

# Samsung [CBRS] Clip-On Antenna Specifications

Atoll antenna pattern name = **XXDWMM-12.5-65-8T-CBRS**



Antenna includes integrated cable with connector  
\* Design is subject to minor change

| Items  | Clip-on Antenna, <b>BASTA**</b>                                  |
|--|--|
| Antenna Gain   | <b>12.5 ± 0.5 dBi (Max 13 dBi)</b>                               |
| Horizontal BW (-3dB)   | <b>65° ± 5°</b>  |
| Vertical BW (-3dB)   | <b>17° ± 3°</b>  |
| Electrical Tilt  | <b>8° (fixed) ± 2°</b>   |
| Front-to-Back Ratio  | <b>&gt; 25 dB</b>  |
| Port-to-Port Tracking  | <b>&lt; 3 dB</b>   |
| VSWR   | <b>&lt; 1.5</b>  |
| Isolation  | <b>&gt; 25 dB</b>  |
| <b>Ingress Protection</b>  | <b>IP55</b>  |
| <b>Size</b>  | <b>220(W)×313(H)×34.3(D) mm (*)<br/>(8.7 x 12.3 x 1.4 inch.)</b> |
| <b>Weight</b>  | <b>&lt; 2.0 kg [Typ. 1.3 kg]</b>                                 |
| It is required that the radio should be weatherproofed properly with JMA WPS Boot with external antenna or <b>with Weatherproof Boot for clip-on antennas.</b> |  |

\*\* Ant. spec. follows NGMN recommendations on Base Station Antenna Standards (BASTA). For example, 'mean ± tolerance of 86.6%' is applied to double-sided specification of statistical RF parameters.

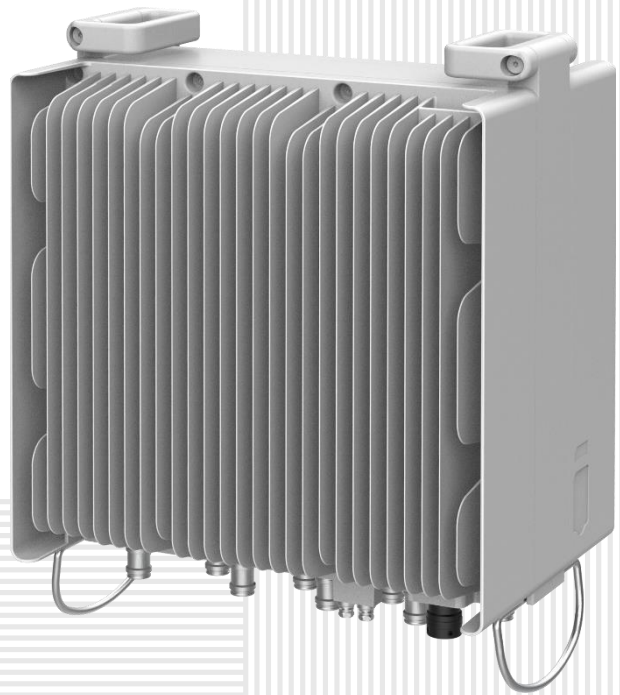
# SAMSUNG

## AWS/PCS MACRO RADIO

DUAL-BAND AND HIGH POWER  
FOR MACRO COVERAGE

Samsung's future proof dual-band radio is designed to help effectively increase the coverage areas in wireless networks. This AWS/PCS 4T4R dual-band radio has 4Tx/4Rx to 2Tx/2Rx RF chains options and a total output power of 320W, making it ideal for macro sites.

Model Code RF4439d-25A



Homepage  
[samsungnetworks.com](http://samsungnetworks.com)

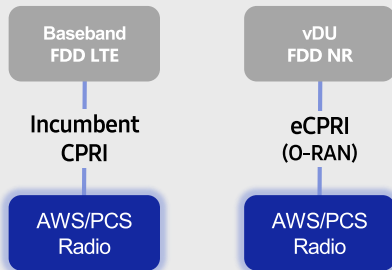


Youtube  
[www.youtube.com/samsung5g](http://www.youtube.com/samsung5g)

## Points of Differentiation

### Continuous Migration

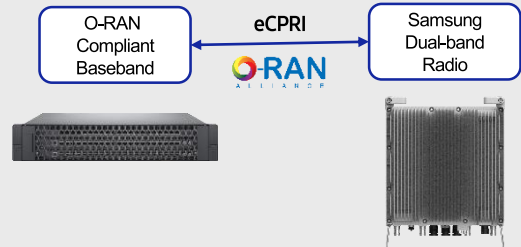
Samsung's AWS/PCS macro radio can support each incumbent CPRI interface as well as advanced eCPRI interfaces. This feature provides installable options for both legacy LTE networks and added NR networks.



### O-RAN Compliant

A standardized O-RAN radio can help in implementing cost-effective networks, which are capable of sending more data without compromising additional investments.

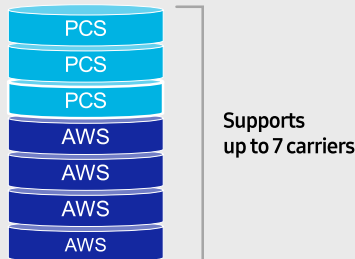
Samsung's state-of-the-art O-RAN technology will help accelerate the effort toward constructing a solid O-RAN ecosystem.



### Optimum Spectrum Utilization

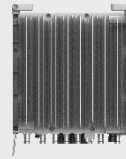
The number of required carriers varies according to site (region). Supporting many carriers is essential for using all frequencies that the operator has available.

The new AWS/PCS dual-band radio can support up to 3 carriers in the PCS (1.9GHz) band and 4 carriers in the AWS (2.1GHz) band, respectively.



### Brand New Features in a Compact Size

Samsung's AWS/PCS macro radio offers several features, such as dual connectivity for baseband for both CDU and vDU, O-RAN capability, more carriers and an enlarged PCS spectrum, combined into an incumbent radio volume of 36.8L.



- 2 FH connectivity
- O-RAN capability
- More carriers and spectrum

Same as an incumbent radio volume

## Technical Specifications

| Item           | Specification  |
|----------------|--|
| Tech           | LTE / NR   |
| Brand          | B25(PCS), B66(AWS)   |
| Frequency Band | DL: 1930 – 1995MHz, UL: 1850 – 1915MHz<br>DL: 2110 – 2200MHz, UL: 1710 – 1780MHz |
| RF Power       | (B25) 4 × 40W or 2 × 60W<br>(B66) 4 × 60W or 2 × 80W                             |
| IBW/OBW        | (B25) 65MHz / 30MHz<br>(B66) DL 90MHz, UL 70MHz / 60MHz                          |
| Installation   | Pole, Wall   |
| Size/Weight    | 14.96 x 14.96 x 10.04inch (36.8L) / 74.7lb                                       |

# 700/850 4T4R Macro 320W ORU - New Filter (RF4461d-13A)

SAMSUNG

## Specifications



| Item                                     | Specification  |  |
|--|--|--|
| Air Interface                            | LTE, NR(HW resource ready)   |  |
| Band                                     | Band13 (700MHz)  | Band5 (850MHz)                         |
| Frequency                                | DL: 746~756MHz   | DL: 869~894MHz                         |
|  | UL: 777~787MHz   | UL: 824~849MHz                         |
| IBW                                      | 10MHz  | 25MHz                                  |
| OBW                                      | 10MHz  | 25MHz                                  |
| Carrier Bandwidth                        | LTE/NR 5*/10MHz  | LTE 5/10MHz<br>NR 5/10/15/20MHz        |
| # of carriers                            | 2C*  | 3C                                     |
| Total # of carriers                      | 4C + B13 (SDL) 1C  |  |
| RF Chain                                 | 4T4R/2T4R/2T2R/1T2R<br>2T2R+2T2R bi-sector                             |  |
| RF Output Power                          | 4 x 40W or 2 x 60W   | 4 x 40W or 2 x 60W                     |
| Spectrum Analyzer                        | TX/RX Support  |  |
| RX Sensitivity                           | Typ. -104.5dBm @1Rx (25RBs 5MHz)                                       |  |
| Modulation                               | 256QAM support, (1024QAM with 1~2dB power back-off)                    |  |
| Input Power                              | -48VDC (-38VDC to -57VDC)  |  |
| Power Consumption                        | 1,165 Watt @ 100% RF load, room temperature                            |  |
| Size (WHD)                               | 380 x 380 x 260 mm (14.96 x 14.96 x 10.23 inch)                        |  |
| Volume                                   | 37.5 L   |  |
| Weight (W/o Solar Shield & finger guard) | 35.9 kg (79.1 lb)  |  |
| Operating Temperature                    | -40°C (-40°F) ~ 55°C (131°F) (Without solar load)                      |  |
| Cooling                                  | Natural convection   |  |
| Unwanted Emission                        | 3GPP 36.104  | 3GPP 36.104                            |
|  | FCC 47 CFR 27.53 c), f)  | FCC 47 CFR 22.917                      |
|  | -  | -69 dBm/100 kHz per path @ 896 ~901MHz |
| CPRI Cascade                             | Not supported  |  |
| Optic Interface                          | 20km, 2 ports (9.8Gbps x 2), SFP+, single mode, Duplex (Option: Bi-di) |  |
| RET & TMA Interface                      | AISG 3.0   |  |
| Bias-T                                   | 4 ports (2 ports per band)   |  |
| Mounting Options                         | Pole, wall   |  |
| NB-IoT                                   | 2GB+2IB or 4IB   | 2SA+2GB or 2GB+2IB or 4GB              |
| PIM Cancellation                         | Support  |  |
| # of antenna port                        | 4  |  |
| External Alarm                           | 4  |  |
| Fronthaul Interface                      | Opt. 8 CPRI / Opt. 7-2x selectable (not simultaneous support)          |  |
| CPRI compression                         | Not Support  |  |

\* 5MHz supporting in B13(700MHz) depends on 3GPP std. and UE capability.  
External filters in interferer and victim sides for Mexican boarder to support 5MHz service need to be considered  
\*\* Finger guard is not needed.

**Tower / Base / Rooftop**

Raycap's flexible Tower, Base Stations and Rooftop protection and Distribution products provide protection for up to 12 Remote Radio Heads/Integrated Antennas. The solutions mitigate the risk of damage due to lightning and provide high levels of availability and reliability to radio equipment.



Mounting Bracket Included

**Features**

- Designed for distribution to 12 RRH circuits, DC power and fiber optics.
- Alarms for moisture detection and intrusion
- Power alarms for wiring anomalies and power disruptions
- Employs the Strikesorb® Surge Protective Device (SPD) specifically designed for the Remote Radio Head (RRH) installation environment and certified for use in DC applications and at low DC operating voltages (48V)
- The Strikesorb is a Class I SPD certified by VDE per the IEC 61643-11 standard as suitable for installation in areas where direct lightning exposure is expected. Strikesorb is able to withstand direct lightning currents of up to 7.5kA (10/350) and induced surge currents of up to 60kA (8/20)
- Provides very low let through / clamping voltage - unique for a Class I product - as it does not employ spark gaps or other switching elements. Strikesorb offers unique protection levels to the RRH equipment as well as the Base Band Units
- RS485 communication link uses two (2) twisted pair (+ground) wires per hybrid cable, and communicates all voltage, boost system and alarm data
- Patent pending design

**Benefits**

- Distributes DC up to 12 Remote Radio Heads and connects up to 24 LC fiber pairs
- Utilizes an IP 67 rated enclosure, also rated to NEBS and UL, allowing for indoor or outdoor installation on a roof or tower top
- Six total cable ports for cable access with custom configurable UL rated glands that accommodate varying diameters of hybrid (combined power and fiber optic) or standard cables with diameters up to 2" (will fit most standard 1 5/8" coax class cables), depending upon port configuration
- Lightweight aerodynamic design provides maximum flexibility for tower top installation
- Field upgradable units with an OVP kit and/or alarm board without interrupting the site operations
- Backwards compatible to existing OVP units that have been in the network for more than 10 years without any failures



