



CRIMSON FIRE
A Spartan Company

2010
SPARTAN/CRIMSON
ENGINE 120
GLADIATOR CLASSIC
Custom Pumper
FDD-655



OPERATION
and
MAINTENANCE
MANUAL

ACKNOWLEDGMENT

This manual is provided to you, the Engine Company members, by the Chicago Fire Department and covers Operational and Maintenance Procedures which need to be thoroughly understood and practiced, thereby ensuring both SAFE and EFFICIENT operation of your apparatus.

Applicable expertise from the manufacturers, Spartan Motors, Inc., Crimson Fire Apparatus Company, LTD., and Hale Fire Pump Division of IDEX Corporation, has been provided herein.

Basic, essential daily preventive maintenance items such as fluid checks of cooling system, crankcase, fuel, power steering, the checking of tire condition, emergency lights and warning devices, while not specifically addressed, are nevertheless normal maintenance procedures.

DEFECTS ARE TO BE REPORTED, WORK ORDERS ARE TO BE OBTAINED FROM THE DEPARTMENT OF FLEET MANAGEMENT.

Where any conflicts or differences may occur from previous apparatus operational guides or procedures, this manual shall prevail on this particular apparatus.

TAKE CARE OF IT, DON'T ABUSE IT, AND IT WILL TAKE CARE OF YOU.

Chicago Fire Department
Division of Training

INTRODUCTION

The 2010 Spartan/Crimson Custom Pumper has been manufactured following nearly two years of effort by representatives of the Chicago Fire Department and the Department of Fleet Management. The goal was to develop a design that best serves the needs of the Fire Department and more importantly, those individuals who operate the apparatus.

Numerous issues were addressed in creating the final design of these pumpers which included overall size, maneuverability, safety and comfort of personnel, compartmentalization, pumping efficiency, hose bed configuration, as well as improved visual and audible warning devices. The Department of Fleet Management specified chassis components, which ensure a more durable and reliable apparatus to cope with the severe duty which our apparatus is subjected to on a daily basis.

Considerable input was provided by field personnel, which included officers, engineers, firefighters, and firefighter/paramedics. While it is virtually impossible to design the perfect apparatus, every attempt was made to include those features desired by the majority of individuals involved in the process.

The new 2010 Spartan/Crimson Custom Pumper incorporates the best features of previous apparatus plus new innovations, which are available from the fire apparatus industry to provide the safest and most efficient pumper design possible. It is the hope of all involved that this apparatus will meet or exceed the needs of all personnel who operate it.

This manual is provided to assist those individuals assigned to drive and operate the 2010 Spartan/Crimson Custom Pumper. It is each Engineer's responsibility to read and understand the information and instructions contained within this manual prior to operating the equipment.

CHASSIS

Manufacturer: Spartan Motors, Incorporated

Model: Gladiator Classic

Cab Construction: Aluminum

Components:

- Detroit Series 60 - 12.7 Liter, 350 HP Turbo charged electronic diesel engine.
- Allison, Model HD4060 electronic 5-speed automatic transmission with 4th gear lock-up.
- Switchable transmission retarder.
- Rockwell anti-lock brake system.
- 4-wheel disc brakes
- Self-leveling rear axle air suspension system.
- 6 maintenance-free gel-cell batteries with jumper studs.
- GOODYEAR, Radial-Unisteel TD tires;
- 315 x 80R 22.5 - FRONT
- 11R x 22.5 - REAR
- 63 Gallon fuel tank.
- Racor fuel-water separator.
- Robert Shaw automatic chassis lubrication system.
- Wabco 1200 heated air dryer with moisture ejector.
- Hale FoamLogix 3.3 System
- LifeGuard SRS Side Roll Protection System
- Redundant Lighting Circuit Switch
- Emergency Pump Shift

Cab Features:

- Hydraulic/electric cab raise, with manual backup pump
- Scene lights on both sides of cab
- Heated side-view mirrors
- Auto-eject 110 volt shore-line connector with battery condition meter
- Code 3 light bar
- FEDERAL *METEOR* white oscillating light below windshield
- Chicago-style reinforced front bumper with two (2) air horns and FEDERAL Electronic Q2 siren with 200-watt speaker.
- Load Manager lighting system
- Built in electric air compressor and battery conditioner

CAPACITIES

GROSS VEHICLE WEIGHT RATING	44,000 lbs. Front axle capacity - 20000 lbs. Rear axle capacity - 24000 lbs.
FUEL CAPACITY:	63 Gallons
CRANKCASE CAPACITY:	38 U.S. Quarts Crankcase oil type - 15W40, API Classification CF4/SG
COOLANT CAPACITY:	55.5 U.S. Quarts - 50/50 mixture of Ethylene Glycol and water, which meets GM specifications
POWER STEERING:	7 U.S. Quarts - DEXRON III
TRANSMISSION:	39 U.S. Quarts - TRANSYND
FIRE PUMP:	Hale 1500 G.P.M. Two-stage Pump Model - Q-TWO 150-23S Pump lubricant: SAE - 90 Gear oil - 3 Quarts
BOOSTER TANK:	500 Gallons
FOAM TANK:	30 Gallons
TIRE PRESSURES:	FRONT - 130 P.S.I. REAR - 120 P.S.I.

