RELIABLE. BOLD. INNOVATIVE.

Cascade Sequencer

Control Installation and Operation Instructions

Also read and follow:

Infinite Energy Boiler Manual

WARNING Installer: Read the appliance Installation Manual, including this manual, before installing. Perform steps in the order given.
User: This manual is for use only by a qualified heating installer.

WARNING Qualified installer: qualified installer is an individual with specific, technical training in space heating systems, domestic hot water systems, fuel gas systems and electrical systems. This individual must have the legally required qualifications. Failure to comply with these provisions can cause a fire or explosion causing property damage, personal injury, or death.

WARNING Installation and Alterations: Only a Qualified installer must carry out the installation and calibration of the heater. Never modify the heater or its flue gas carrying components in any way. This heater must be properly vented. Failure to follow these instructions could result in personal injury or death!

WARNING Prior to any maintenance, disconnect the appliance's electrical power supply and shut off the inlet gas valve. Failure to follow these instructions could result in severe personal injury or death!

CONTENT OF THE KIT

This kit is composed by:
- a cascade sequencer code 62110095;
- These instructions.

1 - INSTALLATION

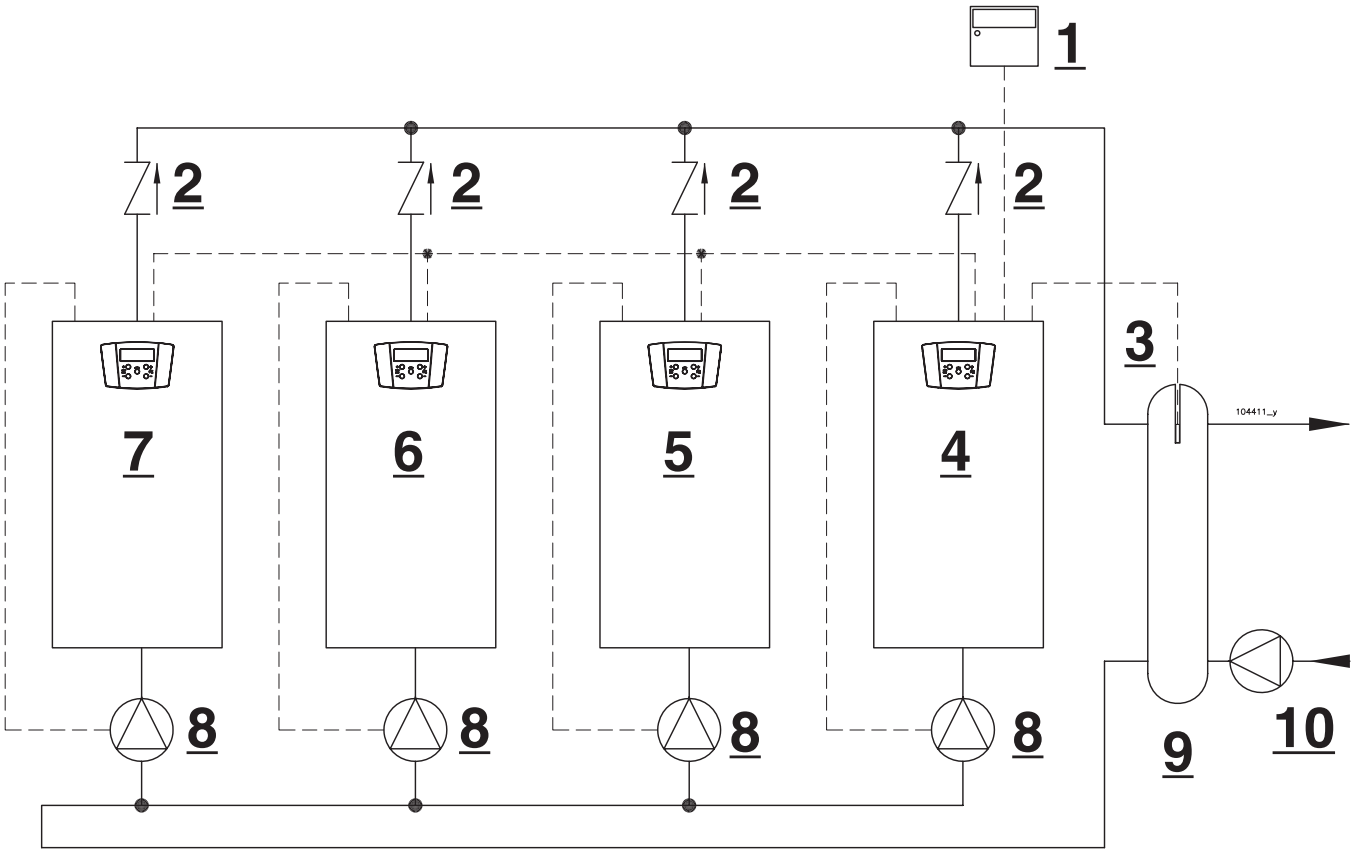
1.1 - Piping Installation

The 885HC cascade sequencer control shall be installed as shown in Figure 1.1. The master heater must be the closest to the low loss header because the master heater will be connected to the cascade general sensor. A maximum of 8 heaters can be connected in cascade.

