



Documentation

Camino 10 / 15 / 20 DSUF



Stange Energietechnik GmbH

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Complete documentation content

EC declaration of incorporation
Registration sheet
Order form for spare parts



Installation and start-up manual
Operating and maintenance manual
Wiring diagram
User manual LDW
Service directory
Spare parts list

(EC) Declaration of incorporation

pursuant to EC Machinery directive 2006/42/EC, Annex II 1 B

SET Stange Energietechnik GmbH, Lise-Meitner-Straße 15, 40764 Langenfeld, Germany

SET Stange Stromerzeuger GmbH, Lise-Meitner-Straße 9, 40764 Langenfeld, Germany

We hereby declare that the following machine (or parts thereof)

Factory product: **Camino** type: **10-20 DSUF** serial no.: (see type plate)

which has not yet been fully usable, complies with all the relevant provisions listed below:

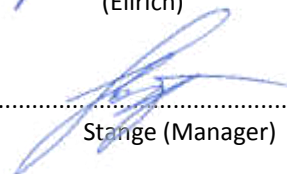
1. EC-guidelines:
 - Machinery guidelines 2006/42/EC
 - EC guidelines on electromagnetic compatibility 2014/30/EU
 - Reach-VO EG Nr. 1907/2006
 - EC directive 1272/2008
2. Applied harmonized standards in particular:
 - DIN EN 12100
 - DIN EN ISO 13857
 - DIN EN 349
 - DIN EN ISO 13732-1
 - DIN EN 60204-T. 1
 - DIN EN 60529
 - DIN EN 61000-6-4
 - DIN EN 61000-6-2
3. Applied national technical standards and specifications in particular:
 - DIN 45635-11
 - TA Air
 - ISO 3046-1
4. Manufacturer's declarations of our suppliers e.g.: B.: for engines, couplings, electrical parts (if applicable).
5. Annex VII – B and VI of the directive 2006/42/EC are implemented. Compliance with the requirements of the Low Voltage Directive has been ensured in accordance with Annex I, point 1 of Directive 2014/35/EU.
6. Additional Information:

Commissioning of the machine (or parts thereof) is prohibited until it is determined that the machine into which this machine (or parts thereof) is to be installed must comply with the provisions of the Directive. The installation declaration expires in case of non-according usage as well as in case of a constructive change which has not been confirmed by us as a manufacturer in writing.

Authorized representative of Stange Energietechnik GmbH
for the compilation of all technical documentation


.....
(Ellrich)

Langenfeld, 2017-12-14


.....
Stange (Manager)

TI-CA10-20-DSUF-12-02-std_en-B

Registration sheet

Dear customer,

We should like to thank you for your decision for a SET-Camino Generator.

Because SET are continuously developing their products and paying attention to your opinion, please submit some comments and proposals in order to further improve the **SET Camino Generators**.

Please return the enclosed card to our service department.

Unit verification/ownership certificate:
(These data are required when ordering spare parts, if necessary)

Generator type:	
Commission number:	
Year of construction:	
Engine number:	
Date of delivery:	
Attached additional components:	
Accessories supplied:	
Remarks:	

Quality assurance department

How often do you use the manual? frequently ☐ occasionally ☐ never ☐

How do you assess the quality of the manual?

	outstanding	satisfactory	moderate	poor
completeness				
structure				
style				
Working steps				
figures				
Overall impression				

Can information be found easily?	yes O	no O	
The scope of the manual is	too low O	too high O	appropriate O
Is necessary information missing?	yes O	no O	

Which kind of information is missing or is required?

--

Did you find any technical discrepancies? yes ☐ no ☐

Please indicate the sheet number below.

--

Thank you

Service department

Please fill in and return the card. We will register you as user of a **SET Camino Generator** and inform you of novelties.

Generator type		Commission No.		Date of delivery	
Year of construction		Engine No.			

First name		Vehicle	
Family name		License plate/ manufacturer	
Street		Date of purchase of generator	
Postal code/ place		Country	
Telephone			

Purchased from:

SET directly yes ☐ no ☐ Installation by own forces? yes ☐ no ☐

Distributor (name)		By a company (name)	
Country		Country	
A shipyard (name)		By an equipment company (name)	
Country		Country	

How often do you use the generator? frequently ☐ occasionally ☐ rarely ☐

Please use the assessment scale to assess the generator.

