



E-3001
NOVEMBER 8, 2005



E300 CONTROL



E350 RIBBON CABLE

FIREYE® E300 EXPANSION MODULE

For use with the Fireye
FLAME-MONITOR™ Control



DESCRIPTION

The FIREYE™ E300 Expansion Module provides increased interlock supervision capability of the FLAME-MONITOR System. The Expansion Module connects to any EB700 FLAME-MONITOR Chassis by means of a ribbon cable. (P/N E350-3, E350-6).

By wiring any of sixteen interlock switches into the Expansion Module, the FLAME-MONITOR display automatically acts as a “first-out” annunciator for these interlocks. In addition, a fuel selection circuit is standard. The E300 is shipped with default messages associated with each set of terminals. The user has the ability to modify these lockout messages in one of two ways:

1. Use the ED510 display module to select a lockout alarm message for the individual terminals of the E300 from a library of available messages. Refer to Bulletins E-1101 or ED-5101 (E300 MESSAGE SELECT section).
2. Program a customized message (up to 40 characters in length) for the individual terminals of the E300 using an IBM compatible PC with the E300 programming software (available at no charge from Fireye) and the appropriate hardware. On most PC's Windows Hyperterminal can be used to program E300 messages.

Note: Modifying the E300 messages requires an EP Programmer with an Engineering code of 28 or later (Engineering codes are found after the date code, e.g. 9416-28).

The Expansion Module does not interfere with the normal operation of the FLAME-MONITOR System. It expands the message and diagnostic capability.

The E300 expansion module provides operational information and reduces troubleshooting time and expense. It expands the standard display messages of the FLAME-MONITOR to identify the specific limit in the operating control circuit or running interlock circuit which caused the burner shutdown or lockout. For a detailed description of the FLAME-MONITOR System, see Bulletin E-1101.

APPROVALS

Underwriters Laboratories Inc.: Listing, File #MH10808

Canadian Standards Association: LR7989/17617 Certification Record

Factory Mutual (FM): Approved

SPECIFICATIONS

Supply Voltage: 120V (+ 10% - 15%), 50 / 60 Hz

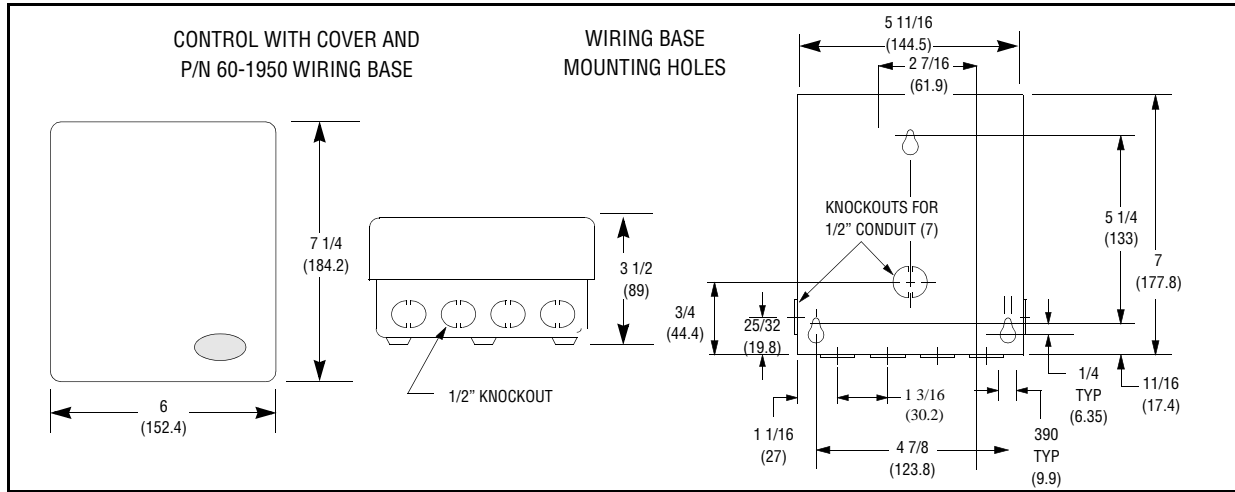
Ambient Temperature Levels: -40°F to +125°F (-40°C to +50°C)

Response Time: 170 milliseconds Purge/32 milliseconds Run

Weight: 0.5 lb.

