# NORTHERN LIGHTS

# M1066 Series

**Reliability. Durability. Simplicity.**

The M1066 Series marine generator sets are powered by new, US EPA Tier II compliant, Lugger diesel engines. Each generator incorporates new features that add high power density to the Northern Lights reputation for cast-iron reliability, durability, and simplicity.

**An important decision.**

Whether you are building a new yacht or repowering, your future enjoyment depends on the generator set you choose today. It will run day and night, so smooth, quiet operation, long engine life, and fuel consumption are major considerations. With so much depending on your new set, it pays to choose one that is built up to a high standard of quality; not down to a low price. It pays to choose Northern Lights.

**The heritage continues.**

Four decades of marine experience stands behind every Northern Lights. Yachtsmen like you have made them standard equipment on yachts from the world's premier builders. Service is handled by our international dealer network and our factory branches.

**Selection without compromise.**

Underloaded and overloaded generators cause problems and waste money. With five models from 80 kW to185 kW, there is an M1066, 60 Hz or 50 Hz set that is just the right size for your vessel.

**Multiple set power teams.**

Northern Lights broad range, 5 kW to 520 kW, lets you combine multiple sets aboard your vessel. Use two M1066s to simplify maintenance and parts supplies. A smaller unit can be a night set. Mix and match sets for the best, single source power solution.

**Silky smooth and whisper quiet.**

Noise and vibration abatement is a top Northern Lights priority. All M1066s have crankshaft vibration dampers. Standard equipment hydrolastic mounts isolate 98% of set vibration from your hull. A cast valve cover absorbs valve clatter and traps crankcase oil vapor for a clean engine room. The cast iron, fresh water cooled exhaust manifold absorbs combustion noise. Choose a Northern Lights super attenuated enclosure with InSep exhaust system to lower sound levels even more.

