AUTOFLAME®

燃烧控制管理系统



Mini Mk8 MM Manual

MK8 微型控制模块手册

MMM8002

2022.03.08

MK8 微型控制模块手册

2022.03.08

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为了安全有效地使用控制模块/EGA 系统，控制模块/EGA 系统的操作人员必须具有与燃烧相关的流程和调试知识。我们要求使用者参加实践培训，请使用首页上 Autoflame 办公室通讯方式来详细了解团体培训和个别教学事宜。

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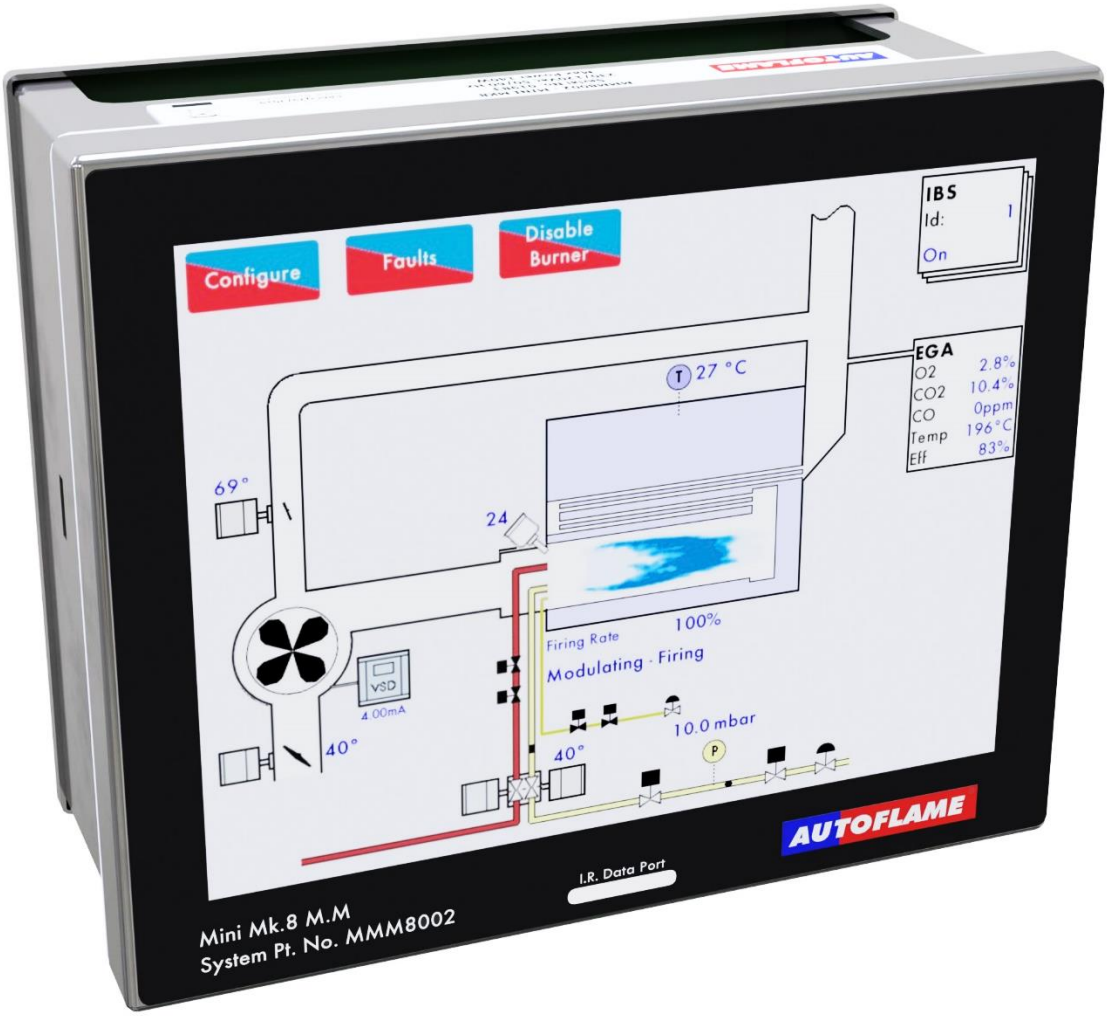
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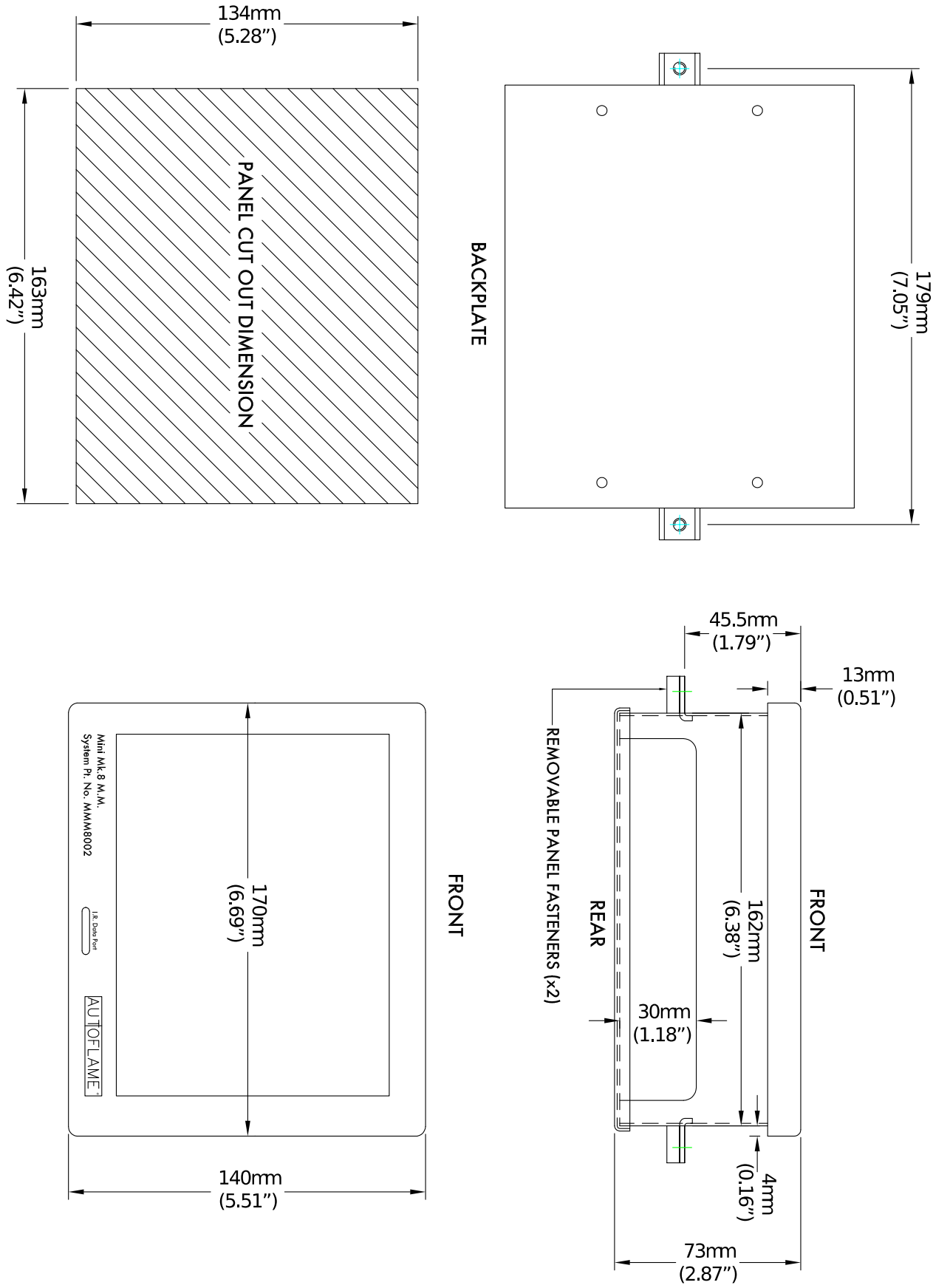
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1 SPECIFICATIONS AND WIRING / 规格和接线

1.1 Mini Mk8 MM / MK8 微型控制模块

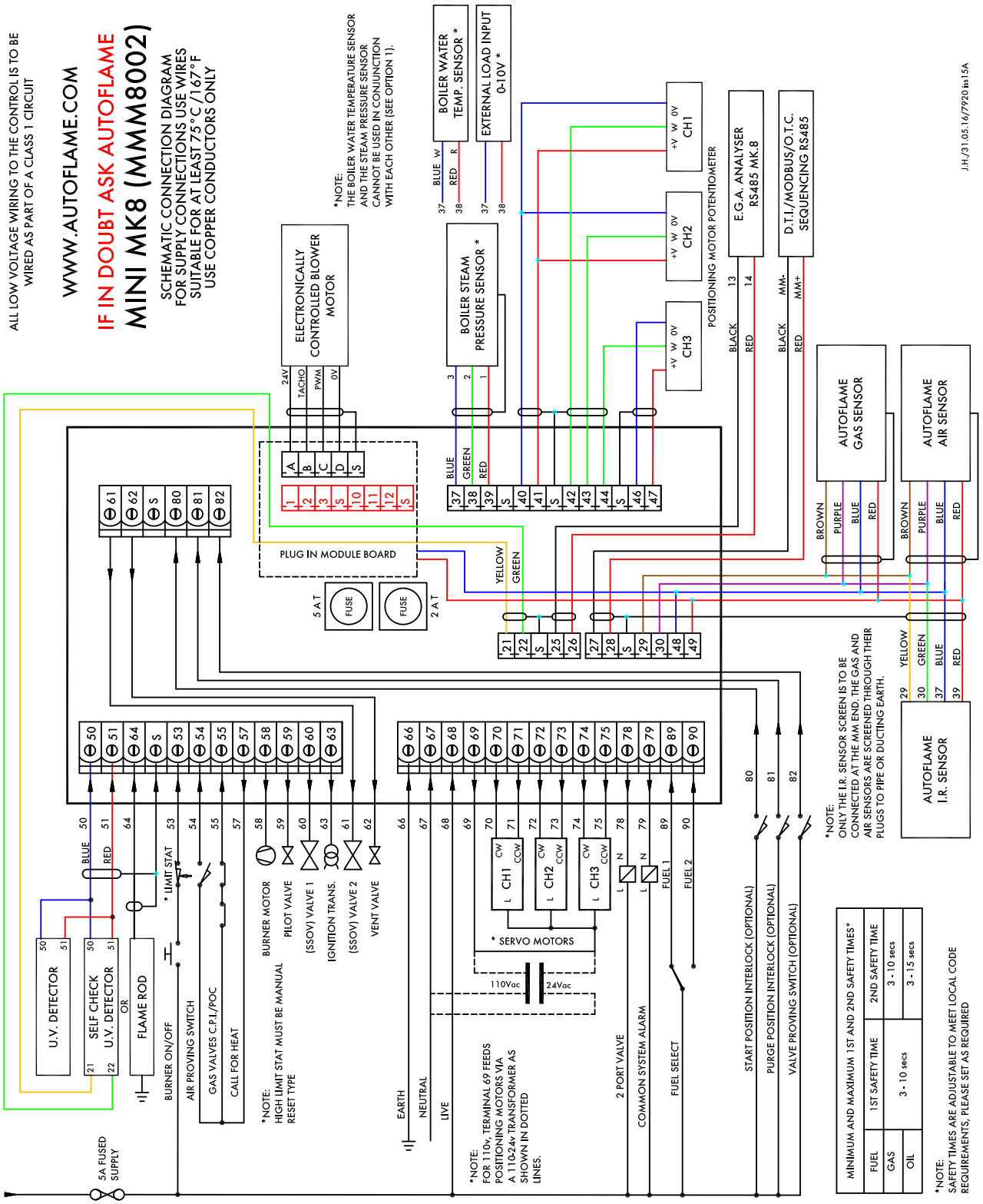


1.1.1 Fixing Holes and Dimensions / 固定孔和尺寸

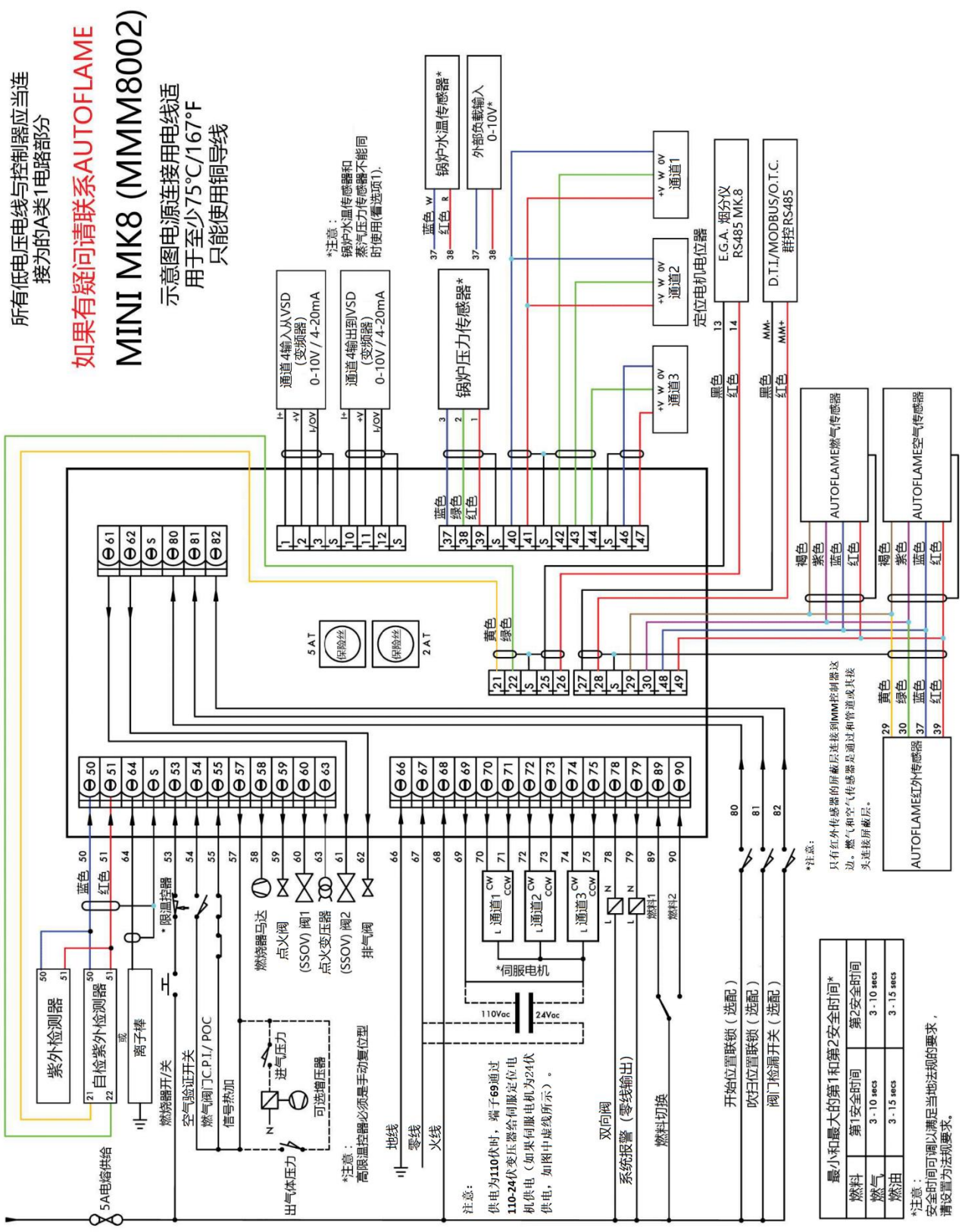


1.2 Wiring Schematic / 接线图

附 PWM 模块连接图示



Fuse	Terminals Protected 端子保护
5A	Mains voltage output terminals 57 – 63 电源电压输出端子 57 - 63
2A	Low voltage terminals and switched neutral outputs 低压端子和开关零线输出


所有低电压电线与控制器应当连接为的A类1电路部分
如果有疑问请联系AUTOFLAME
MINI MK8 (MMM8002)
示意图电源连接用电线适用于至少75°C/167°F只能使用铜导线
通道4输入从VSD (变频器) 0-10V / 4-20mA
通道4输出到VSD (变频器) 0-10V / 4-20mA
锅炉压力传感器*
锅炉水温传感器*
外部负载输入 0-10V*
通道1
通道2
通道3
E.G.A. 烟分仪 RS485 MK.8
D.T.I./MODBUS/O.T.C. 群控RS485
AUTOFLAME燃气传感器
AUTOFLAME空气传感器
AUTOFLAME红外传感器
紫外检测器
自检紫外检测器
或
离子棒
燃烧器开/关
空气验证开关
燃气阀门C.P.I./ POC
信号热加
限温控器
进气压力
可选增压器
出气体压力
燃烧器马达
点火阀
(SSOV) 阀1
点火变压器
(SSOV) 阀2
排气阀
伺服电机
110Vac
24Vac
地线
零线
火线
双向阀
系统报警（零线输出）
燃料切换
开始位置联锁（选配）
吹扫位置联锁（选配）
阀门检漏开关（选配）
5A电熔供给
注意：
供电为110伏时，端子69通过110-24伏变压器给伺服定位电机供电（如果伺服电机为24伏供电，如图中虚线所示）。
*注意：
高限温控器必须是手动复位型
*注意：
只有红外传感器的屏蔽层连接到MM控制器这边，燃气和空气传感器是通过和管道或其接头连接屏蔽层。
最小和最大的第1和第2安全时间*
燃料 | 第1安全时间 | 第2安全时间
燃气 | 3 - 10 secs | 3 - 10 secs
燃油 | 3 - 15 secs | 3 - 15 secs
*注意：
安全时间可调以满足当地法规的要求，请设置为法规要求。

1.3 Electrical Specifications / 电气规格

1.3.1 Classifications / 等级

Classification according to EN298　　根据 EN298 级别

Mains Supply: 电源：	230V, +10%/-15%} 120V, +10%/-15%}	47-63 Hz, unit max. consumption 140W 47-63 Hz, 单位最大用电量 140W
Climate: 气候：	Min. Temperature 最低温度	0^{O}C (32^{O}F)
	Recommended Temperature 建议温度	Less than 40^{O}C (104^{O}F) 少于 40^{O}C (104^{O}F)
	Max. Temperature 最高温度	60^{O}C (140^{O}F)
	Humidity 湿度	0 to 90% non-condensing 不冷凝
Storage: 储藏：	Temperature 温度	-20 to 85^{O}C (-4 to 185^{O}F)
Protection Rating: 防护等级：	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. 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的防护等级是 IP65，NEMA4；控制模块背部的防护等级是 IP20， NEMA1。	

1.3.2 Inputs and Outputs / 输入和输出

Outputs Terminal 输出终端	Rating (230V) 230V 供电	Rating (120V) 120V 供电	Notes 注释
57	250mA	250mA	Must be connected through contactor 必须通过接触器连接
58	250mA	250mA	Must be connected through contactor 必须通过接触器连接
59	1A	2A	0.6 power factor 0.6 功率因数
60	1A	2A	0.6 power factor 0.6 功率因数
61	1A	2A	0.6 power factor 0.6 功率因数
62	1A	2A	0.6 power factor 0.6 功率因数
63	1A	2A	0.6 power factor 0.6 功率因数
78	100mA	100mA	To drive relay only – switched neutral 仅用于驱动继电器 – 零线开关
79	100mA	100mA	To drive relay/lamp only – switched neutral 仅用于驱动继电器 – 零线开关
Max. Load 最大负载	5A	5A	

Note:
注意：

- The high and low voltage connections are not safe to touch. Protection against electric shock is provided by correct installation. **CAUTION – ELECTRIC SHOCK HAZARD.**
  用手触摸高压和低压连接是危险行为。正确安装电气设备可以防止触电事故。**警告：触电危险。**

- Control voltage cabling should be maximum 10m, screened (if not screened then less than 1m, however servomotors can be unscreened up to 10m).
  控制电压电缆的最大长度应为 10m，经屏蔽（若未屏蔽应短至 1 米）；伺服电机的未屏蔽电缆最大长度可为 10m。

- Any cabling over 10m must have additional surge protection.
  所有超过 10m 的电缆必须配备电涌保护。

- Low voltage cables should be screened cable as specified in section 1.3.3.
  低压电缆应符合章节 1.3.3 规定的屏蔽电缆。

- The burner 'High Limit Stat' must be a manual reset type.
  燃烧器的"超高压/温开关"必须为手动复位型。

- There is a lid (back plate) fitted onto the back of the Mini Mk8 MM with a Warning label to prevent any unauthorised fuse replacements.
  在 MK8 微型控制模块背部装有一个盖板。盖板上的标识明确指出更换保险丝操作前必需获得授权。

1.3.3 Cable Specifications / 电缆规格

Low Voltage / 低电压信号

The screened cable used for low voltage wiring from the MM to the servomotors, detectors and variable speed drive must conform to the following specification:
用于从控制模块到伺服电机、探测器和变频器的低压走线屏蔽电缆必须符合以下规范：

U.V. cable length should not exceed 25m; all other screened cable should not exceed 50m.
U.V.电缆长度不应超过 25 米; 所有其他屏蔽电缆不应超过 50 米。

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

- Sixteen wires per core
  每芯 16 线
- Diameter of wires in each core 0.2mm
  芯内电线直径 0.2mm
- Rated at 440V AC rms at 1600Hz
  额定交流电压 440V rms 1600Hz
- DEF 61-12 current rating per core 2.5A
  DEF 61-12 每芯额定电流 2.5A
- Maximum operating temperature 70℃ (158oF)
  最高工作温度 70℃ (158F)
- Nominal conductor area 0.5sq mm per core
  导体公称面积 – 每芯 0.5 平方毫米
- 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
  每芯导体公称直径 0.93mm
- Nominal core resistance at 20℃. 40.1Ω/1000m
  20℃ 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
  编织层填充因子 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:
根据实际使用需要来选用合适的电缆。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

16-2-8C 8 Core

16-2-6C 8 芯

(5 Core not readily available)
(一般没有 5 芯电缆供应)

Note: If using 4 Core cable and interference is detected, use 2 sets of 2 Core.
注意：如果使用 4 芯电缆时检测到相互干扰，就应使用两根 2 芯电缆。

Data Cable / 数据电缆

Data cable must be used for communication connections between MMs for sequencing applications as well as between MMs to EGAs, MMs to a DTI and DTI to BMS systems.
数据电缆用于控制模块间的群控通讯连接，控制模块与 EGA 的通讯连接，控制模块与 DTI 以及 DTI 与 BMS 系统通讯连接。

Communication cable should not exceed 1km.
通讯电缆不能超过 1 公里。

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

1 Belden 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 Belden 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.
客户可询问和获得样品。客户可直接向 Autoflame 工程有限公司采购低压电缆和数据电缆。请联系 Autoflame。

When using a VSD, please review the manufacturer's guidelines on installations to prevent EMC, including the recommendations for reactors and filters.
使用 VSD 时，防止 EMC 影响请参阅制造商的安装指南，包括电抗器和电源滤波器的建议。

Note: For the 4-20mA outputs on the Mini Mk8 MM, the maximum voltage drop supported is 12V.
注:对于 Mini Mk8 MM 的 4-20mA 输出，支持的最大电压降为 12V。

1.3.4 Terminals Description / 接线端子说明

S	All terminals marked S are internally connected 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，该端子可与变频器或者转速计系统的电流输出信号连接，或者和 4-20mA 伺服电机的反馈信号连接。
2	Voltage Input, 0-10V. For channel 4 only. Can be connected to the voltage output of a VSD or tachometer system 电压输入，0-10V。仅用于通道 4，该端子可与变频器或者转速计系统的电压输出信号连接。
3	0V common for Terminals 1 or 2 端子 1 和端子 2 的通用 0V
10	Current Output, 0-20mA/ 4-20mA. For channel 4 only. Can be connected to the current input of a VSD or tachometer system or 4-20mA servomotor feedback 电流输出，0-20mA/ 4-20mA。仅用于通道 4，该端子可与变频器或者转速计系统的电流输入信号口连接，或者和 4-20mA 伺服电机的反馈信号口连接。
11	Voltage Output, 0-10V. For channel 4 only. Can be connected to the voltage input of a VSD or tachometer system 电压输出，0-10V。仅用于通道 4，该端子可与变频器或者转速计系统的电压输入信号口连接。
12	0V common for Terminals 10 or 11 端子 10 和端子 11 的通用 0V
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 (EGA) 与烟气分析仪(E.G.A.)相连的通讯接口
27, 28	Communications port connections for DTI and/or IBS, or Modbus 与 D.T.I. 和/或 IBS, 或者 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 红外线火检(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	0V supply to an Autoflame temperature or pressure detector or 0-10V external modulation input 与 Autoflame 温度或压力检测器或 0-10V 外部调节输入相连的 0V 输入（负极）
38	Signal input from an Autoflame temperature or pressure detector or 0-10V external modulation input 来自 Autoflame 温度或压力探测器或 0-10V 外部调节输入信号 （正极）
39	12V supply to an Autoflame pressure detector 与 Autoflame 压力传感器相连的 12V 电源供应。
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 接点

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 电源接点
42	Signal from channel 1 servomotor, indicating position 通道 1 伺服电机的反馈信号，指示位置
43	Signal from channel 2 servomotor, indicating position 通道 2 伺服电机的反馈信号，指示位置
44	Signal from channel 3 servomotor, indicating position 通道 3 伺服电机的反馈信号，指示位置
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 红外线火检 (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 与离子棒相连的接口
53	Mains voltage input – burner on/off signal, running interlock circuit 火线电压输入 – 燃烧器启停信号，运行联锁电路 **Note: All external safety devices that require manual reset must be reset external to the Autoflame system and prior to completing the recycling interlock** **注意：所有需要手动复位的外部安全装置必须在 Autoflame 系统外部复位，并在完成循环联锁之前复位**
54	Mains voltage input – air proving switch 火线电压输入 – 空气校验开关
55	Mains voltage input - proving circuits, e.g. gas valve proof of closure 火线电压输入 – 检验电路，例如燃气阀门关位检验
57	Mains voltage output – call for heat 火线电压输出 – 需热启动信号
58	Mains voltage output – burner motor 火线电压输出 – 燃烧器电机
59	Mains voltage output – start/pilot valve 火线电压输出 – 启动/引导火阀
60	Mains voltage output – main fuel valve 1 火线电压输出 – 主燃料阀 1
61	Mains voltage output – main fuel valve 2 火线电压输出 – 主燃料阀 2

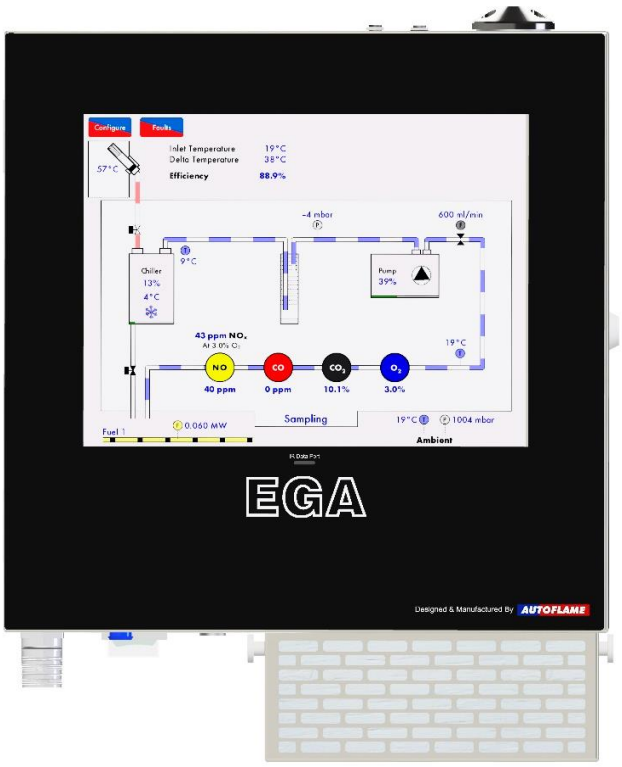
62	Mains voltage output – vent valve 火线电压输出 – 排气阀
63	Mains voltage output – ignition transformer 火线电压输出 – 点火变压器
66	Mains supply – earth 供电 – 地线
67	Main supply – neutral 供电 – 零线
68	Mains supply – live/hot 供电 – 火线
69	Mains voltage output, power to servomotors and/or stepdown transformer 火线电压输出，给伺服电机和/或变压器供电
70	Switched neutral – drives channel 1 servomotor clockwise 零线控制 – 驱动通道 1 伺服电机顺时针转动
71	Switched neutral – drives channel 1 servomotor counter clockwise 零线控制 – 驱动通道 1 伺服电机逆时针转动
72	Switched neutral – drives channel 2 servomotor clockwise 零线控制 – 驱动通道 2 伺服电机顺时针转动
73	Switched neutral – drives channel 2 servomotor counter clockwise 零线控制 – 驱动通道 2 伺服电机逆时针转动
74	Switched neutral – drives channel 3 servomotor clockwise 零线控制 – 驱动通道 3 伺服电机顺时针转动
75	Switched neutral – drives channel 3 servomotor counter clockwise 零线控制 – 驱动通道 3 伺服电机逆时针转动
78	Switched neutral –2-port valve for IBS operation 零线控制 – 2 端阀门，用于 IBS 运行（智能锅炉群控）
79	Switched neutral – alarm output for MM lockout/MM error/EGA error 零线控制 – 控制模块锁定/模块错误/EGA 错误的警报输出
80	Start position interlock/ night setback input/ reduced setpoint input 初始位置连锁/夜间调低值输入/降低设定值值输入
81	Purge interlock/ low flame hold input/ purge pressure proving 吹扫连锁/低火焰保持信号输入/吹扫压力校验
82	Warming stat/ valve proving mains input 暖炉控制点/阀门校验火线输入
89	Mains voltage input – selects fuel 1 curve 火线输入 – 选择燃料 1 曲线
90	Mains voltage input – selects fuel 2 curve 火线输入 – 选择燃料 2 曲线

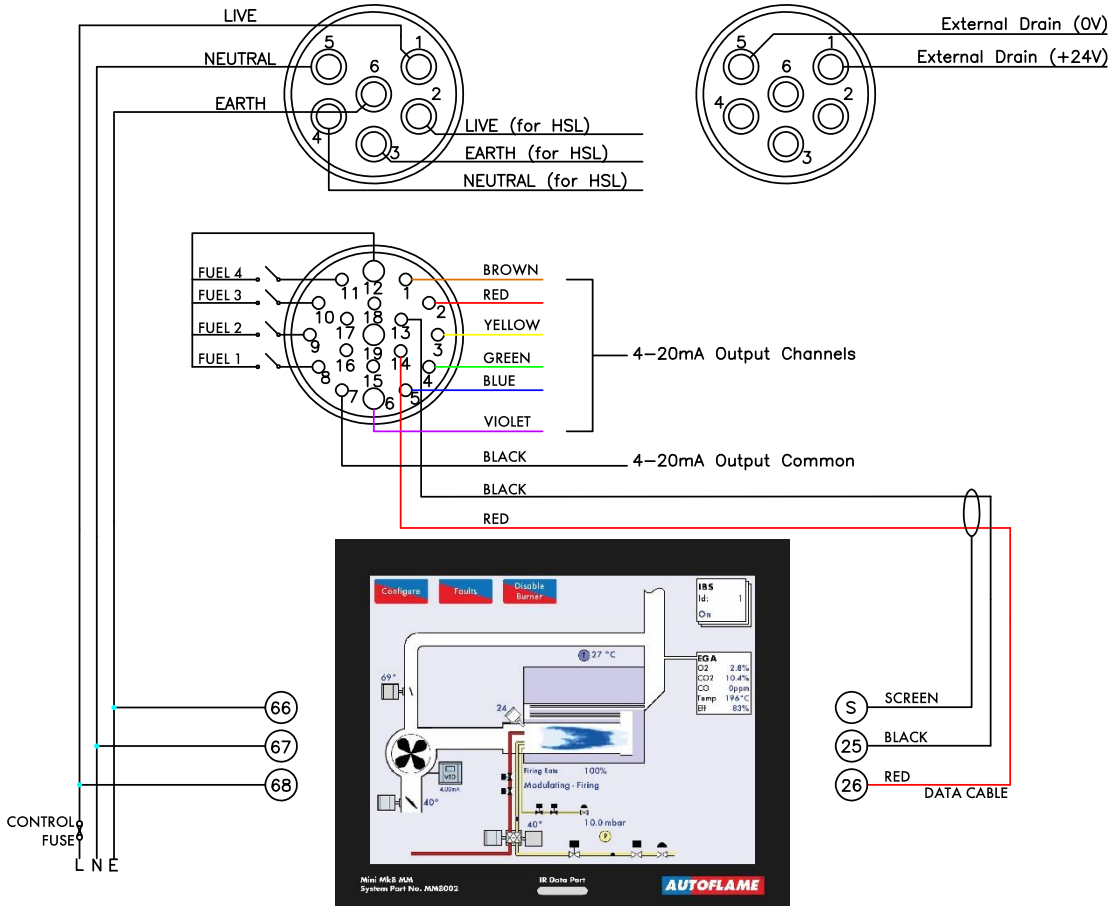
1.4 Standards / 标准

The Mini Mk8 MM has been tested and approved to the following standards:
Mini Mk8 MM 已经过测试，并符合以下标准：

- UL 372, 5th Edition
- C22.2 No. 199-M89
- BS EN 298:2012
- BS EN 12067-2:2004
- BS EN 1643:2014
- BS EN 1854:2010
- ISO 23552-1:2007
- AGA AS 4625-2008
- AGA AS 4630-2005

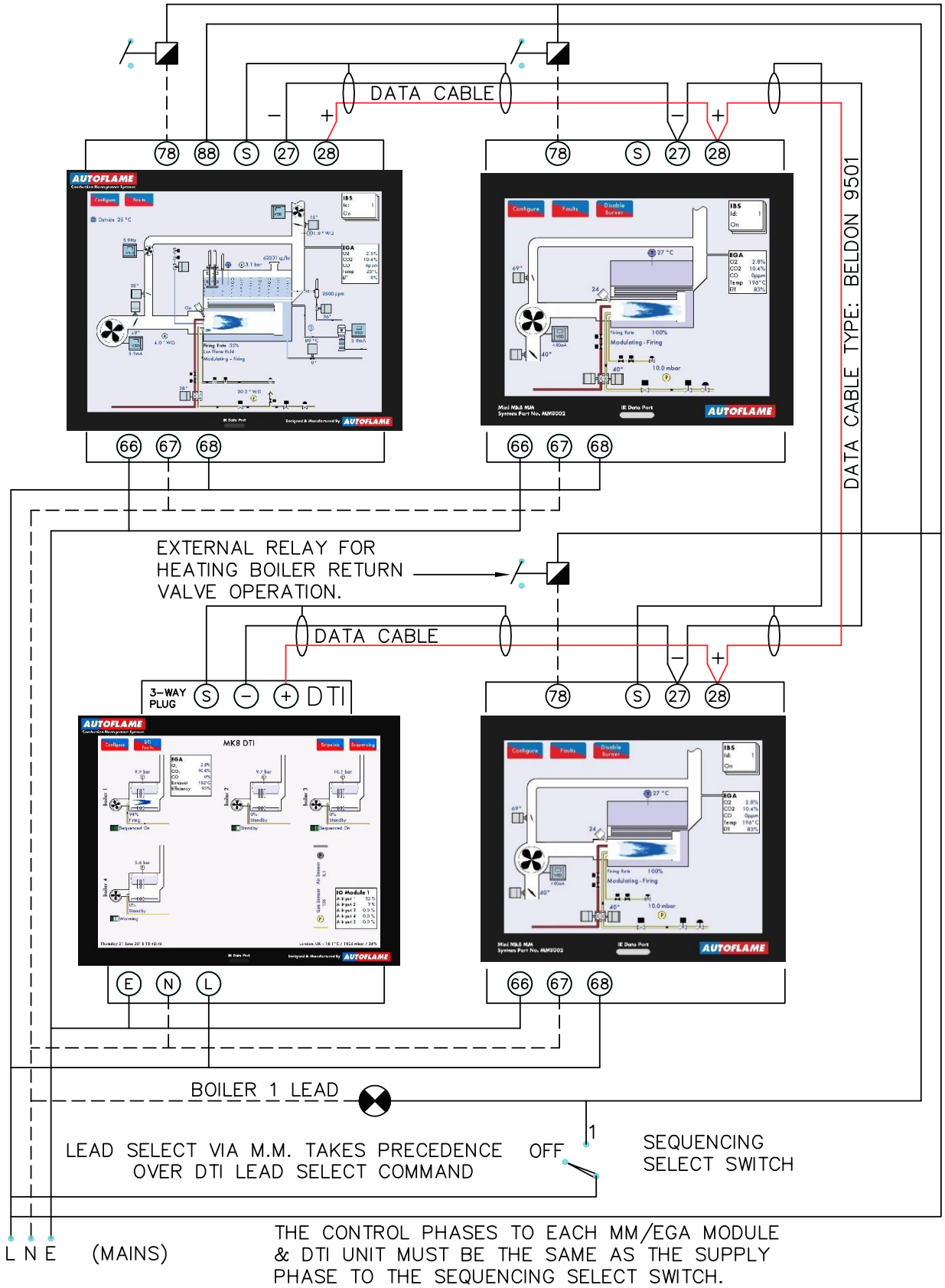
1.5 Connection Between Mini Mk8 MM and Mk8 EGA EVO / MK8 微型控制模块与 MK8 烟分仪的连接



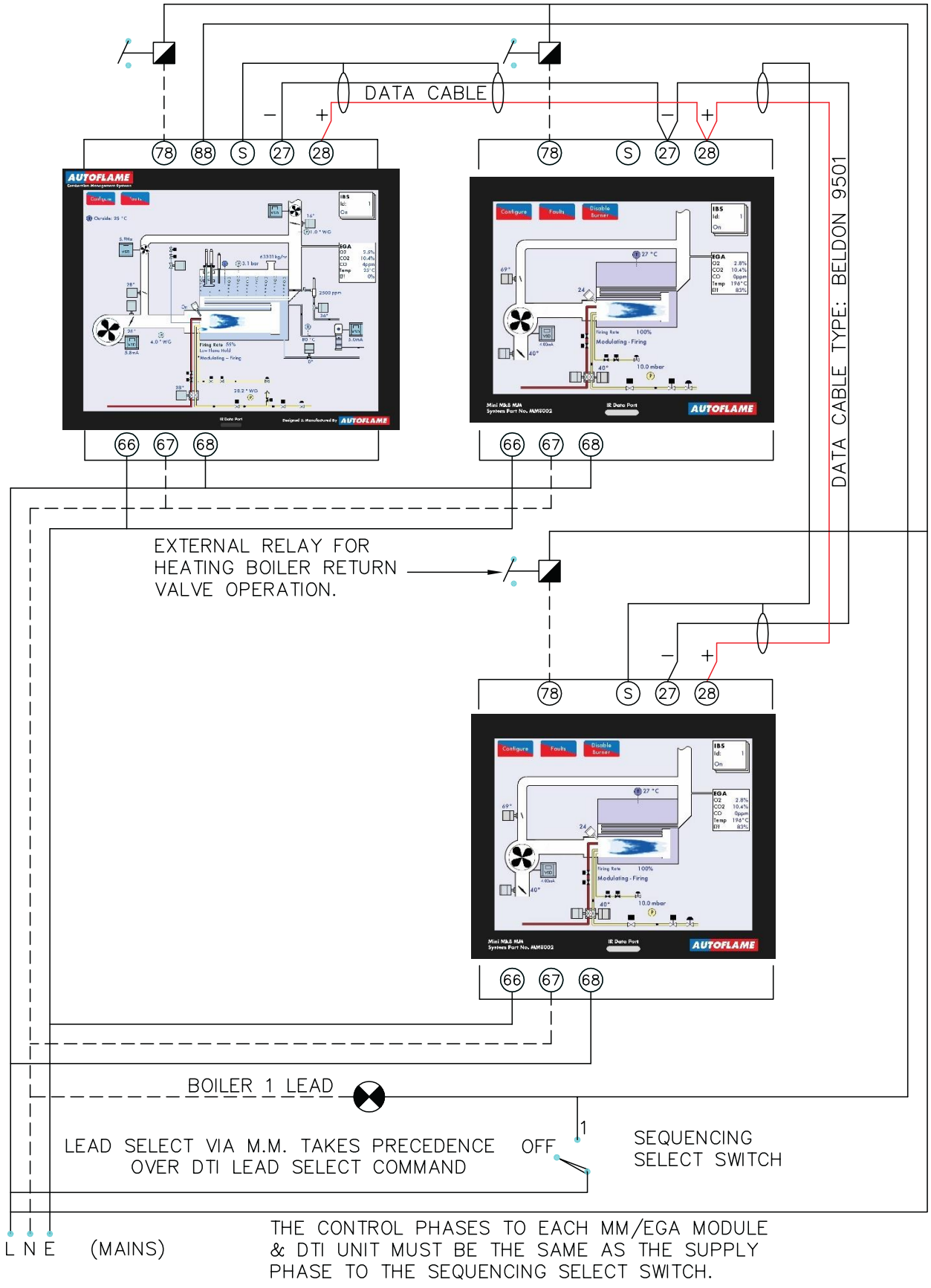


1.6 Connection Between Mini Mk8 MM and Mk8 DTI /

MK8 微型控制模块与 Mk8 DTI 的连接



1.7 Sequencing Connection Diagram / 群控连接图



2 OPTIONS AND PARAMETERS / 选项和参数

2.1 Options / 选项

Note: The Options and Parameters must only be changed by factory trained and certified technicians who have a thorough appreciation of the Autoflame combustion systems and the combustion process in general. Any person changing these set-ups who does not have the correct factory training and understanding of these settings/adjustments may place themselves and others in a potentially dangerous situation.

注意：只有接受过工厂培训的持证人员才能更改选项和参数设置，他们应该整体充分理解 Autoflame 的燃烧系统和燃烧过程。未接受过培训和不理解这些设置项的人员所做的任何选项和参数更改会给自身和他人带来潜在危险。

CH1, CH2, CH3 and CH4, refer to the rows of  **buttons respectively starting with CH1 at the top.**

CH1, CH2, CH3 和 CH4 分别指的是各行按钮  **，CH1 按钮在最顶行。**

The options and parameters are all viewable while the MM is in run mode and the burner is firing; a number of options and parameters can be adjusted through Online Changes. All Burner Control (BC) options/parameters can only be changed in Commissioning mode.
在控制模块运行和燃烧器燃烧期间，操作者可以在屏幕上读取所有选项和参数值或者在线更改一些选项和参数值。但是所有锅炉控制（BC）选项/参数的更改只能在调试模式下进行。

Through Commissioning Mode, all the options and parameters can be adjusted according to the application.
在调试模式下，操作者可以根据使用情况来调节所有的选项和参数。

Power up the unit. If the MM has already been commissioned, press 

when the system starts up. If the system is not already commissioned, the MM will go to commissioning mode automatically.

向控制模块通电。如果控制模块已被调试过，在系统启动时应按下 

调试按钮；如果控制模块未被调试过，控制模块将自动进入调试模式。

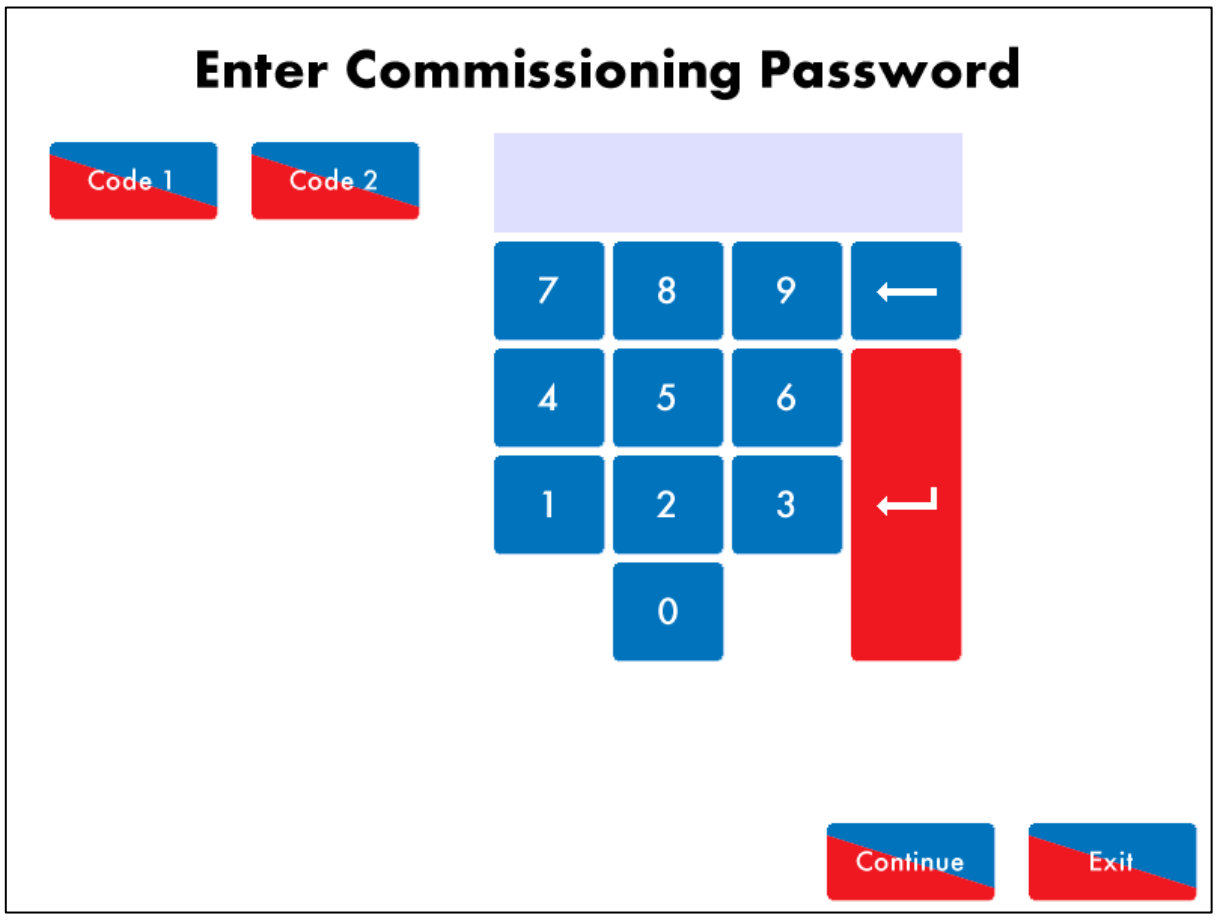


Figure 2.1.i Enter Password / 输入调试密码

"Enter Commissioning Password" is displayed. Use the keypad to enter the password, then press Continue. Press on Code 1 or Code 2 to change the value of an incorrect entry.

屏幕出现"输入调试密码"界面。用小键盘输入密码，然后按下 Continue 继续按钮。在输错密码时可按下 Code 1 按钮或者 Code 2 按钮来进行更改。

Note: The commissioning password should not be distributed to anyone who is not a factory trained and a certified engineer.
注意: 不得向未经过培训的工作人员或者非持证人员泄露调试密码。

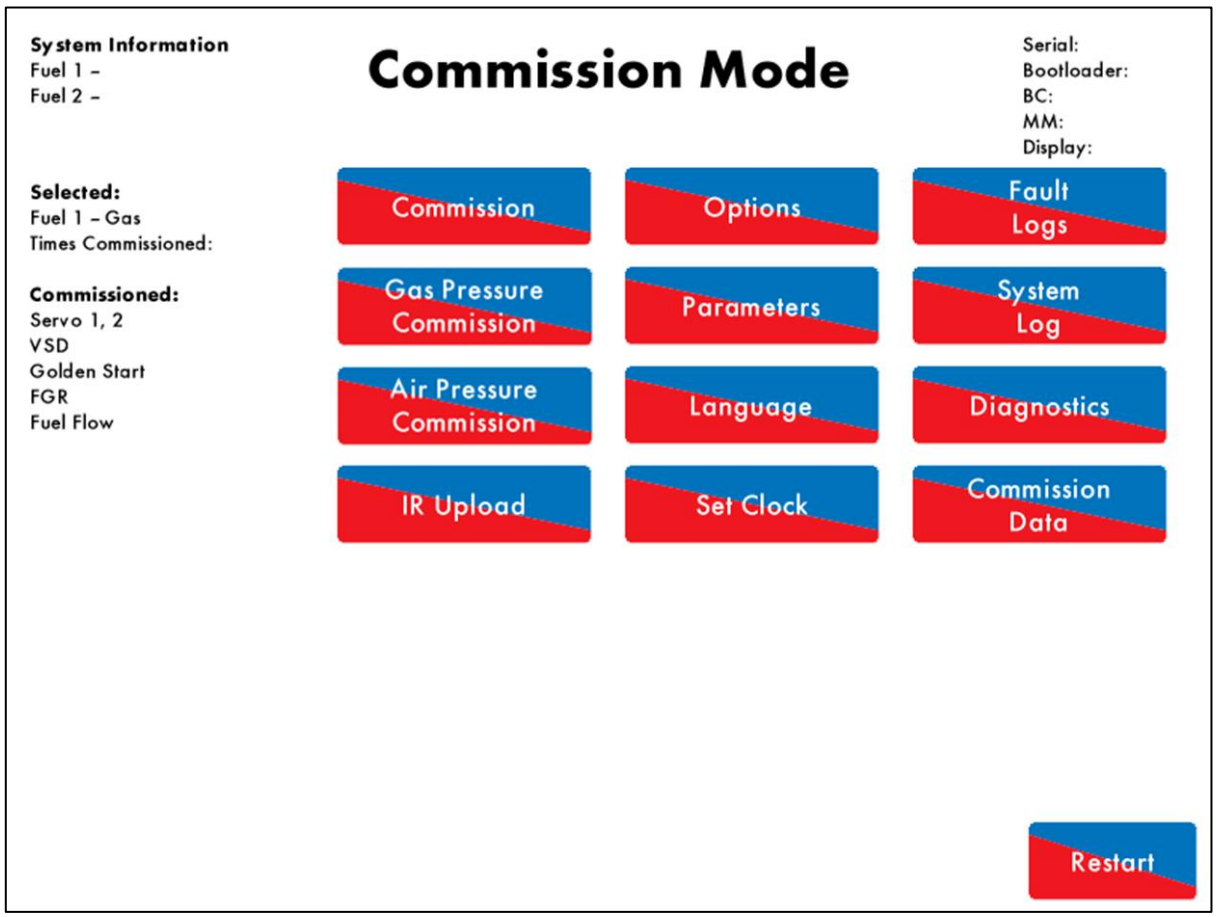


Figure 2.1.ii Commission Mode 调试模式

The “Commission Mode” screen gives information on which fuel is selected, how many times the unit has been commissioned, serial number, bootloader, and BC, MM and Display software.
操作者在“调试模式”界面上可以读取燃料信息，设备调试次数，序列号，引导装载程序和燃烧器控制信息，控制模块和显示软件信息，等等。

In the Commission Mode screen, all the options/ parameters can be adjusted, the gas pressure sensor can be commissioned, the commissioned IR data can be uploaded, the fault logs and system diagnostics can be viewed.
操作者在“调试模式”界面上可进行选项/参数值的更改，燃气压力传感器的调试，红外线数据的上传，故障记录查询和系统诊断。

Note: The Times Commissioned is for the total system and will increment with every fuel commission, single point change and commission upload.

注意：设备调试次数是对整个系统而言。设备调试次数包括了每一次燃料调试，单点更改，和调试数据上传。

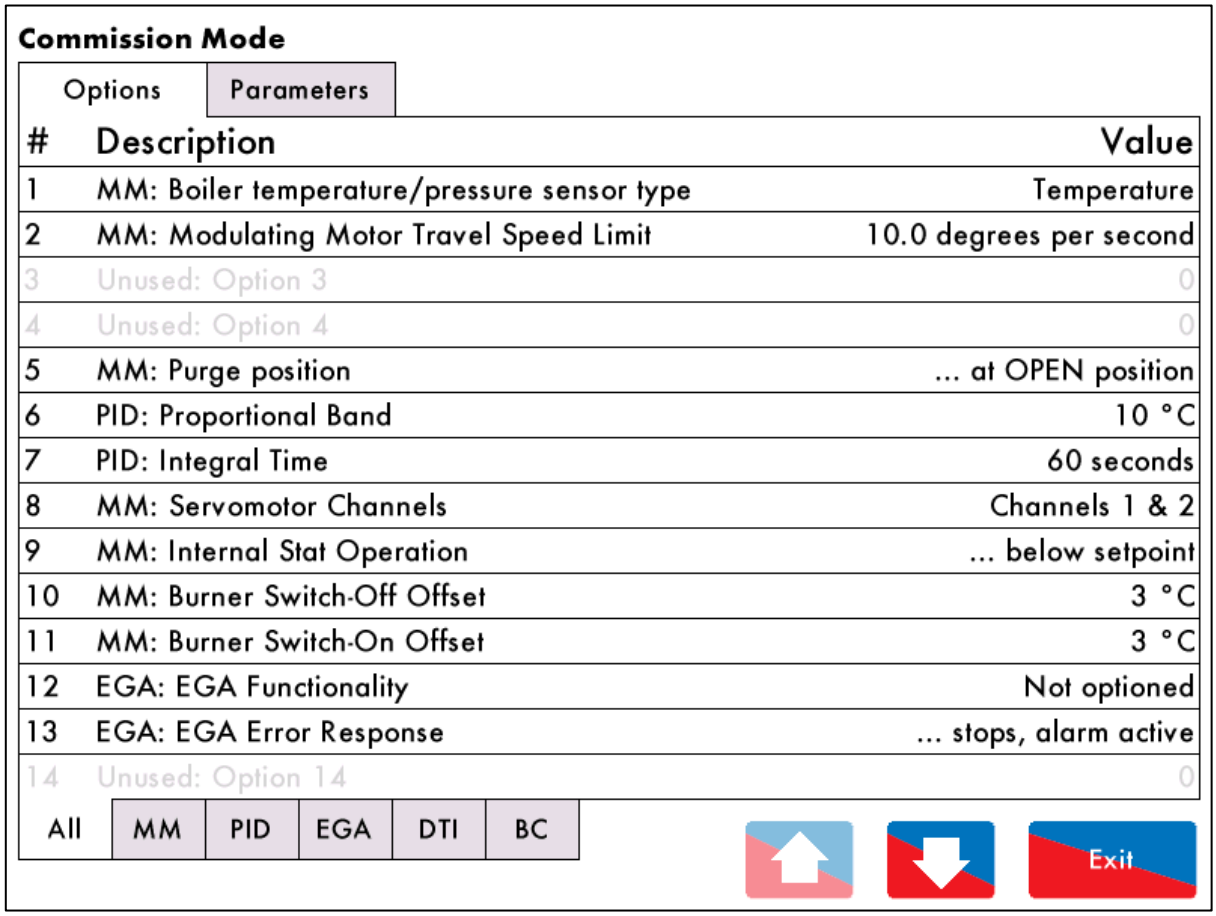


Figure 2.1.iii Options 选项

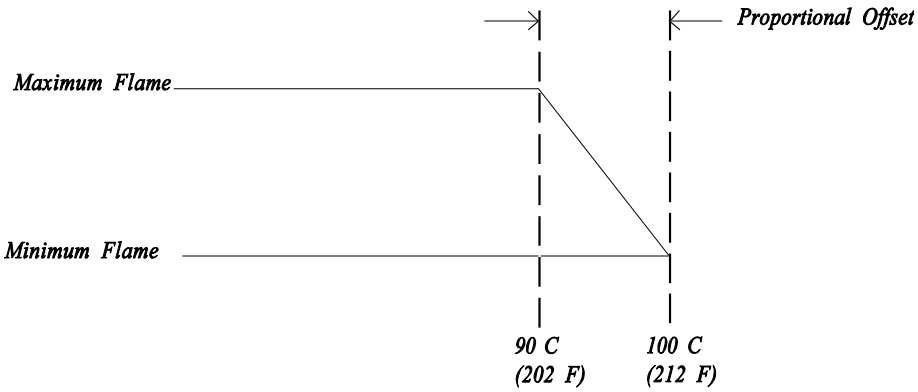
Any number of options and parameters can be changed at one time. By pressing MM, PID, EGA, DTI or BC at the bottom of the screen, the options/ parameters can be grouped together by feature.
操作者每次更改任意数量的选项和参数。通过选择屏幕下方的 MM，PID，EGA，DTI 或者 BC 标签，操作者可浏览根据特点分组的选项和参数信息。

When the changes have been made to suit the application's needs, press Exit to go back to the Commission Mode screen.
在完成所需的更改后，按下退出键回到调试模式界面。

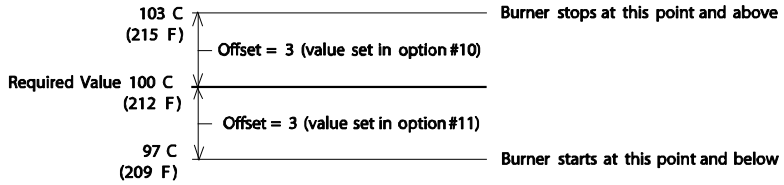
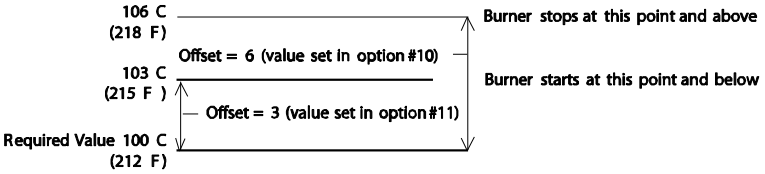
A full list of options are detailed on the next pages. Options/ parameters 110 – 160 are the burner control settings and are safety critical; these must be entered the same for both the option and parameter value. If these BC options and parameters do not match, there will be an option/parameter conflict lockout.
从下页开始列出了完整选项列表。选项/参数 110-160 是燃烧器控制设置（也是安全方面的关键设置），这些选项/参数必须在数值上保持相同。燃烧器控制设置的选项/参数值不同会导致系统锁定。

To set all the options and parameters to the default values and erase the commissioning data, set option/ parameter 160 to 5. The MM will then automatically restart.
将选项/参数的第 160 项设置成 5 可以恢复选项/参数的默认值和清除所有已调试数据。随后控制模块将自动重启。

Option 选项	Default 默认值	Range 范围	Description 说明
1	0		MM: Boiler Temperature/Pressure Sensor Type 控制模块: 锅炉温度/压力传感器类型
			Terminals 37, 38, and 39 are used for the load detector. 端子 37、38 和 39 用于负载检测器。
		0	Temperature 温度 MM10006 0 – 400°C (0 – 752°F)
		1	Low pressure 低压 MM10010 0.0 – 3.4 Bar (0.0 – 50.0 PSI)
		2	Medium pressure 中压 MM10008 0 – 20 Bar (0 – 300 PSI)
		3	High pressure 高压 MM10009 0 – 34 Bar (0 – 500 PSI)
		4	Extra high pressure 超高压 MM10017 0 – 100 Bar (0 – 1450 PSI)
		5	External temperature (voltage input, range set by parameters 52 to 56) 外部温度（电压输入，通过参数 52-56 来设置范围）
		6	External pressure (voltage input, range set by parameters 52 to 56) 外部压力（电压输入，通过参数 52-56 来设置范围）
2	15		MM: Modulating Motor Travel Speed Limit 控制模块:燃烧调节时伺服电机转动速度限值
			If the speed of the motor is too fast, then decrease the value, and vice versa. At other times other than modulation, the motors move at full speed or at the value set in option 75. Movement is limited by the slowest channel i.e. the slowest moving motor. 如果伺服运行速度太快，就降低该数值，反之则升高改数值。除了在调节期间，伺服以全速运行或者以选项 75 的数值运行。运行受到最慢通道的限制，即：运行最慢的伺服。
		6 – 100	0.6 – 10.0
3	0		MM: Return to Curve Mode 控制模块:返回曲线模式
			This controls how quickly the MM moves from off-curve positions (Golden Start, FGR) to the firing curve. By default, this is “purge speed” as before, but can also now select “modulation speed” to move more slowly. 这控制 MM 从偏离曲线位置（黄金启动，FGR）移动到燃烧曲线的速度。默认情况下，这是像以前一样的"吹扫速度"，但现在也可以选择"调节速度"以更慢地移动。
		0	Return to curve at purge speed / 以吹扫速度返回曲线
		1	Return to curve at modulating speed / 以调节速度返回曲线
4	0		MM: Air Channel 控制模块:空气通道
			For setting 0, the servomotors on channels 1 and 2 control the fuel and air, respectively. For setting 1, the fuel is controlled by Channel 1 servomotor and air by Channel 4 VSD. For setting 2, premixed fuel and air is controlled by Channel 1 servomotor. The number of servomotors used is set in Option 8. 设置 0，通道 1 和通道 2 上的伺服电机分别控制燃料和空气。设置 1，燃料由通道 1 伺服电机控制，空气由通道 4 VSD 控制。设置 2 时，预混燃料和空气由通道 1 伺服电机控制。使用的伺服电机的数量在选项 8 中设置。请参阅 MM 应用手册。
		0	Servo Channel 2 / 伺服通道 2
		1	VSD Channel 4 / 变频器通道 4
		2	No Air Channel / 无空气通道

Option 选项	Default 默认值	Range 范围	Description 说明
5	1		MM: Purge Position 控制模块:吹扫位置
			This purge position applies to channels 1-3 as selected in options 67-69, however VSD channels will always purge at open position as default. This setting applies for post-purge if set; see option/ parameter 118 and 135. 该吹扫位置适用于选项 67-69 中选择的通道 1-3。不过变频器通道将作为默认设置始终在开启位置吹扫。此设置适用于设置后吹扫；见选项/参数 118 和 135。
		0	Selected Channels Purge at HIGH Position. 所选通道在高火位吹扫
		1	Selected Channels Purge at OPEN Position. 所选通道在开启位吹扫
6	10		PID: Proportional Band PID:比例带
			The proportional band is on offset below the required setpoint; when the actual temperature/ pressure reaches this band, the burner will begin to modulate as it approaches the required setpoint. 比例带是设定值下的偏移量；当实际温度/压力达到比例带数值范围，燃烧器将开始调节模式去到达设定值。 
		5 – 2000	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的℃, ℉, PSI or 0.1 巴 or 0.01 巴 (取决于选项 1 中设置的负载检测器和选项 65 中设置的公制/英制单位)

Option 选项	Default 默认值	Range 范围	Description 说明
7	60		PID: Integral Time PID: 积分时间
			Every 'n' seconds, 10% of the present offset from the required setpoint is added or subtracted when below or above the setpoint, respectively, to the present proportional value. The value of 'n' is the number of seconds set in this option; if set to 0, there will be no integral control. 每隔'n'秒，当低于或高于设定值时，分别添加或减少所需设定值的 10%的偏移量。选项设定'n'的数值；如果设定 0，就意味着不执行积分控制。
		0	Disabled 禁用
		1 – 250	Seconds 秒
8	0		MM: Servomotor Channels 控制模块: 伺服电机通道
			Channel 1 is always enabled for fuel; this option sets the channels in use. If option 8 is changed after commissioning, then the MM will need to be re-commissioned, unless this option is returned to its previous setting. For setting 2, please refer to the MM Application Possibilities for single servomotor operation. See also option 4 to set the air channel mode. 通道 1 用于燃料；本选项设定所使用的通道。如果在调试后更改选项 8 数值，就需要重新调试控制模块，除非选项 8 恢复到先前的设定。设定 2，请参考控制模块可行性应用的伺服电机操作。请参阅选项 4 来设置空气通道模式。
		0	Channels 1 & 2 通道 1&2
		1	Channels 1, 2 & 3 通道 1, 2&3
		2	Channel 1 only 仅通道 1
9	1		MM: Internal Stat Operation 控制模块: 内部温控运作
			The internal stat turns the burner on and off according to the actual value relative to the required setpoint. For setting 0, the internal stat is kept closed all the time, and a working stat must be fitted to the boiler. For setting 1, the internal stat is opened at an offset above the required setpoint, and closed at an offset below the required setpoint. For setting 2, the internal stat is opened at an offset above the required setpoint, and closed at an offset above the required setpoint. The offset values are set in options 10 and 11. "内部温控"会根据实际值和设定值的关系来控制燃烧器的启停。设置 0，保持"内部温控"全程闭合，这时锅炉上必须安装有正常工作的温控。设置 1，在设定值上方关闭偏移量处断开，在设定值下方开启偏移量处闭合。设置 2，在设定值上方关闭偏移量处断开，在设定值上方开启偏移量处闭合。选项 10 和 11 可以设置这些偏移量的数值。
		0	Internal Stat Always Closed 保持"内部温控"全程闭合
		1	Burner Operates Below Setpoint 燃烧器在设定值之下运行
		2	Burner Operates Above Setpoint 燃烧器在设定值之上运行

Option 选项	Default 默认值	Range 范围	Description 说明
			E.g. Option 9 = 1, required setpoint = 100°C (212°F) 如：选项 9 = 1，要求设定值 = 100˚C(212˚F)  E.g. option 9 = 2, required setpoint = 100°C (212°F) 如：选项 9 = 2，要求设定值 = 100˚C(212˚F) 
10	3		MM: Burner Switch-Off Offset 控制模块: 燃烧器关闭偏移量
		2 – 1000	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) *Note: This option is only relevant if option 9 is set to 1 or 2.* 用于低压传感器的℃,℉, PSI or 0.1 巴 或 0.01 巴（取决于选项 1 中设置的负载检测器和选项 65 中设置的公制/英制单位） *注：此选项仅在选项 9 设置为 1 或 2 时才相关。*
11	3		MM: Burner Switch-On Offset 控制模块: 燃烧器启动偏移量
		0 – 1000	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) *Note: This option is only relevant if option 9 is set to 1 or 2.* 用于低压传感器的℃,℉, PSI or 0.1 巴 或 0.01 巴（取决于选项 1 中设置的负载检测器和选项 65 中设置的公制/英制单位） *注：此选项仅在选项 9 设置为 1 或 2 时才相关。*

Option 选项	Default 默认值	Range 范围	Description 说明
12	0		EGA: EGA Functionality EGA: EGA 功能
			For settings 2 or 3, the E.G.A will trim on the channel 2 air damper, once trim data has been added. If option 12 is set to 0 or 1, then trim can be added at a later date by changing this to 2 or 3 in online changes, going through single point change, and added trim data for each fuel-air position. 对于设置 2 或 3，EGA 在安装好后就开始调节，调节对象是通道 2 空气挡板。如果选项 12 的值为 0 或 1，操作者可以通过在线更改将选项 12 更改成 2 或 3，然后单点更改，并为每个燃料-空气位置添加调节数据。
		0	Not Optioned 不选用
		1	Monitoring Only 仅监控
		2	Applies Trim 执行调节
		3	Applies Trim, Combustion Limits Tested 执行调节，测试燃烧限值
13	0		EGA: EGA Error Response EGA: EGA 错误响应
			This sets the MM operation when an EGA fault occurs. EGA alarms will drive the common system alarm output (terminal 79), see option 14 for warning response. 这将在 EGA 故障发生时设置 MM 操作。 EGA 警报将驱动系统的警报输出(终端 79)，有关警报响应，请参见选项 14。
		0	EGA faults generate Alarms (Burner stops) EGA 故障产生警报(燃烧器停止)
		1	EGA faults generate Warnings (Burner runs) EGA 故障产生警告(燃烧器运行)
14	0		MM: Warning Response MM: 警告响应
			This sets the MM operation on terminal 79 for when an EGA fault occurs. 该选项控制终端 79 在发生 EGA 错误时的运行。
		0	Warnings do not drive Common System Alarm output (T79) 警告不驱动系统警报输出(T79)
		1	Warnings drive Common System Alarm output (T79) 警告驱动系统警报输出(T79)
15	3		MM: User Control MM: 用户控制
			This option sets whether the user can turn the burner on and off, or change the required setpoint via the flame screen on the MM. 此选项设置用户是否可启动和关闭燃烧器，或通 MM 屏幕更改所需的设定值。
		0	Burner on/off and setpoint control disabled 燃烧器启动/关闭和设定值控制都禁用
		1	Burner on/off disabled and setpoint control enabled 燃烧器启动/关闭禁用和设定值控制启用
		2	Burner on/off enabled and setpoint control disabled 燃烧器启动/关闭启运和设定值控制禁用
		3	Burner on/off and setpoint control enabled 燃烧器启动/关闭和设定值控制都启用

Option 选项	Default 默认值	Range 范围	Description 说明
16	0		DTI: Sequencing and DTI Enable DTI: 群控和 DTI 启用
			A lead boiler can be selected by pressing Lead Boiler in the IBS screen or via the DTI if optioned. Only 1 MM may be selected as lead boiler at a time, or the sequencing will not operate. The Lead Boiler button on the MM overrides the DTI Lead Boiler Select. 在锅炉智能群控界面（IBS）选择主导锅炉或者通过 D.T.I.远程选择主导锅炉。每次只有一个控制模块（锅炉）能被选为主导锅炉，否则群控无法进行。本地控制模块的主导锅炉按钮要优先于 D.T.I.远程选择的主导锅炉。
		0	Sequencing Disabled 关闭群控
		1	Sequencing Enabled 开启群控
		2	DTI Enabled 开启 D.T.I.
		3	Sequencing and DTI 开启群控和 D.T.I.
17	-		Unused 未使用
18	1		EGA: Carry Forward of Trim EGA 微调延续
			When the system modulates, the correction that may already exist on the air damper position can be carried forward (only relevant if an EGA is operational on the system). Trim will be reset if the rate of change of the fuel valve angle is greater than that set in parameter 14. 当系统调节时，已有的空气挡板调节值将得以延续。该选项只在 E.G.A.运行时才有效。当燃料阀门角度变化速率大于参数 14 的数值时，空气挡板调节值将被重置。
		0	Disabled 禁用
		1	Enabled 启用
19	0		EGA: O_2 Upper Limit Offset EGA: O_2 上限偏移量
			If the current O_2 value is above this offset limit from the commissioned value, an alarm/ warning will occur (see option 13), for option 12 set to 3. 如果当前氧气值高过调试值的偏移量极限，就会出现警报/警告（见选项 13），当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 100	0.1% - 10.0% O_2 0.1% - 10.0%氧气

Option 选项	Default 默认值	Range 范围	Description 说明
20	0		EGA: CO_2 Upper Limit Offset EGA: CO_2 上限偏移量
			If the current CO_2 value is above this offset limit from the commissioned value, an alarm/ warning will occur (see option 13), for option 12 set to 3. 如果当前的 CO_2 值高于调试值得偏移量极限，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 100	0.1% - 10.0% CO_2
21	0		EGA: CO Upper Limit Offset EGA: CO 上限偏移量
			If the current CO value is above this offset limit from the commissioned value, an alarm/ warning will occur (see option 13), for option 12 set to 3. 如果当前的 CO 值高于调试值得偏移量极限，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 200	1 – 200 ppm CO
22	0		EGA: O_2 Lower Limit Offset EGA: O_2 下限偏移量
			If the current O_2 value is below this offset limit from the commissioned value, an alarm/ warning will occur (see option 13), for option 12 set to 3. 如果当前的 O2 值低于调试值得偏移量极限，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 100	0.1% - 10.0% O_2
23	0		EGA: CO_2 Lower Limit Offset EGA: CO_2 下限偏移量
			If the current CO_2 value is below this offset limit from the commissioned value, an alarm/ warning will occur (see option 13), for option 12 set to 3. 如果当前的 CO_2 值低于调试值得偏移量极限，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		0 – 100	0.1% - 10.0% CO_2
24	-		Unused 未使用

Option 选项	Default 默认值	Range 范围	Description 说明
25	0		EGA: O_2 Absolute Limit EGA: O_2 绝对值
			If the current O_2 value is below this absolute limit, an alarm/ warning (see option13) will occur, for option 12 set to 3. 如果当前的 O_2 值低于绝对值，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 200	0.1% - 20.0% O_2
26	0		EGA: CO_2 Absolute Limit EGA: CO_2 绝对值
			If the current CO_2 value is above this absolute limit, an alarm/ warning (see option13) will occur, for option 12 set to 3. 如果当前的 CO_2 值高于绝对值，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 200	0.1% - 20.0% CO_2
27	0		EGA: CO Absolute Limit EGA: CO 绝对数值
			If the current CO value is above this absolute limit, an alarm/ warning (see option13) will occur, for option 12 set to 3. 如果当前的 CO 值高于绝对值，则会出现警报/警告(参见选项 13)，当选项 12 的数值设置为 3 时。
		0	Disabled 禁用
		1 – 200	1 – 200 ppm CO
28	20		EGA: Trim Threshold EGA:微调阀值
			The trim threshold is an offset from the required setpoint; if the actual value is below this offset, then the EGA will not trim. This option should be set to 0 if trim is to be effective at all times during firing, and/or if external modulation is optioned. No single point changes can be made if the actual value is below this trim threshold. 微调阀值是所需设置点的偏移量；如果实际值低于该偏移量，则 EGA 不会进行调节。如果需要在燃烧过程中微调一直有效，平且/或者如果选择外部调节，则此选项应设置为 0。如果实际值低于微调阀值，则无法进行单点更改。
		0 – 50	^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)

Option 选项	Default 默认值	Range 范围	Description 说明
29	0		MM: Golden Start 控制模块: 黄金启动
			Golden start allows an optimum ignition position to be set in the fuel-air curve, which is not necessarily low flame or part of the standard modulating index. Parameter 15 sets how long golden start position is maintained for. This option also sets from which point to start the Golden Start timer. 黄金启动允许在燃料-空气曲线中设置最佳点火位置，这并不一定是低火位或标准调节指数的一部分。参数 15 设置点火后黄金启动的时长。此选项还设置从何处开始黄金启动计时器。
		0	Disabled 禁用
		1	Enabled (time counted from point of main flame) 启用（从主火焰点开始计时）
		2	Enabled (time counted from ignition) 启用（从点火点开始计时）
30	50		DTI: Minimum Remote Setpoint (DTI/ Modbus) DTI: 最低远程设定值(DTI/ Modbus)
			If a required value command is received from the DTI or Modbus that is below this minimum remote setpoint value, then it will be ignored by the MM. The MM will continue to fire to meet the previous required setpoint. 如果 DTI 或系统 Modbus 收到一个所需值命令低于这个最小远程设定值，那么该控制器将忽略它。该控制器将继续燃烧以满足之前所需的设定值。
		5 – 9990	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
31	100		DTI: Maximum Remote Setpoint (DTI/ Modbus) DTI: 最高远程设定值 (DTI/Modbus)
			If a required value command is received from the DTI or Modbus that is above this maximum remote setpoint value, then it will be ignored by the MM. The MM will continue to fire to meet the previous required setpoint. 如果 DTI 或系统 Modbus 收到一个所需值命令高于这个最大远程设定值，那么该控制器将忽略它。该控制器将继续燃烧以满足之前所需的设定值。
		5 – 9990	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
32	20		EGA: Trim Delay EGA:微调延时
			After ignition, the EGA does not sample for the time delay set in this option (if EGA is set to 2 or 3). This allows for the combustion to stabilise before sampling commences. The delay timer starts at the ignition point. 在点火后，EGA 在本选项中设定的延迟时长不执行采样（如果 EGA 设置为 2 或 3）。这是为了获得稳定的燃烧状态样本。计时始于点火点。
		0 – 250	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
33	1		DTI: MM Identification DTI: 控制模块标识号
			Each MM within a sequencing/ DTI/ Modbus loop must be set with an individual ID number. For communications between the MMs, there cannot be more than 1 MM with the same ID number. 锅炉群控/DTI/Modbus 循环中的每台锅炉控制模块必须设置一个单独的标识号（ID）。在控制模块之间的通讯，不能超过一个控制模块使用同一个标识号（ID）。
		1 – 10	ID number 标识号（ID）
34	-		Unused 未使用
35	10		DTI: Sequence Scan Time DTI:群控扫描时间
			This is the time period between sequencing requests from the lead and the lag MMs. On the sequence scan time, the lead MM will demand lag burners to be brought online or offline, depending on load requirements. See parameters 86 and 87 for change down and up thresholds. Accurate fuel flow metering must be entered for sequencing to operate. The MMs must be connected using data cable (Belden 9501), screened at one end. 这是主导和从属控制模块先后发出两次群控指令的间隔。在群控扫描时间内，主导控制模块会根据负载情况来命令从属锅炉的上线运行或下线待机。参见参数 86 和 87 来下调和上调阀值。必须输入准确的燃料流量计量，以便进行群控操作。控制模块必须使用一端屏蔽的数据线（Belden 9501）连接。
		1 – 100	Minutes 分钟
36	0		EGA: (Mk7 Only) Sensor Selection EGA: 传感器选择（仅用于 MK7 EGA）
			This option selects if the Mk7 EGA is fitted with additional cells. 该选项选择 MK7 EGA 是否装有附加传感器。
		0	No Optional Sensor 无额外传感器
		1	NO_2 Optioned NO2 传感器选用
		2	SO_2 Optioned SO2 传感器选用
		3	NO_2 and SO_2 Optioned NO2 和 SO2 传感器选用

Option 选项	Default 默认值	Range 范围	Description 说明
37	0		PID: Derivative Time PID: 微分时间
			The time taken to add/ remove an additional 10% to the firing rate based on the actual value and the required value. 根据实际值和需求值的相对关系来添加或减少 10%燃烧率所需要的时间。
		0 1 – 200	Disabled / 禁用 Seconds / 秒
38	2		PID: Derivative Deadband PID: 微分无感带
			This deadband is the margin above and below the required setpoint in which no derivative control occurs. 微分静带是处于设定值上方和下方的规定区域。在这个区域不发生燃烧率的添加和减少。
		0	Disabled 关闭 选项
		1 - 15	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
39	-		Unused / 未使用
40	0		DTI: Warming Facility for Low Pressure Steam DTI: 低压蒸汽的暖炉设施
			For sequencing applications where non-return valves are not installed, it is not possible to use a setpoint to keep the boilers in a standby condition. A thermostat (aquastat) can be installed into the boiler shell. Set option/ parameter 156 to 0 to enable terminal 82) for warming stat. When terminal 82 sees a 230/120V input, warming is stopped. The boiler will remain in a warming state based on the settings in options 53 and 54. 无止回阀的锅炉群控无法用设定值来实现锅炉待机。这时炉壁上应安装温控器，还要将选项/参数 156 设置为 0（这是为了使用终端 82 的加热温控设备）。当终端 82 收到一个 230V/120V 信号输入，加热停止。根据选项 53 和 54 的数值来加热锅炉。
		0	Steam Sequencing With Non-return Valves 有止回阀的蒸汽锅炉群控
		1	Steam Sequencing Without Non-return Valves 无止回阀的蒸汽锅炉群控
41	0		DTI: Sequencing Warming mode DTI: 群控暖炉模式
			For setting 0, the first lag is kept in a standby state with the second lag in warming, and the remaining lag boilers off. For setting 1, the first lag boiler is in standby, and the remaining lag boilers are in warming. 设置 0 时，第一从属锅炉保持待机状态，第二从属锅炉保持暖炉并且其他锅炉处于关闭。设置 1 时，第一从属锅炉处于待机状态，其他从属锅炉保持暖炉。
		0	One MM in Warming State 一个控制模块处于暖炉状态
		1	All unused MMs in Warming State 所有从属控制模块处于暖炉状态

Option 选项	Default 默认值	Range 范围	Description 说明
42	20		DTI: Standby Setpoint or Phantom Setpoint Offset DTI: 待机设定值或设定值偏移量
			For sequencing applications where non-return valves are installed, the first lag boiler uses a standby setpoint to keep the boiler in a standby condition. The standby setpoint is set as an absolute value or its current setpoint offset set （set through parameter 47） in this option. When the standby setpoint is in effect, the burner is held at low flame hold. 当群控锅炉带有止回阀时，第一从属锅炉将用待机设定值来保持锅炉待机。本项待机设定值设置为绝对值或者偏移量(通过参数 47 里设定)， 燃烧器在待机时保持低火焰燃烧。
		5 – 9990	°C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
43	-		Unused 未使用
44	-		Unused 未使用
45	0		MM: External Modulation 控制模块: 外部调节
			When enabled, the internal PID control is disabled and the firing rate is set by an external controller applied to terminals 37 and 38. This input control signal can be 0-10V or 2-10V set through parameter 69, and represents zero/ low to high fire by setting parameter 68. A manual reset high limit stat must be fitted. 在使用外部控制时，内部 PID 控制将关闭，外部控制器向终端 37，38 输入信息来设定燃烧率。控制信号可以是 0-10V 或 2-10V （这可以通过参数 69 来设定）。参数 68 可以设定从低火到高火的控制信号或者零或到高火的控制信号。必须安装有可以手动复位的超高温/压开关。
		0	Disabled 禁用
		1	Enabled 启用
46	-		Unused 未使用

Option 选项	Default 默认值	Range 范围	Description 说明
47	0		MM: Cold Start Routine 控制模块: 冷启动程序
			On burner start-up, if the actual value is at 30% or below of the required setpoint, then the burner will be held at low fire for the number of minutes set in this option. It will then go to mid-fire. If the actual value is below 60% of the required setpoint, then the burner will be held at mid-fire for the set minutes. Once this cold start time has elapsed, or the value goes above 60% of the required setpoint, the burner will go to high fire as per the internal PID. It is not recommended to use cold start routine with external modulation or sequencing. 当燃烧器启动时，如果实际值是设定值的 30%或者更低，燃烧器将保持低火燃烧，时长是本选项规定的分钟数；然后进入中火燃烧，如果实际值是设定值的 60%或者更低，燃烧器将保持中火燃烧，时长是本选项规定的分钟数；一旦冷启动程序完成，燃烧器将按照内部 PID 控制进入高火燃烧。
		0	Disabled 关闭
		1 – 2000	Minutes 分钟
48	0		MM: Flue Gas Recirculation – Timer 控制模块：烟气再循环-计时器
			This is the time that the MM channels (servomotors/ VSDs) are held at during the FGR start positions, after which modulation takes place. The burner will start at the FGR start position (unless golden start is optioned and burner starts up at the golden start position. FGR allows approximately 15% of the boiler flue gases via an auxiliary channel (e.g. 3) to be fed back to the burner and mixed with combustion air, to reduce NOx. 这是将控制模块通道（伺服电机/变频器）保持在烟气再循环启动位置的时长，完成这个步骤后系统将进入调节控制。燃烧器将在烟气循环启动位置启动（除非选择黄金启动，否则燃烧器将在黄金启动位置启动）。烟气循环允许大约 15%的锅炉烟气通过辅助通道（例如通道 3）反馈到燃烧器并与燃烧空气混合，以减少氮氧化物。
		0	Disabled 禁用
		1 – 600	Seconds 秒数
49	0		MM: Flue Gas Recirculation – Offset 控制模块： 烟气再循环-偏移量
			This is an offset from the required setpoint. The MM channels (servomotors/ VSDs) are held at the FGR start positions until the actual value reaches this offset value below the required setpoint. 这是设定值的偏移量。控制模块通道（伺服电机/变频器）将一直停留在烟气再循环启动位置，直到实际值达到设定值之下的偏移量。
		0	Disabled 禁用
		1 – 50	^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)

Option 选项	Default 默认值	Range 范围	Description 说明
50	0		MM: Flue Gas Recirculation – Temperature Threshold 控制模块: 烟气再循环-温度阀值
			The MM channels (servomotors/ VSDs) are held at the FGR start positions until the flue gas temperature has reached 120°C (248°F). This option can only be used if an EGA is optioned and operational. 控制模块通道（伺服电机/变频器）将一直停留在烟气再循环的开始位置，直到烟气温度达到 120° C (248° F)。此选项只能在 EGA 被选择并可操作的情况下使用。
		0	FGR Temperature Threshold Disabled 禁用烟气再循环温度阀值
		1	FGR Temperature Threshold Enabled 启用烟气再循环温度阀值
51	-		Unused 未使用
52	-		Unused 未使用
53	0		DTI: Sequencing Warming Burner Off Time DTI: 群控暖炉-燃烧器关闭时间
			When the MM is in warming mode, it will warm to the standby setpoint according to the on and off times set in options 53 and 54. 当控制模块处于加温模式，燃烧器根据选项 53 和 54 的开启和停止时间将锅炉加热到待机设定值。
		0	Disabled 禁用
		1 – 200	Minutes 分钟
54	5		DTI: Sequencing Warming Burner On Time DTI: 群控暖炉-燃烧器开启时间
			When the MM is in warming mode, it will warm to the standby setpoint according to the on and off times set in options 53 and 54. 当控制模块处于暖炉模式，燃烧器根据选项 53 和 54 的开启和停止时间将锅炉加热到待机设定值。
		1 – 30	Minutes 分钟
55	-		Unused 未使用

Option 选项	Default 默认值	Range 范围	Description 说明
56	0		DTI: Alarm Output Operation (Terminal #79) DTI: 警报输出操作（端口 79）
			This is a switched neutral output to select how the alarm function operates. 这是一个零线开关输出，以选择警报功能如何操作。
		0	Relay Normally Off, On During Alarm 继电器正常关闭，警报时打开
		1	Relay Normally On, Off during alarm 继电器正常开启，警报时关闭
57	0		DTI: Fuel Flow Metering DTI: 燃料流量计量
			Fuel flow metering determines the firing rate. If no fuel flow meter is available, a 'dummy curve' should be entered using the burner turndown ratio from the burner rating to determine the low fire point, and the burner rating for the high fire point. If enabled, fuel flow metering is initiated once the burner has been commissioned and is firing. 燃料流量计量决定了燃烧率。如果未使用燃料流量表，则应输入“虚拟曲线”，使用燃烧器额定功率的燃烧器调节比来确定低燃点，并使用燃烧器额定功率来确定高火位。如果启用，一旦燃烧器已调试并正在燃烧，燃料流量计量就被启动。
		0	Disabled 禁用
		1	Enabled 选项开启
58	15		MM: Fuel Flow Metering Ignition Delay 控制模块: 燃料流量计量点火延时
			Fuel flow metering begins after the time delay set in this option has elapsed. 燃料流量计量在被选项中设置的时间延迟后开始。
		0	Disabled 禁用
		1 – 240	Seconds 秒
59	-		Unused 未使用
60	-		Unused 未使用
61	3725		MM: Fuel 1 Calorific Value 控制模块: 燃料 1 热值
			This is the gross calorific value / higher heating value (HHV) including the latent heat of vaporisation of water. To set either metric or imperial units, see option 65. If the units are changed, then this option must be changed accordingly. 这是总热值/高热值（HHV），包括水的汽化潜热。要设置公制或英制单位，请参见选项 65。如果单位被更改，那么这个选项必须相应地更改。
		100 – 65000	100 = 1.00MJ/m^3 or 100 Btu/ft^3

Option 选项	Default 默认值	Range 范围	Description 说明
62	2068		MM: Fuel 2 Calorific Value MM: 燃料 2 热值
			This is the gross calorific value / higher heating value (HHV) including the latent heat of vaporisation of water. To set either metric or imperial units, see option 65. If the units are changed, then this option must be changed accordingly. 这是总热值/高热值（HHV），包括水的汽化潜热。要设置公制或英制单位，请参见选项 65。如果单元被更改，那么这个选项必须相应地更改。
		100 – 65000	100 – 1.00 MJ/kg or 100 BTU/lb
63	-		Unused 未使用
64	-		Unused 未使用
65	0		MM: Display Units MM: 显示单位
		0	Metric Units 公制单位
		1	Imperial Units 英制单位
66	0		MM: Firing Rate Limit MM： 燃烧率限值
			This is the maximum firing rate that can be obtained by the system, imposed in auto and hand modes. Firing rate limit is should not be used with DTI load index control or sequencing. The firing rate limit also applies to external modulation. 这是系统在自动和手动模式下能够达到的最高燃烧率。燃烧率限值是不应与 DTI 负载指数控制或群控使用。燃烧率限值也应用于外部调节。
		0	Disabled 禁用
		1 – 100	% 允许的最高燃烧率百分比

Option 选项	Default 默认值	Range 范围	Description 说明
67	1		MM: Channel 1 Purge Position 控制模块：通道 1 吹扫位置
		0	Channel 1 to purge position 通道 1 到吹扫位
		1	Channel 1 to remain closed for purge 通道 1 保持关闭
68	0		MM: Channel 2 Purge Position 控制模块：通道 2 吹扫位置
		0	Channel 2 to purge position 通道 2 到吹扫位
		1	Channel 2 to remain closed for purge 通道 2 保持关闭
69	0		MM: Channel 3 Purge Position 控制模块：通道 3 吹扫位置
		0	Channel 3 to purge position 通道 3 到吹扫位
		1	Channel 3 to remain closed for purge 通道 3 保持关闭
70	-		Unused 未使用
71	-		Unused 未使用
72	-		Unused 未使用
73	-		Unused 未使用
74	-		Unused 未使用
75	100		MM: Purge Motor Travel Speed 控制模块: 吹扫时伺服电机转动速度
		10 – 100	If the speed of the motor is too fast, then decrease the value. 如果马达转速过快，则应降低值。 0.1 – 10.0
76	-		Unused 未使用
77	-		Unused 未使用
78	-		Unused 未使用
79	-		Unused 未使用
80	0		MM: Outside Temperature Compensation 控制模块：室外温度补偿
		0	Outside temperature compensation disabled 室外温度补偿关闭
		1	Outside temperature compensation enabled 室外温度补偿开启

Option 选项	Default 默认值	Range 范围	Description 说明
81	90		MM: Setpoint at Minimum Outside Temperature 控制模块： 在最低室外温度时的设定值
		50 – 999	This setpoint is limited by the load detector set in option 1. 此设定值受选项 1 中的负载检测器设置的限制。 ^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65)
82	30		MM: Minimum Outside Temperature 控制模块：最低室外温度
		0 – 145	Value 30 = -10^{O}C or -10^{O}F (see option 65) 数值 30 = -10℃ 或 -10℉ （见选项 65)
83	80		MM: Setpoint at Maximum Outside Temperature 控制模块：在最高室外温度时的设定值
		50 – 999	This setpoint is limited by the load detector set in option 1. 此设定值受选项 1 中的负载检测器设置的限制。 ^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
84	80		MM: Maximum Outside Temperature 控制模块：最高室外温度
		0 – 145	Value 80 = 40^{O}C or 40^{O}F (see option 65) 数值 80 = 40℃ 或 40˚F (见选项 65)

