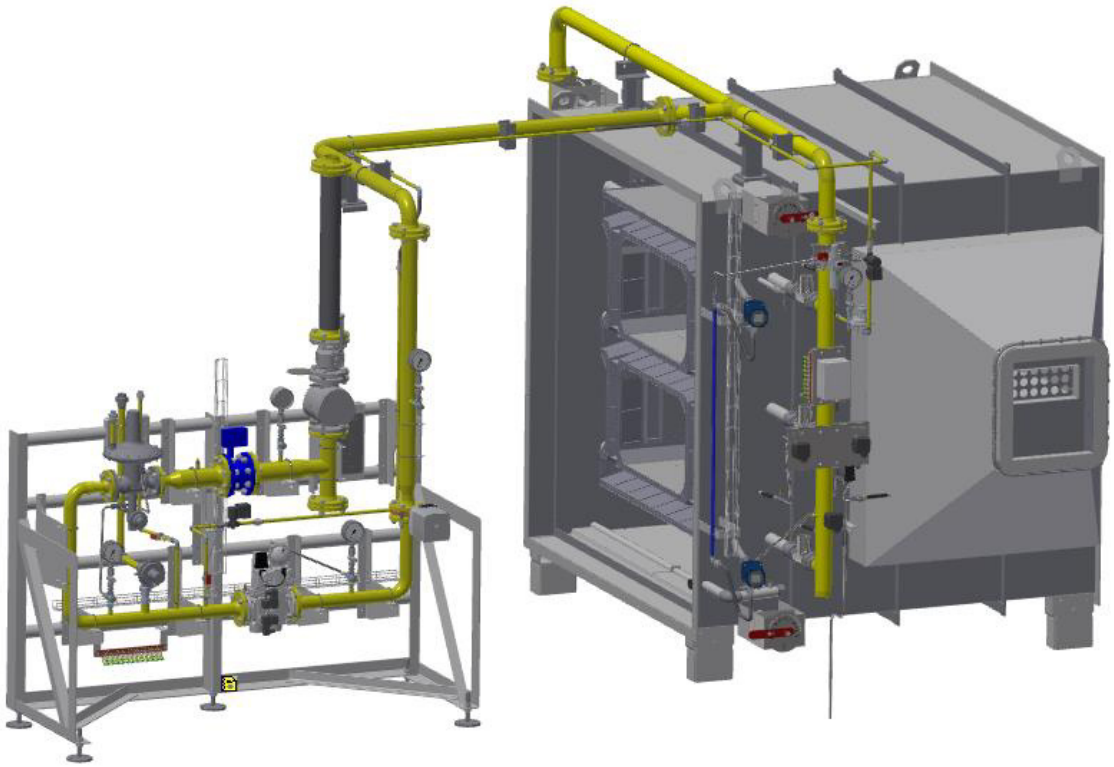
Gyptech

Proven Technology Worldwide

Dryer

Air Heater Manual

Carmit Mister Fix Israel



Customer: Carmit Mister Fix Ltd.
Location: Caesarea, Israel
Project: CAIS 130200
Revision: 00

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Introduction

This manual is written to provide detailed technical information to assist in the maintenance of the air heater. For information regarding maintenance of the board dryer and normal operation, please refer to the maintenance and area operator´s manuals. Maintenance should only be performed by qualified, trained personnel.

Table of Contents

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1. Overview

1.1. SAFETY

1.1.1. General Safety Precautions for Machine Operations and Maintenance

All safety requirements listed below are those generally applicable to this equipment but are not intended to be all-inclusive. They are intended for qualified, experienced personnel who are capable of understanding the maintenance and hazards of machinery operation. Particular types of components may require other precautions as determined by the customer's own safety policies. These precautions should be included in the comprehensive safety program for the particular installation.

These general safety precautions apply to all electrically or mechanically powered equipment and should be observed, as appropriate.

This equipment has been constructed using the highest standards of workmanship with industry accepted state-of-the-art techniques, components and designs. It has been inspected and tested as thoroughly as possible prior to shipment for proper operation and defects in workmanship. However this equipment, like any other, may develop problems due to normal wear, abuse or unforeseeable circumstances. The equipment therefore requires proper operation and maintenance. In the course of performing these functions, personnel will be required to work on or near the equipment. The following precautions are given to avoid injury to these personnel.

