

RA Protector® Series

Protector Series Standby Generator Liquid-Cooled Diesel Engine

STANDARD FEATURES

- Power Zone® 410 Controller, NFPA 110 System Control Capable
- Corrosion Resistant Sound Attenuated Aluminum Enclosure
- Five Year / 2,000 Hour Limited Warranty
- ±1% Digital Voltage Regulation
- <5% Total Harmonic Distortion Power Quality
- Double-Wall Fuel Tank UL 142 & ULC S601 Certified
- EPA Emissions Certified
- CA & MA Emissions Compliant
- UL 2200 Listed

OPTIONAL FIELD-INSTALLABLE FEATURES

Available as field-installable kits

- Push-Button Emergency Stop
- NFPA 110 System Control & Remote Annunciation
- Cold Weather Operation Heaters
- Fuel System & Venting Kits

STANDBY POWER RATING

Model RA01522 - 15 kW, 60 Hz Emergency Standby Power Generator
Model RA02022 - 20 kW, 60 Hz Emergency Standby Power Generator
Model RA03022 - 30 kW, 60 Hz Emergency Standby Power Generator



Generator shown without fuel tank. Fuel tank is always included with generator. Model may vary from image.

QUIET TEST™



*Assembled in the USA using domestic and foreign parts

FEATURES

- **INNOVATIVE DESIGN & PROTOTYPE TESTING** are key components of GENERAC'S success in "IMPROVING POWER BY DESIGN." But it doesn't stop there. Total commitment to component testing, reliability testing, environmental testing, destruction and life testing, plus testing to applicable CSA, NEMA, EGSA, and other standards, allows you to choose GENERAC POWER SYSTEMS with the confidence these systems will provide superior performance.
- **TRUE POWER™ ELECTRICAL TECHNOLOGY:** Superior harmonics and sine wave form produce less than 5% Total Harmonic Distortion for utility quality power. This allows confident operation of sensitive electronic equipment and micro-chip based appliances, such as variable speed HVAC systems.
- **SOLID-STATE, FREQUENCY COMPENSATED VOLTAGE REGULATION:** This state-of-the-art power maximizing regulation system is standard on all Generac models. It provides optimized FAST RESPONSE to changing load conditions and MAXIMUM MOTOR STARTING CAPABILITY by electronically torque-matching the surge loads to the engine. Digital voltage regulation at ±1%.
- **SINGLE SOURCE SERVICE RESPONSE** from Generac's extensive dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component.
- **GENERAC TRANSFER SWITCHES:** Long life and reliability are synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is the GENERAC product line includes its own transfer systems and controls for total system compatibility.

GENERATOR SPECIFICATIONS

GENERATOR OUTPUT

Voltage	RA01522		RA02022		RA03022	
	Power (kW)	Current (A)	Power (kW)	Current (A)	Power (kW)	Current (A)
120/240 V 1-Phase	15	62	20	83	30	125
208/120 V 3-Phase	15	52	20	69	30	104
240/120 V 3-Phase	15	45	20	60	30	90
480/277 V 3-Phase	—	—	—	—	30	45

ALTERNATOR SYSTEM

		RA01522	RA02022	RA03022
Circuit Breaker (CB) Size (A)	120/240 V 1-Phase	70	100	150
	208/120 V 3-Phase	60	80	125
	240/120 V 3-Phase	50	70	100
	480/277 V 3-Phase	—	—	50
Alternator Type		Synchronous		
Rotor Insulation Class		H		
Stator Insulation Class		H		
Telephone Interference Factor (TIF)		<50		
Bearings		Sealed Ball		
Coupling		Flexible Disc		
Excitation System		Direct		
Total Harmonic Distortion		<5%		

VOLTAGE REGULATION

Type	Digital
Sensing	1-Phase
Regulation	±1%

MOTOR STARTING CAPABILITY

skVA at 0.3 Power Factor	RA01522	RA02022	RA03022
	30% Voltage Dip (A)	30% Voltage Dip (A)	30% Voltage Dip (A)
120/240 V 1-Phase	21	32	74
208/120 V 3-Phase	27	27	52
240/120 V 3-Phase	27	27	52
480/277 V 3-Phase	—	—	70