Option 选项	Default 默认值	Range 范围	Description 说明
85	0		MM: Night Setback Offset 控制模块: 夜间调低偏移量
			This offset value is subtracted from the required setpoint. An input is required on terminal 80, see option/parameter 154. 这是需求设定值减去偏移量。终端 80 需要信号输入，参见选项/参数 154。
		0	Disabled 禁用
		1 – 100	^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
86	0		MM: Channel 1 Servo Control Method 控制模块: 通道 1 伺服电机控制方法
		0	Autoflame servomotor, 0.1 degree control Autoflame 伺服电机， 0.1 角度控制
		1	Autoflame servomotor, 0.5 degree control Autoflame 伺服电机，0.5 角度控制
		2	Industrial servomotor, 0.1 degree control 工业伺服电机，0.1 角度控制
		3	Industrial servomotor, 0.5 degree control 工业伺服电机，0.5 角度控制
87	0		MM: Channel 2 Servo Control Method 控制模块: 通道 2 伺服电机控制方法
		0	Autoflame servomotor, 0.1 degree control Autoflame 伺服电机，0.1 角度控制
		1	Autoflame servomotor, 0.5 degree control Autoflame 伺服电机，0.5 角度控制
		2	Industrial servomotor, 0.1 degree control 工业伺服电机，0.1 角度控制
		3	Industrial servomotor, 0.5 degree control 工业伺服电机，0.5 角度控制
88	0		MM: Channel 3 Servo Control Method 控制模块: 通道 3 伺服电机控制方法
		0	Autoflame servomotor, 0.1 degree control Autoflame 伺服电机，0.1 角度控制
		1	Autoflame servomotor, 0.5 degree control Autoflame 伺服电机，0.5 角度控制
		2	Industrial servomotor, 0.1 degree control 工业伺服电机，0.1 角度控制
		3	Industrial servomotor, 0.5 degree control 工业伺服电机，0.5 角度控制

Option 选项	Default 默认值	Range 范围	Description 说明
89	0		MM: VSD Output When Commissioning Closed Position 控制模块：当调试关闭位置时的 VSD 输出
			For setting 0, the VSD output is 0mA, 4mA or 0V. For setting 1, the VSD output is 20mA or 10V. 对于设置 0,变频器输出为 0mA、4mA 或 0V。对于设置 1, 变频器输出为 20mA 或 10V。
		0	When commissioning closed, VSD output is high 当调试关位时，变频器输出为高
		1	When commissioning closed, VSD output is low 当调试关位时，变频器输出为低
90	-		MM: VSD Operation Channel 4 控制模块： 通道 4 变频器操作
		0	Disabled 禁用
		1	Enabled 选项开启
91	0		MM: Output from MM to VSD Channel 4 控制模块：从 控制模块到变频器通道 4 的信号输出
		0	Output range 4 to 20mA 信号输出范围 4-20mA
		1	Output range 0 to 20mA 信号输出范围 0-20mA
		2	Output range 0 to 10V 信号输出范围 0-10V
92	0		MM: Output Units Displayed, VSD Channel 4 控制模块：变频器通道 4 输出显示单位
		0	Selected output signal 所选择的输出信号
		1	Hertz 赫兹
93	25		MM: Output Low Speed from MM to VSD Channel 4 控制模块：从控制模块到变频器通道 4 的低速输出信号
		1 – 200	Hertz 赫兹
94	50		MM: Output High Speed from MM to VSD Channel 4 控制模块：从控制模块到变频器通道 4 的高速输出信号
		1 – 200	Hertz 赫兹
95	0		MM: Input Signal to MM from VSD Channel 4 控制模块： 从变频器通道 4 到控制模块的输入信号
		0	Input range 4 to 20mA 信号输入范围 4-20mA
		1	Input range 0 to 20mA 信号输入范围 0-20mA
		2	Input range 0 to 10V 信号输入范围 0-10V

Option 选项	Default 默认值	Range 范围	Description 说明
96	0		MM: Input Units Displayed, VSD Channel 4 控制模块：变频器通道 4 输入单元显示
		0	Selected input signal 所选择的输出信号
		1	Hertz 赫兹
97	0		MM: Input Low Speed to MM from VSD Channel 4 控制模块:从变频器通道 4 到控制模块的低速输入信号
		0 – 200	Hertz 赫兹
98	50		MM: Input High Speed to MM from VSD Channel 4 控制模块：从变频器通道 4 到控制模块的高速输入信号
		0 – 200	Hertz 赫兹
99	5		MM: VSD Feedback Fault Tolerance 控制模块： 变频器反馈容错
			This is used to check that the feedback varies from high to low fire. For example, if high fire feedback is 20mA and this option is set to 4%, the tolerance that is allowed while firing is ±0.8mA. For commissioning, the low fire feedback must be less than this upper and lower tolerance (1.6mA), so the feedback at low fire must be commissioned at 18.4mA or lower. 这是用来检查反馈变化从高到低火。例如，如果高火力反馈为 20mA，并且该选项设置为 4%，那么低火时允许的公差为±0.8mA。调试时，低火反馈必须小于高火反馈减去上、下公差(1.6mA)的值，因此低火反馈必须调试在 18.4mA 或更低。
		5 – 40	0.5% – 4.0%
100	0		MM: Sequencing/DTI or Modbus Operation 控制模块：群控/DTI 或 Modbus 操作
		0	MM/DTI Sequencing 控制模块/DTI 群控
		1	Modbus Modbus 操作
101	0		MM: Modbus Baud Rate 控制模块：Modbus 波特率
		0	9600 baud 9600 波特
		1	19200 baud 19200 波特
102	0		MM: Modbus Parity Setting 控制模块：Modbus 奇偶校验设置
		0	No parity 无奇偶设置
		1	Odd parity 奇数校验
		2	Even parity 偶数校验

Option 选项	Default 默认值	Range 范围	Description 说明
103	1		MM: Modbus Stop Bits Settings 控制模块：Modbus 停止位设置
		1	1 stop bit 1 停止位
		2	2 stop bits 2 停止位
104	1		MM: Modbus Device ID 控制模块：Modbus 设备标识
		1 – 247	ID range 标识范围
105	0		MM: Modbus Data Format 控制模块：Modbus 数据格式
		0	Binary format 二进格式
		1	ACSII format ACSII 格式
106	-		Unused 未使用
107	-		Unused 未使用
108	-		Unused 未使用
109	-		Unused 未使用

For safety reasons, options 110 – 160 also must be entered in as Parameters. It is the responsibility of the commissioning engineer to ensure that all settings are set in accordance with the appropriate standards, local codes and practices. If options 110 – 160 are not identical with the parameters 110 – 160, then the MM will go straight to Commissioning Mode and an option/ parameter conflict message will appear.
出于安全考虑，还必须输入选项 110 - 160 作为参数。调试工程师的职责是确保所有的设置都符合适各项标准、当地的规范和惯例。如果选项 110 – 160 的数值与参数 110 – 160 的数值不一致，控制模块将直接进入调试模式，选项/参数冲突消息会显示在调试屏幕上。

Option 选项	Default 默认值	Range 范围	Description 说明
110	1		BC: UV Flame Scanner Type 燃烧器控制:紫外火焰检测器类型
			See option/ parameter 120 for the UV threshold and 122 for the flame sensor operation. For setting 2, the self-check UV scanner opens and closes a shutter to check that the UV scanner is not given a false flame signal. 紫外线阀值见选项/参数 120，火焰传感器操作见选项 122。对于设置 2，自检紫外火焰检测器打开和关闭挡板，以检查紫外火焰检测器没有给出虚假的火焰信号。
		1	Standard scanner 标准检测器
		2	Self-check scanner 自检检测器
111	0		BC: Pilot Type 燃烧器控制: 引导火类别
			For interrupted pilot, when lighting off, the pilot valve will close at the point the main flame proving phase begins. For intermittent pilot, when lighting off, the pilot valve will remain open during firing. 对于中断式引导火，当点火时，点火阀在主火焰验证阶段开始时关闭。对于间歇式引导火，当点火时，点火阀在燃烧时保持打开状态。
		0	Interrupted pilot 中断式引导火
		1	Intermittent pilot 间歇式引导火
		2	No pilot 无引导火 *Note: Setting 2 (no pilot) cannot be used with single valve pilot (option/ parameter 130) or flame scanner switchover (option/parameter 122).* *注意：设置 2（无引导火）不能与单阀引导火（选项/参数 130）或火焰检测切换（选项/参数 122）一起使用。*
112	40		BC: Pre-Purge Time 燃烧器控制: 前吹扫时间
			Purging the burner before burner start-up with air will force any combustion remnants out of the stack. Purge time should be set according to the boiler manufacturer's requirements and local codes and regulations. 在燃烧器启动前吹扫，可以将燃烧残留物从烟囱中吹扫出去。吹扫时间应根据锅炉厂商的要求和当地的法规和规定来确定。
		5 – 240	Seconds 秒
113	3		BC: Pre-Ignition Time 燃烧器控制： 预点火时间
			This is the time period when the ignition transformer is on before the pilot valves opens. 这是点火变压器在点火阀打开之前的启动时间段。
		3 – 5	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
114	3		BC: First Safety Time 燃烧器控制：第一安全时间
		3 – 10	This is the time period when the pilot valve is open, before the flame is checked. The time range of this option depends on whether its gas or oil. 这是在检查火焰之前，点火阀开启的时间。这个选择的时间范围取决于是燃气还是燃油。 Seconds 秒
115	3		BC: Pilot Prove Time - Pilot Trial for Ignition (PTFI) 燃烧器控制：引导火验证时间-点火试验（PTFI）
		3 – 5	This is the time period for when the flame is checked after the first safety time, to prove the pilot flame. 这是在第一安全时间后对火焰进行检查的时间，以验证引导火焰。 Seconds 秒
116	3		BC: Fuel 1 Second Safety Time – Main Trial for Ignition (MTFI) 燃烧器控制：燃料 1 第二安全时间-点火主试验（MTFI）
		3 – 10	This is the time period when the main valves are open and the pilot valve is maintained open, before the flame is checked, for firing on gas. See option/ parameters 150 and 151. This does not apply for intermittent pilot, see option/ parameter 111. 这是在检查火焰之前，主阀打开并且点火阀保持打开的时间段，用于燃气上燃烧。参见选项/150 和 151。这个不适用于间歇式引导火，请参阅选项/参数 111。 Seconds 秒
117	5		BC: Main Flame Proving Time 燃烧器控制：主火验证时间
		5 – 20	This is the time period after the second safety phase for interrupted pilot or after the pilot proving phase for intermittent pilot, where the flame is checked, before going to normal firing/modulation. 在进入正常燃烧/调节之前检查火焰，中断式引导火的第二安全阶段之后或者在间歇式引导火的测试阶段之后的这段时间。 Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
118	0		BC: Post-Purge Time 燃烧器控制：后吹扫时间
			If set, a post-purge will occur after a normal burner shutdown. The timer begins once all channels have gone to their post-purge positions. The flame is not checked during post-purge. See option/ parameter 135 for NFPA post-purge. 如果设置，后吹扫会发生在正常燃烧器关闭后。一旦所有通道都到达后吹扫的位置，计时器就开始计时。后吹扫运行时，不检查火焰。NFPA 后吹扫，请参阅选项/参数 135
		0 – 100	Seconds (for option/ parameter 135 set to 0 or 2) 秒 （选项/参数 135 设置为 0 或 2）
		0 – 100	Minutes (for option/ parameter 135 set to 1 or 3) 分钟 （选项/参数 135 设置为 1 或 3）
119	10		BC: Control Box Recycle Time 燃烧器控制：控制盒循环时间
			This is the time delay between the burner shutting down, and going through post-purge if optioned, and the burner starting up again. 这个燃烧器关闭和经过后吹扫（如果选择）及再次启动燃烧器之间的时间延迟。
		3 – 120	Seconds 秒
120	10		BC: UV Threshold 燃烧器控制：紫外线阀值
			This is the minimum flame signal strength, if the flame strength is lower than this threshold, a lockout will occur. The UV counts will stabilise at 5 times this value when increasing, and 3 times this value when decreasing. 这是最小火焰信号强度要求，如果火焰强度低于此阀值，将发生锁定。紫外线计数在增加时将 5 倍稳定于这个值，减少时将 3 倍稳定于这个值。
		5 – 50	UV counts 紫外线计数
121	5		BC: Delay from Start of Pre-Purge Until Air Switch Checked 燃烧器控制：从前吹扫开始到空气开关检查的延时
			This time delay where the air switch is not checked is included within the total pre-purge time set in option/ parameter 112. 不检查空气开关的时间延迟包含在选项/参数 112 中设置的前吹扫总时间内。
		5 – 10	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
122	0		BC: Flame Sensor Selection 燃烧器控制：火焰探测器选择
		0	UV 紫外线
		2	Ionisation 电离感应
		4	IR 红外线
		5	IR and UV 红外线和紫外线
		6	IR and Ionisation 红外线和电离感应
		7	Ionisation to UV switchover 电离感应到紫外线切换 *Note: Ionisation to UV switchover cannot be used with no pilot (option/ parameter 111) or single valve pilot (option/parameter 130).* *注意：电离感应到紫外线切换不能与无引导火（选项/参数 111）或单阀门引导火使用（选项/参数 130）。*
123	3		BC: Fuel 2 Second Safety Time – Main Trial for Ignition (MTFI) 燃烧器控制：燃料 2 第二安全时间-点火主试验(MTFI)
		3 – 15	This is the time period when the main valves are open and the pilot valve is maintained open, before the flame is checked, for firing on oil. See option/ parameters 150 and 151. This does not apply for intermittent pilot, see option/ parameter 111. 这是在检查火焰之前，主阀打开并且点火阀保持打开的时间段，用于燃油上燃烧。 参见选项/参数 150 和 151。这不适用与间歇式引导火，请参阅选项/参数 111。 Seconds 秒
124	0		BC: Timeout on Reaching Purge 燃烧器控制：到达吹扫超时
		0	If the MM is stuck in Run to Purge or Run to Post Purge because the servomotors and VSDs are moving to the purge position, then a lockout will occur after the timeout set in this option has elapsed. This does not apply to any requirements on purge timing such as any additional proving inputs. 如果因为伺服电机和变频器移动到吹扫位置而导致控制模块陷入运行吹扫或运行后吹扫，那么在此选项中设置的超市结束后将发生锁定。这不适用于吹扫时间的任何要求，例如任何额外的校验输入。 Disabled 禁用
		1 – 3600	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
125	0		BC: Fuel Pressure Sensor Mode – Fuel 1 燃烧器控制：燃料压力传感器模式-燃料 1
			For setting 1, valve proving and pressure limits are checked by an Autoflame gas sensor or valve proving by a low pressure switch. For setting 2, pressure limits are checked by the gas sensor. See option/parameters 136 and 137 for gas pressure limits. For setting 3, the system will wait for a mains voltage input on terminal 55 to confirm that the VPS test is completed. If a voltage is not detected on terminal 55 within 10 minutes, a lockout will occur. Please see MM Application Possibilities manual for option/ parameters and wiring guides on VPS and pressure limits setups. 设置 1，阀门校验和压力限值通过 Autoflame 燃气传感器或低压开关阀门校验进行检查。设置 2，压力限值由气体传感器检查。有关气体压力限值，请参阅选项/参数 136 和 137。设置 3，系统将等待端子 55 上的电源电压输入，以确认 VPS 测试已完成。如果在 10 分钟内没检测到端子 55 上的电压，就会发生锁定。有关 VPS 和压力限值设置上的选项/参数和接线指南，请参阅控制模块应用可能手册。
		0	Not Checked 不检查
		1	Valve Proving, Pressure Limits 阀门校验，压力极限值
		2	Pressure Limits Only 仅压力极限值
		3	External VPS 外部 VPS（外部阀门检漏系统）
126	0		BC: Fuel Pressure Sensor Mode – Fuel 2 燃烧器控制：燃料压力传感器模式-燃料 2
			For setting 1, valve proving and pressure limits are checked by an Autoflame gas sensor or valve proving by a low pressure switch. For setting 2, pressure limits are checked by the gas sensor. See option/parameters 136 and 137 for gas pressure limits. For setting 3, the system will wait for a mains voltage input on terminal 55 to confirm that the VPS test is completed. If a voltage is not detected on terminal 55 within 10 minutes, a lockout will occur. Please see MM Application Possibilities manual for option/ parameters and wiring guides on VPS and pressure limits setups. 设置 1，阀门检验和压力限值通过 Autoflame 气体传感器和低压开关阀门检验进行检查。设置 2，压力限值由气体传感器检查。有关气体压力限值，请参阅选项/参数 136 和 137.设置 3，系统将等待端子 55 上的电源电源输入，以确认 VPS 测试已经完成。如果在 10 分钟内没检测到端子 55 上的电压，就会发生锁定。有关 VPS 和压力限值设置上的选项/参数和接线指南，请参阅控制模块应用可能手册。
		0	Not Checked 不检查
		1	Valve Proving, Pressure Limits 阀门检验，压力极限值
		2	Pressure Limits Only 仅压力极限值
		3	External VPS 外部 VPS（外部阀门检漏系统）
127	-		Unused 未使用

Default 默认值	Default 默认值	Range 范围	Description 说明
128	0		BC: VPS Sensor Type 燃烧器控制：VPS（阀门检漏系统）传感器类型
			For setting 0, a low pressure switch is used for VPS and is wired to terminal 82 (set option/ parameter 156). For setting 1, the Autoflame gas pressure sensor is used for VPS. Please refer to the MM Application Possibilities manual for setup. 设置 0，VPS（阀门检漏系统）使用低压开关，并连接到端子 82（设置选项/参数 156）。设置 1 时，VPS 使用 Autoflame 燃气压力传感器。请参阅控制模块应用程序可能手册进行设置。
		0 1	Mains input 火线电压输入 Pressure sensor 压力传感器
129	0		BC: VPS Operation 燃烧器控制：VPS（阀门检漏系统）运行
		0 1 2	VPS operates before start-up VPS 在燃烧器启动前运行 VPS operates after shutdown VPS 在燃烧器关闭后运行 VPS operates before and after VPS 燃烧器启动前和关闭后运行
130	2		BC: Gas Valve Configuration 燃烧器控制：燃气阀门设置
		0 1 2 3 4 5	No vent valve 无排气阀 Vent normally closed 排气阀正常关闭 Vent normally open 排气阀正常开启 No vent valve. Single valve pilot 无排气阀。单阀引导火 Vent normally closed. Single valve pilot 排气阀常闭。单阀引导火 Vent normally open. Single valve pilot 排气阀常开。单阀引导火 *Note: Single valve pilot cannot be used with no pilot (option/parameter 111) or flame scanner switchover (option/parameter 122).* *注意：单阀引导火不适用于无引导火情况。（参见选项/参数 111）*
131	0		BC: Gas Pressure Units 燃烧器控制：燃气压力单位
		0 1 2	“WG mbar PSI

Option 选项	Default 默认值	Range 范围	Description 说明
132	20		BC: Gas Valve Proving Time 燃烧器控制：燃气阀门验证时间
			This is the time period for when both gas valves are closed to detect a change in air pressure for the 'VPS air proving' phase, or change in gas pressure for 'VPS gas proving' phase. 这段时间内，两个燃气阀门都处于关闭状态，以检测“VPS（阀门检漏系统内）空气验证”阶段的气压变化，或“VPS 燃气验证”阶段的燃气压力变化。
		10 – 300	Seconds 秒
133	25		BC: Maximum Pressure Change Allowed During VPS 燃烧器控制：VPS 验证时允许的最大压力改变
			If MM detects a pressure change greater than this value, a lockout will occur. If both options 136 and 138 are set to 0, then a lockout will occur if the measured static line pressure during the VPS void to gas phase is below this absolute value. See option/parameter 131 for gas pressure display units. 如果控制模块检测到压力变化大于此值，则会发生锁定。如果选项 136 和 138 都设置为 0，而在 VPS（阀门检漏系统）注入燃气期间测得的静态管道压力低于这个绝对值，将发生锁定。有关燃气压力显示单位，请参阅选项/参数 131。
		0 – 13400	0 mbar – 1340 mbar (value 25 = 2.5 mbar) 0 毫巴 – 1340 毫巴 (值 25 = 2.5 毫巴) 0” WG – 537.777” WG (value 25 = (1.003 ”WG) 0 " WG - 537.777 " WG(值 25 = (1.003 " WG) 0 PSI – 19.435 PSI (value 25 = 0.036 PSI) 0 PSI - 19.435 PSI(值 25 = 0.036 PSI)
134	3		BC: VPS Valve Opening Time 燃烧器控制：VPS 阀门开启时间
			This is the time period for when the phases when a gas valve is opened – 'VPS Venting' for the void to vent to atmosphere and 'VPS Void to Gas' for the void to fill with gas. 这段时间是燃气阀门开启时的阶段——“VPS 排气”阀间排空至大气，“VPS 充气”阀间燃气充气。
		3 – 20	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
135	0		BC: Purge Time Units / NFPA Post-Purge 燃烧器控制：吹扫时间单位/NFPA（国家消防协会）后吹扫
			See option/ parameter 118 for the purge timing. For setting 2, option/parameter 118 must be set to 15 seconds or higher. During the NFPA post-purge, all the servomotors will remain in the position they were in before normal shutdown or lockout. The NFPA post-purge will occur under any normal shutdown or lockout at any point in firing. 有关吹扫时间，请参阅选项/参数 118。设置 2，选项/参数 118 必须设置为 15 秒或更高。在 NFPA（国家消防协会）后吹扫期间，所有伺服电机将保持在正常关闭或锁定之前的位置。在点火过程中的任何正常关闭或锁定状态下，都会发生 NFPA 后吹扫。
		0	Purge time in seconds 吹扫时间 （秒）
		1	Purge time in minutes 吹扫时间（分钟）
		2	NFPA post purge in seconds NFPA 后吹扫（秒）
		3	NFPA post purge in minutes NFPA 后吹扫（分钟）
136	25		BC: Gas Running Pressure Lower Limit Offset 燃烧器控制：燃气运行压力下限偏移量
			This is an offset lower limit from the commissioned gas pressure, see option/parameter 131 for the gas pressure display units. These limits are also tested during main flame proving. See option/ parameter 125 and 126 to enable the pressure limits. If both options 136 and 138 are set to 0, then a lockout will occur if the measured static line pressure during the VPS void to gas phase is below the absolute value in option 133. 这是已调试的燃气压力的下限偏移量，请参阅燃气压力显示单元的选项/参数 131。这些限值也在主火焰校验过程中进行了测试。要启用压力限值，请参阅选项/参数 125 和 126。如果选项 136 和 138 都设置为 0，而在 VPS（阀门检漏系统）注入燃气期间测得的静态管道压力低于选项 133 中的绝对值，将发生锁定。
		0 – 13400	0 mbar – 1340 mbar (value 25 = 2.5 mbar) 0 毫巴 – 1340 毫巴(值 25 = 2.5 毫巴) 0” WG – 537.777” WG (value 25 = (1.003 ”WG) 0 " WG - 537.777 " WG(值 25 = (1.003 " WG) 0 PSI – 19.435 PSI (value 25 = 0.036 PSI) 0 PSI – 19.435 PSI (值 25 = 0.036 PSI)
137	25		BC: Gas Running Pressure Upper Limit Offset 燃烧器控制：燃气运行压力上限偏移量
			This is an offset upper limit from the commissioned gas pressure, see option/parameter 131 for the gas pressure display units. These limits are also tested during main flame proving. See option/ parameter 125 and 126 to enable the pressure limits. 这是已调试的燃气压力的上限偏移量，请参阅燃气压力显示单元的选项/参数 131。这些限值也在主火焰校验过程中进行测试。要启用压力限值，请参阅选项/参数 125 和 126。
		0 – 13400	0 mbar – 1340 mbar (value 25 = 2.5 mbar) 0 毫巴 – 1340 毫巴 (值 25 = 2.5 毫巴) 0” WG – 537.777” WG (value 25 = (1.003 ”WG) 0” WG – 537.777” WG (值 25 = (1.003 ” WG) 0 PSI – 19.435 PSI (值 25 = 0.036 PSI)

Option 选项	Default 默认值	Range 范围	Description 说明
138	25		BC: Gas Static Line Pressure Lower Limit Offset 燃烧器控制： 燃气静态管道压力下限偏移量
			For setting 0, if the measured static line pressure during the VPS void to gas phase is below the gas pressure offset lower limit set in option/parameter 136, a lockout will occur. If both options 136 and 138 are set to 0, then a lockout will occur if the measured static line pressure during the VPS void to gas phase is below the absolute value in option 133. For settings other than 0, this measured static line pressure is checked against the value set in this option. 设置 0，如果阀门检漏系统阀间注入燃气期间测得的静态管道压力低于选项/参数 136 中燃气压力偏移量下限，将发生锁定。如果选项 136 和 138 都设置 0，而在 VPS（阀门检漏系统）注入燃气期间测得的静态管道压力低于选项 133 中的绝对值，将发生锁定。对于除 0 以外的设置，将根据此选项中设置的值检查测得的静态管道压力。
		0	Option/parameter 136 offset lower limit used 选项/参数 136 偏移量下限使用
		1 – 50000	0.1 mbar – 5000 mbar (value 25 = 2.5 mbar) 0.040” WG – 2006.630” WG (value 25 = 1.003” WG) 0.001 PSI – 72.519 PSI (value 25 = 0.036 PSI) 0.001 PSI – 72.519 PSI
139	-		Unused / 未使用
140	0		Unused / 未使用
141	0		BC: Air Proving Pressure Threshold for Purge 燃烧器控制：吹扫时空气压力验证阀值
			This is the minimum air pressure that must be detected by the MM during purge, when using an Autoflame air pressure sensor. If this is set to 0, then MM will look for the minimum air pressure set in option/ parameter 149. See option/ parameter 146 for air pressure display units. If post-purge is enabled in option/parameter 118 then the purge air threshold cannot be set higher than the running threshold in option 149. If both the proving pressure thresholds for purge and normal running are both enabled, during the ‘driving to ignition’ and ‘driving to post purge’ phases the lower of these two thresholds are used. 当使用 Autoflame 空气压力传感器时，这是吹扫过程中控制模块必须检测到的最小空气压力。如果这个设置为 0，那么控制模块将在选项/参数 149 中寻找最小空气压力设置。空气压力显示单元参见选项/参数 146。如果在选项/参数 118 中启用后吹扫，吹扫空气阀值不能设置高于选项 149 中的运行阀值。如果吹扫和正常运行的校准压力都启用，在“移动至点火”和“移动至后吹扫”阶段使用这两个阀值中较低的一个。
		0 – 300	0 mbar – 30.0 mbar (0” WG – 12.040” WG) 0 毫巴 – 30.0 毫巴 (0” WG – 12.040” WG)
142	60		BC: UV Shutter Test Interval 燃烧器控制：紫外线挡板测试间隔
			This is the time interval between shutter tests on the self-check UV scanner. See options/ parameter 110 and 122. 这是在自检紫外火焰检测器上挡板测试间的时间间隔。参见选项/参数 110 和 122。
		4 – 240	Seconds 秒

Option 选项	Default 默认值	Range 范围	Description 说明
143	0		BC: No Pre-Purge 燃烧器控制：无前吹扫
			For setting 1, there will only be no pre-purge if the burner has recycled after crossing the internal stat, and has gone through VPS checks successfully. If the burner has a lockout, or is restarting after a lockout has been cleared, the MM will force a pre-purge. Fuel must be set to gas. 设置 1，只有当燃烧器经过内部温控进入循环后再次启动并成功通过 VPS（阀门检漏系统）检查后才会跳过前吹扫。如果燃烧器锁定，或锁定清除后重启，控制模块将会强制前吹扫。燃料必须设置为燃气。
		0	Pre-purge operates 前吹扫操作
		1	No pre-purge 无前吹扫
144	4		BC: Maximum Allowed UV Self-Check Errors 燃烧器控制：允许的最大紫外线自检错误数量
			The MM will test the flame detection of self-check UV scanner at a time interval, set in option/ parameter 142, and will generate a lockout if it has more errors than set in this option. See options/ parameters 110 and 122. 控制模块会在一段时间间隔内测试自检紫外火焰检测器的火焰检测，设置为选项/参数 142，如果错误大于该选项设置，将会生成锁定。参见选项/参数 110 和 122。
		1 – 12	Errors 错误
145	-		Unused 未使用
146	0		BC: Air Pressure Sensor Units 燃烧器控制：空气压力传感器单位
		0	“WG
		1	mbar

Option 选项	Default 默认值	Range 范围	Description 说明
147	0		BC: Air Pressure Error Window 燃烧器控制：空气压力错误窗口
			This air pressure error window is only active during modulation; the burner will lockout if the air pressure is outside of this window. 这个空气压力错误窗口仅在燃烧调节时有效；如果空气压力在这个窗口外，燃烧器就会锁定。
		0 – 300	0 mbar – 30.0 mbar (0" WG – 12.040" WG)
148	0		BC: Air Pressure Sensor Type 燃烧器控制：空气压力传感器类型
			For setting 0, and external air pressure switch must be wired to terminal 54. If a reset of voltage is not detected within 2 minutes on terminal 54 during the 'Wait for Air Switch' phase before running to purge, a lockout will occur. For setting 1, the air pressure sensor will look for zero air pressure in the 'Zero Air Sensor' phase before running to purge. Setting 2 includes the checks made for settings 0 and 1, and must both read low before the 'Wait for Air Switch' can be passed. 设置 0，外部空气压力开关必须连接到到端子 54。如果端子 54 在运行吹扫前的'等待空气开关'阶段的两分钟内未检测到电压复位，将会发生锁定。设置 1，空气压力传感器将在运行吹扫前的"零空气传感器"阶段寻找零空气压力。设置 2 包括对设置 0 和 1 进行的检查，平且必须在通过"等待空气开关"之前都读低。
		0	Air switch on T54 终端 54 上的空气开关
		1	Autoflame air pressure sensor Autoflame 空气压力传感器
		2	Autoflame air pressure sensor and air switch on T54 Autoflame 空气压力传感器和终端 54 上的空气开关
149	10		BC: Air Proving Pressure Threshold 燃烧器控制：空气压力验证阀值
			This is the minimum air pressure that must be detected by the MM during normal firing and during purge when option/ parameter 141 is set to 0, when using an Autoflame air pressure sensor. See option/ parameter 146 for air pressure display units. If post-purge is enabled in option/parameter 118 then the purge air threshold cannot be set higher than the running threshold in option 149. If both the proving pressure thresholds for purge and normal running are both enabled, during the 'driving to ignition' and 'driving to post purge' phases the lower of these two thresholds are used. 当使用 Autoflam 空气压力传感器时，当选项/参数 141 设置为 0 时，控制模块在正常点火和吹扫过程中必须检测到最小空气压力。空气压力显示单元参见选项/参数 146。如果在选项/参数 118 中启用后吹扫，那么吹扫空气阀值不能设置高于选项 149 中的运行阀值。如果吹扫校准压力阀值和正常运行都启用，在"移动至点火"和"移动至后吹扫"阶段使用这两个阀值中较低的一个。
		7 – 1200	0.7 mbar – 120.0 mbar (0.281" WG – 48.176 "WG) Value 10 = 0.401 "WG (1.0 mbar)
150	0		BC: Fuel 1 Type 燃烧器控制：燃料 1 类型
		0	Gas 燃气
		1	Oil 燃油

Option 选项	Default 默认值	Range 范围	Description 说明
151	1		BC: Fuel 2 Type 燃烧器控制：燃料 2 类型
		0	Gas 燃气
		1	Oil 燃油
152	-		Unused 未使用
153	-		Unused 未使用
154	0		BC: Terminal T80 Function 燃烧器控制：终端 T80 功能
			Setting 1 allows an additional safety check on the valves and damper to ensure that they are in the correct position for start/low fire. See Valves and Servomotors manual for information on setup and wiring. For setting 2, when an input is detected on terminal 80 the setpoint is reduced according to the night setback offset set in option 85. For setting 3, when an input is detected on terminal 80 the MM will fire to meet the reduced setpoint set via the MM status screen. For setting 4, terminal 80 is used as a delay to purge input to indicate that the system is ready to move to the purge phase, otherwise the system will be stuck in 'delay to purge' indefinitely, unless a timer is enabled in option/parameter 157. 设置 1 允许对阀门和风门进行额外的安全检查，已确保它们处于正确的启动/低火位置。有关安装和接线的信息，请参阅阀门和伺服电机手册。设置 2，当终端 80 检测到输入时，设定值将根据选项 85 中设置的夜间调低输入减少。设置 3，当在终端 80 上检测到输入时，控制模块将通过控制模块状态屏幕点火以达到减少的设定值设置。设置 4，终端 80 用于延迟吹扫输入，以指示系统准备进入吹扫阶段，否则系统将无限期地停留在“延迟吹扫”中，除非在选项/参数 157 中启用计时器。
		0	Not used 未使用
		1	Start position interlock 起始位置连锁
		2	Night setback input 夜间调低输入
		3	Reduced setpoint input 降低设定值输入
		4	Delay to purge input 吹扫输入延迟

Option 选项	Default 默认值	Range 范围	Description 说明
155	0		BC: Terminal T81 Function 燃烧器控制：终端 T81 功能
			For setting 1, terminal 81 acts as an input for a mechanical end stop. It must be made for the whole of the timed purge and post purge phases otherwise a lockout is generated. This input must also be not made while not at purge. For setting 2, an input on terminal 81 will put the MM into low flame hold. For setting 3, terminal 81 acts as a purge pressure switch input. It must be made continuously for the full purge time before proceeding from purge. If it drops out during purge the purge timer restarts. It must also be not made before the blower motor starts to confirm the input is working correctly. If this input comes on during the relay tests a lockout is generated. Option 158 adds an optional timer to this phase. 设置 1，终端 81 作为机械终端停止位输入。它必须在整个定时吹扫和后吹扫阶段保持有效，否则将发生锁定。在非吹扫时，该终端不能有输入。设置 2，终端 81 输入将使控制模块保持低火焰。设置 3，终端 81 作为吹扫压力开关输入，吹扫开始之前，必须在整个吹扫时间内连续进行吹扫，如果在吹扫期间退出，吹扫计时器将重新启动。在风机电机启动前，也不能有输入确认正常，如果该输入在继电器测试期间打开，则将发生锁定。选项 158 在此阶段添加一个可选计时器。
		0	Not used 未使用
		1	Purge interlock 吹扫连锁
		2	Low flame hold input 输入保持低火焰
		3	Purge pressure proving 吹扫压力验证
156	0		BC: Terminal T82 Function 燃烧器控制：终端 T82 功能
			For setting 0, input on terminal 82 will stop the MM warming in sequencing where there are no non-return valves, see option 40. When no input is detected, the MM will go into warming. For setting 1, a low pressure switch is wired to terminal 82 for valve proving; see options 125, 126 and 128. Please refer to the MM Application Possibilities manual. 设置 0，在没有止回阀的情况下，终端 82 上的输入将停止控制模块在群控里头的暖炉模式，请参阅选项 40。当没有检测到输入，控制模块将进入暖炉模式。设置 1，低压开关连接到终端 82 以验证阀门；参见选项 125、126 和 128。请参阅控制模块应用可能手册。
		0	Warming stat 暖炉控制点
		1	Valve proving mains input 阀门验证，火线信号输入

Option 选项	Default 默认值	Range 范围	Description 说明
157	0		BC: Delay to Purge (T80) Timeout 燃烧器控制：吹扫（终端 80）延迟超时
			If option/parameter 154 is set to 4, an input on terminal 80 is required to indicate the system is ready to move toward the purge phase. If the MM does not see this input for 1 second within this time set, then a lockout will occur. Setting 0 will disable this timeout, so the MM would sit indefinitely in delay to purge. 如果将选项/参数 154 设置为 4，需要终端 80 上的输入，以指示系统准备进入吹扫阶段。如果控制模块在此时间设置内 1 秒内没有看到此输入，将会发生锁定。设置 0 将禁用此超时，因此控制模块将无限期地等待吹扫。
		0 1 – 3600	Disabled 禁用 Seconds 秒
158	0		BC: Purge Pressure Proving (T81) Timeout 燃烧器控制：吹扫压力验证(T81) 超时
			If option/parameter 155 is set to 3, then the system will lockout if this purge interlock timer has elapsed. Setting 0 will disable this timeout, so the MM will be in the purge phase indefinitely. 如果选项/参数 155 设置为 3，那么如果这个吹扫连锁计时器已经过期，系统会锁定。设置 0 将禁用此超时，因此控制模块将无限期地处于吹扫阶段。
		0 1 – 15000	Disabled 禁用 Seconds 秒
159	-		Unused 未使用
160	0		BC: Clear Commissioning Data 燃烧器控制：清除调试数据
		5	Clear all commissioning data, options and parameters 清除所有调试数据，选项和参数
		10	Reset all options to default values 重置所有选项到默认值
		15	Reset all parameters to default values 重置所有参数到默认值
		20	Reset all safety options and parameters to default values 重置所有安全选项和参数到默认值

2.2 Parameters / 参数

Please refer to section 2.1 Options for instructions on accessing and changing parameters.
请查阅章节 2.1“选项”来了解读取和更改参数的方法.

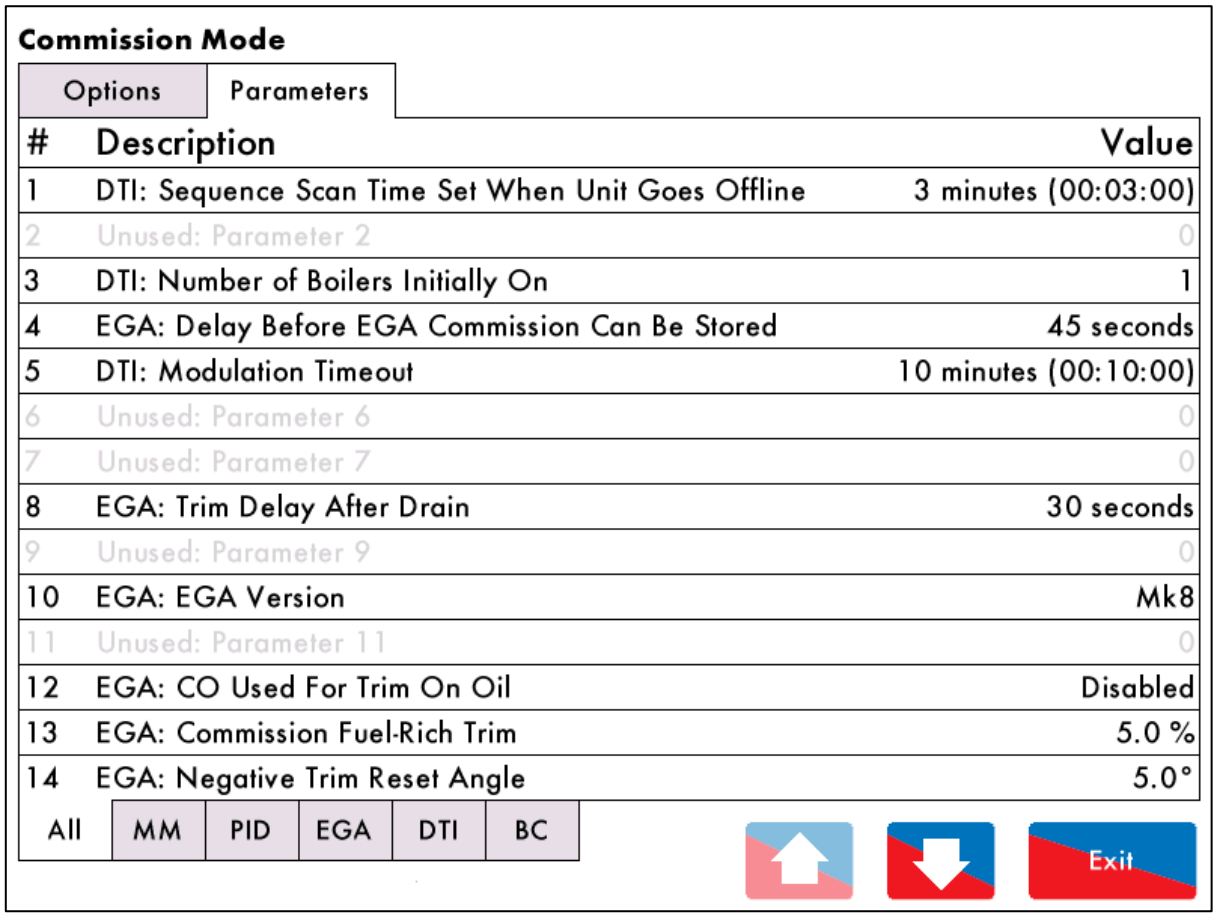


Figure 2.2.i Parameters / 图 2.2.i 参数

Figure 2.2.i shows the Parameters screen. Like with the Options, the Parameters can be easily viewed by feature by pressing the tabs MM, PID, EGA, DTI and BC.
Figure 2.2.i 是参数界面。和选项界面一样，按下标签 MM, PID, EGA, DTI 和 BC 可以方便地读取分组后的参数数据。

A full list of parameters is detailed on the next pages. Options/ parameters 110 – 160 are the burner control settings and are safety critical; these must be entered the same for both the option and parameter value.
从下页开始列出了完整参数列表。选项/参数 110 – 160 是燃烧器控制的设置，也是安全方面的关键设置，这些选项和参数必须在数值上保持相同。

Para-meter 参数	Default 默认值	Range 范围	Description 说明
1	3		DTI: Sequence Scan Time Set When Units Goes Offline 数据传输接口：当设备离线后设定群控扫描时间
		0 – 20	If a sequenced MM drops out of the sequence loop, there is a time delay before the next scan time. 如果一台群控控制模块退出群控循环，在发生下次扫描前会有一个时间延迟。 Minutes 分钟
2	-		Unused 未使用
3	10		DTI: Number of Boilers Initially On 数据传输接口：初始锅炉启动数量
		1 – 10	This sets the number of boilers which when powered on after a shutdown, are in the On state in the sequence loop. This set should be set to the highest MM ID number (see parameter 57) if the application requires all the MMs to be On in the sequence loop when powered back on. 本参数是在全体锅炉关闭后再次上线的锅炉数量，在群控循环中处于开启状态。如果应用程序要求在重新通电时群控循环中的所有控制模块都处于开启状态，则此设置应设置为最高的控制模块 ID 号（请参见参数 57）。 Boilers/MMs 锅炉/控制模块
4	45		EGA: Delay Before EGA Commission Can be Stored 烟分仪：EGA 调试可以存储之前的延时
		10 – 120	During commission and single point change, there is a delay before the EGA values are stored. This value should be set in proportion to how long it takes for the gases to reach the EGA. 在调试和单点更改时，存储 EGA 数值前将有一个延时。这个值应该与燃气到达 EGA 所需得时间相称。 Seconds 秒
5	4		DTI: Modulation Timeout 数据传输接口：调节超时
		1 – 50	If a sequenced MM does not start modulating after being asked to by the lead MM, it is ignored in the sequencing loop. Upon the next scan time, if the MM modulates as required, it will be included in the sequencing loop. 如果一个群控控制模块在主控制模块请求后没有开始调节，那么它将在群控循环中被忽略。在下一次扫描时，如果控制模块按要求进行调节，它将被包含在群控循环中。 Minutes 分钟
6	-		Unused 未使用
7	-		Unused 未使用

Para-meter 参数	Default 默认值	Range 范围	Description 说明
8	30		EGA: Trim Delay After Drain 烟分仪：排水后微调延时
			This is the delay after draining the sample, before the trim cycle start. Within this delay, the trim correction on the air damper or VSD is maintained while the EGA drains and the cells are purged with air. 在完成冷凝水排放后，EGA 要等待一段时间，然后进入微调周期。在延时期间，当 EGA 排放冷凝水和清洁传感器（用空气清洁）时，在风门挡板或变频器上的调节校正保持不变。
		5 – 240	Seconds 秒
9	-		Unused 未使用
10	2		EGA: EGA Version 烟分仪：EGA 版本
		0	Mk7 Protocol Mk7 协议
		1	Mk8 Protocol (Legacy) Mk8 协议（传统）
		2	Mk8 Protocol (RS485) Mk8 协议(RS485)
11	-		Unused 未使用
12	0		EGA: CO Used for Trim on Oil 烟分仪：燃油微调时使用 CO
			If the fuel has been set as oil (see options/ parameters 150 to 153), then the trim function can include CO to calculate the required trim correction. 如果燃料被设置为燃油（参见选项/参数 150 到 153），那么微调计算应包括 CO 计算。
		0	Disabled 禁用
		1	Enabled 启用
13	50		EGA: Commission Fuel-Rich Trim 烟分仪：调试富油微调
			The % of air damper movement when commissioning fuel-rich trim. 当调试富油微调时风门挡板角度的白分比。
		20 – 75	2.0% - 7.5%

Para-meter 参数	Default 默认值	Range 范围	Description 说明
14	50		EGA: Trim Reset Angular Rate 烟分仪：微调重置角速度
		0 – 900	This is the change time in the fuel valve angle per minute that will reset the trim correction. 这是执行重置微调校正时每分钟燃料阀角度的变化时间。 0.0 – 90.0 degrees per minute 0.0 – 90.0 角度/分钟
15	5		MM: Golden Start Time 控制模块：黄金启动时间
		2 – 100	This is the time period for how long the servomotors and VSDs are held at the golden start position from the point of main flame, see option 29. 这是伺服电机和变频器在黄金启动位置从主火焰位置保持的时长（参见选项 29）。 Seconds 秒
16	12		EGA: Time Between Air Calibrations 烟分仪：空气校准间隔时间
		1 – 50	This is the time period between air calibrations if the burner does not go off. 这是在燃烧器不停止时，空气校正间的间隔时间。 0.5 hours – 25.0 hours 0.5 小时-25.0 小时
17	3		EGA: Number of Trims Before Limits Errors Generated 烟分仪：极限错误产生前微调次数
		0 1 – 10	When the combustion limits have been exceeded, the MM will make trim corrections on the air damper. If the number of these trims reaches the value set in this parameter an error will be generated. See options 19, 20, 21, 22, 23, 25, 26, 27 and parameters 94, 96 97 for limits. 当超过燃烧极限，控制模块将在空气风门挡板上作出微调校正。如果这些微调的数量达到该参数设置的值，则会发生错误。极限值参见选项 19，20，21，22，23，25，26，27 和参数 94，96，97。 Disabled 禁用 Number of trims 微调的次数
18	100		EGA: Maximum Trim During Run 烟分仪：运行时最大微调
		20 – 100	This is the maximum trim % of air damper movement during firing. 这是在燃烧过程中空气风门挡板打开的最大微调百分比。 2.0% - 10.0%

Para-meter 参数	Default 默认值	Range 范围	Description 说明
19	50		EGA: Commission Air-Rich Trim 烟分仪：调试富氧微调
		20 – 75	This is the % air damper movement when commissioning the air rich trim. 这是在调试富氧微调时空气风门挡板打开的百分比。 2.0% - 7.5%
20	-		Unused 未使用
21	-		Unused 未使用
22	-		Unused 未使用
23	1		EGA: Add Air When CO Present 烟分仪：当 CO 出现时增加空气
		0 1	This sets whether the trim function adds when CO is present. If the O_2 and CO_2 appear air rich but CO appears fuel rich, then the air damper will open further to remove CO. 设置当 CO 存在时，添加微调功能。如果 O2 和 CO2 表现出富氧而 CO 表现出富燃料，那么空气风门挡板将进一步打开以去除 CO。 Disabled 禁用 Enabled 启用
24	120		EGA: (Mk7 Only) Air Calibration Time 烟分仪：(只限于 MK7)空气校准时间
		20 – 300	For the Mk8 EGA, this is set as default 6 minutes. 对于 Mk8 EGA, 设置默认值 6 分钟 Seconds 秒
25	-		Unused 未使用
26	8		EGA: Trim Samples per Cycle 烟分仪：每个周期微调采样数
		1 – 50	A cycle is the period between when does the EGA carries out a drain to get rid of excess moisture in the exhaust gas sample. This parameter sets the number of trim corrections in between drains. 微调周期是指 EGA 排放烟气样品中多余水分的时间间隔。此参数设置在排水之间的调节校正数。
27	-		Unused 未使用

Para-meter 参数	Default 默认值	Range 范围	Description 说明
28	0		MM: Internal High Limit Setpoint 控制模块：内部上限设定值
			The MM will shut down the burner or inhibit it from starting if the load (pressure or temperature) reaches this value regardless of any other setpoint in use. This setpoint will also operate in Commission Mode. If this setpoint is reached during Single Point Change, the MM will exist Single Point Change and offer to save any current changes. 如果负载(压力或温度)达到此值，控制模块将关闭燃烧器或阻止其启动，而不管使用中的任何其他设定值。此设定值也将在调试模式下运行。 如果在单点变化期间达到此设定值，控制模块将退出单点更改并提供保存任何当前变化的功能。
		0 - 9990	Depending on Option 1 setting 取决于选项 1 的设置
29	1000		MM: Load Sensor Adjustment 控制模块：负荷传感器调整
			Adjust the load sensor (voltage) reading, as a percentage of the reading. 调整负载传感器(电压)读数，作为读数的百分比。
		800 – 1200	Value 1000 = 100.0% of actual reading 值 1000 =实际读数的 100.0%
30	10		MM: Load Sensor Filter Time 控制模块：负载传感器过滤时间
		1 – 40	Seconds 秒
31	0		EGA: (Mk7 Only) Efficiency Calculation Method 烟分仪：（仅使用 Mk7）效率计算方法
			For the Mk8 EGA, efficiency calculation method is set on the EGA. 在 Mk8 EGA 上设置能效计算方法
		0	English 英式
		1	European 欧式
32	0		MM: User Setpoint Minimum Value 控制模块：用户设定值最小值
		0 - 9990	User Setpoint Limits, this limits the minimum value in setpoint in the status screen. 用户设定值限值，这限制了状态屏幕中设定值的最小值。
			^{O}C, ^{O}F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)

Para-meter 参数	Default 默认值	Range 范围	Description 说明
33	0		MM: User Setpoint Maximum Value 控制模块：用户设定值最大值
		0 - 9990	User Setpoint Limits, this limits the maximum value in setpoint in the status screen. 用户设定值限值，这限制了状态屏幕中设定值的最大值。 °C, °F, PSI or 0.1 bar or 0.01 bar for low pressure sensor (depends on load detector set in option 1 and metric/imperial units set in option 65) 用于低压传感器的 ℃, ℉, PSI 或 0.1 巴或 0.01 巴 (取决于选项 1 中的负载检测器和选项 65 中的公制/英制单位)
34			MM：Vendor Details Line 1 控制模块：供应商详细信息第 1 行
			Enter Vendor Name 输入供应商名称
35			MM：Vendor Details Line 2 控制模块：供应商详细信息第 2 行
			Enter Address Details (Street) 输入地址信息（街道）
36			MM：Vendor Details Line 3 控制模块：供应商详细信息第 3 行
			Enter Address Details (Town /City /Zip) 输入地址信息（城镇/城市/邮编）
37			MM：Vendor Details Line 4 控制模块：供应商详细信息第 4 行
			Enter Contact Details (Phone /Email Address) 输入联系方式（电话/邮箱）

Para-meter 参数	Default 默认值	Range 范围	Description 说明
38	***		MM: Commissioning Password Code 1 控制模块：调试密码口令 1
		0 – 255	Code 1 口令 1
39	***		MM: Commissioning Password Code 2 控制模块：调试密码口令 2
		0 – 255	Code 2 口令 2
40	-		Unused /未使用
41	-		Unused /未使用
42	-		Unused /未使用
43	-		Unused /未使用
44	-		Unused /未使用
45	-		Unused /未使用
46	-		Unused /未使用
47	0		DTI：Standby or Phantom Setpoint Type 数字传输接口：待机或偏移量设定值类型
		0	Use Fixed Standby Setpoint 使用固定待机设定值
		1	Use Phantom Setpoint Offset 使用设定值偏移量
48	80		PID: Integral Band 比例积分微分：比例带
		0 – 100	This is the percentage of the proportional band over which the integral control is active. 本参数值是比例带的百分比，在这个区域内比例控制活跃。 0% - 100%
49	-		Unused 未使用
50	-		Unused 未使用
51	-		Unused 未使用
52	0		MM: External Load Detector – Number of Decimal Places 控制模块：外部负载检测器-小数位
		0	This affects parameter the external load detector maximum and minimum values set in parameters 53 and 55. See options 1 and 65. 这将影响参数外部负载检测器在参数 53 和 55 中设置的最大值和最小值。参见选项 1 和 65。 0 decimal place 0 小数位
		1	1 decimal place 1 小数位
		2	2 decimal places 2 小数位

Para-meter 参数	Default 默认值	Range 范围	Description 说明
53	20		MM: External Load Detector – Maximum Value 控制模块：外部负载检测器 - 最大值
		0 – 9990	The scale will depend on how parameter 52 is set. See options 1 and 65. 比例将取决于参数 52 的设置方式。请参见选项 1 和 65。 Bar (PSI) or °C (°F) 20 = 20 Bar (PSI) or °C (°F) if parameter 52 is set to 0 如果参数 52 被设置为 0，则 20 = 20 Bar (PSI)或℃ (℉) 20 = 2.0 Bar (PSI) or °C (°F) if parameter 52 is set to 1 如果参数 52 被设置为 1，则 20 = 2.0 Bar (PSI)或 ℃ (℉) 20 = 0.2 Bar (PSI) or °C (°F) if parameter 52 is set to 2 如果参数 52 被设置为 2，则 20 = 0.2 Bar (PSI)或 ℃ (℉)
54	0		MM: External Load Detector – Maximum Voltage 控制模块：外部负载检测器 – 最大电压
		0 – 100	0.0V – 10.0V
55	20		MM: External Load Detector – Minimum Value 控制模块：外部负载检测器 – 最小值
		0 – 9990	The scale will depend on how parameter 52 is set. See options 1 and 65. 比例将取决于参数 52 的设置方式。请参见选项 1 和 65。 Bar (PSI) or °C (°F) 20 = 20 Bar (PSI) or °C (°F) if parameter 52 is set to 0 如果参数 52 被设置为 0，则 20 = 20 Bar (PSI)或℃ (℉) 20 = 2.0 Bar (PSI) or °C (°F) if parameter 52 is set to 1 如果参数 52 被设置为 1，则 20 = 2.0 Bar (PSI)或 ℃ (℉) 20 = 0.2 Bar (PSI) or °C (°F) if parameter 52 is set to 2 如果参数 52 被设置为 2，则 20 = 0.2 Bar (PSI)或 ℃ (℉)
56	0		MM: External Load Detector – Minimum Voltage 控制模块：外部负载检测器 – 最低电压
		0 – 100	0.0V – 10.0V
57	10		DTI: Highest MM ID 数据传输接口： 控制模块标识的最大值
		1 –10	This sets the highest MM ID number for that sequence or DTI loop. 群控或数据传输接口回路中最高控制模块的标识编码。 Sequence ID 群控标识
58	1		EGA: Air Calibration on Startup 烟分仪：启动时的空气校准
		0 1	For the Mk8 EGA, the air calibration schedule is set on the EGA itself. 对于 Mk8 EGA，空气校准时间表是设定在 EGA 上的。 Disabled 关闭 Enabled 启用
59	-		Unused /未使用
60	60		MM: Logo Display Timer (Standby) 控制模块：商标显示定时器（待机）
			If a custom logo is stored on the data micro-SD card in the MM, then after this timer in standby mode, the custom logo will appear on the screen. 如果自定义商标存储在控制模块的数据卡上，那么在这个定时器进入待机模式后，自定义商标就会出现在屏幕上。
		0 1 – 3600	Disabled 关闭 Seconds 秒

Para-meter 参数	Default 默认值	Range 范围	Description 说明
61	900		MM: Backlight On Time 控制模块：背景灯时间
			If the screen is not pressed and this timer elapses, the backlight will dim. 如果屏幕没有被按下并且这个定时器过期，背景灯将会变暗。
		0	Disabled 关闭
		1 – 1800	Seconds 秒
62	0		DTI: Hot Water Sequencing 数据传输接口：热水群控
			For setting 0 the boilers, the lag boilers will be off. For setting 1, the lag boiler will operate as steam sequencing, as set in option 41. 对于设置 0 的锅炉，滞后锅炉将关闭。对于设置 1，滞后锅炉将按蒸汽群控运行，如选项 41 所示。
		0	Two State Hot Water Sequencing (On/Off) 双态热水群控(开/关)
		1	Three State Hot Water Sequencing (On/Warming/Off) 三态热水群控(开/暖/关)
63	0		DTI: Two Port Valve Output Polarity 数据传输接口：二通阀输出极性
		0	Valve normally open (Closes when energised) 阀门常开（通电时关闭）
		1	Valve normally closed (Opens when energised) 阀门常闭（通电时打开）
64	-		Unused 未使用
65	-		Unused 未使用
66	-		Unused 未使用
67	-		Unused 未使用
68	1		MM: External Modulation Control Range 控制模块：外部控制的范围
			The range is set for either low fire to high fire in setting 0, or zero to high fire in setting 1. See option 45. 范围在设置 0 时设置为低火到高火，或者在设置 1 时设置为零到高火。见选项 45。
		0	Low to high 低火到高火
		1	Zero to high 零到高火

Para-meter 参数	Default 默认值	Range 范围	Description 说明
69	0		MM: External Modulation Input Range 控制模块：外部控制的输入信号范围
			This sets the range for external modulation input on terminals 37 and 38. To use mA, a 500ohm resistor needs to be placed across the terminals. 设置终端 37 和 38 的外部调节输入范围。要使用 mA，需要在端子之间并联一个 500 欧姆的电阻器。
		0	0 to 10V Input 0 到 10V 输入
		1	2 to 10V Input 2 到 10V 输入
70	-		Unused /未使用
71	-		Unused /未使用
72	-		Unused /未使用
73	-		Unused /未使用
74	-		Unused /未使用
75	-		Unused /未使用
76	-		Unused /未使用
77	-		Unused /未使用
78	-		Unused /未使用
79	-		Unused /未使用
80	0		MM: Distributed Return Temperature Shutdown Delta-T 控制模块：分布式返回温度关闭差值 Delta-T
			A user-defined differential temperature threshold may be configured that causes the burner to stop when breached (i.e. when the difference between inlet and outlet temperatures becomes too large). Please see technical bulletin #277 and #278 for full details. 可以配置用户定义的温差阈值，该温差阈值达到时燃烧器会停止（即当回水和出水温度之间的差异达到该阈值时）。有关完整详细信息，请参阅技术简告 #277 和 #278。
		0 1 - 500	Disabled /禁用 ℃, ℉ , metric/imperial units set in option 65 ℃, ℉,取决于选项 65 中的公制/英制单位
81	0		MM: Distributed Return Temperature Restart Delta-T 控制模块：分布式返回温度重启差值 Delta-T
			A user-defined differential temperature threshold may be configured that determines when the burner may restart following a shutdown caused by the differential temperature shutdown threshold. 可以配置用户定义的温差阈值，该阈值确定燃烧器在由温差关闭阈值引起的关闭后何时重新启动。详细信息，请参阅技术简告 #277 和 #278。
		0 1 - 500	Disabled /禁用 ℃, ℉ , metric/imperial units set in option 65 ℃, ℉,取决于选项 65 中的公制/英制单位

Para-meter 参数	Default 默认值	Range 范围	Description 说明
82	0		MM: Distributed Return Temperature Turndown Delta-T 控制模块：分布式返回温度调低差值 Delta-T
			A differential temperature threshold may be defined by the user to determine the differential temperature at which the maximum firing rate starts to be reduced. 用户可以定义一个温差阈值，以确定最大燃烧率开始降低的温差。详细信息，请参阅技术简告 #277 和 #278。
		0 1 - 500	Disabled /禁用 ℃, ℉ , metric/imperial units set in option 65 ℃, ℉,取决于选项 65 中的公制/英制单位
83	-		MM: Display Diagnostic Values 控制模块：显示诊断值
		0 1	Disabled /关闭 Enabled /启用
84	-		Unused /未使用
85	0		MM: Modulation Exerciser Period 控制模块：调节试验器时限
			If the modulation exerciser period is enabled, then the MM will repeatedly run between high fire and low fire. This value sets how long the MM will remain at the high fire and low fire positions. This should only be used in test/inspection conditions. 如果调节试验器时限是启用的，那么控制模块将在高火和低火之间重复运行。此值设置控制模块在高火和低火位置的持续时间。这应该只在测试/检查条件下使用。
		0 1 – 3600	Disabled /关闭 Seconds /秒
86	85		DTI: IBS Change Down Threshold 数据传输接口：智能锅炉群控下调阀值
			IF the combined firing rate of the last 2 MMs in the sequence loop is below this value, then the last lag MM will go from ‘on’ to the next phase (‘standby’, ‘warming’ or ‘off’) depending on how option 41 is set. 如果群控循环中最后两个控制模块的综合发点火率低于这个值，那么最后一个滞后控制模块将根据选项 41 所设置的从“开启”切换到下一个阶段(“待机”、“加热”或“关闭”)。
		0 – 99	0% - 99%
87	95		DTI: IBS Change Up Threshold 数据传输接口：智能锅炉群控上调阀值
			If the firing rate of the last MM in the sequence loop in the ‘On’ phase is above this value, then the next MM will go to the ‘On’ phase upon the next sequence scan time, to meet the load demand. 如果‘开启’阶段群控循环中最后一个控制模块的点火率高于这个值，那么下一个控制模块将在下一次序列扫描时进入‘开启’阶段，以满足负载需求。
		0 – 100	0% - 100%

Para-meter 参数	Default 默认值	Range 范围	Description 说明
88	1000		MM: Outside Temperature Sensor Adjustment 控制模块：室外温度传感器调节
			If the outside temperature reading is too high, then decrease this value. If the outside temperature reading is too low, then increase this value. 如果外部温度读数过高，则降低此值。如果外部温度读数太低，则增加此值。
		500 – 2000	50.0% - 200.0%
89			MM: Stat Exerciser Period 控制模块：内部温控试验器时限
			If the stat exerciser period is enabled, then T53 will be turned on for this timer set, and then turned off for this timer set, repeatedly. This should be used in test/inspection conditions. 如果启用了内部温控试验器时限，那么计时器内的 T53 将设置为开启，然后下一个计时器将设置为关闭，这样一直重复。这应该在测试/检查条件下使用。
		0	Disabled 关闭
		1 – 3600	Seconds 秒
90	1		MM: VSD Minimum Feedback Variation Check (Fuel 1) 控制模块：VSD 最小反馈变化检查(燃料 1)
		0	Disabled /关闭
		1	Enabled /启用
91	1		MM: VSD Minimum Feedback Variation Check (Fuel 2) 控制模块：VSD 最小反馈变化检查(燃料 2)
		0	Disabled /关闭
		1	Enabled /启用
92	-		Unused 未使用
93	-		Unused 未使用
94	0		EGA: NO Upper Limit Offset 烟分仪：NO 上限偏移量
			If the current NO value is above this offset limit from the commissioned value, an EGA error will occur, for option 12 set to 3. 如果当前 NO 值高于调试值的偏移量极限值，则会出现 EGA 错误，因为选项 12 被设置为 3。
		0	Disabled 关闭
		1 – 200	1 – 200 ppm NO
95	-		Unused 未使用

Para-meter 参数	Default 默认值	Range 范围	Description 说明
96	0		EGA: Exhaust Temperature Upper Limit Offset 烟分仪：烟气温度上限偏移量
			If the current exhaust temperature value is above this offset limit from the commissioned value, an EGA error will occur, for option 12 set to 3. See options 13 and 65. 如果当前烟气温度值高于调试值的偏移量极限值，则会出现 EGA 错误，因为选项 12 被设置为 3。参见选项 13 和 65。
		0	Disabled 禁用
		1 – 999	1 – 999 deg^{O}C or deg^{O}F
97	0		EGA: Exhaust Temperature Absolute Limit 烟分仪：烟气温度绝对限值
			If the current exhaust temperature value is above this absolute limit, an EGA error will occur, for option 12 set to 3. See options 13 and 65. 如果当前烟气温度值高于此绝对限值，则会出现 EGA 错误，因为选项 12 被设置为 3。参见选项 13 和 65。
		0	Disabled 禁用
		1 – 999	1 – 999 deg^{O}C or deg^{O}F
98	-		Unused 未使用
99	1		MM: Graceful Shutdown 控制模块：燃料转换时的关闭
			If enabled, when the fuel is deselected, the fuel valve outputs are de-energised, and then a post-purge occurs before the MM restarts. This must not be used if changeover relays are used on the system. Graceful shutdown cannot be used with assured low fire shut off in parameter 100. 如果启用，当燃料被取消选择时，燃料阀输出断开电源，然后在控制模块重新启动之前进行后吹扫。如果系统上使用转换继电器，则不应使用此功能。在参数 100 中，在确保低火关闭的情况下，不能使用燃料转换时的关闭。
		0	Disabled 禁用
		1	Enabled 启用
100	0		MM: Assured Low Fire Shut Off 控制模块：保证低火关机
			If enabled, when the burner turns off on internal stat, the MM will modulate to low fire, shut down and recycle the system before turning off. Assured low fire shut off cannot be used with graceful shutdown in parameter 100. 如果启用，当燃烧器内部温控关闭时，控制模块将调节到低火状态，在关机前关闭并重新使用该系统。在参数 100 中，确保低火关闭不能与燃料转换时的关闭一起使用。
		0	Disabled 关闭
		1	Enabled 启用

Para-meter 参数	Default 默认值	Range 范围	Description 说明
101	0		DTI: Shuffle Sequencing 数据传输接口：随机顺序锅炉群控
			This allows the sequence order to be changed remotely through the DTI or Modbus. See options 16 and 100. 这允许通过 DTI 或 Modbus 远程更改序列顺序。参见选项 16 和 100。
		0 1	Disabled /关闭 Enabled /启用
102	-		Unused 未使用
103	0		MM：Air Pressure Warning Lower Offset 控制模块： 空气压力低警告偏移量
			This is an offset lower limit from the commissioned air pressure, see option/parameter 146 for the gas pressure display units. 这是已调试的燃气压力偏移量下限，请参阅燃气压力显示单元的选项/参数 146。
		0 1-1000	Disabled /关闭 0.1 mbar – 100.0 mbar (value/值 25 = 2.5 mbar) 0.040 " WG – 40.133 " WG (值 25 = (1.003 " WG)
104	0		MM：Air Pressure Warning Upper Offset 控制模块： 空气压力高警告偏移量
			This is an offset upper limit from the commissioned air pressure, see option/parameter 146 for the gas pressure display units. 这是已调试的燃气压力偏移量上限，请参阅燃气压力显示单元的选项/参数 146。
		0 1-1000	Disabled /关闭 0.1 mbar – 100.0 mbar (value/值 25 = 2.5 mbar)
105	0		MM: Gas Pressure Warning Lower Offset 控制模块：燃气压力低警告偏移量
			This is an offset lower limit from the commissioned gas pressure, see option/parameter 131 for the gas pressure display units. These limits are also tested during main flame proving. See option/ parameter 125 and 126 to enable the pressure limits. A warning will be generated if the measured static line pressure during the VPS void to gas phase is below the absolute value in option 133. 这是已调试的燃气压力偏移量下限，请参阅燃气压力显示单元的选项/参数 131。这些极限也在主火焰验证过程中进行了测试。要启用压力限值，请参阅选项/参数 125 和 126。如果在 VPS（阀门检漏系统）注入燃气期间测量的静态管道压力低于选项 133 中的绝对值，则会产生警告。
		0 1 - 13400	Disabled /关闭 0.1 mbar – 1340 mbar (value /值 25 = 2.5 mbar) 0.040 ” WG – 537.777 ” WG (value /值 25 = (1.003 ” WG) 0.001 PSI – 19.435 PSI (value /值 25 = 0.036 PSI)

Para-meter 参数	Default 默认值	Range 范围	Description 说明
106	0		MM: Gas Pressure Warning Upper Offset 控制模块：燃气压力高警告偏移量
			This is an offset upper limit from the commissioned gas pressure, see option/parameter 131 for the gas pressure display units. These limits are also tested during main flame proving. See option/ parameter 125 and 126 to enable the pressure limits. 这是已调试的燃气压力偏移量下限，请参阅燃气压力显示单元的选项/参数 131。这些极限也在主火焰验证过程中进行了测试。要启用压力限值，请参阅选项/参数 125 和 126。
		0 1 - 13400	Disabled /关闭 0.1 mbar – 1340 mbar (value /值 25 = 2.5 mbar) 0.040 ” WG – 537.777 ” WG (value /值 25 = (1.003 ” WG) 0.001 PSI – 19.435 PSI (value /值 25 = 0.036 PSI)
107	***		MM: Online Changes Password Code 1 控制模块：在线更改密码 1
		0 – 255	Code 1 口令 1
108	***		MM: Online Changes Password Code 2 控制模块：在线更改密码 2
		0 – 255	Code 2 口令 2
109	0		MM: Mains Voltage Tolerance 控制模块：电源电压容差
			The MM performs internal tests to ensure that the mains power is safe for the unit to operate. When these tests fail the MM generates an error. This parameter governs the way the MM handle these tests results; setting 1 makes the MM more tolerant to the mains power instability while setting 2 disables the errors altogether. 为运作该单元，为确保电源是安全的，控制模块执行内部测试。当这些测试失败时，控制模块会产生一个错误。此参数掌管控制模块如何处理这些测试结果; 设置 1 使控制模块对电源不稳定有更大的容忍度，而设置 2 则完全禁用该内部测试的错误。 ***Note:*** *Setting 2 should only be used temporarily while investigating and correcting the cause of mains power instability. Running the MM continually on unstable power can degrade the MM and cause permanent damage to the unit.* *注:设置 2 仅在调查和纠正电源不稳定原因时临时使用。在不稳定的电源下连续运行控制模块会降低控制模块的性能并对设备造成永久性的损坏。*
		0 1 2	Standard 标准 Increased 加强 Errors Disabled 错误禁用

3 COMMISSIONING FUEL-AIR CURVE / 调试燃料-空气曲线

3.1 Overview / 概述

Important Note: Prior to commissioning, the fuel and air servomotors must be calibrated to ensure that the position of the valves and damper correspond to the potentiometer feedback signal as displayed on the Mini Mk8 MM. When the valve is fully closed, the MM should display zero degrees. If it does not, please adjust the servomotor potentiometer.
重要提示：在调试前，必须对燃料和空气伺服电机进行校准，以确保阀门和风门挡板的位置与 MK8 微型控制模块（Mini Mk8 MM）上显示的电位器反馈信号一致。当阀门完全关闭时，控制模块应显示 0 度。如果没有，请调整伺服电机电位器。

The commissioning procedure as described must be strictly adhered to. Anybody commissioning a Micro-Modulation system must have an adequate understanding of combustion plant. In the wrong hands hazardous conditions could be made to exist. The Autoflame products must only be installed, set up, commissioned and adjusted by an Autoflame certified technical engineer.
必须严格遵守所述的调试程序。系统调试人员必须充分理解燃烧设备。非专业人员执行的调试操作可能会造成危险。Autoflame 产品只能由 Autoflame 认证的技术工程师来安装，设置，调试和调节。

The fundamental idea of the system is to set a fuel valve position and then set a corresponding air damper position. Care must be taken when adjusting the fuel and air positions so as not to create any unstable or hazardous combustion conditions, e.g. moving the fuel valve to the open position without increasing the air damper position. Improper use may result in property damage, serious physical injury or death.
控制系统的理论基础是设置一个燃料阀门位置和一个对应的空气挡板位置。应仔细调节燃料和空气位置并且保证不造成任何不稳定或者危险的燃烧条件，比如：把燃气阀门调节到开启位的时候未相应增大空气挡板的开度。使用不当可能会导致财产损失，严重的人身伤害或伤亡。

If the MM is commissioned without an EGA then a combustion analyser is required to check the exhaust gases. If the system does have an EGA, then a combustion analyser is not necessary as the EGA performs all normal exhaust gas measurements. When burning oil a smoke detection device is also necessary to check that the smoke generated is within safe limits.
如果控制模块的调试不带 E.G.A.那么就需使用烟分仪来检查烟气。如果系统带有 E.G.A.那么就无需使用烟分仪，因为 E.G.A.能够执行所有常规的烟气测量。当燃烧燃油时，系统还需配有烟雾探测装置来检查烟雾是否超出安全极限。

Once a low firing position has been established, the high fire position is entered first, then descending fuel/air positions are entered consecutively until finally a minimum fuel position is entered. The CH1 and CH2 positions must always be less than the ones previously entered.
在建立了低点火位置后，系统首先进入高火位置，然后操作者输入逐步降低的燃料/空气位置，直到最终获得最低燃料位置（低火位）。CH1 和 CH2 的位置必须始终低于之前输入的燃料/空气位置。

3.1.1 Commissioning Procedure / 调试流程

On a newly installed system the following procedures should be carried out as listed:
对一个新装系统要执行以下流程：

1. Check all interconnecting wiring between the MM and external components is correct.
   检查控制模块与外部部件的连接线路是否正确。
2. Set options and parameters required (refer to sections 2.1 and 2.2).
   设置正确的选项值和参数值（参阅章节 2.1 和 2.2）
3. Set up servomotors.
   设置好伺服电机
4. Program fuel/air positions.
   设置好燃料/空气的位置

3.2 Installation Checks / 安装检查

3.2.1 Commissioning Checks / 调试检查

When all the installation and burner adjustments are completed, the entire burner control system should be tested in accordance with the manufacturer's instructions. The procedure should verify the correct operation of:
在完成所有安装和燃烧器调节操作后，操作者要根据制造商指导文件来检查整个燃烧器控制系统。需检查验证的具体内容如下：

1. Each operating control (temperature, pressure etc.)
   所有的运行控制（温度，压力等等）。
2. Each limit switch (temperature, pressure, low water cut-off, etc.)
   所有的限位开关（温度，压力，低水位切断，等等）。
3. Each interlock switch (airflow switch, high and low fuel pressure or temperature switches, purge and low fire switches, fuel valve proof of closure interlock etc.)
   所有的互联开关（空压开关，高和低燃料压力或温度开关，吹扫和低火开关，燃料阀门关闭校验连锁等等）。
4. Pilot flame failure response and lockout.
   引导火焰的故障响应和锁定。
5. Main flame failure response and lockout.
   主火焰的故障响应和锁定。
6. Tight shut-off for all valves.
   所有阀门的完全关闭

3.2.2 Operational Checks / 运行检查

1. Close manual main shut-off valve.
   关闭手动主截止阀
2. Check all limit circuit wiring for proper operation and correct connection.
   检查所有限值电路的正常运行和正确连接。
3. Confirm that the automatic main fuel valves are wired correctly.
   确认自动主燃料阀门的接线正确。
4. Power the control and electronically check the proper sequence of operation.
   控制器通电，检查正常运行时序。
5. After assuring yourself that all the interlocks and valves are properly wired and that the sequence of operation is correct, open the manual main shut-off fuel valve and proceed cautiously through the boiler light off process. Check all safety interlocks for proper shutdown of the boiler.
   在确认所有联锁和阀门接线正确和运行时序的正确后，打开手动主截止阀并且仔细执行锅炉点火过程。
   检查所有锅炉关机的安全联锁。

WARNING: COMMISSIONING OR BURNER START-UP MUST ONLY BE CARRIED OUT BY A FACTORY TRAINED TECHNICIAN.
警告：锅炉调试或者启动只能由经过工厂培训的技术员来操作。

3.2.3 Installation Precautions / 安装注意事项

The reliability of the equipment may be impaired if used in environments where strong electromagnetic fields exist e.g. if the equipment is installed in a boiler house where radio systems exist then additional EMC (Electro Magnetic Compatibility) measures may have to be considered. Please contact Autoflame for more information.
设备的可靠性在强电磁场环境下会遭到破坏。例如：在锅炉房周围存在电磁场时，系统要采取额外的电磁兼容措施来对抗。请咨询Autoflame来获得更多相关信息。

3.2.4 Maintenance and Servicing / 维护和保养

The Micro-Modulation unit uses solid state technology. It requires no routine maintenance.
微调节设备采用坚实的制造科技。设备无需例行保养。

The servomotors/gas/oil/FGR valves do require routine maintenance. Any fault associated with these parts is usually diagnosed by the MM. Contact Autoflame for preventative maintenance procedures; please refer to the Valves and Servomotors manual for general checks.
伺服电机/燃气阀门/燃油阀门/烟气再循环阀门都需要定期维护。微调节模块可以诊断这些些部件的故障。请联系Autoflame来了解预防性维护程序，请参阅阀门和伺服电机手册了解阀门检查的信息。

3.3 Servomotors / 伺服电机

Autoflame supply three standard sizes of servomotors – small, large and industrial, which can be used for all channels. Autoflame fuel valves require small or large servomotors only. Both small and large servomotors can be configured to drive clockwise or counter clockwise to open a valve or damper. Servomotors can be installed in any orientation; 2 fixed rotation positions if using Autoflame valves. For layout of the small, large and industrial servomotors please refer to the Valves and Servomotors manual.
Autoflame 提供三种标准尺寸马达，小型、大型和工业型，它们可用于所有通道。Autoflame 燃料阀门只使用小型或者大型伺服电机。小型和大型马达都能顺时针或者逆时针转动来打开阀门或者挡板。伺服电机的安装朝向可以时任意方向，Autoflame 阀门具有两个固定转动位置。请参阅阀门和伺服电机手册来获得小型、大型和工业型伺服电机的布局图。

Viewing the shaft end-on, from the potentiometer end, all servomotors drive in a clockwise direction if power is applied between the LIVE and CW terminals, and counter clockwise if the power is applied between the LIVE and CCW terminal.
从电位器端（上盖端）看去，当电源接线位于火线端（L 端）和顺时针端（CW 端）之间时伺服都是顺时针转动；当电源接线位于火线端和逆时针端（CCW 端）之间时伺服都是逆时针转动。

The operation of fuel valves and air dampers is often such that they open in a clockwise direction. If the operation needs to be reversed, it is necessary to swap various wiring connections between the MM and the servomotor(s). An example of reversing the operation of a servomotor is shown in Figure 3.3.3.
燃气阀门和空气挡板的转动方向一般是顺时针。可以通过交换控制模块和伺服电机之间的接线端子来改变阀门/挡板的转动方向，图例 3.3.3 说明了改变通道 1 伺服电机运行方向的方法。

Note: Servomotors are supplied by the factory set at 0.0 position. Remember that this position may not necessarily automatically position the damper at 0.0 or a closed position. This must be physically checked. Failure to do so can result in serious injury or death.
注意：工厂供应的伺服电机设置是 0.0 位，但是这不代表伺服电机一定处于 0.0 位或关闭位。在使用前必须检查挡板位置。忽视这项检查会造成严重人身伤害或伤亡。

3.3.1 Adjusting the Servomotor Potentiometer / 调节伺服电机电位器

Before a burner is fired it is essential to set up each Micro-Modulation servomotor. A tamper proof screwdriver is required (please contact Autoflame).
在燃烧器点火前必须设置每个微调节模块的伺服电机，这需要使用防篡改螺丝刀（请联系 Autoflame）。

Usually control valves/air dampers that the servomotors drive, move through up to 90 angular degrees. The MM system has the ability to drive valves through 360 degrees, but the MM will only display from -6 to 96 degrees.
通常伺服电机移动的控制阀门/空气挡板的最大开度是 90 度。微调节控制系统能够将它们开启 360 度，但是控制系统只显示-6 度到 96 度的范围。

All Channel 1 to 3 readings displayed on the MM are in angular degrees. It is necessary to adjust the potentiometer in the servomotor assembly so that the MM reads 0.0 when the relevant valve/damper is at its fully closed position. The technician must physically check the mechanical position of the dampers and valves, whilst all servomotors are set to 0.0 before leaving the factory this may have changed during shipping. DO NOT ASSUME THEY HAVE BEEN PREVIOUSLY SET CORRECTLY.
控制模块显示的通道 1 到通道 3 数值均为角度值。在必要情况下要调节伺服电机电位器，确保当相关阀门/挡板处于全闭时控制模块显示的数值是 0.0。技术员必须检查挡板和阀门的机械位置，这是由于在出厂后的运输途中伺服电机的 0.0 位置可能会发生变化。不要假定伺服电机的初始设置都是正确的。

To set up a servomotor, first ensure option 12 is set to 0, (this prevents EGA errors from allowing continuation). Put the MM into the commissioning mode and press CLOSE to position the valve/damper mechanically by using the appropriate up and down buttons (see section 3.4.2).
要设置伺服电机，首先确保选项 12 的值是 0（这是防止允许通讯引起的 E.G.A.错误）。然后切换到控制模块的调试模式，按下 CLOSE/关位按钮并且选择 UP 和 DOWN 按钮来机械定位阀门/挡板（参见章节 3.4.2）

WARNING: ELECTRICAL CONNECTIONS ARE LIVE/HOT AND INCORRECT APPLICATION MAY RESULT IN SERIOUS PHYSICAL INJURY OR DEATH.
警告：电气连接带有电流，不正确使用会导致严重人身伤害或伤亡。

Remove the servomotor cover.
移除伺服电机盖板

- For air servomotors carry out the following procedure:
  对空气伺服电机执行以下操作流程:

Use the channel 2 up/down buttons on the MM to position the air damper to its physically closed position. Loosen the two tamper proof screws just enough to enable the potentiometer to rotate. Rotate the potentiometer clockwise or counter clockwise until the relevant channel reads 0.0. Tighten the two tamper proof screws gently until the potentiometer is secure. Do not over tighten the screws. Check that the display still reads 0.0. If incorrect repeat the adjustment process.
使用控制模块上通道 2 的 UP/DOWN 按钮将空气挡板定位到全闭位置。适当松开两个防篡改螺钉，使电位器旋转。顺时针或逆时针旋转电位器直到相关通道的读数变为 0.0。轻轻紧固防篡改螺钉直到电位器的安装变得紧固，不要过分紧固螺钉。然后再次检查读数是否为 0.0。如果仍不正确，应重复上述操作。

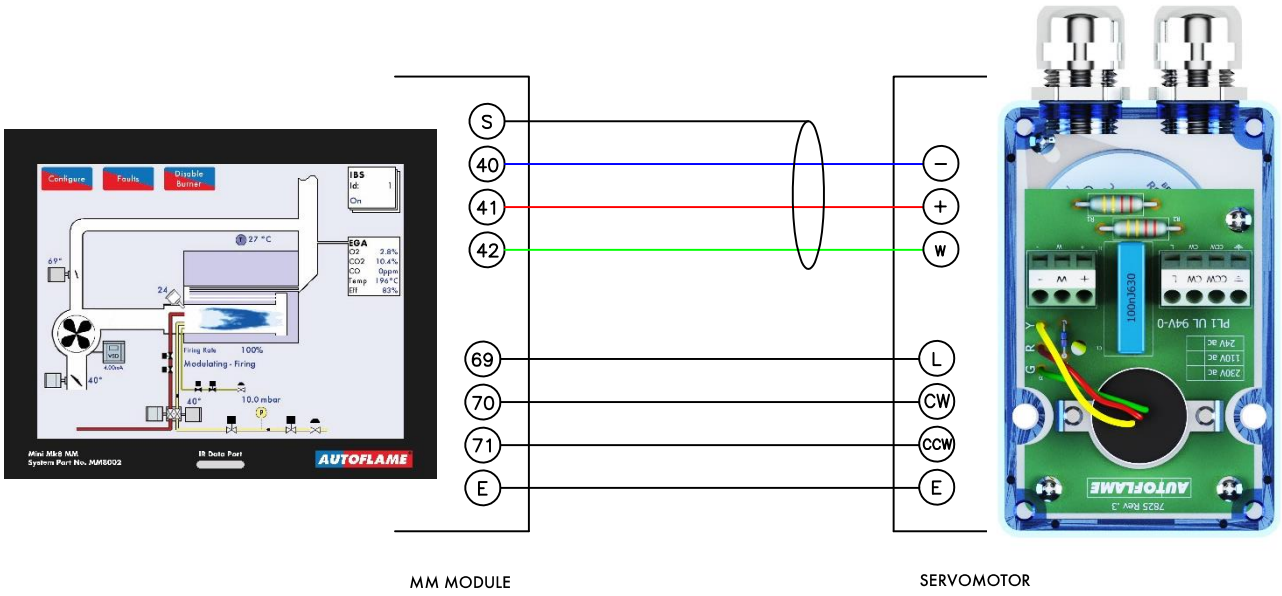
- For fuel servomotors carry out the following procedure:
  对于燃料伺服电机执行以下流程:

On Autoflame gas, oil and gas/oil piggy-back valves it is necessary to remove the servomotor. Manually position the oil/gas valve slot to its closed position. Observe the position of the drive pin on the servomotor. Use the relevant channel up/down buttons to position the pin so that when the servomotor is reassembled to the valve it is in line with the slot. Reassemble the servomotor to the valve, loosen the two tamper proof screws and proceed to adjust the potentiometer position until 0.0 is displayed. Use the external position indicator to ensure the valve is in the fully closed position.
对于 Autoflame 燃气阀，燃油阀和油气一体阀必须要移除伺服电机。手动定位燃油/燃气阀的阀槽到关闭位。观察伺服电机上传动销的位置。用相关通道的 up/down 按钮来定位传动销，要保证伺服电机被装回后与阀槽位置对齐。将伺服电机装到阀门上，松开两个防篡改螺钉，然后调节电位器位置直到控制模块屏幕显示 0.0 位。使用外部示位刻度来确保阀门处于全闭。

3.3.2 Servomotor Feedback Voltage / 伺服电机反馈电压

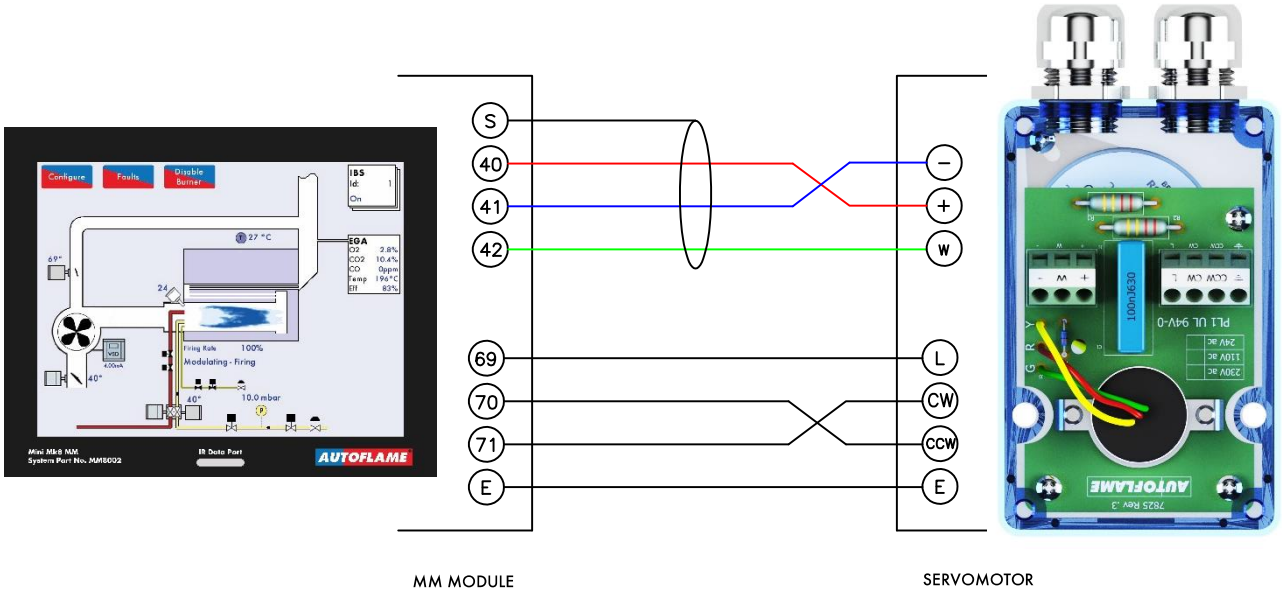
In applications where the servomotor is not positioned close to the display then it is possible to measure the feedback voltage from the servomotor in order to ensure that 0.0 degrees is displayed. By testing the DC voltage between the blue and green wires (wiper and 0V) on the servomotor low voltage terminals this will read 0.21V DC when the reading on the display is 0.0^{O}. The same can be done for when the servomotor is at 96.0^{O} where the voltage will be 3.6V.
当实际使用的伺服电机位置与屏幕数值不符，可通过测量伺服电机反馈电压来确保阀门全闭时屏幕的显示值为 0.0。当伺服电机低压端口上蓝线（0V 端）和绿线（Wiper，W 端）之间的直流电压测量值是 0.21V DC 时屏幕的显示数值应是 0.0 度。当伺服电机角度为 96.0 度的直流电压测量数值应是 3.6V。

3.3.3 Servomotors – Direction Change / 伺服电机 – 改变马达转动方向



SERVOMOTOR CLOCKWISE ROTATION

伺服顺时针转到接线



SERVOMOTOR ANTICLOCKWISE ROTATION

伺服逆时针转到接线

Figure 3.3.3 Servomotor CW&CCW directions wiring (Channel 1 used for illustration)
伺服顺逆时针转向接线（使用通道 1 为例说明）

3.3.4 Servomotors with Autoflame Valves / Autoflame 阀门与伺服电机

On threaded valves, the pin on the top of the valve is 90 degrees opposite from the position of the butterfly valve.
螺口阀门顶部的阀销与蝶阀成 90 度角。

On flanged valves, the pin on the top of the valve is in line with the position of the butterfly valve.
法兰阀门顶部的阀销与蝶阀成 0 度角。

For both valves the external visual position indicator is in line with the position of the butterfly valve. Regardless of the type of valve being used, the servomotor is dispatched from the factory with the potentiometer in the zero position. The same servomotor will be correct for both types of valve, as the servomotor for the threaded valve is mounted at 90 degrees different from the flanged valve.
这两种阀门的外部示位条和蝶阀的实际朝向是相同的。不管选用哪种阀门，所供应的伺服电机的电位器在出厂时都处于 0 位置。螺口阀门和法兰阀门都使用同一种伺服电机，但是伺服电机在这两种阀门上的安装角度相差 90 度。

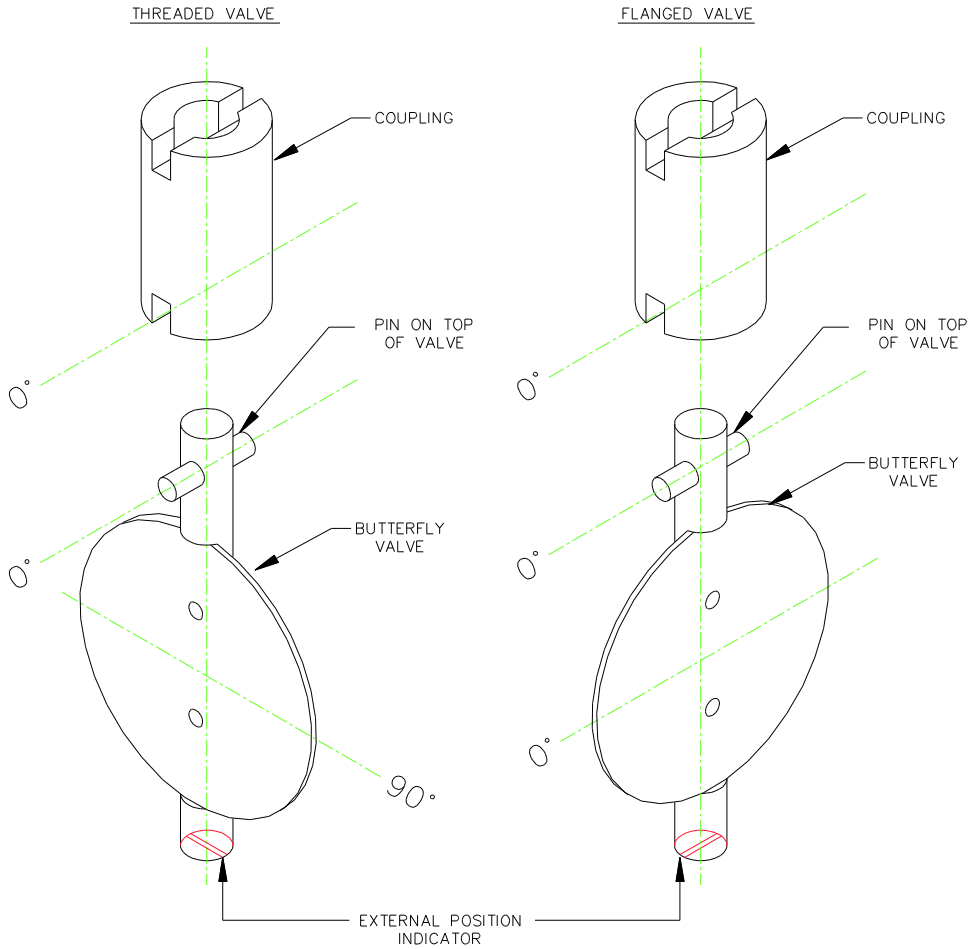


Figure 3.3.4.i Valve Pin Positions
阀销位置

3.4 Commissioning Fuel and Air Positions / 调试燃料和空气位置

The following procedure is shown for commissioning the EGA with option 12 set to 0 (Not Optioned), or 1 (Monitoring only). Trim can be added later by setting option 12 to 2 (Applies trim) or 3 (Applies trim, combustion limits tested). Please see section 3.7 for adding/adjusting the trim data later during Single Point Change. If the EGA is optioned later in Online Changes, the MM will not require a full re-commission; the trim data can be added in Single Point Change.
以下调试操作步骤适用于当选项 12 被设为 0（E.G.A.功能未选用）或 1（E.G.A.仅用于监控）时。操作者可以在以后某时点添加 E.G.A.微调数据，方法是将选项 12 设为 2（E.G.A.微调）或者 3（E.G.A.微调，测试燃烧极值）。请参阅章节 3.7 来了解如何使用“单点更改”来添加/调整 E.G.A.微调。如果在以后的在线更改中选用了 EGA, 控制模块将不需要完全重新调试；微调数据可以在“单点更改”中添加。

For option 12 set to 0 or 1 during commissioning, omit section 3.4.6. For option 12 set to 2 or 3 during commissioning, please include section 3.4.6.
注意：当在调试阶段中选项 12 被设置成 0 或者 1，读者可省略章节 3.4.6。当在调试阶段中选项 12 值被设置成 2 或者 3，读者需要阅读章节 3.4.6。

The fuel and air positions need to be programmed for the following points: CLOSED, OPEN, GOLDEN START (if optioned), FGR START (if optioned), LOW FIRE (START), INTER POINTS, and HIGH FIRE.
操作者要设置各个位置的燃料和空气位：关闭位，开启位，黄金启动位（若在选项中启用），烟气再循环启动位（若在选项中启用），低火位（启动点，如果没有启用黄金启动位或者烟气再循环启动位），中间位，和高火位。

There must be a minimum of 3 INTER points entered on the fuel-air curve, and a maximum of 18. Points can be added/removed in Single Point Change mode (see section 3.7).
燃料-空气曲线上至少有 3 个中间点，最多 18 个。可以在单点更改模式中添加/删除点(参见第 3.7 节)。

During commissioning the required setpoint is not active; the internal stat always remains on regardless of the actual value. Ensure that the high limit stat is set correctly and wired into the recycling interlock (T53), or set the Internal High Limit Setpoint in Parameter 28 , as this will turn the burner off in the event that the safe working maximum temperature or pressure of the boiler is exceeded.
所设的各设定值在调试过程中并不起作用；内部温控将一直保持开启有效。确保正确的上限控制点设置，上限控制点要与再循环联锁端口（T53）连接，或者设置参数 28 内部上限设定值（默认是禁用的）。在最大安全工作温度或锅炉压力，或内部上限设定值（如启用）被超出时，将关闭燃烧器运行。

The high limit stat should be set below the rating of the safety valve, please see the manufacturer’s guidelines for the safety valve for that boiler.
上限控制点数值应该设置在安全阀额定值以下，请参阅该锅炉安全阀的制造商指南。

Note: If a fault occurs, the boiler goes above the high limit stat or power is lost to the MM during commissioning, no data is stored. The points entered are only stored within the MM once the commission has been completed.
如果发生故障，锅炉超过上限控制点数值或控制模块在调试过程中电源出故障，则不存储数据。输入的点只有在调试完成后才会储存在控制模块内。

3.4.1 Starting Commissioning / 开始调试

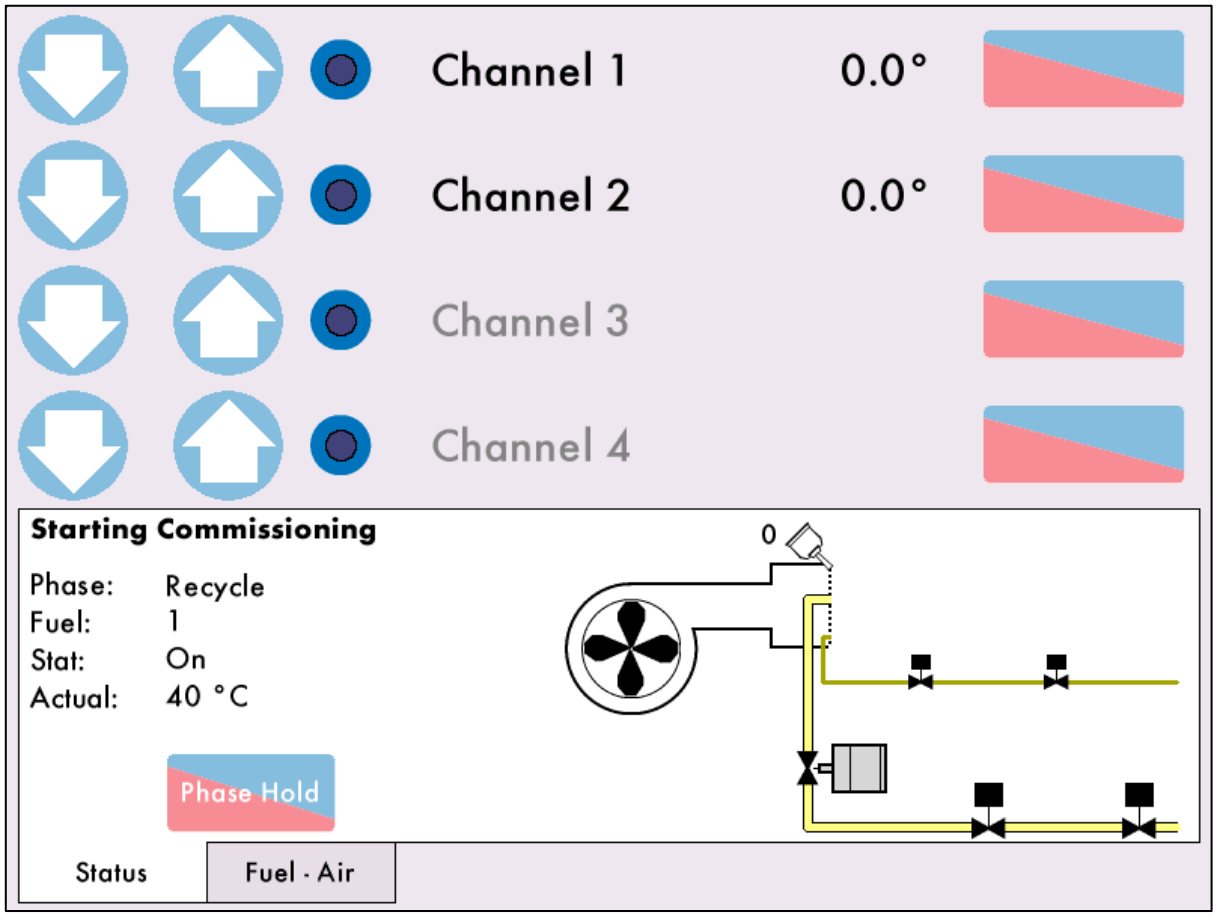


Figure 3.4.1.i Starting Commissioning / 图 3.4.1.i 开始调试

Once the options and parameters have been set, press Commission on the Commission Mode screen in Figure 2.1.ii. If the MM has already been commissioned, then press Commission on the Home Display.

