

# EL 160 Eco & EL 500 Eco

– Modern electric boilers with a new touchscreen

The Professional's Choice Since 1935

## Installation and Operating Instructions



**IMPORTANT**

READ CAREFULLY BEFORE USE  
SAVE FOR FUTURE REFERENCE

1700 891 63-4 EN 18/01/2023

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Subject to any errors in writing and subject to change.

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# Congratulations to your new electric boiler!

You have just purchased an Osby Parca electric boiler which we hope you will be completely satisfied with. On the following pages, you can read about how to take care of your electric boiler.

Save this user manual with installation and care instructions. Your Osby Parca electric boiler will bring you joy for many years, and all the information and initial assistance you need can be found herein.

To ensure a long and fulfilling relationship with your electric boiler, you should sign a servicing contract with your installer.

This will enable the electric boiler to function in good condition for a long time. It will then produce the heat you need – at the lowest total cost – for many years to come.

## Contact info sales department:

sales@osbyparca.se

Tel no +46 (0)479 177 00

**www.osbyparca.se**

Box 93 | 283 22 Osby

SWEDEN

<b>Note:</b> Fill in the information below. This information is valuable if servicing is required.	
Product no 1:	Manufacturer no:
Product no 2:	Manufacturer no:
Installation company:	Tel. no:
Installation date:	Name (responsible):
Electrical contractor:	Tel. no:
Installation date:	Name (responsible):



If these instructions are not followed during installation, operation and maintenance, Osby Parca's obligation pertaining to the applicable warranty terms and conditions is not binding.

## Important to keep in mind!

- Care of the boiler must be done according to the instructions.
- Any inspection of the boiler must be carried out by certified technicians who are trained to work with boilers, associated equipment and accessories.
- Prior to any inspection activities being carried out, this user manual and other associated manuals and documents applicable to the equipment must be read in full and understood.

It is of particular importance that the following points are adhered to upon delivery and installation:

- The product must be transported and stored in an upright position. When being moved, the product can be placed flat for a short time only.
- Remove the packaging and, prior to installation, make sure the product has not been damaged during transport. Report any shipping damage to the transporter.
- Place the product on a stable surface, preferably concrete.  
**If the product is to stand on a soft surface, support slabs must be placed under the feet.**
- Remember that a servicing access area of at least 1.2 metres in front of the product is required.
- The product must not be sunk below floor level.

## Safety Instructions

The following safety instructions must be taken into account when handling, installing and using the product:

- Turn off the safety switch and all circuit breakers before performing any work on the product. Please note that the boiler requires both 400 V supply along with 230 V supply for the control system.
- The product may not be rinsed with water.
- When handling the product with lifting eyes or similar, make sure that the lifting devices, eye bolts and other parts are intact. Never stand or walk underneath a raised product.
- Never compromise safety by detaching or unscrewing covers, hoods or other parts.
- Never compromise safety by disconnecting safety equipment.
- Any work in the product's electrical system may only be carried out by a certified electrician.

Checking the safety valve:

- The safety valve for the boiler/system must be checked regularly. See chapter 4, Servicing.

**This device is not designed to be used by persons (including children) with reduced physical, sensory or mental abilities, or persons with a lack of experience and knowledge who have not received guidance or instruction on the use of the device by a person responsible for their safety. Children must be supervised to ensure they do not play with the device.**

## Recycling

- The packaging must be deposited at a recycling station or with the installation engineer for correct waste management.
- At the end of the product's life cycle, it must be recycled in a correct way and be transported to a waste station or reseller offering a service of that type. Disposing of the product as household waste is not permitted.
- It is of great importance that the product's electrical/electronic equipment is properly disposed of.

# 1. Installation

## 1.1 Installation – HVAC

The boiler must be installed in accordance with current national regulations, as well as DHW system requirements.

In addition, the boiler is approved for zero flow but is designed for pump circulation.

To facilitate servicing, pipes and cabling must not be placed over the boiler or attached to the boiler's rear top cover. The distance between the boiler top and the ceiling should not be less than 900 mm.

The Swedish Electrical Safety Board recommends that an area of 1200 mm in front of the boiler be kept free.

### 1.1.1 Water Quality / Boiler Water

The following requirements apply:

- Boiler water must not contain salt and lime concentrations at levels that may damage the boiler and increase the risk of limescale build-up.
- Water hardness must not exceed 10 dH.
- The pH-value of the water must not be too low (min. 7).
- The water must not contain sludge or any other contaminants.
- Requirements regarding water quality must always be met. Good water increases the service life of the boiler.

### 1.1.2 Glycol in boiler water

It's not uncommon to want to mix glycol into the boiler water.

However, the addition of glycol reduces the heat capacity of the water, i.e. to gain full output the flow must be increased.

There are different types of glycol but, as a rule of thumb, the following changes will occur:

- A 25 % glycol mixture reduces output by approx. 10 %.
- A 35 % glycol mixture reduces output by approx. 15 %.
- A 50 % glycol mixture reduces output by approx. 30 %.

The values above should be considered as guidelines and should not be taken at face value.

### 1.1.3 Built-in safety system (factory-fitted)

If the boiler to be installed has a built-in safety system, recommendations regarding the safety valve's outlet flow must be followed. The outlet flow from the safety valve should have a pressure drop of less than 10 % of the opening pressure, and should discharge safely.

Pressure transmitter factory settings:

- The minimum pressure is set to 0.25 bar
- The maximum pressure is set to 2.85 bar for boilers with 3 bar safety valve
- The maximum pressure is set to 5.85 bar for boilers with 6 bar safety valve

These settings must be checked by the installer and can be adjusted to suit the installation.

For further information - see chapter 6.

**Note: At the standard boiler, the pressure switch connection is plugged. Nothing may be mounted there! Safety equipment must be mounted externally. The electric boiler is CE-approved as a unit and must not be altered.**

## 1.2 Installation – Electrical

Electrical installation must be carried out by a certified electrician, and must be performed in accordance with valid regulations.

Connect 230 and 400 V according to the electrical circuit diagram. The control circuit (230V) must be preceded by a maximum of 16 A fuse.

Cableways or cables should not be placed over or attached to the boiler's rear roof panel.

Power switch is supplied with factory setting. Its response time should be adjusted after installed current for optimal release time.

### 1.2.1 Re-tightening the power cable connections

**! When the boiler is put into operation, inspection and re-tightening of the power cable connections must be carried out for the immersion heaters (on the top of the boiler), current strips and their bolted joints, contactors, incoming phases - zero - earth, and other electrical connections. See chapter Servicing and "Instruction for Re-tightening".**

**! Inspection and re-tightening must then be carried out after 100 hours of operation, after 1 year and, thereafter, at intervals of no more than 2 years. A signature is required in the table on page 10 to support any eventual warranty claim.**

Work in the boiler's electrical system may only be performed by a certified electrician.

NOTE! The boiler's electrics must not be put into operation until the water system is full and the boiler has been bled.

## 1.3 Installation – Ventilation

The electric boiler must be placed in an area supplied with fresh air intake and of sufficient space, where the ambient temperature does not exceed 25 °C and does not fall below 0 °C.

Requirements regarding ambient temperature must be strictly adhered to, as these are functional pre-requisites for the electric boiler's internal ventilation/cooling.

## 1.4 Installation with external control (e.g. heat pump)

If the electric boiler is to be controlled by an external unit, connection **MUST** be done according to the electrical diagram. NOTE! The connection points are different depending on the type of control signal, (eg 0-10 V or 230 V (ext. blocking electricity)).

If control signal is used you define in the control system how to control the boiler, external control, external control input. See chapter 8-10! If control by 230 V remove the jumper at block 10 and 11, row X1.

# 2. Commissioning

**Before commissioning, the entire manual must be read and understood.**

1. Make sure that the installation of water, electricity and ventilation is done according to chapter 1 and that there's water in the system.  
NOTE! Wait to connect any external boiler control. Begin with a "clean" boiler.
2. Start the boiler. The program should now start automatically according to the factory default settings. In order to get a calmer regulation it's recommended to increase the step time, how much is depending on the conditions (eg. size of water system).
3. Any external control is set according to section **10.5.8 Define system** and the manual for external control, e.g. a heat pump.



## 3. Overheating protection and circuit breaker

### 3.1 Overheating protection (Thermal cut-off)

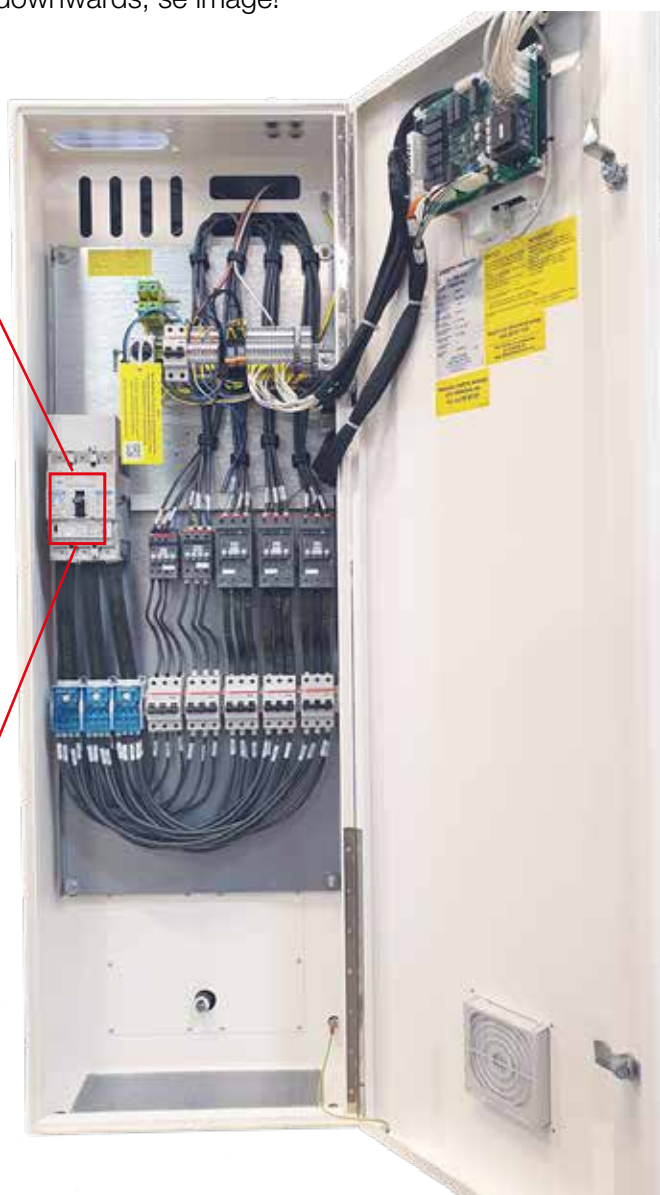
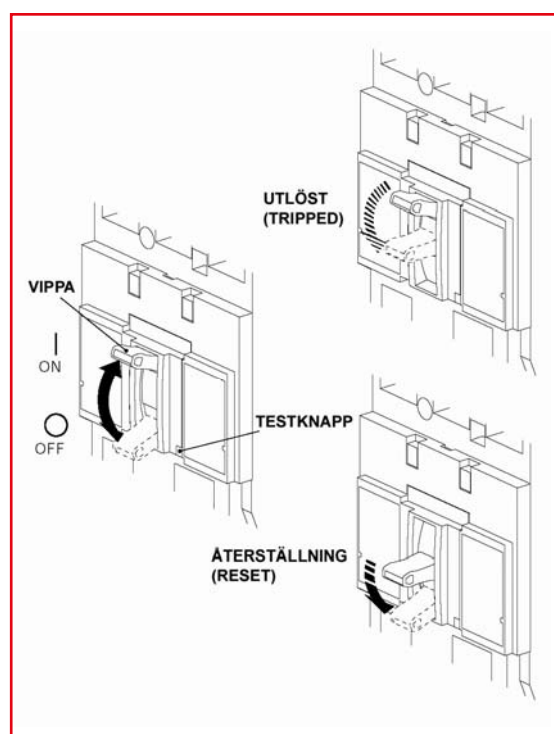
The boiler is equipped with a thermal cut-off (Max. thermostat - Tz), which has been set to  $105^{\circ}\pm 5^{\circ}$  C. This will interrupt the control circuit voltage to the boiler's contactors and release the circuit breakers. The max. thermostat is reset at about  $70^{\circ}$  C. Before the boiler has cooled down, it is not possible to reset the circuit breaker and acknowledge the alarm on the display.

To restart the boiler, the circuit breakers inside the boiler must be reset and the alarm on the display acknowledged.

### 3.2 Circuit breaker (72-504 kW)

The circuit breaker cannot be switched on until the triggered safeguard is reset. (More info is found in the alarm menu.)

Reset is done by pushing the switch (all the way) downwards, se image!



## 4. Servicing

The boiler's control system assists by keeping track of when servicing needs to be carried out. This can be set with the touchscreen in the Service menu. Error messages are also displayed here, along with suggestions for how to rectify the error.

After remedial action, the boiler technician/service technician uses the boiler's 4-digit PIN code to perform a reset. The code is issued once the warranty document has been registered.

### 4.1 Re-tightening the power cable connections

Inspection and re-tightening **must** be carried out after 100 hours of operation, after 1 year and, thereafter, at intervals of no more than 2 years. A signature is required in the table below to support any eventual warranty claim. The control system's service timer assists with keeping track of servicing intervals (provided the correct values have been set). Work in the boiler's electrical system may only be performed by a certified electrician.

See the torque image at page 12-13. Sign the table!

#### 4.1.1 Re-tightening performed

Company	Date	Signature

### 4.2 Replacing the air filter

For EL 160 Eco and 500 Eco, the air filter must be replaced at least once per year. This may need to be done more frequently depending on the boiler room environment. The filter is replaced from the outside. The article number can be found under the chapter "**Spare Parts**" in this manual.

### 4.3 Safety valve function test

For safe operation and functionality, a function test should be carried out at least once per year. Turn the plastic cap (pressure relief valve) until the valve opens. (The seal will follow and does not need to be cut.)

## 4.4 Settings circuit breaker

Please fill in the table at installation and when the boiler is current limited, see magnification of image on p.12!

NOTE! Applies to both models even if only shown in the "Instructions for re-tightening" for EL 160 Eco.

Date	Set value $I_R$ (A)	Signature

**Charateristics:** recommended set value is **1** = releases already at low overload.

$I_R$ : Setting depends on power supply.

