COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF GENERAL SERVICES
COUNTY GOVERNMENT CENTER•SAN LUIS OBISPO, CALIFORNIA 93408•(805) 781-5200
DUANE P LEIB, DIRECTOR

INVITATION TO BID #3384-06
BREATHING AIR SUPPORT UNIT

February 3, 2006

The County of San Luis Obispo is currently soliciting bids for a Breathing Air Support Unit as noted.

Each bid shall specify each and every item as set forth in the attached specifications. Any and all exceptions must be clearly stated in the bid. Failure to set forth any item in the specifications shall be grounds for rejection. The County of San Luis Obispo reserves the right to reject all bids and to waive any informalities.

Please submit two (2) copies of your bid on the attached form. They must be received at the office of the General Services Department no later than 4:00 p.m., February 28, 2006.

Any and all comments and suggestions are sincerely encouraged prior to the bid opening.

If you have any questions about the bid process, please contact me at (805) 781-5906. For technical questions, call Rick Giubbini at (805) 543-4244.

BARBARA ADAMS
Buyer - Central Services Division

TO: ALL PROSPECTIVE BIDDERS
SUBJECT: LOCAL BIDDERS PREFERENCE

The County of San Luis Obispo has established a local vendor preference. All informal and formal bids for contracts will be evaluated with a 5% preference for local vendors. Note the following exceptions:

1. Those contracts which State Law requires be awarded to the lowest responsible bidder.
2. Public works construction projects.

A "local" vendor will be approved as such when, 1) It conducts business in an office with a physical location within the County of San Luis Obispo; 2) It holds a valid business license issued by the County or a city within the County; and 3) Business has been conducted in such a manner for not less than six (6) months prior to being able to receive the preference.

As of March 3, 1994 individual County Buyers evaluate bids considering the local vendor preference described above. The burden of proof will lie with bidders relative to verification of "local" vendor preference. Should any questions arise, please contact a buyer at (805) 781-5200. All prospective bidders are encouraged to quote the lowest prices at which you can furnish the items or services listed in County bids.

	YES	NO
Do you claim local vendor preference?		
Do you conduct business in an office with a physical location within the County of San Luis Obispo?		
Business Address: _____ _____		
Years at this Address: _____		
Does your business hold a valid business license issued by the County or a City within the County?		
Name of Local Agency which issued license: _____		

Business Name: _____

Authorized Individual: _____ Title: _____

Signature: _____ Dated: _____

TO: ALL PROSPECTIVE BIDDERS

SUBJECT: POLICY ON PURCHASING PRODUCTS MADE WITH OR CONTAINING CHLOROFLUOROCARBONS (CFC's)

Summary

Many products contain chlorofluorocarbons (CFC's), a known depleter of ozone in the atmosphere. Under the U.S. Clean Air Act and the Montreal Protocol on Substances That Deplete the Ozone Layer, CFC production for use in industrialized nations is to be totally phased out by January 1, 1996. There are still many products on the market that contain CFC's or are made with CFC's. The Department of General Services, purchasing staff must identify products made with or containing CFC's and purchase alternative products whenever practical and possible.

Policy

To this end, it shall be the policy of the County of San Luis Obispo that all bidders, who wish to do business with the County are required to identify all products that contain CFC's or use CFC's in the manufacturing or shipping processes. Bidders are required to identify alternative products that do not use CFC's, for possible purchase by the County.

Bidder Response

	YES	NO
Do any products offered herein contain CFC's or use CFC's in the manufacturing or shipping process?		
If yes, please offer an alternative product by copying bid forms and submitting an alternate bid. Will you offer an alternate?		
Please provide any other information that may be helpful to the County. Attachments are acceptable.		

Bidder: _____

GENERAL CONDITIONS AND INSTRUCTIONS

1. All bids submitted by Seller to Purchaser should be submitted upon the attached bidder's form, completed and signed, (only typewritten or ink shall be accepted with no erasures or corrections unless properly authenticated by signature) in accordance with the instructions contained herein.

2. The issuance of this bid request creates no obligation on the part of the County and the County reserves the unconditional right at its option to either reject all bids or waive any irregularities or informalities therein. Each bid shall be in a separate sealed envelope with the bid number, name of bidder, title of the bid, date and time due showing on the outside of the envelope.

3. All prices must be firm for 45 days from the date of the bid opening and be inclusive. Upon award, prices will be in effect for the term of the contract.

4. Prompt payment discounts of 20 days or longer will only be considered when comparing bids, however, if you offer any prompt payment discounts, please indicate this on your bid.

5. Awards will be made to realize the greatest savings to the County and may not necessarily be the lowest bid especially where services are of the utmost importance.

6. Submission of a signed bid will be interpreted to mean that the bidder has thereby agreed to all conditions, instructions, descriptions and specifications contained herein.

7. All materials included in the contract shall be in compliance with all Federal and State OSHA laws.

8. All applicable City, State, and Federal taxes and fees are to be included in the proposal.

9. The only terms that will be honored are those terms included in general and special conditions and instructions, purchase order or other documents issued by the County.

10. In the event of any conflicts or ambiguities between these instructions and State or Federal laws, regulations or rules, then the latter shall prevail.

11. Only one bid will be accepted per vendor.

12. Bidders may withdraw their bid either personally, by written request, or by telegraphic request confirmed in the manner specified above at any time prior to the scheduled closing time for receipt of bids. No bidder may withdraw their bid after the time set for the opening.

13. All time limits stated are of the essence and must be complied with. Any bids received after closing time stipulated will be returned unopened.

14. All bids must be submitted in a manner so they can be readily hole punched and placed in a standard legal size file folder.

15. The County may make partial payments after a substantial portion of the merchandise has been delivered. On all items, a 10% retention will be withheld until all merchandise has been accepted.

16. Brand names are used to establish a level of quality only. Any alternates must be approved five (5) days prior to the bid opening date, by the Central Services Manager, who will have the sole right to determine this. If an alternate is submitted without going through the above- described process, the County will have the sole right to decide whether or not an alternate is acceptable.

17. Vendor agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin and that it will comply with the "Contractor's Agreements" provisions of Presidential Executive Order No. 11246.

18. **NO FAXED** Bids will be accepted.

19. Return bid by February 28, 2006 at 4:00 p.m. to:

COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF GENERAL SERVICES
BARBARA ADAMS, BUYER
1087 SANTA ROSA STREET
SAN LUIS OBISPO, CALIFORNIA 93408

BREATHING AIR SUPPORT UNIT

The undersigned agrees to:

Deliver **F.O.B. to County of San Luis Obispo, CDF/San Luis Obispo Fire Department, 635 N. Santa Rosa St., San Luis Obispo CA 93405** the Breathing Air Support Unit itemized below, and in accordance with Specifications attached. All equipment to be new and unused of the latest model year and all attachments shall be designated to be compatible with the model proposed. Equipment shall be delivered, serviced and ready to operate.

All equipment and accessories shall comply with the applicable State and Federal Codes, Regulations and Requirements.

Warranty_____

DESCRIPTIVE LITERATURE WITH COMPLETE SPECIFICATIONS MUST ACCOMPANY ALL BIDS. DEVIATIONS TO ATTACHED SPECIFICATIONS MUST BE CLEARLY INDICATED. NO DEVIATIONS UNLESS SPECIFIED IN SPECIFICATION SHEET OR BELOW.

_____

_____

TERMS OF SALE_____

Prompt payment discounts of less than twenty (20) days cannot be considered.

DATE OF DELIVERY _____

CURRENT PURCHASE:

Item	Qty.	Unit	Description	Unit Price
1	1	Each	Breathing Air Support Unit, in accordance with the attached specifications. Make, Model & Year of Mfg. Bidding:_____	
			7.25% California Sales Tax	
			GRAND TOTAL	

Authorized Official Name (Print)_____

Authorized Official Title (Print) _____

Signature _____

Firm Name _____

Address _____

City _____ State_____Zip Code _____

Telephone _____ FAX _____

Federal Taxpayer ID#_____

☐ Individual/Sole Proprietor ☐ Corporation ☐ Partnership ☐ Other

BIDS MUST BE RECEIVED BY 4:00 P.M., FEBRUARY 28, 2006 AND
WILL BE OPENED IN THE OFFICE OF THE CENTRAL SERVICES MANAGER
Bid #3384-06

Accepted as to items numbered_____

Date _____ Order(s) No. _____

San Luis Obispo County Fire Department
2006 Breathing Air Support Unit

INSTRUCTIONS

The attached pages comprise the Detailed Specifications for the fire apparatus to be bid. Located next to each specification are two letters, a "Y" for "YES" and the other an "N" for "NO". For each specification, circle the appropriate letter to indicate whether or not the apparatus being bid fully meets the exact specification and return a copy of this document with the bid proposal.

For every specification for which "NO" is indicated, list on the separate sheet provided for this purpose, what is being proposed in lieu of compliance with the exact specification (referred to herein as "exceptions"). Proposed exceptions will be evaluated on the basis of quality, performance, and ability to meet the County's needs.

Failure to respond to each specification in the manner described above shall be grounds to reject the bid as non-responsive.

No exceptions will be considered for those specifications so stating. Exceptions will be considered for all other specifications. The County of San Luis Obispo reserves all rights to accept or not accept any proposed exception.

Each bidder's proposal specifications shall be submitted in the same sequence as the enclosed bid specifications for rapid determination of specification compliance.

The following items are "No Exception" items in the bid specifications:

1. The I-H Cab-Chassis (match existing fleet)
2. The multi-plexed electrical system
3. The back up camera (safety enhancement being requested on all large vehicles)
4. The 1000 rpm compressor with a cast iron block (noise and durability)
5. The Revolvair fill station (efficiency and speed of operation)
6. Burst discs and other high pressure air safety items

All items are readily available to all bidders.

Failure to meet a specification for which conformance is indicated will under no circumstances relieve the bidder from conformity to the specification.

Clarification of specifications to bidders, if necessary, will be made in writing upon receipt of request, no later than ten (10) days prior to bid opening, with copies being sent to all other prospective bidders. Clarification requests must be received no later than fifteen (15) days prior to bid opening date in the office of the General Services Manager.

Change authorizations after the issuance of a purchase order shall be made in writing to Matt Jenkins, Administrative Chief San Luis Obispo County Fire Department, (or his written designee), clearly indicating the deviation and cost or savings to the purchaser. In no case shall changes be made without his consent. Changes mandated by Federal or State standards and associated costs after the date of the purchase order shall be the responsibility of the purchaser.

SAN LUIS OBISPO COUNTY F.D.
BREATHING AIR SUPPORT UNIT

CAB AND CHASSIS SPECIFICATIONS

The cab and chassis shall be of suitable size and design for use in the fire service as an emergency response vehicle configuration. The cab and chassis shall be provided with all the standard components for an International 4400 and shall comply with the specifications herein. **No exceptions to this cab and chassis specification.**

A. GENERAL	
Manufacturer:	International Trucks
Model:	4400
Cab:	Two-door
G.V.W.R.:	Minimum 35,000 lbs.
Wheelbase:	160"
Minimum Grad Ability:	23% / 1.8% @ 55 mph
Terrain:	Capable of on and limited off road use
B. ENGINE AND EQUIPMENT	
Engine:	DT570, 330 @ 2200 - 335 peak HP @ 2200 RPM
Torque:	950 lb/ft @ 1200 RPM
High Idle Code:	Supply with Navistar electronic high idle code12VXY
Oil Filters:	Spin-on full flow with 30 quart capacity oil change system and crankshaft viscous damper
Air Cleaner:	Single element with air restriction gauge mounted on the air cleaner
Embers Separator:	Grille mounted to keep hot embers out of engine air intake - IH 2586075C1
Fuel Filter:	Engine mounted
Fuel/Water Separator:	Fleetguard with heater, sight glass, 30 Micron filter and drain indicator light
Exhaust System:	Single muffler with internal catalytic converter, straight discharge perpendicular to outer edge of body, just forward of rear wheels
Engine Brake:	Diamond logic or equal combination engine and exhaust, electronically activated
Fan Clutch:	Horton DriveMaster 2-speed with front tether air inlet and nylon fan
Radiator Core:	940 sq.in. aluminum radiator core and 1025 sq.in. charge air cooler
Deaeration System:	with polypropylene tank
Coolant:	Texaco Long Life ethylene glycol pre-charged to -40F
Coolant System Hoses:	Premium with torque clamps
Alternator:	Leece-Neville 4949PA, 270 amp with self exciter and charge circuit gauge

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Starter:	Delco-Remy MT41, 12 volt
Starter Switch:	Key operated
Engine Shutdown:	Key operated, electric
Air Compressor:	Bendix Tu-Flo 750, 16.5 CFM
Governor:	Electronic
Cruise Control:	Electronic with controls integral to the steering wheel
Throttle Control:	Electronic, stationary, variable speed control mounted on steering wheel
Oil Drain Plug:	Magnetic
C. TRANSMISSION AND EQUIPMENT	
Automatic:	Allison 3000EVS, 6-speed
Vocation Programming:	Transmission Package code 13WUT
Transmission Controls:	Electronic push-button, right hand control
Cooler:	Water to oil tube, heat exchanger type
PTO Outputs:	Two (2) with constant 1800 RPM (maximum) at approximately 1200-1300 engine RPM.
Oil Drain Plug:	Magnetic
D. FRONT AXLE AND SUSPENSION	
Front Axle:	International I-120SG, I-Beam type
Rating:	12,000 lbs. minimum
Front Suspension:	12,000 lbs. taper or multi-leaf springs with shocks
Spring Pins:	Rubber bushings, maintenance free
Front Bearing::	Oil lubricated seals
Power Steering:	Sheppard M-100, power
Steering Column:	Tilting
Steering Wheel:	2-spoke, 18" diameter, black
E. REAR AXLE AND SUSPENSION	
Rear Axle:	Dana Spicer 23090S, single reduction
Rating:	23,000 lbs. minimum
Rear Suspension:	Single Vari-Rate, 23,500 lb with 4500 lb auxiliary rubber spring
Axle Lube:	EmGard 75W-90 Synthetic
Drain Plug:	Magnetic
Rear Oil Seals:	Oil lubricated