**99-185 kW**
**60 Hz / 1800 RPM**

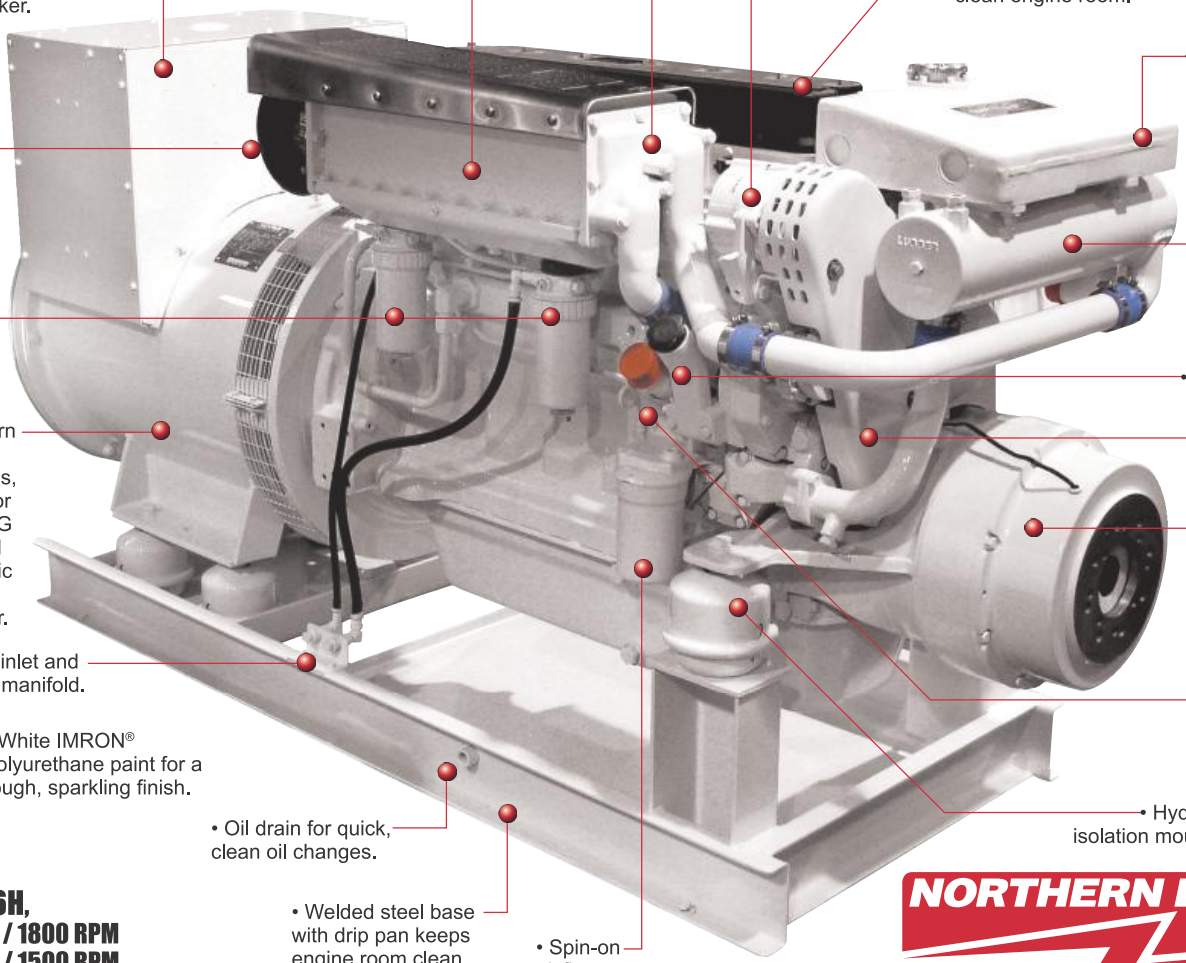
**80-155 kW**
**50 Hz / 1500 RPM**

**Advanced simplicity.**

Simple to operate and maintain. Hoses, gaskets and belts have been minimized. DC control panels keep you in touch with your set's performance while safety shut-downs protect it. Special 500 hour oil changes, oil drains, one side service and owners manuals simplify maintenance.

**Tough Lugger diesels.**

Built for continuous duty, many Lugger powered sets have logged over 30,000 hours without a rebuild. The M1066 has the features to continue this tradition of reliability. Rugged components built from the finest materials.




**M1066H,**
**185 kW / 1800 RPM**
**155 kW / 1500 RPM**
Service side.

# M1066 Series

# Features that will separate your set fro

### Aftercooled For High Power Density

A Northern Lights exclusive. No other set builder has aftercooled this engine! All A and H models have an aftercooler that cools the intake air. Cool air has more oxygen for better combustion. This after-cooler, along with electronically controlled fuel injection, give you more kW output.

### Electronic System Profiler

"ESP" is a window to your set's real time operating condition. The ECU that controls the electronic fuel injection produces a SAE J1939 data stream of engine information that can be shown on an optional Can Buss monitor panel.

### Superior PMG Generator Ends

Northern Lights meet ABS and Lloyd's standards. All have low 95°/50° temperature rise ratings and ±0.5% voltage regulation. All M1066s have Permanent Magnet Generators for 300% short circuit capability required for classed vessels.

### Complete Options List

Each option is designed to integrate into a total power system custom built for your vessel. Consider the high HP electric clutch PTO that can supply touch of a button hydraulics for bow-thrusting, deck winching or sail furling.

### Complete Unit Testing

Northern Lights generator sets are thoroughly factory tested and go through a complete quality control program to ensure your satisfaction with the best built marine generator on the market today.

### Engine Block

- Lugger six cylinder, four cycle, in-line, liquid cooled, overhead valve, marine diesel based on heavy-duty industrial engine block.
- Balanced, forged crankshaft with induction hardend journals and rolled fillets.

