Fischer Panda

Panda 40-4 PSCH-KU-D-USA

Super silent technology

120 / 208 V - 60 Hz / 40kW

Fischer Panda Defense International

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Electrical installation is only allowed to be fitted by trained and examined personnel !

CE-CONFORMITY

The generator and its accessories are so constructed that they comply with CE-regulations. These regulations apply only to the complete installation package to ensure exhaust and cooling systems as well as the electrical installations operate as laid down by the manufactorer. The fitting as such to a vehicle is the sole responseability of those parties carrying out the installation. When installing a generator to a new vehicle it is essential that this information is added to all vehicle documentation! All information is to be passed on to the manufacturer.

Technical Support per Internet: info@fischerpanda.com

Safety Precautions

- By working at the electrical system of the generator the battery must be disconnected to avoid an unintentional start of the generator.
- All contacts must be carefully checked for correctly and right installation (expansion compensation, control if all washer are present, etc.).
- After the installation or an maintenance or repair every contacts must be checked about heat bridges.
- The contacts must be keep free from combustible materials to avoid the arise of a crossover resistance that will be affect the operation of the generator.

GROUND THE EQUIPMENT. - To minimize shock hazard, every equipment chassis and equipment cabinet must be connected to an electrical ground. Power cables connecting the equipment must be installed correctly and the locking mechanisms fully engaged.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE. - Do not operate electrical or electronic equipment in the presence of flammable gasses or fumes. Operation of any electrical system in such an environment presents a safety hazard.

KEEP AWAY FROM LIVE CIRCUITS. - Only qualified maintenance personnel must make module or component replacement and internal adjustments.

DO NOT SUBSTITUTE COMPONENTS OR MODIFY SYSTEM. - Due to the danger of introducing additional hazards, substitute components or equipment must not be installed or connected. The system must not be modified in any manner.

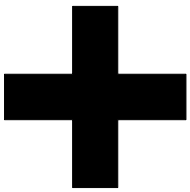
DO NOT DISCONNECT OR CONNECT CABLES WITHOUT REMOVING PRIMARY POWER FROM THE SYSTEM. - Due to possible generation of high-level switching transient voltages when a connection is made or broken with primary power applied, primary power must be removed before connecting or disconnecting cables.

BEWARE OF RADIATION HAZARDS. - Antennas associated with communication sites can be hazardous to personnel when transmitting. Physical or close contact with these antennas can cause radio frequency (RF) burns or severe shock.

BEWARE OF HOT EXHAUST. - Engine exhaust temperatures exceed 650°C(1202°F). When using angle exhaust tube be sure that the tube is not pointed directly at the ground and that the direction of the exhaust is free of combustible material.

Be sure that all electrical installations (including all safety systems) comply with all required regulations of the regional authorities. This includes lightnening conductor, personal protection switch etc.The electrical links must be absolutely shifted and executed after the valid Regulations in each case. This applies also to the used cable materials. The provided cables are certified only for a "protected" transfer (e.g. in the pipe) at a temperature upto max. 70°C (160°F). The electrical system must be likewise equipped with all necessary protections.





5 Safety steps to follow if someone is the victim of electrical shock

- Do not try to pull or grab the individual.
- If you cannot turn off the electrical power, pull, push, or lift the person to safety using a wooden pole, rope, or some nonconductive material.
- If possible, turn off the electrical power.
- Send for help as soon as possible.
- After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start necessary first aid procedures.

WHEN AN ADULT STOPS BREATHING

WARNING

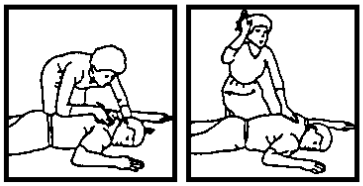
DO NOT attempt to perform the rescue breathing techniques provided on this page, unless certified. Performance of these techniques by uncertified personnel could result in further injury or death to the victim.

1 Does the Person Respond?

- Tap or gently shake victim.
- Shout, "Are you OK?"

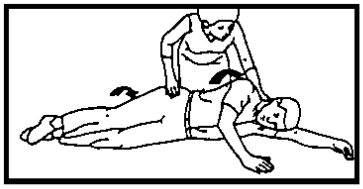
2 Shout, "Help!"

- Call people who can phone for help.



3 Roll Person onto Back.

- Roll victim toward you by pulling slowly.

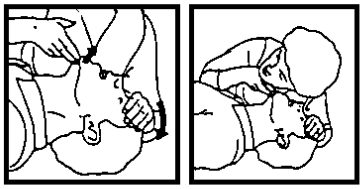


4 Open Airway.

- Tilt head back, and lift chin.
- Shout, "Are you OK?"

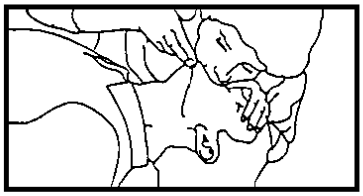
5 Check for Breathing.

- Look, listen, and feel for breathing for 3 to 5 seconds.



6 Give 2 Full Breaths.

- Keep head tilted back.
- Pinch nose shut.
- Seal your lips tight around victim's mouth.
- Give 2 full breaths for 1 to 1½ seconds each.



7 Check for Pulse at side of Neck.

- Feel for pulse for 5 to 10 seconds.

8 Phone EMS for Help.

- Send someone to call an ambulance.

9 Begin Rescue Breathing.

- Keep head tilted back.
- Lift chin.
- Pinch nose shut.
- Give 1 full breath every 5 seconds.
- Look, listen, and feel for breathing between breaths.

10 Recheck Pulse Every Minute.

- Keep head tilted back.
- Feel for pulse for 5 to 10 seconds.
- If victim has pulse, not breathing, continue rescue breathing. If no pulse, begin CPR.

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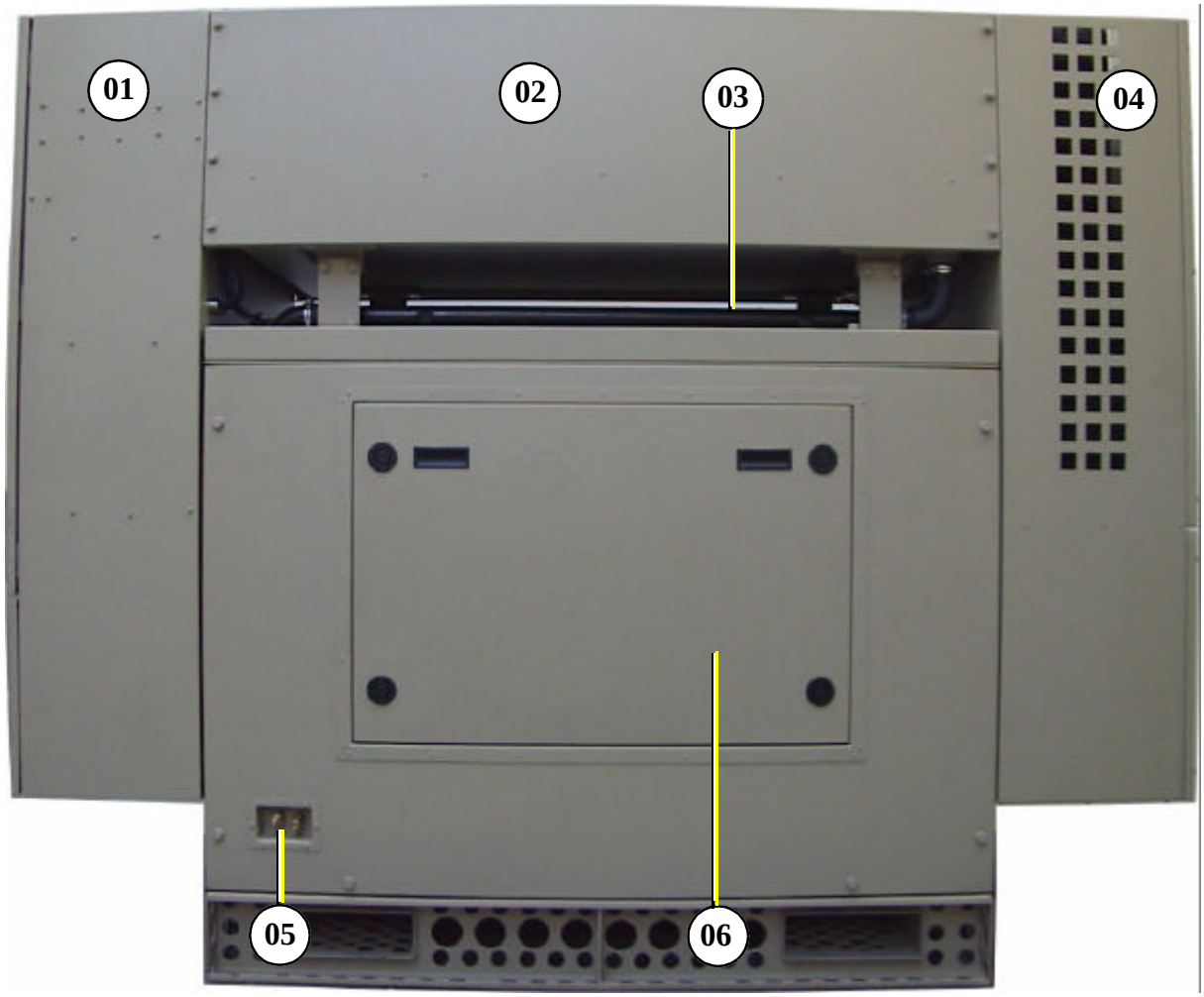
A. The Panda Generator

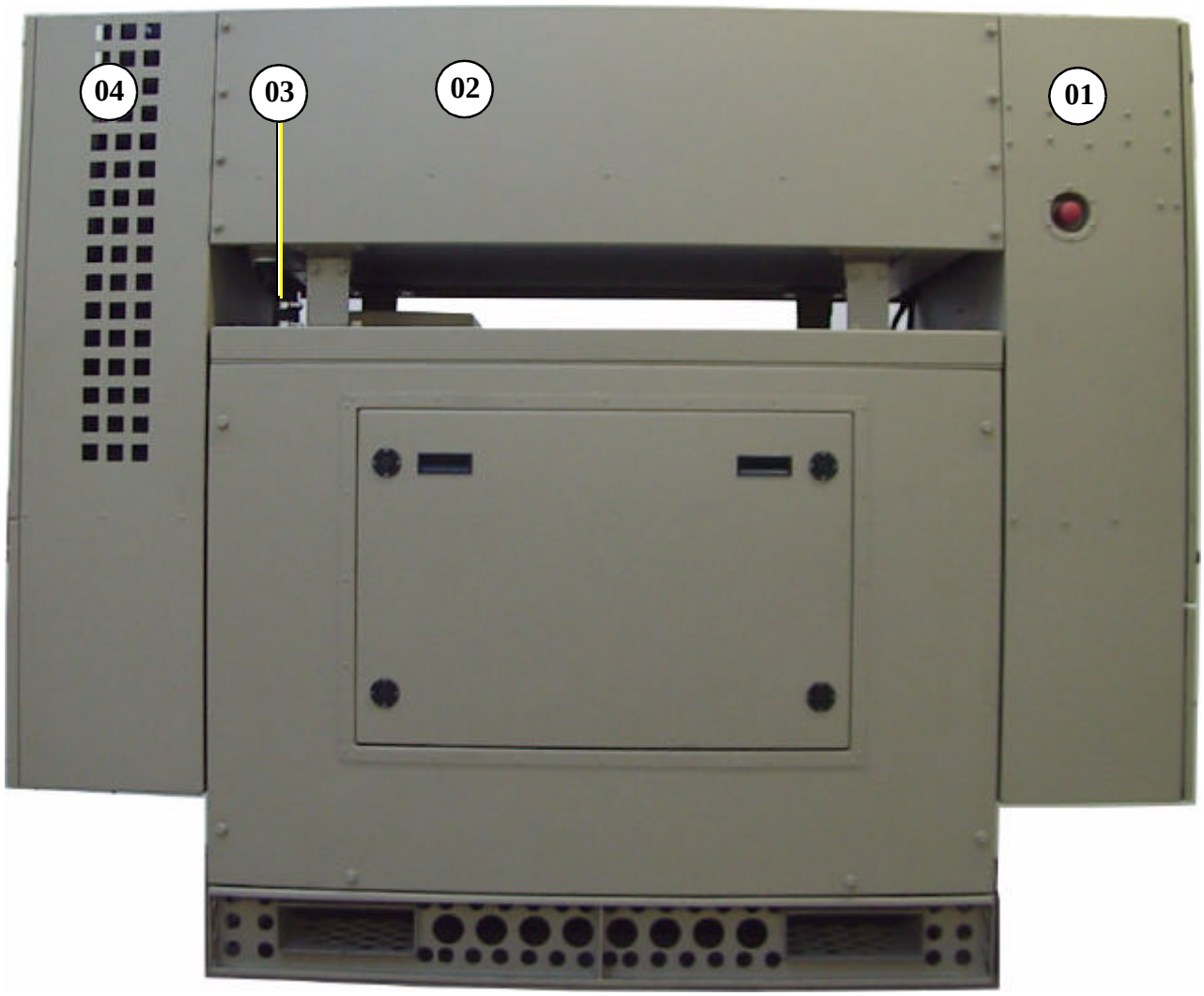
A.1 View from all sides

A.1.1 Side View Right



01. Electrical cabinet
02. Radiator with fans
03. Cooling water pipe, generator - radiator
04. Dry silencer
05. Connection external tank
06. Generator

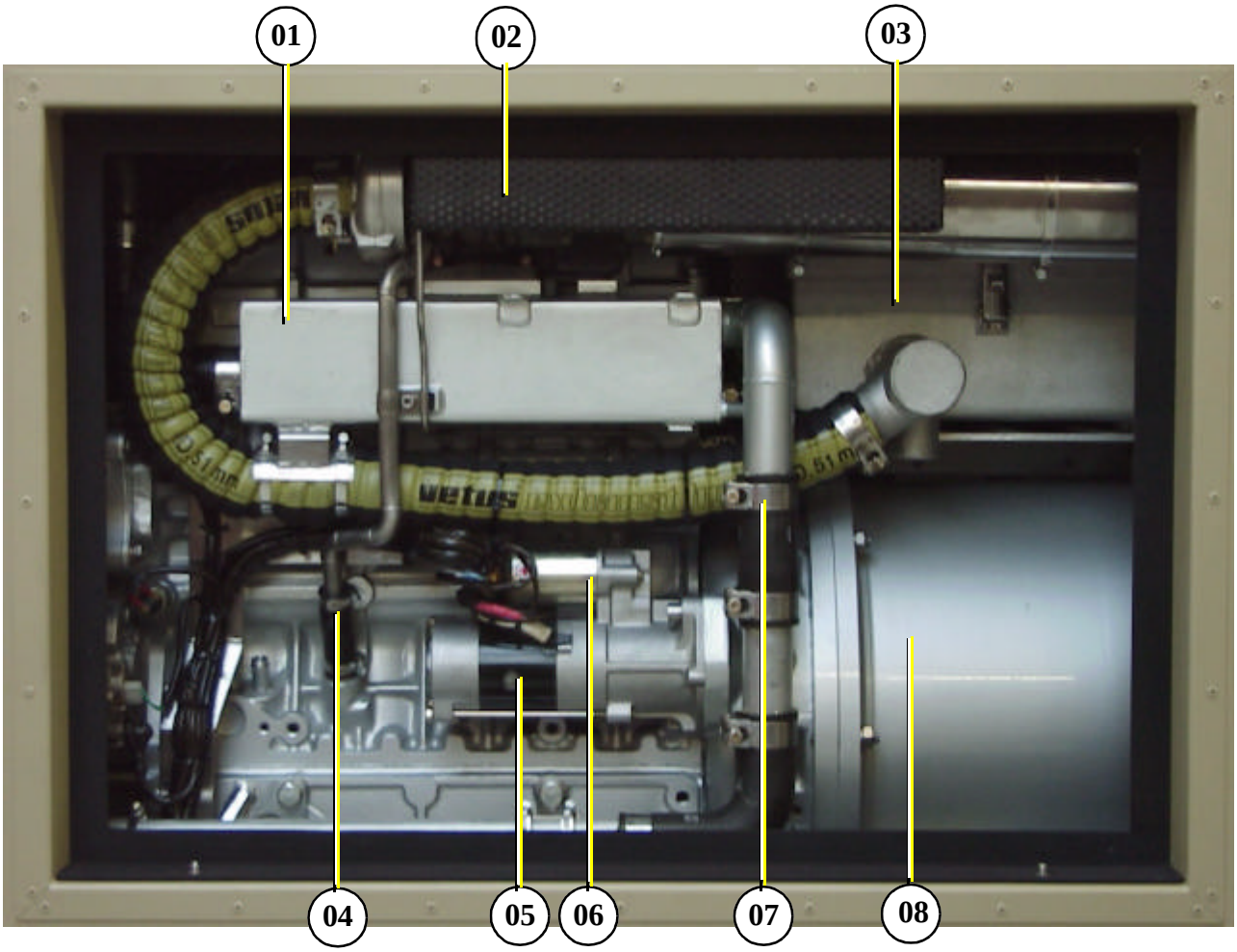
A.1.2 Side View Left



01. Electrical cabinet
02. Radiator with fans
03. Cooling water pipe, generator - radiator
04. Dry silencer

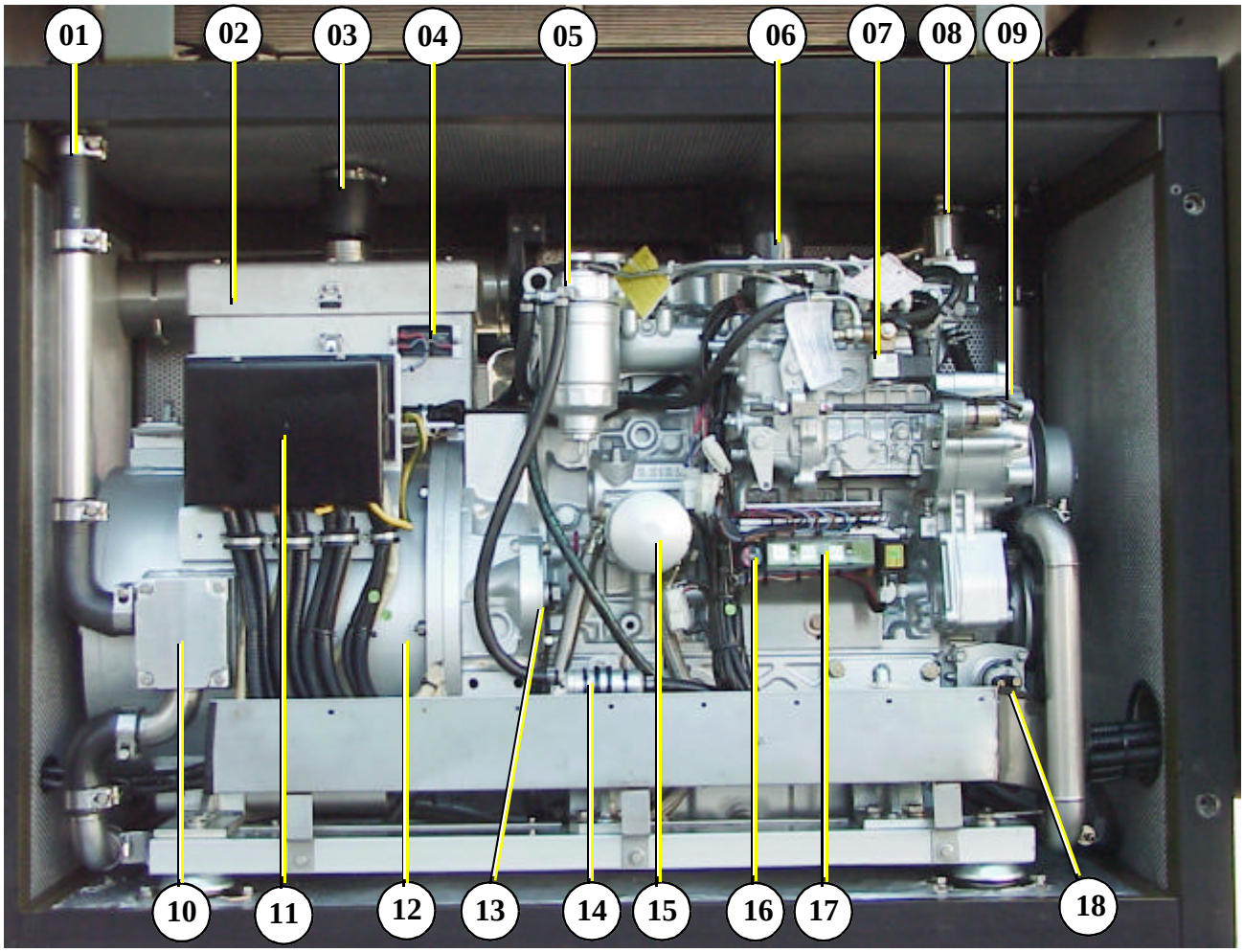
Fig. A.1: Side View Right

A.1.3 Side View Right



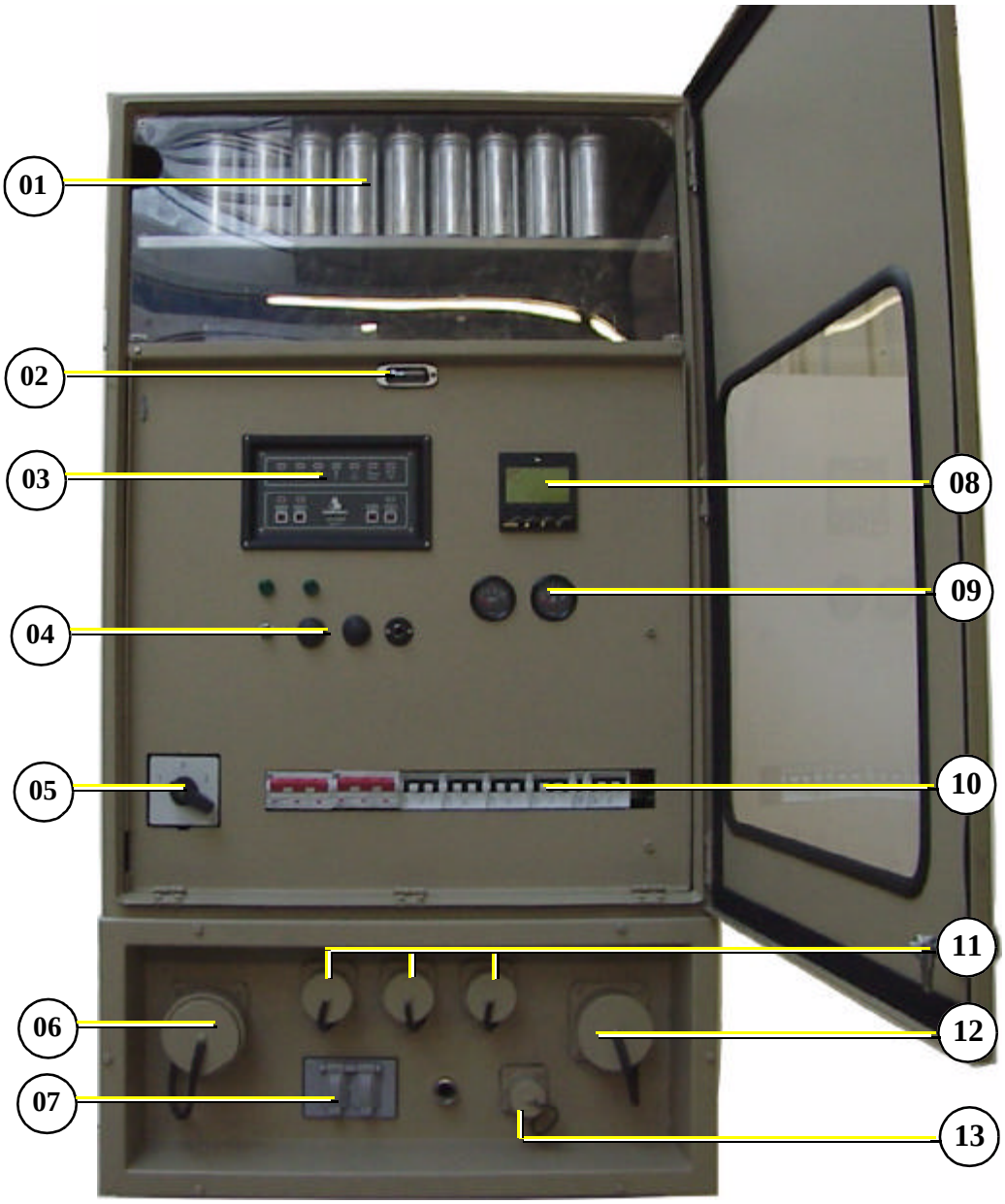
01. Watercooled exhaust elbow
02. Pipe exhaust under heat isolation
03. Air suction housing with air filter
04. Oil runback from turbocharger
05. Starter motor
06. Solenoid for starter motor
07. Coolant out from exhaust elbow
08. Generator housing with coil