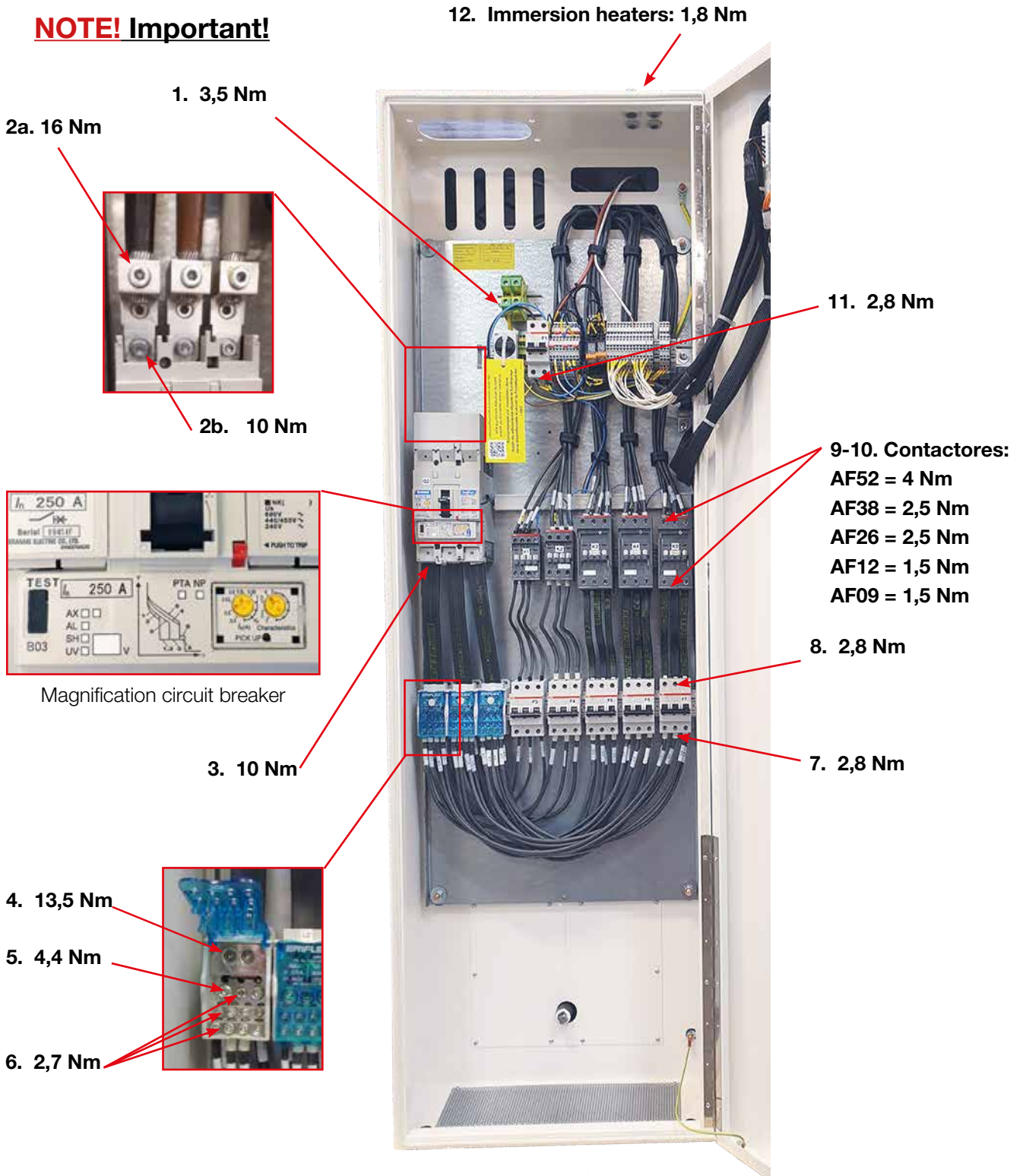
Ex: Set value  $I_R = 0,4$  when current = 100 A

0,5	- " -	125 A
0,8	- " -	200 A
0,9	- " -	225 A
1	- " -	250 A

## 4.5 Instructional images for re-tightening

### Instructions for re-tightening Osby Parca EL 160 Eco

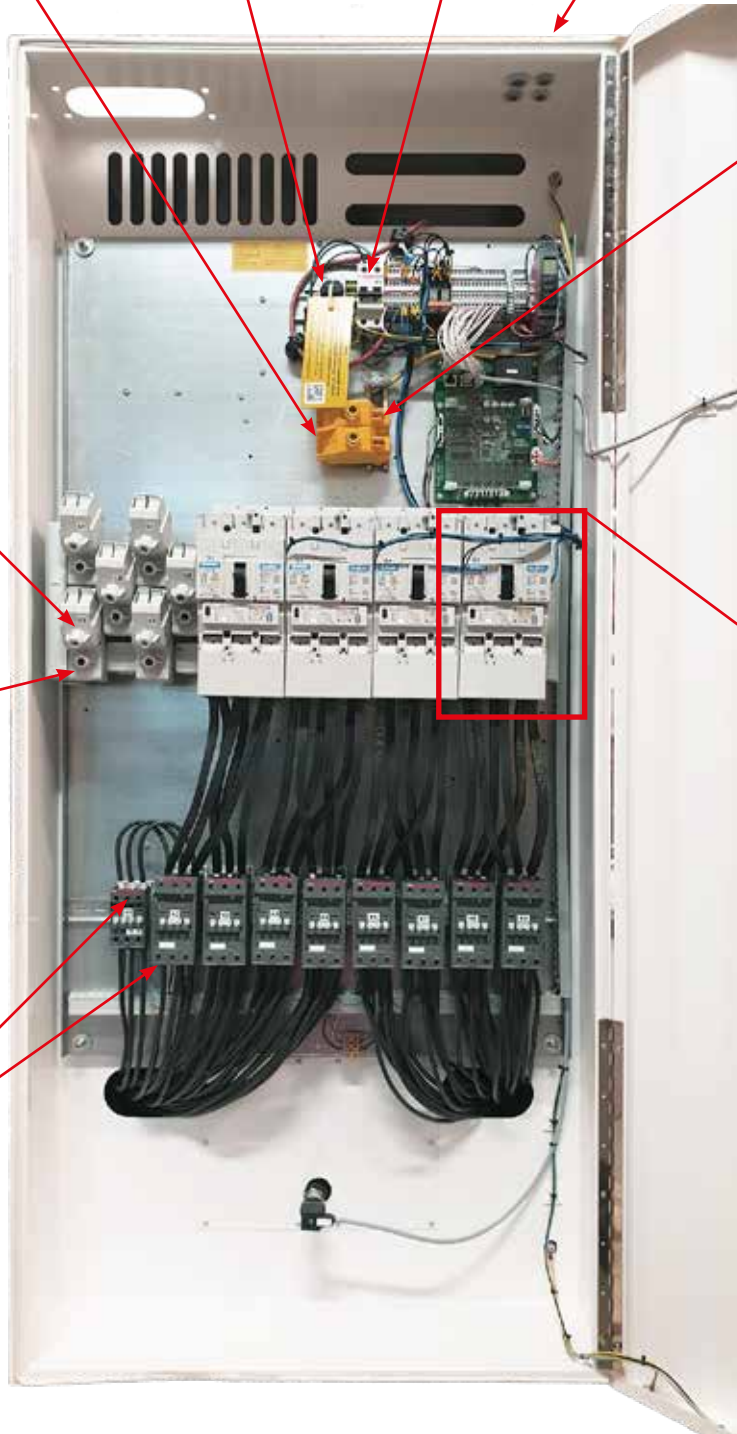
**NOTE! Important!**



## Instructions for re-tightening Osby Parca EL 500 Eco

**NOTE! Important!**

1. 50-95 mm<sup>2</sup> = 20 Nm  
120-300 mm<sup>2</sup> = 45 Nm
2. 0,8 Nm
3. 2,8 Nm
4. Immersion heaters: 1,8 Nm
5. Against rail: 20 Nm
6. 10 Nm
- 7-8. Contactores:  
AF52 = 4 Nm  
AF65 = 4 Nm
9. 15 Nm
10. 26-30 Nm



## 5. Technical Data

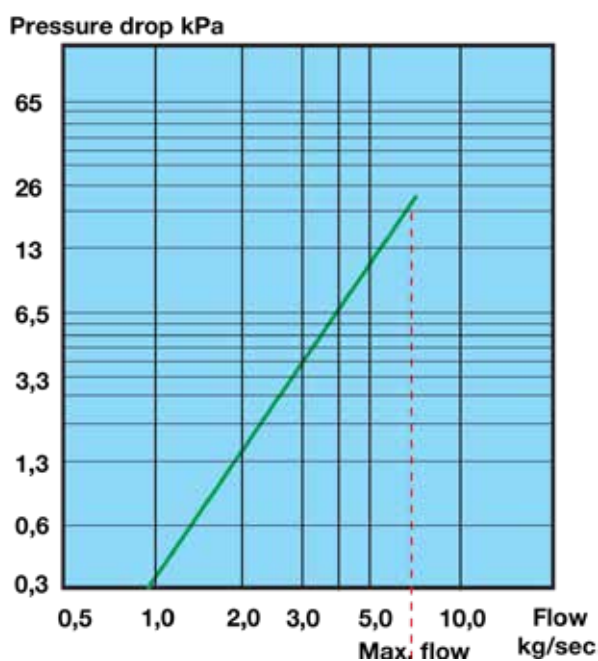
### 5.1 Technical data EL 160 Eco, 72-156 kW

Art. No.		Output		1:st Step	Steps	Voltage	Current	Weight (excl. water)
	Std	S	kW	kW	Qty	V	A	kg
7700130	-01	-31	72	9	7	400 V	104	170-175
7700130	-02	-32	93	9	9	400 V	134	170-175
7700130	-03	-33	114	9	11	400 V	164	180-185
7700130	-04	-34	135	9	13	400 V	195	180-185
7700130	-05	-35	156	9	15	400 V	225	180-185

#### 5.1.1 Design data – EL 160 Eco

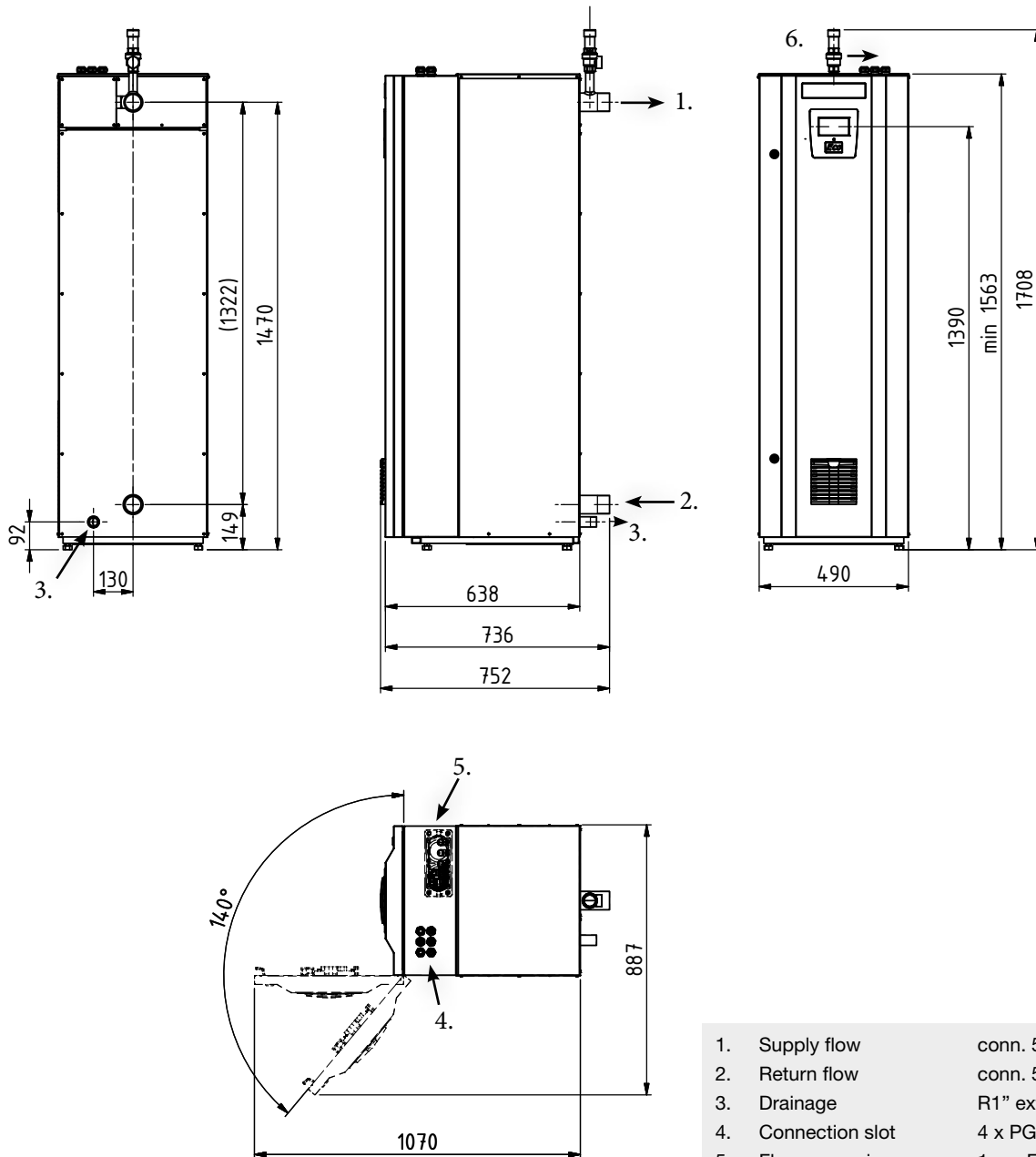
Design pressure	4.0 bar
Testing pressure	5.7 bar
Design temperature	110 °C
Maximum operating temperature	100 °C
Boiler water volume	110 litres
Protection class	IP21
Cable connection (Cu/Al)	2 x 150 mm <sup>2</sup>
Max.thermostat	105 +/- 5 °C
Max preceded fuse for control circuit (230 V)	16 A

#### 5.1.2 Pressure drop / Water resistance EL 160 Eco



### 5.1.3 Dimensions & Connections EL 160 Eco S

(safety valve being discontinued on std versions)



- |                       |                        |
|-----------------------|------------------------|
| 1. Supply flow        | conn. 50 (ext. thread) |
| 2. Return flow        | conn. 50 (ext. thread) |
| 3. Drainage           | R1" ext.               |
| 4. Connection slot    | 4 x PG11               |
| 5. Flange opening     | 1 pc. FL-21            |
| 6. Safety valve 3 bar | DN 20/25 (Only in S)   |

Minimum distance of 900 mm between boiler top and inner ceiling.

