WINPOWER

ELECTRIC START DIESEL GENERATORS

INSTALLATION AND OPERATIONS MANUAL with STAMFORD GENERATORS

MODELS:

DE20I4
DE30I4
DE45F4
DE65F4
DE90F4

MANUAL KEY START AND DSE3110 ELECTRIC START

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries.

Read and understand all instructions in the manual before starting and operating the generator set.

USING THIS MANUAL

Congratulations on your choice of a WINPOWER generator set. You have selected a high-quality, precision-engineered generator set designed and tested to give you years of satisfactory standby service.

To get the best performance from your new engine generator set, it is important that you carefully read and follow the operating instructions in this manual.

Should you experience a problem please follow the “Things To Check” near the end of this manual. The warranty listed in this manual describes what you can expect from WINPOWER should you need service assistance in the future.

COPY YOUR MODEL AND SERIAL NUMBER HERE

No other WINPOWER generator has the same serial number as yours. It is important that you record the number and other vital information here. If you should ever need to contact us on this unit it will help us to respond to your needs faster.

MODEL_____

SERIAL NUMBER_____

‘M” Spec. _____

PURCHASE DATE_____

DEALER_____

TABLE OF CONTENTS

PROPER USE AND INSTALLATION

You must be sure your new engine generator set is:

* Properly serviced before starting
* Operated in a well ventilated area
* Properly exhausted and gases safely dispersed
* Wired by a qualified electrician
* Operated only for its designed purposes
* Used only by operators who understand its operation
* Properly maintained

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS
This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries.

Read and understand all instructions in the manual before starting and operating the generator set.

This engine generator set has been designed and manufactured to allow safe, reliable performance. Poor maintenance, improper or careless use can result in potential deadly hazards; from electrical shock, exhaust gas asphyxiation, or fire. Please read all safety instructions carefully before installation or use. Keep these instructions handy for future reference. Take special note and follow all warnings on the unit labels and in the manuals.

ANSI SAFETY DEFINITIONS

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DANGER:
DANGER indicates an imminently hazardous situation which, if not avoided, *will* result in death or serious injury. This signal word is to be limited to the most extreme situations.
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WARNING:
WARNING indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.
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CAUTION:
CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
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NOTE:
CAUTION is also used on the unit labels and in this manual to indicate a situation that could result in serious damage or destruction of the equipment and possible personal injury.

1. **ELECTRIC SHOCK** - The output voltage present in this equipment can cause a fatal electric shock. This equipment must be operated by a responsible person.

    a. Do not allow anyone to operate the generator without proper instruction.
    b. Guard against electric shock.
    c. Avoid contact with live terminals or receptacles.
    d. Use extreme care if operating this unit in rain or snow.
    e. Use only three-prong grounded receptacles and extension cords.
    f. Be sure the unit is properly grounded to an external ground rod driven into the earth.

2. **FIRE HAZARD** - Diesel fuel presents a hazard of possible explosion and/or fire.

    a. Do not smoke or use open flame near the generator set.
    b. Keep a fire extinguisher nearby and know its proper use. Fire extinguishers rated ABC by NFPA are appropriate.

3. **DEADLY EXHAUST GAS** - Exhaust fumes from any diesel engine contain carbon monoxide, an invisible, odorless and deadly gas that must be mixed with fresh air.

    a. Operate only in well ventilated areas.
    b. Never operate indoors.
    c. Never operate the unit in such a way as to allow exhaust gases to seep back into closed rooms (i.e. through windows, walls or floors).

4. **NOISE HAZARD** - Excessive noise is not only tiring, but continual exposure can lead to loss of hearing.

    a. Use hearing protection equipment when working around this equipment for long periods of time.
    b. Keep your neighbors in mind when permanently installing this equipment.

5. **CLEANLINESS** - Keep the generator and surrounding area clean.

    a. Remove all grease, ice, snow or materials that create slippery conditions around the unit.
    b. Remove any rags or other material that could create potential fire hazards.
    c. Carefully wipe up any fuel or oil spills before starting the unit.
    d. Never allow leaves or other flammable material to build up around the engine exhaust area.

6. **SERVICING EQUIPMENT** - All service, including the installation or replacement of service parts, **should be performed only by a qualified technician.**

    a. Use only factory approved repair parts.
    b. Do not work on this equipment when fatigued.
    c. Never remove the protective guards, cover, or receptacle panels while the engine is running.
    d. Use extreme caution when working on electrical components. High output voltages from this equipment can cause serious injury or death.
    e. Always avoid hot mufflers, exhaust manifolds, and engine parts. They all can cause severe burns instantly.
    f. Installing a generator set is not a “do-it-yourself” project. Consult a qualified, licensed electrician or contractor. The installation must comply with all national, state, and local codes.
    g. Always make sure unit is disabled before placing your hands anywhere near the fan, belts, alternator or water hoses.

TESTING POLICY:

Before any generator is shipped from the factory, it is fully checked for performance. The generator is loaded to its full capacity, and the voltage, current, and frequency are carefully checked.

Rated output of the generators is based on engineering tests of typical units, and is subject to, and limited by, the temperature, altitude, fuel, and other conditions specified by the manufacturer of the applicable engines.

NOTE:
These units come factory set for either key start or manual start. With DSE 3110 controller used in the manual start option it is possible to wire the control for remote start. See page 25 of this manual for wiring instructions. The key start version does not have this option.

SPECIFICATIONS

MODEL DE2014-3 DE20I4-4 DE20I4-17 DE20I4-18
Generator

Wattage	20000	20000	20000	20000
Volts	120/240	120/208	120/240	277/480
Phase	single	three	three	three
PF	1.0	.80	.80	.80
AMPs	83.0	69.5	60.2	30.1
Hertz	60	60	60	60

Engine

Model	Isuzu 4LE1
Starting System	12 Volt Manual Start
Muffler	Standard
Stop System	Key/Emergency
Fuel Consumption (full Load)	1.8 Gal/hour

MODEL DE30I4-3 DE30I4-4 DE30I4-17 DE30I4-18
Generator

Wattage	30000	30000	30000	30000
Volts	120/240	120/208	120/240	277/480
Phase	single	three	three	three
PF	1.0	.80	.80	.80
AMPs	125	104	90	45
Hertz	60	60	60	60

Engine

Model	Isuzu 4LE TurboCharged
Starting System	12 Volt Manual Start
Muffler	Standard
Stop System	Key/Emergency
Fuel Consumption (full Load)	2.6 Gal/hour

MODEL DE45F4-3DE45F4-4 DE45F4-17 DE45F4-18
Generator

Wattage	40000	45000	45000	45000
Volts	120/240	120/208	120/240	277/480
Phase	single	three	three	three
PF	1.0	.80	.80	.80
AMPs	166	156	135	68
Hertz	60	60	60	60

Engine

Model	Iveco N45SM1
Starting System	12 Volt Manual Start
Muffler	Standard
Stop System	Key/Emergency
Fuel Consumption (full Load)	4.09 Gal/hour

MODEL DE65F4-3 DE65F4-4 DE65F4-17 DE65F4-18
Generator

Wattage	55000	62000	62000	62000
Volts	120/240	120/208	120/240	277/480
Phase	single	three	three	three
PF	1.0	.80	.80	.80
AMPs	229	215	186	93
Hertz	60	60	60	60

Engine

Model	Iveco N45SM2 TurboCharged
Starting System	12 Volt Manual Start
Muffler	Standard
Stop System	Key/Emergency
Fuel Consumption (full Load)	4.57 Gal/hour

MODEL DE90F4-3 DE60F4-4 DE90F4-17 DE90F4-18
Generator

Wattage	86000	90000	90000	90000
Volts	120/240	120/208	120/240	277/480
Phase	single	three	three	three
PF	1.0	.80	.80	.80
AMPs	358	312	270	135
Hertz	60	60	60	60

Engine

Model	Iveco N45TM2 TurboCharged
Starting System	12 Volt Manual Start
Muffler	Standard
Stop System	Key/Emergency
Fuel Consumption (full Load)	6.94 Gal/hour

INTRODUCTION AND DESCRIPTION

PRODUCT DESCRIPTION:

This engine-generator set is designed for manual key start operation. The engine-generator set is fully tested at the factory prior to shipment to insure proper operation of each individual component as well as the total system's performance and reliability.

The engine generator set consists of a multi-cylinder, liquid cooled engine nominally operating at 1800 rpm. The generator frequency regulation is maintained by the engine governor to within +/- 1.5 hertz (cps), from no load to rated load for standard mechanical governors. The generator is a single bearing, direct drive, rotating field brushless design. The generator is connected to the engine flywheel via flexible drive disks. The Generator Set is skid mounted with isolation mounts between the engine and base on all units.

NOTICE:

These engine generator sets have only basic engine protections. The Manual Key start panel only provides low oil pressure and high coolant temperature protection, with no voltage or frequency displays. The DSE 3110 electronic start panel displays a basic voltage and frequency reading derived from a line to neutral feed from the generator to the DSE 3110 control. Based on this information it also provides basic over/under speed and voltage protection. Low oil pressure and high water temperature reading/ shutdowns are provided by senders mounted on the engine. No other control options are available on the DE Series Generators, if you application requires additional safety devices or signals consider upgrading to the DR Series Generators by **WINPOWER**.

A customer supplied 12 Volt battery is required to complete the installation. Battery requirements are listed later under the battery installation section.

These engine generator sets come standard with a manual key start system. This key start system utilities a safety latching relay that shut the unit down if the oil pressure gets low or water temperature gets too high. The safety latching relay must be depressed during cranking. Available as an option is a digital DSE 3110 controller that is also programmed for electric start. The DSE 3110 will electronically display your engine speed, generator voltage, generator frequency, engine running time and your battery level voltage. In addition it monitors your oil pressure, water temperature, over/under speed and overcrank to insure safe trouble free operation. Both systems are discussed later in detail.

GENERATOR SET:

Every WINPOWER Generator Set has its own unique identity data plate. This data plate identifies the complete unit model number, the system serial number and has links to the individual components that form the generator set in our factory records. Several of the major components also have their own individual identity plates providing additional information to document build data for warranty and replacement parts.

Be sure to have the main WINPOWER unit data plate information recorded inside the front cover of this manual for future reference and for identification whenever requesting field or factory technical assistance. Primary fields needed for assistance are complete model number, serial number and especially the M-Spec number. The M-Spec number (if provided) is recorded in the 'TYPE NO.' block on the lower right of the plate.

ENGINE:

This manual covers specific operation of the combined engine generator set. Refer to engine operating and maintenance instructions for specific instruction on the care and maintenance of the engine. Oil and fuel requirements along with maintenance schedules and engine warranty information are provided by the individual engine manufacturers.

**** CAUTION ****

EQUIPMENT DAMAGE - *Be sure to check the engine oil level frequently as specified in the engine manual.*

The engine manufacturer has established an excellent worldwide engine service organization; engine service is available from a nearby authorized dealer or distributor. Go to the WINCO web site for a list of engine dealers. (http://www.wincogen.com/ Engine_Support/)

The rated power of each engine-generator is limited by the temperature, altitude and all other ambient conditions specified by the engine manufacturer. Engine power will decrease 3-1/2% for each 1000 ft. above sea level, and will decrease an additional 1% for each 10 degrees Fahrenheit above 60 degrees Fahrenheit. Units should not be operated in ambient temperature greater than 125 degrees Fahrenheit.

GENERATOR:

WINPOWER Generator Sets use brushless, AVR (Auto-Voltage Regulator) controlled broad-range generator ends. The generator converts rotational mechanical energy into electrical energy. These WINPOWER units are equipped with generators manufactured by Cummins Stamford. Each generator 'end' has its own data tag. A unique serial number is stamped on the data plate and the data label is affixed to the main frame of the generator on the left side.