A.1.4 Side View Left



01. Cooling water to radiator
02. Air suction housing with air filter
03. Air suction hose
04. DC/DC - Converter
05. Fuel filter with water separator
06. Cylinder head oil filler neck
07. Fuel solenoid valve
08. Thermoswitch at the thermostat housing
09. Servo-motor for rpm-regulation
10. Coolant terminal block
11. Junction box
12. Generator housing with coil
13. Opt. Sensor for rpm-regulation
14. Fuel pump
15. Oil filter
16. Electrical fuses (red=10A, white=25A)
17. Current working relays
18. Oil pressure switch

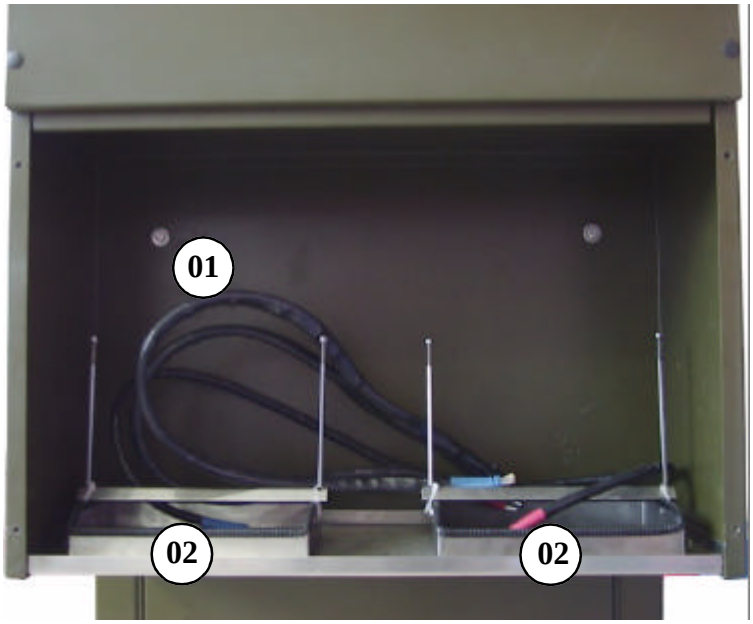
A.1.5 Front View



01. Capacitors for excitation and compensation
02. Panel Light
03. Remote Control Panel
04. Switches „Standby“, „Flame plug“, „Bypass“, „C.-Panel“
05. Main selector Switch
06. Socket5 external supply (3x208V / 100A)
07. Socket6 (120V / 20A)
08. Multi-functional Display
09. Display (oil pressure) / (coolant temperature)
10. circuit breakers
11. Sockets S2-S4 (3x208V AC / 63A)
12. Socket1 LOAD (3x208V / 100A)
13. DC (24V)

Fig. A.2: Front View

A.1.6 Side View Back

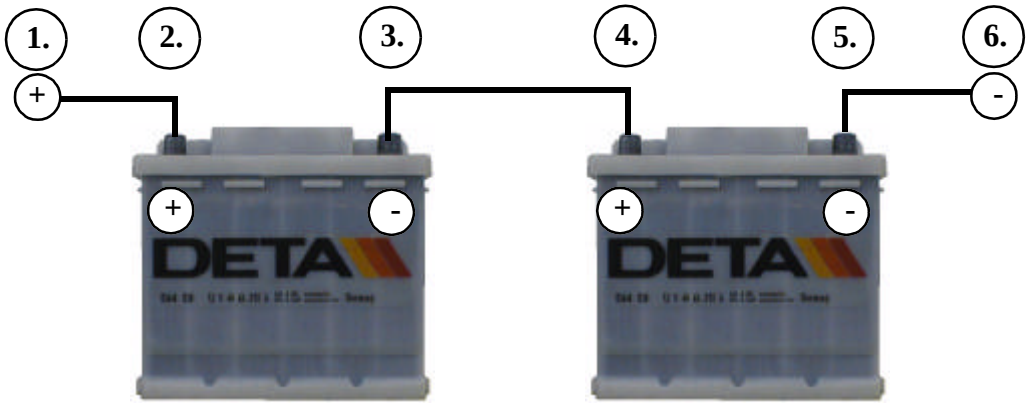


01. Battery Cables

02. Battery holders

ATTENTION!

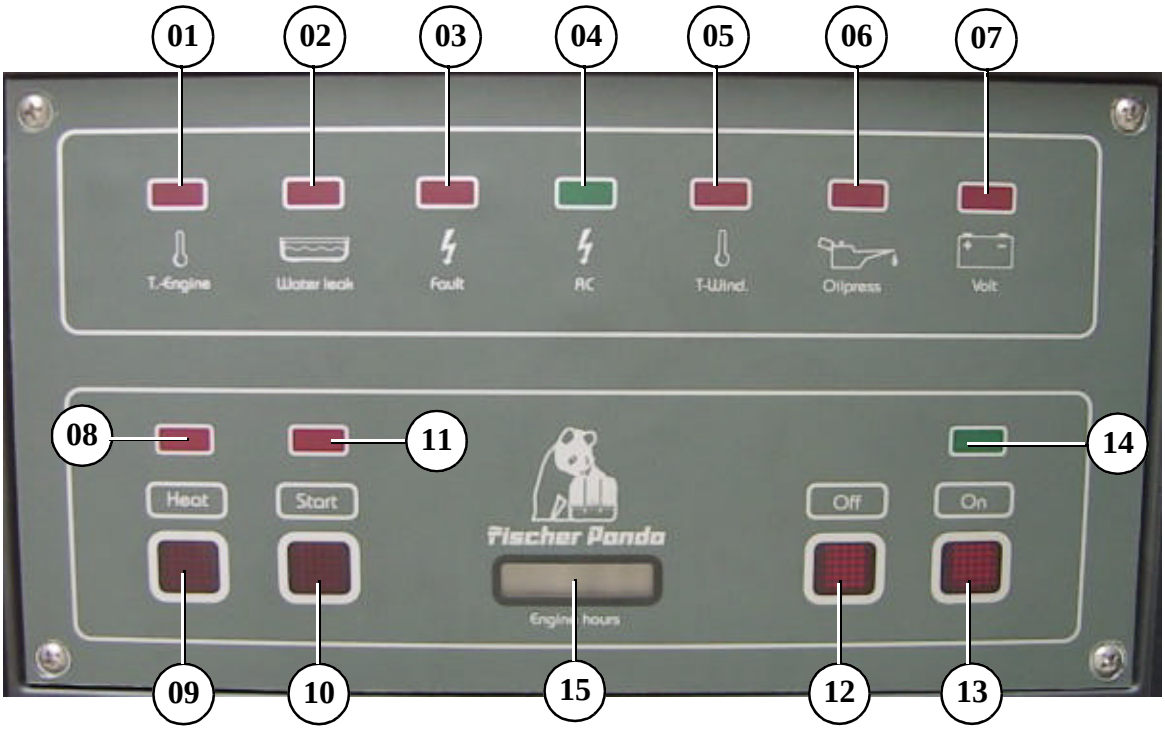
The batterys have to be connected in this order:



A.2 Details of functional units

A.2.1 Remote control panel

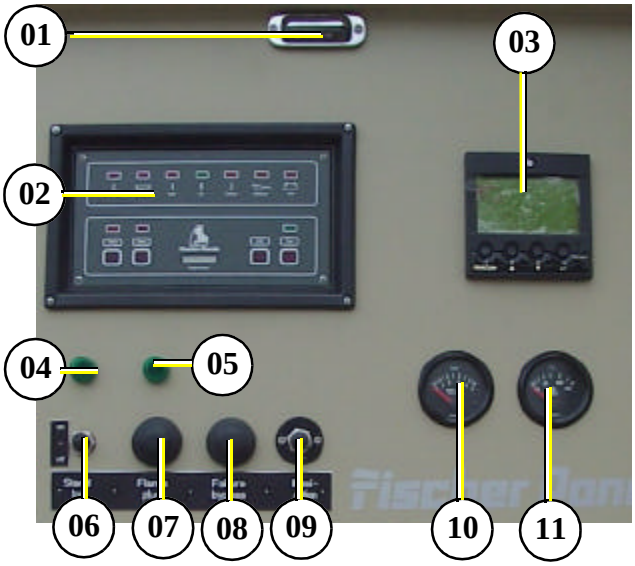
The remote control panel is equipped with some new monitoring functions, which increases the operational safety of the generator. A failure message is shown over contacts which are normaly closed. If a connection is intermitted triggers this a failure message.



01. Warning light coolant temperature
02. Warning light water leak (sensor optional)
03. Warning light AC fault (optional)
04. AC power indicator light
05. Warning light winding temperature
06. Warning light oil pressure
07. Battery loading voltage 12V-DC charging light
08. Glow plug pre-heat indicator light
09. Glow plug pre-heat button
10. System „START“-button
11. System „START“ light
12. Main power switch „OFF“
13. Main power switch „ON“
14. Indicator light Generator „STAND BY“
15. Hours of operation counter

Fig. A.3: Remote Control Panel

A.2.2 Components of electrical system



01. Panel Light
02. Remote Control Panel
03. Multi-functional Display
04. Control light standby
05. Control light flame plug
06. Standby switch
07. Flame plug switch
08. Failure bypass switch
09. Illumination switch
10. Display Oil pressure
11. Display water temperature

Fig. A.4: Front Panel

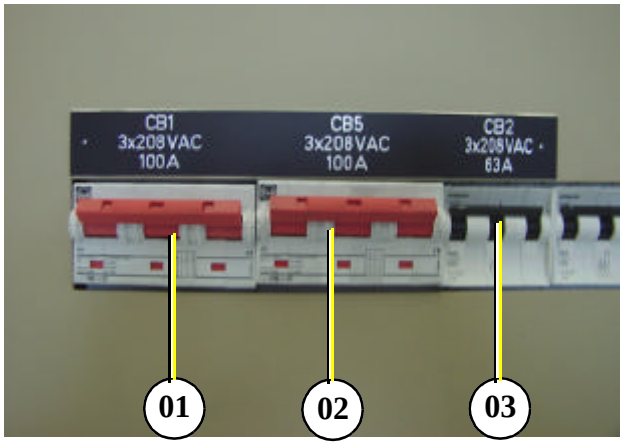
Main selector switch

1 - genset supply

0 - Zero

2 - external supply

Fig. A.5: Circuit breakers



01. Circuit breaker 1 (3x208VAC/100A)
02. Circuit breaker 5 (3x208VAC/100A)
03. Circuit breaker 2 (3x208VAC / 63A)

Fig. A.6: Circuit breakers

01. Circuit breaker 2 (3x208VAC/ 63A)
02. Circuit breaker 3 (3x208VAC/ 63A)
03. Circuit breaker 4 (3x208VAC/ 63A)
04. Circuit breaker 7 (3x208VAC/ 50A)
05. Circuit breaker 6 (120V / 20A)
06. Fan (3x208VAC/ 10A)

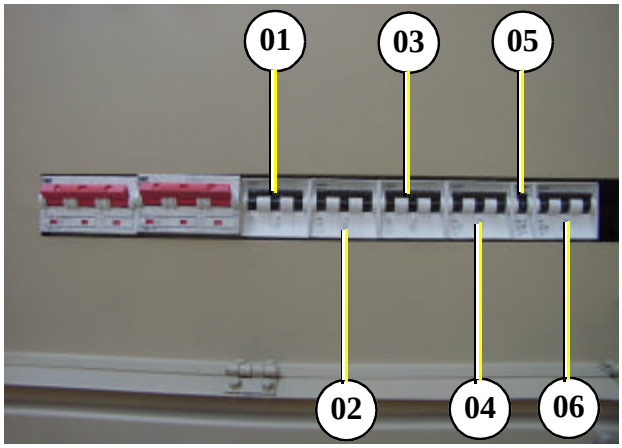


Fig. A.7: Circuit breakers

01. Ext. supply (3x208V / 100A)
02. Sockets 2-4 (3x208VAC / 63A)
03. Socket 6 (120VAC / 20A)
04. Air-condition (3x208VAC / 50A)
05. Socket (24V DC)
06. Socket 1 (3x208V / 100A)

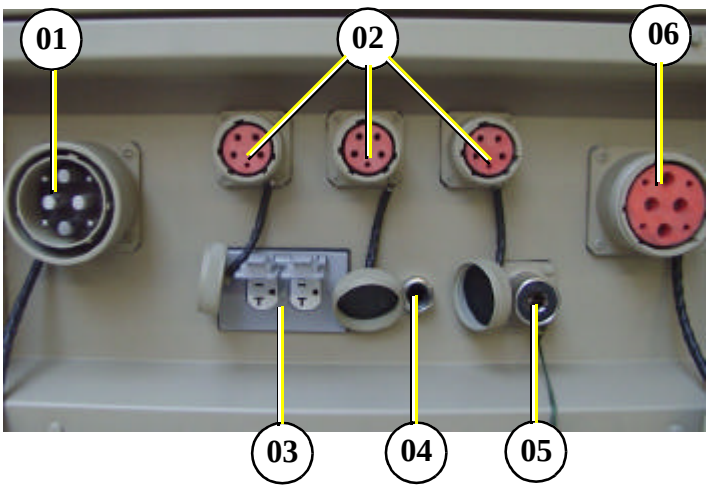


Fig. A.8: Power Connectors

A.3 The VCS-Control

The VCS control regulates the speed of the motor and the generator voltage. It is a part of the accessories and is fitted in the electrical cabinet (see circuit diagrams).

VCS-Control

Fig. A.9: VCS-Control

ATTENTION!

The wire for the measuring voltage must be connected direct to the battery, and is not to be connected to the output side of the generator rectifier.

Because of the drop in voltage, the exact voltage is only received directly to the battery. A wrong connection can lead to damage to the battery!

Alternator

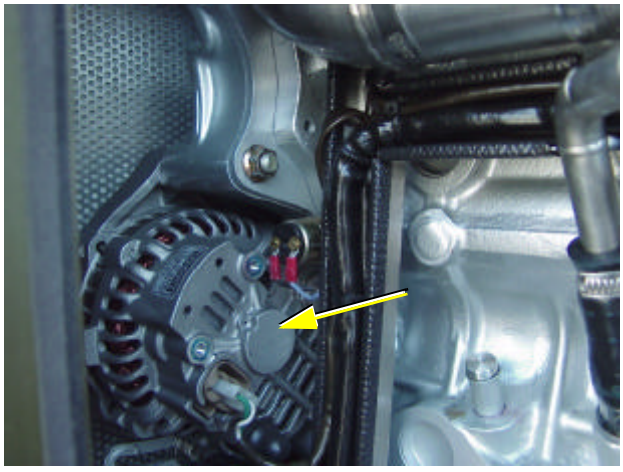


Fig. A.10: Alternator

Starter Motor

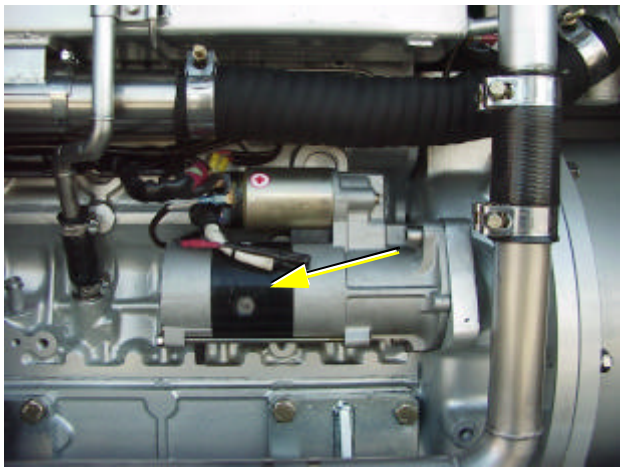


Fig. A.11: Starter Motor

DC/DC Converter at the air suction housing

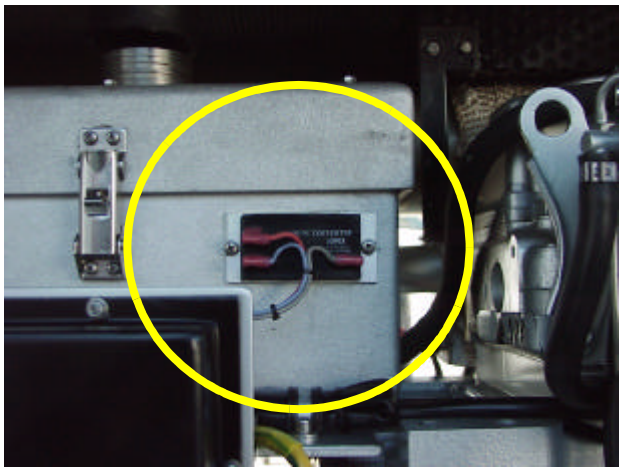


Fig. A.12: DC/DC Converter

Junction plate

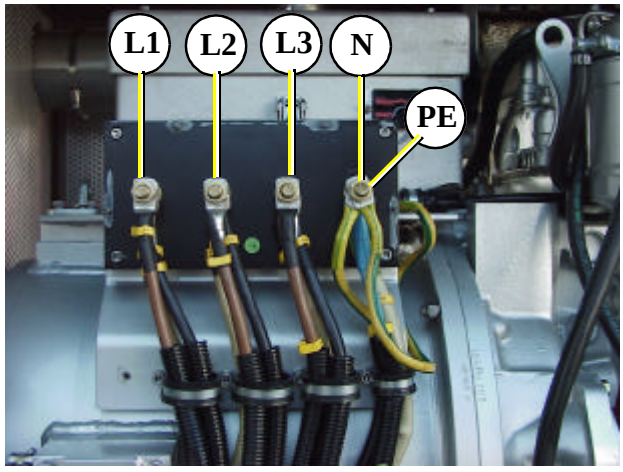
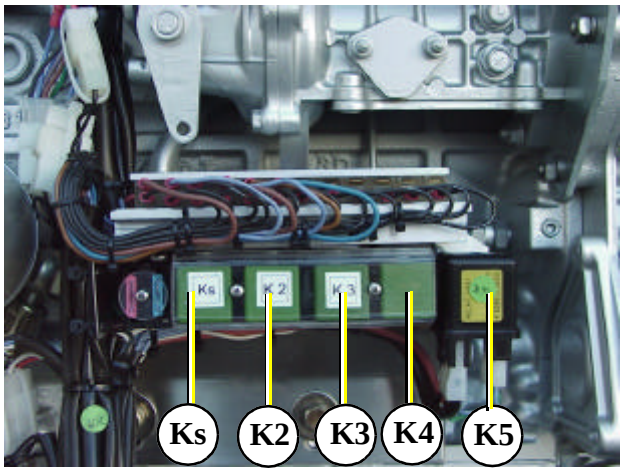