Pluggable OVP  
RTH-PSM-48

## SPECIFICATIONS

# DC Surge Protection for RRH/Integrated Antenna Radio Head

**RVZDC-6628-PF-48 • RVZDC-6628-PF-48NA • RVZDC-6600-PF-48B**

**Tower / Base / Rooftop**

### Electrical

| Model Numbers  | RVZDC-6628-PF-48<br>(SPD with 12 modules & Alarm Board) | RVZDC-6628-PF-48NA<br>(SPD with 12 modules) | RVZDC-6600-PF-48B<br>(Basic Unit - No OVP or Alarm) | RTH-PSM-48-KIT12<br>(Optional OVP Kit, 12 modules) | 6600-ALM-RS485<br>(Optional Alarm Board Kit) |
|--|---|---|---|--|--|
| Nominal Operating Voltage                            | 48 VDC  | 48 VDC                                      | 48 VDC  | 48 VDC   | –  |
| Nominal Discharge Current [ $I_n$ ]                  | 20 kA 8/20 $\mu$ s                                      | 20 kA 8/20 $\mu$ s                          | –   | 20 kA 8/20 $\mu$ s                                 | –  |
| Maximum Surge Current [ $I_{max}$ ]                  | 60 kA 8/20 $\mu$ s                                      | 60 kA 8/20 $\mu$ s                          | –   | 60 kA 8/20 $\mu$ s                                 | –  |
| Maximum Impulse (Lightning) Current per IEC 61643-11 | 7.5 kA 10/350 $\mu$ s                                   | 7.5 kA 10/350 $\mu$ s                       | –   | 7.5 kA 10/350 $\mu$ s                              | –  |
| Maximum Continuous Operating Voltage [ $U_c$ ]       | 75 VDC  | 75 VDC                                      | –   | 75 VDC   | –  |
| Voltage Protection Level [ $U_p$ ] per IEC 61643-11  | < 200V  | < 200V                                      | –   | < 200V   | –  |
| Protection Class as per IEC 61643-11                 | Class I   | Class I                                     | –   | Class I  | –  |
| Power Alarm  | Cross Polarity, Short Circuit, Power Outage             | –   | –   | –  | Cross Polarity, Short Circuit, Power Outage  |
| Intrusion Sensor                                     | Microswitch   | Microswitch                                 | –   | –  | Microswitch                                  |
| Moisture Sensor                                      | Infrared Moisture Detector                              | –   | –   | –  | Infrared Moisture Detector                   |
| Power Boost Ready                                    | RS485 twisted pair connection available                 | –   | –   | –  | RS485 twisted pair connection available      |

### Mechanical

|                               |   |                           |                         |
|-------------------------------|---|---------------------------|-------------------------|
| Suppression Connection Method | Compression lug, #14 - #2 AWG (2mm <sup>2</sup> - 33mm <sup>2</sup> ) |                           |                         |
| Fiber Connection Method       | LC-LC Single mode   |                           |                         |
| Pressure Equalizing Vent      | Gore™ Vent  |                           |                         |
| Environmental Rating          | IP 67   |                           |                         |
| Operating Temperature         | -40° C to +80° C  |                           |                         |
| UV Resistant                  | Yes   |                           |                         |
| Dimensions (L x W x H)        | 12.6" x 16.5" x 29.5"<br>[319mm x 420mm 749mm]                        |                           |                         |
| Weight                        | System: 32 lbs (14.51 kg)   | System: 26 lbs (11.79 kg) | System: 6 lbs (2.72 kg) |
| Combined Wind Loading         | 150mph (sustained):<br>185 lbs (823 N)                                |                           |                         |

### Standards Compliance

|   |  |
|---|--|
| Strikesorb modules are compliant to the following Surge Protective Device (SPD) Standards |  |
| Standards   | UL 1449 5 <sup>th</sup> Edition, IEC 61643-11: 2011, EN 61643-11:2012, IEEE C62.11: 2012, IEEE C62.41.2: 2002, IEEE C62.45: 2002 |
| Certifications  | UL, VDE, CE  |

AWG=American Wire Gauge



# Raycap

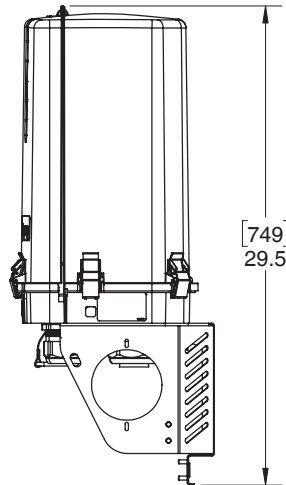
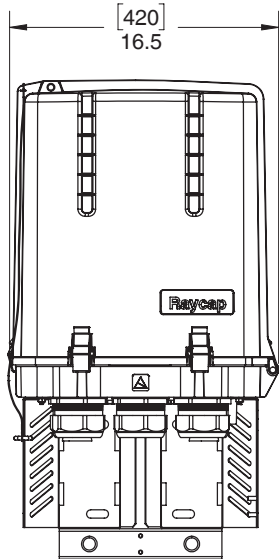
[www.raycap.com](http://www.raycap.com)

**SPECIFICATIONS**

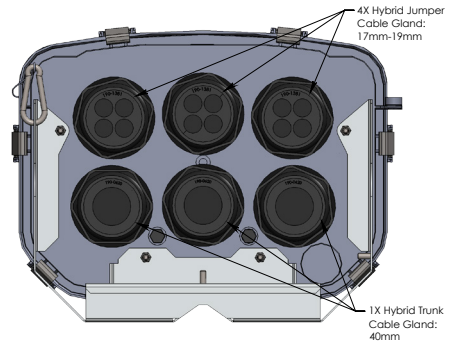
**DC Surge Protection for RRH/Integrated Antenna Radio Head**  
**RVZDC-6628-PF-48 • RVZDC-6628-PF-48NA • RVZDC-6600-PF-48B**

Tower / Base / Rooftop

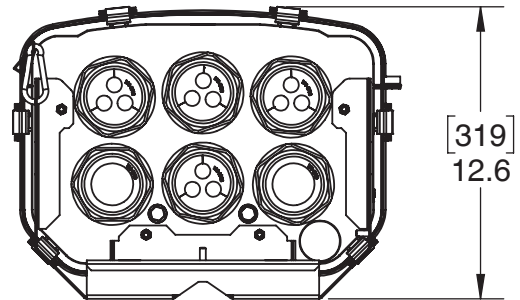
**Product Diagram**



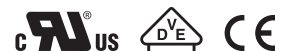
3-Hybrid Cable Configuration



2-Hybrid Cable Configuration



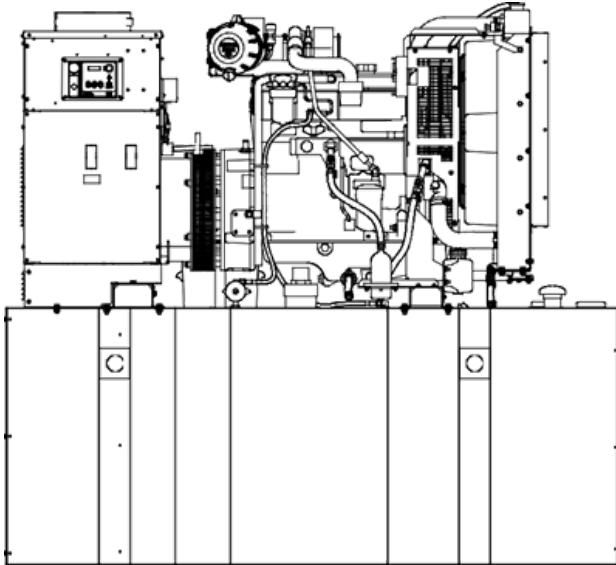
AWG=American Wire Gauge



**Tier 3 EPA-Certified for Stationary Emergency Applications (Not CARB Certified; not for sale in California)**

### Ratings Range

|                 |            |              |
|-----------------|------------|--------------|
|                 |            | <b>60 Hz</b> |
| <b>Standby:</b> | <b>kW</b>  | 50           |
|                 | <b>kVA</b> | 50           |



### Standard Features

- Rehiko provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all generator set systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
  - The unique Fast-Response® X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Rehiko designed controllers for one-source system integration and remote communication. See Controllers on page 3.
  - The low coolant level shutdown prevents overheating (standard on radiator models only).
  - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.

### Generator Set Ratings

| Alternator | Voltage | Ph | Hz | 130°C Rise Standby Rating |      |
|------------|---------|----|----|---------------------------|------|
|            |         |    |    | kW/kVA                    | Amps |
| 4Q8X       | 120/240 | 1  | 60 | 50/50                     | 209  |

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. *Standby Ratings:* The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. *Prime Power Ratings:* At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

### Alternator Specifications

| Specifications                           | Alternator                              |   |                          |                              |  |       |               |     |
|--|---|---|--------------------------|------------------------------|--|-------|---------------|-----|
| Type                                     | 4-Pole, Rotating-Field                  | <ul style="list-style-type: none"> <li>NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.</li> <li>Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.</li> <li>Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.</li> <li>Self-ventilated and dripproof construction.</li> <li>Windings are vacuum-impregnated with epoxy varnish for dependability and long life.</li> <li>Superior voltage waveform from a two-thirds pitch stator and skewed rotor.</li> </ul> |                          |                              |  |       |               |     |
| Exciter type                             | Brushless, Rare-Earth Permanent-Magnet. |   |                          |                              |  |       |               |     |
| Leads: quantity, type<br>4Q_X            | 4, 120/240 V                            |   |                          |                              |  |       |               |     |
| Voltage regulator                        | Solid State, Volts/Hz                   |   |                          |                              |  |       |               |     |
| Insulation:                              | NEMA MG1                                |   |                          |                              |  |       |               |     |
| Material                                 | Class H                                 | <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Peak motor starting kVA:</td> <td style="width: 30%; text-align: center;">(35% dip for voltages below)</td> <td style="width: 40%;"></td> </tr> <tr> <td>240 V</td> <td style="text-align: center;">4Q8X (4 lead)</td> <td style="text-align: center;">121</td> </tr> </table>  | Peak motor starting kVA: | (35% dip for voltages below) |  | 240 V | 4Q8X (4 lead) | 121 |
| Peak motor starting kVA:                 | (35% dip for voltages below)            |   |                          |                              |  |       |               |     |
| 240 V                                    | 4Q8X (4 lead)                           |   | 121                      |                              |  |       |               |     |
| Temperature rise                         | 130°C, Standby                          |   |                          |                              |  |       |               |     |
| Bearing: quantity, type                  | 1, Sealed                               |   |                          |                              |  |       |               |     |
| Coupling                                 | Flexible Disc                           |   |                          |                              |  |       |               |     |
| Amortisseur windings                     | Full                                    |   |                          |                              |  |       |               |     |
| Voltage regulation, no-load to full-load | Controller Dependent                    |   |                          |                              |  |       |               |     |
| One-step load acceptance                 | 100% of Rating                          |   |                          |                              |  |       |               |     |
| Unbalanced load capability               | 100% of Rated Standby Current           |   |                          |                              |  |       |               |     |

### Application Data

| Engine  |                            | Engine Electrical  |                            |
|---|----------------------------|--|----------------------------|
| <b>Engine Specifications</b>                          |                            | <b>Engine Electrical System</b>                                |                            |
| Manufacturer  | John Deere                 | Battery charging alternator:                                   |                            |
| Engine model  | 4045TF280                  | Ground (negative/positive)                                     | Negative                   |
| Engine type   | 4-Cycle, Turbocharged,     | Volts (DC)   | 12                         |
| Cylinder arrangement                                  | 4, Inline                  | Ampere rating  | 75                         |
| Displacement, L (cu. in.)                             | 4.5 (275)                  | Starter motor rated voltage (DC)                               | 12                         |
| Bore and stroke, mm (in.)                             | 105 x 127<br>(4.19 x 5.00) | Battery, recommended cold cranking amps (CCA):                 |                            |
| Compression ratio                                     | 19.0:1                     | Qty., CCA rating each  | One, 640                   |
| Piston speed, m/min. (ft./min.)                       | 457 (1500)                 | Battery voltage (DC)   | 12                         |
| Main bearings: quantity, type                         | 5, Replaceable Insert      | <b>Fuel</b>  |                            |
| Rated rpm   | 1800                       | <b>Fuel System</b>   |                            |
| Max. power at rated rpm, kWm (BHP)                    | 63 (85)                    | Fuel supply line, min. ID, mm (in.)                            | 11.0 (0.44)                |
| Cylinder head material                                | Cast Iron                  | Fuel return line, min. ID, mm (in.)                            | 6.0 (0.25)                 |
| Crankshaft material                                   | Forged Steel               | Max. lift, engine-driven fuel pump, m (ft.)                    | 1.8 (6.0)                  |
| Valve material:                                       |                            | Max. fuel flow, Lph (gph)                                      | 45 (16.5)                  |
| Intake  | Chromium-Silicon Steel     | Max. return line restriction, kPa (in. Hg)                     | 20 (5.9)                   |
| Exhaust   | Stainless Steel            | Fuel prime pump  | Manual                     |
| Governor: type, make/model                            | Mechanical, Stanadyne DB4  | Fuel filter  |                            |
| Frequency regulation, no-load to full-load            | Droop (or Isochronous*)    | Secondary  | 5 Microns @ 98% Efficiency |
| Frequency regulation, steady state                    | ±0.5% (or ±0.25% *)        | Water Separator  | Yes                        |
| Frequency   | Fixed                      | Recommended fuel   | #2 Diesel                  |
| Air cleaner type, all models                          | Dry                        | <b>Lubrication</b>   |                            |
| <b>Exhaust</b>  |                            | <b>Lubricating System</b>                                      |                            |
| <b>Exhaust System</b>                                 |                            | Type   | Full Pressure              |
| Exhaust manifold type                                 | Dry                        | Oil pan capacity, L (qt.) §                                    | 14.7 (15.5)                |
| Exhaust flow at rated kW, m³/min. (cfm)               | 19.2 (679)                 | Oil pan capacity with filter, L (qt.) §                        | 15.6 (16.5)                |
| Exhaust temperature at rated kW, dry exhaust, °C (°F) | 579 (1074)                 | Oil filter: quantity, type §                                   | 1, Cartridge               |
| Maximum allowable back pressure, kPa (in. Hg)         | 7.5 (2.2)                  | Oil cooler   | Water-Cooled               |
| Exhaust outlet size at engine hookup, mm (in.)        | 83 (3.27)                  | § Rehiko recommends the use of Rehiko Genuine oil and filters. |                            |

### Application Data

#### Cooling

##### Radiator System

|  |             |
|--|-------------|
| Ambient temperature, °C (°F)*  | 50 (122)    |
| Engine jacket water capacity, L (gal.)   | 8.5 (2.25)  |
| Radiator system capacity, including engine, L (gal.)   | 17.2 (4.6)  |
| Engine jacket water flow, Lpm (gpm)  | 144 (38)    |
| Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)                             | 36.0 (2049) |
| Water pump type  | Centrifugal |
| Fan diameter, including blades, mm (in.)   | 533 (21.0)  |
| Fan, kWm (HP)  | 1.9 (2.4)   |
| Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O) | 0.125 (0.5) |

\* Enclosure reduces ambient temperature capability by 5°C (9°F).

