



The Brand of Electricity

ELECTRICAL DIESEL GENERATORS EL-DF SERIES USER MANUAL

Please pay attention to instructions and warnings in the user manual to use your generator set with full performance and for a long time.

This user manual has been drawn up to help users benefit from the generator easily. When the device is used in accordance with instructions in the user manual, it is under the guarantee as it is specified in the guarantee certificate for one year or 1000 hours. Failures occurred due to any change executed on the generator without consent of the manufacturer or uses of non-original spare parts in the device are excluded from the guarantee.

Our generators are supplied to the users after the precise tests and other quality control steps following particular production processes implemented by our skilled team.

We strictly recommend you read and observe warning tags on your generator and take the safety precautions enumerated in the user manual to prevent any damage or accident.

Periodic maintenance works should be done to use the device more efficiently' and for a long time. You may execute periodic maintenance agreements with One of Our authorized technical services for this purpose.

The Use 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 done 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.

MODEL		POWER FACTOR	
GROUP SERIAL NUMBER		PHASE NUMBER	
ENGINE MODEL		ENGINE SERIAL NUMBER	
ALTERNATOR MODEL		ALTERNATOR SERIAL	
ESP (kVA)		OUTPUT VOLTAGE FRQ	
PRP (kVA)		TEMPERATURE	
ESP CURRENT / FLOW		ALTITUDE	
PRIME		HUMANDITY	
OPERATION TYPE		DIMENSIONS (mm)	
REVOLUTION PER MINUTE		WEIGHT (kg)	
PERFORMANCE CLASS		DATE OF MANUFACTURE	

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.

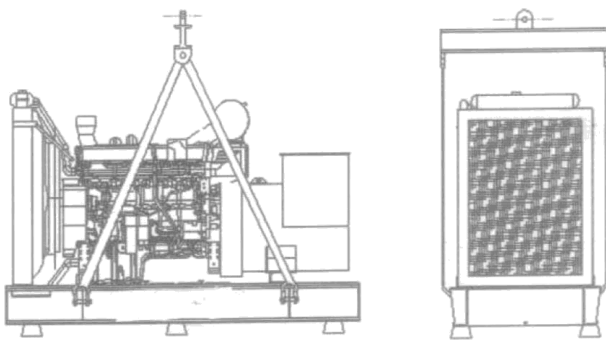
The generator should be operated as per the instructions, taking into consideration the warnings and only by skilled and qualified persons.



ELMARK[®]

The Brand of Electricity

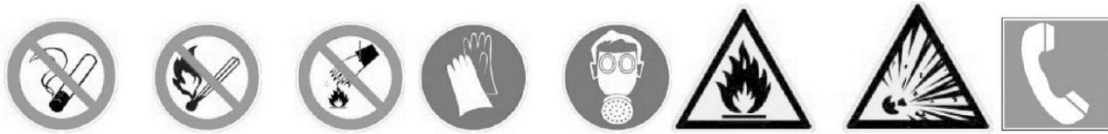
The frame of the generator is designed to make its transportation easy. Holding it improperly may cause serious damage on the components. The generator should be lifted by a forklift and be pushed or pulled by grasping the frame carefully. Do not push the frame directly when using forklift to push; instead, place a wood buffer between the frame and the forklift to prevent any damage. The generator should be lifted with a proper forklift as per its weight. Do not use motor and 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 weightlifting capacity of the lifting tool should be 10% more than the generator's 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 prevented from rotating by means of guide ropes. Do not drag along the generator when moving. For this task, you may 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.



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. Oils, fuels and cooling fluids and accumulator electrolytes 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 the 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 the 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.



MECHANICAL PARTS

The generator 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.

-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.



ELECTRIC DEVICES

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

-Warnings

The generator should be connected to the power system in accordance with the appropriate electricity codes

ELMARK[®]

The Brand of Electricity

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 terminal's 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 electric devices clean and dry. Replace the parts or wiring where the isolation is broken, warm 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 electric fires.

