 and L to 9, N to 10

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

⚠

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

2.5.5 Electrical connections, Pt 1000 temperature sensors and signals

A217/ A317:

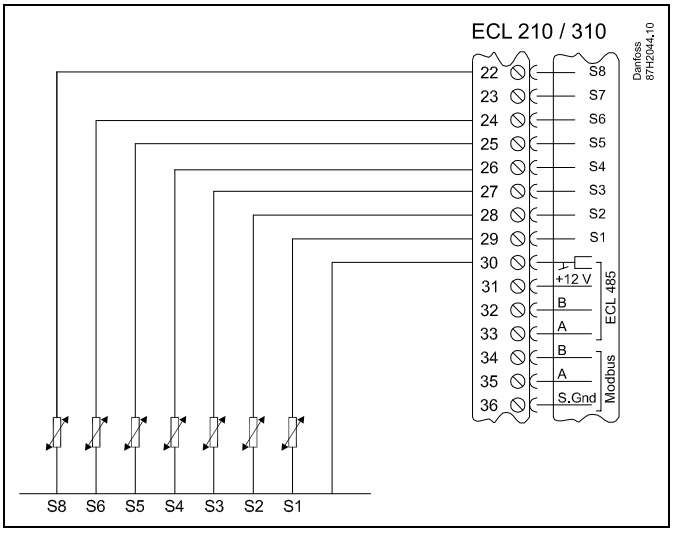
Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor* (optional)	ESMT
28 and 30	S2	Supply temperature sensor (optional)	ESM-11 / ESMB / ESMC / ESMU
27 and 30	S3	DHW heating / charging temperature sensor ** (A217.1 / A317.1) DHW heating temperature sensor ** (A217.2 / A317.2) DHW temperature sensor ** (A217.3)	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	DHW charging temperature sensor** (A217.2 / A317.2 only)	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Return temperature sensor (optional)	ESM-11 / ESMB / ESMC / ESMU
24 and 30	S6	DHW tank temperature sensor, upper***	ESMB / ESMU
23 and 30	S7	Flow / heat meter (pulse signal and ECL 210 only)	
22 and 30	S8	DHW tank temperature sensor, lower (A217.1 / A217.2 / A317.1 / A317.2). Flow switch (A217.3)	ESMB / ESMU
21 and 30		ECL 310 only: Not used	
20 and 30		ECL 310 only: Not used	

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

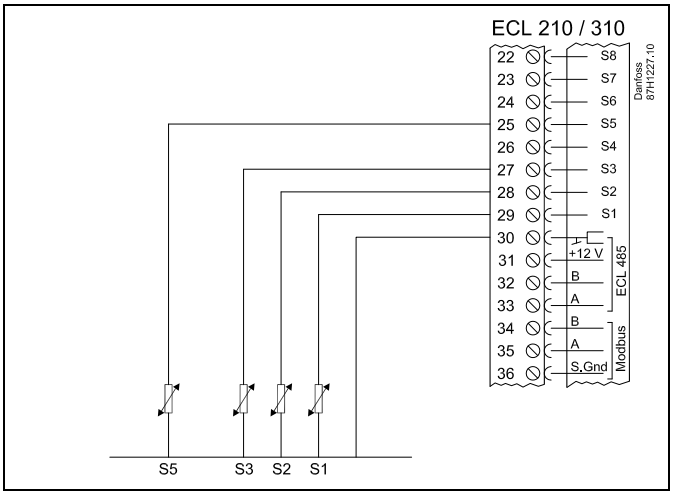
** DHW charging / heating temperature sensor must always be connected in order to have the desired functionality. If the sensor is not connected or the cable is short-circuited, the motorized control valve closes (safety function).

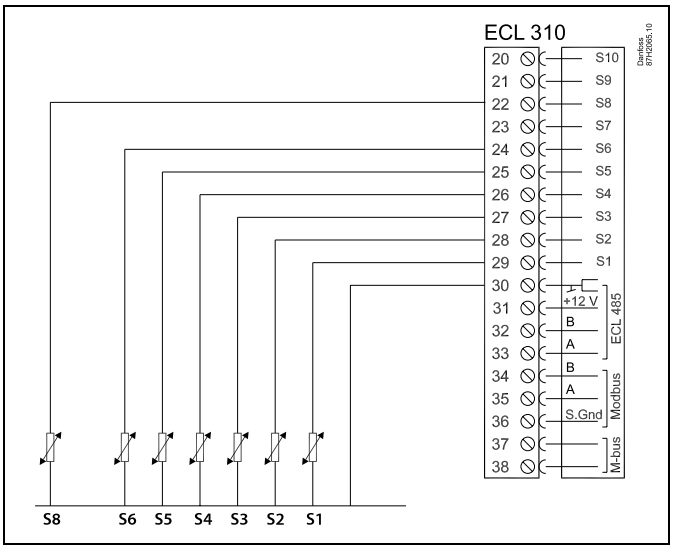
*** This sensor is used if only one tank temperature sensor is required.

Factory established jumper:
30 to common terminal.

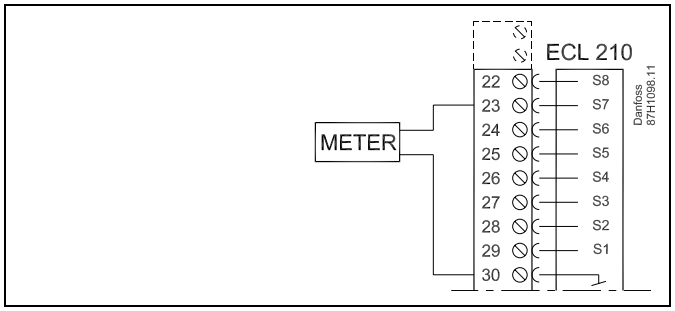


Connections for application 217.3:



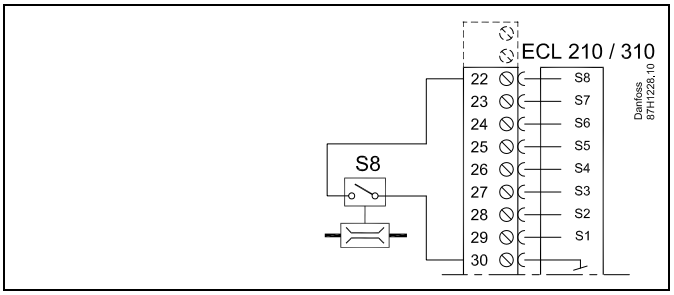


Connection of flow / heat meter with pulse signal



Wire cross section for sensor connections: Min. 0.4 mm^2.
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).

Connection of flow switch, S8 (A217.3)



2.5.6 Electrical connections, ECA 30 / 31

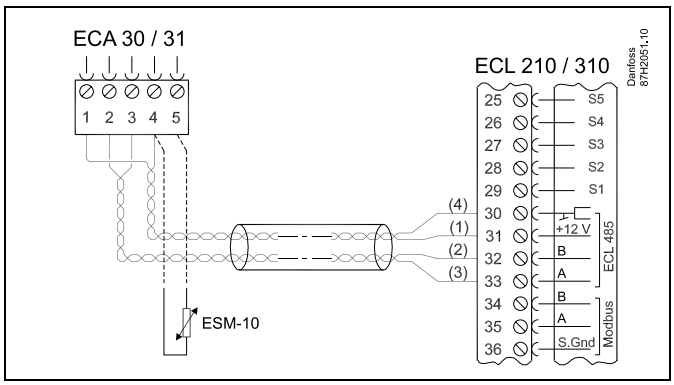
Terminal ECL	Terminal ECA 30 / 31	Description	Type (recomm.)
30	4	Twisted pair	Cable 2 x twisted pair
31	1		
32	2	Twisted pair	
33	3		
	4	Ext. room temperature sensor*	ESM-10
	5		

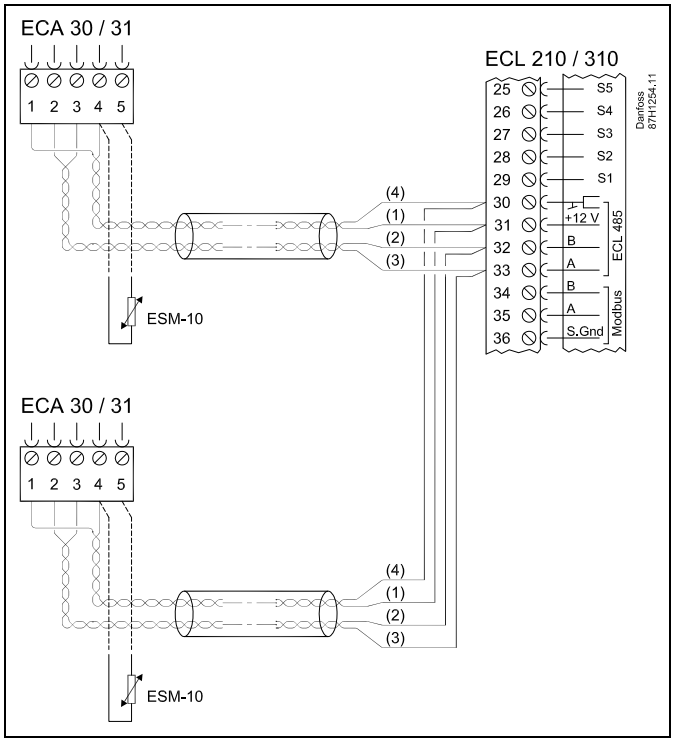
* After an external room temperature sensor has been connected, ECA 30 / 31 must be repowered.

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

The ECA 30 /31 must be set up accordingly.

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





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

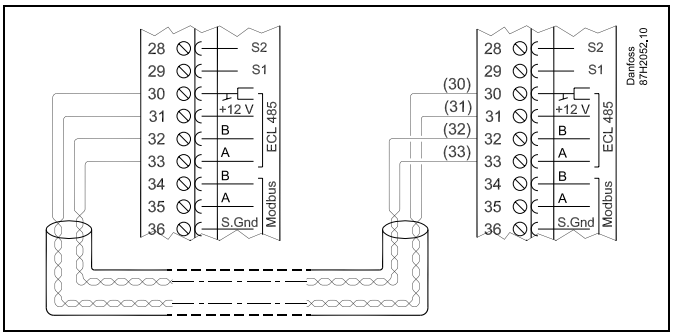
Some applications do not contain functions related to actual room temperature. The connected ECA 30 / 31 will only function as remote control.

