

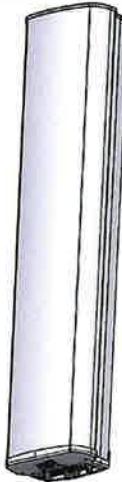
MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

X-Pol Hex-Port 6 ft 60° Fast Roll Off antenna with independent tilt on 700 & 850 MHz:

2 ports 698-798, 824-894 MHz and 4 ports 1695-2180 MHz

- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Compatible with dual band 700/850 MHz radios with independent low band EDT without external diplexers
- 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

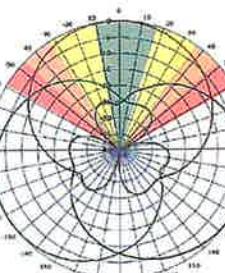


NWAV

Fast Roll-Off antennas increase data throughput without compromising coverage

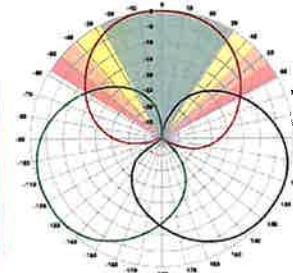
The horizontal beam produced by Fast Roll-Off (FRO) technology Increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors.

Non-FRO antenna



Large traditional antenna pattern overlap creates harmful interference.

JMA FRO antenna



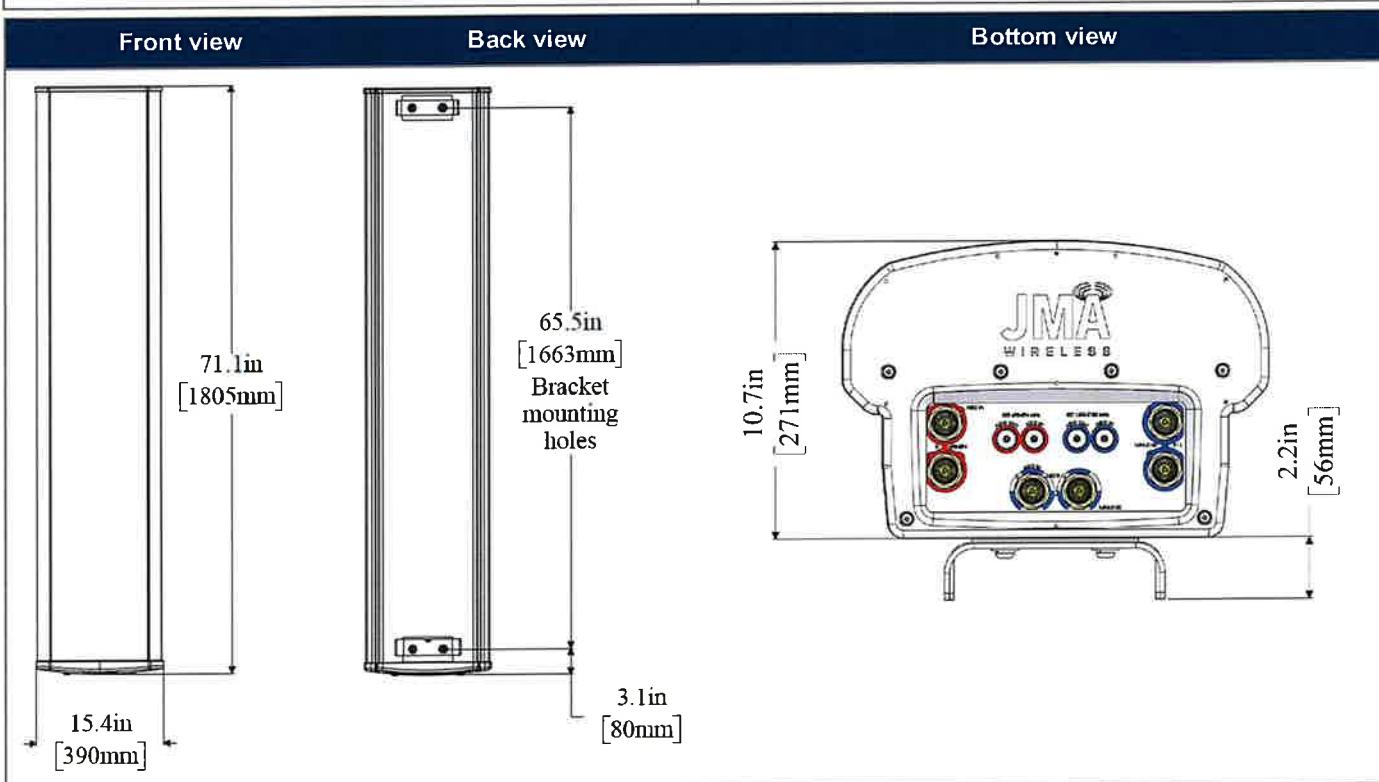
| LTE throughput | SINR | Speed (bps/Hz) | Speed Increase | CQI |
|----------------|-------|----------------|----------------|------|
| Excellent | >18 | >4.5 | 333+% | 8-10 |
| Good | 15-18 | 3.3-4.5 | 277% | 6-7 |
| Fair | 10-15 | 2-3.3 | 180% | 4-6 |
| Poor | <10 | <2 | 0% | 1-3 |

The LTE radio automatically selects the best throughput based on measured SINR.

