Emergency Shutoff Station

Instruction Manual

SOFTWARE VERSION 2.0

INTEGRATED TIME SYSTEMS, INC.

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1. DESCRIPTION

The **Series 610 Emergency Shutoff Station** is a CMOS microprocessor-driven control unit whose primary purpose is to interrupt the flow of toxic or flammable gas from a storage cylinder(s) under unsafe or undesirable conditions. Secondary functions include the ability to serve as a cylinder cross-over controller, purge timer and access lock-out system.

The ESS is available in a single version for use on a one cylinder cabinet or in a dual version for two cylinder control. When connected to appropriate 'low cylinder' sensors, such as scales or pressure transducers, the dual version may be configured to automatically switch from one cylinder to the other as each cylinder empties. Meanwhile, various LEDs and buzzers indicate when a cylinder requires service.

Each ESS station includes (11) optically isolated digital inputs. These inputs may be used to monitor various flow, pressure, exhaust and fire sensors as required in a particular installation. Where required, two of these inputs may be connected to remotely located *ABORT* and/or *ALARM SILENCE* switches. A panel-mounted or enclosure-mounted **Remote Panel** is available for this purpose.

In addition to the digital inputs, (3) electrical digital outputs support remote displays, buzzers and/or relays. One or two pneumatic outputs provide for on/off control of the Emergency Shutoff Valves (ESV) on the cylinder(s) being controlled.

In place of a Remote Panel, the ESS may be configured to communicate with a central Annunciator & Control Station (ACS). The ACS is a specially configured ESS, which displays and controls up to ten individual ESS stations and/or purge controllers. A separate manual is available which describes operation of those configurations.

Programming of each ESS is provided by the manufacturer is response to the unique combination of sensors required by the installation. Sensor configuration data is typically provided by the end-user or installer, and stored in a Read Only Memory (ROM) by the manufacturer. The ROM is installed in a socket inside the ESS unit and may be replaced as system requirements change.

A transparent insert is installed in the front panel of each ESS unit to identify the list of sensors to the user. This removable insert may be updated as required whenever ROMs are changed.

Programmable parameters for each digital input include:

- the logical sense of the sensor (normally open versus normally closed)
- the latching characteristics (should gas flow be restored when sensor becomes safe?)
- whether the sensor is to be overridden during purge operations
- the debounce time required before the sensor is declared unsafe
- the effect of an unsafe sensor (turn off Cylinder 1, Cylinder 2, neither or both)

1.1. Front Panel Controls

A membrane front panel, using metallic snap-action switch domes on a printed circuit board base, provides a reliable operator interface with tactile feedback. Discrete LEDs indicate the status of the various solenoids and sensors.

STATION RESET

The *STATION RESET* button resets any inputs that have been unsafe and are programmed to latch. If all sensors are safe when the *STATION RESET* button is pressed, the Emergency Shutoff Valves (ESV) are re-energized permitting gas to flow.

ALARM SILENCE

The *ALARM SILENCE* button silences both the internal buzzer and the remote buzzer (if present). After the alarm has been silenced, it will sound again if any additional inputs become unsafe.

ABORT

The *ABORT* button on the ESS station triggers a *LOCAL ABORT* of the cylinder(s). Like the sensor alarms, the *LOCAL ABORT* can be canceled with the *STATION RESET* button, or the buzzer can be silenced with the *ALARM SILENCE* button.

PURGE

The *PURGE* key provides a means of disabling selected sensors while a gas panel is being purged. In addition, the *PURGE* keylock provides a means of manually de-energizing the cylinder valve without triggering an alarm. On an ESS configured to serve as a crossover controller, the keylock, in combination with the *STATION RESET,* provides a means of manually selecting one cylinder or the other.

1.2. Front Panel Displays

VALVE OPEN LED

The *VALVE OPEN* LED lights at 100% duty cycle (always on) when the Emergency Shutoff Valve is energized permitting gas to flow. An un-lighted LED indicates that the cylinder valve is off (no gas flowing). A flashing LED represents a prompt as explained in *Valve Control* on page 8.

ALARM LED

The *ALARM* LED flashes in sync with the buzzer to indicate unsafe conditions.

SYSTEM FAILURE LED

The *SYSTEM FAILURE* LED lights during power-up diagnostics and when the watchdog timer on CPU board has failed (see page 11).

POWER LED

The *POWER* LED lights at 100% duty cycle as long as AC power is applied.

BUZZER

The internal buzzer sounds with any lighted sensor LED. It may be silenced with the *ALARM SILENCE* button.

SENSOR DISPLAYS

The sensor display area on the ESS is divided into ten horizontal sensor windows. Each window contains two LEDs (usually red) for each digital sensor or signal input being monitored. Generally, the LED's in the leftmost column of the sensor display indicate the current status of the sensors, while the LED's in the rightmost column display any latched alarm conditions.