Fig. A.13: Junction plate



Ks: Starter Relay

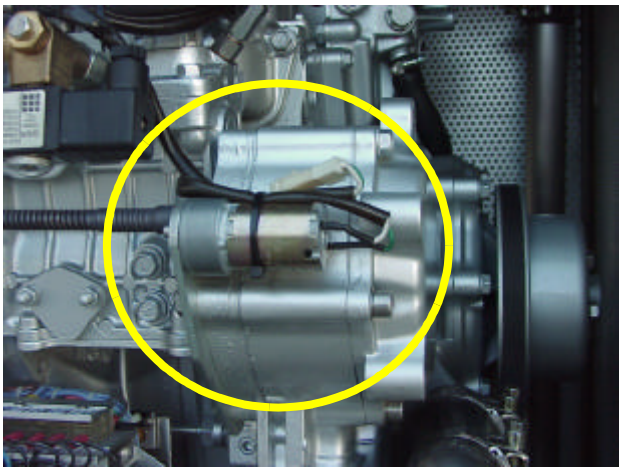
K2: Flame plug

K3: DP +24V

K4: DP +12V

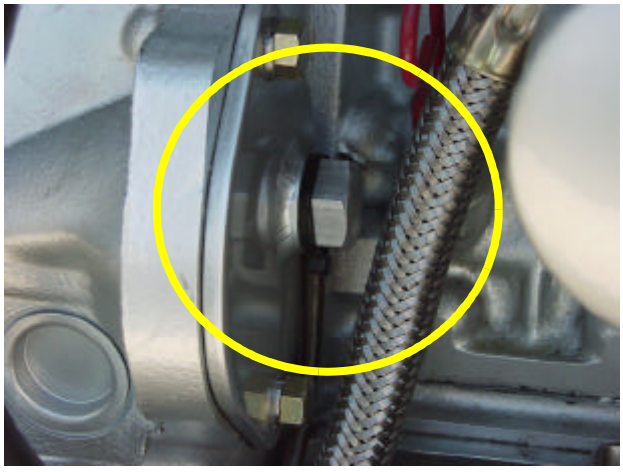
K5: Glow plugs

Fig. A.14: Terminal block



Actuator motor for engine governor

Fig. A.15: Actuator



Mounting hole for rpm-regulation

Fig. A.16: Mounting hole for rpm-regulation

A.3.1 Components of coolant system

Coolant filler cap

Fig. A.17: Cooling water

01. Ventilation screw thermostat housing

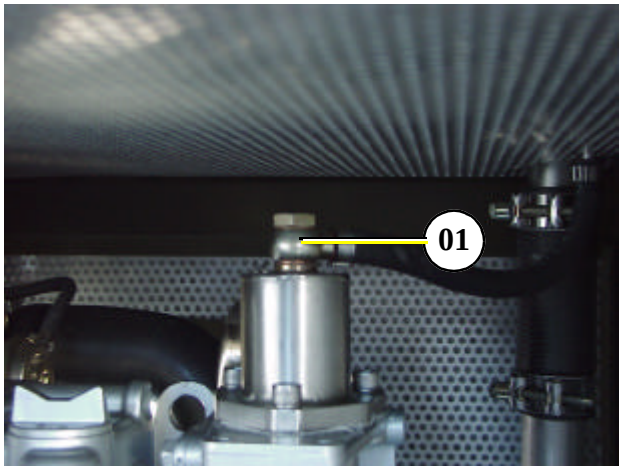


Fig. A.18: Ventilation screws

Coolant connection block

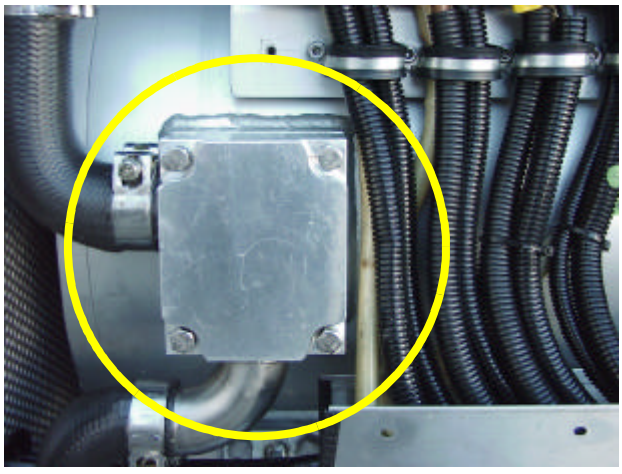
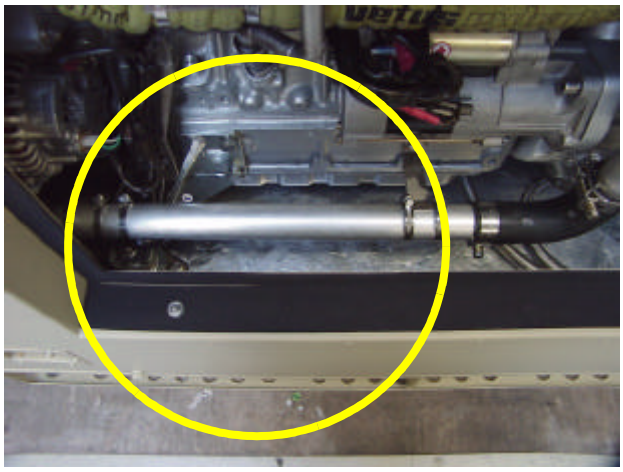
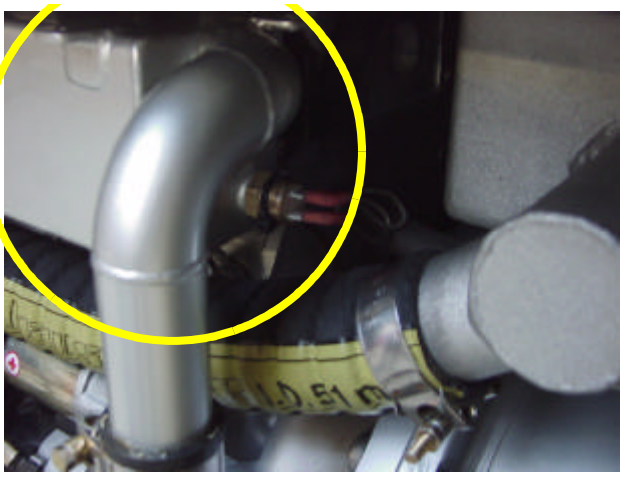


Fig. A.19: Coolant connection block



Coolant tube

Fig. A.20: Coolant tube



Exhaust manifold

Fig. A.21: Exhaust manifold

Connection pipe generator-radiator

Fig. A.22: Coolant

Display coolant temperature

Fig. A.23: Display temperature

Fan at the radiator

Fig. A.24: Fan

Coolant outlet

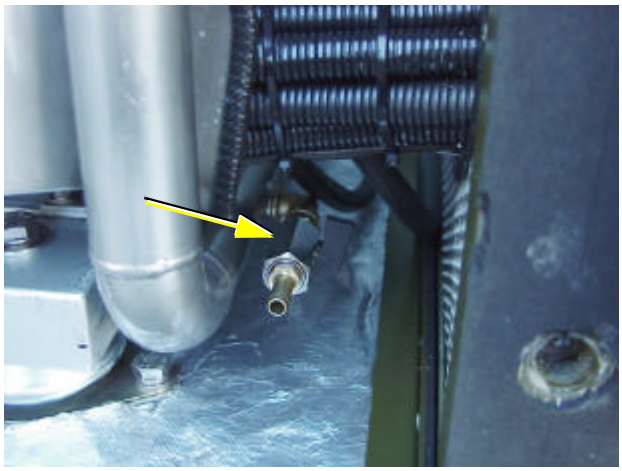
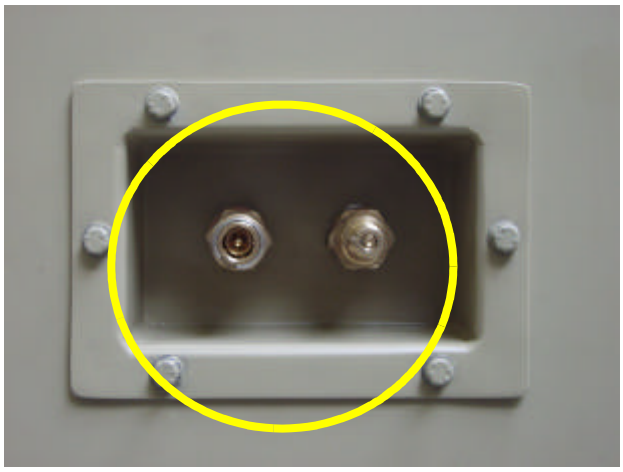


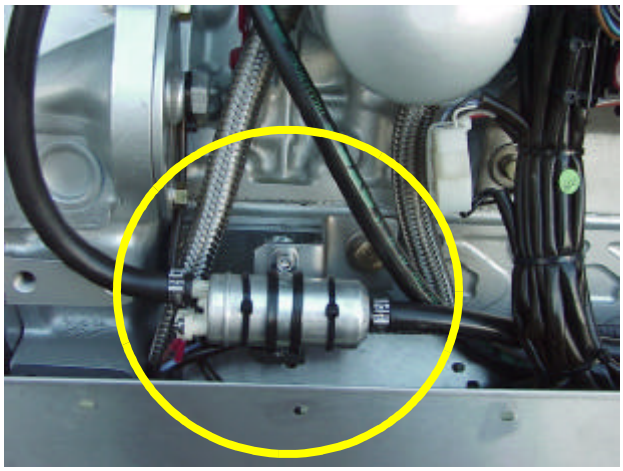
Fig. A.25: Coolant outlet

A.3.2 Components of fuel system



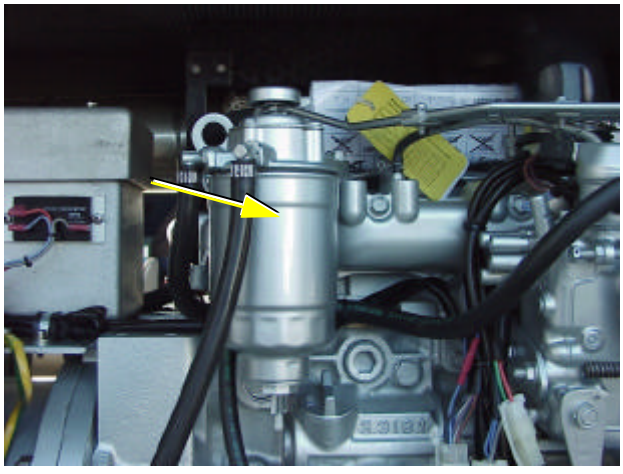
Fuel in / out

Fig. A.26: Fuel in / out



Fuel pump

Fig. A.27: Fuel pump



Fuel filter with water separator

Fig. A.28: Fuel filter

Fuel solenoid valve

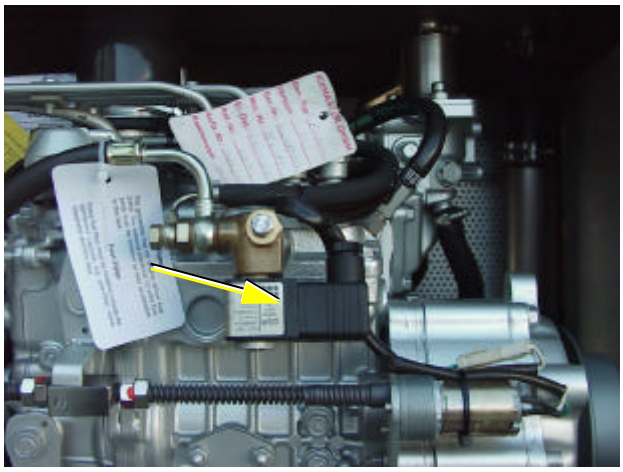


Fig. A.29: Fuel solenoid valve

Injection nozzles

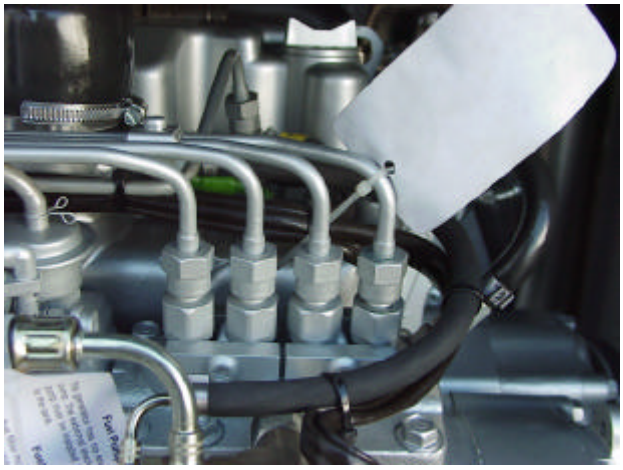


Fig. A.30: Injection nozzles

Flame plug

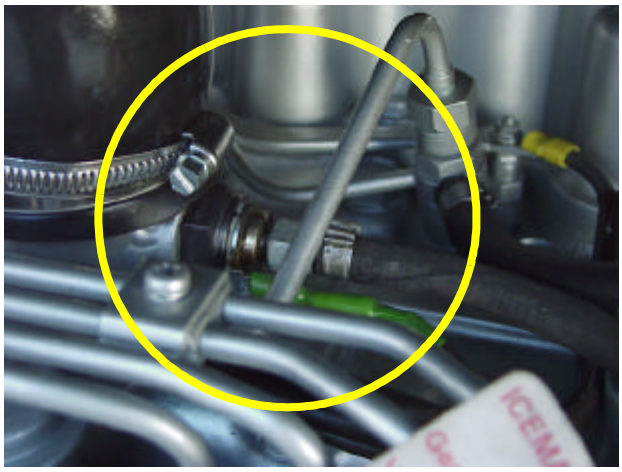
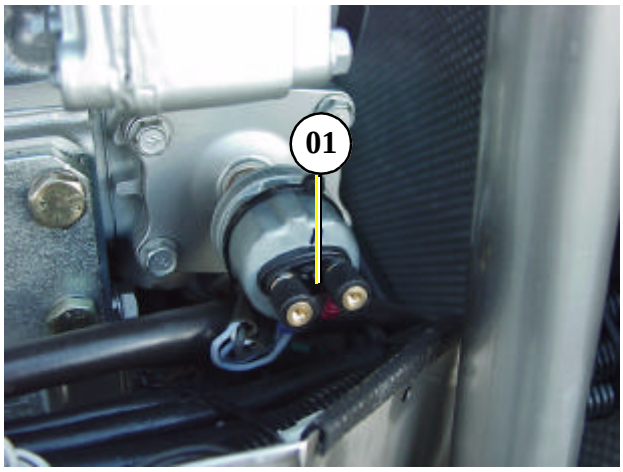


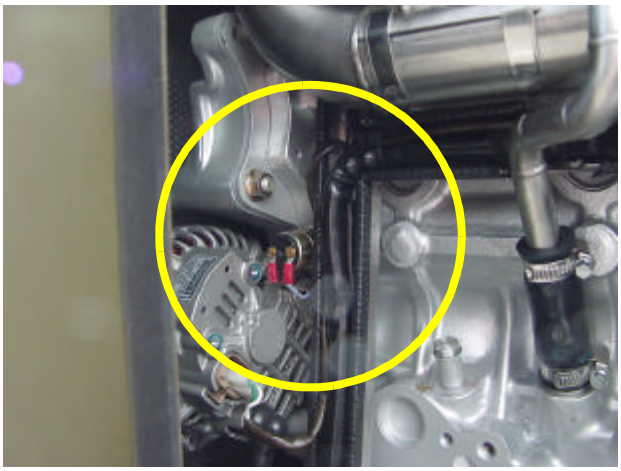
Fig. A.31: Flame Plug

A.3.3 Sensors and switches for operating surveillance



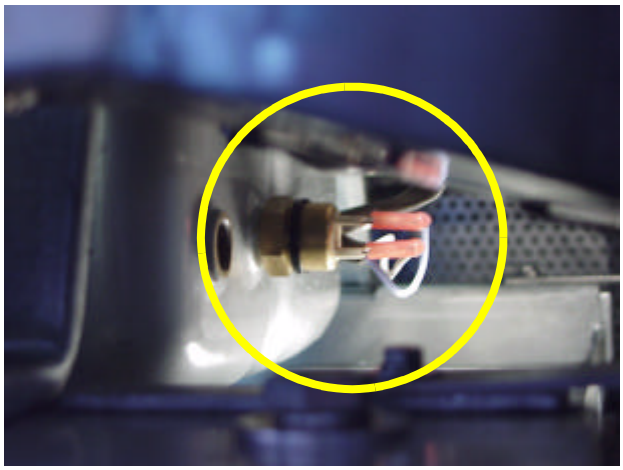
01. Oil pressure transmitter

Fig. A.32: Oil pressure transmitter



OIl pressure switch at DC-dynamo

Fig. A.33: Oil pressure



Thermoswitch oil-sump

Fig. A.34: Thermoswitch oil-sump

Thermoswitch radiator

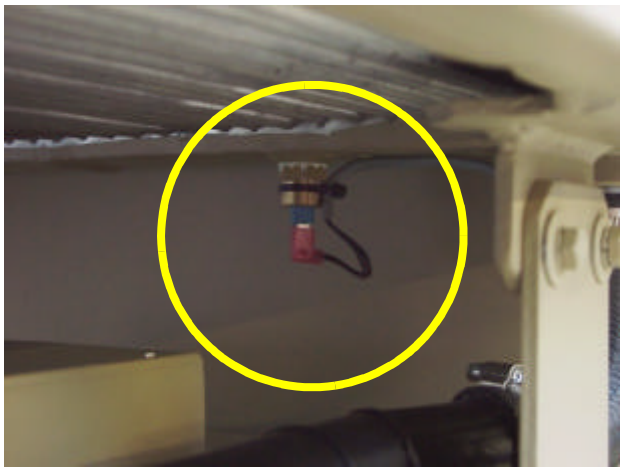


Fig. A.35: Thermoswitch radiator

Thermoswitch exhaust

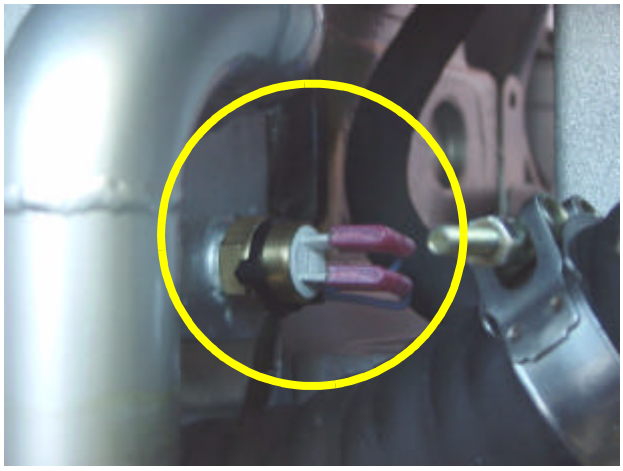


Fig. A.36: Thermoswitch exhaust

Coil thermo-switch

01. Generator winding

02. Temperature switch winding 160°C

03. Generator housing

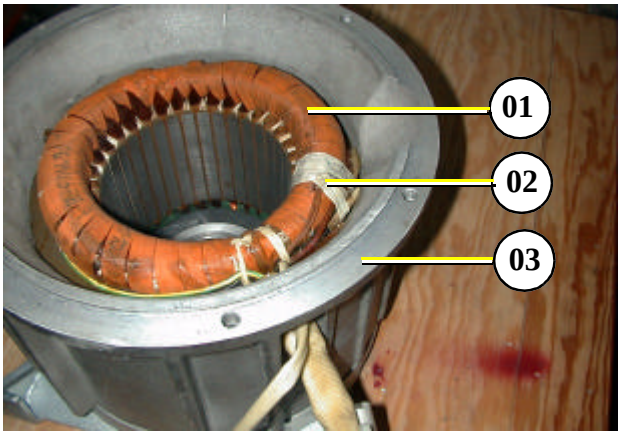
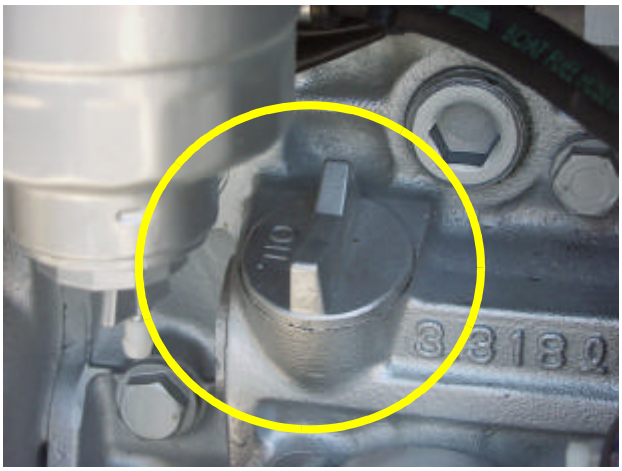


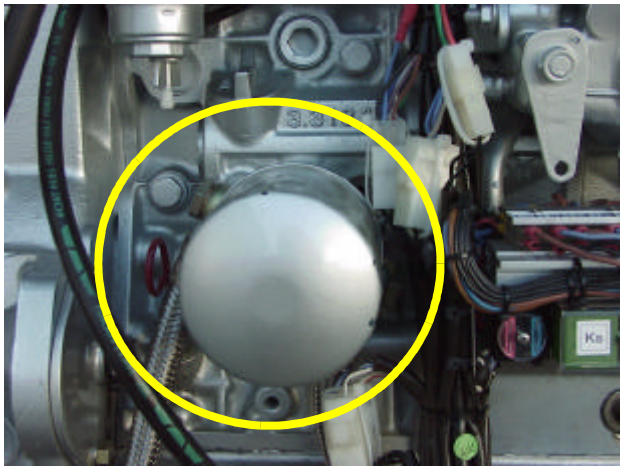
Fig. A.37: Coil thermo-switch

A.3.4 Others



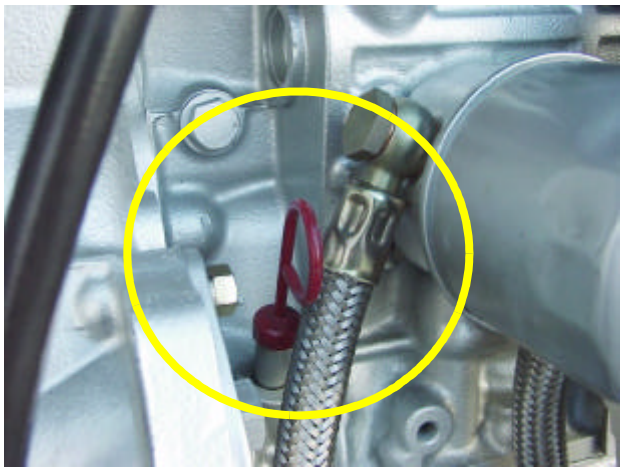
Motor oil filler cap

Fig. A.38: Motor oil filler cap



Oil filter

Fig. A.39: Oil filter



Oil dipstick

Fig. A.40: Oil dipstick

Air suction housing (closed)

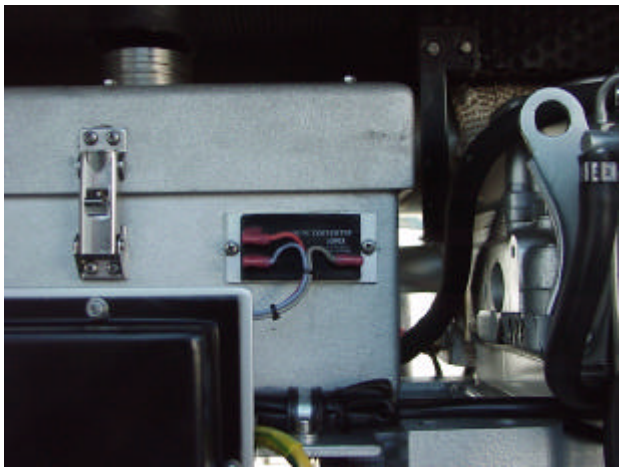


Fig. A.41: Air suction housing

Air suction housing with air filter

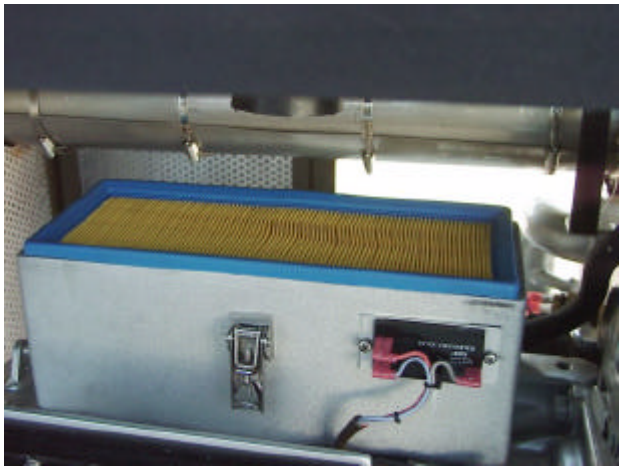


Fig. A.42: Air suction housing

Exhaust outlet

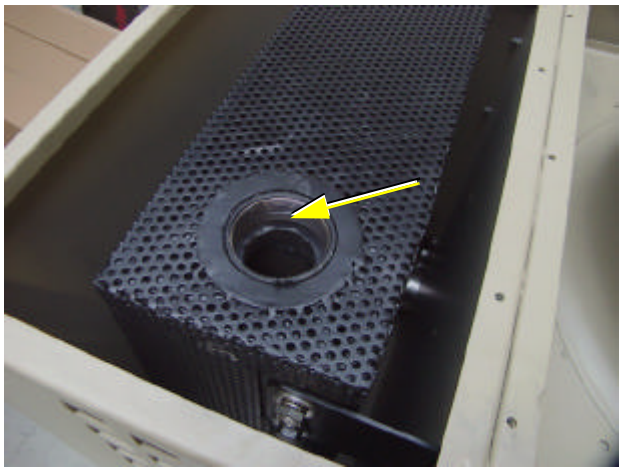


Fig. A.43: Exhaust outlet

B. Generator Operating Instructions

B.1 Safety Instructions

Do not run the generator with an open capsule!

