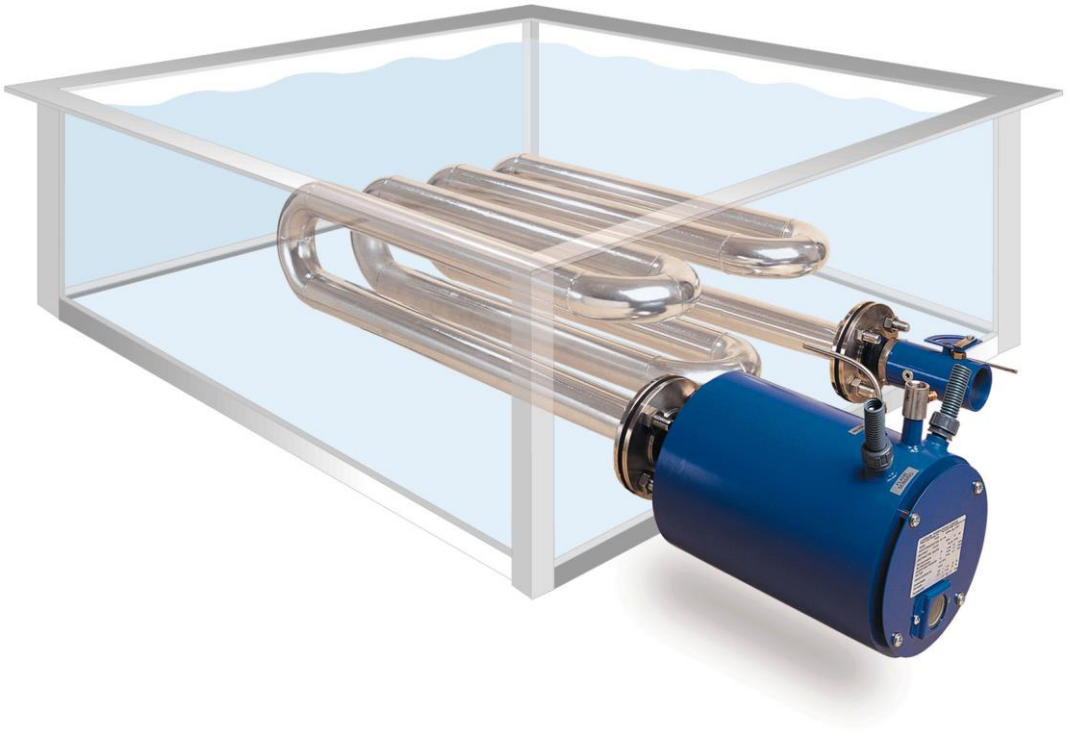
LANEMARK
COMBUSTION ENGINEERING

PROCESS BURNERS

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. This burner is protected by patents.

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

TX TANK HEATING SYSTEM JOB No J***

CUSTOMER :

END USER :

BURNERS : TXN NATURAL GAS BURNER**

If this manual was sent out with an actual burner (or several burners built to the same specification) a duplicate Burner Data Plate will be included on this page. This will give the actual burner :-

Serial Numbers
Gas Type (Natural or Propane)
Electrical and Gas Train Specification
Burner Head Pressure Setting
Fan Motor Supply Voltage Required

SERIAL NO. J*****- 1

MODEL TX20N

FUEL TYPE NATURAL GAS

HEAT INPUT 70 **kW**

BURNER HEAD PRESSURE 8.0 **mbar**

MANUFACTURED MM/YY

SUPPLY GAS TEMP	15	**ºC**	**SUPPLY AIR TEMP.**	15	**ºC**
MAXIMUM HEAT INPUT	80	**kW**	**MINIMUM HEAT INPUT**	27	**kW**
GROSS CALORFIC VALUE	39.911	**MJ/Nm3**	**NET CALORIFIC VALUE**	35.947	**MJ/Nm3**
MAXIMUM INLET PRESSURE	100	**mbar**	**MINIMUM INLET PRESSURE**	20	**mbar**
GAS VALVE TRAIN TYPE	KROMSCHRODER VCD1		**DRAWING NO.**	56791	
ELECTRICAL WIRING DIAGRAM NO.	64559				

INCOMING SUPPLY	230V	**V**	1	**PH**	50	**Hz**		
CONTROL SUPPLY	230	**V**	1	**PH**	50	**Hz**	**FLC** 3	**A**
FAN SUPPLY	400	**V**	3	**PH**	50	**Hz**		
FAN POWER & FLC	2.2	**kW**	4.4	**A**				

SERIAL NO. J***** - 1

MODEL TX20N

FUEL TYPE NATURAL GAS

HEAT INPUT 70 **kW**

BURNER HEAD PRESSURE 8.0 **mbar**

MANUFACTURED MM/YYYY

SERIAL NO. J***** - 1

MODEL TX20N

SUPPLY VOLTAGE 230 **V**

MANUFACTURED MM/YYYY

INFORMATION ONLY

If this manual was sent out with an actual burner a copy of the :-

- Declaration of Conformity
- Declaration Of Incorporation for Partly Completed Machinery..
- Test Certificates.
- Calibration Certificates.
- Certificates for equipment supplied by Lanemark Combustion Engineering Ltd but not manufactured by Lanemark.

will be included after this page if specifically requested by the Customer's order.

LANEMARK
COMBUSTION ENGINEERING

Declaration of Conformity

QAF 06-34

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

Reference/ Serial No. J*****

Issued by: Lanemark Combustion Engineering Limited

Object of Declaration: TX**N NATURAL GAS BURNER

Customers Name:

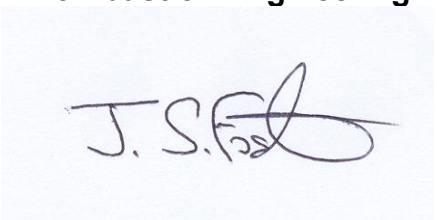
Purchase Order/ Reference:

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

Reg. No. 567424

LANEMARK
COMBUSTION ENGINEERING

Declaration of Incorporation For Partly Completed Machinery
QAF 06-35

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

Reference/ Serial No. J*****

Object of Declaration: TX**N NATURAL GAS BURNER

Customers Name:

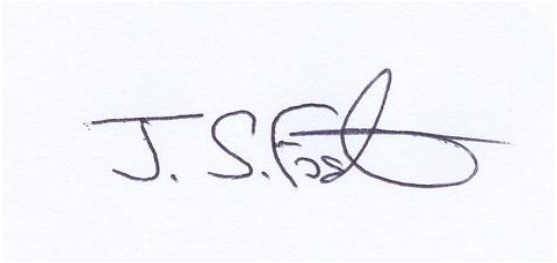
Purchase Order/ Reference:

LANEMARK COMBUSTION ENGINEERING LIMITED

Herby declares that the object of declaration identified above is in accordance with the relevant safety and health requirements of the EC Council Directive on Machinery.
It must be installed and commissioned in accordance with our customer installation and maintenance instructions.
We further declare that the equipment identified above as the object is intended to be incorporated into other equipment/machines to constitute machinery.
Our product must not be put into service until the assembled machinery has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC.

Additional Information: If applicable:

Signed for and behalf of:
Lanemark Combustion Engineering Limited



Name/ function: Managing Director

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SECTION 1 GENERAL DESIGN

BRIEF BURNER SPECIFICATION

Lanemark Combustion Engineering Ltd TX gas fired immersion tube heaters are designed for high efficiency fluid heating in industrial tanks, baths, vats, etc. Each system comprises of an induced draught gas burner firing into a small bore tube heat exchanger immersed in the fluid. The smallest model, the TX15 fires into pipe size nominally 1 ½" (40 mm) and the largest model, the TX60 into pipe size 6" (150 mm).

The heat exchangers are individually computer designed and manufactured by Lanemark (or others to our design), to ensure maximum efficiency and process flexibility and so achieving the minimum process operating costs. Minimum efficiencies of :-

80.0 % (gross calorific value)
90.0 % (net calorific value)

are achievable. The heat exchanger passes through the wall of the tank and is sealed by a flange and gasket. Due to the low initial heat release at the tank connection fibreglass or rubber lined tanks may be used. The burner body mounts onto one end of the heat exchanger and a flue damper to the other. The flue damper is then connected on site to the inlet of the centrifugal flue fan which may serve one or several TX burners.

The burners are available for both Natural Gas and L.P.G Propane Gas and fuel only is controlled to effect an accurate turndown.

The control panel contains the burner programmer unit, on/off switch and all controls necessary including a 3 way air valve which allows the burner to be applied to installations where the exhaust fan runs continuously.

The burners are supplied with 230V or 110V controls and fan motors are generally 3 phase 380-415 V. The fan motor can be energised from the burner control box via an isolator, contactor and motor protection provided by others. Alternatively the fan can run continuously, independently of the burner control panel, using the appropriate interlocks especially if one fan serves several burners.

TX control panels can be supplied to serve a single or multiple burners as required.

SHIPPING CONTENTS

The burner is shipped in a single heavy duty cardboard box with an infill of polyurethane foam. Fans are transported on a wooden pallet and shrink wrapped over or similar.

CONSTRUCTION STANDARDS

The burners are generally constructed in accordance with :-

EN 676 : Automatic Forced Draught Burners For Gaseous Fuels.

EN 746 Part 1: Common Safety Requirements For Industrial Thermoprocessing Equipment

EN 746 Part 2: Safety Requirements For Combustion And Fuel Handling Systems Of Industrial Thermoprocessing Equipment

As these burners are intended to be incorporated into another machine or system they are supplied with a Certificate of Incorporation for Partly Completed Machinery as required by the Machinery Directive 2006/42/EC and are not CE marked as burners for hot water or steam boilers.

GENERAL DESIGN CONSIDERATIONS

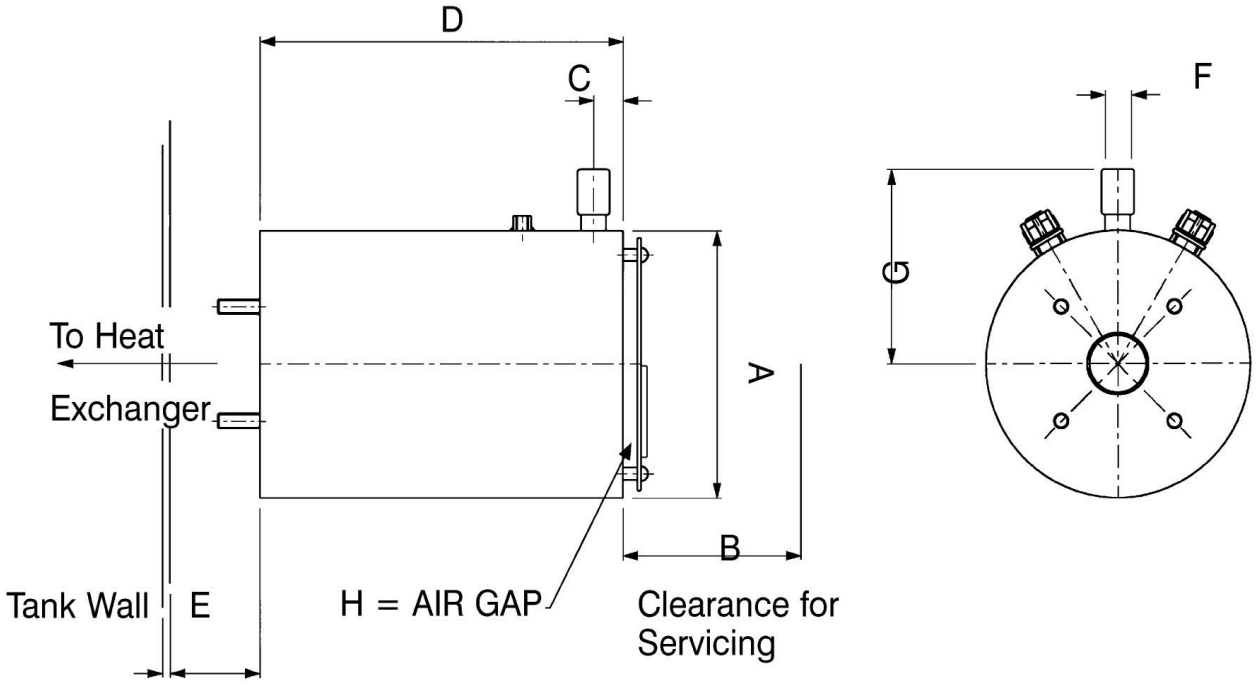
The burner must be installed in accordance with the following regulations :-

I.E.E Regulations (BS7671)
Local Gas Service Area Recommendations
BS5440 Part 1 Specification For Installation Of Flues
BS5440 Part 2 Specification For Installation Of Ventilation For Gas Appliances
BS6644 Installation Of Gas Fired Boilers Between 60kW And 2MW
British Gas IM/30 Code Of Practice For Gas Fired Process Plant
British Gas IM/11 Flues For Commercial And Industrial Gas Fired Boilers And Air Heaters
British Gas IM12 Use Of Gas In High Temperature Plant
British Gas IM/18 Use Of Gas In Low Temperature Plant
LPGA COP9 LPG Air Plant
LPGA COP17 Purging LPG Vessels And Systems
IGE/UP/1 Soundness Testing And Purging Of Industrial And Commercial Gas Installations
IGE/UP/4 Commissioning Of Gas Fired Plant On Industrial And Commercial Premises
IGE/UP/2 Gas Installation Pipe work, Boosters And Compressors On Industrial And Commercial Premises

INSTALLATION

It is UK Law that these burners are installed, commissioned and maintained by competent persons e.g. GAS SAFE registered installers with ACS Certification only. In other countries local regulations must be complied with.

Fig 1 TX GENERAL DIMENSIONS



MODEL TYPE:	DIMENSIONS (in mm, except where stated).							
	A	B	C	D	E	F	G	H
TX 15 TX20	220	150	40	305	75	½" BSP	160	12
TX25E TX30	295	225	50	450	75	1" BSP	210	25
TX40	295	300	50	500	100	1 ½" BSP	230	25
TX60	405	320	120	625	100	2" BSP	305	35
TX80	405	320	60	625	100	2" BSP	354	35

Fig 2 TX EXPLODED VIEW

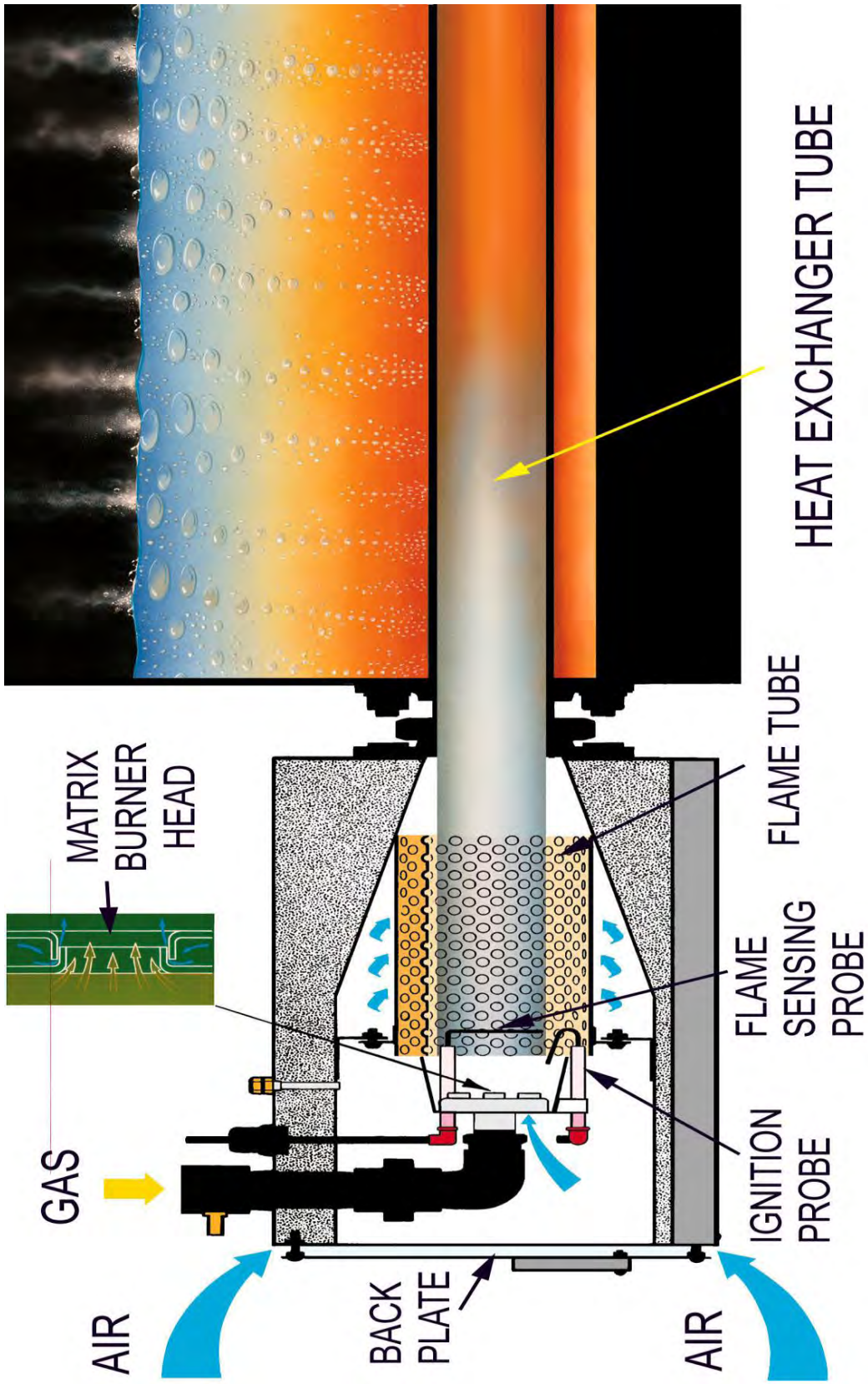
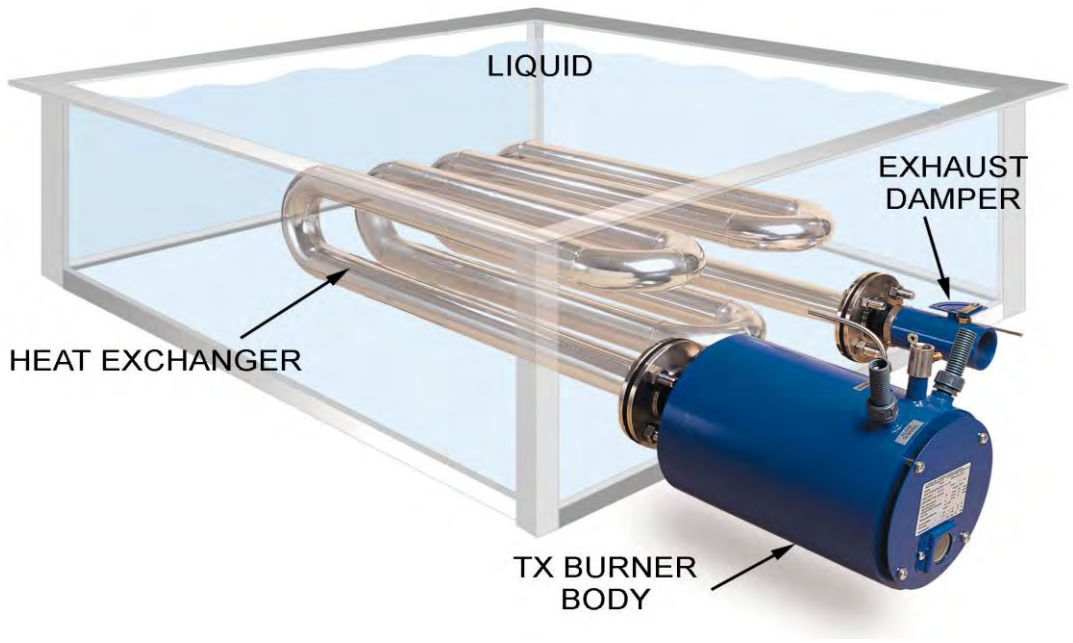
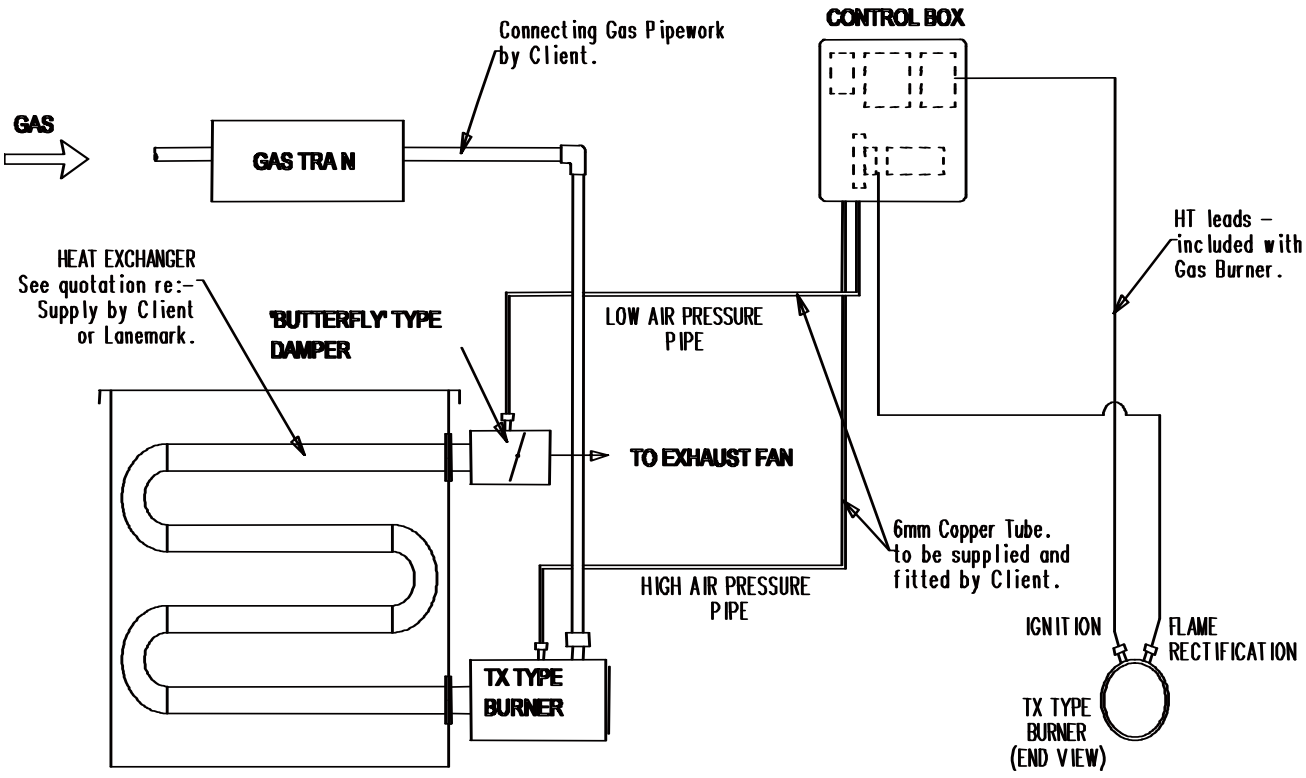


Fig 3 GENERAL ARRANGEMENT OF INSTALLATION





HEAT EXCHANGER DESIGN

The burners are suitable for direct firing into tubes ranging from 1 ½" (40 mm) up to 6" (150 mm) heat exchangers depending on the design.

Section 2 of this manual contains details of the heat exchanger design and application.

FAN EXHAUST DAMPER

The air flow through the burner which is fundamental to the safe and efficient combustion of the fuel gas is controlled by a flue damper which is supplied by Lanemark.

This damper is shown in Fig 4 and it should be installed as shown with the 6 mm fitting for the air flow pressure sensing pipe facing upwards so this 6 mm pipe does not fill with condensation.

The damper is screwed onto the parallel thread on the exit end of the heat exchanger and fixed by a back nut.

Sufficient clearance should be allowed around this damper for Service Engineers to gain access to the butterfly adjusting bolt head and also to the flue gas test sampling point.

EXHAUST PIPE FROM DAMPER TO FAN

This flue connection (see Fig 3) should be made in fabricated steel heating pipe typically in a size one pipe size larger than the flue damper size.

The flue damper should be connected to the fan inlet in solid steel pipe which is normally welded.

Sufficient break flanges should be included so that it is possible to remove the fan. For multiple burners sharing a common fan, individual dampers will be connected into a common manifold.

The size of the final pipe connection and the fan inlet flange must be the same size. The final piece of pipe must be a straight run of minimum length 500 mm. Lanemark would be pleased to advise on the design of the manifold.

If, however it is decided to use a clip together flue system it must be gas tight against 25 mbar suction at up to 300 °C for the life of the system when subject to vibration, condensation etc. Domestic boiler spiral wound flexible flue liner pipe is an unsuitable material for this flue run.

FLUE FROM SEVERAL DAMPERS TO A COMMON EXHAUST FAN

This will again be run in fabricated steel pipe as previous. The size will be that which maintains the collective cross sectional area of all the branches that tee into it. Tees should be swept in and not at right angles. As a rule of thumb the hot flue gas velocity should not exceed 20 m/s.

EXHAUST FLUE FAN

This exhaust flue fan will generally be supplied by Lanemark and may serve a single or multiple burners.

The fan is generally supplied as an R90 type using the Fan Industries standard system for describing the geometry of the fan outlet relative to the inlet. Other configurations e.g. L90 can be supplied to special order. The fan and its impeller are mild steel but other materials e.g. stainless steel can be supplied to special order. The drawing in Fig 5 and its table of dimensions shows a typical fan with motor electrical data and approximate weights.

The standard fan must be installed with its pedestal on the ground or a suitable support. Only special side mounting versions can be installed on their side.

FLUE SYSTEMS

The flue from the exhaust fan will typically be a twin wall insulated stainless steel system suitable for the flue gas temperature of up to 300 °C. Domestic boiler type spiral wound flexible flue liner pipe is unlikely to be suitable material for this application. Lanemark always recommend that the flue terminate outside the building and sufficiently high above the roof to be in a downdraught free zone. If this is not possible see Section 14 " Health and Safety " on this aspect. The flue pipe must never be smaller than the fan outlet socket which is non load bearing and the flue should be rigidly connected and the joint sealed.

For some installations Local and National Government Departments should be contacted for approval to discharge flue gas and this is the responsibility of the installer.

If the flue is to be finished with a flue cap it should be a simple Chinaman's cap or similar that offers minimal resistance to the escape of the high velocity flue gas. A free length of 150 to 200mm to the underside of the cap is typical.

For all flue designs (especially designs where the hot flue gas passes to a second heat exchanger or a dry off stage) Lanemark Combustion Engineering would be pleased to comment on the suitability of the design.

TEMPERATURE CONTROLLERS

Generally the burner is a *high to low* to *off* burner. The burner should be commissioned such that low fire is not sufficient to maintain the tank temperature. Then the main high flame will be brought in intermittently to maintain the set point.

