Chapter 2
Safety

This chapter contains safety guidelines for operating and maintaining the bundler. It describes the safety hazard warnings and cautions included throughout this manual, lists safe practices to observe when operating or working on the machine, and describes all machine safety devices. Read this chapter before attempting to operate the bundler.

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2.1 Operator Safety Responsibilities

Operators and maintenance personnel must take the following general safety precautions when operating and maintaining the equipment:

- Read and understand the contents of this manual before attempting to operate the equipment in the work area.
- Be familiar with all safety procedures and safety devices.
- Know the location of all emergency stops (E-stops).
- Report all unsafe conditions, equipment, and damaged or inoperable safety devices.
- Read all accident prevention signs and tags carefully, and follow any instructions on them.
- Lock out and tag electrical, pneumatic, and mechanical energy before servicing any equipment.
- Use the right tools for the job, and use only tools that are in good condition.
- Store all tools in their proper location after using them.
- Keep the work area clean and free of tools, equipment, dust, and debris.
- Obtain authorized approval before changing or modifying standard operating procedures.
- Notify the appropriate personnel before crossing a safety barrier.

2.2 Safety Hazard Warnings and Cautions

Safety hazard warnings and cautions are included throughout this manual. Each safety hazard warning and caution includes one of the following signal words: DANGER, WARNING, or CAUTION. Signal words are used to draw attention to a safety hazard, to convey the immediacy and severity of the hazard, and to caution against unsafe practices. Accident prevention signs on the equipment also use these same signal words.

- The word DANGER identifies an immediate safety hazard that presents a risk of severe injury or death.
- The word WARNING identifies a potential safety hazard that presents a risk of severe injury.
- The word CAUTION identifies a potential safety hazard that presents a risk of minor injury or property damage.

Each safety hazard warning and caution is accompanied by a pictograph. The pictographs used in this manual are described below.

DANGER, WARNING, or CAUTION

This pictograph denotes a safety hazard warning or caution that is not identified by any of the following pictographs.

DANGER – High Voltage

This pictograph denotes a high voltage hazard. Accidental contact with energized, high-voltage electrical components will cause electrical shock, resulting in severe injury or death.

WARNING – Pinch Point

This pictograph denotes a machinery pinch point hazard. Moving machinery components can create pinch points. Fingers, hands, hair, and loose clothing can become caught accidentally in machinery pinch points and be pulled into the machine, causing severe injury.

WARNING – Sharp Components

This pictograph denotes a sharp machinery component hazard. Accidental contact with sharp machinery components could cause severe injury.

WARNING – Hot Components or Materials

This pictograph denotes a hot machinery component or materials hazard. Accidental contact with hot machine components or packaging materials could cause severe burns.

WARNING – Automatic Startup

This pictograph denotes an automatic machinery startup hazard. The equipment starts or cycles automatically any time product is present and the equipment is ready to run. The unexpected movement of machinery components at startup could cause severe injury to personnel working on or near the equipment.

WARNING – Heavy Materials

This pictograph denotes a heavy machinery component, product, or materials hazard. Attempting to lift or move heavy equipment, machine components, product, or materials improperly or without assistance could cause severe injury.

WARNING – Lock Out Energy Sources

This pictograph denotes an energy hazard. The specified equipment or machinery must be locked out before performing any adjustments, maintenance, repairs, or other work, when energizing or starting the equipment or machinery, or the unexpected movement of machinery components, could cause injury to personnel or damage to the equipment.

2.3 Safety Hazards

This section lists specific safety hazards and applicable safety precautions and instructions.

2.3.1 General Safety Precautions

The following general safety precautions must be observed at all times:

- Read and understand the contents of this manual before attempting to operate the equipment.
- Be familiar with all safety procedures and safety devices.
- Disconnect, lock out, and tag electrical power and air pressure before performing maintenance or repairs. Refer to local policies and procedures for specific lockout instructions.
- Ensure that all personnel are clear of the equipment before starting it.

