
PRODUCT MANUAL

GCRS-40-40 T4F

Generator/Compressor

40 KW/40 CFM



This manual must be read carefully before using your MORSE Industrial Equipment GCRS-40-40 T4F.
Store in a safe and convenient location for future reference.

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Welcome

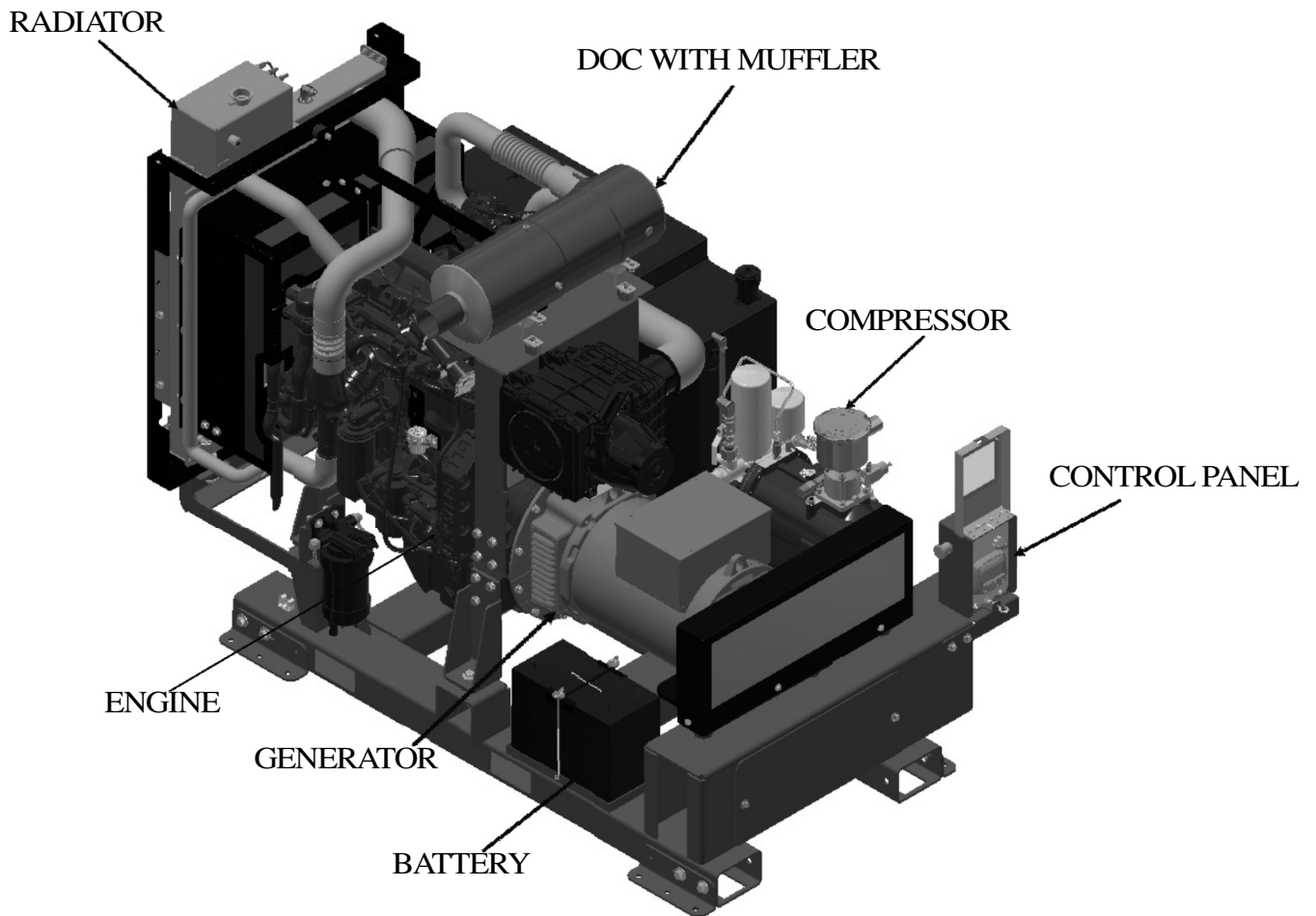
General Information

Thank you for choosing the Morse Industrial Equipment GCRS-40-40 T4F Generator/Air Compressor package. Before operating, carefully read this manual and become well acquainted with your new machine. Doing this will increase your safety and maximize the life of the machine.

Every effort has been expended to make sure that the information in this manual is both accurate and current. However, Morse Industrial Inc. reserves the right to change, alter or otherwise improve the product at any time without prior notice.

Bold printed CAUTION boxes point out important safety instructions, which if not followed, could endanger personal safety and/or property.

Read this manual, the engine manual, and the generator manual thoroughly prior to operating this unit. Follow all instructions in all three manuals. If you do not understand any portion of the manuals, contact your Morse Generator authorized dealer.



Safety

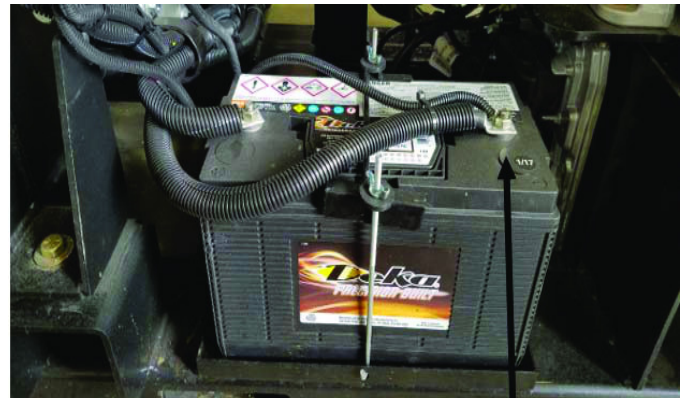
Safety Precautions

NOTICE

IF THIS UNIT IS USED FOR BACK-UP POWER IN THE EVENT OF A UTILITY POWER FAILURE, THE FOLLOWING STEP MUST BE TAKEN BEFORE CONNECTING THE GENERATOR TO AN ELECTRICAL SYSTEM. OPEN THE MAIN CIRCUIT BREAKER OR MAIN SWITCH SERVING THE SYSTEM TO ISOLATE THE GENERATOR SYSTEM FROM THE ELECTRIC UTILITY. FAILURE TO ISOLATE THE GENERATOR AND UTILITY SYSTEMS WILL RESULT IN DAMAGE TO THE GENERATOR AND MAY ALSO RESULT IN INJURY OR DEATH TO ELECTRIC UTILITY WORKERS, DUE TO A BACKFEED OF ELECTRICAL ENERGY.

DANGER

- THIS UNIT PRODUCES DANGEROUS HIGH VOLTAGE THAT CAN CAUSE EXTREMELY HAZARDOUS ELECTRICAL SHOCK. AVOID CONTACT WITH BARE WIRES, TERMINALS, ETC. NEVER PERMIT AN UNQUALIFIED PERSON TO OPERATE OR SERVICE THIS UNIT.
- NEVER HANDLE ANY ELECTRICAL CORDS OR DEVICES WHILE STANDING IN WATER, BAREFOOT, OR HANDS AND FEET ARE WET. HARMFUL OR FATAL ELECTRICAL SHOCK WILL RESULT.
- LOCAL ELECTRICAL CODES MAY REQUIRE THE USE OF AN APPROVED EARTH GROUND TO THE FRAME OF THE GENERATOR. THE GENERATOR IS EQUIPPED WITH A MOUNTING GROUND BOLT AND NUT FOR PROPER CONNECTION. CONSULT WITH A LOCAL ELECTRICIAN FOR GROUNDING REQUIREMENTS IN YOUR AREA.



GROUND TERMINAL

- NEVER ADD FUEL WHILE UNIT IS RUNNING.
- DO NOT SMOKE WHEN PUTTING FUEL IN THE TANK.
- DIESEL ENGINE EXHAUST CONTAINS DEADLY CARBON MONOXIDE GAS. IF BREATHED IN SUFFICIENT CONCENTRATIONS, IT WILL CAUSE UNCONSCIOUSNESS OR DEATH. MAKE SURE THE GENERATOR HAS ADEQUATE VENTILATION FOR THE EXHAUST.
- KEEP HANDS, FEET, CLOTHING, ETC. AWAY FROM DRIVE BELTS, FANS, AND OTHER MOVING PARTS. NEVER REMOVE DRIVE BELTS OR FAN GUARDS WHILE THE UNIT IS RUNNING.

NOTICE

- DO NOT OVERFILL THE FUEL TANK.
- BOTH THE DIESEL ENGINE AND THE GENERATOR REQUIRE FRESH AIR FOR COOLING. MAKE SURE SUFFICIENT VENTILATION IS AVAILABLE FOR BOTH THE GENERATOR AND ENGINE FANS.

Safety

Safety Precautions (Continued)

NOTICE

- DO NOT OPERATE GENERATOR WHERE IT WILL BE EXPOSED TO EXCESSIVE MOISTURE, DIRT, DUST OR CORROSIVE VAPORS.
- NEVER START OR STOP THE GENERATOR WITH ELECTRICAL LOADS CONNECTED AND THE CONNECTED DEVICES TURNED ON! START THE ENGINE FIRST AND LET IT STABILIZE BEFORE TURNING ON THE ELECTRICAL LOADS. TURN OFF ALL ELECTRICAL LOADS BEFORE SHUTTING DOWN THE ENGINE.
- OPERATE GENERATOR ON LEVEL SURFACES UP TO + OR - 10° GRADE.