There are dangerous rotating machine components which could cause injury.

All servicing, maintenance and repair works must be carried out with the generator switched off.

High Voltage DANGER !

The genset output Voltages can all be lethal.

Ensure that all electrical installations comply with all required regulations of the regional authorities. The electrical installation should be performed by a qualified technician.

B.1.1 Protection Conductor:

The standard Panda generator is grounded. The PE connection point is bridged to earth in the AC output terminal box (mounted on the generator). This is the initial earth safety point and is sufficent to ensure safe operation however only as long as no other system is installed. This system is adapted to enable test running of the generator before delivery.

The bridge to ground (PEN) is only effective when all components in the electrical system share a common ground. The bridge to ground can be removed and reconnected to another ground system if required for other safety standards.

Full voltage connections are mounted in the electrical cabinet. It must be ensured that the electrical cabinet is secured and closed while the generator is running.

The starter battery cable should be disconnected when work is being done on either the generator or the electrical system in order to prevent accidental starting of the generator.

B.1.2 Instructions for Capacitors

The generator's electrical system requires two different groups of capacitors:

A) The booster capacitors

B) The operating capacitors

Both types are mounted in the electrical cabinet.

Capacitors store an electrical charge. It is possible that even after they have been disconnected stored energy is still held. Therefore it is essential that the connectors are not touched.

Should it be necessary to check or test the capacitors, they should be shorted out by using an insulated screw driver.

The operating capacitors are automatically discharged when the generator is stopped in the normal way. The booster capacitors will be discharged through internal resistor´s.

For safety however, the capacitors have to be discharged (short circuited) prior to carrying out any work on the AC-Control box.

CAUTION! Do not touch the capacitor contact terminals!

B.2 Operating Instructions

B.2.1 Routine „Pre-Start“ Checks (daily)

1. Check engine oil level (should be on MAX).

LOW OIL PRESSURE WARNING LIGHT!
The generator switches off in the case of insufficient oil-pressure. Do not run the generator with the oil at the lowest level in the crankcase. (A smaller volume of oil will become contaminated considerably quicker than a larger volume and there is the possibility that small air bubbles will get in the oil.) Therefore daily oil-checks are required. The oil-level should always be refilled to MAX. Check oil level prior to starting motor or at least 5 minutes after the motor has stopped.

Engine oil should be MIL-L-2104C or have properties of API classification CD grades or higher. Change the type of engine oil according to the ambient temperature. See Table F.2, “Generator liquids,” on Page II

For Oil-Quantities see Table F.4, “Technical Data Engine,” on Page IX

2. Check engine cooling system (all hoses and hose connections for leaks)
3. Check thermal switches and all cables and cable end terminal connections
   a. Exhaust temperature switch
   b. Engine temperature switch
   c. Oil temperature switch
   d. Oil pressure switch
4. Check tightness of all retaining and connection bolts on the engine & generator and generator base mount bolts.
5. Switch main battery switch "ON" (if installed).
6. Open fuel inlet valve (if installed).

B.2.2 Preliminary remarks

Damage to Starter Motor

The starter is fitted with a free wheel or axial rotating spring cog, which prevents the starter being driven externally by means of the motor. The free wheel will be heavily worn, if the starter still operates, thereby causing damage to the springs, roller bearings or cog teeth. This could lead to complete destruction of the starter.

It is important that every person who operates the generator is informed of this situation. This is practically the only handling error that can be made on board that can lead to fatal consequences for both generator and operator.

Use of the cold-start equipment

If a generator is designated for winter activity you should timely take care for winter-suitable diesel fuel.

Always try out that the fuel is qualified for the temperature, before using the cold-start equipment.

Pre-heating the diesel motor

The motor must be pre-heated, if the diesel motor is designed as a "pre-combustion chamber motor" for indirect fuel injection. A quick glow fitting is used for all Kubota-diesel motors. This glow fitting may only be used for a maximum of 20 Seconds without a pause. A pre-glow period of 5 - 6 seconds suffices for ambient temperatures above 20°C (Plus). For lower temperatures the pre-glow period should be increased.

The motor can be started for temperatures up to minus 20°C, as long as running conditions are suitable. The fuel must be suitable for such conditions, as conventional diesel fuel can produce a paraffin coating at temperatures lower than minus 8°C. so blocking all filters and pipes. It is normal in Europe to use an additive, obtainable from gas stations to ensure use at temperatures as low as minus 15°C. If a generator is to be used for temperatures below minus 8° C, then it must be ensured the fuel is suitable for winter. By use of extra additive, the fuel can also be used at lower temperatures. The appropriate regulations can be obtained from the fuel suppliers. The mineral oil trade have stocks of fuel, which are suitable for use for temperatures below minus 20°C.

Pre-heating procedure

If the engine is to be started at a temperature below minus 15°C, then the pre-heating device must be pressed for 20 seconds before starting. Pre-heating must be continued whilst the generator is being started. The starter motor should not be used for a period longer than 20 Seconds without interruption. If the engine does not start after 20 seconds, then a pause of at least one minute should be made. Then a further start can be attempted.

If the diesel motor does not start as expected, then an initial check should be made to check whether the fuel intake is correct.

Starting the Diesel Motor by means of a Flame Primer System

The diesel motor cannot be started at temperatures below 20°C by means of a conventional pre-heating device. If this use below 20°C is expected, then the aggregate must be fitted with a Flame Primer System. In this case, a flame plug in the induction area is additionally required for pre-heating the air induction.

Tips regarding Starter Battery

Fischer Panda recommends normal starter battery use. If an aggregate is required for extreme winter conditions, then the starter battery capacity should be doubled. It is recommended that the starter battery be regularly charged by a suitable battery-charging device (i.e., at least every 2 Months). A correctly charged starter battery is necessary for low temperatures.

Motor Oil Quality during extreme Winter Conditions

Suitable motor oil is recommended for extremely low temperatures. The advice of mineral oil dealers is recommended. Normally, synthetic oil with the appropriate viscosity is especially suitable for this type of cold start.

Improvement by using additional cold start sprays is not recommended.

Use of the Flame Primer System

The Flame Primer System is started by manually pressing a button, similar to the pre-heating device, which is also manually started. The Flame Primer System must be pressed for approximately 20 seconds before starting. During this period the glow plug sheathed elements reach the desired temperature. (The flame start plug fuel valve automatically opens, if the temperature is reached.)

The pre-heat device must also be depressed at the same time as the Flame Primer System. The electric starter must be engaged after 20 seconds. The Flame primer System button must continue to be pressed down during this period. The start procedure may only be maintained for a maximum of 20 seconds without interruption. If the aggregate does not start during this period, then the starting procedure can be repeated after a period of 60 seconds.

Note: - The flame primer system and the pre-heat device continue to be active during the starting phase. In the case of some aggregates, the pre-heat button must also be pressed down during this period. The pre-heat device is starts automatically in the case of other aggregates. The pre-heat button should be selected, if there is doubt

B.2.3 Overloading of Engine during longer Operation

Please ensure that the genset is not overloaded. Overloading occurs when the electrical load (demand) induces a load torque in the generator which is higher than that which the diesel drive motor can provide. Overloading causes the engine to run rough, burn oil, creates excessive exhaust (environmentally unfriendly) and even to stall. Extra caution should be practised with multi-power units (single and 3-phase current generation) to avoid overloading the diesel drive engine.

The generator should only be loaded at the peak rated power for short periods only! A high peak current is required to start many electrical devices, especially electric motors and compressors (from a still stand state).

In order to prolong the genset´s life expectancy, the nominal electrical demand on the system should not be more than 80% of the rated genset peak load.

Keep PEAK LOADING demand in mind when switching on electrical devices (esp. fridge compressors, electric motors, battery chargers, etc.) which are fed by the generator. Careful "powering up" (gradual loading) of the electrical demand on the generator will help prolong the life of your genset! The genset can be run for several hours at partial load (i.e. 2/3 of rated power), however it is not advised that it is run for more than 2-3 hours at full load.

The Panda is designed so as not to overheat even under extreme conditions. Note: The exhaust gas will become sooty during peak-load operation.

B.2.4 Starting Generator

1. If necessary open the fuel valve
2. If necessary, close the main battery switch.
3. Check if all the consumers have been switched off.

   The consumers are switched off, before the generator is switched off. The generator is not to be started with consumers connected. If necessary, the main switch or fuse should be switched off or the consumers should be individually switched off.

4. Press Standby-switch "ON" (Position 06 on Operation unit).

   Pilot lamp for "Stand by" Button must light up (Position 04 on Control panel).

5. Press "ON" button (Position 13 on Control panel).

   Pilot lamp for "ON" Button must light up (Position 14 on Control panel)..

6. Pre-heat engine (Position 09 auf Control panel).

   Pre-heating is necessary for every running temperature. Pre-heating is not necessary, only if the generator has just been run. The heating period should take at least 6 seconds, however, 20 seconds at the maximum. Heating must last for 20 seconds at a temperature of + 5. If a second attempt is to be made, then a pause of at least 60 seconds is required.
   The generator can be started with the assistance of a pre-heating device at temperatures as low as - 20° C. Please note that the generator can only be run at temperatures below -8°C with winter fuel and additional special additives.

7. Flame Start at temperatures below -20°C (pos. 07 on operation unit)
8. Press "START" button

   The electric starter may only be used for a maximum of 20 seconds. Thereafter, a pause of, at least, 60 seconds is required. If the aggregate does not immediately start, then the fuel intake should be checked to ensure it is flowing freely. (For temperatures below - 8° C check whether there is winter fuel)

9. Check circuit- voltmete, to test whether there is AC voltage and is within the tolerance range (Frequency and voltage).

   The AC voltage should be within a tolerance of ± 3 Volt without load at the nominal voltage. When running without load, the generator frequency should be 4% below the nominal voltage. The generator should be checked, before the consumers are switched on, if the current remain at this level.

10. Switch on consumers. .

    The consumers should only be switched on if the generator voltage is within the permissible range. Parallel connection of several consumers should be avoided, especially if there are consumers with electric motors, such as air-conditioning units in the system. In this case, the consumers must be connected Step by Step

B.2.5 Stopping the Generator

1. Switch off consumers
2. If the load is higher than 70 % of the nominal load, then generator temperature should be stabilised by switching off the consumers for at least 5 minutes.

   At higher ambient temperatures (more than 25° C) the generator should always run for at least 5 minutes without load, before it is switched off, regardless of the load.

3. Press generator "ON/OFF" button and switch off.
4. If necessary, press additional switch (battery switch, fuel stop valve).
5. Switch „Stand by“ button "OFF"

B.2.6 Starting the Generator when overheated by a "Failure Bypass Switch“

There is a "pressure switch" on the operation unit. Faults (e.g. caused by overheating) can be manually overcome by means of this switch. The generator can be started by using the remote control panel. The operating temperature can be reduced for a short period of time (without stress of course), so that the fault switch returns to the original position should overheating cause the generator to shut down because of overheating.

ATTENTION:

Before using the failure bypass switch, it is important to check the oil level, since the oil gauge is deactivated by the switch.

For a further reason it is important to switch off the generator electrical load before the generator is shut down:

Before stopping the generator it is highly recommended that electrical devices (e.g. refrigerating compressors, air conditioning compressors etc) are switched off, because the voltage drops as the rotational speed (rpm) decreases as the engine comes to a halt.

(Also see information regarding voltage control with automatic shut-off for protection of consumers when over or undervoltage occurs).

This is also the case when the generator is started when consumers are switched on.

Normally the generator will no longer excitate if a certain amount of base load is stepped up.

The electrical load should also be shut-off before starting the generator.

If started under electrical load, the engine will still run but the generator will not generate the proper voltage (or even no voltage) since the stator windings do not have the chance to reach full excitation. Electrical units which are switched on in this condition could possibly be damaged (special caution should be practised with electric motors to avoid burnout).

B.2.7 Operating Control System on the Panda Generator

Panda generators are equipped with various sensors. One of these sensors is to stop excitation should a short circuit occur. The combustion engine is further equipped with a oil pressure control switch, which switches the motor off, if the oil pressure sinks to a particular level. Apart from this, all generators are equipped with three temperature switches.

The thermo-switches are placed at the following locations:

1. Thermo-switch fitted to the radiator
2. Thermo-switch fitted to the exhaust ellbow
3. Thermo-switch fitted to the oil sump
4. Thermo-switch in the genset coil
5. Oil pressure switch

Thermo-switch at the radiator

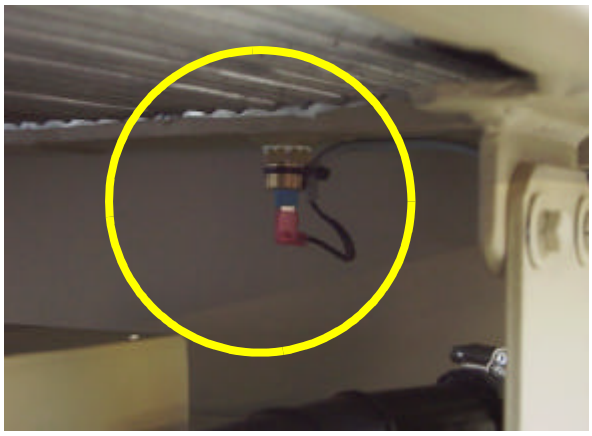


Fig. B.1: Radiator thermo-switch

Thermo-switch fitted to the watercooled exhaust ellbow

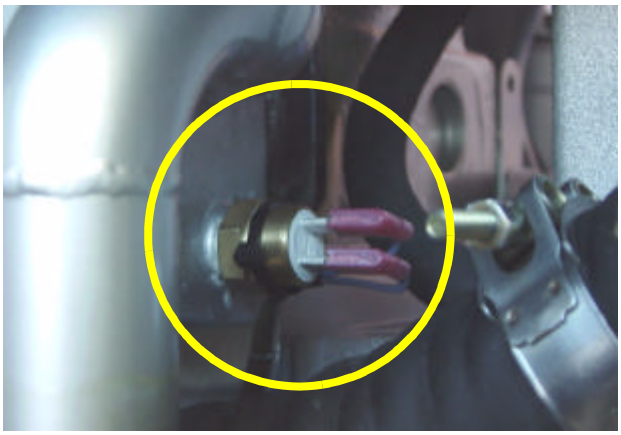


Fig. B.2: Thermo-switch

Thermo-switch engine oil

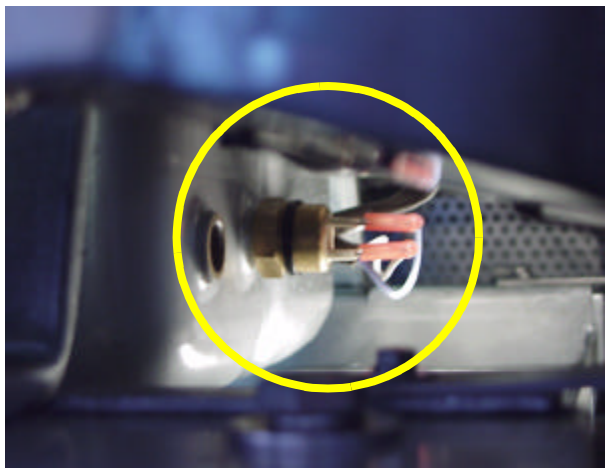
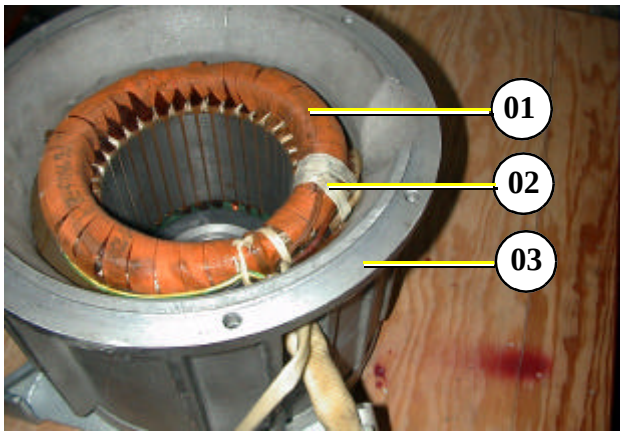


Fig. B.3: Oil sump thermo-switch



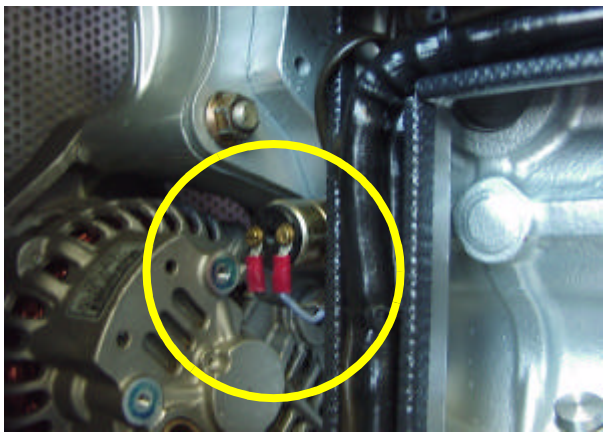
Winding thermo-switch

01. Generator winding

02. Temperature switch winding 160°C

03. Generator housing

Fig. B.4: Winding thermo-switch



Oil pressure switch

Fig. B.5: Oil pressure transmitter

C. Troubleshooting

C.1 Overloading the Generator

Please ensure that the genset is not overloaded. This is especially the case with multi-power aggregates. Overloading occurs when the electrical load (demand) induces a load torque in the generator which is higher than what the diesel combustion engine can provide. Overloading causes the engine to run rough, burn oil, create excessive exhaust (environmentally unfriendly) and even to stall.

The generator should only be loaded at the peak rated power for short periods only! A high peak current is required to start many electrical devices, especially electric motors and compressors (from a still stand state).

In order to prolong the genset´s life expectancy, the nominal electrical demand on the system should not be more than 70% of the rated genset power.

Remember this when switching on electrical devices. This ensures a longer life expectancy.

Continuous performance is the uninterrupted running of the generator for many hours. The genset can be run for several hours at partial load (i.e. 2/3 of rated power), however it is not advised that it is run for more than 2-3 hours at full load.

The Panda is designed so as not to overheat even under extreme conditions. Note: The exhaust gas will become sooty during peak-load operation.

Effects of Short Circuiting and Overloading on the Generator

The generator cannot be damaged by short circuiting or overloading. Short circuiting and overloading suppress the magnetic excitation of the generator, thus, no current is generated and the voltage will collapse. This condition is immediately offset once the short-circuit has been eliminated and/or the electrical overload removed.

Overloading the Generator with Electric Motors

Please note that electric motors require six to ten times more power than their rated capacity to start.

If the supplied generator power is lower than what the electric motor requires, the generator voltage will collapse. For applications where a high current draw is required to start an electrical device (such as an electric motor), the motor manufacturer should be consulted for possible solutions (for example: stronger capacitors, gradual power-up switches, or a specially designed starting unit for electric motors).

System efficiency can be improved by up to 50% and motor current draw (to start) reduced by as much as 100% if it is properly designed. If the inductive load (i.e. E-Motor) is more than 20% of the generator nominal power, a compensation is necessary. See also the information brochure "Special information for operation of Panda generators with inductive load".

C.1.1 Generator Voltage Fluctuations and Monitoring

ATTENTION! Before working on the System read “Safety Precautions” on Page iv

During periods of high electric loading, the voltage may drop to 190V/50Hz (or 95V/60Hz) or even lower. Such voltage drops can potentially cause damage to certain electrical devices such as electric motors, compressors and electronic equipment. In order to ensure that sufficient voltage is available and to avoid the risk of damage to sensitive electrical devices, the supply voltage should be monitored with the voltmeter, which is mounted at the operation unit.

The voltmeter must be respectively checked if additional consumers are switched on. As long as the voltage remains below the critical level the sensitive devices must be switched off during this period.

Overvoltage can be caused by the generator under certain circumstances. This occurs, especially if the speed of the motor changes (increases in speed). Adjustment to the normal motor speed (rpm) should only be done with the use of a rev counter and/or a voltmeter.

A voltage regulated circuit breaker is installed in the electrical system in order to avoid damage, if sensitive or valuable equipment is used. (voltage control with circuit breaker).

C.1.2 Automatic Voltage Monitoring and Auto-Shut Down

If air conditioning units (compressors) or other such valuable equipment are installed on-board, an automatic voltage monitoring unit should be installed to protect this equipment from possible sharp voltage drops. The voltage monitoring system shuts down the entire system (and therefore all users) through a circuit breaker relay as soon as the voltage falls below a set value (the monitor will also shut down the on board grid automatically when the generator is stopped). The monitoring system also switches the grid back on once the required voltage level is again reached. This ensures no damage is caused to the consumers and fittings through undervoltage. Such a voltage relay can be obtained from wholesale dealers or as a complete unit from PANDA dealers.

The circuit is always automatically cut off if the generator is stopped.

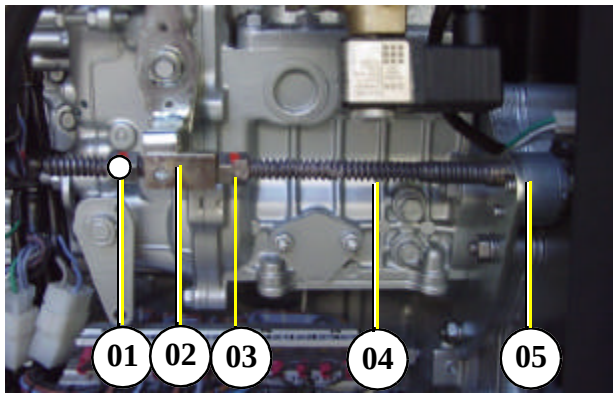
C.1.3 Adjusting Instructions for the Spindle of the actuator

There are two independent regulation devices for the rev range of the generator. Limited upward and downward:

- With the regulation nuts at the spindle of the actuator left and right of the spindle nut.
- With an adjusting screw directly at the base of the rev regulator lever. (only up)

After all work at the components of the rev regulation is done the adjustment of the limitation must be checked.