RECEIVING THE GENERATOR

The generator set will generally be shipped by a commercial 'common freight carrier'. Routing is determined by the bulk, size, and a means available to unload the generator at the receiving end. WINPOWER recommends units that are shipped by common carrier be delivered to a commercial dock to allow the Generator Set to be unloaded in a safe, efficient manner and to minimize handling damage to the unit.

Locate the packing slip on the side of the crate or request it from the truck driver. When receiving the generator take special care in examining it for damage during shipment. Avoid signing for the equipment until a full visual assessment and inventory have been made. Verify that you have received the right equipment and the proper amount by matching up the equipment to the packing list.

UNPACKING INSTRUCTIONS:

When unpacking the generator set, be sure to inspect it carefully for freight loss or damage. If loss or damage is noted at the time of delivery, require that the person making the delivery make note of the loss or damage on the freight bill, or affix his signature under the consignee's memo of the loss or damage. Contact the carrier for claim procedures.

When loss or damage is noted after delivery, segregate the damaged material, and contact the carrier for claim procedures.

"Concealed Damage" is understood to mean damage to the contents of a package which is not in evidence at the time of delivery by the carrier, but which is discovered later. The carrier or carriers are responsible for merchandise lost or damaged in transit. The title to goods rests with the consignee when generators are shipped fob factory, and only the consignee can legally file a claim.

******* CAUTION ******

EQUIPMENT DAMAGE - ***These units are shipped with oil, and a 50/50 mix of coolant. Be sure to check all fluid levels before operating. See engine manufacturer's instruction manual for recommended oil requirements before initial starting.***

UNPACKING:

(Not recommended until the unit is on-site)

1. Carefully remove the crate.

2. After inspecting the engine-generator for external physical damage, locate and check the following items packed with the unit.

   a. Owner's operators manual.
   b. Engine manufacturer's instruction manual.
   c. Battery hold-down brackets & hardware.
   d. Unit components or accessory items shipped loose for on-site installation.
   e. Optional accessories.

3. Remove main frame hold down bolts.

4. Unit can now be lifted from shipping rails.

LIFTING THE GENERATOR SET

NOTICE - Personal Injury

To prevent injury to persons or equipment, observe the following guidelines when lifting the generator:

Due to the different designs, configurations, options, weights, site conditions, and available material handling equipment, specific lifting instructions are not provided for each individual generator set model. General guidelines provided are applicable to the entire standby generator line. It is the responsibility of the installing party to follow the lifting equipment's operators manual to prevent injury to personnel and damage to the generator. Smaller Generator Sets may not require use of overhead lifting equipment and may be placed on the pad with basic material handling equipment, i.e. a forklift.

CAUTION: - Do not attempt to lift the generator set by the means of the lifting eyes on the engine or generator end.

These lifting points are only for use during the manufacturing process and are designed for lifting of the individual Generator Set component.

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******* WARNING ******
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NEVER - attempt to lift the fuel tank while filled with fuel. Sloshing of the fuel can cause a shift in the balance of the fuel tank, making for a DANGEROUS, unbalanced lifting load. If the generator was shipped on the fuel tank, use the lifting points located on the fuel tank to move the entire Generator Set into place. DO NOT place fuel in the tank prior to lifting.

INSTALLATION

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******* WARNING ******
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PERSONAL INJURY - Before proceeding with the installation, be sure the engine control is in the "stop" position. Before proceeding with the installation, be sure the Generator MLCB (Main Line Circuit Breaker) is in the 'OFF' position and the unit starting battery is disconnected.

GENERAL INFORMATION

This series of engine/generator sets are designed and built as open power units, meaning no weather protection has been provided. These unit must be installed inside of an enclosure that will provide proper protection from the elements.

Before beginning the installation process, recheck the voltage, phase and amperage rating of the Generator Set. Be certain it can handle the intended load and are compatible with the intended loads. Plans for installation should be prepared with proper attention to mechanical and electrical engineering detail to assure a satisfactory system installation. The installation must comply with all national, state, and local codes.

The information in this manual is offered only as a guide to finalizing your installation plans.

NOTICE

For full service switching of the entire load, the ATS must be 'SE' (Service Entrance) rated or must have a properly rated fusible disconnect installed before the ATS to protect the contacts.

ENGINE GENERATOR SET MOUNTING

The unit's main frame must be bolted solidly to a solid base. The engine-generator is mounted on channels which are attached with special shock mounts to the main frame. This allows the engine-generator free movement without affecting the base or surrounding equipment

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***** **WARNING** ****

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EQUIPMENT DAMAGE - Never mount these engine generator sets to a wooden base/structure. Over time the wood will deteriorate and the unit mountings will come loose. These units must be mounted to a steel or concrete base.

The unit should be mounted to allow for ample working room around it. A general rule to follow is five (5) feet of clearance from flammable surfaces. These distances may be reduced for nonflammable surfaces but sufficient access must be provided for servicing the equipment.

VENTILATION REQUIREMENTS

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***** **WARNING** ****

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ENGINE/GENERATOR DAMAGE - It is the installer responsibility to insure that there is sufficient cooling air available to prevent the engine and generator from over heating. Damage caused by overheating is not covered by warranty.

Providing proper air movement during your installation planning is absolutely essential, You will need to provide a fresh air inlet as well as a hot air outlet (to the outside of protection housing) for proper engine performance. These engine generator set are equipped with unit mount radiators and the engine is equipped with a pusher type fan. The hot air from the face of the radiator must be ducted out of the enclosure to insure proper cooling. Failing to do so will allow the hot air to recirculate around the radiator causing the engine to overheat resulting in an engine shutdown. If louvers are used in front of the hot air duct to protect the unit from outside weather, these louvers should be 1 1/2 times as large as the area of the radiator face to prevent back pressure.

In addition to a hot air discharge you must plan for a fresh air intake opposite the radiator discharge. These fresh air inlets should also be 1 1/2 to 2 times large than the radiator face. The extra air inlet area is required to minimize restriction and to provide combustion air for the engine. Do not block fresh air intakes with other equipment as this will result in insufficient air flow to the engine for cooling. Installing them opposite the hot air discharge will allow a sweeping flow of cooling air across the engine preventing hot spots.

FUEL INSTALLATION

The fuel supply should be as close to the engine as possible. This will reduce the installation cost of fuel runs and minimize line losses. The diesel fuel supply should be no more than 3 feet below the fuel inlet on the pump. If your fuel supply is lower than three feet you may have to install an additional lift pump to bring the fuel up to the mechanical fuel pump on the engine.

The information in this manual is offered to assist you in providing the proper fuel for your engine. However, this information is only provided to inform you of the engine's requirements and assist in making you aware of the decisions you must make. In no case should the instructions or information provided be interpreted to conflict with any local, state or national codes. If in doubt, always consult your local fire marshal or fuel supplier.

INSTALLING THE FUEL LINE

Engine generator sets are properly adjusted before they leave the factory. Connecting a fuel supply with adequate supply volume is critical to reliable operation. Diesel units with optional base mounted fuel tanks are pre-plumbed to the mechanical fuel pump on the engine.

Open skid mounted Diesel units are often supplied with capped inlet and return lines. The use of a suitable customer supplied flexible fuel lines is essential between the engine and fuel supply to provide a vibration break between your fuel supply and the engine.

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***** **WARNING** ****

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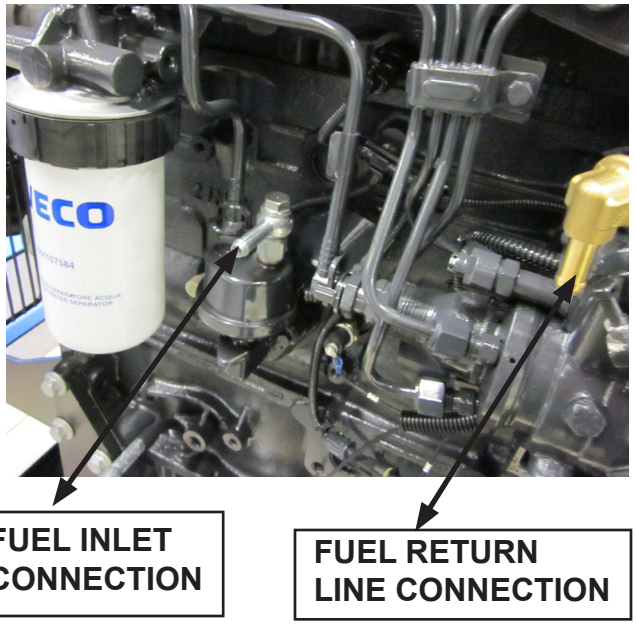
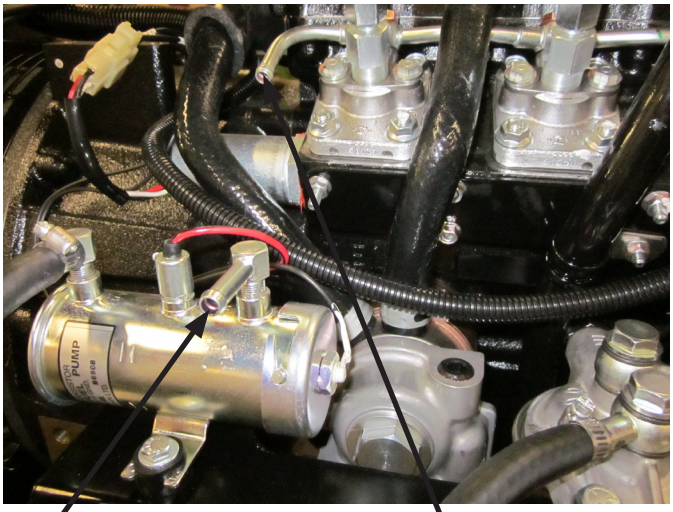
FIRE DANGER - Connecting rigid fuel line (i.e. steel or copper line) directly to the inlet fuel filter or fuel pump may cause the fuel line to crack during operation creating a serious fire hazard.

DE45 - DE90 FUEL LINE CONNECTIONS



DE30 FUEL CONNECTIONS



FUEL INLET CONNECTION

FUEL RETURN LINE CONNECTION

DE20 FUEL CONNECTIONS

FUEL INLET CONNECTION

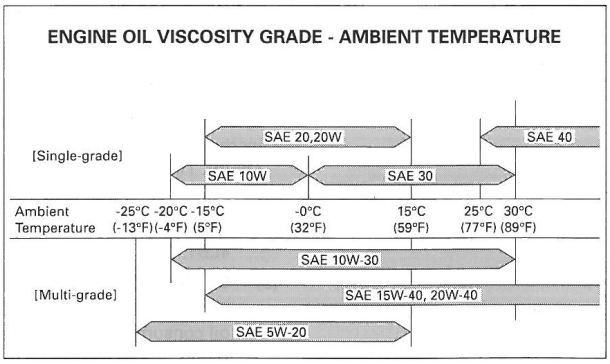
FUEL RETURN LINE CONNECTION

LUBRICATION

Before starting the engine, check the oil level in the crankcase. If it is low, refill to the full mark with the proper weight/grade of oil as recommended by the engine manufacturer's maintenance instructions. The necessity of using the correct oil, and keeping the crankcase full cannot be over emphasized. Failure to use the proper oil and keep the crankcase properly filled will cause excessive engine wear and shorten its useful life.

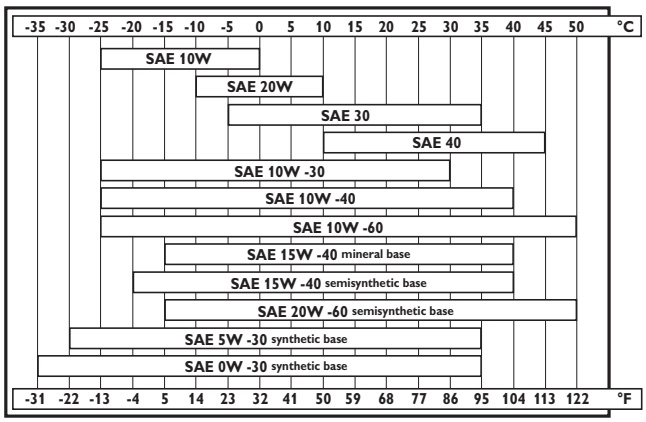
Isuzu oil viscosity table

Use API CC or CD



Fiat oil viscosity table

Use API CF or CH4



COOLANT

Before starting the engine, check the coolant level in the radiator. If it is low, refill as specified in the engine manufacturer's maintenance instructions. The radiator should be filled to about 1 inch below the filler neck. For additional information on engine coolant requirements see engine manufacturer's maintenance instructions.

