



Installation and maintenance manual EcoNom 12-55





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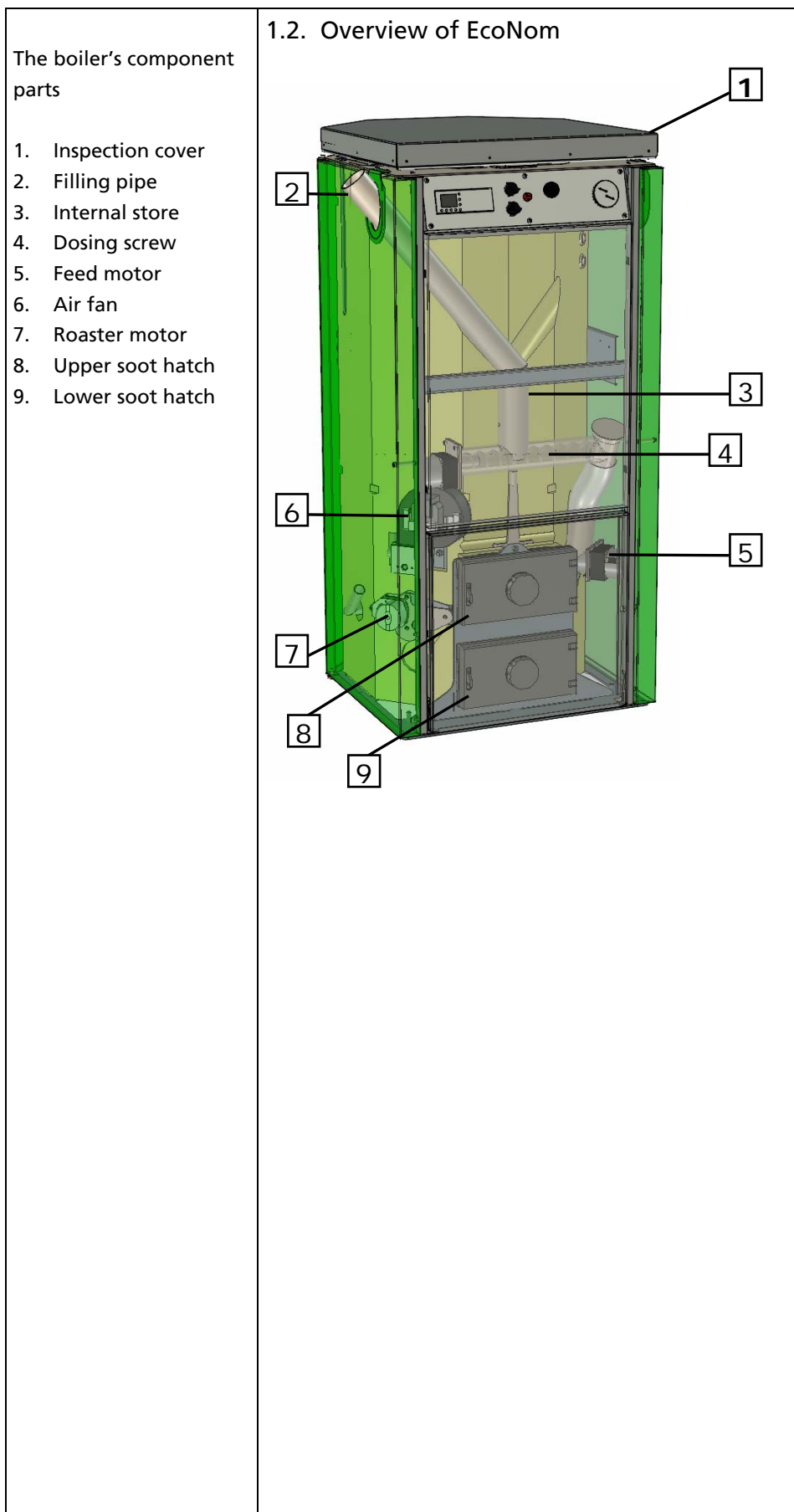
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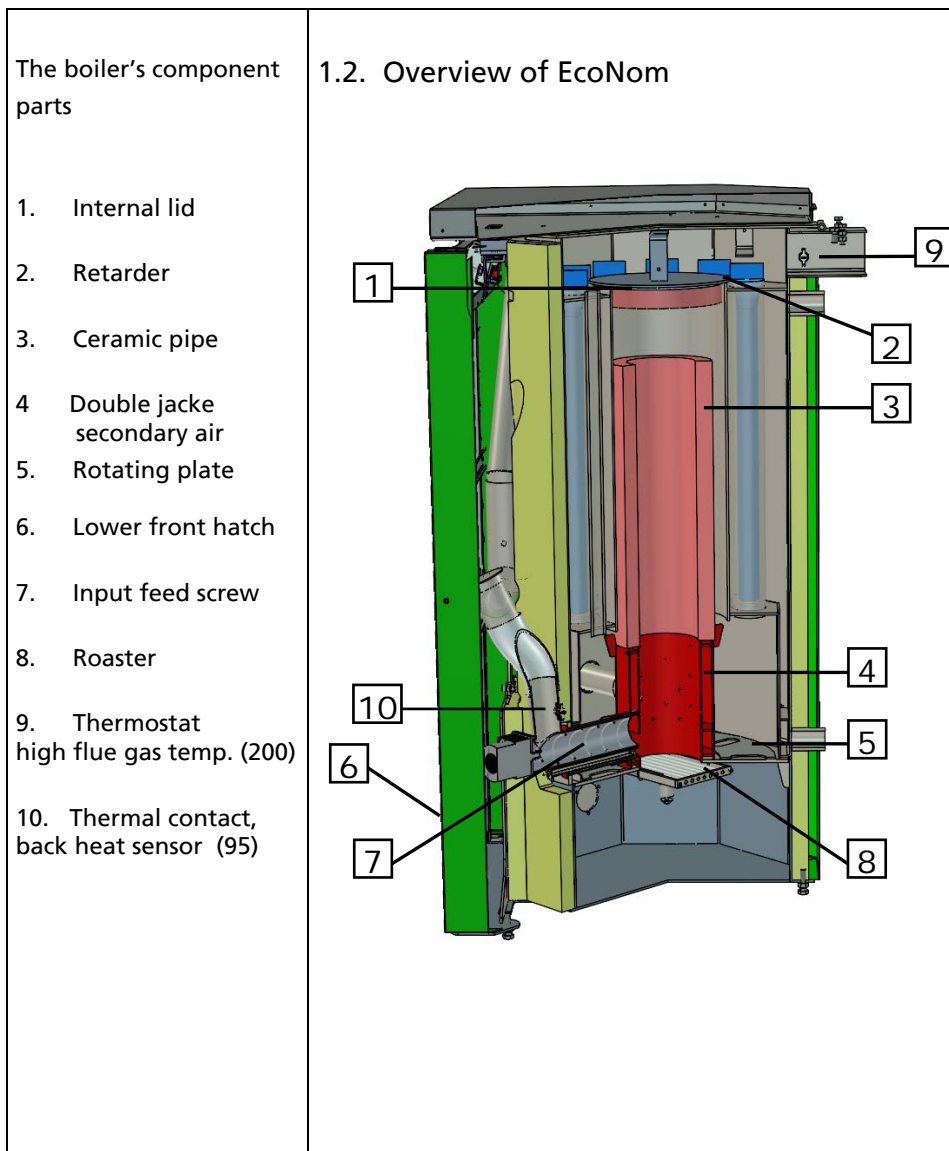
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1. Product description

