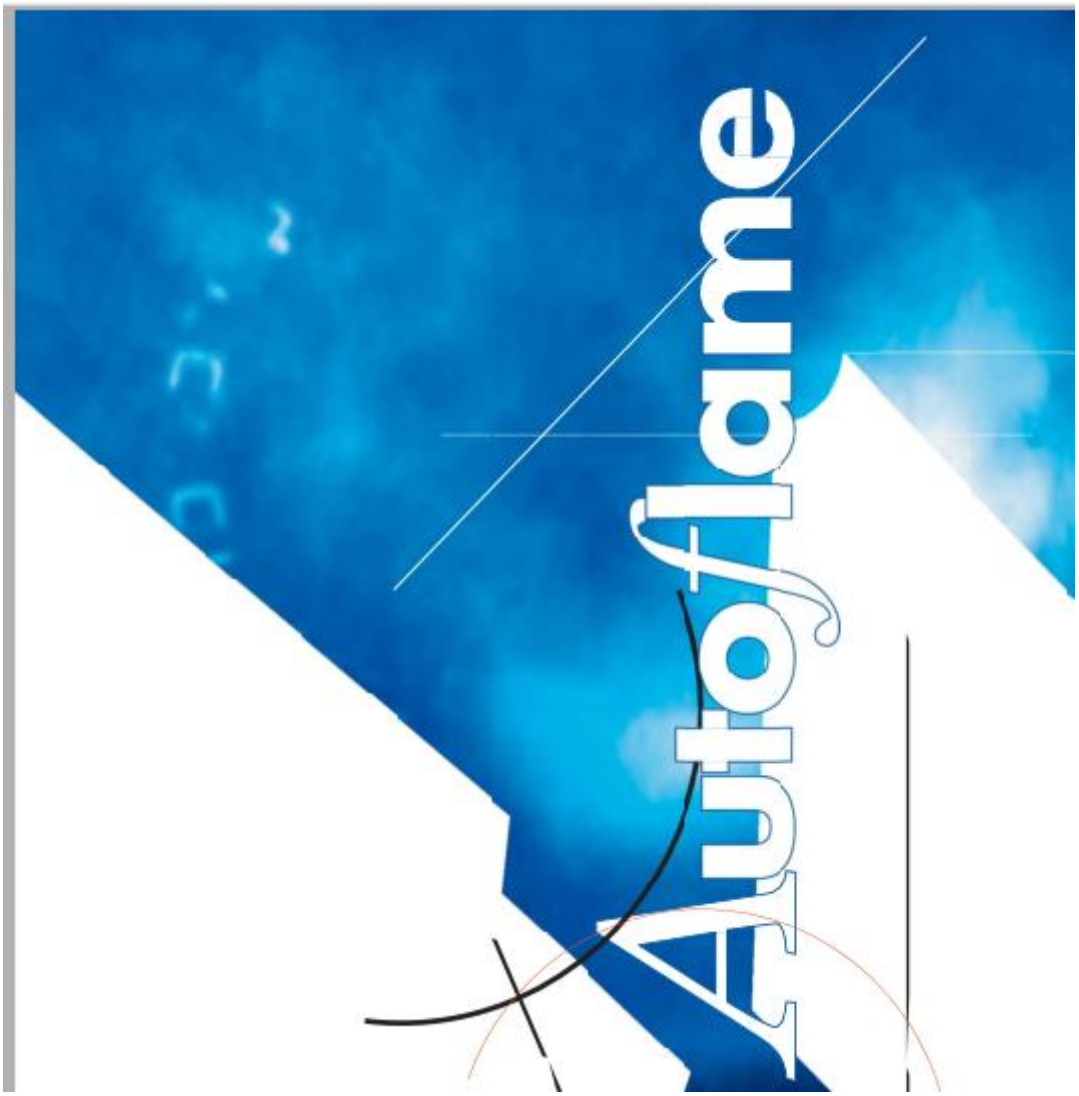

Min Mk8 M.M
End User Guide
Mk8微型控制模块
终端用户指南

AUTOFLAME®

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终端用户指南

Issued by:
发布公司：
AUTOFLAME ENGINEERING LTD
AUTOFLAME工程有限公司
Unit 1-2, Concorde Business Centre
Airport Industrial Estate, Wireless Road
Biggin Hill, Kent TN16 3YN
Tel电话: +44 (0)845 872 2000
Fax传真: +44 (0)845 872 2010
Email电子邮件: salesinfo@autoflame.com
Website网站: http://www.autoflame.com/

Registered Holder:注册持有人：
Company:公司：
Department:部门：

Important Notes
重要说明

A knowledge of combustion related procedures and commissioning is essential before embarking work on any of the M.M./E.G.A. systems. This is for safety reasons and effective use of the M.M./ E.G.A. system. Hands on training is required. For details on schedules and fees relating to group training courses and individual instruction, please contact the Autoflame Engineering Ltd. offices at the address listed on the front.
为了安全有效地使用控制模块/EGA系统，控制模块/EGA系统的操作员必须具有与燃烧相关的流程知识和调试知识。我们要求操作员参加实践培训，请按首页所述地址联系上Autoflame办公室详细了解团体培训课程和个别辅导的时间和费用。

Short Form - General Terms and Conditions
一般条款

A full statement of our business terms and conditions are printed on the reverse of all invoices. A copy of these can be issued upon application, if requested in writing.
所有发票背面均都印有我方商业条款全文。客户可书面申请获取我公司的商业条款文件。

The System equipment and control concepts referred to in this Manual MUST be installed, commissioned and applied by personnel skilled in the various technical disciplines that are inherent to the Autoflame product range, i.e. combustion, electrical and control.
仅有专业人员才能安装、调试、使用本手册所提及的系统设备和控制原理。他们必须精通**Autoflame**产品所涉及的燃烧、电气和控制等技术学科。
The sale of Autoflame's systems and equipment referred to in this Manual assume that the dealer, purchaser and installer has the necessary skills at his disposal. i.e. A high degree of combustion engineering experience, and a thorough understanding of the local electrical codes of practice concerning boilers, burners and their ancillary systems and equipment.
经销商、采购商和安装人员必须具有丰富的燃烧工程从业经验、全面了解当地涉及锅炉、燃烧器和辅助系统**/**设备相关的电气行业规范方能使用本手册提及的**Autoflame**系统和设备。

Autoflame's warranty from point of sale is two years on all electronic systems and components.
One year on all mechanical systems, components and sensors.
Autoflame保修条款**:** 对所有电子系统和部件实行两年售后保修；
对所有机械系统、部件和传感器实行一年售后保修。
The warranty assumes that all equipment supplied will be used for the purpose that it was intended and in strict compliance with our technical recommendations. Autoflame's warranty and guarantee is limited strictly to product build quality, and design. Excluded absolutely are any claims arising from misapplication, incorrect installation and/or incorrect commissioning.
保修前提**:** 所有设备均按预期使用目的使用并严格遵守我方提供的的技术建议。**Autoflame**产品保修条款仅适用于产品制造质量问题和设计问题。根据保修条款，**Autoflame**不接受因误操作、误安装和**/**或调试导致的任何索赔请求。

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1 OVERVIEW AND BENEFITS 概述与优点

1.1 Features and Benefits 特点与优点

Micro-Modulation (M.M.) / Flame Safeguard
微型控制与火焰防护

- Fuel/Air ratio control
- 油气比控制。
- Full colour touch screen
- 全彩色触摸屏。
- 120V or 230V Standard operation 50/60Hz
- 120V或230V标准操作50/60Hz。
- Controls up to 3 servomotors and 1 variable speed drive (VSD/VFD)
- 控制多达3个伺服电机和1个变速驱动(VSD/VFD)。
- 2 independent fuel programmes
- 2个独立的燃料方案。
- Fully adjustable PID load control for temperature or pressure
- 完全可调的温度或压力PID负载控制。
- Internal flame safeguard – full flame supervision with self-check UV, IR and Ionization
  内部火焰防护-自检查紫外线、红外线和离子化全火焰监测。
- Gas valve train leak supervision and high/low gas pressure monitoring
- 气阀门机构泄漏监测和燃气高/低压力监测。
- Air pressure proving and monitoring
- 气压试验和监测。
- 64 Lockouts/errors stored with date, time, phase and reset
- 64锁定/错误存储，带日期、时间、相位和复位。
- System log stored with date, time and status
- 系统日志存储，带日期、时间和状态。
- Single point change function for adding, removing and adjusting fuel/air positions on the commission curve
  单点变化功能，在调试曲线上增加、删除和调整燃料/空气位置。
- User definable optimum ignition position – golden start
- 用户自定义最佳点火位置–黄金启动位置。
- User definable flue gas recirculation start position
- 用户自定义烟气再循环起始位置。
- Variable servomotor travel speed
- 变量伺服电机行程速度。
- Adjustable burner control safety times
- 可调节燃烧器控制安全时间。
- External voltage load control
- 外部电压负载控制。
- Outside temperature compensation of boiler setpoint
- 锅炉设定点外部温度补偿。

- Second setpoint with run times
- 根据运行时间设定第二设定点。
- Hand/auto/ low flame hold
- 手动/自动/低火焰输入。
- Various boiler load detectors available
- 配备各种锅炉负载检测器。
- Fuel flow metering capability – instantaneous and totalized
- 瞬时和累积燃油流量计量能力。
- Password protection of all safety related functions
- 所有安全相关功能的密码保护。
- Infra-red port for upload/download of commissioning data
- 红外线端口上传/下载调试数据。

1 Overview and Benefits 概述与优点

Exhaust Gas Analyser (E.G.A.)

尾气分析仪

- 3 Parameter Trim of O2, CO2, and CO
- 氧气、二氧化碳和一氧化碳三种参数微调。
- Analysis of O2, CO2, CO, NO, exhaust gas temperature, efficiency and delta temperature
- 氧气、二氧化碳、一氧化碳、一氧化氮尾气温度、效率和delta温度分析。
- Optional analysis of NO2 and SO2
- 二氧化氮和二氧化硫可选性分析。
- Local display for re-calibration, changing cells, user configuration and stand-alone operation
- 本地显示重新校准、传感器、用户配置和独立操作。
- Upper/lower/absolute limits for O2, CO2, CO, NO and exhaust temperature
- 氧气、二氧化碳、一氧化碳、一氧化氮和排气温度上下绝对限值。
- Six 4-20mA output signals for interface with other controls/chart recorders
- 用于其他控件和图表记录器接口的六个4-20mA输出信号。

Intelligent Boiler Sequencing

智能锅炉排序

- System will sequence hot water boilers or steam boilers via lead/lag distribution
- 系统通过超前/滞后分布按顺序排列热水锅炉或蒸汽锅炉。
- Fully adjustable user options within the system to tailor sequencing operation to the application
- 系统中完全可调式用户选项，定制应用程序的排序操作。
- System control for isolation of valves or pumps (2 port valve operation)
- 对于阀门或泵隔离系统控制（2端口阀操作）。
- Standby setpoint and warming for lag boilers via a standby pressure and timing sequence aqua-stat
- 通过备用压力和时序水温自动调节器进行待机设定和滞后锅炉加热。

Remote Control/ Data Transfer Interface (D.T.I.)

远程控制/数据传输接口（D.T.I.）

- Direct Modbus communications from M.M. include remote setpoint and firing rate adjustment,enable/disable
- 启用或禁用控制模块直接Modbus通信，包括远程设定点和燃烧速率调节。
- D.T.I. will collect operational data for up to 10 M.M. modules, 10 E.G.A. modules, and 10 Universal I/O modules on one site.
- 数据传输接口将在一个站点搜集多达10个控制模块、10个尾气分析仪模块和10个通用输入/输出模块的运行数据。
- Information transmitted via RS422 or Ethernet link to a local PC/network for running Autoflame CEMS Audit Software
  通过RS422或连接本地计算机或网络（运行Autoflame CEMS Audit 软件）的以太网传输信息。

PC Compatible

计算机兼容性

- Download all commissioning data from an M.M. module to a PC via Download Manager

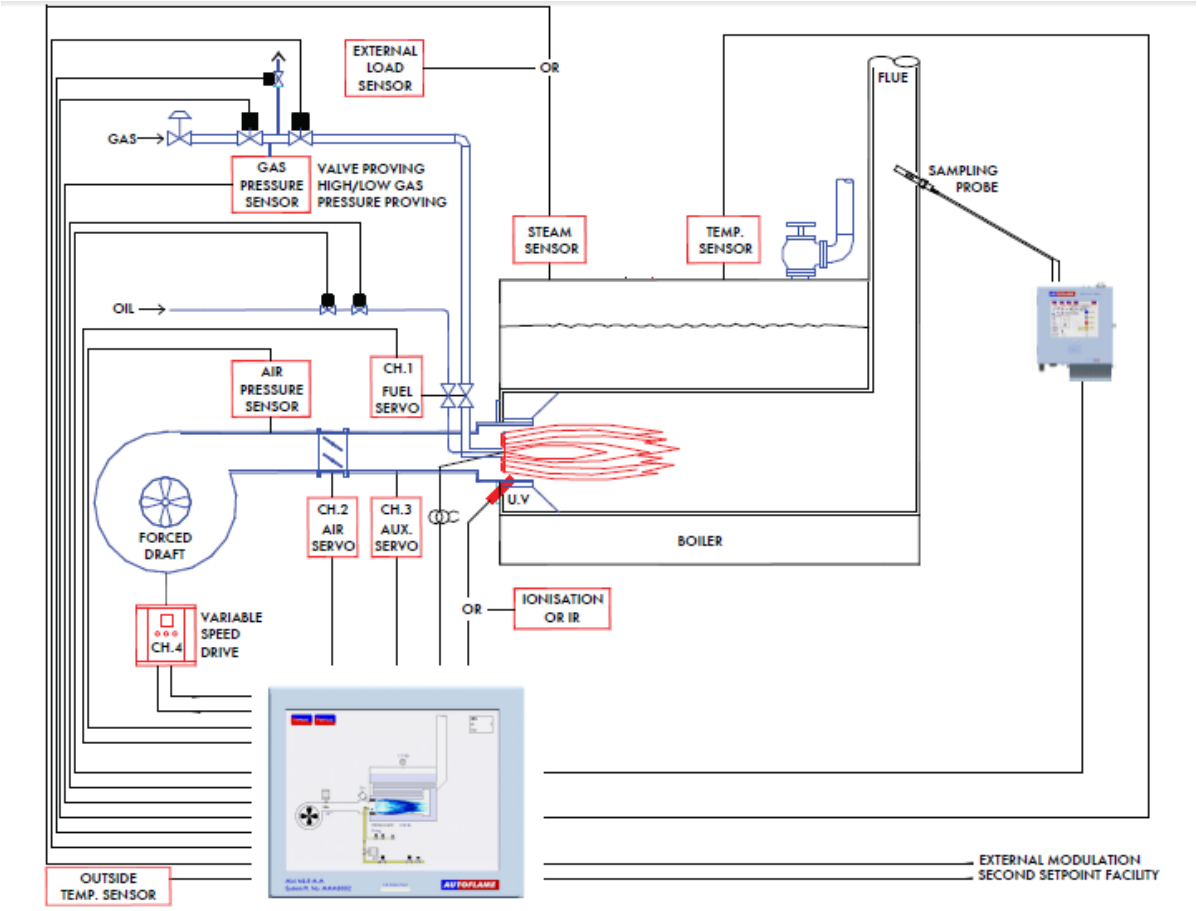
- 从一个控制模块通过下载管理器下载调试数据至一台计算机。
- Upload commissioning data from a PC to an M.M. module via Download Manager
- 从一台计算机通过下载管理器上传调试数据至一个控制模块。

Universal Digital & Analogue Input/ Output Module

通用数字和模拟输入/输出模块

- Detailed logging inputs and outputs when coupled with the Mk7 D.T.I.
- 连接Mk7数据传输接口获取详细的记录输入和输出。
- 16 Line inputs (120V/230V)
- 16个线输入(120V/230V)。
- 6 Analogue inputs and 6 analogue outputs (0-10V, 0-20mA or 4-20mA)
- 6个模拟输入和6个模拟输出(0-10V, 0-20mA or 4-20mA)。
- 8 Volt free contacts
- 8伏自由接触。
- Configurable alarms through Mk7 D.T.I.
- 通过Mk7数据传输接口配置报警。

1.2 System Example 系统实例



1.3 Micro-Modulation (M.M.) 微型控制系统

To ensure maximum efficiency and reliability of the boiler plant operation, two requirements are of paramount importance, the air to fuel ratio and the target temperature or pressure:
为确保锅炉设备运行的最大效率和可靠性，油气比和目标温度或压力这两项要求非常重要。

- The air to fuel ratio must be kept to the minimum to ensure complete combustion within the limitations of the combustion head design. A very high air to fuel ratio will be an indication of high excess air, which decreases the overall efficiency of the boiler. The fuel valve and air damper positions set for this minimum air to fuel ratio along the whole commission curve must be infinitely repeatable to an incredibly high degree of accuracy.
- 油气比必须保持最小，从而确保在燃烧头设计限值内充分燃烧。较高的油气比表明有较高的过剩空气，这样会降低锅炉的整体效率。沿整个调试曲线设定最小的油气比时燃油阀和空气阻尼器位置必须能够无限重复，到达最高的精确度。

- The target temperature or pressure of the boiler should be monitored by the combustion system and at all times, with exactly the right amount of fuel and air fired to achieve this target value. Irrespective of load changes, the burner/boiler system should be able to meet the target temperature or pressure.
- 锅炉的目标温度或压力应通过燃烧系统进行监控，始终用正确的燃料和空气量达到目标值。无论负载如何变化，燃烧器或锅炉系统应能满足目标温度或压力要求。

The burner's fuel to air ratio was traditionally governed by mechanical systems which involved multiple cams, shafts and linkages controlled by one motor. The inherent hysteresis that occurred from the system design allowing components to be loose, which made the level of accuracy required impossible. With this poor accuracy, the response of the fuel input to the monitored temperature/ pressure of the boiler meant that the set target value at most times would overshoot or fall short.
燃烧器的油气比通常由机械系统控制，机械系统包括由一个电机控制的多个凸轮、轴和连杆机构。因系统设计允许组件松动，因此产生的固有滞后现象则无法到达要求的精度，燃油输入要达到锅炉的监控温度或压力则意味着设定的目标值在大多数情况下会过高或下降。

The Micro-Modulation module is the basic building block of the Autoflame System. The Autoflame M.M. module provides an easily programmable and flexible means of optimising combustion quality throughout the load requirement range of the burner/boiler unit whilst ensuring the temperature is accurate to within 1°C (°F) and pressure to within 1 PSI (0.1Bar). Using direct drive motors to individually control the air damper and fuel valve(s), gives the optimum combustion of the burner at every point along the firing range. The allowed error in angular degrees of rotation between the two servomotors at any position in the load range is 0.1°.
微型控制模块是Autoflame系统的基本构建块，Autoflame微型控制模块根据燃烧器或锅炉部件的负载要求范围为优化燃烧质量提供一个易于编程的灵活方式，确保温度精确到1°C（°F）、压力在1 PSI（0.1bar）。使用直接驱动电机单独控制空气阻尼器和燃油阀可以使燃烧器在燃烧范围内各点都实现最佳燃烧。在负载范围内的各位置，两个伺服电机间的旋转角度允许误差为0.1°。

This automated system of burner control can achieve ‘locked on’ near stoichiometric air to fuel mixing throughout the fuel input range of the boiler while maintaining exact temperature or pressure target values. The load control incorporates user-variable Proportional Integral Derivative control. The PID control is infinitely adjustable to match any boiler room requirements.
该燃烧器控制自动化系统可以将附近的化学计量油气“锁定”在锅炉的燃料输入范围内，同时保持准确的温度或压力目标值。负载控制包括用户变量比例积分微分控制，比例积分微分控制可以无限制调节以满足所有的锅炉房要求。

2 ELECTRICAL SPECIFICATIONS
电气规范

2.1 Classifications
分类

Classification according to **EN298**
根据EN298分类

Mains Supply:	230V, +10%/-15%}	47-63 Hz, unit max. consumption 140W
主电源	120V, +10%/-15%}	47-63 Hz，单位最大耗电量140W
Climate:	Min. Temperature	0OC (32OF)
气候	最低温度	
	Recommended Temperature	Less than 40OC (104OF)
	建议温度	低于40C (104F)
	Max. Temperature	60℃ (140º F)
	最高温度	
	Humidity	0 to 90% non-condensing
	湿度	0 至90%不凝结
Storage:	Temperature	-20 to 85℃ (-4 to 185º F)
储存	温度	-20至85℃ (-4至185º F)
Protection Rating:	The unit is designed to be panel mounted in any orientation and the front facia is IP65, NEMA4. The back of the unit is IP20, NEMA1.	
防护等级	控制模块的设计安装朝向是任意方向，控制模块的前部仪表板防护等级为IP65，NEMA4。控制模块背部的防护等级是IP20, NEMA1。	

2.2 Inputs and Outputs
输入和输出

Inputs and Outputs
输入和输出

230V Unit:
230V设备

Outputs	Terminal	57	250mA	Must be connected through contactor	
输出	端口			必须通过接触器连接。	
		58	250mA	Must be connected through contactor	
				必须通过接触器连接。	
		59	1A	0.6 power factor	
				0.6功率因数	
		60	1A	0.6 power factor	
				0.6功率因数	
		61	1A	0.6 power factor	Max Load 5A
				0.6功率因数	最大载荷5A
		62	1A	0.6 power factor	
				0.6功率因数	
		63	1A	0.6 power factor	
				0.6功率因数	
		78	100mA	To drive relay only – switched neutral	

				仅用于驱动继电器-切换至中性	
		79	100mA	To drive relay/lamp only – switched neutral 仅用于驱动继电器/灯-切换至中性	
120V Unit: 120V设备：					
Outputs 输出	Terminal 端口	57	250mA	Must be connected through contactor 必须通过接触器连接。	
		58	250mA	Must be connected through contactor 必须通过接触器连接。	
		59	2A	0.6 power factor 0.6功率因数	
		60	2A	0.6 power factor 0.6功率因数	
		61	2A	0.6 power factor 0.6功率因数	Max Load 5A 最大载荷5A
		62	2A	0.6 power factor 0.6功率因数	
		63	2A	0.6 power factor 0.6功率因数	
		78	100mA	To drive relay only – switched neutral 仅用于驱动继电器-切换至中性。	
		79	100mA	To drive relay/lamp only – switched neutral 仅用于驱动继电器/灯-切换至中性。	

Note:

注：

1. The high and low voltage connections are not safe to touch. Protection against electric shock is provided by correct installation. **CAUTION – ELECTRIC SHOCK HAZARD.**

1. 切勿用手触摸高压和低压连线。正确安装电气设备可以防止触电事故。**警告：触电危险**。

2. Control voltage cabling should be maximum 10m, screened (if not screened then less than 1m, however servomotors can be unscreened up to 10m)

2. 控制电压电缆的最大长度应为10m，经屏蔽（未屏蔽时应小于1米；伺服电机未屏蔽电缆最大长度可为10m）。

3. Any cabling over 10m must have additional surge protection.

3. 所有超过10m的电缆必须配备额外的电涌保护。

4. Low voltage cables should be screened cable as specified in section 2.3.

4. 低压电缆应是2.3节规定的屏蔽电缆。

5. The burner ‘High Limit Stat’ must be a manual reset type.

5. 燃烧器的“上限启停控制器”必须为手动复位型。

Note: There is a lid (back plate) fitted onto the back of the Mini Mk8 M.M. with a Warning label to prevent any unauthorised fuse replacements.

注：MK8微型控制模块背部装有一个盖板（背板）。盖板上的警告标签明确指出更换保险丝前必需获得授权。

2.3 Cable Specifications
电缆规范

2.3.1 High/Control Voltage
高压/控制电压

Screened cable should not exceed 10m and unscreened cable should not exceed 1m. The ionisation/ flame rod cable must be shielded to prevent interference with other cables, as it is a high voltage and high frequency signal.
屏蔽电缆的长度不应超过10m，未屏蔽电缆的长度不应超过1m。为防止因高压和高频信号干扰其他电缆，离子/火焰感应棒电缆必须屏蔽。

2.3.2 Low Voltage
低压
The screened cable used for low voltage wiring from the M.M. to the servomotors, detectors and variable speed drive must conform to the following specification:
控制模块连接伺服电机、检测器和各种变频驱动装置的低压接线屏蔽电缆应符合以下规范：

16/0.2mm PVC insulated overall braid, screened, PVC sheathed.
16/0.2mm PVC 绝缘编织屏蔽电缆，带PVC电缆护套。

- Sixteen wires per core
- 16芯线。
- Diameter of wires in each core 0.2mm
- 各芯电线直径0.2mm。
- Rated at 440V AC rms at 1600Hz
- 1600Hz时额定交流电压440V rms。
- DEF 61-12 current rating per core 2.5A
- DEF 61-12每芯额定电流2.5A。
- Maximum operating temperature 70oC (158oF)
- 最高工作温度70C (158F)。
- Nominal conductor area 0.5sq mm per core
- 公称导体面积每芯0.5平方米。
- Nominal insulation radial thickness on core 0.45mm
- 每芯公称绝缘层径向厚度0.45mm。
- Nominal conductor diameter per core 0.93mm
- 每芯公称导体直径0.93mm。
- Nominal core resistance at 20oC. 40.1Ω/1000m
- 20C时电缆公称电阻值40.1Ω/1000m。
- Nominal overall diameter per core 1.83mm
- 每芯公称总直径1.83mm。
- Fill factor of braid screen 0.7
- 编织层填充系数0.7。
- Equivalent imperial conductor sizes 14/0.0076

- 等效英制导体尺寸14/0.0076

Use the number of cores suitable for the application. A universal part numbering system appears to have been adopted for this type of cable as follows:
根据实际使用需要选用合适的电缆，以下是通用的电缆编号方法。

16-2-2C 2 Core
16-2-2C 2芯。
16-2-3C 3 Core
16-2-3C 3芯。
16-2-4C 4 Core
16-2-4C 4芯。
16-2-6C 6 Core
16-2-6C 6芯。

(5 Core not readily available)
（不提供5芯电缆）

Note: If using 4 Core cable and interference is detected, use 2 sets of 2 Core.
注：使用4芯电缆检测到相互干扰时应使用两套2芯电缆。

2.3.3 Data Cable
数据电缆

Data cable must be used for connections between M.M.s for sequencing applications and between M.M.s and E.G.A.s and for connection between M.M.s and D.T.I.
数据电缆用于控制模块的排序连接、控制模块与尾气分析仪连接、以及控制模块与数据传输接口的连接。

Types of data cable that can be used:
可选用的数据电缆类型：

1 Beldon 9501 for 2-core shielded cable (1 twisted pair)
Beldon 9501，用于2芯屏蔽电缆（一对双绞线）。
2 Beldon 9502 for 4-core shielded cable (2 twisted pairs)
Beldon 9502，用于4芯屏蔽电缆（两对双绞线）。
3 STC OS1P24
STC OS1P24

Samples are available upon request. Low voltage and data cable can be ordered directly from Autoflame Engineering, please contact Autoflame Sales.
我们可以根据要求提供样品。客户可以直接向Autoflame工程有限公司订购低压电缆和数据电缆，请联系Autoflame公司销售部。

2.4 Terminals Description 接线端子说明

S	All terminals marked S are internally connected. They are provided for connections to the various screened cables. 所有标记为S的接线端子都已内部连接，这些端子将和各屏蔽电缆相连接。
1	Current Input, 0-20mA/ 4-20mA. For channel 4 only. Can be connected to the current output of a VSD or tachometer system or 4-20mA servomotor feedback 电流输入，0-20mA/ 4-20mA。仅用于通道4，该端子可与变速驱动或转速计系统的电流输出信号连接或与4-20mA伺服电机反馈信号连接。
2	Voltage Input, 0-10V. For channel 4 only. Can be connected to the voltage output of a VSD or tachometer system or 4-20mA servomotor feedback 电压输入， 0-10V。仅用于通道4，该端子可与变速驱动或转速计系统的电压输出信号连接或与4-20mA伺服电机的反馈信号连接。
3	Common for Terminals 1 or 2 与端子1和端子2通用。
10	Current Output, 0-20mA/ 4-20mA. For channel 4 only. Can be connected to the current input of a VSD or 4-20mA servomotor feedback 电流输出，0-20mA/ 4-20mA。仅用于通道4，该端子可与变速驱动的电流输入信号口连接或与4-20mA伺服电机的反馈信号连接。
11	Voltage Output, 0-10V. For channel 4 only. Can be connected to the voltage input of a VSD or 4-20mA servomotor feedback 电压输出，0-10V。仅用于通道4，该端子可与变速驱动的电压输入信号口连接或与4-20mA伺服电机的反馈信号连接。
12	Common for Terminals 10 or 11 与端子10或者端子11通用。
21, 22	Connections to an Autoflame self-check UV sensor 与Autoflame自检紫外线传感器连接。
25, 26	Communications port connections to an Exhaust Gas Analyser (E.G.A.) 与尾气分析仪(E.G.A.)相连的通讯接口。
27, 28	Communications port connections for D.T.I. and/or IBS, or Modbus 与数据传输接口和/或IBS或Modbus相连的通讯接口。
29, 30	Digital communications connections to an Autoflame IR scanner (MM70017), Autoflame air pressure sensor and/or Autoflame gas pressure sensor 与Autoflame红外线扫描仪(MM70017)、Autoflame 空气压力传感器和/或Autoflame燃气压力传感器相连的数字通讯接口。
37, 38 (39)	Connections to an Autoflame boiler temperature detector (pressure) 与Autoflame锅炉温度（压力）检测器相连的接口。
40	0V supply to channel 1 and channel 2 servomotors 与通道1和通道2伺服电机相连的0v电源。
41	+12V supply to channel 1 and channel 2 servomotors 与通道1和通道2伺服电机相连的+12V电源。
42	Signal from channel 1 servomotor, indicating position 通道1伺服电机信号表示位置
43	Signal from channel 2 servomotor, indicating position

	通道2伺服电机信号表示位置。
44	Signal from channel 3 servomotor, indicating position 通道3伺服电机信号表示位置.
46	0V Supply to channel 3 servomotor 与通道3伺服电机相连的0V电源。
47	+12V Supply to channel 3 servomotor 与通道3伺服电机相连的+12V电源
48, 49	+15V connections to an Autoflame IR scanner (MM70017), Autoflame air pressure sensor and/or Autoflame gas pressure sensor 与Autoflame 红外线扫描仪 (MM70017)、Autoflame 空气压力传感器和/或 Autoflame 燃气压力传感器相连的+15V电压接口。
50, 51	Connections to an Autoflame UV sensor 与Autoflame紫外线传感器相连的接口。
64	Connections to a flame rod 与火焰感应棒相连的接口。
53	Mains voltage input – burner on/off signal, running interlock circuit 输电干线电压输入-燃烧器启闭信号，运行联锁电路。

54 Mains voltage input – safety circuits, e.g. air proving
输电干线电压输入-安全电路，例如空气校验。

55 Mains voltage input - proving circuits, e.g. gas valve proof of closure
输电干线电压输入-检验用电路，例如燃气阀门关闭检验。

57 Mains voltage output – call for heat
输电干线电压输出-要求热量。

58 Mains voltage output – burner motor
输电干线电压输出-燃烧器电机。

59 Mains voltage output – start/pilot valve
输电干线电压输出-启动阀/导阀。

60 Mains voltage output – main fuel valve 1
输电干线电压输出-主燃料阀1。

61 Mains voltage output – main fuel valve 2
输电干线电压输出-主燃料阀2。

62 Mains voltage output – vent valve
输电干线电压输出-排气阀。

63 Mains voltage output – ignition transformer
输电干线电压输出-点火变压器。

66 Mains supply – earth
干线供电-接地。

67 Main supply – neutral
干线供电-中性。

68 Mains supply – live/hot
干线供电-火线。

69 Mains voltage output, power to servomotors and/or servomotor stepdown Transformer
干线电压输出，向伺服电机和/或伺服电机变压器供电。

70 Switched neutral – drives channel 1 servomotor clockwise
中性位-驱动通道1伺服电机顺时针转动。

71 Switched neutral – drives channel 1 servomotor counter clockwise
中性位-驱动通道1伺服电机反时针转动。

72 Switched neutral – drives channel 2 servomotor clockwise
中性位-驱动通道2伺服电机顺时针转动。

73 Switched neutral – drives channel 2 servomotor counter clockwise
中性位-驱动通道2伺服电机反时针转动。

74 Switched neutral – drives channel 3 servomotor clockwise
中性位-驱动通道3伺服电机顺时针转动.

75 Switched neutral – drives channel 3 servomotor counter clockwise
中性位-驱动通道3伺服电机反时针转动。

78 Switched neutral –2-port valve for IBS operation
中性位-智能锅炉排序运行用2端口阀门。

79 Switched neutral – alarm output for M.M. lockout/M.M. error/E.G.A. error.
中性位-控制模块锁定/模块错误/尾气分析仪错误警报输出。

80 Start position interlock/ night setback input/ reduced setpoint input

初始位置联锁/夜间调低值输入/降低设定点值输入。

81 Purge interlock/ low flame hold input
吹扫联锁/低火焰保持信号输入。

82 Warming stat/ valve proving mains input
加温控制点/阀门校验干线输入。

89 Mains voltage input – selects fuel 1 curve
干线电压输入-选择燃料1曲线。

90 Mains voltage input – selects fuel 2 curve
干线电压输入-选择燃料2曲线。

3 END USER OPERATION
终端用户操作

3.1 Home Screen
主屏幕

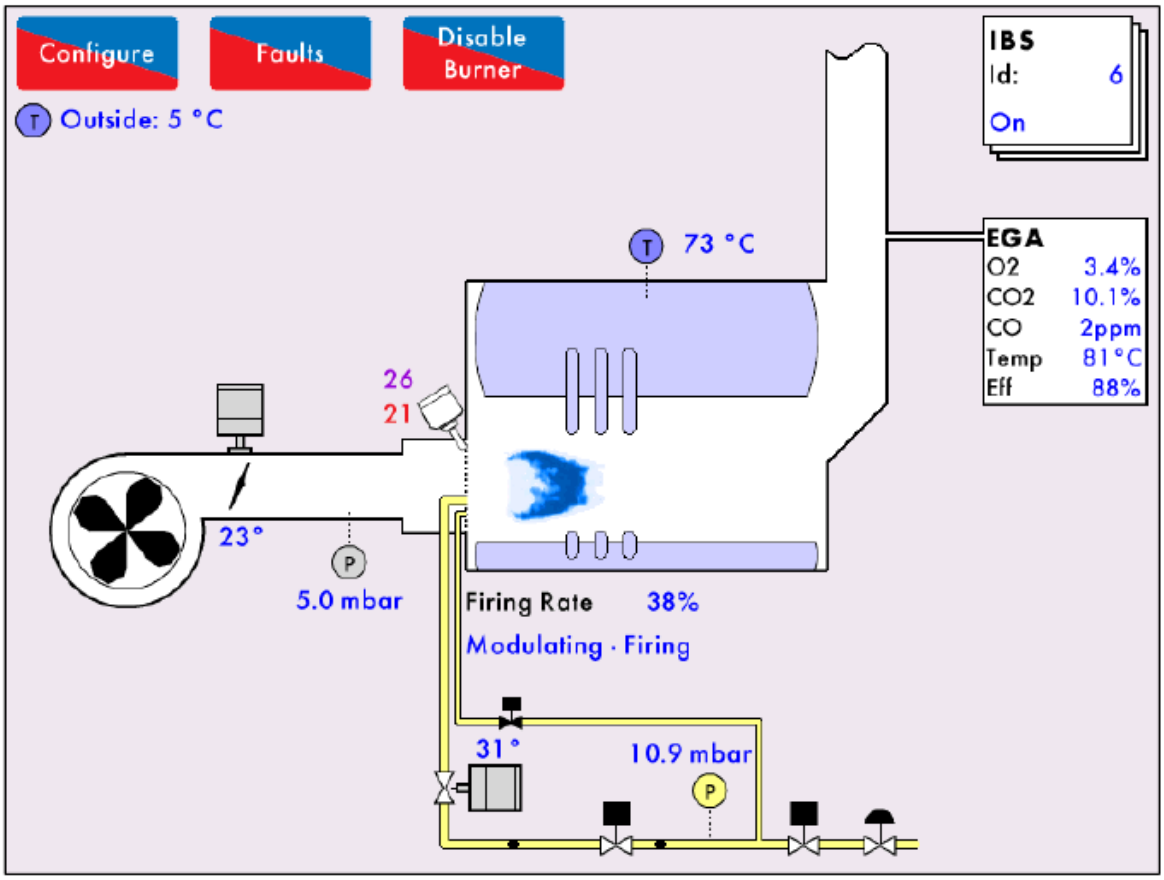


Figure 3.1.i Home 图3.1.i主屏幕

The home screen shown in Figure 3.1.i. displays the current boiler setup. It provides operating information for each component of the burner/boiler in real time. Pressing on components will display further information e.g. pressing on the servomotor image will show the servomotor position history. This boiler room setup can be configured to display what is actually on site, please see section 3.12.2 Boiler Configuration.

图3.1.i显示的主屏幕显示了当前锅炉设置，为燃烧器/锅炉的各组件提供了实时操作信息，按下各组件可以显示更多信息，例如按下伺服电机图标将显示伺服电机的历史位置。锅炉房设置可以设为显示实际位置，请见第3.12.2节关于锅炉配置。

3.1.1 Home Screen Components主屏幕组件

Servomotor
伺服电机

VSD
变速驱动器

Flame Detector
火焰检测器

Gas Pressure Sensor
燃气压力传感器

Air Pressure/ Boiler Steam Pressure Sensor
空气压力/锅炉蒸汽压力传感器

OTC/ Boiler Temperature Sensor
室外空气控制器/锅炉温度传感器

Gas Pipe – gas flowing
气管-气体流动

Gas Pipe – no flow
气管-无流动

Oil Pipe – oil flowing
油管-油流动

Oil Pipe – no flow
油管-无流动

Fuel Valve – solenoid Open
燃油阀电磁开关打开

Fuel Valve – solenoid closed
燃油阀电磁开关关闭

Fuel Control Valve – Open
燃油控制阀-打开

Fuel Control Valve – Closed
燃油控制阀-关闭

Regulator
调节器

Feed Water Pump
给水泵

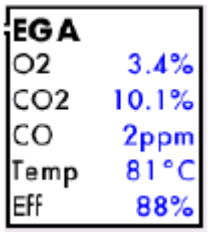
Feed Water Valve
给水阀

Steam/ Air Atomisation
蒸汽/空气雾化

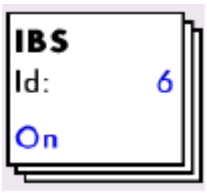
FGR/ Induced Draft Valve
烟气再循环/诱导通风阀

Air Damper
空气阻尼器

Combustion
Air Fan
燃烧空气风机



EGA
Information
尾气分析仪信息

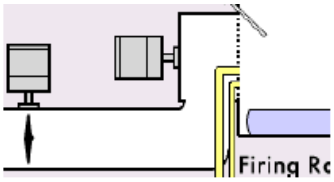


IBS
Information
IBS信息

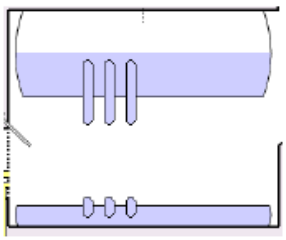
Induced
Draft
诱导通风

Gas Flame
气体火焰

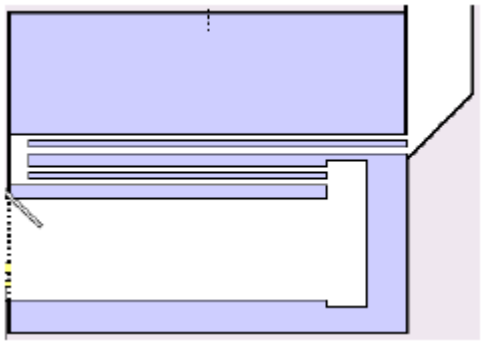
Oil Flame
油火焰



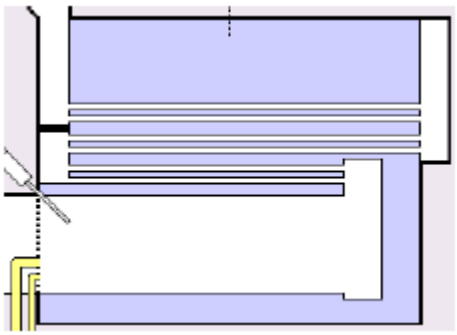
Rotary Cup
Burner
旋转杯燃烧器



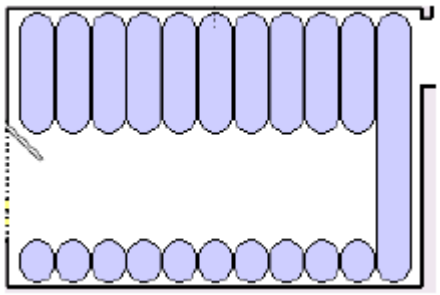
Water Tube
水管



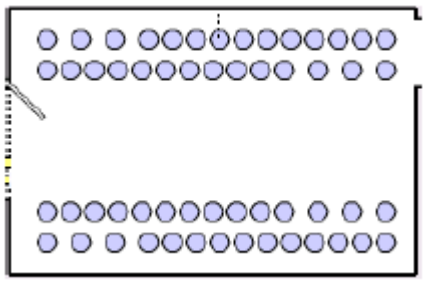
Three-Pass
Fire Tube
三通火管



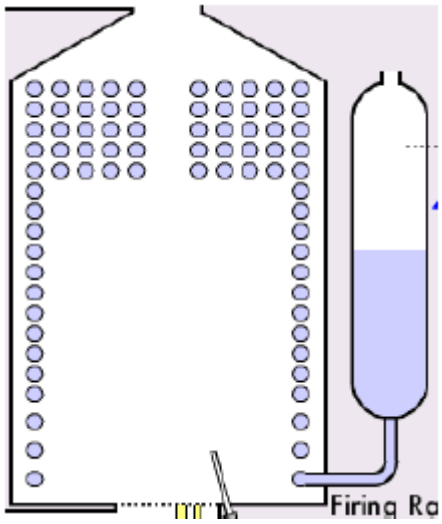
Four-Pass
Fire Tube
四通火管



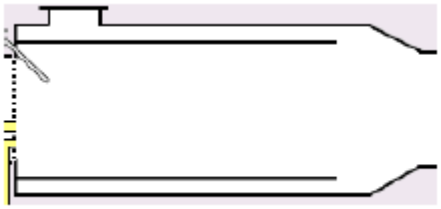
Cast-
Sectional
Tube
铸截面管



Horizontal
Coil Tube
水平油管



Vertical
Coil Tube
垂直油管

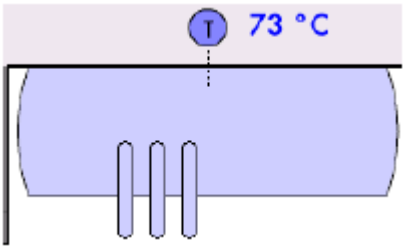
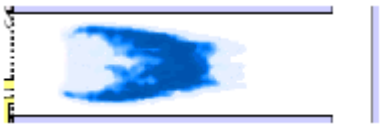


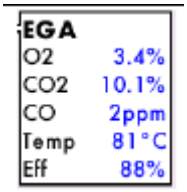
Kiln
干燥器

3.1.2 Home Screen Buttons 主屏幕按钮

The Home screen comprises of various components that can be selected to navigate through the information screens of the M.M. The components display in the Home screen according to the boiler room configuration, see section 3.12.2.

