BOLLARD™ IG320 Series

20' High Cube ISO Container Specifications

**Features and Benefits**

**Unsurpassed Quality & Reliability**
- BOLLARD™ Industrial Generators are engineered and built in the USA specifically for the harshest environments on earth. Every nut and bolt has been built to withstand any type of weather and all the hard work and punishment you can throw at it.

**Custom 20’ ISO Container**
- Recessed entrance and steel plate wall allows for maximum functionality while maintaining required dimensions and increasing strength. Custom air intake and exhaust louvers for optimal airflow efficiency. Can be painted to match any specifications.

**Tier 4 Emissions Certification**
- The John Deere engine used for the MG320 (320kW) Gen-set is Interim Tier 4 EPA certified and will be available for the foreseeable future.

**Heavy Duty Generator with PMG Attachment**
- Heavy duty generator with polybutadiene overcoating for increased cycles and performance in marine environments. Permanent magnet generator for increased performance, cleaner power, and improved motor starting.

**Controls, Gauges & Instrumentation**
- Customizable with a wide variety of sender & control options as well as custom in house fabrication. Packages can be tailor made to fit any application.

**Heavy Duty Steel Base frame with Modular Unistrut™ Support Frame**
- Built to withstand forces much larger than common applications. Includes a shock load retaining system that protects the engine mounts prevents the generator from tearing loose during excessive G forces or container tipping. Modular Unistrut™ support frame allows accessories to be attached without being mounted to the container walls that will flex during transit. Also allows for easy upgrading.

**Critical Grade Exhaust Silencer & Stainless Steel Piping**
- Heavy-duty critical grade series silencer designed for heavy duty stationary, marine systems and mobile power units. Provides a high degree of silencing where the ambient noise level is very low and a high quality silencer is required.

**30 to 40 Gang Reefer Power Outlets**
- 30 to 40 high traffic, quick release connections mounted internally for added weather protection. The custom 20’ ISO container includes a bull-nosed fairlead with aviation brushes to protect cables from chafing and minimize moisture intake during operation.

**SCOR™ Oil Regeneration System with Automatic Oil Makeup System**
- Keeps your oil cleaner and performing better than when it came out of the bottle. With SCOR™, engines constantly run on clean oil with good chemical balance and run longer between oil changes. A standard 1000 hour oil change interval can be extended to 2000 hours and beyond without sacrificing oil quality.

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**General Specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engine Model</strong></td>
<td>John Deere 6135</td>
</tr>
<tr>
<td><strong>Engine Type</strong></td>
<td>In-Line</td>
</tr>
<tr>
<td><strong>Displacement</strong> - L (cu.in)**</td>
<td>13.5 (824)</td>
</tr>
<tr>
<td><strong>Bore x Stroke</strong> - mm (in)**</td>
<td>132 (5.20) x 165 (6.5)</td>
</tr>
<tr>
<td><strong>Cooling System</strong></td>
<td>Radiator (Epoxy Coating)</td>
</tr>
<tr>
<td><strong>Aspiration</strong></td>
<td>Turbocharged</td>
</tr>
<tr>
<td><strong>Oil Sump Capacity</strong> - qts (L)**</td>
<td>19.02 (18)</td>
</tr>
<tr>
<td><strong>Fuel Tank Capacity</strong> - gall (L)**</td>
<td>1000 (3785.41)</td>
</tr>
<tr>
<td><strong>Fuel Performance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Prime - 60Hz, 1800RPM (HP)</strong></td>
<td>320 kW (429.13)</td>
</tr>
<tr>
<td><strong>Standby - 60Hz, 1800RPM (HP)</strong></td>
<td>352 kW (472.04)</td>
</tr>
<tr>
<td><strong>Alternator</strong></td>
<td>24v</td>
</tr>
<tr>
<td><strong>Operating Angle</strong></td>
<td>20° (Constant)</td>
</tr>
<tr>
<td><strong>Container Type</strong></td>
<td>20' High Cube ISO</td>
</tr>
<tr>
<td><strong>Dry Weight</strong> - lbs (approximate)**</td>
<td>22,000 (Complete package)</td>
</tr>
<tr>
<td><strong>Length x Width x Height</strong> - inches (mm)**</td>
<td>238.5(6058) x 96(2438) x 114(2896)</td>
</tr>
</tbody>
</table>

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**Fuel Performance**

![Fuel Performance Graph](image-url)
Features and Benefits - Expanded

**IG320-RA1 Radiator Cooled 3 Phase 240V Industrial Gen-set**
- Utilizes John Deere’s 13.5 liter engine, rated at 320kW Prime and 350kW Standby. Electronically controlled, turbocharged, and Air-to-Air aftercooled, this heavy duty engine is able to produce high torque for demanding loads while remaining EPA Interim Tier 4 compliant.

