



Operating and Maintenance Manual

SET Camino Generators
Type: 10 / 15 / 20



Stange Energietechnik GmbH
Lise Meitner Str. 15
D-40764 Langenfeld

Tel.: +49 (0)2173 / 399 37-0 • Fax: - / 399 37-20
e-mail: Info@set-zeise.de • www.set-zeise.de

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Preface

SET-CAMINO Generator for safe and mains-independent power supply.

The **SET-CAMINO Generator** is designed for installation in vehicles.

It is particularly suited due to:

- Its ideal **construction, workmanship** and **function**.
- High **safety in operation** and nearly unlimited **service life**.
- Low **power consumption**.
- Compact **installation dimensions**.
- Excellent **sound insulation**.

Mains-independent power supply powerful, small and low-noise only by Stange Energietechnik GmbH with original **SET-CAMINO Generators**.

1 Introduction

Thank you for having purchased the **SET-CAMINO Generator** and for reading this operating and maintenance manual.

The **operating manual** of the **SET-CAMINO Generator** includes chapters explaining

- The basic safety hints
- The structure/functions/technical data
- Activation/operation
- Preventive maintenance and servicing
- Elimination of failures and errors/repair

For safe handling and continuous trouble-free operation.

Specifically for the installation of the **SET-CAMINO Generator**, the separate **installation and start-up manual** is provided, covering the chapters

- Installation/transport/shutting down
- Start-up/eliminating maintenance/inspection
- Installation versions/additional equipment
- Construction and installation drawings.

Please read this operating manual thoroughly. It contains important information, **regulations, and safety rules**.

2 Basic safety hints

2.1 Safety provisions

No warranty and liability claims will be accepted for personal and property damage if due to one or several of the following causes:

- Non-compliance with these particular or other known precautions.
- Failure to operate and handle the unit with the necessary care.

2.1.1 Obligations of the owner

The owner shall agree to start up the generator only after having made himself acquainted with the safety regulations and handling of the generator.

These are:

- Accident prevention regulations
- General and engine/plant related safety notes
- Safeguards of the generator
- Actions in emergency cases
- Operation of the generator
- Activities when starting up the generator
- Behaviour in case of failure
- Shutting down the generator
- Transport of the generator
- Disposal of utilities and auxiliary materials

The generator shall be installed properly by specialists only.

1. Check the place of installation and its environment for suitability.
2. You are obliged to eliminate any danger at the generator and its operation.
3. The operating manual must be readily available for the operator at the place of installation of the generator.
4. Follow the regulations for safe working and accident prevention.
5. The operating manual must have been read and understood.
6. Follow the actions dealt with in the operating manual.
7. Pictograms in the operating manual are used to underline particularly important information (for explanations of the pictograms refer to chapter 2.1.2).

8. The unit shall be operated only with the soundproofing housing closed.
9. With the soundproofing housing open, there is the risk of injury by the belts of the dynamo.
10. The electrical loading of the generator by connected power consumers must not exceed that indicated at the nameplate.

2.1.2 Pictograms for safety and danger hints

The following pictograms indicate where safety and danger hints in this operating manual must be complied with in particular:



Emphasises dangerous situations with possible personal injury, also possible generator damage.



Danger due to electrical current. The necessary works shall be carried out only by specialised electricians.



Notes concerning useful hints, explanations and supplements for handling the generator.



No Smoking



Fires and open light forbade.

2.1.3 Principle; application for the purpose intended

The generator has been built in accordance with the latest state of the art and approved safety rules. The requirements of the generator applicable in the manufacturer's country, Germany, (DIN, VDE and Machine Protection Act) have been taken into account. However, improper use may cause danger to the life and limb of the user or third parties as well as damage to the generator and other property.

Use the generator only in proper technical condition and for the purpose intended as well as according to safety standards with due consideration given to potential hazards! Eliminate any failure immediately which might affect safety (or have them eliminated).

The SET-CAMINO generator shall be used only for power generation and operating electrical units with coincident voltages.



Application for the purpose intended also includes compliance with the operating manuals and meeting the inspection and maintenance requirements.

2.2 Organisational measures

Keep the operating manual easily accessible at the place of installation of the generator (in tool compartment or the box provided for this purpose)!

In addition to the operating manual, follow and direct the general legal and other binding regulations for accident prevention and environmental protection! Such duties may also refer, for instance, to the handling of dangerous materials or the provision/wearing of personal protective equipment.

The operating manual must have been read and understood.

It will be too late during service. This is particularly applicable to persons who work time and again only at the generator, e.g. during setting up, maintenance, etc.

Use the personal protective equipment if necessary or required by regulations!

Observe all safety and danger notes at the generator!

Keep all safety and danger notes at the generator in readable state!

Shut down the generator immediately in case of safety relevant modifications at the generator or its operating performance. Do not carry out any modification and/or attachments or re-structuring work at the generator unless the prior written approval by the manufacturer has been obtained. This might affect the safety of the generator! This is also applicable to the installation and setting of safeguards and safety valves as well as for welding work carried out at load-bearing components. Any structural modification shall be done by the manufacturer only.

Use only original spare parts and original accessories of the manufacturer! Spare parts and accessories must meet the technical requirements specified by the manufacturer. Original components will ensure this.

Replace all hose lines at the intervals indicated and/or appropriate, even if no safety relevant defects can be seen!

Keep the intervals for repeated checks/inspection which are specified or given in the operating manual!

Appropriate workshop equipment is required to carry out maintenance/repair work.

Inform yourself of special tools!

Observe the fire alarm and fire fighting facilities!

Inform other persons of the location and operation of fire extinguishers!

2.3 Basic duties

Work at/by the generator shall be carried out only by reliable personnel. Observe the legally admissible minimum age!

Work at the electrical equipment of the generator shall be carried out only by specialised electricians in accordance with the rules of electrical engineering. Work at electrical supply installations shall be carried out by authorised specialists only in compliance with the DIN VDE provisions and the regulations of the relevant country. Check the electrical design of the generator at regular intervals.

2.4 Safety hints for certain operating phases

Follow the specific safety notes during the individual phases of operation.

2.4.1 Normal operation

Refrain from any activity which might affect safety!

Arrange for the necessary precautions so that the generator is operated only in safe and properly functioning state!

Operate the generator only with all safeguards and safety devices, e.g. removable safeguards, emergency OFF devices, sound insulation, exhaustion systems, mounted and functioning properly!

Check the generator for visible damage and defects once a day! Eliminate changes, if any (including the operating performance) immediately, shut down and secure the generator, if necessary!

In case of functional failures, shut down and secure the generator immediately! Eliminate failure immediately (or have them eliminated)!

Observe the switching on/off processes, control display in accordance with the operating manual!

Prior to switching on/starting the generator, make sure that no person is at risk due to the starting generator!

Do not switch off and/or remove exhaustions and bleeding units with the generator running.

2.4.2 Continuous operation

Note and follow the national working, operating and safety regulations for safely handling this generator and its trouble-free operation.

Check the generator for visible damage at regular intervals!

The generator and the control system shall be operated only by instructed operators!

The parameters set by the manufacturer are standard setting values!

Follow all hints given for the case of malfunction (refer also to the chapter „Failure, elimination of failure, repair“). If the actions mentioned there do not result in the elimination of failure, please contact the SET after-sales service department!

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e-mail: Info@set-zeise.de • www.set-zeise.de

2.4.3 Special work

- Carry out all maintenance and installation work at the generator according to the hints. Shut down the generator properly.
- Any person in the facility of the owner who is authorised to carry out assembly, start-up, operation, maintenance, repair or other work, shall have read and understood the operating manual, and in particular the safety notes.
- Keep all setting, maintenance and inspection work and dates specified in the operating manual, including the data concerning the replacement of components/sub-assemblies! This work shall be carried out only by specialised personnel.
- Observe all switching on/off processes according to the operating manual and the hints for maintenance for any work related to the operation, production adaptation, re-equipment or setting of the generator and its safety relevant equipment as well as inspection, maintenance and repair!
- Switch off and secure the generator against unintended re-connection when carrying out maintenance work!
- Lock the main command facilities, withdraw the key and keep it!
- Attach a warning plate at the main switch!

2.5 Hints for specific types of danger

2.5.1 Electrical power

- Use only original fuses with the amperage specified! Switch off the generator immediately in case of power failure!
- Work at electrical installations or operating means shall be carried out only by specialised electricians in accordance with the rules of electrical engineering.
- Disconnect all engine and plant parts at which inspection, maintenance or repair work shall be carried out, from the voltage supply. Check the disconnected components for their proper isolation prior to start any work!
- Check/inspect the electrical equipment of the generator at regular intervals. Eliminate defects, such as loose connections and/or burnt cables immediately.
- If work shall be carried out at live components, employ a second person who can activate the emergency off and/or main switch with voltage release in case of emergency. Use voltage-insulated tools only!

For work at high-voltage sub-assemblies, connect the supply cable to ground and short-circuit the components, e.g. capacitors, with the earthing rod after having disconnected the voltage!

Check the electrical design of the generator at regular intervals.

2.5.2 Gas, dust, steam, smoke

- Carry out welding, burning and grinding work at the generator only after having obtained the specific permission. There may be fire and explosion danger!
- Prior to carry out welding, burning and grinding work, clean the generator and its environment from dust and inflammable materials and arrange for sufficient ventilation (danger of explosion)!
- Observe the national regulations, if any, for work in narrow spaces!
- Follow the safety regulations applicable to the product when handling oils, greases and other chemical substances!
- Be careful when handling hot utilities and auxiliary materials (danger of burns and/or scalding)!

2.6 Notes for warranty and liability

- Have repair and maintenance work carried out by a specialised workshop approved by SET.
- SET will not accept responsibility and liability for work carried out by third party's personnel.
- The „General Terms and Conditions of Sale and Supply“ of SET shall be applicable in any case. They will be provided to the owner when signing the contract at the latest.

Warranty and liability claims for personal and property damage shall be excluded if due to one or several of the following causes:

- Use of the generator for purposes other than the intended.
- Improper assembly, start-up, operation and maintenance of the generator.
- Operating the generator with defects.
- Non-compliance with the notes in the operating manual concerning transport, storage, assembly, start-up and maintenance.
- Unauthorised structural modification to the generator.
- Poor monitoring plant components which are subject to wear.
- Improperly carried out repair work, use of third party's components.
- Catastrophes due to the effects of foreign bodies and Force Majeure.

2.6.1 Storing the generator

No warranty claims will be accepted by SET GmbH for corrosion damage and frost damage due to improper storage, such as moist rooms or the like.

2.6.2 Claims

No replacement or warranty claims will be accepted for improper transport. In case of doubt, contact the manufacturer prior to transport.

2.6.3 Figures and drawings

Are used for general illustration and shall not be decisive for the construction of individual components. The dimensions specified shall not be binding.

2.6.4 Protected rights

Any right in drawings and other documents as well as any disposal right such as copy and disclosure rights shall remain with SET GmbH, even in case of the application of protected rights.

2.6.5 Environmental protection

- Dispose used materials and substances according to the applicable regulations.
Disposal of materials in accordance with environmental standards will promote the re-use of valuable materials.

2.6.6 Dangers and warning signs

The dangerous areas of the generator are identified by warning plates. These signs contain information which will protect you from dangers to health, fatal injuries or property damage!

- Read the appropriate text and follow it during work at any case!
- The danger and warning signs shall be properly recognised and read by the operator!
- Do not remove the plates and signs!

We wish you success and joy with your
SET-CAMINO generator!

3 How to handle the SET Camino Generator

3.1 Scope of supplies

The **SET Camino Generator** has been packed cleanly after the final inspection by our quality assurance department. The generator is transported on a wooden pallet. All components are securely mounted at the pallet. When unpacking, please check the generator for damage due to transport. In case of damage, if any, please inform the forwarding agency immediately.

In detail:

CAMINO generator consisting of:

- Capacitor box
- Cooling unit complete with pumps
- Exhaust gas silencer
- Control panel for installation
- Control cable with plug
- Operating manual **SET**
- Manual **Lombardini**

3.2 Protective measures against mechanical risks

The unit is suspended freely oscillating. Vibration absorbers between the soundproofing housing and the assembly frame as well as inside the soundproofing housing ensure low-vibration operation.

All components required to operate the generator are screwed to the unit.

Bushings in the housing of the soundproofing housing allow installation of the supply connection and the outgoing cables without risk.

The sound insulation material used is self-extinguishing in accordance with DIN 752 000.

The generator is designed so that it withstands all loads if used for the purpose intended.

Properly connect the assembly frame with the vehicle body at the points provided for this purpose.

3.3 Protective measures against electrical risks

Electrical safety has top priority and is achieved by various protective measures.

3.3.1 Electrical risks in the AC circuit 400V 50Hz

Type of protection IP54 of the generator ensures complete protection against contact with live components and against damaging dust deposits and splash water.

Insulation class „F“ of the winding of the generator is characterised by a high temperature and high short-circuit resistance.

The generator is interference suppressed according to VDE 0875 interference level N.

All metal parts of the generator are connected to earth.

3.3.2 Electrical risks in the DC circuit 12V

The electrical installation of the generator is of the 2-pole type.

Installed fused in the control module (electronic box)

Fuses: 1 x 15 A, 1 x 3 A, 1 x 5 A.

Plug connectors are completely insulated, the plug for the control line is torsionally-safe and thus also safe against pole changes.

A sophisticated smart electronic generator Diesel monitoring system protects the generator's system against damage and mal-operation.

3.4 Protective measures for the electrical installation



The electrical system shall be installed by specialised electricians only.

3.4.1 Electrical installation of the AC circuit 400V 50Hz

The distribution box for electrical power – to be mounted by the customer – shall be at least of IP 54 type of protection.

Install a 2-pole change-over switch with the positions 1 – 0 – 2 as mains/generator switch.

Install miniature circuit breakers per consumer circuit to protect the consumer circuits.

Lead the electronic connection lines through the appropriate screwed conduit entries.



When replacing a connection line tighten the screwed joints firmly and check for tension.

- Install a protective conductor when installing the electrical system.
- Direct earthing of the generator with the vehicle body is required here.
- In accordance with the regulations of the manufacturer's country, the protective measure fault current protective circuit (FI residual current circuit breaker) is required.
Residual current circuit breaker: 0.03A

Another protective measure can be prescribed for installations in other countries. The installation company for the plant shall be liable in case of accidents if these regulations are not complied with.