2.3.2 Specific Safety Hazards

DANGER – High Voltage

Hazardous voltages inside the main electrical cabinet, and in all parts of the electrical system, create the risk of electrical shock. Accidental contact with energized, high-voltage electrical components will result in serious injury or death. Take the following precautions to avoid accidental contact by yourself and others with energized, high-voltage electrical components:

- Do not open the main electrical cabinet during normal operation of the bundler.
- Be aware that residual or control voltages might still be present in some electrical components after primary power has been disconnected.
- Ensure that electrical components are de-energized before servicing the equipment or performing maintenance if there is a risk of electrical shock. Shut down the equipment, lock out electrical power, and tag the main electrical disconnect switch.
- Before performing maintenance on the electrical system, discharge all electrical capacitors, and test all electrical circuits, to ensure that they are de-energized. An electrical component failure could energize the equipment even if the disconnect switch is in the OFF (0) position.

- Comply with all applicable safety instructions and plant electrical safety policies and procedures.
- Notify Maintenance immediately of damaged or frayed wiring, or of any damage to other electrical system components.
- Use extreme caution when working inside an electrical panel, cabinet, enclosure, or junction box.

WARNING – Pinch Points

Moving machinery components can create pinch points and other hazards. Pinch points can trap hands and fingers, causing severe injury. Long hair, jewelry, and loose clothing can also be caught in pinch points and pulled into the machine. The following components on the EDL Bundler create pinch points:

- Conveyor belt drive rollers, drive chains, and sprockets
- Distribution rollers
- Pusher assemblies
- Pack clamps
- Clamp jaws
- Film feed assembly rollers and stretch brakes
- Hinged safety guard and electrical cabinet doors

Take the following precautions to protect yourself and others against moving machinery hazards:

- Ensure that all safety guards are in place and secured properly before operating the bundler.
- Keep hands and fingers, tools, equipment, and clothing away from moving machinery components.
- Know the location of all emergency stop buttons before operating the bundler. Pressing an emergency stop button stops the bundler immediately.
- Do not remove safety guards or bypass safety interlock switches to clear jams or adjust machine components while the bundler is in operation.
- Do not remove fixed guards unless the bundler has been shut down and main electrical power has been locked out.

- Before servicing or adjusting the bundler, lock out all energy sources, and tag the energy isolation device, to prevent the unexpected startup, energization, or release of stored or residual energy.
- Use extreme caution when performing maintenance or adjustment procedures that require electrical or pneumatic power to be on, or that require cycling the bundler.
- Wear appropriate attire and required personal protective equipment while working on or around the bundler.
- Do not climb over or crawl under the conveyors when the power is on.
- Ensure that all personnel are clear of the bundler before starting it; before jogging, cycling, or moving machine components; and before activating any controls.

WARNING – Sharp Components

The bottom clamp jaws in the sealer #1 and #2 assemblies are equipped with extremely sharp, hot knife blades. Accidentally touching the blades could result in severe cuts.

Use caution to avoid accidentally touching the knife blade when working in this area, and wear protective gloves when removing, installing, and cleaning the knife blade.

WARNING – Hot Components and Material

The heat tunnel operates at extremely high temperatures. Accidentally touching hot heat tunnel components or hot film can cause severe burns. Take the following precautions to avoid being burned by hot heat tunnel components or film, and to avoid burning the bundles.

- Do not touch heat tunnel components or reach into the tunnel unless it has cooled to a safe temperature.
- Be careful when working near hot (knives) clamp jaws.
- Wear protective gloves if removing shrink-wrapped bundles from the tunnel, or handling them as they exit the tunnel.
- If the film is not forming around the bundle properly, do not slow the speed of the heat tunnel conveyor below the minimum setpoint speed. Bundles that remain inside the heat tunnel too long could catch on fire.

WARNING – Automatic Startup/Cycling

When in the Run mode, the bundler will start or cycle any time product is present and the equipment is ready to run. The unexpected movement of machinery components when the machine cycles can result in severe injury to personnel who are not clear of the equipment. The green light on the light tower indicates that the bundler is in the Run mode.

Stay clear of moving components when the bundler is idle and awaiting product. Shut down the bundler before approaching or entering hazardous areas of the machine. Disconnect and lock out electrical power and air as necessary.

