



Skamania EMS 12' Crane Rescue

Quote Number: 22-218

Quote Date: 03/09/2022

Includes Change Order 227042-1

BUILD SPECIFICATIONS

WARD APPARATUS BODIES SPECIFICATION NEW ALL-ALUMINUM TWELVE (12) FOOT RESPONDER BODY

The apparatus body shall be manufactured as per the following specifications:

BODY DESIGN:

The body shall be modular in design, capable of being removed and remounted on a new chassis. Body integrity and strength to be independent of chassis mounting. Body is specifically designed to enable custom layout of interior compartments.

BODY MATERIALS:

The following shall be the minimum acceptable materials, gauge, and finish used:

Aluminum Sheeting - All exterior panels shall be 5052-H32 aluminum of .125" thickness.

Aluminum Diamond Plate - All diamond plate shall be 3003-H14 aluminum of .125" thickness.

Body Mounting - All body mounting bolts to be minimum Grade 5.

Exterior Fasteners - All exterior nuts, bolts, and screws shall be stainless steel.

CORROSION PROTECTION:

Electrolysis Corrosion Kontrol (ECK) shall be used to prevent dissimilar metal corrosion. ECK shall be used for door latches, door hinges, trim plates, fenderettes, etc. ECK shall be applied to every external fastener hole prior to component mounting.

BODY SUPER-STRUCTURE:

The body super-structure shall be constructed of square aluminum tubing and custom extrusions. All framing and supports shall be welded to create a fully enclosed structure. This construction technique provides high strength and durability and enables custom design of interior compartments.

The side wall structure shall be constructed of 2.0" x 2.0" x .125" 6063-T52 alloy square aluminum tubing, the side wall structure shall be welded and gusseted to the sub structure.

The roof structure shall be constructed of 2.0" x 2.0" x .125" 6063-T52 alloy aluminum tubing in a lateral pattern, maximum 20-inch spacing. The roof structure shall be welded to the side-wall structure.

All side walls shall be surfaced using a .125" aluminum sheet, welded, and bonded to body side wall structure. The body roof shall be surfaced using .125" aluminum diamond plate.

A side body impact rail manufactured of 6063-T52 alloy extruded aluminum shall be welded to the apparatus side wall structure. It shall receive the body side sheet by means of a groove, which runs continually fore to aft of the side wall structure.

BODY FLOOR CONSTRUCTION:

The sub structure shall be constructed of 2.0" x 3.0" x .250" 6063-T52 alloy rectangular aluminum tubing, welded and gusseted to the side-wall structure for maximum strength and durability.

Two (2) mounting rails of full-length 3.0" x 5.0" 6061-T6 alloy rectangular aluminum tubing shall be welded to the sub structure, the mounting rails to align with the chassis frame rails for mounting of the body to the chassis.

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UNDERCOATING:

The underside of the vehicle including all metal work shall be sprayed with SEM ROCK-IT XC urethane automotive undercoating. The ROCK-IT XC product is designed to prevent chipping, cracking, or marring of painted and unpainted surfaces after exposure to high impact sand, gravel, and other abrasive materials. This undercoating shall aid in preventing corrosion and will provide a sound and vapor barrier to the aluminum body structure.

BODY MOUNTING:

The body shall be mounted to the chassis frame at not less than six (6) locations, three (3) on each side.

Neoprene pads shall be furnished and installed between the body and the chassis frame rails to prevent electrolysis and to minimize noise transfer.

BODY FRONT SHEETING: Front body sheet to be fabricated of .125" smooth aluminum, painted job color.

STONE GUARDS:

The front body corners shall have .125" aluminum diamond plate protective guards. The stone guards shall be bolted to the body and provide coverage at a minimum of 24" high from the base of the body.

BODY REAR SHEETING:

The rear body sheet shall be fabricated of .125" smooth aluminum sheeting and painted job color. There shall be a kick plate fabricated of .125" aluminum diamond plate, located below the rear opening.

BODY CORNERS, EXTRUDED:

The exterior body corners and roof perimeter shall be capped with a radiused (2.44") custom aluminum extrusion and welded to the wall and roof structure. Body corners create additional protection from physical and environmental damage to the super-structure.

APPARATUS BODY PAINT FINISH:

Entire paint process including initial surface preparation through final paint and clear-coat application to be conducted according to PPG certified paint process. The final finish of the apparatus shall conform to fire apparatus standards, exhibiting excellent gloss and color retention properties.

Preparation: Removal of all contaminants and oxidation is essential to the final effect of a finish system, the apparatus shall be pre-cleaned with wax and grease remover and dried to evaporation. A PPG 10-step standard body preparation shall be completed. When the substrate is prepared, the entire body shall be cleaned by washing again with wax and grease remover and dried.

Pre-treat ANF Primers: The pre-treat and primer applications shall be made in two (2) independent steps. An application of a combined pre-treat/primer product shall not be allowed as a substrate. The prepared substrate shall be pre-treated with Acid Curing 2 component primer to provide corrosion protection and create an adhesive bond between the substrate and the surface applications. To enhance adhesion and topcoat gloss, a two-component urethane primer shall be applied. All the primed surfaces shall be sanded smooth, thus removing all texture and surface imperfections, and creating a finish base that will meet the rigid requirements of the fire and emergency services.

Top Coats: Paint shall be PPG FBCH. Two (2) coats urethane base coat shall be applied according to paint manufacturer specifications. After the base coats have cured properly, two (2) coats of a high solids urethane clear shall be applied. All surface imperfections shall be removed by buffing and polishing.

Note: Body to be paint matched to chassis, Ford "FT Blue."

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CHASSIS PAINT:

Chassis to be re-painted to match current fleet color Ford OEM "FT Blue."

Per Change Order 227042-1: FORD OEM WHEELS:

Ford OEM wheels shall be polished aluminum.

BLACK-OUT PACKAGE:

Black-out package includes the application of black Rhino coating:

Black Rhino liner coating for running boards, rear bumper, rear kick panel over bumper, front body stone guards, rear wheel well surrounds, fenderettes, rub rails, and upper roof interior walls and flooring, including the access step at rear and light tower protective shroud.