主屏幕包括各种组件，可以选择用于浏览控制模块屏幕上的信息。组件根据锅炉房配置在主屏幕上显示信息，见3.12.2节。

Button按钮	Component组件	Description说明
	Status 状态	The current boiler temperature/ pressure is displayed next to the temperature/ pressure detector. Pressing on the boiler or the load detector gives access to the Status screen, see section 3.2. 当前锅炉温度/压力在温度/压力检测器旁显示。按下锅炉或负载检测器按钮可以进入状态屏幕，见3.2节。
	Fuel-Air 油气	The current firing rate will display below the flame, pressing the flame gives access to the Fuel-Air Screen, see section 3.3. 当前燃烧速度在火焰下发显示，按下火焰按钮可以进入油气屏幕，见3.3节。
	Flame Safeguard 火焰防护	The number of counts will be displayed for the flame scanner used. This button gives access to the Flame Safeguard screen, see section 3.4. 显示使用的火焰扫描器计数数量。按下按钮可以进入火焰防护屏幕，见3.4节。
	Servomotor 伺服电机	This button is animated to display the current angular position of the servomotor, and gives access to the Channels screen, shown in section 3.5. 本按钮可以动画显示伺服电机的当前角度位置，按下按钮可以进入通道屏幕，见3.5节。
	VSD 变频驱动器	This button shows the VSD input signal, and gives access to the Channels screen, see section 3.5. 本按钮显示变频驱动器的输入信息，按钮按钮可以进入通道屏幕，见3.5节。
	Gas Pressure Sensor 燃气压力传感器	This button is animated with the current measured gas pressure, and gives access to the Gas Sensor screen, see

		section 3.6. 本按钮可以动画显示当前所测的燃气压力，按下按钮可以进入气体传感器屏幕，见3.6节。
	Air Pressure Sensor 空气压力传感器	This button is animated with the current measured air pressure, and gives access to the Air Sensor screen, see section 3.7. 本按钮可以动画显示当前所测的空气压力，按下按钮可以进入空气传感器屏幕，见3.7节。
	Fuel Flow 燃油流动	Pressing on the gas/oil pipe gives access to the Fuel Flow screen, see section 3.8. 按下气管/油管按钮可以进入燃料流动屏幕，见3.8节。
	IBS	The IBS box will show the ID number of the M.M., and its status, and if it is the lead boiler. This button gives access to the IBS screen, see section 3.9. 在主锅炉情况下IBS框显示控制模块的ID号和状态，按下按钮将可以进入IBS屏幕，见3.9节。
	EGA 尾气分析仪	The EGA box will show the current exhaust gas and temperature, and efficiency values. This button gives access to the EGA screen, see section 3.10. 尾气分析仪（EGA）框可以显示当前尾气值、温度值和效率值。按下按钮可以进入EGA屏幕，见3.10节。
	Outside Temperature Compensation 室外温度补偿	This temperature sensor is animated with the current outside temperature. This button gives access to the OTC screen, see section 3.11. 温度传感器可以动画显示当前的室外温度。按下按钮可以进入室外温度补偿（OTC）屏幕，见3.11节。

3.1.3 Enable/Disable 启用和禁用

If option 15 is set to 2 or 3 then the burner can be enabled/ disabled by pressing 

in the Home screen (Figure 3.1.i). If option 15 is set to 0 or 1, then the burner will cannot be enabled/disabled via the home screen.

如果选项15被设为2或3，则可以在主屏幕（图3.1.i）上按下 

按钮启用或禁用燃烧器。如果选项15被设为0或1，燃烧器则无法通过主屏幕启用或禁用。

3.1.4 Faults 故障

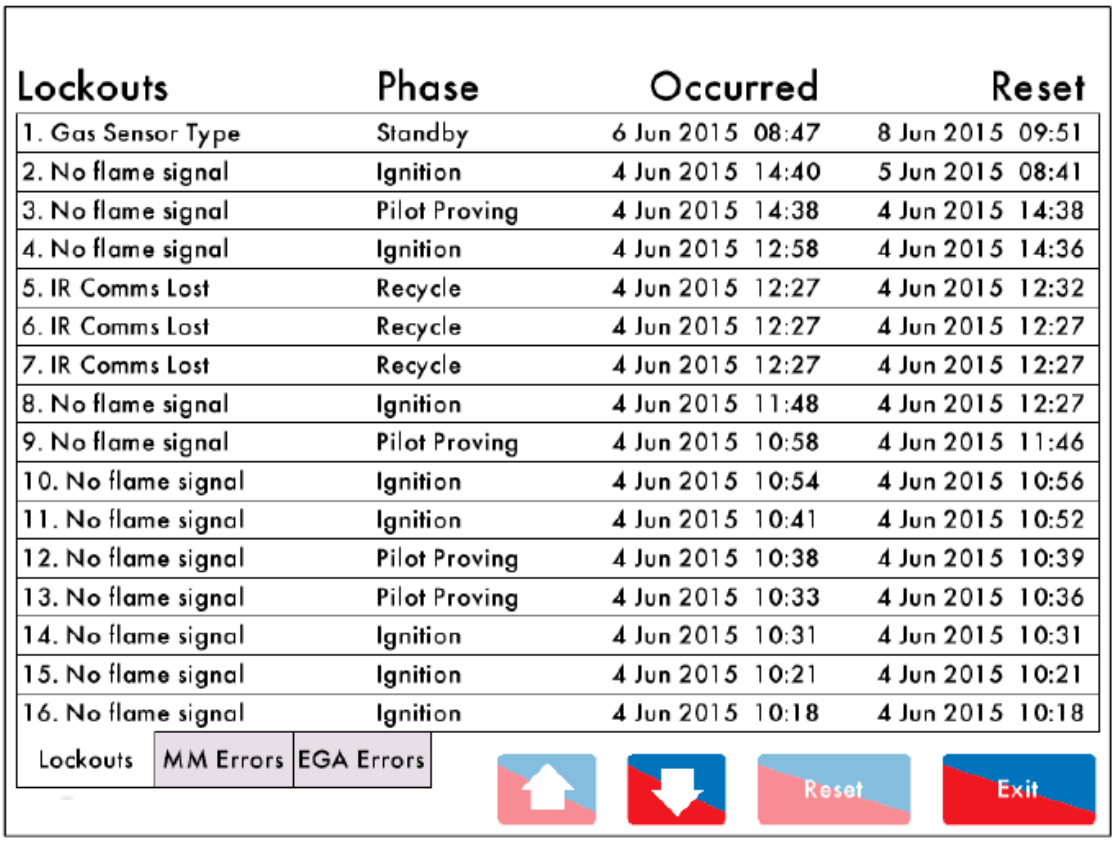


Figure 3.1.4.i Faults 图3.1.4.i故障屏幕

Press 

in the Home screen (Figure 3.1.i) to view the burner lockouts, M.M. errors, and E.G.A. errors. The M.M. will store up to 64 burner lockouts, M.M. errors and E.G.A. errors. These can be reset via Online Changes, see section 3.12.5.

在主屏幕上按下 

按钮可以查看燃烧器锁定错误、控制模块错误和尾气分析仪错误。控制模块将存储64个燃烧器锁定错误、控制模块错误和尾气分析仪错误。这些错误可以通过在线更改进行重置，见3.12.5节。

3.2 Status Screen 状态屏幕

3.2.1 Status状态

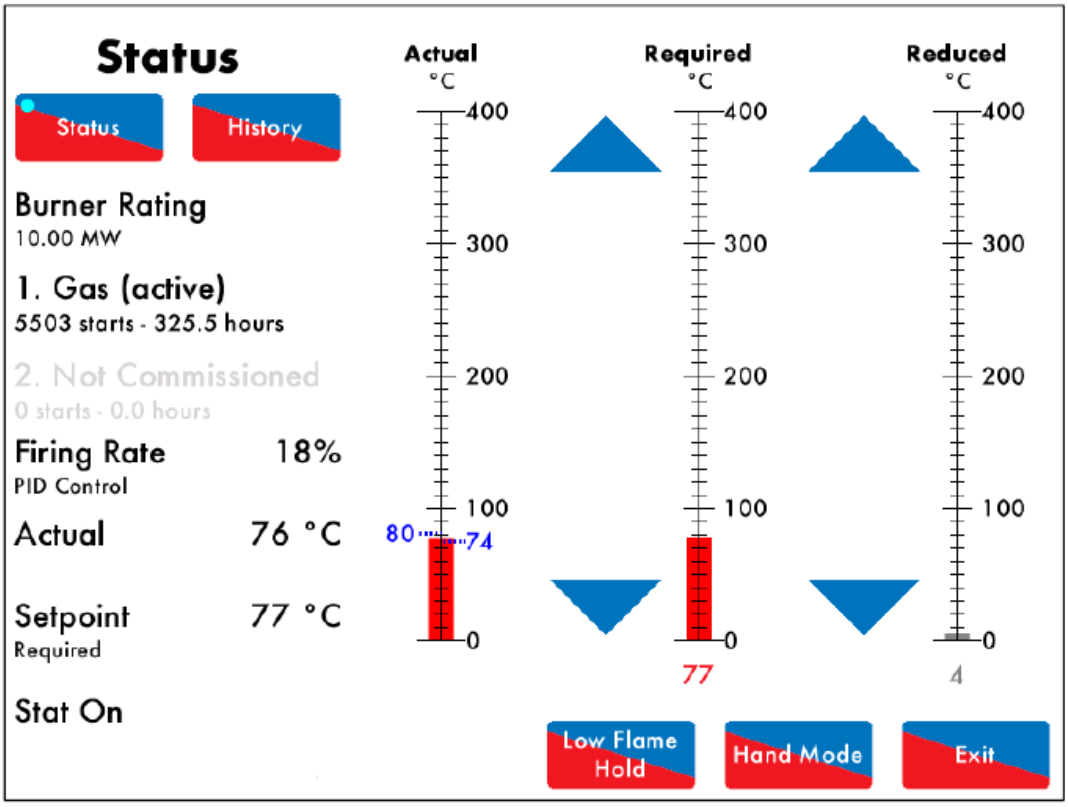


Figure 3.2.1.i Status 图3.2.1.i状态屏幕

Press the boiler load detector button or the boiler image in the Home screen (Figure 3.1.i) to display the Status screen in Figure 3.2.1.i. The status screen gives the following information:
按下锅炉负载检测器按钮或主屏幕上的锅炉图标可以显示图3.2.1.i所示的状态屏幕。状态屏幕将给出以下信息：

- Burner rating
- 燃烧器额定值。
- Current fuel selected and type
- 当前所选燃料和类型。
- Burner starts and run hours
- 燃烧器启动和运行时间。
- Current firing rate
- 当前燃烧速度。
- Control method – internal PID control or external modulation (see option 45)
- 控制方法-内部PID控制或外部调制（见选项45）。
- Actual temperature/ pressure
- 实际温度和压力。
- Setpoint – required/ reduced temperature/ pressure
- 设定点-所需/降低温度和压力。
- Stat status – T53 call for heat on or off
- 启停状态-T53要求热量开或关。

- Burner switch on/off offset (see options 9, 10, and 11)
- 燃烧器开关开/关偏移（见选项9、10和11）。
- Reduced setpoint (see section 3.12.7 Run Times, and option/parameter 154)
- 减少设定点（见3.12.7节运行时间和选项/参数154）。
- Indication if M.M. is firing to meet required or reduced setpoint (red = active, grey = inactive)
- 指示控制模块燃烧是否符合所需或降低设定点（红色=有效；灰色=无效）。
- Arrows for adjusting setpoint (they do not appear if using a D.T.I. or OTC)
- 箭头用于调节设定点（使用数据传输接口或室外温度补偿时不出现箭头）。

Press the  arrows to change the required or reduced setpoints. If these arrows are not displayed, then either the user setpoint change has been disabled (see option 15), or the D.T.I.is controlling the setpoint (see options 16 and 100) or OTC is enabled (see option 80).

按下  箭头可以更改所需的设定点或降低的设定点。如果未显示箭头，其原因是禁用了用户设定点更改（见选项15）或数据传输接口（D.T.I.）正控制设定点（见选项16和100）或启用了室外温度补偿（见选项80）。

Note: Use parameters 29 and 30 to adjust the load detector reading if required.
注：需要时可以使用参数29和30可以调节负载检测器读数。

3.2.2 Status – History 状态历史

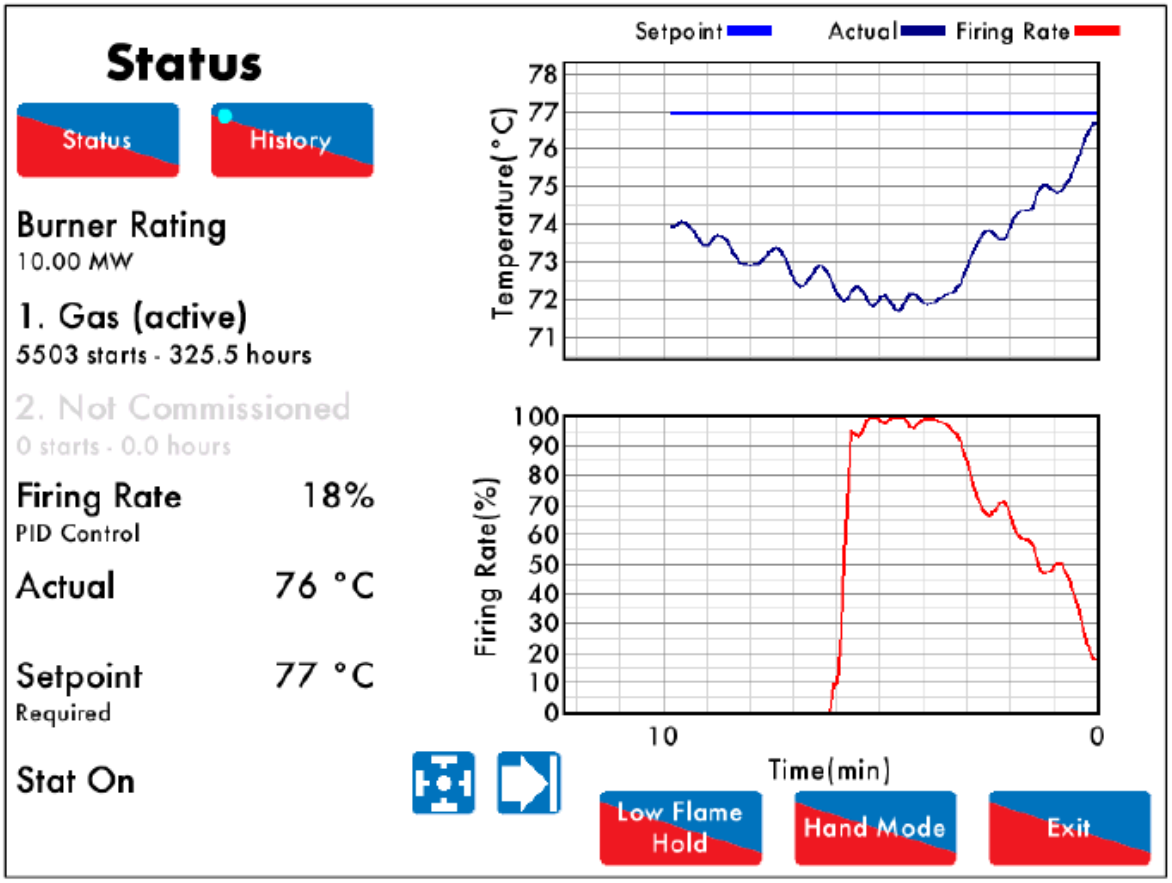


Figure 3.2.2.ii Status – History 图3.2.2.ii状态历史

Press History in the Status screen (Figure 3.2.1.i) to show the Status History in Figure 3.2.2.ii. The setpoint, actual temperature/pressure and firing rate are displayed graphically. This data is logged for 24 hours on the M.M.

在状态屏幕（图3.2.1.i）上按下 History 按钮可以显示图3.2.2.ii所示的状态历史。设定点、实际温度/压力和燃烧速度用图形方式显示，该数据在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.2.3 Status – Low Flame Hold 状态-低火焰保持

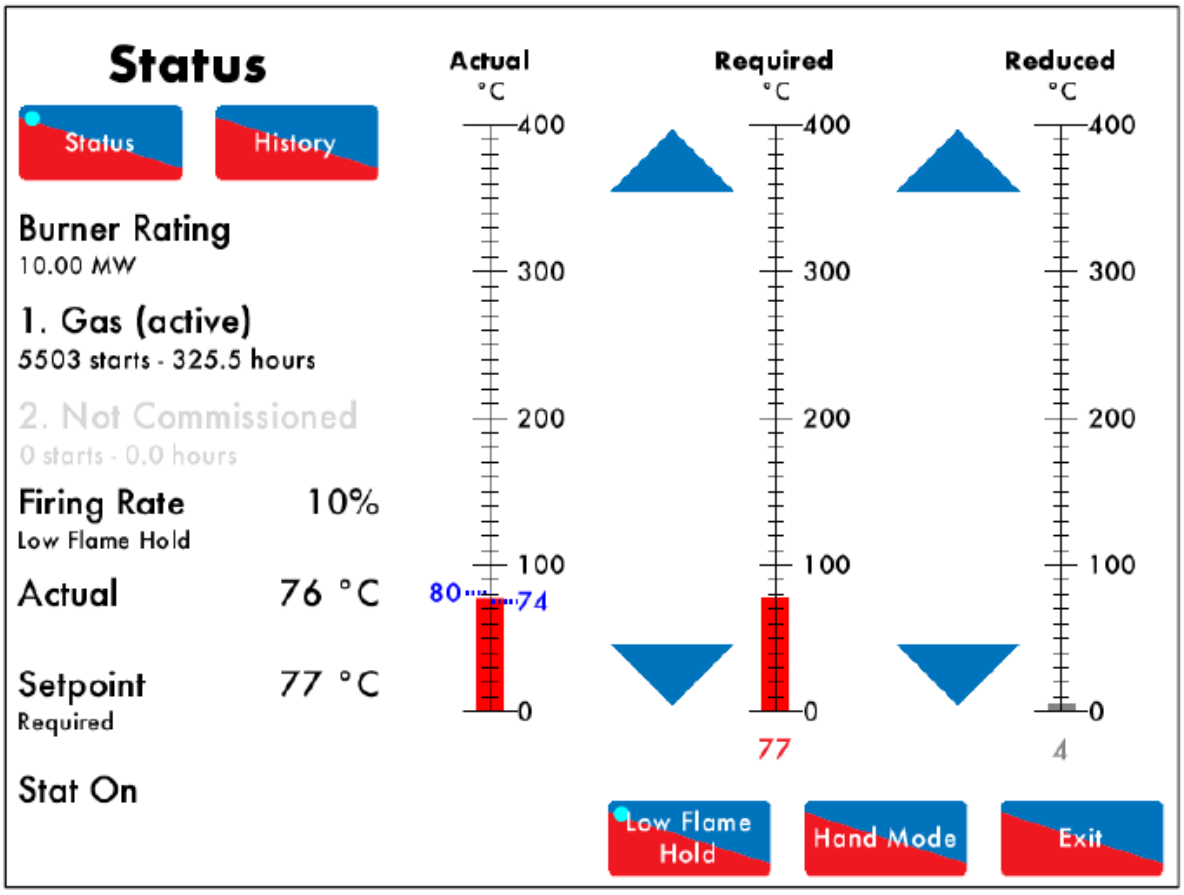


Figure 3.2.3.i Status – Low Flame Hold 图3.2.3.i状态-低火焰保持

Press Low Flame Hold on the Status screen (Figure 3.2.1.i) to put the M.M. in low flame hold, and press this button again to return to modulation, see Figure 3.2.3.i.

在状态屏幕（图3.2.1.i）上按下Low Flame Hold按钮可以将控制模块设为低火焰保持，再次按下该按钮将返回至调节，见图3.2.3.1。

Alternatively, the Mini Mk8 M.M. can also be put in low flame hold via an input on terminal 81, see option/ paramter155.
同时Mk8微型控制模块也可以通过端口81输入设为低火焰保持，见选项/参数155。

Note: If using Intelligent Boiler Sequencing, then putting the M.M. into low flame hold will remove the unit from the sequence loop. It will resume once low flame hold is deselected and after the next scan time elapses.
注：如使用智能锅炉排序，将控制模块设为低火焰保持后会将设备从序列循环中移除，取消选择低火焰保持或在下个扫描时间过后设备将恢复。

Note: If low flame hold and hand mode are both selected, then the hand mode takes priority.
注：如同时选择低火焰保持和手动模式，则手动模式优先。

3.2.4 Status – Hand Mode 状态-手动模式

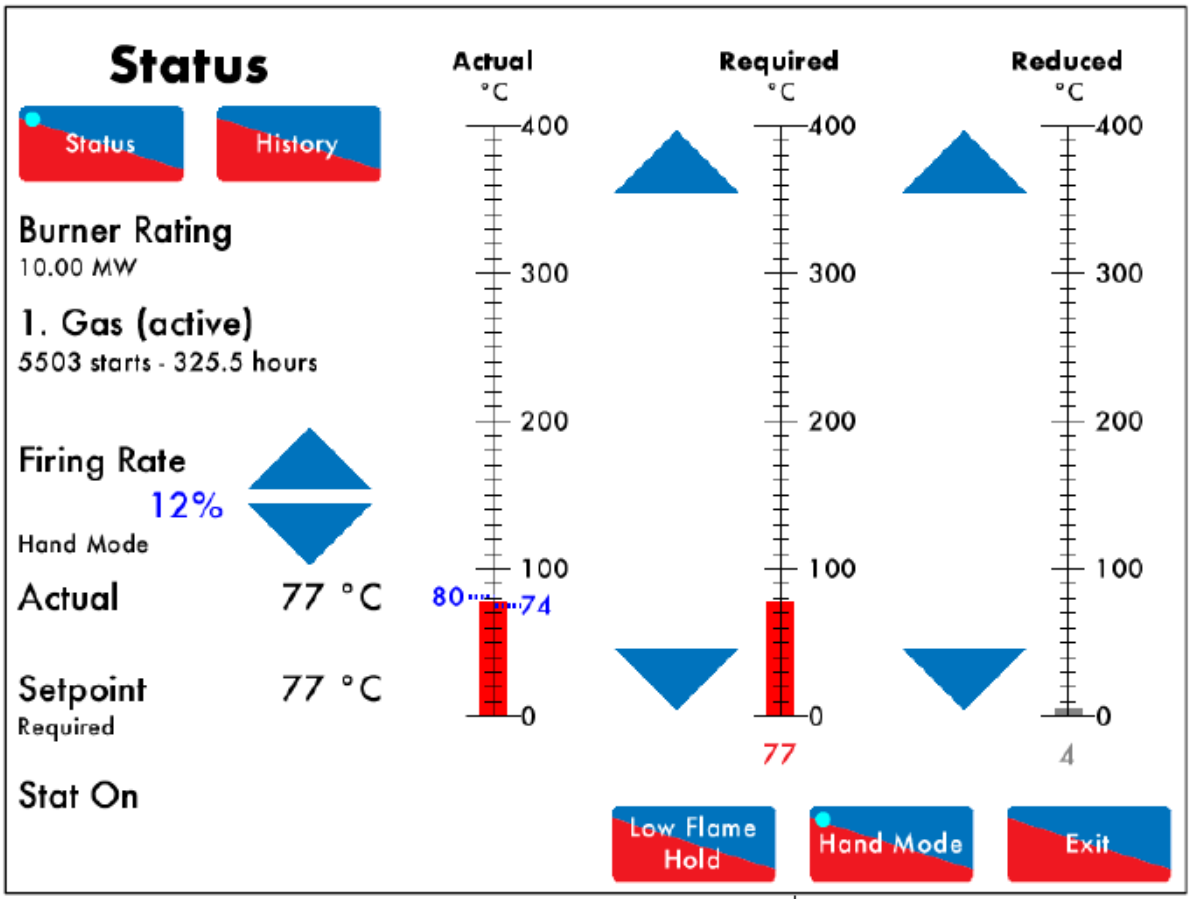


Figure 3.2.4.i Status – Hand Mode 图3.2.4.i状态-手动模式

Press Hand Mode on the Status screen (Figure 3.2.1.i) to put the M.M. in hand mode, where the firing rate can be driven up or down by using the buttons (see Figure 3.2.4.i)

在状态屏幕（图3.2.1.i）上按下 Hand Mode 按钮将把控制模块设为手动模式，此时可以使用 按钮（见图3.2.4.i）增加或降低燃烧速度。

Alternatively, the firing rate can be set remotely via Modbus addresses 40121 and 40131, see section 5.2.
同时可以通过Modbus地址40121和40131远程设定燃烧速度，见5.2节。

Note: If using Intelligent Boiler Sequencing, then changing the firing rate via hand mode remove the unit from the sequence loop. It will resume once low flame hold is deselected and after the

next scan time elapses.
注：如使用智能锅炉排序，则通过手动模式更改低火焰保持后会将设备从序列循环中移除，取消选择低火焰保持或在下个扫描时间过后设备将恢复。

Note: If low flame hold and hand mode are both selected, then the hand mode takes priority.
注：如同时选择低火焰保持和手动模式，则手动模式优先。

3.3 Fuel-Air Screen 油气屏幕

3.3.1 Fuel-Air – Curve 油气曲线

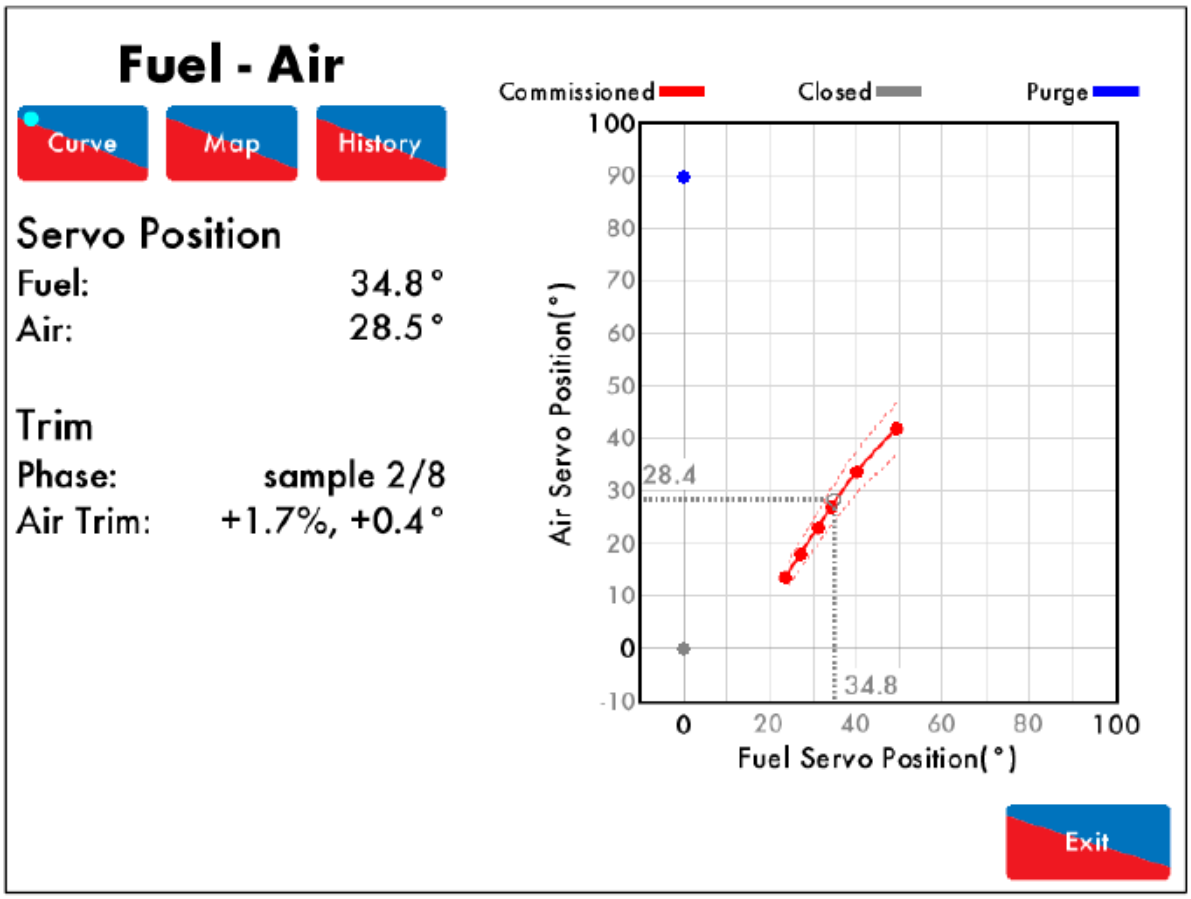


Figure 3.3.1.i Fuel-Air – Curve 图3.3.1.i油气曲线

Press the flame in the Home screen (Figure 3.1.i) to view the Fuel-Air screen in Figure 3.3.1.i. This shows the fuel valve and air damper angular position, the trim status and the commission curve graph.

在主屏幕（图3.1.i）上按下火焰按钮可以查看图3.3.1.i所示的油气屏幕。
屏幕上显示了燃油阀和空气阻尼器的倾斜位置、调节状态和调试曲线图。

3.3.2 Fuel-Air – Map 油气图

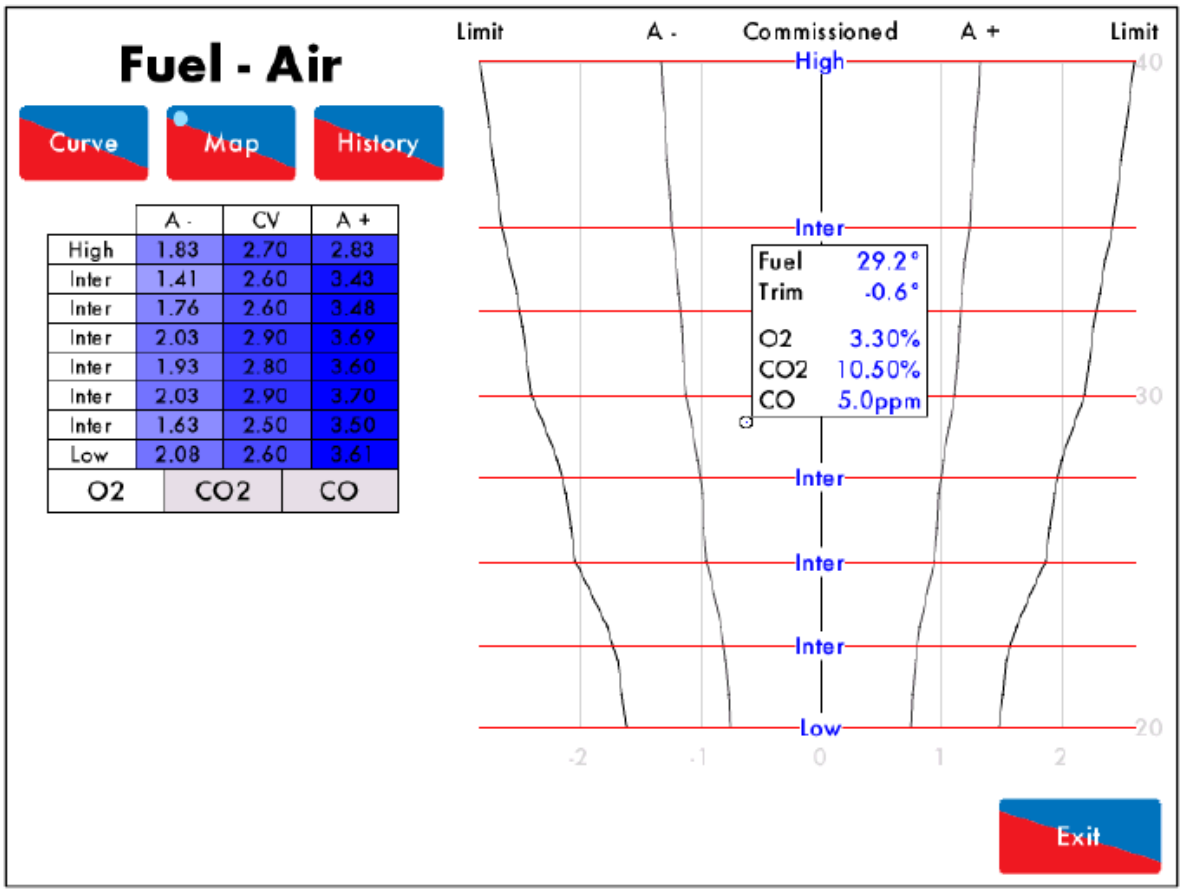


Figure 3.3.2.i Fuel-Air Map 图3.3.2.i油气图

Press 

in the Fuel-Air screen (Figure 3.3.1.i) to view the Fuel-Air Map screen shown in Figure 3.3.2.i. The air rich and fuel rich trim values are shown for each commissioned point. The graph shows E.G.A.'s current reading and if there is any trim correction on the air damper. The circle on the fuel-air map indicates the current position of the trim correction, and how far the current combustion values are from the commissioned values.

在油气屏幕（图3.3.1.i）上按下 

按钮将显示图3.3.2.i所示的油气图屏幕。每个调试点都显示油气控制数据。如果空气阻尼器上有更改调节，则油气图显示尾气分析仪的当前读数。油气图的圆圈指示调节的当前位置以及当前燃烧值和调试值间的差值。

Option 12 must be set to 2 or 3 for the 3-parameter trim function to be activated.
要实现3参数调节功能，则选项12必须设为2或3。

3.3.3 Fuel-Air – History 油气-历史

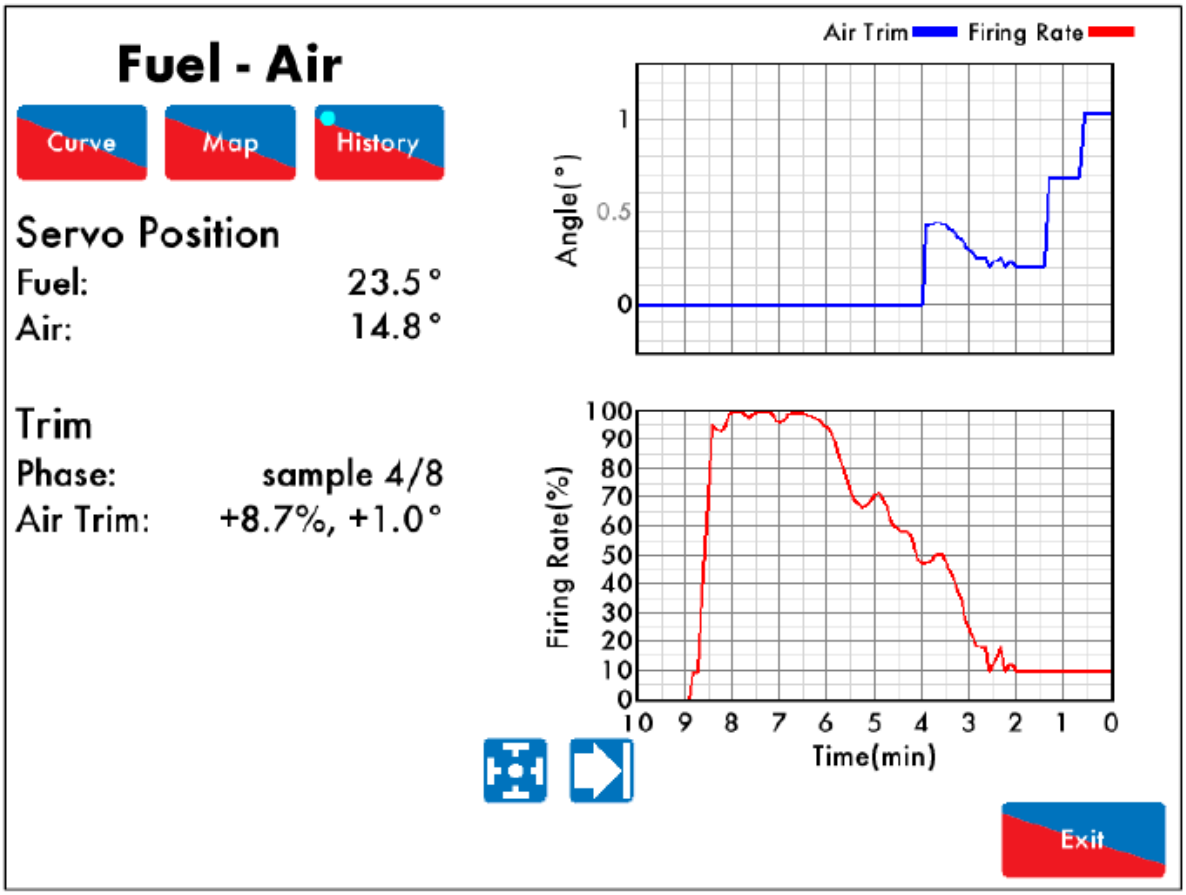


Figure 3.3.3.i Fuel-Air – History 图3.3.3.i油气历史

Press 

in the Fuel-Air screen (Figure 3.3.1.i) to view the Fuel-Air History screen in Figure 3.3.3.i. The firing rate and air trim history (if an E.G.A. is optioned for trim) is displayed. This data is logged for 24 hours on the M.M.

