KIPOR

KIPOR POWER
MAINTENANCE MANUAL

PLEASE READ THIS MANUAL CAREFULLY.
IT CONTAINS IMPORTANT SAFETY INFORMATION.

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KIPOR

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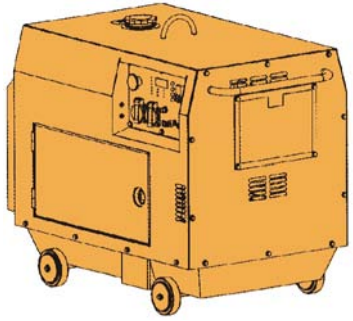


DIESEL GENERATOR

SINGLE-PHASE:
- KDE2200X/E
- KDE3500X/E/T
- KDE5000X/E/T
- KDE6500X/E/T/TA
- KDE6700T/TA
- KDA6700TA/TAO

THREE-PHASE:
- KDE6500X3/E3/T3
- KDE6700T3/TA3
- KDA6700TA3/TAO3

PREFACE

Please read this instruction and ensure understand all regulations concerning handling, check and maintenance thoroughly prior to application.
Failure to follow this instruction may cause serious accidents.

⚠ WARNING

Incorrect operation is likely to lead accidents.
Operate and maintain the machine on the basis of thorough understanding of this instruction.

● Place this instruction in the fitting box or near machine after reading because it is regularly needed.

● If this introduction is lost or damaged, please order one from local KIPOR dealer.

● Please provide this introduction to another user whom machine will be transferred to.

● Machine may be improved or modified. Therefore actual conditions may be different from this introduction.

● If you have any doubt, please consult local KIPOR dealer.

● Machine is the special diesel generator for ground application.

● Safety information contained in this introduction are extremely important. Please read and understand it.

Content

1. SPECIFICATIONS

1-1 Main technical Specifications

	Model	KDE2200X KDE2200E		KDE3500X KDE3500E		KDE6500X KDE6500E		KDE3500T		KDE3700T	
Generating Set	Rated frequency (Hz)	50	60	50	60	50	60	50	60	50	60
	Rated output power (kVA)	1.7	2	2.8	3.3	4.5	5	2.8	3.3	2.8	3.3
	Max. power (kW)	2	2.2	3.2	3.8	5	5.5	3.2	3.8	3.2	3.8
	Rated voltage (V)	230	240/120	230	240/120	230	240/120	230	240/120	230	240/120
	Rated current (A)	7.4	8.3/16.7	12.2	13.8/27.5	19.6	20.8/41.7	12.2	13.8/27.5	12.2	13.8/27.5
	Rated rotation speed (r/min)	3000	3600	3000	3600	3000	3600	3000	3600	3000	3600
	Phase	Single phase		Single phase		Single phase		Single phase		Single phase	
	Excitation type	Self-excitation									
	DC output	12V/8.3A									
	Power factor (cos Φ)	1		1		1		1		1	
	Generator structure	One bearing, Self ventilation									
	Generator	Rotation magnetic field, rotor chute									
	Insulation grade			B		B		B		B	
	Pole number	2		2		2		2		2	
	Engine model	KM170F		KM178F		KM186F		KM178F		KM178F	
	Engine type	One cylinder, 4 choke, air cooled, inlined, diesel engine									
	Bore × choke (mm)	70×55		78×62		86×72		78×62		78×62	

	Model	KDE2200X KDE2200E	KDE3500X KDE3500E	KDE6500X KDE6500E	KDE3500T	KDE3700T
Engine	Displacement(L)	0.211	0.296	0.418	0.296	0.296
	Compression rate	20:01	20:01	19:1	20:01	20:01
	Rated power kW/(r/min)	2.5/3000 2.8/3600	3.7/3000 4.0/3600	5.7/3000 6.3/3600	3.7/3000 4.0/3600	3.7/3000 4.0/3600
	Fuel model	o# (summer), -10# (winter),-35# (chill cold) diesel				
	Lubricating oil model	SAE10W30(above CC grade)				
Generating set	Voltage deviation at steady state	≤±2.5%				
	Frenquency rate	≤5%				
	Voltage wave type distortion rate(zero load)	Single phase ≤5% Three-phase ≤8%				
	Insulation resistence(at cold station)	≤2MΩ				
	Fuel consumption rate(g/kw.h)	370	370	360	370	370
	Capability of fuel tank(L)	15	15	15	16	16
	Continuous running time(Hr)	22	14	8	14.5	14.5
	Overall dimension(mm) (L×W×H)	640×480×530	640×480×530	720×492×650	830×532×740	845×547×742
	Net weight (kg)	X:53 E:60	70	X:95 E:100	140	150
	Starting type	X:Recoil starter; E:Recoil starter/Electric starter	Recoil starter /Electric starter	X:Recoil starter; E:Recoil starter/Electric starter	Electric starter	Electric starter
	Noise level(dBA/7m)(at rated load)	77	77	79	70	79
	Structure type	Open frame	Open frame	Open frame	Silent	Silent

	Model	KDE6500T		KDE6700T/TA/TAO		KDE6500X3/E3/T3		KDE6700T3/TA3/TAO3	
Generating Set	Rated frequency (Hz)	50	60	50	60	50	60	50	60
	Rated output power (kVA)	4.5	5	4.5	5	5.5kVA	6.3kVA	5.5kVA	6.3kVA
	Max. power (kW)	5	5.5	5	5.5	6kVA	7kVA	6kVA	7kVA
	Rated voltage (V)	230	240/120	230	240/120	400/230	416/240	400/230	416/240
	Rated current (A)	19.6	20.8/41.7	19.6	20.8/41.7	7.9	8.7	7.9	8.7
	Rated rotation speed (r/min)	3000	3600	3000	3600	3000	3600	3000	3600
	Phase	Single phase		Single phase		Three phase		Three phase	
	Excitation type	Self-excitation							
	DC output	12V/8.3A				No 12V		No 12V	
	Power factor (cosΦ)	1		1		0.8(lag)		0.8(lag)	
	Generator structure	One bearing, Self ventilation							
	Generator	Rotation magnetic field, rotor chute							
	Insulation grade	B		B		B		B	
	Pole number	2		2		2		2	
	Engine model	KM186F		KM186F		KM186F		KM186F	
	Engine type	One cylinder, 4 choke, air cooled, inlined, diesel engine							
	Bore×choke (mm)	86×72		86×72		86×72		86×72	

	Model	KDE6500T	KDE6700T/TA/TAO	KDE6500X3/E3/T3	KDE6700T3/TA3/TAO3
Engine	Displacement(L)	0.211	0.296	0.418	0.296
	Compression rate	20:01	20:01	19:1	20:01
	Rated power kW/(r/min)	5.7/3000 6.3/3600	5.7/3000 6.3/3600	5.7/3000 6.3/3600	5.7/3000 6.3/3600
	Fuel model	o# (summer), -10# (winter),-35# (chill cold) diesel			
	Lubricating oil model	SAE10W30(above CC grade)			
Generating set	Voltage deviation at steady state	⩽±2.5%			
	Frenquency rate	⩽5%			
	Voltage wave type distortion rate(zero load)	Single phase ⩽5% Three-phase ⩽8%			
	Insulation resistence(at cold station)	⩽2MΩ			
	Fuel consumption rate(g/kw.h)	360	370	360	370
	Capability of fuel tank(L)	15	15	15	16
	Continuous running time(Hr)	8	14	8	14.5
	Overall dimension(mm) (L×W×H)	910×530×740	915×547×742	910×530×740	915×547×742
	Net weight (kg)	165	177	165	177
	Starting type	Electric starter	Electric starter	Electric starter	Electric starter
	Noise level(dBA/7m)(at rated load)	70	70	70	70
	Structure type	Silent	Silent	Silent	Silent

Note: Explaination for generating set model: KDE is the generating set, 2200 is the set model. Function code: X is recoil starter E is electric starter set, T is electric starter silent set, A is digital control panel set, O is automatic starter and automatic change function with ATS.A, O code only used for above 6700 set model.

Main technical specification of single-phase and three-phase generator sets

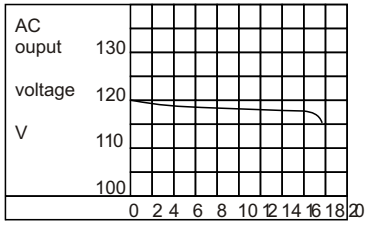
		Model	KDE6500XW/EW		KDE6700TW	
Welding and generating set	Generating work condition (AC)	Rated frenquency (Hz)	50	60	50	60
		Rated output(kW)	2.8	3	2.8	3
		Rated output (V)	230	240	230	240
		Rated current(A)	12.2	12.5	12.2	12.5
		Phase	Single		Single	
		Poweer factor (cosΦ)	1		1	
	Welding work condition (DC)	Welding voltage at zero load(V)	70-75		60-65	
		Rated welding current(A)	160		160	
		Welding work voltage(V)	25-35		26	
		Welding continous load rate(%)	60%		60%	
		Adjusting range of welding current (A)	30-180		50-180	
		Diameter of welding rod Φ(mm)	1.6-4.0		1.6-4.0	
	Rated rotation speed（r/min）		3000	36000	3000	36000
	Exciation type		Self exciation and automatic voltage adjusting(AVR)			
	Rectify type		IGBT+three-phase rectify bridge(PWM)		IGBT+three-phase rectify bridge(PWM)	
	Connecting type		Single bearing			
	Insulation grade		B		B	
	Voltage deviation at steady state		⩽±2.5%			
	Frenquency rate		⩽5%			
	Voltage wave type distortion rate(zero load)		⩽5%			
	Motor		Rotor chute band damping winding			
	Pole number		2		2	
Engine	Engine model		KM186FAG		KM186FAG	
	Engine type		Inlined .single .4-stroke.air cooled		Inlined .single .4-stroke.air cooled	
	Displacement(ml)		418		418	
	Bore x stroke(mm)		86X72		86X72	
	Compression rate		19		19	
	Rated power Kw/(r/min)		5.7/3000 6.3/3600		5.7/3000 6.3/3600	
	Fuel model		0#(Summer) -10#(Winter) -35#(Chill cold)Light diesel			
	Lubricating oil model		SAE10W30 (above CC grade)			
Set	Fuel consumption(g/kw.h)		360		360	
	Oil tank capacity (L)		15		16	
	Continuous running time(h)		6.5		T:7	
	Overall dimension(L X W X H)[mm(in)]		840x535x650		915x547x742	
	Net weight[kg(1bs)]		X：115 E：120		188	
	Starting type		XW: Recoil starter、EW/TW: Electric starter			
	Noise level [db(A)@7m](at rated load)		75		70	
	Structure		EW/XW：Open-frame、TW：Silent			

1-2 The set power and voltage characteristic curves

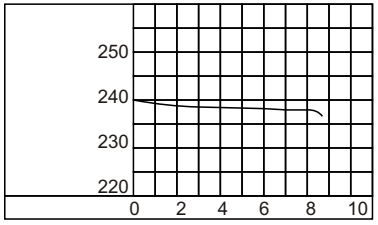
The following curves indicate generator performance at average conditions. The performance may vary according to ambient temperature.

Before generator set leave the factory, voltage is set beyond rated voltage. When generator set start running, output voltage should be equal to rated output, as load time increase, rated voltage decrease.

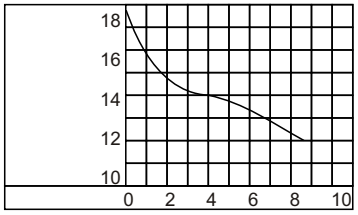
(1) AC external characteristic curves of KDE2200X/E generator sets



KDE2200X/E 120V

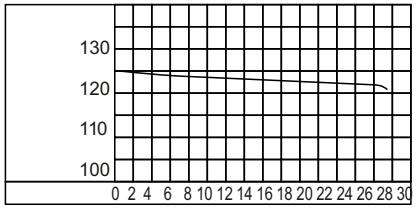


KDE2200X/E 240V

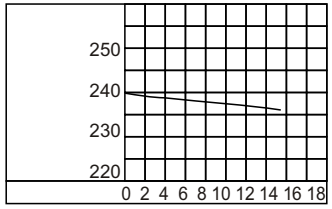


KDE2200X/E

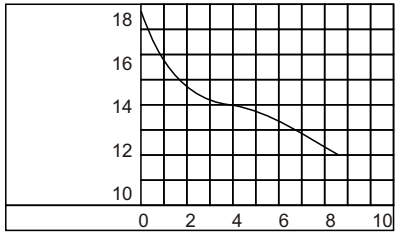
(2)AC external characteristic curves of KDE3500X/E generator sets



KDE3500X/E 120V

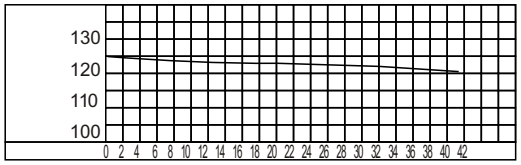


KDE3500X/E 240V

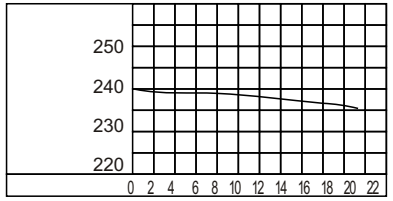


KDE3500X/E

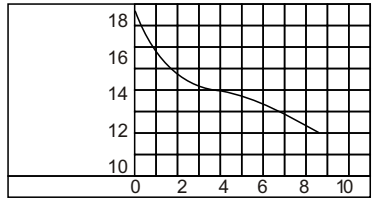
(3)AC external characteristic curves of KDE6500X/E generator sets



KDE6500X/E 120V

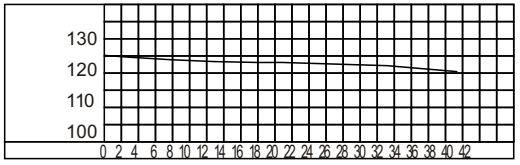


KDE6500X/E 240V

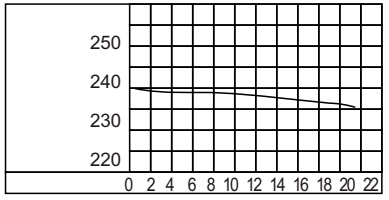


KDE6500X/E

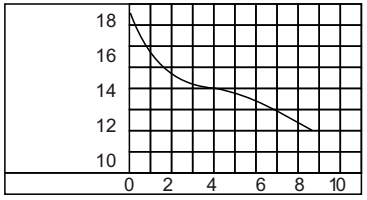
(4)AC external characteristic curves of KDE6500T generator sets



KDE6500X/E 120V

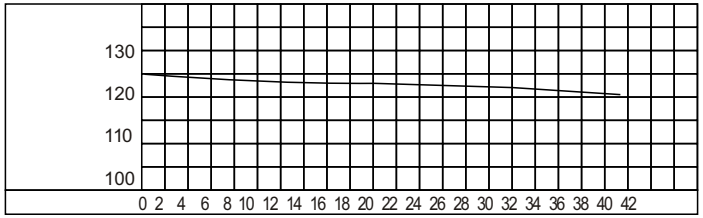


KDE6500X/E 240V

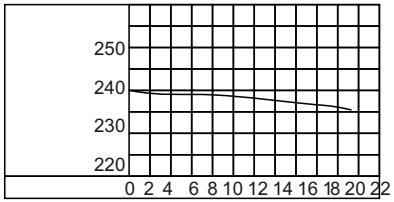


KDE6500X/E

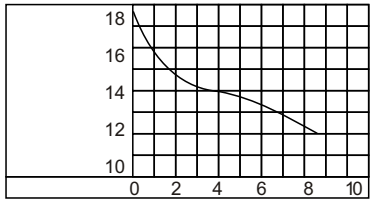
(5)AC external characteristic curves of KDE6700T/TA generator sets