It is anticipated that a digital electronic temperature controller will be supplied either by Lanemark as an optional accessory or by the installer.

This controller should have a set point and an additional alarm stage. The set point contacts will switch the burner down from high fire (full output) to low fire. The alarm stage will then switch the burner from low fire to all off should the tank temperature continue to creep upwards. It will then bring it back on once the temperature has fallen below the setpoint again.

This controller can be a simple set point controller with fixed differentials for high/low/off burners. On/off gas valves should not be switched more than 4 times a minute.

Where the thermal response of the system is relatively slow due to the large quantity of liquid being heated a simple dual mechanical thermostat could be used.

Alternatively modulating burners may have been specified and a full 3 term P.I.D controller can be used as required to suit the characteristics of the application. A control signal of 0(4) – 20 mAmp, 0(2) – 10 V dc or 3 wire direct valve positioning can be specified.

It is recommended that consideration be given to fitting a second totally independent temperature controller. This may be necessary if the liquid being heated is cooking oil or similar. This will act as a High Temperature Trip Thermostat (Policeman Thermostat). Once its set point has been exceeded the burner is held off until manual intervention occurs to reset it.

See the wiring diagram for details of the temperature controller connection. The Technical Department of Lanemark would be pleased to receive electrical and control installation drawings for comment.

LIQUID LEVEL PROTECTION

In addition to the temperature control a suitable float switch, ultrasonic liquid detector or similar should be used to protect the burner from firing into a heat exchanger that is not fully covered by the liquid.

This liquid level detector could be automatic reset if the tank has an automatic filling system and should be connected into the burners control circuit in a similar way to the temperature controller.

VENTILATION SYSTEMS

The burner should only be installed in a production area with sufficient natural or mechanical ventilation to ensure that there is adequate fresh air for complete combustion and adequate extract to maintain an acceptable working environment.

The burner should not be installed in an area where there is a high level of powered mechanical extract but only natural ventilation inlet air. With such a combination the mechanical extract system may starve the burner of combustion air.

For suggested values for natural and mechanical ventilation see BS6644.

Where the air supply quality cannot be ensured consideration should be given to ducting fresh air in from outside.

PROTECTION OF BURNER SYSTEMS

The burner control panel and the gas train are manufactured to IP54 with regard to their protection against water and dust. This standard is sufficient for most commercial applications.

If the burner area is to be washed down with a hose pipe, or if the burner is to be used in an area with excessive condensation, or subject to tanks overflowing or similar, then the gas train and controls must be protected from the ingress of any water and liquid.

If the air is very contaminated with chemicals or dust then the burner should have its air for combustion vented in from a source of fresh clean air.

Lanemark can supply equipment to higher IP standards, equipment manufactured from stainless steel for food preparation areas and with connections for fresh air ducts.

ELECTRICAL SUPPLY

The burner is available with either :-
230V 1 Phase 50 Hz or 110V 1 Phase 50 Hz
controls & gas trains as given on the Burner Data Plate (a duplicate is included in the front of this manual).

The single phase 230V or 110V control panel supply should be made into the control panel through a M20 cable gland from a suitable isolator and fused supply. The cable should be run in cable of sizes suitable for the panel load of 250 VA . All cable should be suitable for a service temperature of 60 degrees centigrade.

THIS BURNER MUST BE EARTHED

The exhaust fan(s) will generally be supplied by Lanemark Combustion Engineering Ltd. The fan motor power and the full load current will be contained on the Data Plate a copy of which is in the front of this manual if this manual was sent out with a burner.

The fan must be adequately earthed using either the earth terminal in the motor terminal box or the earth stud on the motor casing.

The fan should have an independent isolator, motor protection device, contactor with an auxiliary contact provided by others. Alternatively Lanemark would be pleased to supply this as an optional extra.

The fan can run continuously from the main plant control panel. The burner must only run when the fan is running and stop immediately if the fan motor overload trips. An auxiliary contact on the motor overload should be interlocked to the burners own control panel. See the wiring diagram details.

Alternatively the fans motor contactor can be energised from the burners own control panel as shown in the wiring diagram.

All electrical installations should be in accordance with I.E.E Regulations (BS7671).

Output signals are available from the burners control panel, at 230V AC or 110V AC as appropriate for burner ON HIGH / ON LOW / AT LOCKOUT.

Time switches and ON/OFF switches should be connected as shown in the wiring diagram and temperature controllers as discussed later.

Main motor control panels must never backfeed electrically into the Lanemark control panel. If several burners are installed on a common system they must not backfeed each other electrically .

Isolating or 110V transformers must be end and not centre tapped.
The burner control box may have depending on the model over/under voltage protection and will not run if the supply voltage is incorrect.

Remote reset of control box ***lockout*** is possible by briefly applying a 110V or 240V input reset signal or pulling the reset terminal down to neutral briefly as appropriate for the box type. Use the burner's own Data Plate to identify the correct wiring diagram and check this for the applicable method of reset.

GAS SUPPLY GENERAL

Before the burner is connected to a new or existing gas supply the Local Gas Supply Service Provider must be consulted to ensure that the gas meter and supply are of adequate size for the load required.

The burner gas train includes an isolating ball valve and union to allow the burner to be isolated and removed for servicing and a coarse filter.

The pipe work final connections should be made such that it is possible to isolate the gas supply and remove the burner for servicing without removing any gas pipe work. Consideration may be given to making the final connection in an armoured flexible gas hose that complies with current standards.

The gas supply pipe work should be designed and installed in accordance with the standards listed previously.

GAS SUPPLY: NATURAL GAS

A stable gas supply pressure supply of:-

20 mBar (8 in.wg) minimum inlet pressure
100 mBar (14 in.wg) maximum inlet pressure

is required with the burner(s) running and if the supply is a medium pressure supply, or above the maximum required, an additional gas regulator should be installed.

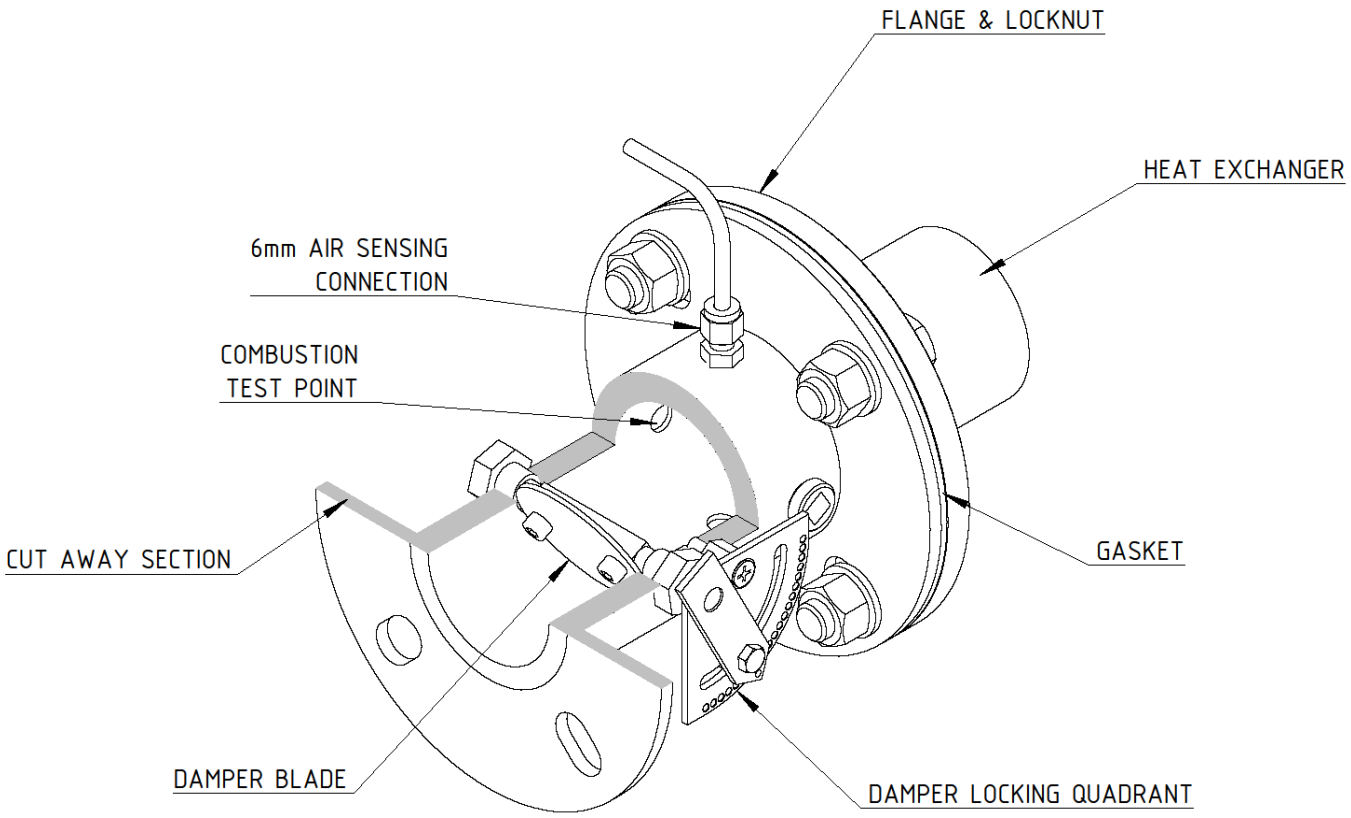
GAS SUPPLY: PROPANE GAS

The burner should be connected to a Propane supply of sufficient capacity so that at full out put the draw off rate of the storage system and its regulators is not exceeded. This burner should not be used on Propane/Butane or Propane/Air mixtures. A stable supply pressure of:-

35 mBar (14 in.wg) minimum inlet pressure
100 mBar (20 in.wg) maximum inlet pressure

is required with the burner(s) running and if the supply is above the maximum required an additional gas regulator should be installed. Low and high pressure cut offs with vents must be fitted and care taken in the design to prevent governor lockup or nuisance trip of these cut offs.

Fig 4 FLUE EXHAUST DAMPER



IMPORTANT: The damper assembly should be installed as shown with the 6 mm air sensing connection pointing upwards (to prevent condensation blocking it) and with sufficient clearance all around to allow Service Engineers access to set the damper quadrant and to use the combustion test point.

Fig 5 GENERAL ARRANGEMENT OF EXHAUST FAN

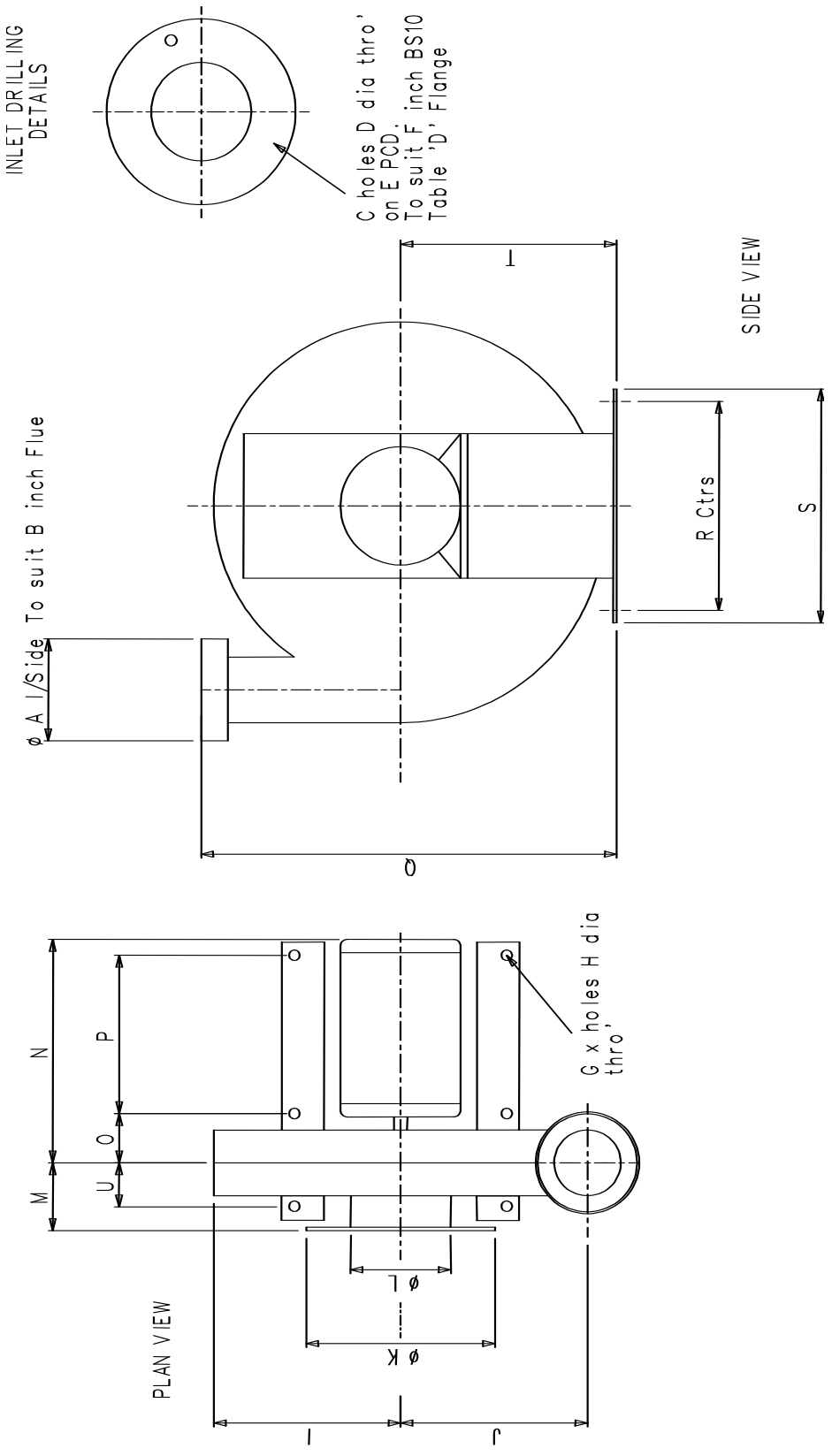


Fig 5 TABLE OF DIMENSIONS FOR FAN

FAN MODEL	A	B inch	C No. Off	D	E	F inch	G No. Off	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	WEIGHT Kg	MOTOR POWER kW	MOTOR F.L.C Amp
12/030	130	5	4	17	178	4	4	16	260	260	220	100	86	311	57	191	574	267	305	286	--	36	0.75	1.5
12/125	130	5	4	17	178	4	4	16	266	266	220	100	86	311	63	191	577	267	305	286	--	36	1.1	2.2
12/200	155	6	8	17	235	6	4	16	280	276	283	150	103	340	75	241	623	318	356	324	--	42	1.5	2.9
24/150	155	6	8	17	235	6	4	16	343	343	283	150	86	356	63	241	761	318	356	394	--	52	2.2	4.2
24/300	210	8	8	17	235	6	4	16	352	352	283	150	103	416	75	241	790	318	356	415	--	75	4.0	7.3
24/400	210	8	8	17	235	6	6	16	365	362	283	150	114	491	146	225	792	362	406	413	79	105	5.5	10.2
24/600	260	10	8	17	292	8	6	16	375	375	336	216	127	457	114	216	815	362	406	432	102	144	7.5	13.0
30/150	155	6	8	17	235	6	4	16	368	368	283	150	86	364	63	241	806	318	356	414	--	74	4.0	7.3
30/300	210	8	8	17	235	6	4	16	378	378	283	150	103	448	75	292	835	368	406	438	--	96	5.5	10.2
30/400	210	8	8	17	292	8	6	16	387	387	336	200	114	491	146	225	840	362	406	438	79	112	7.5	13.0
30/600	260	10	8	17	292	8	6	16	400	400	336	216	127	581	166	268	865	425	470	457	102	187	11.0	20.0

NOTE: All fan motors are 3 phase 380-440v 50 Hz (Eurovoltage) running at approx. 3000rpm unless Alternatives specified.

Any fuses or circuit breakers fitted in conjunction with the electrical motor starter, should be of sufficient rating to carry the starting current of the motor. Generally they should be rated at 2.5 times load current for star-delta starting and 6.5 times full load current for direct on line starting.

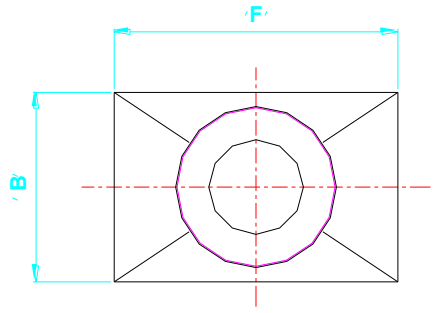
Failure to adequately rate these devices may result in single phasing and therefore damage to the motor, particularly in installations that require frequent starting.

If on first starting the unit rotates in the wrong direction, this can be corrected in the case of three phase motors by changing over any two of the three mains supply leads.

If wired star- delta the motor will run up slowly and this may be a problem with some Honeywell & Siemens burner controllers that allow only 5 seconds for the motor to run to speed and detect the air pressure being generated. The Honeywell DMG970 & Siemens LME21.350 fitted to most TRX & TX burners will wait for 30 seconds and a separate delay timer is not required.

All dimensions are in mm’s apart from those nominal diameters given in inches.

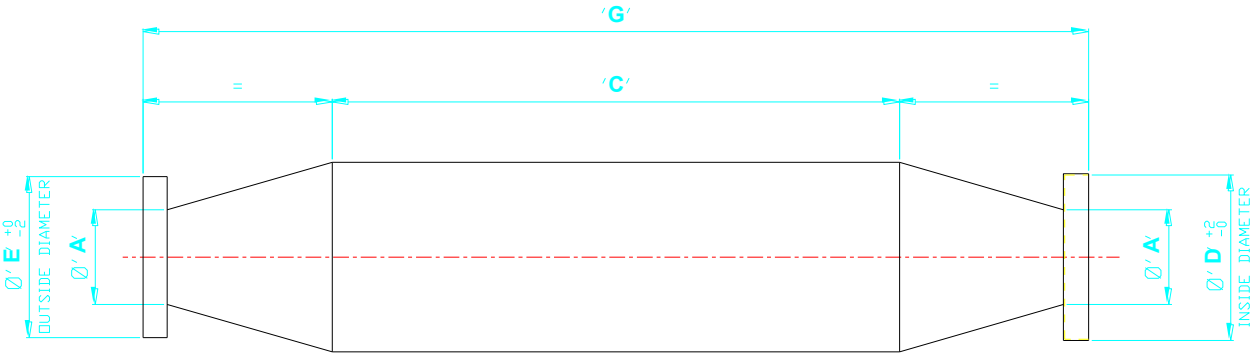
Fig 5 TABLE OF DIMENSIONS FOR SILENCERS



END VIEW

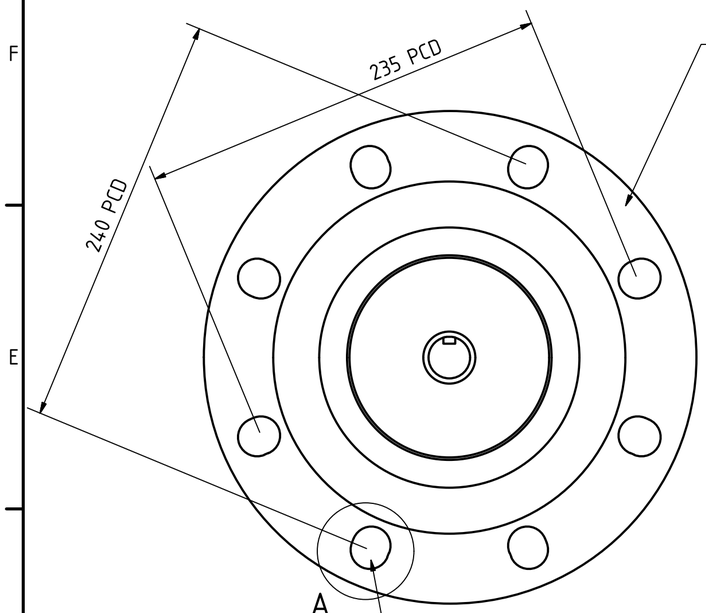
MATERIAL:-
OUTER CASE 16g (1.6mm) FULLY WELDED
INNER FACES 22g (0.7mm) GALVANISED PERFORATED SHEET

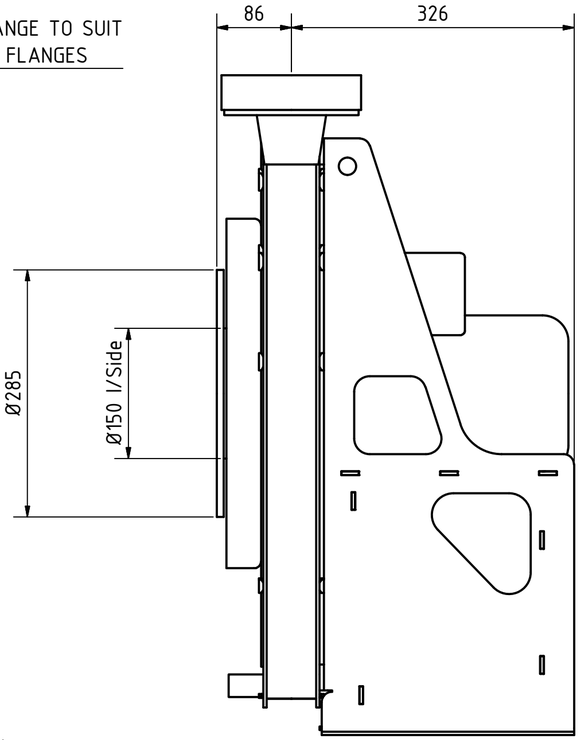
FINISH:-
HEAT RESISTANT BLACK PAINT

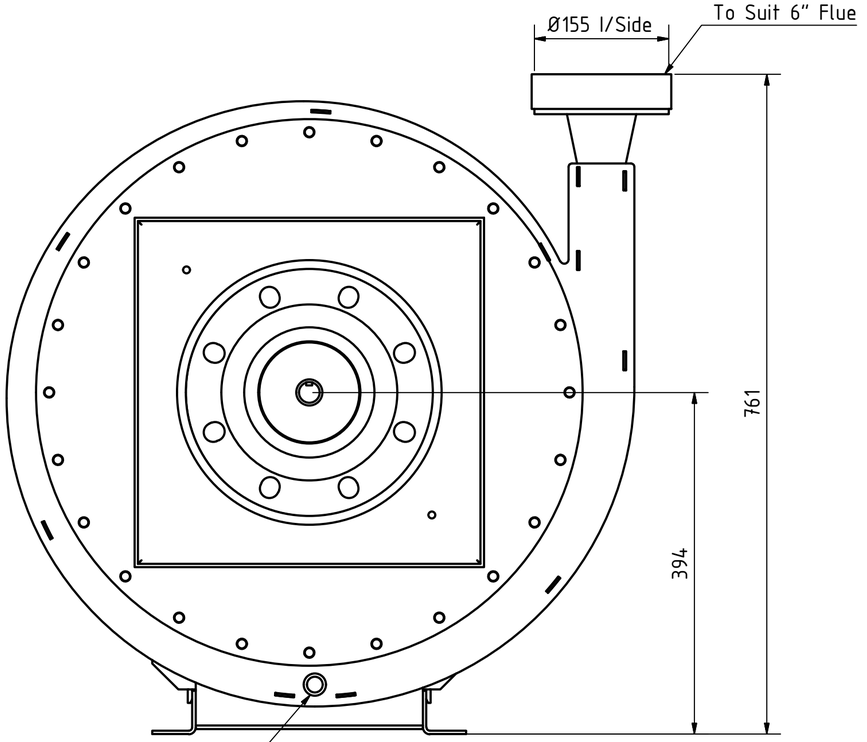


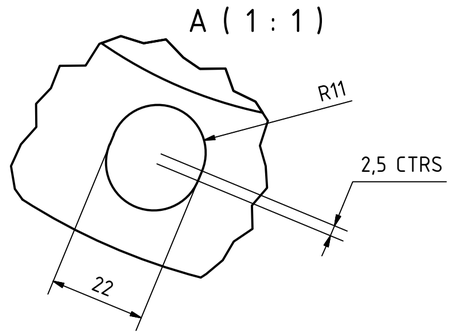
SIDE VIEW

FAN TYPE	PART NO.	A	B	C	D	E	F	G
12/030DF	80082	50	300	600	130	127	300	1200
12/125DF	80083	75	300	600	130	127	300	1200
12/200DF	80084	102	300	600	155	150	300	1200
24/150DF	80086	75	300	600	155	150	300	1200
24/300DF	80087	102	300	900	210	205	300	1500
24/400DF	80089	102	300	900	210	205	300	1500
24/600DF	80090	150	300	900	260	255	450	1500
30/150DF	80091	75	300	600	155	150	300	1200
30/300DF	80092	102	300	900	210	205	300	1500
30/400DF	80093	125	300	900	260	255	450	1500
30/600DF	80094	125	300	900	260	255	450	1500

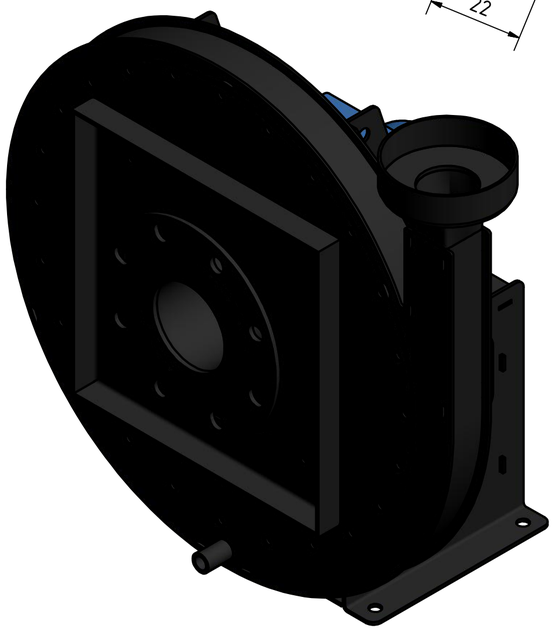




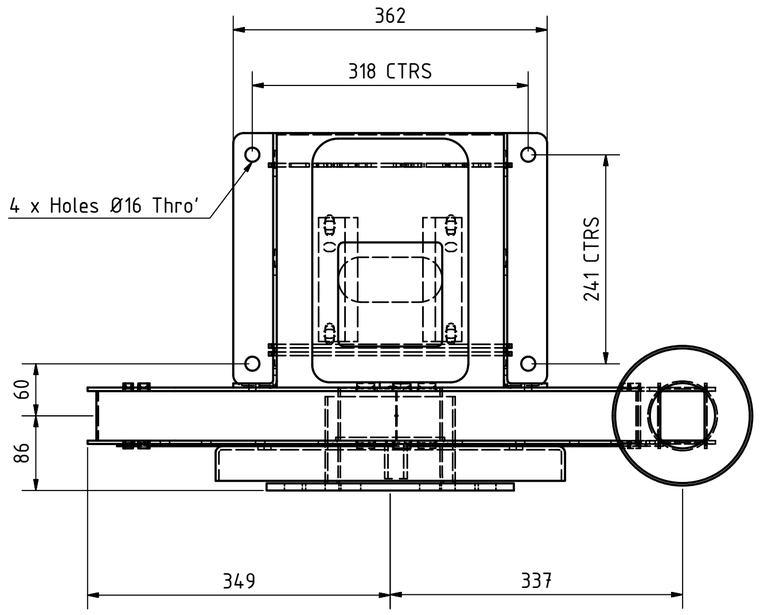




INFORMATION ONLY



Specification:
2.2kw WEG Motor
Speed 2870RPM
Supply:
400V/3ph/50Hz - FLC 4.4 Amps
Motor Frame 90L
Motor IP55 IE3
Fan Duty: 595 m^3/h
Pressure: 60mbar @ 16°C
Weight: 84Kg



DRAWING No: 81 004

ISSUE	DESCRIPTION	DATE	BY
9			
8			
7			
6			
5			
4			
3	INLET FLANGE CHANGED TO SUIT BS & DIN FLANGES; WEG MOTOR	01/04/2015	AJS
2	ADDITIONAL FAN SPECIFICATION ADDED	12/09/2012	CPW
1	FIRST	14/03/2011	CPW

DIMENSIONS ARE IN mm AND DEGREES
TOLERANCE AS STATED OR ±
DRAWING SCALE (1 : 5)
PAPER SIZE A2

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DRAWN BY: CPW
DATE: 14/03/2011
CHECKED BY: AET
DATE: 01/04/2015
ISSUE: 03

Do Not Scale Print
PROJECTION
This is a 1st angle drawing

TITLE: UNIVERSAL EXHAUST FAN
MODEL 24/150DF
ORIENTATION R90

PROJECT No: 223QZ
DRAWING No: 81 004
SHEET 1 OF 1

SECTION 2 HEAT EXCHANGER DESIGN

HEAT EXCHANGER DESIGN

The burners are suitable for direct firing into tubes ranging from 1 ½" (40 mm) up to 6" (150 mm) depending on the application.

