ENGINEERING TOMORROW

Operating Guide

ECL Comfort 310, application A333

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 A333 (order code no. 087H3818).

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

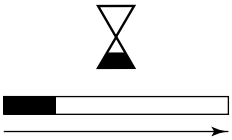
The application A333 complies with ECL Comfort controllers 310 as of software version 1.11 (visible at start-up of the controller and in 'Common controller settings' in 'System').

The application A333 works with the Internal I/O module ECA 32 (order code no. 087H3202).

Additional documentation for ECL Comfort 310, modules and accessories is available on *www.ecl.doc.danfoss.com.*

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

Automatic update of controller software (firmware):
The software of the controller is updated automatically when the key is inserted (as of controller version 1.11 (ECL 210 / 310) and version 1.58 (ECL 296)). The following animation will be shown when the software is being updated:



Progress bar

During update:

- Do not remove the KEY
  If the key is removed before the hour-glass is shown, you have to start afresh.
- Do not disconnect the power
  If the power is interrupted when the hour-glass is shown, the controller will not work.
- Manual update of controller software (firmware):
  See the section "Automatic / manual update of firmware"

Safety Note

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

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

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

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

The ambient temperature ranges for ECL Comfort in operation are:
ECL Comfort 210 / 310: 0 - 55 °C
ECL Comfort 296: 0 - 45 °C.
Exceeding the temperature range can result in malfunctions.

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

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

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

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

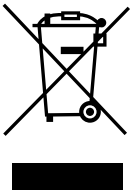
°C (degrees Celsius) is a measured temperature value whereas K (Kelvin) often is used for temperature differences.

The ID no. is unique for the selected parameter.

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

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

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



Disposal Note

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

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

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

2.0 Installation

2.1 Before you start

The A333 application key contains 3 subtypes: **A333.1, A333.2 and A333.3** which are almost identical.

Different and extra functions are described additionally.

The application A333.1 is very flexible.

These are the basic principles:

Typically, the flow temperature is adjusted according to your requirements.

The flow temperature sensor S3 is the most important sensor. The desired flow temperature at S3 is calculated in the ECL controller, based on the outdoor temperature (S1) and the desired room temperature. The lower the outdoor temperature, the higher the desired flow temperature.

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

In Saving mode the heating can be reduced or switched off totally.

The motorized control valve M1 is opened gradually when the flow temperature S3 is lower than the desired flow temperature and vice versa.

The return temperature (S5) can be limited, for example not to be too high. If so, the desired flow temperature at S3 can be adjusted (typically to a lower value), thus resulting in a gradual closing of the motorized control valve. Furthermore, the return temperature limitation can be dependent on the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted return temperature.
In boiler-based heating supply the return temperature should not be too low (same adjustment procedure as above).

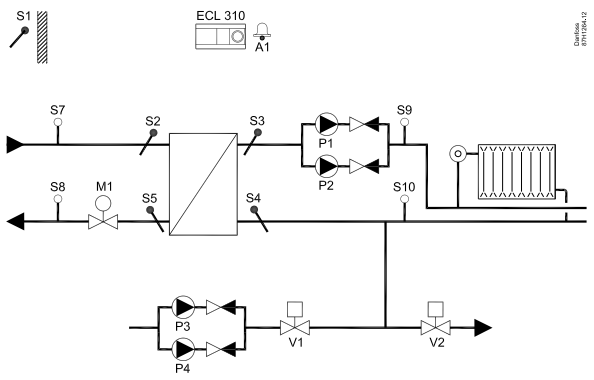
A connected flow or energy meter based on M-bus signal can limit the flow or energy to a set maximum value. Furthermore the limitation can be in relation to the outdoor temperature. Typically, the lower the outdoor temperature, the higher the accepted flow / power.

The circulation pumps P1 and P2 are operated alternately. One circulation pump is used as working pump and the other circulation pump is used as spare pump. The circulation pump in question is ON at heat demand or at frost protection. The alternation time can be set as a number of days and a set time on the shift day. A solution with a single circulation pump can also be selected.

By means of the pressure difference between S9 and S10 the ECL controller verifies that the circulation pump in question is operating.

The pressure difference on the secondary side is based on the static pressures at S9 and S10. The pressures are measured as 0 - 10 volt signals (from pressure transmitters) and converted (scaled) in the ECL controller to appropriate pressure values.

Application A333.1:



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

All named components are connected to the ECL Comfort controller.

List of components:

ECL 310	*Electronic controller ECL Comfort 310*
S1	*Outdoor temperature sensor*
S2	*(Optional) Primary supply temperature sensor. For monitoring purpose*
S3	*Secondary flow temperature sensor*
S4	*(Optional) Secondary return temperature sensor. For monitoring purpose*
S5	*(Optional) Primary return temperature sensor*
S7	*(Optional) Primary supply pressure sensor. For monitoring purpose*
S8	*(Optional) Primary return pressure sensor. For monitoring purpose*
S9	*Secondary flow pressure sensor*
S10	*Secondary return pressure sensor*
M1	*Motorized control valve (3-point controlled)*
P1/P2	*Circulation pumps*
P3/P4	*Refill water pumps*
V1	*Refill water valve*
V2	*Pressure release valve*
A1	*Alarm*

If an acceptable pressure difference is not detected, the ECL controller activates the alarm and shifts the operating command to the opposite circulation pump.

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

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

In case of a too low pressure, measured by S10, the refill water function will supplement with water from a water source.

A refill pump is switched ON and the ON / OFF valve V1 opens.

The refill pumps P3 and P4 are operated alternately. One pump is used as working pump and the other pump is used as spare pump. The alternation time can be set as a number of days.

A solution with a single refill pump can also be selected.

In case of a too high pressure, measured by S10, the release valve V2 (ON / OFF) will open in order to reduce the pressure.

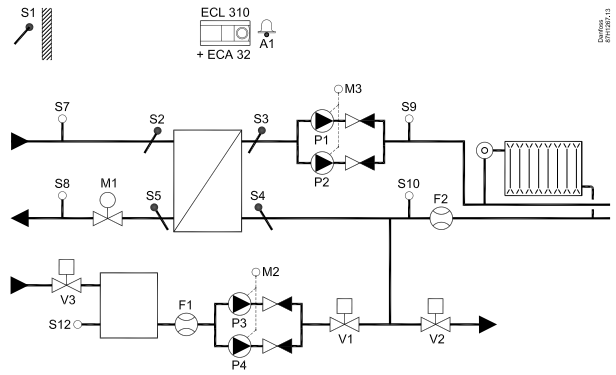
The application A333.2 is very flexible and works like A333.1, and with these additional features:

* The circulation pumps P1 / P2 can, as an alternative to ON-OFF control, be speed controlled by means of a 0 - 10 volt signal. The desired pressure difference between S9 and S10 is set for the speed control procedure.
  A flow-meter F2 (pulse signal, analogue signal S13 or M-Bus) measures the circulation of water in the heating circuit.

* The level in the refill water storage tank is measured by means of the pressure sensor S12. When a too low pressure is measured, the ON / OFF valve V3 opens. An acceptable pressure will close the V3 valve.

* The refill water pumps P3 / P4 can, as an alternative to ON-OFF control, be speed controlled by means of a 0 - 10 volt signal. The desired pressure at S10 is set for the speed control procedure.
  A flow-meter F1 (pulse signal or M-Bus) measures the injected refill water.

Application A333.2:



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

All named components are connected to the ECL Comfort controller.

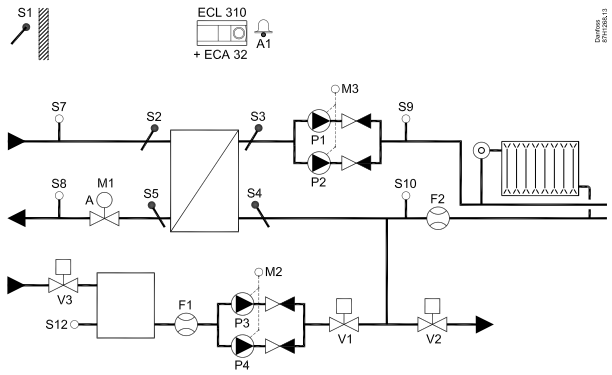
List of components:

ECL 310	*Electronic controller ECL Comfort 310*
ECA 32	*Built-in extension module*
S1	*Outdoor temperature sensor*
S2	*(Optional) Primary supply temperature sensor. For monitoring purpose*
S3	*Secondary flow temperature sensor*
S4	*(Optional) Secondary return temperature sensor. For monitoring purpose*
S5	*(Optional) Primary return temperature sensor*
S7	*(Optional) Primary supply pressure sensor. For monitoring purpose*
S8	*(Optional) Primary return pressure sensor. For monitoring purpose*
S9	*Secondary flow pressure sensor*
S10	*Secondary return pressure sensor*
F1	*(Optional) Flow meter (pulse or M-bus signal)*
F2	*(Optional) Flow meter (pulse, 0 - 10 volt or M-bus signal)*
M1	*Motorized control valve (3-point controlled)*
M2	*Speed control (0 - 10 volt) of P3 / P4*
M3	*Speed control (0 - 10 volt) of P1 / P2*
P1/P2	*Circulation pumps*
P3/P4	*Refill water pumps*
V1	*Refill water valve*
V2	*Pressure release valve*
V3	*Refill water tank valve*
A1	*Alarm*

The application A333.3 is very flexible and works like A333.2, but with this feature:

* The motorized control valve M1 is controlled by means of a 0 - 10 volt signal.

Application A333.2:



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

All named components are connected to the ECL Comfort controller.

List of components:

ECL 310	*Electronic controller ECL Comfort 310*
ECA 32	*Built-in extension module*
S1	*Outdoor temperature sensor*
S2	*(Optional) Primary supply temperature sensor. For monitoring purpose*
S3	*Secondary flow temperature sensor*
S4	*(Optional) Secondary return temperature sensor. For monitoring purpose*
S5	*(Optional) Primary return temperature sensor*
S7	*(Optional) Primary supply pressure sensor. For monitoring purpose*
S8	*(Optional) Primary return pressure sensor. For monitoring purpose*
S9	*Secondary flow pressure sensor*
S10	*Secondary return pressure sensor*
F1	*(Optional) Flow meter (pulse or M-bus signal)*
F2	*(Optional) Flow meter (pulse, 0 - 10 volt or M-bus signal)*
M1	*Motorized control valve (0 - 10 volt controlled)*
M2	*Speed control (0 - 10 volt) of P3 / P4*
M3	*Speed control (0 - 10 volt) of P1 / P2*
P1/P2	*Circulation pumps*
P3/P4	*Refill water pumps*
V1	*Refill water valve*
V2	*Pressure release valve*
V3	*Refill water tank valve*
A1	*Alarm*

Application A333 in general:

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

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

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

A connected flow or energy meter (based on M-bus signal) can limit the flow or energy to a set maximum and in relation to the outdoor temperature.

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

Modbus communication to a SCADA system can be established. The M-bus data can furthermore be transferred to the Modbus communication.

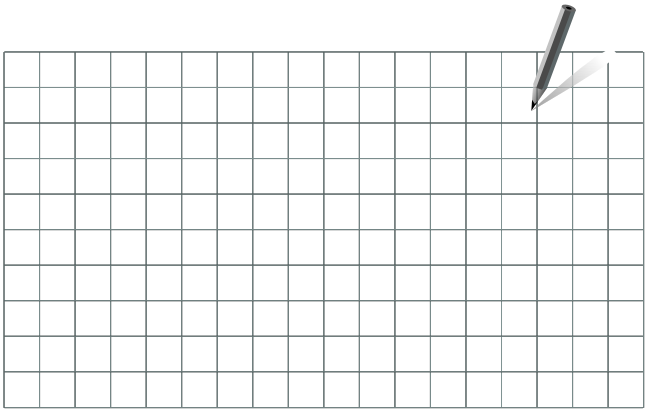
Alarm A1 (= relay 6) can be activated:

- if the actual flow temperature differs from the desired flow temperature.
- if a temperature sensor or its connection disconnects / short circuits. (See: Common controller settings > System > Raw input overview).
- if the circulation pump(s) do(es) not generate acceptable pressure.
- if the refill water pump(s) do(es) not generate acceptable pressure.
- if measured pressures are not inside an acceptable pressure range.

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

2.2 Identifying the system type

Sketch your application



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

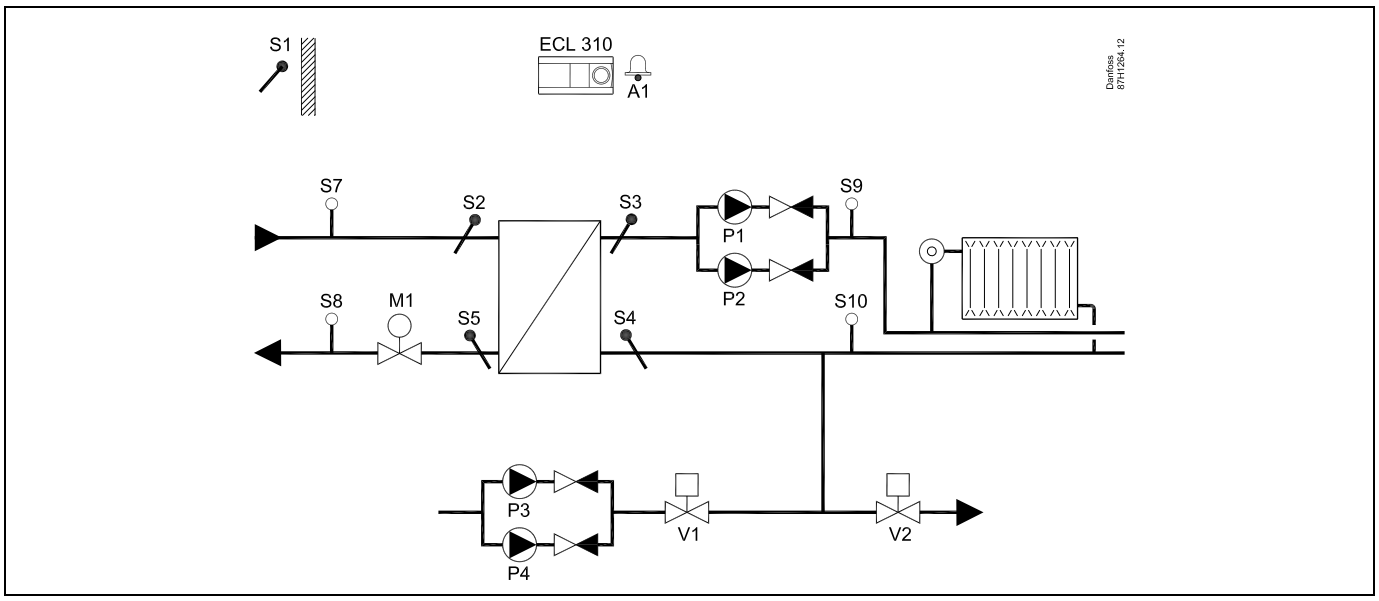
The ECL Comfort controller is a universal controller that can be used for various systems. Based on the shown standard systems, it is possible to configure additional systems. In this chapter you find the most frequently used systems. If your system is not quite as shown below, find the diagram which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

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

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

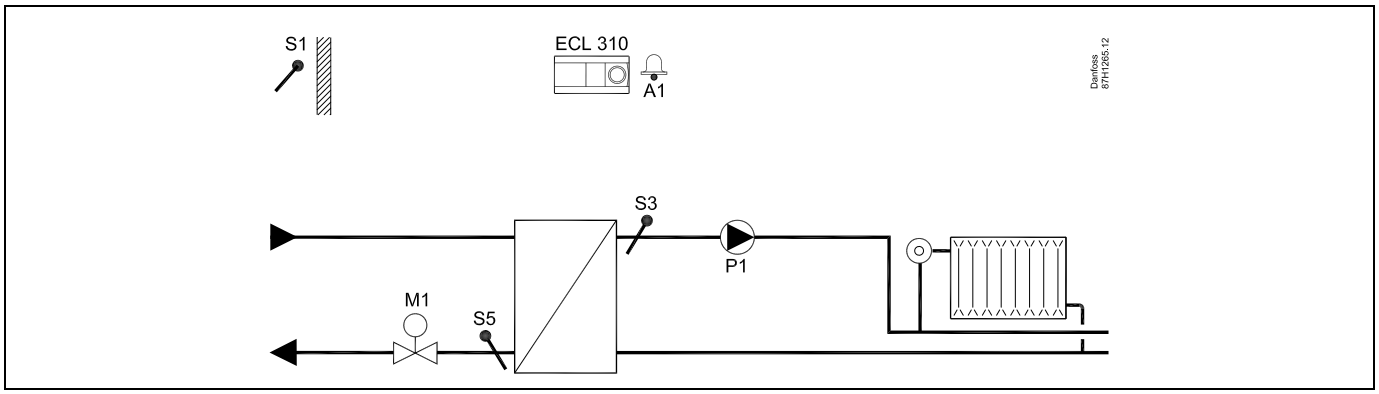
A333.1, ex. a

Heating system with control of up to 2 circulation pumps and up to 2 refill water pumps



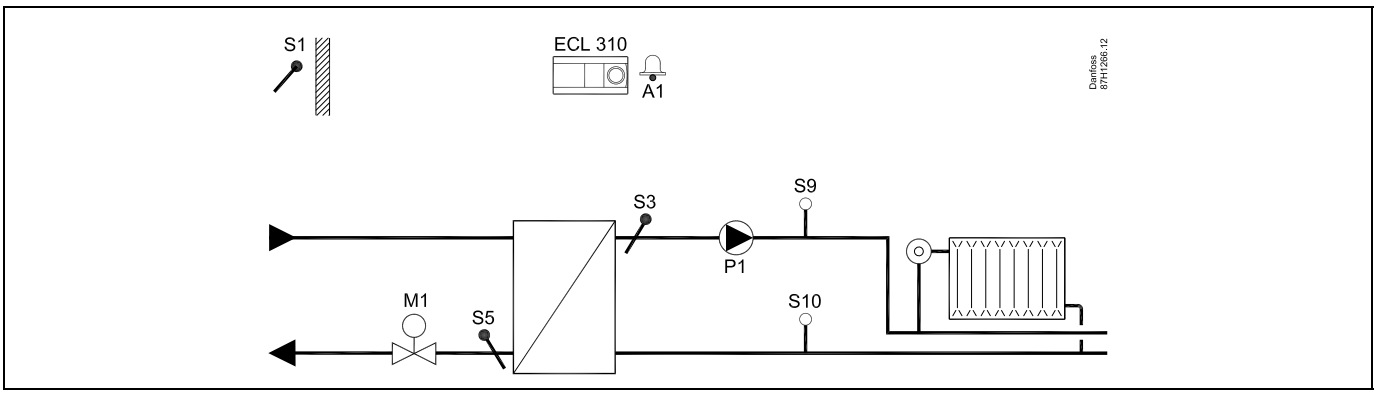
A333.1, ex. b

Basic heating system



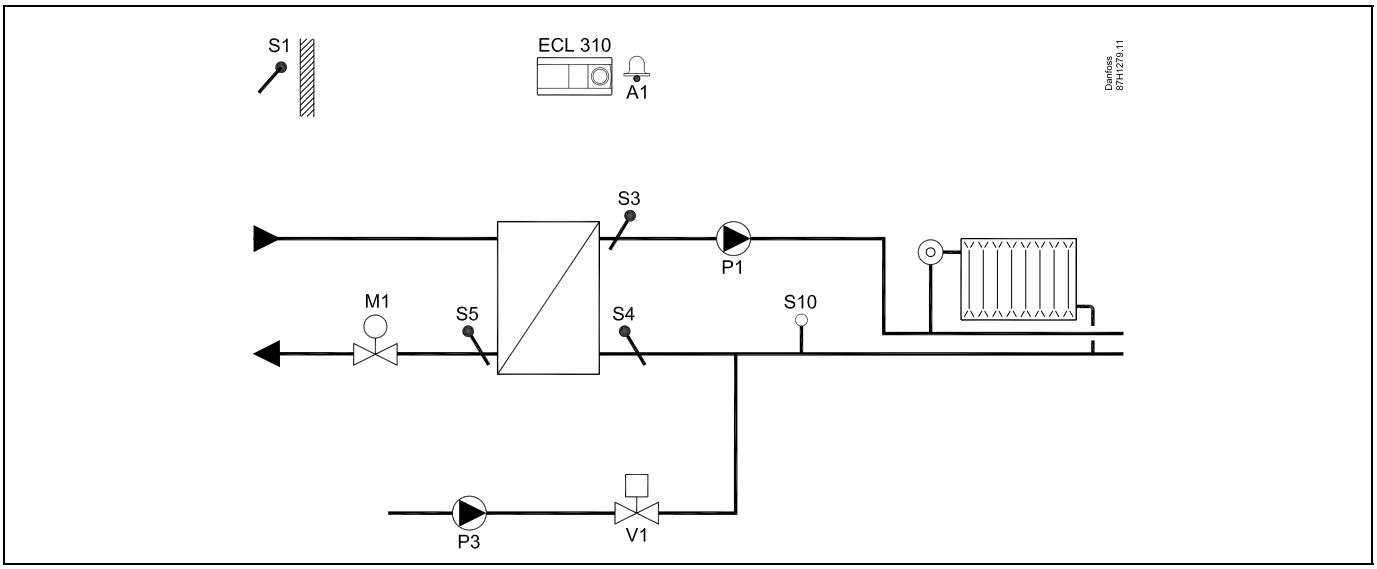
A333.1, ex. c

Heating system with circulation pump feedback



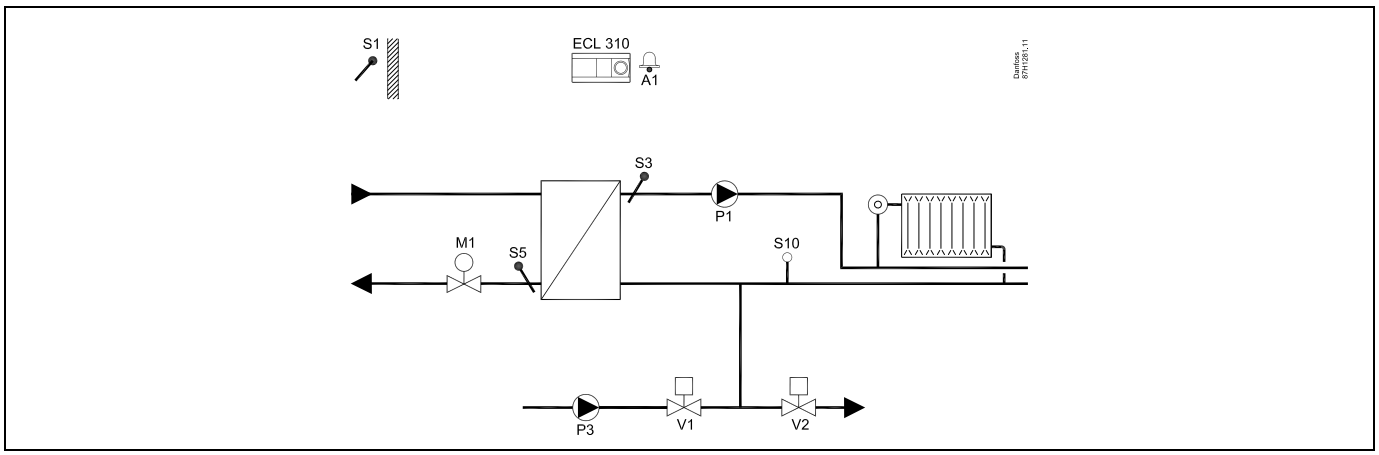
A333.1, ex. d

Heating system with refill water system



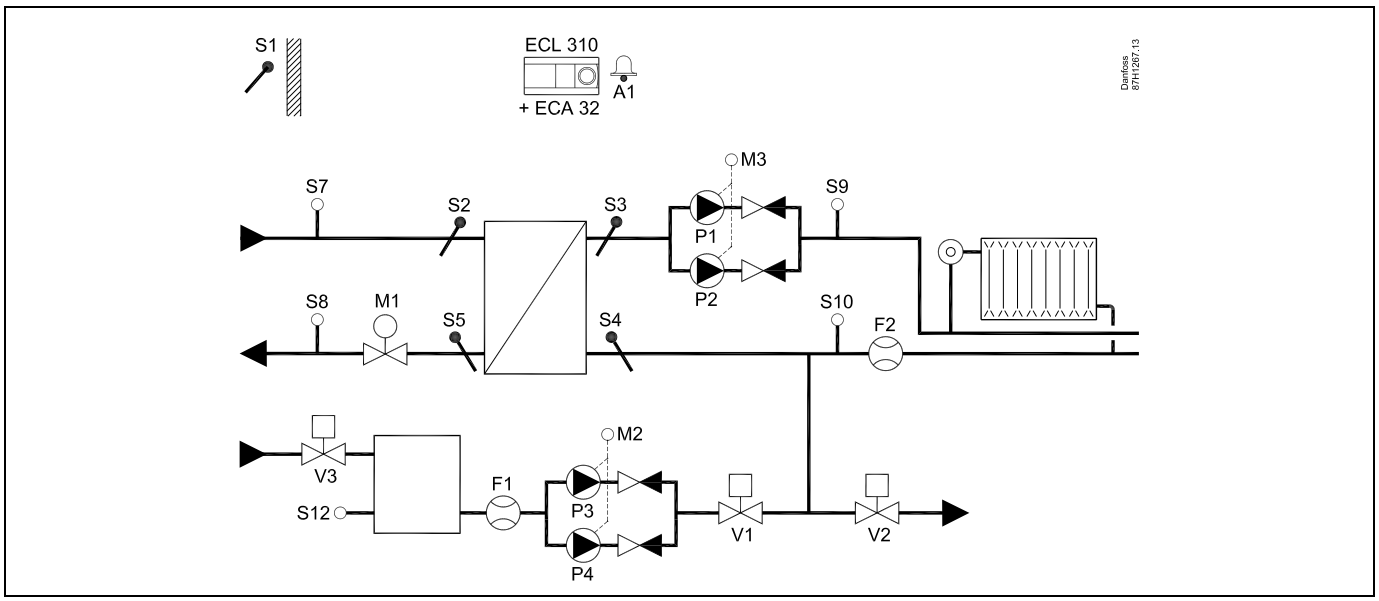
A333.1, ex. e

Heating system with refill water and excess pressure system



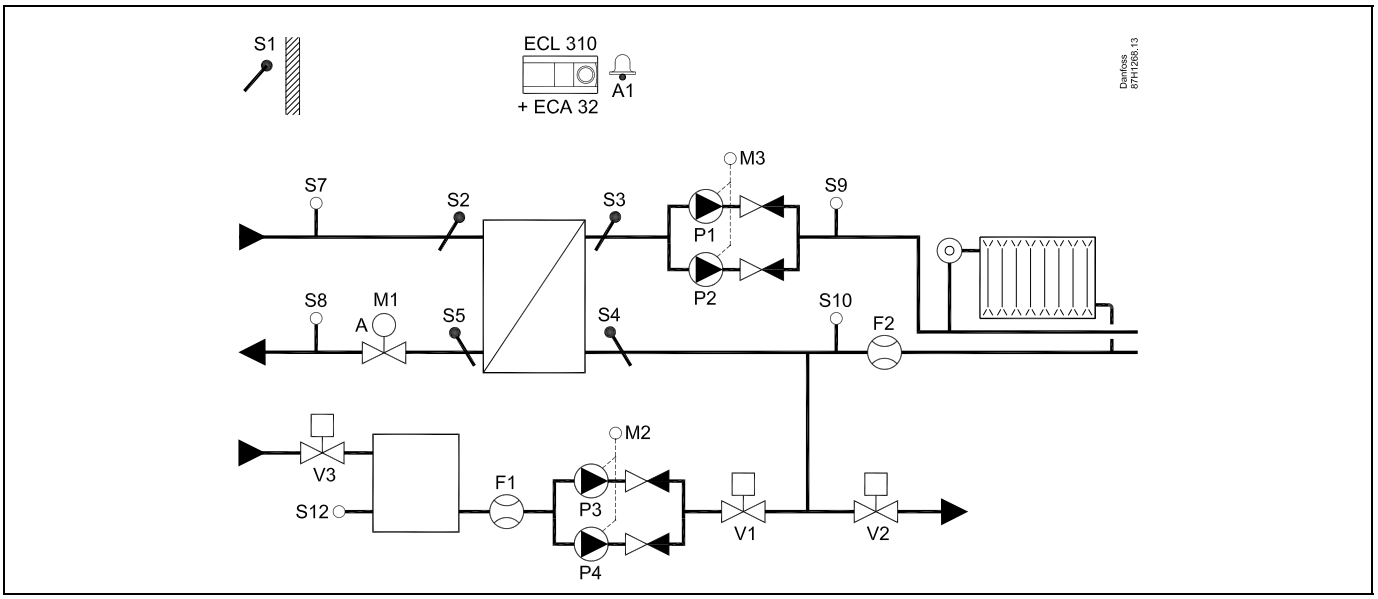
A333.2, ex. a

Heating system with ON / OFF and speed control of up to 2 circulation pumps and up to 2 refill water pumps. Refill water storage control.



A333.3, ex. a

Heating system with ON / OFF and speed control of up to 2 circulation pumps and up to 2 refill water pumps. Refill water storage control. Control valve M1 is controlled by 0 - 10 volt signal.



2.3 Mounting

2.3.1 Mounting the ECL Comfort controller

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

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

ECL Comfort 210 / 296 / 310 can be mounted

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

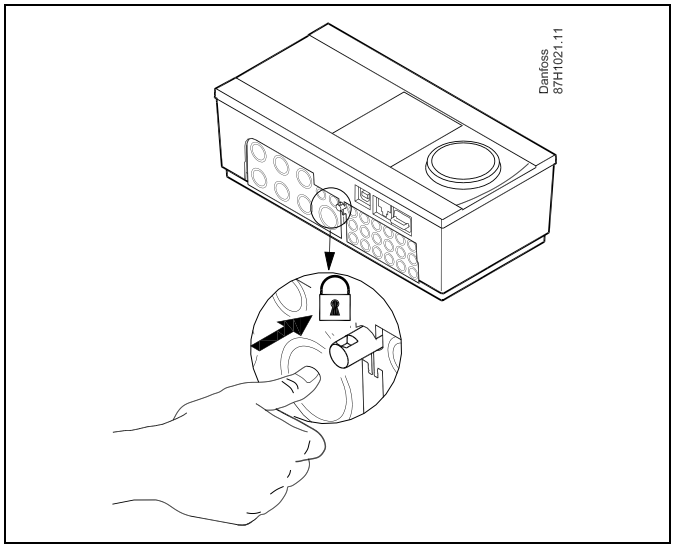
ECL Comfort 296 can be mounted

- in a panel cut-out

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

Screws, PG cable glands and rawlplugs are not supplied.

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



⚠

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.

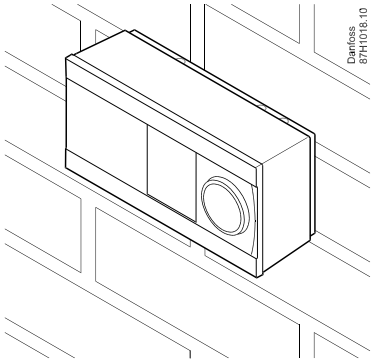
⚠

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!

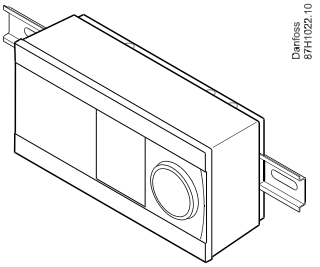
⚠

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

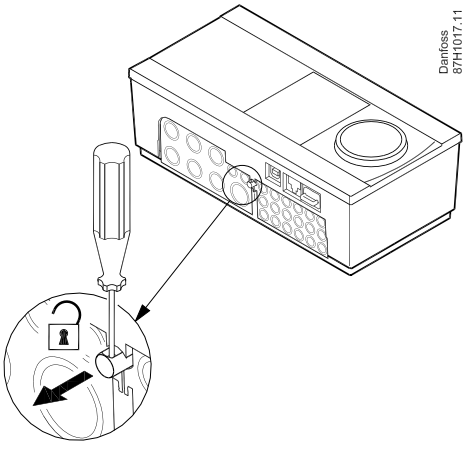
Mounting on a wall
Mount the base part on a wall with a smooth surface. Establish the electrical connections and position the controller in the base part. Secure the controller with the locking pin.



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.

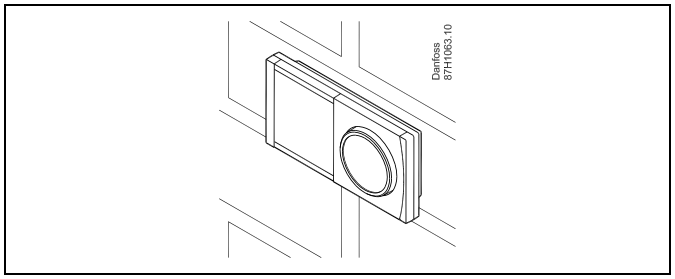
2.3.2 Mounting the Remote Control Units ECA 30 / 31

Select one of the following methods:

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

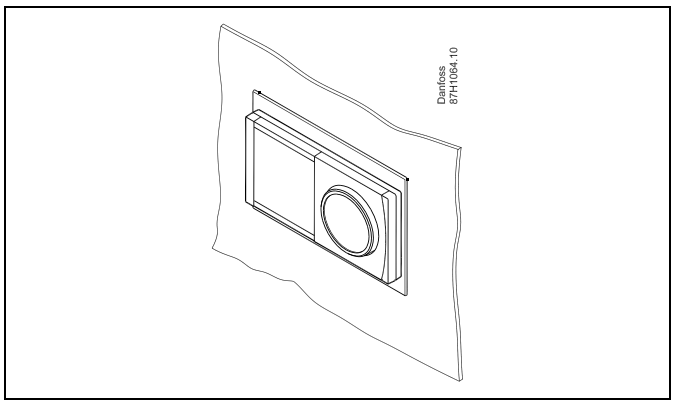
Screws and rawlplugs are not supplied.

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.

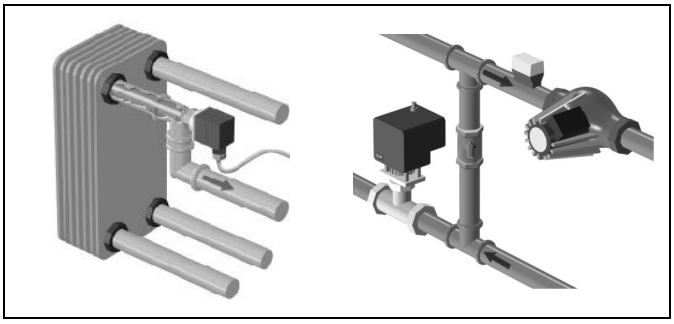
The temperature sensor mentioned below are sensors used for the ECL Comfort 210 / 296 / 310 series which not all will be needed for your application!

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

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

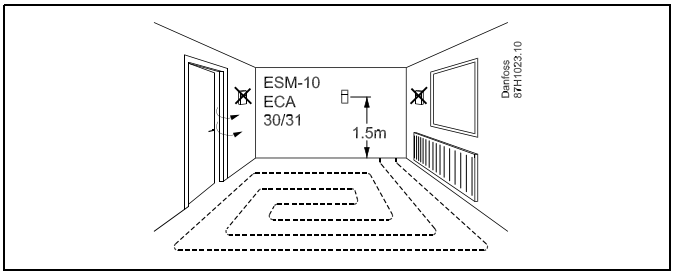
Make sure that the surface of the pipe is clean and even where the sensor is mounted.

