

Thank you for choosing us.

To maintain the Generating Set in optimum condition and retain maximum performance for a long time, **CORRECT OPERATION** and **PROPER MAINTENANCE** are essential.

We strictly recommend you to read and mind warning tags on the Generating Set and take safety precautions enumerated in the manual to prevent any damage or accident.

If you have any question or recommendation in connection with this manual, please do not hesitate to contact our head office, dealers or authorized service shops.

The content of this maintenance instructions may be changed without notice for some quality improvements.

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1. INTRODUCTION

The User and Maintenance Manual has been prepared to help the user benefit from the generator easily and make its maintenance. All instructions in the manual should be taken into consideration to install, maintain and operate your generator with maximum performance and safety for years. Get qualified and skilled people to carry out your Generator Set’s installation, maintenance and settings. If you have to use your generator in dirty and dusty environments, have its maintenance more frequently to ensure regular operation of the device. Every generator has a label on its frame which indicates model and serial numbers besides production date, voltage, amperage, frequency, power factor and weight data. This label has been attached to help you get maintenance service and demand spare parts for your generator.

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IDEA

DIESEL GENERATOR

It is produced to use emergency stand-by power source.

Model : IDJ..... Engine No :

Serial No : Alternator No :

CE D.O.P : Performance Class :

	kVA	kW	cosØ	V	Hz	A	min-	kg
Stand-by
Prime		

Please read operation manual before use.

2. SAFETY PRECAUTIONS

The Generator Set has been designed for being safe in case it is used in accordance with technical guidance. However, the safety responsibility is on the operators and servicemen of the generator. If the specified safety precautions are applied, there might be a small possibility of an accident. Before any technical operation or maintenance, the relevant operator or serviceman is responsible for taking appropriate safety precautions. Before a maintenance or operation, read all recommendations and warnings in the manual, and apply them. If the safety precautions are observed, accident possibility will be reduced. Never operate the generator if there is an unsafe condition which is known or anticipated previously. In case an unsafe condition is noticed about the generator, put a warning sign on the device and detach the negative pole of the accumulator from the accumulator and isolate it. Prevent the

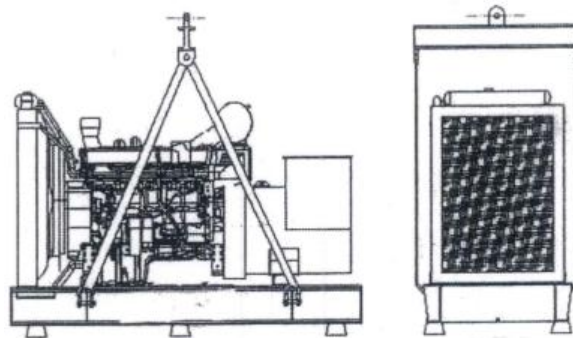
generator from being operated and keep the negative pole (-) isolated from the accumulator until a maintenance and cleaning work is executed.

The generator should be operated as per instructions, taking into consideration the warnings and only by skilled and qualified persons.



2.1. MOVING THE GENERATOR

The frame of the generator is designed to make its transportation easy. Holding it improperly may cause serious damage on the components. The generator should be lifted by a forklift, and be pushed or pulled by grasping the frame carefully. Do not push the frame directly when using forklift to push; instead, place a wood buffer between the frame and the forklift to prevent any damage. The generator should be lifted with a forklift as per its weight. Do not use engine or alternator lifting rings when lifting it with a crane. Opt appropriate lifting equipment and use the specific grasping points on the frame to lift the generator. Make sure that the lifting equipment and support elements are strong and able to lift the generator safely. The weight lifting capacity of the lifting tool should be **10%** more than the generators weight. When it is lifted, the personnel must be kept away from the vicinity of the work area. Absolutely use lockable hooks and shackles to lift with a crane. When the generator is raised from the ground, it should be preventing from rotating by means of guide ropes. Do not drag along the generator when moving. For this task, you slide it on a roller iron or steel pipes that you can lay between the frame and the ground. Make sure that the ground on which the generator will be landed is a smooth and level surface and able to bear the generator's weight.



2.2. THE CHEMICAL SUBSTANCES, FIRE AND EXPLOSION

Fuel tanks of the generators are made in accordance with the appropriate standards. Nonetheless, fuel used in the generators can blaze up and explode. Taking the needed safety precautions in storing places reduces the ignition, explosion and fire risk. It should not be allowed to smoke or fire up nearby the fuel storing areas or produce any danger similarly. Firefighting devices such as **BC** or **ABC** class extinguishers should be placed in the area where the generator is used. The personnel should be trained on how to use of these extinguishers. Oil, fuel and cooling fluid and accumulator electrolyte used in the generators are industrial type products. They can injure workers if they are not used properly. Avoid skin contact with the oil, fuel, coolant and the accumulator electrolytes and do not swallow such liquids. If they are swallowed by accident, immediately seek medical help. Do not try to make the person vomit. In case those substances contact with the skin, wash the contaminated skin area with soapy water and apply a protective skin cream. Do not wear oil or fuel contaminated apparels. Ventilate the generator's room adequately. Keep your generator and its ground and room clean. If the fuel, oil or accumulator electrolyte spill, immediately clean the area with industrial cleaning materials.