Humidity: 85% R.H. non-condensing

DIMENSIONS



ORDERING INFORMATION



E300 EXPANSION MODULE WITH MOUNTING SCREW



E350 RIBBON CABLE (ORDERED SEPARATELY)



WIRING BASE (60-1950) (ORDERED SEPARATELY)

PART NUMBER	DESCRIPTION
E300	Expansion Module used with the EB700 FLAME-MONITOR chassis and 60-1950 wiring base
60-1950	Wiring base
E350-3	3 foot ribbon connector cable
E350-6	6 foot ribbon connector cable
EC485	RS232 to RS485 converter with power supply. Required to customize E300 lockout alarm messages.
ED512-2, -4, -8	Cable with RJ12 connectors on each end. Required to customize E300 lockout alarm messages.

OPERATION

The E300 Expansion Module is designed to expand the capability of the FLAME-MONITOR System by allowing the operator to individually track the operation of three additional recycling interlocks and thirteen running interlocks. The recycling interlocks are wired between the L1-13 terminals on the FLAME-MONITOR wiring base and the non-recycling interlocks are in the 3-P circuit.

Referring to the wiring diagram found on page 5, the auxiliary limits 1, 2 and 3 will act as an operating control to recycle the burner. Whenever one is open and the other limits and operating control are closed, the message on the display of the FLAME-MONITOR control will say:

STANDBY

AUX LIMIT #1 (or #2, or #3) OPEN (or the appropriate modified message)

Similarly, the interlocks in the 3-P circuit will change the standard running interlock message on the display from: LOCKOUT 3-P RUN INTERLOCK OPEN to be one which will individually identify the thirteen interlocks now being monitored by the E300, such as, LOCKOUT 3-P LOW OIL TEMPERATURE (or the appropriate modified message). The interlock switch chosen will be selected on a “first out” basis. The first switch which opens in the string to cause the condition will be displayed. The 3-P circuit is monitored after ten seconds on a burner start-up.

When a “lockout” condition is manually reset, the display on the FLAME-MONITOR and the Expansion Module is ready to begin a new burner sequence. Note the section *Lockouts* in the Bulletin E-1101.

Whenever more than one interlock switch in the L1-13 circuit is open on a start-up, the open interlock switch wired in the sequence closest to the L1 terminal will be displayed. Whenever more than one interlock switch in the 3-P circuit is open on a startup, the open interlock switch closest to terminal 3 will be displayed.



CAUTION: The E300 messages are stored in the EP Programmer of the FLAME-MONITOR control. The E300 messages shown on page 4, and on the wiring diagram on page 5 represent the default messages that are shipped with each programmer module. Unless these default messages are modified via the ED510 display module (Refer to Bulletin ED-5101) or customized via an IBM PC (Refer to CUSTOMIZING E300 MESSAGES in this bulletin), the E300 must be wired EXACTLY AS SHOWN, in the sequence as shown in the wiring diagram on page 5 to ensure proper operation.

The E300 must be connected to the FLAME-MONITOR control to provide access to the additional lockout messages associated with the E300 Expansion Module.

In operation, the 3 to P and L1 to 13 circuits are checked each half cycle (8 milliseconds) by separate photo optical couplers in the FLAME-MONITOR system to determine if any interlock is open. Upon detecting an open interlock, the microprocessor in the FLAME-MONITOR control initiates a LOCKOUT or HOLD message, then scans its inputs corresponding to terminals 23 through 35 and 20 through 22 (on E300) to determine which of the interlocks closest to terminal 3 (3-P circuit) or closest to terminal L1 (L1-13 circuit) is open. The microprocessor then selects the corresponding message from the stored message list and displays it. The E300 messages then become a part of the historical data which is stored in the FLAME-MONITOR system memory.

Any interlock in the 3-P or in the L1-13 circuit that opens for at least 33-50 ms while the burner is ON, or for at least 170 ms while the unit is in PURGE will cause the E300 and the FLAME-MONITOR control to respond with the proper message. Interlock contacts that temporarily open for shorter time periods will be ignored. Refer to the REQUIRED WIRING DIAGRAM on Page 5.

SPECIAL NOTES ON OPERATION

After any recycle (L1-13) or running interlock (3-P) limit opens, the control will display a POST PURGE message for 15 seconds before displaying the appropriate message.