#### Operation Requirements

##### Air Requirements

|   |            |
|---|------------|
| Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)‡ | 125 (4400) |
| Combustion air, m <sup>3</sup> /min. (cfm)                | 5.3 (187)  |
| Heat rejected to ambient air:                             |            |
| Engine, kW (Btu/min.)                                     | 13.4 (760) |
| Alternator, kW (Btu/min.)                                 | 7.6 (435)  |

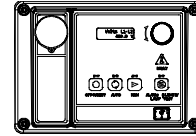
‡ Air density = 1.20 kg/m<sup>3</sup> (0.075 lbf/ft<sup>3</sup>)

##### Fuel Consumption

| Diesel, Lph (gph) at % load | Standby Rating |
|-----------------------------|----------------|
| 100%                        | 17.4 (4.6)     |
| 75%                         | 13.5 (3.6)     |
| 50%                         | 9.4 (2.5)      |
| 25%                         | 5.5 (1.5)      |

| Diesel, Lph (gph) at % load | Prime Rating |
|-----------------------------|--------------|
| 100%                        | 16.1 (4.2)   |
| 75%                         | 12.5 (3.3)   |
| 50%                         | 9.0 (2.4)    |
| 25%                         | 5.0 (1.3)    |

### Controllers



#### APM402 Controller

Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or serial configuration
- Controller supports Modbus® protocol
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-161 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

### Standard Features

- Air Cleaner, Heavy Duty
- Alternator Protection
- Battery Rack and Cables
- Oil Drain and Coolant Drain w/Hose Barb
- Oil Drain Extension (with narrow skid and enclosure models only)
- Operation and Installation Literature
- Radiator Drain Extension (with enclosure only)

### Available Options

#### Approvals and Listings

- CSA Certified
- UL 2200 Listing

#### Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)

#### Open Unit

- Exhaust Silencer, Critical (kit: PA-324470)

#### Fuel System

- Flexible Fuel Lines
- Fuel Pressure Gauge
- Subbase Fuel Tanks

#### Controller

- Common Failure Relay
- Input/Output Module (APM402 controller only)
- Remote Annunciator Panel
- Remote Emergency Stop
- Run Relay

#### Cooling System

- Block Heater, 1500 W, 110-120 V Required for ambient temperature below 0°C (32°F)
- Radiator Duct Flange

#### Electrical System

- Alternator Strip Heater
- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater
- Line Circuit Breaker (NEMA type 1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA type 1 enclosure)

### Miscellaneous

- Air Cleaner Restriction Indicator
- Engine Fluids (oil and coolant) Added
- Rated Power Factor Testing
- Rodent Guards

### Literature

- General Maintenance
- NFPA 110
- Overhaul
- Production

### Warranty

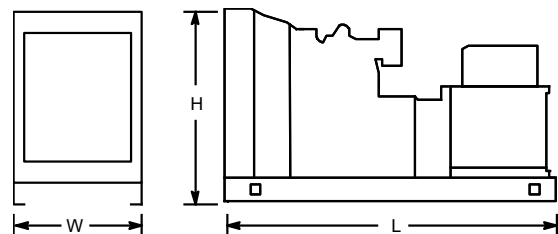
- 2-Year Basic Limited Warranty
- 5-Year Basic Limited Warranty
- 5-Year Comprehensive Limited Warranty

### Other Options

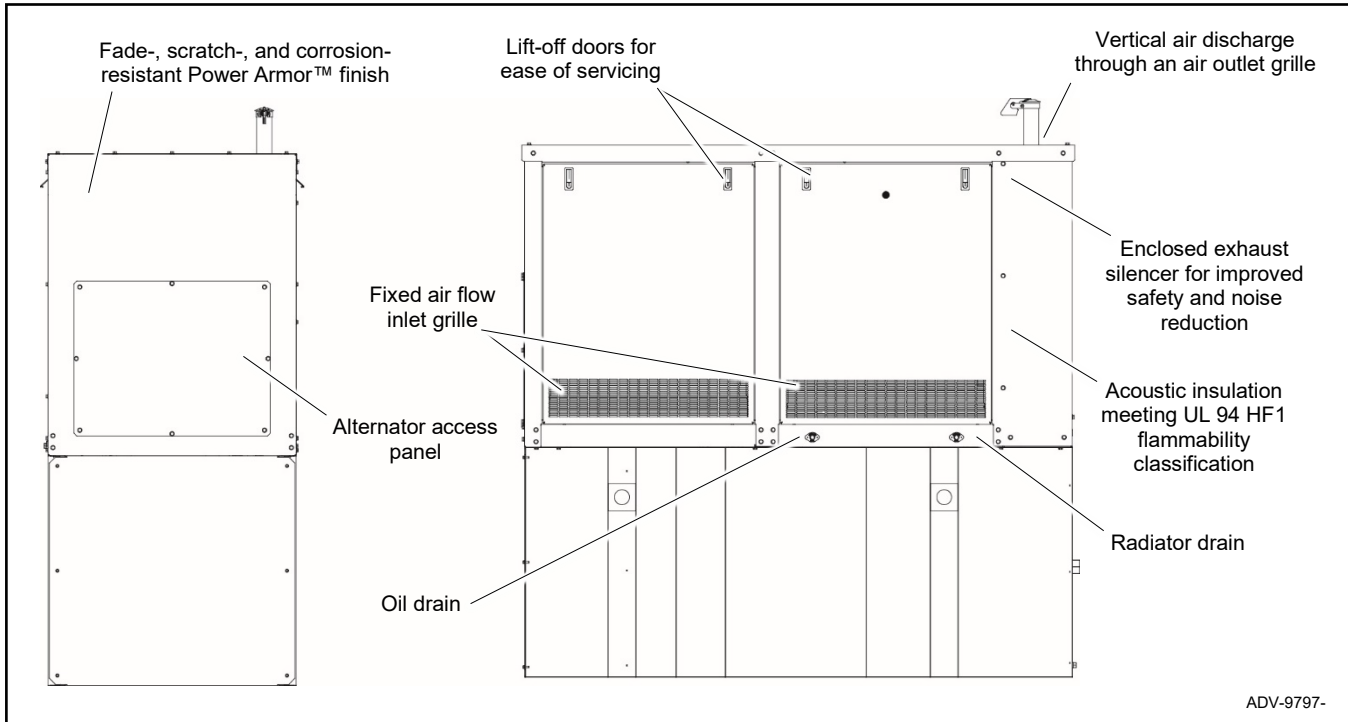
- \_\_\_\_\_
- \_\_\_\_\_
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- \_\_\_\_\_

### Dimensions and Weights

|   |  |
|---|--|
| Overall Size, L x W x H, mm (in.):      |  |
| with standard fuel tank:                | 2320 x 1040 x 2108<br>(91.3 x 40.9 x 82.9) |
| with state fuel tank:                   | 2896 x 1046 x 1753<br>(114 x 41.2 x 69.0)  |
| Weight (radiator model), wet, kg (lb.): | 934 (2060)                                 |



## Sound Enclosure



## Sound Enclosure Features

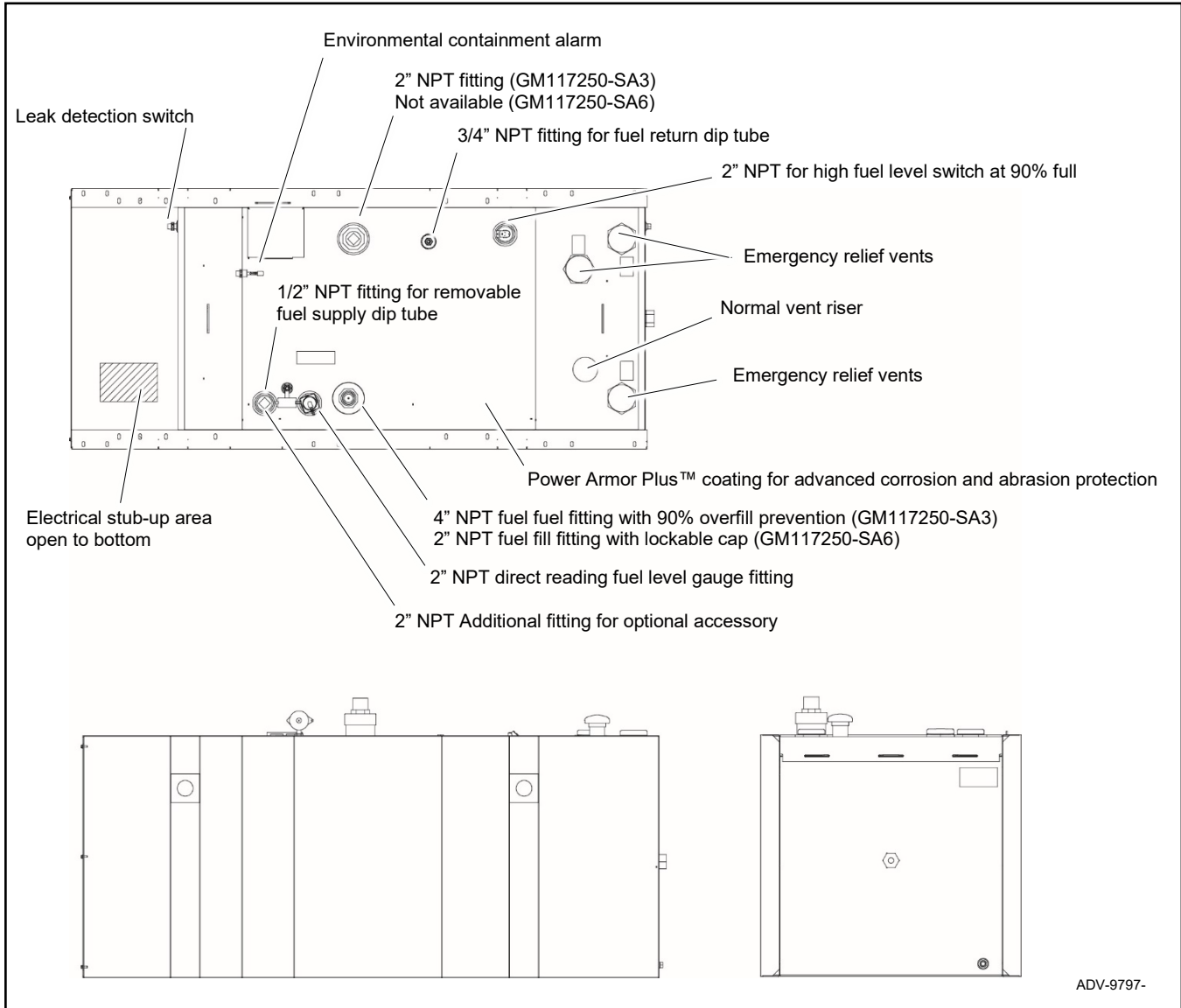
- Internal-mounted silencer and flexible exhaust connector.
- Tank-mounted, steel construction.
- Fade-, scratch-, and corrosion-resistant Power Armor™ automotive-grade textured finish.
- Enclosure has four lift-off access doors which allow for easy maintenance.
- Horizontal air inlet and vertical outlet discharge to redirect air and reduce noise.
- Tank-mounted, steel construction with lift-off doors.
- Acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Sound-attenuated enclosure that uses up to 51 mm (2 in.) of acoustic insulation.
- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to fuel tank.
- Sound-attenuated design. Acoustic insulation UL 94 HF1 listed for flame resistance offering up to 51 mm (2 in.) acoustic insulation.
- Power Armor™ automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal exhaust silencer offering maximum component life and operator safety.
- **NOTE:** Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.

