FIREYE MicroM

FLAME SAFEGUARD CONTROLS MEC320TS, MEP696, MEUV4

c UL US LISTED

FM APPROVED

WARNING: Selection of this control for a particular application should be made by a competent professional, licensed by a state or other government. Inappropriate application of this product could result in an unsafe condition hazardous to life and property.

DESCRIPTION

The Fireye MicroM Series Flame Safeguard Control is a compact, microprocessor based, modular burner management system designed to provide automatic ignition and continuous flame monitoring for commercial sizes of heating and process equipment firing any type of fuel. The advantages of the MicroM are zero dependence on discrete components previously used for timing functions thereby extending the stability of the system and reducing the effects of time and temperature.

A complete MicroM system consists of the relay module, MEC320TS, programmer module, MEP696, amplifier module, MEUV4, subbase, 61-3060 or 61-5042 and UV scanner, UV1A3 or UV1A6. An optional alphanumeric display (ED510) is available that provides complete English language description of the current operating status as well as diagnostic history.

To maximize safety the MEP696 provides early spark termination followed by a pilot proving period. This prevents the unwanted detection of spark generated by a maladjusted pilot and spark assembly. The air flow switch connected between terminals 7 and 6 must be closed within 10 seconds after the start of a cycle. Below is a detailed list of the MEP696 operating parameters.

Functions provided on the MEC320TS chassis and MEP696 programmer:

1. Fixed 30 second pre-purge period
2. Ignition terminal 4 shuts off 10 seconds into the Pilot Trial for Ignition
3. 5 second Pilot Proving period
4. Pilot terminal 3 shuts off 5 seconds into the Main Trial for Ignition
5. Post Purge has selectable 0 or 60 seconds duration
6. Release to modulate contacts 1 second after AUTO
7. Lockout occurs if air flow, terminal 6, is not proven 10 seconds into purge
8. Modbus communications allowing for hookup to plc system
9. Dip-switch selectable communication baud rate, 4800, 9600 or 19200 baud
10. Dip-switch selectable pilot trial for ignition timing, 5 or 10 seconds
11. Smart LEDs that provide on board diagnostic lockout information
12. Amplifier test jacks provide uniform 0-10 vdc for flame signal strength

SPECIFICATIONS

Supply: 120 VAC (min. 102, max. 132) 50/60 Hz.
Power Consumption: 12 VA (Operating)
Shipping Weight (Approx): 3 lbs (1.4 kg)

Table 1: **AMBIENT TEMPERATURE LIMITS**

	MAXIMUM		MINIMUM	
Control	140°F	60°C	- 40°F	- 40°C
Scanner UV1A, UV2, UV8A, 45UV3	200°F	93°C	- 40°F	- 40°C
45UV5-1007, 45UV5-1009	200°F	93°C	- 40°F	- 40°C
Photocell 45CM1	165°F	74°C	- 40°F	- 40°C
Flame Rod (Tip 2460 F)	1500°F	816°C	- 40°F	- 40°C
48PT2	125°F	52°C	-40°F	-40°C
CSIA5	140°F	60°C	-40°F	-40°C

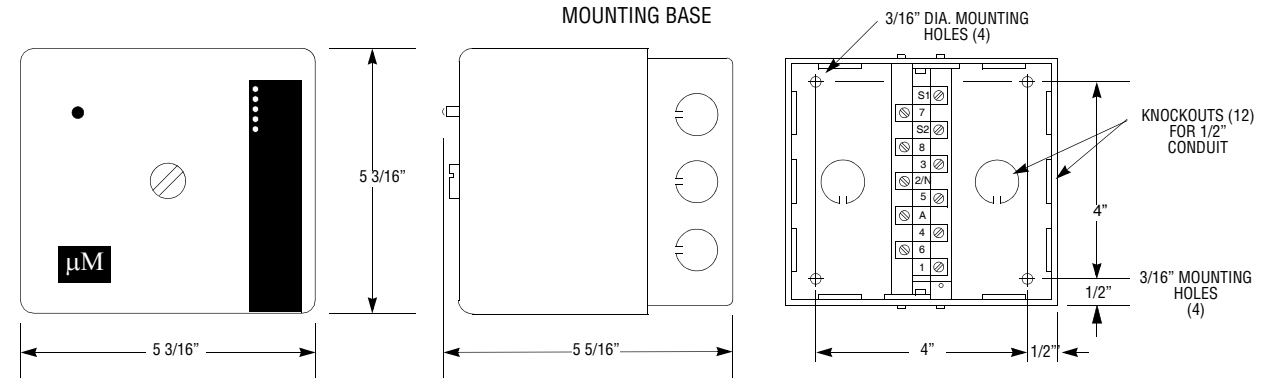
Table 2: **LOAD RATINGS**

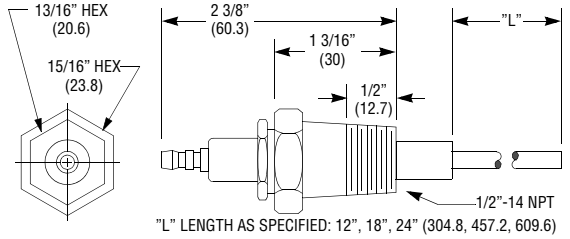
COMBINATION NUMBER	PILOT FUEL TERMINAL 3	IGNITION TERMINAL 4	MAIN VALVE TERMINAL 5
1	C	NO LOAD	E
2	B	NO LOAD	E
3	NO LOAD	NO LOAD	E
4	E	A	E
5	NO LOAD	A	E
6	D	A	E
7	D	A	D
8	NO LOAD	A	D