### Model Specific Systems & Features

**M1066T, M1066A1, A2, A3:**

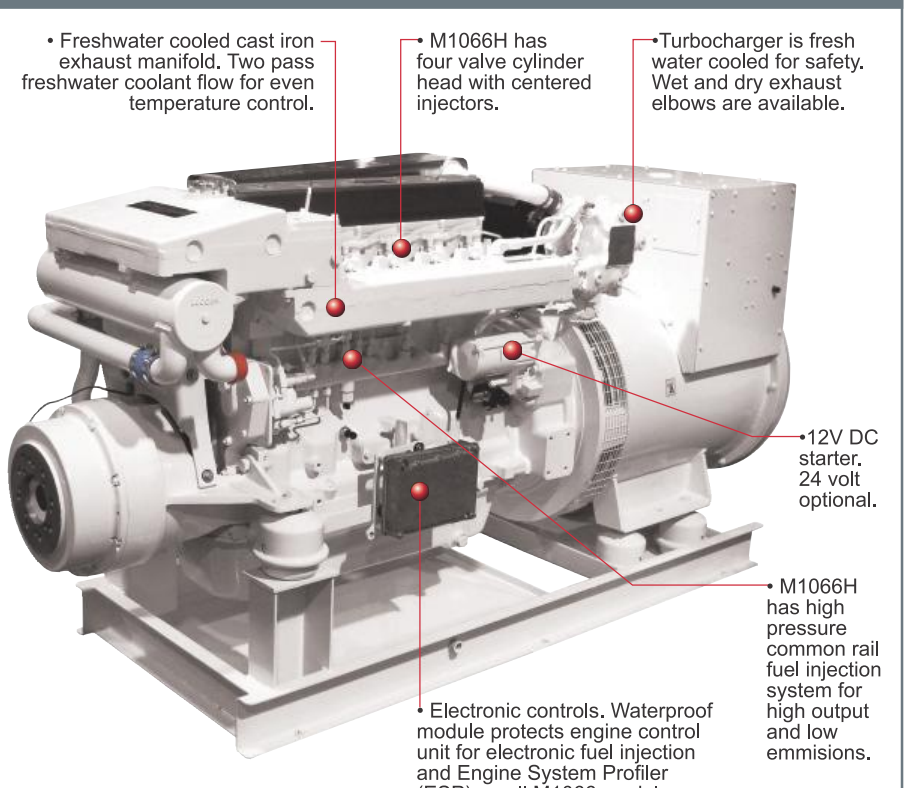
- Electronically controlled rotary fuel injection pump for higher injection pressures, variable timing control and precise fuel metering. Higher power with lower emissions.
- Two valves per cylinder.

**M1066H:**

- High-pressure common rail (HPCR) fuel injection system for high output, improved fuel economy, better load response and low emissions. HPCR continuously supplies injectors with highly pressurized fuel. Higher pressure means better fuel atomization. Injectors are electronically operated by an engine control unit giving nearly infinite control of fuel quantity, injection timing and multiple injection events per power cycle. Pilot injection reduces cold start smoke and noise.
- Four valves per cylinder give increased air flow and allow injectors to be centered in the cylinder for an optimal spray pattern.
- Stainless steel exhaust port liners control heat rejection to head.

- Bimetallic valves have chrome stems & rotators.
- Replaceable valve seats and guides.
- Three ring aluminum alloy pistons with Ni-Resist insert for the top ring. Keystone piston ring reduces carbon buildup under light loads.
- Torsional crankshaft vibration damper for smooth operation.
- 8 groove, poly-vee drive belt powers the DC alternator & freshwater coolant system pump.

### M1066H 185kW to 155 kW - Non Service Side




- Replaceable, wet cylinder liners for long life and low rebuild costs.

### Fuel System

- Direct fuel injection systems (see feature box below)
- Ring clamp fuel filter with air bleed and drain.
- Diaphragm-type, mechanically driven fuel transfer pump with manual priming lever. Electric fuel transfer pump on "A2, A3".
- Flexible fuel lines routed to fuel manifold on base frame for easy installation of vessel's hard piping.

### Lubrication System

- 500 hour oil change interval when fuel and oil requirements are met.(375 hours on M1066H @ 60 Hz)
- Positive displacement gear-type oil pump.
- Full flow, spin-on oil filter.
- Oil spray cooling reduces piston crown temperature for longer life.
- Freshwater, plate-type, full flow oil cooler reduces heat and thermal breakdown of lube oil.
- Large capacity oil pan.
- Cast aluminum rocker arm cover traps valve noise and acts as a closed loop crank-case vent to keep oil vapor in the engine.
- Lube oil drain for quick oil changes.

### Freshwater Cooling System

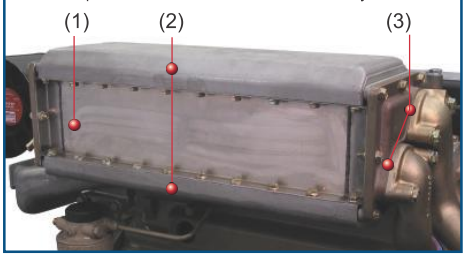
- 2 thermostats for safety and quicker warm-ups.
- Heat exchanger cooling includes:

Gear driven, flexible impeller seawater pump. Easy to clean, tube-type heat exchanger is made of cupro-nickel for long life.