After installation, the heater nearest the low loss header will require hardware adjustments to become master heater #1 and the other heaters will require software changes to become dependent heaters. To do so, follow next sections.

NOTICE Figure 1.1 is only one example of a conceptual piping configuration; other piping configurations are possible. Contact your representative or manufacturer for optional configurations.

Figure 1.1 - Conceptual Cascade Configuration

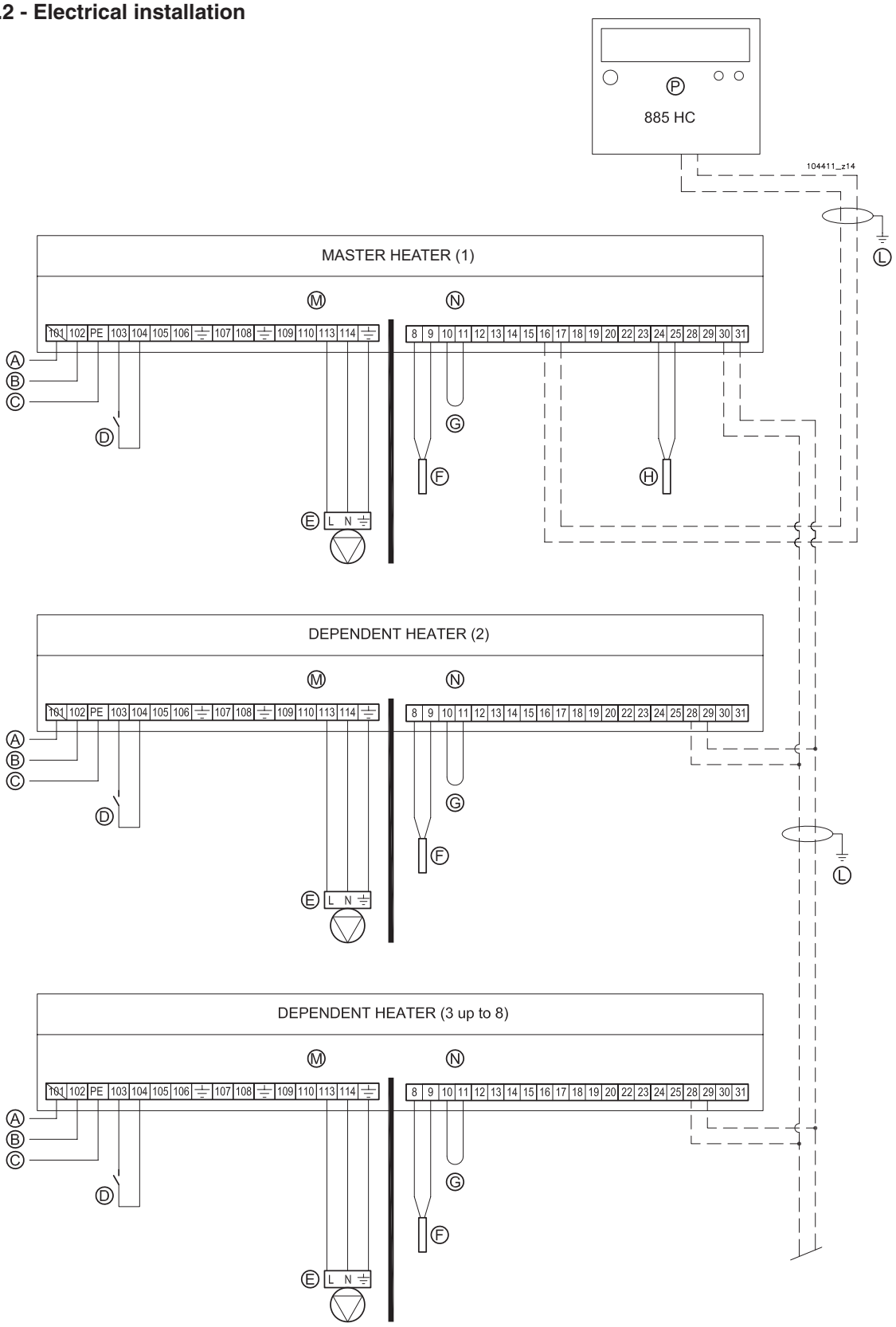


REF	DESCRIPTION
1	885HC Cascade sequencer
2	Check valve
3	Cascade general sensor
4	Master heater #1
5	Dependent heater #2
6	Dependent heater #3
7	Dependent heater #4 up to #8
8	Heater pump
9	Low loss header
10	Heating pump

1.2 - Electrical Installation

The electrical installation must be done as per Figure 1.2 or any other electrical installation suggested by the heater manufacturer.