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

2.5.7 Electrical connections, master / slave systems

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

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

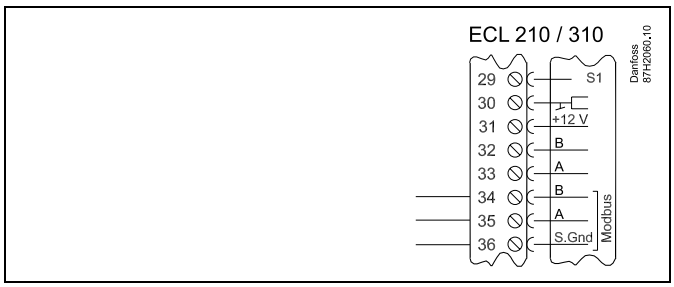


Terminal	Description	Type (recomm.)
30	Common terminal	Cable 2 x twisted pair
31*	+12 V*, ECL 485 communication bus	
32	B, ECL 485 communication bus	
33	A, ECL 485 communication bus	
* Only for ECA 30 / 31 and master / slave communication		

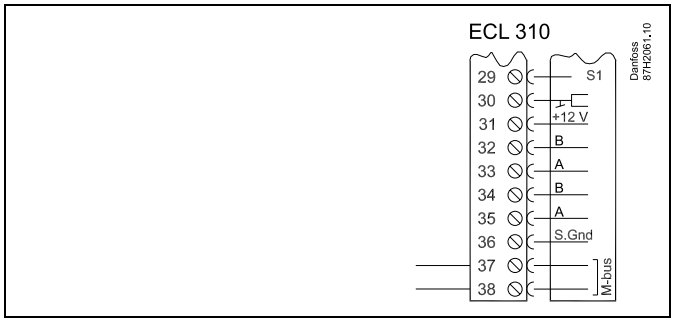
Total cable length: Max. 200 m (all sensors incl. internal ECL 485 communication bus).
Cable lengths of more than 200 m may cause noise sensibility (EMC).

2.5.8 Electrical connections, communication

Electrical connections, Modbus



Electrical connections, M-bus



2.6 Inserting the ECL Application Key

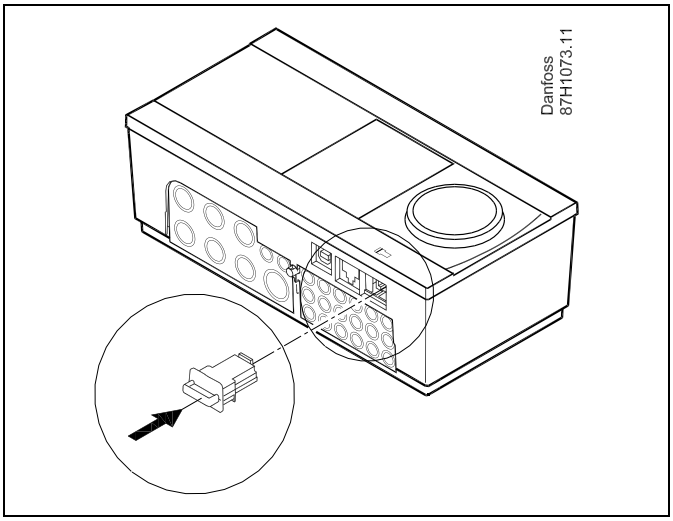
2.6.1 Inserting the ECL Application Key

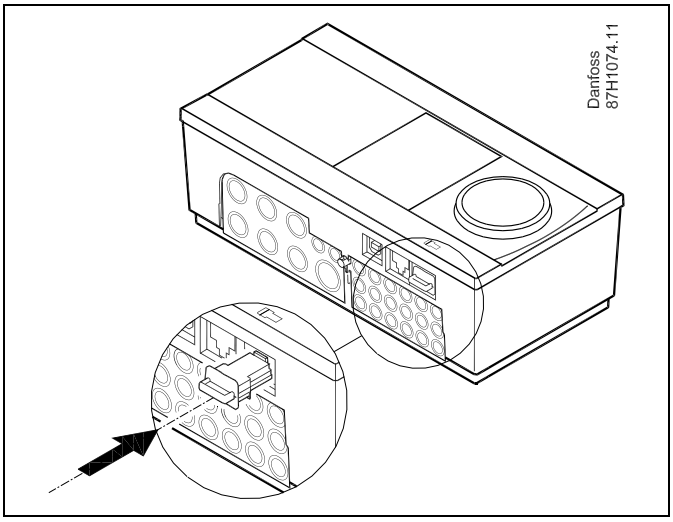
The ECL Application Key contains

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

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

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

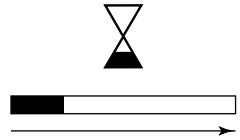




User settings are, among others, desired room temperature, desired DHW temperature, schedules, heat curve, limitation values etc.

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

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



Progress bar

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

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

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

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

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

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

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

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

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

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

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

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

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

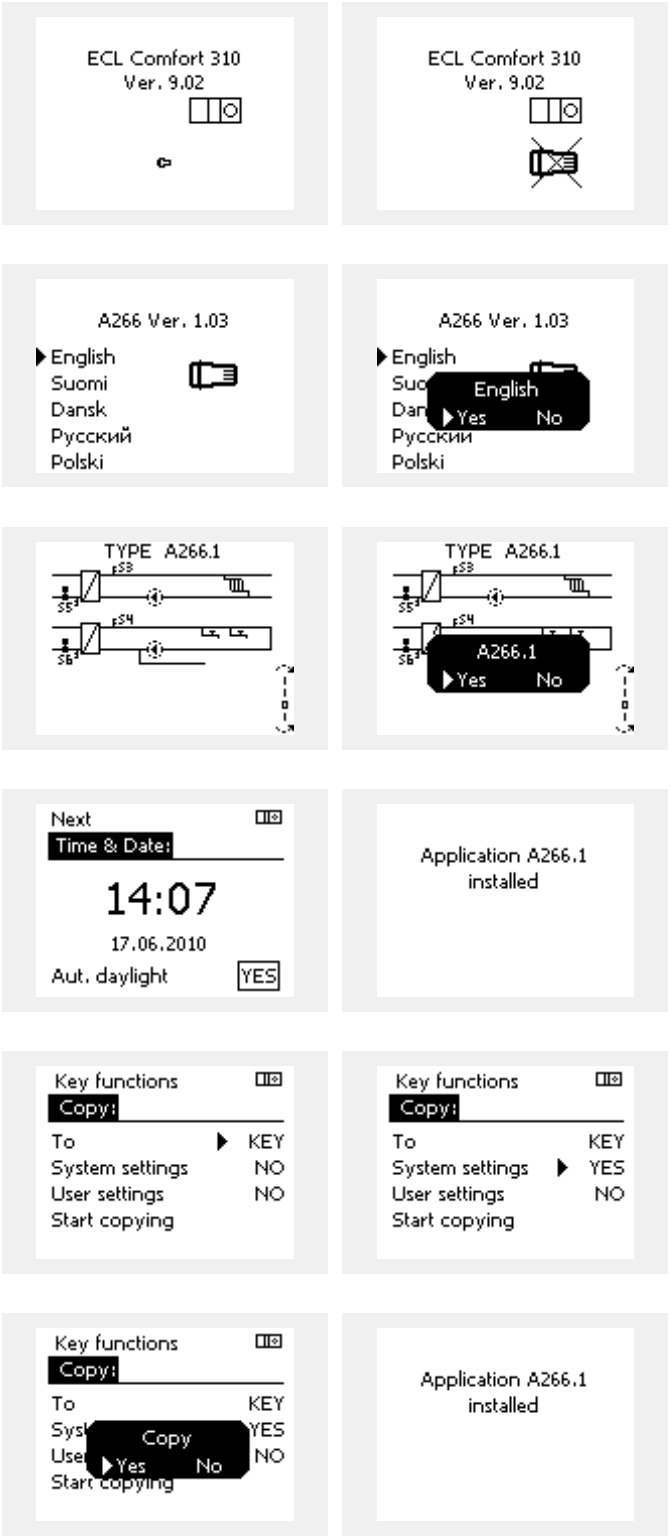
If the key contains user settings:
Push the dial repeatedly.

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

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

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

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

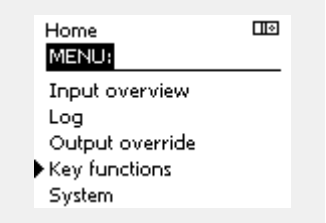


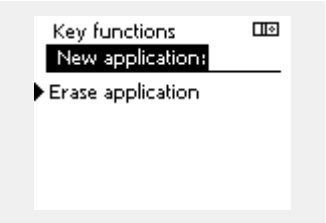
Application Key: Situation 2
The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.

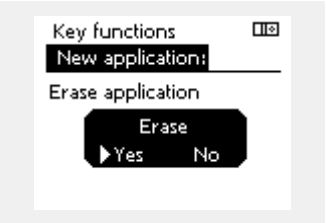
To change to another application on the ECL Application Key, the current application in the controller must be erased (deleted).

Be aware that the Application Key must be inserted.

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







The controller resets and is ready to be configured.

Follow the procedure described in situation 1.

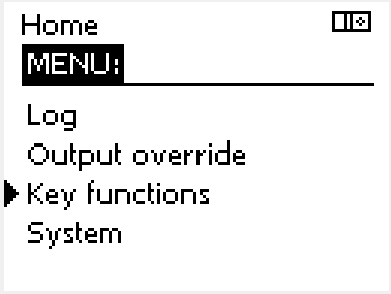
Application Key: Situation 3
A copy of the controllers settings is needed for configuring another controller.

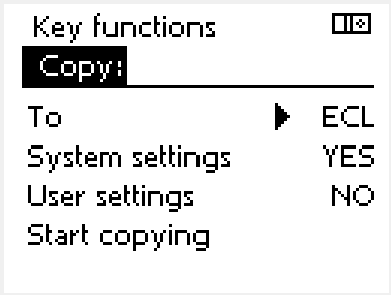
This function is used

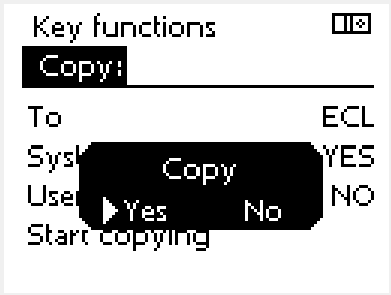
- for saving (backup) of special user and system settings
- when another ECL Comfort controller of the same type (210 or 310) must be configured with the same application but user / system settings differ from the factory settings.

How to copy to another ECL Comfort controller:

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







*

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

**

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

2.6.2 ECL Application Key, copying data

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

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

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

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

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

Factory settings can always be restored.

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

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

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

2.7 Check list

Is the ECL Comfort controller ready for use?