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F. BRAKE SYSTEM EQUIPMENT	
ABS:	Bendix ABS, full vehicle wheel control system, 4-channel with diagnostics
Front:	Air S-Cam, 16.5" x 5", includes 20 sq.in. MGM long stroke brake chambers
Rear:	Air S-Cam, 16.5" x 7", includes MGM TR3030 long stroke chamber and heavy duty spring actuated parking brake with two (2) rear spring brake chambers
Air Lines:	Color coded nylon with compressor air supply line through the air cleaner
Air Dryer:	Bendix AD-9 with heater
Drain Valve:	Automatic Bendix DV-2 with heater for air tank
Slack Adjusters:	Automatic front and rear
Drop/Pinch Frame Conversion Package (if provided)	IH 08WEB - extended ABS cables and air lines
Air Gauge:	Air pressure gauges (2) located in instrument cluster on dash
G. WHEELS AND TIRES	
Wheels:	Six (6) 22.5 x 8.25 polished aluminum, 10-stud hub piloted, flanged nut with polished stainless steel hub and lug nut covers
Front Tires:	Two (2) 11R22.5 Unisteel G149 RSA Goodyear 501, load range G, 14 ply highway tread
Rear Tires:	Four (4) 11R22.5 Unisteel G164 RTD Goodyear load range H, 14 ply mud and snow tread
H. CHASSIS EQUIPMENT	
Mud Flaps:	Black rubber front and rear with spring-loaded holder on rear
Tow Hooks:	Front, frame mounted (2)
Air Horn:	Grover Stutter-tone with foot switches at both the driver and passenger positions.
Bumper:	Front, full width, aerodynamic, chrome plated steel
I. FUEL TANKS AND EQUIPMENT	
Fuel Tank:	Minimum 50 gallon (189L) capacity, right side D-style steel with quick connect outlet, mounted under cab
Fuel System:	Nylon fuel lines with O-ring snap-on quick-connect fitting at both ends

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J. CAB AND EQUIPMENT	
Cab:	Two-door
Grille:	Chrome, integral to hood
Hood/Fenders:	Tilting fiberglass, three piece construction
Glass:	Tinted windshield and cab door glass
Door Glass:	Retractable door glass on all doors
Climate Control:	Heater, defroster and integral air conditioner using HFC-134A refrigerant
Grab Handles:	Two (2) total; one at each door entrance, chrome with anti-slip rubber inserts
Primary Mirrors:	Two (2) Lang Mekra bright finish aerodynamic heated rectangular, 7.09" x 15.75" with bright finish breakaway brackets. Integral convex mirrors both sides with Led clearance lights on lower face of mirrors.
Convex Mirrors:	8" left and right side mounted convex mounted under the primary mirrors
Interior Trim Level:	Deluxe
Headliner:	Insulated with storage pocket over windshield
Driver Seat:	National 2000 air suspension, high back with integral headrest, vinyl, isolated, with 2-position front cushion adjustment, 6 to 17 degree seat back adjustment and air lumbar adjustment with red 3-point lap and shoulder belt
Officers Seat:	National 2000 air suspension, high back with integral headrest, vinyl, isolated, with 2-position front cushion adjustment, 6 to 17 degree seat back adjustment and air lumbar adjustment with red 3-point lap and shoulder belt
Sunvisors:	Left and right side padded interior
Overhead Console:	In addition to the console listed under the Body Electrical section, there will be an International overhead, molded plastic console with dual storage pockets, retainer nets and CB radio pocket; smoke gray with black netting over storage boxes.
Trim:	Smoke gray color on all trim; plastic "A" pillar cover; printed cloth headliner; molded plastic door trim panels (driver and officer side); door storage pocket on driver door, full length; instrument panel trim molded plastic, Drawbridge gray with black center section and hidden cup holder
K. INSTRUMENTS AND CONTROLS	

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Instrument Cluster:	Includes odometer display, miles, trip miles, engine hours, trip hours, fault code readout; warning system for low fuel, low oil pressure, high engine coolant temperature, and low battery voltage (visual and audible); cluster gauges (electronic engine oil pressure, electronic engine water temperature, electronic fuel, electronic tachometer, voltmeter
Auxiliary Gauges:	Allison oil temperature and air cleaner restriction (Filter Minder)
L. LIGHTING AND ELECTRICAL	
Electrical System:	Fully Multiplexed
Programming:	O8HAB Overlay Harness Package
Data Link Connector:	In cab for vehicle programming and diagnostics of chassis
Wiring, Chassis:	Color-coded and continuously numbered
Turn Signals:	Front flush mounted to include reflectors and auxiliary side turn signals with solid state flasher. Self-canceling turn signal switch
Headlights:	Long-life halogen, composite Aero design for two light system; includes daytime running lights. Headlight dimmer with flash-to-pass feature.
Parking Lights:	Integral with front turn signal and rear tail lights
Interior Lights:	Door activated rectangular cab dome light, center mounted with timed theater dimming
Batteries:	Three (3) Group 31, International Maintenance-free, 1950CCA total
Circuit Breakers:	Manual-reset on main panel, SAE Type III with trip indicators
Windshield Wipers:	2-speed electric with intermittent feature and dual control integral with turn signal lever, plus low washer fluid indicator
Horn:	single electric
Radio:	Panasonic CR-W400U AM/FM stereo with weather band; digital clock; and two (2) dual cone speakers
Power Source:	2-post terminal type on dash; and cigar lighter type outlet
M. PAINT	
Cab:	Solid White, base coat, clear coat application (see Body Paint section for any applicable repaint information)
Frame and Undercarriage:	Black

FLUID LEVEL DATA ELECTRONIC DISPLAY

As required by NFPA 1901, section 12-2.3.3, chassis component fluid level data shall be displayed on the dash mounted LCD display screen in the cab. There shall be a separate screen with the appropriate information displayed. Information shall include, at a minimum:
-- Engine: make, model, serial number, recommended grade of oil, recommended filters with part numbers, recommended maintenance schedule.
-- Transmission: make, model, serial number, vocation codes, recommended grade of oil, recommended filters with part numbers, recommended maintenance schedule.
-- Rear Axle: make, model, serial number, recommended weight and type of oil, recommended maintenance schedule.

"OCCUPANT MUST BE SEATED & BELTED" WARNING PLATE

A safety warning label shall be installed in a conspicuous location on the cab dash visible to driver and all passengers that conforms to NFPA 1901, section 14-1.3.5. It shall have a universal pictorial warning and verbal warning as follows: "WARNING - Occupants must be seated and belted when apparatus is in motion". In addition, there shall be a seating occupancy label installed visible to the driver, indicating number of personnel the vehicle is designed to carry, in accordance to NFPA 1901, section 14.1.2.

ENGINE EXHAUST LOCATION

The exhaust pipe extension shall exit on the left side of the apparatus body, forward of the rear wheels. Exhaust tip shall be suitable for use with “Plymo-Vent” exhaust extraction system.

AUTOMATIC BATTERY CONDITIONER

There shall be an IOTA Power Products, model DLS45 automatic battery conditioner installed and connected to the shorepower input. An IQ-3 microprocessor controlled automatic 3-stage "Smart-Charger" will be incorporated into the system that provides bulk, absorption, and float stage charging for rapid, safe battery charging without over-charging. It shall be rated at a minimum of 45 amps and capable of charging up to three batteries in series simultaneously, as well as auxiliary batteries for hand lights and other equipment. Output current shall be rated at 45 amps.

AUTO-EJECT SHOREPOWER

There will be a Kussmaul AutoEject, model 091-55-20-120, 20-amp, 120VAC shoreline inlet with a build-in circuit interrupter provided and located under the driver's door.

The AutoEject will be connected to the vehicle starter switch. When the engine is starter, the AutoEject drives the shoreline connection from the inlet. The electrical inlet will include a red spring-loaded cover to prevent water from entering the receptacle

when the shoreline is not connected. The unit will be completely sealed to prevent contamination of the mechanism, insuring long.

The entire assembly shall be in a sealed, weatherproof box and line inputs to protect the internal components from corrosive road spray. A female receptacle compatible with the system shall be provided that permits subsequent connection by the purchaser to a power cord.

ENGINE COMPARTMENT LIGHTS

Two (2) minimum 5" engine compartment lights shall be provided under the chassis hood. One will be located on each side of the engine.

CAB STEP LIGHTS

A minimum 3" white light shall be installed under the left and right front cab doors in a neoprene shock absorbing mount. They shall be automatically activated whenever the left and right front cab doors are opened.

CAB ENTRANCE STEP & BATTERY COMPARTMENT

There shall a cab entrance step furnished full length of the left side of the cab below the cab door providing full enclosure of the visible undercarriage. The step area shall be fabricated of .125" bright aluminum anti-slip surface treadplate and extend the full width of the cab door conforming to NFPA 1901, Chapter 11-7. All edges not formed by machine break shall be unbroken seam welded. A hinged compartment door with securing latch shall be provided to access the chassis batteries.

FUEL TANK COVER/STEP

The fuel tank shall be fully encased with .125" bright aluminum anti-slip tread plate. The enclosure design shall incorporate the OEM tank step recess and fuel filler. All edges not formed by machine break shall be continuously seam welded. When required, there shall be a minimum 17" wide x 7" deep auxiliary step using Grip-Strut anti-slip insert suspended just below the tank.

Next to the fuel fill shall be a metallic tag with raised letters that reads DIESEL FUEL ONLY.

REAR TOW LOOPS

A pair of heavy-duty hinged tow loops, rated to pull the rated at 10,000 lbs. capacity shall be bolted to the left and right outside drop frame extension rails beneath the rear step bumper. The loops shall be rated for pulling only, not lifting.

SAN LUIS OBISPO COUNTY F.D.
BREATHING AIR SUPPORT UNIT

BODY & FRAME REQUIREMENTS

OPTIONAL FRAME MODIFICATIONS

1. Requirements: The design of the proposed vehicle will require maximized cubic foot displacement for total required storage capacity and the required compartment layout specified herein. The specified wheelbase is the maximum allowed for the completed apparatus. The body manufacturer must assure that all specified equipment will be able to be accommodated in the proposed body using the maximum specified wheelbase. Accommodations must be clearly defined in the bid response. If required to accomplish the required layout and storage accommodation, the chassis frame rails may be modified with a custom pinched and dropped frame design. If the chassis frame rails are modified to accommodate the required compartment layout, the modification/alteration, as completed, shall provide a Resistance to Bending Movement (RBM) of at least two and one-half that of the original unaltered chassis.

Complies: ☐Yes ☐no

2. Engineering Documentation: If the bidder proposes to modify the frame to accomplish the dimensional and layout required, then the bid shall include documentation for strength characteristics of the specified frame modification. Documentation shall be in the form of an Aires, Pro-Engineering or equal computer analysis model of a like frame modification. The analysis, at a minimum, shall graphically show stress points with a full calculated load imposed, based on the GVWR of the chassis. A written synopsis outlining, in laymans terminology, the frame modification procedures and resulting strength characteristics conducted by the manufacturer shall also be included. Due to long term durability concerns and the stress associated with the intended missions of the apparatus, failure to provide engineering documentation may result in disqualification of the proposal.

Complies: ☐Yes ☐no

Engineering documentation in bid? ☐Yes ☐No

3. Frame Warranty Requirement: Any modification to the frame shall be be provided with a warranty, in writing, of not less than that provided by the original chassis manufacturer. A copy of the warranty shall be included.

Complies: ☐Yes ☐no

Is Frame warranty included in bid? ☐Yes ☐no

4. Re-Use of Frame Materials: Under no circumstances will the reuse of steel frame materials cut from the chassis frame assembly be reused for the modification process.

Complies: ☐Yes ☐no

5. Brake Line Requirements: All brake lines shall match those supplied by the chassis manufacturer and shall be attached to chassis with welded studs and rubber insulated straps.

Complies: ☐Yes ☐No

6. Relocation of Frame Mounted Equipment: All air reservoirs, dryers, cab tilt controls and other equipment located inside the frame rails shall be relocated, as required for the modification, in a manner that meets the chassis manufacturers and FMVSS standards.

Complies: ☐Yes ☐No

7. Inspection and Testing Requirements: The chassis shall have a complete inbound and outbound inspection conducted. At a minimum, after completion of all chassis frame modifications, the following test shall be conducted:

a. Laser axle and wheel alignment check.

b. Dynamometer run up test at typical highway speed to check drive line and wheel balance.

c. Dynamometer test at typical highway speed under full simulated load over rear axle.

d. Sample of testing documentation shall be included with the bid proposal. Actual chassis testing documentation will be provided for the completed apparatus.

Complies: ☐Yes ☐no

Are above test conducted by the manufacturer? ☐Yes ☐no

Sample testing documentation in bid? ☐Yes ☐No

MINIMUM BODY CONSTRUCTION REQUIREMENTS

The following specifications are meant to be minimum requirements established for the manufacture and delivery of a vehicle supporting emergency incidents for San Luis Obispo County Fire Department, as outlined herein. Exceptions to these minimum standards will be permitted, but will be evaluated based on the bidders understanding and interpretation of the mission, compliance with maximum height and length requirements and minimum storage capacity (cu.ft.) requirements.

The apparatus body shall be a roll-up side door fully enclosed type. The body shall be especially fabricated for severe emergency service duty.

