



Odin® Derringer 100/50 Specificationⁱ

The Derringer provides a self-contained, diesel-powered, “slide-in” type compressed air foam system (CAFS) unit. The CAFS unit shall be designed to fit into the back of a standard length and width pick-up truck body.

The CAFS shall be designed to discharge water only, air only, foam solution only or compressed air foam from the same discharge outlet. In addition, the consistency of the compressed air foam (expansion ratio), wet/dry shall be fully adjustable.

Engine

The power to drive the system shall be provided by a *Kubota* model 1505, liquid cooled, indirect injection, naturally aspirated diesel engine. The heavy duty rating for this engine is 33.5 hp @ 3000 rpm. Automotive engines or ratings will not be used. The power unit shall have re-borable crankcase of grey cast iron. Aluminum heads with replaceable valve guides. The pressure-lubricated engine shall have a 12VDC 40-amp alternator, glow plugs. A remote oil drain shall be supplied.

Water Pump

The water pump shall be a *Darley* model 1½” AGE single-stage centrifugal pump with a vertically split aluminum case with replaceable bronze impeller and seal rings on a stainless steel shaft. It is designed to provide up to 130 gpm (492 L/min) of plain water flow and pressures up to 170 psi (11.7 b). The pump seal shall be of a mechanical design. Helical cut gears shall be utilized in the pump transmission.

Air Compressor

The air compressor shall be of the oil injected rotary screw type, designed and installed to supply a minimum of 60 cfm @ 125 psi (1982.2 L/min @ 8.6 b) of free air at maximum engine rpm. The compressor air/oil receiver shall be built and designed by the compressor manufacturer. A spin-on oil filter shall also be integrated into the compressor system. Replacement elements shall be readily available.

The air compressor shall be driven via a dry *Gates Poly-V*® drive from the engine crankshaft and will be mounted to the pump platform. The air compressor shall be capable of maintaining prolonged pressure to 150 psi (10.3 b) throughout the service life of the complete CAFS unit.

A pneumatic modulating inlet valve mounted on the air end inlet shall control the compressor. An Auto Odin balancing system shall be provided to automatically maintain the air pressure within plus-or-minus 5% of the water pump pressure throughout the CAFS operating range.

The cooling water to the heat exchanger shall be supplied through a dedicated, filtered line, from the units water pump. Water shall flow through the heat exchanger whenever the water pump is operating. The air compressor cooling system shall incorporate a thermostat that maintains the system oil temperature within a 168°F (75.6°C) to 225°F (107.2°C) range. The system shall be capable of maintaining recommended operating temperatures throughout the full operational range in ambient temperatures up to 115°F (46.1°C). A dry cartridge type air filter shall be provided on the compressor air intake.

Foam Proportioner

The foam proportioner shall be a *FoamPro* model 1601 automatic, 12 VDC, direct-injection system. It shall be capable of maintaining a solution ratio of 0.1% to at least 1% of class “A” foam. The pump shall be a plunger type positive displacement pump. The pump output shall be 1.0 gpm @ 200 psi (3.8 L/min @ 13.8 b). The motor shall be rated at 1/3 hp with a maximum amp draw of 19 amps @ 200 psi (13.8 b). The proportioner shall be capable of using different types of class “A” liquid foam concentrates. This complete system will be mounted within the module.

ⁱ Specifications are subject to change and improvements without notice.



Drive System

The water pump shall be directly driven using a centaflex coupling on an extension shaft in line with the crankshaft of the engine. The compressor, which will be mounted to the engine flywheel housing, shall be belt-driven using a *Gates Poly-V®* belt drive system.

Electrical System

All electrical equipment installed by the manufacturer shall conform to current automotive electrical system standards and the requirements of the applicable NFPA apparatus standards. The wiring shall be individually and permanently color and function coded. The installation shall meet SAE Standard J1128 in its latest edition for GXL or SXL temperature rating.

All exposed wiring shall run in loom with a minimum of 280°F (137.8°C) rating. All wiring loom shall be properly supported and attached to frame members along the entire run. At any point where wire or looms must pass through metal, rubber grommets shall be installed to protect the wire from abrasion.

The main low voltage electrical terminal block and circuit breaker panel shall be provided behind the pump operator's panel in a location providing easy service access.