KDE6700T/TA 120V

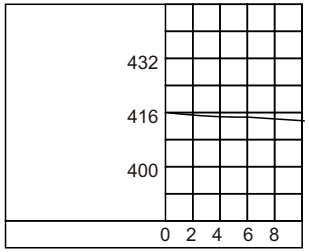


KDE6700T/TA 240V

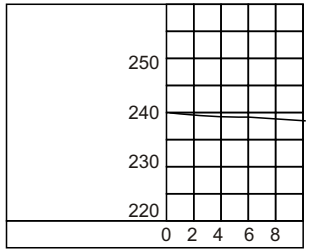


KDE6700T/TA

(6)AC external characteristic curves of KDE6700T3/TA3 generator sets

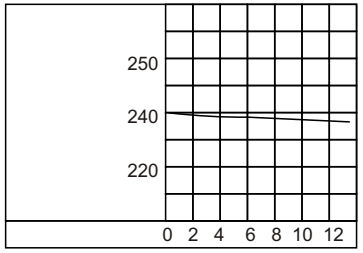


KDE6700T3/TA3 416V/240V

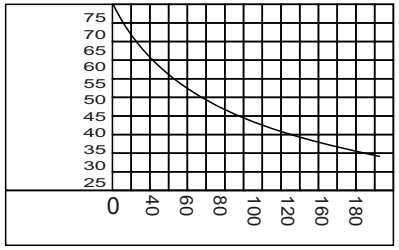


KDE6700T3/TA3

(7)AC external characteristic curves of KDE6500EW/XW generator sets



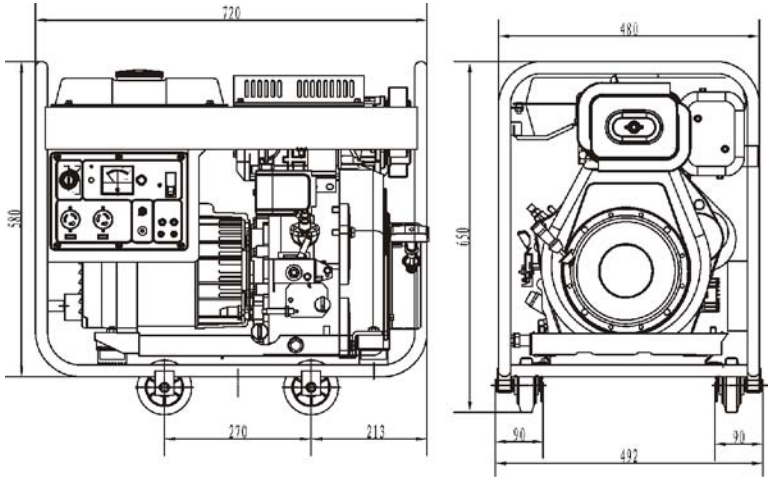
KDE6500EW/XW



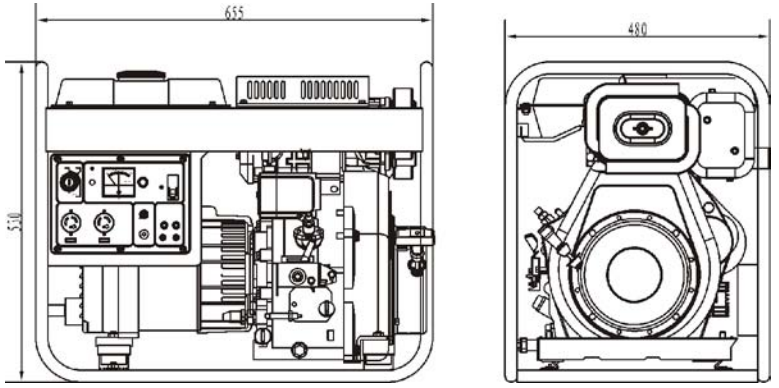
KDE6500EW/XW

1-3 Overall dimension drawing Unit mm

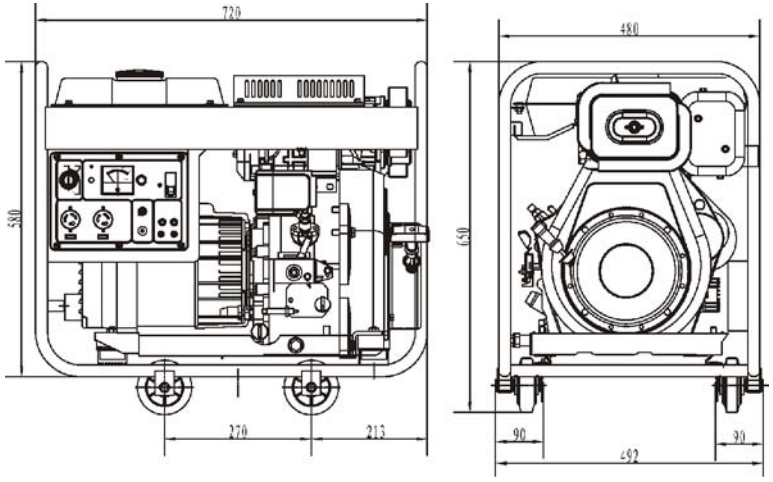
KDE2200X/E generator sets



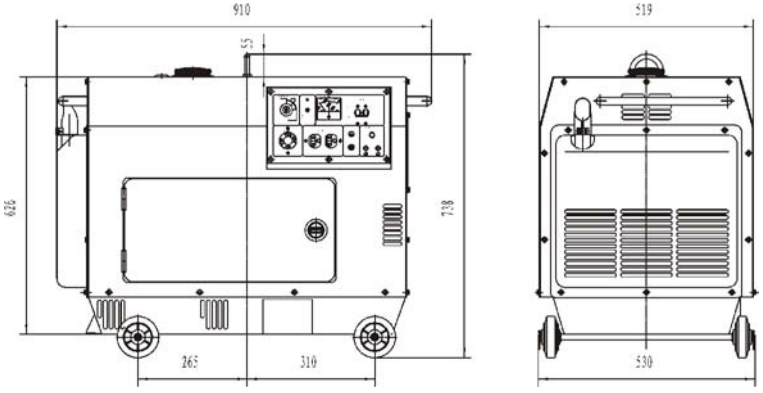
KDE3500X/E generator sets



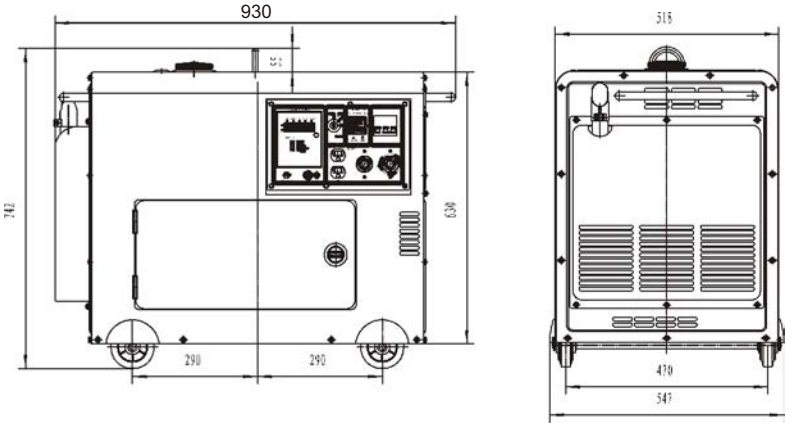
KDE6500X/E/X3/E3 generator sets



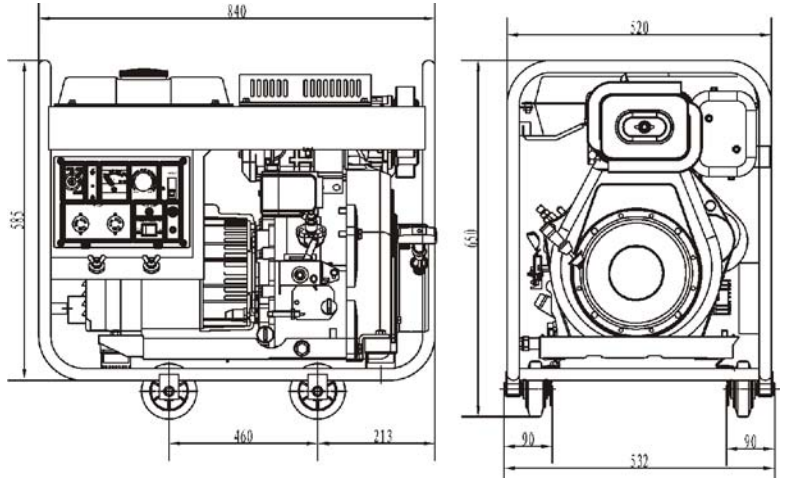
KDE6500T/T3 generator sets



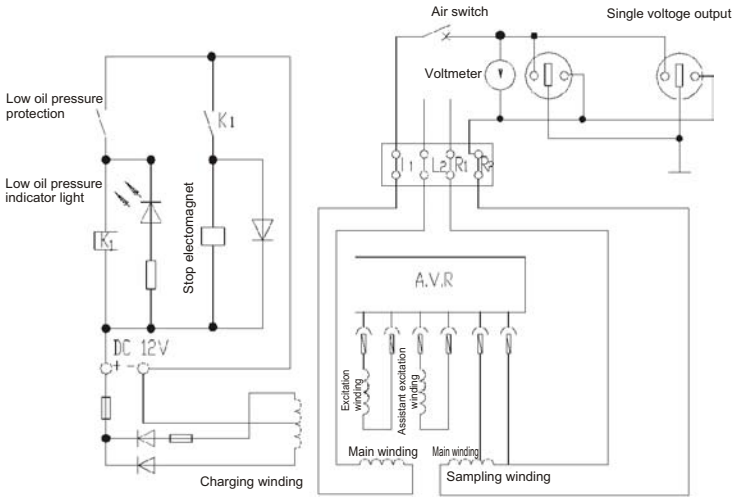
KDE6700T/TA/T3/TA3 generator sets



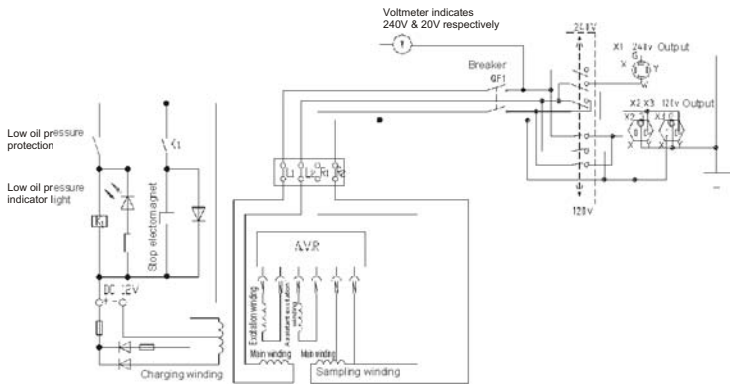
KDE6500XW/EW generator sets



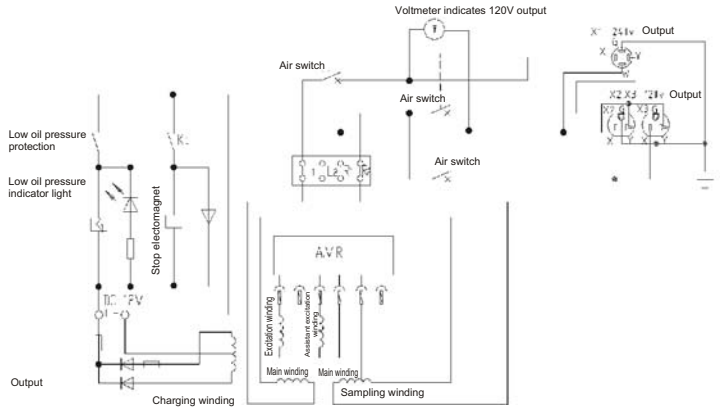
1-4 Wiring diagrams of:
KDE2200X/E generator sets



KDE2200X single voltage output, electric schematic diagram

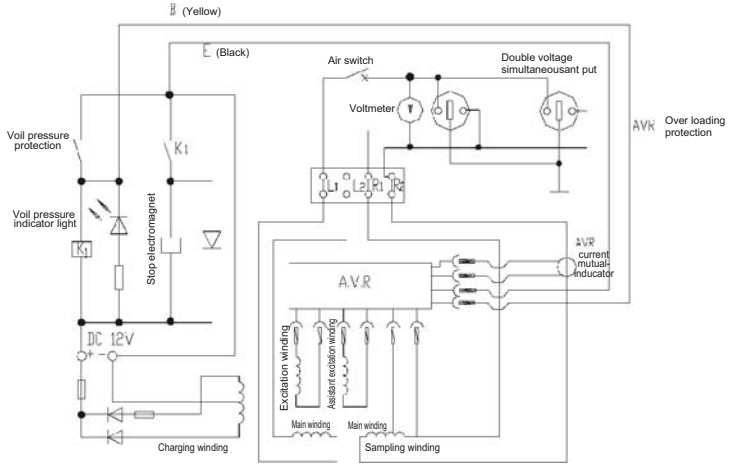


KDE2200X Double voltage selective output, electric schematic diagram

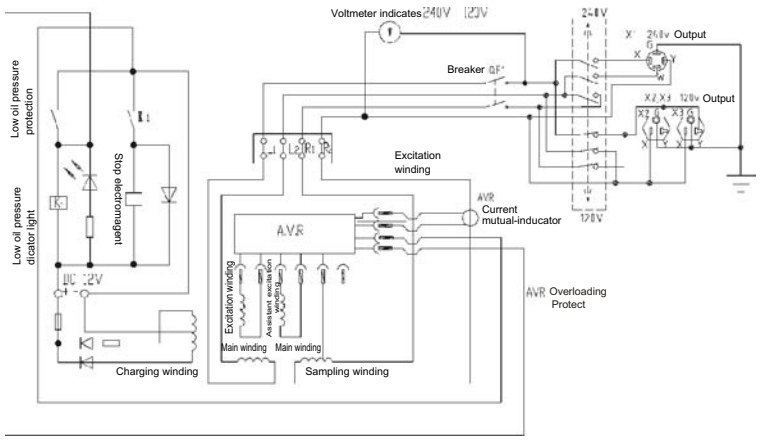


KDE2200X Double voltage simultaneous output, electric schematic diagram

KDE3500X/E&KDE6500X/E generator sets

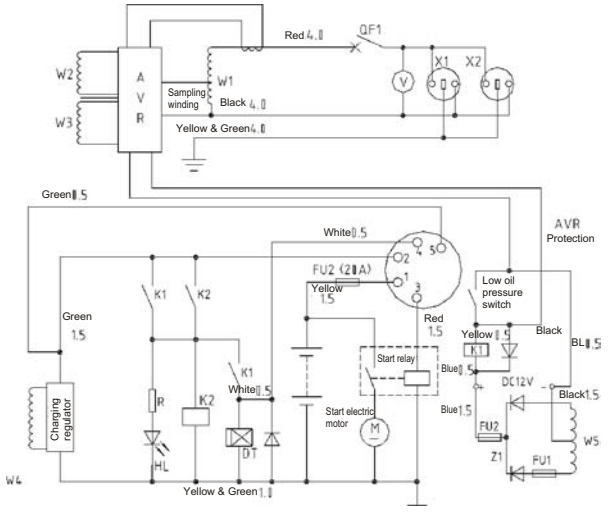


KDE3500X KDE6500X Single voltage output, electric schematic diagram the same



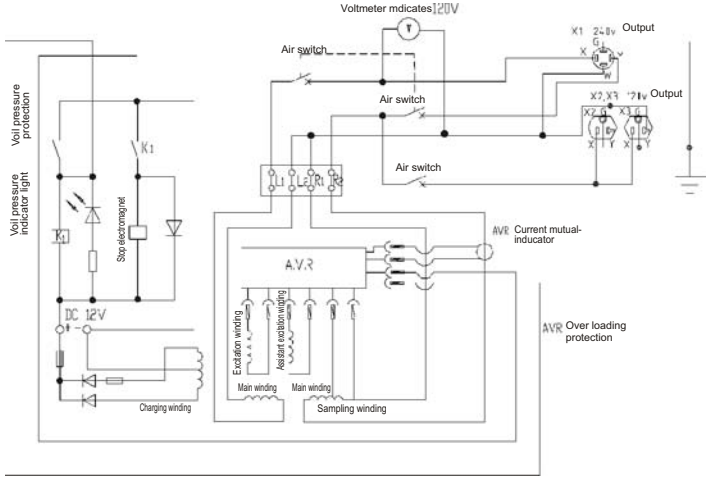
KDE3500X KDE6500X

Double voltage selective output electric schematic diagram the same



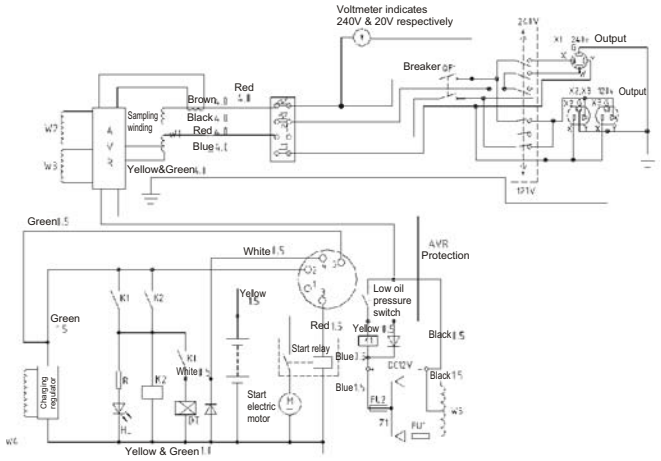
KDE3500E KDE6500E

Single roltage output, electric schematic diagram the same



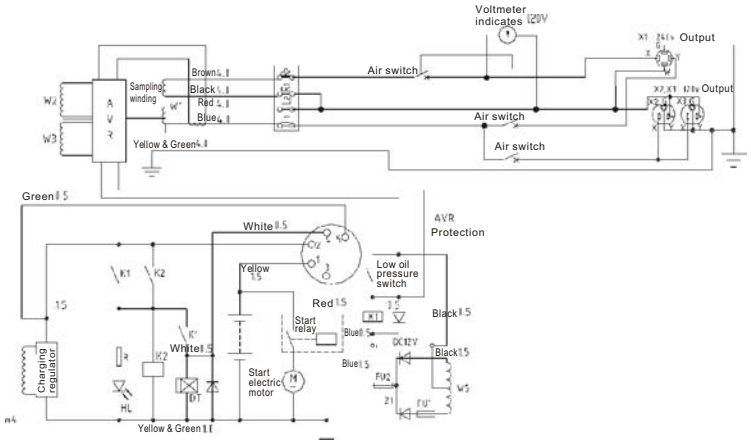
KDE3500X KDE6500X

Double voltage simultaneous output, electric schematic diagram



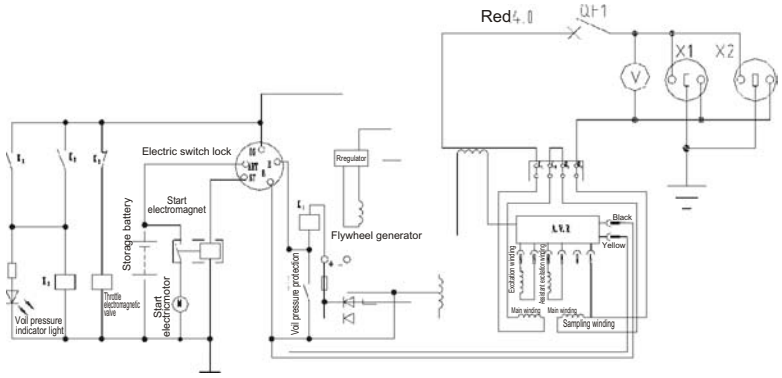
KDE3500E KDE6500E

Double voltage selective output, electric schematic diagram the same

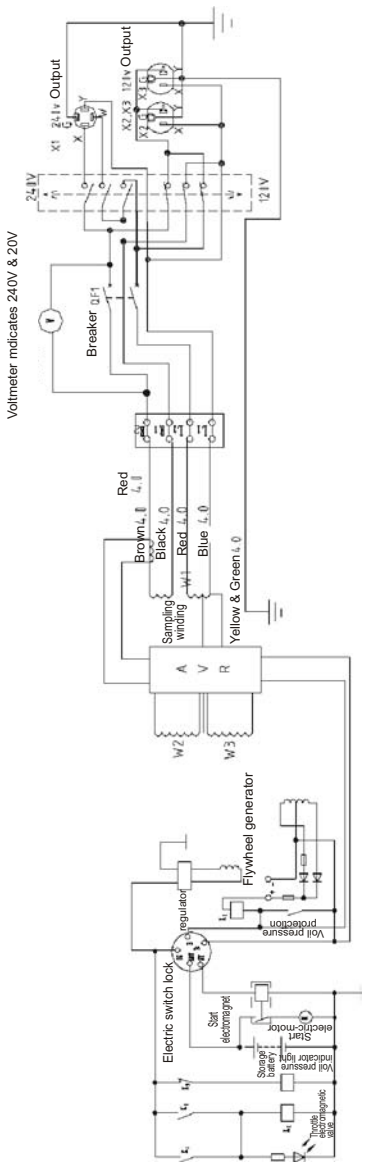


KDE3500E KDE6500E
Double voltage simultaneous output, electric schematic diagram the same