01. Regulating nuts max. revolution
02. Spindle nut with rev regulator lever
03. Regulating nuts min. revolution
04. Spiral thread spindle
05. Actuator



During any operation at the generator all consumers have to be switched off to avoid damages at the equipments. Also the solid state relay, which is installed in the AC-Controlbox must be disconnected to avoid an accidentally activation of the booster capacitors.

C.1.4 Adjustment of the maximum upper revolution

1. Disconnect the plug at the electrical supply line of the actuator.
2. Unclamp the countering nut at the limitation screw with a wrench SW 10.
3. Connect an electrical voltage instrument (voltmeter) with a display range until 300V AC to AC outlet in the AC-Control box.
4. Be sure that no electrical load is adjusted.
5. Start the generator.
6. Increase the rev of the generator by turning the spindle of the actuator manually until the voltmeter reach a value of 260V. (conforms about 3690 rpm)
7. Turn the limit stop screw tight against the limit stop point at the rev regulator lever.
8. Protect the limit stop screw with the countering nut.
9. Check again if the voltage of the generator is limited to max. 260V without load.

The adjustment of the upper limitation of the rev serves an additional safety. The value of the max. voltage lies 5V above the normal operating border.

01. Adjusting screw upper keystroke
02. Countering nut
03. Rev regulator lever

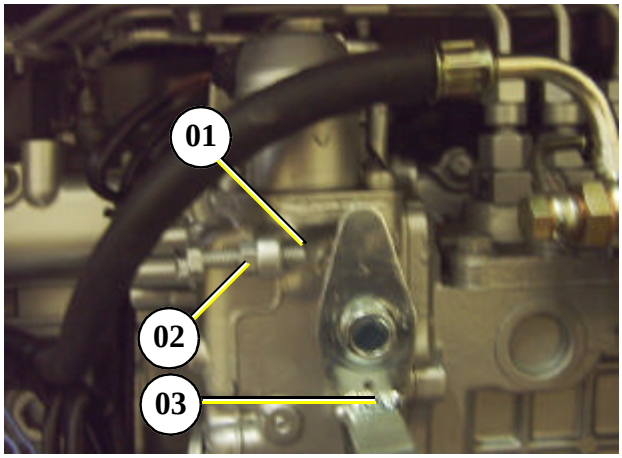


Fig. C.1: Actuator rpm

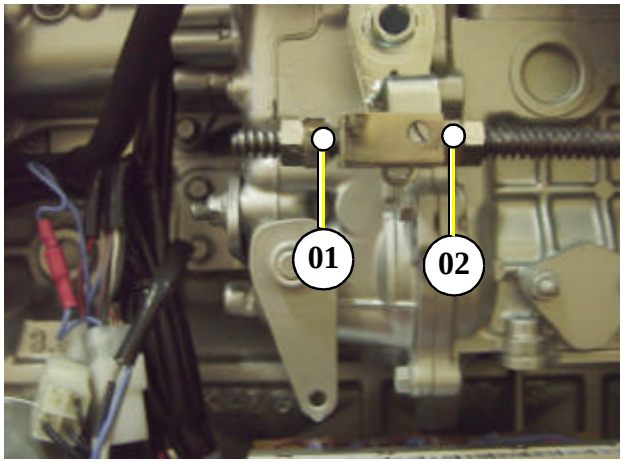
C.1.5 Adjustment of the normal rev limitation

Adjusting the lower limitation:

1. Disconnect the plug at the electrical supply line of the actuator.
2. Unclamp the countering nuts with two wrench SW 14.
3. Connect an electrical voltage instrument (voltmeter) with a display range up to 300V AC to AC outlet in the AC-Control box.
4. Be sure that no electrical load is adjusted.
5. Start the generator.
6. Decrease the rev of the generator by turning the spindle of the actuator manually until the voltmeter reach a value of 225V. (conforms about 2880 rpm)
7. Both nuts must be screwed tight.
8. Check again if the lower voltage of the generator is limited to min. 225V without load.

Adjusting the upper limitation:

1. Proceed like before and tighten the countering nuts at a voltage of max. 260V without load.
2. Check again if the upper voltage of the generator is limited to this value.



01. Adjusting nut for upper rev limitation
02. Adjusting nut for bottom rev limitation

Fig. C.2: actuator rpm

If the adjustment is finished the plug of the actuator must be re-connect for operation.

Re-connect the connections if the electrical supply lines in the AC-Control box were also be disconnected.

C.1.6 Lubrication of the spiral thread spindle

The spiral thread spindle must be lubricated carefully and regularly. Please only use a temperatur independence lubricant (up to 100°C) witch is also equiped with "emergency run qualities".

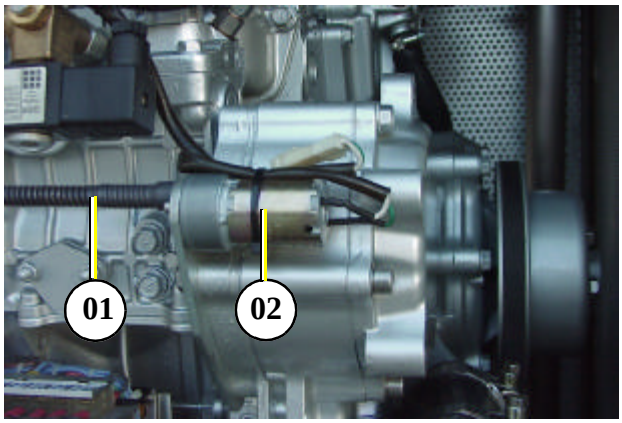
Spread also lubricant to the end of the nuts.

It is possible that the spindle could clamp if the spindle is not enough lubricated. Then the generator can be switched off by over- or undervoltage.

All screws at the actuator and the spindle must be ensured "solveable" with a screw safety grease.

01. Spiral thread spindle

02. actuator for governor



C.1.7 Effects of a longer overload of the generator to the actuator

If the generator is overloaded the voltage falls on account of a not adequate motor power under the nominal value. The actuator stays at the upper keystroke and tries to rev up the diesel engine. An internal regulation limits the current to the actuator, nevertheless a longer overload can damage the winding of the actuator. (short of the winding). The motor gets not strictly inoperative but it can happen that the cranking torque of the actuator is getting weak. This has the consecuence that the rev spindle can not be turned to all positions faultless. Therefore the voltage of the generator is regulated not good or sometimes not at all.

If you notice that the spindle of the actuator doesn´t run faultless, first check if the aggregate was overloaded for a short time and if thereby the winding of the actuator was damaged. Then the actuator has to be changed.

Check firstly the electrical fuse on the control printed circuit board if the actuator will not turn at all.

Change fuse here

(1,6A slow to blow)

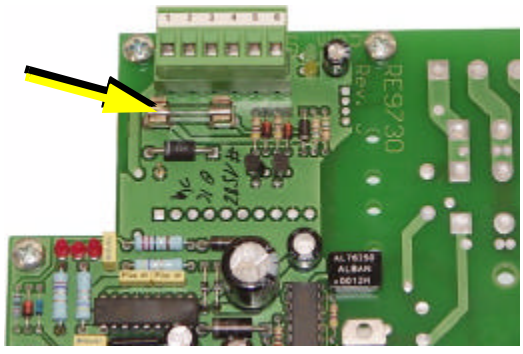


Fig. C.3: Fuse

The generator can't be damaged by an overload because the winding is overload- and short-circuit safety. But damages are possible in the periphery. Especially connected consumers are endangered because a lower voltage can damage them by order.

Possible disturbances in the area of the rev regulation "VCS"	
Failure	**Cause**
The spindle of the actuator jams	• not regularly lubricated. • surface is mechanical damaged. • actuator is defect. • defect of the VCS control (short of winding). • signal 230V AC missing. • limiting nut jams the spindle.
Fuse on the printed circuit board of the VCS control is melted.	• constant overload of the generator.

Steps to check the voltage control by a disturbance:

1. Switch off all electrical consumers.
2. Disconnect the plug of the actuator.
3. Turn the actuator manually to check if the adjusting nut is jamed to the limit stop points.
4. Turn the actuator manually to check if the adjusting nut on the spindel runs faultless.

If there is no result by these steps the actuator is working mechanically correct. After this the electrical components must be checked:

1. Connect the plug of the actuator.
2. Start the generator.
3. Turn the actuator by hand and check if the spindle turns back by the motor.
4. If the motor reacts strongly to the manual turn (the motor can't normally hold with the fingers) the drive will be working correctly. If the voltage control works faulty anyway there is a fault in the control VCS.

If the actuator is not moving the following points are necessary:

1. The motor turns only weak:

• The actuator has shorts in the winding and must be changed. (pay attention that the generator is not overloaded anymore.)

2. The actuator does not move but the spindle can be turned manually. Disconnect the plug of the actuator. Connect provisional an external voltage source 12V-DC to the motor.

a) The actuator don't turns	The actuator is defect and have to be changed.
b) The actuator turns und works faultless:	1. Check the fuse on the VCS printed circuit board. 2. Check if the sense voltage is wired to the VCS circuit board. 3. Check if the VCS supply voltage is wired to the VCS. 4. Check if the VCS outlet signal for the actuator is wired.

Change the VCS printed circiut board if the points above carries no clearance.

Check the limitation of the generator voltage

The mechanical voltage limitation must be checked regularly. The following steps have to be done:

1. Disconnect the plug of the actuator.
2. Switch off all consumers.
3. Connect an electrical voltmeter.
4. Start the generator.
5. Turn the actuator manually to the lower limit stop point.
6. The voltage must be 225V.
7. Turn the actuator manually to the upper limit stop point. The max. voltage is 260V.
8. A new adjustment is necessary in case of deviants.

C.1.8 Low Generator Output Voltage

ATTENTION! Before working on the System read the “Safety Precautions” on Page iv.

Panda generators are designed such that even high electrical disruptions will not cause serious damage to the generator.

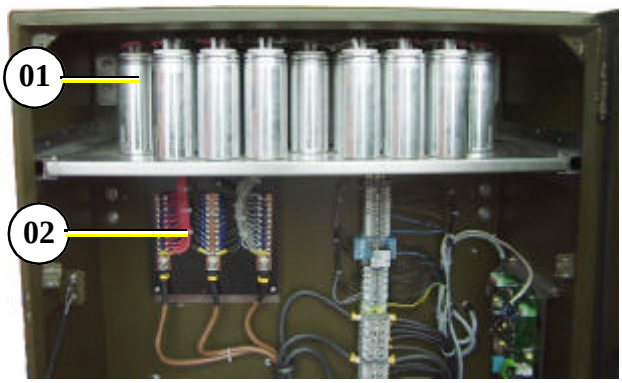
If the generator does not produce any voltage while the diesel drive engine is running, the suspected cause lies outside the generator capsule.

- electrical load not switched off prior to start
- short circuit somewhere in electrical system
- electrical overload

C.1.9 Checking the Generator Voltage

In order to check the generator for faults, stop the generator and disconnect the connection cables between generator and system. Remove the cables at the connection terminal of the generator or, if installed, at the system distribution box. Make sure, there is no voltage on the cables before disconnecting. The capacitors also are to be discharged.

ATTENTION! Never work at the electrical cabinet, while the generator runs! Do not contact the capacitor. Before working on the system read the “Safety Precautions” on Page iv.



01. Capacitors for compensation and excitation

02. Terminal block capacitors

Fig. C.4: Capacitors

After that, the generator should be restarted and the voltage checked at the terminals.

If the generator still does not supply sufficient voltage, the following steps must be undertaken:

1. Check the engine speed. If the r.p.m. is too low, the generator may not be able to achieve full magnetic excitation and thus the required output voltage. If the engine rotational speed is too high, the generator excitation will improve, but the generated voltage can also be too high.
2. If the rev-speed is normal and the output voltage is still outside the acceptable range, the capacitors should be inspected. Do not contact the capacitor terminals! Normally, however, it is highly unlikely that more capacitors than one are faulty. In the event that one or more of the capacitors are indeed faulty, the generated voltage will always be too low.

With the system (electrical load) disconnected, and with the generator motor running, a weak generator voltage is a sure sign that at least one of the capacitors is faulty.

An unusually warm capacitor is also a sign that it is faulty or near the end of its life span.

C.1.10Checking the Capacitors

ATTENTION! Before working on the System read the “Safety Precautions” on Page iv

Do not check the capacitors whilst the generator motor is running! Charged capacitors can be lethal. Do not contact the capacitors with bare fingers or non-insulated metallic objects! In order to test the capacitors, the terminal lead wires have to be disconnected using pliers or a screwdriver with insulated handle(s). Once the wires have been removed, the capacitors must discharged by bridging the capacitor terminals together with a slot screwdriver with an isulated handle.

Discharge the capacitor

01. Screw driver blade

02. Capacitor connections

03. Capacitor

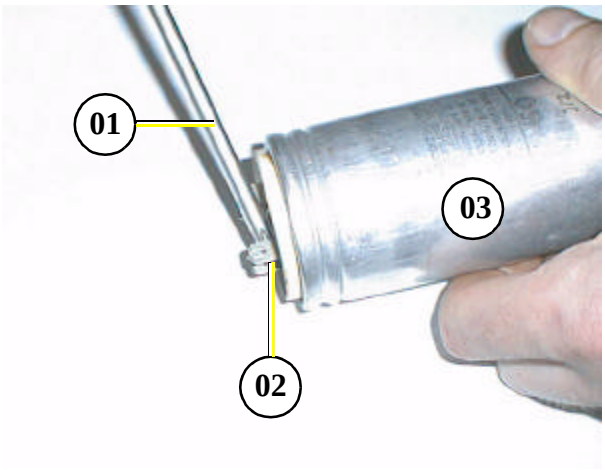


Fig. C.5: Discharge capacitor

The capacitors can be checked using a normal multimeter with a continuity beeper. Check that the multimeter "beeps" when the selector is set to continuity and the end probes are contacted together.

Switch the multimeter to „Continuity: acoustic signal“ and touch both capacitor terminals with the meter end probes.

Fig. C.6: Checking Capacitors

Test each capacitor by touching the multimeter (set on "continuity") end probes on the capacitor terminals: only a brief "beep" should be audible from the multimeter.

Once this has been done, reverse the end probe positions and repeat the check. (The multimeter battery charges the capacitor and then the capacitor discharges quickly. The discharge to the multimeter "closes" the circuit briefly and continuity is achieved for a brief instant causing the short "beep".)

If there is no beep at all or there is a continuous beep, then the capacitor(s) is faulty and needs to be replaced.

You should prefer a measurement by a capacity measuring device.

Check all capacitors in the electrical cabinet

For this measurement, use the capacitor terminal-block (see “Terminal block capacitors” on Page 82) The terminals must be connected in the following order:

1. Cap1: (L1 - L2)
2. Cap2: (L2 - L3)
3. Cap3: (L1 - L3)

The capacitors must not be removed from the electrical cabinet before a check is made. The procedure for checking the capacitors is given below.

The "beep" must be the same period of time for all three checking processes. As long as a measuiring device is available to check the capacity, it is naturally better if the capacitors are checked with this measuring device.

Checking the electrical connections to the Capacitor

It must be ensured that the electrical connections to the capacitor are always tight fitting. Loose connections with transitional resistance can mean that the contact surfaces will become heated externally. This can lead to faster deterioration of the capacitors.

ATTENTION! Do not contact the capacitor. Before working on the System read the “Safety Precautions” on Page iv.

C.2 Testing Generator Stator Windings

C.2.1 Testing Generator Stator Winding for "Shorts" to Ground

If no faults are found with the capacitors and the generator is still not performing correctly, the generator stator windings must be tested for "shorts" to ground as follows:

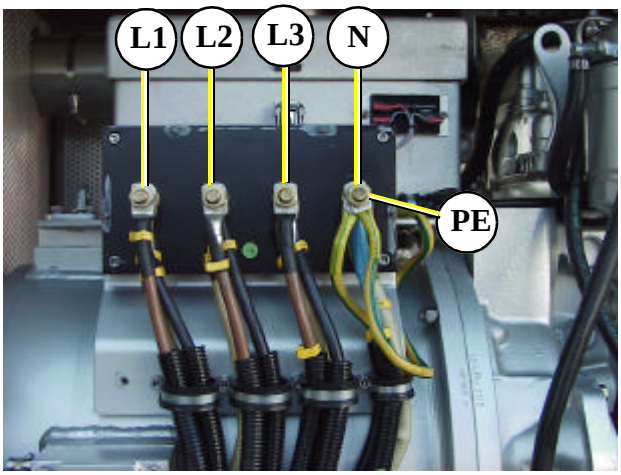
1. Ensure that the generator is "OFF" and cannot be accidentally started. Disconnect the battery.
2. Remove AC output terminal box lid (mounted on generator casing).
3. All terminal box connections are to be removed. (See appropriate circuit diagram.)
4. Remove all cables (also earth lead).
5. A check of the generator terminal box is made by means of a multimeter to determine whether there is continuity between the individual windings connections and ground.

If continuity is detected for any of the combinations, the generator must be sent to the factory for inspection and repair. If this is not possible, the stator can be rewound by a qualified tradesperson/technician. Winding diagrams can be obtained from ICEMASTER GmbH, Germany.

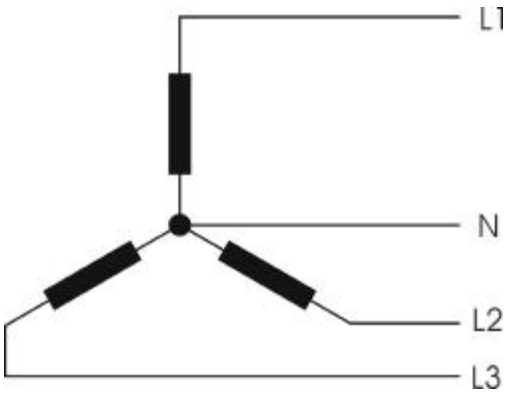
This test, unfortunately, is carried out at very low voltage (9V) when a normal multimeter is used. Therefore only positive short circuits will be displayed. There is the possibility that a short circuit will occur in spite of a negative test result (i.e. moisture). A reliable check can only be carried by using an essentially higher voltage (approx 500V). This type of measuring instrument is normally only used by experts.

If in doubt an electrician must check the winding for a short circuit with an isolation meter.

AC Output Terminal box 120V(208V) - 60Hz



Wiring Diagram



C.2.2 Coil Resistance Measurements in Stator Windings

When there are neither faults with the capacitors nor any low or high voltage "shorts" in the windings to ground, the windings should then be tested for the correct coils resistance (for shorts between wires within the coils). To measure coil resistance a meter capable of measuring low resistances (Milli-Ohm resolution if possible) accurately. Refer to the following table (next Page) for the acceptable range of acceptable resistances. The measured resistance values should be close to the same between the following terminals:

L1-N; L2-N; L3-N

Checking windings.

- Disconnect all the cables from the terminals in the AC-connection box.
- Remove the Neutral- Ground connection.
- Take all the winding connection cables from the terminal bolts.
- Switch your meter in resistance range. When you put the probes of you meter together, you should get a reading of 0.00Ohm. When you isolate the probes, the reading will be Overflow. Please do this tests to check your meter.
- Measure the resistance between the separate windings. Maybe the readings of your meter do not comply with the values of the table in the appendix. In every case the relation between the values should be the same. Some meters do not work fine, when values are very small.
- Measure the resistance between the different windings. When you find a value in the 20 Mega-Giga Ohm range, the winding is ok.
- Measure the resistance between the different windings and housing of the alternator. Here you should also find a value in the Giga-Ohm range. When the winding is shorted to ground, maybe you are not able to measure this, because the voltage of your meter is a few volts. In this case to get a save reading, use a MEGA-meter with a high test voltage

If you find any anormality, when doing this test, please ask your Fischer Panda dealer.

If the measured resistance values deviate from each other significantly, then there is probably a short within the coils. A short within the coils can prevent the generator from achieving the required excitation and therefore from reaching the rated power output. The values listed in the above table, represent the approximate range of acceptable resistances. Most important is that the measures values do not deviate significantly from one another. Large resistance value deviations between phases indicate a short-circuit in the windings. In this case the generator must be newly wound by a qualified technician.

C.2.3 Measuring the Coil Inductive Resistance

Unfortunately a reliable assessment of the winding's performance cannot be attained through checking only coil resistances. However, the symmetry of the coil resistances is a good indicator of winding performance. If the coil resistances are symmetric, the next step is to measure the winding's inductive resistance using a special meter (capable of measuring milli-Henrys).

The coil induction is measured and compared in the same manner as the electrical resistance (i.e. the windings are compared for symmetry). These parts must have the same values. The average values of inductive resistance are given in the *Table F.5, “Technical Data Generator,” on Page IX*

Note: These values strongly depend on the method of measurement (e.g. used instruments)

An alternative test method to check the stator windings can be performed as follows:

1. Ensure that the connection to the circuit system is disconnected.
2. All electrical wires in the generator terminalbox must be disconnected.
3. Reconnect the battery connections.
4. Start the generator.
5. Measure the voltages between the following terminals and compare for symmetry:

The measured voltages are a result of the remaining magnetism in the rotor, which are induced by the voltage tension.

If the measured voltages are far below the values in *Table F.5, "Technical Data Generator," on Page IX*, then there is probably a faulty coil in the winding.

C.2.4 Rotor Magnetism Loss and "Re-magnetizing"

After having stood idle for a longer period of time, or after having been shut down abruptly from operating under a heavy electrical load, most asynchronous generators have difficulties achieving full excitation independently. The remaining rotor magnetism is lost.

ATTENTION ! Before working on the System read the "Safety Precautions" on Page iv.

The magnetism required for excitation can be easily restored using a simple DC Battery. The generator must be stopped to do this, that means the starter may not be actuated. DC is fed to a desired part of the winding from the exterior for a short period. This can, for example, be carried out for by feeding DC to the windings from both terminals of a 230V socket of the vehicles system. (This, of course, can only happen if there is no connection to any power source). There must be a connection between socket and the generator (see diagram below). It suffices if DC is applied for a short period (1-2 seconds). The remaining magnetism can be restored and the generator can be started in the normal manner again.

ATTENTION! - Before this procedure is performed to restore the magnetic field, it is crucial to ensure that the generator is not running! (otherwise, it is very DANGEROUS TO LIFE!)

Initializing the magnetic field in the windings through external current from a 4,5 - 9 volt / max. 5A battery. (No car-battery !)