The electrical connections shall be made using heat shrink and/or weatherproof connectors. All electrical circuits shall be protected with ATO blade type fuses.

Engine Compartment Light

An engine compartment light shall be installed in the module. The engine compartment light shall be controlled by the panel light switch.

Priming System

A *Darley* 12 VDC electric, oil-less, rotary-vane priming system shall be utilized. The primer is capable of priming the water pump through 20' of hard suction hose with a 10' lift. Primer controls and instruction plate shall be mounted on the operator's panel.

Plumbing, Hoses and Lines

All piping shall be stainless steel. Uses of grooved end pipe couplings are required for flexibility and movement of system components on mobile equipment. The compressor manufacturer shall supply all air compressor control lines. Hydraulic hoses will only be used for air injection lines and not control air lines. Flexible piping may be used where applicable. Check valves are required throughout the system to maintain integrity and shall be placed so that the air, water foam and foam solution do not inadvertently mix. One (1) master drain valve shall be provided on the control panel to completely drain the system to prevent freeze damage.

Tank to Pump

The Tank to Pump Valve shall be a 2" *Akron* 2" NST-M self-locking, swing-out valve fitted in the module and controlled from the operator's panel with a push/pull T-handle control.

Tank to Pump Check Valve

A Brass 2" check valve shall be installed in the water pump inlet plumbing, between the water tank and the pump inlet.

Suction Inlet

Suction piping shall be stainless steel with a 2" tank to pump valve controlled from the operator's panel. A 2½" male adapter and cap shall be provided at the operator's panel for drafting. All inlet valves will be *Akron* self-locking, swing-out valves.



Direct Tank Fill

A separate valve with a 2½” NH female swivel connection and plug shall be provided and controlled at the operator’s panel for “direct tank fill” operations with a pressurized water source.

Discharge Outlets

There shall be a 1½” stainless steel, plumbing to panel, mounted CAF discharge outlet. An additional CAF discharge mix point shall be provided for use as a hose reel, pre-connect (or other user defined discharge), for a total of two separate mix points.. Swing check valves shall be installed on each discharge to prevent foam from back flowing into the pump. The CAF mix point controls shall be grouped together on the panel with easy to read calibration marks laser cut into the panel. Discharge valves shall be Akron 1 ½” NST-M self-locking, swing-out valves.

Tank Refill

A 1 ½” tank refill line with a 1½” valve and flexible, reinforced wire-braid, hydraulic hose shall be provided.

Master Drain

A Darley multi-port master drain with remote drain hose shall be installed and operated from the operator’s panel. The drain valve shall be located lower than the main pump body and plumbed to completely drain the system for winterizing.

Module Frame

The frame shall be constructed of aluminum and designed for rigorous use by fire service personnel. The top of the module shall be a laser-cut, aluminum diamond-plate material, stainless steel hinged for a complete service access door. The top access door shall use pneumatic gas shocks to maintain the door in the open position.

Corrosion Resistance Treatments

Die electric tape (laminating type UHMW) is used through out the construction of the module for dissimilar metal contact surfaces. This will include, but not be limited to control panel to frame, engine mounts to frame, and solution injection unit to frame.

All SS screws, which secure the SS panel to the aluminum frame, will be treated with dielectric liquid. The majority of fasteners throughout the system will be SS.

All electrical ground connections to the frame will be treated with dielectric silicone compound. Wire ends will have waterproof and corrosion resistant shrink tube, adhesive lined type terminals and connectors. All electrical plugs in the module will be environmentally sealed Deutsch type. The entire surface of the electric fuse / connection box will be treated with a urethane seal coat, to seal out moisture.

Control Panel

A brushed stainless steel, laser-cut control panel shall be mounted to the electrical box, which shall be of a water resistant design. The following items shall be positioned and clearly marked in a logical manner on the control panel to provide for simple and easy operation.