REAR BODY CHEVRONS:

"Diamond Grade" Chevron reflective striping, six-inch (6") wide, shall be applied to at least 50% of the entire rear body panel. The chevron style striping shall be applied in an inverted "V" pattern at a 45-degree angle from the tailboard to the upper centerline of the rear panel. The stripes shall alternate blue reflective, black reflective.

REFLECTIVE STRIPE:

A reflective 1" – 8" – 1" black reflective stripe to be provided and installed per customer requirement.

LETTERING/GRAPHICS:

The lettering shall be applied per customer requirement. Graphics to be created and installed based on customer provided electronic files.

CAB DOOR REFLECTIVE TRIM:

White reflective trim shall be installed on the inside of each cab door. The reflective trim shall be installed as to not be seen or disruptive from the inside of the cab while the doors are closed but shall provide additional notification to oncoming traffic when the door is open. This trim shall meet NFPA 1901.

RUB RAILS:

A two (2) part impact and rub rail system shall be used for body side protection. A polished aluminum rub rail .75" thick x 3" wide shall be bolted to the body "impact" rail to aid in collision protection. The outside vertical edges shall be chamfered for an aesthetic appearance and to reduce the chance of personnel injury.

Black Scotchlite reflective striping to be applied to the recessed center of rub rail to provide additional body side illumination. An additional four (4) reflectors to be installed, two (2) each side of body.

DRIP RAILS:

There shall be polished aluminum rain gutters installed on the side and rear of the body, the rain gutters shall be fastened to the body and removable in case of damage. Rain gutters that are an integral part of the roof radius will not be acceptable due to the difficulty in replacing if damaged.

WHEEL WELL LINERS, BOLTED SYNTHETIC:

Bolted synthetic inner liners shall be provided at both rear wheel wells.

WHEEL WELL SURROUND PANELS PAINTED:

The body panels that surround the wheel wells shall be painted with no trim overlaid on the body panel.

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FENDERETTES:

The wheel well openings shall be trimmed with polished stainless steel fenderettes, bolted into place.

BODY COMPARTMENT VENTING:

Each compartment that extends below the chassis frame shall have a removable louvered vent panel with a replaceable filter.

BODY COMPARTMENT CONSTRUCTION:

The body compartment shall be enclosed with .125" aluminum sheet. Each compartment floor shall be covered with .188" aluminum sheet for added weight carrying capability, with all seams fully sealed.

The body compartments shall be of a sweep-out design and include a stainless-steel door sill to protect the lower door opening area. The door sill configuration shall have a raised peak to reduce water intrusion under the door when in the closed position.

Wiring channels shall be provided where necessary and shall be screwed in place for ease of access.

ROLL-UP DOORS:

The compartments shall be equipped with custom-built Hansen International Inc. roll-up doors. The doors shall be produced by an ISO-9001 certified company and tested to at least 100,000 cycles. Each door shall have a serial number label and shall carry warranty of ten (10) years. To facilitate a 24-hour replacement part service turn around, the doors must be manufactured in the United States.

Door Construction-Smooth: The doors shall be constructed of double walled and concave hard-anodized aluminum extrusion laths with a smooth exterior surface. The interlocking joint extrusion design shall have an integral synthetic spacer seal to reduce noise and prevent weather or debris intrusion in a closed position. Each door lath shall have inter-locking, nested, and replaceable polymer slide guides. Sides of the door openings shall be of hard anodized aluminum extruded guide channels.

Operating Components: The easy opening doors shall be equipped with a 4" counterbalance spring in the roller assembly to assist in lifting and help prevent the accidental closing. A full width lift bar shall secure each door.

Door Handle and Latching-Handle Bar: The latch bar shall consist of a full width .750" diameter stainless steel tube handle with centrally located knurled anti-slip sections and 1.25" hand clearance between handle and the door surface. The lift handlebar assembly shall have four (4) roller wheels to reduce friction and ease opening of door.

Compartment Lighting Switch: The compartment lights and door-ajar light system shall be activated by an 8-amp rated magnetic switch assembly mounted to the right pennant plate at the top of the door roller area with a permanently installed magnet installed in the top lath. If the bar is not properly closed, it shall activate the "Door Open" light in the cab.

Weather Resistance: The top door drip rail shall be a hard-anodized aluminum extrusion and shall contain a full width strip of weather seal to minimize water ingress along the top of the door. The top door seal shall be of a two (2) piece 'non-contacting design' to prevent damage to graphics, logos, or reflective striping.

Guide channel seals shall be replaceable and constructed of UV resistant rubber with automotive style flocking material for smoothness of operation. The bottom of the door curtain shall have an additional full width UV resistant rubber seal.

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NOTE: Door Finish: The roll up doors shall be painted to match body color.

NOTE: Key Lock: Compartment door handles shall be equipped with a keyed cylinder lock assembly.

COMPARTMENT DOOR CONSTRUCTION, FOR R3 COMPARTMENT (ONLY):

Each pan-style swing door shall be constructed of reinforced .125" aluminum sheeting and shall be approximately 2" thick.

Door shall be mounted on a full length polished stainless-steel hinge with a minimum of .250" stainless steel pins. The hinges are bolted to the body and doors every four (4) inches. The doorjamb shall have gaskets on all four sides. The doors shall be flush mounted to prevent the gaskets from freezing to the body exterior.

The inner door panel shall be constructed of 18-gauge brushed stainless steel and shall be bolted to the outer skin of the door.

NOTE: Door Finish: The pan-style door shall be painted to match body color.

VERTICAL DOOR HOLD OPEN DEVICE:

All vertically hinged doors shall be equipped with Cleveland-style spring loaded door closures. When a door is open, the spring shall hold the door open at 90-degrees to the body. The door closure shall allow the door to be closed by means of one hand.

COMPARTMENT DOOR LATCH:

The swing door on the compartment shall have TriMark 030-1450 series handle latch, which will activate rotary upper & lower locks via a threaded zinc-coated steel rod with yoke end.