On recycle type programmers (e.g. EP260, EP270 or EP380, EP390 set for recycle operation), if a running interlock (3-P) limit opens, the control will shutdown, and then try to restart. The control will hold for ten (10) minutes during purge waiting for the limit to close. If a second running interlock opens during this “hold” period, the message may change to reflect the new interlock.

If auxiliary limit #1, #2 or #3 opens during a firing cycle, the control will initiate a 15 second post purge and then go to a standby message. The FLAME-MONITOR will wait for the L1-13 circuit to close to begin a new cycle.

If multiple interlocks in the 3-P circuit are opened within the first 10 seconds of purge, the first interlock in the following sequence will be displayed:

Table 2: E300 MESSAGES (E110 Interlock System)

OIL MODE		GAS MODE	
Terminal	Message	Terminal	Message
Recycling Limits			
20		20	
21	L1-13 Aux #1 Open	21	L1-13 Aux #1 Open
22	L1-13 Aux #2 Open	22	L1-13 Aux #2 Open
13	L1-13 Aux #3 Open	13	L1-13 Aux #3 Open
Non-Recycling Limits			
23	High Water	23	High Water
24	Low Water	24	Low Water
26	No Fuel Selected	25	No Fuel Selected
28	Low Oil Pressure	27	High Gas Pressure
29	Low Oil Temperature		
30	Low Atomizing Media	30	Low Gas Pressure
31	High Pressure	31	High Pressure
32	High Temperature	32	High Temperature
33	Auxiliary Limit #4	33	Auxiliary Limit #4
34	Auxiliary Limit #5	34	Auxiliary Limit #5
35	Auxiliary Limit #6	35	Auxiliary Limit #6
P	Air Flow	P	Air Flow

Important: If a particular interlock is not used in your system, a jumper must be installed on the terminals of the Expansion-Module wiring base which corresponds to that interlock message. For example: If your system has no high temperature switch and no need for auxiliary limits 5 and 6, a jumper should be placed between terminals 31 and 32, 33 and 34, 34 and 35.

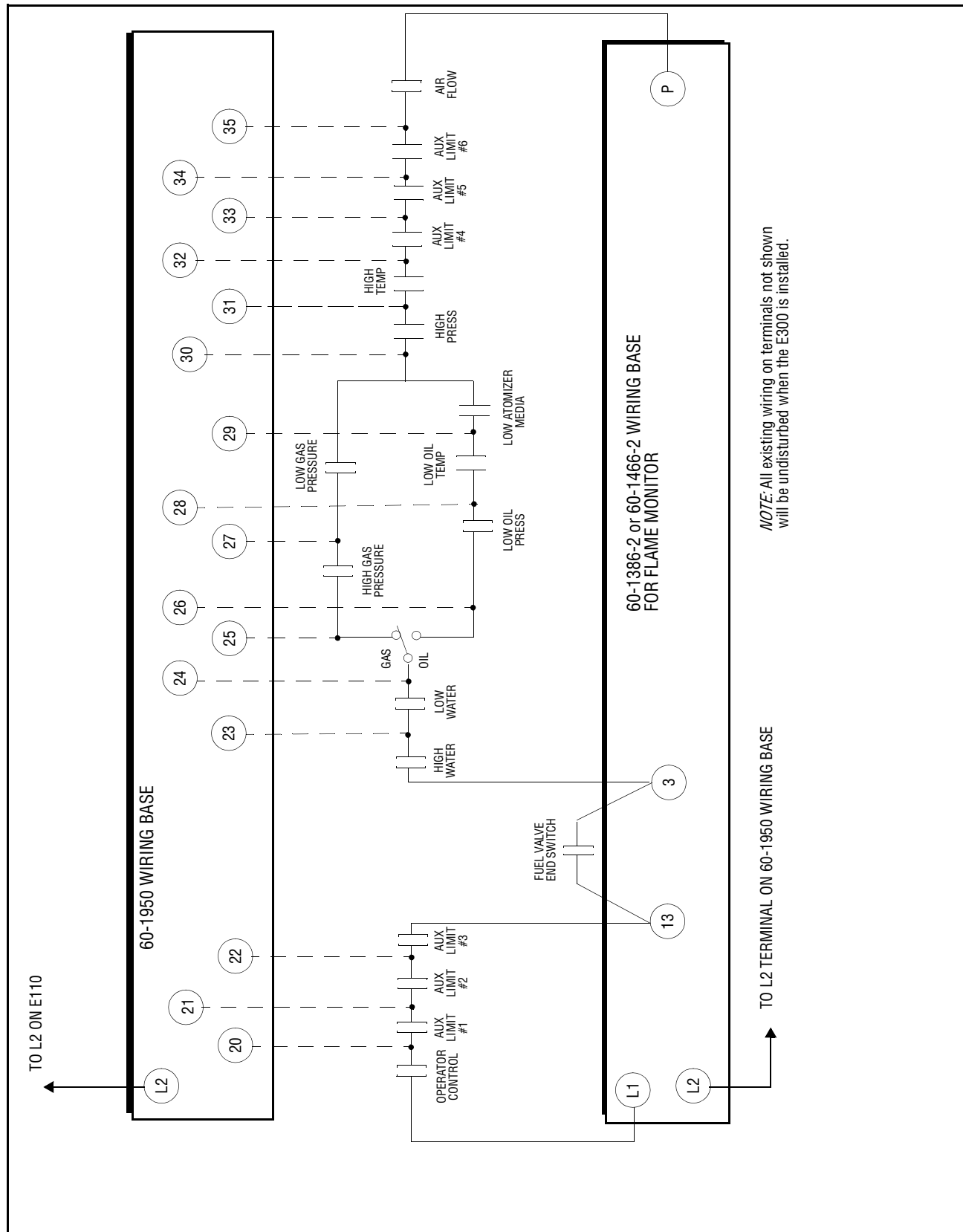
Important: When a single fuel burner is used, the fuel selector switch is not necessary. However, the appropriate terminals to determine fuel type should be jumpered. **For gas only:** terminals 24 and 25. **For oil only:** Terminals 24 and 26.

