

Unit 371,372,378,379,380



# **Sunrise Fire Rescue Division of Training**

## **INTRODUCTION**

This guide has been produced by Division Sunrise Fire Rescue Department's Division of Training. It is created as an adjunct to the extensive field training on units 371,372,378,379, & 380 (hereafter referred to as **Saulsbury Pumpers**). It is also intended to serve as a quick reference guide to the various components and operating systems on the vehicle. This guide is not designed to replace the manuals supplied by the manufacturer's of this vehicle.

## **VEHICLE DESIGN CONCEPT**

Sunrise Fire Rescue Saulsbury Pumpers represent the latest in fire apparatus technology. This vehicle was specifically designed around the needs of Sunrise Fire Rescue and was specified with longevity, efficiency, and safety in mind. This unit, as constructed, includes a dramatic increase in compartment space, total organization of stored equipment, short wheelbase and many devices installed for the purpose of allowing the firefighter to function more safely and effectively. Consider the following excerpt from the 1999 edition of IFSTA's *Pumping Apparatus DRIVER/OPERATOR Handbook*.

"In recent years it has become extremely popular for fire departments to specify fire department pumpers with rear-mount fire pumps.

There are a number of advantages to having the pump on the rear of the apparatus. First, it helps provide a more even weight distribution on the apparatus chassis. As well, it typically allows the apparatus to have more compartment space for tools and equipment than a similar sized vehicle with a midship pump. Other than the location being at the rear of the apparatus, the operation of these pumps is the same as [midship] pumps." p.220

Because of this design, the Saulsbury Pumpers have a massive 330 cubic feet of usable compartment space, a short 182" wheelbase and an extremely tight turning radius.

## **VEHICLE FACTS**

Cab Type – Spartan Motors, Advantage Model MFD  
Engine – Cummins ICS 330 HP turbocharged  
Transmission – Allison 3060P 5 speed automatic  
Body Manufacturer – Saulsbury Fire Apparatus  
Body Material – Stainless Steel with 15 year warranty  
Fire Pump – Hale single stage 1500 GPM  
Booster Tank – 600 Gallons  
Foam Tank – 30 Gallons  
Generator – 5KW Honda wired to truck with remote start  
DC Alternator – 290 Amps  
Height – 10'8"

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Height – 10'8"

Fuel Tank 50 gallons of diesel

Brakes: Disc brakes on all four wheels

Hose capacity:

1500 feet 5" LDH Storz

500 feet 2.5"

500 feet 1.75" (3 lines)

### STARTING THE VEHICLE

A keyless ignition system is employed on this unit. To start the vehicle, activate the electric power switch **FIRST**, then activate the ignition switch, then push in the starter button until the engine cranks over. All three of these controls are located in front of the driver's left knee. (FIG.1)



Figure 1

To shutdown the engine shut the IGNITION switch off first THEN shut the Electric power switch.

**NOTE:** There are two orange button/lamps on the dashboard. The first is a preheat button which is used to preheat the exhaust manifold in very cold weather. This should not really be of use to us. The second is labeled WIF. This lamp stands for Water in Fuel. If water gets into the diesel fuel and is trapped by the on board water fuel separator, this lamp will illuminate. If this lamp illuminates take the unit to the city garage immediately. Water in the fuel is a serious problem.

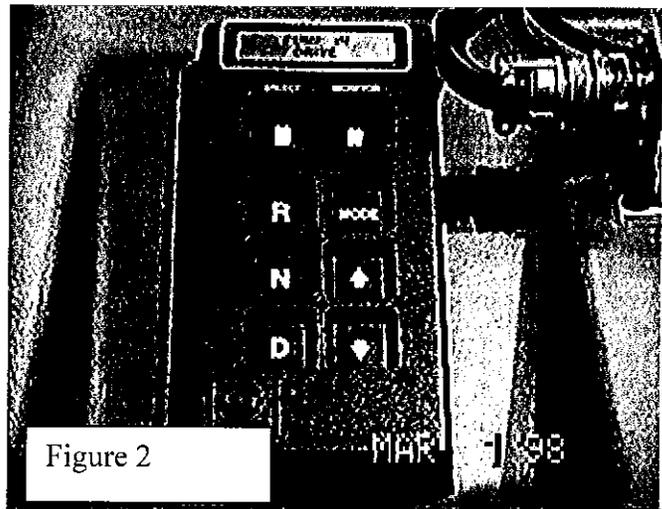
There is also a DEC/INC button by the driver's right knee. This is a blank switch that has no use.

On the upper left side of the dashboard is an ENGINEMINDER® flow restrictor indicator. If this indicator enters the red zone it indicates the need for an air filter change.

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### PARKING BRAKE

A yellow "Maxi Brake" control is located on the dashboard by the driver's right knee. (FIG.1) Pulling the control out activates the parking brake. Pushing it in releases it. The parking brakes will apply and cannot be released whenever the brake system air pressure drops below 60 PSI. The parking brake is interlocked to many systems on the truck including; the pump transfer, ground lighting, and emergency lighting.