There shall be a turnbuckle installed on the rod for easy adjustment. The rotary locks shall be mounted on the top and bottom of both doors and shall be mounted within the door pan.

BODY COMPARTMENT COATING:

All body compartments shall be fully coated with Zolatone (equivalent) to aid in abrasion resistance.

ADJUSTABLE SHELF CHANNEL:

Vertically mounted Uni-Strut channel shall be provided and installed in all exterior compartments where necessary for the installation of infinitely adjustable shelving and trays. The channels shall be of such design to allow square type spring loaded, self-tightening nuts to be attached inside of the channel.

COMPARTMENT L1 SHALL CONTAIN:

FLOOR EXTENSION:

Floor height at the area over the frame rails to be continued on the same plane to the outer body sidewall. Floor extension shall be fabricated of 3/16" smooth aluminum in the form of an inverted box with a 2" lip to create additional support strength.

Note: A two-inch (2") lip to be provided on the outboard edge of the floor beneath the floor extension.

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Per Change Order 227042-1: ADD: ADJUSTABLE SLIDE OUT/TILT DOWN TRAY:

A SlideMaster SMT-TIP slide out adjustable tilt down tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 250-pounds and shall be mounted on SlideMaster steel slides. The tray shall have an extension and shall tilt down approximately 30-degrees. Tray shall be vertically adjustable by mounting in four (4) heavy-duty Unistrut C-channel tracks that are attached to the compartment walls. A red ball IMS push/pull latch on the front of the slide shall hold the tray in the "in" or "out" position.

NFPA compliant reflective striping to be applied to the sides of the tray/tool board that are exposed when in the deployed position.

COMPARTMENT R1 SHALL CONTAIN:

VERTICAL DIVIDER:

A vertical divider shall be provided and installed that separates the L1 compartment from the R1 compartment. The vertical divider shall be fabricated from 3/16" smooth aluminum and include gussets or other reinforcement for added strength.

FLOOR EXTENSION:

Floor height at the area over the frame rails to be continued on the same plane to the outer body sidewall. Floor extension shall be fabricated of 3/16" smooth aluminum in the form of an inverted box with a 2" lip to create additional support strength.

Note: A two-inch (2") lip to be provided on the outboard edge of the floor beneath the floor extension.

SLIDE OUT TRAY:

A SlideMaster SM2-SP 70% extension slide out tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 1,000-pounds and shall be mounted on SlideMaster steel slides. An IMS push/pull red ball latch on the front of the slide shall lock the tray in the "in" or "out" position.

CARGO NETTING:

Web cargo netting shall be provided and installed in the exterior body compartment. Final design to be determined.

COMPARTMENT L2 SHALL CONTAIN:

SLIDE OUT/TILT DOWN TRAY:

A SlideMaster SMT-TIP slide out tilt down tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 250-pounds and shall be mounted on SlideMaster steel slides. The tray shall have an extension and shall tilt down approximately 30-degrees. A red ball IMS push/pull latch on the front of the slide shall hold the tray in the "in" or "out" position.

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COMPARTMENT R2 SHALL CONTAIN:

SLIDE OUT/TILT DOWN TRAY:

A SlideMaster SMT-TIP slide out tilt down tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 250-pounds and shall be mounted on SlideMaster steel slides. The tray shall have an extension and shall tilt down approximately 30-degrees. A red ball IMS push/pull latch on the front of the slide shall hold the tray in the "in" or "out" position.

TRANSVERSE COMPARTMENT L2/R2 SHALL CONTAIN:

STOKES BASKET & BACKBOARD STORAGE:

Storage to be provided for one (1) stokes basket and one (1) Carlson board 57" L x 23" W x 5" H. Construction to be of 1/8" smooth, sanded aluminum. Stokes basket shall be retrievable from either side of the apparatus. Strapping shall be provided to prevent the equipment from sliding into the exterior compartment doors.

COMPARTMENT L3 SHALL CONTAIN:

SCBA CYLINDERS STORAGE, ADJUSTABLE SHELF:

A rack for storage of three (3) SCBA cylinders shall be provided and installed on an adjustable shelf. The storage rack shall be fabricated of aluminum. Each storage slot shall angle to the rear of the rack to prevent the cylinders from sliding out of their stored position. A rubber bumper shall be provided on the rear wall of each slot to absorb the shock of the bottle being placed into position. Each cylinder tube shall be lined have rubber applied to the inside of each slot to reduce scratching on the bottle. The shelf shall be vertically adjustable by mounting to the Uni-Strut channels provided.

SLIDE OUT TRAY:

A SlideMaster SM2-LP 70% extension slide out tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 300-pounds and shall be mounted on SlideMaster steel slides. An IMS push/pull red ball latch on the front of the slide shall lock the tray in the "in" or "out" position.

Per Change Order 227042-1: ADD: ADJUSTABLE SHELF:

One (1) adjustable shelf shall be fabricated and installed. The shelf shall be constructed of 3/16" sanded finish aluminum, with a 2" lip on all four sides. The shelf shall be vertically adjustable by mounting to the Uni-Strut channels provided.

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COMPARTMENT R3 SHALL CONTAIN:

CRANE OPERATIONS:

The curb side compartment behind the rear wheels will house all the crane and outrigger operation components. Plumbing and valves shall be minimized to allow for equipment storage while maintaining access for preventative maintenance and service to the crane/outrigger equipment.

OUTRIGGER CONTROL:

All components of the electric/hydraulic outrigger system to be housed in storage compartment with close proximity to outriggers. Components include the hydraulic motor, oil reservoir, hydraulic oil manifold and lines. Outriggers to be operated via a tethered control.

CONTROL MOUNTING:

Mounted brackets shall be provided to hold the wireless crane remote control unit and the tethered outrigger control.

VERTICAL DIVIDER:

A vertical divider shall be provided and installed. The vertical divider shall be fabricated from 3/16" smooth aluminum and include gussets or other reinforcement for added strength.

ADJUSTABLE SHELVES:

Three (3) adjustable shelves shall be fabricated and installed. The shelves shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelves shall be vertically adjustable by mounting to the Uni-Strut channels provided.