Separate power supply 230 V 1 ~ required for operating voltage.

Pipe connection has dimensions and C-C equal to Osby Parca EL 150.

To facilitate immersion heater replacement, pipes and cabling must not be placed over the boiler or attached to the boiler's rear top cover. The distance between the boiler top and the ceiling should not be less than 900 mm.

### 5.1.4 Power steps EL 160 Eco

7700130-01/31

**EL 160 Eco 72 kW**

**400 V 3-phase**

Step	%	Kw	Kw					CURRENT
			9	21	21	21		
			R 1	R 2	R 3	R 4	R 5	
			K1	K2	K3	K4		A
1	13%	9	1	0	0	0		13
2	29%	21	0	1	0	0		30
3	42%	30	1	1	0	0		43
4	58%	42	0	1	1	0		61
5	71%	51	1	1	1	0		74
6	88%	63	0	1	1	1		91
7	100%	72	1	1	1	1		104

7700130-02/32

**EL 160 Eco 93 kW**

**400 V 3-phase**

Step	%	Kw	Kw					CURRENT
			9	21	21	21	21	
			R 1	R 2	R 3	R 4	R 5	
			K1	K2	K3	K4	K5	A
1	10%	9	1	0	0	0	0	13
2	23%	21	0	1	0	0	0	30
3	32%	30	1	1	0	0	0	43
4	45%	42	0	1	1	0	0	61
5	55%	51	1	1	1	0	0	74
6	68%	63	0	1	1	1	0	91
7	77%	72	1	1	1	1	0	104
8	90%	84	0	1	1	1	1	121
9	100%	93	1	1	1	1	1	134

7700130-03/33

**EL 160 Eco 114 kW**

**400 V 3-phase**

Step	%	Kw	Kw					CURRENT
			9	21	21	21	42	
			R 1	R 2	R 3	R 4	R 5	
			K1	K2	K3	K4	K5	A
1	8%	9	1	0	0	0	0	13
2	18%	21	0	1	0	0	0	30
3	26%	30	1	1	0	0	0	43
4	37%	42	0	0	0	0	1	61
5	45%	51	1	0	0	0	1	74
6	55%	63	0	1	1	1	0	91
7	63%	72	1	1	1	1	0	104
8	74%	84	0	0	1	1	1	121
9	82%	93	1	0	1	1	1	134
10	92%	105	0	1	1	1	1	152
11	100%	114	1	1	1	1	1	165



7700130-04/34

**EL 160 Eco 135 kW****400 V 3-phase**

Step	%	Kw	Kw					CURRENT A
			9	21	21	42	42	
			R 1 K1	R 2 K2	R 3 K3	R 4 K4	R 5 K5	
1	7%	9	1	0	0	0	0	13
2	16%	21	0	1	0	0	0	30
3	22%	30	1	1	0	0	0	43
4	31%	42	0	1	1	0	0	61
5	38%	51	1	1	1	0	0	74
6	47%	63	0	0	1	1	0	91
7	53%	72	1	0	1	1	0	104
8	62%	84	0	0	0	1	1	121
9	69%	93	1	0	0	1	1	134
10	78%	105	0	1	0	1	1	152
11	84%	114	1	1	0	1	1	165
12	93%	126	0	1	1	1	1	182
13	100%	135	1	1	1	1	1	195

7700130-05/35

**EL 160 Eco 156 kW****400 V 3-phase**

Step	%	Kw	Kw					CURRENT A
			9	21	42	42	42	
			R 1 K1	R 2 K2	R 3 K3	R 4 K4	R 5 K5	
1	6%	9	1	0	0	0	0	13
2	13%	21	0	1	0	0	0	30
3	19%	30	1	1	0	0	0	43
4	27%	42	0	0	1	0	0	61
5	33%	51	1	0	1	0	0	74
6	40%	63	0	1	1	0	0	91
7	46%	72	1	1	1	0	0	104
8	54%	84	0	0	1	1	0	121
9	60%	93	1	0	1	1	0	134
10	67%	105	0	1	1	1	0	152
11	73%	114	1	1	1	1	0	165
12	81%	126	0	0	1	1	1	182
13	87%	135	1	0	1	1	1	195
14	94%	147	0	1	1	1	1	212
15	100%	156	1	1	1	1	1	225

## 5.2 Technical data EL 500 Eco

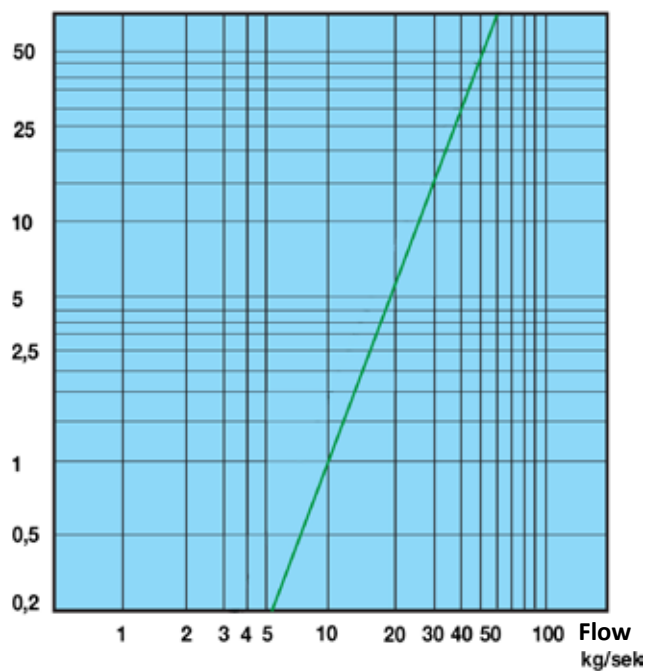
Art. No.			Output	First step	Step	Voltage	Current	Weight (excl.water)
	Std	S	kW	kW	Qty	V	A	kg
7700151	-01	-31	204	15	15	400 V	310	380
7700151	-02	-32	252	21	12	400 V	382	380
7700151	-03	-33	315	21	15	400 V	477	390
7700151	-04	-34	378	21	18	400 V	573	400
7700151	-05	-35	441	21	21	400 V	668	405
7700151	-06	-36	504	21	24	400 V	763	410

### 5.2.1 Design data – EL 500 Eco

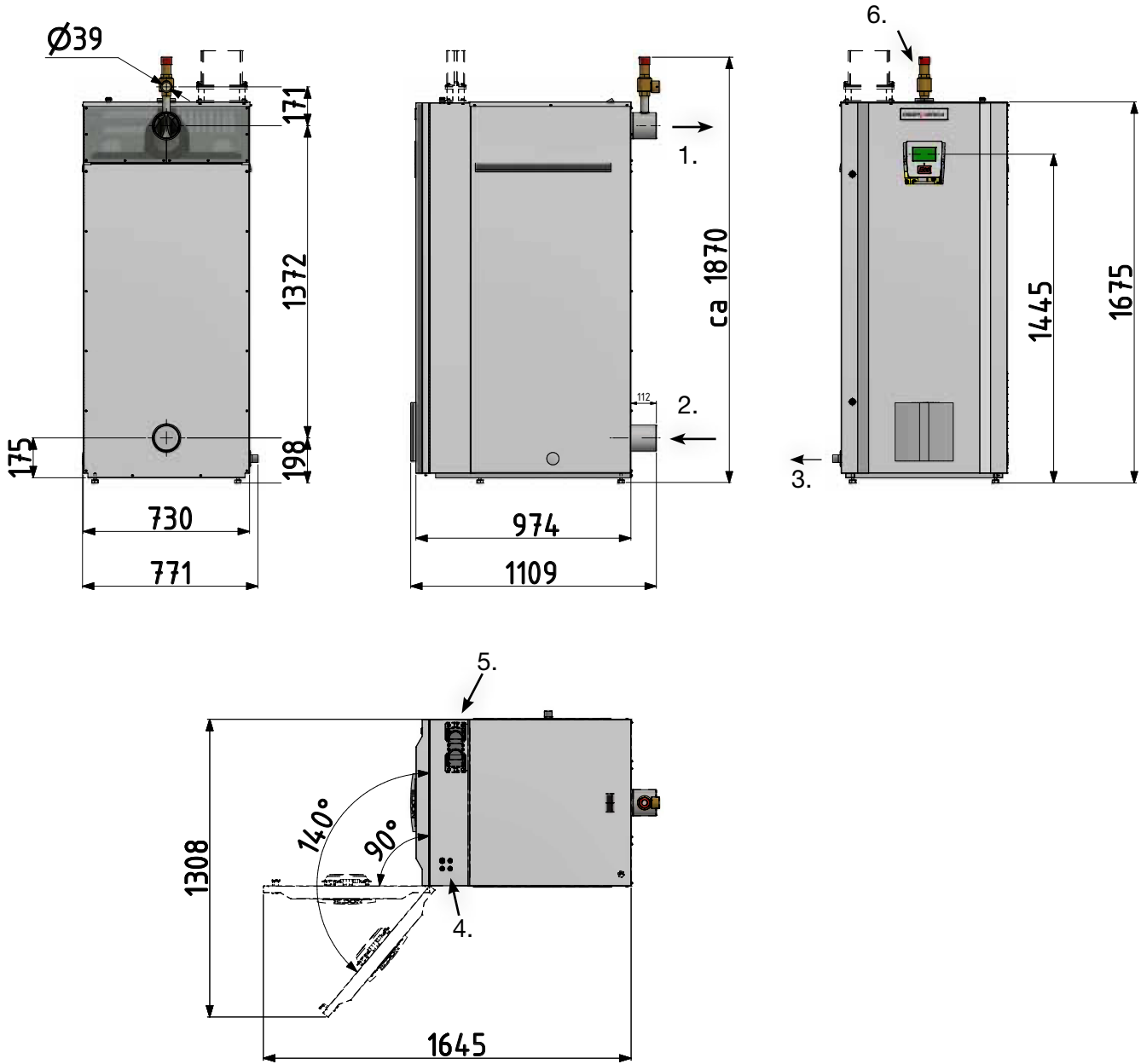
Design pressure	6.0 bar
Testing pressure	8.6 bar
Design temperature	110 °C
Maximum operating temperature	100 °C
Boiler water volume	372 litres
Protection class	IP21
Cable connection (Cu/Al)	2 x 240 mm <sup>2</sup>
Max.thermostat	105 +/- 5 °C
Max preceded fuse for control circuit (230 V)	16 A

### 5.2.2 Pressure drop / Water resistance EL 500 Eco

Pressure drop kPa



### 5.2.3 Dimensions & Connections EL 500 Eco S (safety valve being discontinued on std versions)



To facilitate immersion heater replacement, pipes and cabling must not be placed over the boiler or attached to the boiler's rear top cover. The distance between the boiler top and the ceiling should not be less than 900 mm.

- |                       |                      |
|-----------------------|----------------------|
| 1. Supply flow        | DN100 (welding conn) |
| 2. Return flow        | DN100 (welding conn) |
| 3. Drainage           | R1" ext.             |
| 4. Connection slot    | 4 x PG11             |
| 5. Flange opening     | 1 pc. FL-21          |
| 6. Safety valve 6 bar | DN 25/32 (Only in S) |

Minimum distance of 900 mm between boiler top and inner ceiling.

Separate power supply 230 V 1 ~ required for operating voltage.

Pipe connections do not have the same location as previous Parca EL 350/500.

## 5.2.4 Power steps EL 500 Eco

<b>7700151-01, -31</b>			<b>EI 500 Eco 204 kW</b>			<b>400 V 3-phase</b>	
		kW	15	21	42	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5
Step	%	kW	K1	K2	K3	K4	K5
1	7%	15	1	0	0	0	0
2	10%	21	0	1	0	0	0
3	18%	36	1	1	0	0	0
4	21%	42	0	0	1	0	0
5	28%	57	1	0	1	0	0
6	31%	63	0	1	1	0	0
7	38%	78	1	1	1	0	0
8	51%	105	0	0	1	1	0
9	59%	120	1	0	1	1	0
10	62%	126	0	1	1	1	0
11	69%	141	1	1	1	1	0
12	82%	168	0	0	1	1	1
13	90%	183	1	0	1	1	1
14	93%	189	0	1	1	1	1
15	100%	204	1	1	1	1	1

<b>7700151-02, -32</b>			<b>EI 500 Eco 252 kW</b>			<b>400 V 3-phase</b>	
		kW	21	42	63	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5
Steg	%	kW	K1	K2	K3	K4	K5
1	8%	21	1	0	0	0	0
2	17%	42	0	1	0	0	0
3	25%	63	0	0	1	0	0
4	33%	84	1	0	1	0	0
5	42%	105	0	1	1	0	0
6	50%	126	0	0	1	1	0
7	58%	147	1	0	1	1	0
8	67%	168	0	1	1	1	0
9	75%	189	0	0	1	1	1
10	83%	210	1	0	1	1	1
11	92%	231	0	1	1	1	1
12	100%	252	1	1	1	1	1