3.4.2 Electrical installation of the DC circuit 12V

1. Do not connect the pole terminals to the battery unless the installation is completed, the Diesel engine is ready for operation and the start switch is in OFF position
2. Check pole terminals for tight seat.
3. Apply anti-acid grease to the pole heads and pole terminals.
4. All control lines are switched in a water-proof plug connector.
5. Electrical installation is minimised.
6. A 3 A line fuse is installed in the terminal box for the use of the electrical fuel delivery pump beside the **SET Camino Generator**.
7. The connection cables for the starter battery are lead out of the soundproofing hood, the connection cables are marked (+) and (-) and are provided with pole terminals with the same identification (+) and (-)



The line cross-section of the connection cables lead out of the sound protected hood is designed for the erection of the starter battery in the immediate vicinity of the generator.

3.5 Protective measures for mechanical installation



The electrical system shall be installed by a specialised electrician only. No warranty claims will be accepted in case of improper installation.

3.6 Fuel system

If an external Diesel tank is to be installed, use design-approved tanks only.

When using a common Diesel fuel tank with the main engine, install a suitable foot-operated valve and a ball valve at the tank connection.



All components, pipings and connections must be suitable for Diesel fuel. Install the fuel lines made of fire-resistant tubing with steel thread sheathing according to fire prevention standards.

Permanently installed lines may also consist of copper pipe.

Under certain circumstances it will be necessary to install a primary fuel filter at the water separator.

The electrical fuel delivery pump used must be suitable for Diesel fuel.

The supply and return lines in the tank must reach the tank bottom.



No Smoking



Fires and open light forbade.

3.7 Combustion air supply

- Combustion air is taken in through the opening in the soundproofing hood directly from the engine room.
- If the temperature of the ambient air in the engine room exceeds 20 °C, supply fresh air from outside.
- Supply fresh air through a 40 mm diameter hose. The length of the hose must not exceed 3 m.
- Mount the external air filter, if required.

3.8 Safety notes, summary

1. Check and maintain the starter battery after a longer interruption of operation.
2. Prior to starting the generator, check all connections for tight seat and proper condition.



Increased risk of fire due to leaking fuel.

Malfunction in the system may occur due to failure of the engine cooling or generator cooling system.

- Operate the generator only with the soundproofing hood closed.



Increased risk of injury due to rotating engine components.

- The air inlet opening in the soundproofing hood must be open so that the combustion air can flow in easily.
- Carry out maintenance and inspection work in accordance with the specification of this manual.
- Use original and identical **SET** spare parts only for repair work.
- Work at the electrical installation shall be carried out only by specialised electricians with due consideration given to the applicable regulations.
- Do not start the generator without properly functioning cooling water system.



Fuel must not contact the hot surfaces of the generator. Risk of fire!

3.9 Exhaust gas system

- All components of the exhaust system used must be of heat-resistant material and installed according to fire prevention standards.
Use original **SET** installation parts only.
- The required dimensions* must be kept

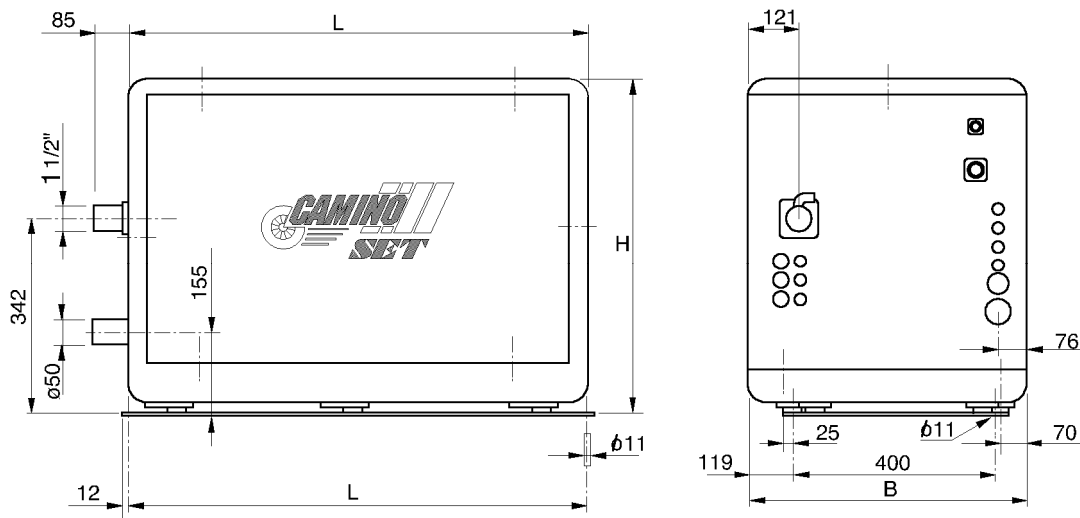
3.10 Cooler unit

- Suction-proof hose only shall be used.
- The required dimensions must be kept.
- Check the coolant at the expansion vessel at regular intervals.
- The cooling air inlet must have at least the 1.2fold of the area of the cooler.
- The cooling air outlet (free outlet) must have at least the area of the cooler.

* (refer also to installation manual)

4 Technical data

4.1 Dimensional sheet „generator“



Engine starter battery:

1. Connection (plus) 1.0m lg.
2. Ground connection (minus) 0.8m lg.

Engine combustion air:

3. Connection (air filter)

Engine fuel connection:

4. Diesel return line 0.2m lg.
5. Diesel supply line 0.2m lg.

Engine cooling system:

6. Coolant supply line.
7. Coolant return line

Engine exhaust gas system:

8. Exhaust gas outlet

Generator control connections:

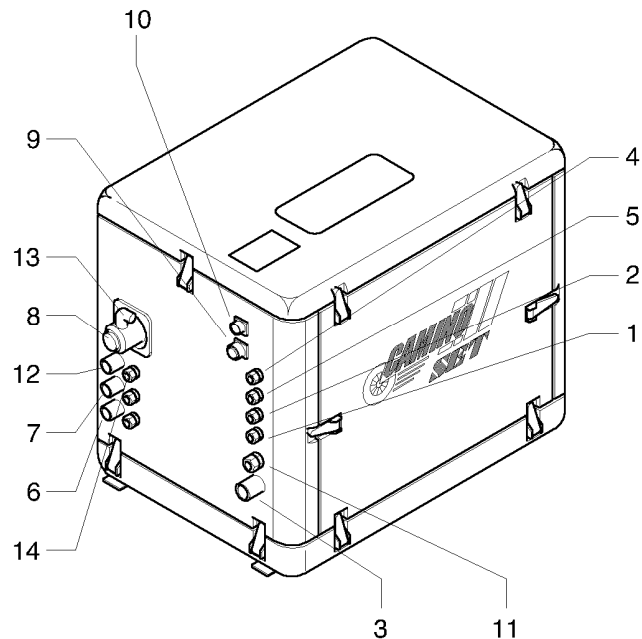
9. Control panel connection
10. Cooler unit connection
11. Capacitor box, 2.0m lg.
to residual current circuit-breaker
and to the consumers

Generator cooling system:

12. Generator coolant supply line
13. Coolant return line

Generator output connections:

14. External consumers 14V/2 x 3A



Deviations possible!
Please refer also to the hints given at the rear of the housing.

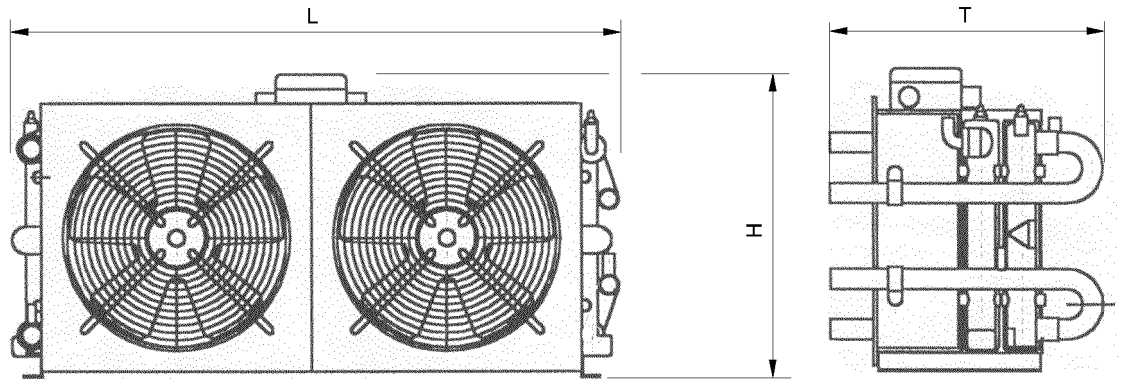
4.2 Dimensional sheet „cooler unit“

Cooler versions:

- Different cooler units can be used depending on the order and application.
- Construction and design must be co-ordinated with **SET** in any case.

Example:

Combined engine and generator cooler

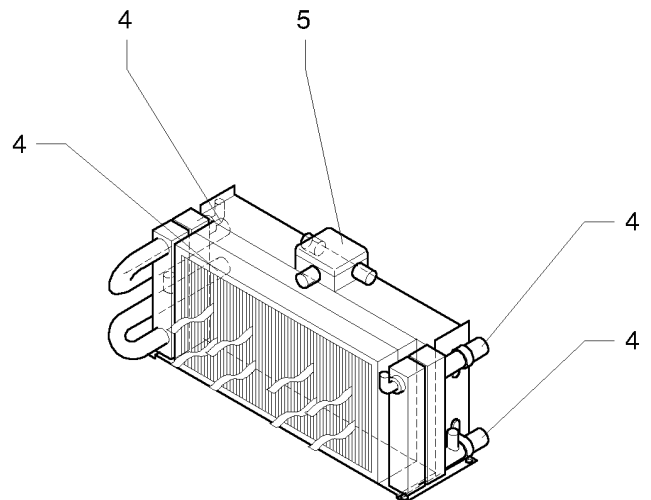


Dimensions:

- | | |
|-----------|--------|
| 1. Length | 870 mm |
| 2. Width | 422 mm |
| 3. Depth | 378 mm |

Connections:

4. Coolant hose connections
5. Control connection



4.3 Technical data „generator“

	CAMINO 10	CAMINO 15	CAMINO 20
Output class (... kW -cos.phi 1*)	8 kW	12.5 kW	16 kW
Cooling (water with anti.-freezing agent)	■	■	■
Installation position: ± 25 degrees (inclination in any direction)	■	■	■
Radio interference suppression VDE 0875 degree N	■	■	■
Weight	260 kg	294 kg	325 kg
Housing	■	■	■
Bottom part	■	■	■
Top part in 5 segments, all sides with clamping closure and removable	■	■	■
Insulation (special foam material)	■	■	■
Sound level... dB(A)	53	53	53
Length of housing (....mm)	763	846	929
Length incl. connections (....mm)	848	931	1014
Width (....mm)	590	590	590
Height (....mm)	620	620	620
Vibration damper** inside	4	6	6
Vibration damper** outside ** (shock-proof in any direction)	4	6	6

- Up to 30 °C ambient air
5 % output losses / 5 °C air temperature rise

Cooler unit: Type: SET

4.3.1 Technical data „generator“

	CAMINO 10	CAMINO 15	CAMINO 20
Product	SET	SET	SET
Output (...kW; cos.phi 1*)	8 kW	12.5 kW	16 kW
Voltage (...V ± 6%)	400 / 230V	400 / 230V	400 / 230V
Amperage (single-phase operation)	12.0 / 45 A	20 / 45 A	24 / 45 A
Battery charge	14 V - 35 A	14 V - 35 A	14 V - 35 A
Coolant filling (water with anti-freezing agent)	8 l	8 l	8 l
Cooling water required (for direct cooling)	20 l / Min	20 l / Min	20 l / Min
Type of protection	IP 54	IP 54	IP 54
Insulation class	"F"	"F"	"F"
Frequency	50 Hz +/- 3 %	50 Hz +/- 3 %	50 Hz +/- 3 %

- The full output can be achieved only after a running in phase of approx. 50 hours of operation.
- The short-circuit proof, self-exciting revolving-field generator can be overloaded to 10 % for a short period of time.
- For three-phase generators, load unbalance up to 80 % is possible.

4.3.2 Technical data „drive engine“

	CAMINO 10	CAMINO 15	CAMINO 20
Drive engine	Lombardini	Lombardini	Lombardini
Cooling (water with anti-freezing agent)	Water	Water	Water
Bore	72 mm	72 mm	72 mm
Stroke	75 mm	75 mm	75 mm
Displacement	611 cm ³	619 cm ³	1222 cm ³
Rated speed	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Engine output acc. to DIN 6270	9.5 kW	14.1 kW	19.1 kW
Combustion air required	0.92 m ³ /min	1.37 m ³ /min	19.1 kW
Exhaust gas volume	1.29 m ³ /min	1.93 m ³ /min	2.57 m ³ /min
Max. exhaust gas counter-pressure (H ₂ O)	1200 mm	1200 mm	1200 mm
Fuel consumption	280 g/kWh	280 g/kWh	280 g/kWh
Luboil filling SAE 10 - 40	1.6 litres	2.4 litres	3.3 litres
Coolant filling (water with anti-freezing agent)	8 litres	10 litres	12 litres
Cooling water required (for direct cooling)	29 l/min	38 l/min	46 l/min
Thermostat	80 °C	80 °C	80 °C
Max. admissible inclined position of engine	Permanent 25 ° short-time 35 °	Permanent 25 ° short-time 35 °	Permanent 25 ° short-time 35 °

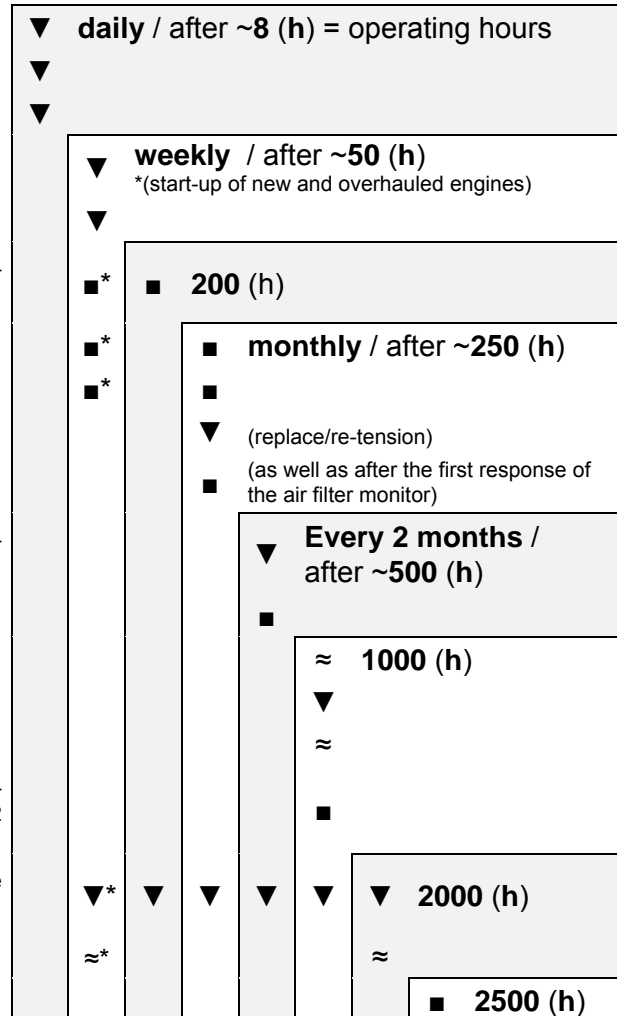
- The dynamo supplies 14 V DC to charge the starter battery.