COMPARTMENT RR1 SHALL CONTAIN:

SLIDE OUT/TILT DOWN TRAY:

A SlideMaster SMT-TIP slide out tilt down tray shall be provided and installed. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 250-pounds and shall be mounted on SlideMaster steel slides. The tray shall have an extension and shall tilt down approximately 30-degrees. A red ball IMS push/pull latch on the front of the slide shall hold the tray in the "in" or "out" position.

ADJUSTABLE SHELF:

One (1) adjustable shelf shall be fabricated and installed. The shelf shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelf shall be vertically adjustable by mounting to the Uni-Strut channels provided.

Per Change Order 227042-1: ADD: AIR COMPRESSOR:

Install a Quincy 2-HP, 24-gal compressor 7.4cfm@100 psi. Compressor to be plumbed to the air reel.

AIR REEL:

Hannay, model EF1516-17-18, air hose reel with 12-volt electric rewind and ball stop shall be provided and installed. Reel shall be equipped with 150 ft. of 3/8" ID utility air hose.

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ROOF STORAGE, CONSTRUCTION:

Roof of apparatus to be constructed for transport and protection of special equipment. Apparatus side wall on curb side, street side, and front of body to extend a minimum of eighteen inches (18") above the roof surface. Finish of the roof edge to be of rolled aluminum extrusion on the exterior edge and aluminum diamond plate on the interior vertical surface. Roof material to be of aluminum diamond plate and to include a minimum six (6) stainless steel D-rings to be used for the securement of the special equipment. Installation location of D-rings to be determined. See unit file for D-Ring installation locations

A step approximately 11" deep constructed of stair tread material shall be provided at the rear of the body for safe access to rooftop walkway.

Floor to incorporate drain(s) to the ground.

ROOFTOP COMPARTMENT:

A rooftop compartment shall be provided full length on the street side of the roof. Dimensions as presented in the engineering drawing. This compartment shall be an integral part of the body. Compartment shall have two (2) aluminum diamond plate doors but have no dividers within the compartment. Each door shall have a full-length stainless-steel hinge and be held in the open position with gas struts. ~~A chrome-plated "L" shaped handle shall allow easy opening of the door with "gloved" hand.~~ The interior of each compartment shall be smooth sheet aluminum.

Per Change Order 227042-1: Rubber T-handle latch with a stainless-steel keeper to be flush mount in lieu of "L" handle.

Note: Rooftop compartment design to include a vertical "return" lip around compartment opening to create a rainproof environment.

FRONT ROOFTOP COMPARTMENT:

There shall be a rooftop compartment provided at the front of the body between the street side roof compartment and the curb side body side. Dimensions as presented in the engineering drawing. This compartment shall be an integral part of the body. The compartment shall have one aluminum diamond plate door with a full-length stainless-steel hinge and be held in the open position with gas struts. ~~A chrome-plated "L" shaped handle shall allow easy opening of the door with "gloved" hand.~~ The interior of the compartment shall be smooth sheet aluminum.

Per Change Order 227042-1: Rubber T-handle latch with a stainless-steel keeper to be flush mount in lieu of "L" handle.

Note: Rooftop compartment design to include a vertical "return" lip around compartment opening to create a rainproof environment.

ROOF COMPARTMENT INTERIOR LIGHTING:

Each roof compartment shall have continuous strip lighting full length of each compartment. Opening the compartment door shall turn on the lights.

ZICO QUIC-LADDER:

Zico Model 3096 ladder, 18" wide with a fold-down section to be mounted on the rear of the body to provide access to the roof. The ladder to incorporate 1.25" heavy-walled aluminum handrails, covered in rough grip black powder coat. Ladder rungs, 3" deep non-skid in compliance to NFPA 1901-09 requirements for slip resistance and static load.

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BODY HANDRAIL:

Handrails shall be 1 1/4" extruded aluminum Hansen non-rotating knurled tubing with chrome plated end stanchions. To include stanchion to body gaskets to prevent dissimilar metal corrosion. Each stanchion shall be bolted into place for ease of removal or replacement.

NOTE: Handrail to be placed on the interior of the roof storage area wall, above the ladder.

ELECTRICAL

ELECTRICAL SYSTEM - BASE:

All wiring and electrical equipment to be compliant with any applicable NFPA 1901 criteria for Special Service Fire Apparatus and SAE standards. All lighting and reflectors shall meet Federal Motor Vehicle Standards. A master warning device switch that energizes all optical warning devices shall be provided.

The warning system on the apparatus shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right of way. The other mode shall signal that the apparatus is stopped and is blocking the right of way.

Switching to sense the position of the park position of an automatic transmission. When the master warning system switch is closed, and the parking brake released or the automatic transmission is not in park, the warning devices signaling the call for right of way shall be energized. When the master optical warning system switch is closed, and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of right of way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

The warning devices shall be constructed or arranged to avoid the projection of light either directly or through mirrors into any driving or crew compartment(s).

Electromagnetic interference suppression shall be in accordance with SAE J551, performance levels and methods of measurement of electromagnetic radiation from vehicles and devices (30-1000 MHZ).

Wiring grommets shall be provided through all panels for automotive type wiring with coated automotive type loom. Insulation shall be in accordance with SAE J1128, low tension primary cable, type SXL or GXL, and wired to SAE J1292, Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach wiring for such loading at the potential employed. All wiring installed by the Apparatus Manufacturer shall be stranded copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. Wiring shall be color and function coded the entire length with insulated bolted-down type hold-down clamps and mechanically secured connections. Overall covering of conductors shall be 280 degrees F. Minimum flame retardant, moisture resistant loom.

Hydraulic lines, air system tubing, control cables, and electrical lines shall be clipped to the frame or body structure of the apparatus and shall be furnished with metal protective looms or grommets at each point where they pass through body panels or structural members. Where any through-the-frame connector is provided, any such connector and wiring shall also be protected from shear or tear.

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Wiring shall be provided with properly rated low voltage over current automatic resetting protective devices. Such devices shall be readily accessible and protected against excessive heat, damage, and water spray. Switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. All electrical components shall be protected against corrosion, heat, vibration, and moisture.

