



ENERJİ OTOMASYON ve GÜÇ SİSTEMLERİ

## MAINTENANCE AND USAGE MANUAL

THE INFORMATION CONTAINED IN THIS MANUAL MAY NOT INCLUDE ALL INFORMATION ABOUT YOUR GENERATOR.

ERK POWER OTOMASYON ENERJİ VE GÜÇ SİSTEMLERİ SANAYİ TİC. LTD. ŞTİ. IT HAS THE RIGHT TO MAKE CHANGES TO IMPROVE THE PRODUCT QUALITY.

#### **USER OF DEAR ERK POWER GENERATOR SET**

THANK YOU FOR CHOOSING THE ERK POWER GENERATOR, WE WISH YOUR WORK IS NOT HALF-DOWN.

ERK POWER GENERATOR MANUFACTURES WITH ISO 9001: 2000 QUALITY MANAGEMENT SYSTEM IN CONFORMITY TO CE NORMS AND WITH ITS ISO 14001: 2004 ENVIRONMENTAL MANAGEMENT SYSTEM.

OUR GENERATORS HAVE REACHED TO YOU, OUR USERS, BY EXECUTING A RIGHT QUALITY CONTROL AND TESTS AT EVERY STAGE OF PRODUCTION. WE ARE WORKING TO CONTINUOUSLY IMPROVE OUR PRODUCT AND OFFER BETTER SERVICE TO YOU WITH ITS EXPERT STAFF AND MODERN FACILITIES.

WE ASK YOU TO READ THE USER'S MANUAL CAREFULLY AND HAVE THE GENERATOR SET INSTALLED BY OUR AUTHORIZED SERVICES TO PREVENT ANYTHING HALF-UP.

THIS USE AND MAINTENANCE MANUAL IS MADE TO HELP THE USER EASILY USE AND MAINTAIN THE GENERATOR. IT IS NOT THE BOOK OF THE REPAIR.

YOUR GENERATOR IS WARRANTED WITHIN 2 (TWO) YEARS OR 1000 WORKING HOURS, INCLUDING THE CONDITIONS SPECIFIED IN THE WARRANTY CERTIFICATE, INCLUDING THE USE ACCORDING TO THE ISSUES STATED IN THE USE AND MAINTENANCE BOOKS. REPAIR AND PART REPLACEMENTS ARISING FROM ANY MODIFICATION OR USE OF NON-ORIGINAL PARTS ON THE GENERATOR WITHOUT THE APPROVAL OF THE MANUFACTURER ARE EXCLUDED FROM THE WARRANTY.

IN ORDER TO TAKE MORE EFFICIENT BENEFIT FROM YOUR GENERATOR, WE SUGGEST YOU TO MAKE A PERIODIC MAINTENANCE AGREEMENT WITH OUR AUTHORIZED SERVICES THAT OFFER UNINTERRUPTED SERVICE FOR 7 DAYS / 24 HOURS.

FOR THE SAFETY OF THE LIFE OF YOU AND YOUR ENVIRONMENT, WE STRONGLY ASK YOU TO FOLLOW THE ATTENTION AND WARNING SIGNS ON THE GENERATOR SET AND TAKE THE SAFETY PRECAUTIONS MENTIONED IN THIS MANUAL.

**ERK POWER OTOMASYON ENERJİ VE GÜÇ SİSTEMLERİ SANAYİ TİC. LTD. ŞTİ.**

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**CHAPTER 1: SAFETY PRECAUTIONS**

**1.1. LOGIN**

THE PRODUCTION OF OUR COMPANY ARE DESIGNED AND DESIGNED WITH THE SECURITY OF ALL KINDS OF GOODS AND LIFE IN THE FOREFORE. IT SHOULD BE INSTALLED AND USED IN ACCORDANCE WITH THE INSTALLATION, MAINTENANCE AND OPERATION RULES SET FORTH IN THIS CATALOG, BOTH TO USE THE GENERATOR IN A LONG-TERM ECONOMIC AND TO ENSURE SAFETY OF LIFE AND GOODS. THE REQUIRED SAFETY MEASURES SHOULD BE TAKEN IN ADVANCE IN INSTALLATION, USE AND MAINTENANCE. SAFE OPERATION RESPONSIBILITY OF THE GENERATOR SET IS RESPONSIBLE TO THE USER AND MAINTENANCE. IF THE INSTRUCTIONS, METHODS AND SAFETY RULES IN THIS BOOK ARE FOLLOWED, THE PROBABILITY OF ACCIDENT WILL REDUCE. OTHERWISE, UNEXPECTED FAILURES AND ACCIDENTS THAT CAN RESULT IN DEATH WILL OCCUR. TO PREVENT THESE, YOU HAVE YOUR GENERATOR USED AND MAINTAINED BY TRAINED OR AUTHORIZED PEOPLE.

PLAN THE PARTS, MACHINE, MOTOR ON YOU WORK IN A WAY TO REACH EACH POINT COMFORTABLE. TAKE PRELIMINARY SAFETY PRECAUTIONS FOR HOW TO CONTROL THE ENGINE TO AVOID EXPOSURE TO SITUATIONS SUCH AS CASHING FROM THE ROTATING PARTS, BURNING AND SHARPED CUTS. MAKE SURE THAT THE HOUSINGS OF THE TURBO COMPRESSOR DRIVE SHAFT, PUMP SHAFT, FAN BELTS AND BLADES ARE IN PLACE OF THE ENGINE PARTS.

DO NOT OPERATE YOUR GENERATOR IF IT IS DEFECTIVE OR NOT SAFE. ALWAYS INSULATE THE BATTERY NEGATIVE (-) BY DISCHARGING THE POLE HEAD FROM THE BATTERY. ATTENTION TO PEOPLE BY HANGING A WARNING / WARNING PLATE ON OR AROUND THE ENGINE.

NEVER REPAIR OR MAINTENANCE WHILE THE GENERATOR SET IS OPERATING. TURN THE GENERATOR OFF AND TAKE ALL SAFETY PRECAUTIONS BEFORE CARRYING OUT.

DO NOT REPAIR OR MAINTENANCE TO Unauthorized PERSONS THAT WILL CAUSE YOUR GENERATOR DAMAGE AND THEREFORE LAYOUT THE WARRANTY. WE RECOMMEND YOU TO USE OUR AUTHORIZED SERVICES WHICH ARE 24/7 SERVICE FOR THESE WORKS.

## **1.2. LIFTING AND MOVING THE GENERATOR SET**

ATTENTION ! : INCORRECT LIFTING OF THE GENERATOR MAY CAUSE SERIOUS DAMAGE TO PARTS.

USE THE LIFTING POINTS ON THE CHASSIS MADE FOR THIS PURPOSE ON OPEN TYPE GENERATORS.  
(FIG 1.1 PAGE 25)

DO NOT LIFT THE GENERATOR USING THE ALTERNATOR AND MOTOR LIFTING RINGS.

REMOVE FROM THE LIFTING POINTS LOCATED ON THE TOP OF THE CABINET.

(FIG 1.2 PAGE 25)

BEFORE LIFTING THE GENERATOR, CHECK THAT THE LIFTING TOOLS ARE SUITABLE TO LIFT THIS WEIGHT. FOR THIS PURPOSE, YOU CAN FIND THE WEIGHT OF THE GENERATOR FROM THE GROUP LABEL ON THE GENERATOR OR FROM THE GENERATOR SET WEIGHT TABLE. THE CAPACITY OF THE LIFTING VEHICLE SHOULD BE AT LEAST 10% OVER THE WEIGHT OF THE GENERATOR.

ALWAYS USE LOCK-LOCK HOOK OR VALVES FOR LIFTING A CRANE. PLEASE CHECK THE LIFTING VALVES BEFORE LIFTING UP FOR WELDING CRACKS, BREAKS, RUSTED OR WEAR, LOOSE, BENDED BOLTS OR NUTS. LIFTING SHOULD NEVER BE MADE WITH INCOMPATIBLE MAPS.

TO PREVENT AND CONTROL THE GENERATOR FROM TURNING RIGHT OR TO THE LEFT WHEN THE GENERATOR IS CUT FROM THE GROUND DURING THE LIFTING BY THE CRANE.

WHEN THE GENERATOR IS LIFTED IN TRANSPORT WITH FORKLIFT, THE REAR WHEELS MUST NOT BE CUT FROM THE GROUND AND THE FORKLIFT SHOULD BE USED ACCORDING TO THE WEIGHT OF THE GENERATOR. THE GENERATOR CAN BE TOWED OR TOWED USING A FORKLIFT. PREVENT THE FORKLIFT FORK DIRECT CONTACT TO THE GENERATOR CHASSIS WHEN THESE OPERATIONS ARE PERFORMED. FOR THIS, YOU CAN USE STRONG WOODEN WEDGES BETWEEN THE FORKLIFT FORK AND CHASSIS. DO NOT DRAG THE GENERATOR ON THE PLACE WHILE PUSHING AND PULLING. FOR THIS, YOU CAN SLIDE BY PUTTING ROUND IRON OR STEEL PIPES BETWEEN THE CHASSIS AND THE GROUND.

ALL PERSONNEL MUST BE KEPT AWAY FROM AROUND WHEN LIFTING AND MOVING THE GENERATOR. DO NOT ATTEMPT TO LIFT THE GENERATOR IN EXTREME WIND WEATHER.

CHECK CABINET AND CONTAINERED GENERATORS BEFORE LIFTING THERE IS A PERSONNEL INSIDE THE CABIN OR CONTAINER. LOCK THE DOORS AND REMOVE THEN.

MAKE SURE THE SURFACE WHERE THE GENERATOR IS LOWERED IS FLAT, UNCOLVED AND CAPACITY TO CARRY THE WEIGHT OF THE GENERATOR. DO NOT DOWNLOAD THE GENERATOR IN CURVED LOCATIONS WITH MORE THAN 10% AND RISK OF SLIPPING.

### **1.3. FIRE AND EXPLOSION**

FUEL USED IN GENERATORS CAN IGNITE AND EXPLODE. TAKING SUITABLE PRECAUTIONS IN STORAGE OF THESE MATERIALS REDUCES THE RISK OF FIRE AND EXPLOSION. BC AND ABC CLASS FIRE EXTINGUISHERS MUST BE AVAILABLE IN THE GENERATOR ROOM AND THE RELATED PEOPLE SHOULD BE TRAINED.

KEEP THE GENERATOR ROOM AND THE GENERATOR CLEAN. CLEAN IT IMMEDIATELY IN CASE OF FUEL, OIL, COOLANT AND BATTERY ELECTROLYTE SPILLED ON THE FLOOR. DO NOT USE FLAMMABLE CHEMICALS TO WIPE DIRTY SURFACES WITH LIQUID INDUSTRIES.

NEVER USE SPRAYS OR SIMILAR CHEMICALS SUCH AS ETHER TO START A DIESEL ENGINE. START SPRAYS USED MAY EXPLODE IN THE SUCTION MANIFOLD. THAT ALSO CAUSES INJURY. VENT THE GENERATOR ROOM CONTINUOUSLY WITH AIR FLOW.