- BEFORE PERFORMING MAINTENANCE ON THIS EQUIPMENT, DISCONNECT THE BATTERY CABLES TO PREVENT ACCIDENTAL START-UP. TAKE CARE NOT TO “ARC” THE BATTERY POSTS (DO NOT TOUCH POSITIVE (+) TO NEGATIVE (-)) WITH THE ENDS OF THE CABLE OR TOOLS USED TO REMOVE THE CABLES. DISCONNECT THE POSITIVE (+) CABLE FIRST. RECONNECT THE POSITIVE (+) CABLE LAST.

- NEVER WEAR JEWELRY WHEN WORKING ON THIS GENERATOR. JEWELRY CAN CONDUCT ELECTRICITY RESULTING IN ELECTRIC SHOCK, OR MAY GET CAUGHT IN MOVING COMPONENTS SUCH AS FANS OR BELTS CAUSING INJURY.

- STUDY THE DANGER WARNINGS AND SAFETY RULES CAREFULLY. BECOME FAMILIAR WITH BOTH THE ENGINE AND GENERATOR SAFETY RULES AND WARNINGS FOUND IN THEIR RESPECTIVE MANUALS.

- MORSE INDUSTRIAL EQUIPMENT INC. CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A SAFETY HAZARD. THE WARNINGS IN THIS MANUAL, THE ENGINE, AND THE GENERATOR MANUALS ARE NOT ALL INCLUSIVE AND ONE MUST USE COMMON SENSE.

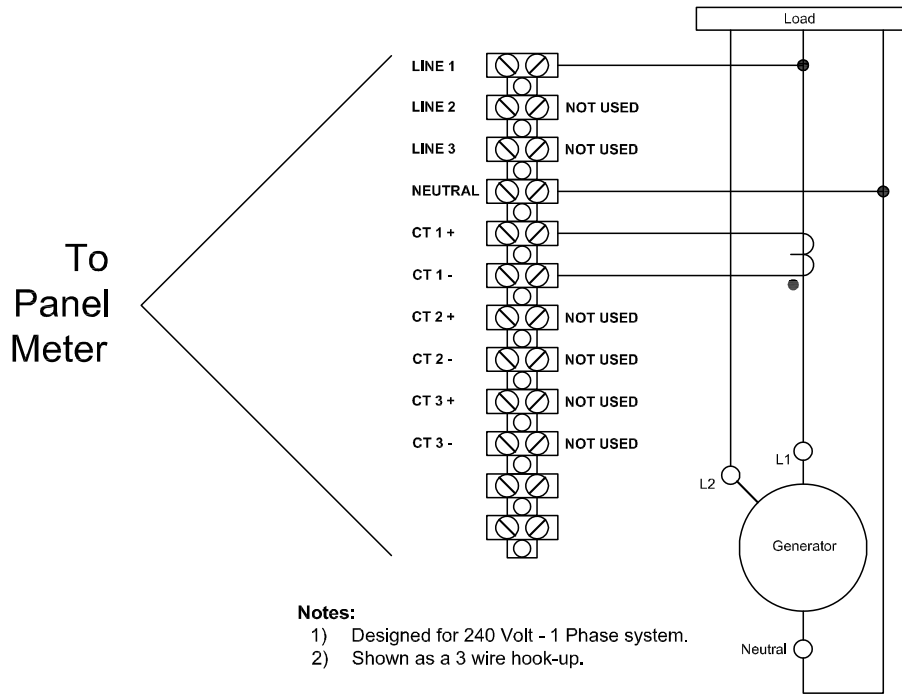
- MORSE INDUSTRIAL EQUIPMENT INC. REQUIRES THE INSTALLATION OF AN ELECTRICAL DISCONNECT BOX THAT ADHERES TO ALL LOCAL ELECTRICAL CODES.

Safety Rules

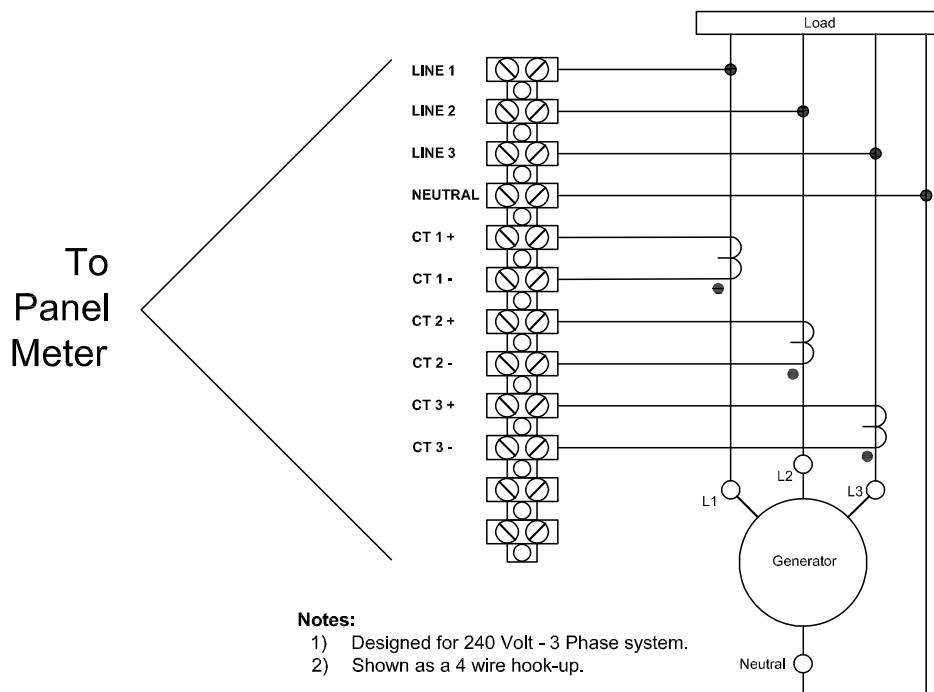
- MORSE INDUSTRIAL EQUIPMENT INC. RECOMMENDS THAT THE INSTALLATION, INITIAL START-UP AND MAINTENANCE OF THIS GENERATOR IS CARRIED OUT BY A MORSE GENERATOR DEALER. DO NOT ATTEMPT TO INSTALL, START, WIRE OR PERFORM MAINTENANCE ON THIS GENERATOR UNLESS YOU ARE TRAINED AND QUALIFIED TO DO SO. PERSONAL INJURY OR DEATH MAY OCCUR.
- KEEP HANDS AND ALL BODY PARTS AWAY FROM THE HOT ENGINE EXHAUST. THIS INCLUDES THE MUFFLER, TURBO CHARGER, AND ALL EXHAUST PIPES. OTHER PARTS OF THE ENGINE AND RADIATOR ARE ALSO HOT.
- WHEN WORKING ON THIS GENERATOR, REMAIN ALERT AT ALL TIMES. WEAR PROTECTIVE CLOTHING INCLUDING SAFETY GLASSES. NEVER WORK ON THIS EQUIPMENT WHEN YOU ARE MENTALLY OR PHYSICALLY FATIGUED,

Installation

1-PHASE REMOTE METER PANEL WIRING



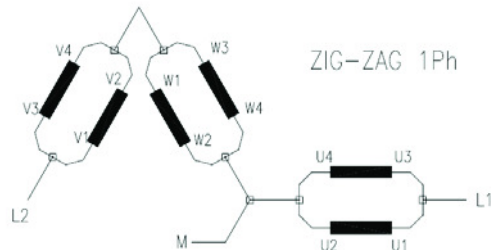
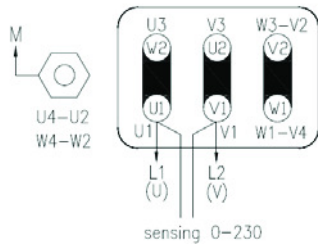
3-PHASE REMOTE METER PANEL WIRING



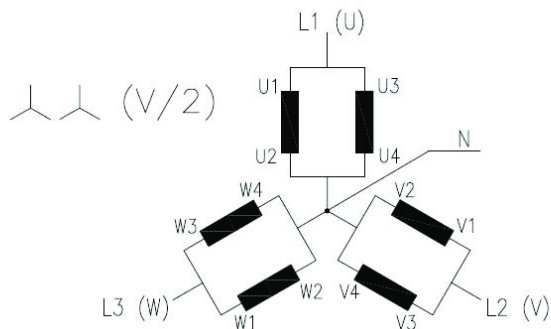
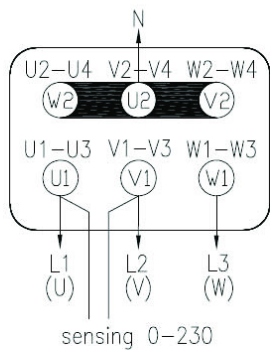
Installation

INTERNAL GENERATOR WIRING

Single Phase
"Zig Zag"



Three Phase



RECOMMENDED BREAKER SIZE (CUSTOMER SUPPLIED)

	Three Phase			Single Phase	
Volts	208V	220V	240V	230V	240V
Breaker	140A	130A	120A	130A	125A

Installation

Louvers

- To avoid potential overheating issues, the exhaust louvers should be sized to a minimum of 6000 CFM @ 1" H₂O and at least 27" H x 23 3/4" W.
- To ensure adequate fresh air flow, the air intake louvers should be at least double the size and performance of the exhaust louvers.