ELECTRICAL SYSTEM:

There shall be a Class 1 Multiplexed Electrical System installed. The multiplex system shall consist of all solid-state components contained inside aluminum extrusions referred to as nodes. Each node shall consist off twenty-four (24) output channels and twenty-four (24) input channels. All inputs and outputs shall be configured into a scale-able electrical harness utilizing Deutsche connectors. The nodes must be waterproof and not require special mounting requirements.

The system is expandable and shall be capable of performing the following functions: load management sequencing, switch loads and receive digital and analog signals. The placement of nodes throughout the apparatus enables a reduction in wire harness bundles, elimination of redundant harnesses and separate circuit boards, relay and circuit breakers, electrical hardware, separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

The complete multiplex system shall eliminate the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, headlamp flasher, door open notification system, interlock modules, separate voltmeter, ammeter, and temperature monitor. In an application where the siren controller is unable to provide the necessary switching then Carling rocker type switches with function labels shall be provided and installed on the center console.

POWER DISTRIBUTION QUARTERS:

The vehicle shall be equipped with a Power Distribution Quarters (PDQ) to provide a protected environment for the electrical systems interface to the apparatus body. The PDQ shall have a service access door that is removable via two (2) recessed positive type door latches. 12v lighting shall automatically activate with the removal of the access door. The compartment and access door shall be fabricated from 5052-H32 aluminum alloy, finished to match with interior compartments, and include venting for heat dissipation.

The design shall provide a standardized platform for reliable and repeatable hard-wired or multiplexed electrical systems that can be documented and easily serviced and maintained. The internal wiring terminals shall be machine or torque-tool crimped to the wire ends and splices shall be protected with heat shrink material. All body harnesses entering and exiting the distribution panel shall pass through a protected wiring channel directly into the PDQ. The electrical distribution panel shall incorporate wiring harnesses that meet or exceed NFPA standards while providing a central location for body wiring harnesses.

Per Change Order 2270042-1: POWER INVERTER:

AIMS pure sine 4000w inverter (US Made) with transfer switch for additional output to meet requirements of compressor and the multiple outlets.

To be mounted on the ceiling in the crane control R3 compartment based on available space.

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Per Change Order 227042-1: SUPPLEMENTAL BATTERY:

Due to the excessive amperage draw from the inverter, the OEM chassis battery system shall be supplemented by one (1) additional Delco 31-900CT or equal high cycle battery housed in a polymer battery box with cover. Battery cables shall not be less than 4/0 and be routed from OEM batteries to the supplemental battery. The cables shall be properly protected with high temperature loom and routed in such a manner as to not be in close proximity of any engine manifold or exhaust components. Pending electrical engineering review.

To be mounted on the floor in the crane control R3 compartment based on available space.
This battery in addition to/independent from the crane operating battery.

ISOLATOR:

There shall be a heavy-duty isolator provided to charge the auxiliary battery from the vehicle alternator.

Per Change Order 227042-1: CIRCUIT BREAKER PANEL:

There shall be a Blue Seas circuit breaker panel installed to house all 120/240-volt circuit breakers. Circuit breakers shall be appropriately rated to wire size and load demand. All circuit breakers shall be labeled as to usage. All circuit breakers shall be switch rated.

Transfer switch included with the AIMS inverter.

115-VOLT INTERIOR OUTLETS:

Seven (7) 15-amp, 115-volt interior duplex receptacles shall be installed in the body. These receptacles shall be wired to the circuit breaker box. One (1) duplex outlet to be in each compartment. Outlet installation location(s) to be determined.

BATTERY CONTROL SYSTEM, IGNITION SWITCH:

Battery master control shall be through the chassis ignition switch. The chassis ignition key shall activate a heavy-duty relay to provide 12-volt battery power to the vehicle. Battery switch shall consist of a minimum 200-ampere, constant duty solenoid to feed from positive side of battery.

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Per Change Order 227042-1: ADD: BATTERY CHARGER:

A Blue Sea Systems Gen II P12 Series 40-Amp Battery Charger shall be provided and installed for maintaining the vehicle's batteries. The battery charger shall be wired to the 120-volt shoreline to activate automatically when power is connected. The charger shall contain three (3) separate and independent circuits, one (1) for each battery. The charger is a four stage, three output, dry mount design, for use in harsh environments.

Independent charging to be provided for the chassis batteries, the auxiliary inverter battery, and the crane operating battery.

KUSSMAUL 120-VOLT SUPER AUTO EJECT:

Kussmaul Super Auto Eject, 20-amp, automatic shoreline disconnect will be provided for the on board, 120-volt battery charging system. The disconnect will be equipped with a NEMA 5-20P male receptacle, which will automatically eject the shoreline when the vehicle starter is energized.

LIGHTING AND WARNING REQUIREMENTS

COMPARTMENT STRIP LIGHTING:

Hansen International "Brilliant White" LED modular compartment lighting shall be installed all compartments to provide even, full height lighting for the compartment without interference from shelves or equipment.

Protected strip to be installed on both sides of the opening and shall run the full height of the compartment. Lights shall be activated by a magnet switch when opening the compartment door.

This lighting system to employ 12V D.C. solid state operation with 24" connective pigtail, 120 lumens per foot, rated at 50,000 hours, waterproof to IP66 rating, and be shock and vibration resistant. Lighting shall snap-in for easy installation and service, if necessary, be manufactured in the USA, exceed NFPA 1901 current edition, and be white in color.

"DOOR OPEN" WARNING LIGHT:

A red LED warning light, Weldon 1500 Series, shall be installed on the cab console and shall flash when any compartment door is open.

ELECTRONIC SIREN:

A Whelen Siren Amplifier model # 295SL101 shall be provided and installed in the cab console. Siren shall include functions: wail, yelp, manual, hands-free, piercer tones, PA, and radio-rebroadcast. The siren shall have the ability to drive 100 or 200-watt output. Control to be backlit with soft LED non-glare green lighting. The operating controls will consist of a power switch, manual button, PA volume switch, horn button, rotary switch, and removable microphone. Amplifier to include a 20A/32V fuse.