4.3.3 Maintenance intervals

Maintenance intervals

▼ = check ≈ = clean ■ = replace

Oil level
 Oil bath and engine air filter
 Coolant level
 Engine for tightness (leakage)
 Battery and cable connections
 Engine oil (acc. to data of engine manufacturer)*
 Oil filter*
 Fuel filter*
 Vee belts *
 Air filter (sound-insulated box)
 Valve/tilting lever clearance (if necessary)
 Coolant pump*
 Injection nozzles*
 Injection nozzles (if necessary)*
 Fuel tank*
 Coolant depending on season, check anti-freezing agent concentration or change every 2 years)
 Cooling system (acc. to data of engine manufacturer n)
 Fuel pre-cleaning
 Toothed belts



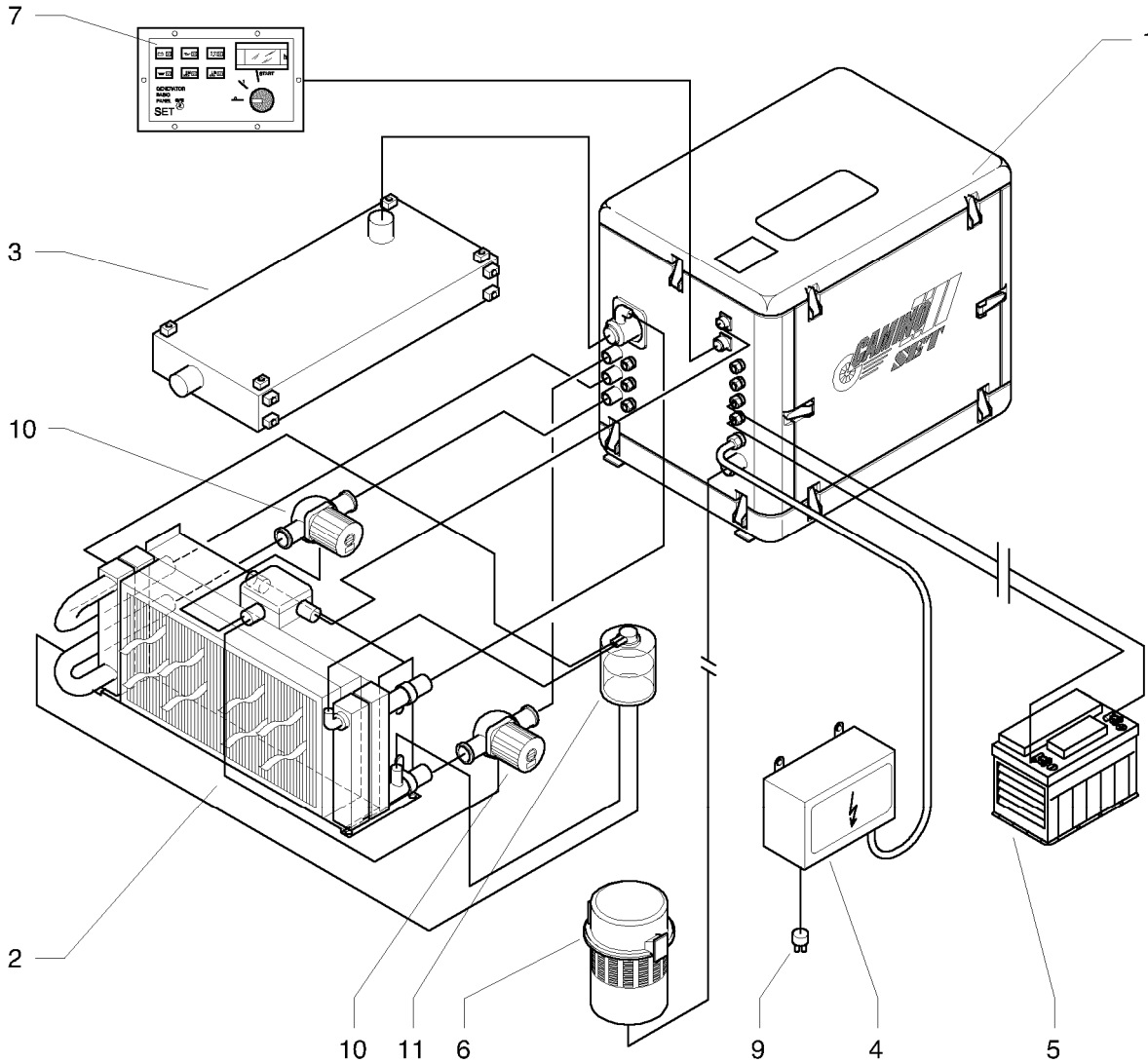
General overhaul to be carried out according to application*.

- In continuous operation after 4000 h
- Variable application after 2 years at the latest

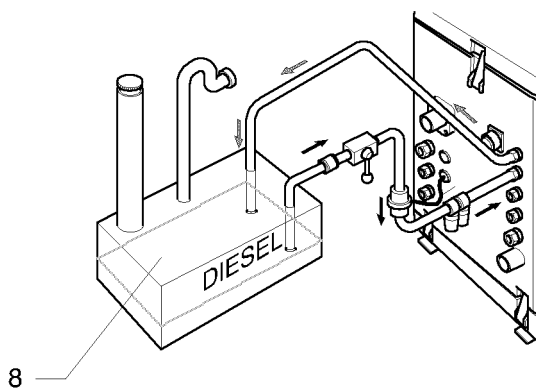
* (refer also to data of engine manufacturer)

5 Construction and functioning

5.1 Main sub-assemblies of SET Camino Generator



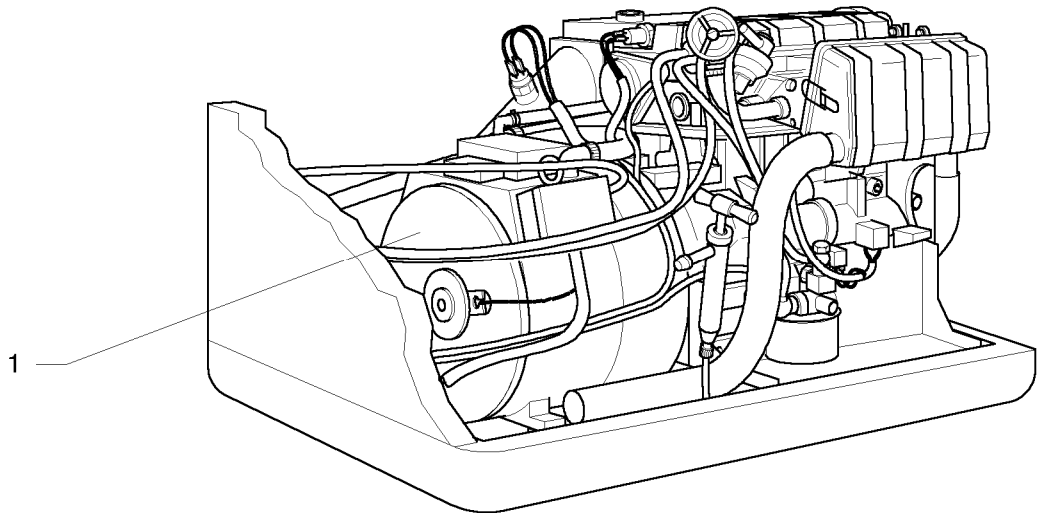
1. Generator CAMINO
2. Cooler unit
3. Exhaust gas silencer
4. Capacitor box
5. Battery (Option)
6. External air filter (Option)
7. Control panel
8. Fuel system
9. Connection to residual current circuit-breaker / miniature circuit-breaker
10. Coolant pump
11. Coolant expansion tank





No modification to the original state of the generator and the accessories supplied is allowed The supplied documentations of sub-suppliers (e.g. engine manufacturer) shall also be binding.
No warranty claims will be accepted in case of non-compliance with the above.

5.2 Sub-assembly „generator“



The housing of the generator (1) consists of cast hollow aluminium walls. It is cooled by the external cooler by means of the coolant pump

The winding of the generator consists of high-quality copper wire. The insulation is in compliance with insulation class “F” (high temperature resistance, high short-circuit resistance and Tropicalised design). The winding is encapsulated so that it does not contact the cooling system.

The generator is a maintenance-free brushless asynchronous generator of type of protection „IP54“.



Type of protection IP54 ensures complete protection against contacting live components as well as damaging dust deposits and splash water.

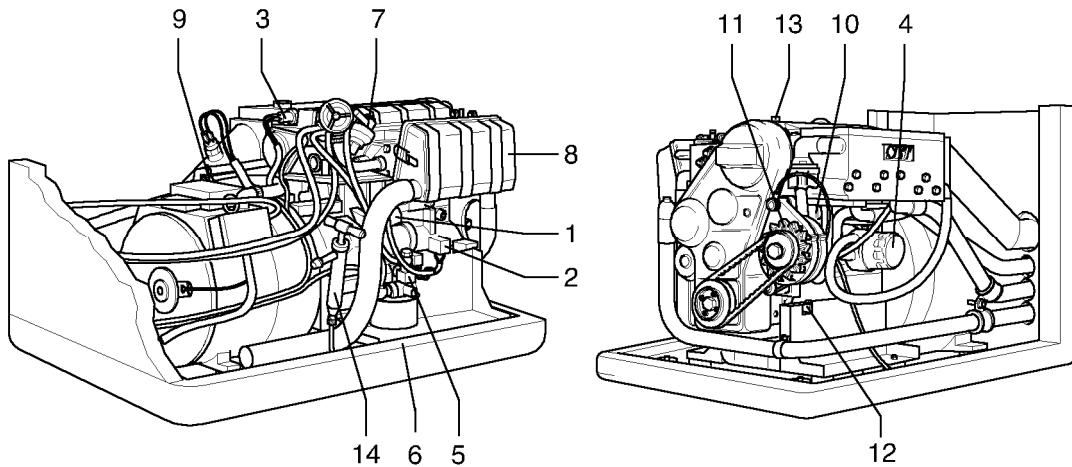
The generator generates a voltage of:

- 400 Volts, 3-phase current 50 Hz
- or 230 Volts, 1-phase AC current, 50 Hz

(refer also to chapter „Technical data“)

5.3 Sub-assembly „Diesel engine“

The drive engine of your **SET-CAMINO** generator is a four-stroke Diesel engine with closed cooling circuit



1. Electrical starter 12V
2. Pre-glowing relay
3. Oil pressure switch
4. Oil filter (option: installation at maintenance side)
5. Fuel solenoid valve
6. Fuel filter
7. Fuel delivery pump
8. Air filter
9. Temperature transmitter – exhaust gas pipe
10. Temperature transmitter - engine
11. Drive - dynamo
12. Oil dipstick (option: extended oil dipstick)
13. Oil filler socket
14. Oil change pump

(refer also to chapter Technical data of „Drive engine“)

5.3.1 How to handle the Diesel engine



***No modification to the original state of the Diesel engine and the accessories supplied is allowed.
No warranty claims will be accepted in case of non-compliance with the above!***

The full output of the Diesel engine is achieved only after a running in period of approx. 50 hours.



After the start, load the generator with approx. 60 % of its output. Longer idling times without load will damage the Diesel engine.

For trouble-free operation:

- Carry out repair, maintenance and inspection work at the Diesel engine properly and at regular intervals.
- Avoid long idling phases of the engine.
Otherwise the pistons and cylinder head will coke.
- Replace oil, air and fuel filters at regular intervals.
(refer also to chapter „Maintenance intervals“ and Maintenance and servicing“)



Let the generator run daily. However, avoid unnecessary operation of the engine to protect the environment.

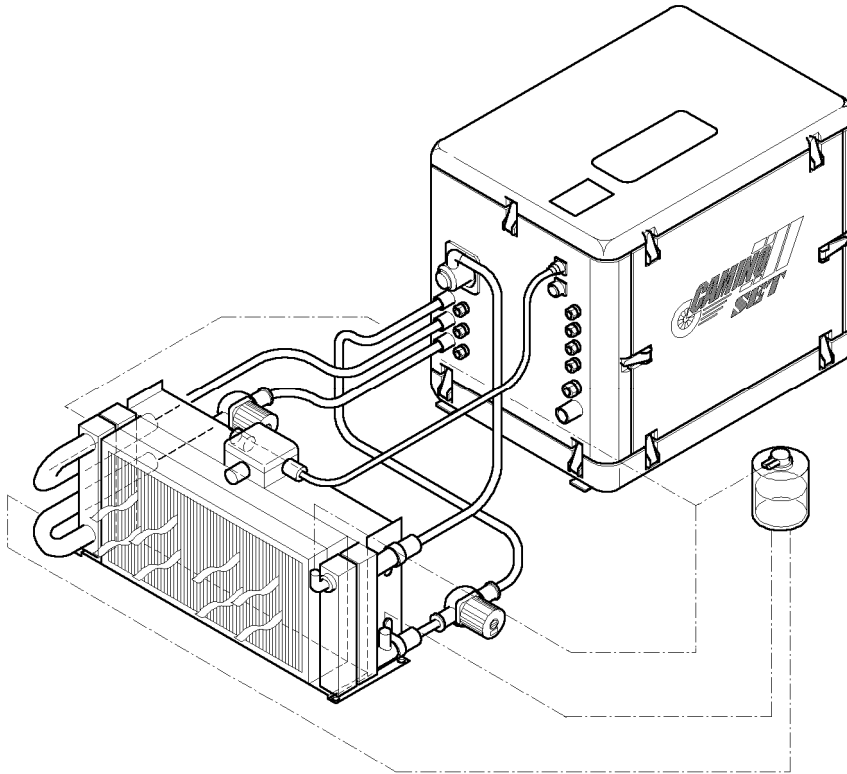
Engine, generator and exhaust gas system are water-cooled and kept continuously at the optimum working temperature by two integrated cooling circuits.



