

**Operating  
Guidelines  
Region II  
Mobile Burn  
Trailer**

**1. Purpose**

The purpose of this Standard Operating Procedure (SOP) is to address the requirements, procedures and standards to be used and followed during training while requesting and operating the Mobile Burn trailer (MBT). Also addressed are personnel requirements, certifications and standards that must be met while training or instructing with the Mobile Burn Trailer. This procedure is to be followed by any person using the burn trailer, regardless of rank, jurisdiction or affiliation. It is the goal of the Mobile Regional Burn Trailer to provide realistic training including live fire burns with the Mobile Burn Trailer in the most secure and safest training environment possible.

**2. Verification of Workers Compensation Coverage & Liability Insurance**

Users of the MBT, must provide the Director of Training of the New Haven Regional Fire Training Academy verification of workers compensation coverage for all participants and certificate of liability insurance. This verification / certificate of insurance can be faxed:

New Haven Regional Fire Academy  
203-946-7881

**3. Requirements, Procedures and Standards:**

The National Fire Protection Association (NFPA) has set standards for use in live fire burning facilities and acquired structures. Operators of the Region II Mobile Burn Trailer will follow NFPA 1403, Standard on Live Fire Training Evolutions as the minimum standard for using the Mobile Burn Trailer while training using live fire events. This will focus on NFPA 1403, Chapter 5 Gas Fired Live Fire Training Structures. (Copy Contained Herein).

**4. Repairs**

If for some reason the unit does not function, or not function properly and routine troubleshooting does not work. The unit shall not be repaired unless by a qualified maintenance technician that has attended training by KIDDE on maintenance and repair of the MT1000 MBT.

**5. Scheduling**

Scheduling will be done through the Region II Fire Coordinator. Request for the use of the Regional trailer will be made to the Coordinator (currently Ray Crowley) via email or phone. The Coordinator will maintain a scheduling calendar and will be responsible for all transportation logistics and scheduling propane deliveries.

**Coordinators Contact Information:**

Ray Crowley  
[raymondcrowley@sbcglobal.net](mailto:raymondcrowley@sbcglobal.net)  
Phone: 203 627 8189

**6. Region II Fee Schedule**

Each jurisdiction will be billed prior to delivery of the trailer for the flat move fee (300.00) X (2) 600.00, A nominal fee of 150.00 dollars will be added to cover the cost repair and or

maintenance. Propane delivered to the site upon completion of the training will be billed separately to the jurisdiction.

Flat fee to move within Region II	600.00	
Fee for repair and maintenance	150.00	
Propane used to be billed post training	<u>XX.XX</u>	
Total for each onsite training	750.00	<b>Plus Propane</b>

**7. Out of Region Fee Schedule**

The advisory board of the Region II MBT has set an out of region usage fee for the Region II MBT as follows:

Flat fee to move out of Region II	1000.00	
Fee for Repair and Maintenance	150.00	
Propane used to be billed post training	<u>XX.XX</u>	
Total for each onsite training	1150.00	<b>Plus Propane</b>

**8. Billing**

Billing and invoice processing will be done by the Region II Fire Coordinator. The Coordinator will track payments and submit to the New Haven Regional Fire School vendor invoices for payment.

**9. Payment**

Payment will be made to the **New Haven Regional Burn Trailer** by the requesting jurisdiction. The account will be maintained by the New Have Regional Fire School with oversight by the New Haven Regional Burn Trailer oversight board.

**Billing address:**

New Haven Regional Burn Trailer  
c/o New Haven Regional Fire Academy  
PO Box 374  
New Haven, CT 06502-0374

**10. Advisory Committee**

An advisory committee will oversee major expenditures for repairs or purchase of props or maintenance contracts. Routine maintenance and emergency repairs are at the discretion of the New Haven Regional Fire Academy. The Advisory Committee will also be provided with an annual activity and financial report to be prepared by the Director of the New Haven Regional Fire Academy.

**11. Cooperative Training**

- a. Cooperative training is encouraged.
- b. In these cases only one jurisdiction will be billed. (The jurisdiction that the trailer is being delivered to.)
- c. The sponsoring agency will be responsible for recouping funds from whomever they are sharing the MBT with.

**12. Operational Requirements:**

When any jurisdiction or department, is going to conduct a live burn using the Mobile Burn Trailer, the following personnel billet and apparatus requirements shall be met;

- Burn Operator – This person must have completed a Train-the-Trainer on use and operation of the Kidde Mobile Fire Trainer.
- Lead Instructor – This person shall be a Connecticut State Certified Fire Service Instructor I or greater.
- Safety Officer (who has been trained by the burn operator on the trailers use and the Temperature Monitoring System and Emergency Shut Downs)
- EMS Personnel
- A student instructor ration of 5:1 shall be maintained.
- Provisions for rehabilitation of personnel.
- Rapid Intervention Crew.
- Accountability system.
- Fire Pumper (s)
- Redundant water supply

**13. Documentation**

All documentation shall be kept by the sponsoring agency of the event. This includes:

- Documentation of burn rotations
- Verification of walk through
- Pre-burn briefing
- Accountability
- Fire Attack Plan
- Site Map
- Safety Plan
- Rehabilitation Plan
- Communications plan
- EMS plan
- Injuries that occurred during training event

**14. Mobile Burn Trailer Requirements for Live Burns:**

- All participant must have had completed the Job Requirements contained in NFPA 1001 Standard for Firefighter Professional Qualifications related to the following subject areas:
  - Safety
  - Fire Behavior
  - Portable Extinguishers
  - Personal Protective Equipment
  - Ladders
  - Fire Hose, Appliances and Streams
  - Overhaul
  - Water Supply
  - Ventilation
  - Forcible Entry
- All personnel operating as either Instructors, Safety Officer(s), Participants, Burn Operator, Back-Up (RIT) shall be provided with full NFPA approved Personal Protective Equipment including:
  - Boots

- Helmet
- Gloves
- Protective Hood
- Turnout Pants
- Turnout Coat
- SCBA
- The designated Burn Operator will inspect the Mobile Burn Trailer with the Lead Instructor to verify safety and that the requirements for NFPA 1403 have been met.
- Provisions shall be made by the lead instructor and safety officer for rehabilitation of fire personnel.
- All doors and windows shall be unlocked and unbolted; however they may be closed for training purposes.
- Burn materials shall be limited to Propane. **Wood, wood pallets, straw, hay and excelsior shall not be allowed.**
- Burning is limited to the props provided.
- A Pre-Burn Briefing shall be conducted by the Lead Instructor and Safety Officer.
- Lead Instructor and Safety Officer shall ensure a Pre-Burn walk-through is conducted and include familiarization of emergency stop switches.
- Water Supply shall be redundant. Hydrant, Tanker or Portable Pond shall supply sufficient water for firefighting efforts in accordance with NFPA 1403.
- Minimum of two attack lines and one backup line shall be charged during every evolution. These shall be a minimum of 1.75" attack lines. These shall be supplied by a fire pump or tanker pumper.

**15. Firefighter Requirements:**

- a. All personnel operating as either Instructors, Participants, Burn Operator, Back-Up (RIT) shall be provided with full NFPA approved Personal Protective Equipment including:
  - Boots
  - Helmet
  - Gloves
  - Protective Hood
  - Turnout Pants
  - Turnout Coat
  - SCBA
- b. Participants shall meet OSHA Standard CFR 1910.134, which states that members shall not have any facial hair that may interfere with a proper seal on their SCBA face piece.
- c. Participants must utilize the host agency accountability system.

**16. Officers Required for Burns:**

The following officer billets and their responsibilities must be filled in order to conduct live fire training burns with the Mobile Burn Trailer.

- Burn Operator – This person must have completed a Train-the-Trainer on use and operation of the Kidde Mobile Fire Trainer.
- Lead Instructor: The Lead Instructor will be the coordinator for the drill. The Lead Instructor needs to minimally possess Firefighter II and Instructor I certifications.
- Safety Officer: The Safety Officer is responsible for the overall safety of the training event. The Safety Officer needs to possess all of the certifications of the Lead Instructor.
- Incident Commander/Accountability Officer: The Incident Commander shall work

with the Lead Instructor and Safety Officer to ensure a quality and safe drill is conducted. The Incident Commander shall work with the Lead Instructor and ensure adequate water supplies are on the scene, that the drill is running in an orderly fashion and shall also keep accountability for those participating in the drill.

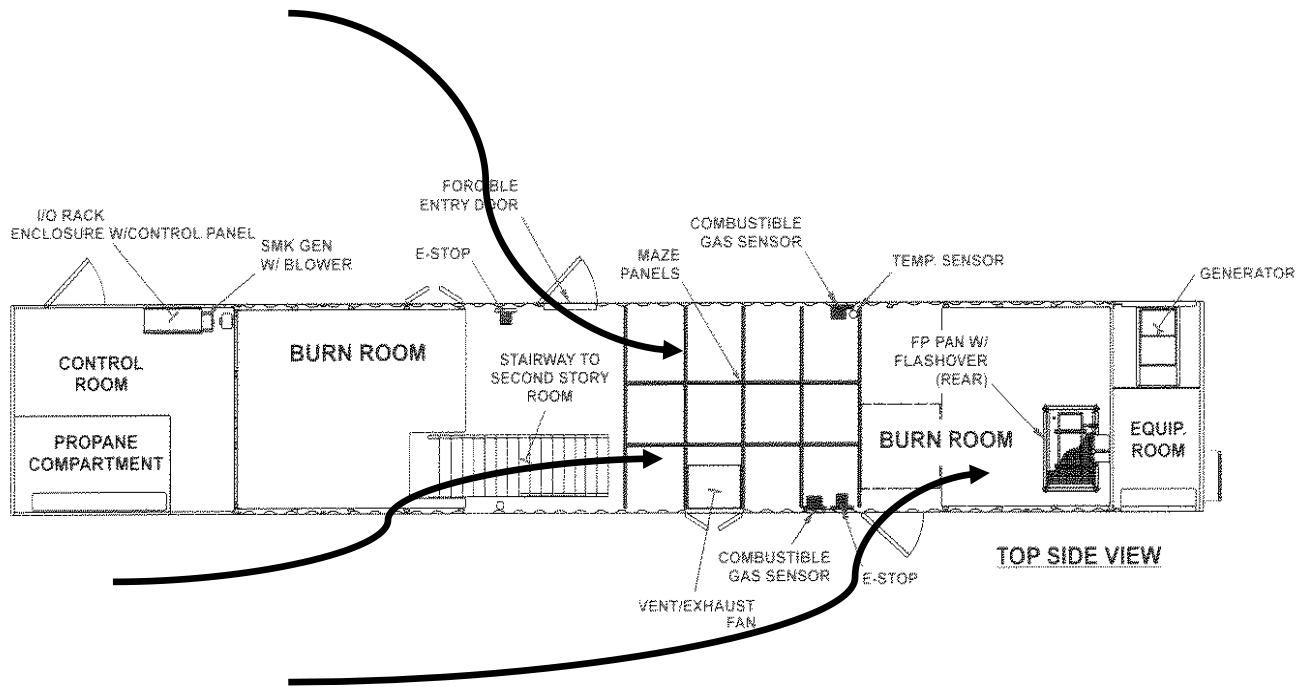
- Interior Safety Officer: The Interior Safety Officer shall be responsible for ensuring the safety of crews inside of the Mobile Burn Trailer during live fire training. Interior Safety Officers shall minimally have Firefighter II, Instructor I and a NFPA 1403 Conducting Live Fire Burns class. They shall also be familiar with the Mobile Burn Trailer, its operation and components. It is preferable that these members be company officer or prior company officers with the listed training.

**17. Transportation Requirements**

- a. Prior to transportation
  - i. Props shall be secured.
  - ii. Walls shall be removed and secured to storage positions on walls with supplied binding straps.
  - iii. Water drained from props
  - iv. All stairs removed and placed in proper positioning on the interior and secured with supplied binding straps.
  - v. Only the selected prime vendor shall be used to move or transport the MBT.

**18. After Action Review**

- a. An after action review using the attached form shall be completed by the host agency upon completion of training and shall be faxed to the New Haven Regional Fire Training Academy within 24 hours of the completion of the training. The fax number for the New Haven regional Fire Academy is 203-946-7881.



Arrows indicate areas attack lines can be utilized.

Back-up RIT Lines shall also be provided.

Minimum 2 lines of 1.75" in diameter minimum.

# REGION II MOBILE BURN TRAILER

## AFTER ACTION/CORRECTIVE ACTION REPORT

Upon Completion Fax to 203-946-7881

### GENERAL INFORMATION

Name of Agency	Text goes in text boxes below
Name of Agency (using MBT)	
Completed by:	
Position:	
Phone number and email address:	
Dates Used	
Date report completed	



<b>EXERCISE/TRAINING OVERVIEW</b>	
<p>Description of Training</p> <p>Brief overview of the training, major strengths demonstrated during the exercise, areas that require improvement</p>	
<p>Training Overview</p> <p>Describe the specific details of the exercise, how event or exercise was structured, how was event or exercise carried out</p>	
<p>Problems with Equipment</p> <p>Describe in detail any problems with the MBT, any problems that will require repair, anything that malfunctioned or was damaged during training.</p>	
<p>Total Participants</p>	
<p>Number of agencies involved</p>	
<p>Lead/Host Agency</p>	
<p>Career / Volunteer / Combination</p>	

Additional Comments:

**NFPA 1403**

**Chapter 5**

manufactured to meet the requirements of NFPA 1975, *Standard on Station/Work Uniforms for Fire and Emergency Services*.

**4.4.18.5** Personal alarm devices shall have been manufactured to meet the requirements of NFPA 1982, *Standard on Personal Alert Safety Systems (PASS)*.

**4.4.18.6** All students, instructors, safety personnel, and other personnel shall wear according to manufacturer's instructions all protective clothing and equipment specified in this chapter whenever they are involved in any evolution or fire suppression operation during the live fire training evolution.

**4.4.18.7\*** All students, instructors, safety personnel, and other personnel participating in any evolution or operation of fire suppression during the live fire training evolution shall breathe from an SCBA air supply whenever they operate under one or more of the following conditions:

- (1) In an atmosphere that is oxygen deficient or contaminated by products of combustion, or both
- (2) In an atmosphere that is suspected of being oxygen deficient or contaminated by products of combustion, or both
- (3) In any atmosphere that can become oxygen deficient, contaminated, or both
- (4) Below ground level

**4.4.19** One person who is not a student shall be designated as the "ignition officer" to control the materials being burned.

**4.4.19.1** The ignition officer shall wear full protective clothing, including SCBA, as required in 6.4.17.1 through 6.4.17.7, when performing this control function.

**4.4.19.2** A charged hose line shall accompany the ignition officer when he or she is igniting any fire.

**4.4.19.3** The decision to ignite the training fire shall be made by the instructor-in-charge in coordination with the safety officer.

**4.4.19.4** The fire shall be ignited by the ignition officer in the presence of and under the direct supervision of the safety officer.

#### **4.5 Instructors.**

**4.5.1** All instructors shall be qualified to deliver fire fighter training by the AHJ.

**4.5.2\*** The participating student-to-instructor ratio shall not be greater than 5 to 1.

**4.5.3** Additional instructors shall be designated when factors such as extreme temperatures or large groups are present, and classes of long duration are planned.

**4.5.4** The instructor-in-charge shall be responsible for full compliance with this standard.

**4.5.5** Prior to the ignition of any fire, instructors shall ensure that all protective clothing and equipment specified in this chapter are being worn according to manufacturer's instructions.

**4.5.6** Instructors shall take a head count when entering and exiting the acquired structure during an actual attack evolution conducted in accordance with this standard.

**4.5.7** Instructors shall monitor and supervise all assigned students during the live fire training evolution.

**4.5.8** The instructor-in-charge shall provide for rest and rehabilitation of members operating at the scene, including any necessary medical evaluation and treatment, food and fluid replenishment, and relief from climatic conditions. (See Annex D.)

**4.5.9** It shall be the responsibility of the instructor-in-charge to coordinate overall acquired structure fireground activities to ensure correct levels of safety.

## **Chapter 5 Gas-Fired Live Fire Training Structures**

### **5.1 Student Prerequisites.**

**5.1.1\*** Prior to being permitted to participate in live fire training evolutions, the student shall have received training to meet the job performance requirements for Fire Fighter I in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, related to the following subjects:

- (1) Safety
- (2) Fire behavior
- (3) Portable extinguishers
- (4) Personal protective equipment
- (5) Ladders
- (6) Fire hose, appliances, and streams
- (7) Overhaul
- (8) Water supply
- (9) Ventilation
- (10) Forcible entry

**5.1.2\*** Students participating in a live fire training evolution who have received the required minimum basic training from other than the AHJ shall not be permitted to participate in any live fire training evolution without first presenting prior written evidence of having successfully completed the prescribed minimum training to the levels specified in 5.1.1.

### **5.2 Structures and Facilities.**

**5.2.1\*** Strict safety practices shall be applied to all structures selected for live fire training evolutions.

**5.2.2\*** Live fire training structures shall be inspected visually for damage prior to live fire training evolutions.

**5.2.2.1** Damage shall be documented.

**5.2.2.2\*** The structural integrity of the live fire training structure shall be evaluated and documented periodically by a licensed professional engineer with live fire training structure experience and expertise.

**5.2.2.3** The frequency of the structural evaluation shall be as follows:

- (1) Once per year for live fire training structures that support more than 60 days of live fire training per year (a day of live fire training is any day during which at least one live fire training evolution has been conducted)
- (2) Once every two years for live fire training structures that support 31 to 60 days of live fire training per year
- (3) Once every three years for live fire training structures that support 30 or fewer days of live fire training per year
- (4) Immediately if visible structural defects have formed, such as cracks, spalls, or warps in structural floors, columns, beams, walls, metal panels, and so on

**5.2.2.4\*** Part of the live fire training structure evaluation shall include, once every 5 years, the removal and reinstallation of a representative area of thermal linings (if any) to inspect the hidden conditions behind the linings.

**5.2.2.4.1** This requirement shall be permitted to be waived under both of the following conditions:

- (1) The thermal lining has never had a break in any part of its thermal barrier (no cracks, holes, breaks, or insulation sags that could allow heat to pass through the lining system).
- (2) Thermocouples between the thermal lining and the structural element indicate that temperatures have never exceeded 149°C (300°F) behind the lining.

**5.2.2.4.2** If the requirement of 5.2.2.4 cannot be waived for a concrete structure, and if removal and reinstallation of thermal linings would be difficult or expensive due to the permanent nature of the lining system, then it shall be permitted to take concrete cores through the protected ceiling slab from the top surface of the slab in order to spot check conditions hidden by the thermal lining.

**5.2.2.5** The engineer shall core solid structural concrete slabs and walls that have been exposed to temperatures in excess of 149°C (300°F) to check for hidden delamination and to test comprehensive strength once every 10 years for conventional (Portland) concrete and once every 3 years for refractory (calcium aluminate) concrete.

**5.2.2.6** Where the live fire training structure damage is severe enough to affect the safety of the students, training shall not be permitted.

**5.2.3** All doors, windows and window shutters, roof scuttles and automatic ventilators, mechanical equipment, lighting, manual or automatic sprinklers, and standpipes necessary for the live fire training evolution shall be checked and operated prior to any live fire training evolution to ensure they operate correctly.

**5.2.4** All safety devices, such as thermometers, oxygen and toxic and combustible gas monitors, evacuation alarms, and emergency shutdown switches, shall be checked prior to any live fire training evolutions to ensure they operate correctly.

**5.2.5** For live fire training structures that contain gas-fueled training systems, the instructors shall run the system prior to exposing students to live flames in order to ensure the correct operation of devices such as the gas valves, flame safeguard units, agent sensors, combustion fans, and ventilation fans.

**5.2.6** Live fire training structures shall be left in a safe condition upon completion of live fire training evolutions.

**5.2.7** Debris hindering the access or egress of fire fighters shall be removed prior to the beginning of the next training exercises.

**5.2.8** Fire lines shall be established to keep pedestrian traffic in the vicinity of the training site clear of the operations area of the live burn.

**5.2.9** Awareness of weather conditions, wind velocity, and wind direction shall be maintained, including a final check for possible changes in weather conditions immediately before actual ignition.

**5.2.10** The instructor-in-charge shall determine the rate and duration of waterflow necessary for each individual live fire training evolution, including the water necessary for control and extinguishment of the training fire, the supply necessary for backup lines to protect personnel, and any water needed to protect exposed property.

**5.2.10.1** The minimum water supply and delivery for the live fire training evolutions shall meet the criteria identified in NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*.

**5.2.10.2** A minimum reserve of additional water in the amount of 50 percent of the fire flow demand determined in accordance with 5.2.10.1 shall be available to handle exposure protection or unforeseen situations.

**5.2.10.3\*** Except under the conditions of 5.2.10.4, separate water sources shall be utilized for the supply of attack lines and backup lines in order to preclude the loss of both water supply sources at the same time.

**5.2.10.4\*** A single water source shall be sufficient at a training center facility where the water system has been engineered to provide adequate volume for the evolutions conducted and a backup power source or backup pumps, or both, are in place to ensure an uninterrupted supply in the event of a power failure or malfunction.

**5.2.11** Areas for the staging, operating, and parking of fire apparatus that are used in the live fire training evolution shall be designated.

**5.2.11.1** An area for parking fire apparatus and vehicles that are not a part of the evolution shall be designated so as not to interfere with fireground operations.

**5.2.11.2** If any of the apparatus described in 5.2.11.1 is in service to respond to an emergency, it shall be located in an area to facilitate a prompt response.

**5.2.11.3** Where required or necessary, parking areas for police or press vehicles shall be designated.

**5.2.11.4** A parking area for an ambulance or an emergency medical services vehicle shall be designated and located where it will facilitate a prompt response in the event of personal injury to participants in the evolution.

**5.2.11.5** The parking area shall be located to facilitate prompt response in the event of personal injury to participants in the evolution.

**5.2.11.6** Ingress and egress routes shall be designated, identified, and monitored during the training evolutions to ensure their availability in the event of an emergency.

**5.2.12** Prior to the conduct of actual live fire training evolutions, a preburn briefing session shall be conducted for all participants.

**5.2.12.1** All facets of each evolution to be conducted shall be discussed in the preburn briefing, and assignments shall be made for all crews participating in the training session.

**5.2.12.2** The location of simulated victims shall not be required to be disclosed, provided that the possibility of victims is discussed during the preburn briefing.

**5.2.12.3** A preburn plan shall be prepared and utilized during the preburn briefing sessions.

**5.2.12.4** All features of the training areas and structure shall be indicated on the preburn plan.

**5.2.13** Prior to the conduct of any live fire training, all participants shall be required to conduct a walk-through of the structure in order to have knowledge of and familiarity with the layout of the live fire training structure and to be able to facilitate any necessary evacuation of the live fire training structure.

**5.2.14** All spectators shall be restricted to an area outside the operations area perimeter established by the safety officer.

**5.2.14.1** Control measures such as ropes, signs, and fire line markings shall be used to indicate the perimeter of the operations area.

**5.2.14.2** Visitors who are allowed within the operations area perimeter shall be escorted at all times.

**5.2.14.3** Visitors who are allowed within the operations area perimeter shall be equipped with and shall wear complete protective clothing in accordance with manufacturer's instructions and in accordance with 5.4.17.1 through 5.4.17.7.

**5.2.15** All possible sources of ignition, other than those that are under the direct supervision of the person responsible for the start of the training fire, shall be removed from the operations area.

**5.2.16** There shall be ample room provided around all props such that there is space for all attack lines as well as backup lines to operate freely.

### **5.3 Fuel Materials.**

**5.3.1** The fuels that are utilized in live fire training evolutions shall have known burning characteristics that are as controllable as possible.

**5.3.2** Unidentified materials, such as debris found in or around the structure that could burn in unanticipated ways, react violently, or create environmental or health hazards, shall not be used.

**5.3.3\*** The use of flammable gas, such as propane and natural gas, shall be permitted only in live fire training structures specifically designed for their use.

**5.3.4** Liquefied versions of the gases specified in 5.3.3 shall not be permitted inside the live fire training structure.

**5.3.5\*** The instructor-in-charge shall assess the selected fire room environment for factors that can affect the growth, development, and spread of fire.

**5.3.6\*** The training exercise shall be stopped immediately when the instructor-in-charge determines through ongoing assessment that the combustible nature of the environment represents a potential hazard.

**5.3.7** An exercise stopped as a result of an assessed hazard according to 5.3.6 shall continue only when actions have been taken to reduce the hazard.

### **5.4 Safety.**

**5.4.1** A safety officer shall be appointed for all live fire training evolutions.

**5.4.2\*** The safety officer shall have the authority, regardless of rank, to intervene and control any aspect of the operations when, in his or her judgment, a potential or actual danger, accident, or unsafe condition exists.

**5.4.3** The responsibilities of the safety officer shall include, but shall not be limited to, the following:

- (1) Prevention of unsafe acts
- (2) Elimination of unsafe conditions

**5.4.4** The safety officer shall provide for the safety of all persons on the scene including students, instructors, visitors, and spectators.

**5.4.5** The safety officer shall not be assigned other duties that interfere with safety responsibilities.

**5.4.6** The safety officer shall be knowledgeable in the operation and location of safety features available within the live fire training structure, such as emergency shutoff switches, gas shutoff valves, and evacuation alarms.

**5.4.7\*** The instructor-in-charge of the live fire training evolutions shall determine, prior to each specific evolution, the number of training attack lines and backup lines that are necessary.

**5.4.7.1** Each hose line shall be capable of delivering a minimum of 360 L/min (95 gpm).

**5.4.7.2** Backup lines shall be provided to ensure protection for personnel on training attack lines.

**5.4.7.3** The instructor-in-charge shall assign the following personnel:

- (1) One instructor to each functional crew, which shall not exceed five students
- (2) One instructor to each backup line
- (3) Additional personnel to backup lines to provide mobility
- (4) One additional instructor for each additional functional assignment

**5.4.8\*** Additional safety personnel, as deemed necessary by the safety officer, shall be located strategically within the structure to react to any unplanned or threatening situation or condition.

**5.4.9** A method of fireground communications shall be established to enable coordination among the incident commander, the interior and exterior sectors, the safety officer, and external requests for assistance.

**5.4.10\*** A building evacuation plan shall be established, including an evacuation signal to be demonstrated to all participants in an interior live fire training evolution.

**5.4.11** Emergency medical services shall be available on site to handle injuries.

**5.4.12** Written reports shall be filled out and submitted on all injuries and on all medical aid rendered.

**5.4.13** A search of the structure shall be conducted to ensure that no unauthorized persons, animals, or objects are in the live fire training structure immediately prior to ignition.

**5.4.14** No person(s) shall play the role of a victim inside the live fire training structure.

**5.4.15** Fires shall not be located in any designated exit paths.

**5.4.16** The training session shall be curtailed, postponed, or canceled, as necessary, to reduce the risk of injury or illness caused by extreme weather conditions.

**5.4.17** Each participant shall be equipped with full protective clothing and SCBA.

**5.4.17.1** All participants shall be inspected by the safety officer prior to entry into a live fire training evolution to ensure that the protective clothing and SCBA are being worn according to manufacturer's instructions and are in serviceable condition.

**5.4.17.2** Protective coats, trousers, hoods, footwear, helmets, and gloves shall have been manufactured to meet the requirements of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

**5.4.17.3** SCBA shall have been manufactured to meet the requirements of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*.

**5.4.17.4\*** Where station or work uniforms are worn by any participant, the station or work uniform shall have been manufactured to meet the requirements of NFPA 1975, *Standard on Station/Work Uniforms for Fire and Emergency Services*.

**5.4.17.5** Personal alarm devices shall have been manufactured to meet the requirements of NFPA 1982, *Standard on Personal Alert Safety Systems (PASS)*.

**5.4.17.6** All students, instructors, safety personnel, and other personnel shall wear all protective clothing and equipment specified in this chapter according to manufacturer's instructions whenever they are involved in any evolution or fire suppression operation during the live fire training evolution.

**5.4.17.7\*** All students, instructors, safety personnel, and other personnel participating in any evolution or operation of fire suppression during the live fire training evolution shall breathe from an SCBA air supply whenever operating under one or more of the following conditions:

- (1) In an atmosphere that is oxygen deficient or contaminated by products of combustion, or both
- (2) In an atmosphere that is suspected of being oxygen deficient or contaminated by products of combustion, or both
- (3) In any atmosphere that can become oxygen deficient or contaminated, or both
- (4) Below ground level

**5.4.18\*** The decision to ignite a training fire shall be made by the instructor-in-charge in coordination with the safety officer.

**5.4.19** Fires shall not be ignited without an instructor visually confirming that the flame area is clear of personnel.

**5.4.20** Flammable gas fires shall not be ignited manually.

## **5.5 Instructors.**

**5.5.1** All instructors shall be qualified by the AHJ to deliver fire fighter training.

**5.5.2\*** The participating student-to-instructor ratio shall not be greater than 5 to 1.

**5.5.3** Additional instructors shall be designated when factors such as extreme temperatures or large groups are present, and classes of long duration are planned.

**5.5.4** The instructor-in-charge shall be responsible for full compliance with this standard.

**5.5.5** Prior to the ignition of any fire, instructors shall ensure that all protective clothing and equipment specified in this chapter are being worn according to manufacturer's instructions.

**5.5.6** Instructors shall take a head count when participants are entering and exiting the live fire training structure during an actual attack evolution conducted in accordance with this standard.

**5.5.7** Instructors shall monitor and supervise all assigned students during the live fire training evolution.

**5.5.8** The instructor-in-charge shall provide for rest and rehabilitation of members operating at the scene, including any necessary medical evaluation and treatment, food and fluid replenishment, and relief from climatic conditions. (See *Annex D*.)

**5.5.9** Instructors responsible for conducting live fire training evolutions with a gas-fueled training system shall be trained in the complete operation of the system.

**5.5.10** The training of instructors shall be performed by an individual authorized by the gas-fueled training system manufacturer or others qualified to perform this type of training.

**5.5.11** Where concurrent, multiple, live fire training evolutions are being conducted in a specifically designed live fire training structure, the identity of the instructor-in-charge of the evolutions shall be clear to all participants.

**5.5.12** It shall be the responsibility of the instructor-in-charge to coordinate overall live fire training structure fireground activities to ensure correct levels of safety.

## **Chapter 6 Non-Gas-Fired Live Fire Training Structures**

### **6.1 Student Prerequisites.**

**6.1.1\*** Prior to being permitted to participate in live fire training evolutions, the student shall have received training to meet the job performance requirements for Fire Fighter I in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, related to the following subjects:

- (1) Safety
- (2) Fire behavior
- (3) Portable extinguishers
- (4) Personal protective equipment
- (5) Ladders
- (6) Fire hose, appliances, and streams
- (7) Overhaul
- (8) Water supply
- (9) Ventilation
- (10) Forcible entry

**6.1.2\*** Students participating in a live fire training evolution who have received the required minimum basic training from other than the AHJ shall not be permitted to participate in any live fire training evolution without first presenting prior written evidence of having successfully completed the prescribed minimum training to the levels specified in 6.1.1.

### **6.2 Structures and Facilities.**

**6.2.1\*** Strict safety practices shall be applied to all structures selected for live fire training evolutions.

**6.2.2\*** Live fire training structures shall be inspected visually for damage prior to live fire training evolutions.

**6.2.2.1** Damage shall be documented.

**6.2.2.2\*** The structural integrity of the live fire training structure shall be evaluated and documented periodically by a licensed professional engineer with live fire training structure experience and expertise.

**6.2.2.3** The structural evaluation shall be conducted with the following frequency:

- (1) Once per year for live fire training structures that support more than 60 days of live fire training per year (a day of live fire training is any day during which at least one live fire training evolution has been conducted)
- (2) Once every two years for live fire training structures that support 31 days to 60 days of live fire training per year



**OPERATION AND MAINTENANCE  
TRAINING COURSE OUTLINE**

FOR THE

**MOBILE FIRETRAINER<sup>®</sup> T-4000-53-1**

PREPARED FOR

**NEW HAVEN FIRE ACADEMY  
NEW HAVEN, CT**

**FEBRUARY 2011**

Kidde Fire Trainers, Inc.  
17 Philips Parkway  
Montvale, NJ 07645-1810 USA

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IW4B1-008-831 T-4000 City of Waterbury Interconnect Diagram

WD4A1-006-910 T-4000 PLUS I/O RACK ENCL ASSY Wiring Diagram

REFERENCE MATERIALS

Generator Set - North Star Model 13000 TFG Generator Owner's Manual

Honda Engine Owner's Manual

Electric Winch - Warn Works 3700 Owner's Manual

Concept Smoke Gen & Dist. Fan - O & M Manual

Trailer - Dexter Axle Operation Maintenance Service Manual

Ventilation Fan - Aerovent General Installation, O & M Instructions

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# 1.0

# INTRODUCTION

---

## 1.1 GENERAL

This manual provides all of the necessary information to operate the:

**MOBILE FIRETRAINER® MT-1000-53-1**

**MANUFACTURED BY:**

**Kidde Fire Trainers Inc.**

If you have any questions regarding the operation or maintenance of this trainer that are not answered in this manual contact the Kidde Fire Trainers Customer Support Group at:

**KIDDE FIRE TRAINERS INC.**

**17 PHILIPS PARKWAY  
MONTVALE, NJ 07645  
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**FAX: 1(201) 300 8101**

**CUSTOMER SERVICE TEL: 1 800-899-1701 EXT 502**

**WEB SITE: [WWW.KIDDEFT.COM](http://WWW.KIDDEFT.COM)**

Utilization of the **MOBILE FIRETRAINER® T-4000-53-1** for live-fire training exercises brings a level of versatility and realism that cannot be duplicated using conventional fire fighting training methods. The operator of the trainer will be able to vary the difficulty, complexity or scale of the fires to challenge the skills of the trainees.

To maximize training effectiveness and use the full potential of the system, a thorough understanding of the trainer system and controls is necessary. This section describes the layout of the manual and the Safety Guidelines for the Trainer. Read and understand the Safety Guidelines and system controls before operating the Trainer.

**Operation and Maintenance Manual**

**1.2 HOW TO USE THIS MANUAL**

The Operation and Maintenance Manual for the **TRAINER** is presented in the following order:

<b>Section 1</b>	<b>Introduction</b>	This section provides a brief functional description how to use the manual and relevant safety guidelines and instructions.
<b>Section 2</b>	<b>System Description</b>	This section provides an equipment overview and a functional description of the major equipment components that are part of the site.
<b>Section 3</b>	<b>Operation</b>	Detailed operating instructions.
<b>Section 4</b>	<b>Maintenance &amp; Servicing</b>	This section provides information on maintaining the various systems, assemblies and components of the trainer.
<b>Section 5</b>	<b>Troubleshooting</b>	Some general guidelines for finding and rectifying minor faults are given in this section.
<b>Section 6</b>	<b>Parts List</b>	This section provides figures and parts list tables for each of the Trainer major assemblies.
<b>Section 7</b>	<b>Drawings &amp; Reference Materials</b>	This section contains interconnection drawings manufacturers documentation to support the trainer



## 1.3 SAFETY

Normal operation of the training system presents potentially hazardous situations to student firefighting personnel. It is of the utmost importance that students read, understand, and follow the safety precautions and guidelines detailed in the following chapters. Failure to follow these safety guidelines could place training area personnel at undue risk of personal injury or death.

### 1.3.1 SAFETY SYMBOLS

Various symbols are used throughout the manual to alert the reader to a potentially dangerous situation.



#### **WARNING**

THE WARNING SYMBOL IS USED WHENEVER A CONDITION EXISTS THAT COULD POTENTIALLY CAUSE DEATH OR SERIOUS INJURY.



#### **CAUTION**

THE CAUTION SYMBOL IS USED WHENEVER A CONDITION EXISTS THAT MAY CAUSE INJURY OR DAMAGE TO ASSOCIATED EQUIPMENT.

### 1.3.2 TRAINER PERSONNEL SAFETY RESPONSIBILITIES

Trainer Personnel (instructors, safety officers, system operators and maintenance personnel) are ultimately responsible for the safety of all personnel entering the training area and compliance to all applicable NFPA, OSHA, national, state and local codes and standards. The safety responsibilities of Trainer Personnel are summarized below:

The safety responsibilities of Trainer Personnel are summarized below:

1. Read and fully understand all provided trainer manuals and this safety handbook.
2. Ensure that the trainer is operated and maintained in accordance with all trainer manuals.
3. Discontinue trainer use if potentially hazardous conditions or anomalies occur.
4. Be familiar with each fireplace's behavior in all modes of operation under all conditions, and insure the safety of personnel with respect to potentially hazardous behaviors.
5. Ensure that personnel are properly trained in the use of self contained breathing apparatus (SCBA).
6. All personnel entering the training area shall wear full firefighting gear. This gear shall include: full-face mask, self-contained breathing apparatus (SCBA) and appropriate protective clothing. As in any fire situation, the exposure of personnel to smoke (real or synthetic), fumes, or other combustion products should be avoided.
7. Ensure that personnel are in a safe position prior to, and during, flame initiation.

### ***Operation and Maintenance Manual***

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8. Ensure that the operator and instructors have a full knowledge and understanding of the training scenario prior to initiation. This should include all fireplace parameter settings as well as reflash capabilities or simulated flame effects.
9. At no time during live-fire operation should the trainer be left unmanned.
10. Kidde Fire Trainers specifies that only water be used as the extinguishing agent. Use of extinguishing agents other than water can result in diminished trainer life and performance and adversely impact safe trainer operation.
11. Ensure that at the completion of a training exercise, personnel without adequate protective clothing and SCBA do not enter a training structure until the ventilation system has been operated at maximum capacity for a minimum of 3 minutes to remove combustion by-products and smoke.
12. Ensure that proper communication is established and in operation between instructors and safety officers before and throughout each training exercise.

#### **1.3.3 STUDENT SAFETY GUIDELINES**

Prior to conducting training, Trainer Personnel must inform students of the dangers involved in live fire training. The following is a list of safety guidelines that must be presented to instructors and students before use of the trainer.

Normal operation of the training system presents potentially hazardous situations to student firefighting personnel. It is of the utmost importance that students read, understand, and follow the safety precautions and guidelines detailed on this page. Failure to follow these safety guidelines could place training area personnel at undue risk of personal injury or death.

1. Do not enter the training area until authorized to do so by Trainer Personnel.
2. Do not enter the training area without proper protective clothing and self-contained breathing apparatus (SCBA). Keep this equipment on during the entire live fire training exercise.
3. While within the training area, be alert at all times. Treat the live fire-training situation the same as an actual fire emergency. Be prepared for any aspect of flame behavior that is possible with an uncontrolled, fully involved fire.
4. Avoid contact with hot surfaces within the training area before, during, and after the live fire training exercise.
5. Avoid breathing smoke and products of combustion while outside the training area.
6. Minimize or avoid contact with clothing and equipment exposed to smoke, soot, and any other fire training residue. If contact cannot be avoided, clean exposed skin surfaces with soap and water as soon as practical.
7. In addition to the guidelines listed above, listen to and carefully follow all rules and directions provided by Trainer Personnel.

*Operation and Maintenance Manual***1.3.4 SYSTEM SAFETY WARNING**

**HIGH VOLTAGES** capable of causing serious injury or death are used in the training system equipment. Unless required for voltage measurement, all power should be turned off when servicing is being performed. When power must be on, use extreme care when working near exposed conductors.

**FUEL GAS** used in the trainer is capable of forming explosive mixtures with air that can be triggered by open flames or sparks. Even residual gas from piping sections can create a hazardous condition. Work only in well ventilated areas, with no exposed flames or possible ignition source.

**OPEN FLAMES** generated in the fireplace area during operation of this equipment can cause serious injury or death. Use extreme care when working in this area whenever training fires are in operation.

**EXPOSURE** to extremes in the environmental conditions such as high or low temperatures, high winds, etc. may occur during a training scenario. Extreme care should be used when training under adverse environmental conditions. Failure to exercise extreme care could result in serious injury or death.

**WARNING**

**SAFE OPERATION OF THE TRAINING SYSTEM MANDATES THAT THE FOLLOWING SAFETY PRECAUTIONS BE TAKEN PRIOR TO ANY OPERATION OR ACTIVITY. FAILURE TO FOLLOW THESE PROCEDURES MAY RESULT IN SERIOUS INJURY OR DEATH.**

1. All personnel entering the training area shall wear full firefighting gear. This gear shall include: full-face mask, self-contained breathing apparatus (SCBA) and appropriate protective clothing. As in any fire situation, the exposure of personnel to smoke (real or synthetic), fumes or other combustion products should be avoided.
2. All live fire training evolutions shall be conducted in accordance with all applicable NFPA Codes (such as 1402, 1403, 1404, and 1500); OSHA; national; state; and local codes and standards.
3. If fuel leaks are detected, they must be repaired. Under no circumstance is trainer operation to be performed when a leak is present.
4. Keep flames and ignition sources away from fuel handling components. When ignited, the fuel may cause serious injury or death.
5. Ensure the upstream fuel supply valve is fully closed prior to the purging of any lines to atmosphere. Tag all valves closed to alert other personnel that service is being performed. Failure to comply may result in serious injury or death.
6. Only smoke generators approved by Kidde Fire Trainers for use in flame areas shall be used.
7. Only smoke fluid recommended by Kidde Fire Trainers, inc. shall be used in the smoke generator(s). Refer to Section 4 (List of Consumable Materials) for recommended smoke fluid.

**Operation and Maintenance Manual**

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**1.3.5 PERIPHERAL EQUIPMENT**

- Generator
- Concept Smoke Generator and Smoke Distribution Fan
- Winch
- Trailer
- Ventilation Fan

**NOTE**

FOR THE ABOVE EQUIPMENT REFER TO SECTION 7 FOR SAFETY INFORMATION.

 **WARNING**

FAILURE TO FOLLOW THE EQUIPMENT SAFETY GUIDELINES COULD PLACE TRAINING AREA PERSONNEL AT UNDUE RISK OF PERSONAL INJURY OR DEATH! , INFORMATION LOCATED IN SECTION 7 OF THIS MANUAL.

**1.3.6 PROPANE SUPPLY GUIDELINES**

**NOTE**

TO ENSURE OPTIMUM EFFICIENCY OF THE FIRE TRAINING EQUIPMENT, USE HD-5 STANDARD GRADE PROPANE GAS FOR ALL PROPANE FUELED KIDDE FIRE TRAINERS, INC.

 **WARNING**

DO NOT FILL PROPANE TANKS WHILE THE GENERATOR IS RUNNING!  
GENERATOR MUST BE OFF WHEN FILLING THE PROPANE TANKS!  
ONLY QUALIFIED PERSONNEL SHOULD FILL THE PROPANE TANKS!

**1.3.7 INCLINE ROOF PROP WARNINGS**

**WEIGHT LIMITS**

 **WARNING**

DO NOT EXCEED 3-4 PEOPLE OR 1000 POUNDS ON THE INCLINE ROOF PROP!

**STOWING OF INCLINE ROOF PROP**

 **WARNING**

DO NOT LEAVE THE INCLINE ROOF PROP IN THE UP POSITION WHEN NOT IN USE, DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER! WHEN ROOF PROP IS DOWN BE SURE TO SECURE IT TO THE TRAINER ROOF WITH THE TWO PINS LOCATED ON EACH SIDE OF THE PROP.

### 1.3.8 COLLAPSIBLE SECOND STORY ROOM PROP WARNINGS

#### STOWING OF COLLAPSIBLE SECOND STORY ROOM PROP

 **WARNING**

DO NOT LEAVE THE COLLAPSIBLE SECOND STORY ROOM PROP IN THE UP POSITION AT THE END OF THE TRAINING DAY, DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER! WHEN COLLAPSIBLE SECOND STORY ROOM PROP IS DOWN BE SURE TO SECURE IT TO THE TRAINER. REFER TO SECTION 3

### 1.3.9 COLD WEATHER OPERATION GUIDELINES

Kidde Fire Trainers strongly recommends that all FIRETRAINER® systems not be operated for training purposes when the ambient temperature is below 32°F. Operation below this temperature may impact the effectiveness of student training.

As water is used as the primary extinguishing agent in most training scenarios, it should be apparent that freezing water and ice may become hazardous to trainees and other site personnel. It is with this safety consideration in mind that Kidde Fire Trainers issues this cold weather operation recommendation.