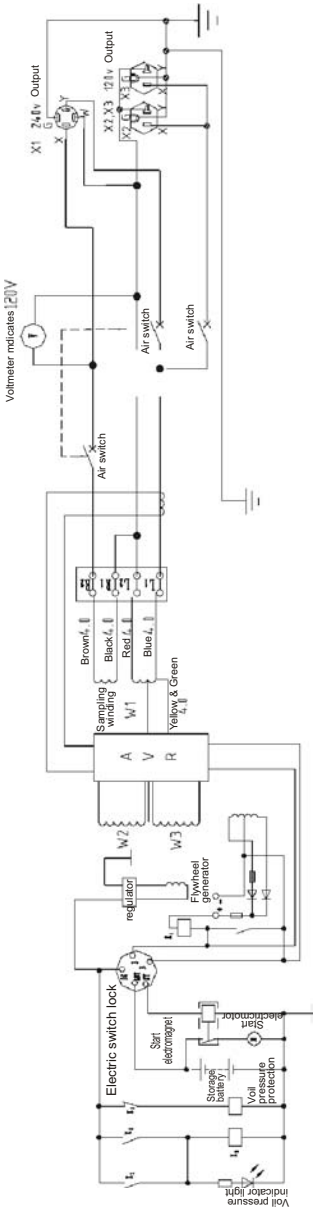
KDE3500T&KDE6500T generator sets



KDE3500T KDE6500T Single voltage output, electric schematic diagram

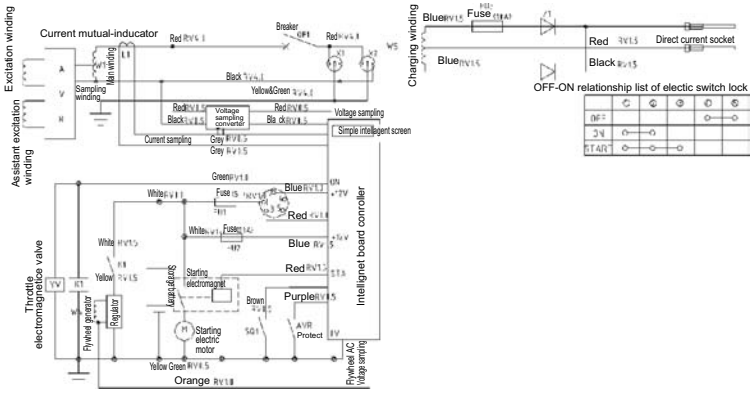


KDE3500T KDE6500T Double voltage selective output, electric schematic diagram

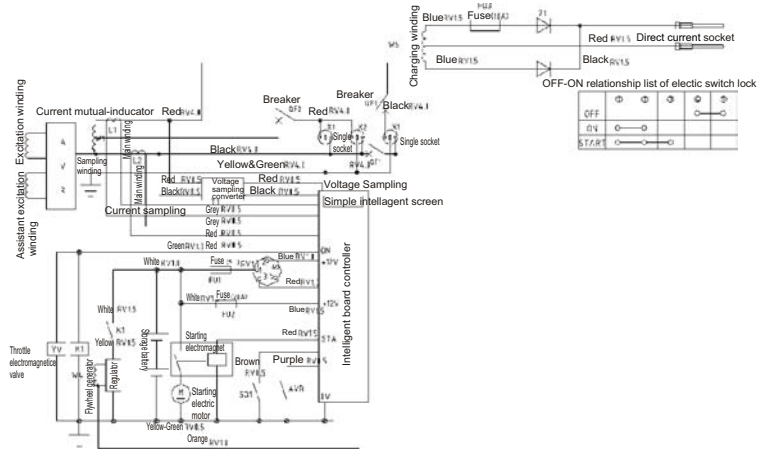


KDE6500T KDE3500T Double voltage simultaneous output, eletric schematic diagram

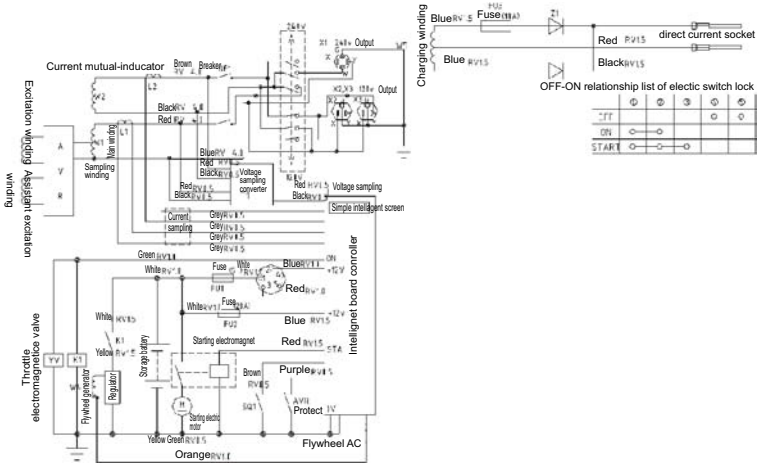
KDE6700TA generator sets



KDE6700TA Single voltage output, electric schematic diagram

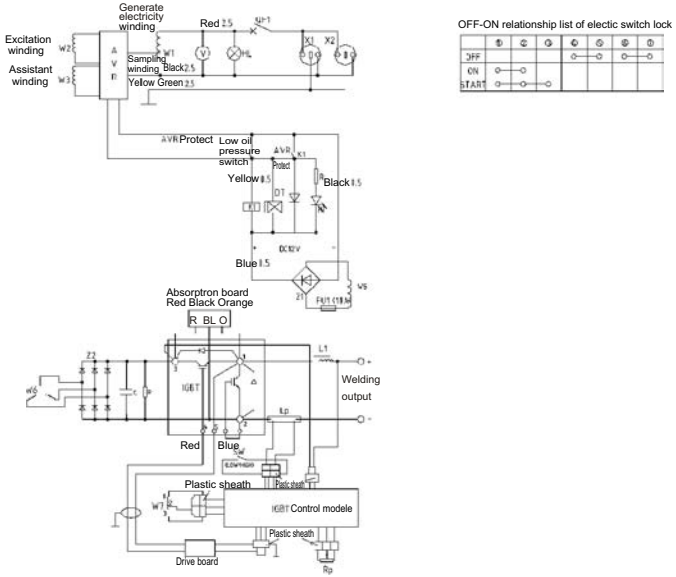


KDE6700TA Double voltage simulataneous output, electric schematic diagram

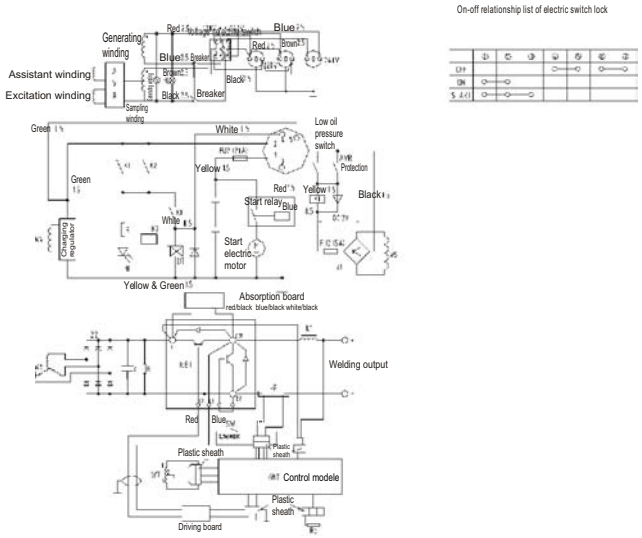


KDE6700TA Doulbe voltage selective output electric schematic diagram

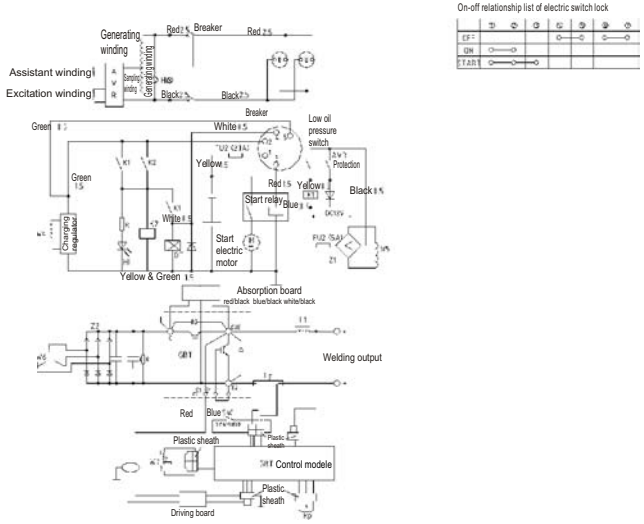
KDE6500EW generator sets



KDE6500EW Both manual start

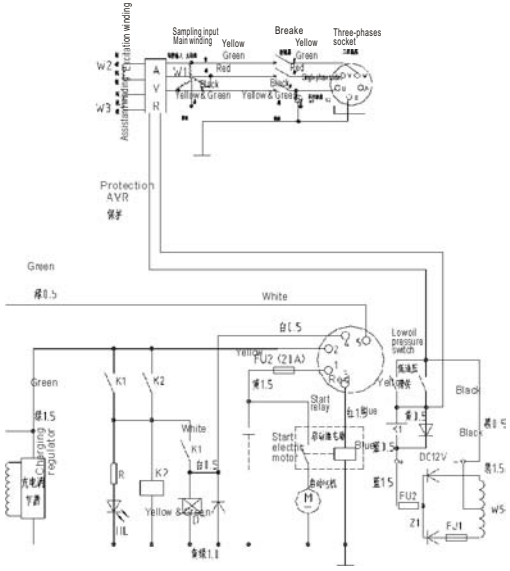


KDE6500EW Double vltage selective output with electric start
Electric schematic diagram

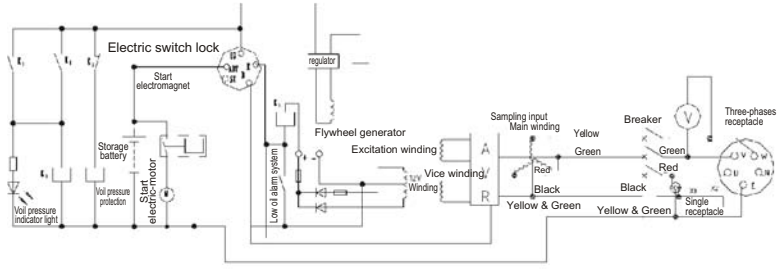


KDE6500XW Manual & electric start electric schematic diagram

KDE3500E3/T3 & 6500E3/T3 generator sets



KDE3500E3 KDE6500E3
Electric schematic diagram the same



KDE3500T3 KDE6500T3
Electric schematic diagram the same

2. Important information

2.1 Release note

This manual is to instruct you how to operate and maintain/service Kipor generator sets in a proper way. Please read the manual and main technical parameters to ensure your correct operation of the generator set and keep it run in best condition as well as quick troubleshooting. Any questions and suggestions about this manual are welcome to contact us or our agents. Please note that as our products are improving, general items in this manual may be different from real products, please service your generator set as stated in the Instructions packed with the generator set.

2.2 Safety precautions

Warning:

2.2.1. To prevent fire：

Do not refill fuel when engine is running.

Wipe off spilt fuel with a clean cloth. Keep flammable/ explosive materials away from generator set.

■ Run generator set at least 1 meter away from buildings and other equipment and keep good ventilation.

■ Run generator set at a horizontal level.

■ Do not put generator set in a room when it is still hot.

2.2.2 To avoid inhaling exhaust gas

Exhaust gas contains poisonous monoxide which is harmful to health. Don not run generator set at a poky or poorly-ventilated place. Sufficient ventilation facility must be available if generator is running in a room.

2.2.3 To avoid injuries

When generator set is running, do not have your head, hands, foot etc. close to rotating parts or exhaust port of hot parts, otherwise you may be burnt or hurt. Do not touch muffler or hot parts immediately after generator set stops. Do not touch generator case during its operation.

2.2.4 Electric shock, short circuit

Do not touch generator set with wet hands, otherwise, electric shock or circuit may happen. Kipor diesel generator sets are not rainproof, so please protect your generator set from rain, snow and water. Running at wet place may cause short circuit or electric shock.

Please connect ground wire for your generator to avoid electric shock. There is a thick and long ground wire between panel ground terminal and the ground, please ensure resistance of the ground wire is below 20Ω.

Do not connect any load to generator set before it starts, otherwise, the load may move suddenly when the generator set starts and cause injuries. Do disconnect the load before start the generator set.

■ For most equipment, starting power is bigger than the power at normal operation.

■ Do not excess current limit of the receptacle.

■ Do not connect your generator set to circuit of utility power, for the difference of output frequency and voltage will damage your appliances and generator set.

2.3 Significance of proper servicing

Proper maintenance is critical to personal safety of the operator and reliability of the generator set. Any mistake or oversight of the maintenance man may cause generator set failure, engine damage and/or physical injuries.

⚠ WARNING

Improper servicing may cause dangers and lead to serious injuries or even deaths. Please do follow the operation procedures and safety precuations stated in this manual.

Some of the most important precaustions are given below. However, we can not warn you of all possible hazards. You yourself are to decide whether a given maintenance task can be performed.

⚠ WARNING

Failure to follow maintenance instructions and precautions may cause serious injuries or even deaths. Please do follow the operation procedures and safety precuations stated in this manual.

2.4 Important safety precautions

Make sure you have a basic and complete understanding of safe operations. Please wear proper work clothes and equipped with proper safety facility. Please keep the following in mind when performing maintenance and repair:

You have read service instructions before performing maintenance and have necessary tools and skills, so taht safe maintenance can be secured:

Switch off the engine before performing maintenance and repair to avoid the follosing hazards:

Nonocide poisoning by exhaust gas from the engine

Ensure good ventilation condition whenever run the engine.

Burnt by hot parts

Do not touch these parts until engine gets cool

Injury by rotating parts

Do not start the engine unless serving instructions require so. Keep your hands, fingers and clothes away from rotating parts of the engine.

To minimize possibility of explosion and fire, when performing maintenance or repair, if gasoline left in generator set, only nonflammable solvent instead of gasoline can be used to clean the parts. Cigarette, spark and flame must be kept away from fuel-related parts.

2.5 Service rules

2.5.1. Use Kipor recommended parts and lube or their equivalents, otherwise engine may be damaged.。

2.5.2. Use special tools designed for the product.

2.5.3. Easily damaged parts such as gaskets and O-rings must be replaced when reassembling .

2.5.4. When torquing bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.

2.5.5. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.

2.5.6 After reassembly, check all parts for proper installation and operation.。

2.5.7. Many screws used in this machine are self-tapping. Be aware that cross-threading or over tightening these screws will strip the threads and ruin the hole.

2.5.8. Use only metric tools when servicing this engine. Metric bolts, nuts and screws are not interchangeable with nonmetric fasteners. The use of incorrect tools and fasteners will damage the engine.

2.5.9. When using tools, follow the instructions and symbols in page 2-3.

2.6 Electric precautions

2.6.1. Hold the connector body to disconnect the connector. Do not disconnect by pulling the wire harness. To disconnect the locking connector, be sure to unlock first, and then disconnect.

2.6.2. Check the connector terminals for bend, excessive extrusion, missing terminal, or other abnormalities before connecting the connector.

2.6.3 To connect, insert the connector as full as it goes. If the connector is a locking type, be sure that it is locked securely.

2.6.4 Check the connector cover for breakage and check whether the connector female terminal is not open excessively. Then, connect the connector securely. Check the connector terminal for rust. Remove the rust using an emery paper or equivalent material before connecting the connector.

2.6.5 Set the harness clips in the specified places of the frame securely, and securely the wire harnesses.

2.6.6 Clamp the cables securely.

2.6.7 Clamp the wire harnesses securely so that they do not interfere with the rotating parts, moving parts and the hot parts.

2.6.8 Route and connect the wire harnesses properly. Be sure that the harnesses are not slack, twisted or pulled taut.

2.6.9 Route the wire harnesses properly so that they do not contact with the shape edges and corners, and the end of the bolts and screws on the body.

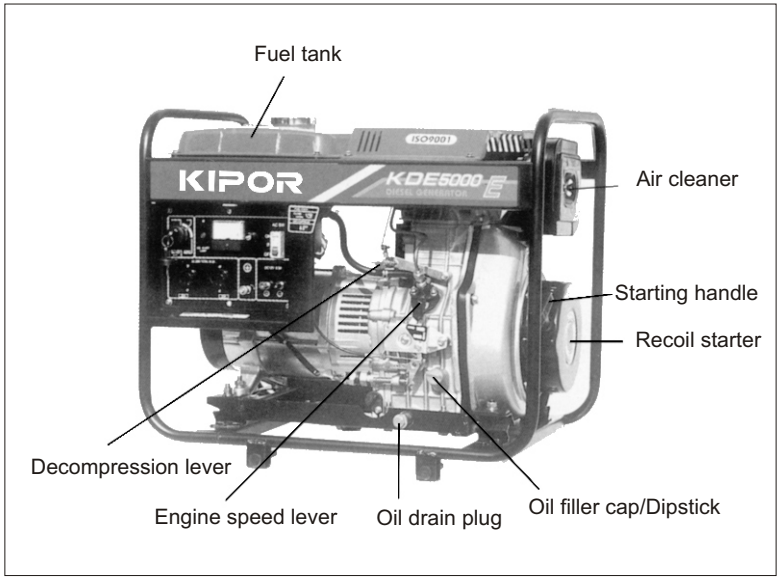
2.6.10 If a wire harness contacts the end of the bolts/screws or sharp edges and corners, protect the contact part of the harness with a tube or by winding with an electrician's insulating tape. If the wire harness has a grommet, set the grommet securely.

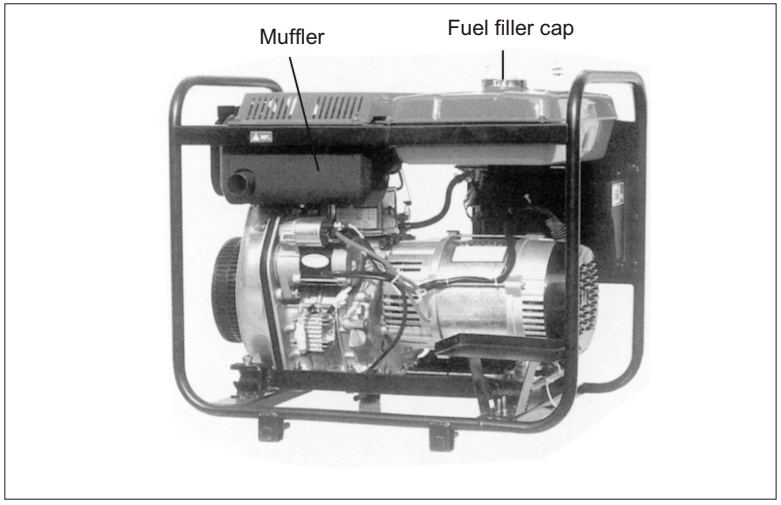
2.6.11 Take care not to pinch the wire harnesses during installation of a part. If a wire harness has the damaged insulation, repair by winding with the electrician's insulating tape.

2.6.12 Read the tester manufacture's operation instructions carefully before operation with tester. Follow the instructions of the Service Manual. Be sure that the battery built in a tester is fully charged and check the meter before inspection using the tester.