Do not put inflammable liquids near the engine. When preparing the accumulator, wear an acid protective apron, face mask and goggles. Before using conductive tools on the accumulator, take off your rings and bracelets, etc. if there are. If accumulator electrolyte spill on your skin or apparel, immediately wash the contaminated area with pressurized water. Before connecting or disconnecting the accumulator, cut off the accumulator charger or unplug it. For avoiding electric arc, keep the grounded conductive objects away from areas of electric hazard. Sparks or electric arc may ignite the fuel. If there is leakage from fuel pipes, get them fixed immediately.

2.3. MECHANICAL PARTS

The generator set has been designed and produced with a casing to make the operators around protected from shifting parts. However, safety precautions should be taken while working in the generator area for keeping the generator and the staff safe against other mechanical hazards.

2.3.1. Warnings

- Do not operate the generator when the safety casing has been removed. Do not attempt to reach near or under the casing while the generator is on for maintaining it or any other reason. Keep your hands, arms, long hair, apparel skirts, etc. away from shifting parts of the generator. Some shifting components cannot be easily seen, watch out! If there is a generator room, keep its door closed or locked.

- Avoid contacting with hot fuel, hot coolant, hot exhaust smoke, hot surfaces and sharp edges.
- Wear gloves, a protective hat and apparel before starting to work in the generator area. Do not open the filling lid of the radiator until the cooling liquid gets cool.
- Before completely opening the lid of the radiator, loosen it slowly to reduce the vapor pressure.



2.4. ELECTRIC DEVICES

Safe and efficient operation of electric devices can be achieved by proper installation, correct use and regular maintenance of such devices.

2.4.1. Warnings

- The generator should be connected to power system in accordance with the appropriate electricity codes and standards by a well-educated and qualified electrician.
- Make the generator grounded and measure its grounding resistance to make sure that the grounding is enough. Stop the generator before connecting or disconnecting the load to the generator and cut off the negative pole (-) of the accumulator.
- Do not touch the conductive parts on the generator, connection cables and electrical parts with your hands or your body or a non-insulated object.
- Recap the alternator terminals' cover after making connection or disconnection of load.
- Do not operate the generator unless the cover is safely fitted.
- Connect the generator to the proper electric charges and power systems in comply with its technical characteristics.
- Keep all electrical devices clean and dry. Replace the parts or wiring where the isolation is broken, worn out or cracked.
- Replace the terminals that are worn out, rusted or faded.
- Keep the terminals clean, and the connections fastened.
- Make all connections and idle cables isolated.
- Use **BC** or **ABC** class extinguishers in case of electric fires.

2.5. NOISE

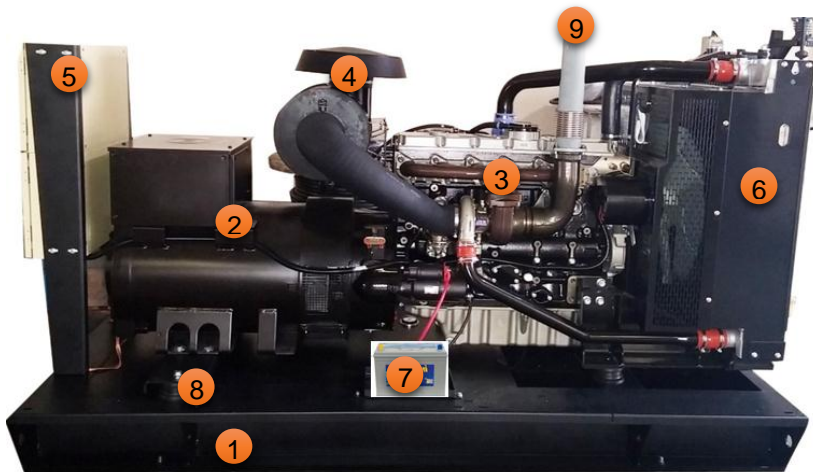
Noise intensity of the generators which are not equipped with noise attenuation canopy is more than 105dB(A). Long time exposure to a noise intensity level over **85dB(A)** is dangerous for hearing. It is necessary to use ear muffs while working nearby the generator area.



2.6. EXHAUST GASES

Inhaling the engine exhaust gases is perilous for human being. Exhaust gases coming from every kind of generators located in a closed area should be discharged by means of leak-proof pipelines which comply with the appropriate standards into the areas with no people. Keep hot exhaust muffler and exhaust pipe away from inflammable substances and make sure that needed safety precautions are taken for the personnel. Do not operate the generator in a system with gas leakage.