NOISE

Noise intensity of the generators which are not equipped with the noise isolation cabin is more than 105 dBA. Long time exposure to a noise intensity level over 85 dBA is dangerous for hearing. It is necessary to use earmuffs while working nearby the generator area.



EXHAUST GASES

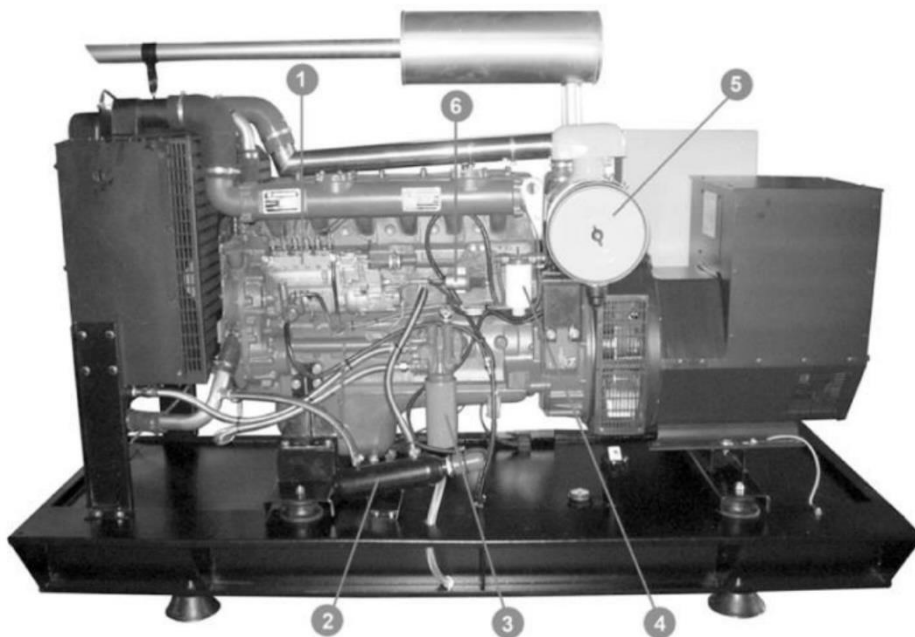
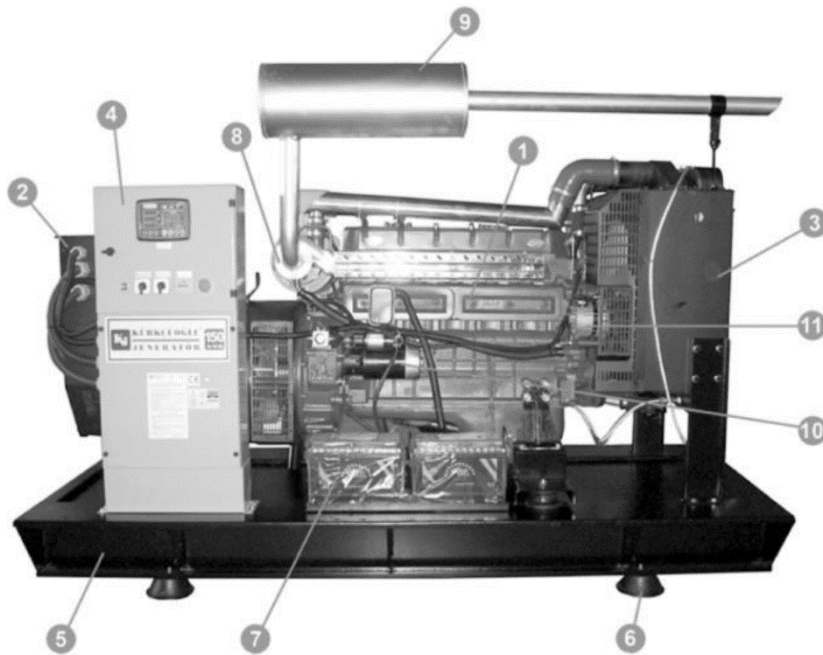
Inhaling the engine exhaust gases is perilous for human being. Exhaust gases coming from every kind of generators located in a closed area should be discharged by means of leak-proof pipelines which comply with the appropriate standards into the areas with no people. Keep hot exhaust muffler and exhaust 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.