### TRANSMISSION

The vehicle is equipped with a 5 speed automatic transmission. The transmission selector consists of an electronic control head mounted on the engine cowling by the driver's right arm. (FIG.2) The control head consists of a display window and a series of touchpad buttons. The **R** button activates the reverse gear. The **N** button places the transmission in neutral. The **D** button places the transmission in the normal drive range. In this range, the transmission will automatically shift up and down through gears 1-4. In this range, a maximum speed of about 52-53 MPH is attainable. The on board fire pump is operated with the transmission in this (**D**) range. The **MODE** button is utilized whenever the vehicle operator wishes to access the 5<sup>th</sup> gear. This gear functions like an overdrive, and permits the vehicle to operate at speeds up to 69-70 MPH. **The mode button must not be used for pumping applications.** The mode feature can be activated at anytime. The mode feature is deactivated whenever the **MODE** button is depressed for a second time, or after the vehicle is shut off.

The maximum speed limit on any City of Sunrise street is 45 MPH. The use of the MODE feature on local streets must bring with it the awareness that the vehicle is then capable of attaining speeds in excess of posted speed limits. The vehicle operator must obey State Traffic Laws at all times and observe safe driving practices.

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There are two additional touchpad buttons on the control head. The up and down buttons allow the operator to manually shift/downshift between gears. Finally, the display window on the control head displays the gear range (**R, N, 4, 5**) on the left side and, on the right side of the window, the actual gear that the transmission is in at the moment it is being viewed.

**If the engine RPM's are too high, the transmission may not shift when selected. If this occurs bring the RPM's down to an idle before shifting**

**WARNING – Make sure the transmission is in neutral (except when pumping) prior to leaving the cab. The transmission selector button must be pressed firmly. Lightly tapping the button may not neutralize the transmission. Failure to visualize the neutral indicator on the display window could result in the driver leaving the cab with the transmission in Drive**

**The maximum speed limit on any City of Sunrise Street is 45 MPH. The use of the MODE feature on local streets must bring with it the awareness that the vehicle is then capable of attaining speeds in excess of posted limits. The vehicle operator must obey all Florida State Traffic Laws, at all times, and observe safe**

Lastly, the window will display the word **MODE** whenever the mode feature is engaged.

### **ENGINE RETARDER**

This vehicle is equipped with a Jacobs® exhaust brake engine retarder. This device greatly enhances the braking abilities of the vehicle. The retarder can be switched on/off via a rocker switch on the dashboard to the right of the driver. The green indicator light on this switch illuminates whenever the retarder circuitry has been engaged. Whenever the vehicle is in motion, and moving at 15 MPH or greater, and the accelerator pedal is released, the retarder will engage. This immediately begins to slow the vehicle.

The vehicle is equipped with a switch to turn the retarder on and off. All retarders can be dangerous when used on slippery roads. As confirmed by

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Spartan Motors Inc. (appendix 1), the retarder on this truck is wired into the ABS brake circuitry so that the retarder will disengage should wheel lockup occur.

**WARNING – Whenever the retarder is off, allowances must be made for increased stopping distances.**

It is normal to hear what sound like an air leak coming from the engine compartment **while the engine is running and the vehicle in motion**. This is the Jake Brake™ expelling compression gases from the exhaust manifold.

### ANTI-LOCK BRAKING SYSTEM (ABS)

These units are equipped with a Rockwell WABCO anti-lock braking system. This system prevents the vehicle from skidding out of control during panic braking. IFSTA's *1999 Pumping Apparatus DRIVER/OPERATOR Handbook* describes how ABS brake systems operate:

“ These systems are effective in that they **minimize** the chance of the vehicle being put into a skid when the brakes are applied forcefully. ABS works using digital technology in an onboard computer that monitors each wheel and controls air pressure to the brakes, maintaining optimal braking ability. A sensing device located in the axle monitors the speed of each wheel. The wheel speed is converted into a digital signal that is sent to the on board computer. When the driver/operator begins to brake and the wheel begins to lock up, the sensing device sends a signal to the computer that the wheel is not turning. The computer analyzes the signal against the signals from the other wheels to determine if this particular wheel should still be turning. If it is determined that it should be turning, a signal is sent to the air modulation valve at that wheel and allowing the wheel to turn. Once the wheel turns, it is braked again. The computer makes these decisions many times a second until the vehicle is brought to a halt.” p.64

#### THEREFORE:

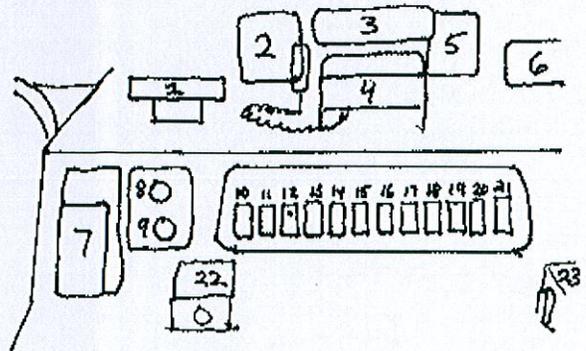
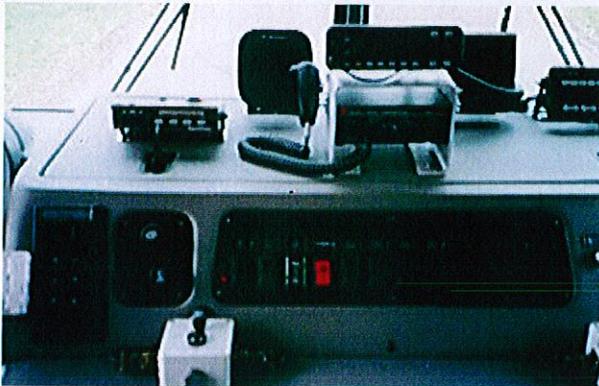
The brake pedal must be activate with solid continuous pressure. **Do not pump the brakes while attempting to stop the vehicle**. Should the ABS system detect impending lockup, it will activate and the driver may feel a pulsation of the brake pedal. This is normal.