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

2.8 Navigation, ECL Application Key A217 / A317

Navigation, application A217.1 / A317.1 (* A217.1 only, ** A317.1 only)

Home		**DHW, circuit 1**	
		ID no.	**Function**
MENU			
Schedule			Selectable
Schedule circ. P			Selectable
Settings	Tank temperature	11193	Charge difference
		11195	Start difference
		11194	Stop difference
		11152	Max. charge T
	Return limit	11030	Limit
		11035	Infl. - max.
		11036	Infl. - min.
		11037	Adapt. time
	Flow / power limit		Actual
		11111	Limit
		11112	Adapt. time
		11113	Filter constant
		11109	Input type
		11115	Units
		11114	Pulse*
	Control par.	11174	Motor pr.
			Xp actual
		11185	Tn
		11186	M run
		11187	Nz
		11189	Min. act. time
	Application	11055	Circ. P priority
		11054	Cont. T control
		11041	DHW P post-run
		11500	Send desired T
		11076	Circ. P frost T
		11093	Frost pr. T
		11141	Ext. input
		11142	Ext. mode
	Anti-bacteria		Selectable
Holiday			Selectable
Alarm	Temp. monitor.	11147	Upper difference
		11148	Lower difference
		11149	Delay
		11150	Lowest temp.
	Digital S9**	11636	Alarm value
		11637	Alarm time-out
	Alarm overview		
Influence overview	Des. DHW T		Return lim.
			Flow / power lim.
			Holiday
			Ext. override
			Anti-bacteria
			SCADA override

Navigation, application A217.1 / A317.1, Common controller settings (* A317.1 only)

Home		Common controller settings	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Schedule output*			Selectable
Input overview			Supply T DHW flow T DHW return T Tank upper T Tank lower T S9 status*
Log (sensors)	Supply T DHW flow & des. DHW return T & lim. Tank T up. & des. Tank T up. & low.		Log today Log yesterday Log 2 days Log 4 days
Output override			M1, P1, P3, 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		
System	ECL version		Code no. Hardware Software Build no. Serial no. MAC Production week
	Extension		
	Ethernet		
	M-bus config		Selectable
	Energy Meters		Selectable
	Display	60058 60059	Backlight Contrast
	Communication	38 2048 2150 2151	Modbus addr. ECL 485 addr. Service pin Ext. reset
	Language	2050	Language

Navigation, application A217.2 / A317.2 (* A217.2 only, ** A317.2 only)

Home		**DHW, circuit 1**	
		ID no.	**Function**
MENU			
Schedule			Selectable
Schedule circ. P			Selectable
Settings	Tank temperature		
		11193	Charge difference
		11195	Start difference
		11194	Stop difference
		11152	Max. charge T
		11068	Flow T adapt time
	Return limit	11030	Limit
		11035	Infl. - max.
		11036	Infl. - min.
		11037	Adapt. time
	Flow / power limit		Actual
		11111	Limit
		11112	Adapt. time
		11113	Filter constant
		11109	Input type
		11115	Units
		11114	Pulse*
	Control par.	11174	Motor pr.
			Xp actual
		11185	Tn
		11186	M run
		11187	Nz
		11189	Min. act. time
	Application	11055	Circ. P priority
		11054	Cont. T control
		11041	DHW P post-run
		11042	Char. P post-run
		11500	Send desired T
		11076	Circ. P frost T
		11093	Frost pr. T
		11141	Ext. input
		11142	Ext. mode
	Anti-bacteria		Selectable
Holiday			Selectable
Alarm	Temp. monitor.	11147	Upper difference
		11148	Lower difference
		11149	Delay
		11150	Lowest temp.
	Digital S9**	11136	Alarm value
		11137	Alarm time-out
	Alarm overview		
Influence overview	Des. DHW T		Return lim.
			Flow / power lim.
			Holiday
			Ext. override
			Anti-bacteria
			SCADA override

Navigation, application A217.2 / A317.2, Common controller settings (* A217.2 only, ** A317.2 only)

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Schedule output**			Selectable
Input overview			Supply T DHW flow T Charge T* DHW return T Tank upper T Tank lower T S9 status**
Log (sensors)	Supply T DHW flow & des. Charge T DHW return T & lim. Tank T up. & des. Tank T up. & low.		Log today Log yesterday Log 2 days Log 4 days
Output override			M1, P1, P2, P3, 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		
System	ECL version		Code no. Hardware Software Build no. Serial no. MAC Production week
	Extension		
	Ethernet		
	M-bus config		Selectable
	Energy Meters		Selectable
	Display	60058 60059	Backlight Contrast
	Communication	38 2048 2150 2151	Modbus addr. ECL 485 addr. Service pin Ext. reset
	Language	2050	Language

Navigation, application A217.3

Home		**DHW, circuit 1**	
		ID no.	**Function**
MENU			
Schedule			Selectable
Schedule circ. P			Selectable
Settings	Flow temperature		
		11178	Temp. max.
		11177	Temp. min.
	Return limit	11030	Limit
		11035	Infl. - max.
		11036	Infl. - min.
		11037	Adapt. time
		11085	Priority
	Flow / power limit		Actual
		11111	Limit
		11112	Adapt. time
		11113	Filter constant
		11109	Input type
		11115	Units
		11114	Pulse
	Control par.	11173	Auto tuning
		11174	Motor pr.
			Xp actual
		11185	Tn
		11186	M run
		11187	Nz
		11189	Min. act. time
		11097	Supply T (idle)
		11096	Tn (idle)
		11094	Open time
		11095	Close time
	Application	11500	Send desired T
		11022	P exercise
		11023	M exercise
		11076	Circ. P frost T
		11040	P post-run
		11093	Frost pr. T
		11141	Ext. input
		11142	Ext. mode
	Anti-bacteria		Selectable
Holiday			Selectable
Alarm	Temp. monitor.	11147	Upper difference
		11148	Lower difference
		11149	Delay
		11150	Lowest temp.
		11150	Lowest temp.
	Alarm overview		2: Temp. monitor.
Influence overview	Des. DHW T		Return lim.
			Flow / power lim.
			Holiday
			Ext. override
			Anti-bacteria
			SCADA offset

Navigation, application A217.3, Common controller settings

Home		**Common controller settings**	
MENU		**ID no.**	**Function**
Time & Date			Selectable
Input overview			Outdoor T DHW flow T DHW return T Supply T Flow switch
Log (sensors)	Outdoor T DHW flow & des. DHW return T & lim. Supply T		Log today Log yesterday Log 2 days Log 4 days
Output override			M1, P1, 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		
System	ECL version		Code no. Hardware Software Build no. Serial no. MAC Production week
	Extension (ECL 310 only)		
	Ethernet (ECL 310 only)		Selectable
	Portal config (ECL 310 only)		ECL portal Portal status Portal info
	M-bus config (ECL 310 only)		Selectable
	Energy Meters (ECL 310 only)		Selectable
	Raw input overview		Selectable
	Alarm		32: Temp. monitor.
	Display	60058 60059	Backlight Contrast
	Communication	2048 38 39 2150 2151	ECL 485 addr. Modbus addr. Band Service pin Ext. reset
	Language	2050	Language

3.0 Daily use

3.1 How to navigate

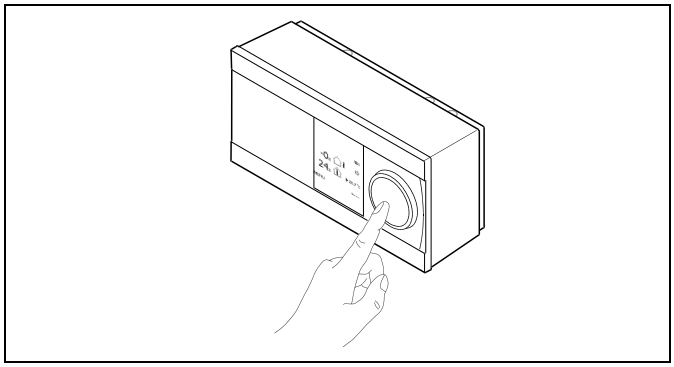
You navigate in the controller by turning the dial left or right to the desired position (↻).

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

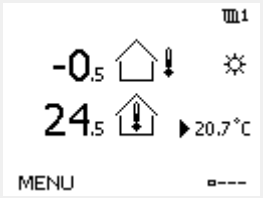
The position indicator in the display (▶) will always show you where you are.

Push the dial to confirm your choices (☝).

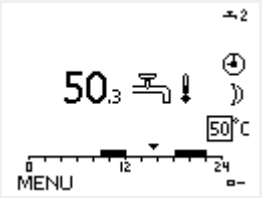
The display examples are from a two-circuit application: One heating circuit (▥) and one domestic hot-water (DHW) circuit (🚿). The examples might differ from your application.



Heating circuit (▥):



DHW circuit (🚿);



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

To enter 'Common controller settings':

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

Circuit selector

3.2 Understanding the controller display

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.

If the temperature value is displayed as

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

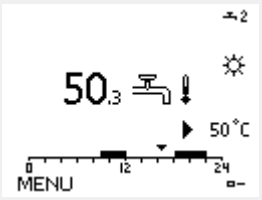
"- - -" the sensor connection is short-circuited.

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

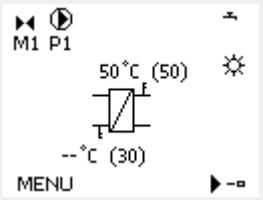
Overview display 2 informs about:
state of the controlled components, actual DHW temperature, (desired DHW temperature), controller mode, return temperature (limitation value).

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

Overview display 1:



Overview display 2:



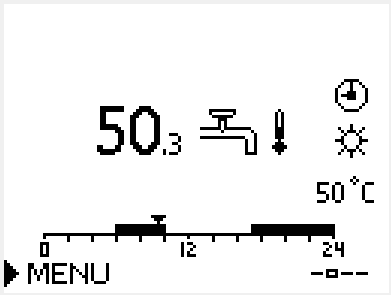
Setting the desired temperature

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 DHW temperature

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

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



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

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

Overview of setting range and settings for DHW modes:

Mode	Setting range	Factory setting
Comfort	10 ... 150 °C	50 °C
Saving	10 ... 150 °C	10 °C
Frost protection*	5 ... 40 °C	10 °C

* related to desired flow temperature

3.3 A general overview: What do the symbols mean?

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

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

Additional symbols, ECA 30 / 31:

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

3.4 Monitoring temperatures and system components

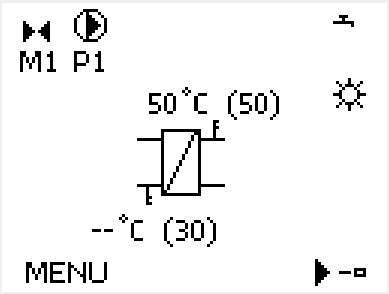
DHW circuit

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

Display example (heat exchanger):

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

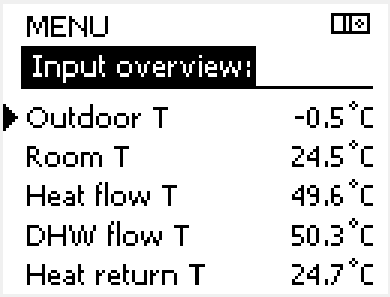
Display example with heat exchanger:



Input overview

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

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



3.5 Influence overview

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

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

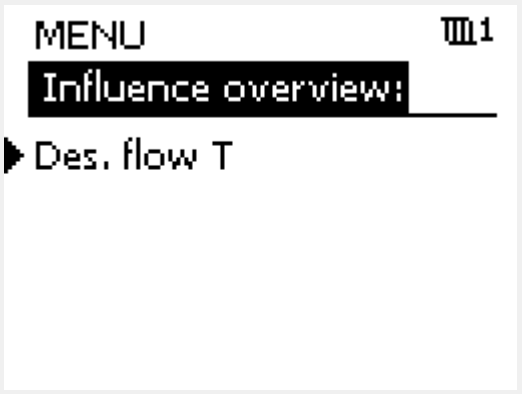
Arrow-down:
The parameter in question reduces the desired flow temperature.