Warning:

As with many types of equipment, parts of this machine may start moving as soon as the pneumatic circuits are pressurized or electrical connections are energized, which may result in injury to personnel or damage to the machine.

1.1.2. Air Heater Safety Guidelines

Warning:

Never insert any foreign objects into the operating equipment openings.

DO NOT open the inspection hatches while the equipment is in operation. Lockout all sources of energy and close the main gas valve before opening the hatches.

Warning:

The air heater fuel is highly flammable and explosive. Never use an open flame around any components on or adjacent to the air heater equipment. Never use cutting discs, welding machines or other equipment that produces sparks and heat on or around the equipment. Smoking around the equipment is prohibited.

The valve train must be vented of all fuel prior to any work being done.

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DO NOT make alterations to regulators, pressure switches, valves or any other components without proper training.

Warning:

Never make ad hoc alteration to the flame safety system in the burner management system! This will put personnel and equipment in severe danger.

DO NOT operate the air heater with any door open.

1.1.3. Set-Up Safety

Avoid locating equipment in environments for which it was not designed (wet, extreme temperatures) or environments which may create a dangerous operating condition such as an explosive atmosphere (gas, dust).

Avoid the use of unauthorized or substitute parts and materials in servicing the equipment. Substitute parts or materials could produce a hazardous operating condition.

Use only materials of adequate size and strength to suit the flows and pressures which will be present in the operating system. Use safety factors in selecting materials for strength to allow for shock and over-pressure conditions should they occur.

1.1.4. Start-Up Safety

Ensure all pneumatic and electrical connections which may have been removed, replaced, or disconnected during an equipment shutdown have been reconnected securely before starting any equipment.

Return all valves (manual and control system operated) and movable machine members which may have been changed from their normal start-up condition during shutdown back to their normal start-up condition before starting any equipment.

Ensure that all personnel, product, etc., are clear of machinery prior to starting any equipment.

1.1.5. During Operation

All guards need to be secured in position when the air heater is in use. Maintain and keep in place all equipment guards.

1.1.6. Shutdown Safety

Prior to any work being done on the air heater.

LOCK OUT ALL SOURCES OF POWER!

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1.2. Air Heaters overview

The function of the Air Heaters is to heat air used in the drying process of gypsum boards. The heaters operate with natural gas as fuel source.

The air heaters are designed to give an even temperature profile in the recirculation duct. This is accomplished by a ladder style burner arrangement. Each heater is divided into several burner sections that can be controlled individually.

The dryer has three air heaters – one in each zone. Each heater has its own dedicated valve train to regulate the gas flow. There are several condition monitors to reassure safe operations.

The air heaters are controlled by a dedicated safety PLC system that controls all functions for start, stop and operation. The safety PLC also monitors that the air heaters operate in a safe manner.

The table below shows the performance data for each Air Heater.

Data	Zone 1	Zone 2	Zone 3	Units
Heat Duty (Expected)**	3860	3580	895	kW (net)
Heat Duty (Rated)	4680	4680	2080	kW (net)
Gas pressure	3,0	3,0	3,0	Bar(g)
Natural Gas heating value LHV	36,4	36,4	36,4	MJ/Nm^3*
Natural Gas Flow** (Expected)	470	470	200	Nm^3/h*
Natural Gas Flow (Rated)	500	500	225	Nm^3/h*
Natural Gas process pressure at burner	14	14	14	mbar(g)
NG process pressure at burner	8	8	8	mbar(g)
Turn-down ration	1:10	1:10	1:10	