To facilitate an accurate inspection environment, the manufacturer shall, upon request of the purchaser, schedule specified inspections during regular working hours Monday through Friday. Said inspections shall be at the discretion of the purchaser. The

manufacturer shall make the following factory personnel available during the inspection process: sales administrator responsible for the contract; engineering representative familiar with the contract; production foreman or equivalent assignment responsible for the manufacturing process of the contracted apparatus and a representative of the upper management team authorized to make decisions for the contractor. To further facilitate an accurate inspection process, the manufacturer shall provide, prior to authorization to begin construction, an itemized and detailed work order for manufacturing of the specified apparatus. The work order shall become a part of the final contract between the purchaser and the manufacturer or manufacturer's representative and shall be used for any interim and final inspections. All agreed upon and authorized changes to the apparatus prior to or during the manufacturing process shall be represented by an immediate release of a revised work order that shall be forwarded to the purchaser.

REGISTERED ENGINEER VERIFICATION

In order to ensure the integrity of the body, chassis, and adjoining substructures, and to provide a unit that is safe for its operators and the general public, the bid response must show proof, upon request, that the manufacturer of the body designed for this contract has at least one registered Professional Engineer to oversee the entire design and construction of the unit. The Professional Engineer must hold a current State Board certification.

Bidder complies with the above requirement: ☐*Yes* ☐*No*

SUBLETTING CRITERIA

The bidder shall clearly state what body components of the apparatus are not manufactured on-site by the bidder. Body components shall be defined as, but not exclusive of: body shell; body doors; body wiring installation (12V & 120V); body painting; applicable cabinets and shelving. Any subletting of work associated with the manufacturing of the specified apparatus shall clearly be stated. It is preferred that the body and body components be manufactured on-site by the primary bidder to limit liabilities associated with service, warranty and total compliance with industry safety standards.

When subletting is proposed by the bidder, the following criteria are required:

1. All sub-contractors must be listed on a separate sheet and included with the bid proposal. Sub-contractors name, address and phone number must be shown.

2. Certified professional engineer on staff of the sub-contractor to oversee manufacturing processes and compliance to safety standards meeting the same criteria as outlined separately herein.

3. A warranty statement must be provided with the bid proposal from each individual sub-contractor identified above. Included in the statement must be the length

of warranty, who is authorized to perform the warranty and who will be responsible for reimbursements.

4. A letter on the sub-contractor's letterhead must identify the primary bidder as an authorized distributor or dealer for the component or assembly process and the length of time associated with the respective company.

5. Sub-contractors must submit proof of product liability equal to the minimum requirement for this contract from the prime contractor.

Failure to disclose minimum defined sub-contractors with the bid proposal shall constitute fraud on the part of the contractor/bidder and therefore shall render the bid or subsequent contract null and void.

Bidder complies with the above requirement: ☐*Yes* ☐*No*

WARRANTY

The body construction shall be warranted, in writing from the manufacturer, for a period of not less than ten (10) years against structural failure. A copy of the manufacturer standard warranty shall be included with the bid proposal outlining specifics of warranty and shall take precedent over any and all other warranty requirements, implied or otherwise.

PRODUCT LIABILITY COVERAGE

The bidder shall provide, with the bid proposal, a binder from an insurance underwriter for the manufacturer of the specified apparatus, providing a minimum of $5,000,000 per occurrence of Product Liability Insurance coverage for the product bid. The binder shall name the purchaser as insured.

Is Insurance Binder enclosed? Yes___ No___

Is the binder endorsed to the purchaser? Yes ___ No ___

MINIMUM CONSTRUCTION REQUIREMENTS

1. Body shall be constructed from 5000 and 6000 Series alloy aluminum, as noted herein, for high tensile strength and corrosion resistance. For long-term structural integrity, all imposed loads shall be supported by structural framework. No load shall be carried by covering sheets.

2. Compartment Floor: All exterior compartment floors shall be constructed of a minimum .125" 5052-H32 alloy aluminum, except wheelhousing compartments, which shall be a minimum .190". The outer edge of all compartments shall be raised 1" above the floor bottom side rail in all side compartments to prevent water from collecting on the

floors. The under side of floors shall be reinforced with minimum 2" x 1" 6061-T6 alloy parallel aluminum channels, running full depth of floor and attached at the outside edge with 5" x 5" gussets and at the inside edge with 2" x 3" angle strap. Channel spacing shall be on minimum 12" centers.

3. Roof Construction: The roof shall be supported structurally in a manner that will support average percentile personnel when walking the full length without severe deformation or structural damage to the roof.

The roof shall be completely covered with minimum .125" bright aluminum tread plate. Necessary seams where multiple sheets of material are joined shall be welded and sealed.

EXTERIOR COMPARTMENTS

1. Minimum Storage Capacity: The following exterior compartment layout, dimensions, and requirements are minimum specifications. The total cu.ft. storage area must be equal to, or more than, the noted requirements under the compartment schedule herein.

Minimum weight carrying capacities of each compartment, measured directly on the floor, shall be 2300 pounds at floor level for all tall compartments and 3500 pounds for the wheelhouse compartment. Proof of load testing must be included with the bid response.

Tested weight rating of compartment floors, as proposed: _____ lbs.

Is proof of testing including in this response? ___ Yes ___No

2. Compartment Walls: No common compartment or partition walls will be accepted. Each interior compartment or wall must independent of adjacent wall with a minimum 2" void between each side. Interior of compartments shall be a smooth finish.

3. Adjustable Shelf Channels: As applicable, all interior side walls, including any specified partitions, shall be provided with integral adjustable shelf channels compatiable with Unistrut hardware. The channels shall be flush with the exterior surfaces and extend from within 10" off the floor to within 10" off the top of the door opening. There will be a minimum of four (4) channels in each exterior compartment, unless specified otherwise herein. Offset requirements may use surface mounted channels, as outlined in the compartment layout schedule. This system is specified to provide the maximum useable storage space within the compartment from side wall to side wall.

COMPARTMENT DOORS

1. Door Type: All exterior compartment doors shall be roll-up type that can be opened individually.

2. Due to the extensive use of slide-out trays, the compartment side walls shall be flush with the door opening. Door tracks that protrude into useable storage space or inhibit travel of slide trays or require slide trays to be narrowed to pass through the door opening are not acceptable.

3. Service Requirements: The door design shall permit field replacement of individual damaged panels or slats. The door track system shall be designed to permit complete removal of the doors by removal of a section of the door track with conventional hand tools.

4. Construction Materials: The compartment doors shall be of all-aluminum construction using interlocking slats made from extruded aluminum.

5. All individual slat edges shall have a minimum .080" radius to minimize paint and graphics chipping, no exception.

6. Exterior Surface Finish: All outer door surfaces shall be painted to match the body and have the same mirror finish. Doors must be capable of being painted by local repair facilities to match original finish.

7. Door Seals: Each door shall have a bottom door seal using solid rubber for durability and a top door seal design to reduce intrusion of water and dust. The vertical outer edges shall be equipped with felt or some other form of weather seal inserts.

8. Door Grab Straps: Due to the full height opening requirements, each door shall be provided with a durable grab strap used to aid in opening and closing door while standing on the ground.

9. Door Locking Requirements: The locking of the left and right side compartment doors shall be accomplished with a lock handle at front of body, one on each side. Each lock handle to have a keyed lock (keyed alike).

BODY DIMENSIONS & COMPARTMENT LAYOUT SCHEDULE:

All proposals shall require a scaled, computer aided design (CAD) drawing or drawings to be included outlining in detail specifically what is being proposed. The proposal drawing(s) shall include, but not be limited to: left side body and chassis; right side body; and rear of body; with all applicable doors open. Specified shelving, trays, storage racks, major equipment and components (as outlined in the compartment layout schedule) and exterior lighting, shall be shown.

1. Maximum wheelbase of chassis: 160"

Bidders Proposal: _____"

2. Maximum cab to axle dimension of chassis: 93"

Bidders Proposal: _____"

3. Maximum length of apparatus: 25'

Bidders Proposal: _____"

4. Minimum length of apparatus body, excluding rear step: 13 1/2'

Bidders Proposal: _____"

5. Overall apparatus width: 96"

Bidders Proposal: _____"

6. Maximum height of apparatus (loaded): 120 1/2"

Bidders Proposal: _____"

CONFIGURATION:

NOTE: Compartment width and height dimensions listed below are minimum door pass-thru clearance requirements, not interior dimensions.

Equipment and/or supplies are included only if specified within the document.

NOTE: Any trays and shelves supplied and listed below are subject to following dimension rules:
-- Adjustable shelves - 1" less than compartment width to compensate for mounting hardware.
-- Slide-trays on floor - 1" less than compartment width
-- Adjustable slide-out trays - 1" less than compartment width to compensate for mounting hardware.
-- Adjustable slide-out and tilt-down trays - 5" less than compartment width due to mounting hardware and tilting mechanism on tray.

ROAD SIDE (LEFT)

No. 1,RS: Forward side compartment with minimum door pass-thru dimensions of:

44" wide x 72" high x 40" deep with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

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EQUIPMENT LAYOUT AND MOUNTING

1. 40 KW PTO generator mounted on floor of compartment within an enclosure or housing to protect the generator and generator components from corrosive road spray (see separate specification for details).

2. Housing panel recessed a minimum of 8" back from door opening providing standing area in front of the generator enclosure for reaching upper storage areas of the compartment. 240/120VAC circuit breaker box will be flush mounted to one side of the face panel. All meters, gauges and specified outlets will be mounted next to the breaker box. Installation of breakers, meters and outlets in this area is required in this manner to provide easy access and unimpeded viewing.

3. Recessed storage compartment in opposite side of panel that will accommodate the light tower remote control head and cable.

4. 40" wide x 30" deep shelf on top of generator housing that is removable for generator and generator component service access.

5. 220 V, electric rewind, cord reel (see separate specification for details).

6. Adjustable shelf 500 lb. Capacity.

No. 2,RS: Wheelhousing compartment with minimum door pass-thru dimensions of:

74" wide x 47" high x 88" deep (transverse) with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

EQUIPMENT LAYOUT AND MOUNTING

1. Breathing air compressor (see separate specification for details).

2. High pressure electric rewind air reel (see separate specification for details).

No. 3,RS: Rear of wheelhousing compartment with minimum door pass-thru dimensions of:

32" wide x 72" high x 23" deep with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

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EQUIPMENT LAYOUT & MOUNTING

1. (2) adjustable shelves 500 lb. Capacity

CURB SIDE (RIGHT)

No. 1,CS: Forward side compartment with minimum door pass-thru dimensions of:

44" wide x 72" high x 40" deep with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

EQUIPMENT LAYOUT AND MOUNTING

1. Twenty-five (25) SCBA tubes

2. Adjustable shelf 500 lb. Capacity

No. 2,CS: Wheelhousing compartment with dimensions door pass-thru of:

74" wide x 47" high x 88" deep (transverse) with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

EQUIPMENT LAYOUT AND MOUNTING

1. (4) ASME cylinders (see separate specification for details).

No. 3,CS: Rear of wheelhousing compartment with minimum door pass-thru dimensions of:

32" wide x 72" high x 23" deep with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

EQUIPMENT LAYOUT AND MOUNTING

1. Two (2) adjustable shelves 500 lb. Capacity

REAR OF BODY (Back):

No. 7,RR: Rear or back of body compartment with minimum door pass-thru dimensions of:

42" wide x 72" high x 32" deep with painted, roll-up aluminum door.

Bidders Proposal: ___"W x ___"H x ___"D

EQUIPMENT LAYOUT AND MOUNTING

1. Revolvair fill station (see separate specification for details).

OVERALL APPARATUS HEIGHT WARNING PLATE

A minimum 6" wide x 3" high red plate with white letters shall be prominently displayed on the center of the cab dash that displays the overall unloaded height at the highest point on the apparatus. It shall read "WARNING - *(clearance height at time of delivery)* CLEARANCE".

REAR WHEEL OPENING FENDERETTES

Removable mirror finish stainless steel fenderettes shall be attached to the rear wheel opening filler panels. They shall be minimum 12-gauge 304 stainless with a radius flare. Polished aluminum or other types of materials are not acceptable. The stainless steel fenderettes shall not be in direct contact with ANY aluminum used in the construction of the body.

REAR MUD FLAPS

A pair of heavy duty black rubber mud flaps shall be bolted to the rear wheelhousing behind the rear wheels.

STONE GUARDS, FRONT & REAR CORNER POST

The lower front and rear body corner posts shall be protected with bright aluminum tread plate shaped to fit the rounded corners. The front guards shall line up visually with the bright tread plate on the cab steps (when applicable). The tread plate shall additionally extend, at the same height, inward on the body to cover the lower body skirt. They shall be attached using round-head drive-rivets. All edges shall be sealed with silver, non-hardening sealant to prevent corrosive agent build-up between the plates and the body.

REAR STEP BUMPER

Bolted to the rear frame supports shall be step bumper constructed to channel steel designed to support a minimum of 600 lbs. of combined weight. It shall be covered with minimum .125" bright aluminum anti-slip embossed tread plate, forming a platform a minimum of 11" deep and minimum 90" wide. It shall be recessed in the center to allow the operator to stand as close as required to the fill station and controls.

There shall be a warning label mounted above the rear step that reads as follows: "DANGER - DO NOT RIDE ON REAR BUMPER/STEP WHILE VEHICLE IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT."

RECESSED WHEELHOUSE PANEL STEPS

To assist in accessing equipment stored in the wheelhouse compartments, a Cast Products #C11301-1 polished aluminum surface mounted step with deep recess shall be installed in the left and right rear wheelhousing panels to facilitate access to equipment stored in the upper reaches of the compartment. There shall be one each forward of wheel opening and one each rear of wheel opening (total of 4). Each step shall be flange mounted using a minimum of four attachment points to the body panel.

REAR WHEEL STEP BARS

There shall be an aluminum step bar installed across the left and right rear wheel openings, extending from front and rear lower crash rail. They shall be bolted in place using non-corrosive bolts and lock nuts to facilitate removal of rear wheels. An expanded metal anti-slip foot pad shall be welded integrally to the bar in the center measuring a minimum of 12" wide. The top surface shall be ribbed for safety.