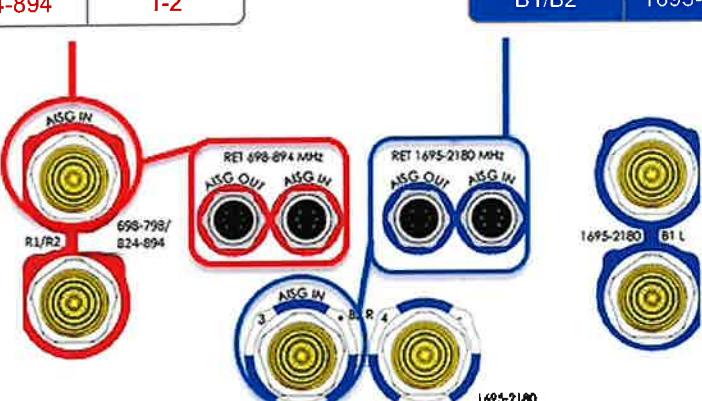
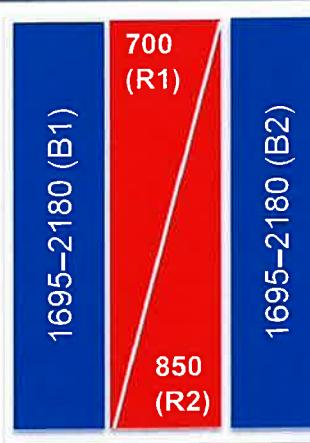
| Electrical specification (minimum/maximum) | Ports 1, 2 | | Ports 3, 4, 5, 6 | | |
|---|---------------|---------|------------------|-----------|-----------|
| Frequency bands, MHz | 698-798 | 824-894 | 1695-1880 | 1850-1990 | 1920-2180 |
| Polarization | ± 45° | | ± 45° | | |
| Average gain over all tilts, dBi | 14.4 | 14.0 | 17.6 | 18.0 | 18.2 |
| Horizontal beamwidth (HBW), degrees | 60.5 | 53.0 | 55.0 | 55.0 | 55.5 |
| Front-to-back ratio, co-polar power @180°± 30°, dB | >24 | >24.0 | >25.0 | >25.0 | >25.0 |
| X-Pol discrimination (CPR) at boresight, dB | >15.0 | >14.2 | >18 | >18 | >15 |
| Sector power ratio, percent | <3.5 | <3.0 | <3.7 | <3.8 | <3.6 |
| Vertical beamwidth (VBW), degrees ¹ | 13.1 | 11.8 | 6.0 | 5.5 | 5.5 |
| Electrical downtilt (EDT) range, degrees | 2-14 | 2-14 | 0-9 | | |
| First upper side lobe (USLS) suppression, dB ¹ | ≤-15.0 | ≤-16.5 | ≤-16.0 | ≤-16.0 | ≤-16.0 |
| Cross-polar isolation, port-to-port, dB ¹ | 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 | | | | |

¹ Typical value over frequency and tilt

| Mechanical specifications | |
|--|---------------------------------------|
| Dimensions height/width/depth, inches (mm) | 71.3 / 15.4 / 10.7 (1811 / 392 / 273) |
| 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) | 60 (27.0) |
| Shipping weight, lb (kg) | 90 (41.0) |
| 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 14° |
| Rated wind survival speed, mph (km/h) | 150 (241) |
| Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N) | 154 (685), 73 (325), 158 (703) |
| Equivalent flat plate @ 100 mph and Cd=2, sq ft | 2.6 |



| Ordering information | |
|---|---|
| Antenna model | Description |
| MX06FRO660-03 | |
| 6F X-Pol HEX FRO 60° independent tilt 700/850 RET, 4.3-10 & SBT | |
| Optional accessories | |
| <u>AISG cables</u> | M/F cables for AISG connections |
| <u>PCU-1000 RET controller</u> | Stand-alone controller for RET control and configurations |