	Outstanding	Satisfactory	Moderate	Poor
Installation				
Soundproofing				
Start behaviour				
Load ability				
Reliability				
Control panel				
Operation				
Vulnerability to faults				

ERSATZTEIL-BESTELLFORMULAR - *Service part order blank*

Herstelleradresse:
Manufacture:



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Generatortyp*:
Genset type:*

Kundenbestell-Nr.*:
Order-No.:*

Eingebaut durch:
Installed from:

Benennung*:
Description:*

Baujahr* / Betriebsstunden**:
Year of manufacture / Operating hours**:*

* Siehe Typenschild – *see rating plate* ** siehe Kontroll-Panel – *see control panel*

Pos.	Stück - Amount	Benennung - Description	Baugruppe - Ident-Nr.:	Bemerkung - Notice

Lieferadresse:
Delivery address:

Erreichbar unter Telefon:
Reachable by phone:

Bestellung von Blatt / Seite
Order from paper / side

Bestellt / Unterschrift:
Order at: / Sign:

Am - at	Von - from

TI-CA10-20-DSUF-12-02-std_en-B



Installation and start up

Camino 10 / 15 / 20 DSUF



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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:

- It's 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 quietly - provided only by Stange Energietechnik GmbH with original **SET-CAMINO Generators**.

Important notes about this manual:

- Subject to technical / constructive changes.
- Options / special requests are not described.
- Illustrations may differ from original.

Installation and mounting must be carried out only by a specialised workshop authorised by SET.

Please do not hesitate to contact us for mounting, planning and installing your **SET-CAMINO Generator**:

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1 Introduction

Prior to installing, connecting and/or starting, please read this manual which has been specifically prepared for the **SET-CAMINO Generator**.

Installation can be carefully prepared only when you are acquainted with the installation and start-up manual. Only in this way it is possible to procure installation accessories and the desired options in due time.

This **installation and start-up manual** includes chapters covering the following subjects:

- Basic safety notes
- Installation preparation and installation data
- Installation of the **SET Camino Generator**
- Electrical installation
- Initial start-up
- Installation documents of sub-suppliers

The separate **Operating manual** with the following chapters should be used by the operator of the **SET-CAMINO Generator**...

- How to handle the SET Camino Generator
- Construction and functioning
- Activation and operation
- Preventive and corrective maintenance
- Elimination of failures and faults
- Operating and maintenance manuals of sub-suppliers

Thus please read the operating manual and the installation/start-up manual carefully prior to any manipulation. It contains important information, regulations and safety rules.

2 General safety instructions

2.1 Safety regulations

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 Icons for safety and danger instructions

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



Points out dangerous situations with possible personal injury, as well as possible damage of the power generator.



Danger due to electrical current. Necessary work may only be performed by a qualified electrician.



References to useful advice, explanations and supplements for handling the generator.



The engines of the power unit running at extremely volatile fuels. During refilling or servicing of fuel tanks and containers there is:



SMOKING PROHIBITED



FIRE PROHIBITED

2.1.3 Principles; intended use

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.



Intended use also includes compliance with the operating instructions and compliance with the inspection and maintenance conditions.

2.2 Organisational measures

Store the generator manuals ready to hand at generators place of installation (in the tool drawer or the container provided)!

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 manual must have been read and understood. It will be too late during service. This is particularly applicable for manpower working occasionally at the generator, e.g. during set up or maintenance.

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 instructions 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 works at carrying parts. Any structural modification shall be done by the manufacturer only.

Use original spare parts and manufacturer's accessories! Spare parts and accessories must meet the requirements set by the engine manufacturer. This is guaranteed by using original parts.

Replace all hoses within stipulated and appropriate intervals even if no safety-relevant defects have been detected!

Compliance with pertaining to regular checks / inspections which are prescribed or specified in the operating instructions!

In order to carry out maintenance work appropriate equipment is absolutely necessary!

Get yourself informed about special tools!

Observe fire detection and firefighting facilities!

Inform other persons about location and operation of fire extinguishers!

2.3 Obligations

Work at the generator shall be carried out by reliable personnel only. Check the legal minimum age!

Work on electrical equipment of the generator may only be performed by a qualified electrician in accordance with electro technical regulations. Work on the electrical supply must be carried out from an authorized expert in accordance with DIN VDE regulations and in accordance with the regulations of the relevant country. Regularly check the electrical equipment of the generator.

2.4 Safety instructions for certain operating phases

During individual operating phases observe the specific safety instructions.

2.4.1 Normal operation

Avoid any safety affecting workflow!

Take measures to ensure that the generator is operating in safe and functional condition only!

Operate power generator only if protective devices and safety-related equipment is in place and functioning (such as detachable protective devices, emergency stop devices, sound insulation or suction devices)!

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

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 or remove suction and ventilation devices when running power generator.

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. Regularly check power generator for visible damage! Operating the generator or the controller is allowed by trained personnel only!

The parameters set by the manufacturer are standard settings!