SPEAKER SYSTEM:

There shall be a Whelen, model SA315P composite, 100-watt speaker. Siren speaker to be recessed or mounted behind the front bumper.

FRONT BODY WARNING LIGHT ARRAY:

There shall be six (6) Whelen 600 series Super LED clear scene lights with chrome bezels installed.

NOTE: All clear lens, four (4) red, two (2) white, staged R, W, R, R, W, R. No white warning lights to be lit when transmission is in Park.

BUILD SPECIFICATIONS

BROW LIGHT:

Fire Tech HiViz Brow Light 46", Model FT-B-46-W. Three (3) independent circuits with twelve (12) LED lights each circuit. Light shall operate at 12v DC and generate 19,000 lumens with a draw of 15-amps. Vertically adjustable up to 15-degrees, housing color to be white.

Note: To be mounted on front face of body, below front body warning light array.

Per Change Order 227042-1: Brow light to be recessed in upper front body

FRONT LOWER WARNING LIGHTS:

There shall be Whelen M2RC series Super LED lights with chrome bezels installed.

Two (2) warning lights shall be mounted in the grille.

Clear lens with red LED light.

SIDE UPPER WARNING LIGHTS:

There shall be Whelen M6 series Super LED upper warning lights with chrome bezels installed.

Two (2) warning lights shall be mounted on the left upper body panel.

Two (2) warning lights shall be mounted on the right upper body panel.

Clear lens with red LED light.

SIDE LOWER WARNING LIGHTS:

There shall be Whelen M2RC series Super LED lower warning lights with chrome bezels installed on the vehicle.

Two (2) lights installed, one (1) on each front fender of the chassis.

Two (2) lights installed, one (1) above each rear wheel well.

Two (2) lights installed, one (1) at each side of bumper tail.

Clear lens with red LED light.

REAR UPPER WARNING LIGHTS:

There shall be Whelen M6 series Super LED rear upper warning lights with chrome bezels installed on the vehicle. Two (2) lights shall be mounted, one (1) in each upper rear corner.

Clear lens with red LED light.

SIDE BODY SCENE LIGHTS:

Whelen Pioneer Plus Model # PFH2 dual panel scene light shall be provided and installed. The 160 watts +12v DC Pioneer light head shall incorporate Super-LED® floodlight installed in a die-cast white powder coated aluminum housing. The PFH2 configuration shall consist of 36 white Super-LEDs. The floodlights will be mounted in the Whelen PBH203 semi-recessed housing with the chrome flange. The lamp can be focused straight out or at 15 degrees down-tilt. The light shall be switched respectively at the cab console.

Note: One (1) dual panel scene light each side of body.

REAR BODY SCENE LIGHTS:

Whelen Pioneer Plus Model # PFP1 single panel scene light shall be provided and installed. The 75 watts +12v DC Pioneer light head shall incorporate Super-LED® single flood light installed in a die-cast white powder coated aluminum housing.

The floodlights will be mounted in the Whelen PBA103 semi-recessed housing with the chrome flange. The lamp can be focused straight out or at 15 degrees down-tilt.

Note: One (1) single panel scene light in each rear upper corner of the body.

BUILD SPECIFICATIONS

REAR TURN SIGNAL, BACK-UP, AND BRAKE LIGHTS:

The rear turn signal, backup and stop/taillights shall be a Whelen M6 series, three (3) light cluster of individual lights.

M6 series LED red combination stop/taillight.

M6 series LED amber turn signal.

M6 series LED white back-up light.

One (1) three (3) light cluster shall be mounted on each rear corner of the body. The lights shall include colored lenses.

REAR LOWER WARNING LIGHTS:

There shall be two (2) Whelen M6 series Super LED rear lower warning lights with chrome bezels installed.

Two (2) lights shall be mounted, one (1) on each side of the lower rear body. Clear lens with red LED light.

LED CLEARANCE LIGHTS:

Nine (9) Weldon 1500 Series LED Low Amp Draw Marker Lamps seven (7) Red (Model #9186-1500-10) and two (2) Amber (Model #9186-1500-20), with stainless steel brush guard (Model #0J10-1200-00) shall be installed to meet ICC, FMVSS and other applicable regulations.

LED UNDERBODY LIGHTS:

There shall be ten (10) ~~eight (8)~~ TecNiq Series E10-WS00-1 LED underbody lights mounted on stainless steel brackets.

Two (2) under the cab entry doors, one (1) each side.

Two (2) under the front body compartments, one (1) each side.

Two (2) under the rear body compartments, one (1) each side.

Two (2) under the rear bumper, one (1) each side.

Note: Lights to be activated when the transmission is placed in Park and the Marker lights are on.

Note: Lights to be activated when transmission is placed in Reverse and when either turn signal is activated.

Per Change Order 227042-1: Add two (2) TecNiq E10-WS00 LED underbody lights under the front of the chassis.

BODY ROOF WALKWAY LIGHTS:

There shall be six (6) Whelen OS Series 0AC0EDCR LED lights installed to illuminate the walkway. These lights shall be staggered on each side to provide adequate illumination of entire walkway. Walkway lights will be activated when the rear roof access ladder is deployed.

LADDER STEP LIGHT:

One (1) Whelen PELCC LED step light shall illuminate the rooftop ladder step area. The light(s) shall be activated when ladder is deployed.

REAR SCENE/WARNING LIGHTS CONTROLLED BY ROOF ACCESS LADDER:

When the rooftop access ladder is deployed, and the vehicle marker lights are illuminated the upper rear warning light and upper rear scene light on the side that the ladder is installed shall be turned off to prevent a visual obstruction to anyone climbing the ladder.