**NOTE**

THIS RECOMMENDATION DOES NOT AND SHOULD NOT BE CONSTRUED TO IMPLY THAT THE TRAINER WILL NOT OPERATE BELOW THE KIDDE FIRE TRAINERS RECOMMENDED OPERATING TEMPERATURE.

### CAUTIONS

Each fireplace has a water bath fabricated from steel. The burner elements are located at the bottom of the bath. For this reason refer to the CAUTION located below.

 **CAUTION**

WHEN NOT IN USE ALL FIREPLACE WATER BATHS SHOULD BE DRAINED OF WATER DURING COLD WEATHER PERIODS, WHEN THE ANTICIPATED AMBIENT TEMPERATURE IS GOING TO BE BELOW 32°F

WHEN TRAINING DURING THE ABOVE MENTIONED CONDITION, FILL WATER BATHS JUST PRIOR TO OPERATION AND DRAIN IMMEDIATELY UPON THE COMPLETION OF TRAINING.

FAILURE TO FOLLOW THESE CAUTIONS MAY RESULT IN SERIOUS DAMAGE TO THE ASSOCIATED EQUIPMENT.

***Operation and Maintenance Manual***

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## 2.0

# SYSTEM DESCRIPTION

### 2.1 INTRODUCTION

The **MOBILE FIRETRAINER® T-4000-53-1** is a fifty-three foot twin axle trailer that is a self-contained, live fire trainer system used to conduct training of firefighters and emergency rescue personnel in live-fire situations. The trainer is a system that generates propane gas fueled fires under the control of a PLC and an instructor. The trainer simulates Class A and B type fires. Class A fires involve ordinary dry combustible materials. Class B fires involve flammable liquids.

#### 2.1.1 TRAINER CONFIGURATION

The **MOBILE FIRETRAINER® T-4000-53-1** consists of a 53'L x 8'-5" W x 13'-3"H steel structure on US DOT compliant 5<sup>th</sup> wheel trailer, two 100 Gal. LP propane tanks, a tri-fuel 20 hp generator, shore power connection (requiring 120/240VAC, 1PH, 50AMP service), a equipment room and large burn room. The trainer requires a reasonably level site (hard asphalt or concrete), a means for handling training water (supply and discharge).

The **MOBILE FIRETRAINER® T-4000-53-1** is a completely re-locatable structure, and does not require any site improvements or permanent structures such as foundations or pads. Figures 2-1 and 2-2 show the trainer.

The **MOBILE FIRETRAINER® T-4000-53-1** burn room consists of an on-board smoke generation system, re-configurable training panels, with one fireplace platform. Located above the rear fireplace platform is a flashover effect that when activated produces a flame that extends across the ceiling (See figure 2-1, Sheet 2 for locations).

Depending upon the type of scenario a mock-up is assembled on top of the front/rear pan assembly and fires are created that engulf the mockup. Each fireplace has a water pan fabricated from steel sheet. At the bottom of the pan, a burner system is installed through which the flammable gas is liberated. Gas/oxygen mixing occurs above the water surface where a standing pilot initiates combustion. The liberation of gas through water greatly enhances the depth of flame and gives the impression of a substantial fire.

The fireplace utilizes *AquaMesh™* burner technology. *AquaMesh™* burner technology presents a realistic representation of a fire-training prop. The *AquaMesh™* burner technology allows the trainee fire fighter to employ common hose line attack patterns without impacting burner performance. The *AquaMesh™* burner technology also prevents flames from being swept from the surface of the burn pan causing unburned gas to be released into the atmosphere at a high rate, creating a potential hazard.

The rear fireplace is controlled from a local hand-held pendant. The pendant attaches to a connection on the I/O Rack Enclosure, located in the Control Room (See figure 2-2, for location). An Operator Interface Panel, located on the front panel door of the I/O Rack Enclosure, allows for setting parameters to create various scenarios, system monitoring and control of various functions of the training fires. Fire extinguishment is accomplished by applying extinguishing agent to the fire. The PLC detects the application of extinguishing agent and simulates the appropriate response of the fire.

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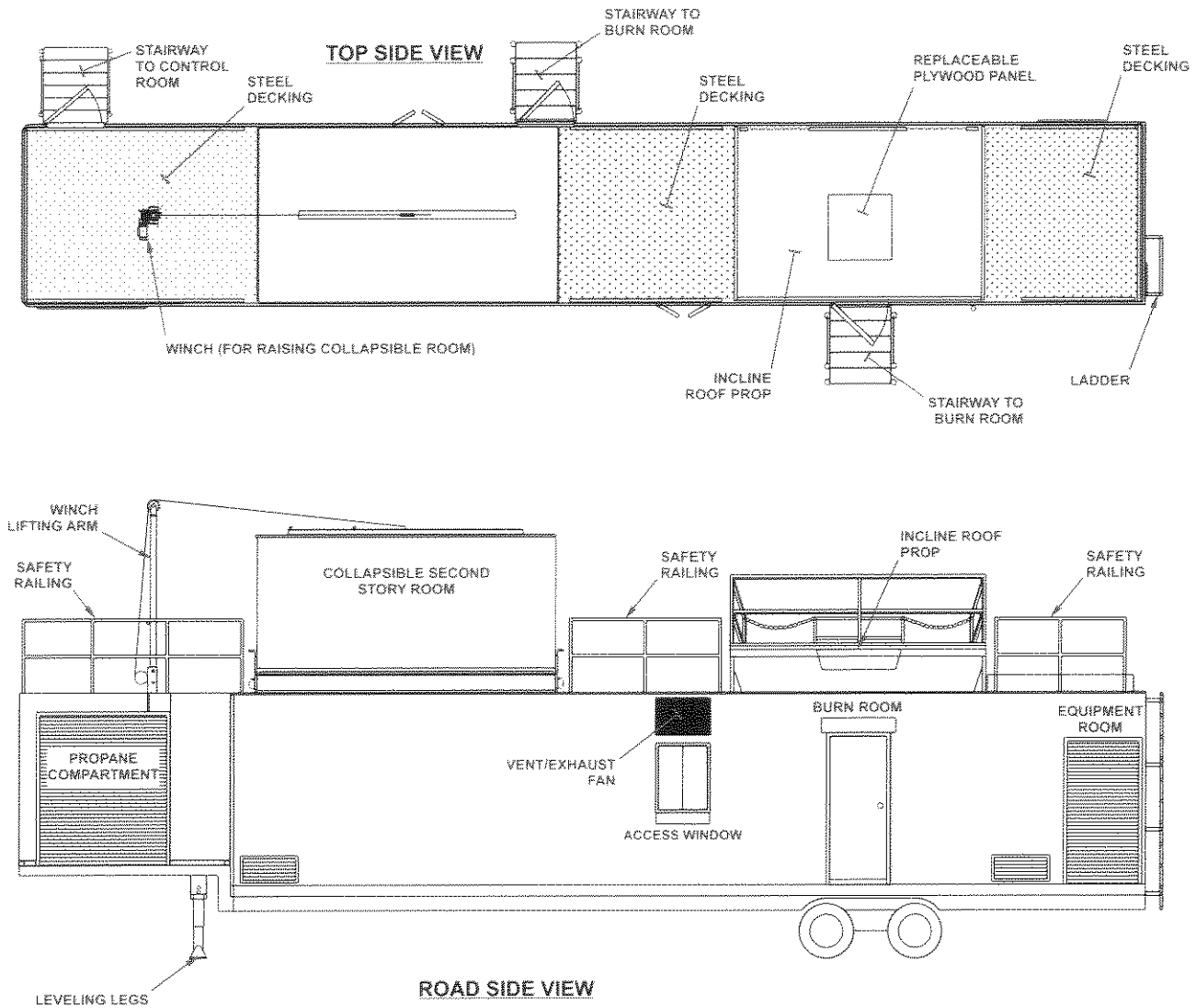


Figure 2-1 Trainer Layout – External View (Sheet 1 of 2)



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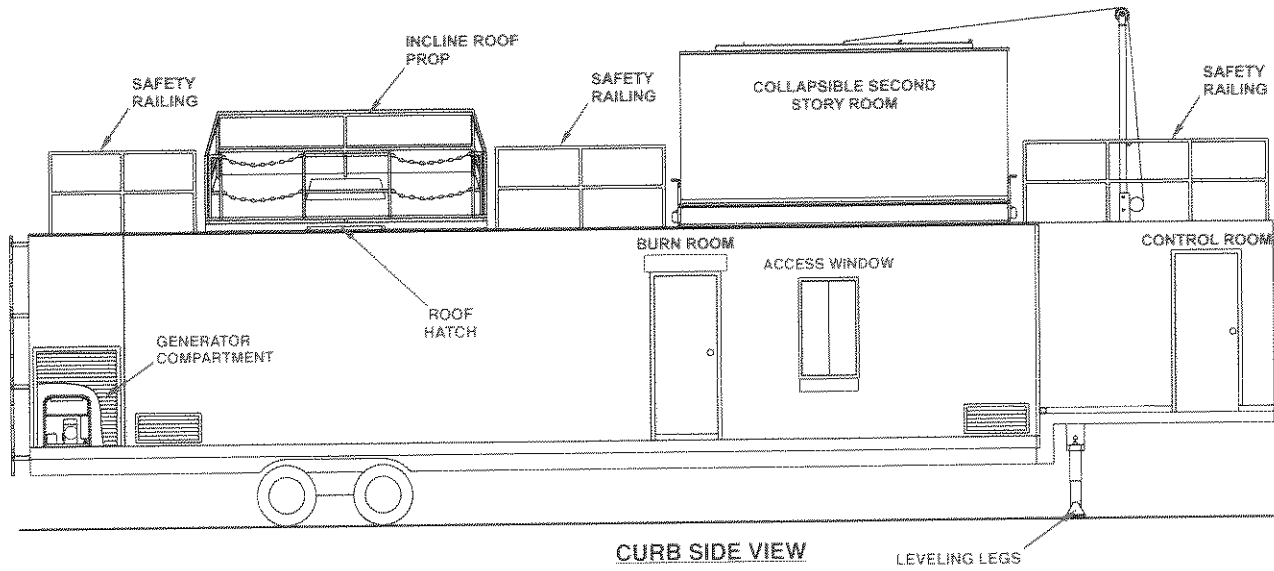


Figure 2-1 Trainer Layout – External View (Sheet 2)

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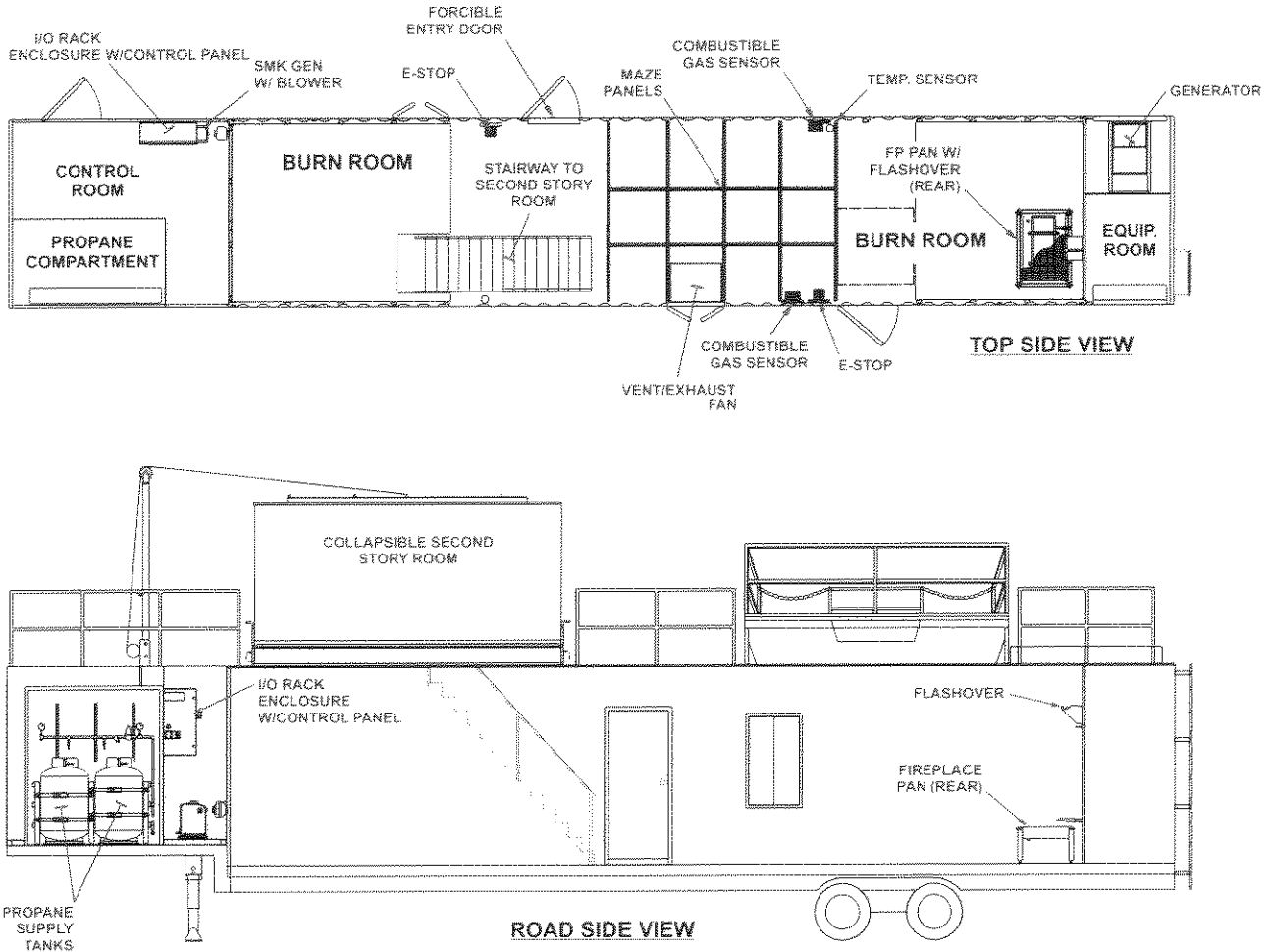


Figure 2-2 Trainer Layout – Internal View

## **2.2 PROPANE COMPARTMENT COMPONENTS**

Refer to Figures 2-1 and 2-2 for location and Figure 2-3 for details.

The Propane Compartment is located at the front of the trailer. There is a rollup door to access the room. An air vent is located in the sidewall of the compartment to keep the room ventilated. This compartment contains the Propane Tanks and Propane Header assembly.

### **2.2.1 PROPANE TANKS**

Each tank has an approximate capacity of 95.5 US Gallons. The tanks come equipped with separate sight gauges, shutoff valves, relief valve and 80 percent stop fill valve



## **WARNING**

**ONLY QUALIFIED PERSONNEL SHOULD FILL THE PROPANE TANKS.**

### **2.2.2 PROPANE HEADER**

This header is located on the back wall of the compartment. The Propane Header is used to supply propane gas from two storage tanks. The gas flows from the tanks through the header and into the first stage regulator. The header is equipped with two pressure gauges, one upstream and one down stream of the first stage regulator. The first stage regulator is a pounds to pounds regulator designed for LP-Gas services. The operating pressure of this regulator is 15-40 psi, and is supplied with a 0-60 psi pressure gauge. This regulator is set at approximately 20-25 psi. It should never be adjusted unless you are properly qualified and comply with all the requirements of the authority having jurisdiction. Flexible hoses are used to connect to a shutoff valve, located on each tank.

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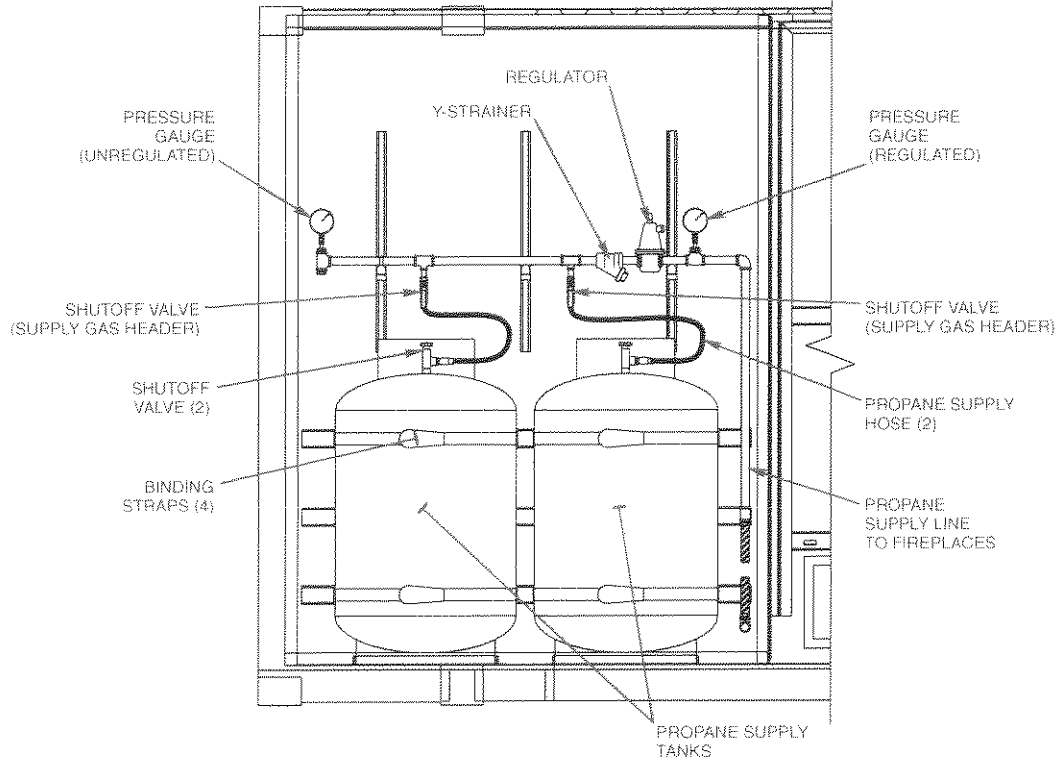


Figure 2-3 Propane Compartment Components

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**2.3 CONTROL ROOM COMPONENTS**

Refer to Figures 2-1 and 2-2 for Control Room Location.

**2.3.1 I/O RACK ENCLOSURE**

This enclosure is used to control and monitor all functions associated with the burn room. See Table 2-1 for Control/Indicator Descriptions and Figure 2-4 for I/O Rack Enclosure.

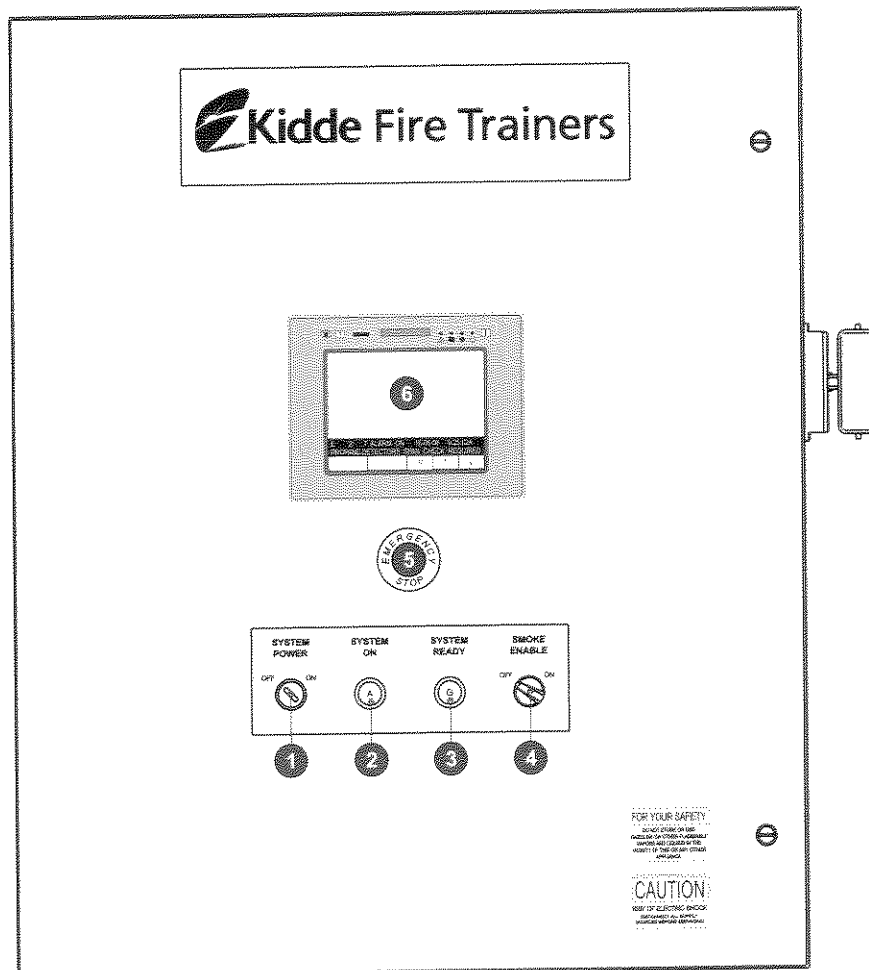


Figure 2-4 I/O Rack Enclosure Assembly – Control Room Components

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**Table 2-1. I/O Rack Enclosure-Controls and Indicators Descriptions**

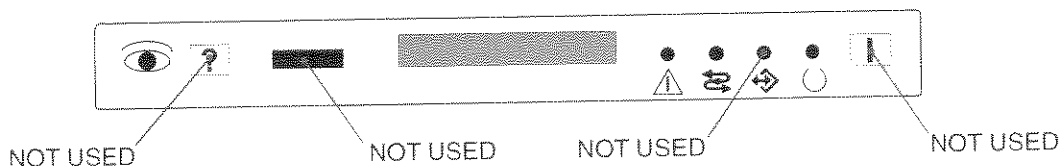
No.	Control	Indicator	Description
1	X		<p><b>SYSTEM POWER</b> - This is a two-position key switch. The key switch is used to secure trainer operation and ensure only the operator or maintenance technician can turn the trainer on. Key can only be removed in the OFF position.</p> <p><b>ON</b> - Power is applied to the trainer and the system is ready for operation. Power is applied to I/O rack enclosure, 24VDC power supply, emergency stop circuit, main circuit breaker panel, and ventilation fans. In addition, the fireplace control pendant is enabled.</p> <p><b>OFF</b> - Removes all power to the I/O Rack Enclosure components. Key is removable from this position only.</p>
2		X	<p><b>SYSTEM ON</b> - When lit (amber), indicates power is applied to the trainer (keyswitch is in the ON position).</p>
3		X	<p><b>SYSTEM READY</b> - When lit (green), indicates all required conditions are satisfied and the trainer is ready for operation.</p>
4	X	X	<p><b>SMOKE ENABLE</b> – This is a two-position switch. The switch is used to enable operation of the smoke generator.</p> <p><b>ON</b> – The switch illuminates and power is applied to the smoke generator. Refer to Pendant controls and indicator description for SMOKE button operation.</p> <p><b>OFF</b> – Switch light goes off and power is turned off to the smoke generator.</p>
5	X	X	<p><b>EMERGENCY STOP</b> - Used to shut down the trainer in the event of an emergency.</p> <p>When pushed in initiates an emergency shutdown of the trainer. All propane valves are automatically closed and all flames extinguish. The vent/exhaust fan ramps-up to full speed.</p> <p>When reset (pulled out), starts a 30-second time delay counter. At the end of the 30-second time period, the trainer is restored to operating power.</p> <p>Switch must be in the pulled-out position to operate the trainer.</p>
6	X	X	<p><b>OPERATOR INTERFACE PANEL</b> - Used to enter operating parameters and view system messages. See screen figures for detailed descriptions.</p>

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**2.3.2 OPERATOR INTERFACE PANEL (FIREPLACES)**

This Operator Interface Panel (OIP) is located on the right front of the I/O Rack Enclosure. This OIP provides the operator a touch screen graphical interface to program the fire scenario parameters for each burn room fireplace and monitor the system status messages. Additionally the OIP is also used to perform system login, span gas check and the daily operational test (D.O.R.T.).

**TOUCH SCREEN DISPLAY FRONT PANEL INDICATORS**



LED	Color	Status	Meaning
	red	OFF	No Touch Screen Hardware Problems Detected
		BLINK	Touch Screen Battery Low
	green	ON	Touch Screen Hardware Fault
		OFF	No Touch Screen Activation
	red	ON	There are messages. To access messages press the "VIEW MESSAGE" button on the current screen
		OFF	No messages
	green	BLINK	Touch Screen Communication Error (Communication Cable)
		ON	Touch Screen Communication OK
	green	OFF	Touch Screen Hardware Fault (Power Cable)
		ON	Touch Screen in Operation

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### INITIALIZATION SCREEN

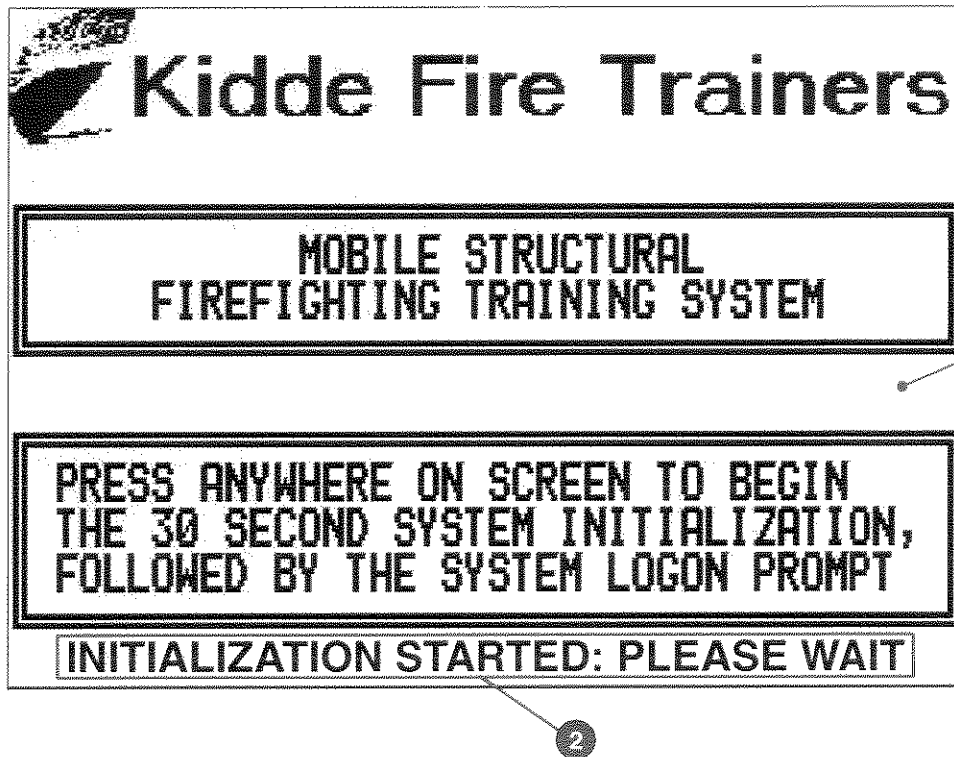


Figure 2-5 Initialization Screen

Table 2-2. Initialization Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	Initialization Screen	This screen appears when power is applied to the I/O rack enclosure (key switch set to ON). This screen is touched to start a 30-second purge cycle. After the Initialization purge cycle the Pass Code screen appears.
2	Confirmation Message	Once the screen is touched this message will appear.



**PASS CODE SCREEN**

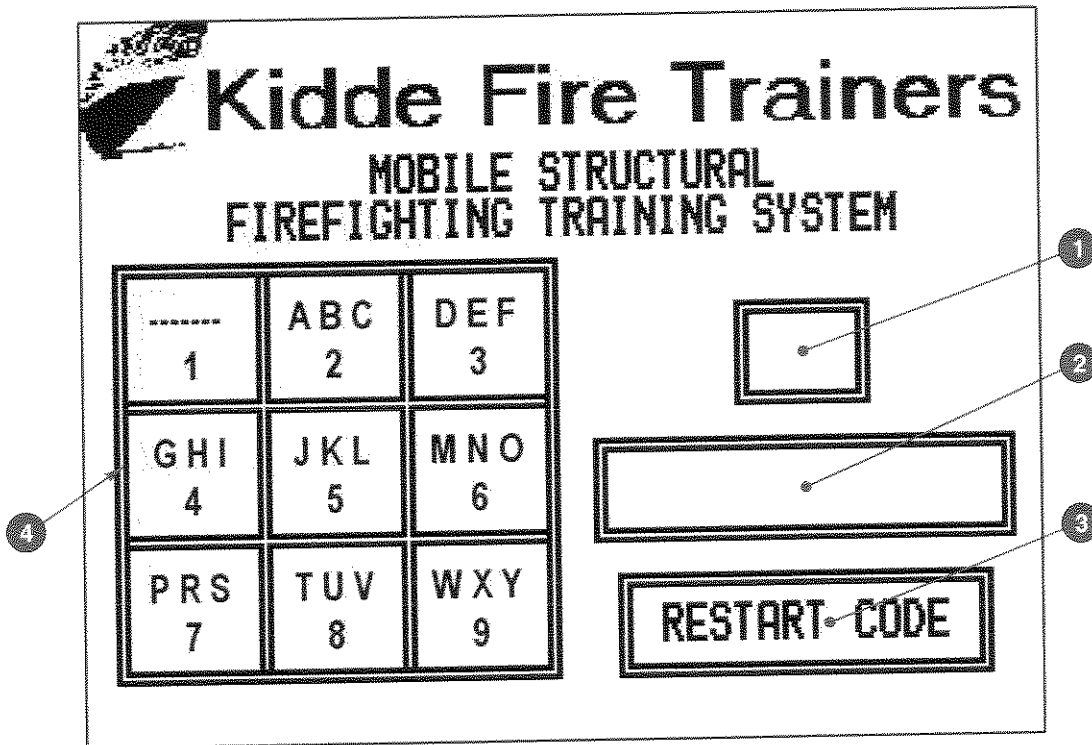


Figure 2-6 Pass Code Screen

Table 2-3. Pass Code Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	Pass Code display window	Displays code as it is being entered.
2	Pass Code message box	Incorrect Pass Code entered - Displays message will read <b>INVALID PASSCODE.</b> Correct Pass Code entered - Displays message will read <b>ENTER PASSCODE.</b>
3	RESTART CODE button	Used to re-enter pass code if necessary.
4	Alpha-Numeric keypad	Used to enter pass code and access Main Menu screen.

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**MAIN MENU SCREEN**

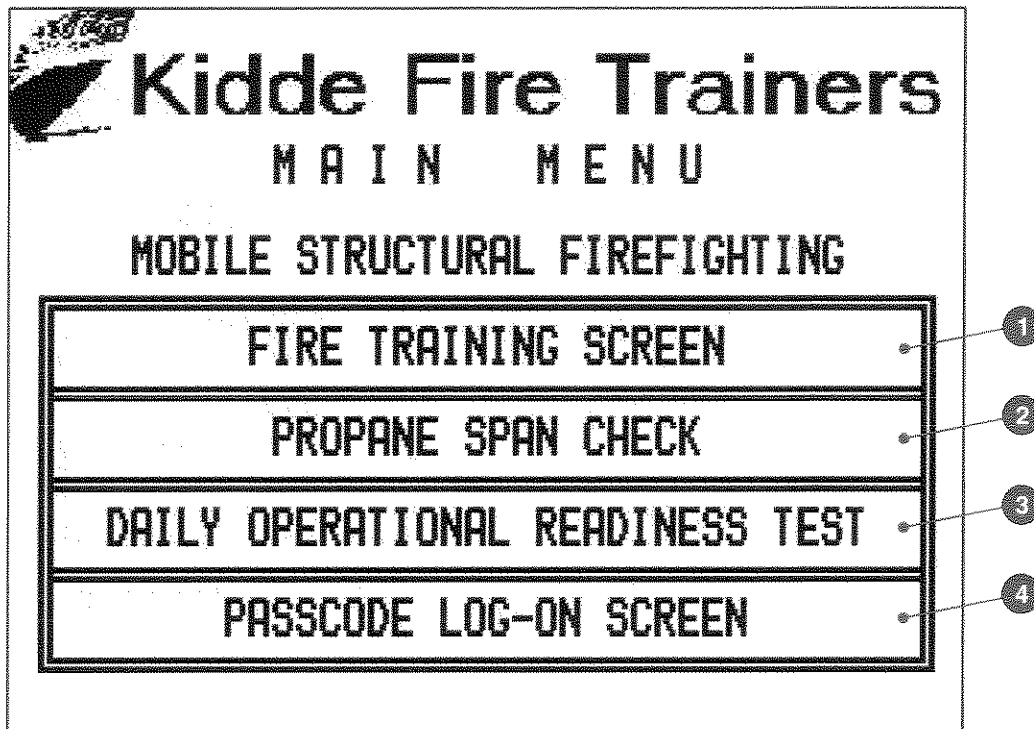


Figure 2-7 Main Menu Screen

Table 2-4. Main Menu Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	FIRE TRAINING SCREEN button	When touched, provides access to Fire Training screen. This screen enables access to the fire parameter settings for the various fireplaces and allows monitoring of burn times, system messages, compartment temperatures, and compartment gas concentration levels during the live-fire scenario.
2	PROPANE SPAN CHECK button	When touched, provides access to Propane Span Check screen. This screen enables performance of the daily span check.
3	DAILY OPERATIONAL READINESS TEST button	When touched, provides access to Daily Operational Readiness Test (DORT) screen. This screen enables performance of the DORT for the trainer.
4	PASSWORD LOG-ON SCREEN button	When touched, returns display to the Pass Code screen.

**PROPANE SPAN CHECK SCREEN**

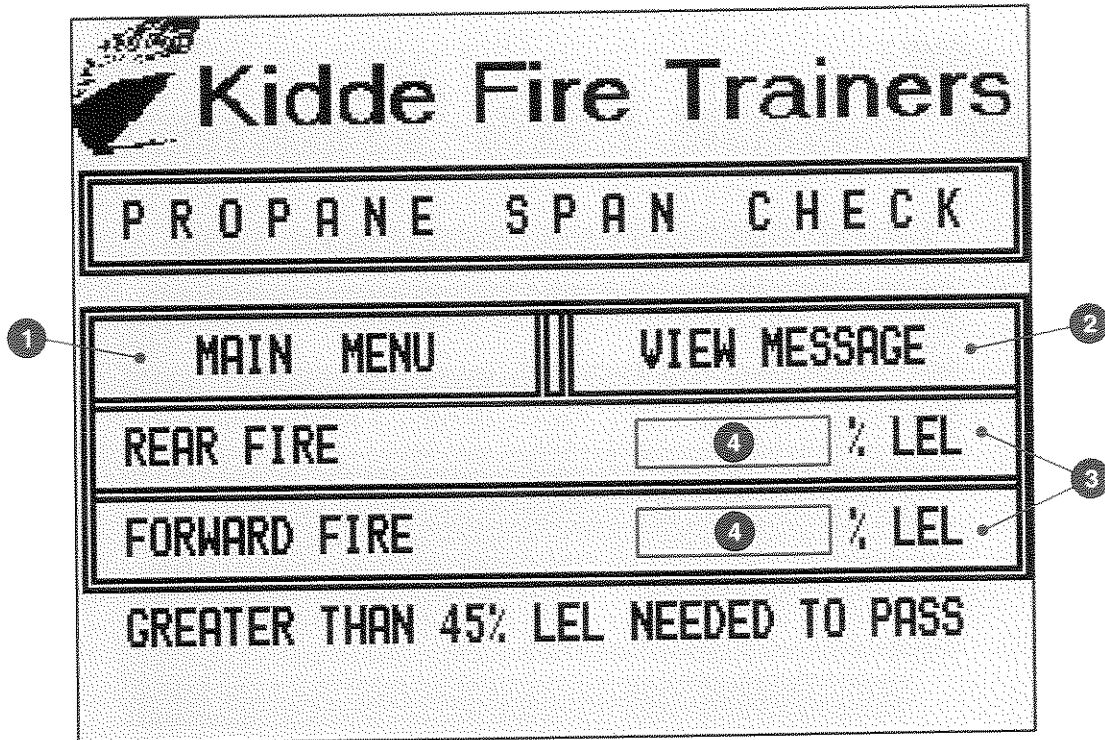


Figure 2-8 Propane Span Check Screen

Table 2-5. Propane Span Check Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	MAIN MENU button	When touched, returns display to MAIN MENU screen.
2	VIEW MESSAGES button	When touched, displays system messages. Refer to Message Screen -Controls and Indicators Descriptions. Refer to the Troubleshooting Section for a complete listing and description of all displayed status messages.
3	PROPANE STATUS window	When system span check is performed, percent LEL will be displayed for each area. Indicated value will increase until 45% LEL is obtained. At that time, PASSED will be displayed in the message area (4), for the associated area, and the indicated LEL percentage returns to zero when span gas is removed.

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**DORT SCREEN**

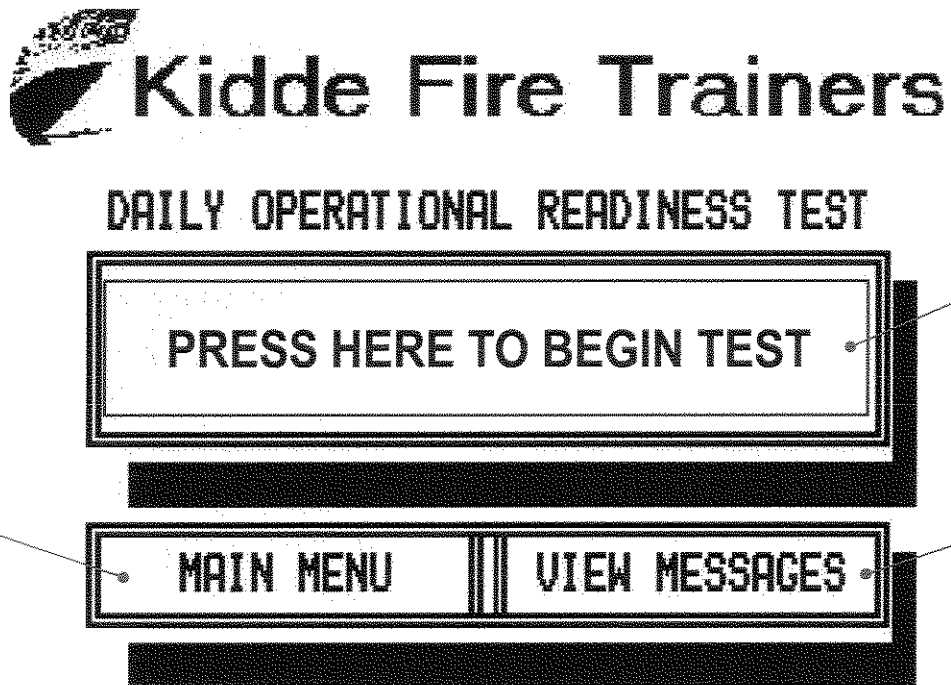


Figure 2-9 DORT Screen

Table 2-6. DORT Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	DORT status window	<p><b>PRESS HERE TO BEGIN TEST:</b> - Touch to start test.</p> <p><b>TESTING: PRESS TO STOP</b> – Touch to stop test at anytime.</p> <p><b>TEST COMPLETED: PASSED</b> – Appears when test is passed.</p> <p><b>TEST COMPLETED: FAILED</b> – Appears when test fails.</p>
2	VIEW MESSAGES button	When touched, displays system messages. Refer to Message Screen -Controls and Indicators Descriptions.
3	MAIN MENU button	When touched, returns display to MAIN MENU screen.

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FIRE TRAINING SCREEN

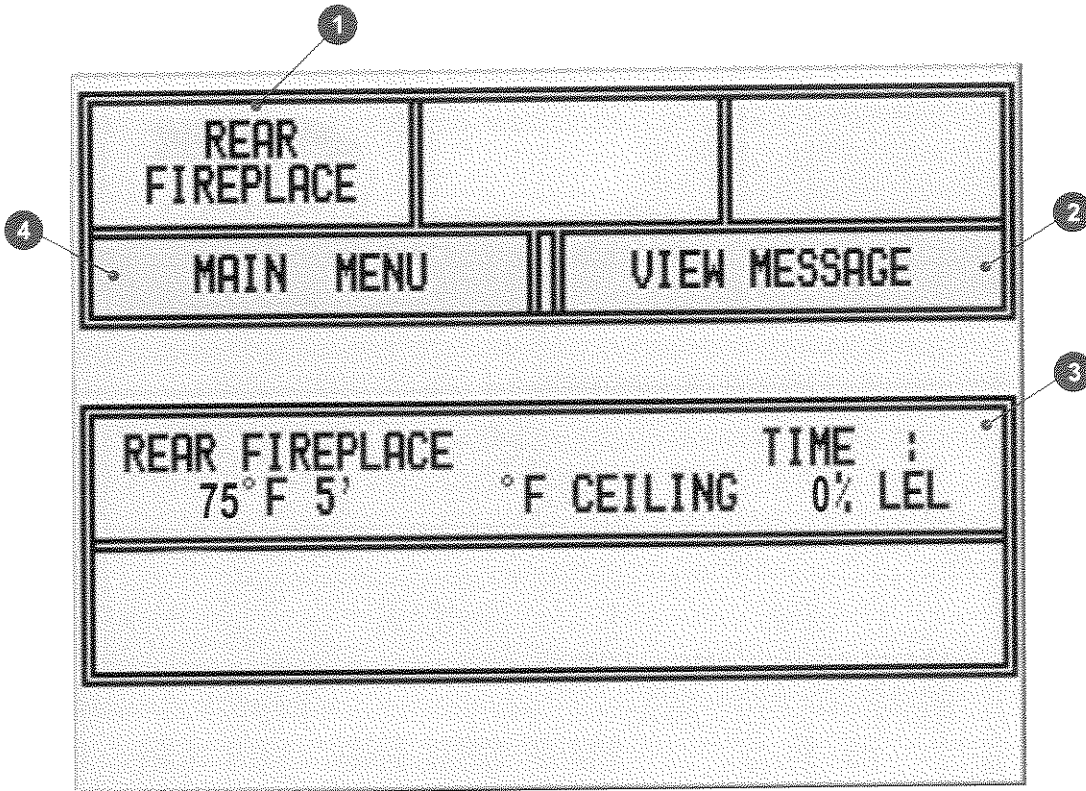


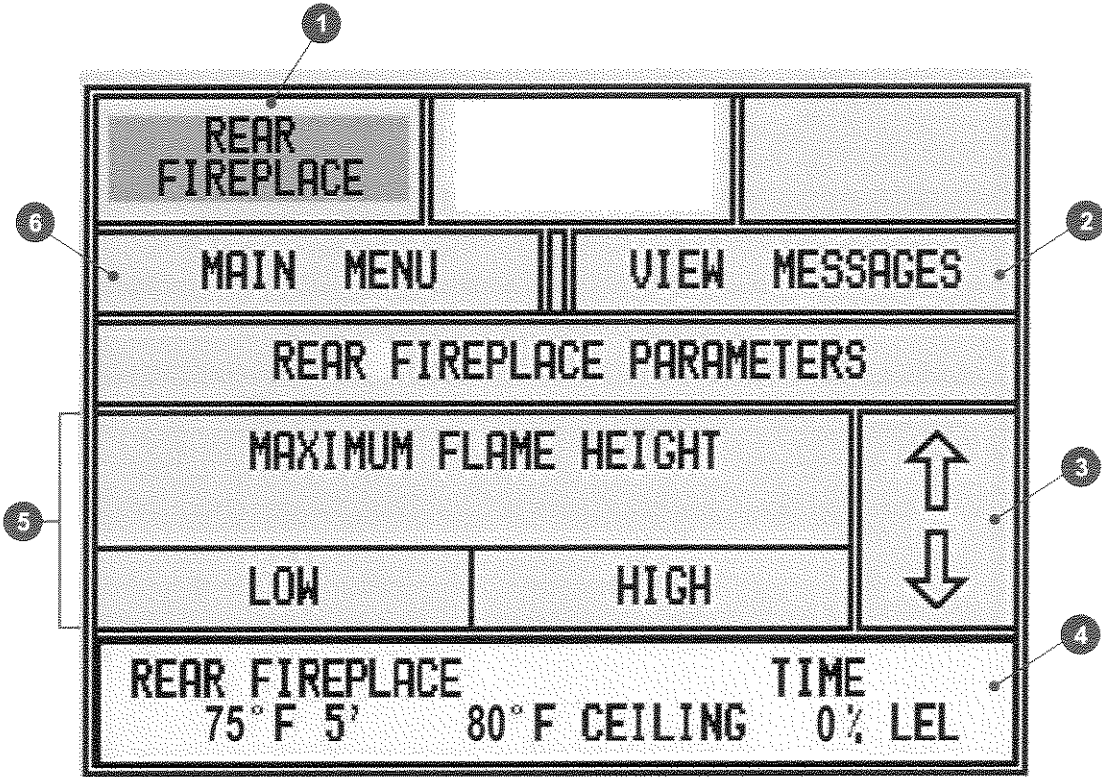
Figure 2-10 Fire Training Screen

Table 2-7. Fire Training Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	REAR FIREPLACE button	When touched, displays PARAMETERS selection screen for the Rear fireplace.
2	VIEW MESSAGES button	When touched, displays system messages. Refer to Message Screen -Controls and Indicators Descriptions.
3	REAR status window	Provides a continuous display of monitored conditions (current operating status, burn time, temperature level, and propane concentration levels) for the Rear fireplace.
4	MAIN MENU button	When touched, returns display to MAIN MENU screen.