INSTALLING THE BATTERY

****** CAUTION ******

In the following battery installation procedure, check to be sure the engine control is in the "stop" position. This should be your last step before initial start-up.

A customer supplied twelve-volt battery is required to complete the installation. Installation of the highest CCA rated battery, within the correct BCI group, will increase cold weather starting performance.

BATTERY REQUIREMENTS

Model	Voltage	BCI Group	MINIMUM CCA Rating
DR20I4	12	24	650
DE30I4	12	24	650
DE45F4	12	24	650
DE65F4	12	24	650
DE90F4	12	31	900

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***** **WARNING** *****

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EQUIPMENT DAMAGE- ***All of these units are 12 Volt and they are all negative ground. Permanent damage will occur if they are connected to a 24 volt system or a positive ground system. If you are using the truck batteries to start these units you may have to disable the charging system to keep it from interfering with the vehicle charging system.***

Installation and servicing of batteries must only be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When installing or replacing batteries, use the proper group/size starting battery. The battery should be a Maintenance Free lead acid design. Deep cycle batteries will not work for this application.

CAUTION – PERSONAL DANGER

CAUTION - NEVER dispose of a battery in a fire. The battery is capable of exploding.

CAUTION -DO NOT open or mutilate the battery. Released electrolyte is known to be harmful to the skin and eyes and to be very toxic.

These engine generator sets are all NEGATIVE ground. Be very careful not to connect the battery in reverse polarity, as this may short circuit the battery charging system on the engine.

CAUTION – A battery presents a risk of electrical shock and high short circuit current. The following precautions must be observed when working with batteries:

1. Remove watches, rings and other metal objects.
2. Use tools with insulated handles.
3. Check both the battery cable ends and the battery posts to be sure they are free of corrosion.
4. Always connect the battery positive cable first and then connect the battery negative cable. When removing the battery cables from the battery reverse the procedure, disconnect the negative cable first and then the positive cable.
5. Be sure all connections are tight and coat the terminals and cable ends with dialectic grease.

WARNING – ***The electrolyte is a diluted sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following precautions must always be taken:***

* Always wear full eye protection and protective clothing
* Where electrolyte contacts the skin, wash off immediately with water.
* If electrolyte contacts the eyes, flush thoroughly and Immediately with water and seek immediate medical attention
* Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of one pound of bicarbonate of soda (baking soda) to one gallon of water. The bicarbonate of soda solution is to be added until the evidence of reaction, foaming, has ceased. The resulting liquid is to be flushed with water and the area dried.

DANGER – Explosive Fire Risk

* Never smoke when near batteries
* Do not cause a flame or spark in the battery area
* Always discharge static electricity from your body before touching batteries by first touching a grounded metal surface

SERVICING BATTERIES

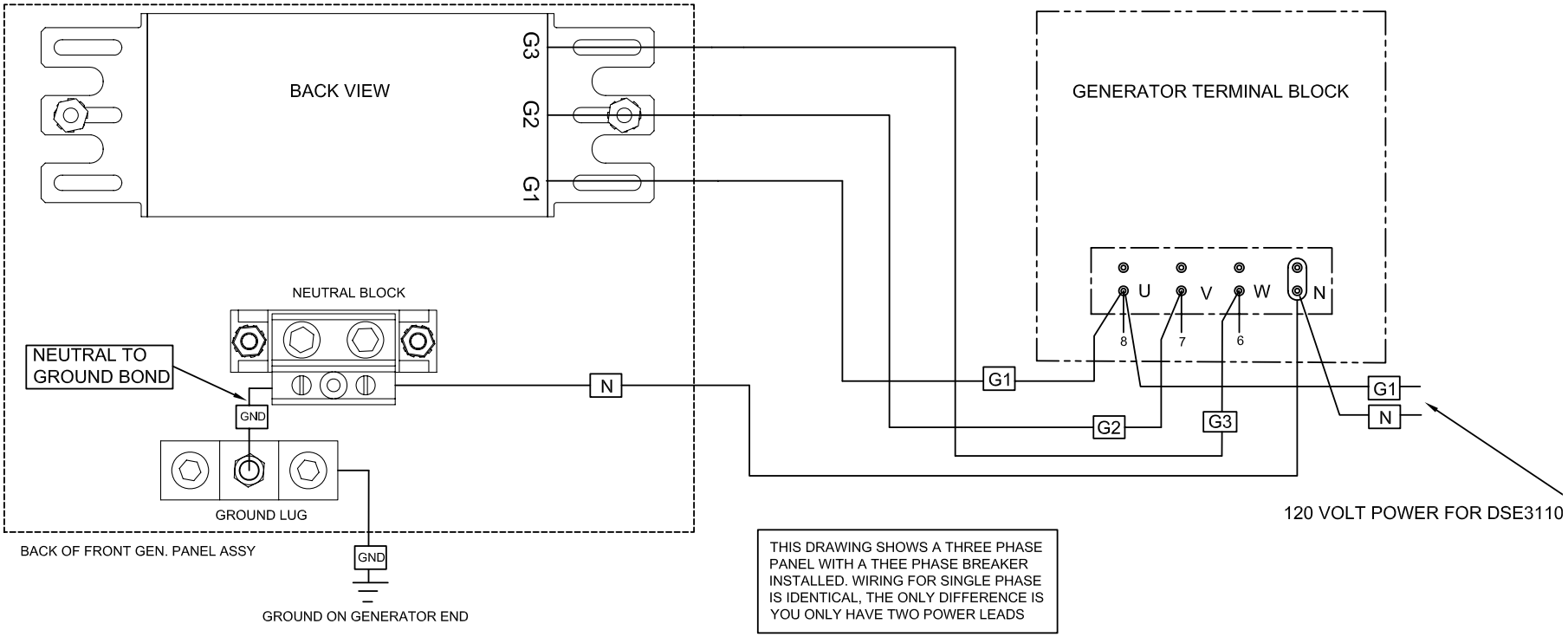
Batteries used on these units may, over time, lose water. This is especially true if you are using a trickle charger to maintain your battery. When refilling the battery with water use only distilled water. Tap water will shorten the service life of the battery.

Never fill the battery above the fill line. Over filling above the upper level line may cause the electrolyte to overflow, resulting in corrosion to the engine or nearby parts. Immediately wash off any spilled electrolyte following the procedure above.

NOTE: *Always make sure that a new battery is fully charged before installing it on a generator set. Failure to do so can cause damage to the engine control module in the generator set.*

All connections must be clean and tight. Check the electrolyte (fluid) in the battery periodically to be sure it is above the plates. Never allow the battery to remain in a discharged condition.

CONTROL BOX AC WIRING



A.C. ELECTRICAL CONNECTIONS

NOTICE - CLASS 1 WIRING METHODS ARE TO BE USED FOR ALL FIELD WIRING CONNECTIONS TO TERMINALS OF A CLASS 2 CIRCUIT

Note: This symbol  always indicates ground where shown.

All wiring must be completed in accordance with the Nation Electric Code as well as any state or local codes.

You must pay particular attention to wire size requirement for the amperage of service you are dealing with. The table below provides you guidance on wire sizing based on both wire type and amperage. **Wire amperages have been derated for 40° C ambient temperatures operation.**

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***** **WARNING** *****

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A main line circuit breaker has been provided inside the generator housing. During all wiring installations make sure the breaker is in the OFF position and the generator operation switch is in the OFF position.

Neutral Lugs - DE20 has 100 amp neutral lugs. These lugs are bonded to ground are provided for you to connect your neutral wires to, from the transfer switch or load distribution center. The lugs will accommodate #12 AWG to #1/0 Awg and should be torqued to 50 in. lbs. The DE30 - DE65 & DE90 480 volt have 225 AMP neutral lugs and will accommodate #4 AWG to 300 MCM and should be torqued to 250 in. lbs. The DE65 single phase and DE90 except the 480 volt units have a 400 amp neutral block. The 400 amp terminal block lugs will handle wire sizes #1 AWG to 400 MCM and should be torqued to 300 in. lbs.

Generator Circuit Breaker, This circuit breaker provides overload protection for the generator. Your power feeds from the load panel will connect to the open lugs on the circuit breaker. The generator power feeds have already been wired into one set of lugs.

The table below gives you the circuit breaker size, lug wire sizes and torque specification. (see the actual breaker for additional information and restrictions)

kW	Voltage	PH	Amp	Wire Capability	Lug Torque
20	120/240	1	85	#12 AWG -2/0 AWG	50 in lbs
20	120/208	3	70	#12 AWG -2/0 AWG	50 in lbs
20	120/240	3	70	#12 AWG -2/0 AWG	50 in lbs
20	277/480	3	30	#14 - #1/0 AWG	80 in lbs

kW	Voltage	PH	Amp	Wire Capability	Lug Torque
30	120/240	1	125	#12 AWG -2/0 AWG	50 in lbs
30	120/208	3	100	#12 AWG -2/0 AWG	50 in lbs
30	120/240	3	100	#12 AWG -2/0 AWG	50 in lbs
30	277/480	3	45	#14 - #1/0 AWG	80 in lbs

kW	Voltage	PH	Amp	Wire Capability	Lug Torque
45	120/240	1	175	#4 AWG - 300 MCM	250 in lbs
45	120/208	3	150	#4 AWG - 300 MCM	250 in lbs
45	120/240	3	150	#4 AWG - 300 MCM	250 in lbs
45	277/480	3	70	#14 - #1/0 AWG	80 in lbs

kW	Voltage	PH	Amp	Wire Capability	Lug Torque
65	120/240	1	250	#1 AWG - 600 MCM	375 in lbs
65	120/208	3	225	#4 AWG - 300 MCM	250 in lbs
65	120/240	3	225	#4 AWG - 300 MCM	250 in lbs
65	277/480	3	100	#14 - #1/0 AWG	120 in lbs

kW	Voltage	PH	Amp	Wire Capability	Lug Torque
90	120/240	1	350	#1 AWG - 600 MCM	375 in lbs
90	120/208	3	300	#1 AWG - 600 MCM	375 in lbs
90	120/240	3	300	#1 AWG - 600 MCM	375 in lbs
90	277/480	3	125	#14 - #3/0 AWG	120 in lbs

Minimum Conductor Sizes between the Generator and the load. Based on wire type and temperature rating. Wire has been derated for 40° C ambient temperatures.