ENGINE SYSTEM

	RA01522	RA02022	RA03022
Make	Perkins		
Model	2.2 L Inline 4-Cylinder, Naturally Aspirated		2.2 L Inline 4-Cylinder, Turbocharged & Aftercooled
Compression Ratio	23.3:1		
Oil Pump Type	Gear		
Oil Filter Type	Full Flow Spin-on		
Crankcase Capacity (qt (L))	11.2 (10.6)		
Temperature Derate	3.4% per 10 °F above 77 °F (3% per 5 °C above 25 °C)		
Altitude Derate	3% per 1,000 ft above 3,000 ft (1% per 100 m above 915 m)	3% per 1,000 ft above 1,000 ft (1% per 100 m above 305 m)	3% per 1,000 ft above 3,000 ft (1% per 100 m above 915 m)
Exercise Speed (rpm)	1,500		
Operating Speed (rpm)	1,800		
Exhaust Flow at Rated Output (cfm (m ³ /min))	160 (4.5)	168 (4.8)	297 (8.4)

GOVERNOR

Type	Electronic
Frequency Regulation	Isochronous

COOLING SYSTEM

	RA01522	RA02022	RA03022
Coolant	50/50 (50% Ethylene Glycol)		
Coolant System Capacity (qt (L))	2.0 (7.6)		3.3 (12.5)
Water Pump Type	Belt Driven		
Fan Type	Belt Driven		
Fan Quantity	1		
Maximum Ambient Air Temperature (°F (°C))	122 (50)		

GENERATOR SPECIFICATIONS

FUEL SYSTEM

Fuel Type	ULSD (Ultra Low Sulfur Diesel)
Fuel Pump Type	Gear
Injector Type	Mechanical
Fuel Filter Type (microns)	5

FUEL CONSUMPTION

Rated Load	RA01522		RA02022		RA03022	
	(US gph)	(L/h)	(US gph)	(L/h)	(US gph)	(L/h)
25%	0.6	2.3	0.7	2.6	1.0	3.8
50%	0.8	3.2	1.0	3.8	1.3	5.0
75%	1.1	4.1	1.4	5.2	1.9	7.2
100%	1.4	5.2	1.8	6.9	2.7	10.2

FUEL TANKS

Double-Wall Fuel Tank	Capacity & Runtime	RA01522	RA02022	RA03022
50 US gallon	Total Capacity (US gal (L))	54 (204)	54 (204)	54 (204)
	Usable Capacity (US gal (L))	50 (189)	50 (189)	50 (189)
	Runtime @50% Load (Hours)	63	50	38
100 US gallon	Total Capacity (US gal (L))	103 (390)	103 (390)	—
	Usable Capacity (US gal (L))	100 (379)	100 (379)	—
	Runtime @50% Load (Hours)	125	100	—
130 US gallon	Total Capacity (US gal (L))	—	—	138 (522)
	Usable Capacity (US gal (L))	—	—	130 (492)
	Runtime @50% Load (Hours)	—	—	100

ELECTRICAL SYSTEM

System Voltage (V)	12
Charge Alternator (A)	85
Battery Charger (A)	5
Recommended Battery (not included)	Flooded Lead Acid, Group 27, 600 CCA Minimum
Maximum Battery Size	Flooded Lead Acid, Group 31, 750 CCA Minimum

ENCLOSURE

	RA01522	RA02022	RA03022
Sound Level at Exercise Speed (dB(A) @23 ft (7 m))	65	65	65
Sound Level at Operating Speed & No Load (dB(A) @23 ft (7 m))	70	70	67
Color	Bisque		

POWER ZONE 410 CONTROLLER



016030

Standard Features

- 128 x 64 Pixel Graphical Display with Heater
- Multilingual
 - English
 - French
 - Spanish
 - Portuguese
- 3-Phase Sensing Digital Voltage Regulator
- Full Range Standby Operation
- Full System Status
 - 3-Phase AC Voltage
 - 3-Phase Current
 - Power
 - Power Factor
 - Oil Pressure
 - Engine Coolant Temperature
 - Oil Temperature (check for oil temp sensor)
 - Fuel Pressure
 - Engine Speed
 - Battery Voltage
 - Output Frequency
 - Time
 - Date
 - Load On Line Power and Gen Power
 - Hourmeter
 - Service Reminders
 - Fault History (Alarm Log)
- Remote Communications
- Programmable Auto Crank
- Emergency Stop
- Not in Auto Flashing Light
- Selectable Low Speed Exercise
- NFPA 110 System Control Capable
- 5A Integrated Battery Charger

Standard Protections

- Low Oil Pressure
- Low Coolant Level
- High/Low Coolant Temperature
- Oil Temperature
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over/Under Current

- Overload
- Battery Voltage
- Battery Charger Current
- Phase-to-Phase and Phase-to-Neutral Short Circuits (I²T Algorithm)
- Ground Fault