### Available Approvals and Listings

- UL 2200 Listing
- cUL Listing (fuel tanks only)

**NOTE:** Some models may have limited third-party approvals; see your local distributor for details.

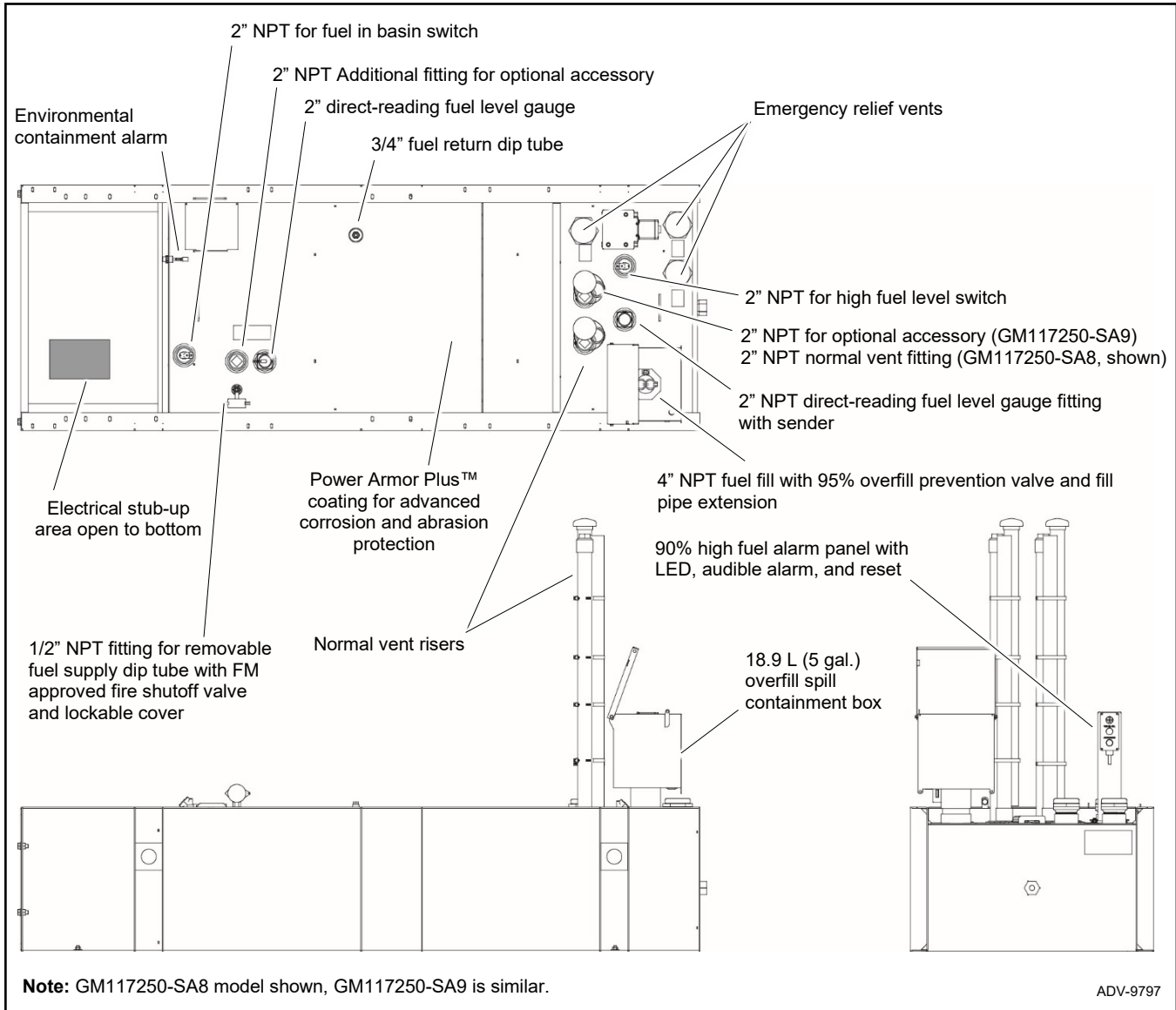
### Subbase Fuel Tank



### Standard Subbase Fuel Tank Features

- Extended operation. Usable tank capacity offers full load standby operation of up to 48 hours on select models.
- Power Armor Plus™ textured epoxy-based rubberized coating that creates an ultra-thick barrier between the tank and harsh environmental conditions like humidity, saltwater, and extreme temperatures, and provides advanced corrosion and abrasion protection.
- UL listed. Secondary containment generator set base tank meeting UL 142 requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Direct reading fuel level gauge visible while filling the tank with annunciation to the generator set controller.
- Emergency pressure relief vents. Vents ensure adequate venting of the inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent with cap. Vent is raised above lockable fuel fill.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set controller.
- Electrical stub-up.

**State Code Subbase Fuel Tank**



**State Code Subbase Fuel Tank Features**

- State tank designed to comply with the installation standards of the Washington State Code (WAC) 296-24-33005
- Includes all of the Standard Subbase Fuel Tank Features.

**State Code Subbase Fuel Tank Options**

**Bottom Clearance**

- I-beams, provides 106 mm (4.2 in.) of ground clearance

**Fuel in Basin Options**

- Fuel in basin switch, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved

**Fuel Fill Options**

- Fill pipe extension to within 152 mm (6 in.) of bottom of fuel tank.
- 18.9 L (5 gallon) spill containment with 95% shutoff

**Fuel Supply Options**

- Fire safety valve (installed on fuel supply line)
- Ball valve (installed on fuel supply line)

**High Fuel Level Switch**

- High fuel level switch

**Normal Vent Options**

- 3.7 m (12 ft.) above grade (with spill containment)

**Fluid Containment Options**

- 125% engine fluid containment



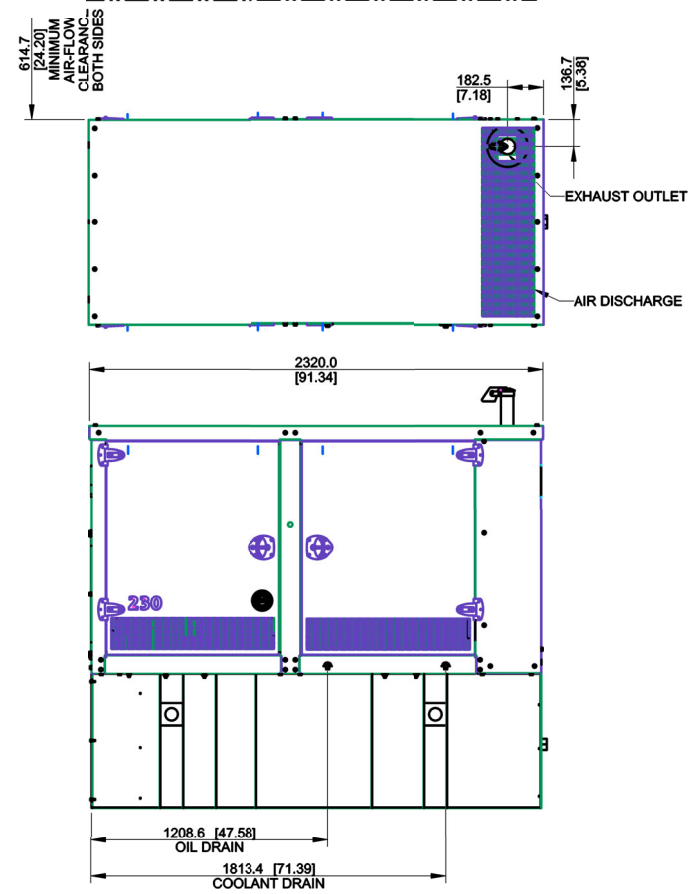
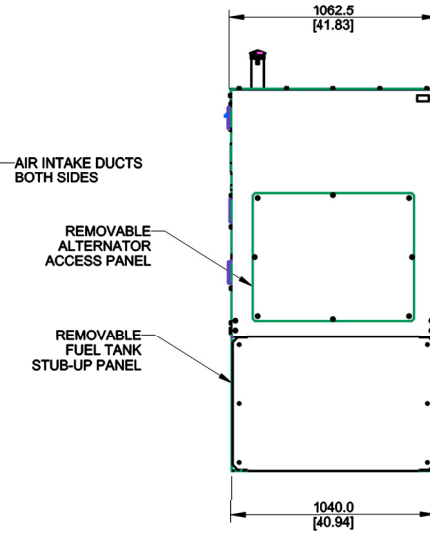
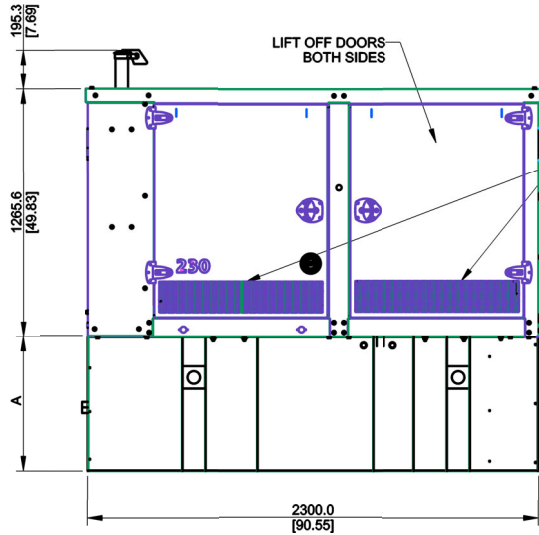
**Industrial Generator Set - 50REOZJE**  
**240 V Diesel**

**NOTES:**

1. DIMENSIONS: MILLIMETERS [INCHES]
2. 6 AMP BATTERY CHARGER
3. 120 VAC ENGINE BLOCK HEATER WITH 60-80F THERMOSTAT
4. GENERATOR MUST BE GROUNDED
5. MUST ALLOW FREE FLOW OF DISCHARGE AIR AND EXHAUST
6. MUST ALLOW FREE FLOW OF INTAKE AIR
7. BASE TANK REQUIRES ALL STUB-UPS TO BE IN REAR TANK STL
8. SEE TABLE FOR SUB-BASE FUEL TANK CAPACITY
9. TANK EQUIPPED WITH FIRE SAFETY VALVE ON FUEL SUPPLY LINE
10. IT IS THE RESPONSIBILITY OF THE INSTALLATION TECHNICIAN TO ENSURE THAT THE GENERATOR INSTALLATION COMPLIES WITH APPLICABLE CODES, STANDARDS, AND REGULATIONS
11. GENERATOR IS INSTALLED ON A UL-142 RATED DOUBLE WALL SUB-BASE FUEL TANK

| TANK NUMBER  | DESCRIPTION                | TANK HEIGHT [A]     | ASSEMBLY WEIGHT    |
|--------------|----------------------------|---------------------|--------------------|
| GM118794-MA1 | STANDARD SKID TANK 210 GAL | 635.8 MM [27.0 IN.] | 1635 KG [3605 LBS] |

**JB-UP AREA**

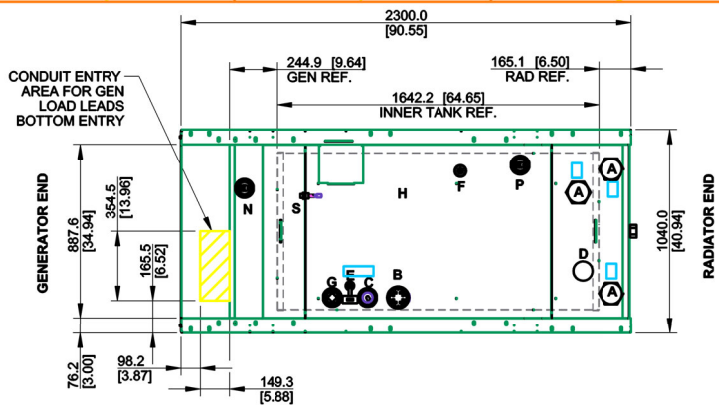


| REV | DESCRIPTION           | BY  | DATE | REVISION LEVEL |
|-----|-----------------------|-----|------|----------------|
| 1   | ISSUE FOR NEW DRAWING | JMR |      | 1              |
|     |                       |     |      |                |
|     |                       |     |      |                |
|     |                       |     |      |                |
|     |                       |     |      |                |