APPARATUS DIMENSIONS

TRAVEL HEIGHT:	10 Feet - 0 Inches
BODY WIDTH:	8 Feet - 3 Inches (including rub rails) 9 Feet - 7 Inches (mirror to mirror)
LENGTH:	30 Feet - 6 Inches
TOTAL LENGTH:	31 Feet – 4 Inches (front tow hooks to end of ladder)
WHEELBASE:	168 Inches
REAR OVERHANG:	7 Feet – 11 Inches

PUMPER BODY

- Manufacturer:** Crimson Fire Apparatus Co., LTD.
- Construction:** Stainless Steel with Aluminum roll-up compartment doors
- Booster Tank:** Booster tank is constructed of Polypropylene and is "L" shaped to provide for a lower hose bed height
- Features:**

- *New* Panasonic – Toughbook CF-30 Fire Mobil Data Terminal (F. M. D. T.)
- *New* - Drain valves on cross-lay #1 and cross-lay #2
- *New* TFT – Ball Intake Valve *AB1SP-NX*
- *New* TFT - Model Typhoon Tiller *Y5-T11A-CH* fixed-mount deck gun w/stream shaper and 1-3/8", 1½", 1¾", & 2" stacked tips
- Reinforced hose bed cover with elastic band fastener
- 2 - hose bed dividers, both of which are adjustable
- Lift-off tray for 1¾" hose above 4" hose bed
- Rear compartment for folding attic ladder
- Hinged pump gauge access panel
- Automatic pump cooler
- Automatic drain valve on deck gun which automatically open when pressure to these discharges drop to 5 PSI or less
- Two upper deck storage areas for foam containers, brooms, shovels, traffic cones, and other miscellaneous items
- AIR BLOWOUT system to assist in expelling water from discharge piping when draining pump in preparation for cold weather
- Two spotlights, one at each rear corner of the apparatus. One is equipped with a spot lamp and the other has a flood lamp for scene lighting at rear of apparatus
- Automatic compartment lights in all doors and compartments

FIRE PUMP

Manufacturer: Hale Products Division of IDEX Corporation

Model: QTWO 150-23S

Type: Two-stage centrifugal

Rated Capacity: 1500 Gallons per minute

1500 G.P.M. @ 150 PSI - - 1423 Engine RPM (nominal)

1500 G.P.M. @ 165 PSI - - 1513 Engine RPM (nominal)

1050 G.P.M. @ 200 PSI - - 1547 Engine RPM (nominal)

750 G.P.M. @ 250 PSI - - 1353 Engine RPM (nominal)

Pump Shift: Hale Model VPS, air powered, cab controlled

Transfer Valve: Manual type, gear driven, pump panel-mounted control

Pump Cooler: Automatic thermostatically controlled pump cooler

Engine Cooler: Full-time (non-switchable) Engine Cooler

Discharges: Four 2½" (2) engineer's side, (1) Officer's side, (1) right rear
Two 4" (1) officer's side, (1) left rear
One 3" top mounted deck gun
Two 1½" cross-lays above pump compartment

Foam Discharges: Two Cross-lay#1
Officer's side right rear – Discharge # 4

Suction Inlets: Two - 6", one on each side of apparatus equipped with manually operated valve
One - 5", with swivel elbow on front bumper and operated with air switch on pump panel
One - 4", located on officer's side rear of apparatus and operated with air switch on pump panel
One - 3", Tank to pump inlet line

PREVENTIVE MAINTENANCE OF PUMP

Pump Gear Box:

Use SAE 90 Weight Gear Oil. Check oil level on the front of the pump gear case at the plug marked "OIL LEVEL". Oil level should be up to the bottom of the of the plug opening. Level should be checked monthly. While checking gear box oil level, look for evidence of water contamination as indicated by a milky appearance of oil. If contamination is noted, obtain a work order from the Department of Fleet Management.

Auto Lube Bearing:

Check oil level annually. Oil should be up to the top of the reservoir. Use SAE-EP 90 Wt. Gear oil. Oil fill is located on top of Auto lube Bearing on the top front of the pump housing (small hex-key plug).

Pump Primer:

Oil-less priming pump, environmentally friendly priming system, which requires NO reservoir. Consequently, there is no siphon-break hole to check.

Transfer Valve:

Clean gears and re-lubricate with dry lubricant every six-month. Operate daily.

Valve Linkages:

Clean push-pull rods and re-lubricate with dry lubricant every six months. Lubricate valve rod pivot points with light oil every six months.

Pump Shift:

Lubricate the shift cylinder (located behind the pump panel, under the pump) at least once a year by squirting a few drops of light cylinder oil into the shift cylinder.

Tank to Pump:

Should be kept in the closed position until needed.

GENERAL PREVENTIVE MAINTENANCE

General daily preventive maintenance checks begin with essential fluid levels for safe and reliable operation of the apparatus. Engine oil dipstick, engine oil fill and windshield solvent can be checked and added in the drop down portion of the front grille. A secondary motor oil dipstick is located on the right side of the motor and is only accessible with the cab raised.

ENGINE OIL:

Figure 1



Left side



Right side

Use multi-grade SAE - 15W-40 motor oil with the proper API classification performance code for diesel engines. The dipstick is located as shown in **Figure 1**. Crankcase capacity is 38 U.S. Quarts. The crankcase oil level should normally be checked after the engine has been OFF for at least 10 minutes to allow proper drainage back to the crankcase.

TRANSMISSION:

Use **TRANSYND** transmission fluid. You must tilt the cab to access the dipstick. Capacity is 39 U.S. Quarts. Because the transmission oil cools, lubricates, and transmits hydraulic power, it is important that the proper oil level be maintained at all times. If the oil level is too low, the converter and clutches will not receive an adequate supply of oil - if the oil level is too high, the oil will aerate, the transmission will overheat, and oil may be expelled through the breather or dipstick tube. **(A transmission diagnostic guide is included at the back of this manual, which outlines procedures for utilizing the shifter keypad to check the transmission status through a series of diagnostic codes.)**

WARNING! WHEN CHECKING THE TRANSMISSION OIL LEVEL, BE SURE THE BRAKES ARE SET AND PROPERLY ENGAGED, AND THE WHEELS CHOCKED.