Display

- Easy Menu Structure
- Multilingual (English, Spanish, French, and Portuguese)
- On Screen Editable Parameters
- Key Function Monitoring
 - 3-Phase Voltage, Amperage, Power, Apparent Power, Reactive Power
 - Selectable Average or Line-to-Neutral Voltage Measurements
 - Frequency
 - Engine Speed
 - Engine Coolant Temperature
 - Oil Pressure
 - Battery Voltage
 - Warning and Alarm Indication
 - Diagnostics
 - Maintenance Events/Information
 - Hourmeter

Control Panel

- AUTO/OFF/MANUAL
 - Operation Through Onboard Buttons or Optional Key Switch
 - Indication Through Display Screen and LEDs
- Audible Alarm and Silence
- Auxiliary Shutdown Rocker Switch (on controller)
- Not-in-Auto Indication

Voltage Regulation

- Digital Control
- 3-Phase Sensing
- Variable V/F Slope Settings
- Negative Power Limit
- Loss of Sensing Protection
- Fault Protection (I²T Function)
- High Voltage Limit
- Low Voltage Limit
- Maximum Power Limit

Governor Functionality

- Speed Control through ECM Integration

Communications Ports

- 1 CANbus Port
- 1 USB Port (for Configuration Transfer and Firmware Upgrades)
- 1 RS-485 Modbus Master Port (for External RAP/RRP/External I/O Modules)
- 1 RS-485 Modbus Slave Port (for other uses, e.g. Building Management System)
- 2 RS-232 Communication Ports (for connectivity device or other uses)

Codes And Standards

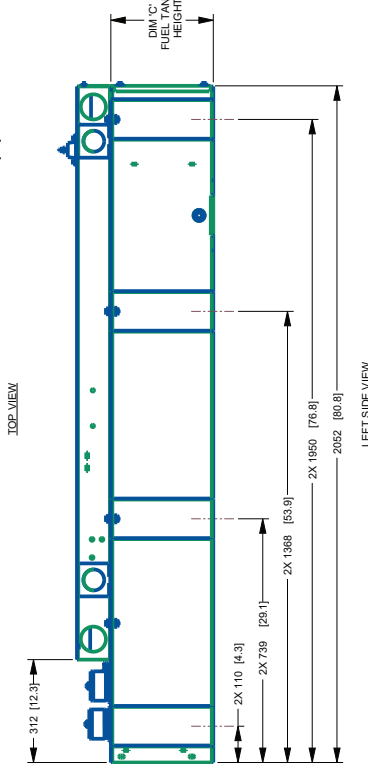
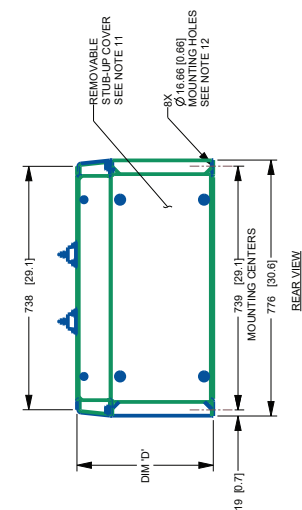
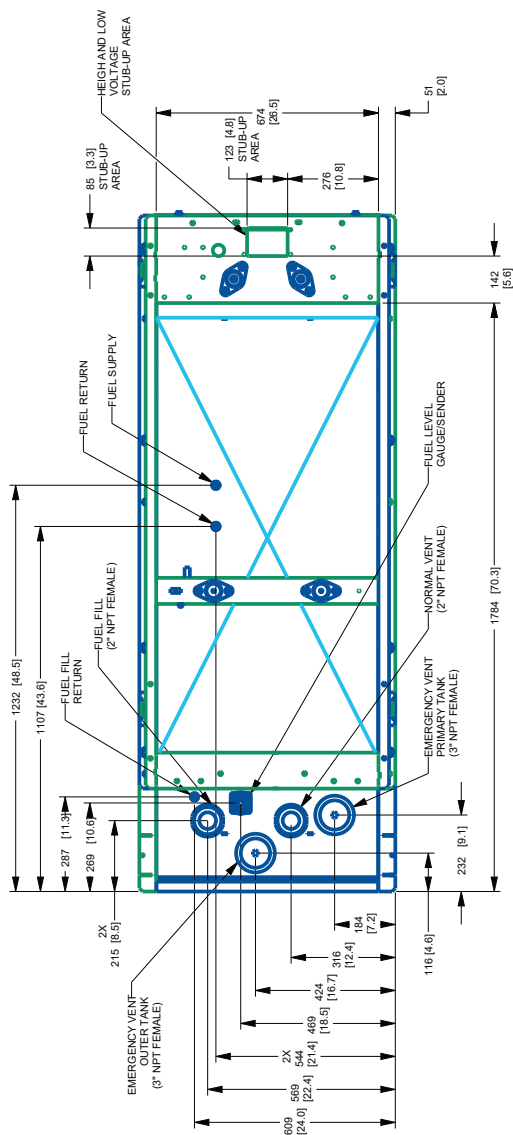
- UL 6200
- CE
- NFPA 110