WARNING – Heavy Materials

Large film rolls are heavy. Careless or improper handling can cause serious injury.

Use caution and proper lifting techniques when moving and handling film rolls. If necessary, use a cart, dolly, or hoist to lift or move film rolls, or transport them to the bundler. Obtain assistance if necessary.

2.3.3 Accident Prevention Signs

Accident prevention signs that identify and describe hazardous or potentially hazardous conditions, equipment, or operations are posted permanently on the bundler. They are designed to call attention to the hazard, and include warning information or specific safety hazard instructions. Accident prevention signs must be kept clean, and any damaged or missing signs must be replaced.

Figure 2-1

Accident Prevention Signs.

2.4 Safety Devices

This section describes the safety devices on the EDL Bundler. The bundler is equipped with emergency stop buttons, energy isolation devices, and safety guards.

2.4.1 Emergency Stop Buttons

Emergency stop (E-Stop) buttons are used in an emergency to shut down the equipment immediately. Pressing an emergency stop button will disconnect electrical power from all bundler motors and will activate the electrical air dump valve, causing the bundler to shut down immediately without regard to the position or timing of the components. An emergency stop button that has been pressed will light red until it has been reset.

Figure 2-2

E-STOP Button on Auxiliary Panel

2.4.1.1 Resetting an Emergency Stop Button

An emergency stop button that has been pressed lights red until it is reset (pulled back out to its home position). The bundler cannot be restarted until all emergency stop buttons have been reset.

> **NOTE: Resetting the emergency stop buttons will not restart the bundler. The bundler can only be restarted from the control panel after all faults have been corrected and all emergency stop buttons have been reset.**

2.4.1.2 Emergency Stop Button Locations

The bundler is equipped with two emergency stop buttons. They are located as follows:

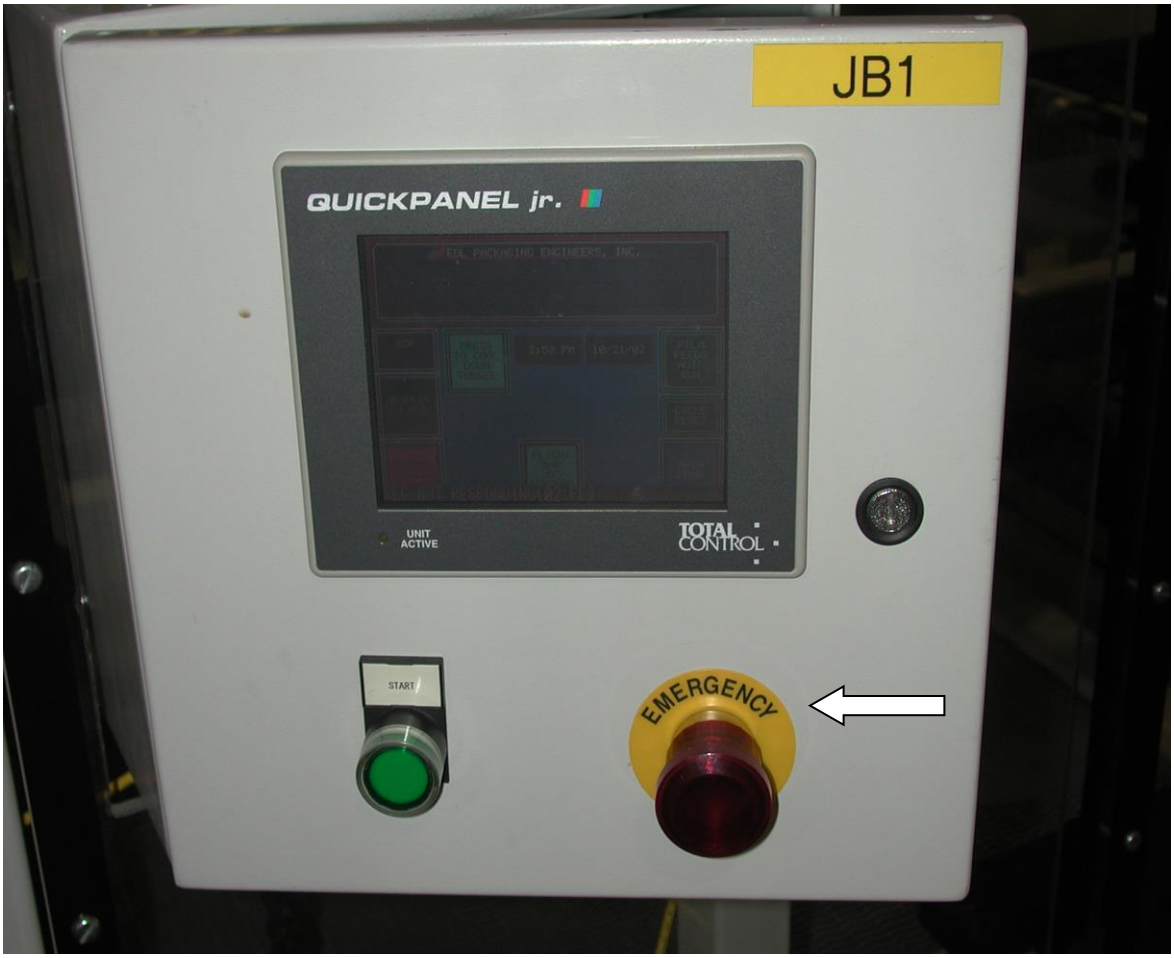

Figure 2-3

E-Stop Button Main Operator Panel

Figure 2-4

E-Stop Button Auxiliary Operator Panel

2.4.2 Energy Isolation Devices

2.4.2.1 Electrical Disconnect Lever

The electrical disconnect lever, located on the main electrical cabinet, controls the flow of electrical power (480 VAC, 120 VAC, and 24 VDC) to the equipment. The disconnect lever supplies electrical power to the equipment when in the ON (1) position and disconnects electrical power when moved to the OFF(0) position. When in the OFF(0) position, a lock can be attached to the disconnect lever to prevent unexpected bundler startup or energization while servicing, adjusting, or maintaining the machine.

Figure 2-5

Main Electrical Cabinet

Figure 2-6

Electrical Disconnect Lever with Safety Lock Out.

2.4.2.2 *Air Disconnect and Dump Valves*

The air disconnect valve is a valve located upstream of the air pressure regulator. When the valve handle is moved to the closed position, it removes air pressure to the bundler. Stored air pressure inside the pneumatic lines must be released manually. The bundler is equipped with both an electrically- and manually operated dump valves that relieves all stored air pressure within the pneumatic system. The bundler is also equipped with a low air pressure sensor that detects low air pressure in the pneumatic system. If low air pressure is detected, the bundler stops, and an alarm signal is generated.

The pack clamp solenoids are equipped with air operated check valves to hold the pack clamps in the up position when the air is dumped

Air Valve Lock Out Lever

Figure 2-7

Air Disconnect Valve and Associated Regulator.

2.4.2.3 Lockout

Energy sources must be locked out and/or the energy isolation device tagged in order to prevent the unexpected startup, energization, or release of stored or residual energy while servicing, adjusting, or maintaining the equipment. Lock out and/or tag applicable energy isolation devices if:

- Production personnel must either remove or bypass machine guards or other safety devices, resulting in exposure to hazards at the point of operation.
- Production personnel are required to place any part of their body in contact with the point of operation.
- Production personnel are required to place any part of their body into a danger zone associated with a machine operating cycle.

WARNING – Lock Out All Energy Sources

Shut down the bundler, lock out main electrical power and air, and release air pressure from the machine before performing adjustments, maintenance, or other tasks if unexpected equipment startup, energization, or the release of stored or residual energy could cause injury to personnel or damage to the equipment. Refer to local policies and procedures for specific lockout and tagout instructions.

Figure 2-8

Electrical Disconnect Lever With Lock Out Applied.

2.4.3 Machine Guarding

2.4.3.1 Safety Guards

Safety guards protect moving machinery components, and prevent personnel from intentionally or instinctively reaching into hazardous areas of the machine or coming into contact with hot, sharp, or moving components. They are mounted in front of, over, or around moving machinery components and hazardous areas of the equipment. All safety guards must be installed, closed, and properly secured before operating the bundler. Replace any cracked or broken guards immediately.