- Utilizes Marathon’s Mariner Series oversized generator with a polybutadiene overcoating for increased cycles and improved performance. This heavy duty generator is custom built specifically to withstand the harsh salt laden marine environment.

- Provides ample power for up to 40 refrigeration vans, about the maximum number which can be placed in close enough proximity to be plugged into the generator. Any generator bigger than 320kW will most likely waste fuel.

**Permanent Magnet Generator (PMG)**
- We use a separate permanent magnet and winding to generate excitation voltage for the generator electromagnets. This increases generator output, provides cleaner power, and improves motor starting by 15%.

**Heavy Duty Generator Diode Package**
- A major source of generator failure is due to sudden increases in load demand, such as that associated with motor starting. This essentially “shocks” the generator voltage regulator and can eventually lead to failure. Oversizing the diodes protects the regulator and diodes from breaking down over time.

**Controls, Gauges & Instrumentation**
- Emergency shutdown, high water temp, low oil pressure, low coolant level, low oil level, overspeed and overload of generator current, Hz and voltage.

**LED Micro Processor AC Control Module (with C.T.’s)**
- Advanced, multi-function control and monitoring with a digital display of engine & generator operating parameters

*Pedestal Mount - Electronic Engine Control Panel*
- Complete engine controls with a convenient location and rugged mounting

**24V Electronics with Remote Start/Stop and 100Amp Alternator**

**24V Marine Batteries with Enclosures and Wiring**

**Battery Disconnect Switch**

**Panel Harness and Diesel Particulate Filter Extension Harness**

**Crankcase Ventilation Filter**
- Filters contaminants and recirculates engine blow-by back into the system. Allows for ZERO crankcase emissions

**Deere Spec Air Intake System**
- Includes intake silencer for reduced noise

**Deere Spec Radiator Cooling System**

**Special Epoxy Coating on Radiator Core**
- For added protection for the high moisture, marine environment

**Center Mounted Dipstick on Right Hand Side**
- Convenient location for ease of service

**Automatic Diesel Particulate Filter (DPF) Regeneration**
- Removes soot from the exhaust gas of the engine and automatically regenerates itself.

**Sea Change Oil Regeneration System (SCOR)**
- Removes solid particulates down to below 1 micron and removes moisture and gaseous contaminants
- Significantly extends intervals between overhauls, oil and filter changes.
- Reduces engine oil costs by up to 90%, significantly reduces oil related maintenance costs
- Maintains base additives and viscosity, improving performance and longevity
- Keeps engine running on clean oil; extending engine life
- Easy to install and easy to maintain.

**RACOR™ 30 Micron Pre Fuel Filter with Water Separator**
- Removes solid particulates down to 30 microns and separates moisture improving fuel performance and extending engine life

**Primary and Secondary Fuel Filter with Water Sensor and Electric Lift Pump**
- 10 micron primary, 2 micron final filtration ensures max injection system protection

**Manuals and Documentation**
- Operators, maintenance, parts, and service manuals included
**Custom 20' High Cube ISO Ocean Container**
- Custom built container to meet extensive and specific customer requirements and strengthened to withstand harsh working environments.
- Removal of front wall, replaced with laser cut 1/4” Steel plate and framed in 3x3x.5” steel angle, recessed for strength and versatility while maintaining required ISO dimensions. Includes cavities for louvers, fairlead and entry door.
- Heavy duty entry door with SS handrail, door latch and hinges with zerk fittings. For high usage, safety, and resistance to corrosive environments.
- Back doors cut for exhaust louver installation.
- Forklift pockets installed on side for easy transportation and mobility.

**Paint and Decoration**
- Industrial grade premium primer & enamel, providing excellent corrosion resistance and visibility in the container. Available in any color per customer/company specification.

**Cable Management**
- Stainless steel fairlead with nylon brush cover for environment protection and stainless steel cable runners from breaker to towers. Supports up to 40 large cables.

**1100 Gallon Fuel Tank Installed on Floor**
- Inner baffles for strength and built in support for generator weight.
- Built in fuel gauge, fuel fill and clean out port, extended vents for safety and mobility.
- Built in support rails and lock downs for generator base frame and ease of installation or removal.
- Non skid material in high traffic areas for safety and cleanliness.

**Heavy Duty Steel Base Frame with Anti-Vibration Mounts**
- Custom designed to handle much higher load than common applications.

**Shock Load Retaining System for Gen-set Mounts**
- Container “humping” in the yard subjects equipment to considerable strain. We’ve found in similar rail yard applications, engine isolation mounts cannot withstand the excessive G forces they are subjected too. Our motion limiting system prevents this excessive loading, keeping the generator from tearing loose and extending the life of the mounts. They are robust enough that if the container was knocked upside down, the engine would remain bolted in place.