GENERATOR SET AND ITS COMPONENTS

Generators are produced using the 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 sets shown below:

ELMARK[®]

The Brand of Electricity



ELMARK[®]

The Brand of Electricity

DIESEL ENGINE

Kurk9uoglu Generator uses heavy-duty diesel engines in production of his generators 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 employed in the generator uses direct current with 12 V or 24 V.

An accumulator for generator sets with 12 V and two accumulators for ones with 24 V are supplied with the generator. Diesel engines are designed to work safely and their filters can be replaced.

ALTERNATOR

Alternators employed in Kurk9uoglu generators are in the protection standards of IP 21 and IP 23, without brush, and have internally cooling systems and single or double bearing, Warning mode of the alternators that are with high efficiency, precision regulation and self-warning system complies with AVR-5/AVR-12 and AVR-20.

THE FRAME AND FUEL SYSTEM

Daily fuel tank of the generators has been designed for operation of 8 hours with full load and placed in the frame. Fuel intake and exhaust outtake connections have been made and the tank has a mechanical fuel level indicator. 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 lessens, 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 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.

LUBRICATING SYSTEM

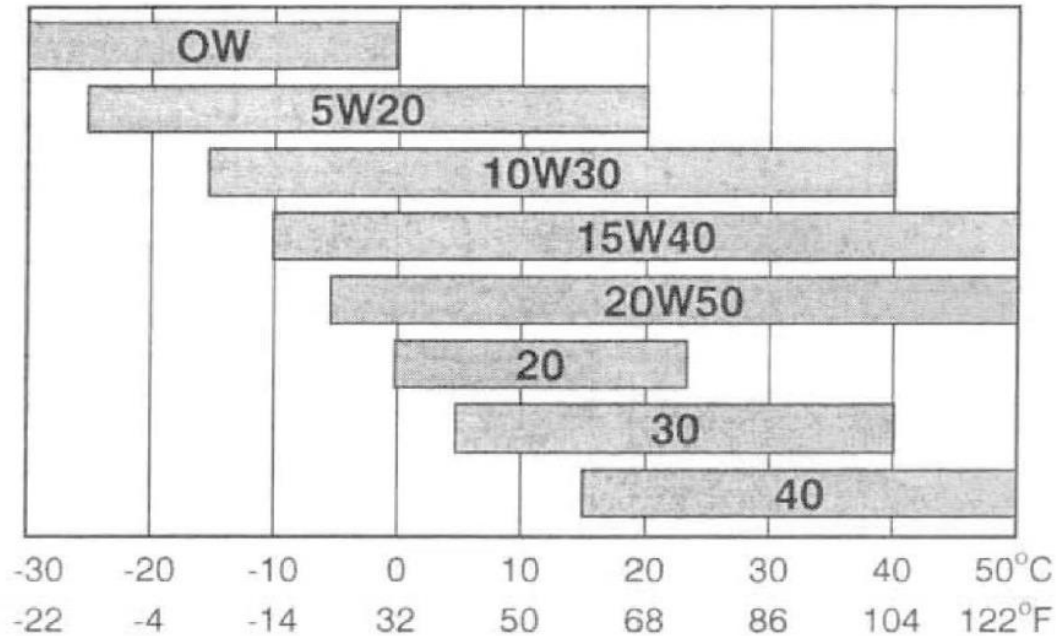
Lubricating system of diesel engines is one of the most important parts in the engine. Appropriate engine maintenance (fuel replacement periods, filter replacement periods and choosing the right oil type should be observed) extends the lifetime of an engine and reduces the utilization cost of it.

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 oils 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 oils should be used.

RECOMMENDED SAE VISCOSITY DEGREES



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 motor'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 duty.

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.

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.