WHEEL CHOCKS

Two (2) ZICO model SAC-44 Quik Choc collapsible wheel chocks shall be provided.

They shall be mounted in ZICO SQCH-44-H holders located under the left body, one forward and one rear of wheels.

LICENSE PLATE FRAME

Located on the rear body panel shall be a Cast Products #C30004 surface-mount lighted license plate frame. It shall have a polished aluminum finish around the outer flange and bead blasted inner finish.

RECESSED ADJUSTABLE SHELF TRACK

As applicable, all interior side walls shall be provided with integral adjustable shelf tracks or channels compatible with Unistrut hardware. The channels shall be flush with the exterior surfaces and extend to within 10" off the top of the door opening. There will be a minimum of four (4) channels in each exterior compartment, unless specified otherwise herein. Offset requirements may use surface mounted channels, as outlined in the compartment layout schedule. This system is specified to provide the maximum useable storage space within the compartment from side wall to side wall.

SHELVING

All specified shelving shall be constructed of not less that 3/16" (.188") 5052-H32 aluminum with a minimum 500 lb. equalized weight rating for each shelf. They shall have minimum 1-1/2" high flanges/lips on all sides. The flanges shall be welded and a .375 inch hole drilled in each corner to permit drainage. Four (4) shall be provided per the compartment layout schedule.

SCBA STORAGE TUBES

Twenty-five (25) SCBA tank PVC storage tubes for spare SCBA bottles shall be installed, as outlined in the compartment layout schedule. Each tube shall be angled at the back and have two (2) adjustable rubber stoppers for bottle retention on the front to restrict the bottles from sliding forward into the roll-up doors.

AWNING, REAR BODY

A deployable awning shall be installed across the rear of the body (approx. 91"). The awning shall have all anodized aluminum hardware and be manufactured by A & E, Inc. The awning fabric shall be woven acrylic fiber. Deployment shall be accomplished with automatic lift handles and lock knob. The color shall be black/gray horizon.

PAINT & GRAPHICS REQUIREMENTS

BODY PAINT

1. The final finishing of this apparatus shall meet or exceed automotive standards, as follows:

a. Minimum paint thickness shall be 2.6 mils, as measured by a Labotron film thickness gauge.

b. Paint surface smoothness shall meet a minimum standard of 85 (on a scale of 100) as measured by Positector Model 3000 smoothness gauge, which measures the smoothness of the coat and quantifies the presence of orange peel and other irregularities in the surface.

c. Paint coat Distinctness-of-Image (DOI) shall meet a minimum standard of 75 (on a scale of 100) as measured by an ATI Systems, Inc. DOI meter, which measures the ability of the paint application to reflect images as a mirror does.

2. All primers and paint shall be 100% lead free.

3. The apparatus shall be fully sanded on all exterior surfaces with no less than 180 grit to assure removal of all imperfections in metal surface. All surfaces shall be de-greased before and after sanding.

4. All surfaces shall be primed with self-etching zinc-chromate based primer. No liquid etching solutions may be used in order to prevent residual solution from leeching under paint edges and causing flaking.

5. The unit will be completely sanded following first primer coat with no less than 320 grit so that the top coat of paint can be applied to a smooth surface. All surfaces shall receive a second filler coat of primer.

6. The entire apparatus shall then be painted with SIKKENS acrylic urethane.

7. After proper curing time, the body and doors shall be lightly sanded to remove all orange peel and blemishes and then machine polished. A final urethane base polish shall be applied to seal the surface and remove sand scratches and polishing swirls. The final finish shall be free of orange peel and have a mirror finish.

8. The apparatus body shall be painted separately while unmounted to insure full coverage.

PAINT LOWER CHASSIS CAB

The lower section of the chassis cab shall be painted red to match the existing fleet. The upper section shall be white, as furnished by the chassis manufacturer. The

repainting of the lower section shall exceed automotive standards as specified in the body painting requirements, except as follows:

1. All emblems, latches and clip-on gaskets shall be removed prior to paint preparation.

2. The cab shall be fully sanded on all exterior surfaces, door jambs and under the hood with no less than 180 grit to assure removal of all imperfections in metal surface. All surfaces shall be de-greased before and after sanding.

3. The entire cab, door jams and under side of hood shall then be painted with SIKKENS acrylic urethane. A minimum of 3 mil thickness shall be applied.

4. After proper curing time, the cab shall be lightly sanded to remove all orange peel and blemishes and then machine polished to a high luster. A final urethane base polish shall be applied to seal the surface and remove sand scratches and polishing machine swirls. The final finish shall be free of orange peel and have a mirror finish. .

TOUCH-UP PAINT

One (1) quart of touch-up paint shall be provided for each color applied to the apparatus.

INTERIOR COMPARTMENT FINISH

The interior walls and exteriors of permanently installed welded partitions shall be finish coated with Zolatone. It shall be light gray with contrasting speckles. The finish shall be resistant to scratches, fuel, organic solvents, chlorine and other common chemical spills. All detachable equipment and components shall be installed after the application of the coating material.

UNDERCARRIAGE COATING

After the apparatus has been painted, the entire undercarriage of the chassis frame, cab and body shall be spray coated with a heavy black paint. Coating shall not be applied to exhaust or drive-line components or frame-mounted apparatus components, except brackets or permanently attached equipment.

CAB AND BODY ACCENT STRIPE

A white cab and body Scotchlite reflective stripe, 6" minimum in width, shall be applied extending in as straight a line as possible from the front fenders of the cab down the left and right sides of the body and across the rear of the body meeting minimum NFPA requirements.

A minimum 4" high reflective Scotchlite stripe shall be installed across the front of the cab area covering a minimum of 40% of the frontal zone meeting minimum NFPA1901 requirements. Exact location/color will be determined at pre-construction conference.

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BREATHING AIR SUPPORT UNIT

12VDC ELECTRICAL SYSTEM REQUIREMENTS

MULTIPLEXED ELECTRICAL SYSTEM

A. GENERAL REQUIREMENTS:

The following specifications are intended to provide minimum guidelines for the apparatus 12-volt electrical power systems. The system shall utilize current industry state-of-the-art multiplexing technology. Any deviations from these minimums must be clearly noted and defined under the "Exceptions" requirements of this bid proposal. Since the specified system utilizes open-market components and are available to all apparatus manufacturers, exceptions to the general design requirements are not acceptable. Bids taking total exception to these minimum requirements will be subject to rejection.

No exceptions to the above requirements.

B. WIRING REQUIREMENTS:

1. The complete 12-volt wiring system and electrical appliances shall be to modern automotive and NFPA 1901 minimum standards throughout the installation. The system will comply with all appropriate SAE J1939 and/or J1708 recommended practices. The manufacturer shall supply an installation and components that provides for easy diagnostics and serviceability of the system.

2. All required DC power conducting wiring shall be of stranded copper wire of adequate gauge for the function served so as to ensure voltage drop of less than one volt at the appliance under full amperage load. Any wiring routed through the engine compartment, within 18 inches proximity of any exhaust components or other high heat components shall be not less than GXL. All other wiring shall be not less than GPL. As specified, any required strobe lights shall be wired using shielded cable, as recommended by the light manufacturer.

3. Any required signal conductors shall be shielded twisted pairs rated by the system manufacturer to carry the multiplex command signals from the switch panel to the control modules.

4. The wiring shall be routed in protective nylon HTZL Type 6 300 degree F. Rated loom in all areas. All wiring shall be specially harnessed with wire ties and, where not routed through grommets, shall be clipped to body members with vinyl coated harness clips.

5. Where wire passes through sheet metal, rubber grommets shall be used to protect both wiring and wire looms.

6. Primary wiring harnesses shall be bench assembled and connections machine welded. Where crimp connections are necessary, the connections shall be made using AMPS or equal connectors with heat-shrink insulators.

C. MULTIPLEXED ELECTRICAL MANAGEMENT SYSTEM:

1. General Overview Requirements:

The apparatus shall be equipped with a fully multiplexed electrical system, no exception. The system shall be compatible with the chassis supplied multiplexed electrical system and fully interfaced using the same diagnostics.

It shall be a peer-to-peer network consisting of all solid state nodes. Each node shall have the ability to control its own inputs and outputs. All inputs and outputs will be configured into a scaleable electrical harness utilizing Deutsche connectors. The nodes must be weatherproof and not require special mounting requirements away from wet environments.

The system, at a minimum, shall be capable of performing the following functions: load management sequencing, switch loads, receive digital and analog signals, perform and report diagnostics, continuously report vehicle status and the system shall be expandable.

"Real Time" data must be capable of being reported and displayed through dedicated operator interface modules.

The multiplex system shall be easily field re-programmable and re-configurable by either the factory or a factory authorized service center.

The system shall have the following minimum features:
-- Total load management
-- Load shedding capabilities (*will begin load shedding when voltage drops below selected level after a 2-minute period per output.)*
-- Load sequencing capabilities
-- "On-board" diagnostics readout
-- Error reporting
-- Full color graphics data display
-- Continuous system monitoring and reporting
-- Emergency warning light flasher
-- Door ajar warning system
-- Real time clock

2. Message Capabilities:

The multiplex system shall have the capability to display diagnostics messages such as short or open circuits. The system shall display load shedding levels and also display when a compartment door is not secure or other equipment is not properly stowed, such as light tower (as applicable).

3. Real-time Diagnostics:

The system shall provide instant message feed back based on an output failure (i.e: burned out bulb or electrical short). The error message shall remain displayed until such time as the "acknowledge" button is depressed. The output shall turn off whenever there is a short circuit or over current condition and shall not reactivate until the system power is reset.

4. PC Diagnostics:

The system shall incorporate a feature that enables a service representative to troubleshoot, repair and replace nodes in the system, should they for any reason fail. It will be run via a PC interface and will monitor all system information. All messages going across the communications bus must be seen on the screen, including analog information. Each node must be capable of being queried for its own voltage drop and capable of obtaining the status of all inputs and outputs from the diagnostics interface.

5. PC Programming:

The system must be programmable at the factory in a language that can be downloaded to a remote service representative's PC or down loader tool with all OEM data, as programmed for this specific apparatus and allow field reprogramming changes as provided by the apparatus manufacturer.

6. System Troubleshooting Guide:

A troubleshooting guide must be provided with each delivered apparatus, placed within the Owners Manual. The guide shall outline, in simplistic language, how to perform system diagnostics and troubleshooting and how to reset default circuits.

D. EMI/RFI PROTECTION:

The electrical system proposed will include means to control undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components will be used to insure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

The apparatus proposed will have the ability to operate in the electromagnetic environment typically found in fire ground operations. The contractor will be able to demonstrate the EMI and RFI testing has been done and meets SAE J551 requirements.

EMI/RFI susceptibility will be controlled by applying immune circuit designs, shielding, twisted pair wiring and filtering. The electrical system will be designed to full compatibility with low-level control signals and high-powered two-way radio communications systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

E. <u>CONSOLE CONTROLS & FUNCTIONS</u>:

1. A combination switch and **color** visual display panel controlling electrical appliances and equipment installed on the chassis and body shall be centrally located in the cab within easy access to the driver. It shall measure not more than 10.25" wide by 7.75" high and be capable of installing in any area of the cab that is convenient to the driver and/or officer positions.

The full color display shall be visible in direct sunlight, but shall not be overpowering during night operations. Once the headlights are activated the screen shall automatically dim to 50% of its intensity so as not to interfere with night driving operations.

Additionally, the display screen will have, as a minimum, the following displays
-- System diagnostic controls and alpha/numeric readouts for displaying system defaults or failures
-- Compartment Open warning graphics - overhead color depiction of apparatus cab and body that graphically displays which doors are not secured. For safety purposes, the following minimum scenario shall be provided: When the apparatus is in the neutral (or parked) mode, the overhead view graphic display of the apparatus will depict which door(s) are open. Once the apparatus is placed into the drive mode a scrolling message shall appear across the top of the Vista display screen and the overhead view graphic display of the door(s) that are open will flash. A beeping sound will also be activated as a secondary warning to the driver of unsecured door(s).

2. The control panel shall have four switches on each side of the LCD display screen that performs the following minimum functions:

-- LEFT SIDE SWITCHES & LCD DISPLAY:
a. LEFT SC ENE LIGHTS *(activates all left 12VDC scene lights)*
b. RIGHT SCENE LIGHTS *(activates all right 12VDC scene lights)*
c. REAR SCENE LIGHTS *(activates all rear 12VDC scene lights)*
d. GENERATOR ACTIVATION (if applicable) *(activates PTO and engine fast idle to preset minimum RPM for proper operation of engine and PTO devices)*

-- RIGHT SIDE SWITCHES & LCD DISPLAY:
a. VISTA ACK (overrides Vista alarms)
b. TRAFFIC ADVISOR (if applicable) *(activates second screen with individual switches functions for various traffic warning patterns)*
c. SPARE
d. BACKUP CAMERA *(activates automatically in reverse mode or with manual override)*

3. Switch functions shall be provided adjacent to each switch on the display screen. When activated, the nomenclature display button shall change colors to instantly identify that the circuit has been activated.

4. Lower panel switches below the color LCD monitor display as follows:
a. E-MASTER *(activates all pre-set emergency response warning lights)*
b. BLOCKING OVERRIDE *(deactivates all blocking lights in Zone A or reactivates lights that have shut down in the blocking mode for emergency discretionary purposes)*
c. HOME *(returns the currently displayed screen back to the "Home" screen location)*
d. SYSTEM INFO *(displays system diagnostic menus)*
e. SERVICE INFO (*displays chassis make, model and serial number; engine and transmission serial numbers; oil capacities; service interval recommendations; other information required for routine maintenance; body builders serial number, dealer and/or service contact info; and other pertinent information that may be deemed necessary.*
f. SPARE
g. HORN/SIREN *(overrides chassis horn button switch to activate designated warning device)*

F. MINIMUM OPERATIONAL SCENARIO TO BE CONTROLLED BY THE MULTIPLEX SYSTEM:

1. Warning Light Activation: When the Emergency Response switch is depressed, the system will determine what needs to happen next by what the engine and transmission is doing. Once the transmission is engaged, the Clear-the-Right-of-Way mode is engaged and all emergency lights are activated.