<p>Important Information and Precautions</p> <p>- Store this manual somewhere easily accessible for future use.</p> <p>- Read through the manual carefully before assembling and starting up your EcoNom 12-55.</p> <p>- Follow the manual's instructions carefully and carry out the recommended care and maintenance.</p> <p><i>NB Remember to close the internal lid on the boiler after servicing and soot removal.</i></p>	<p>1.1. Functional description</p> <p>Pellet firing is extremely similar to oil firing. The major difference is that pellet firing produces a certain quantity of ash that must be removed at regular intervals to prevent it reducing efficiency or disrupting boiler function.</p> <p>The EcoNom 12-55 (subsequently referred to as EcoNom) is a new type of pellet boiler designed for firing using 6-8 mm pellets.</p> <p>A very high level of environmental efficiency is achieved through optimum combustion that yields a high level of efficiency at all output requirements and keeps the proportion of harmful emissions at a very low level.</p> <p>EcoNom has been developed to satisfy demanding modern requirements for reliability, convenience and safety.</p> <p>Operation of the boiler and related feeder system is fully automated and is controlled via the boiler's built-in operating thermostat. Balanced mixing of fuel and air takes place in the boiler's combustion compartment, yielding complete combustion in a cost-effective manner.</p> <p>Fuel feed</p> <p>The boiler's internal feeder system is filled from the external feeder system via a pipe from the boiler's left or right side, (customer's choice). Replenishment of the internal store, which consists of a vertical tube, is governed by 2 sensors, (one transmitter and one receiver). Fuel is fed in from the external store at timed intervals and restart takes place 4 times to ensure filling of the internal store and/or to clarify that the external fuel store is empty. Feeding from the internal store takes place via a dosing screw, which, in turn, supplies the input feed screw with fuel. A drop chute is located between the dosing screw and input feed screw to prevent back heat.</p> <p>The input feed screw feeds the fuel through to the combustion chamber, and the fuel is distributed onto the movable roaster, which consists of 6 smooth rollers and one toothed roller. The rollers are driven by a sprocket and 2 chains connected to a separate motor. The rotation speed of the rollers is only sufficient to allow the fuel to be fully consumed and the ash residue to be ground by the toothed roller and dropped down in to the ash compartment.</p> <p>Air supply</p> <p>Primary and secondary air is supplied via an output-adjusted air fan. The combustion chamber is supplied with primary air via a separate pipe that runs from above to the base of the boiler to ensure efficient final combustion. The secondary air is supplied through a large number of small holes in the double jacket where final combustion takes place step-by-step.</p> <p>Combustion chamber and convection section</p> <p>The combustion chamber is shaped like a vertical cylinder. The convection section consists of a water jacket that surrounds the combustion chamber. The water jacket and combustion chamber are separated by a ceramic pipe. The water jacket has 10 tubes, each with an internal plugged pipe (retarder) that guides the flue gases as close to the water jacket as possible to achieve maximum heat exchange before the flue gases leave the boiler. These retarders can be cut to shorter lengths or removed completely. If further increases in temperature are required, the tubes in the water jacket can be plugged. The supplier must be consulted before any such changes are made.</p>
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<p><i>Recommended fuel specification.</i></p> <p><i>Weight:</i> 600-650 kg/m</p> <p><i>Energy content:</i> 4.7 -5.0 kWh/kg.</p> <p><i>Size/Diameter:</i> 6 and 8 mm</p> <p><i>Size/Length:</i> Max. 4 mm times diameter</p> <p><i>Moisture content:</i> Max. 12%</p> <p><i>Ash melting temp.</i> >1,250°C</p> <p><i>Ash content/Weight:</i> 0.3-1%</p> <p><i>Fines content/Weight:</i> Max. 4%</p> <p><i>Check with the supplier whether the above recommended fuel specifications are valid for deliveries of fuel.</i></p>	<p>1.3. Fuel and fuel quality</p> <p>The pellet fuel can be manufactured from various energy-producing raw materials. The most common is wood raw materials, but there are several alternative raw materials available on the market suitable for pellet production. The homogenous form of pellets makes them easy to handle, transport and store.</p> <p>Important factors that can be controlled are energy value, size, fines content, moisture content and, of course, price.</p> <p>EcoNom is designed to be fired with fuel pellets of wood measuring 6-8 mm in diameter.</p> <p>The majority of the disruptions that can arise due to poor fuel quality are the result of deficiencies in production, handling and intermediate storage before the fuel reaches the end customer.</p> <p>With high levels of fines content, the problems are generally due to production; separation is usually the result of the storage arrangement at the loading area, while handling issues arise from transport and filling at the customer's premises.</p> <p>The occurrence of sintering in the ash is due to silicate impurities or a low ash melting temperature and cannot be ascertained prior to combustion. With pellets that give rise to sintering ash, you should immediately make a complaint to the pellet supplier.</p>
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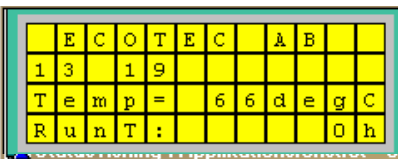
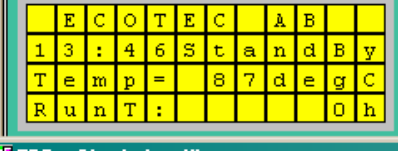
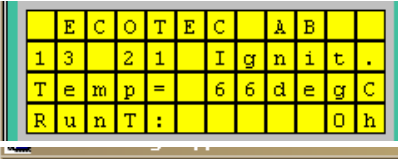
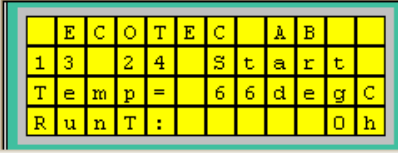
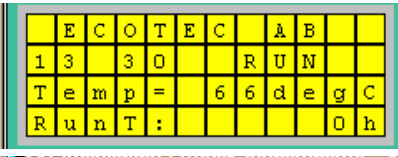
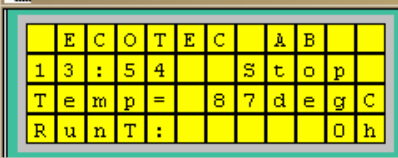