				Cu Conductor		Al Conductor	
			C/B	Wire Temperature Rating			
kW	Voltage	PH	Amp	75°C	90°C	75°C	90°C
20	120/240	1	85	#3 AWG	#4 AWG	#1 AWG	#2 AWG
20	120/208	3	70	#4 AWG	#6 AWG	#3 AWG	#4 AWG
20	120/240	3	70	#4 AWG	#6 AWG	#3 AWG	#4 AWG
20	277/480	3	30	#8 AWG	#8 AWG	#8 AWG	#8 AWG
30	120/240	1	125	1/0 AWG	#1 AWG	3/0 AWG	2/0 AWG
30	120/208	3	100	#2 AWG	#3 AWG	1/0 AWG	#1 AWG
30	120/240	3	100	#2 AWG	#3 AWG	1/0 AWG	#1 AWG
30	277/480	3	45	#6 AWG	#8 AWG	#4 AWG	#6 AWG
45	120/240	1	175	3/0 AWG	2/0 AWG	250 MCM	4/0 AWG
45	120/208	3	150	2/0 AWG	1/0 AWG	3/0 AWG	2/0 AWG
45	120/240	3	150	2/0 AWG	1/0 AWG	3/0 AWG	2/0 AWG
45	277/480	3	70	#4 AWG	#4 AWG	#2 AWG	#3 AWG
65	120/240	1	250	300 MCM	250 MCM	500 MCM	350 MCM
65	120/208	3	225	250 MCM	4/0 AWG	400 MCM	300 MCM
65	120/240	3	225	250 MCM	4/0 AWG	400 MCM	300 MCM
65	277/480	3	100	#2 AWG	#3 AWG	1/0 AWG	#1 AWG
90	120/240	1	350	600 MCM	500 MCM	(2) 250	600 MCM
90	120/208	3	300	500 MCM	350 MCM	(2) 4/0	500 MCM
90	120/240	3	300	500 MCM	350 MCM	(2) 4/0	500 MCM
90	277/480	3	125	1/0 AWG	#1 AWG	3/0 AWG	2/0 AWG

For additional information on wire sizing refer to table 310-16 of the National Electrical Code ANSI/NFPA 70..

For additional information on wire sizing refer to table 310-16 of the National Electrical Code ANSI/NFPA 70.

Ground Lug, These ground lugs are bonded to ground and have a neurtal to gound bond installed. They are provided for you to connect your ground wire to. The lugs on the 45 kW through 90 kW will handle wire sizes #6 AWG to 300 MCM and should be torqued to 250 in. lbs. The lugs on the 20 and 30 kW will accommodate #10 AWG to 2/0 AWG and should be torqued to 200 in. lbs.

****

***** **WARNING** *****

****

PERSONAL DANGER - ***These unit are shipped with a NEUTRAL TO GROUND BOND INSTALLED. If your system already has a neutral to ground bond then you must run a separate ground lead to that location AND UNBOND THE JUMPER IN THE CONNECTION PANEL. For additional questions refer to the current National Electric Code on grounding.***

****

***** **WARNING** *****

****

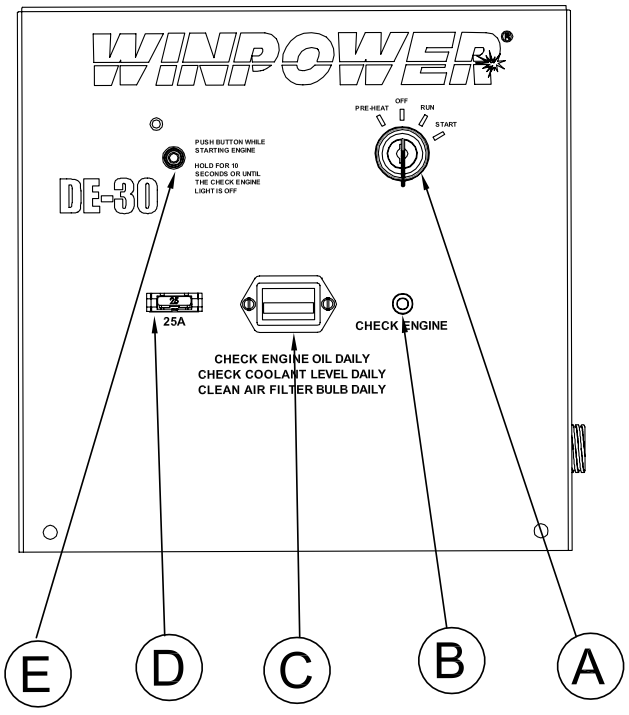
EQUIPMENT DAMAGE - ***When installing a Three Phase 240 volt system be sure you know which lead is the high voltage "wild" leg (208 Volt line to neutral). The generator normally carries the high voltage on the G2 lead.***

ENGINE CONTROL PANEL LAYOUT MANUAL KEY START

A. FOUR POSITION START SWITCH

1. Preheat - This position is used on the DE20 and DE30 only. With the switch in this position the glow plugs on the engine are activated.

2. OFF - In this position all power to the engine is



turn off and the engine is stopped.

3. RUN - With the switch in this position the fuel solenoid and the fuel pump on the engine are activated. A 12 Volt signal is also being sent to the voltage regulator on the engine alternator to activate it.

4. START - This position on the switch will activate the starter on the engine to start it.

B. CHECK ENGINE LIGHT - This light will come on when the low oil pressure switch or the high water temperature sensor switches have been activated on the engine. This light will also come on when you go to start the engine, and stay on until the engine has built sufficient oil pressure to open the low oil pressure switch.

C. RUNNING TIME METER - This meter records the actual hours of engine operation.

D. 25 AMP FUSE - This fuse protect all the DC wiring in the engine control panel and on the engine. If this fuse if blown nothing will work on the engine.

E. SAFETY LATCHING RELAY - This safety latching relay provides the 12 volt DC power to the fuel solenoid and the engine alternator field circuit during normal operation. If the system experiences a low oil pressure fault or a high water temperature fault this relay will trip disconnecting the fuel solenoid and shutting down the engine. When tripped the button on the panel will extend out about 1 inch. This button must also be held in during starting until the check engine light goes out.

INITIAL START UP MANUAL KEY START

****

***** **WARNING** *****

****

EQUIPMENT DAMAGE - ***DO NOT jump start these engine generator sets. Starting these units on a low battery or jump starting them may cause damage to the engine controls.***

Use the following check list to verify correct installation before starting the engine:

1. Engine oil. Fill as required with proper grade/qty.
2. Engine coolant. Fill as required with proper mixture.
3. Unit mounting base properly bolted down.
4. Clearance for service and maintenance on all sides.
5. Proper fuel line material and size.
6. All fuel line connections tight.
7. Battery connections clean and tight.
8. Battery fully charged.
9. All AC and DC wiring installed and properly protected.

After completing the above checklist, the engine-generator set is ready for the initial start-up test.

STARTING PROCEDURE

1. Rotate start switch (A) to the preheat position and hold for 10 seconds. NOTE: **This step applies to the DE20 & DE30 ONLY.**

2. Rotate the Start Switch (A) to the Run position. Then while depressing the Safety Latching Relay button (E) rotate the switch to the Start position. At this point the starter should engage and the unit will start.

3. As the unit starts release the Start Switch and it will return to the run position. You must continue to depress the Safety Latch Relay button until the Check Engine light goes out. When this light goes out, it indicates that the engine has built sufficient oil pressure to operate properly and the high coolant temperature has not been exceeded.

****

***** **WARNING** *****

****

EQUIPMENT DAMAGE - *DO NOT DEPRESS THE SAFETY LATCHING RELAY BUTTON FOR OVER 10 SECONDS. IF THE LIGHT HAS NOT GONE OUT IN 10 SECONDS IT INDICATES THAT EITHER THE ENGINE HAS NOT BUILT OIL PRESSURE OR THE COOLANT TEMPERATURE HAS EXCEEDED THE ALLOWABLE MAXIMUM.*

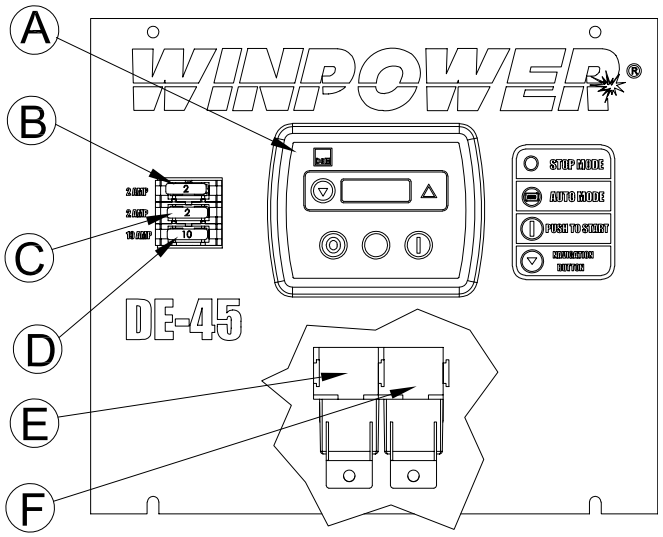
4. After the engine is up an running the circuit breaker can be closed to power your loads. During periods of very cold operation it is best to let the engine warm up for a few seconds before applying the load.

5. When stopping the unit it is best to turn off all the loads before turning the Start Switch to the off position. This prevents your loads from getting low voltage while still running during unit shutdown.

If for some reason during operation the oil pressure should drop below the allowable oil pressure or the water temperature should exceed allowable level the Safety Latching Relay button will pop-out and the unit will shutdown. You will also get a check engine light at this time.

If you find the unit stopped with the relay button popped-out, it could have been caused by either low oil pressure or high water temperature.

DSE 3110 ELECTRONIC START CONTROL



A. Deep Sea 3110 Engine Control - See controller explanation on the following page.

B. 2 AMP FUSE - This fuse is in the AC input line from the generator. This feed that provides the AC voltage reading on the display. If this fuse is blown the DSE 3110 will not display a voltage or frequency reading and will shutdown on low voltage or frequency. (Replacement fuse ATO-ATC 2A-250 Volt)

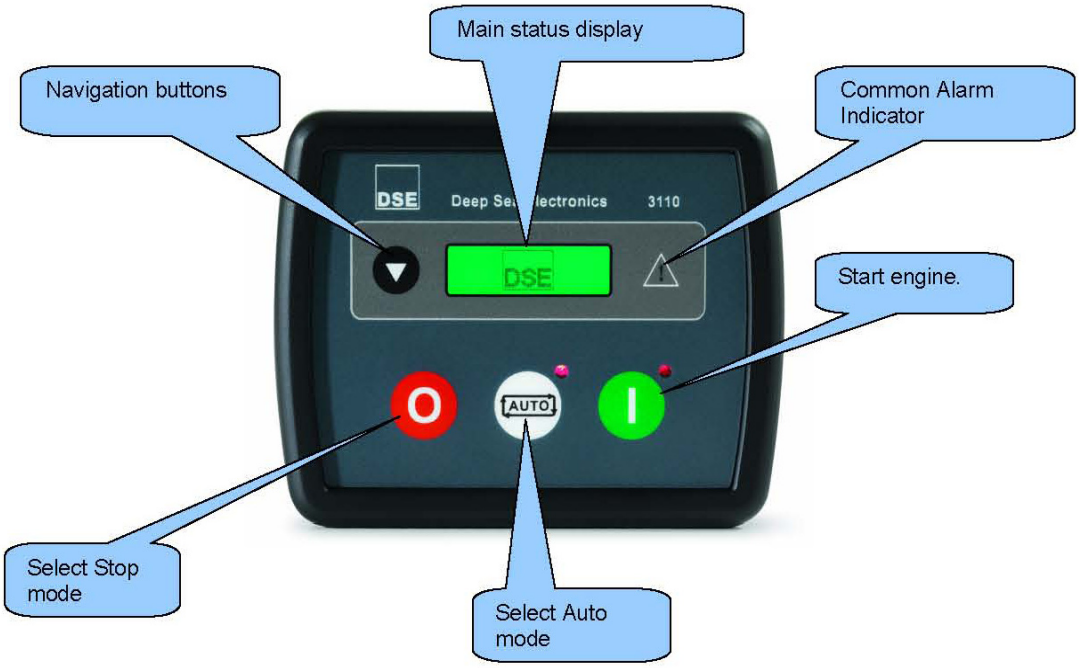
C. 2 AMP FUSE - This fuse supplies the 12 volt DC to power the DSE 3110 controller circuity on the boards. If this fuse is blown the DSE 3110 will not function at all. (Replacement fuse ATO-ATC 2A-250 Volt)

D. 10 AMP FUSE - This fuse supplies the 12 volt DC to power the two pilot relays in the control panel (one relay operates the fuel system and the other operates the starting system). If this fuse is blown the DSE 3110 will show the unit has gone in a start mode but nothing will happen out on the engine generator set. (Replacement fuse ATO-ATC 10A-250 Volt).