When an ESS is configured as a dual-crossover controller, two display windows are reserved to indicate the status of each cylinder. In this case, the LED on the left side of the window indicates the status of the 'low cylinder' sensor, while the LED on the right side of the window indicates the ON/OFF status of the Emergency Shutoff Valve (see page 8).

2. INSTALLATION

2.1. Physical Requirements

The ESS is designed to mount on the top surface on a cylinder storage cabinet. Two threaded 8/32 captive fasteners are provided to secure the electronics enclosure to the storage cabinet. The fasteners are mounted on 5.0 inch centers and are located 4.25 inches from the back of the ESS enclosure. The machine screws can protrude into the cabinet up to 1 inch without risk of contacting internal components. (See *Mounting Template* on page 25.)

While the enclosure is only 6 inches deep, additional clearance should be provided for the electrical and pneumatic connectors.

2.2. AC Power

The ESS contains a power-entry module at the top of the rear panel that permits operation at either 120 volts or 240 volts AC. Selection of line voltage is performed by changing the orientation of a small circuit board located just under the fuse in the power entry module.

To access the line voltage selector, remove the AC power connector and slide the clear fuse cover to the left. The small, rectangular circuit board may be pulled from its socket using a bent paper clip to hook onto the round hole in the board. Rotate the board such that the proper power line voltage, 120 or 240, will be visible under the fuse. Reinstall the board in its socket.

> Note: Damage to the electronics may result if an incorrect line voltage is selected!

The power entry module is fitted with a 2 amp, 250 v, 3AG fuse. To replace the fuse, remove the AC power connector and slide the clear fuse cover to the left. A plastic pull lever labeled *FUSE PULL* releases the fuse from its compartment.

2.3. Air Inlet

A barb fitting is provided on each solenoid for connection to a compressed air or N2 pressure source for the pneumatic actuators. The supplied fitting accepts 1/16" I.D. tubing.

The pneumatic pressure source for the pilot solenoids must be regulated high enough to reliably actuate the process gas solenoids (generally 90 psi minimum), yet low enough so as not to damage the pilot solenoids (100 psi maximum).

2.4. Solenoid Connections

A second barb fitting is provided on the output of each pilot solenoid for connection to the Emergency Shutoff Valve. This fitting also accepts 1/16" I.D. tubing.

2.5. Electrical Connections

Remote panel connections and sensor connections are made via two Phoenix Terminal connector strips, part number **17 92 139**. Each of these two plugs provides (14) signal connections for a total of 28 potential connections. The pinout of the terminal strips follows:

Pin	Function
1	Sensor Common
2	Sensor Common
3	Sensor Common
4	Sensor Common
5	Sensor Common
6	Sensor Common
7	Sensor Common
8	Sensor Common
9	Sensor Common
10	Sensor Common
11	Sensor Common
12	Sensor Common
13	Remote Status LED Out *
14	Remote Buzzer Out *

Pin	Function
15	Sensor 1 Input
16	Sensor 2 Input
17	Sensor 3 Input
18	Sensor 4 Input
19	Sensor 5 Input
20	Sensor 6 Input
21	Sensor 7 Input
22	Sensor 8 Input
23	Sensor 9 Input
24	Remote Abort Input *
25	Remote Alarm Silence *
26	+24 volts
27	Remote Alarm LED Out *
28	+24 volts

***** These inputs and outputs are programmable and may assume other functions in special installations.

2.5.1. Digital Inputs

The (11) digital inputs on the ESS are programmable and may be used as sensor inputs or remote panel connections. All digital inputs are optically isolated and require approximately 1 milliamp to activate. This current may be obtained from the internal 24 volt supply by providing a contact closure or a transistor closure between the particular sensor input pin and any of the *SENSOR COMMON* pins. Any of the pins labeled **+24 volts** may be used to power sensors that require a DC power supply.

2.5.2. Digital Outputs

The (3) electrical outputs on the ESS are each capable of supplying 150 mA @ 24 vdc to various external displays, buzzers and relays. Each output provides an NPN transistor closure to the negative side of the internal 24 volt power supply. For proper operation, each external device must have its positive terminal connected to a connector pin labeled **+24 volts DC** and its negative terminal connected to an appropriate output pin.

> Note: Shorting any of the outputs on the terminal block to any pin labeled +24 volts DC will cause permanent damage to the ULN2802A integrated circuit that drives the outputs.

2.6. Changing ROMs

Many of the operating parameters of the ESS are configured via variables in the operating system ROM (Read Only Memory). By installing different versions of the operating system, the ESS may be adapted to new sensors and new applications. The operating system ROM is installed in a socket on a printed circuit board inside the ESS cabinet.

On units that contain CPU board 9990114 Rev. B, the ROM used is a 200 nanosecond or faster, 8K x 8 CMOS ROM (generic part number 27C64). On units that contain CPU board 9990114 Rev. D or later, the ROM used is a 200 nanosecond or faster, 32K x 8 CMOS ROM (generic part number 27C256).