WHEN INSTALLING OR DISASSEMBLING THE BATTERY POLE HEADS, IF THERE IS A BATTERY CHARGER IN THE SYSTEM FIRST DISCONNECT THE SUPPLY OF THE BATTERY CHARGER.

IN CASE OF MAINTENANCE AND REPAIR, BEFORE ATTACHING THE BATTERY POLE HEAD, ATTACH THE PLUS (+) THEN THE MINUS (-) POLE HEAD. IF DISASSEMBLED, UNLESS STALLED.

DO NOT ALLOW SITUATIONS WHICH MAY SPARK AROUND FUEL AND / OR CAUSE BURNING, SUCH AS SMOKING.

AVOID FUEL SUPPLY WHILE THE GENERATOR IS RUNNING. DO NOT RUN THE GENERATOR IF THERE IS A FUEL LEAK IN THE ENGINE FUEL SYSTEM.

DO NOT ATTEMPT TO REPAIR DAMAGED OR REQUIRING FUEL TANKS ON THE GENERATOR SET AND / OR INSIDE THE GENERATOR ROOM BY WELDING OR SIMILAR WAYS. REPLACE IT WITH NEW.

STORE USED OIL AND FUEL EXTRACTION CLOTHES, OIL AND FUEL FILTERS IN A SAFE PLACE. IN SOME ENVIRONMENTS, OIL-FUEL ABSORBED CLOTHES OR SUPPLIES MAY BE FIRED BY ITSELF.

DO NOT ALLOW SITUATIONS WHERE A BARE FLAME TYPE OR ELECTRIC ARC OCCUR BY THE BATTERIES. BECAUSE HYDROGEN GAS IS HIGHLY FLAMMABLE AND FLAMMABLE WHEN CHARGING FROM BATTERIES, IT MAY CAUSE SERIOUS INJURY. NEVER REMOVE THE POLE HEADS WHILE THE ENGINE IS STARTING AND IS RUNNING. DO NOT HIT OR BEND IT ON.

DO NOT PUT FLAMMABLE OR FLAMMABLE MATERIALS IN THE EXHAUST MANIFOLD AND NEAR THE PIPES.

DO NOT OPERATE THE GENERATOR IN DANGEROUS AREAS WITH EXPLOSIVE AND FLAMMABLE CHEMICALS.

IN GENERATORS THAT WILL BE OPERATED IN FOREST AREAS, ABSOLUTE INSTALL A SPARK HOLDER AT THE EXHAUST PIPE OUTLET. PREVENT LEAVES AND BRANCHES CONTACT THE EXHAUST PIPE.

PROVIDE SUFFICIENT FILLED FIRE TUBES AT THE SIDE OF THE GENERATOR.

#### **1.4. MOVING PARTS AND IRRITATING MATERIALS**

AS A GENERAL MAINTENANCE RULE; DURING MAINTENANCE, THE DIESEL ENGINE MUST BE IN STOP OR ON ITS GUARDS. EXCEPTIONAL MAINTENANCE AND ADJUSTMENTS DO NOT OPERATE THE ENGINES WHERE THE GUARDS ARE REMOVED. APPROACH TO A WORKING ENGINE IS A SAFETY RISK. REMEMBER THAT WIDE AND LOOSE DRESSES AND LONG HAIR WILL TREAD ON ROTATING PARTS AND CAUSE SERIOUS ACCIDENTS. DROPPING MATERIAL LIKE TOOLS AS A RESULT OF IN CARE TO THE OPERATING MOTOR IN CLOSE CONTACT WITH THE ENGINE CAUSES SERIOUS INJURY. DO NOT TOUCH THE ENGINE EXHAUST SYSTEM, TURBO CHARGER COMPRESSED AIR PIPES, HOT OIL, WATER AND A NEW STOPPED ENGINE TO PREVENT BURNING. BEFORE STARTING THE ENGINE, REPLACE THE MATERIAL FOR SAFETY AND PROTECTION THAT HAS BEEN REMOVED DURING THE SERVICE.

NEVER RUN THE ENGINE WITH THE AIR FILTER REMOVED. A RUNNING ENGINE TURBO CHARGER WILL CAUSE SERIOUS PERSONNEL INJURY AND DAMAGE TO THE TURBINE.

AVOID CONTACT THE FUELS, OILS, COOLING LIQUIDS AND BATTERY ELECTRIC USED IN THE ENGINE WITH THE BODY. WEAR GLOVES AND OIL-PROOF CLOTHES WHEN Dealing With These Jobs. OILS, SPECIALLY USED OILS MAY IRRITATE THE SKIN AND CAUSE EXERCISE. AFTER OIL CONTACT THE SKIN, WASH WELL AND USE PROTECTIVE CREAMS. ALWAYS WEAR FACIAL MASK AND ACID RESISTANT CLOTHING WHEN HANDLING WITH THE BATTERY.

DO NOT OPEN THE RADIATOR COVER OR TAPES WHEN THE ENGINE IS HOT. STEAM OR HOT WATER SPRAYS AROUND AND SYSTEM PRESSURE LOSSES. LET THE PRESSURE RELEASE BY SLOWLY OPENING THE RADIATOR COVER. SAFE YOURSELF WHEN OPENING, CONSIDERING WHAT STEAM OR SPLASH WILL GO.

HOT OILS CAUSE BURNS. DO NOT TOUCH HOT OIL, YOUR SKIN CAN BURN. WHEN WORKING ON THE LUBRICATION SYSTEM, BE SURE THAT THERE IS NO PRESSURE BEFORE WORKING. NEVER RUN THE ENGINE WITH THE ENGINE OIL FILTER COVER REMOVED. OIL MAY SPRAY.

## **EXHAUST GASES**

INHALATION OF EXHAUST GASES IS POISONING AND HAZARDOUS TO HUMAN HEALTH. OPERATE THE GENERATOR OUTDOOR OR IN ENVIRONMENT WITH GOOD AIR CIRCULATION.

MAKE SURE THE EXHAUST GAS OUTPUT POINTS DO NOT DELIVER TO HUMANIZED AREAS OR NEAR THE AIR SUCTION DUCTS.

DO NOT RUN THE GENERATOR IN THE EXHAUST SYSTEM WITH A GAS LEAKAGE.

## **1.6. NOISE**

THE NOISE LEVEL IS 100 DBA MORE THAN UNCABINETED TYPE GENERATORS. LONG-TERM EXPOSURE TO THIS NOISE CAN NEGATIVE HUMAN HEALTH AND LOSS OF HEARING.

IF A LONG TIME IS WAITED BY THE GENERATOR, THE HEADPHONE MUST BE ATTACHED. FOR MORE INFORMATION, EXAMINE SECTION 4.13.

## **1.7. ELECTRICITY**

CONNECT THE ELECTRICAL CONNECTIONS OF YOUR GENERATOR TO LICENSED ELECTRICIANS OR TECHNICAL SERVICES.

EARTH THE GENERATOR, INCLUDING THE TRAILER GENERATORS, AND MEASURE THE EARTHING RESISTANCE TO SEE THAT THE GROUNDING IS ENOUGH.

DO NOT START THE GENERATOR ON WET AND WET FLOORS. IF THE GROUND IS WET WET IN THE AREA WHERE THE GENERATOR IS INSTALLED, MAKE THE ELECTRICAL CONNECTIONS BY REMOVING IT ON THE WOODEN OR SIMILAR ISOLATED MATERIALS.

STAY AWAY FROM CABLES OR TERMINALS THAT HAVE ELECTRIC CURRENT. PREVENT TERMINALS CONTACT BODY.

WHEN DISCONNECTING THE LOAD CONNECTION OF THE GENERATOR, STOP THE ENGINE AND DISCONNECT THE BATTERY NEGATIVE POLE HEAD FROM THE BATTERY.

CLOSE THE TERMINAL CONNECTION COVERS BEFORE OPERATING THE GENERATOR AFTER THE LOAD IS CONNECTED.

CONNECT THE GENERATOR TO SUITABLE LOADS AND ELECTRIC SYSTEM ACCORDING TO ITS POWER AND LOAD CHARACTERISTICS.

KEEP ALL ELECTRICAL EQUIPMENT DRY AND CLEAN BY PROTECTING them from MOISTURE. REPAIR CARBONIZED COLORED AND WEARED CONNECTION HARDWARE.

INSULATE THE ENDS OF ALL CONNECTIONS AND IDLE CABLES. SEP OUT FROM LIVE LINES.

WHEN CONNECTING THE GENERATOR TO THE LOAD, MAKE CONNECTIONS ACCORDING TO THE PUBLISHED INTERNAL INSTALLATION REGULATION AND STANDARDS.

#### GENERATOR SET AND PARTS

ERK POWER GENERATORS ARE MANUFACTURED BY USING DIESEL ENGINES AND ALTERNATORS THAT HAVE ACCEPTED WORLDWIDE IN INTERNATIONAL STANDARDS.

EVERY GENERATOR HAS A GROUP LABEL. THIS GROUP LABEL HAS THE SERIAL NUMBER, FEATURES, WEIGHTS AND DATE OF MANUFACTURING OF THE GENERATOR. USE THIS SERIAL NUMBER FOR SPARE PARTS, FAILURE REQUESTS, INTERVIEWS AND REQUESTS.

MAIN PARTS OF THE GENERATOR SET ARE SHOWN IN FIGURE 1.3 PAGE 25.

### **2.1. DIESEL ENGINE**

INDUSTRIAL TYPE DIESEL ENGINES MANUFACTURED AND ACCEPTED WORLDWIDE FOR GENERATORS COMPLYING WITH ISO 8528, ISO 3046 STANDARDS.

4 STROKE MECHANICAL AND ELECTRONIC GOVERNOR MOTORS ALSO MANUFACTURED WITH THE LATEST TECHNOLOGY, ELECTRONIC CONTROL MODULES (EDC, EMS SERIES) ENGINES WITH PRECISION SPEED REGULATION, LOW FUEL CONSUMPTION AND WATER COOLED.



THE MANUFACTURER USES THE ORIGINAL HARDWARE INSTALLED BY THE COMPANY IN ALL ENGINES THAT ERK POWER GENERATOR USES. NO LATER IS ADDED TO ANY ENGINE AFTER PARTS. THEREFORE, MAXIMUM PERFORMANCE IS PROVIDED IN ENGINES. THE ENGINES USED ARE DESIGNED FOR HEAVY OPERATING CONDITIONS AND EQUIPPED WITH REPLACABLE FILTERS. ALL THE HARDWARE TO ENSURE THE SAFETY OPERATION OF THE DIESEL ENGINE ARE GIVEN TOGETHER WITH THE GENERATOR.

DIESEL ENGINE ELECTRIC SYSTEM NEGATIVE CHASSIS 12 OR 24 D.C. DIR. THIS SYSTEM CONSISTS OF STARTER MOTOR, BATTERY CHARGER ALTERNATOR AND BATTERY GROUP. DEPENDING ON THE OPERATING VOLTAGE, ONE OR TWO LEAD-CALCIUM ACID MAINTENANCE-FREE BATTERIES ARE GIVEN TOGETHER WITH THE GENERATOR SET.