1. LED Pump Panel Light Cluster & Switch
2. Water Tank Level Indicator
3. Foam Tank Level Indicator
4. 4” Black Face, Master Water Pressure Gauge
5. 4” Black Face, Master Air Pressure Gauge
6. 4” Black Face, Master Inlet Compound Gauge
7. Pump Test Ports
8. Primer Control
9. Tank Refill Valve, Locking, Push/Pull, T-Handle Valve
10. Direct Tank Fill, Locking, Push/Pull, T-Handle Valve
11. Direct Tank Fill, Inlet, 2½” NH Female Swivel with Plug & Lanyard



12. Tank to Pump, Locking, Push/Pull, T-Handle Valve
13. Suction Inlet, 2½” NH Male with Cap & Lanyard
14. Vernier Throttle Control
15. Master Drain Valve
16. Auxiliary Air Outlet
17. System Operation Instruction Placard
18. Panel Discharge CAFS Outlet 1½” NH Male with Cap & Lanyard
19. *FoamPro* Concentrate Proportioner Control
20. Two (2) Separate Sets of Mix Point Controls
 - a. Water Solution Valve
 - b. Quarter-Turn Air Injection Control Valve
 - c. Quarter-Turn Mix Point Pressure Drain Valve
1. Deluxe SS hinged Electrical Door
 - a) Lofa Engine control
 - b) Hour meter
 - c) Tachometer
 - d) Ignition switch
 - e) Battery charge light
 - f) Glow plug light
 - g) Low oil pressure light
 - h) Engine High Temperature light
 - i) Low water pressure light
 - j) High compressor temperature light
 - k) Compressor temperature gauge
 - l) Engine temperature gauge
 - m) Volt Meter gauge
 - n) Engine oil pressure gauge
 - o) 97dB Audible Alarm
 - p) Panel Light Switch

Labels

All controls, inlets and discharges shall be clearly labeled. The labels shall comply with applicable NFPA standards.

Testing

The completed unit shall undergo a manufacturer’s run-in test prior to delivery. The engine, pump and air compressor shall be operated for a minimum period of six (6) hours, during which time the test operator shall monitor and record the functions and performance of each system component. Compressed air foam shall be produced during the test.

This testing shall be performed to ensure proper system operation and performance prior to shipment. The manufacturer shall provide written certifications that the tested unit meets all performance criteria contained herein (NFPA). Water flow performance shall be tested in accordance with NFPA 1911. Airflow performance shall be measured with a temperature and pressure compensated air flow meter.

Manuals

One (1) copy of the *Operation and Maintenance Manual* and a CD copy shall be provided to the purchaser with each unit. This manual shall include detailed instructions in the operation and maintenance of the overall unit, engine, water pump, air compressor and foam proportioner.



Dimensions

Length	54.5"	(121.92 cm)
Width	47.5"	(120.65 cm)
Height	39"	(71.12 cm)
Weight	1,250 lbs.	(269.9 kg)

Performance

Water Pump	135 gpm @ 150 psi	(511.03 L/min @ 10.3 b).
	160 gpm @ 100 psi	(605.7 L/min @ 6.9 b)
Air Compressor	60 cfm @ 125 psi	(1699 L/min @ 8.6 b)
Simultaneous Flow (NFPA)	100 gpm & 50 cfm @ 125 psi	(378.5 L/min & 1415.8 L/min @ 8.6 b)
Simultaneous Flow	130 gpm & 60 cfm @ 100 psi	(492.1 L/min & 1699 L/min @ 6.9 b)
Engine Horsepower	34 hp @ 3600 rpm	
Fuel Use @ Full Load	1.6 gph	(6.1 L/hr)

Warranty

Engine	1 year
Compressor	1 year
Water Pump	3 year/3000 hours
Chemical Injector	1 year
Water Tank	Lifetime

All fabrication and materials are warranted for a period of two (2) years barring accidents, abuse or negligence. Excluding from warranty are all consumables and parts subject to routine replacement. We will repair or assist in the repair or replacement of the product in its entirety.

Derringer Options

The list of options, which follow, can be added to the standard Derringer module according to your specifications and needs of operation. These options are not included in the base price of the module.

Water Tank

The water tank shall be rectangular in configuration and shall have a capacity based on the chassis GVW. The tank shall be constructed of ½" polypropylene sheet. All joints and seams are to be nitrogen welded.

The tank cover shall be constructed of ½" polypropylene and shall incorporate hold-downs to assist in keeping the cover rigid under fast filling conditions. The cover shall have a combination vent and manual fill tower. The tower shall have a hinged cover and a ¼" thick polypropylene screen.

There shall be two (2) standard tank outlets; one for the tank to pump suction line and one for the tank fill line. An anti-swirl plate shall be installed at the tank-to-pump outlet. A manufacturer's warranty shall be included for the tank.