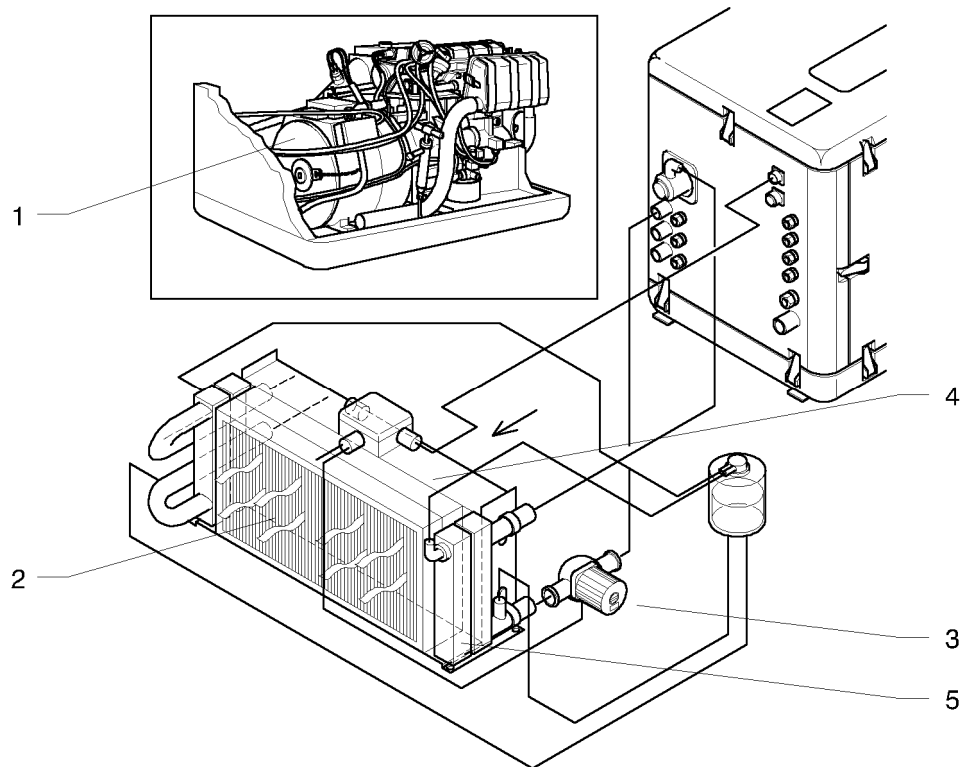
In order to prevent malfunction, have the specified maintenance and inspection work carried out by experienced service personnel at regular intervals.

5.4 Sub-assembly cooling system

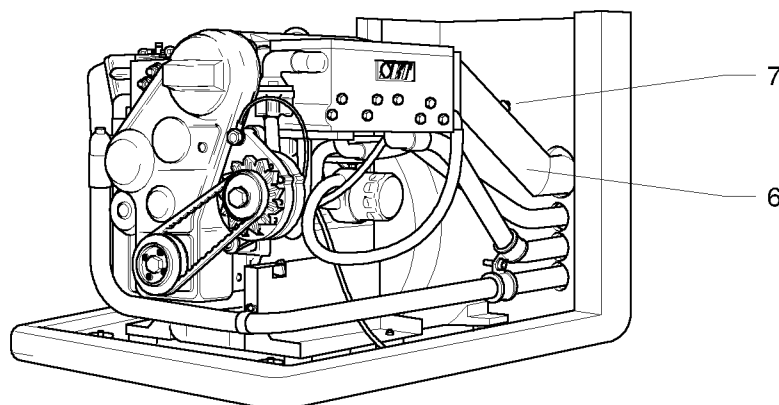
The whole cooling circuit consists of two independently controlled circuits, one circuit for cooling the engine, the other to cool the generator.



5.4.1 Cooling circuit „generator“



The generator cooling system of the **SET Camino Generator** is a closed circuit, which continuously cools the generator (1) via the coolant pump (3). The axial ventilator (4) in the cooler (2) provides the correct coolant temperature. (The generator cooling is controlled via thermostat (5) and the **SET Camino Generator** control unit). Permanent cooling of the generator circuit provides optimum cooling temperatures at ambient temperatures up to $-35\text{ }^{\circ}\text{C}$. For higher temperatures, **SET** offers special coolers as an option.

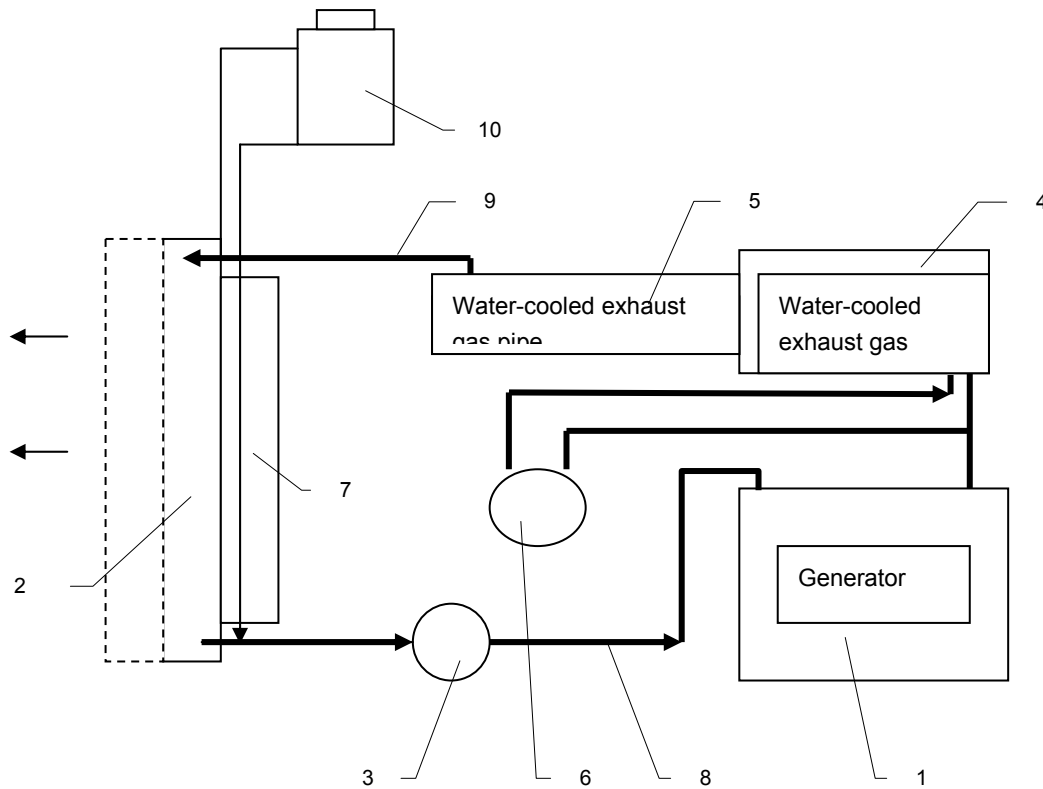


The water-cooled exhaust gas elbow (6) reduces the radiation energy generated. It is also used to silence the engine noise.

The temperature transmitter (7) at the exhaust gas pipe protects the generator from overheating if the coolant pump (3) fails or the cooler unit is out of operation.

Circuit scheme generator cooling

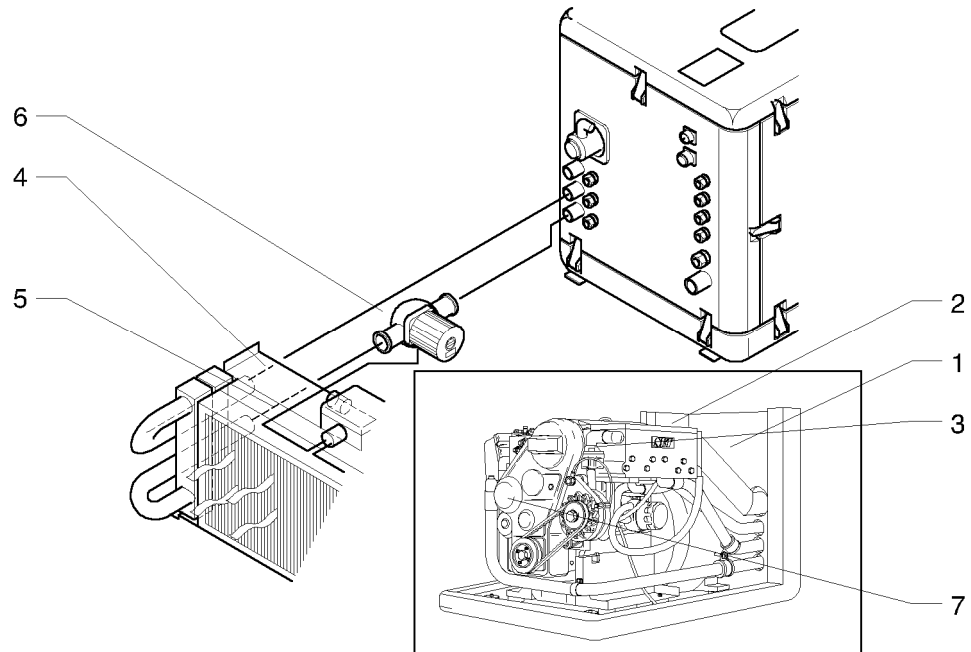
- The coolant (mixture of water and anti-freezing agent) is pumped by the generator pump (3) through the generator (1), oil cooler (6), the water-cooled exhaust gas elbow (4) and the water-cooled exhaust gas pipe (5) and cooled down in the generator cooler (2).
- The axial ventilators and the recirculation pump are also running continuously, the feeding line plug is connected with the socket provided at the rear of the housing.



1. Generator
2. Generator cooler
3. Generator pump
4. Water-cooled exhaust gas elbow
5. Water-cooled exhaust gas pipe
6. Oil cooler
7. Axial ventilator
8. Generator cooling circuit – supply line
9. Generator cooling circuit – return line
10. Expansion vessel

5.4.2 Cooling circuit „Diesel engine“

- The coolant (mixture of water and anti-freezing agent) is pumped by the recirculation pumps (6 + 7) through the engine and cooled down in the engine cooler (1).



1. Water-cooled exhaust gas elbow
2. Bleeding plug
3. Thermostat
4. Engine cooling circuit (supply line)
5. Engine cooling circuit (return line)
6. Engine coolant pump
7. Recirculation pump

The cooling circuit of the engine is a closed cooling system filled with coolant which cools the engine permanently.

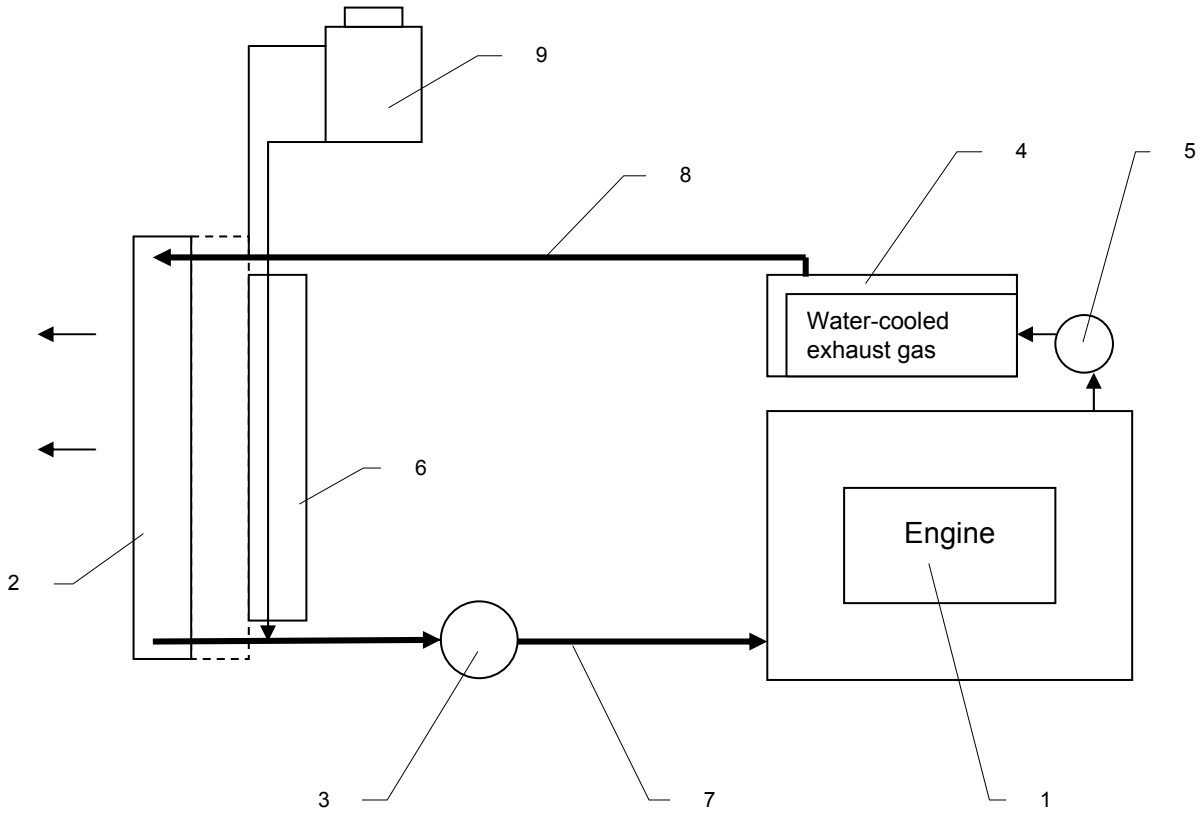
(refer also to chapter Technical data „Drive engine“)



Open the closing plug only when the engine is cooled down and prior to start-up. Risk of scalding!