| 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) | 2 | | | | | | | | | | | | | | | | |
| 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: | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>RET device</th><th>Band</th><th>RF port</th></tr> </thead> <tbody> <tr> <td>R1</td><td>698-798</td><td>1-2</td></tr> <tr> <td>R2</td><td>824-894</td><td>1-2</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>RET device</th><th>Band</th><th>RF port</th></tr> </thead> <tbody> <tr> <td>B1/B2</td><td>1695-2180</td><td>3-6</td></tr> </tbody> </table>  | | | RET device | Band | RF port | R1 | 698-798 | 1-2 | R2 | 824-894 | 1-2 | RET device | Band | RF port | B1/B2 | 1695-2180 | 3-6 |
| RET device | Band | RF port | | | | | | | | | | | | | | | |
| R1 | 698-798 | 1-2 | | | | | | | | | | | | | | | |
| R2 | 824-894 | 1-2 | | | | | | | | | | | | | | | |
| RET device | Band | RF port | | | | | | | | | | | | | | | |
| B1/B2 | 1695-2180 | 3-6 | | | | | | | | | | | | | | | |
| Array topology | | | | | | | | | | | | | | | | | |
| 3 sets of radiating arrays R1/R2: 698-894 MHz B1: 1695-2180 MHz B2: 1695-2180 MHz | <table border="1"> <thead> <tr> <th>Band</th><th>RF port</th></tr> </thead> <tbody> <tr> <td>1695-2180</td><td>3-4</td></tr> <tr> <td>698-894</td><td>1-2</td></tr> <tr> <td>1695-2180</td><td>5-6</td></tr> </tbody> </table> | Band | RF port | 1695-2180 | 3-4 | 698-894 | 1-2 | 1695-2180 | 5-6 |  | | | | | | | |
| Band | RF port | | | | | | | | | | | | | | | | |
| 1695-2180 | 3-4 | | | | | | | | | | | | | | | | |
| 698-894 | 1-2 | | | | | | | | | | | | | | | | |
| 1695-2180 | 5-6 | | | | | | | | | | | | | | | | |

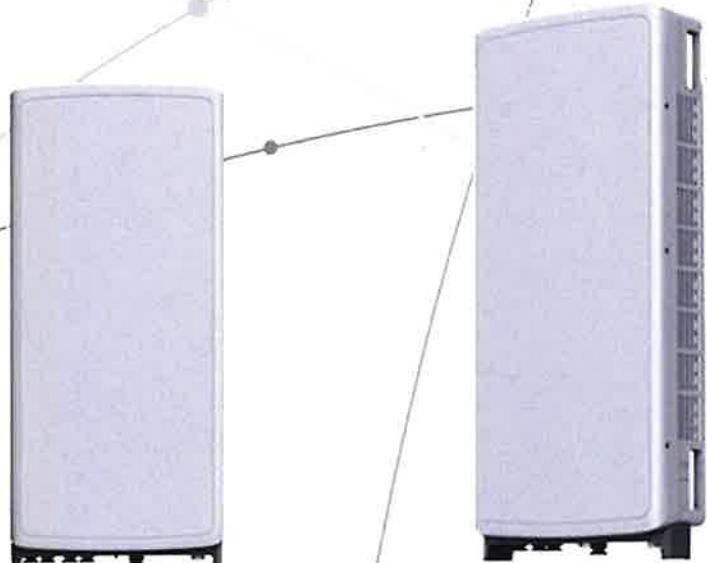
SAMSUNG

SAMSUNG C-Band 64T64R Massive MIMO Radio

for High Capacity and Wide Coverage

Samsung C-Band 64T64R Massive MIMO Radio enables mobile operators to increase coverage range, boost data speeds and ultimately offer enriched 5G experiences to users in the U.S..

Model Code: MT6407-77A

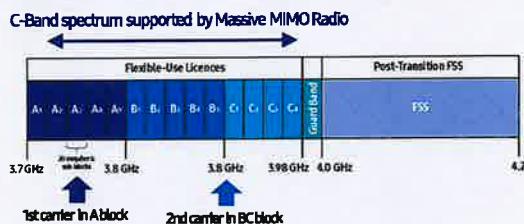


Points of Differentiation

Wide Bandwidth

With capability to support up to 2 CC carrier configuration, Samsung C-Band massive MIMO Radio supports 200 MHz bandwidth in the C-Band spectrum.

Samsung C-Band massive MIMO Radio covers the entire C-Band 280 MHz spectrum, so it can meet the operator's needs in current A block and future B/C blocks



Enhanced Performance

C-Band massive MIMO Radio creates sharp beams and extends networks' coverage on the critical mid-band spectrum using a large number of antenna elements and high output power to boost data speeds.

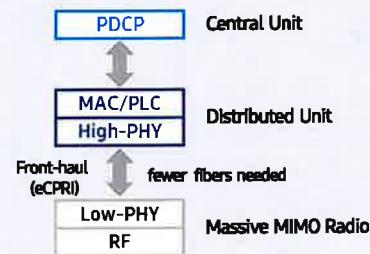
This helps operators reduce their CAPEX as they now need less products to cover the same area than before.

Furthermore, as C-Band massive MIMO Radio supports MU-MIMO(Multi-user MIMO), it enables to increase user throughput by minimizing interference.



Future Proof Product

Samsung C-Band 64T64R Massive MIMO radio supports not only CPRI but also eCPRI as front-haul interface. It enables operators can cut down on OPEX/CAPEX by reducing front-haul bandwidth through low layer split and using ethernet based higher efficient line.



Well Matched Design

Samsung C-Band Massive MIMO radio utilizes 64 antennas, supports up to 280MHz bandwidth, and delivers a 200W output power. despite the above advanced performance, the Radio has a compact size of 50.9L and 79.4lbs. This makes it easy to install the Radio.

It is designed to look solid and compact, with a low profile appearance so that, when installed, harmonizes well with the surrounding environment.