Safety guards on the bundler are of two basic types: fixed guards and interlocked guards. Fixed guards are attached to the machine permanently, and cannot be removed without the use of tools. Fixed guards are not normally removed from the machine, except for maintenance. Interlocked safety guards provide access to the inside of the bundler, and are equipped with switches that prevent access to the machine while it is in operation by causing it to shut down immediately if the guard door is opened or removed. The bundler will not cycle, and cannot be restarted until all interlocked safety guard doors are closed and properly secured.

Opening an interlocked guard door will activate the electrical air dump valve and disconnect electrical power from all machine motors, except the motors that run the heat tunnel conveyor and fan. These motors will continue to run so that any bundles that are inside the heat tunnel when a guard door is opened will be discharged and cooled.

2.4.3.2 Safety Guard Door Locations

The bundler is equipped with 16 safety guard doors, located around the machine. The Door Layout screen on the touchscreen shows the location and position (open or closed) of each guard door.

Safety Guard Door Switch

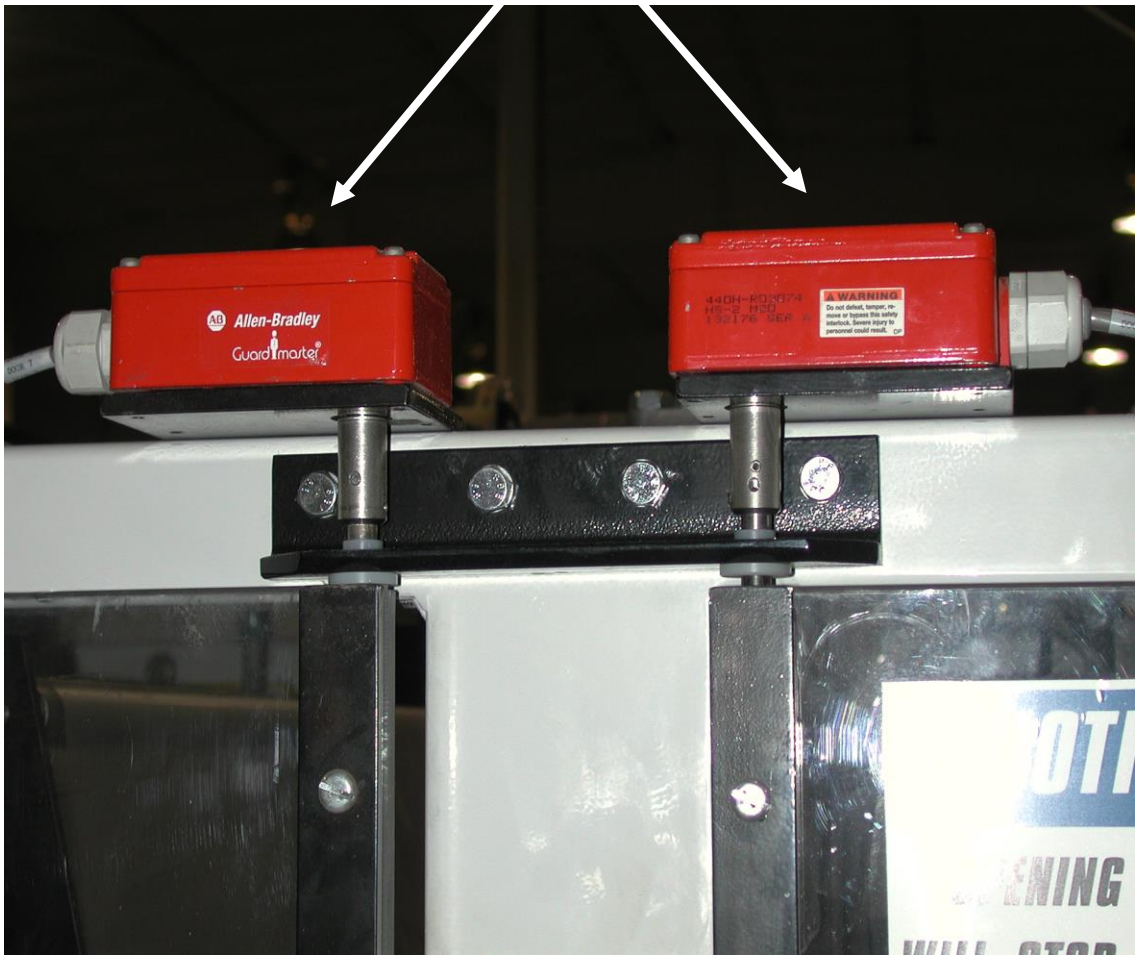

Figure 2-9

Safety Guard Doors

2.4.4 Safety Device Testing

The emergency stop buttons and guard door interlock switches should be tested daily to ensure that the circuits are functioning properly.

This is done by monitoring Main Operator screen for faults while stop buttons and safety guard doors are operated.