*) Nm^3 defined as normal volume at STP conditions; 0˚C and 101,325 Pa

**) Based on 12.5x1200mm production at 40 m/min and 3,8 kg H_2O/kg DS

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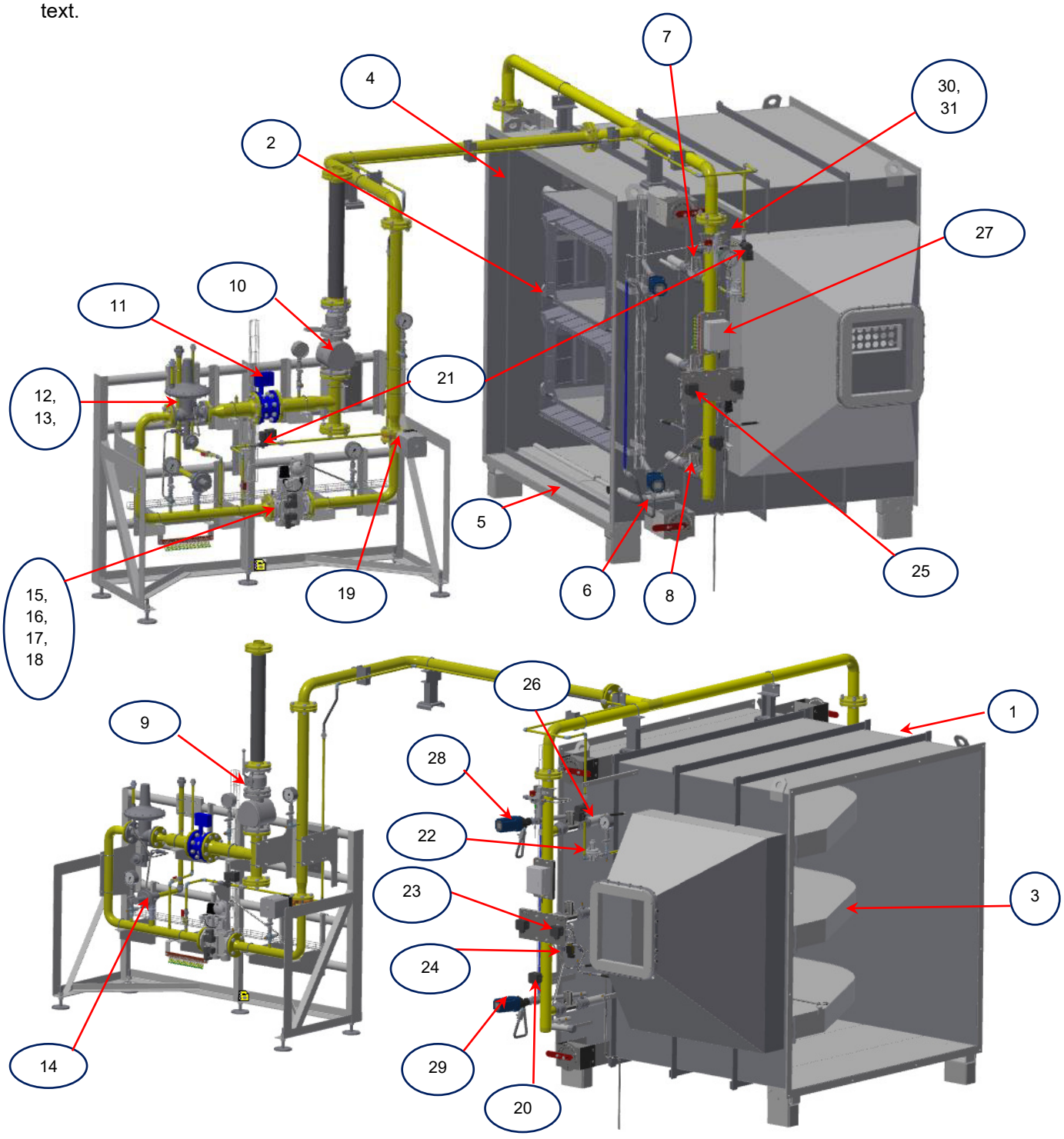
2. SYSTEM OPERATION

2.1. PART IDENTIFICATION AND DESCRIPTION

The following images and chapters briefly describe all components in the air heaters. The images shows zone 1 burner and valve train. The numbers on the images are explained in the part identification text.



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2.1.1. Air Heater body

The main bodies of the Air Heaters are constructed of mild steel. The body (1) is essentially a duct welded into the recirculation air duct. The body holds the burner segments (2) with air manifolds (3) in place. There is an internal flange (4) around the perimeter used to attach air deflector plates (5). The deflector plates can be installed to change the temperature profile around the burner.

There is a pressure reading manifold (6) on the bottom of the air heater body used for differential pressure readings.