ACCUMULATOR

Accumulators 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 accumulators are put at distant points from the generator, this will cause power loss resulting reduction in the starting capacity of the accumulators.

Accumulators 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 the 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 prevents charging.

Maintenance of the Accumulator

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

Take the needed safety precautions while working on accumulators.

CONTROL AND TRANSFER PANEL

Electronic systems are used to control and monitor the operation of the generator. It can be chosen standard automatic or standard manual control systems as per the use requirements. 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 motor temperature and other 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 network-generator transfer. Automatic transfer systems are installed at the back of the control panel of the generators that are up to 75 kVA. External type transfer panels are used for the generators with a power more than 75 kVA.

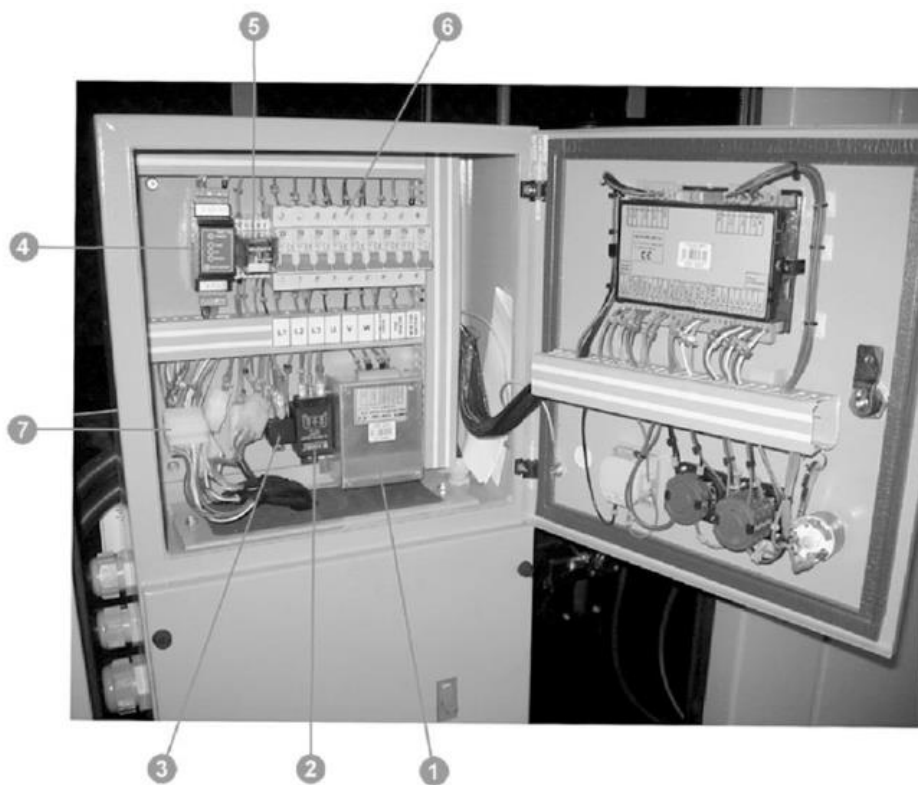
Thermo-magnetic switches are used in the manual generators to avoid fast loading before the engine gets hot.

ELMARK[®]

The Brand of Electricity



- 1. Control Module
- 2. Timer
- 3. Circuit Breaker
- 4. Manuel - Automatic
Selector Switch
- 5. Mains - Generator
Selector Switch
- 6. Contact



- 1. Battery Charger
- 2. Water Level Relay
- 3. 12V / 24V Mini Relay
- 4. Manuel Control Module
- 5. 11 Legged Relay
- 6. Fuses
- 7. Sockets