The following information is provided in the event it becomes necessary to replace a ROM in an existing installation.

2.6.1. Equipment Required

- Screwdriver, Phillips (insulated or non-insulated).
- Pliers, 5" or 6" long nose.

2.6.2. Procedure

- Disconnect the ESS from the AC power source. This can be accomplished by unplugging the line cord from the AC outlet or by unplugging the line cord from the ESS box itself.

- Using a Phillips screwdriver, remove the (4) 4-40x1/4" pan-head screws which secure the cover to the ESS chassis. Lift the cover from the chassis.

- The ROM is plugged into a socket labeled R0 on the CPU board. The CPU board is the 4.0" by 7.5" printed circuit board just behind the front panel. As you face the front of the enclosure, looking down into the exposed front panel assembly, the ROM is located at the right edge of the board.

- To gain access to the ROM, disconnect the 40-pin flat cable connector at the left side of the CPU board and slide the front panel assembly out of the chassis. (Be careful not to strain the flat cable more than necessary.)

- Hold the Front Panel/CPU assembly such that the membrane is facing you with the legends right side up. Look between the Front Panel circuit board and the CPU board. Note the location of the operating system ROM. The ROM is the IC (Integrated Circuit) with a white adhesive label covering its top. It is located on the right side of the CPU board approximately vertically centered. Observe the orientation of the ROM. Note that the notch or indentation in the ROM package that indicates pin 1 faces the center of the CPU board.

- Information on the adhesive label includes:

    1.) a configuration number (ex: 800-0600),
    2.) a version number (ex: -00), and
    3.) the date the software was compiled (format: yymmdd).

Note: All integrated circuits in the ESS are of CMOS construction. Reasonable precautions must be taken to discharge static buildup before handling circuit boards.

- Carefully slip the blade of the screwdriver between the ROM and its socket to loosen and remove the ROM.

- Examine the replacement ROM to insure that no pins are bent. If necessary, straighten any bent pins with the long nose pliers. For easy insertion into the socket, all pins must be perpendicular to the body of the package. If not, hold the ROM against a flat surface such that one row of pins is parallel to the surface. Apply sufficient force to align the pins to the package. Repeat this procedure for the other row of pins.

- Install the replacement ROM in its socket being careful to orient the notch or indentation toward the center of the board.

- Slide the Front Panel/CPU assembly back into the chassis. Note that the CPU board slides into the slots of the card guides.

- Reconnect the 40-pin flat cable connector to the CPU board. Be careful to push the connector completely into its housing.

- Before replacing the cover, reconnect the AC line cord to test for proper operation. Be aware that the AC line voltage is present and exposed inside the cabinet. If the unit is operating properly, all displays except the "System Failure" LED will be lighted continuously. The "System Failure" LED will flash several times as the electronics is being tested. After several seconds, the sensor LEDs will extinguish (except for any 'bad' sensors). At this point, the alarm may or may not sound and the outputs may or may not energize depending on the software configuration.

- If the unit does not complete the self test properly, recheck the connectors and the ROM for proper seating. If necessary, consult the factory.

- After confirming proper operation, replace the cabinet cover. Secure the cover with the (4) 4-40x1/4" screws that were removed earlier.

3. OPERATION

3.1. Power On Self Test

When AC power is applied to the ESS, a software module tests several hardware subsystems. This module includes a lamp test, a ROM checksum test, a RAM pattern test, a watchdog timer test, a crystal test, and a line frequency check. Any hardware failures during these tests cause the system to halt with the *SYSTEM FAILURE* LED activated and the Emergency Shutoff Valve(s) off. During the several seconds while the software is performing the tests, the user is given the opportunity to visually inspect the LEDs on the front panel for proper operation. All of the LEDs except *SYSTEM FAILURE* should be lighted.

When the power-up diagnostics' are successfully completed, the Emergency Shutoff Valve(s) may or may not be activated, depending on whether the power-fail sensor is configured to latch. If the power-fail sensor is programmed to latch, the alarm sounds and the Emergency Shutoff Valve(s) remain de-energized until the *NORMAL/PURGE* keylock switch is rotated from *PURGE* to *NORMAL* and the *STATION RESET* button is pressed. If the power-fail sensor is not programmed to latch, gas flow is restored after approximately 15 seconds when power-up diagnostics' are complete.

3.2. Valve Control

The Emergency Shutoff Valve on each gas cylinder may be manually controlled using the *NORMAL/PURGE* keylock switch on the front panel. When the key is rotated from *NORMAL* to *PURGE* or from *PURGE* to *NORMAL*, the Emergency Shutoff Valves are immediately de-energized (closed). Simultaneously a 15 second timer is triggered and the *VALVE OPEN* LED on the front panel begins to flash. If the operator presses the *STATION RESET* button before the 15 second timer times out, the Emergency Shutoff Valve is energized in the appropriate *NORMAL* or *PURGE* mode. If the timer is permitted to time out before the *STATION RESET* button is pressed, the *VALVE OPEN* LED stops flashing and the Emergency Shutoff Valve(s) remains off.