Generators with the trademark of **IDEA** are produced using diesel engines and alternators which are internationally acknowledged and comply with the appropriate standards. There are many diesel engines and alternators with different trademarks, models and powers that can be chosen in accordance with the operation conditions. Main parts of a generator set are shown below:



1. Fuel tank and baseframe
2. Alternator
3. Diesel Engine
4. Air Filter
5. Control Panel
6. Radiator
7. Battery
8. Anti-vibration Pads
9. Exhaust Outlet

3. GENERATOR SET SUB ASSEMBLIES

3.1. DIESEL ENGINE

IDEA Generator uses heavy-duty diesel engines in production of generator sets which are manufactured for generators, comply with the international standards, and do not need any change to be done by the end user. Our generators are equipped with four stroke engines with precision speed control, low fuel consumption, mechanical or electronic governors as per the power required, water cooling or air cooling optionally. Electrical system of the diesel engines used in the generator uses direct current with **12V** or **24V**. An accumulator for generator sets with **12V** and two accumulators for ones with **24V** are supplied with the generator. Diesel engines are designed to work safely and their filters can be replaced.

3.2. ALTERNATOR

Alternators used in **IDEA** generators are in the protection standards of **IP21** and **IP23**, brushless, and have internally cooling system and single or double bearing. The alternators have high efficiency, precise regulation and self-excitation system.

3.3. THE FRAME AND FUEL SYSTEM

Daily fuel tank of the generators has been designed for 8 hours-operation with full load and placed in the base frame. Fuel inlet and exhaust outlet connections have been made and the fuel tank has a mechanical fuel level gauge. A fuel discharge plug is installed for clearing out the tank so that cleaning operation can be done. Fuel temperature is an important parameter for efficient operation. If fuel temperature goes beyond **71°C**, it leads expansion and the heat capacity per unit volume lessen, so the engine's output power reduces. For special case generators an optional external fuel tank can be installed as well. Connection pipe between the main fuel tank and the daily fuel tank should be equal to or larger than daily tank feeding pipe. Fuel pipelines should be made of black pipes; galvanized pipes are not suitable. The fuel should be clean and not contain water or any abrasive fluids in it. Otherwise the injector, pump and actuator may show failures.

3.4. LUBRICATING SYSTEM

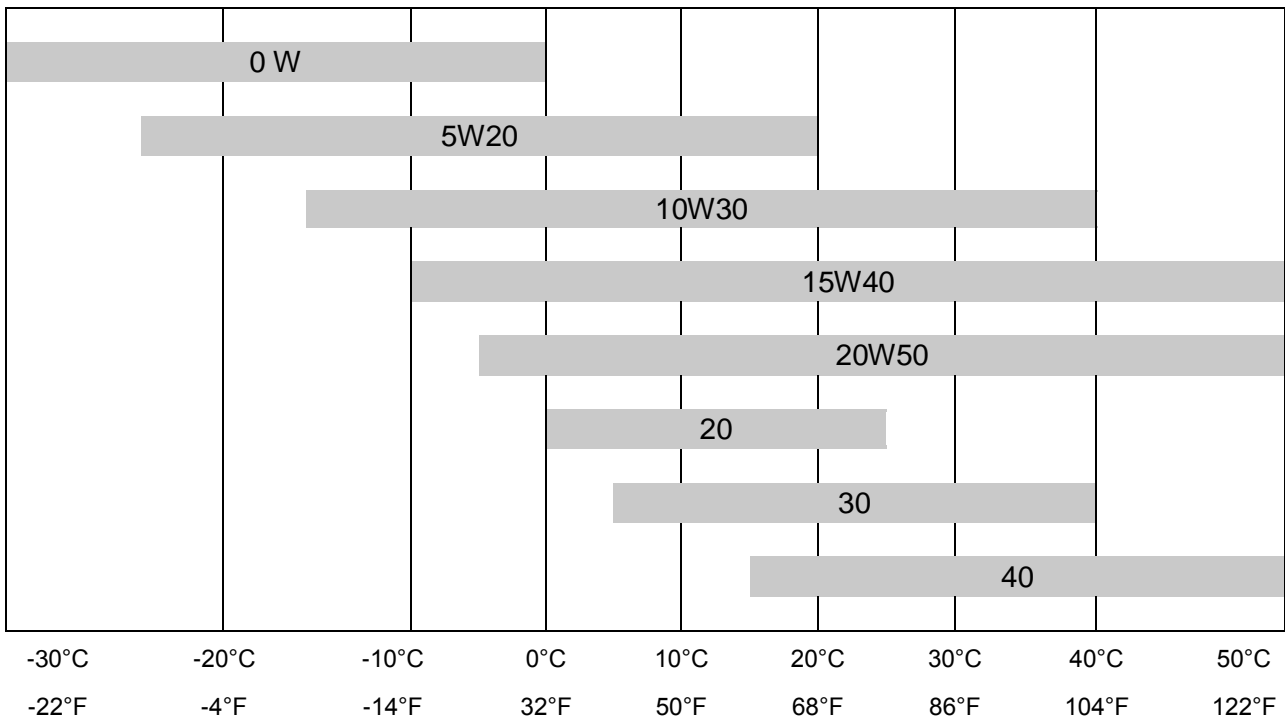
Lubricating system of diesel engines is one of the most important parts in the engine. Appropriate engine maintenance (fuel replacement periods, filter replacement periods and choosing the right oil type should be observed) extends the lifetime of an engine and reduces the utilization cost of it.