DETERMINING A PLACE FOR THE GENERATOR AND INSTALLATION

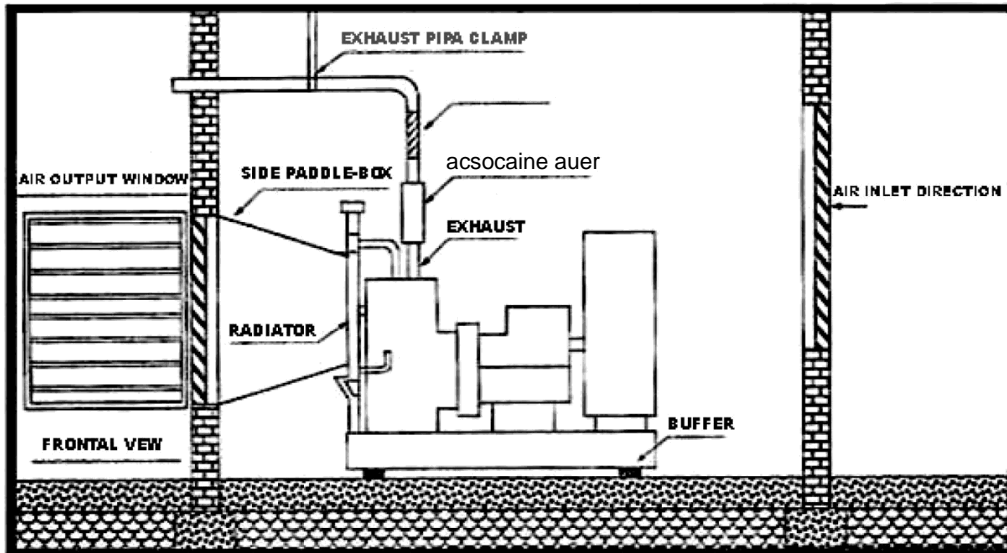
Choosing the place where the generator set will be installed is very important for a high-performance and safe generator operation. Adequate ventilation should be done in the area where the generator is operated. The place of the generator should be protected against environmental facts such as rain, snow, hail, flood, sunlight, freezing cold, excessively hot weather, 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 cabin type generator should be chosen or the 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 the generator and a one meter-space above the generator should be left. There should be a proper road to carry the generator in its room or place. Unauthorized access to the generator should be restricted.

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.

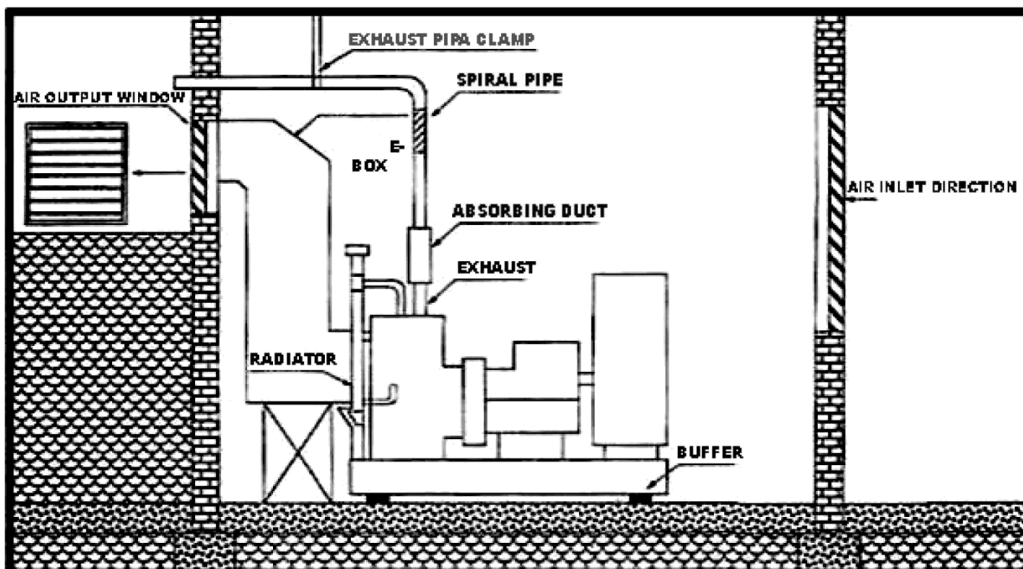
It is required to let fresh air intake to the place of the generator and outlet of the hot air of the engine to the open area for getting more efficient engine operation and protecting overheating.