3.3. Crossover Control

In some installations, the ESS may be configured to serve as a crossover controller. In this type of application, two of the sensor inputs are connected to transducers that monitor the availability of gas from each of two cylinders. The exact type of transducer used depends on the application, but typical choices include: 1.) Scales that measure physical weight, or 2.) Pressure transducers that measure cylinder pressure.

On dual-cylinder crossover units, the user may switch between non-empty cylinders using the following procedure:

1. rotate the keylock from *NORMAL* to *PURGE*
2. rotate the keylock from *PURGE* back to *NORMAL*
3. press the *STATION RESET* button within 15 seconds

3.4. PURGE Mode

Purge Mode is activated by turning the keylock switch to the *PURGE* position and, then, pressing the *STATION RESET* button within 15 seconds. During purge, the Emergency Shutoff Valve is activated as during normal operation, but selected sensors are temporarily bypassed. This is typically used to disable excess flow sensors during purge operations during which flow rates are usually higher than normal.

A timer is activated during purge to turn off the Emergency Shutoff Valve(s) and sound an alarm should the unit be accidentally left in Purge Mode. Unless otherwise specified, this timer is set for 15 minutes.

3.5. Alarms

The local and remote buzzers have at least three distinct sound patterns. Unless otherwise specified by the user, the patterns are as follows:

3.5.1. Purge Alarm

The format of the **Purge Alarm** is a repeated pattern of two short beeps followed by a long pause. This pattern continues until the *ALARM SILENCE* button is pressed or the Purge Timer expires (see *PURGE Mode* on page 9).

3.5.2. Warning Alarm

The **Warning Alarm** format is usually assigned to those sensors that are not configured to shut off the Emergency Shutoff Valve(s). The format of the Warning Alarm is a repeated pattern of two long beeps followed by a short pause. This pattern continues until the *ALARM SILENCE* button is pressed or until the sensor(s) are reset.

3.5.3. Abort Alarm

The **Abort Alarm** format is usually assigned to those sensors that are configured to shut off one or more Emergency Shutoff Valves. The format of the **Abort Alarm** is a continuous pattern of short beeps (five per second). This pattern continues until the *ALARM SILENCE* button is pressed or until the sensor(s) are reset.

3.6. Lamp Test / Solenoid Pulse

A test mode is provided to insure that the front panel LEDs operate properly. The test also insures that the *STATION RESET* button and the *ALARM SILENCE* button are functioning properly.

To initiate this test, press and hold the *STATION RESET* button and the *ALARM SILENCE* button simultaneously. When both buttons are pressed, all front panel LEDs except *SYSTEM FAILURE* should light immediately.

Releasing either the *STATION RESET* button or the *ALARM SILENCE* button, or both, terminates the test and returns the unit to normal operation.

A variable in the configuration table enables an additional function in selected units during *Lamp Test* mode. When this feature is enabled, all solenoids are pulsed for a short interval (usually 0.5 seconds) at 5 seconds into the *Lamp Test* mode. While the solenoids are being pulsed, the *Alarm* led is forced off and the local buzzer is forced on for feedback to the user. This function permits the enduser to pressurize the manifold after a cylinder changeout thereby resetting any downstream pressure transducers.

4. THEORY OF OPERATION

Information contained in this section is provided for documentation purposes only and is not required for normal operation of the ESS.

4.1. CPU Board

The CPU board used in the ESS is a general purpose board that is used in several different products. Following is a description of several sub circuits contained on the board.

4.1.1. Watchdog Timer

This circuit generates the CLEAR signal that is used on the I/O board to force all outputs to their off condition. Software must trigger this circuit at least every 1.6 seconds for outputs to remain energized. This timer is also cleared by a reset signal generated by the Low Voltage Detector described below. The microprocessor can read the output of the watchdog timer for diagnostics' purposes.

4.1.2. Low Voltage Detector / Reset Generator

This circuit contains a 'band-gap' voltage reference to monitor the microprocessor's power supply. A RESET signal is sent to the microprocessor and to the watchdog timer (which forces outputs off) whenever the regulated power supply drops below 4.6 volts. Since all of the circuitry is CMOS and would operate reliably down to about 3.5 or 4 volts, this circuit provides more than adequate low-voltage protection.

4.1.3. Slow-Clock Circuit

This circuit reduces the microprocessor clock frequency by a factor of 10 whenever I/O operations are taking place and during power failures (on products that have a Ni-Cad battery). During I/O operations, this speed reduction permits use of slower CMOS display drivers.