### CAB SWITCHES

A switch console is located on top of the engine cowling between the driver and officer positions. Additionally, radio, siren, and ArrowStik™ controls are

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located in this area. Figures \_ and \_ display the various switches and controls. Switch and control functions are described below.



1. Arrowstik™ control head
2. UHF radio (Sunrise) speaker
3. UHF radio control head
4. Federal PA 300 electronic siren control head
5. 800 mhz radio speaker
6. 800 mhz radio control head
7. Transmission selector
8. Headlights
9. Windshield wiper
10. ABS system Check
11. Jacobs Exhaust retarder On/Off
12. Class 1 Total System Manager™ status indicator
13. Emergency Lights On/Off
14. Left Scene Lights
15. Rear Scene Lights
16. Right Scene Lights
17. Siren Brake
18. spare
19. spare
20. spare
21. spare
22. Driver David Clark System Connector
23. Officer David Clark System Connector

### **Using The Arrowstick™ Controller.**

An Arrowstick™ directional traffic director is located on the rear panel of the truck. This allows the operator to choose a light pattern to direct traffic to the right, or left, or out both sides from the center. Using the control head on switch housing the operator places the slider into the desired pattern to activate the

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lights. The WARN button allow the operator to place the arrowstick™ into an alternating wig wag pattern for additional rear warning.

### CLASS ONE® TOTAL SYSTEM MANAGER™

The Saulsbury Pumpers are equipped with a Class One® Total System Manager™. This device manages the entire 12 volt electrical system via an on board computer per NFPA 1901 requirements. *THE PROFESSIONAL DRIVER OPERATOR SHOULD BE TOTALLY FAMILIAR WITH THE OPERATING PARAMETERS OF THIS SYSTEM. IN THE PAST, SEVERAL DRIVERS HAVE WRITTEN UP "PROBLEMS" ON THE SQURT™ THAT WERE ACTUALLY NORMAL OPERATING FEATURES.*

As a result of NFPA 1901 requirements, the Saulsbury Pumpers, like unit 364(Squirt™), have some wiring features which are new to us. Among these:

- All the emergency warning lights are controlled via a load manager/sequencer. It takes several seconds for all the lights to activate if illuminated simultaneously via the Master Switch(red switch) Similarly, it takes several seconds for the lights to sequence down. **Do not shut the vehicle off until all the lights have sequenced off.** Doing otherwise can damage the circuitry.
- Whenever the Parking Brake is on – All forward facing (front) white lights will be extinguished (**not operate**). This includes the wig wag headlights, two white pods in the roof mounted vector pod, and the mini light bar below the windshield
- The scene lights **will not work** unless the parking brake is on
- The underbody ground lighting **will not work** unless the Parking Brake is ON. These light **remain on** at night **WHENEVER (all the time)** the parking brake is on.
- Compartment lights **are always on** at night whenever the parking brake is on.
- The hydraulic ladder rack is wired into the compartment door ajar circuit. If the ladder rack is not completely stowed properly. The red light and alarm in the cab will activate.
- Whenever system voltage drops BELOW 11.9 volts DC, the system manager™ will automatically engage the high idle (1200 rpm) until such time that the system voltage is above 13 volts DC at which time it will automatically cut out. (parking brake must be on for high idle to work.
- There are three ceiling mounted cab lights, 2 red and 1 white, which are individually switched on for cab illumination at night. The rear (jumpseat) light is activated whenever any of the rear two cab doors are opened. A small white coach light is located above the officer and driver door. These lights automatically activate when the respective door is opened.

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### CAB TILT PROCEDURES

Daily engine oil checks can be accomplished via the engine access door in the cab on top of the engine cowling. If further access to the engine is needed, the entire cab can be tilted upwards to about 45 degrees. Cab tilting is performed by using the remote control cable/controller which is located in compartment 6 on the curbside of the apparatus.



The cab tilt procedure is as follows:

- Remove all loose items from the cab, this includes airpicks from their brackets.
- Retrieve the remote controller and locate yourself to visualize the cab tilt operation
- Raise the cab by depressing up/raise button on the remote controller
- Allow the stay-arm to drop into place around the passenger side lift cylinder
- Lower the cab by pulling on the stay-arm lanyard
- The stay-arm lanyard can be released once the channel has slipped past the lift cylinder flange.
- Depress the down/lower button until the cab is completely lowered. Keep the toggle switch depressed for about 5-7 seconds after the cab has settled completely at which time the red bezel light will shut off, indicating that the cab lock pins have been engaged .
- Stow the controller properly.

