

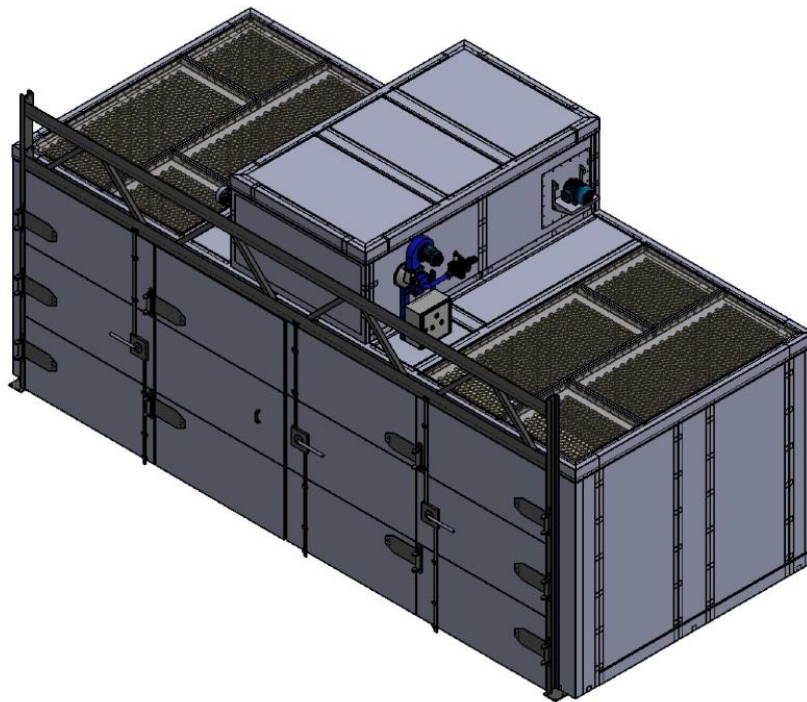


Volume

1

BOSTEC LIMITED

Gas Fired Box Oven Manual



Gas Fired Box Oven Manual



BOOTH OVEN & STOVING TECHNOLOGIES

Operating, Servicing & Fault Finding

Sample Copy Ltd.
Model No. B.B65 25D 24H
14th February 2020

© BOSTEC Limited
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Important Information

To ensure the safety of all personnel the oven must be operated in accordance with this manual.

The equipment has been designed to offer simple, safe and reliable service to you for many years. However it should be properly commissioned and serviced regularly to ensure the equipment performs correctly over its lifetime.

ICON KEY

	Valuable information
	Contact Information
	Technical Information
	Commissioning Report*

We have tried to create a simple to follow manual. Please use the icons for a quick guide to the most important information.

If you have any questions please contact us at info@bostec.co.uk.

WARNING

If incorrectly used or maintained Ovens can be hazardous. It is vital that this manual is followed, the Oven is only operated by trained personnel and only serviced by Qualified Engineers.

Commissioning Report* - only available when commissioned by BOSTEC at time of installation.

SAFETY INFORMATION

You should:



Always ensure the equipment is electrically isolated and 'locked off' prior to commencing any maintenance or work on the equipment controls.

Never tamper with any electrical or gas device or air proving device.

Ensure the equipment is regularly serviced (by Qualified Persons). The law requires you to service any Gas Appliance every 12 months. Contact us to find out how we can help with this.

Never remove any guards (unless for maintenance).

Never consume food or drink in the Oven area.

Ensure the area around the Oven is kept clean and tidy.

Always check the operation of any safety equipment prior to use of the Oven.

Never touch the internal door safety handle as it may be extremely hot.

Appropriate PPE we would recommend:



Safety Glasses or Goggles.

Protective safety shoes with a suitable non-slip sole.

Protective High Temperature gloves.

Suitably rated Breathing Apparatus if harmful vapors are expected.

Oven Operation



Start up Procedure

Check all safety devices are in good condition and operating correctly.

Check Door Seals are in good condition.

Check door locking mechanism suitably closes.



Note

If necessary report Door Seal condition and BOSTEC can supply (& fit) new seals as required.



Switch on the Mains Isolator.

The Heating and Process Controllers will 'boot up' and be ready in a few seconds.

Set the Temperature Setpoint above the shown current temperature of the oven.

Press the START button – the Air Recirculation Fan (and Fume Fan if fitted) will start. The lamps will illuminate and the oven will go through its automatic purging cycle.

If heating is required turn the 'Burner On/Off' switch to 'On'.

Start up Procedure cont...

Note



The Air Fault lamp will illuminate briefly and then go off. This is normal and forms part of the automatic purging system.

Once this is completed the burner on Light will come on – at this point a signal is sent to the burner – the burner will then go through its own automatic safety checks and then the burner will begin heating the oven.