BUILD SPECIFICATIONS

CRANE COMPONENTS

CRANE, ELECTRIC OVER HYDRAULIC, 5,500 LB CAPACITY:

The apparatus builder shall provide and install one (1) Maintainer Corp. of Iowa model EH5520 crane. It shall have a maximum horizontal reach of not less than 20-feet. When in the stored position the crane shall have a maximum horizontal length not to exceed 10-feet. The boom will be hydraulically extendable from minimum to maximum extension. The crane will have a maximum lift capacity of a minimum 5,500-lb, and a minimum 30,000 ft*lb. crane rating. The crane shall have a minimum swing rotation of 580-degrees with an internal stop and shall be powered by a high torque hydraulic motor through a direct, self-locking, worm drive. The crane shall be capable of achieving a 3' lift radius from center of rotation. The boom shall have plus 78-degrees and minus 13-degrees of boom elevation, with visible boom angle indicators on both side of the boom. The overall weight of the crane shall not exceed 1,450 pounds.

All cylinders shall be equipped with load checks and/or counterbalance holding valves to prevent cylinder collapse in the event of hydraulic line failure.

The hydraulic winch shall be powered by a high torque hydraulic motor and equipped with 105' of 5/16" wire rope, able to achieve 15 ft/min.

The crane shall be provided with a hoist/winch payout limiter, to prevent spooling out more than the minimum required 3 wraps on the hoisting drum. Operation to include an internal pressure sensing system. The crane shall be equipped with a two-block damage prevention system, which will disable boom extend, and hoist up.

The crane controls shall incorporate a warning light and an audible overload alarm system. Operation via wireless remote control for all crane functions; lift, lower, boom in, boom out, hoist up, hoist down, rotate right and rotate left. All crane functions shall incorporate an over-ride feature.

The crane shall have two (2) side mounted LED floodlights, 1,350 effective lumens, attached to the side of the crane to be used as boom tracking lights. The lights shall power on with the crane power but can be turned off with a switch located in the crane control compartment.

The crane shall be equipped with a sensor that is connected to the door open light and shall alert any time the crane is not bedded and status lights to indicate tripped conditions for load capacity limit, anti-two-block, and power pack thermal relief.

ELECTRIC/HYDRAULIC OUTRIGGER SYSTEM:

The apparatus builder shall provide and install a square leg, electric over hydraulic outrigger system. The system shall have manual out and "power up/down" capabilities, operated via a tethered control. Reflective striping shall be installed on both sides of the extended outrigger to enhance visibility.

OUTRIGGER PADS:

Commercially available outrigger pads shall be included to assist in the set up and use of the truck mounted crane.

OUTRIGGER CONTROL:

All components of the electric/hydraulic outrigger system to be housed in storage compartment with close proximity to outriggers. Components include the hydraulic motor, oil reservoir, hydraulic oil manifold and lines. Outriggers to be operated via a tethered control.

BUILD SPECIFICATIONS

PAINTED CRANE:

The crane shall be painted to match the body color using the same preparation and paint steps described within.

INCLINOMETER, CRANE OUTRIGGERS:

A bubble inclinometer to be installed in close proximity to the right rear outrigger.

LIGHT TOWER, CRANE APPLICATION:

There shall be a Command Light C-Lite attached at the tip of the crane. Light shall incorporate two (2) Pioneer PFH2 lamps at 40,000 lumens (total output). Light to have tilt feature that provides focused aiming. Control of light by means of a cordless remote control.

LIGHT TOWER, CRANE APPLICATION, PROTECTIVE SHROUD:

There shall be a custom shroud fabricated from 1/8" diamond plate and installed to provide protection to the light on the crane tip. Shroud shall be attached to the rear exterior wall of the front rooftop compartment.

CRANE MOUNTED CAMERA:

Pro Vision Crane Camera System to be installed. VLI Series system shall include a wireless remote-control operation. Seven-inch (7") monitor with swivel bracket to be installed in the crane control compartment.

SUPPLEMENTAL BATTERY, CRANE OPERATION:

The crane is to operate from 12v battery power independent from the chassis main batteries. A separate and isolated deep-cycle battery to be provided (by upfitter) with a crane manufacturer provided battery-mounting kit, including polymer case with cover and tie-down. Battery to be mounted on the floor in the lower section of the crane operations compartment.

RECEIVERS, LOWER:

Two (2) heavy duty two-inch (2") receivers shall be installed to the framework of the chassis under rear compartment, on each side of the apparatus body. Intended for tie-off and/or portable winch.

TRAILER HITCH:

Class III trailer hitch shall be installed on the rear of the rescue vehicle.

TRAILER LIGHT CONNECTOR:

A combination 7-pin/4-pin trailer plug connector wired to the taillights shall be installed.

BUILD SPECIFICATIONS

CHASSIS RELATED ACCESSORIES

REAR SUSPENSION STABILIZATION:

Rear suspension to include SuperSprings® stabilizing system on the crane side of the body to level the load created by the crane installation and to reduce body roll. Modification to be performed without removal of OEM spring pack and should not compromise ride quality.

RHINO BR 10.5 SERIES BUMPER:

OEM factory bumper will be replaced by a Rhino BR Series Full Width Front HD replacement winch bumper assembly. Features include:

Mild steel construction with textured black powder coat finish

Winch compatible tray

Relocation points for OEM tow hooks

License plate mount

Note: Include light bar mount #26173T for mounting of bumper mounted brow light.

FRONT BROW LIGHT, BUMPER MOUNTED:

FireTech HiViz FT-MB-9-TR-FT-BLED mini brow w/ trunnion mount. 14" length. FireTech Combination 10-degree spot and 60-degree flood optic configuration. Black housing

FRONT MOUNTED COMEUP 12,500# WINCH:

There shall be one ComeUp Seal Slim 12.5rs 12V winch provided and installed. 12V DC severe duty winch rated at 12,500 lbs. pulling capacity.

Heavy-duty series-wound motor delivers superior torque output and faster line speed. Motor is equipped with a thermal protection switch. Hardened steel, 3-stage planetary gear train for efficient and reliable operation. Both built-in digital two-way wireless remote control and wired water-proof remote control. Twelve (12) strand construction synthetic rope coated to improve abrasion resistance.