When the fuel selector switch is on the GAS position, the 3 oil interlocks are ignored by the FLAME-MONITOR control. When the switch is in the OIL position, the 2 gas interlocks are ignored.



CAUTION: E300 wiring should not interfere with the safety function of the operation interlock. Check each interlock for proper operation after wiring the E300.

WIRING DIAGRAM FOR DEFAULT MESSAGES



NOTE: All existing wiring on terminals not shown will be undisturbed when the E300 is installed.

TO L2 TERMINAL ON 60-1950 WIRING BASE

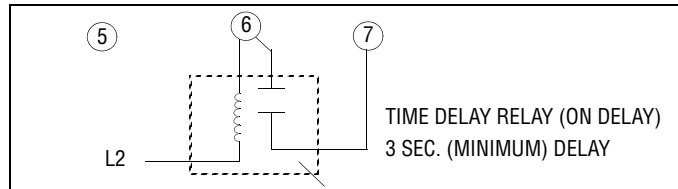
SPECIAL NOTES ON OPERATION

An important safety feature of the FLAME-MONITOR system is its ability to remember the proper timed operation of critical terminals such as fuel valve terminals 5, 6 & 7. Jumpering these terminals could cause the control to sense an unusual condition and lock out.

When changing fuels on combination burners where direct spark ignition is used, it is normal to jumper terminal 6 to 7. To assure that burner operation is not interrupted in this situation, you must do one of the following:

- Momentarily interrupt the power to L1 when changing fuels, before the initial burner cycle with the new fuel, or
- Install a time delay relay as shown in the diagram; this procedure can only be done with CODE 12 or higher programmers.

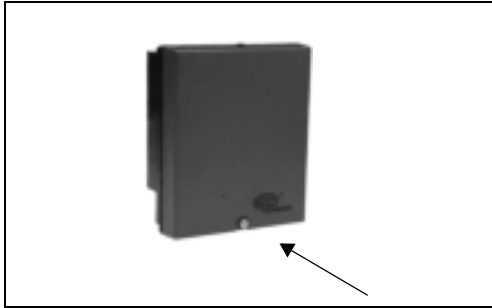
FLAME-MONITOR TERMINALS



INSTALLATION AND WIRING



CAUTION: Remove all power from the FLAME-MONITOR control and the E300 Module before proceeding.



1. Remove cover by loosening screw 1/4 turn.



2. Pull bottom out and lift up from top of clip.



3. Mounting screw is used to attach the control to its wiring base (60-1950). Mounting screw is supplied with the E300.



4. **Caution:** Route the ribbon cable so that it is not in contact or close proximity to line voltage wiring. Secure ribbon cable to double sided tape provided.