E. START SYSTEM PILOT RELAY- This is the pilot relay drives the starter solenoid on the engine starter. When the DSE 3110 calls for the unit to start, this relay is closes sending a 12V positive signal (lead #22) to the control terminal on the start solenoid mounted on top the starter on the engine. This relay will open when the DSE 3110 senses voltage and frequency on AC feedback circuit from the generator disconnecting the starter.

F. FUEL SYSTEM PILOT RELAY- This is the pilot relay for the both the fuel solenoid and the 12V field signal for the alternator on the engine starter. When the DSE 3110 calls for the unit to run this relay closes and sends a 12V positive (lead #21) to both the fuel solenoid and the field circuit on the engine alternator. This relay will stay closed as long as the DSE 3110 is in the run position or until a safety shutdown is activated, at which time the relay will open. When the relay opens all power to lead #21 is disconnected and the engine will shut down. Also if the engine has shutdown one of the safety shutdown a fault code will be displayed. These codes will be discussed later.

DSE 3110 CONTROLLER



	STOP/RESET (Red Button) This button places the module into its “Stop/ Reset” mode. This will clear any alarm conditions for which the triggering criteria have been removed. The fuel supply de-energizes and the engine comes to a standstill. Should a remote start signal be present while operating in this mode, a remote start WILL NOT occur.
	AUTO (White Button) This button places the module into its “Automatic” mode. This mode allows the module to control the function of the generator automatically. The module will monitor the remote start input and once a start request is made, the set will be automatically started and placed on load. The module will then wait until the next start event. AUTO is only available if the control has been rewired for AUTO start. See Page 25 for rewiring instructions..
	START (Green button) Pressing this button from STOP/RESET will start the engine and run off load.
	PAGE Pressing this button scrolls the display to show the various instruments.

INITIAL START UP

****

***** **WARNING** *****

****

EQUIPMENT DAMAGE - ***DO NOT jump start these engine generator sets. Starting these units on a low battery or jump starting them will cause damage to the engine control module.***

Use the following check list to verify correct installation before starting the engine:

1. Engine oil. Fill as required with proper grade/qty.
2. Engine coolant. Fill as required with proper mixture.
3. Unit mounting base properly bolted down.
4. Clearance for service and maintenance on all sides.
5. Proper fuel line material and size.
6. All fuel line connections tight.
7. Battery connections clean and tight.
8. Battery fully charged.
9. All AC and DC wiring installed and properly protected.

After completing the above checklist, the engine-generator set is ready for the initial start-up test.

STARTING PROCEDURE

MANUAL MODE

****

***** **WARNING** *****

****

EQUIPMENT DAMAGE - ***BEFORE ATTEMPTING TO START THIS UNIT COMPLETE YOUR PRE-START CHECKLIST AND ENSURE THE GENERATOR MAINLINE CIRCUIT BREAKER IS IN THE PROPER POSITION PRIOR TO STARTING. STARTING THIS UNIT WITHOUT IT PROPERLY CONNECTED CAN CAUSE SERIOUS PERSONAL INJURY OR EQUIPMENT DAMAGE.***

1. Press and release the red Stop/Reset button.

2. Press and release the green Start Engine button. The engine generator set will crank and start automatically. If the engine fails to start it will display a fault code and the common alarm indicator will start blinking. See the fault code in the Appendix portion of this manual.

3. With the unit running smoothly, check the no load voltage and frequency of the generator output.

4. Once the unit is running and the safety on time has elapsed the engine monitoring switches are active for low oil pressure and high water temperature.

5. After the engine is up an running the circuit breaker can be closed to power your loads. During periods of very cold operation it is best to let the engine warm up for a few seconds before applying the load.

6. When stopping the unit it is best to turn off all the loads before pressing the stop button. This prevents your loads from getting low voltage while still running during unit shutdown.

DSE 3110 ENGINE CONTROL

PROTECTIONS

When an alarm is present, the Common alarm LED if configured will illuminate. **The LCD display will show an icon to indicate the failure.**

WARNINGS

Warnings are non-critical alarm conditions and do not affect the operation of the generator system, they serve to draw the operator's attention to an undesirable condition. Warning alarms are self-resetting when the fault condition is removed. The icon will appear steady in the display.

SHUTDOWNS

Shutdowns are critical alarm conditions that stop the engine and draw the operator's attention to an undesirable condition. Shutdown alarms are latching. **The fault must be removed and the STOP/RESET button pressed to reset the module.** The icon will appear flashing in the display.

MODULE DISPLAY

TIMER ICON

When the module is controlling the engine (starting and stopping) an animated timer icon will be displayed in the icon area to indicate that a timer is active, for example cranking time, crank rest, etc.

STOPPED ICON

When there are no alarms present, an icon will be displayed to indicate the engine is stopped and what mode the unit is in.

Stop Mode

Auto Mode

Manual Mode

RUNNING ICON

When there are no alarms present, an animated icon is displayed to indicate the engine is running.

USB ICON

When a USB connection is made to the module the USB icon is displayed.

MEMORY CORRUPTION

If either the config file or engine file becomes corrupted the unit will display the following icon.

FRONT PANEL CONFIGURATION

This configuration mode allows the operator limited customizing of the way the module operates. Use the module's navigation buttons to traverse the menu and make value changes to the parameters.

1. ACCEPT button.
2. NEXT PAGE button.
3. DECREASE VALUE / NEXT ITEM
4. INCREASE VALUE / NEXT ITEM

ACCESSING THE FRONT PANEL

Press 1 (accept) and 2 (next page) **simultaneously (at the same time).** This display shows the configuration icon: The first parameter is also displayed.

EDITING A PARAMETER

Enter the editor as described above.

* Press 2 to select the required 'page' as detailed below.
* Press 4 to select the next parameter or 3 to select the previous parameter within the current page.
* When viewing the parameter to be changed, press the 1 button. The value begins to flash.
* Press 4 or 3 to adjust the value to the requested setting.
* Press 1 to save the current value. The value stops flashing.
* Press and hold the 1 button to exit the editor, the configuration icon is removed from the display.

NOTE: Values representing pressure will be displayed in Bar. Values representing temperature are displayed in degrees Celsius.
NOTE: When adjusting values in the front panel editor a press and hold of the increment button will cover the full range of the item being adjusted (min to max) in under 20 seconds.
NOTE: When the editor is visible, it is exited after 5 minutes of inactivity for security.

DSE 3110 CONTROL
FAULT CODES

	**AUXILIARY INPUTS**	Auxiliary inputs can be user configured and will display the message as written by the user.
	**FAIL TO START**	The engine has not fired after the preset number of start attempts
	**FAIL TO STOP**	The module has detected a condition that indicates that the engine is running when it has been instructed to stop. **NOTE:- 'Fail to Stop' could indicate a faulty oil pressure sensor - If engine is at rest check oil sensor wiring and configuration.**
	**LOW OIL PRESSURE**	The module detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the *Safety On* timer has expired.
	**ENGINE HIGH OIL TEMPERATURE**	The module detects that the engine oil temperature has exceeded the high engine temperature pre-alarm setting level after the *Safety On* timer has expired.
	**UNDERSPEED**	The engine speed has fallen below the underspeed pre alarm setting
	**OVERSPEED**	The engine speed has risen above the overspeed pre alarm setting
	**BATTERY UNDER VOLTAGE / BATTERY OVER VOLTAGE**	The DC supply has fallen below or risen above the low/high volts setting level.
	**GENERATOR UNDER VOLTAGE**	The generator output voltage has fallen below the pre-set pre-alarm setting after the *Safety On* timer has expired.
	**GENERATOR OVER VOLTAGE**	The generator output voltage has risen above the pre-set pre-alarm setting.
	**GENERATOR UNDER FREQUENCY**	The generator output frequency has fallen below the pre-set pre-alarm setting after the *Safety On* timer has expired.
	**GENERATOR OVER FREQUENCY**	The generator output frequency has risen above the pre-set pre-alarm setting.
	**INTERNAL MEMORY ERROR**	Either the configuration file or engine file memory is corrupted. Contact your supplier for assistance.

TROUBLESHOOTING TABLES

ENGINE WILL NOT CRANK

1. Low/dead battery.
2. Blown DC fuses 2 amp or 25 amp.
3. Defective DSE3110.
4. Defective key switch.
4. Loose or dirty battery terminals.
5. Defective starter.
6. Defective start solenoid.
7. Locked up engine genset.
8. Defective engine harness.
9 Improper battery voltage to start solenoid, fuel pump or fuel solenoid.

ENGINE CRANKS BUT WILL NOT START

1. Improper fuel delivery to the unit.
2. Fuel supply shut off.
3. Fuel tank empty.
4. Air in the fuel system.
5. Engine fuel solenoid has not opened.
6. Defective fuel pump.
7. Defective fuel solenoid
8. Defective engine harness.
9 Improper battery voltage to fuel pump or fuel solenoid.

ENGINE STARTS AND THEN STOPS AND ALARM LIGHT COMES ON

1. Engine oil pressure is low.
2. Engine has high water temperature.
3. Refer to fault code on DSE3110

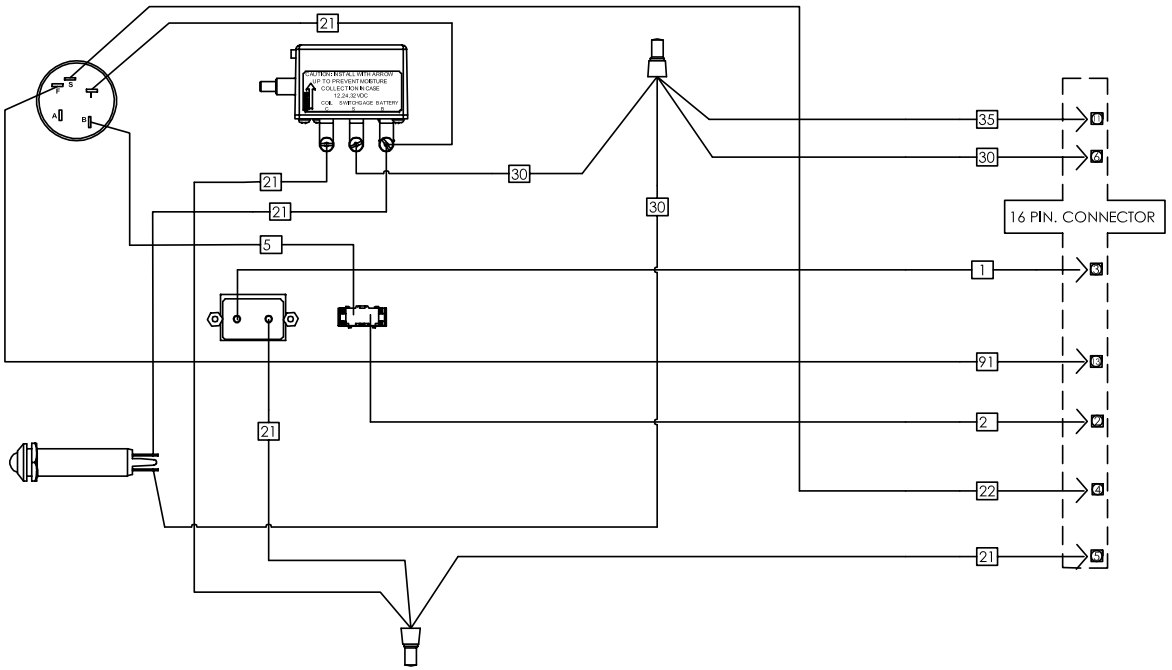
ENGINE WILL NOT COME UP TO SPEED AFTER IT STARTS

1. Insufficient fuel volume getting to the unit.
   a. Too small of fuel line.
   b. Fuel racks not opened properly.
2. Governor is defective.
3. AC short in generator components.