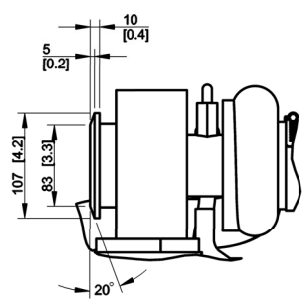
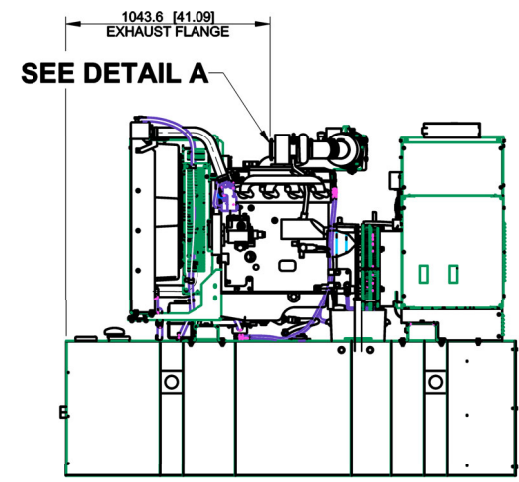
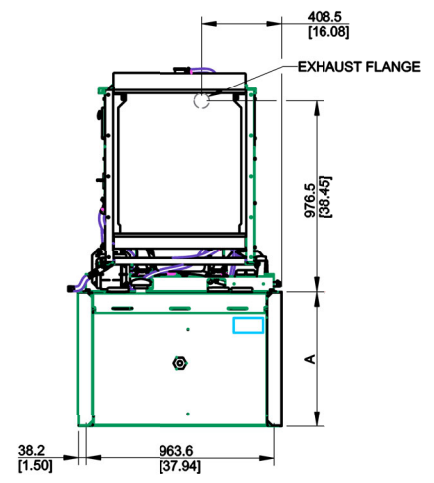
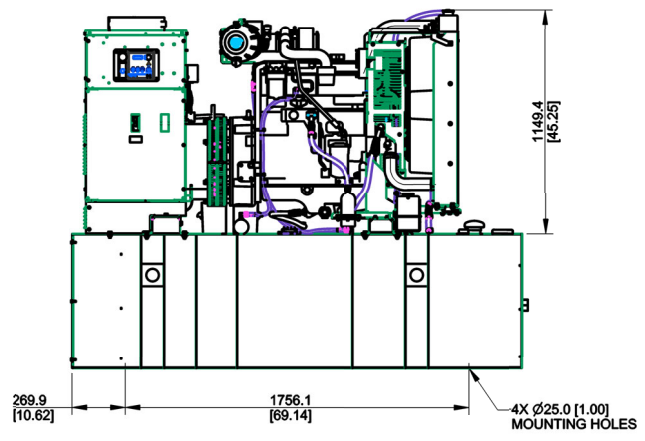
  

|   |  |  |   |
|---|--|--|---|
| E DWGS, SEE PART NO. FOR REVISION LEVEL<br>PART NUMBERS AFFECTED BY LATEST<br>VERSION   |  | DO NOT SCALE<br>THIS ASSEMBLY OR PART MUST COMPLY<br>REFERENCE CAD MODEL FOR UNSPECIFIED | ON COMPOSITE<br>DRAWING INDICATES<br>DRAWING REV              |
| UNLESS OTHERWISE SPECIFIED:<br>ALL DIMENSIONS IN MILLIMETERS<br>GENERAL TOLERANCES: N/A |  | NEW DRAWING  | THIRD ANGLE PROJECTION  |
| DRAWN: JMR  |  | DATE: 06SEP2022  | TITLE:<br><b>DIM PRINT 50REOZJE<br/>VERIZON ENCLOSED UNIT</b> |
| APPROVED: SEE PLM SYSTEM  |  |  | DWG NO.: <b>ADV-9916</b>                                      |

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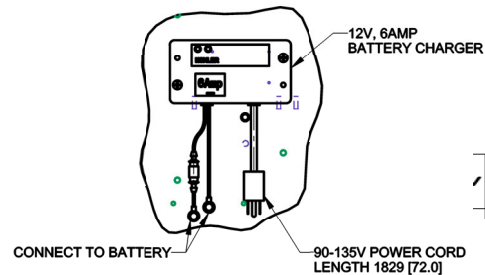
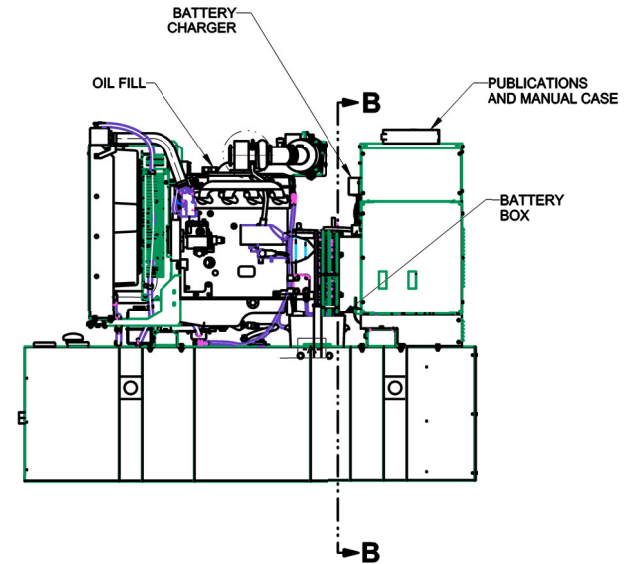
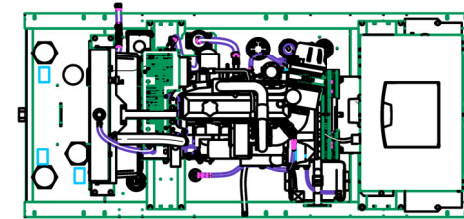
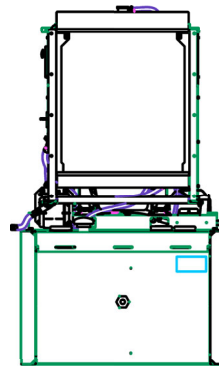
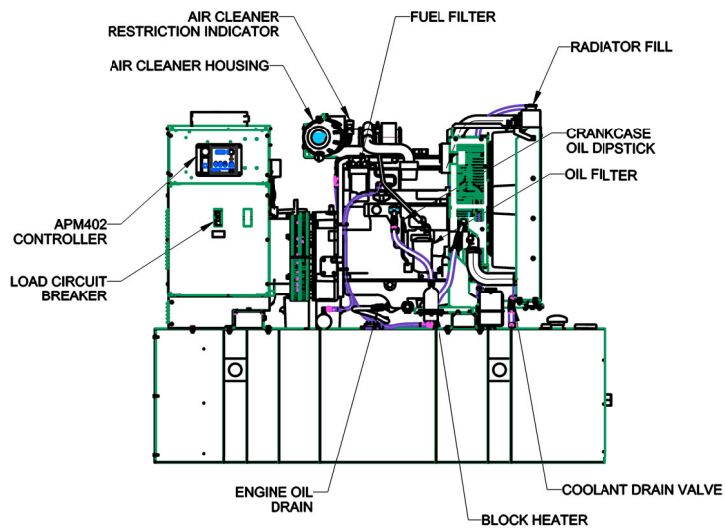


- TANK FITTINGS:**
- A. 3" NPT EMERGENCY VENT FITTING PER NFPA 30 WITH VENT CAPS.
  - B. 4" NPT FUEL FILL FITTING WITH 95% OVERFILL PREVENTION VALVE.
  - C. 2" NPT FOR FUEL LEVEL SENDING UNIT WITH MECHANICAL INDICATOR NEEDLE.
  - D. 2" NPT NORMAL VENT FITTING.(0:@)A
  - E. 1/2" NPT FITTING FOR REMOVABLE ENGINE SUPPLY DIP TUBE (3/8" NPT FEMALE WITH CHECK & FIRE SAFETY VALVES AND LOCKOUT COVER).
  - F. 3/4" NPT FITTING FOR REMOVABLE FUEL RETURN DIP TUBE (3/8" NPT FEMALE).
  - G. 2" NPT ADDITIONAL FITTING FOR OPTIONAL ACCESSORY
  - H. 4" NPT FITTING BUSHED DOWN TO 2" NPT & PLUGGED.
  - N. 2" NPT FOR FUEL IN BASIN SWITCH.
  - P. 2" NPT FOR HIGH FUEL LEVEL SWITCH AT 90% FULL.
  - S. 1/2" NPT FITTING FOR ENGINE FLUID CONTAINMENT BASIN FLOAT SWITCH



**DETAIL A  
EXHAUST OUTLET  
SCALE 0.200**

|  |  |    |     |   |                        |
|--|--|----|-----|---|------------------------|
| REV  | ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL<br>D INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION | BY | JMR | DO NOT SCALE.<br>THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.<br>REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS. |                        |
| -  | NEW DRAWING  |    |     | UNLESS OTHERWISE SPECIFIED:<br>ALL DIMENSIONS IN MILLIMETERS<br>GENERAL TOLERANCES: N/A                                 |                        |
|  |  |    |     | MAJOR ○ = 0<br>CRITICAL ✖ = 0   | THIRD ANGLE PROJECTION |
|  |  |    |     | CHARACTERISTICS COMPLY WITH KPS-80022   |                        |
|  |  |    |     | SCALE: 0.04   | SHEET SIZE: B          |
|  |  |    |     |   | SHEET: 2 OF 3          |
|  |  |    |     | DRAWN: JMR  | DATE: 06SEP2022        |
|  |  |    |     | APPROVED: SEE PLM SYSTEM  |                        |
|  |  |    |     | <b>TITLE:</b><br><b>DIM PRINT 50REOZJE</b><br><b>VERIZON ENCLOSED UNIT</b><br>DWG NO.: <b>ADV-9916</b>                  |                        |
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**SECTION B-B**  
**BATTERY CHARGER**  
**SCALE 0.150**

|           |  |     |   |  |
|-----------|--|-----|---|--|
| DATE      | ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL<br>□ INDICATES PART NUMBERS AFFECTED BY LATEST DRAWING REVISION | BY  | DO NOT SCALE.<br>THIS ASSEMBLY OR PART MUST COMPLY WITH PEP-RML-001.<br>REFERENCE CAD MODEL FOR UNSPECIFIED DIMENSIONS. |  |
| 06SEP2022 | JMR  | JMR | UNLESS OTHERWISE SPECIFIED:<br>ALL DIMENSIONS IN MILLIMETERS<br>GENERAL TOLERANCES: NA                                  |  |
|           |  |     |   | MAJOR ○ = 0<br>CRITICAL ✖ = 0<br>CHARACTERISTICS COMPLY WITH KPS-0022<br>SCALE: 0.04 SHEET SIZE: B SHEET: 3 OF 3<br>THIRD ANGLE PROJECTION |
|           |  |     |   | TITLE:<br><b>DIM PRINT 50REOZJE</b><br><b>VERIZON ENCLOSED UNIT</b><br>DWG NO.: <b>ADV-9916</b>  |
|           |  |     | DRAWN: JMR<br>APPROVED: SEE PLM SYSTEM  | DATE:<br>06SEP2022   |

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# 91900314

## Dual-mount antenna bracket

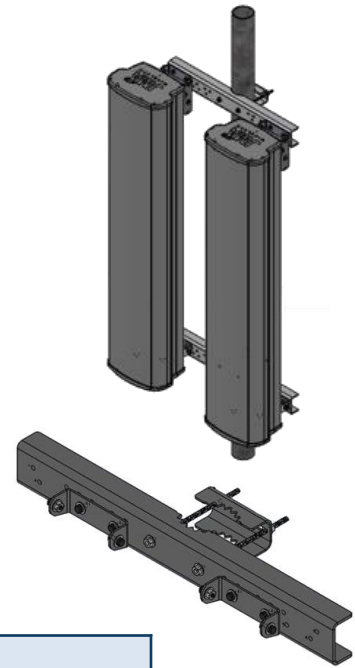


### Dual-mount antenna bracket

- Enables optimal spacing for low-band 4T4R beamforming by allowing for two of the same antenna on one bracket
- Mechanical tilt in line with specified antenna
- Spacing achieved can be 3/4", 2", or 12" (edge-to-edge) dependent on antenna model
- Compatible with MX\*, MC\*, X7C\*, C7C\* antenna ranges

#### Spacing options between dual antennas

|                             |   |
|-----------------------------|---|
| <b>X7C* and C7C* models</b> | 2 of same antennas locked at 2" spacing   |
|                             | Example: (2) X7CQAP-FRO-645-V can be locked at 2" of spacing                    |
| <b>MX*, MC* models</b>      | 2 of same antennas locked at 3/4", 2", or 12" spacing                           |
|                             | Example: (2) MX08FRO660-02 can be locked at 2" or 12" spacing (see above image) |



**Dual-mount bracket assembled**

#### Brackets needed per antenna type

|                             |                                      |               |               |  |                                    |
|-----------------------------|--------------------------------------|---------------|---------------|--|------------------------------------|
| <b>X7C* and C7C* models</b> | <b>All 4' and these 6' antennas:</b> |               |               |  | 91900314-02<br>(2 brackets needed) |
|                             | X7CQAP-FRO-645-V                     | X7CAP-665-V   | X7C-665-V     |  |                                    |
|                             | X7CQAP-FRO-660-V                     | X7C-FRO-640-V | X7C-680-V     |  |                                    |
|                             | X7CQAP-665-V                         | X7C-FRO-660-V | C7C-FRO-656-V |  |                                    |
| <b>MX*, MC* models</b>      | <b>All 8' and this 6' antenna:</b>   |               |               |  | 91900314-03<br>(3 brackets needed) |
|                             | X7CAP-FRO-640-V                      |               |               |  |                                    |
| <b>MX*, MC* models</b>      | <b>4', 6' antennas</b>               |               |               |  | 91900314-02                        |
|                             | <b>8' antennas</b>                   |               |               |  | 91900314-03                        |

#### Mechanical specifications

|  |  |
|--|--|
| Weight per bracket, lb (kg)                | 28 lb (12.7 kg) – dual mount bracket parts only                          |
| Range of allowable mechanical up/down tilt | Tilt range is not affected by dual mount bracket (see antenna datasheet) |
| Rated wind survival speed, mph (km/h)      | 150 mph (241 km/h)   |
| Material specification                     | 0.16" to 0.25" thick hot-dipped, galvanized steel                        |