5. Remove the connector board cover at the bottom of the EB700 chassis and insert the end of the E350 ribbon cable into the circuit board cable connector on the bottom left side of the EB700 as shown.



6. Drape the ribbon cable down the front of the control as shown. Reinstall the connector board cover.

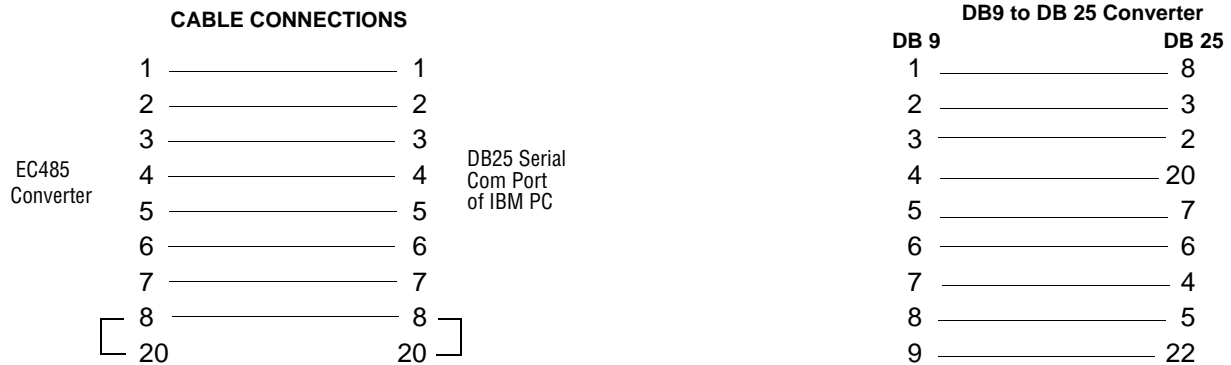
CUSTOMIZING E300 MESSAGES

The user can customize the lockout alarm message associated with each pair of terminals of the E300 Expansion Module. Each customized message can be up to 40 characters in length.

Note: Messages longer than 16 characters in length will scroll across the ED510 display. Messages longer than 8 characters will scroll across the ED500 display.

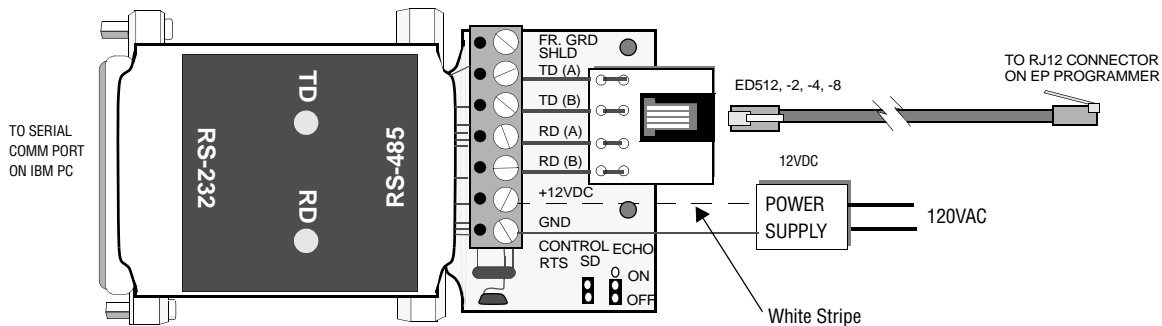
The following equipment is required:

- An IBM compatible PC with E300 programming software (available on the E700 or E720 software programs).
 - An RS232 to RS485 converter (P/N EC485 - includes a power supply).
 - An ED512-2, -4, or -8 cable.
 - EP programmer with an Engineering code of 28 or later.
1. Connect the EC485 converter to the serial COMMunication port of the IBM PC using a straight through cable. The cable should be configured as follows:



A 9 pin to 25 pin converter may be required if the serial COMMunication port on the IBM PC has a DB-9 connector. (See above for pin out connections).

2. Connect the RJ12 female connector (provided with the EC485) to terminals TD(A), TD (B), RD(A), and RD(B) on the EC485. The pins on the RJ12 connector will line up with the terminals on the EC485 converter.
3. Set the jumpers on the EC485 converter to SD and ECHO OFF. See diagram below.