Generator Group		Dimensions of the Group (mm)			Dimensions of the Room (m)			Radiator's Hot Air Outlet Total Area (mm)			Air Inlet (mm)	
Power	Standby	Length	Width	Height	Length	Width	Height	Width	Height	Height from the Ground	Width	Height
(kVA)												
13		1350	750	1250	3150	2350	2750	470	470	500	600	600
16		1350	750	1250	3150	2350	2750	470	470	500	600	600
20		1350	750	1250	3150	2350	2750	470	470	500	600	600
25		1350	750	1250	3150	2350	2750	390	480	500	500	600
33		1600	800	1350	3400	2400	2850	550	600	600	700	750
40		1600	800	1350	3400	2400	2850	550	600	600	700	750
50		1800	850	1350	3800	2850	2850	550	600	500	700	750
58		1800	850	1450	3800	2850	2950	620	650	500	775	825
75		1800	850	1450	3800	2850	2950	620	650	550	775	825
110		2300	900	1700	4300	2700	3200	750	750	550	950	950
125		2300	900	1700	4300	2700	3200	750	750	550	950	950
150		2300	900	1700	4300	2700	3200	720	750	600	950	950
175		2500	1000	1900	4500	2800	3400	750	780	600	950	1000
200		2500	1000	1900	4500	2800	3400	1000	900	550	1250	1125
250		2800	1000	1900	4800	2800	3400	1100	1200	450	1375	1500
280		2800	1000	1900	4800	2800	3400	1250	1200	450	1600	1500
300		2800	1000	1900	4800	2800	3400	1250	1200	450	1600	1500

VENTILATION LAYDUT OF THE GENERATOR SET (GROUND FLOOR)



VENTILATION LAYDUT OF THE GENERATOR SET (BASEMENT)



ELECTRIC CONNECTIONS OF THE GENERATOR and 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 the transfer board should be placed so that the interconnecting cables can be as short as possible. The phase order should be determined in three phase 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 – network transfer, a 3-position inverter switch in manual models and a transfer board in automatic models should be used.

Generator – For making network transfer; a 3-position inverter switch for manual models and a transfer panel for 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. The best grounding resistance is between 1 ohm and 5 ohm.

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

INSTALLATION OF THE TRANSFER PANEL

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

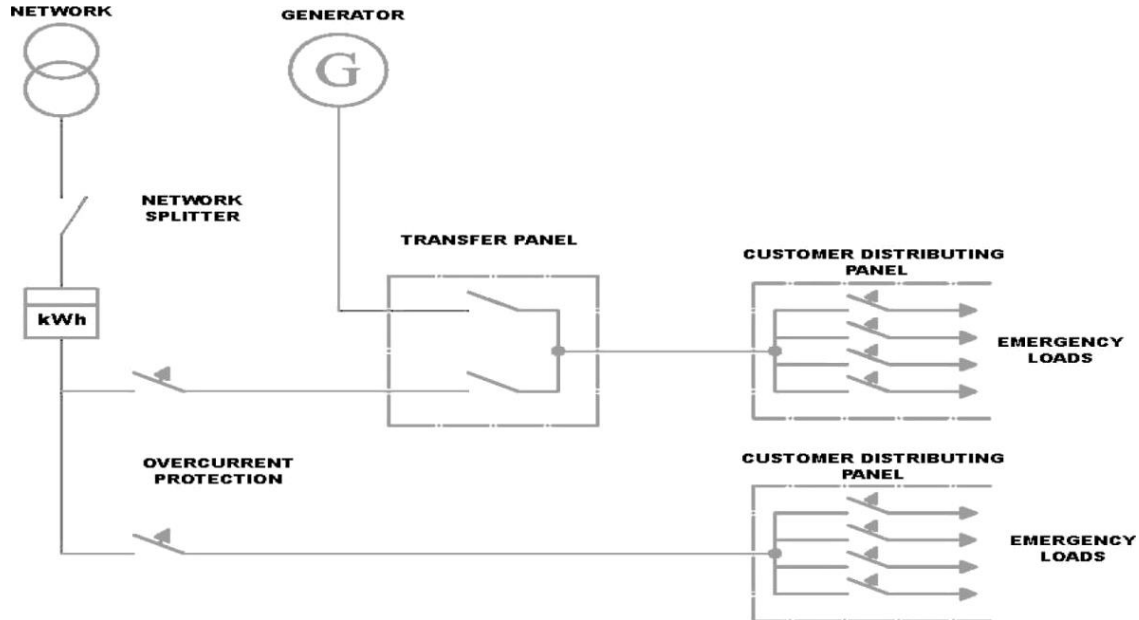
Place the transfer panel as near as possible to the emergency load panels.