DOC Muffler

- DO NOT move the DOC muffler or adjust its position. Tampering with the DOC will void the warranty!
- For exhaust routing use 3" exhaust pipe. A combination of straight pipe, flex pipe, and elbows is allowed.
- A section of flex piping is REQUIRED if the exhaust is hard mounted to the trailer.

General Description

This generator is a frame mounted, diesel engine driven, revolving field, alternating current (AC) generator. The generators revolving field is driven at 1800 rpm by the diesel engine.

- This generator can be used for prime or stand by power and can be wired 3 phase or 1 phase at a frequency of 60 hertz. Voltage can be 120/240 1-PH; and 416 to 480 volt 3-PH. Please refer to the Generator Manual for details.
- Follow all local electrical codes that may require proper grounding of the generator and its electrical system.
- In case of an accident caused by electric shock, immediately shut down the generator. Press the Emergency stop button located on the side of the control panel. Then turn the main ON/OFF rotary switch to the “OFF” position. Do not try to free the victim with the generator running; the electric shock could pass from the victim to anyone in contact with the victim. Make sure the generator is off and the electric system is de-energized. Seek medical attention immediately.

EMERGENCY STOP



MAIN ON/OFF



Hazards & Warnings

Electrical Shock Hazards

This generator produces dangerous electrical voltages that can cause fatal electrical shock. Avoid contact with bare wires, terminals, connections, etc. while the unit is running. Make sure all appropriate covers, guards, and barriers are in place before operating the Generator.

- Do not assume that there is not power flow to the terminals, connections, bare wires, etc. when the generator is not running. The unit could be connected to another power source that could back feed through the generator wire leads. Always test the wire leads for power before working on the unit.
- The National Electrical Code (NEC) requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground unless the generator is vehicle mounted. See article 250.34 of the NEC handbook if the generator is to be mounted in a portable vehicle.

Fire Hazards

- For fire safety, the generator must be operated and maintained properly. Operation must always comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state, and national electrical and building codes. Comply with regulations of the Occupational Safety and Health Administration (OSHA). Ensure the generator and engine are operated in accordance with the manufacturer's instructions and recommendations. Do not alter the construction of the generator or engine or change controls which might create an unsafe operating condition.
- Keep a fire extinguisher near the generator at all times. Make sure the extinguisher is rated "ABC" by the National Fire Protection Association. Keep the extinguisher properly charged and be informed on instructions for use.

Explosion Hazards

- Do not smoke around the generator. Wipe any fuel or oil spills immediately. Make sure there are no combustible materials near or on the generator that can cause a FIRE or EXPLOSION. Keep the area surrounding the generator clean and free from debris.

Warnings

DO NOT START OR STOP GENERATOR WITH ANY CONNECTED ELECTRICAL DEVICE TURNED ON. GENERATOR MUST NOT BE STARTED OR STOPPED WITH ANY TYPE OF ELECTRICAL LOAD ON THE GENERATOR. LOAD GENERATOR AFTER THE GENERATOR IS WARMED UP.

- Operators must not tamper with engine governed speed. High operating speeds are dangerous and increase risk of personal injury or damage to equipment. The generator supplies correct rated frequency and voltage only when running at proper governed speed. Incorrect frequency and/or voltage can damage some connected electrical loads.
- Electrical surges and spikes can cause serious damage to your system and everything plugged into it. Proper surge protectors should be used between the receptacles and every electrical system being used.
- Never weld to truck or trailer chassis, as this will cause damage to many electrical or electronic components grounded to vehicle chassis.

Operation

Initial Startup Preparation

Every GCRS 40-40 T4F is tested at the factory before shipment. This testing assures that the unit is operating properly and that the generator and compressor will deliver its rated capacity. Regardless of the care taken at the factory, there still exists a possibility that damage may occur during shipment. For this reason, it is recommended that the unit be carefully inspected for evidence of damage during shipment. The unit is shipped with the positive battery cable removed. The positive battery cable will need to be connected before starting.



POSITIVE TERMINAL

Operating Conditions

The following conditions should exist for maximum performance of the compressor:

- The machine should be as close to level as possible when operating. The machine should not exceed 10° in any direction .
- Ambient temperature for operation should be below 120°F (49°C).The machine may experience high temperature shutdown above this level.
- Ambient temperature for operation should be above 0°F (-18°C).

Pre-Start-up Inspection Checks

This inspection should be done prior to the compressor test.

- I. Unpack and inspect unit thoroughly upon delivery for any unseen damage during transit.
- II. Check all assemblies, clamps, fittings, hose connections, nuts, and bolts to ensure they are properly tied and secured to the vehicle. This is a very critical area of inspection. The vehicle should not be moved until this inspection has been completed.
- III. Remove all tools, rags, and installation equipment from the area.
- IV. Check compressor oil level and check valves to ensure they're in the correct position.
- V. Check belt tension. Proper belt tensioning is 1/4" deflection @ 2.89 lbf to 4.29 lbf per strand. (For banded belts, like the one supplied with the unit, the belt tensioning should be 1/4" deflection @ 5.78 lbf to 8.58 lbf total.)

Operating Procedure

- I. Read this manual carefully before proceeding.
- II. Verify the service valve is closed, and generator loads are disconnected.
- III. Start the engine
- IV. Allow 3-5 minutes for engine to warm-up.
- V. Open service valve or engage generator and connect electrical equipment

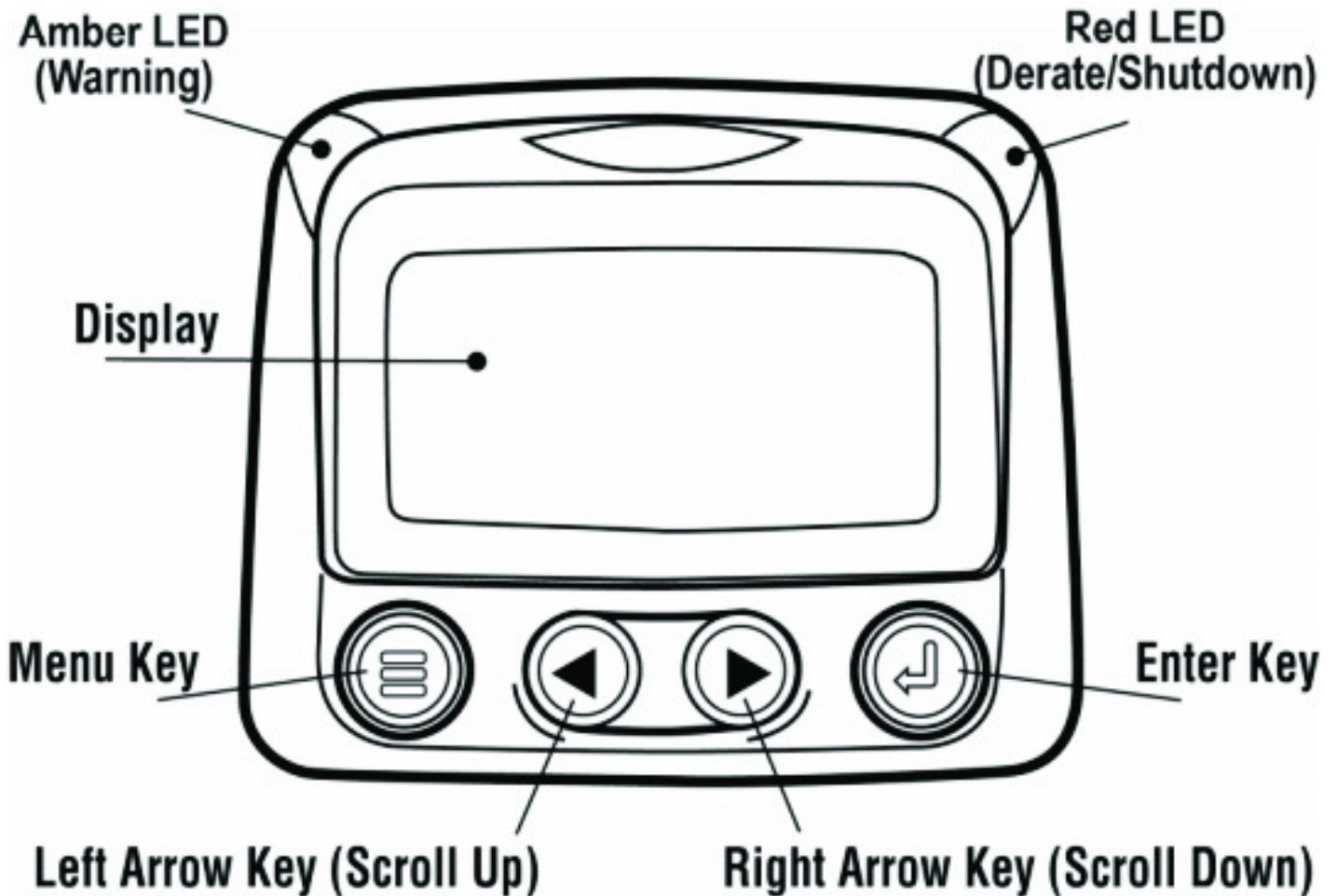
Shutdown Procedure

- I. Close service valve, and disconnects all generator loads.
- II. Turn switch key off
- III. The engine will idle for 45 seconds before shutting down completely

DISPLAY PANEL





Panel Overview

The Murphy PV101 is a compact, durable, and convenient GCRS-40-40 T4F system display. It allows the engine parameters to be displayed for the user. The panel communicates with the engine using on-board CAN to check all of the safeties and display any faults. The user will not have to interact with the panel during normal operation. Startup and shutdown is controlled through the ignition switch while the panel's function is to display parameters and faults. If there is an engine fault at any time you will need to acknowledge the fault by pressing the Enter Key. If the fault is still active, the panel will still show the warning or shutdown icon. To redisplay the fault simply press the Enter Key again.