Technical Specifications

| Item | Specification |
|----------------|---|
| Tech | NR |
| Band | n77 |
| Frequency Band | 3700 - 3980 MHz |
| EIRP | 78.5dBm (53.0 dBm+25.5 dBi) |
| IBW/OBW | 280 MHz / 200 MHz |
| Installation | Pole/Wall |
| Size/Weight | 16.06 x 35.06 x 5.51 inch (50.86L)/ 79.4 lbs |

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

129 Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, Korea

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SAMSUNG

Dual-Band Radio Unit AWS/PCS (B66/B2)

RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Key Technical Specifications

Duplex Type: FDD

Operating Frequencies:

B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)

B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)

Instantaneous Bandwidth:

70MHz(B66) + 60MHz(B2)

RF Chain: 4T4R/2T4R/2T2R

Output Power: Total 320W

DU-RU Interface: CPRI (10Gbps)

Dimensions: 380 x 380 x 255mm (36.8L)

Weight: 38.3kg

Input Power: -48V DC

Operating Temp.: -40 - 55°(w/o solar load)

Cooling: Natural convection

SAMSUNG

Dual-Band Radio Unit 700/850MHz (B13/B5) RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.



The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD

Operating Frequencies:

B13: DL(746-756MHz)/UL(777-787MHz)

B5: DL(869-894MHz)/UL(824-849MHz)

Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)

RF Chain: 4T4R/2T4R/2T2R

Output Power: Total 320W

DU-RU Interface: CPRI (10Gbps)

Dimensions: 380 x 380 x 207mm (29.9L)

Weight: 31.9kg

Input Power: -48V DC

Operating Temp.: -40 - 55°(w/o solar load)

Cooling: Natural convection

HYBRID CABLE



HUBER+SUHNER's hybrid cable combine optical fiber and DC power, are highly flexible and easy-to-route. Two rip cords between the shielding and the jacket allows a quick stripping of the jacket. The shielding, a copper foil under the jacket and the drain wire maintain contact throughout the cable run and allow potential equalisation and a safe installation with regard to lightning strikes.

HYBRID CABLE SPECIFICATIONS

| | LSFH(TM) hybrid cable, global market | UL listed hybrid cable, US market |
|-------------------|--|--|
| Jacket material | thermoplastic, low smoke, halogen free (LSFH(TM)) | PVC |
| Standard | IEC 60502-1:2004-04 | UL 1277, TC-OF-ER |
| Temperature range | in service installation -40 to +75 °C -10 to +50 °C | -40 to +75 °C -10 to +50 °C |
| Operating voltage | 48 Vdc | 48 Vdc |
| Rated voltage | 10 × cable Ø 8 × cable Ø | 12 × cable Ø 10 × cable Ø |
| Conductors | 6 mm ² , 10 mm ² 16 mm ² | AWG 10, 8, 6 |
| Drain wire | 6 mm ² , 10 mm ² class 2 | AWG 6 class B |
| Cable shielding | copper foil 100 % coverage (contacted with drain wire) | copper foil 100 % coverage (contacted with drain wire) |



| | | |
|-----------------|--|--|
| Fiber optic | 5 mm loose-tube cable with up to 36 single mode fibers | 5 mm loose-tube cable with up to 36 single mode fibers |
| Halogen free | yes | no |
| Flame retardant | IEC 60332-1-2:2004 | UL 1685 (UL 1581) vertical tray flame test (70 000 BTU/hr) |
| UV resistant | IEC 60068-2-5 | UL1581 |

DO YOU HAVE A QUESTION?



CONTACT US

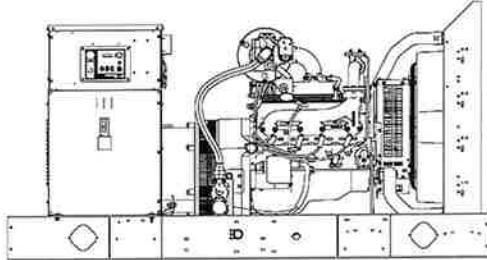


**EPA-Certified for 60 Hz Stationary Emergency Applications**

EPA certification not applicable at 50 Hz

Ratings Range

| Standby: | kW | 60 Hz | | 50 Hz | |
|----------|----|-------|----|-------|----|
| | | kVA | 53 | kVA | 44 |
| | | 53-66 | | 44-55 | |