#### Ordering information

| Mounting bracket model | Description   |
|------------------------|---|
| 91900314-01            | Single dual-mount antenna bracket assembly (see table above, "Brackets per antenna type") |
| 91900314-02            | Two dual-mount antenna bracket assemblies   |
| 91900314-03            | Three dual-mount antenna bracket assemblies   |

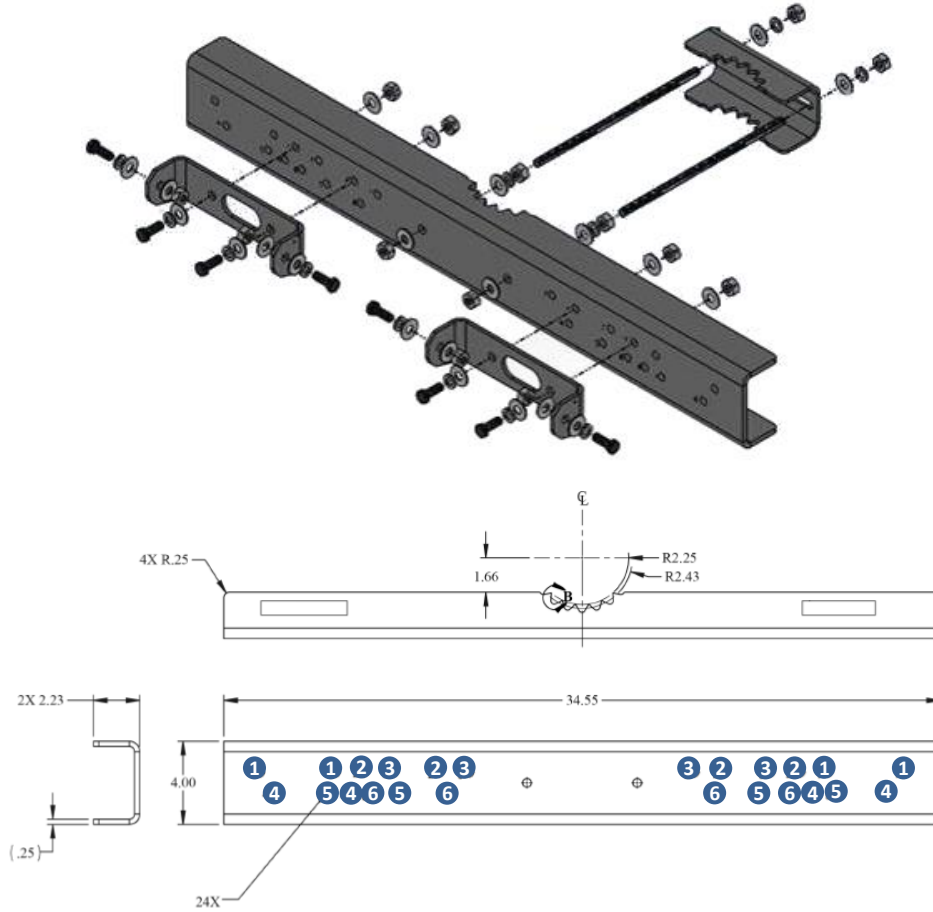
#### \*Compatible antennas

4'–8' Quad-, Hex-, and Octo-Port macro antennas in the X7C; C7C; X7CAP; C7CAP; X7CQAP; MX, MC models

#### Installation instructions

|          |  |
|----------|--|
| 81900506 | Installation instructions for dual-mount bracket assembly (comes with kit) |
|----------|--|

## Dual-mount bracket assembly guide overview



| Model types beginning with: | Antenna width          | Corresponding hole position | Resulting spacing between antennas |
|-----------------------------|------------------------|-----------------------------|------------------------------------|
| MX*, MC*                    | 15.4" (wide spacing)   | 1                           | 12"                                |
|                             | 15.4" (narrow spacing) | 2                           | 2"                                 |
|                             | 12"                    | 3                           | 2"                                 |
|                             | 20"                    | 5                           | 3/4"                               |
| X7C*, C7C*                  | 12.5"                  | 3                           | 2"                                 |
|                             | 24.0"                  | 4                           | 2"                                 |
|                             | 18.8"                  | 5                           | 2"                                 |
|                             | 14.6"                  | 6                           | 2"                                 |

# Specifications

The following table displays the main specifications of the MT6413-77A.

**Table 2. Specifications of the MT6413-77A**

| Item                                |                               | MT6413-77A  |
|-------------------------------------|-------------------------------|---|
| Air Technology                      |                               | 5G  |
| Band/Duplex                         |                               | n77/TDD   |
| OFR                                 |                               | 3,700 to 3,980 MHz  |
| IBW                                 |                               | 200 MHz   |
| OBW                                 |                               | 200 MHz   |
| Carrier Configuration               | Ch. BW                        | NR 20/40/60/80/100 MHz  |
|                                     | Number of carriers (per unit) | 2CC   |
| TRX Path Configuration              |                               | 64T64R  |
| Antenna Configuration               |                               | 4V16H 192 AE (3 x 1 sub-array)  |
| Conductive Power                    |                               | 320 W   |
| MIMO Capacity                       |                               | DL 16L, UL 16RX (8L)  |
| Function Split                      |                               | Opt. 7-2x   |
| Optic Interface                     |                               | 20 km, 25 Gbps x 4 ports  |
| Input Voltage                       |                               | -48 V DC (-36 to -58 V DC)  |
| Power Consumption <sup>a)</sup>     |                               | <ul style="list-style-type: none"> <li>• 882 W @ 40 % room temp</li> <li>• 1,260 W @ 100 % room temp</li> <li>• 1,299 W @ 100 % all temp</li> </ul> |
| Volume / Dimension (W x H x D)      |                               | 41.1 L / 15.75 x 28.9 x 5.51 in. (400 x 734 x 140 mm)   |
| Weight                              |                               | 57.32 lb (26 kg) or less (without a Bracket)  |
| Operating Temperature <sup>b)</sup> |                               | -104 °F to +131 °F (-40 °C to +55 °C), (without solar load)   |
| Cooling Scheme                      |                               | Natural Convection  |
| Installation                        |                               | Pole, Wall  |
| Operating Humidity <sup>b)</sup>    |                               | 5% to 100% RH (non-condensing, not to exceed 30 g/m <sup>3</sup> absolute humidity)   |
| Altitude                            |                               | Telcordia GR-63-CORE, Issue 5, Section 4.1.3  |
| Noise                               |                               | Telcordia GR-487-CORE, Issue 5, Section 3.34 (45 dBA)   |
| Ingress Protection Rating           |                               | IEC 60529 (IP65)  |
| Salt Fog / Salt Spray               |                               | Telcordia GR-487-CORE, Issue 5, Section 3.40.1  |
| Wind Resistance                     |                               | Telcordia GR-487-CORE, Issue 5, Section 3.36  |
| Earthquake                          |                               | Telcordia GR-63-CORE, Issue 5, Section 4.4.1 (Zone 4)   |
| Vibration                           |                               | Telcordia GR-63-CORE, Issue 5, Section 4.4.4 / 4.4.5  |
| EMC                                 |                               | FCC Title 47 CFR Part 15 Subpart B  |

---

|        |                           |
|--------|---------------------------|
| Item   | MT6413-77A                |
| Safety | UL 62368-1                |
| RF     | FCC Title 47, CFR Part 27 |

---



1) These values are predictive of simulation. When development is completed, measurement data can change by +/- 10%.



2) Temperature and humidity are measured 1.5 m above the floor and 400 mm from the equipment's front panel.

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74142



# MX06FIT665-02

NWAV™ X-Pol Hex-Port Antenna

Product discontinued from

December 2024

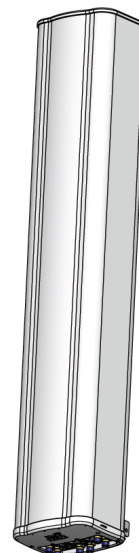
Replacement model:

[MX06FIT665-02E](#)

## X-Pol Hex-Port 6 ft 65° macro FIT (Form in Tighter):

2 ports 698-894 MHz and 4 ports 1695-2200 MHz

- Excellent passive intermodulation (PIM) performance reduces harmful interference.
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM air interface technologies
- Integrated Smart Bias-Ts reduce leasing costs
- Optimized width for reduced wind loading



| Electrical specification (minimum/maximum)                | Ports 1, 2    |         | Ports 3, 4, 5, 6 |           |           |
|---|---------------|---------|------------------|-----------|-----------|
| Frequency bands, MHz                                      | 698-806       | 806-894 | 1695-1880        | 1850-1990 | 1920-2200 |
| Polarization  | ± 45°         |         | ± 45°            |           |           |
| Average gain over all tilts, dBi                          | 14.4          | 14.8    | 17.8             | 18.1      | 18.2      |
| Horizontal beamwidth (HBW), degrees                       | 66.0          | 57.0    | 63.0             | 63.0      | 58.0      |
| Front-to-back ratio, co-polar power @180°± 30°, dB        | >22           | >22.0   | >25.0            | >25.0     | >25.0     |
| X-Pol discrimination (CPR) at boresight, dB               | >17.0         | >15.6   | >23              | >18       | >18       |
| Sector power ratio, percent <sup>1</sup>                  | <5.0          | <3.0    | <4.6             | <3.8      | <5.0      |
| Vertical beamwidth (VBW), degrees <sup>1</sup>            | 13.5          | 12.0    | 6.0              | 5.5       | 5.4       |
| Electrical downtilt (EDT) range, degrees                  | 2-14          | 2-14    | 0-9              |           |           |
| First upper side lobe (USLS) suppression, dB <sup>1</sup> | ≤-17.0        | ≤-16.0  | ≤-17.0           | ≤-16.0    | ≤-16.0    |
| Cross-polar isolation, port-to-port, dB <sup>1</sup>      | 25            | 25      | 25               | 25        | 25        |
| Max VSWR / return loss, dB                                | 1.5:1 / -14.0 |         | 1.5:1 / -14.0    |           |           |
| Max passive intermodulation (PIM), 2x20W carrier, dBc     | -153          |         | -153             |           |           |
| Max input power per any port, watts                       | 300           |         | 250              |           |           |
| Total composite power all ports, watts                    | 1500          |         |                  |           |           |

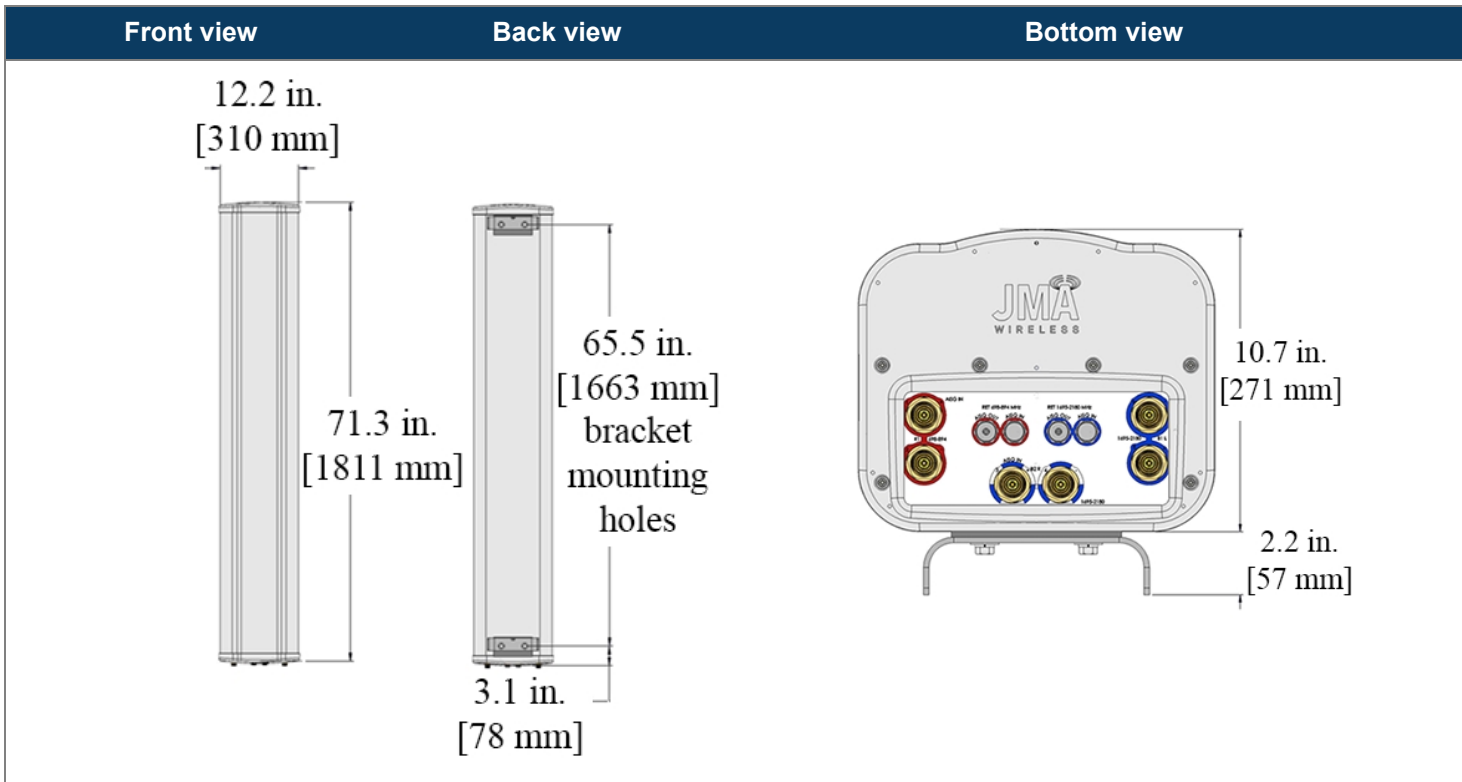
<sup>1</sup> Typical value over frequency and tilt