2.1.2. Burner and combustion air manifolds

Each air heater has burners in a ladder arrangement. The burner is divided into smaller segments in order to control the temperature profile of the heater. Each gas inlet to the burner has a manual gas balancing valve (7) and (8).

There is one combustion air manifold (3) per burner row to distribute air needed for proper combustion. The burners are designed to operate with excess air – i.e. more air than needed to reach stoichiometric combustion conditions. The excess air is needed in the drying process as make-up air in addition to other make-up air inlets on the board dryer.

2.1.3. Valve Train

The valve train comprises a series of valves, regulators and other components to reassure a safe and precise operation. The components are located on separate structures – one for each zone - as well as mounted on the Air Heater bodies. There are one set of valves for the main operations and one set for pilot flame for Natural Gas – used to ignite the burner. The below chapters describe the components in detail.

2.1.3.1. Main isolation valve

At the gas inlet of the valve train there is a lockable manual isolation valve (9). This valve should be closed, locked and tagged before accessing the recirculation duct.

2.1.3.2. Gas Filter

The gas filter (10) catches debris present in the gas to avoid damage to downstream equipment. The filter has pressure test ports to detect when it is time to clean the filter. A high differential pressure means that the filter needs cleaning.

2.1.3.3. Gas Flow Transmitter

One gas flow transmitter (11) with built in pressure and temperature sensors measures the gas flow to each zone. The normalized flow readings are sent to the main PLC system and presented on the HMI. The flow meter has a display for local readings.

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2.1.3.4. High pressure regulator with slam shut function

The high pressure regulator (12) regulates the incoming gas pressure according to spring selection shown elsewhere in this document. The regulator is connected with an impulse pipe downstream in the piping to give constant pressure.

A built in slam shut valve (13) will automatically close if the pressure reaches above 500 mbar to protect downstream devices. The slam shut valve must be manually reset after it has been engaged.

2.1.3.5. Pressure relief valve

The relief valve (14) opens if the pressure reaches above a set point determined by the valve's spring selection, shown elsewhere in this document. The purpose of this valve is to avoid damages due to sudden pressure pulses that can be caused by rapidly closing valves and to avoid that the slam shut valve engages. The relief valve is connected to a ventilation pipe leading outside the building.

2.1.3.6. Dual shut-off valve

Two solenoid valves in common valve housing (15) are used to open and close the flow of gas to each air heater.

The valve also has a Low gas pressure switch (16) and a Leak test pressure switch (17) mounted on the front of the housing. The Low gas pressure switch is used to detect if the incoming pressure is too low, and the Leak test pressure switch is used in the Leak test procedure in the BMS.

The valve housing has limit switches to confirm that each valve is closed.

The low-pressure regulator (18) regulates the incoming gas pressure. Integrated in the dual shut-off valve.

2.1.3.7. Gas control valve

The gas control valve (19) controls the amount of gas being sent to the burner and thus control the burner output. The control valve position is determined by a PID loop in the main dryer PLC. The control valve uses three built in limit switches to drive to low fire position, light off position and high fire position.

2.1.3.8. High pressure switch

The high-pressure switch (20) detects if the gas pressure is too high at the burner gas inlet.

2.1.3.9. Pilot gas shut off valves

Two pilot shut off valves (21) are used to engage pilot flame.

2.1.3.10. Pilot gas pressure regulator

The pilot gas pressure regulator (22) regulates the incoming gas pressure.

2.1.4. Differential air pressure switches

Air pressure switches are used to reassure that there is a flow of combustion air and process air.

The combustion air pressure switch (23) is connected between the combustion air manifold and air heater body. A three-way solenoid valve (24) is used to reassure function of the switch.

The process air pressure switch (25) is connected between the process air inlet and through the dryer roof to the deck level.

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2.1.5. Ignition rod and transformer

There is an ignition rod (26) and an ignition transformer (27) for lighting the pilot flame. The ignition transformer is triggered when the main burner management system calls for burner start and after all necessary safety checks have been performed.

2.1.6. Flame Scanners

Two UV-light flame detectors are used to verify that the burners are lit. One scanner (28) verifies that the pilot is lit whilst the other scanner (29) verifies that the flame has fully propagated to all segments of the burner.