#### *Emergency Hydraulic Backup*

The Saulsbury Pumpers have been equipped with a manual backup system should the hydraulic/electric system fail to raise or lower the cab. **THIS BACKUP SHOULD ONLY BE USED IN EMERGENCIES ONLY.** The backup system works like a large bottle jack. To operate the backup (manual) cab tilt:

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- Make sure the bleed down valve is closed
- Retrieve the jack handle from the wall in compartment 6
- Insert the jack handle into the pump and pump until the cab is raised a locked open as described above.
- To lower, pull the lanyard to release the cab say arm on the right lift cylinder.
- use the handle end to open the hydraulic pump pressure valve. SLOWLY lower the cab in place. BECAUSE THE MANUAL LOWERING CANNOT GUARANTEE POSITIVE LOCKING OF THE CAB TO THE CHASSIS. THE VEHICLE MUST BE TAKEN OUT OF SERVICE UNTIL THE HYDRAU/ELECTRIC CONTROLLER IS REPAIRED.

## CLASS 1 (Captain®) ENGINE GOVERNOR

This vehicle incorporates an electronic engine governor into the fire pump system. The governor control functions as both the relief valve and the engine throttle. This device allows for safe, precise control of the fire pump. There are two separate distinct operational modes on this device: RPM (throttle) mode and PSI mode.



***RPM (throttle) mode*** - The RPM mode allows the operator to control engine speed like the old vernier throttles. This mode allows the operator to maintain a selected RPM. **The pressure governor (relief valve) feature does not function when the engine governor is in the RPM mode.** The anti-cavitation feature does not work in the RPM mode either. The driver operator can switch to

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the RPM mode when pressure surges cause the pump to keep returning to an idle. When using the Throttle(RPM) mode the operator can either watch the RPM display on the ENFO III engine status monitor to the left of the governor or watch the Master Pump Discharge Gauge to the right of the governor while using the increase or decrease buttons.

***PSI (pressure) Mode*** – The pressure mode is achievable only if the parking brake is set and the pump transfer switch is engaged. The pressure mode will adjust engine speed to maintain a selected pressure. Regardless of whether incoming pressure changes, or discharges are opened and shut, the pressure governor will maintain the selected PSI. When using the pressure mode the operator should watch the Master Pump Discharge Gauge to the right of the governor.

***Mode Selection*** – After engaging the pump the Pressure Control head (FIG.7) will display the word MODE. To activate the unit, the operator pushes the mode button once. The unit will now switch to the Throttle (RPM) Mode. Pushing the mode button a second time will transfer unit to the Pressure (PSI) mode. Using the increase and decrease buttons, the operator can advance or lessen the pressure (or RPMs if the unit is in RPM mode). Each time the increase/decrease buttons are depressed, the PSI changes change by approximately 10PSI. For rapid advancement of the values, hold the button in until the desired pressure is attained. The operator can switch between PSI and RPM modes at any time by simply pushing the Mode button. Whenever this change occurs, the governor will change to corresponding values.

***Remember*** – In the RPM mode the engine speed is maintained regardless of flow changes. In the PSI mode the unit meets the flow requirement changes by adjusting engine speed.

***Cavitation Protection Feature*** – The pressure governor includes a cavitation protection feature which protects the pump, plumbing, and firefighters from sudden water surges, ingestion of large amounts of air, or loss of supply pressure. **The mode selector must be in the PSI mode for this feature to be active and the pump pressure must be above 40 PSI.** If the water supply is reduced or interrupted, the governor will first attempt to increase pressure by increasing the engine speed. *If the pump discharge pressure remains less than 25 PSI for more than 5 seconds, the engine speed will automatically return to an idle.*

***If it is apparent that air or a temporary reduction of suction pressure has been or will be introduced into the pump, it may be desirable to temporarily switch from the PSI mode to the RPM mode to reduce the likelihood of sudden RPM changes and the automatic shutdown of lines due to the anti-cavitation feature.***

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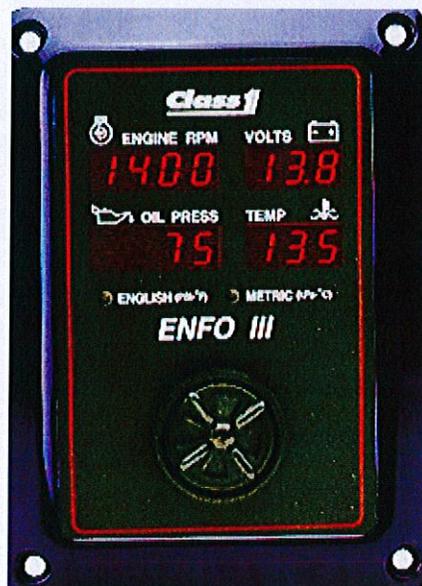
### **System Shutdown**

Pushing the red shutdown button in for more than one second will cause the engine governor to return to an idle speed. The red shutdown button can and should be used to return the engine speed to idle when operating in low or no water flow conditions. **It should not be used when flowing large amounts of water as this may cause a water hammer.** When flowing large amounts of water use the decrease button to gradually reduce engine speed to an idle.