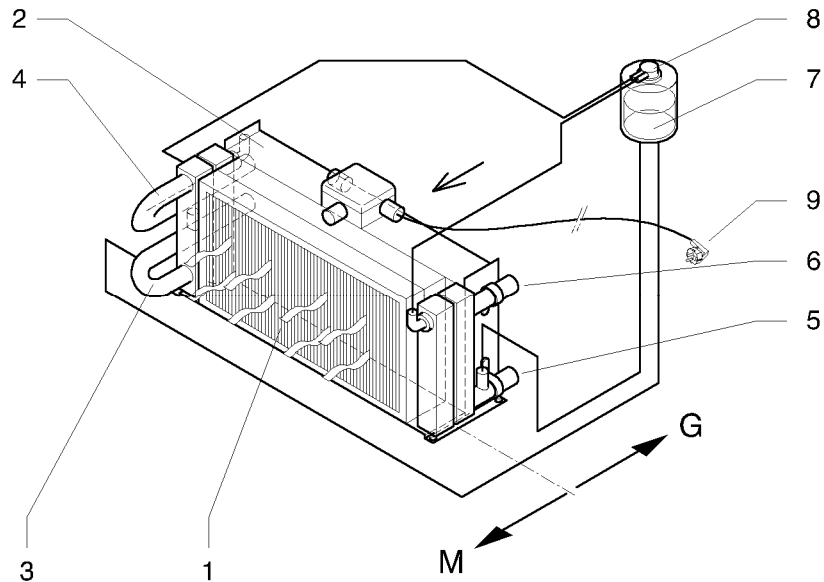
Thermostat (3) controls the coolant circulation depending on the engine temperature.

Circuit scheme – engine cooling



- 1. Engine
- 2. Engine cooler
- 3. Engine pump
- 4. Water-cooled exhaust gas elbow
- 5. Thermostat
- 6. Axial ventilator
- 7. Engine cooling circuit – supply line
- 8. Engine cooling circuit – return line
- 9. Expansion vessel

5.4.3 Cooler unit with axial ventilator



The closed cooling system consists of the external cooler (1) with 2 separate cooling circuits. The axial ventilators (2) in the cooler are supplied with voltage by a generator. The cooler unit is controlled via the connection line with plug (9).

Engine cooling

- Engine cooling circuit – supply line (3)
- Engine cooling circuit – return line (4)

Generator cooling

- Generator cooling circuit – supply line (5)
- Generator cooling circuit – return line (6)

Coolant expansion vessel

- Vessel (7)
- Filler neck (8)

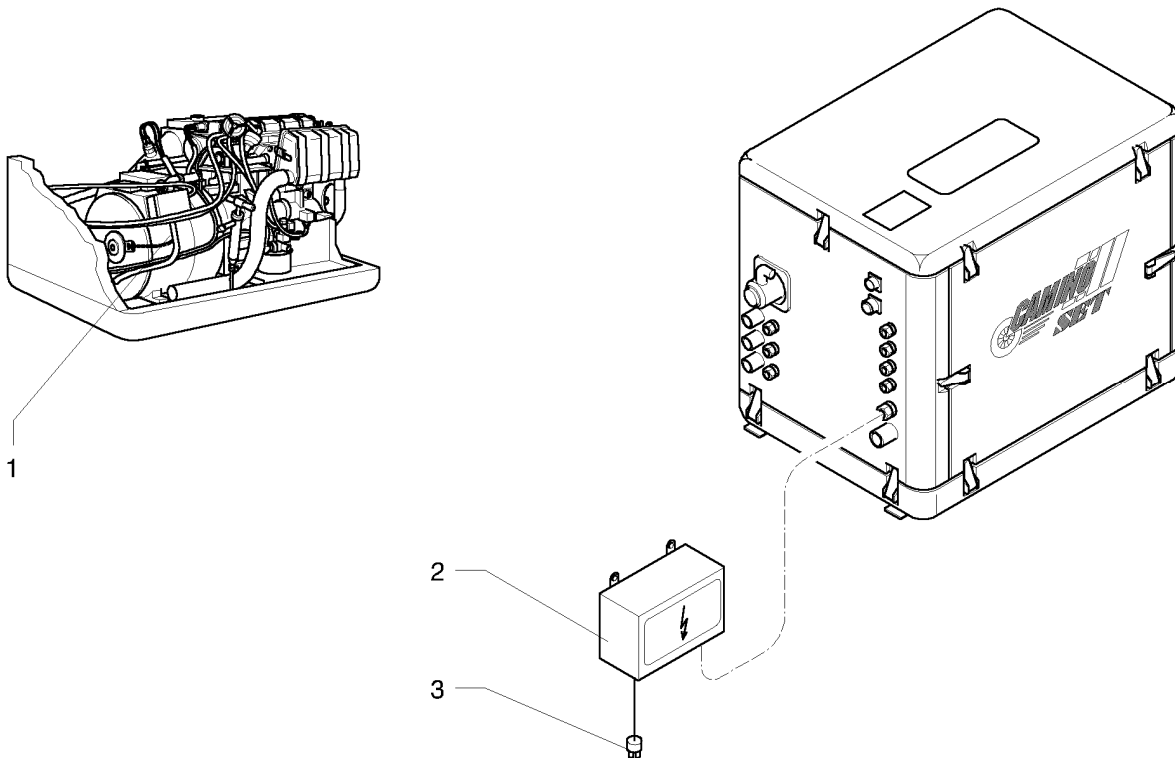


**Open the closures only with the engine cooled down.
Risk of scalding!**



**Risk of injury! Axial ventilator is running independently of the engine!
Disconnect the connection line plug (9) prior to working at the cooler.**

5.5 Sub-assembly capacitor



The active part of the generator (1) includes the capacitor (2). They are firmly connected with each other (wired at the manufacturer's).

The capacitor housing accommodates three capacitor groups (to excite the generator). The capacitors inside have the same voltage like the generator.



Do not open the capacitor housing! Danger to life!
Switch off the engine and secure it against unintended reconnection prior to opening the capacitor.

Power outputs (3) for consumers.



Operate consumers only via residual current circuit-breaker and miniature circuit-breaker!

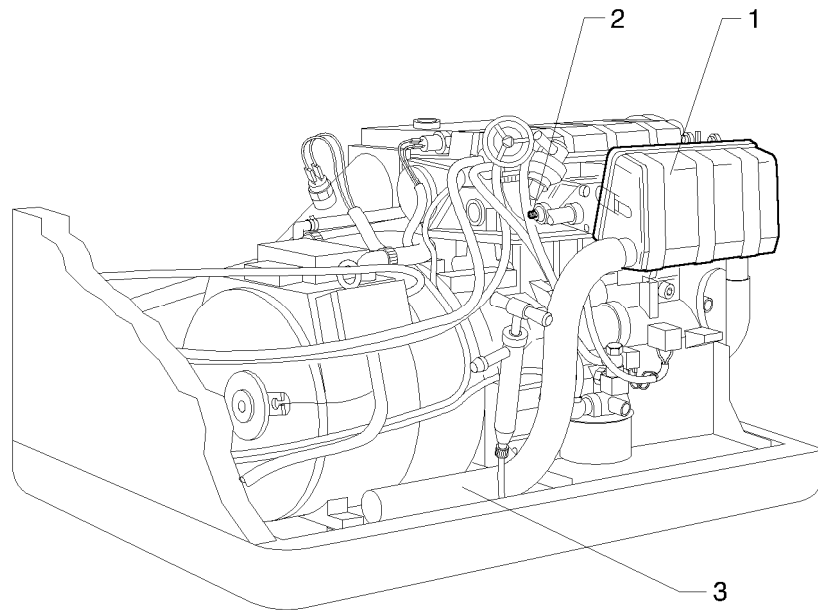
The consumer line is connected at the terminal block inside the capacitor box and the relevant fuses should be provided by the customer according to the generator output.

5.6 Sub-assembly air filter


An air filter (1) is provided at the engine which removes dust from the combustion air taken in.

This filter must be checked/changed according to the maintenance schedule. (refer also to chapter „Maintenance intervals“)

An air intake hose (3) takes in the combustion air from the bottom part of the sound-insulated housing.



If the air flow rate in the air filter is disturbed:

- An increasing under-pressure is generated in the intake duct.
- The engine monitoring system switches off the engine (display ).
- The failure is displayed at the control panel.
- The air filter cartridge must be replaced.

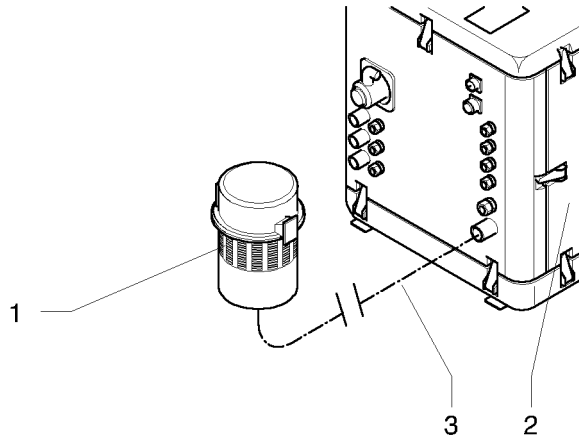


After having replaced the air filter cartridge, press the red key (2) at the monitoring switch prior to the start in order to restore the „normal state“. Then start as usual.

Other possible causes:

- The engine monitoring system responds also in case of centralised alarms and water ingress and switches off the engine.

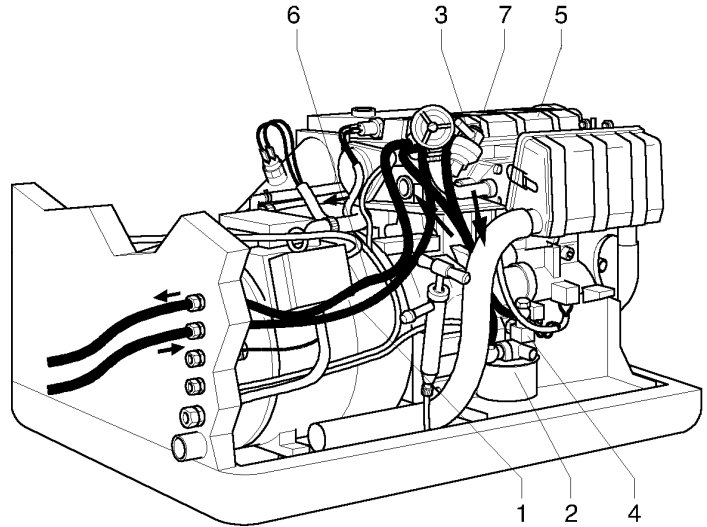
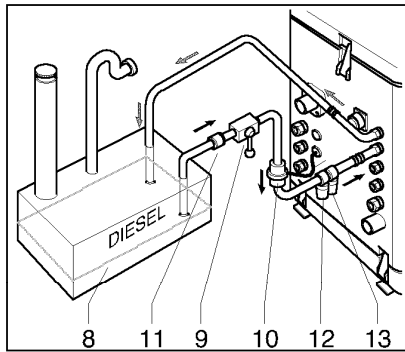
5.6.1 External air filter (Option)



The external air filter (1) (if any) protects all units inside the housing from pollution. The external air filter must also be checked/replaced according to the maintenance schedule. It is connected at the housing (2) by means of a hose (3).

(refer also to chapter „Maintenance intervals“)

5.7 Sub-assembly fuel system



Sub-assemblies:

1. Fuel supply line
2. Fuel filter
3. Injection pump
4. Solenoid valve
5. Injection nozzle
6. Fuel return line
7. Fuel pump

Additional sub-assemblies:

8. Fuel tank*
9. Shut-off valve*
10. Electrical fuel delivery pump*
11. Non-return valve*
12. Primary fuel filter*
13. Water separator*

* (if any)

Fuel supply line (1)

All fuel lines between the fuel tank, the shut-off valve, the electrical fuel pump, the water separator and the primary fuel filter can also be made of suitable copper pipe or pressure-resistant and fuel-resistant hose.



The fuel lines shall be installed only by experienced specialised personnel.

(refer also to separate installation manual).



The connection point at the generator is the lead out fuel hose „Diesel supply line“.



No Smoking



Fires and open light forbade.

Fuel filter (2)

A fuel filter is integrated in the fuel system of the engine. It is installed at the left engine side in the fuel supply line below the starter.



The output of the engine may drop depending on the degree of pollution of the fuel filter (replace coarse fuel filter).

Injection pump (3)

- The injection pump controls the fuel supply to the engine.
- The injection pump generates the necessary pressure in order to inject the fuel through the injection nozzle into the combustion chamber.
- The fuel not required by the injection pump is returned directly into the return line.
- Solenoid valve (4) blocks the filtered fuel.

Two key-operated switches at the control panel are used to control two functions of the solenoid valve:

- Key position „**START**“
Solenoid valve opens (releases the fuel supply).
- Key position „**OFF**“
Solenoid valve closes (fuel supply is interrupted).



Together with the „START“ command also the start command is given to the starter of the generator.

Non-return valve (11)* (refer to SET range of accessories)

We recommend installing a non-return valve between tank and shut-off valve.

A non-return valve prevents the fuel from returning to the tank and the feeding line from draining during longer standstills.



Start problems may occur if the feeding line is filled partially only.

* (if any)

Injection nozzle (5)

The injection nozzle is used to inject Diesel fuel under high pressure into the combustion chamber of the engine.

Return line (6)

Any surplus Diesel fuel delivered is returned to the fuel tank via the return line.

The return line is nit pressurised.



The fuel lines shall be installed only by experienced specialists.
(refer also to installation manual)

Electrical fuel pump (10) *

Install the electrical fuel pump into the fuel supply line near the fuel tank.



The connection for the 12 V fuel delivery pump have been provided already at the SET-CAMINO generator.
(refer also to separate installation manual).

Mount the pump direct at the tank in order to have the fuel line from the tank as „pressurised line“.

(refer also to separate installation manual)



Do not connect the generator together with other engines, e.g. the main engine, at a common fuel line!

Fuel tank (8) *

If the supply and return lines of the generator are connected at the existing Diesel fuel tank, install a separate connection at each line (refer also to separate installation manual).

Shut-off valve (9) *

Shut off the fuel system when working at the generator and during longer standstill periods, to do so, install a fuel shut-off valve in the fuel line.

* (if any)

Primary fuel filter (12) *, (fine filter) (refer to **SET** range of accessories)

Install the primary fuel filter (fine filter) together with a water separator:

1. The engine filter will be relieved from load considerably.
2. Condensation water is prevented from entering the fuel circuit.



Use only filter cartridges for Diesel fuel

Water separator (13) * (refer to **SET** range of accessories)

Water with dirt particles is separated in the water separator, the heavy particles sink down to the bottom.