DISPLAY PANEL

The keypad on the PowerView display is a capacitive touch sensing system. There are no mechanical switches to wear or stick. The keys on the keypad perform the following functions:

	Menu – Enter or exit menu screens.
	Left Arrow – Scroll the screen or move the parameter selection to the left or upward.
	Right Arrow – Scroll the screen and move the parameter selection to the right or downward.
	Enter Key – Select a menu or parameter or hide/view an active fault code.

DISPLAY PANEL

Faults and Warnings

The PowerView provides two means for detecting faults and warnings: visual LEDs on the casing (*Amber* in the upper left corner, and *Red* in the upper right corner) and fault indicators on the display.

Visual Indication

- Amber LED (Warning)
- Red LED (Derate / Shutdown)

Fault Indicators

 Warning

 Derate / Shutdown

Active Fault Codes

When the PowerView receives a fault code from an engine, the 1-up or 4-up display is replaced with the active fault codes message.

Derate / Shutdown Codes

When the PowerView receives a severe fault code from an engine control unit the 1-up or 4-up display is replaced with the SHUTDOWN message.

Specifications

MODEL GCRS-40-40 T4F

Wet Weight = 2350 lbs. (1066 kg)

Dry Weight = 2070 lbs. (939 kg)

Fuel Capacity = 40 gal (151 liters)

ENGINE

Model: Cummins QSF3.8
Power @ 1800 rpm: 74 hp (55 kw)
Number of Cylinders: 4
Bore and Stroke: 4.02 x 4.53 in (102 x 115mm)
Displacement: 229in³ (3.8l)
Aspiration: Turbocharged Charge Air Cooled and EGR
Battery: 12 v 950 cca @ 0 degrees Fahrenheit
Ambient Operating Temp Range: 0°F to 120°F (-18°C to 49°C)

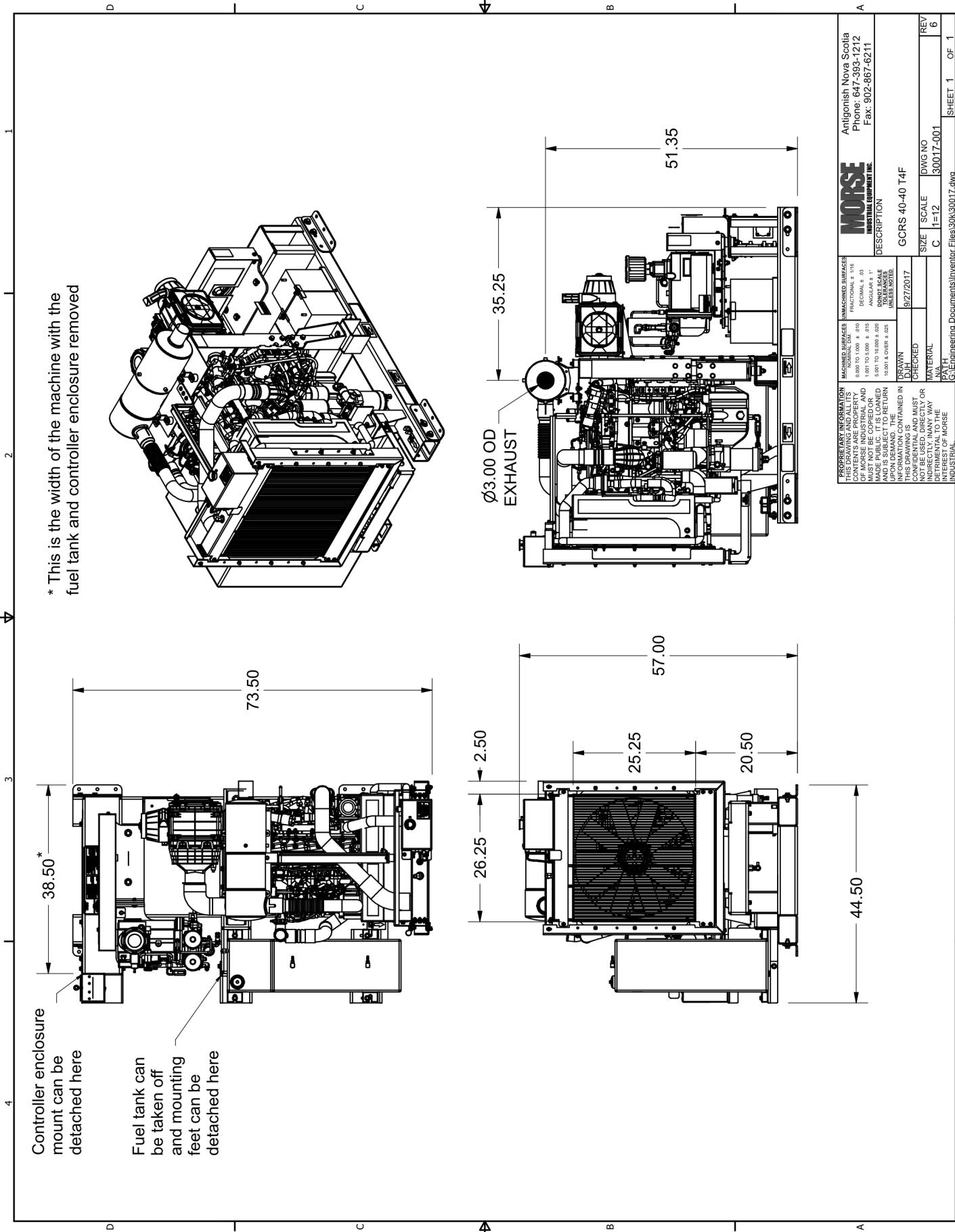
GENERATOR

Model: 40 KW Alternator
Output kw: 40 kw Prime, 44.5 kw Stand-by
Voltage: 208 - 240, 3 ph, 60 hz
Amps: 142 @ 208v , 134 @ 220v , 123 @ 240v

COMPRESSOR

Model: Integrated Air Compressor
Type: Oil Flooded Rotary Screw
Delivery: 40 cfm (1.13 m³/min)
Operating Pressure Range: 80 to 130 PSIG (5.5 to 9 bar)
Oil Sump Capacity: .75 gal (2.83 L)
Total System Capacity: 1.0 gal (3.80 L)
Type Cooling System: Oil to Air
Air Intake Filter: Single Stage Dry
Type of Control: 0-100% Demand
Air Service Connection: 1/2" NPT

Specifications



PROPRIETARY INFORMATION		MORSE INDUSTRIAL EQUIPMENT INC.	
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Compressor Lubrication and Maintenance

This section contains instructions for performing the inspection, lubrication and maintenance procedures required to keep the compressor in proper operating condition. The importance of performing the maintenance described herein cannot be over emphasized.

Periodic maintenance procedures to be performed on the equipment covered by this manual are listed below. It should be understood that the intervals between inspections specified are maximum intervals. More frequent inspections should be made if the unit is operating in a dusty environment, in high ambient temperature, or in other unusual conditions. A planned program of periodic inspection and maintenance will help avoid premature failure and costly repairs. Daily visual inspections should become a routine.

The LUBRICATION AND MAINTENANCE CHART lists serviceable items on this compressor package. The items are listed according to their frequency of maintenance, followed by those items which need only “As Required” maintenance. The maintenance time intervals are expressed in hours. Use the display panel hour readings for determining your maintenance schedules. To find machine hours simply use the left/right buttons to scroll to the correct parameter. Perform the maintenance at multiple intervals of the hours shown.

In addition to the following LUBRICATION AND MAINTENANCE CHART refer to the Engine Operator’s manual for recommended engine lubrication and maintenance.

DANGER

COMPRESSOR MUST BE SHUT DOWN AND COMPLETELY RELIEVED OF PRESSURE PRIOR TO CHECKING FLUID LEVELS. OPEN SERVICE VALVE TO ASSURE RELIEF OF SYSTEM AIR PRESSURE. FAILURE TO COMPLY WITH THIS WARNING MAY CAUSE DAMAGE TO PROPERTY AND SERIOUS BODILY HARM.