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PARAMETERS SCREEN (REAR FIREPLACE)



EXTINGUISHMENT DIFFICULTY LEVEL			↑ ↓
MANUAL	EASY	HARD	

SOAK DIFFICULTY LEVEL			↑ ↓
NONE	SHORT	LONG	

FLASHOVER EFFECT		↑ ↓
ENABLED	DISABLED	

Figure 2-11 Parameters Screen (Rear Fireplace)

***Operation and Maintenance Manual***
**Table 2-8. Parameters Screen -Controls and Indicators Descriptions**

No.	Control or Indicator	Description
1	REAR FIREPLACE button	When touched, enables parameters for the Rear fireplace to be viewed or modified.
2	VIEW MESSGES window	When touched, displays various system status messages. The “\” return button brings the user back to the Fireplace Parameters Screen.
3	Up (↑) and Down (↓) arrow buttons	Used to scroll up or down through the parameters for the selected fireplace.
4	Selected fireplace status window	Provides a continuous display of monitored conditions (burn time, temperature level, and gas concentration levels) for the selected fireplace.
5	Parameter selection window/buttons	When buttons are touched, allows applicable information for selected parameter to be displayed in window. <ul style="list-style-type: none"> <li>• Rear Fireplace:                             <ul style="list-style-type: none"> <li>Maximum Flame Height (Low, High)</li> <li>Extinguishment Difficulty Level (Manual, Easy, Hard)</li> <li>Soak Difficulty Level (None, Short, Long)</li> <li>Flashover Effect (Enabled, Disabled).</li> </ul> </li> </ul>
6	MAIN MENU button	When touched, returns display to MAIN MENU.

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**SYSTEM MESSAGE SCREEN**

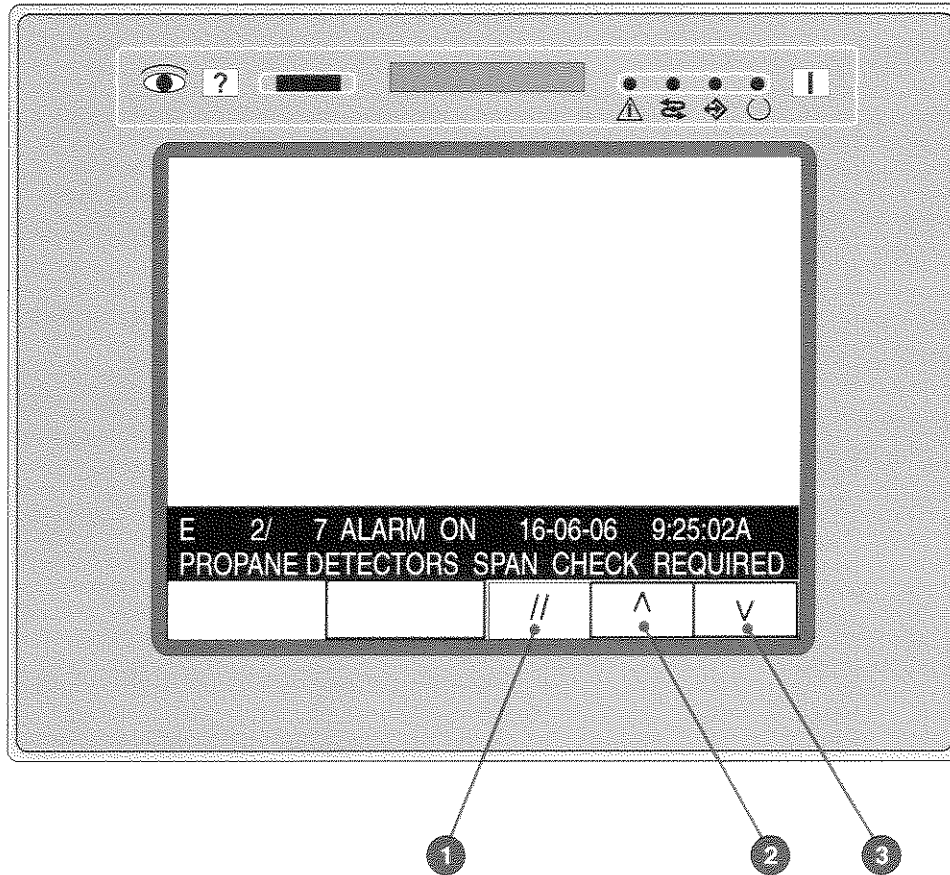


Figure 2-12 Message Screen

Table 2-9. Message Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	//	When touched, returns to previous screen.
2	^	Used to scroll up.
3	v	Used to scroll down.

Refer to the Troubleshooting Section for a complete listing and description of all displayed status messages.



**EMERGENCY SHUTDOWN SCREENS**

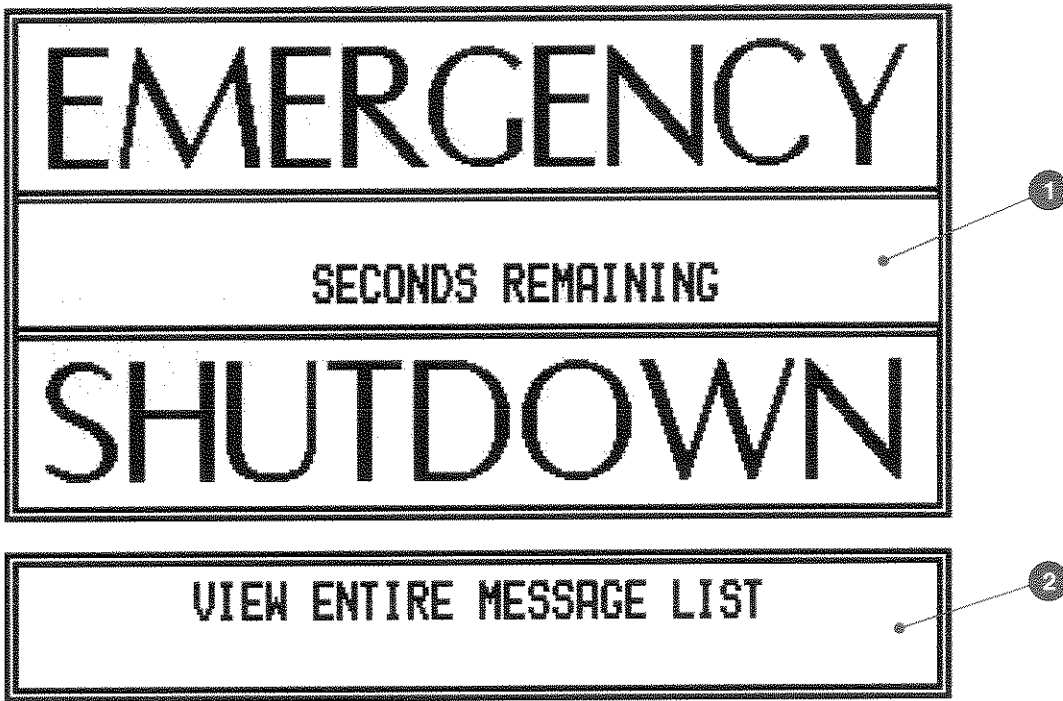


Figure 2-13 Emergency Shutdown Screen

Table 2-10. Emergency Shutdown Screen -Controls and Indicators Descriptions

No.	Control or Indicator	Description
1	Emergency Shutdown status window	When an emergency shutdown has been initiated, a related descriptive message will be displayed, along with the amount of time remaining before the system returns to operational status (after the emergency condition has been cleared).
2	VIEW ENTIRE MESSAGE LIST button	When touched, displays all system status messages. Refer to Message Screen -Controls and Indicators Descriptions Refer to the Troubleshooting Section for a complete listing and description of all displayed status messages.

## PANEL COMMUNICATION FAILURE

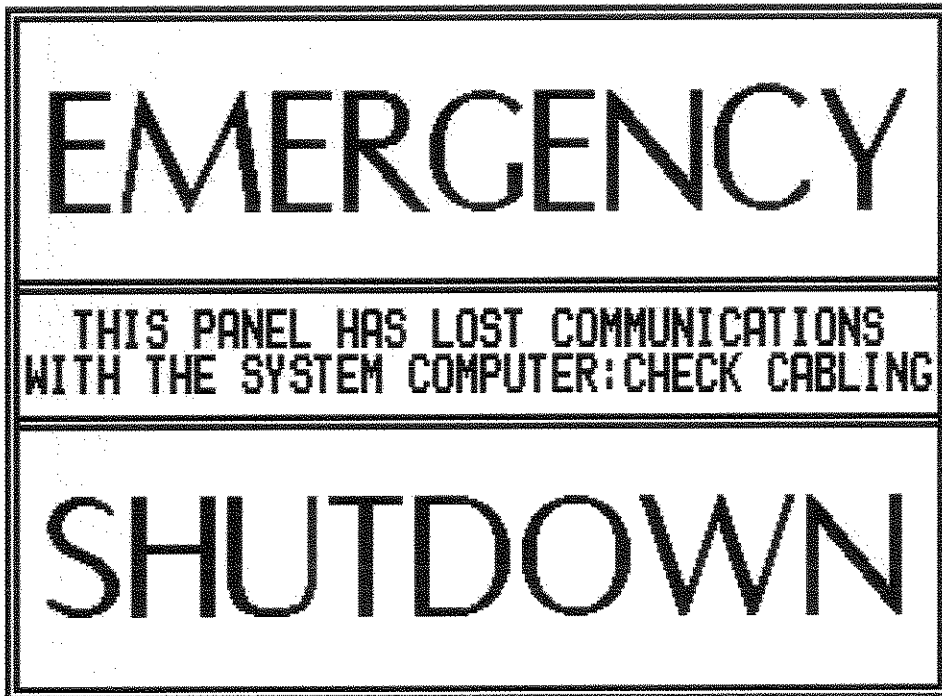


Figure 2-14 Emergency Shutdown Screen (Panel Lost Communication)

In the event that the Operator Interface Panel loses communication with the PLC, a screen will appear as shown in Figure 2-14.

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**2.3.4 CONTROL PENDANT**

This pendant is used to give the instructor full control of the training scenario. It is connected to the I/O Rack Enclosure. See Table 2-11 for Control/Indicator Descriptions and see Figure 2-15 for the Control Pendant layout.

**Table 2-11. Control Pendant – Controls & Indicators**

FIG. 2-17 ITEM NO.	CONTROL	INDICATOR	ITEM NAME	DESCRIPTION
①	X	X	ON/OFF	<p>Press to enable and disable fireplace. When pressed, enables fireplace for operation (scenario parameters are loaded, and system is ready for control commands). Light comes on bright and steady. Smoke generator starts and warms up.</p> <p>When pressed again, disables fireplace. Light returns to a dimly lit condition.</p> <p>Indicator is dimly lit during pre-ventilation period or if system is shut down.</p>
②	X	X	PILOT	<p>Press to turn pilot flame on.</p> <p>When pressed and flashing, indicates pilot flame sequence is in progress.</p> <p>When lit bright and steady, indicates pilot flame sequence is complete and pilot flame is confirmed.</p> <p>When pressed again, turns pilot flame off. Light goes off.</p>
③	X	X	FLAME	<p>Press to turn main flame on.</p> <p>When pressed after pilot flame is confirmed, lights bright to indicate main flame is active. During soak period or when PAUSE is selected, flashes to indicate main flame is not active.</p> <p>When pressed again, turns main flame off. Light goes off.</p>
④	X	X	PAUSE	<p>When pressed during main flame operation, main flame is turned off. Light comes on bright.</p> <p>When pressed again, main flame reignites and the scenario continues. Light returns to a dimly lit condition.</p>

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**Table 2-11. Control Pendant – Controls & Indicators**

FIG. 2-17 ITEM NO.	CONTROL	INDICATOR	ITEM NAME	DESCRIPTION
⑤	X	X	EFFECT	<p><b>Rear Fireplace Flashover</b></p> <p>When rear fireplace is operational, and flashover effect is enabled, press and hold to turn flashover effect on.</p> <p>Indicator automatically flashes when effect is ready for operation.</p> <p>When pressed and held, turns on flashover flames for the preset duration or until the button is released, (whichever is shorter). Indicator lights steady while button is pressed.</p> <p><b>NOTE:</b> <i>Only use the flashover effect 3 times during a single fire training scenario. If used over 3 times, trainer may shutdown due to excessive gas levels detected.</i></p>
⑥	X	X	SMK/VNT	<p>This switch is used to control the smoke generator in the control room (<b>SMK</b>) and the vent/exhaust fan (<b>VNT</b>).</p> <p>To generate smoke the I/O Rack Enclosure <b>SYSTEM POWER</b> key switch and <b>SMOKE ENABLE</b> Switches must both be in the <b>ON</b> position.</p> <p><b>SMK</b> – Once indicator is flashing turn switch to this position to produce smoke. Switch indicator lights steady. Turn switch to center position to turn smoke off. Switch indicator light flashes.</p> <p><b>VENT</b> - When the switch is turned to this position the vent/exhaust fan ramps up to high speed to clear the Burn Room. Turn switch to center position to return vent/exhaust fan to normal operation.</p>
⑦		X	AGENT	<p>Indicator automatically lights bright when extinguishing agent application is detected.</p>

***Operation and Maintenance Manual***
**Table 2-11. Control Pendant – Controls & Indicators**

FIG. 2-17 ITEM NO.	CONTROL	INDICATOR	ITEM NAME	DESCRIPTION
⑧	X	-	FPLC	<p>(1) Select this position for rear fireplace operation.</p> <p>(2) <b>NOT USED.</b></p> <p>(3) <b>NOT USED.</b></p> <p>When switch is used to select another fireplace, the previously selected fireplace remains operational.</p>
⑨	X	X	E-STOP	<p>When pushed in, initiates an emergency shutdown of the trainer. Propane flow to the trainer is shut off, operating power is removed, and the vent/exhaust system ramps up to high speed.</p> <p>When reset (pulled out), starts a 30-second time delay counter. At the end of the 30-second time period, the trainer is restored to operating condition. Switch must be in the pulled-out position to operate the trainer.</p> <p>Automatically flashes when a system message occurs. Resets when ON/OFF switch is pressed. Check fireplace touch screen for error messages.</p> <p>Lights steady during emergency shutdown condition. Will not reset until emergency condition is cleared and ON/OFF switch is pressed.</p>

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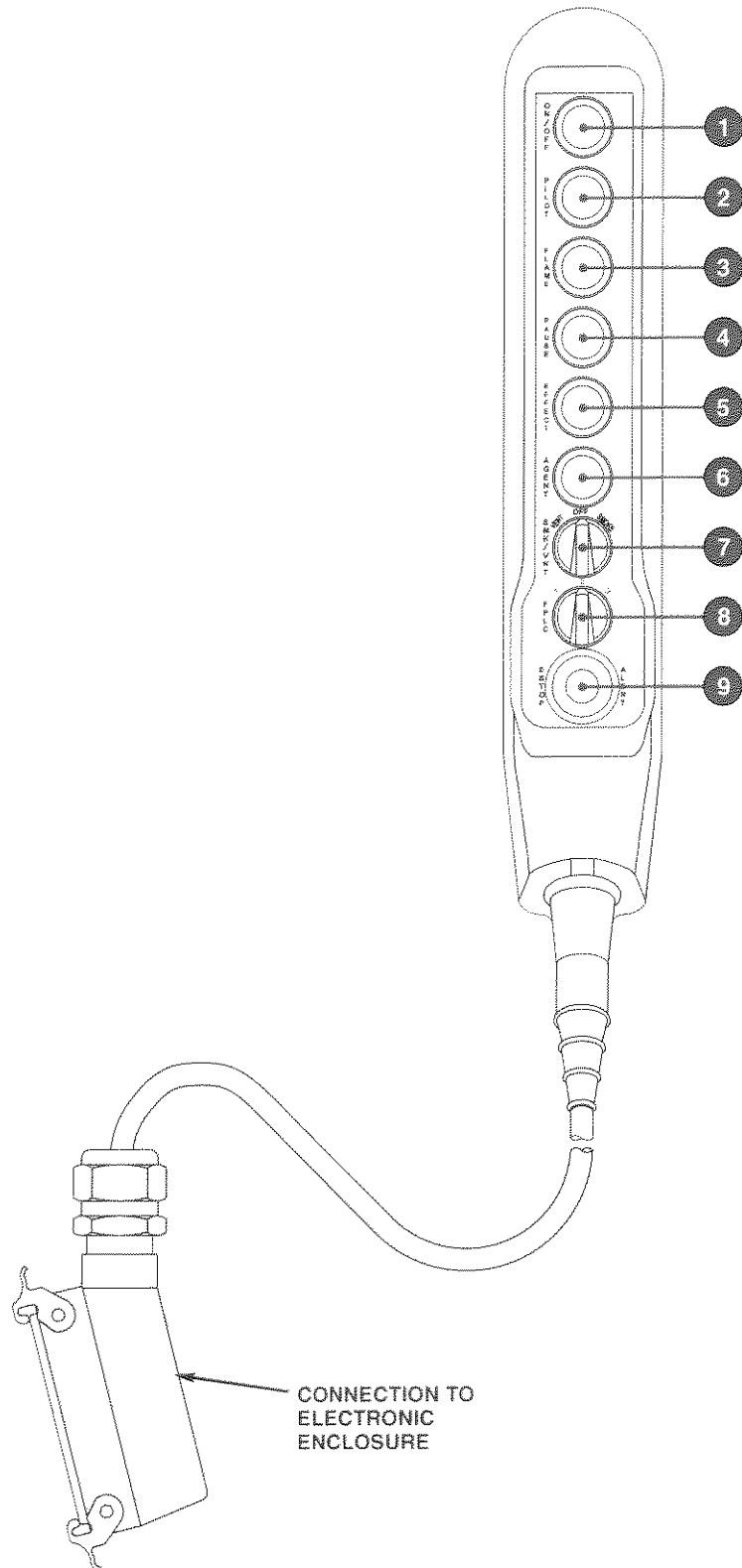


Figure 2-15 Control Pendant

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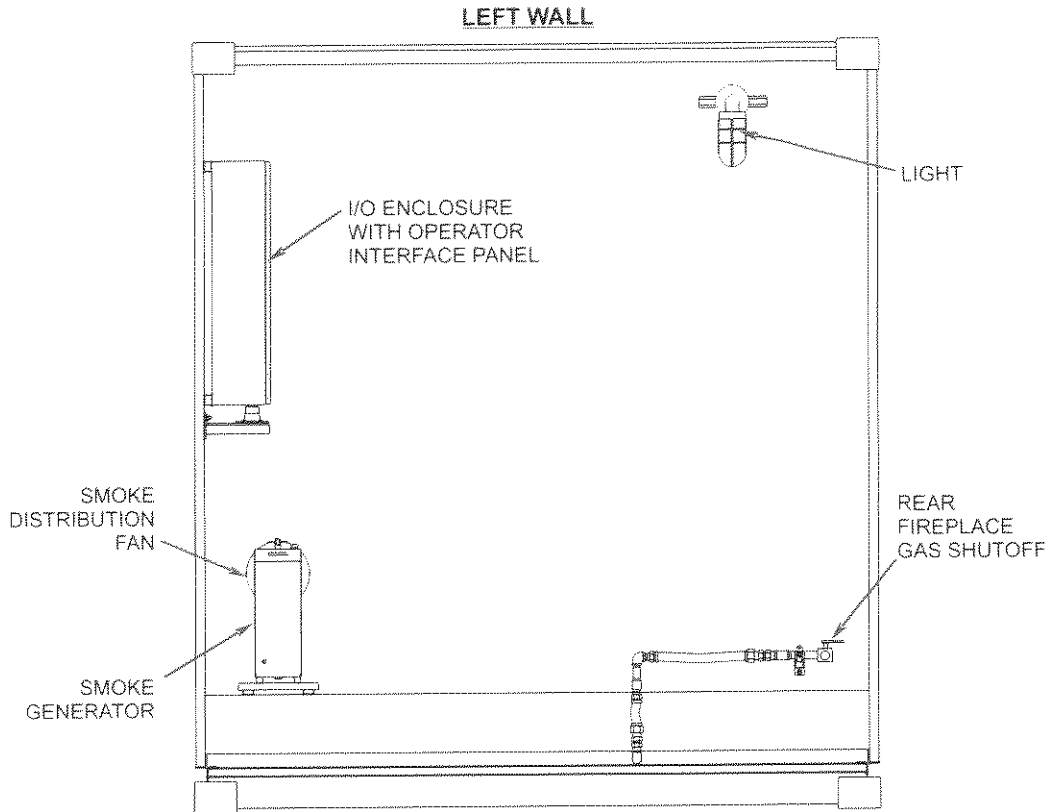


Figure 2-16 Control Room Components (Left Side Wall)

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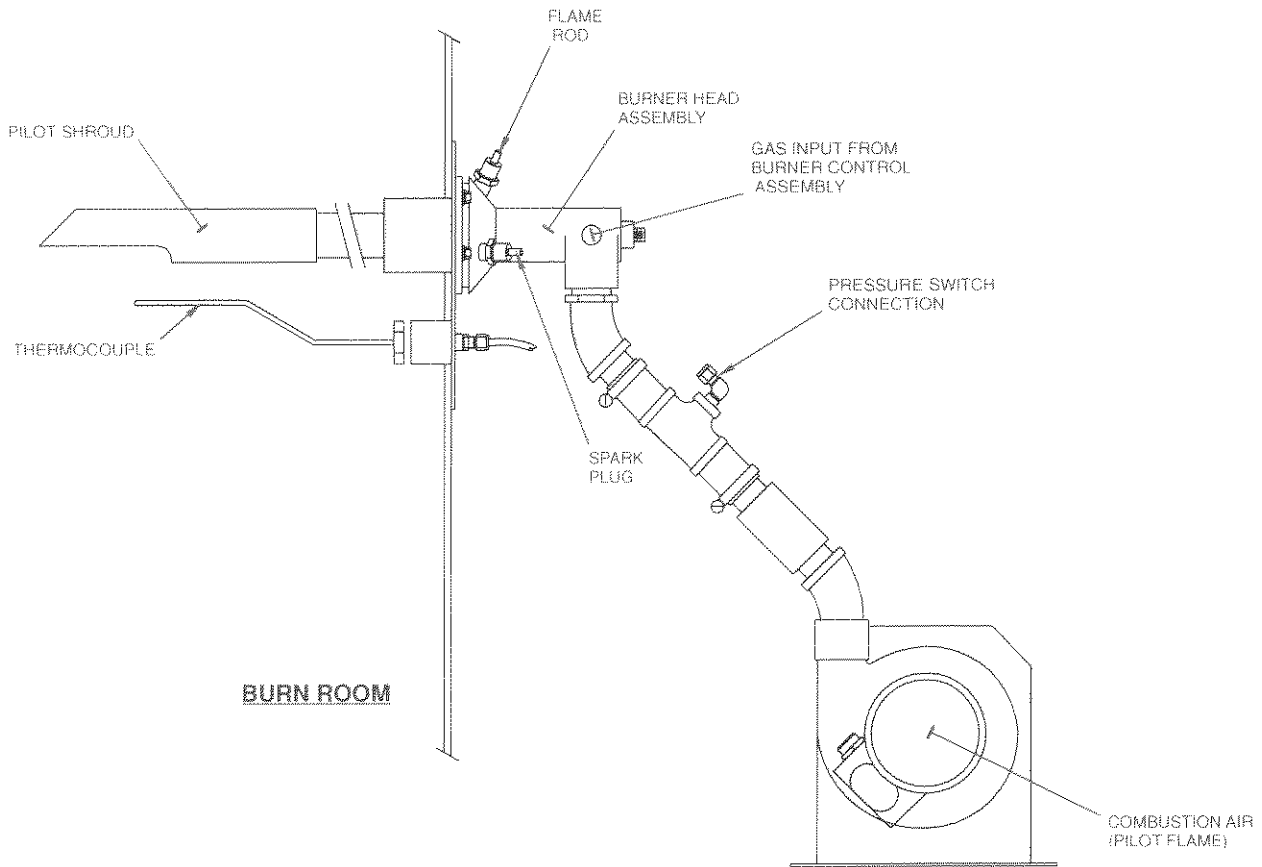


Figure 2-17 Pilot Flame Generation Components (side view)



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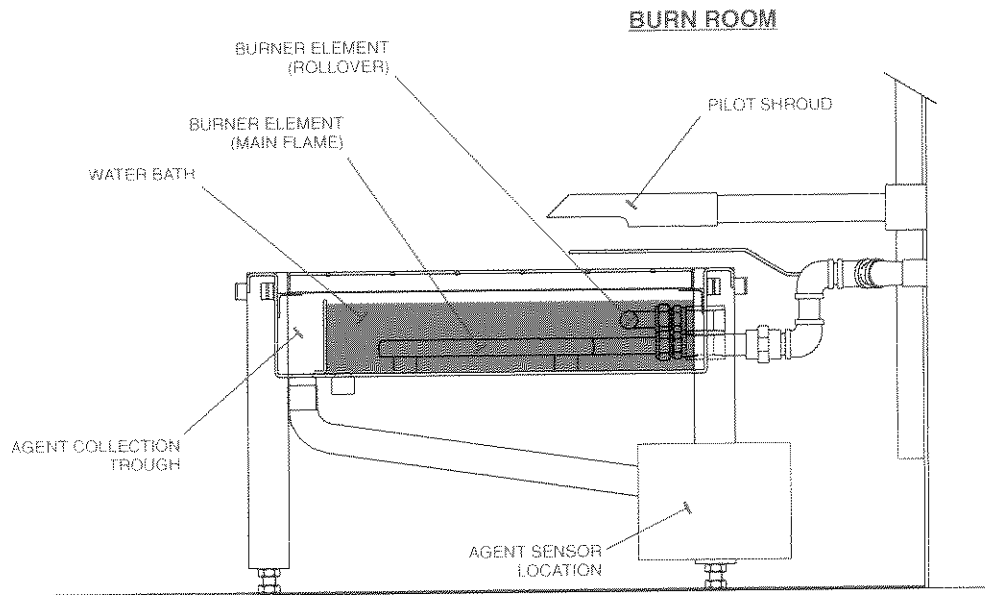


Figure 2-18 Main Flame Generation Components (side view)

**2.3.5 COMBUSTIBLE GAS DETECTION**

The system continuously monitors the unburned gas levels inside the burn room and control room. The burn room is equipped with two combustible gas sensors (See Figure 2-2) and the control room is equipped with one combustible gas sensor (See Figure 2-19). Each sensor is connected to a Transmitter located in the Control Room (See figure 2-19). This system is hard-wired and fail-safe.

The gas sensor transmitter has two alarm levels; the first is a warning. The warning will trigger, when the presence of a combustible gas concentration exceeding 10% of the Lower Explosive Limit (LEL), for propane gas is detected in the burn area. This will accelerate the ventilation/exhaust system fan. The second alarm is triggered when the presence of a combustible gas concentration exceeds 25% of the LEL. When a concentration exceeding this amount is detected the system will automatically fault into an emergency stop condition.

The gas detection transmitter display indicates the percentage of LEL for the corresponding sensor and also displays alarm status.

The combustible gas sensor(s) in the burn area are fitted with protective splashguards that will prevent fire-extinguishing agent from impinging the sensing module readily. See Burn Room Components section for more detail.

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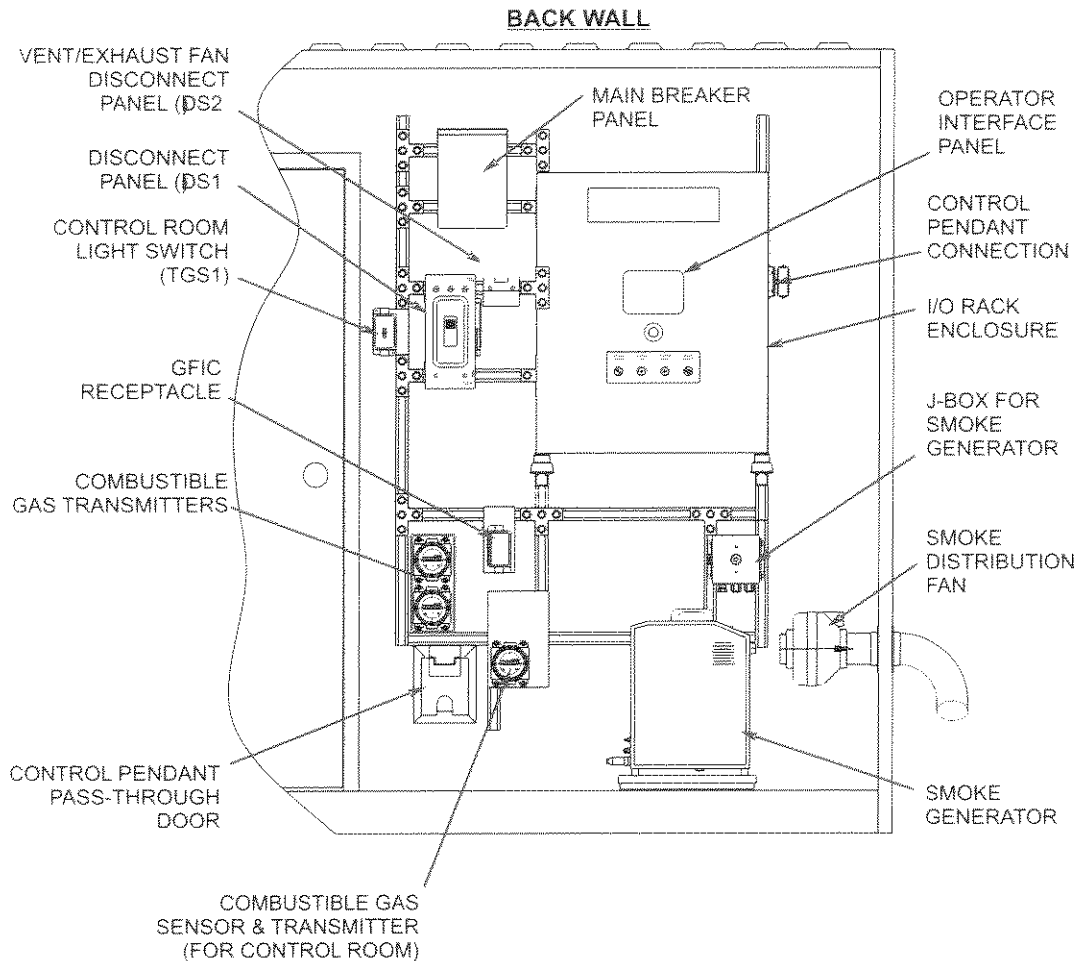


Figure 2-19 Control Room Components (Back Wall)

### 2.3.6 MAIN BREAKER PANEL

The Main Breaker Panel is located on the back wall of the Control Room. This panel houses the main breaker, and the breakers for the I/O Rack Enclosure, interior lights and interior receptacles. These breakers will only operate while the generator/land power is on and the main breaker is energized. Refer to figure 2-19 for location.

### 2.3.7 MAIN POWER DISCONNECT PANEL (DS1)

The Main Disconnect Panel (DS1) is located on the back wall of the Control Room (See figure 2-22 for location). This disconnect isolates the power in from the generator/land power to the system.

### 2.3.8 VENT FAN DISCONNECT PANEL (DS2)

The Vent/Exhaust Fan Disconnect Panel (DS2) is located on the back wall of the Control Room (See figure 2-22 for location). This disconnect switch isolates power to the trainer vent/exhaust fan.

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**2.3.8 INTERIOR LIGHTS/RECEPTACLE**

A light is located on the right wall of the Control Room (Figure 2-23). The light switch is located to the left side of the Control Room doorway (Figure 2-22).

**2.3.9 SMOKE GENERATOR**

The Smoke Generator and fan supplies smoke to the Burn Room via a duct located. The smoke generator creates a realistic smoke by atomizing oil droplets, which are forced by the nitrogen/CO<sup>2</sup> system. The smoke fluid that Kidde Fire Trainers, Inc. supplies is a non-toxic oil based fluid.

The smoke generator is operated automatically with the pendant. The smoke generator is plugged into a receptacle located on the face of a junction box (See Figure 2-22). This junction box also contains the control wiring for the smoke generator.

**2.3.10 NITROGEN CYLINDER (NOT PROVIDED BY KIDDE)**

Nitrogen is required to operate the Concept smoke generator, located in the Control Room. Two nitrogen cylinders are located on the right wall. The cylinders are secured to cradle brackets by binder straps. A regulator is provided to control the delivery pressure of the nitrogen to the smoke generator (See Figure 2-23).

**2.3.11 CONTROL ROOM VENT FAN**

There is a vent fan located on the right wall of the Control Room (Figure 2-23). The switch is located to the right side of the Control Room doorway (Figure 2-23).

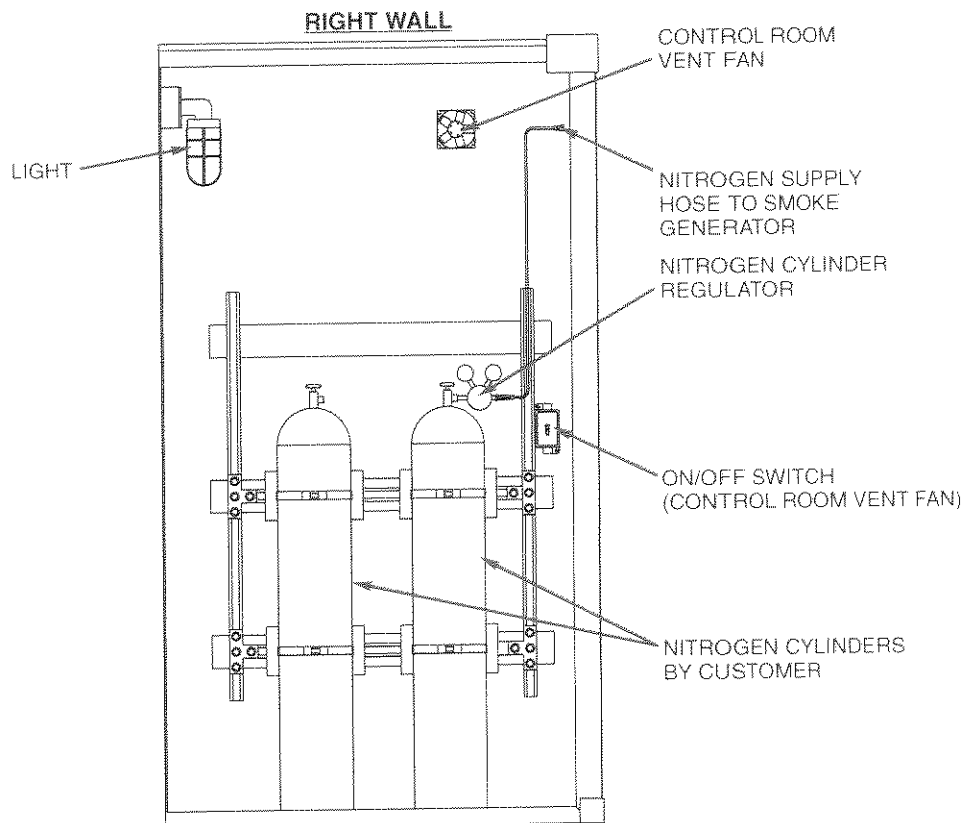


Figure 2-20 Control Room Components (Left Side Wall)

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### **2.4 EQUIPMENT ROOM COMPONENTS**

Refer to Figure 2-2 for Equipment Room Location.

#### **2.4.1 BURNER CONTROL ASSEMBLY (REAR FIREPLACE & FLASHOVER)**

The Burner Control Assembly for the rear fireplace and flashover is located on the back wall of the Equipment Room. The Burner Control Assembly is equipped with components that controls and monitors gas distribution for the rear fireplace and flashover Pilot Assemblies and Main Flames. Refer to Figure 2-21 for the Burner Control Assembly location.

Refer to Figure 2-22 for the Burner Control Assembly Layout.

From the Propane Compartment gas enters the Equipment Room through a manual shutoff valve to the Burner Control Assembly. Gas entering the Burner Control Assembly first passes through a Y-Strainer where the gas is filtered and then to a pressure regulator where the gas pressure is reduced to about 5 psi. An adjustable pressure switch follows the regulator and will shut down the gas supply if a high gas pressure condition occurs. A Safety Shutoff Valve for the Fireplace and Flashover follows the regulator. The Safety Shutoff Valve function is to isolate the input gas from the rest of the system in the event of an emergency or an out-of-range condition.

At each of the Safety Shutoff Valves the Burner Control Assembly branches into two lines, one for the pilot flame and one for the main flame. The gas flowing to the fireplace pilot flame branch passes through a regulator where the gas pressure is further reduced to 5 IWC. Down stream of the regulator is a solenoid valve that controls gas flow to the pilot burner head. The solenoid valve is equipped with a pressure gauge and a push to test button. At the end of the pilot flame branch is an adjustable needle valve. The gas flowing to the Flashover pilot flame branch is equipped with a solenoid valve that controls gas flow to the pilot burner head. Both the Fireplace and Flashover main flame branches start on the output side of the Safety Shutoff Valve and run to the main flame burner elements.

#### **2.4.2 MAIN AND PILOT FLAME GENERATION DESCRIPTION**

Figure 2-22 shows the Pilot and Main Flame generation components. The Rear Fireplace generates a main flame that is ignited by a pilot flame.

##### **2.4.2.1 PILOT FLAME GENERATION DESCRIPTION**

Refer to Figures 2-17 and 2-22.

Air for pilot combustion is generated by the air blower and fed to the Burner Head Assembly via a hose. The air blower is monitored by a pressure switch that ensures airflow is present at the Burner Head Assembly. The airflow signal is fed back to the flame Safeguard unit. Once airflow is verified gas is fed to the Burner Head Assembly where it is mixed with the air from the blower to provide the optimum combination for combustion.

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A low voltage is generated in the flame Safeguard unit, stepped up to a high voltage by a transformer and then supplied to the spark plug on the Burner Head Assembly to ignite the air/gas mixture. To verify that a flame is present in the Burner Head Assembly a flame rod sends a signal to the flame Safeguard unit confirming the presence or absence of the flame.

To confirm the presence of a pilot flame at the fireplace, a thermocouple with its tip directly under the flame confirms or proves when a preset temperature is reached and sends a signal to the PLC in the I/O Rack Enclosure. Pilot activation is achieved by pressing the **Pilot** button on the control pendant. If a flame is not proven in thirty (30) seconds, a message on the Display Panel of the I/O Rack Enclosure will indicate the condition.

### **2.4.2.2 MAIN FLAME GENERATION DESCRIPTION**

The gas for the main flame is supplied from the Burner Control Assembly where it transitions through the Burn Room wall to the main flame burner element (See Figure 2-21). Operation of the main flame is achieved by pressing the **Flame** button on the control pendant, after the pilot flame is running.

### **2.4.3 FLASHOVER MAIN FLAME PILOT GENERATION DESCRIPTION**

Figure 2-21 shows the location of the components that make up the Flashover Main and Pilot Flame generation system. As in the fireplace Main Flame Pilot Generation system, a pilot flame ignites the Flashover main flame.

#### **2.4.3.1 PILOT FLAME GENERATION DESCRIPTION**

Refer to Figures 2-21 and 2-22.

Gas for the pilot flame is fed from the Burner Control Assembly through a pipe to the Burner Head Assembly. This connection passes through into the burn room to the Pilot Burner Head.

The igniter unit supplies a high voltage to the spark plug on the Burner Head Assembly to ignite the air/gas mixture. To confirm the presence of a pilot flame at the flashover, a thermocouple with its tip directly under the flame confirms or proves when a preset temperature is reached and sends a signal to the PLC in the I/O Rack Enclosure.

#### **2.4.3.2 MAIN FLAME GENERATION DESCRIPTION**

Refer to Figures 2-21 and 2-22.

The gas for the Flashover main flame is supplied from the Burner Control Assembly where it transitions through the Burn Room wall to the main flame burner element. Operation of the main flame is achieved by pressing the **EFFECT** button on the control pendant, after the pilot flame is running.