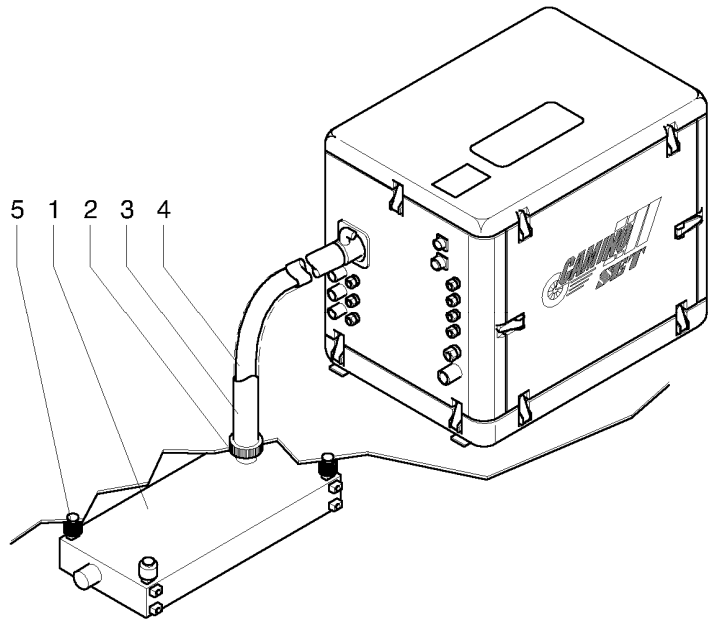
Water in Diesel fuel causes quite a number of failures. Water can transport dirt and rust particles. Thus clean the water separator once a month at least.

* (if any)

5.8 Sub-assembly exhaust gas system

Components

1. Exhaust gas silencer
2. Fixing nut 1 1/2"
3. Flexible exhaust gas line*
4. Ceramic tape*
5. Vibration absorber*



From the engine exhaust gas elbow, the cooled down exhaust gas is passed through the flexible exhaust gas line (3) and then into the engine exhaust gas silencer (1).

Insulate the exhaust gas line by means of ceramic tape (3).

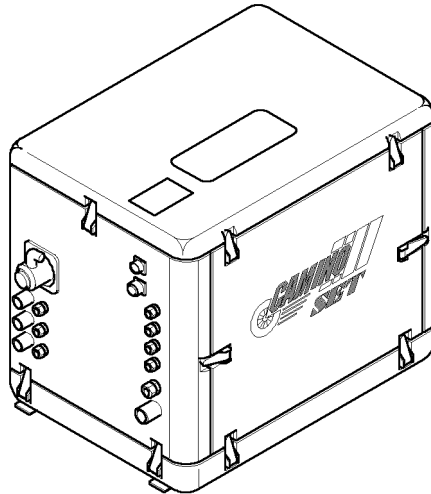
The SET silencer reduces the exhaust gas noise at the outlet of the silencer below the noise level of 53 dB (A).

The silencer is included in the scope of supplies.

* Order the exhaust gas line/ceramic tape and the vibration absorber as accessories from SET.

5.9 Sub-assembly soundproofing housing

Your **SET Camino Generator** is housed by a soundproofing housing which minimised the sound level.



The set is suspended freely oscillating in the housing. An additional vibration absorber between the engine frame and the housing reduces the transmission of solid borne noise. Both measures together guarantee low-vibration service.

The special structure of the bottom part of the housing provides shock resistance in the four longitudinal directions



Prepare a suitable base for the generator because the latter must be screwed firmly with this base. Transmission of solid borne noise is reduced the more the more solid the area for mounting the generator is. (refer also to installation manual).



When installing, avoid any blow to the generator and its sound insulated capsule. (refer also to the separate installation and start-up manual).

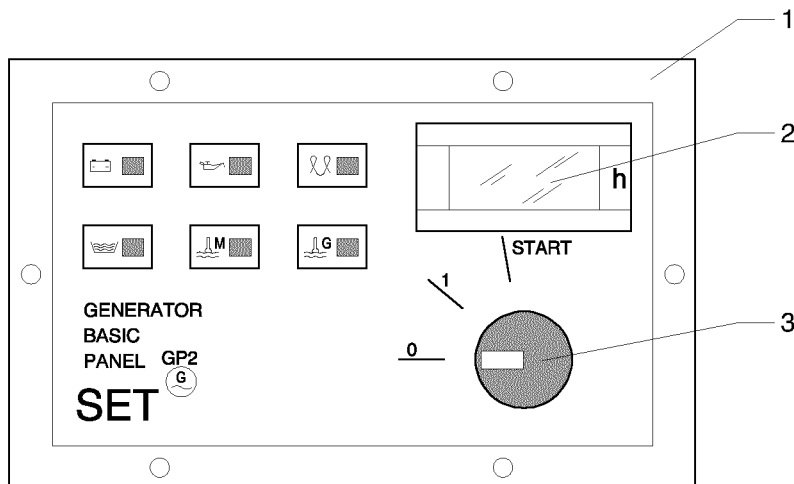
- Provide sufficient space during mounting in order to be able to remove the top parts of the housing and to make the connections.

6 Operation

6.1 Control panel

For the operation of your **SET Camino Generator** you will receive a **SET Generator Control Panel (1)** of modern design.

The clear operator environment allows easy operation of the **SET Camino Generator**.



Description of functions:

Operating hour meter (2)

Key-operated switch... (3)

- | | |
|--------------|--------------------------------------|
| 0 | – OFF |
| 1 | – ON |
| Start | – Ignore pre-glowing time (15 Sec.). |



Battery charge display...

- **Lights GREEN** as long as the charging process is running.
- **Lights RED** in case of a charging fault
- **Lights RED** when the unit is at standstill.



Oil pressure indicator...

- **Lights GREEN** if the oil level is sufficient
- **Lights GREEN** if the required oil pressure is built up. The lubrication required is ensured with the engine running.
- **Lights RED** if the engine is switched off.
- **Lights RED** if the oil pressure is not sufficient.

**Pre-glowing indicator...**

- **Lights for 15 seconds, then turn key-operated switch (3) in „Start“ position.** (for Diesel engines with glow plugs)



Keep the full pre-glowing time (until the YELLOW indicator extinguishes) and then turn the key-operated switch (3) in „Start“ position in case that the engine is cold or difficult to start. This will reduce the total number of starts and thus wear.

**Leakage/under-pressure indicator... (warning flashes)**

- **Lights GREEN if the sound insulated capsule is dry.**
(no leakage)
- **Lights RED is under-pressure is generated in the sound-proofing housing. The engine is switched off.**
(eliminate pollution, clogging)
- **Lights RED if leakage within the soundproofing housing is indicated. The engine is switched off.**
(refer also to chapter Failure, elimination of failures, repair)

**Engine over-temperature indicator...**

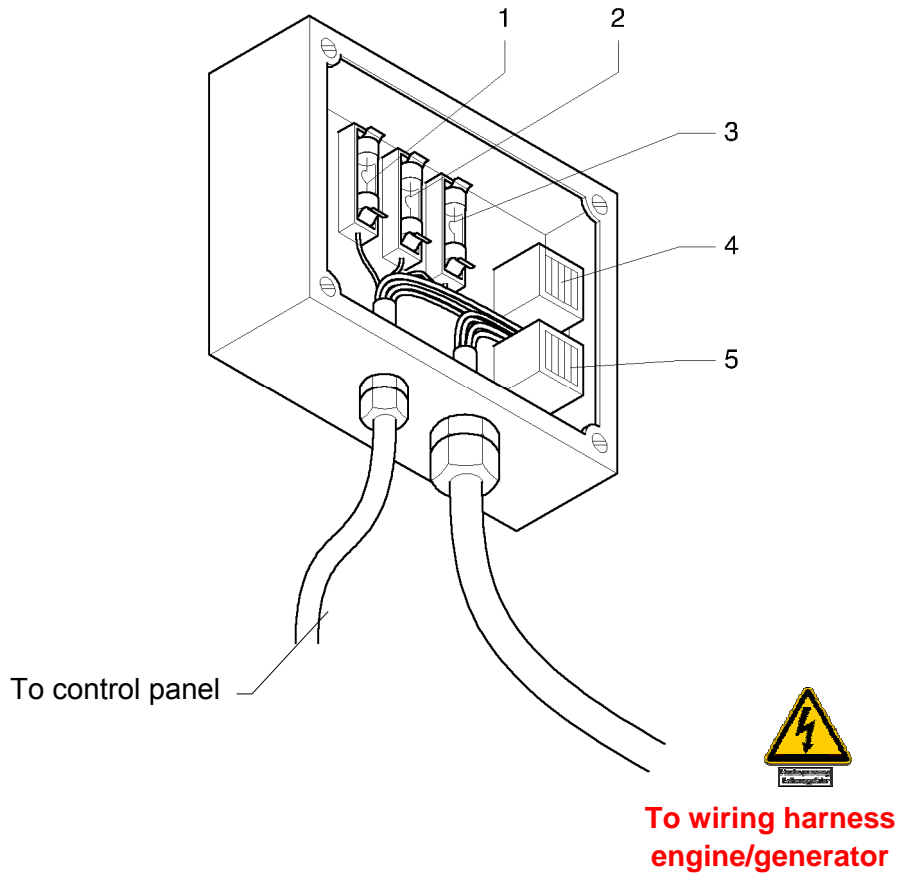
- **Lights GREEN if the engine is within the normal temperature range.**
- **Lights RED if the engine temperature exceeds 90 °C.**

**Generator over-temperature indicator...**

- **Lights GREEN if the generator is within the normal temperature range.**
- **Lights RED if the generator temperature exceeds 90 °C. The engine is switched off**
(refer also to chapter Failure, elimination of failures, repair)

6.2 Electronic box (control module)

The whole control system of your **SET Camino Generator** is accommodated in an „electronic box“ to protect it from environmental influences.



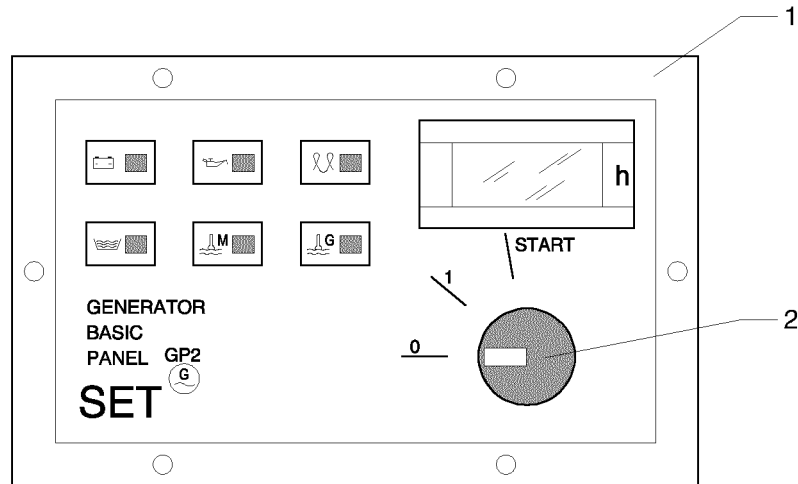
1.	Fuse	15 A	Starter
2.	Fuse	5 A	External consumers/fuel pump
3.	Fuse	3 A	Control panel
4.	Start relay	K 3	Control voltage
5.	Relay	K 2	External consumers

6.3 Engine start with pre-glowing

Prior to each start of the engine, the latter is pre-glowed.

The pre-glowing system is installed as a serial product.

In manual mode, switch off the key-operated switch after each unsuccessful start (in 0 position). Wait for 5 seconds in any case.



Proceed as follows for starting the engine

1. Turn key-operated switch (2) at control panel (1) in **position „1“**.



Pre-glowing indicator lights up for 15 seconds

2. Then turn key-operated switch in position **„START“*** until the engine is running.

* (max. 20 seconds)

3. If the start fails turn the key-operated switch in **position „0“**.
4. Wait for approx. 5 seconds.
5. Repeat starting.

7 Maintenance - servicing

7.1 Hints for maintenance work

7.1.1 Servicing and maintenance of the generator

Repair and maintenance work at the **SET Camino Generator** shall be carried out only by trained and authorised specialists with due consideration given to the safety notes and applicable accident prevention regulations!

Check the **SET Camino Generator** at regular intervals and inform the responsible expert when repair and maintenance work is necessary.



In case of default, there is the risk of body injury, e.g. squeezing, scalding by cooling water.

Performance and reliability of the generator depend on regular maintenance and servicing.

Prior to repair and maintenance work

Turn key-operated switch at the control panel in position „0“ and remove the key.



Work at the electric installation shall be carried out only by specialised electricians.

Use proper tools only for work and replace worn components, screws, nuts, etc. by original spare parts. Carefully mark components and pipelines prior to demounting.

After repair and maintenance work

- Re-mount the safeguards.
- Remove tools and replaced engine components.
- Clean engine components from oil/grease residues.
- Carry out a visual inspection.



Start the SET Camino Generator only after having checked all components and closed the protective housing.

- Insert the key into the key-operated switch and switch on the generator.
- Check generator for proper functioning and eliminate defects, if any, then start the system.

7.1.2 Safe maintenance of mechanical systems

Follow the setting, maintenance and inspection work and dates specified in the operating manual, including the information concerning the replacement of components/sub-assemblies. This work shall be carried out by specialists only.

Follow the switching on/off procedures of the operating manual and the hints for maintenance work for all activities referring to the operation, re-equipment or setting of the generator and its safety systems as well as inspection, maintenance and repair!

Means

- For replacement, carefully fix and secure individual components and large sub-assemblies at the lifting tackle to avoid danger. Use only suitable and technically proper lifting tackles and load take-ups with a sufficient load carrying capacity!
- Use safe climbing means and working platforms when carrying out installation work over head. Do not use engine parts for climbing! Wear anti-falling down equipment when carrying out maintenance work at height! Keep all accesses, handles, steps, hand rails, pedestals, platforms, ladders clean!

Prior to the beginning of work

- Prior to the beginning of special or maintenance work inform the relevant operator and/or designate a supervisor!
- Secure the maintenance area, if necessary!
- If the complete generator is switched off for maintenance and repair work, secure it against unintended re-connection:
 - Lock main command unit and remove the key and/or
 - Mount a warning plate at the main switch.

At the end of work

- Always tighten screwed connections which have been loosened for maintenance and repair work!
- If safeguards must be removed for setting up, maintenance/repair work, re-mount and check the safeguards immediately on completion of maintenance and repair work.
- Arrange for the safe and environmentally saving disposal of utilities and auxiliary material and replaced parts!

Cleaning work

- At the beginning of maintenance work clean the generator – and in particular the connections and screwed joints – from oil and preservatives! Do not use aggressive cleansing agents! Use non-fibrous rags!
- Do not use water, steam jet (high-pressure cleaning unit) for cleaning the **SET Camino Generator**.
- Remove covers/glued linings (if provided) after cleaning!
- After cleaning, check all coolant lines for leaks, loose connections, rubbing points and damage! Eliminate defects, if any, immediately!