Compressed air is used to keep the flame scanners cool and to keep a clear view of sight for the flame scanners. The compressed air is adjusted by a needle valve (30) and a pressure regulator (31).

2.1.7. Overheat protection thermocouple

One thermocouple monitors the temperature downstream the air heater to detect abnormal temperatures. If the temperature reaches a pre-set limit the burners will be shut down to protect the equipment.

2.2. OPERATION

2.2.1. Air Heater Operation

The air heaters are controlled by a dedicated burner management system (BMS). The BMS governs all safety function and burner controls. The main dryer PLC communicates with the BMS to achieve correct temperatures in the drying circuits.

Re-circulated air is forced around the burner in order to heat all air to the same temperature. The main gas valve position governs the air temperature through a PID controller in the PLC.

Several safety checks and actions are continuously made to reassure a safe operation.

Before the air heaters are allowed to operate the complete dryer goes through a purge cycle. The purging ventilates the entire dryer to exhaust any residue combustible gases that could be present. During purging all fans operate to make at least 5 complete air changes in all sections of the dryer. Several conditions must be in place for the purging to commence:

1) Air dampers must be positioned to direct all exhaust air to the exhaust stacks. The positions are verified by limit switches on the dampers. Damper locations and positions are described in the main dryer manual.
2) Air fans must run at pre-determined speed to verify that sufficient amount of air changes has been performed. Fan speeds are verified by auxiliary contacts from variable frequency drives, speed switches and pressure switches. The speed switches are located underneath fan shafts and look at a target disk attached to the shaft. Two pressure switches per zone are used to verify process and combustion air:
    a. The differential pressure across the air heater is measured up- and downstream the burner. When the pressure upstream the burner is higher than the pressure downstream the burner this proves that the recirculation fans are running.
    b. The differential pressure across the combustion air manifold in the manifold and the air heater body. When the pressure in the combustion air manifold is higher than the

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pressure in the heater body this proves that the combustion air fan is running. There is a 3-way solenoid valve that exposes the pressure switch to the same pressure on high and low inlets. This is used o verify that the switch works properly. This test is performed before the BMS allows the air heaters to go through the purge cycle.

During or prior to purge the BMS checks for gas leaks in the dual shut off valve. A pressure switch located between the shut-off valves in the valve housing is utilized. The following procedure is used:

1) At the start of the test valves are closed and the pressure switch is disengaged – i.e. the pressure is below the switching pressure.
2) The valve on the high pressure side opens. The pressure switch is engaged.
3) The valve on the high pressure side closes.
4) The BMS waits 10 s. If the pressure switch stays engaged this means that the low pressure side valve is gas tight. If the pressure switch changes state, the gas escapes through the low pressure valve where the pressure is lower.
5) The valve on the low pressure side open. The pressure switch is disengaged.
6) The BMS waits 10 s. If the pressure switch stays disengaged this means that the high pressure side valve is gas tight. If the pressure switch changes state, the gas enters through the high pressure valve where the pressure is higher.
7) If the test is passed permissive to light the burners are given.

After the dryer has been purged and the leak test has been performed the air heaters are allowed to start.

The start-up sequence is:

1) Verify that no alarms are present. Alarms are triggered by:
    a. Incoming pressure is too low.
    b. The fans are not running – verified in the same way as during purge.
    c. The overheat protection is triggered – meaning that the temperature downstream the air heater is above threshold limit.
    d. Component fault from any device in the gas valve train.
    e. Main dryer PLC doesn't give permissive to start.
2) Control valve drives to light-off position. The position is given by physical limit switches inside the control valve actuator.
3) Pilot shut off valves open.
4) Ignition transformer powers the ignition rod that ignites the pilot gas.
5) Pilot flame scanner proves pilot flame within 10 s.
6) Main gas valves open.
7) Main flame scanner proves main flame within 10 s.
8) Control valve drives to low-fire position.
9) Controls are handed to main dryer PLC.

The burner will shut down in case of the following:

1) Incoming gas pressure is too low, triggered by the low gas pressure switch.
2) Outgoing gas pressure – i.e. between the gas valve train and the burner – is too high, triggered by the high gas pressure switch.
3) The fans are not running – verified by speed switches and/or pressure switches and/or auxiliary outputs from the variable frequency drive.
4) The overheat protection is triggered – meaning that the temperature downstream the air heater is above threshold limit.
5) Loss of flame, triggered by flame scanners.
6) Component fault from any device in the gas valve train.