Figure 1.2 - Electrical installation



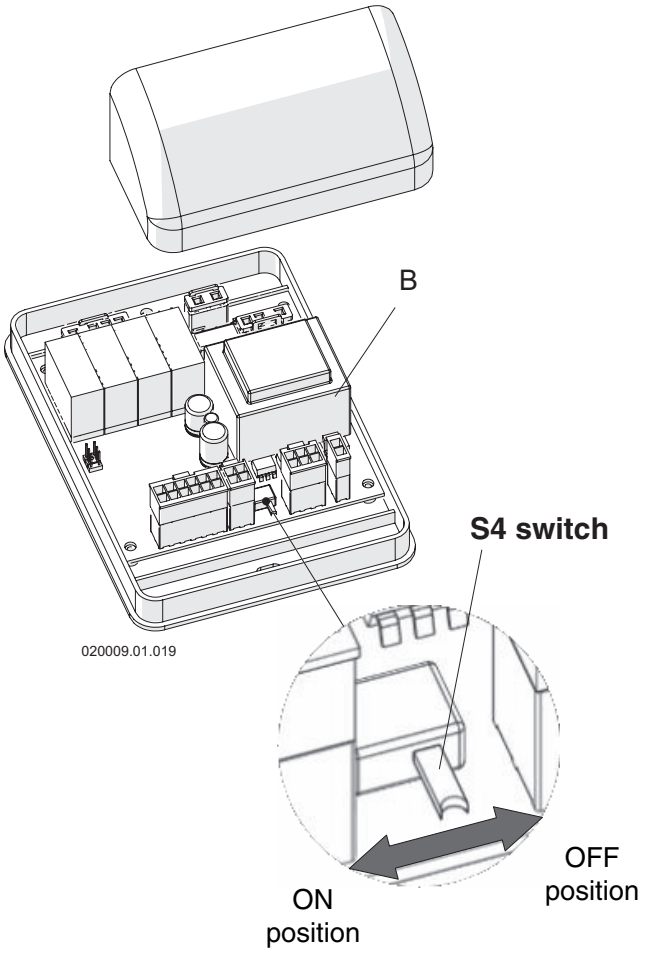
Key of Figure 1.2 - Electrical Connections

REF	DESCRIPTION
101	Hot electrical supply
102	Neutral
PE	Ground
103	LWCO
104	LWCO
105	Heating pump Line (max 3A)
106	Heating pump Neutral (max 3A)
⏚	Ground
107	DHW pump Line (max 3A)
108	DHW pump Neutral (max 3A)
⏚	Ground
109	Alarm (NO) Volt free
110	Alarm (NO) Volt free
113	Local pump Line (max 3A)
114	Local pump Neutral (max 3A)
⏚	Ground
8	Header sensor (HS)
9	Header sensor (HS)
10	Room thermostat (dry contact)
11	Room thermostat (dry contact)
12	Tank sensor
13	Tank sensor
14	Outdoor sensor (OS)
15	Outdoor sensor (OS)
16	Bus (Cascade sequencer)
17	Bus (Cascade sequencer)
18	RS 485 Modbus T+
19	RS 485 Modbus T-
20	RS 485 Modbus GND
22	0-10 Vdc input (GND)
23	0-10 Vdc input (+)
24	Cascade header sensor
25	Cascade header sensor
28	Bus (cascade)
29	Bus (cascade)
30	Bus (Master)
31	Bus (Master)
Ⓓ	“Hot” electrical supply
Ⓔ	“Neutral” electrical supply
Ⓕ	“Ground” Electrical supply
Ⓖ	Low water cut OFF
Ⓗ	Local pump (Max 3A)
Ⓘ	Header temperature sensor
Ⓙ	Room thermostat jumper
Ⓚ	Cascate header temperature sensor
Ⓞ	Ground
Ⓟ	High Voltage terminals
Ⓠ	24 Vdc Voltage terminals
Ⓢ	885HC Cascade sequencer

1.3 - Adjust the S4 Switch on the 885IF Board

1. At top of heater remove junction box cover to gain access to the 885IF board (see Figure 1.3).
2. Move S4 switch from OFF position to ON position (see Figure 1.3).
3. Repeat the procedure on all heaters you want to connect in cascade.

Figure 1.3 - 885IF Board and S4 Switch



(Must be on "ON" position)

1.4 - Adjust the Logic Address on Each Heater

1. On master heater #1, using two electrical wires each 2ft. long, connect the 885HC command to terminals 16 and 17.
2. Turn the on power to master heater #1.
3. Using the 885HC command set the Address to 1 (see Section 2.1).
4. Wait 2 minutes until the address is confirmed by "# 1" appearing on the display.
5. Turn the power off to the master heater #1.
6. Disconnect the two wires from terminals 16 and 17 of the master heater #1.
7. Connect the two wires from the 885HC command to terminals 16 and 17 of the dependent heater #2.
8. Turn the power on to the dependent heater #2.
9. Using the 885HC command, set the Address to 2 (see Section 2.1);
10. Wait 2 minutes until the address is confirmed by "#2" appearing on the display.
11. Turn the power off to the dependent heater #2.
12. Disconnect the two wires from terminals 16 and 17 of the dependent heater #2.
13. Repeat steps 7-12 for each dependent heater using progressive addresses 3, 4, 5, etc.
14. After setting the address on all dependent heaters return to master heater #1 and install the 885HC cascade sequencer to terminals 16 and 17.

1.5 - Adjust the 885HC Command for Boilers or Water Heaters

885HC command is set at the factory for boiler application, but not for water heater applications.
When your system is in place, be sure parameters of the Sub Menu are set as shown in the list in Section 2.1. Select the column Boiler settings for boiler application; select the column Water Heater settings for water heater application.