*Once the red idle button has been activated, the governor leaves the mode sequence. The MODE button must be depressed again and a mode type selected in order to restore control of the pump*

### ENFO III SYSTEM MONITOR

The Class One ENFO III monitor is located on the upper center of the pump panel and continuously displays vital engine and electrical system performance parameters. The ENFO III contains four display windows which provide the following information.



**Engine RPM**

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**System Voltage** – System voltage is continually displayed. However, if the voltage drops below 11.9 VDC the alarm will activate and flash alternately between the voltage level and the word *LO*.

**Oil Pressure** – The engine oil pressure is continually displayed. However, if the oil pressure drops below 10 PSI the alarm will activate and flash alternately between the pressure level and the word *LO*.

**Engine Temperature** – **The engine temperature is continually displayed.** However, if the engine temperature rises above 235 °F the alarm will activate and flash alternately between the temperature and the word *HI*.

## OPERATING THE ON-BOARD GENERATOR

Saulsbury Pumpers are equipped with a 5 Kilowatt (5000 watts) Honda four cycle gasoline fueled - air cooled generator. The generator is located in compartment 2 and supplies the wire reel in compartment 8, the 120 volt outlets located in the wheel wells (1 each side) and the 500 watt telescopic quartz lights mounted on the rear of the body. Although the generator is designed to be run while in its **extended** tray on the truck., it can be quickly disconnected and lifted up out of the tray for portable use



The generator draws its fuel supply from an integral 4.5 gallon fuel tank(gasoline) and has a 1.2 quart oil reservoir for 10W-30 or 10W-40 oil. The generator weighs 175 lbs. without fluids.

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A circuit breaker box is located in compartment 4 (pump panel). This box regulates and controls electrical power coming from the generator. There is a separate GFI circuit breaker for each of the four power branches.

**NOTE:** An additional 120 V duplex outlet box is located in compartment 5 (ALS compartment). This power outlet **does not** run off the generator. It is wired to the shoreline connection for on board charging of ALS equipment.

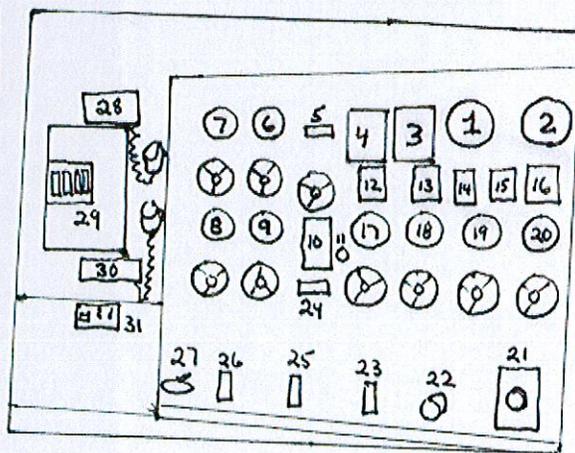
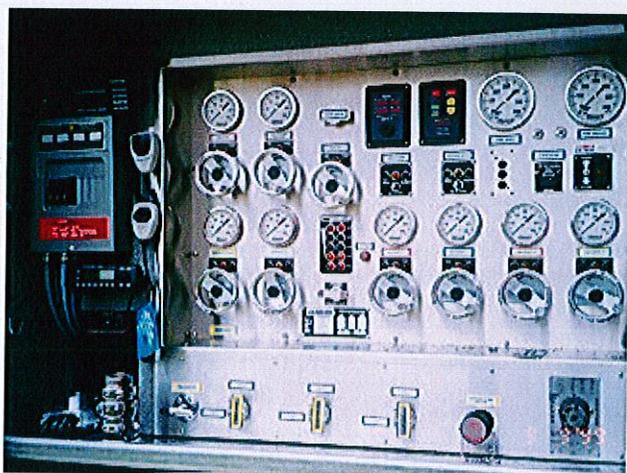
### HYDRAULIC LADDER RACK

The Saulsbury Pumpers have been equipped with a ZICO® overhead electro/hydraulic ladder rack. The rack houses a 24 foot extension ladder, 14 foot roof ladder, 10 foot attic ladder, 6 foot pike pole and 8 foot pike pole. The rack is normal stored up on top of the truck above the curbside compartments. When required the an operator can use the ladder rack control panel located on the right rear (tailboard) panel of the truck to lower the rack to within chest height personnel. When in motion the rack sounds an alarm and flashes amber lights. There are two self explanatory switches on the ladder rack control panel: power on/off and ladder up/down. **ALWAYS CHECK FOR OVERHEAD OBSTRUCTIONS AND POWER LINES PRIOR TO OPERATING THE LADDER RACK.** Always check to see that the deluge gun is out of the way prior to lowering the rack.



### PUMP PANEL COMPONENTS

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The above photo and diagram depict the typical layout of all switches and controls on the Saulsbury Pumper pump panels. A description of each item is listed below.