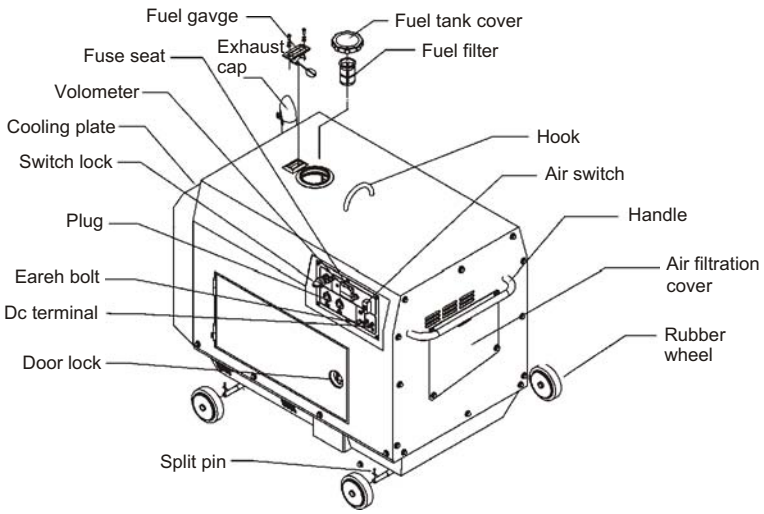
2.7 Part name/description

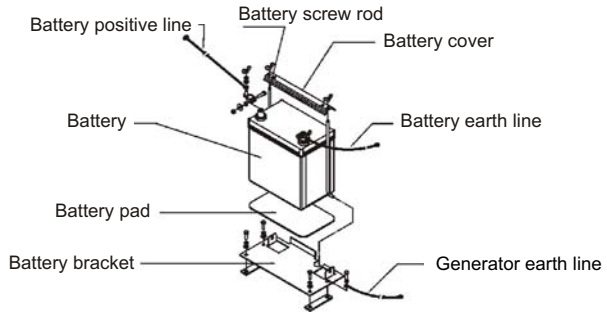
(KDE2200----6500E/X external parts)





KDE6500T/KDE6500T3 - --KDE6700TKDE6700T3---KDE6700TA/KDE6700TA3





2.8 Serial number location

Serial number location varies according to generator set series:

Open frame generator sets (KDE2200X/EKDE6500X/E----KDE6500EW/XW): at outer iron plate of generator stator, to be specifically, below fuel tank.

缺图

Silent generator sets (KDE6500T/T3, KDE6700T/T3, KDE6700TA/KDE6700TA3):

Befor open the set, look up, at the air guide plate at the front of the set.

缺图

2.9 The service standard for generating set

Winding	Set mode	Resistance standard (Ω)	Standard value of voltage at zero load (V)
Main winding	KDE2200X/E	1-1.5	230/240
	KDE3500X/E	1.6-1.8	230/240
	KDE6500X/E	0.75-0.85	230/240
	KDE6500T	0.75-0.85	230/240
	KDE6700T/TA	0.75-0.85	230/240
	KDE6500XW/EW	1.2-1.3	230/240
	KDE6500X/E/T/3	RaN=1.5-1.6	230/240
Rotor winding	KDE2200X/E	30	85
	KDE3500X/E	30-35	60
	KDE6500X/E	40-45	70
	KDE6500T	40-45	70
	KDE6700T/TA	40-45	70
	KDE6500XW/EW	25-30	Welding/generating 110/40
	KDE6500X/E/T/3	R40-45	85
Sub winding	KDE2200X/E	2	115
	KDE3500X/E	2.5	120
	KDE6500X/E	2.5	135
	KDE6500T	2.5	135
	KDE6700T/TA	2.5	135
	KDE6500XW/EW	1.1	140
	KDE6500X/E/T/3	2.5	140
Charge winding	KDE2200X/E	0.25	13/13
	KDE3500X/E	0.35	13/13
	KDE6500X/E	2.5	13/13
	KDE6500T	2.5	13/13
	KDE6700T/TA	2.5	13/13
	KDE6500XW/EW	0.22	13
	KDE6500X/E/T/3	0.25	13/13
Welding winding	KDE6500XW/EW	0.02	V line: 53
Welding Control winding	KDE6500XW/EW	0.15/0.152	18/18

NOTE：1. Sample winding voltage：16V Resistance:0.5Ω
2. Measure the ohm mete, the value is "0" or "∞", separately show

2.10

KDE6500EW/XW

Front end cover	Hexagonal flange face bolt	M8×25	18	1.8	13
Rotor through bolt	Hexagonal flange face bolt	M10×210	50	5	36
Tighten bolt of front/back end cover	Hexagonal flange face bolt	M6×140	10	1	7
Base frame	Hexagonal flange face bolt	M10×45	40	4	29
	Hexagonal bolt	M10	40	4	29
Damping block	Hexagonal bolt	M10	40	4	29
Reactor seat	Hexagonal flange face bolt	M8×14	20	2	15
Guard shield of reactor	Hexagonal flange face bolt	M6×14	9	0.9	7
Fixed reactor	Hexagonal flange face bolt	M6×14	9	0.9	7
	Hexagonal flange face nut	M6	9	0.9	7
Output wire of reactor	Hexagonal flange face bolt	M8×14	20	2	15
	Hexagonal bolt	M8	20	2	15
Median baffle plate	Hexagonal flange face bolt	M6×14	9	0.9	7
	Hexagonal flange face nut	M6	9	0.9	7
Oil scale	Cross slotted pan head screw	M5×12			
Oil switch subassembly	Cross slotted pan head screw	M5×12			
Oil switch	Hexagonal flange face nut	M6	9	0.9	7
Faxed oil tank and upper cover plate	Hexagonal flange face bolt	M6×25	9	0.9	7
	Hexagonal bolt	M6	9	0.9	7
Back cover plate	Hexagonal flange face bolt	M6× 14	9	0.9	7
	Hexagonal flange face nut	M6	9	0.9	7
Indrced air cover	Hexagonal flange face bolt	M5×12			
AVR control module	Hexagonal flange face bolt	M6×40	9	0.9	7
	Hexagonal flange face nut	M6	9	0.9	7
Pannel	Cross slotted pan head screw	M6×16	9	0.9	7
Power supply regulator	Hexagonal flange face bolt	M6×14	9	0.9	7
Electromagnet	Cross slotted pan head screw	M4×10			
Electromagnet fixed on the frame	Cross slotted pan head screw	M5×12			
Fixed resistance	Cross slotted pan head screw	M5×12			
	Cross slotted pan head screw	M3×6			
	Hexagonal bolt	M3			
Fixed capacitor(clip)	Cross slotted pan head screw	M4×20			
	Hexagonal bolt	M4			
Fixed capacitor	Cross slotted pan head screw	M5×10			
	Hexagonal bolt	M5			
Connecting plate of the fixed capacitor	Hexagonal flange face bolt	M5×25			
Fixed absorbing plate and driving plate	Cross slotted pan head screw	M4×40			
	Hexagonal bolt	M4			
Fixed IGBT and rectification bridge	Cross slotted pan head screw(big)	M5×16			
Diverter	Hexagonal flange face bolt	M8×14	20	2	15

	Hexagonal flange face nut	M8	20	2	15
	Hexagonal flange face bolt	M6×12	9	0.9	7
	Hexagonal flange face bolt	M5×12			
Connecting wire of diverter	Cross slotted pan head screw	M4×10			
	Hexagonal bolt	M4			
Fixed diverter	Hexagonal flange face bolt	M6×45	9	0.9	7
	Hexagonal flange face nut	M6	9	0.9	7
Battery	Butterfly nut	M6	9	0.9	7
Carbon brush	Hexagonal flange face bolt	M8×14	20	2	15
Pannel	Cross slotted pan head screw	M3×10			
	Cross slotted pan head screw	M5×20			
	Cross slotted pan head screw	M3×6			
	Hexagonal flange face bolt	M6×20	9	0.9	7

KDE6500T

Front end cover	Hexagonal flange face bolt	M8×25	18	1.8	13
Rotor through screw	Hexagonal flange face bolt	M10×210	50	5	36
Tighted bolt of fore/back end cover	Hexagonal flange face bolt	M6×140	10	1	7
Frame power	Hexagonal flange face bolt	M10×45	40	4	29
	Hexagonal bolt	M10	40	4	29
Frame parts	Hexagonal bolt	M10	40	4	29
Fan duct plate of motor tailstock	Hexagonal flange face bolt	M5×12			
Resonance block	Hexagonal bolt	M10	40	4	29
Fore-indrced air plate	Hexagonal flange face bolt	M8×16	20	2	15
Back-indrced air plate	Hexagonal flange face bolt	M6×18	9	0.9	7
Shockmitigation bracket	Hexagonal flange face bolt	M8×16	20	2	15
Pressure plate of oil pipe	Hexagonal flange face bolt	M6×25	9	0.9	7
Hydraulic pressure regulator	Hexagonal flange face bolt	M6×18	9	0.9	7
	Hexagonal bolt	M6	9	0.9	7
Carbon brush	Hexagonal flange face bolt	M5×12			
Resonance block	Hexagonal flange face bolt	M5×12			
Earth wire(Jar wire)	Hexagonal flange face bolt	M8×16	20	2	15
Exhaust pipe	Hexagonal nut	M8	30	3	22
Lower body of heat insulation chamber	Hexagonal head bolt	M8×16	9	0.9	7
Cover plate of heat insulation chamber	Hexagonal head bolt	M6×18	9	0.9	7
	Cross slotted pan head screw	M5×20			
	Hexagonal nut	M5			
Indrced air cover of motor	Hexagonal flange face bolt	M5×12			
	Cross slotted pan head screw	M5×12			
Pressure plate of jar	Hexagonal head bolt	M6×18	9	0.9	7
Jar	Butterfly nut	M6	9	0.9	7
AVR fixed	Hexagonal flange face bolt	M6×25	9	0.9	7
	Hexagonal head bolt	M6×18	9	0.9	7
Plate of oil tank	Hexagonal flange face bolt	M6×25	9	0.9	7
Fan plate of air filter	Hexagonal head bolt	M6×15	9	0.9	7
Electric door lock	Cross slotted pan head screw	M5×12			
Pannel	Cross slotted pan head screw	M6×16	9	0.9	7
Cabinet	Hexagonal head bolt	M6×15	9	0.9	7
Cover plate of cabinet back door	Hexagonal head bolt	M6×15	9	0.9	7
Right side plate	Hexagonal head bolt	M6×15	9	0.9	7
Cover plate of air filter	Hexagonal head bolt	M6×15	9	0.9	7
Left side plate	Hexagonal head bolt	M6×15	9	0.9	7
Radictor	Hexagonal head bolt	M6×15	9	0.9	7
Muffler	Hexagonal flange face bolt	M8×20	30	3	22
	Hexagonal flange face bolt	M8×30	30	3	22
	Hexagonal nut	M8	30	3	22
Parts of right side plate	Hexagonal flange face bolt	M5×12			

KDE6700T

Front end cover	Hexagonal flange face bolt	M8X25	18	1.8	13
Rotor through bolt	Hexagonal flange face bolt	M10X210	50	5	36
Tighten bolt of fore/back end cover	Hexagonal flange face bolt	M6X140	10	1	7
Frame power	Hexagonal flange face bolt	M10X45	40	4	29
	Hexagonal nut	M10	40	4	29
Frame parts	Hexagonal nut	M10	40	4	29
Air flue plate of motor tailstock	Hexagonal flange face bolt	M5X12			
Resonant vibration block	Hexagonal nut	M10	40	4	29
AVR bracket	Hexagonal flange face bolt	M6X18	9	0.9	7
Front induced draft plate	Hexagonal flange face bolt	M8X16	20	2	15
Back induced draft plate	Hexagonal flange face bolt	M6X18	9	0.9	7
Shockmitigation bracket	Hexagonal flange face bolt	M8X16	20	2	15
Pressure plate of oil pipe	Hexagonal flange face bolt	M6X25	9	0.9	7
Hydraulic pressure regulator	Hexagonal flange face bolt	M6X18	9	0.9	7
Carbon brush	Hexagonal flange face bolt	M5X12			
Rectification bolck	Hexagonal flange face bolt	M5X12			
Earth wire	Hexagonal flange face bolt	M6X18	9	0.9	7
Air exhaust pipe	Hexagonal nut	M8	30	3	22
Lower body of heat insulation chamber	Hexagonal head bolt	M6X18	9	0.9	7
Cover plate of heat insulation chamber	Hexagonal head bolt	M6X18	9	0.9	7
	Cross slotted pan head screw	M5X20			
	Hexagonal nut	M5			
Fan duct cover of motor	Hexagonal flange face bolt	M5X12			
	Cross slotted pan head screw	M5X12			
Pressure plate of jar	Hexagonal head bolt	M6X18	9	0.9	7
Battery	Butterfly nut	M6	9	0.9	7
Parts of oil tank	Hexagonal flange face bolt	M6X25	9	0.9	7
Fan plate of air filter	Hexagonal head bolt	M6X15	9	0.9	7
Electric door lock	Cross slotted pan head screw	M5X12			
Pannel	Cross slotted pan head screw	M6X16	9	0.9	7
Cabinet	Hexagonal head bolt	M6X15	9	0.9	7
Cover plate of cabinet back door	Hexagonal head bolt	M6X15	9	0.9	7
Right side plate	Hexagonal head bolt	M6X15	9	0.9	7
Cover plate of air filter	Hexagonal head bolt	M6X15	9	0.9	7
Left side plate	Hexagonal head bolt	M6X15	9	0.9	7
Radiator	Hexagonal head bolt	M6X15	9	0.9	7
Muffler	Hexagonal flange face bolt	M8X20	30	3	22
	Hexagonal flange face bolt	M8X30	30	3	22
	Hexagonal nut	M8	30	3	22
Parts of right side plate	Hexagonal flange face bolt	M5X12			
Connecting wire of battery	Hexagonal flange face bolt	M8X16	20	2	15

KDE6500E

Front end cover	Hexagonal flange face bolt	M8X25	18	1.8	13
Rotor through bolt	Hexagonal flange face bolt	M10X210	50	5	36
Tighten bolt of fore/back end cover	Hexagonal flange face bolt	M6X140	10	1	7
Frame power	Hexagonal flange face bolt	M10X45	40	4	29
	Hexagonal nut	M10	40	4	29
Earth wire	Hexagonal flange face bolt	M6X12	9	0.9	7
Electromagnet	Cross slotted pan head screw	M3X5			
	Cross slotted pan head screw	M4X8			
Antihunting bracket	Hexagonal flange face bolt	M8X16	20	2	15
Oil tank	Hexagonal flange face bolt	M6X25	9	0.9	7
	Hexagonal nut	M6	9	0.9	7
Decorating plate	Hexagonal flange face bolt	M6X25	9	0.9	7
	Hexagonal nut	M6	9	0.9	7
Carbon brush	Hexagonal flange face bolt	M5X20			
Rectification block	Hexagonal flange face bolt	M5X20			
Earth wire	Hexagonal flange face bolt	M5X12			
Back cover	Hexagonal flange face bolt	M5X12			
AVR	Hexagonal nut	M5			
Oil tank assembly	Cross slotted pan head screw	M5X12			
	Cross slotted pan head screw	M5X8			
	Nut	M6	9	0.9	7
Pannel	Cross slotted pan head screw	M6X16	9	0.9	7
Hydraulic pressure regulator	Hexagonal flange face bolt	M6X18	9	0.9	7
Battery bracket	Hexagonal flange face bolt	M8X16	20	2	15
	Hexagonal nut	M8	30	3	22
	Hexagonal flange face bolt	M6X12	9	0.9	7
	Nut	M6	9	0.9	7
Battery	Butterfly nut	M6	9	0.9	7

KDE6500E

Front end cover			30	3	22
Rotor through bolt	Hexagonal flange face bolt	M10 × 225	50	5	36
Tighten bolt of fore/back end cover	Hexagonal flange face bolt	M6 × 150	10	1	7
Frame power	Hexagonal nut	M8	18	1.8	13
	Hexagonal nut	M10	50	5	36
Earth wire	Hexagonal flange face bolt	M6 × 8	9	0.9	7
Muffler	Hexagonal nut	M8	30	3	22
Fixed	Hexagonal flange face bolt	M8 × 25	20	2	15
	Hexagonal flange face bolt	M6 × 12	9	0.9	7
Pannel	Cross slotted pan head screw	M6 × 16	9	0.9	7
	Nut	M6	9	0.9	7
AVR	Hexagonal flange face bolt	M5 × 16			
Carbon brush	Hexagonal flange face bolt	M5 × 20			
Rectification	Hexagonal flange face bolt	M5 × 20			
Earth wire	Hexagonal flange face bolt	M5 × 12			
Back cover of motor	Hexagonal flange face bolt	M5 × 12			
Oil tank	Hexagonal flange face bolt	M6 × 20	9	0.9	7
Fixed air cleaner	Nut	M6	9	0.9	7
Charging regulator	Hexagonal flange face bolt	M8 × 25	20	2	15
Bracket	Hexagonal flange face bolt	M6 × 12	9	0.9	7
Battery bracket	Hexagonal flange face bolt	M8 × 16	20	2	15
	Hexagonal nut	M8	20	2	15
	Hexagonal flange face bolt	M6 × 12	9	0.9	7
	Hexagonal nut	M6	9	0.9	7
Battery	Butterfly nut	M6	9	0.9	7

KDE2200X/E

Front end cover	Hexagonal flange face bolt	M8X25	18	1.8	13
Rotor through bolt	Hexagonal flange face bolt	M8X180	30	3	22
Tighten bolt of fore/back end cover	Hexagonal flange face bolt	M6X120	10	1	7
Frame power	Hexagonal nut	M8	30	3	22
	Hexagonal nut	M10	40	4	29
Earth wire	Hexagonal flange face bolt	M6X12	9	0.9	7
Electromagnet	Cross slotted pan head screw	M3X5			
	Cross slotted pan head screw	M4X8			
Antihunting bracket	Hexagonal flange face bolt	M8X16	20	2	15
Oil tank	Hexagonal flange face bolt	M6X25	9	0.9	7
	Hexagonal nut	M6	9	0.9	7
Decorating plate	Hexagonal flange face bolt	M6X25	9	0.9	7
	Hexagonal nut	M6	9	0.9	7
Carbon brush	Hexagonal flange face bolt	M5X20			
Rectification block	Hexagonal flange face bolt	M5X20			
Earth wire	Hexagonal flange face bolt	M5X12			
Back cover	Hexagonal flange face bolt	M5X12			
AVR	Hexagonal nut	M5			
Oil tank assembly	Cross slotted pan head screw	M5X12			
	Cross slotted pan head screw	M5X8			
	Nut	M6	9	0.9	7
Pannel	Cross slotted pan head screw	M6X16	9	0.9	7
Hydraulic pressure regulator	Hexagonal flange face bolt	M6X18	9	0.9	7
Battery bracket	Hexagonal flange face bolt	M8X16	20	2	15
	Hexagonal nut	M8	30	3	22
	Hexagonal flange face bolt	M6X12	9	0.9	7
	Nut	M6	9	0.9	7
Battery	Butterfly nut	M6	9	0.9	7

2.11 The set value for leaving the factory

2.11.1 The set value of the automatic adjuster of the voltage AVR

Output voltage is set as rated voltage; the setting of units load protecting current is the 110% of the rated load.