Figure 1 shows a typical flange mounted and plate mounted heat exchanger tube. *Figure 2* and *Figure 3* show the detail of the flange mounting and the support of the heat exchanger within the tank. Plate mounted heat exchangers are similar.

Normally the heat exchangers are manufactured by others to principal dimensions supplied by Lanemark Combustion Engineering Ltd or our official agents. If the heat exchanger is supplied by Lanemark there are some general considerations that should be taken into account.

The heat exchangers are suitable for direct firing by a Lanemark TX gas burner only with :-

Internal pressure	100 mbar negative max'
Internal wall temperature	300 °C maximum
External pressure	0.5 bar max' open tank
External temperature	150 °C maximum
Internal Test Pressure	2 bar for 30 minutes.

The heat exchangers tubes supplied by Lanemark are manufactured to our own internal standards and suitable for the above application but are not designed and manufactured to a specific heat exchanger or pressurised piping system design code. Full constructional details are available on request.

If the heat exchanger is to be used as an integral part of a coded heat exchanger or piping system then Lanemark should be contacted at the design stage to ensure compliance with that code.

The heat exchanger material will generally be BS1387 *medium* grade steel heating pipe but for aggressive applications other materials such as stainless steel Grade 316L Schedule 10 or other suitable materials may be used.

The length of the first leg of a multipass heat exchanger must be at least 10 to 15 pipe diameters and normally the first bend must be a long radius bend as determined by the Lanemark *TX Calc Design Software*.

The initial heat release into the heat exchanger is quite low and fibreglass or rubber lined tanks may be used.

The heat exchanger is generally situated as close to the tank bottom as possible and the top of the top tube must be covered by at least 100 mm of liquid.

The heat exchanger must not come into contact with sludge and sufficient space must be allowed beneath the heat exchanger to allow for any sludge to accumulate.

Similarly scale or debris must not be allowed to form upon the heat exchanger.

The heat exchanger must be protected from accidental damage when the work pieces are immersed into the tank. A suitable guard should be included if there is any possibility of such damage occurring.

The heat exchanger must be supported if the length is sufficient to warrant this. The heat exchanger has a tendency to ***float*** upwards when filled with hot flue gas. A suitable support arrangement is shown in *Fig 3* that allows for some but not excessive movement of the heat exchanger.

The heat exchanger must be protected from running when the tank liquid level is insufficient to cover it and a low liquid level protection device should be fitted.

The liquid temperature will have to be controlled and a thermostat or digital temperature controller is normally fitted into the tank inside a pocket so that this device can be replaced without draining the tank.

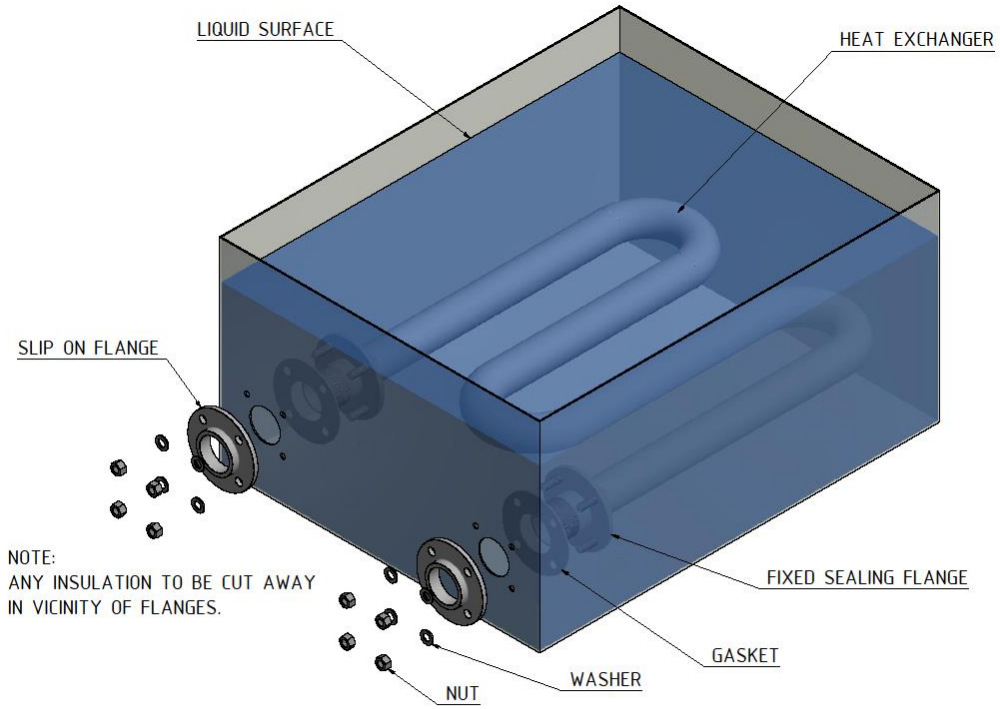
A single butyl rubber gasket is normally used to seal each flange to the tank and is used on the inside of the tank. For most commercial applications butyl rubber gaskets are satisfactory but the suitability of this should be checked at the design stage and if necessary PTFE or other gasket materials can be supplied.

If the tank is manufactured from stainless steel a second gasket is used on the outside face to prevent the mild steel slip on external flange causing a rust stain on the stainless steel. This is generally a butyl rubber gasket.

HEAT EXCHANGER DESIGN DRAWINGS

If this manual was supplied with the burner on a project where a heat exchanger was designed by Lanemark, a copy of the heat exchanger drawing will be included in this section of the manual showing the principal dimensions.

Fig 1 FLANGE AND PLATE MOUNTED HEAT EXCHANGERS



FLANGED CONNECTION TO TANK

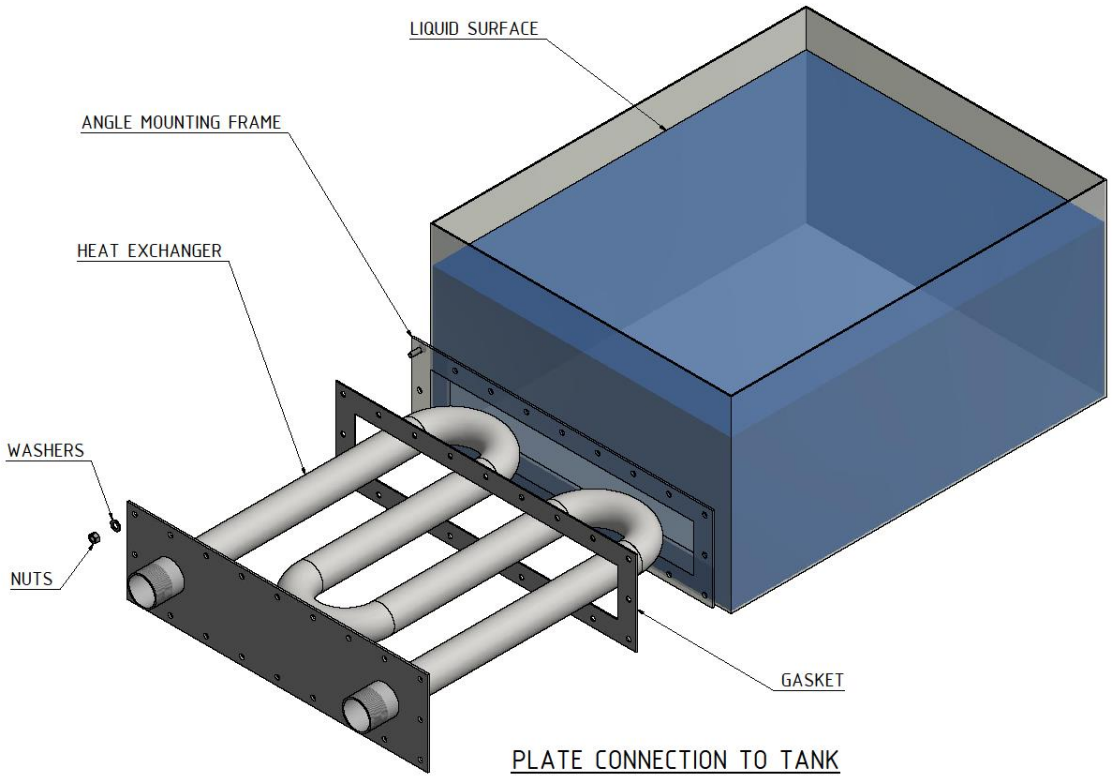
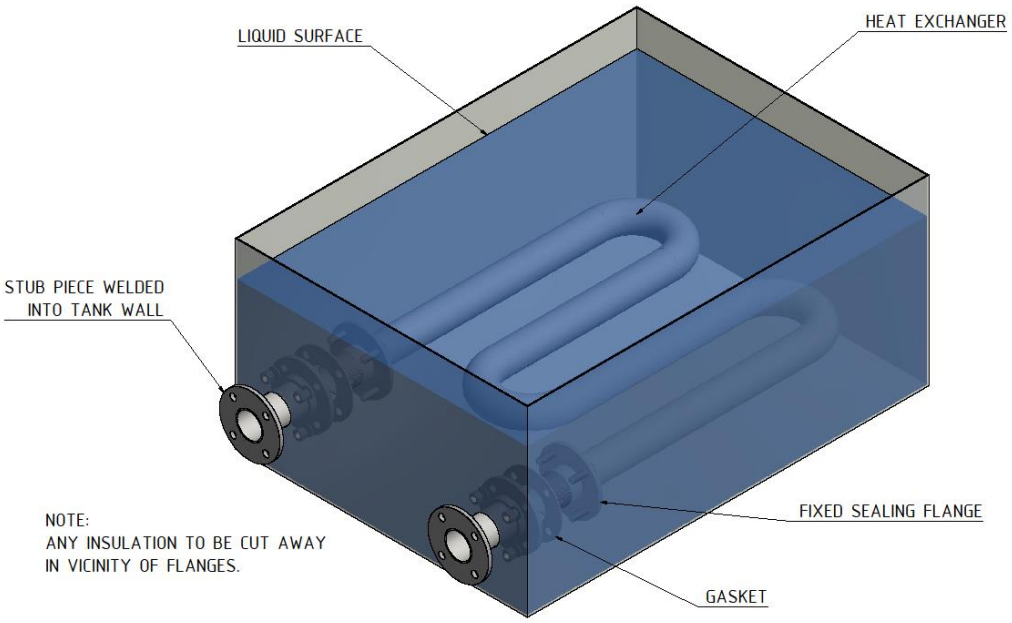
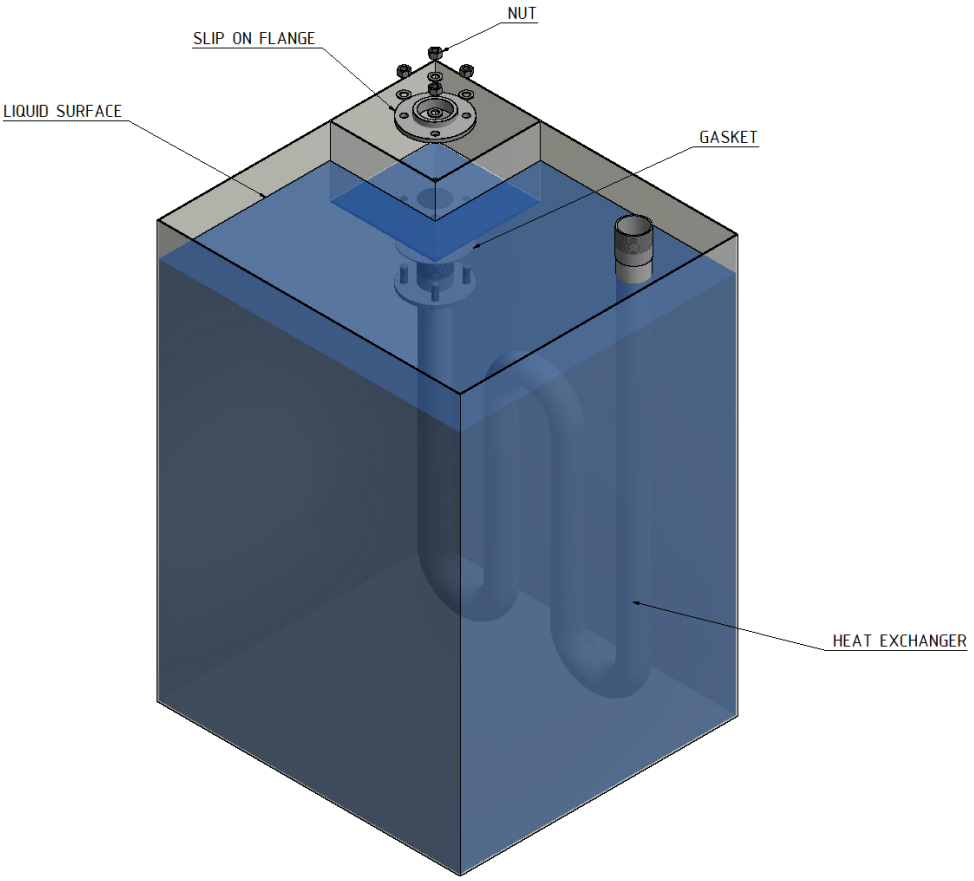


PLATE CONNECTION TO TANK

Fig 2 STUB MOUNTED AND DOWNFIRING HEAT EXCHANGERS

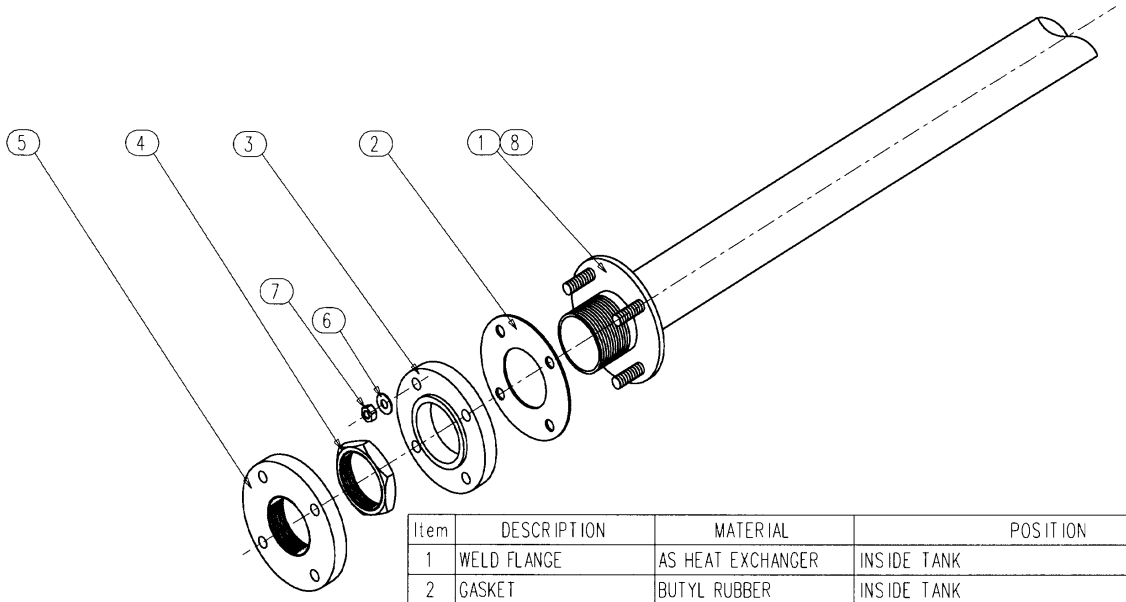


STUB CONNECTION TO TANK



DOWNFIRING CONNECTION TO TANK

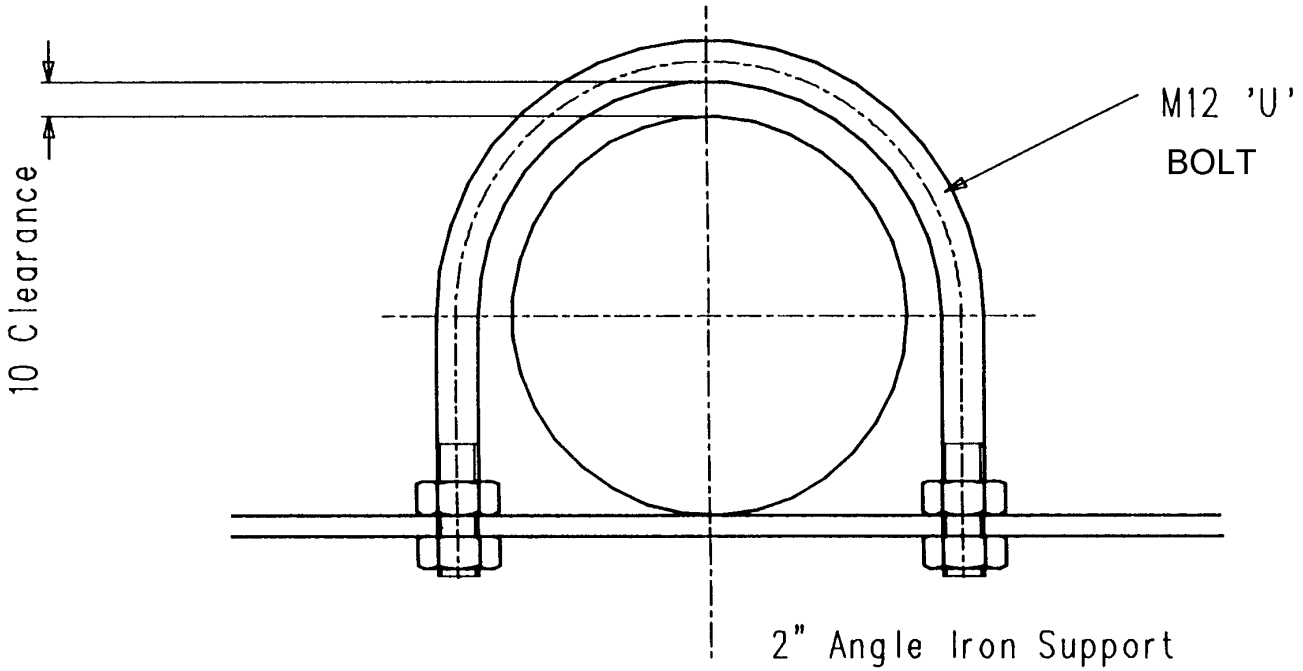
Fig 3 HEAT EXCHANGER FLANGE MOUNTING DETAIL



Item	DESCRIPTION	MATERIAL	POSITION
1	WELD FLANGE	AS HEAT EXCHANGER	INSIDE TANK
2	GASKET	BUTYL RUBBER	INSIDE TANK
3	SLIP ON FLANGE	Mild Steel *	OUTSIDE TANK WALL
4	LOCKNUT	Mild Steel *	TO LOCK SCREWED FLANGE IN POSITION
5	SCREWED FLANGE	Mild Steel *	TO ATTACH TX BURNER IN POSITION
6	WASHER	Mild Steel *	ON M16 BOLT
7	M16 NUT	Mild Steel *	ON M16 BOLT
8	M16 x 50 BOLTS	AS HEAT EXCHANGER	WELD TO FLANGE

* If required the Material may be the same as the Heat Exchanger

Fig 4 HEAT EXCHANGER SUPPORT



SECTION 3 CONTROL PANEL DESIGN

CONTROL PANEL

The control panel supplied by Lanemark is generally designed to suit each individual customers requirements with regard to :-

Voltage 110V / 230V
Burner Controller (Satronic / Siemens /Honeywell)
Temperature controller
Fan motor control
Interface to gas train
Gas train modulation control

The burner can be supplied with :-

1. Standard steel control box containing burner programmer and all parts required to supervise the burner only. A polycarbonate control box is available as an option.

2. Full steel control cabinet including motor control, time switches, temperature control etc.

3. Local junction box containing only those parts that must be situated immediately adjacent to the burner (burner programmer not included).

4. No controls by Lanemark (supplied by others).

Generally I*tem 1* the standard steel control box is supplied and this is interfaced to the customers own main control panel (where applicable).

Figure 1 shows the general layout of this panel which will contain :-

On / Off / Lockout Reset switch
Control fuse
Din Rail terminals to suit
Burner control programmer
Ignition transformer
3 way air valve
Air pressure switch

And if the application requires it :-

Temperature controller
Modulating gas valve transformer and interface
Time clock

INTERFACE WIRING DIAGRAM

Lanemark produce an *Interface Wiring Diagram* for each burner supplied. If this manual was despatched with a burner this manual will contain the correct *Interface* drawing in this section of the manual.

The important interface connections are :-

1 Main 1 phase supply (110V or 230V as specified) rated for a 250VA load.
2a Remote reset of *burner lockout* by a brief 110V / 230V input. The cable must be protected from induced voltages (see the specific drawing).
2b Alternatively the box's reset terminal may require pulling down to neutral to effect the reset (see the specific wiring drawing).
3. Fan auxiliary contact – a pair connecting to an auxiliary contact on the fan motor's contactor which will stop the burner immediately if the fan motor overload trips in operation.
4. Fan motor *call* signal to fan contactor's coil.
5. Remote burner ON lamp.
6. Temperature control Set Point " SP " (high to low fire switch).
7. Temperature control alarm point " AL " (low fire to off switch and time switches etc.).

If modulating gas valves are being used additional connections will be required to drive the modulating motor by a control signal and these should be connected with reference to the wiring diagram. Particular attention must be paid with 0-10 V dc or 4-20 mA signals in tying the neutrals (or grounds) together to complete the circuit.

Where several burners are connected back to a main control panel or share a single fan it is **IMPORTANT** that one burner's electrical interface connections do not backfeed to another burner.

Three more electrical connections are required :-

1 Connection to ignition probe on burner body.
2 Connection to flame sensing probe (or U.V cell).
3 Multicore connection to the gas train.

Lanemark premake these in 3 metre long PVC flexible conduit but disconnect them for transport. The terminals are labelled or numbered for reconnection on site.

Two 6mm steel or copper pipe connections are made to the control panel's air pressure switch from the burner body and the flue damper.

PANEL INTERNAL WIRING DIAGRAM

If this manual was despatched with a burner this manual will contain the correct *Internal Wiring Diagram* in this section of the manual.

The correct drawing number is given on each burner's Data Plate and a duplicate Data Plate is included in the front of this manual.