TRANSMISSION FLUID LEVEL CHECK:

Normal transmission fluid level check can be performed using the diagnostic checks as outlined in the information sheet provided at the back of this manual. However, if the dipstick is used, the following procedure is to be followed:

COLD CHECK:

- The only purpose of the COLD CHECK is to determine if the transmission has enough oil to be safely operated until a HOT CHECK can be made.
- Park the vehicle on a level surface and apply the brake as specified above.
- Run the engine for at least ONE minute. Shift to DRIVE (D) and then to REVERSE (R), then shift to NEUTRAL (N) and allow the engine to idle.
- After wiping the dipstick clean, check the oil level. If the oil level is within the COLD RUN band, the level is satisfactory until the oil is hot enough to perform a HOT RUN check. If the level is not within the COLD RUN band, add or drain as necessary to bring the level to within the COLD RUN band.

HOT CHECK:

- Operate the transmission in DRIVE range until normal TRANSMISSION operating temperature is reached. (140-220°F)
- Park on a level surface, shift to NEUTRAL (N), apply the parking brake, chock wheels and allow the engine to idle.
- After wiping the dipstick clean, check the oil level. Safe operating level is anywhere within the HOT RUN band on the dipstick.
- If the level is not within this band, add or drain as necessary to bring the level to within the HOT RUN band.

POWER STEERING:

Use Dexron III. Power steering fluid can be checked only when cab is raised. Remove the cap from the power steering reservoir and check the dipstick. If necessary, fill until the proper level is obtained.

FRONT AXLE HUBS:

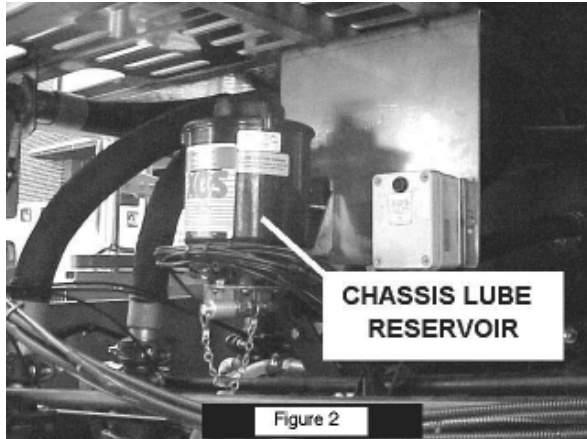
Check for presence and level of 90 Weight gear oil lubricant in each front wheel hub. If lubricant is not visible or is low, obtain a work order. There is a strap across the fill plug, which prevents filling by field personnel.

COOLANT:

The cooling system uses a 50/50 mixture of ethylene glycol antifreeze and water. The system holds about 52 U.S. Quarts. Check coolant bottle as shown in **Figure 1** for proper level. The radiator has a sight glass, which is visible only with the cab fully tilted and the radiator cap is accessible only with the cab tilted. Wait until the engine has cooled if it becomes necessary to remove the radiator cap to add coolant.

CHASSIS LUBE SYSTEM:

The automatic chassis lubrication system pump and reservoir are located in the upper front of the pump compartment, immediately below the cross-lay hose beds. While it is not the responsibility of the engineer to refill the reservoir, the lubricant level should be checked at least ONCE EACH WEEK and a work order obtained when it is less than one-quarter full.



The chassis lube reservoir shown in **Figure 2** can be checked by lowering the hinged gauge panel on the left side of the apparatus, by removing the upper portion of the pump panel on the right side of the apparatus, or when the cab is tilted. The reservoir is transparent to provide for simplified checking of the fluid level

AIR SYSTEM:

An air hose connection is located below the driver's door, above the step. This air hose connection is provided as an AIR INLET **Figure 10** only, to be used in the event the apparatus must be towed and there is inadequate air pressure to release the parking brake.

An AIR OUTLET is located on the pump operator's panel to the left of the large side pump intake. This outlet is equipped with an air hose quick connect fitting and a shut-off valve.

Check for operation of ejector valve on air dryer when compressor tops off air tanks at approximately 120 PSI. Check air tanks periodically for evidence of moisture. Drain air weekly, with shoreline connected to apparatus to test operation of auxiliary air compressor. If the auxiliary air compressor operates frequently when the apparatus is in quarters, a leak should be suspected and a work order may be required to locate and repair the leak.

CAB CONTROLS

UPPER DASHBOARD:



Figure 3

Figure 3 shows the upper portion of the dashboard with the main gauges used to monitor vehicle performance. Below is a list of these gauges.

1. Fuel Level Gauge
2. Filter Minder (Air Filter Restriction)
3. Tachometer with Digital Engine Hour Meter
4. Speedometer with Digital Odometer/Trip Meter/Message Center
5. 4 in 1 Gauge
 - Coolant Temperature
 - Battery Voltage
 - Oil Pressure
 - Transmission Fluid Temperature
6. Primary and Secondary Air Pressure System Gauges



Figure 4

Figure 4 shows the systems warning light cluster located in the uppermost portion of the dashboard. The various lamps will illuminate briefly when the ignition switch is first turned on.

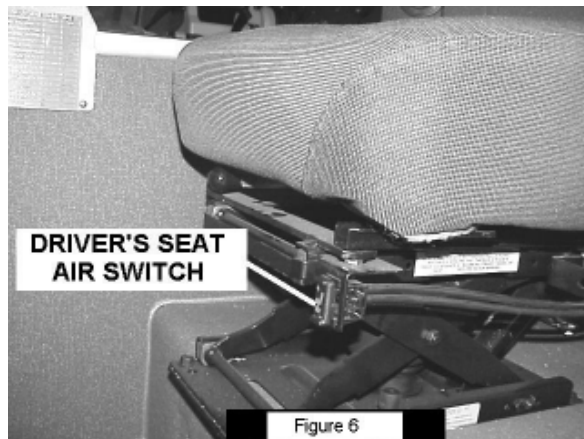
LOWER DASHBOARD:



Figure 5

1. Master Battery Switch
2. Ignition Switch
3. Engine Start Button
4. "Road to Pump" Switch with Green "Pump Engaged" Lamps

Figure 5 shows the lower portion of the dashboard assembly. Below is a list of the controls located on the lower portion of the dashboard.