PRODUCT	PART NUMBER	DESCRIPTION
Control System Kits		
90% Fuel Level Alarm	G0080180	The 90% fuel level alarm alerts the fuel fill operator when the tank reaches 90% fill level by sounding an audible alarm and triggering an LED warning light.
Enclosure Mounted Emergency Stop Kit	G0080170	Emergency Stop consists of a red push button switch; mounts to the exterior of the generator enclosure; replaces the Generator Emergency Shutdown rocker switch in the same location.
Remote Emergency Stop Kit, Surface Mount	G0099250	Emergency Stop consists of a red push button switch with a twist release; switch has an aluminum enclosure which can be mounted extending out from a surface; mounts remote from generator such as near an electrical panel.
Remote Emergency Stop Kit, Flush Mount	G0099260	Emergency Stop consists of a red push button switch with twist release; switch has an aluminum enclosure which can be mounted flush; mounts remote from generator such as near an electrical panel.
Remote Emergency Stop Kit, Break Glass	G0099270	Emergency Stop consists of a spring-loaded switch; switch is behind breakable glass in an aluminum enclosure; glass can be broken with a tethered hammer; mounts remote from generator such as near an electrical panel.
Generac Load Manager, 50 A	G0070001	50 A Load Manager helps optimize the performance of the standby generator by managing large electrical loads upon startup and shed them to aid in recovery when overloaded.
Generac Load Manager, 100 A	G0070061	100 A Load Manager helps optimize the performance of the standby generator by managing large electrical loads upon startup and shed them to aid in recovery when overloaded.
Power Zone Kits		
NFPA 110 Controller Kit	G0080240	Includes controller module with Key Switch, Alarm Horn, and Emergency Stop Switch that connects to Power Zone 410 controller, 10 A battery charger, and remote annunciator panel; requires a capable transfer switch to be considered for NFPA 110 system control and remote annunciation.
Remote Annunciator Panel with 8 Relays	G0098511	Remote annunciator panel with relays; mounts in the structure which is connected to backup power.
Remote Relay Panel	G0098521	Remote relay panel without LEDs or keypad; mounts in the structure which is connected to backup power.
Remote Annunciator Panel without Relays	G0098531	Remote annunciator panel without relays; mounts in the structure which is connected to backup power.
Power Zone 410 I/O Extender Kit	G0089370	Expands I/O for the Power Zone 410 controller to provide connections for additional accessories; connects to controller with a three-wire RS-485 interface.
Power Zone Gateway Kit	G0089360	Provides an Ethernet connection port for the generator for a Building Management System (BMS); NOT intended for or able to be used with Mobile Link or Fleet.
Operating Environment Kits		
Cold Weather Kit	G0080140	Kit includes an engine block heater and battery heater; recommended for operating environments where the temperature drops below 32 °F (0 °C); applies to RA01522, RA02022, and RA03022 models.
Installation Kits		
5 Gallon Spill Box Kit	G0089040	The 5 Gallon Spill Box screws into the existing fuel fill port of the base tank; it captures and contains fuel if over filling or spilling occurs during the fueling process; applies to double-wall fuel tanks only.
Spill Box Drainback Kit	G0080160	The Spill Box Drainback kit allows fuel captured in the Five Gallon Spill Box to drain directly back into the fuel tank; applies to double wall fuel tanks only.
Tank Riser Kit, RA01522 & RA02022	G0080190	Tank Risers support the fuel tank raising it above the foundation surface; may be required in some jurisdictions to help avoid potential corrosion; applies to RA01522 and RA02022 double-wall fuel tank models
Tank Riser Kit, RA03022	G0098990	Tank Risers support the fuel tank raising it above the foundation surface; may be required in some jurisdictions to help avoid potential corrosion; applies to RA03022 double-wall fuel tank models.
Fuel Fill Drop Tube, 50 US Gallon Tank, RA01522 & RA02022	G0080210	The Fuel Fill Drop Tube is used to prevent sparking due to static electricity buildup which can be caused by the fuel dropping into the tank from the fill area; using a drop tube results in submerged filling which increases the fuel delivery flow rate and reduces vapors, foam, and potential tank evaporation; applies to 50 US gallon double-wall fuel tank for RA01522 and RA02022.