Table 3: **COMPOSITION OF EACH COMBINATION**

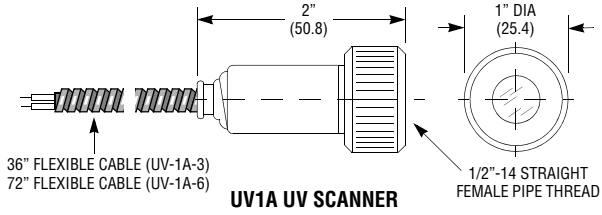
A	B	C	D	E
4.5A Ignition	50 VA Pilot Duty plus 4.5A ignition	180 VA Ignition plus motor values with: 600VA inrush., 360 VA open, 250 VA hold	2A Pilot Duty	65 VA Pilot Duty plus Motor valves with: 3850 VA in rush., 700 VA open, 250 VA hold

DIMENSIONS





69ND1 FLAME ROD



UV1A UV SCANNER

CAUTION: Published load ratings assume that no control be required to handle inrush current more often than once in 15 seconds. The use of control switches, solenoids, relays, etc. which chatter will lead to premature failure. It is important to run through a test operation (with fuel shut off) following the tripping of a circuit breaker, a blown fuse, or any instance of chattering of any external current con-

APPROVALS

Underwriters Laboratories Inc.

Listed Guide MCCZ - File MP1537

Listed Guide MCCZ7, Canada - File MP1537

Underwriters Laboratories Inc.

Recognized Components Guide MCCZ2

Recognized Components Guide, Canada MCZZ8 - File MP1537

Factory Mutual System (FM) Approved

In order for the MicroM to gather and retain statistical and historic data such as burner hours, burner cycles, system hours and average flame signal, it is necessary that Terminal 1 be powered at all times. Removing power from Terminal 1 at the end of the firing cycle causes all data gathered during the previous 16 hours or lockout occurrence will be lost. For conversions or upgrades from older TFM or M-Series II controls that use MART1 amplifiers, it is that Terminal 1 be directly

ORDERING INFORMATION

MicroM Chassis Types (Common for all controls, includes dust cover):	
MEC320TS	120 VAC input with MED8 daughter board
MEP696	Programer module, fixed 30 second pre-purge, lockout on flame fail, lockout on air flow opening 10 seconds after start of cycle, selectable baud rate, PTFI, post purge, recycle/ non-recycle air flow interlock, proof of air interlock open at start
MEUV4	UV Amplifier, 3 sec. FFRT, uses UV1A, UV2, UV8A, UV90 and 45UV3-1050 scanners
MED8	Plug in daughter board
UV1A3	Scanner, UV: 1/2" NPT connector, 3 ft. flex conduit
UV1A6	Scanner, UV: 1/2" NPT connector, 6 ft. flex conduit
61-3060	Closed wiring base, surface mounting
61-5042	Open wiring base, cabinet mounting

INSTALLATION OF CONTROL, SCANNERS AND FLAME DETECTORS

Wiring Base

Mount the wiring base on the burner or on a panel. The location should be free from excessive vibration and within the specified ambient temperature rating. The base may be mounted in any angular position.

All wiring should comply with applicable electrical codes, regulations and local ordinances. Use moisture resistant wire suitable for at least 90 degrees C. Good electrical wiring practice should be followed to ensure an adequate ground system. Refer to Fireye Service Note SN-100 separately and General Grounding Rules later in this document for grounding methods.

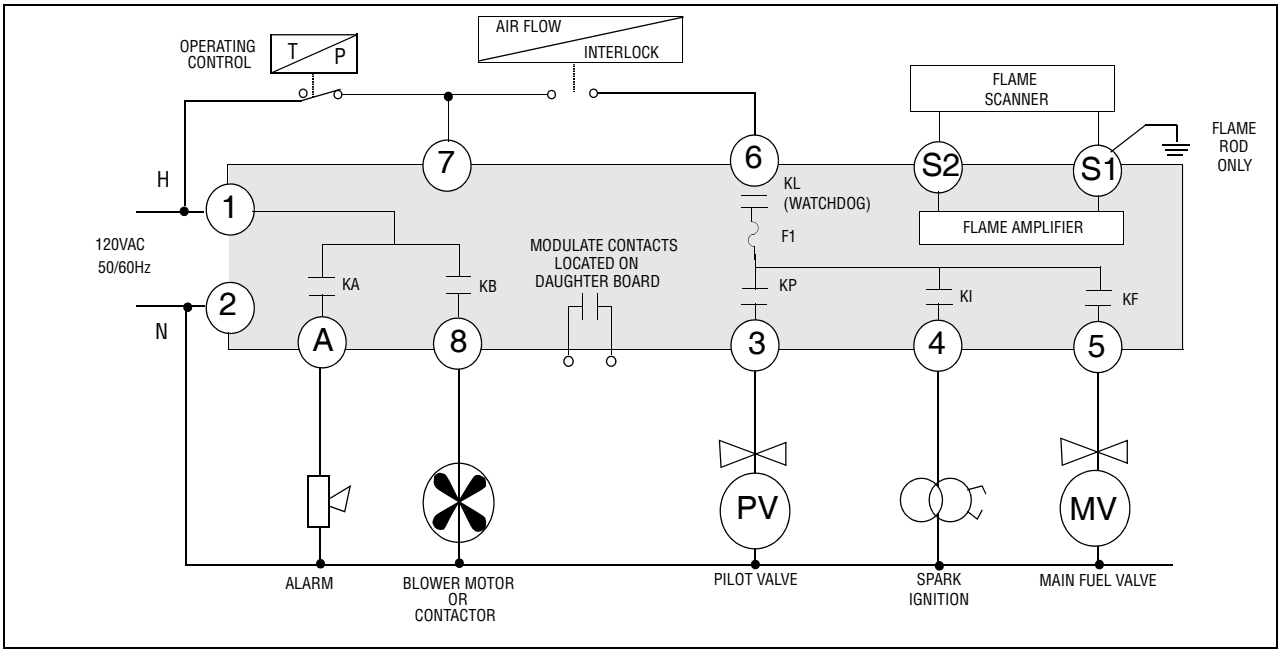
A good ground system should be provided to minimize the effects of AC quality problems. A properly designed ground system meeting all the safety requirements will ensure that any AC voltage quality problems, such as spikes, surges and impulses have a low impedance path to ground. A low impedance path to ground is required to ensure that large currents involved with any surge voltages will follow the desired path in preference to alternative paths, where extensive damage may occur to equipment.