A 25-gallon (94.6 liter) polypropylene foam reservoir shall be provided as an integral part of the booster tank and shall contain a low-level sensor in the bottom of the tank to signal when the foam reservoir needs to be filled. The tank shall be plumbed to supply the foam proportioner pump with a minimum 3/4" hose (size varies per customer specifications).

The tank shall include all fittings, adapters, senders, switches and hoses necessary for tank to module connections.

Skid Frame and Water/Foam Tank

An aluminum weldment sub-frame shall be provided to support the entire slide-in module, with the base constructed of 2" x 4" x 1/4" tubing. The sub frame shall be strong enough to support the weight of the booster tank and pumping equipment while in the apparatus and during loading and unloading and shall be utilized as a base mount for the engine, compressor and pump. Square tubing uprights with angled gussets shall extend up from the rear of the sub frame for attachment of the full width operator's panel. Provisions shall be incorporated in the sub frame to facilitate using a forklift for loading and unloading of the unit.

The tank shall be bolted to the skid frame with stainless steel hardware through full width integral flange mounts at the front and rear. The water tank shall be completely removable without dismantling the skid unit.

Hose Reel

The hose reel shall be of aluminum construction with fairleads and electric rewind, installed with 100' of 1" Niedner HotStop hose with one 1" pistol grip ball valve and tip. The hose reel shall be mounted on top of the water tank and shall have a straight swivel inlet.

Sides

The sides shall be computer cut, ventilated, diamond plate aluminum.

Auxiliary Air Outlet

A type "C" Female quick connect air fitting shall be mounted to the control panel.

Foam Pro Powerfill Foam Refill System

A FoamPro Powerfill foam refill system shall be provided, for installation by the customer. The system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell following manufacturer's recommendations. External fill and flush connections to be quick-connect, cam-lock type. Internal piping to incorporate check valves to prevent backflow. Concentrate tank inlet shall be positioned to minimize agitation per manufacturer's recommendations. The refill operation shall be based on direct measurement of concentrate level in tank. System must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporated within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all bronze three-way valve shall be included to allow the operator to flush system after use. Valve control, intake and flush ports shall be located within corresponding panel plate.

System shall include a 12 or 24-volt electric motor driven, positive displacement concentrate pump. Pump shall deliver minimum flow of 10 gpm (37.8 L/min) @ 20 psi with all concentrates currently utilized in fire apparatus. Pump body to be of all bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system will draw a maximum of 38 amps @ 12 VDC or 19 amps @ 24 VDC. A pump/motor solenoid (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.4 Kw) electric motor directly coupled to the concentrate pump. The system shall receive readings when the concentrate tank is full and stop operation to prevent overflow. (Shipped loose)



Foam Pro Electronic Dual Tank Valve

A FoamPro Electronic Dual Tank Valve System shall be provided, for installation by the customer. The system shall include a solenoid operated valve assembly, a panel placard with switches and lights, check valves electronic module, strainers and interface cables. This system will shift between a class “A” foam tank and a class “B” foam tank. There will be an automatic water flush cycle to prevent cross contamination of the 2 types of foam.

FoamPro 2001

The foam proportioner shall be a *FoamPro* model 2001 automatic, 12 VDC, direct-injection system. It will provide push-button control of foam proportioning rates from 0.1% to 9.9%, in 0.1% increments. The pump output shall be 2.6 gpm @ 150 psi (9.84 L/min @ 10.3 b). The motor shall be rated at ½ hp with a maximum amp draw of 40 amps. The proportioner shall be capable of using different types of liquid foam concentrates. This complete system will be mounted within the module.

FoamPro 2002

The foam proportioner shall be a *FoamPro* model 2002 automatic, 12 VDC, direct-injection system. It will provide push-button control of foam proportioning rates from 0.1% to 9.9%, in 0.1% increments. The pump output shall be 5.0 gpm @ 150 psi (18.9 L/min @ 10.3 b). The motor shall be rated at ¾ hp with a maximum amp draw of 56 amps. The proportioner shall be capable of using different types of liquid foam concentrates. This complete system will be mounted within the module.

