



FURNACE & ASSAY

— S U P P L I E S —

Electric Ashing Furnace Operation & Maintenance Manual

Electrical:

240V

Working Area

3 Shelves each

- 350mm Deep
- 350mm Wide
- 150mm High

Power

Requirements

- 240 Volts
- 1 Phase
- 3.5 Kilowatt



Manual Index

System Overview	3
Spare Parts List	4
Installation Procedure	5
Installing Elements	9-11
Furnace Start-up	12
Electrical Schematic	13
Troubleshooting	14-15
Maintenance	16
Contact Details	17

System Overview

System Overview:

The Ashing furnace has an easy to use on/off toggle switch.

It is heated by 2 elements mounted in the side walls.

Temperature is monitored and modulated automatically by a Type K thermocouple system and Omron temperature controller, pre-set for a maximum temperature of 1000 degrees Celsius. This controller is simple to operate, and has a 2-level display (PV and SV), that shows actual temperature as well as the temperature the furnace is set to.

The door has a micro switch installed that will automatically cut power to the heating elements when the door is opened.



Parts List for FAS-130EAF

Electric Ashing Furnace, Single Phase 3.5kw

Recommended 12 Months Consumables

FAS Part#	FAS Description	Qty
FAS-406	Thermocouple Cupellation 230mm plus 75mm bend	3
FAS-407	Thermocouple Inner Sheath 250x10mm	3
FAS-408	Thermocouple Outer Sheath 250x15mm	3
FAS-603	Ceramic Anchor, (Complete) 3"	12
FAS-703	Ceramic Tube, 30mm EAF Vent	1
FAS-704	Ashing furnace Element Set	2
FAS-1007	Refractory Mortar 1KG	1

Recommended Critical Spare Parts

FAS Part#	FAS Description	Qty
FAS-506	Element Tail Porcelain Tubes, 15 x 50mm	2
FAS-507	Porcelain 3-way Element Connectors	1

Recommended Spare Parts

FAS Part#	FAS Description	Qty
FAS-411	Porcelain 2-way Element Connectors	1
FAS-608	Thermocouple Wire	3

Associated Spare Parts

FAS Part#	FAS Description
FAS-513	Contactora, ABB A30-30-10
FAS-514	Solid State Relay , G3PB-235B/VD
FAS-628	Toggle Switch (on/off, high/low)
FAS-648R	Omron E5CC-RX2ASM-800 Temp Controller
FAS-701	Trays for Ashing Furnace
FAS-702	Micro Door Switch Z15GQB
FAS-801	Isowool Blanket (Kaowool) 128kg x 25mm
FAS-1004	Refractory Mortar 25kg Drum
FAS-1008	Refractory Mortar 2 KG

Installation Procedure

- *Unpack furnace from crate and store in dry area. The furnace usually has timber supports installed inside for transport. Remove before operation.**
- *Furnace requires a min of .5 metre space around it to carry out maintenance / repairs.**
- *Install fuel supply. This must be carried out by a qualified technical person.**
- *Electrical connection is single phase with Earth.**
- *Before connecting power supply make sure ALL electrical connections are tight, and have not become loose in transit.**
- *BEFORE STARTING CHECK THAT ALL EXHAUST DUCTING IS IN PLACE.**

REPLACING ASHING ELEMENTS

When to change an Ashing Furnace element.

If a break in an element is visible, one side of an element is not heating up (glowing) or the furnace is not getting to temperature, chances are an element will need changing.

Below are some pictures of element breaks; some are easily visible, others are a little harder to spot.