Fuel Fill Drop Tube, 100 US Gallon Tank, RA01522 & RA02022	G0080200	The Fuel Fill Drop Tube is used to prevent sparking due to static electricity buildup which can be caused by the fuel dropping into the tank from the fill area; using a drop tube results in submerged filling which increases the fuel delivery flow rate and reduces vapors, foam, and potential tank evaporation; applies to 100 US gallon for RA01522 and RA02022.
Fuel Fill Drop Tube, 50 US Gallon Tank, RA03022	G0098930	The Fuel Fill Drop Tube is used to prevent sparking due to static electricity buildup which can be caused by the fuel dropping into the tank from the fill area; using a drop tube results in submerged filling which increases the fuel delivery flow rate and reduces vapors, foam, and potential tank evaporation; applies to 50 US gallon double-wall fuel tank double-wall tank for RA03022.
Fuel Fill Drop Tube, 130 US Gallon Tank, RA03022	G0098940	The Fuel Fill Drop Tube is used to prevent sparking due to static electricity buildup which can be caused by the fuel dropping into the tank from the fill area; using a drop tube results in submerged filling which increases the fuel delivery flow rate and reduces vapors, foam, and potential tank evaporation; applies to 130 US gallon double-wall fuel tank for RA03022.
Stainless Steel Fuel Lines, RA01522 & RA02022	G0080220	Jurisdictions may require the use of stainless steel fuel lines instead of the standard hoses provided with the generator; stainless steel lines are fire resistant for additional safety; applies to RA01522 and RA02022.
Stainless Steel Fuel Lines, RA03022	G0098960	Jurisdictions may require the use of stainless steel fuel lines instead of the standard hoses provided with the generator; stainless steel lines are fire resistant for additional safety; applies to RA03022.
Vent Extension Kit, RA01522 & RA02022	G0080230	The Vent Extension kit consists of fuel tank vent pipes and supports raising the vent height above the height of the generator roof; applies to double-wall fuel tanks for RA01522 and RA02022 .
Vent Extension Kit, RA03022	G0098970	The Vent Extension kit consists of fuel tank vent pipes and supports raising the vent height above the height of the generator roof; applies to double-wall fuel tanks for RA03022 .
Lockable Fuel Cap	G0065120	The Lockable Fuel Cap provides the ability to lock the fuel system to help prevent tampering or fuel theft.
Maintenance Kits		
Bisque Paint Kit	G0057030	If the generator enclosure is scratched or damaged, it is important to touch-up the paint to protect from future corrosion. The paint kit includes the necessary paint to correctly maintain or touch-up a generator enclosure.
Maintenance Kit, Perkins 2.2 L Engine	G0076410	Regular maintenance kit includes oil filter, oil funnel, air filter, and fuel filter; applies to RA01522, RA02022, RA03022, and RD03022.
Transfer Switch Kits		
3-Phase Voltage Sensing Kit for 208/120 & 240/120 V RTS Transfer Switch	G0074110	3-phase Voltage Sensing Kit <u>required</u> for RTS Transfer Switches <u>when used with</u> the Power Zone 410 controller for 'G' 208/120 or 'J' 240/120 V 3-phase voltage; applies to 3-phase RA01522, RA02022, and RA03022 models configured for 'G' or 'J' voltage.
3-Phase Voltage Sensing Kit for 480/277 V RTS Transfer Switch	G0074120	3-phase Voltage Sensing Kit <u>required</u> for RTS Transfer Switches <u>when used with</u> the Power Zone 410 controller for 'K' 480/277 V 3-phase voltage; applies to 3-phase RA01522, RA02022, and RA03022 models configured for 'K' voltage.

D2.2 G22 Enclosed (A0002043859 2 of 3) RA01522 / RA02022

NOTE: STUB-UP AREA FOR HIGH AND LOW VOLTAGE CONNECTIONS, CIRCUIT BREAKER, NEUTRAL AND CUSTOMER CONNECTION OPENING.
TANK IS LISTED TO UL142 AND ULCS601