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



Room temperature sensor
(ESM-10, ECA 30 / 31 Remote Control Unit)

Place the room sensor in the room where the temperature is to be controlled. Do not place it on outside walls or close to radiators, windows or doors.



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

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

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

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

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

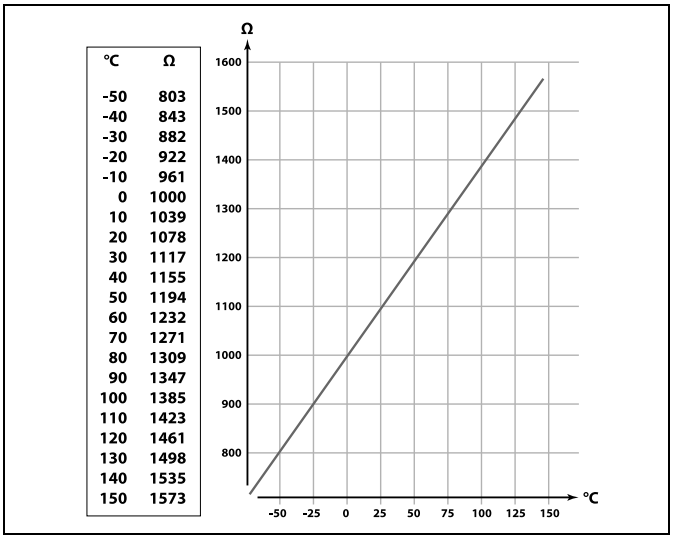
ESM-11, ESMC and ESMB-12: Use heat conducting paste for quick measurement of the temperature.

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

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

Relationship between temperature and ohmic value:

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

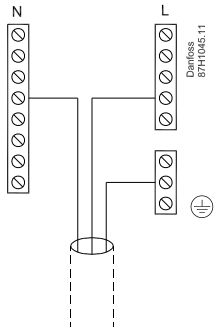


2.5 Electrical connections

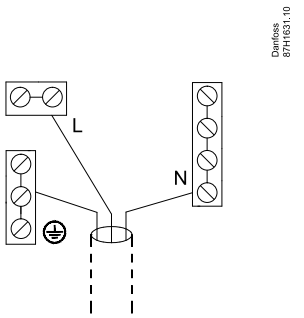
2.5.1 Electrical connections 230 V a.c.

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

ECL 210 / 310



ECL 296



⚠

Warning

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

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

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

⚠

Safety Note

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

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

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

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

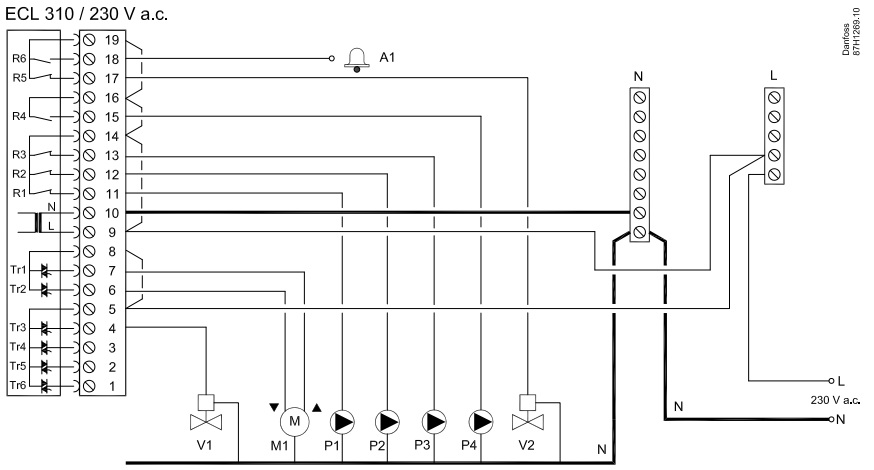
Installation must be avoided if there is a risk for condensation (dew).

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

Connections for A333.1 and A333.2, in general:

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

Application A333.1 / A333.2



Terminal	Description	Max. load
19	Phase for ON / OFF valve / Alarm	
18 A1	Alarm	4 (2) A / 230 V a.c.*
17 V2	ON / OFF valve for pressure release	4 (2) A / 230 V a.c.*
16	Phase for refill water pump	
15 P4	Refill water pump	4 (2) A / 230 V a.c.*
14	Phase for circulation pumps / refill water pump	
13 P3	Refill water pump	4 (2) A / 230 V a.c.*
12 P2	Circulation pump	4 (2) A / 230 V a.c.*
11 P1	Circulation pump	4 (2) A / 230 V a.c.*
10	Supply voltage 230 V a.c. - neutral (N)	
9	Supply voltage 230 V a.c. - live (L)	
8	Phase for motorized control valve M1	
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	Phase for ON / OFF valve V1	
4 V1	ON / OFF valve for refill water	0.2 A / 230 V a.c.
3	Not to be used	
2	Not to be used	
1	Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load		

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

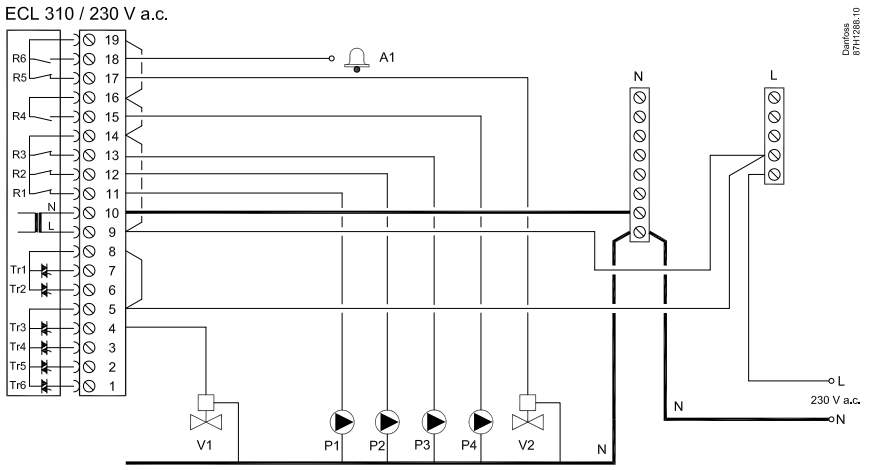
Wire cross section: 0.5 - 1.5 mm²
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm² wires can be inserted into each screw terminal.

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

Connections for A333.3, in general:

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

Application A333.3



Terminal	Description	Max. load
19	Phase for ON / OFF valve / Alarm	
18 A1	Alarm	4 (2) A / 230 V a.c.*
17 V2	ON / OFF valve for pressure release	4 (2) A / 230 V a.c.*
16	Phase for refill water pump	
15 P4	Refill water pump	4 (2) A / 230 V a.c.*
14	Phase for circulation pumps / refill water pump	
13 P3	Refill water pump	4 (2) A / 230 V a.c.*
12 P2	Circulation pump	4 (2) A / 230 V a.c.*
11 P1	Circulation pump	4 (2) A / 230 V a.c.*
10	Supply voltage 230 V a.c. - neutral (N)	
9	Supply voltage 230 V a.c. - live (L)	
8	Not to be used	
7	Not to be used	
6	Not to be used	
5	Phase for ON / OFF valve V1	
4 V1	ON / OFF valve for refill water	0.2 A / 230 V a.c.
3	Not to be used	0.2 A / 230 V a.c.
2	Not to be used	0.2 A / 230 V a.c.
1	Not to be used	0.2 A / 230 V a.c.
* Relay contacts: 4 A for ohmic load, 2 A for inductive load		

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

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

2.5.4 Electrical connections, ECA 32

Connections for A333.2 and A333.3, in general:

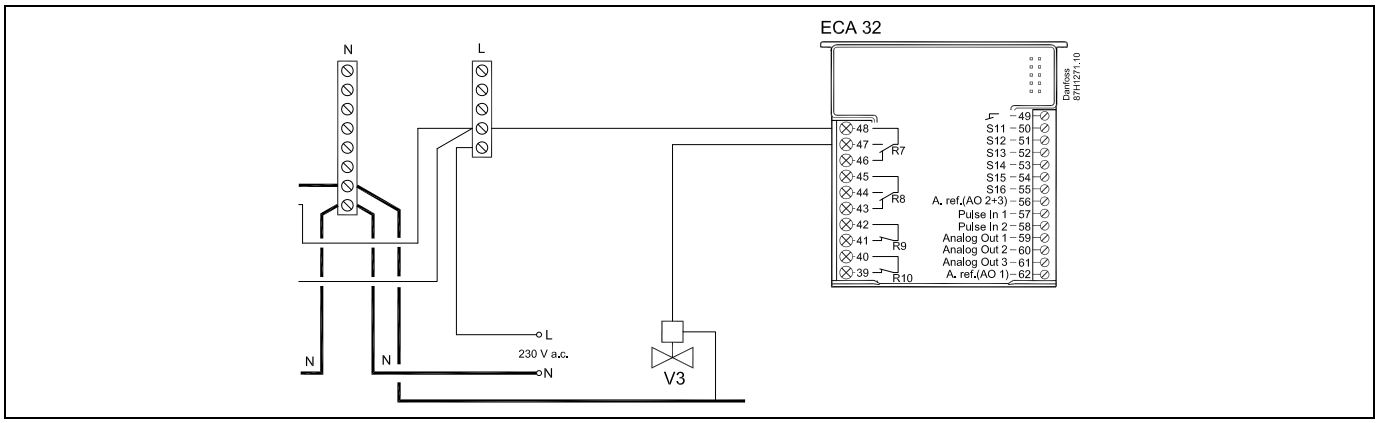
See also the Mounting Guide (delivered with the application key) for application specific connections.

Terminal		Description	Max. load
39	R10	Relay 10, not used	4 (2) A / 230 V a.c.*
40	R10		
41	R9	Relay 9, not used	4 (2) A / 230 V a.c.*
42	R9		
43	R8	Relay 8, not used	4 (2) A / 230 V a.c.*
44	R8		
45	R8		4 (2) A / 230 V a.c.*
46	R7	Relay 7	
47	R7	V3, ON / OFF valve for pressure release	
48	R7	Phase for ON / OFF valve V3	
49		Common terminal for input signals	
50	S11	Input: Position signal from M1, 0 - 10 volt	
51	S12	Input: Refill water level in storage tank, 0 - 10 volt	
52	S13	Input: F2 flow signal, 0 - 10 volt	
53		Not to be used	
54		Not to be used	
55		Not to be used	
56		Reference terminal for Analogue out 2 (M2) and 3 (M3)	
57	F1	Input: Flow-meter, pulse type	
58	F2	Input: Flow-meter, pulse type	
59	M1	Analogue out 1: 0 - 10 volt for control of motorized control valve M1 (A333.3)	2 mA **
60	M2	Analogue out 2: 0 - 10 volt for speed control of refill water pumps P3 and P4 (A333.2, A333.3)	2 mA **
61	M3	Analogue out 3: 0 - 10 volt for speed control of circulation pumps P1 and P2 (A333.2, A333.3)	2 mA **
62		Reference terminal for Analogue out 1 (M1)	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load			
** Min. resistance: 5 KΩ			

2.5.5 Electrical connections, ON / OFF valve V3 controlled from relay output in ECA 32

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

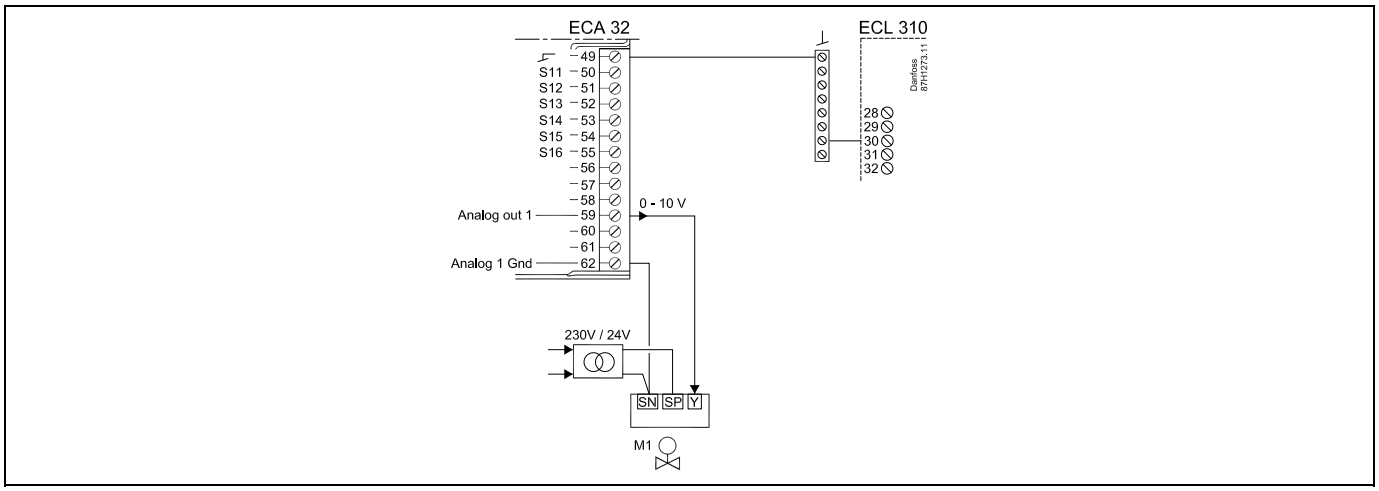
Application A333.2 / A333.3



2.5.6 Electrical connections, 230 V a.c., power supply, motorized control valve M1 controlled by 0 - 10 volt from ECA 32

Connections for A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

Application A333.3

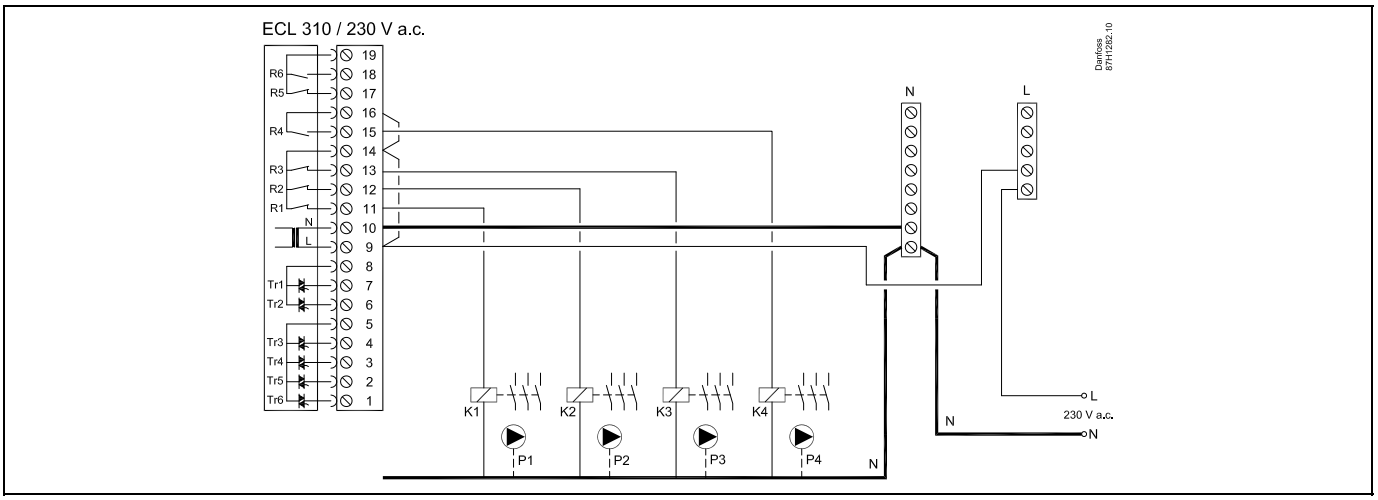


The transformer for supplying the actuator must be a double-isolated version.

2.5.7 Electrical connections, 230 V a.c., power supply, control of 2 or 3 phase powered pumps

Connections for A333.1, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

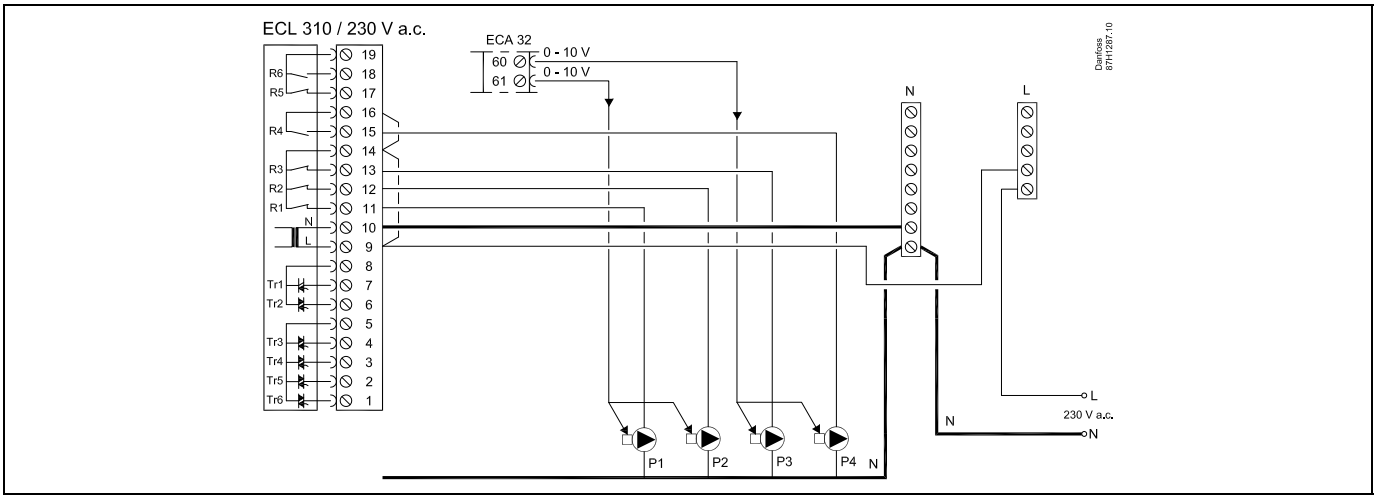
Application A333.1



2.5.8 Electrical connections, 230 V a.c., power supply, ON / OFF control and speed control of 1 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

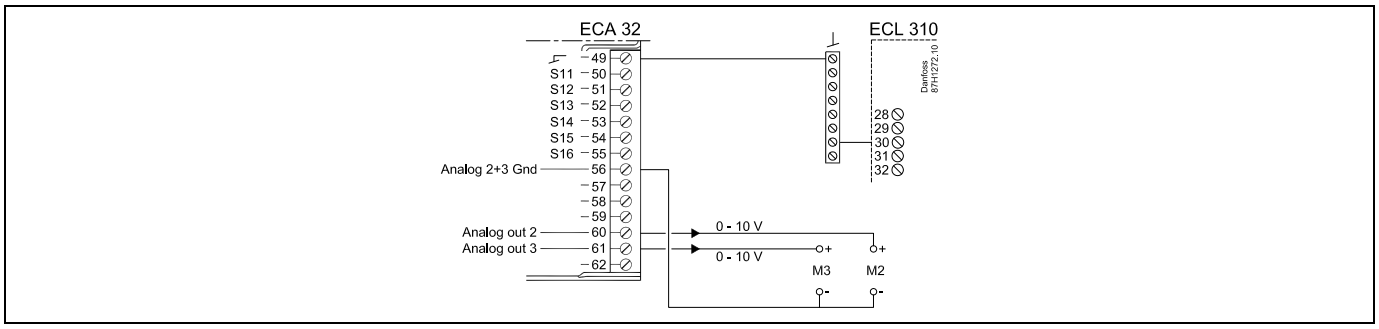
Application A333.2 / A333.3



2.5.9 Electrical connections, 230 V a.c., power supply, 0 - 10 volt for speed control of 1 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

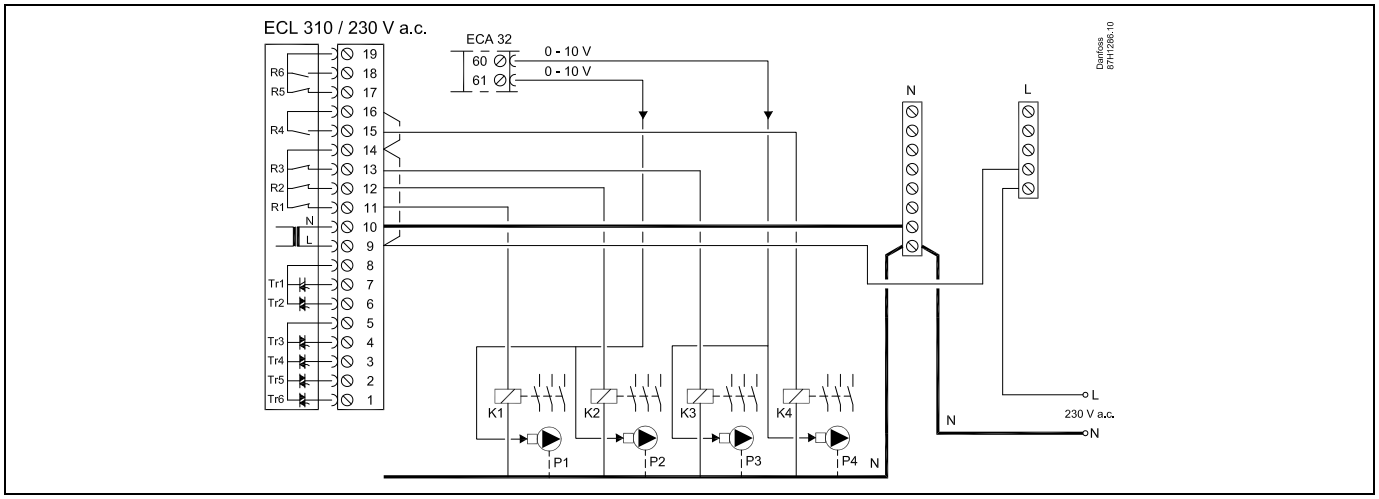
Application A333.2 / A333.3



2.5.10 Electrical connections, 230 V a.c., power supply, ON / OFF control and speed control of 2 or 3 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

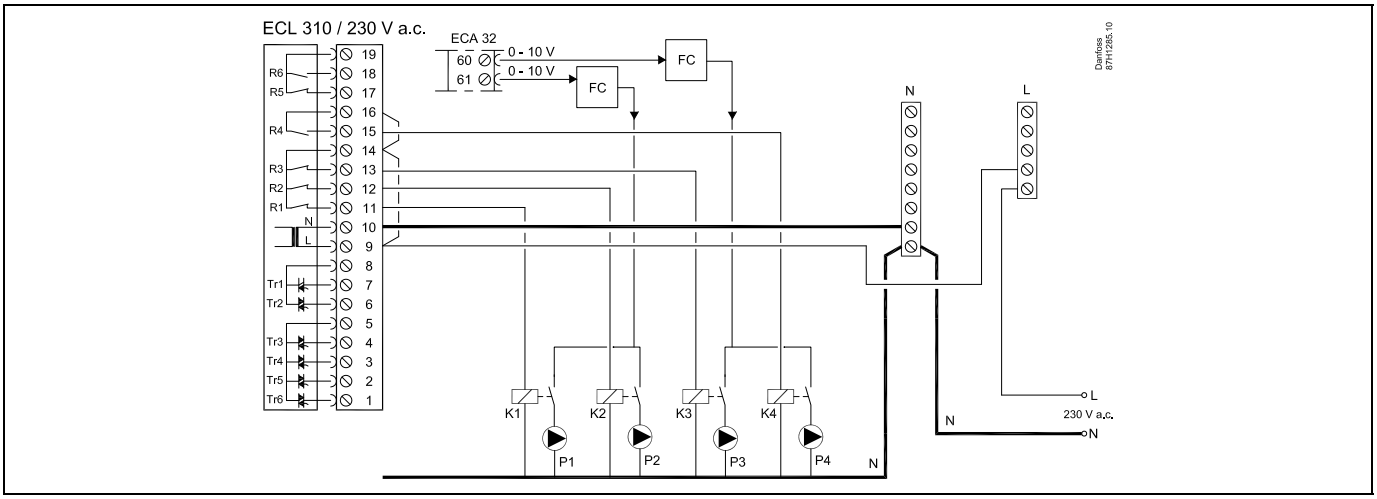
Application A333.2 / A333.3



2.5.11 Electrical connections, 230 V a.c., power supply, ON / OFF control and speed control (via Frequency Converter) of 1 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

Application A333.2 / A333.3

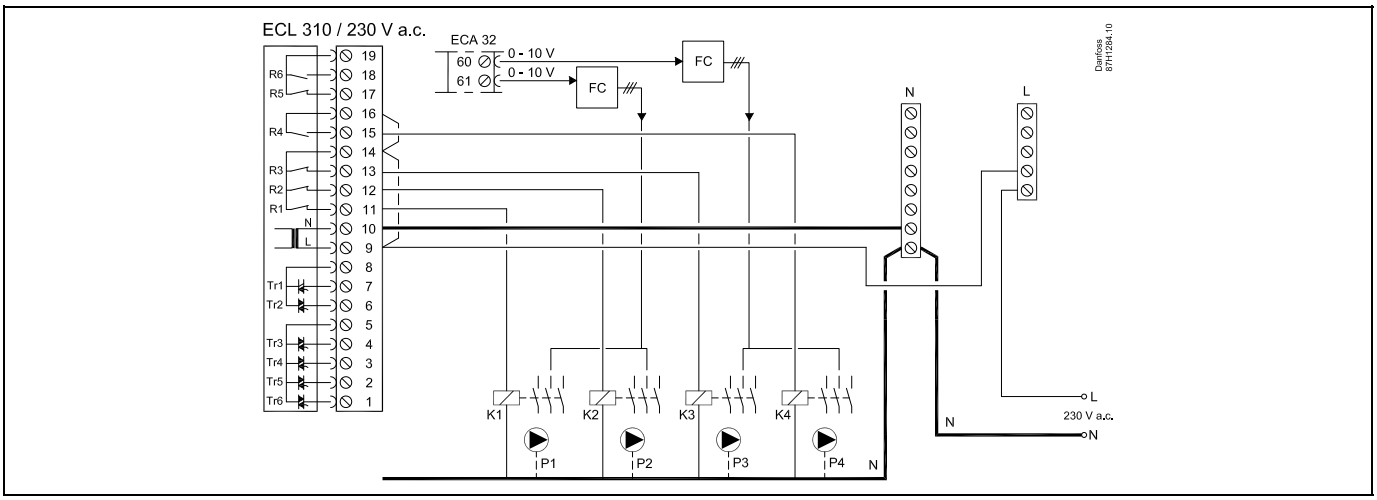


FC = Frequency Converter

2.5.12 Electrical connections, 230 V a.c., power supply, ON / OFF control and speed control (via Frequency Converter) of 2 or 3 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

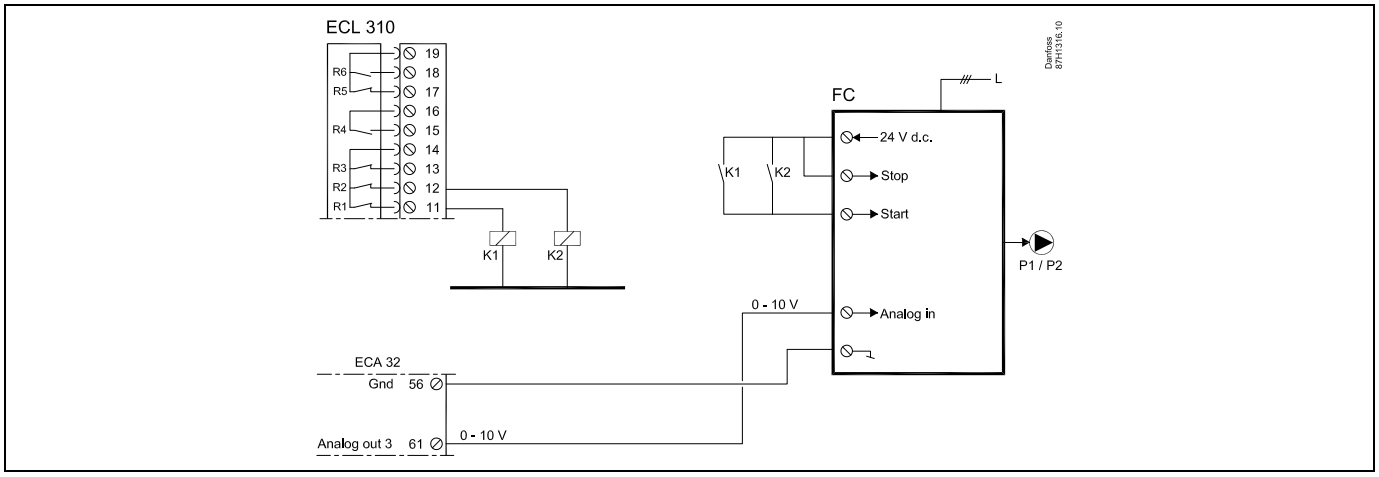
Application A333.2 / A333.3



FC = Frequency Converter

2.5.13 Electrical connections, example with external Start / Stop control of a Frequency Converter for circulation pumps P1 / P2

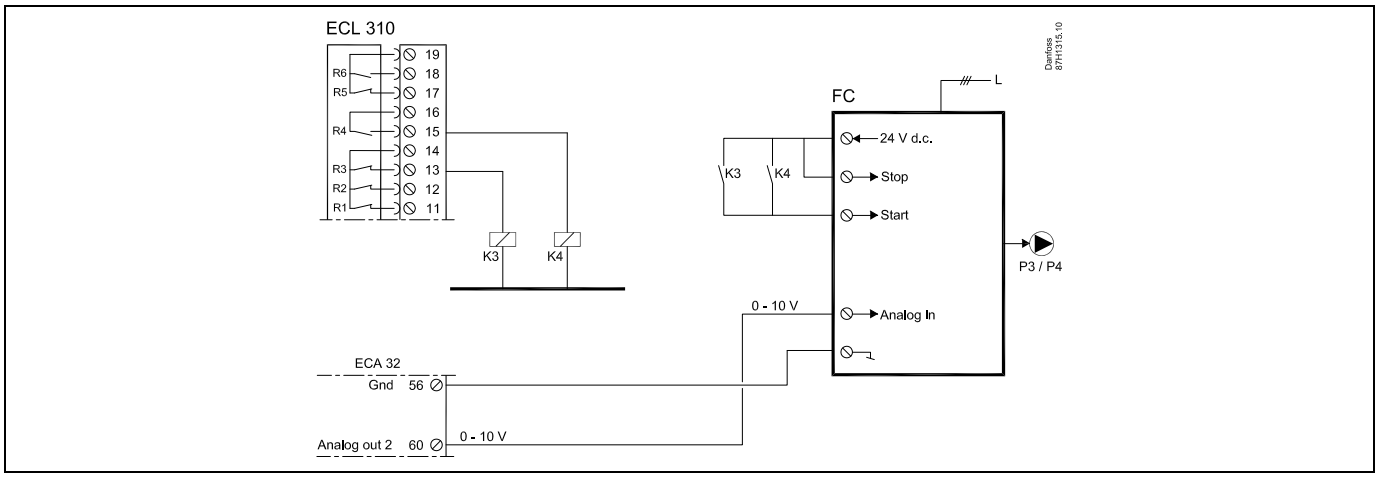
Application A333.2 / A333.3



FC = Frequency Converter

2.5.14 Electrical connections, example with external Start / Stop control of a Frequency Converter for refill water pumps P3 / P4

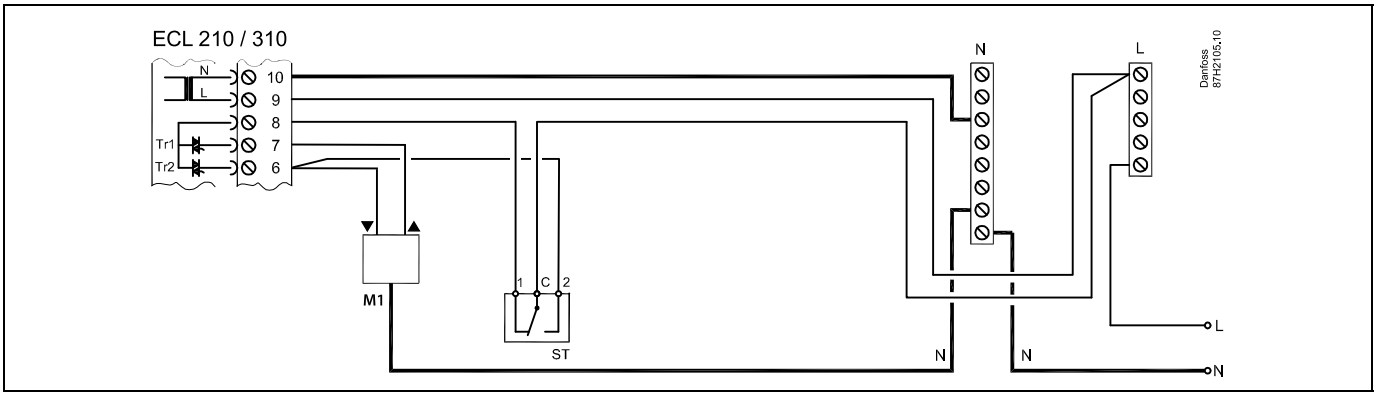
Application A333.2 / A333.3



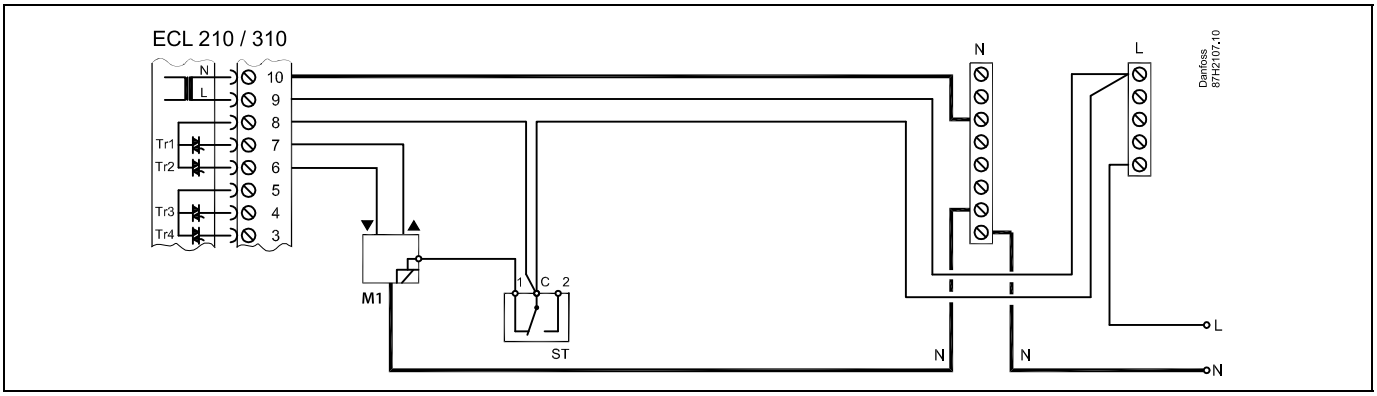
FC = Frequency Converter

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

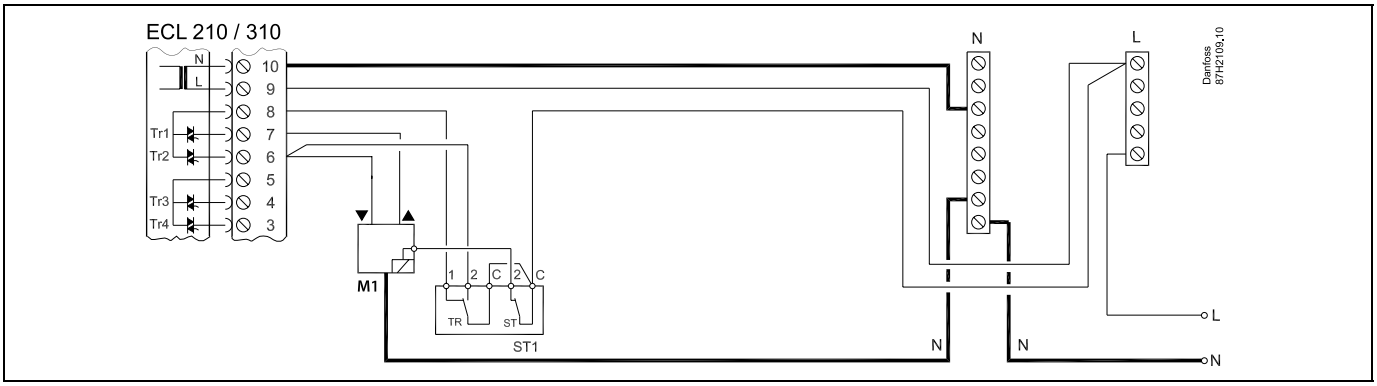
With safety thermostat, 1–step closing:
Motorized control valve without safety function



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.