完成了选项和参数设置后，按下示意图 2.1ii 调试模式屏幕上的 Commission **调试**按钮。如果控制模块已被调试过，可直接按下主页上的 Commission **调试**按钮。

Figure 3.4.1.i shows the Commissioning screen. In the Commissioning screen, the 4 channel positions will be shown, with the unused channels greyed out.
图 3.4.1.i 显示调试屏幕。在调试屏幕中，将显示 4 个通道的位置，未使用的通道将显示为灰色。

Once the MM goes through its internal relay checks and VPS (if optioned), the message 'Select Commissioning' will display.
一旦控制模块通过内部继电器检查和 VPS（阀门检漏系统）(如果已选择)，将显示“选择调试”消息。

3.4.2 Enter CLOSE Position / 输入关闭位置

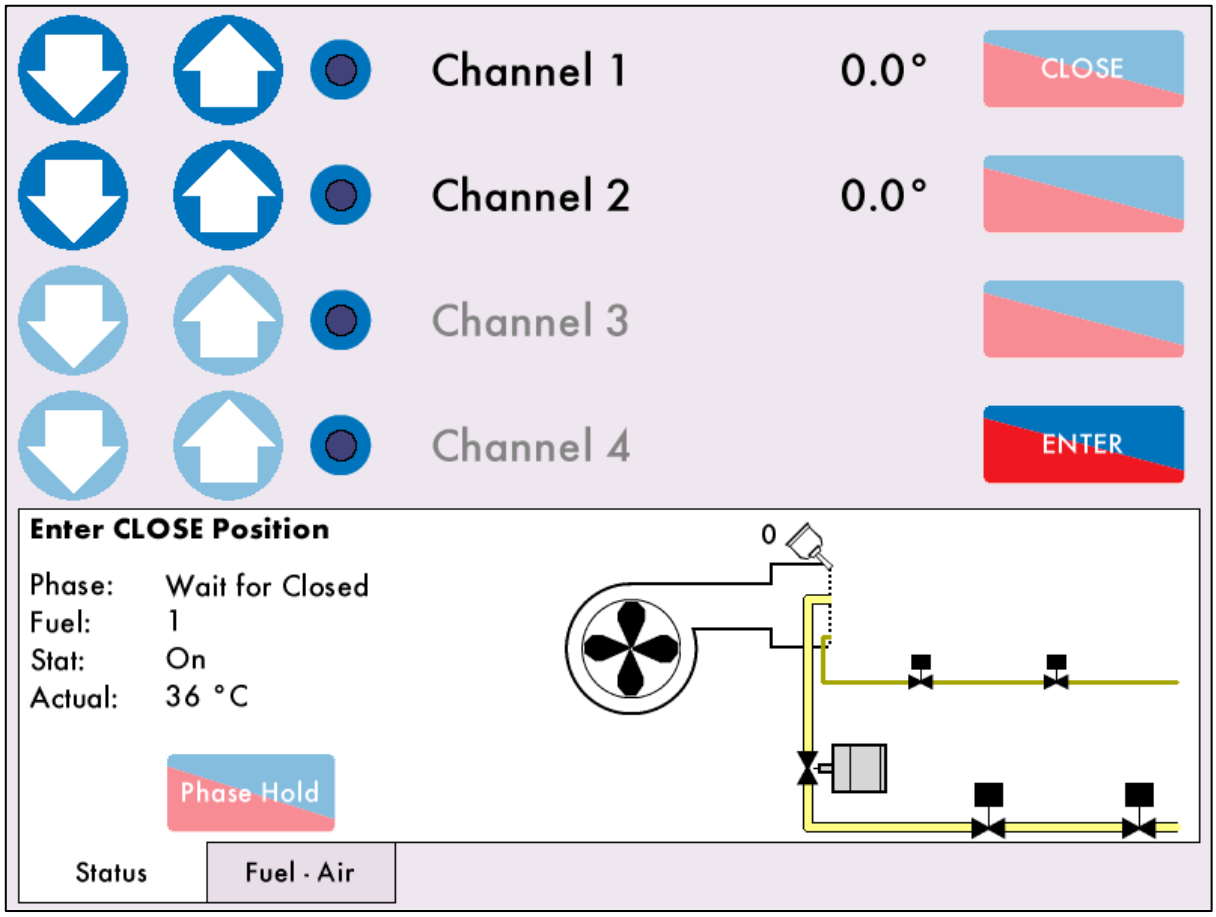


Figure 3.4.2.i Enter CLOSE Position
图 3.4.2.i 输入关闭位置

The MM is now waiting for the CLOSE position to be entered. Press CLOSE to enter this position.

这时 MM 等待输入关闭位置。按下 CLOSE **关位**按钮并且输入关闭位置。

Note: No error checking of the servomotors is enabled at this stage, therefore, do not to drive the servomotors/ dampers beyond any mechanical limitations that may be present on the damper/valve. This may cause damage to the servomotor and/or the damper/valve.
注意：在这个阶段不能执行伺服电机的错误检查。操作者不得过于开启伺服电机/挡板或者使它们的开度超出机械极限。这会导致伺服电机和/或挡板/阀门的损坏。

Use the buttons to set the positions to 0.0°.

使用按钮 来设置 0.0 值。

Note: Double check the damper/valve is physically at the 0.0 (closed) position. This can be achieved by checking for external indications on the damper assembly or the fuel valve. It is the engineer's responsibility to ensure that the servomotors are correctly calibrated. Incorrect calibration can cause serious injury or death.
注意：再次检查挡板/阀门是否处于 0.0（关闭）位置。操作者可以通过观察挡板/燃料阀的“外部示位条”来判断阀门位置是否正确。调试工程师要确保伺服电机都经过正确校准。不正确的伺服电机校准会导致严重的人身伤害和伤亡。

Press ENTER to store the CLOSE position. The burner motor output T58 will energise at this point. A message will then be displayed 'Enter OPEN Position.'

按下 ENTER **确认**按钮来保存关闭位置的设置。燃烧器风机输出端 T58 这时将运行，屏幕上出现信息“输入开启位置”。

3.4.3 Enter OPEN Position / 输入开启位置

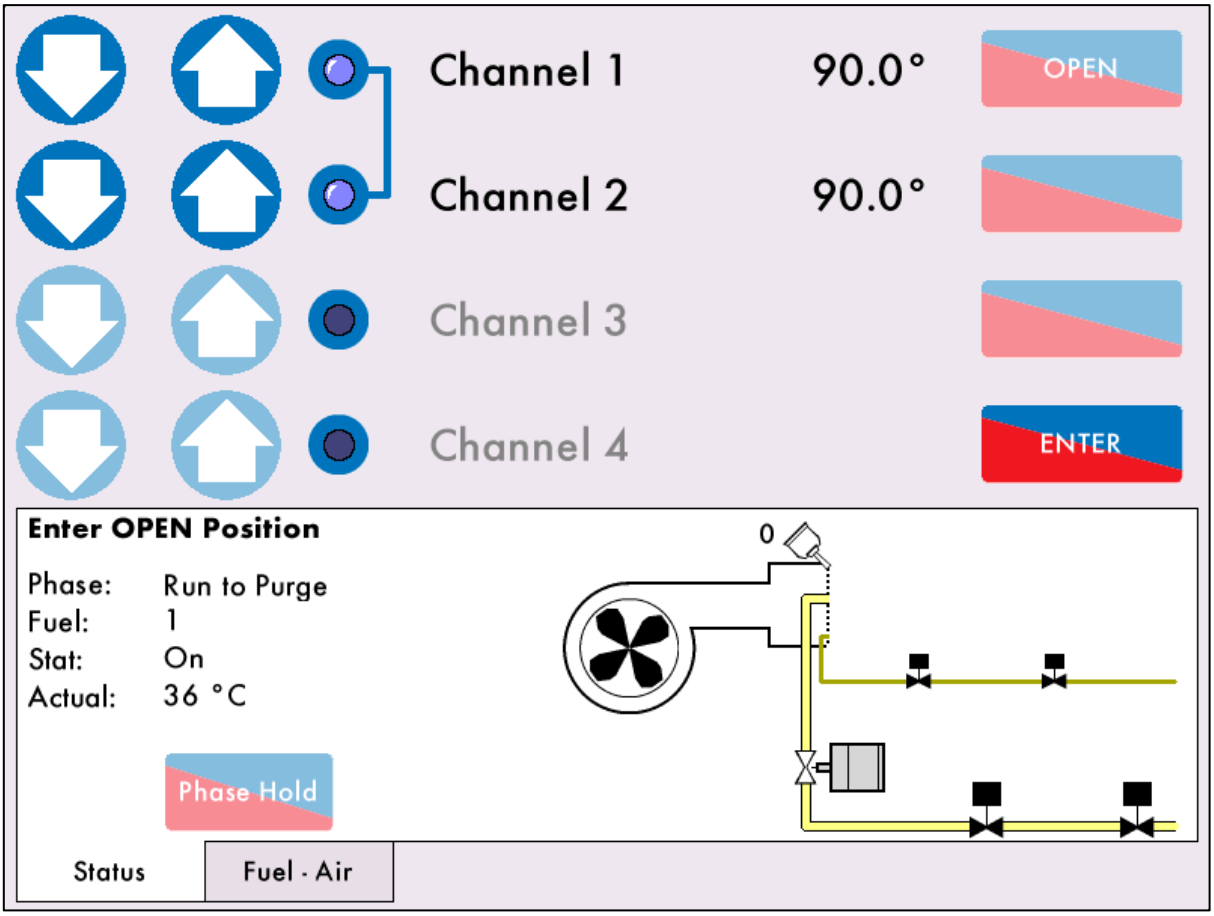


Figure 3.4.3.i Enter OPEN Position
图 3.4.3.i 输入开启位置

Press OPEN and then drive the fuel and air servomotors to their OPEN position. The button hold facility allows multiple channels to be driven up or down at the same time. Press on the blue circles next to the channels; once selected they the blue circles will be filled and a blue line will appear as above in Figure 3.4.3.i to indicate the channels are selected.

按下 OPEN **开位**按钮，然后将燃料伺服电机和空气伺服电机打开到开启位置。通过使用“按键保持”功能可以同时调高或者调低多个通道的位置。操作者按下通道一侧的蓝圈 。蓝圈一旦选定就会填满，与此同时将出现上方示意图 3.4.3.i 中的蓝线来表明通道已选定。

Use the buttons to drive both servomotors to the OPEN position simultaneously. This is normally 90.0° for gas butterfly valves and burner air dampers, but may be set to less than 90.0° if there are

mechanical stops/limits. Channel 4 cannot be adjusted at this stage, its calibration is dictated by the drive set-up and relevant options.

用按钮同时将燃料伺服电机和空气伺服电机打开到开启位置。燃气蝶阀和燃烧器空气挡板一般角度位 90 度，但是当存在机械极限时它们的角度也可被设为小于 90 度。在这个阶段不能够调节通道 4，通道 4 的校准要取决于驱动设置值和相关选项值。

Press 

to save the OPEN positions.

按下

确认按钮来保存开启位置的设置。

Pressing on the Fuel-Air tab at any time will give you a graph showing the fuel and air servomotor angles.
用户可以随时按下燃料-空气标签来查看燃料伺服电机角度和空气伺服电机角度的图示。

3.4.4 Enter START Position / 输入点火位置

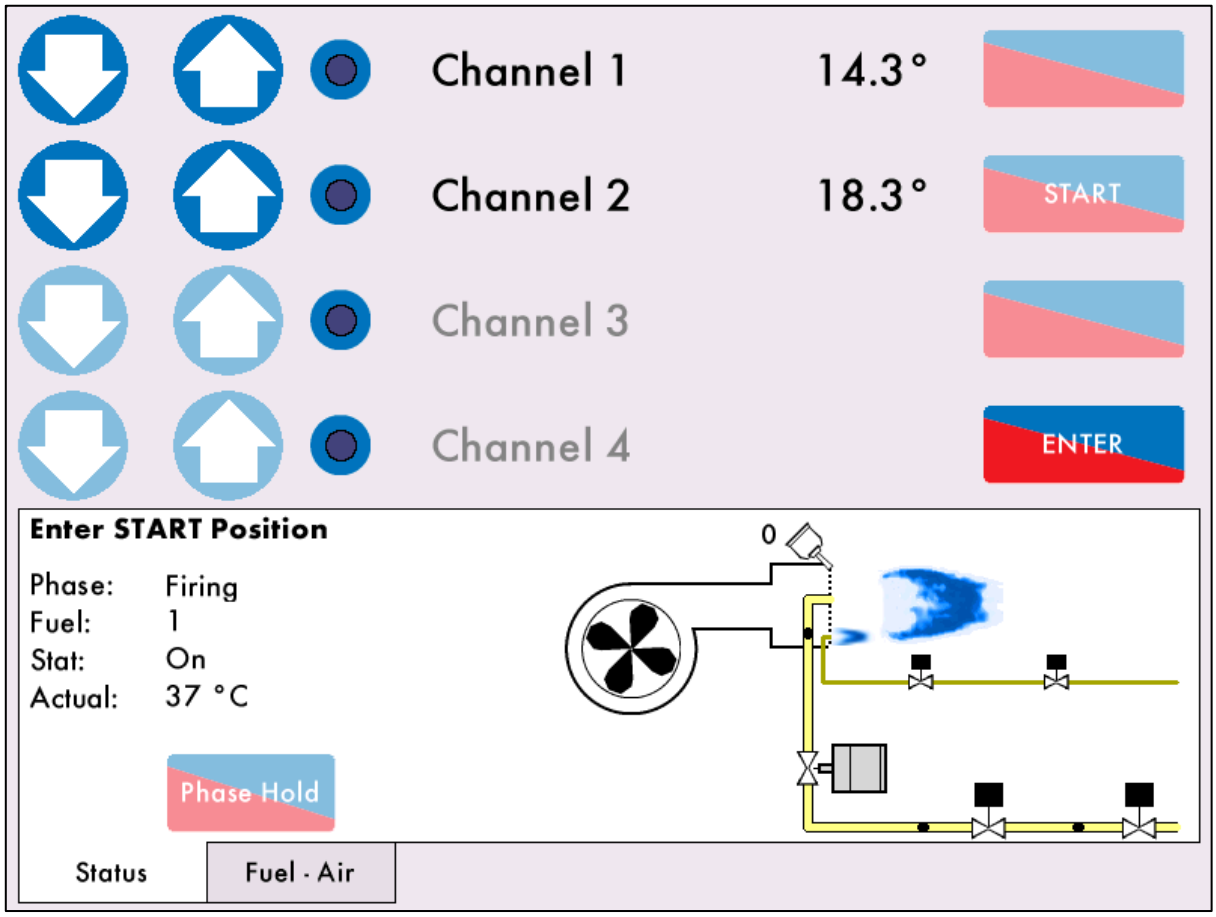


Figure 3.4.4.i Enter START Position
图 3.4.4.i 输入点火位置

Once the system has purged (see options/ parameters 75 and 112), the message 'Set up START Position' will display on the MM.
在系统完成吹扫后（参阅选项/参数 75 和 112），控制模块屏幕将显示“设置点火位置”（该临时点火点不会被保存）。

Press START and drive the servomotors to their START position. To enter a fuel START position which is less than 10 degrees below the OPEN position, you must drive the servomotor below this band, and then back open. For example, if the CH1 OPEN position is set at 90.0^{O}, to set a CH1 START position of 83.0^{O}, you must drive the CH1 servomotor to below 80.0^{O} and then to 83.0^{O}.

按下START**点火位**按钮来将燃料伺服电机和空气伺服电机驱动到点火位置。如果燃料点火位要比开启位要小 10 度以内，用户必须将点火位置角度设置成比开启位置角度小 10 度的数值，然后再反方向调节为与开启位差距少于 10 度的角度。例如：如果通道 1 的开启位置是 90 度，要设置 83 度的通道 1 点火位置，用户应先将通道 1 伺服电机点火位置设为低于 80 度然后再反方向调节到 83 度。

****WARNING** ENTERING THE START POSITION BEFORE REDUCING FUEL INPUT APPROPRIATELY COULD RESULT IN SERIOUS PHYSICAL DAMAGE OR DEATH.**
****警告** 在输入点火位数据前要适当降低燃料输入量，否则有可能导致严重的人身伤害或者伤亡。**

Press 

to enter the START position, where ignition can take place; these fuel and air positions are not stored permanently as it is just a light-off position to put a flame in the boiler and begin the commissioning process.

按下

确认按钮输入点火位置，即将用该角度点火；这些燃料和空气位置不是永久储存的，因为它只是一个点火位置，锅炉点火后进入调试进程。

3.4.5 Phase Hold / 阶段保持

When the system is in commissioning mode only, the Phase Hold feature enables the commissioning engineer to pause the ignition sequence of the burner to make adjustments to the start gas flame if needed.
当系统仅处于调试模式时，调试工程师可使用“阶段保持”功能暂停燃烧器的点火时序，以便根据需要调节燃气启动火焰。

The phase hold feature can be used in pilot open, pilot proving and main flame proving. If the phase is held in the pilot open stage and the flame goes out, a lockout will occur after 20 seconds. However, if the phase is held in either the pilot proving or main flame proving stages, the MM will lockout immediately if the flame scanner does not detect a flame.
“阶段保持”特性可用于引导火开启、引导火校验和主火焰校验。如果阶段保持在引导火打开阶段，火焰熄灭，20秒后将发生锁定。然而，如果阶段保持在引导火校验或主要火焰校验，而火焰检测器没有检测到火焰，控制模块将立即锁定。

If the flame is present and the ‘phase hold’ condition is left indefinitely the ‘Freeze Timeout’ lockout will occur after 10 minutes. When the system is in a run mode the facility is disabled.
如果火焰存在且“阶段保持”条件无限期保留，则在10分钟后将发生“冻结超时”锁定。当系统处于运行模式时，将禁用该设施。

To make adjustments with the gas manually, press 

to keep the system at its current phase positions, a little blue dot on this ‘button’ will appear to indicate that the phase is held. Ensure that the main fuel valve is manually isolated until the pilot flame has been successfully established. Once this has been successfully established, gradually introduce the main fuel supply to the burner while observing the flame stability. Continue to introduce fuel until the manual operated main fuel isolation valve is fully open providing safe and stable combustion that can be maintained. If the combustion is not safe and stable, then adjust the fuel/air ratio accordingly. Once the adjustments have been made, press 

to continue with the commissioning process.

若要手动调整燃气，请按下

阶段保持按钮使系统保持当前阶段位置，此“按钮”上会出现一个小蓝点，表示“阶段保持”。确保手动隔离主燃料阀，直到成功地建立起引导火火焰。一旦成功建立，逐步注入主燃料供应燃烧器，同时观察火焰的稳定性。继续注入燃料，直到手动操作的主燃料隔离阀完全打开，提供可以维持的安全稳定的燃烧。如果燃烧不安全稳定，则相应地调整燃料/空气比。一旦调整完成，按下

阶段保持继续调试过程。

****WARNING****

IT IS THE RESPONSIBILITY OF THE FACTORY TRAINED TECHNICIAN TO ENSURE THAT USE OF THE PHASE HOLD FACILITY DOES NOT LEAD TO A HAZADOUS SITUATION. FAILURE TO DO SO WILL RESULT IN SERIOUS EQUIPMENT DAMAGE, CRITICAL INJURY OR DEATH.

****警告****

接受过工厂培训的技术员要确保正确使用“阶段保持”功能。错误使用“阶段保持”会导致危险状况的发生，会造成严重的设备损坏和重大的人身伤害或伤亡。

3.4.6 Add Trim Data During Commissioning / 在调试阶段添加 EGA 微调数据

If the option 12 is set to 2 or 3 during commissioning, then when setting the servomotors for the HIGH, INTER, GOLDEN START, FGR START and START positions, the trim data will also need to be saved for the fuel rich and air rich trim conditions. The message 'Waiting for EGA readings' will display.
在选项 12 被设置为 2 或 3 的情况下，用户在进行伺服电机高火位，中间位，黄金启动位，烟气再循环位和启动位的设置时还要设置富油和富氧条件下的 EGA 微调数据。屏幕这时将显示“等待 E.G.A.读数”消息。

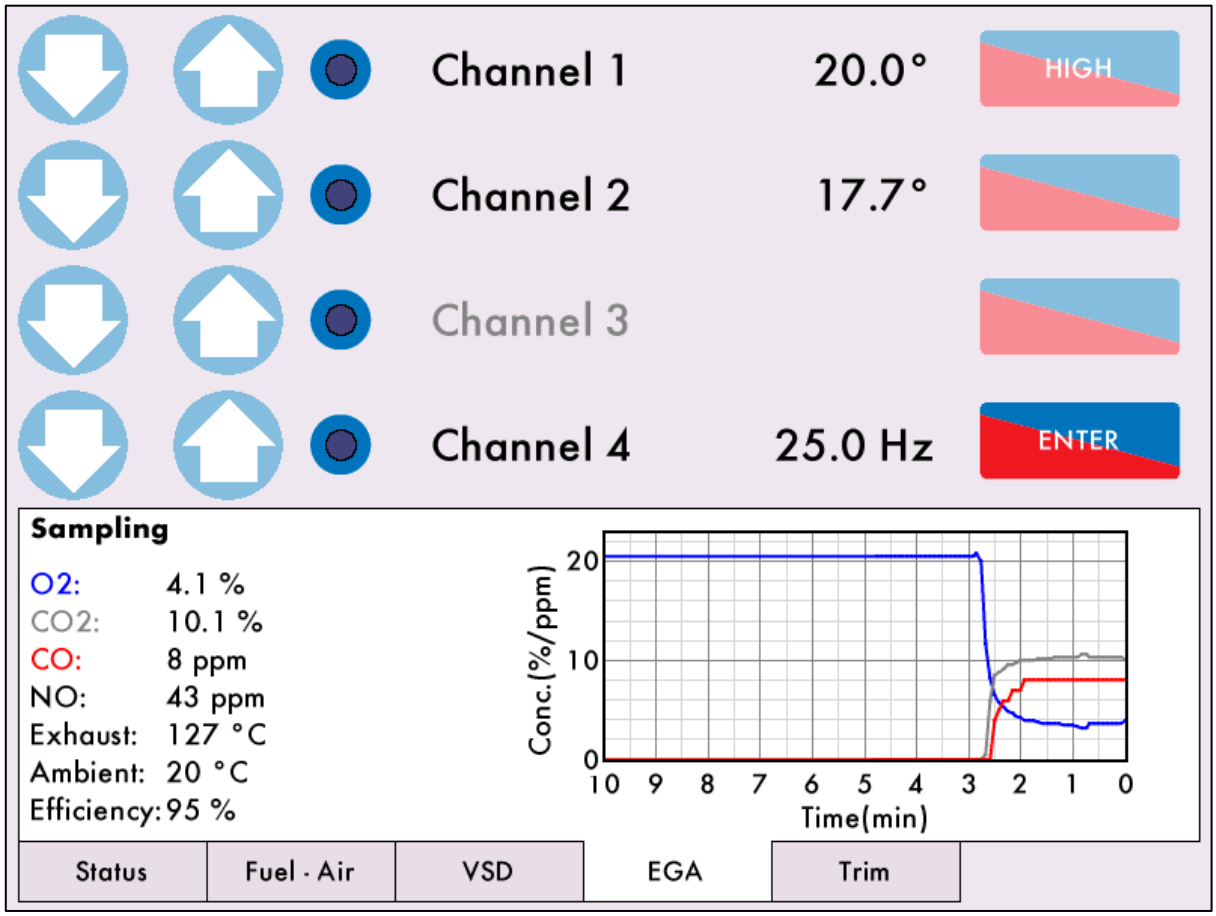


Figure 3.4.6.i Sampling / 图 3.4.6.i 采样中

Press on the EGA tab to display the EGA readings.
按下 EGA 标签来显示 EGA 读数。

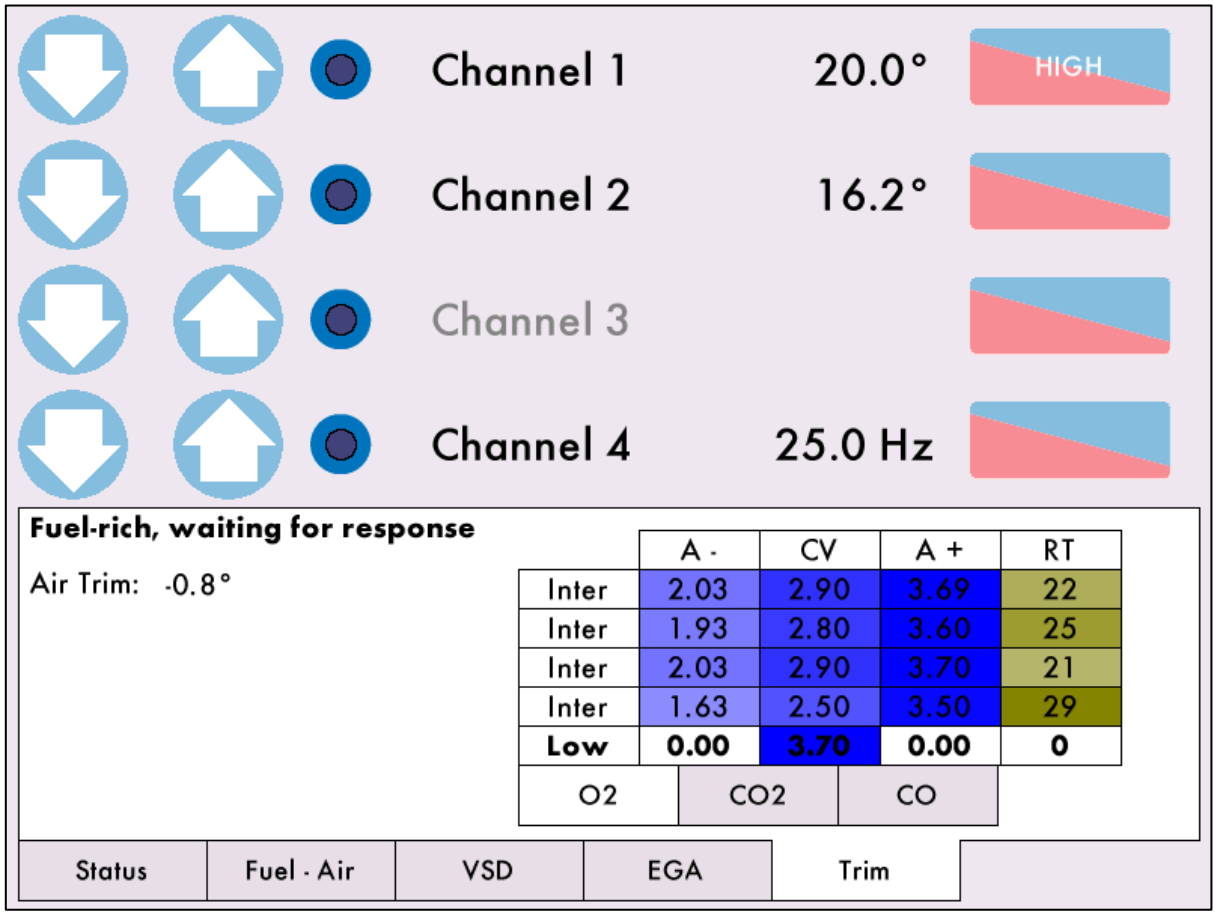


Figure 3.4.6.ii / 图 3.4.6.ii

After you press 

to save those servomotor positions, the EGA will carry out its fuel rich and air rich trim.

在按下

确认按钮来保存伺服电机位置数据后，EGA 将执行富油微调和富氧微调。

Once these trim values have been saved, the system will continue with the commissioning process.
在这些微调数据被保存后，系统将继续进入下个调试步骤。

Note: If the MM has not been enabled for trim during commissioning, this can be added later by setting option 12 for trim, and going into Single Point Change to add trim to each point, see section 3.7.
注:如果控制模块在调试期间没有启用微调，以后可以通过设置微调选项 12 来增加微调，并进入单点更改对每个点增加微调，参见第 3.7 节。

3.4.7 Commissioning VSD / 调试变频器

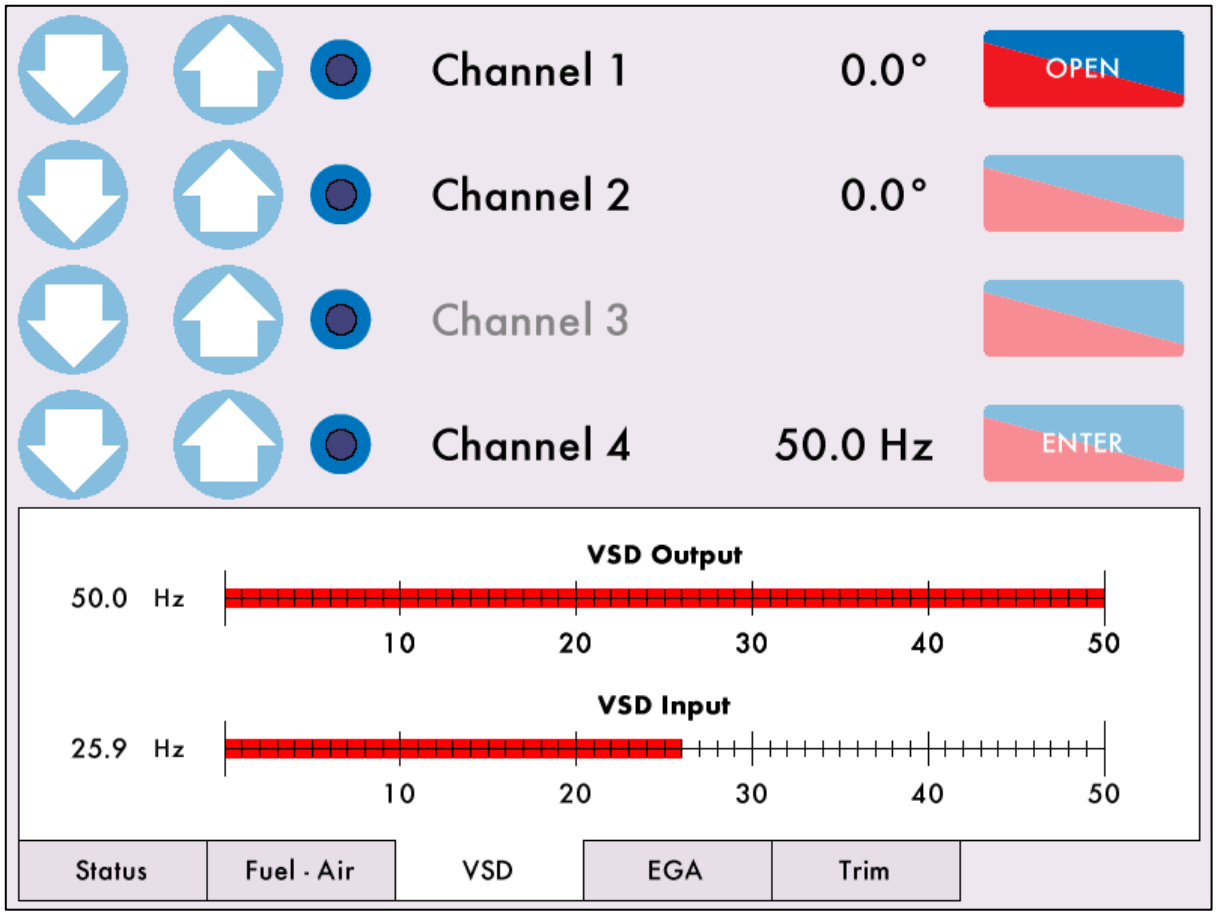


Figure 3.4.7.i Commissioning VSD / 图 3.4.7.i 调试变频器

Press on the VSD tab to view the VSD output and input signal during commissioning.
用户在调试期间按下变频器标签可以获知变频器的输出和输入信号。
If the MM has been enabled with VSD for commissioning and then disabled, or vice versa, a conflict message will appear 'VSD configuration does not match commissioning.'
如果 MM 已经启用 VSD 进行调试，然后禁用，或者反之亦然，则会出现一条冲突消息“VSD 设置与调试不匹配”。

If there is little movement required with the VSD signal, the feedback fault tolerance should be set accordingly. If the tolerance is not set according to the variation, an error 'VSD feedback change too small' will occur.
如果变频器信号几乎不需要移动，则应相应地设置反馈容错。如果没有根据偏差设置容错，就会出现“变频器反馈变化过小”的错误。

Please see option 99 for the VSD fault tolerance, which ensures that a VSD can be verified to be at the correct speed at low fire and different to that of high fire. This also ensures that VSD signal is checked for fixed values and cannot be bypassed, preventing an unsafe condition with reduced air than commissioned. The minimum feedback variation applies to both the upper and lower limits so the total commission must allow for the two combined.
有关变频器（VSD）的容错功能，请参阅选项 99，该选项可确保变频器在低火时的速度是正确的，并且与高火时的速度不同。这也确保了变频器信号被检查为固定值，不能被绕过，比调试时减少了空气，防止了不安全的情况。最小反馈变化适用于上限和下限，因此总调试必须考虑到两者的结合。

Note: For the 4-20mA outputs on the Mini Mk8 MM, the maximum voltage drop supported is 12V.
注意：对于 Mini Mk8 MM 的 4-20mA 输出，支持的最大电压降为 12V。

3.4.8 Set GOLDEN START Position / 设置黄金启动位置

If Golden Start has been enabled in option 29 on a new system which has not been commissioned, the message 'Set Golden Start Position' will display after the START position has been entered.
如果要启用黄金启动位（参阅选项 29）并且系统还没有经过调试，那么在输入点火位后，屏幕上会显示“设定黄金启动位置”。

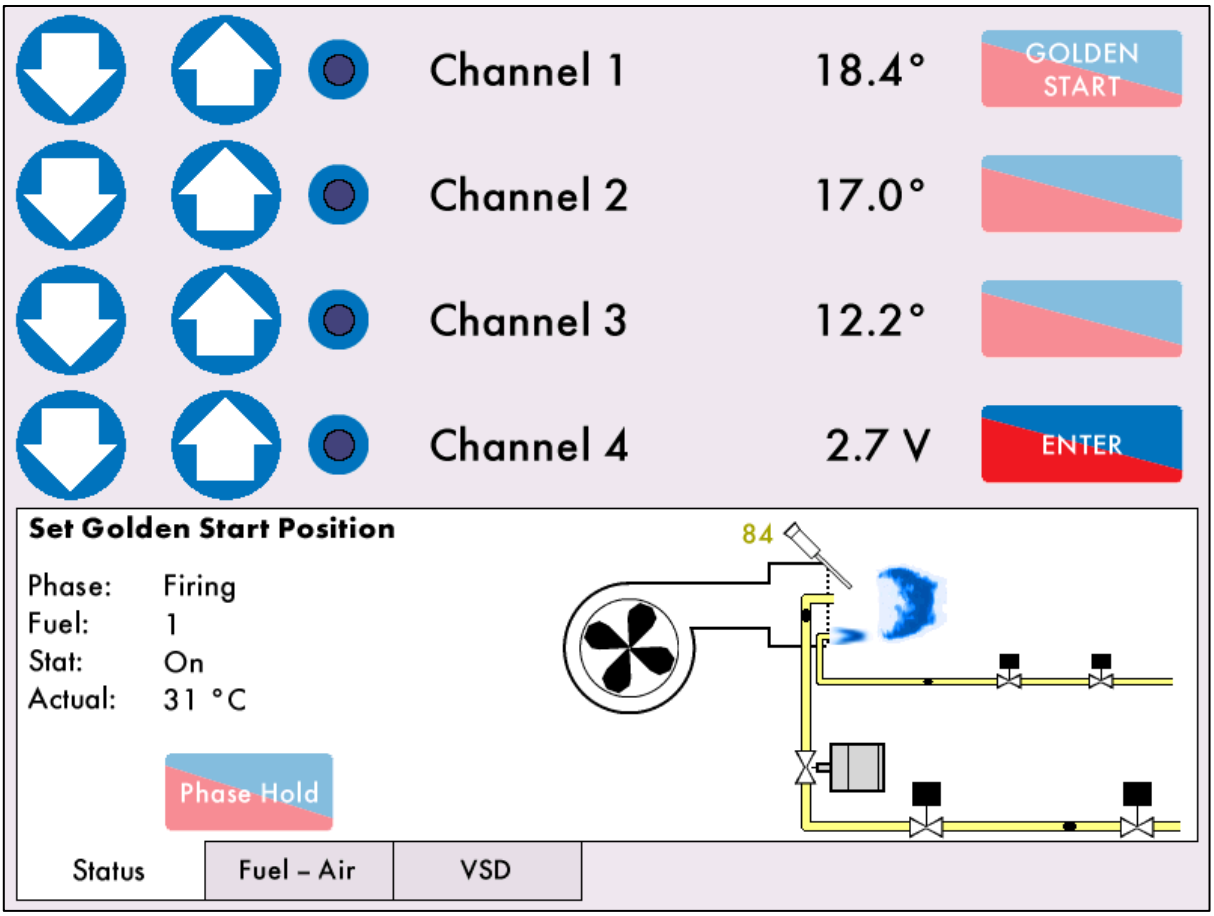


Figure 3.4.8.i Set GOLDEN START Position
设置黄金启动位置

Press GOLDEN START to enter the GOLDEN START position. After entering the GOLDEN START position, proceed to the commissioning steps in section 3.4.9 if FGR START has been enabled, or 3.4.10 if no FGR START is enabled.

按下 GOLDEN START **黄金启动**按钮来输入黄金启动位置。在输入黄金启动位置后，如果烟气再循环启动已启用，则进入第 3.4.9 节中的调试步骤，如果未启用烟气再循环启动，则进入第 3.4.10 节中的调试步骤。

Enabling Golden Start on a Commissioned System
启用已调试系统的黄金启动点

If the system has already been commissioned without Golden Start enabled, go into Commission mode and set option 29 to enable Golden Start. The forced commission message will appear as 'Golden Start optioned but not commissioned.'
如果系统已经在没有启用“黄金启动”的情况下进行了调试，则进入调试模式，并设置选项 29 以启用“黄金启动”。强制调试信息将显示为“黄金启动选择但未调试”。

Press 

on the home screen and once the system goes through its internal relay tests, the message 'Select Commissioning' will appear.

按下主屏幕的

调试按钮，系统完成内部继电器测试后，就会出现“选择调试”的信息。

Press 

to go through the commissioning process and enter the CLOSED, OPEN and light-off START positions. After the entering the light-off START position, the message 'Set Golden Start Position' will appear; press 

to enter the stored GOLDEN START position and continue with the full commissioning procedure in section 3.4.9 if FGR START has been enabled, or 3.4.10 if no FGR START is enabled.

Alternatively, to just add the Golden Start position and not go through the whole commissioning procedure, press 

on the home screen, and once the system has gone through its internal relay tests the message 'Select Commissioning' will appear. Press 

and the MM will go through purge. The message 'Set up START position' will appear to ignite a flame in the burner, see section 3.4.4. Once the burner is firing, the message 'Set Golden Start Position' will appear. Press 

to enter the GOLDEN START position. The message 'Save Commission' will appear, press 

to save the GOLDEN START position and then press 

to return to run mode.

按下

关位按钮进入调试过程，输入关闭位置、开启位置、点火位置。在输入点火位置后，会出现“设置黄金启动位置”的信息；按下

黄金启动按钮输入储存的黄金启动位置，继续完整在第 3.4.9 节中的调试程序如果烟气再循环启动已启用，或者继续 3.4.10 节如果没有启用烟气再循环启动。

或者，只需添加黄金启动位置，而不进行整个调试过程，按下主屏幕的

调试按钮，一旦系统完成内部继电器测试，就会出现“选择调试”的消息。按下

黄金启动按钮，控制模块将进行吹扫。“设置启动位置”信息将显示来点燃燃烧器火焰，参见第 3.4.4 节。一旦燃烧器启动燃烧中，就会出现“设置黄金启动位置”的信息。按

黄金启动按钮输入黄金启动位置。将出现“保存调试”信息，按

保存按钮保存黄金启动位置，然后按

退出按钮返回运行模式。

Note: If FGR START has also been enabled, this position must be entered after the GOLDEN START position.
注意:如果“烟气再循环启动”也已启用，则该位置必须在“黄金启动”位置之后输入。

The Golden Start position of the fuel and air servomotors is completely independent from the modulating load index and commissioned value data.
燃料和空气伺服电机的黄金启动位置完全独立于调节负载指数和调试值数据。

The facility is particularly useful on combustion systems with large turndowns and when firing heavy oil, as it enables the burner to start/ignite at a fuel rich position and then, after a stable flame is established, return to the commissioned combustion curve.
该功能特别适用于具有大比调和燃烧重油的燃烧系统，因为它使燃烧器能够在燃料丰富的位置启动/点火，然后在建立稳定的火焰后，返回到调试燃烧曲线。

The Golden Start position needs to be entered for each required fuel.
每个所需燃料都需要进入黄金启动位置。

The MM holds the Golden Start position for a time set in Parameter 15; this time starts from the point of main flame. After this time, if the Golden Start fuel position is between Low Fire and High Fire, the air damper will open and the fuel valve will stay in the same position, until fuel/air ratio is on the commissioned combustion curve. If the Golden Start fuel position is outside of the main curve, then both the air damper and fuel will go to the Low Fire position. Once on the commission curve, the MM will modulate as per load requirement.
控制模块停留在黄金启动位的时长是参数 15 的数值，停留时长从主火焰点开始计算。在黄金启动结束后，如果黄金启动的燃料位置处于低火焰和高火焰之间，操作者可以逐渐增加空气挡板的开启角度并且保持燃气阀门的开度不变来把燃料/空气比率调试到与燃烧曲线调试数值一致。如果黄金启动的燃料位置在主曲线范围之外，那么空气挡板和燃料阀门都要进入低火位置。在将燃料/空气比率调节到与燃烧曲线一致之后，控制模块将根据负载要求来进行控制。

3.4.9 Set FGR START Position / 设置烟气再循环启动位置

Flue Gas Recirculation (FGR) is a method whereby a quantity (approximately 15%) of the boiler flue gases are fed back to the burner and mixed with the combustion air. The virtue of FGR is the reduction of NOx gases. With the FGR facility, servomotor channel 3 can be used to control the amount of flue gas fed back. It is not good practice to feed back the gases when the flue gas is cold, so all the elements (i.e. servomotors and VSD) can be set at 'FGR' positions until the gases are hot. During this time the CH3 would normally be set closed. Once the FGR holding conditions are met, modulation takes place in the normal way using the curve entered during commissioning.
烟气再循环(FGR)是一种方法，其中数量(约15%)的锅炉烟气反馈到燃烧器，并与燃烧空气混合。烟气再循环的优点是减少了氮氧化物气体。利用烟气再循环设备，伺服电机通道3可用于控制烟气回输量。当烟气是冷的时候，反馈气体是不好的做法，所以各参数(即：伺服电机和变频器)都被设置成热态烟气的再循环位置。在烟气处于冷态时通道3一般为关闭。一旦烟气再循环的保持条件成立，系统将根据调试曲线来执行正常控制。

Setting FGR on a system which has not been commissioned
在未调试的系统上设置烟气再循环

If FGR Start has been enabled in options 48, 49 or 50 on a system which has not been commissioned, the message 'Set FGR Position' will display after entering the light-off START position. If Golden Start has been enabled in option 29, this message will appear after entering the GOLDEN START position.
如果在未调试的系统上的选项 48、49 或 50 中启用了烟气再循环启动，则在进入点火启动位置后将显示“设置烟气再循环位置”消息。如果在选项 29 中启用了黄金启动，则在进入黄金启动位置后将出现此消息。

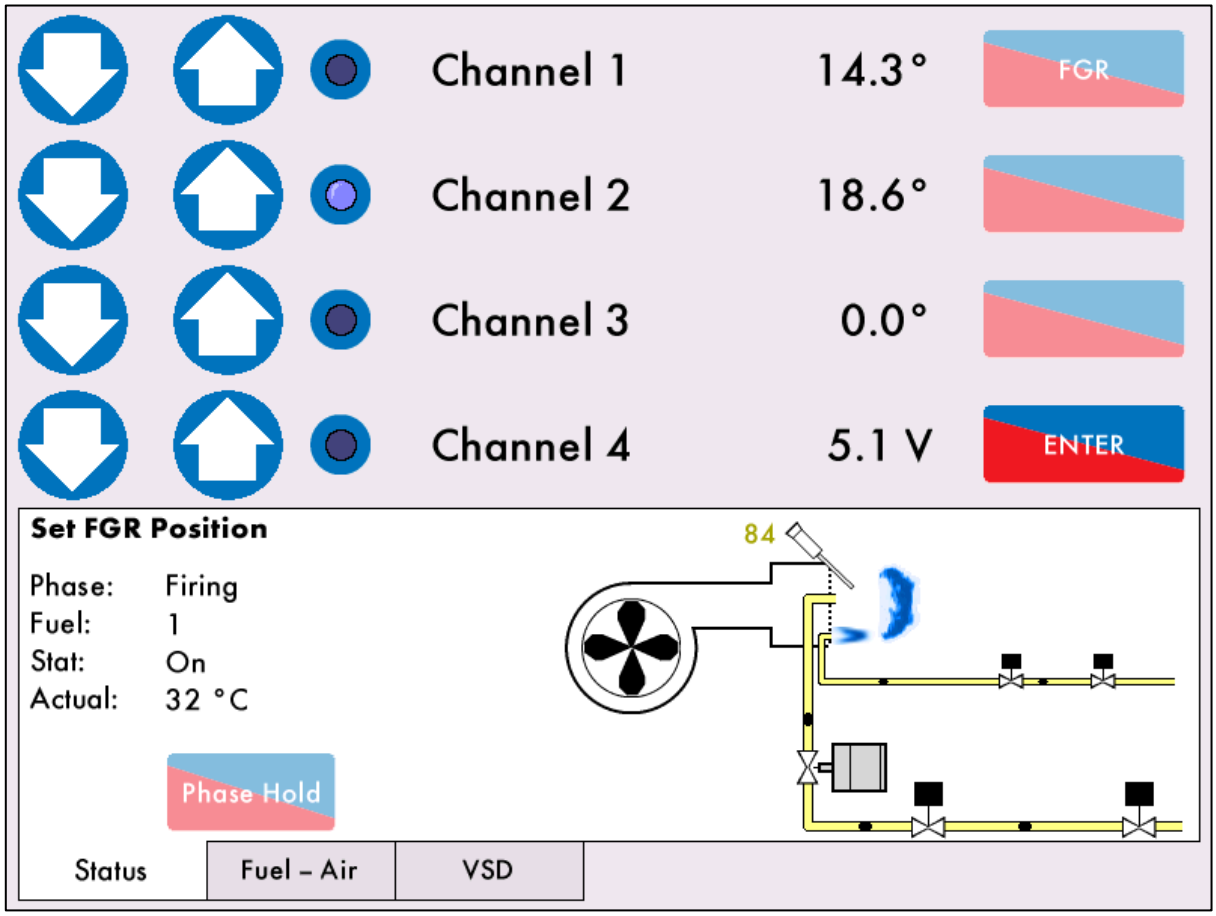


Figure 3.4.9.i Set FGR START Position
图 3.4.9.i 设置烟气再循环启动位置

Press FGR to enter the FGR START position. After entering the FGR START position, proceed to the commissioning steps in section 3.4.10.

按下FGR **FGR** 按钮输入烟气再循环启动位置。输入烟气再循环启动位置后，进行 3.4.10 节的调试步骤。

Enabling FGR Start on a Commissioned System
在已调试系统上启用烟气再循环启动

If the system has already been commissioned without FGR Start enabled, go into Commission Mode and set option 48, 49 or 50 to enable FGR Start. The forced commission message will appear as 'FGR optioned but not commissioned.'
如果系统在没有启用烟气再循环的情况下已进行了调试，则进入调试模式，并设置选项 48、49 或 50 以启用烟气再循环。强制调试信息将显示为“选择烟气再循环但未调试”。

Press Commission on the home screen and once the system goes through its internal relay tests, the message 'Select Commissioning' will appear.

按下主屏幕的Commission **调试**按钮，系统完成内部继电器测试后，就会出现“选择调试”的信息。

Press 

to go through the commissioning process and enter the CLOSED, OPEN, light-off START and GOLDEN START (if enabled) positions. After entering the light-off START or GOLDEN START (if enabled) position, the message 'Set FGR Position' will appear; press 

to enter the stored FGR START position and continue with the full commissioning procedure in section 3.4.10.

按下

关位按钮进入调试过程，输入关位、开位、点火位和黄金启动(如果启用)位置。在进入点火或黄金启动(如果启用)位置后，会出现“设置烟气再循环位置”信息；按下

FGR 按钮输入储存的烟气再循环启动位置，继续 3.4.10 节中的完整调试程序。

Alternatively, to just add the FGR Start position and not go through the whole commissioning procedure, press 

on the home screen, and once the system has gone through its internal relay tests the message 'Select Commissioning' will appear. Press 

and the MM will go through purge. The message 'Set up START position' will appear to ignite a flame in the burner, see section 3.4.4. Once the burner is firing, the message 'Set FGR Position' will appear. Press 

to enter the FGR START position. The message 'Save Commission' will appear, press 

to save the FGR START position and then press 

to return to run mode.

或者，只添加烟气再循环启动位置而不执行整个调试过程，按下主屏幕的

调试按钮，一旦系统完成内部继电器测试，就会出现“选择调试”的消息。按下

FGR 按钮，控制模块会进行吹扫。“设置启动位置”信息将显示在燃烧器中点燃火焰，参见第 3.4.4 节。一旦燃烧器被点燃，消息“设置烟气再循环位置”将出现。按下

FGR 按钮进入烟气再循环启动位置。出现“保存调试”消息，按

保存按钮保存烟气再循环启动位置，然后按

返回按钮返回运行模式。

Note: If both Golden Start and FGR are optioned then the GOLDEN START position is entered before the FGR START position.
注意: 如果系统同时启用“黄金启动”和“烟气再循环”，那么“黄金启动位”将在“烟气再循环启动位”之前进入。

Note: Golden start takes priority over FGR. Once the golden start timer has finished, the servomotors will go straight to the FGR start position.
注意: 黄金启动优先于烟气再循环。一旦保持黄金启动的时长结束，伺服电机将直接进入烟气再循环启动位。

FGR can be set as a Timer, Offset or Temperature Threshold (see options 48, 49 and 50).
可以将烟气再循环设置为计时器、偏移量或温度阀值(参见选项 48、49 和 50)。

3.4.10 Set HIGH Position / 设置高火位置

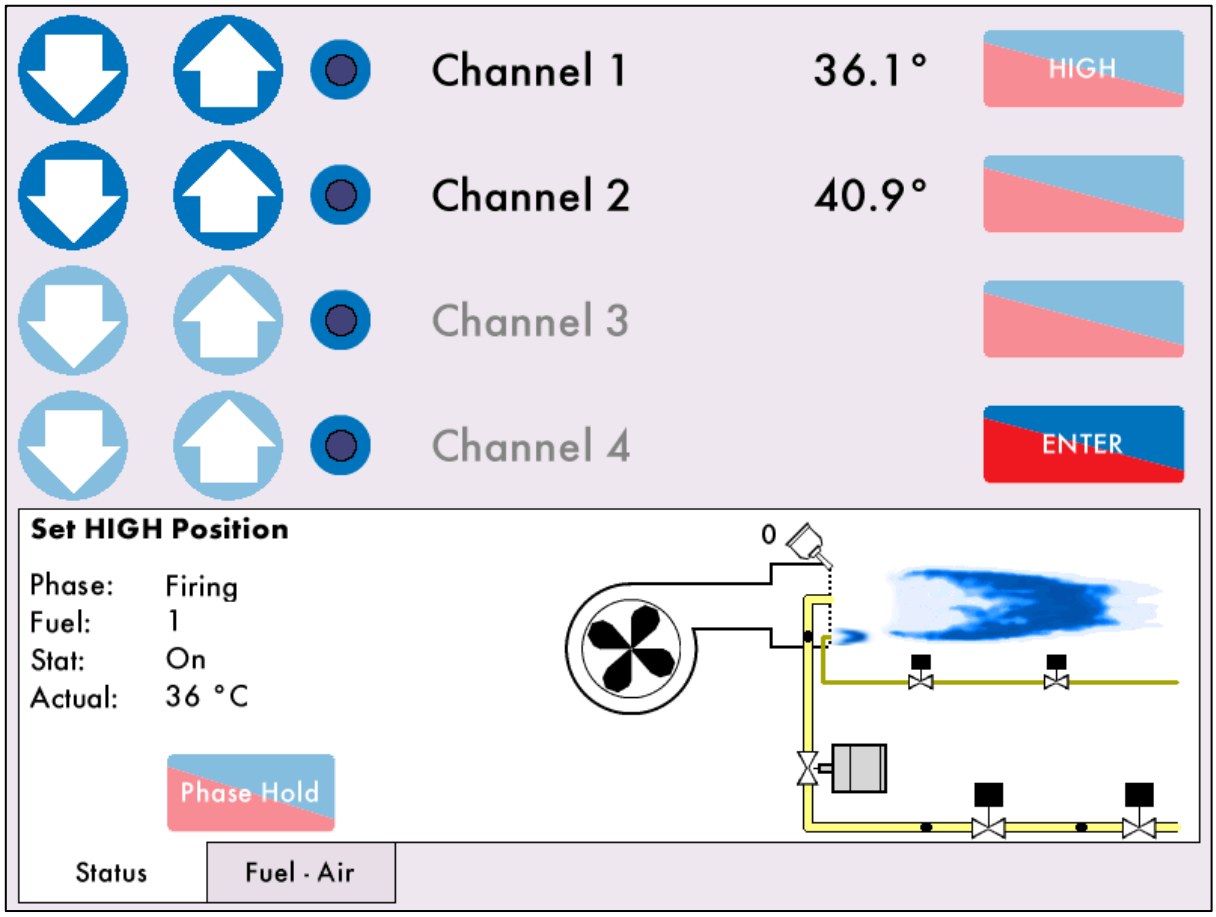


Figure 3.4.10.i Set HIGH Position
图 3.4.10.i 设置高火位置

Once all the START, GOLDEN START and FGR START positions have been entered, the message 'Set HIGH Position' will appear. Press HIGH and drive the servomotors (and VSD if optioned) to the HIGH position by opening the air damper and fuel valve some degrees alternatively, so that more fuel is added gradually.

在输入所有的启动位，黄金启动和烟气再循环启动位，将出现“设置高火位置”消息。按下 HIGH **高火位**按钮并移动伺服电机(若启用变频器)到高火位置，交替打开空气挡板和燃气阀门，目的是向燃烧器逐渐添加更多燃料。

**** WARNING** IT IS THE RESPONSIBILITY OF THE COMMISSIONING ENGINEER TO ENSURE THAT THE FLAME IS SAFE AND THERE IS A GOOD COMBUSTION AT ALL TIMES DURING COMMISSIONING.**
****警告** 调试工程师要保证全程调试过程中的火焰安全和良好燃烧。**

It is not possible to enter the HIGH position higher than the OPEN position. The servomotors must be driven 0.5^{O} up/down from the previous point initially, before entering the next point, the fuel. Press ENTER to store this HIGH position.
输入的高火位置一定比开位低。在输入下个位置点(即燃料)之前，伺服电机最起码要向上/下调节 0.5 度。按下 ENTER **确认** 按钮来保存高火位置值。

3.4.11 Set INTER Position / 设置中间点位置

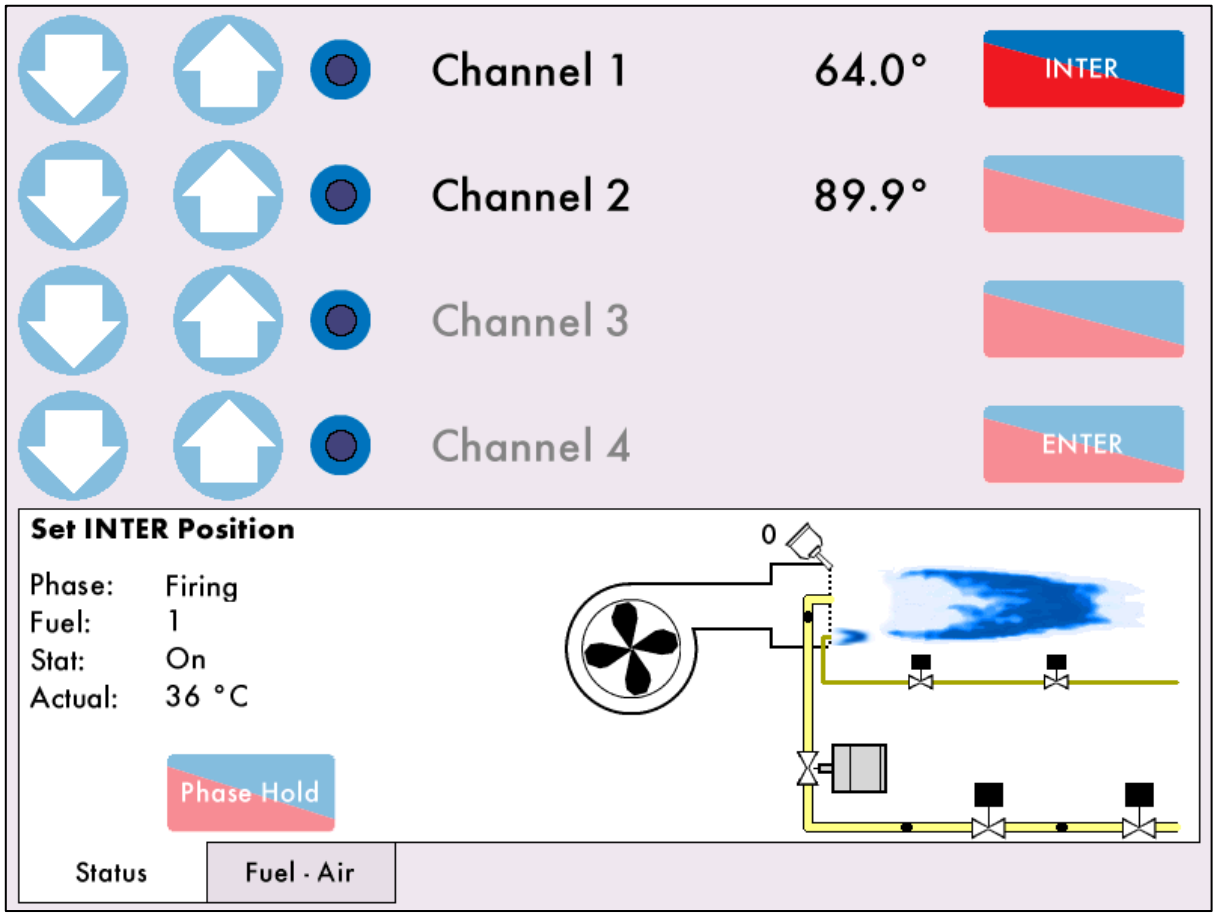


Figure 3.4.11.i Set INTER Position
图 3.4.11.i 设置中间点位置

Once the HIGH position has been entered, the message 'Set INTER Position' will appear. Press INTER to drive the servomotors (and VSD) to the first INTER position. The message 'Move fuel and air positions' will appear at first, as the system must detected a 0.5^{O} movement on CH1 and CH2 before an INTER position can be entered. Press ENTER to store this INTER position.

完成高火位置输入后，控制模块屏幕将显示“设置中间点”的信息。按下INTER**中间点**按钮以移动伺服电机(和变频器)到第一个中间点位置。首先会出现“移动燃料和空气位置”的信息，因为系统必须在通道 1 和通道 2 上检测到 0.5 度的移动，然后才能输入中间位置。按ENTER**确认**按钮，存储此中间点位置。

There must be a minimum of 3 INTER points entered on the fuel-air curve, and a maximum of 18. Points can be added in Single Point Change mode (see section 3.6).
燃料-空气曲线上的中间位至少要有 3 个，最多 18 个。可以在单点更改模式下添加中间位(参见第 3.6 节)。

Continue this process until all the required INTER points have been entered.
继续设置中间位的操作，直到所需的中间位全部都被输入。

3.4.12 Set INTER or START Position / 设置中间点或点火位置

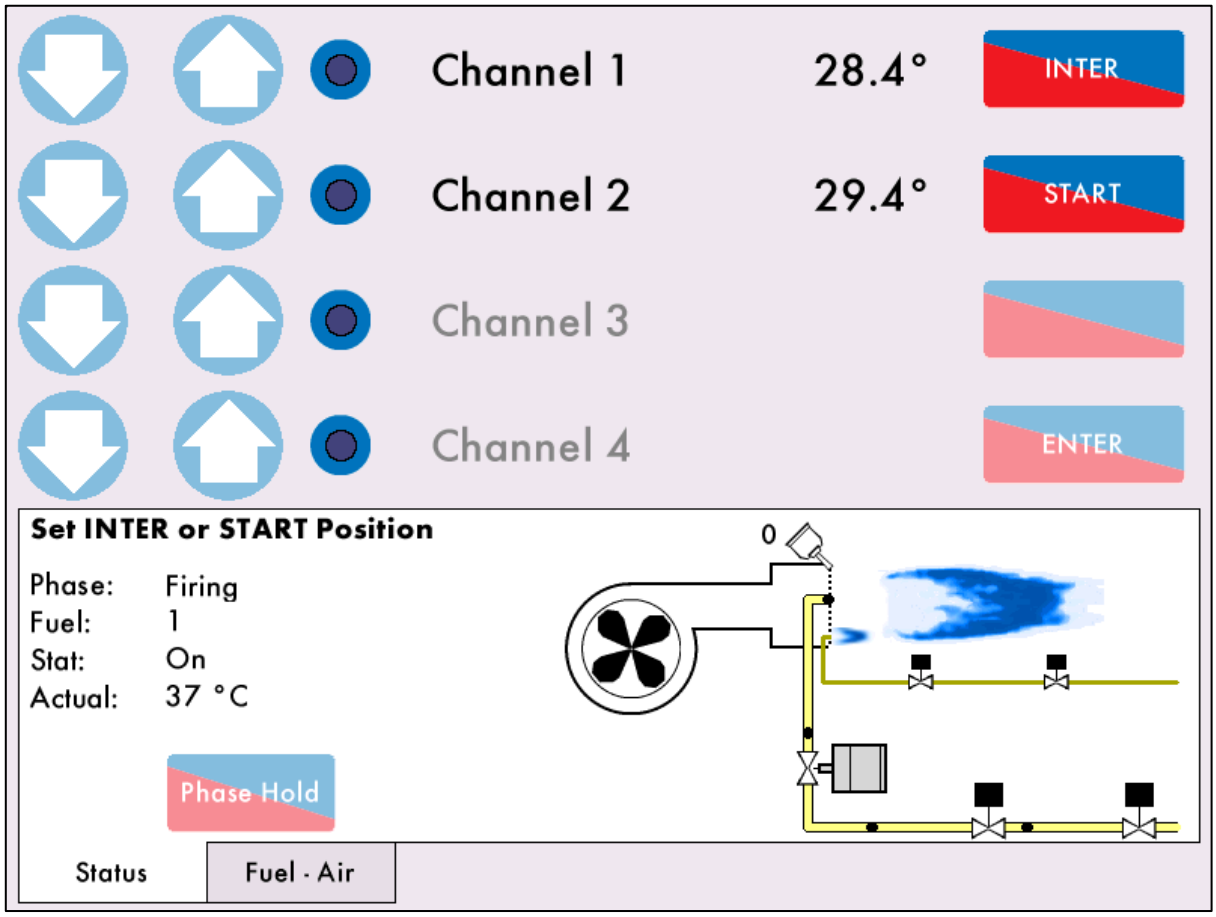


Figure 3.4.12.i Set INTER or START Position
图 3.4.12.i 设置中间位或点火位

Once the minimum 3 INTER points have been added, you will be prompted to either enter another INTER point or the START/LOW FIRE position.
在输入了 3 个中间位后，系统将询问“是否再添加一个新的中间火位，还是添加点火位置”。

Press START to drive the servomotors (and VSD) to the START/ LOW FIRE position, and then press ENTER to store this.

按下 START **点火位**按钮，将伺服电机（和变频器）驱动到点火位置，然后按下 ENTER **确认**按钮保存设置。

Note: If Golden Start or FGR Start are in use, the Start position is only used for Low Fire.
注意：如果系统启用“黄金启动”或者“烟气再循环”，那么点火位置仅用于低火位置。

3.4.13 Save Commission / 保存调试

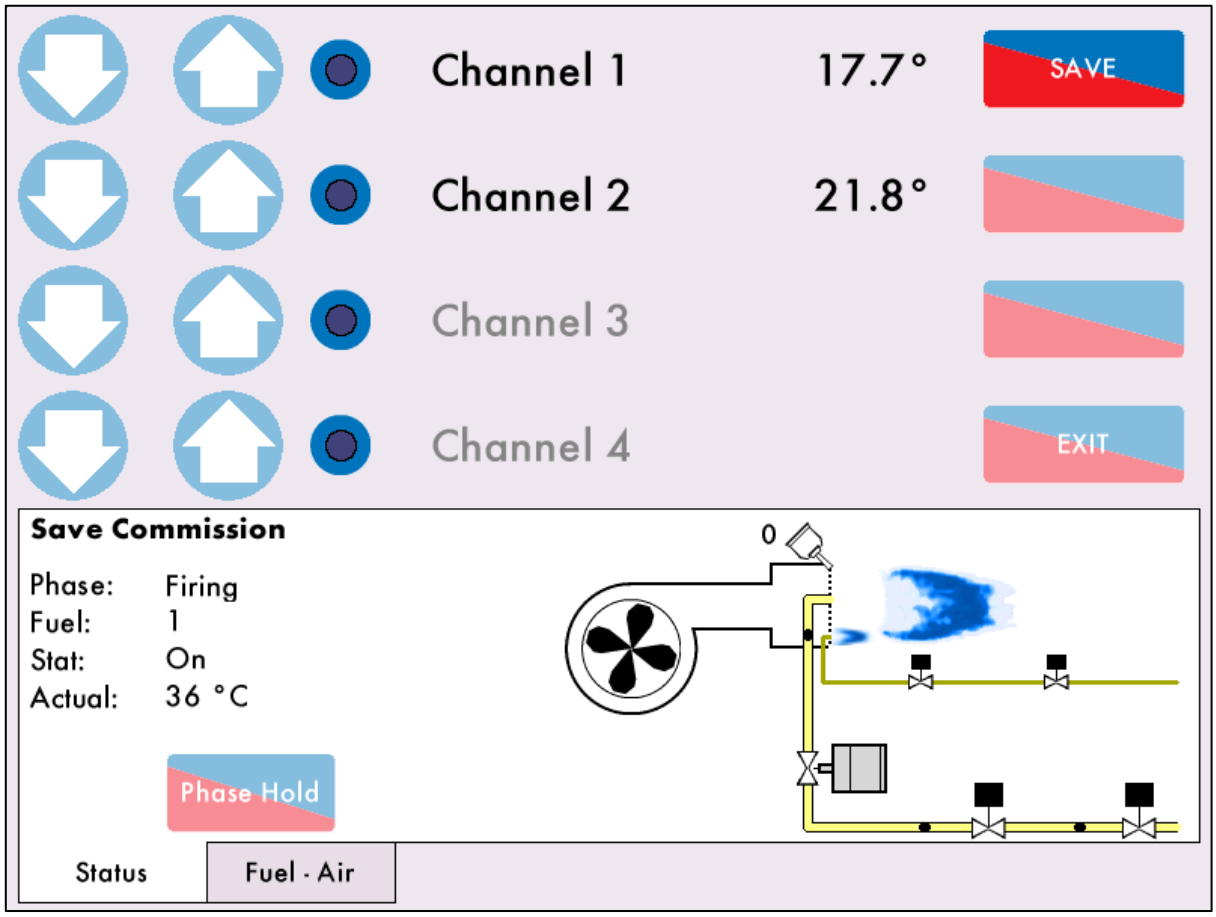


Figure 3.4.13.i Save Commission
图3.4.13.i 保存调试

Once the START position has been entered, press SAVE to store this commission curve. The message 'Commission Complete' will appear and press EXIT to go normal firing mode.

在输入点火位置后，按下SAVE **保存**按钮来保存调试曲线。系统将显示“调试完成”信息，随后按下EXIT **退出**按钮回到正常燃烧模式。

If the burner has been previously commissioned then the new saved curve will overwrite the previous data for the fuel selected. Failure to save the curve will result in the commissioning data not being stored within the unit and a power loss to the unit will result in a loss of data for the fuel selected.
如果燃烧器之前已被调试过，则新保存的曲线将覆盖所选燃料的先前数据。如果没有保存该燃料曲线，将导致调试数据未保存在设备模块中，一旦发生设备断电，对应燃料调试数据就会丢失。

If during commissioning the burner turns off, due to the 'running interlock' opening or a fault, or if the power has been recycled, no points entered are stored. It is recommended to commission the MM with a quick base curve and then adjust/add/remove the points in the Single Point Change.
如果在调试期间由于“运行联锁”或“系统故障”造成燃烧器关闭，或如果电源重启，输入的数值无法储存。建议使用快速基准曲线调试控制模块，然后调整/添加/删除单点更改中的数值。

Once the burner has been commissioned, the fuel flow metering will need to be entered, please go to section 3.5 Fuel Flow Commissioning. If there is EGA trim data to be added then continue to section 3.7 Single Point Change before section 3.5 Fuel Flow Commissioning.
在完成燃烧器调试后，系统将需要输入燃料流量计量数值，请参阅 3.5 节“燃料流量调试”。如果系统启用 EGA 微调，则在进行章节 3.5“燃料流量调试”之前先进行章节 3.7“单点更改”。

Note: If commissioning a fuel for the first time the default required setpoint will be 2.0bar/20PSI/20^{O}C/20^{O}F. The burner will shut down at commission completion due to the low default required setpoint. Go to the Status screen to change the required setpoint.
注: 首次调试燃料时，默认要求的设定值为 2.0bar/20PSI/20℃/20℉。由于低默认所需的设定值，燃烧器在完成系统调试时关闭。转到状态屏幕以更改所需的设定值。

3.5 Fuel Flow Commissioning / 燃料流量调试

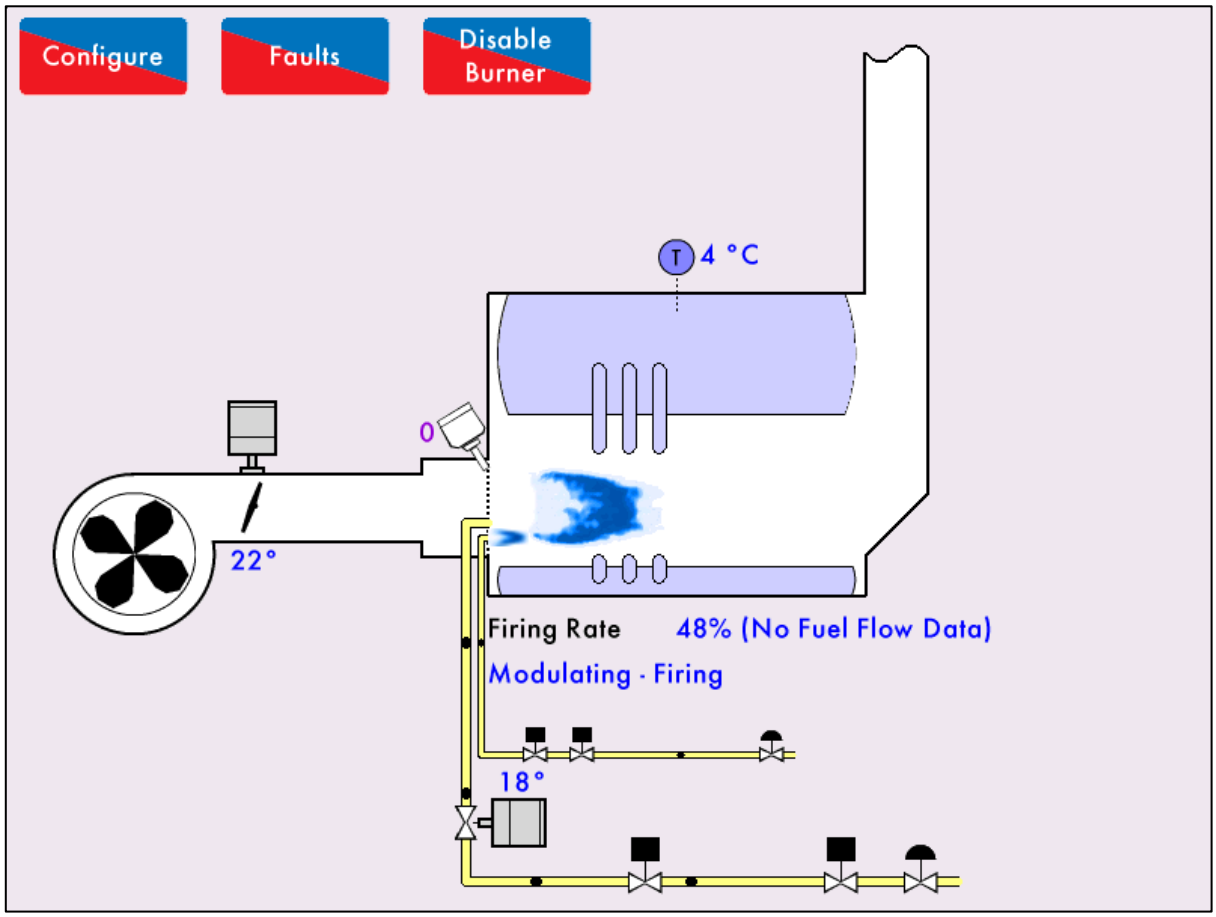


Figure 3.5.i Home Screen – No Fuel Flow Data
图 3.5.i 主页 – 无燃料流量数据

Once the burner has been commissioned, fuel flow metering must be commissioned to calculate the firing rate. The fuel flow metering is used to rate the size or burner and calculate the firing rate.
在完成燃烧器调试后，操作者必须要调试燃料流量表来计算燃烧率。燃料流量表数据被用来评定燃烧器规格和计算燃烧率。

If fuel flow metering is not commissioned and sequencing is optioned, then MM will assume a default burner rating which is based on the fractional fuel valve angle.
如果操作者还未调试燃料流量计量但已启用了控制模块群控，那么控制模块将默认采用基于燃料阀门实际角度的燃烧器规格。

The fuel flow is commissioned from the high fire point down to low fire.
燃料流量的调试过程是从高火位到低火位。

If a fuel flow meter is not being used and only arbitrary values are being used then make sure a good range of values are being used (e.g. 100 to 10) with equal spaces between the values. Not doing this could lead to problems when using IBS and the flame graphic.
如果不使用燃料流量表而仅使用任意值数据，那么要确保使用一个足够大的数值范围（例如：100 到 10），并且各数值之间要由相等间隔，否则在进行智能锅炉群控和生成火焰图形的过程中都会产生问题。

When using arbitrary values, it is good practice to use the following calculation to determine the heat value for each of the 10 points.
当使用任意值数据时，我们建议用以下方法来计算和设置 10 个点的热值。

$$Value\ Between\ Points = \frac{Burner\ Rating - \left(\frac{Burner\ Rating}{Turndown}\right)}{9}$$

For example: Burner Rating: 5.4MW; Turndown Ratio: 5:1.
例如：燃烧器规格：5.4MW，调节比：5:1

$$\frac{5.4 - \left(\frac{5.4}{5}\right)}{9} = 0.48$$

Giving the range (5.40, 4.92, 4.44, 3.96, 3.48, 3.00, 2.52, 2.04, 1.56, 1.08)
根据燃烧器规格，10 个设定值应为（5.40, 4.92, 4.44, 3.96, 3.48, 3.00, 2.52, 2.04, 1.56, 1.08）

Fuel flow metering serves to totalise the amount of fuel being used at each position. If any changes are made to the curve through Single Point Change, then fuel flow will need to be re-commissioned.
燃料流量表被用来计量各个设定值的燃料总用量。如果通过“单点更改”改变了燃烧曲线，那么必须重新调试燃料流量。

Fuel flow commissioning set by option 57, and is carried out in Run mode. The burner must be firing.
在选项 57 中启用燃料流量表，然后在系统运行模式下调试燃料流量表。这时燃烧器必须在燃烧中。

On the Home Screen, press 

to access the System Configuration screen.

在控制模块主页上按下 

设置按钮进入系统设置屏幕。

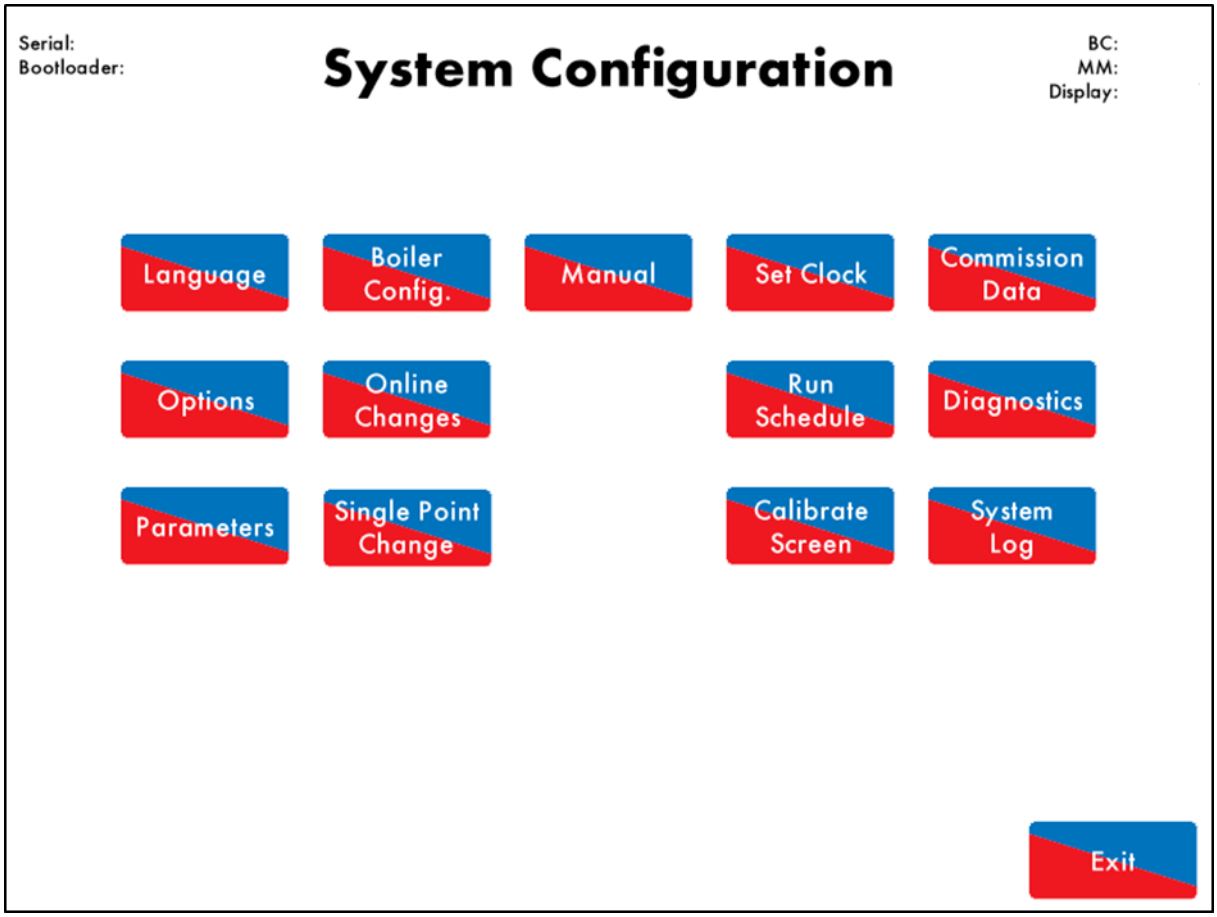


Figure 3.5.ii System Configuration Screen
图 3.5.ii 系统设置屏幕

On the System Configuration screen press Online Changes. You will be prompted to enter the Online Change passwords. Press Continue and Exit to access the Online Changes screen. Press Fuel-flow Commission.