(The following table is the reference value, the electric parts for AVR will be changed according to the temperature)

60HZ 120/240V Units

Model	Frequency (Hz)	Rated power (KVA)	Rated current (A)	Rated voltage (V)	Max power (KVA)	Max current (A)	Current protected value (A)
KDE2200E	60	1.7	7.0	120/240	2	8.3	No protecting setting
KDE3500E	60	3	12.5	120/240	3.3	13.8	14
KDE6500E	60	4.5	18.8	120/240	5.0	20.8	21.5-22.0
KDE6700TA	60	4.5	18.8	120/240	5.0	20.8	21.2
KDE6500E3	60	5	6.9	416/240	5.5	7.6	8
Note: The setting of no function and model units leave the factory as the same model setting in the above table							

50HZ 230V Units

Model	Frequency (Hz)	Rated power (KVA)	Rated current (A)	Rated voltage (V)	Max power (KVA)	Max current (A)	Current protected value (A)
KDE2200E	50	1.7	7.4	230	2	8.7	No protecting setting
KDE3500E	50	2.8	12.2	230	3	13	13.5
KDE6500E	50	4.2	18.3	230	4.5	19.6	21
KDE6700TA	50	4.2	18.3	230	4.5	19.6	21
KDE6500E3	50	5	7.2	400/230	5.2	7.5	8
Note: The setting of no function and model units leave the factory as the same model setting in the above table							

2.11.2 The protecting setting values of the digital panel divide to:

A：The standard setting value of leaving factory

Low oil pressure protection: Protection by stopping if the oil pressure low for 5s, display P-01:

Over frequency protection: Output frequency =55（65）HZ，protection by stopping for 5s, display P-02；

Over voltage protection: The rated output voltage is 110%V, protection by stopping for 3s, display P-03；

Over load protection: The rated output current is 110%, protection by stopping for 1 hour ,display P-04；

Charging malfunction warning: No protection, only display while charging malfunction, display P-05.

B：5KW the special requirement of the North America:

Low oil pressure protection: Protection by stopping if the oil pressure low for 5s, display P-01:

Lack frequency protection: Output frequency =57HZ，protection by stopping for 20s, display P-02；

Over frequency protection: Output frequency =65HZ，protection by stopping for 3s, display P-02；

Lack voltage protection: The output voltage is =105V or =210V, protection by stopping for 20s, display P-03

Over voltage protection: The output voltage is =132V or =264V, protection by stopping for 3s, display P-03；

Over load protection: The output current is between 19.2A and 21.2A, protection by stopping for 1 hour ,display P-04；

Over load protection: The output current is =21.2A, protection by stopping for 20s ,display P-04；

Charging malfunction warning: No protection, only display while charging malfunction, display P-05.

2.12 Troubleshooting —Open-shelf diesel engine and quiet generating set

2.12.1General symptom and possible cause

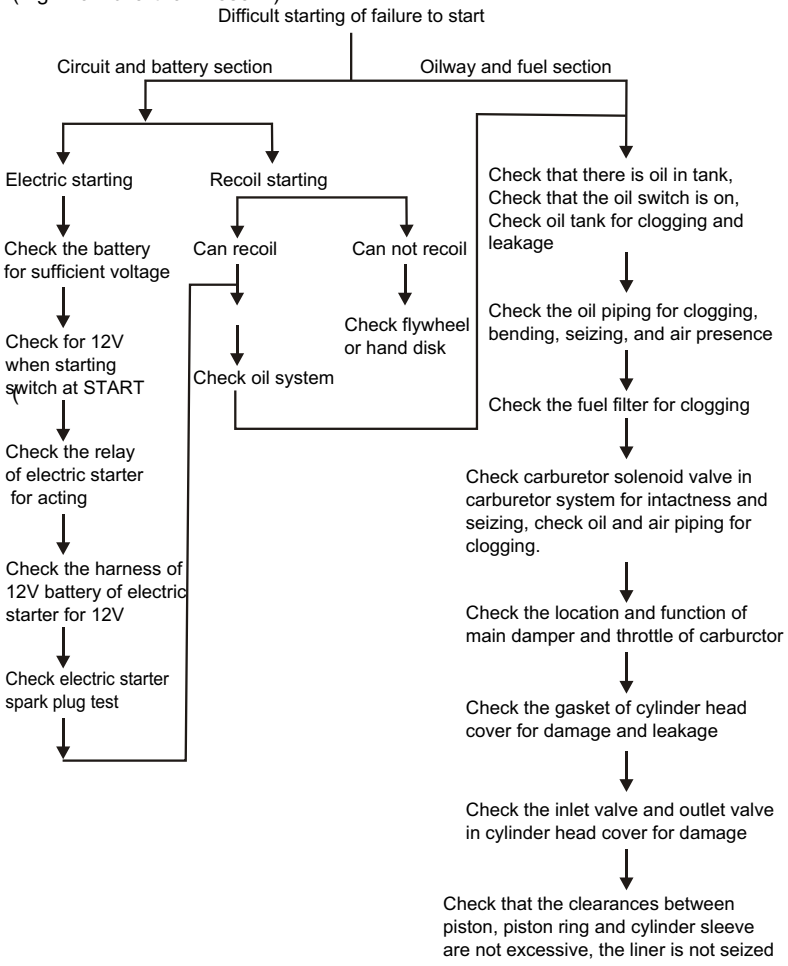
	Fault	Remedy
The diesel engine can not start or difficult to start	Deteriorated diesel oil in fuel oil.	Drain the fuel oil, check and clean.
	Fuel oil is not sufficient	Refill the fuel oil.
	Fuel cock is not at START position	Turn it to START position.
	Oil delivery pipe of oil tank is bent or oil pipe is clogged	Check.
	Diesel oil filter is clogged	Clean.
	The pump does not delivery oil	Remove the high pressure oil pipe, check for delivery of oil, replace pump or clean.
	Fuel injection pump and nozzle do not delivery oil	Remove the high pressure oil pipe, check for delivery of oil, replace pump or clean.
	The governor lever of engine throttle is not at START position.	Switch on.
	Engine oil filter is clogged causing low oil protection	Clean.
	Solenoid fuel valve is clogged or does not work because power off .	Check the 12V power supply or replace solenoid valve.
	The governor lever of engine throttle is faulty	Check, replace.
	Oil nozzle is clogged	Check exhaust-gas or observe engine rotation, clean or replace oil nozzle.
	The contact of starting switch fails to function	Check or replace.
	Electromagnetic coil in starting motor is faulty	Check, replace.
	The starting motor has internal mechanical fault	Check, replace.
	Oil level switch (engine oil alerting apparatus) is faulty	Check, replace.
	The battery has no electricity, charge circuit is faulty	Check, replace battery or charge regulator.
	Valve lash is improperly adjusted or valve pad falls off	Check or adjust lash.
	Engine cylinder has a seize fault.	Check and observe the engine rotation, disassemble the engine to replace faulted part.
	Recoil part in recoil starting set is faulty	Check or replace recoil part.
	Driving gear for starting motor is abrasive or cracked	Check or replace starting motor.
	Power supply for starting circuit is faulty	Check the wiring harness of 12V battery with gauge panel.
Engine speed is unstable, too high or too low.	The oil supply for oil-line is not sufficient.	Adjust or disassemble to clean
	Oil pump or nozzle is faulty.	Check or replace.
	Generator has a overload or short circuit fault	Repair the fault.
	Engine governor spring is faulty.	Repair the fault
	Valve lash is adjusted improperly.	Adjust.
Gauge panel of generating set	1. Air breaker fails to function	Remove it and check for open circuit. The resistance reading in multimeter should be "0"
	2. The wiring of gauge panel is loosened.	Check the wiring harness.
	3. The connection of receptacle is loosened or contact is melted.	Check or replace receptacle.

		Fault	Remedy:
The generator can not generate, generating set has no electricity or the voltage is abnormal, the voltage is fluctuated when loaded.	Fault caused by electric machine.	1. The lead-out of electric machine is loosened.	Check the wiring harness.
		2. The four-port terminal of electric machine is cracked	Check or replace terminal.
		3. Open circuit of electric machine main winding coil	Check resistance value at terminal, reconnect or replace stator.
		4. Short circuit of electric machine main winding coil.	Check resistance value at terminal, reconnect or replace stator.
		5. Open circuit of electric machine secondary winding coil.	Check resistance value at secondary winding inserter, reconnect or replace stator.
		7. Open circuit of electric machine sampling winding coil.	Check resistance value at sampling winding inserter, reconnect or replace stator.
		8. Interturn short circuit of electric machine main winding coil.	Check temperature of electric machine for overheating, check resistance value, or replace stator.
		9. Open circuit of electric machine rotor winding coil.	Check resistance value at collector, reconnect or replace rotor.
		10. Short circuit of electric machine rotor winding coil.	Check resistance value at collector, reconnect or replace rotor.
		11. Loss of magnetism in electric machine rotor magnetic steel	Check main winding for initial voltage when no AVR in electric machine.
		12. Short circuit of electric machine rotor collector.	Check resistance value at collector, reconnect or replace rotor.
		13. Fixed carbon-brush on electric machine stator is loosened or wear-out.	Check resistance value at collector, reconnect or replace carbon-brush.
		14. Rear end cover of electric machine stator is cracked.	Check for abnormal noise of electric machine at starting, check resistance value, replace front end cover.
		15. Frictional short-circuit of electric machine stator and rotor.	Check temperature of electric machine for overheating, check resistance value, or replace stator and rotor.
		16. Electric machine fault caused by wearing of engine output bearing.	Check for abnormal noise of engine or high temperature of electric machine at starting, replace engine.
		17. Fan blade of electric machine is cracked.	Check for abnormal sound or high temperature of electric machine, replace rotor.
		18. Front end cover of electric machine is cracked.	Check for abnormal sound or high temperature of electric machine, replace front end cover.
		19. High temperature overheating of electric machine stator or rotor.	Check temperature of electric machine for overheating, check resistance value, or replace stator and rotor.
		20. Carbon-brush is sparking or wearing, or collector is darkening.	Check resistance value at collector, reconnect or replace carbon-brush.
		21.Insulation resistance of generator is decreased.	Check insulation resistance of stator and rotor by voltage withstanding gauge, or replace stator and rotor of electric machine.
	Fault caused by automatic voltage regulator AVR	1. Voltage can not be regulated, regulating potential meter is fault	Check output voltage or adjust AVR, or replace AVR
		2. Voltage excursion	Check output voltage or adjust AVR, check connecting harness
		3. Generator set automatically stopped after loading, current setting incorrect	Check output voltage or adjust AVR, or replace AVR
		4. Electric component failed	Replace AVR
		5. After entering sampling signal no exciting output	Check exciting output voltage of AVR or adjust AVR, or replace AVR
		6. The voltage can not be established because of insufficient residual voltage of electric machine	Check that the voltage of main winding should be above 6 V without AVR in electric machine
		7. Power loss is increased because of higher voltage output of secondary winding	Check that the voltage of secondary winding should not above 140 V
		8. The voltage deviation of zero load and full load is too large , voltage regulating rate is low	Check AVR and the temperature of electric machine for high temperature, or replace electric machine or AVR
		9. The rising of voltage of generating set is high after capacitive load	Check loading, decrease load; check the voltage of AVR secondary winding, or replace AVR
		10. Incorrect wiring for exciting	Correct wiring
	Fault of intelligent control panel	1. No display on screen.	Check 12V power supply of generating set and check wiring for loosening or replace display screen.
		2. Display wrong code.	
		3. Can not start.	

2.12.2 Flow Chart of Troubleshooting

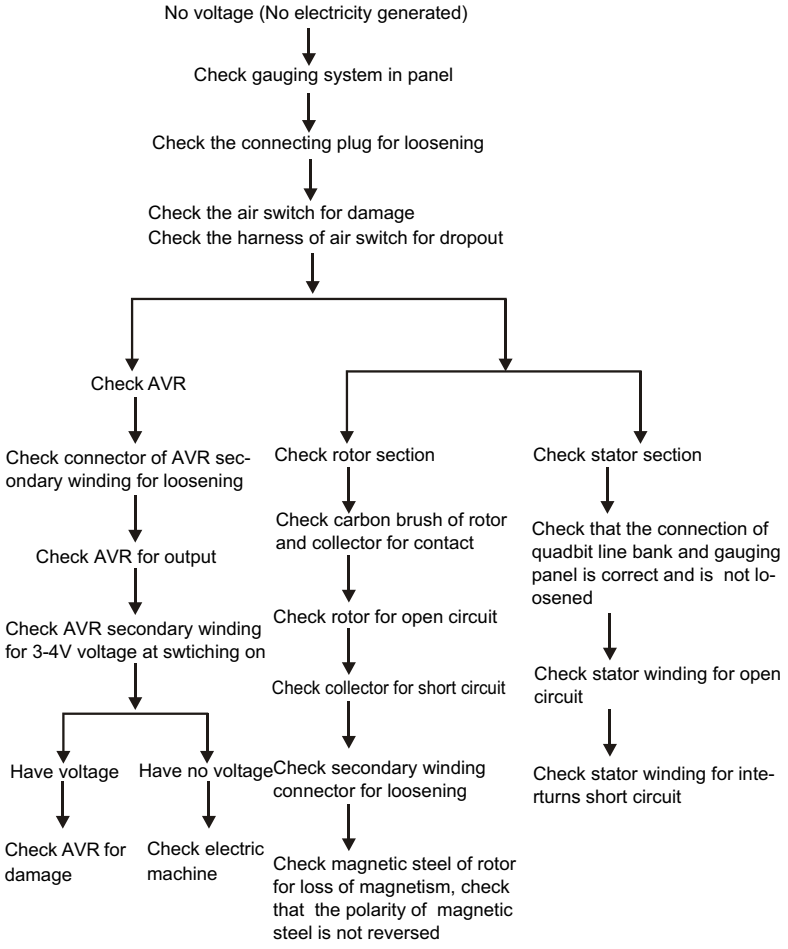
(1)Troubleshooting steps for difficult starting of diesel engine set

(Fig. Flow chart for Diesel 1)

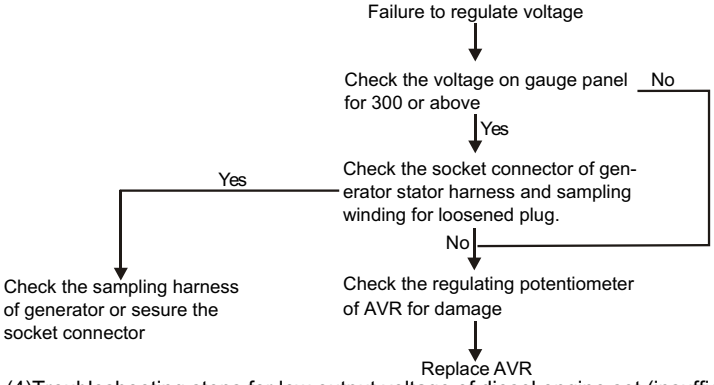


(2)Troubleshooting steps for no voltage

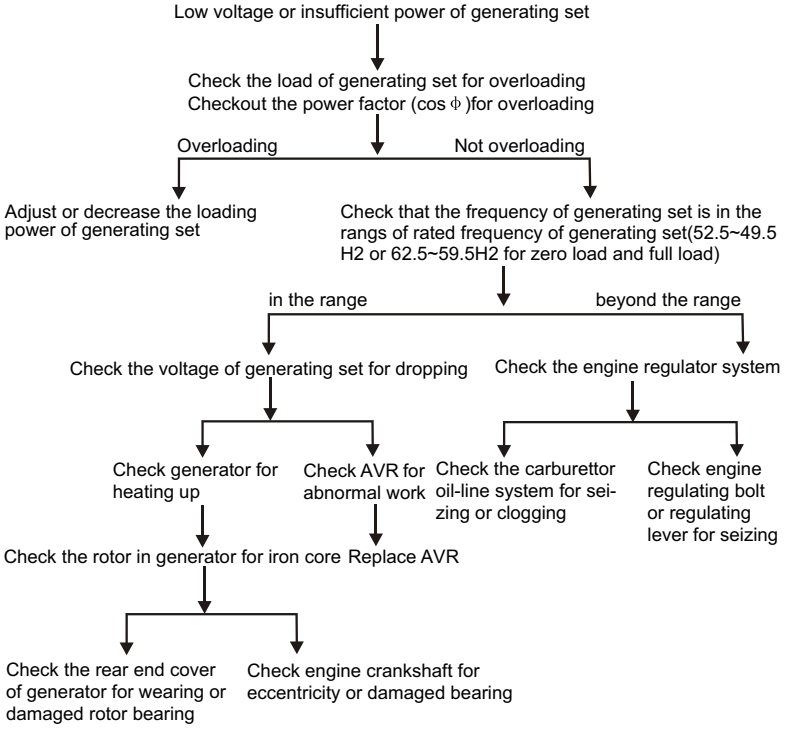
(Fig. Flow chart for diesel 2)



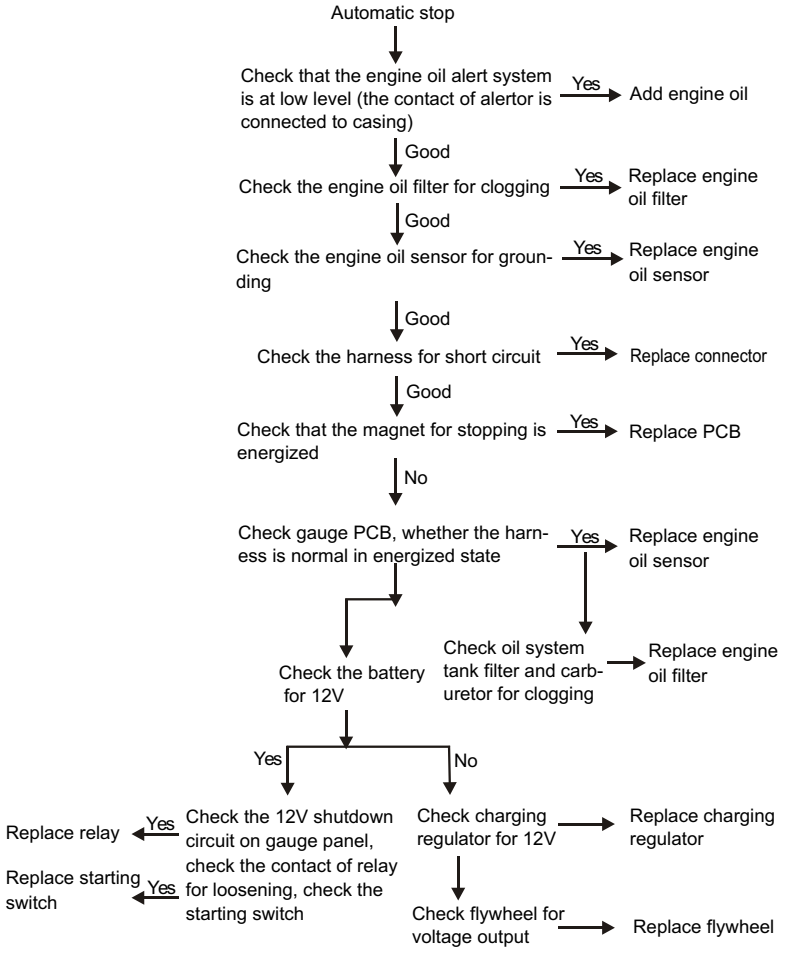
(3)Troubleshooting steps for failure to regulate voltage of diesel engine set (Fig. Flow chart for diesel 3)



(4)Troubleshooting steps for low output voltage of diesel engine set (insufficient power) (Fig. Flow chart for diesel 4)



(5)Troubleshooting steps for automatic stopping of diesel engine set (Fig. Flow chart for diesel 5)



3. MAINTENANCE CHECKS

3.1 Service List

Periodic check and service are very important for keeping the engine in good condition. The chart below indicates what checks to make and when to make them.