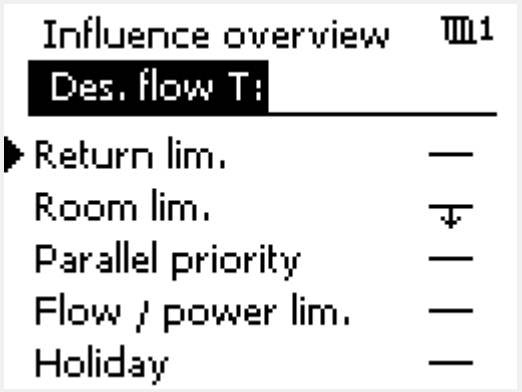
Arrow-up:
The parameter in question increases the desired flow temperature.

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

Straight line:
No active influence.

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





3.6 Manual control

It is possible to manually control the installed components.

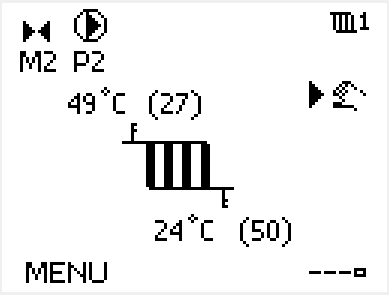
Manual control can only be selected in favorite displays in which the symbols for the controlled components (valve, pump etc.) are visible.

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

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

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

Controlled components *Circuit selector*



During manual operation, all control functions are deactivated. 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 controlled actuator:
The actuator symbol has a value (in %) which can be changed. The % value is corresponding to a voltage value in the range 0 - 10 volt.

3.7 Schedule

3.7.1 Set your schedule

The schedule consists of a 7-day week:

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

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

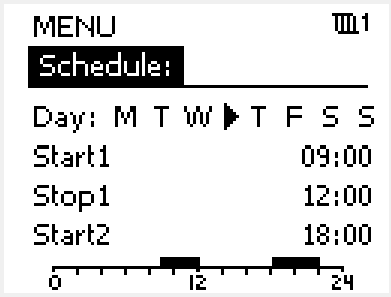
Changing your schedule:

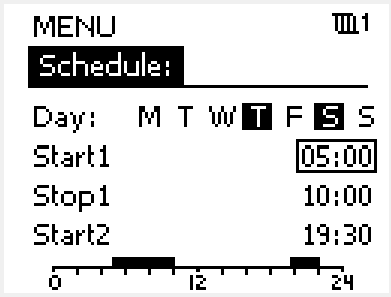
Action:	Purpose:	Examples:
	Choose 'MENU' in any of the overview displays	MENU
	Confirm	
	Confirm the choice 'Schedule'	
	Choose the day to change	▶
	Confirm*	T
	Go to Start1	
	Confirm	
	Adjust the time	
	Confirm	
	Go to Stop1, Start2 etc. etc.	
	Return to 'MENU'	MENU
	Confirm	
	Choose 'Yes' or 'No'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

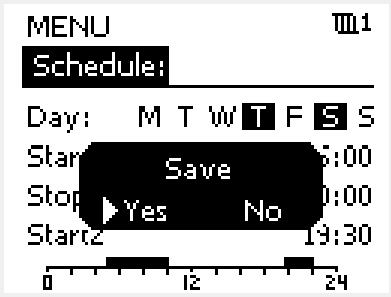
* Several days can be marked

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

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







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

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

4.0 Settings overview

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

Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
Charge difference - A217.1 / A217.2 / A317.1 / A317.2	11193	73	15 K							
Start difference - A217.1 / A217.2 / A317.1 / A317.2	11195	73	–3 K							
Stop difference - A217.1 / A217.2 / A317.1 / A317.2	11194	74	3 K							
Max. charge T - A217.1 / A217.2 / A317.1 / A317.2	11152	75	80 °C							
Flow T adapt time - A217.2 / A317.2	11068	75	20 s							
Temp. max. (flow temp. limit, max.)	11178	75	90 °C							
Temp. min. (flow temp. limit, min.)	11177	75	10 °C							
Limit (return temp. limitation)	11030	76	40 °C							
Infl. - max. (return temp. limitation - max. influence)	11035	76	-2.0							
Infl. - min. (return temp. limitation - min. influence)	11036	76	0.0							
Adapt. time (adaptation time)	11037	77	25 s							
Priority (priority for return temp. limitation) - A217.3	11085	77	OFF							
Actual (actual flow or power)	11110	78								
Adapt. time (adaptation time)	11112	78	OFF							
Filter constant	11113	78	10							
Input type, ECL Key A2xx	11109	79	OFF							
Input type, ECL Key A3xx	11109	79	OFF							
Pulse, ECL Key A2xx	11114	79	OFF							
Units, ECL Key A2xx	11115	80	ml, l/h							
Units — ECL Key A3xx	11115	80	l/h							
Auto tuning - A217.3	11173	81					OFF			
Motor pr. (motor protection)	11174	81	OFF							
Xp actual		82								
Tn (integration time constant)	11185	82	30 s							
M run (running time of the motorized control valve)	11186	82	30 s							
Nz (neutral zone)	11187	82	3 K							
Min. act. time (min. activation time gear motor)	11189	83	3							
Supply T (idle) - A217.3	11097	83					OFF			
Tn (idle) - A217.3	11096	83					120 s			
Open time - A217.3	11094	83					OFF			
Close time - A217.3	11095	84					OFF			
Circ. P priority - A217.1 / A217.2 / A317.1 / A317.2	11055	86	OFF							
Cont. T control - A217.1 / A217.2 / A317.1 / A317.2	11054	86	OFF							
DHW P post-run - A217.1 / A317.1	11041	86	0 m							
DHW P post-run - A217.2 / A317.2	11041	86	0 m							
Char. P post-run - A217.2 / A317.2	11042	87	1 m							
Send desired T	11500	87	ON							
Circ. P frost T	11076	87	2 °C							
Frost pr. T (frost protection temperature)	11093	87	10 °C							
P exercise (pump exercise) - A217.3	11022	87	ON							
M exercise (valve exercise) - A217.3	11023	88	OFF							

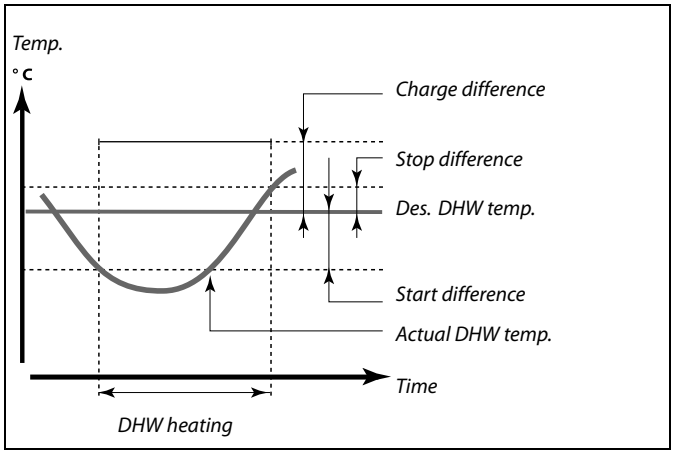
Setting	ID	Page	Factory settings in circuit(s)							
			1		2		3			
P post-run - A.217.3	11040	88	3 m							
Ext. input (external override), ECL 210	11141	88	OFF							
Ext. input (external override) — ECL 310	11141	89	OFF							
Ext. mode (external override mode)	11142	89	COM-FORT							
Day		91								
Start time		91	00:00							
Duration		91	120 m							
Desired T		91	OFF							
Upper difference	11147	92	OFF							
Lower difference	11148	92	OFF							
Delay	11149	92	10 m							
Lowest temp.	11150	93	30 °C							
Backlight (display brightness)	60058	102							5	
Contrast (display contrast)	60059	102							3	
Modbus addr.	38	103							1	
ECL 485 addr. (master / slave address)	2048	103							15	
Service Pin	2150	103							0	
Ext. reset	2151	104							0	
Language	2050	104							English	

5.0 Settings, circuit 1

5.1 Tank temperature

Charge difference - A217.1 / A217.2 / A317.1 / A317.2		11193
Circuit	*Setting range*	*Factory setting*
1	**1 ... 50 K**	**15 K**
Set the number of degrees above the desired DHW temperature that will result in the DHW heating (charging) temperature.		

1... 50: Number of degrees to be added to the desired DHW temperature to obtain the DHW heating (charging) temperature.



The desired DHW temperature is related to the tank temperature sensor.
If two tank temperature sensors are installed, the relation is to the upper tank temperature sensor.

Start difference - A217.1 / A217.2 / A317.1 / A317.2		11195
Circuit	*Setting range*	*Factory setting*
1	**–50 ... –1 K**	**–3 K**
Set the number of degrees below the desired DHW temperature that will start the DHW heating (charging).		

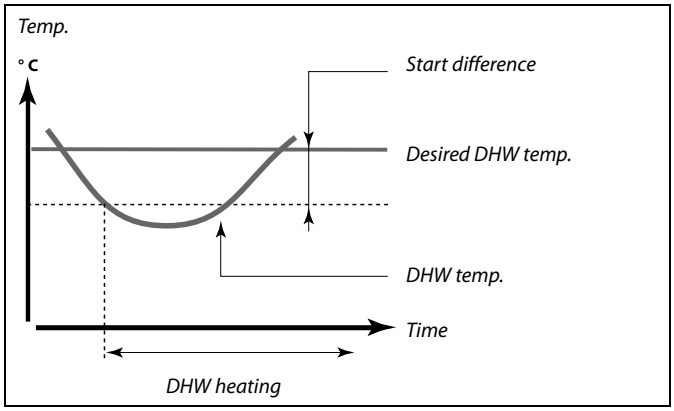
-50 ... –1: Set the number of degrees.

Example:

Desired DHW temp.: 55 °C

Start difference: -3 K

Result:
The DHW heating starts when the temperature measured by the tank temperature sensor (upper) is lower than 52 °C.



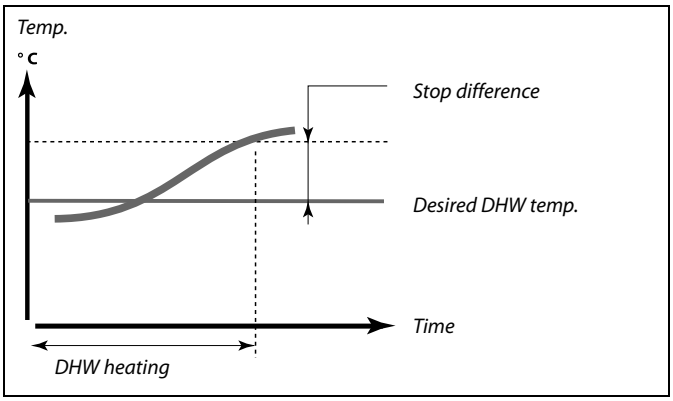
Stop difference - A217.1 / A217.2 / A317.1 / A317.2		11194
Circuit	*Setting range*	*Factory setting*
1	**–50 ... 50 K**	**3 K**

One DHW tank temperature sensor:
Set the number of degrees above the desired DHW temperature that will stop the DHW heating (charging).