# MX06FIT665-02

## NWAV™ X-Pol Hex-Port Antenna

| Mechanical specifications                                    |                                   |
|--|-----------------------------------|
| Dimensions height/width/depth, inches (mm)                   | 71.3/ 12.2/ 10.7 (1811/ 310/ 271) |
| Shipping dimensions length/width/height, inches (mm)         | 82/ 20/ 15 (2083/ 508/ 381)       |
| No. of RF input ports, connector type, and location          | 6 x 4.3-10 female, bottom         |
| RF connector torque  | 96 lbf-in (10.85 N·m or 8 lbf-ft) |
| Net antenna weight, lb (kg)                                  | 51 (23.18)                        |
| Shipping weight, lb (kg)                                     | 84 (38.1)                         |
| Antenna mounting and downtilt kit included with antenna      | 91900318                          |
| Net weight of the mounting and downtilt kit, lb (kg)         | 18 (8.18)                         |
| Range of mechanical up/down tilt                             | -2° to 12°                        |
| Rated wind survival speed, mph (km/h)                        | 150 (241)                         |
| Frontal and lateral wind loading @ 150 km/h, lbf (N)         | 56.7 (252.2), 71.3 (317.2)        |
| Equivalent flat plate @ 100 mph and Cd=2, sq ft              | 1.42                              |
| EPA frontal and lateral, ft <sup>2</sup> , (m <sup>2</sup> ) | 2.5 (0.23), 4.8 (0.45)            |



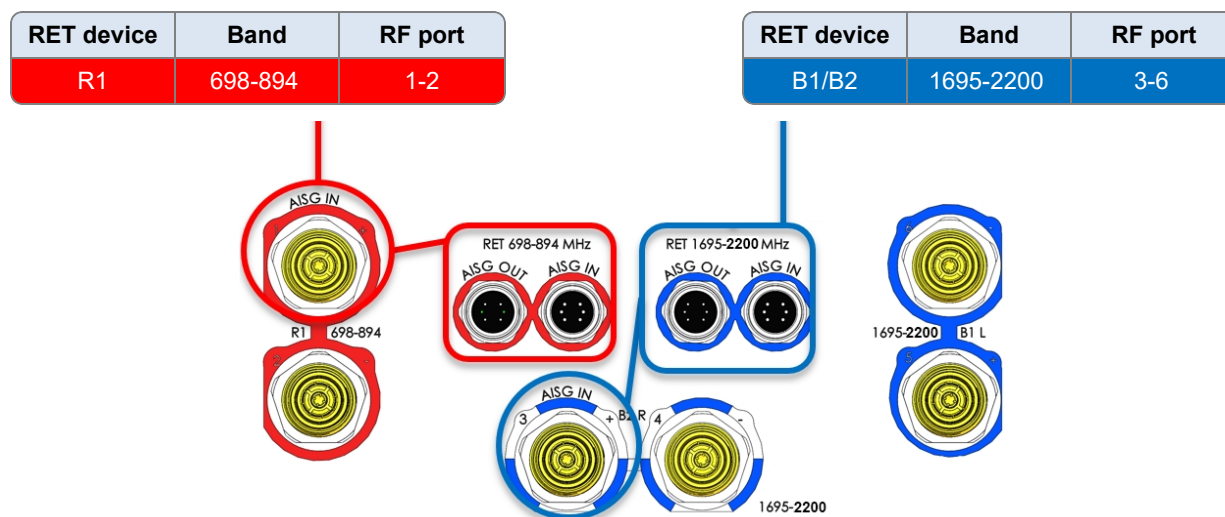
| Ordering information                    |  |
|---|--|
| Antenna model                           | Description  |
| MX06FIT665-02                           | 6F X-Pol HEX FIT 65°, 2-14° / 0-9° RET, 4.3-10 & SBT           |
| Optional accessories                    |  |
| <a href="#">AISG cables</a>             | M/F cables for AISG connections                                |
| <a href="#">PCU-1000 RET controller</a> | Stand-alone controller for RET control and configurations      |
| <a href="#">91900314-02</a>             | Dual Mount Bracket (see 91900314 bracket document for details) |

### Remote electrical tilt (RET 1000) information

|   |   |
|---|---|
| RET location  | Integrated into antenna                                   |
| RET interface connector type                              | 8-pin AISG connector per IEC 60130-9                      |
| RET connector torque                                      | Min 0.5 N·m to max 1.0 N·m (hand pressure & finger tight) |
| RET interface connector quantity                          | 2 pairs of AISG male/female connectors                    |
| RET interface connector location                          | Bottom of the antenna                                     |
| Total no. of internal RETs (low bands)                    | 1   |
| Total no. of internal RETs (high bands)                   | 1   |
| RET input operating voltage, vdc                          | 10-30   |
| RET max power consumption, idle state, W                  | ≤ 2.0   |
| RET max power consumption, normal operating conditions, W | ≤ 13.0  |
| RET communication protocol                                | AISG 2.0 / 3GPP   |

### RET and RF connector topology

Each RET device can be controlled either via the designated external AISG connector or RF port as shown below:



### Array topology

3 sets of radiating arrays

R1: 698-894 MHz  
 B1: 1695-2200 MHz  
 B2: 1695-2200 MHz

| Band      | RF port |
|-----------|---------|
| 1695-2200 | 3-4     |
| 698-894   | 1-2     |
| 1695-2200 | 5-6     |



# CMC85-36CE Combo Cabinet, NICAD



The cabinet is designed to combine wireless telecom power equipment and NICAD batteries into one cabinet. Equipment range from DC power system, Fiber slack tray, cell site router and other servers equipped by customer. This cabinet provide mechanical and environmental protection for the equipment inside. Cooling of active equipment is achieved by DC rated 4100W Air Conditioner with built in EVS (Emergency Ventilation System). Optional 1000W Heater solution for the 3-sting NICAD battery compartment.

- Excellent Thermal Performance on both Heat Exchanger and Air Conditioner options
- Built-in EVS (Emergency Ventilation System) on the Air Conditioner
- Provide enough space for the Power system and other network servers.
- Provide option for security/access control via Puck Lock system.
- Provide flexible access for the cable entrance.
- Provide liftoff rear door panel for full rear access
- Provide heater solution for the cold ambient application.
- Provide flexible configurations to give best in class maximum equipment rack mounting space (Up to 35 total RU)
- Platform products to share many parts including plinth, solar shield, and hybrid cable storage units.
- Excellent cable management system.

|                                    |              |
|------------------------------------|--------------|
| Deactivated PN# 760254913          | (HVAC R134a) |
| Replacement PN# 85B3N-D17-A00D00-1 | (HVAC R513a) |

## General Specifications

### Width / Depth / Height

36" x 37" x 85"

### Enclosure Weight

331kg (730lbs.)

### Access

Bottom: Power compartment  
Side Wall: Fiber, Power, or other cables compartment  
Rear Wall: Hybrid Cables  
Top Roof: Alternative Hybrid Cable entrance

### Door Security

Front door: Swing Handle, Puck Lock System | Rear door: Quarter Turn Lock with lift off hinges, Puck Lock System

### Cooling Option

DC Rated 4100W Air Conditioner unit for the equipment compartment

### Heater

DC Rated 500W heater built-in Air Conditioner / DC Rated 1000W Heater for Battery Compartment

### Total Equipment Thermal Capacity

4000W

### Finish

UV-resistant powder coat; standard finish color is RAL 7035 light grey

### Material Type

Aluminum

# CMC85-36CE Combo Cabinet, NICAD

|                        |   |
|------------------------|---|
| <b>Rack Type</b>       | 19-inch and 23-inch EIA   |
| <b>Rack Units (RU)</b> | Total capacity: 35RU (Horizontal 27RU + Vertical 8RU)<br>Power System   Fiber Slack Tray   Other Customer installed Equipment |
| <b>Battery Type</b>    | 3 strings of NICAD batteries from SAFT OEM  |

## Electrical Specifications

|                            |  |
|----------------------------|--|
| <b>Power System</b>        | Universally supports multiple -48VDC OEM Power Plants and Distribution   |
| <b>GFCI Outlet</b>         | 20AMP, 125Volt Receptable/Outlet, Compliant with UL943 Self-Test Requirement   |
| <b>Input Power Supply</b>  | Big Range of AC Input Voltage 95-305Vac, Support Variations of +/-10%  |
| <b>Alarms and Sensors</b>  | 66-block, Bridged, 25PR*2 or standard and user defined alarms<br>HVAC alarms (including high temperature, Failure)   Door open (both front and side doors)   Rectifier Failure   AC Power Failure   Overheat |
| <b>Battery Compartment</b> | 2 battery shelves that can house up to 3 strings of -48V batteries   |

## Connectivity Specifications

|                         |  |
|-------------------------|--|
| <b>Fiber Slack Tray</b> | Universally supports multiple OEM 19" mounted fiber tray |
|-------------------------|--|

## Mechanical Specifications

|                 |  |
|-----------------|--|
| <b>Mounting</b> | Mounts directly to concrete block (to be prepared on site) or alternative Plinth |
|-----------------|--|