<p>NB The weight of the boiler (240 kg) can cause crushing injuries when handled. To facilitate handling, the ceramic pipe and ceramic lid are handled separately. The inspection cover can be easily removed using a billet in order to further reduce weight and size.</p> <p>NB The boiler must be handled using a cart, trolley or similar that provides adequate stability for handling to prevent accidents or injuries.</p> <p>NB When transporting or moving the boiler the support legs must always be screwed into the bottom level.</p>	<p>1.4. Technical data</p> <p>Performance Output: 15 kW Combustion efficiency: <= 96% Boiler efficiency: 91% Nominal Output</p> <p>Dimensional information Width: 600 mm Depth (excl. smoke pipe): 630 mm, excl. pipe connection Height: 1,250 mm Weight: 240 kg Water volume: 55 litres</p> <p>Design and setting values Calculation pressure: 1.5 bar Calculation temperature: 100 °C Flue gas temperature: 100-160 °C (see chap. 4.1 page 24) Rec. draught: 5-25 Pa. Rec. minimum height above boiler: 700 mm</p> <p>Connections Heating pipe system: DN 25 internal Expansion: To be fitted separately Drainage: To be fitted separately Smoke pipe connection, external: 160x80 mm Smoke pipe connection, internal: 140x70 mm Height, smoke pipe connection, cc. Min. 1,150, max. 1,180 Fuel filling pipe 60.3 mm External Ø</p> <p>Power supply Power supply: 230 VAC, 50Hz Supply cable: 3x1.5 mm Fuse size: 6 Amp Connection output: 500 W Consumption during normal operation 100 W/h</p> <p>Electrical Sensors Thermal contact/Feed 95 °C Thermal contact/Flue gases 200 °C</p>
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	<p>1.5. Safety system</p> <p>EcoNom has been designed in line with the main principles we are accustomed to for oil-fired heating. The benefit of this system is convenient handling, with the location of the fuel store not being restricted by the design of the boiler room.</p> <p>In terms of safety, separation of the boiler and fuel store, in combination with discontinuous fuel feed between them provides increased protection against spreading in the event of back-burning.</p> <p>In short, the internal store is only refilled with a limited quantity of fuel via the external feeder system at each filling. Fuel is fed through a drop chute (hose with a minimum length of 150 mm). A thermal contact is located in the drop chute to detect any heat passing back into the fuel feed pipe. Should this occur, filling of the internal store will cease and the feeder screw will empty the input feed compartment by continuing to feed fuel into the combustion chamber.</p> <p>The boiler's control unit is linked up to operating and maximum thermostats. In the event of an error on the operating thermostat, the maximum thermostat will step in and prevent boiling/overheating of the boiler. This maximum thermostat requires manual resetting by pressing the contact.</p> <p>The boiler has also been designed to revert to normal operating mode following operational disruptions such as power cut, fuel interruptions, etc.</p> <p>The boiler is equipped for outgoing and incoming alarms. A relay fire detector is recommended as an incoming alarm. An audible or visual signal outside the boiler room may be used as an outgoing alarm. To be fitted separately.</p>
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<p>The Run menu shows the boiler's current combustion phase. You can also view time, boiler's current temperature and how many hours the boiler has been running. NB Additional functions continue on the boiler at different time delays when the boiler is switched off. Be careful to avoid damage when handling.</p>	<h3>1.6. Control system</h3> <p>EcoNom has a PLC-model control system from Mitsubishi, E 3515.</p> <p>To start and stop the boiler, use the switch on the boiler panel; the function is the same as the boiler's thermostat. This means that if the boiler is switched off during operation, normal cooling will still be carried out.</p> <p>SETTINGS MENUS FOR ECONOM</p> <p>Description of button functions on PLC unit</p> <p>Arrow button functions = right and left arrows to move between menus Up and down arrows to move within menus Plus button function = increases current value Minus button function = reduces current value OK button function = confirms selection Esc button function = back</p>
<p>Not started.</p>	
<p>Started, thermostat not calling for heat.</p>	
<p>Ignition phase.</p>	
<p>Heating phase.</p>	
<p>Normal operation.</p>	
<p>Cooling down phase.</p>	



PLC offers additional menus as follows:

The dosing screw feed is adapted to current fuel in %. The run time is based on a 10 sec. cycle, e.g. if it is 60%, the dosing screw runs for 6 seconds and pauses for 4 seconds.