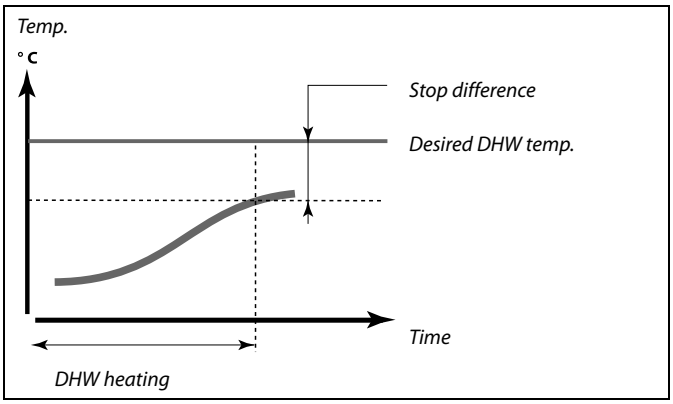
Two DHW tank temperature sensors:
Set the number of degrees above or below the desired DHW temperature but measured by the lower tank temperature sensor that will stop the DHW heating (charging).

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

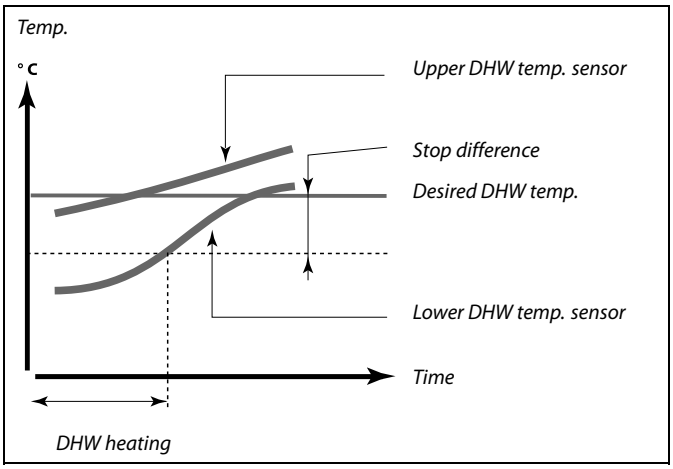
One DHW tank temperature sensor (example with positive 'Stop difference' value):



One DHW tank temperature sensor (example with negative 'Stop difference' value):



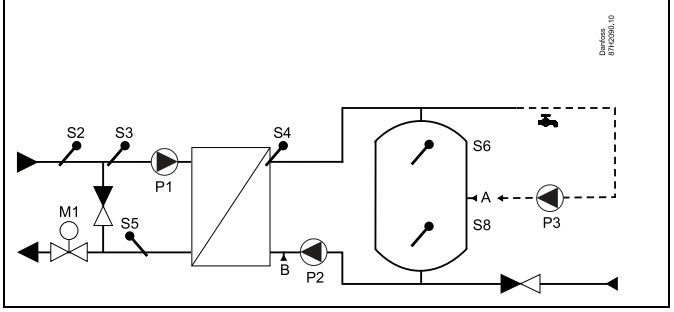
Two DHW tank temperature sensors, upper and lower



Max. charge T - A217.1 / A217.2 / A317.1 / A317.2		11152
Circuit	*Setting range*	*Factory setting*
1	**10 ... 110 °C**	**80 °C**
Set the max. temperature at S3 for heating the DHW.		

10 ... 110: Set the temperature.

Charging principle



Flow T adapt time - A217.2 / A317.2		11068
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**20 s**
Set the adaptation time (seconds) for the desired temperature at S3 based on the desired charging temperature at S4. *The ECL Comfort controller gradually increases the desired temperature at S3 in order to maintain the desired temperature at S4.*		

OFF: The desired flow temperature at S3 is not adapted to the desired charging temperature at S4.

1: The adaptation is quick.

50: The adaptation is slow.

The desired flow temperature at S3 cannot be higher than the set temperature in 'Max. charge T'.

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

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

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

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

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

'Temp. min.' can be overruled by the influence from the return temperature limitation (see 'Priority').

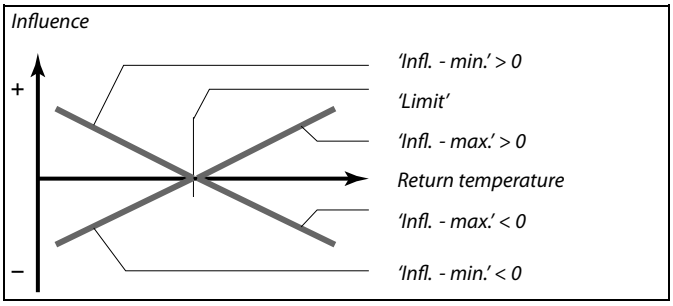
The setting for 'Temp. max.' has higher priority than 'Temp. min.'.

5.2 Return limit

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

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

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



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

Limit (return temp. limitation)		**11030**
Circuit	*Setting range*	*Factory setting*
1	**10 ... 110 °C**	**40 °C**
Set the return tempeature you accept for the system.		

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

Infl. - max. (return temp. limitation - max. influence)		**11035**
Circuit	*Setting range*	*Factory setting*
1	**-9.9 ... 9.9**	**-2.0**
Determines how much the desired flow temperature will be influenced if the return temperature is higher than the calculated limit.		

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

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

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

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

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

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

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

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

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

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

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

1: The desired temperature is adapted quickly.

50: The desired temperature is adapted slowly.

Priority (priority for return temp. limitation) - A217.3		11085
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose whether the return temperature limitation should overrule the set min. flow temperature 'Temp. min.'.		

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

ON: The min. flow temperature limit is overruled.

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

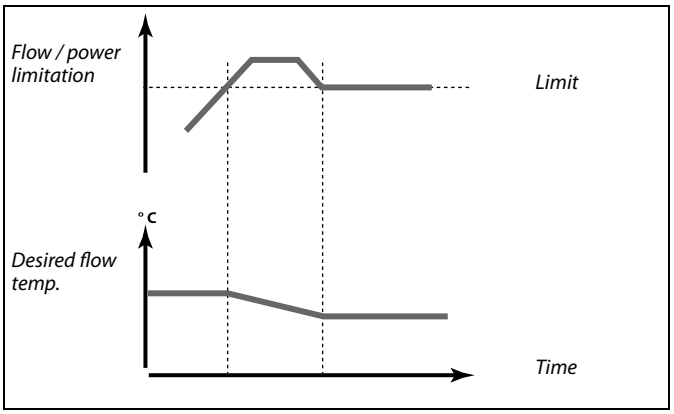
5.3 Flow / power limit

Depending on controller type, the flow / power limit is based on different input types:

ECL Key application	ECL Comfort 210 controller	ECL Comfort 310 controller
A2xx	Pulse signal	Pulse signal
A3xx	Not possible	M-bus signal

A flow or energy meter can be connected to the ECL controller in order to limit the flow or consumed power. The signal from the flow or energy meter can be based on pulse or M-bus signal.

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



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

Limit (limitation value)		**11111**
Circuit	*Setting range*	*Factory setting*
1	**0.0 ... 999.9 l/h**	**999.9 l/h**
Set the limitation value.		

Adapt. time (adaptation time)		**11112**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 50 s**	**OFF**
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.

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

1: The desired temperature is adapted quickly.

50: The desired temperature is adapted slowly.

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

1: Minor dampening (low filter constant)

50: Major dampening (high filter constant)

Input type, ECL Key A2xx		11109
Circuit	*Setting range*	*Factory setting*
1	**OFF / IM1**	**OFF**
Choice of pulse type signal applied to input S7. Possible in ECL Comfort 210 as well as ECL Comfort 310 controllers.		

OFF: No input.

IM1: Pulse.

Flow or power limitation is based on pulse signals.

Input type, ECL Key A3xx		11109
Circuit	*Setting range*	*Factory setting*
1	**OFF / EM1 ... EM5**	**OFF**
Choice of M-bus signal from energy meter number 1 ... 5. Only possible in ECL Comfort 310.		

OFF: No M-bus signal acquired.

EM1 ... EM5: Energy meter number.

Flow or power limitation is based on M-bus signal (ECL Comfort 310 controllers only).

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

OFF: No input.

1 ... 9999: Pulse value.

Example :

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

Units, ECL Key A2xx		11115
Circuit	*Setting range*	*Factory setting*
1	**See the list**	**ml, l/h**
Choice of units for measured values. Choose a value in the range 1 ... 9999 in 'Pulse'.		

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

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

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

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

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

Example 1:

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

'Pulse' (11114): 10

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

Example 2:

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

'Pulse' (11114): 1

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

Units — ECL Key A3xx		11115
Circuit	*Setting range*	*Factory setting*
1	**See the list**	**l/h**
Choice of units for measured values.		

Flow values are expressed as l/h or m^3/h
Power values are expressed as kW, MW or GW.

List for setting range of 'Units':
l/h
m^3/h
kW
MW
GW

5.4 Control parameters

Auto tuning - A217.3		11173
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Automatically determines the control parameters for the DHW control. 'Xp' 'Tn' and 'M run' do not need to be set, when using auto tuning. 'Nz' must be set.		

OFF: Auto tuning is not activated.

ON: Auto tuning is activated.

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

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

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

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

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

The auto tuning process takes up to 25 minutes.

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

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

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

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

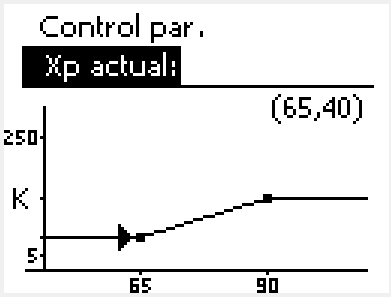
Motor pr. (motor protection)		11174
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 ... 59 m**	**OFF**
Prevents the controller from unstable temperature control (and resulting actuator oscillations). This can occur at very low load. The motor protection increases the lifetime of all involved components.		

OFF: Motor protection is not activated.

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

Recommended for heating systems with variable load.

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



Xp setting range: 5 ... 250 K

Fixed supply temperature settings: 65 °C and 90 °C

Factory settings: (65,40) and (90,120)

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

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

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

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

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

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

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

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

How to calculate the running time of a motorized control valve

The running time of the motorized control valve is calculated using the following methods:

Seated valves

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

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

Rotating valves

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

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

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

Set the acceptable flow temperature deviation.

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

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

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

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

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

Supply T (idle) - A217.3		11097
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
The 'supply T (idle)' is the supply temperature when there is no DHW tapping / DHW draw-off. When DHW tapping / DHW draw-off is not detected (the flow switch is deactivated), the temperature is maintained at a (typical) lower level (saving temperature). Choose which temperature sensor is to maintain the saving temperature.		