1. Pump Intake Pressure Gauge
2. Pump Discharge Pressure Gauge
3. Captain™ Engine governor/throttle
4. Enfo III™ engine monitor
5. Engine cooler
6. Left Rear Discharge Gauge (gate operator underneath)
7. Deck Gun Discharge Gauge (gate operator underneath)
8. Front preconnect 1 (gate operator underneath)
9. Front preconnect 2 (gate operator underneath)
10. Tank level gauges (booster and foam)
11. Air Horn Button
12. Tank to Pump electric valve
13. Auxiliary rear intake electric valve
14. Pump Overheat Alarm
15. Master Intake Valve Air Bleeder
16. Master Intake Valve electric valve operator
17. Discharge 1 Gauge (gate operator underneath)
18. Discharge 2 Gauge (gate operator underneath)
19. Discharge 3 Gauge (gate operator underneath)
20. Discharge 4 (5") Gauge (gate operator underneath)
21. Foam Proportioner control
22. External Foam connection
23. External Foam on/off
24. Pump Primer

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25. Foam tank suction
26. Foam flush
27. Foam eductor On/Off (out is on)
28. 800 mhz radio
29. 120 volt circuit breaker panel
30. UHF (Sunrise) radio
31. Remote control for generator start/stop

### **FOAM SYSTEM**

The Saulsbury Pumpers are equipped with an AKRON® 95 GPM bypass eductor foam system. The system allows for 30 gallons of on board foam to be dispensed through the **FRONT 1-3/4" BUMPER CROSSLAY ONLY**. There is no need to set up anything. To produce foam the operator merely opens the eductor valve, opens the foam tank suction, sets the foam metering dial to the proper percentage and charges the front discharge line to **200 psi**.

Additionally, these trucks have been equipped with an AKRON® off truck access kit. This kit allows foam to be drawn into the on board foam kit from a source other than the on board tank – example; 5 gallon cans. To use this function the operator would perform the same functions as above BUT, he/she would close the foam tank suction valve and open the off truck access valve. Using a supplied 6 foot suction hose connected to a 25mm storz connection on the pump panel, foam is drawn into the on board system for discharge out the front crosslay. The foam tank cannot be filled from this connection.

Whenever either foam supply source is utilized, the foam system must be flushed for 3 minutes at 100 psi. To accomplish this, the foam source valve is closed, the flush valve opened, and the eductor valve opened.

Should it ever become necessary to drain foam from the foam tank, ie. repairs, a foam solution drain valve is located under compartment one on the driver's side. Opening this valve will dump the entire contents of the foam tank.

Complete operating instructions for the foam system are located on the pump panel by the metering valve. All foam control valves are color coded yellow.

### **MASTER INTAKE RELIEF VALVE (MIV)**

We have equipped units the Saulsbury Pumpers with a Hale® Master Intake Valve™. This valve takes the place of the old PIRV valve. The MIV is located on the 6" rear pump intake. The valve is positioned behind the pump panel. The MIV will dump incoming pressures in excess of 125 PSI. Moreover, by using the electric valve control switch on the upper right of the pump, the pump operator can open or close the flow of water into the pump. The MIV pump panel control panel has position indicator lights to indicate the position of the valve. An air

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bleeder is located just to the left of the MIV control switch. The air bleeder is used exactly like the old screw bleeder on the top of the old PIRV. The air bleeder is used to exhaust air from incoming hoselines that could cause the loss of pump prime.

To the left of the 6" rear pump intake is a 2.5" black knob. This knob is the EMERGENCY MANUAL OVERRIDE in case of electrical valve controller failure. To operate the override, just turn the knob about ten rotations....right to close....left to open.



## ELKHART® GEAR OPERATORS

All eight discharge gates on the Saulsbury Pumpers utilize an ELKHART® series 2900G gear actuated valve with position indicators. These valves use a 38:1 gear reduction to allow extremely easy opening and closing of valves with full water flow while providing the pump operator with precise control of the gate. Each valve has a position indicator lamp module with three lights to indicate the position of the valve. These lamps provide the following signals to the pump operator.

<b>SIGNAL</b>	<b>MEANING</b>
RED	Valve is fully closed
GREEN	Valve is fully opened
AMBER	Valve is partially opened (throttled)

## ELKHART® ELECTRONIC VALVE OPERATORS

Three valves on the Saulsbury Pumpers are equipped with ELKHART® series 2900E electronic valve operators. The valves are: The tank to pump valve, The

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tank refill valve, and the MIV previously mentioned. All of these valves have manual backups in case of failure. Each of these valves is equipped with a position indicator lamp module and a toggle switch(actuator).

“The panel mounted toggle switch is used to open the valve or place the valve ball in an intermediate throttled position. The switch is a sealed three position center-off type. The lever locks in the center-off position to prevent the accidental activation of the valve. The switch lever must first be **pulled out** to move either right or left. Open and closed positions are spring loaded, momentary contact. Moving the switch lever to the left causes the valve to travel in the open direction. Moving the switch lever to the right causes the valve to travel in the closed direction. “

The indicator lamp module provides the following signals to the operator:

<b>SIGNAL</b>	<b>MEANING</b>
STEADY RED	Valve in fully closed position
STEADY GREEN	Valve in fully open position
STEADY YELLOW	Valve is partially opened (throttled)
STEADY YELLOW w/ FLASHING GREEN	Valve is moving toward open position
STEADY YELLOW w/ FLASHING RED	Valve is moving toward the closed position