在油气屏幕（图3.3.1.i）上按下 

按钮可以查看图3.3.3.i所示的油气历史图，油气历史图显示了燃烧速度和空气调节历史（如尾气分析仪选定用于调节）数据，该数据在控制模块中保存24小时。

Use the 
buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用 
按钮可以改变显示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.4 Flame Safeguard Screen 火焰防护屏幕

3.4.1 Flame Safeguard 火焰防护

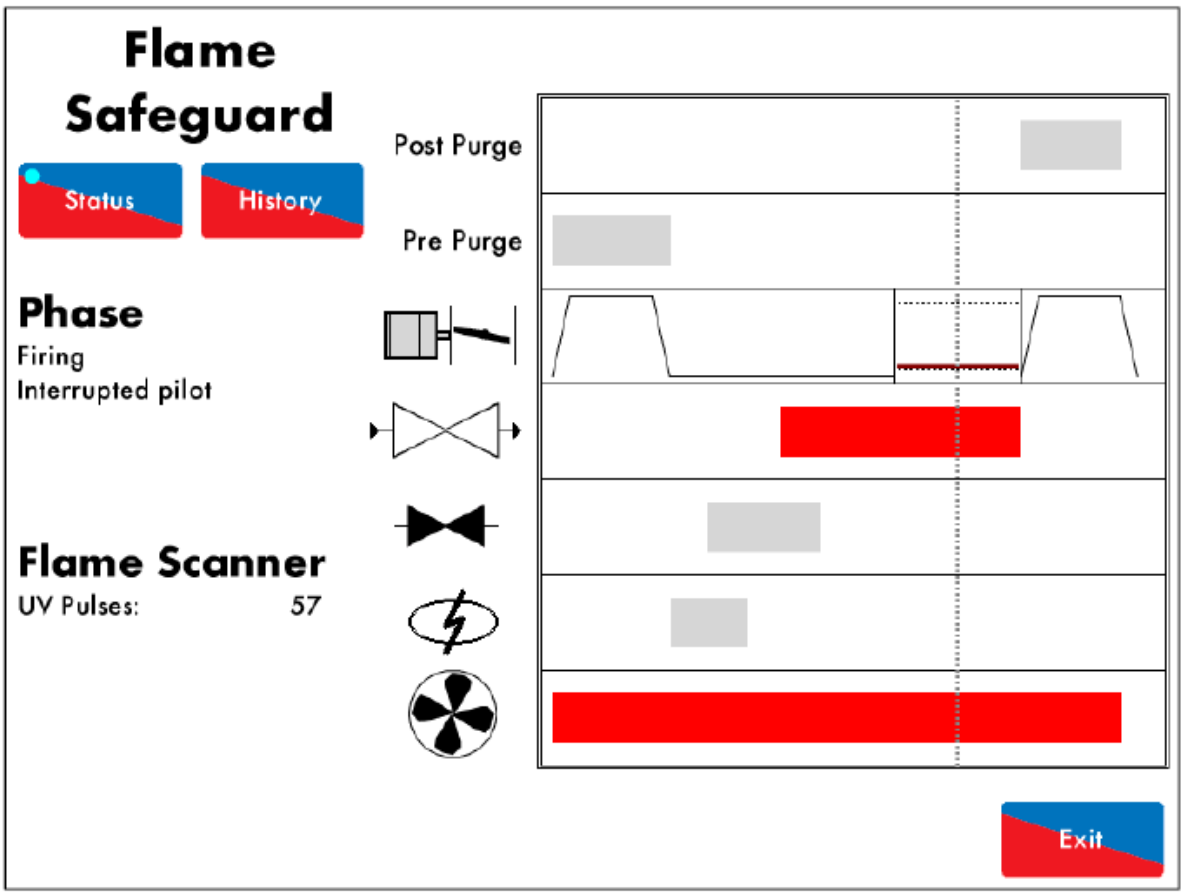


Figure 3.4.1.i Flame Safeguard – Status

图3.4.1.i火焰防护-状态

Press on the flame detector in the Home screen (Figure 3.1.i) to view the Flame Safeguard screen in Figure 3.4.1.i. The Flame Safeguard screen displays the following information:

在主屏幕（图3.1.i）上按下火焰检测器按钮可以查看图3.4.1.i所示的火焰防护屏幕。火焰防护屏幕显示了以下信息：

- Current phase of the M.M.
- 控制模块的电流相位。
- Flame scanner signal strength
- 火焰扫描器信号强度。

Throughout the entire firing sequence, the vertical dotted line will move horizontally showing the currently active components. The inactive components are shown in grey, and active in red. The rows refer to:

经过整个燃烧顺序，垂直虚线将水平移动显示当前活动组件。未活动组件将显示为灰色，活动组件显示为红色。所列内容是指：

- Post purge
- 后吹扫
- Pre-purge
- 预吹扫

- Air damper position
- 空气阻尼器位置
- Main fuel valve
- 主燃料阀
- Pilot valve
- 导阀
- Ignition
- 点火
- Blower motor
- 鼓风机电机

Please refer to section 4 for the start-up sequence of the burner.
燃烧器的启动顺序请参考第4章。

3.4.2 Flame Safeguard – History 火焰防护历史

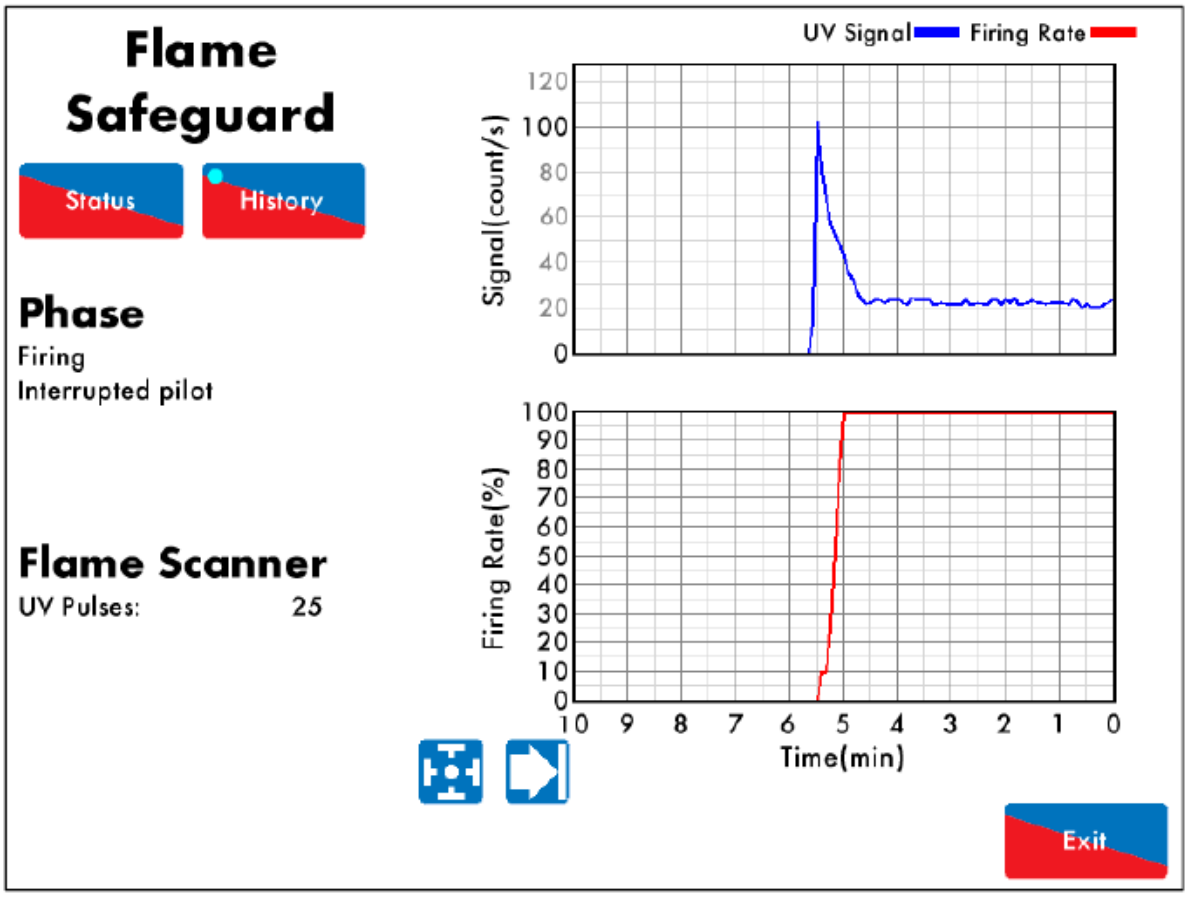


Figure 3.4.2.i Flame Safeguard – History 图3.4.2.i火焰防护历史

Press 

in the Flame Safeguard screen (Figure 3.4.1.i) to view Flame Safeguard History screen in Figure 3.4.2.i. The flame scanner signal and firing rate histories are displayed. This data is logged for 24 hours on the M.M.

在火焰防护屏幕（图3.4.1.i）上按下 

按钮可以查看图3.4.2.i所示的火焰防护历史屏幕。火焰防护历史屏幕显示了火焰扫描器信号和燃烧速度历史数据，该数据将在控制模块上保存24小时。

Use the 
buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用 
按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.5 Channels Screen 通道屏幕

3.5.1 Servomotor 伺服电机

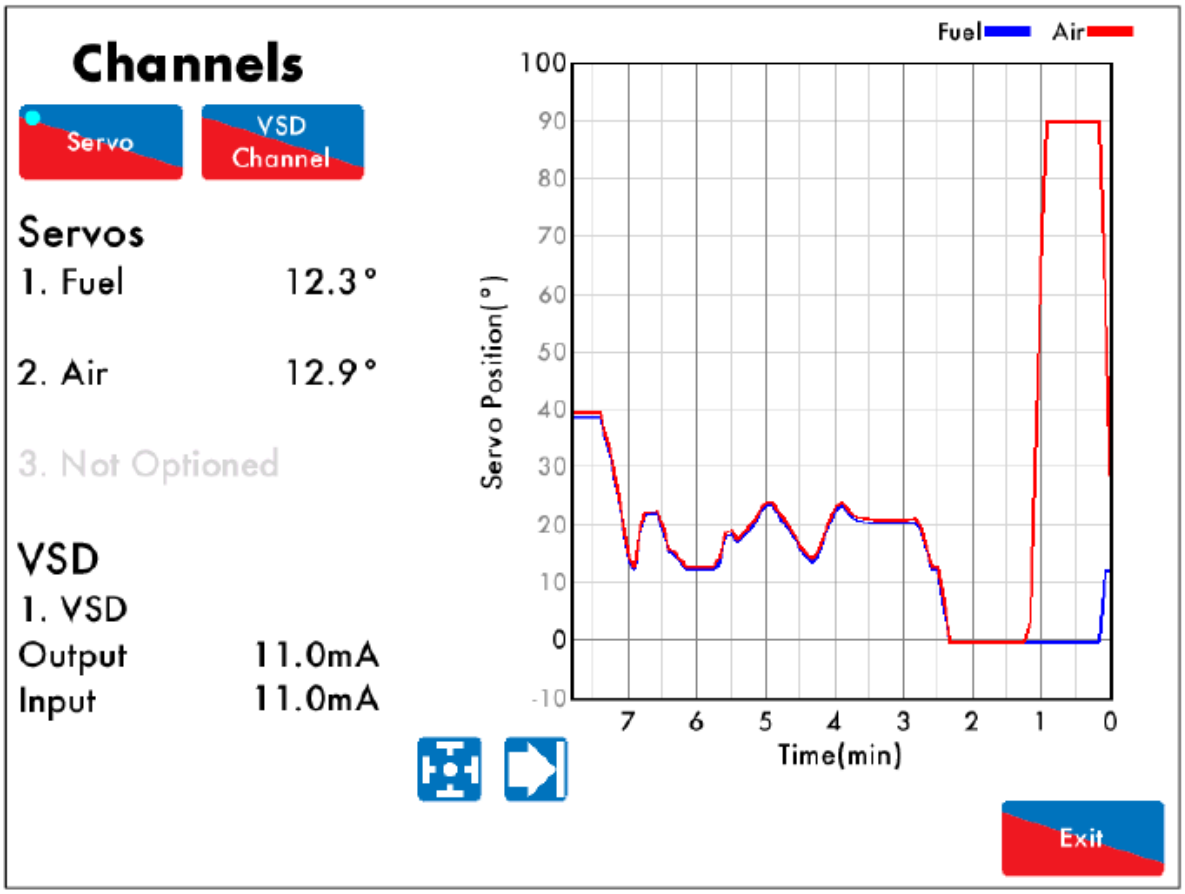


Figure 3.5.1.i Servomotor 图3.5.1.i伺服电机

Press on the servomotor or VSD in the Home screen (Figure 3.1.i) to view Channel screen in Figure 3.5.1.i. The following information is shown:
在主屏幕（图3.1.i）上按下伺服电机或VSD按钮可以查看图3.5.1.i所示的通道屏幕，通道屏幕显示了以下信息：

- Current fuel and air servomotor positions
- 当前燃料和空气伺服电机位置。
- VSD output and input
- VSD输出和输入。

This data is logged for 24 hours on the M.M.
该数据在控制模块中保存24小时。

Use the  buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用  按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.5.2 VSD Channel 变速驱动（VSD）通道

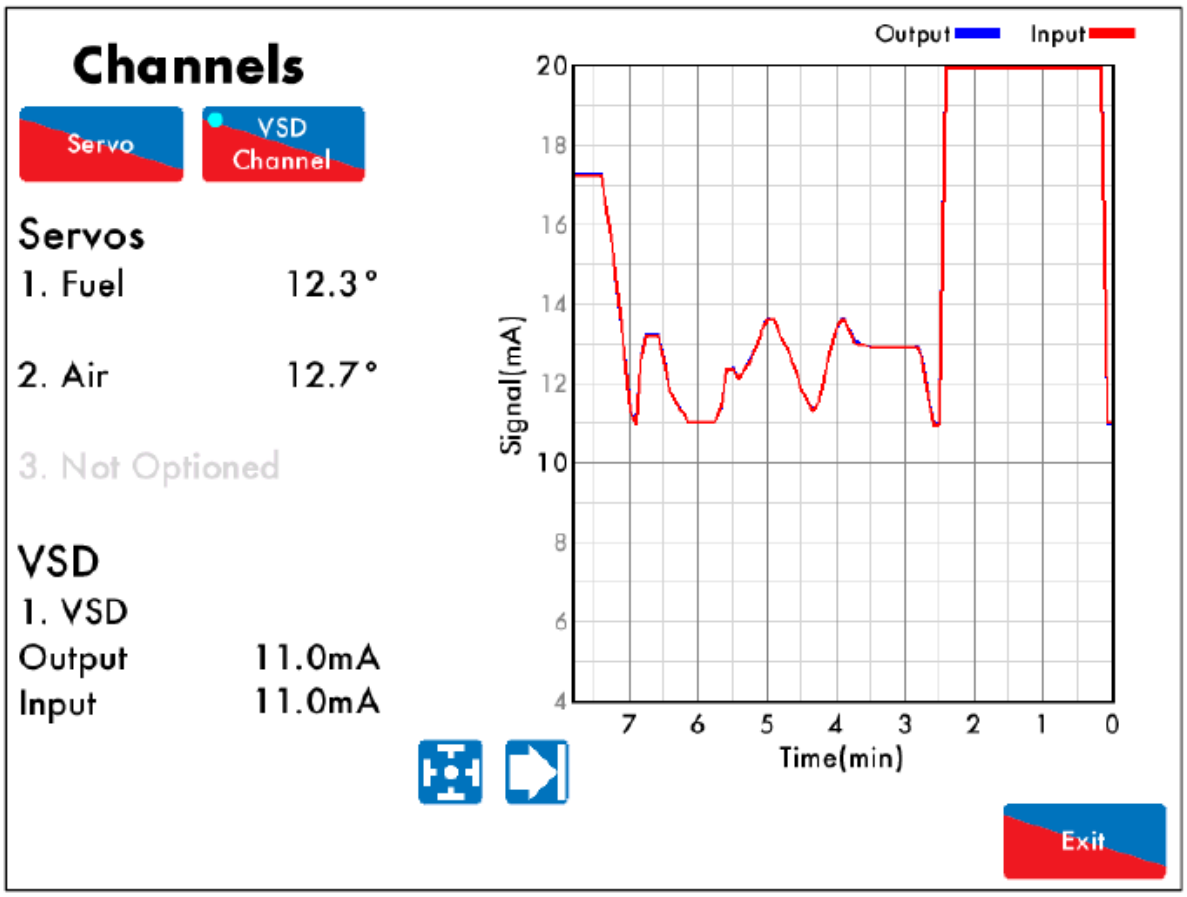


Figure 3.5.2.i VSD Channel 图3.5.2.iVSD通道

Press VSD Channel on the Channels screen (Figure 3.5.1.i) to view the VSD Channel screen in Figure 3.5.2.i. The VSD output and input signal histories are displayed. This data is logged for 24 hours on the M.M.

在通道屏幕（图3.5.1.i）上按下 VSD Channel 按钮可以查看图3.5.2.i所示的VSD通道屏幕，VSD通道屏幕显示了VSD输出和输入信号历史数据，该数据将在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.6 Gas Pressure Sensor Screen 燃气压力传感器屏幕

3.6.1 Gas Pressure 燃气压力

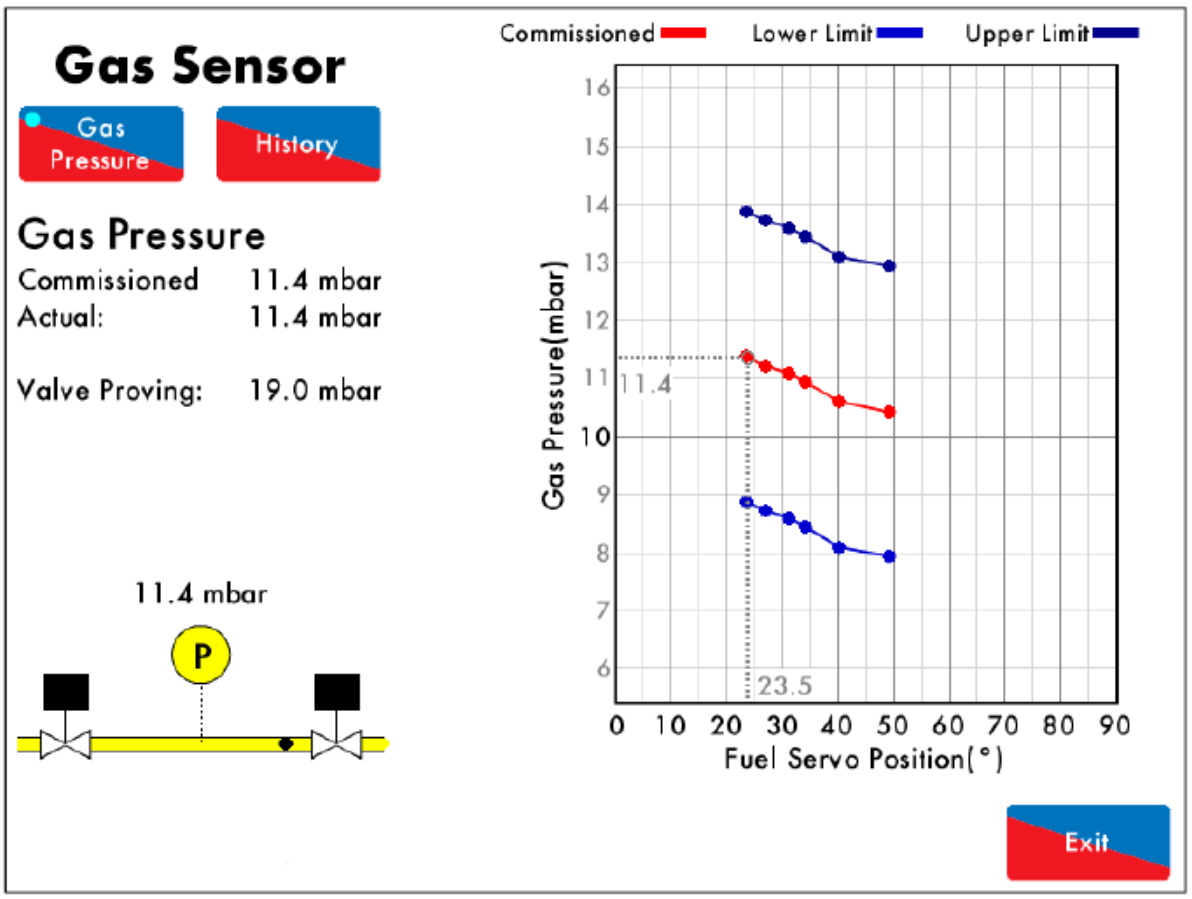


Figure 3.6.1.i Gas Pressure 图3.6.1.i燃气压力

Press on the gas pressure sensor in the Home screen (Figure 3.1.i) to view the Gas Pressure screen in Figure 3.6.1.i. The following information is displayed:
在主屏幕（图3.1.i）上按下燃气压力传感器按钮可以查看图3.6.1.i所示的燃气压力屏幕，燃气压力屏幕显示了以下信息：

- Commissioned gas pressure
- 调试的燃气压力。
- Actual (current) gas pressure detected
- 检测的实际（当前）燃气压力。
- Valve proving gas pressure
- 阀门校验燃气压力。
- Status of main gas and vent valves
- 主燃气阀和排气阀状态。
- Upper/ lower gas pressure limits for the fuel servomotor positions
- 燃料伺服电机位置的上/下燃气压力限值。

3.6.2 Gas Sensor – History 燃气传感器历史

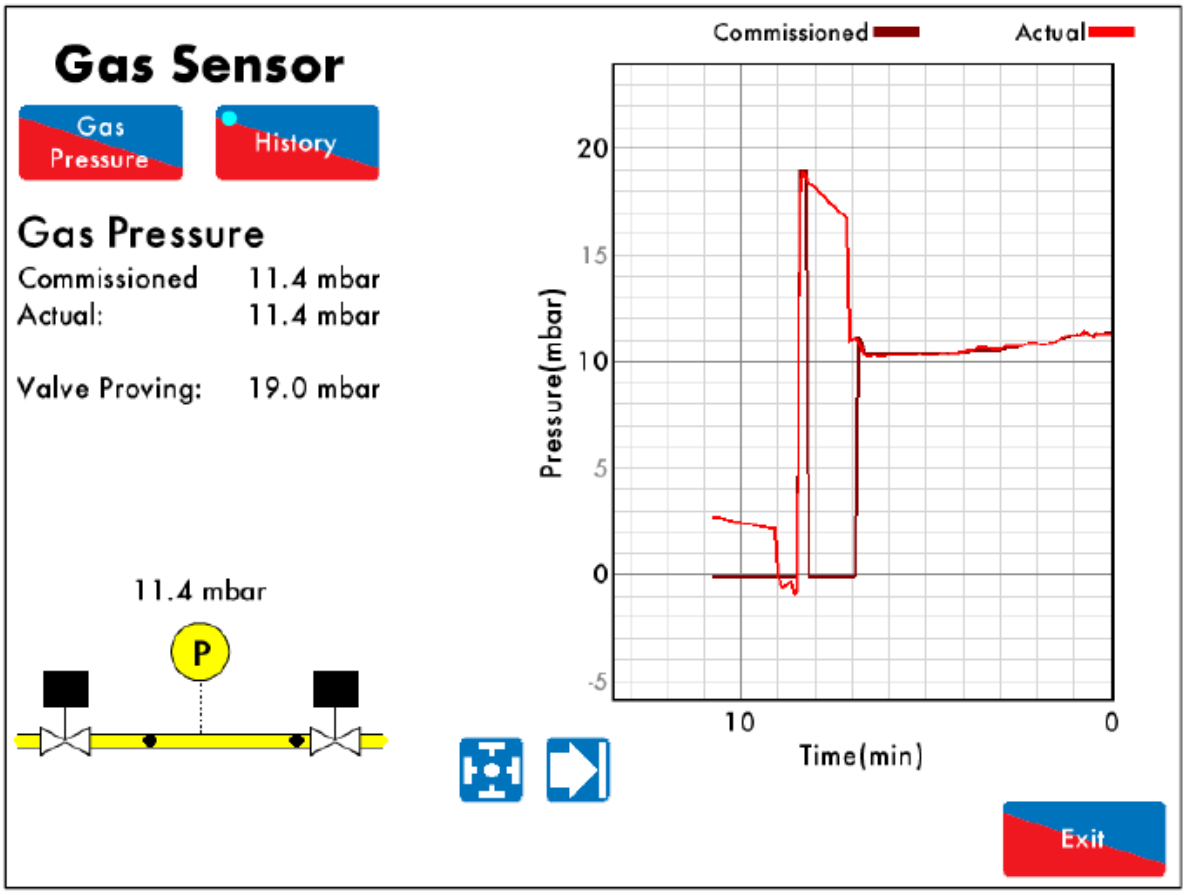


Figure 3.6.2.i Gas Sensor – History 图3.6.2.i燃气传感器历史

Press History in the Gas Pressure screen (Figure 3.6.1.i) to view the Gas Pressure History screen in Figure 3.6.2.i. The commissioned and actual gas pressure histories are displayed. This data is logged for 24 hours on the M.M.

在燃气压力屏幕（图3.6.1.i）上按下 History 按钮可以查看图3.6.2.i所示的燃气压力历史屏幕。燃气压力历史屏幕显示了调试的燃气压力历史和实际燃气压力历史数据，该数据将在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用 按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.7 Air Pressure Sensor Screen 空气压力传感器屏幕

3.7.1 Air Pressure 空气压力

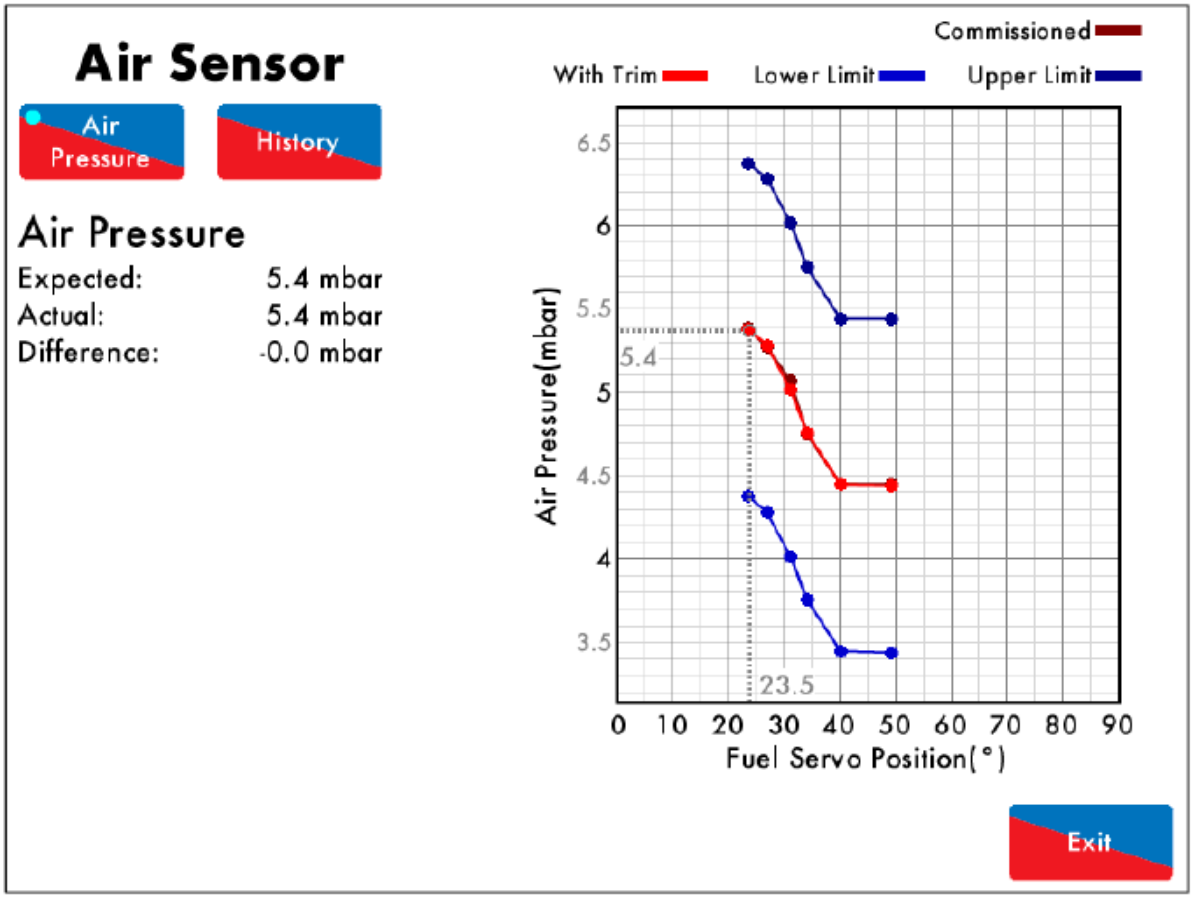


Figure 3.7.1.i Air Pressure 图3.7.1.i空气压力

Press on the air pressure sensor in the Home screen (Figure 3.1.i) to view the Air Pressure screen in Figure 3.7.1.i. The expected air pressure, actual air pressure, and the difference between the expected and the actual air pressure values are displayed.
在主屏幕（图3.1.i）上按下空气压力传感器按钮可以查看图3.7.1.i所示的空气压力屏幕。空气压力屏幕显示了预期空气压力、实际空气压力以及预期空气压力和实际空气压力间的差值。

The graph shows the commissioned air pressure and its upper/ lower limits for the fuel servomotor positions, as well as the air pressure values with trim added on the air damper.
上图显示了调试的空气压力和伺服电机的上/下限值以及调节的空气阻尼器空气压力值。

If commissioned with an EG.A., the air pressure is stored during trim. The red line of air pressure is then displayed to take into account the deviation in the air from the brown commissioned line on the graph.
如用尾气分析仪进行调试，则空气压力在调节时保存。此时显示的空气压力红线应考虑棕色调试线上空气的偏差。

3.7.2 Air Sensor – History 空气传感器历史

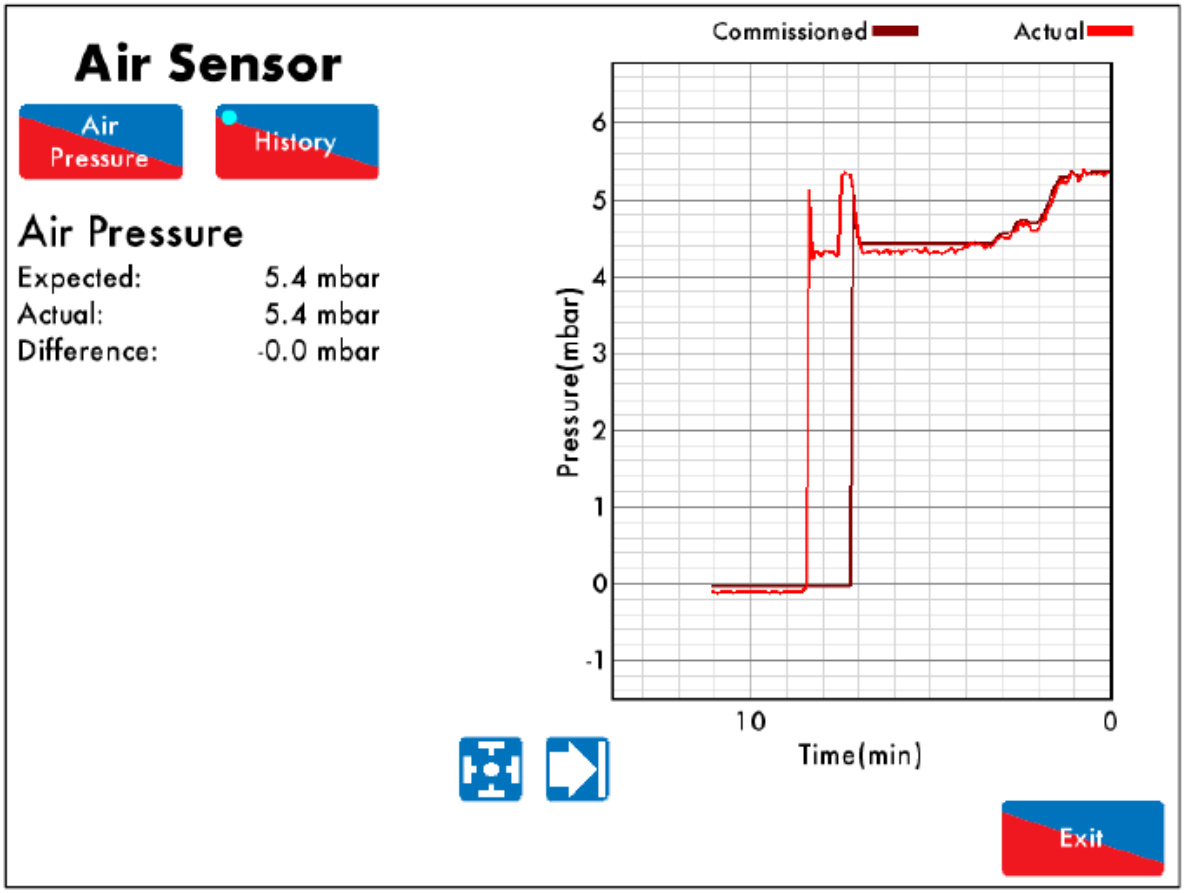


Figure 3.7.2.i Air Sensor – History 图3.7.2.i空气传感器历史

Press 

on the Air Pressure screen (Figure 3.7.1.i) to view the Air Pressure History in Figure 3.7.2.i. The commissioned and actual air pressure histories are displayed. This data is logged for 24 hours on the M.M.

在空气压力屏幕（图3.7.1.i）上按下 

按钮可以查看图3.7.2.i所示的空气压力历史屏幕。空气压力历史屏幕显示了调试的空气压力历史和实际空气压力历史数据，该数据将在控制模块中保存24小时。

Use the  buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用  按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.8 Fuel Flow Screen 燃料流量屏幕

3.8.1 Fuel Flow 燃料流量

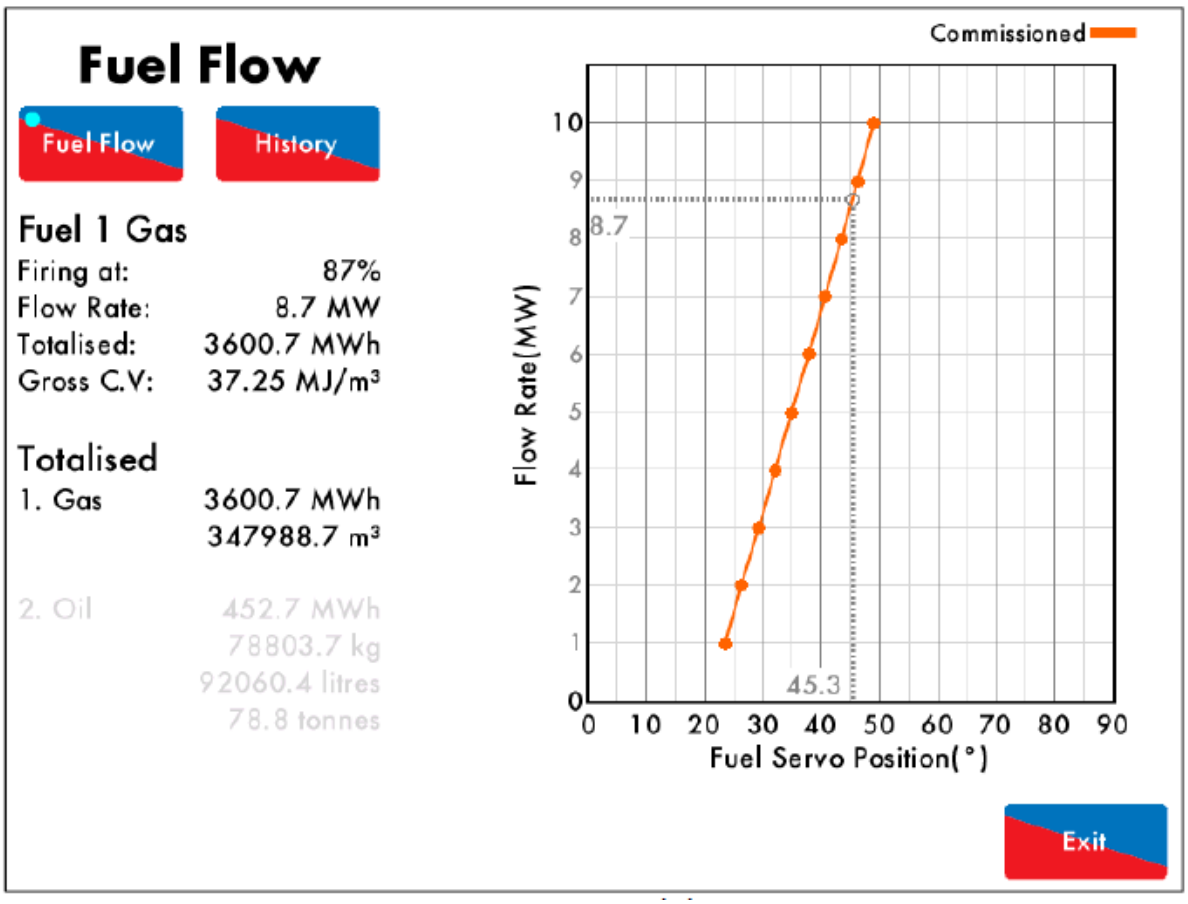


Figure 3.8.1.i Fuel Flow 图3.8.1.i燃料流量

Press the gas/oil pipe in the Home screen (Figure 3.1.i) to view the Fuel Flow screen in Figure 3.8.1.i.

在主屏幕（图3.1.i）上按下油气管按钮可以查看图3.8.1.i所示的燃料流量屏幕。

The following information is shown:

燃料流量屏幕显示了以下信息：

- Current firing rate
- 当前燃烧速度。
- Current fuel flow
- 当前燃料流量。
- Gross calorific value of the fuel
- 燃料总热值。
- Totalised fuel flow
- 总燃料流量。
- Totalised fuel used
- 使用的总燃料。

3.8.2 Fuel Flow – History 燃料流量历史

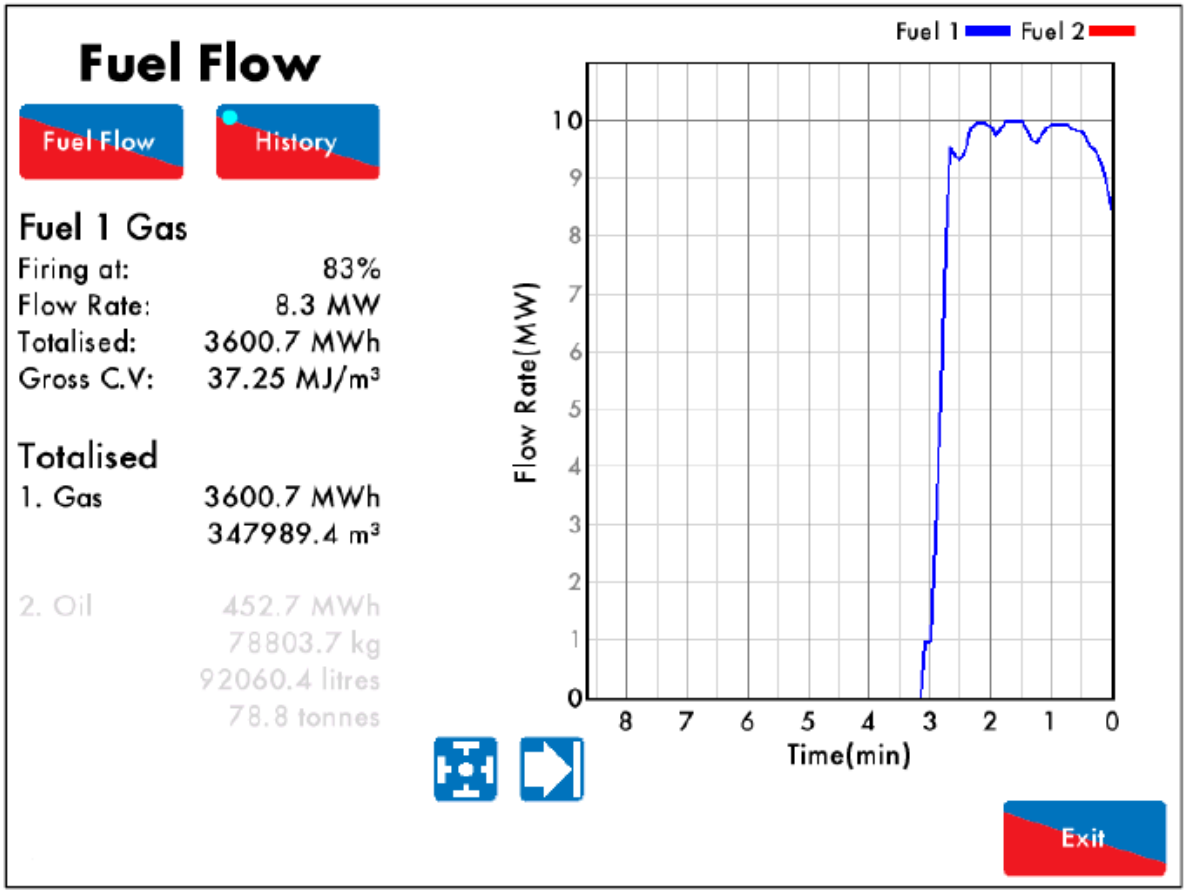


Figure 3.8.2.i Fuel Flow – History 图3.8.2.i燃料流量历史

Press History in the Fuel Flow screen in Figure 3.8.1.i to view the Fuel Flow History in Figure 3.8.2.i. The fuel flow rate history is displayed. This data is logged for 24 hours on the M.M.

在燃料流量屏幕（图3.8.1）上按下History按钮可以查看图3.8.2.i所示的燃料流量历史屏幕，燃料流量历史屏幕显示了燃料流量历史数据，该数据将在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.9 Sequencing Screen 排序屏幕

3.9.1 IBS – Sequencing IBS排序（智能锅炉排序）

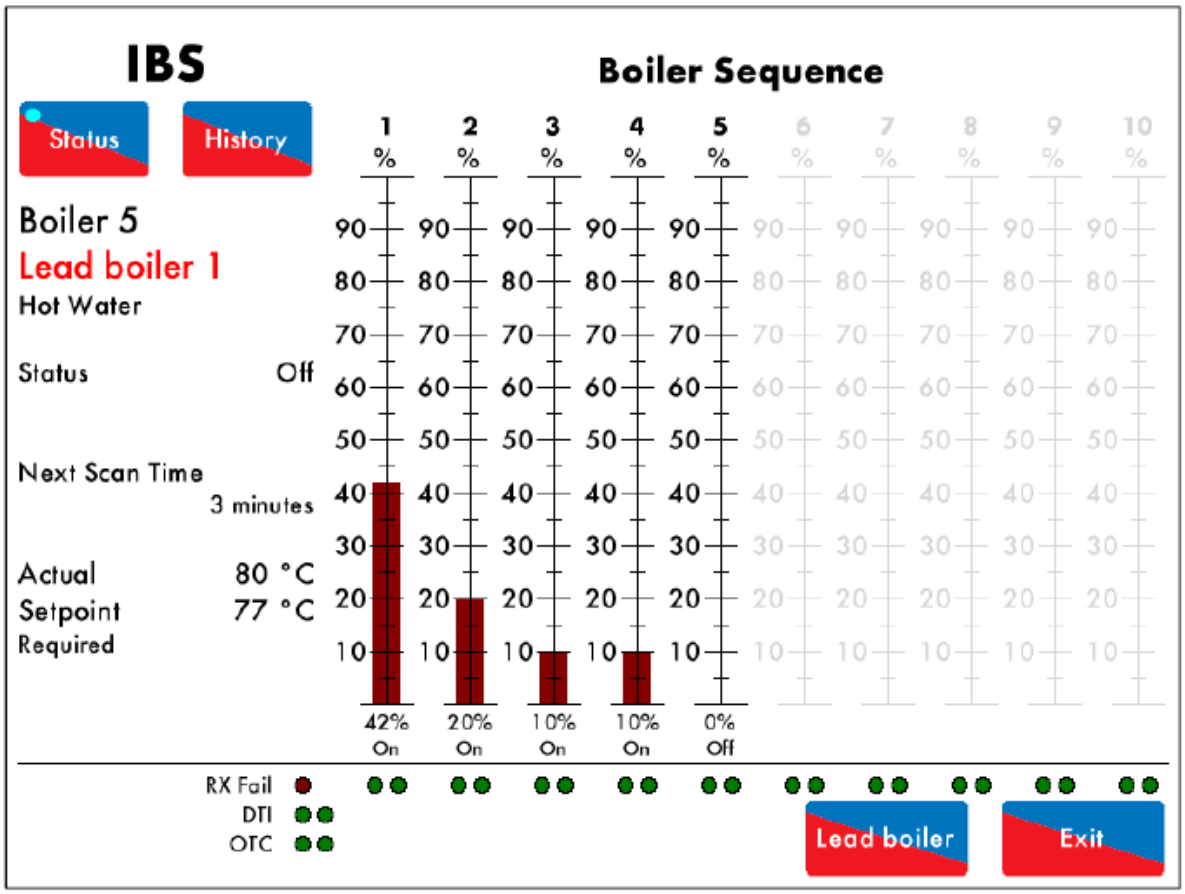


Figure 3.9.1.i IBS – Status 图3.9.1.i IBS状态

Press on the IBS box in the Home screen (Figure 3.1.i) to view the IBS Status screen in Figure 3.9.1.i.