AUTOMATIC TIRE CHAINS:

One (1) set of OnSpot automatic tire chains shall be installed on the rear axle of the rescue vehicle. System shall include a 12-volt continuous duty air compressor with .35 CFM minimum output and include an internal thermal protection switch. Pressure switch to maintain a minimum 90 PSI. Storage tank with mounting brackets to hold minimum 600 cubic inches of air. Build-up time from 0 PSI to 90 PSI to be less than 5 minutes. The control and operation label for the chains shall be mounted in the cab.

CAB CONTROL CONSOLE:

There shall be one (1) cab control console installed in the chassis between the cab bucket seats. This console shall be fabricated from .125" aluminum and shall be as large as possible and bolted into place. This console shall have a removable top cover plate, which shall be retained by stainless steel counter-sunk fasteners.

The console shall accommodate all required electrical connections, sirens, light controls, switch banks, multiplex control heads, and any other electrical equipment as specified. Storage for binders and maps to be provided based on available space, to be determined. The console shall be coated with Zolatone to aid in abrasion resistance.

Note: Console to include two (2) cupholders at rear of top console plate. Final design to be determined.

Per Change Order 227042-1: ADD: HAVIS ARM RESTS:

Install two (2) Havis side mounted arm rests C-ARM-102 in chassis cab console

BUILD SPECIFICATIONS

PRE-WIRED ANTENNA CABLES:

There shall be two (2) RG58U coax cables pre-wired by the body builder from the chassis roof to the cab center console. Cables to be clearly labeled and secured within the console. Antenna bases to be protected by removable covers.

INSTALL CUSTOMER RADIOS:

Installation of customer supplied radios provided all necessary power/ground/antenna adapters are present on supplied radios.

RUNNING BOARDS:

Running boards shall be installed on the unit under the cab doors. They shall be fabricated from aluminum diamond plate and structurally reinforced for maximum strength.

STEP LIGHTS:

There shall be two (2) Whelen OS Series #0AC0EDCR white LED step lights provided. There shall be one (1) light installed at each cab door, one (1) light per doorstep.

The lights shall be activated when the vehicle transmission is placed in park with the park lights active.

REAR STEP AND BUMPER:

The rear bumper and step assembly shall extend full width of the body.

The bumper structure shall be attached to the chassis frame rails using a minimum of 3" structural channel.

The bumper and step assembly shall extend beyond the rear of the modular body a minimum nine inches (9") to protect the body from damage.

The rear step shall be constructed of an open aluminum grip strut material.

FUEL FILL DOOR:

A flush mounted fuel filler guard with a hinged door shall be installed over the fuel fill hose. The opening shall be labeled DIESEL FUEL ONLY engraved on a permanently attached label.

DIESEL EXHAUST FLUID FILL DOOR:

A flush mounted fuel filler guard with a hinged door shall be installed over the diesel exhaust fluid fill. The opening shall be labeled with a permanently attached label.

BACK-UP CAMERA:

One (1) Nagy 7" color back up camera system, 8212-IR Camera Kit, shall be installed on the apparatus. The camera shall display the real time view of the area directly behind the apparatus. Monitor shall attach to the windshield in replacement of the chassis rear view mirror.

BACK-UP ALARM:

Federal Evacuator Plus, model 210331SSG, back-up alarm to be provided. 97 dB(A)

TOW EYES - REAR:

Two (2) tow eyes mounted directly to the chassis rear bumper framework.

MUD FLAPS - REAR:

There shall be black rubber mud flaps installed for the rear wheels.

BUILD SPECIFICATIONS

TIRE PRESSURE MONITORING DEVICES:

Each tire shall be equipped with an LED tire alert pressure management system (Vecsafe equal.) A chrome plated brass sensor shall be provided on the valve stem of each tire and calibrate to the tire pressure when installed on the valve stem for pressures between 20 and 120 psi. The sensor shall activate an integral battery-operated LED when the pressure of that tire drops 8 psi.

Tire monitors to be shipped loosed and installed for calibration after vehicle is loaded with equipment.

WARNING LABELS AND INFORMATION PLATES:

All operator controls and switches shall have the appropriate label and corresponding bezel such as pump discharge controls, electrical connections, fuel/DEF fill and exterior switches, etc. Labels to be manufactured by Innovative Controls.

FASTEN SEATBELT:

Label located in the cab that states "Occupants Must Fasten Seat Belts Before Vehicle is in Motion."

CRANE LABELS:

Labels for the use of the overhead crane/ NFPA Aerial device labels shall be clearly displayed in the crane operation compartment.

HELMET:

Label provided in the cab made visible to everyone in the cab "Helmets are not to be worn in cab and safely secured."

MAXIMUM SEATING CAPACITY:

Label located in the driver's view specifying the maximum number of personnel the vehicle is designed to carry per NFPA standards.

REMAIN SEATED:

Label located in the driver's view that states "Occupants Must Remain Seated While Vehicle is in Motion".

OVERALL HEIGHT:

Label located in the driver's view that states the overall height (in feet and inches) of the vehicle from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

DO NOT RIDE:

Two (2) labels located on the rear of the apparatus, one on each side, that states "Danger: Do Not Ride on Rear Step While Vehicle is in Motion - Death or Serious Injury May Result".

BUILD SPECIFICATIONS

DELIVERY REQUIREMENTS:

VEHICLE ROAD AND SYSTEMS INTEGRITY TESTING:

A complete and thorough road test and systems integrity test shall be conducted at the time of vehicle completion, and prior to delivery. The road-test portion shall encompass differing types of road conditions and terrain, including but not limited to hills, curves, rough roads, rural high-speed environments, urban stop and go environments, and other conditions to verify vehicle manufacturing and delivery integrity.

A systems integrity test shall be performed on the completed vehicle. In this test, the completed vehicle shall have all systems checked for proper operation and conformity to manufacturing specs. This test shall include but not be limited to a full 12-volt electrical test, a full 120-volt electrical test, all doors shall be checked for proper closure, all doors, hatches, bellows, etc. shall have a water test performed to check for leaks, all roll out trays, tool boards, drawers, etc. shall be checked for proper opening and closing, tire chains (if included) shall be operated, and any system having a mechanical function shall be tested.

MANUALS:

All manuals related to sub-system components for included optional equipment to be provided at the time of customer acceptance.