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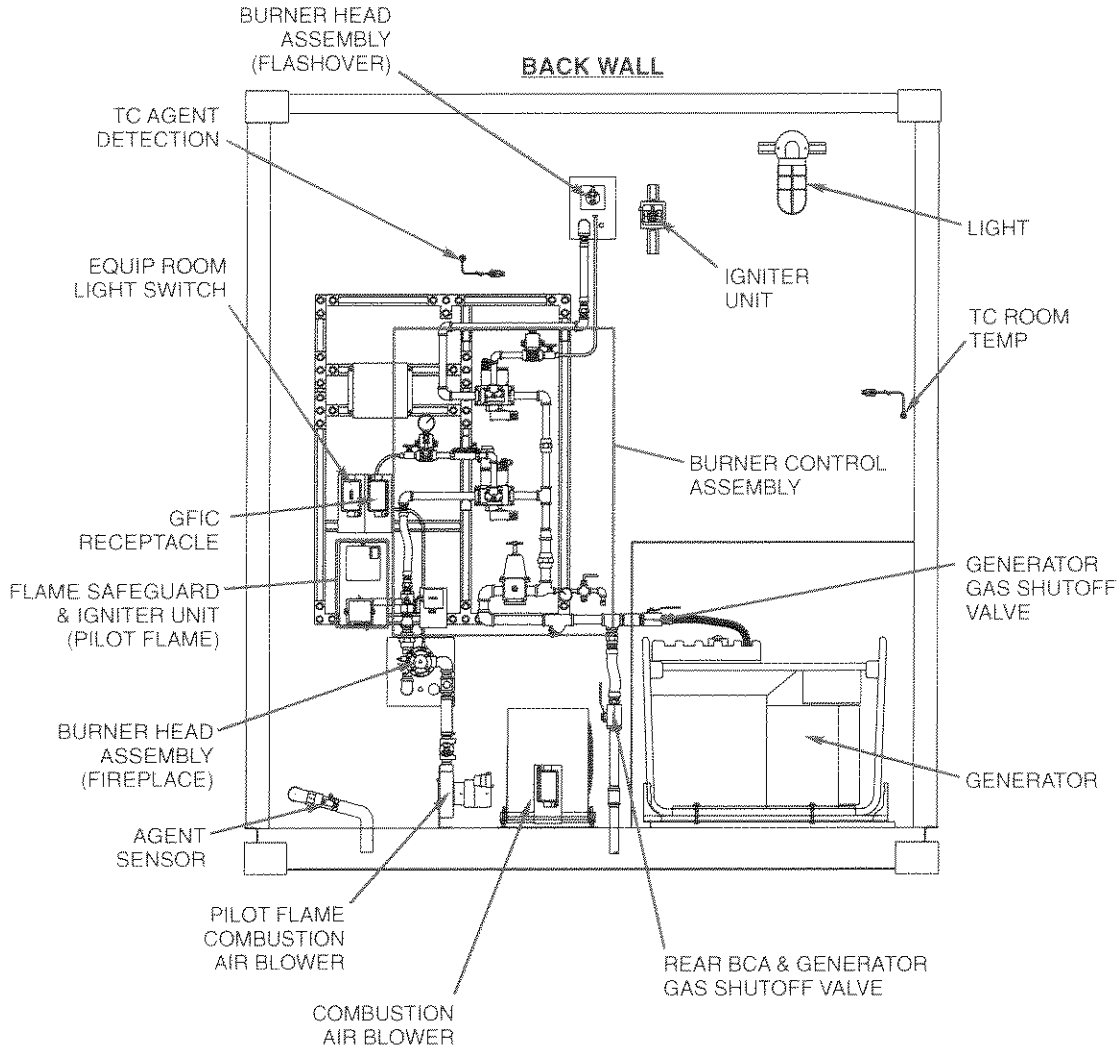


Figure 2-21 Equipment Room Components (Back Wall)

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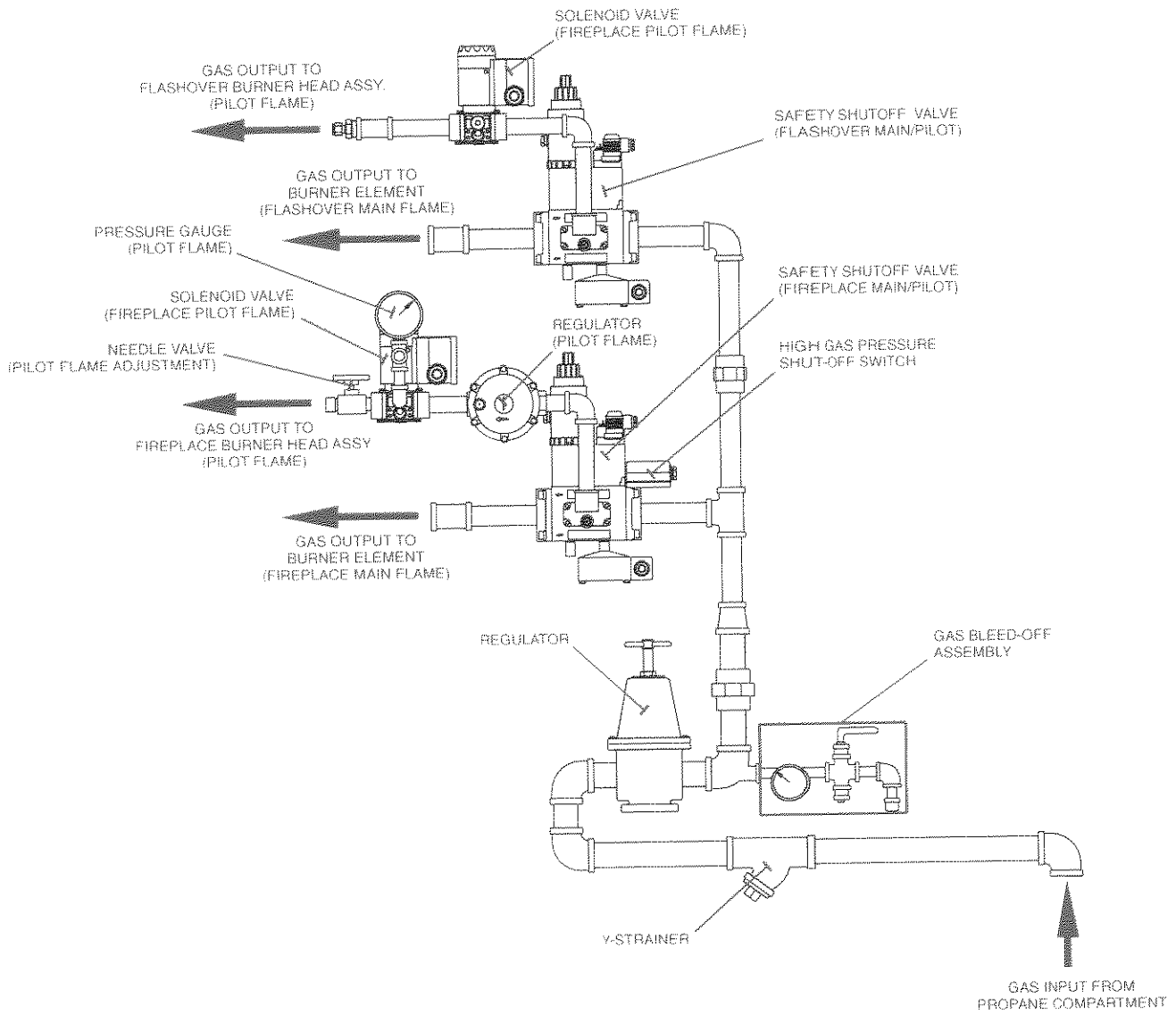


Figure 2-22 Burner Control Assembly (Equipment Room)

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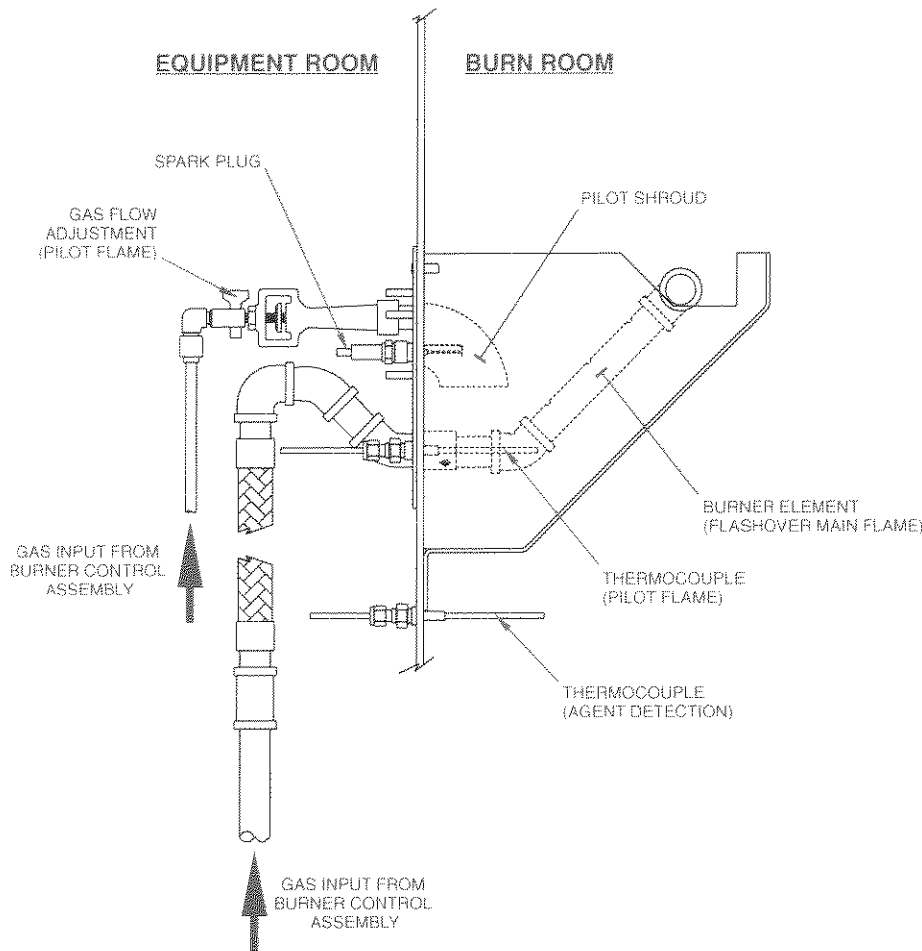


Figure 2-23 Flashover Main/Pilot Flame Generation Components (side view)

### 2.4.4 COMBUSTION AIR BLOWER (MAIN FLAME)

To ensure an adequate supply of air to the Fireplace a combustion air blower (figure 2-21) moves air into the Burn room. The combustion air blower is electronically monitored to ensure airflow is present.

### 2.4.5 AGENT SENSOR

A compartment located in the Fireplace water pan collects water as it is sprayed at the main flame. The collected water flows through a pipe and exits the Fire Training Compartment into the Rear Equipment Room where it passes through a sensor (Figure 2-21). The time that water flows past the sensor is monitored to ensure that water application has occurred for the preset extinguish and soak times.



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**2.4.6 AGENT DETECTION THERMOCOUPLE**

This sensor is used to monitor temperature at the ceiling level and function as extinguishing agent detector (Figure 2-21). When operating the fireplace at high flame, as agent is applied to the ceiling above the fireplace, the thermocouple senses a rapid decrease in temperature and reduces (knocks down) the flame to enhance realism during fire fighting scenarios.

**2.4.7 INTERIOR LIGHTS/RECEPTACLE**

A light with switch is located in the Rear Equipment Room back wall. (Refer to Figure 2-21) and the switch is located on the right side wall. A GFI receptacle is also located on the back wall.

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## **2.5 BURN ROOM COMPONENTS**

### **2.5.1 FIREPLACE PLATFORM**

Refer to Figure 2-2.

The burn room contains one fireplace platform. Depending upon the type of scenario a mock-up is assembled on the fireplace platform and fires engulf the mockup. Each fireplace platform has a water pan fabricated from steel sheet. At the bottom of the pan, a burner system is installed through which the flammable gas is liberated. Gas/oxygen mixing occurs above the water surface where a pilot initiates combustion. The liberation of gas through water greatly enhances the depth of flame and gives the impression of a substantial fire. The front and rear fireplaces utilize *AquaMesh™* burner technology. *AquaMesh™* burner technology presents a realistic representation of a fire-training prop. The *AquaMesh™* burner technology allows the trainee fire fighter to employ common hose line attack patterns without impacting burner performance. The *AquaMesh™* burner technology also prevents flames from being swept from the surface of the burn pan causing unburned gas to be released into the atmosphere at a high rate, creating a potential hazard.

Mock-ups are assembled on top of the fireplace platform. Each mock-up has different characteristics to enhance firefighter training.

### **2.5.2 FLASHOVER BURNER ELEMENT**

Refer to Figure 2-2.

The Flashover Burner Element is located above the rear Fireplace Platform. When the Flashover is activated it produces a flame that extends across the ceiling.

### **2.5.3 GAS SENSOR HEADS**

There are two gas sensor heads in the Burn Room. One sensor head is located on each side of the Burn Room. They sense the level of propane in the Burn Room and will shut the fires down if it reaches unsafe levels. The Sensor Heads are housed in protective enclosures to protect them. For more details refer to "**Safety Systems**", located in this section.

### **2.5.4 TEMPERATURE SENSING DEVICE**

The temperature-sensing device is a thermocouple. There is a thermocouple located near the fireplace platform on the wall of the trainer. The thermocouple is hard wired to two alarms in the I/O Rack Enclosure. There is a 500 °Fahrenheit and 700 °Fahrenheit alarm. With the thermocouple reading of 500 a warning condition occurs, and the ventilation/exhaust fan accelerates. With the thermocouple reading at or above 700°F an alarm condition occurs, the system will automatically fault into an emergency stop condition. For more details refer to "**Safety Systems**", located in this section.

### **2.5.5 E-STOP ASSEMBLY**

There is an E-Stop assembly located at each of the Burn Room doors. When the E-Stop is pressed it shuts down all operating main and pilot flames. The exhaust fan will ramp up to high speed and remain at that speed until the activated push button is reset and the ON/OFF switch is pressed on the Pendant. For more details refer to “**Safety Systems**”, located in this section.

### **2.5.6 VENTILATION/EXHAUST SYSTEM**

The main function of the ventilation/exhaust fan is to purge the burn room of all air impurities and to pull clean air into the burn area (See Figure 2-2). The ventilation/exhaust fan activation is based on operation, warning, and alarm conditions.

The ventilation/exhaust fan operates at two speeds. During normal operation when main flame is activated the ventilation/exhaust fan operates at medium speed (30 HZ). During warning, and alarm conditions the ventilation/exhaust fan operates at high speed (60 HZ). For more details refer to “**Safety Systems**”, located in this section.

### **2.5.7 STAIR ASSEMBLY**

Refer to Figure 2-2.

The stair assembly is located across from the curbside Burn Room door and is used to access the second story room and roof.

### **2.5.8 MOVABLE PANELS**

The trainer is equipped with movable panels. The support posts fit into receivers located along the Burn Room floor and ceiling. The movable panels can be arranged in several configurations. This allows variations in the access from the exterior of the trainer to the Burn Room. This is particularly useful for smoke training exercises when visibility is significantly reduced.

### **2.5.9 MOVABLE WALL BREACH PANEL**

One Movable Wall Breach Panel is supplied with the trainer. The Movable Wall Breach Panel is used to allow a breach point within the panel maze. The Movable Wall Breach Panel is designed to allow the assembly of three wooden 2”x3” to be sandwiched between two section of sheetrock.

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## **2.6 ROOF COMPONENTS**

### **2.6.1 SAFETY RAILING ASSEMBLY**

The safety railing assembly is installed around the perimeter of the roof and is composed of railing posts and chain.

### **2.6.2 COLLAPSIBLE SECOND STORY PROP**

The Collapsible Second Story prop is located at the front portion of the trainer roof. During setup the sidewalls are raised and held in place with pins. A winch is used to raise the roof, front and back walls and hold them in place. Refer to figure 2-1 for prop and winch location.

### **2.6.3 INCLINE ROOF PROP**

The Incline roof prop is located on top of the trainer and extends across the width of the trainer. During setup the Roof Prop is raised into place with prop jacks. This prop is equipped with safety railings and a replaceable plywood panel that can be used for hand cut or saw training. The Incline roof prop is collapsible for transportation. Beneath the Incline roof prop is an opening used to enter the Burn Room.

## **2.7 AUXILIARY COMPONENTS**

### **2.7.1 STAIR WAY**

The trainer is equipped with three stairways and railing sets. These stairways are used to access the Control and Burn Rooms (See figure 2-1 for locations).

### **2.7.2 STEP LADDER**

The trainer is equipped with a rolling stepladder. This stepladder is used to access the rear Equipment Room, Propane Compartment and front decking portion of the trainer (See figure 2-1 for location).

### **2.7.3 FORCIBLE ENTRY DOOR**

One Forcible Entry Door Assembly is supplied with the trainer. The Forcible Entry Door Assembly is used to allow fire service personnel to train on forcible entry techniques.

## **2.8 SAFETY SYSTEMS**

### **2.8.1 VENTILATION/EXHAUST SYSTEM**

The main function of the ventilation/exhaust fan is to purge the burn room of all air impurities and to pull clean air into the burn area (See Figure 2-2). The ventilation/exhaust fan activation is based on operation, warning, and alarm conditions.

The Burn Room can be ventilated either manually (Pendant) or automatically. When the exhaust fan is turned on, air is brought from the outside through louvers and exits through the vent/exhaust fan, clearing the air in the Burn Room.

The fan will accelerate to high speed (60 HZ) due to the following conditions:

- A gas detector reaches a warning level of 10%LEL
- The temperature in the room rises to a warning level of 500°F.
- Initial system purge
- Emergency Stop
- System is purging
- A gas detector reaches an alarm level of 25%LEL.
- The temperature reaches an alarm level of 700°F.

#### **2.8.1.1 VENT/EXHAUST FAN OPERATION-EMERGENCY**

When an Emergency Stop button is activated, the vent/exhaust fan accelerates to high speed and will continue to run at high speed until the emergency stop is reset.

#### **2.8.1.2 VENT/EXHAUST FAN OPERATION 10% LEL OF PROPANE**

When the gas detection system reads over 10% LEL the vent/exhaust fan will accelerate to high speed and the system will continue to run and attempt to remove the unburned gas buildup.

#### **2.8.1.3 VENT/EXHAUST FAN OPERATION 25% LEL OF PROPANE**

When a 25% LEL of propane is detected in a burn room, the vent/exhaust fan accelerates to high speed and the system will automatically fault into an emergency stop condition. The vent/exhaust fan will continue to run at high speed until the concentration of propane is reduced to below 24%.

#### **2.8.1.4 VENT/EXHAUST FAN OPERATION-500°F IS EXCEEDED**

When the temperature in a burn room is detected as exceeding 500°F, the vent/exhaust fan will accelerate to high speed and continue to run at this speed until the temperature is detected as being less than 500°F.

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### **2.8.1.5 VENT/EXHAUST FAN OPERATION-700°F IS EXCEEDED**

With reading at or above 700°F an alarm condition occurs the vent/exhaust fan accelerates to high speed and the system will automatically fault into an emergency stop condition. A message on the Display Panel located on the I/O Rack Enclosure in the Control Room indicates when the shutdown level has been reached.

### **2.8.1.6 VENT/EXHAUST FAN OPERATION-(PENDANT)**

The Control pendant has a **Vent** button for the operation of the Exhaust Fan.

Pressing the **Vent** button runs the vent/exhaust fan at high speed. The button indicating light comes on bright and steady. Pressing the button again turns the Exhaust Fan off.

### **2.8.2 MANUAL EMERGENCY E-STOP BUTTON**

When an E-Stop is pressed it shuts down all operating main and pilot flames. The vent/exhaust fan will accelerate to high speed and remain at that speed until the activated push button is reset and the cause has been corrected. Refer to Figure 2-2 for E-stop locations.

### **2.8.3 COMBUSTIBLE GAS DETECTION**

The combustible gas detection system consists of three transmitters located in the Control Room along with one sensor and two sensors located in the Burn Room (See figures 2-2 and 2-24).

The training system continuously monitors the gas levels inside the Burn Room. The Burn Room is equipped with two combustible gas sensors (See Figure 2-2 and Figure 2-29). Each sensor is connected to a Transmitter located in the Control Room (See Figure 2-22). This system is hard-wired and fail-safe. There is a display area located on each gas detection transmitter. The display indicates the percentage of LEL for the corresponding sensor and also displays alarm status. Additionally the current LEL for the combustible gas sensors is also displayed on the Fire Training screen.

The gas sensor transmitter has two alarm levels; the first is a warning. The warning will trigger, when the presence of a combustible gas concentration exceeding 10% of the Lower Explosive Limit (LEL), for propane gas is detected in the burn area. This will accelerate the ventilation/exhaust fan to high speed. The second alarm is triggered when the presence of a combustible gas concentration exceeds 25% of the LEL. When a concentration exceeding this amount is detected the system will automatically fault into an emergency stop condition. An Emergency Shutdown screen will appear at the touch panel indicating the sensor location.

The combustible gas sensor(s) in the burn area are fitted with protective splashguards that will prevent fire-extinguishing agent from impinging the sensing module readily.

**CAUTION**

THE GAS DETECTION HEADS ARE SENSING DEVICES. HARSH SOLVENTS AND SILICON BASED PRODUCTS CAN/WILL POISON THE GAS DETECTION HEADS. IF THE NEED ARISES TO USE THESE PRODUCTS WITHIN THE AREA OF THE GAS DETECTION HEADS MAKE SURE THAT THE HEADS ARE COVERED WELL, AND THAT THE AREA IS WELL VENTILATED.

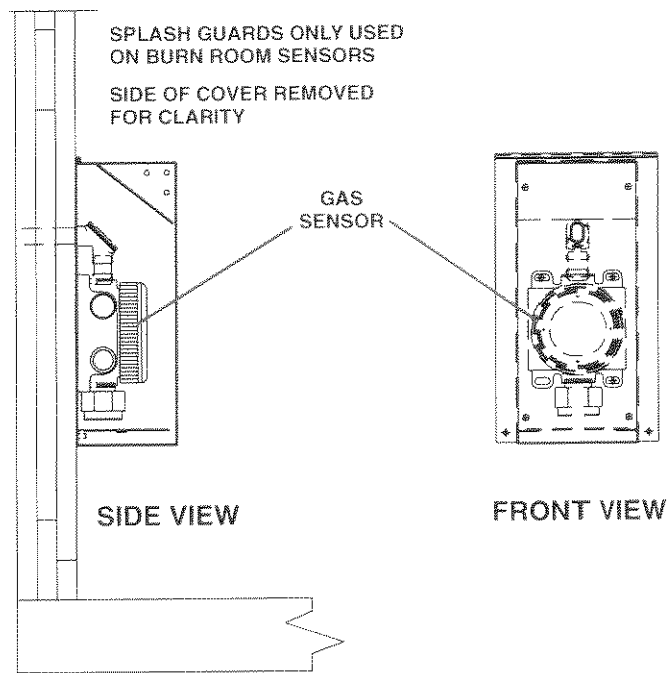


Figure 2-24 Combustible Gas Sensor

**2.8.4 TEMPERATURE MONITORING**

The Burn Room contains one temperature sensor thermocouple to monitor the temperature level. The temperature monitoring system sends the temperature level measured at the sample point to the PLC, which displays this information on request to the operator at the Operator Interface Panel, located on the front of the I/O Rack Enclosure. If the temperature within the compartment reaches a specified "Warning Level" (500°F), the compartment ventilation fan will automatically come on to reduce the temperature level. If the temperature within the compartment reaches a specified "Danger Level" (700°F), the temperature monitoring system immediately initiates a trainer emergency shutdown sequence, an emergency shutdown screen is displayed on the Operator Interface Panel, and trainer operation is disabled. See Figure 2-2 for Burn Room Temperature Sensor location.

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## 3.0

# OPERATION

### 3.1 INTRODUCTION

This section describes the necessary procedures to operate the MOBILE FIRETRAINER® T-4000-53-1.

### 3.2 TRAINER SETUP

Upon arrival to the selected training site the MOBILE FIRETRAINER® T-4000-53-1 system requires setup both internally and externally. When choosing a site the Operator should take the following items into consideration.

1. Site should be clear of all electrical power lines.
2. The site should be relatively level. A hard asphalt or concrete surface makes the ideal location for the trainer. The surface needs to be firm enough to support the trainer.
3. Site should be large enough to allow for staging of equipment and firefighters.

The system must be setup in the proper order.

#### 3.2.1 EXTERNAL SETUP (GROUND LEVEL)

1. There are leveling legs located at the front of the trainer. Using the leveling legs positioning handle, lower the legs to ground level until the weight is removed from the Tow Vehicle fifth wheel.
2. Disconnect air brake hoses from the Trainer. Note: The air brake hoses are color coded blue and red.
3. Disconnect Tow Vehicle electrical connection from the Trainer.
4. Disengage fifth wheel lock by pulling the release handle.



## WARNING

THE FRONT LEVELING LEGS MUST BE DOWN BEFORE UNHOOKING FROM TOW VEHICLE.

5. Pull the Tow Vehicle forward away from the trainer.
6. Open the driver side and passenger side, Burn Room access doors.

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### 3.2.1.1 BURN ROOM STAIRS

Refer to Figure 3-1.

#### NOTE

THERE ARE THREE (3) SETS OF STAIRWAYS AND THREE (3) RAILINGS. THE TALLEST SET IS FOR THE CONTROL ROOM DOOR ACCESS. THE TWO LOWER SETS ARE FOR BURN ROOM DOORS ACCESS.

7. There are two stairways and two railings that are stored inside the Burn Room. Remove the stairways and railings. Position a set of these components at each Burn Room door.
8. Position the stairway against the trainer. Secure stairway to trainer by slotting the stairway hooks into the stairway hook points (1) located just below the Burn Room door opening.
9. There is a leveling foot (2) located on each leg of the stairs. Level the stairway platform with the leveling feet by removing leveling foot securing pin, adjust height and then insert leveling foot securing pin back in hole on both sides.
10. Install railing section opposite to the Burn Room door hinge (3).
11. Repeat steps 7-11 for the Control Room stairs.

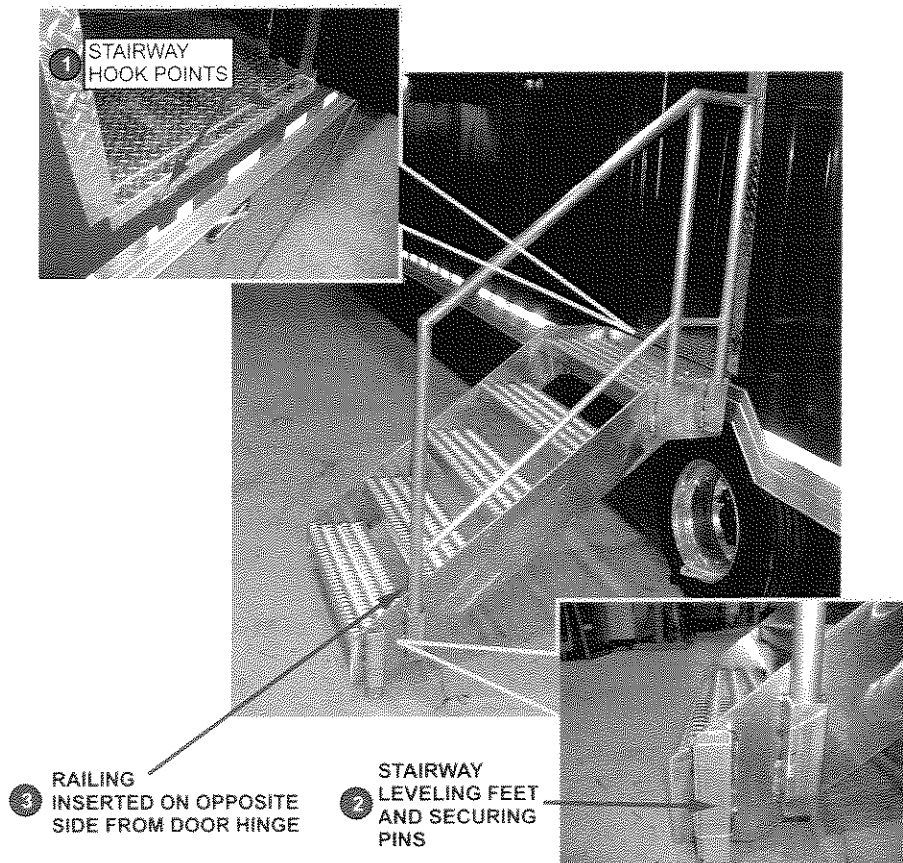


Figure 3-1 Stairway Platform Setup

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**3.2.2 EXTERNAL SETUP (ROOF LEVEL)**

**3.2.2.1 SAFETY RAILING ASSEMBLY**

The safety railing assembly is installed around the perimeter of the roof and is composed of railing sections and safety chains.

1. Access roof by using the rear ladder (Figure 3-2).
2. Located on top of the trainer are railing sections (Figure 3-3). Assemble railing by swinging to the upright position (Figure 3-3 item 1) and allow them to drop into place, in the receivers (Figure 3-4 items 2 & 3).
3. Once all railing sections are in place, attach all safety chains at the entrance and corners of the railing sections.

**⚠ WARNING**

DO NOT PERFORM ROOF EXERCISES WITHOUT HAVING ALL SAFETY RAILING/CHAIN IN PLACE.

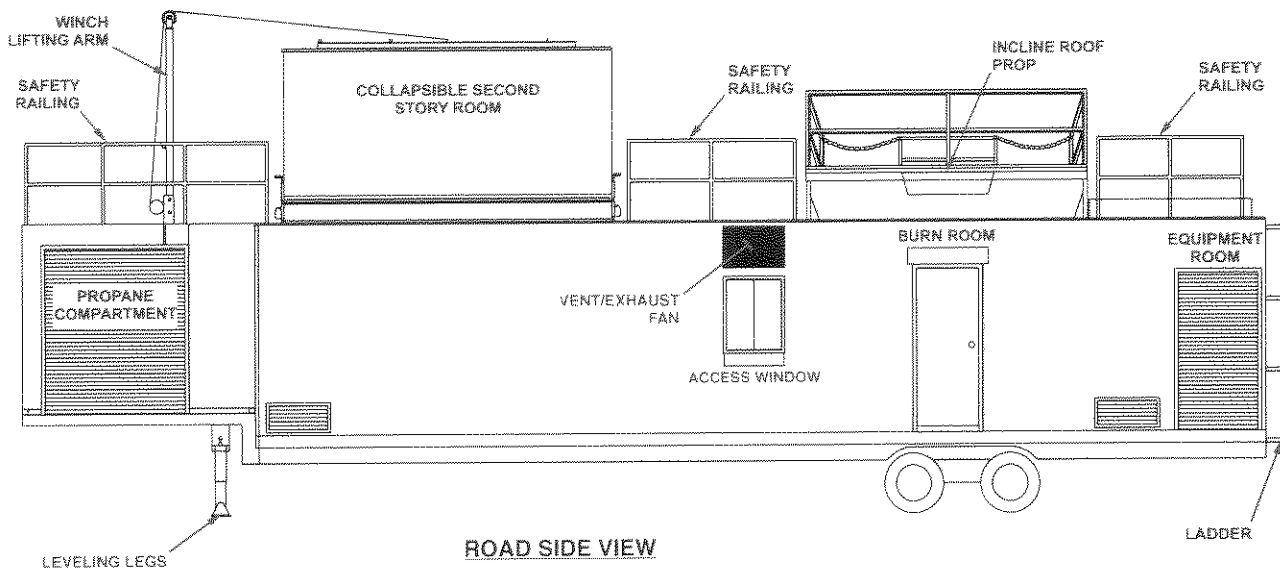


Figure 3-2 Component Location

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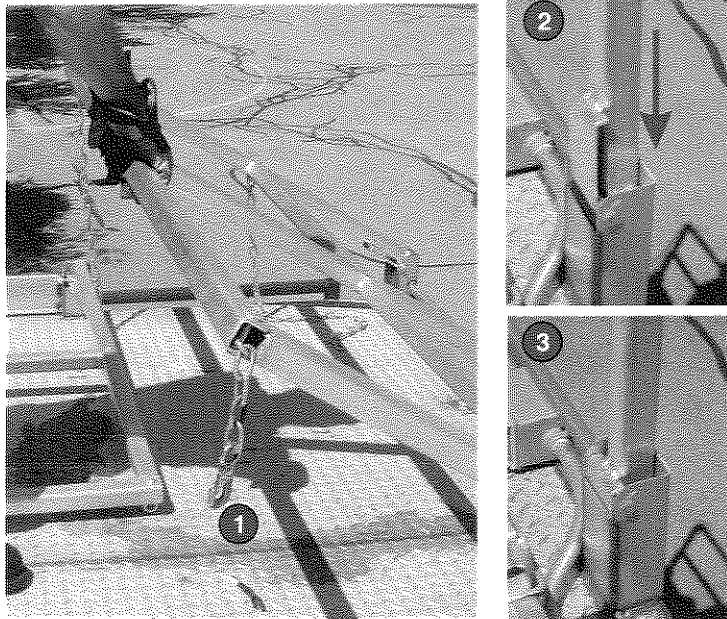


Figure 3-3 Roof Railing Assembly

**3.2.2.2 INCLINE ROOF PROP** **CAUTION**

TWO (2) PEOPLE ARE REQUIRED TO SAFELY ASSEMBLY THE INCLINE ROOF PROP.

 **WARNING**

DO NOT PERFORM ROOF PROP EXERCISES WITHOUT HAVING ALL SAFETY RAILING/CHAIN IN PLACE.

1. At the roadside, there is a spring-loaded pin on each side of the Incline Roof Prop used to secure the Roof Prop to the trainer during transit and any time the Prop is not in use. Disengage and secure each spring-loaded pin in the out position by pulling the pin back and rotating as shown in Figure 3-4, Item 1.
2. The roof prop must be manually raised into position by using the two hand crank jacks. There is a jack located on each side of the roof prop. Release the pin that holds the jack in the stored horizontal position (Figure 3-4, Item 2). Rotate the jacks to the vertical position (Figure 3-4, Item 3).
3. With both jacks, evenly raise the roof prop until the jacks are fully extended.
4. Swing each support leg down to the vertical position (Figure 3-4, Item 4). Align both of the jacklegs vertically and lower both jacks until the roof prop is resting on the support legs and jacklegs (Figure 3-4, Item 4). Be sure the jackleg feet are flat on the trainer roof and located within the receivers and the pin is in, securing the jack in the vertical position (Figure 3-4, Item 5).
5. Attach all safety chains between the incline roof prop and the safety railing assembly end posts.

 **WARNING**

DO NOT PERFORM ROOF PROP EXERCISES WITHOUT HAVING ALL SAFETY RAILING/CHAIN IN PLACE. THERE IS A CHAIN ON EACH SIDE OF THE ROOF PROP. EACH CHAIN IS CONNECTED TO THE TOP OF THE INCLINE ROOF PROP FRAME AND THE TOP OF THE TRAINER TO HOLD THE ROOF PROP IN PLACE WHEN IT IS IN THE RAISED POSITION. BE SURE THAT THESE CHAINS ARE IN PLACE PRIOR TO USING THE ROOF PROP!

DO NOT EXCEED 3-4 PEOPLE OR 1000 POUNDS ON THE INCLINE ROOF PROP!

 **WARNING**

DO NOT LEAVE THE INCLINE ROOF PROP IN THE UP POSITION WHEN NOT IN USE, DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER! WHEN ROOF PROP IS DOWN BE SURE TO SECURE IT TO THE TRAINER ROOF WITH THE TWO PINS LOCATED ON EACH SIDE OF THE PROP.

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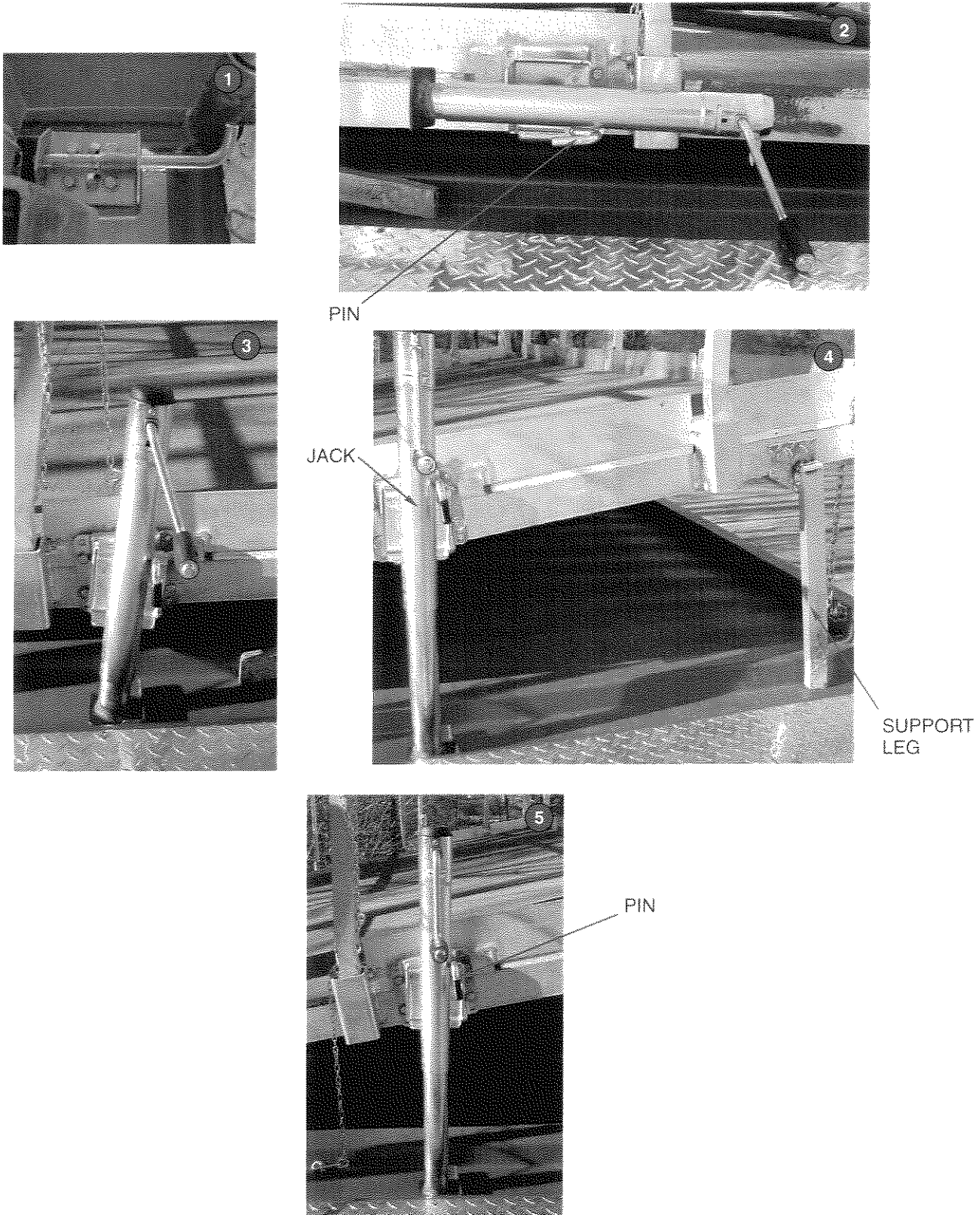


Figure 3-4 Incline Roof Prop Setup

*Operation and Maintenance Manual***3.2.2.3 COLLAPSIBLE SECOND STORY ROOM** **WARNING**

TWO (2) PEOPLE ARE REQUIRED TO SAFELY ASSEMBLY THE SECOND STORY ROOM.

 **CAUTION**

FOR STEP 3, WALK ON RIVETED AREA ONLY WHILE INSERTING WALL PIN INTO RECEIVER. FAILURE TO FOLLOW THIS CAUTION WILL DAMAGE THE COLLAPSIBLE ROOM.

1. Remove the binding straps from all walls.

Refer to Figure 3-5.

2. Lift the curbside wall into upright position (1) and remove the securing pin from the rear support pin and insert rear support pin all the way down into the receiver (2). Make sure the "L" portion of the rear support pin is facing outwards (2).
3. At the front end of the curbside wall, remove the securing pin from the front support pin and insert the support pin all the way down into the receiver (3). Turn the "L" portion of the pin so it is facing inwards and secure with securing pin.
4. Lift the roadside wall into upright position (4) and remove the securing pin from the rear support pin and insert support pin all the way down into the receiver (5). Make sure the "L" portion of the rear support pin is facing outwards (5).

 **CAUTION**

FOR STEP 5, WALK ON RIVETED AREA ONLY WHILE INSERTING WALL PIN INTO RECEIVER. FAILURE TO FOLLOW THIS CAUTION WILL DAMAGE THE COLLAPSIBLE ROOM.

5. At the front end of the roadside wall, remove the securing pin from the front support pin insert the support pin all the way down into the receiver (6). Turn the "L" portion of the pin so it is facing inwards and secure with securing pin.

 **CAUTION**

MAKE SURE THE "L" PORTION OF THE REAR RIGHT AND LEFT SIDEWALL SUPPORT PINS ARE FACING OUTWARD (2 & 5). FAILURE TO FOLLOW THIS CAUTION WILL DAMAGE THE COLLAPSIBLE ROOM.

MAKE SURE THE "L" PORTION OF THE FRONT RIGHT AND LEFT SIDEWALL SUPPORT PINS ARE FACING INWARD AND SECURED IN PLACE WITH SECURING PIN. FAILURE TO FOLLOW THIS CAUTION WILL DAMAGE THE COLLAPSIBLE ROOM AND LEVERAGE ARM.

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6. Remove the winch pendant from the black enclosure, located in the control room, across from the door. Connect the end of the winch pendant cord into the winch connection (7).

 **WARNING**

READ AND UNDERSTAND ALL THE WARN WORKS 3700 WINCH USER MANUAL SAFETY GUIDELINES AND OPERATING PROCEDURES, LOCATED IN SECTION 7 OF THIS MANUAL, BEFORE PROCEEDING.

7. With the winch pendant (9) carefully add enough belt slack (10) to be able to raise the leverage arm.
8. Be sure the end of the winch strap is properly hooked to the bracket that is bolted to the top of the roof section I- Beam (11).

 **WARNING**

THE END OF THE WINCH STRAP MUST BE PROPERLY HOOKED TO THE BRACKET THAT IS BOLTED TO THE TOP OF THE ROOF SECTION I- BEAM AS SHOWN IN FIGURE 3-7, ITEM (11).

9. At the leverage arm remove the pin by first removing the securing pin and then slide the main pin out (12).
10. Carefully pull all of the winch belt slack to the trainer roof.
11. Lift the leverage arm to the up-right position (13), insert the pin and lock it into position with the securing pin. (14 & 15). **WALK ON RIVETED AREA ONLY** while lifting leverage arm.

 **WARNING**

PRIOR TO RAISING THE ROOM:

- BE SURE THERE ARE NO LOOSE ITEMS ON THE COLLAPSIBLE SECTION.
- NO ONE IS IN THE AREA.

 **CAUTION**

PRIOR TO RAISING THE ROOM:

- BE SURE THE "L" PORTION OF REAR SIDEWALL SUPPORT PINS ARE BOTH FACING OUT (FIGURE 3-5, ITEMS 2 & 5).



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Refer to Figure 3-5.

12. Operate the winch to raise the room until the rear wall stops (16) meet the ends of the sidewalls. Try not to start and stop the process. Do not continue to run winch past this point since it will damage the winch or parts of the room.

**WARNING**

**DO NOT CONTINUE TO RUN THE WINCH AFTER THE REAR WALL STOPS MEET WITH THE END OF THE SIDEWALLS.**

**LEAVE WINCH STRAP ATTACHED TO ROOM. DO NOT REMOVE TENSION ON WINCH STRAP.**

13. At the back end of the right and left sidewall. Rotate each support pin so the "L" portion is facing inward (16) and secure each pin in place with securing pins (16).

**WARNING**

**BE SURE THAT BOTH "L" PORTIONS OF THE BACK END RIGHT AND LEFT SIDEWALL SUPPORT PINS ARE FACING INWARD (16) AND SECURED IN PLACE WITH SECURING PINS (16).**

14. Secure sidewalls to back wall with toggle clamps (16).
15. Disconnect the winch pendant from the winch; place the winch pendant back into the enclosure and close cover. Place the protective cap over the pendant connection located on the winch.
16. Be sure the "L" portion of both front sidewall support pins are facing in and secured in place with securing pins (17).