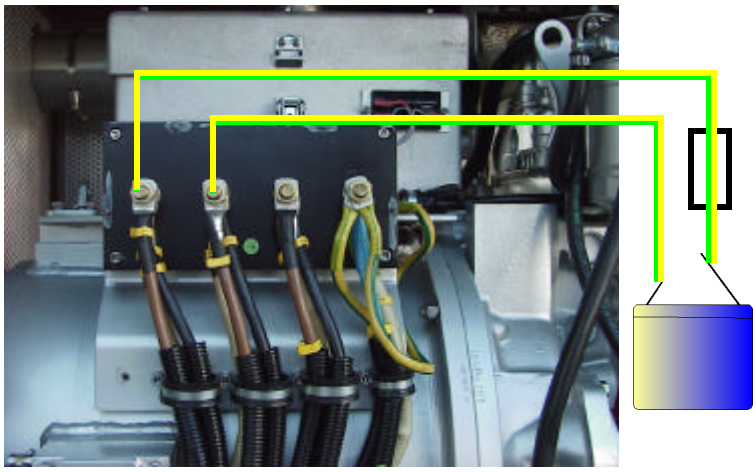


Fig. C.7: Initializing the magnetic field

C.3 Starting Problems

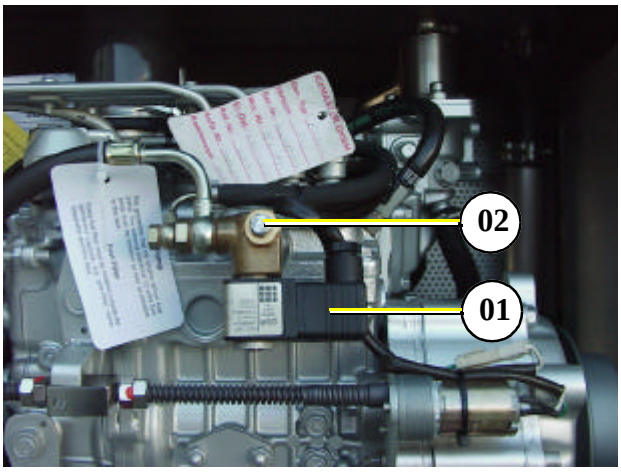
C.3.1 Fuel Solenoid Valve

All engines are equipped with an electric inlet fuel solenoid valve (12V) which switches off the motor.

The fuel solenoid valve is located in front of the injection pump. It opens automatically, if the "START"-button is pressed on the remote control panel. The solenoid valve is CLOSED when the generator main power is switched "OFF". For this reason, it requires a few seconds before the motor comes to a full halt

If the generator fails to start, runs rough, does not reach the proper RPM, or does not stop properly, the first item to suspect in most cases is the fuel solenoid valve and should be inspected first.

A check of the fuel solenoid valve by removing the plug from the fuel solenoid valve for a short period whilst in operation (first remove the small retention screw) and replace it immediately. The motor should "react immediately" by revving high.If the motor does not react sharply to the reconnection of the solenoid wire, it is a sign that the solenoid valve could be faulty.



01. Fuel solenoid valve
02. Ventilation screw

Fig. C.8: Fuel Solenoid

C.3.2 Failure Bypass Switch

The start-failure bypass switch enables an immediate restart facility of the generator, should it cut out, even if this was caused by over-heating. There is normally a requirement to wait until the motor has cooled down to the correct temperature. This can last for several hours in certain circumstances, since the generator is enclosed in a sound-insulated casing, which prevents heat loss.

Failure bypass switch

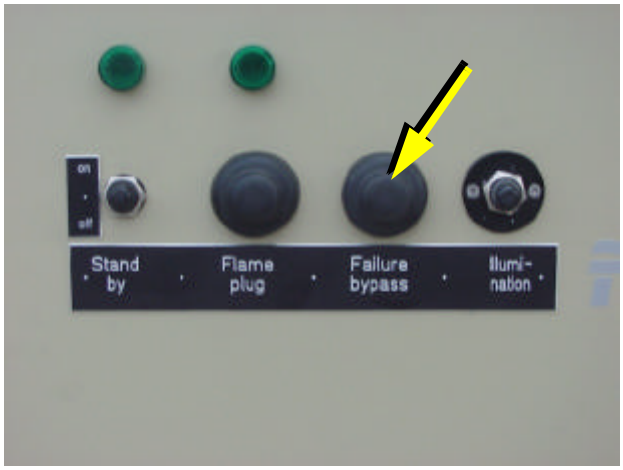


Fig. C.9: Failure bypass switch

This period can be reduced by pushing the button on the front of the generator. The generator can be started by means of the remote control as long as the button is depressed. The switch/ button bypasses any faults allowing the generator to run.

Before depressing the button, a manual check of the oil dip stick must be carried out to determine whether the generator has sufficient oil, as it is possible that the oil pressure switch causes the generator to cut out. If it has been ascertained that the reason for the motor cutting out is over-heating and not lack of oil, the generator can be run for several minutes without load, so that the motor is cooled by the circulating coolant.

BEWARE:

If the temperature is the reason for the generator cutting out when it is running under load, then an immediate check must be made to determine the cause. It could be a fault with the cooling system, one of the fans, the air-intake or a fault with the external cooling system.

Continual use of the starter-failure bypass switch should be avoided, while the generator cuts out during operation.

The generator must always run without load for several minutes before being switched off, so that a temperature compensation occurs. Heat accumulation can cause the generator to overheat, even after ist has been switched off.

Should the overheating alarm be set off, caused by heat accumulation, after the generator has been switched off, then this can also be bypassed using the switch.

C.3.3 Troubleshooting Table

For Troubleshooting see Table F.3, “Troubleshooting,” on Page III

D. Maintenance Instructions

D.1 Maintenance Requirements

Control before starting

- Oil level
- Cooling system leaks
- Visual check for any changes, leaks oil drain system, v-belt, cable connections, hose clips, air filter

Once a month

- Lubrication of actuator-trapezoid thread spindle

For Maintenance Intervalls see Table F.1, “Maintenance Intervalls,” on Page I

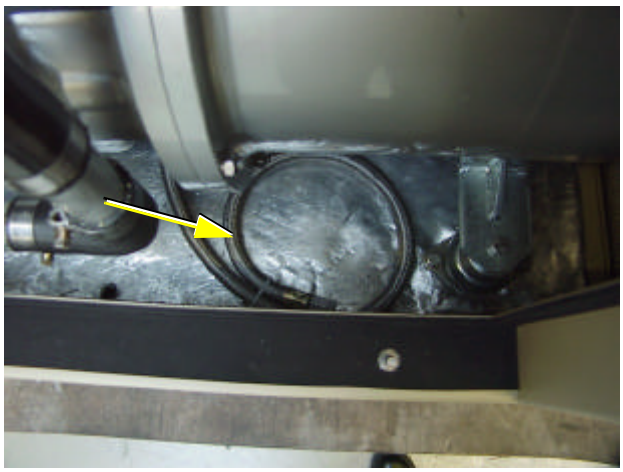
D.2 Oil Circuit Maintenance

The laid down intervals must be heeded in order to avoid serious damage to the motor!

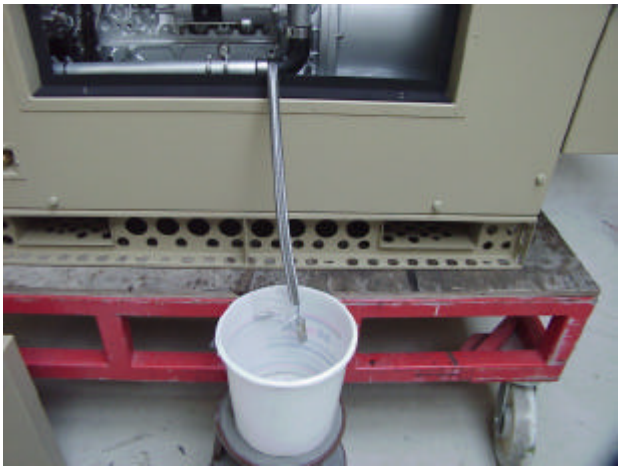
The first oil change should be carried out 35 hours after running time. Thereafter every 100 hours. Type and amount of required Oil see

Table F.2, “Generator liquids,” on Page II and Table F.4, “Technical Data Engine,” on Page IX

An oil drainage hose is fitted in the sound insulation capsule for changing the oil. This is fed through the capsule to the outside.

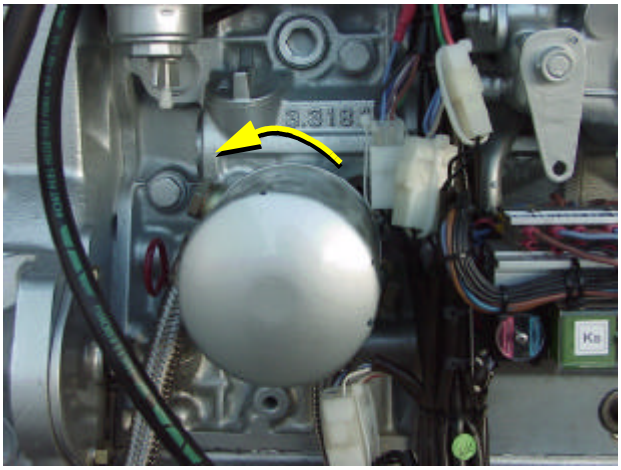


The oil can then be drained by opening the oil drainage screw.



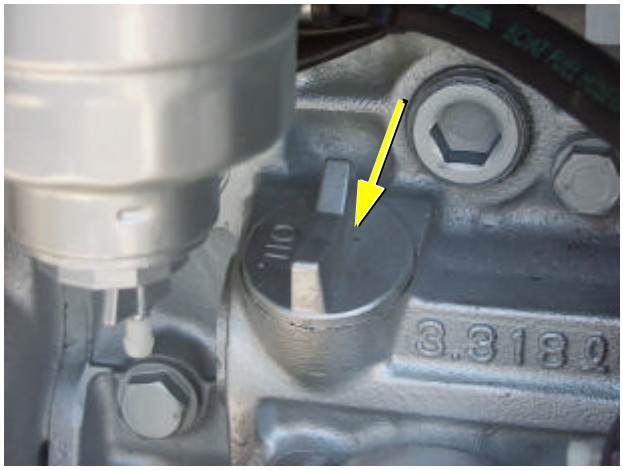
If the oil cannot be drained we recommend the use of a hand pump, which can be connected to the oil drainage hose.

The oil drainage screw is then closed and the hose stored in the sound-insulated capsule again.

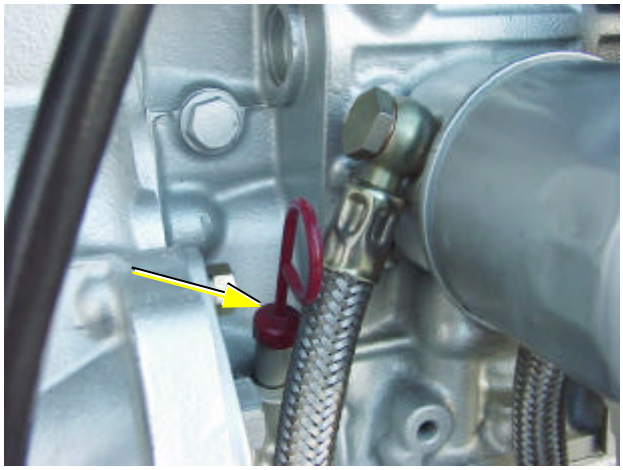


The oil filter could be loosen by a tool (oil-filter strap)

New oil is poured in after opening the oil filling cap and the oil level checked with the use of a dipstick. The laid down filling height may not exceed the "maximum" mark.



The oil level is checked with the use of a dipstick. The laid down filling height may not exceed the "maximum" mark.



D.3 Ventilation of the coolant circuit

For a scheme see Table F.7, “Electrical wiring diagramm,” on Page XI

Internal temperature monitoring switch

The following temperatures are monitored by the remote control panel and the generator switches off when there is a fault.

1. Windings temperature
2. Cylinder head temperature
3. Cooling water temperature switch 2
4. Oil temperature switch
5. Oil pressure switch

The fault is transmitted, if one of these switches measures a value that exceeds the required value (all switches are openers). The current is switched off by the main relay. (Fuel magnet valve closes, the fuel suction pump is switched off).

The following fault switches are integrated into the system, in addition to the fault switches on the remote control panel, which automatically switch off the generator, even if a fault is not shown on the panel:

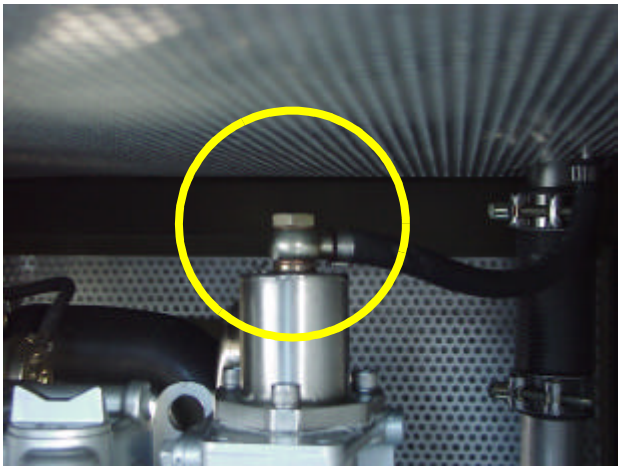
1. Motor oil temperature
2. Generator winding

There are two of these temperature switches which operate independently of each other. This means the generator will cut out, even if the cut out function fails because of a panel fault.

Both internal fault switches (Temperature and Fault switch) directly interrupt the current to the main control relay. This constellation ensures that the generator switches off, when there is a fault in each case.

Particular hints for the ventilation of the cooling system

If the coolant has been drained or if air has permeated into the cooling system by other reasons, a careful ventilation of the cooling system is necessary. This ventilation process has to be rerunned several times.



Open bleeder screw at the thermostat-houing

Pour in coolant through the cooling water filler cap. The coolant flows in very slow.

If you notice that the coolant level don't falls anymore, close bleed screws and start the generator.

The generator should operate up to 60 Seconds.

Switch generator OFF.

Open coolant filler cap again and both bleed screws at the same time.

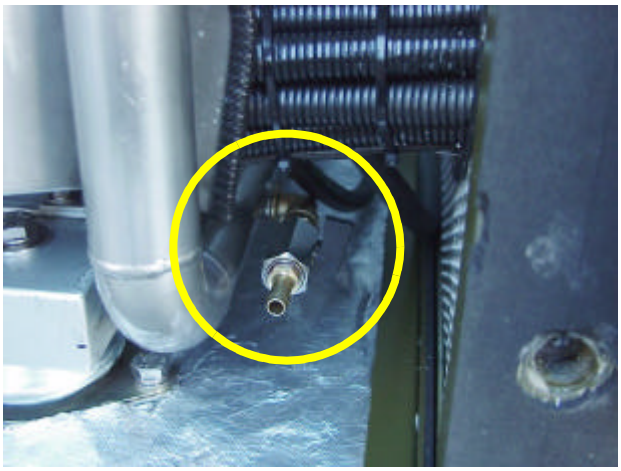
Pour in coolant again

Repeat this process several times.

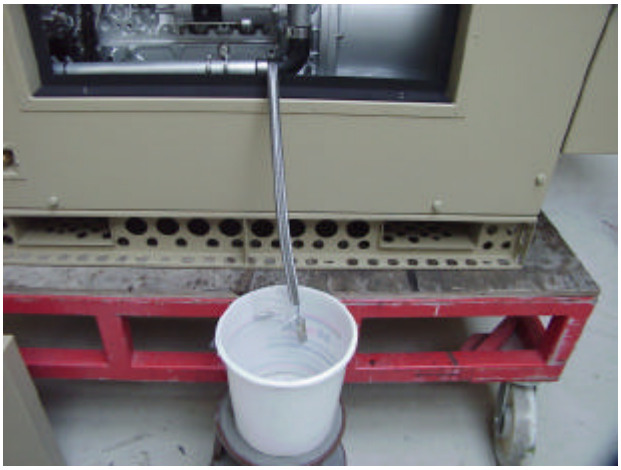
The generator can be started for 5 minutes, if there is no change in coolant level. Bleeding must be then repeated two or three times.

It makes sence to repeat the process of ventilation after a couple of days to ensure that eventually remaining bubbles be removed out from the system

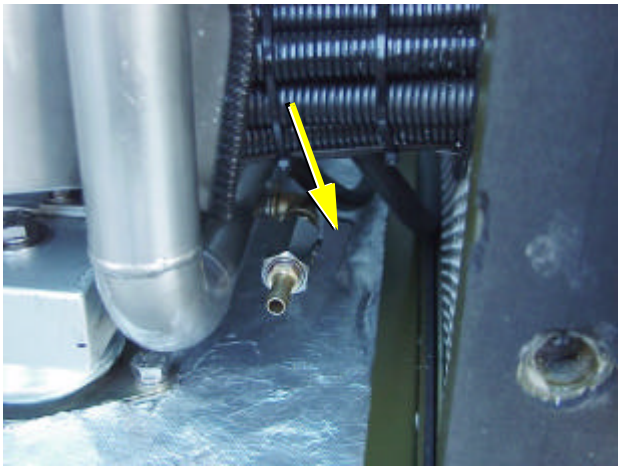
D.3.1 Draining the coolant



Put a hose with a diameter of 8mm and a lenght of approx. 800mm at the drain valve.



Put a bucket under the radiator to collect the draining cooling water.



Open the the drain valve.

Fig. D.1: Coolant drain

D.3.2 Air-bleeding of the Fuel System

Normally, the fuel system is designed to bleed out air itself i.e. as soon as the electric starter motor starts operation the fuel pump starts working and the fuel system will be air-bled after some time automatically. It is nevertheless essential to bleed the system as follows prior to the first operation (as all hoses are empty):

1. Switch the standby switch at the generator frontside and the main power switch on control panel to "ON".
2. Push failure bypass switch and hold tight. The electric fuel pump has to be running audibly. By moving the failure bypass switch you can hear the solenoid valve of the generator starting and stopping (when the sound cover is taken off). After the fuel pump has been running 3 to 4 minutes because the failure bypass switch has been pushed down the bleeding screw of the solenoid valve has to be unscrewed. When opening the screw you have to carry on pushing the switch. To avoid fuel getting in the sound cover a piece of cloth or absorbent paper should be put under the connection. As soon as fuel is running out without bubbles the air bleeding screw can be screwed in again. Now stop pushing the failure bypass switch.
3. Now the unit can be started by pushing the "START"-button. The unit should start after a short while. Should the unit not start the pipe union nuts of the injection nozzles has to be loosen and lift the injection pipe a few millimeter. Try again to start the unit. After the unit has started the pipe union nut has to be tightened again.
4. Main power switch "OFF".
5. Standby switch „OFF“.

Open bleed screw at the fuel solenoid valve

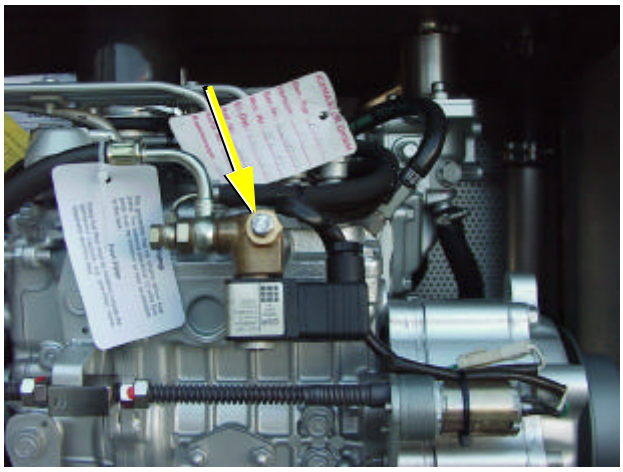
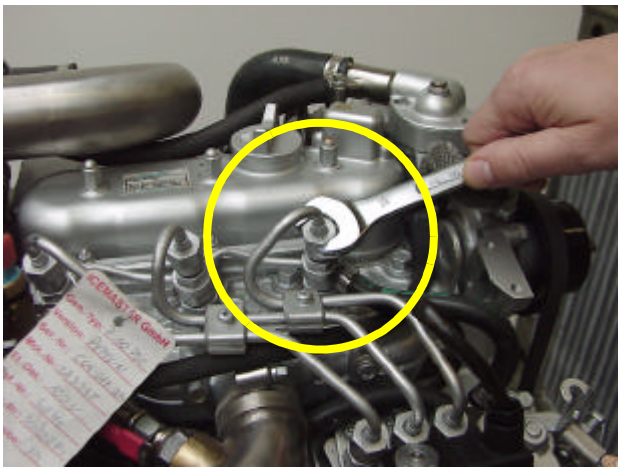
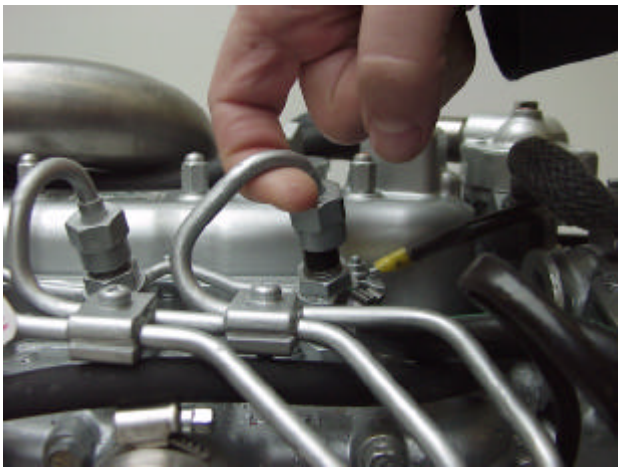


Fig. D.2: Bleed screw at the fuel solenoid valve



Loosen the pipe union nuts of the injection nozzles.

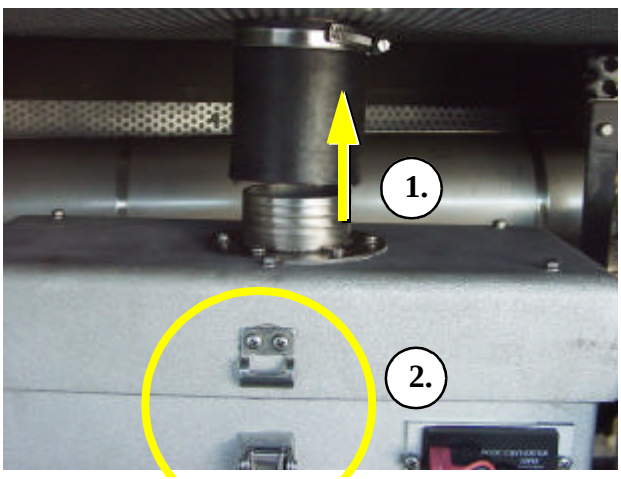
Fig. D.3: Bleed screw at the fuel solenoid valve



Lift the injection pipe a few millimeter.

Fig. D.4: Lifting injection pipe

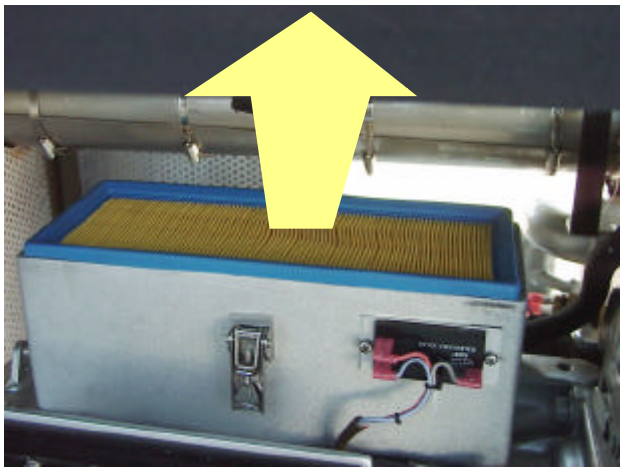
D.3.3 Exchange the air filter



Lift the combustion-air tube above the combustion air housing.