7.1.3 Safe maintenance of electrical installations

Requirements to be met by the maintenance personnel

Work at the electrical system of the generator shall be carried out only by specialised electricians who – due to their technical training, experience and instruction – have knowledge of the relevant norms, provisions and accident prevention regulations (according to the definition for specialists in DIN VDE 0105 and IEC 364).

The person responsible for the plant shall authorise the specialised electricians to carry out the required works and activities. In addition, they have to assess the work carried out, recognise possible risks and work with due consideration given to the applicable regulations

- EN60204,
- U-EX001,
- DIN VDE and
- IEC.



Five safety rules to be observed for the maintenance of electrical components:

1. Switch off main switch.
2. Lock main switch and secure it against re-connection.
3. Check for dead state.
4. Earth and short-circuit.
5. Cover adjacent live components.

Safeguards



Do not repair or bridge fuses. Use only the original fuses with the specified amperage as shown in the electrical wiring diagram!

Switch off the generator immediately in case of power failure!

Electrical equipment

- Inspect/check the electrical equipment of the generator at regular intervals. Eliminate defects, such as loose connections and/or burnt cables, at once.
- Eliminate defects at electrical system, sub-assemblies and operating means immediately. Do not use the system, sub-assembly or operating means in case of acute danger.
- Use voltage-insulated tools only!

Prior to the beginning of work

- Isolate machine and plant parts – if described – at which inspection, maintenance and repair work is carried out.
First of all check the isolated parts for safe isolation, then earthen and short-circuit them and isolate adjacent live parts!
- For work at live parts employ a second person in any case who must activate the mains switch in emergency cases to interrupt voltage.

7.2 Oil level check

Prior to each start of the **SET Camino Generator** check the oil level in the engine.



Check only with the engine at standstill and horizontal position of the generator.

Keep the oil change intervals in order to maintain the performance of the engine:

- 50 operating hours after initial start-up.
- After 125 operating hours, however, twice a year at least.
(refer also to chapter „Maintenance intervals“)



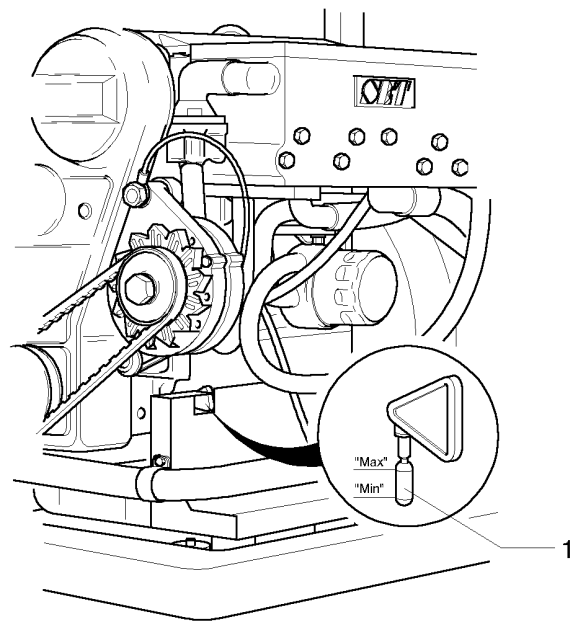
To maintain safety in operation, change the engine oil twice a year even after a lower number of operating hours.

Engine oil level check:

1. Remove soundproofing hood.
2. Withdraw oil dipstick (1).
3. Wipe clean the dipstick and re-insert it.
4. Withdraw oil dipstick again and check oil level (must be between the min. and max. mark).
5. Top up missing oil quantity.

Recommended oil grade:

AE 15W-40 multi-range oil
or an equivalent oil brand.

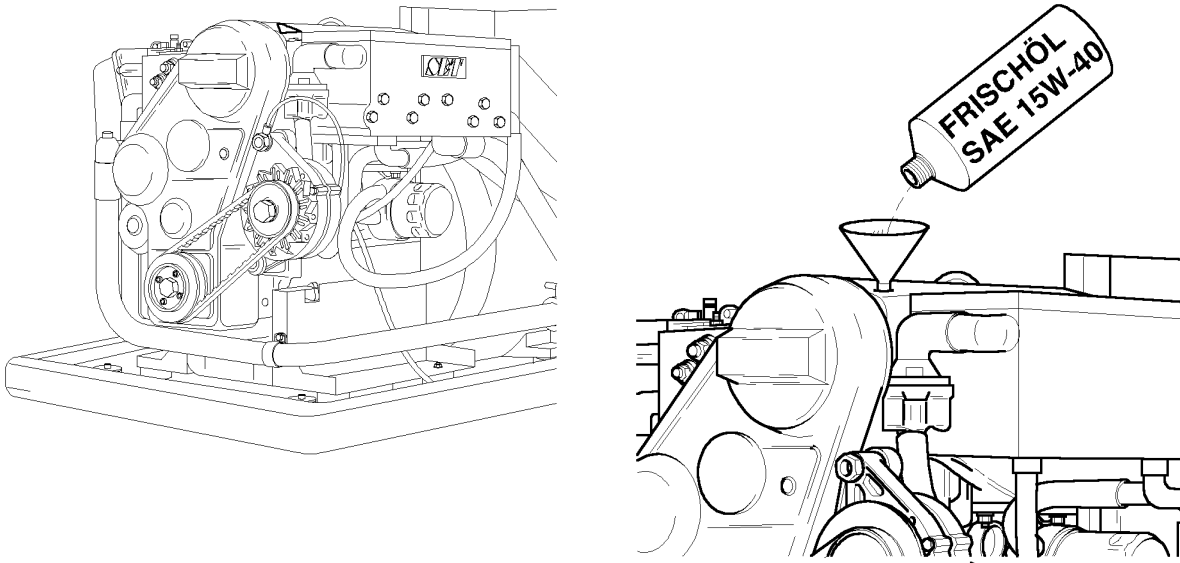


Range of suitability of the engine oil:

Summer	SAE 30
Winter up to -25°	SAE 10 W
Winter up to -10° C	SAE 20 W / 20

(refer also to information of engine manufacturer in Annex).

7.3 Oil change



Change the oil of the operation warm engine as follows:

1. Remove oil filler cover (1).
2. Remove the protective plug at the drain end of the oil change pump (2).*
3. Mount the hose (3) (oil-resistant) onto the connection piece of the oil change pump.*
4. Insert hose end into used oil tank.*
5. Pump off used oil.*
6. Carefully close the used oil tank.
7. Remount the protective plug at the drain end of the oil change pump.*
8. Fill in only the recommended fresh oil (use a funnel).
(refer also to Technical data/Annexes „manufacturer information“)
9. Screw on oil filler cover.
10. Check engine for leakage.
11. Start and load engine. As soon as the engine runs correctly, switch off the engine and close the soundproofing hood.

* (refer also to „Pumping off used oil“)

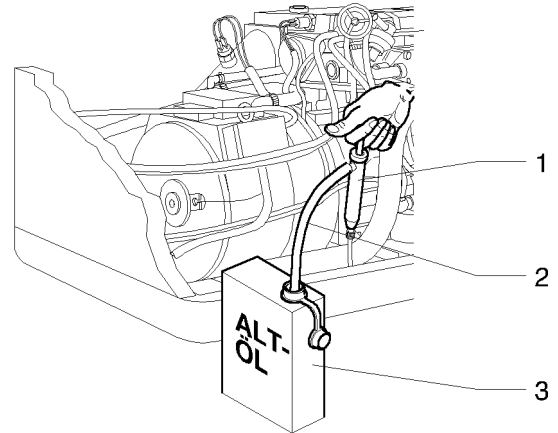


Dispose used oil only in the tank provided for this purpose. Prevent used oil from penetrating the sewerage system or the natural water circulation. Remove spilled oil immediately by means of a rag, keep the rag in an oil-resistant container and dispose it according to the relevant standards. Spilled oil can be a source of fire if the engine is running and the soundproofing housing is heated.

7.3.1 Pumping off used oil

A hand pump is installed in order to facilitate oil change and to prevent the oil from penetrating the sound-proofing housing of the **SET Camino Generator**.

Used oil can be pumped in a tank (3) by means of the hand pump (1) and the hose (2).



Change the oil only with the engine in operation-warm state so that it can be pumped off with all dirt. Warm up the engine under load only. To do so, switch on a sufficient number of current consumers.

7.3.2 Shutting down the SET Camino Generator

If the **SET Camino Generator** is shut down (during winter, etc.) change the oil as described above.

(refer also to the information by the engine manufacturer in the Annex).

7.4 Oil filter replacement

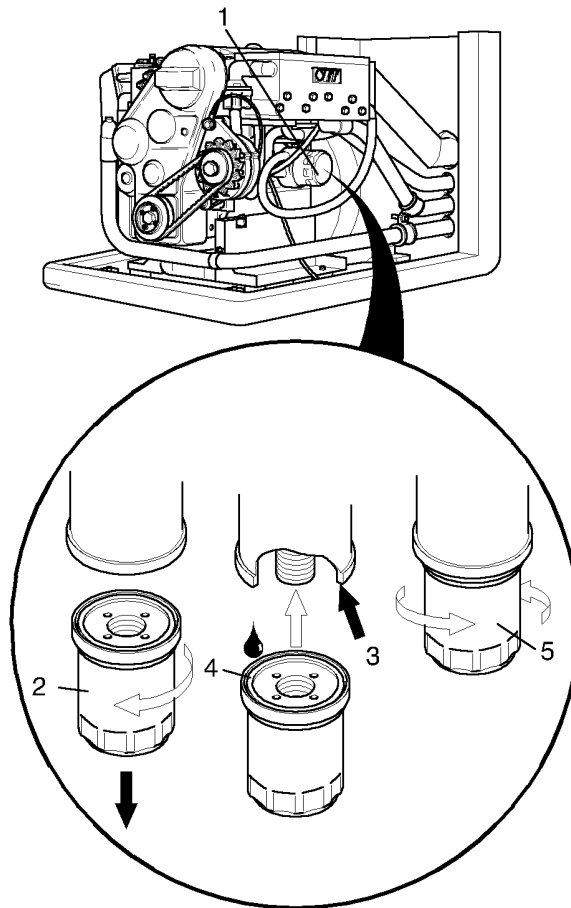


**Disconnect the starter battery prior to any work at the generator.
Danger of injury, danger of fire due to short circuit!**

Replace the oil filter (1) every 250 operating hours and/or during each third oil change (refer also to chapter 4.3.3 „Maintenance intervals“).

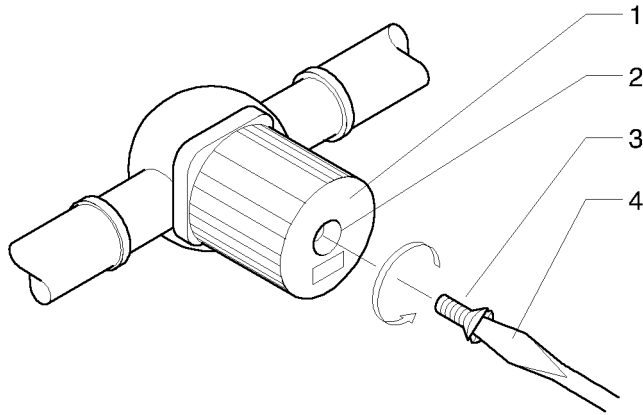
Oil filter replacement:

1. Open soundproofing hood.
2. Remove lateral walls.
3. Place a clean rag beneath the oil filter.
4. Loosen and unscrew the oil filter (anti-clockwise) using the oil filter wrench.
5. Clean the engine block by means of a rag.
6. Apply a slight film of clean oil to the sealing face of the new oil filter.
7. Screw in the new oil filter by hand.
8. Tighten oil filter by means of the oil filter wrench.
9. Remove oil residues.



7.5 Maintenance of cooling system

7.5.1 Cooling circuit



1. Cooling water pump
2. Test screw
3. Screw plug
4. Screw driver

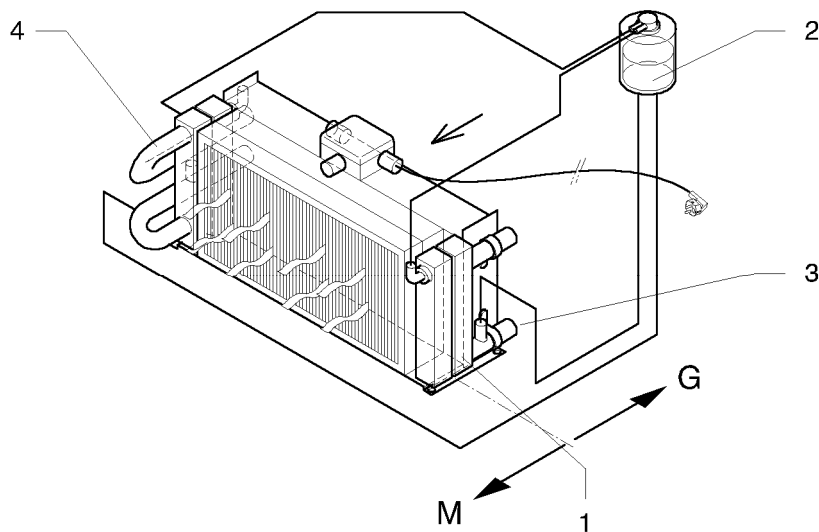


Never let the cooling water pumps running dry. Even short time dry running may destroy the pumps.

The automatic temperature monitoring system signals each failure in the temperature range at the control panel.



Disconnect the starter battery prior to any work at the generator. Danger of injury, danger of fire due to short circuit.



1. Cooler
2. Expansion vessel
3. Cooler hose connection (generator)
4. Cooler hose connection (engine)

To check and/or replace the cooling water pumps proceed as follows:

Demounting



If the cooler unit is placed at a higher position than the generator, first of all drain the cooler at the cooler hose connection (3 and/or 4).

1. Disconnect the pump from the electrical mains.
2. Loosen both screwed joints of the pump
3. Make sure not to loose the gaskets.
4. Now remove the pump.
5. Installation is in reverse order.

7.5.2 Coolant check



Change the coolant every two years because it ages and frost protection is no longer ensured.

Top up coolant after repair work at the cooling system (e.g. demounting the thermostat).