DETAILED INFORMATION ABOUT BATTERIES IS GIVEN IN THE ADVANCED SECTIONS.

THE DIESEL ENGINE COOLING SYSTEM MUST BE WATER COOLED. THE COOLING SYSTEM CONSISTS OF A RADIATOR, A RADIATOR COOLING BEAM, A CIRCULATION PUMP AND THERMOSTAT.

DETAILED INFORMATION ABOUT MOTORS WITH ELECTRONIC CONTROL MODULE IS GIVEN IN LARGE IN THE ADVANCED SECTIONS. ALSO, USING ORIGINAL ENGINES WITH GENERATOR AND MAINTENANCE-REPAIR BOOKS ARE PROVIDED. YOU CAN FIND MORE INFORMATION IN THESE BOOKS.

## **ALTERNATOR**

ERK POWER GENERATOR IN GENERATOR SETS CEI EN 60034-1; VDE 0530; BS 4999-5000; NEMA MG1.22; NF 51-100,111; IT USES ALTERNATORS MADE ACCORDING TO OVE M-10 STANDARDS AND CE NORMS.

ALTERNATORS ARE HIGHLY EFFICIENT WITH MAINTENANCE-FREE BEDDING SYSTEM, IP-23 PROTECTION STANDARD, INSIDE COOLING, BRUSHLESS SELF-WARNING, PRECISION REGULATION, LOW HARMONIC DISTORTION. IT IS DESIGNED TO WORK SMOOTHLY FOR A LONG TIME.

## **2.3. FUEL TANK AND CHASSIS**

THE FUEL TANK IN GENERATORS WITH 1000 KVA AND BELOW IS DESIGNED IN THE MAIN CHASSIS. WHEN THIS POWER IS LARGER THAN THE FUEL TANKS ARE GIVEN BY THE GENERATOR AS EXTERNAL TYPE. TANK CAP TO PROVIDE FUEL FILLING AND TANK AIR CIRCULATION, SUCTION AND RETURN FUEL CONNECTIONS, MECHANICAL FUEL LEVEL INDICATOR, DISCHARGE TAP TO RECOVER WATER AND DISCHARGE THE FUEL. THE CHASSIS IS PRODUCED FROM ST 37-3 STEEL SHEET WITH HIGH STRENGTH BY MAKING STERS ACCOUNT.

## **2.4. VIBRATION WEDGE**

VIBRATION WEDGES ARE USED TO REDUCE THE VIBRATION OF THE MOTOR AND TO PREVENT THE VIBRATION THROUGH THE GROUND. VIBRATION WEDGES ARE SELECTED ACCORDING TO THE WEIGHT OF THE MACHINE AND EXPANSION CALCULATIONS AND THE MOTOR IS PLACED BETWEEN THE ALTERNATOR CONNECTION LEGS AND THE CHASSIS. IN SOME OF OUR MODELS THE ENGINE MANUFACTURING COMPANIES 'INSTRUCTIONS ARE IN LINE WITH THE MOTOR AND ALTERNATOR CONNECTED TO THE CHASSIS AS RIGID AND THE VIBRATION WEDGES ARE PLACED BETWEEN THE CHASSIS AND GROUND.

## **2.5. CONTROL AND TRANSFER PANEL**

AUTOMATIC, MANUAL, BACKUP, DUAL AND SYNCHRONIZATION PANELS ARE AVAILABLE TO OPERATE THE GENERATOR SAFELY FOR THE PURPOSE AND PROTECT THE ENGINE AND ALTERNATOR.

IN AUTOMATIC GENERATORS, TRANSFER OPERATION IS DONE WITH EXTERNAL TRANSFER PANEL.

MANUAL GENERATORS HAVE A THERMAL MAGNETIC SWITCH TO COMMISSIONING THE ENGINE WITHOUT HEATING AND PROTECTION OF THE ALTERNATOR.

MORE DETAILED INFORMATION IS GIVEN IN SECTION 5.

## **2.6. SILENCER AND EXHAUST SYSTEM**

SILENCER AND EXHAUST SYSTEM REDUCE THE NOISE FROM THE ENGINE AND PROVIDES SAFE GAS OUTPUT.

ALSO WITH AN OPEN TYPE GENERATOR, THE EXHAUST MUFFLER IS SUPPLIED FOR INSTALLATION. IN CABINET TYPE GENERATORS, THE SILENCER IS FITTED IN THE CABINET.

MORE DETAILED INFORMATION IS GIVEN IN SECTION 4.6.

## **CHAPTER 3: ROOM SIZING AND SETUP**

### **3.1. LOGIN**

FOR HEALTHY AND SAFE OPERATION OF THE GENERATOR SET, THE PLACE WHERE THE GENERATOR WILL BE INSTALLED IS THE MOST IMPORTANT STAGE OF THE INSTALLATION PROCESS. TO MAKE A SAFE INSTALLATION, TAKE AND APPLY THE SAFETY MEASURES MENTIONED IN SECTION ONE.

INSTALL THE GENERATOR SET ON PLACES TO PROTECT IT AGAINST RAIN, SNOW, FILLED, FLOOD WATER, EXCESSIVE MOISTURE, DIRECT SUNLIGHT, EXCESSIVE COLD OR HOT.

THE GENERATOR SET IS INSTALLED ON LOCATIONS THAT CAN PROTECT HAZARDOUS MATERIALS THAT WOULD BE ABRASIVE AND HAZARDOUS MATERIALS SUCH AS CONDUCTIVE EXHAUST FUME, STEAM, OIL VAPOR, DUST, TIFTIC, YARN.

THE ROOM ENTRANCE SHOULD BE ENABLED TO BE LARGE THAT NO PROBLEM TO ENTER THE GENERATOR INTO INSTALLATION AND TO BE TAKEN OUT IF NECESSARY.

EQUIPMENT THE GENERATOR ROOM WITH SUFFICIENT LIGHTING AND SOCKETS.

IF THE GENERATOR IS TO BE INSTALLED OUTSIDE THE BUILDING, IT MUST BE PLACED IN A CABINET, CONTAINER OR IN THE ROOM. CABINET CAN BE SELECTED AS SOUND INSULATION OR PROTECTION CABINET.

TO REDUCE THE MECHANICAL AND EXHAUST NOISE FROM THE ENGINE AND ALTERNATOR, SOUND-DOWN PANELS CAN BE USED IN THE ENVIRONMENTS CLOSE TO THE RESIDENCES.

DO NOT INSTALL THE GENERATOR SET IN AREAS THAT MAY BE DANGER.

INSTALL THE FIRE EXTINGUISHING DEVICE IN A COMFORTABLE PLACE WHICH IS COMFORTABLE AND CAN EASILY TAKE UP AND FIGHT FIRE.

. PLATFORM AND GROUND

SPECIAL PEDESTAL CONCRETE IS NOT REQUIRED. A FLAT GROUND IS ENOUGH TO CARRY ITS WET WEIGHT OF THE GENERATOR.

CONICAL WEDGES WITH VACUUM TO BE PLACED BETWEEN THE GENERATOR CHASSIS AND THE GROUND AND ABSORBING THE VIBRATIONS IN THE GENERATOR AND REDUCE THE TRANSMISSION TO THE GROUND ARE DELIVERED TOGETHER WITH THE GENERATOR AS A STANDARD. INSTALL THESE VIBRATION WEDGES WHILE PLACING THE GENERATOR ON THE GROUND.

IT IS RECOMMENDED THAT THE GENERATOR SET IS UPGRADED FROM THE GROUND AT RISK OF WATER OR HUMID FLOOR SUCH AS HEATING BOILER ROOM. FOR THIS, THE PLATFORM TO BE BUILT SHOULD BE SUITABLE TO THE GENERATOR SIZE AND 300 MM HIGHER FROM THE GROUND. IN THIS WAY, A DRY GROUND WILL BE PROVIDED IN SAFE OPERATION AND MAINTENANCE OF THE GENERATOR.

TO MAKE CONCRETE Plinth, THE WET WEIGHT AND LENGTH OF THE GENERATOR MUST BE KNOWN. CARRYING POWER OF PEDESTAL CONCRETE SHOULD BE STRENGTHENED WITH MESH IRONS TO BE PLACED IN CONCRETE. CONCRETE DEPTH IS CALCULATED WITH THE FOLLOWING FORMULA

$$FD = \frac{W}{D \times B \times L}$$

FD: BASIC DEPTH (M)

W: WET WEIGHT OF GENERATOR (KG)

D: CONCRETE DENSITY (KG / M<sup>3</sup>)

B: BASE WIDTH (M)

L: BASIC LENGTH (M)

NOTE: FOR THE BASIC WIDTH AND LENGTH IS 300 MM WIDE FROM THE GENERATOR SIZE.

ATTENTION! : IMMEDIATE OR POOR PEDESTAL CONCRETE MAY CAUSE UNWANTED VIBRATIONS.

IF THE GENERATOR IS TO BE PLACED ON THE ROOF OF THE BUILDING, SPECIAL ATTENTION IS REQUIRED TO THE VIBRATION INSULATION. IN SUCH CASES, WE RECOMMEND THE USE OF AUGER SPRING TYPE VIBRATION ISOLATORS. FOR MORE INFORMATION, WE SUGGEST YOU TO CONTACT OUR COMPANY.

#### **GENERATOR ROOM VENTILATION**

THE MAIN PRINCIPLE IS TO DISPOSE THE HOT AIR PRODUCED IN THE ROOM BY GENERATOR GROUPS WITH INTEGRATED MOTOR INTEGRATED RADIATOR AT A MINIMUM LEVEL AND ENSURES CIRCULATION BY DRINKING NECESSARY ENVIRONMENTAL AIR.

AS SHOWN IN FIGURE 1-4, PAGE 26, THE GENERATOR GROUP SHOULD BE INSTALLED PROPERLY, TAKING INTO CONSIDERATION OF THE DISTANCE FROM THE WALLS. THE PURPOSE IS TO DRAW THE COOL AIR FROM THE LOWEST POSSIBLE SECTION OF THE GENERATOR ROOM WALL AND PUSH IT TOWARDS THE RADIATOR AND THEN THEN IT IS THROUGHOUT THE GENERATOR ROOM.

IF THE RADIATOR IS INSTALLED TOO CLOSE TO THE WALL IN AN IMPOSSIBLE STYLE, SOME OF THE HOT AIR TO BE DISPOSED WILL BE REFLECTED INTO THE ROOM AND IT WILL BE DISPOSED BY THE RADIATOR AGAIN. THIS SITUATION CAUSES EXCESSIVE MOVEMENT AS A RESULT OF INSUFFICIENT COOLING CIRCULATION. RADIATOR SHOOTING SIDE WALL WINDOW COOLING SHOULD BE 25% WIDER THAN RADIATOR SURFACE AREA AND SUITABLE FOR RADIATOR CONSTRUCTION SHAPE.

HOOD SHOULD BE MADE BETWEEN THE RADIATOR FLANGE AND THE WALL BY USING SHEET METAL FLEXIBLE MATERIAL THAT IS NON-AIRPROOF. FLEXIBLE HOOD IS ESPECIALLY REQUIRED WHEN MOUNTED ON VACUUM WEDGES ON THE GROUND OF THE GENERATOR.