In case of malfunctions all the notes are to be observed (see also section "Fault, trouble shooting, repair"). If the measures listed there do not lead to the elimination of the malfunction, contact the SET Customer Service!

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2.4.3 Special work

- Carry out all maintenance and installation work at the generator according to the instructions. 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, must have read and understood the operating manual, particularly the safety instructions.
- Compliance all setting, maintenance and inspection work and dates specified in the operating manual, including the data concerning the replacement of components/sub-assemblies! These activities have to be carried out by professionals.
- Observe all switching on/off processes 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 according to the operating manual and the instructions for maintenance!
- In case the generator is switched off completely during maintenance, it must be secured against unexpected reconnection!
- Lock the main command facilities, withdraw the key and keep it!
- Attach a warning plate at the main switch!

2.5 Instructions for specific types of danger

2.5.1 Electrical power

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

When working on high voltage assemblies - after disconnecting the voltage - connect the supply cable to ground and short-circuit the components, f.e. capacitors with a grounding rod!

Regularly check the electrical equipment of the generator.

2.5.2 Gas, dust, steam, smoke

- Carry out welding, burning and grinding work at the generator after having obtained the specific permission only. There can be danger of fire and explosion!
- Prior to carry out welding, burning and grinding work clean the generator and its environment from dust and inflammable materials. Ensure adequate ventilation (danger of explosion)!
- For work in narrow spaces observe national regulations!
- 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

- For repairs and maintenance instruct a specialist workshop authorized by SET only.
- SET will reject all responsibility and liability for any work performed by unauthorized personnel.
- The „General Terms and Conditions of Sale and Supply“ of **SET** are applicable in any case. They are provided to the owner latest upon closing contracts disposal.

Warranty and liability claims for personal and property damage are excluded if they are caused by one or more of the following reasons:

- Improper use of the power generator.
- Incorrect installation, operation, or maintenance of the generator.
- Operating the generator with a proven defect.
- Disregarding the instructions in the operating manual regarding transport, storage, installation, commissioning and maintenance.
- Unauthorized modifications on power generator.
- Inadequate monitoring of plant components which are subject to wear.
- Improper repairs.
- Installation of third party components.
- Catastrophes due to 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

They are for general illustration only and not binding for the construction in detail. Stated dimensions are not binding.

2.6.4 Protected rights

All rights to drawings and other documents and any disposal, exploitation, such as copying and distribution rights remain with SET GmbH, even in the event of industrial property 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 must be properly recognizable and readable by the operator!
- Do not remove any plates and signs!

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

3 Preparation for installation

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.

SET-CAMINO Genset consists of:

- Power generator and engine in capsule
- Capacitor box
- Cooling unit with pumps
- Exhaust gas silencer
- Control panel GP02 for installation
- Control cable with plug
- Manual **SET**
- Manual **KUBOTA**
- Installation kit

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 power generator is constructed so that it can withstand all loads occurring at an intended use. 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 230V / 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 an 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 / 24V

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

Installed fused in the control module (electronic box)

Fuses: **see wiring diagram**

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 must be installed by specialised electricians only.

3.4.1 Electrical installation of the AC circuit 230V / 400V 50Hz

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

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.
- Therefor a direct earthing of the generator with the vehicle body is required.
- • 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 / 24V

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 7,5A 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 must be installed by a specialised electrician only. There will be no warranty claims 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. The tank should be large enough, since the fuel is used for cooling the nozzles.

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, piping's 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.



SMOKING PROHIBITED



FIRE PROHIBITED

3.7 Combustion air supply

- The extraction of the combustion air occurs 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 an external air filter*, if required.

* optional (see **SET accessories**)

3.8 Safety instructions, summary

- Check and maintain the starter battery after a longer interruption of operation.
- 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 with the soundproofing hood closed only.



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 must be carried out by specialised electricians with due consideration given to the applicable regulations only.
- Never start the generator without properly functioning cooling water system.



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



SMOKING PROHIBITED



FIRE PROHIBITED

3.9 Exhaust gas system

- All components used of the exhaust system 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 must be used only.
- The required dimensions must be kept.
- Regularly check the coolant at the expansion vessel.
- 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.



Please note when using blinds to accordingly increase the cooler air exit surface.



The power supply of cooler pump unit is secured with 3 x 4A glass tube fuses in the generator terminal loads.