**FOR ENGINE MAINTENANCE DETAILS, PLEASE REFER TO THE
ENGINE MANUAL**

Compressor Lubrication and Maintenance

NOTE

OBSERVE ALL GAUGE READINGS. NOTE ANY CHANGE FROM THE NORMAL READING AND DETERMINE THE CAUSE. HAVE NECESSARY REPAIRS MADE. "NORMAL" IS THE USUAL GAUGE READING WHEN OPERATING AT SIMILAR CONDITIONS ON A DAY-TO-DAY OPERATION.

FIRST COMPRESSOR OIL AND OIL FILTER CLEANING SHOULD BE DONE AT 50 HOURS. ALSO, MORE FREQUENT OIL CHANGES WILL BE REQUIRED UNDER EXTREME OPERATING CONDITIONS OF EXTREMELY HIGH OR LOW TEMPERATURES, AND HIGH HUMIDITY.

CHANGE OIL EVERY SIX MONTHS, EVEN IF THE NORMAL OIL CHANGE PERIOD, IN HOURS, HAS NOT YET ELAPSED.

ALWAYS WARM UP THOROUGHLY PRIOR TO CHANGING EITHER THE ENGINE OIL OR THE COMPRESSOR OIL.

DO NOT OPEN COMPRESSOR OIL DRAIN; OIL FILTER CAP, OR OIL FILTER UNTIL ALL PRESSURE HAS BEEN RELIEVED. CHECK BY MANUALLY OPENING THE ASME SUMP PRESSURE RELIEF VALVE.

Draining Water From Compressor Oil

Prior to initial start-up; it is recommended to drain water from the compressor sump. Compressor must be shut off for at least 4-6 hours. First, verify there is no pressure in the system. Then, slowly crack the oil drain cap. When opening the oil drain port, any water will drain out before the oil if fully separated. Catch all fluids in a container and dispose of properly. When no water is present, retighten the compressor oil drain cap. Check the compressor oil level and add oil if necessary.

Lubricant Recommendations

WARNING

IT IS IMPORTANT THAT THE COMPRESSOR FLUID BE OF A RECOMMENDED TYPE AND THAT THIS OIL AS WELL AS THE AIR FILTER, OIL FILTER AND COALESCER ELEMENTS BE INSPECTED AND REPLACED AS STATED IN THIS MANUAL. THE COMBINATION OF A SEPARATOR ELEMENT LOADED WITH DIRT AND OXIDIZED OIL PRODUCTS TOGETHER WITH INCREASED AIR VELOCITY AS A RESULT OF THIS CLOGGED CONDITION MAY PRODUCE A CRITICAL POINT WHILE THE MACHINE IS IN OPERATION WHERE IGNITION CAN TAKE PLACE AND COULD CAUSE A FIRE IN THE OIL SUMP. FAILURE TO COMPLY WITH THIS WARNING MAY CAUSE DAMAGE TO PROPERTY AND SERIOUS BODILY HARM.

Compressor Lubrication and Maintenance

Lubricant Recommendations (Continued)

The following general characteristics categorize lubricants that have been found to be satisfactory for use in helical screw type air compressors. Due to the impossibility of establishing limits on all physical and chemical properties of lubricants which can affect their performance in the compressor over a broad range of environmental influences, the responsibility for recommending and consistently furnishing a suitable heavy-duty lubricant must rest with the individual supplier. The lubricant supplier's recommendation must, therefore, be based upon not only the following general characteristics, but also upon his own knowledge of the suitability of the recommended lubricant in helical screw type air compressors operating in the particular environment involved.

CAUTION

MIXING DIFFERENT TYPES OF BRANDS OF LUBRICANTS IS NOT RECOMMENDED DUE TO THE POSSIBILITY OF A DILUTION OF THE ADDITIVES OR A REACTION BETWEEN ADDITIVES OF DIFFERENT TYPES.

Application Guide

Not all lubricating oils are suitable for rotary screw compressor use. The most satisfactory oils are the non-detergent types that contain high levels of corrosion, oxidation, and foam Inhibitors.

Your Morse SCI8 compressor is factory filled with SCO 1000. Other non-detergent motor oils, SAE 10W, class SE or CD, and HD32 HYD OIL that meet the requirements below can be used. However, Morse recommends you use SCO 1000. DO NOT MIX OILS.

The viscosity of the oil chosen depends largely on the ambient operating temperature range. The oil must provide sufficient lubrication for bearings and rotors at operating temperature, and it must have a pour point low enough to provide fluidity at low starting

temperatures. In general, the viscosity range represented by these SAE grades is satisfactory for the temperature range shown:

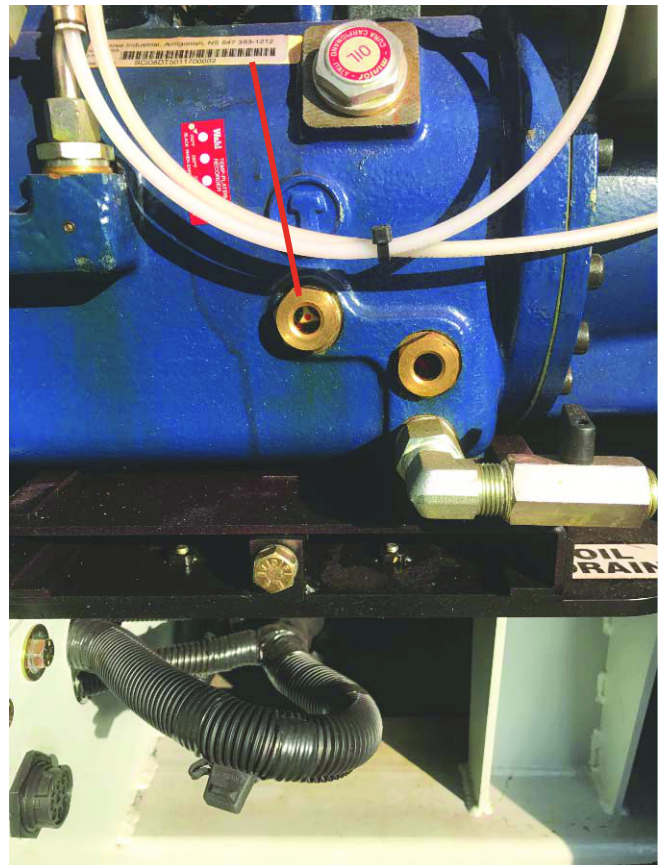
-20 degrees Fahrenheit to 120 degrees Fahrenheit HD 32 HYD OIL
(-25 degrees Fahrenheit Pour Point)

-10 degrees Fahrenheit to 75 degrees Fahrenheit SAE 10 W
(-20 degrees Fahrenheit Pour Point)

-40 degrees Fahrenheit to 120 degrees Fahrenheit Auto Trans. Fluid
(-50 degrees Fahrenheit Pour Point)

Compressor Oil Level

Your Morse SCI8 compressor should always have the proper level of oil. The oil level should always be in the middle of the upper sight glass (as shown below).



Maintenance

INTERVAL	ACTION
AFTER INITIAL 8 HOURS	<ol style="list-style-type: none"> 1. Use 3/4" socket to tighten the compressor slide plate adjustment bolt. 2. Proper belt tensioning is 1/4" deflection @ 2.89 lb. to 4.29 lb. of force per strand.
EVERY 10 HOURS OR DAILY	<ol style="list-style-type: none"> 1. Check compressor and engine oil level. 2. Check air filter. 3. Check for oil and air leaks. 4. Check fuel supply after running. 5. Check for fuel, oil and compressor fluid leaks.
EVERY 50 HOURS OR WEEKLY	<ol style="list-style-type: none"> 1. Drain water from compressor oil at sump. 2. Check belt tension.
EVERY 500 HOURS OR 6 MONTHS	<ol style="list-style-type: none"> 1. Change compressor oil and clean oil filter. 2. Check air filter piping, fittings and clamps. 3. Install new air filter element. (Shorter interval may be necessary under dusty conditions). 4. Check for excessive wear on drive belts. Replace if necessary. 5. Ensure coolant voltage is below 300mV.
EVERY 1000 HOURS OR 1 YEAR	<ol style="list-style-type: none"> 1. Check safety circuit switches. 2. Clean battery terminals. 3. Check compressor shaft seal for leakage. 4. Install new air filter element (Shorter interval may be necessary under dusty conditions) 5. Replace spin-on coalescer element.
EVERY 2000 HOURS OR 2 YEARS	<ol style="list-style-type: none"> 1. Drain and flush radiator.
PERIODICALLY OR AS REQUIRED	<ol style="list-style-type: none"> 1. Inspect air filter element. 2. Replace spin-on coalescer element if necessary. 3. Inspect and clean compressor oil system cooler, etc. 4. Check engine and compressor supports.

NOTE: For clarification on above see the Maintenance section.

Maintenance

Compressor Oil Sump Fill, Level, Drain

Before adding or changing compressor oil make sure that the sump is completely relieved of pressure. Oil is added at the fill cap on the side of the compressor. A drain plug is provided at the bottom of the sump. The proper oil level, when unit is shutdown and has had time to settle is at the midpoint of the upper oil sightglass. The package must be level when checking the oil. DO NOT OVERFILL. The oil sump capacity is given in "Compressor Specifications".