**Generator Set Ratings**

| Alternator | Voltage | Ph | Hz | Natural Gas 130°C Rise Standby Rating | | LP Gas 130°C Rise Standby Rating | |
|------------|---------|----|----|---|------|--|------|
| | | | | kW/kVA | Amps | kW/kVA | Amps |
| 4PBX | 120/208 | 3 | 60 | 53/66 | 184 | 53/66 | 184 |
| | 127/220 | 3 | 60 | 53/66 | 174 | 53/66 | 174 |
| | 120/240 | 3 | 60 | 53/66 | 159 | 53/66 | 159 |
| | 120/240 | 1 | 60 | 53/53 | 221 | 53/53 | 221 |
| | 139/240 | 3 | 60 | 53/66 | 159 | 53/66 | 159 |
| | 220/380 | 3 | 60 | 53/66 | 101 | 53/66 | 101 |
| | 277/480 | 3 | 60 | 53/66 | 80 | 53/66 | 80 |
| | 347/600 | 3 | 60 | 53/66 | 64 | 53/66 | 64 |
| | 110/190 | 3 | 50 | 44/55 | 168 | 44/55 | 168 |
| | 115/200 | 3 | 50 | 44/55 | 159 | 44/55 | 159 |
| 4P10X | 120/208 | 3 | 50 | 44/55 | 153 | 44/55 | 153 |
| | 110/220 | 3 | 50 | 44/55 | 145 | 44/55 | 145 |
| | 110/220 | 1 | 50 | 44/44 | 200 | 44/44 | 200 |
| | 220/380 | 3 | 50 | 44/55 | 84 | 44/55 | 84 |
| | 230/400 | 3 | 50 | 44/55 | 80 | 44/55 | 80 |
| | 240/415 | 3 | 50 | 44/55 | 77 | 44/55 | 77 |
| | 120/208 | 3 | 60 | 53/66 | 184 | 53/66 | 184 |
| | 127/220 | 3 | 60 | 53/66 | 174 | 53/66 | 174 |
| | 120/240 | 3 | 60 | 53/66 | 159 | 53/66 | 159 |
| | 120/240 | 1 | 60 | 53/53 | 221 | 53/53 | 221 |
| 4Q8X | 139/240 | 3 | 60 | 53/66 | 159 | 53/66 | 159 |
| | 220/380 | 3 | 60 | 53/66 | 101 | 53/66 | 101 |
| | 277/480 | 3 | 60 | 53/66 | 80 | 53/66 | 80 |
| | 347/600 | 3 | 60 | 53/66 | 64 | 53/66 | 64 |
| | 110/190 | 3 | 50 | 44/55 | 168 | 44/55 | 168 |
| 4Q10X | 115/200 | 3 | 50 | 44/55 | 159 | 44/55 | 159 |
| | 120/208 | 3 | 50 | 44/55 | 153 | 44/55 | 153 |
| | 110/220 | 3 | 50 | 44/55 | 145 | 44/55 | 145 |
| 4Q10X | 110/220 | 1 | 50 | 44/44 | 200 | 44/44 | 200 |
| | 220/380 | 3 | 50 | 44/55 | 84 | 44/55 | 84 |
| | 230/400 | 3 | 50 | 44/55 | 80 | 44/55 | 80 |
| 4Q10X | 240/415 | 3 | 50 | 44/55 | 77 | 44/55 | 77 |
| | 120/240 | 1 | 60 | 53/53 | 221 | 53/53 | 221 |
| 4Q10X | 110/220 | 1 | 50 | 44/44 | 200 | 44/44 | 200 |
| | 120/240 | 1 | 60 | 53/53 | 221 | 53/53 | 221 |
| 4Q10X | 110/220 | 1 | 50 | 44/44 | 200 | 44/44 | 200 |

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. 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. For dual fuel engines, use the natural gas ratings for both the primary and secondary fuels.

Alternator Specifications

| Specifications | Alternator |
|--|--|
| Manufacturer | Kohler |
| Type | 4-Pole, Rotating-Field |
| Exciter type | Brushless, Rare-Earth Permanent Magnet |
| Leads: quantity, type | 12, Reconnectable |
| 4P8X, 4P10X | 4, 110-120/220-240 V |
| 4Q8X, 4Q10X | Solid State, Volts/Hz |
| Voltage regulator | NEMA MG1 |
| Insulation: | Class H |
| Material | 130°C, Standby |
| Temperature rise | 1, Sealed |
| Bearing: quantity, type | Flexible Disc |
| Coupling | Full |
| Amortisseur windings | Controller Dependent |
| Voltage regulation, no-load to full-load | |
| One-step load acceptance | 100% of Rating |
| Unbalanced load capability | 100% of Rated Standby Current |
| Peak motor starting kVA: | (35% dip for voltages below) |
| 480 V, 400 V 4P8X (12 lead) | 255 (60 Hz), 215 (50 Hz) |
| 480 V, 400 V 4P10X (12 lead) | 275 (60 Hz), 220 (50 Hz) |
| 240 V, 220 V 4Q8X (4 lead) | 120 (60 Hz), 96 (50 Hz) |
| 240 V, 220 V 4Q10X (4 lead) | 144 (60 Hz), 121 (50 Hz) |

- 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.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.