Setting applicable boiler reference values and the hysteresis (number of degrees + and - that determines off and on).

Startdos - number of seconds that the dosing screw runs at start.

With prolonged operating periods with no cooling, there is the AutoClean function that initiates enforced cooling of the boiler after a certain period, e.g. 5 hours, so that roaster and roaster roller cleaning will start.

External screw menu: Setting external screw's run time and number of attempts before alarm.

Level monitor

Setting the level monitor's reference value (signal strength to indicate low pellet level in the internal store).

Optical sensor

Setting the Flame guard/optical sensor reference value (signal strength to indicate that it is low). Setting the alarm delay time for flame loss.

R	u	n	=						5	0	%
T	e	m	p	7	6	D	e	g	6	h	y
S	t	a	r	t	d	o	s	=	8	0	s
A	u	t	o	C	l	e	a	n	=	5	h

E	x	t	F	e	e	d					
F	e	e	T	3	0	s					
A	t	t	e	m	p	t	0	o	f	6	

L	e	v	e	l	M	o	n	i	t	o	r
A	c	t	4	6	0	S	e	t	3	0	0
F	l	a	m	e	G	.	A	l	.	5	s
A	c	t	3	5	0	S	e	t	3	0	



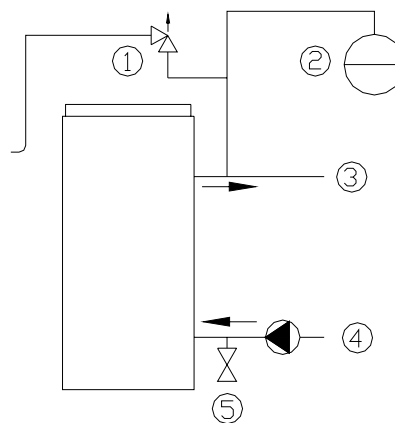
<p>The circulation pump can be controlled directly from the boiler in two ways CONT.RUN and TEMP.CONTROLLED operation.</p> <p>With CONT.RUN, the circulation pump runs continuously when the boiler is on.</p> <p>With TEMP.CONTROLLED operation, the circulation pump runs when the boiler is producing heat, plus the selected delayed stop time.</p> <p>Charge empty boiler: Starts external screw feed to fill the internal store with pellets. When the level monitor detects fuel, external screw feed stops and the dosing screw starts and runs for preset charge time.</p>	<table border="1" data-bbox="622 448 973 593"> <tr><td>C</td><td>i</td><td>r</td><td>c</td><td>P</td><td>u</td><td>m</td><td>p</td><td></td><td></td></tr> <tr><td>S</td><td>e</td><td>l</td><td>e</td><td>c</td><td>t</td><td>F</td><td>u</td><td>n</td><td>c</td><td>+</td></tr> <tr><td>C</td><td>o</td><td>n</td><td>t</td><td>.</td><td>R</td><td>u</td><td>n</td><td></td><td></td><td></td></tr> <tr><td>S</td><td>t</td><td>o</td><td>p</td><td>T</td><td>.</td><td>1</td><td>8</td><td>0</td><td>0</td><td>s</td></tr> </table> <table border="1" data-bbox="622 638 973 784"> <tr><td>C</td><td>i</td><td>r</td><td>c</td><td>P</td><td>u</td><td>m</td><td>p</td><td></td><td></td></tr> <tr><td>S</td><td>e</td><td>l</td><td>e</td><td>c</td><td>t</td><td>F</td><td>u</td><td>n</td><td>c</td><td>+</td></tr> <tr><td>T</td><td>e</td><td>m</td><td>p</td><td>.</td><td>R</td><td>u</td><td>n</td><td></td><td></td><td></td></tr> <tr><td>S</td><td>t</td><td>o</td><td>p</td><td>T</td><td>.</td><td>1</td><td>8</td><td>0</td><td>0</td><td>s</td></tr> </table> <table border="1" data-bbox="622 896 973 1019"> <tr><td>C</td><td>h</td><td>a</td><td>r</td><td>g</td><td>e</td><td>E</td><td>m</td><td>p</td><td>t</td><td>y</td></tr> <tr><td>B</td><td>o</td><td>i</td><td>l</td><td>e</td><td>r</td><td></td><td></td><td></td><td></td><td>+</td></tr> <tr><td>C</td><td>h</td><td>a</td><td>r</td><td>g</td><td>e</td><td>C</td><td>y</td><td>c</td><td>l</td><td>e</td></tr> <tr><td>S</td><td>t</td><td>o</td><td>p</td><td>T</td><td>i</td><td>m</td><td>e</td><td>5</td><td>5</td><td>s</td></tr> </table>	C	i	r	c	P	u	m	p			S	e	l	e	c	t	F	u	n	c	+	C	o	n	t	.	R	u	n				S	t	o	p	T	.	1	8	0	0	s	C	i	r	c	P	u	m	p			S	e	l	e	c	t	F	u	n	c	+	T	e	m	p	.	R	u	n				S	t	o	p	T	.	1	8	0	0	s	C	h	a	r	g	e	E	m	p	t	y	B	o	i	l	e	r					+	C	h	a	r	g	e	C	y	c	l	e	S	t	o	p	T	i	m	e	5	5	s
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2. Installation instructions