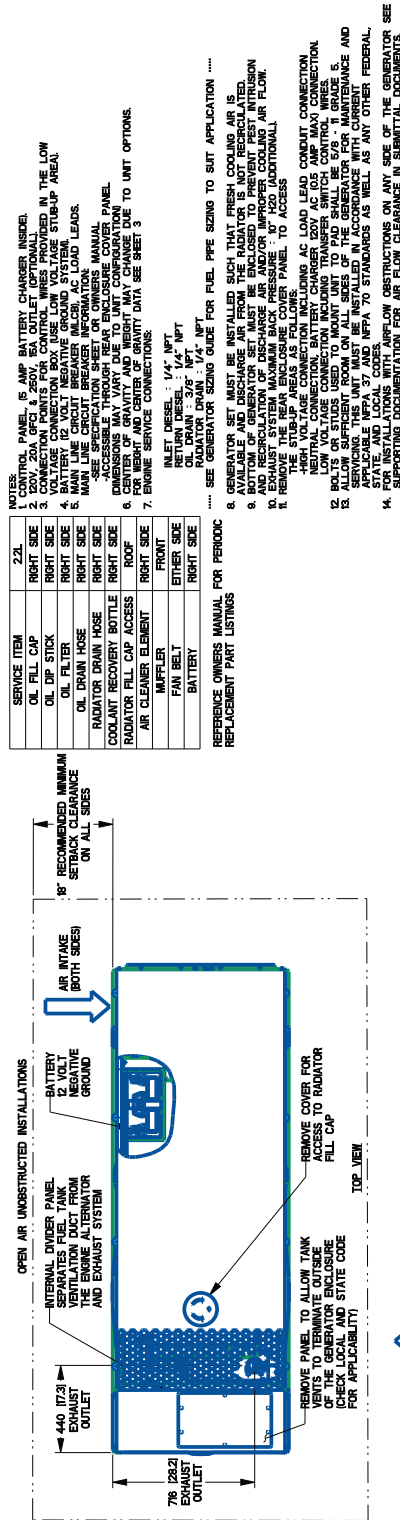
DIMENSIONS ARE IN MILLIMETERS [INCHES]

D2.2 G22 Enclosed (A0002043859 3 of 3) RA01522 / RA02022

STD ENCLOSURE, ALUMINUM

MODEL	FUEL TANK	UNIT WEIGHT (SEE NOTE 6)		TANK WEIGHT	CAPACITY		DIMENSIONS				CENTER OF GRAVITY		
		GENERATOR AS SHOWN	WITH WOODEN SHIPPING SKID		TOTAL CAPACITY	USABLE CAPACITY	DIM 'A' OVERALL HEIGHT	DIM 'B' LIFTING EYE HEIGHT	DIM 'C' FUEL TANK HEIGHT	DIM 'D' FUEL TANK & FRAME HEIGHT	DIM 'X'	DIM 'Y'	DIM 'Z'
RA015 RA020	50 GAL	669 [1475]	690 [1521]	197 [434]	205 [54]	189 [50]	1314 [51.7]	362 [14.3]	311 [12.2]	413 [16.3]	857 [33.8]	207 [8.2]	394 [15.5]
RA015 RA020	100 GAL	761 [1678]	782 [1724]	289 [637]	390 [103]	379 [100]	1635 [64.4]	652 [25.7]	631 [24.8]	734 [28.9]	897 [35.3]	99 [3.9]	394 [15.5]

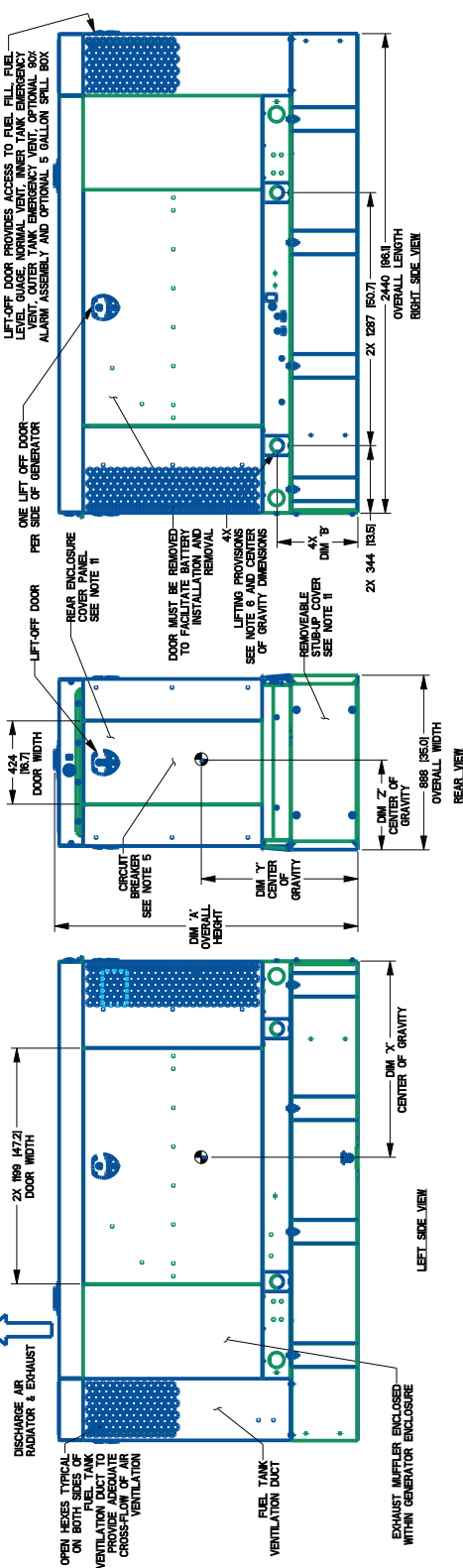
D2.2L G22 Enclosed (A0004795247 1 of 3) RA03022