Engines are lubricated with the oil pumped into critical points by means of the oil pump; lubricating oil forms a protective layer in the bearings and between the cylinder groups and piston rings and among other moving parts. This oil layer reduces friction between metal surfaces by isolating them from each

other. It is possible to maximize the engine power using the right oil type that lessen the pumping energy used by the lubricator pump and friction among the moving parts of the engine, and to minimize the friction losses. A high quality four season-lubricating oil reduces oil consumption in 2-3% comparing to a one-season oil.

If the operation medium's temperature is higher than **15°C**, lubricating oil with the viscosity class SAE **15W/40** should be preferred in all engines.

For other diesel engines, SAE 15W/40 or SAE 20W/50 diesel lubricating oil should be used.



3.5. MUFFLER AND THE EXHAUST SYSTEM

The purpose of an engine exhaust system is to discharge the exhaust smoke out of the room for preventing it from danger and discomfort, and to lessen the noise. An appropriate exhaust muffler is installed in the exhaust pipe of the engine to lessen the noise level.

- Exhaust pipeline should be short and level as soon as possible to lessen the back pressure.
- A flexible buffer should be placed between the exhaust manifold and the exhaust pipeline to prevent the engine's vibration to be transmitted to exhaust pipeline and the building.
- Exhaust pipeline should be supported by surrounding parts to hinder its load for being the dead weight, on the outlet of the exhaust manifold and turbo charger.
- The weight of the exhaust system should be loaded on the building. A stretching element can be used for this study.

- Flare type rain covers with reciprocal weights can be used for different applications to prevent the rain penetration into the exhaust outlet that is open.
- It is not allowed to unite two or more generators' exhaust outlets using a single exhaust pipe.

3.6. VIBRATION BUFFERS

Vibration buffers are used on the connection points of the alternator set to the frame and between the frame and the floor in order to hinder generator parts from coming loose and shocks that may occur on the ground when the generator is operated. Vibration buffers are chosen in accordance with the weight of the device to minimize the vibration and to use the device for a long time without any problem.

3.7. BATTERY

Batteries provide the needed electric energy to activate the electric starter while starting the engine first time. They should be placed as near as the generator. If the batteries are put at distant points from the generator, this will cause power loss resulting reduction in the starting capacity of the accumulators. Batteries with less charge cannot start the engine well in cold weather. More power is needed to start an engine up in cold weather than that of normal weather conditions.

Oxidation may occur on the poles and connection points of the accumulator in process of time. Oxidation causes abrasion on the poles and obstacles charging.

3.7.1. MAINTENANCE OF THE BATTERY

- Keep the top of the accumulator and its terminal clean.
- Coat the battery terminals and connections with Vaseline carefully.
- Screw the terminals adequately (Do not overtighten).
- Check the electrolyte level regularly. This level always must be **10mm** over the plates.
- Pay attention to the battery for not being discharged.

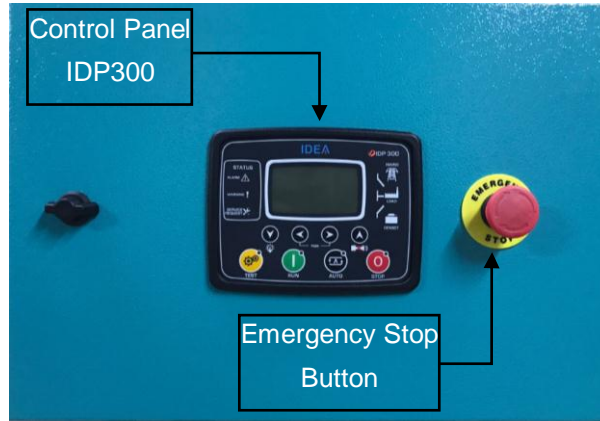
Take the needed safety precautions while working on batteries (See 2.2.).

3.8. CONTROL AND TRANSFER PANEL

Electronic systems are used to control and monitor the operation of the generator. The control panel allows looking out the operation and shutting down of the generator as well as state of the operation and output values. It also stops the generator automatically in the condition of low oil pressure, high engine temperature and other critical failures. The user must know well how to use the control panel and functions of its elements. Indicators of the panel should be observed from time to time while the

generator is on. In this way, it may be possible to intervene in the operation of the generator before a serious problem arises in an extraordinary situation.