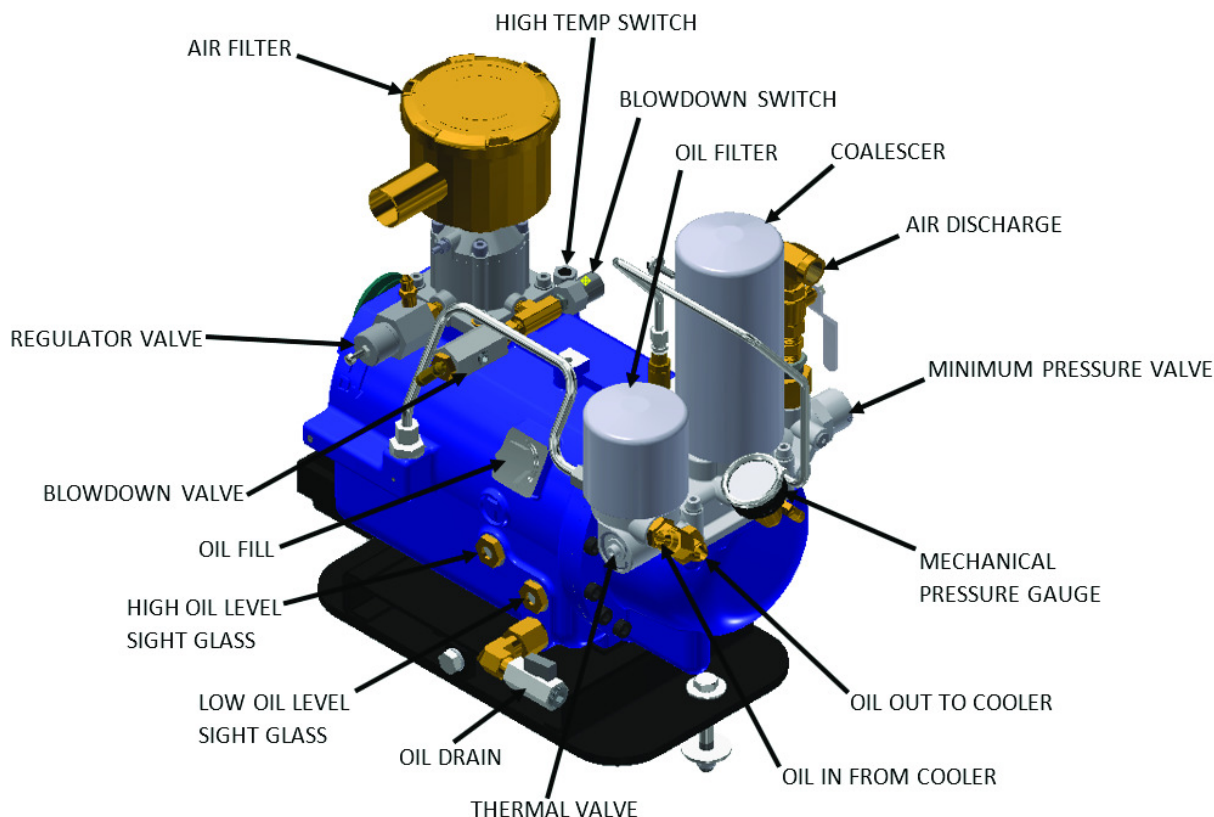
WHILE COMPRESSOR IS RUNNING DO NOT ATTEMPT TO DRAIN CONDENSATE, REMOVE THE OIL LEVEL FILL PLUG OR BREAK ANY CONNECTION IN THE AIR OR OIL SYSTEM WITHOUT SHUTTING OFF COMPRESSOR AND RELIEVING PRESSURE FROM THE SUMP. FAILURE TO COMPLY WITH THIS WARNING MAY CAUSE DAMAGE TO PROPERTY AND SERIOUS BODILY HARM.

Air / Oil Coalescer

This is a single piece unit that requires replacement when it fails to remove the oil from the discharge air.

To replace element, P/N 5013, proceed as follows:

1. Shutdown compressor and wait for complete blow down (zero pressure).
2. Turn element counterclockwise for removal (as viewed from top).
3. Install new rubber seal in head and supply a film of fluid directly on the seal.
4. Rotate element clockwise by hand until element contact seal (as viewed from top).
5. Rotate element at edge of can one more turn clockwise with band wrench.
6. Run system and check for leaks.



Maintenance

WARNING

DO NOT SUBSTITUTE ELEMENT. USE ONLY A GENUINE MORSE INDUSTRIAL REPLACEMENT ELEMENT. THIS ELEMENT IS RATED AT 200 PSI WORKING PRESSURE. USE OF ANY OTHER ELEMENT MAY BE HAZARDOUS AND COULD IMPAIR THE PERFORMANCE AND RELIABILITY OF THE COMPRESSOR, POSSIBLY VOIDING THE WARRANTY.

Oil Filter

The compressor oil filter is a spin-on filter. It is designed with a built in by-pass so that if there is a large restriction, due to cold oil or clogged element, the compressor will still be lubricated.

To replace element, P/N 5012, proceed as follows:

1. Shutdown compressor and wait for complete blow down (zero pressure).
2. Turn element counterclockwise for removal (as viewed from top).
3. Install new rubber seal in head and supply a film of fluid directly on the seal.
4. Rotate element clockwise by hand until element contact seal (as viewed from top).
5. Rotate element at edge of can one more turn clockwise with band wrench.
6. Run system and check for leaks.

Belt Tensioning Procedure

1. Use 3/4" socket to tighten the compressor slide plate adjustment bolt under the compressor on the slide plate.
2. Proper belt tensioning is 1/4" deflection @ 2.89 lbf to 4.29 lbf per strand. (For banded belts, like the one supplied with the unit, the belt tensioning should be 1/4" deflection @ 5.78 lbf to 8.58 lbf total.)

Belt Replacement Procedure

1. Remove generator compressor belt guard.
2. Use 3/4" socket to loosen the compressor slide plate adjustment bolt under the compressor on the slide plate.
3. Remove old belt.
4. Put new belt around the generator pulley then the compressor pulley.
5. Use 3/4" socket to tighten the compressor slide plate adjustment belt under the compressor on the slide plate.
6. Proper belt tensioning is 1/4" deflection @ 2.89 to 4.29 lbf per strand. (For banded belts, like the one supplied with the unit, the belt tensioning should be 1/4" deflection @ 5.78 lbf to 8.0 lbf



ADJUSTMENT SCREW

Maintenance

Engine Cooling System

The GCRS 40-40 T4F's engine has a pressurized cooling system that contains CAT EC-1. Maintenance of the system includes the engine coolant, belt tension, fan integrity, and radiator. Further cooling system maintenance is defined in the engine manual.

WARNING

WATER QUALITY IS IMPORTANT TO THE PERFORMANCE OF THE COOLING SYSTEM. DISTILLED, DEIONIZED, OR DEMINERALIZED WATER IS RECOMMENDED.

Engine Coolant

This diesel engine requires a balanced coolant mixture of water and ethylene glycol base antifreeze. This protects the engine cooling system from corrosion as well as freezing damage. The GCRS 40-40 T4F is shipped from the factory with CAT EC-1. In tropical climates where freeze protection is not required, glycol engine coolant should still be used to help prevent corrosion and pitting of cylinder liners. Drain and replace engine coolant every 12,000 hours.

NOTE

DO NOT USE COOLING SYSTEM SEALING ADDITIVES OR ANTIFREEZE THAT CONTAINS SEALING ADDITIVES.

Antifreeze concentration level should not exceed recommended levels. To do so can cause cooling system failure.

CAT EC-1 pre-mix	Freeze Protection Limit
EC-1 50/50	-37°C (-34°F)
EC-1 60/40	-52°C (-62°F)

NOTE

RADIATOR IS FACTORY FILLED WITH EC-1 COOLANT.

USE OF ANY OTHER COOLANT COULD CAUSE DAMAGE TO THE RADIATOR.

Coolant Level

Before each start-up, when radiator is cold, the coolant level should be checked. When needed, refill with EC-1. The proper level for coolant in the system is to the bottom of the radiator fill neck.

WARNING

CHECK THE COOLANT LEVEL ONLY WHEN THE ENGINE IS STOPPED AND THE TEMPERATURE IS BELOW 160° F. FAILURE TO DO SO CAN CAUSE PERSONAL INJURY FROM HEATED COOLANT SPRAY.

Engine Radiator

Any sign of leakage from the engine radiator may justify a pressure test to assure its integrity. Radiator leaks should only be repaired by qualified service technicians. Dirt that clogs the cooling fins of the radiator should be removed. The use of an air stream or high pressure steam cleaner should be done with caution so as to not damage the delicate fins. Bent cooling fins will reduce the cooling capability of the radiator.

WARNING

MIXING DIFFERENT TYPES OF BRANDS OF COOLANT IS NOT RECOMMENDED DUE TO THE POSSIBILITY OF A DILUTION OF THE ADDITIVES OR A REACTION BETWEEN ADDITIVES OF DIFFERENT TYPES.