4.1.4. AC line Digital Filter and Interrupt Generator

This circuit filters the incoming AC line frequency to remove any spurious noise pulses and to convert the sine wave to a square wave. The resulting signal generates an interrupt to the microprocessor for use in systems that require accurate 50 or 60 cycle line-frequency timing.

4.2. Software

The reaction of the ESS to the status of the various sensors is configured by the manufacturer to satisfy the requirements of the particular installation. For example, each sensor has its own 'debounce' timer to eliminate the effects of noisy switches and glitches. See the section on *Software Configurations* (page 14) for a complete explanation of the programmed parameters.

In addition to customized inputs, the various display windows and buzzers may be software configured. For example, each of the two LEDs on each of the ten sensor display windows may display any combination of the eleven sensor inputs.

5. SPECIFICATIONS

The specifications listed below relate to the requirements and capabilities of the components contained in the **Emergency Shutoff System** electronics enclosure only. The requirements of the various actuators and sensors located in the cylinder storage cabinet must be considered separately.

5.1. Physical

Width:	8.1 inches.
Height:	4.6 inches.
Depth:	6.0 inches.
Weight:	3.5 pounds.
Paint Brand:	Cardinal, high bake, water-based.

5.2. AC Power Requirements

Voltage:	100 to 125 vac or 200 to 250 vac, user selectable.
Current:	fused at 2 amps.
Frequency:	50 or 60 Hertz, automatically selected.
Power:	7 watts maximum.

5.3. Microprocessor

Microprocessor:	8 bit, CMOS, (Harris CDP1802CE).
EPROM:	8 kilobyte x 8 bit, CMOS, UV erasable.
RAM:	8 kilobyte x 8 bit, CMOS, static.
Crystal:	1 MHz.

5.4. Timing

Resolution:	0.1 sec .
Accuracy:	determined by accuracy of power line frequency (typically 0.01% short term error, or 3 seconds maximum long term accumulated error).

5.5. Pneumatic Inputs

Gas:	dry, compressed air or inert gas.
Pressure:	regulated at 80 to 100 psi.

> Note: The input pressure must be adequate to activate the pneumatic actuators, but must not exceed 100 psi. Minimal flow is required by the internal pilot solenoids only during switching. The overall flow requirements are determined by the pneumatic actuators.

5.6. Pneumatic Outputs

Quantity:	(1) or (2) as required by application.
Solenoid:	Humphrey, Mini-Mizer, M3E1 24VDC PCM MTL.
Maximum flow:	1.5 SCFM each @ 100 psi.

5.7. Digital Inputs

Quantity:	(11)
Trigger:	1 mA @ 5 to 40 vdc (24 volts when using internal power supply), edge or level sensitive as determined by software.
Timing:	Signals must be present greater than 0.1 seconds to guarantee detection.

Note: While the function of these inputs varies by installation, typical uses include:

- Sensor inputs.
- Alarm Silence input from remote panel.
- Abort input from remote panel.

5.8. Digital Outputs

Quantity:	(3)
Sink Capability:	150 milliamp @ 24 volts DC (Darlington NPN closure to 24 volt return).

Note: While the function of these outputs may vary by installation, typical uses include:

- Buzzer on remote panel.
- Status LED on remote panel.
- Alarm LED on remote panel.
- Handshake signal to Annunciator & Control Station.
- Status signal to centralized alarm system.

5.9. Power Supply Output

Note: A 24 volt DC power supply is accessible at the rear terminal block for powering sensors or transducers.

Voltage:	20 to 28 volts DC
Current:	250 milliamp

6. SOFTWARE CONFIGURATIONS

6.1. Variables

The following instructions detail the procedure for submitting an ESS configuration to the manufacturer such that a ROM and a front panel insert can be generated. (See page 18 for a blank form listing the software variables and page 20 for an example of a completed form.)

Header Information

In the block at the bottom of the form labeled "Customer", fill in the installation name and any comments that might help identify this particular ESS configuration. The manufacturer will assign a configuration number and date when the ROM is prepared.

Input Functions

The (16) vertical data columns on the configuration form are used to determine the response to each of the digital inputs. As shown on the form, (11) of the inputs are available via the rear panel connectors, while (5) of the inputs are "built-in" via front panel switches and hardware functions. Of the (11) inputs available on the rear panel connectors, (9) are typically assigned to various sensors, while (2) are typically reserved for remote panel functions. The columns on the form that are already filled in pre-assign those system functions that are not normally accessible to the user. Before continuing with the form, fill in the name of each sensor at the top of its corresponding column.

Output 1

Put **1** in the column(s) of any sensor(s) that are to control pneumatic output 1. Put **0** in columns for those sensors that do not affect output 1.

Output 2

Put **1** in the column(s) of any sensor(s) that are to control pneumatic output 2. Put **0** in columns for those sensors that do not affect output 2.