1.6 - Adjust Parameter 2003 on All Dependent Heaters

If parameter 2003 of the dependent heaters is not set to 0 (Zero), the cascade will not work. Follow section "Installer's menu" of the heater's installation manual to check this requirement on each dependent heater.

1.7 - Cascade General Settings for Parameters 3001, 3050, 2003 and S4 Switches

Figure 1.4 - Model 199

Table Key of Figures 1.4, 1.5, 1.6 and 1.7

REF	DESCRIPTION
Ⓐ	MASTER Heater
Ⓑ	1° DEPENDENT Heater
Ⓒ	2° DEPENDENT Heater up to 7

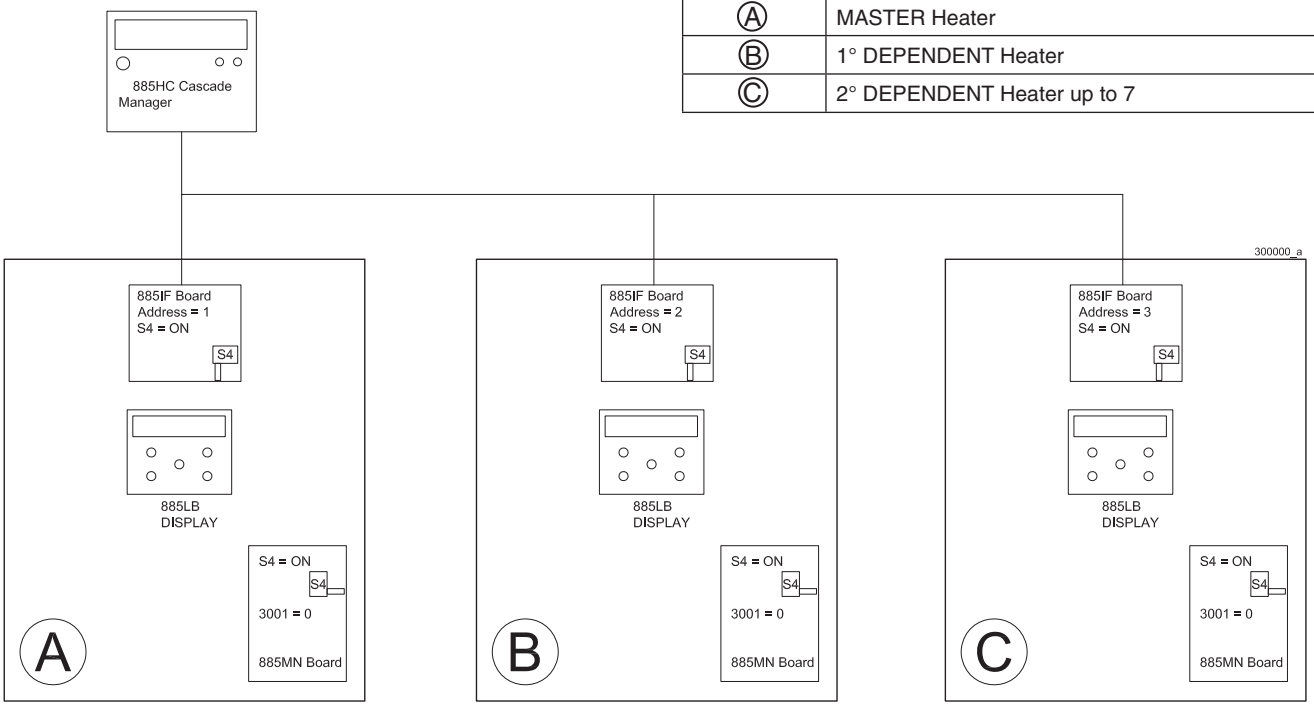


Figure 1.5 - Models 399 and 500

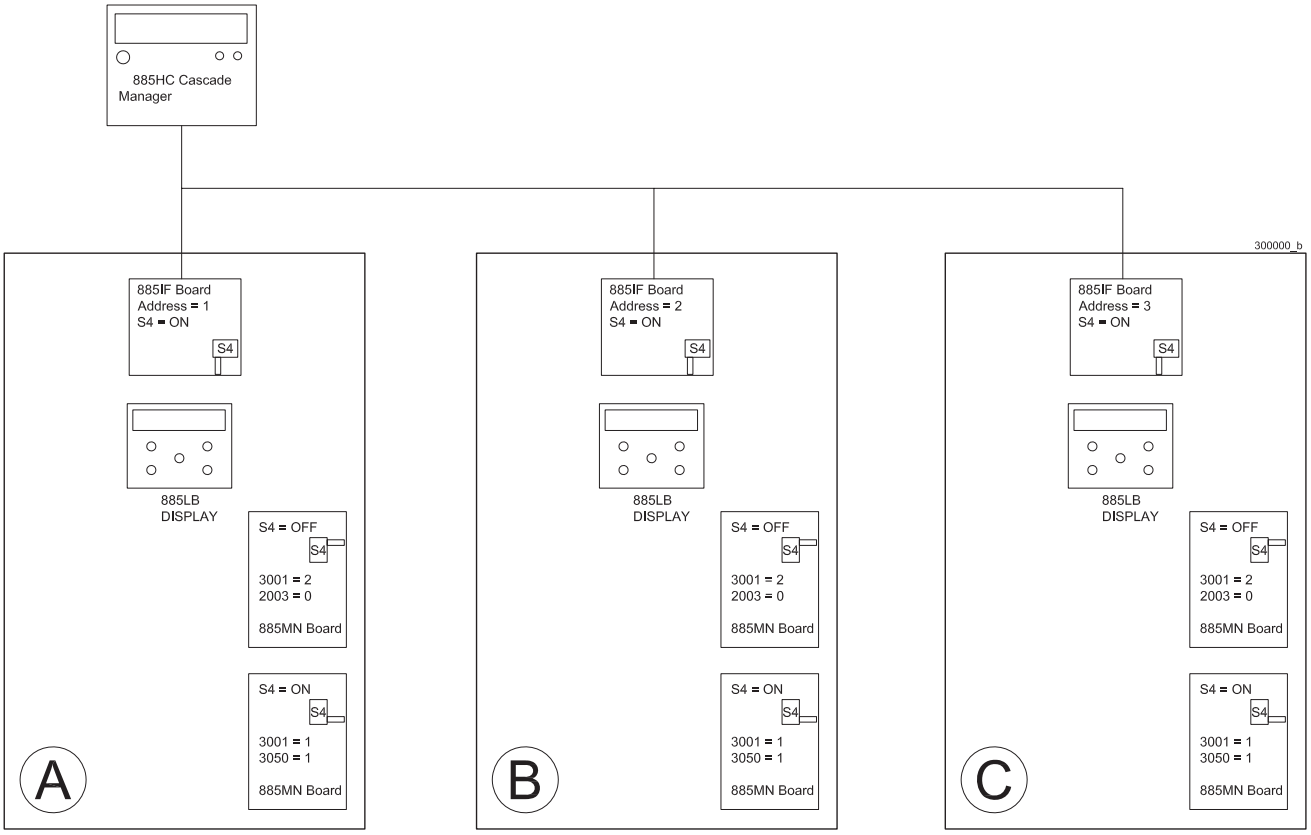


Figure 1.6 - Model 750

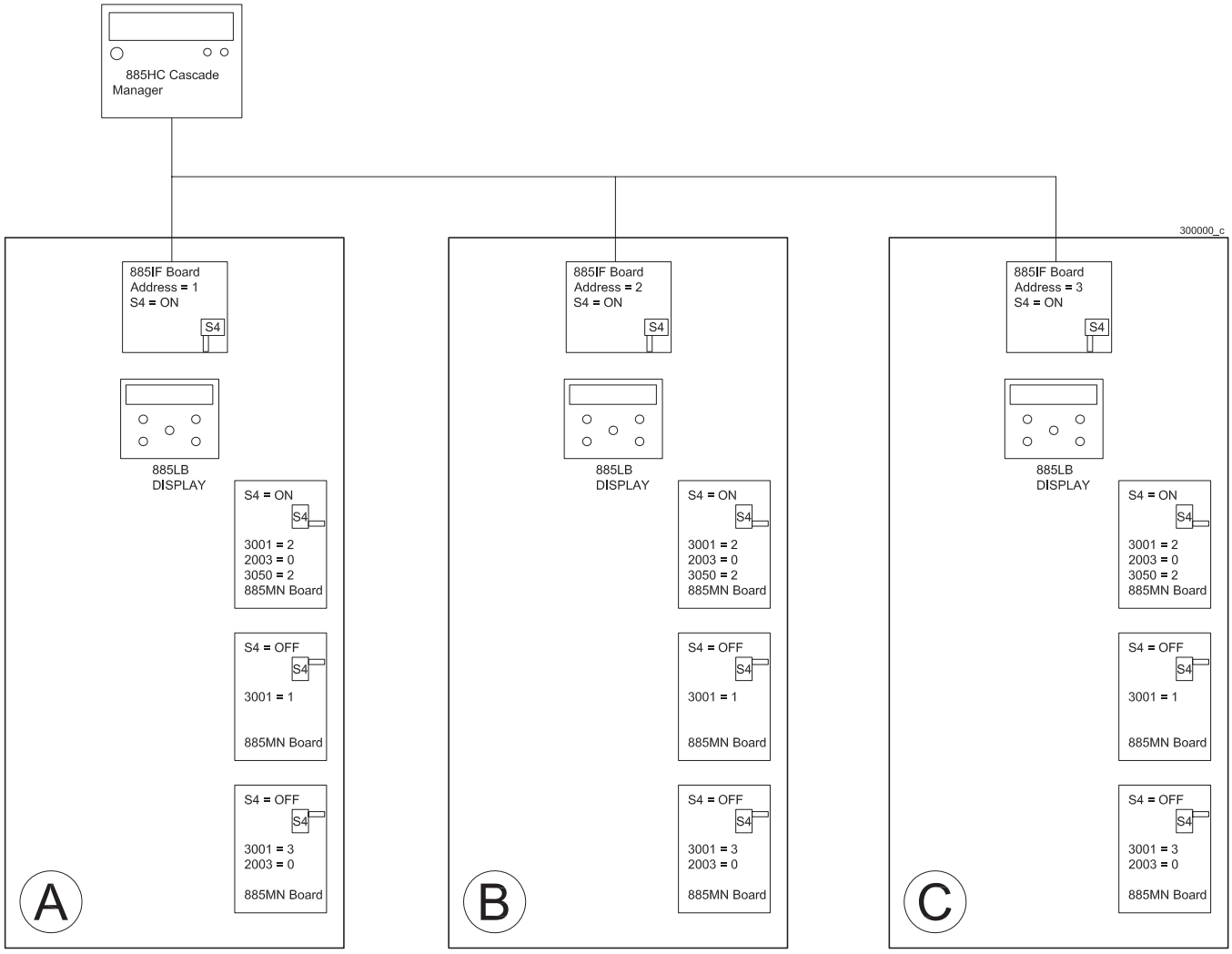
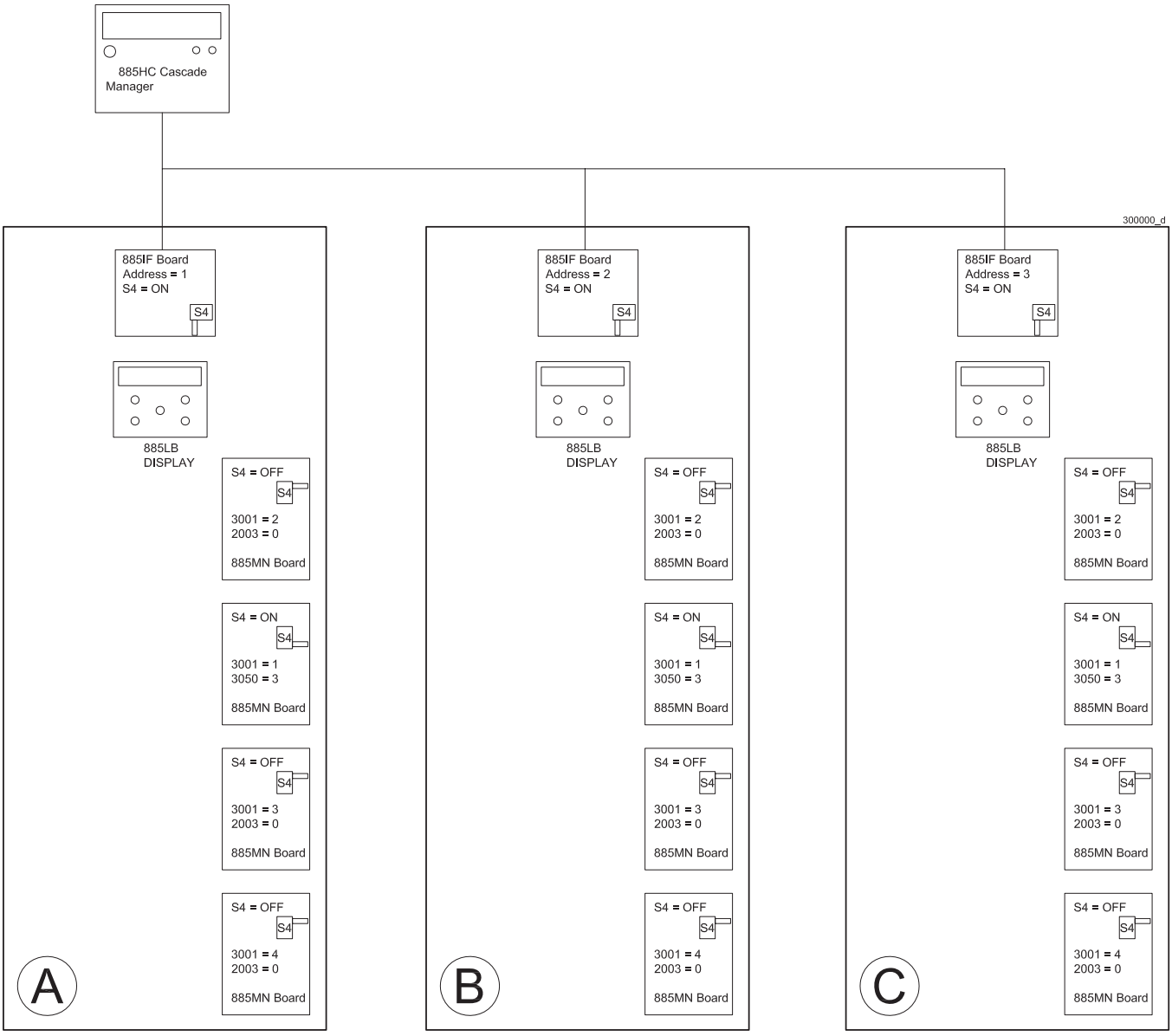