- Cast iron, expansion tank with brass filler neck for easy filling.
- Cast-iron exhaust manifold has double pass freshwater flow for even temperature control, fast warm-up and no hot spots.
- Zinc anode electrolysis protection.
- M1066T available in keel cooled configuration.

### Aftercooler. A Northern Lights Exclusive.

Shown unpainted and without heat shield for clarity.




### Air System-Turbocharger-Aftercooler

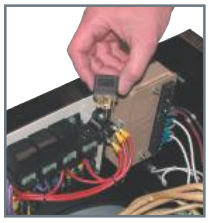
- A1, A2, A3, H models have aftercooler with aircraft quality, 70/30 cupro-nickel, two pass element (1). Oval water tubes are easy to clean and stronger than round tubes. Corrugated air cooling fin design supports tubes better than plate fin type. Seawater piping (3) is cast bronze and stainless steel. Water never touches the cast aluminum air ducts (2). No gaskets; all components are machined and have o-ring seals. Seawater direct from the pump for maximum cooling. Dry bolt holes protect cylinders.

# m the ordinary.

- Turbocharged to increase output. The turbocharger turbine housings are freshwater cooled for safety.
- Dry air filter cleans air and reduces air intake noise.

### DC Electrical System and Electronic System Profiler

- Northern Lights ESP supplies SAE J1939 data stream through a Can Buss plug for optional engine monitor.
- Negative ground, 12 volt DC system has circuit breaker, starter motor and battery charging alternator with regulator.
- Standard, S-3B remote mount control panel with NEMA enclosure has engine hour meter, coolant temperature gauge, oil pressure gauge, DC voltage meter, start-stop switch and shutdown bypass switch.



- Reliable relay based DC system is easy to trouble shoot and repair. Each relay is inexpensive and simply plug-in. No expensive printed circuit board to fail. Relays make multi-panel installation up to 110 ft from set quick & easy.
- Engine and panel are prewired and have terminal strips.
- Low oil pressure and high coolant temperature safety shutdowns.

### AC Generator

- Direct coupled, single bearing, 12 lead, reconnectable AC generator. Maintenance free brushless design.
- Generators meet or exceed ABS standards and include class H insulation, accessible diodes, oversized ball bearings, marine grade shafts and conservative 95°/50° heat rise ratings.
- Engines and generators are torsionally matched for long life.
- Isochronous electronic governor for 0% AC frequency droop.
- Automatic voltage regulator gives fast response to electrical load changes. Voltage is regulated to ±0.5% (one half of one percent) over the entire range from no load to full load.
- All M1066 models have PMG (permanent magnet generator) to power the automatic voltage regulator for 300% short circuit capability needed by classed vessels.

### Special Equipment

- Hydrolastic mounts isolate 98% of set vibration from hull for owner comfort.
- Welded steel base frame with drip pan. Easy to clean.
- Beltguard protects operator.
- Sparkling white, IMRON® poly-urethane paint protects your set. Good service visibility.
- Operator's and parts manuals.

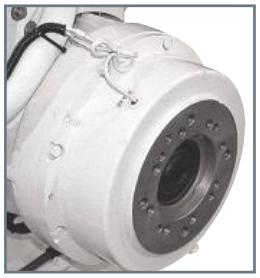
# Options that let you design your power system.

### Design your next generator set.

Here are just some of the options you can choose for customizing your Northern Lights to match your special requirements. These are not slap-dash add-ons. Each is engineered to be part of an integrated power system working in concert to enhance your comfort, safety and ease of vessel operation. Your Northern Lights representative will help your naval architect and boatbuilder specify the ultimate set for your vessel.

### Sound enclosures

Super attenuated enclosures have dual sound-dampening barriers, sound trapping air ducts, and powder coated aluminum frame and panels for corrosion resistance. Easy-to-use trigger latches on panels allow quick access for easy maintenance.



### High HP front power take offs

At the touch of a button, the electric clutch PTO gives you 114 to 190 HP depending on model and RPM. Run hydraulic bow thrusters, deck gear, winches, etc.