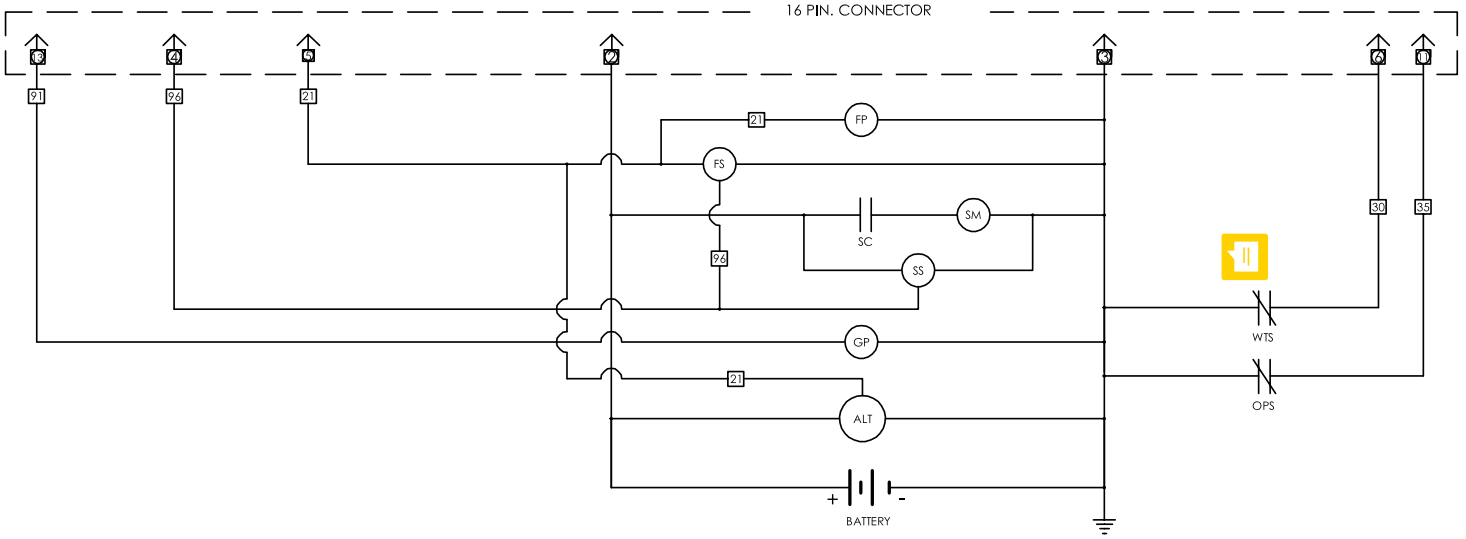
NO AC OUTPUT FROM GENERATOR

1. Defective diode.
2. Defective voltage regulator.
3. Defective rotor.
4. Defective stator.
5. Defective exciter rotor.
6. Defective exciter stator.
7. AC short in the output leads.
8. Defective/open generator output breaker.
9. Wiring error.