在主屏幕（图3.1.i）上按下IBS按钮可以查看图3.9.1.i所示的IBS状态屏幕。

The following information is displayed:

IBS状态屏幕显示了以下信息：

- ID number of the M.M.
- 控制模块的ID号。
- Lead boiler
- 主锅炉。
- Type of sequencing (steam/hot water)
- 排序类型（蒸汽/热水）。
- Current status
- 当前状态。
- Next scan time
- 下次扫描时间。
- Actual temperature/pressure
- 实际温度/压力。
- Required setpoint

- 所需设定点。
- Number of M.M.s in the sequencing loop
- 排序循环中的控制模块数量。
- Current firing rates of all the M.M.s in the loop
- 循环中控制模块的当前燃烧速度。
- Current status of all the M.M.s in the loop
- 循环中控制模块的当前状态。
- Sequencing communications check
- 排序通信检查。

Note: To display the sequencing communications diagnostics, parameter 83 must be set to 1.
注：要显示排序通信诊断信息，参数83必须设为1。

3.9.2 IBS – Lead Boiler IBS-主锅炉

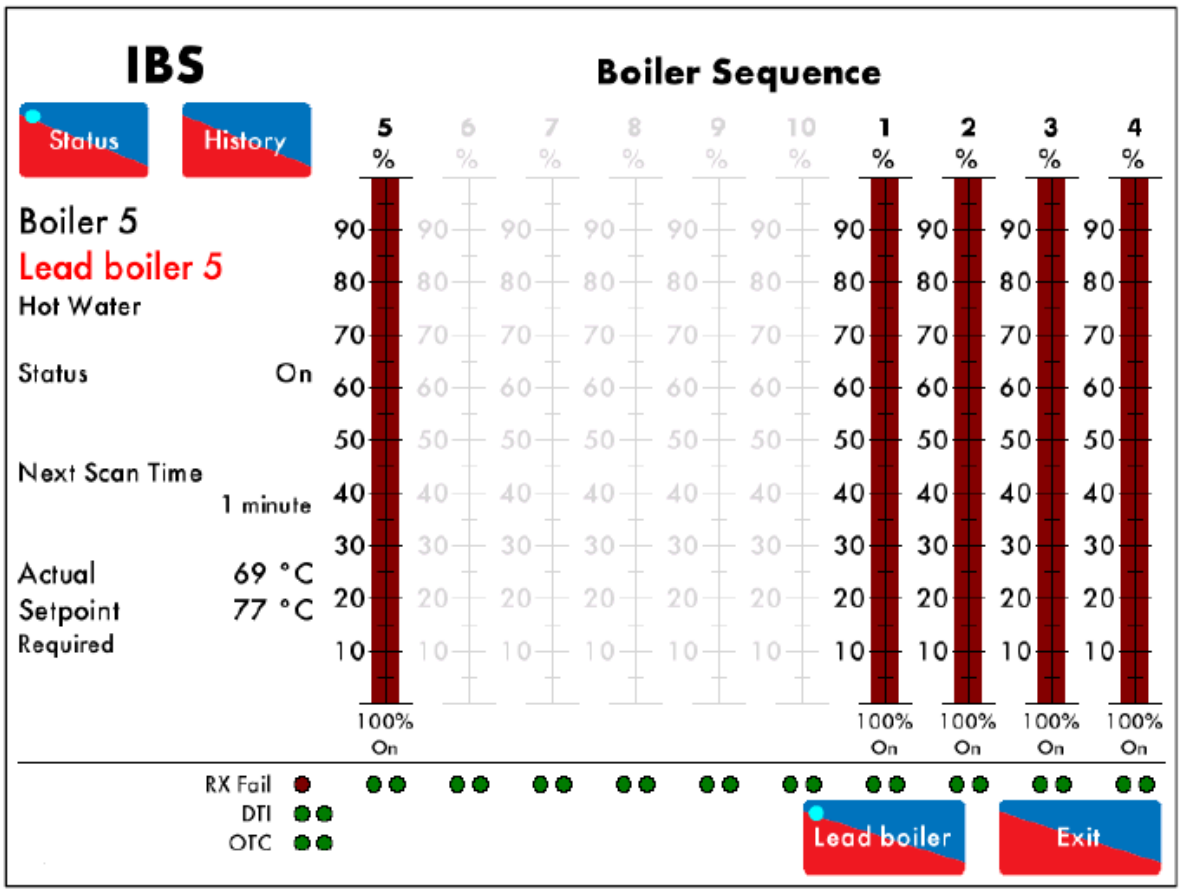


Figure 3.9.2.i IBS – Lead Boiler 图3.9.2.iIBS-主锅炉

Press Lead boiler in the IBS Status screen (Figure 3.9.1.i) to select that M.M. as the lead boiler.

在IBS状态屏幕（图3.9.1.i）上按下 Lead boiler 按钮可以选择控制模块作为主锅炉。

Note: If another M.M. has already been selected as lead boiler, or no boilers have been selected as lead boiler, then the M.M.s will fire independently until one lead boiler has been selected.
注：如果其他控制模块已选定作为主锅炉或尚无锅炉选定作为主锅炉，则控制模块独立燃烧直至选定一个主锅炉。

3.9.3 IBS – History IBS历史

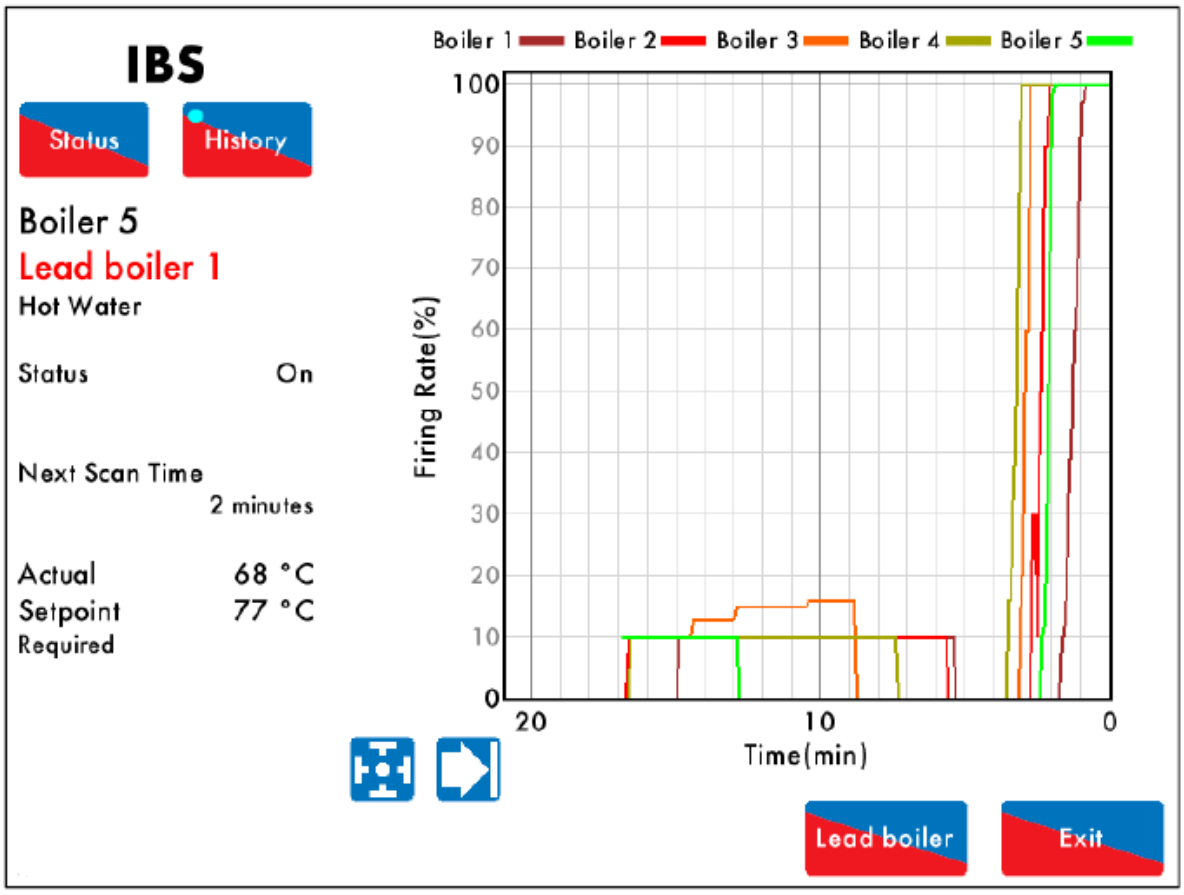


Figure 3.9.3.i IBS – History 主3.9.3.i IBS历史

Press History in the IBS – Status screen (Figure 3.9.1.i) to view IBS History screen in Figure 3.9.3.i.

在IBS状态屏幕（图3.9.1.i）上按下 History 按钮可以查看图3.9.3.i所示的IBS历史屏幕。

The firing rate histories for the M.M.s in the sequencing loop are displayed. This data is logged for 24 hours on the M.M.
IBS历史屏幕显示了排序循环中控制模块的燃烧速度历史数据，该数据将在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.10 E.G.A. Screen 尾气分析仪（EGA）屏幕

3.10.1 E.G.A. – Gas 尾气分析仪-燃气

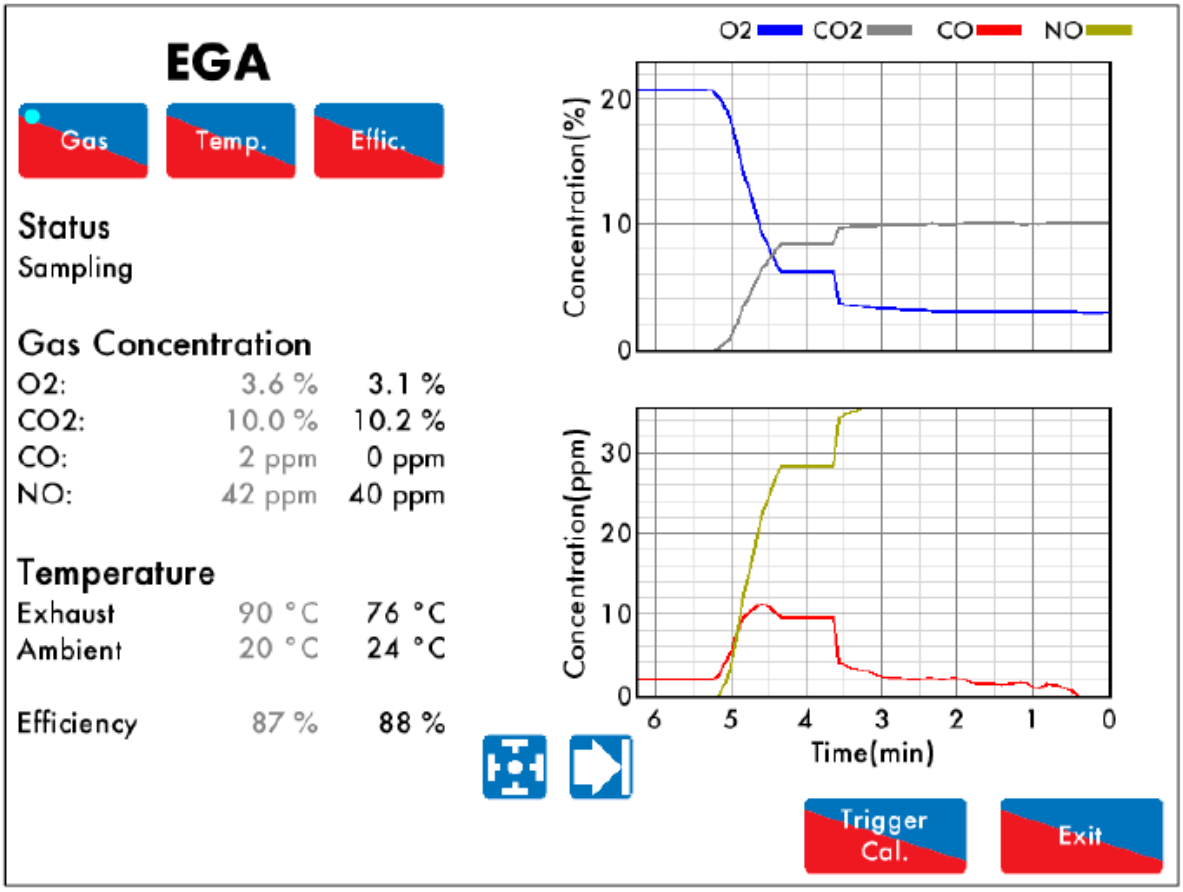


Figure 3.10.1.i E.G.A. – Gas 图3.10.1.i尾气分析仪-燃气

Press the E.G.A. box in the Home screen (Figure 3.1.i) to view the E.G.A. Gas screen in Figure 3.10.1.i. The following information is displayed:
在主屏幕（图3.1.i）上按下EGA按钮可以查看图3.10.1.i所示的EGA燃气屏幕。EGA燃气屏幕显示了以下信息：

- E.G.A. status
- EGA状态。
- Commissioned exhaust gases, temperature and efficiency values (in grey)
- 调试的尾气值、温度值和效率值（灰色）。
- Current exhaust gases, temperature and efficiency values (in black)
- 当前尾气值、温度值和效率值（黑色）。

This data is logged for 24 hours on the M.M.
该数据将在控制模块中保存24小时。

Use the  buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用   按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.10.2 E.G.A. – Temperature EGA温度

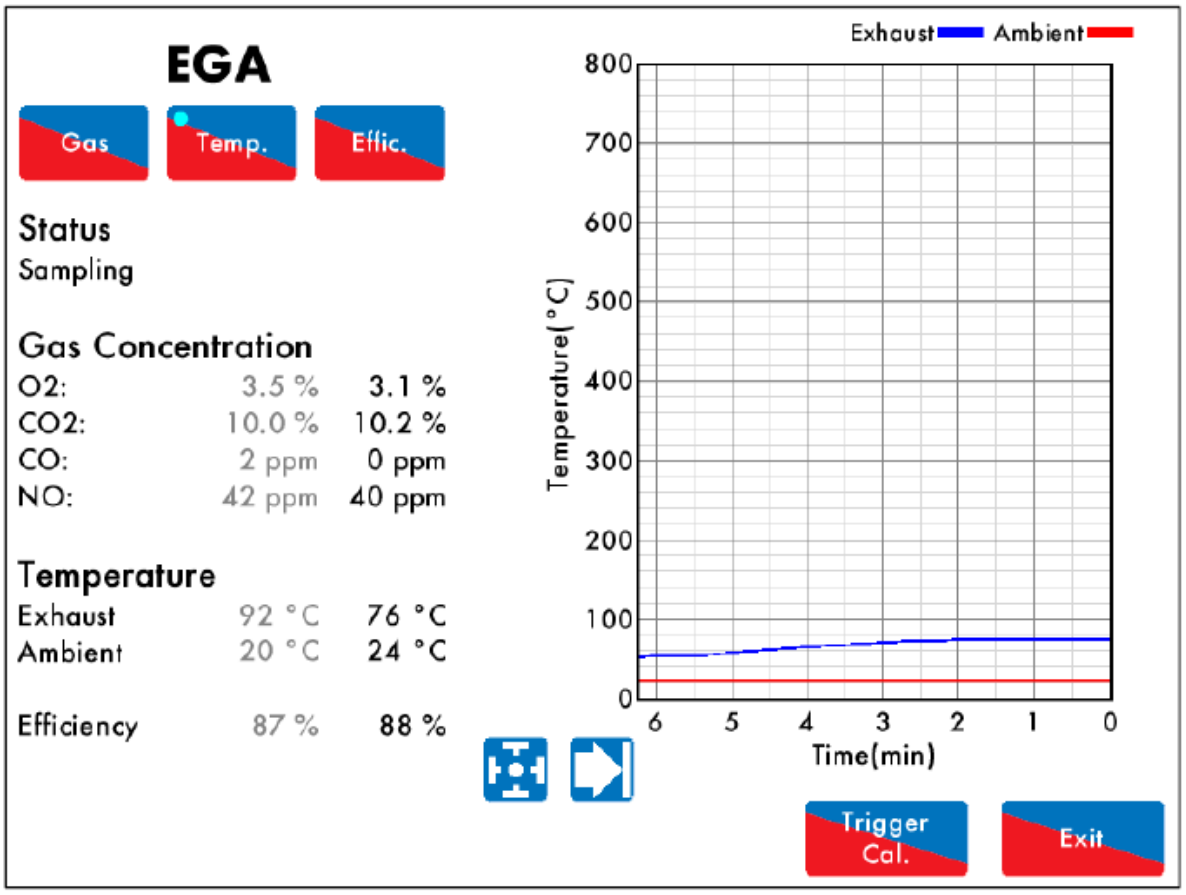


Figure 3.10.2.i E.G.A. – Temperature 图3.10.2.i EGA温度

Press Temp. in the E.G.A Gas screen (Figure 3.10.1.i) to view E.G.A. Temperature screen in Figure 3.10.2.i.The exhaust and ambient temperature histories are displayed. This data is logged for 24 hours on the M.M.

在EGA燃气屏幕（图3.10.1.i）上按下Temp.按钮可以查看图3.10.2.i所示的EGA温度屏幕，EGA温度屏幕显示了排气温度历史和环境温度历史数据，该数据将在控制模块中保存24小时。

Use the buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.10.3 E.G.A. – Efficiency EGA-效率

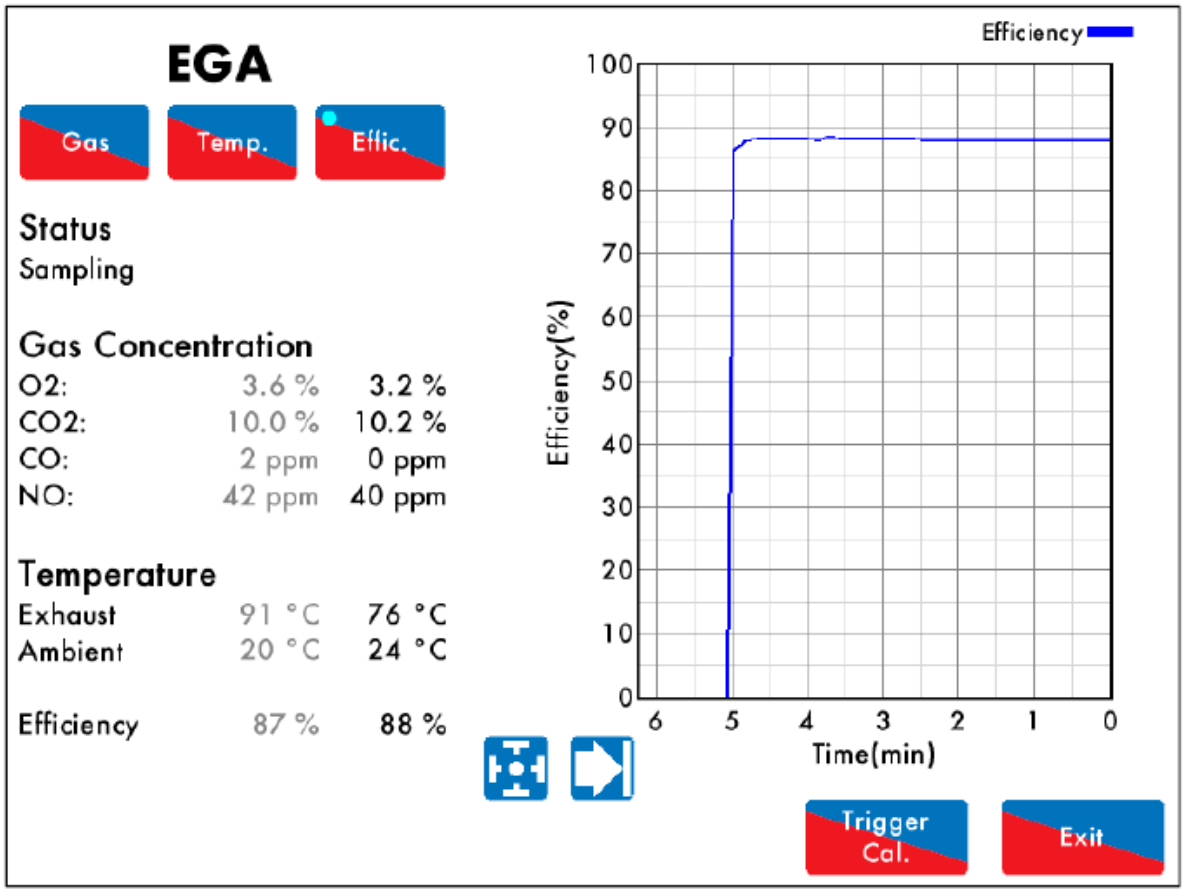


Figure 3.10.3.i E.G.A. – Efficiency 图3.10.3.i EGA-效率

Press 

in the E.G.A. Gas Screen (Figure 3.10.1.i) to view the E.G.A. Efficiency screen in Figure 3.10.2.i. The combustion efficiency history is displayed. This data is logged for 24 hours on the M.M.

在EGA燃气屏幕（图3.10.1.i）上按下 

按钮可以查看图3.10.2.i所示的EGA效率屏幕，EGA效率屏幕显示了燃烧效率历史数据，该数据将在控制模块中保存24小时。

Use the  buttons to change the timescale of the data displayed, and press and drag on the axis to zoom in/ out of the graph.

使用  按钮可以改变所示数据的时间范围，按下或拖动坐标轴可以放大或缩小图示。

This information is logged for 2 years on the D.T.I. when connected with the M.M.
当数据传输接口与控制模块连接时该信息将保存两年。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.11 Outside Temperature Compensation Screen 室外温度补偿屏幕

3.11.1 OTC – Temperature, Setpoint 室外温度补偿(OTC)-温度和设定点

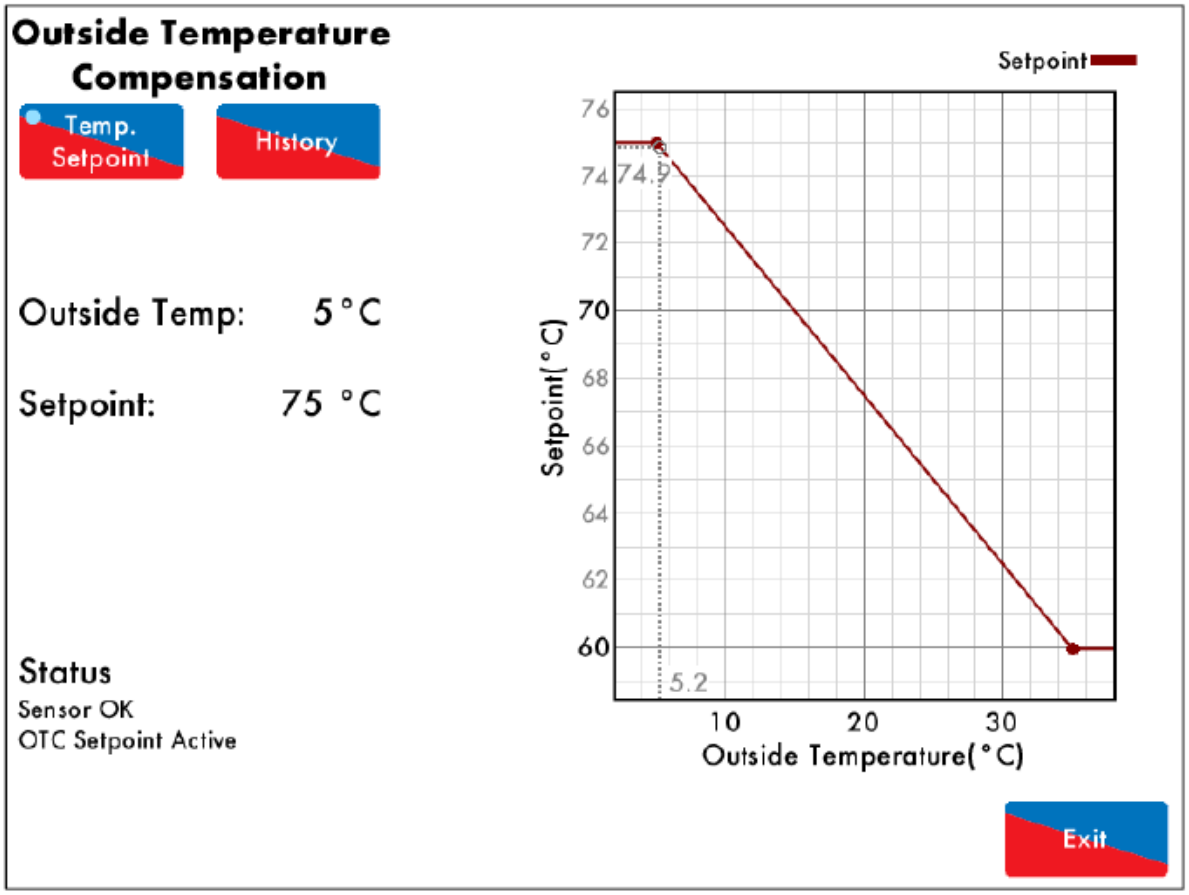


Figure 3.11.1.i OTC – Temperature, Setpoint 图3.11.1.i室外温度补偿-温度和设定点

Press on the outside temperature sensor in the Home screen (Figure 3.1.i) to view the Outside Temperature Compensation screen in Figure 3.11.i. The following information is displayed:
在主屏幕（图3.1.i）上按下室外温度传感器按钮可以查看图3.11.i所示的室外温度补偿屏幕，室外温度补偿屏幕显示了以下信息：

- Current outside temperature
- 当前室外温度。
- Current required setpoint
- 当前所需设定点。
- Status of the OTC sensor
- OTC传感器状态。
- Status of the OTC required setpoint
- OTC所需设定点状态。

Press 

in the Outside Temperature Compensation screen (Figure 3.11.1.i) to view the Outside Temperature Compensation History. The outside temperature and setpoint history are stored on the M.M. for 24 hours.

在室外温度补偿屏幕（图3.11.1.i）上按下 

按钮可以查看室外温度补偿历史数据，室外温度和设定点历史数据将在控制模块中保存24小时。

Note: Power cycling the M.M. or changing fuel will reset this data log.
注：功率循环或更换燃料时将重置数据记录。

3.12 System Configuration Screen 系统配置屏幕

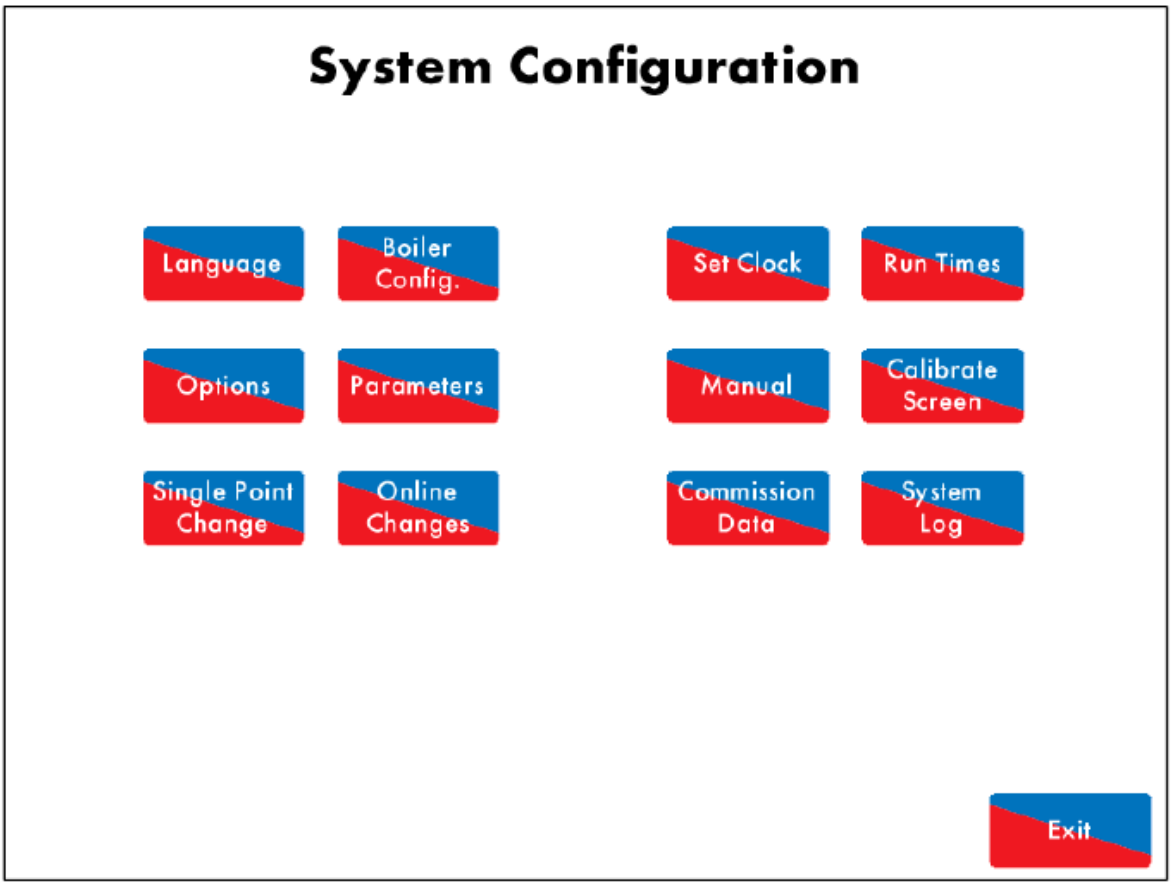


Figure 3.12.i System Configuration 图3.12.i系统配置屏幕

Press 

in the Home screen (Figure 3.1.i) to view the System Configuration screen in Figure 3.12.i. In System Configuration, it is possible to view or make changes to the following:

在主屏幕（图3.1.i）上按下 

按钮可以查看图3.12.i所示的系统配置屏幕，在系统配置屏幕上可以查看或更改以下内容：

- Language (password protected)
- 语言（带密码保护）。
- Boiler configuration displayed (password protected)
- 显示的锅炉配置（带密码保护）。
- View all options/parameters
- 查看所有选项和参数。
- Online changes (password protected)
- 在线更改（带密码保护）。
- Single point change (password protected)
- 单点更改（带密码保护）。
- Clock and run times (password protected)

- 时钟和运行时间（带密码保护）。
- Manual
- 手动。
- Commission data
- 调试数据。
- System log
- 系统日志。
- Calibrate screen
- 校准屏幕。

3.12.1 Language 语言

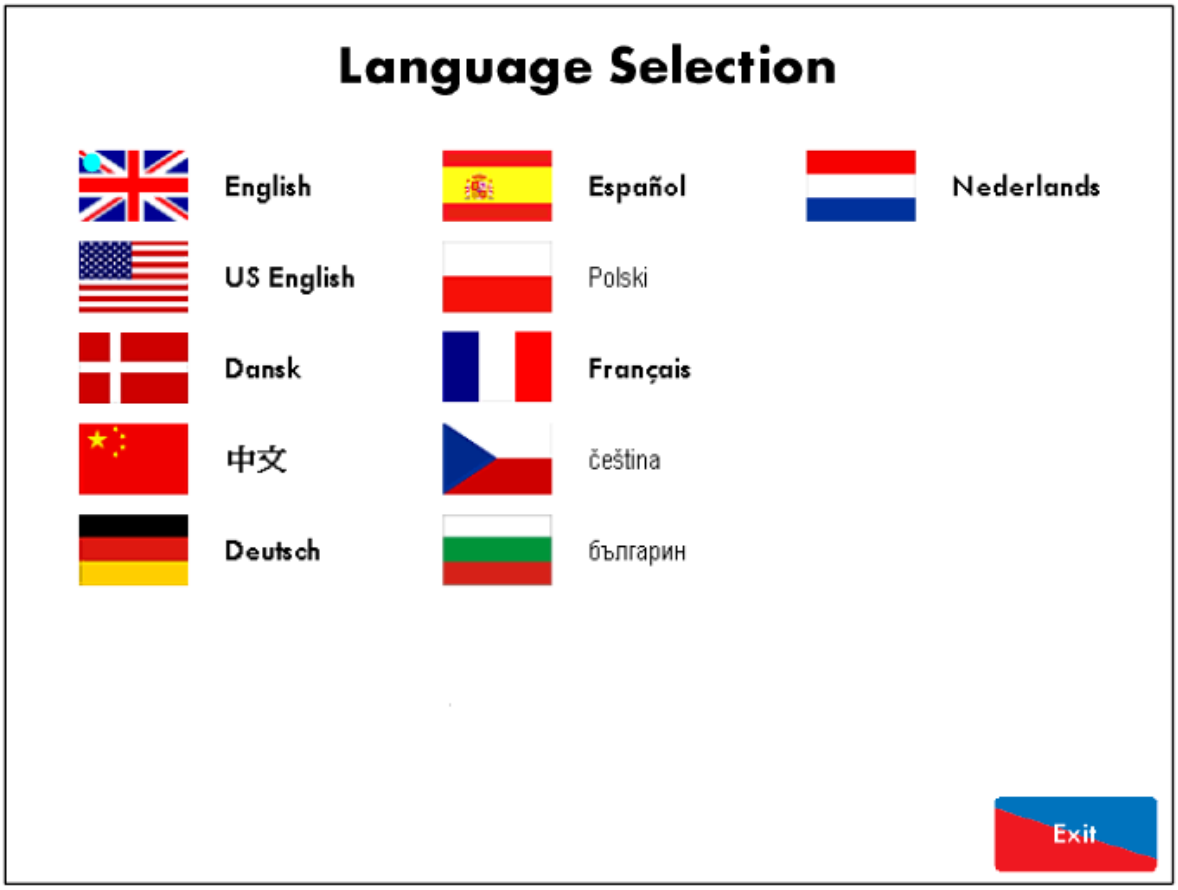


Figure 3.12.1.i Language 图3.12.1.i语言

Press Language in the System Configuration screen (Figure 3.12.i) to view the Language screen in Figure 3.12.1.i. You will be prompted to enter the password (14, 14). Select the language to be displayed and press Exit.

在系统配置屏幕（图3.12.i）上按下 Language 按钮可以查看图3.12.1.i所示的语言屏幕，屏幕将提示您输入密码（14,14），选择显示的语言后按下 Exit 按钮。

Note: The SD card must contain the language file to view this.
注：SD卡必须包含语言文件才能查看语言屏幕。

3.12.2 Boiler Configuration Screen 锅炉配置屏幕

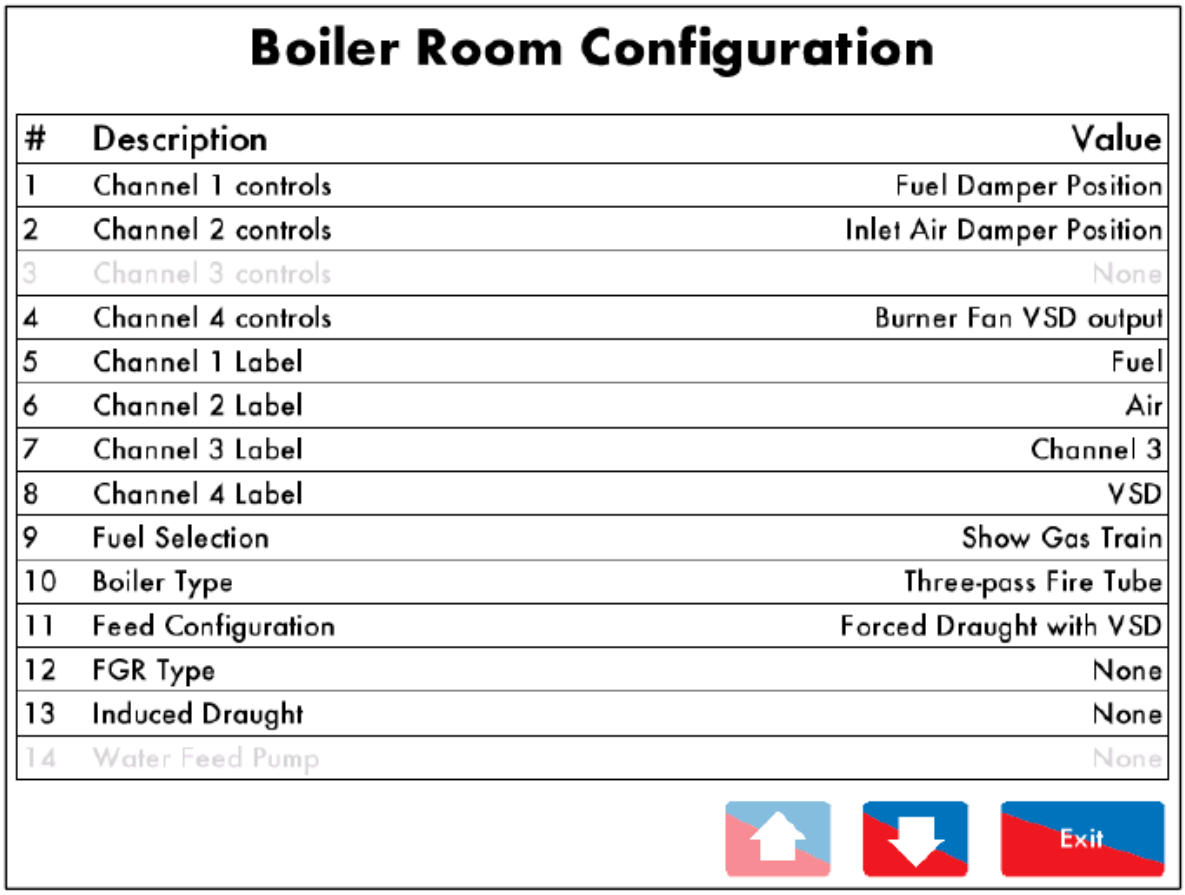


Figure 3.12.2.i Boiler Room Configuration 图3.12.2.i锅炉房配置

Press 

in the System Configuration screen (Figure 3.12.i) to view the Boiler Configuration screen in Figure 3.12.2.i. You will be prompted to enter the password (14, 14). It is possible to set up the boiler display shown in the Home screen. Once the settings have been configured to show how the boiler is setup, press 

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.2.i所示的锅炉配置屏幕，屏幕将提示您输入密码（14,14）。您可以在主屏幕上设置锅炉显示， 设定锅炉设置显示方式后按下 

按钮。

3.12.3 Options 选项

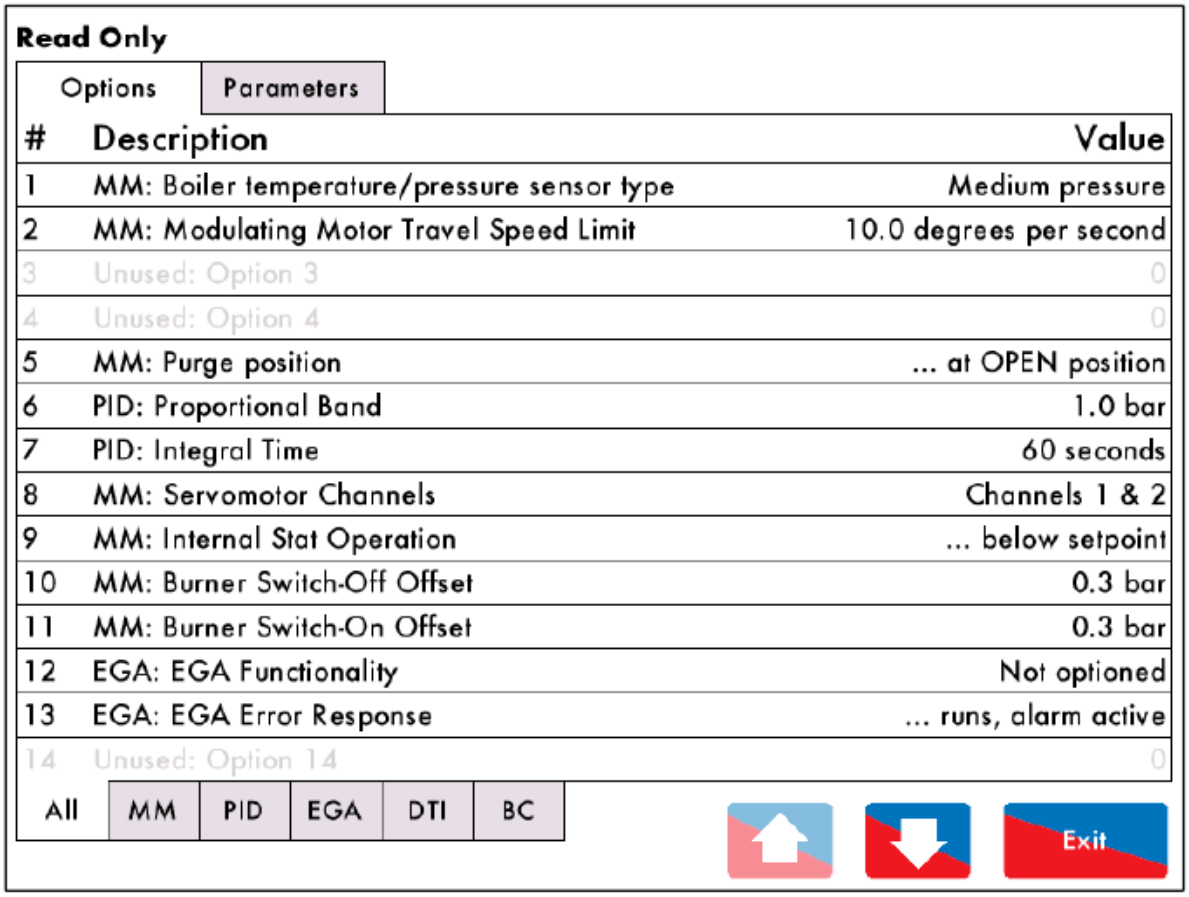


Figure 3.12.3.i Options 图3.12.3.i 选项

Presss 

in the System Configuration screen (3.12.i) to view Options screen in Figure 3.12.3.i. The Options screens display all the options and their settings, however no changes can be made to these settings. To make changes to the Options, please refer to section 3.12.5.