### Double wall fuel lines

With catch tank, alarm and leaking line indicator as required by Lloyd's, ABS, DNV, Germanischer Lloyd's and other class societies.

### Shutdowns and prealarms

Shutdowns for all systems are available. Prealarms warn you before a shut down occurs.

### ESP monitoring systems

It's your window to the operational condition of your generator set. You can monitor all major engine functions and diagnostics on a read out screen mounted in a convenient location.

### DC alternators

High capacity battery charging power. 12V 90A and 120A. 24V 75A and 100A. Standard or isolated ground.

### Aluminum base frames

Take a load off your yacht with these lightweight frames. Aluminum boats owners; you can have your set welded in place.

### Paralleling components

Northern Lights can supply governors and other controls for parallel generator installations.

### InSep exhaust systems

Another Northern Lights exclusive. InSep integrates the generator's water lift exhaust muffler and gas/water separator inside the sound enclosure. The only outside connections are the water outlet and cool exhaust gas hose. Noise reduction. Easy installation. Space savings. InSep does it all.

### Sight oil gauge/alarm

Check the oil level in your sump with a quick glance even when the set is running. Alarm warns you when oil level is low.

### Exhaust components

Wet and dry mufflers. Exhaust gas-water seperators. Wet and dry exhaust elbows. Dry exhaust flex.

### Additonal control panels

Choose the amount of control you want! There are five control panels for these models in 12 or 24 volt versions. These handsome panels allow you to monitor and control your generator from one or several onboard locations. Custom control panels are also available.

**S-1** Includes:
Run light, start/stop switch and shutdown bypass/preheat switch.

**S-1B** Includes:
A run-light, engine hour meter, start/stop switch and shutdown bypass/preheat switch.

**S-3B** Includes:
DC volt meter, coolant temperature gauge, oil pressure gauge, engine hourmeter, start/stop switch and shutdown bypass/preheat switch in a NEMA enclosure. Available with autostart.

**S-3C** same features as S3B in a compact flush mount panel.

**S-4** Includes:
AC voltmeter, frequency meter, ammeter with phase selector switch, DC voltmeter, engine hour meter, engine oil pressure gauge, engine coolant temp gauge and control switches. Available with autostart, flush mount or NEMA box