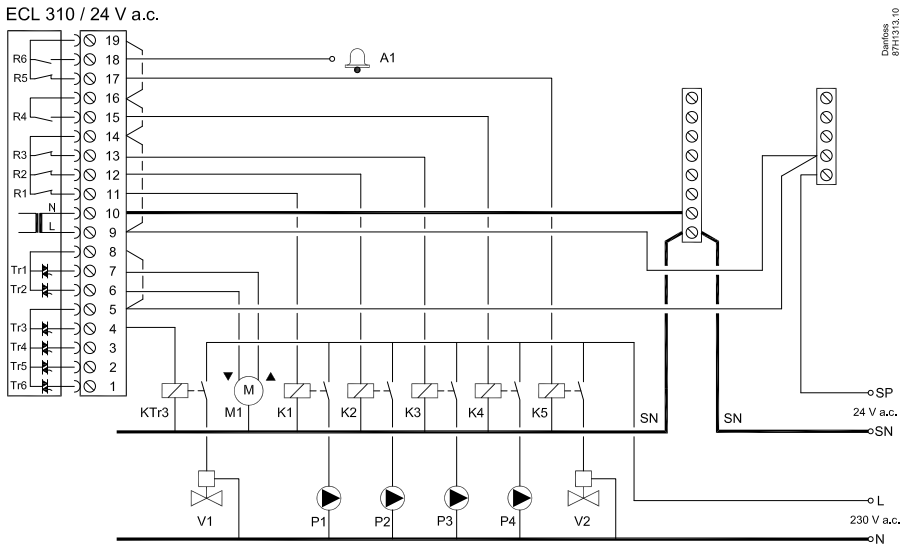
Wire cross section: 0.5 - 1.5 mm^2
Incorrect connection can damage the electronic outputs.
Max. 2 x 1.5 mm^2 wires can be inserted into each screw terminal.

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

Connections for A333.1 and A333.2, in general:

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

Application A333.1 / A333.2



Terminal	Description	Max. load
19	Supply voltage (SP) for ON / OFF valve / Alarm	
18 A1	Alarm	4 (2) A / 24 V a.c.*
17 V2	ON / OFF valve for pressure release	4 (2) A / 24 V a.c.*
16	Supply voltage (SP) for refill water pump	
15 P4	Refill water pump	4 (2) A / 24 V a.c.*
14	Supply voltage (SP) for circulation pumps / refill water pump	
13 P3	Refill water pump	4 (2) A / 24 V a.c.*
12 P2	Circulation pump	4 (2) A / 24 V a.c.*
11 P1	Circulation pump	4 (2) A / 24 V a.c.*
10	Supply voltage 24 V a.c. - (SN)	
9	Supply voltage 24 V a.c. - (SP)	
8	Supply voltage (SP) for motorized control valve M1	
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	Supply voltage (SP) for ON / OFF valve V1	
4 V1	ON / OFF valve for refill water	1 A / 24 V a.c.
3	Not to be used	
2	Not to be used	
1	Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load		

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

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

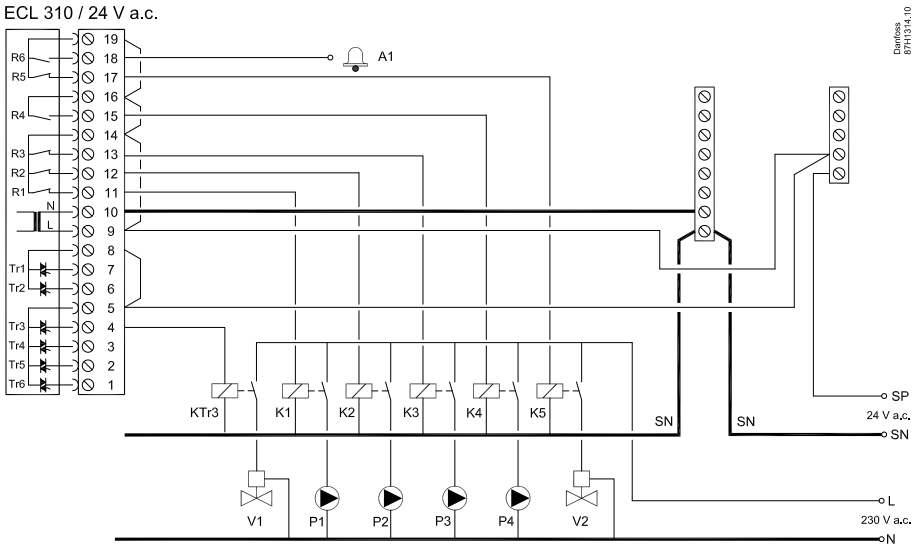
Do not connect 230 V a.c. powered components to a 24 V a.c. power supplied controller directly. Use auxilliary relays (K) to separate 230 V a.c. from 24 V a.c.

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

Connections for A333.3, in general:

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

Application A333.3



Terminal	Description	Max. load
19	Supply voltage (SP) for ON / OFF valve / Alarm	
18 A1	Alarm	4 (2) A / 24 V a.c.*
17 V2	ON / OFF valve for pressure release	4 (2) A / 24 V a.c.*
16	Supply voltage (SP) for refill water pump	
15 P4	Refill water pump	4 (2) A / 24 V a.c.*
14	Supply voltage (SP) for circulation pumps / refill water pump	
13 P3	Refill water pump	4 (2) A / 24 V a.c.*
12 P2	Circulation pump	4 (2) A / 24 V a.c.*
11 P1	Circulation pump	4 (2) A / 24 V a.c.*
10	Supply voltage 24 V a.c. - (SN)	
9	Supply voltage 24 V a.c. - (SP)	
8	Not to be used	
7	Not to be used	
6	Not to be used	
5	Supply voltage (SP) for ON / OFF valve V1	
4 V1	ON / OFF valve for refill water	1 A / 24 V a.c.
3	Not to be used	
2	Not to be used	
1	Not to be used	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load		

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

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

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

2.5.18 Electrical connections, ECA 32

Connections for A333.2 and A333.3, in general:

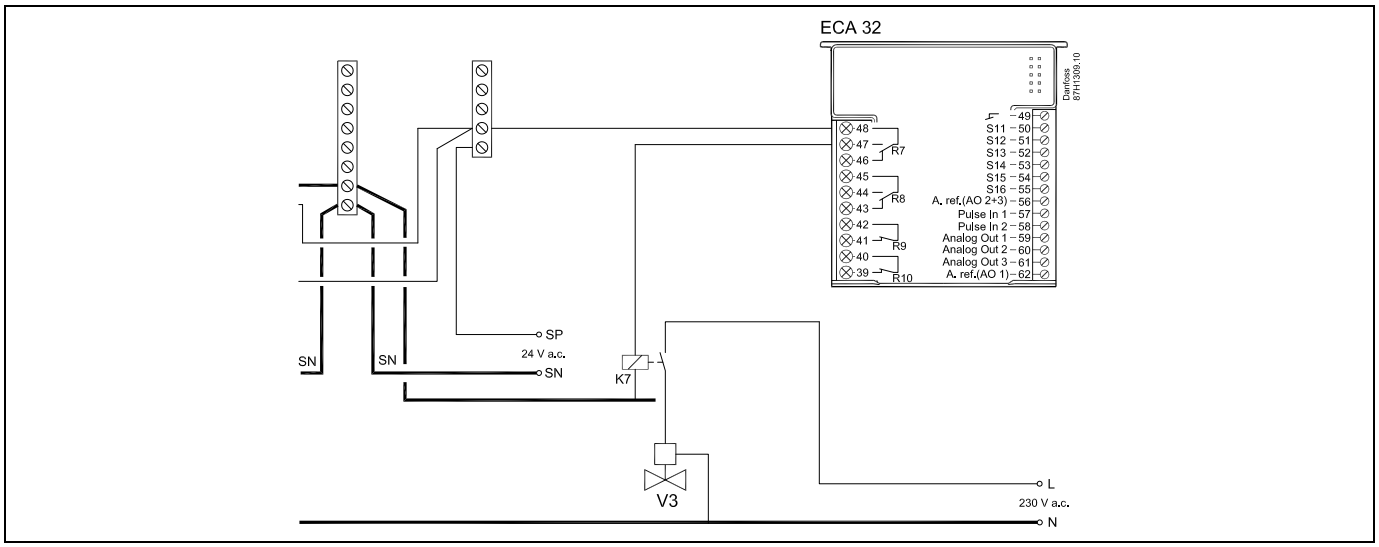
See also the Mounting Guide (delivered with the application key) for application specific connections.

Terminal	Description	Max. load
39 R10	Relay 10, not used	4 (2) A / 24 V a.c.*
40 R10		
41 R9	Relay 9, not used	4 (2) A / 24 V a.c.*
42 R9		
43 R8	Relay 8, not used	4 (2) A / 24 V a.c.*
44 R8		
45 R8		
46 R7	Relay 7	4 (2) A / 24 V a.c.*
47 R7	V3, ON / OFF valve for pressure release	
48 R7	Phase for ON / OFF valve V3	
49	Common terminal for input signals	
50 S11	Input: Position signal from M1, 0 - 10 volt	
51 S12	Input: Refill water level in storage tank, 0 - 10 volt	
52 S13	Input: F2 flow signal, 0 - 10 volt	
53	Input: not used	
54	Input: not used	
55	Input: not used	
56	Reference terminal for Analogue out 2 (M2) and 3 (M3)	
57 F1	Input: Flow-meter, pulse type	
58 F2	Input: Flow-meter, pulse type	
59 M1	Analogue out 1: 0 - 10 volt for control of motorized control valve M1 (A333.3)	2 mA **
60 M2	Analogue out 2: 0 - 10 volt for speed control of refill water pumps P3 and P4 (A333.2, A333.3)	2 mA **
61 M3	Analogue out 3: 0 - 10 volt for speed control of circulation pumps P1 and P2 (A333.2, A333.3)	2 mA **
62	Reference terminal for Analogue out 1 (M1)	
* Relay contacts: 4 A for ohmic load, 2 A for inductive load		
** Min. resistance: 5 KΩ		

2.5.19 Electrical connections, 24 V a.c., power supply, ON / OFF valve V3 controlled from relay output in ECA 32

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

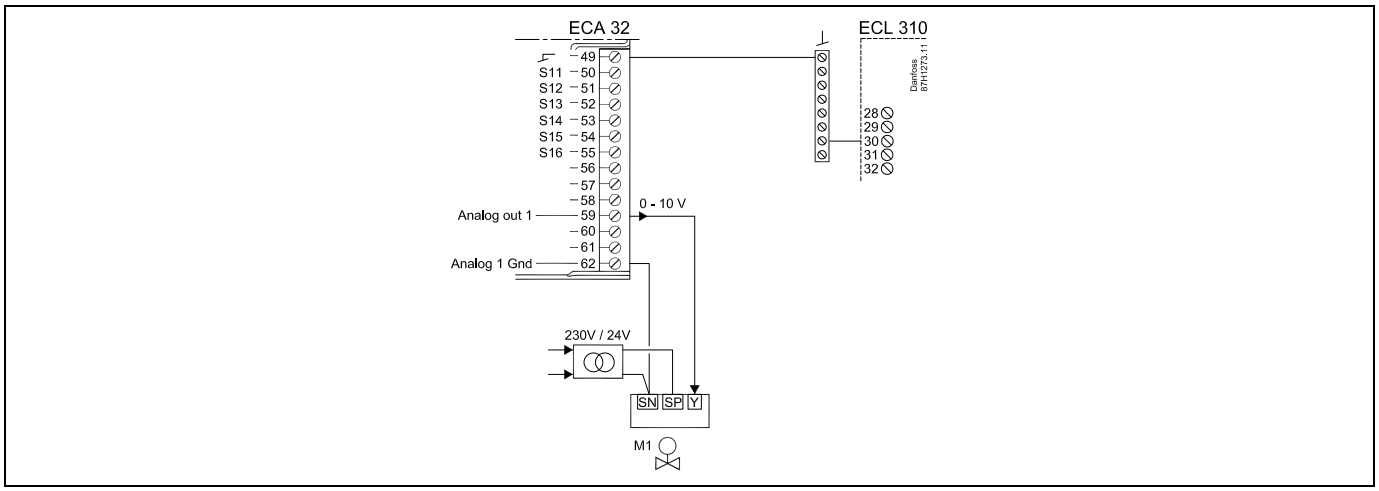
Application A333.2 / A333.3



2.5.20 Electrical connections, 24 V a.c., power supply, motorized control valve M1 controlled by 0 - 10 volt from ECA 32

Connections for A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

Application A333.3

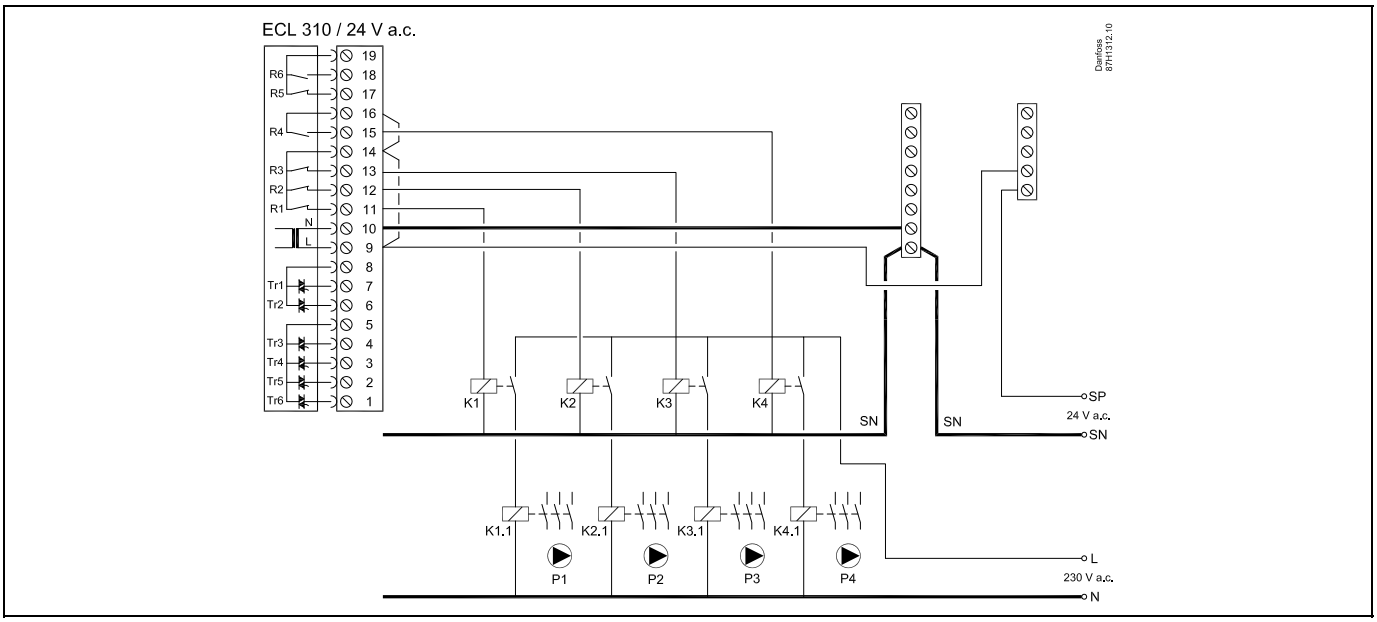


The transformer for supplying the actuator must be a double-isolated version.
The ECL Comfort 310 and the actuator for the control valve M1 must have separate transformers.

2.5.21 Electrical connections, 24 V a.c., power supply, control of 2 or 3 phase powered pumps

Connections for A333.1, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

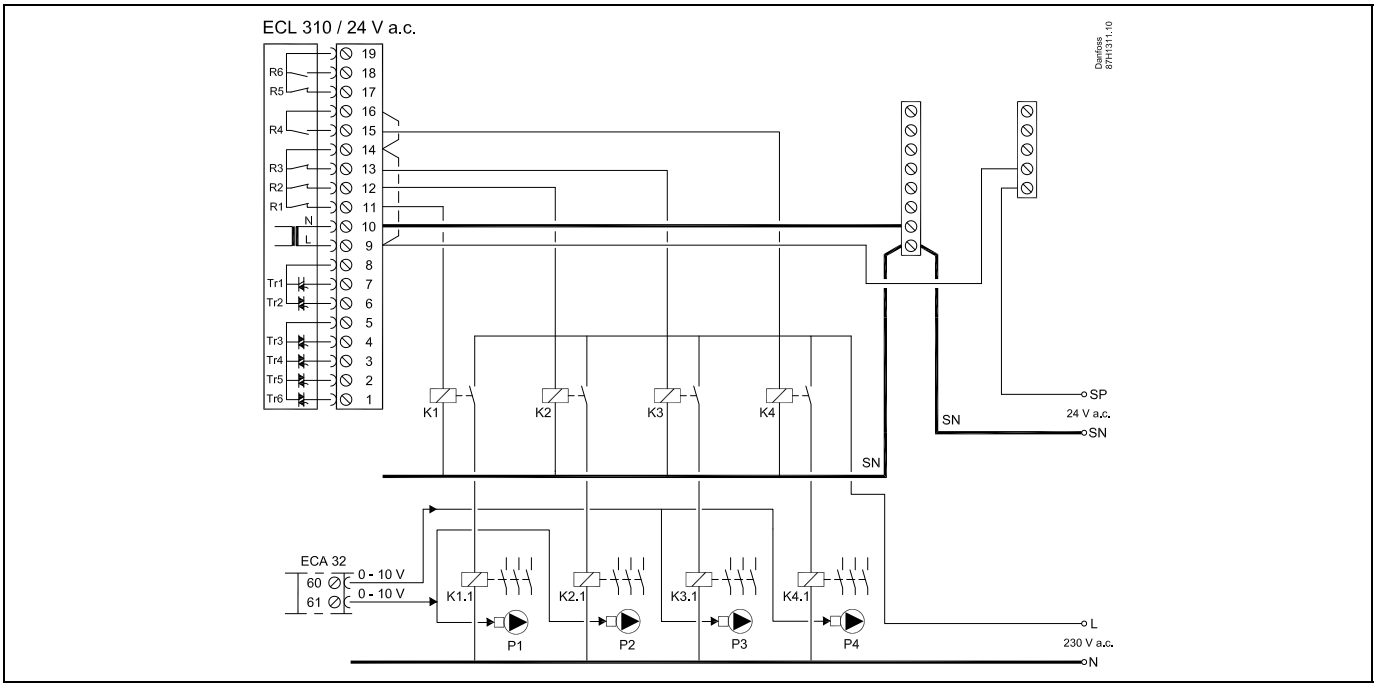
Application A333.1



2.5.22 Electrical connections, 24 V a.c., power supply, 0 - 10 volt for speed control of 1, 2 or 3 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

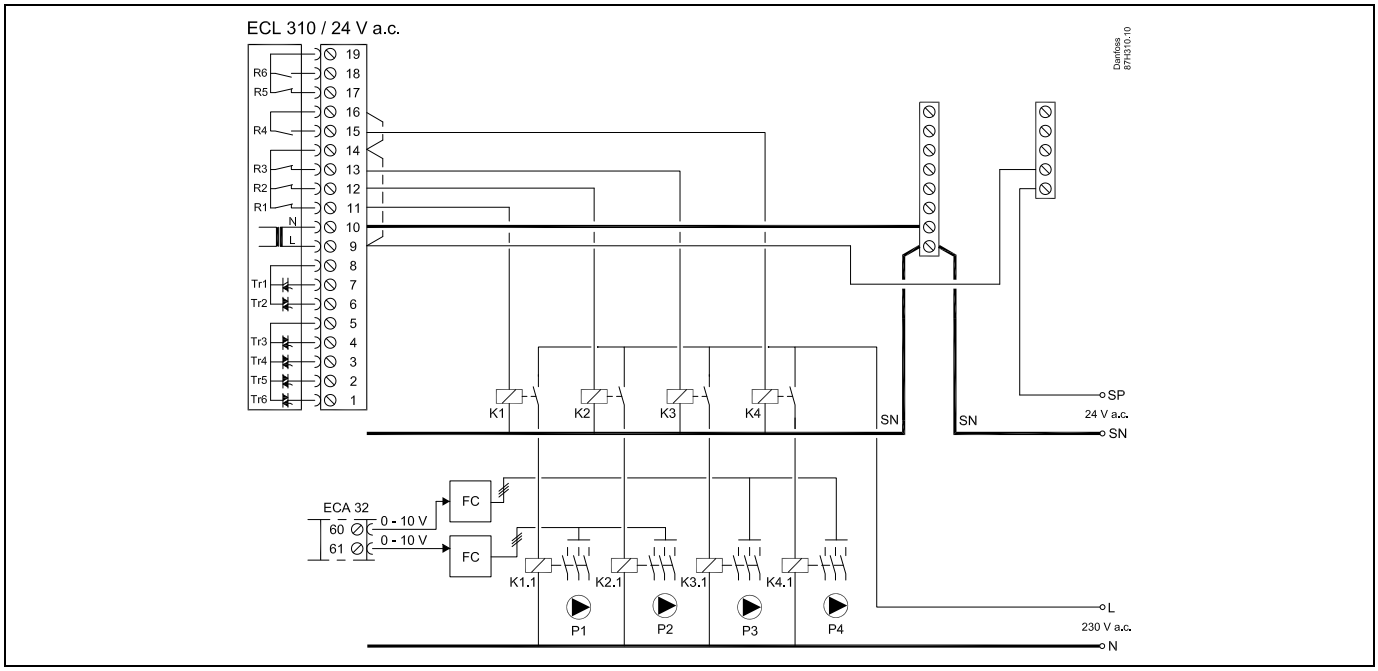
Application A333.2 / A333.3



2.5.23 Electrical connections, 24 V a.c., power supply, ON / OFF control and speed control (via Frequency Converter) of 1, 2 or 3 phase powered pumps

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

Application A333.2 / A333.3



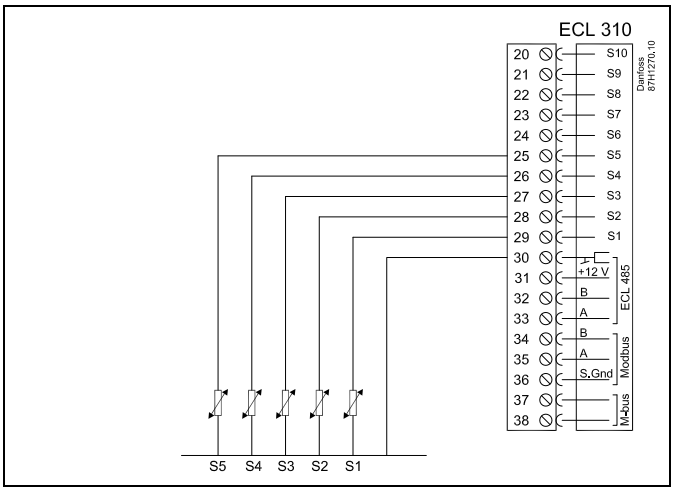
FC = Frequency Converter

Electrical connections for external Start / Stop control of a Frequency Converter:
See examples in "Electrical connections, 230 V a.c."

2.5.24 Electrical connections, Pt 1000 temperature sensors and signals

Connections for A333, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

Terminal	Sensor / description		Type (recomm.)
29 and 30	S1	Outdoor temperature sensor*	ESMT
28 and 30	S2	Primary supply temperature sensor	ESM-11 / ESMB / ESMC / ESMU
27 and 30	S3	Secondary flow temperature sensor **	ESM-11 / ESMB / ESMC / ESMU
26 and 30	S4	Secondary return temperature sensor	ESM-11 / ESMB / ESMC / ESMU
25 and 30	S5	Primary return temperature sensor	ESM-11 / ESMB / ESMC / ESMU
24 and 30		Not used	
23 and 30	S7	Pressure signal (0 - 10 volt)	
22 and 30	S8	Pressure signal (0 - 10 volt)	
21 and 30	S9	Pressure signal (0 - 10 volt)	
20 and 30	S10	Pressure signal (0 - 10 volt)	

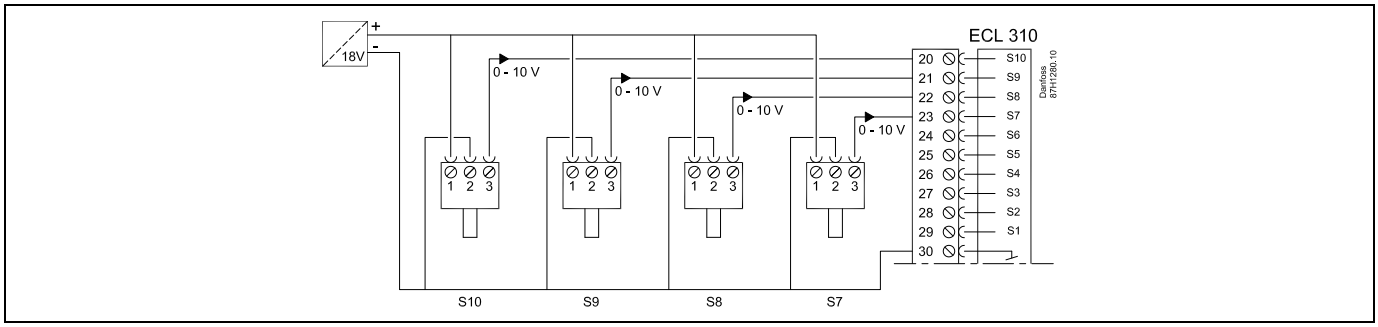


* If the outdoor temperature sensor is not connected or the cable is short-circuited, the controller assumes that the outdoor temperature is 0 (zero) °C.

** The 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).

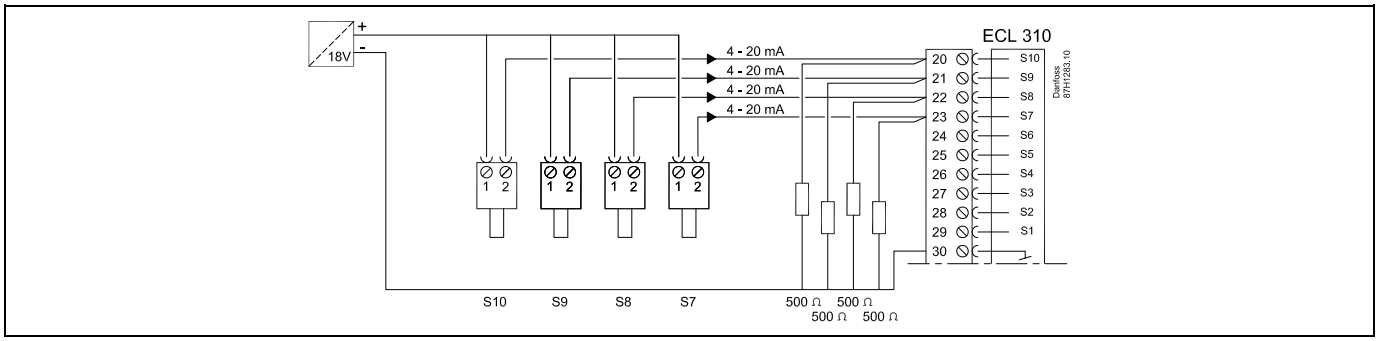
2.5.25 Electrical connections, pressure transmitters, 0 - 10 volt types

S7, S8, S9, S10



2.5.26 Electrical connections, pressure transmitters, 4 - 20 mA types

S7, S8, S9, S10



4 - 20 mA through a resistor of 500 ohm gives a voltage of 2 - 10 volt.

2.5.27 Electrical connections, ECA 32

Connections for A333.2 and A333.3, in general:
See also the Mounting Guide (delivered with the application key) for application specific connections.

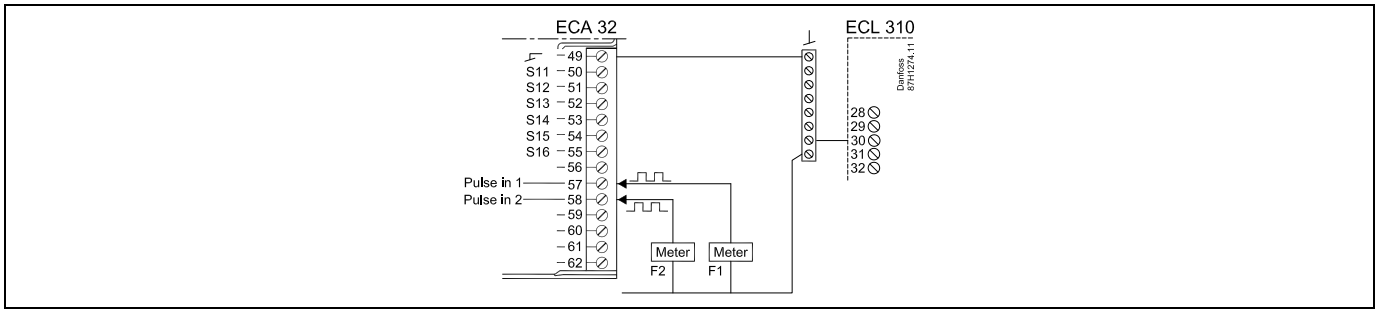
Terminal	Sensor / description	
50 and 49	S11	Position signal from M1, 0 - 10 volt
51 and 49	S12	Refill water level in storage tank, 0 - 10 volt
52 and 49	S13	F2 flow signal, 0 - 10 volt
53 and 49		Not used
54 and 49		Not used
55 and 49		Not used
56		Used for output signal
57 and 49	F1	Water meter (flow meter), pulse type
58 and 49	F2	Flow meter, pulse type

Water and flow meters, possibilities:

Water meter F1 (flow meter)	- pulse type - M-Bus
Flow meter F2 (flow meter)	- pulse type - 0 - 10 volt type - M-Bus

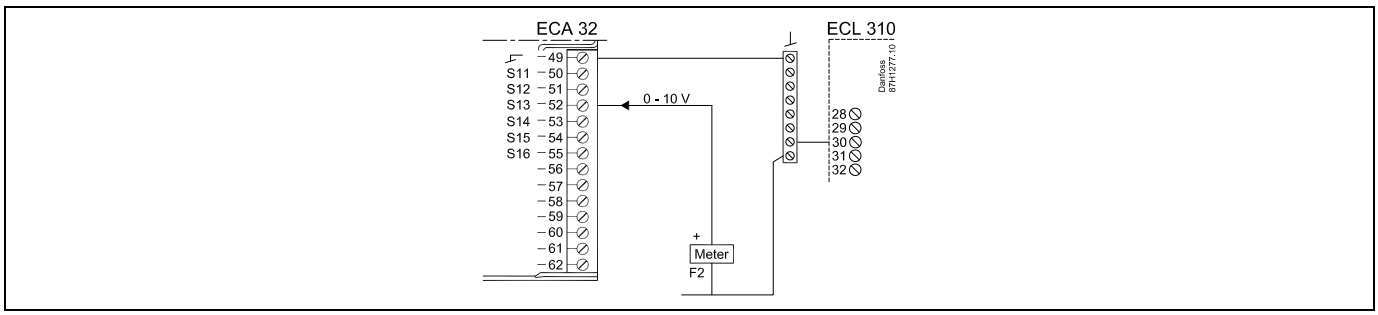
2.5.28 Electrical connections, ECA 32, flow meters, pulse types

A333.2 / A333.3
F1 and F2, pulse input



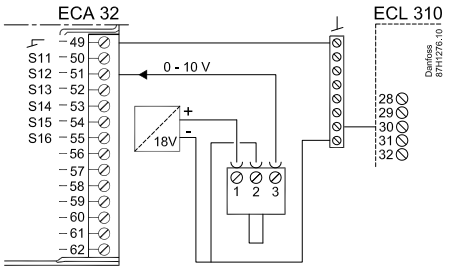
2.5.29 Electrical connections, ECA 32, flow meter, 0 - 10 volt type

A333.2 / A333.3
F2 to input S13 (0 - 10 volt input)



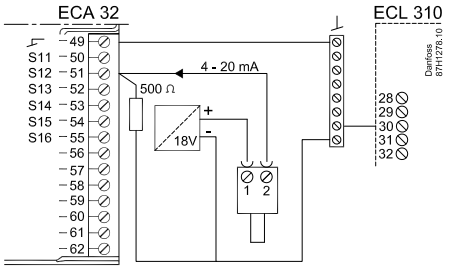
2.5.30 Electrical connections, ECA 32, pressure transmitter, 0 - 10 volt type

A333.2 / A333.3
S12, level in refill water storage tank



2.5.31 Electrical connections, ECA 32, pressure transmitter, 4 - 20 mA type

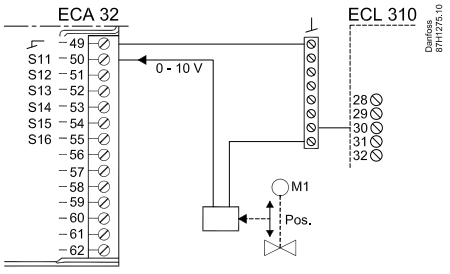
A333.2 / A333.3
S12, level in refill water storage tank



4 - 20 mA through a resistor of 500 ohm gives a voltage of 2 - 10 volt

2.5.32 Electrical connections, ECA 32, M1 valve position, 0 - 10 volt type

A333.2 / A333.3
S11, valve position indication



2.5.33 Electrical connections, ECA 30 / 31

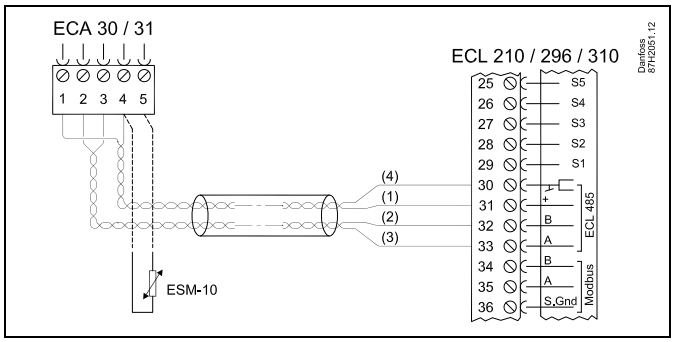
Terminal ECL	Terminal ECA 30 / 31	Description	Type (recomm.)
30	4	Twisted pair	Cable 2 x twisted pair
31	1		
32	2	Twisted pair	
33	3		
	4	Ext. room temperature sensor*	ESM-10
	5		

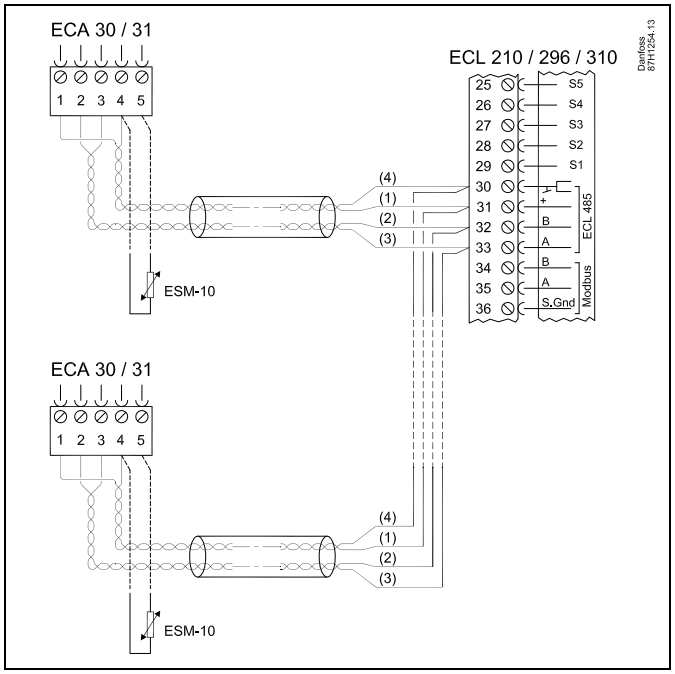
* After an external room temperature sensor has been connected, ECA 30 / 31 must be repowered.