4. Plug on end of the ED512-2, -4, -8 cable into the RJ12 jack on the EC485 converter, and the other end into either of the RJ12 jacks on the EP programmer.
5. The Flame-Monitor control must be powered, and the operating control (L1-13) should be open.

E300 Software

1. Insert the E300 software into the appropriate disk drive on an IBM PC and at the A: prompt (or B: prompt), type **E300** and press **RETURN**.
2. The screen will display the available serial COMMunication ports on the IBM PC. Use the **UP** or **DOWN** cursor position keys or Mouse to highlight the serial COMMunication port where the RS485/RS232 converter is connected.

Note: Pressing the F1 key will display Help information pertaining to each screen.

3. Press **RETURN** (or double click the Mouse) and the screen will display four baud rate selections (300, 1200, 4800, and 9600). Use the Up or Down cursor position keys or Mouse to highlight the selection: **4800, N, 8, 1 - E300 Programming**
4. Press **RETURN** (or double click the Mouse) and the screen will display a blank programing screen. The E300 software program is ready to type in the customized messages.
5. Type in password **&Z***



IMPORTANT: Before the user can type in any customized message, the following characters MUST INITIALLY BE TYPED IN: & Z * (followed by RETURN). The second character must be an upper case Z (not a lower case). These characters WILL NOT appear on the screen when they are typed.

Type in the appropriate command associated with the set of terminals whose message will be modified. All commands must begin with a period. See the table below.

Command	Terminals	Default Message
.T21	20 - 21	AUX LIMIT #1
.T22	21 - 22	AUX LIMIT #2
.T13	22 - 13 (On EB700 or E110)	AUX LIMIT #3
.TP	35 - P (On EB700 or E110)	AIR FLOW
.T35	34 - 35	AUX LIMIT #6
.T34	33 - 34	AUX LIMIT #5
.T33	32 - 33	AUX LIMIT #4
.T32	31 - 32	HIGH TEMPERATURE
.T31	30 - 31	HIGH PRESSURE
.TO30	29 - 30 ¹	LOW ATOMIZING MEDIA
.T29	28 - 29 ¹	LOW OIL TEMPERATURE
.T28	26 - 28 ¹	LOW OIL PRESSURE
.TG30	27 - 30 ²	LOW GAS PRESSURE
.T27	25 - 27 ²	HIGH GAS PRESSURE
.T24	23 - 24	LOW WATER
.T23	23 - 3 (On EB700 or E110)	HIGH WATER

¹ When the fuel selector switch is on the GAS position (terminals 24-25), these messages are ignored.
² When the fuel selector switch is on the OIL position (terminals 24-26), these messages are ignored.

PROGRAMMING THE E300 MESSAGES - EXAMPLE:

1. To change the message associated with the first limit in the 3-P running interlock circuit (terminal 3 of the EB700 or E110 and terminal 23 of the E300), type in **.T23** and press **RETURN**. The screen will display:

NONE STORED (If no customized message has been programmed for these terminals.)

CHANGE MESSAGE Y/N



IMPORTANT: The user must first type in the characters & Z * one time before typing in the command. These characters WILL NOT appear on the screen when they are typed.

2. Type in **Y** to change the message. The screen will display: * (The asterisk indicates a ready prompt)
3. Type in the customized message (up to 40 characters in length) and press **RETURN**.
4. To verify the programmed message, type in the command again (e.g..T23) and press **RETURN**. The screen will display:

.T23

HIGH STACK TEMP (or customized message)

CHANGE MESSAGE Y/N

5. Type in **N**

REVIEW CUSTOMIZED MESSAGES

The E300 software will store the last 32,000 bytes of data in RAM memory on the computer. The user can scroll backward or forward through previously entered commands and customized messages by using the Page Up/Page Down/Up Arrow/Down Arrow keys.

Note: Quitting the E300 software program deletes the commands and messages from RAM memory.

THE ONLY WAY TO DISPLAY THE CUSTOMIZED MESSAGES ON THE ED510 DISPLAY IS TO OPEN THE SAFETY LIMIT WIRED BETWEEN THE APPROPRIATE TERMINALS.

The Sub-Menu “E300 MSG SELECT” on the ED510 Display Module will not display the customized messages, but only display the available lockout messages from its library of messages. (Refer to Bulletin ED-5101).