Setting the Temperature

This is achieved on the K39 Series Temperature Controllers by pressing the **P** button first and then the **▲** button to increase and the **▼** button to decrease the temperature in the lower display.

The display will scroll in the required direction, at first by 1°C at a time. If the button is held down the display will scroll rapidly.



Current Temp

Indicator Light 1

Setpoint Temp

Once the required temperature has been set, press the **P** key again

Note



A Maximum and Minimum set-point will have been pre-programmed to prevent overshooting – this can be changed if required – contact *BOSTEC* for further information.

The small Indicator Light '1' will come on whenever the Temperature Controller is calling for heat.

On fully modulating system Indicator Light '1' will be constantly illuminated as the output is being constantly varied.

Setting the Timer

As standard the timer is set to run automatically. When the setpoint on the K39 Temperature Controller is reached the timer will automatically begin counting down.

When the timer reaches Zero the oven will automatically switch into its 'Cooling' cycle before stopping completely.

Setting the timer is achieved on the TT34 Series Controllers by pressing the **P** button for 1 Second – the display will show **t1** and the indicator light **SET/CNT** will blink rapidly.

Releasing **P** will then show the set time period in Minutes (preset). To adjust the time press the ▲ button to increase and the ▼ button to decrease the time accordingly.



The display will scroll in the required direction, at first by 1 Minutes at a time. If the button is held down the display will scroll rapidly.

Once the required time has been reached the timer will automatically set if no buttons are pressed for 5 seconds.



Note

Whilst the timer is running **SET/CNT** will blink slowly and will show the time left to complete the process. When it reaches Zero it will automatically reset and wait for the next cycle.

Shutdown Procedure

Press the STOP button – the oven has an automatic cooling cycle. You do not need to turn the burner off.

The 'Cooling' indicator will come on and the fans will continue to run for a preset time allowing the oven to cool.



Note

DO NOT TURN THE OVEN OFF UNTIL THE COOLING CYCLE HAS COMPLETED.

TURNING THE OVEN OFF EARLY WILL RESULT IN DAMAGE TO THE BURNER.



When the Oven is not in use isolate the power at the main electrical isolator.

Maintenance Procedures



Note

We recommend the following procedures for most applications. However, this may need to be adjusted to suit the customers application. If in doubt please ask.



WARNING

Wherever possible ensure the control panel isolator is locked in the OFF position before carrying out any maintenance.



The oven is fitted with an ‘Hours Run’ indicator – this should be used in accordance with the information below. We would advise this is checked Daily and then the following schedule followed.



Weekly (or every 20 hours):

Check the internal door handle safety release is operating correctly.
Thoroughly clean down the internal oven walls.



Monthly (or every 200 Hours):

In addition to Weekly checks:

Check and Grease all fan bearing with a suitable Lithium based grease.
Shafts should be rotated during process to ensure full lubrication.
Some discharge after greasing is normal.

Annually (or every 1000 hours):

In addition to Weekly & Monthly checks:

A full Inspection and Service is required (annually in accordance with Gas Appliance Regulations).

This must be carried out by a suitably qualified technician and can be carried out by BOSTEC for you. Contact us for a quotation for this Inspection, Service and Certification.

As part of this Inspection we recommend the following:

Check air distribution dampers are fastened.

Check all door seals and replace as required.

Check, clean and adjust door hinges as required.

Check fan impellers visually for any damage.



With the oven running:

Check all control panel lamps and replace as required.

Check and set Air Pressure Switches to ensure safety circuit is working correctly.

Check and set Over Temperature controller- this isolated inside the control panel. This should never be set at more than 30 Degrees above its normal operating temperature (this will have been preset at original commissioning).



WARNING

On standard temperature ovens (120°C-220°C) we would expect the over temperature to be set at a maximum of 40% above the process set point.

Where required this may be increased on low temperature ovens – if in doubt please ask.



Check rotation of all fans and ensure flue duct is hot.

Check motor Amps are correct in accordance with Motor Rating Plate on each fan – when the oven is hot the Amps will drop slightly, this is normal.

Check and set Purge Timer – The oven should run for 2-3 minutes prior to first initial startup and heating.

With an independent instrument check the reading on the main process controller is reading accurately – if not investigate and repair.

Check and adjust the cooling timer to ensure the oven is below 70°C before switching off.

Fanset Information:



FAN ENGINEERING (MIDLANDS) LIMITED

19 SANDY WAY, AMINGTON IND. EST., TAMWORTH, B77 4EX
PHONE: 01827 57000 FAX: 01827 64641

MANUFACTURERS OF CENTRIFUGAL AND AXIAL INDUSTRIAL FANS

General Safety Instructions for Fans

To be read in conjunction with:

"General Installation, Operation and Maintenance Instructions for Axial Flow Fans"
and
"General Installation, Operation and Maintenance Instructions for Centrifugal Fans"

Fan equipment may present mechanical, electrical, noise or vibration hazards. In order to minimise the risks associated with these hazards it is essential that safety instructions and Installation, operation and maintenance instructions, are implemented by technically competent personnel so that a safe and reliable equipment installation is achieved.