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

The ECA 30 / 31 must be set up accordingly.

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





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

Max. 2 ECA 30 / 31 can be connected to an ECL Comfort 310 controller or to ECL Comfort 210 / 296 / 310 controllers in a master-slave system.

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

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

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

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

2.5.34 Electrical connections, master / slave systems

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

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

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

ECL 485 bus cable

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

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

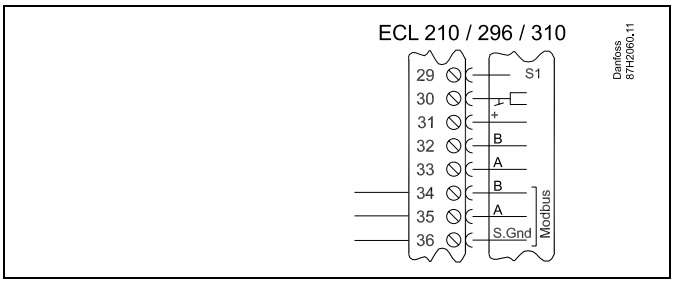
Simple example for total length of all input cables, 3 x ECL:

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

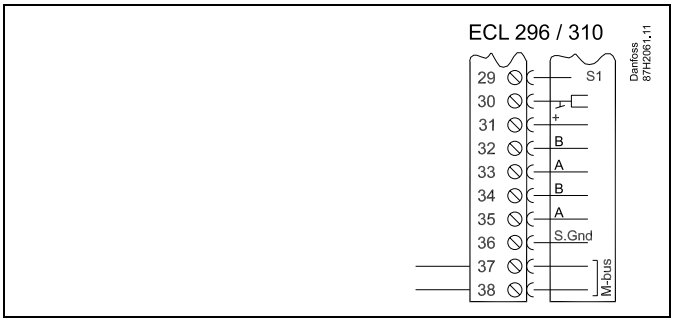
Maximum recommended length of the ECL 485 bus:
200 - 81 m = 119 m

2.5.35 Electrical connections, communication

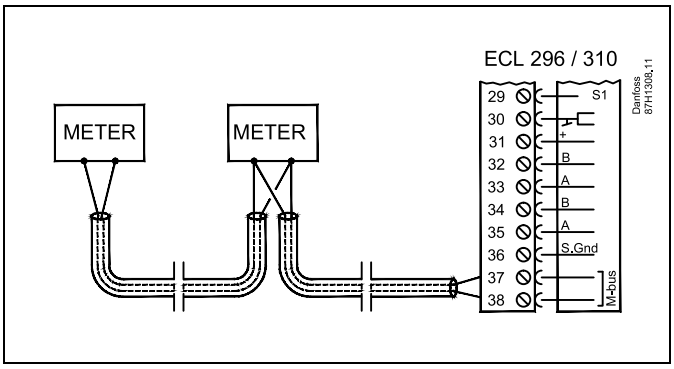
Electrical connections, Modbus



Electrical connections, M-bus



Example, M-bus connections



Electrical connections, Modbus

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

Electrical connections, M-bus

ECL Comfort 210: Not implemented
ECL Comfort 296: On board, non-galvanic isolated. Max. cable length 50 m.
ECL Comfort 310: On board, non-galvanic isolated. Max. cable length 50 m.

2.6 Inserting the ECL Application Key

2.6.1 Inserting the ECL Application Key

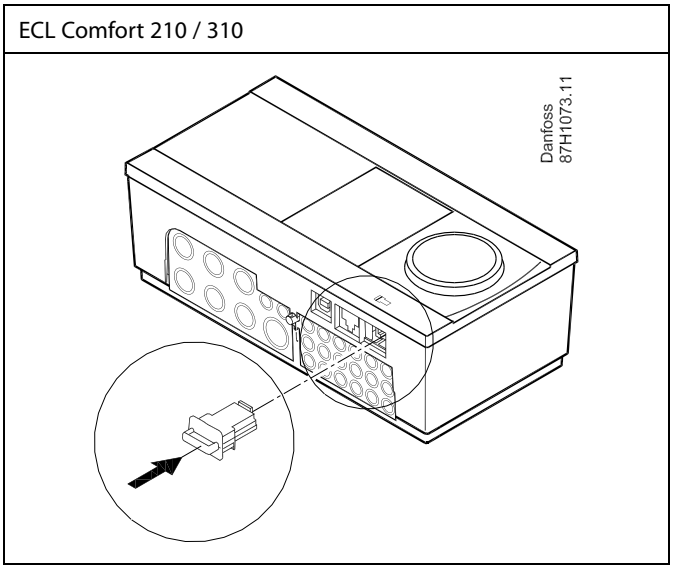
The ECL Application Key contains

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

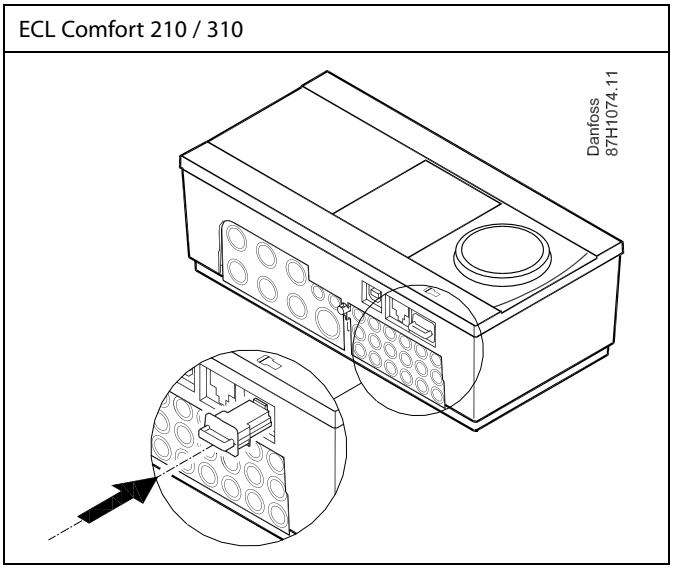
After having powered-up the controller, different situations might be existing:

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

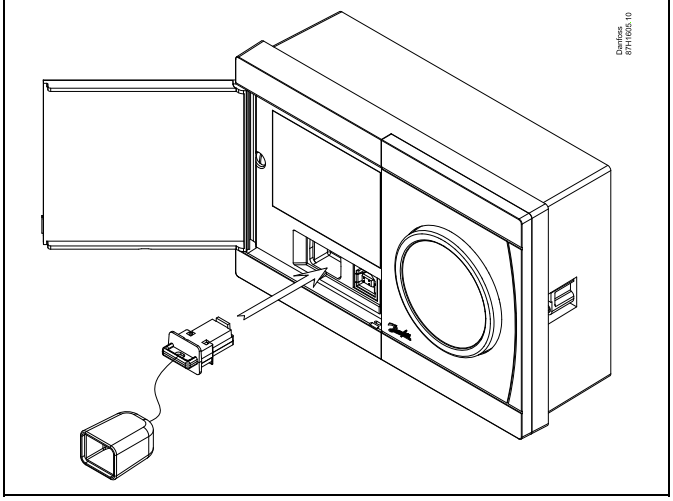
ECL Comfort 210 / 310



ECL Comfort 210 / 310



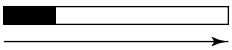
ECL Comfort 296



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

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

Automatic update of controller software (firmware):
The software of the controller is updated automatically when the key is inserted (as of controller version 1.11 (ECL 210 / 310) and version 1.58 (ECL 296)). The following animation will be shown when the software is being updated:



Progress bar

During update:

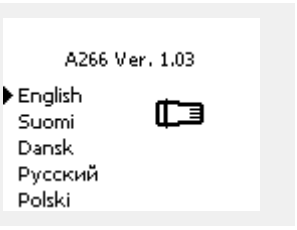
- Do not remove the KEY
  If the key is removed before the hour-glass is shown, you have to start afresh.
- Do not disconnect the power
  If the power is interrupted when the hour-glass is shown, the controller will not work.
- Manual update of controller software (firmware):
  See the section "Automatic / manual update of firmware"

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

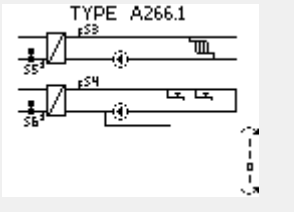
An animation for the ECL Application Key insertion is displayed. Insert the Application Key .

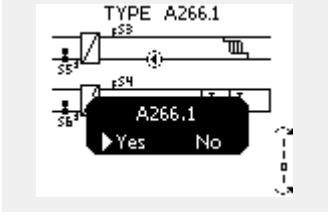
Application Key name and Version is indicated (example: A266 Ver. 1.03).

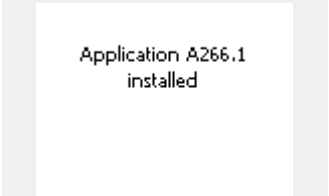
If the ECL Application Key is not suitable for the controller, a "cross" is displayed over the ECL Application Key-symbol.



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





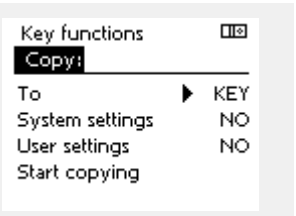


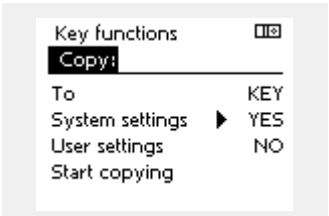
* 'Aut. daylight' is the automatic changeover between summer and winter time.

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

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

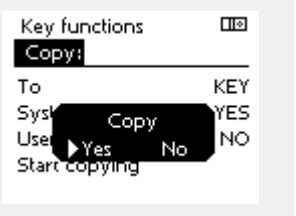
The application is installed, and the controller resets and starts up.

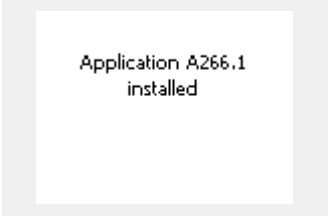




B
The ECL Application key contains changed system settings:
Push the dial repeatedly.

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





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

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

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

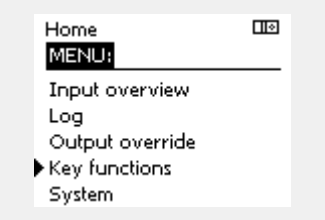
Choose 'Start copying' and confirm with 'Yes'.

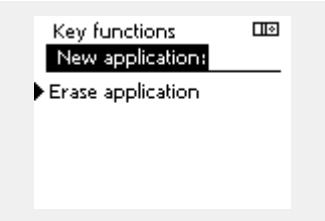
Application Key: Situation 2
The controller already runs an application. The ECL Application Key is inserted, but the application needs to be changed.

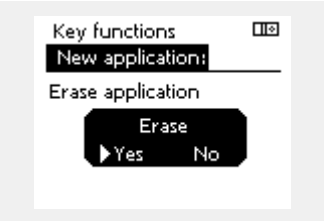
To change to another application on the ECL Application Key, the current application in the controller must be erased (deleted).

Be aware that the Application Key must be inserted.

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







The controller resets and is ready to be configured.

Follow the procedure described in situation 1.

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

This function is used

- for saving (backup) of special user and system settings
- when another ECL Comfort controller of the same type (210, 296 or 310) must be configured with the same application but user / system settings differ from the factory settings.

How to copy to another ECL Comfort controller:

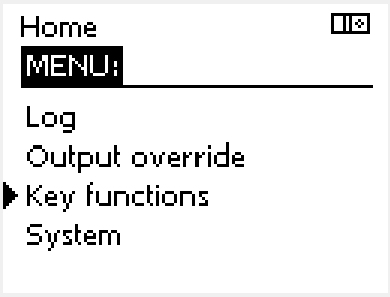
Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	
	Go to 'Key functions'	
	Confirm	
	Choose 'Copy'	
	Confirm	
	Choose 'To'. 'ECL' or 'KEY' will be indicated. Choose 'ECL'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

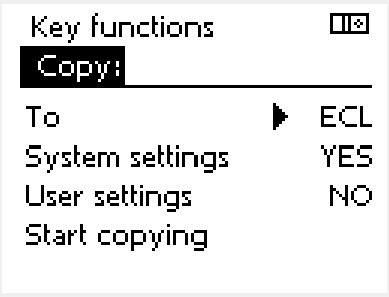
*

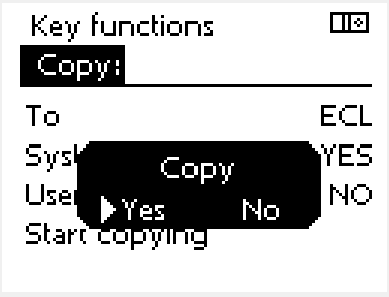
'ECL': Data will be copied from the Application Key to the ECL Controller.
'KEY': Data will be copied from the ECL Controller to the Application Key.

**

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







Language

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

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

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

2.6.2 ECL Application Key, copying data

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

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

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

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

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

Factory settings can always be restored.

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

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

It is possible to copy settings from one ECL Comfort controller to another controller provided that the two controllers are from the same series (210 or 310).
Furthermore, when the ECL Comfort controller has been uploaded with an application key, minimum version 2.44, it is possible to upload personal settings from application keys, minimum version 2.14.

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

Key inserted / not inserted, description:

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

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

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

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

ECL Comfort 296 , controller versions 1.58 and up:

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

2.7 Check list

Is the ECL Comfort controller ready for use?

- ☐ Make sure that the correct power supply is connected to terminals 9 and 10 (230 V or 24 V).
- ☐ Make sure the correct phase conditions are connected:
  230 V: Live = terminal 9 and Neutral = terminal 10
  24 V: SP = terminal 9 and SN = terminal 10
- ☐ Check that the required controlled components (actuator, pump etc.) are connected to the correct terminals.
- ☐ Check that all sensors / signals are connected to the correct terminals (see 'Electrical connections').
- ☐ Mount the controller and switch on the power.
- ☐ Is the ECL Application Key inserted (see 'Inserting the Application Key').
- ☐ Does the ECL Comfort controller contain an existing application (see 'Inserting the Application Key').
- ☐ Is the correct language chosen (see 'Language' in 'Common controller settings').
- ☐ Is the time & date set correctly (see 'Time & Date' in 'Common controller settings').
- ☐ Is the right application chosen (see 'Identifying the system type').
- ☐ Check that all settings in the controller (see 'Settings overview') are set or that the factory settings comply with your requirements.
- ☐ Choose manual operation (see 'Manual control'). Check that valves open and close, and that required controlled components (pump etc.) start and stop when operated manually.
- ☐ Check that the temperatures / signals shown in the display match the actual connected components.
- ☐ Having completed the manual operation check, choose controller mode (scheduled, comfort, saving or frost protection).

2.8 Navigation, ECL Application Key A333

Parameter list, application A333, Heating

Home MENU	Sub-menu Heating	A333 ID nos.	Function	A333.1	A333.2	A333.3
Schedule			Schedule	●	●	●
Settings	Flow temperature		Heat curve	●	●	●
		11178	Temp. max.	●	●	●
		11179	Temp. min	●	●	●
	Return limit	11031	High T out X1	●	●	●
		11032	Low limit Y1	●	●	●
		11033	Low T out X2	●	●	●
		11034	High limit Y2	●	●	●
		11035	Infl. - max.	●	●	●
		11036	Infl. - min.	●	●	●
		11037	Adapt. time	●	●	●
		11085	Priority	●	●	●
	Flow/ power limit		Actual	●	●	●
			Actual limit	●	●	●
		11119	High T out X1	●	●	●
		11117	Low limit Y1	●	●	●
		11118	Low T out X2	●	●	●
		11116	High limit Y2	●	●	●
		11112	Adapt. time	●	●	●
		11113	Filter constant	●	●	●
		11109	Input type	●	●	●
		11115	Units	●	●	●
	Optimization	11011	Auto saving	●	●	●
		11012	Boost	●	●	●
		11013	Ramp	●	●	●
		11014	Optimizer	●	●	●
		11026	Pre-stop	●	●	●
		11021	Total stop	●	●	●
		11179	Summer, cut-out	●	●	●
	Control par. 1		Position		●	●
		15113	Filter constant		●	●
		15607	Low X		●	●
		15608	High X		●	●
		11174	Motor pr	●	●	●
		11184	Xp	●	●	●
		11185	Tn	●	●	●
		11186	M run	●	●	
		11187	Nz	●	●	●
		11189	Min. act. time	●	●	

Parameter list, application A333, Heating, continued

Home	Sub-menu	A333				
MENU	**Heating**	**ID nos.**	**Function**	**A333.1**	**A333.2**	**A333.3**
Settings	Control par., P refill	11321	Pressure, des.		●	●
		13184	Xp		●	●
		13185	Tn		●	●
		13187	Nz		●	●
		13197	Td		●	●
		13165	V.out, max.		●	●
		13167	V.out, min.		●	●
		11331	Sleep level		●	●
		111332	Sleep mode time		●	●
		11330	Wake-up level		●	●
		11333	Boost		●	●
	Control par., P circ.	12322	Pressure, diff.		●	●
		12184	Xp		●	●
		12185	Tn		●	●
		12187	Nz		●	●
		12197	Td		●	●
		12165	V.out, max.		●	●
		12167	V.out, min.		●	●
	Pump control	11322	Pressure diff.	●	●	●
		11314	Chan.-over time	●	●	●
		11310	Retry time	●	●	●
		11313	Stab. time	●	●	●
		11311	Change, duration	●	●	●
		11312	Change time	●	●	●
		11022	P exercise	●	●	●
		11316	Alarm handling	●	●	●
	Refill water		Time left	●	●	●
		12311	Change duration	●	●	●
		11321	Pressure des.	●	●	●
		13322	Pressure diff.	●	●	●
		11318	Max. pressure	●	●	●
		11319	Max. press. diff.	●	●	●
		11323	Time-out	●	●	●
		11320	P exercise	●	●	●
		11325	Valve delay	●	●	●
		11326	No. of pumps	●	●	●
		12316	Alarm handling	●	●	●

Parameter list, application A333, Heating, continued

Home MENU	Sub-menu Heating	A333				
		ID nos.	Function	A333.1	A333.2	A333.3
Settings	Refill tank		Level		●	●
		16113	Filter constant		●	●
		16607	Low X		●	●
		16608	High X		●	●
		16602	Level, desired		●	●
		16194	Stop difference		●	●
		16195	Start difference		●	●
	Application	11017	Demand offset	●	●	●
		11500	Send desired T	●	●	●
		11023	M exercise	●	●	●
		11052	DHW priority	●	●	●
		11077	P frost T	●	●	●
		11078	P heat T	●	●	●
		11093	Frost pr. T	●	●	●
		11141	Ext. input	●	●	●
		11142	Ext. mode	●	●	●
	Water meter		CW consump.		●	●
		13513	Pulse value		●	●
		13514	Preset		●	●
	Flow meter		Actual		●	●
		17607	Low X		●	●
		17608	High X		●	●
		17109	Input type		●	●
		17114	Pulse		●	●
		17115	Units		●	●
	S7 pressure		Pressure	●	●	●
		14113	Filter constant	●	●	●
		14607	Low X	●	●	●
		14608	High X	●	●	●
	S8 pressure		Pressure	●	●	●
		13113	Filter constant	●	●	●
		13607	Low X	●	●	●
		13608	High X	●	●	●
	S9 pressure		Pressure	●	●	●
		12113	Filter constant	●	●	●
		12607	Low X	●	●	●
		12608	High X	●	●	●
	S10 pressure		Pressure	●	●	●
		11113	Filter constant	●	●	●
		11607	Low X	●	●	●
		11608	High X	●	●	●

Parameter list, application A333, Heating, continued

Home	Sub-menu	A333				
MENU	**Heating**	**ID nos.**	**Function**	**A333.1**	**A333.2**	**A333.3**
Holiday			Holiday	●	●	●
Alarm	Temp. monitor	11147	Upper diff	●	●	●
		11148	Lower diff	●	●	●
		11149	Delay	●	●	●
		11150	Lowest temp.	●	●	●
	Refill tank	16614	Alarm high		●	●
		16615	Alarm low		●	●
		16617	Alarm time-out		●	●
	S7 pressure	14614	Alarm high	●	●	●
		14615	Alarm low	●	●	●
		14617	Alarm time-out	●	●	●
	S8 pressure	13614	Alarm high	●	●	●
		13615	Alarm low	●	●	●
		13617	Alarm time-out	●	●	●
	S9 pressure	12614	Alarm high	●	●	●
		12615	Alarm low	●	●	●
		12617	Alarm time-out	●	●	●
	S10 pressure	11614	Alarm high	●	●	●
		11615	Alarm low	●	●	●
		11617	Alarm time-out	●	●	●
	Low pressure	15615	Alarm low	●	●	●
		15617	Alarm time-out	●	●	●
	Alarm overview			●	●	●
Influence overview	Des. flow T		Influence source	●	●	●

Parameter list, application A333, Common controller

Home MENU	Sub-menu Common controller	A333 ID nos.	Function	A333.1	A333.2	A333.3
	Time & date			●	●	●
	Input overview			●	●	●
	Log			●	●	●
	Output override			●	●	●
	Key functions		New application	●	●	●
			Application	●	●	●
			Factory setting	●	●	●
			Copy	●	●	●
			Key overview	●	●	●
	System		ECL version	●	●	●
			Extension	●	●	●
			Ethernet	●	●	●
			Portal config.	●	●	●
			M-bus config.	●	●	●
			Energy meters	●	●	●
			Raw input overview	●	●	●
			Alarm	●	●	●
			Display	●	●	●
			Communication	●	●	●
			Language	●	●	●

3.0 Daily use

3.1 How to navigate

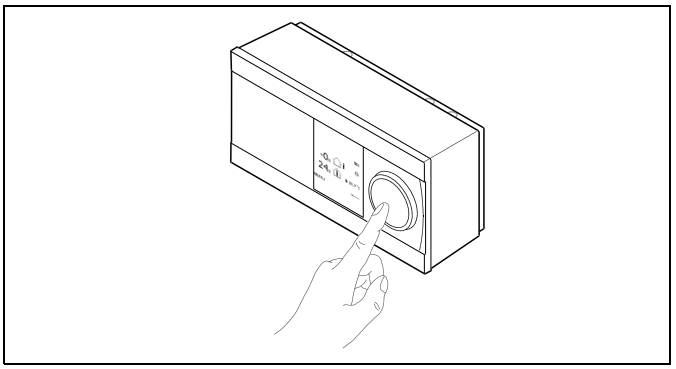
You navigate in the controller by turning the dial left or right to the desired position ( ).

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 ( ):

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

To enter 'Common controller settings':

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

Circuit selector

3.2 Understanding the controller display

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

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

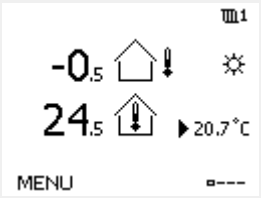
If the dial has not been activated for 20 min., the controller will revert to the overview display you have chosen as favorite.

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

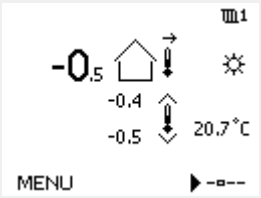
Heating circuit
Overview display 1 informs about:
actual outdoor temperature, controller mode,
actual room temperature, desired room temperature.

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

Overview display 1:



Overview display 2:



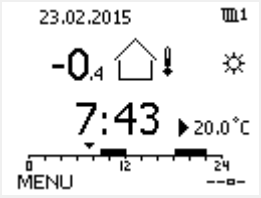
Overview display 3 informs about:
date, actual outdoor temperature, controller mode, time, desired room temperature as well as shows the comfort schedule of the current day.

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

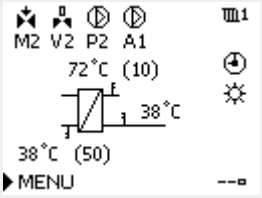
The value above the V2 symbol indicates 0–100% of the analogue signal (0–10 V).

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

Overview display 3:

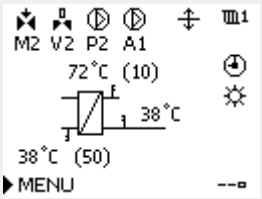


Overview display 4:

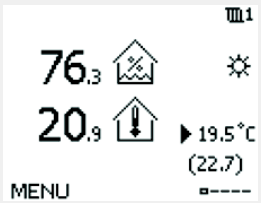


Dependent on the chosen display, the overview displays for the heating circuit inform you about:
- actual outdoor temperature (-0.5)
- controller mode (☼)
- actual room temperature (24.5)
- desired room temperature (20.7 °C)
- trend in outdoor temperature (↗ → ↘)
- min. and max. outdoor temperatures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

Example of overview display with Influence indication:



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



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

If the temperature value is displayed as

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

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

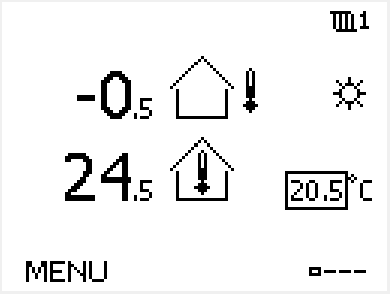
Setting the desired temperature

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

Setting the desired room temperature

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

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



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

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

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

Setting the desired room temperature, ECA 30 / ECA 31

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

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

3.3 A general overview: What do the symbols mean?

Symbol	Description	
	Outdoor temp.	Temperature
	Relative humidity indoor	
	Room temp.	
	DHW temp.	
	Position indicator	
	Scheduled mode	Mode
	Comfort mode	
	Saving mode	
	Frost protection mode	
	Manual mode	
	Standby	
	Cooling mode	
	Active output override	
	Optimized start or stop time	
	Heating	Circuit
	Cooling	
	DHW	
	Common controller settings	
	Pump ON	Controlled component
	Pump OFF	
	Fan ON	
	Fan OFF	
	Actuator opens	
	Actuator closes	
42	Actuator, analogue control signal	
45	Pump / fan speed	
	Damper ON	
	Damper OFF	

Symbol	Description
	Alarm
	Letter
	Event
	Monitoring temperature sensor connection
	Display selector
	Max. and min. value
	Trend in outdoor temperature
	Wind speed sensor
--	Sensor not connected or not used
---	Sensor connection short-circuited
7-23	Fixed comfort day (holiday)
	Active influence
	Heating active (+) Cooling active (-)
1 2	Number of heat exchangers

Additional symbols, ECA 30 / 31:

Symbol	Description
	ECA Remote Control Unit
15	Connection address (master: 15, slaves: 1 - 9)
	Day off
	Holiday
	Relaxing (extended comfort period)
	Going out (extended saving period)

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

3.4 Monitoring temperatures and system components

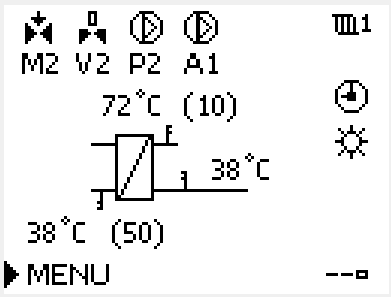
This section describes the function in general for the ECL Comfort 210 / 296 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application.

Heating circuit

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

Display example:

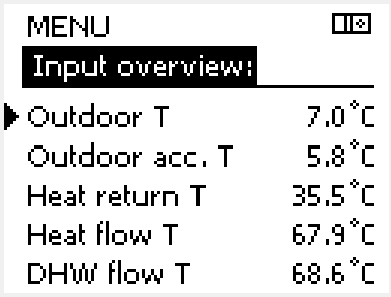
49 °C	Flow temperature
(31)	Desired flow temperature
24 °C	Return temperature
(50)	Return temperature limitation



Input overview

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

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



3.5 Influence overview

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

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

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

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

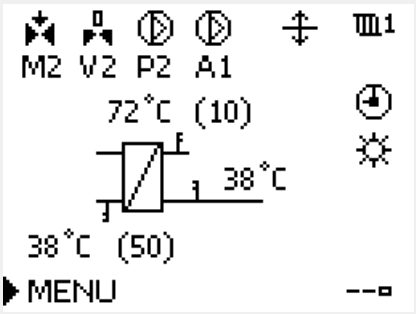
Arrow-up:
The parameter in question increases the desired flow temperature.

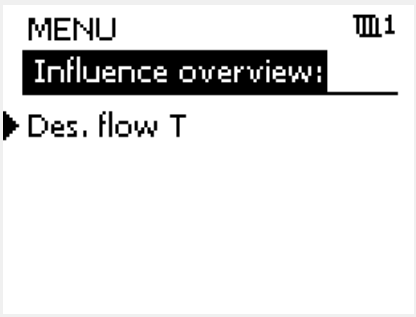
Double-arrow:
The parameter in question creates an override (e.g. Holiday).

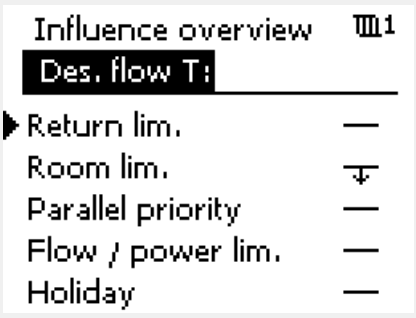
Straight line:
No active influence.

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

Example of overview display with Influence indication:







3.6 Manual control

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

It is possible to manually control the installed components.

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

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

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

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

Controlled components *Circuit selector*

During manual operation:

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

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

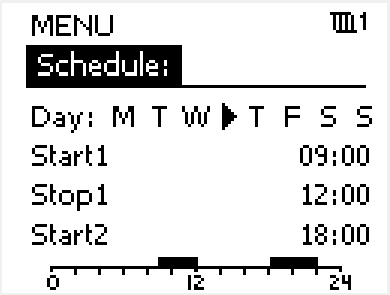
3.7 Schedule

3.7.1 Set your schedule

This section describes the schedule in general for the ECL Comfort 210 / 296 / 310 series. The shown displays are typical and not application related. They might differ from the displays in your application. In some applications, however, there might be more than one schedule. Additional schedules can be found in 'Common controller settings'.

The schedule consists of a 7-day week:

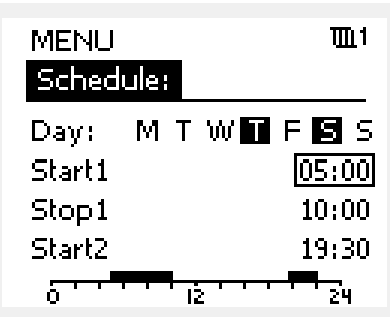
M = Monday
T = Tuesday
W = Wednesday
T = Thursday
F = Friday
S = Saturday
S = Sunday

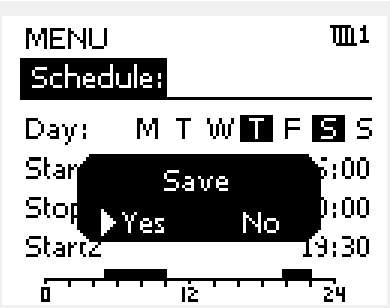


The schedule will day-by-day show you the start and stop times of your comfort periods (heating / DHW circuits).

Changing your schedule:

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





* Several days can be marked

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

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

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

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

4.0 Settings overview

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

Setting	ID	Page	Factory settings in circuit(s)		
			1	2	3
Heat curve		77			
Actual (actual flow or power)		82			
P exercise (pump exercise)	11022	105			
P exercise (pump exercise)	11022	110			
Frost pr. T (frost protection temperature)	11093	117			
Input type	11109	84			
Ext. input (external override)	11141	118			
Ext. mode (external override mode)	11142	118			
Motor pr. (motor protection) — only A333.1, A333.2	11174	92			
Nz (neutral zone)	11187	93			
Retry time	11310	103			
Change, duration	11311	104			
Change time	11312	104			
Stab. time (stabilization time)	11313	104			
Chan.-over time (change-over time)	11314	103			
Alarm handling	11316	105			
Max. pressure	11318	108			
Max. pressure diff.	11319	108			
Pressure des. (A333.2 / A333.3)	11321	95			
Pressure des.	11321	107			
Pressure diff.	11322	103			
Time-out	11323	109			
Valve delay	11325	111			
No. of pumps	11326	111			
Wake up level (A333.2 / A333.3)	11330	98			
Sleep level (A333.2 / A333.3)	11331	98			
Sleep mode time (A333.2 / A333.3)	11332	98			
Boost (A333.2 / A333.3)	11333	99			
V out max. (A333.2 / A333.3)	12165	101			
V out min. (A333.2 / A333.3)	12167	102			
Tn (integration time) (A333.2 / A333.3)	12185	101			
Nz (neutral zone) (A333.2 / A333.3)	12187	101			
Td (Time derivative) (A333.2 / A333.3)	12197	101			
Change duration	12311	106			
Alarm handling	12316	111			
Pressure diff. (A333.2 / A333.3)	12322	100			
V out max. (A333.2 / A333.3)	13165	97			
V out min. (A333.2 / A333.3)	13167	97			
Tn (integration time) (A333.2 / A333.3)	13185	96			

Setting	ID	Page	Factory settings in circuit(s)		
			1	2	3
Nz (neutral zone) (A333.2 / A333.3)	13187	97			
Td (Time derivative) (A333.2 / A333.3)	13197	97			
Pressure diff.	13322	107			
Alarm low	15615	131			
Alarm time-out	15617	131			
Filter constant	16113	113			
Stop difference (A333.2 / A333.3)	16194	115			
Start difference (A333.2 / A333.3)	16195	115			
Level, desired (A333.2 / A333.3)	16602	114			
Low X (A333.2 / A333.3)	16607	114			
High X (A333.2 / A333.3)	16608	114			
Alarm high (A333.2 / A333.3)	16614	128			
Alarm low (A333.2 / A333.3)	16615	129			
Alarm time-out (A333.2 / A333.3)	16617	129			
Input type (A333.2 / A333.3)	17109	122			
Pulse (A333.2 / A333.3)	17114	122			
Units (A333.2 / A333.3)	17115	123			
Low X (A333.2 / A333.3)	17607	121			
High X (A333.2 / A333.3)	17608	122			
Auto saving (saving temp. dependent on outdoor temp.)	1x011	85			
Boost	1x012	85			
Ramp (reference ramping)	1x013	86			
Optimizer (optimizing time constant)	1x014	86			
Demand offset	1x017	116			
Total stop	1x021	88			
M exercise (valve exercise)	1x023	116			
Pre-stop (optimized stop time)	1x026	87			
High T out X1 (return temp. limitation, high limit, X-axis)	1x031	79			
Low limit Y1 (return temp. limitation, low limit, Y-axis)	1x032	79			
Low T out X2 (return temp. limitation, low limit, X-axis)	1x033	79			
High limit Y2 (return temp. limitation, high limit, Y-axis)	1x034	79			
Infl. - max. (return temp. limitation - max. influence)	1x035	80			
Infl. - min. (return temp. limitation - min. influence)	1x036	80			
Adapt. time (adaptation time)	1x037	81			
DHW priority (closed valve / normal operation)	1x052	116			
P frost T (circulation pump, frost protection temp.)	1x077	117			
P heat T (heat demand)	1x078	117			
Priority (priority for return temp. limitation)	1x085	81			
Frost pr. T (frost protection temp.)	1x093	117			
Limit (limitation value)	1x111	82			
Adapt. time (adaptation time)	1x112	83			
Filter constant	1x113	83			

Setting	ID	Page	Factory settings in circuit(s)		
			1	2	3
Filter constant	1x113	91			
Filter constant (S7, S8, S9, S10)	1x113	125			
Units	1x115	84			
High limit Y2 (flow / power limitation, high limit, Y-axis)	1x116	83			
Low limit Y1 (flow / power limitation, low limit, Y-axis)	1x117	83			
Low T out X2 (flow / power limitation, low limit, X-axis)	1x118	83			
High T out X1 (flow / power limitation, high limit, X-axis)	1x119	82			
Upper difference	1x147	127			
Lower difference	1x148	127			
Delay, example	1x149	128			
Lowest temp.	1x150	128			
Motor pr. (motor protection)	1x174	92			
Temp. min.	1x177	78			
Temp. max.	1x178	78			
Summer, cut-out (limit for heating cut-out)	1x179	88			
Xp (proportional band)	1x184	93			
Xp (proportional band)	1x184	96			
Xp (proportional band)	1x184	100			
Tn (integration time constant)	1x185	93			
M run (running time of the motorized control valve)	1x186	93			
Min. act. time (min. activation time gear motor)	1x189	94			
Send desired T	1x500	116			
Pulse value	1x513	120			
Preset	1x514	120			
Low X	1x607	91			
Low X (S7, S8, S9, S10)	1x607	125			
High X	1x608	92			
High X (S7, S8, S9, S10)	1x608	126			
Alarm high	1x614	130			
Alarm low	1x615	130			
Alarm time-out	1x617	130			
Position (A333.2 / A333.3)	Read-out	90			
Time Left	Read-out	106			
Level (A333.2 / A333.3)	Read-out	113			
CW consump. (A333.2 / A333.3)	Read-out	120			
Actual (A333.2 / A333.3)	Read-out	121			
Pressure (S7, S8, S9, S10)	Read-out	124			

5.0 Settings

5.1 Introduction to Settings

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

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

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

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

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

5.2 Flow temperature

The ECL Comfort controller determines and controls the flow temperature related to the outdoor temperature. This relationship is called the heat curve.
The heat curve is set by means of 6 coordinate points. The desired flow temperature is set at 6 pre-defined outdoor temperature values.
The shown value for the heat curve is an average value (slope), based on the actual settings.