If the S2 temperature sensor is not connected, the idle supply temperature will be maintained at S3.
The 'supply T (idle)' function is only active if a value is chosen in 11094.

OFF: The saving temperature is maintained at the DHW flow temperature sensor (S3).

ON: The saving temperature is maintained at the supply temperature sensor (S2).

Tn (idle) - A217.3		11096
Circuit	*Setting range*	*Factory setting*
3	**1 ... 999 s**	**120 s**
Integration time is a constant when no DHW tapping / DHW draw-off is detected (the flow switch is deactivated), for slowly control of the saving temperature at either S3 or S2 (see also the setting in 11097).		

Set a high integration time constant to obtain a slow control.

Set a low integration time constant for a fast control.

Open time - A217.3		11094
Circuit	*Setting range*	*Factory setting*
1	**OFF / 0.1... 25.0 s**	**OFF**
Commands the actuator to open the valve for the set period when a DHW tapping / DHW draw-off starts. The DHW tapping / DHW draw-off is detected by the activated flow switch (S8). The 'open time' function compensates for the delay before the flow temperature sensor measures a change in temperature.		

OFF: The flow switch function is disabled.

0.1 .... 25.0 s: Commanded opening time.

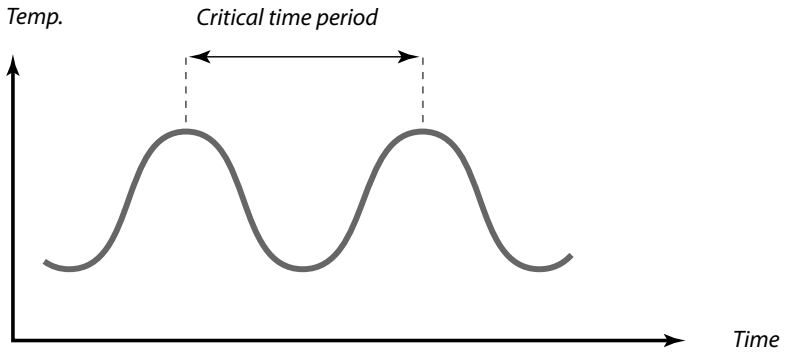
Close time - A217.3		**11095**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 0.1 ... 25.0 s**	**OFF**
Commands the actuator to close the valve for the set period when a DHW tapping / DHW draw-off stops. When no DHW tapping / DHW draw-off is present, the flow switch (S8) is deactivated.		

OFF: Commanded closing time is 0 (zero) sec.

0.1 .... 25.0 s: Commanded closing time.

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.

5.5 Application

Circ. P priority - A217.1 / A217.2 / A317.1 / A317.2		11055
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose whether the DHW circulation pump should be ON during DHW heating.		

OFF: The DHW circulation pump is switched OFF during DHW heating.

ON: The DHW circulation pump is not switched OFF during DHW heating.

When the 'Circ. P priority' is set to OFF, the schedule for the DHW circulation pump is overruled.

Cont. T control - A217.1 / A217.2 / A317.1 / A317.2		11054
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Depending on the DHW circulation pipe connection, the desired DHW heating / charging temperature can be lowered when the DHW heating procedure has elapsed.		

OFF: The desired temperature at S3 or S4 is lowered to 10 °C. Typically, the DHW is circulated through the DHW tank.

ON: The desired temperature at S3 or S4 is lowered to the desired DHW temperature. Typically, the DHW is circulated through the heat exchanger in order to compensate for the heat loss in the DHW circulation pipe.

DHW P post-run - A217.1 / A317.1		11041
Circuit	*Setting range*	*Factory setting*
1	**0 ... 30 m**	**0 m**
Set the DHW heating / charging pump (P1) post-run time (minutes). The pump can continue to be switched ON after the DHW heating procedure in order to utilize the remaining heat in the heat exchanger / boiler.		

0 ... 30: Set the number of minutes for the post-run.

DHW P post-run - A217.2 / A317.2		11041
Circuit	*Setting range*	*Factory setting*
1	**0 ... 30 m**	**0 m**
Set the DHW heating pump (P1) post-run time (minutes). The DHW heating pump can continue to be switched ON after the DHW heating procedure in order to utilize the remaining heat in the heat exchanger / boiler.		

0 ... 30: Set the number of minutes for the post-run.

Char. P post-run - A217.2 / A317.2		11042
Circuit	*Setting range*	*Factory setting*
1	**0 ... 30 m**	**1 m**
Set the DHW charging pump (P2) post-run time (minutes). The DHW charging pump can continue to be switched ON after the DHW heating procedure in order to utilize the remaining heat in the heat exchanger.		

0 ... 30: Set the number of minutes for the post-run.

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

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').

Circ. P frost T		11076
Circuit	*Setting range*	*Factory setting*
1	**OFF / –10 ... 20 °C**	**2 °C**
Set the outdoor temperature value at which the DHW circulation pump is to be active to protect the DHW circuit against frost.		

OFF: The DHW circulation pump is not active.

–10 ... 20: The DHW circulation pump is active when the outdoor temperature is lower than the set value.

Frost pr. T (frost protection temperature)		11093
Circuit	*Setting range*	*Factory setting*
1	**5 ... 40 °C**	**10 °C**
Set the desired flow temperature (S3) to protect the system against frost.		

5 ... 40: Desired frost protection temperature.

P exercise (pump exercise) - A217.3		11022
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**ON**
Exercises the pump to avoid blocking in periods without DHW heating demand.		

OFF: The pump exercise is not active.

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

M exercise (valve exercise) - A217.3		11023
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Exercises the valve to avoid blocking in periods without DHW heating demand.		

OFF: The valve exercise is not active.

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

P post-run - A.217.3		11040
Circuit	*Setting range*	*Factory setting*
1	**0 ... 99 m**	**3 m**
The circulation pump in the heating circuit can be ON for a number of minutes (m) after DHW heating stop . This function can utilize the remaining heat in e.g. a heat exchanger.		

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

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

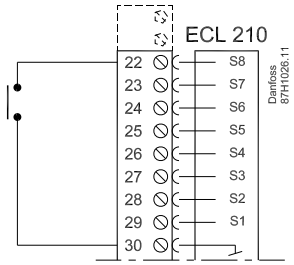
Ext. input (external override), ECL 210		11141
Circuit	*Setting range*	*Factory setting*
1	**OFF / S1 ... S8**	**OFF**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to Comfort or Saving mode.		

OFF: No inputs have been selected for external override.

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

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

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



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

See also 'Ext. mode'.

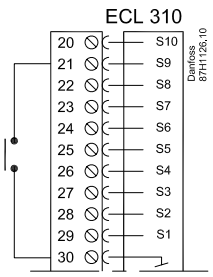
Ext. input (external override) — ECL 310		11141
Circuit	*Setting range*	*Factory setting*
1	**OFF / S1 ... S10**	**OFF**
Choose the input for 'Ext. input' (external override). By means of a switch the controller can be overridden to 'Comfort' or 'Saving' mode.		

OFF: No inputs have been selected for external override.

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

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

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

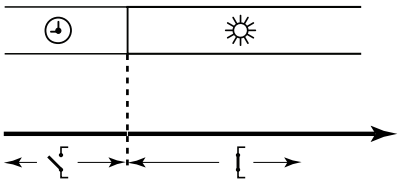


Choose only an unused input for override. If an already used input is applied for override, the functionality of this input is also neglected.

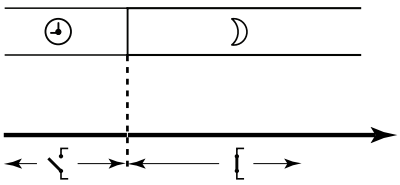
See also 'Ext. mode'.

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

Override to 'Comfort' mode



Override to 'Saving' mode



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

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

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

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

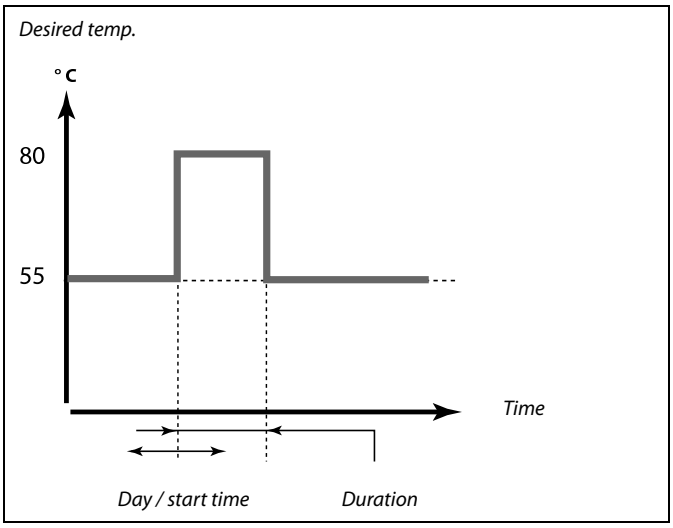
COMFORT: The controller is in comfort mode when the override switch is closed.

See also 'Ext. input'.

5.6 Anti-bacteria

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

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

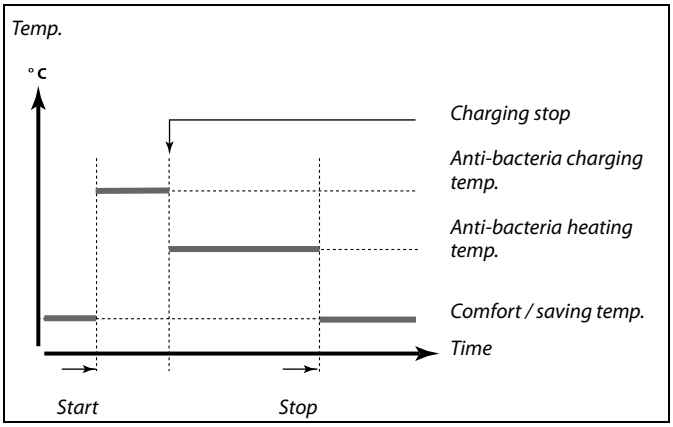


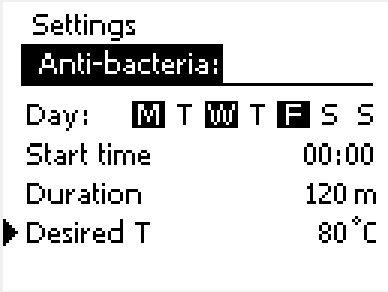
Example of setting conditions for the anti-bacteria function:
'Desired T' = 80 °C
'Charge difference' = 10 K

Start:
On time, the desired DHW heating temperature changes to (80 + 10) 90 °C. The charging pump is switched ON.

When the DHW temperature reaches the stop temperature, the charging pump is switched OFF and the desired DHW heating temperature changes to 80 °C.

Stop:
On time, the desired DHW heating temperature changes from 80 °C to the set temperature according to the set Comfort / saving value.





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

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

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

Start time		
Circuit	*Setting range*	*Factory setting*
1	**00:00 ... 23:30**	**00:00**
Set the start time for the anti-bacteria function.		