在系统设置屏幕上按下 Online Changes **在线更改**按钮。屏幕将显示“输入在线更改密码”。按下 Continue **继续**按钮和 Exit **退出**按钮来进入在线更改屏幕。按下 Fuel-flow Commission **燃料流量调试**按钮。

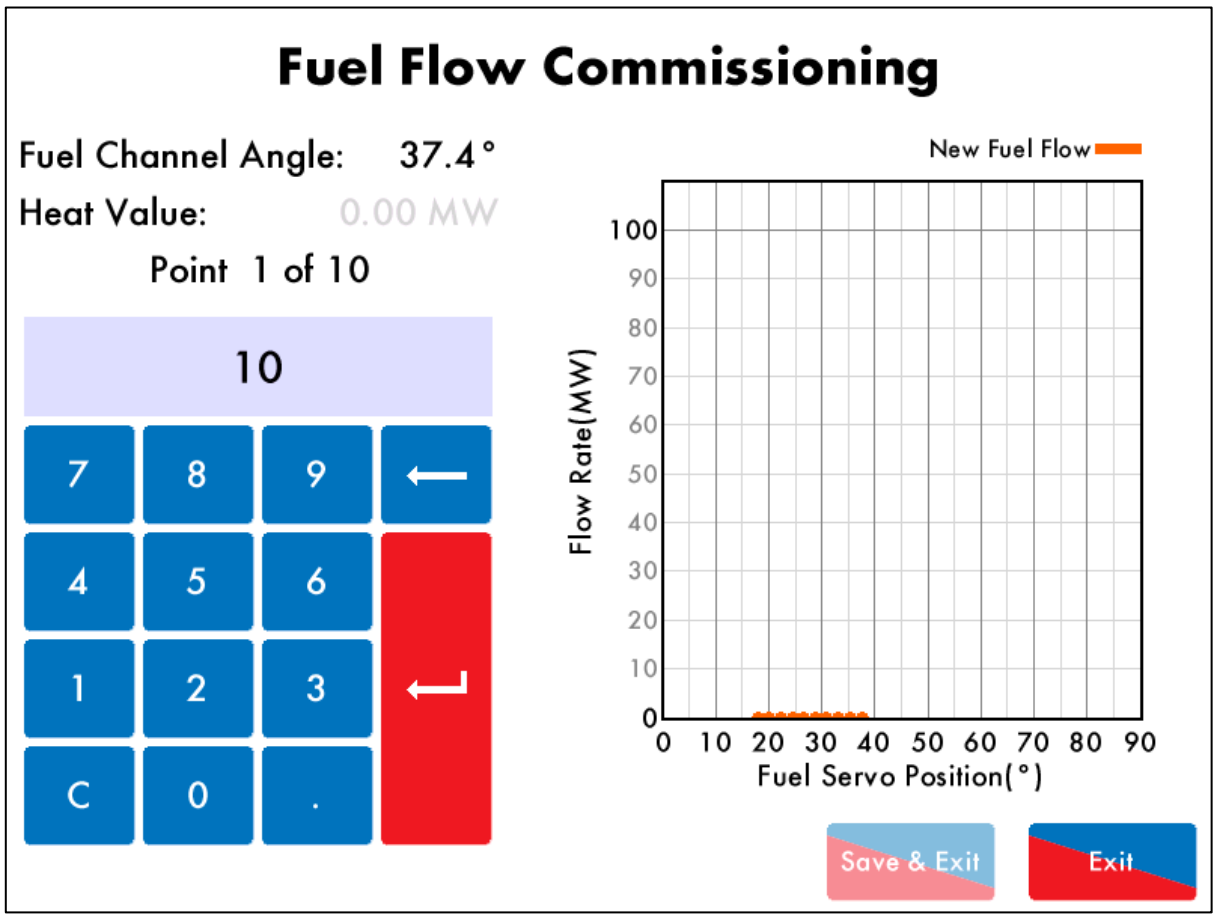


Figure 3.5.iii Fuel Flow Commissioning
图 3.5.iii 燃料流量调试

There are 10 points which need to be entered across the commission curve from low fire to high fire, with low fire being point 1, and high fire being point 10. Older system software will have the 10 points entered from high fire to low fire instead.
输入调试曲线上 10 个从低火到高火的设定值数值，最低火为点 1，最高火为点 10。系统版本较久的 10 个点输入是从高火到低火顺序进行。

Type in the heat value using the keypad and press the return key to save that fuel flow point.
使用键盘输入热量值，并按回车键来保存燃料流量数值。

As you enter the heat values for the 10 points, these will become marked on the graph to the right of the screen.
在输入 10 个设定值的热值时，10 个设定值将被标识在屏幕右侧的图片上。

Once the fuel flow commissioning is complete, press 

to return to modulation in normal firing mode.

燃料流量调试完成后，按下 

保存&退出按钮回到正常燃烧模式下的控制。

If you press 

at any time during fuel flow commission, this will not store the points.

如果在调试燃料流量期间的任何时点按下 

退出按钮，系统将丢失已设的数值。

3.5.1 Calorific Fuel Data / 热量燃料数据

Stats 参数	Kerosene SG 煤油	Gas Oil CI/SH 柴油	Light fuel Oil SG 轻油	Medium fuel Oil SG 中油	Heavy Fuel Oil SG 重油
Relative density 15.6°C (60°F) approx. 15.6°C(60°F) 时的相对密度 / = litres x = kg	0.79	0.835	0.93	0.94	0.96
Flash point (closed) min °C (°F) 闪点（关闭）最小°C（°F）	37.8 (100)	65.6 (150)	65.6 (150)	65.6 (150)	65.6 (150)
Viscosity kinematic (cSt) at 以下温度时的运动粘度					
15.6°C (60°F) approx.	2.0	-	-	-	-
37.8°C (100°F) approx.	-	3.0	-	-	-
82.2°C (180°F) approx.	-	-	12.5	30	70
Equivalent Redwood No.1 Viscosity at 37.8°C (100°F) 等效 Redwood No.1 37.8°C （100°F） 时的粘度	-	33 approx	250 max	1000 max	3500 max
Freezing point °C / °F 冰点°C /°F	Below -40	Below -40	Below -40	Below -40	Below -40
Cloud point °C max / 浊点 最大°C	-	-2.2	-	-	-
Gross calorific values 总热值					
KJ/kg approx.	46,520	45,590	43,496	43,030	42,800
Btu/lb approx.	20,000	19,600	18,700	18,500	18,400
KWh/litre approx.	10.18	10.57	11.28	11.22	11.42
Therms/gallon approx.	1.58	1.64	1.75	1.74	1.77
kW/kg	-	12.66	12.08	-	11.89
Sulphur content % wt. 硫含量 % wt	0.2	0.6	2.3	2.4	2.5
Water content % vol. 水分 % vol.	Negligible 可不计	0.05	0.10	0.20	0.30
Sediment content % wt 沉积物量 % wt	-	Negligible 可不计	0.20	0.03	0.04
Ash content % wt 含灰量 % wt	-	Negligible 可不计	0.02	0.03	0.04
Mean specific heat between 0°C - 100°C approx. 0°C - 100°C 之间的平均比热	0.50	0.49	0.46	0.45	0.45
Volume correction factor per 1°C 每摄氏度的体积校正系数	0.00083	0.00083	0.0007	0.0007	0.00068
Volume correction factor per 1°F 每华氏度的体积校正系数	0.00046	0.00046	0.00039	0.00039	0.00038
Btu/U.S. gallon (US standard) 英国热量单位/美国加仑（美国标准	-	140,000	-	150,000	160,000
Lb/U.S. gallon (US standard) 每磅/美国加仑（美国标准）	-	7.01	-	-	7.01
% lighter than water 轻于水的百分比		20%			4%
1 u.s. Gallon of oil / ft of air 1 美国加仑的油/每英尺空气		1402			

3.5.2 Conversion Factor for Imperial Gas Flow Meters / 英制燃气流量表的换算因子

Required Data: Pressure of gas at meter in “wg
所需数据： 在流量计处的燃气压力，单位“wg
Required gas flow in ft³/min
所需燃气流量，单位：立方英尺/分钟

Calculations: Correction factor = (pressure of gas at meter x 0.00228) + 0.948
计算： 校正系数 = (在流量计处的燃气压力 x 0.00228) + 0.948
Reading on gas meter = required gas flow / correction factor
燃气表读数 = 所需燃气流量 / 校正系数

Example: Pressure of gas at meter = 58” wg
例子： 在流量计处的燃气压力 = 58” wg
Required gas flow = 95 ft³/min
所需燃气流量= 95 立方英尺/分钟
Conversion factor = (58 x 0.00228) + 0.948 = 1.08
换算因子 = (58 x 0.00228) + 0.948 = 1.08
Reading on Meter = 95 / 1.08 = 88 ft³/min
燃气表读数 = 95 / 1.08 = 88 ft³/min

3.5.3 Correction Factor for Burners Significantly Above Sea Level / 较高海拔处燃烧器运行的校正系数

Note: Above sea level i.e. >200m (1ft = 0.3048m)
注：较高海拔处，即>200 米 (1 英尺 = 0.3048 米)

Height above sea level in meters, Calculation for correction factor: =
海拔高度（米），校正系数的计算：=

(Pressure of gas at meter x 0.00228) + (0.948 – (height above sea level x 0.0001075))
(在流量计处的燃气压力 x 0.00228) + (0.948 – (海拔高度 x 0.0001075))

Example: As above but 250 m above sea level:
例子： 沿用上例的燃气压力，海拔高度是 250m

Correction factor = (58x0.00228) + (0.948 – (250 x 0.0001075)) = 1.05
校正系数 = (58x0.00228) + (0.948 – (250 x 0.0001075)) = 1.05

3.5.4 Gas Volume Conversion Factors / 燃气体积换算因素

Assumed gas temperature 假设燃气温度	10 °C	50 °F
Standard pressure 标准压力	e 760 mmHg e 760 毫米汞柱	101.3612 Kpa 101.3612 千帕
Standard temperature 标准温度	15.56 °C	
Ambient pressure 环境压力	101.325 Kpa 101.325 千帕	

Wg " Wg "	PSI PSI	mmH2O 毫米水柱	mmHg 毫米汞柱	Kpa 千帕	mBar 毫巴	Conversion factor 转换因子
1	0.036	25.4	1.867	0.249	2.49	1.0218
2	0.072	50.8	3.734	0.498	4.98	1.0243
3	0.108	76.2	5.601	0.747	7.47	1.0268
4	0.144	101.6	7.468	0.996	9.96	1.0293
5	0.181	127	9.335	1.245	12.451	1.0318
6	0.217	152.4	11.202	1.494	14.941	1.0343
7	0.253	177.8	13.069	1.743	17.431	1.0368
8	0.289	203.2	14.936	1.993	19.921	1.0393
9	0.325	228.6	16.804	2.242	22.411	1.0418
10	0.361	254	18.671	2.491	24.901	1.0443
15	0.542	381	28.006	3.736	37.352	1.0569
20	0.722	508	37.341	4.981	49.802	1.0694
25	0.903	635	46.677	6.227	62.253	1.0819
30	1.083	762	56.012	7.472	74.703	1.0944
35	1.264	889	65.347	8.717	87.154	1.107
40	1.444	1016	74.682	9.963	99.604	1.1195
45	1.625	1143	84.018	11.208	112.055	1.132
50	1.805	1270	93.353	12.453	124.505	1.1445
55	1.986	1397	102.688	13.699	136.956	1.1571
60	2.166	1524	112.024	14.944	149.406	1.1696
65	2.347	1651	121.359	16.189	161.857	1.1821
70	2.527	1778	130.694	17.435	174.307	1.1947
75	2.708	1905	140.03	18.68	186.758	1.2072
80	2.889	2032	149.365	19.925	199.208	1.2197
85	3.069	2159	158.7	21.171	211.659	1.2322
90	3.25	2286	168.035	22.416	224.109	1.2448
95	3.43	2413	177.371	23.661	236.56	1.2573
100	3.611	2540	186.706	24.907	249.01	1.2698
110	3.972	2794	205.377	27.397	273.911	1.2949
120	4.333	3048	224.047	29.888	298.812	1.3199
130	4.694	3302	242.718	32.379	323.713	1.345
140	5.055	3556	261.388	34.869	348.614	1.37
150	5.416	3810	280.059	37.36	373.515	1.3951
160	5.777	4064	298.73	39.851	398.416	1.4201
170	6.138	4318	317.4	42.341	423.317	1.4452

180	6.499	4572	336.071	44.832	448.218	1.4703
190	6.86	4826	354.741	47.323	473.119	1.4953
200	7.221	5080	373.412	49.813	498.02	1.5204

How to use this information:
如何使用这些信息：

1. Measure Volumetric flow of gas for 1min in ft3 (i.e. ft3/min). Note 1m3 = 35.31ft3
   测量 1 分钟内燃气体积流量以立方英尺为单位（即：立方英尺/分钟）。注：1 立方米 = 35.31 立方英尺

2. Multiply this volume flow by 60 to give volumetric flow per hour (i.e. ft3/hr).
   将 1 分钟燃气体积流量乘以 60 得出 1 小时燃气体积流量（即：立方英尺/小时）

3. Measure the pressure of the gas supply.
   测量供气压力

4. Use the table above to obtain a conversion factor.
   使用上表获得转换因子

5. Multiply the volume flow per hour by the conversion factor to obtain a volume at reference conditions.
   将 1 小时燃气体积流量乘以转换因子得出参考条件下的体积流量数值。

6. For natural gas, the calorific value is typically 1000 Btu/ft3. To obtain the firing rate of the boiler at standard reference conditions multiply the volume at reference conditions by 1000.
   天然气热值通常是 1000 英国热量单位/立方英尺。将参考条件下的体积流量乘以 1000 可得出标准参考条件下的锅炉燃烧率。

Represented as an equation:
以公式表示：
Firing rate = (Measured Volumetric flow per minute x 60 x Conversion factor x 1000) Btu/hr
燃烧率 =（1 分钟燃气体积流量 x 60 x 转换因子 x 1000）英国热量单位/小时

3.6 Gas/ Air Pressure Commission / 燃气/空气压力调试

To re-commission the gas pressure sensor, go to Commission Mode and press Gas Pressure Commission. The MM will then run through the points to store the gas pressure values.

要重新调试燃气压力传感器，操作者需要进入调试模式并按下Gas Pressure Commission**燃气压力调试**按钮。控制模块将走一遍各设定值和保存燃气压力数值。

If the VPS is optioned on, the unit will run through this process. The MM will go from Low Fire to High Fire and store the gas pressure values along the curve. Once these values are stored, the upper and lower offset limits will be adjusted to the new commissioned gas pressure values.
当系统启用了 VPS（阀门检漏系统），控制模块要执行本步骤。控制模块将从低火位到高火位走过燃烧曲线和保存各燃气压力数值。在保存好这些数值后，系统将根据新的燃料压力调试数值来调节最高偏移量极限和最低偏移量极限。

If the burner turns off during the gas/air pressure commission, the gas/air pressure commission process with be restarted. This ensures that the MM does not run with an incomplete set of gas/air pressure readings.
如果燃烧器在燃气/空气压力调试期间关闭，燃气/空气压力调试将重新开始。这是为了确保在控制模块运行时燃气/空气压力读数的完整。

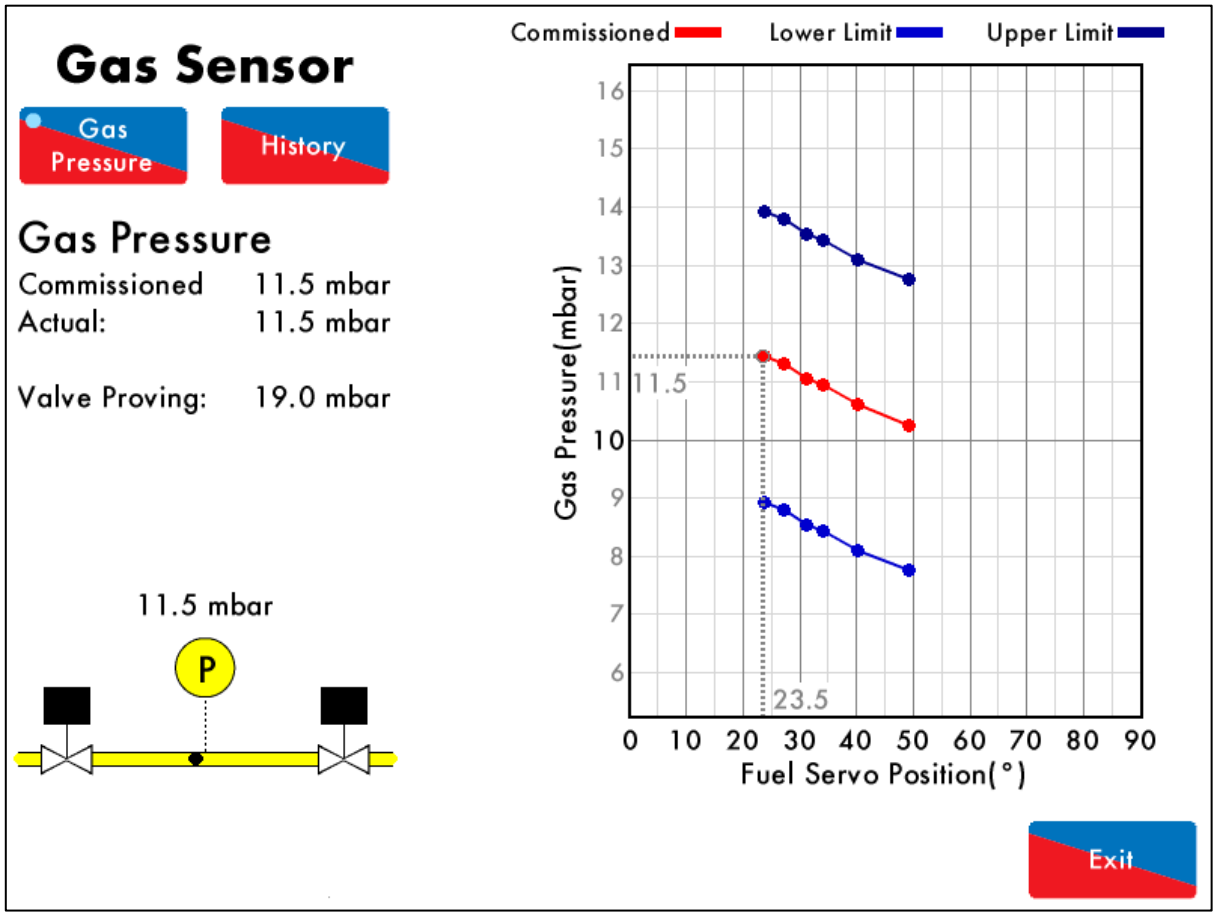


Figure 3.6.i Gas Sensor – Low Fire
图 3.6.1 燃气传感器 - 低火位

To commission the air pressure sensor, in Commission Mode screen press 

to commission the air pressure sensor.

在调试模式屏幕上按下 

空气压力调试按钮来调试空气压力传感器。

Note: If the gas or air pressure sensor is replaced with the same sensor type (same pressure range) then the sensor will not need to be recommissioned.
注意: 如果燃气或空气压力传感器更换为相同的传感器类型(相同的压力范围)，则不需要重新调试传感器。

Note: For applications where VPS is required after burner shutdown only, the option/parameter 129 should be set to 0 when doing the first gas sensor commission on the system to store the valve proving gas pressure. During normal running, option/parameter 129 can be set to 1.
注意: 对于仅在燃烧器关闭后需要 VPS（阀门检漏系统）的应用程序，在系统上进行第一次气体传感器调试以存储阀门检验的燃气压力时，应将选项/参数 129 设置为 0。在正常运行时，选项/参数 129 可以设置为 1。

3.7 Single Point Change / 单点更改

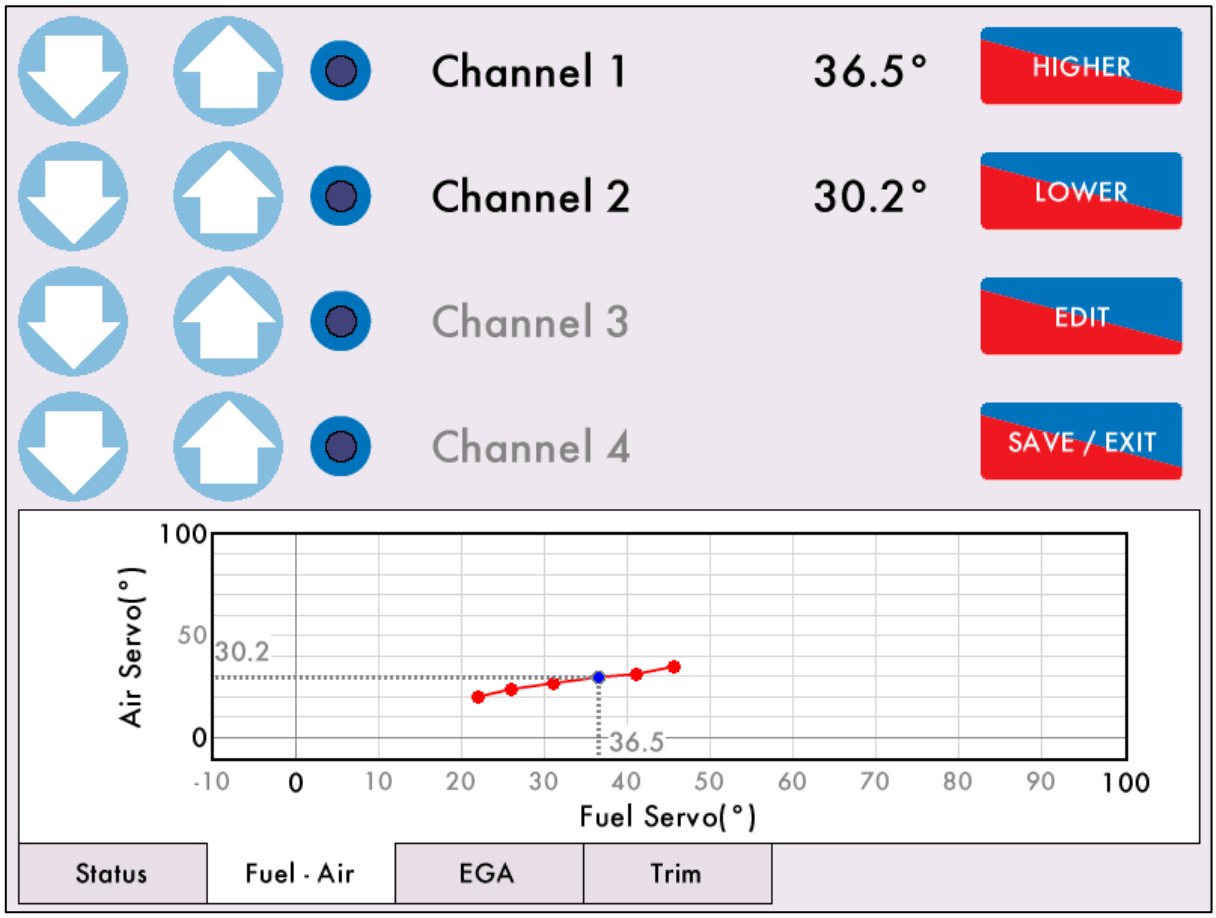


Figure 3.7.i Single Point Change
图 3.7.i 单点更改

Press Single Point Change （单点更改）in the system configuration screen and enter the password to access Single Point Change mode.

在系统设置屏幕上按下 Single Point Change **单点更改**按钮，输入口令来进入单点更改模式。

Select the point to be edited or added trim to by pressing HIGHER or LOWER to go up and down the fuel curve, then press EDIT.

按下 HIGHER **上一点**按钮或者 LOWER **下一点**按钮来选择燃料曲线上需要编辑或添加 EGA 微调操作的设定值。选定后按下 EDIT **修改**按钮。

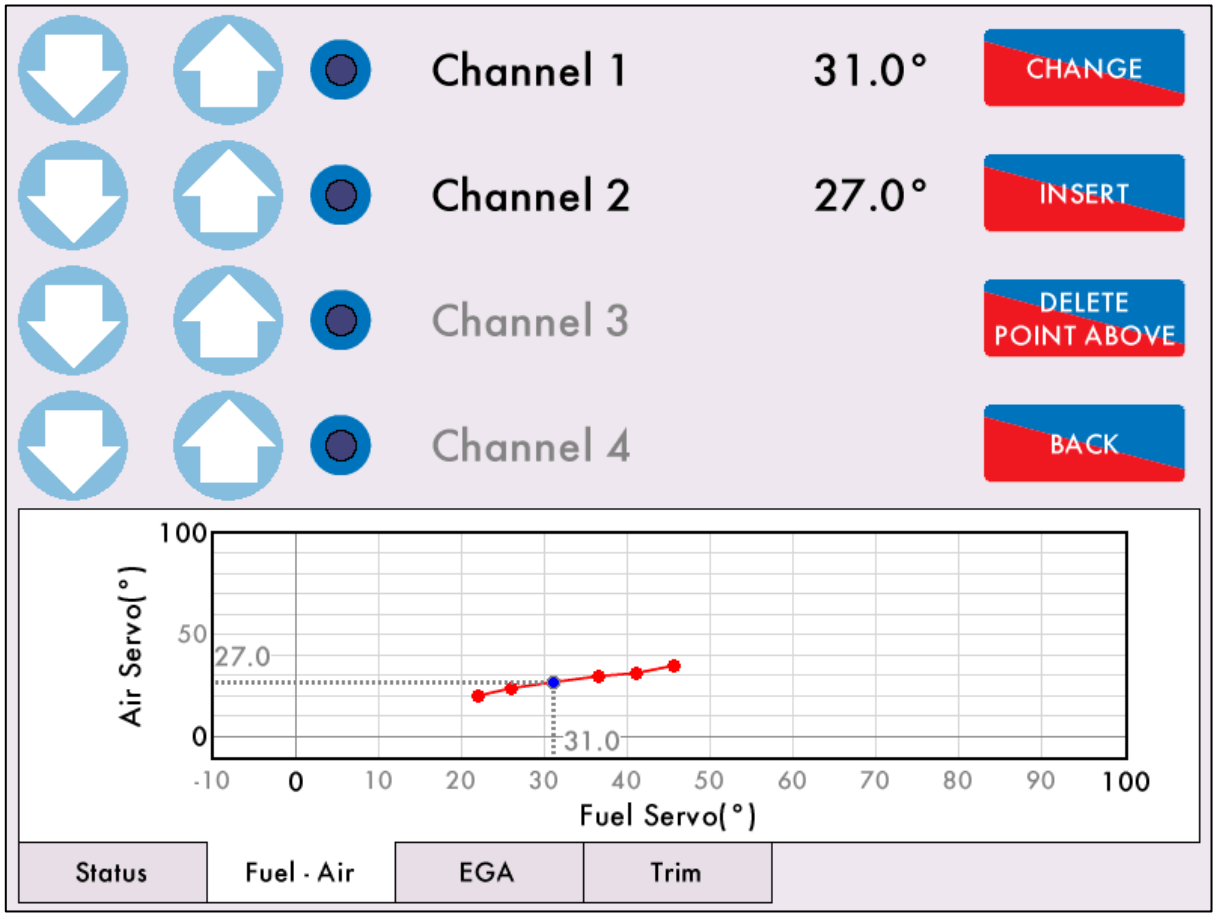


Figure 3.7.ii Changes
图 3.7.ii 更改

To edit a previously entered point press CHANGE and make adjustments to the positions as needed.

要编辑已有设定值，按下CHANGE**修改**按钮后根据需要来更改设定值数值。

To enter a new point press INSERT.

要添加一个新设定值，按下INSERT**插入**按钮。

Press DELETE POINT ABOVE to delete the next point on the commission curve.

按DELETE POINT ABOVE**删除上一点**按钮删除调试曲线上的上一个设定值。

Or press BACK to go back to the previous screen.

或按BACK**返回**按钮返回到上一个界面。

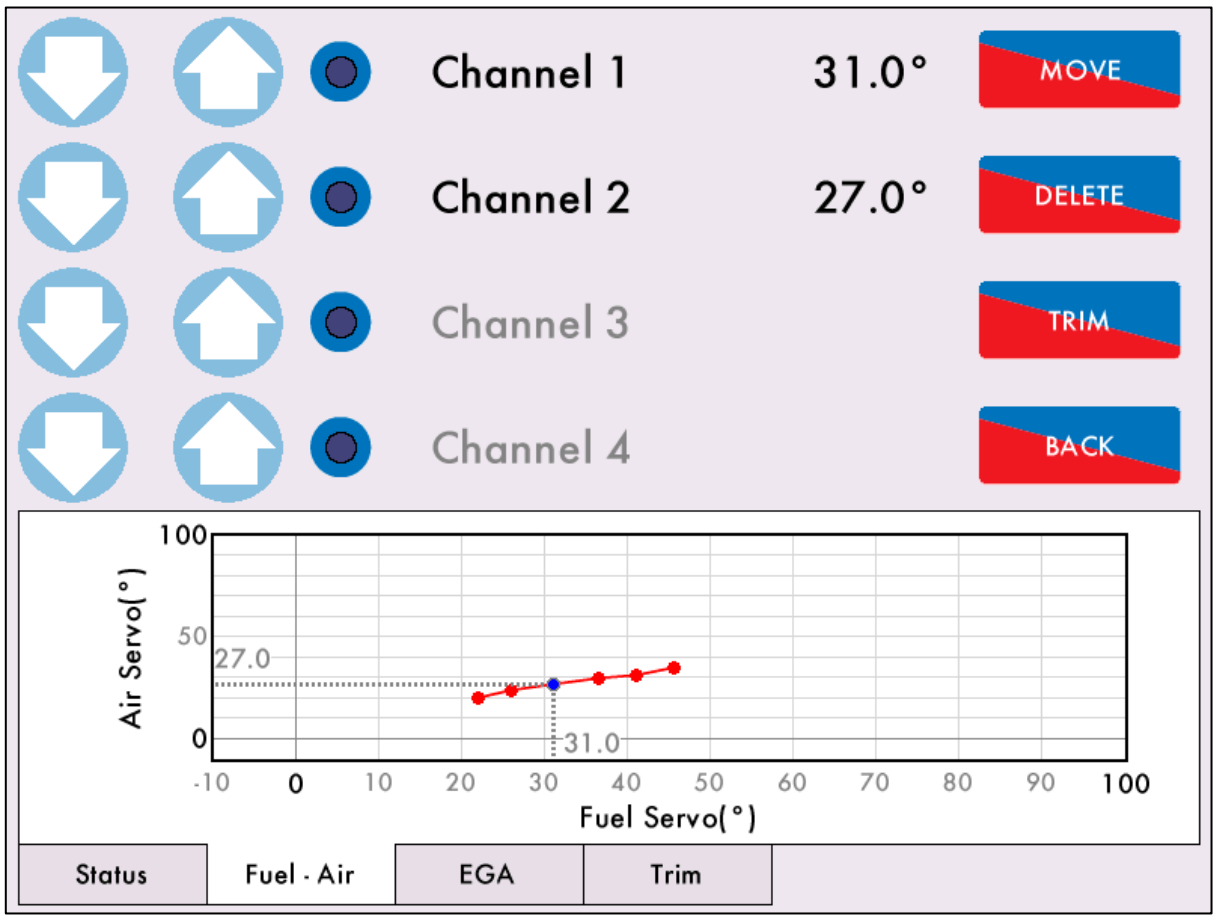


Figure 3.7.iii Changing a Point
图 3.7.iii 更改设定值数值

Press MOVE to change the fuel, air and/or VSD commissioned value of that point. Once the changes have been made, press ENTER to save this position. If a point is overwritten, the trim data is cleared.

按下MOVE**移动**按钮修改设定值的燃料，空气和/或变频器调试值。在完成设定值数值的更改后，按下ENTER**确认**按钮来保存更改。如果某个设定值被重写，该设定值的 EGA 微调数据将被清除。

Press DELETE to remove the point; there must be a minimum of 3 INTER points.

按下DELETE**删除**按钮可删除设定值。系统必须有至少 3 个中间位置设定值。

To add trim data to a point press TRIM, see section 3.4.6 and Figure 3.7.iv.

要向一设定值添加 EGA 微调操作，按下TRIM**微调**按钮，参阅章节 3.4.6 和图示 3.7.iv。

Note: It is not possible to delete LOW or HIGH FIRE positions or have less than 3 INTER points.
注意：低火位或高火位是无法删除的。中间位设定值数量至少是 3 个。

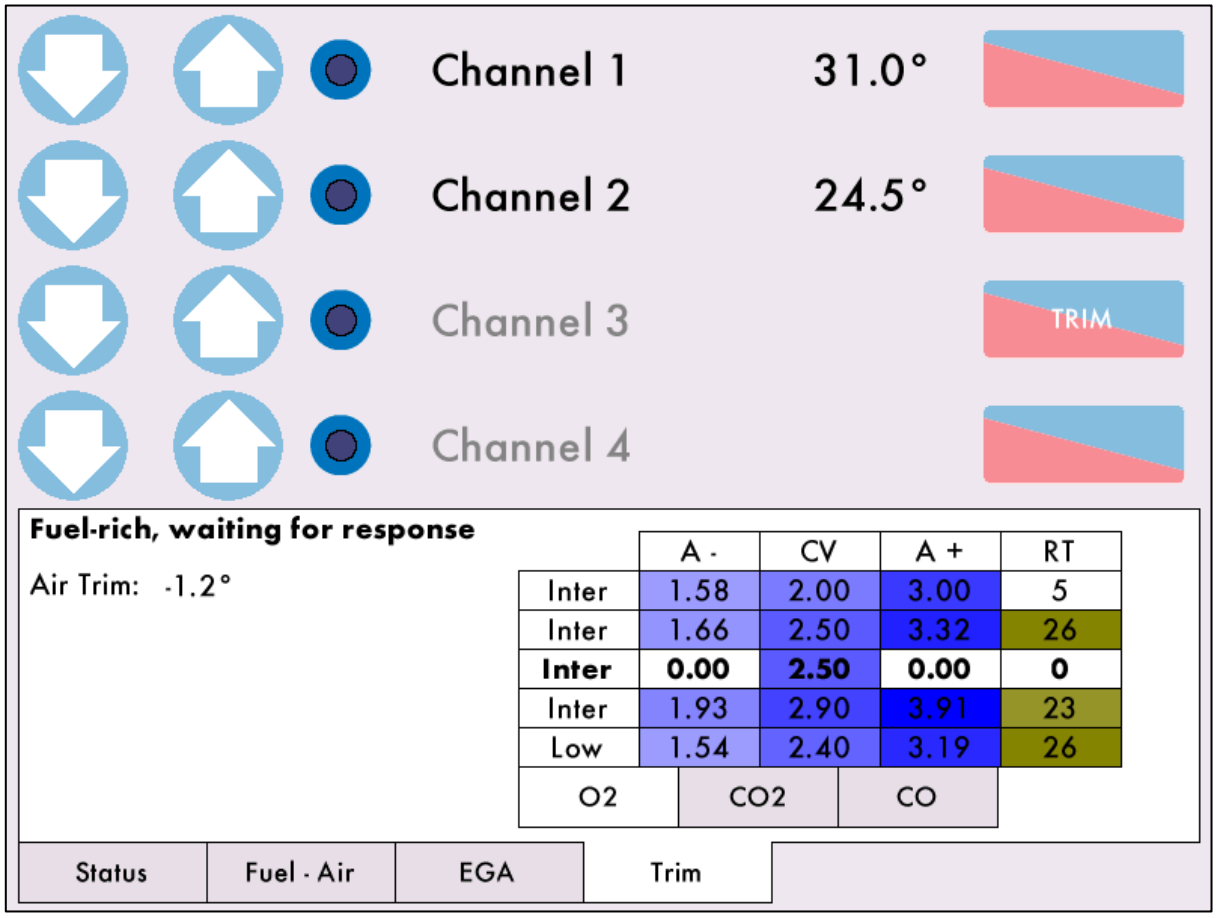


Figure 3.7.iv Single Point Change – Trim
图 3.7.iv 单点更改 - EGA 微调操作

The MM will store the trim values for this position.
控制模块将保存设定值的 EGA 微调数据。

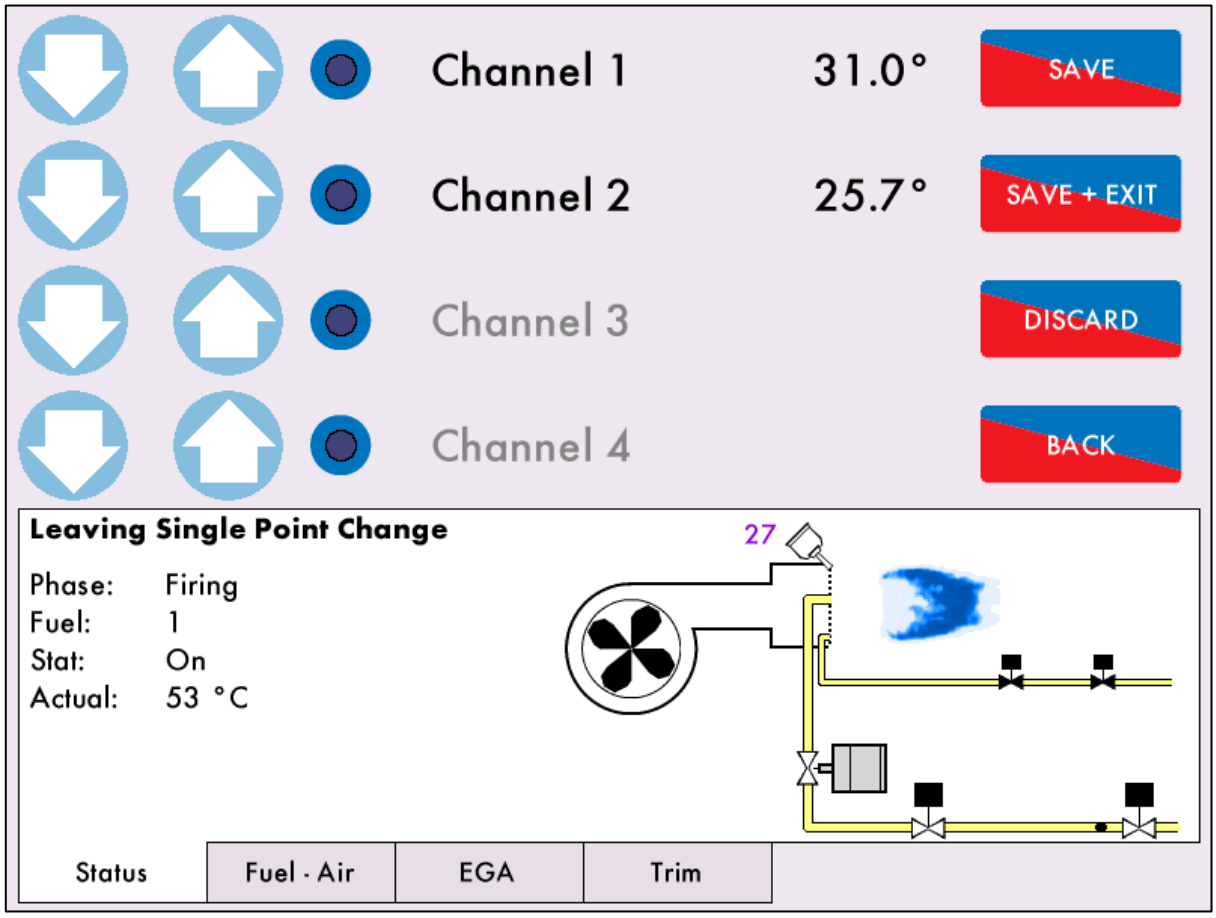


Figure 3.7.v Exit Single Point Change
图 3.7.v 退出单点更改

Once the adjustments have been made, go back to the Single Point Change home screen Figure 3.7.i and press SAVE + EXIT. Press SAVE to save the changes. Alternatively press DISCARD to discard the changes and exit Single Point Changes.

在完成数据调节后，回到单点更改主页屏幕（图示 3.7.i）并按下 SAVE + EXIT **保存+退出**按钮。 按下 SAVE **保存**按钮保存更改。 或者按下 DISCARD **丢弃**按钮丢弃更改并退出单点更改。

The fuel flow commissioning must be entered (again) if the following changes are made in single point change
如果操作者用“单点更改”做了以下操作，那就必须进入燃料流量调试流程（再次）。

- HIGH or START position is changed.
  更改高火位置或低火位置
- EGA trim data has been added.
  添加 EGA 微调数据
- Points have been added.
  添加中间点

Please see section 3.5 Fuel Flow Commissioning.
请参阅章节 3.5 燃料流量调试。

3.8 Online Changes / 在线更改

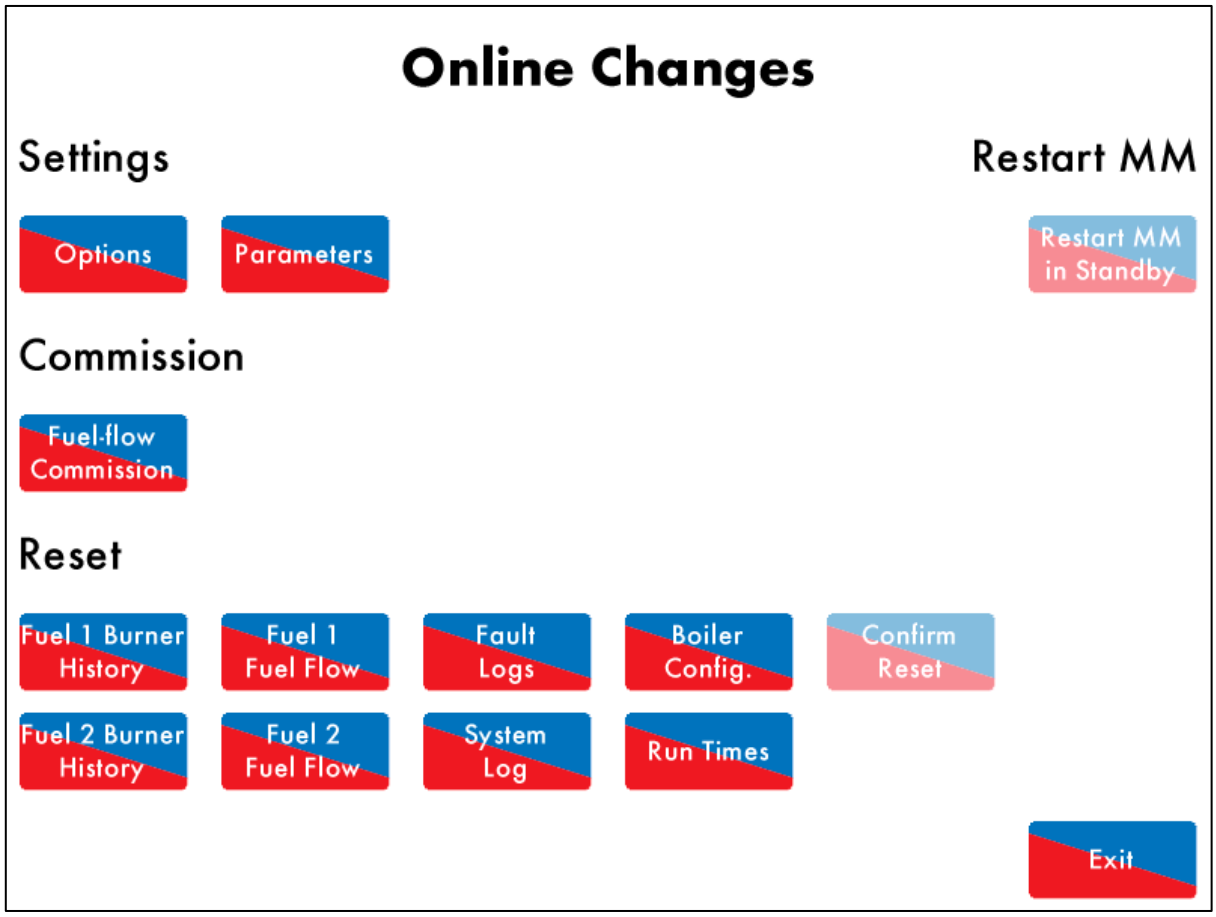


Figure 3.8.i Online Changes Screen
图 3.8.i 在线更改屏幕

The Online Changes is accessed by pressing 

on the system configuration screen, and then entering the password. The Online Changes feature allows the following:

在系统设置屏幕上按下 

在线更改按钮并且输入口令进入在线更改模式。在在线更改模式下可做以下操作：

- Fuel flow commissioning (section 3.5)
  燃料流量调试 （章节 3.5）
  - Change non-safety critical options and parameters
    更改非安全关键选项和参数
  - Reset burner history
    重置燃烧器历史数据
  - Reset fuel flow data
    重置燃料流量数据
  - Reset fault logs
    重置故障记录日志
  - Reset system log
    重置系统日志
  - Reset boiler configuration
    重置锅炉设置

- Reset run times
  重置运行时间记录
- Restart MM if the burner is in standby
  如果燃烧器处于待机，重启控制模块

Press on 

or 

to change the settings. For the Reset function, press the data to be reset e.g. 

and then press on 

.

Press on 

while the burner is in standby to restart the MM.

按下

选项按钮或者 

参数按钮来更改选项/参数的设置。对于重置功能，按下需要重置的数据按钮，例如 

（**燃料 1 燃烧器历史数据**），然后按下

（**确认重置**）按钮。

当燃烧器待机时按下

重启 MM 按钮，重启控制模块。

3.9 Additional Functions / 额外功能

Options/ parameters 154, 155 and 156 are used to set the function of terminals 80, 81 and 82, respectively. Terminal 80 is used for start position interlock, night setback input, and reduced setpoint input. Terminal 81 is used for purge interlock and low flame hold input. Terminal 82 is used for warming stat and valve proving mains input. Proving valves (end switch) provide a secondary confirmation that a valve has reached a pre-defined position.
选项/参数 154、155 和 156 分别设置终端 80、81 和 82 的功能。终端 80 用于“启动位置联锁”，“夜间调低值输入”和“降低设定值值输入”。终端 81 用于“吹扫联锁”和“低火焰输入”。终端 82 用于“加温控制点”和“阀门检验电源输入”。检验阀门（底部开关）的作用是二次确认阀门是否达到预定位置。

To install the End Limit Switches,
安装终端限位开关的方法：

1. Mount the servomotor onto the valve and ensure the potentiometer reads the correct position on the MM for the “CLOSED” and “OPEN” valve positions.
   将伺服电机安装到阀门上，确保屏幕上的电位器读数能正确反映阀门的“关闭”和“开启”位置。
2. Mount the End Switch Proving Unit (E.S.P.U.). The servomotor may have to be moved to a suitable position in order to allow the E.S.P.U. to be attached to the valve.
   安装终端开关检验设备（E.S.P.U.）。为了将终端开关检验设备装到阀门上，伺服电机可能要打开到一个合适位置。
3. Undo the End Limit Switch holding screws.
   解开终端限位打开的紧固螺丝。
4. Adjust the position of CAM corresponding to switches 1 (S1) and 2 (S2) by loosening the CAM screws and move to the required position.
   松开凸轮螺丝并且调节到位，根据开关 1（S1）和开关 2（S2）调节凸轮位置。
5. Wire the ESPU according to the Valve Proving the End Limit Switch will be required to provide. See the End Limit Switch wiring diagram in Figure 3.9.3.i
   根据阀门检验需要来接入终端开关检验设备（E.S.P.U.）。参见图示 3.9.3.i 中的终端限位开关接线图。

Note: The use of these switches is determined by the application approval necessary. These are not required to meet UL, FM or CE.
注意：开关的使用取决于实际的申请批复情况。这些开关不必符合UL, FM或者CE标准。

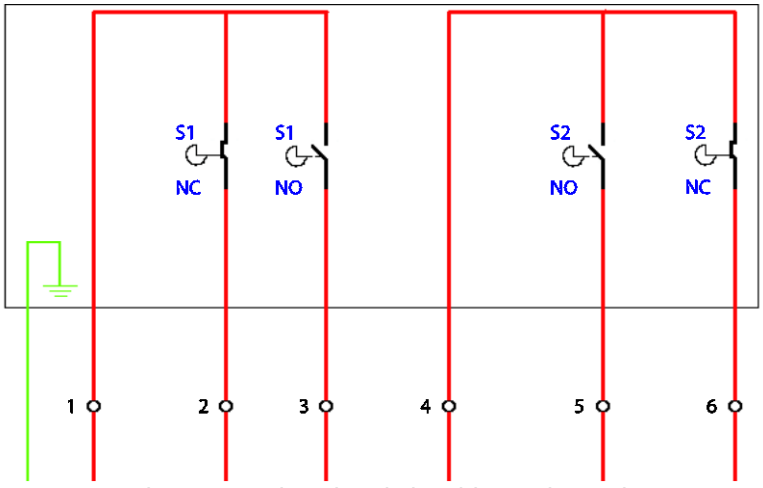


Figure 3.9.3.i End Switch Wiring Schematic
图 3.9.3.i 终端开关配线图

End Limit Switches are mounted on the end of bespoke valves (please contact Autoflame regarding bespoke valve manufacture) which are attached to the air and fuel valve and commissioned depending on the use of the End Limit Switches. An End Limit Switch comprises of two switches, as shown in Figure 3.9.3.i. Each comprises of an Earth and 6 connections to be wired as appropriate. The switches S1 and S2 are setup as per on site specification. These are then wired into both/or either of terminals 80 (the start position interlock) and 81 (purge interlock).
终端限位开关被安装在定制阀门的底部（关于定制阀门的制造，请联系Autoflame）。根据底端限位开关的使用情况，定制阀门被安装在空气阀门以及燃料阀门上并且已经过调试。 一个终端限位开关由两个开关组成（如图3.9.3.i.所示），每个单开关由一根地线和6个接线接口组成。 开关S1和S2的设置要根据现场规范，然后开关S1和S2将被接入终端80（启动位置连锁）和终端81（吹扫连锁）中的一个或者两个。

If option/ parameter 154 is set to 1, then the MM waits at RUN TO IGNITION until this interlock is made on terminal 80. If option/ parameter 155 is set to 1 then the MM waits at RUN TO PURGE until this interlock is made on terminal 81.
如果选项/参数 154 设置为 1，则 控制模块 在"运行至点火"处等待，直到在端子 80 上实现联锁。如果选项/参数 155 设置为 1，则 控制模块 在"运行至吹扫"处等待，直到在终端 81 上实现此联锁。

If option/ parameter 154 is set to 2, terminal 80 is the night setback input (night setback offset must be set in option 85). If it is set to 3, terminal 80 is used for reduced setpoint input. If option/ parameter 155 is set to 2, terminal 81 is used for the low flame hold input. If option/ parameter 156 is set to 0, then terminal 82 is used for the warming stat for sequencing. If it is set to 1, terminal 82 is used for the valve proving mains input (see option/ parameter 128).
如果选项/参数 154 被设为 2，那么终端 80 将被用作“夜间调低值输入”（选项 85 是夜间调低偏移量）。如果选项/参数 154 被设为 3，那么终端 80 被用作“降低设定值值输入”。如果选项/参数 155 被设为 2，那么终端 81 将被用作“低火焰保持信号输入”。如果选项/参数 156 被设为 0，那么终端 82 将被用作“群控过程中加温控制点的输入”。如果选项/参数 156 被设为 1，终端 82 将被用作“阀门校验，火线信号的输入”（参见选项/参数 128）。

4 PID CONTROL / PID 控制

The standard control algorithm used by Autoflame to control the fuel/air ratio is PID control; Proportional-Integral-Derivative control. The control algorithm compares the actual measured temperature or pressure and compares it to the user specified setpoint temperature or pressure. Depending on the measured and setpoint values, the MM's PID control will then either modulate the burner up or down. The rate of change or speed of the burner modulation in relation to changes in measured temperature or pressure is dependent on the settings of the PID control. The PID control action is the sum of the "Proportional" + "Integral" + "Derivative" actions of the PID control. Each contributes to how the 3 term PID control modulates the burner and each operates as outlined below.
Autoflame 使用用于燃料/空气比的标准制算法是 PID 控制，即比例、积分、微分控制。控制算法比较了实际测量的温度或压力和用户特定的设定值温度或压力。控制模块 PID 控制根据测量值和设定值不同来上下调节燃烧器。与测量温度或压力相关的燃烧器调节变化率或速度取决于 PID 控制的设置，PID 控制是“比列+积分+微分”控制的总和，每种都可以用于确定 PID 控制怎样调节燃烧器，各项运行如下所述。

Most applications can be controlled adequately using just the Proportional and Integral settings; a PI control setup.
利用比例和积分设置可以完全控制大部分应用程序，即 PI 控制设置。

Note: PID control is a fine-tuning process. Settings must be carefully and precisely adjusted by a qualified combustion engineers with thorough understanding of the combustion process. Load requirements, overall system response and all other parameters must be taken into consideration when adjusting the PID settings. Otherwise the changes to the system setup can make the controller operate in an unstable and potentially unsafe manner.
注：PID 控制是一个微调过程。设置必须通过对燃烧过程充分了解的资质燃烧工程师进行精确地调整。在调整 PID 设置时，必须考虑负载要求、整体系统响应和所有其他参数。否则，对系统设置的更改会使控制器以不稳定和潜在的不安全的方式运行。

4.1 Proportional Band / 比列范围

The Proportional term is specified in option 6 by defining the “Proportional band” (P-Band). The P-Band is simply an offset from the setpoint pressure or temperature. Outside and below the P-Band, the MM’s PID control will modulate the burner at maximum flame, upon reaching the P-Band, it will then modulate the burner linearly down (see option 6).
比列术语可以通过定义“比例范围”（P-band）在选项 6 中指定。比例范围简而言之是设定值压力或温度的一个偏移量，低于该比例范围，控制模块的 PID 控制都将在维持最高火燃烧，直至达到比例范围内，然后再线性向下调低燃烧器燃烧率（见选项 6）。

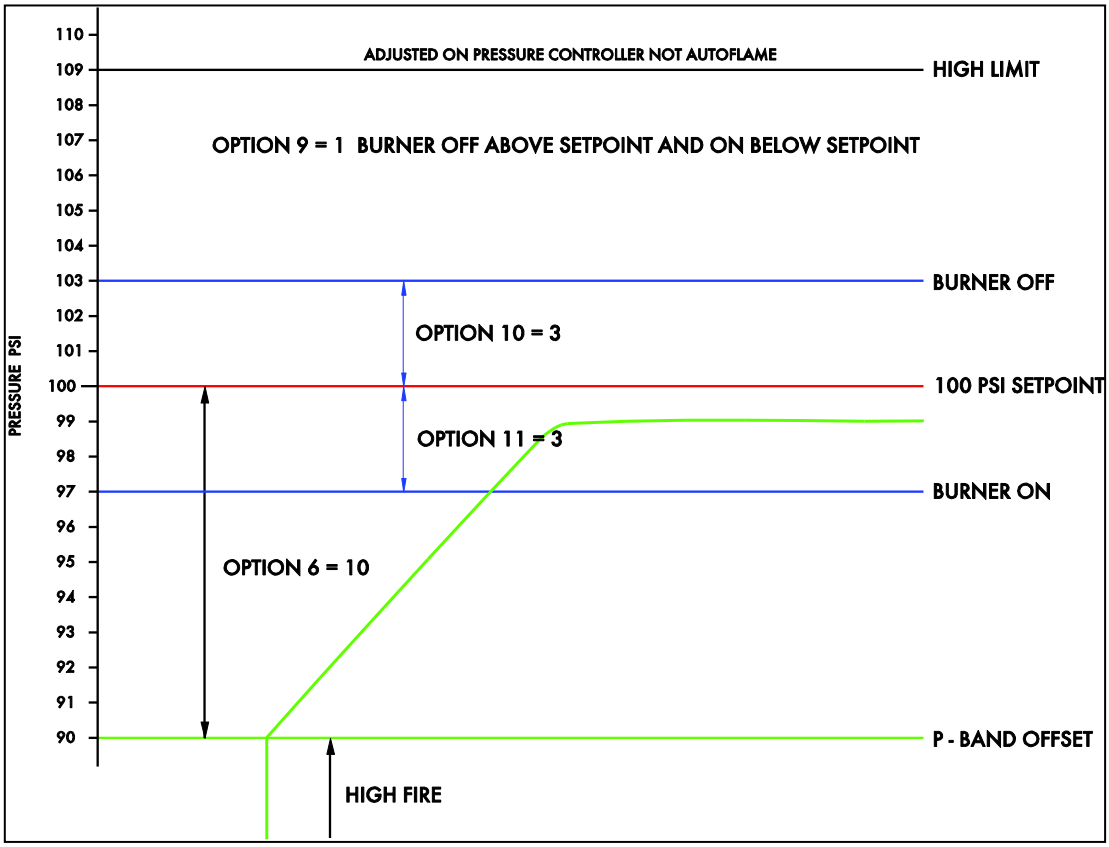


Figure 4.1.i Proportional Band
图 4.1.i 比例范围

4.2. Integral Control / 积分控制

The Integral term is specified in option 7, where the “Integral time”, also known as “reset time”, is set. Within a threshold of the P-Band, the integral term has the effect of increasing or decreasing the burner firing rate by a specific amount every “n” seconds. The amount the firing rate adjusted is 10% of the difference between the measured and setpoint temperature or pressure values, and the time period this amount is added, every “n” seconds, “n” is specified in option 7, the default is 60s.
积分控制在选项 7 中指定，“积分时间”还称为“重置时间”，其数值设置在 P-band 阀值范围内。积分控制能根据每“n”秒的具体数量增加或降低燃烧器的燃烧率，燃烧率调节的数量是测量温度或压力值和设定值温度或压力之间差值的 10%，以及每“n”秒时间范围内增加的量，“n”在选项 7 中指定，默认是 60 秒。

Option 7 is integral time, for which every ‘n’ seconds, 10% of the present offset from the setpoint is added when below the setpoint, or removed when above the setpoint, to the present proportional value.
选项 7 是积分时间，当数值低于设定值时，每“n”秒将会在设定值基础上增加 10%的燃烧率差值，当高于设定值时减少 10%的燃烧率差值。

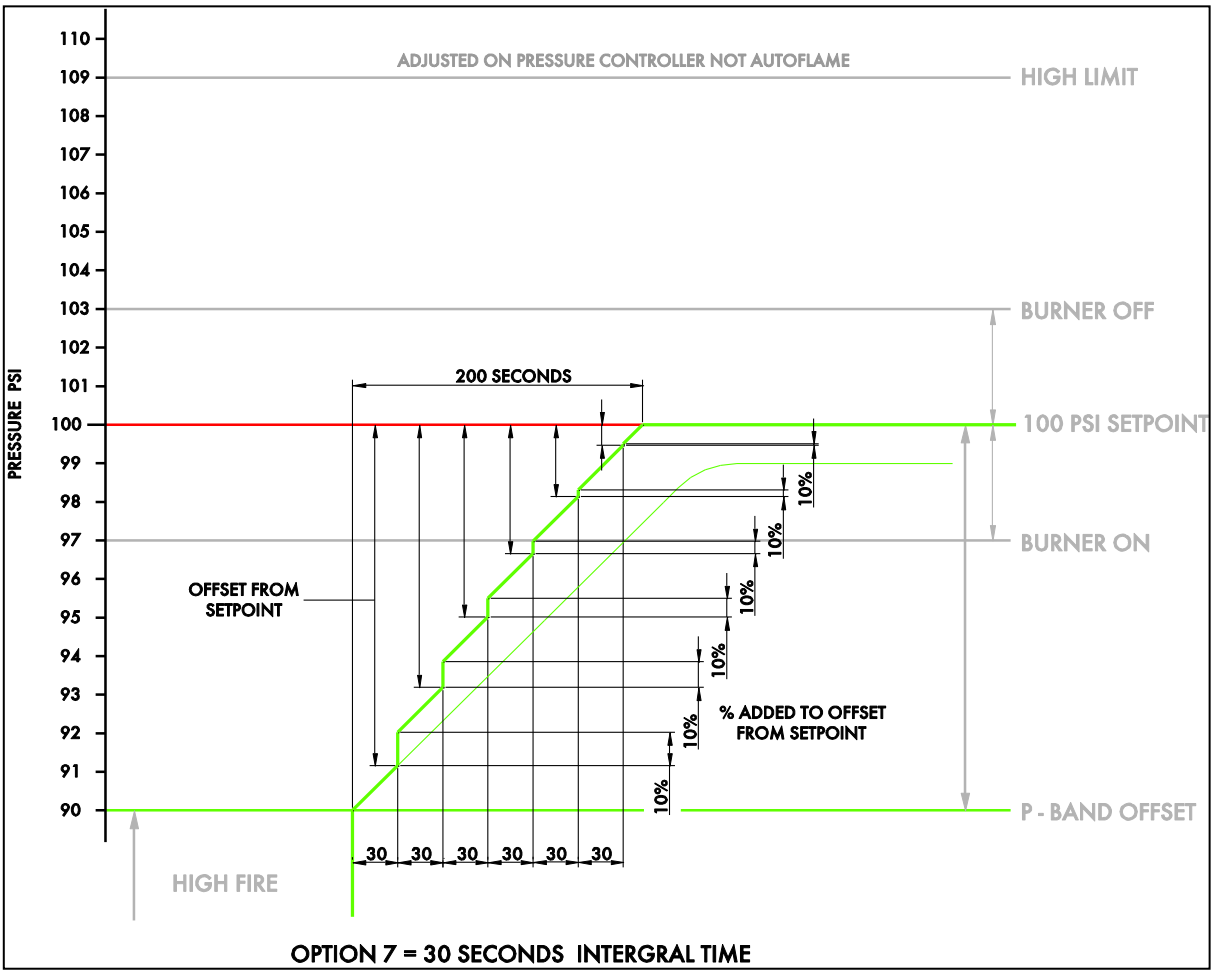


Figure 4.2. Integral Control
图 4.2. 积分控制

(Parameter 48 = 0.8, Integral operation band of P-Band)
(参数 48=0.8，P-band 积分运行范围)

4.3. Derivative Control / 微分控制

The Derivative term of the control system analyses the rate of change in the difference between the measured and set point temperature or pressure. Derivative specific options are set in option 37 and 38. The time interval over which the compared and measured temperature or pressure values are taken is set in option 37, the derivative dead-band or margin above and below the required set point in which no derivative action occurs is set in option 38.
控制系统微分控制用于分析测量温度或压力和设定值温度和压力之间差值的变化率。微分控制在选项 37 和 38 设置，比较温度或压力值和测量温度或压力值间的时间间隔在选项 37 中设置，高于或低于设定值的微分死区范围在选项 38 中设置。

The derivative response sensitivity is 10% firing rate. The derivative time set via option 37 is the time taken to add/remove additional 10% to the firing rate based on the actual value and the required value.
微分响应灵敏度设为 10%燃烧率。微分时间通过选项 37 设置，根据实际值和所需值的不同用于添加或删除额外 10%燃烧率。

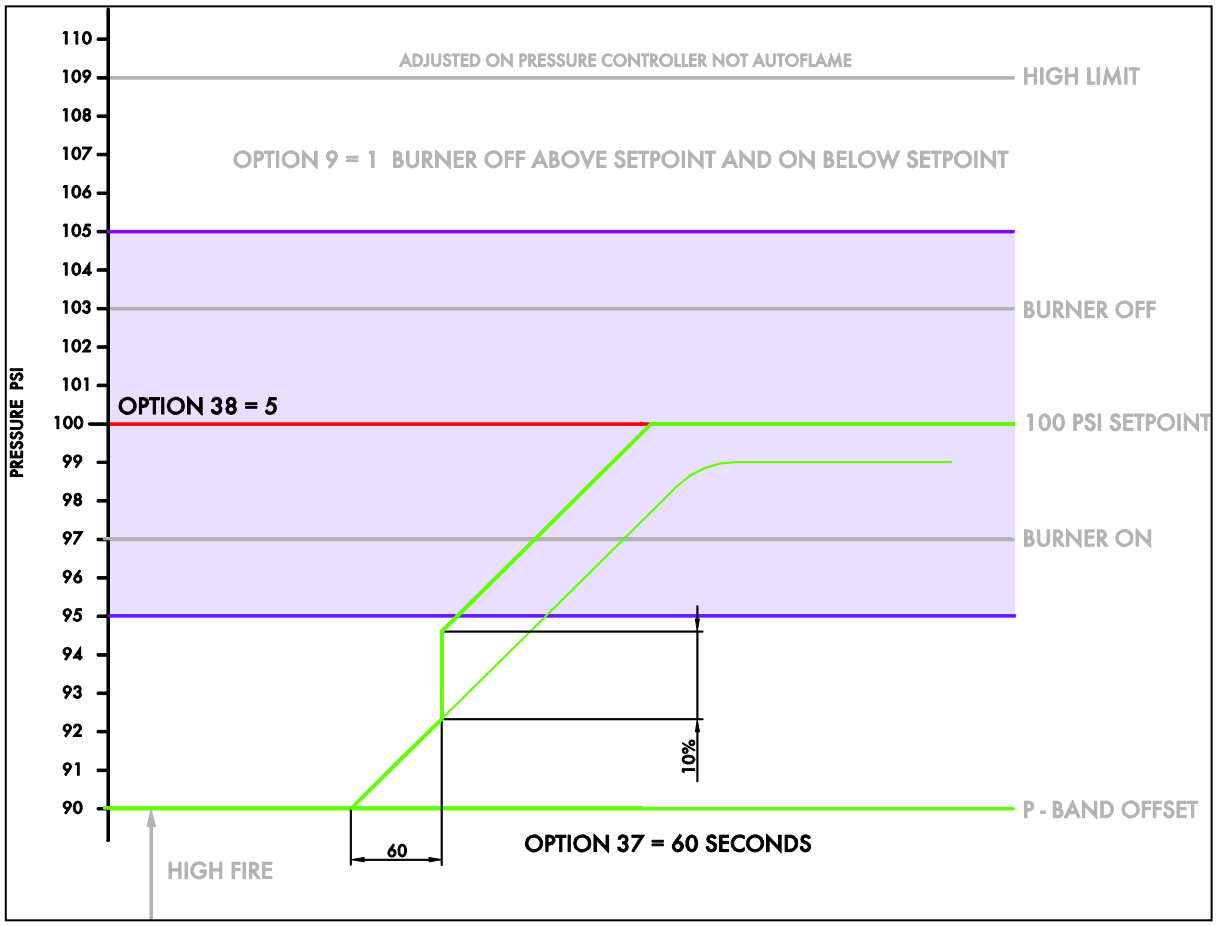


Figure 4.3. Derivative Control
图 4.3. 微分控制

NOTE: The derivative action occurs at all points outside of the deadband. This includes within the proportional band.
注意：微分控制在所有点都超出死区时发挥功能，包括在比例范围内。

5. INTELLIGENT BOILER SEQUENCING (IBS) / 智能锅炉群控（IBS）

The objective of Intelligent Boiler Sequencing (IBS) is to ensure that the minimum number of boiler/ burner units are in operation at any one time to satisfy the heat or steam requirement imposed upon the boiler plant, in the case of multi-boiler installations.
智能锅炉群控的目的是确保在任一时间都保持最少数量的锅炉/燃烧器设备，从而在安装多锅炉时满足锅炉厂所需的热量或蒸汽。

The benefits from using IBS include an increased savings in electrical costs, a reduction in thermal stress on the lag boilers, and an increase in overall plant efficiency. It is possible on the MMs to select steam sequencing, low pressure steam sequencing and hot water sequencing.
使用智能锅炉群控的优点包括降低电力成本、减少辅锅炉的热应力并增加锅炉厂的整体效率。在控制模块上可以选择蒸汽群控、低压蒸汽群控和热水群控。

There are variations of the IBS software that can be selected via the options/parameters procedure: hot water boilers, and steam boilers.
可以通过热水锅炉和蒸汽锅炉的选项/参数选择智能锅炉群控软件的变量。

A maximum of ten MMs (Mini Mk8 MMs, Mk8 MMs or combination of both) may be interconnected by a two wire screened data cable. Any MM interconnected may be selected as the lead boiler for the sequencing.
高达 10 个控制模块（Mini Mk8 MMs, Mk8 MMs 或这两种的混合）可以通过两根屏蔽数据线进行相互连接。任何一个控制模块可以选择作为群控的主锅炉。

The lead boiler can be selected by:
主锅炉通过以下方式确定：

1. Lead Boiler select soft button in the MM's IBS screen.
   主锅炉在控制模块的 IBS 屏幕上选择软按钮。
2. Via Mk8 DTI or using the DTI Manager software.
   通过 Mk8 DTI(数据传输接口)或使用 DTI 管理软件。
3. Modbus write.
   Modbus 写入

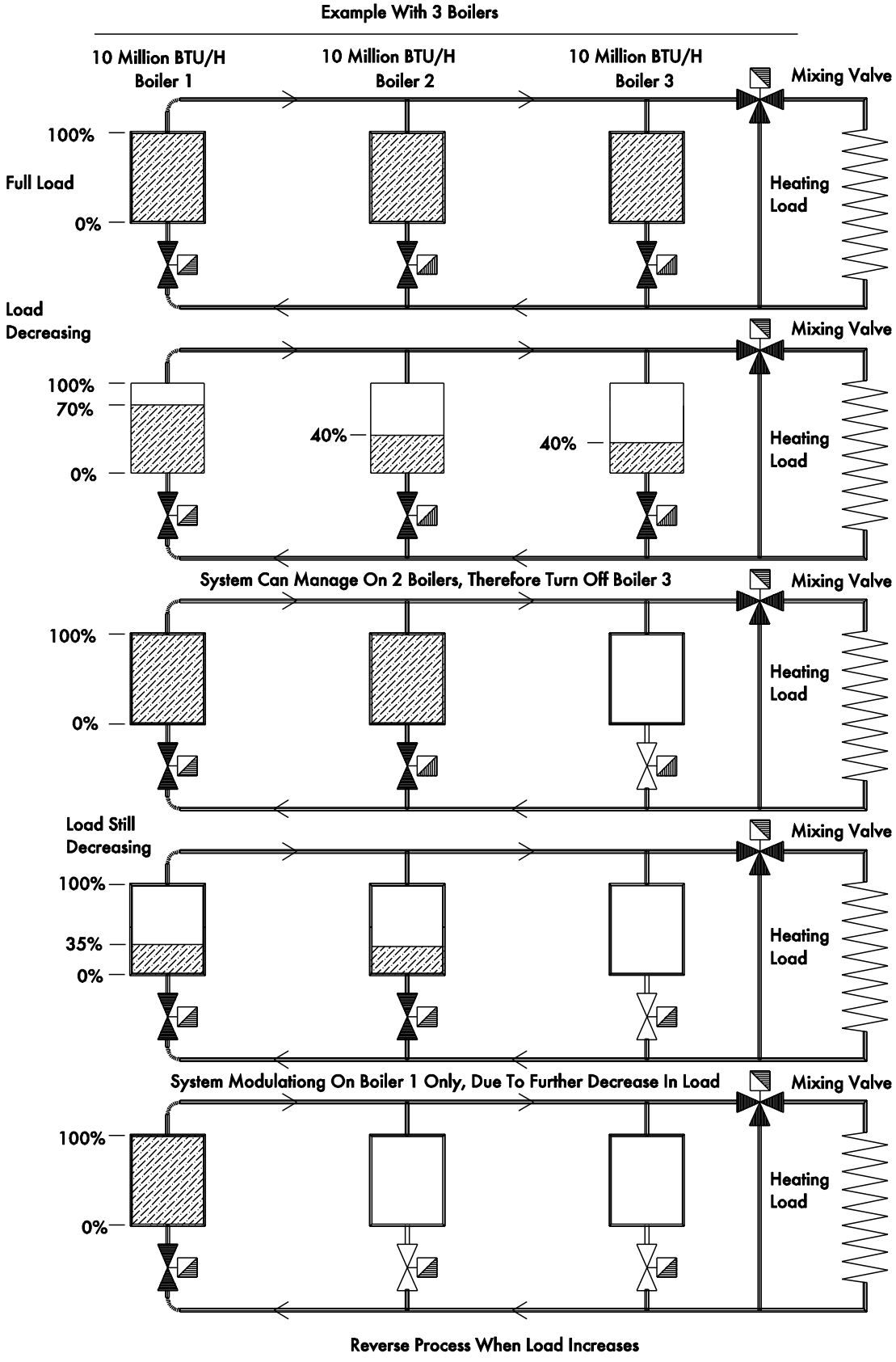
The sequence order of the MMs in the loop can be changed by changing their ID numbers or by changing the order on the DTI if shuffle sequencing is enabled through parameter 101.
利用参数 101 启用随机顺序群控后，控制模块的群控顺序可以通过改变其标识号或在数据传输接口上更改它们的顺序。

Sequencing can be used with external load detector but it cannot be used with external modulation.
群控可以与外部负载检测器和多锅炉运行一起使用，但不得与外部调节模块一起使用。

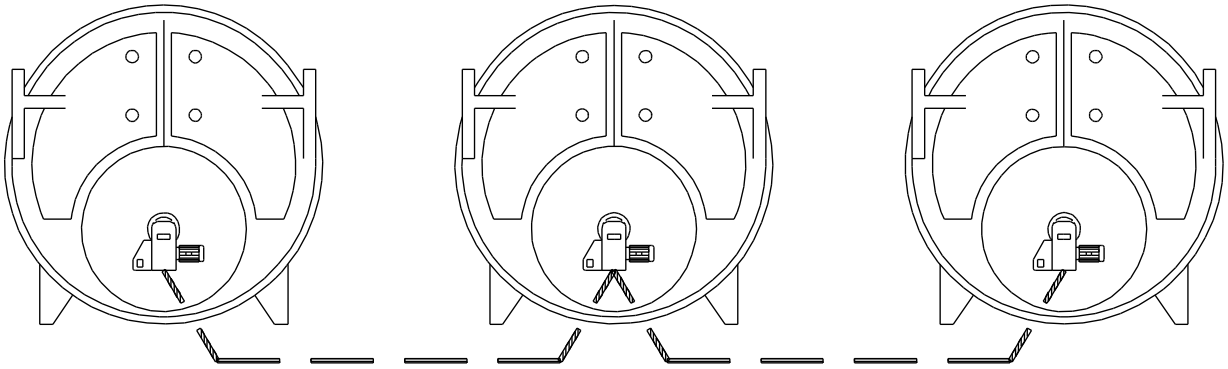
Please refer to section 1 or the Sequencing Connection Diagrams.
请参阅第 1 章节或群控连接图

5.1. Sequencing Schematics / 群控示意图

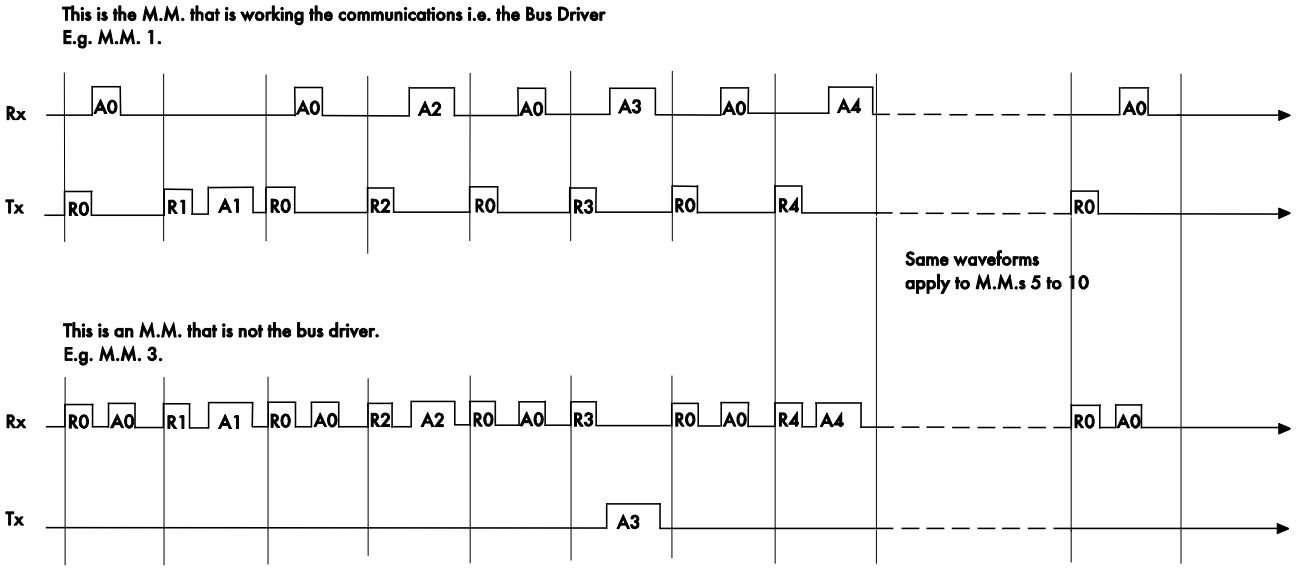
5.1.1. Hot Water Example / 热水示例



5.1.2. Boiler Examples / 燃烧器示例



5.1.3. IBS Communications / IBS 通信



Note : Only 1 M.M. is the bus driver.
The Bus driver is always the M.M. with the lowest ID number in the sequencing loop.

R0 - Request to D.T.I.	A0 - Answer from D.T.I.
R1 - Request to M.M. 1	A1 - Answer from M.M. 1
R2 - Request to M.M. 2	A2 - Answer from M.M. 2
R3 - Request to M.M. 3	A3 - Answer from M.M. 3
R4 - Request to M.M. 4	A4 - Answer from M.M. 4
R5 - Request to M.M. 5	A5 - Answer from M.M. 5
R6 - Request to M.M. 6	A6 - Answer from M.M. 6
R7 - Request to M.M. 7	A7 - Answer from M.M. 7
R8 - Request to M.M. 8	A8 - Answer from M.M. 8
R9 - Request to M.M. 9	A9 - Answer from M.M. 9
R10 - Request to M.M.10	A10 - Answer from M.M. 10

5.2. Sequencing Options and Parameters / 群控选项和参数

The following tables show the sequencing options and parameters.
下表显示了群控选项和参数。

Option 选项	Description 说明
16	Sequencing and DTI enable 群控和数据传输接口启用
33	MM identification 控制模块标识
35	Sequence scan time 群控扫描时间
40	Warming facility for low pressure steam 低压锅炉暖炉设施
41	Warming mode 暖炉模式
42	Standby setpoint 待机设定值
53	Steam sequencing burner off time 蒸汽群控锅炉关闭时间
54	Steam sequencing burner on time 蒸汽群控锅炉启动时间
57	Fuel flow metering 燃料流量计量
100	Sequencing/DTI or Modbus operation 群控/数据传输接口或 Modbus 运行
Parameter 参数	**Description 说明**
1	Sequence scan time set when unit goes offline 设备离线时的群控扫描时间
3	Number of boilers initially on 锅炉最初启动数量
5	Modulation timeout 调节超时
57	Highest MM ID 最大控制模块标识
62	Hot water sequencing 热水群控
86	IBS change down threshold / 智能群控降低阀值
87	IBS change up threshold / 智能群控增加阀值
101	Shuffle sequencing 随机群控

5.3. Hot Water Sequencing / 热水群控

5.3.1. Implementing Hot Water Sequencing / 执行热水群控

For hot water sequencing, a temperature detector must be fitted to all the MMs and option 1 must be set to 0 or 5.
进行热水群控时必须将温度检测器安装于所有的控制模块且选项 1 必须设为 0 或 5。

As sequencing is based on firing rate, the MMs must have fuel flow metering entered, see option 57.
由于群控是根据燃烧率进行，因此控制模块必须输入燃料流量计量值，见选项 57。

The MMs can be configured for sequencing either in Commissioning Mode, or in Online Changes; this allows the commissioning engineer to implement/adjust sequencing later after the burners have been commissioned.
控制模块可以在调试模式中设置群控或在在线更改中设置，调试工程师可以在调试燃烧器后执行或调整群控。

Each MM in the sequencing loop must be set with an individual ID number through option 33; no two MMs can have the same ID number in sequencing, Multi-Burner operation, and when connected to a DTI/Modbus interface. The highest MM ID number should be set for that sequencing loop in parameter 57, so the system only looks for communications with these MMs. The maximum number of MMs that can be in a sequence loop is 10. If there is a DTI in the sequence loop, to control the sequence loop via the DTI, parameter 101 must be set to 1.
群控循环中的每个控制模块都必须通过选项 33 设有一个单独的标识号，两个控制模块不能在群控、多燃烧器运行和连接数据传输接口/Modbus 接口时有相同的标识号。在参数 57 中可以将控制模块最高标识号设为群控循环，这样系统仅需要寻找这些控制模块的通信。在群控循环中的控制模块最大数量为 10，如果在群控循环中有数据传输接口，则可以通过该数据传输接口控制群控循环，且参数 101 必须设为 1。

To enable sequencing, option 16 must be set to 1, or 3 for sequencing with DTI. If option 16 is set to 3, then the DTI/Modbus interface is capable of some remote control. The individual and global required setpoint, lead boiler select, sequence order, enable/disable and firing rate can be set remotely. If an MM's firing rate is set by the DTI/Modbus interface, then that MM will not follow the sequencing loop.
启用群控时选项 16 必须设为 1 或 3，用于带有数据传输接口的群控。如果选项 16 设为 3，则数据传输接口/Modbus 接口可以用于某些远程控制，单独设定值和全球所需设定值、主锅炉的选择、群控顺序、启用/禁用和燃烧率可以设为远程控制。如果控制模块的燃料率是通过数据传输接口/Modbus 接口设置，则该控制模块不会跟随群控循环。

For hot water sequencing, option 53 must be set to 0 to disable the standby warming which is used in steam sequencing. Options 40 and 41 must be set to 0 on all the MMs in the sequencing loop. If warming is required for lag hot water boilers, then hot water sequencing can function like steam sequencing by setting option 62.
热水群控中选项 53 必须设为 0，以禁用用于蒸汽群控的暖炉功能。在群控循环中的所有控制模块中，选项 40 和 41 都必须设为 0。如果辅热水锅炉需要暖炉，则热水群控能像选项 62 设置的蒸汽群控一样工作。

In a sequence loop, there is one lead MM, and the rest are lag MMs. The lead MM identifies its own firing rate by looking at its fuel flow metering data, proportional to the system's load requirements. Having established the percentage firing rate and maximum heating capacity, the lead MM calculates the amount of heat being contributed to the system by this burner.
在群控循环中有一个主锅炉，其他都为辅锅炉。主锅炉可以通过查看其燃料流量计量数据识别燃烧率，燃料流量计量数据与系统的负载要求呈正比。在确定燃烧率百分比和最大加热能力后，控制模块将计算燃烧器向系统传递的热量。

The sequence scan time (see option 35) sets after how long the firing rates of all the MMs in the loop are assessed. The scan time has a critical effect on the responsiveness of the sequencing system. Too long a scan can result in the boilers not coming online quick enough to meet the load demand; too short a scan time (shorter than the burner start-up time) can cause another boiler to be brought online before the previous lag boiler has started firing. The scan time should normally be set at minimum, the start-up time for the burner.