Maintenance

Recommended Spare Parts

Below you will find a list of parts we recommend you keep on hand for your GCRS-40-40 T4F

DESCRIPTION	PART NUMBER
MORSE SCO-1000 LUBRICANT (1G)	5050
OIL FILTER ELEMENT	5012
COALESCER ELEMENT	5013
AIR FILTER ELEMENT	5014
DRIVE BELTS	5015
SHAFT SEAL REPAIR KIT SCA8D	5016
ENGINE AIR FILTER ELEMENT	5017

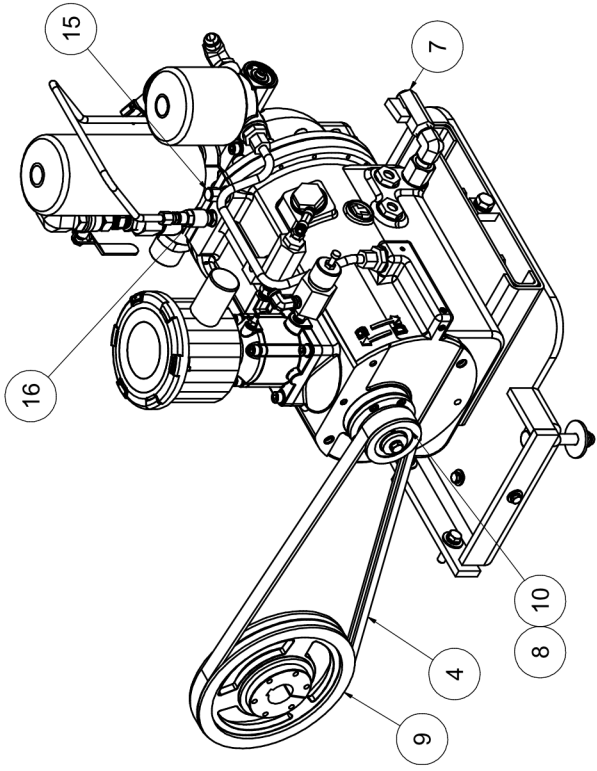
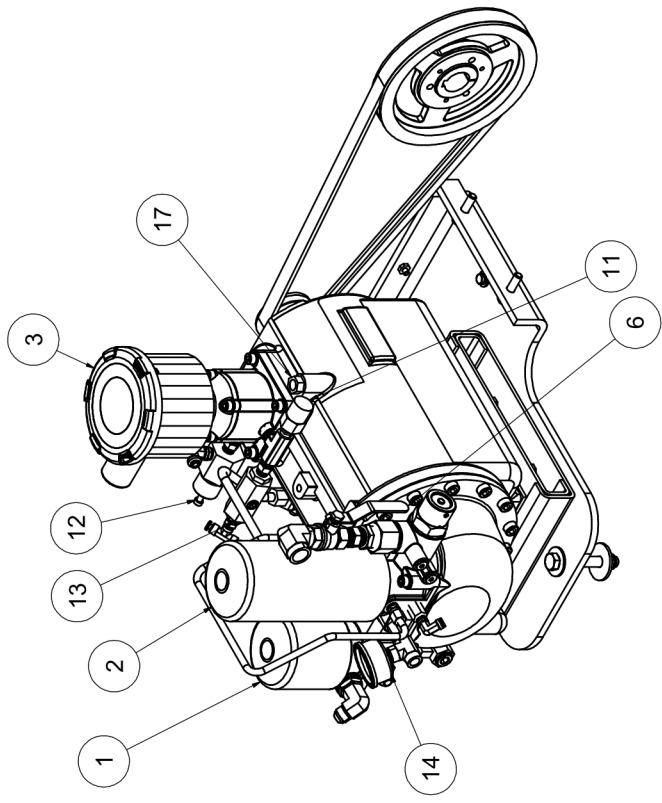
**FOR ENGINE MAINTENANCE
DETAILS, PLEASE REFER TO
THE ENGINE MANUAL**

Replacement Parts

<u>Morse Part Number</u>	<u>Description</u>
5012	ASSY, MORSE T4F OIL FILTER
5013	ASSY, MORSE T4F COALESCER
5014	ELEMENT, AIR FILTER SCI8D5
5015	BELT, DOUBLE BANDED 3VX500
5016	KIT, SHAFT SEAL SCA8DR2
5017	ELEMENT, AIR FILTER ENG 40KW
5019	TANK, FUEL 40 GAL PLASTIC
5020	SOLENOID, 12VDC 100AMP POWER
5021	FAN, 24" BLOWER CM 3.8L
5023	GENERATOR, 40KW SAE 3 3PH STUB
5024	SOLENOID, 12VDC 200AMP POWER
5025	VALVE, SERVICE 1/2 VENTED PORT
5026	VALVE, MINI BALL 1/2 NPT
5027	BUSHING, TAPER-LOCK #1108 25MM
5028	PULLEY, 8.0 2GR 3V
5029	PULLEY, 2.8 2GR 3V TAPER-LOCK
5030	SWITCH, PRESSNC 5LB
5031	BOX, DIGITAL V/HZ/A METER 3 PH
5032	COOLER, RAD/OIL/CAC CM 3.8 T4F
5033	VALVE, REGULATOR 1/4 3.8:1
5034	VALVE, BLOWDOWN 1/4 NC
5036	TUBE, DIESEL FUEL TYGON 3/8 ID
5037	RELAY, POWERWTHRPRF 12VDC
5040	SWITCH, BATT ON/OFF 48V 300AMP
5042	BOX, DIGITAL V/HZ/A METER 1 PH
5043	CORE, OIL COOLER CM 3.8 T4F
5044	CORE, RADIATOR CM 3.8 T4F
5045	CORE, CHARGED AIR COOLER CM 3.8 T4F
5047	VALVE, SAFETY 1/8" BSPP
5048	VALVE, OIL RECOVERY SCI8D5
5049	VALVE, INLET SCI8G5/D5
5050	LUBRICANT, MORSE SCO-10001G
5051	KIT, PE LCL SENSORW/ CONNECTOR
5052	MANUAL, CM 3.8 T4F 40KW 40CFM GENSET PV101
5053	PANEL, DISPLAY MURPHY PV101
5054	GAUGE, PRESS 2.5" 1/4 NPT 0-160 PSI
5055	SWITCH, IGNITION 8-248

Compressor Replacement Parts

ITEM	QTY	PART NUMBER	DESCRIPTION	ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5012	ASSY, MORSE T4F OIL FILTER	11	1	5030	SWITCH, PRESS NC 5LB
2	1	5013	ASSY, MORSE T4F COALESCER	12	1	5033	VALVE, REGULATOR 1/4
3	1	5014	ELEMENT, AIR FILTER SCI8D5	13	1	5034	VALVE, BLOWDOWN 1/4 NC
4	1	5015	BELT, DOUBLE BANDED 3VX500	14	1	5054	GAUGE, PRESS 2.5" 1/4 NPT 0-160 PSI
6	1	5025	VALVE, SERVICE 1/2 VENTED PORT	15	1	5047	VALVE, SAFETY 1/8" BSPP
7	1	5026	VALVE, MINI BALL 1/2 NPT	16	1	5048	VALVE, OIL RECOVERY SCI8D5
8	1	5027	BUSHING, TAPER-LOCK #1108 25MM	17	1	5030	SWITCH, TEMP 230F NC 1/4BSPP
9	1	5028	PULLEY, 8.0 2GR 3V				
10	1	5029	PULLEY, 2.8 2GR 3V TAPER-LOCK				



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DRAWN D.J.H.	CHECKED D.J.H.	DATE 10/10/2017
DESCRIPTION COMPR SYS, GCRS40-40-T4F		
MATERIAL STEEL	SIZE C	SCALE 1=4
PATH G:\Engineering\Documents\Inventor\Files\200k\201213.dwg	DWG NO 201213	REV 0
		SHEET 1 OF 1

Troubleshooting

Overview

This section contains instructions for troubleshooting the equipment following a malfunction. The troubleshooting procedures to be performed on the equipment are listed below. Each symptom of trouble for a component or system is followed by a list of probable causes of the trouble and suggested procedures to be followed to eliminate the cause.

In general, the procedures listed should be performed in the order in which they are listed, although the order may be varied if the need is indicated by conditions under which the trouble occurred. In any event, the procedures that can be performed in the least amount of time and with the least amount of removal, disassembly, or parts should be performed first.

Machine Will Not Crank

If machine won't crank, check for the following:

1. Faulty battery connections
2. Low battery voltage
3. Starter solenoid connections are loose or corroded
4. Faulty starter solenoid or starter

Machine Cranks But Will Not Start

If machine cranks but doesn't start, check for the following:

1. No fuel
2. Air in fuel system
3. Fuel solenoid inoperative

To locate a local Cummins distributor visit:

<https://locator.cummins.com>

Machine Shuts Down With Air Demand Present

If the machine is shutting down when there is an air demand, check for the following:

1. Out of fuel
2. Fuel filter restricted
3. Safety shutdown activated
4. Thermostatic valve malfunctioning

Machine Will Not Build Pressure

If the machine is not building pressure, check for the following:

1. Air demand too great
2. Blowdown valve open
3. Faulty drive coupling.
4. Drive belt slipping or broken.

With No Demand, Machine Builds Excessive Pressure

If the machine is building pressure when there is no demand, check for the following:

1. Discharge pressure regulator not properly adjusted or is faulty.

Insufficient Air Delivery

If the machine cannot deliver enough air, check for the following:

1. Compressor undersized for the air requirement
2. Air intake restricted
3. Faulty drive coupling
4. Drive belt slipping or broken
5. Plugged compressor air filter or air/oil separator

Troubleshooting

Radiator Pressure Cap

If coolant continually spills from radiator through the overflow, the radiator cap should be tested and/or replaced with a 16 PSI rated cap. Be sure cap is tightened to the proper secure position.