PANEL TECHNICAL INFORMATION

CABLE COLOURS		PROTECTION	
Power Wiring	Black	Degree of Enclosure Protection (IP Rating)	-
Neutral	White	CONTROL PANEL DETAILS	
Protective Conductor	Green/Yellow	Incoming Supply	230V 1PH 50HZ
Control Wiring	Red	Panel Isolator Rating (Amps)	20A
Removable Links	Bridging Bars	Full Load Current	-
Ignition Transformer Live	Brown	K.W Connected	-
Ignition Transformer Neutral	Blue	Control Voltage	230V 1PH 50HZ
Ignition Transformer Earth	Green/Yellow	Supply Type	-
1Phase Fan	Brown/Black	Control Panel Dimension	540x260x171mm
3Phase Fan	Brown/Black/Blue	COMPONENT DETAILS	
24VDC +	Violet	Temperature Controller Output Signal	-
24VDC -	Blue	Speed Controller Signal Required	-
Control Signal Positive	Yellow	Temperature Controller Sensor Type	-
Control Signal Negative	Green		
CONDUCTORS/TERMINATIONS			
Size of Power Wiring	2.5mm^2	COMMENTS	
Size of Control Wiring	0.75 mm^2		
Size of Power Terminals	5mm2/4mm2 through		
Size of Control Terminals	5mm2/4mm2 through		
Cable Entry Position	Bottom Entry		

INFORMATION ONLY

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01	FIRST	07.12.15	CPW

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TITLE:
CONTROL BOX WIRING
TX-230V-LME-HL-9-9-3-1-1
2-3-8

	DATE	NAME
Edit	26.11.15	CPW
Chec.	07.12.15	AJL

DRAWING No
64559

JOB No
-

SHEET No
1 OF 11

FILENAME D:\$VaultWorkingFolder\Designs\Electrical\64559\64559 - Sheet 01.dwg

SHEET	GRID REF	TAG NAME	DESCRIPTION 1	DESCRIPTION 2	DESCRIPTION 3
3	2-B	-Q1	ISOLATION	SWITCH	
3	2-E	-GND1	PROTECTIVE	EARTH	
3	5-B	-F1	PANEL	FUSE	
4	2-D	-K1	BURNER	RESET	
4	3-D	-K3	GAS	PRESSURE	FAULT VFC
4	4-B	-HGPS	HIGH GAS	PRESSURE	SWITCH
4	4-D	-K2	GAS	PRESSURE	FAULT
4	5-D	-H1	GAS	PRESSURE	FAULT
4	6-B	-LGPS	LOW GAS	PRESSURE	SWITCH
4	6-C	-S1	BURNER	ON/OFF	
5	5-A	-LME	SIEMENS LME21	BURNER	CONTROLLER
6	2-B	-APS	AIR	PRESSURE	SWITCH
6	3-D	-AV1	3 WAY	AIR	VALVE
6	8-D	-K4	BURNER	LOCKOUT	VFC
7	2-B	-F2	START	GAS VALVE	PROTECTION
7	2-D	-MV1	MAIN	GAS	VALVE 1
7	3-D	-SV1	START	GAS	VALVE 1
7	4-D	-H2	BURNER	RUNNING	
7	5-B	-F3	MAIN	GAS VALVE	PROTECTION
7	5-D	-MV2	MAIN	GAS	VALVE 2
8	2-D	-1	IGNITION & FLAME	SENSING	
8	3-B	-T1	IGNITION	TRANSFORMER	
9	2-C	-K5	24VDC	HIGH/LOW	CONTROL
9	3-C	-K6	24VDC	ON/OFF	CONTROL
9	4-C	-K7	24VDC	BURNER	RESET

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JOB No
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SHEET No
2 OF 11

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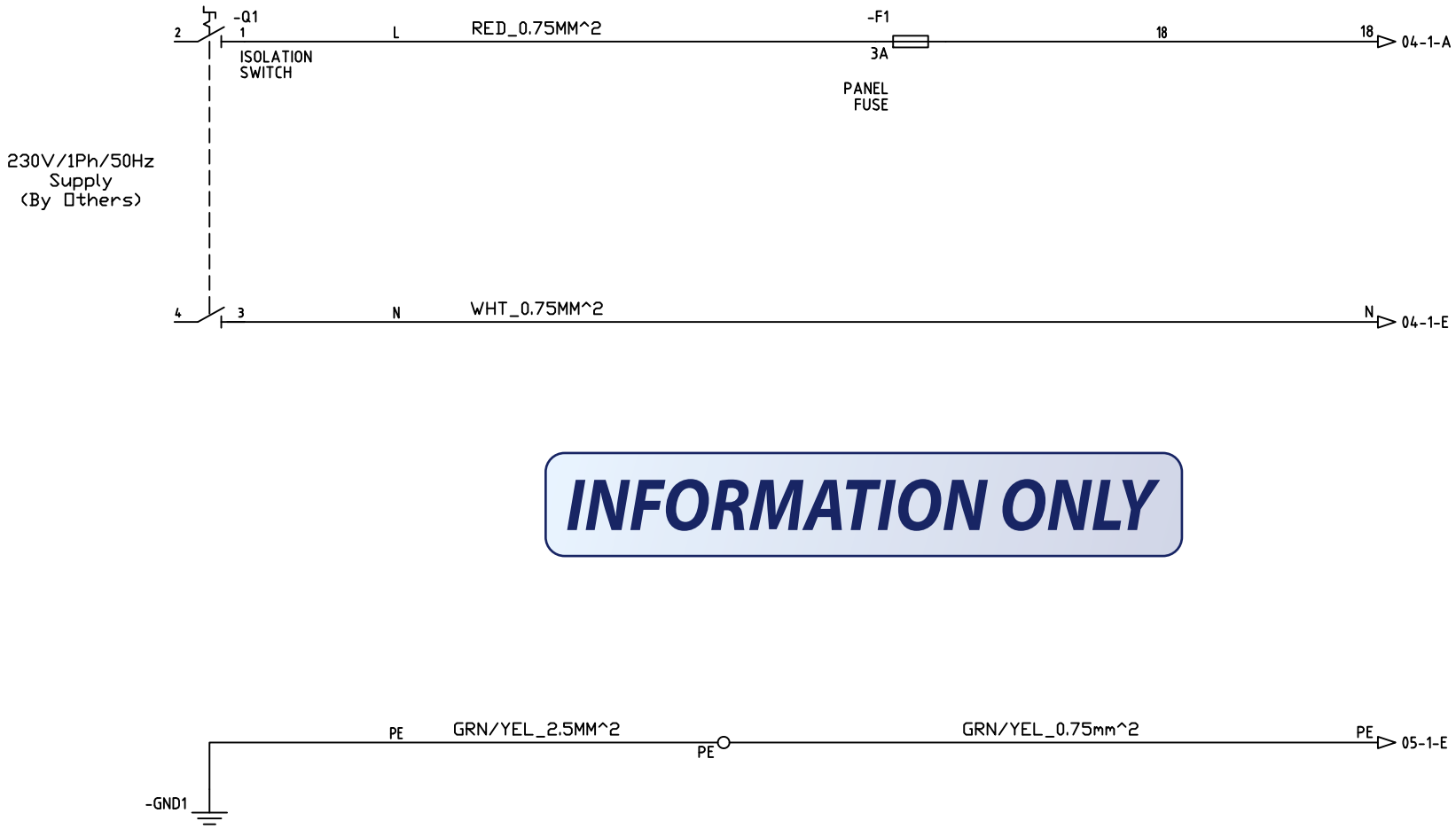

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JOB No
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SHEET No
3 OF 11

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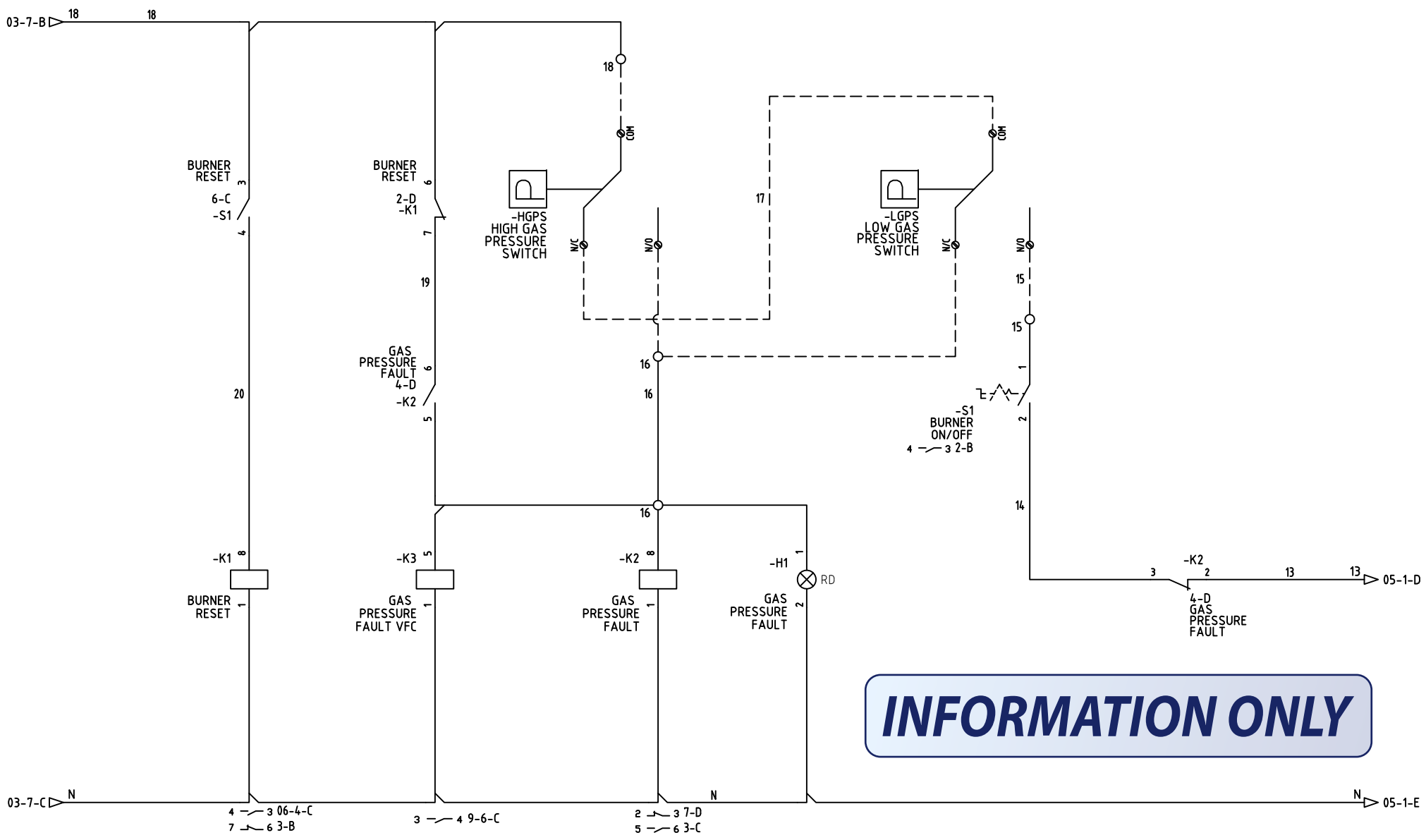

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4 OF 11

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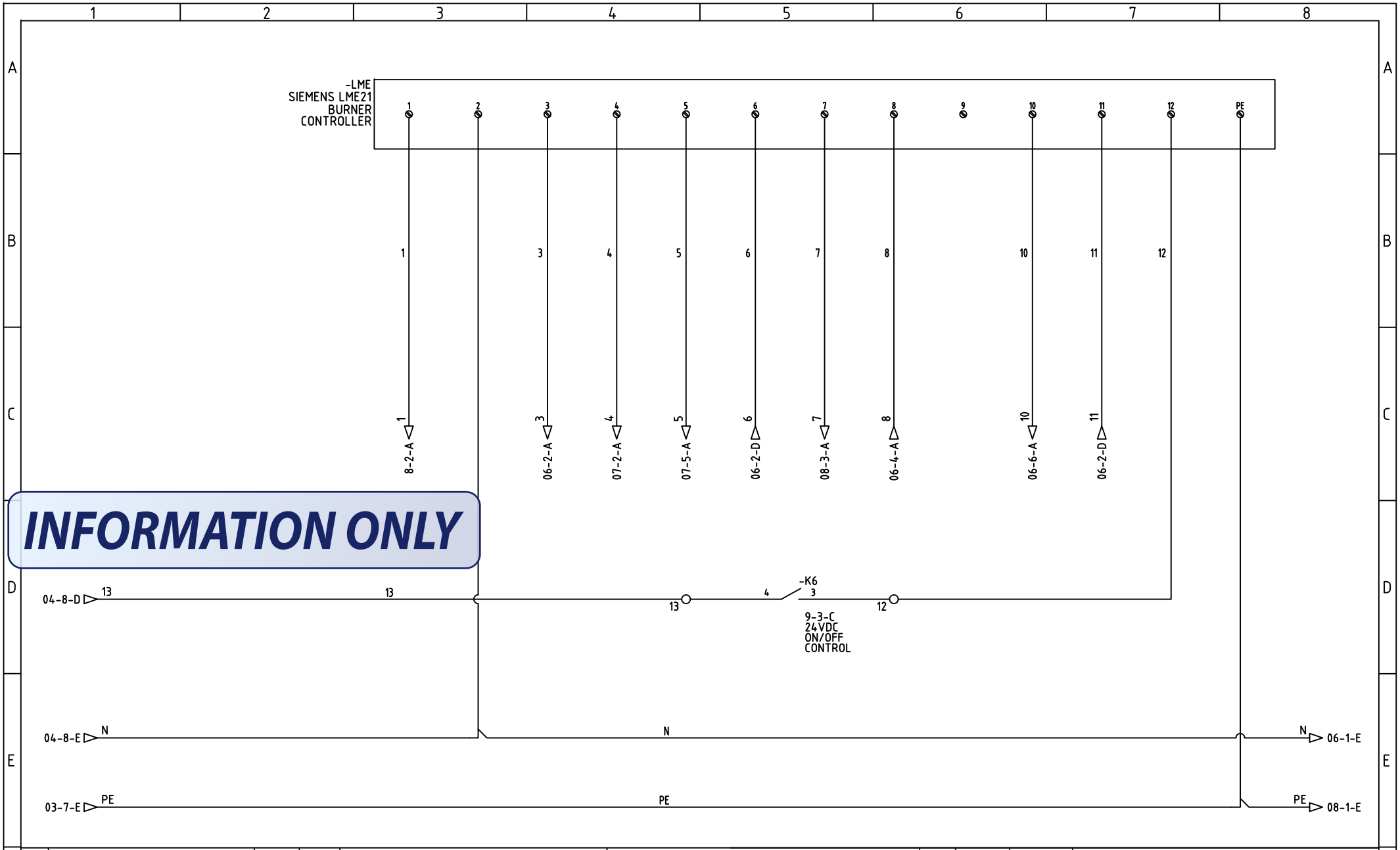

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JOB No
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SHEET No
5 OF 11

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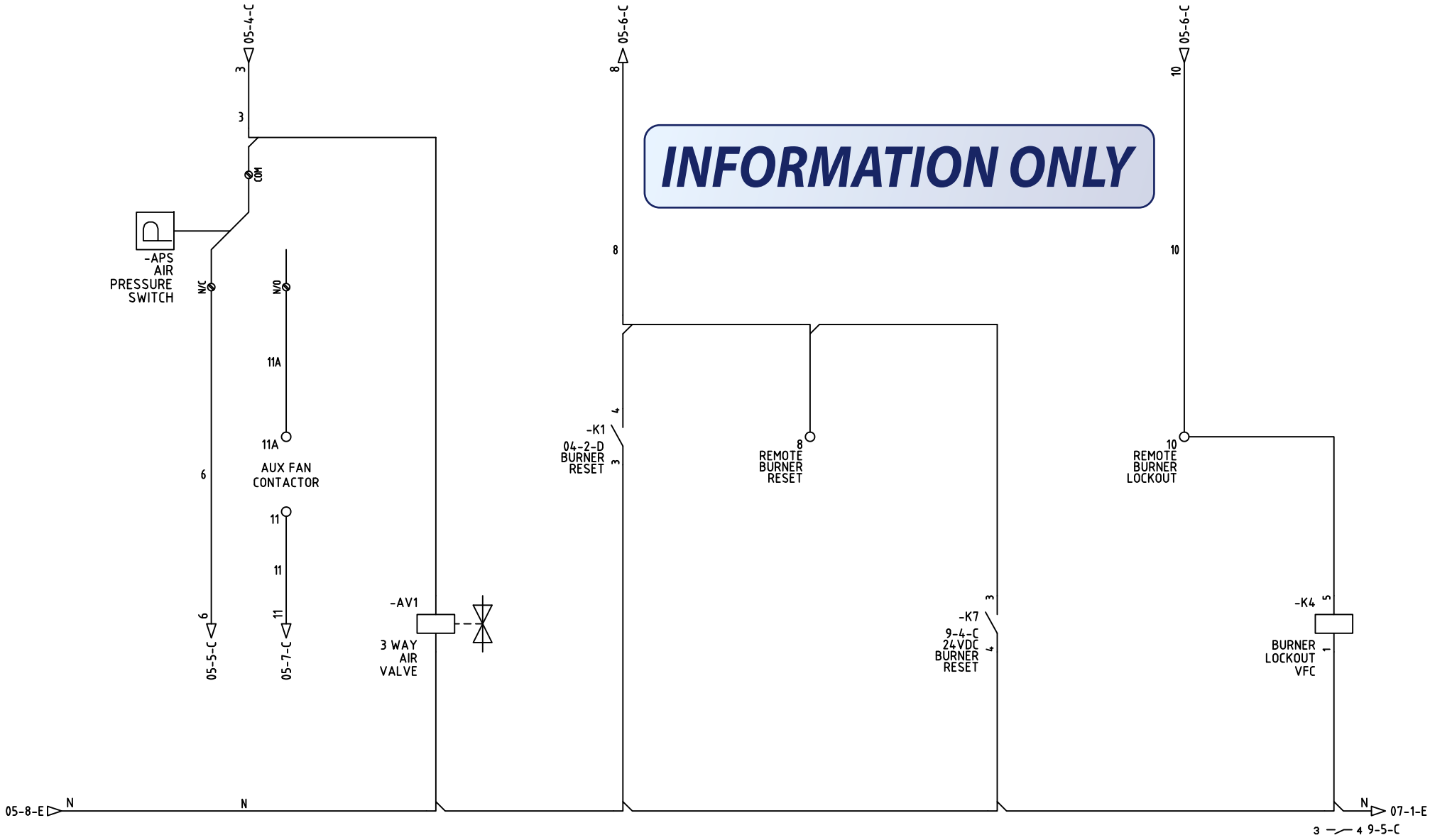

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JOB No
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6 OF 11

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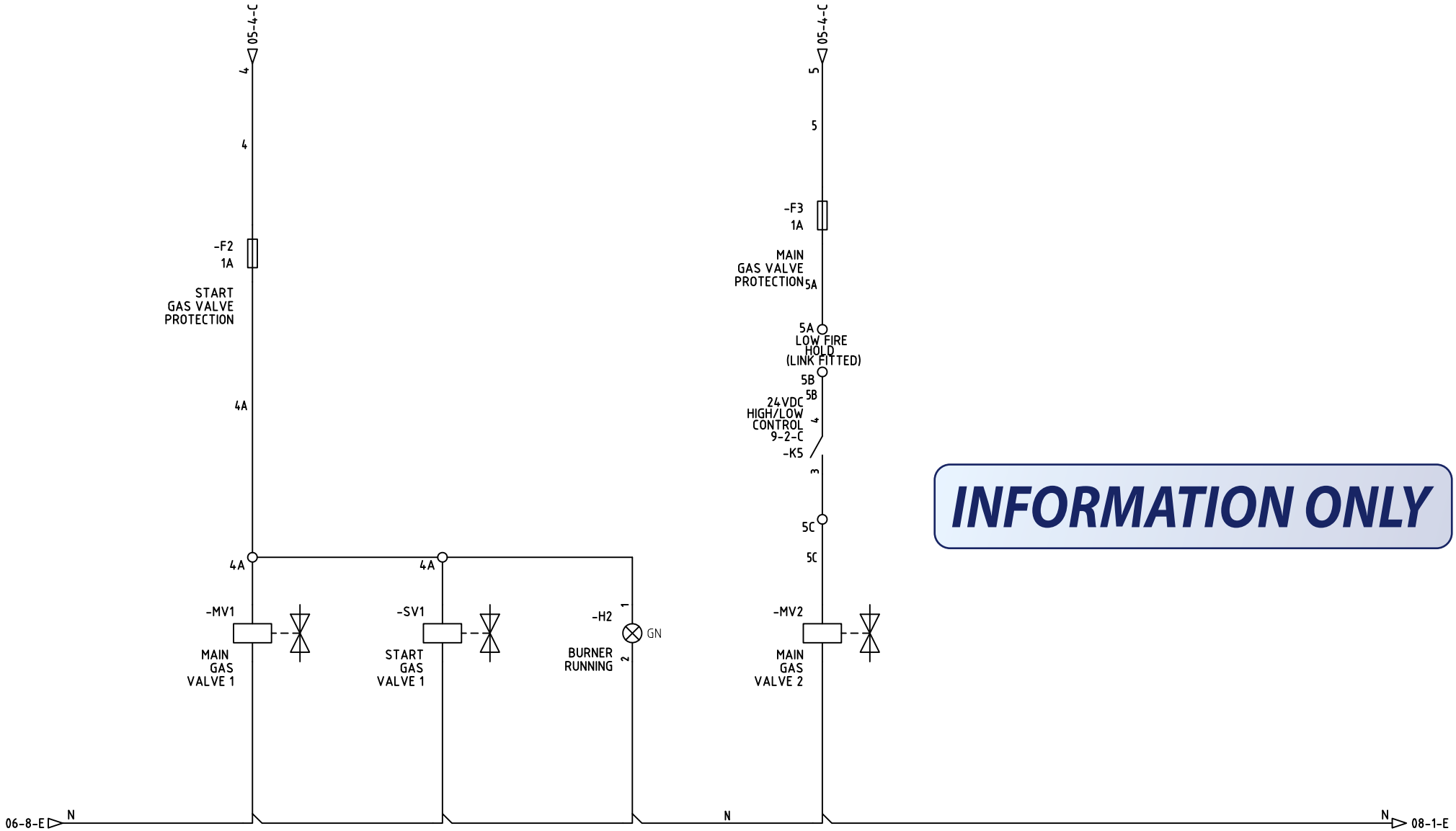

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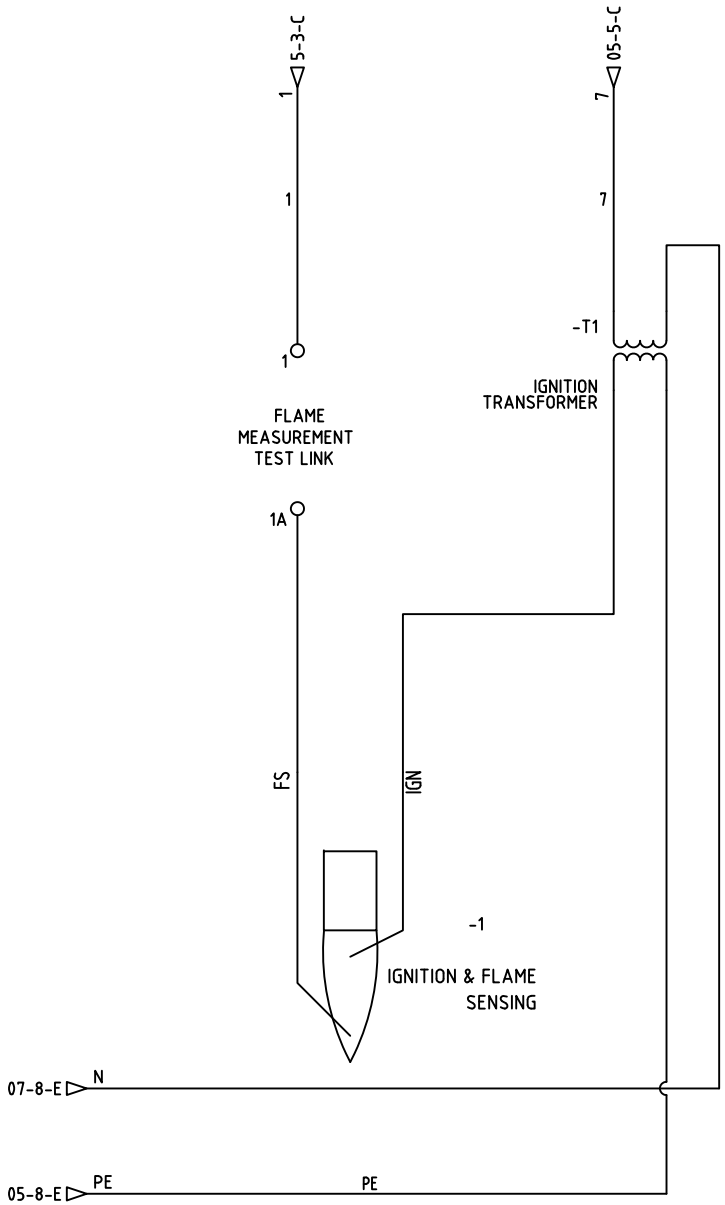

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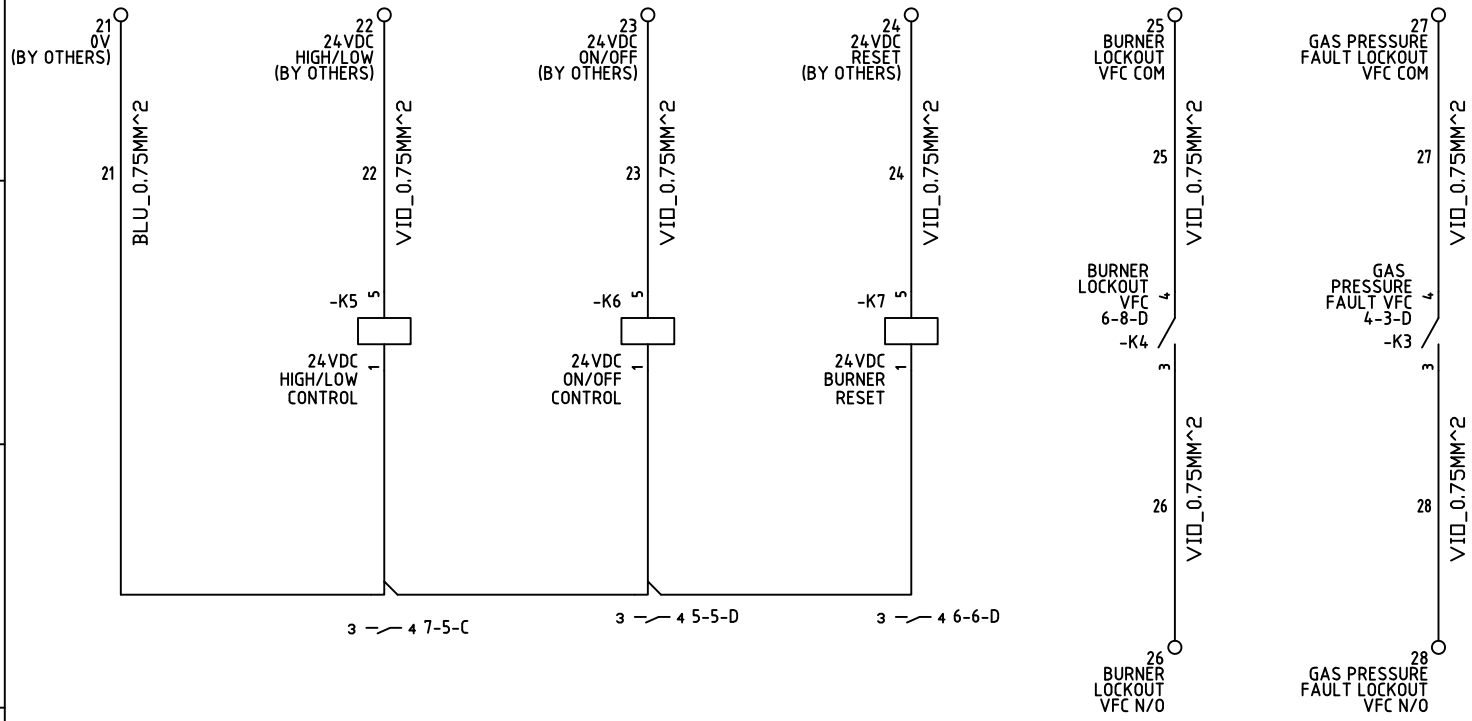
8 OF 11

FILENAME D:\$VaultWorkingFolder\Designs\Electrical\64559\64559 - Sheet 08.dwg



INFORMATION ONLY

No:	Revision	Date	By
01	FIRST	07.12.15	CPW

LANEMARK COMBUSTION ENGINEERING

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TITLE:
CONTROL BOX WIRING
TX-230V-LME-HL-9-9-3-1-1
2-3-8