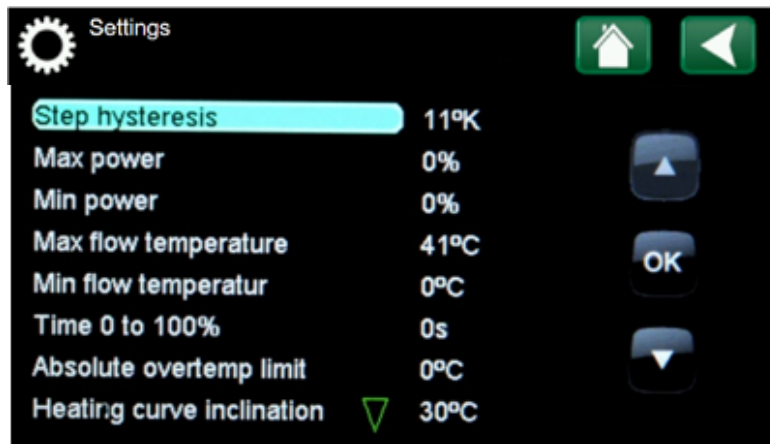
<b>7700151-03, -33</b>			<b>EI 500 Eco 315 kW</b>			<b>400 V 3-phase</b>		
		kW	21	42	63	63	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6
Step	%	kW	K1	K2	K3	K4	K5	K6
1	7%	21	1	0	0	0	0	0
2	13%	42	0	1	0	0	0	0
3	20%	63	0	0	1	0	0	0
4	27%	84	1	0	1	0	0	0
5	33%	105	0	1	1	0	0	0
6	40%	126	0	0	1	1	0	0
7	47%	147	1	0	1	1	0	0
8	53%	168	0	1	1	1	0	0
9	60%	189	0	0	1	1	1	0
10	67%	210	1	0	1	1	1	0
11	73%	231	0	1	1	1	1	0
12	80%	252	0	0	1	1	1	1
13	87%	273	1	0	1	1	1	1
14	93%	294	0	1	1	1	1	1
15	100%	315	1	1	1	1	1	1

<b>7700151-04, -34</b>			<b>EI 500 Eco 378 kW</b>			<b>400 V 3-phase</b>			
		kW	21	42	63	63	63	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7
Steg	%	kW	K1	K2	K3	K4	K5	K6	K7
1	6%	21	1	0	0	0	0	0	0
2	11%	42	0	1	0	0	0	0	0
3	17%	63	0	0	1	0	0	0	0
4	22%	84	1	0	1	0	0	0	0
5	28%	105	0	1	1	0	0	0	0
6	33%	126	0	0	1	1	0	0	0
7	39%	147	1	0	1	1	0	0	0
8	44%	168	0	1	1	1	0	0	0
9	50%	189	0	0	1	1	1	0	0
10	56%	210	1	0	1	1	1	0	0
11	61%	231	0	1	1	1	1	0	0
12	67%	252	0	0	1	1	1	1	0
13	72%	273	1	0	1	1	1	1	0
14	78%	294	0	1	1	1	1	1	0
15	83%	315	0	0	1	1	1	1	1
16	89%	336	1	0	1	1	1	1	1
17	94%	357	0	1	1	1	1	1	1
18	100%	378	1	1	1	1	1	1	1

7700151-05, -35			EI 500 Eco 441 kW			400 V 3-phase				
		kW	21	42	63	63	63	63	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7	Relay 8
Step	%	kW	K1	K2	K3	K4	K5	K6	K7	K8
1	5%	21	1	0	0	0	0	0	0	0
2	10%	42	0	1	0	0	0	0	0	0
3	14%	63	0	0	1	0	0	0	0	0
4	19%	84	1	0	1	0	0	0	0	0
5	24%	105	0	1	1	0	0	0	0	0
6	29%	126	0	0	1	1	0	0	0	0
7	33%	147	1	0	1	1	0	0	0	0
8	38%	168	0	1	1	1	0	0	0	0
9	43%	189	0	0	1	1	1	0	0	0
10	48%	210	1	0	1	1	1	0	0	0
11	52%	231	0	1	1	1	1	0	0	0
12	57%	252	0	0	1	1	1	1	0	0
13	62%	273	1	0	1	1	1	1	0	0
14	67%	294	0	1	1	1	1	1	0	0
15	71%	315	0	0	1	1	1	1	1	0
16	76%	336	1	0	1	1	1	1	1	0
17	81%	357	0	1	1	1	1	1	1	0
18	86%	378	0	0	1	1	1	1	1	1
19	90%	399	1	0	1	1	1	1	1	1
20	95%	420	0	1	1	1	1	1	1	1
21	100%	441	1	1	1	1	1	1	1	1

7700151-06, -36			EI 500 Eco 504 kW			400 V 3-phase					
		kW	21	42	63	63	63	63	63	63	63
			Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7	Relay 8	Relay 9
Step	%	kW	K1	K2	K3	K4	K5	K6	K7	K8	K9
1	4%	21	1	0	0	0	0	0	0	0	0
2	8%	42	0	1	0	0	0	0	0	0	0
3	13%	63	0	0	1	0	0	0	0	0	0
4	17%	84	1	0	1	0	0	0	0	0	0
5	21%	105	0	1	1	0	0	0	0	0	0
6	25%	126	0	0	1	1	0	0	0	0	0
7	29%	147	1	0	1	1	0	0	0	0	0
8	33%	168	0	1	1	1	0	0	0	0	0
9	38%	189	0	0	1	1	1	0	0	0	0
10	42%	210	1	0	1	1	1	0	0	0	0
11	46%	231	0	1	1	1	1	0	0	0	0
12	50%	252	0	0	1	1	1	1	0	0	0
13	54%	273	1	0	1	1	1	1	0	0	0
14	58%	294	0	1	1	1	1	1	0	0	0
15	63%	315	0	0	1	1	1	1	1	0	0
16	67%	336	1	0	1	1	1	1	1	0	0
17	71%	357	0	1	1	1	1	1	1	0	0
18	75%	378	0	0	1	1	1	1	1	1	0
19	79%	399	1	0	1	1	1	1	1	1	0
20	83%	420	0	1	1	1	1	1	1	1	0
21	88%	441	0	0	1	1	1	1	1	1	1
22	92%	462	1	0	1	1	1	1	1	1	1
23	96%	483	0	1	1	1	1	1	1	1	1
24	100%	504	1	1	1	1	1	1	1	1	1

## 5.2.5 Example of power limitation





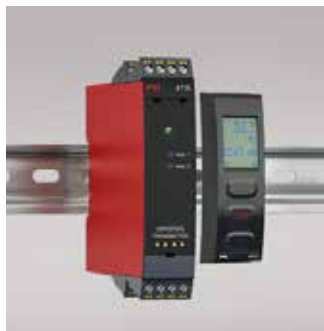
## 6. Built-in Safety System (option)

Our built-in safety solution (72-504 kW) is approved for installation without catastrophe protection, steam collector, level sensor or flow monitor. This saves you both time and money.

Our solution consists of a safety valve, pressure transmitter and an overheating protection (max. thermostat). In addition, all models also have a circuit breaker.



Safety valve AT 8310A <sup>1</sup>



Pressure transmitter <sup>2</sup>



Overheating protection/  
Max. thermostat <sup>3</sup>

We offer a convenient, simple and economical solution since all equipment comes fully assembled from our factory, which means you save time and money on installation and labour costs.

Equipment Built-in safety system				
Boiler output	Designation	Connection	Opening pressure	Quantity
72 - 156 kW	Safety valve <sup>1</sup>	DN 20/25	3 bar	1
	Pressure transmitter <sup>2</sup>	DN 15		1
	Overheating protection/ Max. thermostat <sup>3</sup>			1
204 - 504 kW	Safety valve <sup>1</sup>	DN 25/32	6 bar	1
	Pressure transmitter <sup>2</sup>	DN 15		1
	Overheating protection/ Max. thermostat <sup>3</sup>			1

### 6.1 Design

Design in accordance with this description as well as SS EN 12828 closed systems, AFS 2017:3 and AFS 2016:6.

## 6.2 General

Under normal operating conditions, all safety monitors have closed connections in the control circuit for the control equipment's outlet relays and the boiler's contactors. This applies for the ingoing safety valve, pressure transmitter and overheating protection (max. thermostat).

## 6.3 Safety valve <sup>1</sup>

The safety valve is fitted directly to the boiler and has sufficient capacity, as well as a pressure drop in the inlet which is less than 3 % of the opening pressure. The outlet flow from the safety valve must be checked during inspection to ensure that the pressure drop is less than 10 % of the opening pressure, and that it discharges safely.

For safe operation and functionality, a function test should be carried out at least once per year.

## 6.4 Pressure transmitter <sup>2</sup>

If the boiler has a built-in safety system it is also equipped with a pressure transmitter with an outgoing signal of 4-20 mA and a relay controlling that the pressure is within stated range. (The protection closes a contact in the safety loop if the pressure is within valid range.) If the signal from the pressure transmitter shows to be outside valid range, the contact breaks the safety loop.

Actual pressure (for the boiler) can be read on the transmitter display inside the boiler.

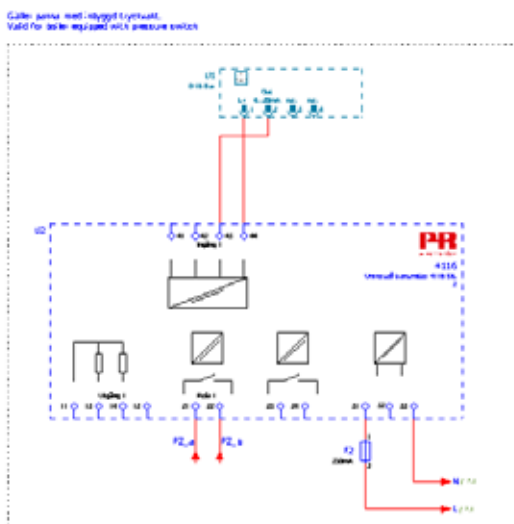
If the range needs to be change, contact us and we will send you the manual for the transmitter.

**At delivery these are the factory settings:**

**Min pressure is set on 0,25 bar.**

**Max. pressure is set on 2,85 bar for boilers with 3 bar safety valve**

**Max. pressure is set on 5,85 bar for boilers with 6 bar safety valve**



Input: Current  
Range: 4-20mA  
Unit: bar  
Displays: 11.11  
Min: 0.0  
Max: 16.0  
Disp: Rel  
Step R1func: Window  
R1.cont: C.I.W  
Setp.Lo: 0.25  
Setp.Hi: 3.85 eller 5.85  
R1.Hyst: 0.0

## 6.5 Overheating protection (max. thermostat) <sup>3</sup>

The boiler is equipped with a overheating protection (max. thermostat Tz) which is set on 105° ±5° C.

If exceeded the maneuver to the boiler contactors will break and provides a signal that triggers the circuit breakers. The max thermostat resets at about 70 ° C. Before the boiler has cooled down, it is not possible to reset the circuit breaker and acknowledge the alarm on the display.

To restart the boiler, the circuit breakers on the inside must be reset and the alarm on the display acknowledged.

## 6.6 Testing of safety equipment

For different reasons there may be need of a function test of the safety equipment. This may, for example, apply to annual service or an inspection. Below is a brief description of how testing can be performed for each guard. For more information, refer to the supplier's instructions.

**NOTE! Remember to reset after test!**

### 6.6.1 Safety valve <sup>1</sup>

For safe operation and functionality, a function test should be carried out at least once per year. Turn the red plastic cap (pressure relief valve) until the valve opens (you may hear a "snap"). The seal does not need to be cut, it will follow. No reset is needed; the valve closes automatically.

### 6.6.2 Pressure transmitter <sup>2</sup>

Function test is performed by lowering the set max. pressure to a value < working pressure. You enter the menu at the transmitter display, submenu **Settings**, stepping to **Setp.Hi** (is found in two places, but only one is in use). This value is to be lowered beneath the working pressure and then the safety guard is triggered.

After test **Setp.Hi** must be (re)set at a value of 0,15 bar lower than the safety valve.

### 6.6.3 Overheating protection (Thermal cut-off) <sup>3</sup>

Unfortunately there's no really good method to test the overheating protection. Earlier there were recommendations about heating the sensor with e.g a hot air gun, but by that there's a risk of breaking the sensor.

However, you can measure continuity between terminals 1 and 2. If the signal passes through, the protection is not triggered. If, on the other hand, there is no signal, the guard is triggered and then it is either broken or the boiler is too hot. Compare with the boiler temp sensor (value can be seen in the boiler display).

## 6.7 Troubleshooting

Any malfunction is shown in the boiler's display, e.g. when there's an alarm. By pressing the alarm in the menu, an alarm description is shown, see **chapter 10.4**.

In some specific cases further investigations must be made.

### 6.7.1 Triggered safety circuit

When there's an alarm regarding the safety circuit the troubleshooting is made by measuring (the current) through the circuit from terminal 1 to terminal 8.

### 6.7.2 Triggered circuit breaker

The circuit breaker is triggered when, for example, the overheating protection is triggered. How to reset the circuit breaker is shown in image at p. 9. The circuit breaker cannot be switched on until the triggered safeguard is reset.

### 6.7.3 Temp sensors

Boiler temp sensors and outdoor temp sensors are checked by measuring their resistance. Compare to values in the charts at p. 4.8

## 7. Accessories

Accessories Eco-series electric boilers		
Art. No	Image	Designation
584196401	1	Outdoor temperature sensor, incl. 15 m cable
1118404-01	2	3 current sensors for secondary measurement, Max. 5A. Excl. current transformer
3364-3065	3	Cable flange FL21 1x16-300mm <sup>2</sup>
3364-3066	4	Cable flange FL 21 2x16-300mm <sup>2</sup>
6000-0501		Pipe system EL 500 Eco accessory 1 MW



1.



2.



3.



4.

# 8. Control system

## 8.1 Introduction

Osby Parca's new Eco series of electric boilers has an advanced but easy-to-use control system with a touchscreen via which all settings can be made.

### Control system functions:

- monitors all electric boiler functions
- allows for individual settings
- displays the desired values for e.g. temperature, operating time, energy consumption, and fault alerts
- enables simple and structured settings and troubleshooting.

### Factory values

Electric boilers in the Eco series come with factory-set values as standard. These are monitored by the control system, which constantly ensures optimal functionality and economical operation. These values can be easily changed if required.

### Menu structure

The product's menus are described on the following pages. First an overview is provided, followed by a detailed description of each menu.

Latest version of firmware may be downloaded via [www.osbyparca.se](http://www.osbyparca.se).

## 8.2 Factory-set values

Step Time	30 sec
Max. temp	100 °C
Min. temp	20 °C
Set point	80 °C
Delta T	4 °C
Lang.	Eng



When connecting the control voltage, a start-up image is displayed while the system check is being performed.