Mechanical hazards must be minimised by preventing access to the rotating parts whilst the fan is operating. Wire mesh guards can be provided by fan engineering for this purpose.

All installation work must be completed in accordance with the installation, operation and maintenance instructions, before any attempt is made to run the fan. The fan must be correctly earthed and no maintenance work carried out without first switching off and isolating the fan and its controls from the electrical supply and ensuring that the rotating parts are at rest.

Fan equipment when operating at high pressures and/or rotational speed may generate unacceptable noise levels. By reference to fan engineering, the sound levels can be obtained and the necessary action must then be taken to reduce these appropriately. Sound and vibration attenuators can be provided by fan engineering for this purpose.

Fans require routine maintenance, and facilities for this to be carried out safely, must be incorporated in to design of the fan installation.

If there is any difficulty in correctly interpreting these safety instructions or the installation, operation and maintenance instructions, then it is essential that fan engineering is consulted for help and advice.

FAN ENGINEERING (MIDLANDS) LIMITED

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PHONE: 01827 57000 FAX: 01827 64641

MANUFACTURERS OF CENTRIFUGAL AND AXIAL INDUSTRIAL FANS

General Installation, Operation and Maintenance Instructions for Axial Flow Fans

To be read in conjunction with "General Safety Instructions for Fans".

Site Storage

The fan must be stored in clean, dry conditions in a vibration free area. Before installation the resistance to earth of the motor should be measured. If this is less than 1 Megaohm the motor should be dried out before applying the main voltage. The impeller should be rotated periodically to prevent the hardening of the grease and corrosion of the bearings.

Installation

For long trouble free operation of the fan it will require periodic routine maintenance, therefore the fan must be mounted so that it is easily accessible, and that all inlet and discharge ducting is self-supporting.

The axial fan is supplied fully assembled and is run tested in the factory. In dry conditions (unless otherwise stated) the fan may be mounted in any position horizontally, vertically or inclined.

Bifurcated fans when mounted horizontally, should have the motor tunnel in a vertical position.

Inlet and Outlet Connections

When installing the fan, sharp bends in the ductwork should be avoided in the vicinity of the fan. For optimum performance the connection to the ductwork should be by means of a smooth transformation duct with a 60° maximum effective included angle when the diameter decreases in the direction of airflow, or 15° maximum effective angle when it increases in the direction of airflow. The height of the fan supports should be adjusted so that no undue distortion of the fan casing or mounting occurs. When anti vibration mounts are used, flexible connections should also be used. The flexible connections should be fitted so that they are almost taut. The fan should be aligned closely with the inlet and outlet ductwork and must be fitted in accordance with the airflow direction and rotation arrows shown on the nameplate.

Electric Motors

Supply. The details of the site supply must be checked to ensure that the voltage, frequency, power rating and number of phases comply with the details given on the motor nameplate.

Connection. The wiring must be connected in accordance with the instructions on the motor name plate. The direction of rotation of the fan is marked on the fan case.

Earthing. The fan must be earthed in accordance with the requirements of the local supply authority or code of practice. A separate earth continuity conductor should be connected to the earthing screw in the terminal box.

Starting. Starting of the fan may be carried out manually or automatically. The number of starts in a given time should be limited as follows:

3 direct on line starts / hour
2 starts in succession followed by 30 min. Cooling.

Protection. Any fuses in the circuit should be regarded as protecting the wiring against the effects of short circuits or wiring faults. They are not suitable for overload protection. Fuse ratings must be sufficient to carry the starting current, which, if no specific information is available, may be taken as six times the nameplate current for 5 seconds (direct on line starting) or 3 times the name plate current for 20 seconds (star delta starting).

Single Phasing. To provide protection against a blown fuse or a bad contact, a starter with single phase protection must be used.

Overload Protection. The overload current setting must not exceed 1.1 times the nameplate current. Motors fitted with thermistor overheat protection should be wired in accordance with the instructions given.

Weather Proof Motors. Weather proof motors are provided with drain holes and in wet conditions must be mounted with the drain holes at the lowest point. If the drain holes are plugged the plugs must be removed before commissioning.

Operating Conditions

Standard fans are suitable for use in an ambient temperature of -40°C to $+40^{\circ}\text{C}$, except for belt driven fans which may be used from 0°C to 60°C , provided the motor is in an ambient from -20°C to $+40^{\circ}\text{C}$.

When fans are operating in ambient temperatures below 0°C icing up must be avoided.

Direct driven fans are not suitable for handling air containing free moisture or corrosive fumes.

Routine Maintenance

After a short period of running, and thereafter as experience dictates, the fan should be inspected to ensure that there is no build up of dirt or other matter that would cause overheating of the motor or obstruct the impeller track.