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

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

MENU > Settings > Flow temperature

Heat curve		
1	**0.1 ... 4.0**	**1.0**

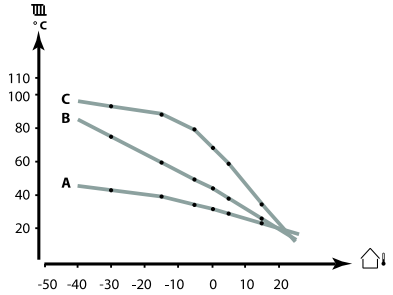
The heat curve can be changed in two ways:

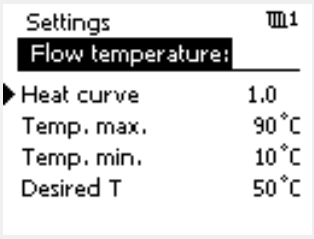
1. The value of the slope is changed (see heat curve examples on next page)
2. The coordinates of the heat curve are changed

Change the value of the slope:
Push the dial to enter / change the slope value of the heat curve (example: 1.0).
When the slope of the heat curve is changed by means of the slope value, the common point for all heat curves will be a desired flow temperature = 24.6 °C at an outdoor temperature = 20 °C and a desired room temperature = 20.0 °C.

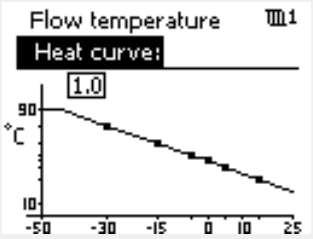
Change the coordinates:
Push the dial to enter / change the coordinates of the heat curve (example: -30,75).
The heat curve represents the desired flow temperatures at different outdoor temperatures and at a desired room temperature of 20 °C.
If the desired room temperature is changed, the desired flow temperature also changes:
(Desired room T - 20) × HC × 2.5
where "HC" is the Heat Curve slope and "2.5" is a constant.

Desired flow temperature

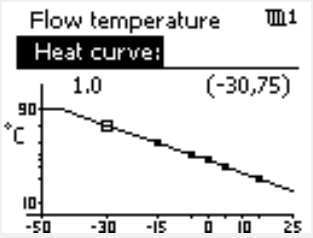




Slope changes



Coordinate changes



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

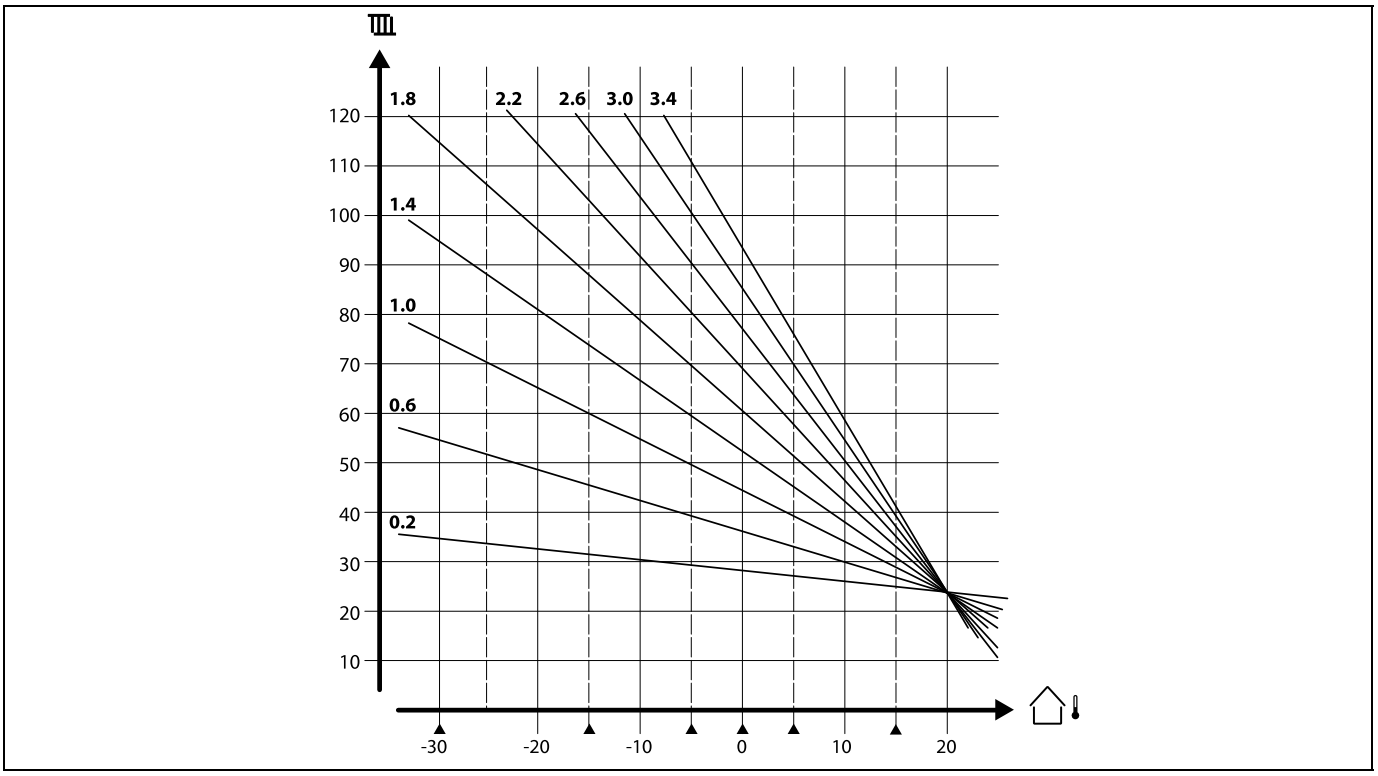
Example:

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

Result:

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

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



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

MENU > Settings > Flow temperature

Temp. min.	**1x177**

See Appendix "Parameter ID overview"

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

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

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

MENU > Settings > Flow temperature

Temp. max.	**1x178**

See Appendix "Parameter ID overview"

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

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

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

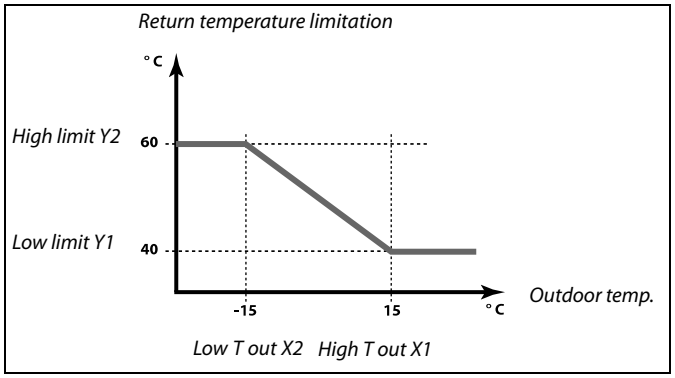
5.3 Return limit

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

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

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

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



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

MENU > Settings > Return limit

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Return limit

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Return limit

Low T out X2 (return temp. limitation, low limit, X-axis)	**1x033**
Set the outdoor temperature value for the high return temperature limitation.	

See Appendix “Parameter ID overview”

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

MENU > Settings > Return limit

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

See Appendix “Parameter ID overview”

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

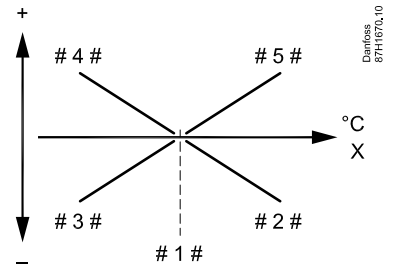
MENU > Settings > Return limit

Infl. - max. (return temp. limitation - max. influence)	**1x035**
Determines how much the desired flow temperature will be influenced if the return temperature is higher than the calculated limit.	

See Appendix “Parameter ID overview”

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.



X = Return temperature
 # 1 # = Limitation temperature
 # 2 # = Negative influence (1x035) when return temp. gets higher than limit. temp.
 # 3 # = Negative influence (1x036) when return temp. gets lower than limit. temp.
 # 4 # = Positive influence (1x036) when return temp. gets lower than limit. temp.
 # 5 # = Positive influence (1x035) when return temp. gets higher than limit. temp.

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

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

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

MENU > Settings > Return limit

Infl. - min. (return temp. limitation - min. influence)	**1x036**
Determines how much the desired flow temperature will be influenced if the return temperature is lower than the calculated limit.	

See Appendix "Parameter ID overview"

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

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

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

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

MENU > Settings > Return limit

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

See Appendix "Parameter ID overview"

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

Minor value: The desired temperature is adapted quickly.

Major value: The desired temperature is adapted slowly.

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

MENU > Settings > Return limit

Priority (priority for return temp. limitation)	**1x085**
Choose whether the return temperature limitation should overrule the set min. flow temperature 'Temp. min.'.	

See Appendix "Parameter ID overview"

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

ON: The min. flow temperature limit is overruled.

If you have a DHW application:
Please also see 'Parallel operation' (ID 11043).

If you have a DHW application:
When dependent parallel operation is in function:

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

5.4 Flow / power limit

A flow or energy meter can be connected (M-bus signal) to the ECL controller in order to limit the flow or consumed power.

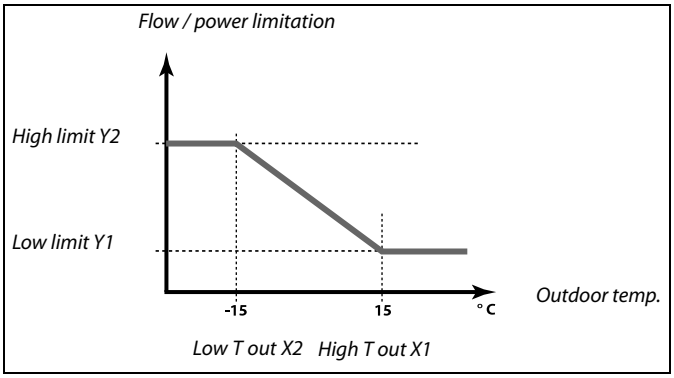
The flow / power limitation can be based on the outdoor temperature. Typically, in district heating systems a higher flow or power is accepted at lower outdoor temperatures.

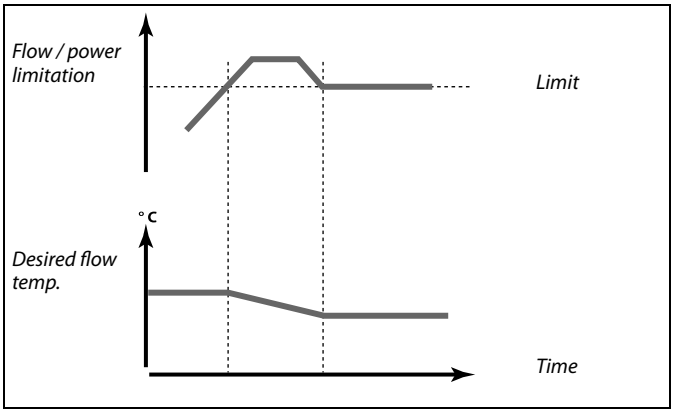
The relationship between the flow or power limits and the outdoor temperature is set in two coordinates.

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

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

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





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

MENU > Settings > Flow / power limit

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

MENU > Settings > Flow / power limit

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

See Appendix "Parameter ID overview"

MENU > Settings > Flow / power limit

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

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

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

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

See Appendix “Parameter ID overview”

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

MENU > Settings > Flow / power limit

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

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

See Appendix “Parameter ID overview”

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

Minor value: The desired temperature is adapted quickly.

Major value: The desired temperature is adapted slowly.

MENU > Settings > Flow / power limit

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

See Appendix "Parameter ID overview"

Minor value: Lower dampening

Major value: Higher dampening

MENU > Settings > Flow / power limit

Input type	11109
Choice of M-bus signal from energy meter number 1 ... 5. Only possible in ECL Comfort 310.	

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

OFF: No M-bus signal acquired.

EM1 ... EM5: Energy meter number.

MENU > Settings > Flow / power limit

Units	1x115
Choice of units for measured values.	

See Appendix "Parameter ID overview"

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 energy 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.

5.5 Optimization

MENU > Settings > Optimization

Auto saving (saving temp. dependent on outdoor temp.)	**1x011**
Below the set value for the outdoor temperature, the saving temperature setting has no influence. Above the set value for the outdoor temperature, the saving temperature relates to the actual outdoor temperature. The function is relevant in district heating installations in order to avoid a big change in the desired flow temperature after a saving period.	

See Appendix "Parameter ID overview"

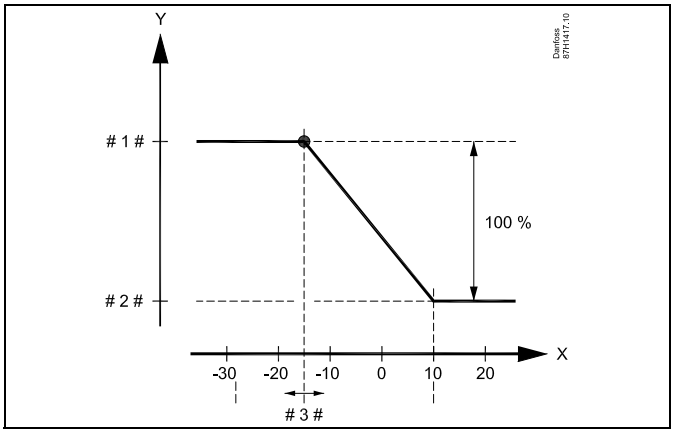
OFF: The saving temperature does not depend on the outdoor temperature; the reduction is 100%.

Value: The saving temperature depends on the outdoor temperature. When the outdoor temperature is above 10 °C, the reduction is 100%. The lower the outdoor temperature, the less the temperature reduction. Below the set value, the saving temperature setting has no influence.

Comfort temperature: The desired room temperature in Comfort mode

Saving temperature: The desired room temperature in Saving mode

The desired room temperatures for Comfort and Saving modes are set in the display overviews.



X = Outdoor temperature (°C)

Y = Desired room temperature (°C)

1 # = Desired room temperature (°C), Comfort mode

2 # = Desired room temperature (°C), Saving mode

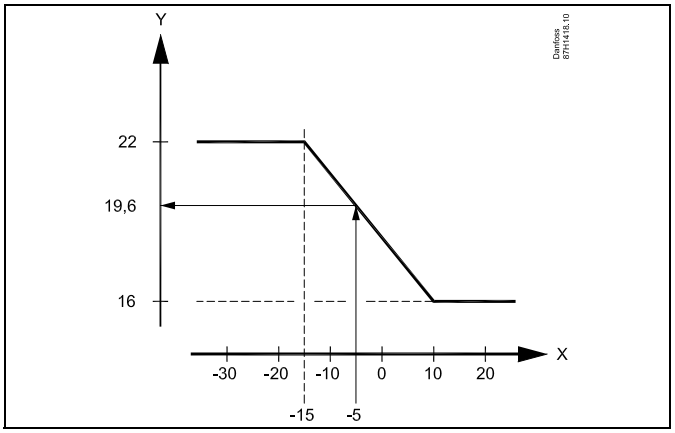
3 # = Auto saving temperature (°C), ID 11011

Example:

Actual outdoor temperature (T.out):	–5 °C
Desired room temperature setting in Comfort mode:	22 °C
Desired room temperature setting in Saving mode:	16 °C
Setting in 'Auto saving':	–15 °C

The condition for the outdoor temperature influence:
T.out.influence = (10 - T.out) / (10 - setting) =
(10 - (-5)) / (10 - (-15)) =
15 / 25 = 0,6

The corrected desired room temperature in Saving mode:
T.room.ref.Saving + (T.out.influence x (T.room.ref.Comfort - T.room.ref.Saving))
16 + (0,6 x (22 - 16)) = 19,6 °C



X = Outdoor temperature (°C)

Y = Desired room temperature (°C)

MENU > Settings > Optimization

Boost	**1x012**
Shortens the heating-up period by increasing the desired flow temperature by the percentage you set.	

See Appendix "Parameter ID overview"

OFF: The boost function is not active.

Value: The desired flow temperature is increased temporarily with the set percentage.

In order to shorten the heating-up period after a saving temperature period, the desired flow temperature can be increased temporarily (max. 1 hour). At optimizing the boost is active in the optimization period ('Optimizer').
If a room temperature sensor or an ECA 30 / 31 is connected, the boost stops when the room temperature is reached.

MENU > Settings > Optimization

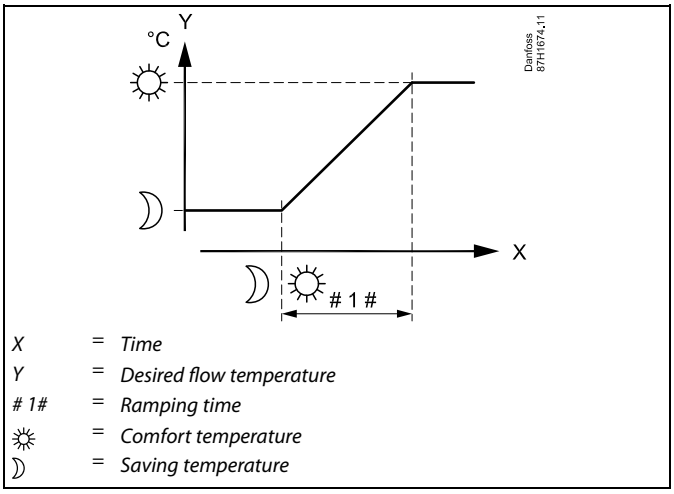
Ramp (reference ramping)	**1x013**
The time (minutes) in which the desired flow temperature increases gradually to avoid load peaks in the heat supply.	

See Appendix "Parameter ID overview"

OFF: The ramping function is not active.

Value: The desired flow temperature is increased gradually with the set minutes.

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



X = *Time*
Y = *Desired flow temperature*
 # 1# = *Ramping time*
☼ = *Comfort temperature*
☽ = *Saving temperature*

MENU > Settings > Optimization

Optimizer (optimizing time constant)	**1x014**
Optimizes the start and stop times for the comfort temperature period to obtain the best comfort at the lowest energy consumption. *The lower the outdoor temperature, the earlier the heating cut-in. The lower the outdoor temperature, the later the heating cut-out.* *The optimized heating cut-out time can be automatic or disabled. The calculated start and stop times are based on the setting of the optimizing time constant.*	

See Appendix "Parameter ID overview"

Adjust the optimizing time constant.

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

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

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

Table I:

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

Table II:

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

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

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

MENU > Settings > Optimization

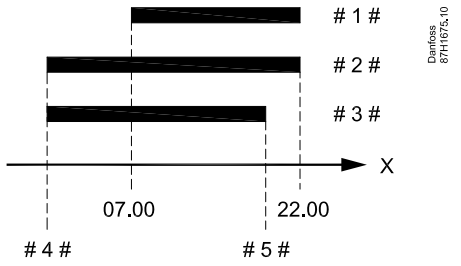
Pre-stop (optimized stop time)	**1x026**
Disable the optimized stop time.	

See Appendix "Parameter ID overview"

OFF: The optimized stop time is disabled.

ON: The optimized stop time is enabled.

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



X	=	*Time*
# 1#	=	*Schedule*
# 2 #	=	*Prestop = OFF*
# 3 #	=	*Prestop = ON*
# 4 #	=	*Optimized start*
# 5 #	=	*Optimized stop*

MENU > Settings > Optimization

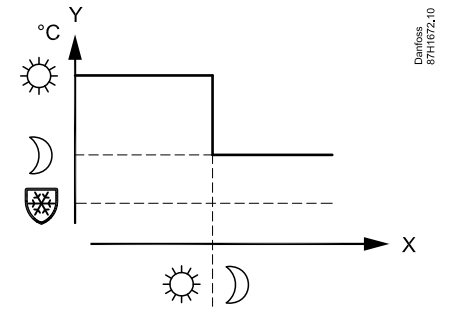
Total stop	**1x021**
Decide whether you want a total stop during the saving temperature period.	

See Appendix "Parameter ID overview"

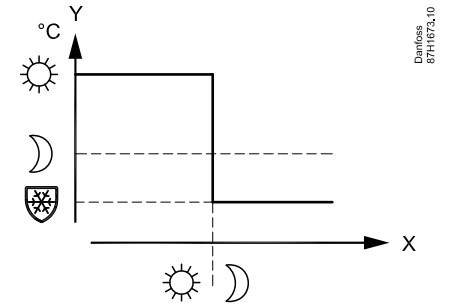
OFF: No total stop. The desired flow temperature is reduced according to:
- desired room temperature in saving mode
- auto saving

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

Total stop = OFF



Total stop = ON



X	=	*Time*
Y	=	*Desired flow temperature*
☼	=	*Comfort temperature*
☽	=	*Saving temperature*
❄	=	*Frost protection*

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

MENU > Settings > Optimization

Summer, cut-out (limit for heating cut-out)	**1x179**

See Appendix “Parameter ID overview”

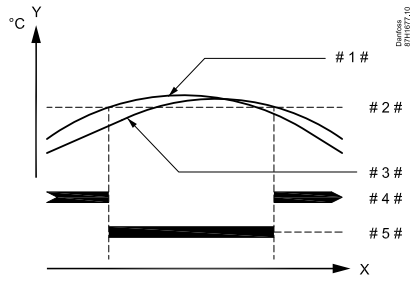
The heating can be switched OFF when the outdoor temperature is higher than the set value. The valve closes and after the post-run time, the heating circulation pump stops. ‘Temp. min.’ will be overruled.

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

This function can save energy.

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

Summer, cut-out



X = *Time*

Y = *Temperature*

 # 1# = *Actual outdoor temperature*

 # 2 # = *Cut-out temperature (1x179)*

 # 3 # = *Accummulated (filtered) outdoor temperature*

 # 4 # = *Heating enabled*

 # 5 # = *Heating disabled*

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

5.6 Control parameters 1

The applications A333.1 and A333.2 control the motorized control valve M1 by means of 3-point control.

The application A333.3 controls the M1 by means of a 0 - 10 volt control signal.

The motorized control valve M1 is opened gradually when the flow temperature S3 is lower than the desired flow temperature and vice versa.

3-point controlled M1 (A333.1 and A333.2):

"Open" and "close" commands come from the electronic outputs of the ECL Comfort controller and control the position of M1.

The commands are expressed as "Arrow-up" (open) and "Arrow-down" (close) and displayed at the M1 symbol.

When the temperature at S3 is lower than the desired temperature, short open-commands come from the ECL Comfort controller in order to open M1 more than the moment before. By this, the S3 temperature aligns with the desired temperature.

Oppositely, when the temperature at S3 is higher than the desired temperature, short close-commands come from the ECL Comfort controller in order to close M1 more than the moment before. Again, the S3 temperature aligns with the desired temperature.

Neither open-commands nor close-commands will come as long as the flow temperature corresponds to the desired temperature.

0 - 10 volt controlled M1 (A333.3):

A control voltage between 0 and 10 volt comes from the extension module ECA 32 and controls the position of M1. The voltage is expressed as a % value and displayed at the M1 symbol.

When the temperature at S3 is lower than the desired temperature, the control voltage is gradually increased in order to open M1 more than the moment before. By this, the S3 temperature aligns with the desired temperature.

The control voltage remains on a fixed value as long as the flow temperature corresponds to the desired temperature.

Oppositely, when the temperature at S3 is higher than the desired temperature, the control voltage is gradually decreased in order to close M1 more than the moment before. Again, the S3 temperature aligns with the desired temperature.

MENU > Settings > Control parameters 1

Position (A333.2 / A333.3)		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	***)**
Position of the motorized control valve M1 is indicated as a % value. A 0 - 10 volt signal comes from a position measuring in M1 and is applied to input S11 (ECA 32). This input voltage is converted to the displayed % value. Access to conversion (scale) settings.		

***)** 2.0 volt = 0 %, 10.0 volt = 100 %

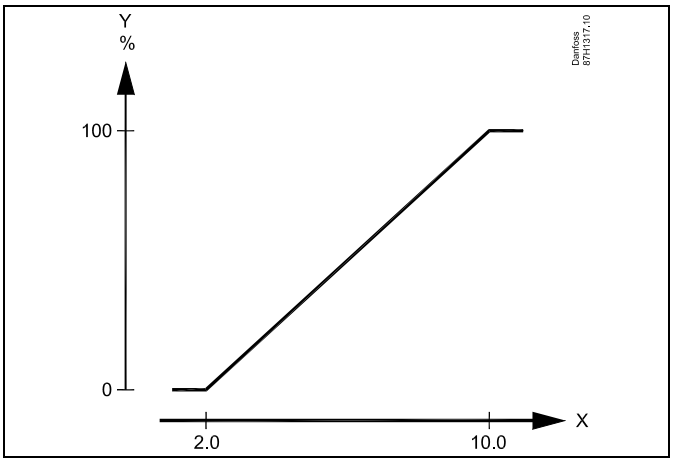
The position is measured by means of a 0 - 10 volt signal.
The measured voltage must be converted to a position value by the controller.

The following procedure sets up the conversion:
Push the dial to see the graph and enter the value sets for the 2 input voltages and related position values.
Position value range: 0 … 100 %

The factory set voltage values (2.0 volt and 10.0 volt) can be changed in the following two separate menus "Low X" and "High X".

Factory settings: 2.0 , 0 (= 2.0 V / 0 %) and 10.0,100 (= 10.0 V / 100 %)

This means that the "Position" is 0 % at 2.0 V and 100 % at 10.0 V.
Typically, the higher the voltage, the higher the displayed position.



X = Volt

Y = Position

This scaling menu is always displayed, regardless a position signal is applied.
The position is indicated as 0 when the position signal is not applied.

MENU > Settings > Control parameters 1

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

See Appendix “Parameter ID overview”

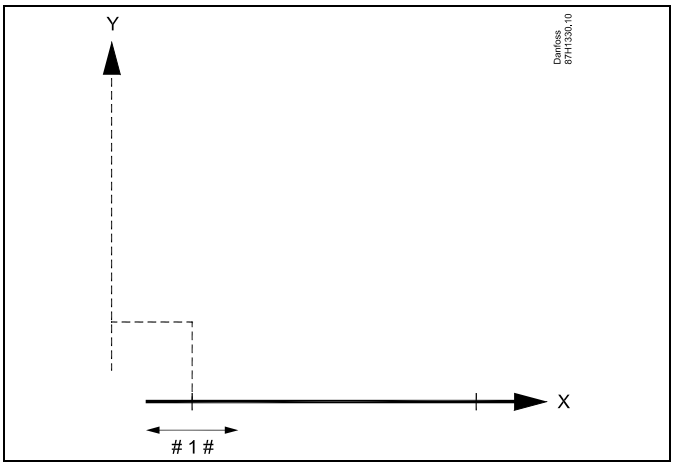
Minor value: Lower dampening

Major value: Higher dampening

MENU > Settings > Control parameters 1

Low X	1x607
Definition of which voltage value corresponds to which position value. The voltage (as a 0 - 10 volt signal) comes from a position measuring in M1 and is applied to input S11 (ECA 32). This input voltage is converted to display a % value for the position of M1. See also "Position" and "High X".	

See Appendix “Parameter ID overview”



X = Volt

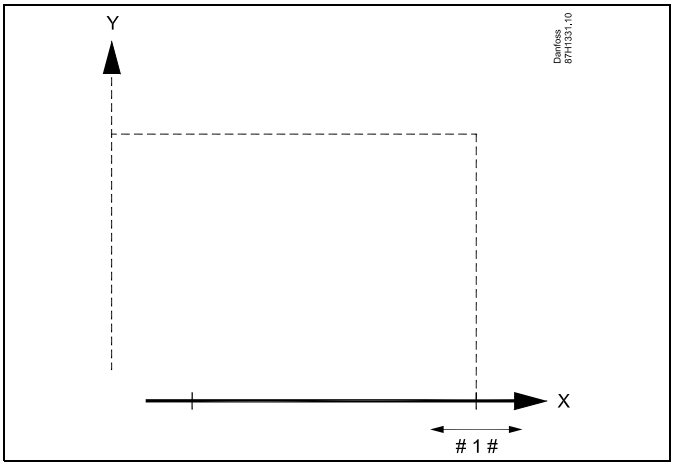
Y = Position

1 # = Low X

MENU > Settings > Control parameters 1

High X	1x608
Definition of which voltage value corresponds to which position value. The voltage (as a 0 - 10 volt signal) comes from a position measuring in M1 and is applied to input S11 (ECA 32). This input voltage is converted to display a % value for the position of M1. See also "Position" and "Low X".	

See Appendix “Parameter ID overview”



X = Volt

Y = Position

1 # = High X

MENU > Settings > Control parameters 1

Motor pr. (motor protection)	1x174
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.	

See Appendix “Parameter ID overview”

OFF: Motor protection is not activated.

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

MENU > Settings > Control parameters 1

Motor pr. (motor protection) — only A333.1, A333.2		11174
Circuit	*Setting range*	*Factory setting*
1	**OFF / 10 ... 59 m**	**OFF**
Prevents the controller from unstable temperature control (and resulting actuator oscillations). This can occur at very low load. The motor protection increases the lifetime of all involved components.		

OFF: Motor protection is not activated.

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

Recommended for heating systems with variable load.

MENU > Settings > Control parameters 1

Xp (proportional band)	1x184

See Appendix "Parameter ID overview"

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

MENU > Settings > Control parameters 1

Tn (integration time constant)	1x185

See Appendix "Parameter ID overview"

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

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

MENU > Settings > Control parameters 1

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

See Appendix "Parameter ID overview"

Set the 'M run' according to the examples or measure the running time by means of a stop watch.

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

Seated valves

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

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

Rotating valves

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

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

MENU > Settings > Control parameters 1

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

Set the acceptable flow temperature deviation.

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

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

MENU > Settings > Control parameters 1

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

See Appendix “Parameter ID overview”

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

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

5.7 Control parameters, refill pump(s)

Control parameters for refill water pump(s), applications A333.2 / A333.3

The refill water pumps P3 / P4 can be speed controlled by means of a 0 - 10 volt signal. The speed control signal comes from the output M2 (terminals 60 and 56) on the ECA 32 module.

A desired pressure at S10 is set for the speed control procedure. The control voltage is expressed as a % value and displayed at the M2 symbol.

When the pressure at S10 gets too low, a refill pump (P3 or P4) is switched ON.

The control voltage is gradually increased in order to increase the speed of the refill water pump. By this, the pressure aligns with the desired pressure.

The control voltage remains on a fixed value as long as the pressure corresponds to the desired pressure.

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

Sleep function:

In order to protect a refill pump against a too low speed, the "Sleep function" can be used.

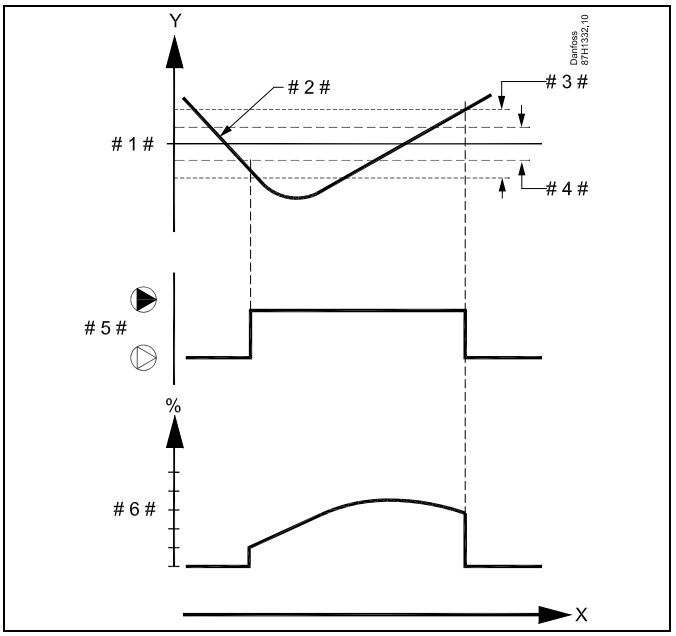
When the speed control voltage for M2 gets lower than "Sleep level", the control voltage is commanded to 0 % after a period ("Sleep mode time"). The refill pump stops.

After elapse of the "Sleep mode time" and a continued demand for refill, the control voltage is commanded to "Wake-up level" and starts the refill pump. A "Boost" can be added to the "Wake-up level".

MENU > Settings > Control parameters, refill pump(s)

Pressure des. (A333.2 / A333.3)		**11321**
Circuit	*Setting range*	*Factory setting*
1	**0.2 . . . 25.0 bar**	**3.0 bar**
Setting of desired pressure at S10 in order to speed control the refill pump(s) P3 / P4.		