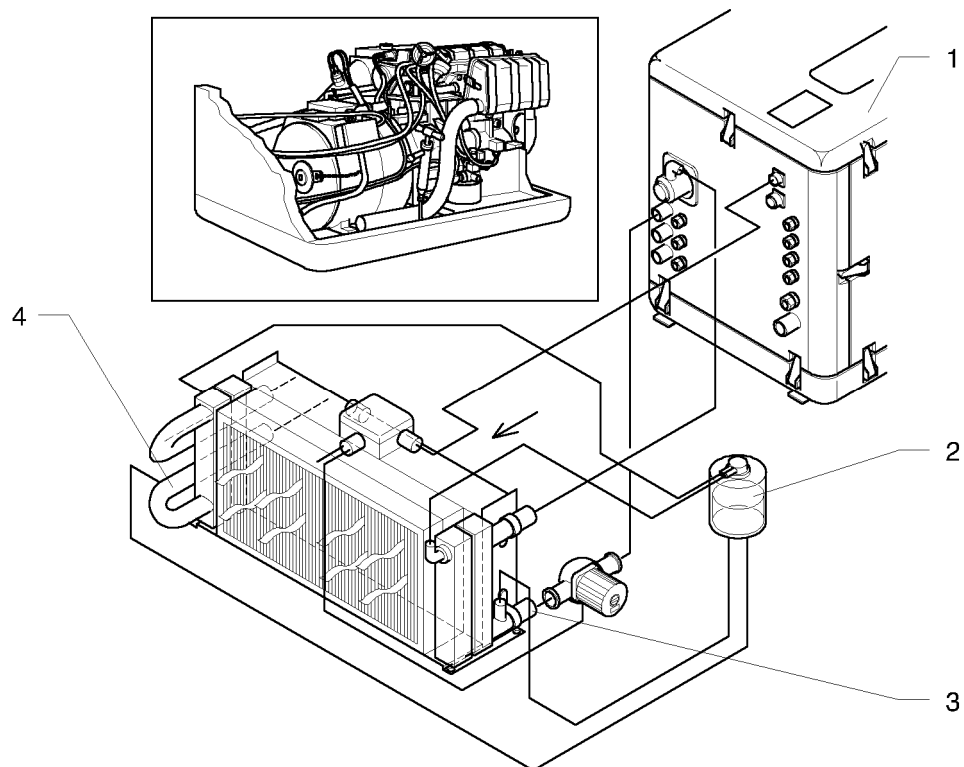
Frequent topping up of coolant indicates leaks in the system.

- Eliminate any leak.

7.5.3 Coolant change

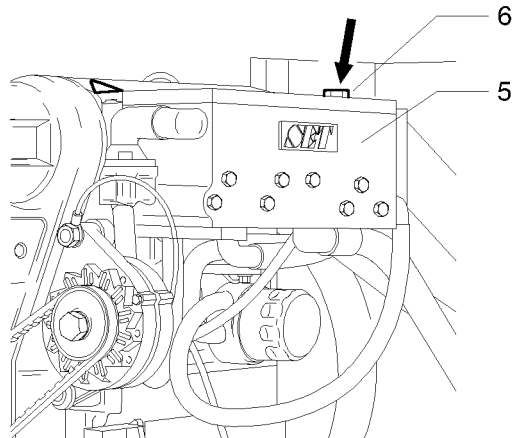


**Let engine cool down.
Danger of scalding by hot coolant when opening the cooling system.
Collect the coolant and dispose it according to the relevant regulations.**



Draining the coolant from the cooling circuit:

- Open soundproofing hood (1).
- Open expansion vessel (2).
- Open the cooler hose connections (3 + 4) one after the other.
- Drain the coolant and collect it in a suitable tank.
- Close the cooler hose connections (3 + 4).



Filling the cooling system:

- Fill coolant (mixture of 60 % water and 40 % anti-freezing agent) into the expansion vessel (2).
- Unscrew the screw (6) at the water-cooler exhaust gas elbow (5) and fill in coolant.
- Close screw (6) and expansion vessel (2).

Bleeding the cooling system:


- Start engine and warm it up.
- Bleed the cooling system by loosening the screw (6)
- Close screw (6)
- Check cooling water level in expansion vessel (2), bleed again, if necessary.

7.6 Maintenance of air filter

7.6.1 Engine air filter replacement

The **SET Camino Generator** is provided with an engine air filter (1).

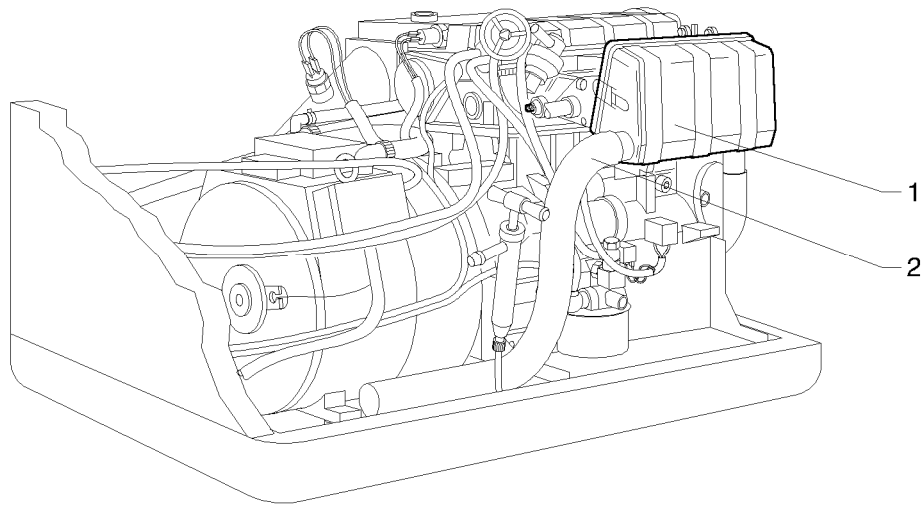
The **engine air filter** is mounted at the engine inside the soundproofing housing.

An under-pressure switch (2) is mounted at the air filter housing (1) to monitor the air filter. As soon as it responds, the LED  lights up at the control panel.

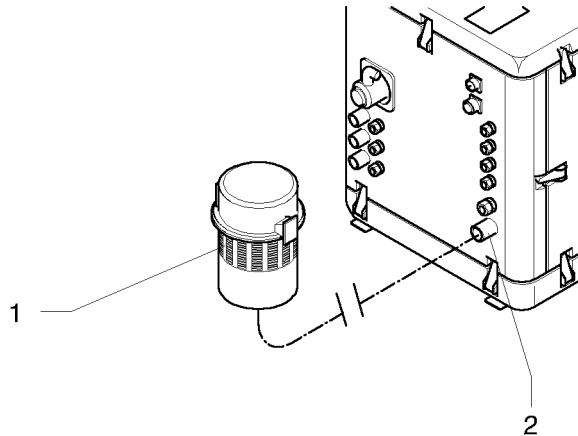
Replace the air filter cartridge if clogged.

Replace the air filter as follows:

1. Open the soundproofing housing
2. Disconnect the air intake hose (2)
3. Open the chambers
4. Replace filter cartridge
5. Close in reverse order



7.6.2 External air filter replacement (option)*



The **external** air filter (1)* is provided in the immediate vicinity of the generator. It is mounted at the connection (2) at the rear wall of the housing by means of an air hose.

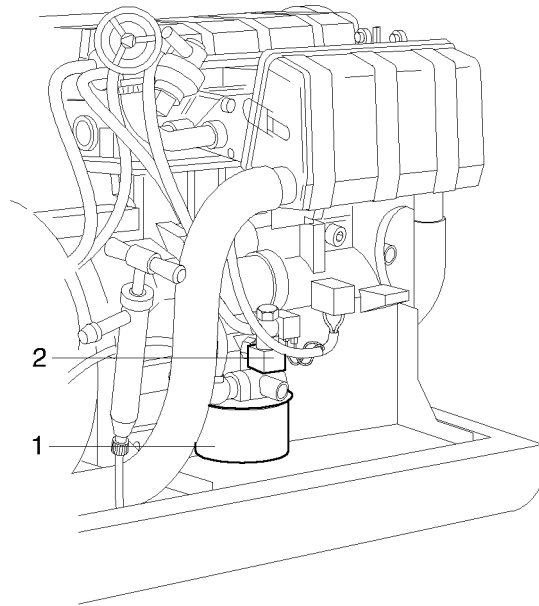
The external air filter is subject to regular checks. It must be replaced every 250 operating hours. Clean or replace the air filter cartridge at that time



After replacement press in the red key at the under-pressure switch.

*(if any)

7.7 Fuel filter replacement



If a fuel system with external water separator (1) is installed, the external fine fuel filter will be clogged earlier than the engine fuel filter (1).

Clean the external fine fuel filter every 250 operating hours or replace it after 500 operating hours.



If the fuel system of the generator is connected direct at the tank of the vehicle, replace the fuel filter of the vehicle every 250 operating hours.



If no external fuel filter is installed make sure that fuel without water and suspended matter is filled in.

Replacement of fuel filter of vehicle:

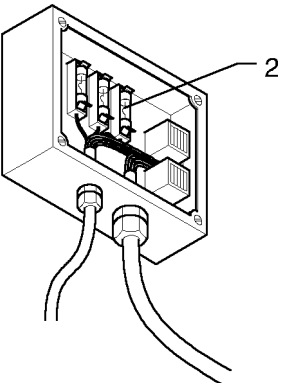

1. Close fuel cock (2)
2. Collect fuel (by placing a rag beneath)
3. Loosen fuel filter cartridge (1) by means of a commercially available tool
4. Dispose used filter and rag according to environmental standards!
5. Slightly wet the new fuel filter cartridge with fuel and screw on hand-tight
6. Tighten the fuel filter cartridge by half a rotation
7. Open fuel cock and check contact face for leaks.

8 Failure, elimination of failure, repair

8.1 Analysis and elimination of failure

8.1.1 The engine does not start









(refer also to the documents of the Diesel engine manufacturer in the Annex)





FAILURES	POSSIBLE CAUSES	REMEDY
Engine does not rotate during starting.	<p>Battery voltage insufficient</p> <p>Fuse in electr. box responded (2).</p>  <p>Magnetic switch does not engage. (If necessary, have the mechanical engagement noise checked by a second person).</p> <p>Failure in starter circuit</p>	<p>Check cable connection of battery poles for tight seat</p> <p>Insert new fuse if the power supply to the control panel failed.</p>  <p>Work at electrical installations or operating means shall be carried out <u>only</u> by specialised electricians in compliance with the rules of electrical engineering.</p> <p>Check cable connections at starter.</p> <p>Check cable from battery to starter</p>
Engine rotates at starter speed, however, does not start	<p>Lack of fuel</p> <p>Fuel solenoid valve does not open.</p> <p>Fuel filter clogged</p> <p>Fuel pump does not delivery.</p> <p>Fuse of external consumer responded.</p>	<p>Check Diesel fuel level in tank.</p> <p>Check whether the fuel shot-off cock is open.</p> <p>Check electrical connection at valve.</p> <p>Check fuel filter at tank.</p> <p>Check electrical connection of pump.</p> <p>Replace fuse</p>

8.1.2 Engine starts, however, shows unbalance or decelerates and stops

(refer also to the documents of the Diesel engine manufacturer in the Annex)

FAILURES	POSSIBLE CAUSES	REMEDY
Engine starts, however shows unbalance or decelerates and stops	Fuel supply interrupted	Have fuel solenoid valve inspected
Fuel supply fails	Primary fuel filter at tank clogged Coarse filter at engine clogged Air in piping Pump defective	Check filter, clean or replace it, if necessary Check filter, clean or replace it, if necessary. Bleed Replace fuel pump
Air intake system fails	Fresh air supply: Air intake line clogged	Check air intake line from soundproofing housing to air intake socket (hose kinked, etc.)
Engine generates black smoke	Insufficient air supply Injection pump defective, injection nozzle defective Unit is overloaded Valve clearance incorrect	Check line from soundproofing housing to air intake socket Have injection pump checked in specialised workshop, clean injection nozzle Reduce the number of connected consumers Have the valve clearance set according to the instructions of the engine manufacturer

FAILURES		POSSIBLE CAUSES	REMEDY
	Engine stops, red pilot lamps at control panel lights up. LED oil pressure Switching off	Too low an oil pressure Oil pressure switch responds	Check oil level, top up, if necessary
	LED G temperature Switching off	Too low a coolant level Generator pump does not run. Exhaust gas pipe too hot. Temperature switch responds. Cooler ventilator does not run.	Check whether expansion vessel is filled with coolant, top up, if necessary. Check pump. Check ventilator
	LED E temperature Switching off	Engine too hot due to missing cooling water flow. Engine pump does not run, temperature switch responds Cooler ventilator does not run.	Check whether expansion vessel is filled with coolant, top up, if necessary. Check pump. Check ventilator.
 	LED E+G temperature switch-off	Generator too hot due to missing coolant flow. Too high a temperature in expansion vessel. Temperature switch responds.	Check whether the electrical pump of the cooling unit is also running.
 	LED E+G temperature switch-off	Generator too hot due to missing cooling air. Cooler ventilator defective. Honeycombs of cooler defective. Temperature switch ON.	Replace cooler ventilator. Clean honeycombs of cooler.
	Over-speed	Engine speed set too high. Over-voltage limit exceeded.	Have the engine speed set
	LED water ingress in housing Centralised fault – water switch-off	Hose ruptured and coolant leaks into the housing	Eliminate leaks

FAILURES		POSSIBLE CAUSES	REMEDY
	LED water ingress in housing Centralised fault – air filter switch-off	Air filter clogged	Replace air filter cartridge Press red key.
	LED G temperature Switching off	Generator overheated Temperature switch responds.	Check cooling circuit of generator. Observe the cooler opening with the unit running. Observe recirculation
	Generator does not supply voltage.	The generator has been started together with connected consumers Distribution of vehicle installation not switched on (residual current circuit-breaker, miniature circuit-breaker)	Switch off all consumers and wait until the voltage is restored . (takes 3 s in most cases) Switch on residual current circuit-breaker; switch on miniature circuit-breaker
	Generator is running, voltage is too low.	Too large a number of connected consumers Capacitor defective Engine speed too low	Reduce number of consumer Have the capacitor checked Have the engine speed set
	Generator voltage too high	Engine speed too high	Have the engine speed set
	CAUTION - ELECTRICITY The generator generates an AC voltage of 400/230/50 Hz. This voltage is dangerous to life. A specialised electrician only is able to detect and eliminate faults in the electrical system using the necessary tools.		
	Pilot lamp „battery“ at control panel does not change from “Red” to “Green”.	Dynamo defective	Check fuse - F1 – Have dynamo checked.

8.1.3 Annex Wiring diagram

8.1.4 SET service hotline

Please contact our service team if quick help is needed.

SET Stange Energietechnik GmbH

Lise Meitner Str. 15

D-40764 Langenfeld

SET service hotline :	Germany	(0177) 33 960 37
	International	(+49 -177) 33 960 37