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7) Main dryer PLC shuts the burner off, e.g. if the dryer deck drives shut down or if the outfeed conveyors are not running.

In case of very low heat request from the main PLC there is a pilot switch function. This function shuts the main burner off and runs only with pilot flame.

2.3. TROUBLE-SHOOTING

Troubleshooting Air Heater Problems	
Purge cycle failure	**Solved By**
BMS detects that air dampers aren't driving to purge position.	• Verify that the damper actuators move the damper shaft. • Check that the damper limit switches detect the physical targets and that the cable is connected.
Fans are not running at purge speed.	• Verify that the fans are running. • Check speed switches. • Check air pressure switches located on burner. • Check for condensate in the impulse pipes to the pressure switches.
Gas leak is detected in double shut-off valve.	• Verify that both valves can close completely. • Check for debris in valve seat.
Gas pressure switches are disengaged	• Reset the pressure switches locally.
Burner will not start	**Solved By**
Gas does not reach the burner.	• Clean the gas filter. • Check that the manual valves leading to the burner are open. • Verify that there is pressure in the pipes all the way to the burner. • Check that the slam shut valve is not engaged; the slam shut valve must be reset locally.
The ignition transformer does not ignite the flame.	• Check cable between transformer and ignition rod. • Check that the transformer is working. • Replace spark plug if needed.
Flame is not detected in 10 s	• Check that the gas pressure downstream the low pressure regulator is in the pre-set range. If the pressure is too low the gas will not reach the burner in time. • Inspect the regulators and repair if needed.
Pilot flame does not ignite	• Check pilot shut-off valves. Check pilot regulator.
Flame Failure	**Solved By**
Loss of flame scanner signal	• Check that the flame scanner has a clear line of sight to the flame. • Check that the cable is connected.

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	• Verify that compressed air reaches the flame scanner pipe.
Loss of gas pressure	• Clean the gas filter. • Check that the high and low gas pressure switches aren't engaged. Reset the switches locally. • Check that the incoming gas pressure is in design range. • Verify that all valves are open and that the pressure regulators are working. Repair/Replace if needed.
Loss of combustion air pressure	• Verify that the combustion air fan is running. • Verify that the hoses to the differential pressure switch are connected. • Check for condensate in the impulse pipes and tubes. Clean if needed. • Replace the differential pressure switch if needed.
Loss of process air pressure	• Verify that the recirculation fans are running. • Verify that the hoses to the differential pressure switch are connected. • Check for condensate in the impulse pipes and tubes. Clean if needed. • Check for debris or blockage in the impulse pipes located inside the burner. • Speed up the recirculation fans if the above is OK.
Loss of signal from BMS or PLC	• Check cabling. • Check for damaged I/O cards.

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3. MAINTENANCE

In order to prevent premature failure of the equipment, the following preventative maintenance procedures are recommended. It is recommended that maintenance work be done by qualified trained personnel only. The following procedures are not intended to be in-depth technical procedures but a simple step-by-step guide for skilled maintenance personnel.

The Air Heaters must have regular, personal inspections. This general observation is for detecting any abnormal behaviors.

Warning:

When performing any maintenance work always lockout all sources of energy (electrical, pneumatic, mechanical, electromagnetic, chemical, thermal, hydraulic, etc.).

Warning:

It is critical to the plant operation that there are spares of all components on the air heaters. One damaged component will shut down all production.

3.1. PREVENTIVE MAINTENANCE SCHEDULE

3.1.1 Monthly

Unit	What To Do?
Gas Filter	• Check the differential pressure to detect if the filter needs cleaning. Clean the filter when required.
Safety Guards	• Check their condition.
Machine	• Clean-up around the machine and remove build-up.
Burner	• Check condition of burner nozzles in terms of dirt build up, heat deformations and corrosion. Replace if worn.
Pressure	• Keep record of manual pressure readings up- and downstream of each pressure regulator. The regulators need service if the changes are large.
Gas pipes and valves	• Check for leaks. Repair if required. Check that all threaded connections are gas tight.

