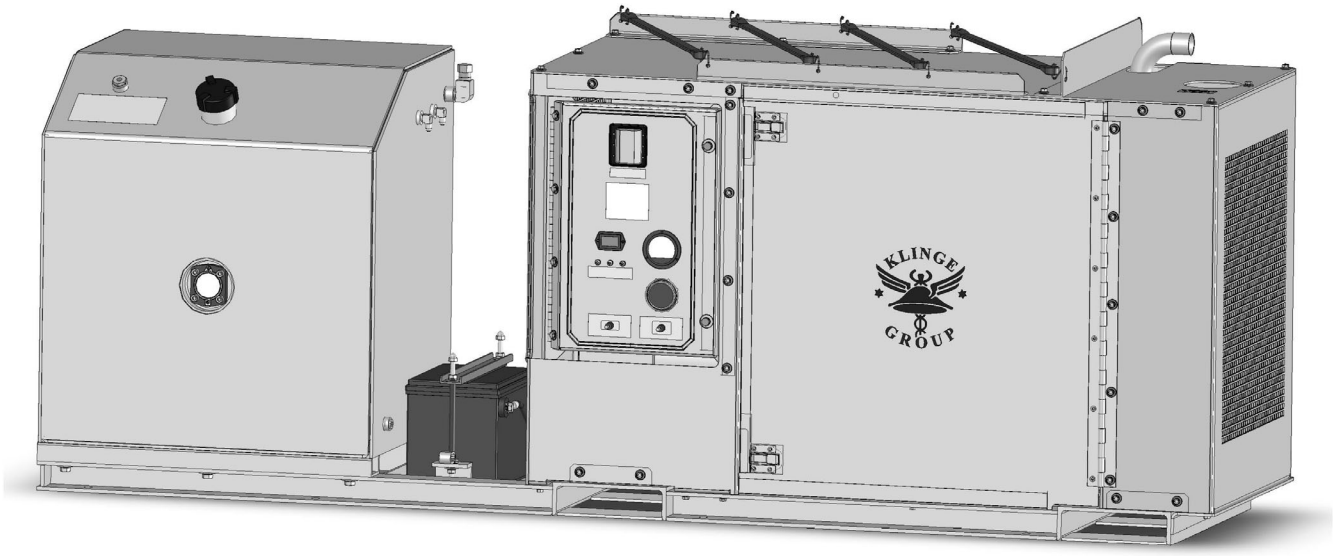
MODEL NMG-112-07



OPERATION, MAINTENANCE, AND SPARE PARTS MANUAL

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MANUFACTURED BY KLINGE CORPORATION

REVISION RECORD

Rev	Description	Date	Approved
A	Numerous changes to content and format	2016/07/01	BES
B	Revised PTI Form section pg 6	2019/01/28	BES
C	General updates including electrical schematic and parts sections	2023/1/31	BES

Contents

Service Request
Requests for Service should be directed to the Klinge Service Team. The below link should be used to place all requests for service and will afford the quickest response time.

https://klingecorp.com/request-service/

This form will help us determine model and age of the equipment, location, basic details about the issue, who to contact and how to best handle the issues with the equipment. A service ticket number will be provided in a response email once the form is received and processed. If the equipment is out of warranty, charges may apply for extensive technical support.

Additionally, our Service Department can be reached via email at technical@klingecorp.com.

Spare Parts Request
Requests for Spare Parts should be directed to our Parts Department via email at spares@klingecorp.com. Please have available at the time of the request the Serial Number of the equipment to ensure that the proper part is provided.

Use of this Manual
The use of this manual is intended for the safe operation of the equipment described. It is therefore reasoned that persons who have the occasion to use this manual have a knowledge of mechanical and electrical systems and components addressed by its' contents. However, efforts have been made to enable persons less familiar with these systems to use this manual.

The equipment may be installed in a number of configurations. Each may have optional items and differing external details provided by third parties. The specific electrical diagram is posted on the unit as decals.

Suggestions as to improvement in content and format are welcome and should be addressed to engineering@klingecorp.com. Corrections and improvements will be included on dated revisions – the latest of which will be available upon request.

PRE-TRIP INSPECTION FORM

It is important that a Pre-Trip Inspection (PTI) be completed prior to each shipment.

The NMG-112 PTI form can be found on Klinge's website at: http://www.klingecorp.com/pti/

SECTION ONE SPECIFICATIONS

GENERAL

The **NMG-112-07** (Nose Mount Generator Set) was specifically designed to meet the rigorous demands of ocean, over-the-road, and rail transport of 20' and 40' refrigerated containers and tank containers. The NMG-112 can be mounted quickly in the nose of a recessed container, using only four bolts in the front and two clips in the back that are included in the installation kit.

CONSTRUCTION

- Welded aluminum frame
- Aluminum doors and closures
- Stainless steel hardware

ENGINE

YANMAR DIESEL 3TNV70--HGE, 4 stroke, 3 cylinder vertical in line, overhead valves, water cooled, indirect injected with spherical swirl chambers

- Bore / Stroke: 2.76 inches (70 mm) / 2.91 inches (74 mm)
- Displacement: 52.11 inch^3 (854 cm^3)
- Engine rotation: Counter-clockwise (viewed from rear)
- Compression ratio: 23.4: 1
- Power output: 16.1 kW @ 3600 rpm intermittent; 14.5 kW @ 3600 rpm continuous
- Injection pump: YANMAR in line with constant speed mechanical governor control
- Firing order: 1 – 3 – 2 – 1
- Lubrication: Multi stage trochoid pump; 4 US quarts (3.8 liter) oil pan capacity
- Specific fuel consumption: ≤300 g/kWh
- Cooling system: Radiator force-feed circulation. Five-blade pusher fan.
- Starting system: 12V electric motor assisted by super-quick heating glow plugs

MAIN POWER ALTERNATOR

MECC ALTE ECO3-3SN/2 - three phases, 2 Pole, brushless, single bearing, IP 23 protection, electronic regulated, class H insulation, ΔT = 257° F (125° C)
12 kW / 15 kVA; cosφ 0.8; 3 X 480 / 277 V; 60 Hz (3600 RPM); 18.8 / 32.6 A

TEMPERATURE OPERATING RANGE

- -40^o F to 104^o F (-40^o C to 40^o C)

DIMENSIONS AND WEIGHT

- Length: 82.75” (2102mm); Height: 29.31” (744mm); Depth: 18.50” (470mm)
- 712 lb. (323 kg) without fuel
- 970 lb. (440 kg) with full fuel tank

MOUNTING
- Front: four ½" bolts
- Back: one mounting clip or four ½" bolts

FUEL SYSTEM
- The fuel system is self-bleeding and self priming.
- Fuel tank: 38 US gallons (144 L) capacity for approximately 50 hrs of normal operation
- Primary fuel filter: 10 micron, large capacity with incorporated water separator and 200 Watt 12 V heater to prevent wax building in cold weather. The fuel heater is controlled by Thermostat and starts automatically to operate at 45 °F (7 °C) and stops at 75 °F (24 °C) as long the electrical control system is "ON".
- Secondary fuel filter with transparent bowl and fuel cock, mounted on the engine.
- Electrical 12 V DC fuel lift pump mounted on the engine.

POWER SUPPLY
- 12kVA; 480 V AC / 3 phase / 60 Hz (Standard) or 277 V AC / 3 phase / 60 Hz (Optional)
- 25 A power circuit breaker
- CEE 17, - 32 A power receptacle
  Note: The generator set can be operated also at 3000 rpm / 50 Hz. with an output of 10kVA; 400 V AC / 3 phase (Standard) or 230 V AC / 3 phase (Optional).

CONTROLS
- Two toggle switches, ON-OFF and START-PEHEAT
- Low oil pressure switch 1 Pole P > 7 PSI (0.5 kg/cm^2) OPEN
- High coolant temperature switch 1 Pole < 221°F (105°C) OPEN
- Electronic TIMER Emergency Stop Unit and LED indicators for cause of shut down
- Engine oil pressure and coolant temperature gauges
- Hour-meter
- Ammeter for battery charging control
- AC Voltmeter for power output control with green band between 420 and 500 V
- 25 A circuit breaker for the DC 12 V system

BATTERY STARTING SYSTEM
- Battery: 12 V / 630 CCA @ 0°F (-17.8°C) / side posts
- Battery charging alternator: 12 V, 40 A
- Starter motor: 12 V / 0.8 kW

COMBUSTION AIR CLEANING SYSTEM
One high performance two stage Radial Seal® air filter with extended life dry cartridge, built in tangential pre-cleaner and automatic dust and water expelling Vacuator™ valve.
The filter is easy to be serviced (no tools needed), lightweight and corrosion free.
For operation in heavy dust conditions an incorporated safety filter is available at request.

LUBRICATION SYSTEM

- Forced lubrication by trochoid pump
- Oil filtering system with replaceable filter cartridge

COOLING SYSTEM

- Pressurized liquid (50/50 water / glycol) forced circulation by centrifugal pump
- Cooling capacity 81,300 btu/hr (20,500 kcal/h)
- Cooling fan ∅ 12.2 inch (310 mm), plastic, 5 blades, pusher type
- Thermostat
- High temperature switch, normal open, closes at 221°F (105°C)

FUEL

Use Diesel fuel SAE No. 2-D, No. 1-D in cold weather, or any other equivalent low Sulphur content diesel fuel as European Union EN 590:96; United Kingdom BS 2869-A1 or A2; International ISO 8217 DMX; Japan JIS K2204 Grade No.2; China GB252; Korea KSM-2610; NATO Code F-54.

General:

- The fuel cetane number should be equal to 45 or higher.
- The sulphur content must not exceed 0.5%. Less than 0.05% is preferred.
- Fuel additives are not recommended since they may cause poor engine performance.
- Water and sediment in the fuel should not exceed 0.05% by volume.

NOTE: The generator set can also be operated on the following alternative kerosene based fuels: JP-5; JP-8; NATO F-34 and JET-A.

When the Diesel engine is operated with kerosene based fuel a 10 to 15% horsepower loss is to be expected and a pre-mature wear of the injection components will occur since these fuels have lower lubrication properties.
The durability of the non-fuel components is not affected.

NOTE: Never mix Diesel fuel with Kerosene based fuels.
Do not use: JP-4; Jet-B and NATO 40 fuels.

ENGINE OIL

Use engine oil that meets or exceeds the following guidelines or specifications:

API (American petroleum Institute) Service categories CD or higher
ACEA (Association des Constructeurs Européens d'Automobiles) Services Categories E-3; E-4 and E-6
JASO (Japanese Automobile Standards Organization) Service categories DH-1

Select the appropriate engine oil viscosity based on the ambient operation temperature.
Based on the SAE service grade viscosity classification it is best to use an oil with a SAE 15W-40 viscosity that covers a temperature range from –15 ºC (5 ºF) to +40 ºC (104 ºF).
For higher or lower operation temperatures select an oil with appropriate viscosity using a SAE service grade viscosity chart.

SECTION TWO SAFETY PRECAUTIONS

SAFETY DO'S AND DON'TS

DON'T

DON'T allow inexperienced personnel to work on the generator or electrical equipment.

DON'T remove guards or protective devices.

DON'T wear loose clothing or jewelry in the vicinity of moving parts. These can get in machinery, with disastrous results.

DON'T wear jewelry while working on electrical equipment. If your hair is long, wear a head covering. Hair caught in a drill press, fan belt or other moving part can cause serious injury.

DON'T stand on a wet floor while working on electrical equipment. Use rubber insulated mats placed on dry wood platforms.

DON'T lunge after a dropped tool. To do so may place you in a position of extreme danger.

DON'T commence any operation until you have taken all the necessary steps to ensure that you are in complete safety.

DO

DO perform your tasks carefully, without undue haste.

DO provide fire extinguishers (rated ABC).

DO provide a First Aid Kit (for burns and abrasions). Obtain medical attention, if necessary.

DO use the correct tools for the job you are doing.

DO make sure that all fasteners are secure.

DO use extreme care while making adjustments on the generator set while it is running.

DO keep your hands away from moving parts.

DO disconnect batteries before starting work on the generator set.

DO use screwdrivers, pliers, diagonal pliers, etc. with insulated handles.

DO remember to keep one hand in your pocket if it is necessary to work on "**live**" circuits. That will prevent passage of electricity into one hand and out the other, which passes current across the heart.

DO PRACTICE SAFETY. THE LIFE YOU SAVE MIGHT BE YOUR OWN

ROTATING HAZARDS

1. Keep your hands, clothing, and tools clear of the alternator belt when the generator set is running.
2. If it is necessary to run the generator with the end cover removed, be very careful with tools or meters being used in that area to avoid contacting the rotor.

BATTERY HAZARDS

Few people realize just how dangerous a battery can be.

The electrolyte in a lead acid battery is dilute sulfuric acid (H_2SO_4). During charge or discharge functions of a battery, a chemical change takes place within the individual cells that cause the bubbling we see through the filler hole. This gas bubbling is hydrogen and oxygen, and it is **EXPLOSIVE**. If during this gassing action, a means of ignition is present, an explosion could occur. A defective battery may suddenly explode even while standing idle. Added to this danger, consider a fall-out of highly corrosive sulfuric acid caused by the explosion. A rubber blanket or other cover can be used to reduce the risk from possible explosion.

PRECAUTIONS

1. Always wear eye protection when servicing batteries. If electrolyte is splashed on the skin or in the eyes, flush immediately under running water. Obtain medical help as soon as possible.

2. When charging batteries, do not remove the vent caps.

3. When disconnecting or reconnecting the generator-set battery makes sure the ON/OFF switch is in the **OFF** position to prevent an arc, which could cause the battery to explode. Disconnect the ground cable first, preferably at a point away from the battery. Reconnect the ground cable last, again away from the battery if possible.

4. **DO NOT** check a battery by "**sparking**" across the posts. Eye injury from the arc or explosion may occur.

ELECTRICAL HAZARDS

HIGH VOLTAGE

When servicing or repairing a generator set, the possibility of serious or even fatal injury from electrical shock exists.
Extreme care must be used when working with an operating generator.
Lethal voltage (480V) exists on connections within the generator compartment and the control box.

PRECAUTIONS

1. When working on high voltage circuits on the generator sets, **DO NOT** make any rapid moves. If a tool drops, **DO NOT** grab for it. People do not contact high voltage wires on purpose. It occurs from an unplanned movement.

2. Make sure of your footing. If you slip, you will instinctively grab for support. This can be lethal around a generator set. Work on rubber mats or dry wood if possible.

3. Use tools with insulated handles that are in good condition. Never hold metal tools in your hand if exposed energized conductors are within reach.

4. Treat all wires and connections as high voltage until a meter and wiring diagram show otherwise.

5. Keep one hand in your pocket if you are working on a live circuit. This will prevent passage of electricity.

IMMEDIATE ACTION MUST BE INITIATED AFTER A PERSON HAS RECEIVED AN ELECTRICAL SHOCK!

Obtain expert medical assistance if available.
The source of shock must be immediately removed by either shutting down the generator power or removing the victim from the source. If it is not possible to shut off the generator set, the wire should be cut with an insulated tool (e.g. a wooden handled axe or cable cutters with heavy insulated handles), or a rescuer wearing insulated gloves. Whichever method is used, **DO NOT** look at the wire while it is being cut. The ensuing flash can cause blindness.
Remember that **INSULATED GLOVES MUST BE INSULATED** and not just rubber gloves manufactured for protection from liquids. If the victim has to be removed from live circuitry, pull him off with a non-conductible material. Use his coat, a rope, wood or loop your belt around his leg or arm and pull him off.
DO NOT TOUCH THE VICTIM, you could receive a shock from current flowing through his body. After separating the victim from the power source, check immediately for respiration and presence of pulse**. If a pulse is present, respiration might be restored by mouth-to-mouth resuscitation.**

LOW VOLTAGE

Control circuits utilized by the generator set are low voltage (12 volts D.C.). This voltage potential is not considered dangerous, but the large amount of current available (over 300 amps) can cause severe burns if shorted to ground.

1. Disconnect the negative terminal of the battery if possible when working on the generator set. Disconnect the cable end that is away from the battery.

2. **DO NOT** wear jewelry, watches, or rings. These items can short out and cause severe burns to the wearer.

GENERAL SAFETY PRECAUTIONS

1. Use extreme caution if holes are drilled into the generator set.
   Holes drilled into an electrical wire can cause fire, explosion, or shock hazard.

2. Be sure all mounting screws are tight and are the correct length.

3. Keep tools and equipment clean and in good working condition.
   Accidents occur when you attempt procedures without the proper tools.

4. Do not work on a generator set in a confined area.
   Diesel exhaust can become very dangerous.

SECTION THREE GENERATOR SET OPERATION

PRE-START INSPECTION

- Check fuel level – Use diesel fuel as indicated in Section One - FUEL
  Make sure that the fuel cap is tight and the area around it is clean.
- Check engine oil level – should be at full mark
  Use SAE Multi-grade Oil as indicated in Section One – ENGINE OIL.
  Do not overfill. Overfilling may result in white exhaust smoke, engine over speed or internal damage.
  Never mix different types of engine oil. This may adversely affect the lubricating properties of the engine oil
- Check coolant level – should be between the two marks on the overflow bottle.
  Use a 50/50 % ethylene or propylene glycol / water mixture.
  Never use water only.
- Check fan belt for tension and integrity.
- Check circuit breaker. Make sure that the generator's main circuit breaker located in the electrical control box door is in "OFF" position (down).