4 Technical data

4.1 Dimensional sheet „Electricity producer“



4.2 Technical data „Electricity producer“

	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)	Free of silikat 40/60	Free of silikat 40/60	Free of silikat 40/60
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)	56	56	56
Length A incl. console (....mm)	935	1018	1101
Length B excl. console (....mm)	763	846	929
Length C excl. console (....mm)	610	610	610
Length D incl. console (....mm)	587	587	587
Length E excl. console (....mm)	589	589	589
Length F incl. console (....mm)	625	625	625
Vibration damper** outside (shock-proof in any direction)	4	6	6
Vibration damper** inside	4	6	6

- Up to 35°C ambient air
5% output losses / 5°C air temperature rise

Cooler unit: Type: **SET**

4.2.1 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	400 / 230V	400 / 230V	400 / 230V
Frequency (+/- 5%)	50 Hz	50 Hz	50 Hz
Amperage (single-phase operation)	12,8 / 45 A	20 / 45 A	26 / 45 A
Battery charge	12 V - 35 A	12 V - 35 A	12 V - 35 A
Type of protection	IP 54	IP 54	IP 54
Insulation class	"F"	"F"	"F"

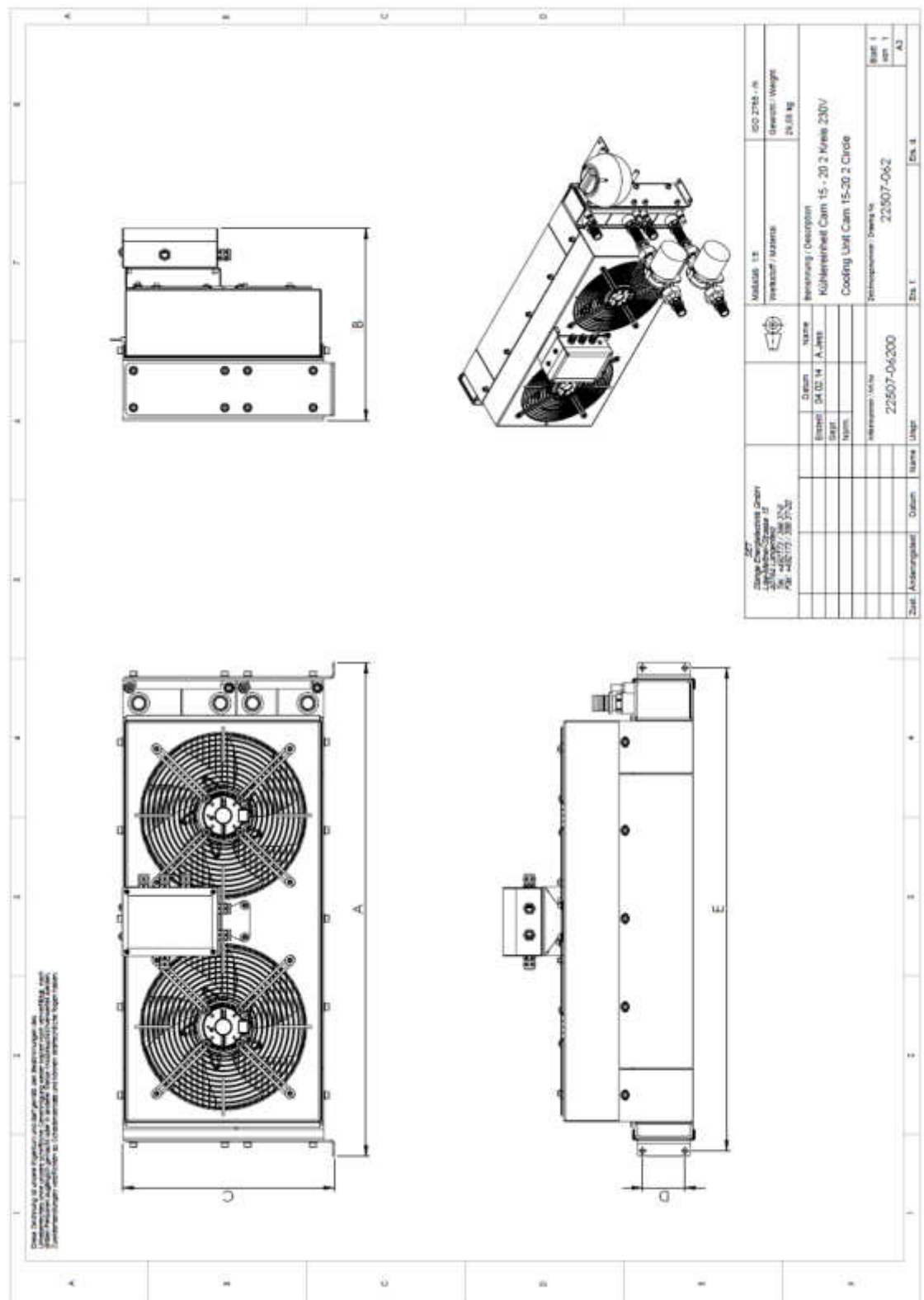
- The full performance is achieved only after the break-in period of approximately 50 hours of operation.
- The short-circuit proof self-exciting revolving-field generator can be overloaded to 10 % for a short period of time.
- For three-phase generators, load unbalance up to 80 % is possible