Engine Fan

Check the engine fan for cracks, loose bolts, and bent or damaged blades. Replace damaged fans immediately. Do not run system if any of the conditions exist. Make sure the hex head bolts mounting the fan to the water pump pulley are properly torqued to 29 ft-lbs.

Unplanned Shutdown

When the operation of the machine has been interrupted by an unexplained shutdown, check the following:

1. Check to determine if compressor oil is at proper level.
2. Check cooler for dirt, slush, ice on the fins, or any other obstructions to cooling Airflow.
3. Make a thorough external check for any cause of shutdown such as broken hose, broken oil lines, loose or broken wire, etc.
4. Check the engine oil level with the engine stopped and in a level position. If the oil level is low, remove the oil filler cap, and fill to the upper limit mark on the dipstick with the recommended oil.

Improper Discharge Pressure

1. If discharge pressure is too low, check the following:
 - Too much air demand.
 - Service valves open blowing to atmosphere.

- Leaks in service line.
- Restricted compressor inlet air filter.
- Faulty control system operation (regulator, inlet valve etc.)
- Low engine speed.

2. If discharge pressure is too high or safety valve blows, check the following:
 - Oil separator plugged up.
 - Faulty safety valve.
 - Faulty regulator or set to high.
 - Inlet valve leaking, or partially open. Loss of pressure signal to inlet valve from regulator causing inlet valve to stay open.

Engine Overheating

1. Low oil level, refill.
2. Air blockage into engine fan.
3. Dirty radiator..
4. Dirty oil in engine.
5. Low engine coolant level.

Compressor

Abnormal compressor oil consumption or oil in service line, check for the following:

1. Over filling of oil sump.
2. Leaking oil lines or oil cooler.
3. Defective separator element.
4. Compressor shaft seal leakage.
5. Discharge pressure below 55 PSI.

Troubleshooting

Separator Plugging

If the separator element has to be replaced frequently because it is plugging up, it is an indication that foreign material may be entering the compressor inlet or the compressor oil is breaking down or excessive moisture is not being drawn from the unit.

Compressor oil can break down prematurely for a number of reasons.

1. Extreme operating temperature
2. Negligence in draining condensate from oil sump
3. Using the improper type of oil
4. Dirty oil.

The complete inlet system should be checked for leaks.

High Compressor Discharge Temp

1. Check compressor oil level. Add oil if required (see section for oil specifications).
2. Check engine fan and fan belt.
3. Clean outside of oil cooler.
4. Clean oil system (cooler) internally.
5. Plugged compressor oil filter. Change element.
6. Plugged oil return line, clean orifice and check valve.

Insufficient Air Delivery

1. Plugged compressor air filter, clean or replace.
2. Plugged air/oil separator. Replace separator element and also change compressor oil and oil filter at this time.
3. Defective pressure regulator, adjust or repair.

Generator Troubleshooting

Generator Not Working

If the generator does not excite, check the following:

- Demagnetized unit.
- Too low of rotational speed.
- Faulty voltage regulator.
- Fuse is blown.
- Failure occurred in the windings.
- Faulty rectifier bridge.
- False contact.

Generator Shuts Down

After the generator is excited and then it deactivates, check the following:

- Loose connection.

Generator Overheats

If the generator is overheating, check the following:

- Partially obstructed ventilation openings.
- Probable overload.

Generator Is Noisy

If the generator operates louder than usual, check the following:

- Faulty bearings.
- Faulty drive coupling.

Generator Blowing Fuses

If the generator has a burnt fuse continuously, check the following:

- Faulty voltage regulator.
- Faulty rectifier bridge.
- Exciter stator down to earth.
- Sensing wires has wrong connection.
- Short circuit between aux and main winding.

Generator Has Low Voltage at No Load

If the generator has a low, no load voltage, check the following:

- Reduce the generator speed.
- The voltage regulator is out of calibration.
- The sensing wires has wrong connection.
- The voltage regulator is faulty.
- There is a failure in the windings.

Generator Has High Voltage at No Load

If the generator has a high, no load voltage, check the following:

- Sensing wires has wrong connection.
- The voltage regulator is out of calibration.
- The voltage regulator is faulty.

Generator Troubleshooting

Generator Has Low Voltage at Full Load

If the generator has too low, full load voltage, check the following:

- The voltage regulator is out of calibration.
- The rectifier bridge is faulty.
- The voltage regulator is faulty.
- Possible overload situation.
- The engine speed slows down
- Intervention of under frequency device.

Generator Unstable Voltage

If the generator has unstable voltage, check the following:

- Loose connections.
- The voltage regulator is out of calibration.
- Irregular rotation.

Generator Has Dirty Windings

- Can cause smoke.
- Demagnetization of the generator.
- Could burn the windings.
- Excessive heat.

Generator - Improper Speed

If the generator is running at a improper speed, you will experience the following:

- Offset frequency.
- Blowing AVR boards.
- Blowing fuses.
- Burnt windings.

FOR DIESEL ENGINE WARRANTY REFER TO CUMMINS MANUAL

Morse Industrial Equipment warrants that this generator unit conforms to applicable drawings and specifications approved in writing by Morse. The unit assembly will be free from defects in material and workmanship for a period of one (1) year from the date of initial operation or eighteen (18) months from the date of shipment, whichever period first expires. All other components and parts of Morse manufacture, will be free from defects in material and workmanship for a period of one (1) year from the date of initial operation or eighteen (18) months from the date of shipment, whichever period first expires. If within such period Morse receives from the Buyer written notice of alleged defect in or nonconformance of the unit, all other components and parts of Morse manufacture and if in the judgment of Morse these items do not conform or are found to be defective in material or workmanship, Morse will at its option either, (a) furnish a Service Representative to correct defective workmanship, or (b) upon return of the item F.O.B. Morse original shipping point, repair or replace the item or issue credit for the replacement item ordered by Buyer, (Defective material must be returned within thirty (30) days of return shipping instructions from Morse. Failure to do so within specified time will result in forfeiture of claim), or (c) refund the full purchase price for the item without interest. Factory installed compressor units will also include warranty on installation for a period of one (1) year. This warranty does not cover damage caused by accident, misuse or negligence. If the generator or compressor unit is disassembled the warranty is void. Morse's sole responsibility and Buyer's exclusive remedy hereunder is limited to such repair, replacement, or repayment of the purchase price. Parts not of Morse manufacture are warranted only to the extent that they are warranted by the original manufacture. Morse shall have no responsibility for any cost or expense incurred by Buyer from inability of Morse to repair under said warranty when such inability is beyond the control of Morse or caused solely by Buyer.

There are no other warranties, express, statutory or implied, including those of merchantability and of fitness of purpose; nor any affirmation of fact or representation which extends beyond the description of the face hereof.

This warranty shall be void and Morse shall have no responsibility to repair, replace, or repay the purchase price of defective or damaged parts or components resulting directly or indirectly from the use of repair or replacement parts not of Morse manufacture or approved by Morse or from Buyer's failure to store, install, maintain, and operate the equipment according to the recommendations contained in the Operating and Parts Manual and good engineering practice. The total responsibility of Morse for claims, losses, liabilities or damages, whether in contract or tort, arising out of or related to its products shall not exceed the purchase price. In no event shall Morse be liable for any special, indirect, incidental or consequential damages of any charter, including, but not limited to, loss of use of productive facilities or equipment, loss of profits, property damage, expenses incurred in reliance on the performance of Morse, or lost production, whether suffered by Buyer or any third party.

Morse Industrial Equipment

Phone: 647-393-1212

PO Boc 1519

www.morseindustrial.ca

Antigonish, Nova Scotia Canada B2G 2L8

Engine carries a 2 year/2000 hour warranty. Engine must be registered with Cummins upon delivery to end user for warranty to be activated. Register your engine at:

<https://quickserve.cummins.com>

Warranty



MORSE INDUSTRIAL EQUIPMENT WARRANTY REGISTRATION

Fax Transmission

To: Warranty Department
From: _____ Date: _____
Re: Product Registration Pages: _____

End User Information: (Required for Warranty Activation)

Name: _____ Phone: _____
Address: _____
City: _____ State: _____ Zip: _____
Contact: _____ E-mail Address: _____

Distributor Information: (Required for Warranty Activation)

Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Contact: _____ E-mail Address: _____

Product Information: (Required for Warranty Activation)

Model No.: _____ Serial No.: _____
Date Product Delivered: _____ Compressor Serial No.:* _____
Date Product in Service: _____

* if units equipped with compressor option

ONE REGISTRATION FORM PER UNIT

Registration form must be mailed or faxed within 15 days of customer installation.

Mail to:

PO BOX 1519
Antigonish, Nova Scotia
Canada B2G 2L8

Phone: 647-393-1212