STARTING THE UNIT

1. If engine is cold push the "START – PREHEAT" toggle to the left in "PREHEAT" and hold for 5 to 7 seconds. Ammeter should show DISCHARGE.
2. Push "ON – OFF" switch to "ON" position.
   The green LED "SYSTEM ON" and the red LED "LOW OIL PRESSURE" will come on and the electrical fuel pump will start to operate.
3. Push the "START - PREHEAT" toggle to the right in "START" position in order to crank the engine. Release the switch as soon as the engine has started.
   If engine fails to start after 15 seconds of cranking, reset the system by turning the "ON – OFF" switch to "OFF".
   Repeat steps #2 and 3, and if needed in cold weather also step #1.
   Keep an interval of 15 – 20 seconds between two successive cranking.

NOTE: If for any reason the engine is not started within eight seconds after the "ON – OFF" switch was put in "ON" the timer located in the control box will shut the system down.
The green LED "SYSTEM ON" will go off and the red LED "LOW OIL PRESSURE" will stay "ON" until the system is reset.

AFTER START CHECK-UP

- AC Voltmeter needle should be in the green band indicating ≅ 480 V in now load condition
- Ammeter should indicate charging
- Hour-meter indicator should be rotating
- Engine oil pressure gauge should indicate 30 PSI or higher

ENGINE PPROTECTION CONTROLS

There are several safety devices employed to prevent damage to the engine, or the electrical system, should a potentially dangerous situation occur.

The 25 A circuit breaker protects DC components and wiring from a short circuit situation. The breaker will reset periodically until the short circuit is removed.
WHEN A DC CIRCUIT BREAKER IS REPLACED IT MUST BE INSTALLED PROPERLY WITH THE "BAT" TERMINAL CONNECTED TO THE LINE OR BATTERY SIDE OF THE CIRCUIT AND THE "AUX" TERMINAL CONNECTED TO THE LOAD SIDE OF THE CIRCUIT AS INDICATED ON THE BREAKER

Two safety shutdown devices are used to protect the engine:
High temperature switch that actuates at 221ºF (105ºC)
Oil pressure switch that actuates at 7 psi (0.5 kg/cm^2)

TIMER – EMERGENCY STOP UNIT

The TIMER Emergency Stop Unit provides safety monitoring of the engine.
The TIMER is completely encapsulated into a mounting case and it is able to withstand a wide ambient temperature range, from -4°F (-20°C) to +140°F (+60°C), as the shock and weather conditions encountered in transport applications.
The TIMER automatically shuts down the engine in case of High Coolant Temperature and/or Low Oil Pressure. The TIMER also shuts down the electrical control system if:

- The engine runs out of fuel or stops for any other reason
- The engine is not started within eight seconds after the "ON–OFF" switch is put in "ON"

This prevents battery drain if the "ON-OFF" switch is accidentally pushed in "ON" position.

LED INDICATORS

The electrical control system is provided with three, high intensity colored (one green and two red) LEDs located on the front of the control box.

- Green LED: "SYSTEM ON"
- Red LED: "LOW OIL PRESSURE"
- Red LED: "HIGH COOLANT TEMPERATURE"

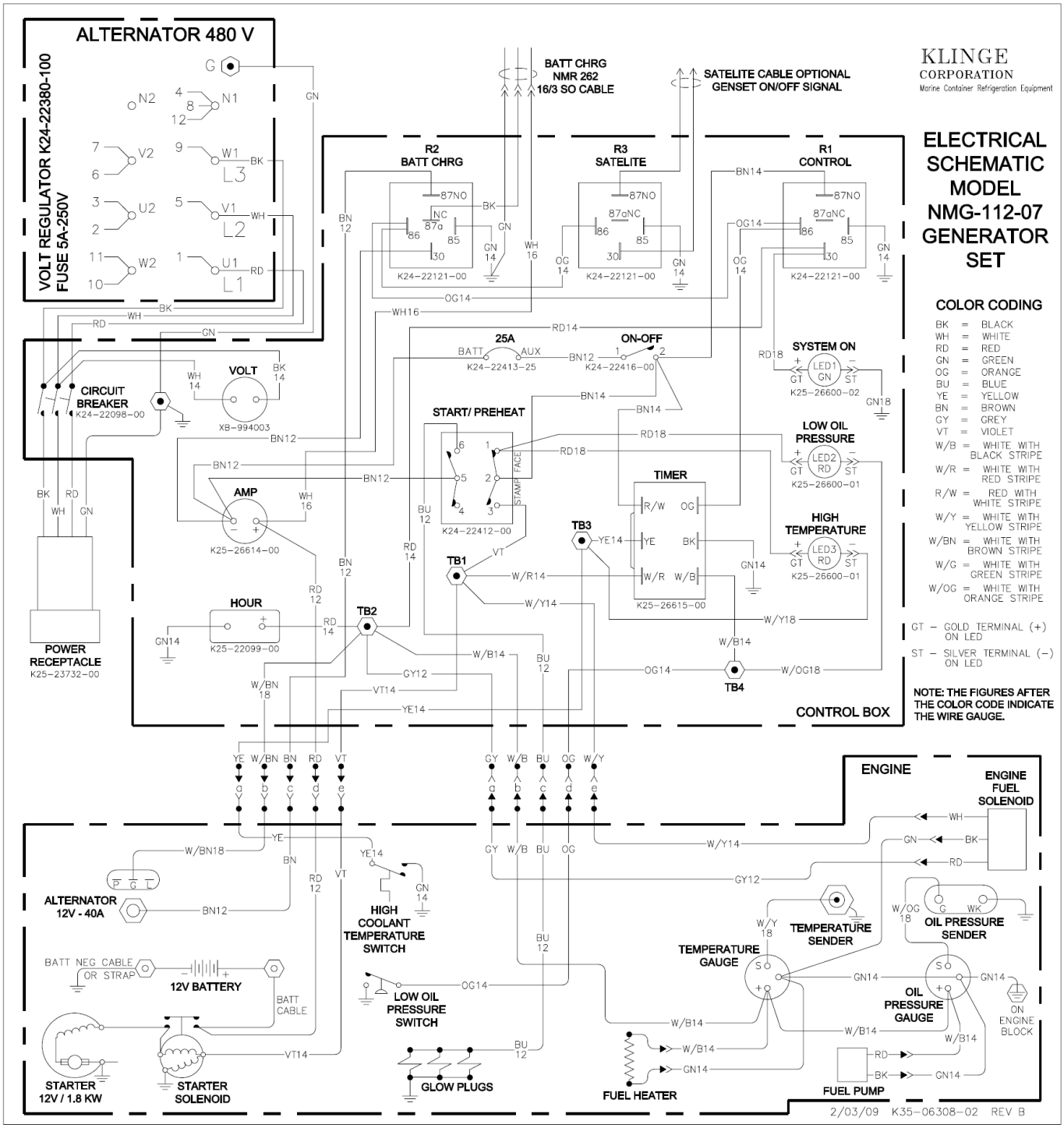
Red LED -LOW OIL PRESSURE- "ON" indicates that the unit is shut down either for low oil pressure, or engine has run out of fuel, or that the ON-OFF switch was accidentally turned ON.
Note: The Red Low Oil Pressure LED will also be "ON" in the time interval between the ON-OFF switch is pushed in ON position and the engine is started. If the engine fails to start the LED will stay ON.
Both red LED – LOW OIL PRESSURE and HIGH COOLANT TEMPERATURE- "ON" indicate that the unit is shut down for high coolant temperature.

ENGINE SPEED (RPM) AND FREQUENCY

The engine must be set to run at 3600 rpm corresponding to a frequency of 60 Hz at FULL LOAD.

NOTES:
1/ AVOID OVER SPEEDING, SEVERE DAMAGE CAN OCCUR.
2/ UNDER NO CONDITION SHOULD THE RPM BE BELOW 3600 RPM (60 Hz).

WIRING DIAGRAM



SECTION FOUR MAINTENANCE AND COMPONENT INFORMATION

FUEL SYSTEM

The fuel injection pump and fuel injection nozzles are precisely manufactured and therefore using fuel which contains water or dust particle will result in equipment seizure, costly damages and decreased engine output.

- Replace primary fuel filter element after every 1000 hrs of operation.

Use **KLINGE K26-25180-02** filter element.

- Replace secondary fuel filter element after every 500 hrs of operation.

Use **KLINGE K26 25150 104** filter element.
Before starting the unit check for leaks and for water in the filter bowl. Drain if necessary.
DO NOT USE:
- Diesel fuel that has been contaminated with engine oil, it can cause engine damage and can also affect the emission control.
- Fuel additives, except "Biocide" ones, if required.

CAUTION: Never mix diesel fuel with kerosene based fuels

COMBUSTION AIR INTAKE SYSTEM

Engine performance and life depends on the intake air condition.

- Replace air filter cartridge after every 500 hrs. of operation.

Use **KLINGE K26 25102 00** filter cartridges.
After 250 hours of operation, or more often if the generator set is operated in a dusty environment, remove the filter cartridge and blow, only from the inside, air at a pressure of 45 – 70 PSI (3 – 5 kg/cm^2) to remove the dust.
Take care to not damage the filter element during the cleaning and to not cause air leakage (sucking) when the air cleaner is reassembled.

Safety filter (optional – for operation in heavy dust conditions)

- Replace safety filter (if so equipped) following the instructions above

For replacement use **KLINGE K26 25100 00** cartridge.

LUBRICATION

A correct oil and filter service will ensure good performances and a long engine life.

- Change oil and filter after initial 50 hrs. of operation. Afterwards change the oil every 250 hrs. and filter every 500 hrs of operation or at least once a year.

Use SAE multi-grade oil as indicated in Section One – Engine Oil.
Use **KLINGE K26 25150 100** filter element.

- Check the oil level before every start, add oil if required up to the FULL mark.

CAUTION: Never mix up different brands or different type of oils.

COOLING SYSTEM

- Use 50/50 Ethylene Glycol / Water solution. Never exceed 60 / 40 antifreeze water mix.

NOTE: Concentrations over 65% may cause water pump leakage.

- Drain, flush and replace coolant every two years or every 1000 hrs. of operation, whichever comes first.
- Check the hoses and pump for leaks and the coolant level.

With a cool engine the liquid level should be between the two marks on the expansion tank.

FAN BELT
Check the fan belt for tension and integrity before every starting.
Replace if necessary using **KLINGE K26 25150 101** belt.

VALVE CLEARANCE ADJUSTMENT
It is recommended to adjust the valve clearance every 1000 operating hours, or whenever the valve rocker is abnormally noisy or in an engine malfunction though the fuel system is properly working.
With a cold engine the valve clearance, both intake and exhaust should be adjusted to 0.006 – 0.010 inches (0.15 – 0.25 mm).
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INJECTION TIMING ADJUSTMENT
The injection timing needs not to be readjusted.

CYLINDER COMPRESSION MEASUREMENT
The cylinder compression pressure measurement must be done whenever the engine output is reduced.
Compression pressure: 470 ± 15 psi (33 ± 1 kg/cm^2)
Test condition: Cranking speed 250 RPM; Coolant temperature 167°F (75°C)
Dispersion of compression among cylinders: 29 – 43 psi (2 –3 kg/cm^2).
NOTE: Repair the engine and / or replace some parts if compression pressure is lower than 370 ± 15 (26 ± 1 kg/cm^2).

FUEL INJECTIONS NOZZLES
An injection nozzle test is required any time when the engine output is reduced and blackish exhaust smoke is present.
Testing should be performed in a specialized shop where the necessary equipment is available.
Tests should be performed to check the static injection starting pressure and the fuel spray conditions. The injection nozzle opening pressure should be 1700 + 140/-0 psi (120 +10 / - 0 kg/cm^2).

BATTERY
Keep the battery fully charged all the time, it is important especially in cold season.
Keep the battery posts clean and the battery cables tighten securely.
Always disconnect the battery negative ground strap when work on the unit is performed.
If distillated water is needed to be added, do it before the unit will be operated, otherwise the water will not mix with the acid and can freeze in cold weather.

STARTER AND BATTERY CHARGING ALTERNATOR
The starter and the battery charging alternator servicing consists of:
- Check the carbon brushes and the brush contact.
- Clean the alternator slip ring.

Avoid spraying water or steam on the alternator and on the starter, it may cause damage.

OPERATION AT 400V – 50 Hz
- Remove the jumper between 5a and 6 on the Electronic Voltage Regulator located under the cover on top of the alternator
- Reduce the engine speed at 3000 RPM

SECTION FIVE TROUBLESHOOTING

TROUBLE SHOOTING

The following trouble shooting chart is by no means complete, but covers the more general type problems, which would most likely occur if a breakdown are experienced.

POSSIBLE CAUSE	CORRECTIVE ACTION SUGGESTED
Problem: Engine starter will not energize	
Loose or corroded Battery Terminals	Clean terminals and tighten
Battery Voltage too low	Recharge or replace battery
Faulty START / PREHEAT Switch	Replace
Faulty ON / OFF Switch	Replace
Faulty Starter Solenoid	Replace
Faulty Starter Motor	Replace
Circuit Breaker Open	Replace if it does not reset
Problem: Starter turns but engine does not ignite	
Faulty control Relay R1	Replace
Faulty emergency stop Timer	Replace
Faulty Engine Fuel Solenoid	Replace
Control rack is stuck in stop position	Remedy
Engine too hot and protection system will not allow to operate	Allow engine to cool will not allow starter
Faulty coolant Temperature Switch	Replace switch
Faulty electrical Fuel Pump	Replace
No Fuel	Add fuel to tank
Clogged fuel filter element	Replace
Fuel cock on secondary fuel filter closed	Open

POSSIBLE CAUSE	CORRECTIVE ACTION SUGGESTED
Problem: Engine starts but stalls immediately	
Air in the fuel system	Remedy and bleed the system
Defective oil pressure Switch Low oil pressure LED stays ON	Replace switch
Oil level to low	Add oil
Fuel cock on secondary fuel filter closed	Open
Problem: Engine stops with high engine temperature indication	
Coolant temperature too high	Check cooler for air flow restriction and clean or remove restriction
Coolant level too low	Add coolant
Defective high temperature switch	Replace switch
Thermostat malfunction	Replace
Fan belt slippage or broken	Remedy or replace
Problem: Black exhaust	
Clogged air filter	Clean the filter cartridge or replace
Improper fuel – low cetane grade	Replace fuel
Nozzle damage	Repair or replace nozzle
Problem: White smoke	
Water or oil mixed in fuel	Replace fuel and clean fuel filter
Low compression pressure	Check compression
Low coolant temperature	Check thermostat and replace if needed
Problem: Unstable engine running (Hunting)	
Defective governor spring	Replace
Incorrect valve adjustment	Adjust valve clearance

POSSIBLE CAUSE	CORRECTIVE ACTION SUGGESTED
Problem: No Voltage at power receptacle but AC voltmeter needle is in the green band	
Main Circuit Breaker is on OFF position	Turn main circuit breaker ON
Defective main Circuit Breaker	Replace
Problem: No AC Voltage	
No residual magnetism in the alternator	Restore magnetism by flashing with 12V DC any two of the L1; L2 or L3 terminals. **Do not make permanent contact**. See 5.2 "Restoring residual magnetism"
Open in main stator windings	Check for continuity in windings
Broken diode bridge	Check and replace if needed
Low speed	Check speed and set at nominal value of 3600 rpm
Problem: High No-Load Voltage	
Excessive speed	Check engine speed and adjust.
Voltage not correctly adjusted	Adjust voltage using the potentiometer located on the voltage regulator
Defective electronic voltage regulator	Replace electronic voltage regulator
Problem: Low No-Load Voltage	
Low speed	Check and adjust speed
Broken diode bridge	Check and replace if needed
Breakdown in alternator windings	Check alternator windings resistance The reference values are Stator windings: 0.678 Ohm Rotor: 8.253 Ohm
Problem: Proper No-Load Voltage but Low Voltage under Load	
Low speed at load	Check and adjust engine speed under load
Overload	Check and adjust load

POSSIBLE CAUSE	CORRECTIVE ACTION SUGGESTED
Problem: Proper No-Load Voltage but High Voltage at Load	
High speed	Check and adjust engine speed
Problem: Fluctuant Voltage	
Poor contacts	Check electrical connections
Uneven rotation	Check for uniform engine rotation speed
Electronic voltage regulator (EVR)	Regulate the stability using the STAB potentiometer located on the EVR
Problem: Noisy Alternator	
Broken bearings	Check and replace
Unbalanced load	Check load and remedy

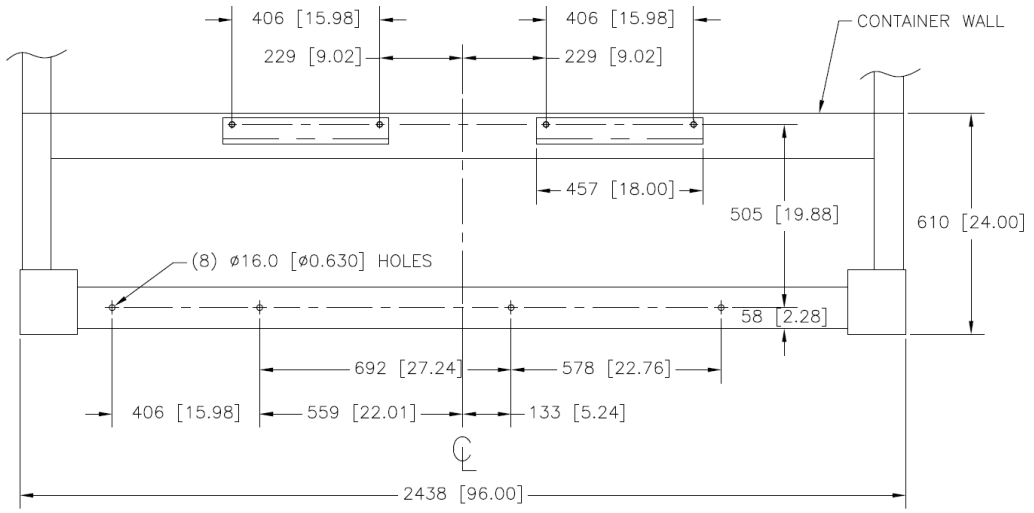
RESTORING RESIDUAL MAGNETISM

The current necessary to magnetize the alternator field is obtained from the exciter. Initially upon starting the generator, current low and voltage are induced into the exciter armature by the magnetic lines of force set by the residual magnetism of the exciter field poles.
Residual magnetism of the exciter field poles may be lost or weakened by a strong neutralizing magnetic field from any source, or if the generator is not operated for a long period of time.
Should the generator fail to build up voltage after being disassembled for any reason, **apply a DC voltage of 12 Volts battery at any two of the L1; L2 or L3 (U1; U2 or U3) terminals inside the alternator junction box.**
Do not make a positive connection, but rather touch the two leads together until the generator voltage begins to rise, and then remove.
It is recommended that a 10-Ampere fuse should be inserted in the circuit, to prevent any damage in case the build-up voltage is not removed quickly enough.
Start generator and observe voltage build-up. Reflash field if generator output voltage does not build up.