4.2.2 Technical data „drive engine“

	Camino 10	Camino 15	Camino 20
Drive engine	Lombardini	Lombardini	Lombardini
Cooling	Water	Water	Water
Bore	75 mm	75 mm	75 mm
Stroke	77,6 mm	77,6 mm	77,6 mm
Displacement	686 cm ³	1028 cm ³	1372 cm ³
Rated speed	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Engine output acc. to DIN 6270	9,75 kW	15 kW	20,42 kW
Fuel consumption	280 g/kWh	280 g/kWh	280 g/kWh
Lube oil filling SAE 10 - 40	1,6 l	2,4 l	3,3 l
Coolant filling (water with anti-freezing agent)	8 l	10 l	12 l
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°

- For charging the starter battery, the alternator provides 12 volts DC voltage.

4.3 Dimensional sheet „Cooling Unit“



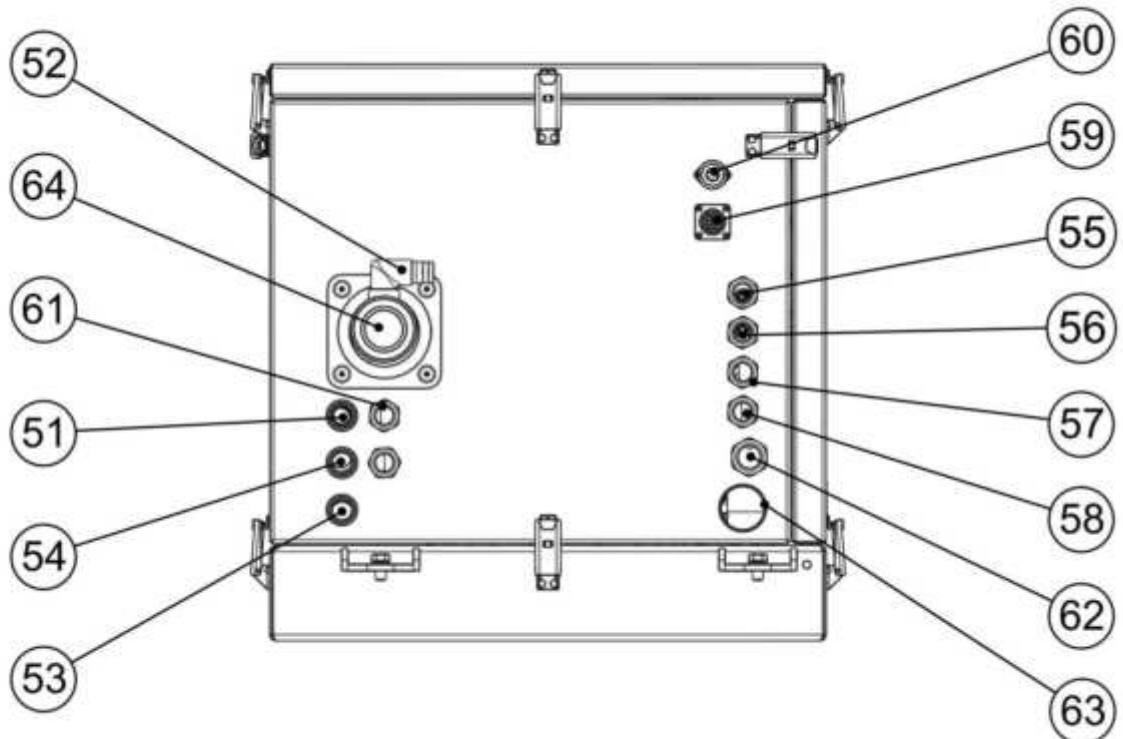
	Camino 10	Camino 15	Camino 20
Length A	944 mm	944 mm	944 mm
Width B	334 mm	360 mm	360 mm
Height C	347 mm	400 mm	444 mm
Bore distance D	75 mm	80 mm	90 mm
Bore distance E	915 mm	915 mm	915 mm

Cooler versions:

- Depending on the order you can also use various cooler units.
- The design and layout must necessarily be matched from **SET**.

5 Couplings and connections

5.1 Overview connection wall

**Motor starter battery:**

- 58 Connection (plus) 1.0 m lg.
- 57 Ground terminal (minus) lg 0.8 m.

Engine combustion air:

- 63 Port (air filter)

Engine fuel supply:

- 55 Diesel return 0.2 m lg.
- 56 Diesel flow 0.2 m lg.