The transfer panel should be located in a 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 taken from the generator should be equally distributed to the three phases as much as possible. The value to be taken from one phase never can exceed the nominal current value.

If the transfer panel is separated from the generator, the transfer panel is placed near the distribution panel as much as possible. In this case, power cables are installed from the generator, from the network panel, from the emergency load panel to the transfer panel.

Furthermore, a control cable of 7x1,5 mm² should be installed from the generator control and start panels to the transfer panel.



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 A
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



The Brand of Electricity

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 engine oil and cooling fluid and fill the fuel tank.

Turn the fuses and the load out switch (if there is) in the panel to off (0) positions.

Discharge the air in the fuel system via a manual fuel automat on the engine.

Control the charge of the accumulator and connect the poles starting with the positive pole (+) and then the negative one (-).

Turn the fuses in the panel to ON (I) position and open the emergency stop button by turning right 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 TEST button in the automatic models, and START button in the manual models.

Check the voltage, frequency, oil pressure and temperature on the coolant when the generator is operated in the test position.

OPERATION OF THE AUTOMATIC GENERATOR SET

If the generator is wanted to start automatically every time, DKG 307 panel will be AUTO position and switches will be on AUTOMATIC and NETWORK positions.

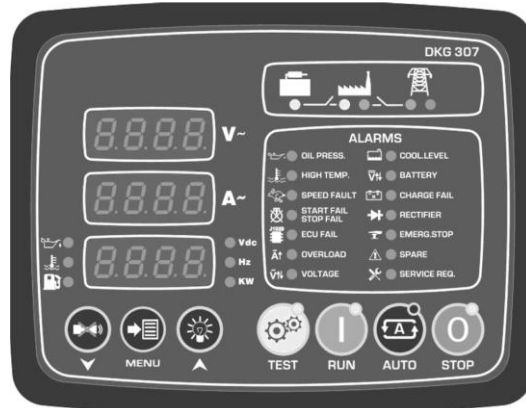
Generator control panel checks the network phases continuously; lower limit of the network voltage is set to 180 V, and the upper limit is set to 250 V in the program. When the network voltage goes out those limits or the network power is cut off, the generator operates automatically and gets the load within 12 seconds.

When the network power gets back, automatic control panel follows the network power to 30 seconds. If the network power is on the normal value, it transfers the load to the network and automatically shuts down after a cooling operation for one minute.

Automatic generator set can be operated manually via a starter key by turning the control panel to Off position, and switches to MANUAL and NETWORK positions. After the generator has come to normal engine speed, switch is turned to GENERATOR position and the load is transmitted to the generator.

When the network power comes back, switch is set to NETWORK position and the generator is stopped by means of the starter key.

There are trouble signals on the control panel. If one of these lights up, there is a problem in the generator set. In this situation, the generator ceases to work and shuts down automatically. After the troubleshooting operation, press the KAP button on the control panel and reset the system. Operate the generator on the TEST position, and then turn it to the AUTO position. The generator will shut down automatically after one minute.



OPERATION OF THE MANUAL GENERATOR SET

Check the required parameters to start up your manual generator set and take the safety precautions.