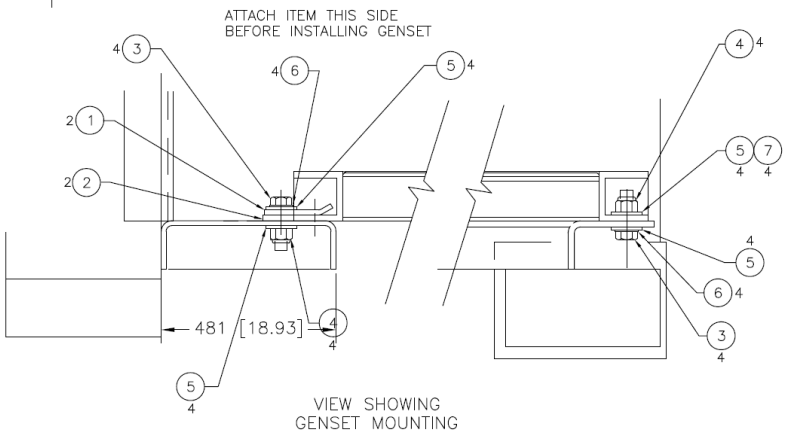
VOLTAGE REGULATION

- The output of the alternator is controlled and regulated by means of an Electronic Voltage Regulator (EVR) that ensure a precise voltage of 2% in static conditions with any power factor and with a variation in speed of between –10 % and +30%.
- The alternator output voltage must be checked under no-load conditions, with the correct setting of the frequency.
- The voltage may be adjusted by ± 5% of the nominal by acting upon the voltage potentiometer on the electronic voltage regulator (EVR).

SECTION SIX PARTS SECTION



QTY	PART NO.	ITEM	DESCRIPTION
2	060-03126-00	1	CLIP MOUNTING GENERATOR SET REAR - WHITE
2	060-03127-03	2	SPACER NMG-112-07 MOUNTING CLIP - WHITE
8	K21-50227-40	3	SCREW HEX SS M12 X 1.75 X 40
8	K21-50100-12	4	NUT LOCK SS M12 X 1.75
16	K21-16547-12	5	WASH FLAT SS M12 (13 X 37 X 3)
8	K21-50421-12	6	WASHER LOCK SS M12
4	K21-50492-06	7	WASHER INSULATED PVC 1/2
1	360-11009-03	8	PIPE EXHAUST NMG-112-06/ 07
4.00 FT	K26-25077-07	9	HOSE FLEX SS 1.50"/ 1.63" ID/ OD
2	K21-14751-00	10	CLAMP EXHAUST CS 1-3/4 (1-7/8 DIA)
2	K21-16320-00	11	CLAMP EXHAUST CS 1-1/2 (1-3/4 DIA)
4	K21-50421-08	12	WASHER LOCK SS M8
4	K21-16547-08	13	WASH FLAT SS M8 LARGE OD 24MM
1	K35-06157-44	14	COPY OF 360-15401-00



VIEW SHOWING
GENSET MOUNTING

REV LEV	DATE	CHG NO	DR	CHK	REVISION RECORD
A	7/21/08	N/A	MH	DB	MOVED LOWER EXHAUST BRACKET SHEET 2/2

PROJECTION

DIMENSIONS ARE IN MM [INCHES]
DO NOT SCALE — TOLERANCES
UNLESS OTHERWISE INDICATED
X. = +/- 1.0 [X.XX = +/-.031]
X.X = +/- 0.5 [X.XXX = +/-.015]

	NAME	DATE
DR	D GROVE	4/25/08
APPR	DB	4/25/08
SCALE	N/A	

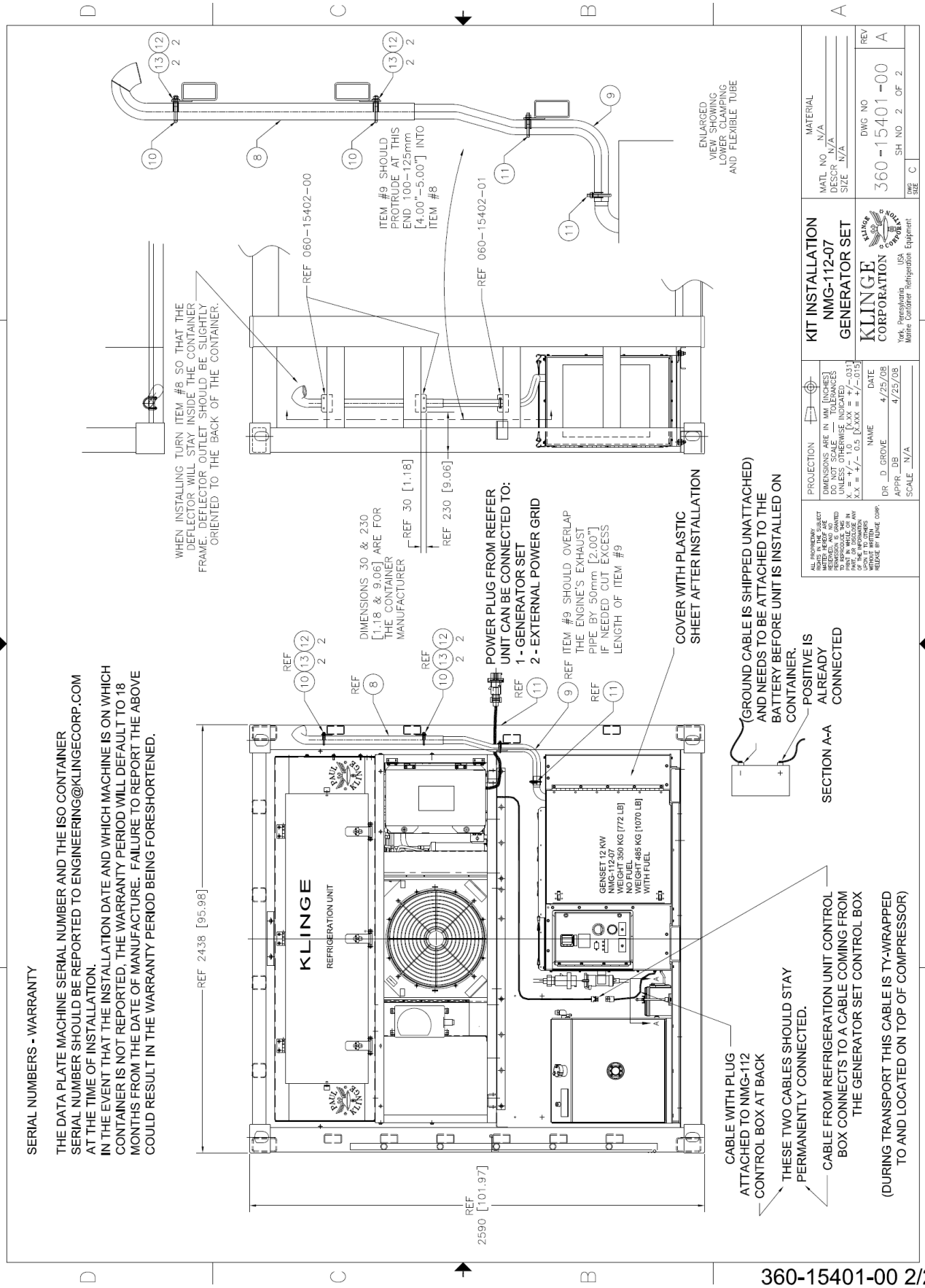
KIT INSTALLATION
NMG-112-07
GENERATOR SET

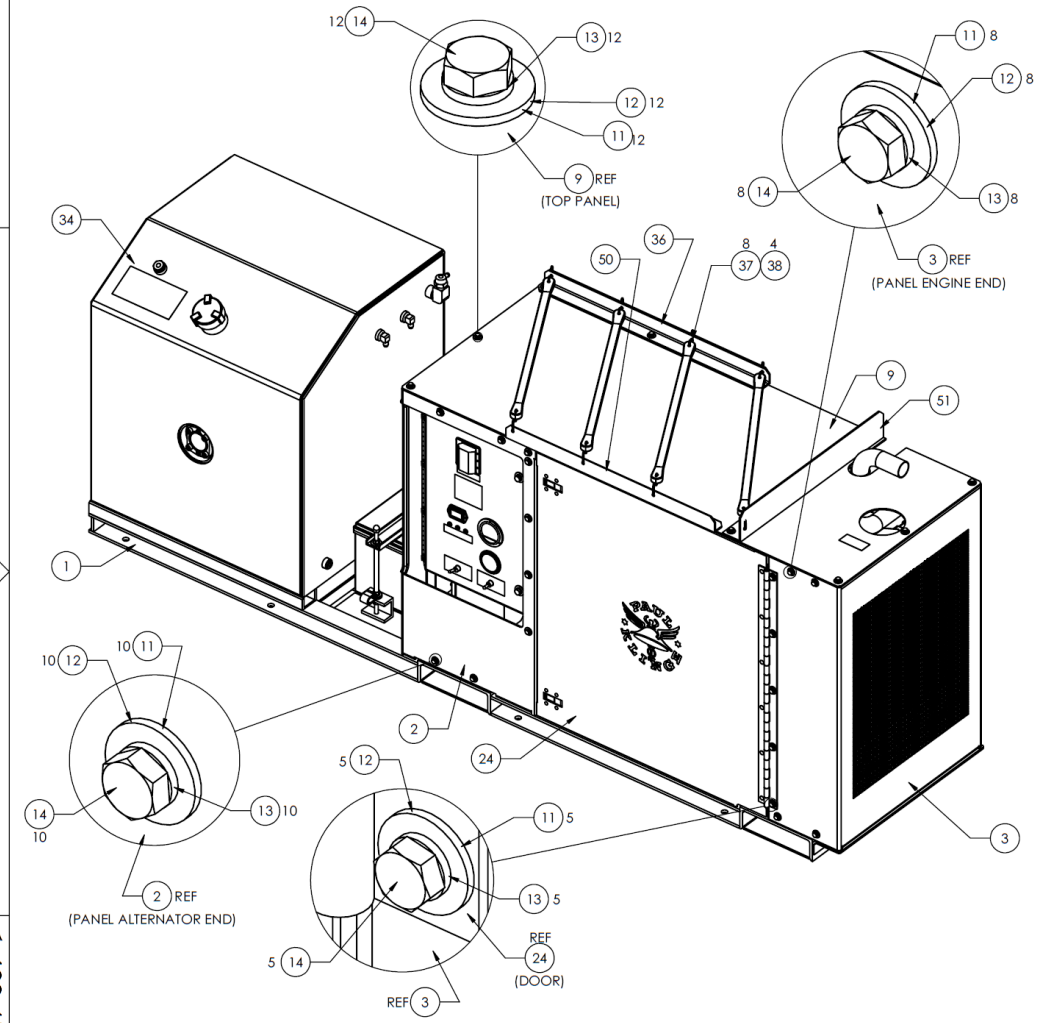
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment

MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 360-15401-00 REV A
SH NO 1 OF 2
DWG SIZE C

360-15401-00 1/2


SERIAL NUMBERS - WARRANTY
THE DATA PLATE MACHINE SERIAL NUMBER AND THE ISO CONTAINER SERIAL NUMBER SHOULD BE REPORTED TO ENGINEERING@KLINGECORP.COM AT THE TIME OF INSTALLATION.
IN THE EVENT THAT THE INSTALLATION DATE AND WHICH MACHINE IS ON WHICH CONTAINER IS NOT REPORTED, THE WARRANTY PERIOD WILL DEFAULT TO 18 MONTHS FROM THE DATE OF MANUFACTURE. FAILURE TO REPORT THE ABOVE COULD RESULT IN THE WARRANTY PERIOD BEING FORESHORTENED.
WHEN INSTALLING TURN ITEM #8 SO THAT THE DEFLECTOR WILL STAY INSIDE THE CONTAINER FRAME. DEFLECTOR OUTLET SHOULD BE SLIGHTLY ORIENTED TO THE BACK OF THE CONTAINER.
REF 060-15402-00
REF 060-15402-01
ITEM #9 SHOULD PROTRUDE AT THIS END. 100-125mm [4.00"-5.00"] INTO ITEM #8
ENLARGED VIEW SHOWING LOWER CLAMPING AND FLEXIBLE TUBE
DIMENSIONS 30 & 230 [1.18 & 9.06] ARE FOR THE CONTAINER MANUFACTURER
REF 30 [1.18]
REF 230 [9.06]
POWER PLUG FROM REEFER UNIT CAN BE CONNECTED TO:
1 - GENERATOR SET
2 - EXTERNAL POWER GRID
REF ITEM #9 SHOULD OVERLAP THE ENGINE'S EXHAUST PIPE BY 50mm [2.00"] IF NEEDED CUT EXCESS LENGTH OF ITEM #9
COVER WITH PLASTIC SHEET AFTER INSTALLATION
(GROUND CABLE IS SHIPPED UNATTACHED) AND NEEDS TO BE ATTACHED TO THE BATTERY BEFORE UNIT IS INSTALLED ON CONTAINER.
POSITIVE IS ALREADY CONNECTED
SECTION A-A
KLINGE
REFRIGERATION UNIT
GENSET 12 KW
NMG-112-07
WEIGHT 350 KG [772 LB]
NO FUEL
WEIGHT 485 KG [1070 LB]
WITH FUEL
REF 2438 [95.98]
REF 2590 [101.97]
CABLE WITH PLUG ATTACHED TO NMG-112 CONTROL BOX AT BACK
THESE TWO CABLES SHOULD STAY PERMANENTLY CONNECTED.
CABLE FROM REFRIGERATION UNIT CONTROL BOX CONNECTS TO A CABLE COMING FROM THE GENERATOR SET CONTROL BOX
(DURING TRANSPORT THIS CABLE IS TY-WRAPPED TO AND LOCATED ON TOP OF COMPRESSOR)
KIT INSTALLATION
NMG-112-07
GENERATOR SET
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment
MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A
DWG NO
360-15401-00
SH NO 2 OF 2
REV A
DWG SIZE C
PROJECTION
DIMENSIONS ARE IN MM [INCHES]
DO NOT SCALE — TOLERANCES UNLESS OTHERWISE INDICATED
X.X = +/- 0.5 [X.XX = +/- .031] X.XX = +/- 0.13 [X.XXX = +/- .015]
NAME DATE
DR D GROVE 4/25/08
APPR DB 4/25/08
SCALE N/A
ALL PROPRIETARY RIGHTS TO THE SUBJECT MATTER HEREOF ARE RESERVED. NO (GRANTED) PERMISSION IS GRANTED TO REPRODUCE THIS DRAWING IN WHOLE OR IN PART, OR DISCLOSE ANY PART OF THE INFORMATION HEREIN CONTAINED TO OTHERS WITHOUT WRITTEN RELEASE BY KLINGE CORP.
UPON IT TO OTHERS
360-15401-00 2/2