# M1066 Series General Specifications and Dimensions

| AC Output[1] | M1066T | M1066A1 | M1066A2 | M1066A3 | M1066H |
|---|---|---|---|---|---|
| **60 Hz, 1800 RPM[1] kW** | **99 kW** | **130 kW** | **145 kW** | **160 kW** | **185 kW** |
| **50 Hz, 1500 RPM[1] kW** | **80 kW** | **105 kW** | **115 kW** | Contact Factory | **155 kW** |
| Voltage regulation and PMG | All models: ±0.5% (±1/2 of 1 percent) voltage regulation & permanent magnet generator AVR power supply. | | | | |
| Frequency droop control | All models have Isochronous 0% frequency droop control | | | | |
| Phase and power factor | All models: 3 phase-0.8 power factor is standard. Single phase-1.0 (unity) power factor is available. | | | | |
| Generator full load temperature rise | All models: 95°C temperature rise at 50°C ambient | | | | |
| **Lugger Marine Diesel Engine Data** | | | | | |
| Inline cylinders/Aspiration/Operating cycle | I-6/Turbo/4 | I-6/Turbo Aftercooled/4 | I-6/Turbo Aftercooled/4 | I-6/Turbo Aftercooled/4 | I-6/Turbo Aftercooled/4 |
| Displacement - cid (liter) | 414 (6.8) | 414 (6.8) | 414 (6.8) | 414 (6.8) | 414 (6.8) |
| Bore/Stroke - inches (mm) | 4.19/5 (106/127) | 4.19/5 (106/127) | 4.19/5 (106/127) | 4.19/5 (106/127) | 4.19/5 (106/127) |
| HP @ 1800 RPM (1500 RPM)[2] | 150 (114) | 200 (160) | 228 (Contact Factory) | 256 (Contact Factory) | 286 (252) |
| Max. front power take off HP @ 60 Hz (50 Hz) | 149 (114) | 190(158) | 190 (Contact Factory) | 190 (Contact Factory) | 190 (158) |
| Oil capacity with filter - quarts (ltr) | 20 (19) | 34 (32.5) | 34 (32.5) | 34 (32.5) | 34 (32.5) |
| **Engine Cooling System** | | | | | |
| Approx. heat exchanger cooling capacity - gal (ltr) | 6.5 (24.7) | 6.5 (24.7) | 6.5 (24.7) | 6.5 (24.7) | 6.5 (24.7) |
| Min. seawater inlet/discharge through hull dia. - in (mm) | 1.25 (32) | 2 (51) | 2 (51) | 2 (51) | 2 (51) |
| Sea water pump inlet hose ID - in (mm) | 1.25 (32) | 2 (51) | 2 (51) | 2 (51) | 2 (51) |
| Heat rejection to jacket water - BTU min 60Hz/50Hz | Contact Factory | Contact Factory | Contact Factory | Contact Factory | Contact Factory |
| Freshwater pump capacity - 60 Hz - gpm (lpm) | 60(227) | 60(227) | 60(227) | 60(227) | 60(227) |
| Freshwater pump capacity - 50 Hz - gpm (lpm) | 50(189) | 50(189) | Contact Factory | Contact Factory | 50(189) |
| Seawater pump capacity - 60 Hz - gpm (lpm) | 24(91) | 42(159) | 42(159) | 42(159) | 42(159) |
| Seawater pump capacity - 50 Hz - gpm (lpm) | 20(76) | 35(133) | Contact Factory | Contact Factory | 35(133) |
| Max seawater pump suction head - in (m) | 39 (1) | 39 (1) | 39 (1) | 39 (1) | 39 (1) |
| Consult factory for keel and skin cooler data | CF | N/A | N/A | N/A | N/A |
| **DC Electrical System** | | | | | |
| DC starting voltage - standard (optional) | 12 (24) | 12 (24) | 12 (24) | 12 (24) | 12 (24) |
| Min battery capacity - amp hr/12V CCA (24V CCA) | 225/800 (570) | 225/800 (570) | 225/800 (570) | 225/800 (570) | 225/800 (570) |
| Starter rolling amps @0° 12VDC (24VDC) | 920 (600) | 920 (600) | 920 (600) | 920 (600) | 920 (600) |
| 12Volt battery cable size up to 10 ft - 3m | 000 | 000 | 000 | 000 | 000 |
| **Air & Exhaust Systems** | | | | | |
| Generator cooling air flow 1&3 phase - 60 Hz/cfm | 1100 | 1100 | 1100 | 1100 | 1100 |
| Generator cooling air flow 1&3 phase - 50 Hz/cfm | 915 | 915 | Contact Factory | Contact Factory | 915 |
| Air consumption - 60 Hz - cfm ($m^3$/m) | 352 (9.2) | 420 (11.9) | 452 (12.8) | 494 (14) | 523 (14.8) |
| Air consumption - 50 Hz - cfm ($m^3$/m) | 240 (6.8) | 318 (9.0) | Contact Factory | Contact Factory | 427 (12.1) |
| Exhaust gas volume - 60 Hz - cfm ($m^3$/m) | 851 (24.1) | 1081 (30.6) | 1162 (32.9) | 1306 (37) | 1317 (37.3) |
| Exhaust gas volume - 50 Hz - cfm ($m^3$/m) | 600 (17) | 995 (28.2) | Contact Factory | Contact Factory | 1112 (31.5) |