SERVICE ITEM	Z.Z.L.
OIL FILL CAP	RIGHT SIDE
OIL DIP STICK	RIGHT SIDE
OIL FILTER	RIGHT SIDE
OIL DRAIN HOSE	RIGHT SIDE
RADIATOR DRAIN HOSE	RIGHT SIDE
COOLANT RECOVERY BOTTLE	RIGHT SIDE
RADIATOR FILL CAP ACCESS	ROOF
AIR CLEANER ELEMENT	RIGHT SIDE
MUFFLER	FRONT
FAN BELT	ETHER SIDE
BATTERY	RIGHT SIDE

- CONTROL PANEL IS AMP BATTERY CHARGER INSIDE.
- 200V, 20A, 0FC1 & 250V, 15A OUTLET (OPTIONAL).
- INTERNAL DIVIDER PANEL IS LOCATED IN THE LOW VOLTAGE CONNECTION BOX. USE LOW VOLTAGE STUBUP AREA.
- BATTERY IS 12 VOLT NEGATIVE GROUND SYSTEM.
- MAIN LINE CIRCUIT BREAKER INFORMATION.
- SEE SPECIFICATION SHEET OR OWNERS MANUAL FOR ADDITIONAL INFORMATION.
- DIMENSIONS MAY VARY DUE TO UNIT CONFIGURATION.
- CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS.
- ENGINE SERVICE CONNECTIONS. (SEE SHEET 3)
- INLET DIESEL : 1/4" NPT
- RETURN DIESEL : 1/4" NPT
- FUEL TANK FILLER NECK : 1/4" NPT
- GENERATOR SIZING GUIDE FOR FUEL PIPE SIZING TO SUIT APPLICATION
- GENERATOR SET MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECYCLED.
- INSTALLATION MUST BE IN ACCORDANCE WITH ALL APPLICABLE ELECTRICAL CODES AND STANDARDS.
- EXHAUST SYSTEM MAXIMUM BACK PRESSURE : 10" H2O (ADDITIONAL) THE EXHAUST SYSTEMS CLEARANCE PANEL TO ACCESS.
- HIGH VOLTAGE CONNECTION INCLUDING AC LOAD LEAD CONDUIT CONNECTION. (SEE SHEET 3) FOR ADDITIONAL INFORMATION.
- LOW VOLTAGE CONNECTION INCLUDING TRANSFER SWITCH CONTROL WIRES.
- BOLTS OR STUDS USED TO MOUNT UNIT TO PAD SHALL BE 5/8" - 11 GRADE 5.
- APPLICABLE MPA 37 AND NFPA 70 STANDARDS AS WELL AS ANY OTHER FEDERAL, STATE OR LOCAL CODES.
- FOR INSTALLATIONS WITH AIRFLOW OBSTRUCTIONS ON ANY SIDE OF THE GENERATOR SEE SUPPORTING DOCUMENTATION FOR AIR FLOW CLEARANCE IN SUBMITTAL DOCUMENTS.