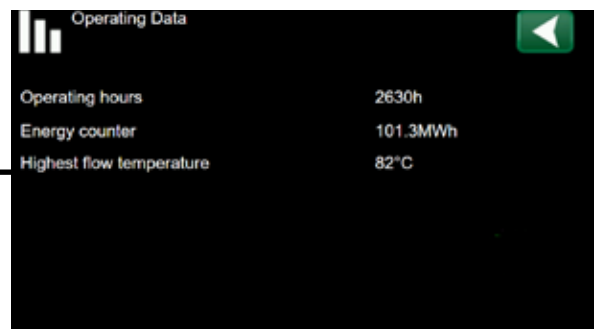
Home screen / main menu (example)

# 9. Menu overview

## Home screen:



## Operating time, energy calculator and highest boiler temperature menu:



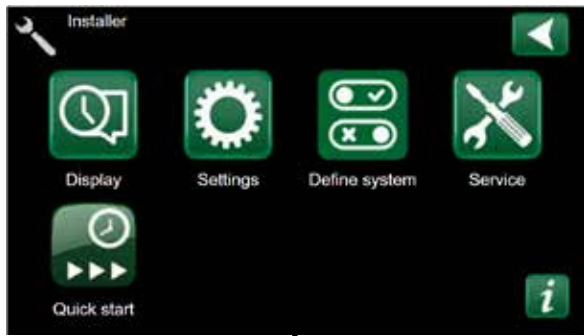
## Advanced settings menu:



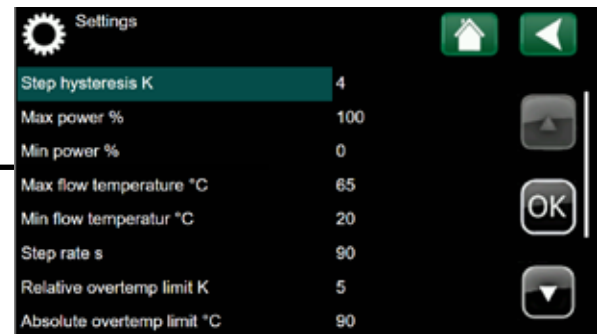
## Alarm menu:



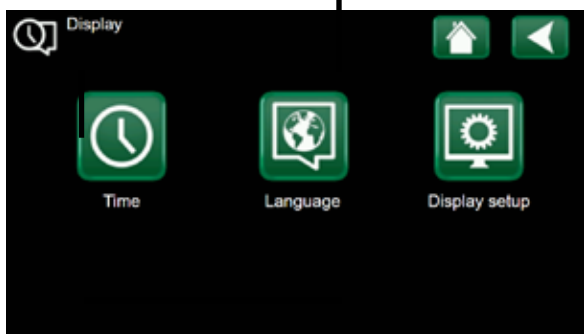
**Advanced settings menu:**



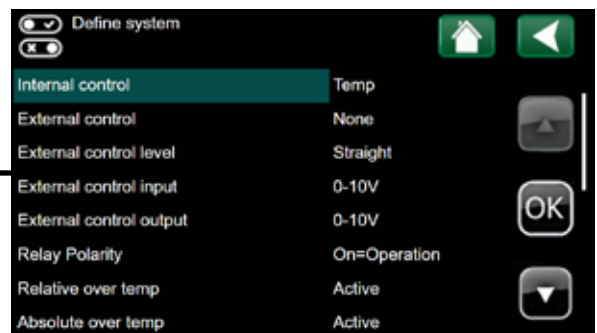
**Settings menu**



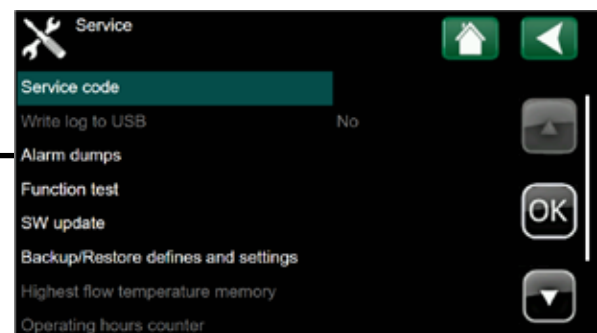
**Display menu:**



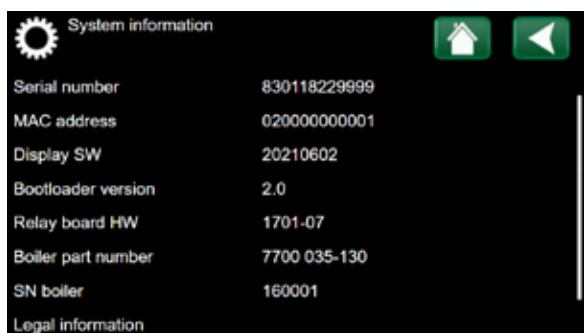
**Define system menu:**



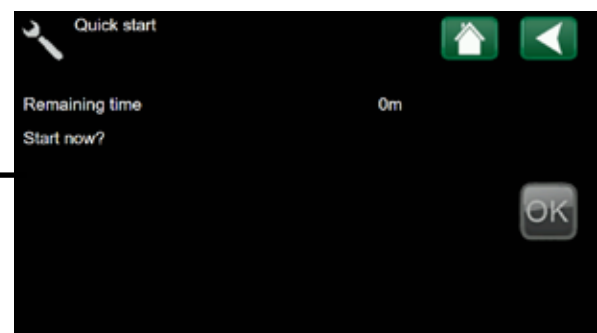
**Service menu:**



**System information menu:**



**Quick start menu:**



# 10. Detailed menu descriptions

- All settings can be configured directly on-screen using the easy-to-read control panel. The large icons function as buttons on the touchscreen.
- You can easily access the different menus to view operational information or set your own values.
- Use the arrow buttons to scroll up and down in the menus.
- Choices are saved by pressing the **OK** button.
- The previous menu is reach by pressing the **Return** button.



**NOTE! Some menus are only displayed if their function is active. A deactivated function is "dim/grey".**

## 10.1 Description of icons



### Stop button

Stops boiler operation. The boiler enters Standby mode.



### Start button

Starts boiler operation. The boiler enters Idle mode for approx. 5 seconds before the first output stage begins.



### Operational info

Current operational data for the boiler is displayed here.



### Advanced

Electric boiler and system settings and servicing are done here.



### Alarm

Displays the alarm menu and alarm history.



### Active alarms

Active alarms are displayed here along with a clear description of the alarm and actions for resetting.



### Display

Settings for date, preferred menu language and other adjustments of the screen.



### Settings

Opens the boiler's Settings menu.



### Define system

The heating system's structure can be set/changed here.



### Service

Advanced settings must be made by a professional.



### Quick start

Here, the remaining time for delays can be viewed, and the function can be overridden.



### System information

Here you'll find information about the boilers serial number, article number etc.



### Return

Press the Return button to return to the previous page/screen.



### Home

Press the Home button to return to the home screen.



### OK

Press the OK button to highlight and confirm text and selections in the menus.



### Information

Displays alarm descriptions and help text.



### Reset

Used to reset an alarm.



### Service indicator

A flashing icon indicates that it is time for the boiler to be serviced.



## 10.2 Main menu

This menu is the system's home screen. All other menus can be accessed from here.

An overview of the current operational data is provided here.

The set point can be directly adjusted using the **+** and **-** buttons.

Operation can always be stopped with the **0** button, regardless of how the boiler is controlled (analogue signal, BMS, etc.).

However, the boiler cannot always be started with the **1** button. This is contingent by the way the boiler system is controlled. The reason for this is explained later in the manual under the menu that manages this function.

If a button is not pressed within 2 minutes, the system will revert to this menu screen.

### 10.2.1 Main menu when external control

If external control is active the set point from the external signal is shown here.

If control via **power** the set point is shown in **%**.  
If control via **temperature** the set point is shown in **°C**.

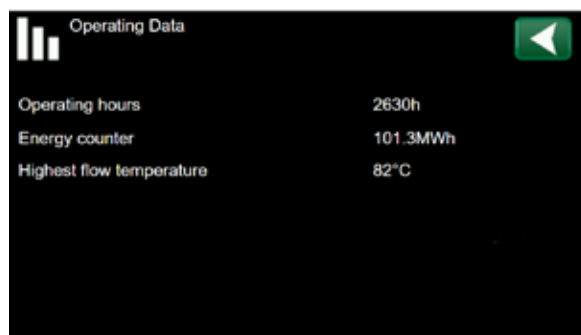
The **+** and **-** buttons are deactivated (dimmed).



Home screen / main menu (example)



This example shows an EL 500 Eco which is external controlled.



Operational information (example)

## 10.3 Operational information

The total number of hours the boiler has been in operation can be viewed here, as well as the boiler's highest temperature. The energy calculator displays the total number of produced kWh.

## 10.4 Alarm menu

All alarms and operational disruptions are indicated by the alarm icon flashing red. When the icon is pressed, the menu displaying the active alarm is opened.



Home screen / main menu with a triggered alarm (example)

### 10.4.1 Alarm description

The system has several different alarm descriptions.

The arrows can be used to highlight the alarm you wish to investigate. Press the **?** button for a description of the alarm.

If the alarm cannot be reset, the RST button will be dim. This may mean that the alarm is still active or that any component in the safety equipment have not been reset.

The alarm description explains why the alarm has been triggered, how to check a sensor for example, and how to reset.

If the fault cannot be reset, you will be advised to contact Support. This may happen if e.g. the relay board has broken.

### 10.4.2 Alarm messages

In the event of a system alarm or fault, the alarm icon will flash red. When the icon is pressed, the alarm menu will be displayed along with a message describing the alarm, e.g. *E10 Com error BMS*.

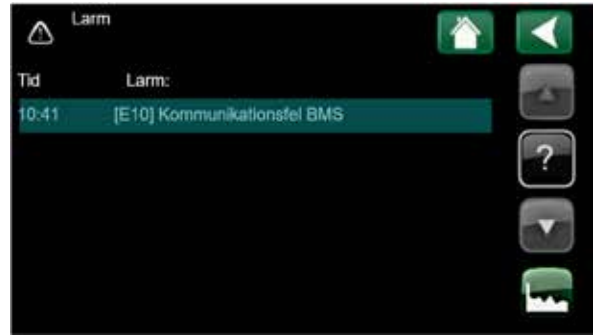
If several alarms are active, they will be displayed sequentially. A persisting fault must first be rectified before it can be reset. Some alarms are reset automatically if the fault ceases.

Press the **?** button for a description of the alarm and to reset.

This menu explains why the alarm was activated and how it can be reset. The system is able to display a total of 18 alarm messages (8 at a time).

#### Alarm messages

- E00 Relay board memory error
- E01 Boiler temp sensor
- E02 High cabinet temperature
- E03 Cabinet overheated
- E05 Outdoor temp sensor
- E06 External control signal deviation
- E07 Safety circuit tripped
- E08 Boiler temperature too high
- E09 Communication error relay board



Alarm overview (example)



The alarm can be reset



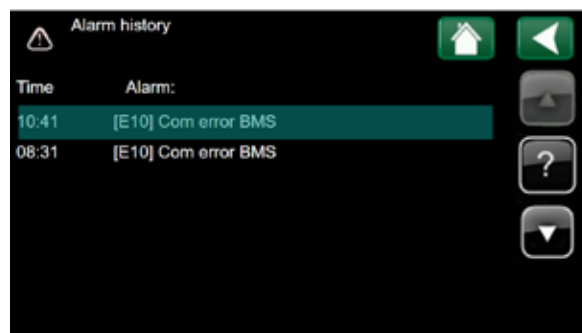
The alarm cannot be reset



- E10 Communication error BMS.
- E11 Phase L1 Missing
- E12 Phase L2 Missing
- E13 Phase L3 Missing
- E14 USB error
- E15 Room sensor
- E16 System temp sensor from boiler
- E17 Temp sensor from exchanger
- E18 Temp sensor to exchanger

### 10.4.3 Alarm history

Previous alarms are shown here.



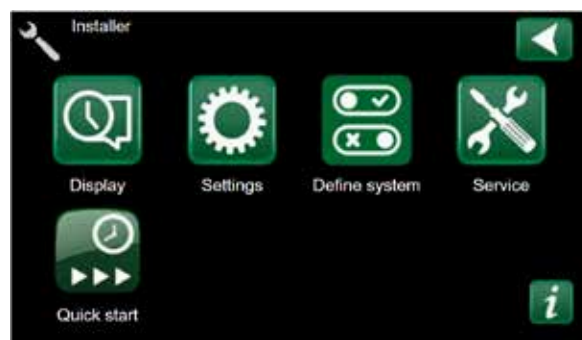
Alarm history (example)



## 10.5 Advanced

This menu contains six submenus;

- **Display** has settings for time, language and the actual display.
- **Settings** are used by both the installer and user to set values and functions.
- **Define system** is used to define how the boiler is to be controlled, to specify limit values and communication.
- **Service** is used for troubleshooting, diagnostics, history, program updates and to enter the reset PIN code\*.
- **Quick start**
- **System information** is found via the icon/button marked *i*.

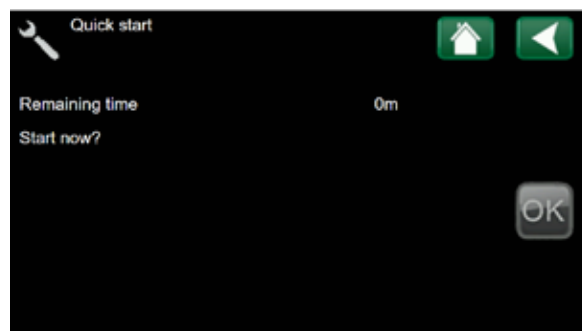


### 10.5.1 Quick start

Is activated if the boiler has been without power for more than 3 minutes.

The current duration of the 1h delay can be viewed here, and an override to quick-start the boiler directly can be performed.

Limits the boiler's power to about 25% of the total power.



\* PIN code is sent when the warranty registration is done.



## 10.5.2 Display

Here you set the time, language and other parameters for the touch screen.