群控扫描时间可以在循环中所有控制模块的燃烧率确定后在选项 35 中设置，扫描时间的关键作用是影响群控系统的响应时间。如果时间过长，锅炉可能不会快速联机以满足负载要求，如果时间过短，则扫描时间（小于燃烧器启动时间）可能导致辅锅炉在开始燃烧前调用了它的下一个锅炉。正常的扫描时间至少应与燃烧器的启动时间相同。

The lead MM looks at its firing rate and sends a command to the lag MMs to either contribute to load because it cannot reach the setpoint, or to stop contributing to the load because the system has met the load demand. Only one lead MM can be selected at one time, if more than 1 is selected as lead MM, then the MMs will ignore the sequencing loop commands and return to independent firing. Parameter 2 sets how often the 'bus driver' MM requests and transmit information to the other MM The 'bus driver' is always the MM with the lowest ID number.
主锅炉确定燃烧率后将向辅锅炉发送命令，因为控制模块不会到达设定值，当系统已经满足负载要求时控制模块将停止加载。一次只能选择一个主锅炉，如果一次选择了多个主锅炉，则控制模块将忽略群控循环命令并返回独立燃烧。参数 2 用于设置“主”控制模块请求信息或向其他控制模块传递信息的频率，主控制器始终是带有最小标识号的控制模块。

The MMs will start, continue or stop contributing to the load based on the change up and down thresholds, see parameter 86 and 87. The next lag MM will be brought online if the lead MM cannot cope with the load demand, and its firing rate is above the change up threshold. Alternatively, the MM will go into standby, warming or offline if the last two lag MMs have a total combined firing rate less than the change down threshold, because the system can cope with the load demand.
控制模块将根据上下变化的阀值启动、继续运行或停止，见参数 86 和 87。如果主燃烧器无法满足负载要求且燃烧率将大于上阀值，则会调用下一辅锅炉。同样，如果最后两个控制模块的总燃烧率小于下阀值， 后面辅控制模块将进入待机、暖炉或离线状态，因为系统可以应对负载要求。

For example, if the change up threshold in parameter 87 is set at 90%, then if the last firing MM in the sequence is above 90% firing rate, then upon the elapse of the next scan time, the next lag MM will be brought online. If at the next scan time, the firing rates of the last two online lag MM are 30% and 40% respectively, and the change down threshold in parameter 86 is set at 80%, then the last lag MM will go into standby, warming or off depending on how the sequencing mode is set.
例如，如果在参数 87 中将上阀值设为 90%，在群控中如果最后燃烧的控制模块燃烧率大于 90%，则在经过下一扫描时间后，下一辅锅炉将启动。如果在下一扫描时间，最后两个联机的辅锅炉燃烧率分别为 30%和 40%，在参数 86 中下阀值设为 80%，则最后辅锅炉 将进入待机、暖炉或离线状态，这取决于群控模式的设置。

If a lag MM fails to start when requested, the scan time will be decreased by the offset set in parameter 1, until it is automatically ignored from the sequencing communication loop. If a lag MM fails to modulate after being requested to contribute to the load requirement, then that MM will be ignored from the sequencing communication loop after a time delay set in parameter 5.
如果一个辅燃烧器在请求后没有启动，则扫描时间将根据参数 1 中设置的偏移量而减少，直至在群控通信循环中自动忽略。如果一个辅燃烧器在请求后没有根据负载要求调节，则在选项 5 中设置时间延迟后，在群控通信循环中将忽视该控制模块。

After a power recycle, the number of MMs which are initially set on when the MMs start up again, is set in parameter 3.
在断电重启后，则控制模块再次启动后最初设置的控制模块数量可以在参数 3 中设置。

5.3.2. Two Port Valve Operation / 两端阀的运作

In hot water sequencing, when there is no demand for all of the lag boilers to be on, the system will close the two port valves on the lag boilers that do not need to be on. This will stop the hot water circulating in the system from passing through the boiler and the heat being wasted.
在热水群控中，当所有辅锅炉没有要求启动时，系统将关闭不需要启动的辅锅炉上两个端口阀，这将关闭系统中的热水循环。

It is possible to use Terminal 78 which is a switched neutral to control the two port valve. This works by switching to neutral once the MM has stopped firing but if the temperature of the boiler ever gets above the required set point then Terminal 78 will switch back even if the boiler is not firing.
可以使用零线开关的终端 78 来控制两个端口阀。当燃烧器停止燃烧时可以零线开关，但如果锅炉的温度高于所需设定值时，终端 78 将切换回来，即使锅炉不再燃烧。

- When the two port valve is closed on an OFF lag boiler, if at any time, the residual heat in that boiler is above the required setpoint, the valve is opened immediately and the heat is let through the system. The two port valve then stays open.
在关闭的辅锅炉上关闭两端口阀时，如果在任何时候锅炉中的剩余热量高于所需设定值，则阀门将立即打开，热量将通过系统排出，然后两端口阀保持打开状态。

- When the lead boiler recognises that it needs a lag boiler to come online after the sequence scan time, the lag boiler will then run its relay tests. This will open the two port valve immediately and it will then stay open.
当主锅炉识别出需要延长锅炉在群控扫描时间后联机时，延长锅炉将进行继电器测试，这将立即打开两端口阀并保持打开状态。

For the two port valve to close, the lag boiler must be in standby mode, and the actual setpoint must be on or below the required setpoint; it must be in this condition for at least one minute.
如果要让两端口阀关闭，延长锅炉必须处于待机模式，且实际设定值必须高于或低于所需设定点，只有在至少一分钟内保持此条件，两端口阀才可关闭。

Terminal 78 on the MM is a switched neutral connection for controlling a two port valve that would normally be installed in the boilers return pipe connection to the common return header. This facility ensures that boilers that are switched ‘offline’ do not contribute return temperature water to the flow header thereby diluting the flow temperature to the building.
控制模块终端 78 切换到中性连接后可以控制两端口阀，通常两端口阀安装在锅炉回水管上，回水管与常见的回水头相连。该设备可以确保离线的锅炉不会将返回水传递至流量头，从而可以降低建筑物的流量温度。

5.4. Steam Sequencing / 蒸汽群控

5.4.1. Warming Steam Boilers / 蒸汽暖炉

The difference between steam pressure sequencing is the warming periods; the IBS settings explained in section 5.3.1 are the same. By keeping the lag MMs at low fire when they are in standby/ warming, when they are requested by the lead MM to come online and contribute to the load, they will not be started from cold.
蒸汽压力群控间的差别在于加热时间，第 5.3.1 节所述的 IBS 设置是相同的。当辅锅炉处于待机/暖炉状态时，辅锅炉将保持低火焰，当辅锅炉被主控制模块要求联机时，它们将不会在冷启动。

A steam boiler is at risk of thermal shock if not warmed before running at high fire. If the lag boiler is required to contribute to the steam load, then the boiler must be warm in order to contribute quickly in a safe manner. If the boiler is started from cold and allowed to fire at a high firing rate straight away then this may cause damage to the boiler. The tubes will increase in temperature and if the boiler started from a cold position then this will cause thermal shock to the boiler.
如果蒸汽锅炉在高火焰运行前不暖炉，则有可能受到热冲击的风险。如果辅锅炉被要求增加蒸汽负载，则锅炉必须进行加热，以便快速进入安全状态。如果锅炉冷启动并允许直接在高火率下燃烧，则可能对锅炉造成损坏。如果锅炉在冷态启动，管道的温度将增加，则将会对锅炉造成热冲击。

Additionally, not warming a steam boiler can result in a slow response to meet the system's steam demand. For process applications and critical sites such as hospitals, it is imperative that the steam is met efficiently and quickly. If one of the boilers fails, or locks out then it is very important that the next boiler in the sequencing loop gets up to pressure as quickly as possible. Therefore, if this starts up from a cold status then this will take a long time to get up to pressure safely. By warming this lag boiler this means that the boiler will maintain a pressure, offset from the required setpoint in order to ensure that when required this gets up to pressure quickly.
此外，蒸汽锅炉不加热可能会导致响应迟缓，以满足系统的蒸汽要求。至于工艺应用和关键场所如医院，蒸汽必须满足高效、快速的要求。如果一个锅炉发生故障或锁定，则在群控循环中的下一个锅炉需要尽快满足压力要求，因此，如果锅炉从冷状态下启动，则会花费很长时间才能达到安全压力。通过辅锅炉暖炉，则意味着锅炉将保持在所需设定值之下的偏移量压力，以便确保快速满足压力要求。

5.4.2. Implementing Steam Sequencing / 执行蒸汽群控

The operation of IBS for steam boilers is similar to hot water sequencing but with additional features as explained below. In the case of hot water boilers only two states in the control form exist; either on or off. However, with steam boilers sequencing there are three states which are controlled sequentially.
蒸汽锅炉的 IBS 操作类似于热水群控，但具有以下所述的附加特性。对于热水锅炉，在控制模式下仅存在两种状态，即启动或停止。然而，蒸汽锅炉群控有三种状态是按顺序控制的。

Just like in hot water sequencing, steam sequencing is used to ensure that only the minimum number of boilers required are contributing to meet the required setpoint, reducing fuel consumption and improving the overall plant efficiency.
与热水群控相同，蒸汽群控可以用于确保仅需要最少数量的锅炉满足所需设定值，从而减少燃料消耗并提高工厂的整体效率。

The steam sequencing operation has 4 sequencing states:
蒸汽群控运行有以下四种群控状态：

- On – the burner fires and modulates freely to meet the required setpoint. The burner will start and stop according to the above and below offset differentials (see options 9, 10 and11).
  启动-燃烧器燃烧并自动调节以满足所需设定值的要求，燃烧器将根据大于或小于的偏移量差异值（见选项 9,10 和 11）启动和停止。

• Standby – the burner remains at the low fire position to meet the standby setpoint (set as an absolute value in option 42). The burner will start and stop according to the above and below offset differentials (see options 9, 10 and 11).
待机-燃烧器保持在低火焰位置以满足待机设定值的要求（在选项 42 中设为绝对值）。燃烧器将根据大于或小于的偏移量差异值（见选项 9,10 和 11）启动和停止。

• Warming – the burner remains at the low fire position to meet the standby setpoint (see option 42) and runs according to a timer of X minutes firing (see option 54) and Y minutes not firing (see option 53). If option 54 is set to 0, then the burner will continually fire at the low fire position to meet the standby setpoint in the warming state.
加热—燃烧器保持低火焰位置以满足待机设定值的要求（在选项 42 中设为绝对值）并根据 X 分钟燃烧（见选项 54）和 Y 分钟不燃烧（见选项 53）定时器的时间运行。如果选项 54 设为 0，则燃烧器将在低火焰位置继续燃烧以满足加热状态下待机设定值的要求。

The burner can also be controlled by a (warming) thermostat fitted in the boiler shell, wired to terminal 82 (see option/ parameter 156).
燃烧器可以通过安装在锅炉外壳上的（加热）恒温器进行控制，锅炉外壳与终端 82 相连（见选项/参数 156）。

• Off – the burner does not fire.
停止-燃烧器不燃烧。

As well the options/parameters given in section 5.3.1, the following also need to be set for steam sequencing:
除 5.3.1 节给出的选项/参数外，蒸汽群控还需要设置以下选项：

• Option 41 – Sets whether all the lag boiler states, either the first lag is kept in standby state with the second lag in warming and the remaining lag MMs off, or all the lag boilers after the first lag boiler are kept in warming state and there are no boilers offline.
选项 41-设置所有辅锅炉状态，即第一辅锅炉是否处于待机状态，第二辅锅炉是否处于暖炉状态，其他辅锅炉是否关闭，或第一辅锅炉后的所有辅锅炉是否处于暖炉状态且没有锅炉离线。

• Option 42 – Sets the standby setpoint for sequencing where non-return valves are installed; the first lag boiler will aim to maintain this standby setpoint when in the warming/standby phase. This is set as absolute value.
选项 42-当没有安装止回阀时设置群控的待机设定值，在加热/待机阶段，第一辅锅炉将保持在该待机设定值，该值应设为绝对值。

• Options 53 – Sets the steam sequencing burner off time. This is the time in minutes for how long the boiler will be off for during Warming mode.
选项 53-设置蒸汽群控锅炉的停止时间，即在暖炉模式下确定锅炉停止的分钟数。

• Option 54 – Sets the steam sequencing burner on time. This is the time in minutes for how long the boiler will be in low flame hold for the boiler to heat up to its standby setpoint, when in Warming mode. Options 42, sets the standby setpoint.
选项 54-设置蒸汽群控锅炉的启动时间。即在暖炉模式下确定锅炉加热至待机设定值时处于低火焰保持的分钟数，选项 42 用于设置待机设定值。

5.4.3. Low Pressure Steam Sequencing / 低压蒸汽群控

For steam boiler plants where check (non-return) valves are not installed, or the required setpoint is less than 2 Bar (20 PSI), it is not possible to use a standby setpoint. Each pressure sensor would read the same pressure value, regardless of individual boiler temperature/ pressure. A thermostat (Aquastat) can be installed into the boiler shell, and option 40 must be set to low pressure steam sequencing.
没有安装止回阀或所需设定值小于 2 Bar (20 PSI)的蒸汽锅炉厂不能使用待机设定值。每个压力传感器将读取相同的压力值，而无论单个锅炉的温度和压力是多少。节温器（水温自动调节器）可以安装在锅炉外壳上，而且选项 40 必须设为低压蒸汽群控。

A live input on terminal 82 (see option/ parameter 156) will initiate warming for that lag boiler, and this will fire according to the interval timings in options 53 and 54.
终端 82 上的实时输入（参见选项/参数 156）将启动辅锅炉的暖炉，并根据选项 53 和 54 中的间隔时间点火。

5.5. Troubleshooting IBS / 故障排除 IBS

If IBS is not turning the lag boilers on and off as needed to meet load demand, this indicates that there is an issue with the sequencing communications or with the fuel flow commissioning data.
如果 IBS 没有按照需要开启和关闭辅锅炉以满足负载需要，这表明群控通信或燃料流量调试数据存在问题。

Fuel Flow Metering must be set correctly on all the MMs as this is used to determine the firing rate and burner rating which IBS looks at to decide whether to bring on or turn off lag boilers.
所有控制模块上的燃料流量计量都必须正确设置，因为该值可以用于确定燃烧率和锅炉额定值，从而 IBS 软件能够确定是否启动或停止辅锅炉。

The MMs must be connected via a Belden 9501 in daisy chain configuration as per the sequencing wiring diagrams in section 1, with the data cable screened at one end only.
所有控制模块都必须按照第 1 节中的群控布线图通过百通 9501 菊花链结构进行连接，仅在一端屏蔽数据线。

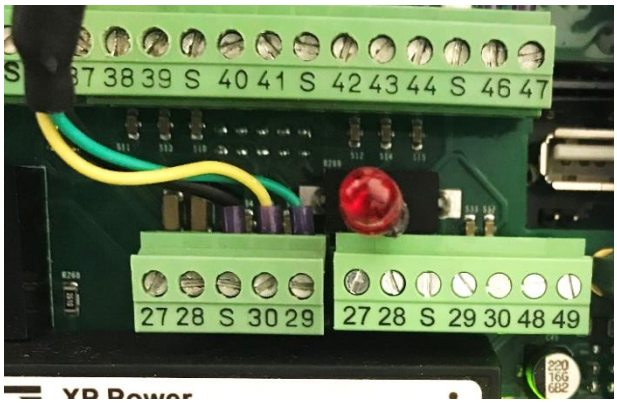
During firing, an MM will be removed from the sequence loop should any of the following occur:
在燃烧期间，如果出现以下问题，控制模块将从群控循环中去除：

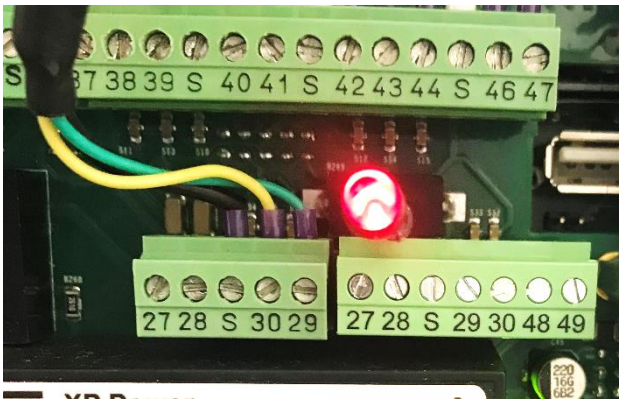
- Communications to the MM has timed out
  控制模块通信超时。
- The MM has been disabled remotely via the DTI or a BMS with option 16 set to 3
  控制模块通过数据传输接口或楼宇管理系统（选项 16 设为 3）被远程禁用。
- Option 16 on the MM is not set to 1 or 3
  控制模块上选项 16 未设为 1 或 3。
- The MM is in an error, burner lockout or expansion alarm state
  控制模块出现故障，燃烧器锁定或处于警报状态。
- The MM has not started modulating within the required time
  控制模块在所需时间内没有开始调节。
- The DTI is manually controlling the firing rate
  数据传输接口手动控制燃烧率。
- Modulation exerciser is being used
  正在使用调节试验器
- Option 47 has been set for cold-start routine
  选项 47 被设为常规冷启动。
- The MM is in Hand or Low Flame Hold mode
  控制模块处于手动或低火焰保持模式。
- The MM has been optioned for Modbus
  Modbus 已选择了控制模块。

Testing Communications with an LED
用 LED 的测试通信

When having communications problems between Autoflame MMs, a simple test with a standard 5V LED can confirm if they are due to hardware or wiring problems.
当 Autoflame 控制模块间出现通信故障时，可以用一个标准的 5VLED 进行简单的测试，确定是硬件问题还是接线问题。

Take a standard 5V LED and wire it into terminals 27 and 28 of the MM ensuring correct polarity (black connected to the negative leg of the LED). If the MM is communicating, the LED will flash intermittently. If the LED does not flash, check the polarity is correct on the LED. If the LED still does not flash, please contact Autoflame Sales Department. Do this for all the MMs in the sequence.
使用一个标准的 5V LED 并连接至控制模块的终端 27 和 28 上，确保电极连接正确（黑色连接 LED 的负极）。如果控制模块开始通信，则 LED 将间歇闪烁。如果 LED 没有闪烁，则检查 LED 的电极连接是否正确。如果 LED 仍未闪烁，请连接 Autoflame 销售部。同时按群控测试所有控制模块。


37 38 39 S 40 41 S 42 43 44 S 46 47
27 28 S 30 29
27 28 S 29 30 48 49


37 38 39 S 40 41 S 42 43 44 S 46 47
27 28 S 30 29
27 28 S 29 30 48 49

6. GENERAL FEATURES / 一般特性

6.1. Calibrating the Load Sensor's Actual Value / 标定负载传感器的实际值

The actual load sensor value can be calibrated. Parameter 9 allows the temperature / pressure sensor value to be adjusted, it allows the user to adjust the actual value between a range of 80.0% and 120.0%.
实际负载传感器值可以校正。参数 9 允许调节温度/压力传感器的值，允许用户在 80.0% ~ 120.0%的范围内调节实际值。

The load sensor can be calibrated via Commissioning Mode or through Online Changes.
操作者在调试模式或者在线更改模式下可以校正负载传感器。

The percentage change may not be linear to the current temperature/ pressure, i.e. 80% of 100°C may not show 80°C.
注百分百更改值并不和当前温度/压力值成线性关系，即 100 度的 80%并不一定显示 80 度。

For example, if the actual temperature was showing as 91degC on the MM, but the true temperature was 79degC, change the value in parameter 29 until the correct temperature adjustment has been made. Figure 6.1 shows the load sensor adjusted by 96.0% to display 79degC.
例如：如果控制模块屏幕显示的实际温度是 91 度，但实际温度是 79 度，则操作者可以调节参数 29 的数值直到屏幕上显示正确的数值。图示 6.1 是通过更改 96%的读数来将负载传感器读数调节到 79 度。

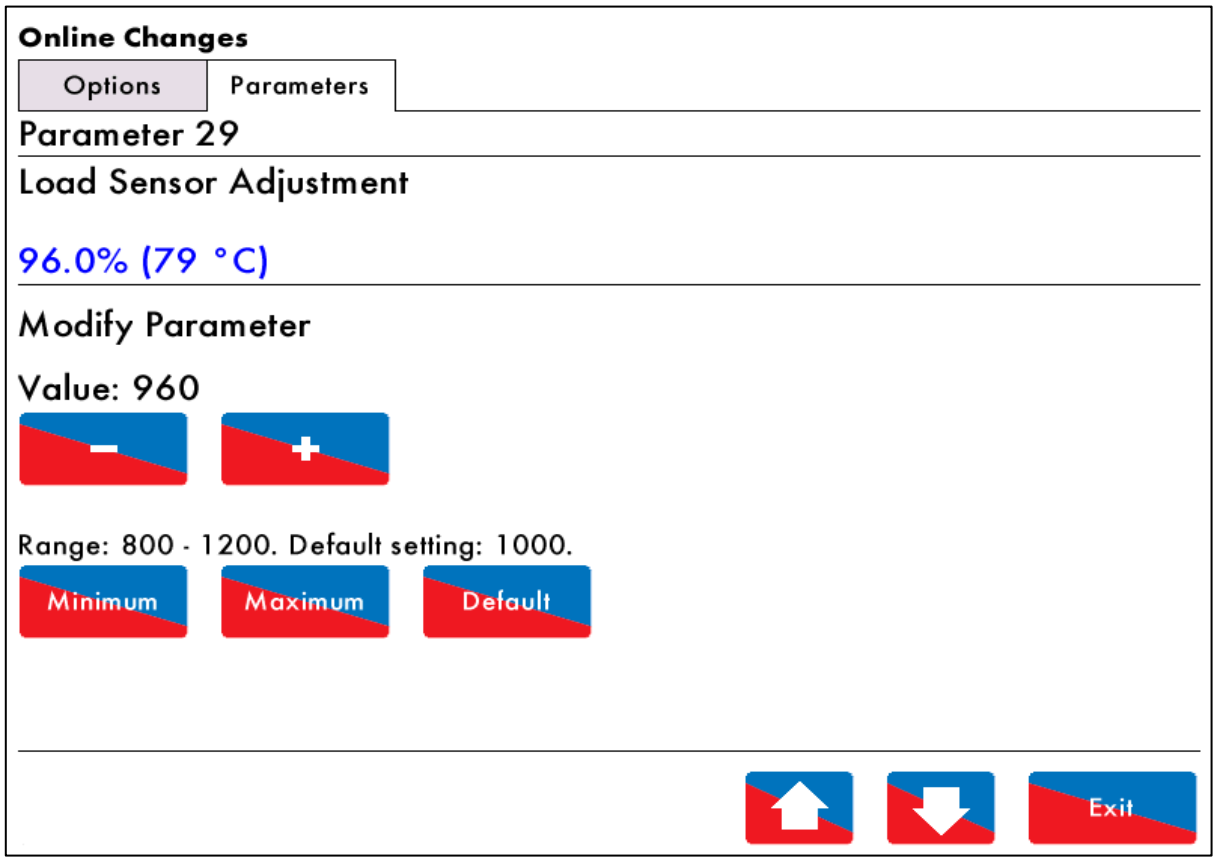


Figure 6.1 Load Sensor Adjusted
图 6.1 调整后的负载传感器

6.2. External Modulation / 外部调节

For external modulation, option 45 can be set to 1 (Enabled), and option 9 must be set to 0. The internal PID control is disabled and the firing rate is set by input control signal on terminal 37, 38 as appropriate for 0 – 10V and 2 – 10V. Set parameters 68 for the external modulation control range, and parameter 69 for the input range. The fuel flow metering must be commissioned.
对于外部控制，选项 45 可以设置为 1（启用），并且选项 9 必须设置为 0。内部的 PID 控制是禁用的，燃烧率由终端 37、38 设置为 0-10V 和 2-10V 控制信号来设定。设置参数 68 为外部调节控制范围，参数 69 设定为外部控制的输入信号范围。燃料流量计量必须调试使用。

External modulation using 4-20mA signal requires placing 500Ω resistor across terminals 37 and 38.
系统可以通过一个跨接终端 37、38 的 500 欧姆电阻来使用外部控制的 4 – 20mA 电流输入。

6.3. HAND, LOW FLAME HOLD AND AUTO / 手动, 低火焰保持和自动

6.3.1. Hand Operation / 手动操作

Hand operation enables the firing rate positions to be set to a specific position, in the range of low to high fire, when the burner is firing. Fuel flow metering must be entered. Sequencing will not operate correctly if the MM is in hand mode. Hand mode can only be activated when the burner is firing.
当燃烧器燃烧时，从低火到高火范围内，手动操作可以将燃烧率位置设定至指定位置，此时必须输入燃料流量计量。如果控制模块处于手动模式，则群控将不会正常运行。手动模式只有当燃烧器燃烧时可以启用。

The Mini Mk8 MM will go into hand mode when the hand mode soft button is pressed in the Status screen. Arrows will then appear on the screen which can be used to increase and decrease the firing rate. Once the hand mode is deactivated, the MM will go to auto mode and fire according to normal modulation. On the Mini Mk8 MM the transfer between hand and auto mode is always bumpless.
当在手动状态屏幕上按下手动模式软键按钮时，Mk8 微型控制模块将进入手动模式。控制模块屏幕上将出现箭头，可以用于增加或降低燃烧率。当禁用手动模式时，控制模块将进入自动模式并正常调节火焰。在 Mk8 微型控制模块中，手动模式和自动模式之间的转换始终是无颠簸的。

If the low flame hold input is activated on terminal 81 (see option/parameter 155), then this will take priority over the hand button pressed in the Status screen.
如果在终端 81 上激活低火焰保持输入（见选项/参数 155），那么这将优先于状态屏幕上按下的手动按钮。

6.3.2. Low Flame Hold / 低火焰保持

Low flame hold is the state when the MM's firing rate goes to its low fire position, while the burner is firing. Fuel flow metering must be entered. Sequencing will not operate correctly if the MM is in low flame hold.
低火焰保持是当控制模块燃烧率到达其低火焰位置时的一种状态，测试燃烧器将继续燃烧，必须输入燃料流量计量。如果控制模块处于低火焰保持状态，则群控不会正常运行。

To put the Mini Mk8 MM into low flame hold, go to the Status screen and press the low flame hold button, or put an input on terminal 81 (option/parameter 155 must be set to 2). Once out of low flame hold, the MM will return to normal modulation.
要使 Mk8 微型控制模块处于低火焰保持状态，进入状态屏幕平按下低火焰保持按钮，或输入终端 81（选项/参数 155 必须设置为 2）。一旦低火焰保持结束，控制模块会返回到正常的调节。

6.3.3. Auto Operation / 自动运行

The MM 'Auto' operation enables the burner modulation to maintain the setpoint; the firing rate will modulate according to how far away the actual temperature or pressure is away from the required setpoint. The firing rate is determined from the fuel flow metering entered via option 57; the more accurate the fuel flow metering, the more accurate the firing rate
控制模块自动运行可以使燃烧器保持设定值，燃烧率将根据实际温度或实际压力与所需设定值的差距而进行调节。燃烧率可以通过选项 57 在输入燃料流量计量后确定，燃料流量计量的越准确，则燃烧率越准确。

6.4. Single Servomotor Operation / 单伺服电机操作

For applications where only the VSD controls the air going into the burner and no air servomotor is required, the Mini Mk8 MM can be set for single servomotor with VSD. The MM will make changes to the fuel servomotor and VSD in synchronisation as the firing rate modulates up and down.
对于应用程序，只有 VSD 控制空气进入燃烧器，不要求有空气伺服电机，MK8 微型控制器可以设置为一个单独的伺服电机与 VSD。控制模块将对伺服电机和 VSD 同步做出改变作为燃烧率调节高低。

When using a single servomotor with VSD, the MM checks that the VSD feedback is within the fault tolerance bands set in option 99 as the fuel servomotor drives open to increase the firing rate. If the VSD feedback is not higher than the tolerance band at that the servomotor angle, then the servomotor will wait until the VSD ramps up to meet this limit at minimum. This prevents the burner from being too fuel-rich as the firing rate increases. As the fuel servomotor closes, there is a natural lag in the VSD feedback as it slows down; the fuel servomotor still waits for the VSD but does not modify the target VSD speed.
当使用一个单独的伺服电机与 VSD，控制模块检查 VSD 反馈是在故障容忍带设置在选项 99 因为燃料伺服电机驱动器打开，以增加燃烧率。如果 VSD 反馈不高于伺服电机角度的容忍带，则伺服电机将等待，直到 VSD 上升，以满足最小限值。这可以防止燃烧器在燃烧速率增加时燃料过于丰富。因为燃料伺服电机关闭，VSD 反馈里有一个自然滞后作为减慢；燃料伺服电机会一直等待 VSD，但不修改 VSD 目标速度。

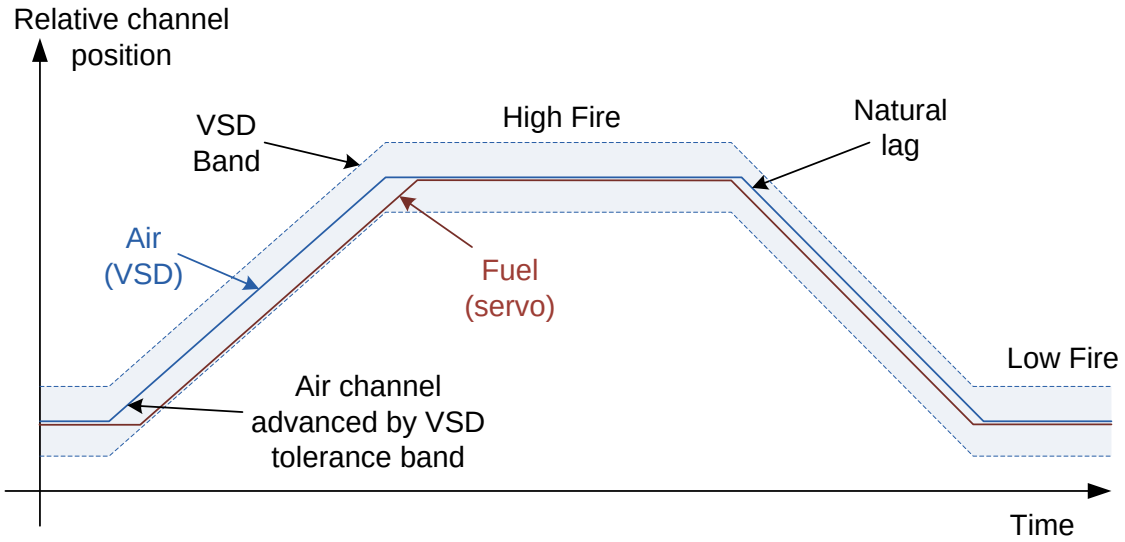


Figure 6.4.i Single Servomotor with VSD Diagram / 图 6.4.i 带 VSD 的单伺服电机图表

Option 4 Air Channel must be set to setting 1 for 'VSD Channel 4,' and options 90 to 99 must be set according to the VSD settings. Option 8 must be set to 'Channel 1 only.' Option 89 allows the user to send the high signal to the VSD only when the T58 is required to come on, to prevent the burner being forced with air at start-up.
选项 4 空气通道设置必须设置为 1“VSD 通道 4”，并且必须根据 VSD 设置将选项 90 到 99 设定。 必须将选项 8 设置为“仅通道 1”。选项 89 允许用户仅在要求打开 T58 时才将高信号发送到 VSD，以防止燃烧器在启动时被空气挤压。

Note: EGA trim will not work with single servomotor with VSD.
注意：EGA 微调不适用于带 VSD 的单个伺服电机配置。

For single servomotor with VSD, both the fuel servomotor on channel 1 and the VSD on channel 4 are wired as normal to the MM.
对于带 VSD 的单伺服电机配置，通道 1 上的燃料伺服电机和通道 4 上的 VSD 均与 MM 正常连接。

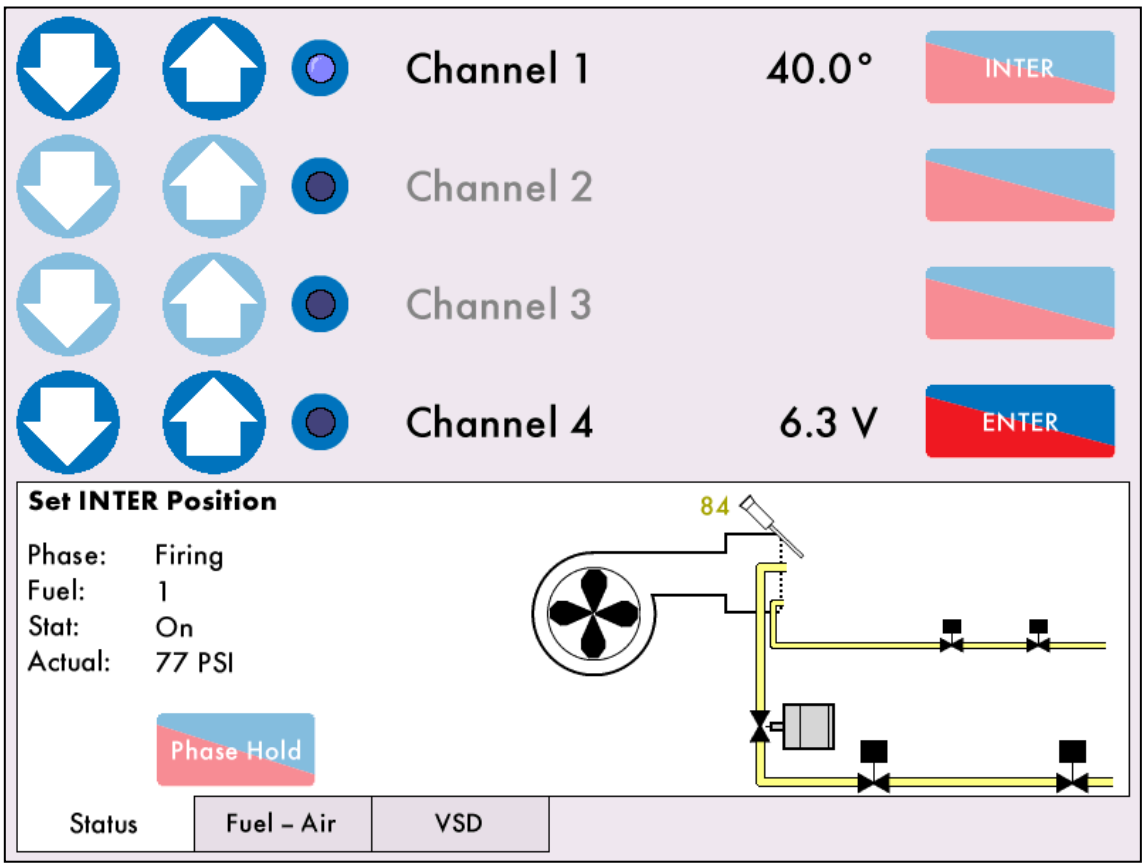


Figure 6.4.ii. Single Servomotor with VSD
图 6.4.ii. 单伺服电机和变频器

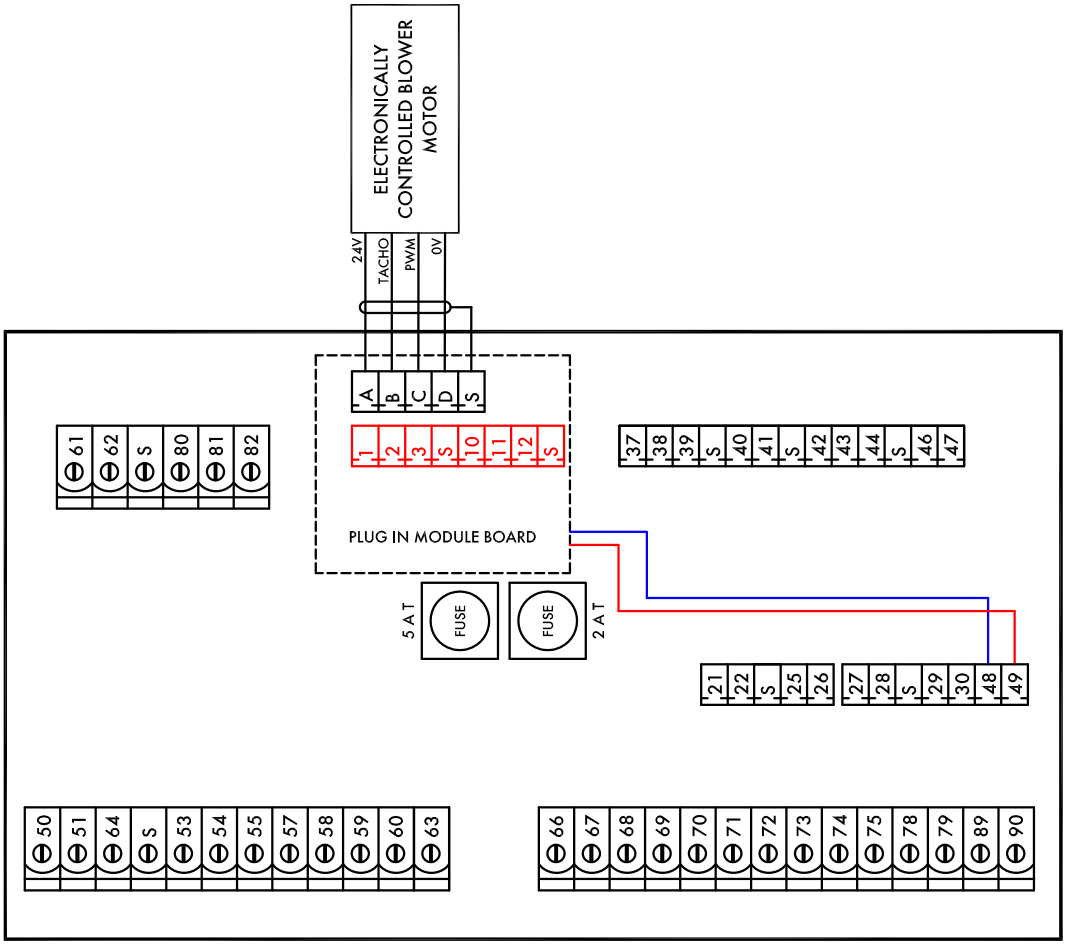
The commissioning procedure remains the same, however only the channel 1 gas servomotor position and channel 4 VSD position needs be entered for each point. In Run mode the system will show the servomotor position and VSD input and output signals.

调试程序保持不变，但每个点只需要输入通道 1 燃气伺服电机位置和通道 4 VSD 位置。在运行模式下，系统将显示伺服电机位置以及 VSD 输入和输出信号。

6.5. PWM Motor Control / 脉宽调节电机控制

In applications with fans/blowers that uses Pulse Width Modulation (PWM) control, the Mini Mk8 MM requires an additional module to control these fans, the PWM Adapter Module (Part # SP80050).
在带有使用脉宽调节（PWM）控制的风扇/风机的应用中，Mini Mk8 MM 需要一个附加模块来控制这些风扇，即 PWM 适配器模块（产品号 SP80050）。

This adapter is plugged into the VSD channel 4 terminals (1, 2, 3, 10) on the Mini Mk8 MM and the fan is commissioned like a VSD. The power supplied to the module comes from the IR scanner terminals 48 and 49.
该适配器插入 Mini Mk8 MM 的 VSD 通道 4 端子（1、2、3、10），并且像 VSD 一样调试风机。 提供给模块的电源来自 IR 火检端子 48 和 49。



Before purchasing this module, please contact Autoflame Engineering. The digital fan adapter must be purchased according to the specification of the digital fan. The device must be programmed with the correct speed settings for the fan to be used and must be fitted with the correct interface components.
购买此模块之前，请联系 Autoflame Engineering。 必须根据数字风机的规格购买数字风扇适配器。 该设备必须设置正确的速度设定才能使用风机，并且必须装有正确的接口组件。

The following options must be set:
必须设置以下选项：

Option 选项	Setting 设定值	Option 选项	Setting 设定值
89	1	94	Default
90	1	95	2
91	2 (2-10V)	96	Default
92	Default	97	Default
93	Default	98	Default

The supplied pin jumper must be placed for setting the open and closed position in commission mode, and must be removed after the pre-purge phase is completed. The rest of the commissioning procedure is the same as that of Ch4 VSD. In Run mode the system will show the servomotor position and VSD input and output signals.
在调试模式下必须将提供的插针跳线插上以设置开位和关位，并且在前吹扫阶段完成后必须将其拔下。 其余调试步骤与通道 4 VSD 相同。 在运行模式下，系统将显示伺服电动机的位置以及 VSD 输入和输出信号。

6.6. No Air Servomotor / 无空气伺服电机

Some burner applications use natural draught to supply air for combustion without the need for air blower for forced draught and there is no air damper, so the air supplied to the burner is at atmospheric pressure. In such applications there is no need for control on the air channel and only the fuel channel requires controlling.
一些燃烧器应用使用自然通风来提供燃烧空气，而无需鼓风机来强制通风，并且没有风门，因此供应到燃烧器的空气处于大气压下。 在这样的应用中，不需要对空气通道进行控制，仅燃料通道需要控制。

The Mini Mk8 MM allows the system to be set so that the burner is commissioned with channel 1 servomotor only to control the fuel flow. This configuration can also be used for pre-mix burners where the fuel to air volume ratio is not varied. In these applications, channel 1 is used to vary the volume of combined air and fuel.
Mini Mk8 MM 允许对系统进行设置，以便使用通道 1 伺服电机调试燃烧器，仅用于控制燃料流量。 这种配置也可用于不改变燃料与空气体积比的预混燃烧器。 在这些应用中，通道 1 用于改变空气和燃料的混合量。

The gas servomotor is wired as normal to the MM, and option 4 must be set to 'No Air Channel.' Option 8 must be set to 'Channel 1 only.'
燃气伺服电动机与 MM 的接线正常，并且选项 4 必须设置为“无空气通道”。选项 8 必须设置为“仅通道 1”。

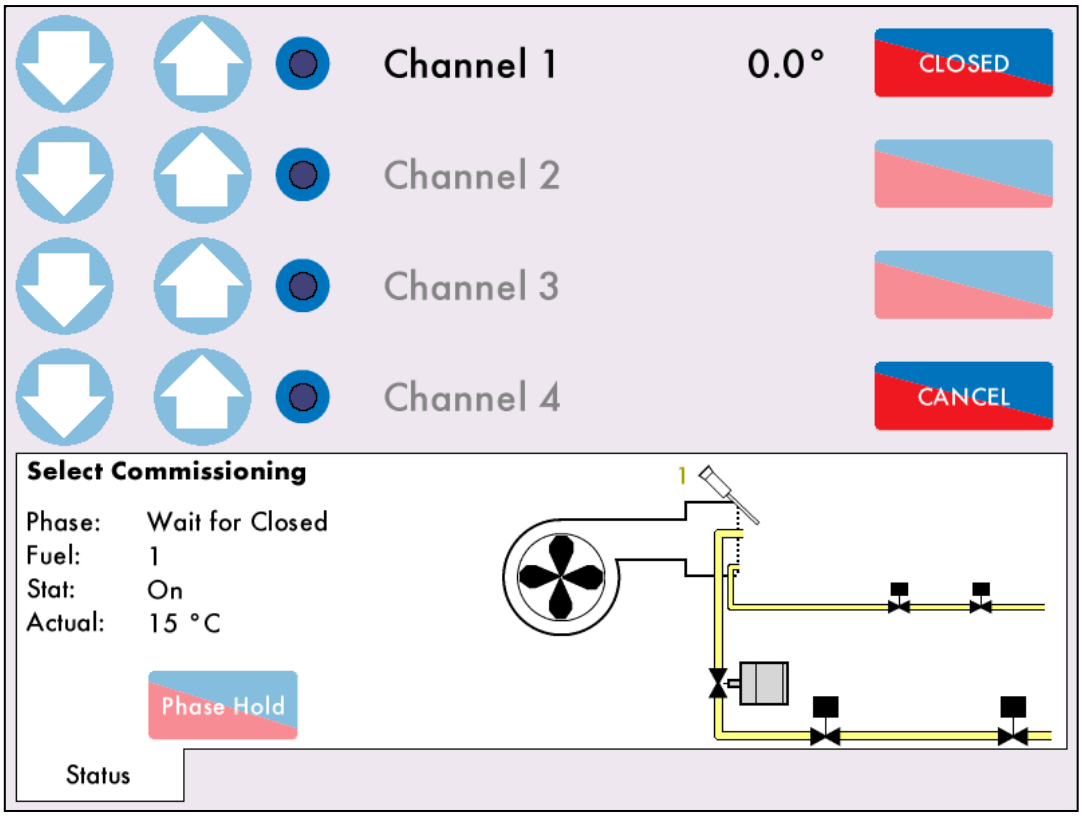


Figure 6.6 Commissioning with No Air Servomotor / 图 6.6 无空气伺服电机的调试

The commission procedure follows the normal steps but with channel 1 servomotor only.
调试过程遵循常规步骤，但仅使用通道 1 伺服电机。

For more information on using the Mini Mk8 MM on an atmospheric burner or pre-mix burner and what limit switches or purge delay is required, please contact Autoflame Engineering.
有关在大气燃烧器或预混燃烧器上使用 Mini Mk8 MM 的更多信息，以及需要什么限位开关或吹扫延迟的信息，请联系 Autoflame Engineering。

6.7. No Pre-Purge / 无预吹扫

It is possible to minimise the burner start-up time by bypassing the pre-purge. The major advantage of this control means that the overall boiler efficiency is increased by minimising the heat loss to the stack during a purge cycle. This means the burner starts-up quicker therefore reaching setpoint in a reduced time. According to the EN676 European regulation, the burner is allowed to restart without a pre-purge if the burner has recycled due to operational temperature/pressure. When the burner is stopped by a lockout then this procedure is not allowed and the burner will have to start-up as normal with a pre-purge. In order for no pre-purge to be active, valve proving must take place and finish successfully. If this valve proving operation is successful then the burner may start-up without a pre-purge.
可以绕过预吹扫减少燃烧器启动时间，这种控制方法的主要优点是在吹扫阶段通过减少烟气管热损失来提高锅炉的效率。这意味着燃烧器启动时间更快，可以在更短的时间到达设定值。根据 EN676 欧洲法规，如果燃烧器因运行温度/压力达到设定值而再循环（停炉），则燃烧器允许在不进行预吹扫的情况下重启。当燃烧器因锁定而停止时，则不允许进行上述步骤。此时燃烧器将正常启动并带有预吹扫。为了不激活预吹扫，必须进行阀门检验并成功完成检验。如果阀门检验操作成功，则燃烧器则会在不进行预吹扫的情况下启动。

In order to initiate the no pre-purge feature, option/ parameter 143 must be set to a value of 1. During the first start-up the burner will start with a pre-purge initiated. Once the complete commissioning curve has been entered and the burner has started successfully, the burner will then start-up every time with no pre-purge. If the burner goes above its setpoint and turns off on high temperature/ pressure, then the next time the burner starts-up, it will go through the VPS operation and then light off without a pre-purge, i.e. the burner has shut down in a controlled manner and the gas valves have been checked for integrity.
为了不激活预吹扫功能，选项/参数 143 必须设为 1。在第一次启动时，燃烧器将在预吹扫情况下启动，当成功输入调试曲线且燃烧器成功启动后，燃烧器每次将会在没有预吹扫的情况下启动。如果燃烧器超过其设定值并在高温或高压下关闭，则下次燃烧器启动时将进行阀门检验系统运行，然后在没有预吹扫的情况下点火，例如：即燃烧器以受控方式关闭，燃气阀已检查完整性。

According to the EN676 regulation, the burner is only allowed to work in this manner if VPS operation has been set to operate before the burner starts up; option/parameter 129 must be set to 0.
根据 EN676 的规定，如果阀门检验系统设为在燃烧器启动前运行，则选项/参数 129 必须设为 0。

The start sequence without pre-purge is as follows:
无预吹扫的启动顺序如下所示：

1. Firstly, the system goes through its internal tests and relay checks.
   首先，系统进行内部测试和继电器检查。
2. Call for heat on Terminal 57 activates and the system will go through the VPS operation.
   调用热能激活终端 57，系统将进行阀门检验操作。
3. If this operation is successful then the MM will drive the channels to the light off or start position.
   如果该操作成功，则控制模块将驱动通道至点火或到启动位置。
4. Once all channels reach the start position then the burner will light off.
   当所有通道都到达启动位置后，燃烧器将点火。

burner shuts down in an abrupt manner, e.g. loss of power to the unit, then the next time the burner starts-up a complete purge will be initiated.
燃烧器紧急关闭，例如设备断电，然后下次燃烧器将启动完整的吹扫流程。

If no pre-purge is enabled in option/parameter 143, and one or more of the following conditions occur, the next time the burner starts up, a complete pre-purge will be initiated:
如果在选项/参数 143 中启用预吹扫，则会出现一种或多种以下情况，下次燃烧器启动时将进行完整的预吹扫流程：

- Burner lockout
  燃烧器锁定
- Loss of power to the MM
  控制模块断电
- VPS checks have failed
  阀门检验系统检查失败
- MM has been in standby for 24 hours or more
  控制模块 24 小时或更长时间处于待机状态

Note: Pre-purge is only available on fuels which are optioned as gaseous.
注：预吹扫在选择燃料后才运行。

6.8. Mini Mk8 MM Flame Detection Using Ionisation /

利用电离作用进行 Mk8 微型控制模块火焰检测

As well as using UV or IR, the Mini Mk8 MM can detect a flame using an ionisation signal/flame rod. This is wired into terminal 64 and the cable must be shielded.
除了紫外线或红外线，Mk8 微型控制模块也可以使用电离信号或离子棒检测火焰。这需要是使用带屏蔽层的线缆接到终端 64 上。

For ionisation, the flame will be signalled when the rectification voltage is above 30Vdc, the maximum sensed rectification voltage is 540Vdc, above which a Lockout will be generated.
关于电离信号，当整流电压大于 30Vdc 时将会发出火焰信号，可检测出的最大整流电压是 540Vdc，超过该电压值时将会导致锁定。

Please check Autoflame Flame Scanners Guide for further details about flame detection options.
有关火焰检测选项的详细信息，请查看 Autoflame 火焰检测器指南。

6.9. Terminals 80, 81 and 82 Functions / 终端 80、81 和 82 功能

6.9.1. T80 Functions / 终端 80 功能

Option/parameter 154 controls the function of terminal 80. One of the following functions can be triggered when a live input is detected on this terminal.
选项/参数 154 控制终端 80 的功能。在该终端上检测到火线输入时，可能会触发以下其中的功能。

Start position interlock Allows an additional safety check on the valves and damper to ensure that they are in the correct position for start/low fire using end limit switch.
Please check Autoflame Valves Guide for further details.
“启动位置连锁” 允许对阀门和风门进行额外的安全检查，可以使用终端限位开关，以确保它们处于正确的启动/低火位置。
请查看 Autoflame 阀门指南以了解更多细节。

Night setback input The setpoint is reduced according to the night setback offset set in option 85.
“夜间调低值输入” 根据选项 85 设置夜间调低偏移量来降低设定值。

Reduced setpoint input The MM will fire to meet the reduced setpoint set via the MM status screen.
“降低设定值输入” 通过控制模块状态屏幕设置控制模块会来满足降低的设定值。

Delay to purge input terminal 80 is used as a delay to purge input to indicate that the system is ready to move to the purge phase, otherwise the system will be stuck in ‘delay to purge’ indefinitely, unless a timer is enabled in option/parameter 157.
“延迟吹扫输入” 终端 80 用作延时吹扫输入，以指示系统准备移动到吹扫阶段，否则系统将无限期地停留在“延时吹扫”，除非在选项/参数 157 中启用计时器。

Option/parameter 157 can be used to set a timer for the delay to purge input. If the MM does not see this input for 1 second within this time set, then a lockout will occur. Setting 0 will disable this timeout, so the MM would sit indefinitely in delay to purge.
选项/参数 157 可用于为吹扫输入的延迟设置计时器。如果控制模块在设置的时间内有 1 秒没有看到这个输入，那么锁定将会发生。设置 0 将禁用此超时，因此控制模块将无限期地等待吹扫。

6.9.2. T81 Functions / 终端 81 功能

Option/parameter 155 controls the function of terminal 80. One of the following functions can be triggered when a live input is detected on this terminal.
选项/参数 155 控制终端 81 的功能。在该终端上检测到火线输入时，可能会触发以下其中的功能。

Purge interlock Terminal 81 acts as an input for a mechanical end stop. It must be made for the whole of the timed purge and post purge phases, otherwise a lockout is triggered. This input must not be made while not at purge.
吹扫连锁 终端 81 作为机械末端停止的输入。必须用作整个时间设定的吹扫和后吹扫阶段，否则就会触发锁定。当不吹扫时不能进行此输入。

Low flame hold input An input on terminal 81 will put the MM into low flame hold.
低火焰保持输入 端子 81 上的输入将把控制模块置于低火焰保持状态。

Purge pressure proving Terminal 81 acts as a purge pressure switch input. It must be made continuously for the full purge time before proceeding from purge. If it drops out during purge the purge timer restarts.
吹扫压力校正 终端 81 作为一个吹扫压力开关输入。从吹扫开始之前，整个吹扫时间必须连续吹扫。如果在吹扫期间退出，则吹扫计时器重新启动。

It must not be made before the blower motor starts to confirm the input is working correctly. If this input comes on during the relay tests then lockout is triggered.
在风机电机启动之前，该端子不得有输入用以确认它的正常工作状态。如果这个输入在继电器测试期间出现，那么就会触发锁定。

Option/parameter 158 adds an optional timer to this phase. The system will lockout if this purge interlock timer has elapsed. This timeout can be disabled so the MM will be in the purge phase indefinitely.
选项/参数 158 添加一个可选的定时器到这个阶段。如果这个吹扫联锁计时器已经过期，系统将锁定。可以禁用此超时，这个控制模块将无限期地处于吹扫阶段。

6.9.3. T82 Functions / 终端 82 功能

Option/parameter 156 governs the function of terminal 82. One of the following functions can be triggered when a live input is detected on this terminal.
选项/参数 156 控制终端 82 的功能。在该终端上检测到火线输入时，可能会触发以下其中的功能。

Warming stat
暖炉温控器

Input on terminal 82 will stop the MM warming in sequencing where there are no non-return valves, see option 40. When no input is detected, the MM will go into warming.
在没有止回阀的情况下，在终端 82 上的输入将停止群控控制模块的暖炉，参见选项 40。当没有检测到输入时，控制模块将进入暖炉。

Valve proving mains input
阀门检验电源输入

A low pressure switch can be wired to terminal 82 for valve proving; see options 125, 126 and 128. Please refer to the Sensors Guide for further details.
在 82 端子上可接一个低压开关，用于阀门校验；参见选项 125、126 和 128。请参阅传感器指南以了解更多细节。

7. REMOTE CONTROL / 远程控制

7.1. Modbus Settings / Modbus 设置

The data on a Mini Mk8 MM can be accessed remotely either by connecting the MM to a Mk8 DTI, or by using Direct Modbus.
通过将控制模块连接到 Mk8 DTI，或使用直接 Modbus，可以远程访问 Mk8 微型控制模块上的数据。

There are a limited number of Modbus addresses available on the Mini Mk8 MM which can be accessed directly without the need for a DTI.
Mk8 微型控制模块带有数个 Modbus 地址。操作者无需通过 D.T.I.就能直接使用这些 Modbus 地址。

When using Direct Modbus, e.g. connecting to Building Management System from the MM without a DTI, then neither Autoflame Intelligent Boiler Sequencing (IBS) nor the DTI can be used.
当直接使用 Modbus 时（比如当用户不通过 D.T.I.将控制模块连接到楼宇管理系统时），Autoflame 智能锅炉群控和 D.T.I.都不能使用。

The MM communicates using an RS485 data link from terminals 27 (-ve) and 28 (+ve). Belden 9501 data cable is recommended.
控制模块使用接线端子 27 (-ve)和 28 (+ve)上的 RS485 数据线来进行通讯。建议使用 Beldon 9501 数据线。

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

The maximum block of addresses the Mini Mk8 MM 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，Modbus 的内置极限是 255 个字节包。

If the MM 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 MM. If the Modbus is ‘offline’ then remote setpoint and firing rate set via Modbus will be disabled. The only exception is the enable/disable burner which changes the enable/disable button on the MM on the home screen, as this change will last until the Modbus state is changed again or the enable/disable button is pressed again.
如果 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来保持 Modbus 的“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 来远程设置数值和燃烧率。在 Modbus 失联后仍可以用控制模块主页上的按钮来启动/停止燃烧器。在 Modbus 通讯恢复后从 Modbus 地址发出的启动/停止燃烧器的命令要优先于主页上燃烧器启动/停止按钮的操作。

If the MM is powered off or the communications 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。

7.2 Configuration / 设置

Option 选项	Description 说明	Setting 设置
100	Sequencing/DTI or Modbus function 群控/DTI 或 Modbus 功能	1
101	Modbus baud rate Modbus 波特率	As required 根据需要
102	Modbus parity setting Modbus 校验设置	As required 根据需要
103	Modbus stop bits setting Modbus 终止位设置	As required 根据需要
104	Modbus device ID Modbus 设备标识号	As required 根据需要
105	Binary format 二进制格式	As required 根据需要

The following terminals are used for Direct Modbus.
以下终端用于直接的 Modbus。

Terminal 终端	Description 说明
27	RS485 -
28	RS485 +
S	Screen 屏蔽

7.3 Modbus Addresses / Modbus 地址

There are 4 types of Modbus addresses:
一共有四类 Modbus 地址：

0x Read/Write digital outputs – off/on commands 0x 读/写 数字输出信号 – 关闭/开启命令	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 数值分别代表关闭/开启或者否/是
1x Read digital inputs – off/on signals/indications 1x 读取 数字输入信号 – 关闭/开启信号/指示	
3x Read analogue inputs – variable data in 3x 读取 模拟量信号输入 – 可变数据	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，数值范围是从 0 到 65534 并不带小数点。例如：通道 1 位置的 Modbus 数值是 900，它等同于 90.0˚。
4x Read/Write analogue outputs – variable adjustments 4x 读/写 模拟量信号输出 – 变量调整	

Address Type: RWD = Read/Write Digital （读/写 数字量）
地址类型： RD = Read Digital （读取 数字量）
RWA = Read/Write Analogue （读/写 模拟量）
RA = Read Analogue （读取 模拟量）

Address 地址	Description 说明	Type 类型
00001	Enable/Disable MM 启用/关闭控制模块	Read/write digital 读/写 数字量
• 0 = Burner is enabled, 1 = Burner is disabled 0 = 启用燃烧器，1 = 禁用燃烧器 • Value changes state of enable/disable button on MM home screen; changes are kept if MM loses comms with Modbus device sending commands 数值改变控制模块主屏幕上启用/禁用按钮的状态；如果控制模块失去了与 Modbus 设备发送命令的通信，则会保留更改		
10217	EGA Trim Optioned EGA 执行微调	Read digital 读取 数字量
• 0 = Trim not optioned, 1 = Trim optioned 0 = 不启用微调操作， 1 = 启用微调操作 • Returns value 0 when option 12 is set for monitoring only. 当选项 12 被设置为“仅监控”时，返回数值 0。		
10218	EGA is Trimming EGA 正在微调	Read digital 读取 数字量
• 0 = EGA not trimming, 1 = EGA is trimming 0 = EGA 不在微调， 1 = EGA 正在微调 • Returns value 0 is actual temperature/pressure is below trim threshold 返回数值 0 是实际温度/压力低于微调阀值		
10219	EGA Cooler Ready EGA 冷却器就绪	Read digital 读取 数字量
• 0 = Cooler is ready, 1 = Cooler is not ready 0 = 冷却器就绪，1 = 冷却器未就绪 • Returns value 0 if EGA is an error state 如果 EGA 处于错误状态，返回数值 0。		
10220	EGA Ambient Temp OK EGA 环境温度适合	Read digital 读取 数字量
• 0 = Temperature OK, 1 = Temperature not OK 0 = 温度适合，1 = 温度不适合		
10221	EGA NO_2 On EGA 启用 NO2 感应器	Read digital 读取 数字量
• 0 = NO_2 cell not optioned, 1 = NO_2 cell optioned 0 = 没有选用 NO2 感应器， 1 = 选用了 NO2 感应器 • See option 36, valid for Mk7 EGA only 参见选项 36，仅适用于 MK7 EGA		
10222	EGA SO_2 On EGA 启用 SO2 感应器	Read digital 读取 数字量
• 0 = SO_2 cell not optioned, 1 = SO_2 cell optioned 0 = 不启用 SO2 感应器， 1 = 启用 SO2 感应器 • See option 36, valid for Mk7 EGA only 参见选项 36，仅适用于 MK7 EGA		

Address 地址	Description 说明	Type 类型
10224	EGA OK to Sample EGA 就绪，准备采样	Read digital 读取 数字量
• 0 = EGA is not sampling, 1 = EGA is sampling 0 = EGA 不在采样，1 = EGA 采样中		
10233	Hand Mode 手动模式	Read digital 读取 数字量
• 0 = MM not in hand mode, 1 = MM in hand mode 0 = 控制模块非手动模式，1 = 控制模块手动模式		
10234	Low Flame Hold 低火焰保持	Read digital 读取 数字量
• 0 = MM not in low flame hold, 1 = MM in low flame hold 0 = 控制模块非低火焰保持，1 = 控制模块低火焰保持		
10242	Disabled Status 关闭状态	Read digital 读取 数字量
• 0 = Burner enabled, 1 = Burner disabled 0 = 燃烧器开启，1 = 燃烧器关闭 • Returns state of enable/disable button on MM home screen and same value as address 00001 在控制模块主屏幕上返回按钮启用/关闭状态，它的数值于地址 00001 相同		
30101	Load Index 负载指数	Read analogue 读取 模拟量
• Firing rate % 燃烧率		
30102	Firing Status 燃烧状态	Read analogue 读取 模拟量
• 0 = Non-modulating, 1 = Modulating 0 = 非控制，1 = 控制 • Returns value 0 single point change, fuel flow metering and commissioning 返回数值 0 单点更改，燃料流量计量和调试		
30104	Burner Rating 燃烧率	Read analogue 读取 模拟量
• MW x 10 • Metric units determined from fuel flow metering 通过燃料流量计量确定的公制单位		

Address 地址	Description 说明	Type 类型
30105	Actual Value 实际值	Read analogue 读取 模拟量
	• Metric: temperature ^{O}C, pressure Bar x 10, low pressure Bar x 100 公制：温度˚C，压力 Bar x 10，低压 Bar x 100 • Imperial: temperature ^{O}F, pressure PSI, low pressure PSI x 10 英制：温度˚F, 压力 PSI，低压 PSI x 10	
30106	Required Value 所需值	Read analogue 读取 模拟量
	• Metric: temperature ^{O}C, pressure Bar x 10, low pressure Bar x 100 公制：温度˚C，压力 Bar x 10, 低压 Bar x 100 • Imperial: temperature ^{O}F, pressure PSI, low pressure PSI x 10 英制：温度˚F,压力 PSI，低压 PSI x 10	
30107	Selected Fuel 所选燃料	Read analogue 读取 模拟量
	• 0 = Fuel 1, 1 = Fuel 2 0 = 燃料 1，1 = 燃料 2	
30109	Channel 1 Position 通道 1 位置	Read analogue 读取 模拟量
	• Degrees x 10 角度 x 10 • Range is -6.0^{O} to 96.0^{O} 范围为-6.0˚到 96.0˚	
30110	Channel 2 Position 通道 2 位置	Read analogue 读取 模拟量
	• Degrees x 10 角度 x 10 • Range is -6.0^{O} to 96.0^{O} 范围为-6.0˚到 96.0˚	
30111	Channel 3 Position 通道 3 位置	Read analogue 读取 模拟量
	• Degrees x 10 角度 x 10 • Range is -6.0^{O} to 96.0^{O} 范围为-6.0˚到 96.0˚	
30113	MM Error Number 控制模块错误代码	Read analogue 读取 模拟量
	• 0 = System is does not have an error, N = error number, check error codes 0 = 系统是没有错误，N = 错误代码，检查错误代码	
30115	EGA Current O_2 Value EGA 当前 O_2 数值	Read analogue 读取 模拟量
	• % x 10	
30116	EGA Current CO_2 Value EGA 当前 CO2 数值	Read analogue 读取 模拟量
	• % x 10	

Address 地址	Description 说明	Type 类型
30117	EGA Current CO Value EGA 当前 CO 数值	Read analogue 读取 模拟量
• ppm x 10		
30118	EGA Current Exhaust Gas Temperature EGA 当前烟气温度	Read analogue 读取 模拟量
• Metric: temperature x 10 °C 公制：温度 x 10 ℃ • Imperial: temperature x 10 °F 英制：温度 x 10 ℉		
30119	EGA Current Efficiency Value EGA 当前效率数值	Read analogue 读取 模拟量
• % x 10		
30120	EGA Current NO Value EGA 当前 NO 数值	Read analogue 读取 模拟量
• ppm x 10		
30121	EGA Current SO_2 Value EGA 当前 SO_2 数值	Read analogue 读取 模拟量
• ppm x 10		
30122	EGA Commissioned O_2 Value EGA 当前 O_2 数值	Read analogue 读取 模拟量
• % x 10		
30123	EGA Commissioned CO_2 Value EGA调试CO_2数值	Read analogue 读取 模拟量
• % x 10		
30124	EGA Commissioned CO Value EGA调试CO数值	Read analogue 读取 模拟量
• ppm x 10		
30125	EGA Commissioned Exhaust Gas Temperature EGA调试烟气温度	Read analogue 读取 模拟量
• Metric: temperature x 10 °C 公制：温度 x 10 ℃ • Imperial: temperature x 10 °F 英制：温度 x 10 ℉		
30126	EGA Commissioned Efficiency Value EGA调试效率数值	Read analogue 读取 模拟量
• % x 10		
30127	EGA Commissioned NO Value EGA 调试 NO 数值	Read analogue 读取 模拟量
• ppm x 10		
30128	EGA Commissioned SO_2 Value EGA 调试 SO_2 数值	Read analogue 读取 模拟量
• ppm x 10		

Address 地址	Description 说明	Type 类型
30129	EGA Error Code EGA错误代码	Read analogue 读取 模拟量
• 0 = EGA does not have a fault, N = EGA error code 0 = EGA 没有错误，N = EGA 错误代码		
30130	Minimum Remote Setpoint 最小远程设定值	Read analogue 读取 模拟量
• Metric: temperature °C, pressure Bar x 10, low pressure Bar x 100 公制：温度°C，压力 Bar x 10, 低压 Bar x 100 • Imperial: temperature °F, pressure PSI, low pressure PSI x 10 英制：温度°F,压力 PSI，低压 PSI x 10		
30131	Maximum Remote Setpoint 最大远程设定值	Read analogue 读取 模拟量
• Metric: temperature °C, pressure Bar x 10, low pressure Bar x 100 公制：温度°C，压力 Bar x 10, 低压 Bar x 100 • Imperial: temperature °F, pressure PSI, low pressure PSI x 10 英制：温度°F,压力 PSI，低压 PSI x 10		
30132	Current Flow Thousands 当前流量 1000s	Read analogue 读取 模拟量
• Metric kW, imperial MMBTU/hr x 1000 公制 KW,英制 MMBTU/ hr x 1000 • 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 数值被去除整数后的剩余数字。比如：1.5MW/hr 的对应数值是 500 ，而 15.1MMBTU/hr 的对应数值是 100。		
30133	Current Flow Millions 当前流量 百万	Read analogue 读取 模拟量
• Metric MW, imperial MMBTU/hr 公制 MW，英制 MMBTU/hr • Whole number of MW or MMBTU/hr. E.g. 1.5MW gives 1 value and 15.1MMBTU/hr gives 15 value MW 数值或者 MMBTU/hr 数值的整数值。比如：1.5MW 对应数值是 1，而 15.1MMBTU/hr 的对应数值是 15		
30134	Fuel 1 Flow Total Thousands 燃料 1 总流量 1000s	Read analogue 读取 模拟量
• 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，x 1000。比如：1.5MW/hr 的对应数值是 500，而 15.1MMBTU 的对应数值是 100。		
30135	Fuel 1 Flow Total Millions 燃料 1 总流量 百万	Read analogue 读取 模拟量
• Metric MW/h, imperial MMBTU 公制 MW/h, 英制 MMBTU • Whole number of MW/hr or MMBTU. E.g. 1.5MW/hr gives 1 value and 15.1MMBTU gives 15 value MW/hr 数值或者 MMBTU 数值的整数值。比如：1.5MW/hr 对应数值是 1，而 15.1MMBTU 对应的数值是 15		

Address 地址	Description 说明	Type 类型
30136	Fuel 1 Flow Total Billions 燃料 1 总流量 十亿	Read analogue 读取 模拟量
• Metric GW/hr, imperial MMBTU / 1000 公制 GW/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 数值或者 MMMBTU 数值的总数值。比如：1.5MW/hr 对应数值是 0，而 15.1MMBTU 对应数值是 0		
30137	Fuel 2 Flow Total Thousands 燃料 2 总流量 1000	Read analogue 读取 模拟量
• 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 or MMBTU x 1000 数值被去除整数后的剩余数字, x 1000。比如：1.5MW/hr 的对应数值是 500，而 15.1MMBTU 的对应数值是 100。		
30138	Fuel 2 Flow Total Millions 燃料 2 总流量 百万	Read analogue 读取 模拟量
• Metric MW/h, imperial MMBTU 公制 MW/h, 英制 MMBTU • Whole number of MW/hr or MMBTU. E.g. 1.5MW/hr gives 1 value and 15.1MMBTU gives 15 value MW/hr 数值或者 MMBTU 数值的总数值。比如：1.5MW/hr 对应数值是 1，而 15.1MMBTU 对应数值是 15		
30139	Fuel 2 Flow Total Billions 燃料 2 总流量 十亿	Read analogue 读取 模拟量
• Metric GW/hr, imperial MMBTU / 1000 公制 GW/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 数值或者 MMMBTU 数值的总数值。比如：1.5MW/hr 对应数值是 0，而 15.1MMBTU 对应数值是 0		
30143	EGA Current Ambient Temperature EGA 当前环境温度	Read analogue 读取 模拟量
• Metric: temperature x 10 ^{O}C 公制：温度 x 10℃ • Imperial: temperature x 10 ^{O}F 英制：温度 x 10°F		
30144	EGA Current Delta Temperature EGA 当前 Delta 温度	Read analogue 读取 模拟量
• Metric: temperature x 10 ^{O}C 公制：温度 x 10℃ • Imperial: temperature x 10 ^{O}F 英制：温度 x 10°F		
30145	EGA Commissioned Ambient Temperature EGA 调试环境温度	Read analogue 读取 模拟量
• Metric: temperature x 10 ^{O}C 公制：温度 x 10℃ • Imperial: temperature x 10 ^{O}F 英制：温度 x 10°F		

Address 地址	Description 说明	Type 类型
30146	EGA Commissioned Delta Temperature EGA 已调试 Delta 温度 • Metric: temperature x 10 °C 公制：温度 x 10℃ • Imperial: temperature x 10 °F 英制：温度 x 10°F	Read analogue 读取 模拟量
30147	UV Counts 紫外线计数值 • Returns value displayed on MM 返回显示在控制模块上的值	Read analogue 读取 模拟量
30148	IR Counts 红外线计数值 • Returns value displayed on MM 返回显示在控制模块上的值	Read analogue 读取 模拟量
30149	Ionisation Counts 离子信号计数值 • Returns value display on MM 返回显示在控制模块上的值	Read analogue 读取 模拟量
30150	EGA Current NO_2 Value EGA 当前 NO_2 数值 • ppm x 10	Read analogue 读取 模拟量
30151	EGA Commissioned NO_2 Value EGA 调试 NO_2 数值 • ppm x 10	Read analogue 读取 模拟量
30804	Channel 4 VSD Output 通道 4 变频器输出 • mA x 10 or V x 10	Read analogue 读取 模拟量
30805	Channel 4 VSD Input 通道 4 变频器输入 • mA x 10 or V x 10	Read analogue 读取 模拟量
30830	Lockout Number 锁定代码 • 0 = System is not in lockout, N = lockout number 0 = 系统未锁定状态，N = 锁定代码	Read analogue 读取 模拟量
30831	Fuel 1 Type 燃料 1 类型 • 0 = Gas, 1 = Oil 0 = 燃气，1 = 燃油 • Option/ parameter 150 value 选项/参数 150 数值	Read analogue 读取 模拟量
30832	Fuel 2 Type 燃料 2 类型 • 0 = Gas, 1 = Oil 0 = 燃气，1 = 燃油 • Option/parameter 151 value 选项/参数 151 数值	Read analogue 读取 模拟量

Address 地址	Description 说明	Type 类型
30839	Fuel 1 Hours Run 燃料 1 运行小时数	Read analogue 读取 模拟量
• Completed hours 完成的小时数		
30840	Fuel 2 Hours Run 燃料 2 运行小时数	Read analogue 读取 模拟量
• Completed hours 完成的小时数		
30843	Fuel 1 Start-ups 燃料 1 启动	Read analogue 读取 模拟量
• Start-ups 启动		
30844	Fuel 2 Start-ups 燃料 2 启动	Read analogue 读取 模拟量
• Start-ups 启动		
30849	Current Gas Pressure 当前燃气压力	Read analogue 读取 模拟量
• mbar x 10, “wg x 10, PSI x 100 • parameter 41 value 参数 41 数值		
40001	Remote Required Setpoint 远程所需设定值	Read/write analogue 读/写模拟量
• Metric: temperature ^{O}C, pressure Bar x 10, low pressure Bar x 100 公制：公制：温度℃，压力 Bar x 10，低压 Bar x 100 • Imperial: temperature ^{O}F, pressure PSI, low pressure PSI x 10 英制：温度 ° F，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，控制模块将忽略这些所需数值，转而使用在控制模块屏幕上已设的设定值数值。		
40121	Remote Firing Rate 远程燃烧率	Read/write analogue 读/写模拟量
• % • 40131 must be set to 1 to change the firing rate remotely 要远程更改燃烧率，地址 40131 必须被设置为 1		
40131	Remote Firing Rate Enable 远程燃烧率设定启用	Read/write analogue 读/写模拟量
• 0 = Remote firing rate disabled, 1 = Remote firing rate enabled 0 = 远程燃烧率设定关闭，1 = 远程燃烧率设定开启		

8. OPERATION / 操作

8.1. Home Screen / 主屏幕

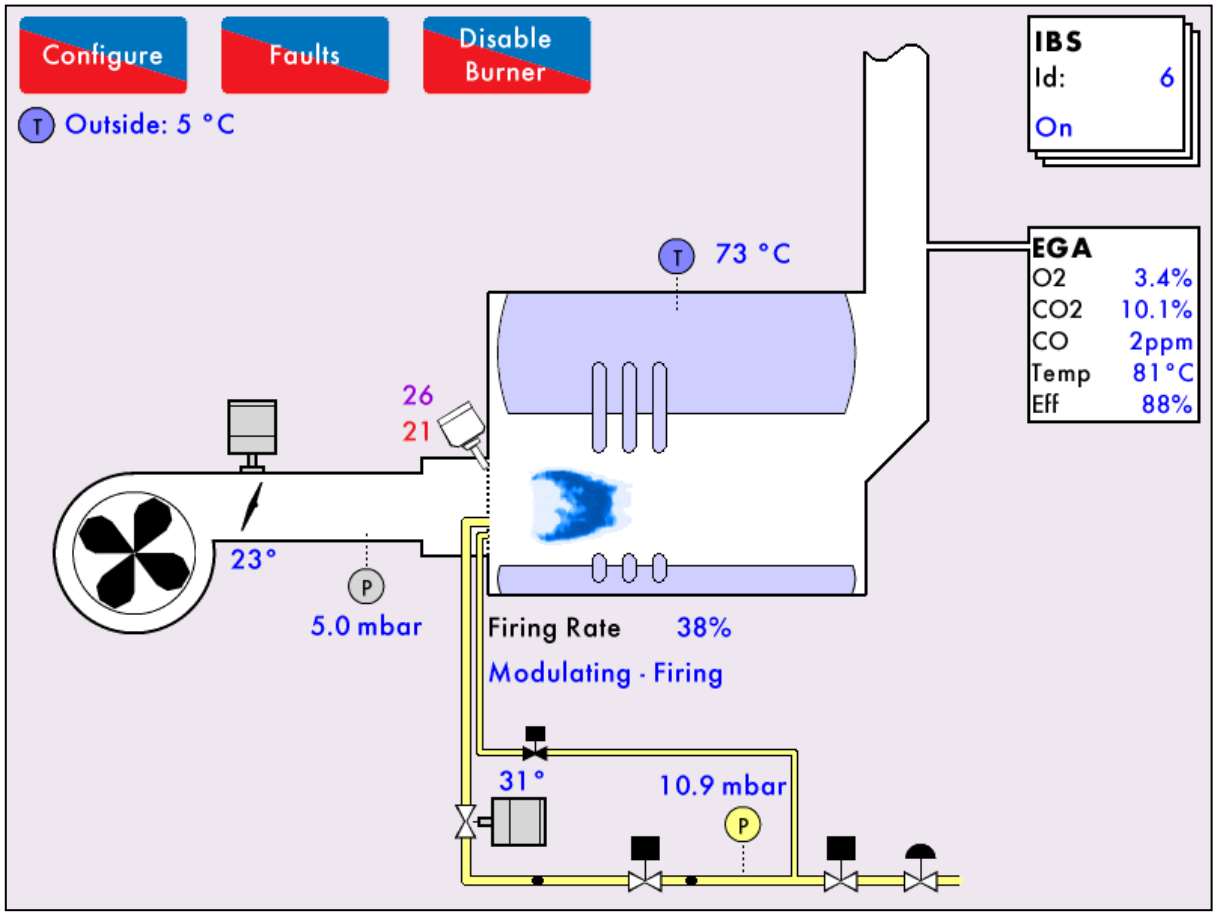
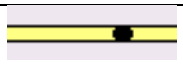
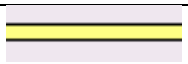
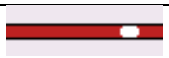
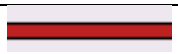
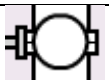
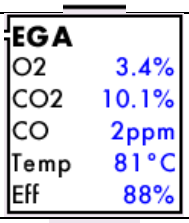
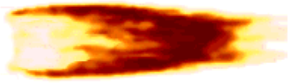
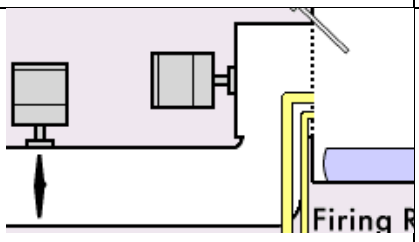
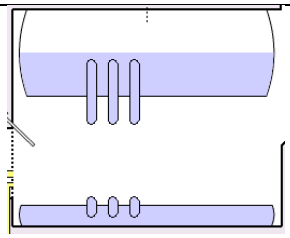
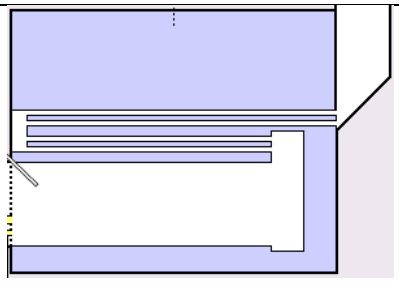
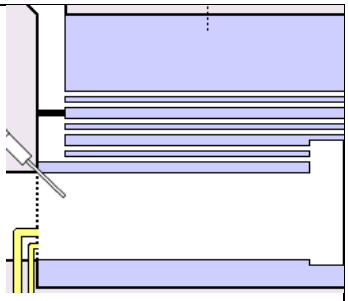
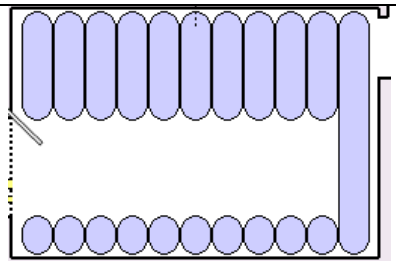
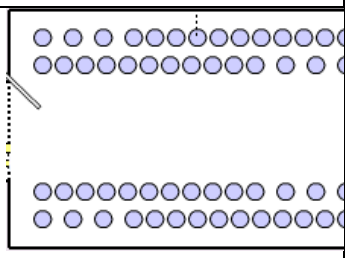
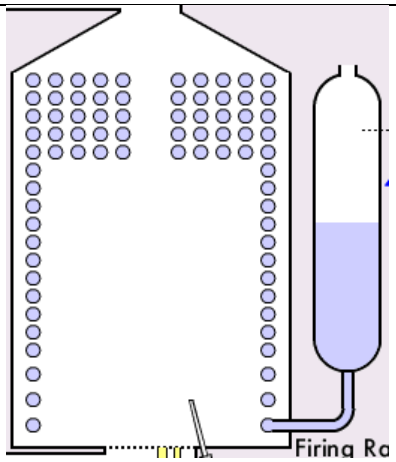
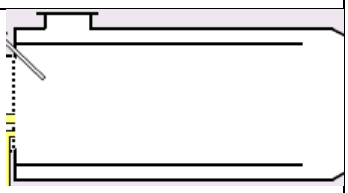
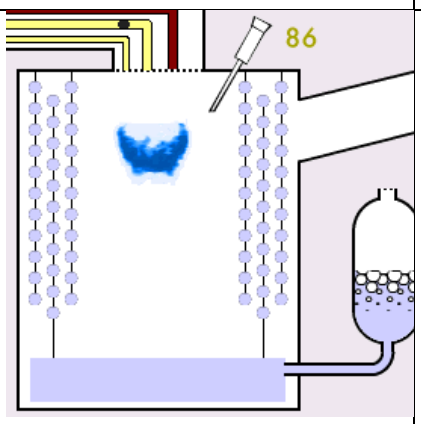


Figure 8.1.i Home / 图 8.1.i 主屏幕

The home screen shown in Figure 8.1.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 8.12.2 Boiler Configuration.
图 8.1.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 8.12.2 节关于锅炉设置。

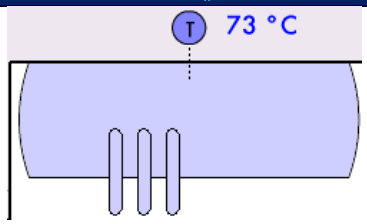
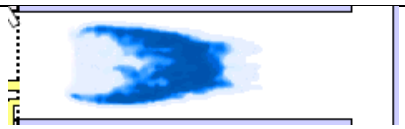
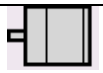
8.1.1. Home Screen Components / 主屏幕组件

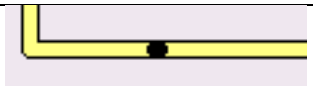
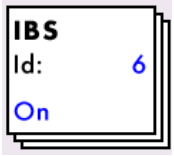
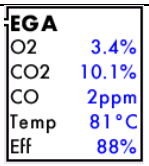
Servomotor 伺服电机		VSD 变频器	
Flame Detector 火焰检测器		Gas Pressure Sensor 燃气压力传感器	
Air Pressure/ Boiler Steam Pressure Sensor 空气压力/锅炉蒸汽压力传感器		OTC/ Boiler Temperature Sensor 室外温度控制器/锅炉温度传感器	
Gas Pipe – gas flowing 燃气管-燃气流动		Gas Pipe – no flow 燃气管-无流动	
Oil Pipe – oil flowing 油管-油流动		Oil Pipe – no flow 油管-无流动	
Fuel Valve – solenoid open 燃料阀 - 电磁阀打开		Fuel Valve – solenoid closed 燃料阀-电磁阀关闭	
Fuel Control Valve – open 燃料控制阀-打开		Fuel Control Valve – closed 燃料控制阀-关闭	
Regulator 调压器		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/引流阀		Air Damper 空气风门	
Combustion Air Fan 燃烧空气风机		EGA Information 烟气分析仪信息	
IBS Information IBS 智能群控信息		Induced draft （烟道）引流通风	
Gas Flame 燃气火焰		Oil Flame 油火焰	
Rotary Cup Burner 旋转杯燃烧器		Water Tube 水管	

Three-Pass Fire Tube 三回传火管		Four-Pass Fire Tube 四回传火管	
Cast-Sectional Tube 铸铁锅炉		Horizontal Coil Tube 水平盘管式	
Vertical Coil Tube 垂直盘管式		Kiln 窑炉	
Vertical Condenser 立式冷凝炉			

8.1.2. 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 MM The components display in the Home screen according to the boiler room configuration, see section 8.12.2.
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 8.12.2 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 燃料-空气	The current firing rate will display below the flame, pressing the flame gives access to the Fuel-Air Screen, see section 3.3. 当前燃烧率在火焰下方显示，按下火焰按钮可以进入燃料-空气屏幕，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. 显示使用的火焰检测器计数数量。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。

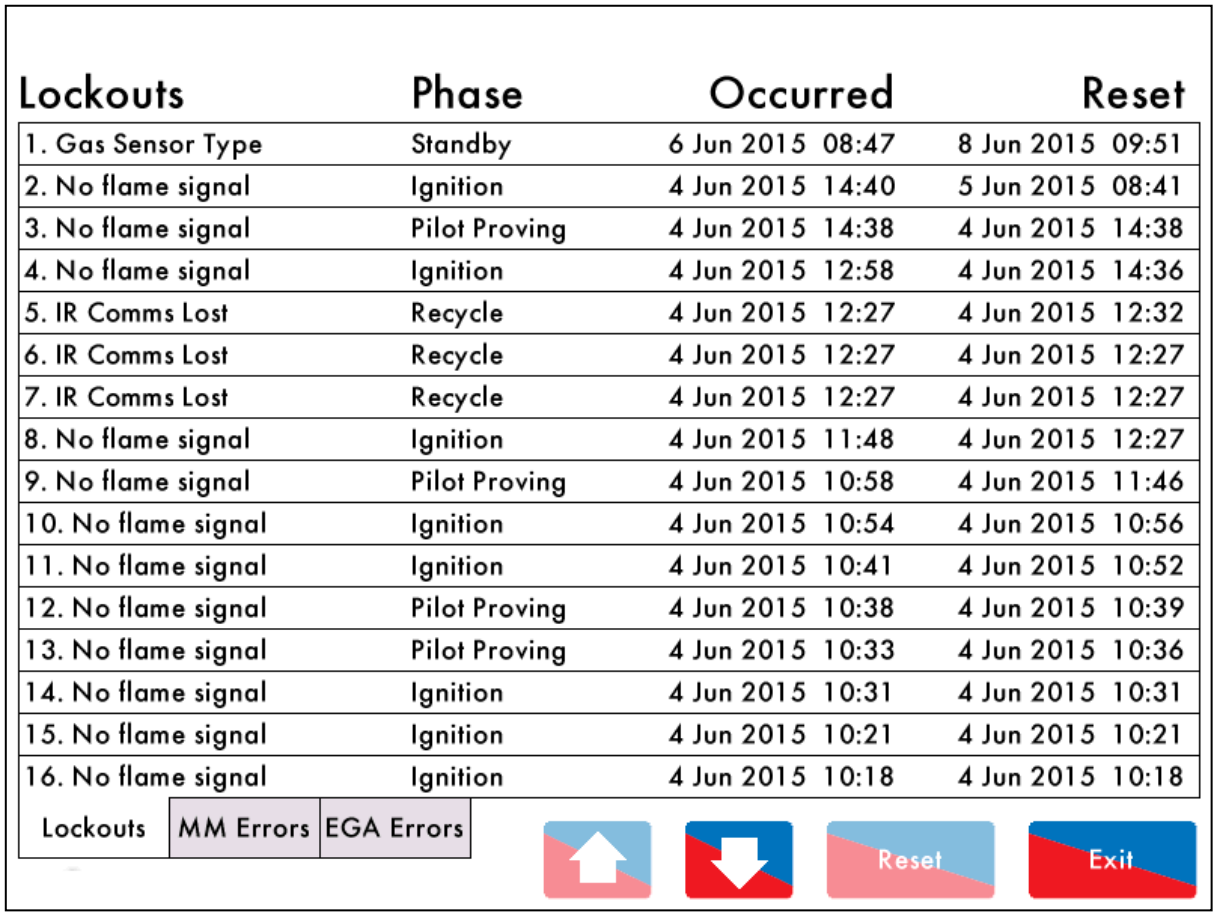
	Fuel Flow 燃料流动	Pressing on the gas/oil pipe gives access to the Fuel Flow screen, see section 3.8. 按下气管/油管按钮可以进入燃料流动屏幕，见 3.8 节。
	IBS 智能锅炉群控	The IBS box will show the ID number of the M.M., and its status, and if it is the lead boiler. This button gives access to the IBS screen, see section 3.9. IBS 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 烟气分析仪	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. 烟气分析仪（EGA）框可以显示当前烟气值、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。

8.1.3. Enable/Disable / 启用/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 8.1.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 8.1.i）上按下  禁用燃烧器按钮来启用或禁用燃烧器。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。

8.1.4. Faults / 故障



Press 

in the Home screen (Figure 8.1.i) to view the burner lockouts, MM errors, and EGA errors. The MM will store up to 64 burner lockouts, MM errors and EGA errors. These can be reset via Online Changes, see section 8.12.5.

在主屏幕上（图 8.1.i）按下

故障按钮可以查看燃烧器锁定错误、控制模块错误和烟气分析仪错误。控制模块将存储 64 个燃烧器锁定错误、控制模块错误和烟气分析仪错误。这些错误可以通过在线更改进行重置，见 8.12.5 节。

8.2. Status Screen / 状态屏幕

8.2.1. Status / 状态

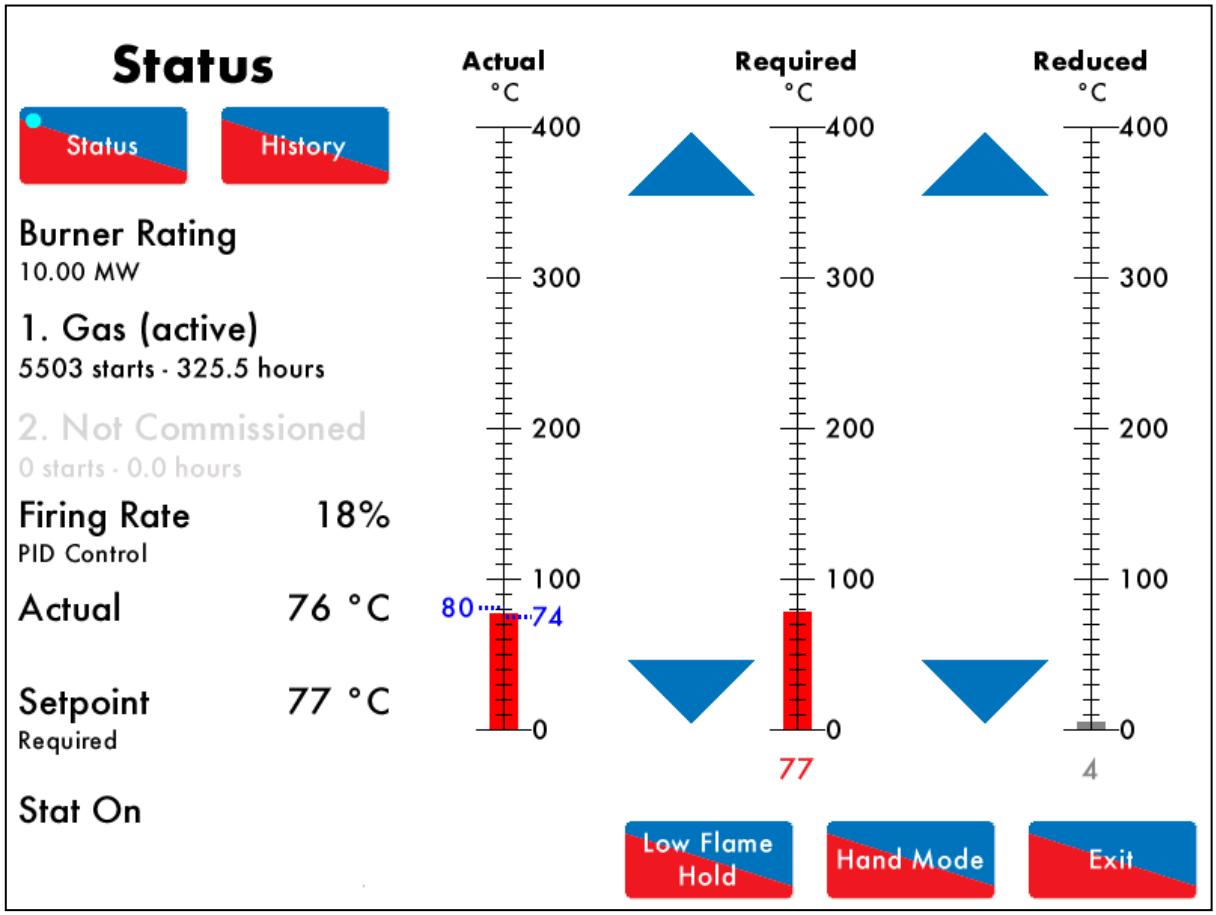


Figure 8.2.1.i Status
图 3.2.i 状态屏幕

Press the boiler load detector button or the boiler image in the Home screen (Figure 8.1.i) to display the Status screen in Figure 8.2.1.i. The status screen gives the following information:
按下锅炉负载检测器按钮或主屏幕上（图 8.1.i）的锅炉图标可以显示图 8.2.1.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
  当前燃烧率
- Control method – internal PID control or external modulation (see option 45)
  控制方法-内部 PID 控制或外部调节（见选项 45）
- Actual temperature/ pressure
  实际温度/压力
- Setpoint – required/ reduced temperature/ pressure
  设定值-所需/降低温度/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/关偏移（见选项 9、10 和 11）。

- Reduced setpoint (see section 8.12.7 Run Times, and option/parameter 154)
  减少设定值（见 8.12.7 节运行时间和选项/参数 154）。
- Indication if MM 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值（红色=有效；灰色=无效）。
- Arrows for adjusting setpoint (they do not appear if using a DTI or OTC)
  箭头用于调节设定值（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 DTI 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值或降低的设定值。如果未显示箭头，其原因是禁用了用户设定值更改（见选项 15）或数据传输接口（D.T.I.）正控制设定值（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。

8.2.2. Status – History / 状态 - 历史

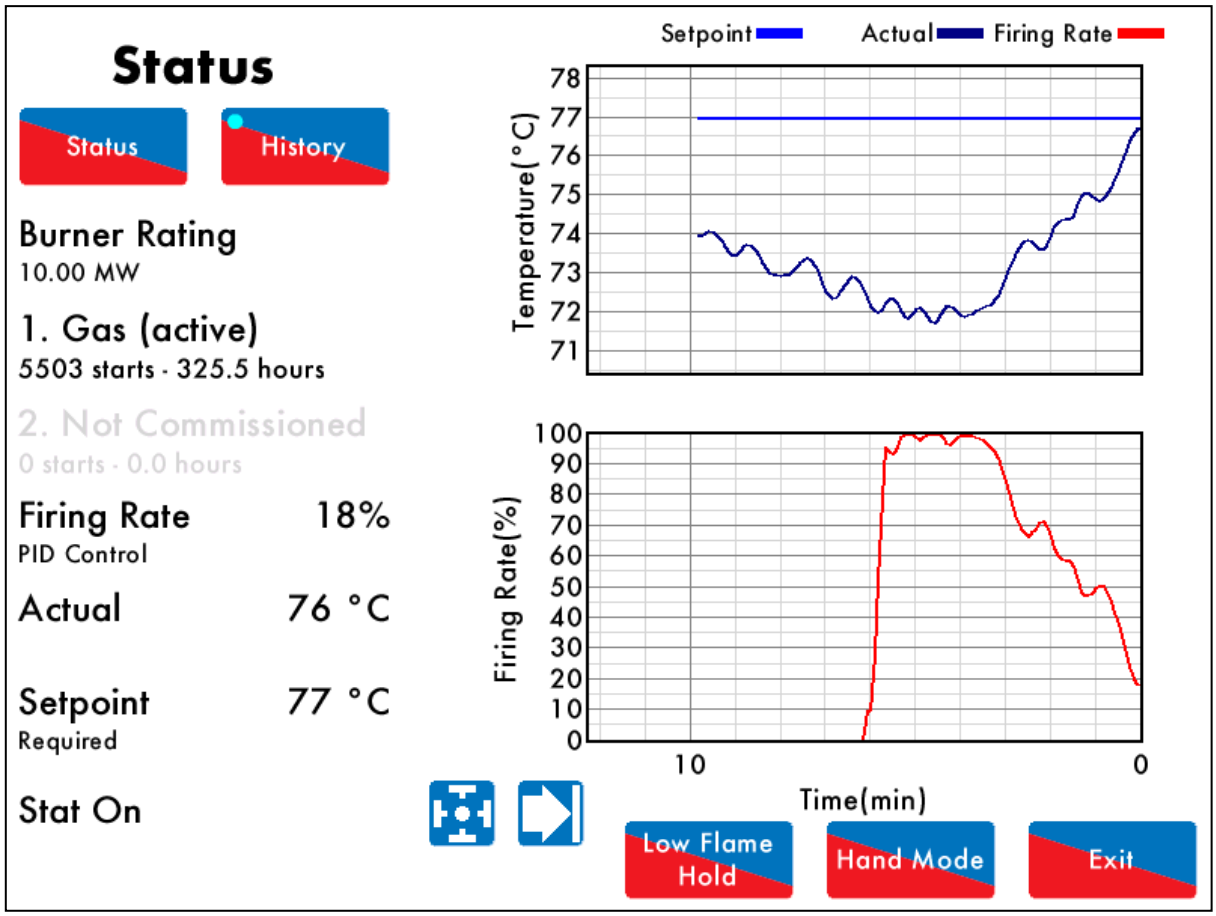


Figure 8.2.2.ii Status – History / 图 8.2.2.ii 状态-历史

Press 

in the Status screen (Figure 8.2.1.i) to show the Status History in Figure 8.2.2.ii. The setpoint, actual temperature/pressure and firing rate are displayed graphically. This data is logged for 24 hours on the MM.