Interval	Every time	First month or 20 Hrs	Third month or 100 Hrs	Sixth month or 500 Hrs	Every year or 1000 Hrs
Check and refill fuel oil	○				
Drain out fuel oil		O			
Check and refill engine oil	○				
Check for oil leakage	○				
Check and tighten fastening parts	○			○ Tighten the cylinder head bolts	
Replace engine oil		○ (First time)	○ (Sine second time)		
Clean engine oil filter				○ (Replace if necessary)	
Replace air cleaner element	(Service more frequently when used in dusty areas)			○ (Replace)	
Clean fuel oil filter				○	○ (Replace)
Check fuel injection pump				O	
Check nozzle				O	
Check fuel pipe				○ (Replace if necessary)	
Adjust clearance of intake/exhaust valves				O	
Replace piston ring		○ (First time)			O
Check carbon brush and slip ring				O	

3.2 Checks

3.2.1Check fuel oil

Select proper fuel oil. Only use the light diesel, which is most suitable for the engine. Keep dust and water out of the fuel. When filling the fuel tank from drums, make sure that no dust or water is mixed in the fuel. Otherwise the serious fuel injection pump and nozzle problems will result. Do not overfill. Overfilling is very dangerous.. Do not fill the tank beyond the top of the red plug inside the fuel tank.

3.2.2 Check engine oil

⚠ WARNING

■Always check the engine oil level with the generating set on a level surface before starting and refill if necessary.

■The engine may be damaged if operated with insufficient engine oil, it is also dangerous to refill too much engine oil as sudden increase in engine speed may be caused by its combustion.

! CAUTION:

The generating set is equipped with low oil protection system. This system will stops the engine automatically when the oil level falls below the lower level. This prevents accidents such as bearing seizures, etc.

■ Select the most applicable engine oil

It is very important to select the applicable engine oil for keep up the performance and life of the generating set. If inferior engine oil is used, or if your engine oil is not replaced periodically, the risk of piston seizure, piston ring sticking and accelerated wear of the cylinder liner, bearing and other moving components increases significantly. So the generating set life will be shortened.

KIPOR recommends CC/CD oil classified by API. Choose the applicable viscosity oil according to the local ambient temperature.

3.2.3 Check air cleaner

(1)Screw off the wing nut, remove the air cleaner cover and take out the element.

! CAUTION

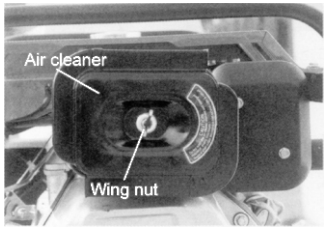
■Do not wash the element with detergent.

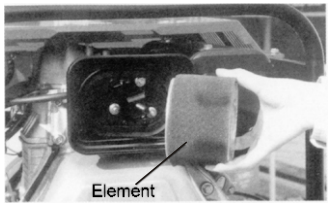
■Replace the element when its output decrease or a bad exhaust color is noticed.

■Never run the generating set without the element, otherwise the rapid engine wear will result.

(2)Reattach the air cleaner cover and screw on the wing nut.

Series KDE, Type X/E





3.2.4 Check Starting Performance of Generating Set

Turn off the main switch and any other loads.

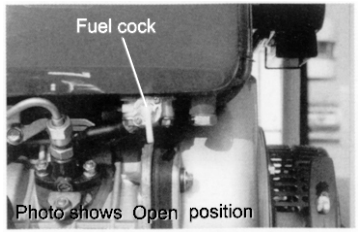
■Be sure to turn off the main switch before starting.

■The generating set should be earthed to prevent electric shocks.

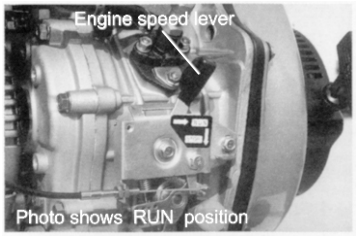
3.2.4.1 Recoil starting

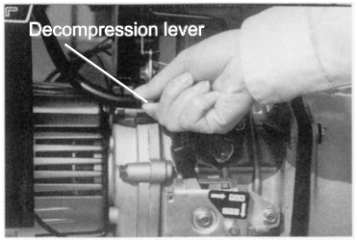
Start the engine according to the following procedures:

(1)Open the fuel cock.



(2) Set the engine speed lever at the RUN position.





(3)Pull out the recoil starter handle.

■Pull out the handle until you feel the resistance, then return it back to the initial position.

■Press down the decompression lever. It will return automatically when the recoil starter is pulled.

■Pull out the recoil starter handle briskly with both hands.

⚠ ATTENDED

■ Do not allow the handle grip to snap back against the engine. Return it gently.

■ When the engine is difficult to start in cold weather, remove the screw plug from the cylinder head cover and add 2 cc engine oil.

3.2.4.2.Electric starting

(1)Starting (The preparations for electric starting are the same as for the recoil starting.)

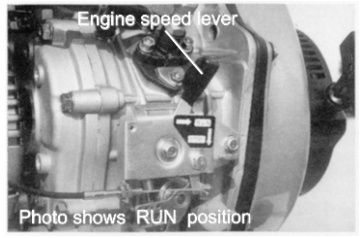
■ Open the fuel cock. (Note: This procedure is not necessary for generating set of series KDE type T.)

■ Set the engine speed lever at RUN position. (Note: This procedure is not necessary for generating set of series KDE type T .)

■Turn the starting key to START position.

■ Remove your hand from the key as soon as the engine starts.

■If the starting motor does not start after 10 seconds, wait 15 seconds before starting it again.



⚠ ATTENDED

■ Run the starting motor for long time will cost the battery power greatly even burn out the battery.

■ Always leave the starting key at ON position while the engine is running.

3.2.5 Check battery

Only KDE6500T-6700T/TA generating set is equipped a 12V36AH maintenance-free battery as factory standard configuration.

Check the battery capacity every month when in use. Measure the voltage of battery, it should not lower than 11.5V. Otherwise the generating set will not start. Check the charging circuit for fault.

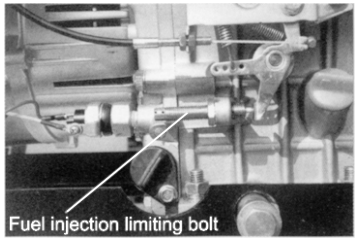
It should be noted for customer of other generating set, that if his self-equipped battery is not a maintenance-free battery, he should check the battery electrolyte level every month. Refill the distilled water until the upper limits if the electrolyte dropped to the lower limits.

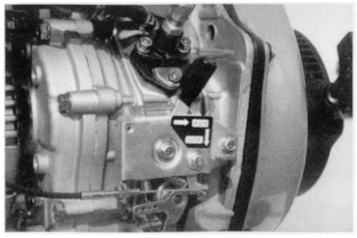
⚠ ATTENDED

■If the electrolyte level is too low, the engine may fail to start because there is not sufficient electricity. On the other side, if the electrolyte level is too high, the fluid will corrode the surrounding parts. Do keep the electrolyte level between the upper and lower limits.

In installing battery, the generating set should be stopped. Set the battery to be installed beside the generating set. Take out positive and negative connecting post of battery provided with generating set. Fix them to the positive and negative poles of battery respectively. Take out positive (red) and negative (black) connecting harness of battery. Secure them to the positive and negative poles on battery terminal post. Then put the battery onto the battery holder of generating set. Secure it with battery clamping plate and bolt provided with generating set.

(2) For generating set equipped with low oil alerting system, check that the low oil indicating lamp is not on.





⚠ ATTENDED

■When the oil pressure is too low or the engine oil level is too low, the low oil alerting system will act to stop the engine. If no engine oil is refilled, the engine will not restart. Please check engine oil level first, then refill engine oil.

■ Never loosen or adjust engine speed limiting bolt and fuel oil limiting bolt.

3.2.6 Checks during the running

(1) Whether there is abnormal sound or vibration in generator.

(2) Whether the engine runs rough.

(3) Check the color of exhaust. (Is it black or too white?)

If you notice any of the above-mentioned phenomenon happened, stop the engine and find out the fault cause according to troubleshooting.

3.2.6.1 Check A.C.Output Characteristic

(1) Be sure to run the generating set at rated speed, otherwise the automatic voltage regulator (AVR) will produce the forced excitation. If the running is for a long time under such condition, AVR will be burned out.

(2) After switching on the air switch, observe the voltmeter on the panel of the control cabinet, the voltmeter should point to 230 V (50 Hz), 120/240 V (60 Hz) for single-phase generating set; 400 V (50 Hz), 416 V (60 Hz) for three-phase generating set, then the loading can be carried out.

(3) Connect the equipments to the generating set in order. For the matter of the motor load, firstly the heavy-duty motor should be connected, then the light-duty motors. If the operation is false, the generating set will lag or stop suddenly. It is necessary to unload the generating set immediately and turn off the main switch and do checks

⚠ ATTENDED

■ If overloading of the circuit trips the AC circuit air switch, reduce the electrical load on the circuit, and wait a few minutes before resuming operation.

3.2.6.2 DC checks

(1) DC terminals are only for charging 12 V battery.

(2) Set the air switch at OFF position while charging. On the 12 V output terminals a charge switch can be connected so the switch can be used for on-and-off purpose..

⚠ ATTENDED

■ Connect the positive and negative poles of the battery with the positive and negative poles of DC terminals separately. Do not confuse them, otherwise the generator and battery will burn out.

■ Do not contact the positive pole of the DC terminal with its negative pole, otherwise the generating set damage will result.

■ Do not contact the positive pole of the battery with its negative pole, otherwise the battery damage will result.

■ When a large capacity battery is charged, excessive current flows (charging current should not exceed 8 A), the fuse for the direct current will burn out.

■ Never run the generating set while it is still connected with the battery.

■ Never use DC 12 V and AC at the same time.

⚠ ATTENDED

■ Battery exhausts explosive gas. Keep sparks, flames, and cigarettes away from the battery. To prevent from creating a spark near the battery, always connect the charging cables to the battery first and only then to the generating set. When disconnecting, you should disconnect the cables at the generating set first.

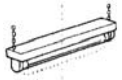
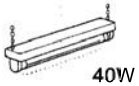
■ Charge the battery at a well-ventilated place.

■ Before charging, remove the cap from each cell of the battery.

■ Stop charging if the electrolyte temperature exceeds 45 ℃.

3.2.7 Check Overload Operation

Electrical appliance particularly motor-driven equipment will produce very high current while starting, the table below provides the reference for connecting these apparatus to the generating set in service by user.

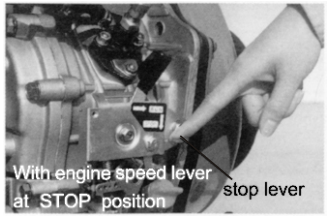
TYPE	WATTAGE		TYPICAL APPLIANCE	EXAMPLE		
	STARTING	RATED		APPLIANCE	STARTING	RATED
· Incande-scent lamp · Heating applian-ce	X1	X1	 Incandescent lamp TV 	 Incandescent lamp 100W	100VA (W)	100VA (W)
· Fluoresc-ent lamp	X2	X1.5	 Fluorescent lamp	 40W Fluorescent lamp	80VA (W)	60VA (W)
· Motor-driven equip-ment	X3~5	X2	 Refrigerator  Electric fan	 Refrigerator 150W	450-750VA (W)	300VA

3.2.8Check Stopping of Generating Set

(1)Disconnect the load from the generating set.

(2)Turn off the air switch of the generating set.

(3)Set the speed lever at RUN position, run the generating set without load for about 3 minutes. Do not stop the engine suddenly, otherwise the temperature will increase abnormally, the nozzle will blocked and the generating set will be damaged.



■Press down the stop lever.

■Concerning the electric starter, turn the key to OFF.

■Turn the fuel cock lever to S position.

■Pull out the recoil starter handle until you feel resistance (at this position, both intake/exhaust valve are closed.) and leave the handle in this position. This prevents the engine from rust.

⚠ WARNING

■If the engine keep on running even after the speed lever is placed at the STOP position, either turn the fuel cock to the CLOSE position or loosen the nut of high pressure fuel pipe on the pump side to stop the engine.

■Do not stop the engine with the decompression lever.

■Do not stop the generating set with load. Stop it after the load removed.

4. MAINTENANCE

4.1 Oil-line and intake/exhaust parts

This section mainly deal with the actions which should be taken while a fault of engine oil, oil quantity variation, air cleaner, oil line or oil tank presents.

(1) In case of excessive engine oil filled (exceeds 2/3) or white smoke emitted from engine during generating set running, drain the oil.

(2) Refill engine oil to prescribed level. The low oil alert lamp will on and the generating set will stop automatically.

(3) If the abnormal condition still presents, carry out the troubleshooting checks for engine automatic stopping

4.1.1 Engine oil

Check oil level.

Check the engine oil level with the engine stopped and the generating set on a level surface.

(1) Open the cabinet door.

(2) Remove the oil filler cap and check the oil level, note that the oil level should be a bit lower the oil filler.

(3) If the oil level is low, refill oil to a position a bit lower the oil filler.

Check the stability of engine oil. Check that no impurity is adulterated.

Recommended engine oil: SAE10W-30 or SAE30, grade SE, SF, or SG of API service classification.

Engine oil is the main factor to affect the engine service life. Use four-stroke automatically purifying oil.

Recommended oil of SAE10W-30 is commonly used. When the average temperature of user's area is within the applicable range for recommended engine oil, the engine oil of other viscosity may be used.

Viscosity table.

(4) Tighten the oil filler cap.

4.1.2 Replace engine oil

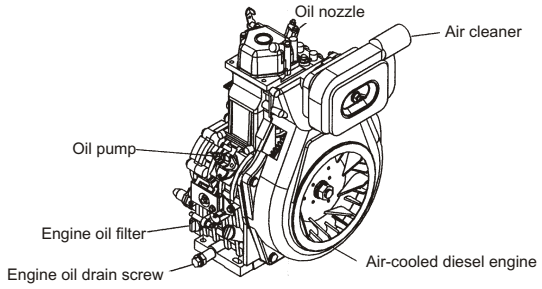
Drain the oil while the engine is still warm, since hot oil is drained fast and thoroughly.

(1) Remove service cap. Remove the oil filler cap. Drain the old oil into a suitable container.

For environment protection it is recommended to put the waste engine oil in a sealed container and delivery it to service station or recycle center of user's area. Never pour the engine oil on the ground or debris.

Caution: The used engine oil contains cancerogenous substance. If contact with skin frequently or for long time, skin cancer would be caused. Clean your hands with soak thoroughly and rinse it immediately.

(2) Refill engine oil to specified position.
(3) check the oil level again after fueling;if oil level is too low, fuel to specified level.
(4) Reinstall the service cap.



(Fig.)Drawing of engine oil components

4.1.3 Oil tank/fuel oil filter

Cleaning:

(1) Remove the oil pipe from oil tank. Remove the fuel oil filter.

(2) Remove the clogging material in filter. Check the filter for damage. Replace if necessary.

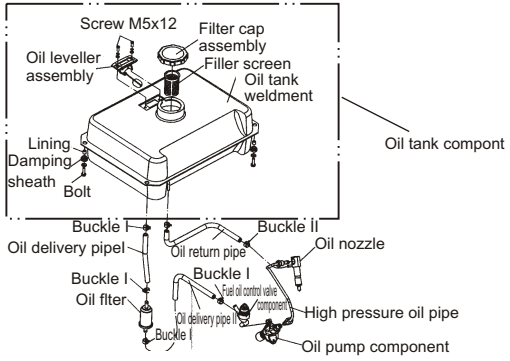
(3) Remove the oil tank. Clean it with detergent. After cleaning air dry completely, then reinstall it.

(4) In quiet generating set, the cabinet must be removed.. Remove the oil tank. Clean it with detergent. After cleaning air dry completely, then reinstall it.

(5) Reinstall the filter into oil tank. Connect oil pipe.

(6) Reinstall other parts in counter order for disassembling.

Refill the oil tank with diesel oil. Check the oil pipe for leakage.



(Fig.) Drawing of oil tank

4.1.4 Oil pipe/oil pump

(1) Check the oil pipe for deterioration, cracking, or leakage of diesel oil. If the oil pipe has any abnormality, replace it.

(2) Check the magnet of pump for deterioration, cracking, or leakage of oil. If there is any abnormality, replace the oil pump.

(3) Check for water accumulation or other foreign material in pump. If any, replace pump.

(4) After assembling check all parts for leakage again.

Service: The fault phenomena is fluctuation of engine running or automatic stopping -----fuel supply is insufficient or air presents.

Cause: Air presents in oil tank, oil pipe. Generally in new engine, or after oil-break during running, a lot of air would be entered in engine pump or high pressure oil pipe while fill oil.

Remedy:

(1)Stop the generating set. Check oil tank and oil pipe for oil-break;

(2)If oil-break happens, refill fuel oil.

(3)Loosen the circlip at the intake pipe of engine pump with a nipper pliers. Place a container under the oil pump and oil pipe, discharge the air from oil pipe which was entered in oil-break. Seeing oil flow out from oil pipe, connect the oil pipe to the intake pipe of pump immediately and clip on.

Service: The fault phenomena is not starting or automatic stopping----------The oil pump does not delivery oil.

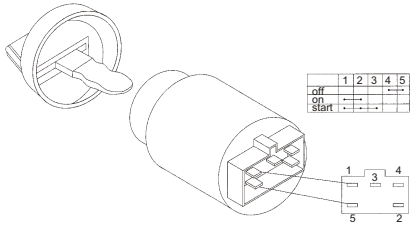
Remedy:

(1)Loosen the discharging pipe at engine oil pump and high pressure oil pipe with a open-end spanner.

(2)When starting open-shelf generating set by recoil or electric starter, pull out the discharging pipe of oil pump. It is normal if there is oil in it. If no oil, replace the oil pump.

(3)For quiet generating set check the 12V power supply first.

Checkout the voltage. Repeat the steps (1) and (2). Set the electric switch lock to ON position. Checkout the 12V with a multimeter. If the 12V presents, replace oil pump. If there is no 12V voltage, check the electric wiring and electric switch lock, service according to the gauge panel.



(Fig.) Electric switch lock

4.1.5 Air cleaner

A dirty air cleaner will obstruct air from entering carburetor, thus reduces the engine working efficiency. If the engine is running in dusty area, clean the air cleaner more frequently.

Caution: Never run the engine without the element or with a defective element, the dirt may enter into engine to accelerate the engine damage.

Checking/cleaning:

(1) Loosen screws on service cap, remove the service cap.

(2) Push off the locking plate on the top of air cleaner, remove the air cleaner.

(3) Take out the filter element.

(4) Wash the element in warm soap water, rinse it and air dry completely. Or clean with high fire point solution and air dry.