REPLACING ASHING ELEMENTS

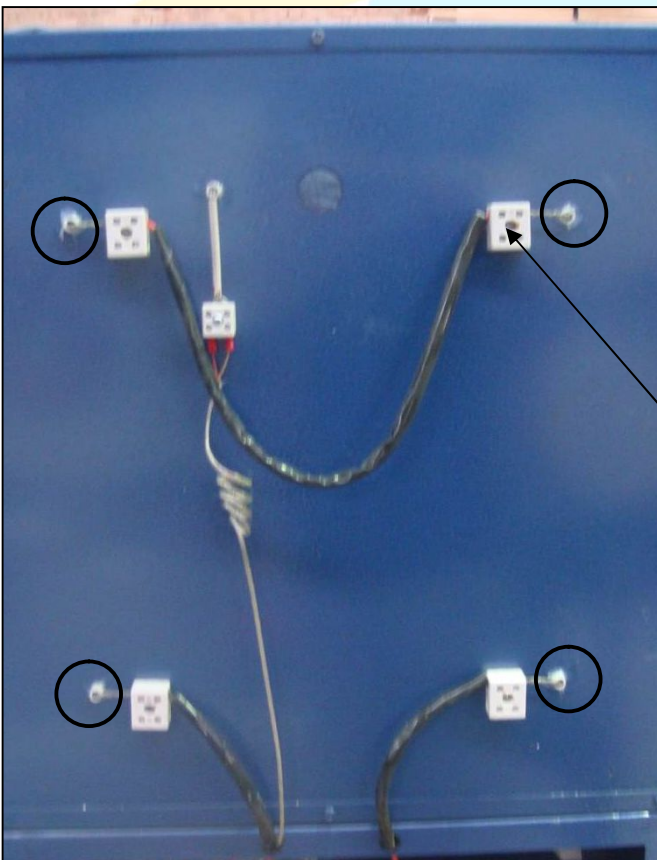
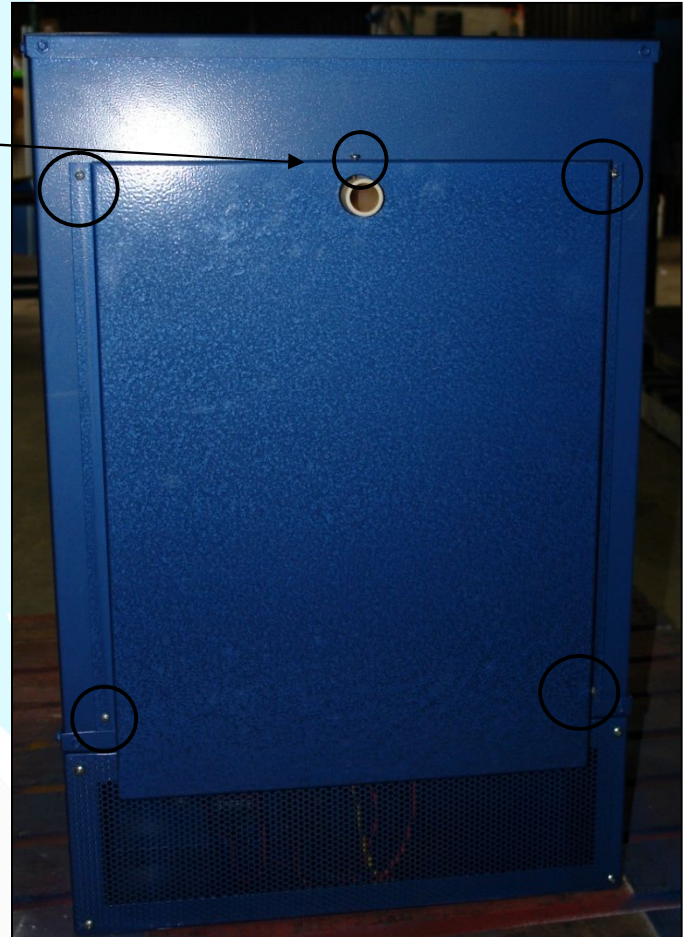
How to change an Ashing Furnace element.

First Isolate Power Supply

To remove back panel, firstly unscrew the bolt holding vent tube in place.

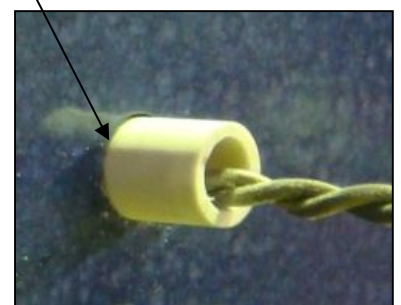
Then unscrew the four mounting bolts on the back panel.

Once removed locate where the old elements are connected to.



Loosen the screw in the connection to the element.

Straighten element tails and pull out ceramic tubes covering the elements. Keep these to cover the new elements.

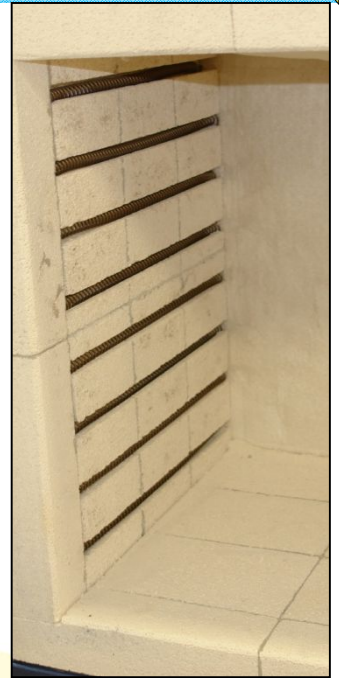


Once elements are free, move to the front of the furnace.