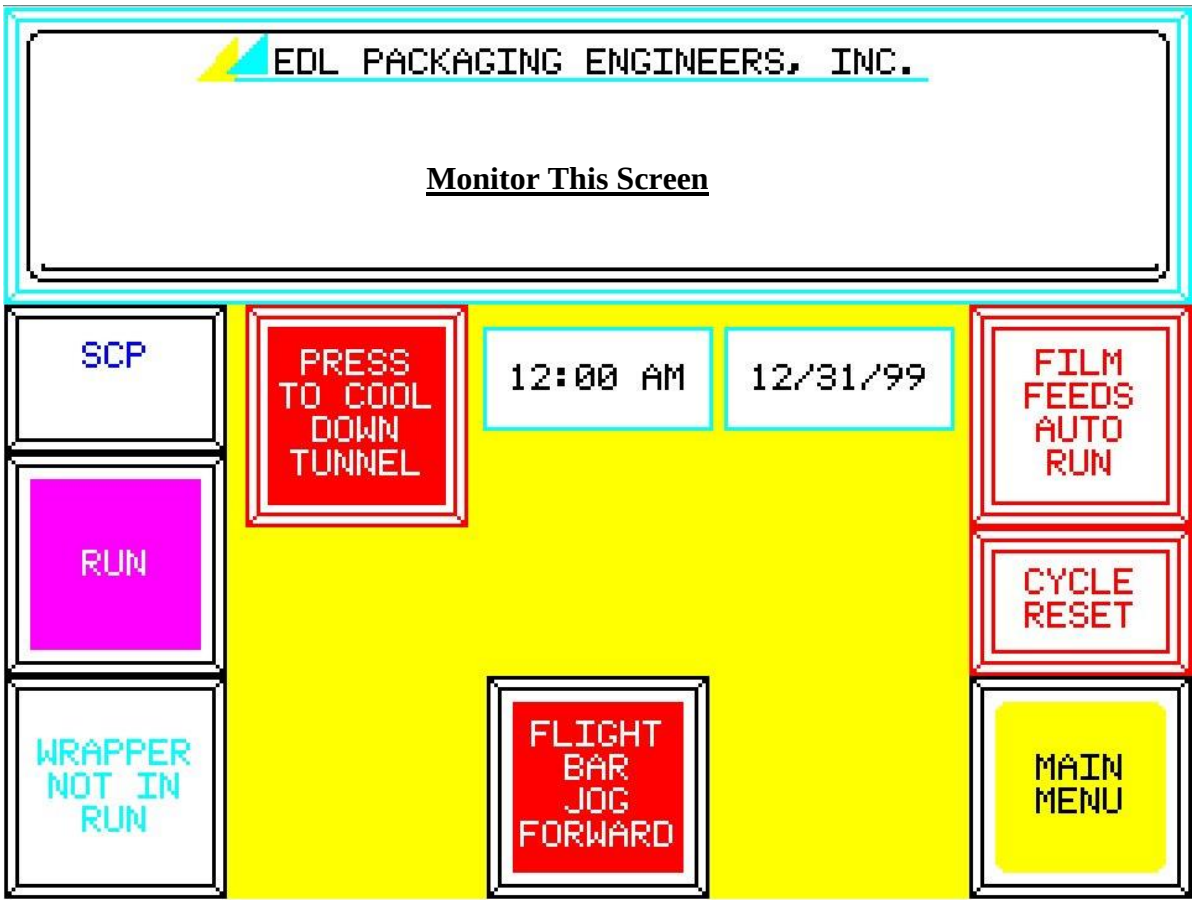

Figure 2-12

ACTIVE ALARM SCREEN

This screen displays all current ALARMS. ALARMS include FAULTS, OPEN GUARDS, OVERLOADS, and JAMS. It lists them such that the most recent one is on top.