Soak the element in clean engine oil, squeeze out redundant engine oil. The redundant engine oil may prevent air to enter into foam element and would smok at engine starting.

(5) Reinstall the element in air cleaner. If necessary, clean the air cleaner rubber and housing. Make sure that the seal ring of air cleaner cover is secured.

(6) Reinstall the air cleaner cover. Reinstall parts in order. Lock the locking plate on the top of air cleaner. Make sure that the seal ring of air cleaner cover is secured. If the seal ring of air cleaner cover is damaged, replace it.

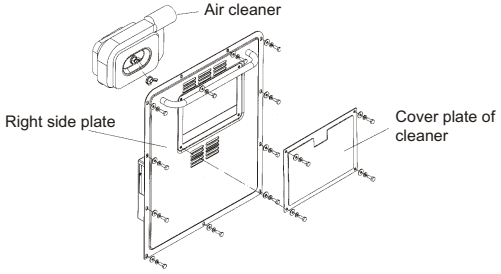
(7) Reinstall the service cap.

Caution: If the cover of air cleaner installed not tightly, it would fall during engine running due to vibration. Never run the engine without air cleaner or with a defective air cleaner to prevent accelerated wear of engine.

Service: The fault phenomena is fluctuation of engine running and incapable of power raising-------insufficient air intake.

Cause: (1) Dirty air enters; (2) Exhaust gas feedbacks during engine running, which causes incomplete combustion in engine and carbon deposition on oil nozzles.

Remedy: Repeat the above-mentioned steps for cleaning. Refer to engine service for oil nozzle faults.



(Fig.) Cleaning of air cleaner

4.1.6 Muffler

a. Removing and reinstalling

Caution: Remove and reinstall the muffler after the engine is cooled down.

(1)Protective hood of muffler

In quiet generating set the cooling plate must be removed, then remove the muffler.

(2)Muffler (Installation: Before installing, tap muffler with a plastic hammer to remove internal carbon deposition.)

(3)Gasket of muffler (Can not be reused)

Service 1: The fault phenomena is black smoke emitted from exhaust port during engine running -------insufficient air intake.

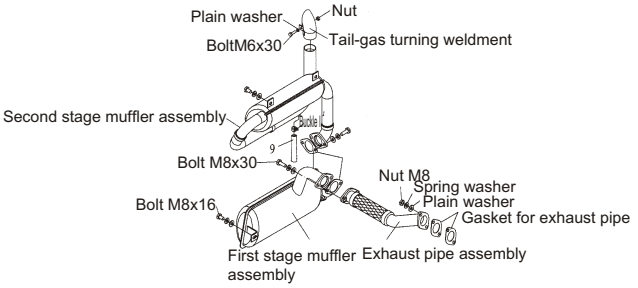
Cause: (1) Dirty air enters; (2) Exhaust gas feedbacks into air cleaner during engine running, which causes incomplete combustion in engine and carbon deposition on oil nozzles.

Remedy:Repeat the above-mentioned steps for cleaning. Refer to engine service for oil nozzle faults.

Service 2: The fault phenomena is black smoke emitted from exhaust port during engine running ------generating set is overloaded

Cause:1.Generating set is overloaded. 2.Engine oil nozzle and oil pump have faults causing incomplete combustion in engine and carbon deposition on oil nozzles.

Remedy: 1.Repeat the above-mentioned steps for cleaning. 2.Reduce the loading power of generating set. 3. Refer to engine service for oil nozzle faults.



(Fig.) Muffler

4.2 Control panel

This section mainly deal with the remedy for faults caused by air switch, voltmeter, electric switch lock, receptacle or PCB in control panel, and actions which should be taken while the generating set faults such as no voltage output, no voltage indication, not starting, automatic stopping, etc. present.

4.2.1 A.C. receptacle

Check: Connect two poles of receptacle with a jumper. The current should flow normally between conductor terminals. There is current passed between receptacle ground terminal and receptacle installing set.

Service 1: The fault phenomena is no voltage output in generating set.

----Receptacle terminal is loosened, receptacle terminal is melted.

Cause: 1.Wring is loosened due to vibration. 2. Receptacle patchplug is loosened to result in heating up

Remedy: 1. Add glue. 2. Replace plug and receptacle.

4.2.2 D.C. receptacle or post

Check: Connect two poles or posts of receptacle with a jumper. Open the circuit breaker (if any), the current should flow normally between conductor terminals.

Service 1: The fault phenomena is no voltage output in generating set.

----Receptacle terminal is loosened, receptacle terminal is melted.

Cause: 1. Wring is loosened due to vibration. 2. Receptacle patchplug is loosened to result in heating up

Remedy: 1. Add glue. 2. Replace plug and receptacle.

4.2.3 Starting switch

Check: Circuit should be closed when switched on. Circuit should be open when switched off. In starting position the circuit should be closed.

	1	2	3	4	5	6	7
OFF				——	——	——	——
ON	——	——					
START	——	——	——				

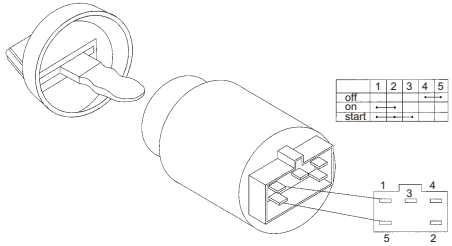
Service 1: The fault phenomena is incapable to switch on, start or stop.----------Receptacle terminal of switch is loosened, switch contact is melted.

Cause: 1. Wring is loosened due to vibration.

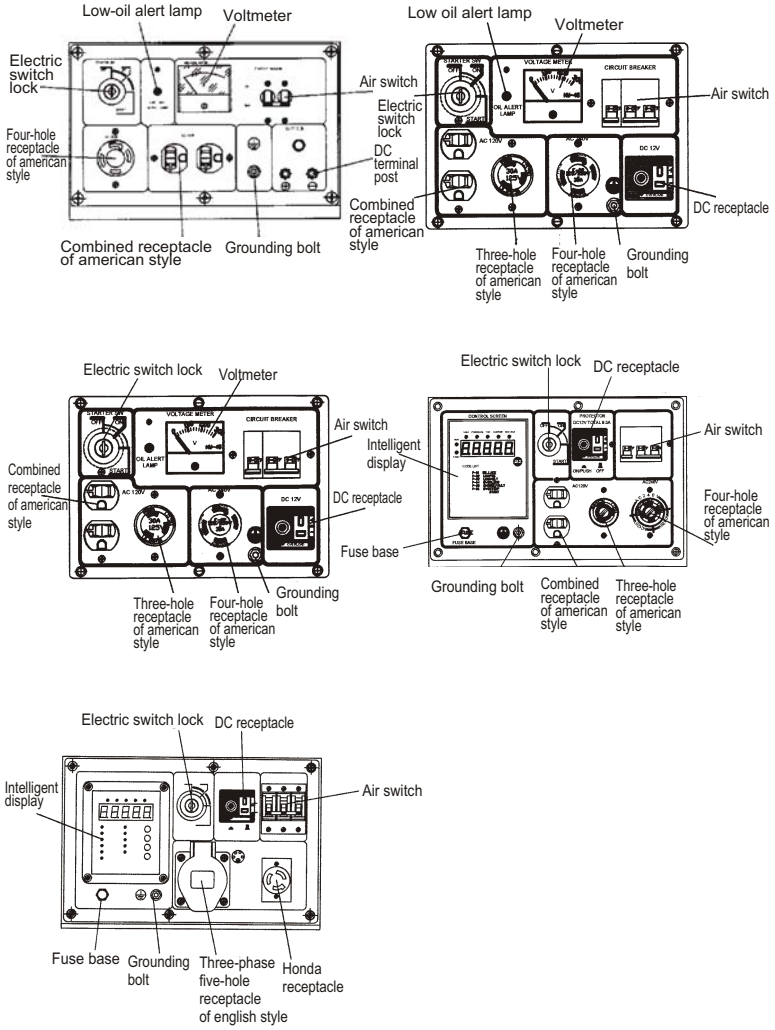
2. Switch patchplug is loosened, result in heating up

Remedy: 1. Checkout the resistance for each switch position with a multimeters. The on-off relation should comply with the table above, otherwise there would be fault.

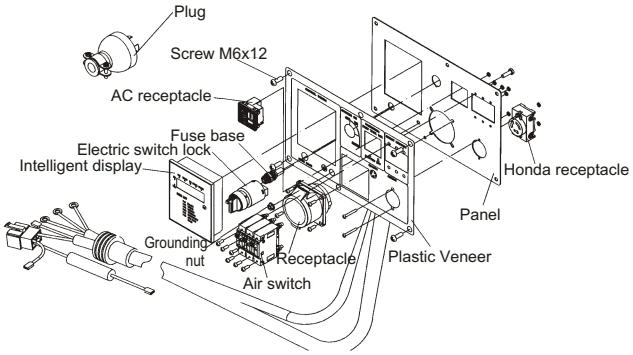
2. Replace patchplug and electric door lock.



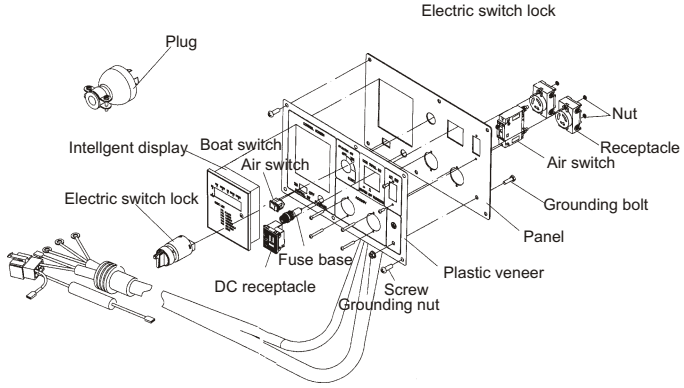
(Fig.) Position of electric switch lock



(Fig.) Panel



Gauge panel Three-phase generating set



Gauge panel Three-phase generating set

4.2.4 Voltmeter

Check: Connect electric supply , which voltage range is the same as voltmeter, to the terminal post of voltmeter. The voltmeter should indicate normal voltage.

Service: Fault phenomena is that there is AC current output during generating set running, but no AC voltage indication.----------The voltmeter is open-circuit, the wring of voltmeter is loosened.

Cause: 1. Wring is loosened due to vibration. 2. The element in voltmeter is damaged. 3. The pointer of voltmeter is seized.

Remedy: 1. Checkout the resistance on voltmeter terminal posts with a multimeter for on-off relation. On is normal. Off is faulty. 2. Replace voltmeter.

Cause: 1. The generator does not generate power.

Remedy: According the troubleshooting for generator.

4.2.5 Air switch

Check: Checkout the resistance at two ends of air switch with a multimeter. The resistance should be infinity in OFF and zero in ON.

Service 1: The fault phenomena is that there is AC current output during generating set running, but no AC voltage indication.-----The voltmeter is open-circuit, the wring of voltmeter is loosened.

Cause: 1. Wring is loosened due to vibration. 2. The element in voltmeter is damaged. 3. The pointer of voltmeter is seized.

Remedy: 1. Checkout the resistance on voltmeter terminal posts with a multimeter for on-off relation. ON is normal. OFF is faulty. 2. Replace voltmeter.

4.2.6 PCB parts for engine oil alarming and stopping

Check: Checkout the contact and circuit of relay on PCB with a multimeter for correct on-off.

Service 1: The fault phenomena is low oil pressure indication alarming.-----The indicating lamp on PCB always on.

Cause: 1. The engine oil filter is dirty, result in false alarm of engine oil. 2. The relay on PCB is defective.

Remedy: 1. Checkout the resistance of two harnesses at the terminal post of alarming apparatus for on-off relation. Off is normal. On is faulty. 2. Replace PCB. 3. Replace relay, or 4.Replace engine oil alarming apparatus.

Service 2: The fault phenomena is automatic stopping during generating set running.----------The relay on PCB is damaged.

Remedy: 1. Checkout the resistance of two harnesses at the terminal post of alarming apparatus for on-off relation. Off is normal. On is faulty. 2. Replace PCB. 3. Replace relay, or 4.Replace engine oil alarming apparatus.

4.3 Generator

4.3.1 Generator

Check

(1) Front end cover: Check for cracking

(2) Generator fan: (Take care not to damage the fan blade in disassembling and assembling)

(3)Rotor: Remove engine oil and contaminant on surface part before installation. Normal measured resistance should comply with table 2.9. The color should be red brown. In case of burn-out by short circuit, it would become black and cracking would present. Then the rotor should be replaced.

(4)Clip ring: It should be smooth without any defect or distortion. The semicircle of center boss should be clear. In case of distortion the clip ring should be replaced.

(5)Through stud: Locking torque is 50-55 Nm. If locked not tightly, the generator would be damaged by scrubbing of rotor and stator.

(6)Stator: Check the external enamel covered wire for defect in disassembling and assembling. Do not contact the copper wire part with ground or sharp metal part directly to prevent scuffing.

(7)Stator lead-out: Divided into main winding, secondary winding, sampling winding and 12V low voltage winding. Checkout the resistance of each winding, it should be same as the parameter in table 2.9. Otherwise the stator should be replaced.

(8)Carbon brush: There should be no open-circuit between lug and pole of carbon brush, and no short-circuit between two poles.

(9)Rear end cover: Check for cracking.

Disassembling/assembling

(1)Open the rear end cover for open-shelf generating set. Remove the cabinet, cooling plate, left and right side plate, and muffler for quiet generating set.

(2)Remove the generator with wiring. In quiet generating set must remove the induced draft hood, then remove the harness.

(3)Remove 4XM6X175M bolt of rear end cover.

(4)Take out the stator.

(5)Fix the rotor with a belt spanner, then remove 10MM flange bolt.

Caution: Never knock the nut or rotor with hammer etc.

(6)Remove the rotor with a flywheel drawer.

4.3.2 Installation of rotor

Caution: Remove the dust and oil pollution from the crankshaft and rotor part. Check the magnetic part of rotor for attachment of metallic material or gasket.

(1)Insert the semicircle clip ring into key groove.

(2)Install the rotor on the crankshaft.

(3)Fix the rotor with a belt spanner, secure the 10MM flange bolt to specified torque.

Tightening torque: 50 Nm (5.0 kgf.m, 37.5 lbf.ft)

4.3.3 Stator

If measured resistance exceeds above-mentioned specified value, check the harness of generator. Replace the harness of generator if necessary. If the harness of generator is regular, replace the stator assembly.

Secondary winding:

Checkout the resistance between two blue (green) terminals of four-position connector. See table 2.9 for the resistance value.

If measured resistance exceeds above-mentioned specified value, check the harness of generator. Replace the harness of generator if necessary. If the harness of generator is regular, replace the stator assembly.

AC winding:

Checkout the resistance of main winding on four-position terminal board.

The resistance value between (red, white, green) terminals in 120V/240V simultaneous output.

In 120V/240V selected output the resistance for (brown, black, red, blue) terminals which are (L1, L2; R1, R2) respectively.

If measured resistance exceeds specified value in table 2.9, check the harness of generator. Replace the harness of generator if necessary. If the harness of generator is regular, replace the stator assembly.

12V low voltage winding:

Checkout the resistance between the green terminals on four-position connector.

If measured resistance exceeds specified value in table 2.9, check the harness of generator. Replace the harness of generator if necessary. If the harness of generator is regular, replace the stator assembly.

Sampling winding:

Checkout the resistance between the yellow terminals on four-position connector.

If measured resistance exceeds specified value in table 2.9, check the harness of generator. Replace the harness of generator if necessary. If the harness of generator is regular, replace the stator assembly.

B. Adjustment

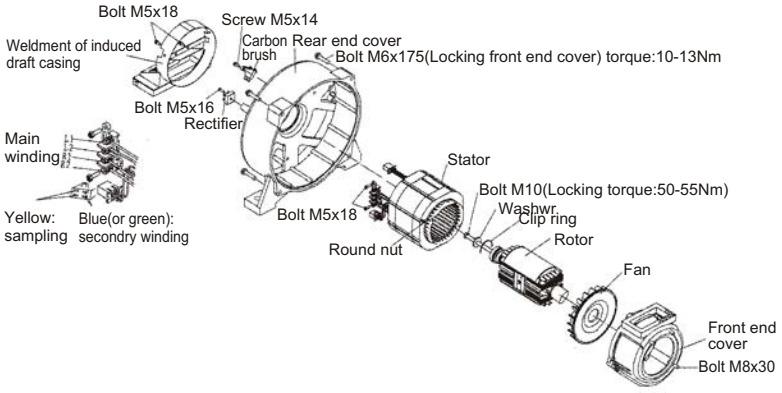
The spacing between the stator winding and rotor.

Insert a feeler between the stator winding and the projection of rotor. Push the rotor winding to 90°, 180°, 270°, 360°. The rotor rotate for one turn. Secure the flange bolt connecting stator and front end cover. The locking torque is 10-13 Nm (1.0 kgf.m, 7.5 lbf.ft). Spacing: 0.25 +/- 0.1 mm (0.020+/-0.004 in)

Service: The fault phenomena is: no voltage, no power output, scrubbing of stator and rotor, generator burn-out, generating set does not start.

Cause: 1. Open circuit of winding, 2. Short circuit of winding, 3. Carbon brush wearing, 4. Fixing parts loosened due to vibration, 5. Front and rear end covers cracking, 6. Seizing of stator and rotor, 7. Engine crankshaft bearing wearing

Remedy: 1. Avoid overloading and ventilate to cool down, 2. Replace carbon brush, 3.Replace generator, 4. Secure the connecting parts, 5. Replace front and rear end covers.



(Fig.) Components of electric machine

4.4 Cabinet

4.4.1 Right side plate

Check: Check the inlet and outlet of air duct on right side plate to ensure ventilation. Each sound absorbing sponge should be clog-free.

Service: 1. The fault phenomena is insufficient AC current output during generating set running------Air duct clogged. 2. High temperature of engine

Cause: 1. Vibration 2. The sponge falls off by the effect of temperature.

Remedy: 1. Replace sponge

4.4.2 Left side plate, cooling plate

Check: Check the inlet and outlet of air duct on left side plate to ensure ventilation. Each sound absorbing sponge should be not clogged or fall off.

Service: 1. The fault phenomena is insufficient AC current output during generating set running------Air duct clogged. 2. High temperature of engine 3. High temperature of exhaust pipe

Cause: 1. Vibration 2. The sponge falls off by the effect of temperature.

Remedy: 1. Replace sponge. 2. Replace heat insulating material.

4.4.3 Cabinet

Check: Check the inlet and outlet of air duct on cabinet to ensure ventilation. Each sound absorbing sponge should be not clogged.

Service: 1. The fault phenomena is insufficient AC current output during generating set running------Air duct clogged. 2. High temperature of engine 3. High temperature of exhaust pipe

Cause: 1. Vibration 2. The sponge falls off by the effect of temperature.

Remedy: 1. Replace sponge. 2. Replace heat insulating material.

4.4.4 Transformer in cabinet

Check: Checkout the resistance at two terminals of transformer with a multimeter. Closed circuit is normal. Open circuit is faulty. The transformer is installed only in model KDE6700TA. In other model there is no transformer.