ONCE THE RADIATOR SUCTION SIDE WINDOW MUST BE 25% WIDER THAN THE COOLING RADIATOR SURFACE AREA AND SUITABLE TO THE RADIATOR CONSTRUCTION SHAPE.

A GOOD EXAMPLE SHOWING THAT IS FIGURE-1.5 AS SEEN ON PAGE 26. RADIATOR FRONT CONNECTION AREA IS 1.44 M<sup>2</sup>, THE AIR OUTLET / INLET CLEARANCE IS 1.80 M<sup>2</sup> IF THE AREA REQUIRED TO BE ON THE WALL.

IF THE GRILL IS INSTALLED, THE SPACE SHOULD BE INCREASED TO 2.25 M<sup>2</sup>.

WINDOWS SHOULD BE SHUTTERED TO PROTECT THE AIR CLEARANCES. THESE MAY BE FIXED OR MOVABLE TYPE. MOVING TYPES AUTOMATICALLY CAN BE AUTOMATED THAT WILL TURN ON WHEN THE GENERATOR IS OPERATED AND SHUT OFF WHEN THE GENERATOR IS OFF. MOVABLE SHUTTERS ARE SUITABLE FOR MANUAL GENERATORS. SHOULD NEVER BE USED ON AUTOMATIC GENERATORS.

NECESSARY COOLING AIR IS PROVIDED FOR THE ALTERNATOR BY WITHDRAWING SUCTION AIR THROUGH THE ALTERNATOR. THUS, THE AIR FILTER COMES TO THE SUCTION AND THE ENGINE. THEN THE TEMPERATURE FROM THE RADIATOR IS DISCHARGED FROM THE WINDOW TO THE ATMOSPHERE BY BEING SUCKED BY THE FAN AND THROUGH THE RADIATOR THAT IS BLOWED ON THE RADIATOR.

SOMETIMES IT IS NOT POSSIBLE, EVEN IF THE SUCTION WINDOW IS PREFERRED TO BE AT THE BOTTOM OF THE WALL. IF THE ABOVE SUCTION IS LESS, AN ACCUMULATION OF THE AMOUNT OCCURS DUE TO HIGHER HEAT.

IN SUCH CASE, THE INNER HEAT OF THE GENERATOR ROOM WILL NOT BE AVOIDED. FOR THIS PURPOSE, THE FILTER SUCTION AIR MOVEMENT IS CONTROLLED AND THE LOAD IS REDUCED OR TAKEN THAT AS DEMERG.

IF THE HOT AIR DISPOSED BY THE RADIATOR CANNOT BE DIRECTLY GIVEN OUTSIDE, IF AN AIR SHOT HOOD IS TO BE MADE, AIR DIRECTION DUCTS MUST BE MADE IN THE HOOD. SEE FIGURE 1-6 PAGE 26

#### . EXHAUST SYSTEM

THE FIRST FUNCTION OF THE EXHAUST SYSTEM IS THROUGH THE EXHAUST GASES FROM THE MANIFOL TO THE EXTERNAL ATMOSPHERE FROM THE ENGINE AND GENERATOR ROOM AT A SOUND LEVEL.

WHEN THE EXHAUST GAS IS DISCHARGED OUT OF THE ENGINE, IF THE EXHAUST GAS IS DROPPED TO A DEFINED UNDER A DEFINED LIMIT AND IS DISPOSED WITHOUT RESISTANCE, THE ENGINE WILL GIVE OPTIMUM PERFORMANCE.

THE TOTAL EXHAUST SYSTEM RETURN PRESSURE AT THE ENGINE EXHAUST OUTLET FLASH AT START SHALL NOT BE MORE THAN RECOMMENDED.

EXCESSIVE EXHAUST PRESSURE WILL CAUSE COMPLETE WEAKNESS IN THE ENGINE COMBUSTION CHAMBER AND CYLINDER WALL. As a result, LOW POWER IN THE ENGINE WILL CAUSE HIGH EXHAUST EXPLOSION AND DRYING IN THE COMBUSTION CHAMBER AND PIPES. IF AN OIL INSTALLATION OCCURS, THE TURBO CHARGER DAMAGES THE TURBINE PART. THESE OIL INSTITUTIONS ACCUMULATE ON TURBINE SCALE AND TURN INTO HARDENED CARBON RESIDUES WITH TIME. THEREFORE, THE PROBLEMS BY CREATING IMBALANCE (BALANCE DISORDER) IN TURBO TURBINE ROTATION

IT CAUSES.

EXHAUST SYSTEM INSTALLATION SHOULD BE PLANNED OUTSIDE OF NORMAL INSTALLATION. THE MAIN PURPOSE SHOULD BE THE FOLLOWING.

1. TO ENSURE THAT THE REBACK PRESSURE OF THE COMPLETE SYSTEM IS BELOW THE MAXIMUM LIMIT. THEREFORE, ENSURING THAT GAS IS EXPOSED BY USING THE SHORTEST DISTANCE AND LESS ELBOWS. IF MORE THAN ONE ELBOW WILL BE USED, TO KEEP THE ELBOW DIAMETER 50% OVER THE PIPE DIAMETER.
2. HANGING THE EXHAUST OUTPUT ELBOW AND SUPPORTING THE WEIGHT OF THE TURBOCHARGER.
3. CONSIDERING THERMAL EXPANSION AND CONTRACT.

4. TO PROVIDE THE NECESSARY FLEXIBILITY BY MOUNTING A COMPENSATOR AT THE EXHAUST OUTLET OF THE ENGINE.

5. REDUCING EXHAUST NOISE.

WHEN THE EXHAUST ELBOW IS DIRECTLY CONTACTED TO THE TURBO OUTPUT AND IS NOT SUPPORTED FROM THE ENGINE, THE TURBOCHARGER CAN ONLY SUPPORT THE SMALL WEIGHTS OF THE EXHAUST SYSTEM. THIS ISSUE THAT THE EXHAUST SYSTEM SHOULD NOT BE SUPPORTED FROM THE EXHAUST ELBOW. SUPPORT ACCORDING TO THE CONDITIONS ON THE GENERATOR GROUP, ANOTHER SUITABLE REASON CAN BE SUPPORTED.

IF THE ENGINE IS ON ANTI-VIBRATION WEDGES OR SIMILAR LAYOUT, WHEN THE ENGINE STARTED OR STOPPED THERE WILL BE A SIDE MOVEMENT AT THE ENGINE EXHAUST OUTPUT ELBOW FLASH. IN PRACTICE A FLEXIBLE (FLEXIBLE) EXHAUST PIPE IS CONNECTED TO THE SIDE OF THE OUTLET FLANGE.

IF THERE IS A SHOCK OR MOVING FORWARD BETWEEN THE ENGINE AND THE EXHAUST SYSTEM, THE FLEXIBLE CONNECTION SHOULD BE CONNECTED AS CLOSE TO THE ENGINE AS POSSIBLE.

DUE TO HEAT EXPANSION, THERE WILL BE A MOVEMENT ON THE EXHAUST PIPE ONCE. THE USE OF EXPANSION BELLOWS (COMPENSATORS) MADE OF STAINLESS STEEL IS A METHOD TO DEFINE THE PROBLEM CAUSED BY EXPANSION.

TRULY DAMPING BELLOWS ONLY TAKE ON THE DEFORMATIONS PARALLEL TO THE HORIZONTAL AXIS. THE RECOMMENDED APPLICATION IS THE WAY OF TWO SEPARATE SHORT BELLOWS WITH A LENGTH BETWEEN 250 -400 MM, CONNECTED TO THE STRAIGHT OUTLET EXHAUST PIPE. THEREFORE, THE ANGULAR MOVEMENT CAUSED BY THE EXPANSION IS REDUCED BY SUCTION BY EACH BELLOW.

IT IS RECOMMENDED TO MAKE HEAT INSULATION TO THE EXHAUST SYSTEM TO REDUCE THE HEAT SPREADING FROM THE EXHAUST SYSTEM TO THE GENERATOR CHAMBER. EXHAUST HEAT INSULATION TO BE MADE ONCE ONCE HELPS TO REDUCE THE ENGINE NOISE LEVEL BY SUMMARY.

(FIGURE 1-7 PAGE 26)

IT IS RECOMMENDED TO INSULATE THE EXHAUST SYSTEM IN ORDER TO DISPOSE OF THE NEGATIVITY THAT MAY CAUSE FROM FUEL LEAKAGES THAT MAY RESULT IN CRACKING IN THE FUEL PIPE.

HANGING CLAMPS CAN BE USED FOR INSULATION WHERE PIPE FLANGES OR FLEXIBLE COMPENSATORS ARE LOCATED. THIS HANGING CLAMP OR PIPE BRACELET MUST BE EASY ATTACHED SO THAT THE EXHAUST ELASTIC PIPING SYSTEM IS NOT INTERFERING WITH THE FUNCTION.

ATTENTION ! : DO NOT INSULATE EXHAUST MANIFOLTS AND TURBO CHARGES. IF IT IS INSULATED, IT WILL CAUSE FAILURES DUE TO INEFFICIENT OPERATION IN THE ENGINE AND THE PRESSURE ARISING FROM THERMAL STRESS ON THE PARTS.

AT THE EXHAUST GAS EXHAUST AND CLEAN AIR SUCTION CYCLE (CIRCULATION) OF THE ENGINE SHOULD PREVENT THE EXHAUST GAS TO ENTER AGAIN BY THE ENGINE AIR SUCTION LINE. ROTATION OF EXHAUST GASES CAUSES A SHORT TIME Clogging in the Air Filter due to the reduction in the amount of oxygens and the soot in the EXHAUST GAS THAT WILL ACHIEVE THE COMBUSTION IN THE CLEAN AIR TO ENTER THE ENGINE.

IT SHOULD BE PREFERRED TO INSTALL THE EXHAUST DRAIN PIPES AT THE SAME POSITION WHERE THE RADIATOR IS OUT OF THE WALL. RAIN COVER (HOROS) IS USED IN THE HORIZON INSTALLATION OR THE FIRE NOZZLE IS CUT AT THE BOTTOM OF THE WATER DROPPERS IN THE EXHAUST PIPE. ONCE THE FIRE MOUTH SHOULD BE LESS IMPORTANT AS TO THE SOUND POLLUTION FACTOR.

DUE TO CONDENSATION AT A LONG EXHAUST PIPE DUE TO THE WORK, WATER DROPS ARE FORM AND THIS WATER ENTERS THE ENGINE. FOR PROTECTION PURPOSES, A DISCHARGE PATTERN SHOULD BE ADDED TO RECEIVE WATER THAT CAN COLLECT FROM THE LOWEST LEVEL OF PIPING. OTHERWISE CAUSE CORROSION OR HYDRAULIC LOCKING IN THE ENGINE.