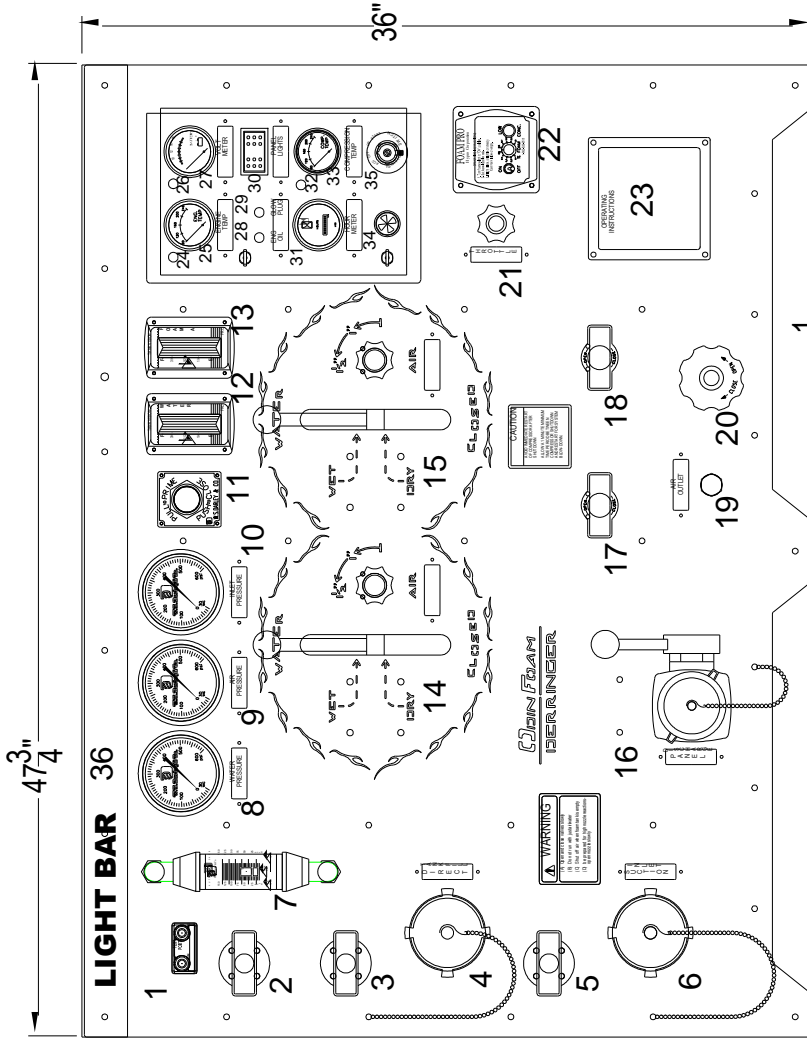
Remote Start with Throttle Rocker

The remote control panel shall be pre-wired with plug-in connectors for ease of installation. The standard wire harness length is twenty-five feet (25'). The remote start option shall include the throttle rocker actuator mounted to the throttle linkage on the engine. The assembly shall include the following components mounted on a placard with the necessary labels permanently painted on the placard.

- 1) Low Oil psi Light
- 2) System High Temp. Light
- 3) Glow Plug Light (*when used*)
- 4) Low Water Pressure Light
- 5) FoamPro Remote On / Off Control (Requires Foam Pro 2000 Series option)
- 6) FRC Tank Vision Mini Water Tank Level Gauge
- 7) Throttle Rocker Switch
- 8) Ignition Switch
- 9) 97dB Audible Alarm