2. Compartment Lights Activation: The compartment lights will be activated anytime the left and right door lock handle is opened or rear door is opened and when the apparatus is in the neutral or parked position.

3. Ground Lights Activation: Ground lights will be activated by respective upper body scene light switches or whenever the apparatus is placed in the reverse mode of operation to further light the backup zone or when the respective left or right turn signal is activated.

G. ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS:

Advanced on-board diagnostic messages will be provided to support rapid trouble shooting of the electrical power and signal system. The diagnostic messages will be displayed on the VISTA control screen located adjacent to the driver position. The on-board message center will include the following minimum diagnostic information:

1. Multiple diagnostics on display with text description. Circuit alerts will scroll across the top of the screen in a text message.

2. Simplified warning indicators (from operators perspective).

3. Automatic display of further information in order of problem severity.

In addition to a visual message center, the system will activate status indicators and audible alarms designed to provide warning of problems within any circuit or signal command module. The system will include, at a minimum, the following attributes and improvements over analog type systems:

1. On-board self-diagnostic messages and status indicators.

2. Visual confirmation of communication of each Vehicle Power Module, Display Module, and ECU.

3. Automatic self-test on startup with provision for manual diagnostic checks.

4. Minimize use of control relays.

5. Provide control for NFPA 1901 mandated safety interlocks and indicators.

6. Utilize system integration to eliminate redundant wiring and components.

7. Improve control system reliability by reducing relay and connector contacts.

8. Advanced electrical system load management and sequencing system.

9. Imbedded service interval information.

10. Customized software programmed to reflect the vehicle's unique configuration.

11. Field re-programmable to accommodate changes to the vehicle operating parameters.

12. Fully documented hardware.

H. SERVICE AND MAINTENANCE DIAGNOSTICS:

Advanced vehicle service and maintenance will be assisted with an integral software program. The software will provide troubleshooting tools to service technicians via the VISTA control screen. The service and maintenance program will include the following minimum features:

1. Easy to understand diagnostic procedures.

2. Automatic failure detection.

3. Appropriate warning regarding the location of welding-sensitive components.

4. System simulation and pinging of nodes for status verification.

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BREATHING AIR SUPPORT UNIT

I. BATTERY SYSTEM:

1. The battery enclosure and system shall be located conveniently to provide for easy service and replacement.

2. Battery cables shall be of sufficient size to carry the full load of apparatus and to start the vehicle using a minimum of 1/0 AWG stranded copper. The cable shall be shielded from exhaust and mufflers. Rubber grommets shall be provided where cable enters the battery box.

3. The original equipment chassis manufacturer shall install a battery cutoff switch that disconnects all battery power to the apparatus, except electronic memory circuits. If the chassis manufacturer does not provide a factory installed battery cutoff switch, the apparatus body manufacturer shall install an extra-heavy-duty on/off battery solenoid switch, rated at a minimum 600 amps continuous, 900 amps momentary rating. The solenoid shall be activated by a paddle type switch installed in cab, accessible from the driver's door.

The switch shall serve as a master disconnect for the battery system, disconnecting the batteries from the chassis and apparatus appliances. Electronic memory circuits relating to the electronically controlled engine and transmission and other memory sensitive components shall have 12VDC power supplied through a separate bypass circuit that is not disconnected by the battery switch.

4. A single green LED light located in the center of the Vista LCD display shall indicate the status of the batteries. It shall be activated anytime the battery switch is in the "ON" position to alert the operator of the status of the battery switch.

5. See Chassis specifications for battery requirements.

J. ENGINE AUTOMATIC HIGH IDLE DEVICE:

1. The engine shall be equipped with an electronically controlled device that automatically increases the engine RPM level on demand.

2. The system's primary activation shall be by the automatic mode, programmed through the multiplex electrical load management system to activate whenever the system detects voltage output of less than 12.7 volts for more than 30 seconds (or as established by the apparatus manufacturer). It shall be capable of manual deactivation or engagement of the transmission or by depressing the foot brake. The system shall not activate unless transmission is in the neutral position.

VISTA CONTROL PANEL MOUNTING BRACKET

The VISTA control panel shall be mounted to a Pan-O-Vise heavy duty bracket that permits the screen to be positioned at the discretion of the user.

12VDC VOLTAGE OUTPUT TESTING & DOCUMENTATION

The apparatus low voltage system shall be tested and certified by the manufacturer prior to final delivery. A copy of the testing and successful completion will be included in the Owners Manual.

Reserve Capacity Test:

The unit shall be run until all engine and engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be shutoff after ten (10) minutes and the battery system shall then be capable of restarting the engine.

Alternator Performance Test At Idle:

Minimum continuous electrical load shall be activated while the apparatus is at idle speed. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure and corrective actions shall be employed.

Alternator Performance Test At Full Load:

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm sounded by excessive battery discharge, as detected by the system, or a voltage of less than 11.7 volts DC for a 12 volt nominal system for more than 120 seconds, it shall be considered a test failure and corrective actions employed.

Low Voltage Alarm Test:

The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm is activated. The battery voltage measured at the battery terminals with the load still applied must be above 11.7 volts or the test shall be considered a failure and corrective actions employed.

Documentation:

At the time of final delivery, an Amp Draw Report complying with NFPA 1901, Section 13-15 will be completed and inserted into the Owners Manual. It will provide the following information:

1. Documentation of the electrical system performance test.

2. Written load analysis with the following information:

-- a. Nameplate rating of the alternator
-- b. The alternator rating under the conditions specified in NFPA 1901, section 13.3.2.
-- c. The minimum continuous load of each component that is specified per NFPA 1901, section 13.3.2.
-- d. Additional loads that, when added to the minimum continuous load, determine the total connected load.
-- e. Each individual intermittent load

DO NOT MOVE TRUCK MESSAGE DISPLAY

To prevent accidents or damage caused by unsecured appendages on the cab and body, the following messages shall be displayed on the cab mounted display screen that are displayed whenever the transmission is shifted out of the neutral position and one or more of the following is detected:

-- Street side cab doors are not secured
-- Street side body doors are not secured
-- Curb side cab doors are not secured
-- Curb side body doors are not secured
-- Rear door is not secure (if applicable)
-- Street side roof box lid not secured (if applicable)
-- Curb side roof box lid not secured (if applicable)
-- Light tower not stowed (if applicable)
-- Observation platform rails not stowed (if applicable)
-- Awning is not stowed (if applicable)

The above text messages are required in addition to the minimum flashing light and audible warnings required by NFPA 1901. Due to the number of flashing warning lights and audible alarms typically supplied within the confines of the cab, the text messages are considered critical to the safe operation of the apparatus, Thus no exceptions will be permitted to this requirement.

GRAPHICS DISPLAY

In addition to the text message and flashing lights to warn of non-secured or stowed equipment, an overhead graphic color display will be visible on the Vista monitor. Whenever a compartment door is not secured, yellow flashing indicators will depict which doors are not secured (cab, left side, right side and rear). If the roof compartment lids are not closed (if applicable), the roof compartment graphics will flash. If the light tower (if applicable) is not stowed, a graphic depicting the light tower raised will flash. If the awning (if applicable) is not stowed, a graphic depicting the awning extended will flash.

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CAB CONSOLE

A console shall be installed between the front cab seats that will accommodate radio control heads, siren control head, console panel, maps, note books and etc. The design shall not interfere with access to the engine service access cowling or chassis manufacturers dash mounted gauges, switches or other options. The console surface shall measure 17.75" wide x 23" long.

A book/map storage compartment will be provided at the back of the console with a minimum 10" long x 12" wide opening. The opening will have a hinged lid with latch to to conform to NFPA 1901, preventing stored books and objects from becoming projectiles should the vehicle become involved in an accident.

The VISTA control panel shall be mounted in the upper section of the console.

Mounted on the console shall be a flexshaft map light and two (2) recessed 12-VDC power point receptacles with rubber covers.

Ample space with "knockout" plate will be provided for subsequent installation by the end user of radios, monitors or other applicable equipment.

DOT CLEARANCE & LED MARKER LIGHTS

The apparatus body shall be equipped with upper side, front and rear LED (no exception) marker lights. The side and rear of the body will be provided with reflectors. All lights and reflectors shall conform to D.O.T. and FMVSS minimums for such vehicles of this type. All marker lights shall be incorporated into the headlight circuit of the cab/chassis.

TAIL LIGHT ASSEMBLY

The rear tail light assemblies shall have three (3) individual minimum 4" lights for the left and right sides. The top lights shall be LED amber turn; center clear incandescent back up lights; and lower LED red stop/turn. The LED assemblies shall have not less than 42 light emitting diodes in each assembly. The left and right light cluster assemblies shall be recessed into the body panel. Each light shall have a polished stainless steel trim ring. Connections for each light shall be made using AMPS watertight plug assemblies, no exception. The four LED lights shall carry a ***lifetime replacement warranty***, valid should only a single LED element malfunction, not a given percentage of elements.

UPPER BODY AUXILARY LED STOP/TURN & EMERGENCY WARNING LIGHTS

Two (2) Federal 4" red LED auxiliary stop light shall be flush mounted on the left and right upper rear body. They shall be connected to the same circuit as the primary lower stop light using watertight connectors.

In addition to the standard brake light mode, these lights shall also function as auxiliary turn signals and emergency warning lights. They shall automatically activate whenever the vehicle is placed in the emergency response mode and flash at a rate not less than 160 fpm to differentiate the pattern from other functions. The emergency warning mode shall be automatically disabled whenever either the turn signal (left or right) or the brakes are applied. The flash pattern in the turn signal mode shall be a approximately 60 fpm for immediate recognition by anyone following the apparatus that the mode has changed.

AUXILIARY BRAKE LIGHT ACTIVATION

The rear brake lights shall be automatically activated whenever the auxiliary engine brake is engaged.

BRAKE LIGHT IMPULSE ALERT SIGNAL

Upon application of the brakes, the upper auxiliary LED brake lights will emit two rapid impulse flash sequences to warn vehicles behind the apparatus that braking actions have been initiated. This alert is required to gain the attention of any motorist following the apparatus and watching the emergency flashing light pattern that a new alert mode is being initiated.

MID-SHIP AUXILIARY LED TURN SIGNALS

There shall be an amber auxiliary mid-ship LED turn signal mounted in the lower body crash rail, forward of the rear wheels. These lights shall flash in tandem with the front and rear turn signals.

UPPER SIDE BODY SCENE LIGHTS

Two (2) each Whelen 810CAOZR surface mount 8" X 10" halogen scene lights shall be installed on the upper left and right sides of the of the body, one forward and one aft (total of 4). The scene lights shall have combination 8 to 32 degree internal optic lens. Each left and right pair shall be activated by individual switches on the cab control console.

UPPER REAR BODY SCENE LIGHTS

Two (2) each Whelen 810CAOZR surface mount 8" X 10" halogen scene lights shall be installed on the upper rear body, one left and one right. The scene lights shall have combination 8 to 32 degree internal optic lens. They shall be activated by a separate switch on the cab control console.

SIDE SCENE LIGHTS ACTIVATED BY TURN SIGNALS

The left or right side scene lights shall be illuminated by activation of the respective turn signal to warn traffic of a turn sequence or to illuminate the turn zone.

In addition to the switch activation capability, the rear scene lights shall be automatically activated whenever the transmission is placed in the reverse mode of operation.

LED COMPARTMENT STRIP LIGHTS

There shall be high intensity LED compartment lighting strips installed in each compartment. There shall be a minimum of one (1) LED diode every 4" of length covering a minimum of two-thirds of the compartment height. The housing assembly must be water-resistant. They shall be installed forward of any shelf or tray to project light across and into each of the shelf or tray locations. The installation shall exceed the NFPA standard of one-foot candle average per four cubic feet of area.

COMPARTMENT OPEN WARNING & AUTOMATIC LIGHT ACTIVATION

All compartment lights shall be automatically activated when the left or right lock handle is released and any other door not associated with the side compartment locking system is opened. The console switch shall be capable of over-riding the automatic system.

In the event a door is not properly closed and/or secured, a scrolling text message will be displayed on the bottom of the VISTA display screen as follows:

-- Cab Doors Ajar
-- Roadside Body Door Ajar
-- Curbside Body Door Ajar
-- Rear Body Door Ajar
-- Roof Compartment Lids Ajar (if applicable)

If more than one location is not secured, all doors affected in the above list will scroll across the bottom of the screen. As each respective door is secured, the text will disappear from the scrolling alert.

In addition to the text alert, there shall be a compartment open warning light installed within prominent viewing of the driver. It shall be a minimum 2-1/2" x 1-1/2" Grote or equal. The light will be activated only when the doors are not secured and the transmission is placed into a forward or reverse mode of operation. It shall also flash if the parking brake is not set. A metallic plate shall be placed in close proximity of the light that reads - "Do Not Move Apparatus When Light Is Flashing."