Figure 1.7 - Model 1000

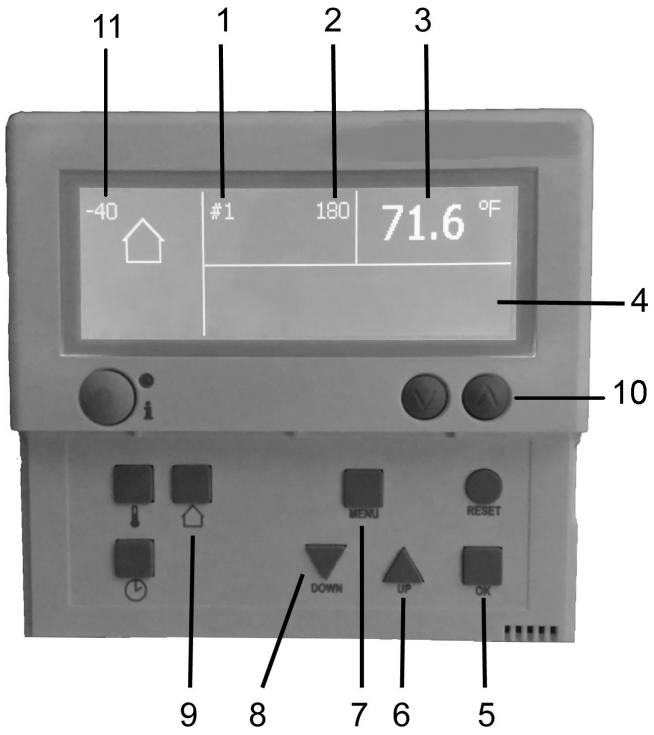


2 - USE OF THE 885HC SEQUENCER

NOTICE Before any activity wait 40 seconds for communication between sequencer and heaters.

The 885HC cascade sequencer has a basic screen shown below. Each button of the display controls a different function.

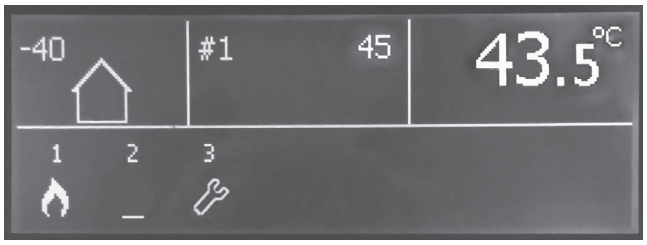
Figure 2.1 - Control Panel



Key of Figure 2.1

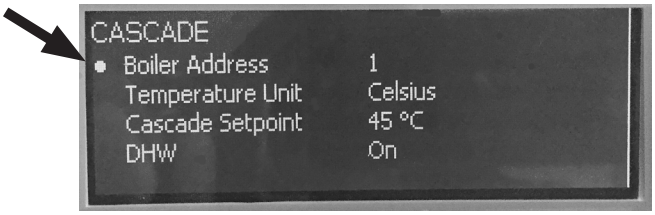
1 = Logic address
2 = Cascade setpoint
3 = Cascade temperature
4 = Status of the cascade
5 = OK button to confirm a change to a parameter
6 = Up button to scroll parameters or to increase a value
7 = Menu button to return to main menu
8 = Down button to scroll parameters or to decrease a value
9 = Home button to enter the menu
10 = Cascade button
11 = Outdoor temperature

By pressing button "10" of Figure 2.1 the bottom side of the display will change to show the status of the cascade. Display will show the number of heaters in the cascade, numbers "1", "2", and "3" (can be up to "8") and if they are in request for heating a flame icon appear below the number, or if they are in stand by a underscore icon appear below numbers. If there is an anomaly in the control a wrench icon will appear below numbers.

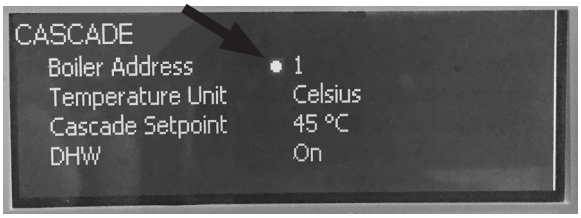


2.1 - Sub Menu

Refer to Figure 2.1 when not otherwise specified.
From the status screen the "Sub menu" can be entered by pressing and holding the "HOME" button (detail "9") for 8 seconds. When the Sub menu is displayed you can select a parameter by scrolling the list with the "UP" and "DOWN" buttons.



When the parameter is selected, press the "OK" button (the dot of parameter selectioned will move on the value).



The parameter value will start to blinking. Now you can change the parameter value by using the "UP" and "DOWN" buttons. When the desired value is reached you can save it by pressing the "OK" button.

Set each parameter following Figure 2.2 (°C) or 2.3 (°F). To leave the Sub Menu, press the "Menu" button.