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.3.i所示的选项屏幕，选项屏幕显示了所有选项和设定值且设定值无法更改。更改选项时请参考3.12.5节。

3.12.4 Parameters 参数

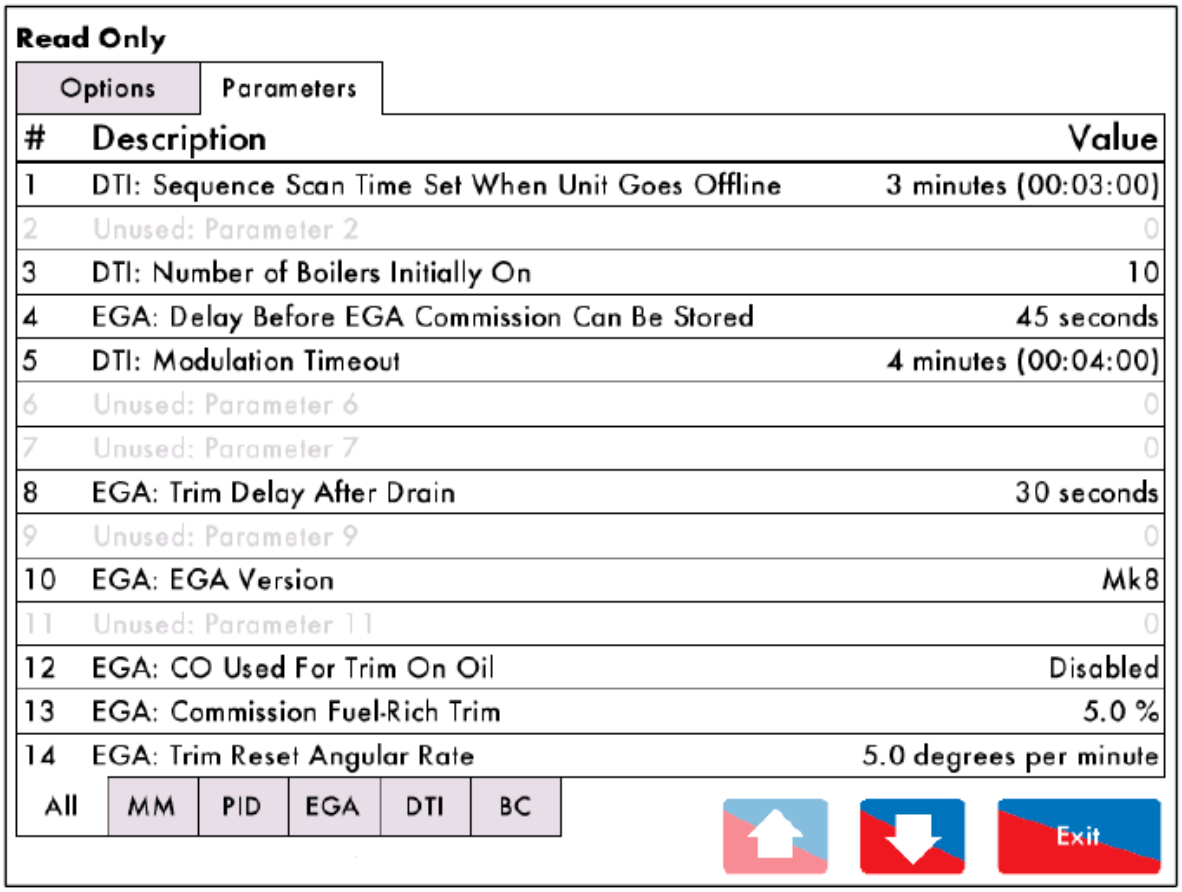


Figure 3.12.4.i Parameters 图3.12.4.i 参数

Press 

in the System Configuration screen (Figure 3.12.i) to view the Parameters screen in Figure 3.12.4.i. The Parameters screens display all the parameters and their settings. To make changes to these Parameters, refer to section 3.12.5.

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.4.i所示的参数屏幕，参数屏幕显示了所有参数和设定值。更改参数时请参考3.12.5节。

3.12.5 Online Changes 在线更改

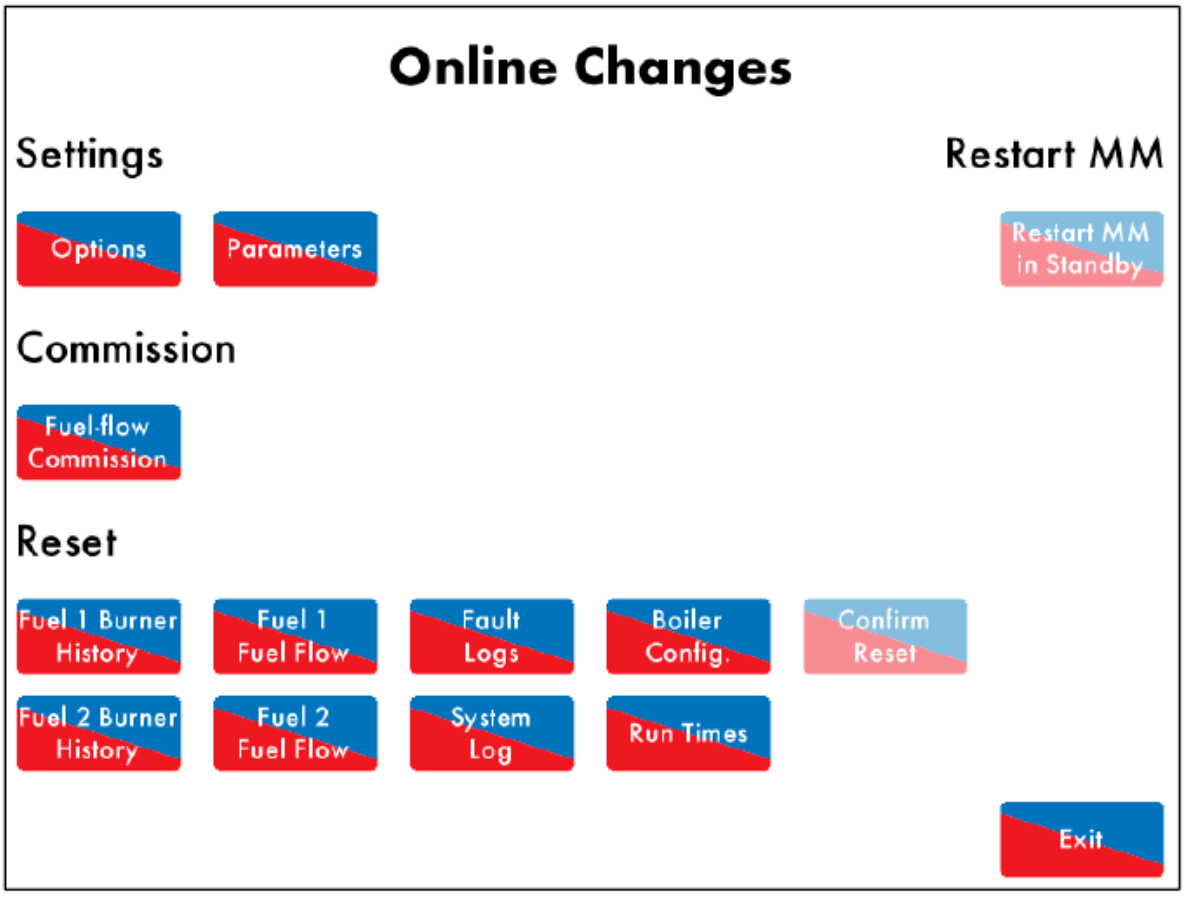


Figure 3.12.5.i Online Changes 图3.12.5.i在线更改

Press Online Changes in the System Configuration screen (Figure 3.12.i) to view the Online Changes screen in Figure 3.12.5.i. You will be prompted to enter the password. It is possible to change the nonsafety critical options/parameters by pressing Options or Parameters.

在系统配置屏幕（图3.12.i）上按下 Online Changes 按钮可以查看图3.12.5.i所示的在线更改屏幕，屏幕将提示您输入密码，按下 Options 按钮或 Parameters 按钮可以更改与安全无关的关键选项和参数。

Press Fuel 1 Burner History to reset the Fuel 1 burner history and then press Confirm Reset. The fuel 1 and 2 burner and fuel flow history, fault logs, system log, boiler configuration and run times can all be reset.

按下 

按钮可以重置燃料1燃烧器历史，然后按下 

按钮。燃料1和燃料2燃烧器和燃料流量历史、故障日志、系统日志、锅炉配置和运行时间都可以重置。

If the M.M. is in standby mode, press 

to restart the M.M. This button will be greyed out as in Figure 3.12.5.i if the burner is on.

如果控制模块处于待机模式，按下 

按钮可以重启控制模块，当燃烧器为开启时该按钮将呈灰色，见图3.12.5.i所示。

3.12.6 Set Clock 设置时钟

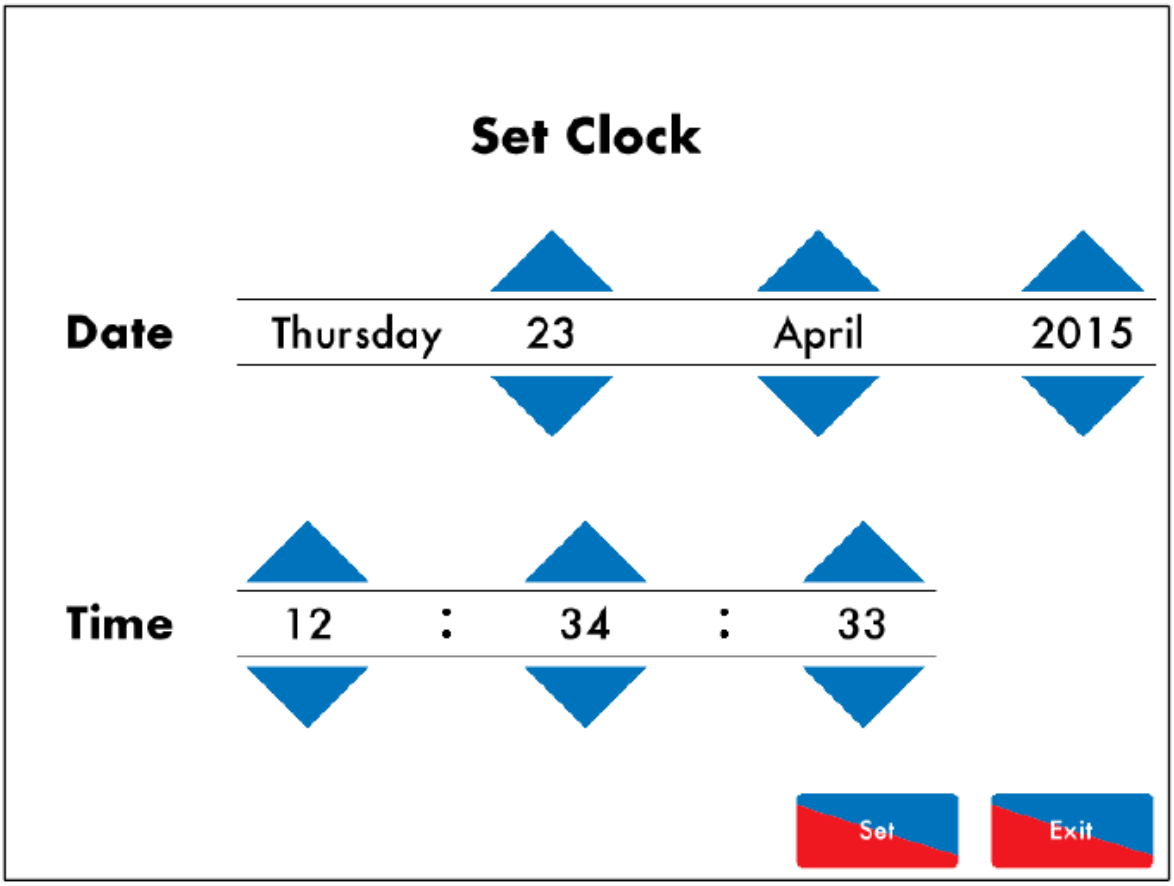


Figure 3.12.6.i Set Clock 图3.12.6.i设置时钟

Press 

in the System Configuration screen (Figure 3.12.i) to view the Set Clock screen in Figure 3.12.6.i. You will be prompted to enter the password (10, 10). Change the time and date using

the  buttons. Press 

and then 

.

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.6.i所示的设置时钟屏幕，屏幕将提示您输入密码（10,10）。使用  按钮可以更改时间和日期，按下 

按钮然后按下 

按钮。

Note: If connected to a D.T.I. the time and date will be set by this and not be user adjustable.

Please refer to the D.T.I. Set-Up Guide to change this time.
注：如连接数据传输接口，则时间和日期可以通过上述方式设置且用户不可调整。
要更改时间请参考DTI设置指南。

3.12.7 Run Times 运行时间

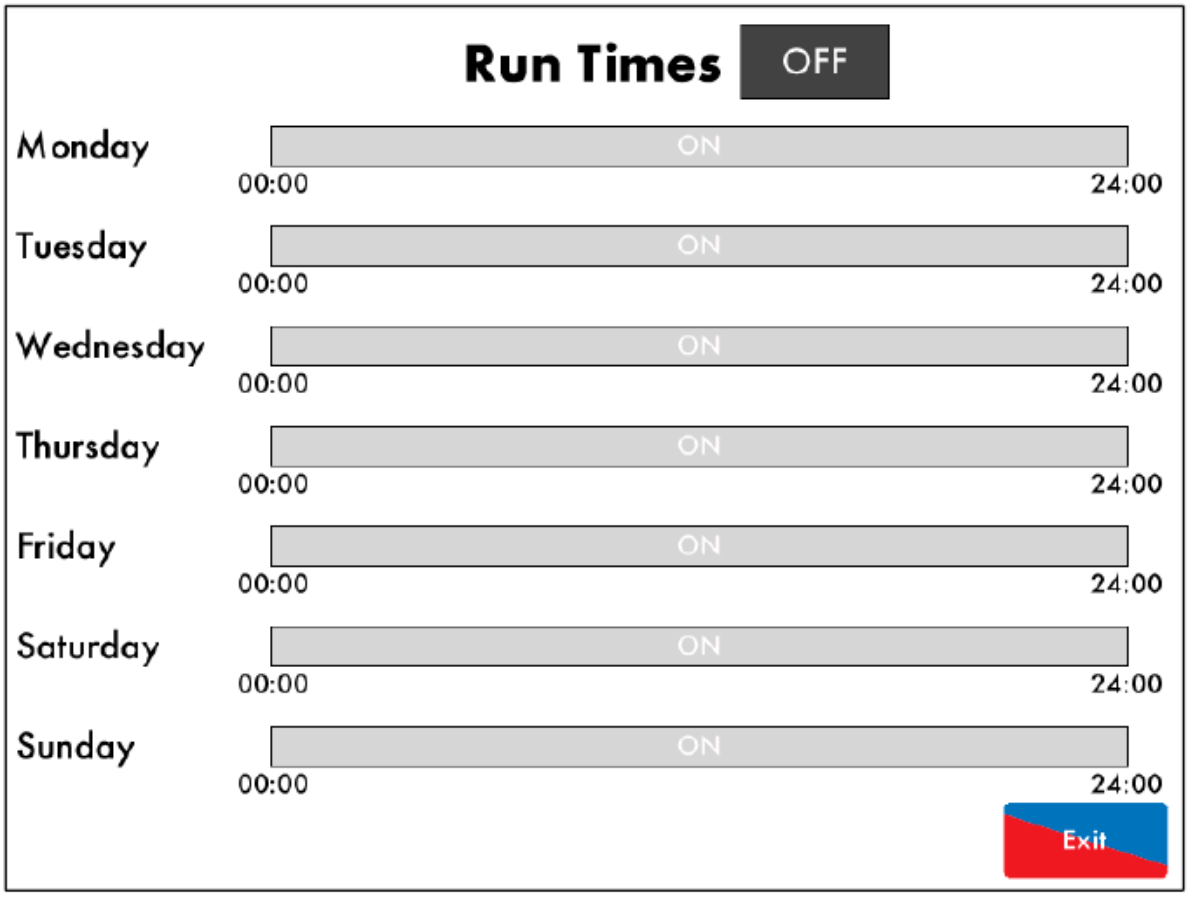


Figure 3.12.7.i Run Times – OFF 图3.12.7.i运行时间关闭

Press 

in the System Configuration screen (Figure 3.12.i) to view the Run Times screen in Figure 3.12.7.i. You will be prompted to enter a password (11,11). Run Times sets when the M.M. is scheduled to be on and firing to the required setpoint, on and firing to the reduced setpoint or off.

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.7.i所示的运行时间屏幕，屏幕将提示您输入密码（11,11），运行时间可以设置控制模块预期启动时间、燃烧所需设定点、降低设定点启动、燃烧或关闭。

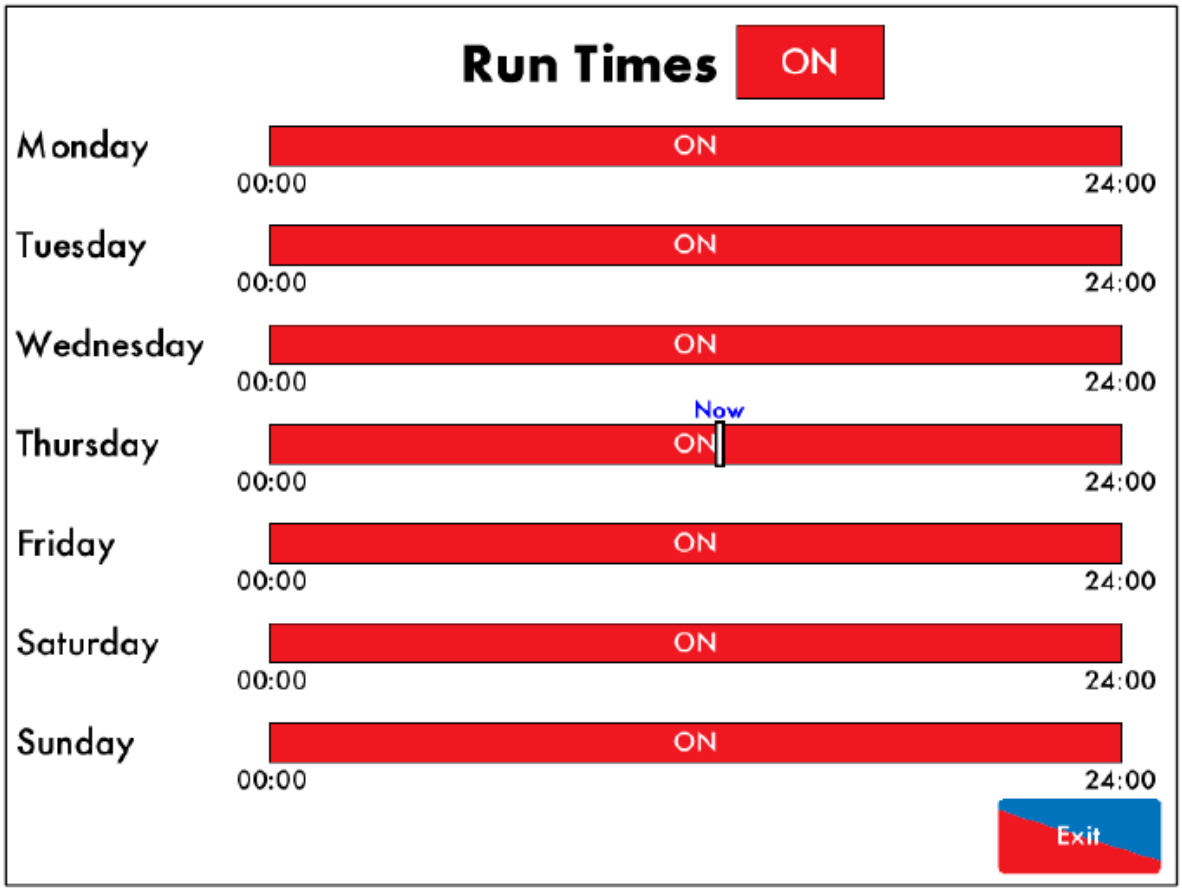


Figure 3.12.7.ii Run Times – ON 图3.12.7.ii 运行时间开启

Press OFF in the Run Times screen (Figure 3.12.7.i) to view the Run Times On/Off screen in Figure 3.12.7.ii. Press ON in the Run Times – ON screen to disable the run times.

在运行时间屏幕（图3.12.7.i）上按下OFF按钮可以查看图3.12.7.ii所示的运行时间开启/关闭屏幕。在运行时间开启屏幕上按下ON按钮可以禁用运行时间。

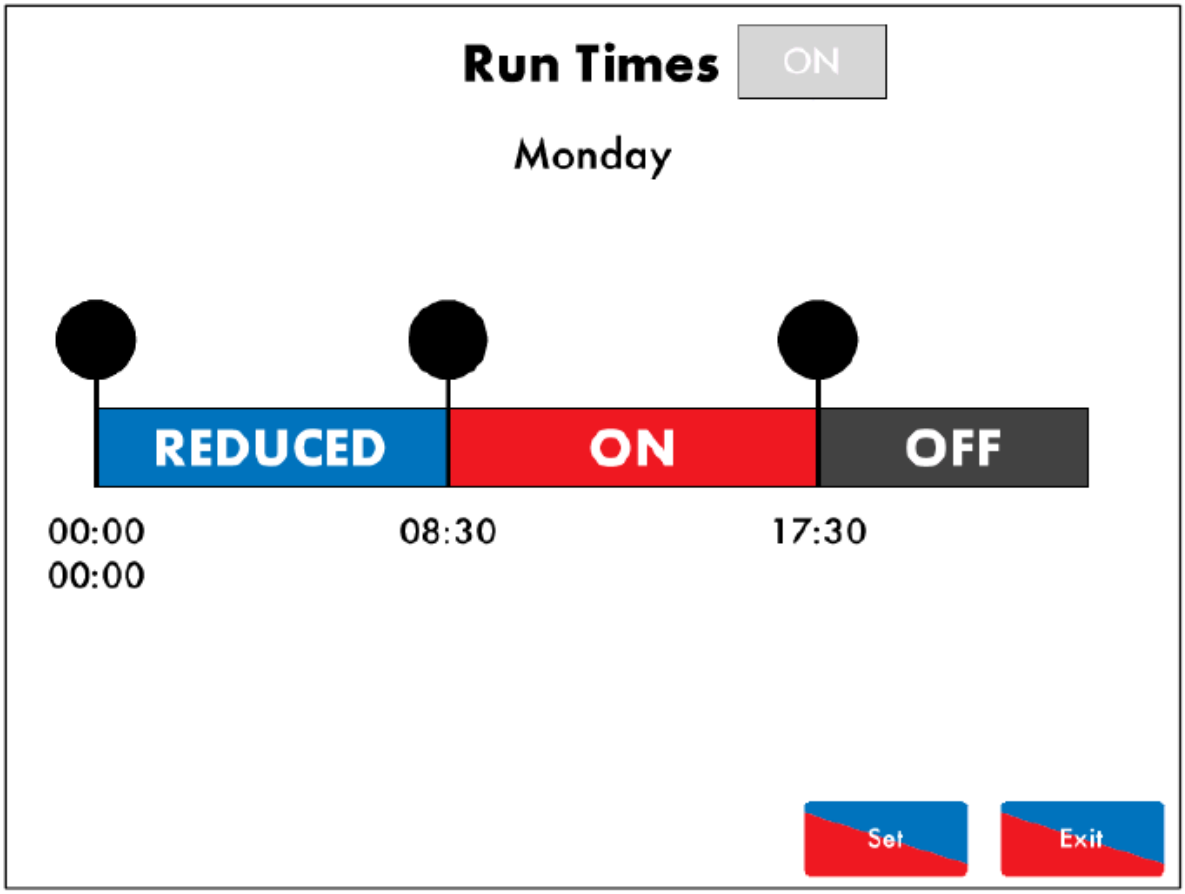


Figure 3.12.7.iii Run Times – Monday 图3.12.7.iii运行时间-星期一

To set the schedule, press on the bar for that day in the Run Times On/Off screen (Figure 3.12.7.ii) and drag the  to set the intervals, and then press the bar to change the intervals to ON, OFF or REDUCED. Up to 4 time periods can be set.

要设定时间表，先在运行时间开启/关闭屏幕（图3.12.7.ii）上按下设定日按钮，拖动  设定间隔时间，然后按下按钮将间隔时间改为ON、OFF或REDUCED。可以设置4个时间区段。

Note: The M.M. will fire to the reduced setpoint set in the Status screen (Figure 3.2.1.i) when scheduled in the Run Times or if option/parameter 154 is set to 3 and an input is detected on Terminal 80.
注：当运行时间或选项/参数154设为3且端口80检测到输入时，控制模块将在状态屏幕（图3.2.1.i）中设定的降低设定点燃烧。

3.12.8 Manual 手动

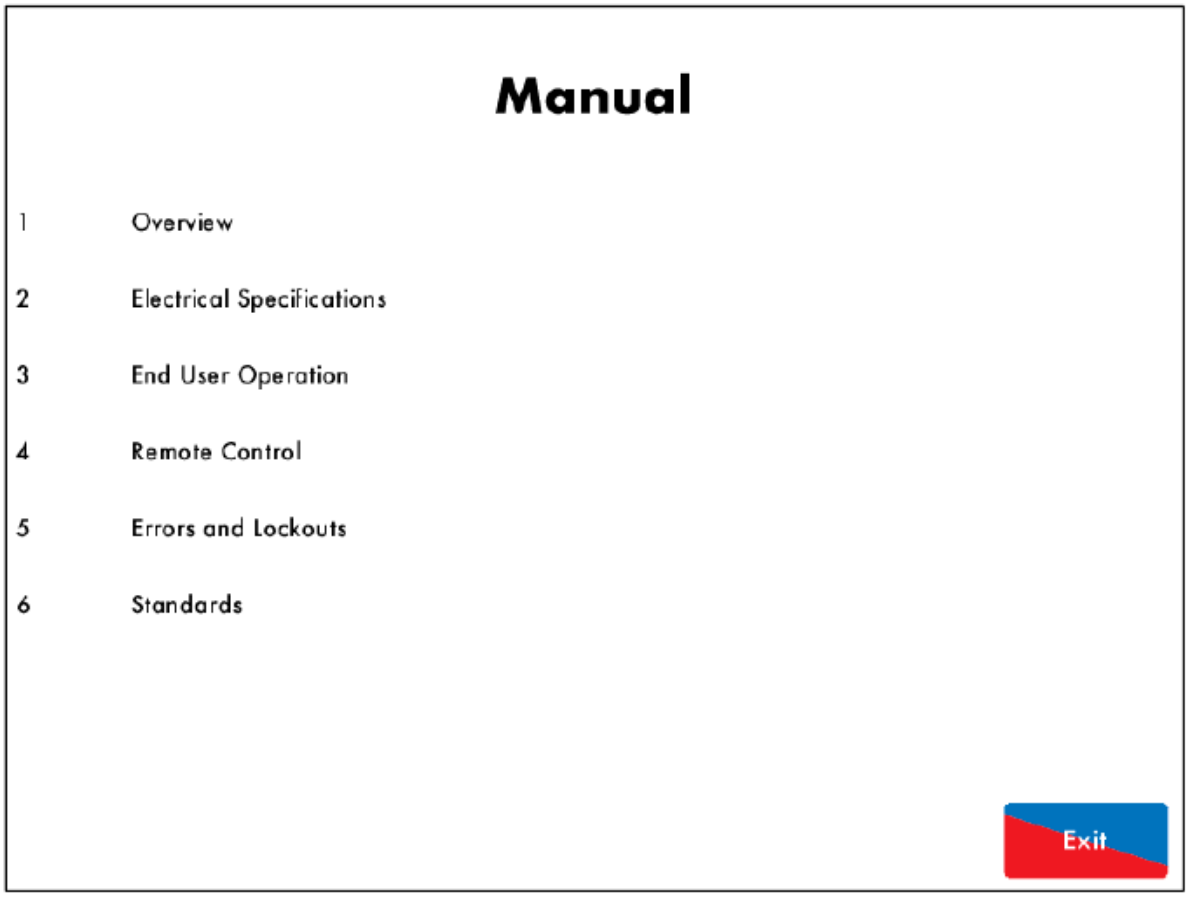


Figure 3.12.8.i Manual 图3.12.8.i手动

Press 

in the System Configuration (3.12.i) to view the Manual screen in Figure 3.12.8.i. Press on the section headings to navigate to the sections.

在系统配置屏幕（3.12.i）上按下 

按钮可以查看图3.12.8.i所示的手动屏幕，按下段落标题可以浏览各段内容。

Note: The SD card must contain the manual file to view this.
注：SD卡必须包含手动文件才能查看此屏幕。

3.12.9 Commission Data 调试数据

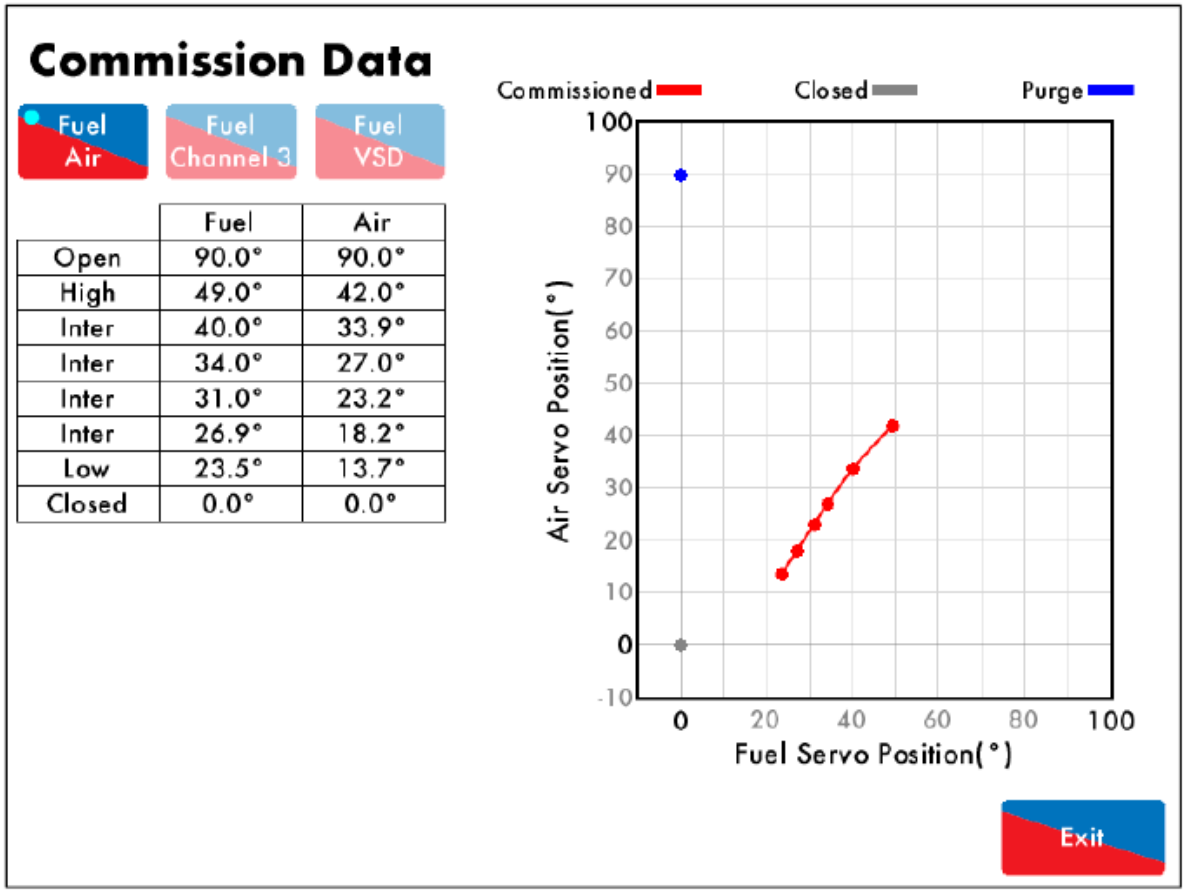


Figure 3.12.9.i Commission Data 图3.12.9.i调试数据

Press Commission Data in the System Configuration screen (Figure 3.12.i) to view the Commission Data screen in Figure 3.12.9.i.

在系统配置屏幕（图3.12.i）上按下 Commission Data 按钮可以查看图3.12.9.i所示的调试数据屏幕。

3.12.10 System Log 系统日志

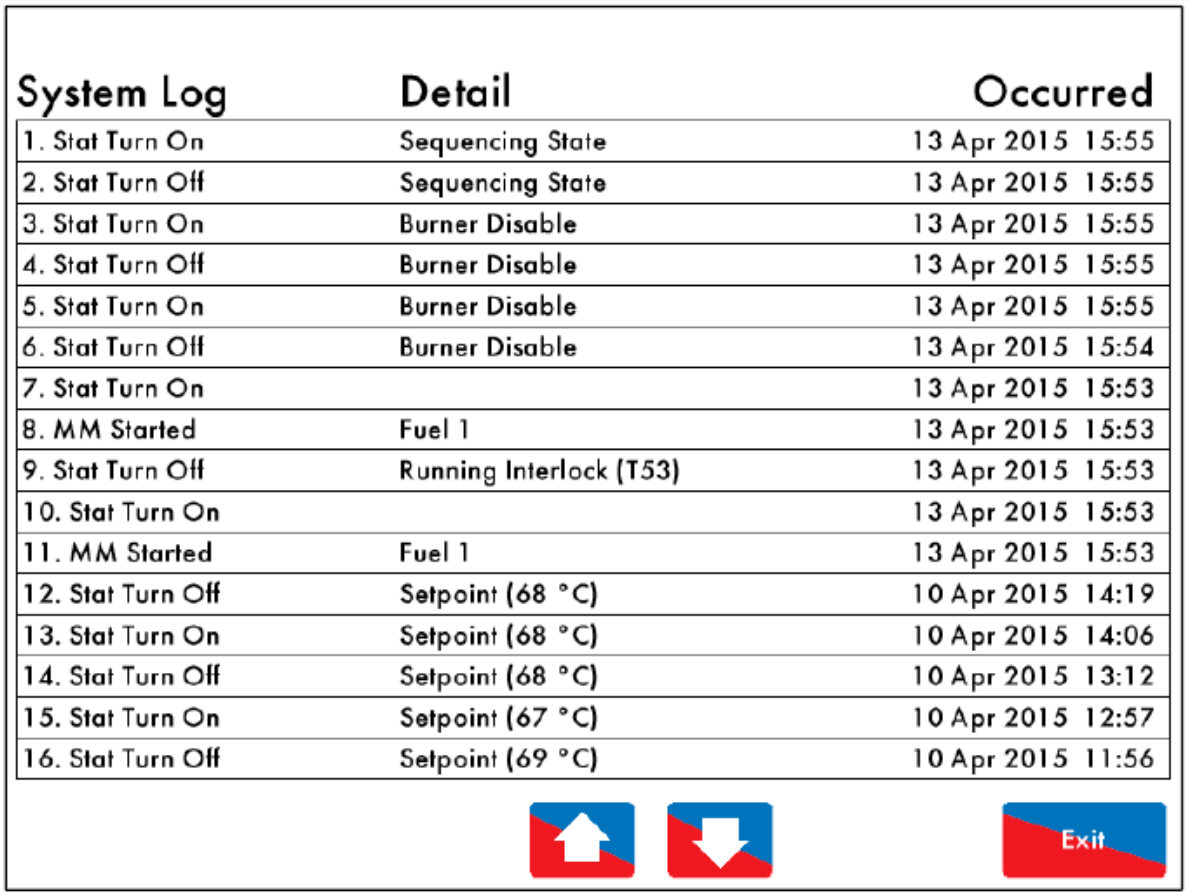


Figure 3.12.10.i System Log 图3.12.10.i系统日志

Press 

in the System Configuration screen (Figure 3.12.i) to view the System Log screen in Figure 3.12.10.i. This data is stored on the M.M. and the SD card for 1000 entries.