GROUND LIGHTS

Minimum 4" diameter shock mounted ground lights shall be installed. They shall be mounted in the following locations:
-- one (1) each forward of left & right rear wheels
-- one (1) each aft of left & right rear wheels
-- one (2) under rear step bumper

They shall be activated in the following scenarios:
1. When any body compartment door is opened
2. Manually from respective scene light switches
3. When the apparatus is shifted to the reverse mode
4. Left and right sides activated by respective turn signal

NFPA OPTICAL WARNING DEVICES

The apparatus shall comply with the requirements of latest edition of NFPA 1901, Chapter 11-8 "Optical Warning Devices". The flashing pattern and sequencing shall be fully compliant with this standard. All lights shall function in the "Calling for Right of Way" mode. Designated upper Zone A lights and auxiliary lighting specified herein shall be disabled in the "Blocking Right of Way" mode. Under no circumstances shall any of the "Blocking Right of Way" lights be disabled by the electrical system load manager. "Blocking mode shall be automatically activated whenever the transmission is placed in the neutral or park position. The following lights shall be provided:

UPPER ZONE A WARNING LIGHTS

A Whelen model C4000000 Centurion 60" light bar will be mounted on the cab roof. It will feature four (4) rotators and three (3) diamond mirrors. The light shall be above any cab roof mounted components that may obstruct any light projections forward or to the side of the apparatus. Lens will be red.

LOWER ZONE A FRONT CAB WARNING LIGHTS

A Whelen 60F000FRR red halogen warning light with 6EFLANGE chrome flange shall be mounted roadside (left) and curbside (right) front of the cab (total of 2).

HEADLIGHT WIG-WAG FLASHERS

The headlights shall be provided with an alternating or pulsating flash mode referenced as a wig-wag mode. It sequence shall be automatically inoperable when the headlights are in the high beam mode. Since the lights exceed the minimum NFPA 1901 requirements, the lights shall be managed by the load manager within the multiplexing system and controlled through the "Blocking Right-of-Way" circuit.

LOWER ZONE B & D INTERSECTION WARNING LIGHTS

A Whelen RSR03ZCR red TIR3 Super-LED warning light shall be mounted in the roadside (left) and curbside (right) of the cab fenders (total of 2). It will feature ultra-bright LED technology and be vibration, moisture and corrosive resistant.

LOWER ZONE B & D SIDE BODY WARNING LIGHTS

A Whelen 60F000RR red halogen warning light with 6EFLANGE chrome flange shall be mounted in the roadside (left) and curbside (right) lower apparatus body crash rails; one (1) fore and aft (total of 4).

LOWER ZONE C REAR BODY WARNING LIGHTS

A Whelen 60F000RR with 6EFLANGE red halogen light shall be mounted on the lower rear body panel, one (1) roadside (left) and curbside (right).

UPPER ZONE B & D SIDE BODY WARNING LIGHTS

Two (2) Whelen 810CAARR red dual halogen warning lights shall be mounted on the roadside (left) and curbside (right) of the upper apparatus body, one (1) fore and aft of the upper roof rail (total of 4). These lights fulfill the requirements for midship and rear warning lights in Upper Zone B and D.

UPPER ZONE C REAR BODY WARNING LIGHTS

A Whelen 810CAAAR amber halogen warning light with 810TRIM chrome flange shall be mounted on the upper rear body panel, one (1) roadside (left) and curbside (right).

SIREN, FEDERAL PA300 ELECTRONIC

A Federal Signal model PA300MSC electronic siren shall be mounted in cab control console convenient to the driver. It shall feature yelp, wail, radio and PA modes and have a manual override switch. A noise-canceling mike shall be permanently attached.

HORN/SIREN SWITCH

A switch shall be provided on the control console that permits the driver to select activation of either the chassis OEM horn or the siren from the steering wheel horn button.

SIREN SPEAKER

A Federal Signal DynaMax 100 watt compact electronic speaker, model MS100 with MSFMT-EF chromed trim bezel shall be mounted in the left side of the front bumper.

ANTENNA COAXIAL PRE-WIRING

A two-way radio coaxial cable shall be routed from cab roof to the cab console between the seats. The termination point at the radio site shall have a PL259 connector soldered to the coaxial. The termination point at the antenna site shall be supplied with a minimum of 6" of exposed cable.

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CAB MOUNTED 12VDC TERMINAL STRIP & FUSE BLOCK

A 6-circuit terminal strip and fuse block will be installed in the cab. It will be powered from the chassis battery system using minimum 8-gauge wiring for subsequent connection of radios and other auxiliary equipment . The strip shall have a total of six (6) terminal points and fuse blocks that will accept either ATC fast acting blade type fuses or plug-in style circuit breakers. Each circuit will be capable of handling up to 30-amperes. The outlets and fuse blocks will be mounted behind a clear insulating cover with the fuse blocks accessible from the face of the cover.

BACK-UP ALARM

A back-up alarm rated at not less than 102 DBA shall be installed under the rear of the apparatus body that meets minimums requirements of NFPA 1901. It shall be automatically activated whenever the transmission is in the reverse mode of operation.

REAR VISION CAMERA SYSTEM

A SafetyVision high resolution black and white rear vision camera shall be installed and integrated to the dash mounted Vista LCD monitor. It shall automatically engage whenever the apparatus is placed in the reverse mode of operation and manually by an individual activation switch on the VISTA control panel. **NO EXCEPTIONS.**

The camera shall be mounted in a weather-resistant housing to protect the connection from water and other forces. The camera shall feature a solid-state imager, electronic iris, wide angle lens, built-in heater and waterproof connector. The housing shall resist up to 60 G's of shock and vibration resistance to 6.8 G's. It shall be subjected to salt spray testing to handle road conditions. The viewing area shall not be less than 118 degrees horizontal and 93 degrees vertical.

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240/120VAC ELECTRICAL SYSTEM REQUIREMENTS

1. General Requirements: The complete wiring and electrical installation shall conform to the current National Electrical Code (NEMA) applicable to mobile applications, except where superseded by NFPA. #1901 Chapter 19 standards. All electrical equipment installed shall be suitable for intended use and type locations (wet, dry, or underbody and chassis).

The system shall be installed or supervised by a licensed electrical technician(s) to assure the required level of safety and protection to the fire apparatus operators.

The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the open market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture, and severe continuous usage. For this reason, use of any solid conductor (non-stranded) wiring, such as Romex, will not be accepted.

The following electrical components and wire shall be the minimum acceptable standard for this type of apparatus:

2. Wiring: All AC electrical primary wiring rated at 20 amps and higher shall be fine stranded copper type THNN. THNN cable is much more flexible for mobile routing applications and is required in lieu of industry standard THHN, which is not as flexible. The wire shall be sized to load and circuit breaker rating.

Electrical cables or conduit shall not be attached to chassis suspension components, water, fuel or brake lines, 12VDC wiring or harnesses and not be within 12 inches of any exhaust system component or 6 inches of fuel lines.

3. Circuit Breaker Box: The circuit breaker box shall be equal in quality to Square D with a hinged cover or door. All circuit breakers shall be switch rated and sized to load demand.

4. Receptacle and Inlet Devices: Any exterior outlets specified herein shall be mounted in cast aluminum or zinc die cast boxes with weather resistant snap open covers. An isolation gasket shall be used whenever any portion of the outlet or covers comes into contact with a body panel.

Where subjected to wet locations, the receptacle outlet and inlet devices, including those on hardwired remote power distribution boxes, shall be of grounding type provided with a wet location cover and installed in accordance with Section 210-7 Receptacles and Cord Connections of the NEC.

All receptacles located in wet locations shall be installed in a plane from vertical not less than 24 inches from the ground.

All receptacles located in a dry location shall be of the grounding type.

All receptacles shall be marked with the type of line voltage (120 volts or 240 volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they shall be so marked.

5. Labeling: All circuit breakers, outlets, fixtures, or appliances shall be properly labeled identifying voltage and amperage rating. The labels shall display a minimum 14 pt. letters or numerals and be of a contrasting color to the apparatus background surface to which they are affixed. If imprinted labels are utilized, they shall have a clear Mylar type surface coating that prevents smearing or damage by weather or petro-chemicals.

6. Load Balance: To provide proper loading and efficient generator operation, the 120 volt wiring shall be split to permit a balanced load condition.

7. Grounding: Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded system will not be used. Only stranded or braided conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor, properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

8. Over-current Protection: The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144 inches in length, unless used on trailer applications.

For fixed power supplies, all conductors in the power supply assembly will be type THNN, THW, or use stranded conductors enclosed in nonmetallic X-Flex, LiquidTite or equal flexible conduit rated for a minimum of 194 degrees F.

For portable power supplies, conductors located between the power source and the line side of the main, over-current protection will be Type SOW or Type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees F.

9. Wiring Methods: Fixed wiring system will be limited to the following:

-- Metallic or nonmetallic X-flex, LiquidTite or equal flexible conduit rated at not less than 194 degrees F.

-- Type SOW or Type SEO cord with a WA suffix, rated at 600-volts at not less than 194 degrees F.

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump plumbing, hydraulic lines, exhaust system components, or low voltage wiring. In addition, the wiring will be run as follows:

-- Separated by a minimum of twelve (12) inches, or properly shielded from exhaust piping.

-- Separated from fuel lines by a minimum of six (6) inches.

Electrical cord or conduit will be supported within six (6) inches of any junction box and at a minimum of every 24-inches of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

10. Wet Locations: All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24 inches from the ground. Receptacles on off-road vehicles will be a minimum of 30 inches from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

11. Dry Locations: All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 12 inches above the interior floor height.

All receptacle will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single-phase, they will be so marked.

12. Listing: All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

13. Operational Test to NFPA 1901, section 23.16: The following test will be performed by the apparatus manufacturer prior to final delivery to test and certify that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order.

a. The prime mover shall be started from a cold start operation and the line voltage electrical system loaded to 100 percent of apparatus load or nameplate rating of power source whichever being the lesser. The following information shall be recorded:

--The cranking time until the prime mover starts and runs, if applicable.
--The voltage, frequency, and amperes at continuous full rated load.
--The prime mover oil pressure, water temperature, transmission temperature, hydraulic temperature, and the battery charge rate, as applicable.
-- The ambient temperature and altitude.

b. The power source shall be operated at 100 percent of apparatus load or of its nameplate voltage rating (whichever is the lesser) for a minimum of two (2) hours in accordance with NFPA 1901 and U.L. (See U.L. testing requirements).

c. When the line voltage power is derived from the vehicles low voltage system, the minimum continuous electrical load as defined in Chapter 9 shall be applied to the low voltage electrical system during the operational test. Any termination of line voltage power by the low voltage load management system shall be noted and the duration of the periods of line voltage power source shutdown shall be recorded.

d. The results of the U.L. test listed in this section shall be supplied to the purchaser at the time of delivery *(not applicable to portable generators)*.

14. Wiring Schematics: An electrical wiring schematic diagram generated by a CAD program shall be provided with the completed apparatus. It shall be an as built schematic listing the agency name and the serial number of the body. An indicative schematic shall be enclosed with the bid response.

GENERATOR - POWER TAKE-OFF TYPE

1. General Requirements: The apparatus shall be equipped with a complete electrical power plant system provided by a chassis engine and transmission driven power take-off type generator. The complete wiring and generator installation shall conform to current National Electrical Code standards, as prescribed by the National Fire Protection Association (NFPA).

The system shall be installed by qualified electrical technicians to assure the required level of safety and protection to apparatus operators.

The installation shall be designed for continuous operation without overheating and undue stress on components.

2. Generator Minimum Specifications:

Onan fire and emergency service series with a minimum rating of not less than 40KW (40,000 watts) at 1800 RPM

Voltage shall be 3-phase capable of producing at the panel both 120/240VAC Delta with a minimum 125 amp continuous load rating.

3. Generator Mounting: The generator shall be supported on the reinforced compartment floor designed to withstand the weight and torque load of the generator under worst-case scenarios. The generator shall be installed within the forward compartment, at floor level in a manner that provides simple access for service and/or removal.

4. Power Take-off: A Chelsea transmission power take-off shall be mounted directly to the Allison automatic transmission PTO output. The gear ratio shall permit the generator to operate under full loads at an engine speed of approximately 1400 rpm. Over-speed protection shall be incorporated into the electronic engine set-up that will disengage the PTO at 1600 rpm's and automatically re-engage once the rpm's drops back to 900.

The drive-line shall be minimum 2" hollow tube type with heavy duty Spicer 1310 Series (no exception) universal joints rated for any drive-line angles required for installation. The shafting shall be splined type to allow movement between the chassis components and the generator. The drive shaft shall be precision welded and balanced prior to installation to insure smooth, vibration-free performance at maximum RPM levels.

The engagement of the power takeoff shall be in the chassis cab with a switch on the Vista display panel with a scrolling "engage" message across the lower section of the screen.

The power supply to the PTO engagement control shall be wired to a neutral safety position transmission switch to prevent engagement unless the vehicle is in the neutral position.

5. PTO Engaged Warning Message: A text message shall scroll across the bottom of the Vista display screen that reads "PTO Engaged" anytime the PTO is activated.

6. Electronic Engine Governor System: The generator system shall be controlled by the OEM chassis and engine manufacturer's electronic governor controls.

The system shall automatically control the engine through a magnetic pickup so that the generator input speed is a constant 1800 rpm regardless of electrical load demand.

7. Instruments and Controls: To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a FRC FROG-D-3P-D generator display with digital frequency, ampere and volt meters

This panel shall be mounted next to or integral with the circuit breaker panel. This unit shall be a single phase, three wire, 120/240VAC series

Circuit breakers shall assure overload protection and also shall be used as disconnect switches. The breakers shall be sized to generator output.

8. Generator Housing/Mounting: To protect the generator from damage subjected by corrosive elements (i.e: road salts), water and road oils, the generator shall be installed inside the forward compartment, as outlined in the Compartment Layout Schedule, and be covered by a housing panel constructed of 3/16" aluminum. The face of the panel shall have a DA swirled finish. The top of the housing shall serve as an equipment mounting shelf and be removable for service access to the generator and generator components.

The compartment shall be ventilated and have drain holes in the corners to prevent accumulation of water spray. To prevent overheating, the compartment shall have a 120VAC "pan-cake" type fan installed that is engaged anytime the generator is functioning. The fan shall draw air in from the bottom of the compartment and discharge out the lower front side.