### *AUTO-TRAVEL FEATURE*

A unique and valuable feature of the 2900E control system is its “Auto-Travel” capability. The travel time from fully closed to fully open position in seven seconds for all valve sizes. This travel speed ensures precise valve throttling control, and assures against rapid closure of the valve and associated water hammer potential. The Auto-Travel feature allows the pump operator to either fully open or fully close the valve without the need to hold the switch lever for seven seconds

Auto-Travel can only be initiated from the fully open or fully closed positions. To open or close the valve using Auto-Travel, the operator simply pulls the switch lever out and briefly moves it to either the open or closed position. If the switch lever is held in either the open or closed position for more than one half second the Auto-Travel feature will be overridden; the valve ball will stop in an intermediate position when the switch lever is released. Auto-Travel can be stopped at any ball position by momentarily placing the switch lever in either the open or closed position, regardless of ball travel direction.”

p.3 ELKHART® part # 98086000

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### *MANUAL VALVE OVERRIDE*

If the valve motor power fails for any reason, the valve can be opened or closed manually. Manual actuation is accomplished by turning the hex nut fitting on the end of the worm drive shaft opposite the motor. A ¾" socket wrench is located at the pump operator's panel for this purpose.

### **AIR CONDITIONING SYSTEMS**

The Saulsbury Pumpers are each equipped with two separate air conditioning systems; a 12 volt 40,000 BTU system mounted in the center of the cab which is used when the engine is running and a 120 volt roof mounted system located behind the driver. The 120 volt roof mounted system ONLY operates when the truck is connected to the shoreline via the KUSSMAUL® auto eject™ located by the driver's door. The purpose of the 120 volt air conditioner is to pre-chill the cab as it sits in the bay. Upon starting the engine, the shoreline plug is ejected, shutting off the 120 volt air conditioner at which time the 12 volt Air conditioner takes over.

**Officers and Drivers must make sure to avoid the following:**

- 1. Do not block the air intake at the front of the 12 volt air conditioner ie. bunker coats**
- 2. Do not operate any of the air conditioners with the cab windows open.**

### **KUSSMAUL PUMP PLUS SYSTEM**

The Saulsbury Pumpers are equipped with 30 amp KUSSMAUL® PumpPlus™ systems. These systems contain the following components and features:  
**30 amp auto eject plug** – Located just ahead of the driver's door this plug connection is considerably different from present SFD shoreline plugs. IT must be supplied with the large BLUE shore-power plug. There is a small toggle switch on the truck mounted receptacle. When connecting to the shore plug the operator activates the toggle switch which engages the receptacle drive to extend the truck connection outward. The shoreline is then connected. The plug will automatically eject and the connection will automatically retract whenever the ignition circuit is started.

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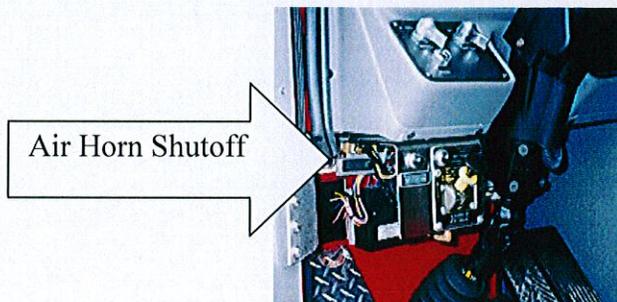
**Battery Charger/Conditioner** - These trucks are equipped with an on board battery charger/conditioner which, when plugged in via the shoreline connection, constantly trickle charges the vehicle batteries and keeps them at optimal performance levels. A battery level meter is located on the cab wall just ahead of the driver's door and above the shoreline connection.

**Auto Air Pump** – These units are equipped with a 120 volt auto compressor which when connected via the shoreline maintains the air pressure in the on board air tanks (brakes) at approximately 90 PSI. When the pressure drops to approximately 60 psi. The auto pump kicks in and fills the air tanks. The auto pump ONLY works when the truck is off AND connected to the 120 volt shoreline. Whenever the truck is running, the on board 13 CFM Holset compressor fulfills normal air pressure buildup requirements.

**On board Recharging receptacle** - a 120 volt duplex outlet is located in compartment 5. This is wired directly to the shoreline circuit for on board charging of on board equipment. I.e; suction unit. It DOES NOT work off the generator or 12 Volt system.

### **AIRHORN SHUTOFF**

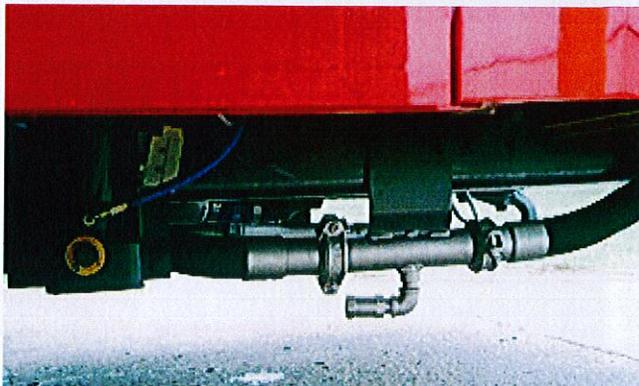
A shutoff valve is located under the driver's dash area to shut the airhorns off should they become stuck on or develop a bad leak.