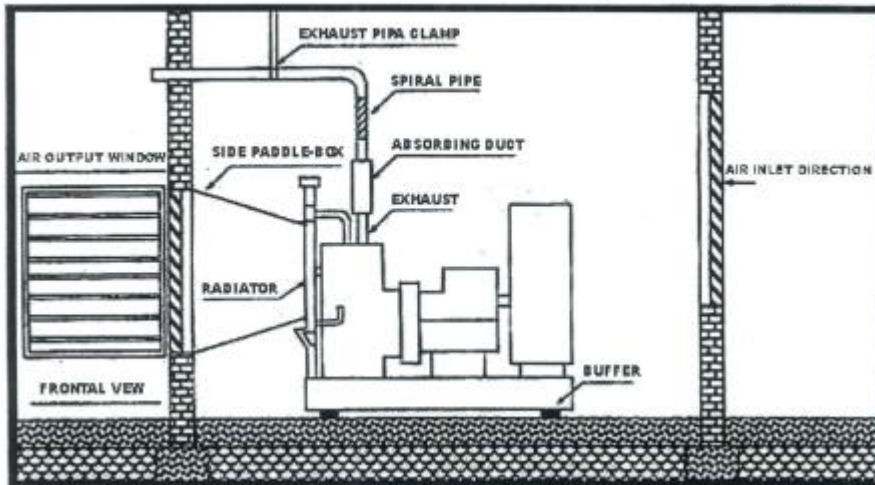
Automatic transfer panels are used in automatic generators to provide the mains-generator transfer. Automatic transfer systems are built on wall hanging type up to **200kVA** standby. Free standing type transfer panels are used for the rest of the power ranges.



4. DETERMINING A PLACE FOR THE GENERATOR AND INSTALLATION

Choosing the place where the generator set will be installed is very important for a high-performance and safe generator operation. Adequate ventilation should be carried out in the area where the generator is operated. The place of the generator should be protected against environmental facts such as rain, snow, hail, flood, sunlight, freezing cold, excessively hot water, etc. It should be covered against dust, oily smoke, steam and other abrasive substances and electric conductivity providers that can be carried by air flow. If there is a special generator room and it is operated in open air, a generator with canopy should be chosen or necessary precautions should be taken to protect the device against weather conditions. For cooling and maintaining of the generator, at least a two-meter space around and one-meter space above the generator should be restricted.

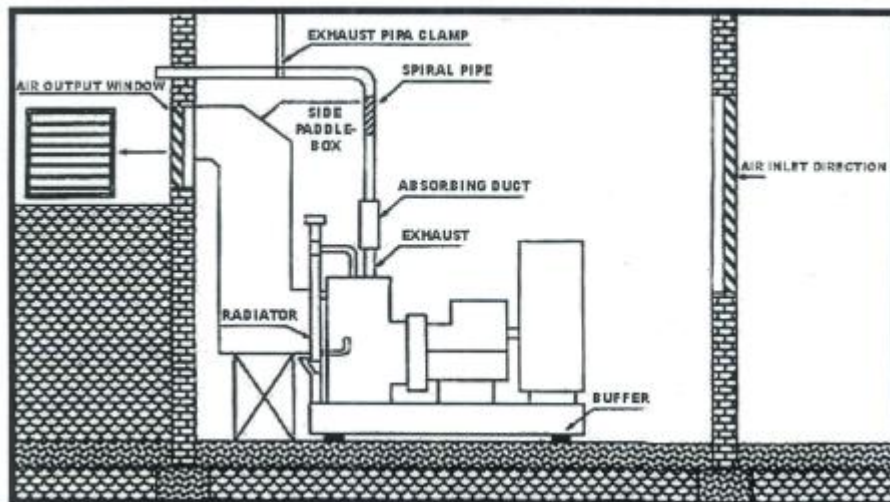
VENTILATION LAYOUT OF THE GENERATOR SET (GROUND FLOOR)



A special concrete pedestal is not necessary to put the generator on, a smooth ground is adequate. However, for places with standing water or moisture such as a boiler room, it is recommended to put the generator set on a platform raised from the floor.

It is required to let fresh air intake to the place of the generator and outlet of the hot air of the engine to the open area for getting more efficient engine operation and protecting overheating.

VENTILATION LAYOUT OF THE GENERATOR SET (BASEMENT)



4.1. ELECTRIC CONNECTIONS OF THE GENERATOR & START UP

Please have the electric connections of the generator done by authorized professionals and make sure that the safety precautions listed in the **section 2.4.** are observed. Power cables' load flow should be calculated as per the operation voltage and the distance between the generator and the load. The generator and transfer panel should be placed so that the interconnecting cables can be as short as possible. The phase order should be determined in three phases systems in the present network and the phase order should be controlled before the energy of the generator is released to the load afterwards the generator connections.