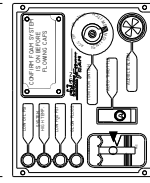


CONTROL PANEL



- 1. TEST PORTS
- 2. TANK REFILL VALVE
- 3. DIRECT TANK FILL VALVE
- 4. DIRECT TANK FILL INLET
- 5. TANK TO PUMP VALVE
- 6. SUCTION INLET
- 7. AIR FLOW METER
- 8. WATER PRESSURE GAUGE
- 9. AIR PRESSURE GAUGE
- 10. INLET PRESSURE GAUGE
- 11. PRIMER
- 12. WATER LEVEL GAUGE
- 13. FOAM LEVEL GAUGE
- 14. MIX POINT #1 CONTROLS
- 15. MIX POINT #2 CONTROLS
- 16. PANEL DISCHARGE
-Valve Optional-
- 17. MIX POINT #1 DRAIN
- 18. MIX POINT #2 DRAIN
- 19. AUX-AIR OUTLET
- 20. MASTER DRAIN
- 21. THROTTLE
- 22. FOAM-PRO CONTROLLER
- 23. OPERATING INSTRUCTIONS
- 24. HIGH-ENG-TEMP. LIGHT
- 25. ENGINE TEMPERATURE GAUGE
- 26. ALTERNATOR LIGHT
- 27. VOLTMETER
- 28. LOW OIL PRESSURE LIGHT
- 29. GLOW PLUG LIGHT
- 30. PANEL LIGHT SWITCH
- 31. ENGINE HOUR METER
- 32. HIGH COMPRESSOR TEMP. LIGHT
- 33. COMPRESSOR TEMPERATURE GAUGE
- 34. AUDIBLE ALARM
- 35. IGNITION SWITCH
- 36. LIGHT BAR

ELECTRICAL DOOR



REMOTE CONTROL PANEL (OPTIONAL)

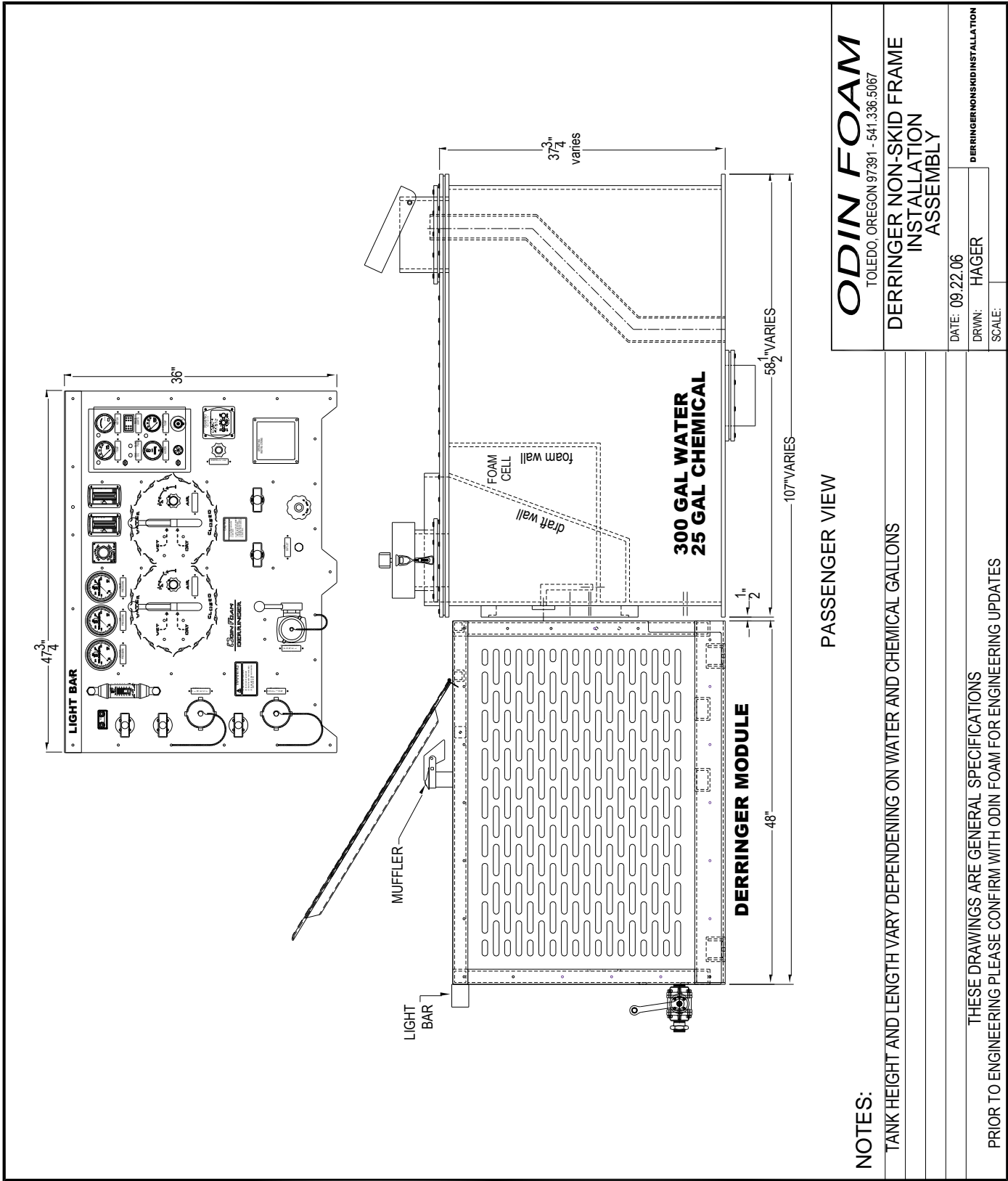
ODIN FOAM
TOLEDO, OREGON 97391 - 541.336.5067