**Heavy Duty LED Lighting with Automatic Timer Shut Off**
- Heavy duty, high efficiency LED lighting for 24 hour operation and service capability. This is of extra importance when the human eye is rapidly transitioning from a bright outdoor yard, to the inside of a metal container. It reduces fatigue and lag time, as well as helping operators more quickly spot any tripping or slipping hazards that may be present. It also makes it much easier to identify coolant and engine oil leaks early on.

**Main Electrical Circuit Breaker**
- Installed for short circuit and overload protection. We position the main breaker panel so that an operator cannot stand directly in front of it when flipping the switch. This is an important electrical safety precaution often overlooked.

**30 to 40 Gang Reefer Power Outlets**
- High traffic, quick release connections mounted internally for added weather protection.

**Wiring and Connectors**
- Includes connectors & wiring for gen-set to towers and load bank adaptor lugs for ease of maintenance.

**Modular Unistrut™ Attachments and Accessory Connections**
- For cable management, ease of service and upgradability.

**Custom Air Intake and Exhaust Louvers**
- For ensuring proper air flow, efficiency, weather protection, and emissions. Our intake and exhaust louvers are powdercoated extruded aluminum. Using the extrusion process allows a profile that does a much better job of keeping salt water out of the enclosure while still providing enough airflow. We also fit the louvers with bird screens and washable filter elements to help dry salt laden sea air before it enters the equipment space.

**Automatic Lube Oil Regulator and Reservoir**
- Often placed on unmanned refrigeration barges, it’s vital generator operation isn’t interrupted because of engine alarm shutdowns. A generator failure on a long haul can cause expensive losses of goods. The oil make up system monitors engine oil level when personnel cannot, keeping it at a constant level and preventing engine automatic shutdowns while underway.

**10# Marine Fire Extinguisher with Mounted With Stainless Hardware in Recessed Exterior Location**
- For protection in key location with stainless mounting hardware for corrosive resistance.

**Exhaust System**
- 6” SuperFlex™ 5 ply 321 Stainless Steel Exhaust Bellows - To absorb heat expansion and protect equipment.
- Critical Grade end out/side in exhaust silencer - For reduced noise.
- Schedule 10 SS tube hangers and NASA grade exhaust thimble
- Installation of exhaust blanketing for bellows, piping and silencer.
- Includes stainless exhaust thimble to exterior.

**Extras**
- Labor: engineering, layout, fabrication, assembly, bench test and calibration.
Dimensions - In [mm]

Dimensions or pictures may show non-standard equipment
Dimensions may be subject to change without notice and with the use of alternate containers or generators.
Please confirm exact configuration if dimensions are critical.

<table>
<thead>
<tr>
<th>Load Performance</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td>Load in kW</td>
<td>80</td>
<td>160</td>
<td>240</td>
<td>320</td>
</tr>
<tr>
<td>Pounds Per Hour</td>
<td>50.26</td>
<td>81.08</td>
<td>114.16</td>
<td>148.74</td>
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<tr>
<td>Gallons Per Hour</td>
<td>7.080</td>
<td>11.42</td>
<td>16.08</td>
<td>20.95</td>
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<tr>
<td>kW Per Gallons Per Hour</td>
<td>11.29</td>
<td>14.01</td>
<td>14.92</td>
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<tr>
<td>Pounds Per Gallon</td>
<td>7.1</td>
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<td>7.1</td>
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<tr>
<td>Continuous kW Output</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
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<tr>
<td>Horsepower At Load</td>
<td>107.25</td>
<td>214.5</td>
<td>321.75</td>
<td>429</td>
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<tr>
<td>Horsepower Continuous</td>
<td>429</td>
<td>429</td>
<td>429</td>
<td>429</td>
</tr>
<tr>
<td>Pounds Per Horsepower Hour</td>
<td>.469</td>
<td>.378</td>
<td>.355</td>
<td>.347</td>
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</tbody>
</table>

Summary

Built for Business
We build our products tough, efficient, and reliable. We collaborated with port engineers and maintenance personnel to design our containerized generator packages for their cargo yards. Our expertise in marine generator construction was coupled with their hands on experience of how the equipment is used and abused. We're proud of the product, and we understand each client and job requires unique solutions. We work with our clients to build them a tough, efficient and reliable solution that is tailored to their specific needs and goals.

At the end of the day our equipment is used as part of business operations to make money: not spend it fixing equipment or losing it on unfulfilled contracts. We're confident our equipment gives customers the highest possible chance of achieving their goals. We can't say our equipment never breaks because by their very nature engines consume themselves and sometimes we make mistakes. But we own up to them and service what we sell. We don't build anything we wouldn't put on our own vessels and we work hard to build them worthy of yours.