The driver's seat has several adjustments to meet the preferences of each driver. Shown in **Figure 6** is the air switch used to adjust the support for the driver, which can be adjusted to the driver's weight. The seat can be moved forward or back as required and the backrest can be tilted as desired. There is also a lumbar control for the backrest.

The upper forward section of the motor doghouse serves as a mounting for several controls for the both the engineer and the officer. The items shown in **Figure 7** are listed below.

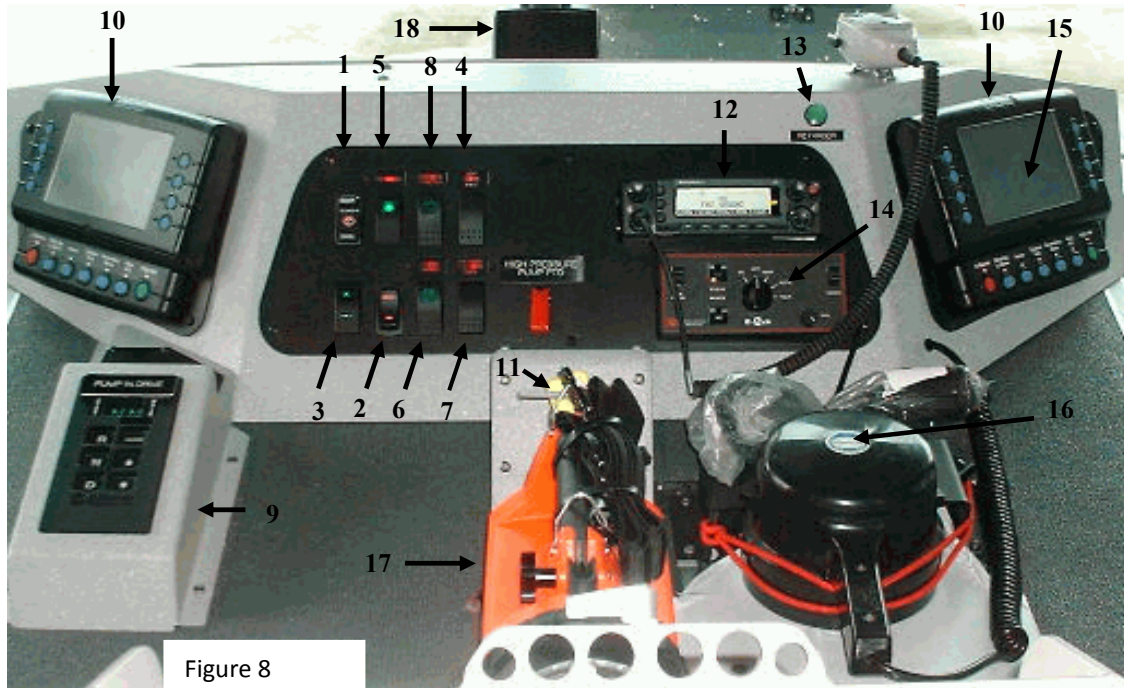


Figure 8

1. Windshield wiper switch
2. Panel light dimmer switch
3. Headlight switch
4. 3-Way Amber LED Warning light switch: Left=sequences left, Center=Random flash, Right=sequences right
5. Retarder switch
6. Heated mirror switch
7. Horn / Siren / Air Horn switch
8. Mud/Snow Traction
9. Transmission Keypad shifter
10. (2) V-MUX Multiplex Screens
11. Parking Brake
12. Radio (*New* Motorola 05)
13. Retarder "ON" light
14. Siren control
15. Officer's speedometer
16. Spot Light
17. Flashlight
18. Speaker

Figure 7

OFFICER'S SIDE DASHBOARD:



The F.M.D.T. is directly in front of the Officer's seat. See **Figure 8**. The Fire Mobile Data Terminal (F. M. D. T.) is securely fastened, in front of officer's seat, to a locking mount, on the docking station, that can be removed by the use of the proper key.

The siren control module is located on the engine doghouse immediately to the left of the officer's seat **Figure 7**. The Federal EQ2B siren is an electronic siren, which accurately emulates the sound of the electro-mechanical Q2 siren that is by far, the most popular siren in use by the Fire Service throughout the USA. Because the siren is an electronic design with an amplifier and speaker, it also has a PA function with a separate microphone from the radio microphone. The unit can be set to function in the PA mode or a choice of siren mode functions and includes an electronic horn switch. Because the siren takes several seconds to wind-down in the wail or manual functions, a "Brake" switch is provided to silence the speaker in less than two seconds. To operate the siren from the officer's siren foot pedal or the horn button on the steering column, the mode function switch on the siren control head must be set to the "MANUAL" function.

MISCELLANEOUS CAB FEATURES:

Mounted in the ceiling of the cab interior, directly to the rear of the windshield defroster unit, is a warning light to indicate an open cab or compartment door. This is a bright red LED light, which flashes rapidly when a cab or compartment door is still open whenever the parking brake is released.

Just to the rear of the open door warning light is a dome light with two map lights, which are switched independent of the dome light.

Above each cab door is a combination white and red dome light. The red light can be used to provide minimal illumination in the cab without distracting the driver.

A small on-board air compressor is underneath the forward facing firefighter's seat. This compressor ensures adequate air pressure when an alarm is received. It should be tested weekly by deliberately draining the apparatus air supply. This can be accomplished by repeatedly pumping the air brake pedal with the motor shut off.

A battery conditioner/charger is mounted on the cab floor under the rearward facing jump seat. The battery conditioner is provided to ensure that the apparatus batteries are maintained with sufficient charge to start the apparatus motor while in quarters, offsetting the constant draining of the batteries by the M.D.C. and G.P.S. systems. AC power to the battery conditioner is provided by the shoreline.

The ALS compartment, located behind the officer's seat, is equipped with AC outlets to provide power for charging ALS equipment. Power for these outlets is provided by the shoreline.