DERRINGER CONTROL PANEL LEGEND

DATE: 03.16.06
DRWN: HAGER
SCALE:

DERRINGER PANEL LEGEND

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 TOLEDO, OREGON 97391 - 541.336.5067

**DERRINGER NON-SKID FRAME
 INSTALLATION
 ASSEMBLY**

DATE: 09.22.06	DERRINGER NON-SKID INSTALLATION
DRWN: HAGER	
SCALE:	

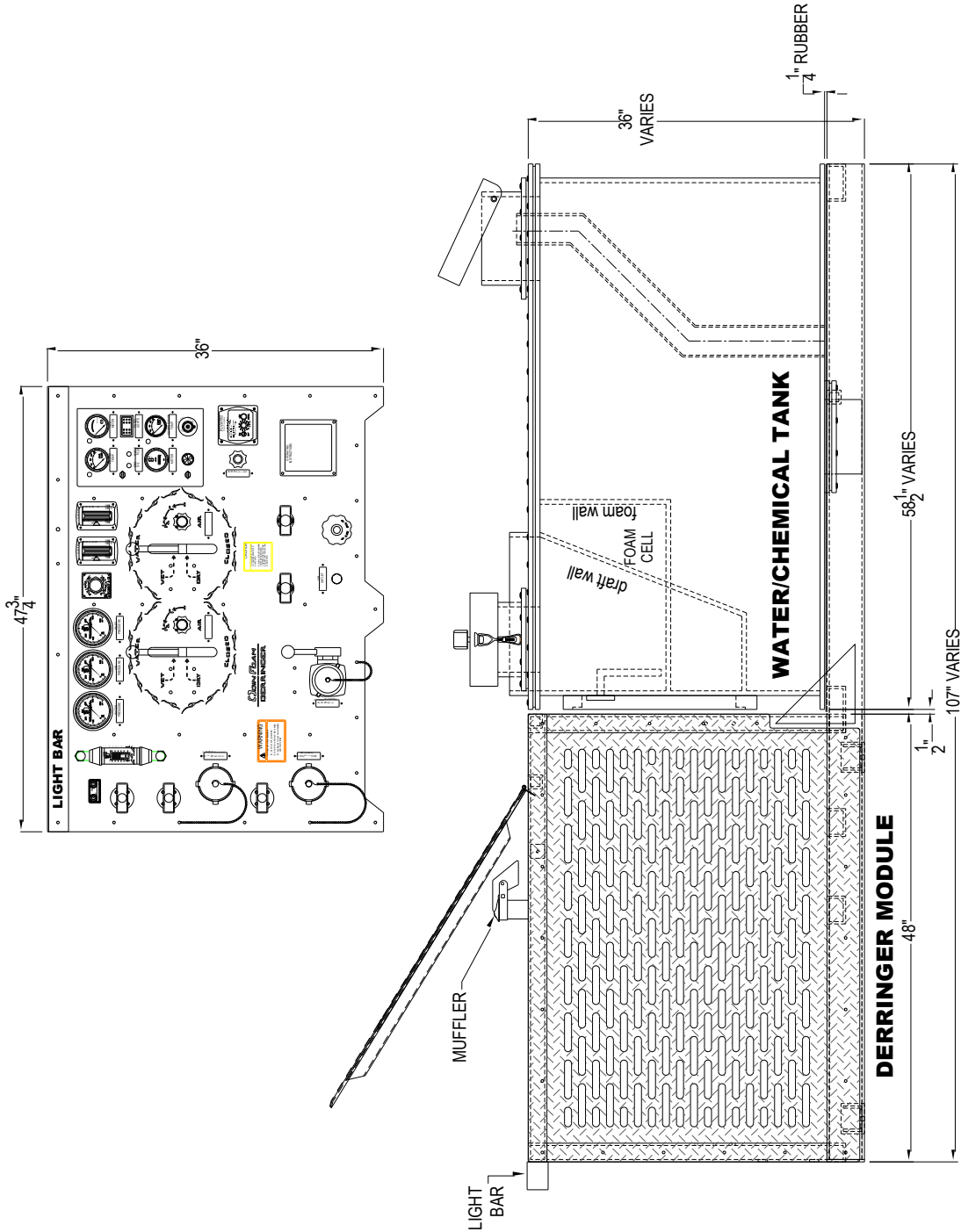
PASSENGER VIEW

NOTES:

TANK HEIGHT AND LENGTH VARY DEPENDING ON WATER AND CHEMICAL GALLONS

THESE DRAWINGS ARE GENERAL SPECIFICATIONS
 PRIOR TO ENGINEERING PLEASE CONFIRM WITH ODIN FOAM FOR ENGINEERING UPDATES

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PASSENGER VIEW

ODIN FOAM

TOLEDO, OREGON 97391 - 541.336.5067

**DERRINGER SKID FRAME
INSTALLATION
ASSEMBLY**

DATE: 07.01.04

DRWN: HERNANDEZ

SCALE: H:\CAD\DEPT\CAD\INSTALLATION\MODULES\DERRINGERSKIDINSTALLATION.DWG

NOTES:

TANK HEIGHT AND LENGTH VARY DEPENDING ON WATER AND CHEMICAL GALLONS

THESE DRAWINGS ARE GENERAL SPECIFICATIONS
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ODIN® Derringer 100/50	Engine Driven C.A.F.S.
Standard Equipment	
<ul style="list-style-type: none"> • Engine – Kubota, Liquid Cooled, 4 Cylinder 33.5 hp, Indirect Injection, Naturally Aspirated Diesel Engine, 12 VDC Electric Start, Vernier Throttle • Control Panel – Illuminated, Laser Cut, Brushed Stainless Steel Panel with all Engine, Air Compressor, Water Pump and Foam Injection System Controls, Gauges and Instruments Installed • Water Level Gauge • Foam Level Gauge • Air Flow Meter • Air Compressor – Rotary Screw Compressor Assembly, Auto Odin Balance