Engine cooling system:

- 53 Coolant Supply.
- 54 Coolant return

Engine exhaust system:

- 64 exhaust outlet

Power generator control connections:

- 59 Control panel connector
- 60 Cooler unit connection
- 62 Capacitors box, 2.0 m lg. to the GFCI and to consume

Generator cooling system:

- 51 Coolant Supply
- 52 Coolant return

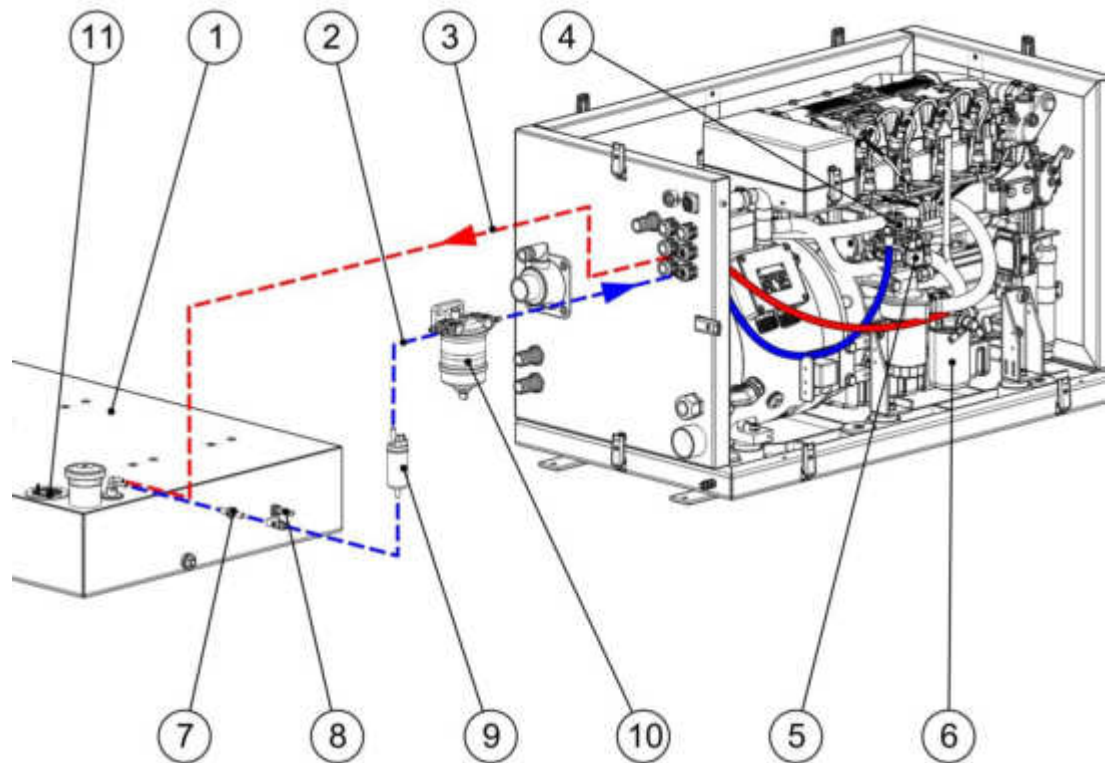
Generator power connections:

- 61 External consumers 14V / 7,5A



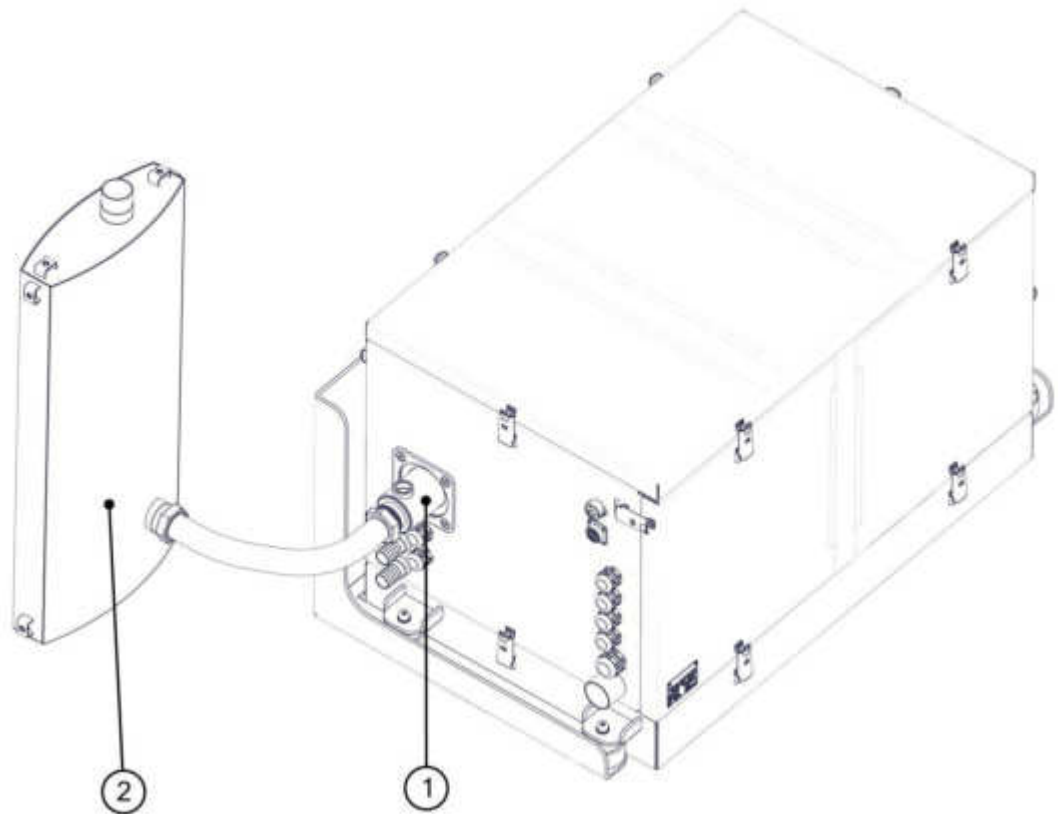
Deviations possible!
Please follow the instructions on the capsule rear wall.

5.2 Connections fuel supply



	from	to	Type / size
2	Engine fuel flow	filter / tank	forward / 0,2m lg.
3	Engine fuel return line	filter / tank	forward / 0,2m lg.

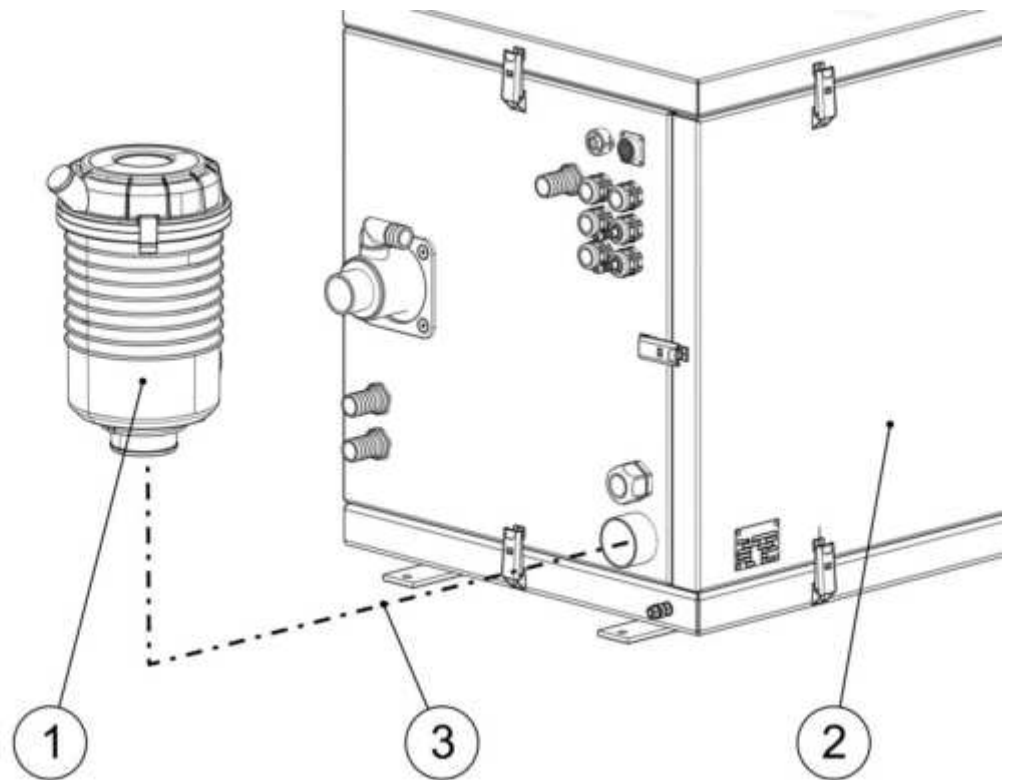
5.3 Connections exhaust silencer



from	to	Type / size
Exhaust manifold (1)	Exhaust silencer (2)	Flexible exhaust pipe Ø ...x ...long

The inlet and outlet of the **SET** exhaust muffler (2) can be reversed.