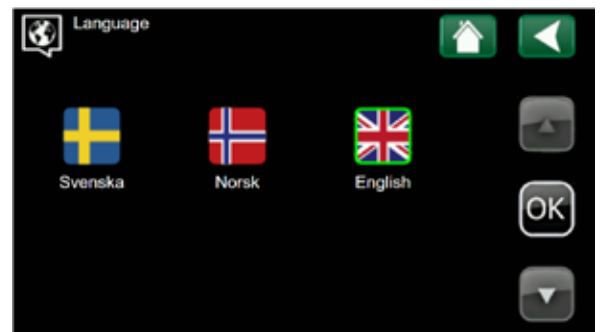
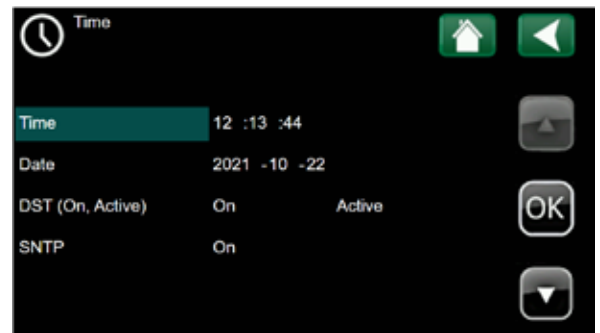
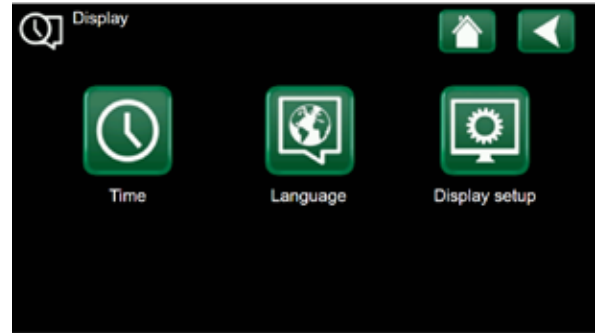
**Time** can be set manually or using SNTP\* if the boiler has an internet connection. If "SNTP On" (see under **Settings**) the time and date are automatically adjusted from the internet.

**Language** is selected by pressing on of the flags and then **OK**.

Under **Display setup** you can set these parameters:

- **Sleep delay**; time in seconds before the screen turns off (0.....)
- **Backlight**; brightness of the screen (10....100%)
- **Click sound**; should touch screen be heard? (Yes/ No)
- **Time zone**; is used together with SNTP\* to get the correct time, see menu **Time**. For Sweden, it should be +1
- **Lock code**; code to lock the screen
- **Font size**; resize text (standard / small / large)

\*SNTP = Simple Network Protocol, is a protocol that describes how time can be synchronized between devices on the Internet.



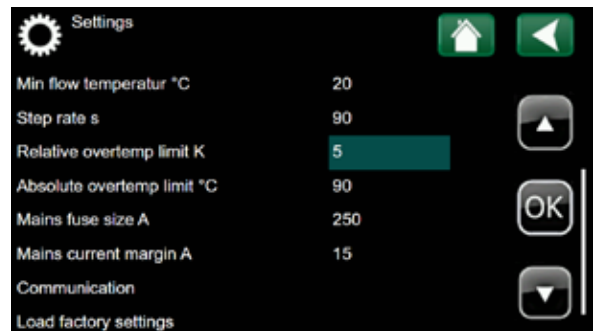
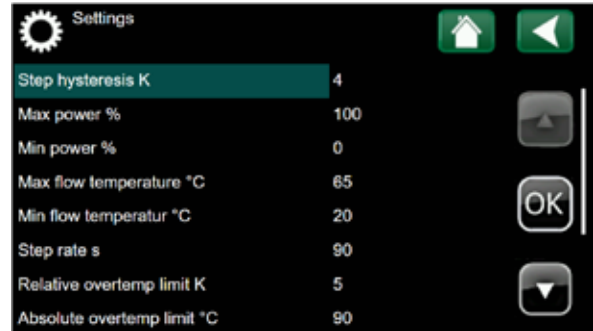


### 10.5.3 Settings

Boiler values and functions can be set here. The functions displayed depend on how the system has been defined.

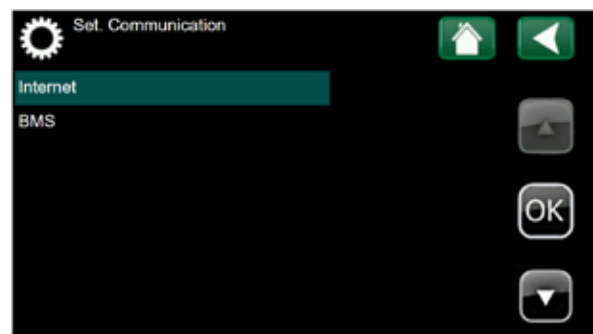
Use the arrows to select the desired function. Press **OK** to open, and use the **+** och **-** buttons to increase/decrease values or activate/deactivate functions.

- **Step hysteresis**; a dead band range within which the stage regulator stops the onset of power to avoid overtemperature. (1...16)
- **Max power**; how much of the boiler's total power may be switched on (=power limitation) (0...100%)
- **Min power**; minimum power that must always be switched on. (0...100%)
- **Max flow temp**; desired boiler temperature (=same as on the start page) (0...100°C)
- **Min flow temp**; lowest permissible temperature for the boiler. (0...100°C)
- **Step rate**; time between entry of power, exit is always 16 sec / step. (20...240 sek)
- **Relative overtemp limit** (1...15)
- **Absolute overtemp limit** (40...110°C)
- **Main fuse size** (16...2000A)
- **Main current margin**; number of Ampere that must be available before the boiler can increase the power (0...50A)
- **Communication**, *further info in section 10.5.3!*
- **Load factory settings**



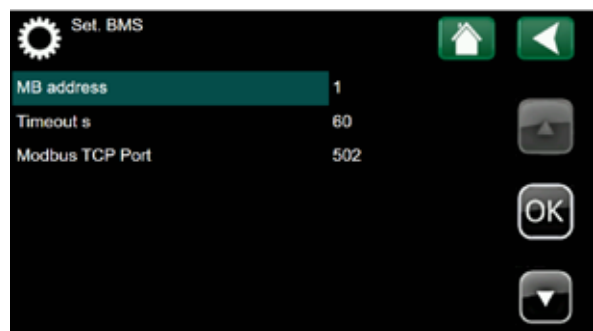
### 10.5.4 Settings Communication

Here you select settings for communication via the **Internet** or **BMS.BMS**.



### 10.5.5 Settings BMS

- **MB Address**; address in the Modbus protocol (Node number)
- **Time out**; time without communication (10...)
- **Modbus TCP Port**; port for modbus communication (Optional, default=502)



The parameters (*Adress, Baud rate, Paritet, Stop bit and Timeout*) are set to match the data at the other end. There is no right or wrong, as long as the data is the same at both ends!

**NOTE!** If one try to read an invalid adress the answer from BMS will be code 0x83 ERROR.

The user must clarify that any invalid addresses will not be read or accept to deal with the problem.

These are the valid commands for Modbus communication:

03 (0x03) Read Holding Registers

06 (0x06) Write Single Register

16 (0x10) Write Multiple registers

23 (0x17) Read/Write Multiple registers

Max. read and write speed: 1000 mS.

### 10.5.6 BMS variables

These variables are available:

#### Read-only register

Reg no.	Function	Type	Unit	Direction	Comment
1	Register version	U16		R	1 = This version
2	Display software version	U16		R	
3	Relay board hardware version	U16		R	
4	Article no. high value	U16		R	Always displays 3317
5	Article no. low value	U16		R	Always displays 2015
6	Serial no. high value	U16		R	
7	Serial no. low value	U16		R	
8	Operating time high value	U16	kh	R	Max. 64 Mh = 7,300 years
9	Operating time low value	U16	0.1 h	R	
10	Highest boiler temp value	S16	0.1°	R	
11	Energy calculator high value	U16	10 MWh	R	Max. 640 TWh
12	Energy calculator low value	U16	kWh	R	
13	Boiler status	U16		R	0 = Off, 1 = Wait, 2 Active
14	1h delay	U16		R	0=Deactivated, 1=Activated
15	Boiler temp	S16	0.1°	R	
16	Outdoor temp	S16	0.1°	R	
17	Reserved				Room temp
18	Relay board temp	S16	0.1°	R	
19	Phase current L1	S16	0.1A	R	Max. 3 kA
20	Phase current L2	S16	0.1A	R	
21	Phase current L3	S16	0.1A	R	
22	Boiler output	S16	kW	R	Max. 32MW
23	System temp sensor	S16	0.1°	R	Optional
24	Temp sensor from heat exchanger	S16	0.1°	R	Optional
25	Temp sensor to heat exchanger	S16	0.1°	R	Optional
26	Active BMS alarms low value	U16		R	Bit encoded: Bit 0 alarm 0... Bit 15 alarm 15
27	Active BMS alarms high value	U16		R	Bit encoded Bit 0 alarm 16... Bit 4 alarm 20

## Read/Write register

50	Set point temp	S16	0.1°	R/W	
51	Set point output	S16	%	R/W	
52	Heating curve ascension / inclination	S16	0.1°	R/W	
53	Heating curve adjustment	S16	0.1°	R/W	
54	Reduced boiler temp	S16	0.1°	R/W	
55	Boiler start	S16		R/W	0 = Stop, 1= Start Reading returns 999
56	Reset alarm low value	U16		R/W	Bit encoded 1 = reset Alarm 0..15 Reading returns 0xFFFF
57	Reset alarm high value	U16		R/W	Bit encoded 1 = reset Alarm 16..17 Reading returns 0xFFFF

### 10.5.7 Settings Ethernet:

- **DHCP;** Should the network assign an IP address or should it be configured manually? Depends on current network configuration at the property and how the network is managed. (Yes/No)

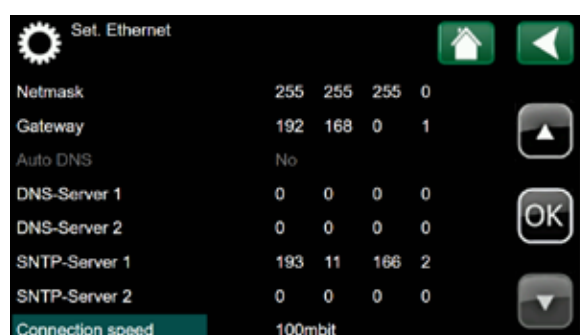
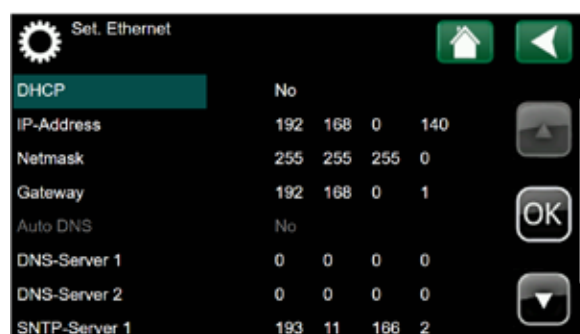
NOTE! **Yes** is recommended! If **No** = IP, Netmask and Gateway are to be configured manually.

- **Auto DNS;** **Yes** = DNS is configured from the net  
**No** = DNS is configured manually
- **SNTP-Server;** Address of server that provides time synchronization information.  
Default: 193.11.166.2 (Sweden Stockholm Sp Sveriges Tekniska Forskningsinstitut)
- **Connection speed** (10 or 100 Mbit)

To get a quick start, it is recommended that you set DHCP to **Yes** and let the network assign all required addresses. Then the time is also adjusted and the communication starts.

To access the mirroring of the screen via computer, **Web** must be set as **Active** in the menu **Advanced/Define system/Web**. The IP address is entered in your browser (in the example above 192.168.0.146/main.html).

If the mirroring is to be displayed outside the internal network, the network router must be configured for this.





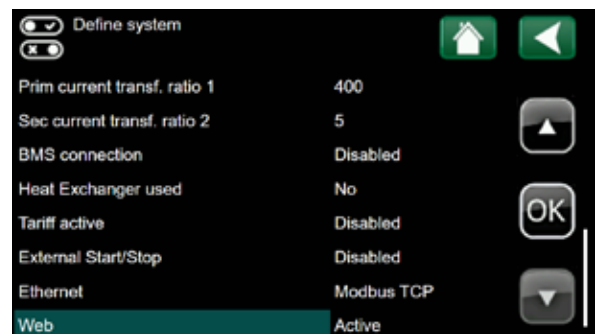
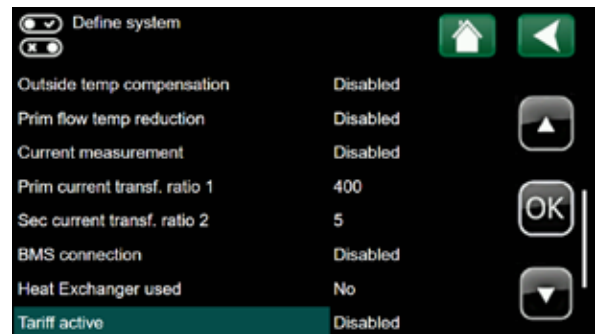
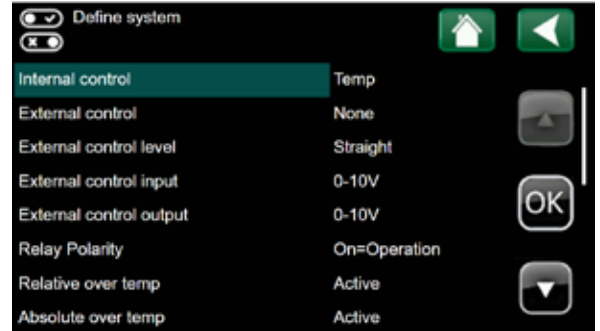
## 10.5.8 Define system

How the boiler will be controlled is defined here, limit values can be specified and functions can be managed.