0.2 - 25.0: Set the desired pressure at S10 (in bar)



X = Time
Y = Pressure
# 1 # = Pressure desired
# 2 # = Actual pressure
# 3 # = Pressure difference
# 4 # = Neutral zone, Nz
# 5 # = Refill water pump
# 6 # = Speed control signal (0 - 10 V)

The parameter "Pressure des." is also used in application A333.1 for setting desired pressure for ON / OFF control of refill pump(s) P3 / P4.

MENU > Settings > Control parameters, refill pump(s)

Xp (proportional band)	**1x184**

See Appendix “Parameter ID overview”

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

MENU > Settings > Control parameters, refill pump(s)

Tn (integration time) (A333.2 / A333.3)		**13185**
Circuit	*Setting range*	*Factory setting*
1	**1 . . . 999 sec**	**25 sec**
Set the integration time for the control of the pressure at S10.		

Low value: Controller reacts fast, but with less stability

High value: Controller reacts slow and with higher stability

MENU > Settings > Control parameters, refill pump(s)

Nz (neutral zone) (A333.2 / A333.3)		**13187**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 2.0 bar**	**0.4 bar**
Set the acceptable pressure deviation at S10. *When the actual pressure is within the neutral zone, the controller does not change the refill pump speed.*		

Low value: A low variation in pressure is acceptable

High value: A high variation in pressure is acceptable

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

MENU > Settings > Control parameters, refill pump(s)

Td (Time derivative) (A333.2 / A333.3)		**13197**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 250 sec**	**0 sec**
The Td related function can avoid a too aggressive reaction in the speed control procedure.		

0: No influence

Low value: Minor influence

High value: Major influence

MENU > Settings > Control parameters, refill pump(s)

V out max. (A333.2 / A333.3)		**13165**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**100 %**
The output voltage for controlling the speed of the refill pump can be limited to a maximum value. *See also "V out min".*		

0 - 100: The value in % expresses the maximum voltage for controlling the analogue output for the speed control of the refill pump.

Example:

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

The setting of "V.out min" has priority over "V.out max".

MENU > Settings > Control parameters, refill pump(s)

V out min. (A333.2 / A333.3)		13167
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**0 %**
The output voltage for controlling the speed of the refill pump can be limited to a minimum value. *See also "V out max".*		

0 - 100: The value in % expresses the maximum voltage for controlling the analogue output for the speed control of the refill pump.

Example:

A setting of 15 % means that the output voltage will be 1.5 volt as a minimum.

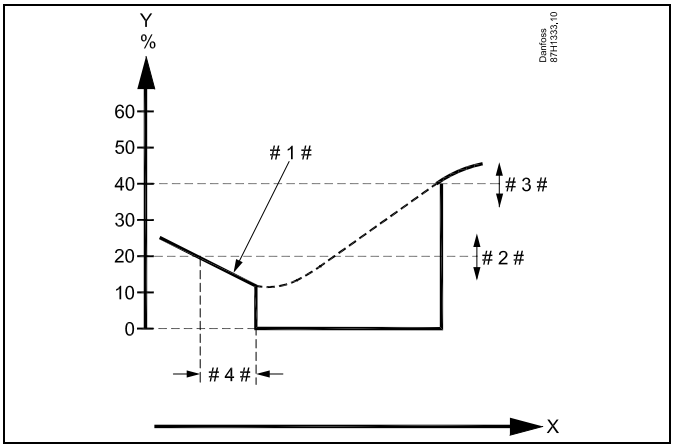
The setting of "V.out min" has priority over "V.out max".

MENU > Settings > Control parameters, refill pump(s)

Sleep level (A333.2 / A333.3)		11331
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 . . . 100 %**	**20 %**
When the speed control signal gets below the "Sleep level" value, the speed will be set to 0 (zero) % after elapse of "Sleep mode time". *The refill pump stops (goes into sleep mode).* *The set value is also the speed level at a new refill procedure.* *This function protects the refill pump against low speed.* *See also: "Sleep mode time" and "Wake up level".*		

OFF: The sleep function is disabled

1 - 100: The sleep function is enabled



X = Time

Y = Speed control signal (0 - 10 V) (%))

1 # = Actual control signal

2 # = Sleep level

3 # = Wake-up level

4 # = Sleep mode time

MENU > Settings > Control parameters, refill pump(s)

Sleep mode time (A333.2 / A333.3)		11332
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 300 sec**	**10 sec**
The "Sleep mode time" determines a delayed stop of the refill pump at too low speed. *See also: "Sleep level" and "Wake up level".*		

0 - 300: Set the sleep mode time (in seconds)

MENU > Settings > Control parameters, refill pump(s)

Wake up level (A333.2 / A333.3)		**11330**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**40 %**
After elapse of the "Sleep mode" time and a continued refill demand, the refill water pump restarts with a speed level as the set value. *See also: "Sleep level" and "Sleep mode time".*		

0 - 100: Set the restart speed level

MENU > Settings > Control parameters, refill pump(s)

Boost (A333.2 / A333.3)		**11333**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**5 %**
The "Wake-up level" can be increased with a % value.		

0 - 100: Set the boost level

Example:

"Wake-up level" = 40 %

"Boost" = 15 %

Result: The increased "Wake-up level" = 40 x 1.15 = 46 %

5.8 Control parameters, circulation pump(s)

Control parameters for circulation pump(s), applications A333.2 / A333.3

The circulation pumps P1 / P2 can be speed controlled by means of a 0 - 10 volt signal. The speed control signal comes from the output M3 (terminals 61 and 56) on the ECA 32 module.

A desired pressure difference between S9 and S10 is set for the speed control procedure.

The control voltage is expressed as a % value and displayed at the M3 symbol.

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

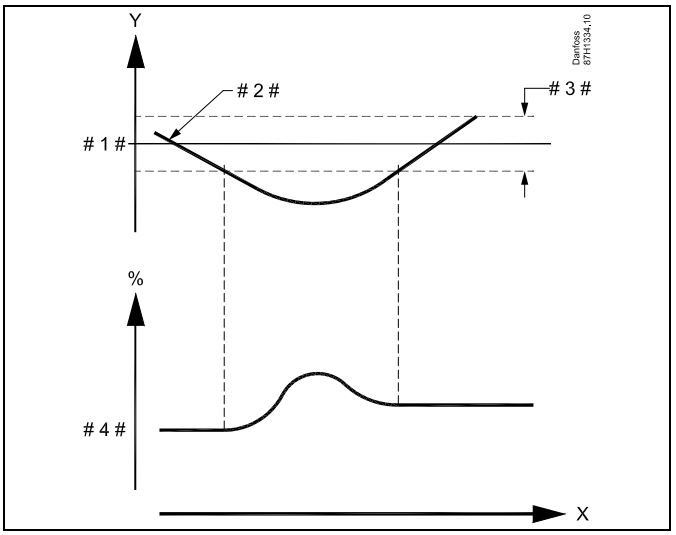
The control voltage remains on a fixed value as long as the pressure difference corresponds to the desired pressure difference.

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

MENU > Settings > Control parameters, circulation pump(s)

Pressure diff. (A333.2 / A333.3)		**12322**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 5.0 bar**	**1.5 bar**
Setting of desired pressure difference between S9 and S10 in order to speed control the circulation pump(s) P1 / P2.		

0.1 - 5.0: Set the desired pressure difference between S9 and S10 (in bar)



X = Time

Y = Pressure

1 # = Pressure diff., desired

2 # = Actual pressure difference

3 # = Neutral zone, Nz

4 # = Speed control signal (0 - 10 V)

MENU > Settings > Control parameters, circulation pump(s)

Xp (proportional band)	**1x184**

See Appendix "Parameter ID overview"

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

MENU > Settings > Control parameters, circulation pump(s)

Tn (integration time) (A333.2 / A333.3)		**12185**
Circuit	*Setting range*	*Factory setting*
1	**1 . . . 999 sec**	**5 sec**
Set the integration time for the control of the pressure difference between S9 and S10.		

Low value: Controller reacts fast, but with less stability

High value: Controller reacts slow and with higher stability

MENU > Settings > Control parameters, circulation pump(s)

Nz (neutral zone) (A333.2 / A333.3)		**12187**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 2.0 bar**	**1.0 bar**
Set the acceptable pressure difference deviation. When the actual pressure difference is within the neutral zone, the controller does not change the circulation pump speed.		

The neutral zone is symmetrical around the desired pressure difference value, i.e. half the value is above and half the value is below.

Low value: A low variation in pressure is acceptable

High value: A high variation in pressure is acceptable

MENU > Settings > Control parameters, circulation pump(s)

Td (Time derivative) (A333.2 / A333.3)		**12197**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 250 sec**	**0 sec**
The Td related function can avoid a too aggressive reaction in the speed control procedure.		

0: No influence

Low value: Minor influence

High value: Major influence

MENU > Settings > Control parameters, circulation pump(s)

V out max. (A333.2 / A333.3)		**12165**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**100 %**
The output voltage for controlling the speed of the circulation pump can be limited to a maximum value. *See also "V out min".*		

0 - 100: The value in % expresses the maximum voltage for controlling the analogue output for the speed control of the circulation pump.

Example:

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

The setting of "V.out min" has priority over "V.out max".

MENU > Settings > Control parameters, circulation pump(s)

V out min. (A333.2 / A333.3)		**12167**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 %**	**0 %**
The output voltage for controlling the speed of the refill pump can be limited to a minimum value. *See also "V out max"..*		

0 - 100: The value in % expresses the minimum voltage for controlling the analogue output for the speed control of the circulation pump.

Example:

A setting of 15 % means that the output voltage will be 1.5 volt as a minimum.

The setting of "V.out min" has priority over "V.out max".

5.9 Pump control

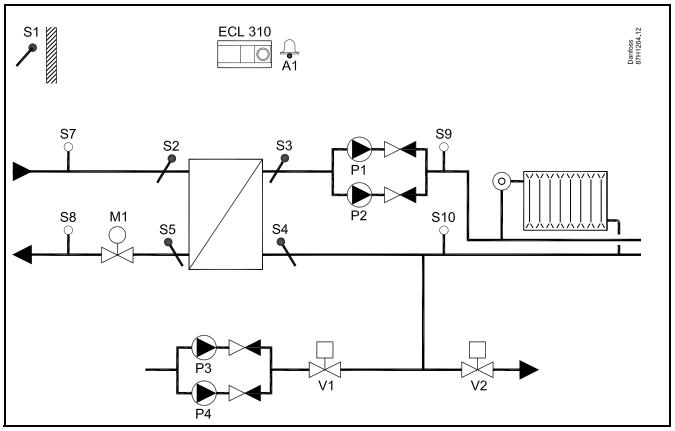
The A333 application can operate with one or two circulation pumps, P1 or P1 / P2.

When operating with two circulation pumps, the pumps are controlled alternately, according to a time set-up.

When a pump is switched ON the controller is waiting for pressure difference (S9 - S10) to build up.

If an acceptable pressure difference is not achieved, an alarm is generated and the ECL Comfort controller switches ON the other pump.

If none of the pumps can come into operation (detected by means of an unacceptable pressure difference), the alarm is activated and the motorized control valve M1 closes (a safety function).



The alarm function is disabled if the "Alarm handling" (ID no. 11316) is set to OFF.

Settings for pressure transmitter signal (0 - 10 volt) and conversion into pressure value are described in the section S7, S8, S9, S10 pressure.

MENU > Settings > Pump control

Pressure diff.		**11322**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 5.0 bar**	**1.5 bar**
Setting of acceptable pressure difference between S9 and S10 in order to feed back that the circulation pump is working properly.		

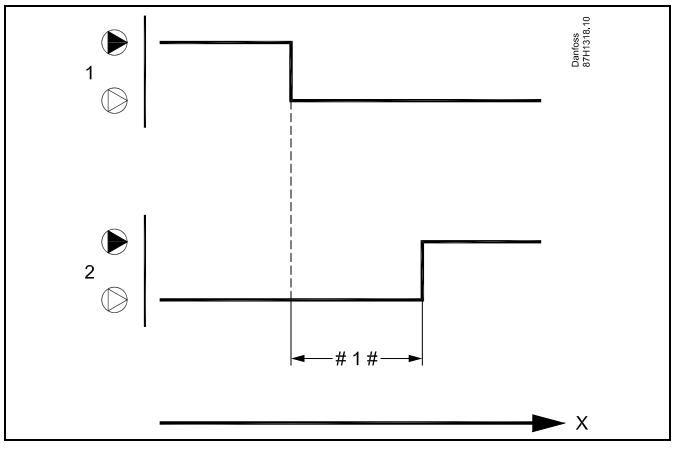
0.1 - 5.0: Set the desired pressure difference between S9 and S10 (in bar)

MENU > Settings > Pump control

Chan.-over time (change-over time)		**11314**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 99 s**	**15 sec**
Setting of time to elapse between the pump stop command for one pump and the start command for the other pump. The change-over time can ensure that a pump is stopped efficiently before the other pump starts.		

OFF: One circulation pump in the application.

1 ... 99: Time for change-over.



X = Time

1 # = Change-over time (sec.)

MENU > Settings > Pump control

Retry time		**11310**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1... 99 m**	**OFF**
If an alarm has been generated for the pump or alarms have been generated for both pumps, this setting will determine the time between the time of the alarm and the retry time for repeated pump start.		

OFF: No retry time required after an alarm. The pump or pumps in question will not be restarted.

1 ... 99: After an alarm, the pump or pumps will be restarted after the set time.

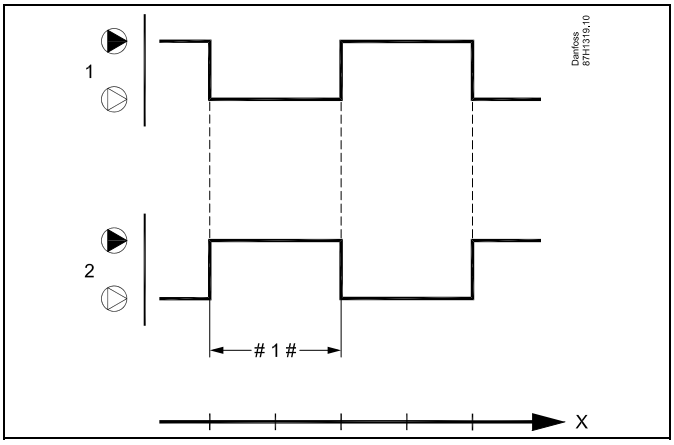
MENU > Settings > Pump control

Stab. time (stabilization time)		**11313**
Circuit	*Setting range*	*Factory setting*
1	**1... 99 s**	**50 sec**
Setting of max. time to elapse between pump start command and feedback from differential pressure switch. *If the differential pressure switch does not give feedback within the set time, the alarm will be activated and the other pump will get a start command.*		

If the chosen stabilization time ('Stab. time') is too short, the active pump will stop immediately after the stabilization time has elapsed.

MENU > Settings > Pump control

Change, duration		**11311**
Circuit	*Setting range*	*Factory setting*
1	**1 . . . 10 days**	**7 days**
The number of days between shift of circulation pumps. The shift takes place at the time set in 'Change time'.		

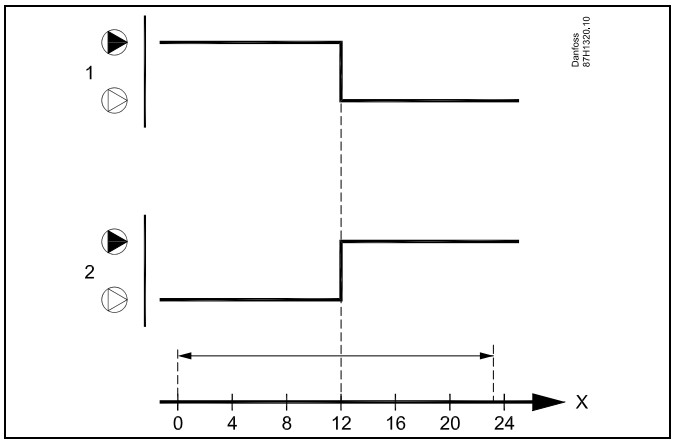


X = Time

1 # = Change duration

MENU > Settings > Pump control

Change time		**11312**
Circuit	*Setting range*	*Factory setting*
1	**0 ... 23**	**12**
The exact time of the day, where the shift must take place. The day is divided into 24 hours. The factory setting here is 12 which means 12:00 (noon).		



X = Time

MENU > Settings > Pump control

P exercise (pump exercise)		**11022**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 200 sec**	**OFF**
The time the pump is activated during exercise. Exercise takes place every day (at 12:20) when no heat demand has been present.		

The feedback from the pressure difference between S9 and S10 is active and will activate the alarm in case that the pump does not start.

OFF: No pump exercise.

1 ... 200: Activation time during exercise.

MENU > Settings > Pump control

Alarm handling		**11316**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose whether the controller must react on an unacceptable pressure difference between S9 and S10.		

OFF: Alarm function is disabled. Circulation pump is not stopped although the pressure difference is too low.

ON: Alarm function is enabled. Circulation pump is stopped if the pressure difference is too low.

5.10 Refill water

Leaks on the consumers side (secondary side) will result in falling static pressure and thereby a poor supply of heating. A refill water function can inject water to increase the static pressure.

The A333 application can monitor the static pressure and enable the refill water function when the pressure is too low.

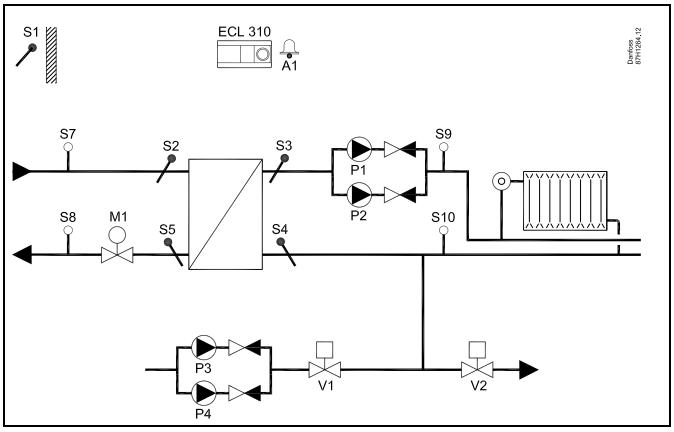
The pressure is measured by means of a pressure transmitter S10 (giving a 0 - 10 volt signal in relation to the measured pressure).

The refill water function can operate with one or two refill water pumps, P3 or P3 / P4. In addition a refill water valve V1 is controlled.

When operating with two refill water pumps, the pumps are controlled alternately, according to a time set-up.

When a too low pressure is detected the refill water pump is switched ON and, after a set time, the ON-OFF valve is activated.

The controller awaits ("Time-out") the pressure at S10 to build up. If an acceptable pressure is not achieved, an alarm is generated and the ECL Comfort controller switches OFF the pump in question.



The alarm function is disabled if the "Alarm handling" (ID no. 12316) is set to OFF.

Settings for pressure transmitter signal (0 - 10 volt) and conversion into pressure value are described in the section "S7 - S10".

MENU > Settings > Refill water

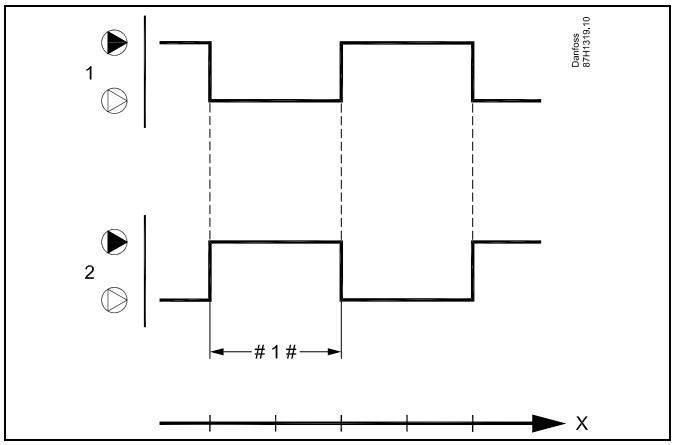
Time Left		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	-
Number of hours before a refill water pump change-over command takes place.		

MENU > Settings > Refill water

Change duration		**12311**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 . . . 60 days**	**7 days**
The number of days between refill water pump change-over.		

OFF: The automatic refill water pump change-over is disabled.

1 - 60: The automatic refill water pump change-over is enabled.



X = Time

1 # = Change duration

The "Change duration" has no influence when only one refill water pump is selected in "No. of pumps" (ID no. 11326).

MENU > Settings > Refill water

Pressure des.		**11321**
Circuit	*Setting range*	*Factory setting*
1	**0.2 . . . 25.0 bar**	**3.0 bar**
Setting of desired pressure at S10 in order to ON / OFF control the refill pump(s) P3 / P4. *See also 'Pressure diff.'*		

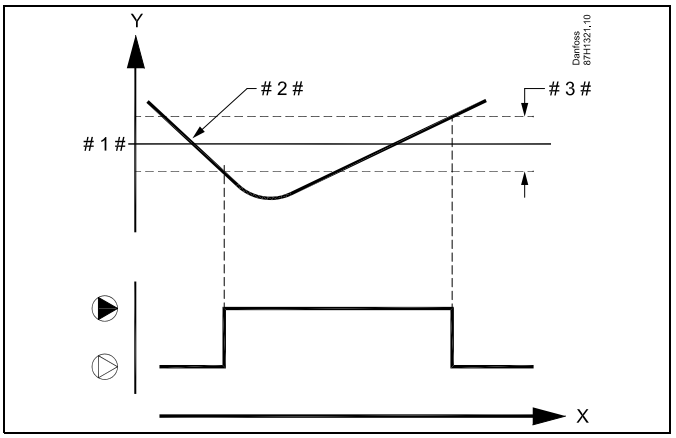
0.2 - 25.0: Set the desired pressure at S10.

The parameter "Pressure des." is also used in application A333.2 / A333.3 for setting desired pressure for speed controlled refill pump(s) P3 / P4.

MENU > Settings > Refill water

Pressure diff.		**13322**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 5.0 bar**	**1.5 bar**
Setting of the switching difference for the measured pressure at S10. The difference is symmetrical around the 'Pressure des.' See also 'Pressure des.'		

0.1 - 5.0: Set the desired switching difference related to the pressure at S10.

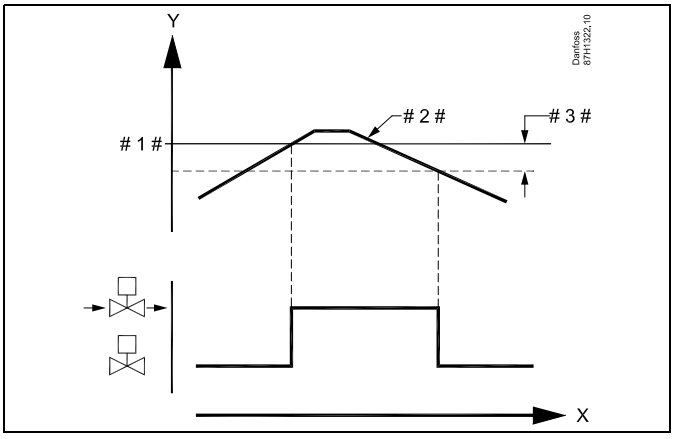


X = Time
Y = Pressure
# 1 # = Pressure desired
# 2 # = Actual pressure
# 3 # = Pressure difference

MENU > Settings > Refill water

Max. pressure		**11318**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 40.0 bar**	**40.0 bar**
Setting of the max. acceptable pressure at S10. When the pressure at S10 gets higher than set value, the release valve V2 is opened in order to reduce the pressure. See also "Max. press. diff."		

0.0 - 40.0: Set the max. acceptable pressure at S10.



X = Time
Y = Pressure
# 1 # = Max. pressure
# 2 # = Actual pressure
# 3 # = Max. pressure difference

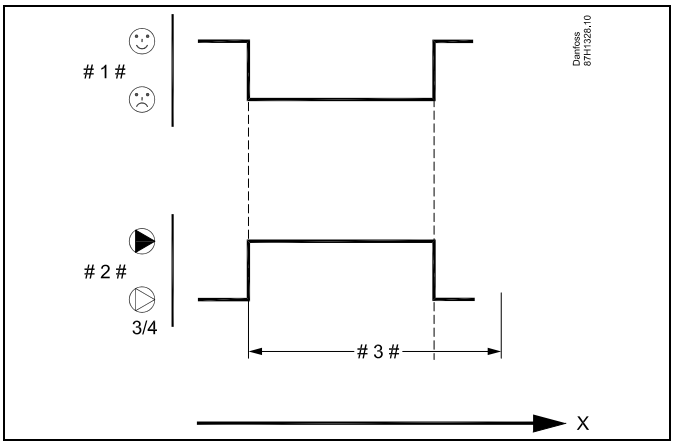
MENU > Settings > Refill water

Max. pressure diff.		**11319**
Circuit	*Setting range*	*Factory setting*
1	**-5.0 . . . -0.1 bar**	**-0.5 bar**
Setting of the pressure difference below "Max. pressure" to ensure an acceptable pressure in the heating system. When the pressure at S10 gets lower than the set difference below "Max. pressure", the release valve V2 is closed in order to stop reducing the pressure. See also "Max. pressure"		

-5.0 - -0.1: Set the pressure difference related to "Max. pressure" at S10.

MENU > Settings > Refill water

Time-out		**11323**
Circuit	*Setting range*	*Factory setting*
1	**1 . . . 1000 sec**	**100 sec**
Setting of the max. time for refill. The pressure, measured by S10, must be OK within the set time. If not, the refill water function stops and an alarm is activated.		

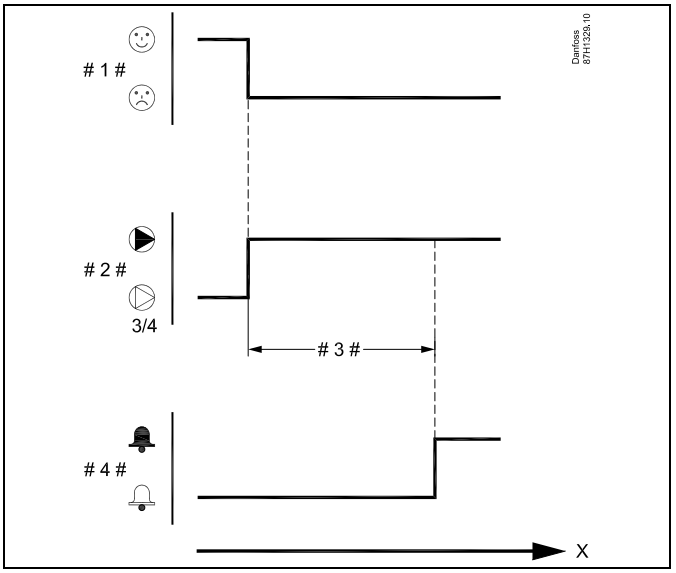


X = Time

1 # = Pressure OK / not OK

2 # = Refill pump 3 or 4

3 # = Time-out



X = Time

1 # = Pressure OK / not OK

2 # = Refill pump 3 or 4

3 # = Time-out

4 # = Alarm

The "Time-out" function is disabled when "Alarm handling" (ID no. 12316) is set to OFF.

MENU > Settings > Refill water

P exercise (pump exercise)		11022
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 ... 200 s**	**OFF**
The time the pump is activated during exercise. Exercise takes place every day (at 12:00).		

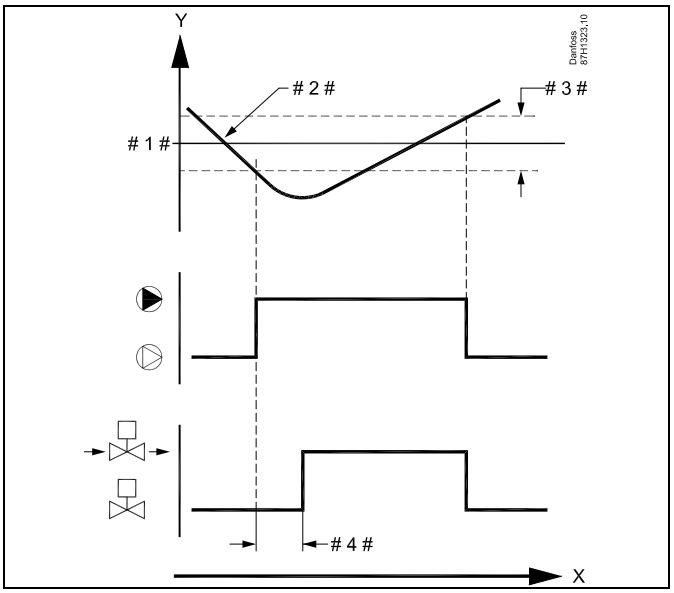
OFF: No pump exercise.

1 ... 200: Activation time during exercise.

The feedback from the pressure at S10 is active and will activate the alarm in case that the pump does not start.

MENU > Settings > Refill water

Valve delay		11325
Circuit	*Setting range*	*Factory setting*
1	**0 ... 30 s**	**1 sec**
Setting of the time for activation of the ON/OFF valve after start of the refill water pump.		



X = Time

Y = Pressure

1 # = Max. pressure

2 # = Actual pressure

3 # = Max. pressure difference

4 # = Valve delay

MENU > Settings > Refill water

No. of pumps		11326
Circuit	*Setting range*	*Factory setting*
1	**1 / 2**	**1**
Choose the number of refill water pumps in the system.		

MENU > Settings > Refill water

Alarm handling		**12316**
Circuit	*Setting range*	*Factory setting*
1	**OFF / ON**	**OFF**
Choose whether the controller must react on an unacceptable pressure at S10.		

OFF: Alarm function is disabled. Refill water pump is not stopped although the pressure is too low.

ON: Alarm function is enabled. Refill water pump is stopped if the pressure difference is too low.

5.11 Refill tank

A refill water storage tank can be controlled.

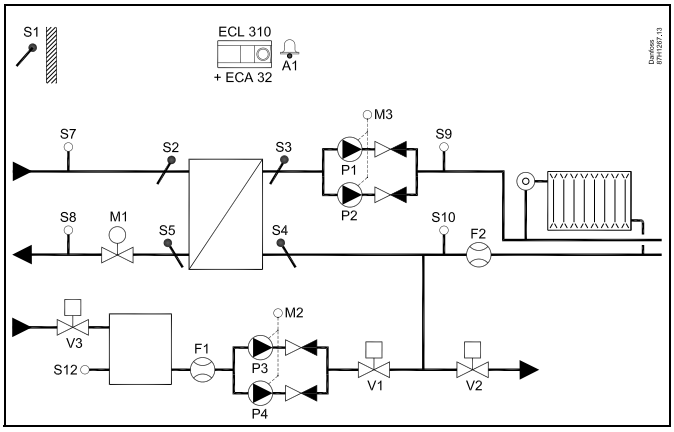
The water level at S12 is measured by means of a pressure transmitter (giving a 0 - 10 volt signal in relation to the measured pressure).

The water level is displayed in meters.

When the water level gets too low, the ON / OFF valve V3 is opened and fills refill water into the storage tank.

When the water level has reached an acceptable level, V3 is closed.

If an alarm is activated because of too high or too low level in the refill water storage tank, the refill pump(s) stop(s) and the valve V1 closes.



MENU > Settings > Refill tank

Level (A333.2 / A333.3)		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	***)**
Level of the water in the refill water storage tank is indicated as a value in meters *A 0 - 10 volt signal comes from a pressure transmitter and is applied to input S12 (ECA 32). This input voltage is converted to the displayed meter value.* *Access to conversion (scale) settings.*		

***)** 2.0 volt = 0.0 m, 10.0 volt = 15.0 m

The water level is measured by means of a 0 - 10 volt signal.

The measured voltage must be converted to a water level value by the controller.

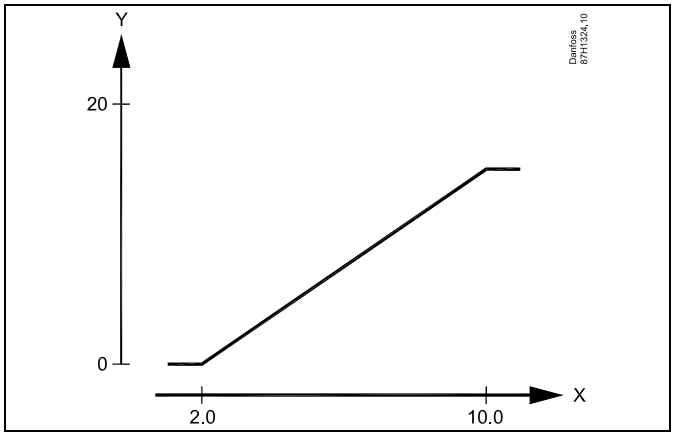
The following procedure sets up the conversion:
Push the dial to see the graph and enter the value sets for the 2 input voltages and related water level values.
Water level value range: 0.0 … 20.0 m

The factory set voltage values (2.0 volt and 10.0 volt) can be changed in the following two separate menus "Low X" and "High X".

Factory settings: 2.0 , 0 (= 2.0 V / 0.0 m) and 10.0 , 15.0 (= 10.0 V / 15.0 m)

This means that the "Water level" is 0.0 m at 2.0 V and 15.0 m at 10.0 V.

Typically, the higher the voltage, the higher the displayed water level.



X = Volt

Y = Meter

This scaling menu is always displayed, regardless a water level signal is applied.
The water level is indicated as 0.0 m when the water level signal is not applied.

MENU > Settings > Refill tank

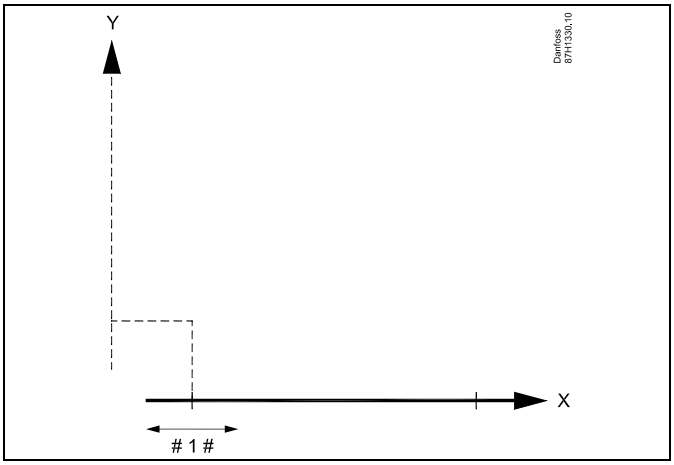
Filter constant		**16113**
Circuit	*Setting range*	*Factory setting*
1	**1 - 250**	**4**
The filter constant dampens the water level signal from the pressure transmitter in order to make a stable read-out and related functions.		

1: Minor dampening (low filter constant)

250: Major dampening (high filter constant)

MENU > Settings > Refill tank

Low X (A333.2 / A333.3)		**16607**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**2.0 V**
Definition of which voltage value corresponds to which water level value. The voltage (as a 0 - 10 volt signal) comes from a pressure transmitter and is applied to input S12 (ECA 32). This input voltage is converted to display a water level value (in meter). See also "Level" and "High X".		



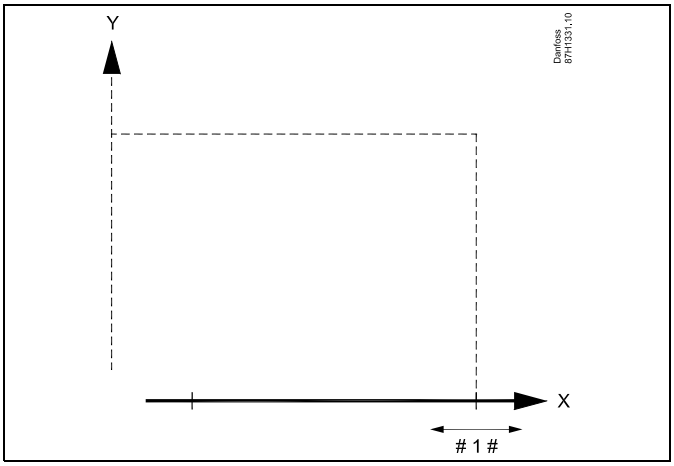
X = Volt

Y = Level

1 # = Low X

MENU > Settings > Refill tank

High X (A333.2 / A333.3)		**16608**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**10.0 V**
Definition of which voltage value corresponds to which water level value. The voltage (as a 0 - 10 volt signal) comes from a pressure transmitter and is applied to input S12 (ECA 32). This input voltage is converted to display a water level value (in meter). See also "Level" and "Low X".		