	DATE	NAME
Edit	26.11.15	CPW
Chec.	07.12.15	AJL

DRAWING No
64559

JOB No
-

SHEET No
9 OF 11

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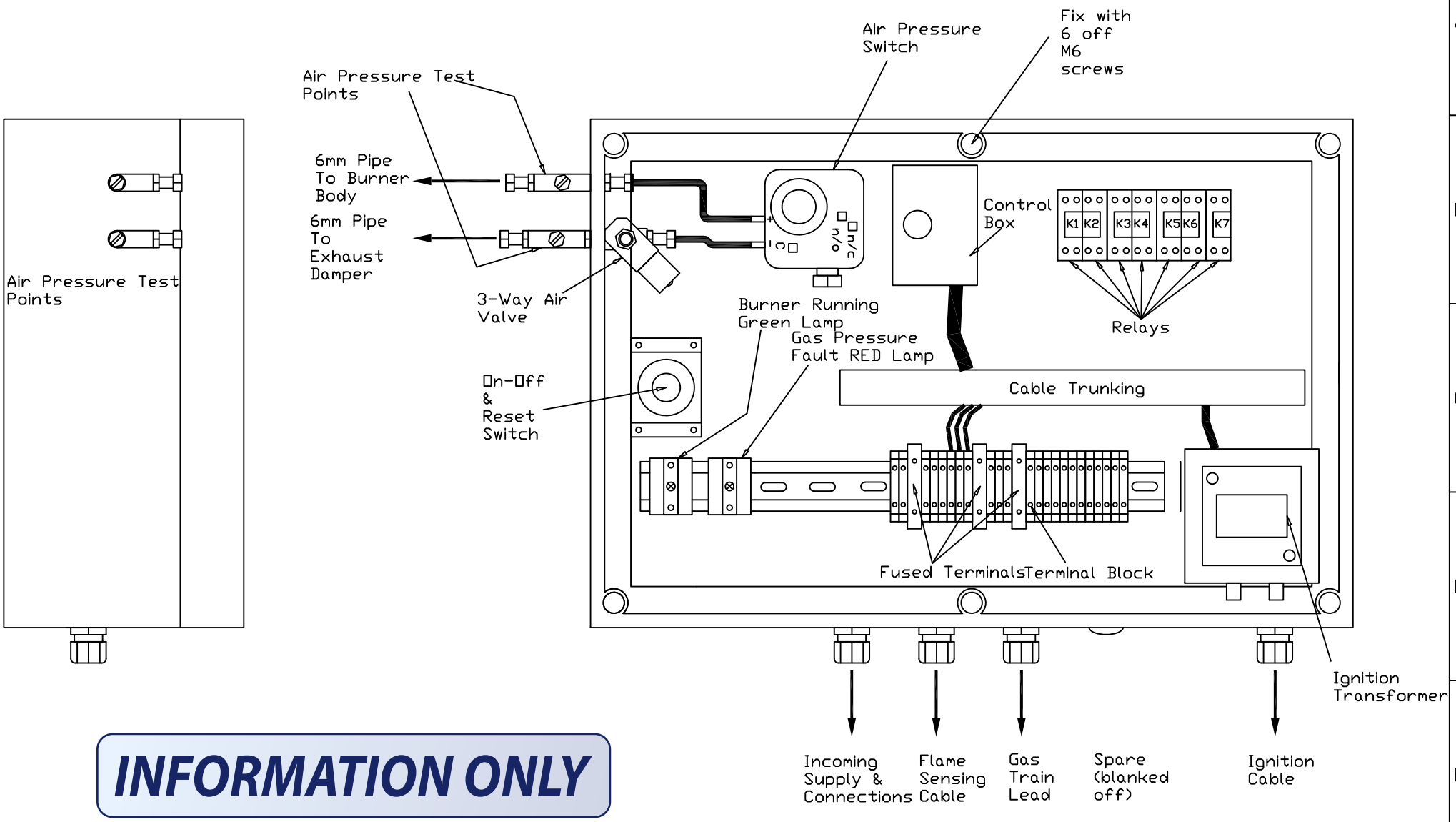

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2-3-8

	DATE	NAME
Edit	26.11.15	CPW
Chec.	07.12.15	AJL

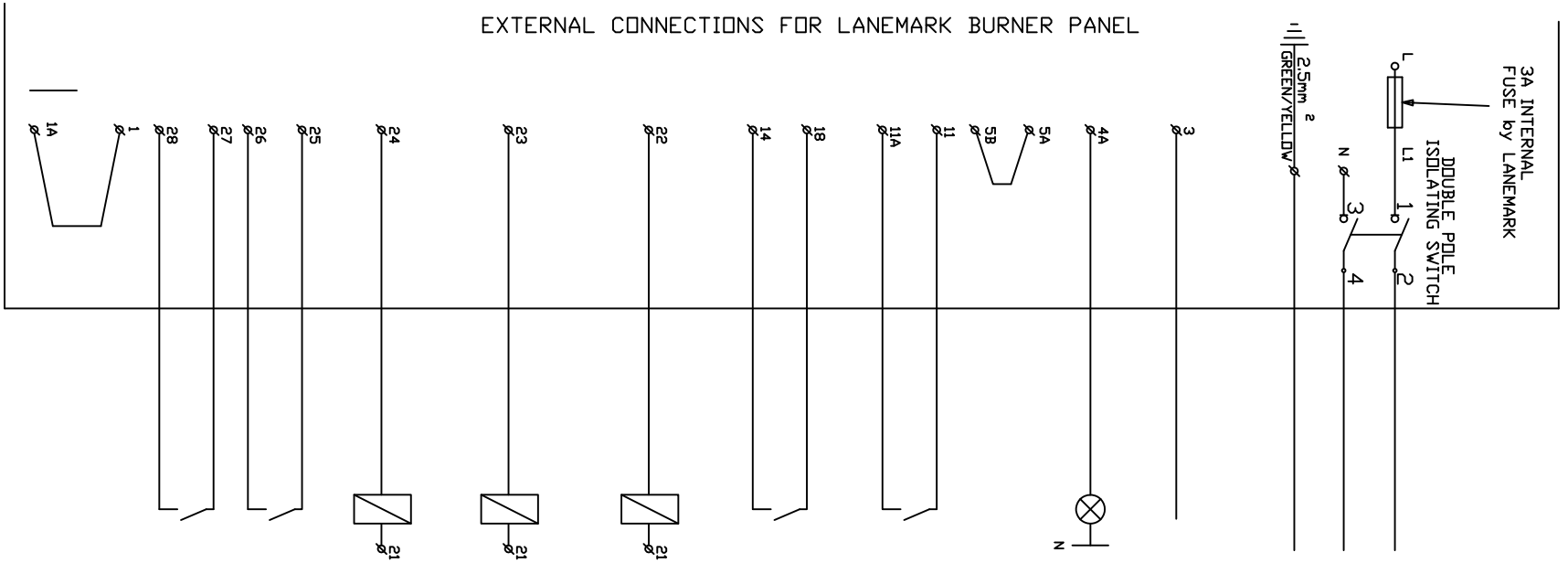
DRAWING No
64559

JOB No
-

SHEET No
10 OF 11

FILENAME D:\$VaultWorkingFolder\Designs\Electrical\64559\64559 - Sheet 10.dwg

EXTERNAL CONNECTIONS FOR LANEMARK BURNER PANEL



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CONTROL BOX WIRING
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2-3-8

	DATE	NAME
Edit	26.11.15	CPW
Chec.	07.12.15	AJL

DRAWING No
64559

JOB No
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SHEET No
11 OF 11

FILENAME D:\$VaultWorkingFolder\Designs\Electrical\64559\64559 - Sheet 11.dwg

SECTION 4 TEMPERATURE CONTROL DESIGN

TEMPERATURE CONTROL

The burner can be designed to operate :-

1. On / off
2. Or High / low
3. Or Modulating gas at fixed air
4. Or Modulating air and gas

to suit the application requirements.

Usually the burners are supplied as high/low/off (or on/off which is just high/low with a link added in the Lanemark control panel).

The burner is normally commissioned with the low fire such that it is not sufficient to hold the process temperature at the Set Point " SP " and the temperature controller brings the burner back in at high fire to top up the temperature. The low fire should not exceed 30% of high fire to comply with the standards to which the burner is built. If the process temperature exceeds the Alarm Temperature " AL " then the alarm stage of the temperature controller switches the burner from low fire to off.

A second independent temperature controller may have been specified at the design stage to act as Policeman or High Limit Thermostat. Should the process temperature exceed the Set Point and also the normal Alarm Point (possibly because the main temperature controller has failed), then this second thermostat will switch the burner off and not allow automatic restart.

The temperature controllers for on/off or high/low control are typically simple mechanical thermostats or digital electronic controllers that are programmed for on/off control and the P.I.D and Autotune facility are disabled. An on/off gas valve should not be switched more than 4 times a minute.

For processes that require accurate temperature control a modulating gas valve may be fitted and this will be driven by a 0(2) - 10 V dc , 0(4) - 20 mAmp or 3 wire direct valve positioning signals.

Lanemark normally use 24V AC modulating motors on gas valves and the 24V AC power supply is supplied by Lanemark if a control panel is supplied.

For 3 wire valve positioning motors (a simple 24V, 110V or 230V feed is used to open and then to close the modulating motor) the electronic temperature controller must have slave relays placed between itself and the modulating motor.

This is to protect its internal contacts which are generally rated at a fraction of an Amp and not able to carry the associated *in-rush* current.

WIRING OF TEMPERATURE CONTROLLERS

If Lanemark supplied an electronic digital temperature controller and built it into the control panel the wiring diagrams contained in this manual will show this controller.

Generally the only additional field wiring will be to connect the temperature sensor back to the control panel. This must be done in suitable cable and screened.

For simple mechanical thermostats if these were supplied by Lanemark these will require field wiring back to the control panel and interconnecting as shown on the *Interface Wiring Diagram*.

SETTING / PROGRAMMING CONTROLS

If Lanemark supplied temperature controls with a burner a Data Sheet will be contained in this section of the manual detailing how to programme and adjust them.

TEMPERATURE SENSORS

For electronic temperature controllers Lanemark generally supply Pt100 (platinum resistance) sensors to suit the controller with an industrial style housing.

For mechanical thermostats Lanemark generally supply single (on/off control) or dual (high/low control) thermostats to suit the application. These have a plastic housing and the adjustment dials are underneath a cover and cannot be accidentally adjusted.

A stainless steel pocket approximately 300 mm long is also supplied with both types of sensor so that the sensor can be replaced without draining the tank.

The tank will require a ½" BSP boss adding to the wall in a position where the sensor will detect a representative temperature. This position must be such that the sensor will not be damaged when baskets of work are dropped into or passed through the tank.

A data sheet will be included in this section of the manual if such a sensor was supplied.

SECTION 5 OTHER CONTROLS DESIGN

OTHER CONTROLS

When specified Lanemark can supply and build other controls into the control panel to suit the application. Typical additional controls are :-

1. Time switches
2. Hours run meters
3. Liquid level controls
4. Fan motor controls (overload / contactor)

PROGRAMMING/SETTING OTHER CONTROLS

For controls like time switches a Data Sheet will be contained in this section of the manual giving instructions on how to set and programme them.

INSTALLING / WIRING OTHER CONTROLS

When supplied with a burner the wiring will be shown in the specific wiring diagrams contained in this manual.

Additional field wiring may be needed e.g. connection of a liquid level float switch.

Data sheets will be contained in this section of the manual giving details of any installation needed.

SECTION 6 GAS TRAIN DESIGN

GAS TRAINS

Gas trains are designed by Lanemark to meet the specific application and customer requirements e.g.

1. Type and volume of gas
2. Voltage (110V or 230V)
3. Class of IP protection required
4. Destination Country
5. Special features e.g. pressure switches
6. Modulating gas valve motor requirement
7. Fine filters for some countries supplies

Gas trains are suitable for a maximum inlet pressure of 100 mbar / 40 in.wg and IP54 unless specifically ordered to a different specification.

Lanemark will be pleased to advise on special pressure requirements and supply special pressure regulators to suit.

The gas trains on TX15 to TX40 are normally supplied prefitted to the burner body by a union (but removed for transport) so that they can rotated on the union to face left or right.

Alternatively the TX15 to TX40 gas trains can be ordered with the gas train loose for final connection and installation on site within 2.5 m / 10 feet of the burner body. The TX60 gas trains are too large and heavy to be preconnected to the burner body and they are always supplied loose. The installer will have to supply a suitable piece of pipe and fittings, including a union, so the burner can be removed if ever needed.

Gas trains are generally designed to have a start rate (also low fire) of no more than 30% of the main (high fire) gas rate.

WIRING GAS TRAINS

The gas train's gas valves are electrically connected back to the burners control panel. Lanemark generally make this wiring connection and run it in a 3 m flexible PVC conduit. It is disconnected for transport and has to be remade on site. The cable cores are tagged and identified to aid reconnection.

The connections are also shown in the wiring diagram contained in this manual if the manual was despatched with a burner.

DRAWINGS OF GAS TRAINS

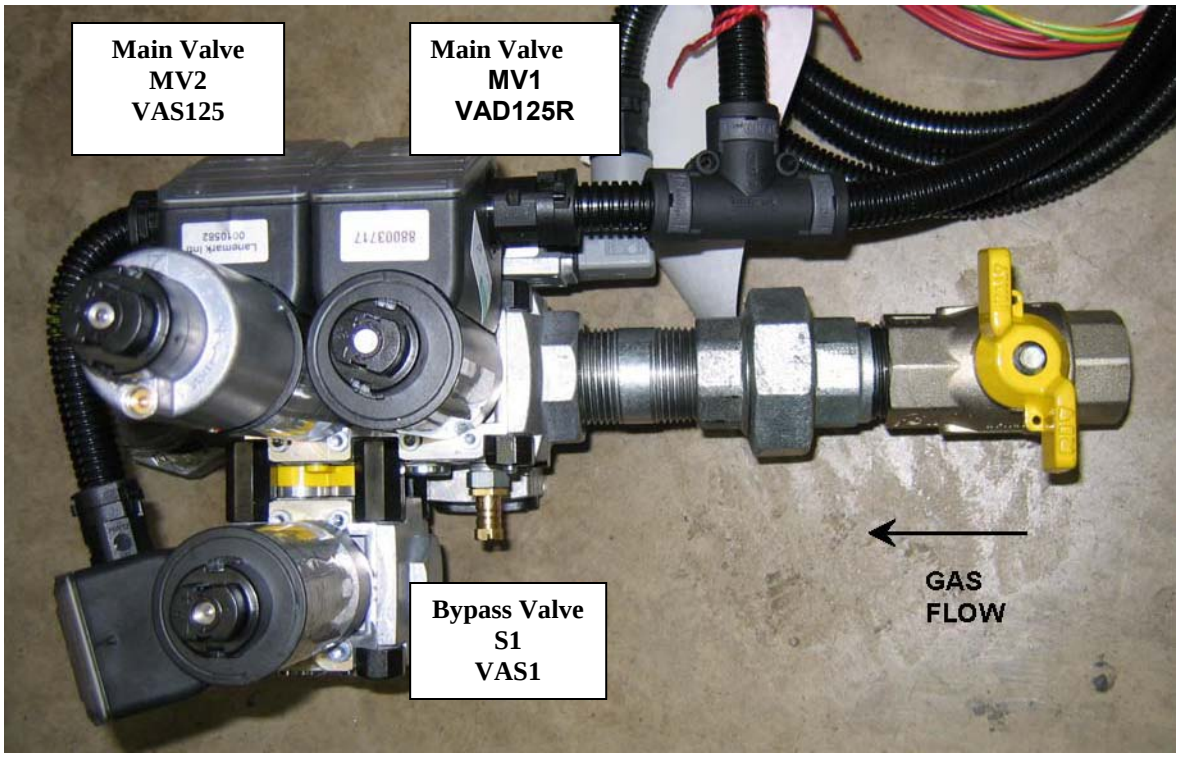
If this manual was sent out with a burner a copy of the gas train drawing will be included in this section of the manual. The gas train drawing number is on the burner's Data Plate and a copy of this Data Plate is stuck in the front of this manual.

SETTING / ADJUSTING GAS VALVES

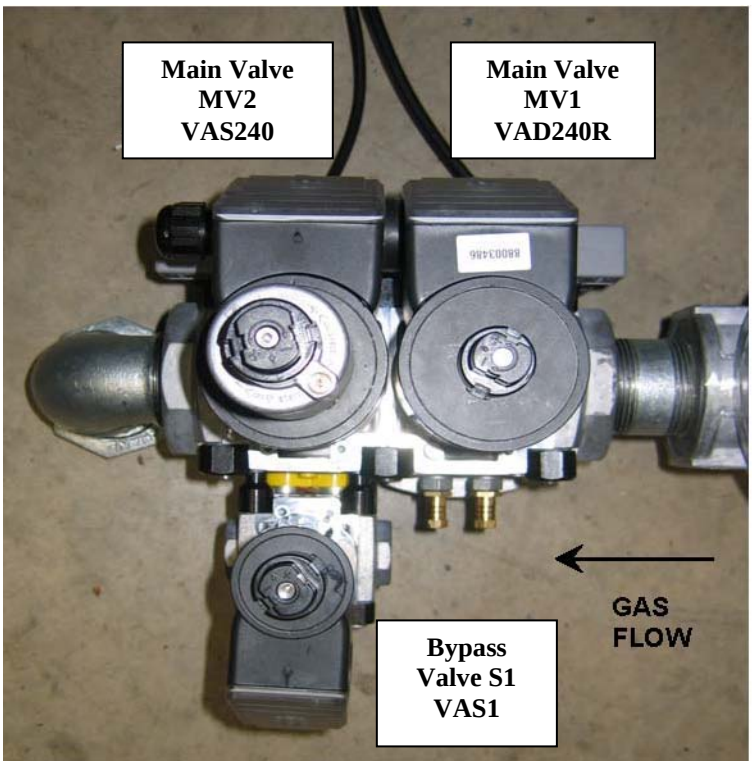
The gas train drawing will show the type of gas valves used. Data sheets for the gas valves and other gas components like modulating motors will be contained in this section of the manual. These data sheets will show the basic adjustments that can be made.

KROMSCHRODER VCD VALVE

1" Gas Train General Layout



1½" Gas Train General Layout

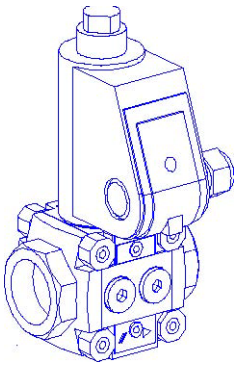


Note: All gas trains are supplied with a Low Gas Pressure Switch as standard. DG40 (5-40mBar)

KROMSCHRODER VCD VALVE

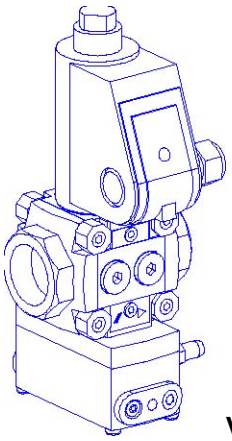
Valve Adjustment

Technical Specification



VAS Solenoid valve for safe-guarding gas.

Inlet Pressure **PE**: 10-500mBar
Pressure **PG**: 2.5-25 mBar



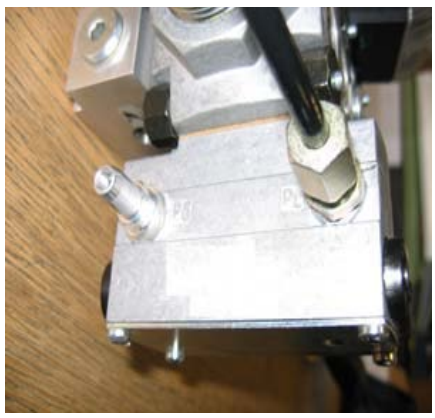
for modulating burner

Inlet Pressure **PE**: 10-500mBar

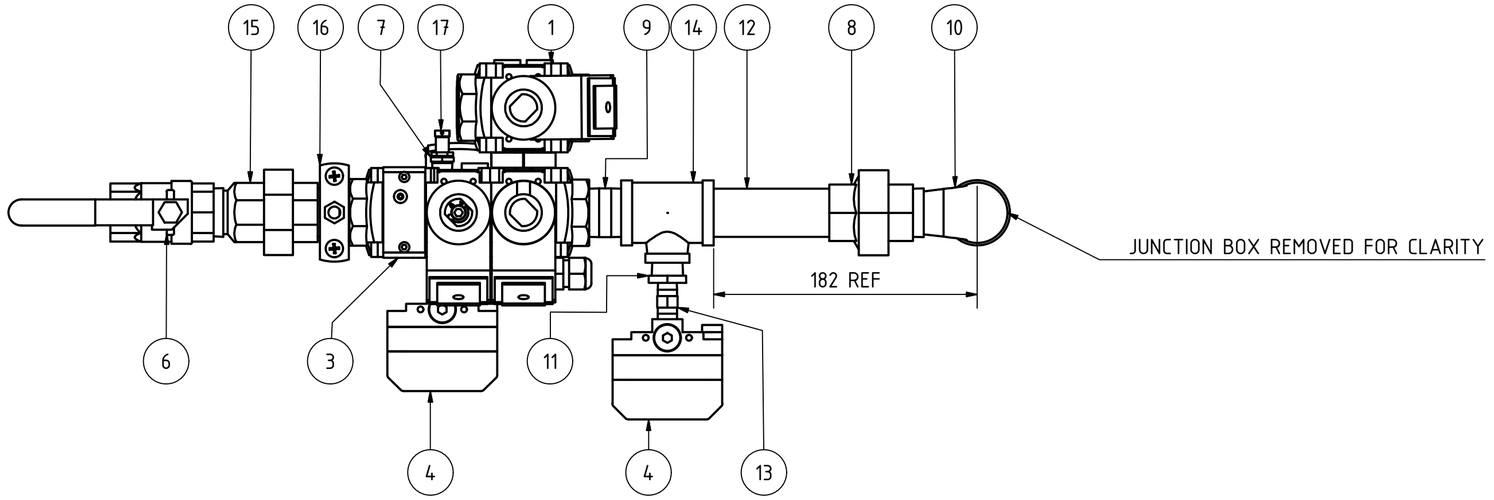
VAD Constant Pressure Governor Outlet

VAS The markings on the cover cap can be used for coarse adjustment of the flow rate. A 2.5mm Allen key should be used, 1 turn is equivalent to 0.75mm valve stroke to a maximum of 5 turns.

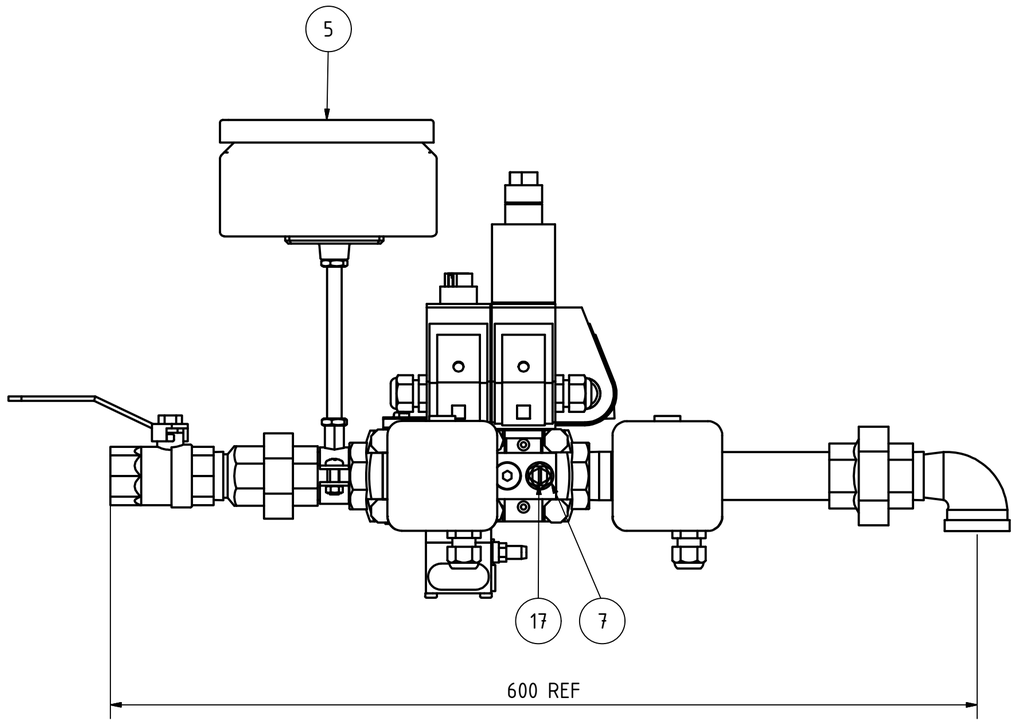
VAD Adjust the pressure to that required using a manometer on **PG**, with a 2.5mm Allen key on the Governor adjustor.

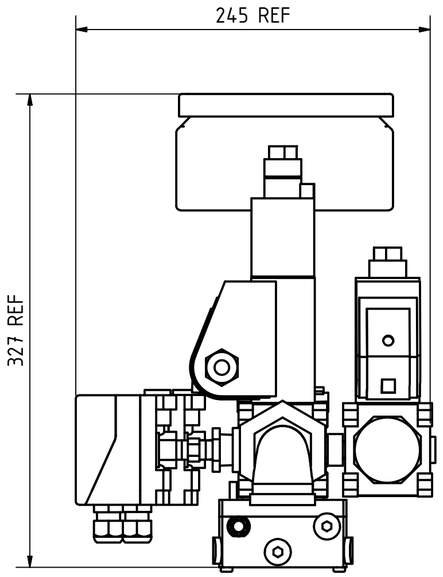


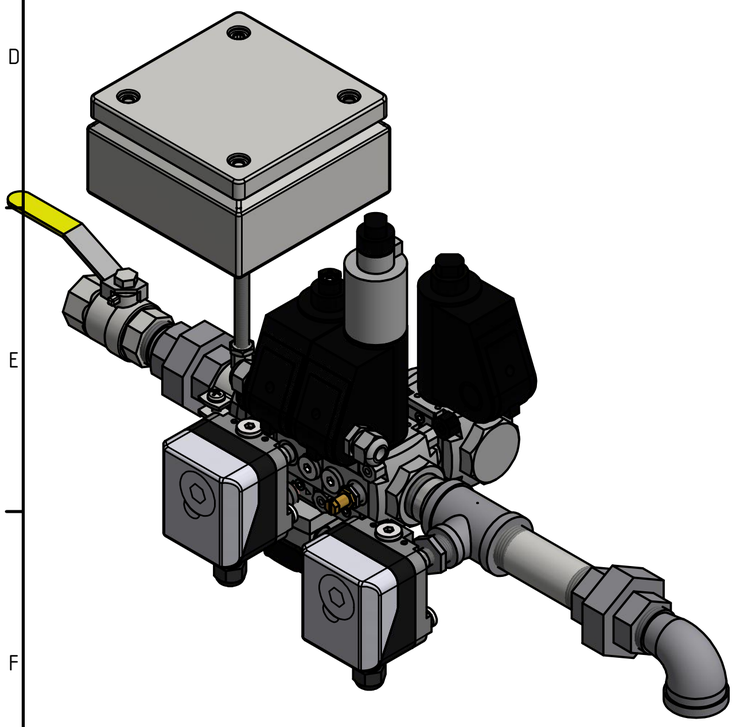
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	0010595	VAS125R BYPASS 230V
2	1	0010855	KROMSCHRÖDER GAS VALVE VCD1 1" 230V
3	1	0010977	KROMSCHRODER VMF1-05M UKV13005
4	2	0011992	DG 50U GAS PRESSURE SWITCH IP65
5	1	0012182	150x150x80 TERMINAL BOX
6	1	0015104	1" LOCKABLE BALL VALVE
7	2	0021048	1/4" x 1/8" ST STL REDUCING BUSH
8	1	0021058	1" F/F ST STL UNION
9	2	0021062	1" BARREL NIPPLE S/S
10	1	0021063	1" MALE/FEMALE ELBOW STAINLESS STEEL
11	1	0021091	1/2" X 1/4" REDUCING BUSH S/S
12	1	0021095	1" ST STL EXTENDED NIPPLE 100MM LONG
13	2	0021108	1/4" HEX NIPPLE S/S
14	1	0021111	1"x1/2"x1" REDUCING TEE S/S
15	1	0021113	1" M/F UNION ST STL
16	1	0021145	1" x 8mm FLAMCO CLIP S/S
17	1	0022030	PRESSURE TEST POINT 1/8"



GAS FLOW







INFORMATION ONLY

ISSUE	DESCRIPTION	DATE	BY
09			
08			
07			
06			
05			
04			
03			
02			
01	FIRST	07/08/2017	BAS

DIMENSIONS ARE IN mm AND DEGREES

TOLERANCE AS STATED OR ±

DRAWING SCALE (1 : 3)

PAPER SIZE A2

LANEMARK
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DRAWN BY: BAS
DATE: 07/08/2017
CHECKED BY: AJL
DATE: 07/08/2017
ISSUE: 01

Do Not Scale Print

PROJECTION: 1st This is a angle drawing

TITLE: GAS TRAIN DESIGN TX 230V VCD 1"

PROJECT No:

DRAWING No: 56791

SHEET 1 OF 1

DRAWING No 56791

SECTION 7 INSTALLATION

FITTING THE HEAT EXCHANGER

The heat exchanger should be fitted using the slip on flanges, gaskets and nuts as shown in *Section 2 Fig 2.* The two gaskets are fitted to the inside of the tank and they are normally butyl rubber unless a special material is specified at the design stage.