The belt tension of belt driven axial fans should be checked after the first few hours running and thereafter at three monthly intervals or as experience dictates. The belt tension should be set as stated in the fenner wedge belt tensioning instructions (see *next page*). After tensioning the belts the alignment of the pulleys should be checked by holding a straight edge across their faces.

Lubrication

Direct driven axials are fitted with sealed bearings and do not require greasing.

Belt driven axials require lubricating with SHELL ALVANIA R3 grease after one month operation and thereafter as conditions dictate. When carrying out relubrication it is essential that every trace dirt and water is removed from around the grease nipple and that a clean grease gun is used. Only a low pressure should be required to inject the grease. If a high pressure is required the cause should be investigated.

Fenner Wedge Belt Tensioning Instructions

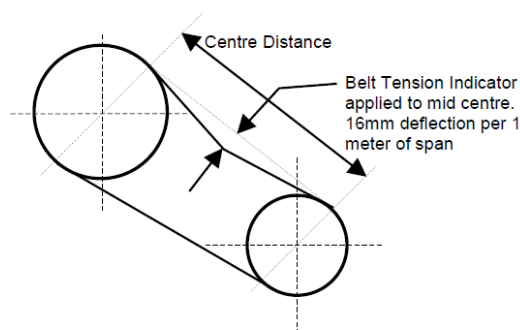
One Shot Tensioning

Fenner wedge belts are built right from the start to ensure totally precise inherent length, to stay matched during storage and in the new drive. Now, after extensive field tests, our claim of genuine "one shot" tensioning has been endorsed by satisfied customers all over the world on all belt sections.

Simply put the belts around the pulleys, set them to the appropriate tension value stated in the "tensioning forces" table opposite (using a belt tension indicator), run the drive under load for 30 minutes, stop the drive, check the tension, re-setting to the catalogue if necessary. On a properly designed drive for the application there will be no need for any attention during the life of the drive.

Method of Belt Tensioning using Belt Tension Indicator

1. Calculate the deflection distance in mm on a basis of 16mm per metre of centre distance.
Centre Distance (m) x 16 = Deflection (mm).
2. Set the lower marker ring at the deflection distance required, mm on the lower scale.
3. Set the upper marker ring against the bottom edge of the top tube.
4. Place the belt tension indicator on top of the belt at the centre of the span, and apply a force at right angles to the belt deflecting it to point where the lower marker ring is level with the top of the adjacent belt.
5. Read off the force value indicated by the top edge of the upper marker ring.
6. Compare this force to the kgf value shown in the table below.



If the measured force falls within the values given. The drive should be satisfactory. A measured force below the lower value indicates under-tensioning. A new drive should be tensioned to the higher value to allow for the normal drop in tension during the running in period.

Note after the drive has been running for 30 minutes, the tension should be checked and re-adjusted to the higher value, if necessary.

Belt Section	Force required to deflect belt 16mm per meter span		
	Small Pulley Dia (mm)	Newton (N)	Kilogram force (kgf)
SPZ	56 - 95	13 - 20	1.3 - 2.0
	100 - 140	20 - 25	2.0 - 2.5
SPA	80 - 132	25 - 35	2.5 - 3.6
	140 - 200	35 - 45	3.6 - 4.6
SP	112 - 224	45 - 65	4.6 - 6.6
	236 - 315	65 - 85	6.6 - 8.7
SPC	224 - 355	85 - 115	8.7 - 11.7
	375 - 560	115 - 150	11.7 - 15.3

The high performance and efficiency of Fenner precision built belts requires correct tension

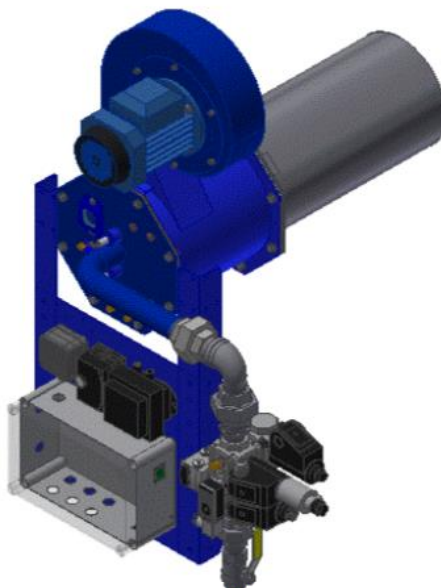
Burner Information:

LANEMARK

COMBUSTION ENGINEERING

PROCESS BURNER DIVISION

INSTALLATION, COMMISSIONING AND MAINTENANCE MANUAL



The information contained in this manual is advisory and in general terms only and does not constitute a legal liability on Lanemark Combustion Engineering Ltd.

Lanemark Combustion Engineering Ltd reserves the right to supply equipment to their latest specification.