NOTICE After any change, wait 40 seconds for screen to update status. **Parameters displayed in this Sub Menu are showed in figures 2.2 and 2.3.**

2.2 - Troubleshooting

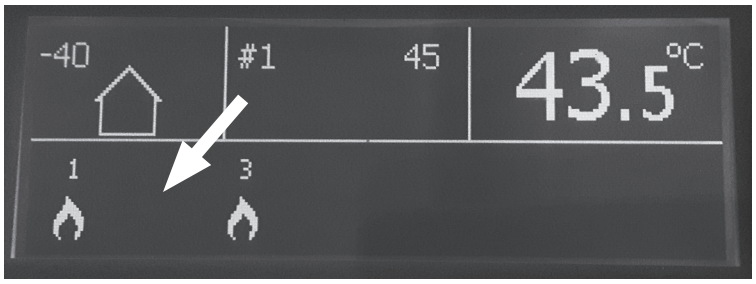
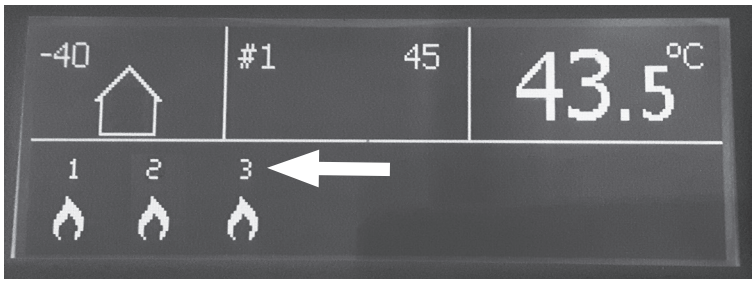
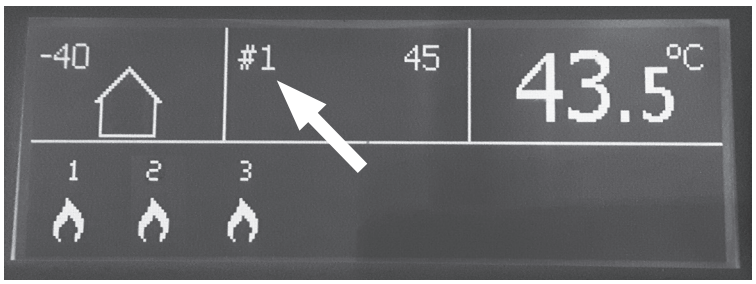
DESCRIPTION	SOLUTION
Display of the 885HC command does not light on	Check to be sure switch S4 is in the ON position (see Figure 1.3)
“Boiler address” parameter is correctly set in all heaters but the same heaters reference is not shown on display.	Check that communication wires are correctly in place (see Figure 1.2 terminals 30 and 31 on master heaters and 28 and 29 on corresponding dependents.
	
Dependent boiler seems to be operating independently.	Verify that the unit is still present on the communication chain by looking at the sequencer's Cascade status menu.
	
Changing the logic address on the heater, as per section 1.4, I’m unable to see the update on the screen	After changing the logic address, display can take up to 3 minutes to show the address on the screen.
	

Figure 2.2 - Parameters with °C settings

Parameter	M.U.	Range	Factory settings	Boiler settings	Water Heater settings	Customized value
Boiler address	/	0..16	0	0 - Stand Alone heater 1 - for Master 2 - for first dependent 3 - for second dependent 4 - ...etc	1 - for Master 2 - for first dependent 3 - for second dependent 4 - ...etc	
Temperature unit	/	°C..°F	/	/	/	
Cascade setpoint	°C	20..90	80	/	/	
DHW ON..OFF	/	ON..OFF	OFF	ON only if you want to drive an indirect water heater	OFF	
Start delay time	sec	0..1200	600	600	15	
Stop delay time	sec	0..1200	600	600	15	
Start boiler diff	°C	8..20	2.5	2.5	2.5	
Stop boiler diff	°C	8..32	1	1	1	
Stop all boiler diff	°C	8..32	10	10	10	
Max offset up	°C	8..28	10	10	10	
Max offset down	°C	8..28	10	10	10	
Rotation interval	Days	1..10	5	5	5	
P Value	/	0..255	20	20	20	
I Value	/	0..255	120	120	120	
D Value	/	0..255	0	0	0	
Slew rate	/	1..255	5	5	5	
System correction	°C	8..18	0	0	0	
Mod delay factor	min	0..60	4	4	0	

Figure 2.3 - Parameters with °F settings

Parameter	M.U.	Range	Factory settings	Boiler settings	Water Heater settings	Customized value
Boiler address	/	0..16	0	0 - Stand Alone heater 1 - for Master 2 - for first dependent 3 - for second dependent 4 - ...etc	1 - for Master 2 - for first dependent 3 - for second dependent 4 - ...etc	
Temperature unit	/	°C..°F	/	/	/	
Cascade setpoint	°F	68..194	140	140	140	
DHW ON..OFF	/	ON..OFF	OFF	ON only if you want to drive an indirect water heater	OFF	
Start delay time	sec	0..1200	600	600	15	
Stop delay time	sec	0..1200	600	600	15	
Start boiler diff	°F	0,9..22,5	5	5	5	
Stop boiler diff	°F	0..45	2	2	2	
Stop all boiler diff	°F	0..45	18	18	18	
Max offset up	°F	0..36	18	18	18	
Max offset down	°F	0..36	18	18	18	
Rotation interval	Days	0..30	5	5	5	
P Value	/	0..255	20	20	20	
I Value	/	0..120	120	120	120	
D Value	/	0..255	0	0	0	
Slew rate	/	0..255	5	5	5	
System correction	°F	0..18	0	0	0	
Mod delay factor	min	0..60	4	4	4	

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