To make the generator – mains transfer, a **3-way changeover switch** in manual models and a transfer panel in automatic models should be used.

The generator set and the transfer panel should be grounded before operating. Never operate the generator unless the grounding installation is made. Grounding is required and useful to protect people against electrical hazards and to make the electronic control devices more efficient.

Grounding is carried out by sticking copper electrodes or plates in the earth which are also connected to the generator frame through a copper conductive with appropriate cross section grounding plates are preferred for high-power generators. The voltage between a phase and the earth should not go beyond the system voltage in a well-executed grounding. According to IEC, the grounding resistance should be below **1 Ohm**.

The cross section of power cables and grounding cables to be chosen as per the generator power are given in the table of cable choosing.

4.1.1. INSTALLATION OF THE TRANSFER PANEL

The important points to be taken into consideration when the transfer panel is installed:

- Place the transfer panel as near as possible to emergency load panels.
- The transfer panel should be located in clean, dry, well-ventilated place which is away from excessive heat. When the medium temperature increases over **40°C**, fuses and switches will open more rapidly. There should be an adequate working area around the transfer panel.
- The current values drawn from the generator, should be equally distributed to three phases as much as possible. The value to be drawn from one phase never can exceed the nominal current value.
- If the transfer panel is separated from the generator, it is placed near the distribution panel as much as possible. In this case, power cables to be connected to transfer panel from

generator, mains and load or main distribution panel. Furthermore, a control cable as **7x1,5 mm²** should be connected between generator control and start panel and transfer panel.