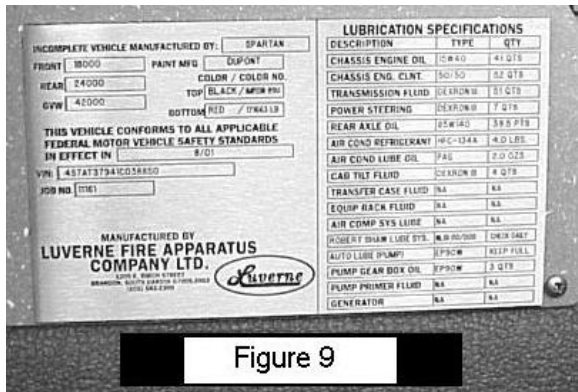


Figure 9

A specification plate is mounted on the engineers' sun visor inside the cab. The specification plate **Figure 9** lists the axle ratings, G.V.W.R., paint codes and Vehicle Identification Number. Also listed are the various fluids for the apparatus and their capacities to serve as a reference for the operator as well as service personnel.

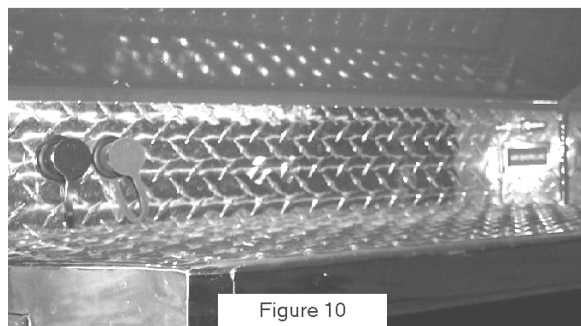


Figure 10

Figure 10 shows the battery jumping terminals located immediately below the driver's door. The terminals are protected with rubberized, color-coded caps (red-positive and black-negative). The jumping terminals can be used if the apparatus must be jump-started or to use the apparatus batteries to jump-start another vehicle. **Also pictured is the previously mentioned Air Inlet.**

A large white scene light is mounted on each side of the cab exterior for illuminating the work area on the sides of the apparatus. Each scene light has its own switch mounted on the switch panel on the engine doghouse.

PUMP AND PUMP CONTROLS



Figure 11

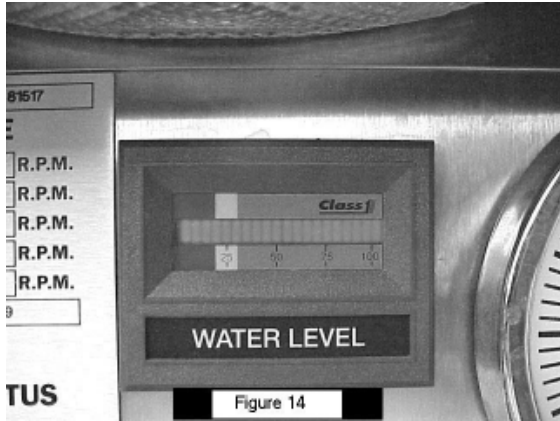
The Hale QTwo-23S pump **Figure 11** installed in this apparatus was designed to meet or exceed the performance requirements specified by the Chicago Fire Department. Working closely with the pump and apparatus manufacturers, Department representatives attempted to develop a design which provides superior flow characteristics for L.D.H. discharges, a deck gun design that provides maximum versatility, and a user-friendly pump panel configuration.

An additional intake is provided on the rear of the apparatus in response to requests from numerous field personnel.

The main goal in configuring the pump operators' panel was to place the operating handle/control and discharge gauge for each discharge as close to the actual discharge port location as possible. This enables the operator to quickly locate the appropriate control and gauge.

The large hand-wheel for controlling the L.D.H. discharges is required due to the size of the valve supplied to control these discharges. A return to the use of the horizontal sliding discharge handles for the side mounted 2-1/2" discharge ports was specified as the design provides ease of regulating the hand-lines most often connected to these discharges.

Figures 12 and 13 show the location of the external remote radio control head and microphone. In order to provide a position convenient to the pump operator and yet not vulnerable to the elements, the control head and microphone are mounted inside the "Engineers Compartment". To avoid requiring the door of this compartment to remain open during pumping operations, the microphone is mounted to the inside of a small door, which can be opened to access the microphone when pumping. The control head in the compartment need only be accessed when changing the radio channel or adjusting the volume on the external speaker, which is mounted above the pump operators panel.

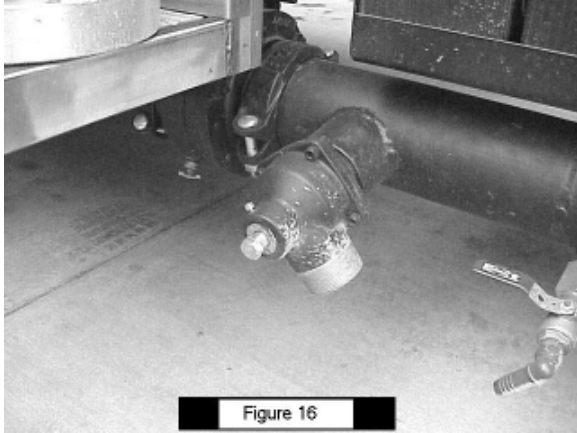


The water level gauge shown in **Figure 14** is located at the top center of the pump operator's panel. 20 LED bars indicate the water level with indicators at each quarter of the scale. As the water level decreases, the LED's shut off from right to left. At 25% remaining water in the tank, the LED's, which have shut off, will begin flashing to alert the pump operator that the water level is less than 25%.



The front and rear suction inlets to the pump have air-operated valves. The front and rear intake switches shown in **Figure 15**, while appearing to be electrical switches, are actually air switches which can be immediately switched from one position to the other. They are designed to open or close the intake valve slowly as required by N.F.P.A. standards.

While the operation of this pump is similar to earlier models, there are some new innovations as well as required accessories that should be discussed. The following is a list of these items.