REPLACING ASHING ELEMENTS

Carefully remove old elements. Slowly pull out of grooves, making sure not to damage the brick work as you go.

One element may come out in several pieces.



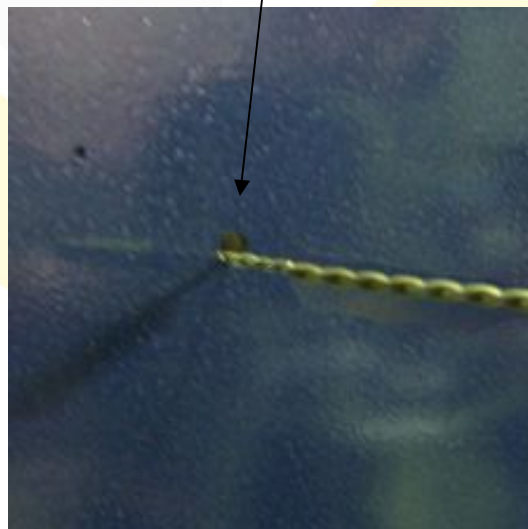
Take note of how they come out. This will help you to understand how to install the new elements into the grooves in the furnace. Once old elements are out, make sure to vacuum all grooves out as dust, parts of an old element and any other build up will shorten the life span of the new elements.



Lay new elements out and make sure they are not tangled. Pick up by the element tail and thread into the hole through the bricks and out the back of the furnace.



There will be one of these holes top and bottom of each wall.



REPLACING ASHING ELEMENTS

Carefully place elements into grooves trying not to force the elements in too much, as this may break the bricks.



REPLACING ASHING ELEMENTS

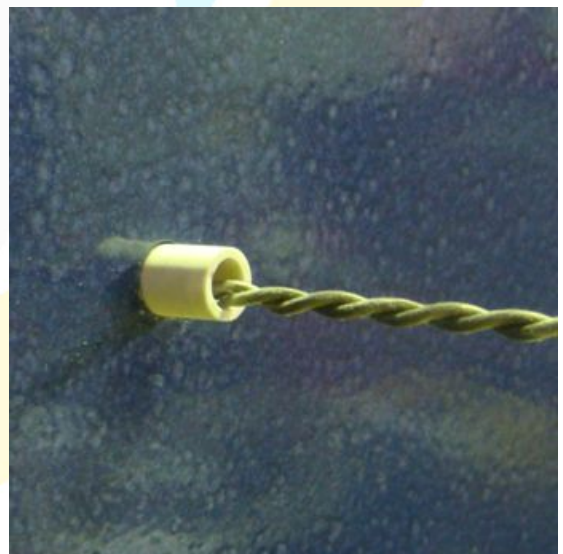
Once both sides of elements are in place and sitting in grooves, move to the back of the furnace.

If you are having issues with getting the elements to sit in the grooves, you can pin elements back. If you do not have any element pins then elements may fall into place when elements are Annealing in the first hour of start up. If they are still not sitting correctly you will need to source some element pins or use excess element tails (see below) to make some element pins.



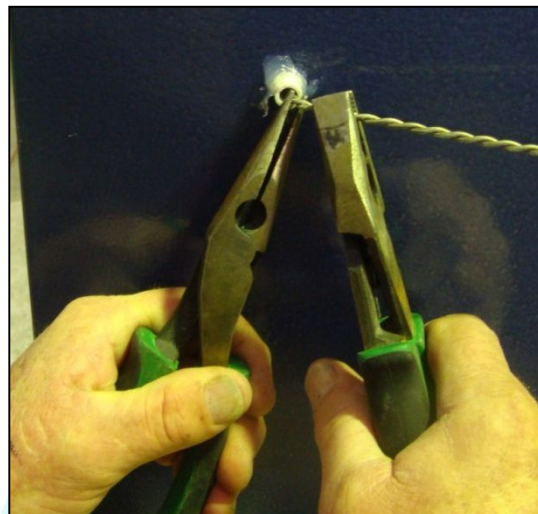
Slide ceramic tube back over the element tails top and bottom.

Push into place, leaving about 5-10mm out, and silicon around to keep in place.



REPLACING ASHING ELEMENTS

Once Silicon has dried, using two sets of pliers bend tails towards the centre of the furnace.
You will need to bend to just over 90 Deg.