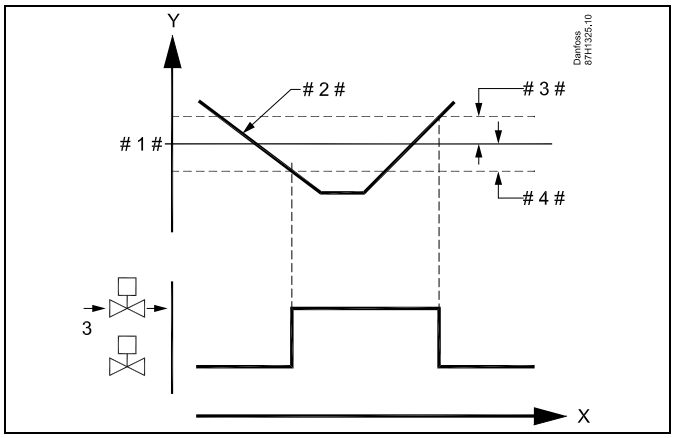
X = Volt

Y = Level

1 # = High X

MENU > Settings > Refill tank

Level, desired (A333.2 / A333.3)		**16602**
Circuit	*Setting range*	*Factory setting*
1	**0.2 . . . 25.0 m**	**3.0 m**
Setting of desired water level (measured by S12) in the refill water storage tank. *See also "Stop difference" and "Start difference".*		



X = Time
Y = Level
# 1 # = Level, desired
# 2 # = Actual level
# 3 # = Stop difference
# 4 # = Start difference

MENU > Settings > Refill tank

Stop difference (A333.2 / A333.3)		**16194**
Circuit	*Setting range*	*Factory setting*
1	**0.1 . . . 5.0 m**	**0.5 m**
Setting the difference above the desired water level that will stop the filling of the refill water storage tank (the valve V3 closes). *See also "Level, desired" and "Start difference".*		

MENU > Settings > Refill tank

Start difference (A333.2 / A333.3)		**16195**
Circuit	*Setting range*	*Factory setting*
1	**-5.0 . . . -0.1 m**	**–0.5 m**
Setting the difference below the desired water level that will start the filling of the refill water storage tank (the valve V3 opens). *See also "Level, desired" and "Stop difference".*		

5.12 Application

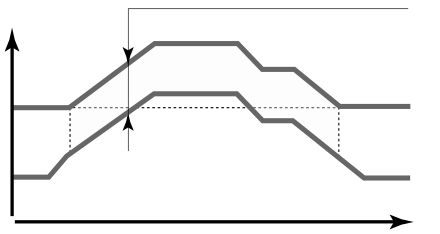
MENU > Settings > Application

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

See Appendix “Parameter ID overview”

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

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



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

MENU > Settings > Application

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

See Appendix “Parameter ID overview”

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

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

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

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

MENU > Settings > Application

M exercise (valve exercise)	**1x023**
Exercises the valve to avoid blocking in periods without heat demand.	

See Appendix “Parameter ID overview”

OFF: The valve exercise is not active.

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

MENU > Settings > Application

DHW priority (closed valve / normal operation)	1x052
The heating circuit can be closed when the controller acts as slave and when DHW heating / charging is active in the master.	

See Appendix "Parameter ID overview"

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

ON: The valve in the heating circuit is closed* during active DHW heating / charging in the master controller.
** The desired flow temperature is set to the value set in 'Frost pr. T'*

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

MENU > Settings > Application

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

See Appendix "Parameter ID overview"

OFF: No frost protection.

Value: Circulation pump is ON when the outdoor temperature is below the set value.

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

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

MENU > Settings > Application

P heat T (heat demand)	1x078
When the desired flow temperature is above the set temperature in 'P heat T', the controller automatically switches ON the circulation pump.	

See Appendix "Parameter ID overview"

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

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

MENU > Settings > Application

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

5 ... 40: Desired frost protection temperature.

MENU > Settings > Application

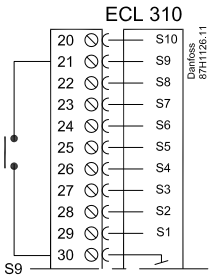
Frost pr. T (frost protection temp.)	**1x093**
Set the desired flow temperature at temperature sensor S3 to protect the system against frost (at heating cut-out, total stop etc.). When the temperature at S3 gets lower than the setting, the motorized control valve opens gradually.	

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

See Appendix “Parameter ID overview”

MENU > Settings > Application

Ext. input (external override)		**11141**
Circuit	*Setting range*	*Factory setting*
	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.

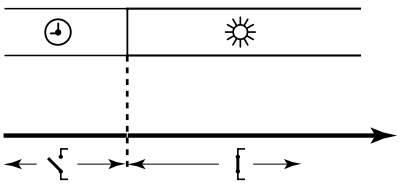
See the drawing for a connection example of an override switch to input S9.

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

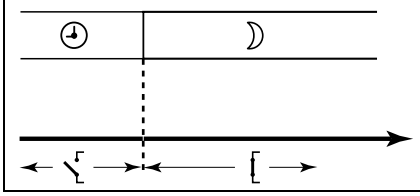
See also ‘Ext. mode’.

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

MENU > Settings > Application

Ext. mode (external override mode)		**11142**
Circuit	*Setting range*	*Factory setting*
	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'.

5.13 Water meter

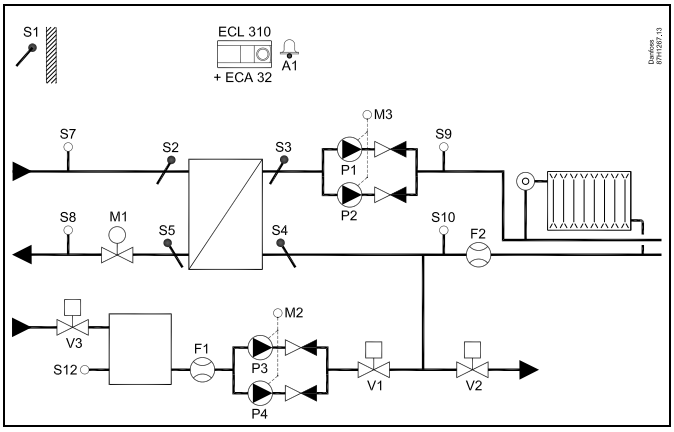
Applications A333.2 / A333.3

A water meter, F1, can measure the amount of refill water injected into the heating installation.

The water flow at F1 is measured by means of:

* a flow meter, giving pulses to "Pulse 1" on the ECA 32 module or
* a flow meter, connected to the M-Bus terminals

The water amount is displayed in m³.



MENU > Settings > Water meter

CW consump. (A333.2 / A333.3)		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	-
Amount of refill water injected into the heating installation. The displayed value is in m³.		

MENU > Settings > Water meter

Pulse value	**1x513**
Setting of the value of each pulse from the water (flow) meter. This parameter is used when the water meter is connected to the "Pulse 1" on the ECA 32 module.	

See Appendix “Parameter ID overview”

MENU > Settings > Water meter

Preset	**1x514**
Is used for resetting the measured water consumption (registered by the water meter). Via the Modbus communication a value can be preset to a defined value, for example if the water meter is replaced.	

See Appendix “Parameter ID overview”

OFF: Normal status.

ON: The registered amount of water is reset to 0 (zero). The setting returns to OFF.

5.14 Flow meter

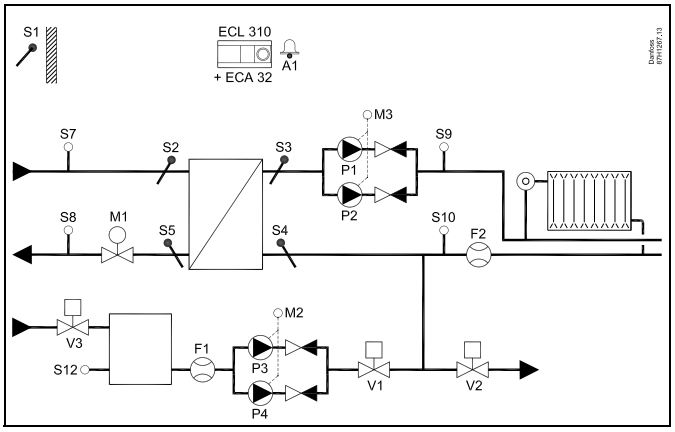
Applications A333.2 / A333.3

A flow meter, F2, can measure the circulating water flow in the heating installation.

The flow at F2 is measured by means of:

* a flow meter, giving a 0 - 10 volt signal and applied to S13 on the ECA 32 module or
* a flow meter, giving pulses and applied to "Pulse 2" on the ECA 32 module or
* a flow meter, connected to the M-Bus terminals.

The water flow can be displayed in l / h (liters / hour) or m^3 / h (cubic meters / hour).



MENU > Settings > Flow meter

Actual (A333.2 / A333.3)		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	***)**
Actual flow in the heating installation. *The displayed value is in l / h.* *Flow meter F2 giving a 0 - 10 volt signal:* *The voltage signal is applied to the input S13 and is converted to the displayed flow value.* *Access to conversion (scale) settings.*		

***)** 2.0 volt = 0 l/h, 10.0 volt = 1000 l/h

The flow is measured by means of a 0 - 10 volt signal.

The measured voltage must be converted to a flow value by the controller.

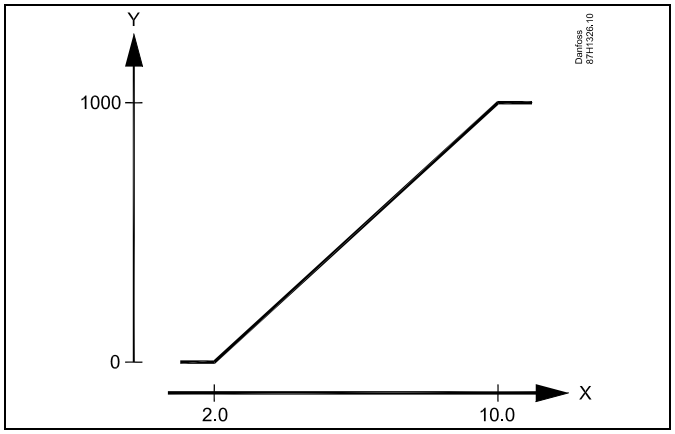
The following procedure sets up the conversion:
Push the dial to see the graph and enter the value sets for the 2 input voltages and related flow values.
Flow value range: 0 … 1000 l/h.

The factory set voltage values (2.0 volt and 10.0 volt) can be changed in the following two separate menues "Low X" and "High X".

Factory settings: 2.0 , 0 (= 2.0 V / 0 l/h) and 10.0 , 1000 (= 10,0 V / 1000 l/h)

This means that the "Flow" is 0.0 l/h at 2.0 V and 1000 l/h at 10.0 V.

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



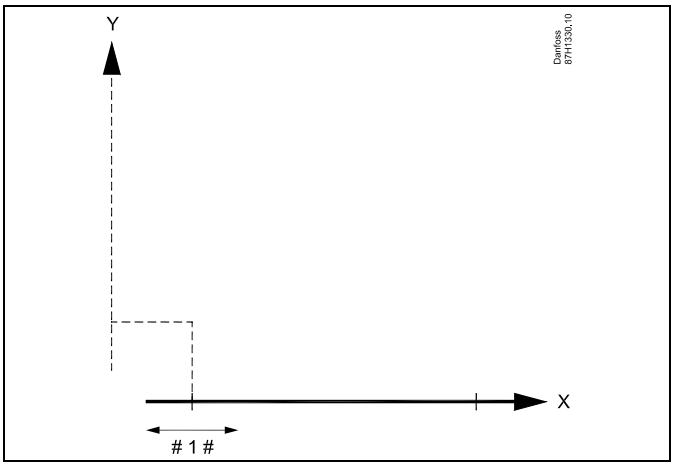
X = Volt

Y = Liter / hour

This scaling menu is always displayed, regardless a flow signal is applied.
The flow is indicated as 0.0 l/h when the flow signal is not applied.

MENU > Settings > Flow meter

Low X (A333.2 / A333.3)		17607
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**2.0 V**
Definition of which voltage value corresponds to which water flow value. The voltage (as a 0 - 10 volt signal) comes from a flow meter and is applied to input S13 (ECA 32). This input voltage is converted to display a water flow value (in m³ / h). See also "Actual" and "High X".		



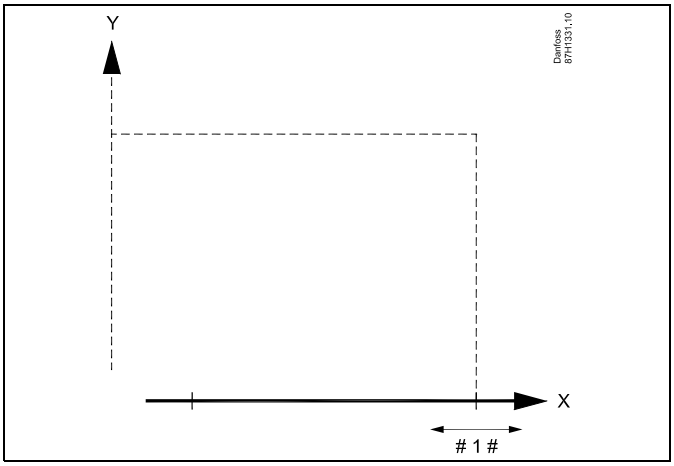
X = Volt

Y = Flow (m³ / h)

1 # = Low X

MENU > Settings > Flow meter

High X (A333.2 / A333.3)		17608
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**10.0 V**
Definition of which voltage value corresponds to which water level value. The voltage (as a 0 - 10 volt signal) comes from a flow meter and is applied to input S13 (ECA 32). This input voltage is converted to display a water flow value (in m³ / h). See also "Actual" and "Low X".		



X = Volt

Y = Flow (m³ / h)

1 # = High X

MENU > Settings > Flow meter

Input type (A333.2 / A333.3)		17109
Circuit	*Setting range*	*Factory setting*
1	**AM1 / IM1 / EM1 . . . EM5 / OFF**	**OFF**
Setting of the signal type from the flow meter F2.		

AM1: F2 sends analogue signal (0 - 10 volt), applied to S13 on ECA 32.

IM1: F2 sends pulse signal, applied to "Pulse 2" on ECA 32.

EM1 - EM5: F2 sends signal via M-Bus.

OFF: No F2 signal.

MENU > Settings > Flow meter

Pulse (A333.2 / A333.3)		**17114**
Circuit	*Setting range*	*Factory setting*
1	**OFF / 1 . . . 9999 l**	**OFF**
Choice of flow meter type. *Setting of the value of each pulse from the flow meter. This parameter is used when the flow meter is connected to the "Pulse 2" on the ECA 32 module.*		

OFF: Flow signal comes from an analogue meter or an M-bus connected meter.

1 - 9999: Setting of the value of each pulse from the flow meter.

MENU > Settings > Flow meter

Units (A333.2 / A333.3)		**17115**
Circuit	*Setting range*	*Factory setting*
1	**l/h / m³/h**	**l/h**
Setting of desired unit for the read-out of actual flow.		

5.15 S7, S8, S9, S10 pressure

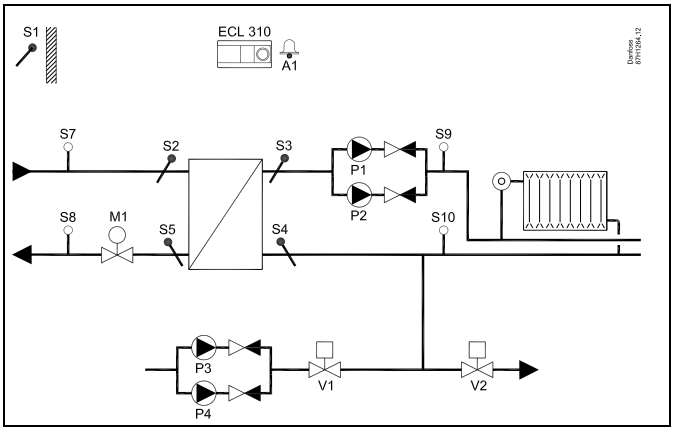
Pressure measuring

The pressures at S7, S8, S9 and S10 are measured by means of pressure transmitters, all giving a 0 - 10 volt signal in relation to the measured pressure.

Alternatively, other pressure transmitter types can give a 4 - 20 mA signal in relation to the measured pressure.

As described in the section "Electrical connections, Pt 1000 temperature sensors and signals" the 4 - 20 mA can be sent through (for example) a 500 ohm resistor in order to convert the current signal to a voltage signal. (4 - 20 mA through a resistor of 500 ohm gives a voltage of 2 - 10 volt).

In this section the set-up procedure for pressure transmitters S7, S8, S9 and S10 is described commonly.



Overview, pressures in an A333 application:

Name:	Place:	Description:
S7	Primary supply	for monitoring purpose
S8	Primary return	for monitoring purpose
S9	Secondary flow	mandatory for circulation pump control
S10	Secondary return	mandatory for refill water function and circulation pump control

MENU > Settings > S7, S8, S9, S10 pressure

Pressure (S7, S8, S9, S10)		**Read-out**
Circuit	*Setting range*	*Factory setting*
1	-	***)**
The pressure is indicated as a value measured in bar. A 0 - 10 volt signal comes directly from a pressure transmitter (voltage output) or converted by means of a resistor from a pressure transmitter (current output). The voltage signal is applied to the input in question and is converted to the displayed pressure value. Access to conversion (scale) settings.		

***)** 2.0 volt = 0.0 bar, 10.0 volt = 20.0 bar

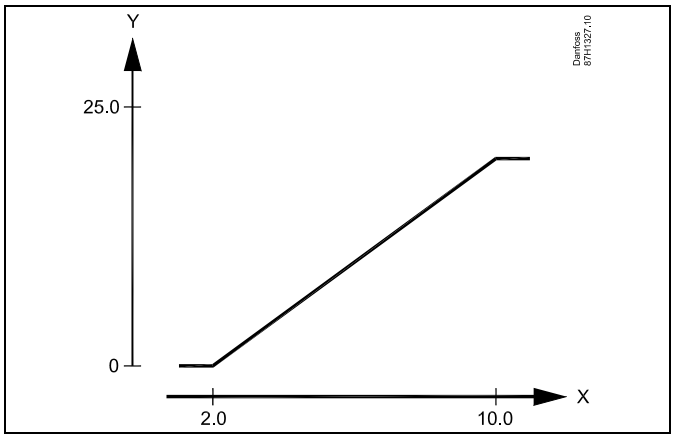
The pressure is measured by means of a 0 - 10 volt signal. The measured voltage must be converted to a pressure value by the controller.

The following procedure sets up the conversion:
Push the dial to see the graph and enter the value sets for the 2 input voltages and related pressure values.
Pressure value range: 0.0 … 25.0 bar.

The factory set voltage values (2.0 volt and 10.0 volt) can be changed in the following two separate menues "Low X" and "High X".

Factory settings: 2.0 , 0 (= 2.0 V / 0 l/h) and 10.0 , 1000 (= 10,0 V / 1000 l/h)

This means that the "Pressure" is 00 bar at 2.0 V and 2.,0 bar at 10.0 V. Typically, the higher the voltage, the higher the displayed pressure.



X = Volt

Y = Pressure (bar)

This scaling menu is always displayed, regardless a pressure signal is applied.
The pressure is indicated as 0.0 bar when the pressure signal is not applied.

ID no. overview, S7, S8, S9 and S10 pressure:

	Filter constant	**Low X**	**High X**
S7	14113	14607	14608
S8	13113	13607	13608
S9	12113	12607	12608
S10	11113	11607	11608

MENU > Settings > S7, S8, S9, S10 pressure

Filter constant (S7, S8, S9, S10)		**1x113**
Circuit	*Setting range*	*Factory setting*
1	**1 - 250**	**4**
The filter constant dampens the pressure signal from the pressure transmitter in order to make a stable read-out and related functions.		

See Appendix “Parameter ID overview”

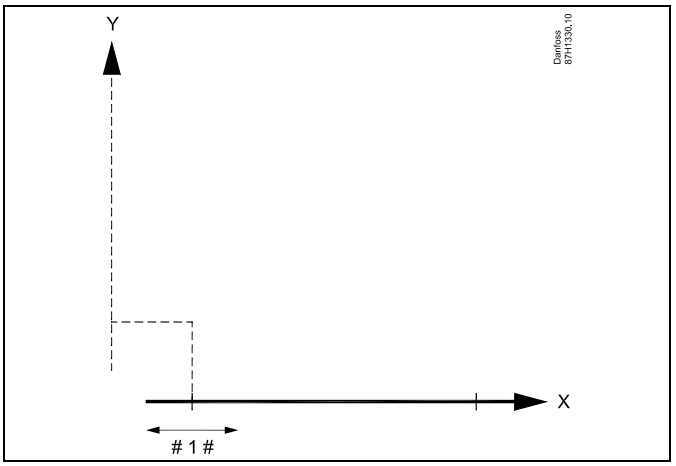
1: Minor dampening (low filter constant)

250: Major dampening (high filter constant)

MENU > Settings > S7, S8, S9, S10 pressure

Low X (S7, S8, S9, S10)		1x607
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**2.0 V**

Definition of which voltage value corresponds to which pressure value.
The voltage (as a 0 - 10 volt signal) comes from a pressure transmitter and is applied to input S7 (S8, S9, S10).
This input voltage is converted to display a pressure value (in bar).
See also "Pressure" and "High X".

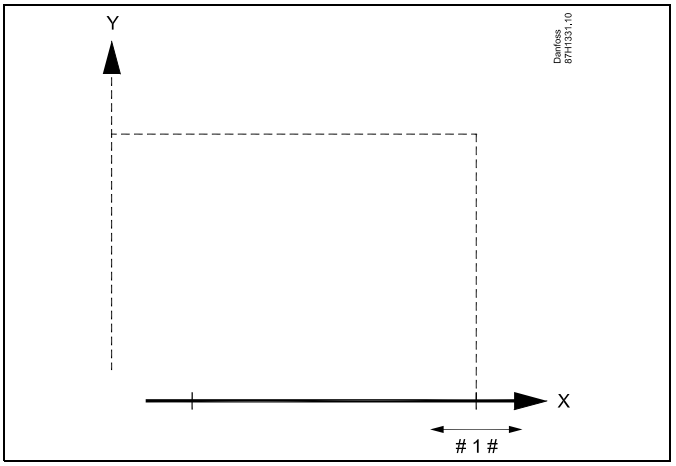


X = Volt
Y = Pressure (bar)
# 1 # = Low X

MENU > Settings > S7, S8, S9, S10 pressure

High X (S7, S8, S9, S10)		1x608
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 10.0 V**	**10.0 V**

Definition of which voltage value corresponds to which pressure value.
The voltage (as a 0 - 10 volt signal) comes from a pressure transmitter and is applied to input S7 (S8, S9, S10).
This input voltage is converted to display a pressure value (in bar).
See also "Pressure" and "Low X".



X = Volt
Y = Pressure (bar)
# 1 # = High X

5.16 Alarm

The alarm function activates A1 (relay 6). The alarm relay can activate a lamp, a horn, an input to an alarm transmitting device etc.

The alarm relay is activated

- as long as the alarm reason is present (automatic reset) or
- even the alarm reason has disappeared (manual reset)

Alarm, possibilities:

Name:	Description:	Reset:
Temp. monitor	Actual flow temperature differs from the desired flow temperature.	Automatic
Refill tank (A333.2, A333.3)	Too low or too high water level in refill water storage tank.	Manual
S7 . . . S10 pressure	Too low or too high pressure.	Automatic
Low pressure	Too low pressure at S10.	Automatic
Temperature sensor input	Accidently break or short-circuit of connected temperature sensor.	Manual

Resetting an alarm, in general:
MENU > Alarm > Alarm overview: Look for alarm symbol in specific line.
(Example: "3: Pump 1")
Push dial

MENU > Settings > Alarm

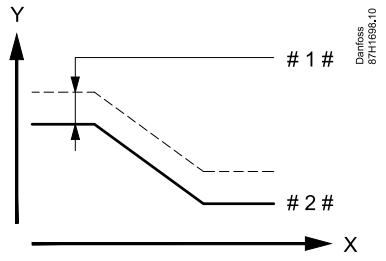
Upper difference	1x147
The alarm is activated if the actual flow temperature increases more than the set difference (acceptable temperature difference above the desired flow temperature). See also 'Delay'.	

See Appendix “Parameter ID overview”

OFF: The related alarm function is not active.

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

Upper difference



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

MENU > Settings > Alarm

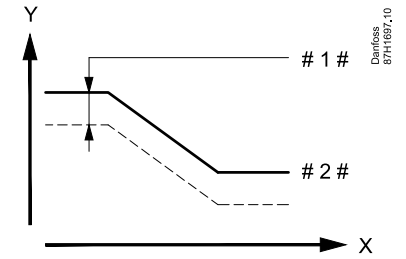
Lower difference	1x148
The alarm is activated if the actual flow temperature decreases more than the set difference (acceptable temperature difference below the desired flow temperature). See also 'Delay'.	

See Appendix "Parameter ID overview"

OFF: The related alarm function is not active.

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

Lower difference



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

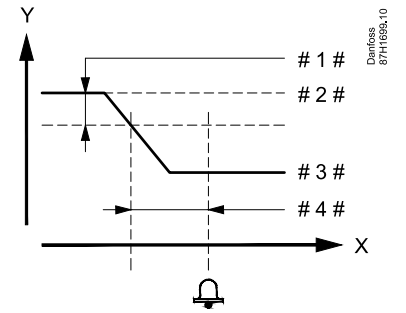
MENU > Settings > Alarm

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

See Appendix "Parameter ID overview"

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

Delay, example



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

MENU > Settings > Alarm

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

See Appendix "Parameter ID overview"

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

MENU > Settings > Alarm

Alarm high (A333.2 / A333.3)		**16614**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 25.0 m**	**25.0 m**
Alarm is activated when the refill water storage tank level (in meter) gets higher than the set value. *See also: "Alarm low" (ID no. 16615) and "Alarm time-out" (ID no. 16617).*		

0.0 - 25.0: Set the high alarm level

When the "Alarm high" or "Alarm Low" alarm is activated:

* the alarm symbol appears in the display
* the refill water tank valve V3 closes
* the refill water valve V1 closes
* the refill water pump stops

If the alarm reason disappears:

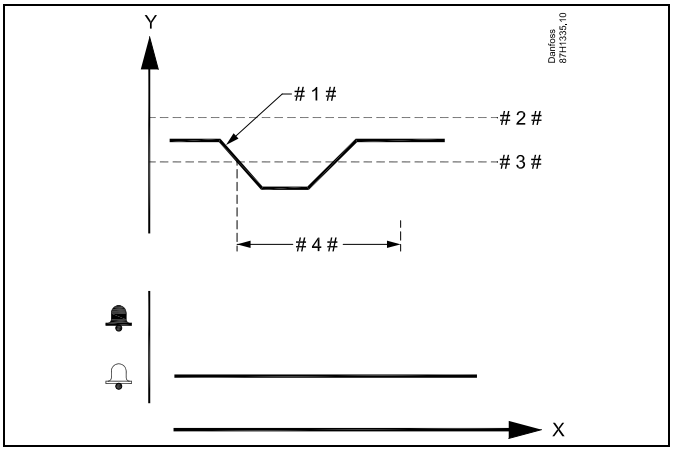
* the alarm must be reset manually

Resetting an alarm:
MENU > Alarm > Alarm overview > "5: Refill tank": Push dial

MENU > Settings > Alarm

Alarm low (A333.2 / A333.3)		**16615**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 25.0 m**	**0.0 m**
Alarm is activated when the refill water storage tank level (in meter) gets lower than the set value. *See also: "Alarm high" (ID no. 16614) and "Alarm time-out" (ID no. 16617).*		

0.0 - 25.0: Set the low alarm level.

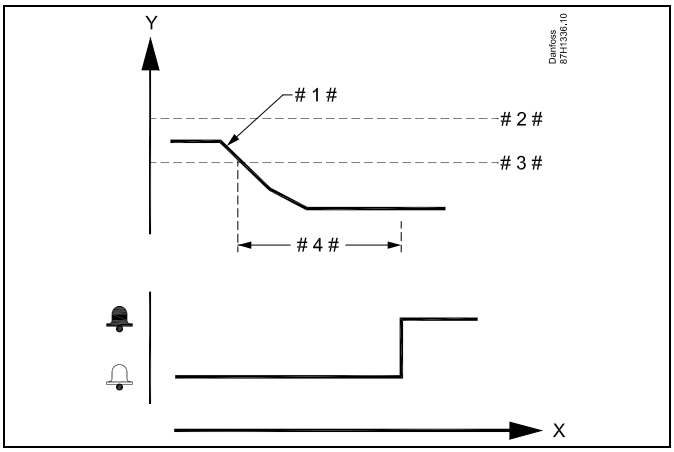


X = Time
Y = Level
# 1 # = Actual level
# 2 # = Alarm high
# 3 # = Alarm low
# 4 # = Alarm time-out

MENU > Settings > Alarm

Alarm time-out (A333.2 / A333.3)		**16617**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 250 s**	**15 s**
If an alarm condition from either 'Alarm high' or 'Alarm low' is present for a longer time than the set Alarm time-out (in seconds), the alarm function is activated. See also: "Alarm high" (ID no. 16614) and "Alarm low" (ID no. 16615).		

0 - 250: Set the time-out time.



X = Time
Y = Level
# 1 # = Actual level
# 2 # = Alarm high
# 3 # = Alarm low
# 4 # = Alarm time-out

ID no. overview for S7, S8, S9 and S10 alarm:

	Alarm high	**Alarm low**	**Alarm time-out**
S7	14614	14615	14617
S8	13614	13615	13617
S9	12614	12615	12617
S10	11614	11615	11617

MENU > Settings > Alarm

Alarm high		**1x614**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 25.0 bar**	**25.0 bar**
Alarm is activated when the pressure (in bar) gets higher than the set value.		

0.0 - 25.0: Set the high alarm level

MENU > Settings > Alarm

Alarm low		**1x615**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 25.0 bar**	**25.0 bar**
Alarm is activated when the pressure (in bar) gets lower than the set value.		

0.0 - 25.0: Set the low alarm level.

MENU > Settings > Alarm

Alarm time-out		**1x617**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 100 m**	**10 m**
If an alarm condition from either 'Alarm high' or 'Alarm low' is present for a longer time than the set Alarm time-out (in minutes), the alarm function is activated.		

0 - 100: Set the time-out time.

MENU > Settings > Alarm

Alarm low		**15615**
Circuit	*Setting range*	*Factory setting*
1	**0.0 . . . 25.0 bar**	**25.0 bar**
Alarm is activated when the pressure (in bar) at S10 gets lower than the set value. *See also "Alarm time-out" (ID no. 15617).*		

0.0 - 25.0: Set the low alarm level

When the "Low pressure" alarm is activated:

* the alarm symbol appears in the display
* the control valve M1 closes
* the circulation pump stops

If the "Low pressure" alarm reason disappears:

* the alarm symbol disappears in the display
* the control valve M1 works normal
* the circulation pump starts

MENU > Settings > Alarm

Alarm time-out		**15617**
Circuit	*Setting range*	*Factory setting*
1	**0 . . . 250 s**	**10 s**
If the alarm condition from 'Alarm low' is present for a longer time than the set Alarm time-out (in seconds), the alarm function is activated. *See also "Alarm low" (ID no. 15615).*		

0 - 100: Set the time-out time.

6.0 Common controller settings

6.1 Introduction to 'Common controller settings'

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

To enter 'Common controller settings':

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

Circuit selector

6.2 Time & Date

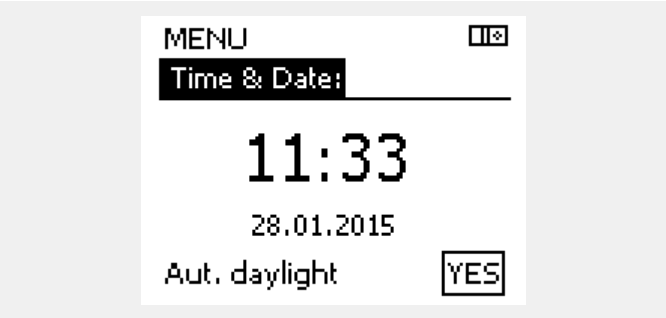
It is only necessary to set the correct date and time in connection with the first use of the ECL Comfort controller or after a power break of more than 72 hours.

The controller has a 24 hour clock.

Aut. daylight (Daylight saving time changeover)

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

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



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

How to set time and date:

Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose 'Common controller settings'	
	Confirm	
	Go to 'Time & Date'	
	Confirm	
	Place the cursor at the position to be changed	
	Confirm	
	Enter the desired value	
	Confirm	
	Move the cursor to the next position to be changed. Continue until 'Time & Date' has been set.	
	Finally move the cursor to 'MENU'	
	Confirm	
	Move the cursor to 'HOME'	
	Confirm	

6.3 Holiday

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

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

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

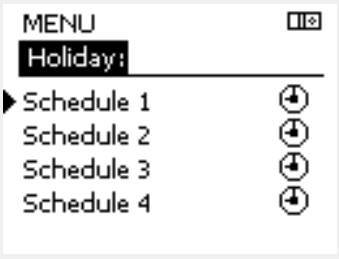
Selectable modes are Comfort, Saving, Frost protection or Comfort 7-23 (before 7 and after 23, the mode is scheduled).

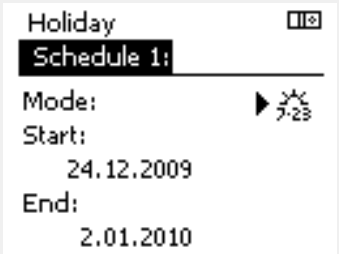
How to set your holiday schedule:

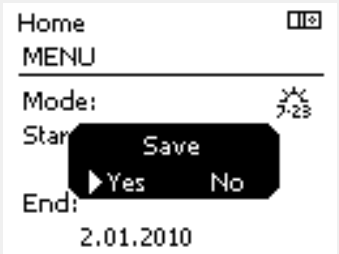
Action:	Purpose:	Examples:
	Choose 'MENU'	MENU
	Confirm	
	Choose the circuit selector at the top right corner in the display	
	Confirm	
	Choose a circuit or 'Common controller settings'	
	Heating	
	DHW	
	Common controller settings	
	Confirm	
	Go to 'Holiday'	
	Confirm	
	Choose a schedule	
	Confirm	
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

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

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







Holiday, specific circuit / Common Controller

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

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

Holiday, deleting a set period:

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

Example 1:

Circuit 1:
Holiday set to "Saving"

Common Controller:
Holiday set to "Comfort"

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

Example 2:

Circuit 1:
Holiday set to "Comfort"

Common Controller:
Holiday set to "Saving"

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

Example 3:

Circuit 1:
Holiday set to "Frost protection"

Common Controller:
Holiday set to "Saving"

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

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

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

 Day off

 Holiday

 Relaxing (extended comfort period)

 Going out (extended saving period)

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

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

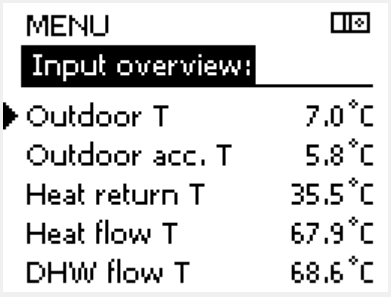
Quick guide "ECA 30 / 31 to override mode":
1. Go to ECA MENU
2. Move cursor to "Clock" symbol
3. Select the "Clock" symbol
4. Choose and select one of 4 override functions
5. Below the override symbol: Set hours or date

6.4 Input overview

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

The input overview is located in the common controller settings.