Application Data

Engine

| Engine Specifications | 60 Hz | 50 Hz |
|--|-----------------------------|-----------|
| Manufacturer | Kohler | |
| Engine: model, type | KG6208 6.2 L | |
| Cylinder arrangement | V-8 | |
| Displacement, L (cu. in.) | 6.2 (378) | |
| Bore and stroke, mm (in.) | 101.6 x 95.25 (4.00 x 3.75) | |
| Compression ratio | 10.5:1 | |
| Rated rpm | 1800 | 1500 |
| Max. power at rated rpm, kW (HP) | 77.0 (103) | 64.3 (86) |
| Cylinder head material | Cast Aluminum | |
| Piston type and material | High Silicon Aluminum | |
| Crankshaft material | Cast Iron | |
| Valve (exhaust) material | Forged Steel | |
| Governor type | Electronic | |
| Frequency regulation, no-load to full-load | Isochronous | |
| Frequency regulation, steady state | ±1.0% | |
| Frequency | Fixed | |
| Air cleaner type, all models | Dry | |

Exhaust

| Exhaust System | 60 Hz | 50 Hz |
|---|-------------|-----------|
| Exhaust manifold type | Dry | |
| Exhaust flow at rated kW, m ³ /min. (cfm) | 11.7 (414) | 9.8 (345) |
| Exhaust temperature at rated kW, dry exhaust, °C (°F) | 677 (1250) | |
| Maximum allowable back pressure, kPa (in. Hg) | 10.2 (3.0) | |
| Exhaust outlet size at engine hookup, mm (in.) | 76 (3.0) OD | |

Engine Electrical

| Engine Electrical System | 60 Hz | 50 Hz |
|--|-------------------------|-------|
| Ignition system | Electronic, Distributor | |
| Ignition system | Electronic | |
| Battery charging alternator: | | |
| Ground (negative/positive) | Negative | |
| Volts (DC) | 12 | |
| Ampere rating | 130 | |
| Starter motor rated voltage (DC) | 12 | |
| Battery, recommended cold cranking amps (CCA): | | |
| Qty., rating for -18°C (0°F) | 1, 630 | |
| Battery voltage (DC) | 12 | |

Fuel

| Fuel System | 60 Hz | 50 Hz |
|---|-----------------------------------|-------|
| Fuel type | Natural Gas, LP Gas, or Dual Fuel | |
| Fuel supply line inlet | 1 NPTF | |
| Natural gas fuel supply pressure, kPa (in. H ₂ O) | 1.24-2.74 (5-11) | |
| LPG vapor withdrawal fuel supply pressure, kPa (in. H ₂ O) | 1.24-2.74 (5-11) | |
| Dual fuel engine, LPG vapor withdrawal fuel supply pressure, kPa (in. H ₂ O) | 1.24 (5) | |

| Fuel Composition Limits * | Nat. Gas | LP Gas |
|---|------------|-------------|
| Methane, % by volume | 90 min. | — |
| Ethane, % by volume | 4.0 max. | — |
| Propane, % by volume | 1.0 max. | 85 min. |
| Propene, % by volume | 0.1 max. | 5.0 max. |
| C ₄ and higher, % by volume | 0.3 max. | 2.5 max. |
| Sulfur, ppm mass | | 25 max. |
| Lower heating value, MJ/m ³ (Btu/ft ³), min. | 33.2 (890) | 84.2 (2260) |

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Lubrication

| Lubricating System | 60 Hz | 50 Hz |
|--|---------------|-------|
| Type | Full Pressure | |
| Oil pan capacity, L (qt.) [§] | 5.7 (6.0) | |
| Oil pan capacity with filter, L (qt.) [§] | 7.1 (7.5) | |
| Oil filter: quantity, type [§] | 1, Cartridge | |
| § Kohler recommends the use of Kohler Genuine oil and filters. | | |

Cooling

| Radiator System | 60 Hz | 50 Hz |
|--|-------------|-------------|
| Ambient temperature, °C (°F) * | 50 (122) | |
| Engine jacket water capacity, L (gal.) | 7.3 (1.93) | |
| Radiator system capacity, including engine, L (gal.) | 20.8 (5.5) | |
| Engine jacket water flow, Lpm (gpm) | 129 (34.1) | 108 (28.5) |
| Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.) | 61.7 (3510) | 53.3 (3030) |
| Water pump type | Centrifugal | |
| Fan diameter, including blades, mm (in.) | 533 (21) | |
| Fan, kWm (HP) | 2.2 (2.9) | 1.3 (1.7) |
| Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H ₂ O) | 0.125 (0.5) | |
| * Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F). | | |

Operation Requirements

| Air Requirements | 60 Hz | 50 Hz |
|---|-------------|-------------|
| Radiator-cooled cooling air, m ³ /min. (scfm) [†] | 136 (4800) | 113 (4000) |
| Combustion air, m ³ /min. (cfm) | 4.6 (163) | 3.9 (136) |
| Heat rejected to ambient air: | | |
| Engine, kW (Btu/min.) | 30.9 (1760) | 26.5 (1510) |
| Alternator, kW (Btu/min.) | 7.7 (440) | 6.9 (390) |
| † Air density = 1.20 kg/m ³ (0.075 lbm/ft ³) | | |

| Fuel Consumption [‡] | 60 Hz | 50 Hz |
|--|------------|-----------------|
| Natural Gas, m ³ /hr. (cfh) at % load | | Standby Ratings |
| 100% | 24.9 (879) | 20.4 (721) |
| 75% | 19.7 (696) | 14.8 (524) |
| 50% | 13.9 (490) | 9.8 (345) |
| 25% | 7.9 (277) | 5.8 (204) |
| LP Gas, m ³ /hr. (cfh) at % load | | Standby Ratings |
| 100% | 9.5 (337) | 8.5 (300) |
| 75% | 7.6 (267) | 5.7 (199) |
| 50% | 5.1 (178) | 4.2 (146) |
| 25% | 3.2 (113) | 2.7 (96) |