Turn the P switch with OFF/ON positions on the control panel to ON position

Press START (1) button on DKG 317 control panel.

The generator starts to work. Operate it in the idle position for about 2 minutes so that the engine gets warm and reaches normal speed.

Turn the inverter switch to GENERATOR position to execute load transfer and turn the load breaker switch to OPEN (1) position.

When you want to shut down the generator, turn the load breaker switch to CLOSED (0) position and inverter switch to NETWORK position.

After operating the generator in the idle position for cooling for about 2 minutes, press OFF button on DKG 317 control panel.

After the generator has stopped, turn the switch (OFF/ON) to OFF position.

There are trouble signals on the control panel. If one of them lights up, there is a problem in the generator set. In this situation, the generator ceases to work and shuts down automatically.

After the troubleshooting operation, press the red colored OFF button on the control panel and the lighting LED on the control panel will shut off.

Operate your manual generator set for 15 minutes once a week to make the accumulator charged and execute 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 doesn't produce enough power.	" Fuel pipe is plugged " Fuel filter is polluted Air filter is polluted " Poor quality fuel " Exhaust pipe is plugged Fuel automat is out of order " The governor is out of order
The diesel engine works poorly or not at all.	" Electric starter cannot rotate the diesel " There is air intake in the fuel line " Fuel tank is empty " Fuel pipe is plugged Fuel control solenoid is out of order " Fuel filter is polluted " The heater fails to work " Exhaust pipe is plugged " Poor quality fuel Fuel automat is out of order " The injector is out of order or out of adjustment " Oil sensor / switch or connection part is out of order
The engine works inefficiently	" Fuel pipe is plugged " Fuel governor is out of order Fuel filter is plugged " Fuel pump is out of order " Air filter is polluted There is air intake in the 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 pump is defective
Oil pressure is too high	" Oil viscosity degree is wrong " Oil pressure indicator is out of order
	" Exhaust pipe is plugged " Cooling fan is defected " Radiator cores are plugged or pipes are dirty " Cooling system is insufficient " Oil filter or pipe is plugged * Injectors are out of order or out of adjustment " Heater system is out of order " Oil level in the sump is low
Generator works but does not produce electric	" Fuse of the voltage card has blown " Voltage card is out of order * Diodes of the dynamo have blown
Voltage card warns, but alternator has no voltage and no warning	" Connections are imperfect
As the alternator does not charge, voltage is low.	" Voltage adjustment potentiometer is out of adjustment
As the alternator charges, voltage is low.	" Voltage adjustment potentiometer is out of adjustment " Protection of the voltage card is on " Voltage card is out of order " Check the cable connections of the voltage card " Diodes are defective
As the alternator does not charge, voltage is high	* Voltage adjustment potentiometer is out of adjustment " Voltage card is out of order
As the alternator charges, voltage is high	" Voltage adjustment potentiometer is out of adjustment " Regulator is out of order
Variable voltage	" Engine speed is variable " Check the cable connections of the voltage card " Voltage card is out of adjustment or out of order



The Brand of Electricity

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, water levels in the generator set and the accumulator once a week. You must switch the

generator to (KAP) position on DKG 307 panel while doing those controls.

Check the cooling water level in the radiator and complete, if need be. While doing this operation, the radiator is not 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 taking out the dipstick. Oil should be between the two lines on the dipstick.

After finishing the controls, operate your generator in the TEST position for 15 minutes, and press the OTO (AUTO) button on the control panel after the test is concluded. The generator will stop automatically after one minute.

FIRST MAINTENANCE

Motor 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 need be. Electrical connections and indicators of the device are checked. It is also controlled for detecting if there are any leakages of oil, fuel or water on the engine.

Radiator, tubes of the fuel system, belts and brackets are inspected as well.

MAINTENANCE FOR EVERY 150 HOURS

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

In addition to these maintenance works, 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 device. Otherwise, wrong maintenance and spare parts may cause failures and damages that will make the guarantee of your device

ELMARK[®]

The Brand of Electricity