<p>NB Compulsory registration and planning permission may be required for installing EcoNom. Contact your municipality's local planning authority for further information.</p> <p>Safety valve: If a sealed expansion tank is installed for the radiator system, the safety valve must be checked 4 times/year. Activate the valve by pressing or turning the regulator and then checking that water enters the waste pipe running from valve to outlet.</p>	<p>THE BOILER MUST BE SET UP AND INSTALLED IN ACCORDANCE WITH SPECIFIED BUILDING STANDARDS. THE BOILER MUST STAND UPRIGHT ON THE FLOOR AND ON HEATPROOF MATERIAL, E.G. CONCRETE. OBSERVE THE INDICATED CLEARANCE VALUES FOR POSITIONING OF THE BOILER.</p> <p>2.1. Connection to radiators and heating circuits The installation of heating systems must be performed as per applicable hot water standards and the New Building Regulations of the National Board of Housing, Building and Planning. Safety equipment is to be installed as per applicable new building regulations and hot water standards.</p> <p>If a sealed expansion tank is used, the system must have a safety valve (approved by the National Board of Occupational Safety and Health), manometer and ventilating valve. The safety valve must be fitted in a non-closing connection at the highest point of the boiler, but not directly on the boiler. The connection must run in a continuous incline to the safety valve. Before filling the boiler with water the enclosed drain cock must be installed on the boiler's lower water connection.</p> <p>If an open expansion tank is used, it must be positioned in a location protected from frost, and if freezing is suspected, a safety valve should be added to this connection.</p> <p>Heating connections The boiler is connected as per the circuit diagram below.</p>
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- 1 Safety valve
- 2. Open or sealed expansion tank
- 3. To tank or double-jacketed water heater
- 4. From tank
- 5. Drainage





2.2. Electrical connection, wiring diagram

502 POT. FREE, CLOSING
501 OUTGOING ALARM
Is an integral switch in PLC that closes in the event of an alarm.

304 SIGN. EXTERNAL TEMP.
303 24 VDC EXTERNAL TEMP.
Power supply and input to the external temp. sensor.
(Temperature. Displayed on the PLC Display.)

302 INCOMING ALARM
Input signal in the event of external alarm, e.g. smoke detector. (To be connected as open under normal circumstances.)

301 24 VDC

102 FEED CIRC. PUMP
101 EXTERNAL FEED.

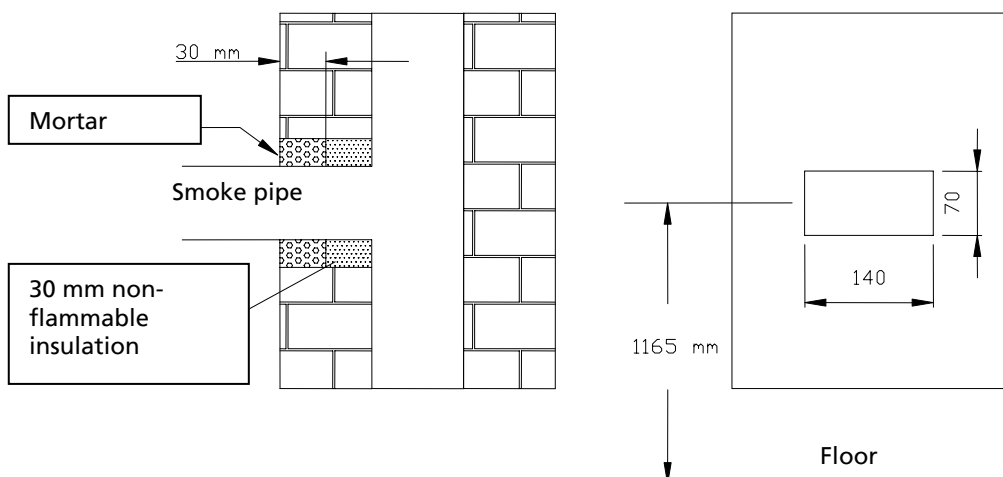
PE Protective earth
N Zero
L Single-phase 230 VAC

Wiring diagram see page 27 - 30



<p>NB <i>An application must be made to the district chimney sweep for inspection of the flue. The chimney must be swept as per the Fire Prevention Act. This is managed by your district chimney sweep. Removal of soot from the boiler should be carried out in such a way as to ensure good operating economy. After soot removal, the flue gas temperature will fall, which increases efficiency and reduces fuel consumption.</i></p> <p><i>NB Consider the risk of crushing injuries if the drop chute is not used when the inspection cover is opened.</i></p>	<p>2.3. Flue connection and air inlet</p> <p>The flue connection is at the top on the rear of the boiler. The flue pipe dimensions are 160x80 mm externally. Height from the floor to the centre of the flue pipe is 1,165 mm +/-15 mm, (depending on adjusted base bolts). A standard expansion pipe measuring 140x70 mm is included for connection to the flue.</p> <p>With the help of the flue connection on the boiler, connection can be made to the rear, and, using pipe bends, upwards and to the sides. Pannkitt is a suitable sealing compound.</p> <p>The height of the flue should be dimensioned to suit the requirements of the building.</p> <p>Chimneys, regardless of model, must always have a vacuum of 1 – 2.5 mm vp.</p> <p>If this is not achieved, the following flue gas requirements are recommended: A brick chimney to be fed by a 110 mm (approx.) diameter acid-proof thin-walled pipe or an acid-proof 110 mm diameter element chimney.</p> <p>The position of the chimney in relation to surrounding buildings and terrain can also have a negative effect on the vacuum.</p> <p>In the event of counter pressure in the ignition phase, a chimney sweep should be consulted.</p> <p>Walling in of smoke pipes into the chimney should be carried out according to the diagram below. If walling in is carried out in this way, soot spillage will be avoided when cleaning the chimney. Height of hole for the smoke pipe as per dimension sketch below.</p>
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Sketch - Chimney connection





<p>NB <i>The air supply duct to the boiler room must be of at least an equivalent size to the flues and be positioned to provide minimum chimney draught.</i></p> <p>NB <i>Consider the risk of crushing injuries if the drop chute is not used when the inspection cover is opened.</i></p>	<p>2.4. Fire protection, space, floor bearing capacity</p> <p>EcoNom must be set up and installed in accordance with applicable Building Standards.</p> <p>The boiler must stand upright on the floor. Some adjustment for uneven floors is possible using the base bolts that must be fitted to the base plate. The boiler must also stand on heatproof material, e.g. concrete/plating.</p> <p>Fuel transport hoses between external screw and boiler must be a hose model with a low melting point, (melts on generation of heat) and must not emit toxic gases.</p> <p>Minimum clearance in front of the boiler 550 mm; for easier maintenance min. 1,000 mm.</p> <p>Minimum clearance at the sides of the boiler is 340 mm; at clearances down to 150 mm the side doors should be removed.</p> <p>Minimum clearance height above the boiler is 700 mm.</p>
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3. Operation and care