QTY.	PART NO.	ITEM	DESCRIPTION
1	360-14990-01	1	FRAME ASSEMBLY NMG-112-07
1	360-15408-00	2	PANEL ASSEMBLY ALTERNATOR NMG-112-07
1	360-15409-00	3	PANEL ASSEMBLY ENGINE END NMG-112-07
1	360-14959-01	4	FRAME TOP PANEL SUPPORT NMG-112-07
4	K28-11019-05	5	ISOLATOR ENGINE NEOPRENE LOAD 220/ 110 LB
2	K21-16480-02	6	SCREW HEX 3/8-16 X 1/2" BATTERY POSTS
16	K21-50226-30	7	SCREW HEX HD SS M10 X 1.5 X 30
1	360-15410-00	8	ENGINE / ALTERNATOR ASSEMBLY NMG-112-07
1	360-14961-00	9	PANEL TOP ASSEMBLY NMG-112-07 WHITE
1	360-15413-00	10	FUEL SYSTEMS COMPONENTS NMG-112-07
71	K21-50492-03	11	WASHER INSULATED PVC 1/4
71	K21-16547-06	12	WASHER FLAT SS 6 MM LARGE OD 18MM
61	K21-50421-06	13	WASHER LK SPG SS M6 18-8
65	K21-50224-25	14	SCREW HEX SS M6 X 1 X 25
1	K21-50224-40	15	SCREW HEX SS M6 X 1 X 40
25	K21-50401-10	16	WASHER FLAT SS 10mm
4	K21-50226-70	17	SCREW HEX HD SS M10 X 1.5 X 70
4	K21-16486-03	18	WASHER SNUBBING 2.00 OD/ .45 ID/ .125 THK CS
12	K21-50100-10	19	NUT LOCK SS M10 X 1.5 NYLON INSERT
2	K21-16548-06	20	CLAMP CS VINYL COATED 0.625" ID 3/4" WIDE
1	XB-205039-28	21	CABLE BATTERY ASSEMBLY POS (+) 46" LONG
9	K21-50421-10	22	WASHER LOCK SPG SS 10MM
2	K25-25935-07	23	TUBE HEAT SHRINK PVC 1/2 X 5.00" LONG
1	360-15414-00	24	DOOR ASSEMBLY NMG-112-07
* 1	K25-26516-00	25	BATTERY 12V 690 CCA SIDE POSTS
2	K28-11062-02	26	RUBBER NEOPRENE BLACK 3/16" THICK X 9.00" X 2.50"
2	060-15360-00	27	ROD SS M8 X 1.25 X 235MM BATT HOLD-DOWN NMG-112-06/012
6	K21-16249-08	28	NUT HEX SS 8mm x 1.25
1	360-13996-01	29	BATTERY HOLD-DOWN ASSEMBLY NMG-112-06/012
7	K21-16547-08	30	WASH FLAT SS M8 LARGE OD 24MM
6	K21-50421-08	31	WASHER LOCK SPG SS 8MM
6	K21-50492-04	32	WASHER INSULATED PVC 5/16
1	360-15415-00	33	BOX ELECTRICAL ASSEMBLY FULLY WIRED NMG-112-07
1	360-15412-00	34	TANK FUEL ASSEMBLY NMG-112-07 WHITE
14	K21-50492-05	35	WASHER INSULATED PVC 3/8
1	060-14747-00	36	RETAINER POWER CABLE NMG-112-629mm / 24.75" LONG WHITE
8	K29-18490-00	37	HOOK STRAP SS 0.125 DIA. WIRE
4	K28-10691-00	38	STRAP 15" LG NO HOOKS
1	060-14947-01	39	SUPPORT ELECT BOX RIGHT NMG-112-07
1	360-15379-01	40	SUPPORT ELECTRICAL BOX LEFT WITH NUT INSERTS NMG-112-07
5	K21-50100-06	41	NUT LOCK SS M6 X 1
6	K21-16547-10	42	WASHER FLAT SS 10MM LARGE OD
2	K21-16546-05	43	NUT ACORN SS M8 X 1.25 18-8
1	360-13965-01	44	HOLDER SNAP ASSEMBLY POWER RECEPTACLE (METRIC)
1	K25-25990-04	45	WRAP SPIRAL BLACK 1/2" - 6.00" LONG
1	K35-06385-00	46	LABEL "WARNING BREAK-IN OIL.."
1	K21-50226-20	47	SCREW HEX HD SS M10 X 1.5 X 20
1	K25-26621-08	48	STRAP GROUND 8" LG
1	K21-15649-18	49	CLAMP CUSH SS 64mm ID [2.50" ID]
1	060-14747-001	50	RETAINER POWER CABLE NMG-112-584mm / 23.00" LONG WHITE
1	060-15436-00	51	ANGLE ALUMINUM 3 X 2 X 1/8 X 20" POWER CORD PROTECTOR NMG-112

SOME PARTS NOT SHOWN FOR CLARITY

* - BATTERY ADDED AT TIME OF SHIPMENT

REV	DATE	DR	CHK	REVISION RECORD
A	5/02/08	DBG	DB	CHANGES AS PER BUILD
B	8/29/08	DBG	DB	ADDED GROUND STRAP VIEW TO SHEET 3/3
				CHANGED TYP # PLACES TO # BESIDE BALLOONS PER PRODUCTION
C	1/22/09	DBG	DB	ITEM #36 QTY 1 WAS 2, ADDED ITEMS #50 & #51

REV	DATE	DR	CHK	REVISION RECORD

PROJECTION

DIMENSIONS ARE IN INCHES (MM)
DO NOT SCALE — TOLERANCES UNLESS OTHERWISE INDICATED
XX DECIMAL +/-.03 OR [1/32]
XXX DECIMAL +/-.015 OR [1/64]

	NAME	DATE
DR	D GROVE	11/30/07
APPR	DB	11/30/07
SCALE	N/A	

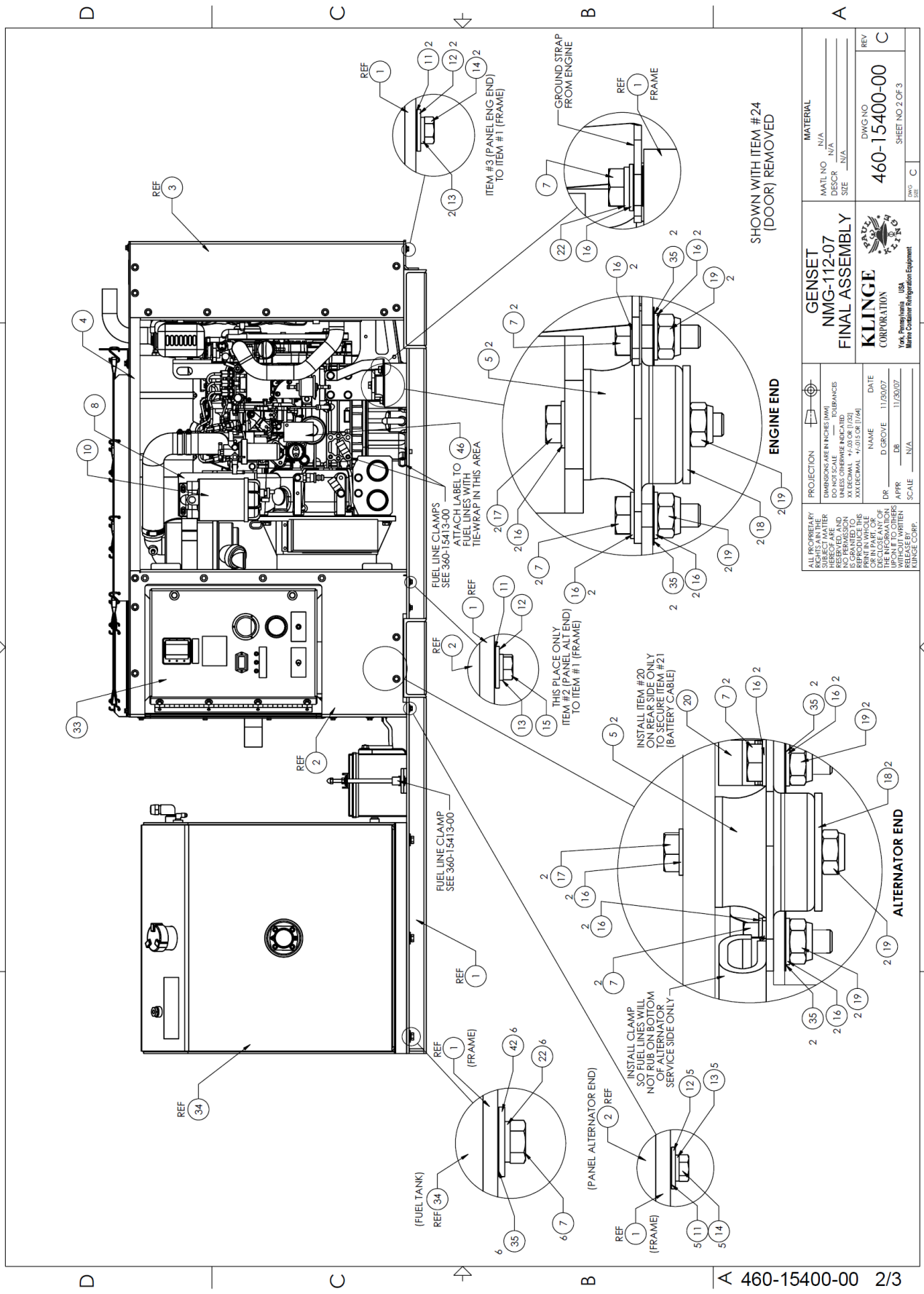
GENSET
NMG-112-07
FINAL ASSEMBLY

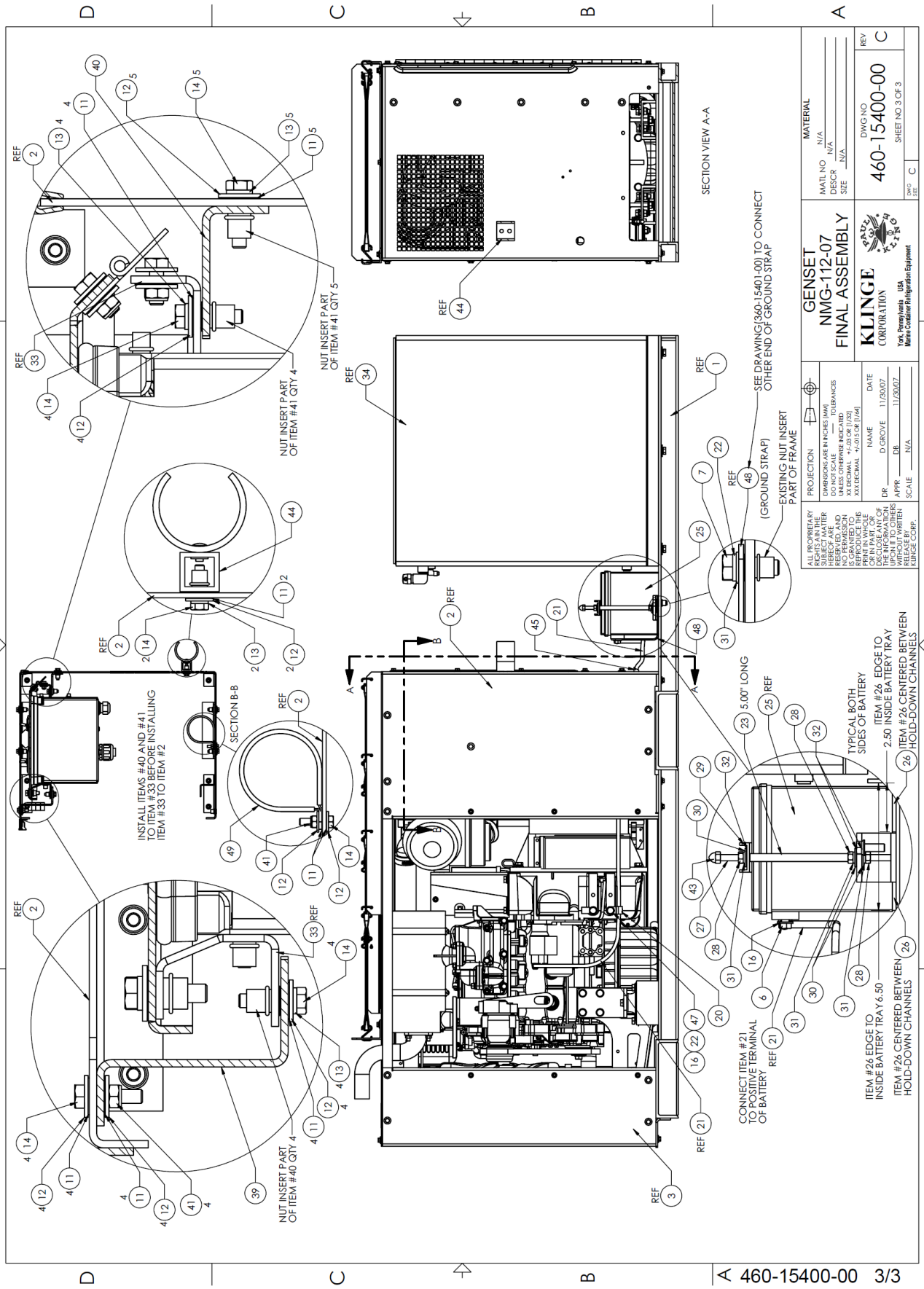
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment

MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 460-15400-00
REV C
SHEET NO 1 OF 3
DWG SIZE C

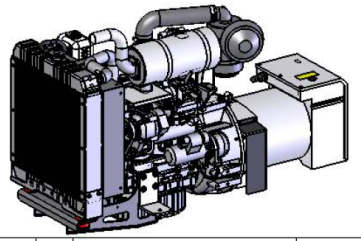
460-15400-00 1/3


GENSET
NMG-112-07
FINAL ASSEMBLY
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment
460-15400-00
SHEET NO 2 OF 3
SHOWN WITH ITEM #24 (DOOR) REMOVED
ENGINE END
ALTERNATOR END
ITEM #3 (PANEL ENG END) TO ITEM #1 (FRAME)
GROUND STRAP FROM ENGINE
FUEL LINE CLAMPS SEE 360-15413-00
ATTACH LABEL TO FUEL LINES WITH TIE-WRAP IN THIS AREA
THIS PLACE ONLY ITEM #2 (PANEL ALT END) TO ITEM #1 (FRAME)
INSTALL ITEM #20 ON REAR SIDE ONLY TO SECURE ITEM #21 (BATTERY CABLE)
INSTALL CLAMP SO FUEL LINES WILL NOT RUB ON BOTTOM OF ALTERNATOR SERVICE SIDE ONLY
FUEL LINE CLAMP SEE 360-15413-00
(FUEL TANK)
(PANEL ALTERNATOR END)
(FRAME)
460-15400-00 2/3


GENSET
NMG-112-07
FINAL ASSEMBLY
KLINGE CORPORATION
460-15400-00
SHEET NO 3 OF 3
SECTION VIEW A-A
SECTION B-B
INSTALL ITEMS #40 AND #41 TO ITEM #33 BEFORE INSTALLING ITEM #33 TO ITEM #2
NUT INSERT PART OF ITEM #41 QTY 5
NUT INSERT PART OF ITEM #41 QTY 4
NUT INSERT PART OF ITEM #40 QTY 4
SEE DRAWING(360-15401-00) TO CONNECT OTHER END OF GROUND STRAP
(GROUND STRAP)
EXISTING NUT INSERT PART OF FRAME
TYPICAL BOTH SIDES OF BATTERY
ITEM #26 EDGE TO 2.50 INSIDE BATTERY TRAY
ITEM #26 CENTERED BETWEEN HOLD-DOWN CHANNELS
5.00" LONG
CONNECT ITEM #21 TO POSITIVE TERMINAL OF BATTERY
ITEM #26 EDGE TO INSIDE BATTERY TRAY 6.50
ITEM #26 CENTERED BETWEEN HOLD-DOWN CHANNELS
460-15400-00 3/3