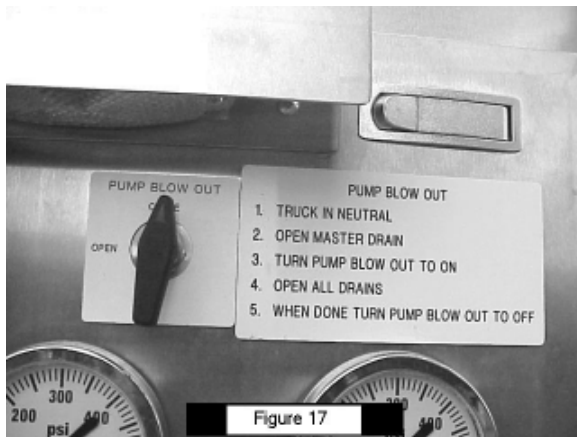
SUCTION RELIEF VALVE:

N.F.P.A. STANDARD 1901 requires that all new pumpers be equipped with an automatic intake pressure relief system. This system helps protect the intake side of the pump from excessive pressures, as may be encountered when working from a wall hydrant or during an in-line operation. Each of the four suction inlets to the pump is equipped with an intake relief valve as shown in **Figure 16**. With an operating range of 75-250 PSI, the intake relief valves on this apparatus are adjusted to open at 125 PSI.

NEW MANUAL BLEED DRAINS:

The two cross-lay beds are equipped with manual drains.

AIR BLOWOUT SYSTEM:



The pump is equipped with an air blowout system, which will help to drain the entire pump of water. This will be especially useful during cold weather. The instruction plate is found at the upper right portion of the pump operator's panel as shown in **Figure 17**.

SLOW CLOSE DEVICES:

N.F.P.A. STANDARD 1901 dictates that all intakes/discharges 3" or larger be equipped with slow open/close devices to reduce the likelihood of water hammer when these valves are operated. Therefore, front and rear intakes are so equipped with the air-operated intake valves mention earlier.

The large side intakes are equipped with manually operated valves, which are opened or closed with a hand wheel.

As mentioned earlier, the L.D.H. discharges have hand wheel operated valves, which prevent rapid opening or closing. The deck gun has a valve, which requires extra effort to open or close to comply with this standard.

BLEEDER VALVES ON INTAKES:

The large side intake valves are quipped with bleeder valves on the outboard side of the valve. The front intake has 2 drain valves, one in front and one behind the front axle, and the rear intake has a bleeder valve handle below the rear intake port.

When receiving water into any of these intakes through 4" hose, such as quick water or in-line operations, these bleeders should be left open until a steady flow of water is present before opening the intake valve. This will prevent air from being forced into the pump, which can cause damage.

ELECTRONIC PRESSURE GOVERNOR:



Figure 18

Earlier apparatus equipped with electronic pressure governors utilized the *Captain* model, which contained the pump controls in one panel and the engine data in a separate panel. The *Total Control* pressure governor incorporates both functions into a single unit. The operations of both models are identical with the exception of a few minor differences.

Due to the extensive information required for the safe and efficient operation of the *Total Control*, a separate manual is being supplied with your new apparatus to assist engineers and certified extra drivers in becoming familiar with this device. It is recommended that a copy of the manual be kept in the apparatus as a reference.

All new engines are being equipped with E electronic pressure governors to control the fire pump. **Figure 18** shows the control panel for the *Total Control*, pressure governor installed on this apparatus. Manufactured by *Fire Research Corporation*, it is designed to operate pumps powered by *Detroit Diesel* engines.

GENERAL OPERATING PROCEDURES

STARTING THE ENGINE:

- Turn ON master battery switch.
- Turn ON ignition switch.
- Engage starter by depressing starter button.

ENGINE SHUT DOWN:

- Transmission in NEUTRAL gear.
- Engage parking brake or chock wheels.
- Turn OFF ignition switch.
- Turn OFF master battery switch.

PUMP ENGAGEMENT:

- Bring the vehicle to a complete STOP.
- Place the road transmission in NEUTRAL.
- Engage the parking brake and chock wheels.
- Move the Pump Shift control handle from "ROAD", hesitate briefly in the neutral position, then into the "PUMP" position.
- The GREEN "PUMP SHIFT" LIGHT immediately adjacent to this control will come "ON" indicating a completed shift.
- When ready to immediately discharge water, place the ROAD transmission in DRIVE by depressing the "D" button on the keypad shifter.
- The "PUMP ENGAGED-OK TO PUMP" indicator light will come ON in about two seconds, again indicating a completed shift. If the shift does not seem to be completed, repeat the entire procedure.
- **Check Speedometer, it should read 15-20M.P.H., if not, repeat procedure.**

NOTE:

The accelerator pedal in the cab is inoperative whenever the pump is engaged.

PUMP OPERATION:

It is imperative that the pump operator thoroughly review and understand the operation of the Electronic Pressure Governor before operating the pump. Refer to the *Fire Research Corporation* Operational Guide provided with this apparatus before operating the pump.

Ensure that the *GREEN* pump engaged light and the *GREEN* road to pump light are illuminated. The RPM gauge should now registers a minimum of 1500 RPMs. Also, before operating the pump, ensure that the throttle ready *GREEN* lamp is illuminated next to the pressure governor panel.

You may now proceed with the pumping operation, following established pump operating procedures and information provided in the *Fire Research Corporation Operation Guide*.

SHUTTING DOWN THE PUMP:

1. Make certain to press the "IDLE" switch on the Pressure Governor Panel to bring the engine to idle speed and cancel the "PRESSURE" mode operation.
2. Shift ROAD transmission to NEUTRAL.
3. Move the pump shift control lever from the PUMP position, pausing briefly in the NEUTRAL position, then into the ROAD position.
4. Neither GREEN indicator lights should be illuminated at this point.