REFERENCE OWNERS MANUAL FOR PERIODIC REPLACEMENT PART LISTINGS

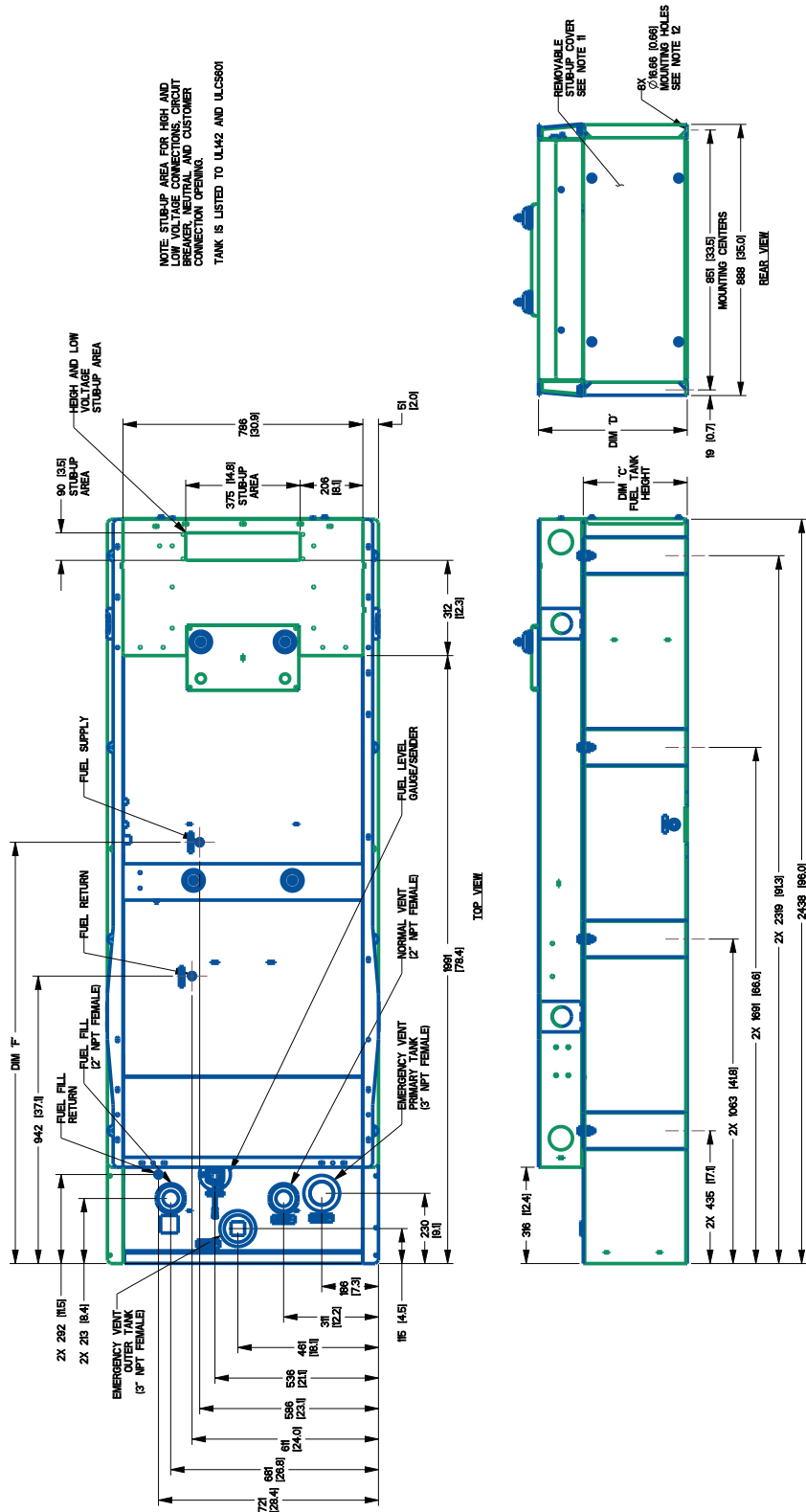


DIMENSIONS ARE IN MILLIMETERS (INCHES)

INSTALLATION DRAWING

D2.2L G22 Enclosed (A0004795247 2 of 3) RA03022

NOTE: STUB-UP AREA FOR HIGH AND LOW VOLTAGE CONNECTIONS, CIRCUIT BREAKER, NEUTRAL AND CUSTOMER CONNECTION OPENING.
TANK IS LISTED TO UL142 AND ULCS601



INSTALLATION DRAWING

D2.2L G22 Enclosed (A0004795247 3 of 3) RA03022

STD ENCLOSURE, ALUMINUM

MODEL	FUEL TANK	UNIT WEIGHT (SEE NOTE 6) GENERATOR AS SHOWN	TANK WEIGHT	CAPACITY		DIMENSIONS				CENTER OF GRAVITY (SEE NOTE 6)			
				WITH WOODEN SHIPPING SKID	DRY WEIGHT	TOTAL CAPACITY	USABLE CAPACITY	DIM 'A' OVERALL HEIGHT	DIM 'B' LIFTING EYE HEIGHT	DIM 'C' FUEL TANK HEIGHT	DIM 'D' FUEL TANK & FRAME HEIGHT	DIM 'E' FUEL SUPPLY	DIM 'X'
RA030	50 GAL	980 [2183]	252 [556]	204 [54]	189 [50]	1544 [608]	411 [162]	341 [134]	487 [192]	1380 [543]	1066 [42]	335 [132]	454 [179]
RA030	130 GAL	1117 [2463]	379 [836]	522 [138]	492 [130]	1874 [738]	741 [292]	671 [264]	818 [322]	1517 [597]	1098 [432]	219 [84]	453 [178]