A SIMPLE HOLE OF THE LOWEST LEVEL FOR THE WATER DISCHARGE MAY BE DRILLED OR THROUGH A DISCHARGE PIPE OR IT CAN BE COLLECTED IN A BANK AND EMPTY DURING THE MAINTENANCE PERIODS. THIS HOLE OR DRAIN IS OPENED BACK FROM THE APPROPRIATE PLACE, SO THE EXHAUST FUME DOES NOT LEAK.

A DAMPING OR EXPANSION SILENCER NORMALLY REDUCES THE SOUND OF EXHAUST GASES. THE BEST NOISE REDUCING PERFORMANCE AT THE SILENCER FACILITY CAN BE ACHIEVED BY AVOIDING THE SILENCERS IN THE MIDDLE OF THE EXHAUST PIPING SYSTEM. IF POSSIBLE, THE BEST SILENCER MOUNTING LOCATION IS MADE TO MEET  $\frac{2}{3}$  OF THE PIPING LENGTH.

## **FUEL SUPPLY SYSTEM**

ATTENTION!: FOLLOW THE SAFETY PRECAUTIONS MENTIONED IN CHAPTER 1 WHERE FUEL IS AVAILABLE.

FOR A RELIABLE AND HEALTHY OPERATION, GENERATOR ENGINES REQUIRE THE USE OF MODERN HIGH PRESSURE AND EXTREMELY CLEAN FUEL. THE FUEL SYSTEM MUST BE SUCH AS TO SUPPLY CONTINUOUS FUEL TO THE ENGINE. IF THE FUEL OF THE SPECIFIED FEATURE IS NOT USED, THE FOLLOWING OCCUR: DIFFICULTY IN START, WEAKENING EVENT, INJECTORS AND COMBUSTION CHAMBERS, FUEL SYSTEM AND FILTERS SHORTENED IN THE LIFE OF THE ENGINE.



ERK POWER GENERATOR RECOMMENDS TO USE ASTM OR 2.0 DIESEL FUEL.

VISCOSITY: RECOMMENDED VISCOSITY 1.3 TO 5.8 SYNTHYSTROKE.

SETAN NUMBER: 40 OVER 0 C, 45 BELOW 0 C

THE NUMBER OF SULFUR: IT SHOULD NOT EXCEED 0.5% VOLUME.

WATER AND SUBSTANCE: THE VOLUME SHOULD NOT EXCEED 0.05%.

DENSITY: 0.816 TO 0.876 G / CC

ASH: 0.02% VOLUME SHOULD NOT EXCEED.

AMOUNT OF ACID: EVERY 100 ML SHOULD NOT EXCEED 0.1 MGKOH.

HIGH ASH (AMOUNT OF MINERAL RESIDUES IN THE FUEL) CAUSE OXIDIZATION IN CYLINDERS AND INJECTORS.

LOW SETAN COUNT CAUSE HARD ENGINE TO OPERATE.

IN CASE OF EXCESSIVE SULFUR AMOUNT IN THE FUEL, SULFUR RESIDUES TURN INTO SULFURIC ACID AT THE TIME OF COMBUSTION, THAT GETS DANGER AND CAUSE EXCESSIVE WEAR.

INCOMPATIBLE VISCOSITY CAUSES EXCESSIVE SMOKE COMBUSTION AND DROP IN POWER IN THE ENGINE.

THE FUEL TANK SHOULD NOT BE HIGHER THAN THE ENGINE INJECTOR LEVEL FOR ENGINES WITH LARGE POWER (OVER 1000 KVA), ESPECIALLY FEED FROM EXTERNAL FUEL TANK. MEASURES SHOULD BE TAKEN TO PREVENT FUEL MOVEMENT WHEN THE ENGINE IS STOPPED. IN MOTORS, THE FUEL AT HIGH TEMPERATURE RETURNING FROM THE FUEL SYSTEM MUST BE COOLED TO A LEVEL THAT DOES NOT EXCEED A MAXIMUM 55 ° C BEFORE RETURNING TO THE DAILY FUEL TANK. THE SUPPLY PIPE DRAWED FROM THE FUEL TANK TO THE ENGINE MUST BE DIAMETER TO MEET THE FUEL CONSUMPTION OF THE ENGINE. FUEL RETURN LINE PIPE DIAMETER FEED LINE SHOULD NOT BE LESS THAN THE PIPE DIAMETER.

AVOID USING PLASTIC AND OTHER IMPOSSIBLE MATERIALS, INCLUDING GALVANIZED PIPES AND RECORDS, IN PIPING THE GENERATOR FUEL SYSTEM.

FUEL PIPE PIPE DIMENSIONING SHOULD BE ADDED TO THE FILTERS INSTALLATION ELEMENTS AND THE PRESSURE DROP IN THE VALVES. THE FUEL PIPES MUST BE CONNECTED WITH FLEXIBLE FUEL HOSES AT THE CONNECTION POINT TO THE ENGINE. OTHERWISE, CRACKING AND LEAKS WILL OCCUR IN THE PIPING THAT IS DIRECTLY CONNECTED DUE TO THE GENERATOR VIBRATION. DO NOT PASS

THE FUEL PIPES AT THE PLACES OF HOT WATER PIPES, ELECTRIC WIRES AND KEEP IT AWAY FROM THE EXHAUST SYSTEM.

INSULATE THE FUEL PIPES BEFORE THE WEATHER CONDITIONS. IN SOME CASES, EXTERNAL TYPE FUEL TANK MAY BE BURNED BELOW THE ICE LEVEL OF THE SOIL. IN THIS MANNER, THE FUEL CAN BE PREVENTED FROM FREEZING.

DO NOT USE TEFLON BAND TYPE MATERIALS IN FUEL LINE PIPING AND ELEMENT ASSEMBLY. THESE BELTS MAY LEAK INTO THE ENGINE FUEL SYSTEM AND CAUSE THE PUMP AND INJECTORS TO Clog.

CAUTION !: NEVER PUT THE FUEL RETURN LINE TO THE FUEL SUPPLY LINE. ALWAYS MAKE IT CONVERT INTO FUEL TANK.

THE AUTOMATIC FILLING SYSTEM IS MADE AS OPTIONAL. AUTOMATIC FUEL FILLING WITH MAGNETIC ELECTRONIC LEVEL FLOAT SYSTEM ON THE DAILY FUEL TANK AND GEAR PUMPS TO PROVIDE FUEL TRANSFER. WE RECOMMEND TO CONSULT YOUR SALES REPRESENTATIVE FOR MORE INFORMATION.

#### FUEL PIPE RECOMMENDATIONS ACCORDING TO GENERATOR POWER

GENERATOR STANDBY POWER (KVA)	MAXIMUM FUEL PIPE LENGTH (M)	MAXIMUM VERTICAL HEIGHT (M)	MAXIMUM FITTINGS ELEMENT NUMBER (M)	RECOMMENDED PIPE DIAMETER (INCH)
10 - 700	6	1	6	25.4 (1*)
800 -1385	6	1	6	38 (1 1/2*)
1401 - 2500	6	1	6	50.8 (2*)

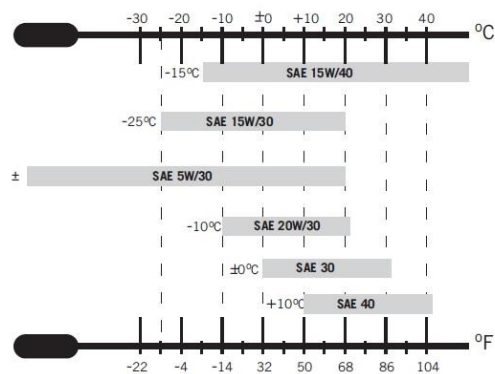
#### LUBRICATION

THE LUBRICATION SYSTEM OF DIESEL ENGINES IS ONE OF THE MOST IMPORTANT PARTS OF THE GENERATOR SET. CORRECT OIL SELECTION, OIL AND FILTER CHANGE PERIODS WILL EXTEND THE PERFORMANCE OF THE ENGINE AS IT'S LIFE.

THE CLASSIFICATION OF THE AMERICAN PETROLEUM INSTITUTE (API), THE AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM) AND SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) A SYSTEM FOR THE CLASSIFICATION AND PERFORMANCE CATEGORY SYSTEM FOR THE DEVELOPMENT OF LUBRICATION OILS.

IF THE OPERATING TEMPERATURE OF THE ENGINES IS ABOVE -15 DEGREES, THE MANDATORY OIL IS 15W / 40 AND MEETS API CG-14 PROPERTIES AS MINIMUM.

IF THE RATE OF SULFUR IN OIL IS LESS THAN 0.2%, THE ENGINE OIL IS CHANGED EVERY 500



WORKING HOURS. OILS CONTAINING MORE THAN A STATED PERCENT OF SULFUR SHORTEN THE PERIOD OF OIL CHANGE. OIL CHANGE PERIOD SHOULD NOT EXCEED 200 HOURS WHEN USING API CF, CF-4, CG-4 TYPE OILS. WHEN VDS, VDS-2, ACEA, E3 ARE USED, THE OIL CHANGE PERIOD IS UP TO 400 HOURS.

OIL LEVELS SHOULD BE CHECKED BY PERIODS THAT INSPIRE THE WORKING OR STANDBY ENGINES.

#### . COOLANT MIXTURE

SUITABLE WATER - ANTIFREEZE (ETHYLENE GLYCOL) MIXTURE RATIO IS 50% ETHYLENE-GLYCOL AND 50% CLEAN SOFT WATER FOR USE IN DIESEL ENGINES. ANTIFREEZE SHOULD HAVE ASTM D5345 OR ASTM D4985 SPECIFICATION. ANTIFREEZE MIXTURE WITH A 50% RATIO IS FREEZING DEGREE IS - 35 ° C. CONSISTING OF A MIXTURE OF 60% ETHYLENE GLYCOL AND 40% SOFT CLEAN WATER, ANTIFREEZE USED IN POLE CONDITIONS HAS A DEGREE OF PROTECTION (FREEZING) - 40 ° C.

ANTIFREEZE CONSISTING OF PROPYLENE GLYCOLKEN, AN ALTERNATIVE CHEMICAL, IS A PROTECTION DEGREE OF -29 ° C WHEN MIXED WITH 50% WATER.

CAUTION!: MIXTURES CONTAINING MENTOL ARE NOT SUITABLE.

IF ANTIFREEZE CANNOT BE PROVIDED AND ENVIRONMENTAL TEMPERATURE IS EXPECTED TO NOT FALL BELOW + 10 ° C, 1 LITER OF 1% (0.5 LITER) OF CORROSION INHIBITOR CAN BE USED BY MIXING WITH CLEAN SOFT WATER.

FOR EXAMPLE, 50 LITER OF WATER CAN BE MIXED BY HALF (0.5) LITERS OF INHIBITOR. USE OF THIS MATERIAL MUST BE USED ACCORDING TO THE MANUFACTURER'S WRITTEN INSTRUCTIONS ON THE INHIBITOR BOX.

CLEAN SOFT WATER MEANS PURIFIED WATER OF IONS, PURIFIED WATER, RAIN WATER OR WATER THAT MEETS THE FOLLOWING CHARACTERISTICS FROM A SOURCE.