DE20 & DE30 KEY START SCHMATIC

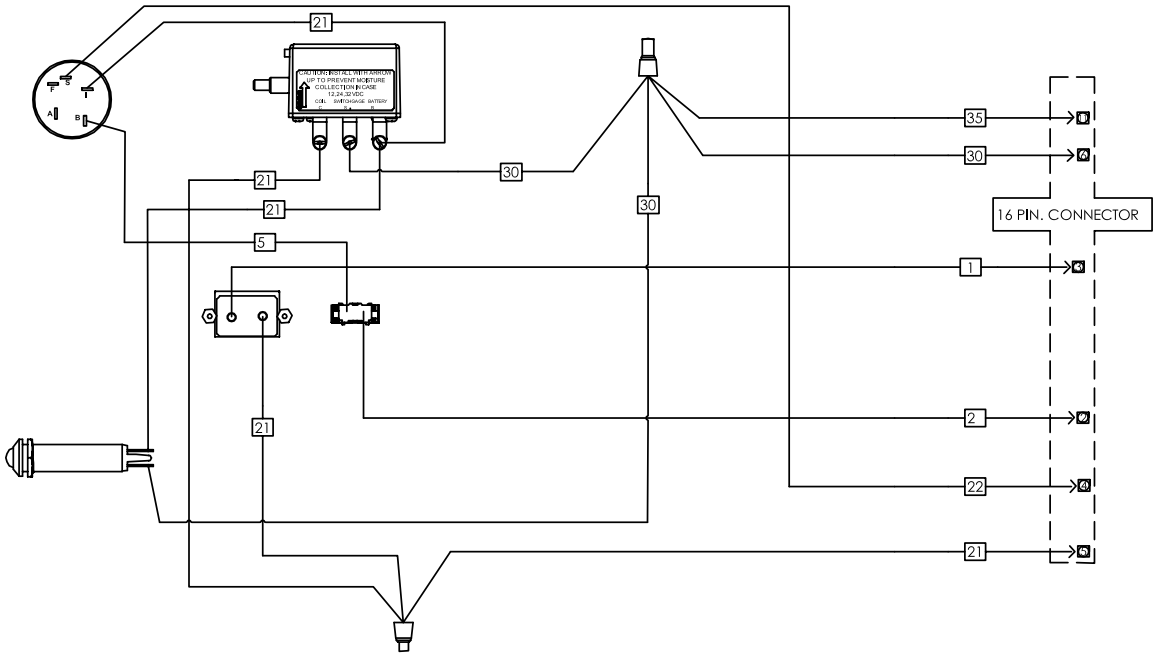


START CONTROL PANEL

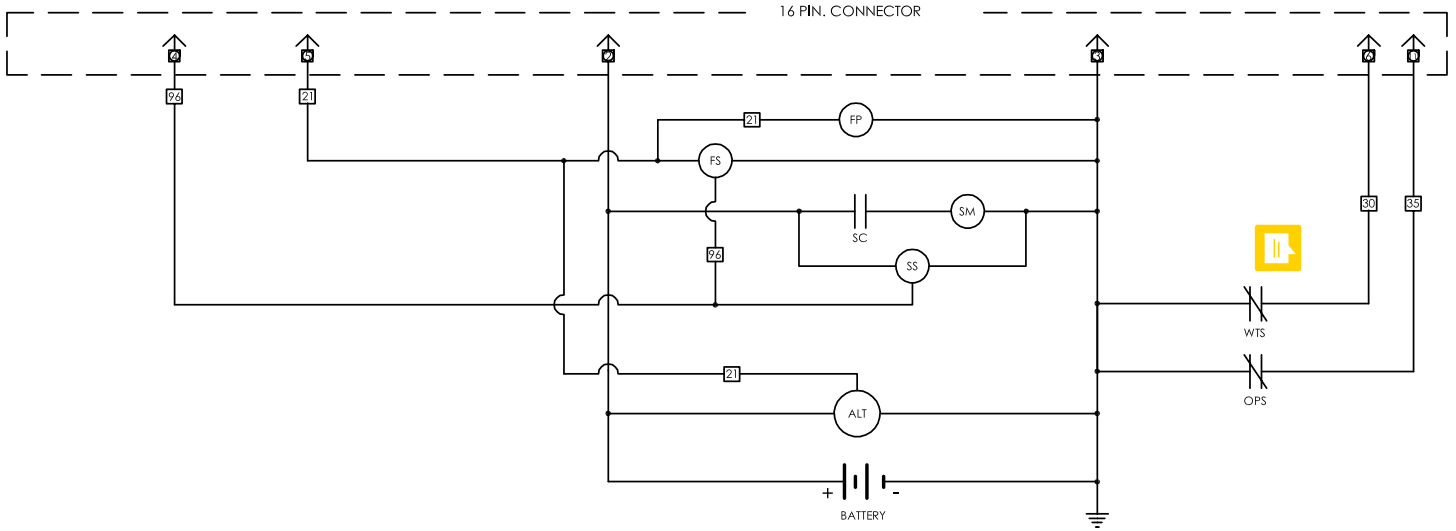


ENGINE WIRING HARNESS

DE45 & DE65 KEY START SCHMATIC



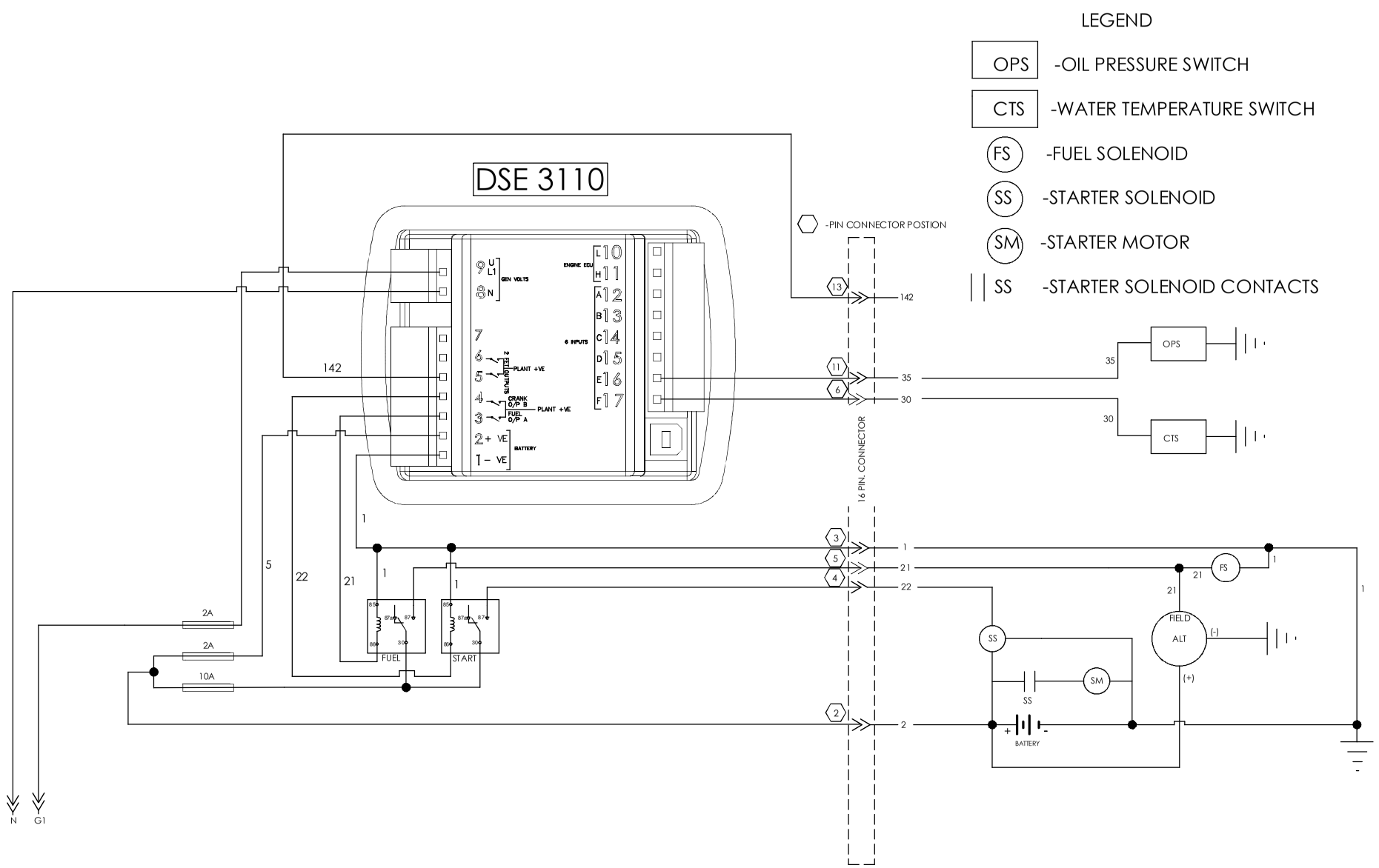
START CONTROL PANEL



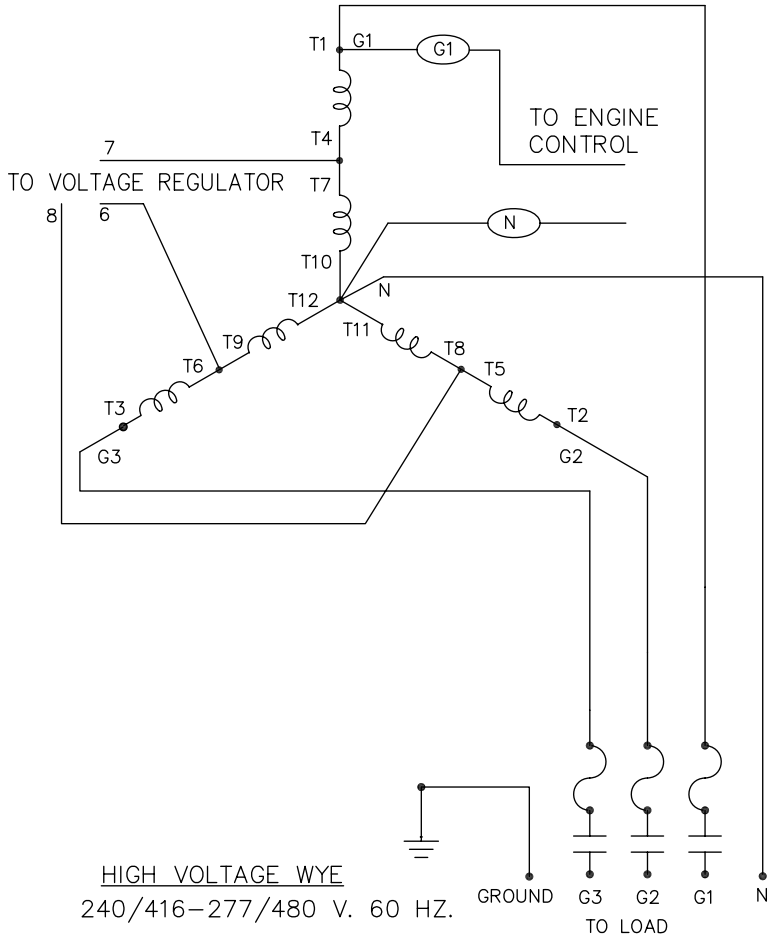
ENGINE WIRING HARNESS

LEFT BLANK INTENTIONALLY AT THIS TIME

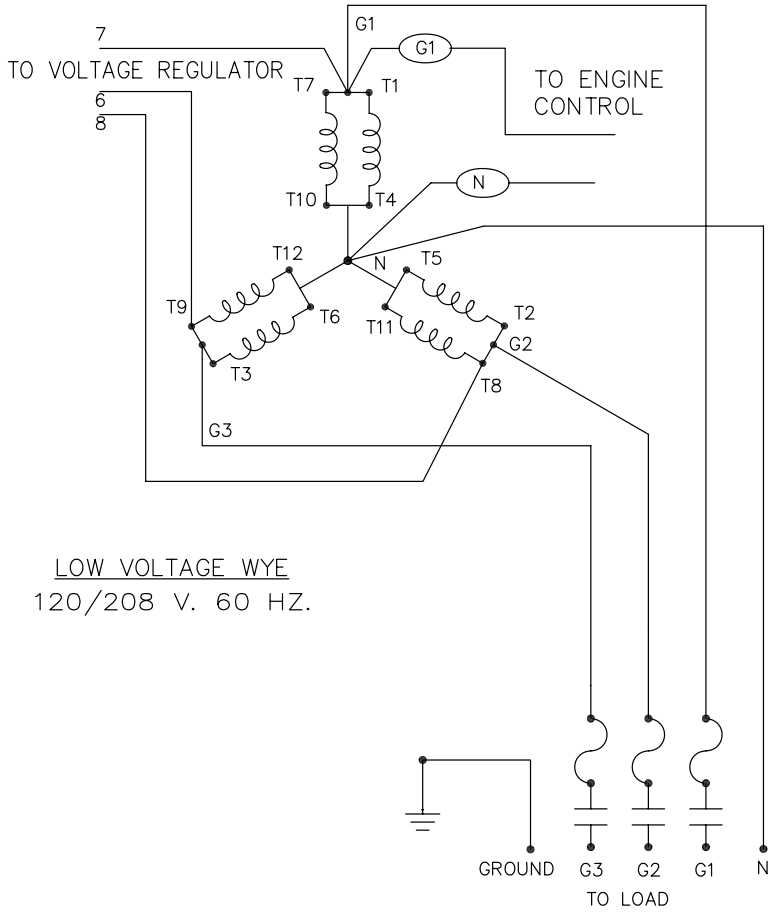
DE45 & DE65 DE90 3110 ELECTRIC START PANEL



THREE PHASE AC WIRING
HIGH AND LOW WYE

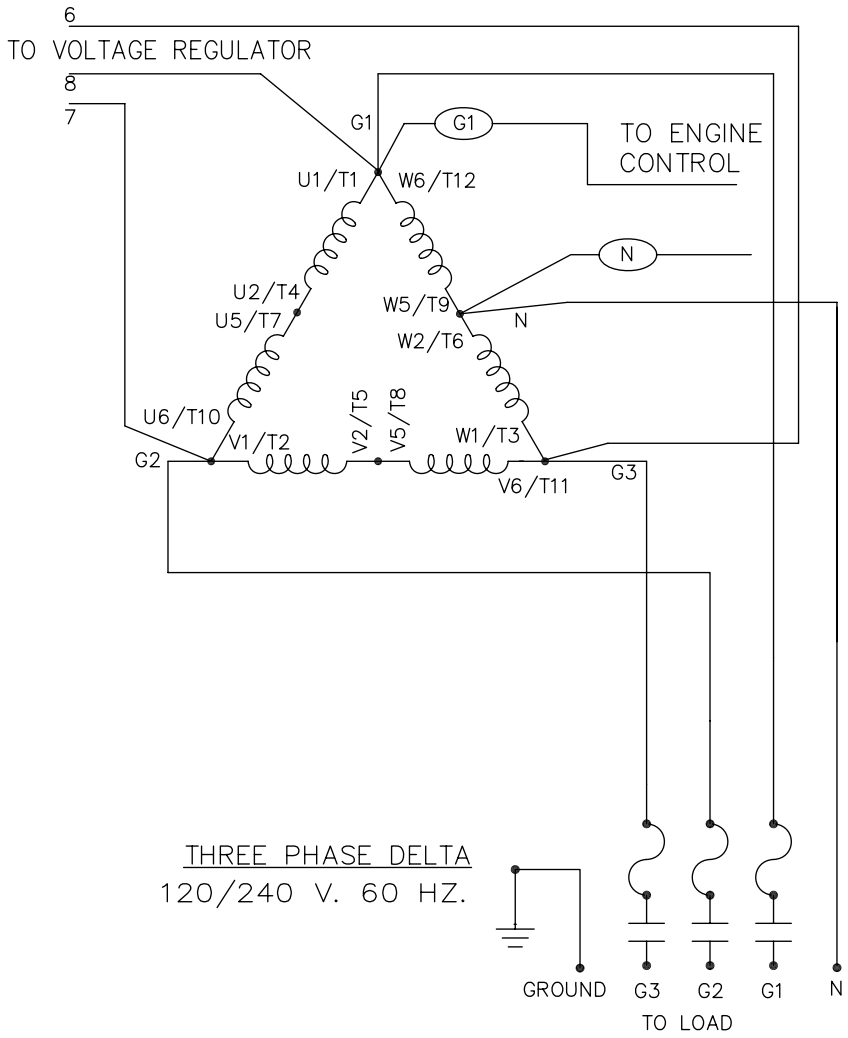


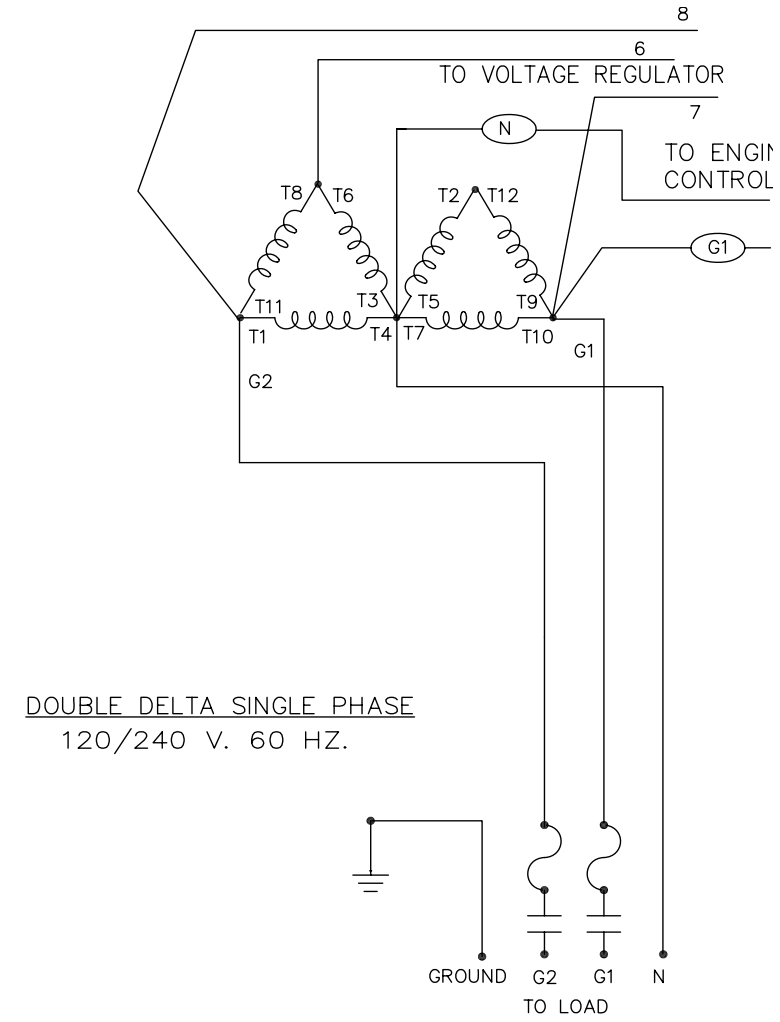
HIGH VOLTAGE WYE
240/416–277/480 V. 60 HZ.



LOW VOLTAGE WYE
120/208 V. 60 HZ.