在系统配置屏幕（图3.12.i）上按下 

按钮可以查看图3.12.10.i所示的系统日志屏幕，该数据将保存在控制模块中，SD卡可以保存1000条日志。

4 BURNER START-UP SEQUENCE 燃烧器启动顺序

The M.M. goes through a series of internal checks and flame safeguard checks before starting up the burner; these are relevant to the burner application. Any errors or lockouts which might occur in the start-up sequence will provide information on the time and date they have occurred, and the phase in which it occurred. If any errors or lockouts occur, please contact Autoflame Engineering Ltd or your local Autoflame Technology Centre.
燃烧器启动前控制模块要经过一系列内部检查和火焰防护检查，这些检查都与燃烧器应用程序有关。在启动过程中可能出现任何错误或导致锁定，此时将提供出现故障的时间和日期以及相位。如果出现错误或导致锁定，请联系Autoflame工程有限公司或当地Autoflame技术中心。

The following start-up sequence is shown for an example burner application. The system has been set up with these burner control features:
以下内容显示了启动的燃烧器应用程序，系统已根据燃烧器控制特点进行设置：

- Firing on gas
- 燃气燃烧。
- 2 Valve proving system – no vent valve, single valve pilot
- 2阀校验系统-无排气阀、单阀导燃。
- Interrupted pilot
- 导燃中断。
- UV scanner
- UV扫描器。
- Air pressure sensor
- 空气压力传感器。
- Gas pressure sensor – VPS and pressure limits checked
- 燃气压力传感器- 检查阀门校验系统（VPS）和压力限值。
- VPS operates before start-up
- 启动前的阀门校验系统操作。
- Pre-purge and post-purge
- 预吹扫和后吹扫。
- No golden start
- 无黄金启动点。
- No FGR start
- 无FGR启动。

4.1 Recycle 再循环

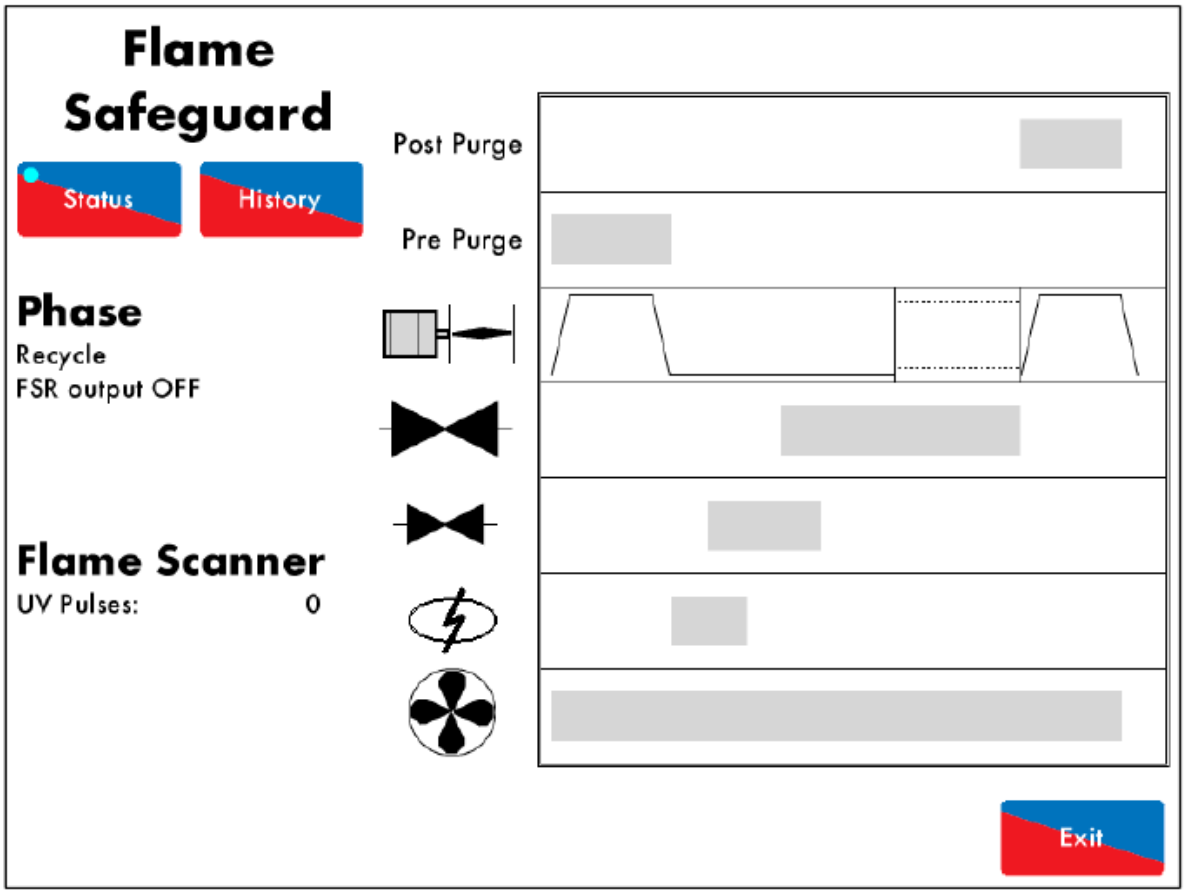


Figure 4.1.i Recycle 图4.1.i再循环

When the burner enters the Recycle phase shown in Figure 4.1.i, both the fuel valves and air damper go to their respective commissioned 'closed' positions, and the burner is not firing.
当燃烧器进入图4.1.i所示的再循环阶段时，燃料阀和空气阻尼器将分别进入调试"关闭"位置，燃烧器将无法燃烧。

As the burner is off in Recycle, there should not be any flame detected. The UV scanner checks that there is no flame, and if a flame is detected, the lockout 'Simulated Flame' will occur. This could be a result of after burn and must be investigated. A post-purge could be necessary. See option/parameters 118 and 135.
由于再循环中燃烧器已关闭，因此无法检测出任何火焰。紫外线扫描器将检查是否无火焰，检测到火焰时将锁定"模拟火焰"，这可能是燃烧后导致的结果，因此需要必须进行检查，可以进行后吹扫。见选项/参数118和135。

While the M.M. is in the Recycle phase, if T53 is switched ON, there will be time delay before the burner starts up. See option/parameter 119.
当控制模块处于再循环阶段时，如果开启T53，则燃烧器在启动前没有任何时间延迟。见选项/参数119。

4.2 Standby 待机

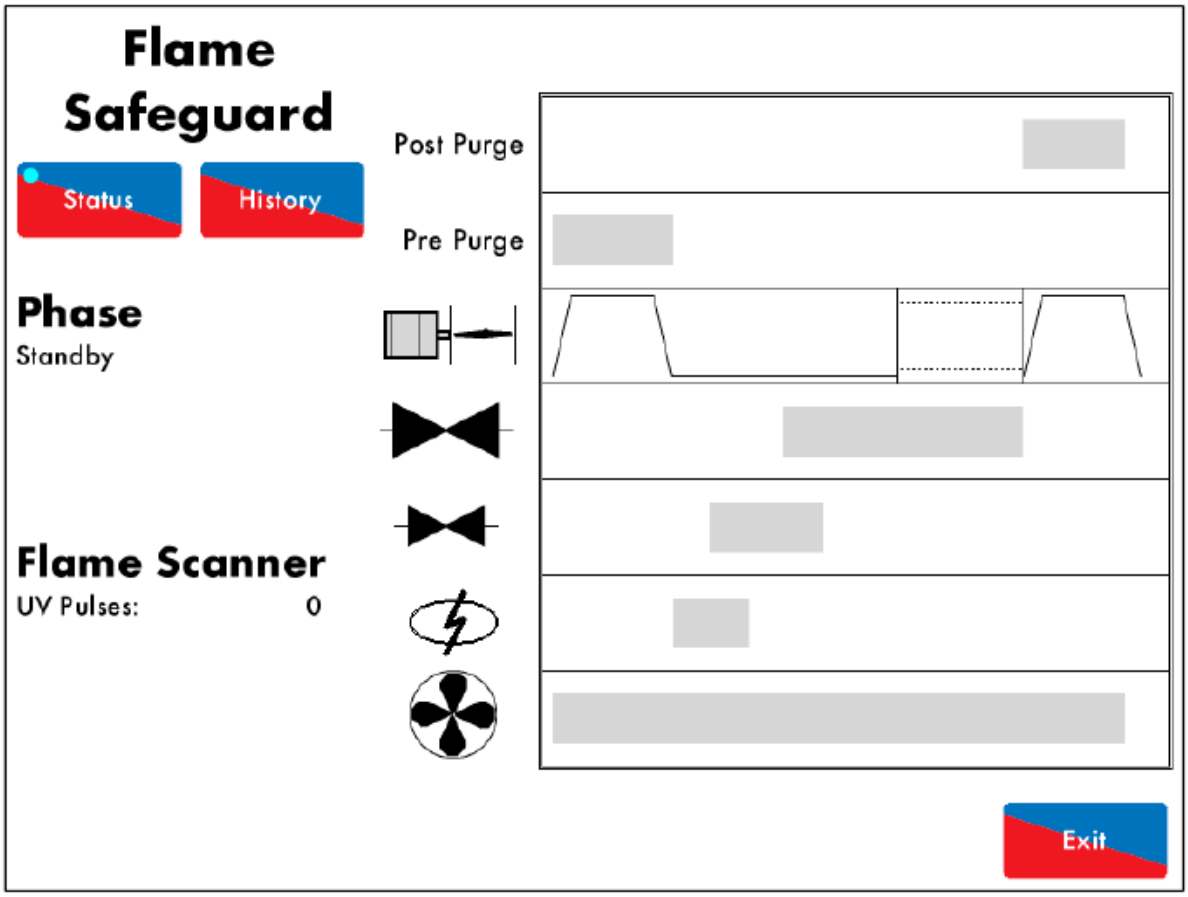


Figure 4.2.i Standby 图4.2.i 待机

The burner will go into Standby shown in Figure 4.2.i., before the safety checks begin to initiate the burner start-up sequence.
安全检查开始燃烧器启动顺序前，燃烧器将进入图4.2.所示的待机阶段。

The M.M. will remain in this phase if it is waiting for a call to start via the internal stat, subject to the required setpoint and load demand. The external safety interlock circuit is tied into T53, this also must be ready for the burner to be switched on, to move to the next phase.
如果需要通过内部启停等待调用，根据所需设定点和负载要求控制模块将在本阶段保持不变。要启动燃烧器外部安全联锁电路必须连接T53，以便进入下一阶段。

The M.M. will only move to the next phase when the actual temperature/pressure of the system has reached the burner's on range, set as an offset value of the required temperature/pressure. See options 9, 10 and 11.
当系统的实际温度/压力达到燃烧器范围时控制模块将进入下一阶段，燃烧器范围设置为所需温度/压力的偏移值。见选项9、10和11。

The Standby phase is also part of the Intelligent Boiler Sequencing. The M.M. could be in Standby because it is a lag boiler and not required to contribute to the system. See options 16, 41, 42, 53 and 54.

待机阶段也是智能锅炉排序的一部分。控制模块也可能因滞后锅炉和系统不需要而处于待机状态。见选项16, 41, 42, 53和54。

The M.M. will remain in Standby if the burner has been disabled, see section 3.1.3. The M.M. can also be disabled remotely, see section 5 Remote Control.
燃烧器被禁用时控制模块将处于待机状态，见3.1.3节。控制模块也可以远程禁用，见第5章远程控制。

4.3 Internal Relay Tests 内部继电器测试

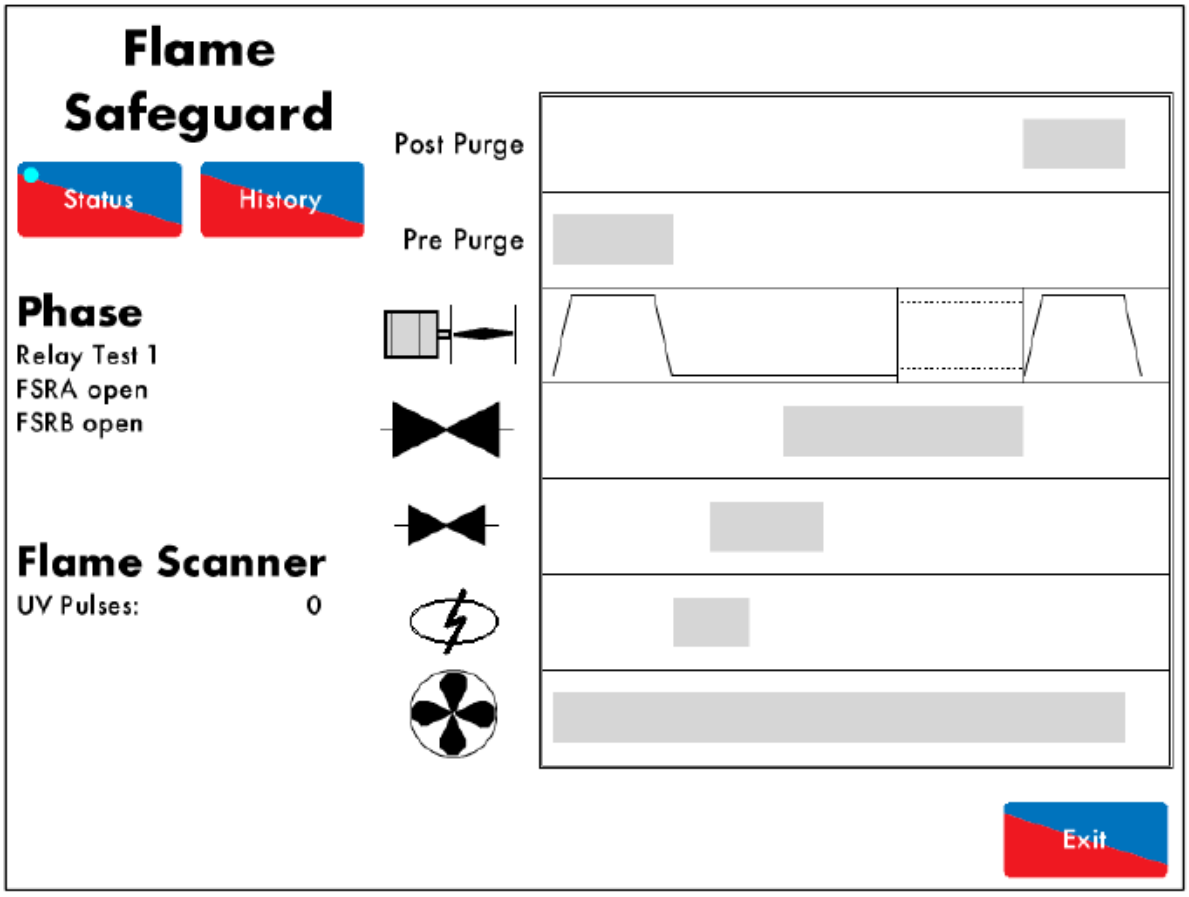


Figure 4.3.i Relay Test 1 图4.3.i继电器测试1

During the Internal Relay Tests phase shown in Figure 4.3.i., the M.M. will check its internal flame safe relays 1 to 5. Should any lockouts occur now for the relay tests such as 'FSR Test 1A' this is an indication of an internal fault within the M.M.
在图4.3.i所示的内部继电器测试阶段，控制模块将检查内部火焰安全继电器1至5。如果继电器测试如"FSR测试1A"时出现锁定，则表明控制模块出现内部故障。

The M.M. will go through a series of 5 relay tests.
控制模块将经过连续5个继电器测试。

If voltage is detected on terminal 57 call for heat during these checks when there should not be, the lockout 'Fail Safe Relay Fault' will occur. Please check the 5A fuse.
如果端口57上检测达到的电压要求在检查中加热，则出现"安全装置继电器故障"，见检查5A保险丝。

4.4 CPI Input CPI输入

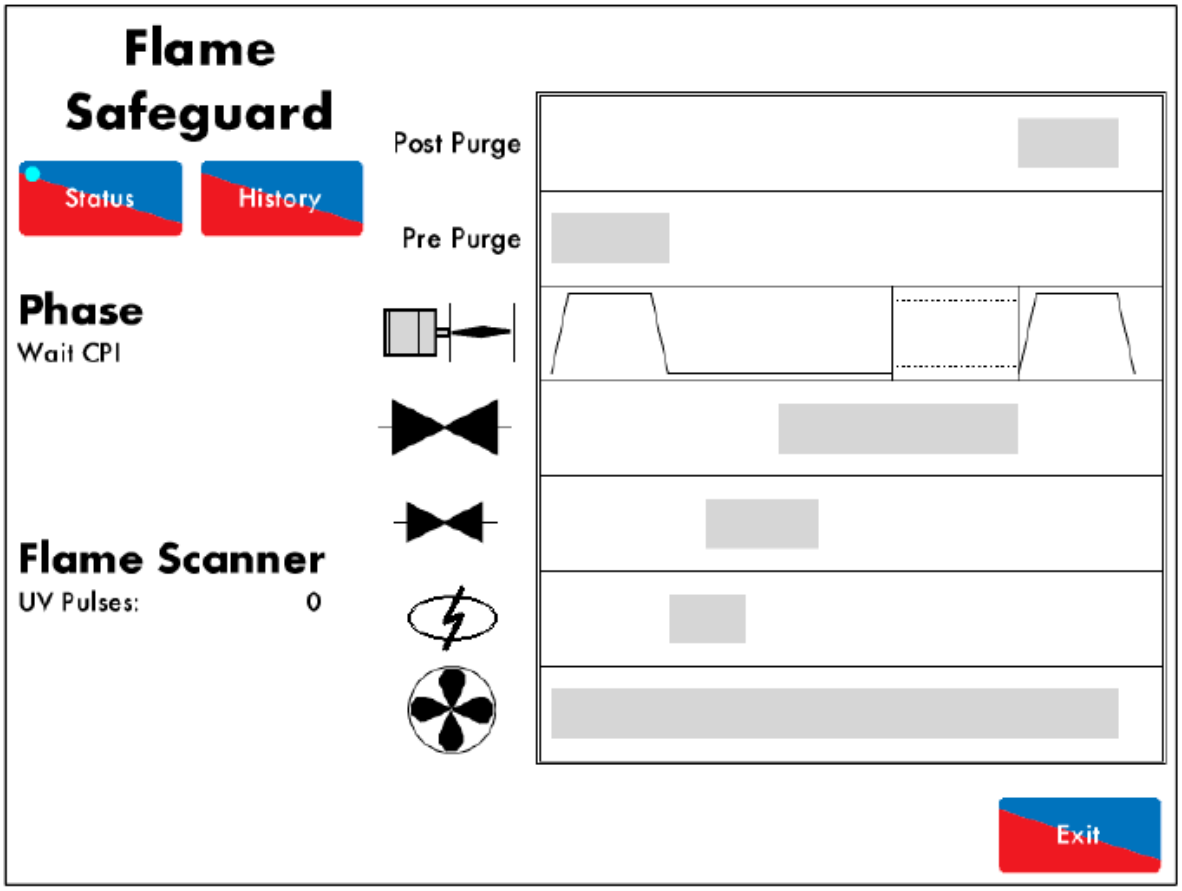


Figure 4.4.i CPI Input 图4.4.iCPI输入

In the Wait CPI phase shown in Figure 4.4.i, a check is made on terminal 55 for the proof of closure switch. If terminal 55 does not see an input within 5 seconds, the lockout 'No CPI Reset' will occur.

在图4.4.i所示的等待CPI阶段，需要对端口55进行阀门关闭校验开关检查。如果端口55在5秒内无输入，在出现"No CPI重置"。

4.5 Valve Proving 阀门校验

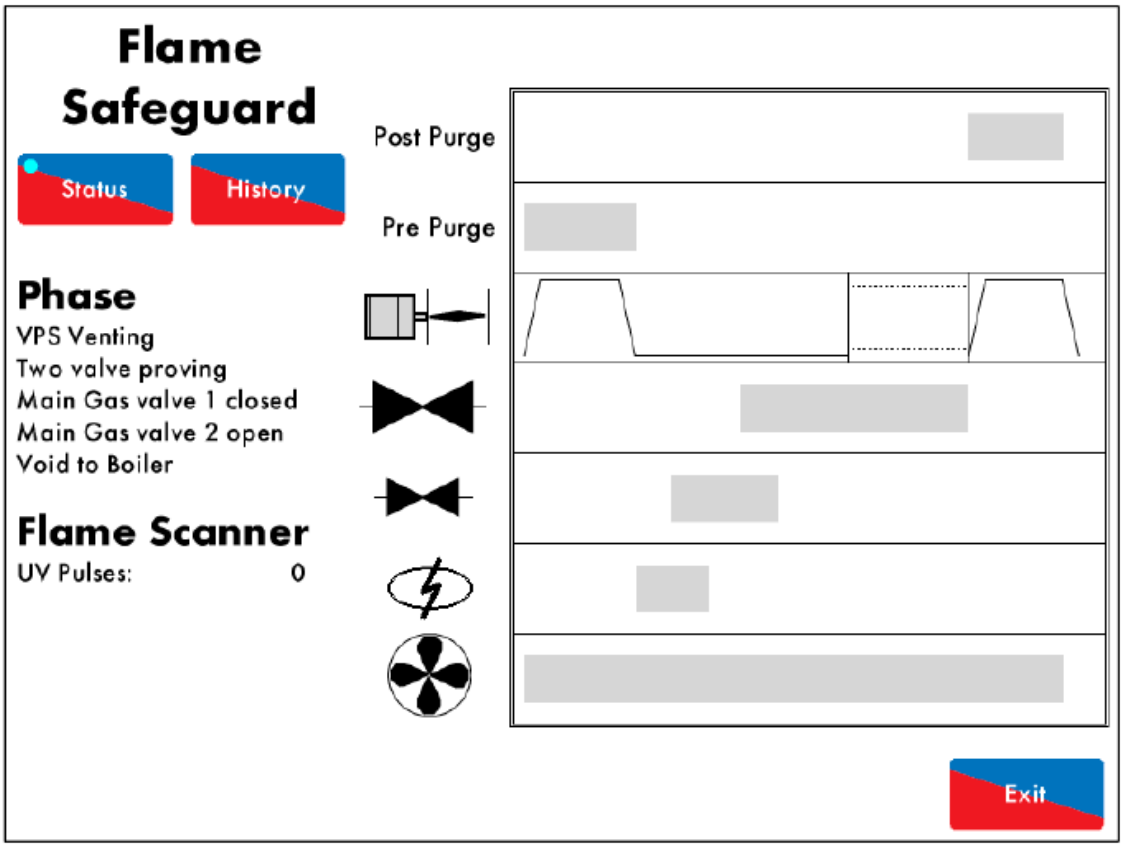


Figure 4.5.i VPS Venting 图4.5.i VPS排气

In this example, the M.M. has no vent valve and has single valve pilot optioned. 2 Valve proving is used to check the integrity of the gas for any leaks. See option/parameter 130.
在本例中，控制模块没有排气阀，仅有一个可选的单阀导燃，此时可用2阀校验检查燃料是否泄漏。见选项/参数130。

During the VPS Venting phase shown in Figure 4.5.i., the main gas valve 1 is checked. The main gas valve 1 output is off (closed), and the main gas valve 2 output is on (opened), so that the void between the main gas valves can vent to atmosphere. The gas pressure sensor is now zeroed. If the gas pressure sensor cannot be zeroed, the lockout 'VPS air zeroing fail' will occur, since the gas pressure has been detected when venting to atmosphere. This could indicate that there is a fault with the main gas valve 1 or 2.
在图4.5.i所示的VPS排气阶段将检查主燃气阀1。主燃气阀1输出关闭，主燃气阀2输出打开，因此可以通过主燃气阀间的空隙排气。此时燃气压力传感器归零。如果燃气压力传感器未归零，则出现"VPS空缺归零错误"，因为在排气时已检测到燃气压力。这可能表明主燃气阀1或2没有故障。

If no voltage is detected when the burner main gas valve 2 output T61should be on (and vice versa), the lockout 'Main Gas 2 Output Fault' will occur.
当燃烧器主燃气阀2输出T61启动时未检测到电压，则出现"主燃气阀2输出故障"。

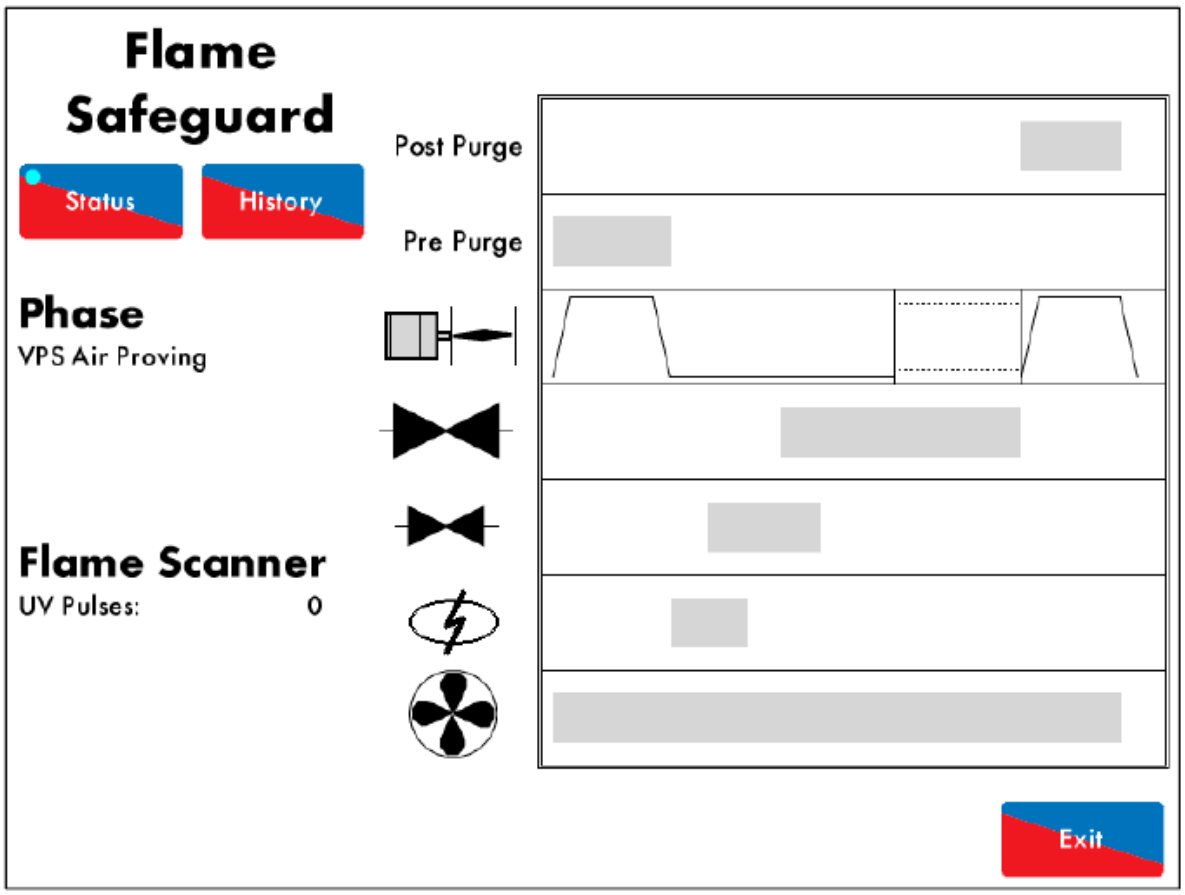


Figure 4.5.ii VPS Air Proving 图4.5.ii VPS空气校验

In the VPS Air Proving phase shown in Figure 4.5.ii, the main gas valve 2 output is off (closed) and the main gas valve 1 output is off (closed), to check for a pressure increase. If a pressure increase is detected then the lockout 'VPS Air Proving Fail' occurs as air has been let in between the main gas valve 1 and 2, indicated that main gas valve 1 has failed.

在图4.5.ii所示的VPS空气校验阶段，主燃气阀2输出关闭，主燃气阀1输出关闭，则检测压力是否增加。如果检测到压力增加，则出现"VPS空气校验失败"，因为空气已经进入主燃气阀1和2间，这表明主燃气阀1出现故障。

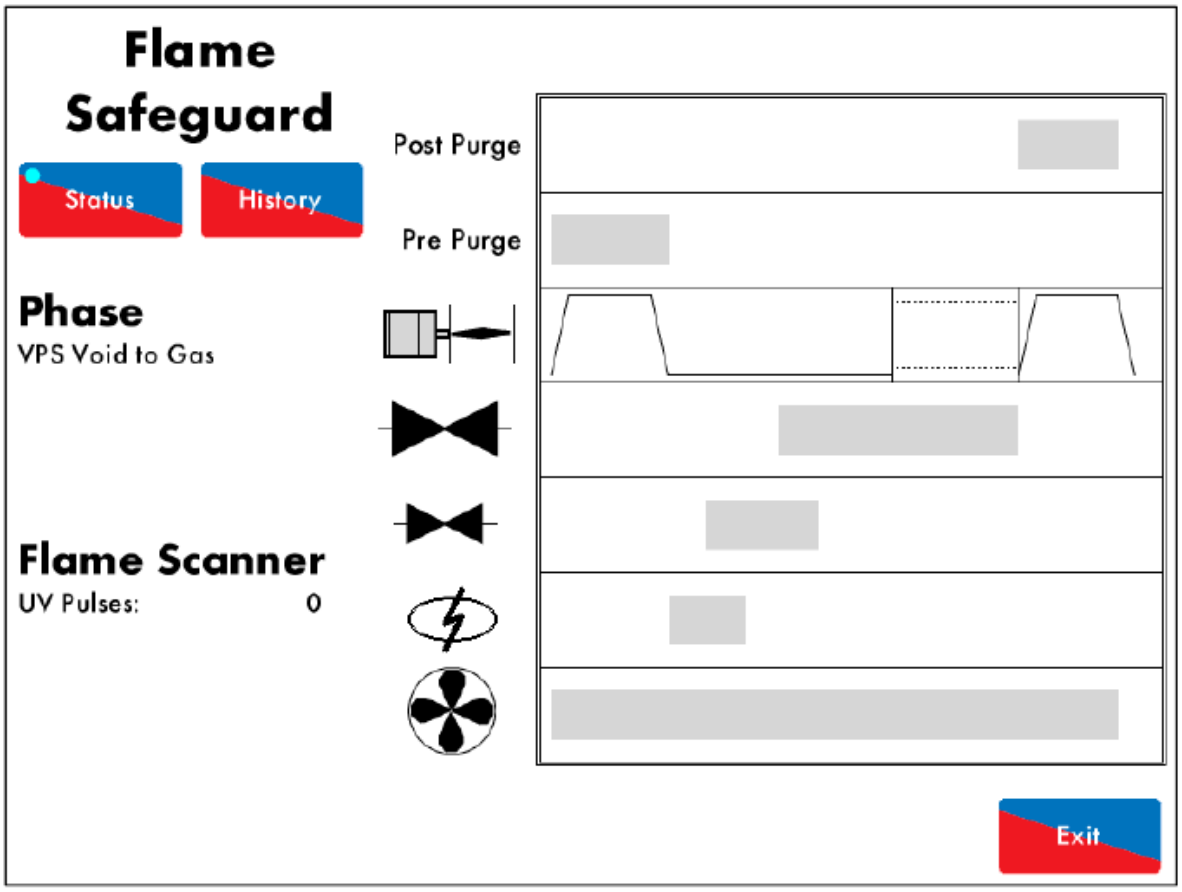


Figure 4.5.iii VPS Void to Gas 图4.5.iii VPS空隙排气

In the VPS Void to Gas phase shown in Figure 4.5.iii, the main gas valve 1 output is on (open), and the main gas valve 2 is output off (closed) – gas is let through to fill the void.
在图4.5.iii所示的VPS 空隙排气阶段，主燃气阀1输出打开，主燃气阀2输出关闭，燃气则允许通过以填充空隙。

If no voltage is detected when the burner main gas valve 1 output T60 should be on (and vice versa), the lockout 'Main Gas 1 Output Fault' will occur.
燃烧器主燃气阀1输出T60打开时未检测到电压，则出现"主燃气阀1输出故障"。

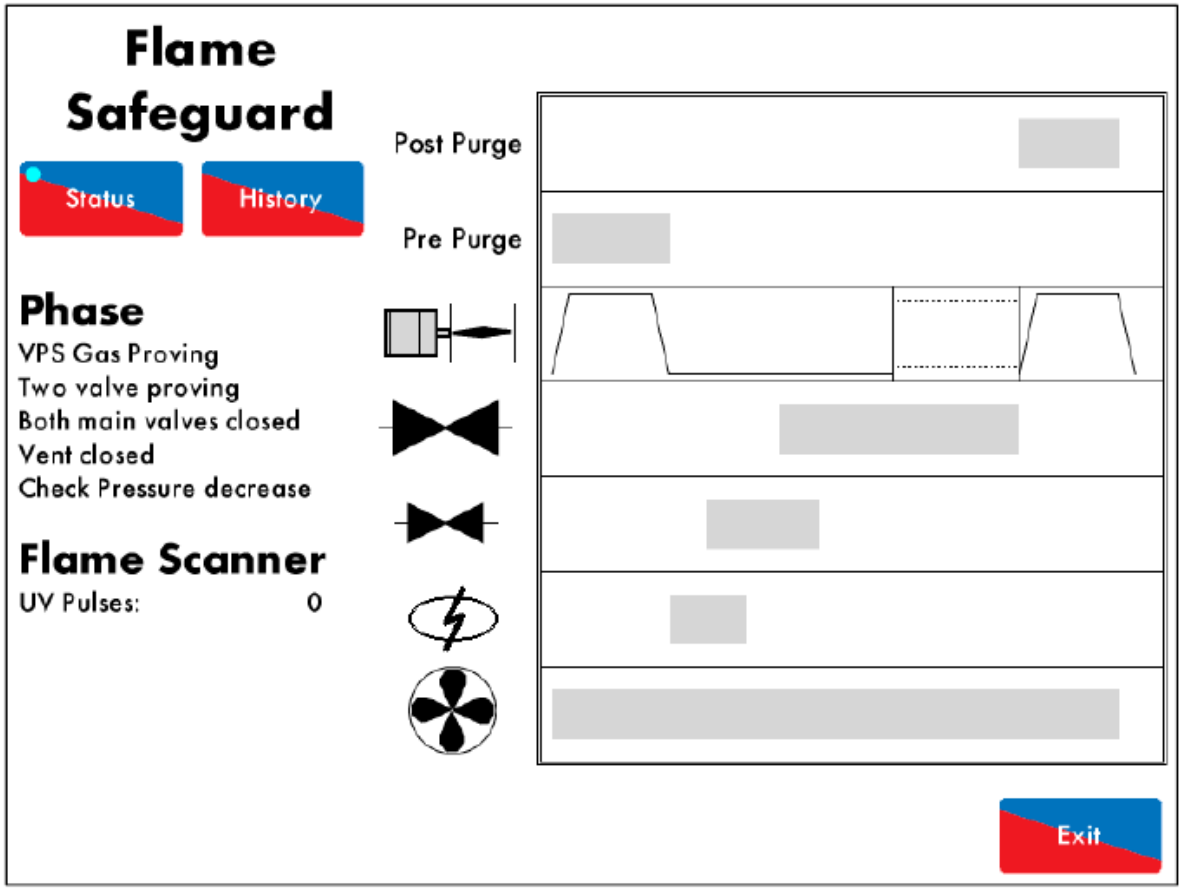


Figure 4.5.iv VPS Gas Proving 图4.5.iv VPS燃气校验

In the VPS Gas Proving phase shown in Figure 4.5.iv, the outputs of main gas valve 1 and 2 are both off (closed), to check for any gas leaks in the void between the main valves. If there is a decrease in the gas pressure, there could be a leak of pressure out and the lockout 'VPS Gas Proving Fail Low' will occur. This indicates that there could be a fault with main gas valve 2. See option/parameter 133.
在图4.5.iv所示的VPS燃气校验阶段，主燃气阀1和2的输出均关闭，此时检查主燃气阀间的空隙是否出现漏气。如果燃气压力降低，则说明有压力泄露并出现"VPS燃料验证失败"。这表明主燃气阀2可能出现故障。见选项/参数133。

If the lockout 'VPS Gas Input Too High' occurs, this indicates that there an increase in pressure has been detected. Check the main gas valve 1, and ensure the valve opening times are set correctly, see option/ parameter 134.
如果出现"VPS燃烧输出过高"，则表明检测到压力增加。检查主燃气阀1，确保阀门开启时间设置正确，见选项/参数134。

4.6 Zero Air Sensor 零空气传感器

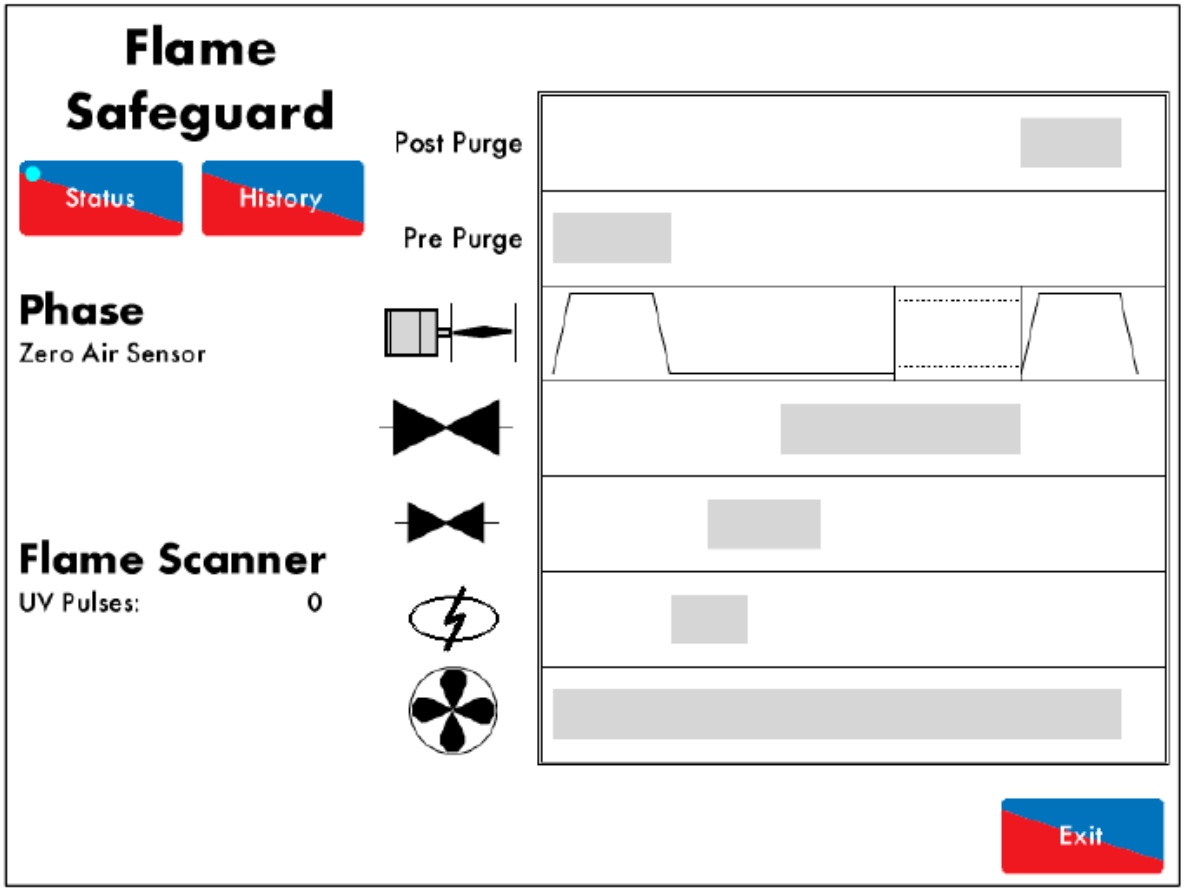


Figure 4.6.i Zero Air Sensor 图4.6.i零空气传感器

Once the VPS checks are competed, the air pressure is checked before the burner motor starts up in the Zero Air Sensor screen shown in Figure 4.6.i. The air pressure sensor will look for zero air pressure. If the air pressure sensor cannot be zeroed, because there is 5mbar difference from the air pressure sensor's zero value, then the lockout 'Air Sensor Zero' will occur.
VPS检查完成后，则在燃烧器电机启动前检查空气压力，见4.6.i所示的零空气传感器屏幕。空气压力传感器将检测零空气压力。如果空气压力传感器无法归零，则因为从空气压力传感器零值开始有5mbar的差值，因此将出现"空气传感器归零"。

If an air switch is used on T54, the M.M. will go to the Wait for Air Switch phase. If a reset of voltage is not seen and the M.M. is in this phase more than 2minutes, the lockout 'Wait Air Switch Timeout' will occur.
如果在T54上使用空气开关，控制模块将经过等待空气开关阶段。如果没有重置电压，控制模块在该阶段将超过2分钟，此时将出现"等待空气开关超时"。

4.7 Purge 吹扫

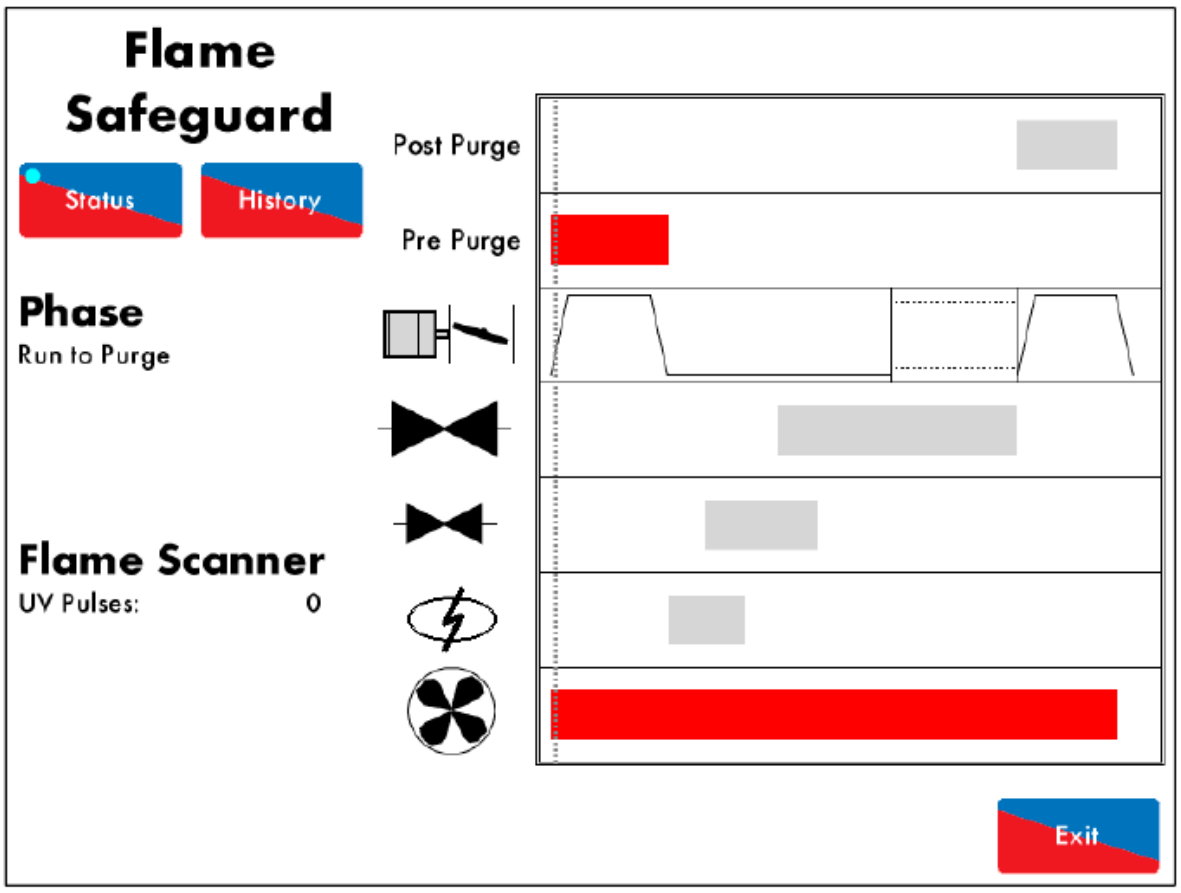


Figure 4.7.i Run to Purge 图4.7.i运行到吹扫

Once all the internal relay and VPS checks have been made, the channels move to their commissioned purge positions in the Run to Purge phase shown in Figure 4.7.i. The burner motor output is switched on. If a VSD is fitted and the feedback does not match the commissioned signal, the M.M. will sit at Run to Purge indefinitely without a lockout.
当完成内部继电器和VPS检查时，通道将移动其调试吹扫位置至图4.7.i所示的运行到吹扫阶段，此时燃烧器电机输出开启。如果配备了VSD且反馈不予调试信号匹配，则控制模块将无限期处于运行到吹扫阶段而不会锁定。

If no voltage is detected when the burner motor output T58 should be on (and vice versa), the lockout 'Motor Output Fault' will occur.
当燃烧器电机输出T58开启时未检测到电压，则出现"电机输出故障"。