CHLORES -40 MG / LITER MAX, SULPHATES -100MG / LITER MAX, TOTAL HARDNESS 170 MG / LITER MAX, TOTAL SOLIDS 340 MG / LITER MAX AND PH DEGREES BETWEEN 5.5 TO 9.0.

IF SOFT WATER IS NOT USED, THE ENGINE MAY MAKE OVER RUNNING DUE TO SET SIDE DEPOSITS THAT MAY OCCUR IN THE COOLING SYSTEM. THIS IS IMPORTANT FOR BILHASSA MOTORS WITH FREQUENTLY ADDED WATER.

ATTENTION !: PRODUCTS THAT ARE NOT APPROVED FOR THE COOLING SYSTEM MAY CAUSE SERIOUS TROUBLES. IF THE RATE OF CORROSION PROTECTOR INHIBITOR TO BE PLACED IN THE COOLING SYSTEM IS INSUFFICIENT, IT CAUSES EOSION (WEAR) AND CORROSION IN THE COOLING SYSTEM.

### 3.9. BATTERY

MAIN FUNCTIONS OF THE BATTERY ON THE GENERATOR; TO PROVIDE THE ELECTRIC CURRENT REQUIRED FOR THE STARTER MOTOR DURING THE FIRST OPERATION OF THE ENGINE, TO PROVIDE NECESSARY ENERGY WHEN THE ENERGY REQUIREMENT CANNOT BE MEETED BY THE ALTERNATOR AND TO REGULATE THE VOLTAGE ON THE ELECTRIC SYSTEM OF THE GENERATOR.

CHARGING STATUS	DENSITY	VOLTAGE
% 100	1.28	12.72
% 75	1.24	12.45
% 50	1.20	12.24
% 25	1.17	12.06
DEŞARJ	1.14	11.89

WHEN THE BATTERY VOLTAGE FALLS TO 12.45, THE BATTERY MUST BE CHARGED OR CONNECTED.

CHARGING MUST BE UP TO ONE THAN TWENTY OF THE BATTERY CAPACITY. AT 135 A / H AND HIGHER CAPACITIES, UP TO TWENTY-FIVE ARE ALLOWED. CHARGING WITH HIGH CURRENT SHORTENES THE BATTERY LIFE. FOR THIS REASON, LOW CURRENT LONG CHARGING TIMES SHOULD BE PREFERRED. IT IS USEFUL TO AVOID CHARGING AS FAST AND HIGH CURRENT AS POSSIBLE.

BUMPER BATTERY CHARGER IN GENERATOR SYSTEMS WILL PROVIDE THE BATTERY TO STAY CONTINUOUSLY CHARGED.

GOOD OPERATION OF COLD AND PARTIALLY CHARGED BATTERIES ONLY AT LOW TEMPERATURES IS A SMALL POSSIBILITY. BECAUSE IT IS INCREASED IN COLD POWER REQUIRED TO START THE ENGINE. PARTIALLY CHARGED BATTERIES FACE ANOTHER DANGER, ESPECIALLY IN WINTER MONTHS. DURING DISCHARGING, THE SPECIFIC WEIGHT OF THE ELECTROLYTE WILL BE REDUCED AND APPROACH TO THE FREEZING TEMPERATURE OF THE WATER. THIS WILL INCREASE THE RISK OF FROSTING OF ELECTROLYTE.

BATTERY CHARGING STATUS	DENSITY	FREEZING TEMPERATURE (C)
% 100	1.28 gr/cm <sup>3</sup>	- 70
% 75	1.24 gr/cm <sup>3</sup>	-45
% 50	1.20 gr/cm <sup>3</sup>	-25
% 25	1.17 gr/cm <sup>3</sup>	-15
DISCHARGE	1.14 gr/cm <sup>3</sup>	-7.2

## . ELECTRICAL CONNECTIONS

40°C Çevre Sıcaklığında Jeneratör Gücüne Göre Tavsiye Edilen Kablo Seçim Tablosu

Standby Gücü (kVA)	400 V da Maksimum Yük Akımı (A)	40°C Havada Akım Taşıma Kapasitesi (A)	PVC İzoleli YVY (NYY) 0.6/1 kV Her Bir Faz İçin (mm <sup>2</sup> )	Standby Gücü (kVA)	400 V da Maksimum Yük Akımı (A)	40°C Havada Akım Taşıma Kapasitesi (A)	PVC İzoleli YVY (NYY) 0.6/1 kV Her Bir Faz İçin (mm <sup>2</sup> )
10	14	25	2,5	358	517	534	2 X 120
15	22	33	4	400	578	610	2 X 150
22	32	42	6	412	595	610	2 X 150
30	43	57	10	450	650	801	3 X 120
33	48	57	10	500	723	801	3 X 120
45	65	76	16	506	731	801	3 X 120
66	95	123	35	550	795	915	3 X 150
80	116	123	35	559	808	915	3 X 150
88	127	135	50	630	910	1068	4 X 120
94	136	155	50	700	1012	1068	4 X 120
100	145	155	50	800	1156	1220	4 X 150
110	159	191	70	900	1301	1335	5 X 120
142	205	228	95	1125	1626	1735	5 X 185
150	217	228	95	1385	2001	2000	5 X 240
167	241	267	120	1500	2168	2400	6 X 240
200	289	305	150	1656	2393	2440	8 X 150
250	361	382	2 X 70	1875	2710	2800	7 X 240
275	397	456	2 X 95	2264	3272	3200	8 X 240
305	441	534	2 X 120				

CONNECT THE ELECTRICAL CONNECTIONS OF THE GENERATOR SET WITH LICENSED AND EDUCATED PERSONS. WE RECOMMEND USING OUR AUTHORIZED SERVICES FOR THESE WORKS.

ALL ELECTRICAL CONNECTIONS MUST BE MADE ACCORDING TO THE GIVEN PROJECTS. WHEN MAKING ELECTRICAL CONNECTIONS, IT MUST BE MADE ACCORDING TO INTERNATIONAL STANDARDS AND RULES.

THE ENERGY CABLES OF THE GENERATOR SET SHOULD BE CALCULATED ACCORDING TO THE OPERATING VOLTAGE, FULL LOAD CURRENT AND DRAWING. CURRENT CARRYING CAPACITIES OF THE CABLES ARE GIVEN IN THE FOLLOWING TABLES.

VIBRATION IN THE CABLES TO BE CONNECTED TO THE GENERATOR SET SHOULD BE MADE WITH FLEXIBLE CABLES BY CONSIDERING THE EYE. IT WILL BE SUITABLE TO USE H07 RN-F TYPE CABLE FOR LOW VOLTAGE (MAXIMUM 1000 V) CONSISTING OF RUBBER SHEATED FLEXIBLE CONDUCTORS. IF THE TRANSFER PANEL IS AT A REMOTE SECTION, THIS SYSTEM WILL BE EXPENSIVE. THIS CAN BE MADE WITH THE TERMINAL BOX IN ORDER TO BE ECONOMIC.

THE CABLES ARE INSTALLED BETWEEN THE GENERATOR SET, THE TRANSFER PANEL AND THE CONTROL BOARD WITH THE SHORT DISTANCE AS POSSIBLE. IF THE TRANSFER PANEL IS AWAY FROM THE DISTANCE, THE VOLTAGE DROP-IN ACCOUNT MUST BE DONE. VOLTAGE DROP IS GIVEN IN THE FORMULA BELOW.

PHASE SEQUENCE SHOULD BE DETERMINED AT TRANSFER PANEL CONNECTIONS WITHOUT CUT-OFF ENERGY. AFTER THE TRANSFER PANEL CONNECTIONS ARE COMPLETED, THE PHASE ORDER MUST BE CHECKED AGAIN WITHOUT ENERGY DELIVERED TO THE INSTALLATION.

THE GENERATOR SET AND THE DEVICES TO OPERATE, CONTROL AND TRANSFER PANEL MUST BE EARTHED BEFORE THE GENERATOR IS OPERATED. GROUND VOLTAGE PROVIDES A REFERENCE FOR SYSTEM VOLTAGE. A POOR-MADE GROUNDING CAN ALSO CAUSE NEGATIVE EFFECTS OF CONTROL AND CONTROL DEVICES.

ATTENTION!: WE NEVER START THE GENERATOR SET WITHOUT GROUNDING.

CONDUCTOR GROUNDING: IT IS THE CONNECTION OF METAL CONDUCTORS TO THE SOIL. THE PURPOSE OF THIS;

- DUE TO EARTHING, THE SYSTEM'S VOLTAGE BALANCE IS PROVIDED.
  - REDUCED HAZARD TO HUMAN LIFE.
  - EFFICIENT OPERATION OF ELECTRONIC CONTROL AND CONTROL DEVICES IS PROVIDED.
  - GENERATOR NEUTRAL POINT POTENTIAL DOES NOT CHANGE IRREGUALLY AS A REFERENCE.
  - THE VOLTAGE BETWEEN ANY PHASE AND THE GROUND DOES NOT EXCEED THE PHASE VOLTAGE OF THE SYSTEM NORMALLY
- MUST.

GROUNDING IS DONE WITH EARTHING ELECTRODE OR PLATES.

GROUNDING ELECTRODE

COPPER COATED STEEL BARS FOR HARD FLOORS ARE SOM COPPER BARS FOR NORMAL FLOORS. EARTHING IS PROVIDED BY PUMPING ONE OR MORE EARTHING ELECTRODES TO THE SOIL. IT IS USUALLY PREFERRED FOR SMALL POWERED OR MOBILE GENERATOR SYSTEMS.

### **3.12. GROUNDING PLATES**

ESPECIALLY USED IN FIXED TYPE GENERATORS. MADE WITH GALVANIZED COPPER SHEETS. IT IS RECOMMENDED TO USE MORE THAN ONE SOIL PLATE FOR HIGH POWER GENERATORS. THE DISTANCE BETWEEN PLATES AND GROUNDING MADE OR TO BE MADE FOR DIFFERENT PURPOSES SHOULD BE AT LEAST 20M.

### **3.13. GROUNDING LINE**

IT IS A SUITABLE SECTION OF COPPER CONDUCTOR USED FOR CONNECTION TO THE GROUNDING ELECTRODE. GROUNDING CONDUCTOR MUST BE SELECTED ACCORDING TO STANDARDS AND CURRENT CARRYING CAPACITY. THE CONNECTION OF THE GROUNDING CONDUCTOR TO THE GROUNDING ELECTRODE OR PLATE SHOULD BE PROTECTED AGAINST POSSIBLE DEFECT. GOOD GROUNDING CONNECTION MUST HAVE LOW ELECTRIC RESISTANCE AT THE POINT OF LIGHTNING OR LEAKAGE CURRENT WITH EARTH. THE BEST GROUNDING RESISTANCE IS BETWEEN 1 OHM AND 5 OHM. RESISTANCE OVER 20 OHM WILL CREATE A POTENTIAL DIFFERENCE THAT WILL BE DANGEROUS. WITH 15 MA AND 50 VOLT VOLTAGE POTENTIAL IS DANGER FOR HUMAN HEALTH.