<p><i>NB</i></p> <p><i>Recommended fuel specification.</i></p> <p><i>See fuel and fuel quality spec. page 5.</i></p> <p><i>For further information on fuel management and storage, contact your fuel supplier.</i></p>	<p>3.1. Fuel management</p> <p>Each time pellets are transferred there is a risk of disintegration. Pellets are transferred from the bulk truck via the vehicle's flexible hose to the injection pipe. They are then transferred into the silo/store and out via screws before finally reaching the boiler. Erosion occurs in all these operations, and the primary aim is to utilise methods that cause minimum erosion of the fuel. You must always ensure that:</p> <ul style="list-style-type: none"> the bulk truck's hose is as short as possible. the injection pipe has a smooth internal surface and joints with no edges, and is not made of plastic, (due to static charging). you have good transport screws. <p>The pellet store must be designed to prevent the risk of contamination or moisture damage. Pay particular attention to penetration of moisture from walls and floor. It is also vital that pellets are not exposed to direct flows of water from rain or condensation drips. However, pellets do not draw moisture from surrounding air and can therefore be stored outside under a roof.</p> <p>When blowing pellets into the store you may have problems with dust and fine particles being drawn out with the air. This can be prevented by using a special ventilating filter.</p>
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<p><i>NB Please note that the external screw is started automatically from the boiler.</i></p>	<p>3.2. Description of fuel replenishment</p> <p>Fuel feed from the fuel store to EcoNom is fully automatic; it employs an adjusted feeder system that is controlled via the boiler's control unit. The feeder system is always based on the safety principle of breaking the fuel flow by free fall (drop chute in the hose) between the external feed and the boiler.</p> <p>The external fuel feed with associated screws is adjusted using the boiler's control unit and must have a capacity of 6-12 kg/hour in order to achieve steady fuel feed.</p>
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<p><i>NB</i> Starting the boiler for the first time after installation should be undertaken by a qualified installation engineer.</p> <p><i>The main power should only be switched off for servicing. Remember to switch the power back on once servicing is complete.</i></p> <p><i>When starting up after the external feeder system has been emptied of pellets, it must be refilled before starting the boiler.</i> See instructions for initial activation.</p> <p><i>NB Doors and hatches must be closed during operation.</i></p> <p><i>NB If the boiler has been disconnected for a long time, moisture may form in the ignition element and the earth fault switch may be triggered. (Action: see troubleshooting/alarms).</i></p>	<p>3.3. Description of ignition and extinguishing</p> <p>Initial activation</p> <p>On initial activation the external feeder system must be filled up. To do this, press the + button in the "Charge Empty Boiler" menu on the PLC unit.</p> <p>Only the external feeder system is now in operation, and feeding switches off automatically once the level monitor detects fuel in the boiler's internal store.</p> <p>Start-up is now possible by switching the ON/OFF button on the instrument panel to the ON position, and the boiler's dosing motor and feed motor will start and feed the fuel onto the stationary roaster. At the same time, the fan will start and the ignition element will heat up. Once the fuel reaches the ignition element's hot-air discharge it ignites after < 5 min.</p> <p>EcoNom's optical sensor indicates when the fuel has ignited and switches off the ignition element. The roaster's rollers begin to rotate after a delay of approximately 1-2 min. Before combustion reaches optimum level, the feeding rate of the fuel is reduced by half for around 4 minutes. This gives the fuel time to fully ignite, and the fuel feed subsequently switches to full capacity.</p> <p>Once fuel feeding has reached full capacity, the PLC program takes over and controls the boiler's functions. See run menus under heading 1.6. Control system.</p> <p>Extinguishing</p> <p>To switch off the boiler, switch the ON/OFF button on the instrument panel to OFF position.</p> <p>The dosing screw will now stop, but the input feed screw will continue for 60 seconds. The fan will run for a further 4 min and the roaster will run for an additional 15 min and then alternate between forward and reverse to clean the roaster.</p> <p>Combustion values on activation:</p> <ul style="list-style-type: none"> • O₂ value 9-11% <p>After running-in:</p> <ul style="list-style-type: none"> • O₂ value 6-8% <p>Check of O₂ value after 100 and 500 hours or if the boiler is producing soot.</p>
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<p><i>NB</i></p> <p><i>For every 17-degree increase in the flue gas temperature, the efficiency of the boiler is reduced by approximately 1%.</i></p> <p><i>Always exercise caution when handling hot ashes, as they may be glowing and could cause burns or fire; take particular care when touching hot ceramic lids or pipes and ash doors in the left opening.</i></p> <p><i>Remember that ash must be separated from ordinary rubbish in household waste.</i></p> <p><i>Ash vac refers, in principle, to a vacuum cleaner supplemented by a separator/vessel to retain the ash.</i></p> <p><i>Always store ash in a tin bucket with a tightly-sealing lid.</i></p> <p><i>When removing ash, protective breathing gear must be worn if necessary.</i></p>	<p>3.4. Frequency of ash removal</p> <p>All combustion of solid fuel, even if it takes place by automated means, normally requires slightly more maintenance and care than oil firing. With the EcoNom, upkeep is minimal thanks to a well thought-out design and ash compartment.</p> <p>The boiler must be cleaned after 500 operating hours/4 times/year (may vary depending on pellet quality) or when the flue gas temperature has risen by 50°C since previous cleaning.</p> <p>The following must be done when cleaning:</p> <p>Switch off the boiler one hour before servicing, or when the water temperature is between 50-60°C. Open the side doors resting on rear hinge and screw in the middle at the front.</p> <p>Open the inspection cover on the top of the boiler, remove the internal lid and lift up the retarders that are set in the tubes and clean them (10 in all). Scrape the tubes clean using the accompanying soot rake shaped like a half-moon. Then scrape the inner jacket pipe using the larger soot scraper. Remember that the ceramic will still be very hot, (at maximum operation approx. 1,000°C). So wear gloves and protective clothing of heatproof material when cleaning the boiler.</p> <p>Close the internal lid and shut the inspection cover.</p> <p>Shut the lower front hatch. The front hatch, which can also be used as an ash collector, can be moved between the two soot hatches, pushed in under the hatches and locked to facilitate collection of ash.</p> <p>Open the two soot hatches one at a time and remove the ash by sucking it up with a special ash vac, or rake out the ash using a soot rake. Empty the upper ash compartment first from the front and then turn the rotary plate anticlockwise (use the accompanying tool and the holes drilled in the plate) to remove the ash from behind the roaster and the feed unit for the fuel (see chap. 1.2 point 5).</p>
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<p><i>NB</i> <i>If the operating thermostat has not called for heating, the cause of this must be checked and remedied.</i> <i>If the cause cannot be established, an installation engineer must be contacted immediately.</i> <i>NB Remember to close the internal lid after servicing and soot removal.</i></p>	<p>3.5. Frequency and scope of inspections Inspect daily for the first 2 weeks after start-up and then once a week.</p> <p>Bear in mind and check the following during an inspection: The main power switch must always remain on until the boiler has cooled. Open the soot hatch and check that the deposit of carbon does not have an oily black coating. The carbon deposit should be dry and grey in colour. Connections between the boiler and the external feeder system must be properly fixed and tight.</p>
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<p><i>NB</i> <i>When inspecting boiler, always check quantity of ash in the upper and lower ash compartment. The quantity of ash governs the frequency of ash removal.</i></p> <p><i>Take particular note after a new delivery or change of pellets.</i></p> <p><i>NB</i> <i>The ceramic pipe is fairly heavy and is awkward to handle. Clean the pipe to ensure a good grip and handle it in such a way as to minimise the risk of dropping or crushing injuries.</i></p>	<p>3.6 Service interval and maintenance Servicing should be carried out after approximately 500 operating hours/4 times/year (may vary depending on pellet quality) or when the flue gas temperature has risen by 50°C since previous service.</p> <p>Ash removal and scraping the boiler and its ducts clean (soot removal) can be undertaken by extraction from the ash compartment as well as by raking out. To access the ash compartment, open the boiler's lower hatches. See "The following must be done when cleaning" under heading 3.4.</p> <p>Frequency of ash removal Check that the roaster is free of stones and other incombustible matter. Check the hose connections between the external feed and the boiler, and reset after servicing.</p> <p>Annual inspection: Check the flame guard/optical sensor and its inspection pipe and clean as required. Check the ceramic pipe and the internal lid for any large cracks or other damage that may disrupt operation.</p>
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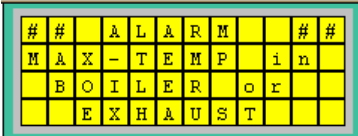
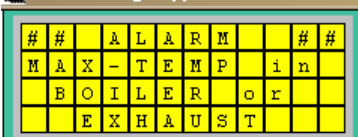