WARNING: Controls require safety limits utilizing isolated mechanical contacts. Electronic limit switches may cause erratic operation and should be avoided.

Refer to bulletin MP-5601 for a detailed description of the MEP696 programmer.

Refer to bulletin MC-5000 for additional information about the MicroM product line.

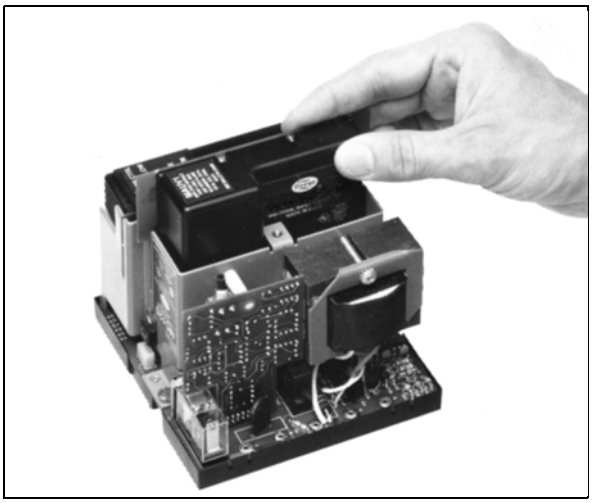
FIGURE 1. WIRING ARRANGEMENT FOR PILOT IGNITED BURNERS USING MEP696 PROGRAMMER



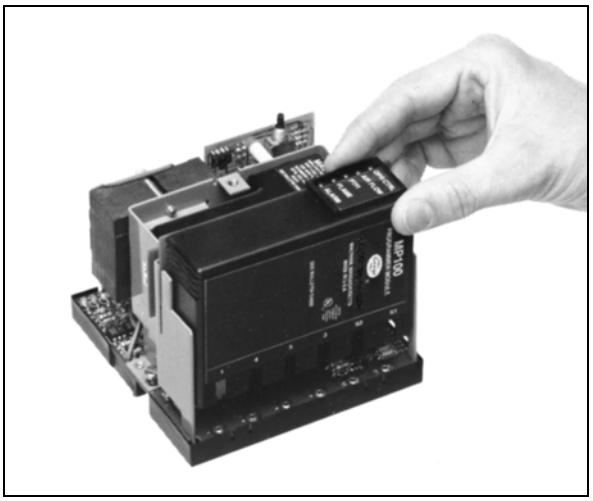
INSTALLING THE PROGRAMMER AND AMPLIFIER MODULES

WARNING: Remove power from the control before proceeding.

FIGURE 2. .



AMPLIFIER



PROGRAMMER

Remove the dust cover from the chassis. Insert the amplifier module into the slot in the corner of the chassis and gently push the module into position. Insert the programmer module into the slot at the right side of the chassis and gently push the module into position.

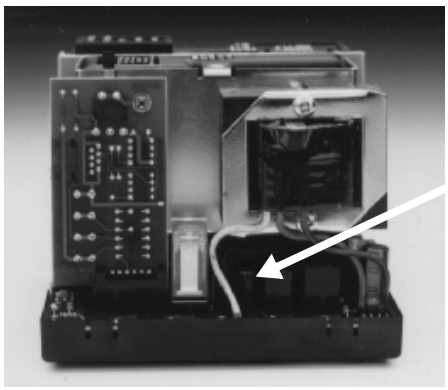
WARNING: Turn off the power when installing or removing the control.

Replaceable Fuse

The chassis modules are designed with a field replaceable fuse. The fuse is located on the printed circuit board below the transformer. In the event the fuse becomes OPEN, the Operating Control, PTFI, and Flame LED's will light. Terminals 3 (pilot) and 4 (ignition) KF will not be energized and the control will lock out and indicate Lockout, Check Blown Fuse. The fuse can blow as a result of an overload condition on Terminals 3, 4, or 5. To replace the fuse, remove power from the system and using a small screwdriver or similar tool, install a Fireye replacement fuse (P/N 23-197).

WARNING: Disconnect power before servicing.

FIGURE 3.