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



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

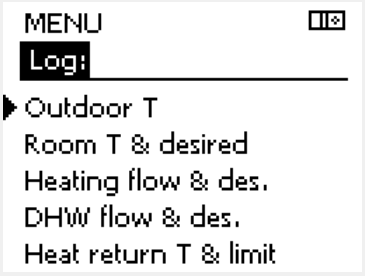
6.5 Log

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

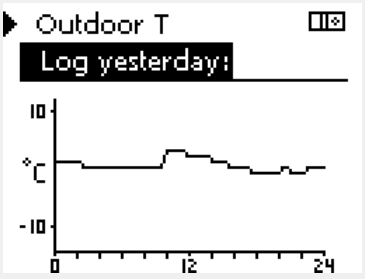
The log function (temperature history) allows you to monitor the logs of today, yesterday, the past 2 days as well as the past 4 days for the connected sensors.

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

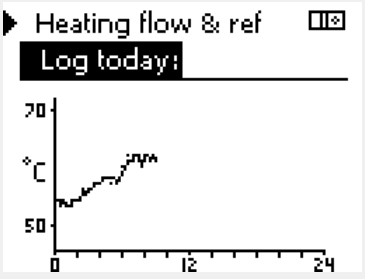
The log function is only available in the 'Common controller settings'.



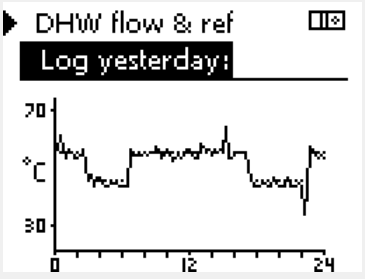
Example 1:
1 day log for yesterday showing the development in outdoor temperature during the past 24 hours.



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



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



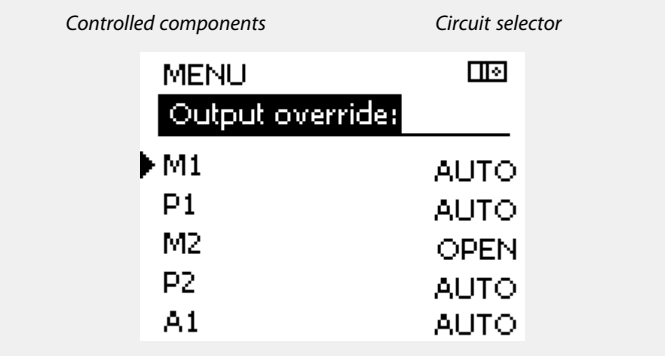
6.6 Output override

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

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

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

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



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.

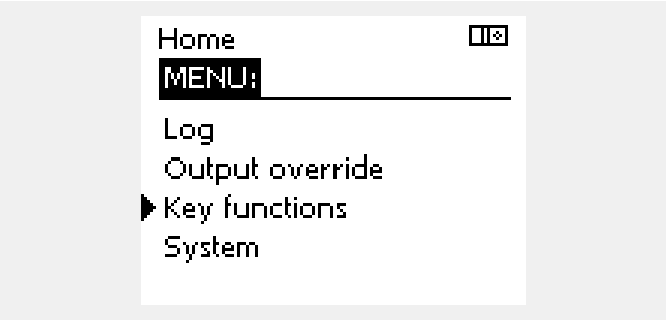
Application A333.3:
The motorized control valve M1 is controlled by a 0–10 volt (0–100%) signal. It can be set to AUTO or ON.

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



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

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

Key inserted / not inserted, description:

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

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

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

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

ECL Comfort 296 , controller versions 1.58 and up:

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

6.8 System

6.8.1 ECL version

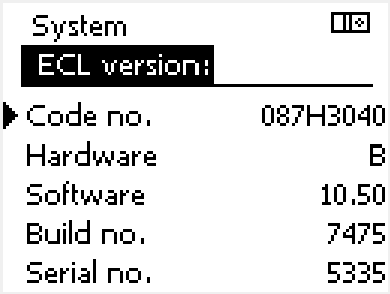
In 'ECL version' you will always be able to find an overview of the data related to your electronic controller.

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

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

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

Example, ECL version



6.8.2 Extension

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

6.8.3 Ethernet

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

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

6.8.4 Portal config

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

ECL Portal related parameters are set here.

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

6.8.5 M-bus config

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

M-bus related parameters are set here.

6.8.6 Energy meter and M-bus, general information

ECL Comfort 296 / 310 / 310B only

When using the Application Key in the ECL Comfort 296 / 310 / 310B, up to 5 energy meters can be connected to the M-bus connections.

Connection of energy meter can:

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

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

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

The ECL Comfort 296 / 310 / 310B act as an M-bus master and must be set to communicate with connected energy meter(s).
See MENU > Common controller > System > M-bus config.

Technical info:

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

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

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

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

IDLE: Normal state

INIT: The command for initialization has been activated

SCAN: The command for scanning has been activated

GATEW: The command Gateway has been activated

The ECL Comfort 296 / 310 / 310B will return to IDLE when commands have been completed.
Gateway is used for read-out of energy meter via ECL Portal.

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

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

Typically, 300 or 2400 baud is used.
If ECL Comfort 296 / 310 / 310B are connected to the ECL Portal, a baud rate of 2400 is recommendable, provided the energy meter allows this.

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

Command		**5998**
Circuit	*Setting range*	*Factory setting*
-	NONE / INIT / SCAN / GATEW	NONE
The ECL Comfort 296 / 310 / 310B are M-bus masters. In order to verify connected energy meters, different commands can be activated.		

NONE: No command activated

INIT: Initialization is activated

SCAN: Scanning is activated in order to search for connected energy meters. The ECL Comfort 296 / 310 / 310B detect the M-bus addresses of up to 5 connected energy meters and place these automatically in the "Energy meters" section. The verified address is placed after "Energy meter 1 (2, 3, 4, 5)"

GATEW: The ECL Comfort 296 / 310 / 310B act as a gateway between energy meters and ECL Portal. Used only for service.

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

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

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

0: Normally not used

1 - 250: Valid M-bus addresses

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

255: Not used

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

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

0: Small data set, small units

1: Small data set, large units

2: Large data set, small units

3: Large data set, large units

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

Data examples:

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

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

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

See also Appendix for detailed description of "Type".

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

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

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

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

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

MENU > Common controller > System > Energy meters

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

6.8.7 Raw input overview

Measured temperatures, input status and voltages are displayed.

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

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

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

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

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

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

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

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

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

6.8.8 Sensor offset (new functionality as from firmware 1.59)

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

Common controller > System > Sensor offset

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

Positive offset value: The temperature value is increased

Negative offset value: The temperature value is decreased

6.8.9 Display

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

0: Weak backlight.

10: Strong backlight.

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

0: Low contrast.

10: High contrast.

6.8.10 Communication

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

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

ECL 485 addr. (master / slave address)		2048
Circuit	*Setting range*	*Factory setting*
	0 ... 15	15
This settting is relevant if more controllers are working in the same ECL Comfort system (connected via the ECL 485 communication bus) and / or Remote Control Units (ECA 30 / 31) are connected.		

0: The controller works as slave.
The slave receives information about the outdoor temperature (S1), system time, and signal for DHW demand in the master.

1 ... 9: The controller works as slave.
The slave receives information about the outdoor temperature (S1), system time, and signal for DHW demand in the master. The slave sends information about the desired flow temperature to the master.

10 ... 14: Reserved.

15: The ECL 485 communication bus is active.
The controller is master. The master sends information about the outdoor temperature (S1) and system time.
Connected Remote Control Units (ECA 30 / 31) are powered.

The ECL Comfort controllers can be connected via the ECL 485 communication bus to perform a larger system (the ECL 485 communication bus can connect to max. 16 devices).

Each slave must be configured with its own address (1 ... 9).

However, more slaves can have the address 0 if they only have to receive information about outdoor temperature and system time (listeners).

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

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

0: Reset not activated.

1: Reset.

The total cable length of max. 200 m (all devices incl. the internal ECL 485 communication bus) should not be exceeded.
Cable lengths of more than 200 m may cause noise sensibility (EMC).

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

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

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

6.8.11 Language

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

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

7.0 Miscellaneous

7.1 ECA 30 / 31 setup procedures

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

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

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

Connections: See the section 'Electrical connections'.

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

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

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

Menu structure

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

The ECA MENU contains:

- ECA settings
- ECA system
- ECA factory

ECA settings: Offset adjustment of the measured room temperature.

Offset adjustment of relative humidity (ECA 31 only).

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

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

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

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

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

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

The ECL menus are as described for the ECL controller.

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

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

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

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

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

Display part of ECA 30 / 31:

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

Display part of ECA 30 / 31:

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

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

ECA MENU > ECA settings > ECA sensor

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

Example:

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

Minus value: The indicated room temperature is lower.

0.0 K: No correction of the measured room temperature.

Plus value: The indicated room temperature is higher.

ECA MENU > ECA settings > ECA sensor

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

Example:

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

Minus value: The indicated relative humidity is lower.

0.0 %: No correction of the measured relative humidity.

Plus value: The indicated relative humidity is higher.

ECA MENU > ECA system > ECA display

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

0: Weak backlight.

10: Strong backlight.

ECA MENU > ECA system > ECA display

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

0: Low contrast.

10: High contrast.

ECA MENU > ECA system > ECA display

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

OFF: Simple remote control, no room temperature signal.

ON: Remote control, room temperature signal is available.

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

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

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

ECA MENU > ECA system > ECA communication

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

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

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

For installation of an application in an ECL Comfort 210 / 296 / 310 controller the 'Slave addr.' must be A.

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

ECA MENU > ECA system > ECA communication

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

1 .. 9: Slave controllers.

15: Master controller.

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

Example:

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

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

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

ECA MENU > ECA system > ECA override

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

OFF: Override not possible.

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

15: Address of master controller for override.

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

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

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

ECA MENU > ECA system > ECA override

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

OFF: No heating circuit is selected for override.

1 … 4: The heating circuit number in question.

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

Example 1:

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

Example 2:

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

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

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

ECA MENU > ECA system > ECA version

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

The ECA version information is useful in service situations.

ECA 30 / 31:

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

ECA MENU > ECA factory > ECA clear apps.

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

NO: The erase procedure is not done.

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

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

ECA MENU > ECA factory > ECA default

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

NO: The restore procedure is not done.

YES: The restore procedure is done.

ECA MENU > ECA factory > Reset ECL addr.

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

NO: The reset procedure is not done.

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

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

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

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

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

ECA MENU > ECA factory > Update firmware

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

NO: The updating procedure is not done.

YES: The updating procedure is done.

The ECA 30 / 31 automatically verifies if a new firmware is present on the application key in the ECL Comfort controller.
The ECA 30 / 31 is automatically updated at new application upload in the ECL Comfort controller.
The ECA 30 / 31 is not automatically updated when connected to an ECL Comfort controller with uploaded application. A manual update is always possible.

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

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

7.2 Override function

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

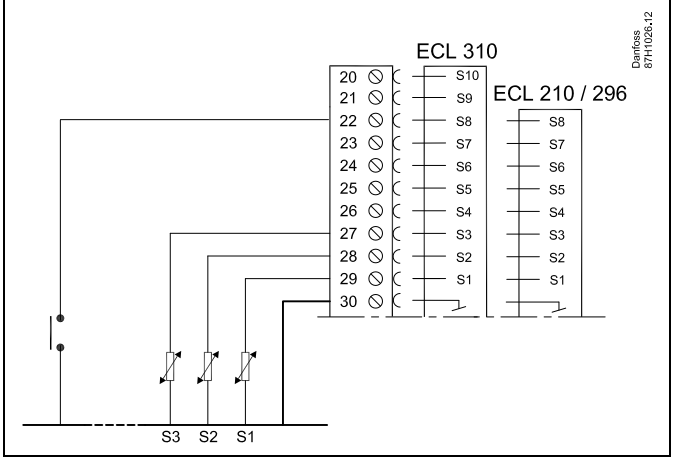
Different override modes can be selected, depending on application key type.

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

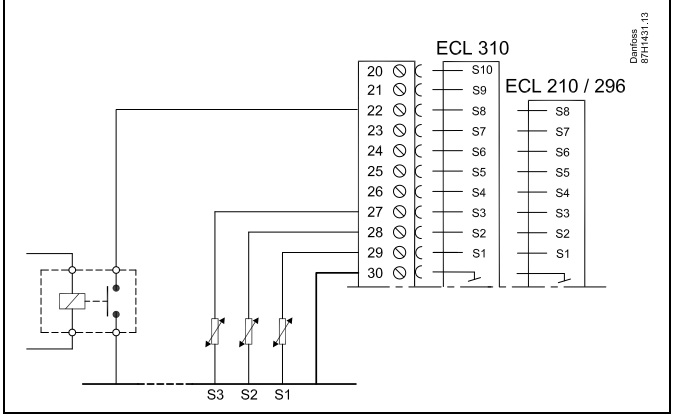
"Comfort" is also called normal heating temperature.
"Saving" can be reduced heating or heating stopped.
"Constant temperature" is a desired flow temperature, set in the menu "Flow temperature".
"Frost protection" stops the heating totally.

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

Example, override switch connected to S8:



Example, override relay connected to S8:



Example 1

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

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

Settings in ECL:

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

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

   Select COMFORT
3. Select circuit > MENU > Schedule:

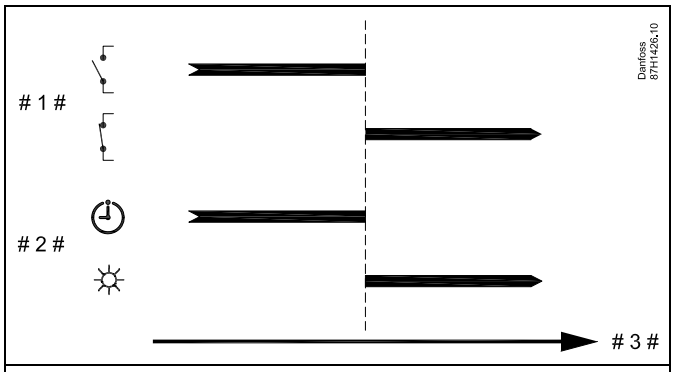
   Select all weekdays

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

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

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

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



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

Example 2

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

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

Settings in ECL:

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

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

   Select SAVING
3. Select circuit > MENU > Schedule:

   Select all weekdays

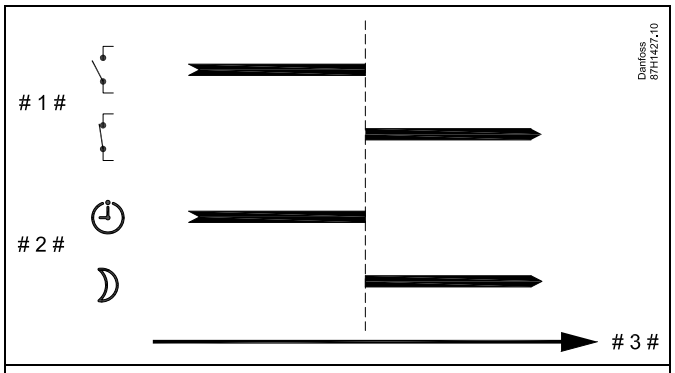
   Set "Start1" to 00.00

   Set "Stop1" to 24.00

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

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

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



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

Example 3

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

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

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

Settings in ECL:

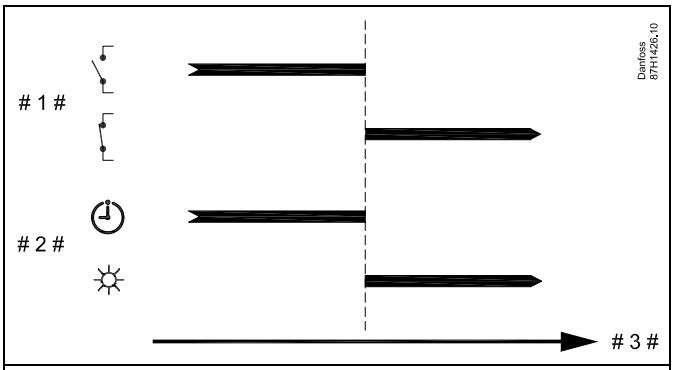
1. Select circuit > MENU > Settings > Application > Ext. input:

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

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

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

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



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

Example 4

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

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

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

Settings in ECL:

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

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

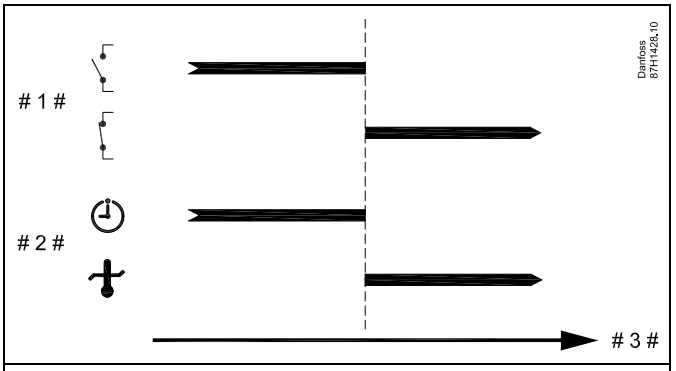
   Select CONST. T
3. Select circuit > MENU > Settings > Flow temperature >

   Desired T (ID 1x004):

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

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

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



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

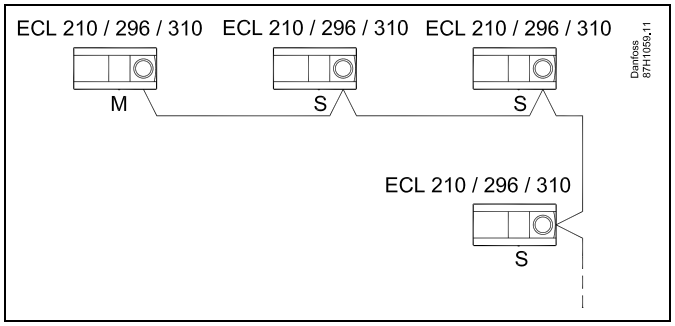
7.3 Several controllers in the same system

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

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

Furthermore, the master controller can receive information about:

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SLAVE controller:
Set the desired function:

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

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

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

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

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

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

SLAVE controller:

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

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

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

SLAVE controller:

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

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

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

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

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

7.4 Frequently asked questions

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

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

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

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

The ECL Application Key is lost?
Switch the power off and on again to see the ECL controller type, version code (e.g. 1.52), code no. and application (e.g. A266.1) or go to 'Common controller settings' >'Key functions' > 'Application'. The system type (e.g. TYPE A266.1) and the system diagram is displayed.
Order a replacement from your Danfoss representative (e.g. ECL Application Key A266).
Insert the new ECL Application Key and copy your personal settings from the controller to the new ECL Application Key, if required.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Language

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

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

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

How to set a correct heat curve?

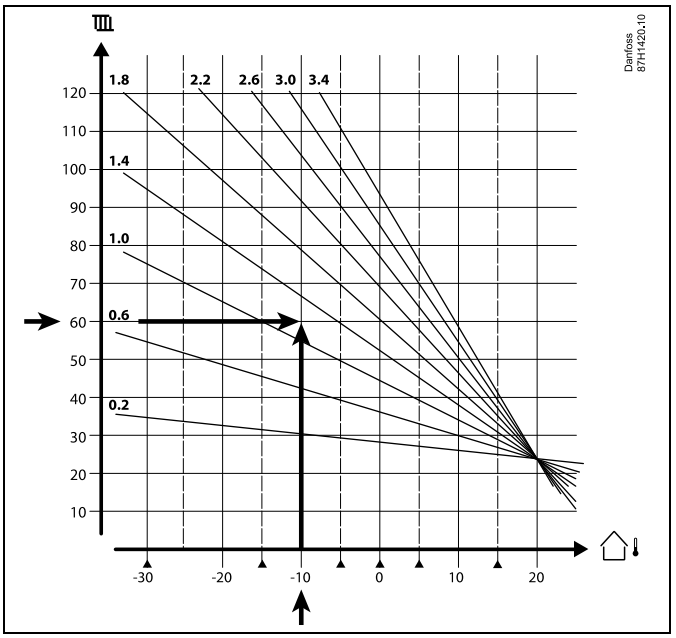
Short answer:
Set the heat curve to the lowest possible value, but still having comfortable room temperature.

The table shows some recommendations:

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

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

See the heat curve slope diagram.



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

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

In general:

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

7.5 Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Heating circuit
The circuit for heating the room / building.

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

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

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

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

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

Log function
The temperature history is displayed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.6 Type (ID 6001), overview

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

7.7 Automatic / manual update of firmware

Info:

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

Situation 1:

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

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

Situation 2:

ECL Comfort controller is installed and runs an application.

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

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

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

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

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

7.8 Parameter ID overview

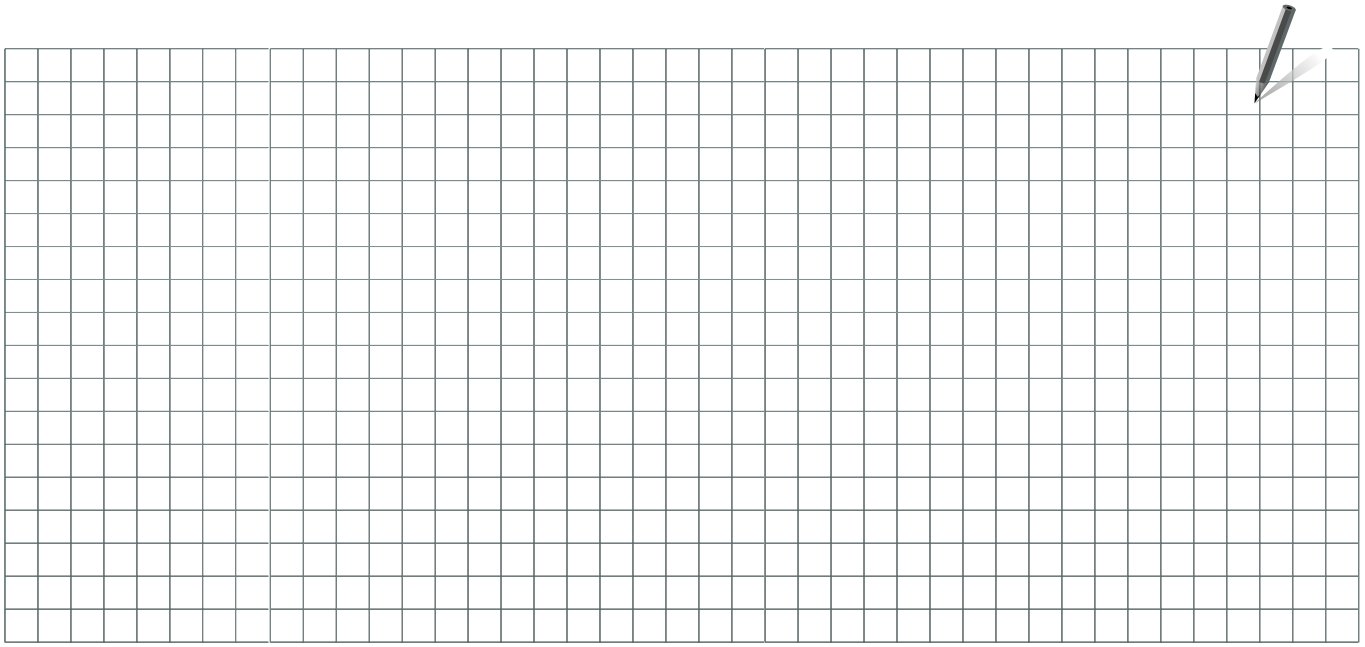
A333.x — **x** refers to the subtypes listed in the column.

ID	Parameter Name	A333.x	Setting range	Factory	Unit	Own settings	
11010	ECA addr.	2, 3	0 ... 0	0			
11011	Auto saving	1, 2, 3	OFF, -29 ... 10	-15	°C		85
11012	Boost	1, 2, 3	OFF, 1 ... 99	OFF	%		85
11013	Ramp	1, 2, 3	OFF, 1 ... 99	OFF	Min		86
11014	Optimizer	1, 2, 3	OFF, 10 ... 59	OFF			86
11017	Demand offset	1, 2, 3	OFF, 1 ... 20	OFF	K		116
11021	Total stop	1, 2, 3	OFF ; ON	OFF			88
11022	P exercise	1, 2, 3	OFF, 1 ... 200	OFF	Sec		
11023	M exercise	1, 2, 3	OFF ; ON	OFF			116
11026	Pre-stop	1, 2, 3	OFF ; ON	ON			87
11031	High T out X1	1, 2, 3	-60 ... 20	15	°C		79
11032	Low limit Y1	1, 2, 3	10 ... 150	40	°C		79
11033	Low T out X2	1, 2, 3	-60 ... 20	-15	°C		79
11034	High limit Y2	1, 2, 3	10 ... 150	60	°C		79
11035	Infl. - max.	1, 2, 3	-9.9 ... 9.9	0.0			80
11036	Infl. - min.	1, 2, 3	-9.9 ... 9.9	0.0			80
11037	Adapt. time	1, 2, 3	OFF, 1 ... 50	25	Sec		81
11052	DHW priority	1, 2, 3	OFF ; ON	OFF			116
11077	P frost T	1, 2, 3	OFF, -10 ... 20	2	°C		117
11078	P heat T	1, 2, 3	5 ... 40	20	°C		117
11085	Priority	1, 2, 3	OFF ; ON	OFF			81
11093	Frost pr. T	1, 2, 3	5 ... 40	10	°C		117
11109	Input type	1, 2, 3	EM1 ; EM2 ; EM3 ; EM4 ; EM5 ; OFF	OFF			
11112	Adapt. time	1, 2, 3	OFF, 1 ... 50	OFF	Sec		83
11113	Filter constant	1, 2, 3	1 ... 50	10			
11115	Units	1, 2, 3	ml, l/h ; l, l/h ; ml, m3/h ; l, m3/h ; Wh, kW ; kWh, kW ; kWh, MW ; MWh, MW ; MWh, GW ; GWh, GW	ml, l/h			84
11116	High limit Y2	1, 2, 3	0.0 ... 999.9	999.9			83
11117	Low limit Y1	1, 2, 3	0.0 ... 999.9	999.9			83
11118	Low T out X2	1, 2, 3	-60 ... 20	-15	°C		83
11119	High T out X1	1, 2, 3	-60 ... 20	15	°C		82
11141	Ext. input	1, 2, 3	OFF ; S1 ; S2 ; S3 ; S4 ; S5 ; S6 ; S7 ; S8 ; S9 ; S10 ; S11 ; S12 ; S13 ; S14 ; S15 ; S16	OFF			
11142	Ext. mode	1, 2, 3	COMFORT ; SAVING	COMFORT			
11147	Upper difference	1, 2, 3	OFF, 1 ... 30	OFF	K		127

ID	Parameter Name	A333.x	Setting range	Factory	Unit	Own settings	
11148	Lower difference	1, 2, 3	OFF, 1 ... 30	OFF	K		127
11149	Delay	1, 2, 3	0 ... 250	180	Sec		128
11150	Lowest temp.	1, 2, 3	10 ... 50	30	°C		128
11174	Motor pr.	1, 2, 3	OFF, 10 ... 59	OFF	Min		92
11177	Temp. min.	1, 2, 3	10 ... 150	10	°C		78
11178	Temp. max.	1, 2, 3	10 ... 150	90	°C		78
11179	Summer, cut-out	1, 2, 3	OFF, 1 ... 50	20	°C		88
11184	Xp	1, 2, 3	5 ... 250	80	K		
11185	Tn	1, 2, 3	1 ... 999	30	Sec		93
11186	M run	1, 2	5 ... 250	60	Sec		93
11187	Nz	1, 2, 3	1 ... 9	3	K		
11189	Min. act. time	1, 2	2 ... 50	10			94
11310	Retry time	1, 2, 3	OFF, 1 ... 99	OFF	Min		
11311	Change, duration	1, 2, 3	1 ... 60	7			
11312	Change time	1, 2, 3	0 ... 23	12			
11313	Stab. time	1, 2, 3	1 ... 99	50	Sec		
11314	Chan.-over time	1, 2, 3	OFF, 1 ... 99	15	Sec		
11316	Alarm handling	1, 2, 3	OFF ; ON	OFF			
11318	Max. pressure	1, 2, 3	0.0 ... 40.0	40.0	Bar		
11319	Max. press. diff.	1, 2, 3	-5.0 ... -0.1	-0.5	Bar		
11320	P exercise	1, 2, 3	OFF, 1 ... 200	OFF	Sec		
11321	Pressure, des.	1, 2, 3	0.2 ... 25.0	3.0	Bar		
11322	Pressure, diff.	1, 2, 3	0.1 ... 5.0	1.5	Bar		
11323	Time-out	1, 2, 3	1 ... 1000	10	Min		
11325	Valve delay	1, 2, 3	0 ... 30	1	Sec		
11326	No. of pumps	1, 2, 3	1 ... 2	1			
11330	Wake up level	2, 3	0 ... 100	40	%		
11331	Sleep level	2, 3	OFF, 1 ... 100	20	%		
11332	Sleep mode time	2, 3	0 ... 300	10	Sec		
11333	Boost	2, 3	0 ... 100	5	%		
11500	Send desired T	1, 2, 3	OFF ; ON	ON			116
11607	Low X	1, 2, 3	0.0 ... 10.0	2.0	V		
11608	High X	1, 2, 3	0.0 ... 10.0	10.0	V		
11609	Low Y	1, 2, 3	0.0 ... 25.0	0.0	Bar		
11610	High Y	1, 2, 3	0.0 ... 25.0	25.0	Bar		
11614	Alarm high	1, 2, 3	0.0 ... 25.0	25.0	Bar		130
11615	Alarm low	1, 2, 3	0.0 ... 25.0	0.0	Bar		130
11617	Alarm time-out	1, 2, 3	0 ... 100	10	Min		130
12113	Filter constant	1, 2, 3	1 ... 250	2			
12165	V out max.	2, 3	0 ... 100	100	%		
12167	V out min.	2, 3	0 ... 100	0	%		

ID	Parameter Name	A333.x	Setting range	Factory	Unit	Own settings	
12184	Xp	2, 3	5 ... 250	10	Bar		
12185	Tn	2, 3	1 ... 999	5	Sec		93
12187	Nz	2, 3	0.0 ... 2.0	1.0	Bar		
12197	Td	2, 3	0 ... 250	0	Sec		
12311	Change, duration	1, 2, 3	OFF, 1 ... 60	7	day		
12316	Alarm handling	1, 2, 3	OFF ; ON	OFF			
12322	Pressure, diff.	2, 3	0.1 ... 5.0	1.5	Bar		
12607	Low X	1, 2, 3	0.0 ... 10.0	2.0	V		
12608	High X	1, 2, 3	0.0 ... 10.0	10.0	V		
12609	Low Y	1, 2, 3	0.0 ... 25.0	0.0	Bar		
12610	High Y	1, 2, 3	0.0 ... 25.0	25.0	Bar		
12614	Alarm high	1, 2, 3	0.0 ... 25.0	25.0	Bar		130
12615	Alarm low	1, 2, 3	0.0 ... 25.0	0.0	Bar		130
12617	Alarm time-out	1, 2, 3	0 ... 100	10	Min		130
13113	Filter constant	1, 2, 3	1 ... 250	4			
13165	V out max.	2, 3	0 ... 100	100	%		
13167	V out min.	2, 3	0 ... 100	0	%		
13184	Xp	2, 3	5 ... 250	25	Bar		
13185	Tn	2, 3	1 ... 999	25	Sec		93
13187	Nz	2, 3	0.1 ... 2.0	0.4	Bar		
13197	Td	2, 3	0 ... 250	0	Sec		
13322	Pressure, diff.	1, 2, 3	0.1 ... 5.0	1.5	Bar		
13513	Pulse value	2, 3	0.1 ... 1000.0	10.0	l		120
13514	Preset	2, 3	OFF ; ON	OFF			120
13607	Low X	1, 2, 3	0.0 ... 10.0	2.0	V		
13608	High X	1, 2, 3	0.0 ... 10.0	10.0	V		
13609	Low Y	1, 2, 3	0.0 ... 25.0	0.0	Bar		
13610	High Y	1, 2, 3	0.0 ... 25.0	25.0	Bar		
13614	Alarm high	1, 2, 3	0.0 ... 25.0	25.0	Bar		130
13615	Alarm low	1, 2, 3	0.0 ... 25.0	0.0	Bar		130
13617	Alarm time-out	1, 2, 3	0 ... 100	10	Min		130
14113	Filter constant	1, 2, 3	1 ... 250	4			
14607	Low X	1, 2, 3	0.0 ... 10.0	2.0	V		
14608	High X	1, 2, 3	0.0 ... 10.0	10.0	V		
14609	Low Y	1, 2, 3	0.0 ... 25.0	0.0	Bar		
14610	High Y	1, 2, 3	0.0 ... 25.0	25.0	Bar		
14614	Alarm high	1, 2, 3	0.0 ... 25.0	25.0	Bar		130
14615	Alarm low	1, 2, 3	0.0 ... 25.0	0.0	Bar		130
14617	Alarm time-out	1, 2, 3	0 ... 100	10	Min		130
15113	Filter constant	2, 3	1 ... 250	2			
15607	Low X	2, 3	0.0 ... 10.0	2.0	V		

ID	Parameter Name	A333.x	Setting range	Factory	Unit	Own settings	
15608	High X	2, 3	0.0 ... 10.0	10.0	V		
15609	Low Y	2, 3	0 ... 100	0	%		
15610	High Y	2, 3	0 ... 100	100	%		
15615	Alarm low	1, 2, 3	0.0 ... 25.0	0.0	Bar		130
15617	Alarm time-out	1, 2, 3	0 ... 250	10	Sec		130
16113	Filter constant	2, 3	1 ... 250	2			
16194	Stop difference	2, 3	0.1 ... 5.0	0.5	Min		
16195	Start difference	2, 3	-5.0 ... -0.1	-0.5	Min		
16350	Level, desired	2, 3	OFF, 0.1 ... 25.0	3.0	Min		
16607	Low X	2, 3	0.0 ... 10.0	2.0	V		
16608	High X	2, 3	0.0 ... 10.0	10.0	V		
16609	Low Y	2, 3	0.0 ... 20.0	0.0	Min		
16610	High Y	2, 3	0.0 ... 20.0	15.0	Min		
16614	Alarm high	2, 3	0.0 ... 25.0	25.0	Min		130
16615	Alarm low	2, 3	0.0 ... 25.0	0.0	Min		130
16617	Alarm time-out	2, 3	0 ... 250	15	Sec		130
17109	Input type	2, 3	AM1 ; IM1 ; EM1 ; EM2 ; EM3 ; EM4 ; EM5 ; OFF	OFF			
17113	Filter constant	1, 2, 3	1 ... 250	2			
17114	Pulse	2, 3	OFF, 1 ... 9999	OFF			
17115	Units	2, 3	ml, l/h ; l, l/h ; ml, m3/h ; l, m3/h	ml, l/h			84
17607	Low X	2, 3	0.0 ... 10.0	2.0	V		
17608	High X	2, 3	0.0 ... 10.0	10.0	V		
17609	Low Y	2, 3	0 ... 1000	0			
17610	High Y	2, 3	0 ... 1000	1000			



Installer:
By:
Date:

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