**WARNING**

**BE SURE THAT BOTH "L" PORTIONS OF THE FRONT END RIGHT AND LEFT SIDEWALL SUPPORT PINS ARE FACING INWARD (17) AND SECURED IN PLACE WITH SECURING PINS (17).**

**WARNING**

**DO NOT LEAVE THE SECOND STORY COLLAPSIBLE ROOM IN THE UP POSITION AT THE END OF THE TRAINING DAY OR DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER! COLLAPSE ROOM AND PROPERLY SECURE TO TRAINER.**

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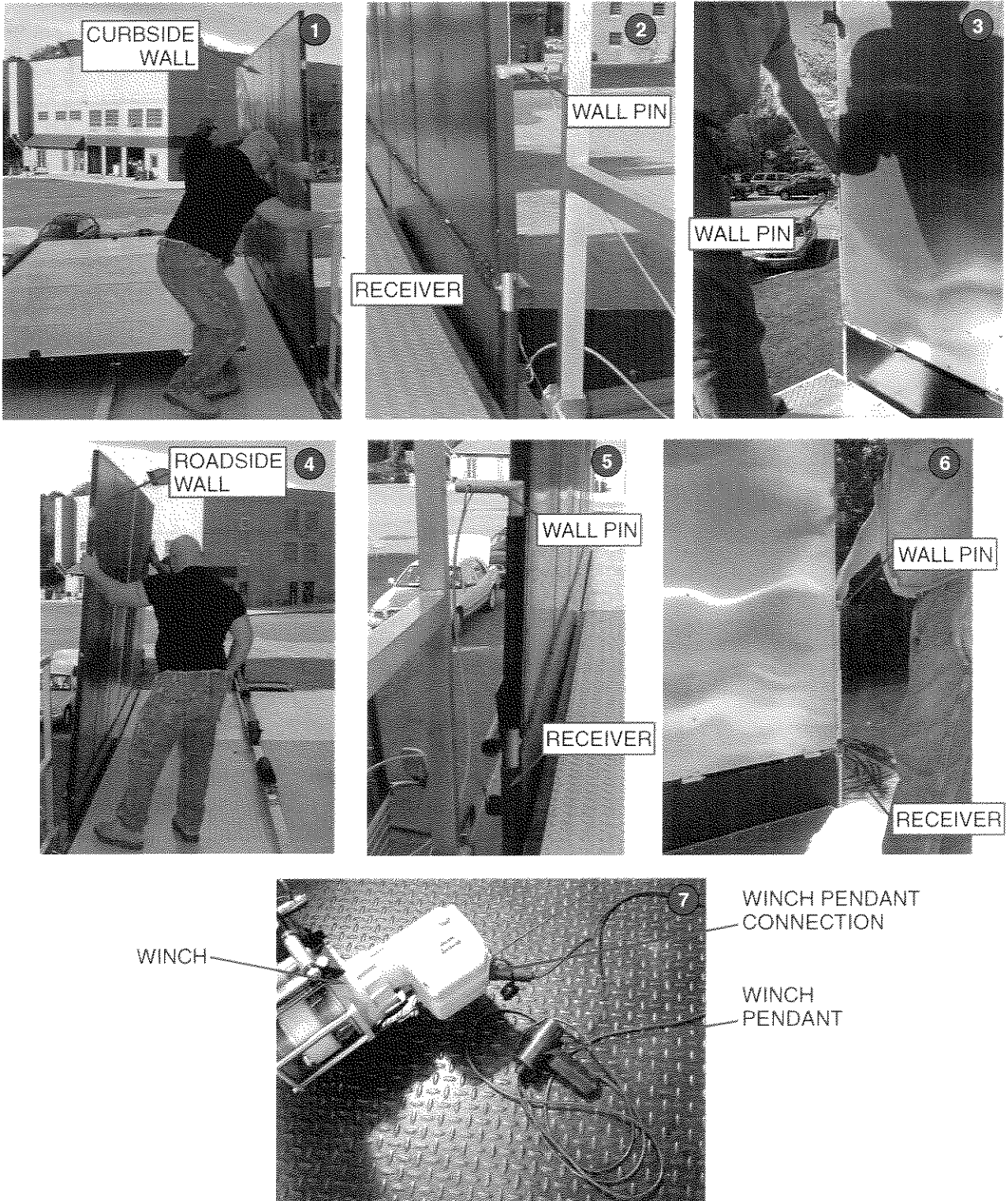


Figure 3-5 Second Story Room Setup (Sheet 1 of 4)

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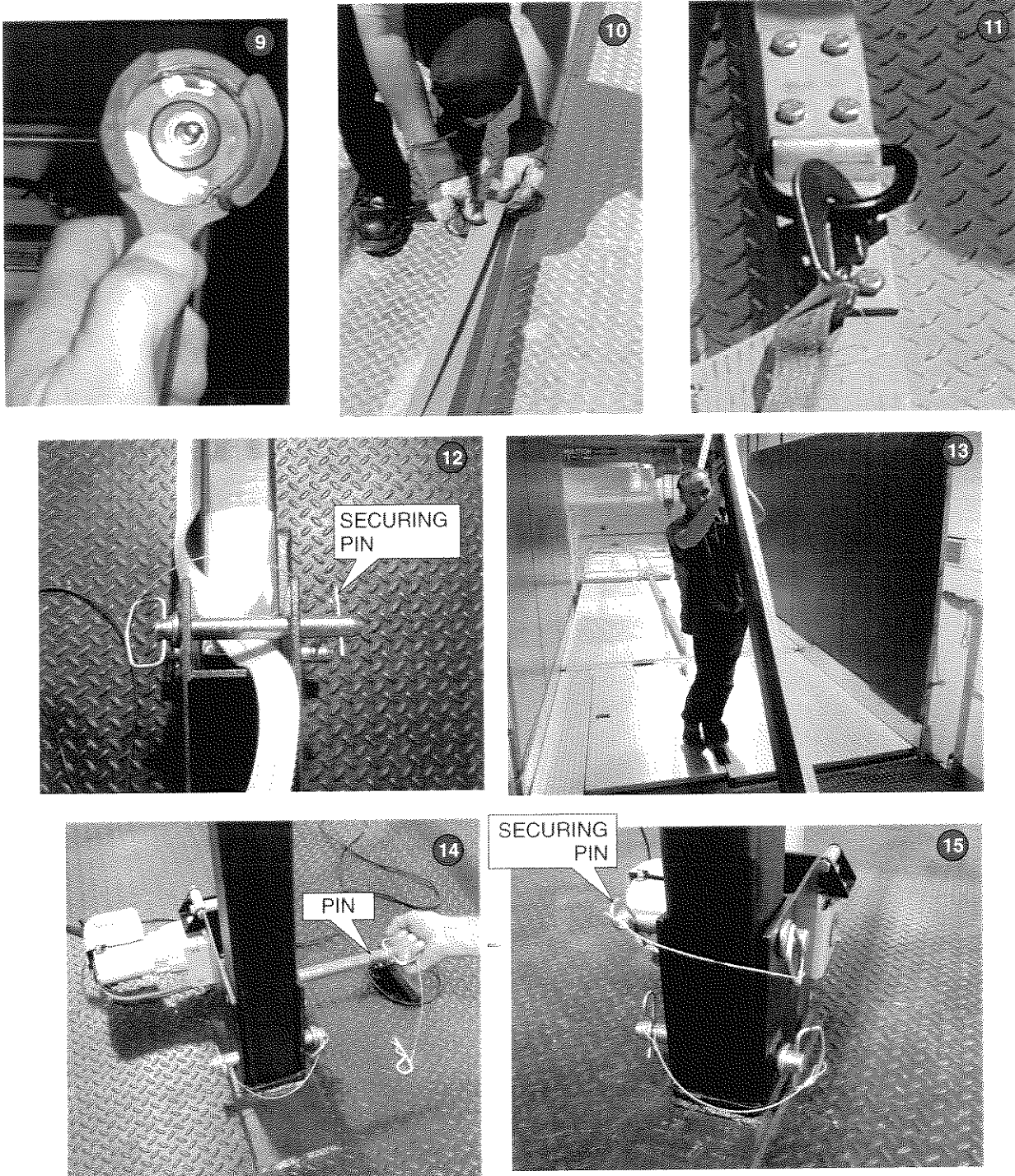


Figure 3-5 Second Story Room Setup (Sheet 2)

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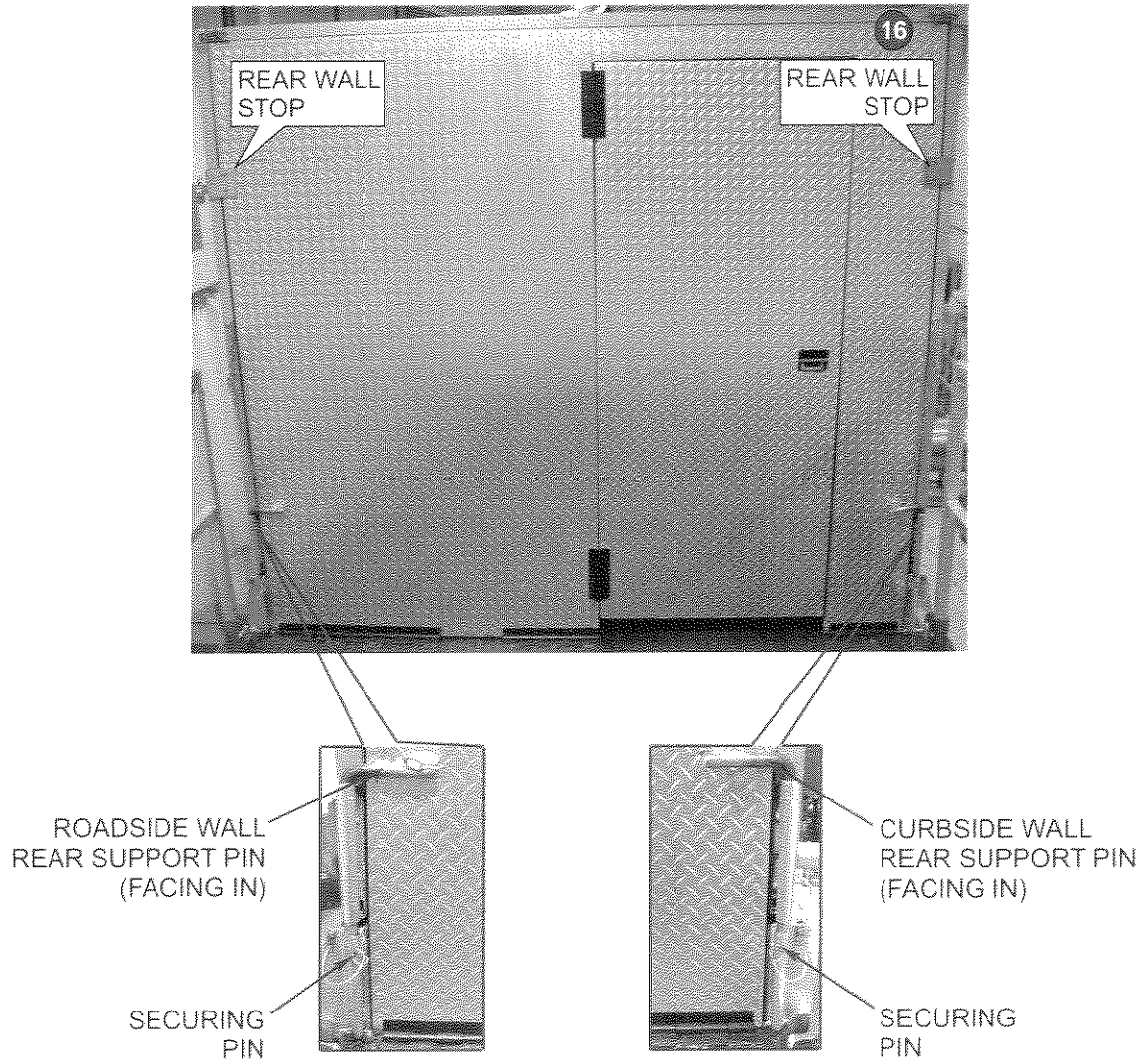


Figure 3-5 Second Story Room Setup (Sheet 3)

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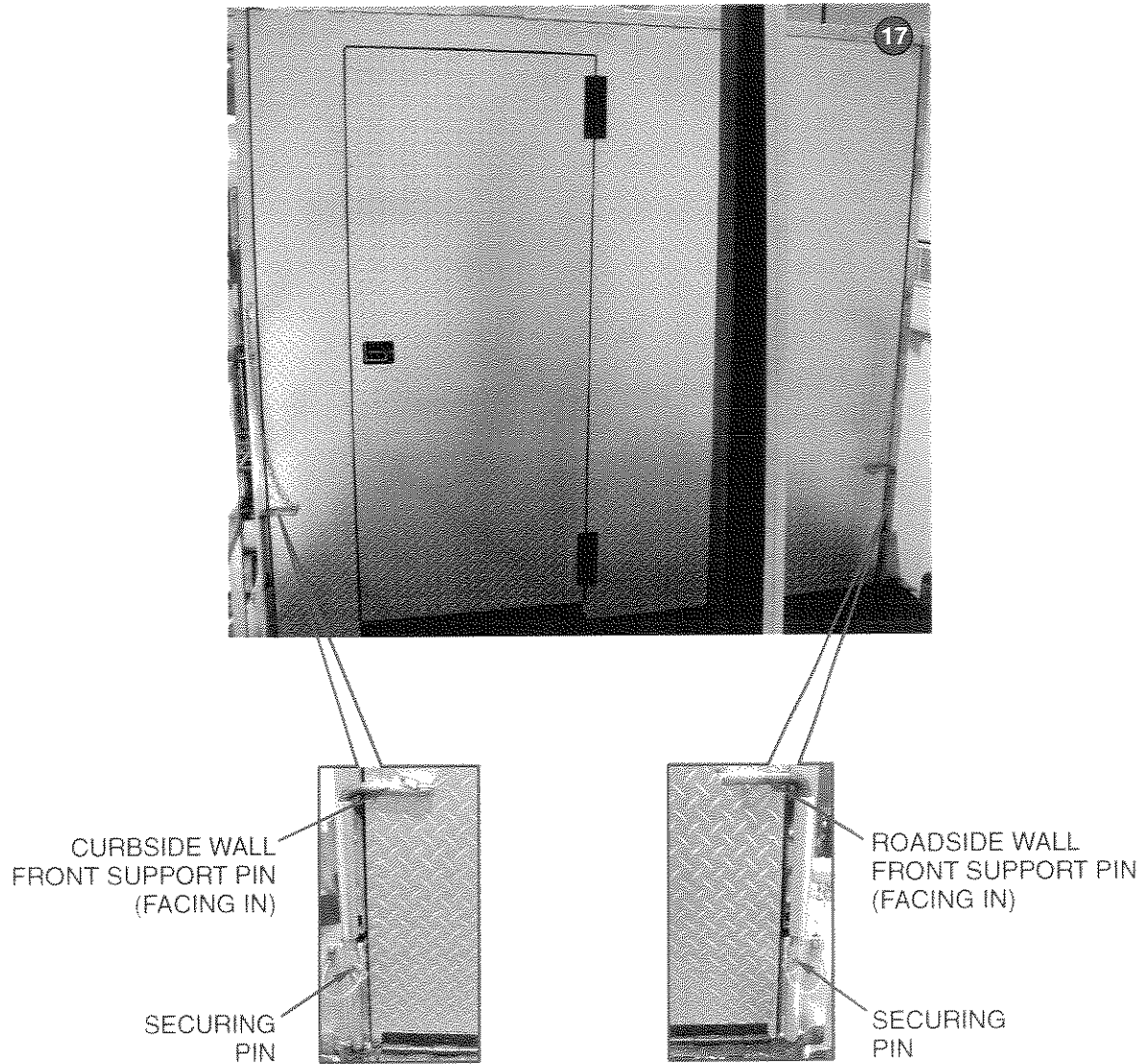


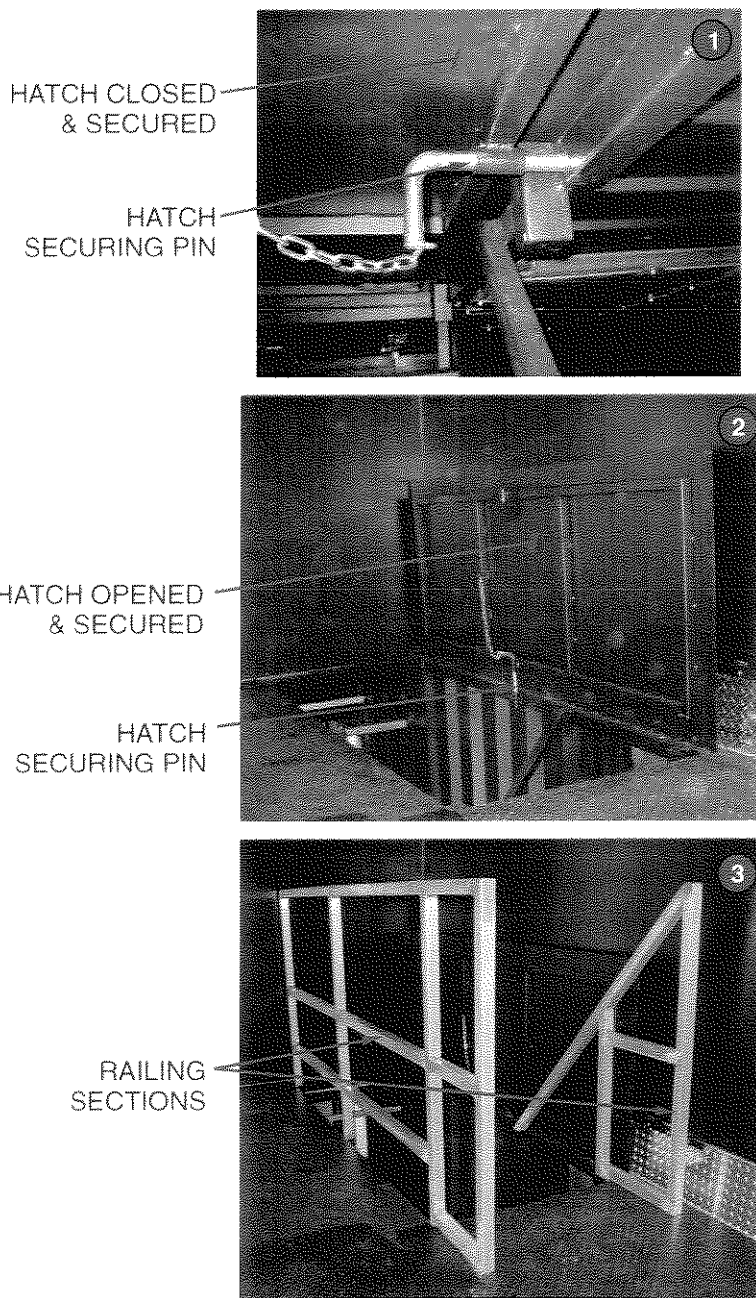
Figure 3-5 Second Story Room Setup (Sheet 4)

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Refer to Figure 3-6.

- 17. At the hatch, from burn room side remove securing pin (1).
- 18. Open hatch and secured in the open position with hatch securing pin (2).
- 19. Install right and left railing sections (3) by inserting railing section into receivers.



**Figure 3-6 Internal Second Story Room Setup**

### 3.2.3 INTERNAL SETUP

#### 3.2.3.1 BURN ROOM

Refer to Figure 3-7 for Component Locations.

1. Fill the Rear fireplace water bath until it overflows (See Figure 3-7 for location and Figure 3-8 for detail). When using the Stove prop be sure to fill range top with water.

### CAUTION

MAKE SURE THAT BOTH OF THE FIREPLACE WATER BATH PANS ARE COMPLETELY FULL! DAMAGE MAY OCCUR IF MAIN BURNER IS LIT WITHOUT WATER IN THE PANS.

WHEN NOT IN USE THE FIREPLACE WATER BATH PANS SHOULD BE DRAINED OF WATER DURING COLD WEATHER PERIODS, WHEN THE ANTICIPATED AMBIENT TEMPERATURE IS GOING TO BE BELOW 32°F

WHEN TRAINING DURING THE ABOVE MENTIONED CONDITION, FILL WATER BATH PANS JUST PRIOR TO OPERATION AND DRAIN **IMMEDIATELY** UPON THE COMPLETION OF TRAINING.

FAILURE TO FOLLOW THESE CAUTIONS MAY RESULT IN SERIOUS DAMAGE TO THE ASSOCIATED EQUIPMENT.

2. Check the general area for debris and confirm that there are no obstacles that would prevent training.
3. Decide which prop is to be installed on the Rear fireplace platform.
4. Remove the remaining props and set in a safe location out of the way.
5. Install the Rear fireplace platform prop.
6. The trainer is equipped with movable panels. The panels fit into receivers located along the ceiling and floor. Install the movable panels as required.

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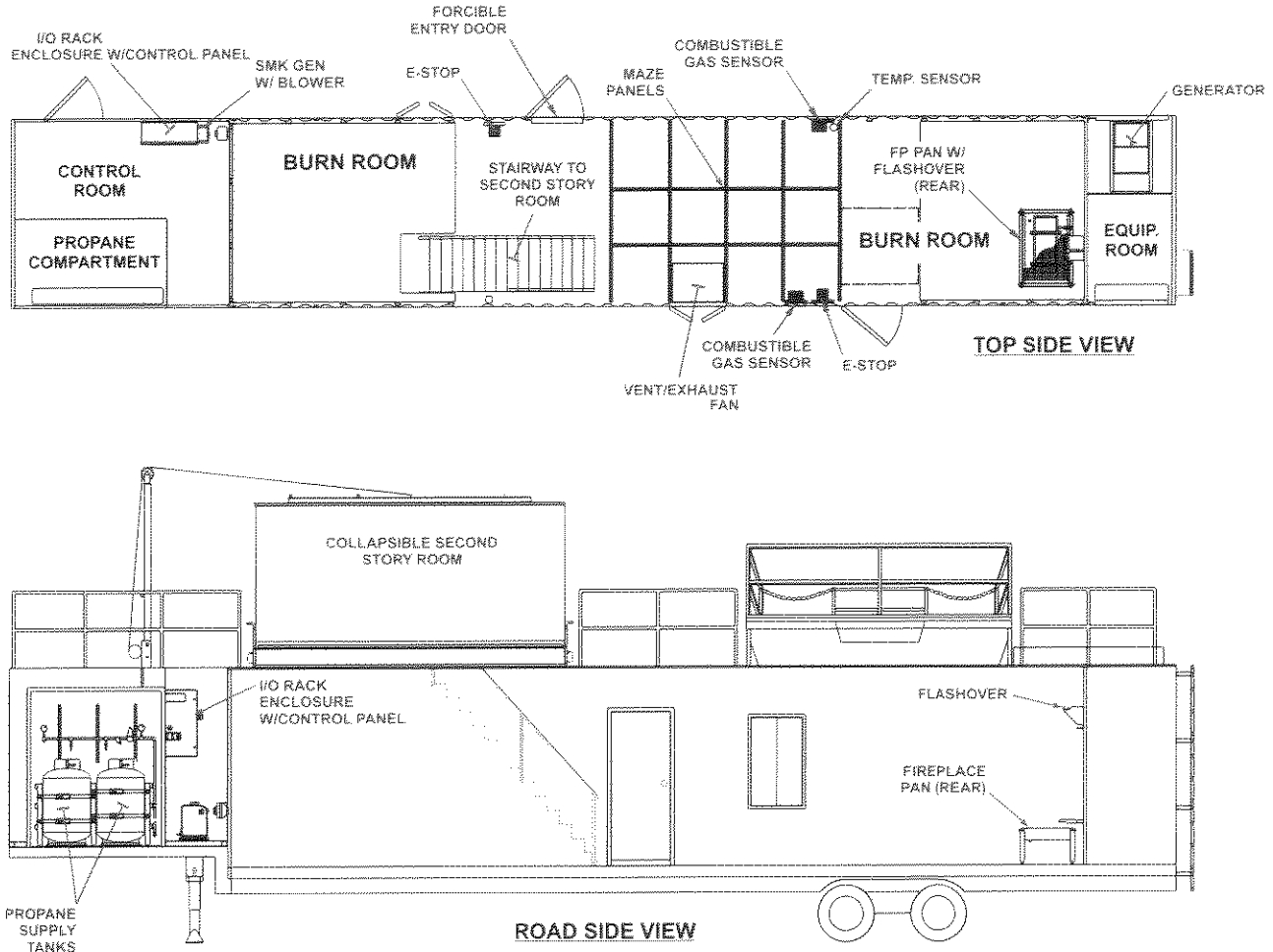


Figure 3-7 Trainer Setup (Internal)



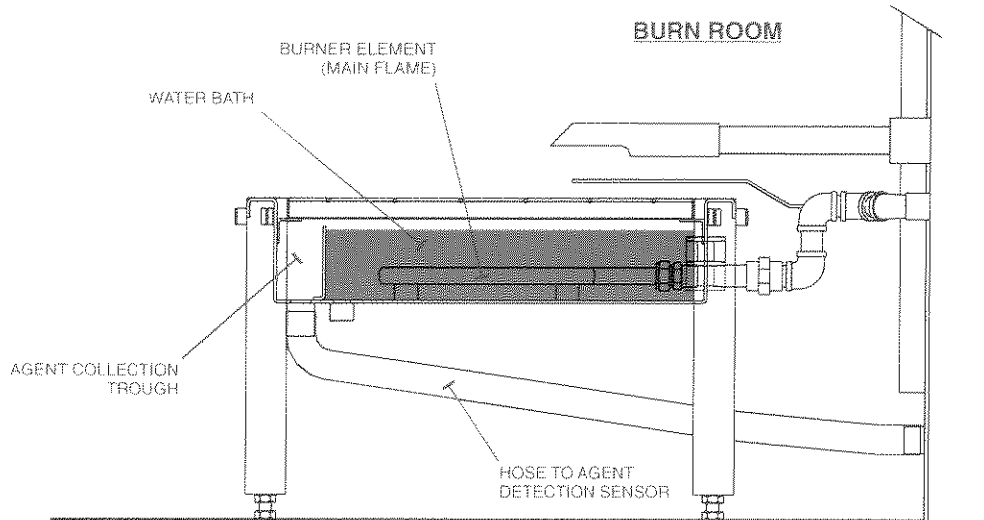


Figure 3-8 Rear Fireplace Water Bath

### 3.3 SYSTEM START-UP

Once the trainer has been set-up, the System must be started.

#### 3.3.1 PROPANE SUPPLY

Refer to Figure 3-9 for Component Locations.

**AT PROPANE COMPARTMENT:**

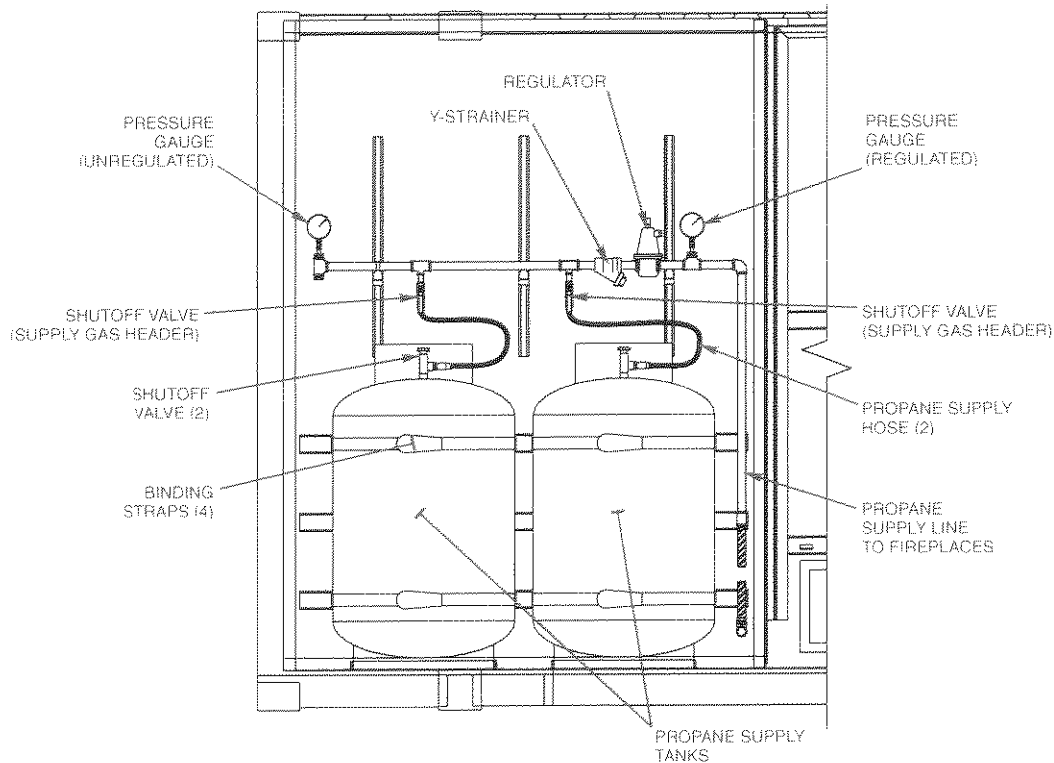
1. Check the indicator located on each tank to verify there is propane.

### **WARNING**

**LEAVE PROPANE COMPARTMENT DOOR OPEN DURING TRAINER OPERATION AND TANK FILLING TO ALLOW FOR PROPER VENTILATION OF THE PROPANE COMPARTMENT.**

2. Verify that both propane tanks are connected to the Propane Supply Gas Header assembly by a propane supply hose.
3. Verify that both Propane Supply Gas Header shutoff valves are closed.
4. Turn the valves all the way open on both propane tanks.
5. Slowly open each shutoff valve located on the Propane Supply Gas Header.
6. Check pressure gauge (Regulated) on the Propane Supply Gas Header, it should read 25-30 psi.

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**Figure 3-9 Propane Compartment**

7. Open gas shutoff valve to Rear fireplace Burner Control Assembly (Figure 3-10).
8. Open gas shutoff valve to Rear fireplace Burner Control Assembly (Figure 3-11)
9. At the Control Room Check ALL gas line fittings for gas leaks.
10. Check ALL gas line fittings for gas leaks from Control Room to Rear fireplace Burner Control Assembly.
11. At the Rear Equipment Room open gas shutoff valve to Rear fireplace Burner Control Assembly (BCA) and generator (Figure 3-11).
12. Check ALL gas line fittings for gas leaks.



### WARNING

**DO NOT OPERATE TRAINER UNLESS ALL GAS LINE FITTINGS ARE CHECKED FOR LEAKS!  
IF LEAKS ARE DETECTED SHUT OFF BOTH PROPANE SUPPLY TANK VALVES IMMEDIATELY!  
DO NOT OPERATE TRAINER UNTIL LEAKS ARE REPAIRED AND TESTED!**

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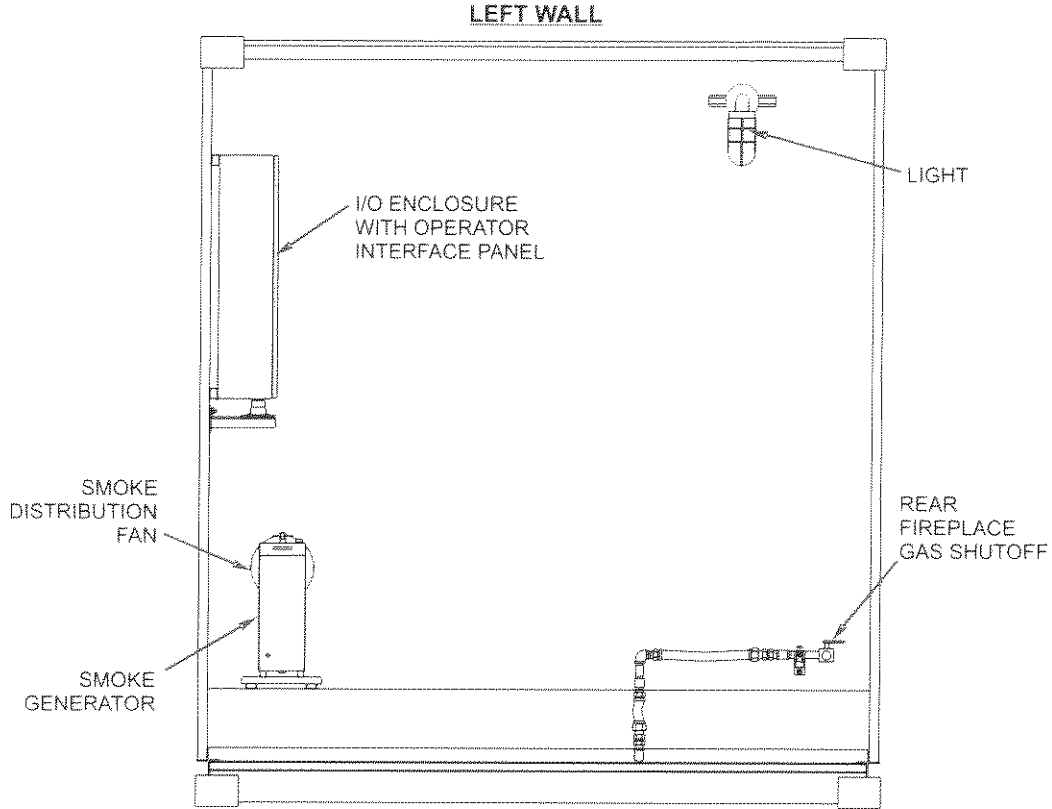


Figure 3-10 Propane Gas Shutoff Valves (Control Room Left Wall)

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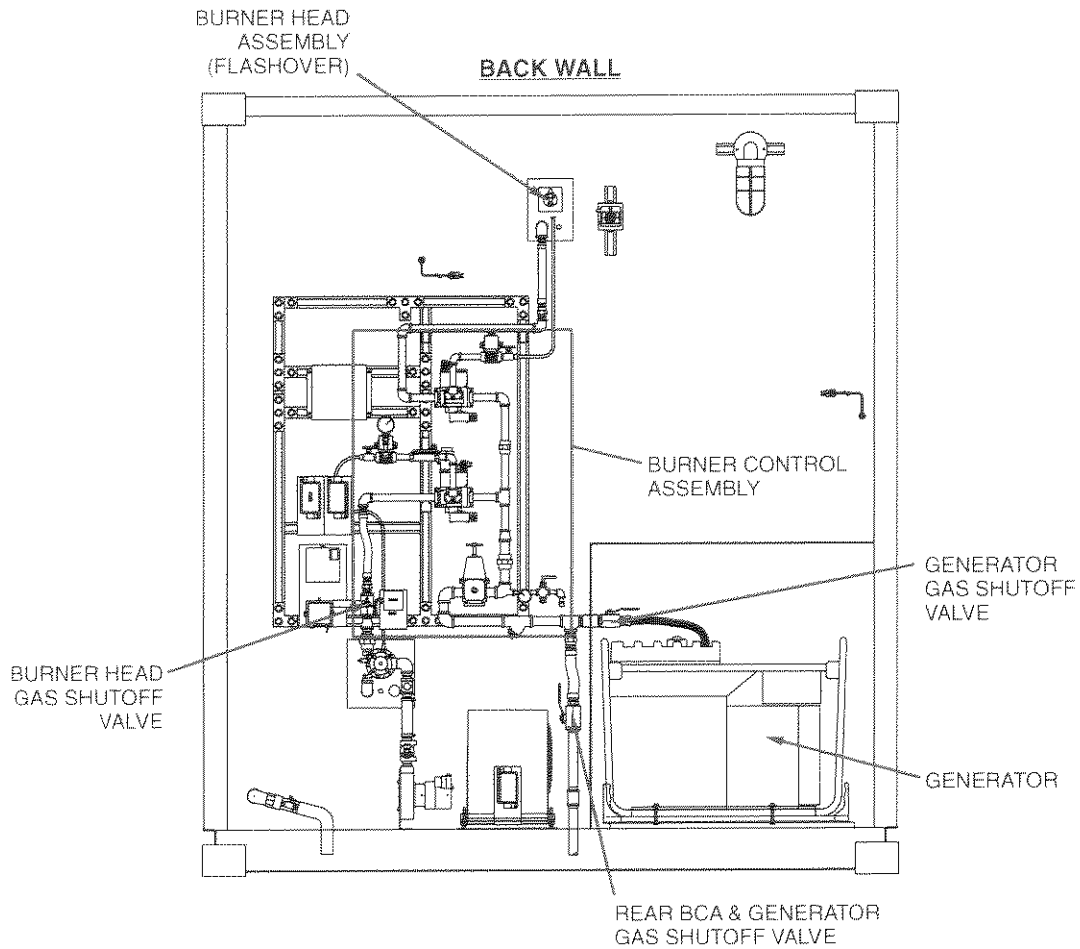


Figure 3-11 Propane Gas Shutoff Valves (Equipment Room Back Wall)

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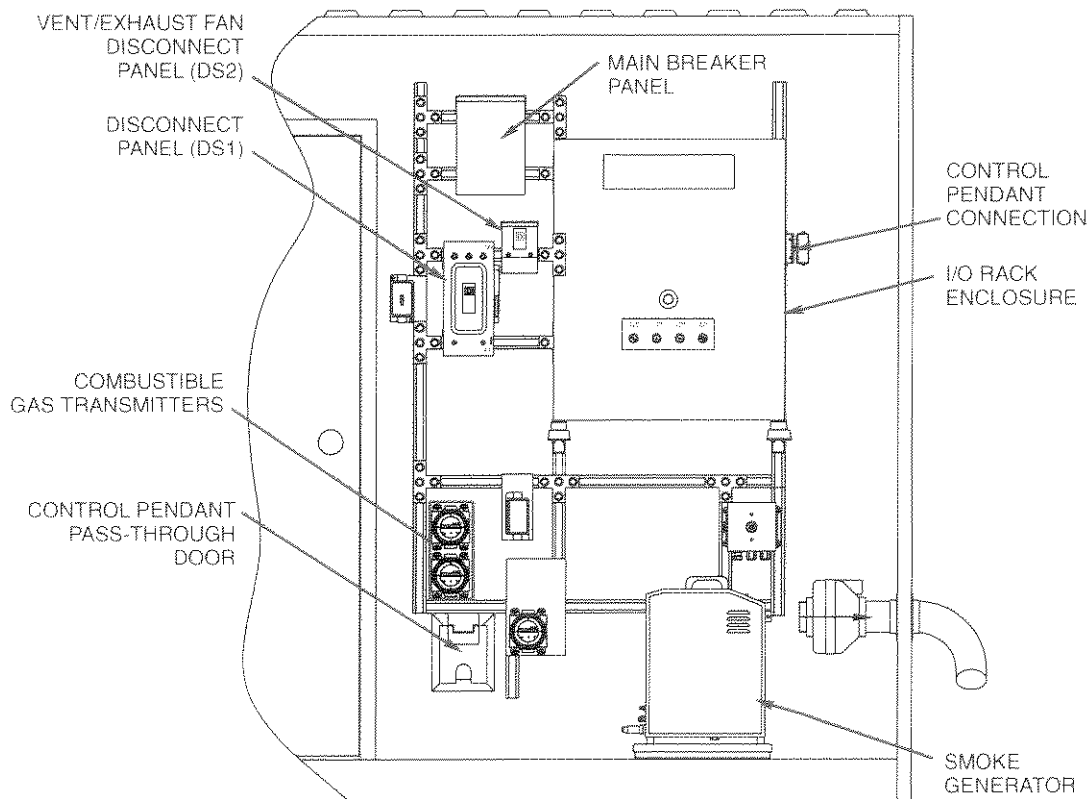
**3.3.2 GENERATOR**

**AT CONTROL ROOM:**

1. At the main breaker panel, be sure all the circuit breakers are in the ON position (See Figure 3-12).
2. On the I/O Rack Enclosure Control Panel, make sure the SYSTEM POWER key switch is in the **OFF** position (See Figures 3-12 & 3-13).
3. On the I/O Rack Enclosure Control Panel, make sure the SMOKE ENABLE switch is in the **OFF** position (See Figures 3-12 & 3-13).
4. The main disconnect switch (DS1) is located on the left wall. Make sure that the main disconnect (DS1) is in the **OFF** position (See Figure 3-12).
5. The vent/exhaust fan disconnect switch (DS2) is located on the left wall. Make sure that the disconnect (DS2) is in the **ON** position (See Figure 3-112).

**AT GENERATOR COMPARTMENT:**

6. Open the generator compartment door. The generator is mounted to a slide rail. There is a locking lever located on the front right hand side of the slide rail. Pull the lever out as you slide the generator out of the compartment. Once the stop is reached let go of the locking lever and be sure the generator is locked in position by pushing back on it. See Figure 3-13 for location.



**Figure 3-12 Control Room (Back Wall)**

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**AT GENERATOR COMPARTMENT:**

7. Slowly open the gas shutoff valve for the generator (Figure 3-11).
8. Check ALL gas line fittings to the Generator for gas leaks.

 **WARNING**

**DO NOT OPERATE GENERATOR UNLESS ALL GAS LINE FITTINGS ARE CHECKED FOR LEAKS!  
IF LEAKS ARE DETECTED SHUT OFF BOTH PROPANE SUPPLY TANK VALVES IMMEDIATELY!  
DO NOT OPERATE TRAINER UNTIL LEAKS ARE REPAIRED AND TESTED!**

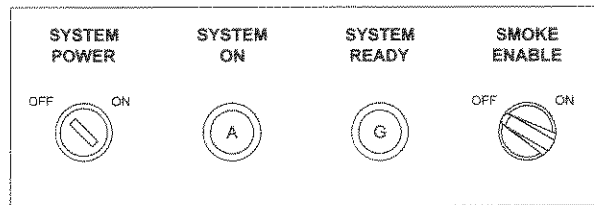


Figure 3-13 I/O Rack Enclosure Front Panel

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**3.3.2.1 PREPARATION FOR GENERATOR OPERATION**

At the start of each training day the following inspections must be made to ensure safe operation.

**⚠ WARNING**

**READ AND UNDERSTAND ALL THE NORTH STAR GENERATOR SAFETY GUIDELINES AND OPERATION PROCEDURES, LOCATED IN SECTION 7 OF THIS MANUAL, BEFORE PROCEEDING.**

1. Check engine oil. For procedure, correct oil grade and quantity of oil, refer to the NORTH STAR GENERATOR and Honda engine Owner's Manual, located in Section 7 of this Manual.
2. Be sure fuel selector switch is in the LP/NG position as shown in Fig. 3-14, Item (1).
3. Be sure the electrical cable is plugged into the 120/240 V-50A outlet on the generator (Figure 3-14, Item (2)).
4. Be sure there are no electrical loads on the generator.

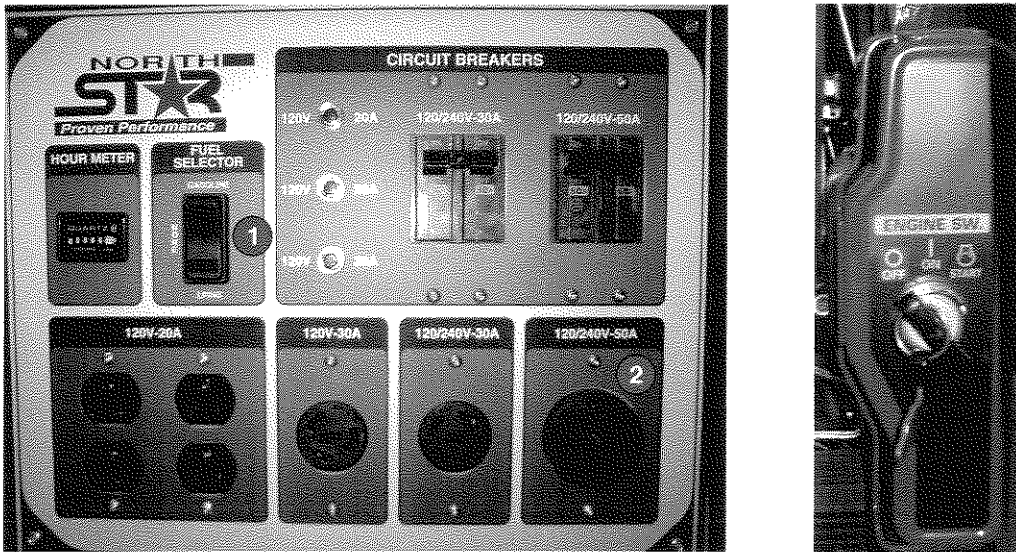


Figure 3-14 Generator Side Panel & Engine Switch

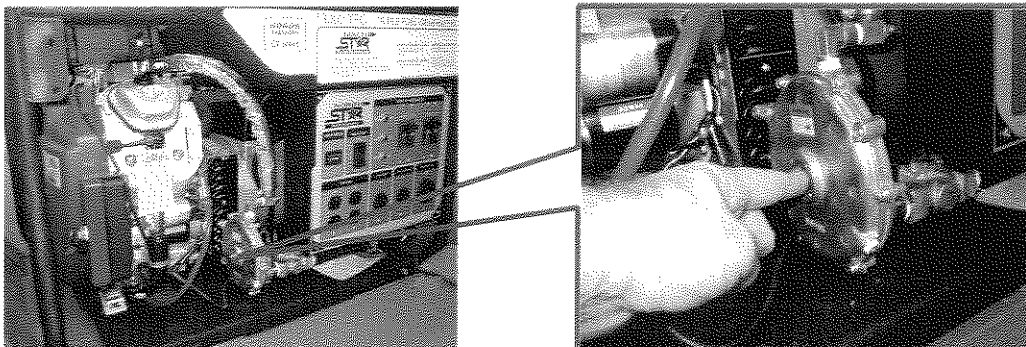


Figure 3-14(a) Generator Primer Button

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### 3.3.2.2 GENERATOR OPERATION

#### WARNING

PRIOR TO STARTING GENERATOR BE SURE IT IS OUT OF THE COMPARTMENT AND LOCKED IN POSITION.

1. At the generator turn the engine key to the Start position (See Figure 3-14).

#### **NOTE**

FOR COLD STARTS IT MAY BE NECESSARY TO MOMENTARILY DEPRESS THE PRIMER BUTTON WHILE STARTING THE ENGINE, AS SHOWN IN FIGURES 3-16 (A).

#### CAUTION

ALLOW GENERATOR TO RUN AT NO LOAD FOR FIVE MINUTES UPON INITIAL START-UP TO PERMIT ENGINE AND ALTERNATOR TO WARM UP AND STABILIZE.