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3.2. List of components and maintenance procedures

Refer to Gyptech's spare part drawings. UPDATED WHEN DRAWINGS ARE AVAILABLE

AREA	ITEMS	Z1	Z2	Z3	MANUFACTURER	0SPECIFICATION
Supply Line	Control Valve Actuator	1	1	1	Siemens	SQM50.480A2Z3
Supply Line	Control Valve	1	1	n/a	Siemens	VKF11.050
Supply Line	Control Valve	n/a	n/a	1	Siemens	VKF11.032
Supply Line	Drive Shaft	1	1	1	Siemens	AGA58.5
Supply Line	Mounting Plate	1	1	1	Siemens	ASK33.3
Burner Safety	Combustion Air 3 Way Valve	1	1	1	Burkert	0330-T-03,0-FF-MS-GM82-024/DC-08*JH54 + cable
Burner Safety	Combustion Air Pressure Switch	1	1	1	Dungs	LGW 3 A4 SE, including cable socket 3 pol + PE
Burner Safety	Process Air Pressure Switch	1	1	1	Dungs	LGW 3 A4 SE, including cable socket 3 pol + PE
Inlet Line	Gas Filter	1	1	n/a	Dungs	GF60065/4, DN65, ISO Flange
Inlet Line	Gas Filter	n/a	n/a	1	Dungs	GF60040/3, DN40, ISO Flange
Inlet Line	Ball Valve - Inlet Lock Out	n/a	n/a	1	Dungs	KSN75B, DN40, ISO Flange, LOCKABLE
Inlet Line	Ball Valve - Inlet Lock Out	1	1	n/a	Dungs	KSN75B, DN65, ISO Flange, LOCKABLE
Inlet Line	Ball Valve - Bleed Valve	1	1	1	Dungs	S95 3/8", BSP, Female/Female, LOCKABLE
Inlet Line	Pressure Gauge	1	1	1	Dungs	0-6bar Ø80mm, With Push Bottom Cock, G1/2"
Pilot Line	Pressure regulator	1	1	1	Dungs	FRS 503. 3/8" BSP, Blue Spring [10-30mBar]
Ignition System	Spark Igniter	1	1	1	Honeywell	Drawing 50173777-891, Part of Burner Rail
Pilot Line	Ball Valve - Pilot Lock Out	1	1	1	Dungs	S95 3/8", BSP, Female/Female, LOCKABLE
Pilot Line	Pilot Safety Shutoff Valves	2	2	2	Dungs	MVD 503/5, 3/8" BSP, 24VDC
Pilot Line	Pressure Gauge	2	2	2	Dungs	0-60mbar Ø80mm, With Push Bottom Cock, G1/2"
Pilot Line	Pressure Gauge	1	1	1	Dungs	0-600mbar Ø80mm, With Push Bottom Cock, G1/2"
Supply Line	High Gas Pressure Switch	1	1	1	Dungs	ÜB 50 A4 SE, including cable socket 3 pol + PE
Supply Line	Low Gas Pressure Switch	1	1	1	Dungs	GW 500 A5 SE, including cable socket 3 pol + PE
Supply Line	Leak Test Gas Pressure Switch	1	1	1	Dungs	GW 500 A5 SE, including cable socket 3 pol + PE
Supply Line	Pressure Gauge	1	1	1	Dungs	0-160mbar Ø80mm, With Push Bottom Cock, G1/2"
-	Test Nipple	25	25	25	Flamkontroll	Rp1/8", DN6
Ignition System	Ignition Transformer	1	1	1	Hennig	ZTI 7,5kV, 230 VAC 50Hz, GTU8-7,5kV
Supply Line	Safety Relief valve	1	1	1	Pietro Fiorentini	VS/AM 65 MP (300mbar - 500mbar)
Inlet Line	Gas Flow Meter	1	n/a	n/a	RMG	TME400-VC 25-400m3/hr, ISO DN80, L to R, 0,8-6 bar (a) range, PN 10