FD-E Mk 6 SERIES GAS BURNER J****

CUSTOMER

END USER

BURNERS **FD**EN-3 NATURAL GAS BURNER**

SERIAL NO. J*****- 1
MODEL FD10EN
FUEL TYPE NATURAL GAS
HEAT INPUT 440 kW
BURNER HEAD PRESSURE 5.6 mbar
MANUFACTURED MM/YYYY

SUPPLY GAS TEMP	15	°C	SUPPLY AIR TEMP.	15	°C
MAXIMUM HEAT INPUT	440	kW	MINIMUM HEAT INPUT	13	kW
GROSS CALORIFIC VALUE	39.911	MJ/Nm ³	NET CALORIFIC VALUE	35.9	MJ/Nm ³
MAXIMUM INLET PRESSURE	100	mbar	MINIMUM INLET PRESSURE	20	mbar
GAS VALVE TRAIN TYPE	KROMSCHRODER VCD2		DRAWING NO.	56708	
ELECTRICAL WIRING DIAGRAM NO.	62053				

CONTROL SUPPLY	230	V	1	PH	50	Hz	FLC	3	A
FAN SUPPLY	400	V	3	PH	50	Hz			
FAN POWER & FLC	0.25	kW	0.70	A					

SERIAL NO. J*****- 1
MODEL FD10EN
FUEL TYPE NATURAL GAS
HEAT INPUT 440 kW
BURNER HEAD PRESSURE 5.6 mbar
MANUFACTURED MM/YYYY

SERIAL NO. J*****- 1
MODEL FD10EN
SUPPLY VOLTAGE 230 V
MANUFACTURED MM/YYYY

INFORMATION ONLY



Declaration of Conformity
QAF 06-34

(In accordance with Machinery Directive 2006/42/EC)



Reference/ Serial No. J*****
Issued by: Lanemark Combustion Engineering Limited
Object of Declaration: FD**EN-3 NATURAL GAS BURNER
Customers Name:
Purchase Order/ Reference:

The object of the declaration described above have been inspected and tested in accordance with the conditions and requirements of the purchase order and unless otherwise stated conform in all respects to the specifications(s) drawings relevant thereto and is in conformity with the requirements of the following documents:

2014/30/EC	Electromagnetic Compatibility Directive.
ISO 9001: 2015	Quality Management System – Requirements.
BS EN 746-2: 2010	Industrial Thermoprocessing Equipment, Safety requirements for combustion and fuel handling systems.
2014/35/EC	Low Voltage Directive (LVD).
BS EN 60204-1:2006	Safety of Machinery. Electrical equipment of machines General requirements.

Additional Information: If applicable (i.e. Applicable concessions, Raw materials, Cast numbers/Test results/Batch numbers).

Signed for and behalf of:
Lanemark Combustion Engineering Limited

Name/function: J. Foster/ Director. Name/function: P. Collier/ Managing Director

Date of Issue: DD/MM/YYYY

Place of Issue: As address below



Registered Address: Lanemark House, Whitacre Road, Nuneaton,
Warwickshire, UK, CV11 6BW
Tel: +44 (0) 24 7635 2000 Fax: +44 (0) 24 7634 1166
E-mail: info@lanemark.com Web site: <http://www.lanemark.com>
Company Registration No. 05471903 VAT No. GB 185 5272 84
Place of Registration: England & Wales
Directors: P.R. Collier, J.S. Foster, A.E. Thompson



Basic Fault Finding

The oven will not start:



1. Check Mains Supply and Isolator
2. Check Temperature Controller is set to call for heat
3. Check circuit breakers inside control panel
4. Check overloads inside control panel

'AIR FAULT' lamp indicator is on:



1. Check the fans is working
2. Check the air pressure switch is working (by turning it up)
3. Check the Air Fault system start timer is working

'OVER TEMP' lamp indicator is on:



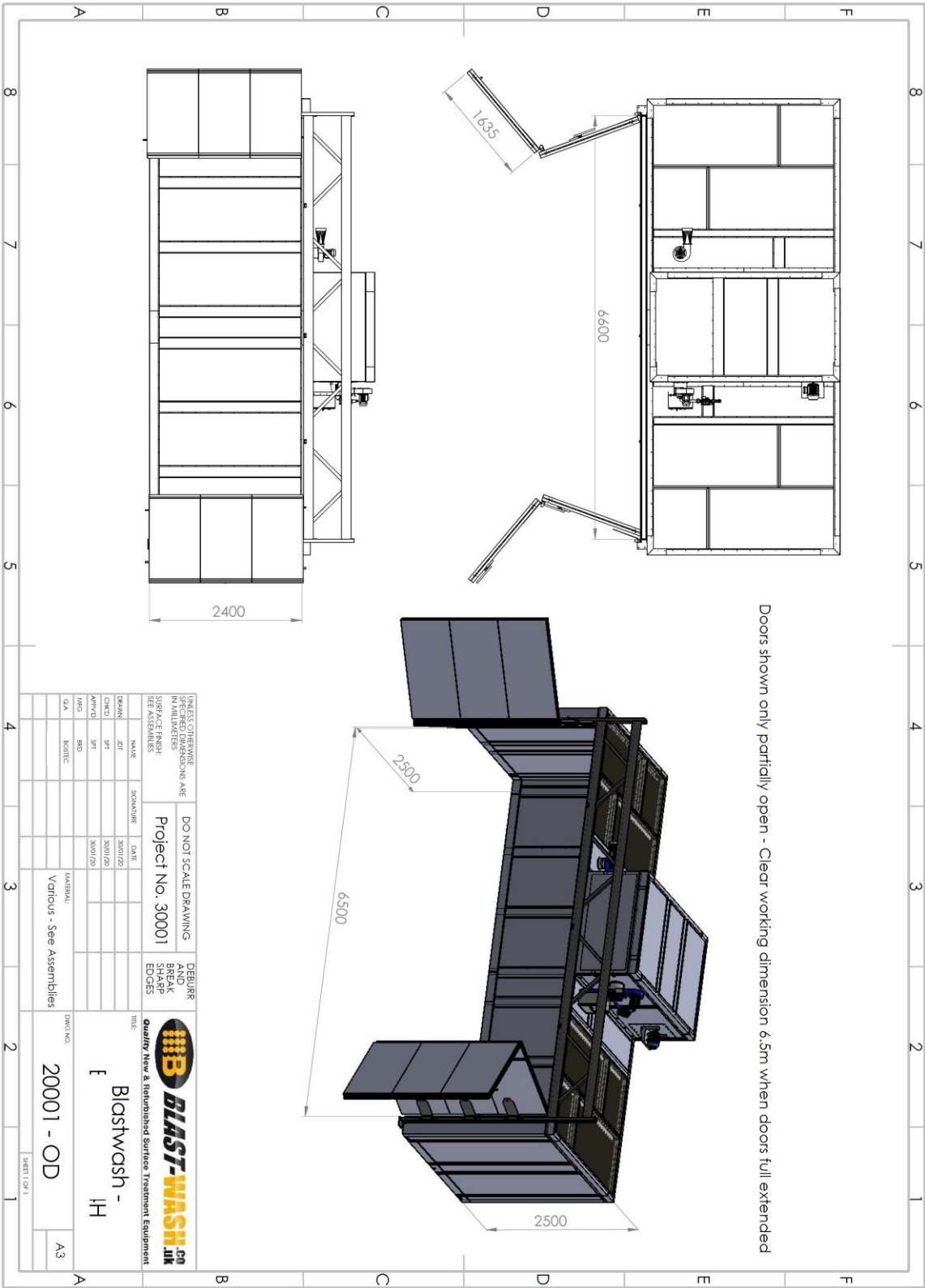
- 1 Check the fans are running correctly
- 2 Check the setpoint on the Over Temperature controller (inside the panel). Adjust to a maximum of 40% of oven setpoint.