2. Once the generator has been running for five minutes, at the Control Room, switch the main disconnect (DS1) to the **ON** position. This will power up the gas detection unit. It will take approximately 5 minutes for the Gas Detection System to warm-up (See Figure 3-12).
3. At this time the Control Room and Rear Equipment Room lights can be turned ON if required.

### 3.3.3 SMOKE GENERATOR

Refer to Figure 3-12 for Component Locations.

The Trainer is equipped with a smoke generator located in the Control Room.

1. At the Control Room, the smoke generator is located under the I/O Enclosure.
2. Check the site gauge on the smoke generator to verify that the smoke fluid reservoir has sufficient fluid. If smoke fluid is required refer to Section 4 of this Manual.
3. If required attach the regulator assembly to the nitrogen cylinder.
4. Verify that the nitrogen is turned on and the gauge reads approximately 75 pounds pre square inch.

### 3.3.4 E-STOPS

1. Verify that the two Burn Room emergency push button stops and the one on the front of the Control Room I/O Rack Enclosure are pulled out.

### 3.3.5 PENDANT

1. Plug pendant into the connection located on the right side of the I/O Rack Enclosure (See Figure 3-12).



### 3.4 TRAINER PRE OPERATION

#### 3.4.1 CONTROL ROOM

**NOTE**

PRIOR TO PERFORMING STEP 1, VERIFY THAT ALL THREE OF THE COMBUSTIBLE GAS DETECTION TRANSMITTERS HAVE COMPLETED THE WARM-UP CYCLE AND THERE IS A NUMERIC VALUE SHOWING ON ALL THREE TRANSMITTER DISPLAYS. THE COMBUSTIBLE GAS DETECTION TRANSMITTERS ARE LOCATED IN THE CONTROL ROOM

1. Power the system on by turning the SYSTEM POWER key switch to the ON position. The SYSTEM ON light comes on (See Figure 3-15).
2. If fire training scenario requires smoke, turn the SMOKE ENABLE switch to the ON position (See Figure 3-15).

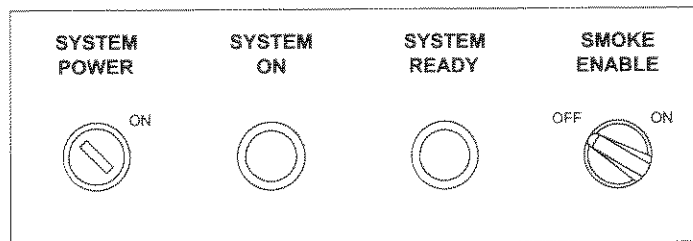


Figure 3-15 I/O Rack Enclosure Front Panel

**Operation and Maintenance Manual****3.4.2 CONTROL ROOM CONTROL CONSOLE TOUCH SCREEN**

1. Verify touch screen illuminates and the Initialization Screen comes up (Refer to Figure 3-16).
2. Press anywhere on the Initialization screen to start the 30-second vent/exhaust fan purge cycle. Once the screen is touched the message **"INITIALIZATION STARTED: PLEASE WAIT"** will appear at the bottom of the screen (See Figure 3-16). Once the 30-second vent/exhaust fan purge cycle is complete the Pass Code screen appears.

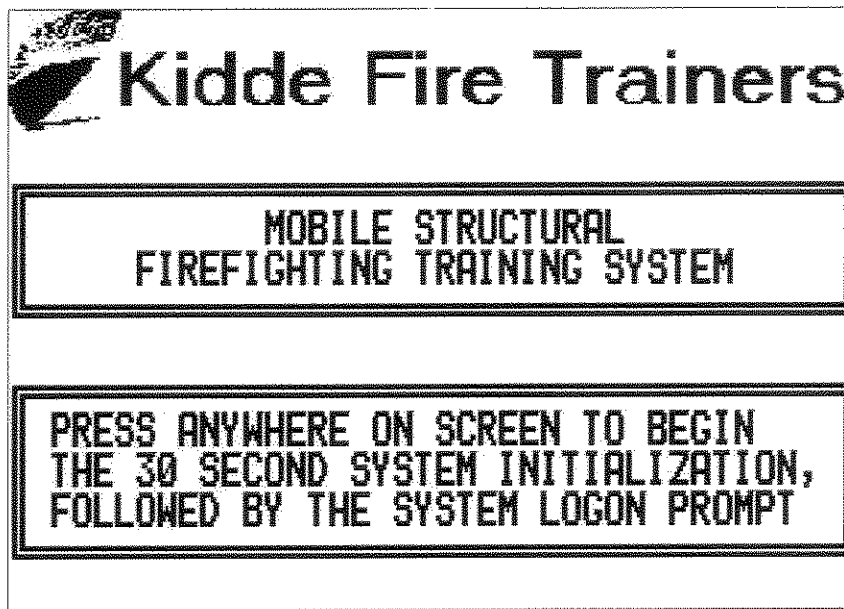


Figure 3-16 Initialization Screen

3. At the Pass Code screen, use the alpha-numeric keypad to enter pass code and touch Enter. If wrong pass code is entered, an error message is displayed. To re-enter pass code, press RESTART CODE button, enter correct pass code, and touch ENTER PASSCODE (See Figure 3-17).

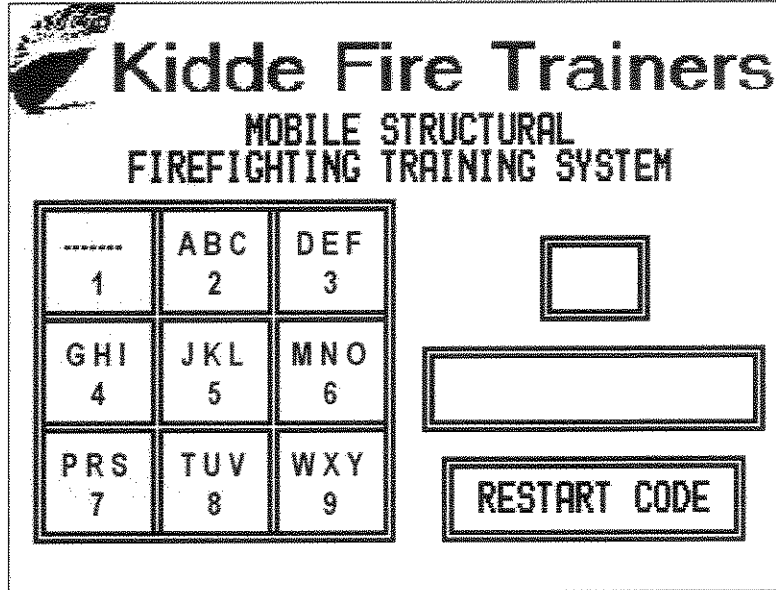


Figure 3-17 Pass Code Screen

4. After a successful pass code is entered, a MAIN MENU screen is displayed (See Figure 3-18).

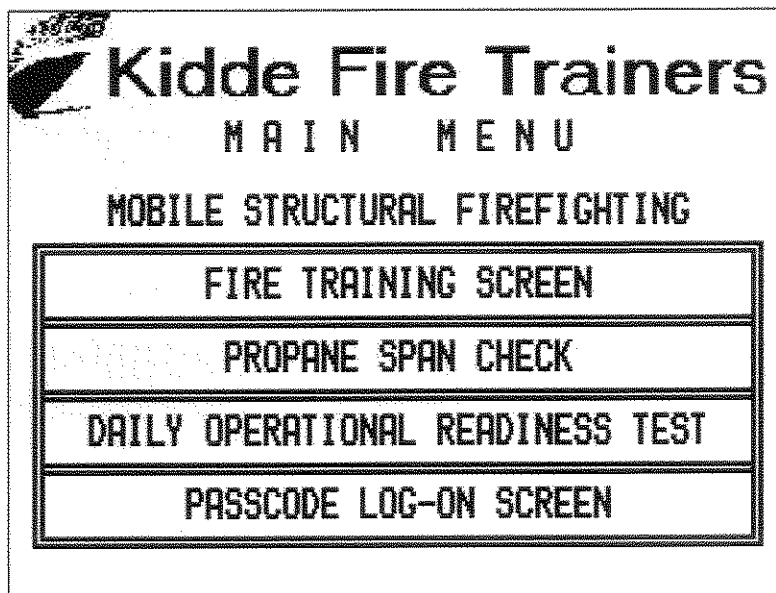


Figure 3-18 Main Menu Screen

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### 3.4.2.1 PROPANE SPAN CHECK

To ensure safe operation of the combustible gas sensor system, the trainer system monitors the need for a Propane Span Check. There are two gas sensors located in the Burn Room to monitor combustible gas levels. These two gas sensors require a Propane Span Check every 24 hours. This check verifies the calibration of the gas sensors. When the gas sensors require a Propane Span Check, the computer system informs the operator at the touch screen via a message. All fireplace operation is disabled until the required Propane Span Check has been successfully completed.

To perform a Propane Span Check, at the Main Menu screen, touch the PROPANE SPAN CHECK area to bring up the Propane Span Check Screen as shown in Figure 3-19. See Section 2, Figure 2-2 for sensor locations.



Figure 3-19 Propane Span Check Screen



## WARNING

ONLY USE KIDDE FIRE TRAINERS, INC. APPROVED TEST GAS!

1. Set up the span gas cylinder assembly, (see Figure 3-20), by the sensor in the Burn Room and remove the protective cover by undoing the two nuts on the bottom of the cover.
2. Clip the gas sensor cap from the span gas cylinder, onto the bottom of the sensor.
3. On top of span gas cylinder, slowly open cylinder shutoff valve and apply gas for approximately 20 seconds and then close cylinder shutoff valve and remove sensor cap from sensor under test. Repeat this step for both sensors.

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4. At the Propane Span Check Screen verify that all recorded values are greater than 45% LEL and PASSED is displayed for the Rear and Forward sensors.

**NOTE**

REPLACEMENT FILLED SPAN GAS CYLINDERS SHOULD BE AVAILABLE FOR SPAN CHECKING. FAILURE TO PERFORM SPAN CHECK OR OBTAIN IN-RANGE INDICATIONS WILL INHIBIT TRAINER OPERATION.

5. If any values are not within the correct range perform the Calibration Procedure described in Section 4.

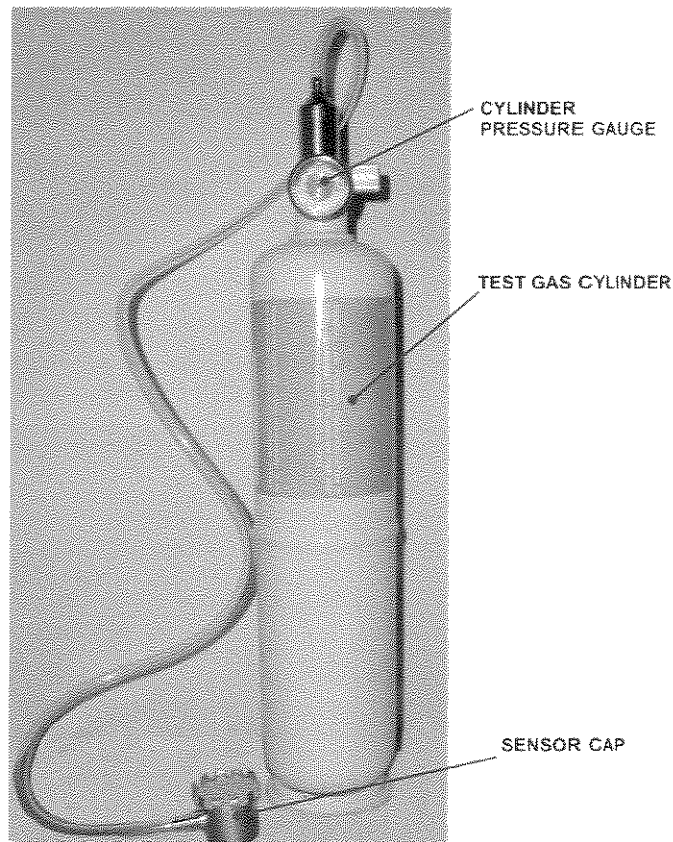


Figure 3-20 Test Gas Kit

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**3.4.2.2 DAILY OPERATIONAL READINESS TEST (DORT)**

**NOTE**

KIDDE FIRE TRAINERS, INC. RECOMMENDS THAT THE DAILY OPERATIONAL READINESS TEST (DORT) BE PERFORMED EACH DAY, PRIOR TO FIRST OPERATING THE TRAINER. A SUCCESSFUL DORT PROVIDES CONFIDENCE THAT THE SYSTEM IS READY TO CONDUCT TRAINING SCENARIOS.

1. For the start of the training day, perform an automatic system diagnostics test by touching the DAILY OPERATIONAL READINESS TEST button on the MAIN MENU screen (See Figure 3-19).
2. The DAILY OPERATIONAL READINESS TEST (DORT) screen comes up, as shown in Figure 3-21. Run DORT test by touching the PRESS HERE TO START TEST. Touch TESTING: PRESS TO STOP to stop the DORT test at any time. When test is completed, depending on the outcome, the screen will show a "TEST COMPLETED:" "PASSED" or "FAILED" status message. Upon successful completion of DORT, exit the DORT screen and return to MAIN MENU.



**DAILY OPERATIONAL READINESS TEST**



Figure 3-21 DORT Screen

**NOTE**

THE MOBILE FIRETRAINER® T-4000-53-2 IS NOW READY FOR OPERATION.

### 3.5 TRAINER OPERATION

The following procedures are used to operate the Rear Fire. All fires may be operated simultaneously if desired.

**WARNING**

FOR SAFETY, A MINIMUM OF TWO PEOPLE ARE REQUIRED TO CONDUCT TRAINER OPERATION.

#### 3.5.1 SETTING FIRE PARAMETERS

1. At touch screen MAIN MENU display, touch FIRE TRAINING SCREEN button. A Fire Training screen is displayed, with the Rear fireplace status display window of the monitored conditions (burn time, temperature level, and propane concentration level) and parameter selection tabs (See Figure 3-22).



Figure 3-22 Fire Training Screen

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**3.5.1.1 REAR FIRE PARAMETERS**

1. Touch the REAR FIREPLACE selection tab at the top of the Fire Training screen to display the REAR FIREPLACE PARAMETERS screen. The corresponding selection tab will become highlighted (See Figure 3-23).

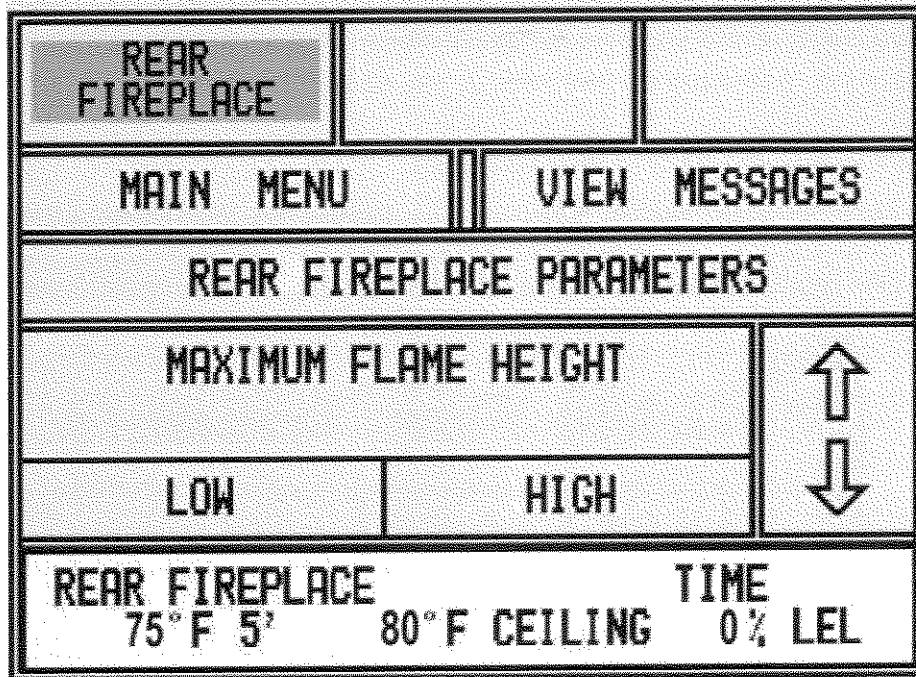


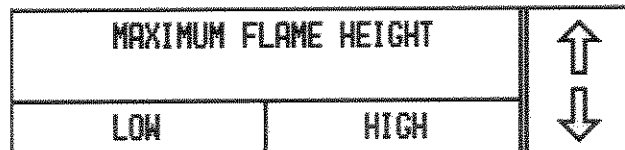
Figure 3-23 Rear Fireplace Parameters Screen

2. Using the up (↑) and down (↓) arrow buttons, scroll through each choice and select desired parameter category for the Rear Fireplace. The parameter categories and associated selections for the Rear fireplace are as follows:

**MAXIMUM FLAME HEIGHT:**

**LOW** – (flame stays at LOW setting)

**HIGH** – (flame starts at LOW setting and after 5 seconds goes to HIGH)





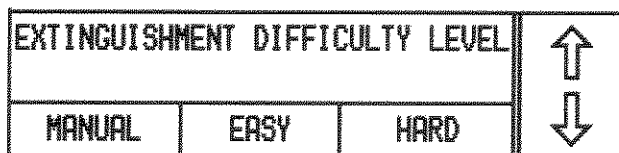
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**EXTINGUISHMENT DIFFICULTY LEVEL:**

**MANUAL** – (no agent detection, operator extinguishes fire)

**EASY** - (fire extinguished after 10 seconds of agent detection)

**HARD** - (fire extinguished after 30 seconds of agent detection)

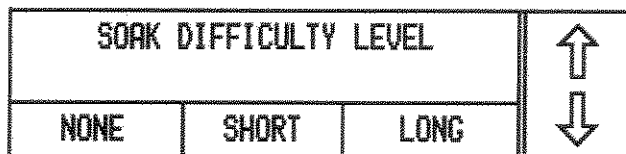


**SOAK DIFFICULTY LEVEL:**

**NONE** – (No additional agent application required to prevent reflash)

**SHORT** – (10 seconds of additional agent application required to prevent reflash)

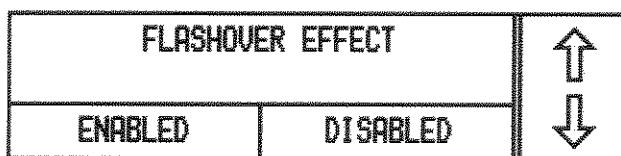
**LONG** – (30 seconds of additional agent application required to prevent reflash)



**FLASHOVER EFFECT:**

**ENABLED** – (flashover effect can be initiated from pendant)

**DISABLED** – (flashover effect cannot be initiated from pendant)



3. Touch the desired parameter selection for each Rear parameter.

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3.5.2 FIREPLACE OPERATION

Once all the parameters have been set, the Pendant Assembly (Figure 3-24) is used to activate and control the fire training scenario. Any fire or combination of fires may be activated at one time. Table 3-2 provides information for using the Pendant Assembly.

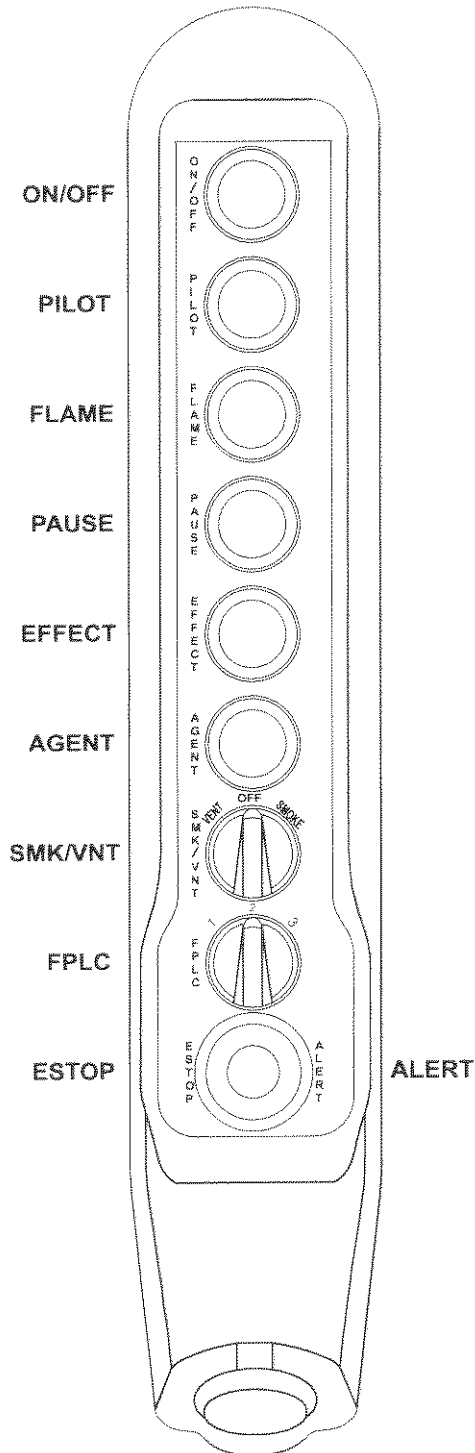


Figure 3-24 Control Pendant Assembly

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**Table 3-2. Control Pendant**

<b>Step</b>	<b>Action</b>	<b>Result - Comment</b>
1	Use FPLC switch to select applicable fireplace for operation	Enables pendant to control Rear Fire (1), or Forward Fire (2)( <b>NOT USED</b> ). When switch is used to select another fireplace, the previously selected fireplace remains operational.
2	Press ON/OFF indicator switch (green)	Press to enable and disable fireplace. When pressed, enables fireplace for operation (scenario parameters are loaded, and system is ready for control commands). Light comes on steady. When pressed again, disables fireplace. Light flashes. Indicator is not lit during pre-ventilation period or if system is shut down.
3	Press PILOT indicator switch (blue)	Press to turn pilot flame on and off. When pressed and flashing, indicates pilot flame sequence is in progress. When lit steady, indicates pilot flame sequence is complete and pilot flame is confirmed. When pressed again, turns pilot flame off. Light goes dim.
4	Press FLAME indicator switch (red)	Press to turn main flame on and off. When pressed after pilot flame is confirmed, lights steady to indicate main flame is active. During soak period or when PAUSE is selected, flashes to indicate main flame is not active. When pressed again, turns main flame off. Light goes dim.
5	Rotate SMK/VNT switch to SMK indicator switch (white)	Press to start and stop smoke emitting at burn room. To generate smoke the I/O Rack Enclosure <b>SYSTEM POWER</b> key switch and <b>SMOKE ENABLE</b> Switches must both be in the <b>ON</b> position. <b>SMK</b> – Once indicator is flashing turn switch to this position to produce smoke. Switch indicator lights steady. Turn switch to center position to turn smoke off. Switch indicator light flashes.
<b>At this point applicable main flame is active and ready for training scenario to start. The following switches can be pressed as required.</b>		
--	PAUSE indicator switch (amber)	Press to pause and resume main flame operation. When pressed during main flame operation, main flame is turned off. Light comes on bright. When pressed again, main flame reignites and the scenario continues. Light goes dim.
--	AGENT indicator (green)	Indicator automatically lights when extinguishing agent application is detected.

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Step	Action	Result - Comment
--	Rotate SMK/VNT switch to VNT indicator switch (white)	<b>VENT</b> - When the switch is turned to this position the vent/exhaust fan ramps up to high speed to clear the Burn Room. Turn switch to center position to return vent/exhaust fan to normal operation.
--	ALERT indicator (red)	Automatically flashes when a system message occurs. Resets when ON/OFF switch is pressed. Check fireplace touch screen for error messages.
--	E-STOP switch (red)	When pushed in, initiates an emergency shutdown of the trainer. Propane flow to the trainer is shut off, operating power is removed, and the vent/exhaust system ramps up to high speed. When reset (pulled out), starts a 30-second time delay counter. At the end of the 30-second time period, the trainer is restored to operating condition. Switch must be in the pulled-out position to operate the trainer.
--	EFFECT indicator switch (red)	<p><b>Rear Fireplace Flashover</b></p> <p>Press to turn flashover effect on and off (Rear fireplace only) Indicator automatically flashes when flashover effect is ready for operation.</p> <p>When pressed and held, turns on flashover flames for the preset duration or until the switch is depressed, (whichever is shorter). Indicator lights steady while switch is depressed.</p> <p>The flashover effect can be initiated any time the EFFECT button Indicator is flashing.</p> <p style="text-align: center;"><b>NOTE:</b></p> <p><i>Only use the flashover effect 3 times during a single fire training scenario. If used over 3 times, trainer may shutdown due to excessive gas level detected.</i></p>

**NOTE**

**FOR INTEGRATED SOUND EFFECTS SYSTEM OPERATION, REFER TO SECTION 7, DRAWINGS AND REFERENCE MATERIALS FOR THE INTEGRATED SOUND EFFECTS SYSTEM USERS MANUAL.**

**THERE IS A FORCIBLE ENTRY DOOR LOCATED AT CURB SIDE BURN ROOM DOOR. REFER TO PARAGRAPH 3.7 FOR FORCIBLE ENTRY DOOR OPERATION.**

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### 3.6 SYSTEM SHUTDOWN

At the end of each training day the following procedure must be performed to ensure the trainer is shutdown in a safe and secure manner.

**AT CONTROL PENDANT:**

1. Turn off all fireplaces by using the fireplace selector switch and **ON/OFF** button on the pendant.
2. If smoke is being generated, turn the **SMK/VNT** switch to the **VNT** position to clear the Burn Room
3. Once Burn Room is cleared turn the **SMK/VNT** switch to the center position.
4. At the I/O Rack Enclosure, set the SMOKE ENABLE switch to the **OFF** position.
5. At the I/O Rack Enclosure, set the SYSTEM POWER keyswitch to the **OFF** position and remove the key.

**AT BURN ROOM:**

6. Inspect movable maze panels for signs of damage.
7. If required disassemble and store movable maze panels.
8. Inspect burn room and props for signs of damage.
9. If required disassemble and store both fireplace props.

 **CAUTION**

WHEN NOT IN USE THE REAR FIREPLACE WATER BATH PAN SHOULD BE DRAINED OF WATER DURING COLD WEATHER PERIODS, WHEN THE ANTICIPATED AMBIENT TEMPERATURE IS GOING TO BE BELOW 32°F

FAILURE TO FOLLOW THIS CAUTION MAY RESULT IN SERIOUS DAMAGE TO THE EQUIPMENT.

 **CAUTION**

ALWAYS BE SURE THE FOLLOWING IS COMPLETED PRIOR TO TRANSPORTING THE TRAINER!

- MOVABLE MAZE PANELS ARE SECURELY STORED.
- FIREPLACE PROPS DISASSEMBLED AND SECURELY STORED.
- ALL FIREPLACE WATER BATH PANS DRAINED.

FAILURE TO FOLLOW THIS CAUTION MAY RESULT IN SERIOUS DAMAGE TO THE EQUIPMENT!

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**AT CONTROL ROOM:**

10. Turn OFF Nitrogen Bottle and back out regulator.
11. Remove regulator assembly from nitrogen cylinder and securely store, prior to transporting the trainer.

**CAUTION**

REMOVE REGULATOR ASSEMBLY FROM NITROGEN CYLINDER AND SECURELY STORE, PRIOR TO TRANSPORTING THE TRAINER!

FAILURE TO FOLLOW THIS CAUTION MAY RESULT IN SERIOUS DAMAGE TO THE EQUIPMENT!

**3.6.1 ROOF PROPS****3.6.1.1 COLLAPSIBLE SECOND STORY ROOM****WARNING**

DO NOT LEAVE THE SECOND STORY COLLAPSIBLE ROOM IN THE UP POSITION AT THE END OF THE TRAINING DAY OR DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER!  
COLLAPSE ROOM AND PROPERLY SECURE TO TRAINER.

**WARNING**

TWO (2) PEOPLE ARE REQUIRED TO DISASSEMBLE THE SECOND STORY ROOM.

Refer to Figure 3-28.

1. Remove Railing from top portion of stairway (1) and safely store in trainer.
2. Remove pin and close hatch (2). From the burn room side, secure hatch closed with pin (3).
3. Close and latch the doors located in the rear and front wall of second story room.
4. Unsecure the sidewalls from the back wall by opening and unhooking both toggle clamps (4 & 5).
5. With the winch strap hook still, attached to the top of the Second Story Room, remove the securing pin from the rear right and left sidewall support pins and turn the support pins so the "L" portion of the pins are facing outwards (6 & 7).

**CAUTION**

MAKE SURE THE BOTH TOGGLE CLAMPS ARE RELEASED (4 & 5) AND "L" PORTION OF THE REAR SIDEWALL SUPPORT PINS ARE FACING OUTWARD (6 & 7). FAILURE TO FOLLOW THIS CAUTION WILL DAMAGE THE COLLAPSIBLE ROOM.

*Operation and Maintenance Manual***WARNING****PRIOR TO LOWERING THE ROOM:**

- BE SURE THERE ARE NO LOOSE ITEMS ON THE COLLAPSIBLE SECTION.
  - ALL ROOM RAILING IS DISASSEMBLED AND SECURELY STOWED IN TRAINER.
  - HATCH IS CLOSED AND SECURED
  - BOTH TOGGLE CLAMPS ARE RELEASED (FIGURE 3-28, 4 & 5)
  - THE SIDEWALL REAR SUPPORT PINS ARE ALL FACING OUTWARD (FIGURE 3-28, 6 & 7).
  - THE REAR AND FRONT WALL DOORS ARE CLOSED AND LATCHED.
  - BE SURE THERE ARE NO OBSTRUCTIONS.
  - NO ONE IS IN THE AREA.
6. Remove the winch operating pendant from the black enclosure, located in the control room. Connect the end of the winch pendant cord into the winch connection (8).

**WARNING**

READ AND UNDERSTAND **ALL** THE WARN WORKS 3700 WINCH USER MANUAL SAFETY GUIDELINES AND OPERATING PROCEDURES, LOCATED IN SECTION 7 OF THIS MANUAL, BEFORE PROCEEDING.

**AVOID SHOCK LOADS WHEN LOWERING THE ROOM. SHOCK LOADS CAN MOMENTARILY EXCEED THE WINCH AND STRAP RATING.**

7. With the winch carefully lower the collapsible walls down flat onto the roof of the trainer.
8. Remove the securing pin from the leverage arm pin (9).

**WARNING**

**LEVERAGE ARM MUST BE SUPPORTED PRIOR TO REMOVING THE PIN.**

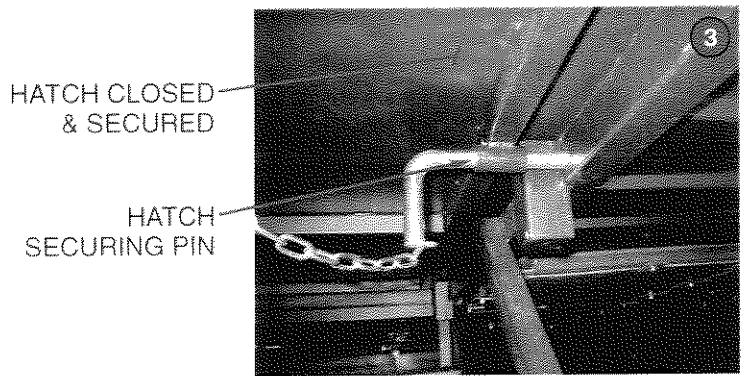
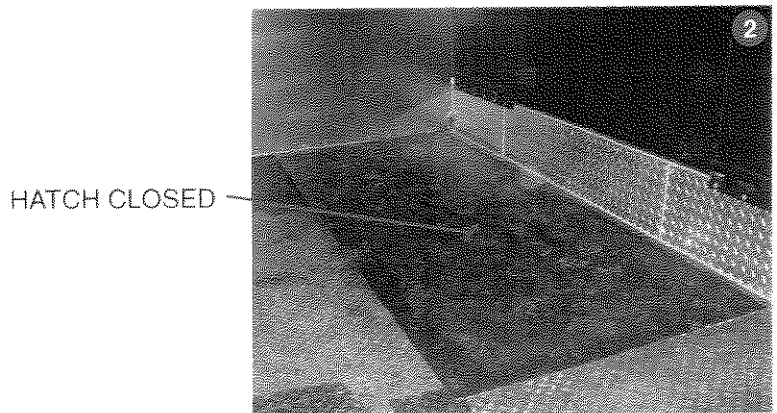
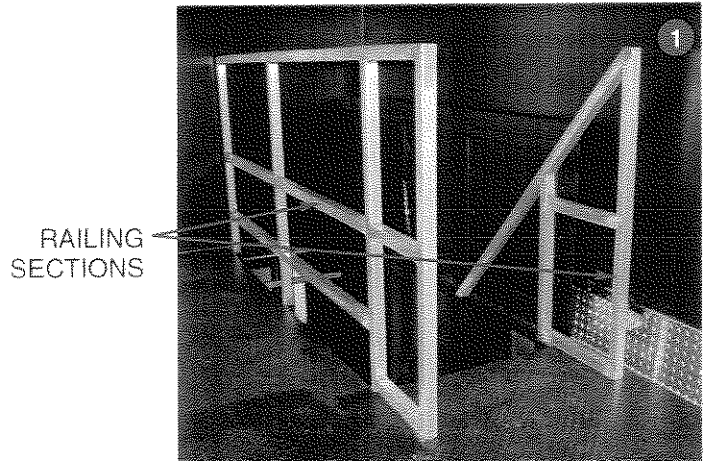
9. While supporting the leverage arm remove the pin (10).
10. Carefully walk the leverage arm down (11) to rest on the top of the collapsed room (12). **WALK ON RIVETED AREA ONLY** while lowering leverage arm.
11. With the winch remove slack from winch belt. Leave enough to allow the pin to be inserted back into the leverage arm support (13). Secure pin in place with securing pin (13).
12. While supporting the roadside wall, lift the front and rear pins (14) & (15) and swing wall down onto leverage arm (16). **WALK ON RIVETED AREA ONLY** while working. Secure wall supporting pins in wall receivers with securing pins (20).

**Operation and Maintenance Manual**

- 13. While supporting the curbside wall, lift the front and rear pins (17) & (18) and swing wall down onto driver sidewall (19). **WALK ON RIVETED AREA ONLY** while working. Secure wall supporting pins in wall receivers with securing pins (20).
- 14. Secure second story collapsible room to trainer roof with binder straps.

**⚠ WARNING**

**PROPERLY SECURE THE COLLAPSE ROOM TO THE TRAINER!**



**Figure 3-25 Second Story Room (Sheet 1 of 4)**



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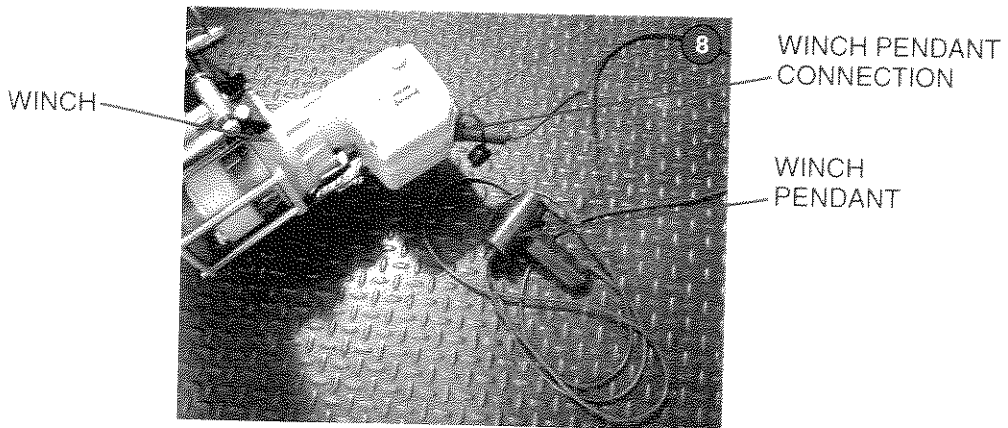
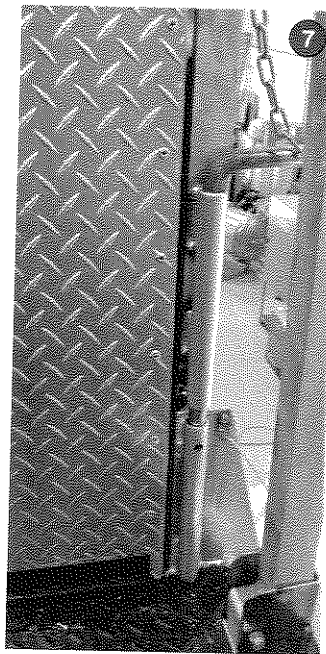


Figure 3-25 Second Story Room (Sheet 2)

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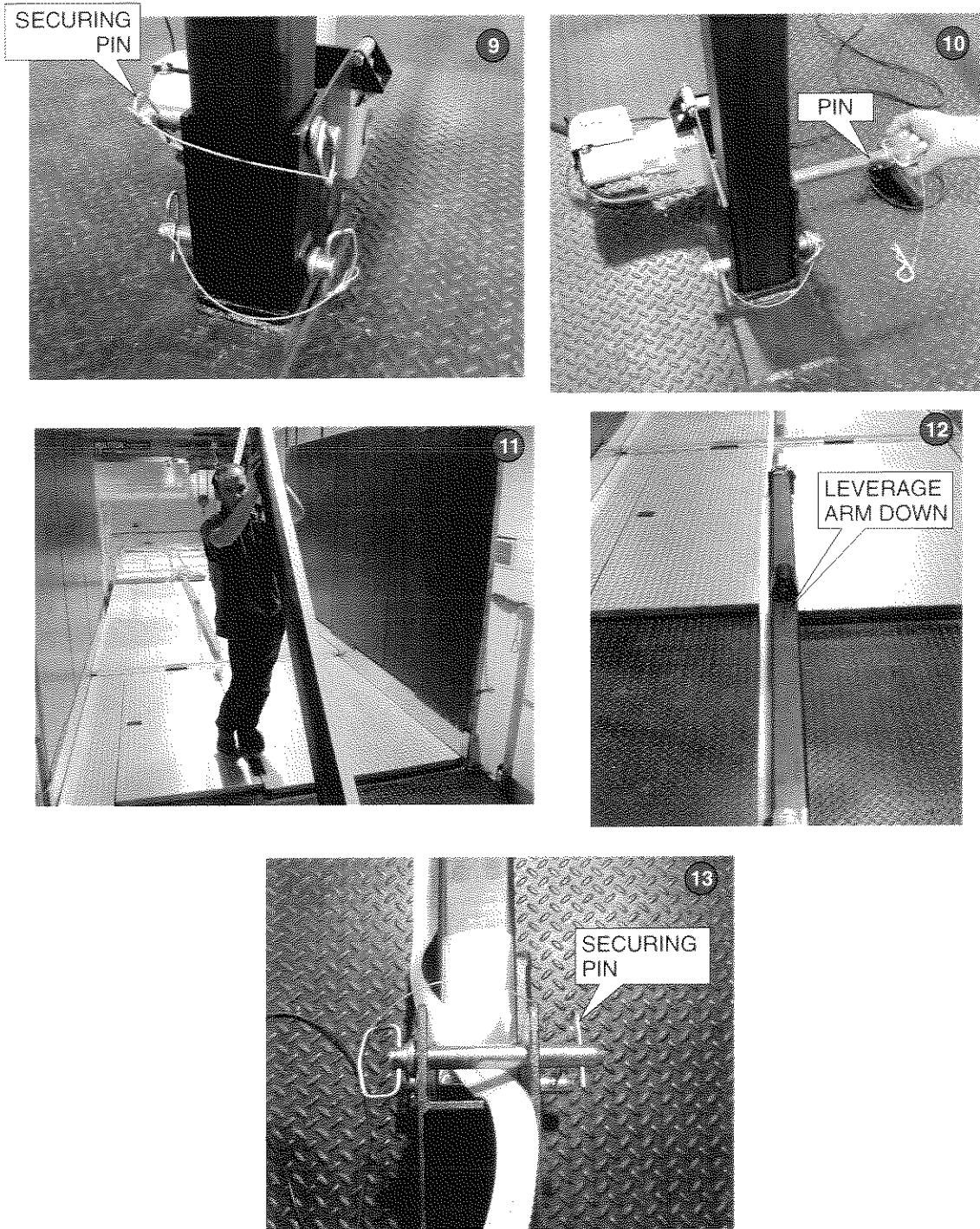


Figure 3-25 Second Story Room (Sheet 3)

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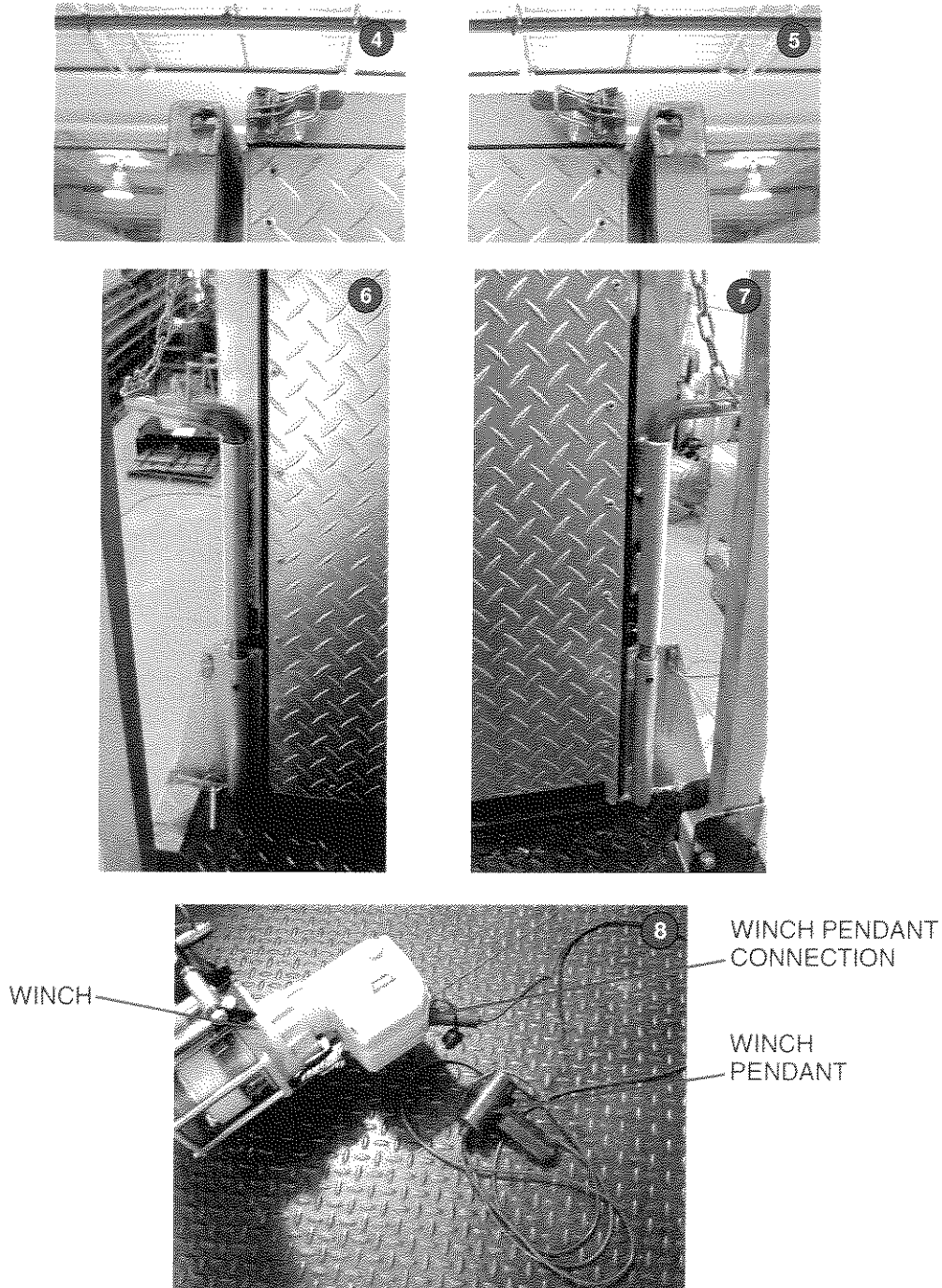