[‡] Nominal fuel rating: Natural gas, 37 MJ/m³ (1000 Btu/ft.³)
LP vapor, 93 MJ/m³ (2500 Btu/ft.³)

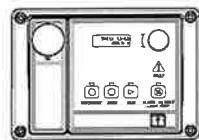
LP vapor conversion factors:

8.58 ft.³ = 1 lb.

0.535 m³ = 1 kg.

36.39 ft.³ = 1 gal.

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.

Dual Fuel Model Features

- Natural gas is the primary fuel. Automatically transfers back to primary fuel when LPG fuel becomes low or generator stops and restarts.
- The patented reset box on the generator provides the ability to manually transfer back to natural gas.



Dual Fuel Reset Box

Standard Features

- Alternator Protection
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, electronic secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Available Options

Approvals and Listings

- CSA Approval
- IBC Seismic Certification
- UL 2200 Listing
- Hurricane Rated Enclosure

Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)

Open Unit

- Exhaust Silencer, Critical (kit: PA-352663)
- Flexible Exhaust Connector, Stainless Steel

Fuel System

- Dual Fuel NG/LPG (automatic changeover)
- Flexible Fuel Line
(required when the generator set skid is spring mounted)
- Fuel Filter Kit

Controller

- Common Fault Relay
- Two Input/Five Output Module
- Remote Annunciator Panel
- Remote Emergency Stop
- Run Relay
- Manual Speed Adjust

Cooling System

- Block Heater, 1500 W, 110-120 V
Required for ambient temperatures below 10°C (50°F)
- Radiator Duct Flange

Electrical System

- Alternator Strip Heater
- Battery
- Battery Charger
- Battery Charger Temperature Compensation
- Battery Heater
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)

Miscellaneous

- Air Cleaner Restrictor Indicator
- Certified Test Report
- Engine Fluids (oil and coolant) Added
- Rated Power Factor Testing
- Rodent Guards
- Open Unit Accessory Kit
(stone guards, radiator duct flange, flexible exhaust)

Literature

- General Maintenance
- NFPA 110
- Overhaul
- Production

Warranty

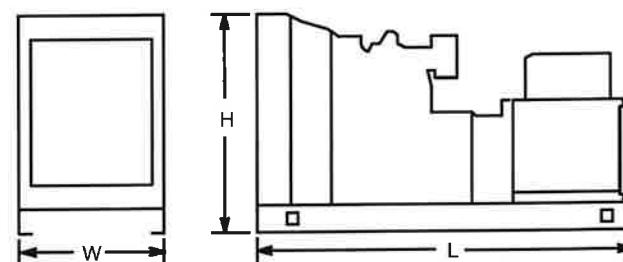
- 2-Year Basic Limited Warranty
- 5-Year Basic Limited Warranty
- 5-Year Comprehensive Limited Warranty