NOTE	QTY.	PART NO.	ITEM	DESCRIPTION	NOTE	QTY.	PART NO.	ITEM	DESCRIPTION
	1	K26-25150-06	1	ENGINE YANMAR 3TNV70-HGE 3 CYL		1	K26-25095-01	44	HOOD AIR INLET PLASTIC FITS 1.75 OD AIR FILTER INLET
****	1	K24-22380-00	2	ALTERNATOR 12 KW/15 KVA 277/480 V 3 PH/60 HZ 2 POLE SAE#7-1/2 CPLG DISC		7	K21-16518-28	45	CLAMP HOSE SS 1-5/16 TO 2-1/4 CLAMPING RANGE
**	1	060-14939-01	3	SUPPORT RH RADIATOR MOUNTING NMG-112-06/ 012		1	360-14708-01	46	WIRE HARNESS ENGINE 3TNV70 (NOT SHOWN)
**	1	060-14939-02	4	SUPPORT LH RADIATOR MOUNTING NMG-112-06/ 012	610 mm [24"]	[2]	K28-11069-00	47	TUBING PVC CLEAR 5/16 ID 7/16 OD
	2	060-14983-00	5	MOUNT ENGINE FRONT PAINTED NMG-112-06/012		24	K21-50401-10	48	WASHER FLAT SS 10mm
*	2	K26-25164-08	6	WASHER 2.00 OD/ .51 ID/ .125 THK CS		11	K21-50401-06	49	WASHER FLAT SS 6 MM
**	1	360-14975-00	7	RADIATOR WITH MODIFIED FAN SHROUD FOR NMG-112-06 & NMG-012		7	K21-50421-06	50	WASHER LK SPG SS M6 18-8
*	2	K26-25164-06	8	ISOLATOR RADIATOR BOTTOM		1	K25-26340-02	51	NUT LK CONDUIT 1/2
*	3	K26-25165-055	9	GASKET EXHAUST		1	K35-06392-00	52	LABEL VOLTAGE ADJUSTMENT POTENTIOMETER
	1	360-14714-00	10	BRACKET ASSEMBLY SECONDARY FUEL FILTER 3TNV70 ENGINE		1	K25-26129-05	53	CONNR STRAIGHT PLASTIC SHORT 3/4"(.45-.709)
	1	360-14709-01	11	SUPPORT AIR & FUEL FILTER ASSEMBLY NMG-112-06/012		12	K21-50421-08	54	WASHER LOCK SPG SS 8MM
*****	1	060-14736-01	12	BAFFLE AIR EXHAUST ALTERNATOR RIGHT SIDE SEE NOTE #10		22	K21-50421-10	55	WASHER LOCK SPG SS 10MM
*****	1	060-14736-02	13	BAFFLE AIR EXHAUST ALTERNATOR LEFT SIDE SEE NOTE #10		7	K21-50224-20	56	SCREW HEX SS M6 X 1 X 20
	1	060-13945-00	14	BRACKET GAUGES ENGINE PAINTED		15	K21-50225-20	57	SCREW HEX SS M8 X 1.25 X 20
*	1	K26-25169-00	15	MUFFLER RAISING KIT		8	K21-50226-35	58	SCREW HEX SS M10 X 1.5 X 35 LG
**	1	360-14981-00	16	MUFFLER K26-25165-051 THERMAL INSULATED		4	K21-50226-25	59	SCREW HEX HD SS M10 X 1.5 X 25
	1	060-14976-00	17	PLATE BATTERY CHRG ALTN PROTECT NMG-112-06		21	K21-50401-08	60	WASHER FLAT SS 8MM
	1	K28-10936-08	18	PLUG SEAL POLY FLUSH .88 HOLE .03-.08		2	K21-50224-16	61	SCREW HEX SS M6 X 1 X 16
*	1	K26-25164-03	19	BRACKET CROSS RADIATOR SUPPORT NMG-112-06/012		1	K21-50225-90	62	SCREW HEX SS M8 X 1.25 X 90
	1	360-14180-00	20	BAND MOUNTING AIR CLEANER MODIFIED		4	K21-50226-20	63	SCREW HEX HD SS M10 X 1.5 X 20
	1	K26-25099-00	21	FILTER AIR FPG G042545 50 CFM PLASTIC 4.8 DIA HOUSING		1	K35-06365-00	64	DECAL, " 50/50 ETHYLENE GLYCOL / WATER "
	1	360-14710-01	22	HOSE ASSEMBLY AIR INTAKE NMG-112-06/012		2	K21-16249-08	65	NUT HEX SS 8mm x 1.25
*	1	K26-25164-04	23	MOUNT UPPER RADIATOR HOLDER NMG-112-06/012		1	K21-50100-08	66	NUT LOCK SS M8 X 1.25 NYLON INSERT
*	1	K26-25164-07	24	ISOLATOR 1" DIA X 3/4" H M8X1.25 THREAD		1	K21-50100-06	67	NUT LOCK SS M6 X 1
*	1	K26-25164-05	25	SUPPORT HORIZONTAL UPPER RADIATOR HOLDER NMG-112-06/012		1	K26-25100-00	68	FILTER SAFETY CARTRIDGE OPTIONAL
*	1	K26-25163-053	26	HOSE RADIATOR BOTTOM OUTLET NMG-112-06		2	K21-16549-01	69	CLAMP 2-TUBE CUSHIONED 1/2" CS
*	1	K26-25163-052	27	HOSE RADIATOR TOP (COOLANT INLET)		1	K21-16548-04	70	CLAMP CUSH CS 1/2 ID
356 mm [14"]	[2]	K28-11037-01	28	MOLDING SBR PUSH-ON 1/16" EDGE 7/32"WIDE 7/16"HIGH	*	1	K26-25150-103	71	FILTER FUEL SECONDARY WITH DEAERATOR YANMAR 3TNV70 ENG
**	1	K26-25163-055	29	HOSE 1L OVERFLOW BOTTLE 3TNV70-HGE ENGINE SEE NOTE #7		1	K35-06305-00	72	LABELS L1, L2, AND L3
*	1	K26-25163-054	30	OVERFLOW BOTTLE WITH SUPPORT 1-LITER YANMAR 3TNV70-HGE ENG.		2	K21-16519-05	73	CLAMP NYLON 3/8 ID. 0.203 MOUTING HOLE
	1	360-14734-00	31	HOSE ASSEMBLY OIL DRAIN NMG-112 SEE NOTE ON SHEET 4		1	360-15422-00	74	PLATE ELECTRICAL FUEL PUMP MOUNTING 3TNV70 ENGINE
	2	K21-50225-25	32	SCREW HEX SS M8 X 1.25 X 25		1	K26-25179-00	75	FUEL PUMP ELECTRIC 12VDC
*	1	K26-25165-054	33	SUPPORT L BRACKET MUFFLER 3TNV70 ENGINE		2	K21-16198-05	76	CLAMP CUSH CS 1/2 OD
	1	360-14978-01	34	ELBOW EXHAUST MODIFIED NMG-112-06/012 SHORT		2	K21-16410-09	77	SCREW HEX SS 1/2-13 X 2.50 LG
	1	K21-50224-50	35	SCREW HEX SS M6 X 1 X 50		1	K25-26621-08	78	STRAP GROUND 8" LG
	1	360-14739-01	36	CABLE POWER ASSY ALTERNATOR TO CONTROL BOX NMG-112-07 SEE NOTE #5		8	K21-50401-05	79	WASH FLAT M5 (5.3mm ID x 10mm OD)
	1	060-13912-00	37	ADAPTER OIL PRESSURE SENDER AND PRESSURE SWITCH		1	K23-10280-00	80	CLAMP HOSE (.38 - .63) 5/16 WIDE SS
*	1	K26-25111-126	38	SWITCH OIL PRESSURE NORMAL CLOSED	***	1	360-15358-01	81	COVER ALTERNATOR ECO3-3SN/2 OR ECP3-3S/2 MODIFIED
	1	K26-24935-00	39	SENDER OIL PRESSURE 0-150 PSI		1	K35-06361-00	82	LABEL "FUSE K25-26610-00 250V"
	1	060-14744-00	40	ADAPTER BRS M16 TO 3/8-18 NPT (K23-13032-04 MODIFIED)		1	060-15423-00	83	GASKET ELECTRICAL FUEL PUMP MOUNTING PLATE 3TNV70 ENGINE
	1	K26-25178-00	41	TEMPERATURE SENDER 12VDC		1	K21-16198-09	84	CLAMP CUSH CS 3/4 ID
	1	K26-25177-00	42	TEMPERATURE GAUGE 12V 0-250/ 120 F/C STUD TERMINAL		1	K21-16400-04	85	SCREW PAN SS M5 X 0.8 X 16mm LG
	1	K26-24934-00	43	GAUGE OIL PRESSURE 0-150 PSI BLK		8	K21-50226-30	86	SCREW HEX HD SS M10 X 1.5 X 30

NOTES:
1. * PART INCLUDED IN ENGINE KIT AND USED AS IT IS.
2. ** PART INCLUDED IN ENGINE KIT THAT MUST BE MODIFIED.
3. USE ANTI-SEIZE ON ALL BOLTS.
4. REMOVE THE EXISTING MECHANICAL FUEL PUMP AND RETURN IT TO THE STORE ROOM AS K26-25150-102.
5. TO CONNECT CABLE USE DRAWING 360-14720-03.
6. *** COMPONENT OF ALTERNATOR THAT MUST BE MODIFIED AS SHOWN ON SHEET 5/5
7. BEFORE INSTALLING CUT HOSE 22" LONG AND WAVE IT THROUGH THE OVERFLOW BOTTLE SUPPORT.
   -WHEN INSTALLED MAKE SURE THAT IT CAN NOT BE DAMAGED BY THE COOLING FAN.
8. THE OUTLET (RIGHT SIDE) OF THE SECONDARY FUEL FILTER SHOULD BE 0.19" - 0.25" AWAY FROM THE INJECTION PUMP.
9. **** K24-22380-00 = ECO3-3SN/2 ALTERNATOR, K24-22380-03 = ECP3-3S/2 ALTERNATOR.
10. ***** 060-14736-01 & 060-14736-02 ARE FOR ALTERNATOR K24-22380-00.
    060-14736-03 & 060-14736-04 ARE FOR ALTERNATOR K24-22380-03.



REV	DATE	DR	CHK	REVISION RECORD
E	3/12/09	DBG	DB	ITEM #15 (K26-25169-00) WAS K26-25111-70
	ITEM #54 QTY 12 WAS QTY 16, ITEM #60 QTY 21 WAS QTY 25			
	DELETED K21-16522-04 WAS ITEM #64, ITEM #64 WAS ITEM #87			
	ITEM #65 QTY 2 WAS QTY 6			
F	3/26/09	DBG	DB	ITEM #35 (K21-50224-50) WAS K21-50224-70
	MOVED HARDWARE DETAIL CHANGED NOTES SHEET 3/5			
G	4/7/09	NB	SL	SEE ECN 09-27

REV	DATE	DR	CHK	REVISION RECORD
H	7/15/10	DBG	HR	ITEM #12 (060-14736-03) WAS 060-14736-01
	ITEM #13 (060-14736-04) WAS 060-14736-02 (ECN 10-41)			
J	12/26/11	DBG	HR	ITEM #58 QTY 8 WAS 16, ADDED ITEM # 86
	ITEM #86 WAS #58 QTY 8 ALTERNATOR TO FLYWHEEL HOUSING SHT 3			
	ITEM #12 WAS (060-14736-03), ITEM #13 WAS (060-14736-04)			
	ITEM #81 (360-15358-01) WAS 360-15358-00, ADDED NOTES #9 & #10			
	PUT DIMENSIONS FOR BOTH ALTERNATORS ON SHT 5/5			

PROJECTION

DIMENSIONS ARE IN MM [INCHES]
DO NOT SCALE — TOLERANCES FOR INCHES UNLESS OTHERWISE INDICATED
XX DECIMAL +/-.03 OR [1/32]
XXX DECIMAL +/-.015 OR [1/64]

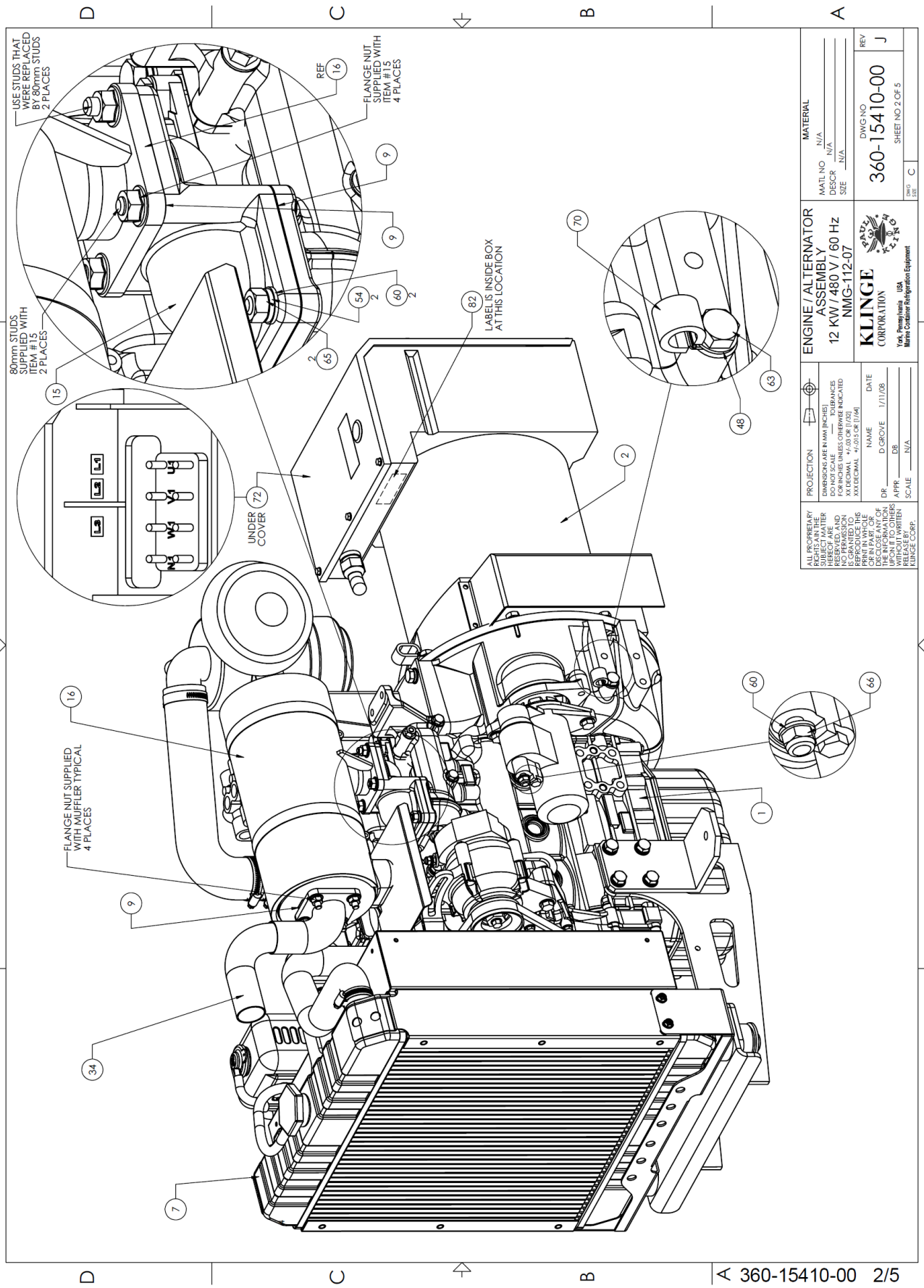
	NAME	DATE
DR	D GROVE	1/11/08
APPR	DB	1/11/08
SCALE	N/A	

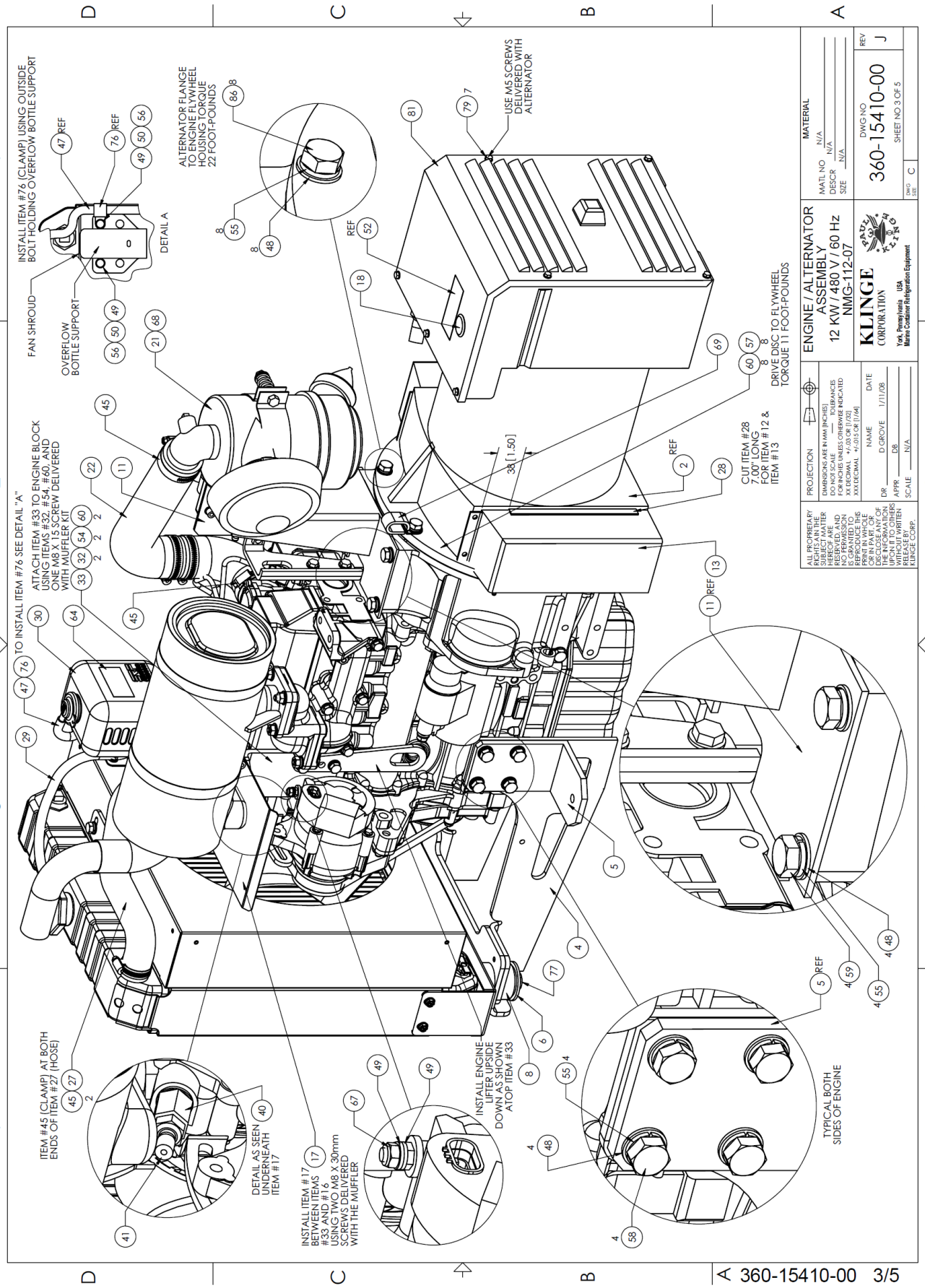
ENGINE / ALTERNATOR ASSEMBLY
12 KW / 480 V / 60 Hz
NMG-112-07