在状态屏幕（图 8.2.1.i）上按下 

历史按钮可以显示图 8.2.2.ii 所示的状态历史。设定值/实际温度/压力和燃烧率用图形方式显示，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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：机器重启或更换燃料时将重置数据记录。

8.2.3. Status – Low Flame Hold / 状态 - 低火保持

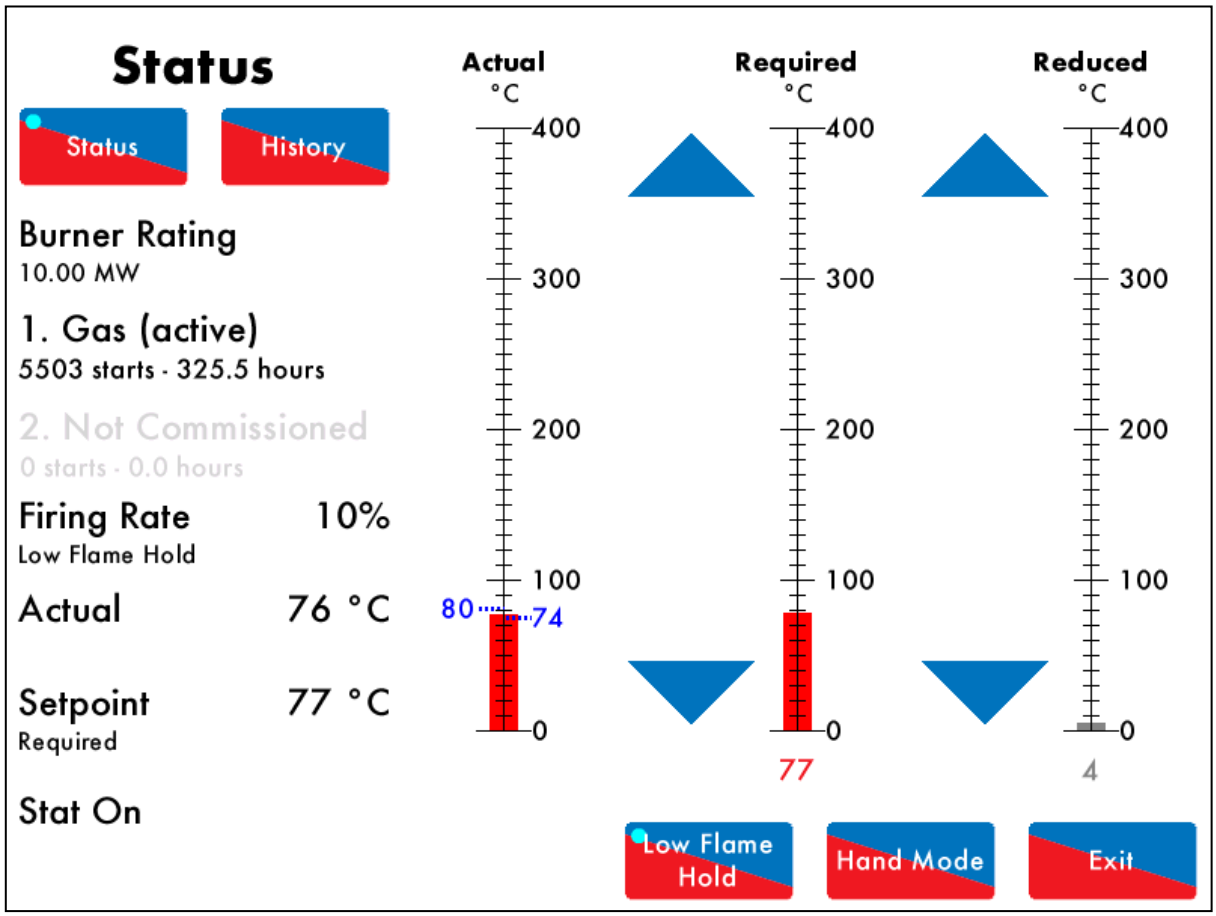


Figure 8.2.3.i Status – Low Flame Hold
图 8.2.3.i 状态-低火保持

Press Low Flame Hold on the Status screen (Figure 8.2.1.i) to put the MM in low flame hold, and press this button again to return to modulation, see Figure 8.2.3.i.

在状态屏幕（图 8.2.1.i）上按下 Low Flame Hold 低火保持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 8.2.3.1。

Alternatively, the Mini Mk8 MM can also be put in low flame hold via an input on terminal 81, see option/ parameter 155.
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 MM 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：如使用智能锅炉群控，将控制模块设为低火焰保持后会将设备从群控序列中移除，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。

8.2.4. Status – Hand Mode / 状态 - 手动模式

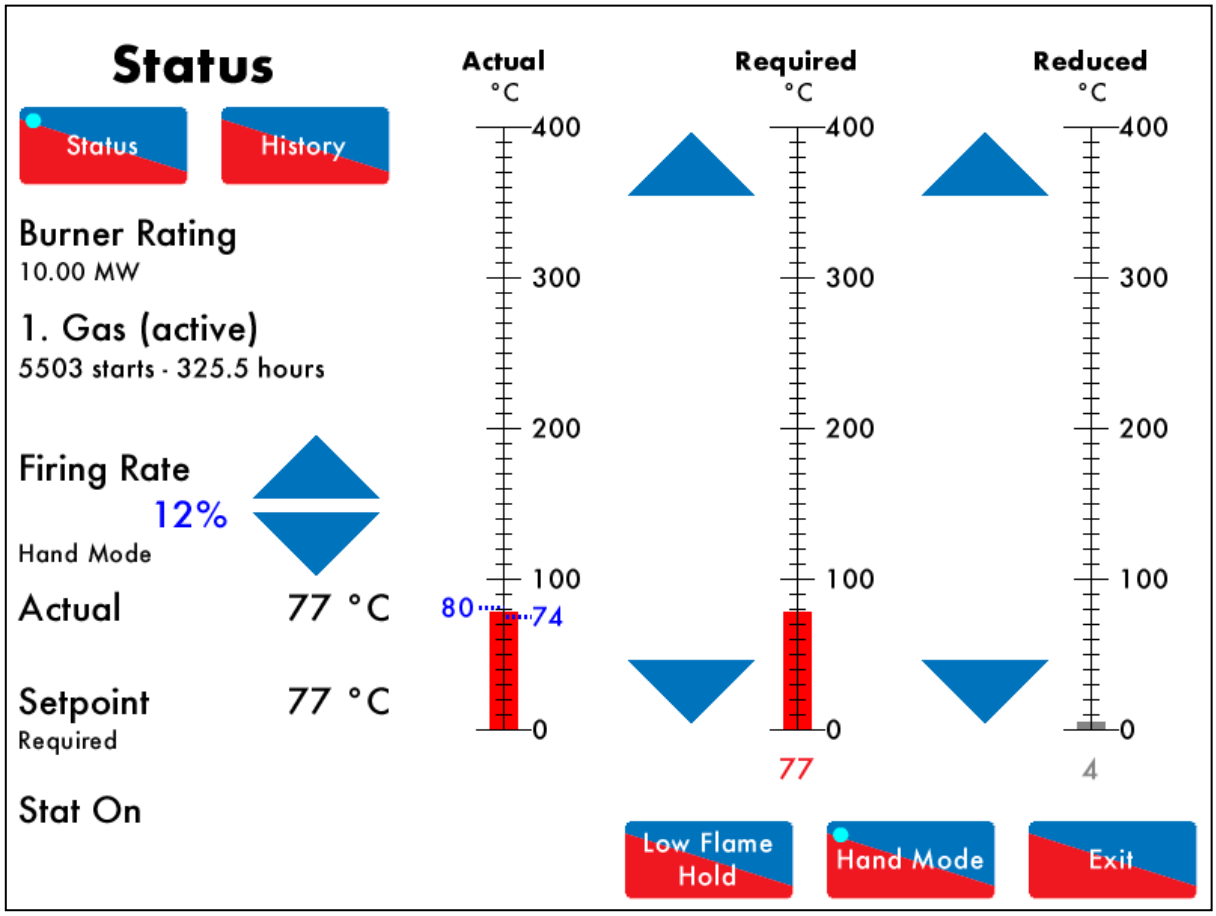


Figure 8.2.4.i Status – Hand Mode
图 8.2.4.i 状态 - 手动模式

Press 

on the Status screen (Figure 8.2.1.i) to put the MM in hand mode, where the firing rate can be driven up or down by using the  buttons (see Figure 8.2.4.i).

在状态屏幕（图 8.2.1.i）上按下 

手动模式按钮将把控制模块设为手动模式，此时可以使用  按钮（见图 8.2.4.i）增加或降低燃烧率。

Alternatively, the firing rate can be set remotely via Modbus addresses 40121 and 40131, see section 7.
同时可以通过 Modbus 地址 40121 和 40131 远程设定燃烧率，见 7 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：如使用智能锅炉群控，则通过手动模式更改低火焰保持后会将设备从群控序列中移除，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。

8.3. Fuel-Air Screen / 燃料 - 空气屏幕

8.3.1. Fuel-Air – Curve / 燃料 - 空气曲线

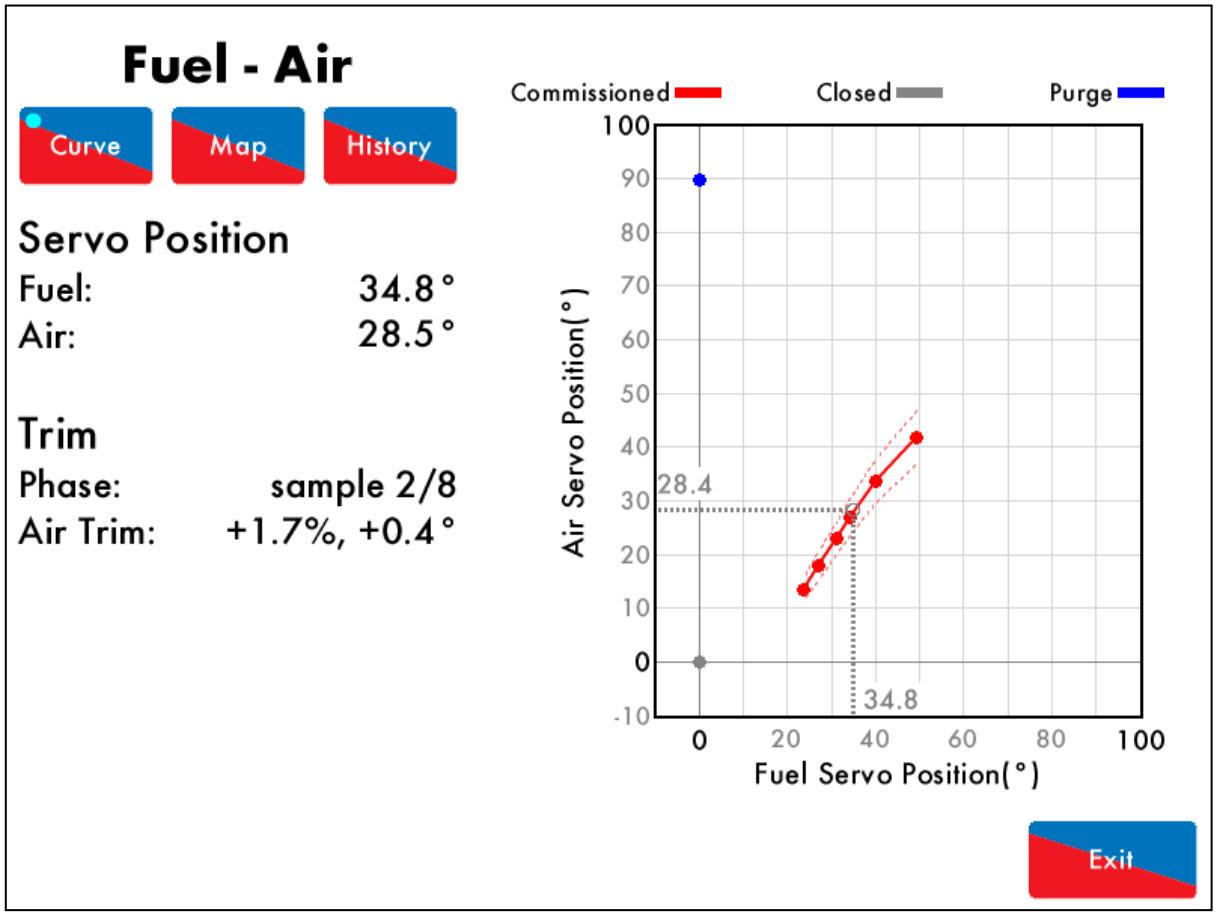


Figure 8.3.1.i Fuel-Air – Curve
图 8.3.1.i 燃料 - 空气曲线

Press the flame in the Home screen (Figure 8.1.i) to view the Fuel-Air screen in Figure 8.3.1.i. This shows the fuel valve and air damper angular position, the trim status and the commission curve graph.
在主屏幕（图 8.1.i）上按下火焰按钮可以查看图 8.3.1.i 所示的燃料-空气屏幕。屏幕上显示了燃料阀和空气风门的倾斜位置、微调状态和调试曲线图。

8.3.2. Fuel-Air – Map / 燃料-空气 - 图

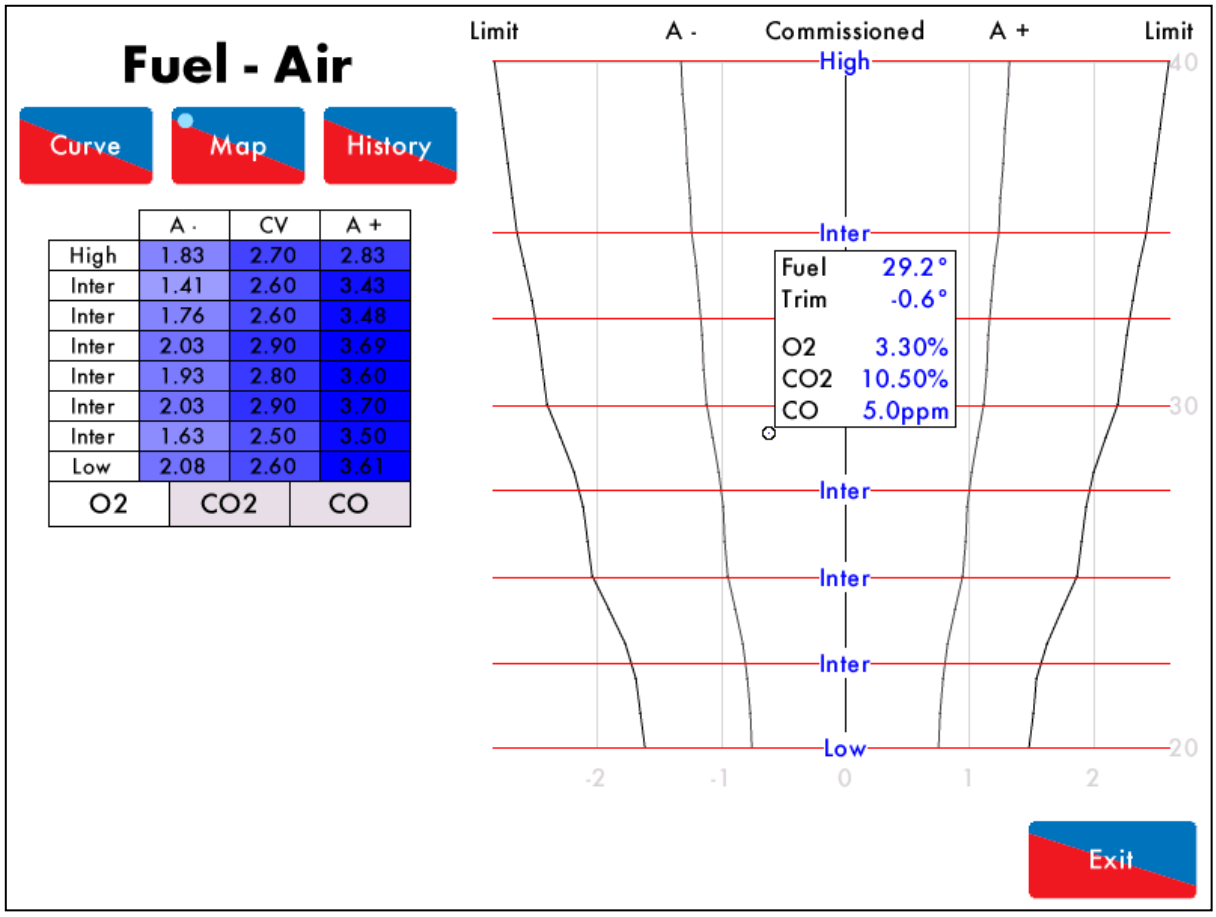


Figure 8.3.2.i Fuel-Air Map / 图 8.3.2.i 燃料-空气图

Press 

in the Fuel-Air screen (Figure 8.3.1.i) to view the Fuel-Air Map screen shown in Figure 8.3.2.i. The air rich and fuel rich trim values are shown for each commissioned point. The graph shows EGA'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.

在燃料-空气屏幕（图 8.3.1.i）上按下 

图按钮将显示图 8.3.2.i 所示的燃料-空气图屏幕。每个调试点都显示富氧和富油的微调数据。燃料-空气图显示 EGA 的当前读数和风门挡板上的微调更正（如有）。燃料-空气图的圆圈指示当前微调更正位置和当前燃烧率的调试值间的距离。

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

8.3.3. Fuel-Air – History / 燃料-空气 - 历史

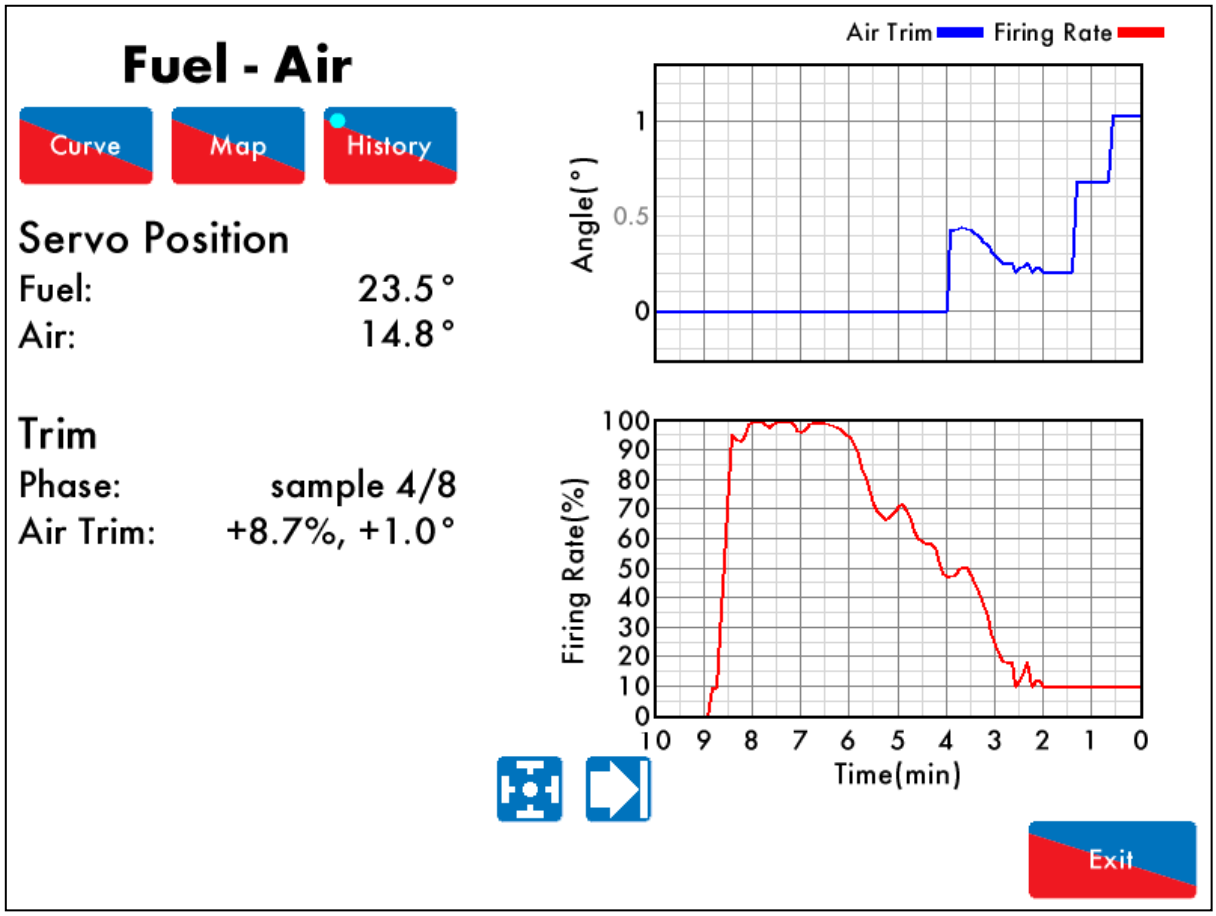


Figure 8.3.3.i Fuel-Air – History / 图 8.3.3.i 燃料-空气-历史

Press 

in the Fuel-Air screen (Figure 8.3.1.i) to view the Fuel-Air History screen in Figure 8.3.3.i. The firing rate and air trim history (if an EGA is optioned for trim) is displayed. This data is logged for 24 hours on the MM.

在燃料-空气屏幕（图 8.3.1.i）上按下

历史按钮可以查看图 8.3.3.i 所示的燃料-空气历史图，燃料-空气历史图显示了燃烧率和空气调节历史（如烟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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.4. Flame Safeguard Screen / 火焰防护屏幕

8.4.1. Flame Safeguard / 火焰防护

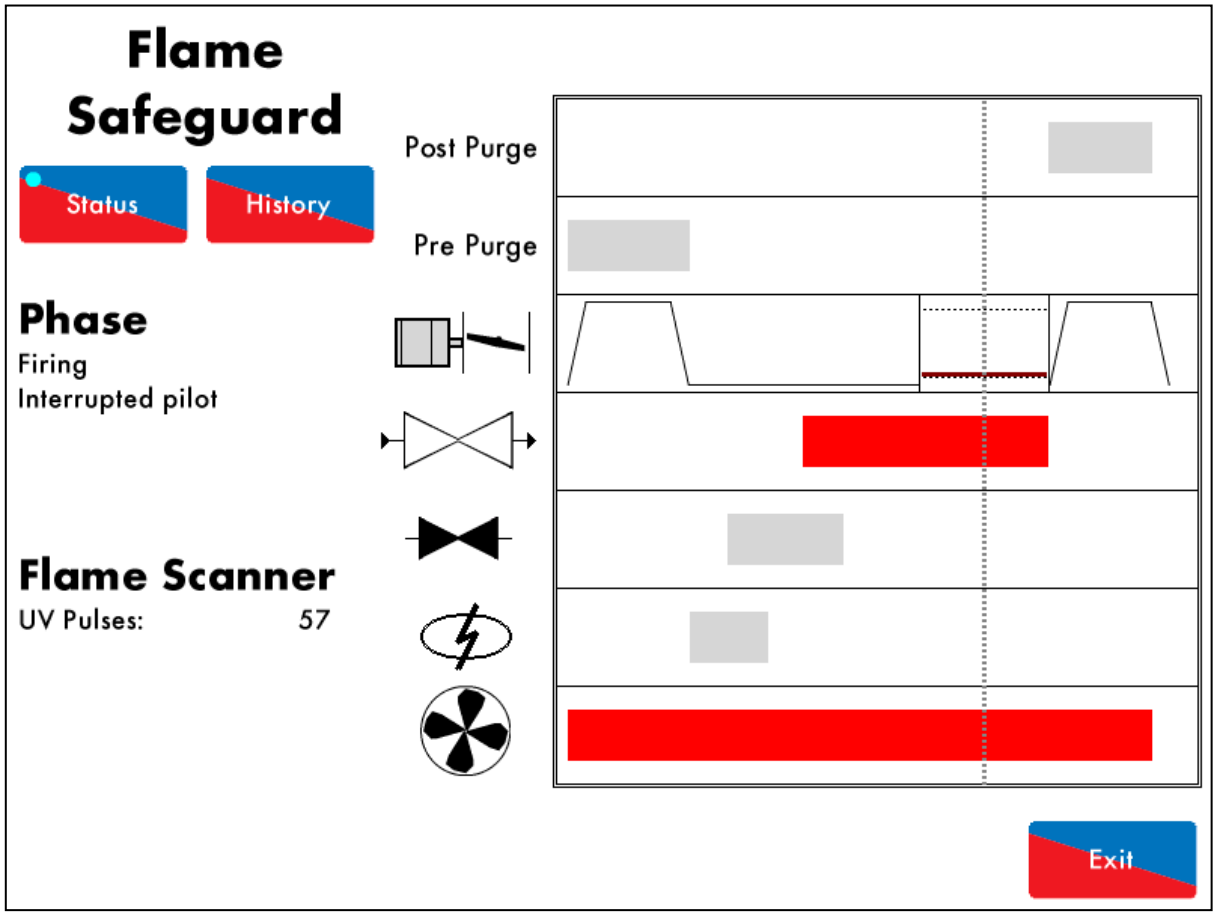


Figure 8.4.1.i Flame Safeguard – Status
图 8.4.1.i 火焰防护-状态

Press on the flame detector in the Home screen (Figure 8.1.i) to view the Flame Safeguard screen in Figure 8.4.1.i. The Flame Safeguard screen displays the following information:
在主屏幕（图 8.1.i）上按下火焰检测器按钮可以查看图 8.4.1.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 MM
  控制模块的当前阶段
- Flame scanner signal strength
  火焰检测器信号强度

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
  前吹扫
- Air damper position
  空气风门位置
- Main fuel valve
  主燃料阀
- Pilot valve
  点火阀
- Ignition
  点火包
- 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。

8.5. Channels Screen / 通道屏幕

8.5.1. Servomotor / 伺服电机

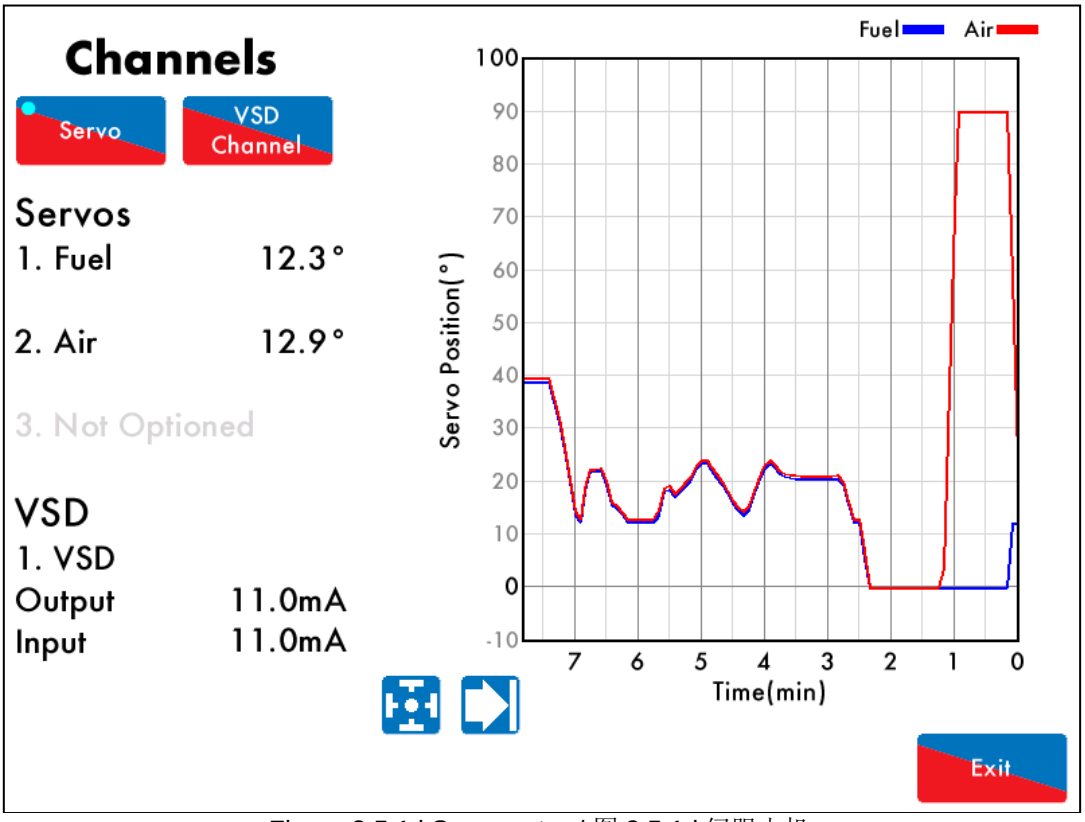


Figure 8.5.1.i Servomotor / 图 8.5.1.i 伺服电机

Press on the servomotor or VSD in the Home screen (Figure 8.1.i) to view Channel screen in Figure 8.5.1.i. The following information is shown:
在主屏幕（图 8.1.i）上按下伺服电机或 VSD 按钮可以查看图 8.5.1.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 MM.
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 Mk8 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.5.2. VSD Channel / 变频驱动（VSD）通道

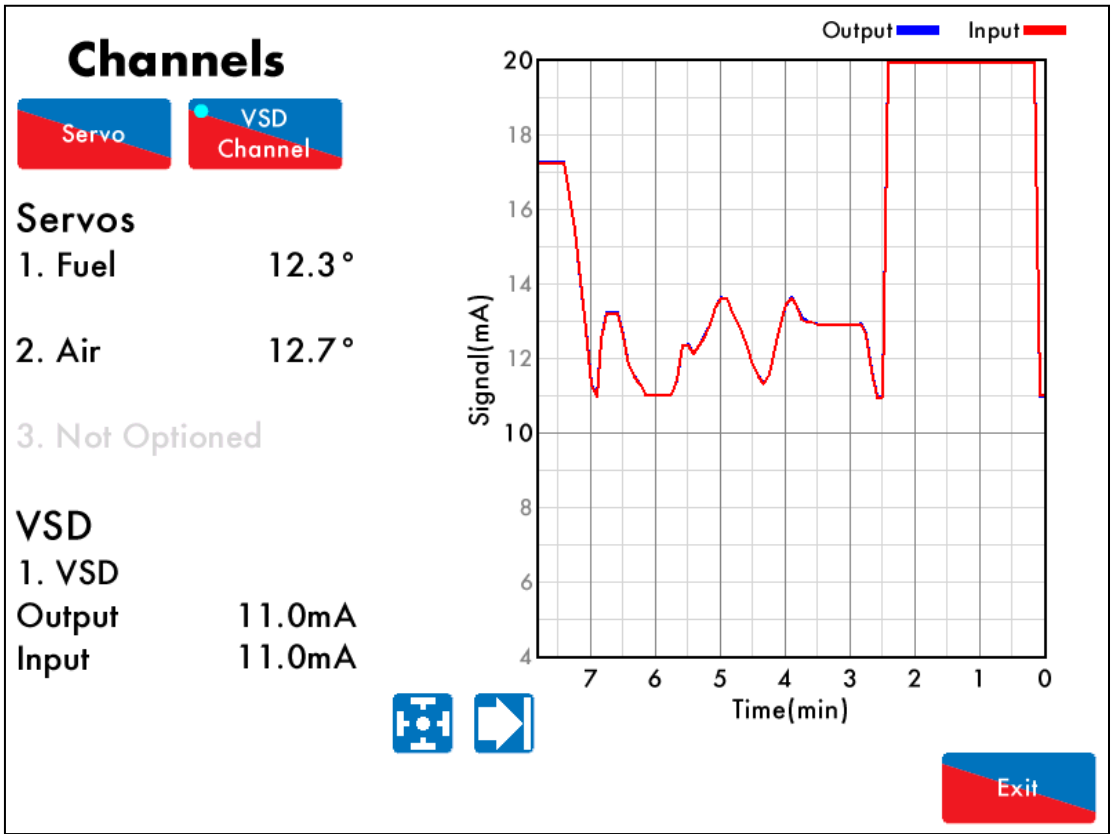


Figure 8.5.2.i VSD Channell / 图 8.5.2.i VSD 通道

Press VSD Channel on the Channels screen (Figure 8.5.1.i) to view the VSD Channel screen in Figure 8.5.2.i. The VSD output and input signal histories are displayed. This data is logged for 24 hours on the MM.

在通道屏幕（图 8.5.1.i）上按下 VSD Channel VSD 通道按钮可以查看图 8.5.2.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 Mk8 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.6. Gas Pressure Sensor Screen / 燃气压力传感器屏幕

8.6.1. Gas Pressure / 燃气压力

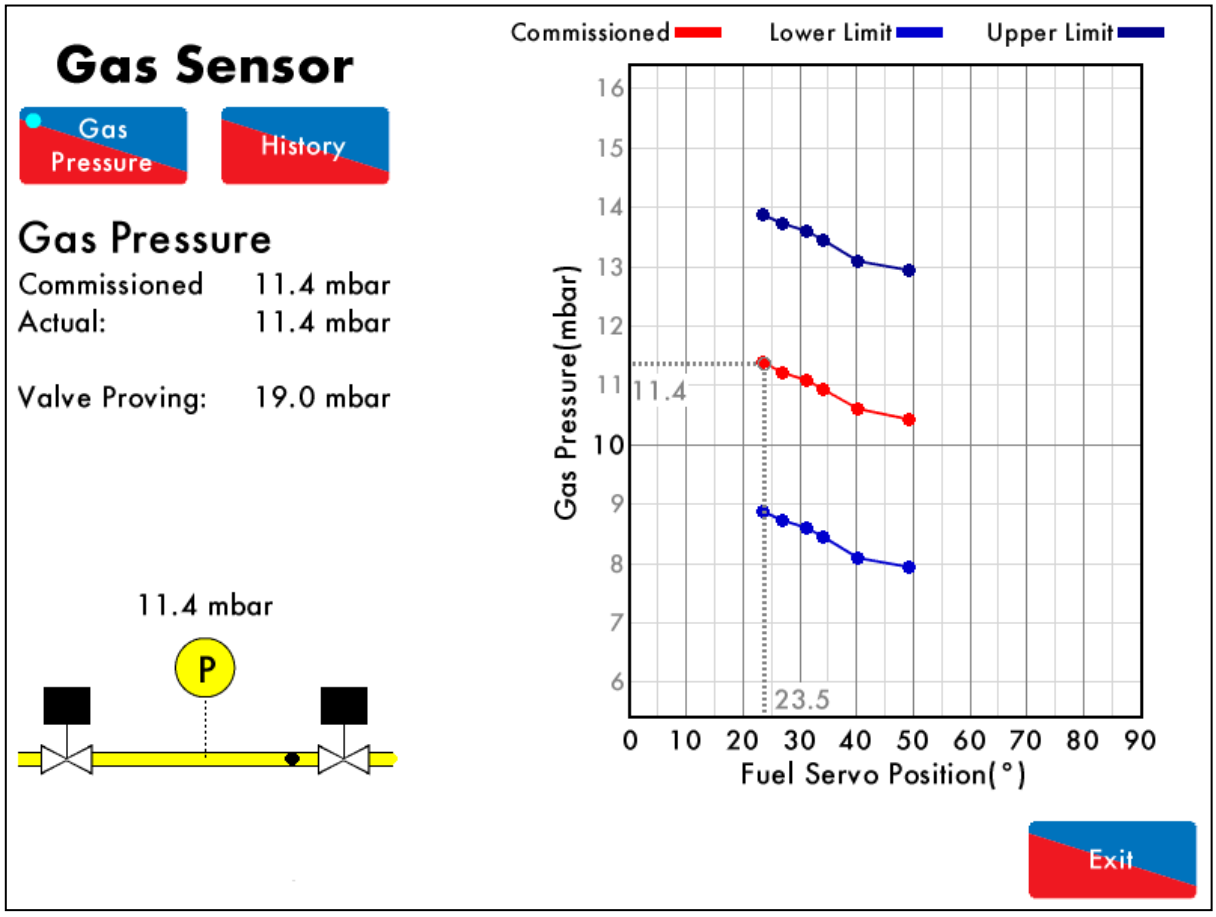


Figure 8.6.1.i Gas Pressure / 图 8.6.1.i 燃气压力

Press on the gas pressure sensor in the Home screen (Figure 8.1.i) to view the Gas Pressure screen in Figure 8.6.1.i. The following information is displayed:
在主屏幕（图 8.1.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。

8.6.2. Gas Sensor – History / 燃气传感器 - 历史

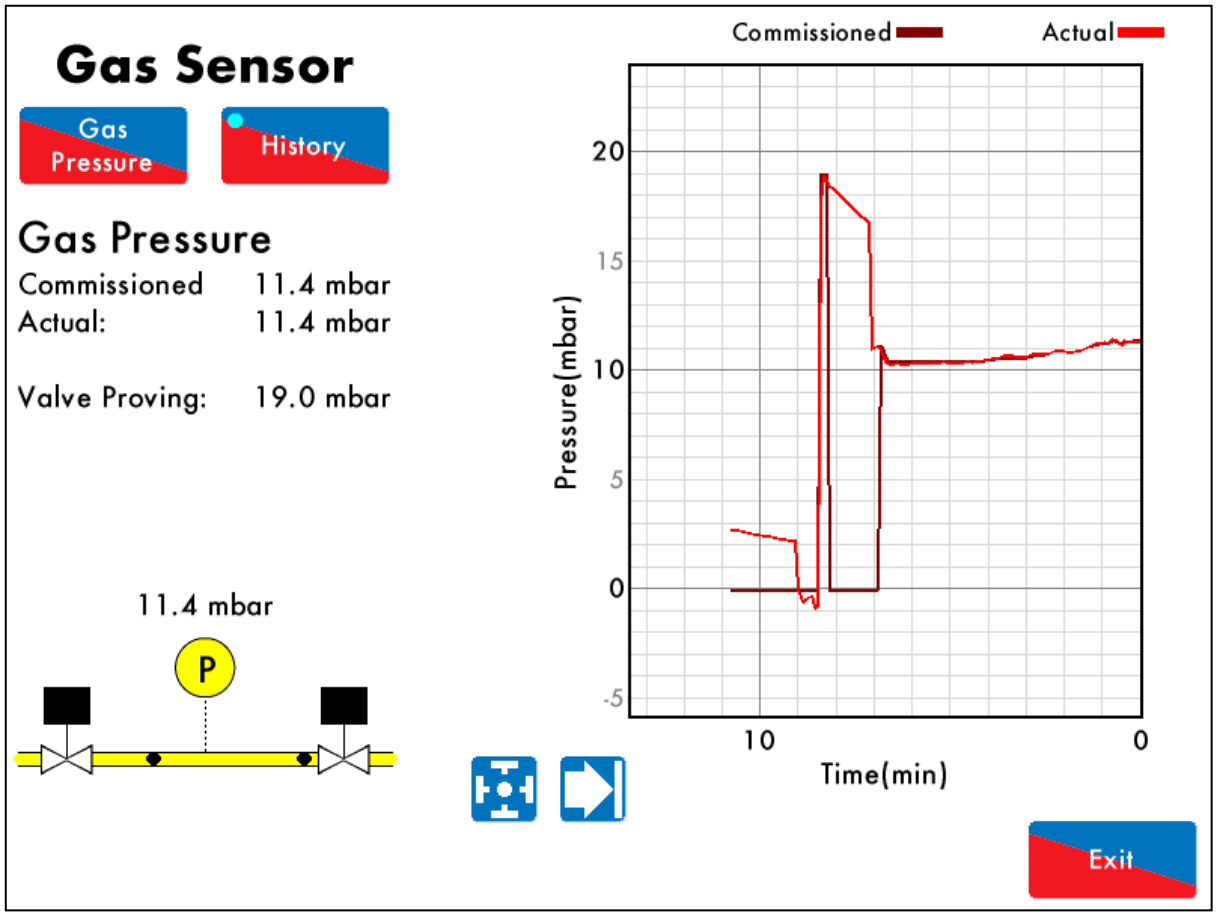


Figure 8.6.2.i Gas Sensor – History / 图 8.6.2.i 燃气传感器 - 历史

Press 

in the Gas Pressure screen (Figure 8.6.1.i) to view the Gas Pressure History screen in Figure 8.6.2.i. The commissioned and actual gas pressure histories are displayed. This data is logged for 24 hours on the MM.

在燃气压力屏幕（图 8.6.1.i）上按下 

历史按钮可以查看图 8.6.2.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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.7. Air Pressure Sensor Screen / 空气压力传感器屏幕

8.7.1. Air Pressure / 空气压力

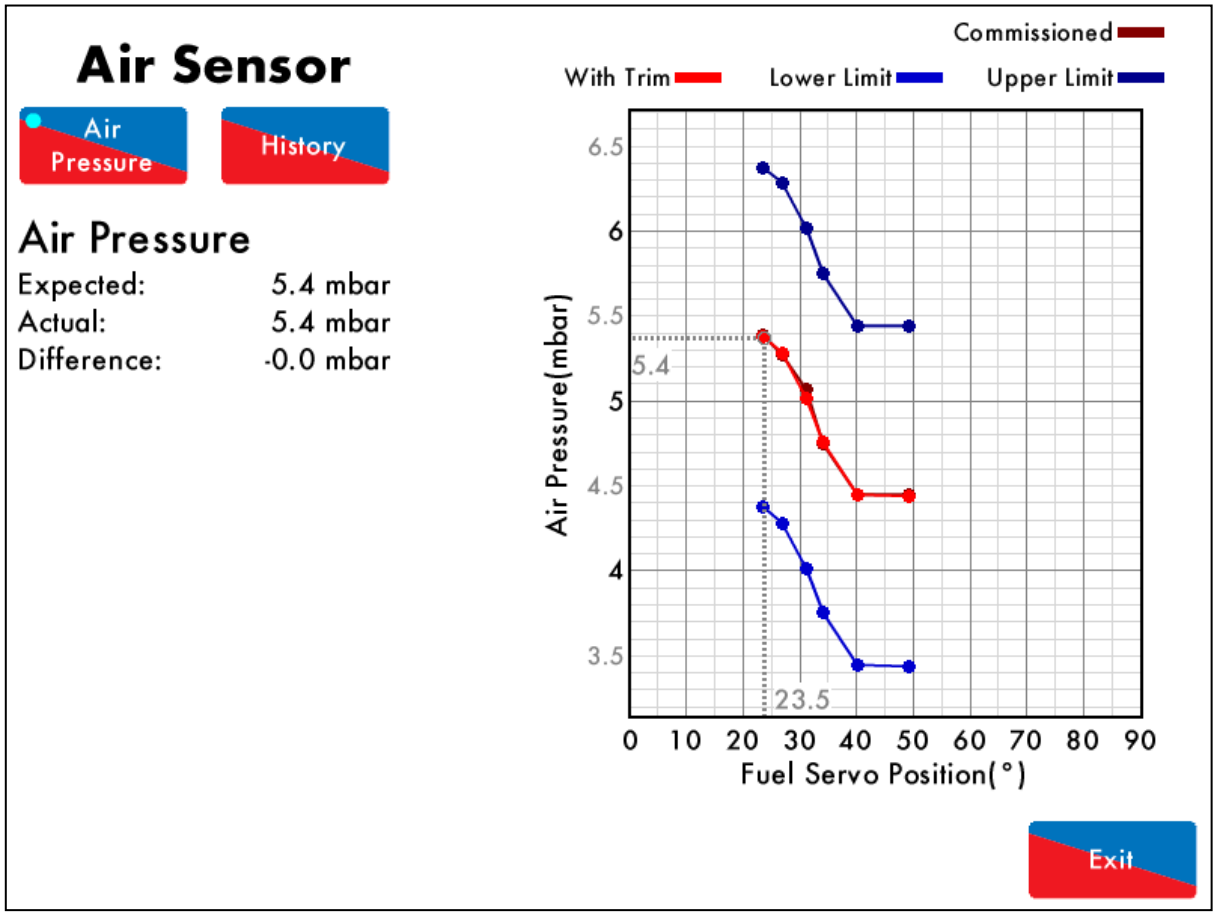


Figure 8.7.1.i Air Pressure / 图 8.7.1.i 空气压力

Press on the air pressure sensor in the Home screen (Figure 8.1.i) to view the Air Pressure screen in Figure 8.7.1.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 8.1.i）上按下空气压力传感器按钮可以查看图 8.7.1.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风门空气压力值。

If commissioned with an EGA, 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.
如用烟气分析仪进行调试，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在线空气的偏差。

8.7.2. Air Sensor – History / 空气传感器 - 历史

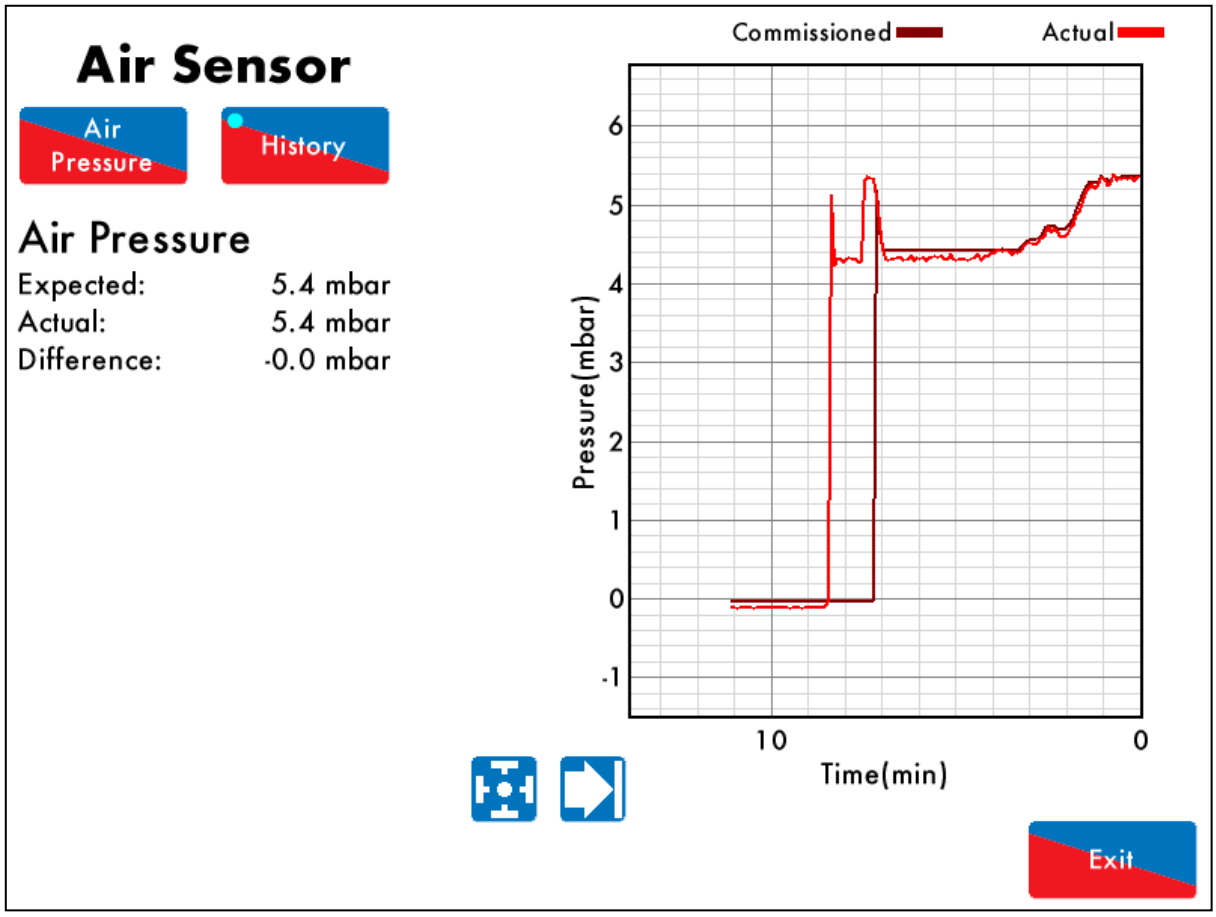


Figure 8.7.2.i Air Sensor – History / 图 8.7.2.i 空气传感器 - 历史

Press 

on the Air Pressure screen (Figure 8.7.1.i) to view the Air Pressure History in Figure 8.7.2.i. The commissioned and actual air pressure histories are displayed. This data is logged for 24 hours on the MM.

在空气压力屏幕（图 8.7.1.i）上按下

历史按钮可以查看图 8.7.2.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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.8. Fuel Flow Screen / 燃料流量屏幕

8.8.1. Fuel Flow / 燃料流量

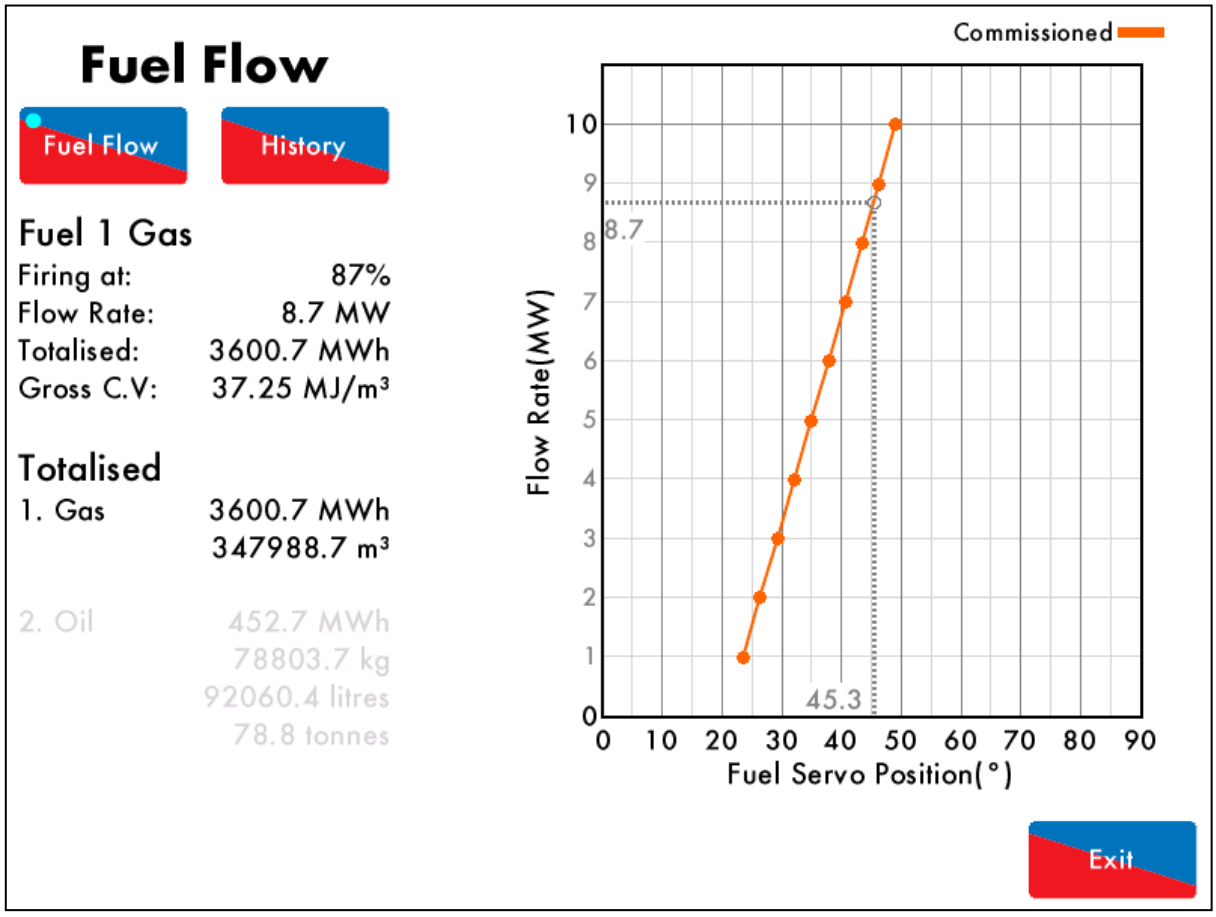


Figure 8.8.1.i Fuel Flow / 图 3.8.1.i 燃料流量

Press the gas/oil pipe in the Home screen (Figure 8.1.i) to view the Fuel Flow screen in Figure 8.8.1.i. The following information is shown:
在主屏幕（图 8.1.i）上按下燃料-空气管按钮可以查看图 8.8.1.i 所示的燃料流量屏幕。燃料流量屏幕显示了以下信息：

- Current firing rate
  当前燃烧率。
- 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。

8.8.2. Fuel Flow – History / 燃料流量 - 历史

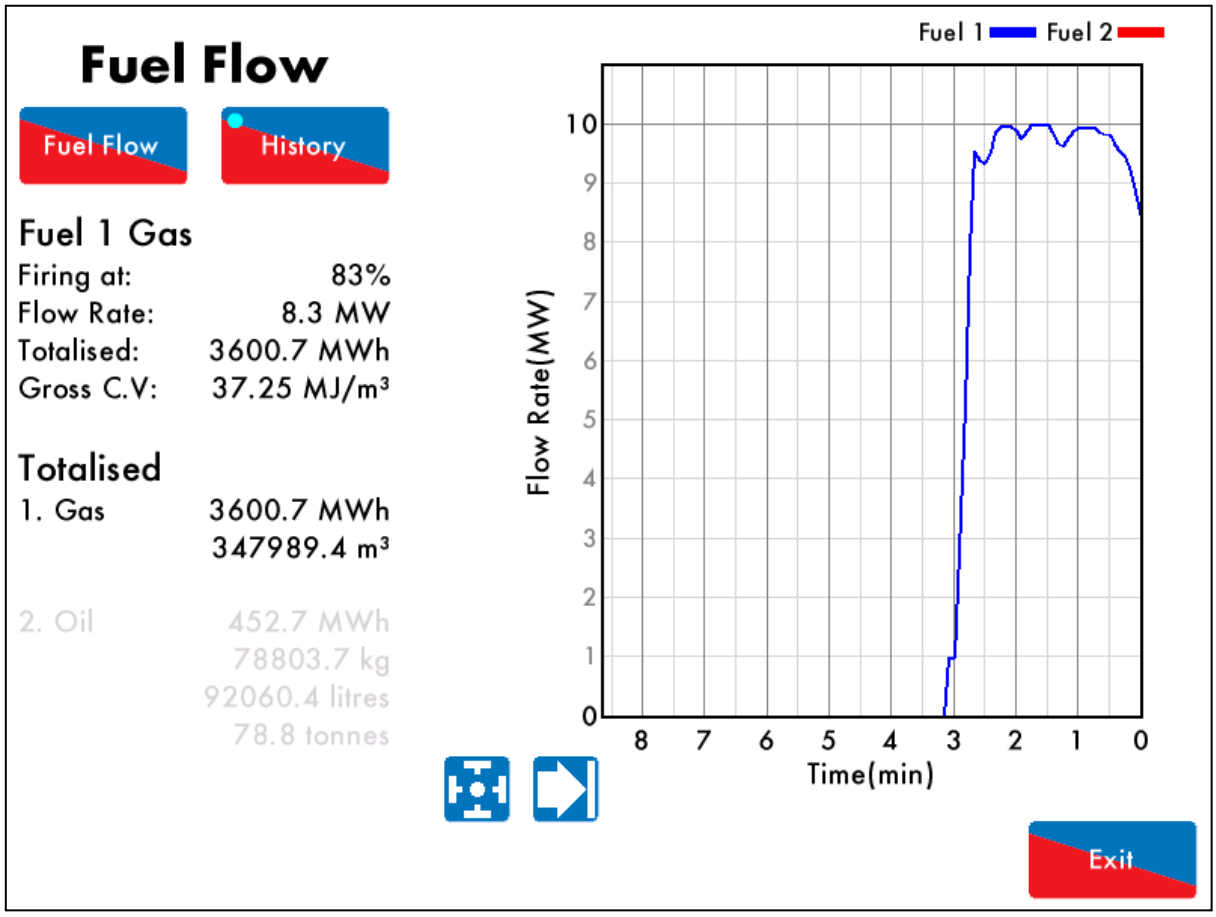


Figure 8.8.2.i Fuel Flow – History / 图 8.8.2.i 燃料流量 - 历史

Press History in the Fuel Flow screen in Figure 8.8.1.i to view the Fuel Flow History in Figure 8.8.2.i. The fuel flow rate history is displayed. This data is logged for 24 hours on the MM.

在燃料流量屏幕（图 8.8.1）上按下 History 历史按钮可以查看图 8.8.2.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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.9. Sequencing Screen / 群控屏幕

8.9.1. IBS – Sequencing /智能锅炉群控 – 群控

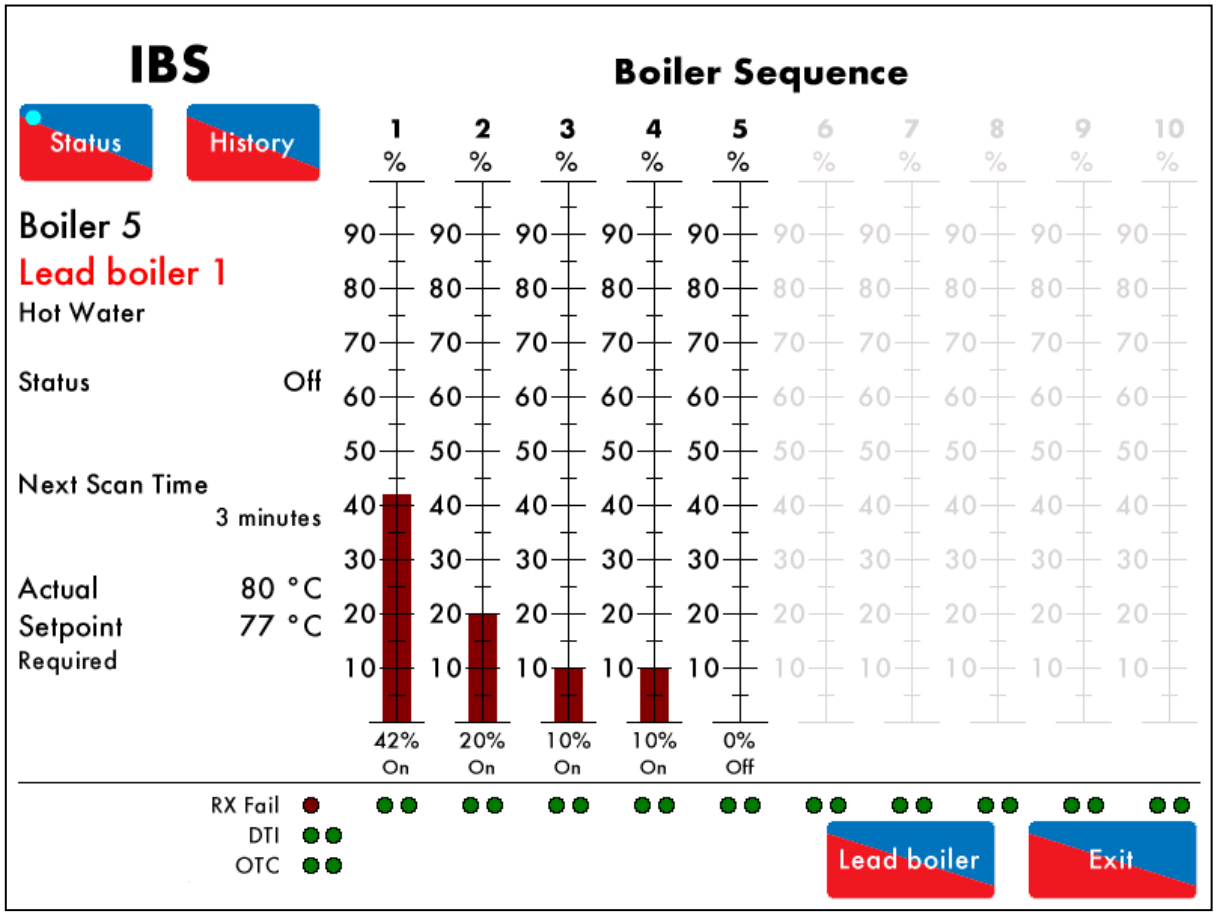


Figure 8.9.1.i IBS – Status / 图 8.9.1.i IBS 状态

Press on the IBS box in the Home screen (Figure 3.1.i) to view the IBS Status screen in Figure 8.9.1.i. The following information is displayed:
在主屏幕（图 8.1.i）上按下 IBS 按钮可以查看图 8.9.1.i 所示的 IBS 状态屏幕。IBS 状态屏幕显示了以下信息：

- ID number of the MM
  控制模块的 ID 号
- Lead boiler
  主锅炉
- Type of sequencing (steam/hot water)
  群控类型（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
  所需设定值
- Number of MMs in the sequencing loop
  群控循环中的控制模块数量。
- Current firing rates of all the MMs in the loop
  循环中所有控制模块的当前燃烧率
- Current status of all the MMs in the loop

循环中所有控制模块的当前状态

- Sequencing communications check
  群控通信检查

Note: To display the sequencing communications diagnostics as shown above, parameter 83 must be set to 1.
注：要显示群控通信诊断信息，参数 83 必须设为 1。

Pressing on the bars of MMs which are offline will give more information on why it has been removed from the sequencing loop.
按下控制模块离线的条目会提供更多信息，并说明从群控循环中移除的原因。

8.9.2. IBS – Lead Boiler / 智能锅炉群控 - 主锅炉

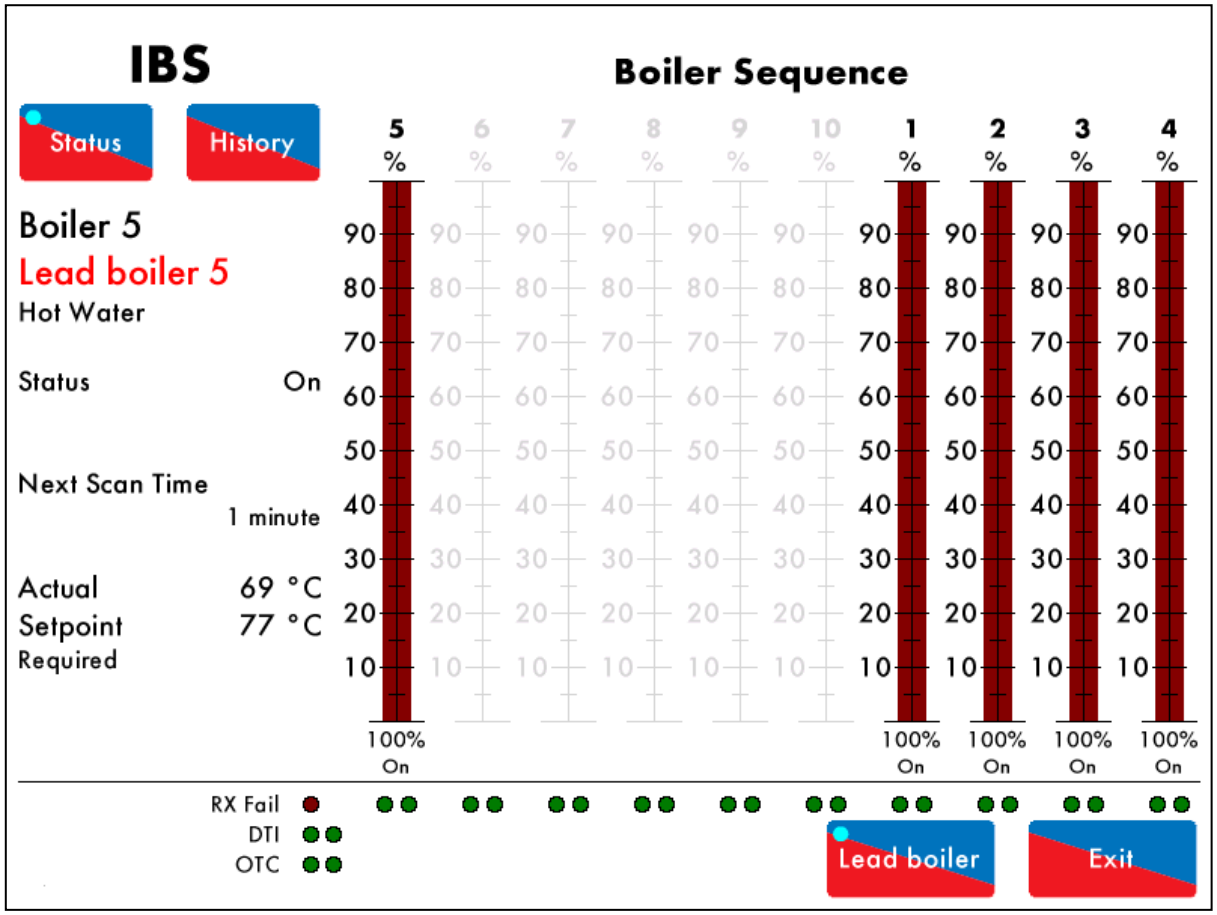


Figure 8.9.2.i IBS – Lead Boiler / 图 8.9.2.i 智能锅炉群控-主锅炉

Press 

in the IBS Status screen (Figure 8.9.1.i) to select that MM as the lead boiler.

在 IBS 状态屏幕（图 8.9.1.i）上按下

主锅炉按钮可以选择该控制模块作为主锅炉。

Note: If another MM has already been selected as lead boiler, or no boilers have been selected as lead boiler, then the MMs 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。

8.9.3. IBS – History / 智能锅炉群控 - 历史

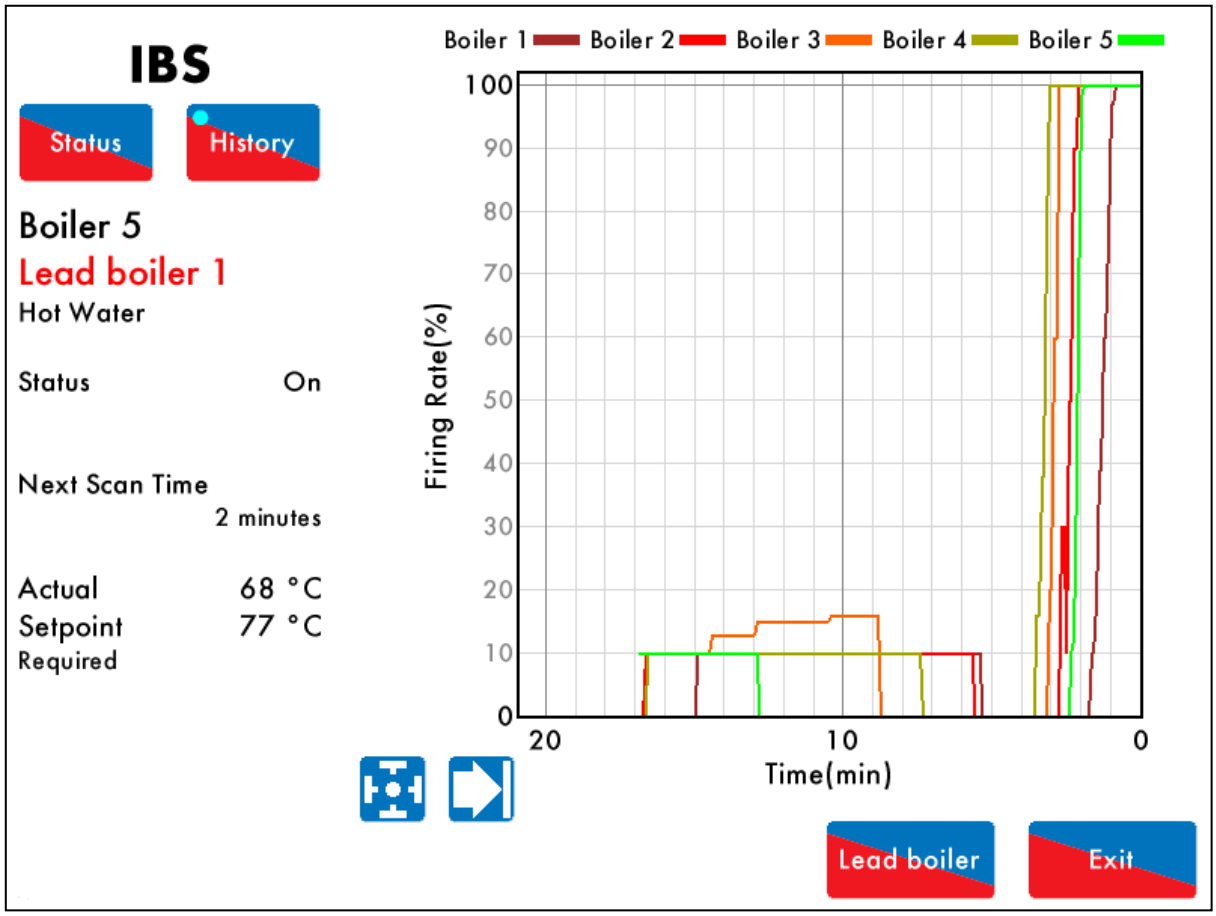


Figure 8.9.3.i IBS – History / 图 8.9.3.i 智能群控 - 历史

Press 

in the IBS – Status screen (Figure 8.9.1.i) to view IBS History screen in Figure 8.9.3.i. The firing rate histories for the MMs in the sequencing loop are displayed. This data is logged for 24 hours on the MM.

在 IBS 状态屏幕（图 8.9.1.i）上按下 

历史按钮可以查看图 8.9.3.i 所示的 IBS 历史屏幕。

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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.10. EGA Screen / 烟气分析仪（EGA）屏幕

8.10.1. EGA – Gas / 烟气分析仪 - 燃气

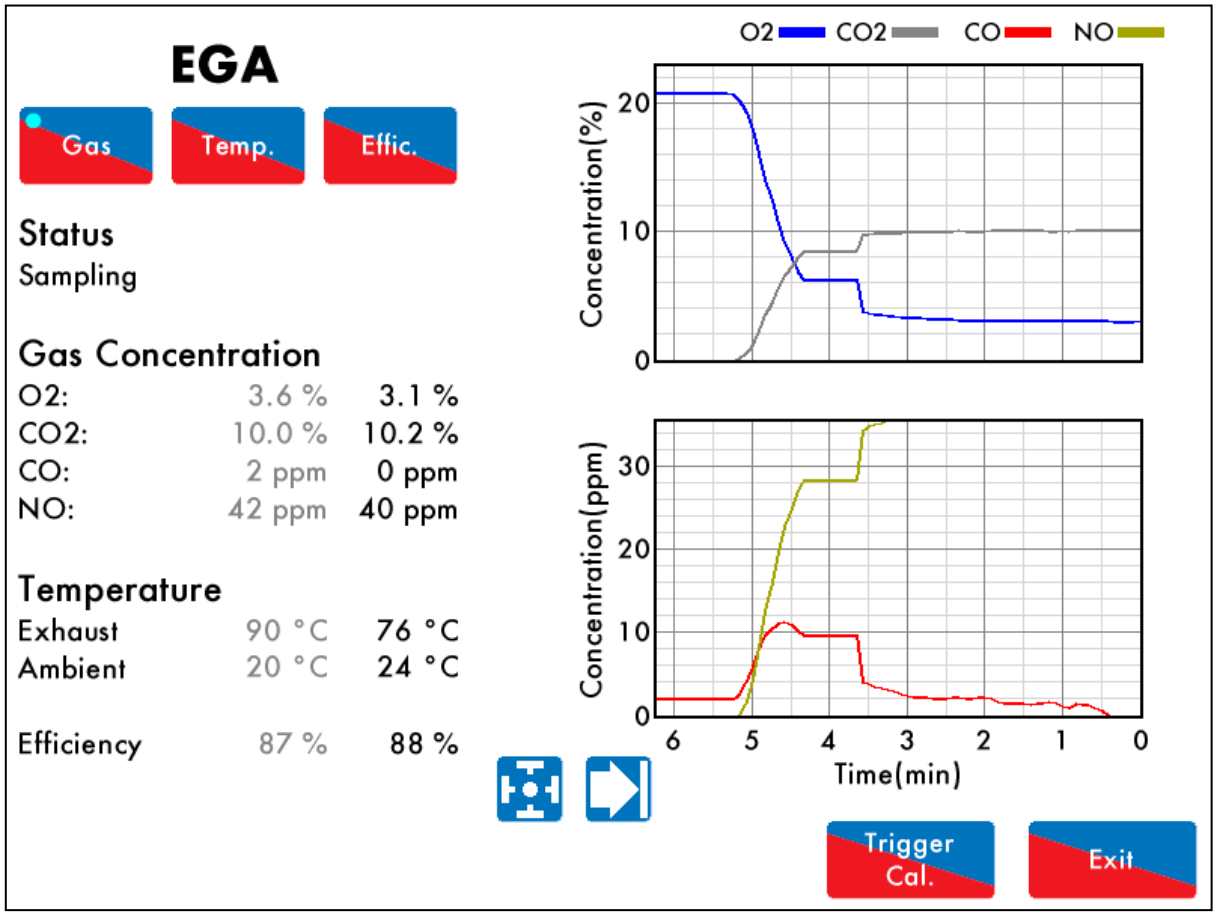


Figure 8.10.1.i EGA – Gas / 图 8.10.1.i 烟气分析仪-燃气

Press the EGA box in the Home screen (Figure 8.1.i) to view the EGA Gas screen in Figure 8.10.1.i. The following information is displayed:
在主屏幕（图 8.10.i）上按下 EGA 按钮可以查看图 8.10.1.i 所示的 EGA 燃气屏幕。EGA 燃气屏幕显示了以下信息：

- EGA status
  EGA 状态
- Commissioned exhaust gases, temperature and efficiency values (in grey)
  调试的烟气值、温度值和效率值（灰色）。
- Current exhaust gases, temperature and efficiency values (in black)
  当前烟气值、温度值和效率值（黑色）。

This data is logged for 24 hours on the MM.
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 DTI when connected with the MM.
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 MM 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。

Press 

to force the EGA into a calibration when it is next in a safe condition, such as not trimming and not calibration.

在安全情况下，如不调节和校准时，按 

强制 EGA 进行校准。

8.10.2. EGA – Temperature / 烟气分析仪 -温度

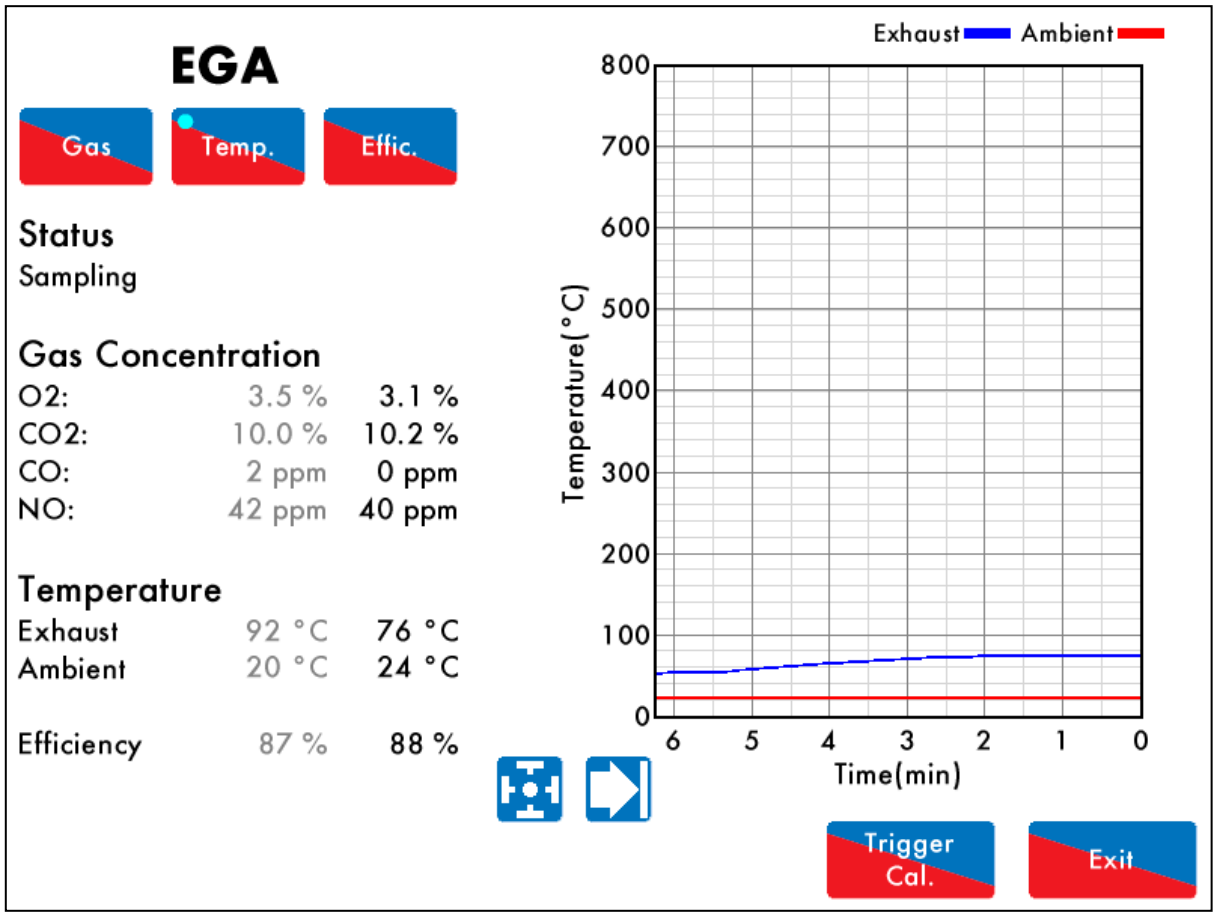


Figure 8.10.2.i EGA – Temperature / 图 8.10.2.i EGA 温度

Press 

in the E.G.A Gas screen (Figure 8.10.1.i) to view EGA Temperature screen in Figure 8.10.2.i.The exhaust and ambient temperature histories are displayed. This data is logged for 24 hours on the MM.

在 EGA 燃气屏幕（图 8.10.1.i）上按下 

温度按钮可以查看图 8.10.2.i 所示的 EGA 温度屏幕，EGA 温度屏幕显示了烟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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.10.3. EGA – Efficiency / 烟气分析仪- 效率

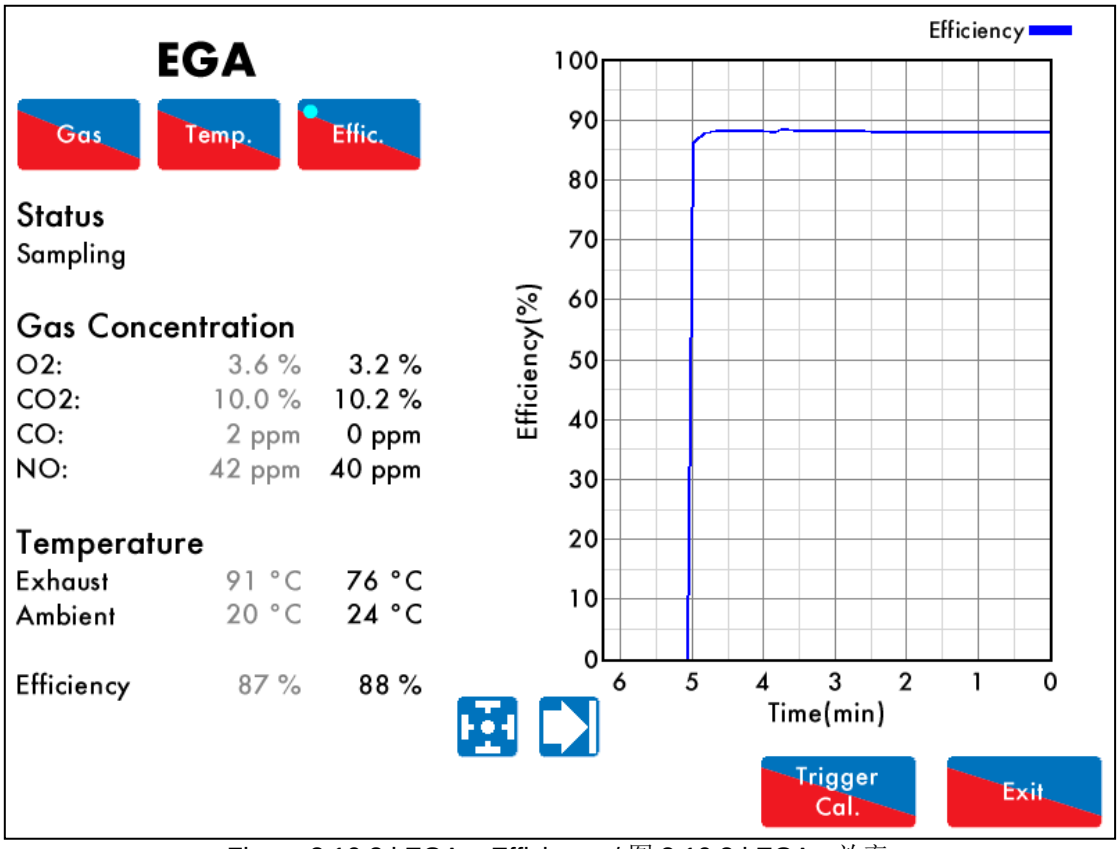


Figure 8.10.3.i EGA – Efficiency / 图 8.10.3.i EGA - 效率

Press 

in the EGA Gas Screen (Figure 8.10.1.i) to view the EGA Efficiency screen in Figure 8.10.2.i. The combustion efficiency history is displayed. This data is logged for 24 hours on the MM.

在 EGA 燃气屏幕（图 8.10.1.i）上按下

效率按钮可以查看图 8.10.2.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 DTI when connected with the MM.
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 MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.11. Outside Temperature Compensation Screen / 室外温度补偿屏幕

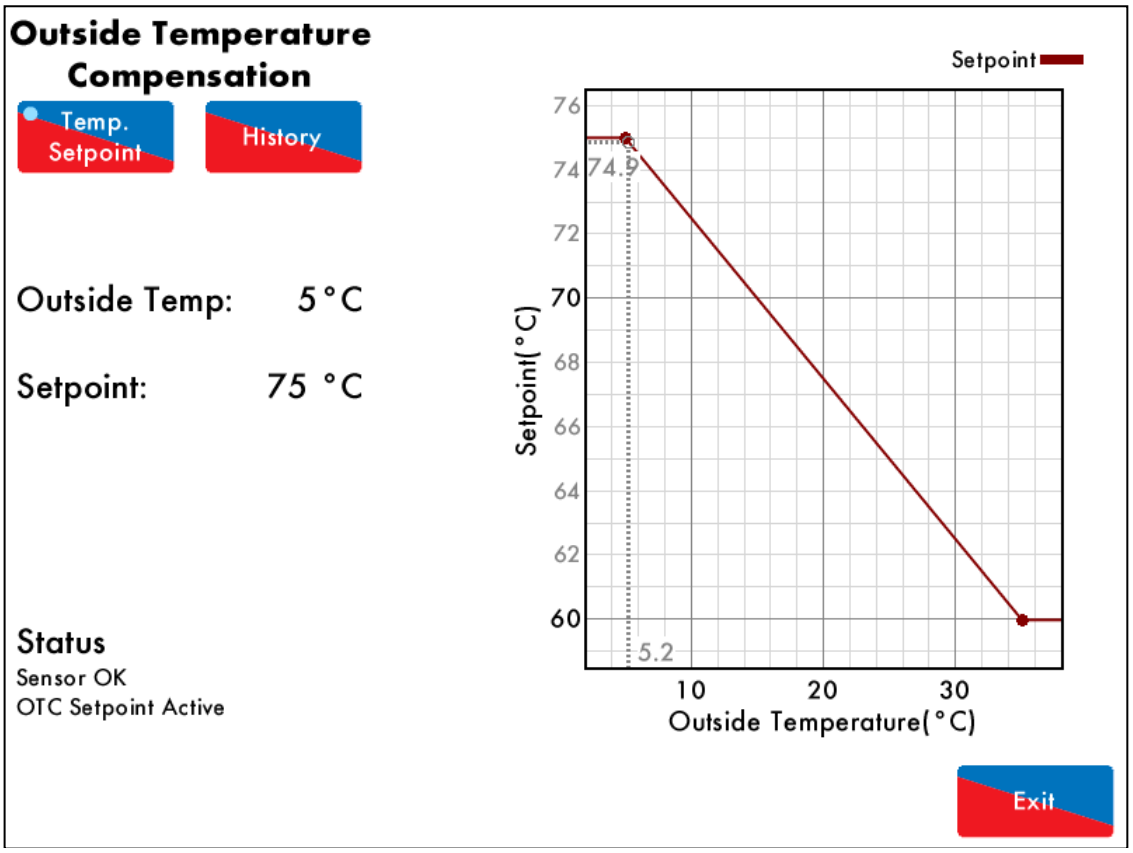


Figure 8.11.i OTC – Temperature, Setpoint
图 8.11.1.i 室外温度补偿-温度和设定值

Press on the outside temperature sensor in the Home screen (Figure 8.1.i) to view the Outside Temperature Compensation screen in Figure 3.11.i. The following information is displayed:
在主屏幕（图 8.1.i）上按下室外温度传感器按钮可以查看图 8.11.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
  当前所需设定值
- Status of the OTC sensor
  OTC 传感器状态
- Status of the OTC required setpoint
  OTC 所需设定值状态

Press 

in the Outside Temperature Compensation screen (Figure 8.11.1.i) to view the Outside Temperature Compensation History. The outside temperature and setpoint history are stored on the MM for 24 hours.