For food or hygiene applications a stainless steel heat exchanger may have been specified, with stainless steel flanges and locknuts.

The heat exchanger may have break flanges along its length if it is too long to be manufactured and transported in one piece. These break flanges should be made with a gasket which will normally be butyl rubber.

The heat exchanger may be delivered with temporary transport straps welded to it. These should be removed with an angle grinder or similar, preferably when the heat exchanger is in its final position in the tank and supported.

The heat exchanger should be supported with suitable brackets (*See Fig 3*) if required.

The parallel threads on the end of the heat exchanger will normally be protected from damage during transit but the locknuts should be run down them before fitting the heat exchanger to check them.

FITTING THE BURNER

The burner should be fitted to the heat exchanger by first fitting the backnut to the parallel thread and then fitting the screwed flange which is locked in position with the backnut. See *Fig 2*. The burner body is fixed using the nuts and washers provided to the screwed flange. No gasket is required as this connection is under negative pressure.

FITTING THE CONTROL PANEL

The control panel should be fitted within about 2 m of the burner body to a cool dry surface so that the flexible conduits reach between the two.

FITTING THE GAS TRAIN

On TX15s to TX40s the gas trains will generally be pre-fitted but may have been removed for transport. The union may be turned to position the gas train to the left or right. On all TX60s and some TX15s to TX40s the gas train is supplied loose, for connection on site, within 2.5 m / 10 feet of the burner body. Care should be taken that gas trains are installed the correct way around (look for the arrows on the gas valves) and valves must never point downwards.

FITTING THE FLUE DAMPER

The flue damper should be fitted to the outlet end of the heat exchanger. The flanged type using the locknut, screwed flange & gaskets supplied. The screwed type a locknut to secure it onto the parallel thread. No jointing compound is required because this joint is under negative pressure.

The 6 mm connection for the pressure sensing pipe should point upwards so condensation does not collect and block it. Sufficient clearance should be left so that Service Engineers can gain access to the damper adjuster and flue gas sampling test point.

FITTING THE 6 mm PRESSURE SENSING PIPE

Two off pieces of 6 mm outside diameter steel or copper pipe are required generally about 3 m long.

This pipe should be connected from the fitting on the flue damper to the fitting on the control panel marked *damper* and to the fitting on the burner body to the fitting marked *burner*.

This pipe should be run in such a way that there are no long horizontal runs or U-traps that could collect condensation and block the pressure signal.

MAKING THE GAS CONNECTION

The gas connection should be made to the inlet point on the gas train to the isolating ball valve supplied.

The pipe work final connection should be made in such a way that it is possible to isolate the gas with the ball valve provided and then to break the union and remove the complete burner without removing any further gas pipework. The weight of the incoming gas pipework will require independent support and must not be supported off the burner.

The burner must not be put into operation until the gas supply has been purged and proved sound as given under *Design* previously. The burner's gas train is suitable for an inlet pressure of 100 mbar maximum.

If the gas supply system is to be pressure tested the gas train must be spaded off first, as a pressure over 100 mbar will destroy the gas valves.

THE EXHAUST FAN

The fan should be bolted down onto a level base and sited so that the supply of cooling air to the motor is not restricted and the ambient temperature does not exceed 40° C.

The fan must not be operated independently of the ducted system without securely guarding inlet and outlet ports. Note: The light gauge transport covers are not strong enough for this purpose. This is to prevent contact with the rotating impellor and avoid overload of the fan motor.

Before starting the fan check that there are no foreign bodies inside the unit, otherwise these could be ejected with considerable force.

MAKING THE ELECTRICAL CONNECTIONS

An external wiring interface and panel internal wiring diagram are contained in *Section 3* of this manual..

THIS APPLIANCE MUST BE EARTHED

All wiring should be in accordance with I.E.E. Regulations (BS7671) and the requirements contained under *Design* given previously.

The voltage requirements for each burner vary to meet the end users specification. If this manual has been sent out with an actual burner (or series of burners built to the same specification) then a Burner Data Plate duplicate label will be included inside the front cover of this manual. This data plate will give the exact as built electrical details for a particular burner.

The high tension ignition and flame detection connections require making. These have been prerun in PVC conduit from the burner body and final connection should be made. The ignition coaxial cable screws directly into the ignition transformer. The flame sensing cable is made to the terminal rail and the cable is tagged with the terminal number.

The connections to the gas train gas valves will have been premade and again prerun in PVC conduit but disconnected for transit. These cables are made to the terminal rail and the cable cores are tagged with the terminal number.

The 230V or 110V 1 Phase supply to the burners control panel should be made through the 20 mm cable gland from a suitable isolator and fuse as given previously under *Design*. 110V supplies must be *end tapped* not from *centre tapped* transformers.

The 230V 1 Phase or 415V 3 Phase AC 50 Hz supply to the burner fan motors should be made from a suitable isolator, motor protection device and contactor as given under *Design* earlier.

The auxiliary contact on the fan motor contactor, temperature controller and external burner lockout reset input signal should be connected back to the burner's control panel.

HIGH / LOW TEMPERATURE CONTROLS

See *Section 4* . For high / low / off burners a temperature controller with a Set Point and an Alarm stage should be used with a suitable sensor. The internal contacts of the temperature controller should be suitable to carry the burners full load of 250 VA and the in-rush current associated with valves opening and ignition transformers delivering a spark. It is recommended that interposing relays be used rated at 5 Amps.

The controller should not switch quicker than 30 seconds as gas valves should not be cycled rapidly.

The temperature controller may however have been supplied by Lanemark as an optional extra with a suitable sensor which will require site wiring.

The temperature controller should be wired to the control panel as shown in the wiring diagram contained using suitably screened cable for the sensor as necessary.

MODULATING TEMPERATURE CONTROL

Generally TX tank burners are two stage but for modulating gas burners the type of control signal i.e. 0-10 V dc, 4-20 mA or 3 wire direct control will have been determined at the design stage.

The modulating control signal should be made into the appropriate terminals as shown in the wiring diagram using suitable screened cable. A negative or 0V return is generally required by the temperature control instrument. This should be connected to the 24V AC neutral from the transformer feeding the modulating motor. This will complete the circuit.

For 3 wire direct control of a modulating valve temperature controllers should have internal contacts suitable for the in-rush current of the modulating motor. Lanemark recommend that interposing relays be used that are rated for 10 Amp. Generally Lanemark supply these interposing relays. The temperature controller should have a minimum ON and OFF switching time of 0.6 seconds to allow the modulating motor (which has a 30 second travel time) to correctly interpret the signal and move the gas ball valve accordingly.

LIQUID LEVEL PROTECTION

If specified at the design stage the liquid level detector should be connected into the burner's control circuit in a similar way to the temperature controller.

OVER TEMPERATURE PROTECTION

At the design stage it may have been decided that a second totally independent temperature controller to act as a High Temperature Trip Thermostat (Policeman Thermostat) is required because of the nature of the application e.g. heating oil. Once the overheat temperature has been exceeded the burner is held off until manual intervention occurs to reset this thermostat. This thermostat should be connected into the burners control circuit in such a way as to isolate the electrical supply to the burner.

TX BURNER INSTALLATION CHECKLIST

Before the burner is ready for commissioning the following should be checked to establish that the installation is complete in accordance with the installation details given in the Installation and Commissioning Manual. Generally a Mechanical and Electrical Installation Drawing will have been prepared by the customer or his installer and Lanemark would be pleased to receive copies of these drawings for comment. The gas supply should be turned off while performing these checks and electrical connections should be made with reference to the wiring diagram for connection numbers.

	DESCRIPTION	
1	Lanemark will supply a specific heat exchanger and tank drawing for each project. The heat exchanger should be fitted into the tank with the appropriate flanges and gaskets and any transit straps then removed. It should be supported to prevent it from dropping when the tank is empty and loosely restrained from floating upwards when the tank is full. A typical support drawing is available.	
2	The tank should be filled with the liquid and the automatic fill or recirculating pumps tested. The heat exchanger must be kept covered at all times by liquid to a minimum depth of 1 heat exchanger pipe diameter above the top of the heat exchanger.	
3	The flue damper should be fitted to the heat exchanger. The damper is not symmetrical and has a label on it showing which end points towards the fan. The 6mm brass fitting for the air pressure pipe connection should point upwards so condensation cannot block it. Sufficient space should be left so the Service Engineer can set the damper and take a flue gas sample from the test point.	
4	The flue damper should be connected to the fan inlet in solid steel pipe which is normally welded. If, however it is decided to use a clip together flue system it must be gas tight against 25mBar suction at up to 300 °C for the life of the system when subject to vibration, condensation etc. Sufficient break flanges should be included so that it is possible to remove the fan. For multiple burners sharing a common fan, individual dampers will generally be connected into a common manifold. The size of the final pipe connection and the fan inlet flange must be the same size. The final piece of pipe must be a straight run of minimum length 500 mm. Lanemark would be pleased to advise on the design of the manifold.	
5	The main flue should be connected to the fan outlet socket and not reduced in size and the joint sealed, it should be self supporting and flue terminals should not restrict the outlet. Lanemark recommend that the flue **always** discharges outside the building. If this is not possible Lanemark must be consulted.	
6	The burner body should be fitted to the heat exchanger inlet and locked with the backnut. No gasket is required for this joint. Sufficient room should be left around the burner body to allow the Service Engineer to remove the front cover (600mm) and to gain access to the gas valve (300mm).	
7	The burner's control panel should be mounted onto a cool wall or similar adjacent to the burner body. The burner ignition, flame sensing and gas train electrical connections have to be made between this panel and the burner body and gas train. Lanemark provide these 3 connections as flying leads made in 3 metre flexible PVC conduits. They can be shortened but only the gas train connections can be extended. These connections have the wire tails made and each wire is numbered for site connection by the installer to the Lanemark wiring diagram.	
8	Two runs of 6mm pipe should be connected to the burners control panel. This pipe is 6mm outside diameter steel Bundy tube or copper pipe and is supplied by the customer unless specifically ordered on Lanemark. One run is connected to the burner body and the other to the flue damper. Lanemark provide the connection points complete with 6mm olives and cap nuts. This pipe should avoid any long horizontal runs or U-traps that could collect condensation.	

9	The gas train is generally designed to be connected direct to the fitting on the burner body. Lanemark however despatch it as a separate item to make packing easier. It must be replaced so that the gas flows through the gas valves in the correct direction. There is an arrow engraved into the gas valve body to show the correct direction of flow. By prior arrangement the gas train can be manufactured so that it can be fitted on site within 3 metres of the burner body and piped up to suit by others. The gas valve coils should always face upwards. It is **IMPORTANT** that the gas train is protected from water or liquid that may overflow the tank or be used during cleaning down of the system as liquids can penetrate the electrical connections.
10	The gas train should be fitted by the installer and the gas supply should be made to the gas train inlet.
11	The gas supply system should be proved sound and purged and a Certificate will be required for a new system to prove this was done.
12	The gas system should be capable of providing the specified volume of Natural Gas or Propane (LPG) Gas. The minimum inlet gas pressure to the burner with the burner running is 20mBar for Natural Gas and 35mBar for Propane. The maximum inlet pressure is 35mBar for Natural Gas and 50mBar for Propane.
13	The temperature control sensor(s) and tank liquid level protection devices should be fitted and wired up. These should be wired back to their instruments or to the burner(s) control panel.
14	The flue exhaust fan and combustion air and tank liquid surface extract ventilation systems must be installed and if fans are used they should be tested and interlocked so that the burner(s) cannot run unless these fans are running.
15	The electrical supply (generally 3 phase 415V 50 Hz) should be made to the fan motor through a contactor with a suitably sized overload. The contactor should have an auxiliary contact to interlock *fan running* for each burner that shares the fan. Lanemark can supply this overload/contactor and wiring diagrams are available.
16	The fan should be tested, the overload set and the direction of rotation checked.
17	Generally the fans are designed to run continuously from a manual selector switch or similar or from a main motor control panel supplied by others. If the fan is to start only when required by the burner(s) then a ***start*** signal should be connected from the burner(s) to the coil of the fan motor contactor ensuring multiple burners do not back-feed each other at the main or individual burner control panel.
18	The ***fan running*** interlock should be made from the fan contactor auxiliary contact(s) to the burner(s) interlock connections.
19	The burner's power supply and earth should be made from a local isolator with a suitable fuse (or MCB) for protection. This should be rated for a 250 VA load for 110V or 230V as specified.
20	Temperature / liquid level / time clock / on/off controls etc. should be connected and tested. Additional links may be needed in the Lanemark panel if some of the above are not being used to complete the circuit depending on the exact site application. Any digital instruments should be configured and the correct temperatures and times set. If the burner is a modulating burner the 3 wire direct valve positioning, 4-20 mA or 0-10 V dc control signal should be connected to the burner as shown in the wiring diagram and the instrument tested to ensure the modulating valve responds to the input signal. Upon on/off or high/low burners the temperature controller's Proportional-Integral-Derivative (P.I.D.) or any other automatically tuning (autotune) features should be turned off.
21	Any remote burner status signals connections e.g. burner ON, LOCKOUT and REMOTE RESET should be wired in to the burners control panel and tested.
22	The general area must be made safe for Service Engineers to work in.
23	In the UK the burner must only be commissioned by a Service Engineer who is ACS and GAS SAFE registered for Industrial Gas Burners. In other countries local gas regulations must be observed.

SECTION 8 COMMISSIONING

PRECOMMISSONING THE BURNERS ELECTRICAL CONTROL PANEL

THIS APPLIANCE MUST BE EARTHED

These tests can only be carried out by suitably qualified electricians.

Carry out the following electrical safety checks using a multimeter. Do not use a P.A.T (portable appliance tester) as high voltages generated could damage the electronics in temperature controllers and the Siemens Controller and give a false reading.

Earth Continuity Check

1. The appliance must be disconnected from the main supply.

2. Set the multimeter to Ohms x 1 scale and zero if necessary.

3. Measure the resistance between the earth connection point in the burner's junction box and the earth connection point from the supply panel or distribution board.

4. If the resistance is greater than 0.1 Ohm then check that the earth cable size is adequate and that all connections are clean, sound and correctly made.

Short Circuit Check

1. The burner must be electrically disconnected from the main supply and the burners own ON/OFF switch must be ON and any temperature controllers or time clocks interlinked should be calling.

2. Set the meter to the Ohms scale x 1 and measure the resistance between the incoming live and neutral terminals in the burner's junction box. If the meter reads zero then there is a direct short circuit and a fault that should be rectified.

3. Set the meter to Ohms x 100 scale and measure the resistance between the burner's earth connection point and the its incoming live terminal. If the resistance seen is less than infinity then there is a fault that requires rectifying.

Polarity Check

Connect the burner control panel to the incoming supply set the meter to read AC Volts by 300V scale.
If an isolating or step down transformer has been used the secondary side must be end tapped and not centre tapped as this can interfere with the operation of the Satronic programmer.

1. Measure the voltage between the incoming live and neutral terminals in the burner's junction box and it should read typically 230V AC or 110V as appropriate. The Satronic control box has under/over voltage protection and will not run if the supply is incorrect.

2. Measure the voltage between the incoming neutral and the earth connection in the burner's electrical junction box. The voltage should read less than 15V AC.

3. If these voltages are not seen than a neutral fault or polarity fault may exist. If very sensitive earth leakage trips have been fitted to the electrical installation then some types of multi meter may cause them to trip while attempting to measure voltages to earth.

Resistance to Earth Check

1. The burner must be electrically disconnected from the main supply and the burners own ON/OFF switch must be ON and any temperature controllers or time clocks interlinked should be calling.

2. Set the meter to Ohms x 100 scale.

3. Measure the resistance between the incoming live connection and the earth connection in the burner's electrical junction box. The reading should be infinity and if there is any other reading then there is a fault which should be isolated and rectified.

PRECOMMISSIONING THE BURNERS ELECTRICAL 1 OR 3 PHASE FAN

1. Generally the connections will be checked in a similar way as given previously. Look for 230V to neutral on 1 phase and 400V between phases on 3 phase motors.

2. For 3 phase motors use the manual button on the motor contactor or similar and check the motor is rotating in the correct direction. If not isolate and reverse two of the phase connections.

3. For 1 and 3 phase motors set the overload or motor protection device in accordance with maker's instructions and with reference to the fan motor kW rating and full load current.

PRECOMMISSIONING GAS

The gas pipework system from the gas meter to the burner should be sound and purged in accordance with the standards given previously. A Test and Purging Certificate will be available to show this was completed. With the gas isolated at the main inlet, main gas train outlet (and pilot line outlet isolating valve if fitted) undertake the following checks to prove that the gas train valves are sound and have not been damaged in transit :-

1. With reference to the gas train schematic drawing fit a manometer to the inlet pressure test nipple.
2. Open the main isolating gas cock briefly and then close it. The gas trapped between the main isolating gas cock and the first main valve seat should remain at constant pressure for 2 minutes. If loss of pressure is seen then the main valves or the pilot bypass gas valve seats are letting by and it is faulty and must be replaced as given later under *Maintenance*. Replace all test nipples.

TEST RUN OF BURNER WITH LME21.350

With the main inlet gas isolating cock turned off and the burners own on/off switch turned off which is located on the burners electrical control box complete the following checks :-

1. Ensure that the tank or bath is put into operation with any recalculating pumps, agitators or automatic make up systems running. The burners exhaust fan should be running. This fan may have been wired back to the burner to get its start signal or it may receive a start signal from an independent main motor control panel.
2. Low inlet gas pressure switches are fitted to the gas train they require adequate inlet gas pressure to operate.
3. Switch on the burners on/off switch and any isolators and the Siemens LME21.350 burner controller should start to run. If the controller was left at *Lockout* previously the reset button will glow red and this should be reset by pressing it or the reset switch.
4. The auxiliary contact from the burner's combustion air fan motor starter should be interconnected into the same part of the control system as the burner's air pressure switch. See the wiring diagram. If this connection is missing the controller box will lockout exactly as if there was a problem with the air pressure switch. Check this connection or put in a temporary link.
5. The Siemens burner controller should become live and an orange light should be on the box. This first section will also pull in the burners fan; if the contactor has been wired back to the burners own junction box. The two off 3 way solenoid valves fitted to the pipes going to the air pressure switch will also be energised. The pressure switch will now see the actual fan differential pressure and will not be venting to atmosphere as previous. The controller has 5 seconds to detect that the fan is running. If the controller *locks out* at orange light this is because the air pressure switch is set too high. It is set to maximum at the factory. Adjust the switch to 1 m.bar and if the box again *locks out* at this stage it is because the pressure switch or box has failed to see that the fan is running. If this happens again investigate as given later under *Fault Finding.*
6. The Burner controller will continue to the ignition stage were the orange light will start to flash. Here the start (also low fire) gas valves will open (gas should be ON for Test run) and the ignition spark will attempt to light the start flame. At this stage the controller will go to a green light to show that the burner is alight.

If the Siemens Burner controller has run to a green light then the burner is ready for commissioning.

IN THE UK COMMISSIONING OF GAS APPLIANCES CAN ONLY BE CARRIED OUT BY SUITABLY QUALIFIED TECHNICIANS WHO WILL BE GAS SAFE REGISTERED SPECIFICALLY TO UNDERTAKE WORK ON INDUSTRIAL GAS BURNERS. IN OTHER COUNTRIES LOCAL REGULATIONS MUST BE OBSERVED.

COMMISSIONING COMBUSTION

All burners are fired at works as part of the final inspection procedure but final settings can only be set on site to suit a particular application.

A BURNER WILL START AND RUN BUT IN THE UK IT MUST ALWAYS BE COMMISSIONED BY A SUITABLY QUALIFIED TECHNICIAN WHO HAS BEEN GAS SAFE AND ACS REGISTERED TO DO THIS WORK. FOR OTHER COUNTRIES LOCAL REGULATIONS MUST BE OBSERVED.

The following settings and checks should be made after the pre-commissioning procedure has been completed.

The main inlet gas isolating cock should be OFF and the burner should be turned off at its own on/off switch.

Air Pressure Switch and Flue Damper

1. The air pressure switch was despatched set to maximum. This has then been turned down to typically 5 mbar during the pre-commissioning stage to allow the burner to run. If not do this now but do not set the pressure switch to minimum because the Siemens Burner Controller may misinterpret this a faulty pressure switch.
2. The flue damper should be set to about 2/3 rds open as an initial setting to allow the burner to run.
3. The electrical link in the control panel (5A – 5B Service Engineers *low fire hold link*) should be removed so that the burner will run on pilot only.
4. The burners on/off switch and any other external controls should be brought on and the main isolating gas cock should be turned on.
5. The burner will start to run and the Burner controller will start to flash as shown previously until the ignition stage is reached. If the gas pipework is not completely purged of air the burner may lock out on the first few attempts at ignition. If lockout does occur the cause should be found by interpreting the lockout signal code.
6. Once the pilot flame is established the controller control would normally bring on the main gas but as the electrical link 5A – 5B has been removed the second main valve coil will not be energised.
7. The pilot flame can be adjusted to give a reliable flame by adjusting the *pilot gas rate adjuster* screw. (The location of this adjuster screw is shown previously in this manual). To comply with standards it must not exceed 30% of the main flame rate.

Main Flame and Exhaust Flue Damper

8. Switch the burner off and replace the electrical link 5A – 5B and turn the inlet ball cock 2/3 rds off. Fit a manometer to the gas pressure test point on the burner head. (See the previous illustration in this manual). From the burners Data Plate (or the graphs contained in this manual) obtain the gas head pressure required to set the burner on the required rate.
9. Restart the burner and it will run to the main flame stage this time. As the burner runs to main flame watch the gas head pressure rise and progressively open the inlet gas ball cock and set the main gas pressure on the main gas valve governor. (An illustration of the adjuster position is contained previously in this manual and there is a protective dust cover over the adjuster screw proper). To increase gas turn the governor screw clockwise and anticlockwise to decrease.
10. Once the gas pressure has been correctly set for main flame the combustion should be set to achieve :-

Natural Gas

Oxygen	(O_2)	6.0 %
Carbon dioxide	(CO_2)	8.5 %
Carbon monoxide	(CO)	100ppm (maximum)

Propane Gas

Oxygen	(O_2)	6.5 %
Carbon dioxide	(CO_2)	9.5 %
Carbon monoxide	(CO)	100ppm (maximum)

A typical gross flue gas temperature is 190 - 220°C when the system is up to its operating temperature.

The combustion is set by adjusting the position of the exhaust flue gas damper remembering to tighten the locking nut when finished. Once the exhaust flue damper is set pilot and main flame gas pressures should be rechecked as the position of the damper can have a slight influence on the gas pressure.

11. The air pressure switch should be set when the flue and combustion system are cold and after the flue damper has been set. With the flue fan running but with the burner off measure the negative pressure at the test point on the burner body (as illustrated previously in this manual).

The pressure switch should be set to typically 70% of the measured air pressure or 2 mbar less than the measured air pressure. If the pressure switch is set too high then there is a possibility that nuisance lockout could occur when detecting air pressure. If the pressure switch is set too low then there is the possibility that the pressure switch would not switch the burner off if there was a problem e.g. a partially blocked flue.

The pressure switch should never be set to minimum because the Siemens burner controller times how long it takes the pressure switch to change over. If set to the minimum it changes over so quickly the controller can misinterpret this as a faulty switch.

An air pressure switch must never be set too low to sacrifice safety for reliability.

12. Fit a manometer to the air pressure test point. With the burner running to the air prepurge stage the pressure switch should be turned *up* to test that the air pressure switch prevents the burner from firing and that it locks out after about 1 minute.
13. With the burner running the pressure switch should be turned down and the burner should lockout due to loss of the air pressure signal.
14. With the burner running turn off the main gas isolating cock and check that the burner locks out due to loss of flame signal.
15. With the burner running in main flame the inlet gas pressure should checked to ensure it is within specification :-

Natural Gas

20 mBar (8 in.wg) maximum
35 mBar (14 in.wg) minimum and typical

Propane Gas

35 mBar (14 in.wg) maximum
50 mBar (20 in.wg) minimum and typical

If the inlet pressure is above the maximum an additional regulator must be fitted. If the inlet pressure is below the minimum then the local Gas Supply Authority should be contacted to establish the cause. If the inlet pressure is unstable (the pressure may fall at times of peak demand) then as the burner has been commissioned relative to the standard inlet pressures problems may well occur during periods of low pressure.

On Propane systems ***overpressure cut out*** with vents and ***under pressure cut out*** devices must be fitted. The settings of these should be checked for suitability and recorded.

If low inlet and high outlet gas pressure switches have been fitted these should be set and their operation checked. A low inlet gas pressure switch will be set to 5 mbar below the minimum inlet pressure specified above.

A high outlet gas pressure switch should typically be set to 3 mbar above the normal high fire gas pressure. The slow opening adjuster on the main gas valve (if fitted) may need adjusting to slow the opening down or a pressure pulse may occur on normal opening and trip the pressure switch.

Multiple Burners Sharing a Single Fan

16. Many burners will share a common exhaust fan and flue system. The individual burners should be first commissioned as for a single burner. When all flue dampers and gas governors are set the gas pressures and combustion settings should be rechecked with all burners running together and adjusted if necessary.