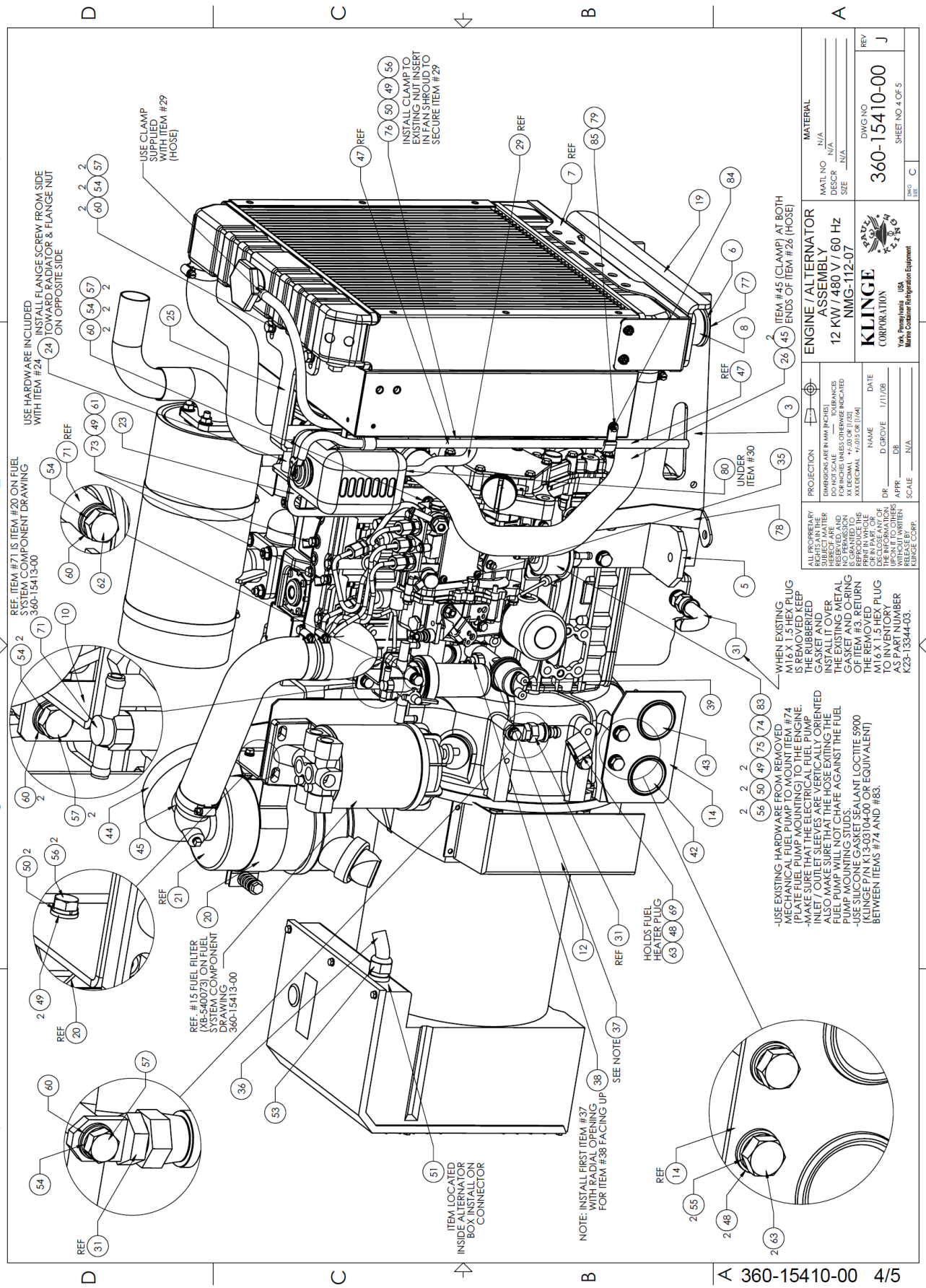
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment

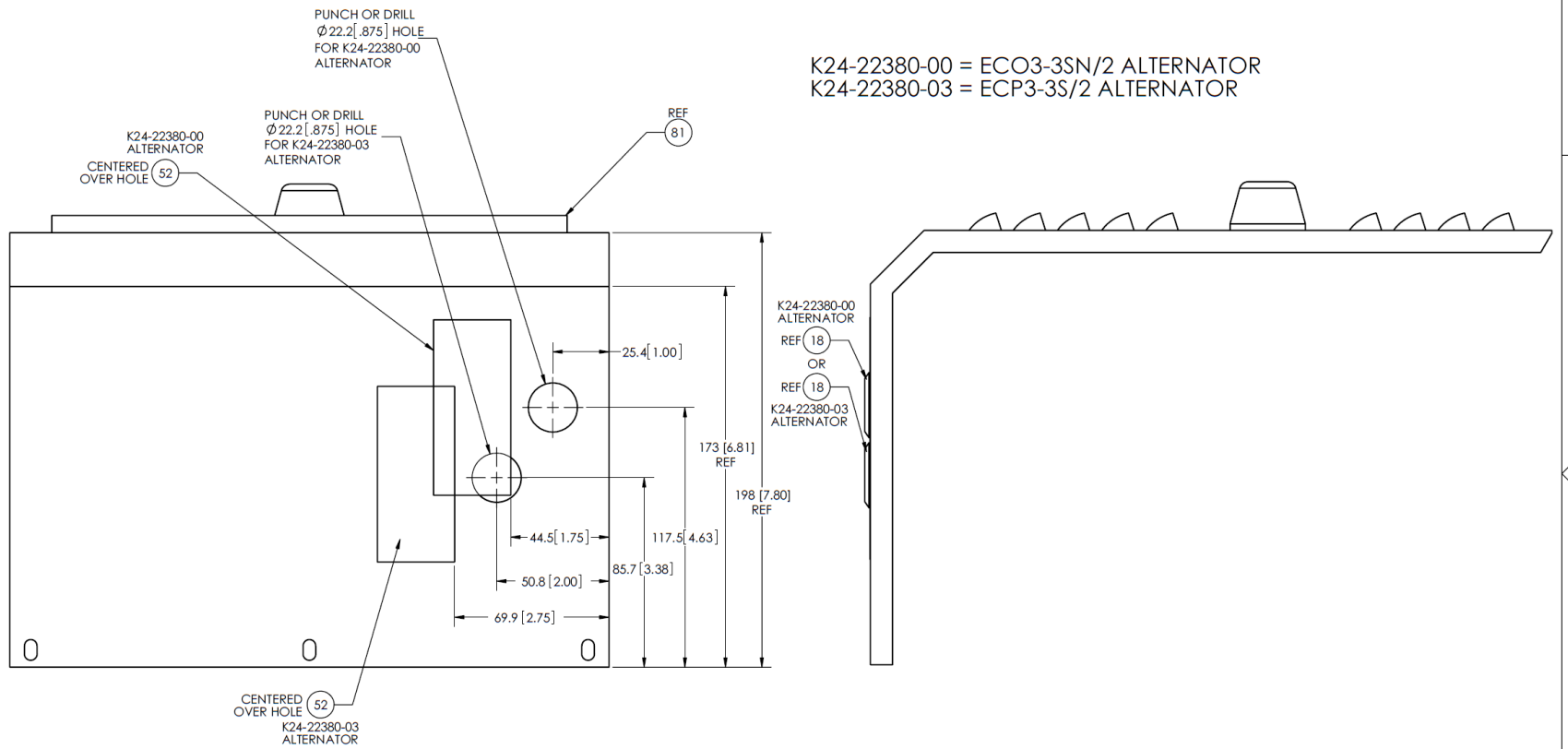
MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 360-15410-00 REV J
SHEET NO 1 OF 5
DWG SIZE C


USE STUDS THAT WERE REPLACED BY 80mm STUDS 2 PLACES
REF 16
FLANGE NUT SUPPLIED WITH ITEM #15 4 PLACES
80mm STUDS SUPPLIED WITH ITEM #15 2 PLACES
LABEL IS INSIDE BOX AT THIS LOCATION
UNDER COVER
FLANGE NUT SUPPLIED WITH MUFFLER TYPICAL 4 PLACES
ENGINE / ALTERNATOR ASSEMBLY
12 KW / 480 V / 60 Hz
NMG-112-07
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment
DWG NO 360-15410-00
REV J
SHEET NO 2 OF 5
A 360-15410-00 2/5


ENGINE / ALTERNATOR ASSEMBLY
12 KW / 480 V / 60 Hz
NMG-112-07
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment
DWG NO 360-15410-00
REV J
SHEET NO 3 OF 5
MATERIAL N/A
DESCR N/A
SIZE N/A
DWG SIZE C
PROJECTION
DIMENSIONS ARE IN MM [INCHES]
DO NOT SCALE
FOR DECIMAL TOLERANCES
XX DECIMAL +/-.03 OR [1/32]
XXX DECIMAL +/-.015 OR [1/64]
NAME DATE
DR D. GROVE 1/11/08
APPR DB
SCALE N/A
ALL PROPRIETARY RIGHTS IN THE SUBJECT MATTER HEREOF ARE RESERVED, AND NO PERMISSION IS GRANTED TO REPRODUCE THIS PRINT IN WHOLE OR PART OR DISCLOSE ANY OF THE INFORMATION WITHOUT WRITTEN RELEASE BY KLINGE CORP.
INSTALL ITEM #76 (CLAMP) USING OUTSIDE BOLT HOLDING OVERFLOW BOTTLE SUPPORT
FAN SHROUD
OVERFLOW BOTTLE SUPPORT
DETAIL A
ALTERNATOR FLANGE TO ENGINE FLYWHEEL HOUSING TORQUE 22 FOOT-POUNDS
USE M5 SCREWS DELIVERED WITH ALTERNATOR
TO INSTALL ITEM #76 SEE DETAIL "A"
ATTACH ITEM #33 TO ENGINE BLOCK USING ITEMS #32, #54, #60, AND ONE M8 X 15 SCREW DELIVERED WITH MUFFLER KIT
38 [1.50]
CUT ITEM #28 7.00" LONG FOR ITEM #12 & ITEM #13
DRIVE DISC TO FLYWHEEL TORQUE 11 FOOT-POUNDS
ITEM #45 (CLAMP) AT BOTH ENDS OF ITEM #27 (HOSE)
DETAIL AS SEEN UNDERNEATH ITEM #17
INSTALL ITEM #17 BETWEEN ITEMS #3 AND #16 USING TWO M8 X 30mm SCREWS DELIVERED WITH THE MUFFLER
INSTALL ENGINE LIFTER UPSIDE DOWN AS SHOWN ATOP ITEM #33
TYPICAL BOTH SIDES OF ENGINE
A 360-15410-00 3/5


ENGINE / ALTERNATOR ASSEMBLY
12 KW / 480 V / 60 Hz
NMG-112-07
KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment
360-15410-00
REV J
SHEET NO. 4 OF 5
MATERIAL N/A
DESCR N/A
SIZE N/A
DWG NO
DWG SIZE C
PROJECTION
SCALE N/A
DR D. GROVE 1/11/08
A PPR DB
NAME DATE
ALL PROPRIETARY RIGHTS IN THE SUBJECT MATTER HEREOF ARE RESERVED AND NO PERMISSION IS GRANTED TO REPRODUCE THIS PRINT IN WHOLE OR IN PART, OR DISCLOSE ANY OF THE INFORMATION UPON IT TO OTHERS WITHOUT WRITTEN RELEASE BY KLINGE CORP.
REF: ITEM #71 IS ITEM #20 ON FUEL SYSTEM COMPONENT DRAWING 360-15413-00
USE HARDWARE INCLUDED WITH ITEM #24
INSTALL FLANGE SCREW FROM SIDE TOWARD RADIATOR & FLANGE NUT ON OPPOSITE SIDE
USE CLAMP SUPPLIED WITH ITEM #29 (HOSE)
INSTALL CLAMP TO EXISTING NUT INSERT IN FAN SHROUD TO SECURE ITEM #29
ITEM #45 (CLAMP) AT BOTH ENDS OF ITEM #26 (HOSE)
UNDER ITEM #30
REF. #15 FUEL FILTER (X8-540073) ON FUEL SYSTEM COMPONENT DRAWING 360-15413-00
HOLDS FUEL HEATER PLUG
ITEM LOCATED INSIDE ALTERNATOR BOX. INSTALL ON CONNECTOR
NOTE: INSTALL FIRST ITEM #37 WITH RADIAL OPENING FOR ITEM #38 FACING UP
SEE NOTE 37
-USE EXISTING HARDWARE FROM REMOVED MECHANICAL FUEL PUMP TO MOUNT ITEM #74 (PLATE FUEL PUMP MOUNTING) TO THE ENGINE.
-MAKE SURE THAT THE ELECTRICAL FUEL PUMP INLET / OUTLET SLEEVES ARE VERTICALLY ORIENTED ALSO MAKE SURE THAT THE HOSE EXITING THE FUEL PUMP WILL NOT CHAFE AGAINST THE FUEL PUMP MOUNTING STUDS.
-USE SILICONE GASKET SEALANT LOCTITE 5900 (KLINGE P/N K13-03104-00 OR EQUIVALENT) BETWEEN ITEMS #74 AND #83.
WHEN EXISTING M16 X 1.5 HEX PLUG IS REMOVED KEEP THE RUBBERIZED GASKET AND INSTALL IT OVER THE EXISTING METAL GASKET AND O-RING OF ITEM #3. RETURN THE REMOVED M16 X 1.5 HEX PLUG TO INVENTORY AS PART NUMBER K23-13344-03.
360-15410-00 4/5



NOTES:
1. REMOVE THE TERMINALS COVER FROM ALTERNATOR AND PUNCH Ø0.875 HOLE AS INDICATED.
2. TOUCH UP COVER PAINT IF NEEDED.
3. INSTALL SEAL PLUG (ITEM #18) FROM THE OUTSIDE.
4. KEEP TERMINALS AREA COVERED DURING STEPS 1 THRU 3.
5. REINSTALL THE COVER TEMPORARILY, UNTIL THE NEXT ASSEMBLY STEP.