在室外温度补偿屏幕（图 8.11.1.i）上按下

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

Note: Power cycling the MM or changing fuel will reset this data log.
注：电源重启或更换燃料时将重置数据记录。

8.12. System Configuration Screen / 系统设置屏幕

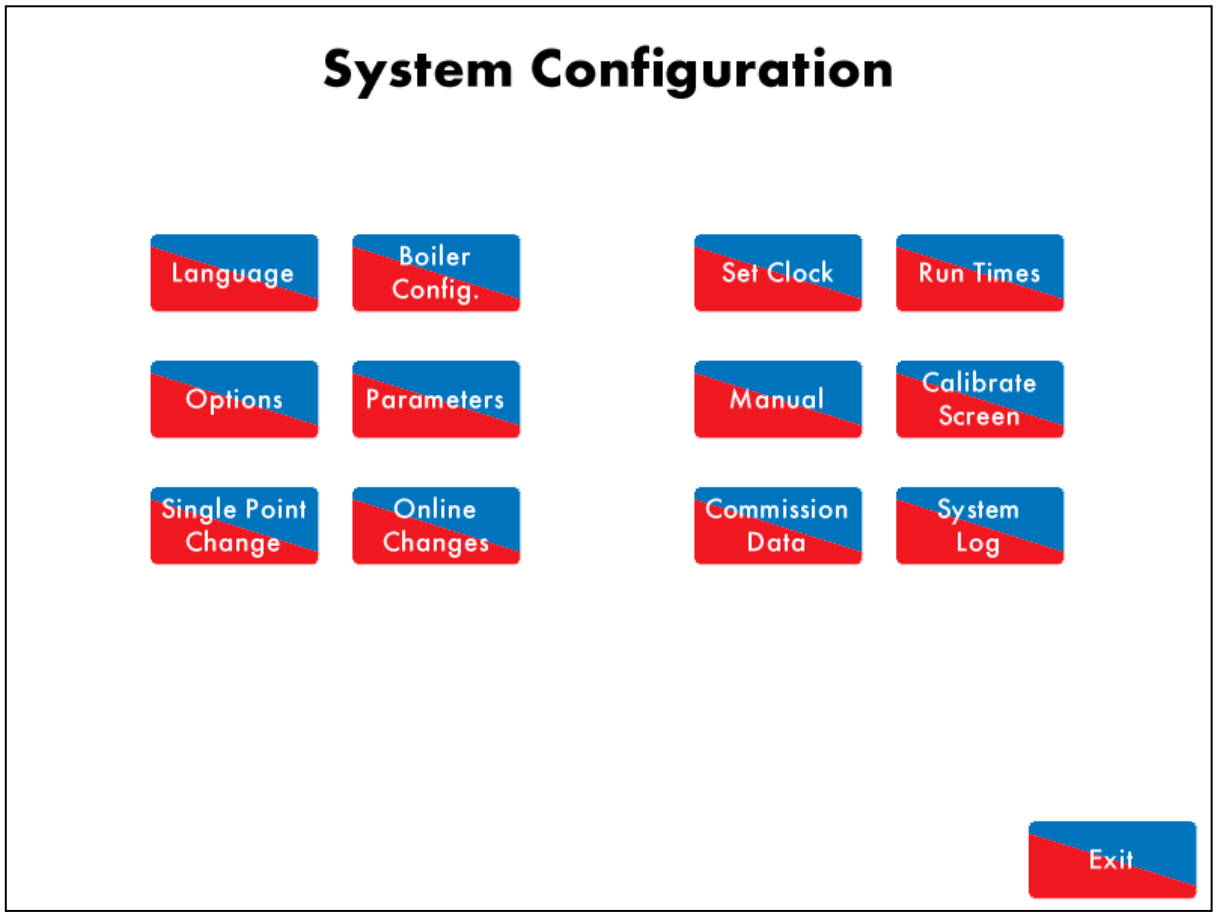


Figure 8.12.i System Configuration
图 3.12.i 系统设置屏幕

Press 

in the Home screen (Figure 8.1.i) to view the System Configuration screen in Figure 8.12.i. In System Configuration, it is possible to view or make changes to the following:

在主屏幕（图 8.1.i）上按下

设置按钮可以查看图 8.12.i 所示的系统设置屏幕，在系统设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)
  显示的锅炉设置（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
  手册
- Commission data
  调试数据

- System log
  系统日志
- Calibrate screen
  校准屏幕

8.12.1. Language / 语言

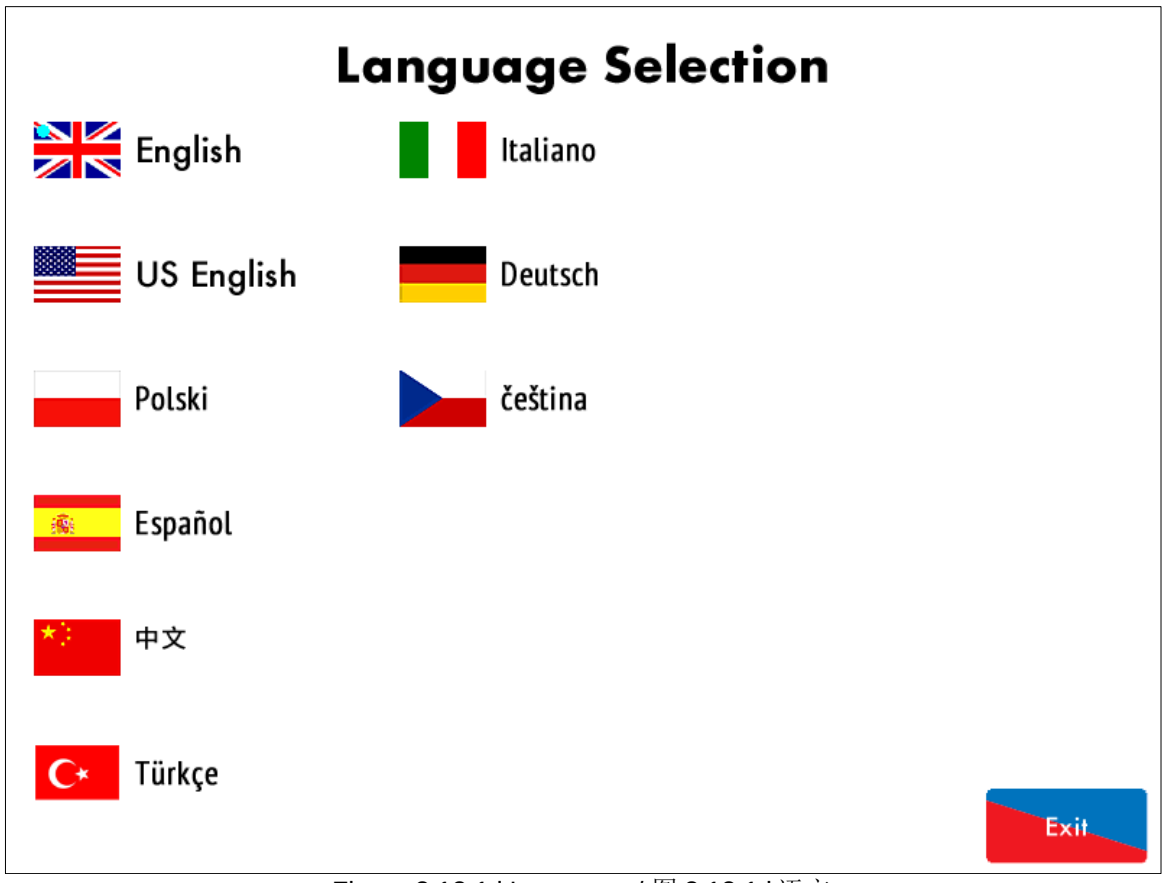


Figure 8.12.1.i Language / 图 8.12.1.i 语言

Press 

in the System Configuration screen (Figure 8.12.i) to view the Language screen in Figure 8.12.1.i. You will be prompted to enter a password. Select the language to be displayed and press 

.

在系统设置屏幕（图 8.12.i）上按下

语言按钮可以查看图 8.12.1.i 所示的语言屏幕，屏幕将提示您输入密码，选择显示的语言后按下

退出按钮。

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。

Note: The Online Changes password is used to access the Language selection screen. Please contact your local Autoflame approved tech centre for this password.
注：在线更改密码用于访问语言选择屏幕。有关此密码，请与本地 Autoflame 认证技术中心联系。

8.12.2. Boiler Configuration Screen / 锅炉设置屏幕

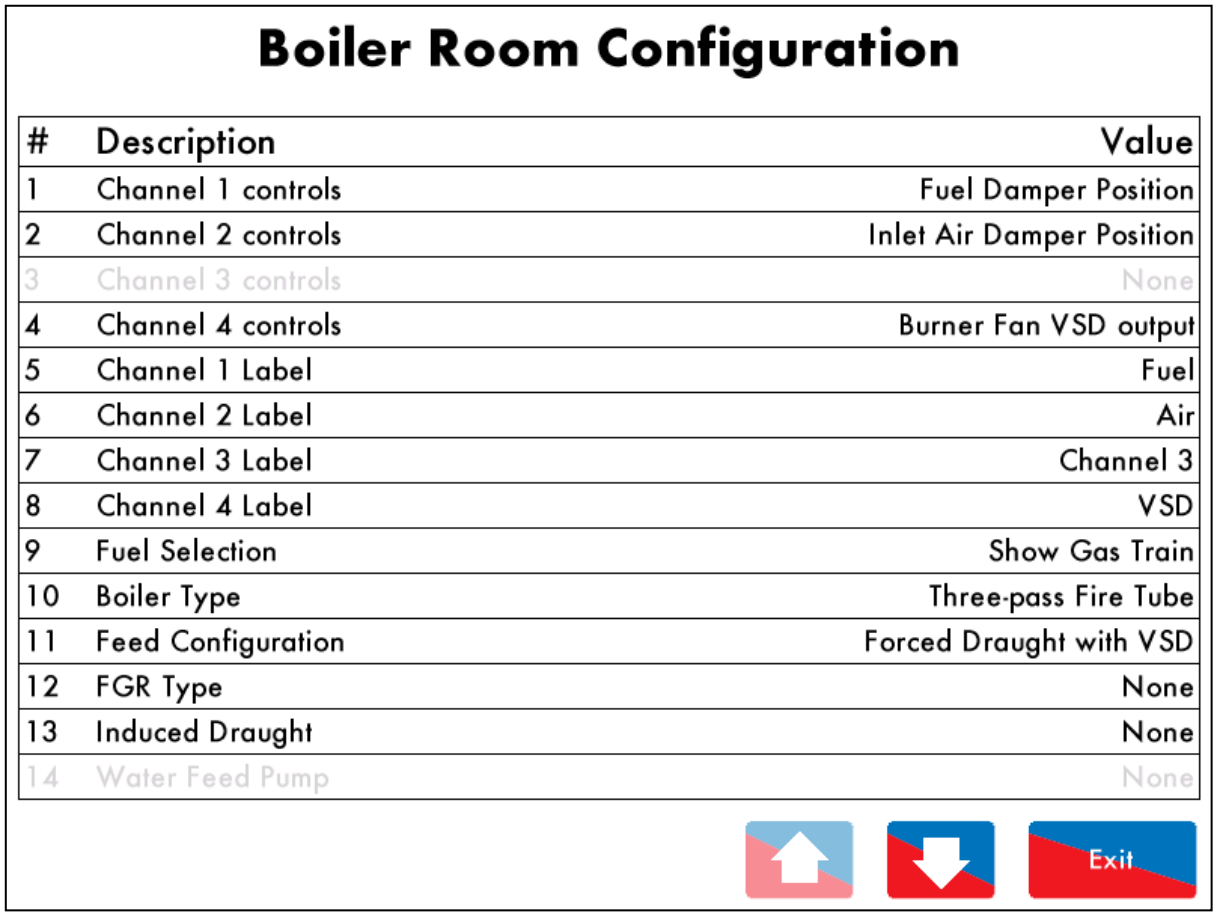


Figure 8.12.2.i Boiler Room Configuration / 图 8.12.2.i 锅炉设置

Press 

in the System Configuration screen (Figure 8.12.i) to view the Boiler Configuration screen in Figure 8.12.2.i. You will be prompted to enter the password. 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 

.

在系统设置屏幕（图 8.12.i）上按下 

锅炉设置按钮可以查看图 8.12.2.i 所示的锅炉设置屏幕，屏幕将提示您输入密码。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 

退出按钮。

Note: The Online Changes password is used to access the Boiler Configuration selection screen. Please contact your local Autoflame approved tech centre for this password.
注：在线更改密码用于访问锅炉设置选择屏幕。有关此密码，请与本地 Autoflame 认证技术中心联系。

The table below shows the available Boiler Configuration settings.
下表显示了可用的锅炉设置设置。

Setting 设置	Description 说明	
1	Channel 1 Controls / 通道 1 控制	
Fuel damper position 燃料阀门位置		
2	Channel 2 Controls / 通道 2 控制	
None 无		Draught air damper position 背压烟气挡板位置
Inlet air damper position 进风挡板位置		Steam/air atomisation damper position 蒸汽/空气雾化挡板位置
Outlet air damper position 出风挡板位置		Water inlet damper position 进水挡板位置
FGR air damper position FGR 烟气挡板位置		
3	Channel 3 Controls / 通道 3 的控制	
None 无		Draught air damper position 背压烟气挡板位置
Inlet air damper position 进风挡板位置		Steam/air atomisation damper position 蒸汽/空气雾化挡板位置
Outlet air damper position 出风挡板位置		Water inlet damper position 进水挡板位置
FGR air damper position FGR 烟气挡板位置		
4	Channel 4 controls / 通道 4 的控制	
None 无		Draught fan VSD output 背压风机变频器输出
Burner fan VSD output 燃烧器风机变频器输出		Water feed VSD output 给水变频器输出
FGR fan VSD output 烟气再循环风机变频器输出		
5	Channel 1 Label / 通道 1 标签	
Channel 1 通道 1		Steam 蒸汽
Fuel 燃料		VSD 变频器
Gas 燃气		Blower 鼓风机
Oil 燃油		Sleeve 套管
Air 空气		Head 头
FGR 烟气再循环		Inlet 入口
P-Air (primary air) 一次风		Outlet 输出
S-Air (secondary air) 二次风		Water 水
T-Air (third air) 三次风		Gas 1 燃气 1
ID fan (induced draught) 引风机		Gas 2 燃气 2
FD fan (forced draught) 送风机		
6	Channel 2 Label / 通道 2 标签	
Channel 2 通道 2		Steam 蒸汽
Fuel 燃料		VSD 变频器
Gas 燃气		Blower 鼓风机
Oil 燃油		Sleeve 套管
Air 空气		Head 头
FGR 烟气再循环		Inlet 入口
P-Air (primary air) 一次风		Outlet 输出
S-Air (secondary air) 二次风		Water 水
T-Air (third air) 三次风		Gas 1 燃气 1
ID fan (induced draught) 引风机		Gas 2 燃气 2
FD fan (forced draught) 送风机		

Setting 设置	Description 说明	
7	Channel 3 Label / 通道 3 标签	
Channel 3 通道 3		Steam 蒸汽
Fuel 燃料		VSD 变频器
Gas 燃气		Blower 鼓风机
Oil 燃油		Sleeve 套管
Air 空气		Head 头
FGR 烟气再循环		Inlet 入口
P-Air (primary air) 一次风		Outlet 输出
S-Air (secondary air) 二次风		Water 水
T-Air (third air) 三次风		Gas 1 燃气 1
ID fan (induced draught) 引风机		Gas 2 燃气 2
FD fan (forced draught) 送风机		
8	Channel 4 Label / 通道 4 标签	
Channel 4 通道 4		Steam 蒸汽
Fuel 燃料		VSD 变频器
Gas 燃气		Blower 鼓风机
Oil 燃油		Sleeve 套管
Air 空气		Head 头
FGR 烟气再循环		Inlet 入口
P-Air (primary air) 一次风		Outlet 输出
S-Air (secondary air) 二次风		Water 水
T-Air (third air) 三次风		Gas 1 燃气 1
ID fan (induced draught) 引风机		Gas 2 燃气 2
FD fan (forced draught) 送风机		
9	Fuel Selection / 燃料选择	
Show gas train 显示燃气阀组		
Show oil train 显示燃油阀组		
Show gas and oil 显示燃气和燃油		
Show gas and oil close-coupled 显示燃气和燃油阀紧密结合		
10	Boiler Type / 锅炉类型	
Water tube 水管		Horizontal coil tube 水平盘管式
Three-pass fire tube 三回传火管		Vertical coil tube 垂直盘管式
Four-pass fire tube 四回传火管		Kiln 窑炉
Cast-sectional tube 铸铁锅炉		Vertical Condenser 立式冷凝器
11	Feed Configuration / 供给设置	
Forced draught 鼓风式		Rotary cup 旋转杯
Forced draught with VSD 鼓风式和变频器		
12	FGR Type / 烟气再循环类型	
None 无		
Induced FGR with a motorised damper 引导式 FGR 与电动挡板		
Forced FGR with VSD 强制式 FGR 与电动挡板		
Forced FGR with a motorised damper and VSD 强制式 FGR 与电动挡板和 VSD		

Setting 设置	Description 说明
13	Induced draught / 引导式通风
None 无 Induced draught 引导式通风 Induce draught with damper 引导式通风与挡板 Induced draught with a VSD 引导式通风与 VSD Induce draught with motorised damper 引导式通风与挡板和 VSD	
15	Steam/Air Atomisation / 蒸汽、空气雾化
None 无 Show steam/air train 显示蒸汽/空气阀组 Show steam/air train with a servo 显示蒸汽/空气带伺服阀组	
16	Two-Port Valve / 两端阀
None 无 Show two-port valve 显示两端阀	
17	Combustion Head Type / 燃烧头类型
Diffuser 扩散器 Mesh 表面燃烧	

8.12.3. Options / 选项

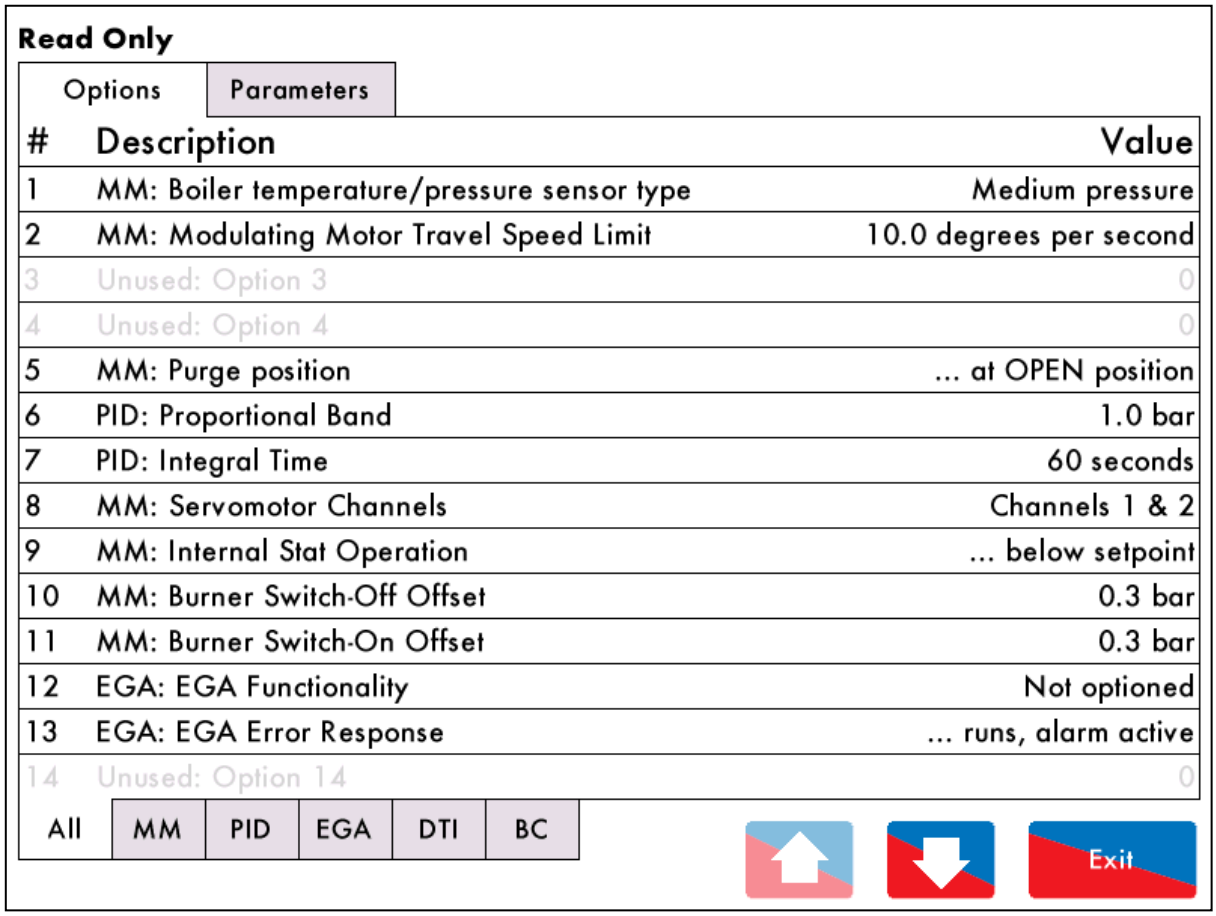


Figure 8.12.3.i Options / 图 8.12.3.i 选项

Presss 

in the System Configuration screen (8.12.i) to view Options screen in Figure 8.12.3.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 8.12.5.

在系统设置屏幕（图 8.12.i）上按下

选项按钮可以查看图 8.12.3.i 所示的选项屏幕，选项窗口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 8.12.5 节。

8.12.4. Parameters / 参数

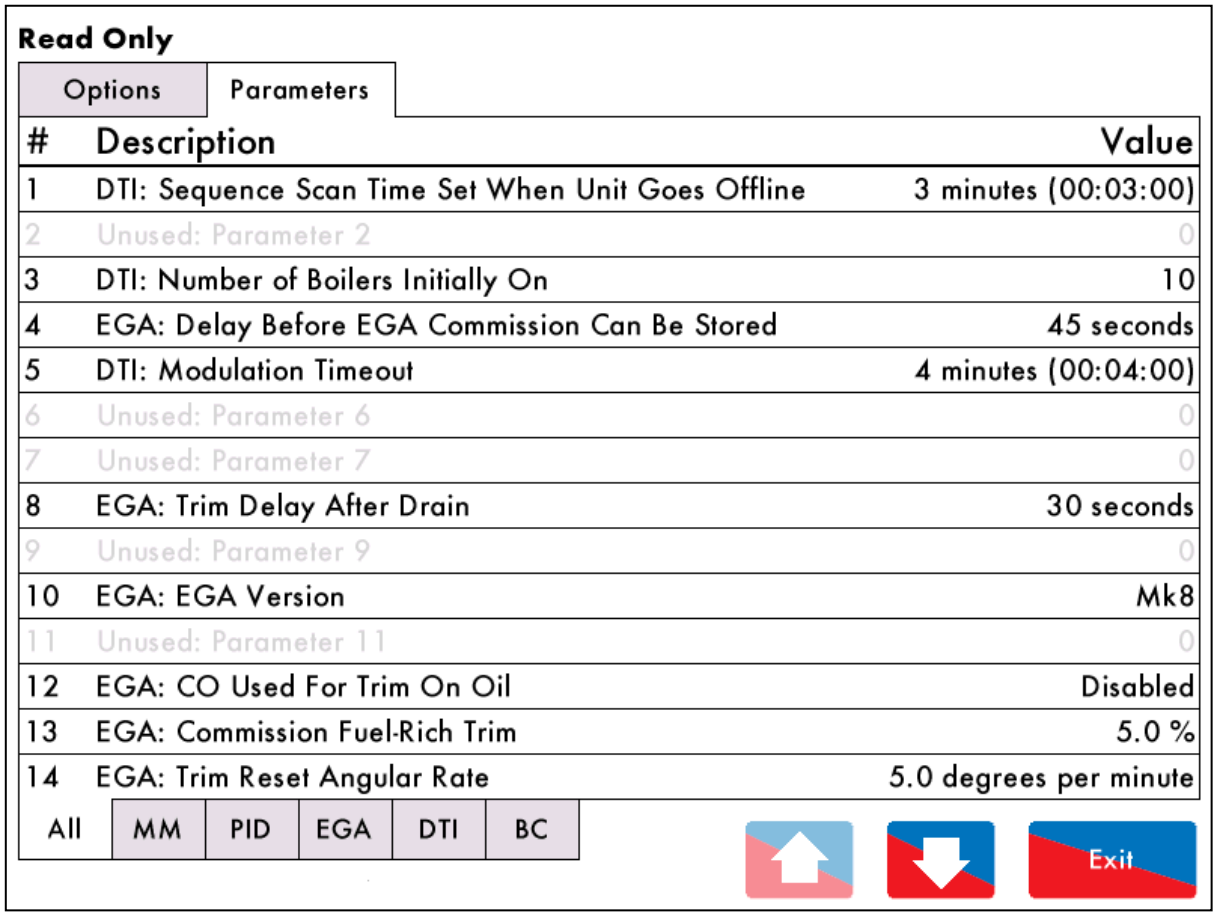


Figure 8.12.4.i Parameters / 图 8.12.4.i 参数

Press 

in the System Configuration screen (Figure 8.12.i) to view the Parameters screen in Figure 8.12.4.i. The Parameters screens display all the parameters and their settings. To make changes to these Parameters, refer to section 8.12.5.

在系统设置屏幕（图 8.12.i）上按下 

参数按钮可以查看图 8.12.4.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 8.12.5 节。

8.12.5. Online Changes / 在线更改

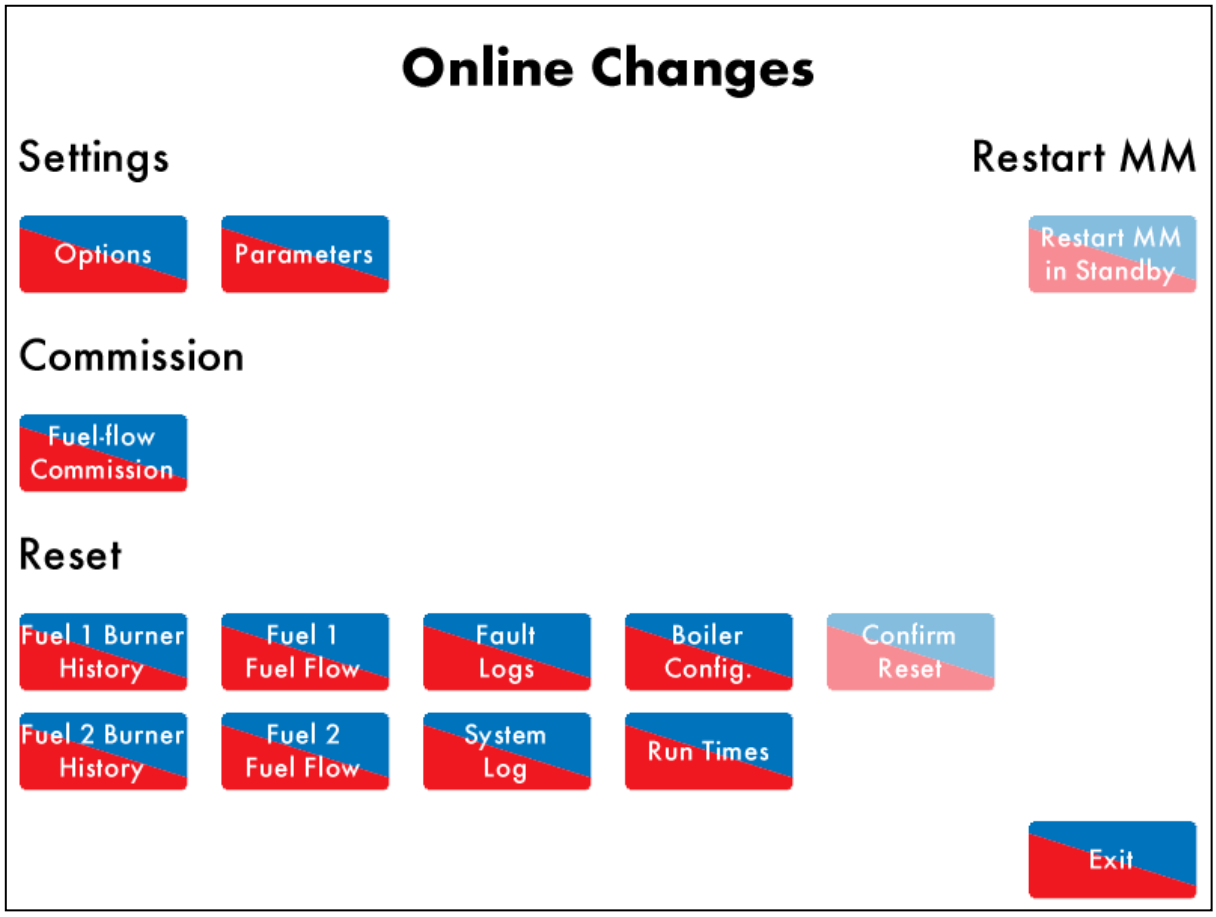


Figure 8.12.5.i Online Changes / 图 8.12.5.i 在线更改

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 non-safety critical options/parameters by pressing Options or Parameters.

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.

If the MM is in standby mode, press Restart MM to restart the MM. This button will be greyed out as in Figure 3.12.5.i if the burner is on.

在系统设置屏幕（图 3.12.i）上按下 Online Changes 在线更改按钮可以查看图 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 选项按钮或 Parameters 参数按钮可以更改非安全关键选项和参数。

按下 Fuel 1 Burner History “燃料 1 燃烧机历史”按钮可以重置燃料 1 燃烧器历史，然后按下 Confirm Reset 确认重置按钮。燃料 1 和燃料 2 燃烧器和燃料流量历史、故障记录、系统日志、锅炉设置和运行时间都可以重置。

如果控制模块处于待机模式，按下 Restart MM 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。

8.12.6. Set Clock / 设置时钟

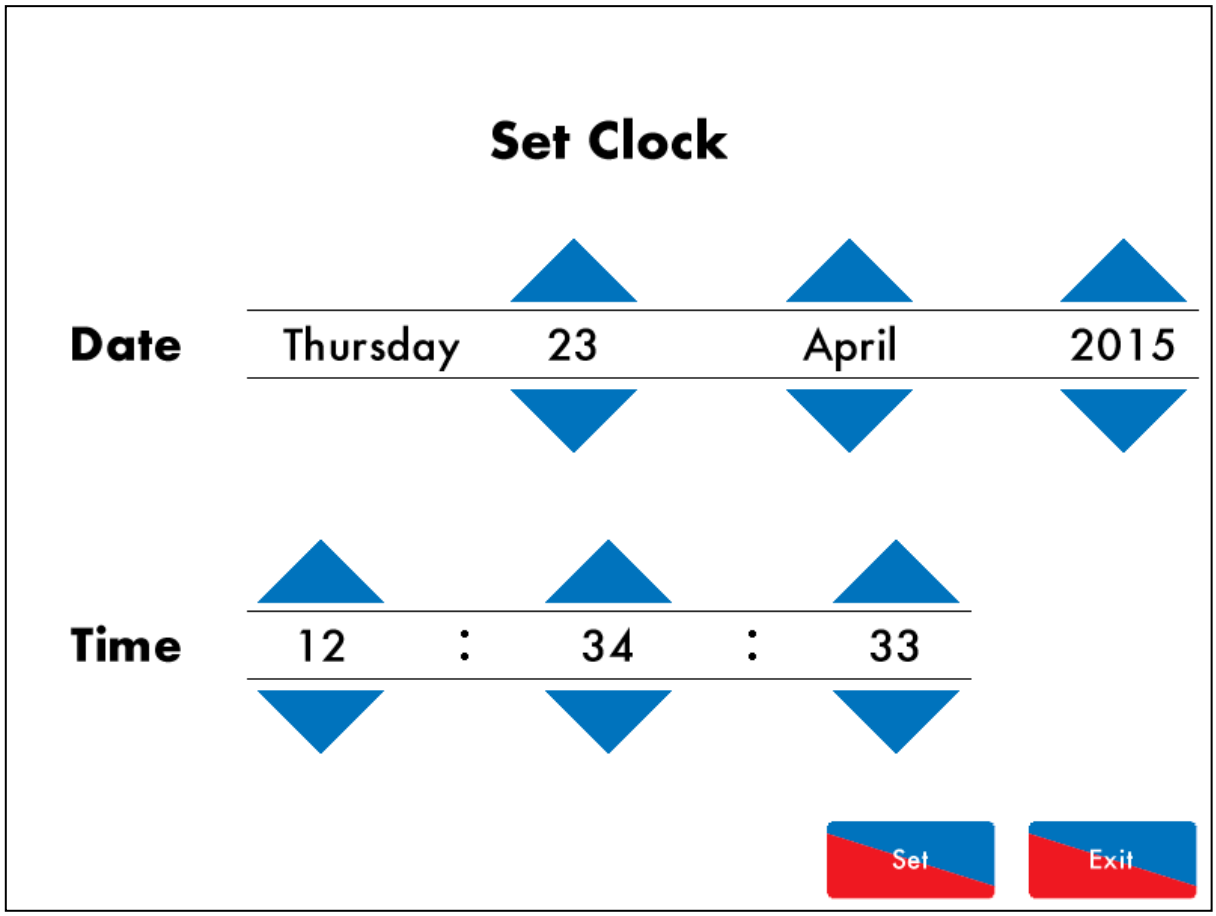


Figure 8.12.6.i Set Clock / 图 8.12.6.i 设置时钟

Press Set Clock in the System Configuration screen (Figure 8.12.i) to view the Set Clock screen in Figure 8.12.6.i. You will be prompted to enter the password. Change the time and date using the ▲ ▼ buttons. Press Set and then Exit .

Note: If connected to a Mk8 DTI the time and date will be set by this and not be user adjustable. Please refer to the Mk8 DTI Manual to change this time.

在系统设置屏幕（图 8.12.i）上按下 Set Clock 设置时钟按钮可以查看图 8.12.6.i 所示的设置时钟屏幕，屏幕将提示您输入密码。使用 ▲ ▼ 按钮可以更改时间和日期，按下 Set 设定按钮然后按下 Exit 退出按钮。

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。

8.12.7. Run Time / 运行时间

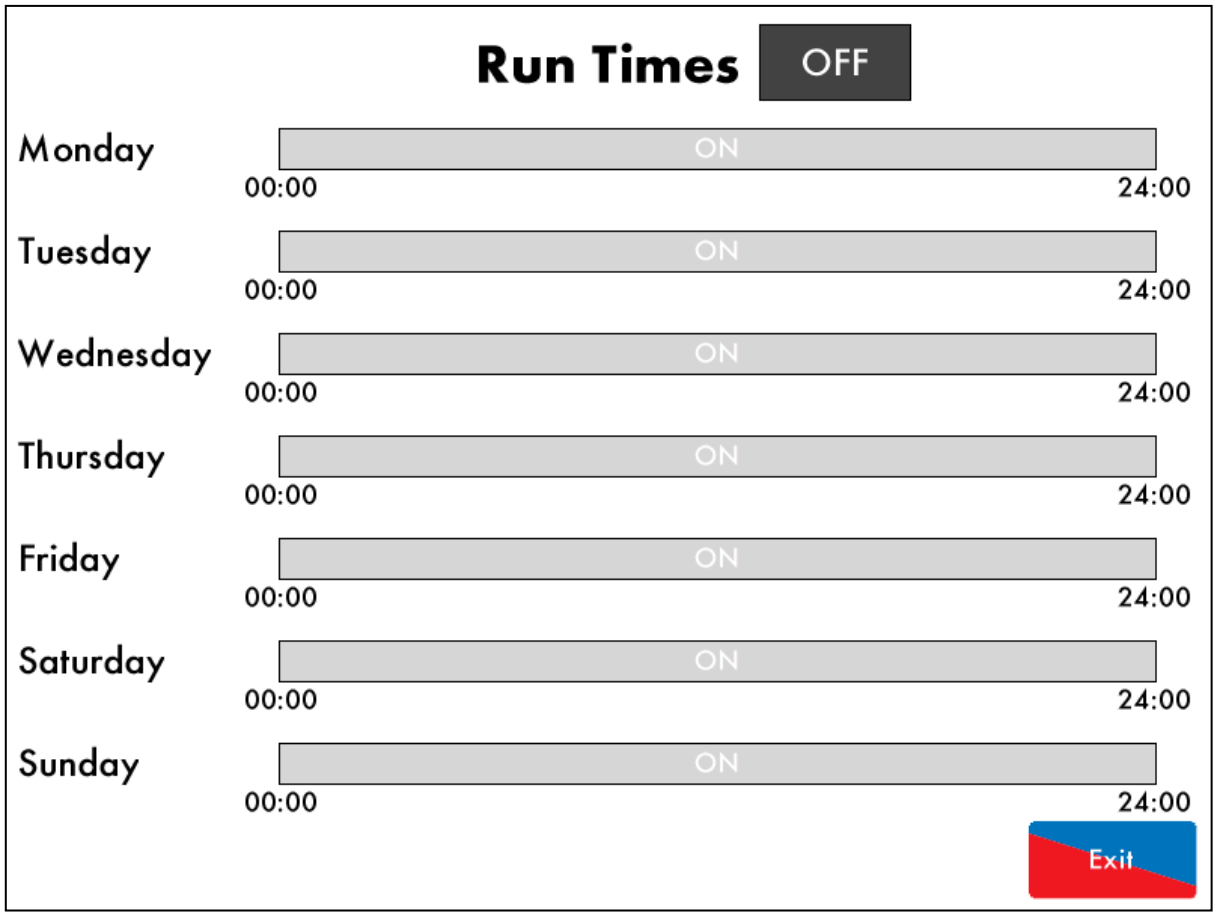


Figure 8.12.7.i Run Times – OFF / 图 8.12.7.i 运行时间-关闭

Press Run Times in the System Configuration screen (Figure 8.12.i) to view the Run Times screen in Figure 8.12.7.i. You will be prompted to enter a password. Run Times sets when the MM is scheduled to be on and firing to the required setpoint, on and firing to the reduced setpoint or off.

在系统设置屏幕（图 8.12.i）上按下 Run Times “运行时间表”按钮可以查看图 8.12.7.i 所示的运行时间屏幕，屏幕将提示您输入密码，运行时间可以设置控制模块预期启动时间、燃烧所需设定值、降低设定值、或关闭。

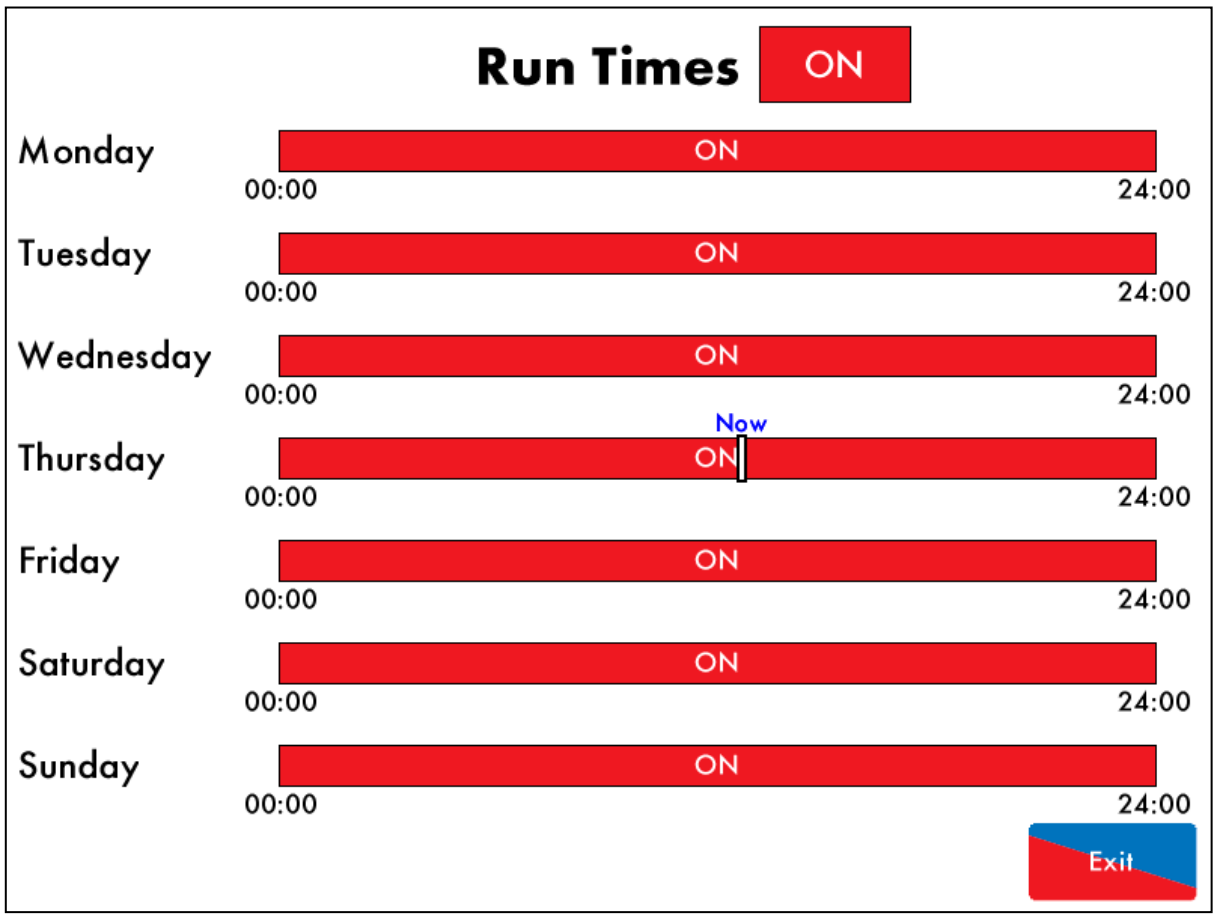


Figure 8.12.7.ii Run Times – ON / 图 8.12.7.ii 运行时间-开启

Press OFF in the Run Times screen (Figure 8.12.7.i) to view the Run Times On/Off screen in Figure 8.12.7.ii. Press ON in the Run Times – ON screen to disable the run times.

在运行时间屏幕（图 8.12.7.i）上按下 OFF 关闭按钮可以查看图 8.12.7.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 启用按钮可以禁用运行时间。

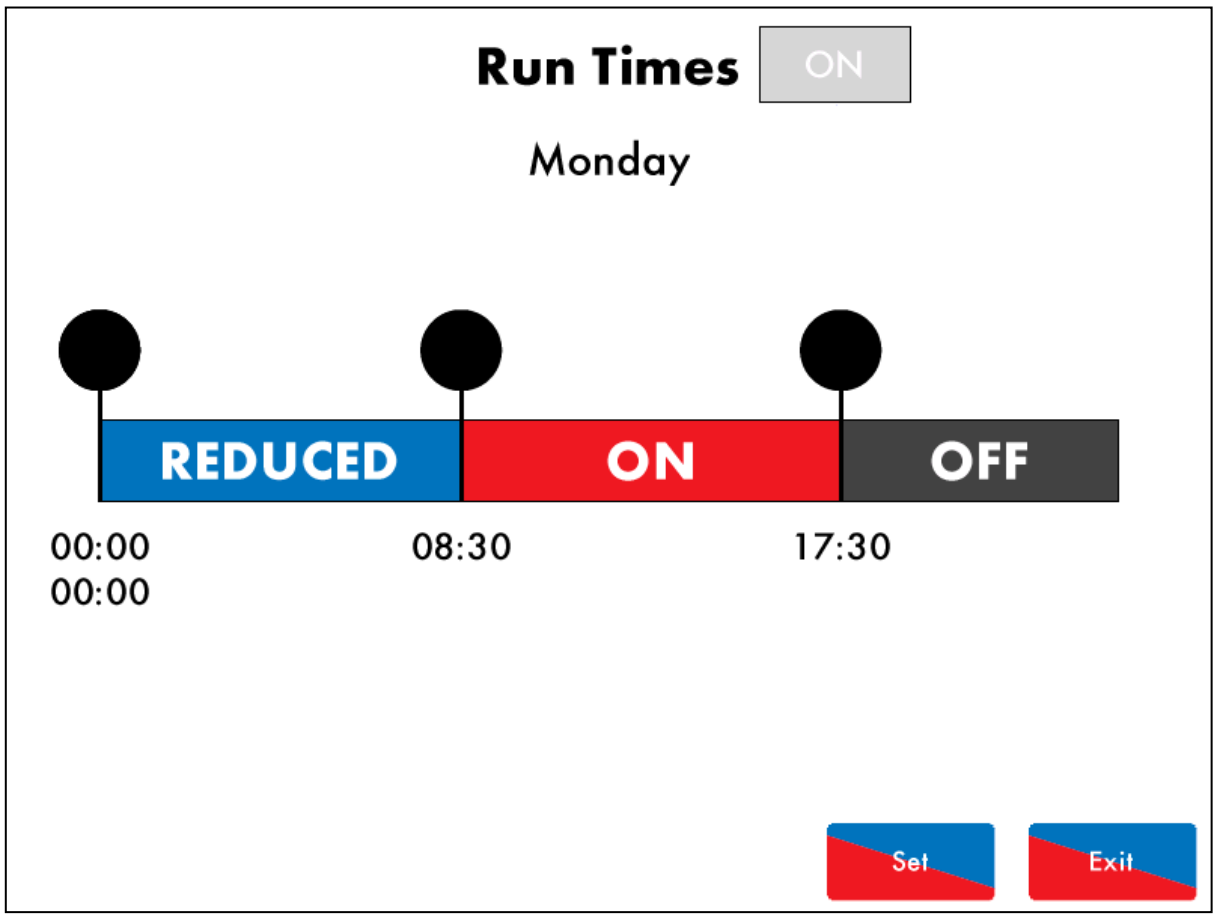


Figure 8.12.7.iii Run Times – Monday
图 8.12.7.iii 运行时间-星期一

To set the schedule, press on the bar for that day in the Run Times On/Off screen (Figure 8.12.7.ii) and drag the to set the intervals, and then press the bar to change the intervals to ON, OFF or REDUCED. Up to 5 time periods can be set.

Note: The MM will fire to the reduced setpoint set in the Status screen (Figure 8.2.1.i) when scheduled in the Run Times or if option/parameter 154 is set to 3 and an input is detected on Terminal 80.

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开启、关闭或降低设定值。可以设置 5 个时间区段。

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 8.2.1.i）中设定的降低设定值燃烧。

8.12.8. Manual / 手册

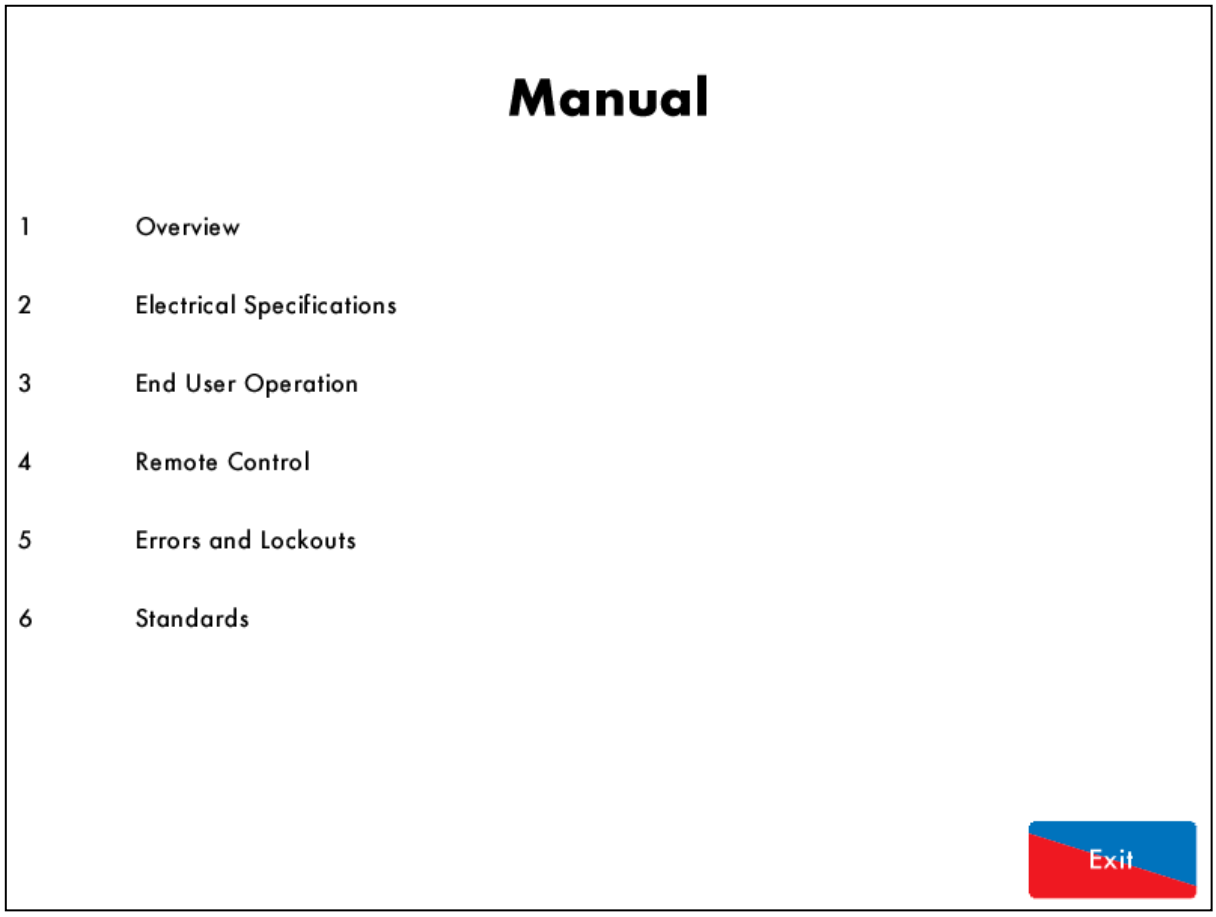


Figure 8.12.8.i Manual / 图 8.12.8.i 手册

Press 

in the System Configuration (8.12.i) to view the Manual screen in Figure 8.12.8.i. Press on the section headings to navigate to the sections.

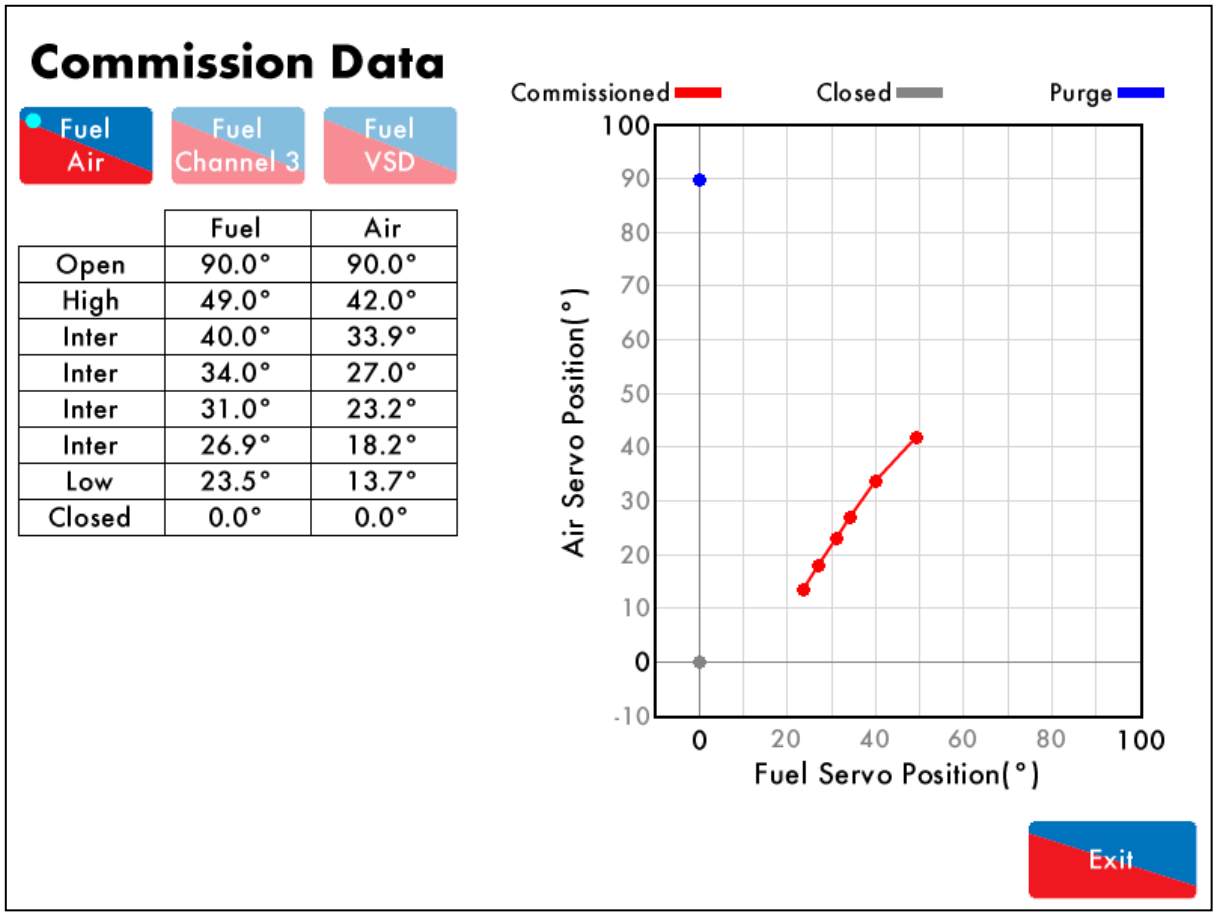
Note: The SD card must contain the manual file to view this.

在系统设置屏幕（8.12.i）上按下 

手册按钮可以查看图 8.12.8.i 所示的手册屏幕，按下段落标题可以浏览各段内容。

注：SD 卡必须包含手册文件才能查看此屏幕。

8.12.9. Commission Data / 调试数据



	Fuel	Air
Open	90.0°	90.0°
High	49.0°	42.0°
Inter	40.0°	33.9°
Inter	34.0°	27.0°
Inter	31.0°	23.2°
Inter	26.9°	18.2°
Low	23.5°	13.7°
Closed	0.0°	0.0°

Figure 8.12.9.i Commission Data / 图 8.12.9.i 调试数据

Press Commission Data in the System Configuration screen (Figure 8.12.i) to view the Commission Data screen in Figure 8.12.9.i.

在系统设置屏幕（图 8.12.i）上按下 Commission Data 调试数据按钮可以查看图 8.12.9.i 所示的调试数据屏幕。

8.12.10. System Log / 系统日志

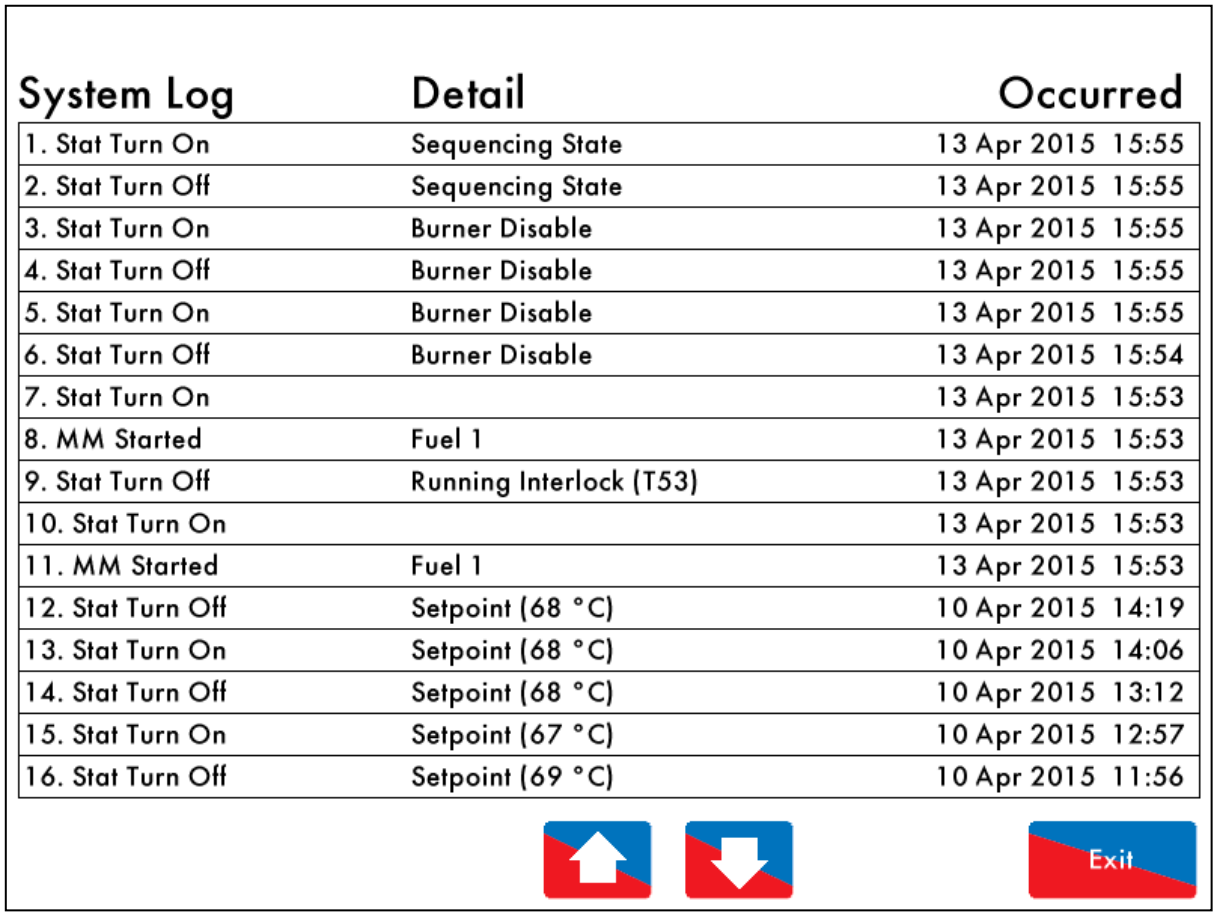


Figure 8.12.10.i System Log
图 8.12.10.i 系统日志

Press 

in the System Configuration screen (Figure 8.12.i) to view the System Log screen in Figure 8.12.10.i. This data is stored on the MM and the SD card for 1000 entries.

在系统设置屏幕（图 8.12.i）上按下

系统日志按钮可以查看图 8.12.10.i 所示的系统日志屏幕，该数据将保存在控制模块和 SD 卡可以保存 1000 条日志。

9. BURNER START-UP SEQUENCE / 燃烧器启动顺序

The MM 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信息及发生的时间和日期。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 阀检验系统-无排气阀、单阀引导火。
- Interrupted pilot
  中断式引导火
- UV scanner
  UV 检测器
- 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
  前吹扫和后吹扫
- No golden start
  无黄金启动点
- No FGR start
  无 FGR 启动

9.1. Recyclem / 循环

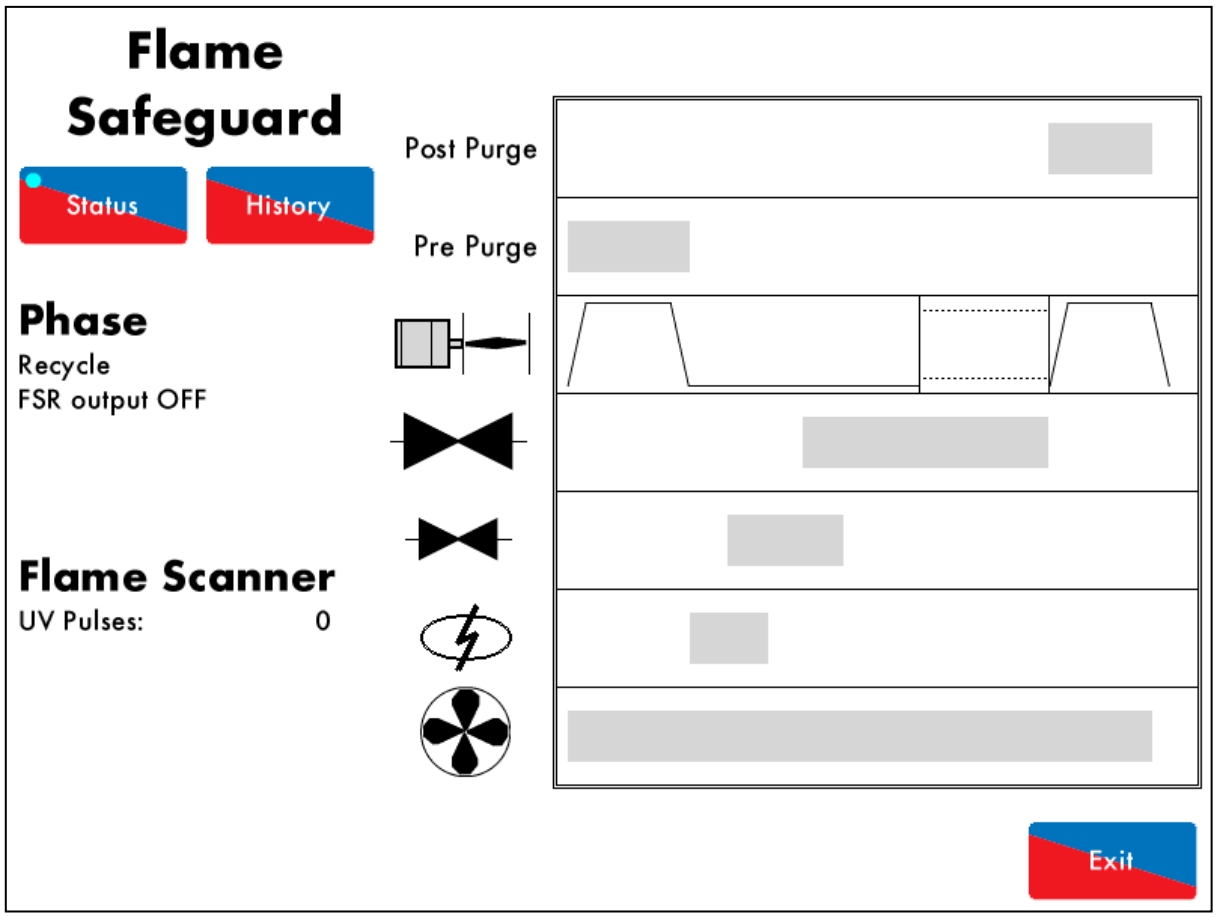


Figure 9.1.i Recycle / 图 9.1.i 循环

When the burner enters the Recycle phase shown in Figure 9.1.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 9.1.i 所示的循环阶段时，燃料阀和空气风门将分别进入调试“关闭”位置，燃烧器不在燃烧中。

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.
由于循环中燃烧器已关闭，因此无法检测出任何火焰。紫外火焰检测器将检查是否无火焰，检测到火焰时将锁定“虚假火焰”，这可能是燃烧后导致的结果，必须进行检查。可能需要后吹扫。见选项/参数 118 和 135。

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

9.2. Standby / 待机

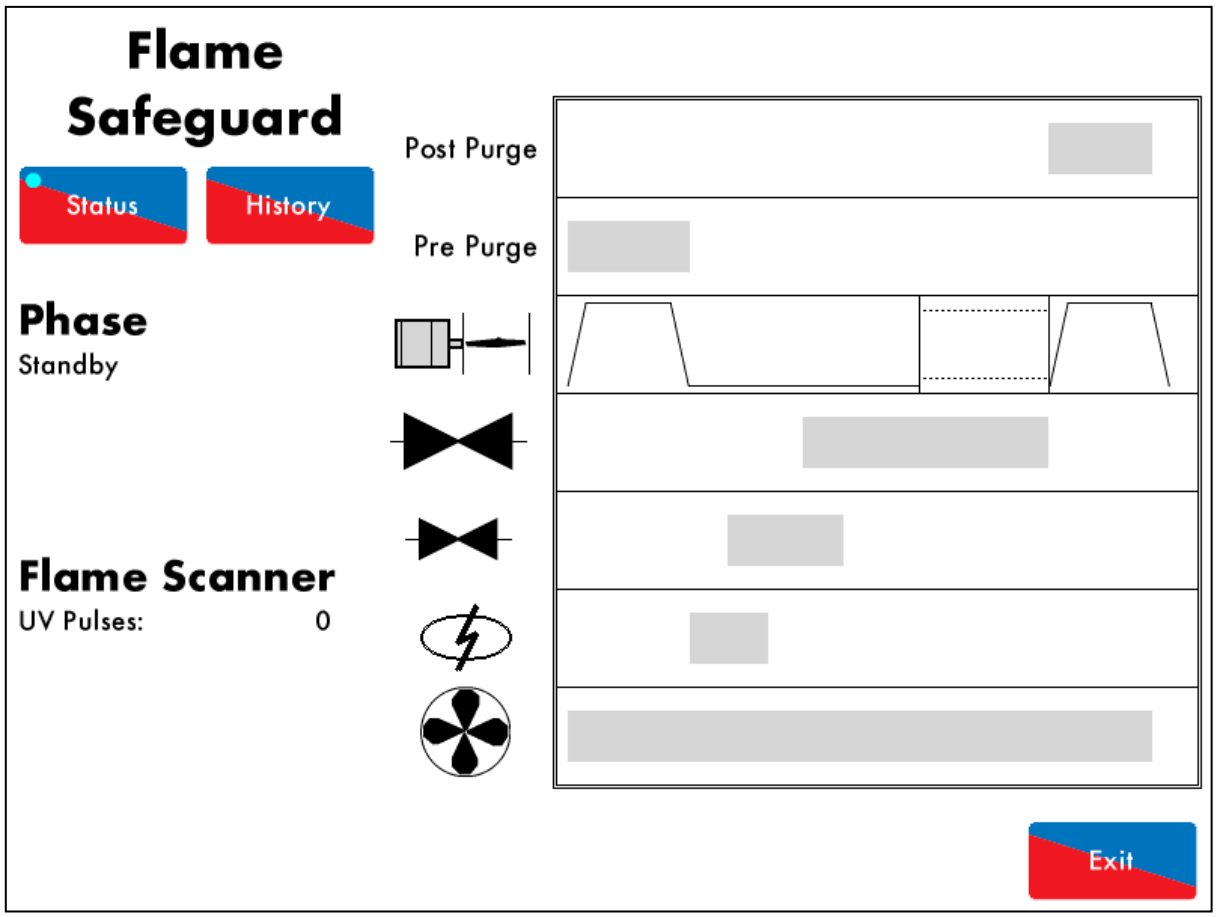


Figure 9.2.i Standby / 图 9.2.i 待机

The burner will go into Standby shown in Figure 9.2.i., before the safety checks begin to initiate the burner start-up sequence.
在安全检查开始启动燃烧器动作之前，燃烧器将进入待机状态，如图 9.2.i 所示。

The MM 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.
如果需要通过内部温控等待调用，根据所需设定值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 MM 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/压力达到燃烧器启动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 MM 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群控的一部分。控制模块也可能因辅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 MM will remain in Standby if the burner has been disabled, see section 8.1.3. The MM can also be disabled remotely, see section 7 Remote Control.
燃烧器被禁用时控制模块将处于待机状态，见 8.1.3 节。控制模块也可以远程禁用，见第 7 章远程控制。

9.3. Internal Relay Tests / 内部继电器测试

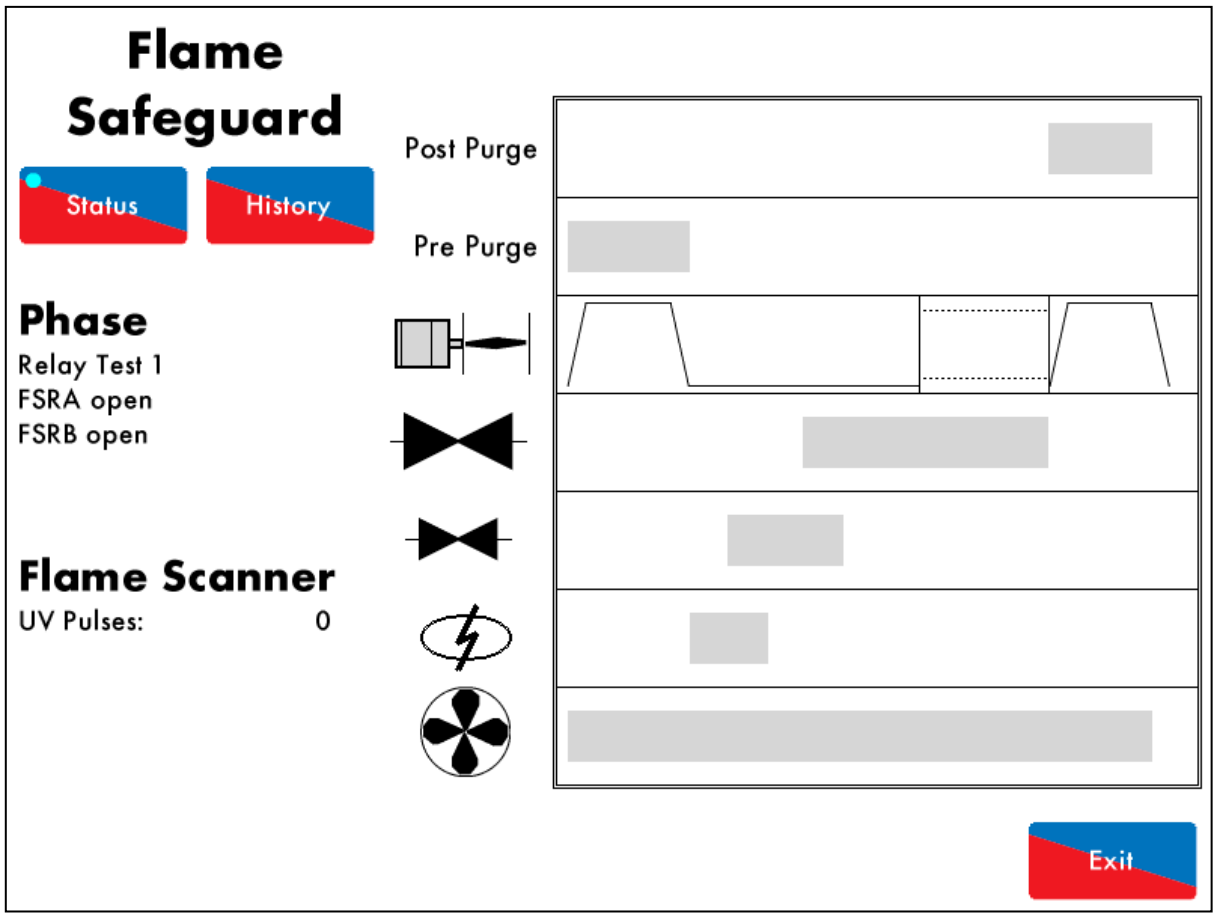


Figure 9.3.i Relay Test 1 / 图 9.3.i 继电器测试 1

During the Internal Relay Tests phase shown in Figure 9.3.i., the MM will check its internal fail-safe relays tests from 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 MM.
在图 9.3.i 所示的内部继电器测试阶段，控制模块将检查内部故障保护继电器测试 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 MM 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.
如果在这些测试期间检测到终端 57 上有交流电源输出，而正常是不应该有，则会发生锁定"故障安全继电器故障"。请检查 5A 保险丝。

9.4. CPI Input / CPI 输入

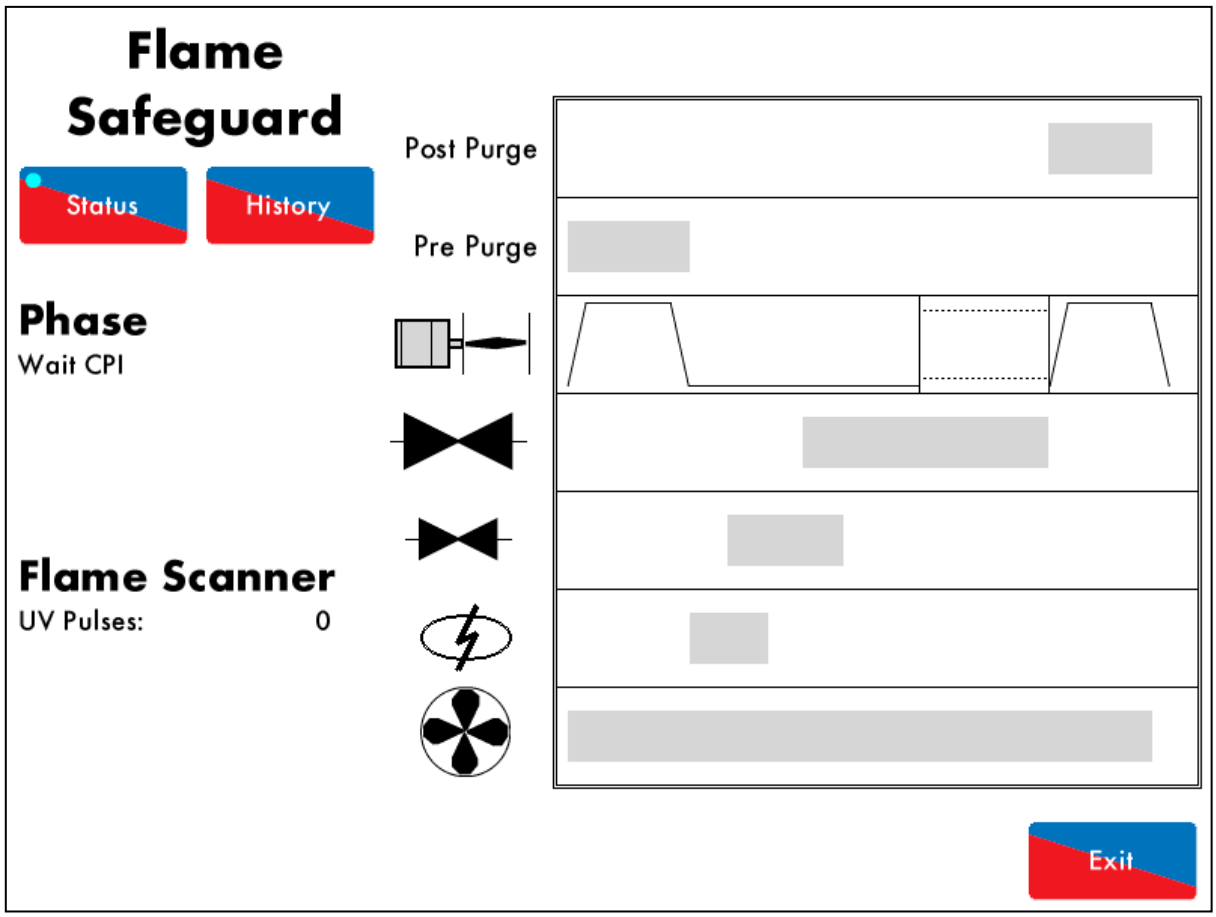


Figure 9.4.i CPI Input / 图 9.4.i CPI 输入

In the Wait CPI phase shown in Figure 9.4.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 9.4.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，会出现“No CPI 重置”。

9.5. Valve Proving / 阀门校验

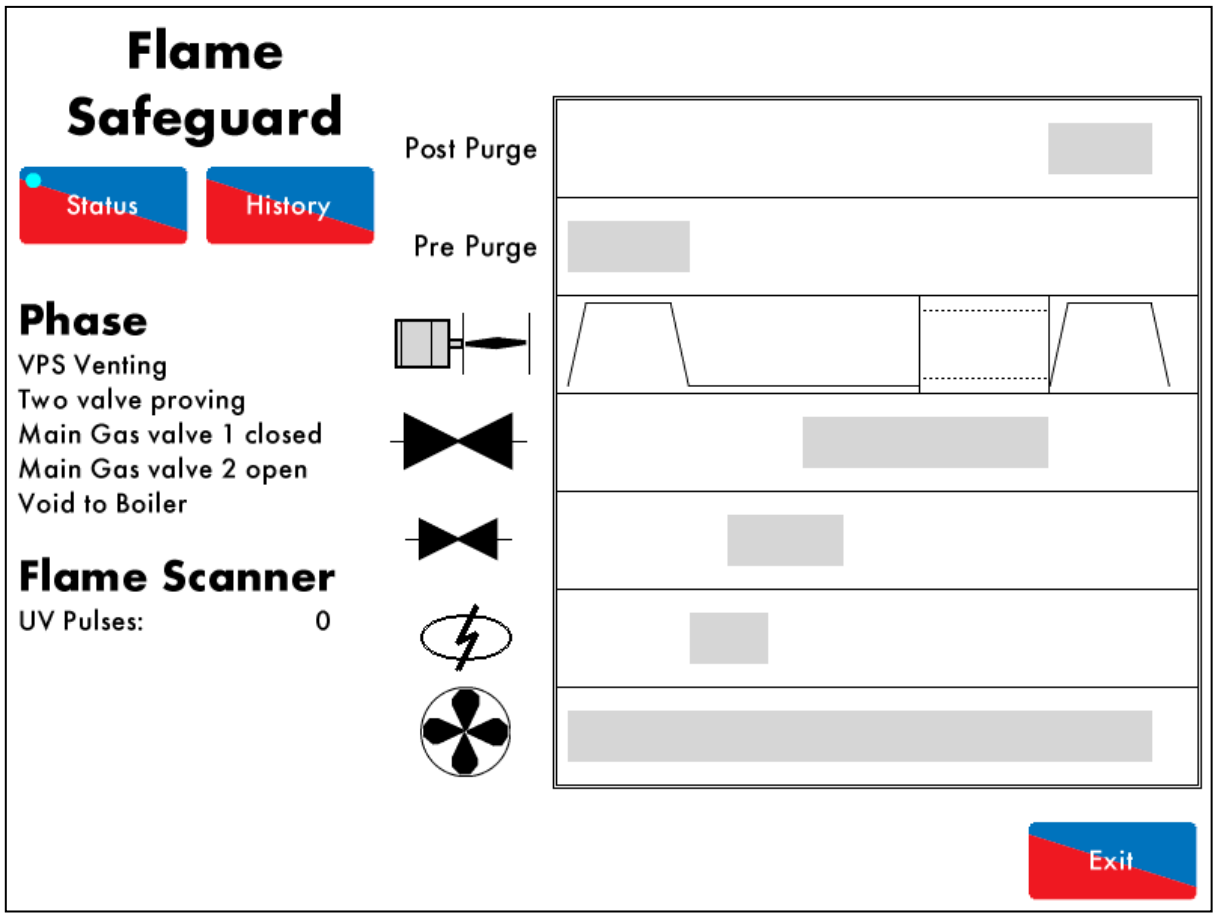


Figure 9.5.i VPS Venting / 图 9.5.i VPS 排气

In this example, the MM 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，有一个已选的单阀引导火，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 9.5.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 9.5.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，因此可以通过将主燃气阀间的空隙排到大气。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 空气归零错误”，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 有故障。

If no voltage is detected when the burner main gas valve 2 output T61 should 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”。

Note: If valve proving has been optioned with no vent valve and with single valve pilot, then the pilot valve is used for this VPS venting phase.
注：如果阀门校验选择了没有排气阀和单阀引导火，那么引导火阀用于 VPS 排气阶段。

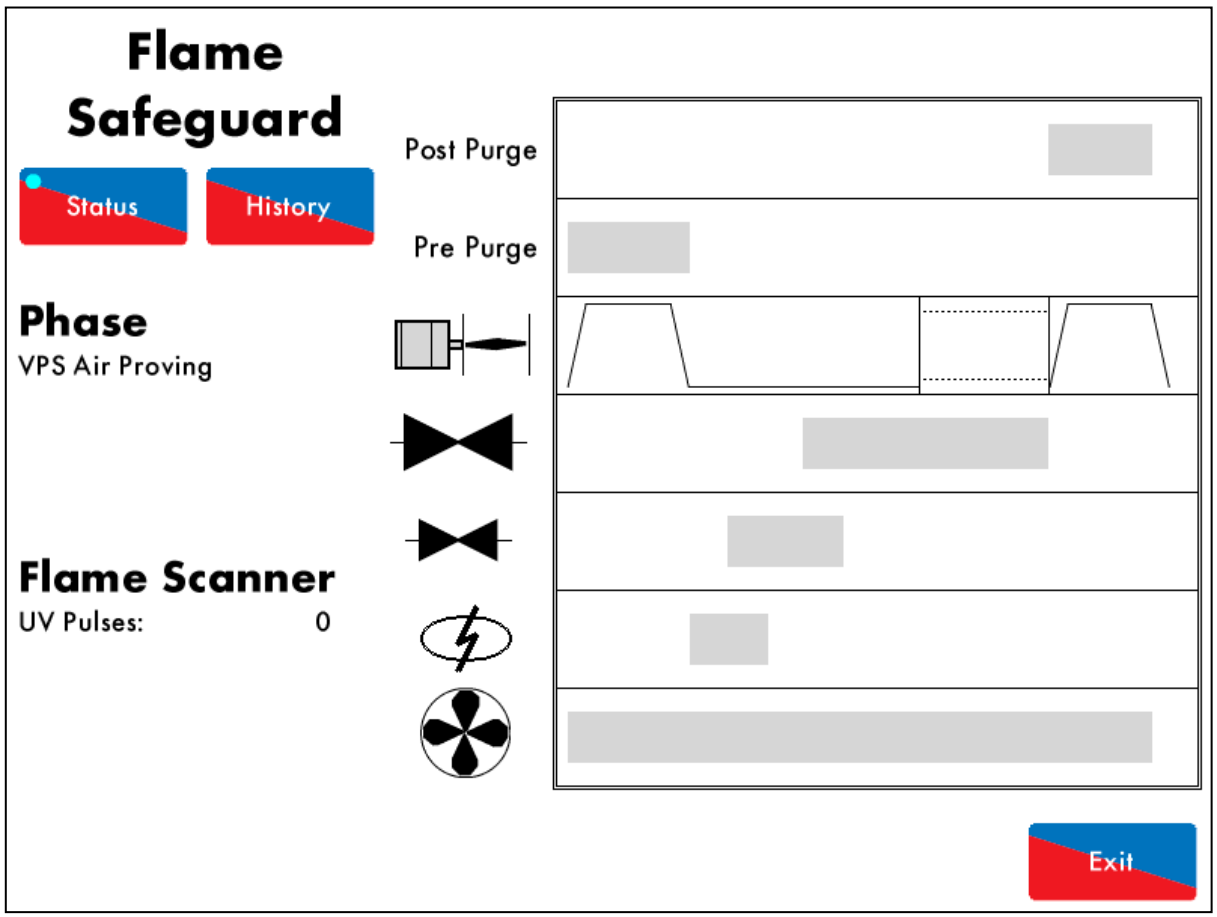


Figure 8.5.ii VPS Air Proving / 图 8.5.ii VPS 空气校验

In the VPS Air Proving phase shown in Figure 8.5.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.
在图 8.5.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，检测压力是否增加。

After the valves close, there is a 1.5 second delay before pressure reading is taken. 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.
在阀门关闭后，有 1.5 秒的延迟，然后才读取压力读数。如果检测到压力增加，则触发锁定“VPS 空气校验失败”，因为燃气已经进入主燃气阀 1 和 2 之间，说明主燃气阀 1 已经失效。

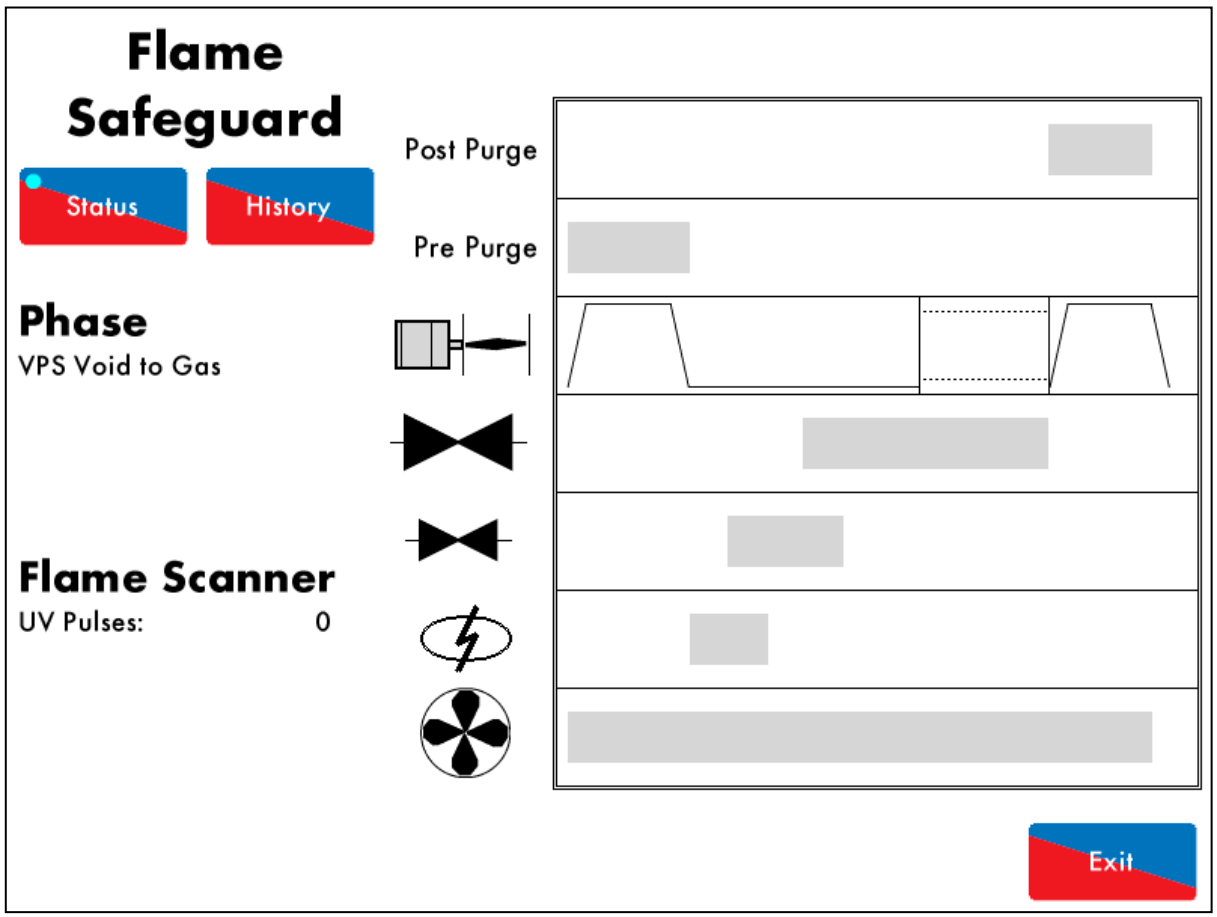


Figure 9.5.iii VPS Void to Gas / 图 9.5.iii VPS 充气

In the VPS Void to Gas phase shown in Figure 9.5.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 9.5.iii 所示的 VPS 充气阶段，主燃气阀 1 输出打开，主燃气阀 2 输出关闭，允许燃气填充两阀间的空隙。

If the measured static line pressure is below the offset lower limit set in option/parameter 138, then a 'gas pressure low limit' lockout will occur.
如果测量到的静态管线压力低于选项/参数 138 中设置的偏移下限，则将发生“燃气压力下限”锁定。

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.
如果燃烧器主燃气阀 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”。

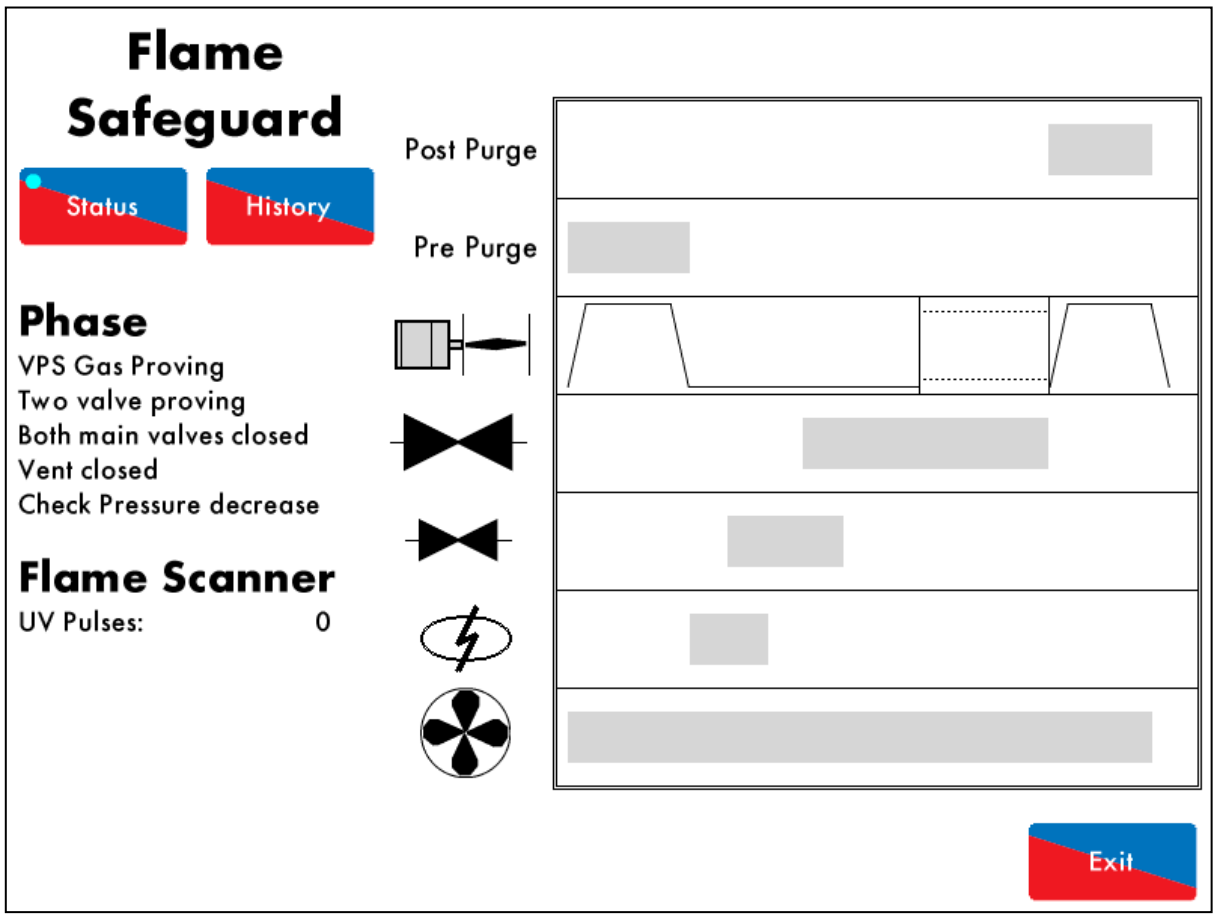


Figure 9.5.iv VPS Gas Proving / 图 9.5.iv VPS 燃气校验

In the VPS Gas Proving phase shown in Figure 9.5.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.
在图 9.5.iv 所示的 VPS 燃气检验阶段，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。

After the valves close, there is 1.5 second delay before the initial gas pressure reading is taken. The reading taken after this delay must be at least 80% of this measured static line pressure. 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.
阀门关闭后，有 1.5 秒的延迟，然后再读取初始燃气压力读数。在此延迟之后所取得读数必须至少为所测静态管线压力的 80%。如果燃气压力降低，可能会出现压力泄漏，从而导致“VPS 燃气故障降低”锁定。这说明可能是主燃气阀 2 出了故障。看到选项/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 燃气输入过高”，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。