NOTE:

SINCE MODERN PUMPS DEPEND ON WATER BOTH FOR LUBRICATION AND COOLING PURPOSES, IT IS IMPERATIVE THAT A FLOW OF WATER BE PROVIDED TO THE PUMP. IF IT IS NECESSARY TO TEMPORARILY CEASE PUMPING OPERATIONS, MERELY PUT THE ROAD TRANSMISSION IN NEUTRAL.

DRIVING PROCEDURES

ACCELERATOR PEDAL:

The motor on this apparatus has an electronically controlled fuel system. As a result, the accelerator pedal is an electronic device, which results in an instant response to changes in the position of the pedal. On rougher pavements, the bouncing of the apparatus can cause the driver to fluctuate the position of the accelerator pedal making steady application of power more difficult.

To compensate, it has been found that keeping the heel of the right foot resting on the floor of the cab provides a steadier control of the accelerator pedal.

ROAD TRANSMISSION:

The road transmission is controlled by means of a keypad shifter located on the dashboard, immediately to the right of the driver. When the "D" button is depressed, the transmission will shift into DRIVE and the digital display will show the number "4". This indicates that the transmission will operate from 1st thru 4th gear. This range of gears is recommended for operation on city streets.

When driving on an expressway or the Outer Drive, it may be desirable to shift up to 5th gear. By depressing the "MODE" button, the display will change to "5" and the transmission will operate in 1st thru 5th gear. This procedure can be done whether the vehicle is in motion or stationary. The procedure can be reversed as long as the vehicle speed is less than 50 MPH.

When slippery, snowy, icy road conditions, or steep grades are encountered, it may be desirable to operate in a lower speed range. By depressing the "MODE" button and then the "DOWN ARROW" button, the display can be changed to 3, 2, or 1 to lower the maximum gear in which the transmission will operate.

MUD/SNOW TRACTION:

The apparatus is equipped with a mud/snow traction feature. This allows you to engage the mud/snow toggle switch by pressing it to the on position and continuing to hold it until you are free to move the apparatus. The mud/snow feature allows the axle to slow down rotation, which provides more road traction.

TRANSMISSION RETARDER:

The apparatus is equipped with a transmission retarder, which can be switched on and off. The switch to activate the retarder is located near the engineer's right hand. Once the transmission retarder has been switched to the "ON" position, it illuminates the retarder light located on the officer's side of the dash. **See Figure 7.**

The transmission retarder provides additional braking force to the rear wheels, which considerably extends the service life of the brakes. When switched on, the retarder activates whenever the driver totally releases the accelerator and applies braking action down to approximately 5 MPH.

IT IS THE POLICY OF THE CHICAGO FIRE DEPARTMENT THAT THE RETARDER BE ACTIVATED AT ALL TIMES WITH THE EXCEPTION OF SLIPPERY ROAD CONDITIONS SUCH AS IN RAIN, SNOW, OR ICE.

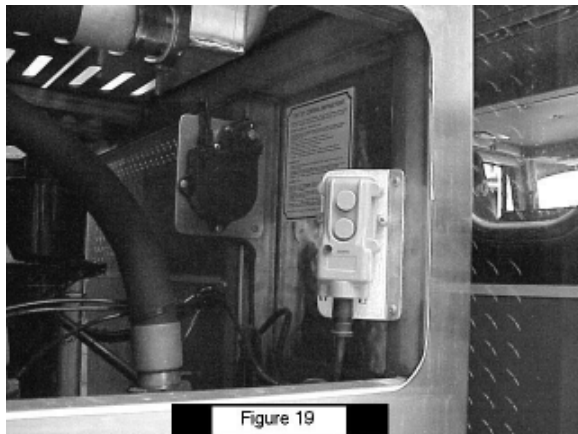
Due to the fact that the braking force applied by the retarder cannot be regulated by the driver, there is a possibility that it can cause the rear wheels to lock under slippery road conditions, causing a loss of vehicle control. The vehicle's anti-lock brake system is designed to automatically disable the retarder when wheel lock-up is detected; however, the manufacturer strongly recommends that the retarder be disabled by the driver whenever road traction is questionable.

A warning plate has been installed just below the transmission keypad shifter to remind the driver to disable the retarder during slippery road conditions.

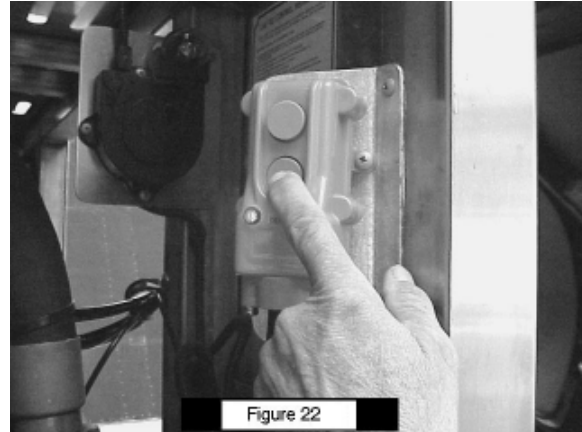
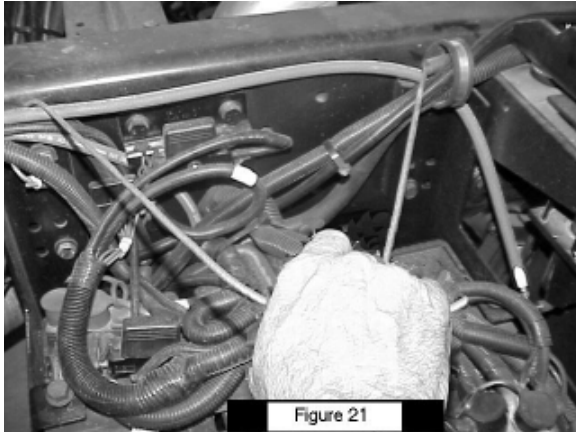
CAB TILT PROCEDURES

CAB TILT:

1. Master Battery Switch "ON".
2. Engine not running.
3. Parking Brake Engaged. (Wheels Chocked)
4. Move the front suction swivel to the FORWARD position.
5. (This usually requires stretching out the soft suction)
6. Check the front bumper area for any other items (including hose butts etc.) that may interfere with the raising of the cab.
7. Check and remove/secure any loose items from within the entire cab area. S.C.B.A. harnesses should be removed from all forward facing seats.
8. Make certain that all doors are secured in the closed position.
9. Make certain that the deck gun is resting in the cradle supplied.
10. Front wheels must be pointed forward.
11. Check for adequate (15 FEET MINIMUM) overhead clearance.
12. Remove upper portion of pump panel on officer's side of apparatus to access cab lift controls. **Figure 19**
13. Push and hold electric tilt switch "UP" button until cab tilts and manual safety holding device falls into place. **Figure 20**
14. Push electric tilt switch "DOWN" button until cab rests on the manual safety-holding device.

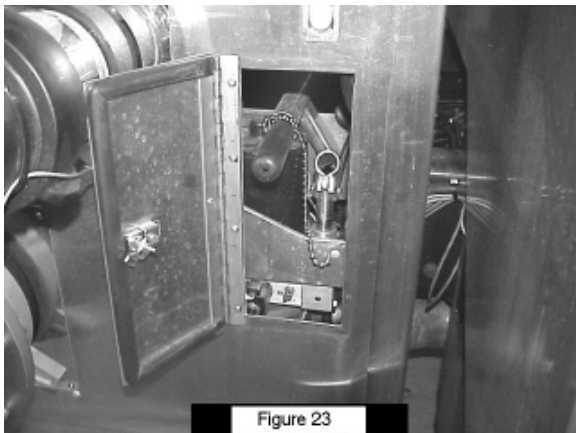


CAB LOWERING:



1. Push electric tilt switch "UP" button to free-up manual safety holding device.
2. Pull cable release with right hand **Figure 21**, (CONTINUE TO HOLD ONLY LONG ENOUGH TO DISENGAGE MANUAL SAFETY). At the same time, with the left hand, push the electric tilt switch "DOWN" button to lower the cab **Figure 22**.
3. After the cab appears to be fully lowered, CONTINUE TO HOLD THIS SWITCH DOWN FOR APPROXIMATELY 5 SECONDS or until red lamp flickers or shuts off.

MANUAL CAB RAISING/LOWERING CAPABILITY



In case of electrical pump failure, the cab may be raised and/or lowered by following the same procedures while providing the necessary hydraulic power via the manual hydraulic jack **Figure 23** provided within a compartment to the right of the L.D.H. discharge port on the officer's side pump panel.

LifeGaurd SRS System:



Figure 24

The apparatus is equipped with the LifeGaurd SRS system, which provides side roll protection for the driver, officer, and rear-facing seat behind the driver. **Figure 24.** The system will be activated in any type of rollover crash.



Figure 26

While performing the regeneration process the vehicle should be placed in an area where there is sufficient space to release exhaust temperatures that are higher than normal. The exhaust will reach very high temperatures and are dangerous for firefighters and civilians.

Redundant Lighting Circuit Switch:



Figure 27

The redundant lighting circuit switch **Figure 27** allows the apparatus to still have emergency lights when all electric power is lost. The switch has a safety rocker, which will automatically turn off when the rocker is in the down position.

Emergency Pump Shift:



Figure 28

The Emergency Pump Shift **Figure 28** enables the apparatus to be placed in the pump position in the event the air operated pump shift operation fails. Follow the instruction posted at the side of the Emergency Pump Shift to engage apparatus in pump.

OTHER MISCELLANEOUS ITEMS

WORK LIGHTS:

The apparatus is equipped with work lights at several locations on the body. A switch located on the pump operator's panel illuminates the pump panel.

The rear tailboard area can be illuminated with work lights operated from a switch on the left side of the rear of the apparatus.

Lights have been installed under the catwalk above the ladders to aid in removal and replacement of the ladders. These lights are operated from a switch located on the right rear of the apparatus.

FOLDING STEPS:

The folding steps installed on the body of this apparatus were positioned to provide the best possible access to the upper portions of the body. Using any other portion of the body or its accessories as stepping surfaces is not only dangerous but can cause damage to equipment.

HARD SUCTION HOSE:

Due to the relative infrequent use of the hard suction hoses, they have been positioned in a location on the apparatus, which has reduced the ease of access when needed. This was done to maximize the use of the hose bed area for its intended purpose.

The recommended method of removing the hard suction from the apparatus is to have personnel climb into the hose bed area, remove the hard suction from their trays and lay them into the hose bed. After climbing down from the hose bed, the personnel can slide the hard suction off the back of the apparatus. This method can be used when only the engineer and the hydrant person are available to perform this task.

If additional personnel are available, the hard suction can be passed off the rear of the apparatus immediately upon removal from the tray.

DO NOT ATTEMPT TO PASS THE HARD SUCTION HOSE TO PERSONNEL ON THE GROUND OFF THE SIDE OF THE APPARATUS AS MISHANDLING COULD CAUSE UNNECESSARY DAMAGE TO THE APPARATUS BODY.

REMINDER

ANY DEFECTS FOUND DURING INSPECTIONS OR OPERATIONS MUST BE PROMPTLY REPORTED, AND WORK ORDERS OBTAINED FROM THE DEPARTMENT OF FLEET MANAGEMENT,

WARNING - PER SPARTAN MOTORS, INC.

NO WELDING BY FIELD PERSONNEL ON THIS APPARATUS!

EXTREME DAMAGE WILL RESULT TO THE AUTOMATIC TRANSMISSION ELECTRONIC CONTROLS. DISCONNECTING THE VEHICLE BATTERIES IS NOT SUFFICIENT PREVENTION.

TAKE CARE OF IT, DON'T ABUSE IT, AND IT WILL TAKE CARE OF YOU.

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