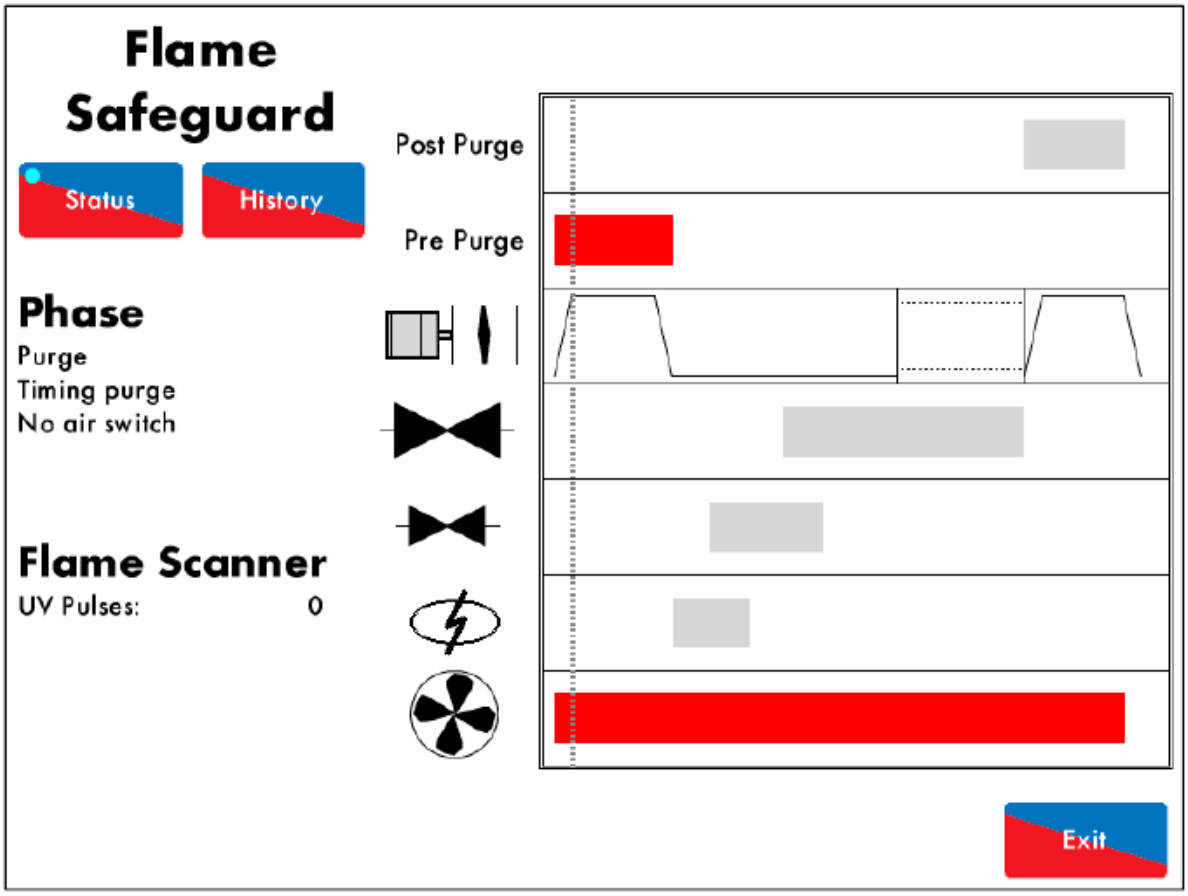


Figure 4.7.ii Purge No Air Switch 图4.7.ii吹扫无空气开关

The Purge No Air Switch phase shown in Figure 4.7.ii allows a delay before the air switch/air pressure sensor is checked. See option/parameter 121.
在图4.7.ii所示的吹扫无空气开关阶段，在空气开关/空气压力传感器检查前允许延迟。见选项/参数121。

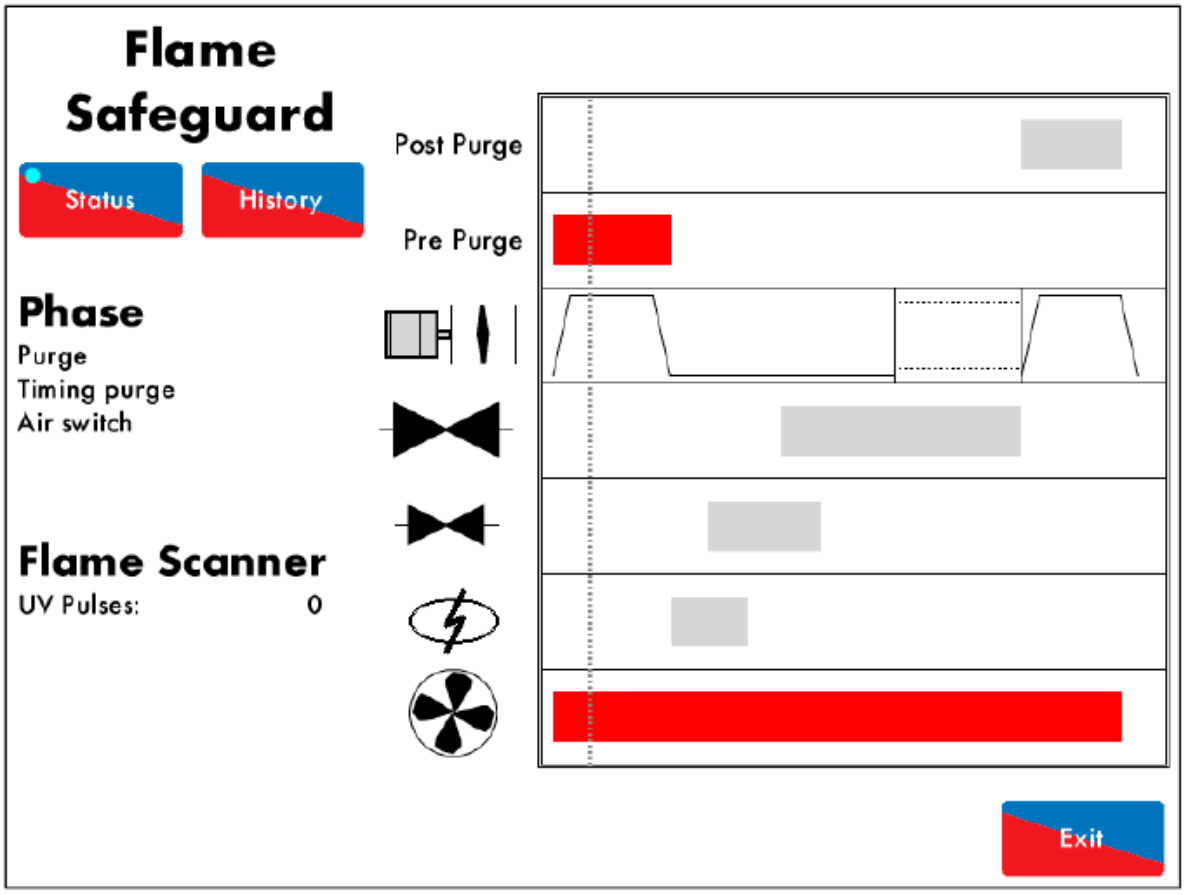


Figure 4.7.iii Purge Air Switch 图4.7.iii 吹扫空气开关

Once the 'delay from start of the purge before the air switch is checked' has elapsed, the air pressure sensor checks for a minimum air pressure in the Purge Air Switch phase shown in Figure 4.7.iii. If the air pressure sensor does not detect sufficient air, then the lockout 'No Air Proving' will occur. See option/ parameters 141 and 149.
空气开关检查前吹扫启动延迟过后，空气压力传感器将检查图4.7.iii所示的吹扫空气开关阶段的最小空气压力，如果空气压力传感器未检测到足够空气，则出现"无空气校验"，见选项/参数141和149。

If using an air switch, line voltage must be present on T54 throughout the purge cycle and maintained until the burner enters the Recycle phase on Shut Down. See option/ parameter 145.
如果使用空气开关，在吹扫循环阶段T54上必须出现线电压，直至燃烧器进入关闭前的再循环阶段，见选项/参数145。

Purging the burner/boiler forces fresh air to flow through the combustion chamber; this clears out any fuel remnants or residual combustion gases. See option/parameter 112.
吹扫燃烧器/锅炉使新鲜空气流经燃烧室，这样可以清除燃料残余或残留的燃烧气体，见选项/参数112。

4.8 Ignition 点火

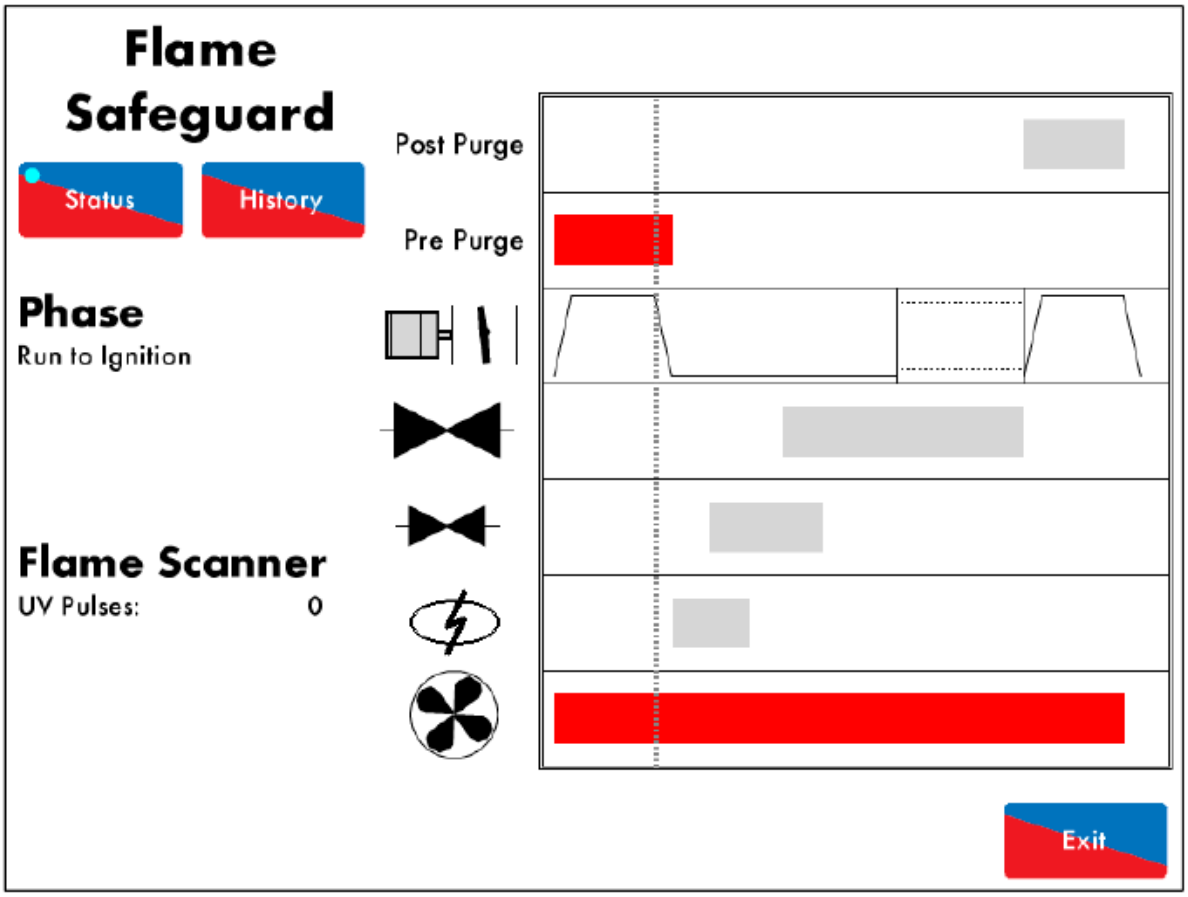


Figure 4.8.i Run to Ignition 图4.8.i运行至点火

In the Run to Ignition phase shown in Figure 4.8.i, the channels will move to their commissioned start positions. If a VSD is fitted and the feedback does not match the commissioned signal, the M.M. will sit at Run to Ignition indefinitely without a lockout.
在图4.8.i所示的运行至点火阶段，通道将移动其调试启动位置。如果配备VSD且反馈不予调试信号匹配，则控制模块将无限期处于运行至点火阶段而不会锁定。

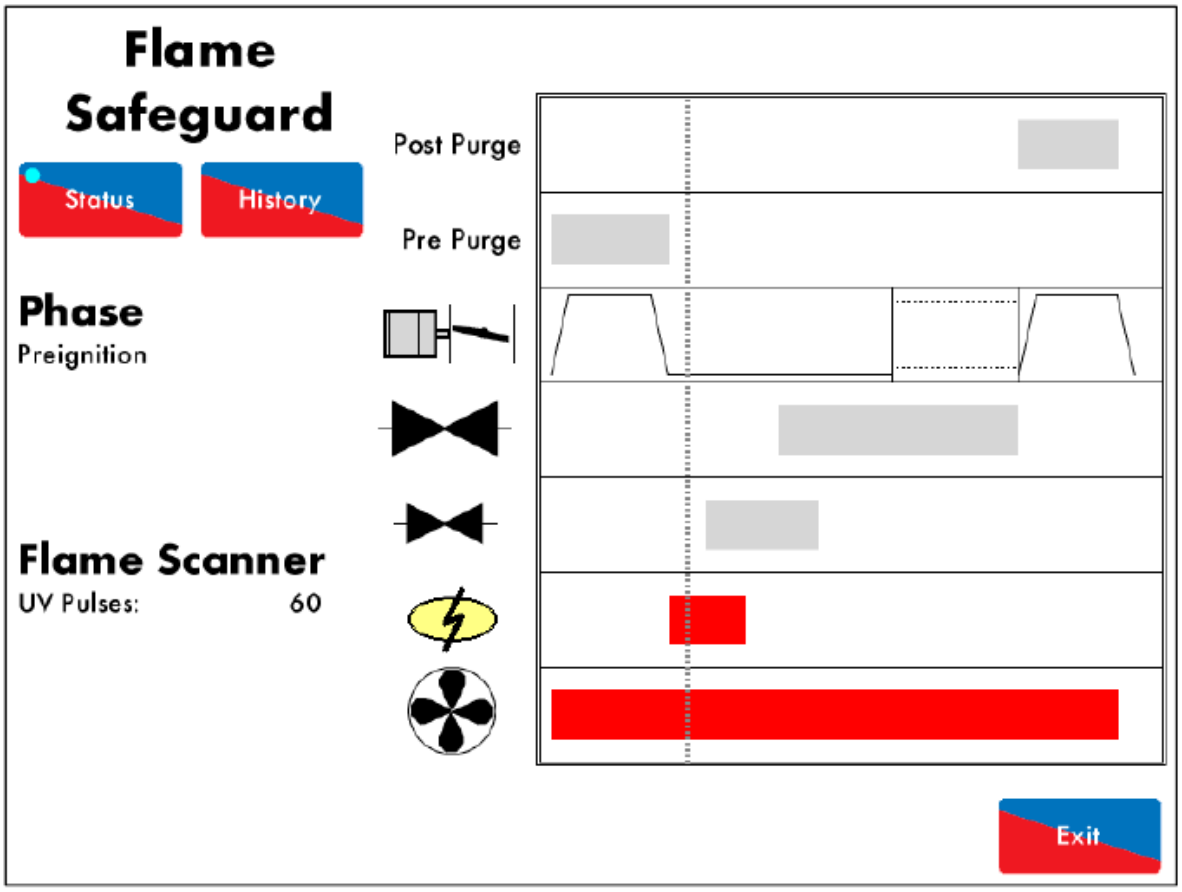


Figure 4.8.ii Pre-ignition 图4.8.ii 预点火

The ignition transformer output is switched on in the Pre-ignition phase shown in Figure 4.8.ii, before the pilot gas valve is switched on (open). See option/parameter 113.
在导燃燃气阀打开前点火变压器打开处于图4.8.ii所示的预点火阶段，见选项/参数113。

If no voltage is detected when the ignition output T63 should be on (and vice versa), the lockout 'Ignition Output Fault' will occur.
当点火输出T63启动时未检测到电压，则出现"点火输出故障"。

If the gas valves proof of closure switch output T55 is opened during ignition, the lockout 'CPI Input Wrong State' will occur.
如果燃气阀校验关闭开关输出T55在点火阶段打开，则出现"CPI输入错误状态"。

4.9 Pilot 导燃

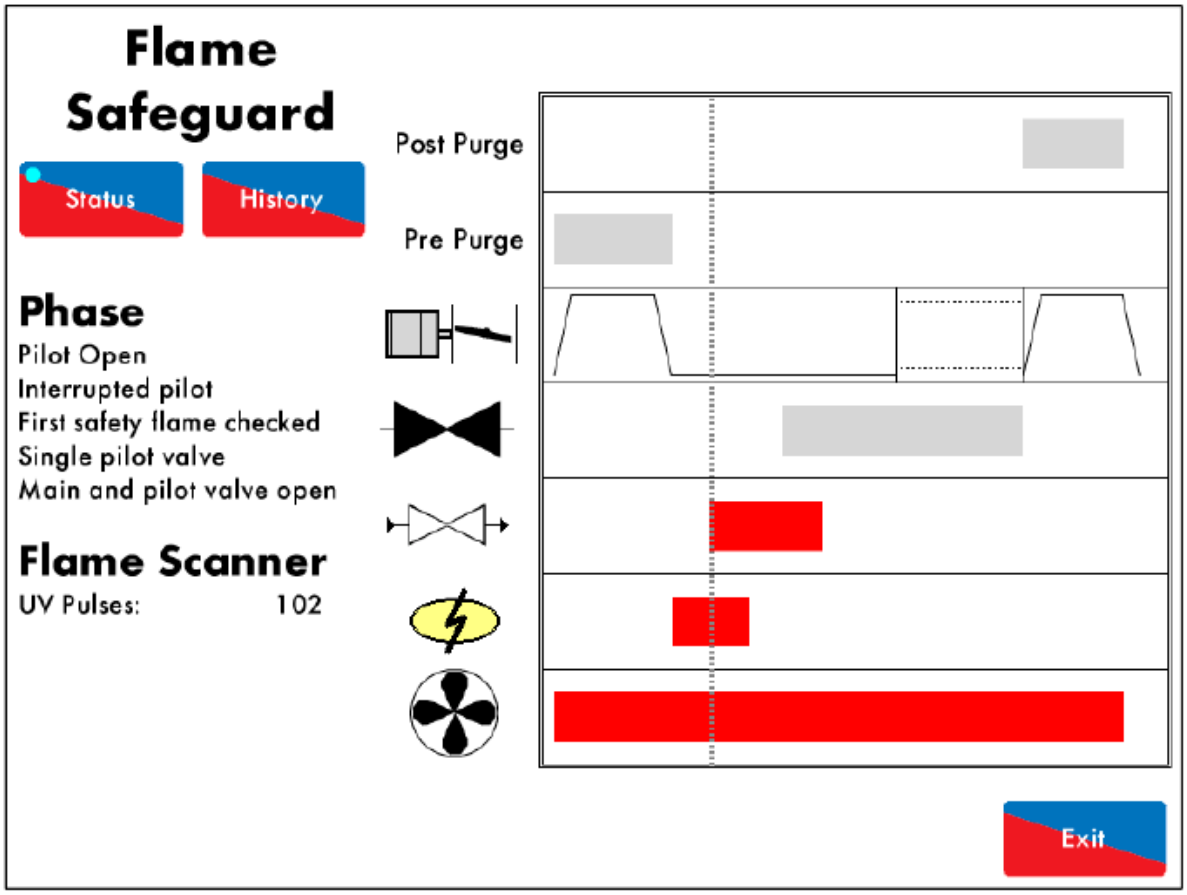


Figure 4.9.i Pilot Open 图4.9.i 导燃启动

The pilot gas valve is switched on (open) in the Pilot Open phase shown in Figure 4.9.i. The 1st safety time is the period when the pilot valve is open before the flame is checked. See option/parameter 114.
当导燃燃气阀在图4.9.i所示的导燃启动阶段打开时，第一安全时间是检查火焰前的导燃阀打开阶段。见选项/参数114。

If no voltage is detected when the pilot valve output T59 should be on (and vice versa), the fault 'Start Gas Output Fault' will occur.
当导燃阀输出T59打开时未检测到电压，则出现"启动燃气输出故障"。

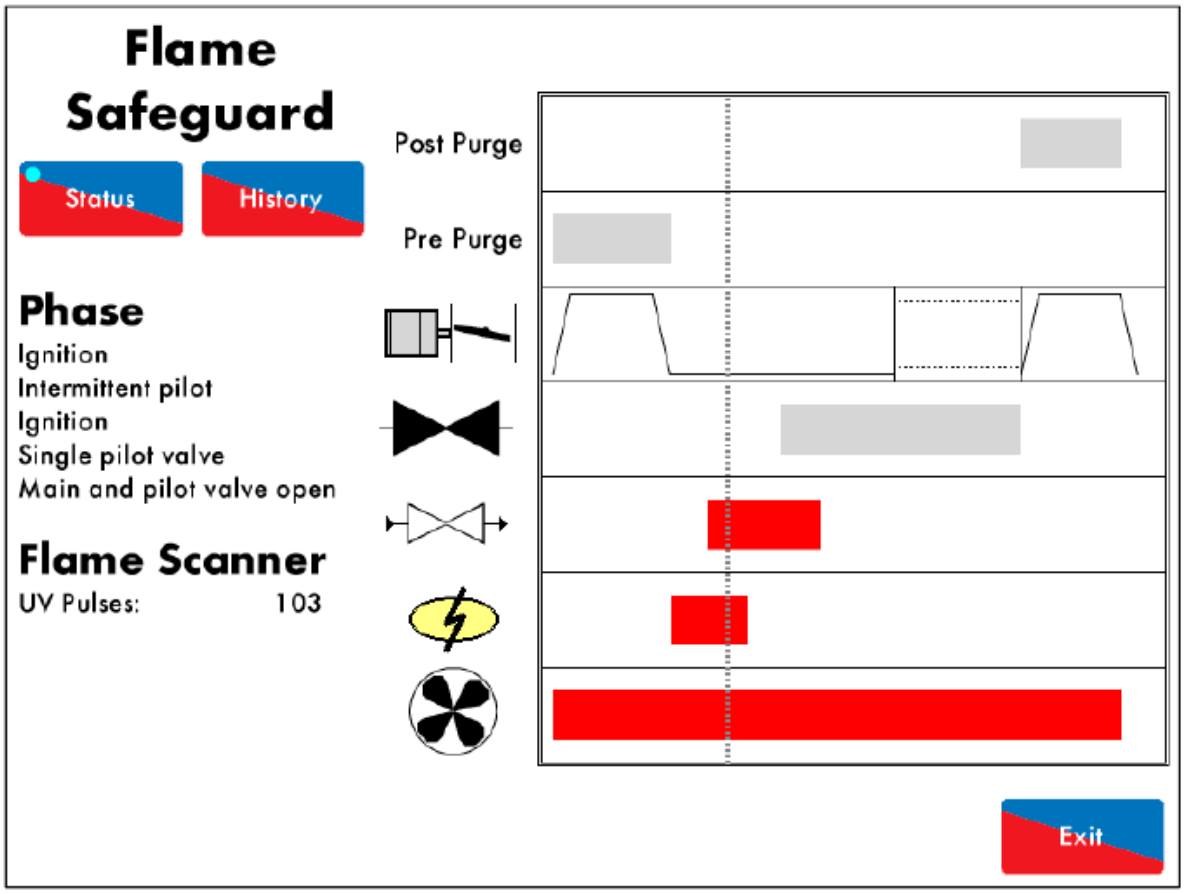


Figure 4.9.ii Ignition 图4.9.ii 点火

At the end of the 1st safety time period, the pilot flame is checked by the UV scanner in the Single Valve Pilot Ignition shown in Figure 4.9.ii. If the pilot goes out, the lockout 'No Flame Signal' will occur.

在第一安全时间阶段末，紫外线扫描器在图4.9.ii所示的单阀导燃点火阶段检查导燃火焰，如果导燃火焰熄灭，则出现"无火焰信号"故障。

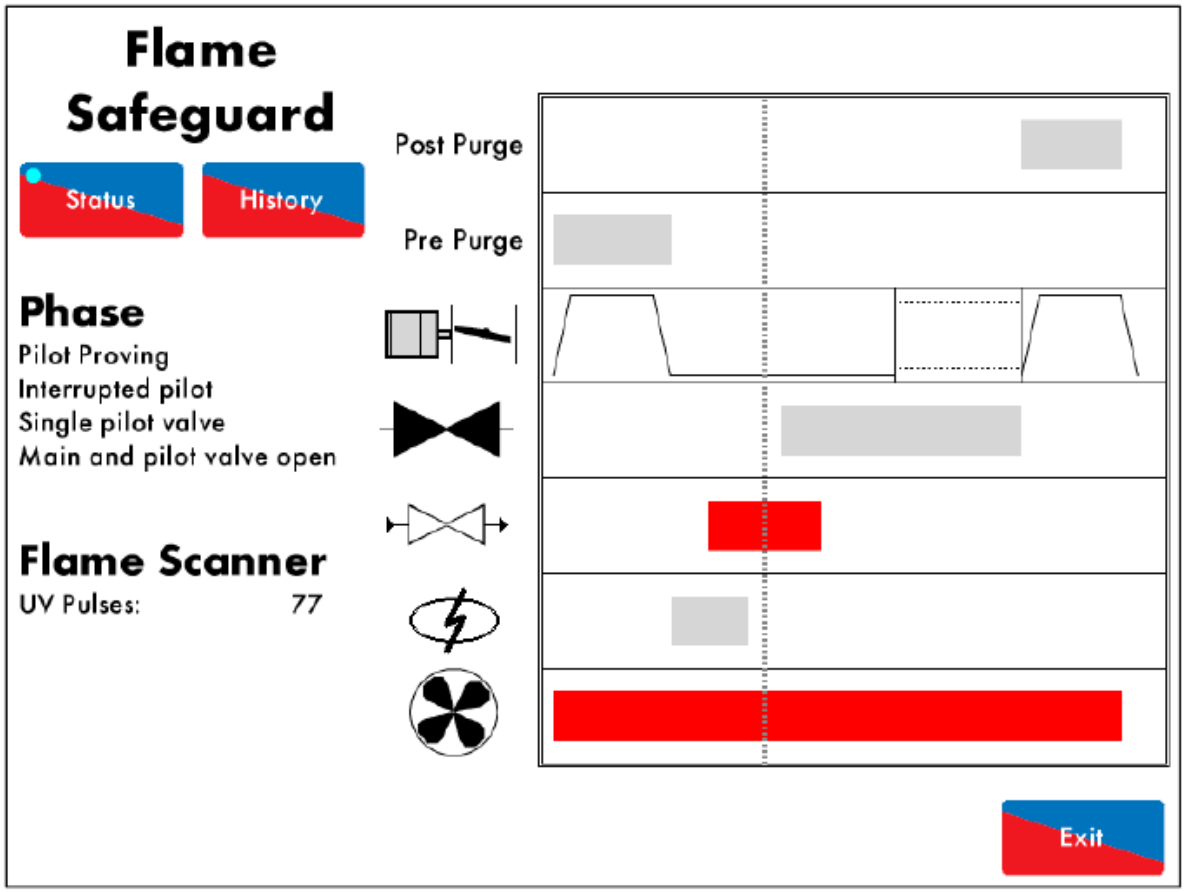


Figure 4.9.iii Pilot Proving 图4.9.iii导燃校验

The ignition transformer output is switched off after the pilot ignition, in the Pilot Proving phase shown in Figure 4.9.iii. This proving period gives the pilot flame a chance to stabilise. The flame is checked to ensure the pilot is strong. If the pilot goes out, the lockout 'No Flame Signal' will occur. See option/parameters 115 and 120.

导燃点火后点火变压器输出关闭处于图4.9.iii所示的导燃校验阶段时使导燃火焰达到稳定，检查火焰确保导燃足够强，如果导燃火焰熄灭，则出现"无火焰信号"。见选项/参数115和120。

4.10 Proving 校验

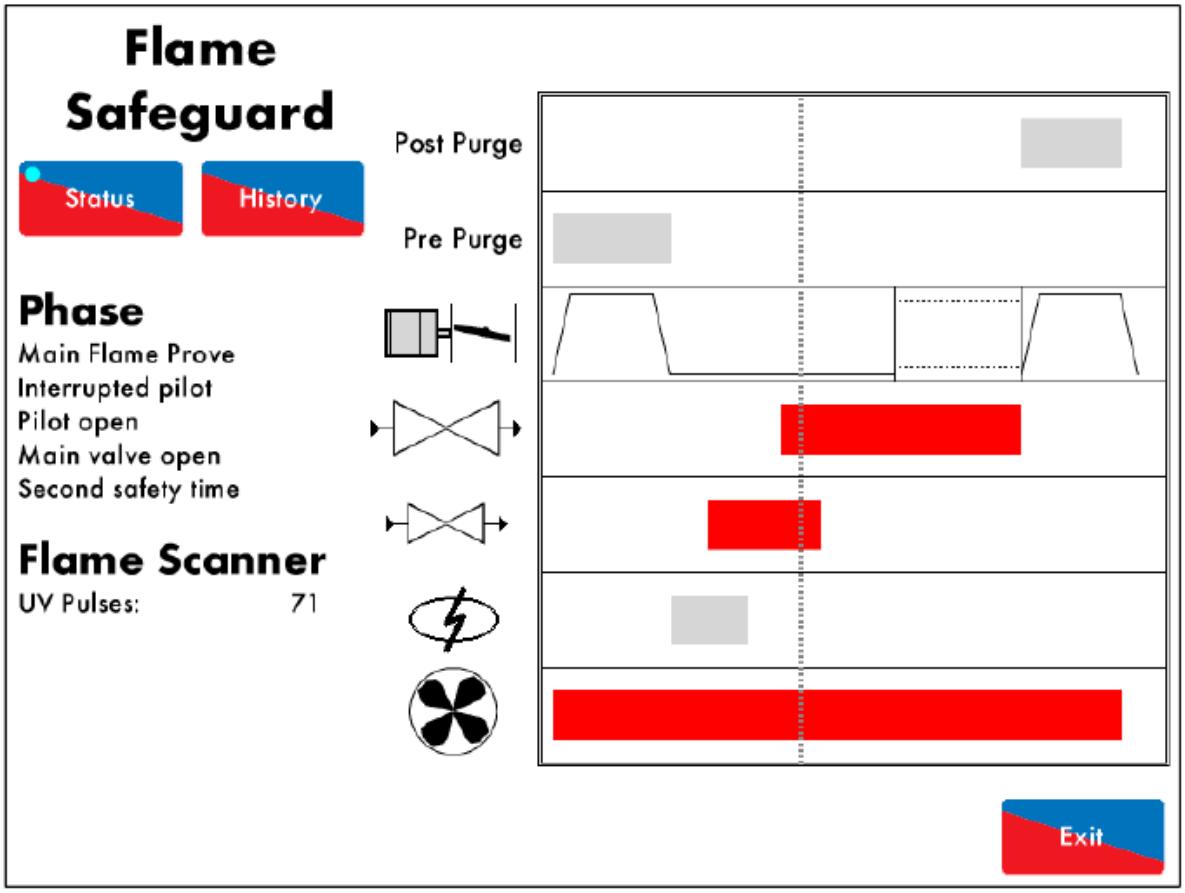


Figure 4.10.i Main Flame Prove Second Safety Time 图4.10.i主火焰校验第二安全时间

The 2nd safety time begins, where the flame is not checked in the Interrupted Pilot 2nd Safety phase shown in Figure 4.10.i.
第二安全时间开始时，在图4.10.i所示的中断导燃第二安全阶段不检查火焰。

The 2nd safety time is the period where the pilot/main valves overlap. The outputs of the main gas valves 1 and 2 are switched on (opened), while the pilot valve output is maintained on (opened). This 2nd safety time allows the main flame to light prior to the pilot valve output being switched off (closed). See option/parameter 116. If the flame is not strong enough, the lockout 'No Flame Signal' will occur.
第二安全时间阶段导燃和主燃气阀相互重叠，主燃气阀1和2的输出打开，导燃阀输出保持打开状态。第二安全阶段允许主火焰在导燃阀输出关闭前燃烧。见选项/参数116。如果火焰不够强，则出现"无火焰信号"。

If no voltage is detected when the burner main gas valve 1 output T60 should be on (and vice versa), the lockout 'Main Gas 1 Output Fault' will occur.
燃烧器主燃气阀1输出T60打开未检测到电压时，则出现"主燃气阀1输出故障"。

If no voltage is detected when the burner main gas valve 2 output T61should be on (and vice versa), the lockout 'Main Gas 2 Output Fault' will occur.

燃烧器主燃气阀2输出T61打开未检测到电压时，则出现“主燃气阀2输出故障”。

The CPI/POC input T55 is now no longer checked through the firing cycle.
CPI/POC输入T55在燃烧循环阶段不需要检查。

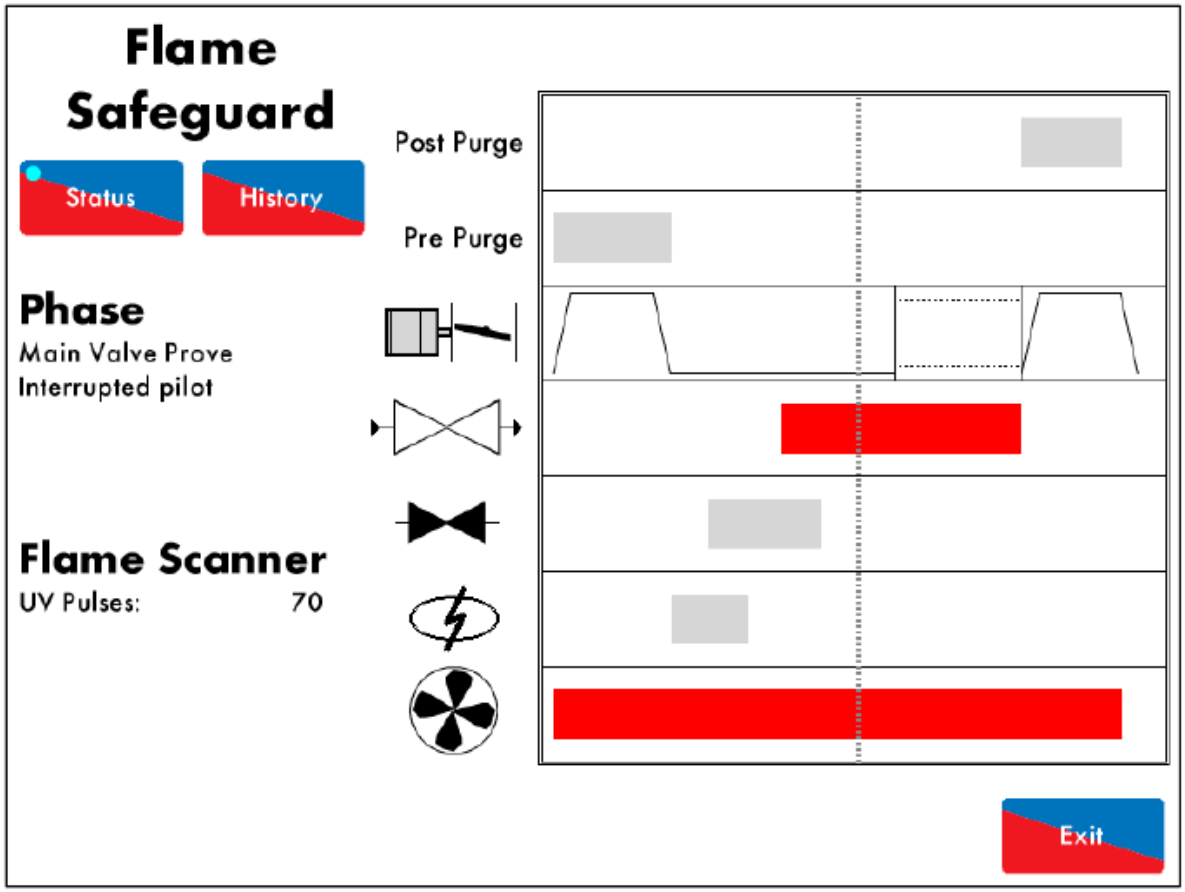


Figure 4.10.ii Main Flame Prove 图4.10.ii主火焰校验

In the Interrupted Pilot Main Prove phase shown in Figure 4.10.ii, the pilot gas valve output is switched off (closed). There is a time delay to allow the main flame to stabilise before the burner proceeds to normal modulation as set. If the main flame fails now, the lockout 'No Flame Signal' will occur. See option/ parameter 117.