Polarity

Put **1** in the column(s) of any sensor(s) whose contacts are ***safe when open***. Put **0** in columns for those sensors that are ***unsafe when open***.

Latching

Put **1** in the column(s) of any sensor(s) that are to latch when the sensor becomes unsafe. These sensors will require a ***STATION RESET*** to restore gas flow. Put **0** in columns for those sensors that are to restore gas flow when the sensor becomes safe.

Purge Override

Put **1** in the column(s) of any sensor(s) that are to be ignored during ***Purge***. Put **0** in columns for those sensors that must continue to be monitored.

Warning Only

Put **1** in the column(s) of any sensor(s) that are to sound an alarm without interrupting gas flow(s). Put **0** in columns for those sensors that must interrupt gas flow(s).

Debounce Time

Specify the amount of time (in tenths of seconds) a sensor must be unsafe before the ESS reacts.

Count Value

Not used

Count Clear Time

Not used

Power Fail

Put **1** in the column(s) of any sensor(s) that are to generate the ***Power-fail*** function. Usually, only the *Power Fail* column will contain a 1.

Local Abort

Put **1** in the column(s) of any sensor(s) that are to generate the ***Local Abort*** function. Usually, only the *Abort* column will contain a 1.

Reset

Put **1** in the column(s) of any sensor(s) that are to generate a ***Reset*** function. Usually, only the *Reset* column will contain a 1.

Local Alarm Silence

Put **1** in the column(s) of any sensor(s) that are to generate the ***Local Alarm Silence*** function. Usually, only the *Alarm Sil* column will contain a 1.

Purge (Max Time____min)

Fill in the PURGE interval in minutes. After this time has expired, the ESV(s) are shut off and an alarm is sounded. Put **1** in the column(s) of any sensor(s) that are to initiate the ***Purge*** function. Usually, only the *Purge* column will contain a 1.

Remote Abort

Put **1** in the column(s) of any sensor(s) that are to generate the ***Remote Abort*** function. Usually, only the *Remote Abort* column will contain a 1.

Remote Alarm Silence

Put **1** in the column(s) of any sensor(s) that are to generate the ***Remote Alarm Silence*** function. Usually, both the *Alarm Sil* and the *Remote Al Sil* columns will contain a 1.

Display Windows 1 through 10

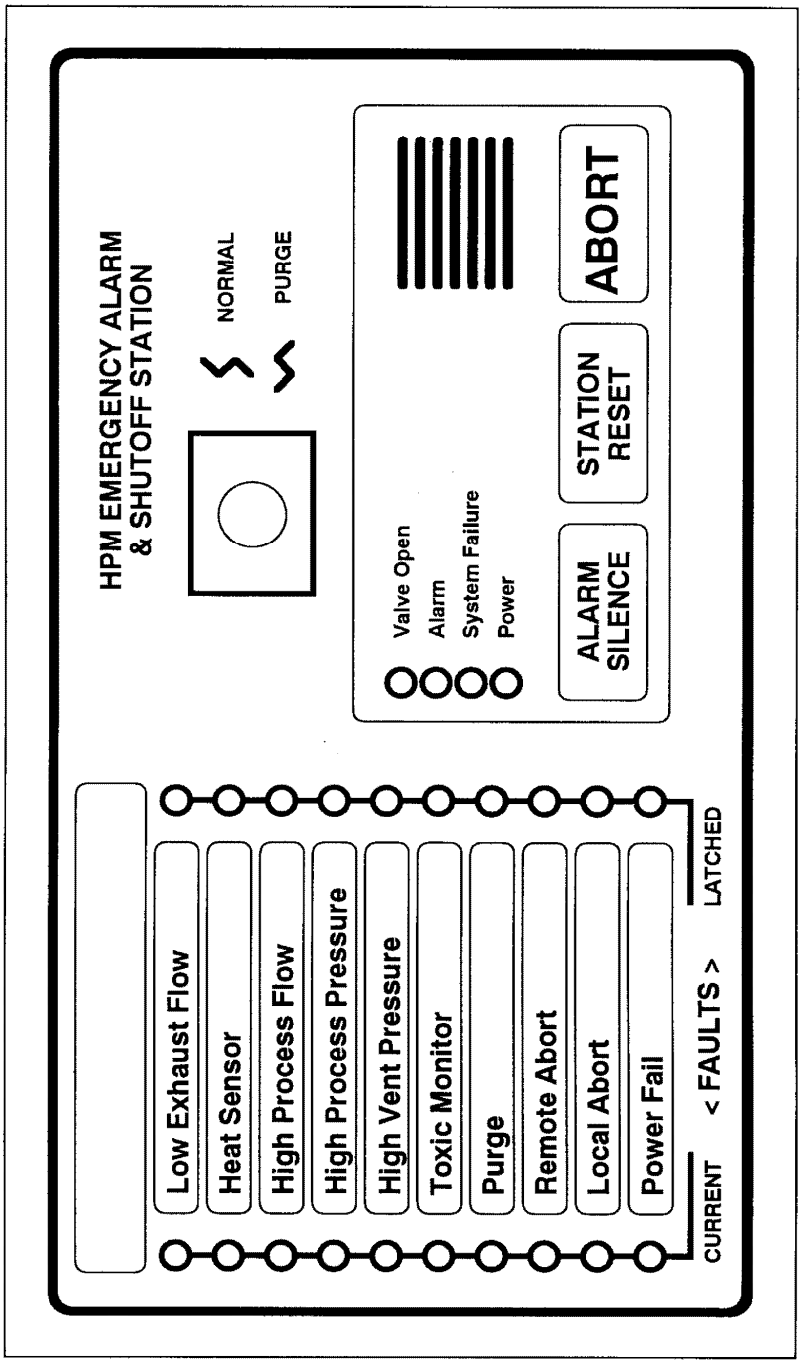
Just to the right of each of the Display Window numbers, fill in the exact text to be printed on the insert in that window. Then, put a check mark in the column(s) of any sensor(s) that are to be displayed in each of the display windows. With Version 2 software, the windows may be sub-divided such that each window displays two functions - one sensor on the left side and a second on the right side.