Service: The fault phenomena is no voltage indication during generating set running or a code of P-03 present..----------Open circuit or short circuit of transformer.

Cause: 1. Vibration. 2. Fixing parts loosened or fall off.

Remedy: 1. Replace transformer.

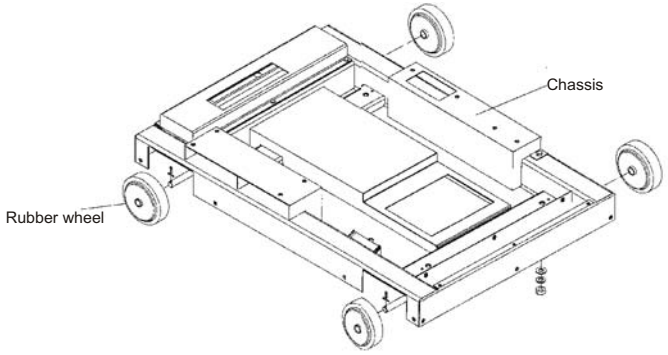
4.4.5 Chassis

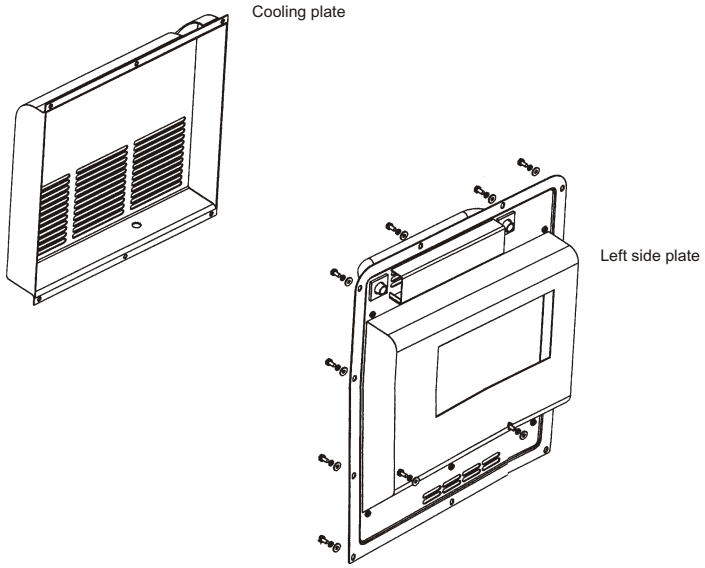
Check: Check the inlet and outlet of air duct to ensure ventilation. Each sound absorbing sponge should be not clogged.

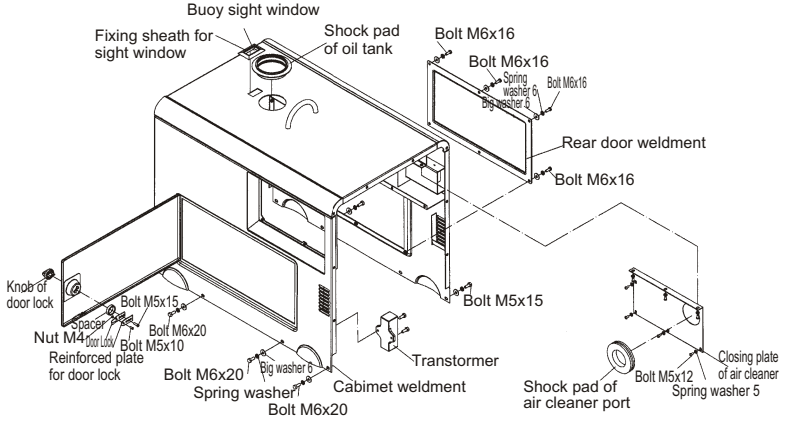
Service: 1. The fault phenomena is that the wheel falls off during generating set running. 2.Air duct clogged.

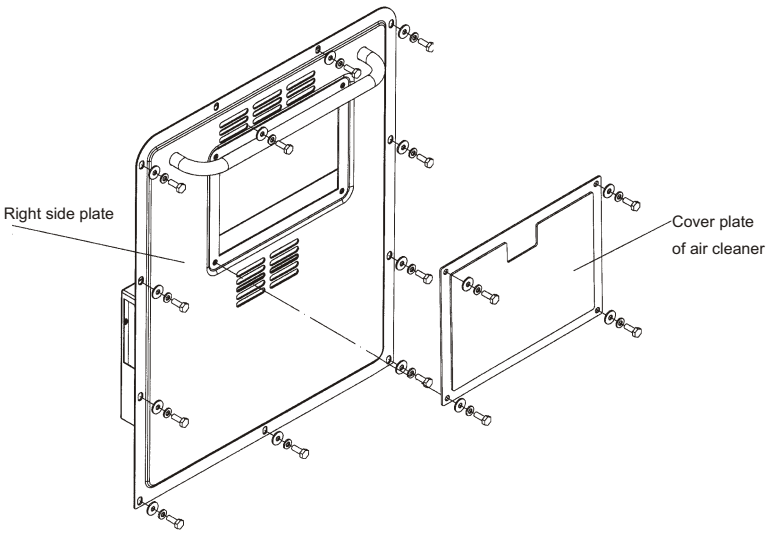
Cause: 1.Vibration. 2. Fixing parts loosened or fall off.

Remedy: 1. Replace wheel. (Only in model KDE6700T/TA/TA3 have to remove the cabinet of generating set)



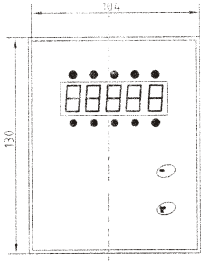




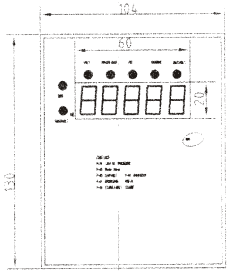


(Fig.) Cabinet (1), (2), (3)

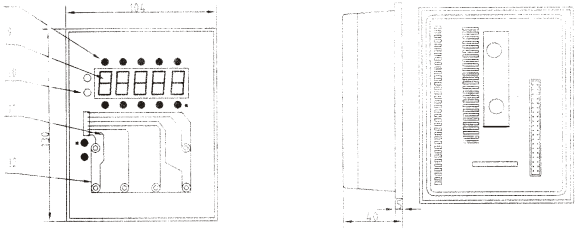
5. SERVICE OF INTELLIGENT CONTROL PANEL



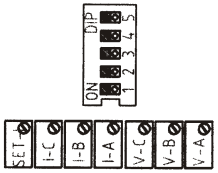
Chinese PVC veneer



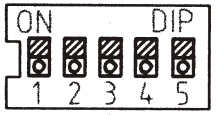
English PVC veneer



PVC circuit board on module exterior



Toggle switch for function setting



1: Frequency setting

2、3:Voltage setting (2:ON 3:ON)--230V
(2:OFF 3:ON)--240V
(2:ON 3:OFF)--115V
(2:ON 3:ON)--230V
(2:OFF 3:OFF)--120V
(4:ON 5:ON)--single phase
(4:OFF 5:ON)--double voltage selected output
(4:ON 5:OFF)--double voltage simultanceous output
(4:OFF 5:OFF)--three phase

SET To regulate curret of protected point

I-C To regulate current of phase C

I-B To regulate current of phase B

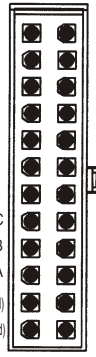
I-A To regulate current of phase A

V-C To regulate voltage of phase C or line CA

V-B To regulate voltage of phase B or line BC

V-A To regulate voltage of phase Aor line AB

Charging checkout, negative
Common terminal fur output
Starting output
Fuel oil control output
Power supply input, positive
Protection input(low is valid)
Starting signal (high is valid)
Input terminal 2 for current of phase C
Input terminal 2 for current of phase B
Input terminal 2 for current of phase A
Phase B voltage input (the phase-voltage)in transformed)
Phase A voltage input (teh phase-voltage) in transformed)



Charing checkout, position
Common terminal for output
Stating output
Power supply input
Engine oil alarming input(grounding is valid)
Voltage selection 120/240
Input termianl 1 for current of phase C
Input termianl 1 for current of phase B
Input termianl 1 for current of phase A
Phase C voltage input (the phase-voltage is transformed)
Common torminal for voltage input

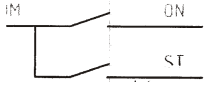
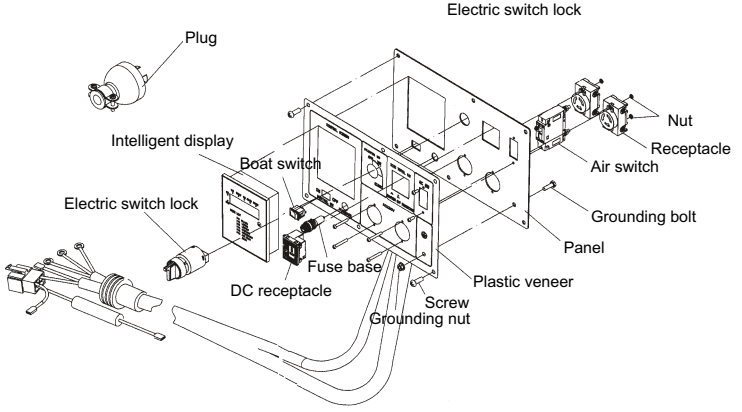


Diagram of starting motor fuel oil control

Both pin of common terminal starting motor to be connected



(Fig.) Intelligent control panel

5.1 Setting

(1) Press and hold down key "FUN", turn the electric switch lock from OFF to ON. After 5 seconds enter the setting program.

(2) According to the number of voltage phases and the table below select corresponding toggle switch.

	Display	Toggle switch DIP4	Toggle switch DIP5	Toggle switch DIP4 Left Right	Toggle switch DIP5 Left Right	Meaning
Phase number setting	PH-1	ON	ON	ON ■□ OFF	OFF ■□ ON	Single phase single voltage output
	PH-2	ON	OFF	ON □■ OFF	OFF ■□ ON	Double voltage selected output
	PH=2	ON	OFF	ON ■□ OFF	OFF □■ ON	Double voltage selected output
	PH-23	OFF	OFF	ON □■ OFF	OFF □■ ON	Three-phase output

(3) Press key "FUN" to enter frequency setting. According to the frequency of output voltage and table below select corresponding toggle switch.

	Display	Toggle switch DIPI	Toggle switch DIPI	Meaning
Frequency setting	F-60	ON	Left ■□ Right	Frequency of output voltage is 60 Hz
	F-50	OFF	Left □■ Right	Frequency of output voltage is 50 Hz

(4) Press key "FUN" to enter voltage setting. According to the output voltage and table below select corresponding toggle switch.

	Display	Toggle switch DIP2	Toggle switch DIP3	Toggle switch DIP2 Left Right	Toggle switch DIP3 Left Right	Meaning
Voltage setting	U-120	OFF	OFF	ON □■ OFF	ON □■ OFF	Output voltage 120
	U-115	ON	OFF	ON ■□ OFF	ON □■ OFF	Output voltage 115
	U-240	OFF	ON	ON □■ OFF	ON ■□ OFF	Output voltage 240
	U-230	ON	ON	ON ■□ OFF	ON ■□ OFF	Output voltage 230

(5) Press key "FUN" to enter current setting. Display IXXX.X. Regulate the potentiometer I_set to vary displayed value. Clockwise to decrease and counterclockwise to increase. The minimum variation is 0.3. Set the current value to rated current..

(6) After setting:

a. Start generating set directly. At this point the protection function for electrical parameter is revoked.

b. Turn the electric switch lock from ON to OFF, then restart generating set.

(7) Press and hold down key "FUN", Turn the electric switch lock from OFF to ON. After 5 seconds enter setting program. Start generating set. The protection function for electrical parameters will be revoked

(8) Charge and checkout the toggle switches as table below

Type of engine	DIP1(three positions)	DIP2(three positions)	DIP3(three positions)	Remark (three position toggle switch)
5KW diesel	OFF	ON	ON	According to the voltage of flywheel generator

Warning: Do not adjust this switch. It is adjusted in factory. The user and maintenance person should not vary the settings.

5.2 Checks

Starting check

(1) Turn the electric switch lock from OFF to ON. The rated current of generating set output is displayed in display window. After 0.1-0.5 seconds the output voltage will displayed (at this point the voltage is zero).

(2) Turn the electric switch lock from ON to ST. "STArt" will displayed in display window. The starting motor drive the engine to start.

Display of electrical parameters

(1) After starting of generating set the voltage indicating lamp will on. The output voltage is displayed in display window. According to different phase number of output the voltage will be displayed as follows:

Phase number	Display
Single phase single voltage	Display output voltage
Double voltage selected output	Display actual output voltage according to various selection
Double voltage simult-aneous output	Display "AXXX.X", in which the XXX.X is voltage value, display the high voltage value of output. Press key FUN to display "bXXX.X", in which the XXX.X is voltage value, display a lower voltage value of output. Press key FUN to display "CXXX>X", in which the XXX.X is voltage value, display another lower voltage value of output.
Three-phase output	Display "AbXXX", in which the XXX is voltage value, display voltage value of line AB. Press key FUN to display"bCXXX", in which the XXX is voltage value, display the voltage value of line BC. Press key FUN to display "CAXXX", in which the XXX is voltage value, display the voltage value of line CA

Press key FUN, the current (power) indicating lamp will on. The output current (power) is displayed in display window. According to different phase number of output display current (power) as follows:

Phase number	Display
Single phase single voltage	Display power (VA)
Double voltage selected output	Display power (VA)
Double voltage simultaneous output	Display power (VA)
Three-phase output	Display "AXXX.X", in which the XXX.X is current value, display the current value of phase A. Press key FUN to display "bXXX.X", in which the XXX.X is current value, display the current value of phase B. Press key FUN to display "CXXX.X", in which the XXX.X is current value, display the current value of phase C.

(3)Press key FUN, the frequency indicating lamp will on, the output frequency is displayed in display window.
(4)Press key FUN, the running indicating lamp will on, the accumulated running time (hrs) is displayed in display window.
(5)Press key FUN, the battery indicating lamp will on, the voltage of battery is displayed in display window..
(6)Press key FUN, the voltage is displayed in display window.

Display electrical parameters in turn

(1)Enter in-turn display

After starting of generating set, press and hold down the key FUN for 2 seconds. The electrical parameters will be in turn displayed in display window in following sequence:

Voltage------Current(power)------Frequency------Running time------Voltage of battery--- Voltage

(2) Exit in-turn display

In in-turn display condition press and hold down FUN for 2 seconds to exit in-turn display.

Stopping

Turn the electric switch lock from ON to OFF to stop the generating set.

5.3 Maintenance

Fault code display and actions to be taken (factory default)

Code display	Meaning	Action to be taken	Remark
P-01	Insufficient engine oil pressure. Sustain for 5 seconds, then stop	1.Check engine oil 2.Check fuel oil 3.Check engine oil sensor 4.Check oil line for air 5.Check connecting wire	
P-02	Frequency exceeds 55 Hz or 65 Hz. Sustain for 5 seconds, then stop	1.Check oil line for air 2.Check fuel oil 3.Check engine governor 4. Check frequency of generator output voltage	
P-03	Output voltage exceeds 110% of rated voltage. Sustain for 3 seconds, then stop	1.Check generator output voltage 2.Check AVR 3.Check generator carbon brush 4.Check generator sampling winding 5.Check transformer unit 6.Check fuel oil 7.Check oil line for air	
P-04	Overloading: Load exceeds 110% of rating, sustain for 60 seconds, then stop; load exceeds rating but less than 110% of rating, sustain for 60 min. then stop	1.Check load for overloading 2.Check output circuit for short circuit 3.Check generator 4.Check current transformer 5.Check oil line for air	
P-05	Charging fault	1.Check battery 2.Check charger 3. Check charging generator (flywheel generator) 4.Check fuel oil 5.Check oil line for air	

Fault code display and actions to be taken (default for 5 KW special requirement in North America)

Code display	Meaning	Action to be taken	Remark
P-01	Insufficient engine oil pressure. Sustain for 5 seconds, then stop	6.Check engine oil 7.Check fuel oil 8.Check engine oil sensor 9.Check oil line for air 10.Check connecting wire	
P-02	Frequency≥65 Hz. Sustain for 3 seconds, then stop. Frequency ≤57 Hz Sustain for 20 seconds, then stop.	5.Check oil line for air 6.Check fuel oil 7.Check engine governor 8. Check frequency of generator output voltage	
P-03	Voltage ≥132V (264V), Sustain for 3 seconds, then stop. Voltage≤105V (210V), Sustain for 20 seconds, then stop	8.Check generator output voltage 9.Check AVR 10.Check generator carbon brush 11Check generator sampling winding 12.Check transformer unit 13.Check fuel oil 14.Check oil line for air	
P-04	Overloading: Load exceeds rated 21.2A, sustain for 60 seconds, then stop. Load exceeds rating, in 19.2A-21.2A, sustain for 60 min. then stop	6.Check load for overloading 7.Check output circuit for short circuit 8.Check generator 9.Check current transformer 10.Check oil line for air	
P-05	Charging fault, display without protection	6.Check battery 7.Check charger 8. Check charging generator (flywheel generator) 9.Check fuel oil 10.Check oil line for air	

Note:

(1) At protection of generating set the protected object and protection code are displayed alternately in display window.

(2) When protection stopping happens, you can press key FUN to inquire the parameters before protection.

(3) Do not remove battery during generating set running, otherwise the electrical device may be damaged.

(4) When stopping happens due to burn-out of fuel oil, the protection of P-01, P-02, P-03, P-04, P-05 will happen because of air in oil line. The air would be discharged completely after several times of restarting. If necessary, the oil line should be treated with air-bleeding for normal running of generating set. After starting the generating set may run unstably. Run generating set without load for 5 min., then the generating set will resume to normal running.

(5) When start with insufficient electricity of battery, the display screen may be abnormal and the generating set will not start. Charge the battery or replace with a new battery.

(6) The DIP switches on panel are set in factory. Do not vary the settings by unprofessional person. If varied, the panel would not work abnormally.

5.4 Parameter setting list

Item	Display	Toggle switch	Meaning	Remark
Phase number setting	□ PH-1	DIP4 ON, DIP5 ON	Single phase single voltage output	
	□ PH-2	DIP4 OFF, DIP5 ON	Double voltage selected output	
	□ PH-2	DIP4 ON, DIP5 OFF	Double voltage simultaneous output	
	□ PH-3	DIP4 OFF, DIP5 OFF	Three-phase output	
Frequency	□ F-60	DIP1 ON	Output frequency 60 Hz	
	□ F-50	DIP1 OFF	Output frequency 50 Hz	
Output voltage	□ U-115	DIP2 ON, DIP3 OFF	Output voltage 115V	
	□ U-120	DIP2 OFF, DIP3 OFF	Output voltage 120V	
	□ U-230	DIP2 ON, DIP3 ON	Output voltage 230V	
	□ U-240	DIP2 OFF, DIP3 ON	Output voltage 240V	
Rated current	I____		Rated current	

5.5 Diagram of Switch Position for Address Setting