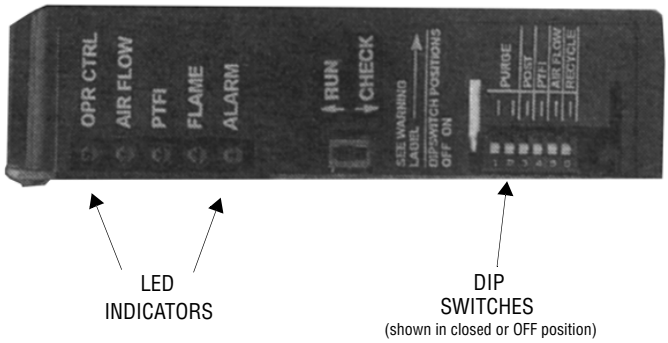
MEP696 Programmer Dip Switch Configuration

SWITCH						FUNCTION	
6	5	4	3	2	1		
				C	C	4800	BAUD RATE SELECTION
				C	O	9600	
				O	C	19200	
				O	O	19200	
			C			DISABLED	POST PURGE
			O			60 SECONDS	
		C				5	PTFI TIME
		O				10	
	C					DISABLE	PROVE AIR FLOW OPEN AT START
	O					ENABLE	
C						RECYCLE	
O						NON-RECYCLE	

Note: C refers to switch closed position, closed position is when the switch is toward the printed circuit board. O refers to switch open position or when the switch is moved away from the printed circuit board. Indicating arrow on top of programmer cover points toward closed position.

Except for baud rate selection, once the switches are set, they become permanently stored after 8 hours of continuous operation or they can be manually set through the use of the optional ED510 display. Refer to the section using the optional ED510 display for detailed information.

The ED510 display operates at 4800 baud only. To use the ED510 display, power must be removed and dip switches 1 & 2 must be set in the **CLOSED** position.



Dipswitch Definitions

Baud Rate: On every application of power, the communication baud rate is determined by switches 1 & 2. The available selections are 4800, 9600 ad 19200 baud. *Note the ED510 requires the baud rate to be set at 4800, switches 1 & 2 closed.*

Post Purge: If enabled, Terminal #8 (blower motor or contactor) will remain energized for 60 seconds after terminal #7 or Terminal #6 is detected as open.

PTFI Time: The length of time that Terminal #3 and Terminal #4 will be energized after the pre-purge period to detect pilot flame.

Prove Air Flow Open: After power is detected on Terminal #7 (limit control) and before energizing Terminal #8 (blower motor or contactor) no power must be detected on Terminal #6 (running interlock switch). If power is detected on Terminal #6, the MicroM will hold for 60 seconds after which safety lockout will occur. On recycle operation, if this is enabled, Terminal #8 will be de-energized to allow Terminal #6 to open.

Recycle: Applies to air flow interlock opening during the Run condition. If the air flow interlock (Terminal #6) opens, the control will de-energize Terminals #3, #4 and #5, and if Recycle is selected a new prepurge period will begin. Lockout and alarm will occur immediately after air flow interlock opening if Non-Recycle is selected.

LED INDICATOR LIGHTS

The MEP696 Programmer Module has 5 LED lights to indicate the operating status of the control and also to display the coded sequence under locked out conditions. The function of the lights under a normal operating condition is:

Operating Control: This LED is energized whenever the burner control switch and all other various limit switches are closed and power is applied to Terminal #7.

Interlock or Air Flow: This LED is illuminated whenever power is detected on Terminal #6, indicating the air flow switch or other running interlock is closed. If the operating control is closed and the running interlock switch remains open, this LED will flash at a 1 second rate. Lockout will occur if the switch remains open for 10 seconds into the start of the cycle.

PTFI: This LED is illuminated only during the pilot trial for ignition period and the stabilization period.

Flame: This LED is on whenever a flame signal is detected, and the control is not in a locked out state.

Alarm: This LED flashes when an alarm condition is detected and is also used as an address indicator (see communication).

During an alarm condition, the Alarm LED is made to flash at approximately a 1 second rate. The remaining four LEDs are illuminated as a coded sequence identifying the reason for the lockout. For instance, for a LOCKOUT - FLAME FAIL- PTFI, the INTERLOCK, PTFI and FLAME LED's will all be lit steady, with the Alarm LED flashing. This remains true if power is removed and then restored while in a locked out condition.

While in the Idle or Off state, the LEDs are made to flash sequentially every minute to show the operational status of the control. The LEDs can be tested by pressing and releasing the Reset push button, while in the Idle or Off state

LOCKOUT CODES

MSGN		DESCRIPTION	OP CTRL	AIRFLOW INTLCK	TFI	FLAME	ALARM
DEC	HEX						
6	6	Lockout Line Frequency Noise Detected	●	❍	❍	●	✱
7	7	Lockout Flame Fail - TFI	❍	●	●	●	✱
15	0F	Lockout Fault Unknown	●	●	●	●	✱
16	10	Lockout Amplifier High Count Fail	❍	❍	❍	❍	✱
19	13	Lockout Flame Fail - MTFI	❍	❍	●	●	✱
20	14	Lockout False Flame - STANDBY	❍	●	❍	❍	✱
21	15	Lockout Intrlck Open	●	●	●	❍	✱
22	16	Lockout Intrlck Closed	❍	●	●	❍	✱
24	18	Lockout Chassis Opto	●	●	❍	●	✱
37	25	Lockout Flame Fail - AUTO	❍	●	❍	●	✱
39	27	Lockout Fuel Valve State Change	❍	❍	❍	●	✱
54	36	Lockout Check Chassis	❍	❍	❍	●	✱
55	37	Lockout Check Programmer	❍	❍	●	❍	✱
56	38	Lockout Check Amplifier	●	❍	❍	❍	✱
58	3A	Lockout Amplifier Auto Check Fail	●	❍	●	❍	✱
59	3B	Lockout Check BLOWN FUSE	●	❍	●	●	✱
76	4C	Lockout Check Scanner	●	●	❍	❍	✱
N/A	N/A	System Error	✱	✱	✱	✱	●

❍ = NOT LIGHTED
● = LIGHTED
✱ = FLASHING

All LED's Flashing indicates defective programmer.