6.2. Blank Configuration Form

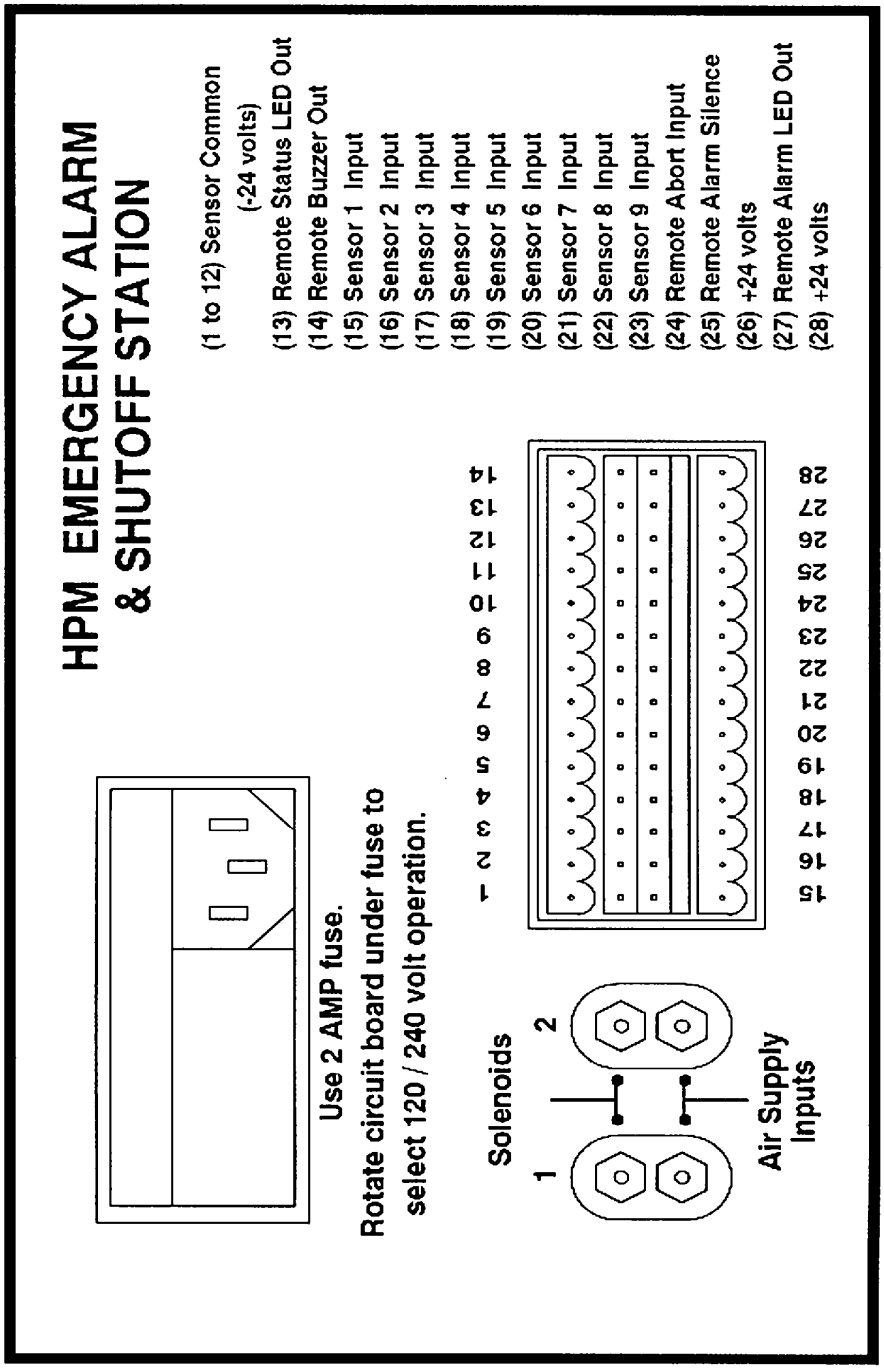
6.3. Sample Configuration Form

7. APPENDIX

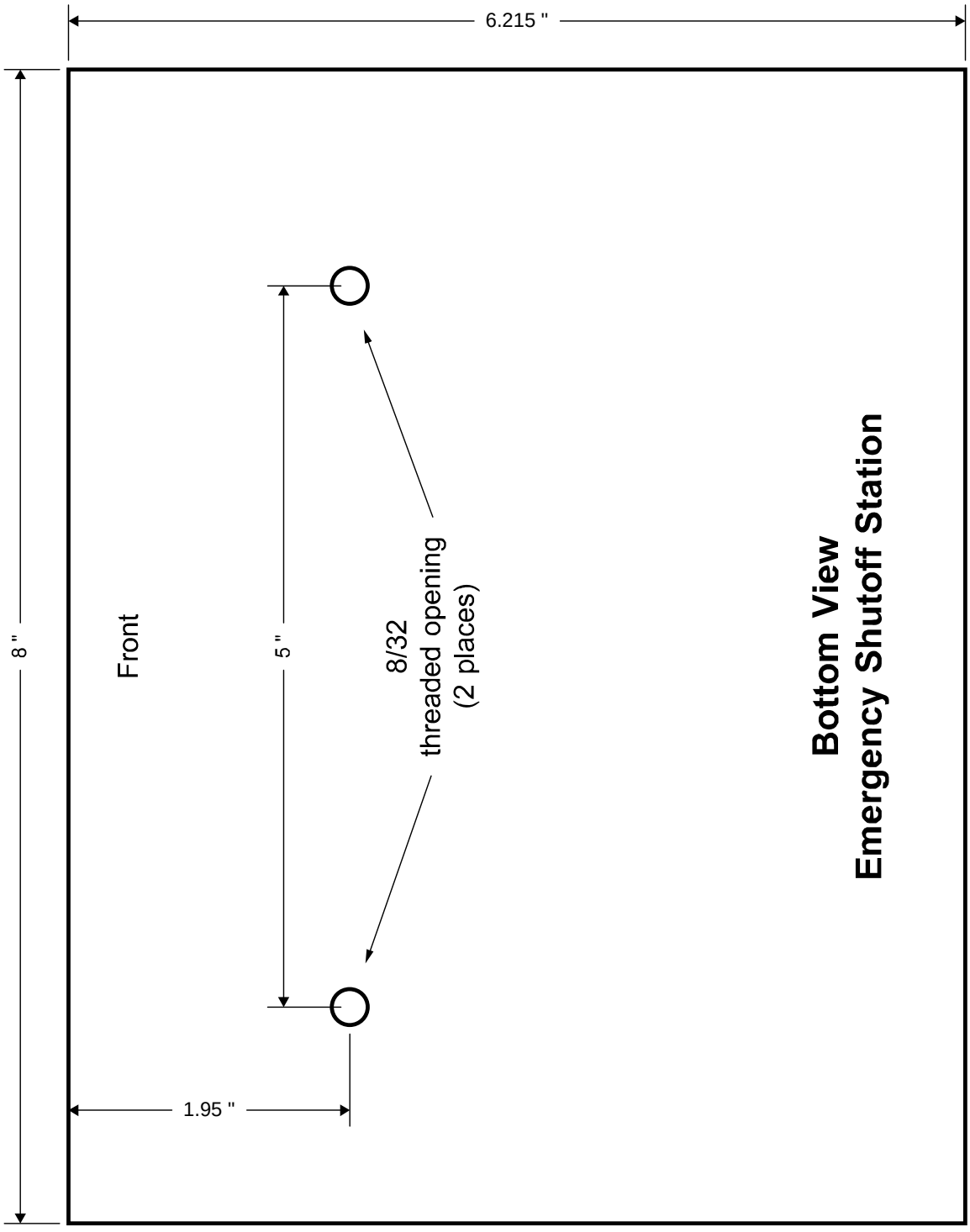
7.1. Front Panel Drawing



7.2. Rear Panel Drawing



7.3. Mounting Template



7.4. Remote Panel Wiring

Function	Male 'D' Connector on Remote Panel	Female 'D' Adapter on ESS	ESS Terminal Block
Abort Switch	1		24
Alarm Silence Switch	2		25
Status LED	3		13
Buzzer	4		14
Alarm LED	5		27
-24 volts	6		10
-24 volts	7		10
+24 volts	8		28
+24 volts	9		28