<p>NB <i>If an oily black coating forms in the boiler's flues, the quantity of fuel being fed in must be checked.</i> <i>See instructions under Commissioning.</i></p>	<p>3.7 Checking the safety system</p> <p>Safety valve: If a sealed expansion tank is installed for the radiator system, the safety valve must be checked 4 times/year. Activate the valve by pressing or turning the regulator and then checking that water enters the waste pipe running from valve to outlet.</p> <p>The following must be considered and checked regularly: Ensure that the area surrounding the boiler is free from pellets, shavings, dust and powder. Open hatches and check for cleanliness and spillage. Check that the boiler's flues do not have an oily black coating.</p>
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<p>Quick stop <i>The boiler switches off all functions except the input feed screw, which has a delayed stop time.</i></p>	<p>3.8 Troubleshooting/Alarms</p> <p>NB ALARM MENUS ARE INDICATED BY THE DISPLAY LIGHTING + UP AND THE TEXT FLASHING.</p> <p>All alarms are acknowledged by switching the ON/OFF button to the OFF position.</p> <p>The system has two different stop sequences in the event of an alarm.</p> <p>Cooling down = The 'Alarm' text is indicated, and the system undertakes normal controlled cooling down. or Quick stop = Alarm is indicated and all operations are stopped.</p> <div data-bbox="598 1391 959 1536" data-label="Image"> </div> <p>External alarm is an external function. Generally a smoke detector connected to the boiler's alarm input.</p> <p>FAULT: The flue gases do not have free passage through boiler or chimney.</p> <p>Action: Check smoke pipe connection and chimney.</p>
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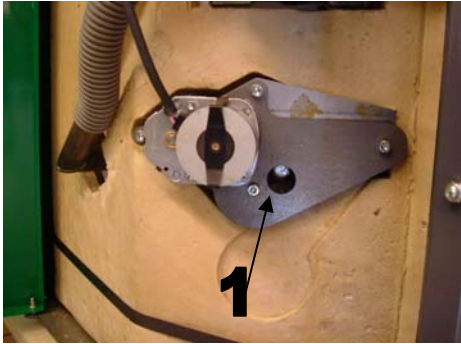
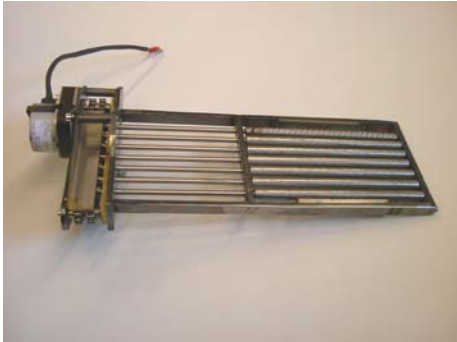