All MicroM chassis are shipped with a convenient peel off label that can be applied to any surface (inside cover) for future reference.

DIAGNOSTIC MESSAGES - TROUBLESHOOTING GUIDE

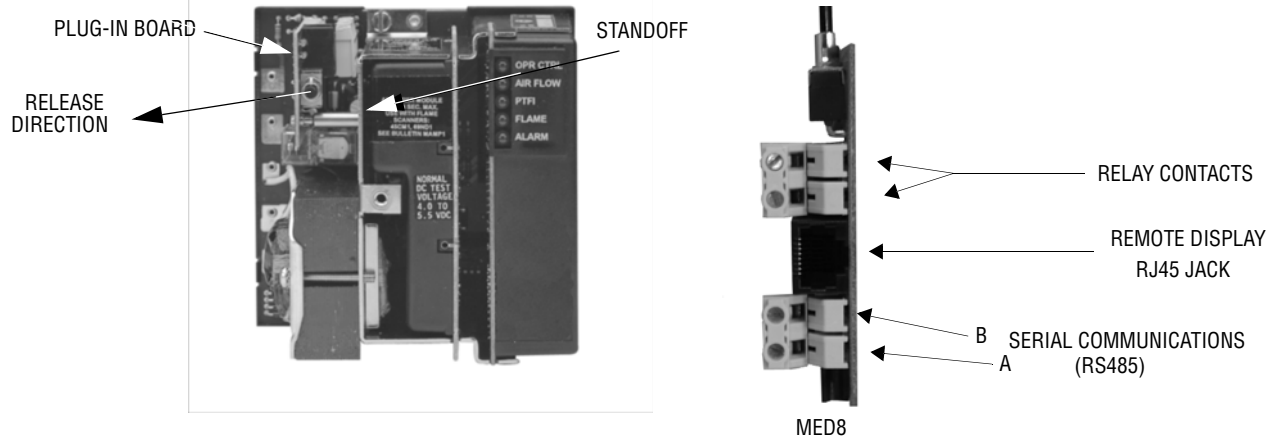
	POSSIBLE CAUSE	SOLUTION
Check Programmer	Voltage on Terminal 5 at improper time.	Inspect wiring to main fuel valve
	Welded watchdog relay	Replace chassis
	Internal diagnostic failure	Replace programmer
Check Chassis	Voltage on Terminal 3 or 4 at improper time.	Inspect wiring to pilot valve and igniter.
	Welded watchdog relay	Replace chassis
Chassis Opto	Opto-Coupler(s) short circuited	Replace chassis
Amplifier High Count Fail	Amplifier signal level high	Replace Amplifier module
Amplifier Auto Check Fail	Flame signal too high	Use orifice in sight pipe
	Internal Amplifier diagnostic fault	Replace Amplifier module
Check Scanner	Defective shutter	Inspect scanner wiring, replace scanner
	UV tube false firing	Replace UV tube or scanner
Check Blown Fuse	No power detected on terminal 3	Inspect defective pilot valve or igniter
	Defective fuse	Replace fuse
Line Frequency Noise Detected	Spikes detected on AC mains	Check for SCR motors or DC drives
		Inspect ground system
Fuel Value State Change	Terminal 5 (main fuel) detected on during TFI	Check external wiring or replace chassis
Check Amplifier	Amplifier not passing diagnostic tests	Replace Amplifier module
System Error	Noise transient	Check high energy ignition noise location. Be sure it is not arcing to chassis or wrapped with scanner wiring.