在图4.10.ii所示的中断导燃主校验阶段，导燃燃气阀输出关闭，燃烧器继续正常调节前有时间延迟，允许主火焰达到稳定。如果主火焰失效，则出现"无火焰信号"。见选项/参数117。

4.11 Firing 燃烧

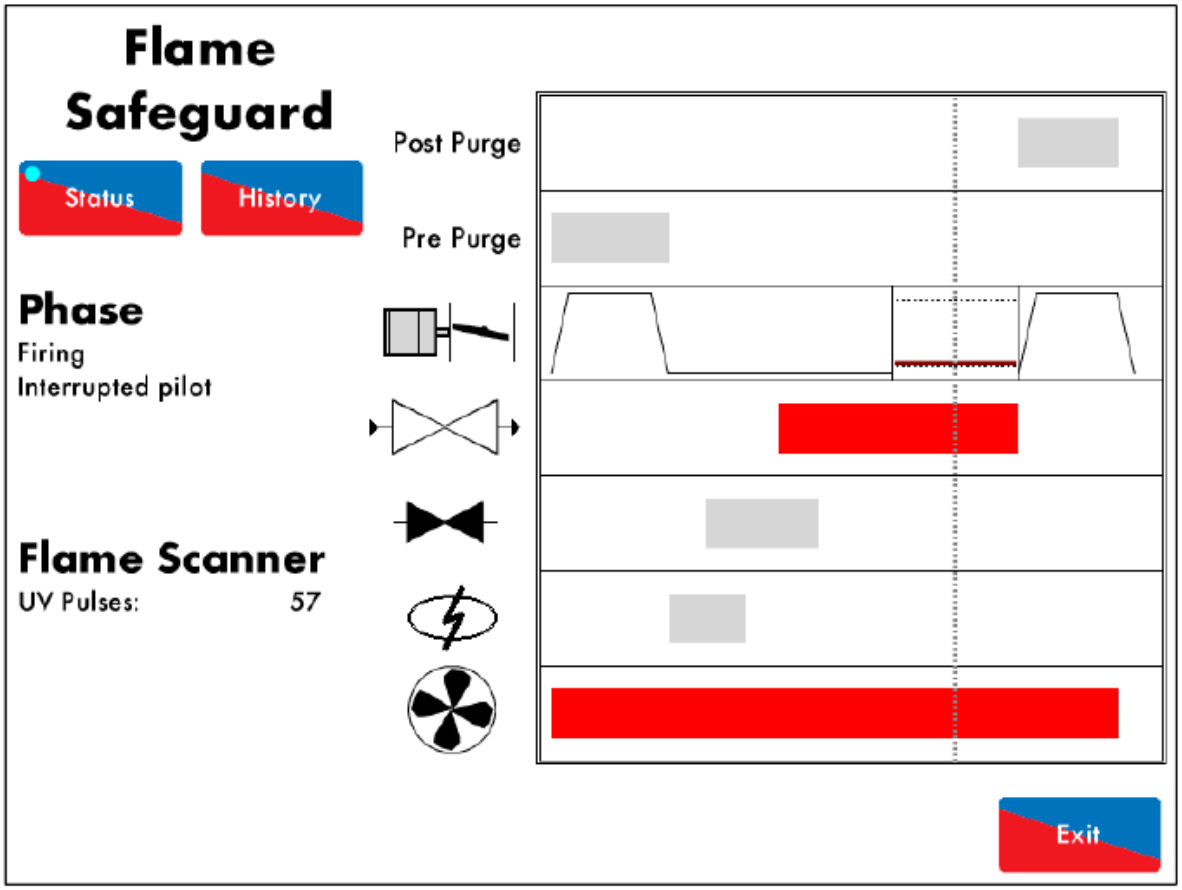


Figure 4.11.i Firing 图4.11.i 燃烧

The burner has now completed the start-up sequence and fires normally according to its set operation in the Firing phase shown in Figure 4.11.i. If using internal PID, the burner will modulate its firing rate up and down based on how far away its actual temperature/ pressure is from meeting the required temperature/ pressure.
燃烧器现在已完成启动，此时根据图4.11.i所示的燃烧阶段设定操作正常燃烧。如果使用内部PID，燃烧器将根据实际温度/压力上下调节燃烧速度，以满足所需的温度和压力。

The gas and air pressure limits are continually monitored in this example. If the gas pressure exceeds the upper limit or is below the lower limit, the lockouts ‘Gas Pressure High’ or ‘Gas Pressure Low’ will occur, respectively. If the air pressure is outside of the limits, the lockout ‘Air Pressure Out of Window’ will occur. See option/parameters 136, 137 and 147.
此时将继续监控燃气和空气压力限值。如果燃气压力持续超过上限或低于下限，则分别出现“燃气压力过高”或“燃气压力过低”故障。如果空气压力超过限值，则出现“空气压力超过限值”。见选项/参数136、137和147。

4.12 Post Purge 后吹扫

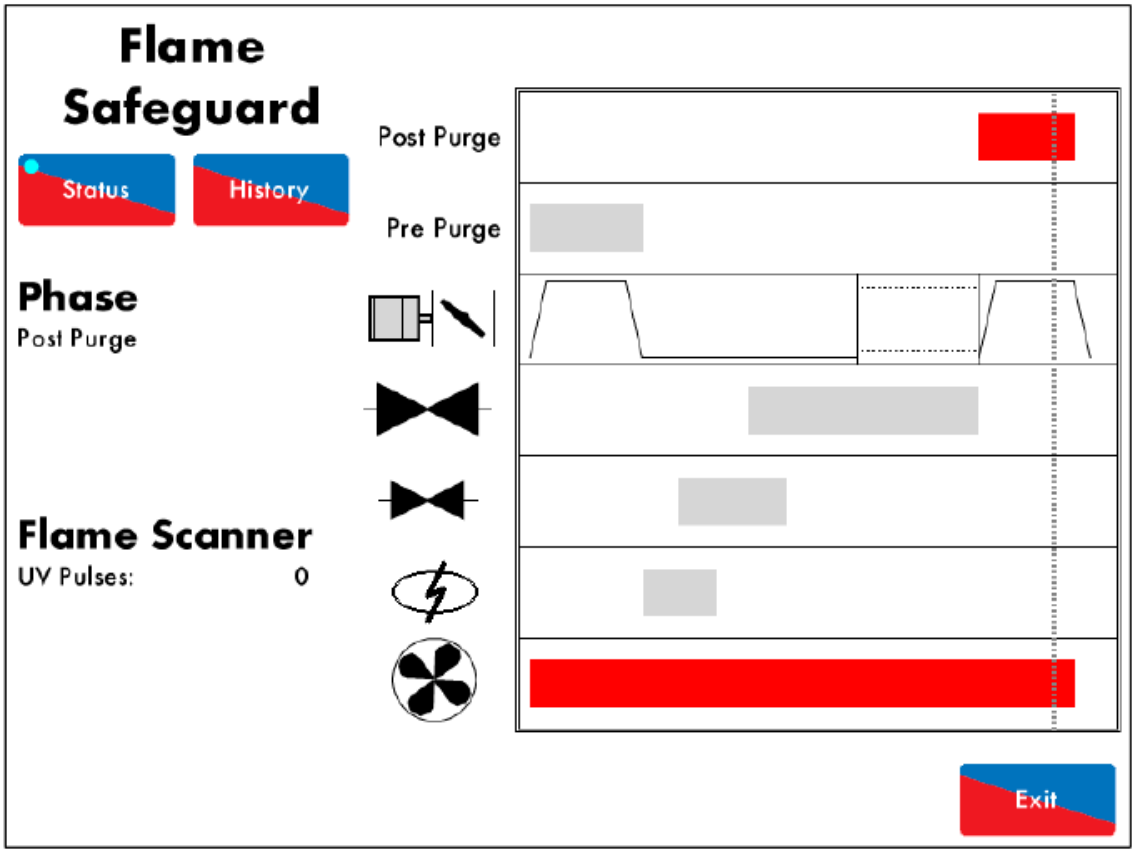


Figure 4.12.i Post Purge 图4.12.i后吹扫

The Post-Purge phase shown in Figure 4.12.i is optioned in this example. When T53 is switched off and the burner is off, the M.M. will purge fresh air through the burner/boiler, when the burner shuts down in normal conditions (internal/external stat). The outputs of the main gas valves 1 and 2, and the pilot valve are switched off (closed). See option/parameters 118 and 135.
在本例中后吹扫阶段为可选阶段。当T53关闭且燃烧器关闭时，控制模块将通过燃烧器和锅炉清除新鲜空气，此时燃烧器在正常状态下（内外部启停）关闭，主燃气阀1和2输出和导燃阀关闭。见选项/参数118和135。

If NFPA Post-Purge is selected, then the burner will also perform a Post-Purge in the event of a lockout/error at any time after the Ignition phase.
如果选择NFPA后吹扫，燃烧器在点火阶段后在任何时间出现锁定/错误时都会进行后吹扫。

After Post-Purge, the M.M. will go back to the Recycle phase, the burner start-up sequence will continue as required.
在后吹扫后，控制模块将经过再循环阶段，燃烧器启动顺序将按要求继续。

Note: The Post-Purge time includes the time to drive the servomotors to their purge positions (this is not applicable to the NFPA Post-Purge).
注：后吹扫时间包括驱动伺服电机至吹扫位置的时间（不适用NFPA后吹扫）。

5 REMOTE CONTROL远程控制

5.1 Modbus Settings Modbus设置

There are a limited number of Modbus addresses available in the Mini Mk8 M.M., which can be accessed directly without the need for a D.T.I.
Mk8微型控制模块中的Modbus地址有限，操作员无需通过数据传输接口就能直接使用这些 Modbus 地址。

When using Modbus direct, e.g. connecting to Building Management System from the M.M. without a D.T.I., then neither Autoflame Intelligent Boiler Sequencing nor the D.T.I. can be used.
当直接使用 Modbus 时 （比如当用户不通过数据传输接口将控制模块连接到楼宇管理系统时），Autoflame智能锅炉排序和数据传输接口都不能使用。

The Mini Mk8 M.M. communicates using an RS485 data link from terminals 27 (-ve) and 28 (+ve). Beldon 9501 data cable is recommended.
Mk8微型控制模块使用接线端子 27 (-ve)和 28 (+ve)上的 RS485数据线进行通信。建议使用 Beldon 9501 数据线。

Up to 10 Mini Mk8 M.M.s can be linked to together and connected to a Building Management System via terminals 27 and 28. Each Mini Mk8 M.M. will need to be set with an individual Modbus device ID by setting option 104.
最多可将 10 个 Mk8 微型控制模块连接起来，然后通过接线端子 27 和 28 与楼宇管理系统连接。操作员可以通过选项 104 设置每台Mk8微型控制模块的 Modbus 设备标识号。

The maximum block of addresses the Mini Mk8 M.M. can read and write to is 127, as per Modbus having a built-in limit of 255 byte packets.
Mk8 微型控制模块能读写的最大地址块数量是127个，Modbus的内置限值是 255个字节数据包。

If the Mini Mk8 M.M. does not receive any Modbus commands for 60 seconds, the Modbus goes “offline.’ You can keep the Modbus “online” with a simple instruction, such as polling or setting a single value to that individual M.M. If the Modbus is “offline” then remote setpoint and firing set via Modbus will be disabled. The only exception is the enable/ disable burner which changes the enable/ disable button on the M.M. home screen, as this change will last until the Modbus state is changed again or the enable/ disable button is pressed again.
如果 Mk8 微型控制模块超过 60 秒未收到 Modbus 指令，Modbus 将“下线”。用户可以发出简单指令保持 Modbus “在线”，例如对控制模块进行简单问询或者单值设置。如果 Modbus 处于“下线”状态，用户不能利用 Modbus 远程设置数值和燃烧率。在 Modbus 失联后仍可以用控制模块主屏幕上的按钮启动/停止燃烧器。在 Modbus 通信恢复后从 Modbus 地址发出的启动/停止燃烧器命令优先于主屏幕上燃烧器启动/停止按钮的操作。

If the M.M. is powered off or the comms is lost, the Modbus address values from the unit will not be true.
如果控制模块断电或者通信中断，控制模块会发出错误的 Modbus 地址数据。

Please see next page for Modbus addresses.
从下页列出了Modbus 地址列表。

5.2 Modbus Addresses Modbus地址

There are 4 types of Modbus addresses:
一共有四种类型Modbus地址。

0x Read/Write digital outputs – off/on commands 0x读/写数字输出-关闭/开启命令 1x Read digital inputs – off/on signals/indications 1x读取数字输入-关闭/开启信号/指示	These are binary values and have a 0/1 value indicating an off/on or no/yes value. 这些是二进制值， 0/1 值分别代表关闭/开启或者否/是值。
3x Read analogue inputs – variable data in 3x读取模拟信号输入-可变数据 4x Read/Write analogue outputs – variable adjustments 4x读/写模拟信号输出-变量调整	These are multiple integer values and can have a value of 0 to 65534 and do not contain decimal points i.e. channel 1position Modbus value is 900 which is equivalent to 90.0° 这些是多重整数值，数值范围从 0到 65534 并不带小数点。例如：通道1位置的Modbus数值是 900，等同于 90.0°。

0x			
00001	Enable/Disable M.M. 启用/禁用控制模块	0 = Burner is enabled 0 =启用燃烧器 1 = Burner is disabled 1= 禁用燃烧器	*This changes the state of the enable/disable button on the M.M. home screen. The changes are kept if Modbus goes “offline.” *这个地址可更改控制模块主屏幕上的启用/关闭按钮状态。如果Modbus“下线”，本设置仍有效。

1x			
10217	E.G.A. Optioned 启用EGA	0 = Trim not optioned 0 = 不启用调节操作 1 = Trim optioned 1 = 启用调节操作	*Returns 0 when option 12 is set for monitoring only. *当选项12设为“仅监控”时，本地址返回值为0。
10218	Actual up to Trim Threshold 调节阈值。	0 = E.G.A. not trimming 0 = E.G.A.不执行调节 1 = E.G.A. trimming 1 = E.G.A.执行调节	
10219	E.G.A. Cooler Ready EGA冷却器就绪。	0 = Cooler is ready 0 = 冷却器就绪 1 = Cooler is not ready	*Returns 0 is the E.G.A. is an error state. *当 E.G.A.处于错误状态时，本地

		1 = 冷却器未就绪	址返回值为 0。
10220	Ambient Temperature OK 环境温度合格。	0 = Temperature OK 0 = 温度合格 1 = Temperature not OK 1 = 温度不合格	
10221	NO Optioned 启用NO传感器。	0 = NO cell not optioned 0 = 不启用NO传感器 1 = NO cell optioned 1 = 启用NO传感器	
10222	SO2 Optioned 启用SO2传感器	0 = SO2 cell not optioned 0 = 不启用SO2传感器 1 = SO2 cell optioned 1 = 启用SO2传感器	
10224	E.G.A. OK to Sample EGA就绪，准备取样。	0 = E.G.A. is not sampling 0 = E.G.A.不取样 1 = E.G.A. is sampling 1 = E.G.A.取样	
10233	M.M. Hand Mode 控制模块手动模式	0 = Not in hand mode 0 =非手动模式 1 = In hand mode 1 =手动模式	
10234	M.M. Low Flame Hold 控制模块低火焰保持	0 = Not in low flame hold 0 = 非低火焰保持 1 = In low flame hold 1 = 低火焰保持	
10242	M.M. Disabled Status 控制模块禁用状态	0 = Burner not disabled 0 = 燃烧器未禁用 1 = Burner is disabled 1 = 燃烧器禁用	*This shows the state of the enable/disable button on the home screen.Returns same value as address 00001 *这个地址显示主屏幕上的按钮启用/禁用状态。其数值与地址00001的数值相同。

3x			
30101	Firing Rate 燃烧率	%	
30102	Firing Status 燃烧状态	0 = Non-modulating 0 =非调节 1 = Modulating 1=调节	*0 is for non-modulating states like single point change, fuel flow metering and commissioning *0 是非调节状态，比如处于单点更改、燃料流量计量和调试。
30104	Burner Rating 燃烧器规格	MW x 10	*Always shown as metric. It is calculated from fuel flow metering. *始终显示公制单位。根据燃料流量计算。
30105	Actual Value 实际数值	Metric: Temperature OC, Pressure Bar x 10, Low Pressure Bar x 100 Imperial Temperature OF, Pressure PSI, Low Pressure PSI x 10 公制温度℃，压力Bar x 10，低压Bar x100，英制温度℉，压力 PSI，低压PSI x 10	*Pressure value 015 would be 1.5 Bar if metric, or 15 PSI if imperial *压力数值 015 等于公制压力 1.5 Bar 或者英制压力15 PSI。
30106	Required Value 所需值	Metric: Temperature OC, Pressure Bar x 10, Low Pressure Bar x 100 Imperial Temperature OF, Pressure PSI, Low Pressure PSI x 10 公制温度℃，压力 Bar x 10，低压 Bar x 100 英制 温度℉，压力 PSI，低压 PSI x 10	
30107	Selected Fuel (0/1)	0 = Fuel 1	

	所选燃料（0/1）	0=燃料1 1 = Fuel 2 1=燃料2	
30109	Channel 1 Position 通道1位置	Degrees x 10 角度x 10	*457 value would be 45.7O *457 数值等同于45.7
30110	Channel 2 Position 通道2位置	Degrees x 10 角度x 10	
30111	Channel 3 Position 通道3位置	Degrees x 10 角度x 10	
30113	M.M. Error Number 控制模块错误代码	Error code 错误代码	*See section 6.1. *见6.1节。
30115	E.G.A. Run O2 Value E.G.A.运行O2值	% x 10	*25 value would be 2.5% *数值25等同于2.5%
30116	E.G.A. Run CO2 Value E.G.A.运行CO2值	% x 10	
30117	E.G.A. Run CO Value E.G.A.运行CO值	ppm x 10	
30118	E.G.A. Run Temperature E.G.A.运行温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30119	E.G.A. Run Efficiency E.G.A.运行效率	% x 10	
30120	E.G.A. Run NO Value E.G.A.运行NO值	ppm x 10	
30121	E.G.A. Run SO2 Value E.G.A.运行SO2值	ppm x 10	
30122	E.G.A. Commission O2 Value E.G.A.调试O2值	% x 10	
30123	E.G.A. Commission CO2 Value E.G.A.调试CO2值	% x 10	
30124	E.G.A. Commission	ppm x 10	

	CO Value E.G.A.调试CO值		
30125	E.G.A. Commission Temperature E.G.A.调试温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30126	E.G.A. Commission Efficiency E.G.A.调试效率	% x 10	
30127	E.G.A. Commission NO Value E.G.A.调试NO值	ppm x 10	
30128	E.G.A. Commission SO2 Value E.G.A.调试SO2值	ppm x 10	

3x			
30129	E.G.A. Error Code E.G.A.错误代码	Error code 错误代码	*See Mk8 E.G.A. Set-Up and Trim Guide manual *见Mk8 E.G.A.设置和尾气调节指南。
30130	Minimum Remote Setpoint 最小远程设置点	Metric: Temperature OC, Pressure Bar x 10, Low Pressure Bar x 100 Imperial Temperature OF, Pressure PSI, Low Pressure PSI x 10 公制温度℃，压力Bar x10，低压Barx100，英制温度 ℉，压力PSI，低压PSI x 10	
30131	Maximum Remote Setpoint 最大远程设置点	Metric: Temperature OC, Pressure Bar x 10, Low Pressure Bar x 100 Imperial Temperature OF, Pressure PSI, Low Pressure PSI x 10 公制温度℃，压力Bar x10，低压Barx100，英制温度 ℉，压力PSI，低压PSI x 10	
30132	Current Flow 1000s 电流1000s	Metric kW Imperial MMBTU/hr x 1000 公制MW， 英制MMBTU/hr x1000	*Remainder after whole number of MW or MMBTU/hr x 1000 taken away. E.g. 1.5MW gives 500 value and 15.1MMBTU/hr gives 100 value * MW数值或 MMBTU/hr x 1000数值去除整数后的剩余数字。比如：1.5MW 的 对应 数 值是500；15.1MMBTU/hr 的对应数值是100。
30133	Current Flow	Metric MW	*Whole number of MW or

	Millions 电流 百万	Imperial MMBTU/hr 公制 kW/hr 英制 MMBTU/hr	MMBTU/hr. E.g. 1.5MW gives 1 value and 15.1MMBTU/hr gives 15 value * MW 数值或 MMBTU/hr x 1000 数值的整数值。比如1.5MW 对应数值是1，15.1MMBTU/hr的对应数值是15。
30134	Fuel 1 Flow Total 1000s 燃料 1 总流量 1000s	Metric kW/hr Imperial MMBTU/hr 公制 kW/hr 英制 MMBTU/hr	*Remainder after whole number of MW/hr or MMBTU x 1000 taken away, x 1000. E.g. 1.5MW/hr gives 500 value and 15.1MMBTU gives 100 value * MW/hr 数值或MMBTU x 1000 数值被去除整数后的剩余数字。比如：1.5MW/hr 的 对 应 数值是500；15.1MMBTU 的对应数值是100。
30135	Fuel 1 Flow Total Millions 燃料1总流量 百万	Metric MW/hr Imperial MMBTU 公制 kW/hr 英制 MMBTU/hr	*Whole number of MW/hr or MMBTU. E.g. 1.5MW/hr gives 1 value and 15.1MMBTU gives 15 value * MW/hr 数值或MMBTU数值的整数值。比如：1.5MW/hr 对应数值是1，15.1MMBTU 的对应数值是15。
30136	Fuel 1 Flow Total Billions 燃料1 总流量 十亿	Metric GW/hr Imperial MMBTU / 1000 公制 kW/hr 英制 MMBTU/1000	*Whole number of GW/hr or MMMBTU E.g. 1.5MW/hr gives 0 value and 15.1MMBTU gives 0 value * GW/hr 数值或MMMBTU 数值的整数值。比如：1.5MW/hr 对应数值是0，15.1MMBTU 的对应数值是0。
30137	Fuel 2 Flow Total 1000s 燃料2总流量 1000s	Metric kW/hr Imperial MMBTU/hr 公制 kW/hr 英制 MMBTU/hr	
30138	Fuel 2 Flow Total Millions 燃料2总流量 百万	Metric MW/hr Imperial MMBTU 公制 MW/hr 英制 MMBTU	
30139	Fuel 2 Flow Total Billions 燃料2总流量	Metric GW/hr Imperial MMBTU / 1000 公制 GW/hr	

	百万	英制 MMBTU / 1000	
30143	E.G.A. Run Ambient Temperature E.G.A.运行环境温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30144	E.G.A. Run Delta Temperature E.G.A.运行Delta温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30145	E.G.A. Commission Ambient Temperature E.G.A.调试环境温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30146	E.G.A. Commission Delta Temperature E.G.A.调试Delta温度	Metric OC x 10 Imperial OF x 10 公制℃x 10 英制℉x 10	
30804	Channel 4 VSD Output 通道4变速驱动输出	mA x 10 V x 10	*55 value is 5.5mA or 5.5V *数值55等同于5.5mA或5.5V。
30805	Channel 4 VSD Input 通道4变速驱动输入	mA x 10 V x 10	*This input reads correctly even if VSD is not optioned. *即使未启用VSD仍将正确读取输入信号。
30830	Lockout 锁定	Error code 错误代码	*See section 6.2 Burner Lockouts *见6.2节燃烧器锁定。

3x			
30831	Fuel 1 Type 燃料1类型	0 = Gas 0=燃气 1 = Oil 1=燃油	*Option/ parameter 150 value *选项/参数150值。
30832	Fuel 2 Type 燃料2类型	0 = Gas 0=燃气 1 = Oil 1=燃油	*Option/ parameter 151 value *选项/参数151值。
30839	Fuel 1 Hours Run 燃料1运行小时数		*Number of completed hours *完整小时数。
30840	Fuel 2 Hours Run 燃料2运行小时数		*Number of completed hours *完整小时数。
30843	Fuel 1 Start-Ups 燃料1启动		
30844	Fuel 2 Start-Ups 燃料2启动		
30849	Actual Gas Pressure 实际燃气压力	“wg x 10 mbar x 10 PSI x 100	*Output units depend on option/ parameter 131, and is not affected by option 65 metric/ imperial setting. *输出值单位取决于选项/参数131值，输出值单位不受选项 65 公制/英制的设置影响。

4x			
40001	Required Value 所需值	Metric: Temperature OC, Pressure Bar x 10, Low Pressure Bar x 100 Imperial Temperature OF, Pressure PSI, Low Pressure PSI x 10 公制温度℃，压力Bar x10，低压Barx100，英制温度 ℉，压力PSI，低压PSI x 10	*After 1 minute of no Modbus communications to the unit, the M.M. will ignore this required value and use the required setpoint set on the M.M.’s status screen. * 如果控制设备超过60秒未收到Modbus指令，控制模块将忽略所需值，转而使用在控制模块屏幕上已设的设定点数值。
40121	Remote Firing Rate Value	%	*40131 must be set to 1 to change the firing rate remotely *要远程更改燃烧率，地址40131

	远程燃烧率数值		必须设为 1。
40131	Remote Firing Rate Enable/Disable 远程燃烧率设定，启用/禁用	0 = Remote firing rate Disabled 0 =远程燃烧率禁用 1 =Remote firing enabled 1=远程燃烧启用	

6 ERRORS AND LOCKOUTS 错误和锁定

6.1 M.M. Errors 控制模块错误

Error 错误	Message 错误消息	Description 说明
1	Channel 1 Positioning Error 通道1定位错误	Servomotor is outside of the commissioned range 伺服电机运行超出调试范围。

- Check wiring on terminals 40 – 47
- 检查接线端子40-47的接线。
- Check signal cable from the M.M. to the servomotor is screened at one end
- 检查从控制模块到伺服电机的信号电缆是否被一端屏蔽。
- Check potentiometer is zeroed correctly
- 检查电位计是否正确归零。
- Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0O
- 进入调试模式，检查伺服电机位置，确保在0.0°关闭。

2	Channel 2 Positioning Error 通道2定位错误	Servomotor is outside of the commissioned rang 伺服电机运行超出调试范围。

- Check wiring on terminals 40 – 47
- 检查接线端子40-47的接线。
- Check signal cable from the M.M. to the servomotor is screened at one end
- 检查从控制模块到伺服电机的信号电缆是否被一端屏蔽。
- Check potentiometer is zeroed correctly
- 检查电位计是否正确归零。
- Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0O
- 进入调试模式，检查伺服电机位置，确保在0.0°关闭。

3	Channel 3 Positioning Error 通道3定位错误	Servomotor is outside of the commissioned range 伺服电机运行超出调试范围。

- Check wiring on terminals 40 – 47
- 检查接线端子40-47的接线。
- Check signal cable from the M.M. to the servomotor is screened at one end
- 检查从控制模块到伺服电机的信号电缆是否被一端屏蔽。
- Check potentiometer is zeroed correctly
- 检查电位计是否正确归零。
- Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0O
- 进入调试模式，检查伺服电机位置，确保在0.0°关闭。

5	Channel 1 Gain Error 通道1增量错误	Servomotor position measurement hardware error 伺服电机位置测量硬件错误。

- Check wiring and voltages on terminals 40 – 47 and if no fault found, contact Autoflame
- 检查接线端子40-47 的接线和电压。如未发现故障，请联系 Autoflame。

6	Channel 2 Gain Error 通道2增量错误	Servomotor position measurement hardware error 伺服电机位置测量硬件错误。

- Check wiring and voltages on terminals 40 – 47 and if no fault found, contact Autoflame
- 检查接线端子40-47 的接线和电压。如未发现故障，请联系 Autoflame。

7	Channel 3 Gain Error	Servomotor position measurement hardware error

通道3增量错误　　伺服电机位置测量硬件错误。

- Check wiring and voltages on terminals 40 – 47 and if no fault found, contact Autoflame
- 检查接线端子40-47 的接线和电压。如未发现故障，请联系 Autoflame。

9 Channel 1 Movement Error　　No movement detected when servomotor requested to Move
通道1运动错误　　要求伺服电机运动时检测到无运动。

- Check wiring and voltages on terminals 40 – 47 and 70 – 75
- 检查接线端子40-47和70-75 的接线和电压。
- Check actual servomotors drive in correct direction
- 检查伺服电机运动方向是否正确。
- Check valve is not stuck
- 检查阀门是否卡住。

10 Channel 2 Movement Error　　No movement detected when servomotor requested to Move
通道2运动错误　　要求伺服电机运动时检测到无运动。

- Check wiring and voltages on terminals 40 – 47 and 70 – 75
- 检查接线端子40-47和70-75 的接线和电压。
- Check actual servomotors drive in correct direction
- 检查伺服电机运动方向是否正确。
- Check damper is not stuck
- 检查阻尼器是否卡住。

11 Channel 3 Movement Error　　No movement detected when servomotor requested to Move
通道3运动错误　　要求伺服电机运动时检测到无运动。

- Check wiring and voltages on terminals 40 – 47 and 70 – 75
- 检查接线端子40-47和70-75 的接线和电压。
- Check actual servomotors drive in correct direction
- 检查伺服电机运动方向是否正确。
- Check valve is not stuck
- 检查阀门是否卡住。

13 Analogue Power Supply Error　　ADC measured 12V supply out of range
模拟电源错误　　ADC所测12V电源超出范围

- Check wiring for shorts on terminals 41, 47 and 39
- 检查接线端子41、47和39的接线是否短路。
- Remove all plugs apart from power to the unit, go to commissioning mode, and if error continues, contact Autoflame

拔下设备供电插头之外的所有插头，进入调试模式。如果故障持续，请联系Autoflame。

14 Digital Power Supply Error　　ADC measured 3.3V supply out of range
数字电源错误　　ADC所测3.3V电源超出范围

- Check wiring and voltages on all terminals and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。
- Remove all plugs apart from power to the unit, go to commissioning mode, and if error continues, contact Autoflame

拔下设备供电插头之外的所有插头，进入调试模式。如果故障持续，请联系Autoflame。

Error 错误	Message 错误消息	Description 说明
15	EEPROM Error EEPROM错误	Fault communicating with the on board EEPROM 与 EEPROM 通讯故障。

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

16	ADC Error ADC错误	Internal fault 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

17	Watchdog Timeout 监控设备超时	Internal fault 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

18	Processor Clock Error 处理器时钟错误	Internal fault 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

19	System Error 系统错误	Internal fault 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

20	Flash Data Error Flash数据错误	Internal fault 内部故障

- Re-install software SD card and contact Autoflame
- 重新安装软件SD卡并联系 Autoflame。

21	Processor Temperature Error 处理器温度错误	Internal fault 内部故障

- Check wiring and voltages on all terminals and contact Autoflame
- 检查所有接线端子的接线和电压并联系 Autoflame。
- Check ambient temperature of unit does not exceed maximum recommend temperature
- 检查设备的环境温度是否超过最大建议温度。

22	Burner Control Comms Error 燃烧器控制通信错误	Internal fault 内部故障

- Contact Autoflame
- 联系Autoflame。

23	Burner Control Reset 燃烧器控制重置	Internal fault 内部故障

- Contact Autoflame
- 联系Autoflame。

24	Software Error 软件错误	Internal fault 内部故障

- Contact Autoflame
- 联系Autoflame。

25 Zero-Crossing Detection Error — Internal fault
零交点检测错误 — 内部故障

- Check mains supply going to unit is within acceptable voltage range
- 检查设备电源输入电压是否在可接受的电压范围内。
- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

26 Mains Input Detection Error — Mains input stuck on
干线输入检测错误 — 干线输入中止

- Check wiring and voltages on terminals 89 – 90, and if no fault found, contact Autoflame
- 检查接线端子89-90 的接线和电压。如未发现故障，请联系 Autoflame。

27 Load Sensor Error — Load sensor is out of range
负载传感器错误 — 负载传感器超出范围

- Check load sensor wiring and ensure that the return voltage/resistance is less than 1V/ 1kΩ
- 检查荷载感应器的接线，确保回复电压/电阻小于1V/ 1kΩ。

28 VSD Error — Feedback incorrect
变速驱动错误 — 反馈错误

- Check VSD feedback against commissioned VSD and ensure the feedback is stable
- 对照调试值检查变速驱动回馈信号，确保回馈信号稳定。

29 VSD No Commission Feedback — No feedback detected during commissioning
变速驱动无调试反馈 — 在调试期间检测不到反馈信号

- Check VSD feedback during commissioning
- 调试期间检查变速驱动回馈信号。
- Check wiring on terminals 1 – 3 and 10 – 12
- 检查接线端子1-3和10-12上的接线。

30 Missing Commissioning Data — Internal fault
丢失调试数据 — 内部故障

- Check there is commissioning data for all options servomotors/VSD
- 检查所有启用的伺服电机/变速驱动调试值。

31 FAR Execution Speed — Internal fault
FAR执行速度 — 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

32 Software Error — Internal fault.
软件错误 — 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

33 Software Error — Internal fault.
软件错误 — 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

34 Software Error — Internal fault.
软件错误 — 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

35 Software Error — Internal fault.
软件错误 — 内部故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子的接线和电压。如未发现故障，请联系 Autoflame。

Error 错误	Message 错误消息	Description 说明
36	VSD Sampling Error 变速驱动取样错误	VSD feedback current/ voltage too high 变速驱动反馈电流/电压过高

- Check wiring on terminals 1 – 3, and 10 – 12
- 检查接线端子1-3和10-12的接线。

37	VSD Feedback Too Low 变速驱动反馈过慢	VSD feedback value is too low during commissioning 调试过程中变速驱动反馈数值过低

- Check wiring on terminals 1 – 3, and 10 – 12
- 检查接线端子1-3和10-12的接线。
- Check VSD feedback while commissioning
- 调试时检查变速驱动反馈信号。

38	Air Pressure Commission Fault 空气压力调试故障	Internal fault 内部故障

- Check wiring on terminals 29, 30, 48 and 49
- 检查接线端子29、30、48和49的接线。
- Re-commission air pressure sensor.
- 重新调试空气压力感应器。

39	Gas Pressure VPS Commission Fault 燃气压力 VPS（阀门校验）调试故障	Gas pressure during VPS below option/ parameter 133 VPS（阀门校验）期间的燃气压力低于选项/参数133值

- Check option/ parameter 133 and check gas pressure
- 检查选项/参数133并检查燃气压力。
- Re-commission gas pressure sensor
- 重新调试燃气压力感应器。

40	Gas Pressure Run Commission Fault 燃气压力运行调试故障	Gas pressure commissioned value too low for main curve/ golden start 调试后的燃气压力远低于主燃烧曲线/黄金启动的要求。

- Check option/ parameter 136
- 检查选项/参数136。
- Re-commission gas pressure sensor
- 重新调试燃气压力感应器。

41	Air Pressure Commission Fault 空气压力调试故障	Air pressure commissioned value too low for main curve/ golden start 调试后的空气压力远低于主燃烧曲线/黄金启动的要求。

- Check option/ parameters 147 and 149
- 检查选项/参数147和149。
- Re-commission air pressure sensor
- 重新调试空气压力感应器。

6.2 Burner Lockouts 燃烧器锁定

Error 错误	Message 错误消息	Description 说明
1	CPI Input Wrong State CPI 输入错误状态	Proof of closure switch opened during ignition sequence 点火排序时阀门关闭开关校验开启

- Check wiring on terminal 55
- 检查接线端子55的接线。
- Check proof of closure switches
- 检查阀门关闭校验开关。

2	No Air Proving 无空气校验	No air pressure during start/ firing 启动/燃烧时无空气压力

- Check wiring on terminal 54
- 检查接线端子54的接线。
- Check air pressure switch
- 检查空气压力开关。
- Check air pressure sensor
- 检查空气压力传感器。
- Check air pressures during running
- 运行时检查空气压力。

3	Ignition Output Fault 点火输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 63
- 检查接线端子63上的接线和电压。

4	Motor Output Fault 电机输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 58
- 检查接线端子58上的接线和电压。

5	Start Gas Output Fault 点火燃气输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 59
- 检查接线端子59上的接线和电压。

6	Main Gas 1 Output Fault 主燃气1输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 60
- 检查接线端子60上的接线和电压。

7	Main Gas 2 Output Fault 主燃气2输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 61
- 检查接线端子61上的接线和电压。

8	Vent Valve Output Fault 排气阀输出故障	Voltage detected when output is off (and vice versa) 输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 62
- 检查接线端子62上的接线和电压。

9	Fail Safe Relay Fault	Voltage detected when output is off (and vice versa)

	安全装置继电器故障	输出关闭时检测到电压（或输出开启时检测不到电压）

- Check wiring and voltage on terminal 57
- 检查接线端子57上的接线和电压。
- Check 5A fuse
- 检查5A保险丝。

10	Simulated Flame	Flame is present when it not should be
	模拟火焰	火焰在不应存在时存在。

- Isolate gas/ oil immediately
- 立即隔离燃气/燃油。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。
- If during shutdown a post-purge maybe required for after burn
- 在关机时有可能需要后吹扫。

11	VPS Air Proving Fail	Leak detected during ‘air proving’ part of VPS
	VPS（阀门校验）空气校验失败	VPS（阀门校验）“空气校验”时检测到泄漏

- Check 1st main valve
- 检查一级主阀门。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

12	VPS Gas Proving Fail	Leak detected during ‘gas proving’ part of VPS
	VPS（阀门校验）燃气校验失败	VPS（阀门校验）“空气校验”时检测到泄漏

- Isolate gas
- 隔离燃气。
- Check 2nd main valve and vent valve
- 检查二级主阀门和排气阀。
- Check pilot valve if using single valve pilot
- 使用单阀导燃时检查导向阀。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

13	No Flame Signal	No flame detected during ignition/ firing
	无火焰信号	点火/燃烧时检测不到火焰

- Visually check flame
- 目视检查火焰。
- Check the flame scanner
- 检查火焰监视器。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

14	Shutter Fault	UV signal detected during shutter operation on self-check
	断路器故障	断路器自检时检测到紫外线信号。

- Check wiring on terminals 21 and 22
- 检查接线端子21和22 上的接线。
- Check UV scanner type and check option/ parameter 110 is set accordingly
- 检查紫外线监视器型号并检查选项/参数110是否设置正确。

15	NO CPI Reset	Proof of closure switch not made after valves closed
	NO CPI重置	阀门关闭后阀门关闭校验开关未工作

- Check wiring on terminal 55

- 检查接线端子55上的接线。
- Check proof of closure switches
- 检查阀门关闭检验开关。

Error 错误	Message 错误消息	Description 说明
17	Gas Pressure Low 燃气压力过低	Gas pressure low limit exceeded while firing (gas sensor) 超出燃气压力下限（燃气传感器）

- Check gas pressure
- 检查燃气压力。
- Check option/ parameter 136
- 检查选项/参数136。

18	Gas Pressure High 燃气压力过高	Gas pressure high limit exceeded while firing (gas sensor) 超出燃气压力上限（燃气传感器）

- Check gas pressure
- 检查燃气压力。
- Check option/ parameter 137
- 检查选项/参数137。

19	RAM Test Failed RAM 测试失败	Hardware fault 硬件故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

20	PROM Test Failed PROM 测试失败	Hardware fault 硬件故障

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

21	FSR Test 1A FSR测试1A	Internal relay test failed 内部继电器测试失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

22	FSR Test 2A FSR测试2A	Internal relay test failed 内部继电器测试失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

23	FSR Test 1B FSR测试1B	Internal relay test failed 内部继电器测试失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

24	FSR Test 3B FSR测试3B	Internal relay test failed 内部继电器测试失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

26	Watchdog Fail 2B 监控设备故障2B	Internal check failed 内部检查失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

28	Watchdog Fail 2D 监控设备故障2D	Internal check failed 内部检查失败

- Check wiring and voltages on all terminals, and if no fault found, contact Autoflame
- 检查所有接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

29	Input Fault 输入故障	Power supply fault 电源故障

- Check mains voltage to the M.M.
- 检查控制模块的干线电压。

32	Gas Pressure Low Limit 燃气压力下限	Gas pressure too low compared to commissioned value during VPS VPS 期间燃气压力较调试值相比过低

- Check gas pressure sensor value
- 检查燃气压力传感器数值。

33	VPS Air Zeroing Fail VPS（阀门校验）空气归零故障	Fail when venting to atmosphere 排气时发生故障

- Check vent valve
- 检查排气阀

39	Freeze Timeout Freeze 超时	M.M. kept in Phase Hold for more than 10minutes 控制模块停留在 “阶段保持” 时间超过10分钟

- Keep M.M. in Phase Hold during commissioning for less than 10 minutes
- 调试时将控制模块的“阶段保持”时长控制在10分钟以内。

47	Ion. Internal Failsafe Fault 电离/火焰棒，内部安全装置故障	Internal check failed for flame rod 火焰棒内部检查失败

- Check wiring on terminal 64 and flame rod
- 检查接线端子64上的接线，检查火焰棒。

48	Ion. Positive Peak Failsafe Fault 电离/火焰棒，正峰值安全装置故障	Signal check failed for ionisation scanner 电离扫描仪信号检查故障

- Check wiring on terminal 64 and ionisation scanner
- 检查接线端子64上的接线，检查电离扫描仪。

49	Ion. Negative Peak Failsafe Fault 电离/火焰棒，负峰值安全装置故障	Signal check failed for ionisation scanner 电离扫描仪信号检查故障

- Check wiring on terminal 64 and ionisation scanner
- 检查接线端子64上的接线，检查电离扫描仪。

50	Ionisation High Ambient 电离高环境温度	Flame detected when there shouldn’t be. 在不应存在火焰时检测到火焰。

- Check wiring on terminal 64
- 检查接线端子64上的接线。

51	Ionisation No Flame 电离无火焰	No flame detected when there should be. 在应存在火焰时检测不到火焰。

- Check wiring on terminal 64
- 检查接线端子64上的接线。
- Visually check flame
- 目视检查火焰。
- Check IR scanner

- 检查红外线扫描仪。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

Error 错误	Message 错误消息	Description 说明
52	High IR Ambient 高红外线环境温度	Flame detected when there shouldn't be 在不应存在火焰时检测到火焰

- Visually check flame
- 目视检查火焰。
- Check IR scanner
- 检查红外线扫描仪。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

53	IR Comms Lost 红外线通信丢失	Loss of comms with IR scanner 红外线扫描仪通信丢失

- Check wiring on terminals 29, 30, 48 and 49
- 检查接线端子29、30、48和49上的接线。

62	UV Signal Too High 紫外线信号过强	Internal check failed for UV 紫外线内部检查失败

- Check wiring on terminals 21, 22, 50 and 51
- 检查接线端子21、22、50和51上的接线。

63	Purge Limit Switch 吹扫限位开关	Interlock not made on terminal 81 接线端子81上未设置联锁

- Check option/ parameter 155
- 检查选项/参数155。
- Check wiring on terminal 81
- 检查接线端子81上的接线。

64	Start Limit Switch 启动限位开关	Interlock not made on terminal 80 接线端子80上未设置联锁

- Check option/ parameter 154
- 检查选项/参数154。
- Check wiring on terminal 80
- 检查接线端子80上的接线。

65	FSR A	Internal check failed 内部检查失败

- Check wiring and voltages on terminals, and if no fault found, contact Autoflame
- 检查接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

66	FSR B	Internal check failed 内部检查失败

- Check wiring and voltages on terminals, and if no fault found, contact Autoflame
- 检查接线端子上的接线和电压。如未发现故障，请联系 Autoflame。

67	Gas Pressure Sensor Timeout 燃气压力传感器超时	Signal lost from gas pressure sensor 燃气压力传感器信号丢失

- Check gas pressure sensor wiring on terminals 29, 30, 48 and 49
- 检查接线端子29、30、48和49上燃气压力传感器接线。

68	Wrong Gas Pressure Sensor Type 检测到错误的燃气压力传感器	Wrong gas pressure sensor detected

错误的燃气压力传感器类型

- Check options/ parameter 128 and 156
- 检查选项/参数128和156。

69 Gas Pressure Sensor Fault — Internal pressure sensor fault
燃气压力传感器故障 — 内部压力传感器故障

- Contact Autoflame
- 请联系 Autoflame。

70 UV SP1 Comms Failure、 — Internal UV scanner fault
紫外线 SP1通信失败 — 内部紫外线监视器故障

- Contact Autoflame
- 请联系 Autoflame。

71 Air Pressure Sensor Timeout — Signal lost from air pressure sensor
空气压力传感器超时 — 空气压力传感器信号丢失

- Check air pressure sensor wiring on terminals 29, 30, 48 and 49
- 检查接线端子29、30、48和49上的空气压力感应器接线。

72 Air Pressure Wrong Sensor Type — Wrong air pressure sensor detected
检测到不正确的空气压力传感器
错误的空气压力传感器类型

- Check option/ parameter 148
- 检查选项/参数148。

73 Air Pressure Bad Value — Internal pressure sensor fault
空气压力坏值 — 内部压力传感器故障

- Contact Autoflame
- 请联系 Autoflame。

74 Air Pressure Zero Commissioned Value Wrong — Air pressure value is more than 5mbar from sensor's zero Value
空气压力零调试值错误 — 空气压力数值和传感器零值相差5mbar以上

- Check air pressure sensor value during VPS
- VPS（阀门校验）期间检查空气压力传感器数值。

75 Air Pressure High Commissioned Value Wrong — Incorrect air pressure value
错误的空气压力值
空气压力高调试值错误

- Check air pressure sensor value during VPS
- VPS（阀门校验）期间检查空气压力传感器数值。
- Check wiring on terminals 29, 30, 48 and 49
- 检查接线端子29、30、48和49 上的接线。

76 Air Pressure Out of Window — Incorrect air pressure value
空气压力超出范围值 — 错误的空气压力值

- Check air pressure sensor value during VPS
- VPS 期间检查空气压力传感器数值。

77 Wait For Air Switch Timeout — Voltage has not been reset for 2minutes
"等待空气开关"超时 — 电压超过两分钟未被重置

- Check air pressure sensor value during VPS
- VPS 期间检查空气压力传感器数值。
- Check voltage has been resets on terminal 54 within 2minutes
- 在接线端子54上检查电压是否在两分钟内被重置。

- Check wiring and voltage on terminal 54
- 检查接线端子54上的接线和电压。

Error 错误	Message 错误消息	Description 说明
78	VPS Gas Input Too High VPS 燃气输入值过高	Gas pressure too high during VPS VPS 期间燃气压力过高

- Isolate gas
- 隔离燃气。
- Check 1st main valve and vent valve
- 检查一级主阀门和排气阀。
- Check option/ parameter 134
- 检查选项/参数 134。
- Call a certified Commissioning Engineer to investigate
- 请有资质的调试工程师进行检查。

199	UV Error 紫外线错误	Internal check failed 内部检查失败

- Check wiring and voltages and contact Autoflame
- 检查接线和电压并联系 Autoflame。

201	CPU PU Fail CPU PU故障	Internal check failed 内部检查失败

- Check wiring and voltages and contact Autoflame
- 检查接线和电压并联系 Autoflame。

202	EEProm Fail EEProm故障	Internal check failed 内部检查失败

- Check wiring and voltages and contact Autoflame
- 检查接线和电压并联系 Autoflame。

7 STANDARDS 标准

The Mini Mk8 M.M. has been tested and approved to the following standards:
Mk8微型控制模块已通过测试并符合以下标准:

C22.2 No. 199-M89

UL 372, 5th Edition

BS EN 298:2012

BS EN 12067-2:2004

BS EN 1643:2014

ISO 23552-1:2007

Notes
注释

Autoflame Engineering Ltd
Autoflame工程有限公司
Unit1-2 Concorde Business Centre
Airport Industrial Estate, Wireless Road
Biggin Hill, Kent TN16 3YN
United Kingdom
+44 (0) 845 872 2000
www.autoflame.com