The generator housing shall also provide flush mounting of the circuit breaker panel, specified electrical outlets, meters and controls. All these items shall be flush mounted on the face of the panel, which shall be recessed back into the compartment a minimum of 8" to provide a step surface for reaching equipment located in the upper reaches of the compartment. Additionally, the top of the housing shall service as a shelf for storing or mounting equipment, but shall be removable for service access to the generator.

LABELING OF EQUIPMENT

All circuit breakers will be labeled and will be provided for all outlets indicating output amperage, voltage, and phase.

To properly monitor the generator performance and load demands during operation, the generator will be equipped with a full instrument and control package. These monitoring devices will be mounted in the specified location next to the load center. The following FRC FROG-D Generator Meters Panel and instruments will include:

-- digital voltmeter
-- two digital ammeters
-- one (1) digital frequency meter
-- one (1) digital hourmeter
-- one (1) PTO engagement indicator light

UL CERTIFIED DIELECTRIC VOLTAGE WITHSTAND TEST

The generator and all related electrical systems shall be independently tested and certified in writing by Underwriters Laboratories (UL). The testing shall conform to NFPA 1901, Chapter 23.16.2 requirements.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for 1 minute.

The dielectric tester shall have a 500 volt-amperes (VA) or larger transformer, with a sinusoidal output voltage that can be verified.

The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:
--1. Isolate the power source from the panel board and disconnect any solid state low voltage components.
-- 2. Connect one lead of the dielectric tester to all the hot and neutral busses tied together.
-- 3. Connect the other lead to the fire apparatus frame or body.
-- 4. Close any switches and circuit breakers in the circuits.
-- 5. Apply the dielectric voltage for 1 minute in accordance with the testing equipment manufacturer's instructions.

The electrical polarity of all permanently wired equipment, cord reels, and receptacles (as applicable) shall be tested to verify that wiring connections have been properly made.

Electrical light towers, floodlights, motors, fixed appliances, and portable generators (as applicable) shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

Testing procedures shall be conducted as outlined in NFPA 1901, Chapter 23.16.5.3. The results of each test shall be recorded on an appropriate form and provided with the delivery documentation.

THREE-PHASE BREAKER BOX & LOAD CENTER

The line voltage electrical system will comply with applicable NFPA 1901 standards and with applicable sections of the National Electrical Code #70 standards. Line voltage carrying equipment down stream of the power source will be "listed" (where applicable) in accordance with manufacturers instructions.

A minimum 24-place Square-D or equal quality manual reset over current device (breakers) will be installed to protect the line voltage electrical system components. A 150-amp, 3-phase main over current protection device will be provided that is either incorporated in the power source or is connected to the power source by a power supply assembly. The size of the main over current protection device will not exceed 125 percent of the nameplate amperage rating on the power source specification label or the rating of the next larger available size over current protection device where so recommended by the power source manufacturer.

Over current protection devices will be provided for each individual circuit and will be sized at not less than 15 amps in accordance with NEC. Each over current protection device will be marked to identify the function of the circuit it protects. The circuit breaker panel and instruments will be located in a plane facing the operator so that all circuit breakers are readily visible under normal operating conditions. The panel will be readily visible and located so that thee is unimpeded access to the panel board controls.

The breaker panel will be recess mounted in the face of the generator housing panel with a protective, hinged access door. The panel will be recessed a minimum of 8-inches back from the edge of the door opening.

EXTERIOR DUPLEX OUTLETS

A 20 amp (5-20), 120VAC duplex outlet mounted in a weatherproof exterior housing with spring-loaded covers and wired with 12/3 THNN wire shall be installed at the forward section of the body wheelwells on the left and right side. They shall be protected with a GFI circuit breaker. A metallic tag with raised letters reading 120VAC shall be installed above the outlet.

120VAC TWIST-LOCK OUTLETS

Four (4) 20-amp, 120VAC twist-lock outlets (NEMA L5-20R), wired with 12/3 THNN wire shall be installed. One shall be installed on the rear section of the body wheelhouse on the right and left side and one each below the rear portable telescopiong scene lights. Each outlet shall be provided with weatherproof cover. A metallic tag with raised letters reading 120VAC shall be installed above the outlet.

240 VAC TWIST-LOCK OUTLET

A 30 amp, 240VAC twist-lock outlet (NEMA L6-30R) with weatherproof cover shall be installed on the generator housing panel. A metallic tag with raised letters shall be installed above the outlet.

ELECTRIC REWIND CORD REEL WITH GROUND CONTINUITY MONITOR

A Hannay model ECR1624-17-18 electric rewind cord reel shall be installed, as described in the compartment layout schedule. The cord reel shall be designed to accommodate not less than 200 feet of 10/4 cable.

The cord reel shall have the following features:

-- Side disc shall have rolled edges and concentric reinforcing ribs.

-- Bearing shall support the axle at each end of the reel to provide smooth rotation and eliminate weight on the swivel joint.

-- The reel axle shall be full length of the reel.

The reel shall be equipped with a 12-volt DC electric rewind motor with a SDLM-40 circuit breaker and operated by a push-button control located on the compartment adjacent to the reel, easily reached by standing on the ground and not more than 72" from ground level. A metallic tag with raised letters reading CORD REEL REWIND shall be installed next to the rewind button and contain the following information: (a) Current rating; (b) Current type; (c) Phase; (d) Voltage; and (e) Total cable length. . A metallic tag with raised letters reading CORD REEL REWIND shall be installed next to the rewind button.

A Topwind assembly "C" captive roller shall be provided to help guide the cord on and off the reel. A HS-3 cord stop ball shall be provided to prevent the end of the cord from being wound onto the reel.

The reel shall be equipped with 200 feet of 10/4 SO yellow safety cord. A single 30-amp, 240VAC twist-lock outlet (NEMA L14-30R) shall be wired to the end of the cord. The plug shall incorporate a ground continuity and power status monitoring device. The device will be integral to the plug and provide dual, bright LED indicators with 360 degree visibility. A green light will indicate proper ground continuity and a red light will indicate loss of ground continuity or mis-wire. Both shall indicate current present. The cord reel shall be wired to the circuit panel with 10/4 DLOC wire routed in weather resistant conduit. The reel shall be provided with a separate 30-amp, 240VAC breaker. The power rewind cable spool area shall be visible to the operator during the rewind operation.

A label will be provided in a readily visible location adjacent to any permanently connected reel. It will indicate the following:
-- current rating
-- current type
-- phase
-- voltage
-- total cable length

REMOTE POWER DISTRIBUTION BOX

An Akron model EJB remote power distribution box shall be provided with safety yellow powder coating finish. A large handle shall be provided on top of the box that permits handling with gloved hands. The box shall be provided with a total of four (4) GFCI protected outlets. There shall be one (1) L5-20R, two (2) L5-15R, 120VAC twist-lock receptacles and one (1) 5-15 straight blade receptacle pair. Each receptacle shall be equipped with a spring-loaded snap cover. All electrical receptacles shall be UL listed components. The cast aluminum box shall be a least 1/4” thick and the four corner edges a minimum of 3/4” thick, providing for durability under extreme fire service use applications. To prevent damage associated with raised indicator lamps, the box shall be fitted with 3/8” thick polypropylene faceplates on each side of the box which act as backlighting so that plug orientation to the receptacle is quick and easy to align. A NEMA L5-30P male plug shall be recessed into one end of the box to supply power from a remote source to the four (4) receptacles.

An Extenda-Lite EJB-VMT yellow powder-coated aluminum mounting bracket shall be attached to the wall next to the reel. It shall permit the power distribution box to be stored near the cord reel with the cord attached.

750W TRI-POD TELESCOPING LIGHTS WITH GROUND CONTINUITY MONITOR

A Havis-Shields MagnaFire 3000 telescoping flood light shall be installed on the left and right rear of the body (total of 2). The light head shall be a model KR-37 with 120 VAC quartz halogen lamp rated at 750 watts, 19,200 lumens. Each lamp head shall be mounted on a model KR-SB-837TM-S removable tri-pod telescoping pole with switch located on the light head. The lights shall be provided with a male plug compatible with the specified outlet. If the light assembly is mounted against a painted surface, brushed finish stainless steel plates will be installed on body behind the nested position of the light heads to prevent damage. The plug shall incorporate a ground continuity and power status monitoring device. The device will be integral to the plug and provide dual, bright LED indicators with 360 degree visibility. A green light will indicate proper ground continuity and a red light will indicate loss of ground continuity or miswire. Both shall indicate current present.

LIGHT TOWER LIMB GUARD

The front of the light tower, in the lowered position, shall have a minimum .125” bright aluminum tread plate limb guard installed. The guard shall provide an approximately 60 degree angled deflection of limbs and cover the complete mechanism in a manner that does not interfere with full operational functions of the tower in the raised position. It shall be anchored to reinforcement plates to minimize damage to the roof panel on impact.

LIGHT TOWER PRE-INSTALLATION PREP

The forward roof of the body shall be reinforced for the mounting of a light tower. It shall also be prewired and have an airline plumbed for the future installation of a Wil-Burt light mast.

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BREATHING AIR SUPPORT UNIT

BREATHING AIR SYSTEM REQUIREMENTS

MOBILE BREATHING AIR COMPRESSOR & CYLINDER CHARGE SYSTEM

INTRODUCTION

This specification describes a modular mobile respiratory air compressor assembly that is powered by three phase utility power and a PTO electric generator system. The system shall be used to charge self-contained breathing apparatus cylinders (BAC's).

The air supplied by this charging system shall meet or exceed the requirements of Grade "E" breathing air, as described in the Compressed Gas Association, Commodity Specification, G-7.1. The system shall meet all current OSHA, NIOSH, State Industrial Safety and Vehicle Code requirements. The following specification shall be considered minimum.

It is of critical importance to the end users that the system be designed as "user friendly", with operational and maintenance procedures kept as simple as possible, while providing for maximum safety of the operators. The following minimum requirements outline a system that meets this performance criteria. All components and features specified herein are open-market and non-proprietary. Any line item for which bidders take exception must be explained in detail, outlining specifically how the proposed system exceeds the minimum simplicity, maintenance and safety requirements outlined herein.

WARRANTY

The equipment supplied shall be guaranteed to be new, of current design, and free of all defects in material and workmanship for a period of one year, based on prescribed service and maintenance.

BID INSTRUCTIONS

The bidder shall submit, with the quotation response, the manufacturer's descriptive literature and performance data to verify compliance with the minimum requirements of the following items:

1. Air compressor assembly
2. Power sources
3. Purification system
4. Control and monitoring system
5. Air storage
6. Charge station

A. 6000 PSI HIGH PRESSURE BREATHING AIR COMPRESSOR SYSTEM:

The compressor module shall be of open design, horizontal configuration with all

components mounted on a heavy-duty frame specifically engineered to absorb all stress imposed by mobile operation. The complete unit (except air receivers) shall be factory assembled and tested to assure quality and reliability. The compressor block shall be manufactured in the U.S.A. **NO EXCEPTIONS**

The compressor package shall require positioning, bolt-down, electrical and pneumatic connections to be operational. If specified herein, a 3-phase shore power connection shall be provided. The compressor shall be completely operational from the single compressor control panel mounted over the charge station. All controls shall be located where they can be easily seen and operated without operator moving away from the control panel.

The following is the scope of the compressor module:

-- 36.8 Piston Displacement SCFM
-- 20.4 ACFM FAD @ 5000 PSI
-- 26 SCFM Charge Rate (formula = 0 PSI to 6000 PSI)
-- 31.8 SCFM Charging Rate (formula = 500 PSI to 3000 PSI)
-- 1000 RPM maximum speed - **NO EXCEPTIONS**
-- 20 hp Minimum Electric Motor rating

1. Frame: 100% cast iron designed to support the overhung crankshaft. Cylinders bolt directly to the cast iron frame. Frame to be completely sealed, yet provide for maximum accessibility.

2. Crankshaft: Overhung design supported by two heavy duty ball bearings with replaceable crankpin bearing. Entire shaft to be balanced with an integral counterweight to insure smooth, trouble-free operation.

3. Connecting Rods: Crankpin bearing inside the rod shall be precision ground requiring no alignment.

4. Cylinders: 100% cast iron, separately cast and individually bolted to the frame. The cylinders shall be precision honed for low oil carryover. Radial fins provided on the cylinders to remove heat and ensure 360 degree cooling for the cylinders.

5. Pistons: The first and second stages shall utilize a step type double acting piston. The third stage shall utilize a steeple type piston. The fourth stage shall use a built-up, steeple type piston.
6. Rings - The first stage shall utilize five compression rings and one oil control ring. The second stage shall utilize three compression rings and one oil control ring. The third stage shall use four compression rings and one oil scrapper ring. The fourth and final stage shall use five compression rings and one oil scrapper ring.

7. Flywheel - The cast iron flywheel, with attached fan, shall force a "cyclone" air blast over the deep finned cylinders, multi-finned intercoolers, and finned tube aftercooler. The flywheel shall be balanced for vibration free operation. The fan shall be bolted to

the flywheel and sized to match ambient conditions for the climate within which this apparatus will operate.

8. Intercoolers - The intercoolers between stages shall be finned tube construction to provide maximum cooling area. They shall be located directly in the flywheel air blast to remove the heat of compression between stages, keeping running temperatures and power loads to a minimum. The intercoolers shall be provided with a relief valve to prevent over-pressurization.

9. Intercooler Pressure Gauge - Pressure gauges shall be provided to display reading pressure in the intercooler(s). Abnormal pressures indicate when valve maintenance is required, eliminating costly tear down inspections.

10. Lubrication - Splash lubrication of running parts shall be designed for simplicity and reliablity. Lubrication dippers shall be integral with connecting rods and cannot come loose.