Other Options

-
-
-
-
-
-

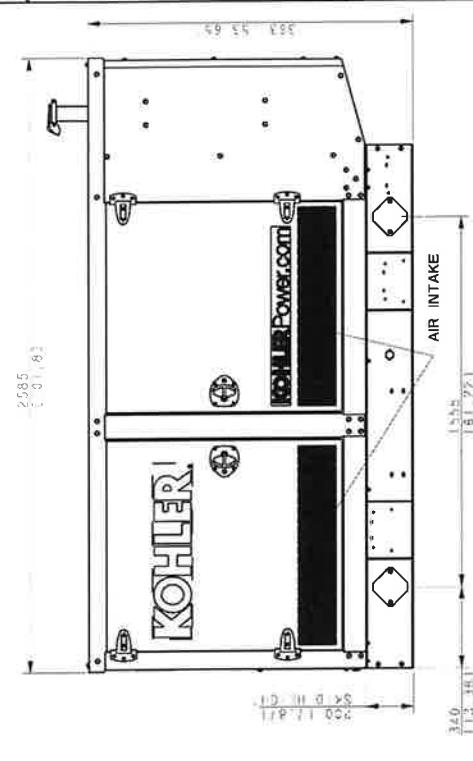
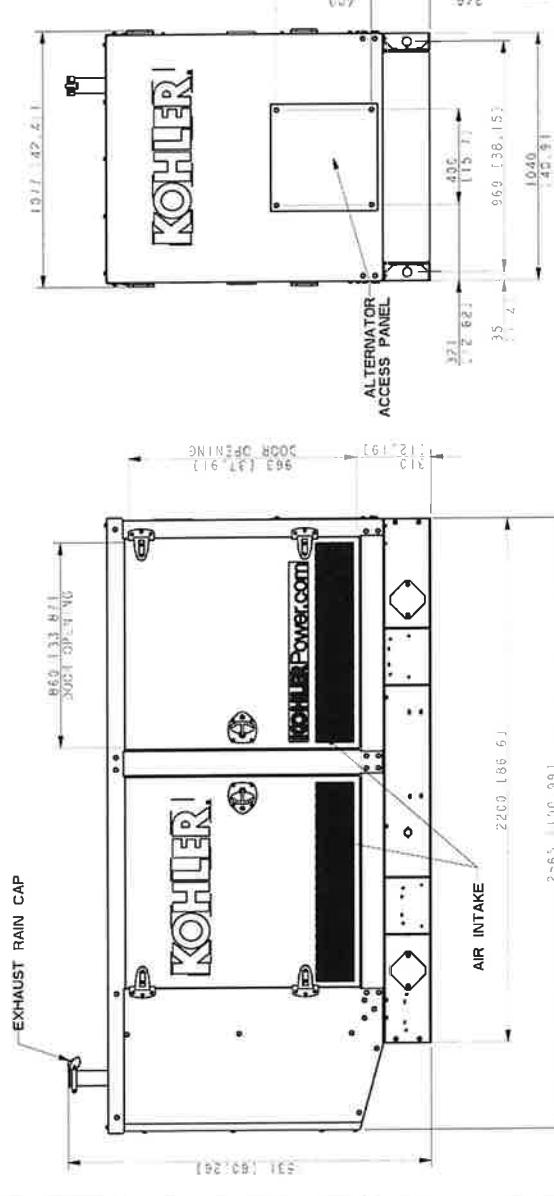
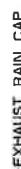
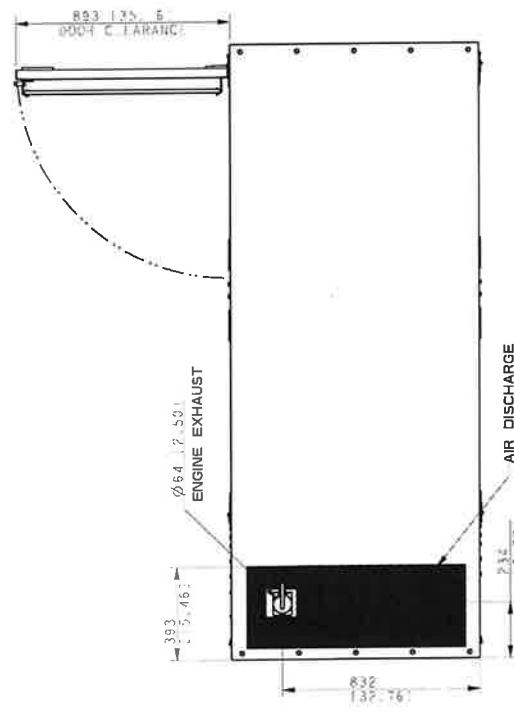
Dimensions and Weights

Overall Size, L x W x H, mm (in.):
 Wide Skid 2200 x 1040 x 1170 (86.6 x 40.9 x 46.1)
 Narrow Skid 2200 x 864 x 1170 (86.6 x 34.0 x 46.1)
 Weight (radiator model), wet, kg (lb.): 862 (1900)



DISTRIBUTED BY:

| MODEL | GENSET WEIGHT (WET) WITH ENCLOSURE | ENCLOSURE ONLY |
|-----------------|--|----------------------|
| 40kW 4PX/405X | STEEL WEATHER 1010 kg ALUM. SUM. SOUND 922 kg | 2226 LBS 1054 LBS |
| 40kW 4PBX/407BX | STEEL WEATHER 1046 kg ALUM. SUM. SOUND 930 kg | 2307 LBS 1053 LBS |
| 45kW 4PBX/407BX | STEEL SOUND 1051 kg ALUM. SUM. SOUND 935 kg | 2338 LBS 1053 LBS |
| 45kW 4PBX/407BX | STEEL SOUND 1051 kg ALUM. SUM. SOUND 935 kg | 2338 LBS 1053 LBS |
| 50kW 4PBX/408BX | STEEL SOUND 1067 kg ALUM. SUM. SOUND 975 kg | 2332 LBS 1053 LBS |
| 50kW 4PBX/408BX | STEEL SOUND 1067 kg ALUM. SUM. SOUND 975 kg | 2332 LBS 1053 LBS |
| 45kW 4DIOX | STEEL WEATHER 1010 kg ALUM. SUM. SOUND 922 kg | 2226 LBS 1054 LBS |
| 50kW 4DIOX/4QDX | STEEL WEATHER 1010 kg ALUM. SUM. SOUND 922 kg | 2226 LBS 1054 LBS |
| 60kW 4DIOX/4QDX | STEEL WEATHER 1046 kg ALUM. SUM. SOUND 930 kg | 2307 LBS 1053 LBS |



NOTE: IBC CERTIFICATION IS REQUIRED, SEE SEISMIC
CONSTRUCTION INSTRUCTIONS

DIMENSION PRINT, 40-60 KW

ADV.9039