Open the combustion air housing by loosen the clamp in the middle of the front side

Lift the frame that holds the air filter.

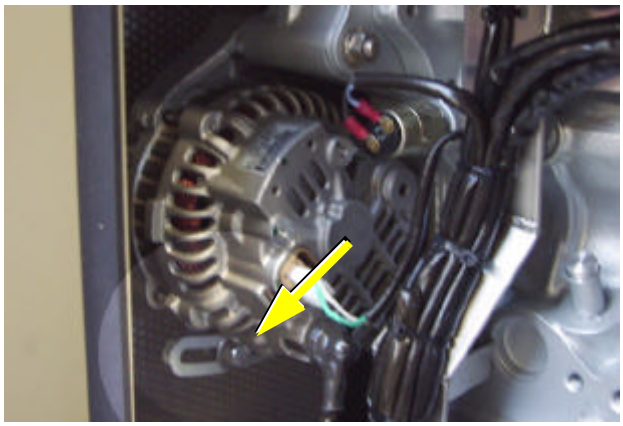


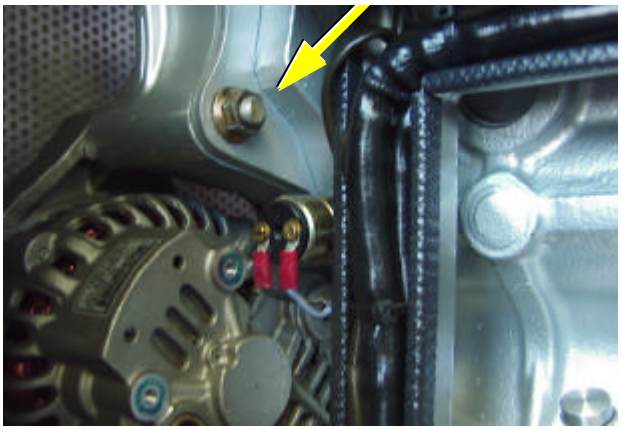
D.3.4 Exchange of the V-belt for alternator and internal cooling water pump

The relative high ambient temperature in the closed sound insulated capsule (about 85°C) can be a reason for a reduced lifespan of the v-belts. It is possible that the "softener" in the rubber compound lose their effect after a short operating time because the air in the sound insulated capsule can be relative warm and dry.

The v-belt must be controlled in a very short time interval. It can be happen to change the v-belt after some weeks because of unfavorably conditions. Therefore the control is needed in an interval of 100 operating hours. The v-belt ia a wearing part. It should be enough spare v-belts on board. We suggest to stand by the according service-packet.

Loose the attachment screw at the turnbuckle





Loose the attachment screw above the alternator

Push the alternator into the direction of the thermostat/housing

Now the v-belt can be changed. Stretch the v-belt by pulling the alternator back.

Tighten the fixing screws above and below the alternator.

E. Installation Instructions

E.1 Generator Connections

ATTENTION! Before working on the System read the “Safety Precautions” on Page iv.

E.1.1 General Instructions

- It is important to pay attention to the fresh air intake.
- The radiator may not be covered.
- Untrained personnel should never open the generator.
- Prevent that keys fall in hands of unauthorised personnel.

E.1.2 Fuel System Installation

A fuel filter with water separator is fitted on the interior of the generator capsule itself. Generally fuel forward and back flow must be connected to the diesel tank by means of its own induction pipe. Attention must also be paid that the fuel back flow pipe leads to the tank floor, in order to prevent emptying of the fuel pipe.

Generally, the Panda generator bleeds the fuel lines automatically. Before starting your generator for the first time (or after the genset has been sitting idle for a longer period of time), follow

“Air-bleeding of the Fuel System” on Page 55.

The following items must be installed:

1. Fuel feed pipe from the tank to the generator
2. External fuel suction pump (12V DC) is useful
3. Return pipe to the tank (no pressure)

The fuel suction pump should be mounted as close to the fuel tank as possible.

E.1.3 Connection to 24V Starter Battery-Block

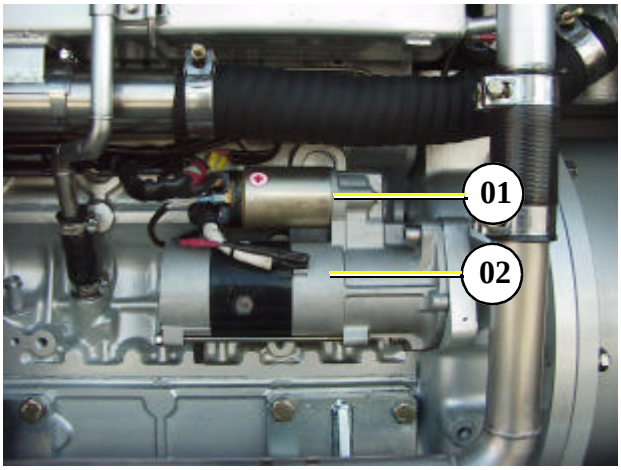
The Panda has its own alternator to charge a 24V starter battery.

It is necessary to install a 24V (2x12V in a line) starter battery for the generator.

ATTENTION!

It must be ensured that the cable is firstly attached to the generator and finnally to the battery. Furthermore, the battery should be fitted as close as possible to the generator, in order to avoid greater voltage deviation. The 24V positive pole is connected to the red lead and the negative pole to the blue lead.

E.1.4 Generator Starter Motor



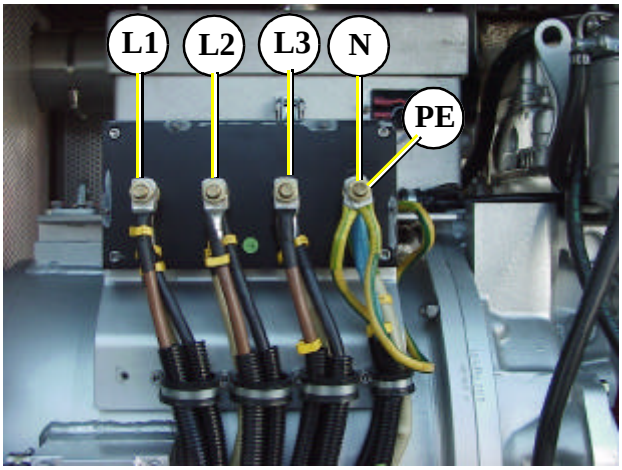
All Panda generators are equipped with an independent 24V-DC starter motor. The connecting lines from the battery to the DC system are part of the delivered aggregate.

01. Starter motor

02. Solenoid switch for starter motor

E.1.5 Connection of external devices

The information given on the generator plated must be followed. When feeding the cables through the lower case of the capsule, it must be ensured that this is provided with the appropriate counter strain fittings and insulation.



Junction plate

Fig. E.1: Junction plate

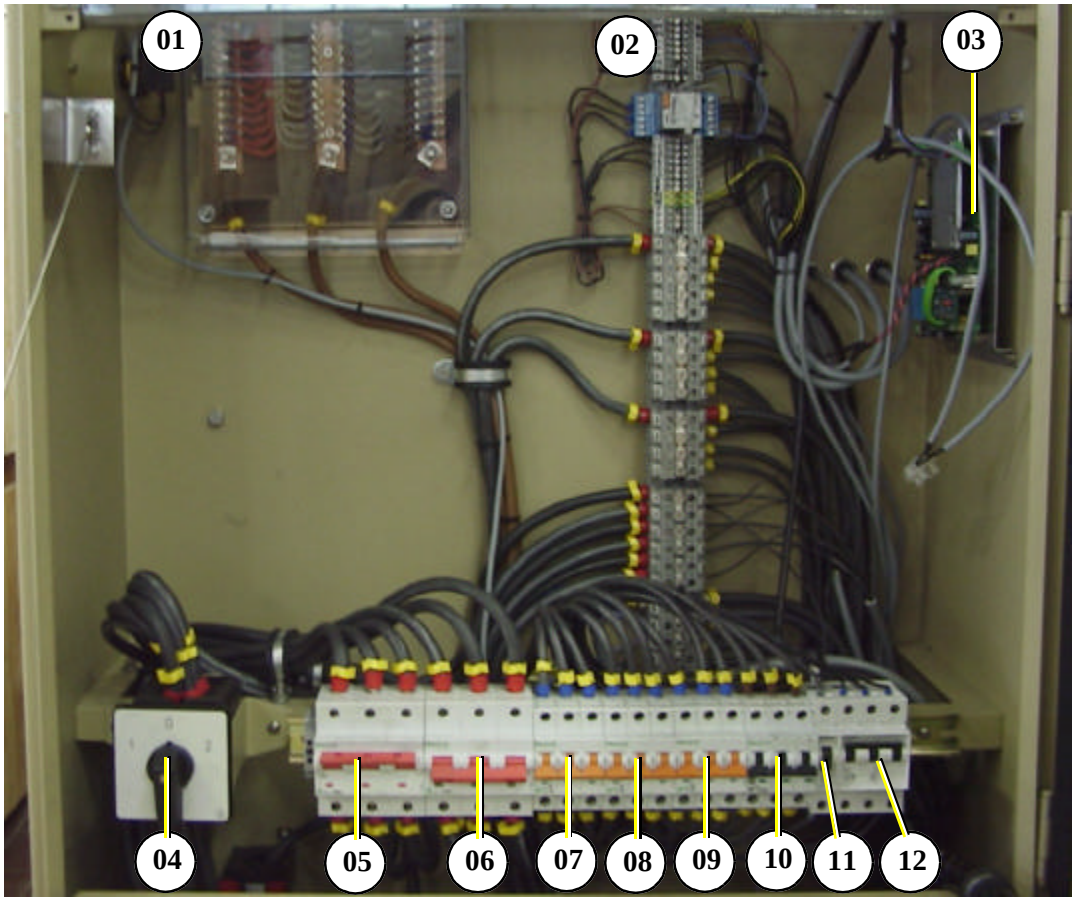
E.2 Electrical cabinet with VCS and ASB

The front panel must always be closed, since the components of the cabinet produce 208 V during operation.

ATTENTION ! Danger to Life - High voltage

Before working on the System read the "Safety Precautions" on Page iv

Electrical Cabinet (front view)



01. Terminal block capacitors
02. Terminal block
03. VCS - Voltage controller board
04. Main selector switch
05. Circuit breaker 1 (3x208VAC/100A)
06. Circuit breaker 5 (3x208VAC/100A)
07. Circuit breaker 2 (3x208VAC/ 63A)
08. Circuit breaker 3 (3x208VAC/ 63A)
09. Circuit breaker 4 (3x208VAC/ 63A)
10. Circuit breaker 7 (3x208VAC/ 50A)
11. Circuit breaker 6 (120V / 20A)
12. Fan (3x208VAC/ 10A)

The AC connections for the generator are installed at the manufacturer.

The installation of the 208 V power system starts at the electrical cabinet and all the required terminals mounted in it.

The negative pole and the ground are connected to the housing.

Ensure that the power supply system installation conforms to all of the required electrical system safety regulations of your local authorities. Only a qualified electrician should install the electrical system. Especially adherance to the regulations regarding conducters, safety switches etc.

E.2.1 Capacitors and terminal block

Capacitors

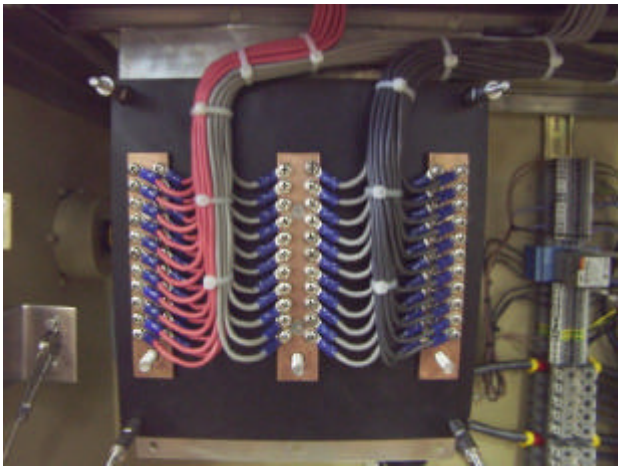
It is possible that the aggregate does not start, when a consumer is attached which needs a high inductive starting current. In this case the capacity of the booster capacitors must be increased.

The total capacity can be increased by parallel connection of additional capacitors.

The size of the capacitors depends on the inductive load.

A second possibility is to exchange the existing capacitors against larger. The size depends also on the inductive load.

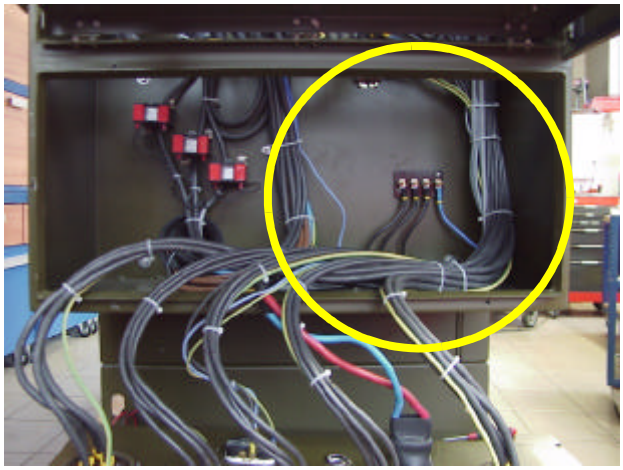
Fig. E.2: Capacitors



Terminal block capacitors

Fig. E.3: Terminal block capacitors

E.2.2 Terminal for air condition



E.2.3 The VCS-Control and Components

This Panda generator is fitted with the electronic voltage control "VCS" as standard.

The VCS controls the generator voltage and motor speed. An actuator mounted at the injection pump can increase the engine speed by up to 8%.

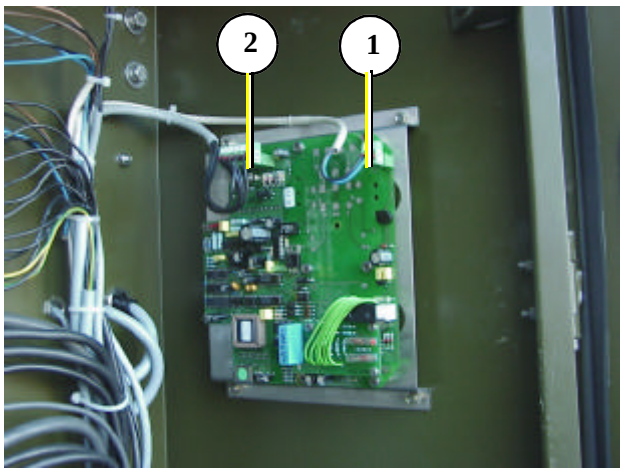
If the generator runs without load, the voltage should be 120V (between L1-N) with a frequency of approx 57.8 to 58.6 Hz. The frequency (equates to the speed) can be increased by up to 8%. This ensures that the engine speed is increased when there is an extra load. The maximum speed is achieved when 80% load is reached.

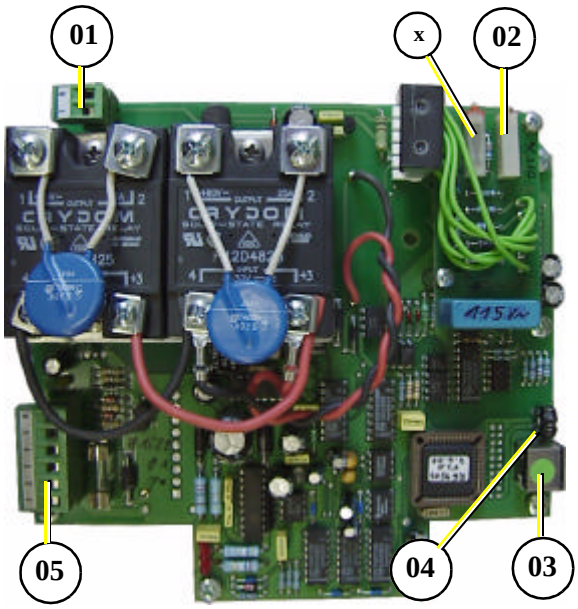
The clearance of the speed control range is limited by an adjusting screw, above and below. Adjustment of this screw may not occur without the expressive approval of the manufacturer.

All signals pass through the circuit board in the AC-Control box. The signal impulse for the actuator is passed to the electric motor by means of the 5 core wire.

The generator maintains its full capability if the VCS has a defect. In this case the base current must be raised to at least 120V by adjusting the minimum setting on the speed gauge, in order to ensure that the generator output voltage at 70% nominal load does not drop below 105V.

1. Connection 115V control voltage
2. Connection DC-supply and servo motor





VCS

01. sensing voltage (actual value)

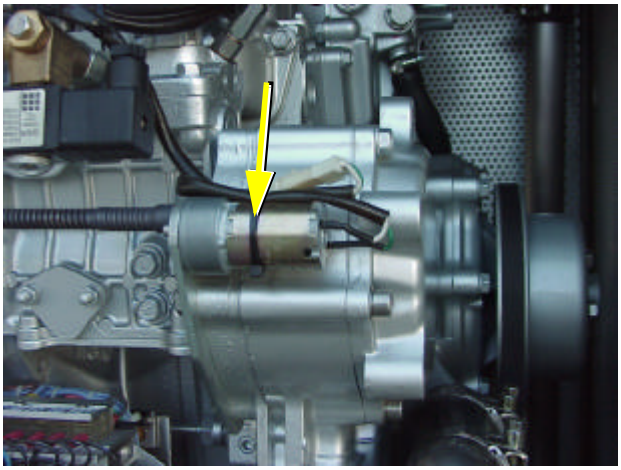
02. VCS voltage (set value)

03. Connector for PC

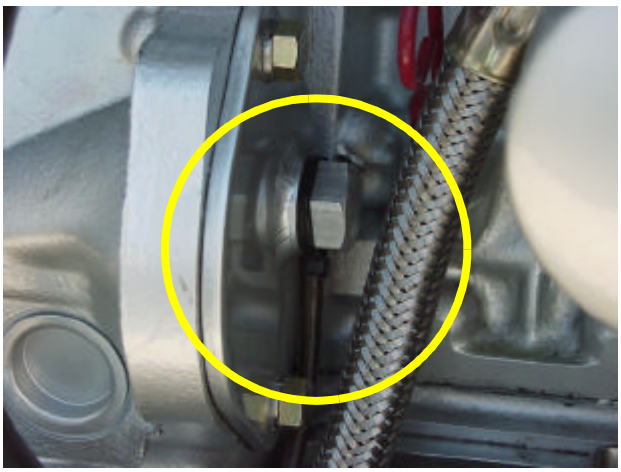
04. Potentiometer for booster time

05. Connection DC-supply - servo motor

x. Booster voltage - don't adjust !



Actuator



Mounting screw for speed sensor

ATTENTION!

The wire for the measuring voltage must be connected direct to the battery, and is not to be connected to the output side of the generator rectifier.

Because of the drop in voltage, the exact voltage is only received directly to the battery. A wrong connection can lead to damage to the battery!

E.2.4 Generator Relays

Ks: Starter Relay

K2: Flame plug

K3: DP +24V

K4: DP +12V

K5: Glow plugs

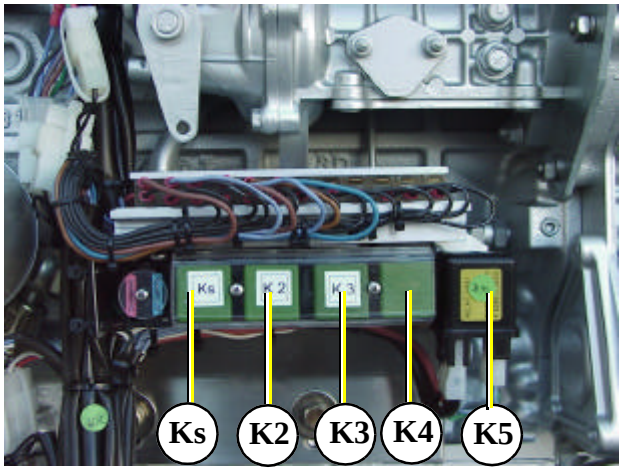


Fig. E.4: Terminal block

E.2.5 Generator Fuses

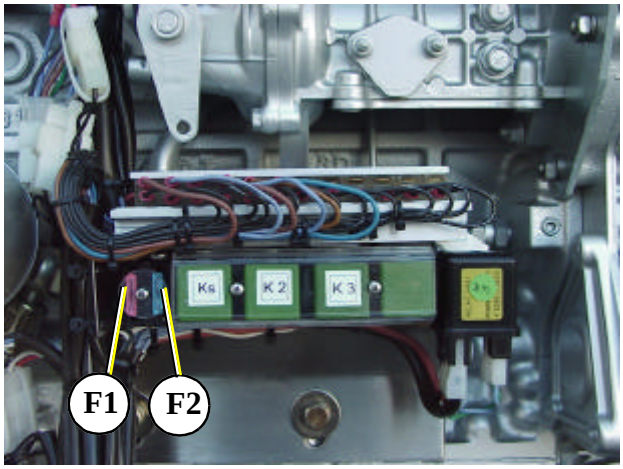
The Panda generator is fitted with two fuses. They have the following purposes (also see circuit diagram).

Fuse 1: This fuse protects the DC wiring of the generator. This is a 10A slow fuse.

Fuse 2: This 15A slow fuse protects the wire to the starter relay.

F1. Fuse (10A) red

F2. Fuse (15A) blue



E.2.6 ASB Start Booster

Additionally, the automatic start booster is located on the circuit control board. If the voltage drops below a pre-set voltage the starting current could be increased by connecting a second group of capacitors.