Valve, Compressor Temperature Gauge with Alarm 	<ul style="list-style-type: none"> • Pump System – Darley Model 1½ AGE with Two (2) Independent 1½” CAF Discharge Mix Point, One (1) 2-1/2” Tank to Pump Suction Inlet and One (1) Direct Tank Fill with 2½” NH Female Swivel Inlet, Master Drain Valve, 12 VDC Electric Primer System and Stainless Steel Plumbing • Frame – Lightweight Aluminum with Fork Lift Provisions • Lid – Precision Computer Cut, Ventilated, Hinged, Gas Shock Lift Struts, Latched, Fully Assembled Lid • Foam Proportioner System – FoamPro Model 1601 System
Options	
300/25 Gallon Poly Tank (Shipped Loose) with Tank Kit – All Fittings, Boots, Clamps, Pipes, and Tank Mount Rubber Necessary to Connect the Derringer to a Water/Foam Tank	
200 to 400 Gallon Water / 25 Gallon Foam Poly Tank with Tank Kit, Installed on Full Skid Frame	
Sides – Ventilated, Precision Computer Cut (2 each)	
Hose Reel – Installed with 100’ of 1” Niedner Hose, 1” Pistol Grip Ball Valve and Tip	
<i>FoamPro Powerfill Foam Refill System (shipped loose)</i>	
<i>FoamPro Electronic Dual Tank System (shipped loose)</i>	
<i>FoamPro2001 Proportioner (Replaces FoamPro 1601 proportioner)</i>	
<i>FoamPro2002 Proportioner (Replaces FoamPro 1601 proportioner)</i>	
Remote Start with Throttle Rocker – Includes Mini Panel, Ignition Switch, Glow Plug Light, Low Oil Pressure Light, System High Temperature Light, Water Level Indicator, Low Water Pressure Light, Throttle Rocker Switch, Electric Throttle Installed on Linkage, 25’ of Coded Wire with Plug Connectors. Tested (<i>Shipped Loose</i>)	