Accessed from MAIN MENU SCREEN

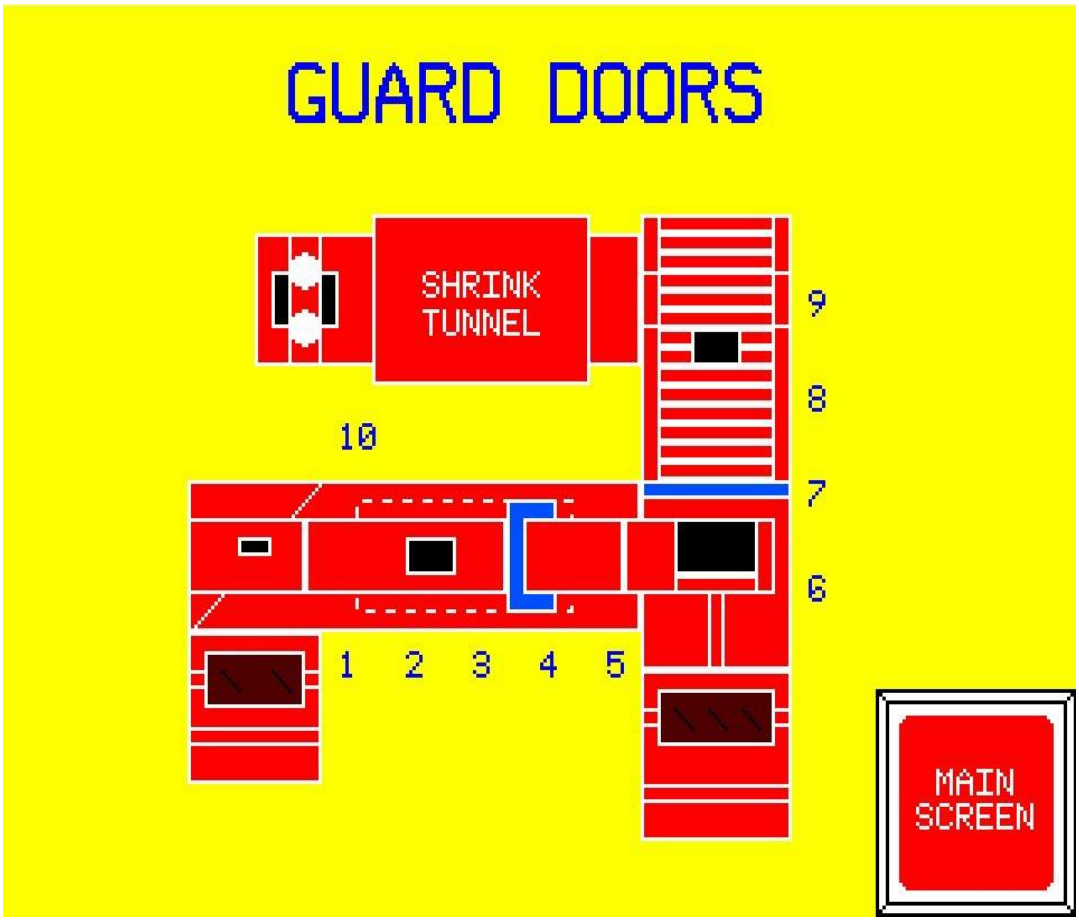

Figure 2-13

GUARD DOOR LAYOUT

This top view of machine shows which GUARD DOOR is open.
Accessed from MAIN MENU SCREEN