PROJECTION

DIMENSIONS ARE IN INCHES [MM]
DO NOT SCALE — TOLERANCES
UNLESS OTHERWISE INDICATED
XX DECIMAL +/-.03 OR [1/32]
XXX DECIMAL +/-.015 OR [1/64]

	NAME	DATE
DR	D GROVE	1/11/08
APPR	DB	1/11/08
SCALE	N/A	

ENGINE / ALTERNATOR ASSEMBLY
12 KW / 480 V / 60 Hz
NMG-112-07

KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment

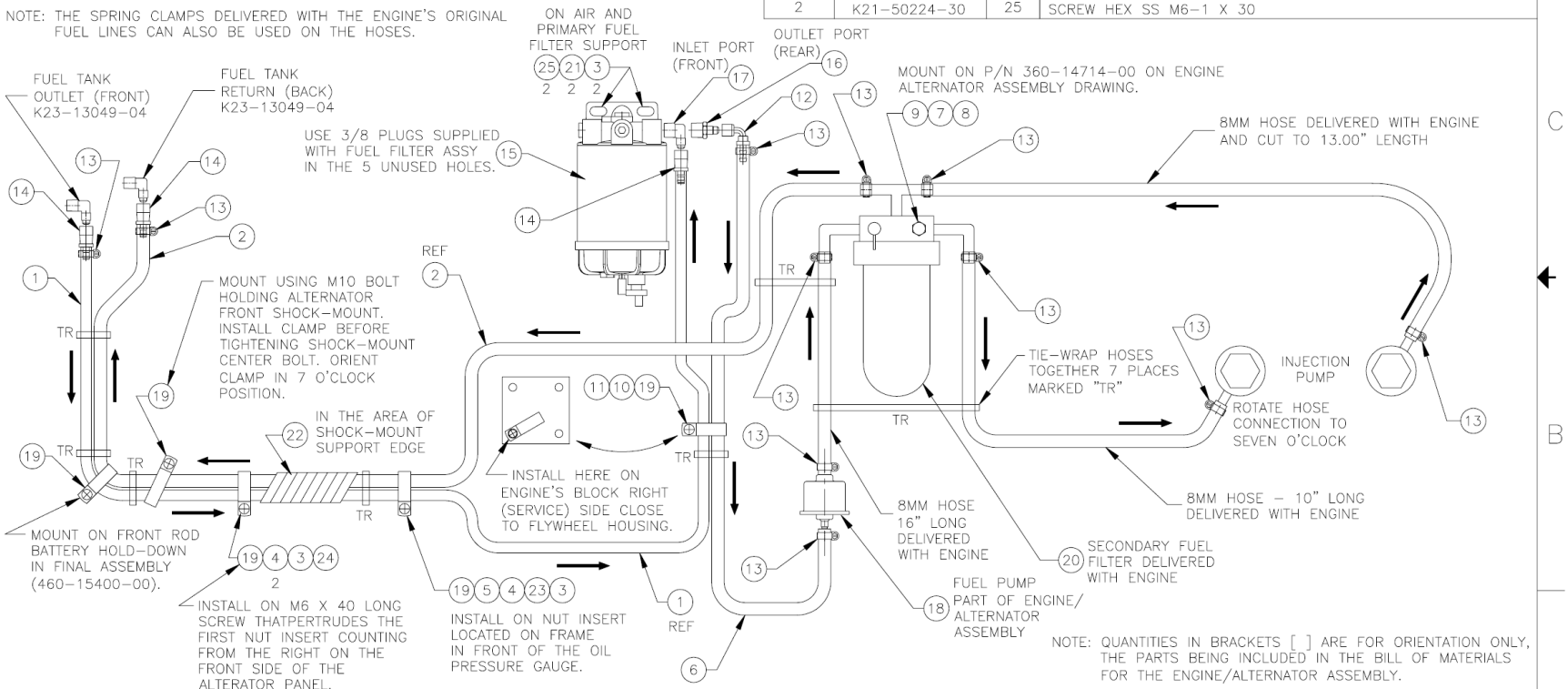
MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 360-15410-00
REV J
SHEET NO 5 OF 5
DWG SIZE C N/A

QTY	PART NO.	ITEM	DESCRIPTION
1	060-13991-01	1	HOSE 1/4"ID FUEL PICK-UP NMG-112 (82" LONG)
1	060-13992-02	2	HOSE 5/16"ID FUEL RETURN NMG-112 (82" LONG)
4	K21-10186-00	3	WASHER LOCK SPG SS 1/4" HEAVY
3	K21-10189-00	4	WASHER FLAT SS 1/4" 0.63 O.D.
1	K21-50224-25	5	SCREW HEX SS M6-1 X 25
1	060-13992-01	6	HOSE 5/16" ID X 25.50" LONG
[1]	K21-14761-00	7	WASHER LOCK SS 5/16
[1]	K21-16216-00	8	WASHER FLAT SS 5/16" 0.69 O.D. 18-8
[1]	K21-50225-90	9	SCREW HEX SS M8 X 1.25 X 90
1	K21-50226-20	10	SCREW HEX SS M10 X 1.5 X 20 18-8
1	K21-50401-10	11	WASHER FLAT SS M10
1	K23-13362-01	12	FITTING SWIVEL 90° ELBOW CS 7/16-20 1/4" ID HOSE

QTY	PART NO.	ITEM	DESCRIPTION
11	K23-10280-00	13	CLAMP HOSE .38-.63 5/16 WIDE
3	K23-13038-01	14	FITTING STRAIGHT 1/4 HOSE X 7/16-20 FLARE SAE 45
1	360-15421-00	15	FUEL FILTER WATER SEP & HEATER ASSEMBLY
1	K23-13094-05	16	FITTING STRAIGHT 1/4 MFLR X 3/8 MPT BRASS
1	K23-13049-05	17	FITTING MALE 90° BRS 1/4 MFLR X 3/8 MPT
[1]	K26-25179-00	18	FUEL PUMP ELECTRICAL
5	K21-16549-01	19	CLAMP CUSHIONED 2 X 1/2"OD HOSES
[1]	K26-25150-103	20	FILTER FUEL SECONDARY WITH DEAERATOR
2	060-06765-00	21	WASHER FLAT SS 1/4" X 1.00" OD
0.67 FT.	K25-15990-05	22	WRAP SPIRAL BLACK 3/4 (8.00")
1	K21-50492-03	23	WASHER INSULATED PVC 1/4 X 0.62" OD
1	K21-50103-06	24	NUT HEX SS M6
2	K21-50224-30	25	SCREW HEX SS M6-1 X 30

NOTE: THE SPRING CLAMPS DELIVERED WITH THE ENGINE'S ORIGINAL FUEL LINES CAN ALSO BE USED ON THE HOSES.



NOTE: QUANTITIES IN BRACKETS [ ] ARE FOR ORIENTATION ONLY, THE PARTS BEING INCLUDED IN THE BILL OF MATERIALS FOR THE ENGINE/ALTERNATOR ASSEMBLY.

REV LEV	DATE	CHG NO	DR	CHK	REVISION RECORD
A	3/30/09	N/A	DBG	DB	ADDED ITEM #25 (K21-50224-30)
	ITEM #5 (K21-50224-25) QTY 1 WAS QTY 3				
B	8/17/09	09-40	DBG	HR	ITEM #3 QTY 4 WAS QTY 2 IN BOM

REV LEV	DATE	CHG NO	DR	CHK	REVISION RECORD

PROJECTION

DIMENSIONS ARE IN INCHES (MM)
DO NOT SCALE — TOLERANCES UNLESS OTHERWISE INDICATED
XX DECIMAL +/-.031
XXX DECIMAL +/-.015

NAME	DATE
DR D GROVE	3/20/08
APPR DB	
SCALE N/A	

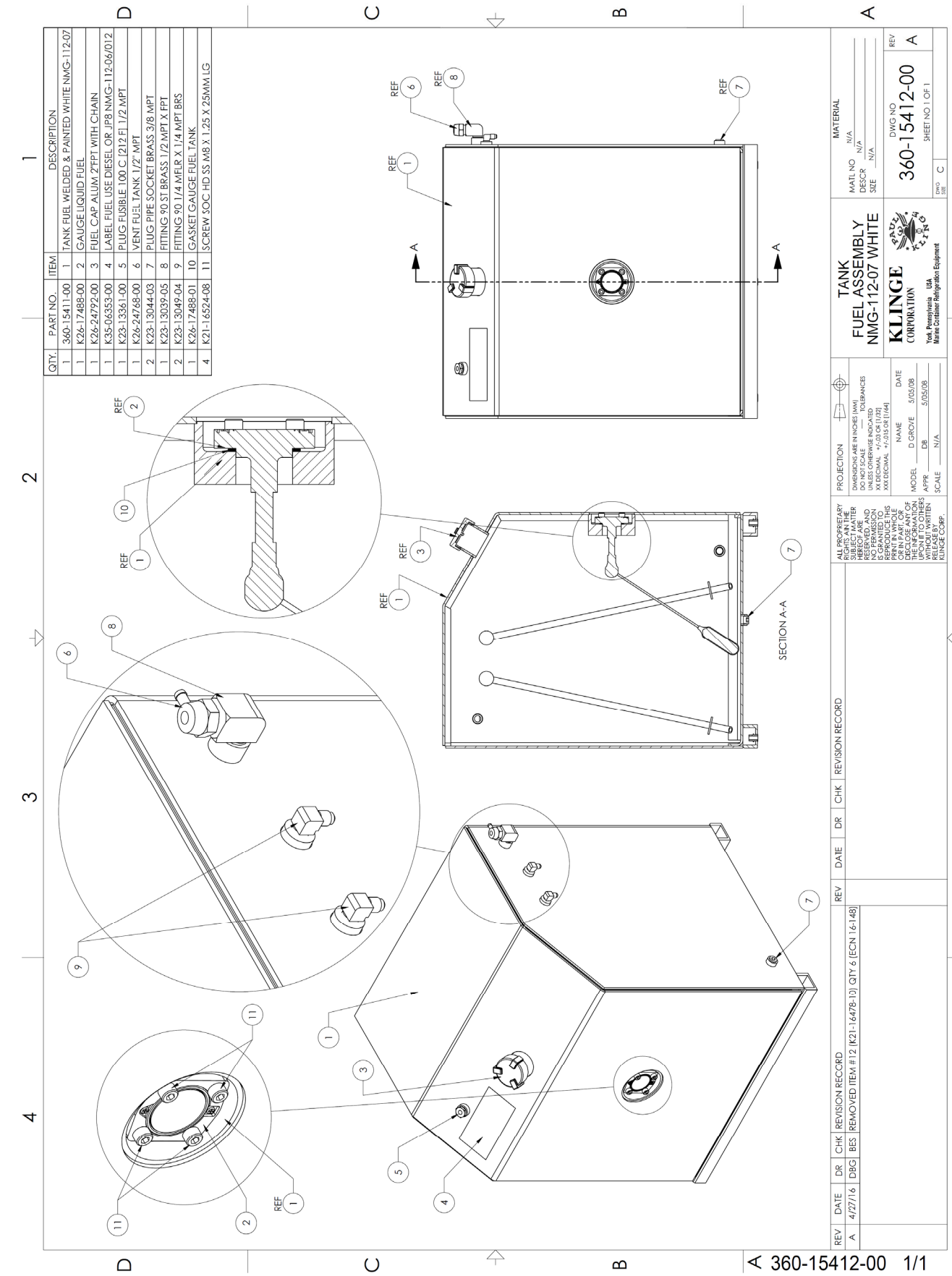
FUEL SYSTEM COMPONENTS NMG-112-07

KLINGE CORPORATION
York, Pennsylvania USA
Marine Container Refrigeration Equipment

MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 360-15413-00 REV B
SH NO 1 OF 1
DWG SIZE C

360-15413-00



QTY.	PART NO.	ITEM	DESCRIPTION
1	360-15411-00	1	TANK FUEL WELDED & PAINTED WHITE NMG-112-07
1	K26-17488-00	2	GAUGE LIQUID FUEL
1	K26-24792-00	3	FUEL CAP ALUM 2"FPT WITH CHAIN
1	K35-06353-00	4	LABEL FUEL USE DIESEL OR JP8 NMG-112-06/012
1	K23-13361-00	5	PLUG FUSIBLE 100 C [212 F] 1/2 MPT
1	K26-24768-00	6	VENT FUEL TANK 1/2" MPT
2	K23-13044-03	7	PLUG PIPE SOCKET BRASS 3/8 MPT
1	K23-13039-05	8	FITTING 90 ST BRASS 1/2 MPT X FPT
2	K23-13049-04	9	FITTING 90 1/4 MFLR X 1/4 MPT BRS
1	K26-17488-01	10	GASKET GAUGE FUEL TANK
4	K21-16524-08	11	SCREW SOC HD SS M8 X 1.25 X 25MM LG

REV	DATE	DR	CHK	REVISION RECORD
A	4/27/16	DBG	BES	REMOVED ITEM # 12 [K21-16478-10] QTY 6 [ECN 16-148]

ITEM	PART NO.	DESCRIPTION	QTY EA	QTY FEET	QTY INCHES
1	360-15416-00	BOX ELECTRICAL ASSEMBLY NMG-112-07 WHITE	1		
2	360-14509-03	CABLE POWER ASSEMBLY - PIGGY TAIL WITH POWER RECEPTACLE	1		
3	360-14508-02	CABLE AUXILIARY BATTERY CHARGER	1		
4	K25-26607-05	CONNECTOR BODY MALE 5 CONTACTS	1		
5	K25-26608-05	CONNECTOR BODY FEMALE 5 CONTACTS	1		
6	K25-26611-01	CONTACT PIN 18-16 GA 30A / 16V	1		
7	K25-26611-02	CONTACT PIN 14-12 GA 30A / 16V	2		
8	K25-26611-03	CONTACT PIN 12-10 GA 30A / 16V	2		
9	K25-26612-02	CONTACT SOCKET 14-12 GA 30A / 16V	3		
10	K25-26612-03	CONTACT SOCKET 12-10 GA 30A / 16V	2		
11	K25-26016-00	SEAL WIRE 20-18 GA (2.03-2.80mm) GREEN	1		
12	K25-26016-01	SEAL WIRE 16-14 GA (2.81-3.49mm) GRAY	5		
13	K25-26016-02	SEAL WIRE 12 GA (3.45-4.30mm) BLUE	4		
14	K25-09018-00	TERMINAL RING #8 (22-18 GA) INSULATED RED	6		
15	K25-10865-00	TERMINAL RING #8 (16-14 GA) INSULATED BLUE	21		
16	K25-08499-00	TERMINAL RING #8 (12-10 GA) INSULATED YELLOW	4		
17	K25-11083-00	TERMINAL RING #10 (16-14 GA) INSULATED BLUE	4		
18	K25-08477-00	TERMINAL RING #10 (12-10 GA) INSULATED YELLOW	6		
19	K25-18946-00	TERMINAL RING 1/4 (22-18 GA) INSULATED RED	1		
20	K25-21101-00	TERMINAL RING 1/4 (16-14 GA) INSULATED BLUE	5		
21	K25-25896-00	TERMINAL ADAPTER 1/4 PUSH-ON #6 SCREW	3		
22	K25-26595-01	TERMINAL PUSH-ON 1/8 (18-16 GA) FULLY INSULATED	6		
23	K25-23735-00	TERMINAL PUSH-ON 1/4 (16-14 GA) FULL INSUL BLUE	13		
24	K25-26073-00	TERMINAL PUSH-ON 1/4 (12-10 GA) FULL INSUL YELLOW	2		
25	K25-26627-00	CLIP 90° MALE CONNECTOR DELPHI PACKARD MOUNTING	1		
26	K25-26628-04	CONDUIT FLEX SPLIT NYLON BLACK 0.415 I.D. 0.556 O.D.		1.17 FT	(14.0")
27	K25-26630-04	CABLE WRAP NYLON WHITE 0.31" ID 0.38" OD 0.035" THK		2.00 FT	(24.0")
28	K25-23742-00	WIRE ELECT TIN 14 GA WHITE PVC INSULATED 1000V		0.67 FT	(8.0")
29	K25-23742-01	WIRE ELECT TIN 14 GA BLACK PVC INSULATED 1000V		0.67 FT	(8.0")
30	K25-23742-02	WIRE ELECT TIN 14 GA RED PVC INSULATED 1000V		3.54 FT	(42.5")
31	K25-23742-04	WIRE ELECT TIN 14 GA GREEN PVC INSULATED 1000V		6.29 FT	(75.5")
32	K25-23742-06	WIRE ELECT TIN 14 GA YELLOW PVC INSULATED 1000V		3.92 FT	(47.0")
33	K25-23743-02	WIRE ELECT TIN 12 GA RED PVC INSULATED 1000V		5.17 FT	(62.0")
34	K25-23743-03	WIRE ELECT TIN 12 GA BLUE PVC INSULATED 1000V		5.50 FT	(66.0")
35	K25-23743-07	WIRE ELECT TIN 12 GA GRAY PVC INSULATED 1000V		3.46 FT	(41.5")
36	K25-26065-02	WIRE ELECT TIN 18 GA RED PVC INSULATED 1000V		4.88 FT	(58.5")
37	K25-26065-04	WIRE ELECT TIN 18 GA GREEN PVC INSULATED 1000V		3.17 FT	(38.0")
38	XB-994518-14	WIRE ELECT TIN 18 GA WHITE/YELLOW INSULATED 600V		(2.50 FT)	30.0"
39	XB-994518-16	WIRE ELECT TIN 18 GA WHITE/BROWN INSULATED 600V		(3.46 FT)	41.5"
40	XB-994518-17	WIRE ELECT TIN 18 GA WHITE/ORANGE INSULATED 600V		(2.75 FT)	33.0"
41	XB-994514-07	WIRE ELECT TIN 14 GA BROWN PVC INSULATED 600V		(6.92 FT)	83.0"
42	XB-994514-08	WIRE ELECT TIN 14 GA ORANGE PVC INSULATED 600V		(6.33 FT)	76.0"
43	XB-994514-10	WIRE ELECT TIN 14 GA VIOLET PVC INSULATED 600V		(6.08 FT)	73.0"
44	XB-994514-11	WIRE ELECT TIN 14 GA WHITE/BLACK PVC INSULATED 600V		(3.96 FT)	47.5"
45	XB-994514-12	WIRE ELECT TIN 14 GA WHITE/RED PVC INSULATED 600V		(3.96 FT)	8.0"
46	XB-994514-14	WIRE ELECT TIN 14 GA WHITE/YELLOW INSULATED 600V		(0.67 FT)	42.0"
47	XB-994512-07	WIRE ELECT TIN 12 GA BROWN PVC INSULATED 600V		(12.75 FT)	153.0"
48	K25-26114-03	CONDUIT PLASTIC EXTRAFLEX 3/4		1.84 FT	(22.0")
49	K25-26666-00	TERMINAL POSITION ASSURANCE MALE 5 CONTACT BLACK	1		
50	K25-26667-00	TERMINAL POSITION ASSURANCE FEMALE 5 CONTACT BLACK	1		

NOTES:

1. **CUT ITEM #26 IN TWO EQUAL 7" LONG SECTIONS. INSTALL ONE SECTION AROUND THE 5 WIRES CONNECTED TO THE MALE CONNECTOR AND THE SECOND SECTION AROUND THE FIVE WIRES CONNECTED TO THE FEMALE CONNECTOR. BOTH SECTIONS SHOULD START FROM THE END OF THE ELECTRICAL BOX.**
2. **CUT ITEM #27 IN TWO EQUAL 12" LONG SECTIONS AND WRAP EACH SECTION AROUND THE RED, WHITE, AND BLACK #10 GAUGE WIRES CONNECTED TO THE MAIN CIRCUIT BREAKER.**
3. **USE ELECTRICAL SCHEMATIC K35-06308-02 ATTACHED TO THIS DRAWING AS SHEET 3/3 FOR WIRING CONTROL.**
4. **PULL ITEM #3 (CABLE BATTERY CHARGER) THROUGH THE 1/2" STRAIGHT CONNECTOR.**
5. **PULL ITEM #2 (CABLE POWER PIGGY TAIL) THROUGH THE UPPER 3/4" CABLE GRIP.**
6. **AFTER ASSEMBLING INSTALL ITEM #49 (TERMINAL POSITION ASSURANCE MALE 5 CONTACT BLACK) TO ITEM #4 (CONNECTOR MALE 5 CONTACTS) TO SECURE WIRES.**
7. **AFTER ASSEMBLING INSTALL ITEM #50 (TERMINAL POSITION ASSURANCE FEMALE 5 CONTACT BLACK) TO ITEM #5 (CONNECTOR FEMALE 5 CONTACTS) TO SECURE WIRES.**

REV LEV	DATE	CHG NO	DR	CHK	REVISION RECORD
A	2/03/08	N/A	DBG	DB	MALE CONNECTOR WAS FEMALE ON FUEL FILTER 3/3
B	7/23/09	09-50	DBG	SRL	ADDED ITEMS #49 & #50, AND NOTES #6 & #7.