11. Inlet Filter - The filter shall have a durable carbon steel canister with baked enamel finish. A treated paper dry type 10 micron inlet filter/silencer shall be provided.

12. Valves - The first and second stage shall be concentric ring type valves that allow balanced and efficient inlet and discharge air flow. The third and fourth stages shall have concentric ring and plate valves that are cartridge type for ease of maintenance. All valves shall be made from premium grade stainless steel. Valves components shall be easily removable for inspection and maintenance.

13. Unloader - The unloader shall automatically bleed the air from intercoolers and cylinders, providing a loadless start to protect the motor from overload.

14. Burst Disc Discharge Relief Valve - A burst disc discharge relief valve shall be provided to protect the system from any sudden, abnormal pressure surge. A conventional relief valve is not acceptable due to its potential inability to "relieve" quickly enough.

15. Low Oil Level Switch - A low oil level switch shall be provided to prevent the unit from operating when oil is low.

16. Separator/Drain Traps - A drain trap shall be provided between the second and third stage, third and fourth stage, and at the discharge of the compressor. The accumulated water and oil vapor shall be automatically removed.

17. Automatic Condensate Drain System - An automatic condensate drain shall be provided that automatically drains the condensate traps during operation and when the compressor stops.

18. Compressor Pistons - The compressor shall have piston rings on all pistons. The third and fourth stage pistons shall be connected to the guide piston by a concentric

retainer, such that the compression piston is free of thrust loading, and always is in contact with the guide/drive piston to prevent damage caused by a free floating piston. NO EXCEPTIONS

B. PURIFICATION SYSTEM:

1. Purification chambers shall be constructed of aluminum alloy 6351 as its anti-corrosive properties exceed all other chamber materials.

2. The purification system shall be rated for 6000 PSI working pressure with a 4 to 1 safety factor.

3. The purification system shall process a minimum of 84,000 SCF of air per cartridge set. Purified air shall be measured by the actual weight of Molecular Sieve. Electronic Dewpoint (DP) detection shall not be used as a means to claim extended chemical cartridge life.

4. Each purification chamber shall have "Safety Burst Disc" integrated into its base. **NO EXCEPTIONS.**

5. CO and dewpoint sensors shall not be installed in the purification chambers. Sensors shall be installed downstream of chambers so the sampled air is representative of that delivered to the B.A. cylinders.

C. CONTROLS AND MONITORS:

An electronic controller/monitor shall continuously monitor and control all significant functions and parameters of the complete air compressor system. If an out-of-tolerance or unsafe condition occurs, the controller will stop the compressor and advise the status of the system in words, on a minimum four-line LCD display.

1. Controller shall have the following minimum features:

a. Automatic compressor start/stop
b. Carbon monoxide monitoring/control with "Safety Stop"
c. Dew point monitor/control with "Safety Stop"
d. Auto condensate drain control
e. Record total time on compressor assembly
f. Record time since last compressor service
g. Record time since purification cartridge change
h. Record time on dew point (DP) sensor cell
i. Record time on carbon monoxide (CO) sensor cell
j. Auto-Purge (see separate specification)

2. Alarms (Audio/Visual)

a. High discharge air temperature - with automatic compressor "STOP"
b. High discharge air carbon monoxide - with automatic compressor "STOP"
c. High discharge air moisture (dewpoint) - with a "WARN" to advise a pending purification cartridge change; an "ALARM" with automatic "STOP"
d. Low oil level and/or pressure - with automatic compressor "STOP"

3. Special Features and Alarms

a. Prolonged "run" control - shall be provided to stop the compressor assembly when predetermined continuous run time has been exceed. Prevents the compressor from operating when there is a major air leak.
b. Time limit for "OVERRIDE" operation - Shall be provided to prevent a potential unsafe condition if a system were left in "OVERRIDE" operation.
c. Auto-Purge - Normally when a compressor shuts down and cools naturally, moisture condensate in the cylinders and causes rust on the cylinder walls and piston rings. This system requires an "auto-purge" control that automatically runs the compressor in an unloaded condition to remove all condensed moisture, thus increasing the compressor life.
d. Compartment door interlock - the street and curb side doors of the designated compartment that the compressor assembly is mounted shall have interlock switches provided that prevent the compressor from being operated with the doors in the closed position.
e. A complete calibration kit shall be provided for all monitors requiring periodic calibration.

D. CHARGE STATION MODULE - 4 BAC Capacity:

1. The charge system shall be a separate module and integrated into the apparatus as outlined in the compartment layout schedule herein. The device shall be designed to safely and efficiently charge breathing apparatus cylinders (BACs) in a protective "containment chamber" that will contain all fragments in the event of BAC failure. The resulting air blast shall be vented in a harmless direction such that any resultant air or particle flow will not cause injury or collateral damage to persons or property. Containment chamber must have been tested to contain a one-hour cylinder (90 cu.ft.) rupture. **NO EXCEPTIONS**.

2. The design of the system shall be such that two (2) BACs are charged within the "chamber" while two (2) BACs are attached and made "ready" on the outside of the "chamber". When the first two (2) BACs are charged, they shall be rotated out of the"chamber" as the "ready" BACs are rotated into the "chamber". Since refill time is paramount in the mission of the system, systems that can not be "made ready" during the fill process are not acceptable.

3. The charge adapters shall be the "rigid-fast-attach" type. The charge adapters shall be mounted three feet, plus or minus two inches, above ground/floor level to provide an efficient ergonomic operation.

4. The device shall contain safety interlocks such that if the "chamber" is not closed and locked, air will not flow into the BACs. The "chamber" shall automatically lock and unlock by initiating the charging process only. After setting the air flow-control and pressure regulator to required air flow and pressure, all that shall be required from that point forward is pull up or push down the actuation lever to control start or stop the air-flow and initiate chamber lock.

5. The control panel shall contain "safety" pressure gauges for: Air from the compressor; air in the storage system; and air in the BACs being charged. Automatic control valves shall be provided to control: Air to and from the air storage system; and to the BACs being charged. Manual bleed valves shall be integrated into the "charge" adapters.

6. An adjustable pressure regulator shall be provided to select the "charge" pressure for automatic BA cylinder charging.

7. Safety relief valves shall be incorporated to prevent over charging both high and low pressure BACs.

8. Where automatic control valves are used, manual by-pass valves shall be installed for emergency operation.

E. AUXILIARY FILL PORT:

Located on the left side of the fill control panel will be an auxiliary fill port with JIC outlet with safe-ty cap. The outlet shall be capable of being used as a quick-fill connection or filling of remotely lo-cated storage vessels. The outlet shall be controlled through a 0-7500 psi silicone filled gauge and high pressure adjustable regulator. It shall be labeled "AUX. FILL OUTLET."

Connected to this outlet shall be a second port that discharges out the back of the fill panel for permanent connections of high pressure air reels or other auxiliary devices, as specified separate-ly herein.

F. UTILIITY AIR REGULAR & GAUGE:

Located on the face of the control panel will be a minimum 0-300 psi gauge and regulator control knob labeled "Utility Air". An outlet connection will be provided on the back of the panel for connection of auxiliary utility air outlets or reels, as specified herein.

G. AUTOMATIC SEQUENCE CONTROL:

Automatic sequence control valve(s) shall be installed to manage the airflow. When the storage and BAC pressure gauges equalize, the system shall prioritize the BACs. When the BACs are fully charged, the air flow is automatically redirected to refill the storage air receivers. NO EXCEPTIONS.

H. AIR STORAGE SYSTEM:

The air storage system shall be a separate module. The cylinders shall be mounted in a horizontal position, and shall manifold as one volume. The system shall have ASME cylinders and relief valves, isolation valves, drain valves, and pressure gauges as required by current federal and state OSHA codes.

Each cylinder shall be rated for a minimum of 6000 PSI at a 4 to 1 safety factor; have a capacity of 525 standard cubic feet @ 6000 PSIG. There shall be 4 cylinders in the system.

I. AIR QUALITY CERTIFICATION

Prior to delivery, the system shall complete an air quality test in compliance with the compressed breathing air specification as described by NFPA 1500-1997 by an independent laboratory accredited by the American Association for Laboratory Accreditation in the Chemical Field for Testing. The test will include a Random Sample testing the following characteristics:

1. Oxygen, Volume %
2. Nitrogen/Argon, Volume %
3. Carbon Monoxide (CO), ppmv
4. Water, ppmv/Dewpoint, degrees F
5. Total Volatile Hydrocarbon Content (TVHC)
6. Oil (condensed & Particulate, mg/m3
7. Odor

A certificate of compliance and Air Check Report outlining all concentrations will be provided in the customer manual.

J. DELIVERY, INSTALLATION AND TRAINING:

The complete system shall be assembled and tested as a complete system at the factory prior to shipment. A test certificate shall be part of the Operation and Maintenance manuals (2 sets) that shall be shipped with the system.

The installation of the system shall be within the confines of the apparatus body, as outlined herein. The design of the installation shall in no way provide for any obstruction of air across the compressor assembly.

The user shall receive training on the operation and maintenance of the system upon final delivery of the apparatus by a certified air technician.

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HIGH PRESSURE HOSE REEL

A Hannay model EFH1520-17-18-H6M high pressure hose reel complete with hose and fittings shall be installed, as described in the compartment layout schedule. The hose reel shall be rated for up to 6000 psig working pressure and shall be capable of holding up to 250 feet of high pressure 3/16" I.D. Synflex hose.

The hose reel shall have the following features:

-- Side disc shall have rolled edges and concentric reinforcing ribs.

-- Bearing shall support the axle at each end of the reel to provide smooth rotation and eliminate weight on the swivel joint.

-- The reel axle shall be full length of the reel.

-- The swivel joint inlet shall permit the reel to rotate freely while connected.

The reel shall be equipped with a 12-volt DC electric rewind motor with a SDLM-40 circuit breaker and operated by a push-button control located on the compartment adjacent to the reel, easily reached by standing on the ground.

A Topwind assembly "C" roller shall be provided to help guide the hose on and off the reel. A HS-3 hose stop shall be provided to prevent the end of the hose from being wound onto the reel.

To monitor pressure in the supply line, a gauge and valve shall be furnished at the air control panel.

The reel shall be equipped with 250 feet of 3/16" I.D. Parker 520N (Synflex) fill hose rated at 6,000 psi with 20,000 psi maximum burst pressure. The fill hose shall be continuous with no unions, except where coupled with MxM NPT in 316 stainless steel. Synflex hose shall be routed from the reel location to the air source location. The hose end shall have a CGA 347 swivel connector and line valve with a bleed-off valve. An orange plastic ball shall be installed on the end of the hose to prevent the hose from retracting past the captive roller device.

The hose reel shall be equipped with a flow "fuse" at the inlet of the high pressure flex hose to restrict and/or stop the air flow to prevent hose "whip" in the event of a hose or adapter failure. **NO EXCEPTIONS**.

A bleed valve shall be provided on the supply side next to the reel rewind button to bleed off pressure after each use.

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OWNERS MANUALS

Two (2) 3-ring binders (one original and one copy) shall be provided with the completed apparatus that contains, at a minimum, the following information:

1. All "as wired" schematics for both 12VDC and 120/240VAC systems.

2. Operational and troubleshooting procedures.

3. Paint and key codes.

4. All data, operations manuals, warranty information and schematics, as supplied by equipment options manufacturers.

5. Body, frame and paint warranty documents.

6. CD-ROM of electrical system programming and schematics stored in a plastic sleeve.

The manufacturers and applicable dealers telephone numbers and contact persons names shall be supplied within the binder.

DOT SAFETY KIT

Prior to departure from the manufacturing site, the completed apparatus shall have a DOT compliant safety kit placed in the cab within reach of driver containing the following equipment: one set of triangle markers; one 12v flashlight; one 2-1/2# BC fire extinguisher; and plastic carrying case.

FUEL TANK FILLED AT DELIVERY

The fuel tank shall be filled upon final delivery at the factory.

PRE-CONSTRUCTION CONFERENCE

Immediately after notification of contract award, the successful bidder shall schedule a pre-construction conference between the appointed representatives of the purchaser and the contractor. The conference shall be held not later than 30 days after notification at the fire departments headquarters. The contractor shall present a set of final engineering construction drawings and line item production shop order complying with the specifications outlined herein. Should the purchaser deem that the contractor has not properly interpreted the specifications or does not intend to manufacture the emergency vehicle as specified, appropriate corrective actions shall be agreed upon and the conference shall be re-scheduled. Should the purchaser determine, at the second conference, that the contractor remains unable to meet the intent of the specifications, the contract may be deemed null and void.

FACTORY FINAL INSPECTION

A factory final inspection will be conducted prior to release of the completed apparatus for delivery. The inspection will verify compliance to the specifications and fit and finish. Expenses for travel for one (1) person will be included in the contract price and include airfare; hotel accommodations; rental car (as applicable); and meals while at the factory. Upon correction of any discovered discrepancies, the vehicle will be released for delivery under its own power to the appointed destination. A final acceptance inspection will be conducted upon arrival to ensure all discovered discrepancies have been properly corrected.

PERFORMANCE AND PAYMENT GUARANTY

The bidder to whom the award is to be made shall execute and deliver to the purchaser a Performance and Payment bond in the amount of 100% of the contract amount, payable directly to the purchaser. No reassignments or second party endorsements are permitted. Bonds must be issued by the apparatus manufacturer that will be responsible for completing the terms of the contract. Bonds submitted by or in the name of a dealer or sales representative do not protect the purchasers interest and are not acceptable. Failure to provide a performance bond within 10 days of notification to enter into contract shall be considered breach of contract terms and subject to forfeiture of the bid bond or other surety.

DETAILED SPECIFICATIONS
PROPOSED EXCEPTIONS

(Attach Additional Sheets, if Necessary)

Specifications	Proposed Exception

DETAILED SPECIFICATIONS
OPTIONS

(Attach Additional Sheets, if Necessary)

Option	Price