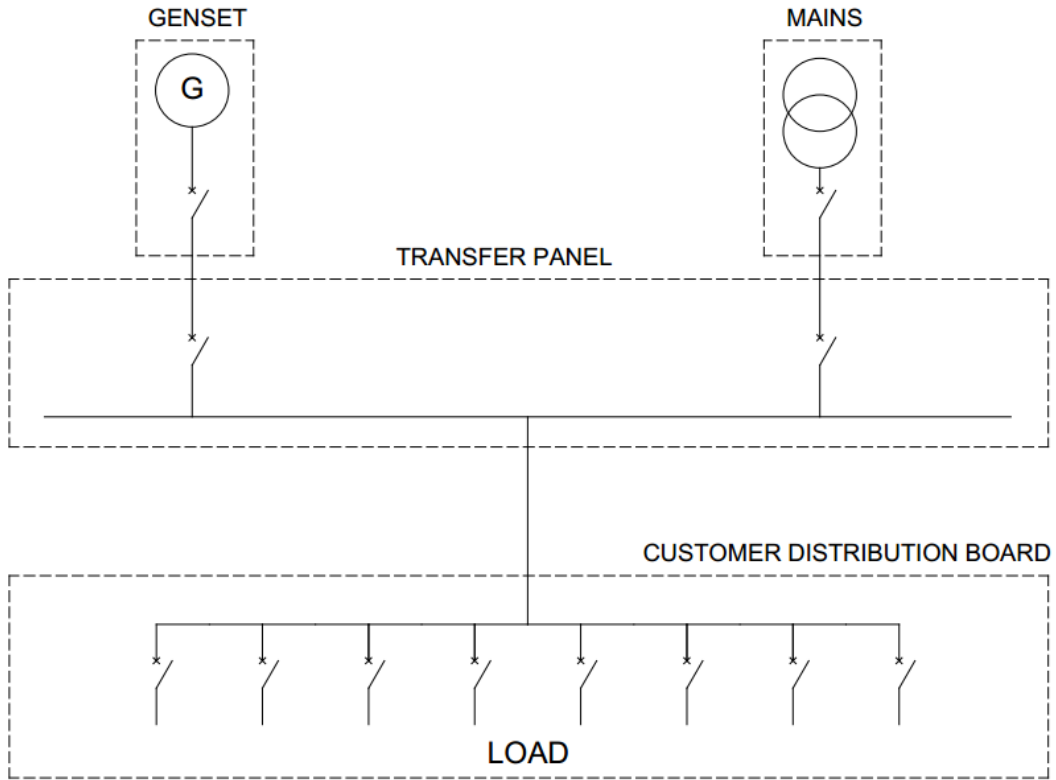


TABLE OF CABLE CHOOSING

POWER		CABLE						CURRENT CARRYING CAPACITY			CALCULATED CURRENT	
POWER OF THE GENERATOR KVA	COS Ø	NUMBER OF CORES (FOR ONE PHASE)	NEUTRAL CROSS-SECTION mm ²	GROUND CROSS-SECTION mm ²	TYPE	LENGTH L m	NOMINAL CABLE CURRENT A	CABLE CURRENT A	TOTAL CABLE CURRENT A	TOTAL VOLTAGE DROP %e	CURRENT	
13	0,8	4x6	-	1x6	NYN	50	43	41	40,85	1,07	19	
16	0,8	4x6	-	1x6	NYN	50	43	41	40,85	1,32	23	
22	0,8	4x6	-	1x6	NYN	50	43	41	40,85	1,82	32	
27	0,8	4x10	-	1x10	NYN	50	60	57	57	1,34	39	
33	0,8	4x10	-	1x10	NYN	50	60	57	57	1,64	48	
40	0,8	4x16	-	1x10	NYN	50	80	76	76	1,24	58	
50	0,8	3x25+16	-	1x10	NYN	50	106	101	100,7	0,99	72	
55	0,8	3x25+16	-	1x10	NYN	50	106	101	100,7	1,09	79	
75	0,8	3x35+16	-	1x10	NYN	50	131	124	124,45	1,06	108	
110	0,8	3x70+35	-	1x25	NYN	50	202	192	191,9	0,78	159	
125	0,8	3x70+35	-	1x25	NYN	50	202	192	191,9	0,89	180	
150	0,8	3x95+50	-	1x25	NYN	50	244	232	231,8	0,78	217	
175	0,8	2(1x35)	1x35	1x16	NYN	50	169	144	287,3	1,17	253	
200	0,8	2(1x50)	1x50	1x25	NYN	50	206	175	350,2	1,09	289	
250	0,8	2(1x70)	1x70	1x35	NYN	50	261	222	443,7	0,89	361	
280	0,8	2(1x70)	1x70	1x35	NYN	50	261	222	443,7	0,97	404	
300	0,8	2(1x95)	1x95	1x50	NYN	50	321	273	545,7	0,86	433	
350	0,8	2(1x95)	1x95	1x50	NYN	50	321	273	545,7	0,91	505	
380	0,8	3(1x70)	2(1x70)	1x70	NYN	50	261	222	665,55	0,9	548	
400	0,8	3(1x70)	2(1x70)	1x70	NYN	50	261	222	665,55	0,94	577	
440	0,8	3(1x70)	2(1x70)	1x70	NYN	50	261	222	665,55	1,04	635	
450	0,8	3(1x70)	2(1x70)	1x70	NYN	50	261	222	665,55	1,06	650	
500	0,8	3(1x95)	2(1x70)	1x70	NYN	50	321	273	818,55	0,87	722	
550	0,8	3(1x95)	2(1x70)	1x70	NYN	50	321	273	818,55	0,96	794	

4.2. OPERATING THE GENERATOR

Make the final controls of the generator set before the device is operated, and follow the appropriate safety precautions.

- Check the levels of the engine oil and cooling liquid and fill the fuel tank.
- Turn the fuses and load out circuit breaker (if there is) in the panel to **OFF** [0] position.
- Discharge the air in the fuel system via manual fuel pump on the engine.
- Control the charge of the battery and connect the poles starting with positive pole (+) and then the negative pole (-).
- Turn the fuses in the panel to **ON** [1] position and release emergency stop button by turning counterclockwise if it is pressed.
- When the control panel is powered, check the warning LEDs by pressing the lamp test button.
- For operating the generator without load in the test position, press **RUN** button for automatic models, for the manual models, if any transfer panel is not connected, generator set directly energizes load. For this case, in order to run manual generators without load, the load out circuit breaker must switched to **OFF** [0] position.
- Check the voltage, frequency, oil pressure and temperature of the coolant when the generator is operated in the test position.

4.2.1. OPERATION OF THE AUTOMATIC GENERATOR SET

If the generator is desired to start in automatically in case of mains cut or mains failure, **IDP300** panel must be at **AUTO** position.



- Generator control panel checks mains phases continuously; lower limit of many phase of the mains is set to **180V**, and the upper limit is set to **250V** as default program in **IDP300** panel. The generator will start and energizes the load within **12 seconds** upon mains cutout or any of the mains voltage goes out of the default programmed limits.
- When mains voltage or frequency returns in the limits, automatic control panel observes mains voltage and frequency values for **120 seconds**. If the mains values are within the programmed limits, generator will transfer load to mains and automatically shuts down after a cooling period for two minutes.
- There are some signal lamps on the control panel. If “**Alarm**” led is on whether generator set is running or not, means there is a problem on the generator and it will stop if it is running or will not start upon a mains problem. After troubleshooting operation, press **STOP** [0] button on the control panel and reset the present failure. Operate the generator on **TEST** position, and then turn it to **AUTO** position.