MATERIAL
MATL NO N/A
DESCR N/A
SIZE N/A

DWG NO 360-15415-00
REV B
SH NO 1 OF 3
DWG SIZE C

BOX ELECTRICAL ASSEMBLY FULLY WIRED NMG-112-07

KLINGE CORPORATION
York, Pennsylvania USA
Marine Combined Refrigeration Equipment

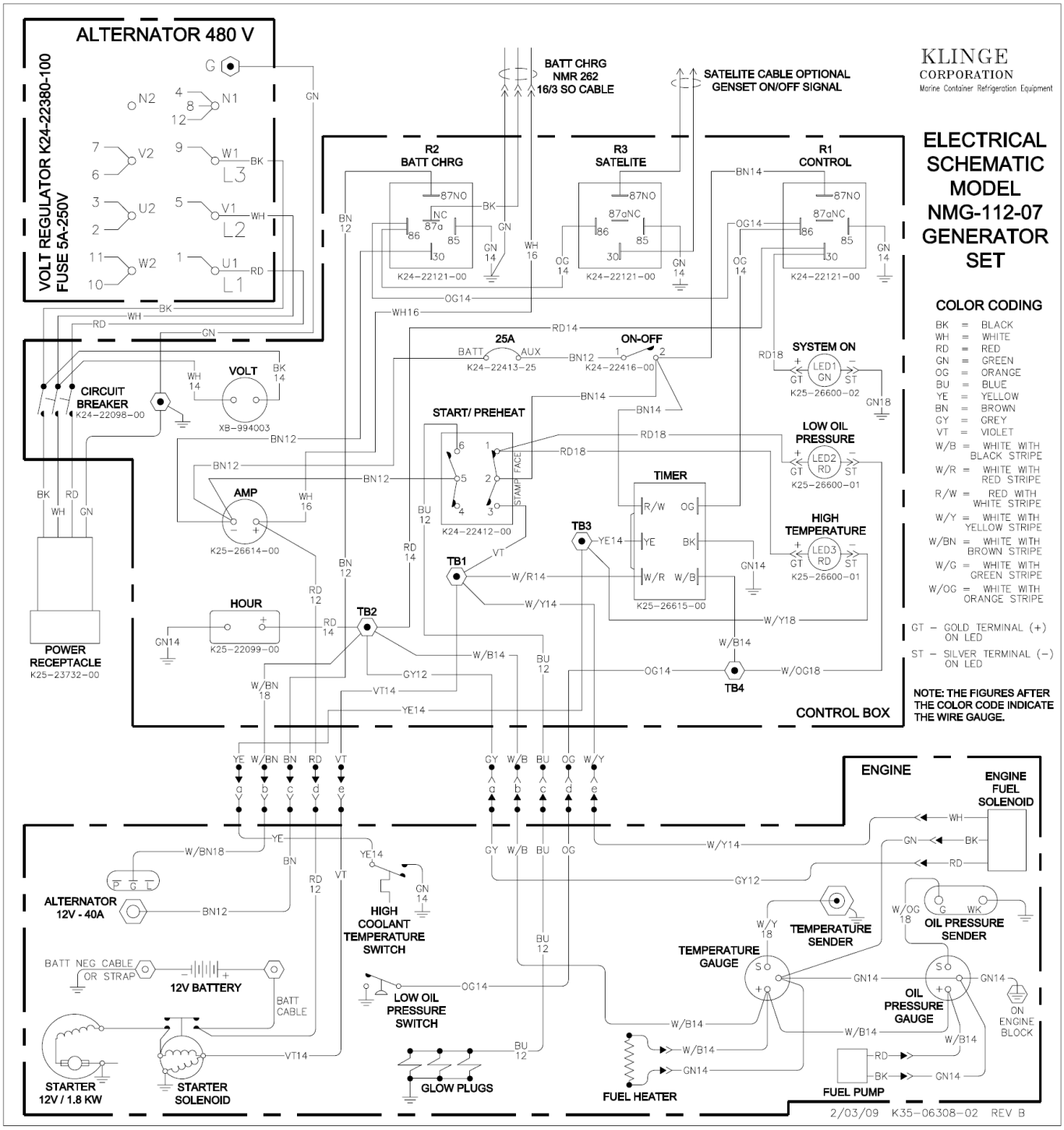
PROJECTION

DIMENSIONS ARE IN INCHES (MM)
DO NOT SCALE — TOLERANCES
UNLESS OTHERWISE INDICATED
XX DECIMAL +/-.03 OR [1/32]
XXX DECIMAL +/-.013 OR [1/64]

	NAME	DATE
DR	D GROVE	10/15/08
APPR	DB	10/15/08
SCALE	N/A	

360-15415-00 1/3

360-15415-00 REV B SHEET 2 OF 3					BOX ELECTRICAL ASEEMBLY FULLY WIRED NMG-112-07							
LINE NO.	LOCATIONS		WIRE PART NUMBER	AWG SIZE	mm²	COLOR	WIRE LENGTH MM	WIRE LENGTH (INCHES)	TERMINALS			
	"A" END	"B" END							"A" END		"B" END	
1	CONNECTOR MALE A	TB-3	K25-23742-06	14	1.95	YE	1041	41	PIN SEAL	K25-26611-02 K25-26016-01	#8 RT BLUE	K25-10865-00
2	CONNECT0R MALE B	TB-2	XB-994518-16	18	0.97	W/BN	1054	41.5	PIN SEAL	K25-26611-01 K25-26016-00	#8 RT RED	K25-09018-00
3	CONNECTOR MALE C	R2 - 87NO	XB-994512-07	12	3.10	BN	1041	41	PIN SEAL	K25-26611-03 K25-26016-02	1/4 PO YELLOW	K25-26073-00
4	CONNECTOR MALE D	AMP +	K25-23743-02	12	3.10	RD	1575	62	PIN SEAL	K25-26611-03 K25-26016-02	#10 RT YELLOW	K25-08477-00
5	CONNECTOR MALE E	TB-1	XB-994514-10	14	1.95	VT	1067	42	PIN SEAL	K25-26611-02 K25-26016-01	#8 RT BLUE	K25-10865-00
6	CONNECTOR FEMALE A	TB-2	K25-23743-07	12	3.10	GY	1054	41.5	SOCKET SEAL	K25-26612-03 K25-26016-02	#8 RT YELLOW	K25-08499-00
7	CONNECTOR FEMALE B	TB-2	XB-994514-11	14	1.95	W/B	1054	41.5	SOCKET SEAL	K25-26612-02 K25-26016-01	#8 RT BLUE	K25-10865-00
8	CONNECTOR FEMALE C	START/PREHEAT SWITCH - 6	K25-23743-03	12	3.10	BU	1676	66	SOCKET SEAL	K25-26612-03 K25-26016-02	#8 RT YELLOW	K25-08499-00
9	CONNECTOR FEMALE D	TB-4	XB-994514-08	14	1.95	OG	1016	40	SOCKET SEAL	K25-26612-02 K25-26016-01	#8 RT BLUE	K25-10865-00
10	CONNECTOR FEMALE E	TB-1	XB-994514-14	14	1.95	W/Y	1067	42	SOCKET SEAL	K25-26612-02 K25-26016-01	#8 RT BLUE	K25-10865-00
11	R1 - 30 ADAPTER	TB-2	K25-23742-02	14	1.95	RD	343	13.5	1/4 PO ADAPT #8 RT BLUE	K25-25896-00 K25-10865-00	#8 RT BLUE	K25-10865-00
12	R1 - 30 ADAPTER	LED 1 + GOLD TERM	K25-26065-02	18	0.97	RD	953	37.5	#8 RT RED	K25-09018-00 INTO 1/4 PO ADAPT FROM LINE #11	1/8 PO	K25-26595-01
13	TB-2	HOUR +	K25-23742-02	14	1.95	RD	737	29	#8 RT BLUE	K25-10865-00	1/4 PO BLUE	K25-23735-00
14	TIMER ECU -W/B	TB-4	XB-994514-11	14	1.95	W/B	152	6	1/4 PO BLUE	K25-23735-00	#8 RT BLUE	K25-10865-00
15	LED 2 - SILVER TERM	TB-4	XB-994518-17	18	0.97	W/OG	838	33	1/8 PO	K25-26595-01	#8 RT RED	K25-09018-00
16	ON-OFF -2	R1 - 87NO	XB-994514-07	14	1.95	BN	1016	40	#8 RT BLUE	K25-10865-00	1/4 PO BLUE	K25-23735-00
17	ON-OFF -2	START/PREHEAT SWITCH - 2	XB-994514-07	14	1.95	BN	203	8	#8 RT BLUE	K25-10865-00	#8 RT BLUE	K25-10865-00
18	ON-OFF -2	TIMER ECU -R/W	XB-994514-07	14	1.95	BN	889	35	#8 RT BLUE	K25-10865-00	1/4 PO BLUE	K25-23735-00
19	TB-1	START/PREHEAT SWITCH - 3	XB-994514-10	14	1.95	VT	787	31	#8 RT BLUE	K25-10865-00	#8 RT BLUE	K25-10865-00
20	AMP -	START/PREHEAT SWITCH - 5	XB-994512-07	12	3.10	BN	127	5	#10 RT YELLOW	K25-08477-00	#8 RT YELLOW	K25-08499-00
21	AMP -	CB 25A - BATT	XB-994512-07	12	3.10	BN	864	34	#10 RT YELLOW	K25-08477-00	#10 RT YELLOW	K25-08477-00
22	AMP -	R2 - 30	XB-994512-07	12	3.10	BN	940	37	#10 RT YELLOW	K25-08477-00	1/4 PO YELLOW	K25-26073-00
23	START/PREHEAT SWITCH - 1	LED 3 + GOLD TERM	K25-26065-02	18	0.97	RD	254	10	#8 RT RED	K25-09018-00	1/8 PO	K25-26595-01
24	START/PREHEAT SWITCH - 1	LED 2 + GOLD TERM	K25-26065-02	18	0.97	RD	279	11	#8 RT RED	K25-09018-00	1/8 PO	K25-26595-01
25	TB-3	LED 3 - SILVER TERM	XB-994518-14	18	0.97	W/Y	762	30	#8 RT RED	K25-09018-00	1/8 PO	K25-26595-01
26	TB-3	TIMER ECU -YE	K25-23742-06	14	1.95	YE	152	6	#8 RT BLUE	K25-10865-00	1/4 PO BLUE	K25-23735-00
27	TB-1	TIMER ECU -W/R	XB-994514-12	14	1.95	W/R	203	8	#8 RT BLUE	K25-10865-00	1/4 PO BLUE	K25-23735-00
28	CB 25A - AUX	ON-OFF -1	XB-994512-07	12	3.10	BN	914	36	#10 RT YELLOW	K25-08477-00	#8 RT YELLOW	K25-08499-00
29	R1 - 86 ADAPTER	TIMER ECU -OG	XB-994514-08	14	1.95	OG	610	24	1/4 PO ADAPT #8 RT BLUE	K25-25896-00 K25-10865-00	1/4 PO BLUE	K25-23735-00
30	R1 - 86 ADAPTER	R2 - 86 ADAPTER	XB-994514-08	14	1.95	OG	178	7	#8 RT BLUE	K25-10865-00 INTO 1/4 PO ADAPT FROM LINE #29	1/4 PO ADAPT #8 RT BLUE	K25-25896-00 K25-10865-00
31	R3 - 86	R2 - 86 ADAPTER	XB-994514-08	14	1.95	OG	127	5	1/4 PO BLUE	K25-23735-00	#8 RT BLUE	K25-10865-00 INTO 1/4 PO ADAPT FROM LINE #30
32	HOUR -	GROUND STUD	K25-23742-04	14	1.95	GN	965	38	1/4 PO BLUE	K25-23735-00	1/4 RT BLUE	K25-21101-00
33	TIMER ECU -BK	GROUND STUD	K25-23742-04	14	1.95	GN	559	22	1/4 PO BLUE	K25-23735-00	1/4 RT BLUE	K25-21101-00
34	R1 - 85	GROUND STUD	K25-23742-04	14	1.95	GN	152	6	1/4 PO BLUE	K25-23735-00	1/4 RT BLUE	K25-21101-00
35	R2 - 85	GROUND STUD	K25-23742-04	14	1.95	GN	114	4.5	1/4 PO BLUE	K25-23735-00	1/4 RT BLUE	K25-21101-00
36	R3 - 85	GROUND STUD	K25-23742-04	14	1.95	GN	127	5	1/4 PO BLUE	K25-23735-00	1/4 RT BLUE	K25-21101-00
37	LED 1 - SILVER TERM	GROUND STUD	K25-26065-04	18	0.97	GN	965	38	1/8 PO	K25-26595-01	1/4 RT RED	K25-18946-00
38	CB - AC L2	VOLTMETER 0 - 600V	K25-23742-00	14	1.95	WH	203	8	#10 RT BLUE	K25-11083-00	#10 RT BLUE	K25-11083-00
39	CB - AC L3	VOLTMETER 0 - 600V	K25-23742-01	14	1.95	BK	203	8	#10 RT BLUE	K25-11083-00	#10 RT BLUE	K25-11083-00



360-15415-00 3/3 7/23/09 REVB

ENGINE and ALTERNATOR PARTS

GENERAL

The model of the engine used on the NMG-112-07 Generator Set is **3TNV70-HGE.**
The model of the alternator used on the NMG-112-07 Generator Set is **ECO3-3SN/2** and the model of the electronic voltage regulator is **SR7/2-G**.

LIST OF FREQUENTLY USED SERVICE AND MAINTENANCE PARTS

Description	Part No.
- Oil filter	K26 25150 100
- Primary fuel filter element	K26 25180 02
- Bowl with heater-primary fuel filter	K26 25180 03
- Bowl O-ring & seal service kit	K26 25180 04
- Secondary fuel filter element	K26 25150 104
- Fuel pump electrical	K26 25179 00
- V-Belt (cooling fan and alternator)	K26 25150 101
- Air filter cartridge	K26 25102 00
- Safety filter cartridge, to be installed only if the unit is operated in a heavy dust environment	K26 25100 00
- Gasket bonnet (rocker arm cover)	K26 25150 107
- Gasket cylinder head	K26 25150 108
- Hose radiator inlet (top tank)	K26 25163 052
- Hose radiator outlet (bottom tank)	K26 25163 053
- Temperature gauge	K26 25177 00
- Temperature sender	K26 25178 00
- High temperature switch	K26 25150109
- Oil pressure gauge	K26 24934 00
- Oil pressure sender	K26 24935 00
- Oil pressure switch	K26 25111 126
- Pump assembly water	K26 25150 110
- Gasket water pump	K26 25150 111
- Thermostat	K26 25150 112
- Stop solenoid	K26 25150 113
- O-ring stop solenoid	K26 25150 114
- Starter motor 12V	K26 25150 115
- Starter solenoid (emergency switch)	K26 25150 116
- Alternator 12V battery charging	K26 25150 117
- Brush assembly battery charging alternator	K26 25150 118
- Alternator electronic voltage regulator	K24 22380 100
- Alternator BY 255 diode	XB-994108