### **3.14. GROUNDING TERMINAL**

IT IS THE CONNECTION OF THE EARTHING LINE TO THE SPECIFIED PLACE ON THE GENERATOR SET. IN THIS WAY, ALL THE ELEMENTS OF THE GENERATOR SET WILL BE GROUNDED.

ATTENTION !: DO NOT USE DEVICES WITHOUT METAL BODY GROUNDING.

## **CHAPTER 4: CONTROL SYSTEMS**

### **4.1. TRANSFER PANELS**

IT IS THE SYSTEMS THAT DIRECT THE MAINS OR GENERATOR ENERGY TO THE LOAD OUTPUT AND SWITCH IT. SWITCHING CONTROL THE NETWORK AND GENERATOR ENERGY OF THE CONTROL PANELS AND PERFORM THE TRANSFER IN APPROPRIATE CASE. THE TRANSFER SYSTEM IS REALIZED

BY CONTACTORS, AUTOMATIC TRANSFER SWITCHES OR MOTORIZED SWITCHES ACCORDING TO THE POWER.

IN ERK POWER GENERATOR GENERATORS, THE TRANSFER SYSTEM IS MADE WITH AUTOMATIC TRANSFER SWITCHES. TRANSFER PANELS ARE DESIGNED EXTERNALLY FOR ALL POWERS.

THE POWER OF THE TRANSFER PANELS SHOULD BE AT LEAST GENERATOR POWER ACCORDING TO THE POWER TO BE SUPPLIED BY THE GENERATOR. IN THE DISTRIBUTION BOARD, THE LOADS TO BE SUPPLIED BY THE GENERATOR ARE SEPARATED AS URGENT AND NON-URGENT LOADS. IN SOME CASES, THE EMERGENCY AND NON-EMERGENCY LOADS ARE NOT SEPARATED ON THE DISTRIBUTION BOARDS. WHEN THE MAINS ENERGY IS AVAILABLE, ONE LOADING IS MADE IN THE SUPPLY BY THE GENERATOR. IN SUCH CASES, THE AUTOMATIC TRANSFER SWITCH USED IN THE TRANSFER PANEL SHOULD BE SELECTED ACCORDING TO THE NETWORK POWER BECAUSE THE NETWORK POWER IS MORE THAN THE GENERATOR POWER.

THE FOLLOWING ISSUES IN TRANSFERS TO EXTERNAL TYPE PANEL.

- PLACE THE TRANSFER BOARD AS CLOSE TO THE DISTRIBUTION BOARD WHEN POSSIBLE.
- THE AREA TO BE PLACED IN THE TRANSFER PANEL VENTILATION WITHOUT GOOD HUMIDITY AND HUMIDITY
- IT MUST BE A CLEAN AND DRY ENVIRONMENT.
- MAKE SURE THERE IS ENOUGH SPACE FOR WORK AROUND THE TRANSFER PANEL.
- DO NOT PUT FOREIGN SUBSTANCES ON TRANSFER PANELS.
- RUBBER MUŞAMBA OR SIMILAR TO PROVIDE INSULATION IN FRONT OF TRANSFER AND DISTRIBUTION BOARD
- COOL THE MATERIALS.
- USE CABLE SECTION SUITABLE FOR GENERATOR AND MAINS. (SEE CHAPTER 4.10)

CONTROL OF BREAKERS USED IN TRANSFER PANEL AND TRANSFER FOR REFERENCE VOLTAGES

- PULL 7 X 2.5 MM<sup>2</sup> CONTROL CABLE BETWEEN THE BOARD AND THE CONTROL BOARD.
- ALWAYS GROUND THE TRANSFER PANEL.

#### **4.2. CONTROL PANELS**

MANAGE TO START THE GENERATOR SET, CHECK THE MOTOR AND ALTERNATOR, STOP THE GENERATOR SET IN THE EVENT OF ALARM.

THERE ARE AUTOMATIC AND MANUAL CONTROL PANELS. ALL PANELS ARE MADE WITH MICRO-PROCESSOR ELECTRONIC CONTROL PANELS.



### **4.3. AUTOMATIC CONTROL BOARD**

IT IS USED FOR AUTOMATIC TRANSFER OF GENERATOR SET AND NETWORK. MONITORING THE MAINS ENERGY CONTINUOUSLY THROUGH THE CONTROL PANEL. IN THE EVENT THE MAINS VOLTAGE EXCEEDS THE SET LIMITS OR AT LEAST ONE PHASE IS CUT OFF AND TURNS THE GENSET INTO SERVICE. MONITORS THE GENERATOR SET OPERATION CONTINUOUSLY AND OPERATES ACCORDING TO THE SIGNIFICANCE OF THE ALARM WHEN AN ALARM STATUS OCCURS. WHEN THE MAINS ENERGY COMES BACK AND ENTERS THE BORDER, IT IS READY FOR THE NEXT INTERRUPT.

## **CHAPTER 5: MAINTENANCE**

IN THIS SECTION THE GENERATOR'S MAINTENANCE IS DESCRIBED. FOR MORE DETAILED MAINTENANCE DUE TO THE FEATURES OF THE ENGINES, PLEASE EXPLORE THE ENGINE AND ALTERNATOR MANUALS GIVEN TOGETHER WITH THE GENERATOR SET.

YOU MUST HAVE MAINTENANCE OF YOUR GENERATOR SET BY AUTHORIZED PERSONS OR AUTHORIZED SERVICES. PLEASE NOTE THAT THE WARRANTY WILL BE VOIDED FOR MAINTENANCE, REPAIRS OR ADJUSTMENTS MADE BY UNAUTHORIZED SERVICES OR PERSONS.

ALWAYS USE ORIGINAL SPARE PARTS FOR MAINTENANCE AND REPAIR. DO NOT USE PARTS THAT ARE NON-ORIGINAL OR NOT APPROVED IN WRITING BY ERK POWER GENERATOR. DAMAGE CAUSED BY NON-ORIGINAL MAINTENANCE OR REPAIR PARTS WILL BE EXCLUDED FROM THE WARRANTY FOR YOUR GENERATOR SET.

FOLLOW THE SAFETY PRECAUTIONS MENTIONED IN THE PAST SECTIONS WHEN CARRYING OUT.

### **5.1. DAILY MAINTENANCE**

THE AMOUNT OF COOLANT IN THE RADIATOR IS CONTROLLED. COMPLETED IF NECESSARY. THE RADIATOR IS NOT FILLED UP TO THE LIQUID STORE, IT IS FILLED UP TO 2-2.5 CM UNDER THE UPPER HOPPER SURFACE. SIDE RADIATOR IS LEFT FOR THE EXPANDING COOLANT. THE AMOUNT OF ANTIFREEZE IS CONTROLLED BEFORE COLD WEATHER BEGINS AND ANTIFREEZE IS ADDED AS NECESSARY.

THE AMOUNT OF OIL IS CHECKED BY PULLING THE OIL BAR. SHOULD BE BETWEEN TWO LINES ON THE OIL BAR. If it is missing, it is put through the oil filling port, same as the oil in the engine. AFTER 15 MINUTES WAITING, THE OIL LEVEL IS CHECKED AGAIN. WHEN THE ENGINE IS STARTED, OIL PRESSURE IS CHECKED ON THE INDICATOR ON THE PANEL. IF THE OIL PRESSURE IS BELOW THE LIMIT,

THE CONTROL PANEL WILL GIVE A WARNING OR STOP ALARM. NOT BELOW THE RECOMMENDED VALUE.

THE AMOUNT OF FUEL IN THE FUEL TANK IS CHECKED. PREVENT THE ENGINE TO DOWN TO THE LEVEL THAT WILL MAKE AIR TO THE ENGINE.

OIL, FUEL AND WATER LEAKAGE IS CHECKED BY EYE.

## **5.2 FIRST CARE**

OIL, OIL AND FUEL FILTER IS CHANGED DURING 30 HOURS OR 60 DAYS (WHICH IS OVER FIRST) MAINTENANCE. AIR FILTER IS CONTROLLED. IT IS CLEANED AND REPLACED IF NECESSARY. ALL ELECTRICAL CONNECTIONS ARE CHECKED. THE ENGINE IS CHECKED FOR ANY OIL, FUEL AND COOLANT LEAKAGE. HOSE CLAMPS, BELTS IN THE COOLING CIRCUIT ARE CHECKED.

## **5.3 MONTHLY OR "100" HOURS MAINTENANCE**

ALL THE OPERATIONS MADE IN DAILY OR 8 HOURS MAINTENANCE REPEAT.

BATTERY MAINTENANCE IS MADE.

IMPORTANT NOTE: ONLY PURE WATER IS PUTTED IN THE ACCUMULATOR. ABSOLUTELY DO NOT PUT ACID WATER. THE WATER PLATES SHOULD BE FILLED UP TO 1CM AND NEVER FILLED UP TO THE STRAIT.

## **5.4. FOUR MONTHLY OR "250" HOURS MAINTENANCE**

LUBRICATING OIL IS CHANGED.

OIL, FUEL AND AIR FILTERS ARE CHANGED.

DRIVE BELT Tearing AND TENSION IS CHECKED. IF NECESSARY TAKE BACK AND SPACE.

FUEL, LUBRICATION AND COOLING SYSTEM LEAKS ARE CHECKED.

BATTERY MAINTENANCE IS MADE.

ALL ELECTRICAL CONNECTIONS ARE CHECKED.

#### **5.5 ANNUAL OR "750" HOURS MAINTENANCE**

ALL THE PROCEDURES MADE IN FOUR MONTHLY OR "250" HOUR MAINTENANCE REPEAT.

TORQUE CONTROL IS DONE BY TIGHTENING THE CYLINDER HEAD BOLTS AND NUTS.

VALVE ADJUSTMENT SPACES ARE CHECKED AND ADJUSTMENT IS MADE IF NECESSARY.

THE WATER IN THE COOLING SYSTEM IS FULLY DISCHARGED AND A NEW ANTIFREEZE IS ADDED.

OIL PRESSURE IS CHECKED BY STARTING THE ENGINE.

ALTERNATOR AND STARTER CONNECTIONS ARE CHECKED.

ALL INDICATORS ARE FULLY FUNCTIONAL.

THE INJECTORS ARE REMOVED, CHECK THE SETTINGS AND INSTALLED IN THEIR PLACE.

#### **5.6 1250 HOURS MAINTENANCE**

ALL "750" HOURS OF MAINTENANCE REPEAT.

INJECTOR AND VALVE SETTINGS ARE CHECKED AND THE NECESSARY SETTINGS ARE MADE.

THE COOLING WATER SYSTEM IS CHECKED AND NECESSARY CLEANING PROCEDURES ARE MADE.

CHECK THE STARTER AND CHARGING ALTERNATOR.

CHECK AND TIGHTEN THE MOUNTING BOLTS AND NUTS.

## **5.7. 2500 HOURS MAINTENANCE**

ALL "1250" HOUR MAINTENANCE IS REPEAT.

THE COOLING WATER IS CHANGED WITH CLEAN WATER AND ANTIFREEZE IS ADDED. LEAKAGE CONTROL AND CONNECTION ELEMENTS ARE CHECKED. RADIATOR HEADS ARE CLEANED AND TAKE UP IF THERE IS COMPRESSED AIR IN THE SYSTEM.