| Exhaust gas temp - 60 Hz - F° (C°) | 984° (529°) | 966° (519°) | 966° (520°) | 991° (533) | 927° (427°) |
| Exhaust gas temp - 50 Hz - F° (C°) | 945° (507°) | 1076° (580°) | Contact Factory | Contact Factory | 975° (524°) |
| Approx heat radiated to air - 60 Hz - BTU/min | 812 | 1060 | 1189 | 1312 | 1458 |
| Approx heat radiated to air - 50 Hz - BTU/min | 656 | 861 | Contact Factory | Contact Factory | 1271 |
| Max exhaust Back Pressure - inch $H^2O$ (mm $H^2O$) | 30 (762) | 30 (762) | 30 (762) | 30 (762) | 30 (762) |
| **Fuel System** | | | | | |
| Fuel injection pump type and control | Rotary Electronic | Electronic | Electronic | Electronic | HPCR Electronic |
| Min suction & return line - in (mm) | 3/8 (9.5) | 3/8 (9.5) | 3/8 (9.5) | 3/8 (9.5) | 3/8 (9.5) |
| Max fuel transfer pump suction lift - in (mm) | 36 (914) | 36 (914) | 36 (914) | 36 (914) | 36 (914) |
| Max fuel flow to transfer pump - gph 60 Hz (50 Hz) | 23.5 (22.7) | 25.6 (24.7) | 49.6 (Contact Factory) | 49.6 (Contact Factory) | 22.3 (20.6) |
| Full load fuel returned to tank - gph 60 Hz (50 Hz) | 15.6 (16.4) | 14,5 (15.6) | 38.2 (Contact Factory) | 36.9 (Contact Factory) | 7.4 (8.2) |
| Specific fuel consumption max load - 60 Hz - lbs.hp.hr. | .377 | .359 | .352 | .351 | .371 |
| Specific fuel consumption max load - 50 Hz - lbs.hp.hr. | .355 | .347 | .347 | N/A | .351 |
| Approx. fuel rate at 60 Hz full load - gph (lph)[3] | 7.92 (30) | 11.12 (42) | 11.33 (42.9) | 12.66 (47.9) | 14.94 (56.5) |
| Approx. fuel rate at 50 Hz full load - gph (lph)[3] | 6.35 (24) | 9.19 (37.5) | Contact Factory | Contact Factory | 12.45 (47.1) |
| **Max Engine Operating Angle** | | | | | |
| Continuous, All Models (with separate expansion tank) | Front Down: 0-5°, ( 0-10°). Rear Down: 0-12°. Left or Right Down: 0-5°, (0-23°) | | | | |
| Intermittent - 2 minutes, All Models | Front or Rear Down: 0-30°. Left or Right Down: 0-30° | | | | |
| **Dimensions and Weight (see note 4)** | | | | | |
| Set length - inch (mm)[4] | 86 (2184) | 87.2 (2215) | 87.2 (2215) | 87.2 (2215) | 87.2 (2215) |
| Set width - inch (mm)[4] | 30 (762) | 32 (812) | 32 (812) | 32 (812) | 32 (812) |
| Set height - inch (mm)[4] | 40.16 (1020) | 45.1 (1146) | 45.1 (1146) | 45.1 (1146) | 45.1 (1145) |
| Approx. set dry weight HE cooling 3 phase - lbs[4] | 2791 (1266) | 3378 (1533) | 3468 (1340) | 3646 (1643) | 3613 (1639) |
| Approx set dry weight HE cooling 1 phase - lbs[4] | 2791 (1266) | 3378 (1533) | 3378 (1532) | 60 Hz-3742 / 50Hz-N/A | 60 Hz-4324 / 50Hz-4454 |
| Sound enclosure length - inch (mm)[4] | 89.87 (2282.8) | 90.87 (2308.2) | 90.87 (2308.2) | 90.87 (2308.2) | 90.87 (2308.2) |
| Sound enclosure width - inch (mm)[4] | 40.25 (1022.4) | 46 (1168.4) | 46 (1168.4) | 46 (1168.4) | 46 (1168.4) |
| Sound enclosure height - inch (mm)[4] | 43.49 (1104.7) | 50.5 (1283) | 50.5 (1283) | 50.5 (1283) | 50.5 (1283) |
| Sound enclosure weight - lbs (kg)[4] | 725 (329) | 798 (582) | 798 (582) | 798 (582) | 798 (582) |

**NOTES:**
1. Prime kW ratings for 3Ø at 0.8 power factor. Consult factory for deration factors.
2. Net flywheel hp rating for fully equipped engine at rated speed under SAE J816b.
3. Based on prime kW rating at 1800 and 1500 RPM. Fuel rate may vary depending on operating conditions.
4. Contact factory = consult factory representative or www.northern-lights.com for current information.
4. Data for units with hydrolastic mounts, heat exchanger cooling and 3 phase generator ends. Dimensions and weight are affected by optional equipment, AC output, phase, exhaust and cooling configuration. Standard, non-InSep enclosures.
5. Dimensions are subject to change without notice, they are not intended for installations. Contact a factory representative for the current installation data.