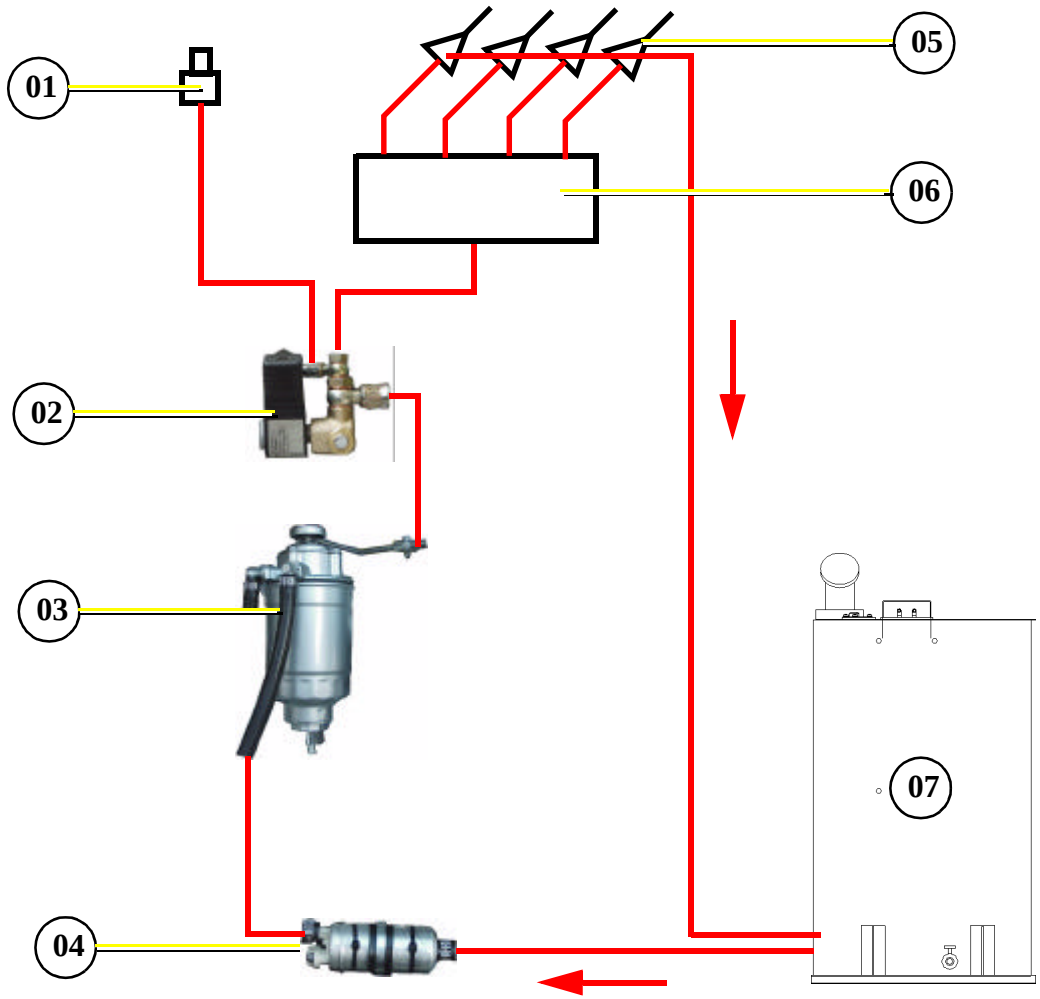
The starting current can be increased by 300% for a short period by combining both components voltage/speed control and ASB Start booster.

E.3 Fuel System Installation

A fuel filter with water separator is fitted on the interior of the generator capsule itself. Generally fuel forward and back flow must be connected to the diesel tank by means of its own induction connection pipe. Attention must also be paid that the fuel back flow pipe leads to the tank floor, in order to prevent emptying of the fuel pipe.

Generally, the Panda generator bleeds the fuel lines automatically. Before starting your generator for the first time (or after the genset has been sitting idle for a longer period of time), follow the "Air-bleeding of the Fuel System" on next page.

Fuel system installation sheme



01. Flame plug
02. Fuel solenoid valve
03. Fuel filter
04. Fuel pump
05. Injection nozzles
06. Injection pump
07. Fuel tank

F. Appendix

F.1 Maintenance Intervalls

After operating hours:	35-50h	100h	200h	300h	400h	500h	600h	700h	800h	900h	1000h
Check all coolant and water hoses	X	X	X	X	X	X	X	X	X	X	X
Check waterpump	X	X	X	X	X	X	X	X	X	X	X
Empty water separator/fuel pre-filter (if present)	X	X	X	X	X	X	X	X	X	X	X
Change motor oil	X	X	X	X	X	X	X	X	X	X	X
Clear of oil filter	X					X*)					X*)
Check air intake suction & flow, air filter, intake manifold, etc.	X	X	X	X	X	X	X	X	X	X	X
Check fuel lines	X	X	X	X	X	X	X	X	X	X	X
Readjust valve clearance (every 500 h only)	X					X*)					X*)
Replace valve cover gasket (every 500 h only)	X					X*)					X*)
Check all sensors & switches a) Coolant temperature sensor b) Exhaust temperature sensor c) Oil pressure sensor	X	X	X	X	X	X	X	X	X	X	X
Check all securing and fastening screws: a) All base mount screws b) Exhaust manifold screws c) Starter fixing d) Connection screws generator/engine	X	X	X	X	X	X	X	X	X	X	X
Check all electrical cables	X	X	X	X	X	X	X	X	X	X	X
Check battery	X	X	X	X	X	X	X	X	X	X	X
Idle run voltage (Volts)	X	X	X	X	X	X	X	X	X	X	X
Voltage under load (Volts)	X	X	X	X	X	X	X	X	X	X	X
Current under load (Amperes)	X	X	X	X	X	X	X	X	X	X	X
Engine speed (rpm) or frequency (Hz)	X	X	X	X	X	X	X	X	X	X	X
Change of the fuel filter	X	X	X	X	X	X	X	X	X	X	X
Change of the air filter	X		X*)		X*)		X*)		X*)		X*)
Cooler fan under load at bridged temperature sensor/ temperature switch	X	X	X	X	X	X	X	X	X	X	X
uptake of the ambient temperature	X	X	X	X	X	X	X	X	X	X	X
temperature switch / watertemperature IN/OUT, at full load and max. speed of cooler, bridged temperature sensor / temperature switch	X	X	X	X	X	X	X	X	X	X	X

After operating hours:	35-50h	100h	200h	300h	400h	500h	600h	700h	800h	900h	1000h
Actuate all ventilation valves -screws	X	X	X	X	X	X	X	X	X	X	X
With actuate the failure override switch check if the waterpump works faultless (only at gents without v-belt drived waterpump)	X	X	X	X	X	X	X	X	X	X	X
Check v-belt (not at AGT4000, Panda 4,5ND, Panda 5000LPE)	X	X	X	X	X	X	X	X	X	X	X
Check toothed belt (only VW-engine)	X	X	X	X	X	X	X	X	X	X	X
Squeezing off the injection nozzel (every 2000 h)											

*) or every 12 month

The motor manufacturer's regulations and instructions must be observed, especially operating and inspection instructions ! (See the motor manufacturer's operating instructions.)

F.2 Generator liquids

Engine oil types	
above 25 °C	SAE30 or SAE10W-30 SAE10W-40
0 °C to 25 °C	SAE20 or SAE10W-30 SAE10W-40
below 0 °C	SAE10W or SAE10W-30 SAE10W-40

Use a mixture of water and antifreeze. The antifreeze needs to be suitable for aluminium. The antifreeze concentration must be regularly checked in the interests of safety.

Coolant mixture ratio	
Water/antifreeze	Temperature
70:30	-20°C
65:35	-25°C
60:40	-30°C
55:45	-35°C
50:50	-40°C

ICEMASTER recommend to use the product: GLYSANTIN PROTECT PLUS/G 48

Engine coolant automotive industry Product description		
Product name	GLYSANTIN ® PROTECT PLUS / G48	
Chemical nature	Monoethylenglycol with inhibitors	
Physical form	Liquid	
Chemical and physical properties		
Reserve alkalinity of 10ml	ASTM D 1121	13 – 15 ml HCl 01 mol/l
Density, 20°C	DIN 51 757 procedure 4	1,121 – 1,123 g/cm^3
Water content	DIN 51 777 part 1	max. 3,5 %
pH-value undiluted		7,1 – 7,3

F.3 Troubleshooting

GENERATOR OUTPUT VOLTAGE TOO LOW For 50Hz versions: less than 200V / For 60Hz versions: less than 100V	
Cause	**Solution**
Generator is overloaded.	Reduce the electrical load. (Switch off consumers)
Motor is not reaching the rated rpm.	Refer to "motor faults" section.
Defective capacitor(s).	Check capacitors and replace if necessary.

GENERATOR VOLTAGE TOO HIGH (MORE THAN 240V-50Hz / 135V-60Hz) If the generator is providing excessively high voltage, the following potential causes should be investigated:	
Cause	**Solution**
Over-energizing due to wrong capacitors.	Check capacitors type and replace if necessary.
Measurering voltage on the VCS circuit board is missing.	Check VCS System, check cable connections.
Motor is running too fast (rpm too high).	Check motor speed with rpm-meter or frequency meter and adjust to proper speed under "zero" electrical load: (3120 rpm-50Hz / 3720 rpm-60Hz). Inspect ESC or VCS Systems if installed.

GENERATOR VOLTAGE FLUCTUATES	
Cause	**Solution**
1. Disturbances on the electrical system/user side. 2. Motor disturbances.	1. Check if electrical load is fluctuating. 2. Refer to section: "Motor runs irregular".

GENERATOR NOT ABLE TO START ELECTRIC MOTOR	
Cause	**Solution**
If the generator is unable supply enough power to start an electric motor (120V-60Hz or 231V-50Hz), it is usually because the motor draws too much current during starting process.	Check the motor's current draw required for starting (switch to 380V if possible). This could be remedied by providing stronger capacitors or installing an optional "Easy Start Booster Set". (See App. G) Enquire at your nearest Panda dealer or directly at the manufacturer.

DIESEL MOTOR FAILS TO START	
Cause	**Solution**
Starter battery switched "OFF".	Check position of battery switch and switch "ON" (if installed).
Starter battery voltage insufficient (battery too weak).	Inspect battery terminals and cables for a good electrical connection (Inspect against corrosion, tattered wires, etc.).
Starting current disrupted.	During the normal starting process, the battery voltage drops to 11V with a fully charged battery. If the voltage does not drop during starting, the electrical connection is faulty. If the battery voltage drops lower than 11V, then the battery has been discharged.

STARTER IS TURNING MOTOR, BUT FAILS TO START	
Cause	**Solution**
Fuel inlet solenoid valve not opening.	Check wire connections and circuitry to solenoid valve. (ref. DC wiring diagram: Relay K2, Fuse)
Fuel pump not working.	Check fuel-filter and pump: clean if necessary.
Lack of fuel.	Check fuel supply.
Glow-plugs not working correctly.	Check glow plugs and heating time.
Too much air in fuel lines.	Test fuel system for leakage. Bleed air from fuel system (refer to section "Bleeding Air from Fuel System").
Fuel-filter blocked.	Replace fuel filter.
Low compression pressure.	See Kubota motor-manual.

MOTOR DOES ACHIEVE ENOUGH SPEED DURING STARTING PROCESS	
Cause	**Solution**
Starter battery voltage insufficient.	Check battery.
Damaged bearing(s) piston (seized).	Repairs need to be carried out by Kubota-Service. (refer to Kubota motor-manual)
Cooling water in combustion chamber.	1. Turn generator "OFF" at control panel. 2. Remove the glow plug (see Kubota-manual). 3. Rotate the motor by hand carefully. 4. Check if there is water in the oil and change both oil and filter if necessary. 5. Determine cause for excess water in the combustion chamber. The excess water can be caused by a defective air vent in the cooling water system, which should be checked and cleaned, or replaced if faulty.

MOTOR RUNS IRREGULARLY	
Cause	**Solution**
Faulty centrifugal injector governor.	Have the centrifugal governor inspected by a Kubota-Service technician.
Too much air in fuel lines.	Bleed air from fuel system.

MOTOR SPEED DROPS	
Cause	**Solution**
Lack of fuel	Check fuel supply system: - fuel filter, renew if necessary - check fuel pump - check fuel lines (bleed if necessary)
Lack of intake air.	Check air intake paths. Check and clean air filter (and intake muffler if installed).
Generator overloaded by too many consumers.	Reduce the electrical load (switch off consumers).
Generator overloaded by over-energizing.	Check that the proper capacitor type is installed and that they are connected correctly.
Defective generator (windings, bearings, or other).	Generator must be sent to manufacturer for repair of damaged bearings or winding.
Damaged engine.	Repair of bearing damage, etc., by Kubota-Service.

MOTOR RUNS IN OFF POSITION	
Cause	**Solution**
Fuel inlet solenoid valve or throttle shut solenoid is not switching off.	Check wire connections to solenoid. Check valve functions as in the "Inlet Fuel Solenoid Valve" or in the trottle shut off solenoid sections. Replace if necessary.

MOTOR STOPS BY ITSELF	
Cause	**Solution**
Lack of fuel.	Check fuel supply system.
Excess heat in cooling system (thermo switch tripped)- lack of cooling water. Is indicated on the remote control panel.	Check cooling water system flow: water pump, inlet water filter, extra heat exchanger coolant flow.
Lack of oil (oil pressure sensor tripped). Is indicated on the remote control panel.	Check oil-level and if necessary top up. Check motor's oil-pressure and have repaired by Kubota-Service if necessary.
Over-/undervoltage. Is indicated on the remote control panel.	Switch-off the remote control panel, reduce the electrical load (switch-off consumers), start again.

SOOTY, BLACK EXHAUST	
Cause	**Solution**
Generator is overloaded.	Check electrical load and switch off unnecessary consumers.
Insufficient intake air.	Check intake air filter; clean if necessary.
Fuel injector faulty.	Replace injector.
Valve clearance incorrect.	Readjust valve clearance to correct value (refer to Kubota-manual).
Poor fuel quality.	Use better quality diesel (recommended: 2-D Diesel).
Poor combustion.	Incorrect AFR (air/fuel ratio) due to motor timing adjustment. Have motor serviced by Kubota.
Low compression pressure.	See Kubota motor manaul.

GENERATOR MUST BE SHUT OFF IMMEDIATELY IF:	
Cause	**Solution**
- motor rpm suddenly rises or drops - unusual noise comes from genset - exhaust colour suddenly becomes dark - leakage in the cooling water system.	Refer to respective section of manual and if necessary, have repaired by Kubota-Service, or Panda representative.

Troubleshooting VCS System:	
Cause	**Solution**
Throttle control servo motor does not move.	Check voltage supply and wire connections to servo motor. Motor connected? Check 230V connection to VCS.
Servo motor sets trottle too high or too low.	Check that the wires to the servo motor are connected properly (±). Check 230V connection to VCS.
If the VCS electronics are faulty, the generator can still run by over-riding the system. To override the VCS, disconnect the plug and jumper the contacts. 1. Loosen the connecting rods motor from the injection pump regulator and turn screw to a max. voltage of 240V. or 2. Loosen the connecting plugs of the Motor VCS electronic and turn the motor direct by hand.	

F.4 Technical Data Engine

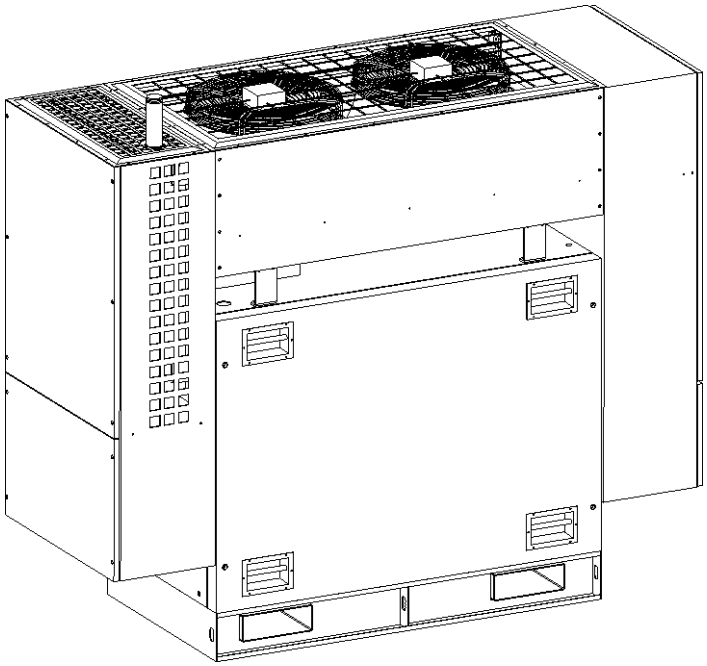
Generator	**Panda40-4 PSCH-KU-D-USA**
Type	Kubota V3300 TD
Governor	mechanical + VCS
Automatic Startbooster	yes
Cylinders	4 TD
Bore	98 mm
Stroke	110 mm
Stroke volume	3318 ccm
max. Power (DIN 6271-NB) at 2600rpm	58,2 kW
Rated speed 60Hz	1500 rpm
Idle running speed	2800 rpm[a]
Valve clearance (engine cold)	0,23 - 0,27 mm
Cylinder head nut torque	98 - 108 Nm
Compression ratio	21:8
Lubrication oil capacity	13,2 l
Fuel consumption [b]	approx. 4,2 - 11,2l
Oil consumption	max. 1% of fuel consumption
Permissible max. permanent tilt of engine	a) 25° across the longitudinal axis b) 20° in the longitudinal direction

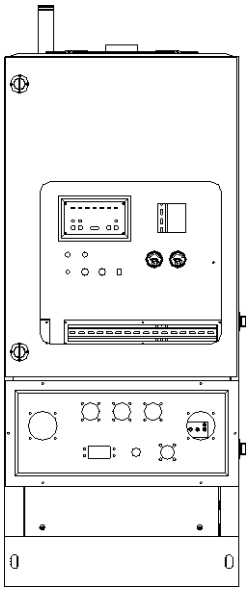
a. Progressive govenor by VCS
b. 0,35l/kW electrical power, the randomized values between 30% and 80% of the power rating.

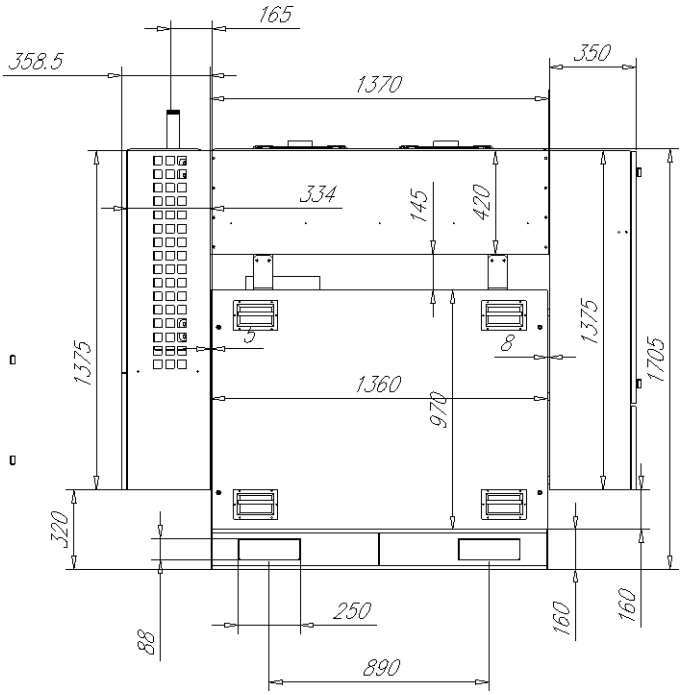
F.5 Technical Data Generator

Generator	**Panda40-4 PSCH-KU-D-USA**
Permanent output power	40 kW (kVA), 3000mtr alt., 50 degree C
Output voltage	120V / 208V 3phase
Output Current	192 A
Frequency	60 Hz
Stator Da	340 mm
Stator Di	225 mm
Rotor Lfe	240 mm

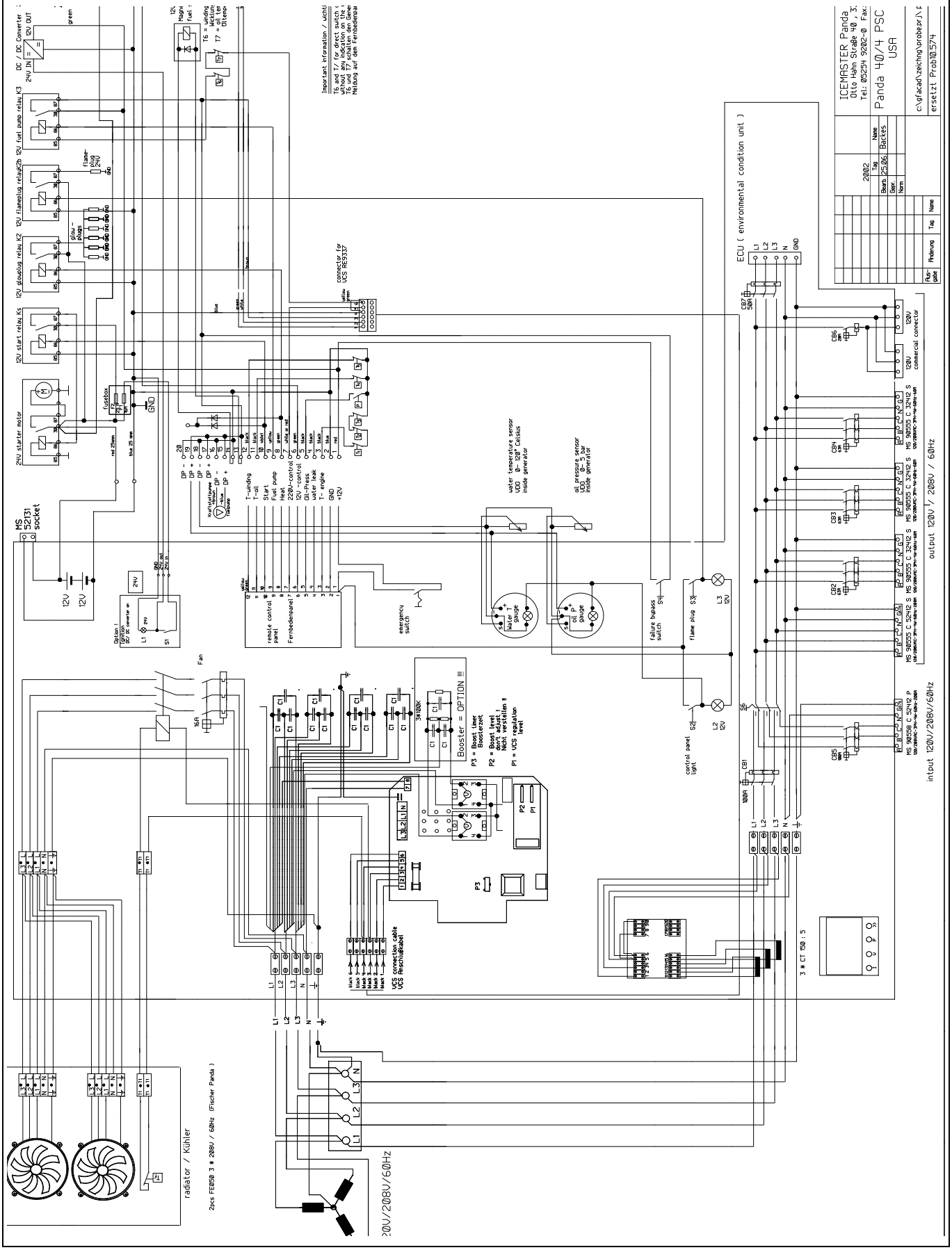
F.6 Capsule Measurements







F.7 Electrical wiring diagramm



F.8 Remote Control Panel wiring diagram