Duration		
Circuit	*Setting range*	*Factory setting*
1	**10 ... 600 m**	**120 m**
Set the duration (minutes) for the anti-bacteria function.		

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

OFF: The anti-bacteria function is not active.

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

5.7 Alarm

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

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

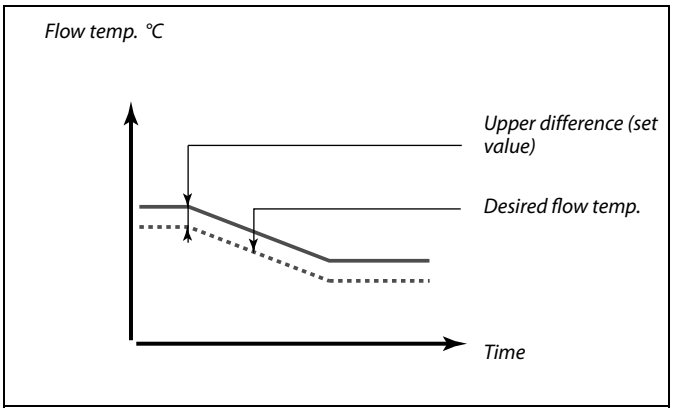
The relay in question is activated as long as the alarm condition is present.

Typical alarms:

- Actual flow temperature differs from the desired flow temperature.

5.7.1 Temp. monitor.

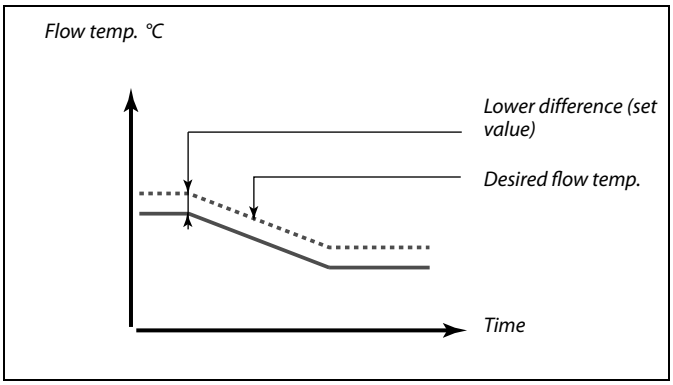
Upper difference		**11147**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow temperature increases more than the set difference (acceptable temperature difference above the desired flow temperature). See also 'Delay'.		



OFF: The alarm function is not active.

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

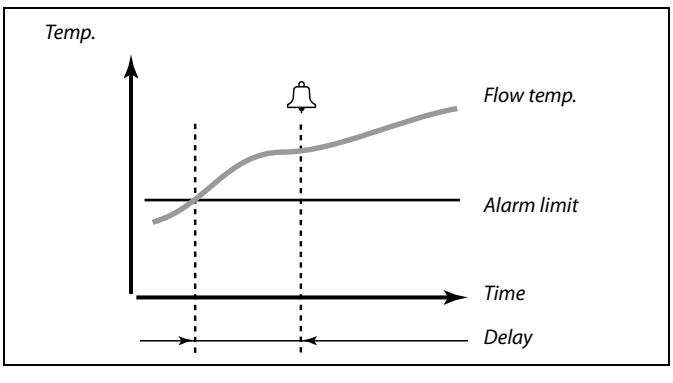
Lower difference		**11148**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 30 K**	**OFF**
The alarm is activated if the actual flow temperature decreases more than the set difference (acceptable temperature difference below the desired flow temperature). See also 'Delay'.		



OFF: The alarm function is not active.

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

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



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

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

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

6.0 Common controller settings

6.1 Introduction to 'Common controller settings'

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

To enter 'Common controller settings':

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

Circuit selector

6.2 Time & Date

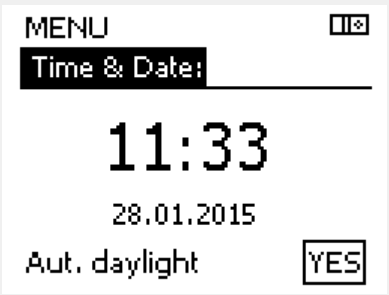
It is only necessary to set the correct date and time in connection with the first use of the ECL Comfort controller or after a power break of more than 72 hours.

The controller has a 24 hour clock.

Aut. daylight (Daylight saving time changeover)

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

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



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

6.3 Holiday

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.

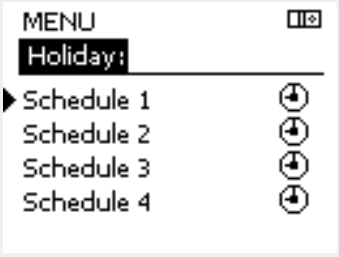
Selectable modes are Comfort, Saving, Frost protection or Comfort 7-23 (before 7 and after 23, the mode is scheduled).

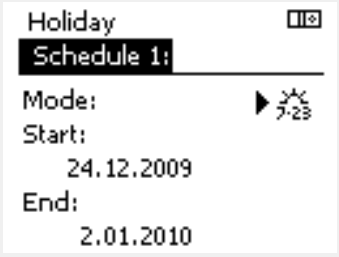
How to set your holiday schedule:

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.



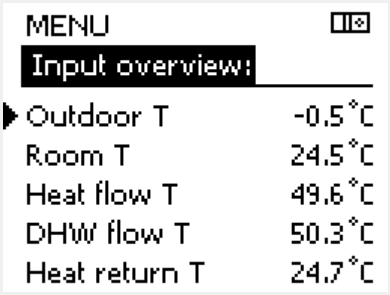


6.4 Input overview

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

The input overview is located in the common controller settings.

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

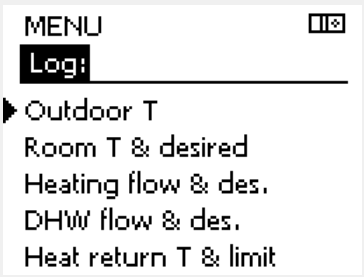


6.5 Log

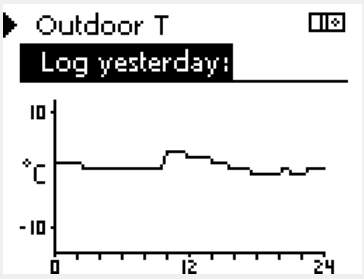
The log function (temperature history) allows you to monitor the logs of today, yesterday, the past 2 days as well as the past 4 days for the connected sensors.

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

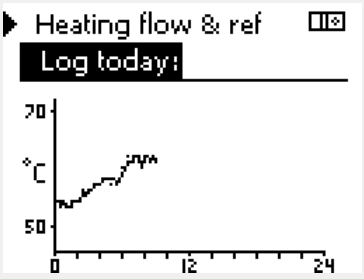
The log function is only available in the 'Common controller settings'.



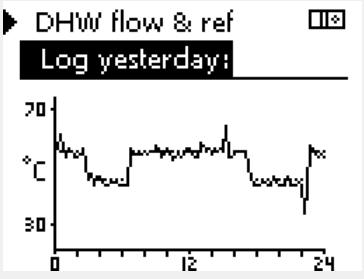
Example 1:
1 day log for yesterday showing the development in outdoor temperature during the past 24 hours.



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.



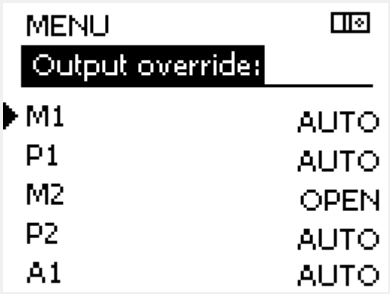
6.6 Output override

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

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

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

Controlled components *Circuit selector*



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

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

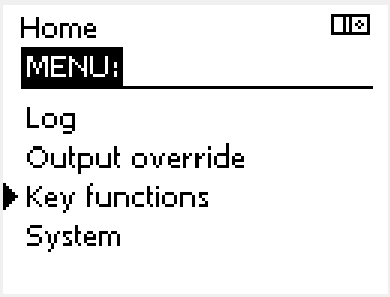
Applications P330.3, P330.8 and P330.12:
The motorized control valve M4 is controlled by a 0–10 volt (0–100%) signal. It can be set to AUTO or ON.

AUTO: Normal control (0–100%)

ON: The 0–10 volt signal is set to the %-value, set below the indication 'ON'.

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 application and its subtypes of the ECL key in question.
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



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

6.8 System

6.8.1 ECL version

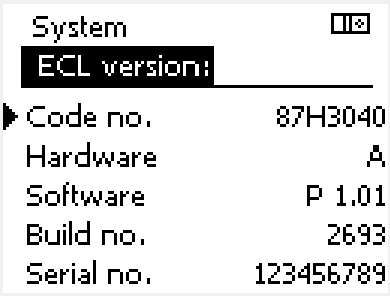
In 'ECL version' you will always be able to find an overview of the data related to your electronic controller.

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

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

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

Example, ECL version



6.8.2 Extension

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

6.8.3 Ethernet

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

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

6.8.4 Portal config

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

Internet related parameters are set here.

6.8.5 M-bus config

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

M-bus related parameters are set here.

6.8.6 Energy Meters

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

6.8.7 Raw input overview

Measured temperatures, input status and voltages are displayed.

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

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

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

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

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

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

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

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

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

6.8.8 Display

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

0: Weak backlight.

10: Strong backlight.

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

0: Low contrast.

10: High contrast.

6.8.9 Communication

Modbus addr.		**38**
Circuit	*Setting range*	*Factory setting*
	1 ... 247	**1**
Set the Modbus address if the controller is part of a Modbus network.		

1 ... 247: Assign the Modbus address within the stated setting range.

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!***		

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).

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

0: Reset not activated.

1: Reset.

6.8.10 Language

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

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

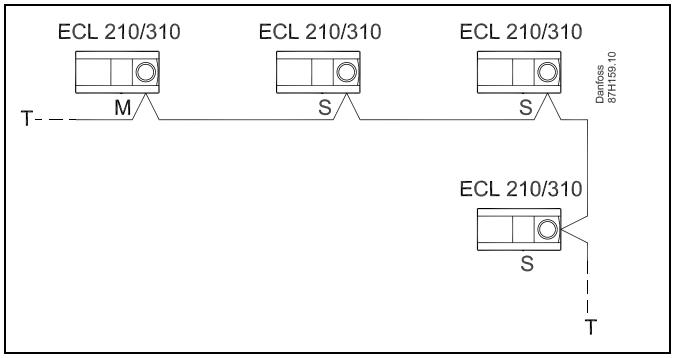
7.0 Miscellaneous

7.1 Several controllers in the same system

When ECL Comfort controllers are interconnected by means of the ECL 485 communication bus (cable type: 2 x twisted pair), the master controller will broadcast the following signals to the slave controllers:

- Outdoor temperature (measured by S1)
- Time and date
- DHW heating activity

Furthermore, the master controller can receive information about the desired flow temperature (demand) from slave controllers.



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

Situation 1:

The slave controllers only receive information about outdoor temperature and date / time.

SLAVE controllers:
Change the factory set address from 15 to address 0.