PLUG-IN DAUGHTER BOARD

Description

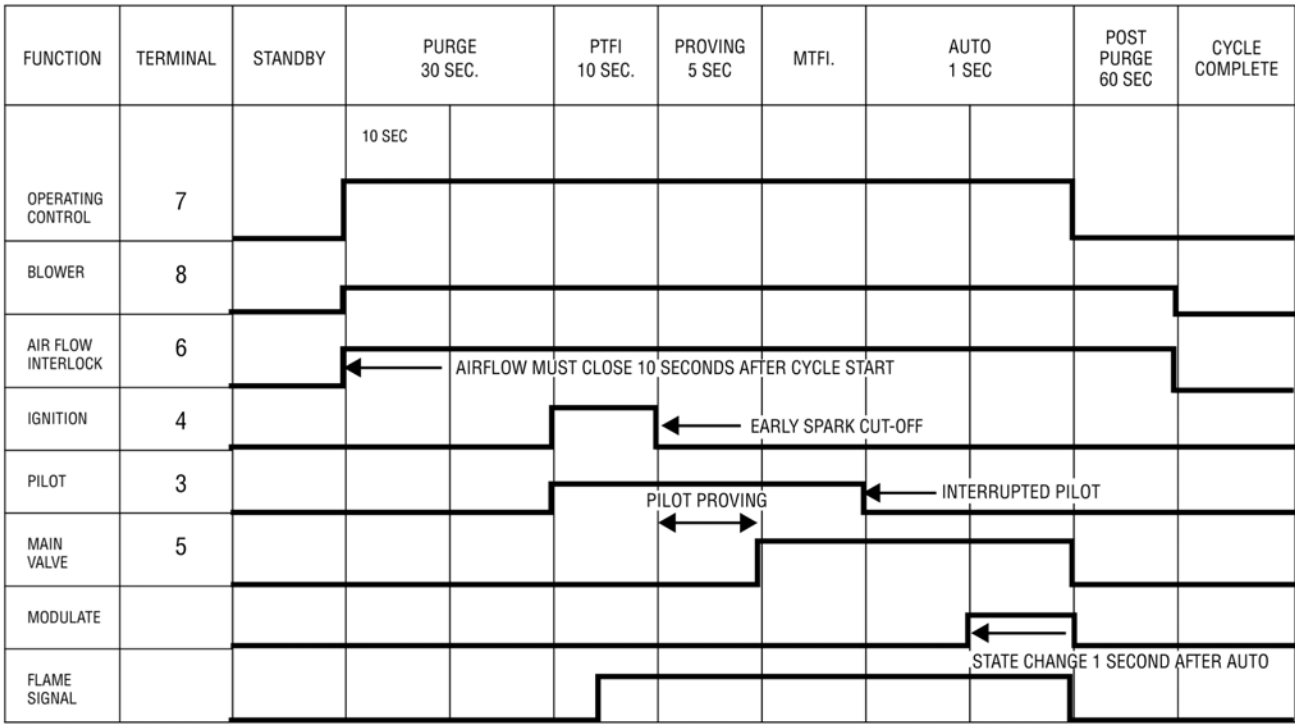
A plug-in board is pre-installed in the MEC320TS chassis to provide local reset, remote alpha-numeric display, serial communications and normally closed relay contacts.

FIGURE 4. PLUG -IN BOARD LOCATION AND INSTALLATION



SEQUENCE TIMING

Table 4: MEP696 Timing Sequence



COMMUNICATIONS

The protocol to be used is Modbus RTU. This is implemented by the master (PC, PLC, etc.) issuing a poll to the slave (MicroM) and the slave responding with the appropriate message.

A typical format of a poll request is as follows:

DST	FNC	ADR HI	ADR LO	DAT HI	DAT LO	CRC LO	CRC HI

DST refers to the logical address of the slave set but using reset pushbutton or ED510.

FNC is the function being requested. FNC 03 is a read request.

ADR is the message number or register number of the data being requested. In Modbus, register addresses begin at 40001 but is interpreted as address 00.

DAT is the number of words being requested. A word is an integer consisting of 2 bytes.

The normal response from a slave is as follows:

DST	FNC	DBC	DATA…. Hi/Lo	CRC LO	CRC HI

DBC is the data byte count being returned. It must be two times the DAT number from the poll request.

DATA is the data returned and is always a series of 2 byte integers. If 4 words were requested then DBC would be 8 and there would be 8 data bytes or 4 data words containing the requested data.

The format of the data is 4800, N, 8, 1 meaning 4800 baud, no parity, and 1 stop bit.

Below is a table of currently available messages provided by the MicroM programmers, followed by a description where necessary.

MESSAGE ADDRESS	WORDS REQUESTED	RESPONSE	VALUE
00	1-6	STATUS	83 (053H) = RUN; 202 (0CAH) = LOCKOUT
01	1	MSGN	Current message being displayed (see Table 3)
02	1	GSTAT	Defines Timer Type
03	1	TIMER	Time, Flame, Address
04	1	FLAME	Flame Signal
05	1-3	LOGSTAT	Current logic module, PURGE, PTFI, AUTO
06	1	INPUTS	Input limits state
07	1	OUTPUTS	Output relays state
08	2, 4 or 8	SYSMINS	System on minutes
10	2 or 4	BNRMINS	Burner on minutes
12	2	CYCLES	Completed Burner Cycles
14	1	LOCKOUT COUNT	Stored Lockout Count
15	1-6	LOCKOUT HISTORY	Last 6 Lockouts, first word is most current lockout
21	1-2	DEVTYP	Programmer device type, 5=EP, 6=EPD, 7=MicroM
22	1	AMPTYP	Amplifier Type; MECD=080H; MEUV=090H; MEIR=0A0H; MERT=0B0H; MEUVS=0C0H
23	1	PROGTYP	Programmer Type
24	2	FLAME SIGNAL AVERAGES	PTFI and Auto Flame Signal Averages
26	1-9	Combined Status	See Description Below
35	6	Most Recent Lockout Data	Returns complete lockout description of stored lockout history. Includes lockout message, lockout module, @ burner hours, and @ burner cycles
41	6	2nd Most Recent Lockout Data	
47	6	3rd Most Recent Lockout Data	
53	6	4th Most Recent Lockout Data	
59	6	5th Most Recent Lockout Data	
65	6	6th Most Recent Lockout Data	

Messages 00, 05, 08, 10, 15, 21 and 26 are unique in that a limited number of successive registers can be combined with these requests. For example, a request to message 00 can contain up to 6 data words. The response to this would contain STATUS, MSGN, GSTAT, TIMER, FLAME and LOGSTAT. If the requested data word count (DAT) were to be 2 then the response would contain STATUS and MSGN only. Message 15, last 6 lockouts, can return data ranging from 1 to 6, with 1 referring to the most recent lockout.