THREE PHASE AC WIRING-DELTA
SINGLE PHASE AC WIRING





GENERATOR TESTING RESISTANCES & ENGINE REPLACEMNT PARTS

MODEL	DE20I4-3	DE20I4-4	DE20I4-17	DE20I4-18
Generator				
Stamford	PI144E			
Winding Group	311			
Wattage	20000	20000	20000	20000
RESISTANCES	ohms			
ROTOR	0.67			
STATOR	0.30			
EXCITER ROTOR	0.215			
EXCITER STATOR	19.36			
VOLTAGE REGULATOR	AS480			
Engine				
Model	Isuzu 4LE1			
Starting System	12 Volt Manual Start			
Oil Filter (2 required)	2992544			
Pre-Fuel filter & Water Sep	2992662			
Water Sensor	4254020			
Fuel Filter Elements	2994048			
Air Filter Element	8025818			
Alternator Belt	500341810			
Alternator	500315943			
Starter Motor Assembly	99486046			
Upper Radiator Hose	8040980			
Lower Radiator Hose				
Muffler	Standard			
Stop System	Key/Emergency			
Fuel Consumption (full Load)	1.8 Gal/hour			
Owner Must Provide				
Fuel	ASTM D-975 - 1D or 2D EN590 or equivalent See engine manual for additional fuel types & specification			
Oil Type	10W-30 CC/CD See engine manual for additional oil information.			
Oil Capacity	8.6 Quarts			
Cooling System	50/50 Mix			

MODEL	DE30I4-3	DE30I4-4	DE30I4-17	DE30I4-18
Generator				
Stamford	PI144H			
Winding Group	311			
Wattage	30000	30000	30000	30000
RESISTANCES	ohms			
ROTOR	0.89			
STATOR	0.1			
EXCITER ROTOR	0.21			
EXCITER STATOR	22.9			
VOLTAGE REGULATOR	AS480			
Engine				
Model	Isuzu 4LE Turbocharged			
Starting System	12 Volt Manual Start			
Oil Filter (2 required)	2992544			
Pre-Fuel filter & Water Sep	2992662			
Water Sensor	4254020			
Fuel Filter Elements	2994048			
Air Filter Element	8025818			
Alternator Belt	500341810			
Alternator	500315943			
Starter Motor Assembly	99486046			
Upper Radiator Hose	8040980			
Lower Radiator Hose				
Muffler	Standard			
Stop System	Key/Emergency			
Fuel Consumption (full Load)	2.6 Gal/hour			
Owner Must Provide				
Fuel	ASTM D-975 - 1D or 2D EN590 or equivalent See engine manual for additional fuel types & specification			
Oil Type	10W-30 CC/CD See engine manual for additional oil information.			
Oil Capacity	8.6 Quarts			
Cooling System	50/50 Mix			

MODEL	DE45I4-3	DE45I4-4	DE45I4-17	DE45I4-18
Generator				
Stamford	UCI224D			
Winding Group	311			
Wattage	45000	45000	45000	45000
RESISTANCES	ohms			
ROTOR	0.64			
STATOR	0.065			
EXCITER ROTOR	21.0			
EXCITER STATOR	0.142			
VOLTAGE REGULATOR	SX460			
Engine				
Model	Fiat N45SM1X.A004			
Starting System	12 Volt Manual Start			
Oil Filter	2992242			
Fuel Filter Elements	50410784			
Air Filter Element	8041642			
Alternator Belt	504013617			
Alternator	504225814			
Starter Motor Assembly	504031929			
Upper Radiator Hose	8050892			
Lower Radiator Hose	8050893			
Muffler	Standard			
Stop System	Key/Emergency			
Fuel Consumption (full Load)	4.09 Gal/hour			
Owner Must Provide				
Fuel	ASTM D-975 - 1D or 2D EN590 or equivalent See engine manual for additional fuel types & specification			
Oil Type	10W-30 CF-CH4 See engine manual for additional oil information.			
Oil Capacity	13.5 Quarts			
Cooling System	50/50 Mix			

MODEL	DE65I4-3	DE65I4-4	DE65I4-17	DE65I4-18
Generator				
Stamford	**UCI224F**			
Winding Group	**311**			
Wattage	65000	65000	65000	65000
RESISTANCES	ohms			
ROTOR	0.83			
STATOR	0.033			
EXCITER ROTOR	20.0			
EXCITER STATOR	0.156			
VOLTAGE REGULATOR	SX460			
Engine				
Model	Iveco N45SM2X.A008 Turbocharged			
Starting System	12 Volt Manual Start			
Oil Filter	2992242			
Fuel Filter	50410784			
Air Filter Element	8041642			
Alternator Belt	504013617			
Alternator	504225814			
Starter Motor Assembly	504031929			
Upper Radiator Hose	8050892			
Lower Radiator Hose	8050893			
Muffler	Standard			
Stop System	Key/Emergency			
Fuel Consumption (full Load)	4.57 Gal/hour			
Owner Must Provide				
Fuel	ASTM D-975 - 1D or 2D EN590 or equivalent See engine manual for additional fuel types & specification			
Oil Type	10W-30 CF-CH4 See engine manual for additional oil information.			
Oil Capacity	13.5 Quarts			
Cooling System	50/50 Mix			

MODEL	DE90I4-3	DE90I4-4	DE90I4-17	DE90I4-18
Generator				
Stamford	**UCI274C**			
Winding Group	**06**	**311**	**311**	**311**
Wattage	86000	90000	90000	90000
RESISTANCES	ohms			
ROTOR	1.12			
STATOR 311	0.03			
STATOR 06	0.016			
EXCITER ROTOR	0.156			
EXCITER STATOR	20.0			
VOLTAGE REGULATOR	SX460			
Engine				
Model	Iveco N45TM2.A008 Turbocharged			
Starting System	12 Volt Manual Start			
Oil Filter	2992242			
Fuel Filter	50410784			
Air Filter Element	8041322			
Alternator Belt	504013617			
Alternator	504225814			
Starter Motor Assembly	504031929			
Radiator Hose Adapter (2)	8036102			
Upper Radiator Hose	4863960			
Lower Radiator Hose	98433199			
Muffler	Standard			
Stop System	Key/Emergency			
Fuel Consumption (full Load)	6.94 Gal/hour			
Owner Must Provide				
Fuel	ASTM D-975 - 1D or 2D EN590 or equivalent See engine manual for additional fuel types & specification			
Oil Type	10W-30 CF-CH4 See engine manual for additional oil information.			
Oil Capacity	13.5 Quarts			
Cooling System	50/50 Mix			

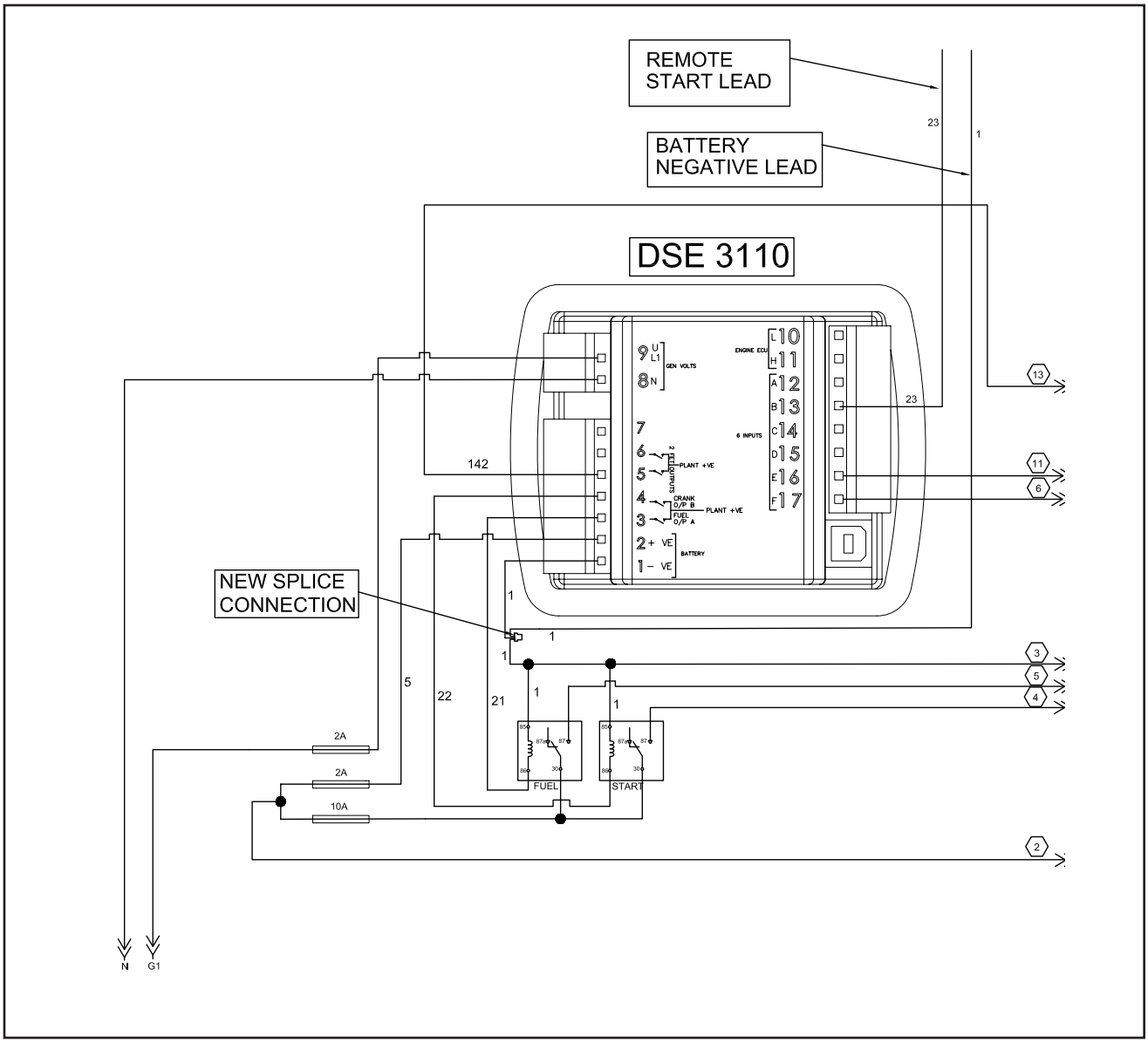
REWIRING THE DE SERIES GENERATOR FOR REMOTE START

The DE Series generators equipped with the DES 3110 controllers can be rewired for remote start. These will make them compatible with a standard two wire start Automatic Transfer Switch.

Rewire procedures:

1. Remove the top cover on the generator connection box.
2. Remove the screws holding the panel containing the DSE 3110 control and tip it down.
3. Unplug the eight pin green connector containing terminal #13,
4. Install a control wire to be routed to the automatic transfer switch in position #13 and label this wire #23 and plug the connector back into the DSE 3110.
5. Unplug the seven green pin connector containing terminal #1.
6. Position #1 already has a wire in it. You will have to cut that wire and splice a new wire into the existing one. Use a good crimp splice connection, do not use wire nuts. Label this wire #1 and plug the connector back into the DSE 3110.

These two wires are your remote start leads (wire #23 & #1) that must be routed to your Automatic Transfer Switch or what ever device you are using to activate the remote start. With the DSE 3110 in the “AUTO” position a relay closure across these two lead will activate the automatic start function in the DSE 3110. As long as the relay stays closed the unit will continue to run. Once the relay is open and contact between lead #23 and #1 is broken the unit will shutdown.



WINCO INC

12 MONTH LIMITED WARRANTY

WINCO, Incorporated warrants to the original purchaser for 12 months or 1000 hours which ever occurs first, that goods manufactured or supplied by it will be free from defects in workmanship and material, provided such goods are installed, operated and maintained in accordance with WINCO written instructions.

WINCO's sole liability, and Purchaser's sole remedy for a failure under this warranty, shall be limited to the repair of the product. At WINCO's option, material found to be defective in material or workmanship under normal use and service will be repaired or replaced. For warranty service, return the product within 12 months or 1000 hours which ever occurs first from the date of purchase, transportation charges prepaid, to your nearest WINCO Authorized Service Center or to WINCO, Inc. at LeCenter Minnesota.

THERE IS NO OTHER EXPRESS WARRANTY.

To the extent permitted by law, any and all warranties, including those of merchantability and fitness for a particular purpose, are limited to 12 months or 1000 hours which ever occurs first, from date of purchase. In no event is WINCO liable for incidental or consequential damages.

Note: Some states do not allow limitation on the duration of implied warranty and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply in every instance. This warranty gives you specific legal rights which may vary from state to state.

WINCO reserves the right to change or improve it products without incurring any obligations to make such changes or improvements on products purchased previously.

EXCLUSIONS:

WINCO does not warrant Engines. Engines are covered exclusively by the warranties of their respective manufacturers, see enclosed warranties.

WINCO does not warrant Batteries, or Other Component Parts that are warranted by their respective manufacturers.

WINCO does not warrant modifications or alterations which were not made by WINCO Inc.

WINCO does not warrant products which have been subjected to misuse and/or negligence or have been involved in an accident.

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