Figure 3-25 Second Story Room (Sheet 2)

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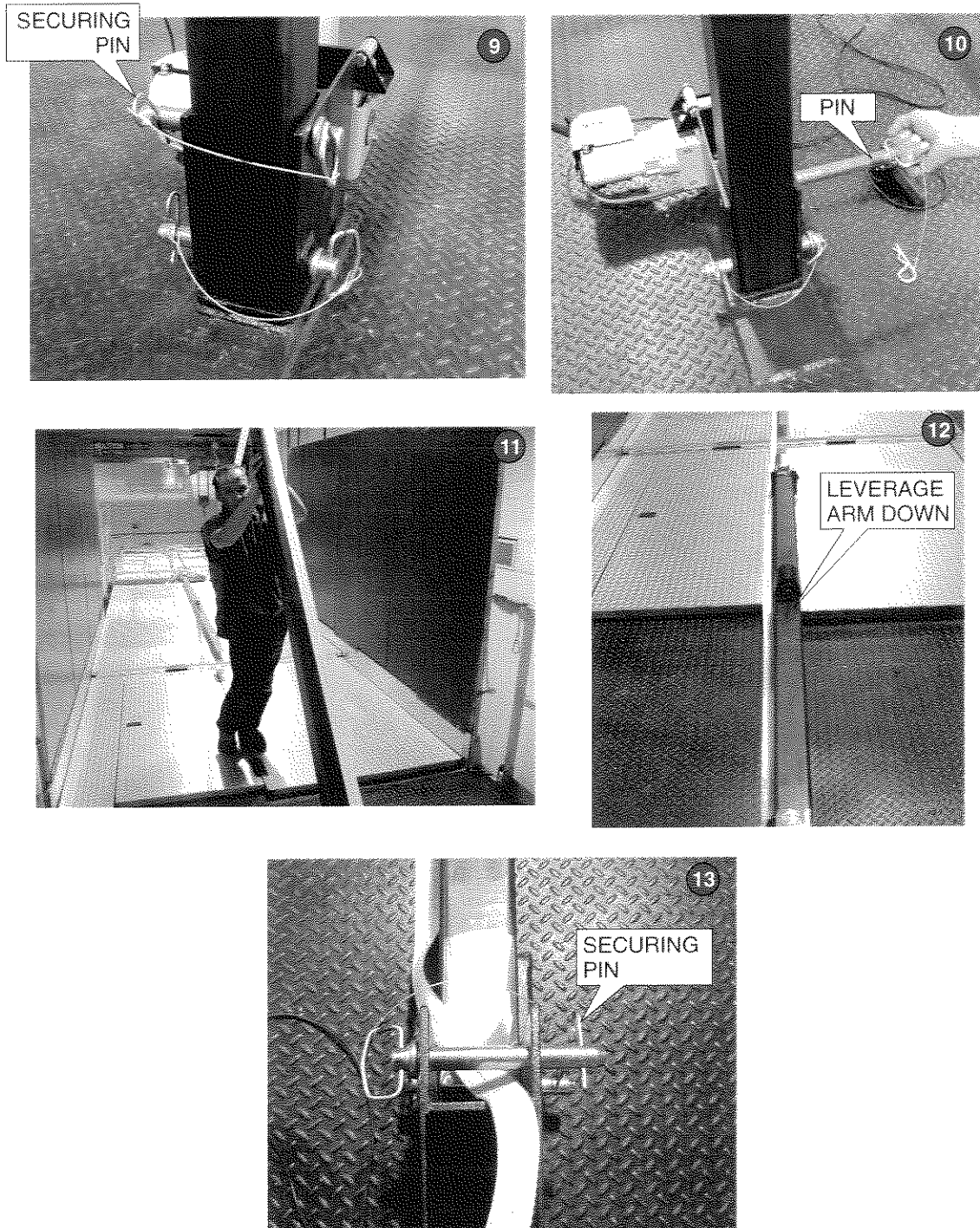


Figure 3-25 Second Story Room (Sheet 3)

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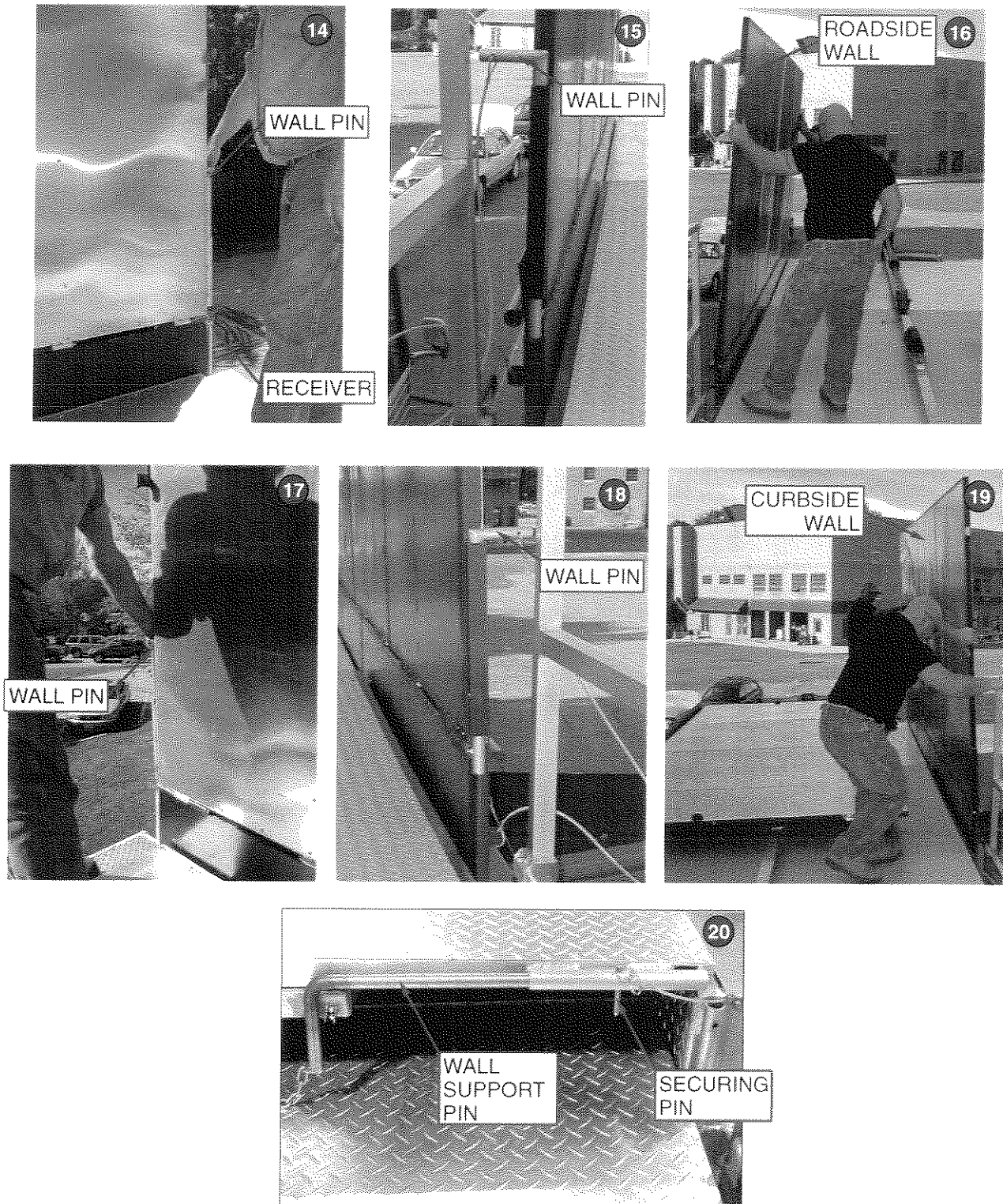


Figure 3-25 Second Story Room (Sheet 4)

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### **3.6.1.2 INCLINE ROOF PROP**

Refer to Figure 3-26.

#### **WARNING**

DO NOT LEAVE THE INCLINE ROOF PROP IN THE UP POSITION WHEN NOT IN USE, DURING WINDY CONDITIONS AND WHILE TRANSPORTING THE TRAINER! WHEN ROOF PROP IS DOWN BE SURE TO SECURE IT TO THE TRAINER ROOF WITH THE TWO PINS LOCATED ON EACH SIDE OF THE PROP.

#### **WARNING**

**TWO (2) PEOPLE ARE REQUIRED TO SAFELY STOW THE INCLINE ROOF PROP.**

1. Remove and store or secure in place the plywood from cutout section located under the incline roof prop.
2. With the jacks, use the crank handles to raise the incline roof prop until the weight of the roof prop is taken off the support legs and is placed on the jacks (1).
3. Fold both of the support legs up against bottom frame of roof prop.
4. With the jack handles lower the roof prop until the weight of the roof prop is taken off the jacks.
5. On both jacks, release the pins and rotate the jacks to the horizontal position and lock into place with pins.
6. There is a spring loaded locking pin located on each side of the incline roof prop. Secure the incline roof prop to the trainer roof by rotating each locking pin to release the pin into the hole located in the side of the incline roof prop frame (3).
7. Unhook all safety chains.
8. Stow the side railing sections first by lifting the railing sections up and swinging them down onto the incline roof prop. Repeat same procedure for both front/back railing sections.
9. Secure railing in place with straps.
10. If applicable, disconnect and remove the rear roof lighting from the trainer. Securely store the lights inside the trainer.

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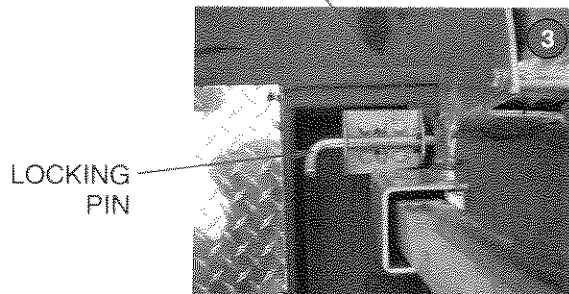
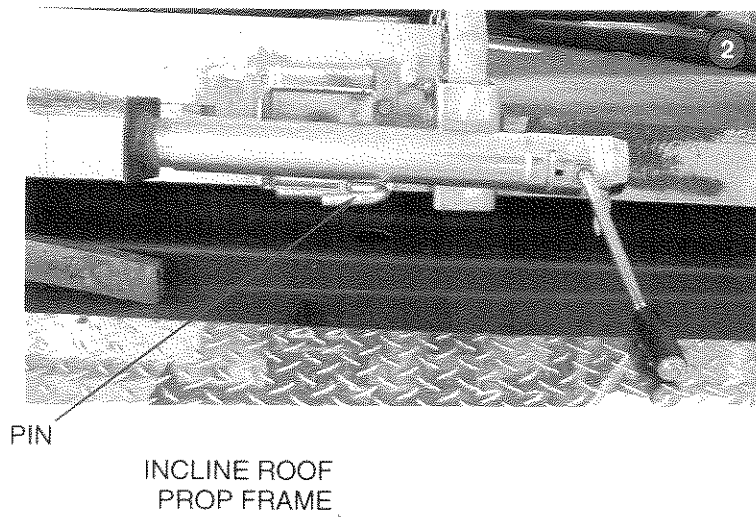
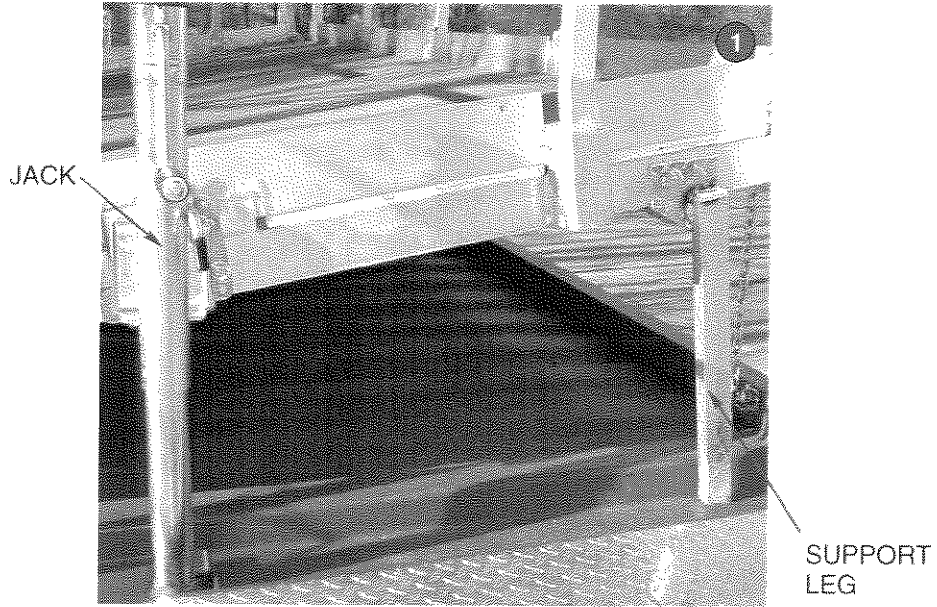


Figure 3-26 Incline Roof Prop

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**3.6.1.3 ROOF SAFETY RAILING AND CHAIN**



**CAUTION**

DO NOT LEAVE ROOF SAFETY RAILING & CHAIN ASSEMBLY IN PLACE WHILE TRANSPORTING TRAINER!

1. Disconnect ALL safety chain from safety railing sections.
2. Stow ALL of the safety railing sections by lifting up and swinging them down onto the trainer roof.
3. Secure railing in place with straps.



**WARNING**

PROPERLY SECURE ALL SAFETY RAILING TO THE TRAINER!



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**3.6.2 GENERATOR**

1. When no longer required remove any electrical devices that may be plugged into the GFI receptacles. Turn off light switches in Control and Equipment Rooms.
2. Set disconnect switch (DS1) to the OFF position (See Figure 3-14).
3. Disconnect the control pendant from the I/O Rack Enclosure connection and stow the Pendant Assembly inside the trainer.
4. Continue to run the engine at no load for 3 to 5 minutes for the engine to cool.
5. At the Power Generator, stop the engine by turning engine key to the **OFF** position.

**WARNING**

THE ENGINE AND MUFFLER WILL REMAIN HOT FOR SEVERAL HOURS AFTER SET IS STOPPED. PERSONNEL SHOULD NOT TOUCH THESE COMPONENTS AS SEVERE BURNS MAY RESULT.

6. After the engine is stopped, close the generator propane supply valve (See Figure 3-13).

**AT CONTROL ROOM:**

7. Turn off the gas shutoff valve for the Rear Burner Control Assembly (See Figure 3-12).

**AT EQUIPMENT ROOM:**

8. Turn off the gas shutoff valve for the Rear fireplace Burner Control Assembly and generator (See Figure 3-13).

**AT PROPANE SUPPLY COMPARTMENT:**

9. Turn off propane supply at both propane tank shutoff valves (See Figure 3-11).
10. Turn off both shutoff valves on the hose connections to the Propane Supply Gas Header (See Figure 3-11).

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**3.6.3 GENERAL**

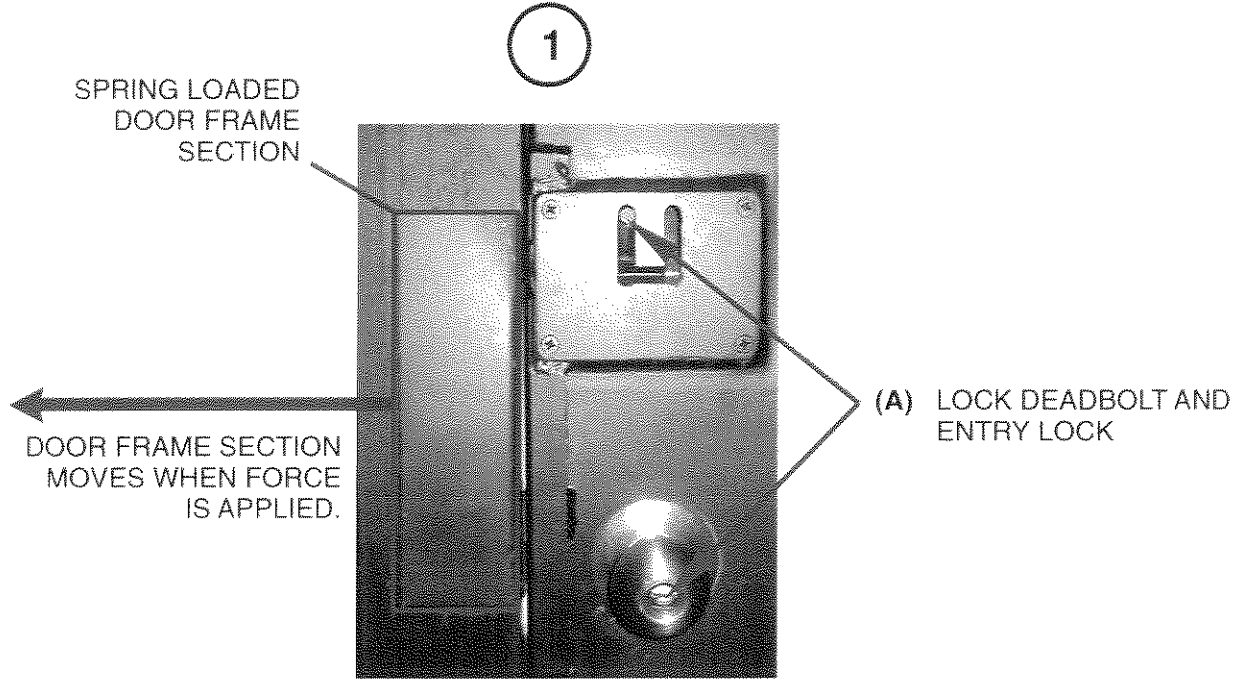
1. Once the generator has cooled, slide the generator back into the compartment by pulling the rail-locking lever out, while sliding the generator into the room. Once the stop is reached let go of the locking lever and be sure the generator is locked in position by pulling back on it.

**WARNING**

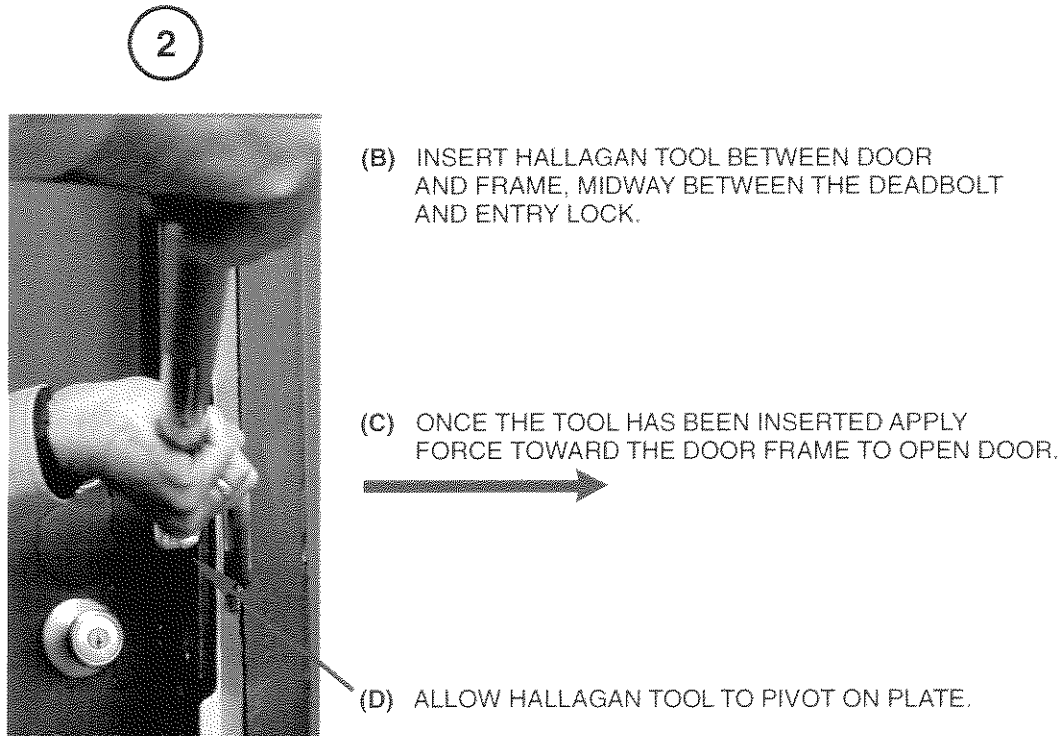
**BE SURE THE GENERATOR IS LOCKED IN POSITION.**

2. Close and lock the generator compartment door.
3. Remove the handrail from all three of the stairway assemblies.
4. Remove the three stairways from the sides of trainer and store and secure in trainer, along with the handrail.
5. Store and secure step platform ladder inside the Propane Compartment and close and lock the Propane Supply Compartment doors.
6. Verify that all equipment is stored and secured.
7. Close and lock all trainer doors and shutters.

### 3.7 FORCIBLE ENTRY DOOR OPERATION



INSIDE VIEW OF DOOR



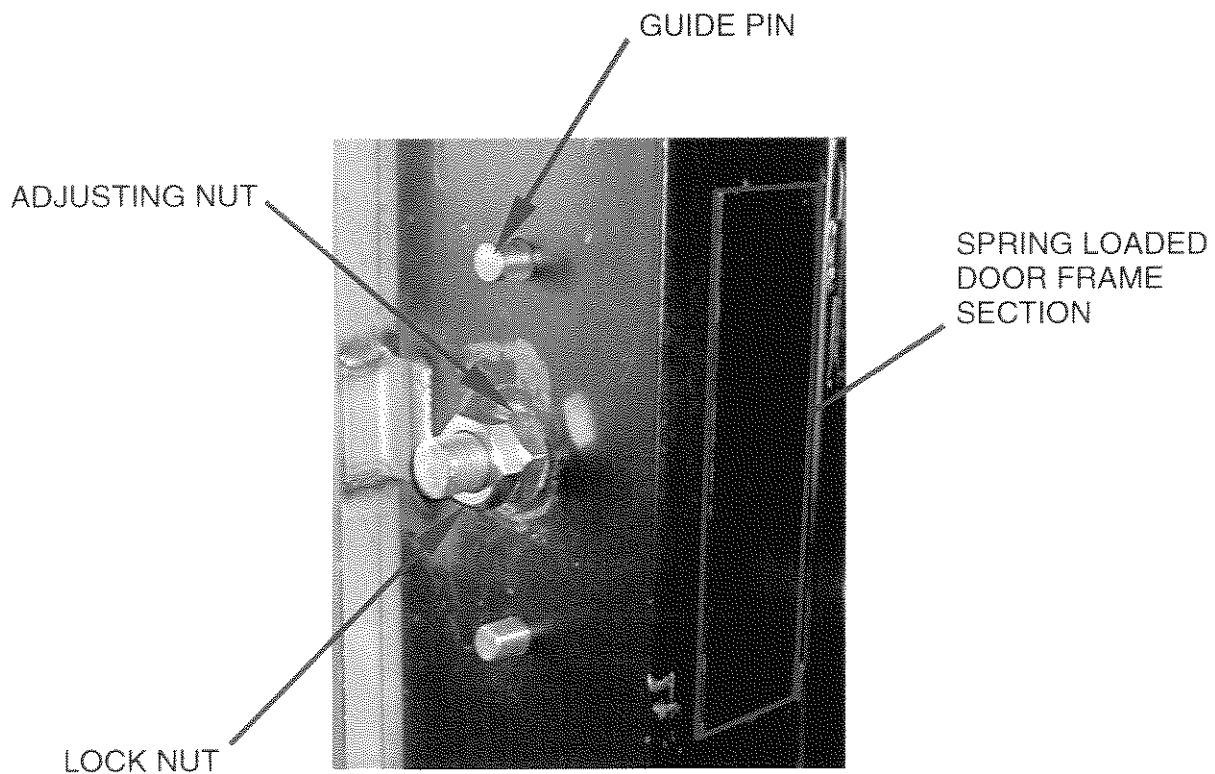
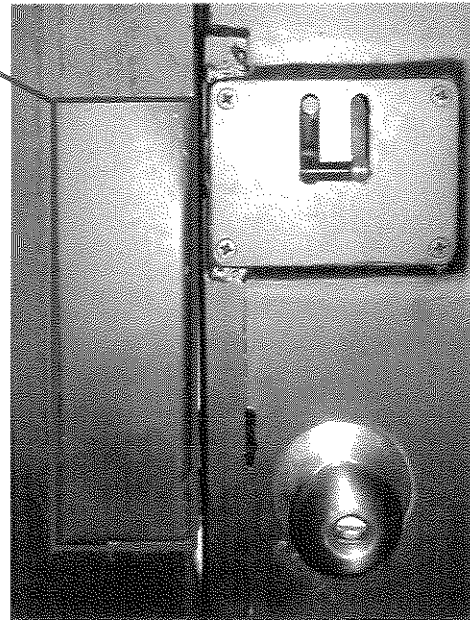
OUTSIDE VIEW OF DOOR

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SPRING LOADED DOOR  
FRAME SECTION SHOULD BE  
FLUSH WITH STATIONARY  
DOOR FRAME.

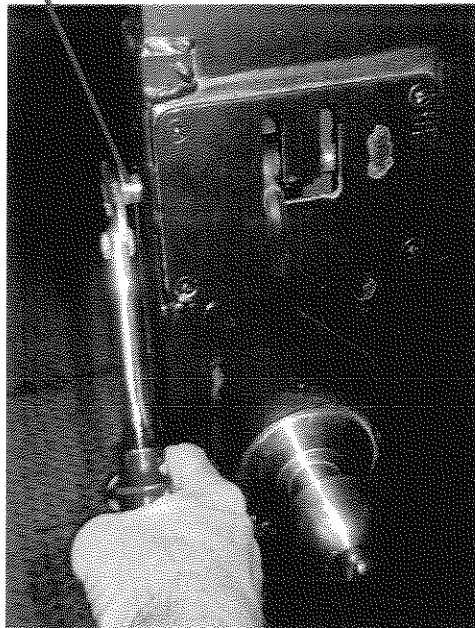
IF SPRING LOADED DOOR FRAME  
SECTION INTERFERES WITH DOOR  
CLOSURE, LOOSEN LOCK NUT AND  
TIGHTEN ADJUSTING NUT UNTIL  
SECTION IS FLUSH WITH DOOR FRAME.  
TIGHTEN LOCK NUT AGAINST  
ADJUSTING NUT.



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DEADBOLT



DEADBOLT LENGTH IS ADJUSTED BY  
ROTATING THE DEADBOLT. CLOCKWISE  
FOR IN AND COUNTERCLOCKWISE FOR  
OUT.

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## **4.0 MAINTENANCE AND SERVICING**

### **4.1 INTRODUCTION**

This section provides procedures for replacement and calibration of components or sub-systems that may require maintenance or servicing between preventive maintenance visits.

Tools and parts required are described along with the indication or period of required service or maintenance.

### **4.2 CONSUMABLE MATERIALS**

Table 4-1 shows a list of the consumable materials along with recommended places to obtain items.

<b>Table 4-1. Consumable Materials</b>		
<b>Nomenclature</b>	<b>Part No./Specification</b>	<b>Distributor</b>
Smoke Fluid Kidde Type II Smoke Fluid (Do Not Substitute)	1A1-002-017- 001 (six ½-gallon bottles) 002 (5-gallon bottle) 003 (55-gallon drum)	Kidde Fire Trainers inc. 17 Philips Parkway Montvale, NJ 07645 (201) 300-8100
Span Gas Cylinder, with span gas: 1.1% (±2%) (50% LEL) propane	226166-004	Detector Electronics Corp. 6901 West 110 <sup>th</sup> St. Minneapolis, MN 55438 (952) 829-8750
Nitrogen	N/A	Local Supplier

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### 4.3 PERIODIC MAINTENANCE

Certain components or sub-systems must be checked on a periodic basis to ensure serviceability. Table 4-2 lists the required checks along with their frequency.

Table 4-2. Periodic Maintenance Tasks		
Period	Assembly	Task
DAILY - OR - BEFORE START OF TRAINING	Agent Sensors	Flush all agent sensors with water <b>NOTE:</b> The water collection system must be flushed between scenarios to eliminate the chance of contaminants from accumulating on the water detecting surfaces. Agent lock-on could occur if foreign matter builds up within the sensing system. This problem may be difficult to diagnose and may result in sensor failure. A thorough flushing with water between each scenario will ensure trouble free operation of the water detection system. See 4.4.6 for procedure
	Combustible Gas Sensing Systems	Perform span check for both systems. See 4.4.4 for procedure. All fireplace operation is disabled until the required Propane Span Check has been successfully completed.
	Ventilation Fan	Listen for excessive or unusual vibration or noise, report problems.
	Emergency Stops	Before Training begins randomly press an emergency stop to verify correct operation of safety system.
	Smoke Generator	Check smoke fluid level. If fluid is required refer to 4.4.3 for procedure.
AFTER TRAINING IS COMPLETED FOR THE DAY	Smoke Generator Distribution Fan	Remove plug from the bottom of the fan casing and allow fluid to drain into a container. Once drained re-install plug.
Weekly	PLC Backup Battery	Verify that the BAT LED on the front of each PLC is not on (red). Replace if necessary. See 4.4.1 for procedure.



***Operation and Maintenance Manual***
**Table 4-2. Periodic Maintenance Tasks**

<b>Period</b>	<b>Assembly</b>	<b>Task</b>
	Core10 Insulating Panels (If installed)	For each insulating panel, perform the following  Visually inspect each panel for cracks, damage, warped or buckled panels, deteriorated welds. Repair as required.  Check panels for proper security. Be sure all panel clip hardware is tight.
<b>Monthly</b>	Gas Detection System	Perform a Combustible Gas Detection System Calibration (Refer to 4.4.5)
	Fireplace Burner Pans	Before training begins for the day inspect fireplace burner pans for unusual or abnormal conditions (Report any potential problems).
<b>6 Months</b>	Room Temperature Sensors.	Verify with a thermocouple simulator that operational set points trigger correctly.

### **4.3.1 PERIPHERAL EQUIPMENT PERIODIC MAINTENANCE**

- Generator
- Winch
- Concept Smoke Generator and Smoke Distribution Fan
- Trailer
- Ventilation Fan

**NOTE**

**FOR MAINTENANCE INFORMATION REFER TO THE APPROPRIATE INFORMATION, LOCATED IN SECTION 7 OF THIS MAINTENANCE MANUAL.**

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### **4.4 SERVICING**

#### **4.4.1 PLC BATTERY REMOVAL AND REPLACEMENT**

The battery required for data backup in the event of a power failure will require replacement when the **BAT** Led on the front of the Controller is red. Follow the procedure below to replace the battery. Refer to Figure 4-1 for location.

#### **CAUTION**

**DO NOT SUBSTITUTE ANY OTHER BATTERY FOR THE D3-D4-BAT. USING ANY OTHER BATTERY COULD RESULT IN AN UNSAFE CONDITION.**

**BATTERY MUST BE REMOVED WITH POWER ON. REMOVING BATTERY WITH POWER OFF WILL CAUSE LOSS OF SOME FUNCTIONS OF THE PLC.**

**IF THE CPU HAS BEEN POWERED OFF YOU SHOULD POWER-UP THE CPU FOR AT LEAST 5 SECONDS PRIOR TO CHANGING THE BATTERY.**

1. Verify that there are no gas detection LEL warning or shutdown messages.
2. Open the door on the I/O Rack Enclosure
3. Open the door on the Controller to access the battery.
4. Gently pull the battery out of the retaining clips.
5. Squeeze the two retaining clips located on each end of the battery connector and remove connector from socket.
6. Insert the new battery connector into the connector socket until it clicks into place.

#### **NOTE**

**THE CONNECTOR IS POLARIZED AND MAY ONLY BE INSERTED ONE WAY.**

7. Insert the new battery into the battery retaining clips and close door.
8. Verify that the **BAT LED** is off. If it is not, replace battery again. If problem persists contact Kidde Fire Trainers Customer Service.

#### **WARNING**

**DO NOT ATTEMPT TO RECHARGE THE BATTERY OR DISPOSE OF IT BY FIRE. THE BATTERY MAY EXPLODE OR RELEASE HAZARDOUS MATERIALS.**

#### 4.4.2 MEMORY CARTRIDGE REPLACEMENT

 **CAUTION**

TO AVOID LOSS OF MEMORY, POWER TO THE CPU MODULE MUST BE TURNED OFF BEFORE REMOVAL OF THE MEMORY CARTRIDGE. MEMORY CARTRIDGE IS FACTORY PROGRAMMED BEFORE SHIPMENT.

1. Locate memory cartridge extraction lever (See Figure 4-1) and gently pull the top of the lever down and towards you.
2. Remove memory cartridge from CPU.
3. Slide memory cartridge into slot in CPU and push lever upwards and inwards to secure cartridge.

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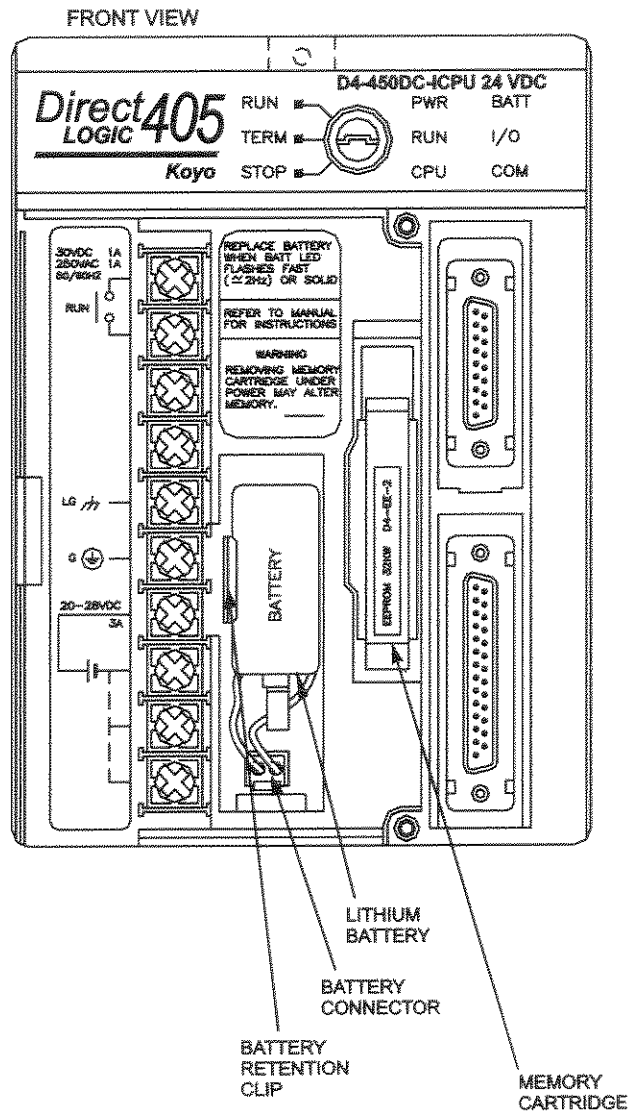


Figure 4-1 PLC

### 4.4.3 SMOKE FLUID RESERVOIR SERVICING

Fill the smoke fluid reservoir as follows (Figure 4-2):



#### **WARNING**

PRIOR TO PERFORMING ANY SERVICE ON THE SMOKE GENERATOR BE SURE TO REMOVE POWER FROM SMOKE GENERATOR. TURN OFF NITROGEN BOTTLE AND BACK OUT REGULATOR MAKING SURE THERE IS NO PRESSURE BUILT UP IN THE SMOKE FLUID RESERVOIR. BE SURE THE SMOKE GENERATOR HAS COOLED DOWN.

1. The Smoke Generator is located in the Control Room. The Smoke Generator is mounted on a plate. Remove the hardware that secures the smoke generator to the mounting plate. Remove the Smoke Generator from the Plant Room. Check the site gauge on the smoke generator to verify how much smoke fluid is required.
2. If smoke fluid is required slowly unscrew and remove cap from smoke fluid filler port. Inspect filler cap o-ring for damage. Replace if necessary.



#### **WARNING**

ENSURE ONLY KIDDE FIRE TRAINERS (KIDDE TYPE II) SMOKE FLUID IS USED FOR REPLENISHING.



#### **CAUTION**

DO NOT OVERFILL BEYOND THE MAXIMUM LEVEL SHOWN ON THE SIGHT GLASS. POUR A SMALL AMOUNT OF SMOKE FLUID IN AT A TIME AND WAIT TO VIEW LEVEL. THE FLUID IS DENSE AND TAKES TIME TO REGISTER ON THE SIGHT GAGE.

3. Using a funnel (supplied with Smoke Generator), slowly fill reservoir with smoke fluid.
4. Reinstall filler cap and hand tighten (do not over tighten).
5. Wipe any spillage from reservoir and surrounding area.
6. Re-install the Smoke Generator back onto the mounting plate and secure with hardware. Be sure the discharge of the Smoke Generator is inline with the opening into the Burn Room.

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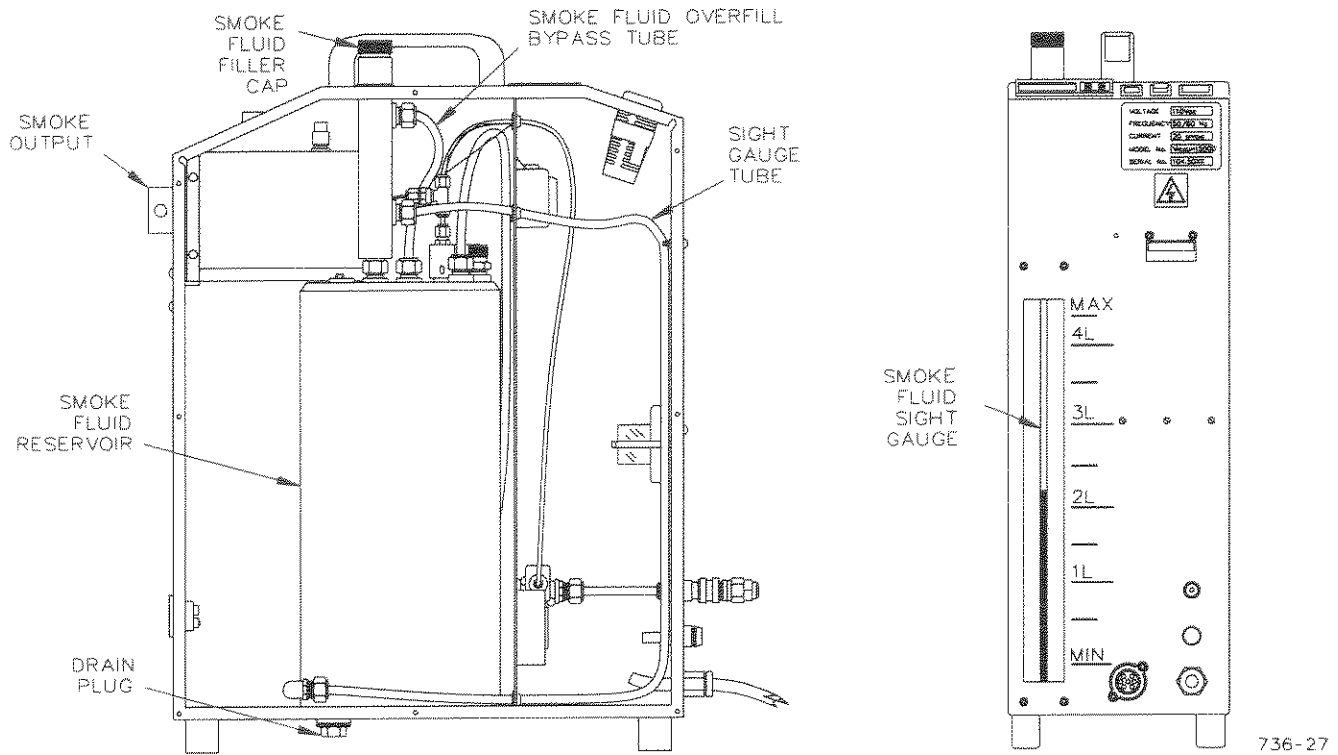


Figure 4-2. Smoke Fluid Filling-Smoke Generator

#### 4.4.4 SPAN CHECK PROCEDURE

To ensure safe operation of the combustible gas sensor system, the trainer system monitors the need for a Propane Span Check. There are two gas sensors located in the Burn Room to monitor combustible gas levels. These two gas sensors require a Propane Span Check every 24 hours. This check verifies the calibration of the gas sensors. When the gas sensors need calibration, the computer system informs the operator at the touch screen via a message. All fireplace operation is disabled until the required Propane Span Check has been successfully completed.

To perform a Propane Span Check, at the control console fire trainer touch screen, on the Main Menu screen touch the PROPANE SPAN CHECK area to bring up the Propane Span Check Screen as shown in Figure 4-3. See Figure 4-4 for touch screen and transmitter locations and Figure 4-5 for gas sensor locations.

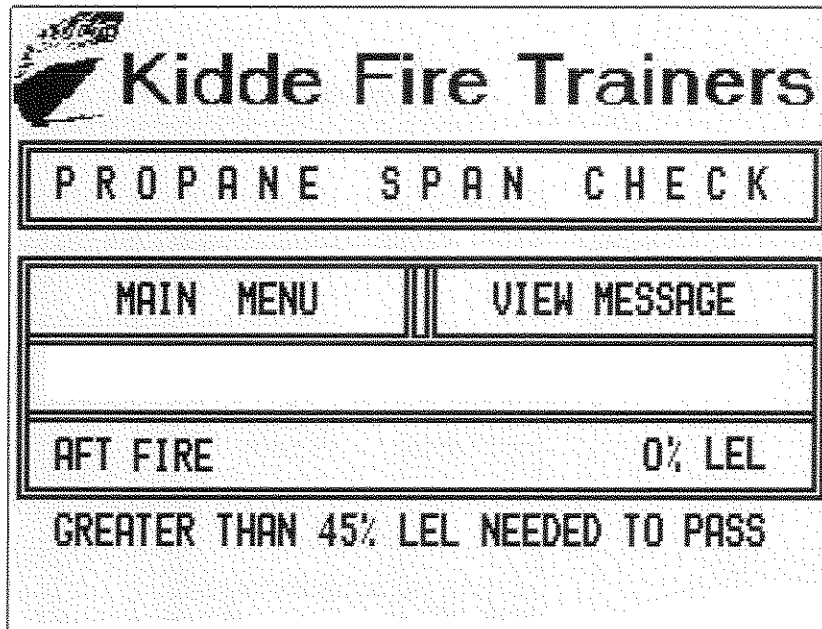


Figure 4-3. Propane Span Check Screen

### **WARNING**

**ONLY USE THE TEST GAS SPECIFIED IN TABLE 4-1!**

1. Set up the span gas cylinder assembly, (see Figure 4-6), by the sensor in the Burn Room and remove the protective cover by undoing the two nuts on the bottom of the cover.
2. Clip the gas sensor cap from the span gas cylinder, onto the bottom of the sensor.

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3. On top of span gas cylinder, slowly open cylinder shutoff valve and apply gas for approximately 20 seconds and then remove sensor cap from sensor under test. Repeat this step for both sensors.
4. At the Propane Span Check Screen verify that all recorded values are greater than 45% LEL and PASSED is displayed for the Forward and Aft sensors.

### **NOTE**

REPLACEMENT FILLED SPAN GAS CYLINDERS SHOULD BE AVAILABLE FOR SPAN CHECKING. FAILURE TO PERFORM SPAN CHECK OR OBTAIN IN-RANGE INDICATIONS WILL INHIBIT TRAINER OPERATION.