Message 26 returns the current operating status as well as stored burner hours and burner cycles as a snapshot of the entire MicroM system. When all 9 words are requested, the data returned consists of STATUS, MSGN, FLAME, INPUTS, OUTPUTS, BNRMINS, and BNRCYCS.

The MSGN being transmitted is a numerical value and must be interpreted by the communicating device, which actually is an advantage since this can be made to be whatever message text the end user wants. In other words, it allows for programming custom messages without actually changing the message in the programmer.

The MicroM stores its burner on time (Terminal 5 powered) and system on time (L1 powered) in minutes. Internally, the programmer converts this to hours for display purposes, however the result is rounded down. The information being supplied by Modbus will be the actual time in minutes and it is up to the communicating device to do the conversion. Since the maximum value stored in the MicroM is 9,999,999 minutes, the maximum value in hex therefore, is 98967FH and comprises of two data words. The maximum cycle count is 999,999 decimal or 0F423FH, still two data words. As an example, the System on Minutes data is transmitted from the MicroM to the interface as high word / low word as shown below:

MESSAGE ADDRESS 8		**MESSAGE ADDRESS 9**	
HIGH WORD		LOW WORD	
HIGH BYTE	LOW BYTE	HIGH BYTE	LOW BYTE
0	98H	96H	7FH

Note: Data from address 9 cannot be accessed directly.

All values are represented in a HEX or base 16 format.

GSTAT determines the type of value TIMER represents. TIMER can be a running timer such as is used in purge, a flame signal or meaningless. Only the lower nibble of GSTAT has any value. If this value is 0 then the TIMER value has no meaning. The value in TIMER is a background minute timer in the MicroM and should be ignored. If GSTAT is between 4 and 7, the TIMER represents the current value flame signal. If GSTAT is a 1, 2, or 3 then TIMER represents a running timer value.

The baud rate of the MicroM is fixed at 4800 bits per second. The format of the data is 8 data bits, no parity and 1 stop bit. Due to the RS485 format, the communication format is considered half-duplex. That is, only one user is permitted on the communication lines at a time.

The information contained in INPUTS and OUTPUTS represents the status of the interlocks and relays respectively. For the INPUTS, a 1 in the interlock position defines the interlock as being on or energize where the 1 in any bit position in the OUTPUT register signifies the relay as being energized.

INPUTS

			Term 5	Term 3	Term 6	Term 7	
Reset	Scrl	Mode	RF	Pilot	Intrlck	OpCntrl	Ref

Reset, Scrl and Mode represent the keypad located on the ED510 display. A ‘0’ in any of these positions indicates the switch is depressed. A ‘1’ in the opto-coupler position indicates the opto-coupler is on or interlock closed.

OUTPUTS

			Term 8	Term A	Term 3	Term 5	Term 4
N/A	N/A	N/A	Blower	Alarm	Pilot	Main Fuel	MTFI

A ‘1’ in any terminal position indicates the relay is energized. Term 4 indicates the state of K1 relay, located in the MEP500 series programmers.

It is suggested that repeated polling interval not be less than 200 mSec per request. Requesting data such as burner minutes, system minutes and burner cycles be kept at a minimum due to the amount of processing time required to gather that data.

Table 1: Logic Dispatch

LOGIC DISPATCHER		
VALUE		MicroM
HEX	DEC	
45H	69	MPOSTIDLE
46H	70	MPREPURGE1
47H	71	MPURGE
48H	72	MTFI
49H	73	MSTABLE
4AH	74	MTFMF
4BH	75	MAUTO
4CH	76	MSHTDWN1
4DH	77	MSHTDWN2
4EH	78	MIDLE

Table 2: Message Description

DEC	HEX	MicroM Message
1	1	L1-7 OPEN
2	2	FALSE FLAME
3	3	STARTING BURNER
4	4	
5	5	INTRLCK OPEN
6	6	LOCKOUT LINE FREQUENCY NOISE DETECTED
7	7	LOCKOUT FLAME FAIL - PTFI
8	8	UNIT ADDRESS
9	9	MTFI
10	0AH	IGNITION TIMING
11	0BH	
12	0CH	FLAME SIGNAL
13	0DH	CYCLE COMPLETE
14	0EH	OFF
16	10H	LOCKOUT AMPLIFIER HIGH COUNT FAIL
19	13H	LOCKOUT FLAME FAIL – MTFI
20	14H	LOCKOUT FALSE FLAME – STANDBY
21	15H	LOCKOUT INTRLCK OPEN
22	16H	LOCKOUT INTRLCK CLOSED
23	17H	INTRLCK CLOSED (PROVING AIR FLOW OPEN AT START)
24	18H	LOCKOUT OPTO FAILURE
30	1EH	FALSE FLAME
37	25H	LOCKOUT FLAME FAIL - AUTO
39	27H	FUEL VALVE STATE CHANGE
40	28H	AIR FLOW CLOSED
49	31H	LOCKOUT FLAME FAIL - PTFI
54	36H	LOCKOUT CHECK CHASSIS
55	37H	LOCKOUT CHECK PROGRAMMER
56	38H	LOCKOUT CHECK AMPLIFIER
58	3AH	LOCKOUT AMPLIFIER AUTO CHECK FAIL
59	3BH	LOCKOUT CHECK BLOWN FUSE
76	4CH	LOCKOUT CHECK SCANNER