VIBRATION WEDGES ARE CHECKED.

### **. BATTERY MAINTENANCE**

FOLLOW THE SAFETY RULES MENTIONED IN THE PAST SECTIONS WHEN MAINTAINING THE BATTERY.

BATTERIES USED IN GENERATOR SETS ARE LEAD-ACID TYPE BATTERIES CONSISTING OF A GROUP OF POSITIVE AND NEGATIVE ELECTRODE CELLS OR PLATES SUBMERGED WITH ELECTROLYTICITY (SULFURIC ACID).

THE BATTERY ENERGY USED CONSISTS OF A CHEMICAL REACTION IN THE CELLS. THIS REACTION HAS RECYCLING AND THE BATTERY MAY BE CHARGED AND DISCHARGED AGAIN.

USED BATTERIES CAN CONTINUOUS BUMPER CHARGE FOR APPROXIMATELY 4 YEARS, THEN THEY ARE REPLACED.

CHECK THE DENSITY OF THE BATTERY FLUID WITH A BOMETER. ALSO NOMINAL TEMPERATURE (AT 20 °C) THE MEASURED VALUE IN EACH CELL SHOULD BE ABOUT 1.28. (THE DESIRED VALUE IN A 100% CHARGED BATTERY)

DO NOT ADD DISTILLED WATER TO THE BATTERY, ONLY ADD PURE WATER.

KEEP THE BATTERY CLEAN AND CLEAN CONTINUOUSLY TO AVOID POLLUTION. REMOVE THE COVERS AND ADD PURE WATER ABOUT 10 MM ABOVE THE PLATES. REPLACE THE COVERS. INSTALL THE TOP OF THE BATTERY.

CHECK THE OPERATING ENVIRONMENT TEMPERATURE OF THE BATTERY YOU ARE USING (APPROXIMATELY -5 C TO +50 C). AT INCOMPATIBLE TEMPERATURES, THE BATTERY LIQUID MAY FREEZE AND CUT INTERACTIVE.

BATTERY POLE HEADS OCCUR OXIDATION WITH TIME. OXIDATION CORRES THE BATTERY POLE HEADS AND PREVENTS CHARGING. DISASSEMBLE THE CONNECTIONS AND CLEAN THE OXIDIZED WITH HOT WATER, THEN REPEAT THE CONNECTIONS AND COAT WITH GREASE OIL OR VASEL.

TURN OFF THE SUPPLY FUSES ON THE GENERATOR PANEL WHILE REMOVING THE BATTERY POLE HEADS AND DISABLE THE BATTERY CHARGER. ATTACH THE POLE HEAD BEFORE ATTACHING THE "+" THEN "-".

CHECK THE TIGHTENING OF THE BATTERY POLE HEADS NEVER Crank the ENGINE WITH THE LOOSE CONNECTION. DO NOT OVERTIGHTEN THE TERMINALS.

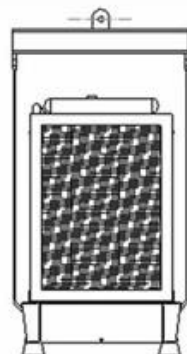
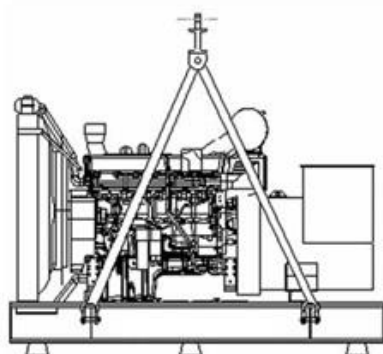
## 5.9. RADIATOR MAINTENANCE

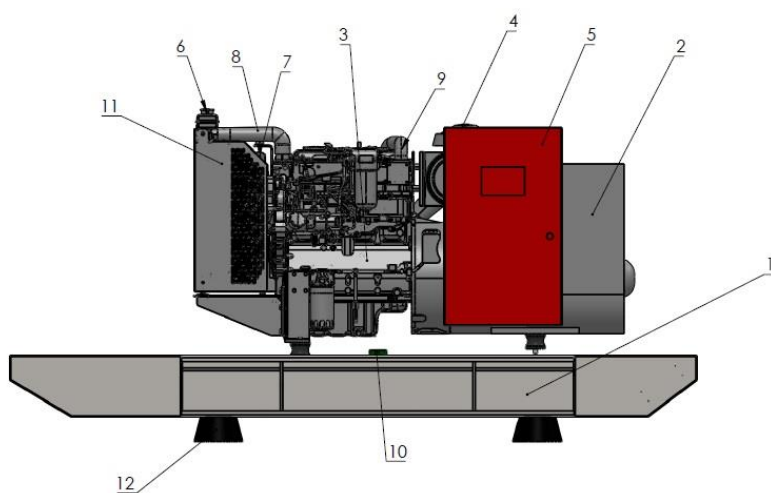
CORROSION IN RADIATOR IS THE FIRST CAUSE OF FAILURES. ALWAYS CHECK FOR LEAKAGE AT RADIATOR HOSE CONNECTIONS.

DRAIN THE RADIATOR OF THE GENERATOR THAT WILL NOT BE RUNNING FOR A LONG TIME, OR MAKE SURE THE RADIATOR IS PROTECTED. FILL RADIATOR WITH DISTILLED OR NATURAL SOFT WATER OR USE ANTI-CORROSION ADDITIONAL AMOUNT TO WATER.

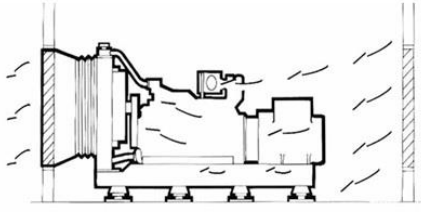
RADIATORS LOCATED IN DUSTY AND DIRTY ENVIRONMENTS CANNOT BE OBTAINED FROM DIRT, MOTOR STEAM, HUMIDITY, VARIOUS PARTICLES, THAT CAUSES A DECREASE IN ENGINE PERFORMANCE. LOW PRESSURE STEAM SHOULD BE USED TO CLEAN THE RESIDUES IN THESE CASES. OR IT SHOULD BE IMMERSSED IN ALKALI SOLUTION FOR 15-20 MINUTES AND THEN CLEANED WITH HOT WATER.

ENGINE Crankcase VENTILATION IS EFFECTIVE TO Clogging RADIATORS. THIS INFORMATION HAS BEEN DISCLOSED IN THE PREVIOUS SECTION, IN THE CHARTER VENTILATION SECTION. REVIEW AGAIN.



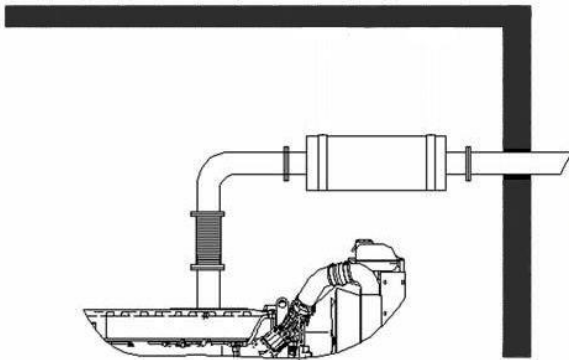
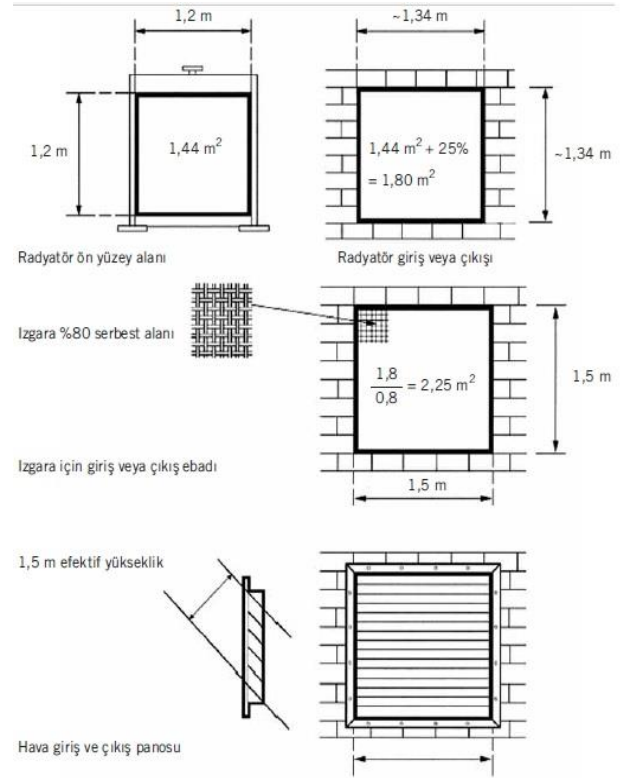
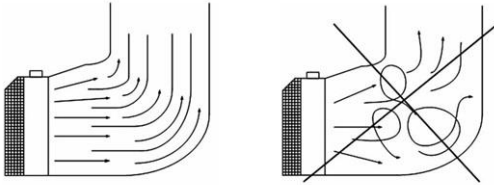


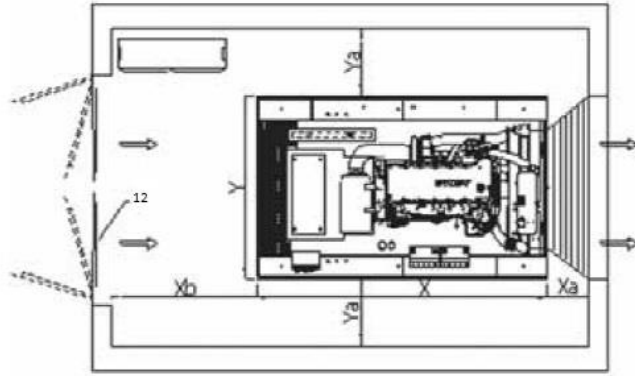
1	FUEL TANK AND CHASSIS
2	ALTERNATOR
3	DIESEL ENGINE
4	AIR FILTER
5	CONTROL PANEL
6	RADIATOR
7	RADIATOR EXPANSION TANK
8	AFTER COOLER RADIATOR
9	EXHAUST EXPANSION COMPENSATOR
10	FUEL TANK FILLING NOZZLE
11	RADIATOR HOUSING
12	CONICAL VIBRATION WEDGE



## ROOM SIZING AND

## INSTALLATION





$$Y_a = Y/2$$

$$X_a = 800-1000 \text{ mm}$$

$$X_b = X/2$$

NO.	ADI	AÇIKLAMA
1.	Şasi	Jeneratör gurup şasisi
2.	Panjur	Jeneratör hava atış panjuru
3.	Davlumbaz	Hava yönlendirme için
4.	Egzoz	
5.	Kompansatör	
6.	Motor	
7.	Alternatör	
8.	Kumanda Panosu	
9.	Transfer Panosu	
10.	Vibrasyon Takozu	
11.	Akü	
12.	Panjurlu Kapı	Jeneratör hava emiş panjuru