- **Internal control** (Temp/power)
- **External control** (None/temp/power)
- **External control level** (Straight/Inverterad)
- **External control input** (5V, 0-10V, 0-20mA, 4-20mA)
- **External control output** (5V, 0-10V, 0-20mA, 4-20mA)
- **Relay polarity** (Operation/Alarm)
- **Relative overtemp** (Active/Disabled)
- **Absolut over temp** (Always active)
- **Outdoor temp compensation** (Active/Disabled)
- **Prim flow temp reduction** (Active/Disabled)
- **Current measurement** (Active/Disabled)
- **Prim current transformer ratio** (10-2000 in steps of 10A)
- **Sec current transformer ratio 2** (5, fixed value)
- **BMS connection** (Active/Disabled) NOTE! Choose **Disabled**, only used in special cases.
- **Heat exchanger used** (Yes/No)
- **Tariff active** (Closed contact/Disabled)
- **External control Start/Stop** (Active/Disabled)
- **Ethernet**; Should the boiler respond to the request via Modbus TCP? (Disabled/Modbus TCP)

NOTE! Port setting is done in **Avanced/Settings/Communication/BMS**

- **Web**; Should the web interface be usable? (Active/Disabled)







## 10.5.9 Service (display)

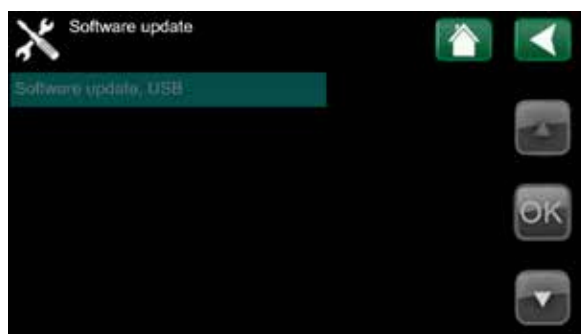
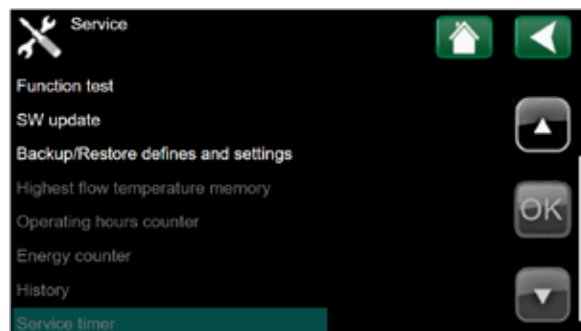
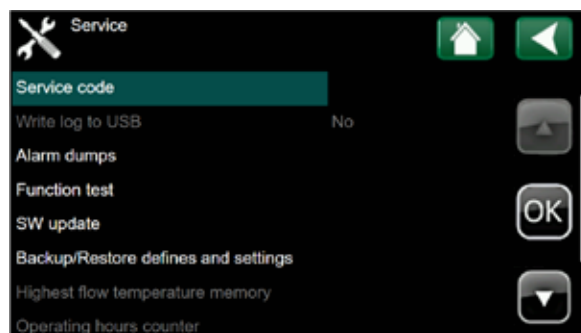
Service is used for troubleshooting, diagnostics, history, program updates and reset. To reset saved operational history and the service timer, a 4-digit pin/service code must be entered.

- **Service code;** is received when the warranty registration of the boiler is done. When entered the grey (dim) alternatives in the menu may be used.
- **Write log to USB;** Write log file for trouble shooting to connected USB. Is grey (dim) if no USB is connected. (Yes/No)

Logs operational data, inputs and outputs to a file on the usb memory every 30 seconds for 24h.

Is used by Osby Parca to make advanced analysis of the boiler's functions.

- **Alarm dumps;** export the alarm log to USB for trouble shooting.
- **Function test;** see status of all inputs and outputs. Inputs are grey and outputs white, the white ones may be managed. When leaving the menu the outputs revert to the status determined by the regulator. *Further info in section 10.6!*
- **SW update;** update the software from a USB stick (opens new menu)
- **Backup/Restore defines and settings** (opens new menu)
- **Reset Highest flow temperature memory** (pin code needed)
- **Reset operating time counter** (pin code needed)
- **Reset energy counter** (pin code needed)
- **Reset history** (pin code needed)
- **Service timer;** Shows remaining time to service and allows you to set time for the next service. When it's time for service, a yellow wrench appears on the home page (pin code needed).



Software update, USB



Backup/Restore defines and settings

Also see chapter 4, Servicing.

## 10.6 Function Test

Function testing allows simple system status troubleshooting to be carried out.

When function testing is active, the boiler's normal functions are switched off.

Ap04 refers to connector A, position 4 on the relay board.

All **inputs** are off (dim) and cannot be changed. These can only be read. If, for example, a sensor displays -999 or +999, this means that the sensor's input is open and short-circuited, respectively.

**Outputs** are on and can be changed. Use the arrow buttons to select the desired position for testing, then press **OK** and + or - to switch between on/off.

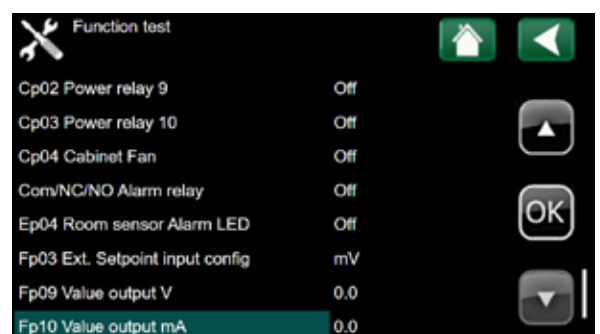
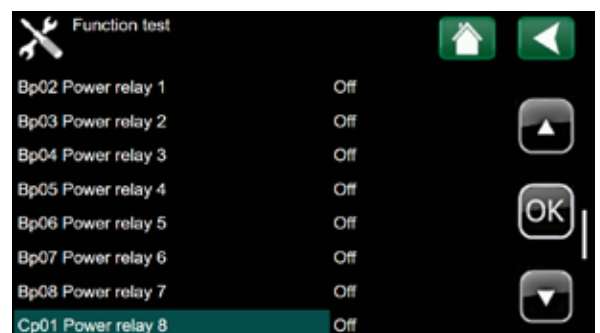
### Inputs

- 230 V Safety circuit
- 230 V Ext shut off
- Flow temp reduced
- Tariff
- Outdoor sensor
- Room sensor = external Start/Stop
- Boiler temp sensor
- Internal temp board sensor
- External set point
- Phase current L1
- Phase current L2
- Phase current L3
- Internal raw voltage
- System flow (temp) sensor
- Temp sensor heat exchanger out
- Temp sensor heat exchanger in

### Outputs

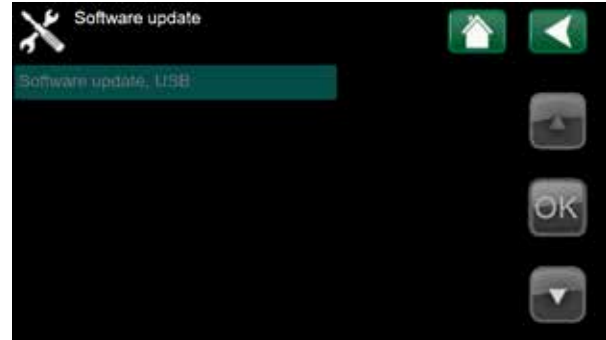
- Output power relay 1 (On/Off)
- Output power relay 2 On/Off)
- Output power relay 3 (On/Off)
- Output power relay 4 (On/Off)
- Output power relay 5 (On/Off)
- Output power relay 6 (On/Off)

- Output power relay 7 (On/Off)
- Output power relay 8 (On/Off)
- Output power relay 9 (On/Off)
- Output power relay 10 (On/Off)
- Cabinet fan (On/Off)
- Com/NC/NO Alarma relay (On/Off)
- External set point input config. (mV/Ma)
- Value output (V/mA)



### 10.6.1 Update SW from USB

When the control system needs to be updated, select this option from the Service menu. Updating is performed with a USB flash drive plugged into the panel's port. Then press OK in the menu. The program is written to the panel. The system will then restart. The boiler displays the start-up screen while a system check is done, after which the main menu will be displayed. Boiler updating is now complete.



Latest version of firmware may be downloaded via [www.osbyparca.se](http://www.osbyparca.se).

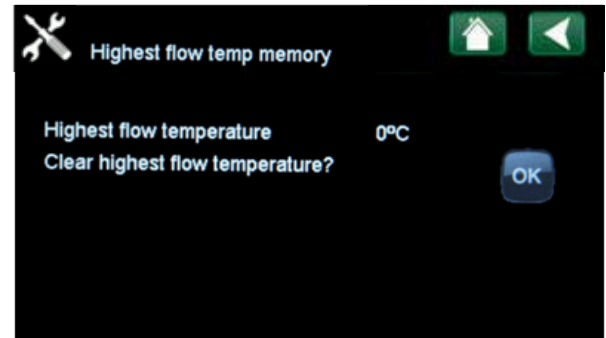
**! Prior to start, check to ensure the settings made have not changed after the update.**

### 10.6.2 Backup/reset settings from USB

Insert a USB flash drive into the panel's port. Then select the Backup or Reset menu, press OK.

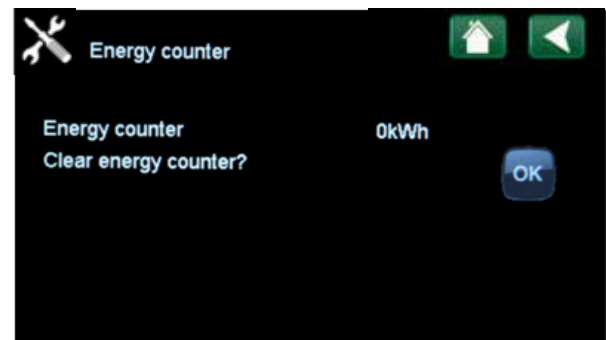
### 10.6.3 Reset highest boiler temperature

This menu displays the highest temperature reached by the boiler and shows a reset prompt. Pressing OK resets the value to zero. PIN code is required to access the menu\*.



### 10.6.4 Reset operating time calc.

This menu displays the total number of hours the boiler has been in operation and shows a reset prompt. Pressing OK resets the calculator to zero. PIN code is required to access the menu\*.

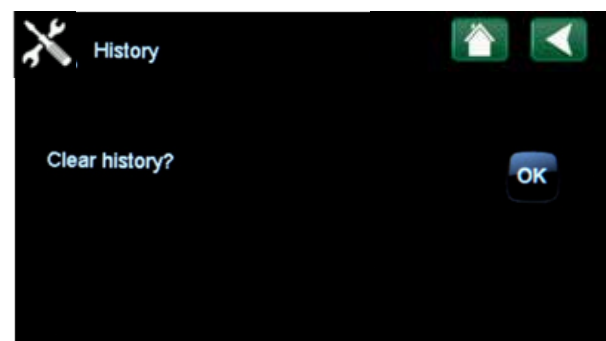


### 10.6.5 Reset energy calculator

This menu displays the total number of produced kWh and shows a reset prompt. Pressing OK resets the calculator to zero. PIN code is required to access the menu\*.

### 10.6.6 Reset history

The menu shows a reset history prompt. Pressing OK resets the graphs. PIN code is required to access the menu\*.



### 10.6.7 Service timer

Shows time remaining until the next service. The interval length between services is set here. This function can be deactivated after the warranty has expired.

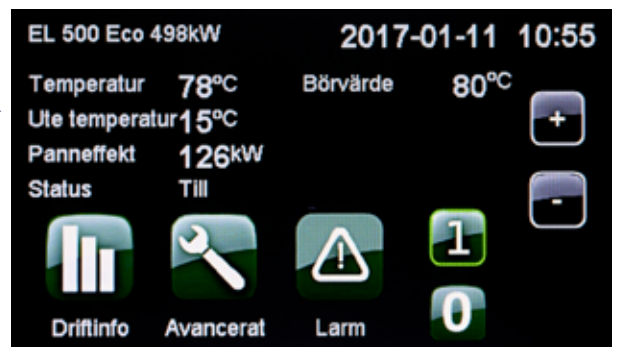
\* PIN code is sent when the warranty registration is done.

## 10.7 External power

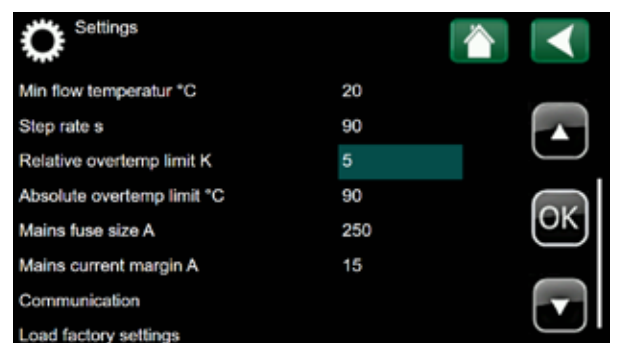
With a closed potential-free contact from overall systems or other external circuits, the boiler can be started or stopped provided the safety circuit conditions are met. When the circuit is broken the boiler quickly downshifts and enters OFF mode. When the circuit is closed again, the boiler first enters STANDBY mode and then, once the step duration permits, ON mode.

## 10.8 Outdoor Compensation

Once an existing sensor has been defined, the outdoor temperature will be displayed in the main menu.

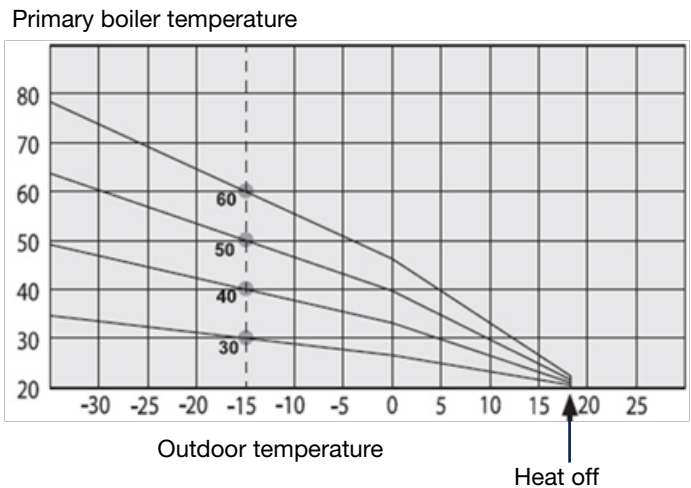


The heating curve defines the starting value for the boiler temperature. The outdoor temperature generates regulation of the boiler temperature.



### 10.8.1 Heating curve ascension/ inclination

The curve can be set between 30° and 60° inclination. In the example below, the set heating curve's inclination provides a boiler temperature of 60 °C when the outdoor temperature is -15 °C.

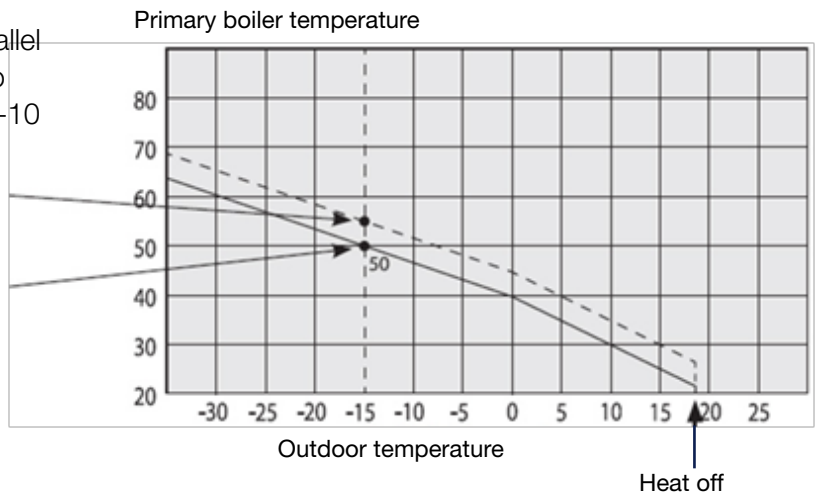


### 10.8.2 Heating curve adjustment

The heating curve can be adjusted in parallel with the desired value in order to adapt to different systems. Adjustment values are -10 °C... +10 °C.