### **AUTOMATIC DRAIN VALVES**

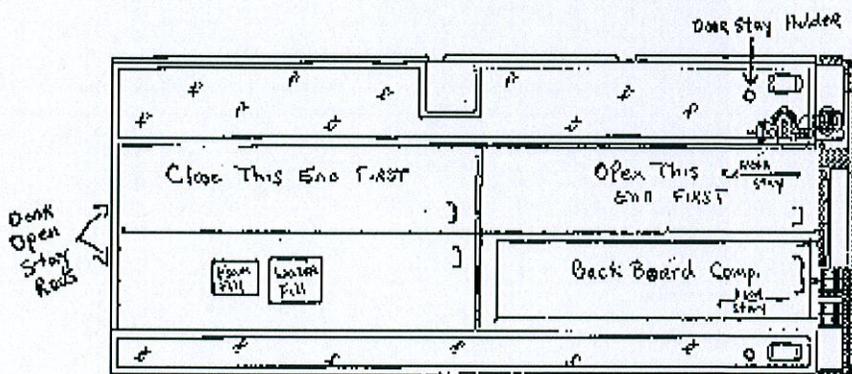
Class One® automatic drains have been installed on the two front preconnects as well as the deck gun and left rear discharge pipes. These are designed to automatically drain the line off water when ever line pressure drops below 6psi. All other drains are manually operated underneath the pump operator's compartment.

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### HOSEBED COVERS

The Saulsbury Pumpers are equipped with a four section aluminum treadplate hosebed cover system. Each section has a handle and a door stay rod. The two doors on each side are interlocked. The rear section door on any given side **MUST BE OPENED FIRST** in order to open the front section. Similarly, the front doors on any given side **MUST BE CLOSED FIRST** in order to close the rear section. Stay rods are located on each section for holding the doors open. Small cutout doors have been made in the front left section for booster/foam tank access without having to lift the door.



### HOSELOADS

Two 150 foot S – Load 1-3/4 " hose loads are located in the front bumper. It may be necessary to unlatch the hose tray cover in order to deploy the hoseline.

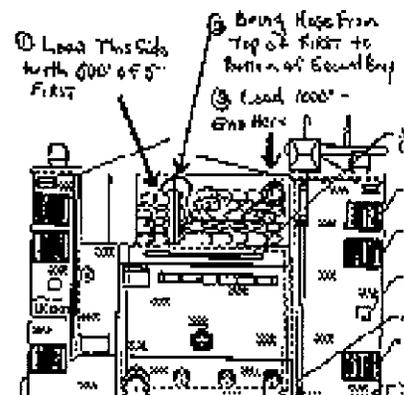
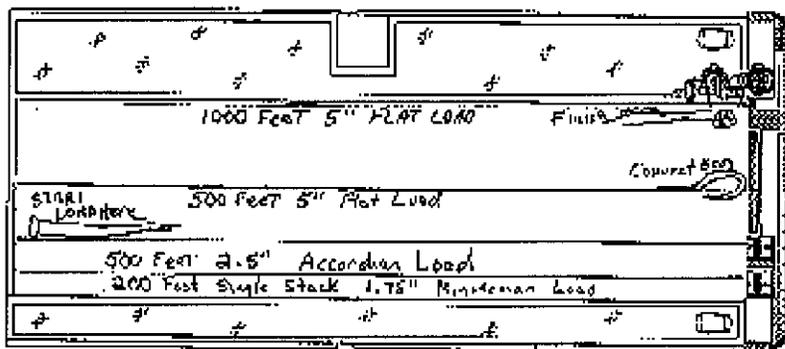
One 200 foot SINGLE STACK minuteman 1-3/4" hoseload is located at the left rear of the hosebed. This load is packed just like the 2-1/2" blitz line on our other pumpers.

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500 feet of 2-1/2' Accordion loaded is stored to the right of the 200 foot rear preconnect. It is packed MALE OUT.

**FOR UNITS 371 & 372 ONLY** Because of the need to provide a support for the hose bed cover system, it was necessary to split the 5" hosebed. This however does not affect the packing or deploying of 5" hose to any extent. The combined beds hold 1500 feet of 5" LDH hose. The proper packing of this hosebed is particularly critical for safe deployment. The smaller (left) bed is packed first with the end coupling of the first length of hose placed in the very rear of the hosebed. Pack 5 lengths (500 ft) into this section. Then attach the sixth section and immediately bend the hose around the section divider into the larger bed(right) and begin packing the next 10 lengths(1000 ft) until the last coupling is in the upper right hand corner.

**WARNING.** Be extremely careful to allow room for the 5" LDH coupling to deploy **INSIDE THE COVERED HOSEBED**. Extensive use of "Dutchmen" are necessary to guarantee proper deployment.



## PROBLEMS?, REPAIRS?

The Saulsbury Pumpers are vehicles utilizing quite a bit of high end technology. While it may be simple for a driver/operator to troubleshoot a burned out taillight, driver/operators **SHOULD NOT** attempt to rewire circuits, disable interlocks, disable warning buzzers, or attempt repairs to electronic systems on board.

Any problems or malfunctions should be reported to the Logistics Division via the normal departmental processes and procedures.