## Environmental Specifications

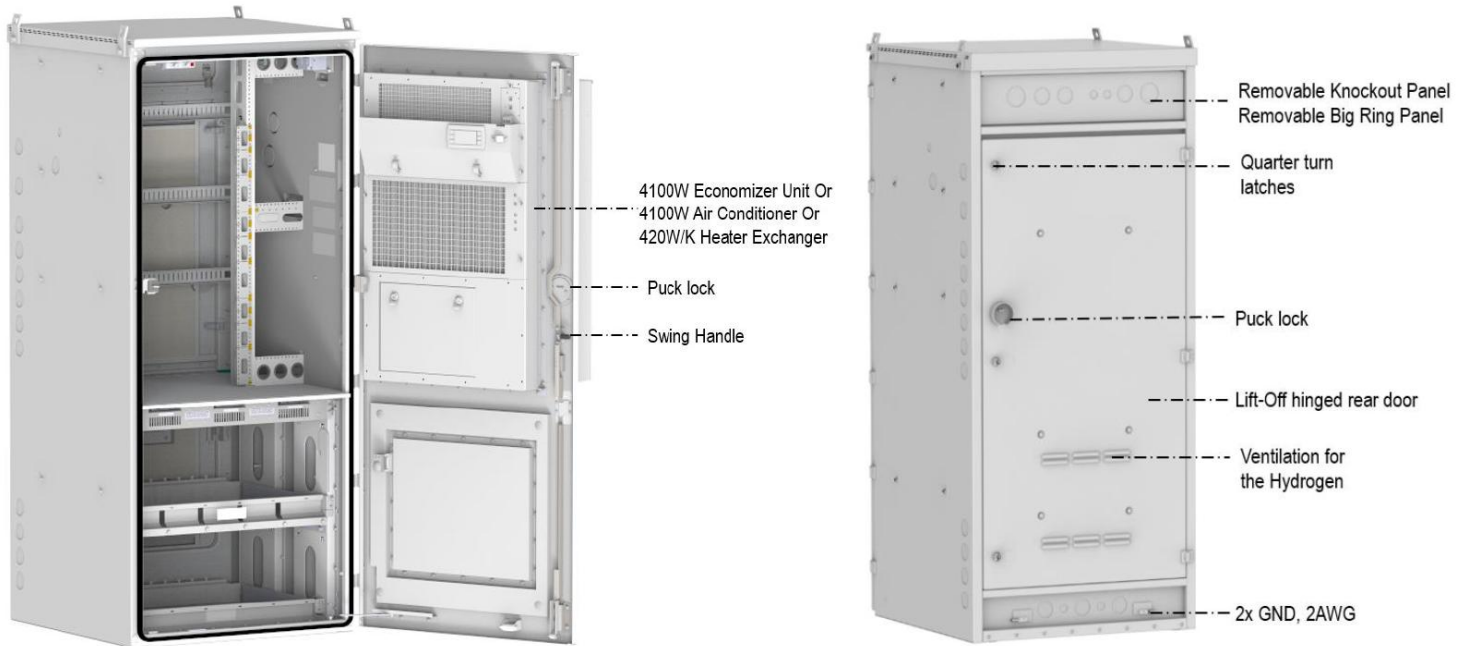
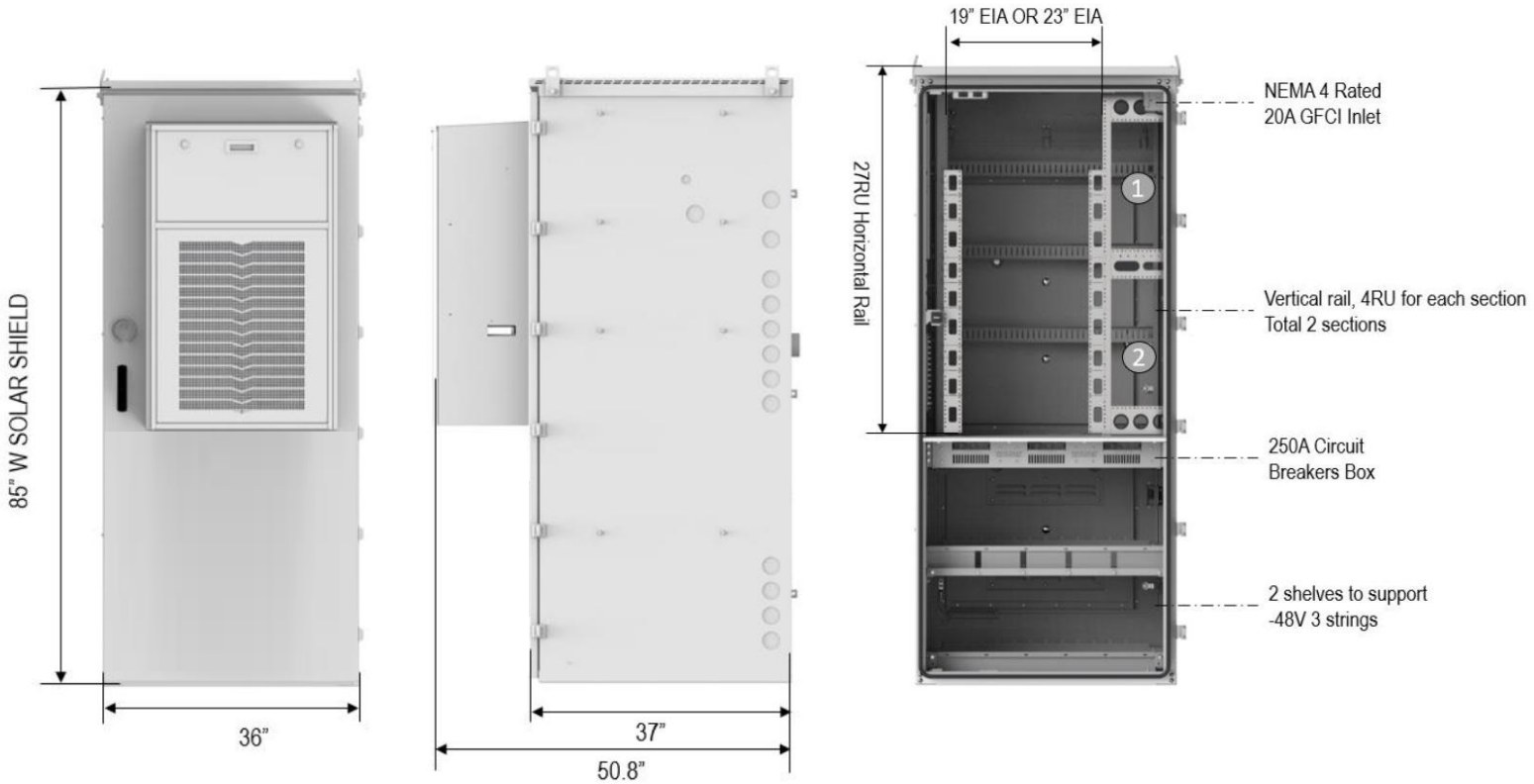
|                                |   |
|--------------------------------|---|
| <b>Operating Temperature</b>   | -40 °F to 115 °F (-40 °C to 46 °C) continuous operation   |
| <b>Storage Temperature</b>     | -40 °F to 158 °F (-40 °C to 70 °C)  |
| <b>Humidity</b>                | 0 to 95%, non-condensing  |
| <b>Acoustic Noise</b>          | 60dBA   |
| <b>Qualification Standards</b> | GR487   Seismic Zone 4 compliant   IP55<br>ETL4007237 Certification, Confirms To ANSI/UL STD 62638-1, UL SUB 1801 |
| <b>Classification</b>          | Designed, manufactured and/or distributed under this quality management system                                    |

|               |               |
|---------------|---------------|
| <b>Agency</b> | ISO 9001:2015 |
|---------------|---------------|



# CMC85-36CE Combo Cabinet, NICAD

## Cabinet Layout



## Group Datasheet HB114-U6S12-xxx-LI Series

# HYBRIFLEX™ RRH Hybrid Cable Solution 6x12, 6AWG Low-Inductance, 1-1/4", Single-Mode Fiber With DLC Connectors

## Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

This low-inductance version of HYBRIFLEX allows mobile operators deploying an RRH architecture to deploy >400ft sites without the danger of power-cycling their RRHs due to voltage swings, which could occur in some specific instances. It combines bend-insensitive single-mode fiber (12 pairs of DLC connectors), 6 pairs of low-inductance DC wires and 9 pairs of 18AWG wires used to carry alarm signals. The package also includes a special RFS-designed DC insulating boot, used to properly protect and insulate the DC wires after stripping the jacket, avoiding possible short-circuits while wiring it to the distribution boxes. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable.

## Technical Specifications

### Structure

|                        |                                |           |             |
|------------------------|--------------------------------|-----------|-------------|
| Outer Conductor Armor: | Corrugated Aluminum            | [mm (in)] | 36.0 (1.42) |
| Jacket:                | Flame Retardant                | [mm (in)] | 39.0 (1.54) |
| UV-Protection:         | Individual and External Jacket |           | Yes         |

### Mechanical Properties

|  |  |                |                        |
|--|--|----------------|------------------------|
| Weight, Approximate                      |  | [kg/m (lb/ft)] | 2.52 (1.70)            |
| Minimum Bending Radius, Single Bending   |  | [mm (in)]      | 152 (6)                |
| Minimum Bending Radius, Repeated Bending |  | [mm (in)]      | 254 (10)               |
| Recommended/Maximum Clamp Spacing        |  | [m (ft)]       | 1.0 / 1.2 (3.25 / 4.0) |

### Electrical Properties

|   |  |                   |               |
|---|--|-------------------|---------------|
| DC-Resistance Outer Conductor Armor                   |  | [Ω/km (Ω/1000ft)] | 0.9 (0.27)    |
| DC-Resistance Power Cable, 13.3mm <sup>2</sup> (6AWG) |  | [Ω/km (Ω/1000ft)] | 1.4 (0.42)    |
| Inductance @100-1000Hz                                |  | [μH/m (μH/ft)]    | < 0.19 (0.06) |

### Fiber Optic Properties

|                                     |  |           |               |
|-------------------------------------|--|-----------|---------------|
| Version                             |  |           | Single-mode   |
| Quantity, Fiber Count               |  |           | 24 (12 pairs) |
| Core/Clad                           |  |           | 9/125         |
| Primary Coating (Acrylate)          |  | [μm]      | 245           |
| Secondary Coating Diameter, Nominal |  | [μm]      | 900           |
| Minimum Bending Radius              |  | [mm (in)] | 137 (5.4)     |
| Optical Loss @ wavelength 1310nm    |  | dB/km     | 0.5           |
| Optical Loss @ wavelength 1550nm    |  | dB/km     | 0.5           |

### DC Power Cable Properties

|                                  |  |                         |                         |
|----------------------------------|--|-------------------------|-------------------------|
| Size (Power)                     |  | [mm <sup>2</sup> (AWG)] | 13.3 (6)                |
| Quantity, Wire Count (Power)     |  |                         | 12 (6 concentric wires) |
| Size (Alarm)                     |  | [mm <sup>2</sup> (AWG)] | 0.8 (18)                |
| Quantity, Wire Count (Alarm)     |  |                         | 18 (9 stranded pairs)   |
| Type                             |  |                         | PVC/Nylon               |
| Primary Jacket Diameter, Nominal |  | [mm (in)]               | 9.3 (0.365)             |

### Environment

|                          |  |           |                          |
|--------------------------|--|-----------|--------------------------|
| Installation Temperature |  | [°C (°F)] | -20 to +65 (-4 to +149)  |
| Operation Temperature    |  | [°C (°F)] | -40 to +65 (-40 to +149) |
| Storage Temperature      |  | [°C (°F)] | -40 to +70 (-40 to +158) |

### Standards (meets or exceeds)

|             |   |
|-------------|---|
| Jacket      | UL2882 Type RHC, UL Listed  |
| Fiber Optic | UL Listed Type OFNR (UL1666), RoHS Compliant  |
| Alarm Wires | UL Standard 1063, 1581 VW-1, MTW Oil and Gasoline RES1 SUNRES (Cable meets UL requirements), RoHS/REACH Compliant |
| Power Wires | For use in Type RHC per UL 2882, PVC/Nylon, RoHS/REACH Compliant  |



- Patented DC Wire Insulator**  
 Used at the DC wire connection in distribution boxes, prevents potential short circuits
- Aluminum corrugated armor with outstanding bending characteristics**  
 Minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1-1/4" coaxial cable**
- Outer conductor grounding**  
 Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design**  
 Decreases tower loading
- Robust cabling**  
 Eliminates need for expensive cable trays and ducts
- Optical fiber and power cables housed in single corrugated cable**  
 Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor, flame-retardant jacket**  
 Ensures long-lasting cable protection

## Group Datasheet HB114-U6S12-xxx-LI Series

# HYBRIFLEX™ RRH Hybrid Cable Solution 6x12, 6AWG Low-Inductance, 1-1/4", Single-Mode Fiber With DLC Connectors

### Ordering Information

| Length, ft* | Model Number       | Length, ft* | Model Number       | Length, ft* | Model Number        |
|-------------|--------------------|-------------|--------------------|-------------|---------------------|
| 10          | HB114-U6S12-10-LI  | 230         | HB114-U6S12-230-LI | 450         | HB114-U6S12-450-LI  |
| 20          | HB114-U6S12-20-LI  | 240**       | HB114-U6S12-240-LI | 460         | HB114-U6S12-460-LI  |
| 30          | HB114-U6S12-30-LI  | 250         | HB114-U6S12-250-LI | 470         | HB114-U6S12-470-LI  |
| 40          | HB114-U6S12-40-LI  | 260         | HB114-U6S12-260-LI | 480         | HB114-U6S12-480-LI  |
| 50          | HB114-U6S12-50-LI  | 270**       | HB114-U6S12-270-LI | 490         | HB114-U6S12-490-LI  |
| 60          | HB114-U6S12-60-LI  | 280         | HB114-U6S12-280-LI | 500         | HB114-U6S12-500-LI  |
| 70          | HB114-U6S12-70-LI  | 290         | HB114-U6S12-290-LI | 510         | HB114-U6S12-510-LI  |
| 80          | HB114-U6S12-80-LI  | 300         | HB114-U6S12-300-LI | 520         | HB114-U6S12-520-LI  |
| 90**        | HB114-U6S12-90-LI  | 310         | HB114-U6S12-310-LI | 530         | HB114-U6S12-530-LI  |
| 100         | HB114-U6S12-100-LI | 320         | HB114-U6S12-320-LI | 540         | HB114-U6S12-540-LI  |
| 110         | HB114-U6S12-110-LI | 330         | HB114-U6S12-330-LI | 550         | HB114-U6S12-550-LI  |
| 120**       | HB114-U6S12-120-LI | 340         | HB114-U6S12-340-LI | 560         | HB114-U6S12-560-LI  |
| 130         | HB114-U6S12-130-LI | 350         | HB114-U6S12-350-LI | 570         | HB114-U6S12-570-LI  |
| 140         | HB114-U6S12-140-LI | 360         | HB114-U6S12-360-LI | 580         | HB114-U6S12-580-LI  |
| 150**       | HB114-U6S12-150-LI | 370         | HB114-U6S12-370-LI | 590         | HB114-U6S12-590-LI  |
| 160         | HB114-U6S12-160-LI | 380         | HB114-U6S12-380-LI | 600         | HB114-U6S12-600-LI  |
| 170         | HB114-U6S12-170-LI | 390         | HB114-U6S12-390-LI | 610         | HB114-U6S12-610-LI  |
| 180**       | HB114-U6S12-180-LI | 400         | HB114-U6S12-400-LI | 700         | HB114-U6S12-700-LI  |
| 190         | HB114-U6S12-190-LI | 410         | HB114-U6S12-410-LI | 800         | HB114-U6S12-800-LI  |
| 200         | HB114-U6S12-200-LI | 420         | HB114-U6S12-420-LI | 900         | HB114-U6S12-900-LI  |
| 210**       | HB114-U6S12-210-LI | 430         | HB114-U6S12-430-LI | 1000        | HB114-U6S12-1000-LI |
| 220         | HB114-U6S12-220-LI | 440         | HB114-U6S12-440-LI |             |                     |

\* Length is "L" shown in product drawing, \*\* Quick Ship Model – Contact RFS for details

### Product Drawing