- In ⊡⊙, go to System > Communication > ECL 485 addr:

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

SLAVE controller: How to react on a DHW heating demand sent from the MASTER controller

Situation 2:
The slave receives information about a DHW heating activity in the master controller and can be set to close the selected heating circuit.

SLAVE controller:
Set the desired function:

- In circuit 1 / circuit 2, go to 'Settings' > 'Application' >'DHW priority':

DHW priority (closed valve / normal operation)		**11052 / 12052**
Circuit	Setting range	**Choose**
1 / 2	OFF / ON	**OFF / ON**

OFF: The flow temperature control remains unchanged during active DHW heating / charging in the master controller.

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

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

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

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

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

Situation 3:

The slave controller receives information about outdoor temperature and date / time. The master controller receives information about the desired flow temperature from slave controllers with an address from 1 ... 9:

SLAVE controller:

- In ☐|⊙, go to System > Communication > ECL 485 addr.
- Change the factory set address from 15 to an address (1 ... 9). Each slave must be configured with its own address.

ECL 485 addr. (master / slave address)		**2048**
Circuit	Setting range	**Choose**
☐|⊙	0 ... 15	**1 ... 9**

Furthermore, each slave can send information about the desired flow temperature (demand) in each circuit back to the master controller.

SLAVE controller:

- In the circuit in question, go to Settings > Application > Send desired T
- Choose ON or OFF.

Send desired T		**11500 / 12500**
Circuit	Setting range	**Choose**
1 / 2	OFF / ON	**ON or OFF**

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

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

MASTER controller:

- In the circuit 1, go to Settings > Application > Demand offset
- Change OFF to a value (for example 5 K) which is added to the highest demand (desired flow temperature) from the slaves.

Demand offset		**11017**
Circuit	Setting range	**Choose**
1	OFF / 1 ... 20 K	**1 ... 20 K**

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

7.2 Frequently asked questions

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

The time shown in the display is one hour off?
See 'Time and Date'.

The time shown in the display is not correct?
The internal clock may have been reset, if there has been a power break for more than 72 hours.
Go to the 'Common controller settings' and 'Time & Date' to set the correct time.

The ECL Application Key is lost?
Switch the power off and on again to see the system type and the software generation of the controller or go to 'Common controller settings' >'Key functions' > 'Application'. The system type (e.g. TYPE A266.1) and the system diagram is displayed.
Order a replacement from your Danfoss representative (e.g. ECL Application Key A266).
Insert the new ECL Application Key and copy your personal settings from the controller to the new ECL Application Key, if required.

The room temperature is too low?
Make sure that the radiator thermostat does not limit the room temperature.
If you still cannot obtain the desired room temperature by adjusting the radiator thermostats, the flow temperature is too low. Increase the desired room temperature (display with desired room temperature). If this does not help, adjust the 'Heat curve' ('Flow temp.').

The room temperature is too high during saving periods?
Make sure that the min. flow temperature limitation ('Temp. min.') is not too high.

The temperature is unstable?
Check that the flow temperature sensor is correctly connected and in the right place. Adjust the control parameters ('Control par.').
If the controller has a room temperature signal, see 'Room limit'.

The controller does not operate and the control valve is closed?
Check that the flow temperature sensor is measuring the correct value, see 'Daily use' or 'Input overview'.
Check the influence from other measured temperatures.

How to make an extra comfort period in the schedule?
You can set an additional comfort period by adding new 'Start' and 'Stop' times in 'Schedule'.

How to remove a comfort period in the schedule?
You can remove a comfort period by setting start and stop times to the same value.

How to restore your personal settings?
Please read the chapter concerning 'Inserting the ECL Application Key'.

How to restore the factory settings?
Please read the chapter concerning 'Inserting the ECL Application Key'.

Why can't the settings be changed?
The ECL Application Key has been removed.

How to react on alarms?
An alarm indicates that the system is not operating satisfactorily.
Please contact your installer.

What does P and PI control mean?
P control: Proportional control.
By using a P control, the controller will change the flow temperature proportional to the difference between a desired and an actual temperature, e.g. a room temperature.
A P control will always have an offset which not will disappear over time.

PI control: Proportional and Integrating control.
A PI control does the same as a P control, but the offset will disappear over time.
A long 'Tn' will give a slow but stable control, and a short 'Tn' will result in a fast control but with a higher risk of unstability.

7.3 Definitions

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

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

Alarm function
Based on the alarm settings, the controller can activate an output.

Anti-bacteria function
For a defined period, the DHW temperature is increased in order to neutralize dangerous bacteria, e.g. Legionella.

Balance temperature
This setpoint is the basis for the flow / air duct temperature. The balance temperature can be adjusted by the room temperature, the compensation temperature and the return temperature. The balance temperature is only active if a room temperature sensor is connected.

Comfort operation
Normal temperature in the system controlled by the schedule. During heating the flow temperature in the system is higher to maintain the desired room temperature. During cooling the flow temperature in the system is lower to maintain the desired room temperature.

Comfort temperature
Temperature maintained in the circuits during comfort periods. Normally during daytime.

Compensation temperature
A measured temperature influencing the flow temperature reference / balance temperature.

Desired flow temperature
Temperature calculated by the controller on basis of the outdoor temperature and influences from the room and / or return temperatures. This temperature is used as a reference for the control.

Desired room temperature
Temperature which is set as the desired room temperature. The temperature can only be controlled by the ECL Comfort controller if a room temperature sensor is installed.
If a sensor is not installed, the set desired room temperature however still influences the flow temperature.
In both cases the room temperature in each room is typically controlled by radiator thermostats / valves.

Desired temperature
Temperature based on a setting or a controller calculation.

Dew point temperature
Temperature at which the humidity in the air condensates.

DHW circuit
The circuit for heating the domestic hot water (DHW).

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

Flow temperature
Temperature measured in the flow at any time.

Flow temperature reference
Temperature calculated by the controller on basis of the outdoor temperature and influences from the room and / or return temperatures. This temperature is used as a reference for the control.

Heat curve
A curve showing the relationship between actual outdoor temperature and required flow temperature.

Heating circuit
The circuit for heating the room / building.

Holiday schedule
Selected days can be programmed to be in comfort, saving or frost protection mode. Besides this, a day schedule with comfort period from 07.00 to 23.00 can be selected.

Humidity, relative
This value (stated in %) refers to the indoor moisture content compared to the max. moisture content. The relative humidity is measured by the ECA 31 and is used for the calculation of the dew point temperature.

Limitation temperature
Temperature that influences the desired flow / balance temperature.

Log function
The temperature history is displayed.

Master / slave
Two or more controllers are interconnected on the same bus, the master sends out e.g. time, date and outdoor temperature. The slave receives data from master and sends e.g. desired flow temperature value.

Pt 1000 sensor
All sensors used with the ECL Comfort controller are based on the Pt 1000 type (IEC 751B). The resistance is 1000 ohm at 0 °C and it changes with 3.9 ohm / degree.

Optimization
The controller optimizes the start time of the scheduled temperature periods. Based on the outdoor temperature, the controller automatically calculates when to start in order to reach the comfort temperature at the set time. The lower the outdoor temperature, the earlier the start time.

Outdoor temperature trend
The arrow indicates the tendency, i.e. whether the temperature rises or falls.

Refill water function
If the measured pressure in the heating system is too low (e.g. due to a leakage), water can be supplemented.

Return temperature
The temperature measured in the return influences the desired flow temperature.

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

Room temperature
Temperature measured by the room temperature sensor or the Remote Control Unit. The room temperature can only be controlled directly if a sensor is installed. The room temperature influences the desired flow temperature.

Schedule
Schedule for periods with comfort and saving temperatures. The schedule can be made individually for each week day and may consist of up to 3 comfort periods per day.

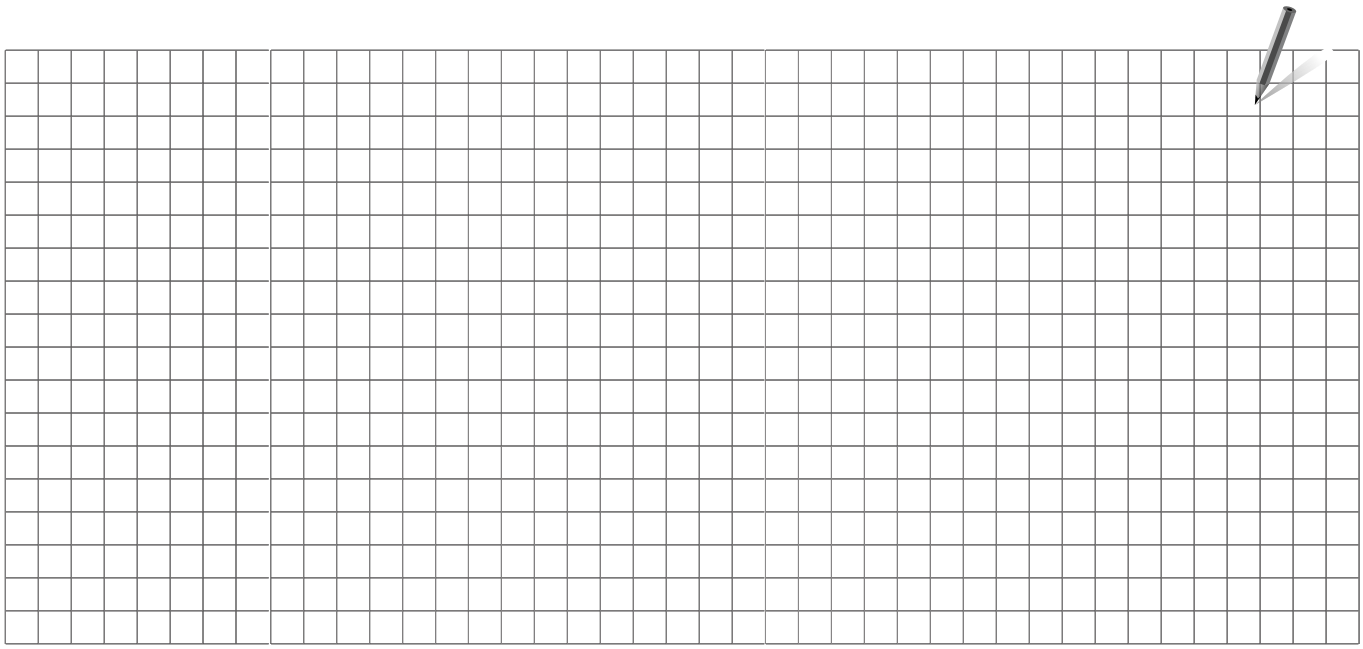
Saving temperature
Temperature maintained in the heating / DHW circuit during saving temperature periods.

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

Weather compensation
Flow temperature control based on the outdoor temperature. The control is related to a user-defined heat curve.

2-point control
ON / OFF control e.g. circulation pump, change-over valve or damper control.

3-point control
Opening, closing or no action of the actuator for the motorized control valve. No action means that the actuator remains in its current position.



Installer:

By:

Date:

Installation Guide ECL Comfort 210 / 310, application A217 / A317

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