5. If any values are not within the correct range perform the Calibration Procedure described in this section.

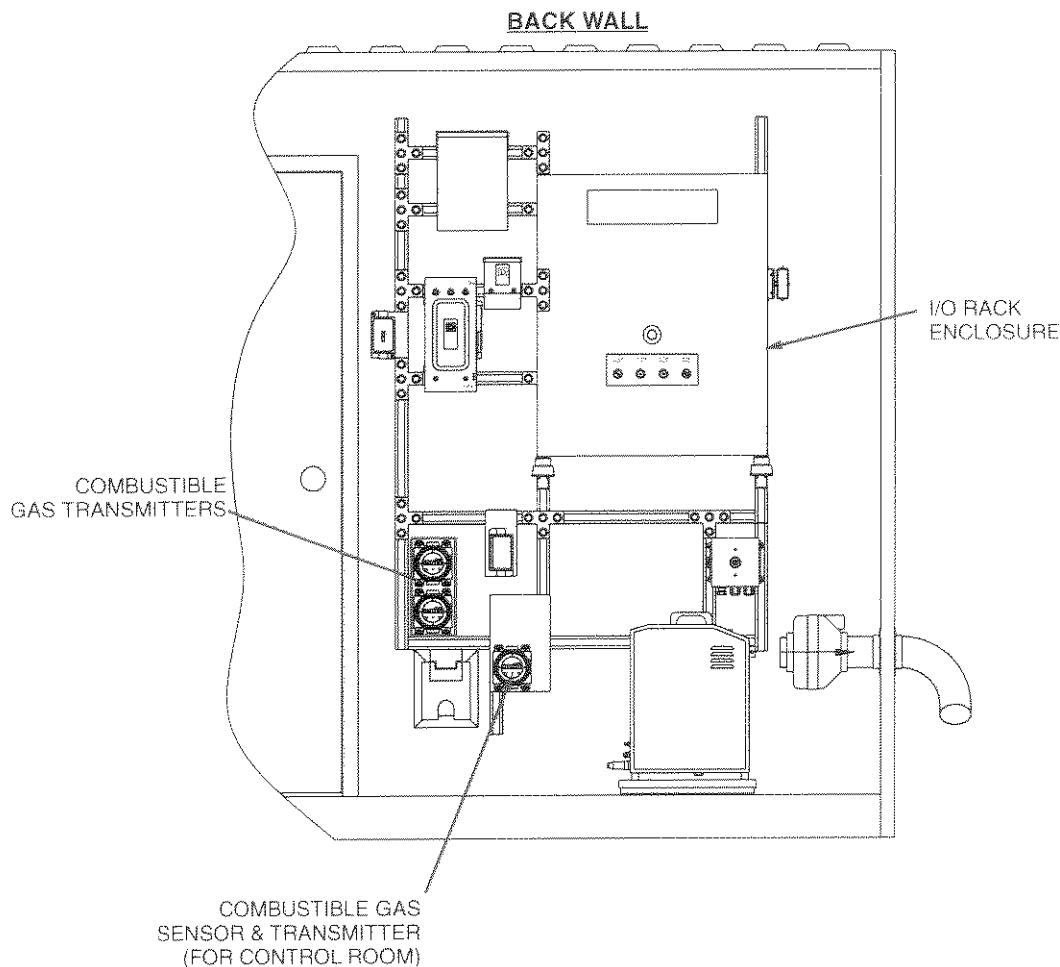


Figure 4-4. Gas Transmitter/Sensor Locations (Control Room)



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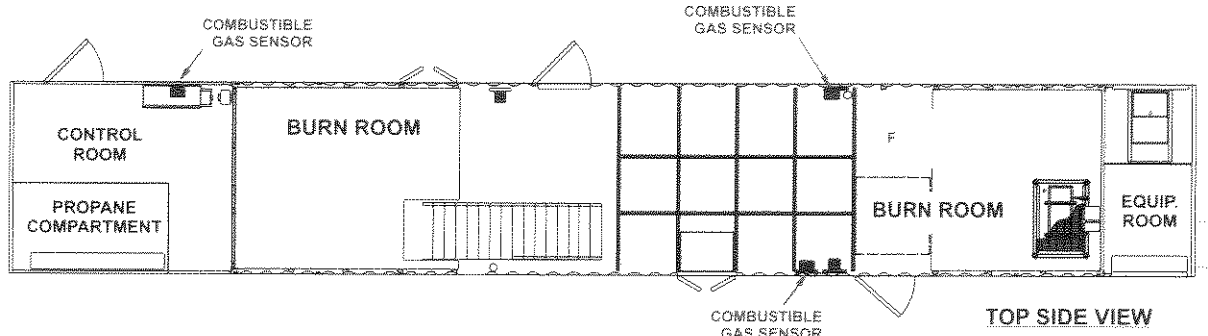


Figure 4-5. Gas Sensors Locations

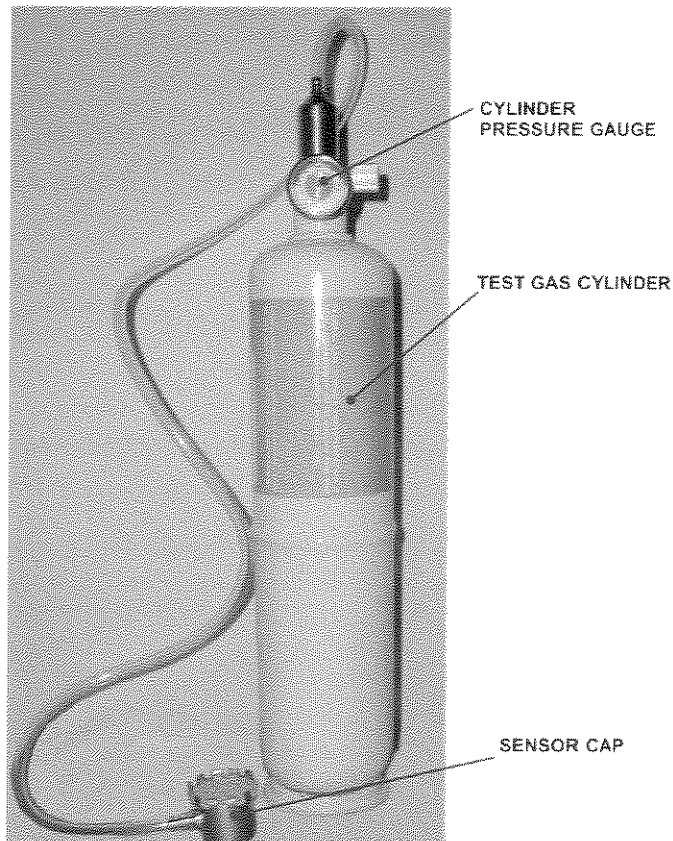


Figure 4-6. Test Gas Kit

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### 4.4.5 COMBUSTIBLE GAS DETECTION SYSTEM CALIBRATION

This procedure is performed at periodic intervals, if the Span Check procedure fails or a new gas sensor is installed, the following procedure must be performed. This non-intrusive calibration procedure is required to ensure proper operation of the sensor. A calibration magnet and the equipment shown in Figure 4-6 are used to perform this procedure.

The combustible gas sensors (3) must be calibrated to ensure accuracy in their measurement of unburned propane levels. Unsafe levels could occur due to a leak in a supply line or when fires are being fought.

The combustible gas detection system consists of three transmitters located in the Control Room along with one sensor (See Figure 4-4) and two sensors located in the Burn Room (See Figure 4-5).

A gas standard of a precise mixture of propane to air is injected into each sensor and the system automatically performs an calibration when it is initiated using a magnet that is held underneath the transmitter unit for an approximate time period.



## WARNING

ONLY USE THE TEST GAS SPECIFIED IN TABLE 4-1!

### CALIBRATION GAS KIT

A kit is provided with all the components necessary to test the gas sensors for accuracy. The kit consists of:

- Test gas cylinders (2)
- Gas pressure gauge (1) and Sensor cap (1) connected by 3 ft. of plastic hose
- Cal magnets (2)

Figure 4-6 shows the kit components ready for use. The gas pressure gauge and sensor cap assembly is screwed on to the top of one of the cylinders until it is tight. The knurled knob to the right of the gauge allows gas to flow to the sensor cap when it is opened.

### CALIBRATION PROCEDURE

#### **NOTE**

PERFORM THE CALIBRATION PROCEDURE IN THE MORNING BEFORE COMMENCING TRAINING TO ENSURE THAT THE AIR AROUND THE SENOR IS RELATIVELY FREE OF CONTAMINANTS.

Refer to Figure 4-6 for details on Test Gas Kit.

1. Locate the sensors in the Burn Room (See Figure 4-5) and remove the protective cover by undoing the two nuts on the bottom of the cover. Rotate the cover outwards and lift up to remove.
2. Clip the gas sensor cap onto the bottom of the sensor.

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Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this manual.

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3. Initiate calibration by holding the Cal magnet under the correct transmitter for 7 seconds (See figure 4-7). The display will sequence through the Setup settings. When the transmitter enters the Calibration mode, the display will show the detected gas concentration and an alternating message "ZERO" "CAL".
4. When the zero calibration is complete the display message will now show the detected gas concentration and an alternating message: "APLY" "GAS". Apply the calibration gas to the sensor by placing the calibration cup over the sensor. The display will show a rising gas concentration and an alternating message "GAS" "ON".
5. Continue applying calibration gas until the display shows the alternating message: "CAL" "OK" then "RMV" "GAS". At this point turn off and remove the calibration gas and if the calibration was successful the message displayed will be "XXXX SPAN" where XXXX will display a number that indicates sensor life. Any number over 100 indicates that the sensor is good. When the gas level falls below the lowest alarm set point, and if no faults are present, the transmitter automatically exits the Calibration mode.
6. If a fault is present the display will show the fault description then the alternating message RMV "GAS. The fault must be cleared before a successful calibration can be completed. Refer to the Fault messages, table 4-3.
7. Repeat steps 1-6 for the remaining Burn Room sensor.
8. Repeat steps 2-6 for the Control Room sensor.

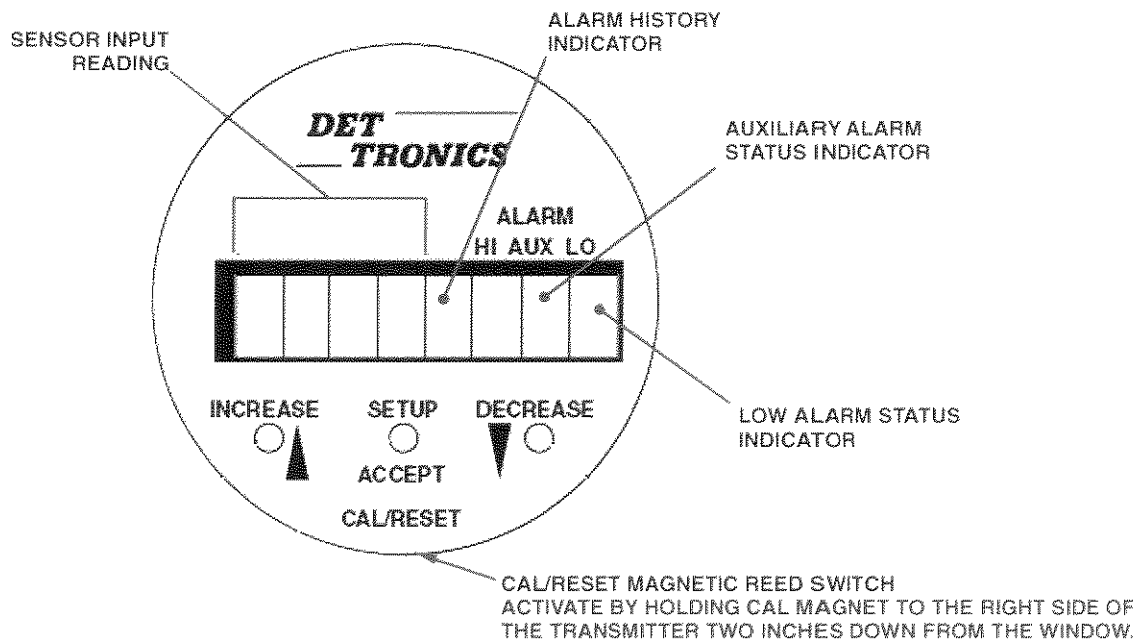


Figure 4-7. Gas Sensor Transmitter

**Operation and Maintenance Manual**
**Table 4-3. Gas Sensor Fault Messages**

Fault Message Display	Explanation and Corrective Action
Blank Display	EEPROM sumcheck failure. Cycle power to clear fault. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"COMPUTER" "FAILURE"	RAM or processor failure. Cycle power to clear fault. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"WDT" "FAILURE"	Watchdog timer failure. Cycle power to clear fault. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"EEPROM" "FAILURE"	Activate the Cal/Reset switch using the Cal Magnet, then perform Setup and Calibration procedures. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"EXT RSET" "PROBLEM"	External reset button has been activated for 15 seconds or longer. Self-clearing when button is released.
"24V P.S." "FAILURE"	External 24 volt power supply is not in the 15 to 32 volt range. Check and correct input voltage. During normal operating mode, this fault is self clearing when the fault is corrected. If fault occurs during warm-up or calibration modes, activate the Cal/Reset switch using the Cal Magnet.
"5V P.S." "FAILURE"	Internal 5 volt analog power supply is not in the 4.75 to 5.35 volt range. During normal operating mode, this fault is self clearing when the fault is corrected. If fault occurs during warm-up or calibration modes, activate the Cal/Reset switch using the Cal Magnet. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"SENSOR" "PROBLEM"	Sensor input fault. With 4 to 20 mA output sensors, the current output is below 2 mA or above 35 mA. In normal operating mode, the unit automatically goes through Warm-up when this fault clears. If this fault occurs at the end of the warm-up period or calibration procedure, recalibrate the sensor. If fault persists, contact Kidde Fire Trainers, Inc. Service Department.
"REPLACE" "SENSOR"	(In calibration mode) sensor is defective. Replace sensor and perform calibration procedure.
"CAL" "ABORTED"	(Cal Message) Time ran out while waiting for the gas reading to stabilize. Activate the Cal/Reset switch using the Cal Magnet.
"SENSOR" "E.O.L."	(Cal Message) Sensor reaching End Of Life. Consider replacement of the sensor in the next 1 or 2 calibrations.
"ZERO" "DRIFT"	Negative zero drift. Sensor input is -9% full scale or lower. Perform sensor calibration.

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**4.4.6 AGENT SENSOR ASSEMBLY ADJUSTMENT**

The agent sensor consists of a liquid proximity sensor, mounted on the agent collection hose. Agent sensors are installed for each of the Burn Room fireplaces. The rear fireplace agent sensor is located in the rear equipment room and the front agent sensor is located in an enclosure on the right side of the fireplace platform. The extinguishing agent sensors detect the application of water to the fireplace. Agent sensors are orientated so that water being applied to the fireplace will be collected and routed past the liquid proximity sensor. Each liquid proximity sensor is mounted on a clear polyvinyl tube, which in turn is attached to an elbow fitting within the enclosure. Adjustments are made by a combination of rotating the angle of the elbow (to increase/decrease drainage) and rotating the orientation of the clear tube (to increase/decrease sensitivity). If the proximity sensor is not properly aligned, it will affect wet agent detection and the fireplace will not respond properly.

If the proximity sensor is replaced, the new sensor must be aligned, as follows:

Refer to Figure 4-8

1. Rotate clear tube (clockwise or counterclockwise) so that the proximity sensor is orientated approximately midway (on the side wall) between the uppermost (least sensitive) and lowermost (most sensitive) positions.

Agent application response can be monitored at the agent sensor.

2. While someone is monitoring the agent sensor, apply water to the fireplace. As water passes the agent sensor the Yellow LED should come on and stay on while water passes the agent sensor. Rotate clear tube to move sensor closer to the lowermost position and increase water detection sensitivity.
3. Stop application of water. When water is no longer passing by the agent sensor the Yellow LED should go out. Rotate clear tube to move sensor further from the lowermost position and decrease water detection sensitivity.
4. Repeat steps 2 and 3, as necessary until the sensor detects water and the detection stops coinciding with the actual application and stoppage of water.

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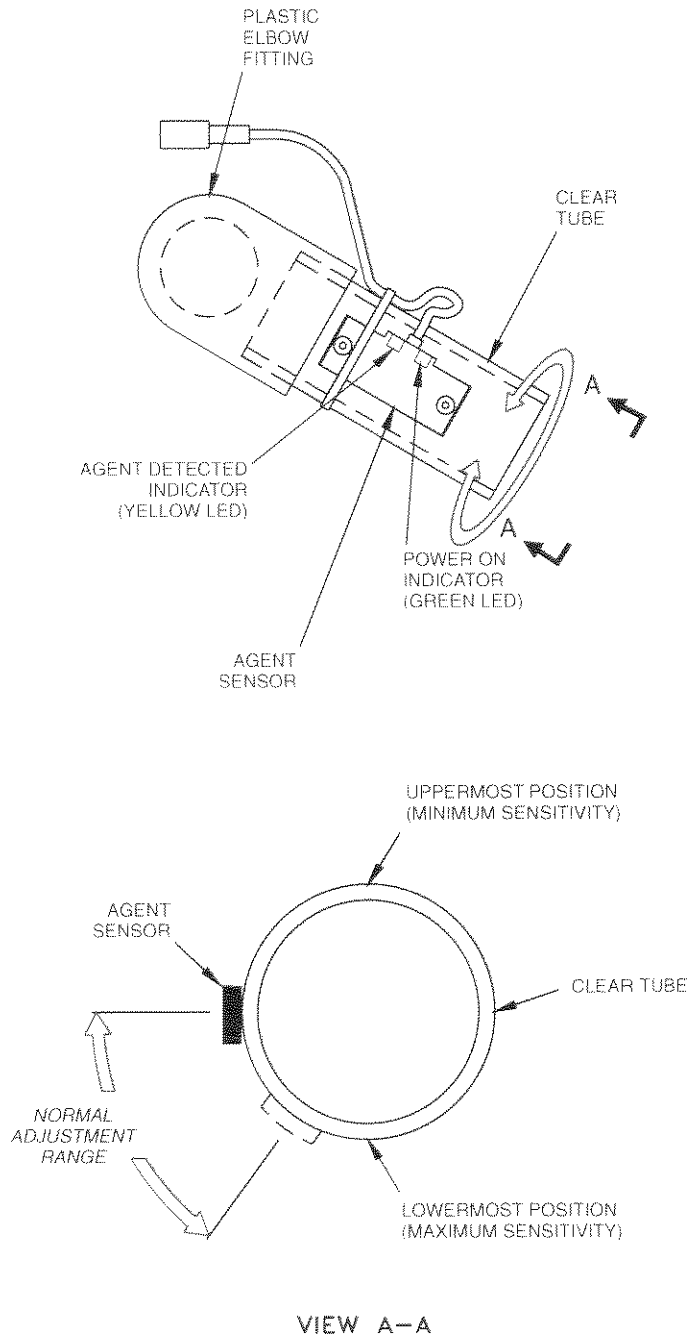


Figure 4-8. Agent Sensor Adjustment

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**4.4.7 Y-STRAINER SERVICING**

A Y-strainer is located on the propane tank manifold and at the input of the Rear fire Burner Control Assembly. The Y-strainer requires periodic cleaning, inspection, and if necessary replacement. Removal and replacement procedures are provided.

**Y-STRAINER FILTER REMOVAL.**

1. Secure ball valve directly up stream of Y-strainer.
2. Bleed gas out of line down stream of Y-strainer by operating the trainer.

**WARNING**

**DO NOT BLEED OFF UNBURNED GAS!**

3. Remove Y-strainer filter cover and discard gasket.
4. Remove filter element from Y-strainer body.

**Y-STRAINER FILTER REPLACEMENT.**

5. Clean filter element using a strong detergent, rinse thoroughly, and blow dry. Inspect cleaned element for damage to the screen and replace if necessary.
6. Carefully Install filter element in Y-strainer body.
7. Install new filter cover gasket.
8. Coat threads of end cap with thread sealant (approved for gas).
9. Install cover to Y-strainer body. By hand tighten cover, assuring that the filter element is in proper alignment and the cover sits flush to the Y-strainer body.

**CAUTION**

**IF YOU ARE UNABLE TO SEAT THE COVER FLUSH TO THE Y-STRAINER BODY BY HAND, STOP IMMEDIATELY. REMOVE THE COVER, RE-ALIGN THE FILTER ELEMENT AND REPEAT STEP 9.**

10. Tighten cover with wrench.
11. Open ball valve up stream of Y-strainer.
12. Leak test Y-Strainer. If there is a leak detected, secure ball valve directly up stream of Y-strainer. Repeat steps 9-11.

**WARNING**

**IF LEAK IS DETECTED, DO NOT OPERATE SYSTEM UNTIL LEAK IS ELIMINATED!**

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### **4.4.8 TOUCH SCREEN BATTERY REMOVAL AND REPLACEMENT**

The battery required for data backup in the event of a power failure will require replacement when the **BAT** Led on the front of the Controller is red. Follow the procedure below to replace the battery.


#### **CAUTION**

**DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE BATTERY WITH MODEL No. CR2430 (3V 270mA LITHIUM) NOT RECHARGEABLE. USING ANY OTHER BATTERY COULD RESULT IN AN UNSAFE CONDITION.**

#### **NOTE**

**REPLACING THE BATTERY WILL CAUSE THE LOSS OF THE DATA MAINTAINED BY THE BATTERY.**

Refer to Figure 4-9

1. Turn off the power to the panel.
2. Using a screwdriver loosen the four screws securing the battery holder to the back of the touch screen.
3. Remove the holder.
4. Remove the battery.
5. Replace battery with a new one (Model No. CR2430).
6. Reinstall battery holder and secure in place with the four mounting screws.
7. Apply power to the touch screen and check front of touch screen panel LED  indicator for good battery status.



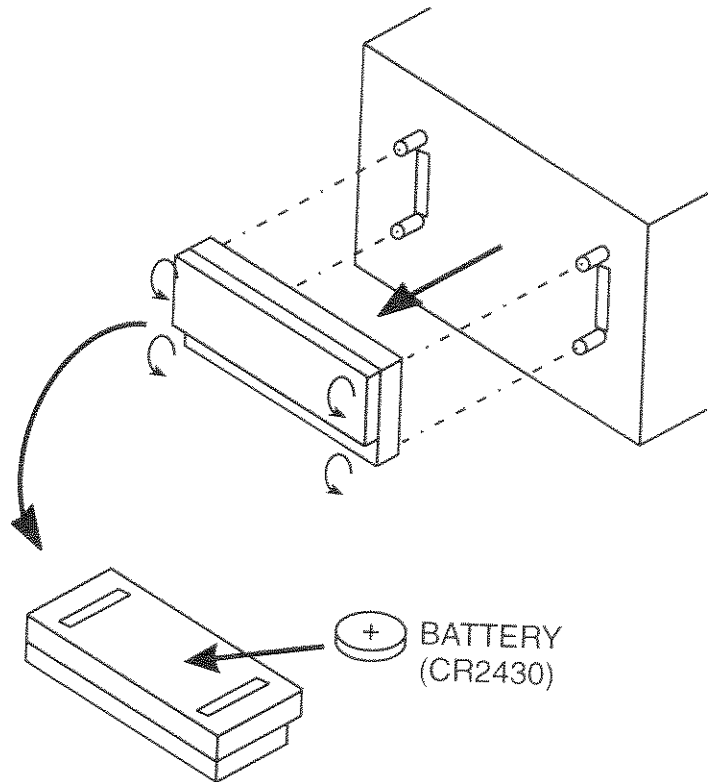


Figure 4-9. Touch Screen Battery Replacement

**ENTERING DATE/TIME.**

Replacing the battery will cause the loss of the current date and time. Reset the Date/Time as follows:

1. At Logon screen press anywhere on touch screen until the configuration screen appears (about 4 Sec.).
2. Using the arrow keys select the date field and set current date by using the up/down arrows and then enter.
3. Using the arrow keys select the time field and set current time by using the up/down arrows and then enter.
4. Use the ESC key to return to logon screen.

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**4.4.9 PERIPHERAL EQUIPMENT PERIODIC SERVICING**

- Generator
- Winch
- Concept Smoke Generator and Smoke Distribution Fan
- Trailer
- Ventilation Fan
- Sound System

**NOTE**

FOR SERVICING INFORMATION REFER TO THE APPROPRIATE INFORMATION, LOCATED IN SECTION 7 OF THIS MAINTENANCE MANUAL.

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## 5.0

# TROUBLESHOOTING

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### 5.1 INTRODUCTION

This section provides troubleshooting information to assist operators in isolating minor problems. Included are discussions on troubleshooting philosophy and troubleshooting guidelines, and since this trainer uses propane and high voltages, a safety discussion is included in Section 1 of this manual.

### 5.2 TROUBLESHOOTING PHILOSOPHY

The troubleshooting philosophy is based on discovery of equipment malfunctions during operation or testing. As a result, malfunctions are normally detected by the operator. Malfunctions reflect the failure of trainer equipment to respond correctly to operator or trainee induced stimuli.

The troubleshooting procedures in this section are for a qualified maintenance technician that is experienced in electronic and propane gas systems. As a minimum, the technician must be thoroughly familiar with the operation and troubleshooting of this trainer.

### 5.3 TROUBLESHOOTING GUIDELINES

#### 5.3.1 MALFUNCTION DETECTION

When a malfunction is detected, the characteristics of that malfunction must be carefully identified. In addition, the specific mode of trainer operation must be identified. Careful attention to the exact nature of the malfunction and under what conditions it occurred must be noted. This information enables the maintenance technician to accurately reproduce the malfunction and troubleshooting the fault.

Fault isolation is provided for **displayed malfunctions** and **observed malfunctions**. Displayed malfunctions are detected by the system's evaluation of feedback and status signals. Feedback and status signals are analyzed by the processor to determine if a system malfunction had occurred. In the event a system malfunction or a trainer shutdown (due to unsafe conditions) occurs, an appropriate display message is generated and displayed at the touch screen display (located on the I/O Rack Enclosure Assembly). The displayed malfunctions are listed in table 5-1. This table has two columns, the first column has the displayed message, and the second column has a description of what the displayed message means and the most probable causes of the fault.

Observed malfunctions are noticed by the operator or maintenance technician during normal system operation or testing. The observed malfunctions are listed in table 5-2. This table has three columns; symptom, cause, and remedy. The symptom column lists the observed malfunction. The cause column lists one or more probable causes for the particular symptom. When multiple causes are given, they are listed in most probable order first. The remedy column specific steps to identify the malfunctioning component and/or provides the corrective action to be taken.

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### **5.3.2 TROUBLESHOOTING ORDER**

The troubleshooting of electrical components should be accomplished first. Before an electrical component is replaced the wiring should be checked first to ensure the associated power and signals are getting to and from the component. Only when electrical components are functioning correctly should gas components be suspected.

### **5.4 SAFETY**

Troubleshooting the trainer exposes the technician to conditions that require a conscientious approach to safety. The trainer uses high voltages and propane gas. In addition, trainer operation produces a damp environment with wet equipment and surrounding areas. When troubleshooting electrical problems, if propane gas is not required, shut off the supply. When troubleshooting propane gas problems remove electrical power if not required. Prior to troubleshooting the trainer, review the following precautions:



#### **WARNING**

- IF GAS LEAKS ARE DETECTED, THEY MUST BE REPAIRED FIRST. UNDER NO CIRCUMSTANCE IS TRAINER OPERATION OR TROUBLESHOOTING TO BE PERFORMED WHEN A LEAK IS DETECTED.
- EXPLOSIVE GAS IS USED IN THIS TRAINER THAT, WHEN IGNITED, COULD CAUSE INJURY TO PERSONNEL. KEEP FLAMES AND SPARK GENERATING EQUIPMENT AWAY FROM GAS COMPONENTS.
- ENSURE GAS SUPPLY LINE VALVE IS CLOSED PRIOR TO OPENING ANY LINES. TAG VALVE TO ALERT OTHER PERSONNEL THAT SERVICE IS BEING PERFORMED.
- HIGH VOLTAGES CAPABLE OF CAUSING DEATH ARE USED IN THE TRAINER. USE EXTREME CARE WHEN TROUBLESHOOTING THE EQUIPMENT.
- TROUBLESHOOTING SHOULD NOT BE PERFORMED UNLESS AT LEAST TWO PERSONS ARE PRESENT.

**Operation and Maintenance Manual**
**Table 5-1. Displayed Messages**

Displayed Message	Description/Remedy
CONTROL PANEL EMERGENCY STOP PRESSED	Indicates an emergency shutdown of the system was initiated from the emergency shutdown switch on the I/O Rack Enclosure Assembly.
< E-STOP SWITCH NAME> EMERGENCY STOP PRESSED	Indicates emergency shutdown of the system was initiated from one of the Burn Room emergency shutdown switches or the Control Console emergency shutdown switch.
HIGH GAS PRESSURE LOCKOUT	<p>This indicates that the high pressure switch on a fireplace BCA is indicating that the gas pressure has reached the upper preset limit. All fireplace operation is disabled until condition is corrected.</p> <p>When the gas pressure level has fallen to normal levels the system will automatically reset. If the gas pressure level does not fall to normal levels, Refer to Section 4, paragraph 4.4.9. for the High Gas Pressure Alarm Restart procedure.</p>
REAR FIREPLACE HIGH TEMPERATURE SHUTDOWN	Indicates compartment temperature has exceeded preset temperature setpoint. Ventilation is initiated and the trainer is shutdown.
REAR FIREPLACE HIGH VALVE FAILED TO CLOSE	<p>The Rear fireplace high valve is not functioning properly. The system is not receiving the required proof of closure feedback. Check if high valve relay is receiving an energizing signal causing it to remain energized. Replace relay as required.</p> <p>Check to see if high valve relay contacts are stuck closed. This would keep power on the high solenoid valve holding the valve open thereby opening the proof of closure switch. Replace relay as required.</p> <p>Check the proof of closure switch, and replace as required.</p> <p>If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
REAR FIREPLACE HIGH VALVE FAILED TO OPEN	<p>The Rear fireplace high valve is not functioning properly. High valve relay or solenoid valve is faulty. Also proof of closure switch on valve may be faulty.</p> <p>Check and replace as required. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
REAR FIREPLACE LOW VALVE FAILED TO CLOSE	<p>The Rear fireplace low valve is not functioning properly. The system is not receiving the required proof of closure feedback. Check if low valve relay is receiving an energizing signal causing it to remain energized. Replace low valve relay as required.</p> <p>Check to see if low valve relay contacts are stuck closed. This would keep power on the low solenoid valve holding the valve open thereby opening the proof of closure switch. Replace low valve relay as required.</p> <p>Check the proof of closure switch, and replace as required.</p> <p>If the message continues to be displayed, contact the Kidde Fire Trainers, Inc.</p>

**Operation and Maintenance Manual**
**Table 5-1. Displayed Messages**

Displayed Message	Description/Remedy
REAR FIREPLACE LOW VALVE FAILED TO OPEN	<p>The Rear fireplace low valve is not functioning properly.</p> <p>Low valve relay, or low solenoid valve is faulty. Also proof of closure switch on valve may be faulty.</p> <p>Check and replace as required. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
REAR FIREPLACE AGENT LOCK-ON	<p>Indicates the rear fireplace wet agent sensor is always on (locked-on). If the wet agent detector status LED is lit without wet agent being applied, inspect the drain and piping for a clog that may be causing wet agent buildup around the wet agent sensor. If there is no wet agent buildup, readjust the sensitivity of the wet agent sensor. If readjustment of the wet agent sensor does not correct the problem, remove the wet agent sensor and clean the sensing face. If agent detection lock-on is still a problem, replace the wet agent sensor.</p>
REAR FIREPLACE MAIN LOCK-OUT-ROOM TOO HOT	<p>Rear fireplace is locked out. The compartment temperature must be lowered by cooling the compartment with water spray.</p>
REAR FIREPLACE MAIN TIME-OUT	<p>Indicates the Rear fireplace has been in the main flame mode for the maximum time allowable without the application of agent and the fireplace automatically shut down</p>
REAR FIREPLACE PILOT AIRFLOW FAILURE	<p>The Rear fireplace pilot is not functioning properly. The system is not receiving the required pilot airflow proved feedback.</p> <p>Pilot airflow switch did not sense enough airflow. Make sure that the blower is operating, and the pilot air proved switch is closed when the system is ENABLED. If not, check the in line connector to the blower and verify the presence of 120VAC. Check the butterfly valve attached to the outlet of the pilot air blower to ensure it is open, and power is applied to the blower motor.</p>
REAR FIREPLACE PILOT FAILED TO PROVE	<p>The Rear fireplace pilot is not functioning properly. The system is not receiving the required pilot proved feedback.</p> <p>First visually verify the presence of flame at the mockup pilot nozzle. If flame is present, contact Kidde Fire Trainers, Inc.</p> <p>If flame is not present:</p> <p>Check Pilot Air Blower and associated Pilot Air Proved switch, replace as required.</p> <p>Check wiring from igniter unit to spark plug and flame rod in pilot burner head. Replace wiring, spark plug, pilot flame rod, or igniter unit as required.</p> <p>Check Extended Pilot Thermocouple and wiring. Replace as required.</p> <p>Check the Pilot Gas Valve to ensure it is open, and replace as required.</p> <p>If all these conditions are satisfied and pilot failures continue, contact Kidde Fire Trainers, Inc.</p>

**Operation and Maintenance Manual**
**Table 5-1. Displayed Messages**

<b>Displayed Message</b>	<b>Description/Remedy</b>
<b>REAR FIREPLACE PILOT FAILED TO HEAT UP</b>	<p>The Rear fireplace pilot is not functioning properly. The system is not receiving the required pilot temperature feedback.</p> <p>This is an indication that the flame leaving the pilot nozzle is of insufficient size or temperature to ensure positive combustion of the fuel gas being released from the main burner elements. This is normal for the first pilot trial of the training day. If the situation continues, visually verify the presence of flame coming out of the nozzle in the training compartment. If the pilot flame is of adequate length to reach the main burners, check that Extended Pilot Thermocouple is directly in the path of the pilot flame. Bend as required to position it directly in the flame. If the flame appears adequate, and the probe is directly in the flame, replace Extended Pilot Thermocouple. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
<b>REAR FIREPLACE PILOT LOCKED ON</b>	<p>The Rear fireplace pilot is not functioning properly.</p> <p>First visually verify presence of flame at the mockup pilot nozzle. If flame is not present, contact Kidde Fire Trainers, Inc.</p> <p>If flame is present, check that pilot gas solenoid valve is not stuck open or the igniter unit is faulty. If the situation continues contact Kidde Fire Trainers, Inc.</p>
<b>REAR FIREPLACE PILOT LOCKOUT-PILOT TOO HOT</b>	<p>The Rear fireplace pilot is not functioning properly. The system is receiving the excessive pilot temperature feedback when pilot is off.</p> <p>This is an indication that the airstream leaving the pilot nozzle remained at an elevated temperature for an extended period after the pilot had been turned off. This condition may occur if the mockup was not cooled off adequately. Verify that the message is not displayed when the pilot nozzle is included in the post-scenario flushing/cooling exercises.</p> <p>If the message still appears, replace Extended Pilot Thermocouple. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
<b>REAR FIREPLACE PILOT LOCKOUT-VALVE OPENED</b>	<p>Indicates a main valve was open when the PILOT button was pushed.</p>
<b>REAR FIREPLACE PILOT TIME-OUT</b>	<p>Indicates the Rear fireplace has reached the maximum time allowable in the pilot mode and the fireplace automatically shut down.</p>
<b>REAR FIREPLACE SAFETY VALVE FAILED TO CLOSE</b>	<p>The BCA safety shutoff valve is not functioning properly.</p> <p>The proof of closure switch is in conflict with the current position of the valve. The valve proof of closure switch is in an incorrect position. Feedback indicates open when commanded closed.</p> <p>The position of the switch can be seen by looking below the valve. Normally this valve will not fail open. If this occurs, it usually indicates that the switch is out of adjustment. More likely, the valve is failing to open. If this occurs, make sure that the in-line connector to the valve is secure. Measure the voltage at the female side of the in line connector and make sure that you see a transition from 0 to 120 VAC momentarily when you turn the fireplace from OFF to ON using the ON/OFF button on the pendant.</p>

**Operation and Maintenance Manual**
**Table 5-1. Displayed Messages**

Displayed Message	Description/Remedy
REAR FIREPLACE SAFETY VALVE FAILED TO OPEN	<p>The BCA safety shutoff valve is not functioning properly.</p> <p>The proof of closure switch is in conflict with the current position of the valve. The valve proof of closure switch is in an incorrect position. Feedback indicates closed when commanded open.</p> <p>The position of the switch can be seen by looking below the valve. Normally this valve will not fail open. If this occurs, it usually indicates that the switch is out of adjustment. More likely, the valve is failing to open. If this occurs, make sure the in-line connector to the valve is secure. Measure voltage at female side of in line connector and make sure you see a transition from 0 to 120 VAC momentarily when you turn the fireplace from OFF to ON using the ON/OFF button on pendant.</p>
REAR FIREPLACE COMBUSTION BLOWER FAILURE	<p>The equipment room combustion blower is not functioning properly. The system is not receiving the required proof of operation.</p> <p>Check if combustion blower is operating. If not, check for power to combustion blower and repair wiring as required, or replace combustion if necessary.</p> <p>If combustion blower is operating, suspect faulty current sensor CSR2 in the I/O Rack Enclosure Assembly.</p>
REAR HIGH PROPANE SHUTDOWN	<p>Indicates propane gas levels have reached LEL gas level greater than 25% and initiated an emergency shutdown. Ventilation fan will remain on until the LEL level has dropped below 25% and then remain on for a further 30 seconds before automatically turning off.</p>
REAR FLASHOVER PILOT FAILED TO HEAT	<p>The Rear flashover pilot is not functioning properly. The system is not receiving the required pilot temperature feedback.</p> <p>This is an indication that the flame leaving the pilot nozzle is insufficient size or temperature to ensure positive combustion of fuel gas being released from main burner elements. This is normal for first pilot trial of the training day. If situation continues, visually verify presence of flame coming out of nozzle in training compartment. If pilot flame is of adequate length to reach main burners, check that Flashover Pilot Proved Thermocouple is directly in path of pilot flame. Bend as required to position it directly in flame. If the flame appears adequate, and probe is directly in flame, replace Flashover Pilot Proved Thermocouple. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>
REAR FLASHOVER PILOT TOO HOT	<p>The Rear flashover pilot is not functioning properly. The system is receiving excessive pilot temperature feedback when the pilot is off.</p> <p>This is an indication that the airstream leaving the pilot nozzle remained at an elevated temperature for an extended period after the pilot had been turned off. This condition may occur if the mockup was not cooled off adequately. Verify that the message is not displayed when the pilot nozzle is included in the post-scenario flushing/cooling exercises.</p> <p>If the message still appears, replace Flashover Pilot Proved Thermocouple. If the message continues to be displayed, contact Kidde Fire Trainers, Inc.</p>

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this manual.



**Operation and Maintenance Manual**
**Table 5-1. Displayed Messages**





Displayed Message	Description/Remedy
<b>REAR FLASHOVER VALVE FAILED TO CLOSE</b>	<p>The Rear flashover effect gas release valve is not functioning properly. The system is not receiving the required proof of closure feedback. Check if flashover valve relay is receiving an energizing signal causing it to remain energized. Replace flashover valve relay as required.</p> <p>Check to see if flashover valve relay contacts are stuck closed. This would keep power on the flashover solenoid valve holding the valve open thereby opening the proof of closure switch. Replace flashover valve relay as required.</p> <p>Check the proof of closure switch, and replace as required.</p> <p>If the message continues to be displayed, contact the training system supplier.</p>
<b>REAR FLASHOVER VALVE FAILED TO OPEN</b>	<p>Rear flashover effect gas release valve not functioning properly. Flashover valve relay or flashover solenoid valve is faulty. Also proof of closure switch on valve may be faulty.</p> <p>Check and replace as required.</p>
<b>PENDANT EMERGENCY STOP</b>	<p>Indicates an emergency shutdown of the system was initiated from the control pendant emergency shutdown switch.</p>
<b>VENT FAN FAILURE</b>	<p>The ventilation fan is not functioning properly.</p> <p>The current sensor feedback is in conflict with the commanded state of the fan.</p> <p>This is an indication that the ventilation system is in one of the following states:</p> <ol style="list-style-type: none"> <li>1. Not operating when commanded to do so by the training system: Make sure that all breakers and disconnect switch in the ventilation system are in the proper position. Verify the presence of airflow through the ventilation system at the system outlet.</li> <li>2. Operating when not commanded to do so by the training system: Check for faulty relay in magnetic motor starter assembly.</li> </ol>
<b>PROPANE DETECTORS SPAN CHECK REQUIRED</b>	<p>Indicates propane gas sensors require a Propane Span Check. This check verifies the calibration of the gas sensors. All fireplace operation is disabled until the required Propane Span Check has been successfully completed.</p>

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**Table 5-2. Observed Faults**

Observed Fault	Cause	Remedy
No power when SYSTEM POWER keyswitch is turned to ON.	1. Circuit breaker(s) not set.	1. Reset associated breaker(s) in circuit breaker panel.
	2. Faulty Keyswitch KS1, or faulty 24vdc Power Supply PS1.	2. Check for 24 VDC at TB1-1 and ground in I/O Rack Enclosure. If voltage is not present replace power supply. If voltage is present, check for voltage at switch KS1. Replace switch if no voltage is present.
Indicator lights on Control Pendant do not operate correctly.	1. Faulty lamps.	1. Replace lamp. If Fault remains contact Kidde Fire Trainers, Inc.
Switches on Control Pendant do not operate correctly.	Faulty switches.	Check for 24 VDC at switch output. If voltage is not present, replace switch. If voltage is present, contact Kidde Fire Trainers, Inc.
Emergency shutdown occurs although no switch was activated.	1. Excess fuel gas levels were detected.	1. Allow ventilation cycle to complete, check for fuel gas leaks, and repair as required.
	2. High compartment temperature was detected.	2. Allow ventilation cycle to complete, and cool down training compartment with water spray.
	3. Faulty wiring, and/or loose connections.	3. Carefully check wiring, and connections for E-Stop switch.
	4. Faulty I/O card.	4. Measure for 24 VDC between TB1-1 and 24V RTN at the I/O rack enclosure. If 24 VDC is measured, replace I/O card. If 24 VDC is not measured, replace emergency shutdown switch.

**Operation and Maintenance Manual**
**Table 5-2. Observed Faults**

Observed Fault	Cause	Remedy
No smoke output	Refer to Concept Smoke Generator Manual in Section 7.	
Poor smoke quality	Refer to Concept Smoke Generator Manual in Section 7.	
Water is applied but not detected, or water is detected, when no water is being applied.	Agent Detection Sensor faulty.	<p>This usually means there is some foreign material in the sensing path of the water detector. Flush sensor and collection tube making sure to keep sensor at same angle as it was before cleaning.</p> <p>Agent application response can be monitored at any of the following locations:</p> <ul style="list-style-type: none"> <li>• On the Agent sensor, LED comes on bright when water is applied and goes off when water is no longer applied.</li> <li>• On the corresponding I/O module, the status indicator light comes on when water is applied and goes off when water is no longer applied.</li> </ul> <p>If problem persists, perform a Proximity switch adjustment (refer to Section 4 of this manual). If problem persists, contact Kidde Fire Trainers, Inc.</p>
Winch does not operate.	1. Winch pendant is not connected to winch.	1. Be sure the end of the winch pendant is connected to the winch. Refer to Section 3 of this manual.
	2. Circuit breaker not set.	2. Be sure the circuit breaker is set. The circuit breaker is located in the enclosure, on the front of the trainer.
	3. Battery is dead.	3. Check battery voltage, charge if required.
Touch Screen  Red LED Blinks	1. Touch Screen Battery is Low	1. Replace Battery. Refer to Section 4 of this manual for procedure
Touch Screen  Red LED is On	1. Touch Screen Hardware Fault	1. Reset Trainer System by turning the <b>SYSTEM POWER</b> key switch, on the I/O Enclosure to the OFF position. Wait about five minutes, and then turn <b>SYSTEM POWER</b> key switch to the ON position.
Touch Screen  Green LED is Off	1. Touch Screen power Hardware Fault	1. Check power cable connection at back of Touch Screen
Touch Screen  Green LED Blinks	1. Touch Screen lost Communication w/ PLC	1. Check PLC Port cable connection at back of Touch Screen, and at I/O Enclosure

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**PERIPHERAL EQUIPMENT TROUBLESHOOTING**

- Electric Winch
- Generator
- Concept Smoke Generator and Distribution fan.
- Trailer
- Ventilation Fan

**NOTE**

FOR TROUBLESHOOTING REFER TO THE APPROPRIATE INFORMATION, LOCATED IN SECTION 7 OF THIS MAINTENANCE MANUAL.