Modulating Motors

17. If a modulating motor is fitted to a ball valve the motor end stop must be set so that when it is at its fullest closed position, there is still sufficient gas flow, to light reliably and sustain a stable flame. The temperature controller should be set and the correct response of the modulating motor to the control signal should be checked. See the Data Sheet on the motor that will be contained in this manual.

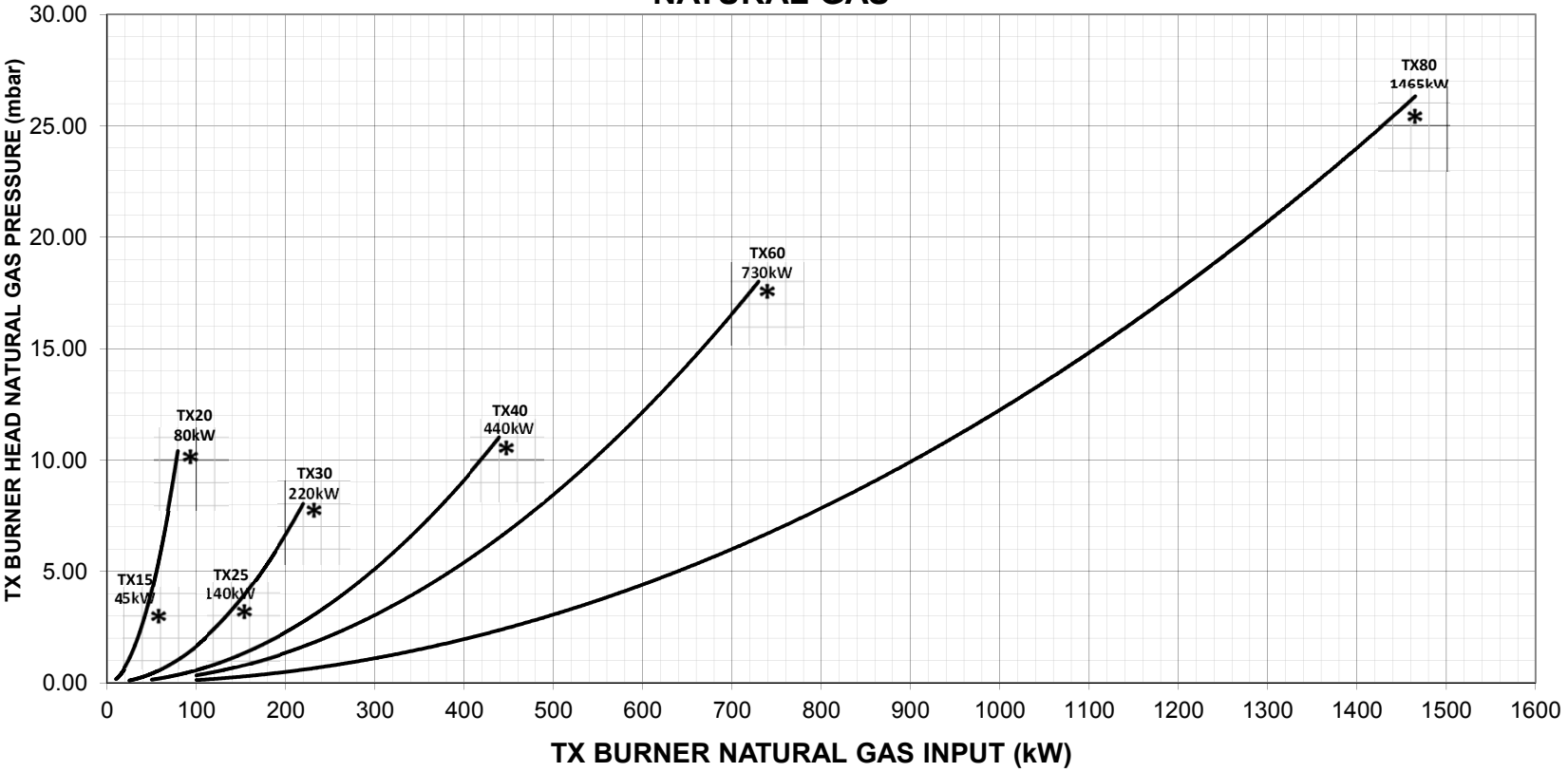
Final Checks

18. Check the operation of any mechanical or electronic temperature controllers. Record the set points and for electronic temperature controllers record the set-up parameters. Generally the burner should not be called to start more than 6 times an hour and should not switch from high flame to pilot / low flame more than 60 times an hour.
19. Check the operation of any low liquid level protection systems or automatic liquid make up systems.
20. Check that there is adequate ventilation for safe combustion as given under *design considerations* previously.
21. The owner/operator of the burner system should be instructed in the basic operation of the burner and its controls.

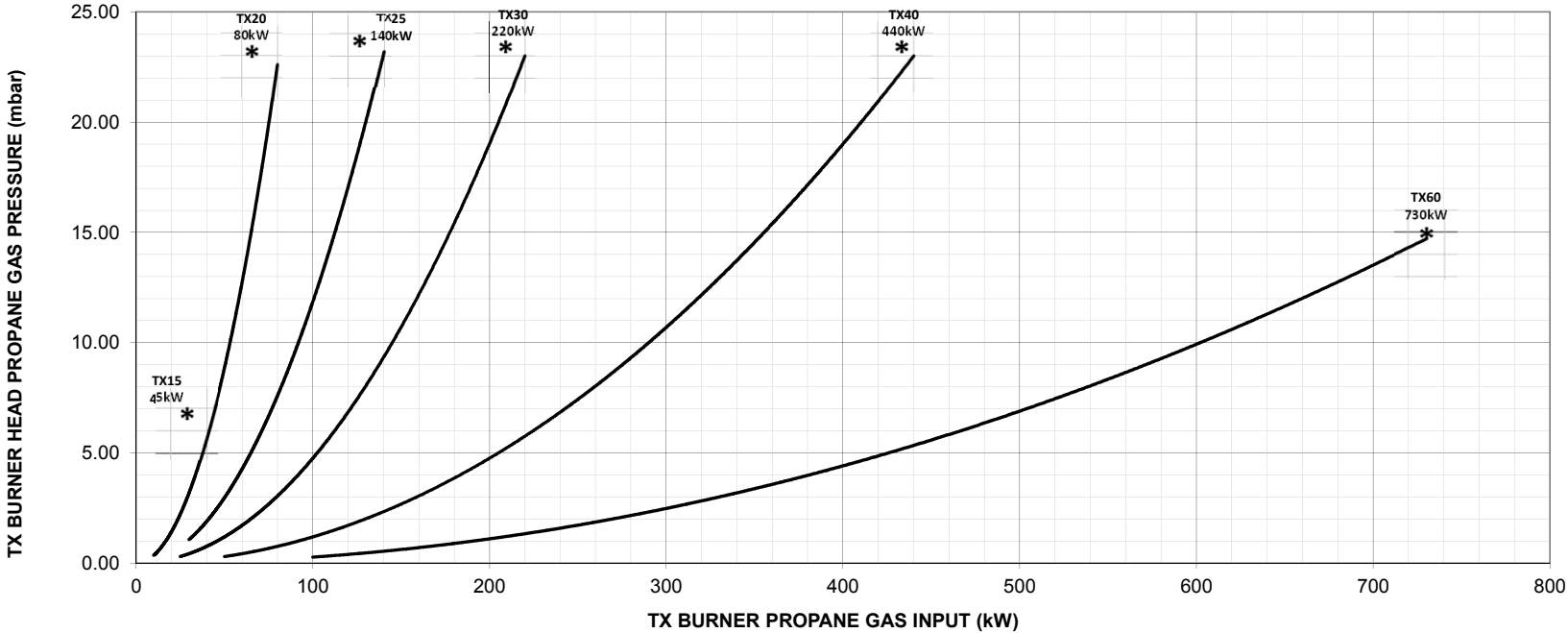
FINALLY replace all pressure test points and complete a commissioning form similar to the sample contained in this manual.

IMPORTANT: IF FOR ANY REASON THE COMMISSIONING HAS NOT BEEN FULLY COMPLETED OR IF THERE IS A PROBLEM WITH THE GAS SUPPLY , FLUE, VENTILATION OR SAFETY CONTROLS THEN THE SYSTEM SHOULD NOT BE LEFT CAPABLE OF BEING RUN. THE OWNER / OPERATOR OF THE BURNER SYSTEM SHOULD BE MADE AWARE BEFORE LEAVING SITE.

LANEMARK
TX BURNER GAS INPUT v GAS PRESSURE
NATURAL GAS



LANEMARK
TX BURNER GAS INPUT v GAS PRESSURE
PROPANE



EXAMPLE OF TX BURNER COMMISSIONING REPORT FORM

CUSTOMER NAME: ……
SITE ADDRESS: ……

BURNER MODEL: ……**SERIAL No:** …… **GAS TYPE:** ……
CONTROL PANEL VOLTAGE:……**V GAS TRAIN TYPE:** ……
BURNER MOTOR POWER ……..…**kW VOLTAGE:**……..……**V RUN CURRENT:**……..……**Amp**
(The above can be found on the burner data plate stuck to the burner body and also a duplicate may be stuck in the inside cover of this manual)

PRECOMMISSIONING CHECKS:

1 BURNER EARTHED:…… **Y / N**
2 BURNER CONTROL PANEL ELECTRICAL INSTALLATION CHECKED:…..…….. **Y / N**
3 BURNER FAN MOTOR ELECTRICAL INSTALLATION CHECKED:…… **Y / N**
4 FAN MOTOR CURRENT COLD :……**Amp**
5 FAN MOTOR CURRENT HOT: ……..……**Amp**
6 FAN MOTOR OVERLOAD SET (COLD) TO: ……**Amp**
7 GAS INSTALLATION SOUNDNESS TESTED AND PURGED:…… **Y / N**
8 BURNER GAS TRAIN SOUNDNESS TESTED:…… **Y / N**
9 BURNER DRY RUN COMPLETED:…… **Y / N**

COMMISSIONING CHECKS

1 AIR DAMPER SETTING	**% OPEN**				
2 PRESSURE BEFORE DAMPER COLD	**mbar**				
3 PRESSURE BEFORE DAMPER HOT	**mbar**				
4 AIR PRESSURE SWITCH SETTING	**mbar**				
5 AIR PRESSURE AT BURNER HEAD GAS PRESSURE TEST POINT	**mbar**				

PILOT FLAME SETTINGS

1 PILOT BURNER HEAD PRESSURE	**mbar**				
3 FLAME SIGNAL	**(% or microamps)**				

MAIN FLAME SETTINGS

1 BURNER HEAD PRESSURE	**mbar**				
2 FLAME SIGNAL	**(% or microamps)**				
3 OXYGEN	**O2 %**				
4 CARBON DIOXIDE	**CO2 %**				
5 CARBON MONOXIDE	**CO %**				
6 NET FLUE GAS TEMPERATURE	**°C**				
7 PROCESS TEMPERATURE	**°C**				
8 GAS FLOW RATE	**M^3/h**				

OTHER

1 TEMPERATURE CONTROLLER SET POINT	**°C**				
2 TEMPERATURE CONTROLLER ALARM POINT	**°C**				
3 FLUE AND VENTILATION SATISFACTORY	**Y/N**				

NOTES:

SIGNED: **FOR:** **DATE:**

SECTION 9 MAINTENANCE

CLEANING AND MAINTENANCE

MAINTENANCE IN THE UK CAN ONLY BE CARRIED OUT BY SUITABLY QUALIFIED TECHNICIANS WHO ARE GAS SAFE AND ACS REGISTERED TO DO THIS WORK. FOR OTHER COUNTRIES LOCAL REGULATIONS MUST BE OBSERVED.

Maintenance should be carried at intervals depending on the hours run and the application of the burner. For burners running continuously this could be up to four times a year but never less than once a year.

CLEANING THE BURNER HEAD ASSEMBLY

1. Isolate the gas supply at the service gas cock provided as part of the gas train. Isolate all electrical supplies to the burner and its flue fan.
2. Remove the back cover plate from the burner body. Disconnect the ignition and flame detection leads from the electrodes set taking a note of which is which.
3. Break the union to the burner head and remove the complete burner head assembly. See *Figure 1 Burner Head And Electrode*.
4. The burner will typically have a light covering of dust on the head and the perforated flame tube. This should be removed with a lint free rag or a soft brush and vacuumed up if necessary. This dust should be treated with care. A disposable mask and safety goggles should be worn to prevent the possibility of inhaling this dust or getting any dust in the eyes.
5. The burner electrode set should be checked for their serviceability and generally they will be replaced yearly.
6. The electrodes should be set as shown in the drawing contained in this manual. See *Fig 2 Electrode.*

7. Replacement of the burner head assembly is the reverse of the above.
8. After each service visit the integrity of the gas safety valves and the soundness of any gas pipework disturbed must be shown to be safe, as given previously under *Precommissioning Gas*. The burner settings must be checked as given previously under *Commissioning* and a written record made.

PROCESS TANK AND HEAT EXCHANGER

1. Check temperature and liquid level probes for correct operation.
2. Remove sludge that has built up in the bottom of the process tank, this must not be allowed to build up and come into contact with the heat exchanger.
3. Remove any scale that has built up on the heat exchanger or debris that has gathered. It is important that the heat exchanger is only in contact with the process liquid for efficient heat transfer.

THE EXHAUST FAN

1. The fan will not normally require cleaning other than the surface of the motor to ensure adequate cooling.

2. Visually inspect the fan casing and ducts for signs of deformity or deterioration.

3. A drain plug is fitted at the bottom of the fan casing. Undo the plug to drain any condensate. Excessive condensation indicates that the flue requires insulation or the burner combustion checked.

GAS TRAIN AND CONTROLS

The following checks should be made annually.

1. The operation and soundness of the isolating gas cocks on the gas train should be checked. This should be done by pressure testing up to the seal of these ball valves and establishing that there is no loss of pressure in a similar way to that used for testing the main gas valve seats.
2. The gas soundness of the gas train gas valves and associated pipe work should be checked as given previously under *Precommissioning Gas*.
3. The setting of the air pressure switch and the lockout function of the burner's control box to an incorrectly set pressure switch or lack of pilot stage start gas should be rechecked. This should be done as given previously under *Commissioning Dry Run*.
4. The gas train and control panel should be visually inspected to look for obvious signs of damage or deterioration.

FiG 1 BURNER HEAD AND ELECTRODES

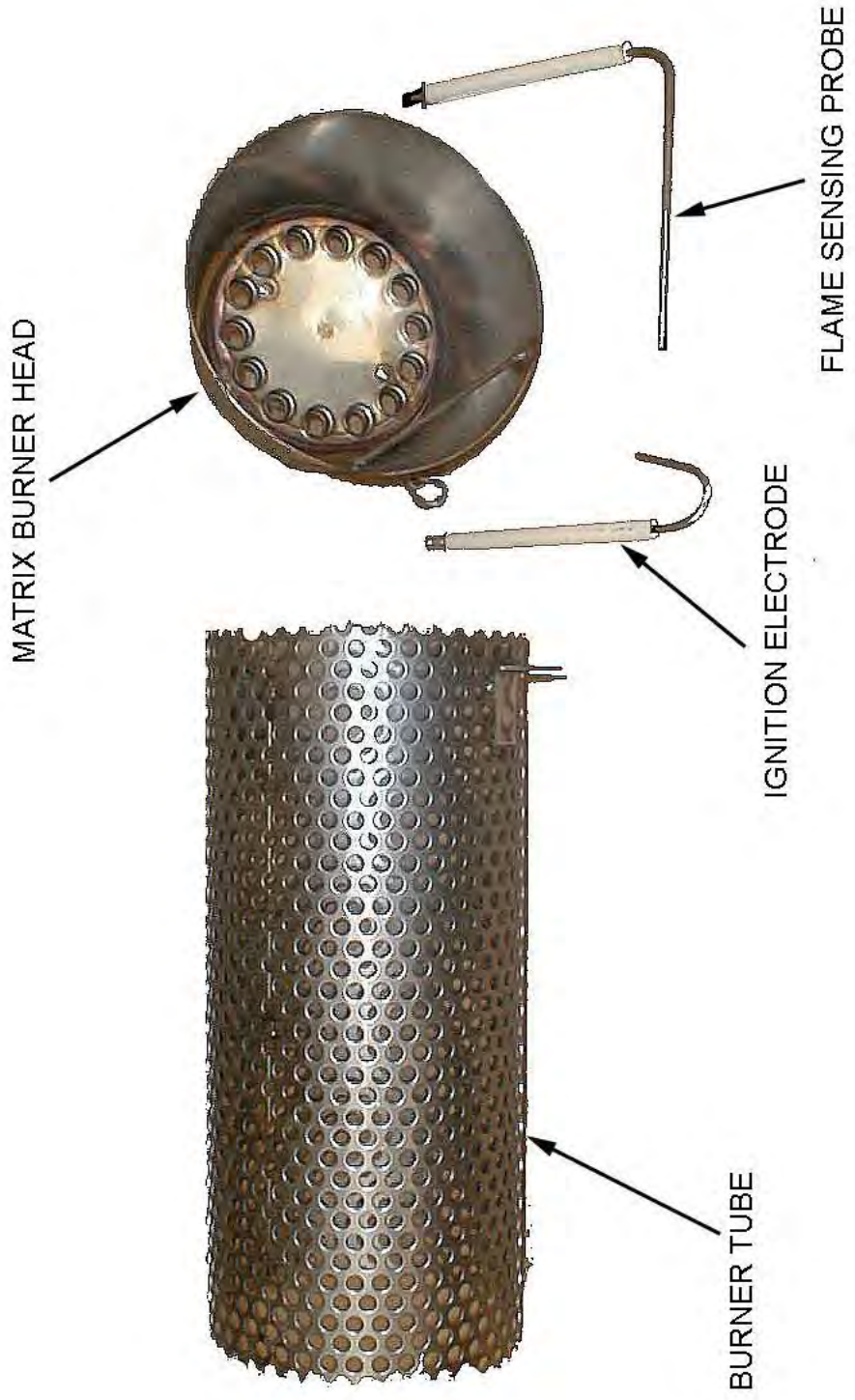


Fig 2a ELECTRODE SETTINGS TX15/ TX20/ TX25E & TX40

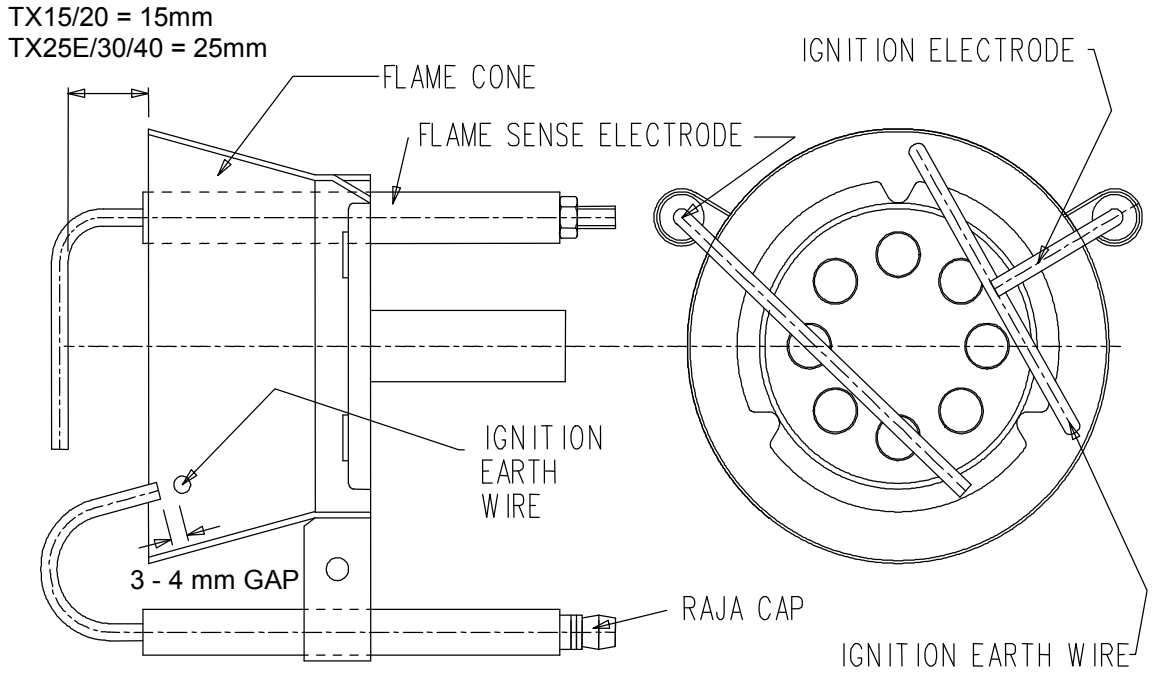
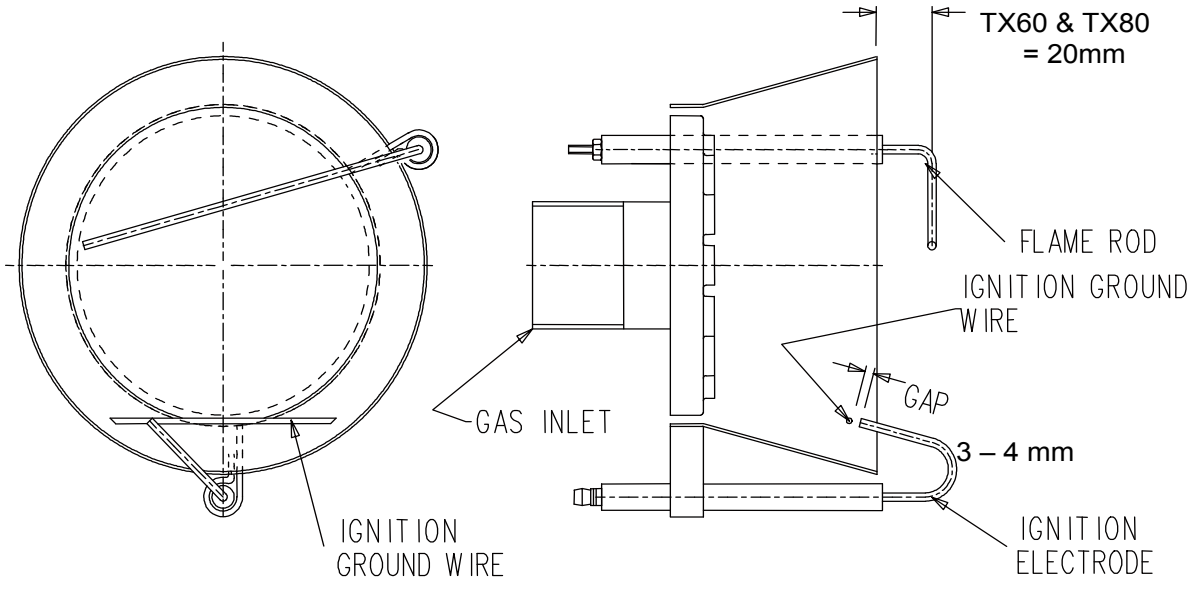


Fig 2b ELECTRODE SETTINGS TX60 & TX80



SECTION 10 FAULT FINDING

NOTE: If the fault persists and the cause cannot be isolated, contact Lanemark Combustion Engineering Ltd to arrange for a visit by one of our Service Engineers.

Lanemark Combustion Engineering Ltd,
Whitacre Rd,
Nuneaton,
Warwickshire.
CV11 6BW

Tel: 024 7635 2000
Fax: 024 7634 1166

Tel Int: + 44 (0) 24 7635 2000
Fax Int: + 44 (0) 24 7634 1166

Web site : http://www.lanemark.com
e-mail : info@lanemark.com

FAULT FINDING GENERAL - SIEMENS LME21 BURNER CONTROLLER

SYMPTOM	FAULT	ACTION
Burner's Siemens burner controller at *lockout* or not attempting to start.	Burner fault or safety interlocks holding the burner off. The supply voltage is above/below the nominal supply voltage value (110 or 240V) and the Burner Controller will not operate. The remote burner lockout reset has been continuously switched on.	Refer to the later section specifically on burner control faults. Correct the supply voltage. Release the reset switch.
Process temperature rising above the required temperature.	Thermostat is set incorrectly. Thermostat is not sensing a representative process temperature. Thermostat is not switching down to low fire or modulating downwards. Low fire is set too high,	Reset thermostat. Check the actual temperature in the area of the sensor. Check the wiring and settings of electronic controls and replace if necessary. Reset low fire.
Process temperature fails to reach the required temperature.	Thermostat is set incorrectly. Thermostat is holding burner in low fire or not modulating upwards. The burner performance has not been matched to the process requirement. The process conditions have been changed since commissioning. High fire coil has failed.	Reset thermostat. Check the wiring and settings of electronic controls and replace if necessary. Recommission the burner. Recommission the burner. Replace coil.
Evidence of poor combustion conditions e.g. sooting or smells.	Original commissioning settings have been altered. **Do not use equipment**	Recommission the burner.

FAULT FINDING TEMPERATURE CONTROLLERS

SYMPTOM	FAULT	ACTION
Burner runs to ignition and the temperature controller switches the burner off and it attempts to cycle again.	The ignition spark is interfering with the electronics of the temperature controller.	Check that the ignition spark plug cap is an original part or replacement and suppressed with a 5 kilo ohm resistor.

FAULT FINDING GAS VALVES

SYMPTOM	FAULT	ACTION
1st valve or governor will not open.	High pressure gas trapped between 1st and 2nd main valve seats and locking up 1st valve.	Remove test point between seats. Tap valve to release 1st valve seat. Open up by-pass valve to allow more gas to flow.
2nd main valve not opening.	The throughput restrictor has been fully or almost fully closed. The slow opening adjuster is set to the *slowest* opening. Coil failed.	Open up the through put restrictor and increase the speed of lift of the slow opening adjuster. Replace faulty coil.
No pilot/start gas.	The adjuster on the pilot / start gas valve closed or nearly fully closed. Pilot coil failed.	Use the adjuster to increase the pilot/start gas flow. Replace pilot coil.

FAULT FINDING BURNER CONTROLS SIEMENS LME21 BURNER CONTROLLER

The burner faults can be diagnosed by looking at the flashes on the Siemens LME21 burner controller.

SYMPTOM	FAULT	ACTION
Burner at lockout and will not reset.	Burner Controller is seeing a flame signal.	Look for flame being present due to the gas valves having failed to close.
	Fault on remote reset.	Check that terminal 8 is not being held at permanent neutral which initiates remote reset of the box.
	Burner Controller is faulty.	
	Faulty burner controller.	Replace Burner Controller.