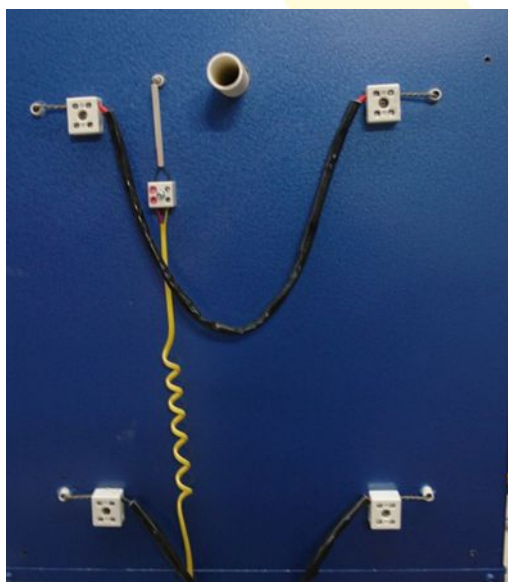


Measure 50mm from centre of bend and cut excess tail off.

NOTE: if you unwind the excess wire from the tails into two single bits of wire, you can use this to make element pins if having issues with elements sitting flat. Bend to a U shape pin about 30mm long.



Reinstall element tails into porcelain connectors.



Once all have been reinstalled (before attaching back panel to furnace) turn on the furnace for one hour to anneal elements.

Once elements have been annealed, check to see if elements are sitting correctly in grooves. Isolate power and check tightness of element tails in porcelain connectors, as the wire can become loose as it softens.

Once this has been checked replace back cover.

STARTING UP FURNACE

Front Panel



Temperature Controller

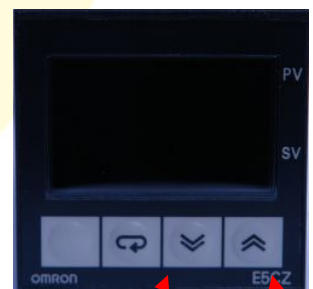
Toggle
Switch

Micro
Switch

1. Connect Power
2. Turn Furnace on at toggle Switch
3. Once door is closed, the furnace will start.

If the door is open the power to the furnace is cut by the Micro Door Switch.

Temp Display



Temp
Down

Temp
Up

Set Temperature controller to desired temperature.

Troubleshooting

FAULT:

Furnace Not Turning on.

Make sure the furnace is connected to power.

Make sure the furnace door is closed, as it has a safety door switch to cut power when the door is open.

FAULT:

The Error shown below in the picture is coming up on the temperature controller.

This is a thermocouple circuit error.



It could be a few things, the most common is the thermocouple is broken and needs changing.

If you still have this error after changing out the thermocouple it could be because a wire has become loose in the circuit. Try and tighten all wire connections from thermocouple head to temp controller.

If you still have no luck then check the thermocouple wire has not been melted/damaged. If it has, then replace it.

If all this fails, you may need to replace the temp controller.

Troubleshooting

FAULT:

The furnace door is not closing properly or is not sealing.

Over time the Kaowool in the door may become compacted slightly.

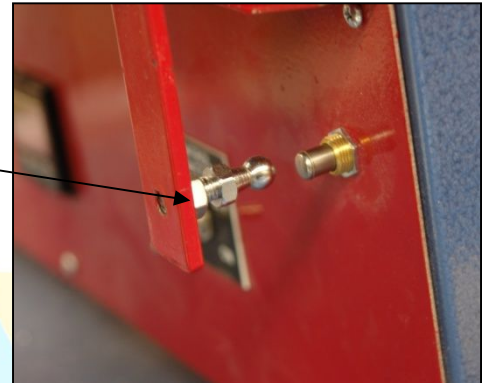
This may stop the door from sealing properly when closed due to the micro door switch that is installed.

If this happens you can simply screw the connection bolt in more to allow the door to seal correctly.

If this is done test the door switch is still working correctly.

If the door is open, the power should cut from the furnace.

When the door is shut the power will return.



FAULT:

The Furnace is not heating up or one side of elements is not heating up.

Shut furnace down and check elements for breaks.

If breaks present replace affected element. (See instructions above)

If none seen remove back panel and check the element connections are tight.

If issues continue replace element as a break sometimes is not visible.

Maintenance

Do not place anything closer than 0.5 of a metre to the furnace as this may damage the item or cause damage to the furnace.

It is important to keep the bench clean and clear around the furnace.

Once every few months or when the furnace is shut down and cool, vacuum out the furnace and the element grooves.

This will help the elements to last longer.

Seal any cracks in bricks with refractory mortar.

Note: keep mortar away from element grooves.

Contact Details



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