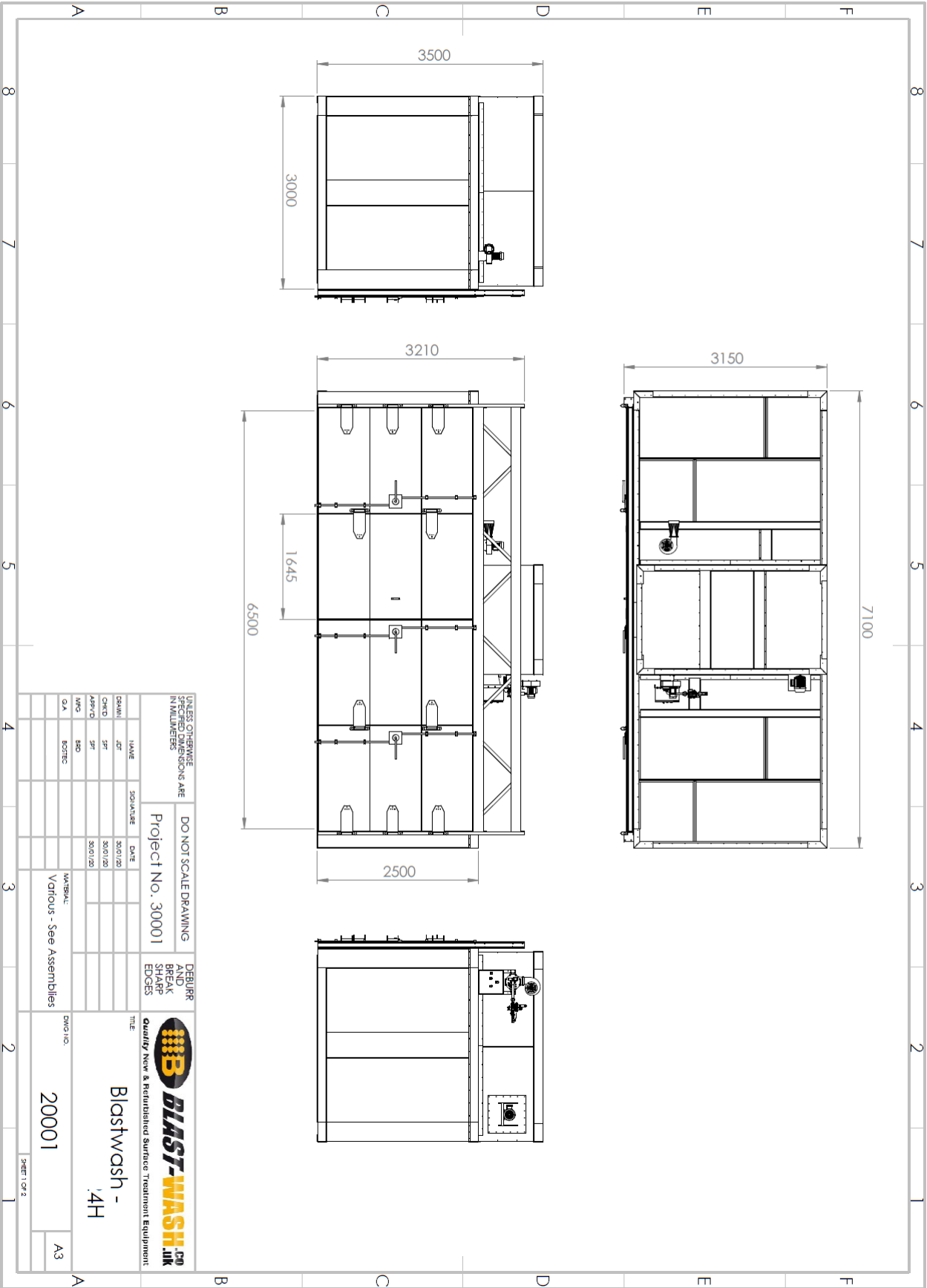
'ERR' shows on Temperature Controller:

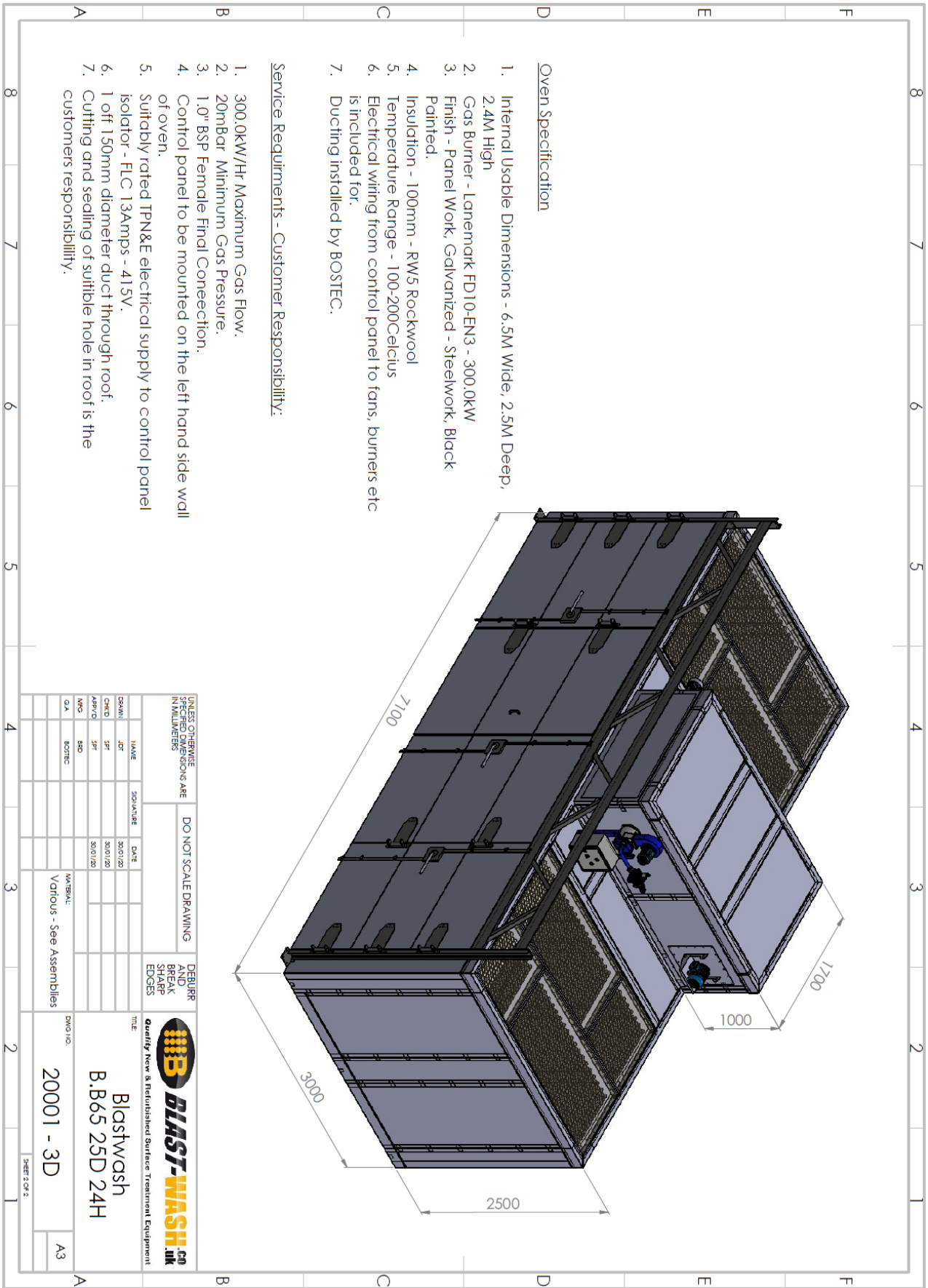


1. Check Thermocouples for connection and damage
2. Poor air recirculation – check impellers for rotation and damage
3. Poor air recirculation – check air feed and return dampers are not closed

Drawings







Commissioning Form



LEV - Thorough Inspection & Test

Test Record & Certificate

Company Name

Waterwash Example

Test Date:

22/01/2020

Test Date

Plant Ser No. or Manufacturer

300**

Time

15:46

LEV Type

Water Wash Booth

Is the Water Level Correct?

Yes

Check the level visually - the tank should typically be 90% full - inspect top-up system if level is incorrect.

Is level of waste in tank okay?

Yes

If the waste level is too high the filtration system will not work effectively - inform customer that the test cannot be completed until this is resolved.

Water pH Value

7

Does the tank have any leaks?

No

If yes inform customer and explain the LEV will fail the test until this is rectified.

Is water flowing evenly?

Yes

Check and set water jet nozzles

Yes

Check and set water screens

Yes

Full visual check?

Yes

Are all joints sealed?

Yes

z

Are all guards in place?

Yes

Is ducting in good condition?

Yes

Is the inside of the ducting okay?

Yes

Some paint build up is expected - heavy deposits are not acceptable.

Any visual signs of leakage from ducting?

No

Is the electrical equipment okay?

Yes

Is general LEV construction in good condition?

Yes

Grease bearings/shafts/hinges/pumps/fans.

N/A

Is there a Manometer?

Yes

Is Manometer working correctly?

Yes

Is there a conveyor?

No

Are there any motorised dampers?

No

How many extract fans are there?

2

Detail Fans and Numbers

Fan 1 LHS, Fan 2 RHS

Make a note of how you have assigned each fan a number.

Fan 1

Motor kW	O/L Amps Setting	Clipped Amps	Rotation Checked
3.0	6.2	5.8	Yes

Fan 2

Motor kW	O/L Amps Setting	Clipped Amps	Rotation Checked
3.0	6.2	5.9	Yes

How many Water Pumps are there?

1

Pump 1

Motor kW	O/L Amps Setting	Clipped Amps	Rotation Checked	Rotation Checked
----------	------------------	--------------	------------------	------------------

4.0	8.5	7.9	Yes	Yes
-----	-----	-----	-----	-----

Is a full Air Speed Check being carried out?

Yes

Air Speed Readings & Calculation

Filter Area Width

6.60

in Metres

Filter Area Height

1.50

in Metres

High Level 1

0.70

M/Sec

High Level 2

0.70

M/Sec

High Level 3

0.75

M/Sec

High Level 4

0.80

M/Sec

Mid Level 1

0.69

M/Sec

Mid Level 2

0.59

M/Sec

Mid Level 3

0.68

M/Sec

Mid Level 4

0.72

M/Sec

Low Level 1

0.72

M/Sec

Low Level 2

0.80

M/Sec

Low Level 3

0.90

M/Sec

Low Level 4

0.70

M/Sec

Avg Air Velocity - M/Second

0.73

Measured Air Volume - M3/Hour

25,987.49

Smoke Test been carried out?

Yes

Clearance Time

21

Time in Seconds

Time in Seconds

Fit 'Clearance Time' Label?

Yes

Has equipment passed LEV Test?

Yes

Has the PASS Label been fitted?

Yes

Have any parts been used during the test?

No

Parts other than those required on every test

Parts other than those used on every test are charged as follows:

Engineers Name

Stephen
First

Tracey
Last

Customers Name

Jakeee
First

Traceee
Last

Engineers Signature



Customers Signature



Congratulations you're all set. Your next test is due:

23/03/2021