Inclination 50 °C  
Adjustment +5 °C

Inclination 50 °C  
Adjustment 0 °C



### 10.8.3 Highest primary boiler temperature

Highest permitted temperature for the heating system.

### 10.8.4 Lowest primary boiler temperature

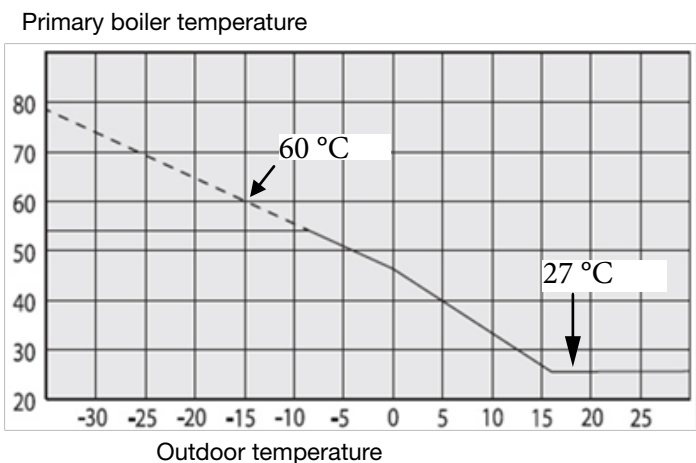
Lowest permitted temperature for each heating system

**One example:**

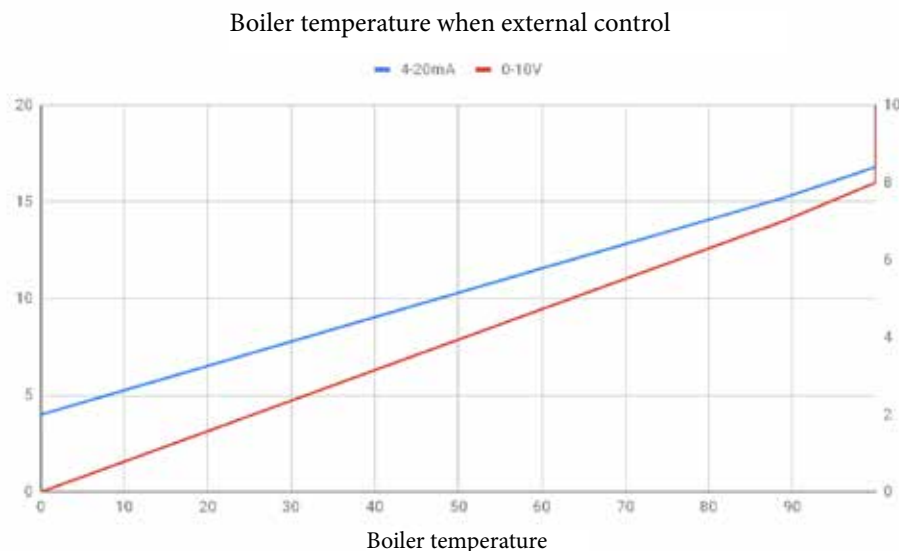
Inclination 60 °C  
Adjustment 0 °C

In this example, the highest permitted primary flow temperature has been set to 55 °C.

The lowest temperature is 27 °C (summer-time compensation or systems unable to tolerate very high temperatures).



## 10.8.5 Diagram boiler temperature



## 10.9 Stage regulator

The regulator utilises stage numbers. These are fixed in the system and cannot be set manually.

### Output in percent

Calculated by using the boiler model's rated output and the output of connected stages. This value can be configured to analogue output.

### Output set point in percent

Set point in percent is converted to an output stage. This is used to limit the stage regulator.

### Overcurrent

No comparison of the next output stage's expected current increase/decrease. The current margin defined in the Settings menu is used to reconnect an output stage. Explained in more detailed under the "Current Overload" section.

### Stage duration

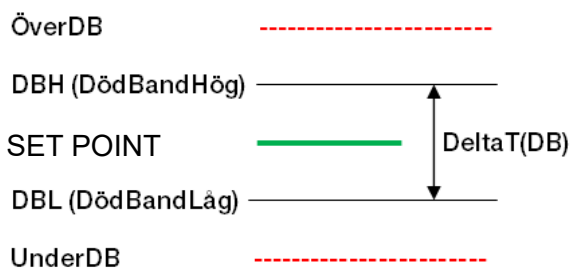
Stage duration can be increased in the Settings menu.

**NOTE! Initial stage duration cannot be adjusted or changed. It is fixed at 16 seconds.**

## 10.10 Delta T, deadband

The function of delta T is to produce the most obtuse temperature angle possible before the set point is reached. If delta T is too small, there is a significant risk of major temperature fluctuations. This value is factory-set at 4 °C, and is to be adapted according to the heating system in which the boiler is installed.

## 10.11 Deadband range



### The temperature is higher than the deadband

The output stage is disconnected after each step.

### The temperature is within the deadband

The stage regulator does nothing.

### The temperature is lower than the deadband

The output stage is connected during the step depending on the temperature's tendency.

## 10.12 Current overload

The current controller uses the highest measured current value for phases L1, L2, and L3. If this current value exceeds the set value of the main fuse, the temperature controller is overridden by the stage regulator downshifting. In this mode, the temperature controller is only permitted to downshift or retain the present value.

If the current value + current margin is less than the value of the main fuse, the temperature controller is permitted to increase the stage output. The current margin is set in the Settings menu.



## 10.13 Output control

The regulator utilises normal temperature control. The output stage is not permitted to increase above the output set point. When the external output set point changes, the regulator follows the signal and shifts up every 16 seconds.

## 10.14 Current limitation

If necessary, the output of the boiler can be limited when, for example, the current drawn exceeds the main fuses of the system. The connection of current sensors to the system-specific current transformers' 0–5 A side must be done in accordance with the boiler's associated wiring diagram. The function is activated in the **Define System** menu. Here, the current transformer's conversion can be specified (primary and secondary side).

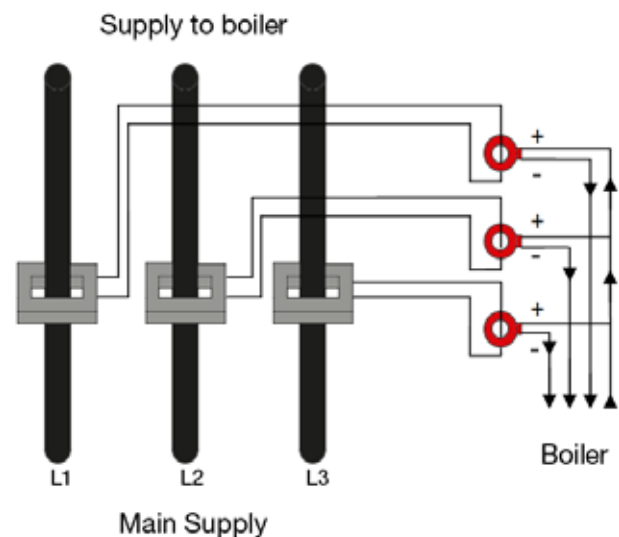
## 10.15 Current sensors

As depicted in the illustration, the current sensors must be mounted to the current transformer's cabling. For connection to the boiler, please refer to the actual model's wiring diagram. Current sensors are available from Osby Parca as boiler accessories.



These current sensors can be ordered from Osby Parca. Art. no. 1118404-01

System-specific current transformer



# 11. Sensor resistances

Boiler temp sensor NTC 22

Temperature °C	NTC 22 Resistance Ω
130	800
125	906
120	1027
115	1167
110	1330
105	1522
100	1746
95	2010
90	2320
85	2690
80	3130
75	3650
70	4280
65	5045
60	5960
55	7080
50	8450
45	10130
40	12200
35	14770
30	18000
25	22000
20	27100
15	33540
10	41800
5	52400
0	66200
-5	84750
-10	108000
-15	139000
-20	181000
-25	238000

Outdoor sensor NTC 150

Temperature °C	NTC 150 Resistance Ω
70	32
65	37
60	43
55	51
50	60
45	72
40	85
35	102
30	123
25	150
20	182
15	224
10	276
5	342
0	428
-5	538
-10	681
-15	868
-20	1115
-25	1443
-30	1883
-35	2478
-40	3289

NOTE! The sensors must be disconnected before measuring the resistance!



## 12. Spare parts Eco series

<b>Immersion heaters with packings</b>					
Boiler (kW)	Art. no.	Designation	Insertion length (mm)	Packing	Designation
36	7612027-01	Immersion heater, complete 18.2 kW / 230 V	485	7112185-02	Packing cartridge EL 36 / EL 50
50	3311-0040	Immersion heater, complete 25 kW / 230 V	485	7112185-02	Packing cartridge EL 36 / EL 50
69-504	7612000-05	Immersion heater 9 kW / 230/400 V / 2" thread	820 ±16	7616507-01	O-ring EPDM, 70 g peroxide
69-504	7612000-09	Immersion heater 15kW / 230/400 V / 2" thread	1070 ±20	7616507-01	O-ring EPDM, 70 g peroxide
69-504	7612000-09/1	Immersion heater 15kW / 230/400 V / 2" thread	685	7616507-01	O-ring EPDM, 70 g peroxide
69-504	7612000-14	Immersion heater 21 kW / 400 V / 2" thread	1320 ±26	7616507-01	O-ring EPDM, 70 g peroxide
69-504	7612000-14/1	Immersion heater 21 kW / 400 V / 2" thread	900	7616507-01	O-ring EPDM, 70 g peroxide

<b>Air filter, fan &amp; control system</b>		
Boiler model	Art. no.	Designation
EL 160 Eco	3381-0302	Replacement filters EFA200 5-pack
EL 500 Eco	3381-0303	Replacement filters EF250/300 5-pack
EL 500 Eco	3381-0305	Filter fan EF300 256 m³/h 230 VAC
All EL Eco	589460302	Touchscreen (Serial number must be specified at order)
All EL Eco	583742307	Boiler temp sensor ECO L=2.5 meter
All EL Eco	3317-2015	Relay board electric boiler ECO
160-500 Eco	3369-3359S	Network cable 0,5 m, shielded

<b>Thermostats/High pressure switches</b>		
Boiler	Part no.	Designation
69-504 kW	7020160-05S	Overheating protection (max.thermostat)
<b>Boilers with integrated safety system</b>		
69-504 kW	7020160-05S	Overheating protection (max.thermostat)
69-504 kW	3366-0601	Pressure transmitter (sender). Accessories: Receiver 3395-3253 and display 3395-3254

**We also refer to the associated “spare parts list” at the wiring diagram for the actual boiler.**

## 13. CE certificate



### FÖRSÄKRAN OM ÖVERENSSTÄMMELSE DECLARATION OF CONFORMITY (CE-intyg / CE-Certificate )

**LVD 2014/35/EU  
EMC 2014/30/EU**

**Produkt: Elpanna / Electric boiler**

Fullständigt produktnamn/nummer/Full identification of the product :

Modell/Type : El 160 Eco Effektområde/Capacity : **69 - 156 kW**

Övrig information: \_\_\_\_\_

Ett urval av produkten har bedömts och funnits vara i överensstämmelse med /  
A Sample of the product has been assessed and found to be in conformity with :

Direktiven 2014/30/EU (EMC-direktivet) och 2014/35/EU (Lågspänningsdirektivet)  
Directive 2014/30/EU (EMC-directive) and 2014/35/EU (Low Voltage Directive)  
Ecodesign 811/2013/EU labelling and 813-814/2013/EU Commission regulation

Följande standarder har använts vid testning/bedömning/  
Following standards were used in assessing:

EMC (gällande lätt industri eller industriföremål samt för fastighetsbruk /  
regarding light industry or industrial equipment and for real estate use )

EN 61000-6-4 : 2007 , A1 :2011  
EN 61000-6-2 :2005  
EN 61000-4-2  
EN 61000-4-3  
EN 61000-4-4  
EN 61000-4-5  
EN 61000-4-6  
EN 61000-4-11

Osby 2018-01-05

.....  
Ort och datum / Place and date

.....  
(Namnteckning / Signature)  
Dennis Eliasson General Manager  
Enertech AB Osby Parca Div.

**FÖRSÄKRAN OM ÖVERENSSTÄMMELSE  
DECLARATION OF CONFORMITY  
(CE-intyg / CE-Certificate)**

**LVD 2014/35/EU  
EMC 2014/30/EU**

**Produkt: Elpanna / Electric boiler**

Fullständigt produktnamn/nummer/Full identification of the product :

Modell/Type : **El 500 Eco** Effektområde/Capacity : **150 - 504 kW**

Övrig information: \_\_\_\_\_

Ett urval av produkten har bedömts och funnits vara i överensstämmelse med /  
A Sample of the product has been assessed and found to be in conformity with :

Direktiven 2014/30/EU (EMC-direktivet) och 2014/35/EU (Lågspänningsdirektivet)  
Directive 2014/30/EU (EMC-directive) and 2014/35/EU (Low Voltage Directive)  
Ecodesign 811/2013/EU labelling and 813-814/2013/EU Commission regulation

Följande standarder har använts vid testning/bedömning/  
Following standards were used in assessing:

EMC (gällande lätt industri eller industriföremål samt för fastighetsbruk /  
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EN 61000-6-4 : 2007 , A1 :2011  
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EN 61000-4-2  
EN 61000-4-3  
EN 61000-4-4  
EN 61000-4-5  
EN 61000-4-6  
EN 61000-4-11

Osby 2020-01-27

.....  
Ort och datum / Place and date



.....  
(Namnteckning / Signature)  
Dennis Eliasson General Manager  
Enertech AB Osby Parca Div.

## 14. Appendices

- Circuit diagram
- Warranty document



Subject to errors or updates made after this edition.