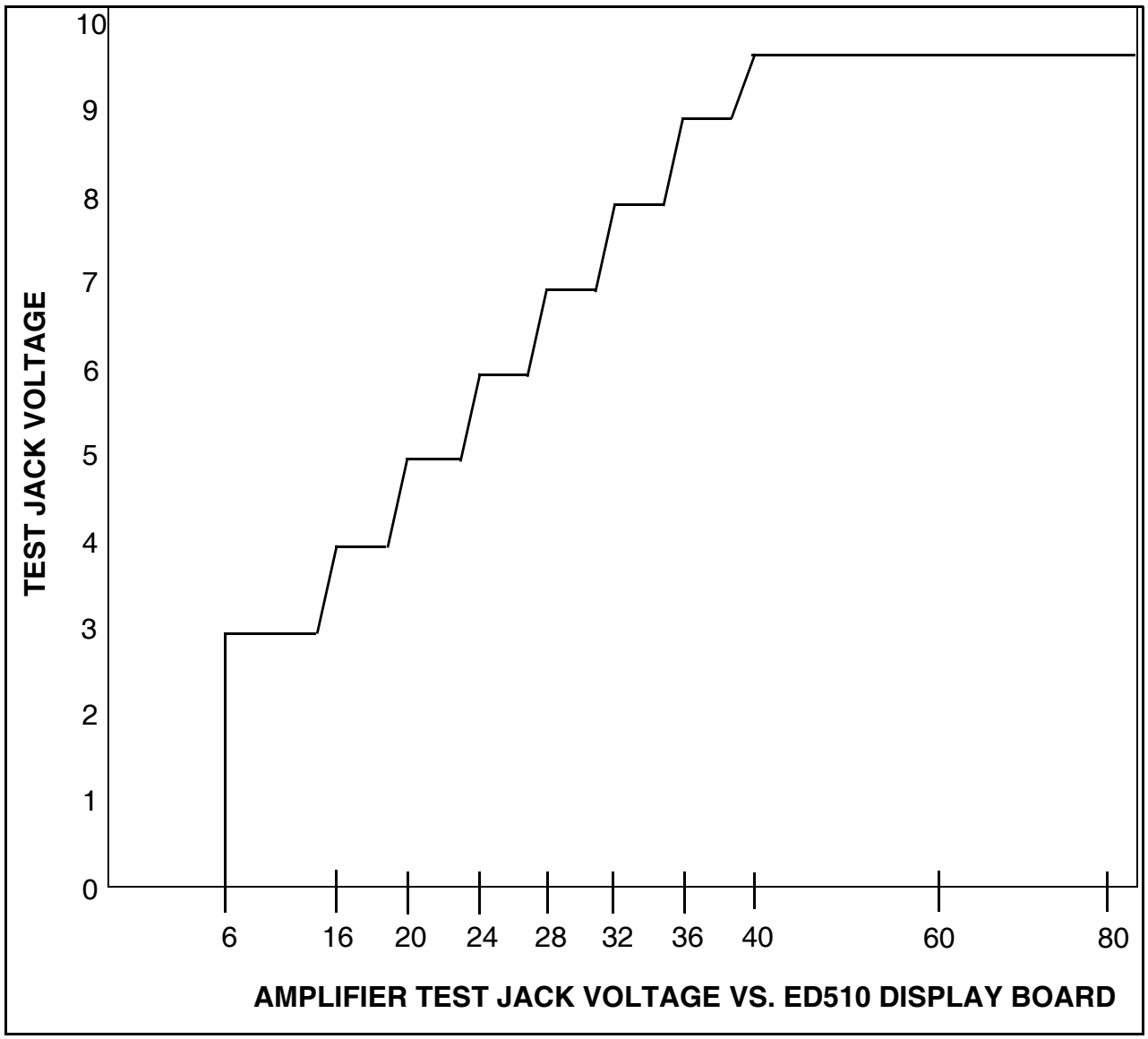
Addressing Modes

For communication in a multi-burner or multi-control environment, each MicroM must have a unique address. The range of address allowed within the MicroM is 0 to 31 allowing for a possible 32 units to be connected in a single multi-drop node. As shipped the default address is 0. The address of the MicroM may be set using two methods. Using the ED510 display, it is necessary is SCRL to the PROGRAM SETUP menu and enter that submenu with the MODE key. SCRL down until the display indicates UNIT ADDRESS with the actual address of the MicroM being displayed on the top line of the display. Pressing and releasing the RESET key will cause the address to increment. The

address after 31 is 0. The second method is to use the local reset located on the plug-in board. It is first necessary to open the operating control (L1-7) to have the MicroM in the IDLE or STANDBY position. Depressing the reset switch for greater than 10 seconds will cause the address of the MicroM to be displayed in a binary format on the LEDs located on the programmer board. Because the default is address 0, and since address 0 would mean no LEDs would be lit; the ALARM LED is made to flash when the address is 0. The OP CTRL LED is the least significant bit while the ALARM relay is the most significant bit. To increment the address counter, depress and release the RESET push button and observe the LED pattern. If the RESET switch is untouched for 30 seconds the current address displayed will be stored to memory and the MicroM will automatically exit the address mode.

TEST JACK VOLTAGE

For all amplifiers, the MicroM provides a uniform 0-10 volt signal to represent the flame signal strength. A signal reading greater than 4 volts is considered sufficient to provide reliable operation. This same signal is also available in a numerical format on the ED510 display. The chart below correlates the test jack voltage to the numerical value. The signal clamps at 10 volts at a numerical value greater than 42 and the numerical value clamps at 80.



NOTICE

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MC-3200
APRIL 16, 2013
supersedes June 6 2006