<p><i>Cooling down. The boiler performs normal cooling down.</i></p>	<p>Fault alarm is indicated by the following text message</p> <p>FAULT: The boiler is receiving no signal that there is fuel in the internal store. The boiler initiates the set number of collection attempts as entered and then stops on alarm 'short of fuel'.</p> <p>Action: Check that there is fuel. Check functioning of external screws. Check that the external feed is adequate.</p>
<p><i>Cooling down. The boiler performs normal cooling down.</i></p>	<p>Fault: The boiler's flame guard/optical sensor does not detect light at start.</p> <p>Action: Check that there is fuel. Check the level monitor's signal on the display; if the signal is lower than the reference value, then there must be fuel in the internal store. If the internal store is empty, clean any dust and dirt off the level monitors. Check the cleanness of the roaster. Remove the flame guard from its holder while the display is showing the value; if it reacts to the light in the room, it is OK. Remove the flame guard and check that the pipe and hole through which the flame guard 'sees' are clear and clean.</p>
<p><i>Cooling down. The boiler performs normal cooling down.</i></p>	<p>Fault: The boiler's flame guard/optical sensor does not detect light in the boiler during operation.</p> <p>Action: Check that there is fuel. Check the level monitor's signal on the display; if the signal is lower than the reference value, then there must be fuel in the internal store. If the internal store is empty, clean any dust and dirt off the level monitors. Check the cleanness of the roaster. Remove the flame guard from its holder while the display is showing the value; if it reacts to the light in the room, it is OK. Remove the fan and check that the pipe and hole through which the flame guard 'sees' are clear and clean.</p>



<p><i>Quick stop</i> All functions are stopped except input feed screw</p>	 <p>FAULT: Alarms for maximum flue gas temperature that may be due to an unswept boiler or the inner hatch not being in place. Temperature monitor fitted on the right side of the smoke pipe behind cover plate (see page 5). The monitor is equipped with a manual reset function.</p> <p>Action: Check the above points.</p>
<p><i>Quick stop</i> All functions stop except input feed screw</p>	 <p>FAULT: Alarm for excess temperature in the boiler, i.e. protection against overheating of the boiler.</p> <p>Action: Check whether the running temperature has been set too high. Check whether water circulation has ceased. Check whether the boiler's set water volume is too low.</p>
<p><i>Cooling down.</i> The boiler carries out a cooling down procedure in order to empty the input feed screw to prevent the possibility of back-burning.</p>	 <p>FAULT: The back-heat monitor is located on the input feed side (see page 5) and is triggered when its temperature exceeds 95 °C. The monitor is equipped with a manual reset function.</p> <p>Action: Check that the flue gas has free passage through boiler and chimney.</p> <p>Other faults: If the inspection cover is not closed, the dosing screw will switch off, producing a start attempt failure. If the cover is opened temporarily during operation, dosing also ceases for a corresponding period. If the cover remains open for a prolonged period, the flame guard will lose its signal and the boiler will transmit an alarm for the flame guard.</p> <p>Action: Check whether the inspection cover is properly closed.</p> <p>Earth fault switch triggered by mistake when starting boiler: If the boiler has been out of service for a long time, moisture forms in the ignition element and the earth fault switch will be triggered.</p> <p>Action: Remove the ignition element and warm it up, e.g. in an oven for several hours. Or connect the boiler without earth fault switch; start the boiler and any moisture will disappear after several hours' running.</p>



<p>1. Fixing screw</p> <p>Roaster with sprocket and motor</p>	<p>Replacing roaster! The roaster is replaced as a complete exchange unit. Open the left side door and undo the roaster fastening's screw and cables and draw out the roaster. NB The front left bracket must be loosened from its lower fastening. Replace the whole roaster unit. Install in reverse order.</p>  
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<p><i>Remember that the combustion air intake for the boiler chamber must not be blocked.</i></p>	<p>3.10. Checking condensation in the flue At low flue gas temperatures, (<80°C, 1 metre below the chimney outlet) there is a risk of condensation forming in the flue. Temperature and condensation formation near the mouth of the chimney should therefore be checked after installation. Condensation can also form in large chimney areas. These checks should be carried out by an authorised chimney sweep.</p>
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4. Installation engineer's instructions

<p><i>Remember! If there are employed staff who look after the system, special rules and recommendations must be observed.</i></p> <p><i>See AFS 2002:1 published by the Swedish Work Environment Authority.</i></p> <p><i>Remember that a coating of soot in the boiler's flues results in a rise in the flue gas temperature, thus the flue gas temperature can also be controlled by soot removal.</i></p> <p><i>NB If the boiler has been disconnected for a long time, moisture may form in the ignition element and the external earth fault switch may be triggered. (Action: see troubleshooting/alarms).</i></p>	<p>4.1. Commissioning</p> <p>NB When activating a cold boiler and chimney with a low vacuum, it may be necessary to start the boiler without retarders to facilitate the chimney function.</p> <p>NB Check output by weighing fuel per time unit.</p> <p>NB Note the recommended combustion values and record the boiler values when starting up. See table under heading 4.2. "Control values for commissioning"</p> <p>On start-up it is important that the flue gas temperature keeps to min. 80 °C, 1 metre from the mouth of the chimney. This temperature is required to prevent condensation in the chimney. The flue gas temperature drops by approx. 5 - 8 °C per running metre of chimney. At a chimney height of 10 metres, the flue gas temperature thus drops by approx. 50 – 80 °C. To maintain the requirement of 80 °C 1 metre from the mouth of the chimney, a flue gas temperature of around 130 – 150 °C through the boiler smoke pipe connection is therefore required.</p> <p>The flue gas temperature in the boiler is primarily determined by two factors: the length of the retarders in the pipes of the water jacket and the quantity of soot in the boiler.</p> <p>When a new boiler is installed, the flue gas temperature may be approx. 100 – 120 °C in the smoke pipe connection, so it may be necessary to remove the front retarders (e.g. 2) to achieve a higher flue gas temperature.</p> <p>For starting up, see initial activation under heading 3.3. Description of ignition and extinguishing.</p>
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