Control on but no Lights on the display .	Control circuit not complete. Air pressure switch is in the normally open position i.e. it is sensing air when an air flow signal should not be present.	Check for continuity between terminals 12B, 12A, 12. Check that any interlocks fitted in this circuit are calling. Look at the wiring to the air pressure switch and establish if the air pressure switch has stuck at normally open (n/o), if so replace the switch. If the oven has its own fan the draught from this fan may be holding the air pressure switch at normally open. There are 2 off 3 way air valves fitted into the 2 off air sensing pipes and these should be venting the air pressure switch to atmosphere. Check that these 3 way valves are not fitted in the wrong direction or have stuck in the wrong position. Check that the pipes are not blocked
Burner starts but *locks out* after the orange light has been on	The air pressure switch has not detected that the burner fan is running and moved across to the normally open position within 65 seconds.	Check that the fan motor auxiliary contact has pulled in across terminals 11-11A. Check that the 2 off 3-way air valves are being energised and not venting the air pressure being created to atmosphere. Check that the air pressure switch contacts are changing across. Use a manometer to measure the actual differential air pressure being created and compare this to the pressure switch setting.
Lockout after the orange light and when the light is green.	Air pressure switch has returned to the normally closed position.	Check with a manometer the air pressure being seen and the operation of the switch. Check the 3 way air valves are venting the pressure being generated.
Pilot flame established but lockout after orange flashing light.	Failure to detect the start gas flame.	Check the ionisation current. It should be a minimum of 3 microamps dc for a flame rod or 3 microamps for a U.V cell. Check the position of the detection probe and the connections to it. Check if the pilot flame is too weak or being over aired. If UV cell clean the sight glass. Replace controller or U.V cell.

Pilot flame NOT established lockout at green.	Failure to provide gas and or air.	Check that the gas supply is on and that the start gas valve is opening and that gas pressure is reaching the burner head. Check that the pilot stage is not being over aired or under gassed and producing a mixture that will not light.
	Failure to provide a spark.	Check the ignition probe spark gap. Check that the probe is not earthing and the connections are OK. Check that the ignition transformer is being energised via terminal 7.
Lockout after green light.	Unstable pilot flame.	Check the flame signal strength as given previously and look for a dip in signal. Adjust the start gas rate or the air damper as appropriate.
	Weak flame signal. Unstable main flame as main valves open.	Check the position of the flame sensing probe and the connections. Put a manometer on the burner head test point. Look for the gas pressure increasing progressively. If the pressure increases rapidly when the main valve opens, check for excessively high inlet gas pressure. Check the setting and operation of the governor.
	Weak main flame signal.	Check that the flame detection probe is positioned as given in this manual.

FAULT FINDING BURNER CONTROLS SIEMENS LME21 BURNER CONTROLLER

The burner faults can be diagnosed by looking at the indicator light on the burner controller.

Color code table for multicolor signal lamp (LED)		
Status	**Color code**	**Color**
Waiting time «tw», other waiting states	❍.....	Off
Ignition phase, ignition controlled	● ❍ ● ❍ ● ❍ ● ❍ ● ❍ ●	Flashing yellow
Operation, flame o.k.	□.....	Green
Operation, flame not o.k.	□ ❍ □ ❍ □ ❍ □ ❍ □ ❍	Flashing green
Extraneous light on burner startup	□ ▲ □ ▲ □ ▲ □ ▲ □ ▲	Green-red
Undervoltage	● ▲ ● ▲ ● ▲ ● ▲ ● ▲	Yellow-red
Fault, alarm	▲.....	Red
Error code output (refer to «Error code table»)	▲❍ ▲❍ ▲❍ ▲❍	Flashing red
Interface diagnostics	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	Red flicker light

..... Steady on
❍ Off

▲ Red
● Yellow
□ Green

Error code table		
Red blink code of signal lamp (LED)	**«AL» at term. 10**	**Possible cause**
2 blinks	On	No establishment of flame at the end of «TSA» - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
3 x blinks	On	«LP» faulty - Loss of air pressure signal after «t10» - «LP» is welded in normal position
4 blinks	On	Extraneous light when burner startup
5 blinks	On	Time out «LP» - «LP» is welded in working position
6 blinks	On	Free
7 blinks	On	Too many losses of flame during operation (limitation of repetitions) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner
8 x blinks	On	Free
9 blinks	On	Free
10 blinks	Off	Wiring error or internal error, output contacts, other faults
14 blinks	On	CPI contact not closed

During the time the cause of fault is diagnosed, the control outputs are deactivated
- Burner remains shut down
- External fault indication remains deactivated
- Fault status signal «AL» at terminal 10, according to the error code table

The diagnostics of the cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button for about 1 second (< 3 seconds).

NOTE: With 10 & 14 Blink faults there is no lockout indication.

SECTION 11 COMPONENT REPLACEMENT

COMPONENT REPLACEMENT

COMPONENT REPLACEMENT CAN ONLY BE CARRIED OUT BY SUITABLY QUALIFIED TECHNICIANS WHO WILL BE GAS SAFE & ACS REGISTERED SPECIFICALLY TO UNDERTAKE WORK ON INDUSTRIAL GAS BURNERS

ONLY ORIGINAL EQUIPMENT SPARES SUPPLIED BY LANEMARK COMBUSTION ENGINEERING SHOULD BE FITTED TO THESE BURNERS TO ENSURE THE SAFE AND CORRECT OPERATION OF THE BURNER.

ISOLATE THE GAS SUPPLY AT THE SERVICE GAS COCK PROVIDED AS PART OF THE GAS TRAIN. ISOLATE ALL ELECTRICAL SUPPLIES TO THE BURNER.

IGNITION AND FLAME DETECTION PROBES

1. To replace the ignition and flame detection probe set follow the instructions as given previously in this manual under M*aintenance – cleaning the burner head assembly.*

BURNER HEAD ASSEMBLY

1. To replace the burner head follow the instructions as given previously in this manual under M*aintenance – cleaning the burner head assembly.*

FAN IMPELLER AND MOTOR

1. Generally this will not require replacing during a routine service.

GAS VALVE COILS

Warning - Solenoid coils run hot in operation, allow sufficient time for them to cool before removal.

1. Remove the electrical connections to the gas valve by removing the push on plug caps or the connections to the valve terminal blocks. Make a note of the position of the connections to aid replacement later.
2. Remove the coil from the body of the gas valve by releasing the fixing nut or retaining clip on the top of the gas valve. This fixing may be located under a plastic cover.
3. Fit a new coil as the reverse of the above. Ensure that the replacement is the same voltage as that removed.
4. After such work the integrity of the gas safety valves and the soundness of any gas pipework disturbed must be shown to be safe, as given previously under *Precommissioning Gas*. The burner settings must be checked as given previously under *Commissioning* and a written record made.

GAS VALVES BODIES

1. Remove the electrical connections to the gas valves by removing the push on plug caps or the connections to the valve terminal blocks. Make a note of the position of the connections to aid replacement later.
2. Fit a temporary earth continuity connection and then break the gas unions on the burner gas train.
3. Remove the faulty gas valve body and replace using a new “O” Ring or replace pipework using a proprietary gas jointing compound. Ensure that the direction of gas flow through the gas valve is correct by looking for the *direction arrow* stamped on the casting.
4. Replace the complete gas train assembly as the reverse of the above.
5. After such work the integrity of the gas safety valves and the soundness of any gas pipework disturbed must be shown to be safe, as given previously under *Precommissioning Gas*. The burner settings must be checked as given previously under *Commissioning* and a written record made.

BURNER PROGRAMMER

1. Release the fixing screw holding the Burner Programmer box (Satronic, Landis, Honeywell or similar) to its base and pull the box out.
2. Replace as the reverse of the above.
3. The burner settings must be checked as given previously under *Commissioning* and a written record made.

IGNITION TRANSFORMER

1. Release the live, neutral and earth electrical connections from the ignition transformer.
2. Unscrew the ignition cable from the transformer.
3. Release the fixing screws and remove the ignition transformer complete.
4. Replace as the reverse of the above. Care must be taken that a good connection is made with the ignition cable onto the transformer body.
5. The burner settings must be checked as given previously under *Commissioning* and a written record made.

MODULATING MOTOR (IF FITTED)

1. Remove the plastic cover over the motor and release the electrical connections. Note where these electrical connections go.
2. The shaft of the ball valve will have an *index* mark. Note the position of this mark relative to the clamp that grips it.
3. Release the clamp and the screws holding the motor body.
4. Turn the motor over and note how the splined shaft is aligned relative to its indexing mark. A Data Sheet for the motor is contained in this manual giving more details of this. Note how the small switches on the Printed Circuit Board are set as these determine the direction of travel and the type of control signal used.
5. Set the splined shaft and switches on the new motor as per the old motor.
6. Refitting is the reverse of the above.
7. The burner settings must be checked as given previously under *Commissioning* and a written record made. In particular the bottom end stop of the modulating motor must be set sufficiently open to allow enough gas to pass for reliable starting of the burner.

3 WAY AIR VALVE

1. Release the electrical plug cap from the coil of the valve.
2. Release the retaining nut from the stem of the valve and the coil can now be lifted away.
3. If the valve body itself is faulty the body can be released from the plastic tubes by releasing the push on pipe connections. A screwdriver should be used to push the collars inwards then the pipe can be pulled out.
4. Release the valve body if necessary by releasing the backnut holding the valve to the backplate.
5. Replace as the reverse of the above.
6. If the 6mm plastic pipes have been disturbed care should be taken that these have been replaced correctly and a good air tight seal made.
7. The burner settings must be checked as given previously under *Commissioning* and a written record made.

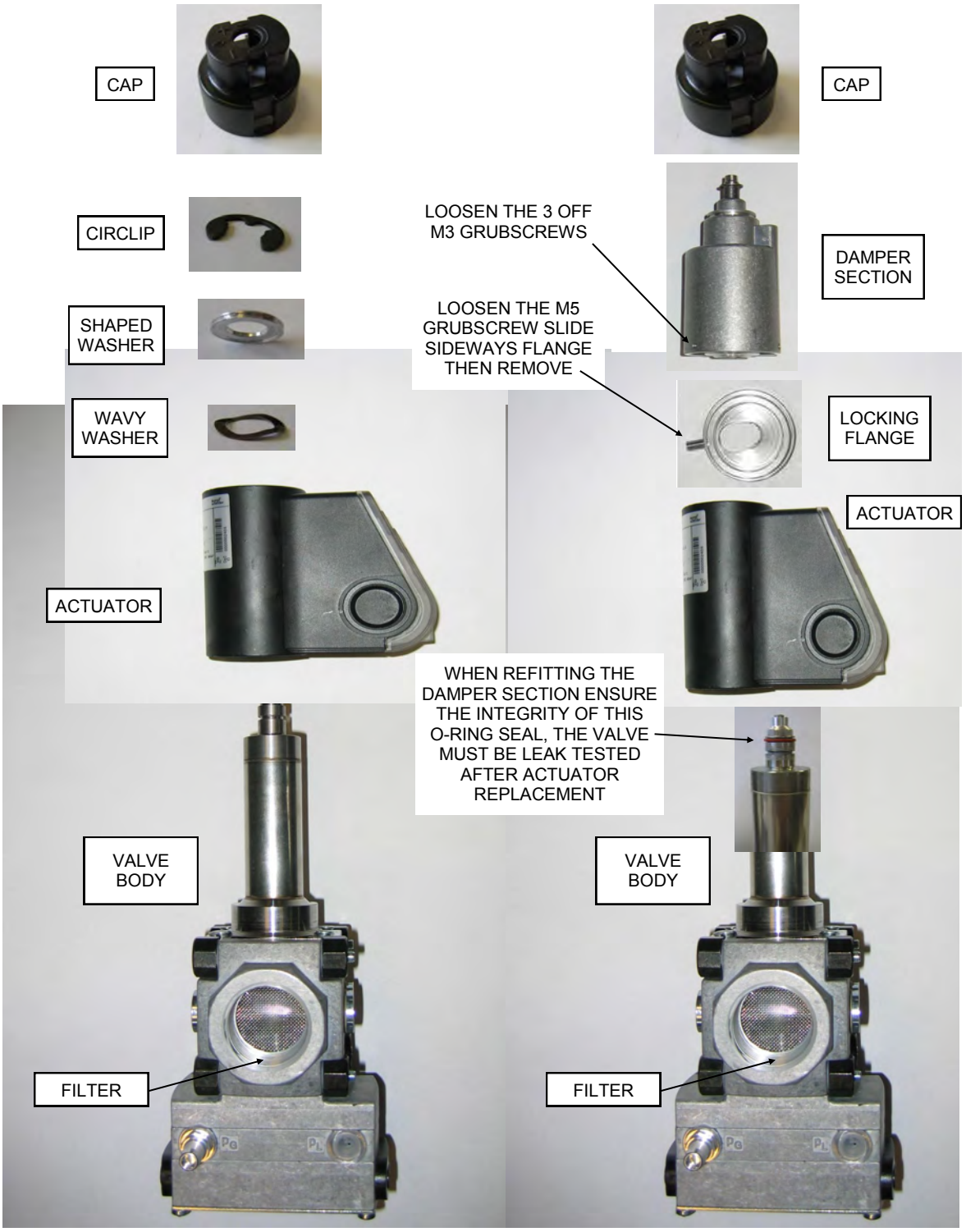
AIR PRESSURE SWITCH

1. Remove the plastic cover over the pressure switch and release the electrical connections and the switch fixing screws.
2. Replace as the reverse of the above.
3. The burner settings must be checked as given previously under *Commissioning* and a written record made.

REPLACEMENT OF ACTUATOR ON KROMSCHRODER VALVES

FIXING OF ACTUATOR ON VALVE BODY

FAST OPENING

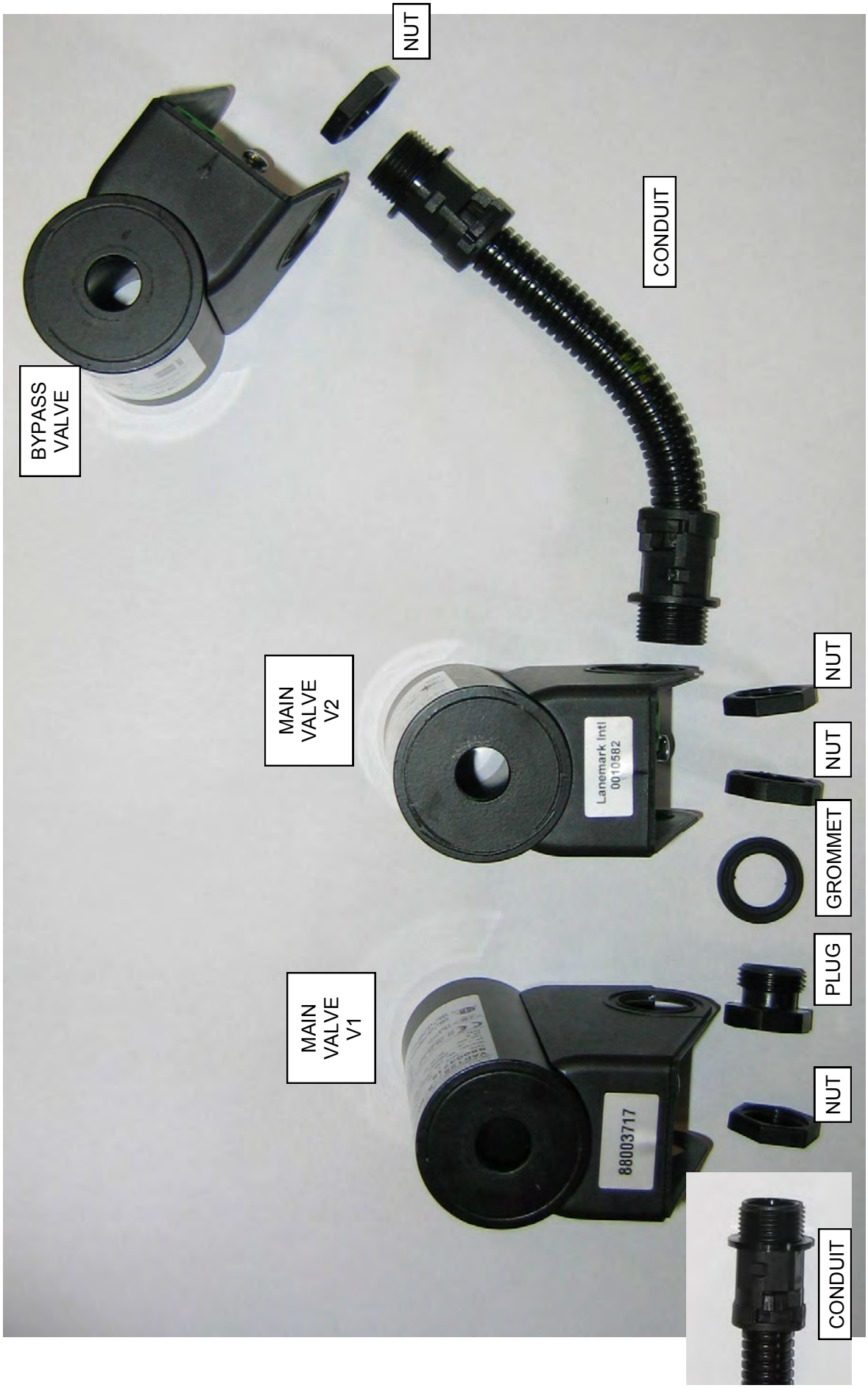


FIXING OF ACTUATOR ON VALVE BODY

SLOW OPENING

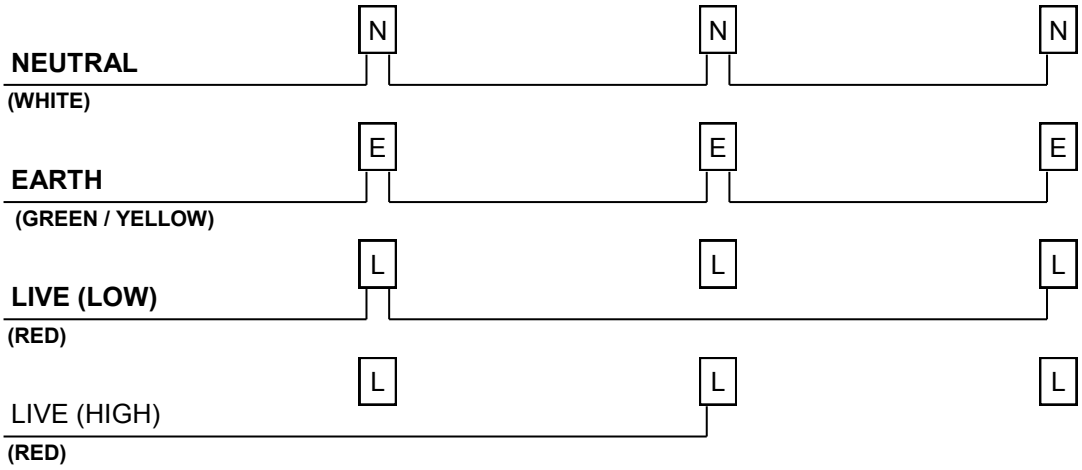
Part Numbers: **VA1 230V = 10771** **VA2 230V = 10773** **VBY 230V = 10779**
VA1 110V = 10772 **VA2 110V = 10774** **VBY 110V = 10778**

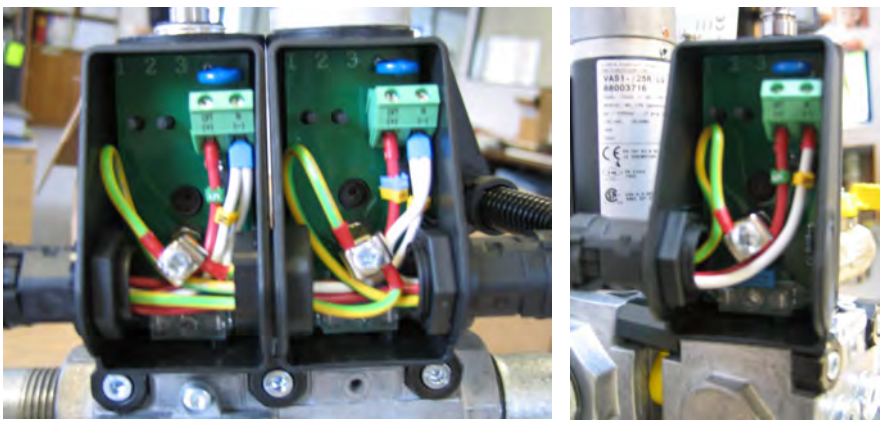
WIRING OF KROMSCHRODER VALVES



WIRING OF KROMSCHRODER VALVES

MAIN VALVE V1	MAIN VALVE V2	BY-PASS VALVE





NOTE:- TO REPLACE ANY SOLENOID FIRST ISOLATE THE POWER SUPPLY, REMOVE THE FRONT COVER AND DISCONNECT THE WIRING AND CONDUIT AS REQUIRED. FOR REPLACEMENT OF VALVE ACTUATORS ON V1 OR V2 IT WILL BE NECESSARY TO DISCONNECT THE NEUTRAL ON THE BYPASS VALVE AND

SECTION 12 SPECIAL FEATURES

If any Special Features were designed and supplied with a burner details will be contained in this section. This could be Data Sheets for special components and additional operating and commissioning instructions.

SPECIAL FEATURES

If any Special Features were designed and supplied with a burner details will be contained in this section.

This could be Data Sheets for special components and additional operating and commissioning instructions.

SECTION 13 RECOMMENDED SPARES

If this manual was sent out with a burner then the Recommended Spares list will be contained in this section of the manual for the burner and any accessories e.g. Temperature Controllers.

LANEMARK
COMBUSTION ENGINEERING

Job No: **J****

Part No	Description	TX20N

ESSENTIAL SPARES

0010031	3-WAY AIR VALVE ASSEMBLY (230V)
0010771	KROMSCHRODER GAS VALVE COIL VA1 (230V)
0011992	PRESSURE SWITCH DG50UG- 4 (2.5-50MB) 84447020 - IP65
0012027	DUNGS AIR PRESSURE SWITCH LGW50A2 (2.5-50mbar)
0013023	MCT IGNITION TRANSFORMER (230V)
0013032	NGK IGNITION ELECTRODE CAP LB05E
0013033	NGK FLAME SENSE ELECTRODE CAP LB05F
0013041	CONTROL BOX FUSE (3.15A) 20x5mm
0013050	CONTROL BOX FUSE (1A) 0210
0013201	FINDER SINGLE RELAY (230V)
0013443	SIEMENS BURNER CONTROL BOX LME21.350 (230V)
0013564	FINDER DOUBLE RELAY (NARROW) (230V)
0013569	FINDER SINGLE RELAY (24VDC)
0016038	TX15/20 IGNITION ELECTRODE Drg 82060
0016039	TX15/20 FLAME SENSING ELECTRODE

OTHER SPARES

0010595	KROMSCHRÖDER BYPASS GAS VALVE VAS1 (230V)
0010855	KROMSCHRÖDER GAS VALVE VCD1 1" 230V excl. LGPS
0050101	TX20 FLAME TUBE Drg No 45089/2
0050250	TX15/20 NATURAL GAS BURNER HEAD
9681004	EXHAUST FAN 24/150DF UNI/R90 (400V/3ph/50Hz/2.2kW)
FB81059	TX EXHAUST FAN IMPELLOR 24/150DF - (M/S)
FB81083	TX EXHAUST FAN MOTOR24/150DF 400V/3ph/50Hz/2.2kW/WEG

INFORMATION ONLY

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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

SECTION 14 HEALTH AND SAFETY

C.O.S.H.H (CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH)

The burner as delivered including packaging contains no chemicals or substances that represent a hazard to health during installation or operation if installed in accordance with these instructions.

GASKETS

The gaskets as supplied as original equipment are ceramic fibre with binder. They are pre-cut to shape and prefitted to the burner. These gaskets do not need cutting on site.
For service work when fitting new gaskets, use gloves and protective goggles and do not allow this material to come into contact with the skin, eyes or inhale or ingest it.

PAINTS

During first operation there may be a faint smell but if the burner is operated in an area ventilated in accordance with this manual this represents no hazard.

SEALENTS

Gas tight joints are made with a proprietary gas jointing compound and no other chemical sealants are used. Gaskets are fixed with silicone based adhesive.

HEALTH AND SAFETY

The following should be considered when installing, operating or servicing this burner.

LIFTING

The weight of the burner and fan or heat exchanger should be assessed before lifting commences. The gas train may be removed if necessary to reduce the weight of the burner and so aid safe lifting.
Two persons may be required to lift larger fans and heat exchangers.
Burners, fans and heat exchangers should not be left unsupported.

SHARP EDGES

Any sheet metal edge that does not have a safety edge or protective covering should be handled with gloves.

ELECTRICAL

THIS BURNER MUST BE EARTHED

The burner must only be installed and maintained electrically by trained competent electricians.

GAS

In the UK this burner must only be commissioned and maintained by trained and competent technicians who are GAS SAFE and ACS registered specifically for industrial gas burners. For other countries local regulations must be observed.

RECYCLING

The burner is made from:

Mild and stainless steel sheet and tube.
Aluminium / cast iron castings.
Copper wire and windings.
Plastic switches, terminals, controls etc.

These burners contain the minimum of welding and they can easily be unassembled into their main material group. Approximately 95% by weight can be recycled.

DISPOSAL OF PACKAGING AND BURNER

The cardboard box and polyurethane packing can be recycled or disposed of to an appropriate facility.

The burner body can be stripped down and the materials recycled or disposed of to an appropriate facility.

Lanemark Combustion Engineering Ltd would be pleased to receive back by prior arrangement the burner or its packaging for recycling.

FLUING TX BURNERS INSIDE BUILDINGS

'Lanemark Combustion Engineering Ltd recommends that flues should ***always*** discharge outside the building.

However, there is no UK regulation, applicable in a factory that specifies this action.

End users may decide it is safe to terminate the flue inside the building but ***only*** if they have carried out stringent risk assessments. The end user, as the employer of the operatives in the building, should take advice from the Health and Safety Executive, either directly or by reference to its publications e.g. Guidance Note EH22 ' Ventilation of the Workplace'.

Lanemark Combustion Engineering's Service Engineers are GAS SAFE & ACS certified as required by UK law.

If an end user has flues terminating inside a building, a Service Engineer ***may*** ask to see the relevant hazard assessments and HSE documentation before commencing work on the gas equipment. Such a request will be to reassure the Service Engineer, who has a legal obligation to take care of his own safety and that of others, that the area is considered safe and that he is complying with ACS regulations'.

SECTION 15 NOTES

NOTES

CUSTOMER NAME: ……………………………………………………………………………………………………
SITE ADDRESS: ………………………………………………………………………………………………………

BURNER MODEL: ……………………**SERIAL No:** ……………………… **GAS TYPE:** …………………………
CONTROL PANEL VOLTAGE:……………**V** **GAS TRAIN TYPE:** ………………………………….……………..
BURNER MOTOR POWER …………….**kW** **VOLTAGE:**……………**V** **RUN CURRENT:**…………….**Amp**
(The above can be found on the burner data plate stuck to the burner body and also a duplicate may be stuck in the inside cover of this manual)

DATE	NOTES	SIGNED

This manual is also available in PDF format. Please quote the Job Number on the front.

L A N E M A R K C O M B U S T I O N E N G I N E E R I N G L T D

L A N E M A R K H O U S E W H I T A C R E R D N U N E A T O N E N G L A N D C V 1 1 6 B W
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