IMPORTANT: The E500 Communication Interface will only display the E300 default messages. The E500 will not display the messages from the available library of messages or any customized messages.

MESSAGES

The following is a list of **default messages** which appear on the ED510 display when it is connected to an E300. The user also can modify the message associated with each set of terminals in one of two ways:

1. Use the ED510 display module to select a lockout alarm message for the individual terminals of the E300 from a library of available messages. Refer to Bulletins E-1101 or ED-5101 (E300 MESSAGE SELECT section).
2. Program a customized message (up to 40 characters in length) for the individual terminals of the E300 using an IBM compatible PC with the E300 programming software.


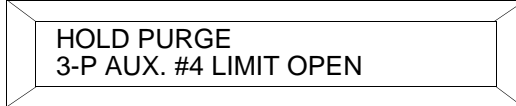
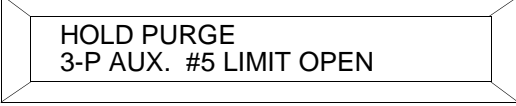

The default messages below also list in the description the associated terminal on the E300 wiring base. When the message is modified for a set of terminals (see above), the modified message will be displayed when the interlock wired to those terminals opens.

Note: Modifying the E300 messages requires an EP Programmer with an Engineering code of 28 or later (Engineering codes are found after the date code, e.g. 9416-28).

The various messages (default or modified) correspond to the terminals on the E300 wiring base (60-1950). For example, if the interlock switch wired between terminals 23 and 24 opens, the FLAME-MONITOR control will display LOW WATER (default message) or the appropriate modified message.

If the E300 wiring terminals for a particular interlock are not used in your system, a jumper must be installed across those terminals.

The FLAME-MONITOR control is compatible with two types of display modules (ED510 and ED500). The ED500 was the predecessor of the ED510 display and uses an older design. It does not have the features of the ED510 display. The following messages are associated with the ED510 display. These messages may differ slightly with the ED500 display.

HOLD MESSAGES ^{1,2}	DESCRIPTION
	The air flow switch has opened and the control is waiting until the condition corrects itself. ³ (Terminal P on FLAME-MONITOR wiring base.)
	The auxiliary #4 switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 33).
	The auxiliary #5 limit switch has opened and the control is waiting until the condition corrects itself ² (Terminal 34).
	The Auxiliary #6 limit switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 35).

¹. Messages more than 16 characters in length will scroll from right to left on the bottom line of the display.

². HOLD messages only apply to recycle-type programmers i.e. EP260 or EP380, EP390 set for recycle operation.

³. This condition will hold for 10 minutes on an EP260, EP270, EP380, EP390 series programmer before a lockout will occur.

HOLD PURGE
3-P HIGH GAS PRESSURE

The high gas pressure switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 27)

HOLD MESSAGES^{1 2}

DESCRIPTION

HOLD PURGE
3-P HIGH TEMPERATURE

The high temperature switch has opened and the control is waiting until the condition corrects itself. (Terminal 32).

HOLD PURGE
3-P HIGH PRESSURE

The high pressure switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 31).

HOLD PURGE
3-P HIGH WATER

The high water cutoff circuit has opened and the control is in a hold condition until it close.² (Terminal 23). *

HOLD PURGE
3-P LOW ATOMIZING MEDIA

The low atomizing media switch has opened and the control is waiting until the condition corrects itself. ³ (Terminal 30)

HOLD PURGE
3-P LOW GAS PRESSURE

The low gas pressure switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 30)

HOLD PURGE
3-P LOW OIL PRESSURE

The low oil pressure switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 28)

HOLD PURGE
3-P LOW OIL TEMPERATURE

The low oil temperature switch has opened and the control is waiting until the condition corrects itself. ² (Terminal 29)

HOLD PURGE
3-P LOW WATER

The low water cutoff circuit has opened and the control is waiting until the condition corrects itself. ² (Terminal 24)

HOLD PURGE
3-P FUEL SELECTED

The fuel selection switch was opened during, or at the beginning of an operating cycle. ² (Terminal 25 or 26)

¹. Messages more than 16 characters in length will scroll from right to left on the bottom line of the display.

². HOLD messages only apply to recycle-type programmers i.e. EP260 or EP380, EP390 set for recycle operation.

³. This condition will hold for 10 minutes on an EP260, EP270, EP380, EP390 series programmer before a lockout will occur.