4.2.2. OPERATION OF THE MANUAL GENERATOR SET

- Check the required parameters to start up your manual generator set and take safety precautions.
- Press **AUTO** button on **IDP300** control panel.
- The generator starts to run. Operate it for about **2 minutes** so that the engine gets warm up and reaches nominal speed.
- Turn the changeover switch to **GENERATOR** position to execute load transfer, and turn the load breaker switch (optional) to **ON** [1] position.
- When the generator desired to shut down, turn the load breaker switch (optional) to **OFF** [0] position and turn the changeover switch to **MAINS** position before stopping the engine.
- After operating the generator at no load for cooling about **2 minutes**, press **STOP** button on **IDP300** control panel.
- There are trouble signals on the control panel. If one of them lights up, that means, there is a problem in the generator set. In this situation, the generator ceases to operate and shuts down automatically.
- **Operate your manual generator set for 15 minutes once a week to make the battery charged and for making an overall control.**

TROUBLESHOOTING TABLE

Electric starter rotates the diesel slowly	▪ Accumulator is discharged
	▪ Cables of the accumulator are barely in contact
	▪ Electric starter is out of order
The engine does not produce enough power	▪ Fuel pipe is clogged
	▪ Fuel pipe is polluted
	▪ Air filter is polluted
	▪ Fuel quality is poor
	▪ Exhaust pipe is clogged
	▪ Manual fuel pump is out of order
	▪ The governor is out of order
The engine works poorly or not at all	▪ Electric starter cannot rotate the diesel
	▪ There is air in the fuel line
	▪ Fuel tank is empty
	▪ Fuel pipe is clogged
	▪ Fuel control solenoid is out of order
	▪ Fuel filter is polluted
	▪ The heater fails to work
	▪ Exhaust pipe is clogged
	▪ Poor fuel quality
	▪ Manual fuel pump is out of order
	▪ The injector is out of order or out of adjustment
	▪ Oil sender/switch or connection part is out of order
The engine works inefficiently	▪ Fuel pipe is clogged
	▪ Fuel governor is out of order
	▪ Fuel filter is clogged
	▪ Fuel pump is out of order
	▪ Air filter is polluted
	▪ There is air in fuel system
	▪ Injectors are out of order or out of adjustment
	▪ Relief valves are out of adjustment
Oil pressure is too low /	▪ Oil viscosity degree is wrong

Oil pressure is too high	▪ Oil pump is defective
	▪ Oil pressure indicator is out of order
	▪ Oil filter or pipe is clogged
	▪ Oil level in the sump is low
Generator works but does not produce electricity	▪ Fuse of the AVR has blown
	▪ Voltage card is out of order
	▪ Rectifying diodes have blown
AVR is OK but alternator does not produce electricity	▪ Rectifying diodes have blown
	▪ Stator windings are damaged
Charge Alternator does not charge the battery	▪ Fan belt has broken
	▪ Charging alternator's IC regulator has damaged
	▪ Poor engine wiring on terminals
	▪ Charging alternator itself has damaged
Variable Voltage	▪ Engine speed is variable
	▪ Check the connections of the AVR
	▪ AVR is out of adjustment or out of order

5. MAINTENANCE OF THE GENERATOR

A well applied maintenance program will extend the lifetime of the generator. The place and the floor where the generator is located should be clean every time. Water, fuel, oil and other fluids are not allowed to be collected on or in the generator.

A service warning lamp is installed in the control panel of the generator set. When the lamp lights up, you must get the generator maintained. An overall maintenance is needed for the generator for every 150 hour-operation time or once a year. Following maintenances should be done for every **150 hour-operation** time or once a year.

- Check the oil, fuel, cooling liquid levels in the generator set and the battery once a week. You must switch the generator to **OFF (STOP)** position on **IDP300** panel while doing those controls.
- Check the cooling liquid level in the radiator and replenish, if needed. While doing this operation, the radiator should not be filled completely, there should be an empty volume of about 2 cm for expansion under the top of the chamber.
- Check the oil level by pulling out the dipstick. Oil level should be between two lines on the dipstick.

- After finishing the controls, operate your generator in **RUN** position for 15 minutes, and press AUTO button on the control panel after the test is concluded. The generator will stop automatically by finishing the cooling period.

5.1. FIRST MAINTENANCE

Engine oil, oil filters and fuel filters are to be replaced during the **50 hour-maintenance** or the first running-in maintenance. Air filter is cleaned, or replaced, if needed. Electrical connections and indicators of the device are checked. It is also controlled for detecting if there are any leakages of oil, fuel or cooling liquid on the engine. Radiator, tubes of the fuel system, belts and brackets are inspected as well.

5.2. MAINTENANCE FOR EVERY 150 HOURS

The operation of the first maintenance will be repeated for maintenance of **150 hours**, too. The battery is maintained and the fan belt's tension is controlled, by stretching the belt, its looseness is eliminated, if there is.

In addition, cooling water and antifreeze are completely discharged and replaced for every two years.

Get your generator maintained by authorized servicemen and let only original spare parts to be used in the generator. Otherwise, wrong maintenance and spare parts may cause failures and damages that will make the warranty of your generator set invalid.