9.6. Zero Air Sensor / 零空气传感器

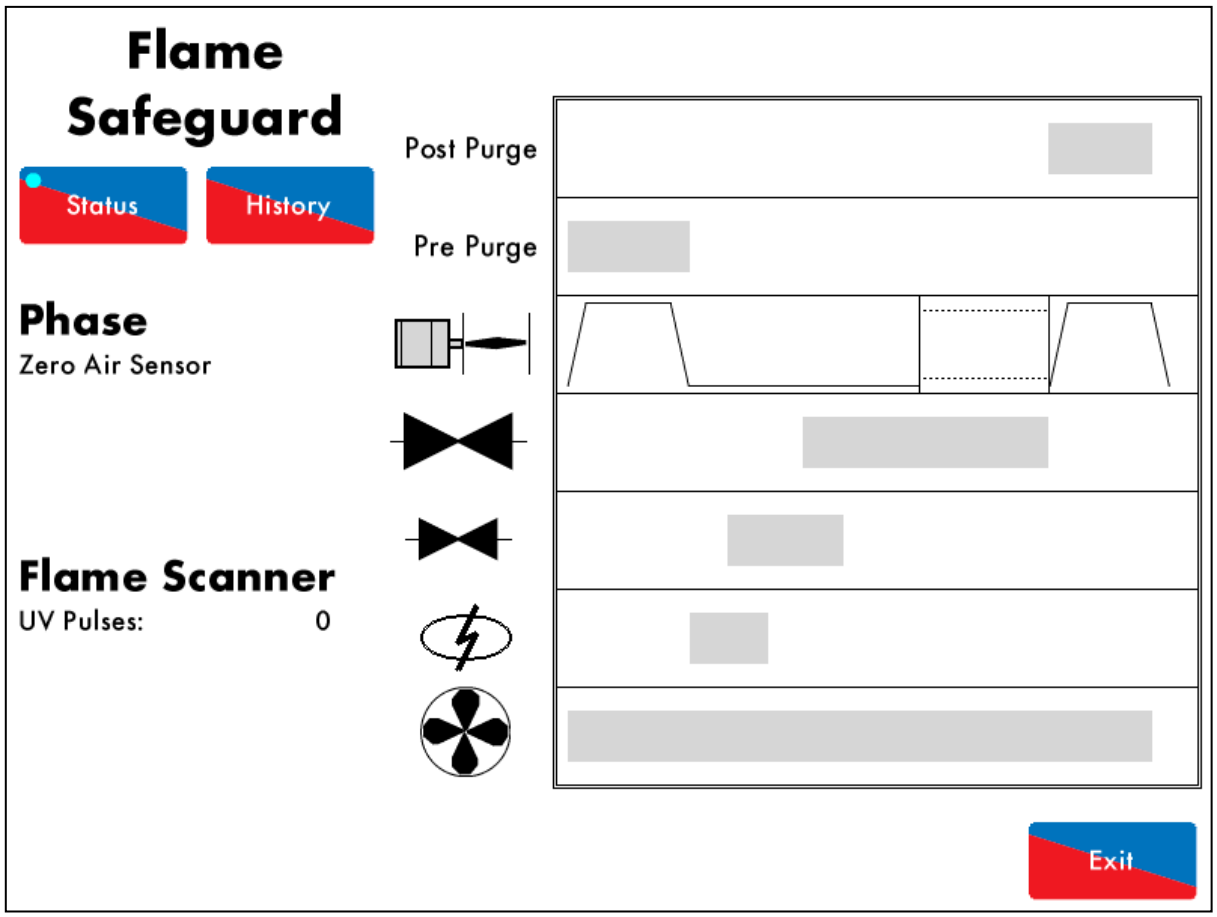


Figure 9.6.i Zero Air Sensor / 图 9.6.i 零空气传感器

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 9.6.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，见图 9.6.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 MM will go to the Wait for Air Switch phase. If a reset of voltage is not seen and the MM 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。如果控制模块在该阶段超过 2 分钟没有重置电压，此时将出现“等待空气开关超时”。

If both an air pressure sensor and air switch are optioned, then both must read low before the 'Wait for Air Switch' phase can be passed, see option/parameter 148.
如果同时选择了气压传感器和空气开关，那么在通过“等待空气开关”阶段之前，两者都必须读数低，参见选项/参数 148。

9.7. Purge / 吹扫

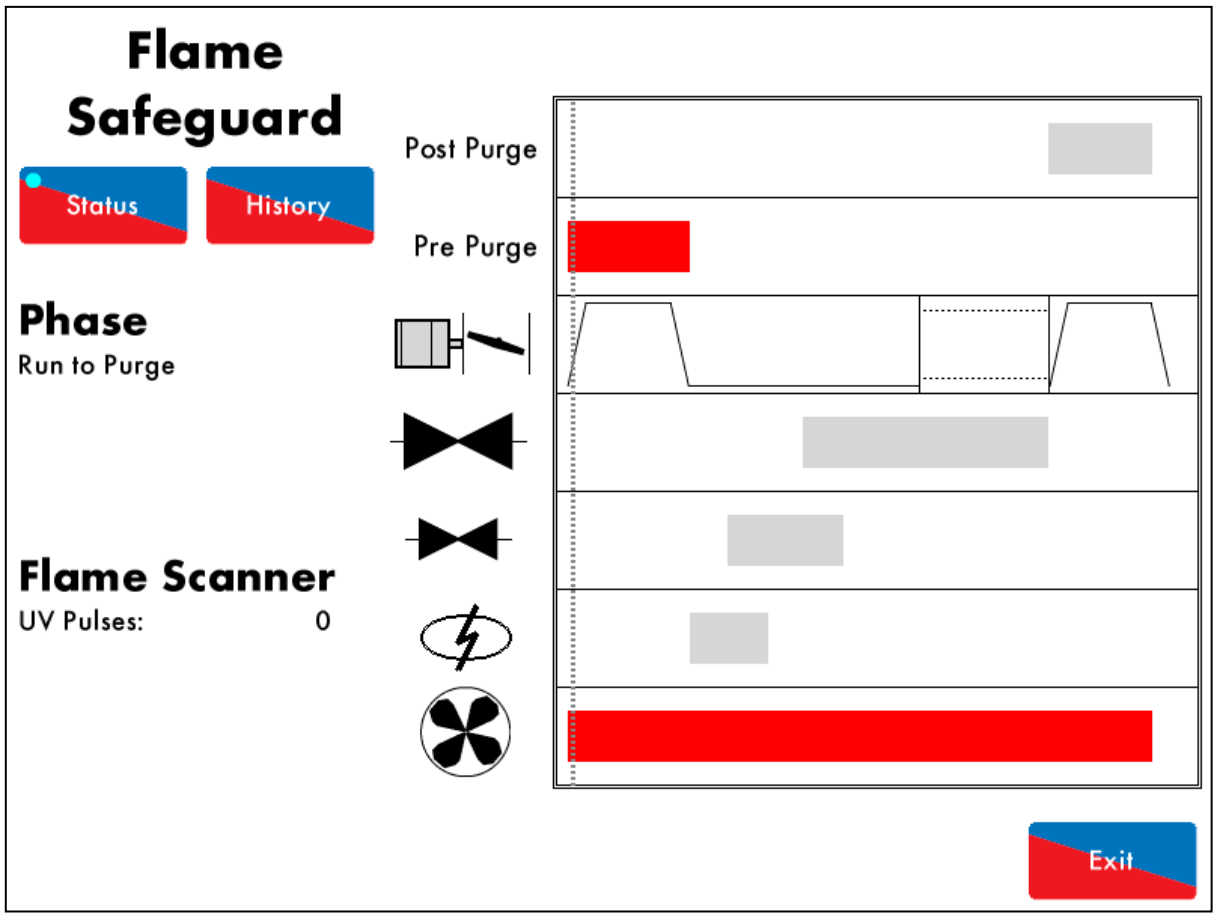


Figure 9.7.i Run to Purge / 图 9.7.i 运行到吹扫

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 9.7.i. The burner motor output is switched on. If a VSD is fitted and the feedback does not match the commissioned signal, the MM 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 9.7.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”。

Note: A delay to purge input can be used on terminal 80; a timeout can also be optioned for this input. See option/parameters 154 and 57.
注：在终端 80 上可以使用延时吹扫输入；还可以为输入选择超时。参见选项/参数 154 和 57。

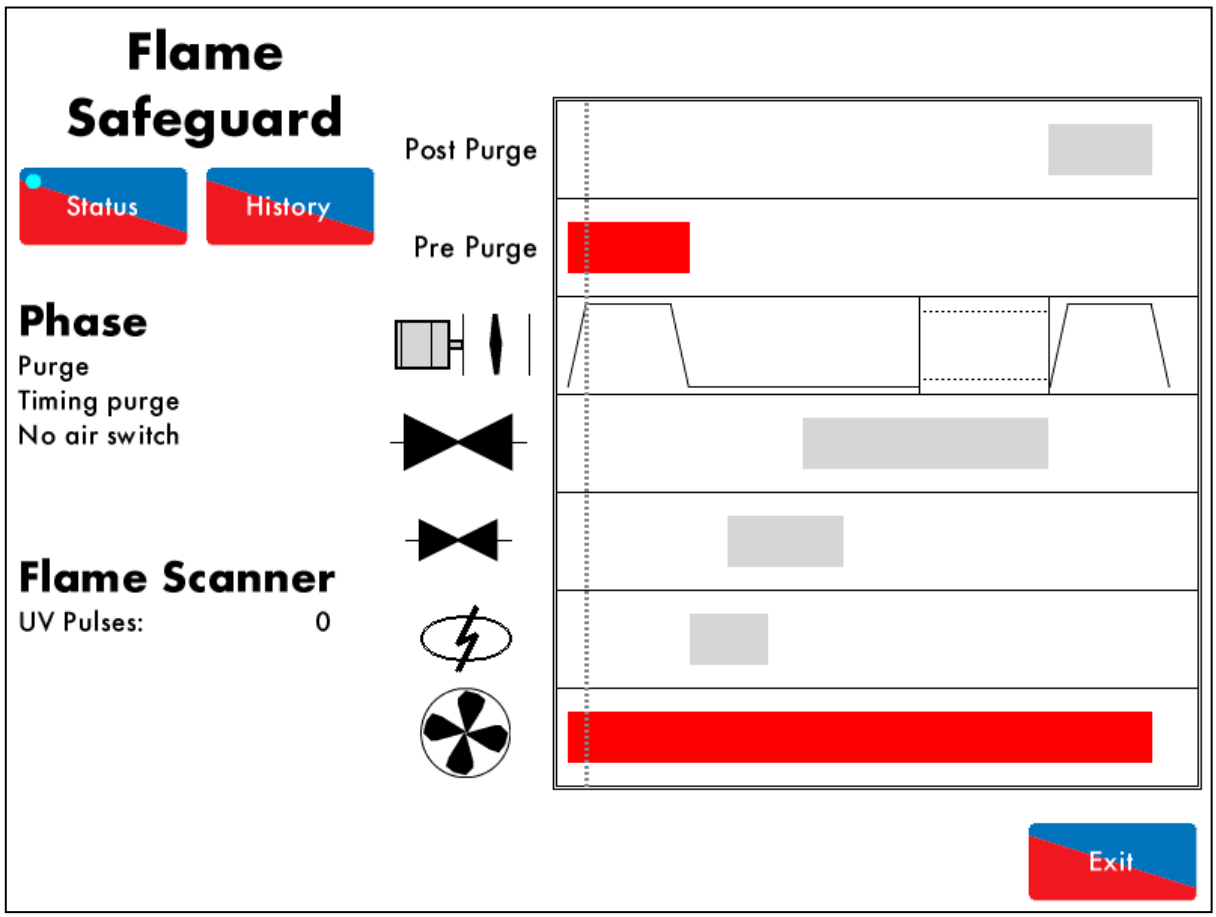


Figure 9.7.ii Purge No Air Switch / 图 9.7.ii 吹扫无空气开关

The Purge No Air Switch phase shown in Figure 9.7.ii allows a delay before the air switch/air pressure sensor is checked. See option/parameter 121.
在图 9.7.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。

Note: A purge position interlock can be connected to terminal 81; this input must made in order for the system to begin the purge phase, see option/parameter 155.
注：81 端子可连接吹扫位置联锁；为了使系统开始吹扫阶段，必须进行此输入，请参阅选项/参数 155。

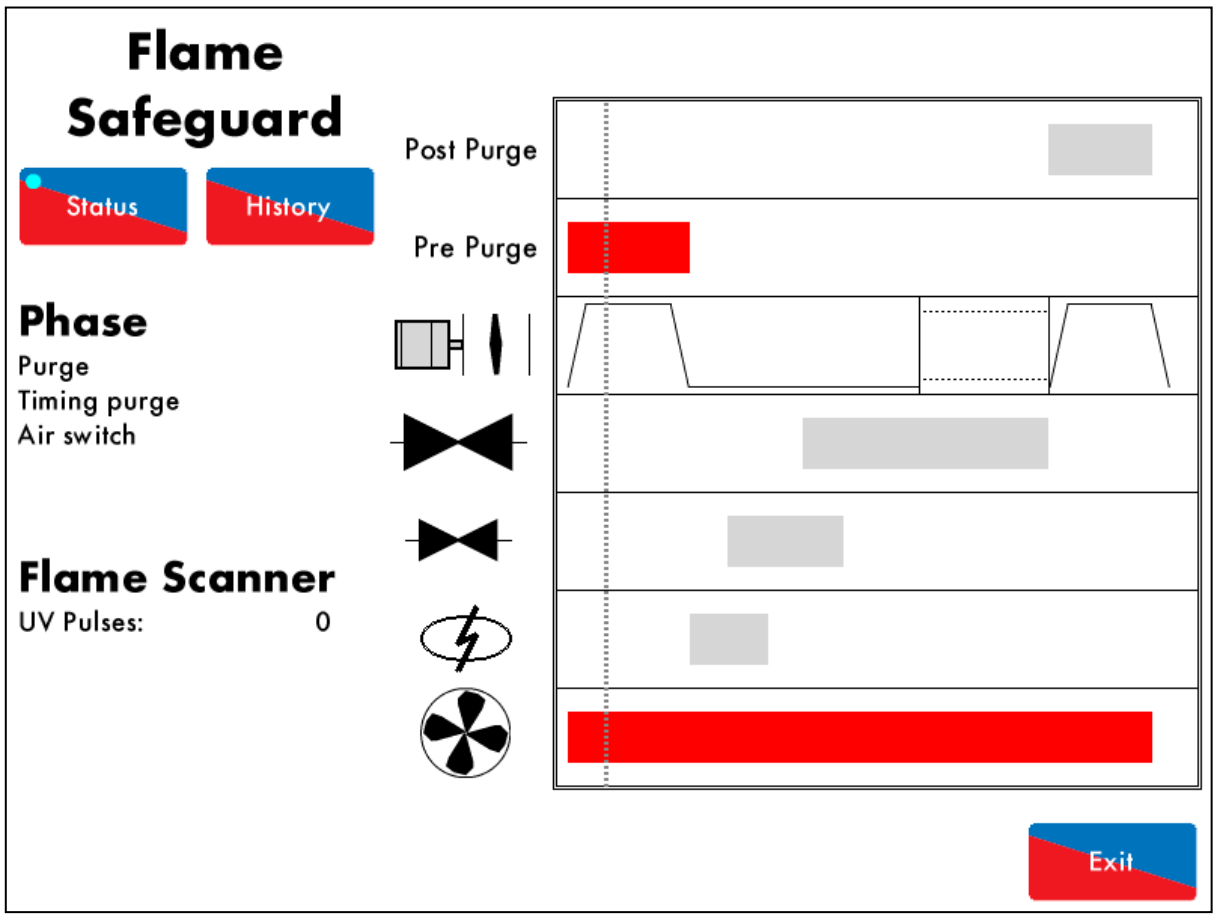


Figure 9.7.iii Purge Air Switch / 图 9.7.iii 吹扫空气开关

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 9.7.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 9.7.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。

Note: A purge pressure proving input can be used on terminal 81 with an optional timeout; this input is checked after the no air switch delay, see option/parameters 155 and 158.
注：在终端 81 上可以使用一个吹扫压力验证输入，可选超时；此输入在无空气开关延时后检查，见选项/参数 155 和 158。

9.8. Ignition / 点火

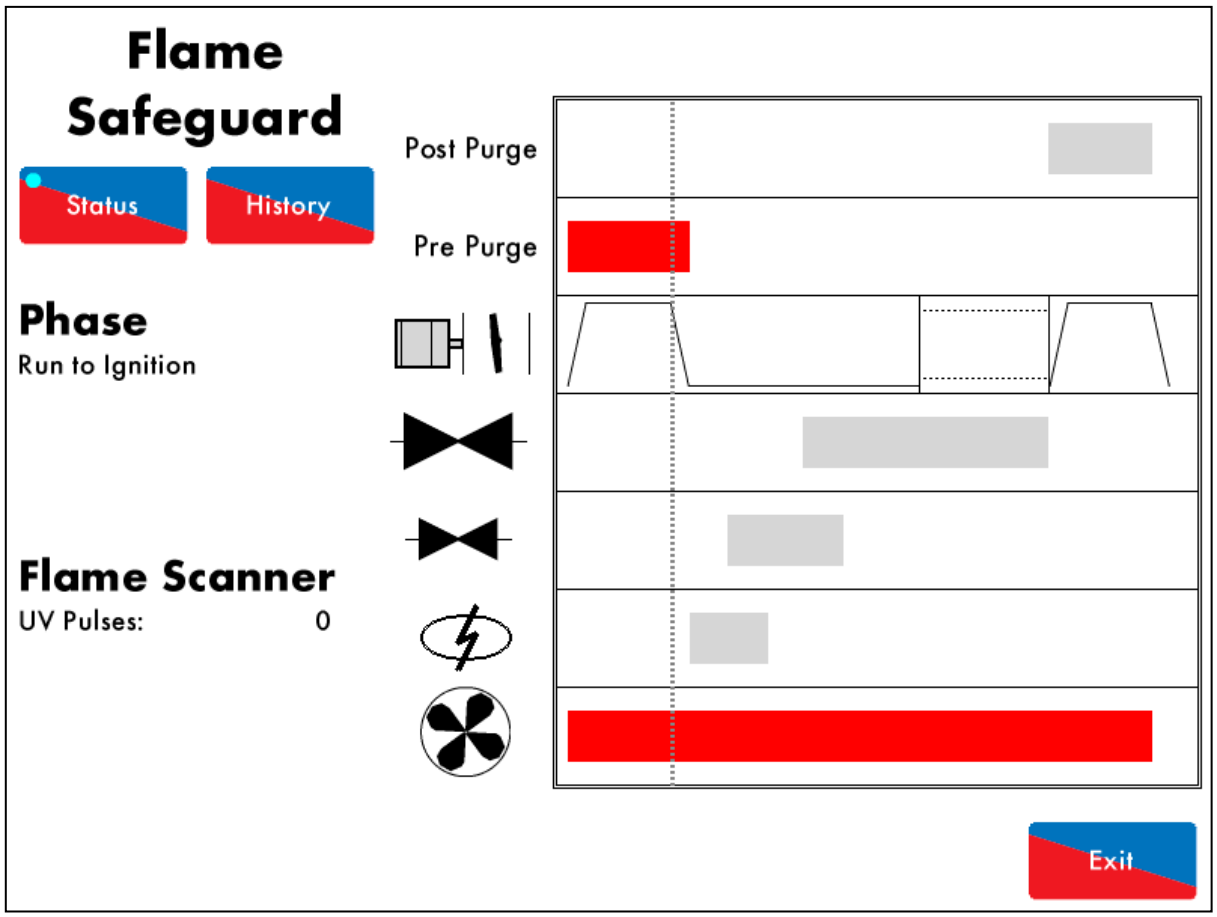


Figure 9.8.i Run to Ignition / 图 9.8.i 运行至点火

In the Run to Ignition phase shown in Figure 9.8.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 MM will sit at Run to Ignition indefinitely without a lockout.
在图 9.8.i 所示的运行至点火阶段，通道将移动其已调试的启动位置。如果配备 VSD 且反馈不和已调试信号匹配，则控制模块将无限期处于运行至点火阶段而不会锁定。

Note: If the system has been commissioned with FGR start, then the MM will run to the FGR start positions her, unless Golden start is commissioned and the MM will run to the Golden start position.
注：如果系统已调试 FGR 启动，则控制模块将运行到 FGR 启动位置，除非已调试黄金启动，控制模块将运行到黄金启动位置。

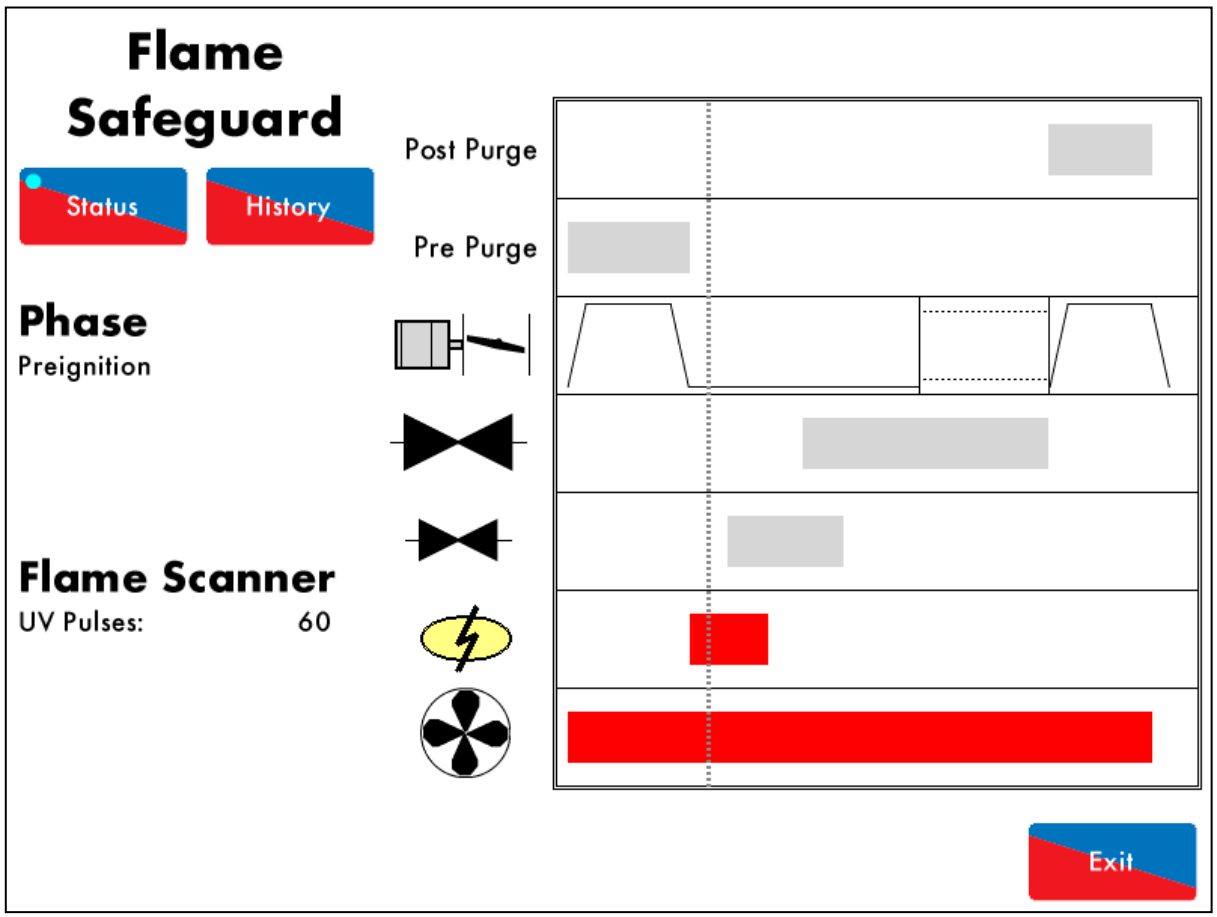


Figure 9.8.ii Pre-ignition/ 图 9.8.ii 预点火

The ignition transformer output is switched on in the Pre-ignition phase shown in Figure 9.8.ii, before the pilot gas valve is switched on (open). See option/parameter 113.
在引导火燃气阀打开前点火变压器打开处于图 9.8.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 在点火阶段断开，则出现“CPI 输入错误状态”。

9.9. Pilot / 引导火

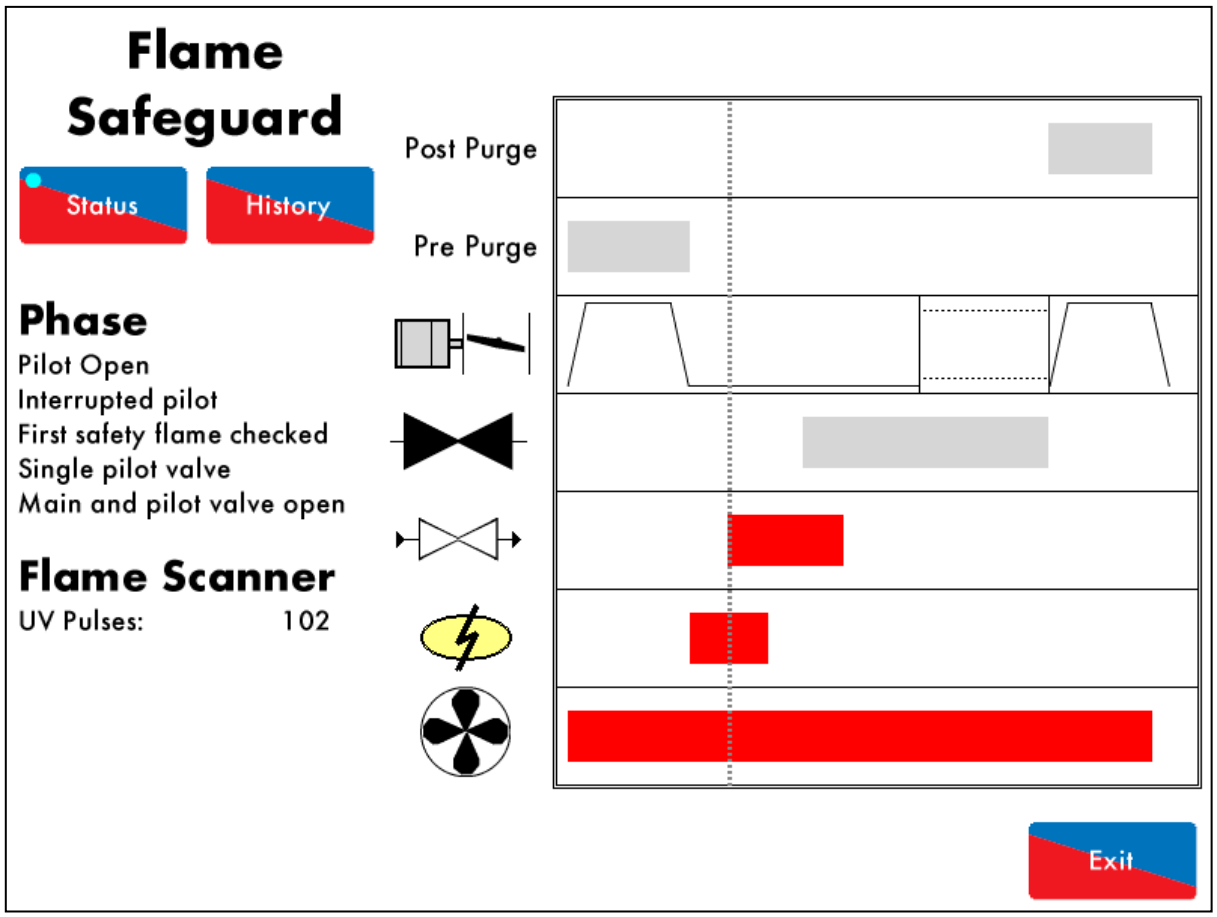


Figure 9.9.i Pilot Open / 图 9.9.i 引导火启动

The pilot gas valve is switched on (open) in the Pilot Open phase shown in Figure 9.9.i. The 1st safety time is the period when the pilot valve is open before the flame is checked. See option/parameter 114.
当引导火燃气阀在图 9.9.i 所示的引导火启动阶段打开时，第一安全时间是检查火焰前的引导火阀打开阶段。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.
当引导火阀输出 T59 打开时未检测到电压，则出现“启动燃气输出故障”。

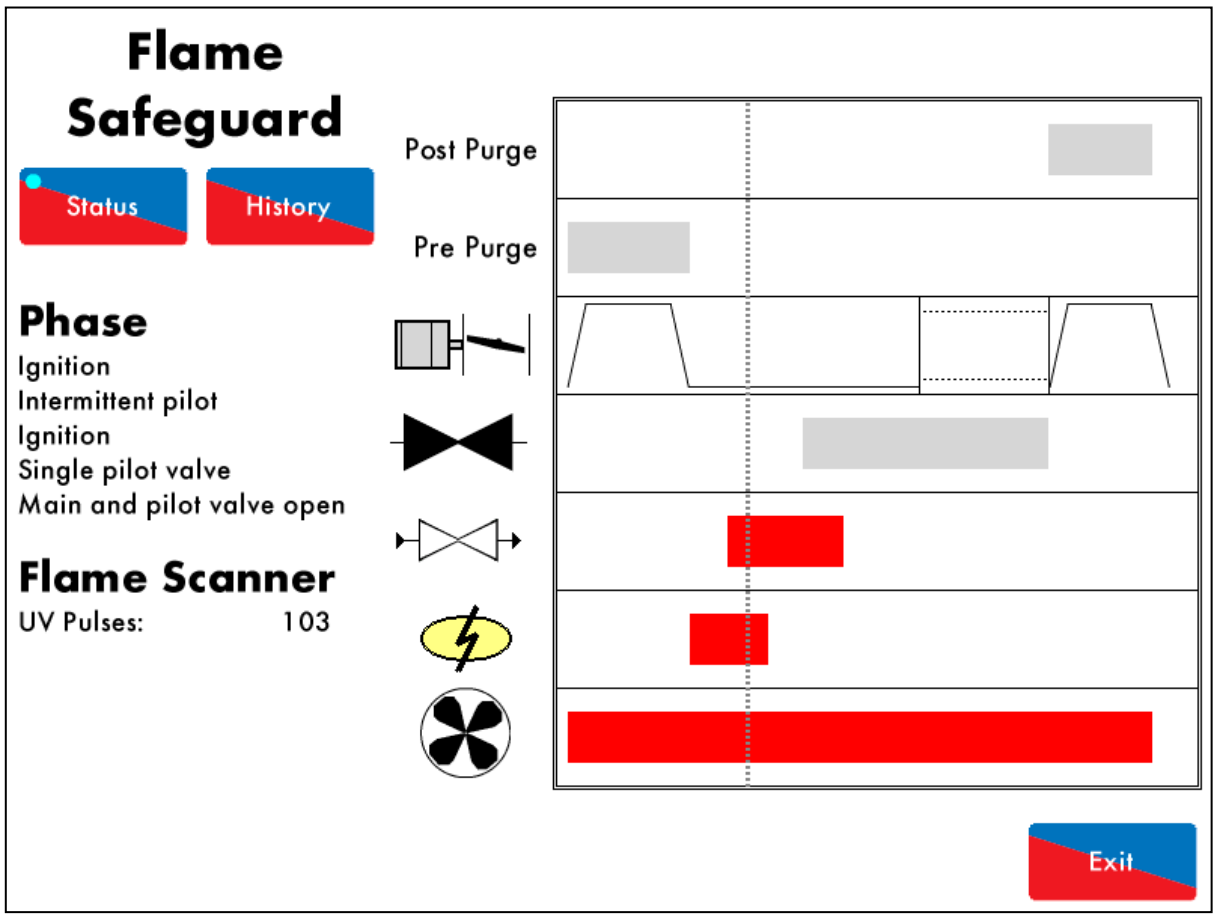


Figure 9.9.ii Ignition / 图 9.9.ii 点火

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 9.9.ii. If the pilot goes out, the lockout 'No Flame Signal' will occur.
在第一安全时间阶段末，紫外火焰检测器在图 9.9.ii 所示的单阀引导火点火阶段检查引导火焰，如果引导火火焰熄灭，则出现“无火焰信号”故障。

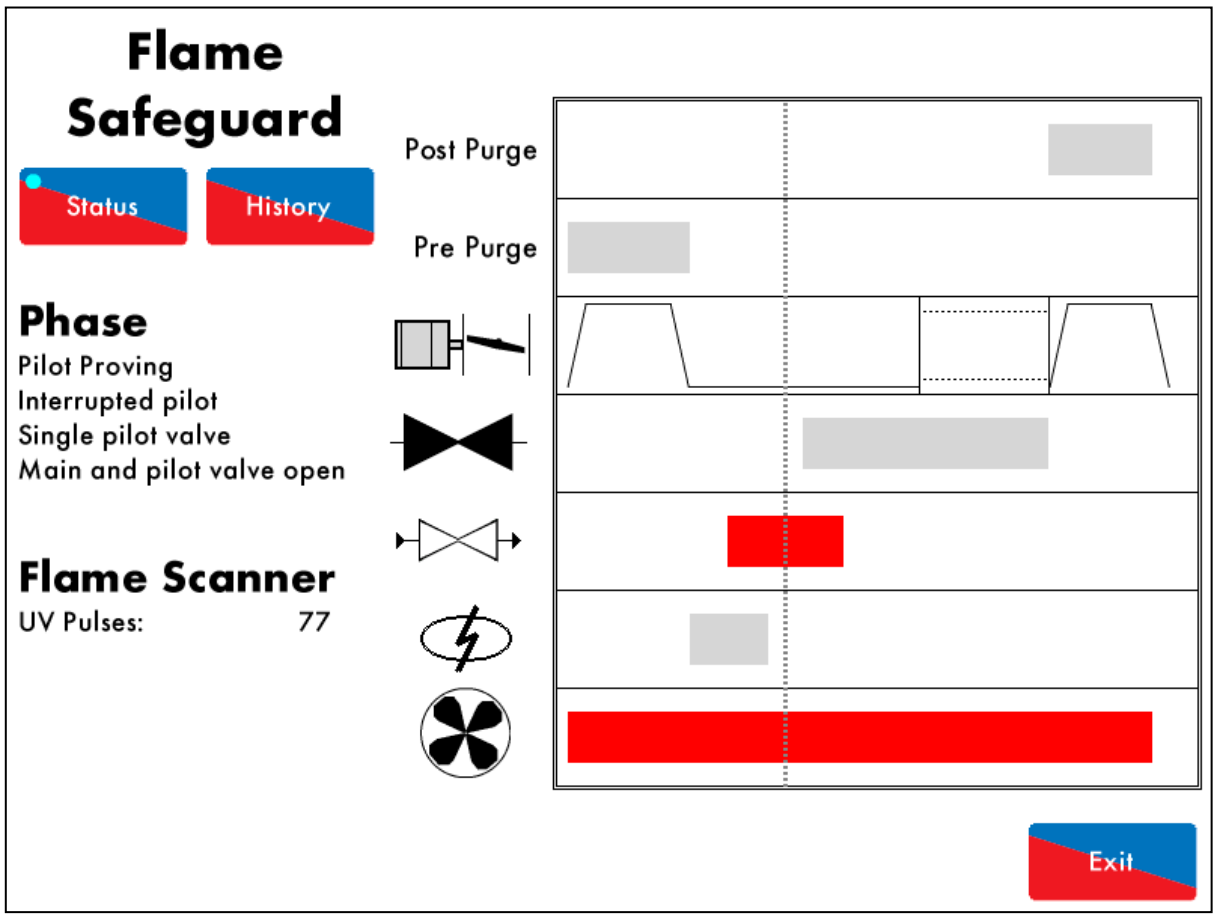


Figure 9.9.iii Pilot Proving/ 图 9.9.iii 引导火校验

The ignition transformer output is switched off after the pilot ignition, in the Pilot Proving phase shown in Figure 9.9.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.

引导火点火后点火变压器输出关闭处于图 9.9.iii 所示的引导火校验阶段时使引导火焰达到稳定，检查火焰确保引导火足够强，如果引导火火焰熄灭，则出现“无火焰信号”。见选项/参数 115 和 120。

9.10. Proving / 检漏

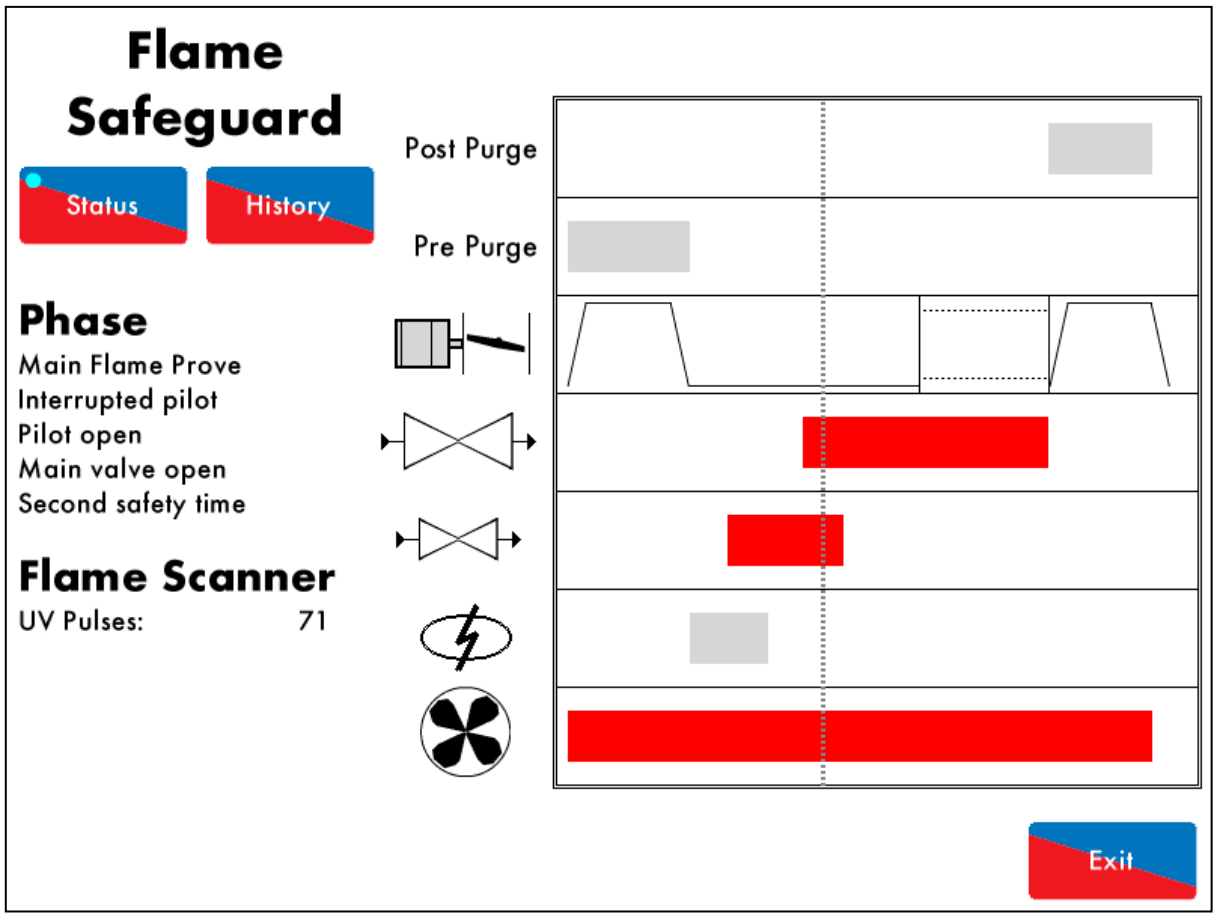


Figure 9.10.i Main Flame Prove Second Safety Time
图 9.10.i 主火焰校验第二安全时间

The 2nd safety time begins, where the flame is not checked in the Interrupted Pilot 2nd Safety phase shown in Figure 9.10.i.
第二安全时间开始时，在图 9.10.i 所示的中断引导火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.
安全时间阶段引导火和主燃气阀相互重叠，主燃气阀 1 和 2 的输出打开，点火阀输出保持打开状态。第二安全阶段允许主火焰在点火阀输出关闭前燃烧。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。

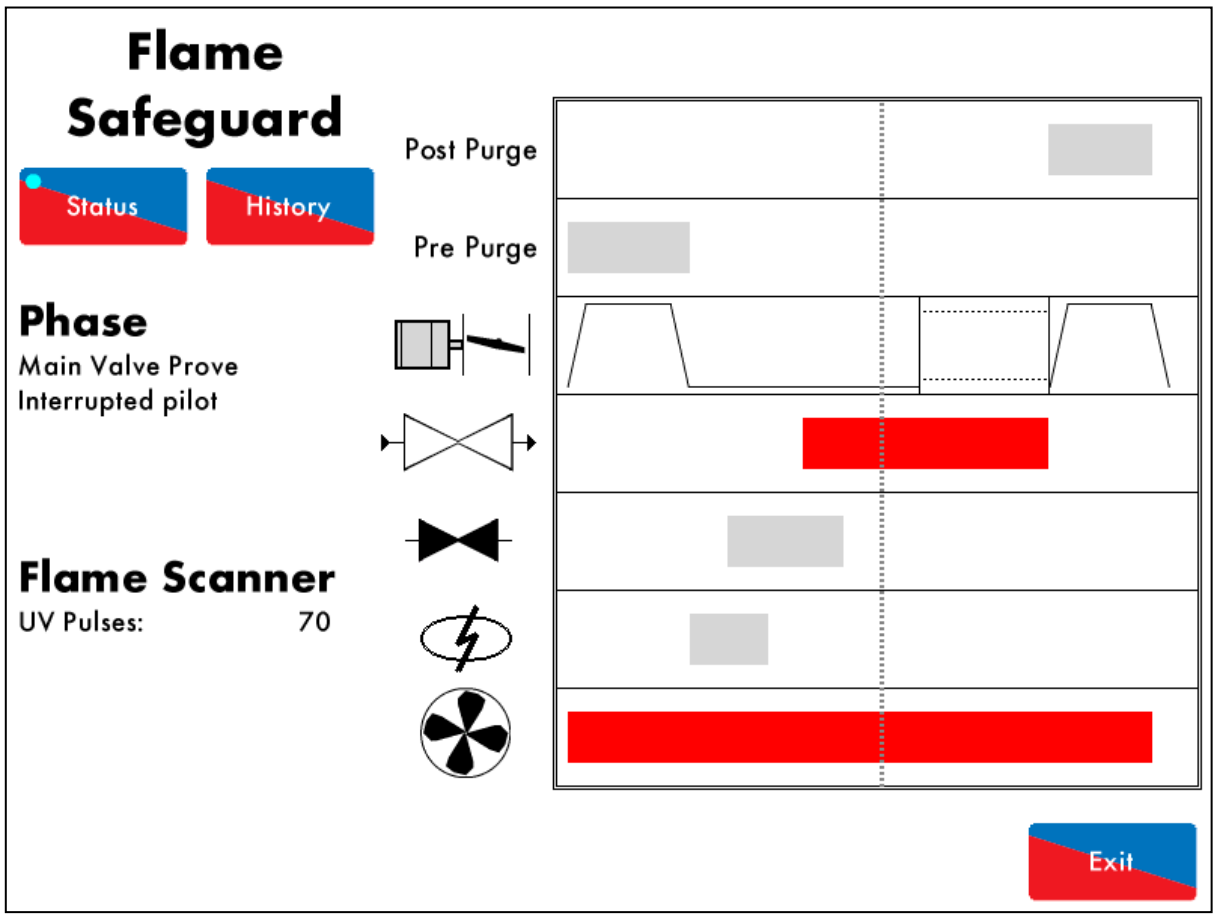


Figure 9.10.ii Main Flame Prove / 图 9.10.ii 主火焰校验

In the Interrupted Pilot Main Prove phase shown in Figure 9.10.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 9.10.ii 所示的中断引导火主校验阶段，点火阀输出关闭，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。

After the second safety time, the gas pressure limits are checked in the main flame proving phase, see option/parameters 136 and 137.
在第二安全时间后，在主火焰校验阶段检查燃气压力限值，见选项/参数 136 和 137。

9.11. Firing / 燃烧

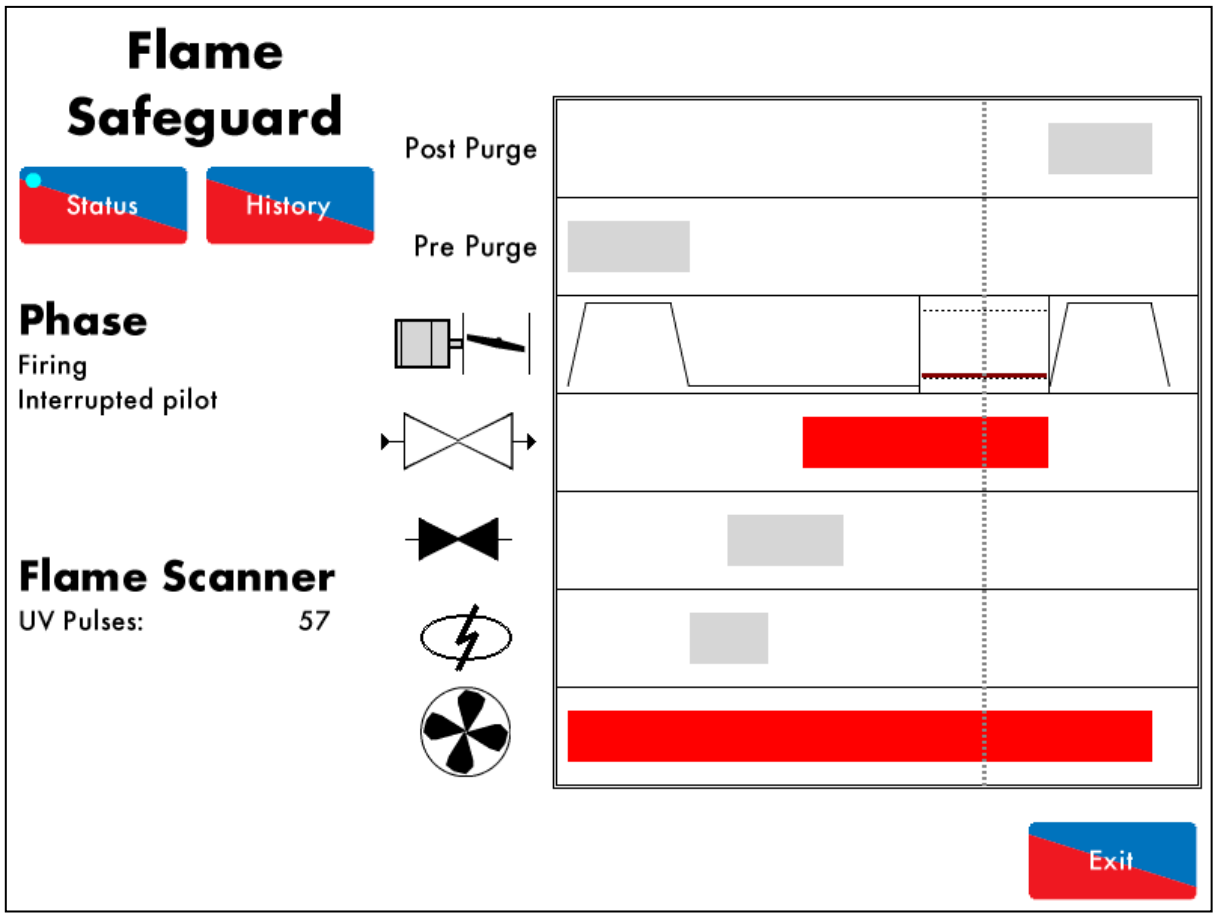


Figure 9.11.i Firing / 图 9.11.i 燃烧

The burner has now completed the start-up sequence and fires normally according to its set operation in the Firing phase shown in Figure 9.11.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 9.11.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/压力上下调节燃烧率，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。

9.12. Post Purge / 后吹扫

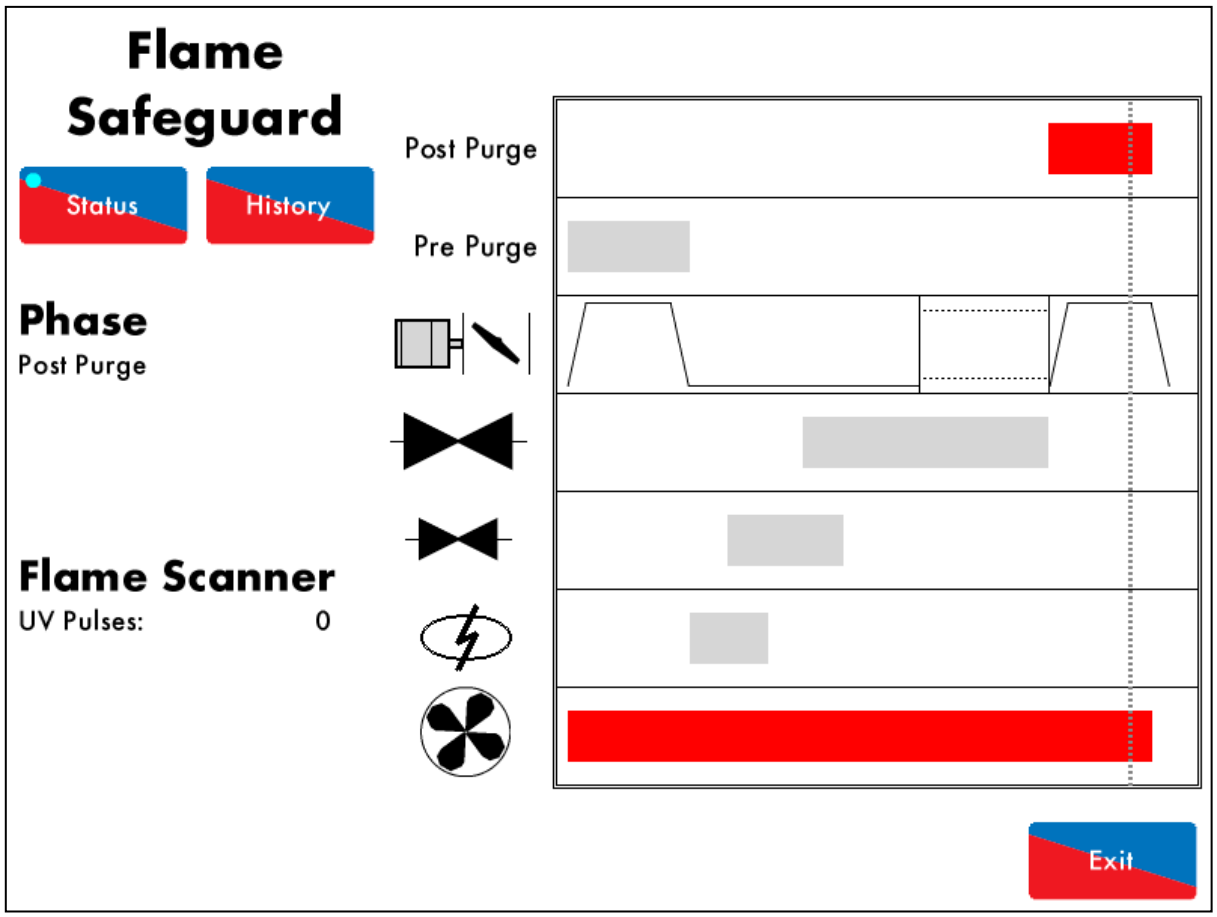


Figure 9.12.i Post Purge 图 9.12.i 后吹扫

The Post-Purge phase shown in Figure 9.12.i is optioned in this example. When T53 is switched off and the burner is off, the MM 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吹扫新鲜空气，此时燃烧器在正常状态下（内外部温控）关闭，主燃气阀 1 和 2 输出和点火阀输出关闭。见选项/参数 118 和 135。

The post purge timer begins once the channels have moved to their post purge positions and the purge interlock has been made on terminal 81 if optioned. This does not apply to NFPA post purge.
一旦通道已经移动到后吹扫位置，后吹扫计时器开始，吹扫联锁已经在终端 81 上进行（如果选择的话）。这不适用于 NFPA 后吹扫。

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

Note: 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, and the purge interlock on terminal 81 is not checked, if optioned.
如果 NFPA 后吹扫被选中，那么燃烧器也将在点火阶段之后的任何时间发生锁定/错误时执行后吹扫，并且不检查终端 81 上的吹扫联锁（如果选择的话）。

10. ERRORS AND LOCKOUTS / 错误和锁定

10.1. Errors / 错误

Errors occur when the MM detects an internal fault, component out of range, internal check failure or power supply issue. To clear an error, the MM must be restarted.
错误发生时，控制模块检测到一个内部故障，组件超出范围，内部检查故障或电源问题。要清除错误，必须重新启动控制模块。

Error 错误	Message 错误信息	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, 41, 42. 检查接线端子 40，41，42。 • Check signal cable from the MM 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 检查电位器是否被正确调零。 • Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0° 进入调试模式，检查伺服电机位置，确保其关闭位对应 0.0°		
2	Channel 2 Positioning Error 通道 2 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, 41, 43. 检查接线端子 40、41、43。 • Check signal cable from the MM 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 检查电位器是否被正确调零 • Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0° 进入调试模式，检查伺服电机位置，确保其关闭位对应 0.0°		
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 44, 46, 47. 检查接线端子 44、46、47。 • Check signal cable from the MM 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 检查电位器是否被正确调零 • Go into Commissioning mode, check the servomotor position and ensure that closed is at 0.0° 进入调试模式，检查伺服电机位置，确保其关闭位对应 0.0°		
5	Channel 1 Gain Error 通道 1 增益错误	Servomotor position measurement hardware error 伺服电机位置测量硬件错误
• Check wiring and voltages on terminals 40, 41, 42 and 70 – 71 检查端子 40、41、42 和 70 – 71 上的接线和电压		
6	Channel 2 Gain Error 通道 2 增益错误	Servomotor position measurement hardware error 伺服电机位置测量硬件错误
• Check wiring and voltages on terminals 40, 41, 43 and 72 – 73 检查端子 40、41、43 和 72 – 73 上的接线和电压		
7	Channel 3 Gain Error 通道 3 增益错误	Servomotor position measurement hardware error 伺服电机位置测量硬件错误
• Check wiring and voltages on terminals 44, 46, 47 and 74 – 75 检查端子 44、46、47 和 74 – 75 上的接线和电压		

Error 错误	Message 错误信息	Description 说明
9	Channel 1 Movement Error 通道 1 运转错误	Servomotor moves when not expected and vice versa 伺服电机在意料之外的情况下转动，反之亦然。
• Check wiring and voltages on terminals 70 & 71 检查端子 70 和 71 上的接线和电压 • Check 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 通道 2 运转错误	Servomotor moves when not expected and vice versa 伺服电机在意料之外的情况下转动，反之亦然。
• Check wiring and voltages on terminals 72 & 73 检查端子 72 和 73 上的接线和电压 • Check servomotors drive in correct direction 检查伺服电机运动方向是否正确 • Check damper is not stuck 检查挡板是否卡住		
11	Channel 3 Movement Error 通道 3 运转错误	Servomotor moves when not expected and vice versa 伺服电机在意料之外的情况下转动，反之亦然。
• Check wiring and voltages on terminals 74 & 75 检查端子 74 和 75 上的接线和电压 • Check 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 模拟电源供应错误	ADC measured 12V supply out of range ADC 测量电压 12V 供电，超出范围
• Check wiring for shorts on terminals 41, 47 and 39 检查端子 41，47 和 39 上的接线是否短路		
14	Digital Power Supply Error 数字电源供应错误	ADC measured 3.3V supply out of range ADC 测量电压 3.3V 供电，超出范围
• Check for noise on the mains input, wiring and voltages on all terminals 检查电源输入、接线和所有端子上的电压是否有干扰		
15	EEPROM Error EEPROM 芯片错误	Fault communicating with the on board EEPROM 与 EEPROM 通讯故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		

Error 错误	Message 错误信息	Description 说明
16	ADC Error ADC 错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
17	Watchdog Timeout 监视设备超时	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
18	Processor Clock Error 处理器时钟错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
19	System Error 系统错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
20	Flash Data Error 闪存数据错误	Internal fault 内部故障
• Re-install software SD card		
21	Processor Temperature Error 处理器温度错误	Internal fault 内部故障
• Check ambient temperature of unit does not exceed maximum recommended temperature 检查设备的环境温度是否超过推荐的最高温度		
22	Burner Control Comms Error 燃烧器控制通讯错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
23	Burner Control Reset 燃烧器控制重置	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
24	Software Error 软件错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
26	Mains Input Detection Error 电源输入检测错误	Fuel mains input stuck reading low 燃料电源输入卡在低读数
• Check wiring and voltages on mains voltage terminals 53 – 90 检查端子 53 – 90 上的接线和电压		
27	Load Sensor Error 负载传感器错误	Voltage from load sensor is outside of expected range 负载传感器的电压超出预期范围
• Check load sensor wiring and ensure that the return voltage/resistance is less than 1V/ 1kΩ 检查负载传感器的接线，确保返回电压/电阻小于 1V/1 kΩ		
28	VSD Error 变频器错误	Feedback incorrect 反馈信号错误
• Check VSD feedback against commissioned VSD and ensure the feedback is stable 检查变频器反馈和调试的变频器数值，确保反馈稳定。		
29	VSD No Commission Feedback 变频器无调试反馈	No VSD feedback detected during commissioning 调试期间未检测到变频器反馈
• Re-commission with VSD feedback connected 与变频器反馈连接后重新调试 • Check wiring on terminals 1 – 3 and 10 – 12 检查端子 1 – 3 和 10 – 12 上的接线		

Error 错误	Message 错误信息	Description 说明
30	Missing Commissioning Data 调试数据丢失	Internal fault 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/变频器调试数据		
31	FAR Execution Speed FAR 执行速度	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
32	Software Error 软件错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
33	Software Error 软件错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
34	Software Error 软件错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
35	Software Error 软件错误	Internal fault 内部故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
36	VSD Sampling Error 变频器采样错误	VSD feedback current/ voltage too high 变频器反馈电流/电压过高
• Check wiring on terminals 1 – 3 and 10 – 12 检查端子 1 – 3 和 10 – 12 上的接线		

Error 错误	Message 错误信息	Description 说明
38	Air Pressure Commission Fault 空气压力调试故障	No air pressure trim data for a point with EGA trim 无 EGA 微调的空气压力微调数据
• Check EGA trim and air pressure trim in fuel-air curve 检查燃料-空气曲线中的 EGA 微调和空气压力调节		
39	Gas Pressure VPS Commission Fault 燃气压力 VPS（阀门检漏系统）调试故障	Commissioned gas pressure during VPS is below option/ parameter 133 threshold VPS（阀门检漏系统）期间的调试的燃气压力低于选项/参数 133 的阀值
• Check option/ parameter 133 and check gas pressure 检查选项/参数 133 和检查燃气压力 • Re-commission gas pressure sensor 重新调试燃气压力传感器		
40	Gas Pressure Run Commission Fault 燃气压力运行调试故障	Commissioned gas pressure during Golden/ FGR start or main curve is below option/ parameter 136 threshold 在黄金/FGR（烟气再循环）启动或主燃烧曲线期间的调试燃气压力低于选项/参数 136 的阀值
• Check option/ parameter 136 and check gas pressure 检查选项/参数 136 和检查燃气压力 • Re-commission gas pressure sensor 重新调试燃气压力传感器		
41	Air Pressure Commission Fault 空气压力调试故障	Commissioned air pressure during Golden/ FGR start or main curve is too low 在黄金/FGR（烟气再循环）启动或主燃烧曲线期间的调试空气压力太低
• Check option/parameters 147 and 149 检查选项/参数 147 和 149 • Re-commission air pressure sensor 重新调试空气压力传感器		
42	Air Pressure Zeroing Fault 空气压力归零故障	Commissioned air zero pressure is more than 5mbar from sensor's zero value 调试的空气调零压力超过传感器零位值的 5 毫巴
• Check air pressure sensor value during VPS 在 VPS（阀门检漏系统）期间检查空气压力传感器		

10.2. Lockouts / 锁定

Lockouts occur when the MM detects a fault with the burner operation such as VPS, gas/air pressure sensor and flame scanners. The lockout must be cleared and investigated on the MM.
当控制模块检测到燃烧器操作(如：VPS、燃气/空气压力传感器和火焰检测器)的故障时，就会发生锁定。必须清除并检查控制模块上的锁定。

Lockout 锁定	Message 锁定信息	Description 说明
1	CPI Input Wrong State CPI 输入错误状态	Proof of closure switch opened during ignition sequence 在点火时序，阀门关闭检验开关开启
• Check wiring on terminal 55 检查端子 55 的接线 • Check proof of closure switches 检查阀门关闭检验开关		
2	No Air Proving 无空气验证	No air pressure during start/ firing 启动/燃烧时无空气压力
• Check wiring on terminal 54 检查端子 54 上的接线 • 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 运行期间检查空气压力		
3	Ignition Output Fault 点火输出故障	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 63 检查端子 63 上的接线和电压		
4	Motor Output Fault 风机输出故障	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 58 检查端子 58 上的接线和电压		
5	Start Gas Output Fault 点火阀输出故障	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 59 检查端子 59 上的接线和电压		
6	Main Gas 1 Output Fault 主燃气阀 1 输出故障	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 60 检查端子 60 上的接线和电压		
7	Main Gas 2 Output Fault 主燃气阀 2 输出故障	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 61 检查端子 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) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 62 检查端子 62 上的接线和电压		

Lockout 锁定	Message 锁定信息	Description 说明
9	Failsafe Relay (Check 5AT) 故障保护继电器(检查 5A 保险管)	Voltage detected when output is off (and vice versa) 当关闭输出信号时，检测到电压（或者当开启输出信号时，检测不到电压）
• Check wiring and voltage on terminal 57 检查端子 57 上的接线和电压 • Check 5A fuse 检查 5A 保险丝		
10	Simulated Flame 假象火焰	Flame is present when it not should be 火焰在不该出现的时候出现
• Isolate all fuels immediately 立即隔离所有燃料 • Check the wiring and screening on the flame scanner 检查火焰检测器上的线路和屏蔽 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查 • If this lockout occurs during shutdown a post-purge may be required for after burn 如果这种锁定发生在关机期间，燃烧后可能需要后吹扫。		
11	VPS Valve 1 Proving Fail VPS 主阀 1 检漏失败	Leak detected during ‘air proving’ part of VPS VPS（阀门检漏系统）的“空气检漏”检测到泄漏
• Check 1st main gas valve 检查一级主燃气阀门 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
12	VPS Valve 2 Proving Fail VPS 主阀 2 检漏失败	Leak detected during ‘gas proving’ part of VPS VPS（阀门检漏系统）的“燃气检漏”检测到泄漏
• Check option/parameter 133 检查选项/参数 133 • Check 2nd main gas valve and vent valve 检查主燃气阀 2 和排气阀 • Check pilot valve if using single valve pilot • 如果使用单阀点火，检查点火阀 • Isolate gas and call a certified Commissioning Engineer to investigate 隔离燃气并请持证调试工程师进行调查		
13	No Flame Signal 无火焰信号	No flame detected during ignition/ firing 点火/燃烧时检测不到火焰
• Visually check flame 目测检查火焰 • Check the flame scanner 检查火焰检测器 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
14	Shutter Fault 挡光片错误	UV signal detected during shutter operation on self-check 挡板自检操作时检测到紫外线信号
• Check wiring on terminals 21 and 22 检查端子 21 和端子 22 上的接线 • Check UV scanner type and check option/ parameter 110 is set accordingly 检查紫外火焰检测器类型和检查选项/参数 110 对应的设置		

Lockout 锁定	Message 锁定信息	Description 说明
15	NO CPI Reset 没有 CPI 重置	Proof of closure switch not made after valves closed 阀门关闭后，阀门关闭检验开关未工作
• Check wiring on terminal 55 检查端子 55 上的接线 • Check proof of closure switches 检查阀门关闭检验开关		
17	Gas Pressure Low 燃气压力低	Gas pressure low limit exceeded while firing (gas sensor) 燃烧时超过燃气压力下限（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 燃气压力高	Gas pressure high limit exceeded while firing (gas sensor) 燃烧时超过燃气压力上限（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 内存测试失败	Hardware fault 硬件故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
20	PROM Test Failed 只读储存器测试失败	Hardware fault 硬件故障
• Contact Autoflame approved local Tech Centre 联系 Autoflame 认可的当地技术中心		
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 terminals 50 – 64 检查端子 50-64 上的接线和电压		
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 terminals 50 – 64 检查端子 50-64 上的接线和电压		
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 terminals 50 – 64 检查端子 50-64 上的接线和电压		
24	FSR Test 2B FSR 测试 2B	Internal relay test failed 内部继电器测试失败
• Check wiring and voltages on terminals 50 – 64 检查端子 50-64 上的接线和电压		
26	Watchdog Fail 2B 监测失败 2B	Internal check failed 内部继电器测试失败
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
28	Watchdog Fail 2D 监测失败 2D	Internal check failed 内部继电器测试失败
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		

Lockout 锁定	Message 锁定信息	Description 说明
29	Input Fault 输入错误	Mains input stuck-on detection 电源输入检测到维持在 0 位之上
• Check mains voltage to the MM 检查控制模块的火线电压		
32	Gas Pressure Low Limit 燃气压力下限	Gas pressure lower than commissioned VPS value 燃气压力比调试的 VPS（阀门检漏系统）数值低
• Check gas pressure 检查燃气压力 • Check option/parameters 136 and 138 检查选项/参数 136 和 138		
33	VPS Pressure Zeroing VPS 压力归零	Gas pressure sensor cannot be zeroed at VPS venting 燃气压力传感器不能在 VPS（阀门检漏系统）排气时归零
• Check gas pressure is within zero range (see MM Application Possibilities) 检查燃气压力是否在零范围内（请参阅控制模块应用可能） • Check vent valve 检查排气阀		
39	Freeze Timeout 阶段保持超时	MM kept in Phase Hold for more than 10minutes 控制模块停留在“阶段保持”的时间超过 10 分钟
• MM kept in Phase Hold during commissioning for more than 10 minutes 调试时将控制模块的“阶段保持”时长保持 10 分钟以上。		
44	Proving Circuit Fail T80 验证电路失败 T80	Loss of input on terminal 80 when delay to purge is enabled 启用延迟吹扫时，端子 80 的输入丢失
• MM must be an input at all time from position to purge to post purge. 控制模块从吹扫位到后吹扫总是一定需要一个输入确认 • Check wiring on terminal 80. 检查端子 80 上的接线		
45	No Proving Circuit Set T80 没有 T80 验证电路设置	Delay to purge timeout has elapsed 延迟吹扫超时已结束
• Check option/parameter 157, and wiring on terminal 80. 检查选项/参数 157 和端子 80 上的接线		
46	PurgePressureProving Timeout 吹扫压力验证超时	Purge pressure proving timeout has elapsed 吹扫压力验证超时已结束
• Check option/parameters 155 and 158, and wiring on terminal 81. 检查选项/参数 155 和 158，以及端子 81 上的接线。		
47	Ion. Internal Failsafe Fault 离子棒内部失效保护故障	Internal check failed for flame rod 火焰棒内部检查失败
• Check wiring on terminal 64 检查端子 64 上的接线		

Lockout 锁定	Message 锁定信息	Description 说明
48	Ion. Positive Peak Failsafe Fault 离子棒正峰失效保护	Signal check failed for flame rod 离子棒信号检查失败
• Check wiring on terminal 64 检查端子 64 上的接线		
49	Ion. Negative Peak Failsafe Fault 离子棒负峰失效保护	Signal check failed for flame rod 火焰棒信号检查失败
• Check wiring on terminal 64 检查端子 64 上的接线		
50	Simulated Flame 假象火焰	Flame detected when there should not be (secondary test for ionisation) 在不应有火焰时检测到火焰（电离二次测试）
• Visually check flame and check flame rod 目测火焰和检查火焰棒 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
51	No Flame Signal 没有火焰信号	No flame detected when there should be (secondary test for ionisation) 在应有火焰时检测不到火焰（电离二次测试）
• Visually check flame and check flame rod 目测火焰和检查火焰棒 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
52	High IR Ambient 高红外线环境	Flame detected when there should not be 在不应有火焰时检测到火焰
• Visually check flame and check IR scanner 目测火焰和检查红外线检测器 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
53	IR Comms Lost 红外线通讯丢失	Loss of comms with IR scanner 红外线检测器的通讯丢失
• Check wiring and screen on terminals 29, 30, 48 and 49 检查端子 29、30、48 和 49 上的接线和屏幕 • Check that the IR scanner is not removed from the magnetic ring socket 检查红外线检测器是否从磁环插座上取出		
62	UV Signal Too High 紫外线信号太高	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 检查端子 81 上的接线		

Lockout 锁定	Message 锁定信息	Description 说明
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 检查端子 80 上的接线		
65	FSR A 失效保护继电器 A	Internal check failed 内部检查失败
• Check wiring and voltages on terminals 50 – 64 检查端子 50-64 上的接线和电压		
66	FSR B 失效保护继电器 B	Internal check failed 内部检查失败
• Check wiring and voltages on terminals 50 – 64 检查端子 50-64 上的接线和电压		
67	Gas Sensors Comms 燃气传感器通讯	Signal lost from gas pressure sensor 燃气压力传感器信号丢失
• Check wiring and screen on terminals 29, 30, 48 and 49 检查端子 29、30、48 和 49 上的接线和屏幕		
68	Gas Sensor Type 燃气传感器类型	Wrong gas pressure sensor detected 检测到错误的燃气压力传感器
• Check option/parameters 128 and 156 检查选项/参数 128 和 156		
69	Gas Sensor Fault 燃气传感器故障	Internal pressure sensor fault 内部压力传感器故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
70	UV Pot Fault 紫外线电位器故障	Hardware fault 硬件故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
71	Air Sensor Comms 空气传感器通讯	Signal lost from air pressure sensor 空气压力传感器信号丢失
• Check wiring and screen on terminals 29, 30, 48 and 49 检查端子 29、30、48 和 49 上的接线和屏幕		
72	Air Sensor Type 空气传感器类型	Wrong air pressure sensor detected 检测到错误的空气压力传感器
• Check option/parameter 148 检查选项/参数 148		
73	Air Sensor Fault 空气传感器故障	Internal pressure sensor fault 内部压力传感器故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		

Lockout 锁定	Message 锁定信息	Description 说明
74	Air Sensor Zero 空气传感器归零	Air pressure is more than 5mbar from sensor's zero value 空气压力数值比传感器的零位数值多于 5 毫巴
• Check air pressure sensor value during VPS VPS（阀门检漏系统）期间检查空气压力传感器		
75	Air Sensor Signal High 空气传感器信号高	Air pressure reading is above 400mbar 空气压力读数超过 400 毫巴
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
76	Air Sensor Error Window 空气传感器错误窗口	Air pressure outside of these limits for 3 seconds 空气压力超过限值 3 秒
• Check air pressure 检查空气压力 • Check option/parameter 147 检查选项/参数 147		
77	Wait Air Switch Timeout "等待空气开关"超时	Voltage has not been reset for 2minutes 电压超过两分钟未被重置
• Check air pressure sensor value during VPS VPS（阀门检漏系统）期间检查空气压力传感器 • Check voltage has been reset on terminal 54 within 2minutes before run to purge 运行吹扫前 2 分钟内检查端子 54 上检查电压是否被重置 • Check wiring and voltage on terminal 54 检查端子 54 上的接线和电压		
78	Gas Proving Fail High 燃气验证高失败	Gas pressure too high during VPS VPS（阀门检漏系统）期间燃气压力太高
• Isolate gas 隔离燃气 • Check 1st main valve and vent valve 检查主阀 1 和排气阀 • Check option/ parameters 133 and 134 检查选项/参数 133 和 134 • Call a certified Commissioning Engineer to investigate 请持证调试工程师进行调查		
79	FSR Test 1C FSR 测试 1C	Hardware fault 硬件故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
80	Timeout on Reaching Purge 达到吹扫超时	Time set in option/parameter 124 has elapsed 选项/参数 124 时间设置已完成
• Check option/parameter 124 检查选项/参数 124		
82	Purge Pressure Proving Input 吹扫压力验证输入	Input on T81 read high during relay test phases 在继电器测试阶段，T81 的输入读高
• Input has been made before the blower starts; it should only be made continuously during purge. 风机启动前已输入；只能在吹扫过程中持续产生。 • Check wiring on terminal 81. 检查端子 81 上的接线		

Lockout 锁定	Message 锁定信息	Description 说明
198	BC Input Short BC 输入短	Internal fault 内部故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
199	Lockout 199 锁定 199	Internal fault 内部故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
200	Lockout Cleared 锁定解除	Lockout has been cleared 锁定已经解除
• MM status after lockout has been reset (Modbus) 重新锁定后的控制模块状态（Modbus）		
201	Power up CPU Test Fail 电源开启 CPU 测试失败	Internal check failed 内部检查故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		
202	Power up EEPROM Test Fail 电源开启 EEPROM 测试失败	Internal check failed 内部检查故障
• Contact Autoflame approved local tech centre 联系 Autoflame 认可的当地技术中心		

10.3. Alarms and Warnings / 警报和警告

Alarms and warnings are faults detected with the system operation. If an alarm occurs, the burner will stop running, and if a warning occurs, the burner will continue to run. The following options/parameters set whether system operation faults are set as alarms or warnings:
警报和警告是在系统操作中检测到的故障。如果出现警报，燃烧器将停止运行，如果出现警告，燃烧器将继续运行。系统运行故障是否设置为警报或警告，设置如下选项/参数：

Option 13 EGA Fault Response
选项 13 EGA 错误响应
Option 14 Warning Response
选项 14 警告响应

Fault 故障	Message 故障信息	Description 说明
1	EGA Internal Error EGA 内部错误	Fault on EGA EGA 故障
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check EGA for fault description 检查 EGA 的故障说明		
2	No EGA Communications 没有 EGA 通讯	MM has lost communications with EGA 控制模块丢失与 EGA 的通讯
• Alarm or warning based on option 13 (warning if option 12 is set to monitoring only) 警报或警告基于选项 13 设置（如果选项 12 仅设置为监视，则为警告） • Check parameter 10 is set to correct EGA version 检查参数 10 是否设置为正确的 EGA 版本 • Check EGA operating mode is selected as 'EGA with MM' 检查 EGA 操作模式是否被选作“EGA 与控制模块”。 • Check wiring between EGA and MM (terminals 25 and 26 on MM) 检查 EGA 和控制模块之间的接线（控制模块上端子 25 和 26）		
3	O_2 Upper Limit O_2 上限	O_2 value is above upper limit offset of commissioned value* O_2 值高于调试值的上限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 19 检查烟气读数和选项 19		
4	O_2 Absolute Limit O_2 绝对限值	O_2 value is below absolute limit* O_2 值低于绝对限值*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 25 检查烟气读数和选项 25		
5	O_2 Lower Limit O_2 下限	O_2 value is below lower limit offset of commissioned value* O_2 值低于调试值的下限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 22 检查烟气读数和选项 22		
6	CO_2 Upper Limit CO_2 上限	CO_2 value is above upper limit offset of commissioned value* CO_2 高于调试值的上限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 20 检查烟气读数和选项 20		

Fault 故障	Message 故障信息	Description 说明
7	CO_2 Absolute Limit CO_2 绝对极限值	CO_2 value is above absolute limit* CO_2 值高于绝对极限值*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 26 检查烟气读数和选项 26		
8	CO_2 Lower Limit CO_2 下限	CO_2 value is below lower limit offset of commissioned value* CO_2 值低于调试值的下限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 23 检查烟气读数和选项 23		
9	CO Upper Limit CO 上限	CO value is above upper limit offset of commissioned value* CO 值高于调试值的上限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 21 检查烟气读数和选项 21		
10	CO Absolute Limit CO 绝对限值	CO value is above absolute limit* CO 值高于绝对限值*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and option 27 检查烟气读数和选项 27		
11	NO Upper Limit NO 上限	NO value is above upper limit offset of commissioned value* NO 值高于调试值的上限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and parameter 94 检查烟气读数和选项 94		
12	Exhaust Temperature Upper Limit 烟气温度上限	Exhaust temperature is above upper limit offset of commissioned value* 烟气温度高于调试值的上限偏移量*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and parameter 96 检查烟气读数和选项 96		
13	Exhaust Temperature Absolute Limit 烟气温度绝对限值	Exhaust temperature is above absolute limit* 烟气温度高于绝对限值*
• Alarm or warning depending on option 13 警报或警告取决于选项 13 • Check exhaust gas readings and parameter 97 检查烟气读数和选项 97		
50	Load Sensor Fault 负载传感器故障	Incorrect/no load sensor detected 检测到错误/无负载传感器
• Alarm 警报 • Check option 1 检查选项 1 • Check wiring on terminals 37 – 39 检查端子 37 – 39 上的接线		

Fault 故障	Message 故障信息	Description 说明
52	Zero-Crossing Fault 过零故障	Mains voltage test failed 电源电压测试失败
• Alarm 警报 • Check mains supply going to unit is within acceptable voltage range 检查电源是否在可接受的电压范围内 • Check Parameter 109 setting 检查参数 109 设置		
53	Gas Pressure Warning Level 燃气压力警告水平	Gas pressure not within commissioned range 燃气压力不在调试范围内
• Alarm 警报 • Check main gas pressure 检查主燃气压力		
54	Mains Input Stuck On (Fuel 1 Select) 电源输入维持在 0 位之上（选择燃料 1）	Voltage detected during the zero-crossing period of the mains cycle 在电源周期过零期间检测到的电压
• Alarm 警报 • Check that all screening is applied as per the wiring diagram. 检查所有屏蔽是否按照接线图进行 • Check earthing at T66 检查 T66 地线 • Check Parameter 109 setting 检查参数 109 设置		
55	Mains Input Stuck On (Fuel 2 Select) 电源输入维持在 0 位之上（选择燃料 2）	Voltage detected during the zero-crossing period of the mains cycle 在电源周期过零期间检测到的电压
• Alarm 警报 • Check that all screening is applied as per the wiring diagram. 检查所有屏蔽是否按照接线图进行 • Check earthing at T66 检查 T66 地线 • Check Parameter 109 setting 检查参数 109 设置		

*****When option 12 is set to 3 for trim and combustion limits, the combustion limits are evaluated once per trim cycle. A combustion limit error will occur if the current exhaust value has crossed the combustion limit for the number of trim cycles set in parameter 17 (the default value is 3 cycles).
*当用于调节和燃烧极限的选项 12 设置为 3 时，燃烧限值将在每个微调周期评估一次。如果当前烟气数值超过参数 17 设置的调节周期数的燃烧限值（默认值是 3 个周期），则会发生燃烧限值错误。

10.4. Setting Conflicts / 设置冲突

Some of the option/parameter values may require another option/parameter to be set, as described in the table below. The MM will be forced into Commission Mode.
系统中的一些选项/参数设置值需要另一个选项/参数设置值的配合，如下表中所说明的。控制模块将被迫进入调试模式。

Setting Conflict Message 设置冲突信息
(1) (45) External modulation cannot be used with external load sensor. (1) (45) 外部调节不能与外部负载传感器使用。
• External modulation and external load sensor are connected to the same terminals, so they cannot be used together. 因为外部调节与外部负载传感器同时连接到相同的终端，使用它们不能一起使用。 • Check options 1 and 45. 检查选项 1 和 45
(1) (P53, P54, P55, P56) External load sensor incorrectly configured (1) (P53, P54, P55, P56) 外部负载传感器配置错误
• The external load sensor must be set with the minimum and maximum values and voltages. 外部负载传感器必须设置最小值、最大值和电压。 • Check option 1 and parameters 53 – 56. 检查选项 1 和参数 53 – 56
(1) (81, 83) OTC setpoints too high for optioned load sensor (1) (81, 83) 负载传感器选择的 OTC 设定值过高
• If minimum and maximum setpoints OTC setpoints must be set within the possible range of the optioned load detector. 如果最小和最大设定值 OTC 设定值，则负载探测仪必须要选择设置在可能的范围内。 • Check option 1, 81 and 83. 检查选项 1、81 和 83。
(4) (8) Servo channel 2 configured as air but not enabled (4) (8) 伺服通道 2 配置为空气但不启用
• If the air servomotor is enabled, then channel 2 must also be enabled. 如果启用空气伺服电机，那么通道 2 也必须被启用。 • Check options 4 and 8. 检查选项 4 和 8。
(4) (12) Trim requires the use of a servo as the air channel (4) (12) 微调需要使用一个伺服作为空气通道
• If the air channel is controlled by a VSD and no air servomotor, then trim function cannot be used. 如果空气通道由一个 VSD(变频器)控制而且没有空气伺服电机，那么就不能使用调节功能。 • Check options 4 and 12. 检查选项 4 和 12。
(4) (90) VSD Channel 4 configured as air but not enabled. (4) (90) VSD（变频器）通道 4 配置为空气但不启用。
• If the air is controlled by the VSD on channel 4, then this VSD must be enabled. 如果空气由通道 4 上的 VSD（变频器）控制，那么必须启用该变频器。 • Check options 4 and 90. 检查选项 4 和 90。
(30) (31) Invalid remote sepoint configuration (30) (31)远程设定值配置无效
• The Minimum Remote Setpoint (DTI/Modbus/External) cannot be set higher than the Maximum Remote Setpoint (DTI/Modbus/External) and vice versa. 最小远程设定值（DTI/Modbus/外部）不能设置高于最大远程设定值（DTI/Modbus/外部），反之亦然。 • Check options 30 and 31. 检查选项 30 和 31。

Setting Conflict Message 设置冲突信息
(45) (16) External modulation cannot be used with sequencing (45) (16) 外部调节不能与群控一起使用
• External modulation cannot be used on any MMs in sequencing. 外部控制不能与控制模块上的任何群控一起使用 • Check options 16 and 45 检查选项 16 和 45
(81, 82, 83, 84) OTC Configuration invalid (81, 82, 83, 84) 室外温度控制的配置无效
• Setpoints at minimum and maximum outside temperatures cannot be set the same. 室外温度最小和最大设定值设置不能一样 • Minimum and maximum outside temperatures cannot be set the same. 最小和最大室外温度设置不能一样 • Check options 81, 82, 83 and 84 检查选项 81、82、83 和 84
(111) (122) Flame scanner changeover cannot be optioned with no pilot (111) (122) 火焰检测器转换不能选择没有引导火
• If no pilot is set, then flame scanner changeover cannot be used. 如果没有设置引导火，那么火焰检测器转换就不能被使用 • Check option/parameters 111 and 122. 检查选项/参数 111 和 122
(111) (130) Single valve pilot cannot be optioned with no pilot (111) (130) 单阀点火不能选择没有引导火
• If no pilot is set, then gas valve configuration cannot be set for single valve pilot. 如果设置为无引导火，那么燃气阀配置就不能设置为单阀引导火。 • Check option/parameters 111 and 130. 检查选项/参数 111 和 130。
(116) Fuel 1 2nd Safety time too high for Gas (116) 燃料 1 第二安全时间对于燃气太高
• If fuel 1 is gas, the maximum allowed 2nd safety time is 10 seconds. 如果燃料 1 是燃气，允许第二安全时间的最大值是 10 秒。 • Check option/parameters 116 and 150. 检查选项/参数 116 和 150。
(118) (135) NFPA Post Purge must be at least 15 seconds (118) (135) NFPA 后吹扫必须至少 15 秒
• If NFPA Post Purge is enabled, then this time must be set to a minimum of 15 seconds. 如果启用 NFPA 后吹扫，那么时长必须设置为至少 15 秒。 • Check option/parameters 118 and 135 检查选项/参数 118 和 135
(118) (141) (149) Purge air pres. threshold cannot be higher when post purge is optioned (118) (141) (149) 当选择后吹扫时，吹扫空气主阀值不能太高。
• If post purge is enabled, then the purge air pressure threshold cannot be set higher than the running air pressure threshold. 如果启用后吹扫，那么吹扫空气压力阀值不能超过运行的空气压力阀值。 • Check option/parameters 118, 141 and 149. 检查选项/参数 118、141 和 149。
(123) Fuel 2 2nd Safety time too high for Gas (123) 燃料 2 第二安全时间对燃气太高。
• If fuel 2 is gas, the maximum allowed 2nd safety time is 10 seconds. 如果燃料 2 是燃气，允许第二安全时长最大值是 10 秒。 • Check option/parameters 123 and 151. 检查选项/参数 123 和 151。

Setting Conflict Message 设置冲突信息
(125, 126) (128) Pressure limits do not operate using digital input. (125, 126) (128) 压力限值不使用数字信号输入操作
• Gas pressure upper/lower limits can only be used with a gas pressure sensor. 燃气压力上/下限仅能与燃气压力传感器使用。 • Check option/parameters 125, 126 and 128. 检查选项/参数 125、126 和 128。
(125) (150) Gas pressure sensor cannot be optioned when fuel type is oil (fuel 1) (125) (150) 如果燃料类型是燃油（燃料 1），就不能选择燃气压力传感器。
• Valve proving and gas pressure limits can only be used for gas 阀门检漏和燃气压力限值仅能用于燃气。 • Check option/parameters 125 and 150 检查选项/参数 125 和 150。
(126) (151) Valve proving cannot be optioned when fuel type is oil (fuel 2) (126) (151) 如果燃料类型是燃油（燃料 2），那么就不能选择阀门检漏。
• Valve proving and gas pressure limits can only be used for gas 阀门检验和燃气压力极限仅能用于燃气。 • Check option/parameters 126 and 151 检查选项/参数 126 和 151。
(128) (156) T82 is no set as VPS input (128) (156) T82 没有设置为 VPS(阀门检漏系统)输入
• If valve proving is optioned and configured as a digital VPS input from, T82 must be configured as the input for a VPS input gas pressure switch. 如果选择和配置阀门检验作为数字 VPS（阀门检漏系统）输入，那么 T82 必须配置为 VPS 输入燃气压力开关输入。 • Check option/parameters 128 and 156. 检查选项/参数 128 和 156。
(P85) (16) Modulation exerciser cannot be used with sequencing (P85) (16) 调节试验器不能用于群控
• Modulation exerciser should be used for test purposes and cannot be used with sequencing. 调节试验器不应用于测试目的，而且也不能用于群控。 • Check option 16 and parameter 85. 检查选项 16 和参数 85。
(P89) (16) Stat exerciser cannot be used with sequencing (P89) (16)温控试验器不能用于群控
• Stat exerciser should be used for test purposes and cannot be used with sequencing. 温控试验器应该用于测试目的, 不能用于群控。 • Check option 16 and parameter 89. 检查选项 16 和参数 89。
(P99) (P100) Graceful shutdown and assured low fire shut off not allowed (P99) (P100) 平滑关闭和保证低火关闭不允许
• If graceful shutdown is set, then assured low fire shut off cannot be used. 如果设置平滑关闭，那么保证低火关闭不能被使用。 • Check parameters 99 and 100. 检查参数 99 和 100。
(158) (112) Purge Pressure Proving Timeout must be longer than Pre-Purge Time (158) (112) 吹扫压力检验超时必须长于前吹扫时间
• Check options/parameters 112 and 158 检查选项/参数 112 和 158
(158) (118) Purge Pressure Proving Timeout must be longer than Post-Purge Time (158) (118) 吹扫压力检验超时必须长于后吹扫时间
• Check options/parameters 118 and 158 检查选项/参数 118 和 158

10.5. Forced Commission / 强迫性调试

The MM will be forced into Commission mode if there is a setting conflict as in 5.4.6, and/or the following conditions occurs:
如在 5.4.6 中出现设置冲突的情况，或者出现下面的条件，那么控制模块将被迫进入调试模式。

Forced Commission Message **强迫调试信息**
Fuel not commissioned. 燃料未调试
• Selected fuel must be commissioned. 选择的燃料必须进行调试
Servo configuration does not match commissioning. 伺服配置不匹配调试
• The number of servomotors selected does not match the last commission settings. 启用的伺服电机数量与之前的调试设置不匹配 • Check option 8. 检查选项 8
VSD configuration does not match commissioning. VSD（变频器）配置与调试不匹配
• The settings for VSD channel 4 do not match the last commission settings. 通道 4VSD(变频器)的设置与之前的调试设置不匹配 • Check options 90, 91 and 95. • 检查选项 90、91 和 95。
Golden start optioned but not commissioned. 启用黄金启动但还未调试
• Golden start has been optioned but not set in the last commission settings, see section 3.4.8. 已经启用但在之前的调试设置还未设置的黄金启动，见章节 3.4.8 • Check option 29. 检查选项 29
FGR optioned but not commissioned. 启用了烟气再循环但还未调试
• FGR start has been optioned but not set in the last commission settings, see section 3.4.9. 已经启用但在之前的调试设置还未设置的烟气再循环启动，见章节 3.4.9 • Check options 48, 49 and 50. 检查选项 48、49 和 50
EGA fuel/air-rich trim ranges changed. EGA 富油/富气微调范围改变
• EGA trim range does not match last commission settings. EGA 微调范围不符合上次调试设置 • Check parameters 13 and 19. 检查参数 13 和 19
BC Option/parameter mismatch. 燃烧器控制选项/参数不匹配
• There is a mismatch in the BC option/parameters 110 – 160. 燃烧器控制选项/参数 110-160 不匹配 • Check options 110 – 160 match to their corresponding parameter. 检查选项 110-160 是否匹配相应的参数
Invalid option value. 无效选项值
• An option value is outside the allowed range for the current software. 选项值是当前软件允许的范围之外 • Check all options. 检查所有选项

Forced Commission Message 强迫调试信息
Invalid parameter value. 无效参数值
• A parameter value is outside the allowed range for the current software. 参数值是当前软件允许的范围之外 • Check all parameters. 检查所有参数
Options have been reset. 选项已经重设
• Option settings have been reset due to data lost in an EEPROM error. 由于 EEPROM 错误的数据丢失，选项设置已重设。
Parameters have been reset. 参数已重设
• Parameter settings have been reset due to data lost in an EEPROM error. 由于 EEPROM 错误的数据丢失，参数设置已重设。
VPS sensor not commissioned. VPS（阀门检漏系统）感应器还未调试
• Gas pressure sensor has been enabled but not commissioned. Perform a gas pressure commission or a full re-commission. 燃气压力传感器已被启用但未调试。执行燃气压力调试或全部的重调试。
Commissioned gas pressure during valve proving too low. 在阀门检验期间燃气压力调试值过低
• Gas pressure stored during valve proving is less than option/parameter 133. 在阀门检验期间燃气压力的存储低于选项/参数 133。
Commissioned running gas pressure too low. 调试的运行燃气压力太低
• Gas pressure at one or more commissioned points is less than option/parameter 136. 一个或多个燃气压力调试值低于选项/参数 136。
APS sensor not commissioned. 空气压力传感器未调试
• Air pressure has been enabled but not commissioned. Perform an air pressure commission or a full re-commission. 已启用空气压力未调试。执行空气压力调试或全部重调试。
Commissioned air pressure too low. 调试的空气压力太低
• Air pressure at one or more commissioned points is less than option/parameters 147 and/or 149. 一个或多个空气压力调试值低于选项/参数 147 和/或 149。
VSD feedback variation too small VSD（变频器）反馈变化太小
• VSD feedback variation is within optioned tolerance band meaning that a constant value can pass for any point on the curve. VSD（变频器）反馈变化在启用期间容错意味着一个常数值可以通过曲线上的任何值。 • Check option 99. 检查选项 99
Air channel configuration does not match commissioning 空气通道配置与调试不匹配
• Air channel selected does not match the last commission settings. 启用空气通道与上次调试设置不匹配 • Check option 4. 检查选项 4
IR Upload was completed successfully, check configuration then restart. 成功完成红外线上传，检查配置再重启。
• Check data has uploaded successfully before restarting in run mode. 在运行模式重启之前，检查数据是否成功上传。

Installation & Commissioning Guide
Mini Mk8 MM
Part#. MMM8002
08 March 2022

MK8 微型控制模块手册
Part#. MMM8002
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