STANDBY MESSAGES

DESCRIPTION

STANDBY
L1-13 AUX. #1 OPEN

The auxiliary limit switch #1 in the operating control circuit has opened and the control is waiting until the condition corrects itself.² The control will hold this message indefinitely. (Terminal 21)

STANDBY
L1-13 AUX. #2 OPEN

The auxiliary limit switch #2 in the operating control circuit has opened and the control is waiting until the condition corrects itself. The control will hold this message indefinitely. (Terminal 22)

STANDBY
L1-13 AUX. #3 OPEN

The auxiliary limit switch #3 in the operating control circuit has opened and the control is waiting until the condition corrects itself. The control will hold this message indefinitely. (Terminal 13 on the FLAME-MONITOR wiring base.)

LOCKOUT MESSAGES¹

DESCRIPTION

LOCKOUT PURGE²
3-P AIR FLOW OPEN

The air flow switch has opened and caused the control to lockout. (Terminal P on the FLAME-MONITOR wiring base).²

LOCKOUT PURGE²
3-P AUX #4 OPEN

The auxiliary #4 limit switch has opened and caused the control to lockout. (Terminal 33).²

LOCKOUT PURGE²
3-P AUX #5 OPEN

The auxiliary #5 limit switch has opened and caused the control to lockout. (Terminal 34).²

LOCKOUT PURGE²
3-P AUX #6 OPEN

The auxiliary #6 limit switch has opened and caused the control to lockout. (Terminal 35).²

LOCKOUT PURGE²
3-P HIGH GAS PRESSURE

With gas selected, the high gas pressure switch has opened and caused the control to lockout. (Terminal 27).²

LOCKOUT PURGE²
3-P HIGH PRESSURE

The high pressure switch has opened and caused the control to lockout. (Terminal 31).²

LOCKOUT PURGE²
3-P HIGH TEMPERATURE

The high temperature switch has opened and caused the control to lockout (Terminal 32).²

¹. Messages more than 16 characters in length will scroll from right to left on the bottom line of the display.

². The point in the operating sequence in which the lockout occurred will appear in the upper right hand corner of the display (e.g. PURGE, PTFI, MTFI, or AUTO). On recycle-type programmers (e.g. EP260, EP270, or EP380, EP390 set for recycle operation), the display will always indicate the LOCKOUT occurred during PURGE, even though the interlock could have opened during Purge, PTFI, MTFI, or AUTO and failed to close within the first 10 minutes of purge following the recycle.

LOCKOUT PURGE ²
3-P HIGH WATER

The high water cutoff circuit has opened and caused the control to lockout (Terminal 23). ²

LOCKOUT PURGE ²
3-P LOW ATOMIZING MEDIA

With oil selected, the low atomizing media switch has opened and caused the control to lockout. (Terminal 30). ²

LOCKOUT PURGE ²
3-P LOW GAS PRESSURE

With gas selected, the low gas pressure switch has opened and caused the control to lockout (Terminal 30). ²

LOCKOUT PURGE ²
3-P LOW OIL PRESSURE

The low oil pressure switch has opened and caused the control to lockout (Terminal 28). ²

LOCKOUT PURGE ²
3-P LOW OIL TEMPERATURE

The low oil temperature switch has opened and caused the control to lockout (Terminal 29). ²

LOCKOUT PURGE ²
3-P LOW WATER

The low water cutoff circuit has opened and caused the control to lockout (Terminal 24). ²

LOCKOUT PURGE ²
3-P FUEL SELECTED

The fuel selection switch was opened during or at the beginning of an operation cycle. (Terminal 25 or 26). ²

LOCKOUT PURGE ²
EXPANSION MODULE

The Flame-Monitor programmer has detected an error in attempting to read the E300 Expansion Module.





NOTICE

When Fireeye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireeye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireeye products and not to any other equipment or to the combined system or its overall performance.

WARRANTIES

FIREYE guarantees for *one year from the date of installation or 18 months from date of manufacture* of its products to replace, or, at its option, to repair any product or part thereof (except lamps, electronic tubes and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of the product on the face of its sales order. **THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES AND FIREYE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.** Except as specifically stated in these general terms and conditions of sale, remedies with respect to any product or part number manufactured or sold by Fireeye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireeye be liable for consequential or special damages of any nature that may arise in connection with such product or part.



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Supersedes July 2002