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Inlet Line	Gas Flow Meter	n/a	1	n/a	RMG	TME400-VC 25-400m3/hr, ISO DN80, R to L, 0,8-6 bar (a) range, PN 10
Inlet Line	Gas Flow Meter	n/a	n/a	1	RMG	TME400-VC 6-100m3/hr, ISO DN50, L to R, 0,8-6 bar (a) range, PN 10
Inlet Line	High Gas Pressure regulator	1	1	n/a	Pietro Fiorentini	DIVAL 600GB ∅ MP, DN40, Brown Spring [230-350mBar], inkl. SAV
Inlet Line	High Gas Pressure regulator	n/a	n/a	1	Pietro Fiorentini	DIVAL 600GB ∅ MP, DN25, Brown Spring [230-350mBar], inkl. SAV
Inlet Line	Flexible Hose	n/a	n/a	1	Hydroscand	Flange, DN40, L=800 mm, 3bar, Naturgas, 20 C
Inlet Line	Flexible Hose	1	1	n/a	Hydroscand	Flange, DN65, L=800 mm, 3bar, Naturgas, 20 C
Burner	Flexible Hose - Pilot	2	2	2	Hydroscand	MALE/MALE G3/8" L=500 mm 1,0bar, Naturgas, 20 C
Burner	Flexible Hose - UV scanner air	2	2	2	Hydroscand	MALE/MALE G3/8" L=500 mm 1,0bar, Tryckluft, 20 C
Flamedetector System	Flame Scanner incl. Purge air flange	2	2	2	DURAG	Durag D-LX 110 UL-C1/M5/0000/MP7
Flamedetector System	Flame Scanner cables	2	2	2	DURAG	D-LX 110/710...MP7, 20 meter
Burner Safety	High Temperature Element	1	1	1	Pentronic	5525480-002, Type J
Ignition System	High voltage cable	1	1	1	Lapp	ÖLFLEX® HEAT 180 FZLSi
Ignition System	Rajah	1	1	1	Roger Hogue	SSN Rajah droit snap non-isole
Ignition System	Damask	1	1	1	Roger Hogue	250 BOOT Capuchon rouge droit
Supply Line	Main Dual Safety Shutoff Valve	1	1	n/a	Siemens	VGD40.050, ISO,
Supply Line	Main Dual Safety Shutoff Valve	n/a	n/a	1	Siemens	VGD40.040, ISO,
Supply Line	Safety Shutoff Valve Actuator #1	1	1	1	Siemens	SKP15.001E2 Limit switches build in
Supply Line	Safety Shutoff Valve Actuator #2	1	1	1	Siemens	SKP25.001E2,Limit switches build in
Supply Line	Pressure regulator spring	1	1	1	Siemens	AGA 22 (Yellow/Gold)
Supply Line	Connector Valve Actuator	2	2	2	Siemens	AGA 64
Supply Line	Connector End Switch	2	2	2	Siemens	AGA 65
Supply Line	Damping valve	1	1	1	Siemens	AGA25.2
Burner	Needle Valves	2	2	2	SMC	G 3/8" FEMALE - G 3/8" FEMALE, SMC #AS3000-F03

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Compressed Air Line	Pressure Regulator + Filter + PS	1	1	1	SMC	#HVS30-F03B-S, #Y300-A, #AW30K-F03C-1-B, #AR339-270AS, #KQ2VD10-03AS, #ISE40A-01-P-L (ASSEMBLY NO: 5M-1564-2/1-619800-006)

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4. Appendices

Specification	Document name
Zone Dryer process flow diagram	130200-170000-FD01
Zone 1 Air heater drawing	130200-170056-100
Zone 1 Gas Valve Train drawing	130200-170056-120
Zone 1 Air heater flow diagram	130200-170156-FD01
Zone 2 Air heater drawing	130200-170056-200
Zone 2 Gas Valve Train drawing	130200-170056-220
Zone 2 Air heater flow diagram	130200-170256-FD01
Zone 3 Air heater drawing	130200-170056-300
Zone 3 Gas Valve Train drawing	130200-170056-320
Zone 3 Air heater flow diagram	130200-170356-FD01

For equipment manuals, technical information and maintenance procedures, see separate supplier documentation from following manufacturers.

- Pietro Fiorentini
- Dungs
- Siemens
- Eclipse
- Hennig
- Bürkert
- Siemens
- Durag
- Honeywell
- RMG
- SMC
- Pentronic

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