5.4 Connection external air filter* (optional)



from	to	Type / size
Connection (air connect to capsule 2)	External air filter* (1)	Air hose line (3) Ø 40 x max. 3 m

* if any

6 Installation of the SET Camino Generator

6.1 General

This chapter cannot describe any installation possible. It deals with the mounting and installation hints (for the application of the **SET Camino Generator** according to the purpose intended) for qualified/authorised specialists.

- In case of uncertainty, particularly if information about specific product details or accessories for installation is missing, obtain the relevant information from specialised workshops authorised by **SET** or directly from the manufacturer **SET**.
- To do so, please always indicate the type designation and production number of the generator (refer also to registration sheet).



After installation, a functional test must be carried out. Make sure that there are no obvious safety deficiencies and hazards for the user or the environment.



The commissioning of the electrical system may only be performed by a qualified electrician.

- Have the installation work carried out by a specialist workshop authorised by **SET**.
- Any responsibility and liability is rejected by **SET** for any works carried out by third parties.
- Use approved and perfect materials only for mounting and installation.
- Subsequent faults are often attributable to non-professional installation of the **SET Camino Generator** or to the use of inferior materials.

6.2 Preparation

When choosing the installation area following points should be noted.

- Design openings which are large enough for exhaust and air.
- Avoid heat accumulations.
- If possible, fix the base for the mounting frame sound-isolated.
- To prevent sound transmission, consider a minimum distance to walls.
- Observe the minimum clearance to port wall.
- Avoid 90° elbows directly on the exhaust outlet.
- No decoupled installation of vibrating parts.



In case of doubt, please contact the **SERVICE** of the **SET** company phone +49 2173 39937-14 or your certified installation partners.

6.3 Environment

- The installation place of the **SET-CAMINO Generator** should provide sufficient space so all maintenance points are readily accessible.
- The ambient temperature at the installation site or in the room should not exceed 20°C.
- Higher ambient temperature will reduce the output of the Diesel engine. If the room temperature exceeds 20°C, provide a separate combustion air supply.
- The soundproofing hood of the **SET-CAMINO Generator** has a socket where combustion air can be supplied via the external air filter.
- Observe a safe distance to walls of at least 150mm.
- Observe a minimum distance of 300mm at the terminal side.
- The installation surface must have a thickness of at least 25mm and be sound-insulated.
- Up to a line length of about 3 m, a ventilation hose may be used with 40 mm diameter.



The venting hose shall be mechanically resistant and installed without bends, if possible.

Insulation

The **SET-CAMINO Generator** is installed in a soundproofing hood and does not require any additional insulation at the place of installation.



When positioning the generator make sure that maintenance and checks can be carried out without hindrance.

After positioning, please check access to:

- air filter replacement
- fuel filter replacement
- oil filter replacement
- V-belt replacement
- coolant bleeding
- fuse replacements
- oil check

6.4 Installing the console

In order to transmit the forces generated by the **SET Camino Generator** an as large as possible solid foundation is required. Use existing holes during assembly where ever possible. Alternatively, mounting plates (f. e. adapter plates) might be used. Mounting frame must always be connected to the vehicle frame rigidly. Avoid using cavities for mounting the **SET Camino Generator**. Avoid cavities below the foundation.

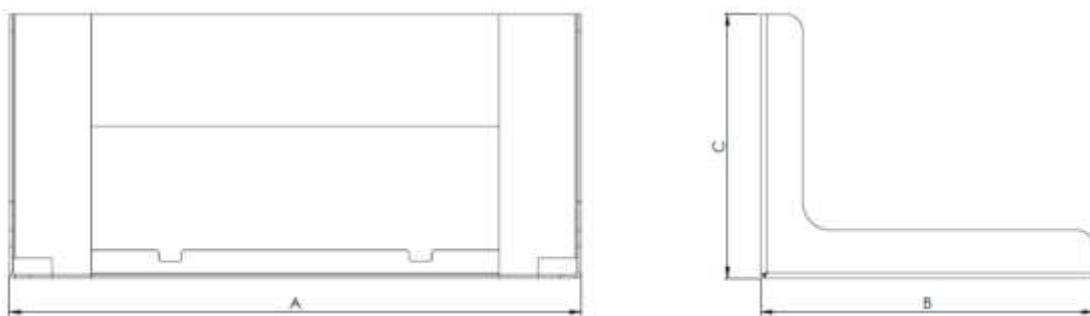
Advantageous foundations and suitable points of the vehicle bottom are:

- solid steel plates (approx. 10 mm)
- glued wooden plates
- screen printing plates at least 30 mm thick

To meet the different assembling or foundation situations, no drillings have been pre-attached to the mounting console. Insert holes after console location is defined.

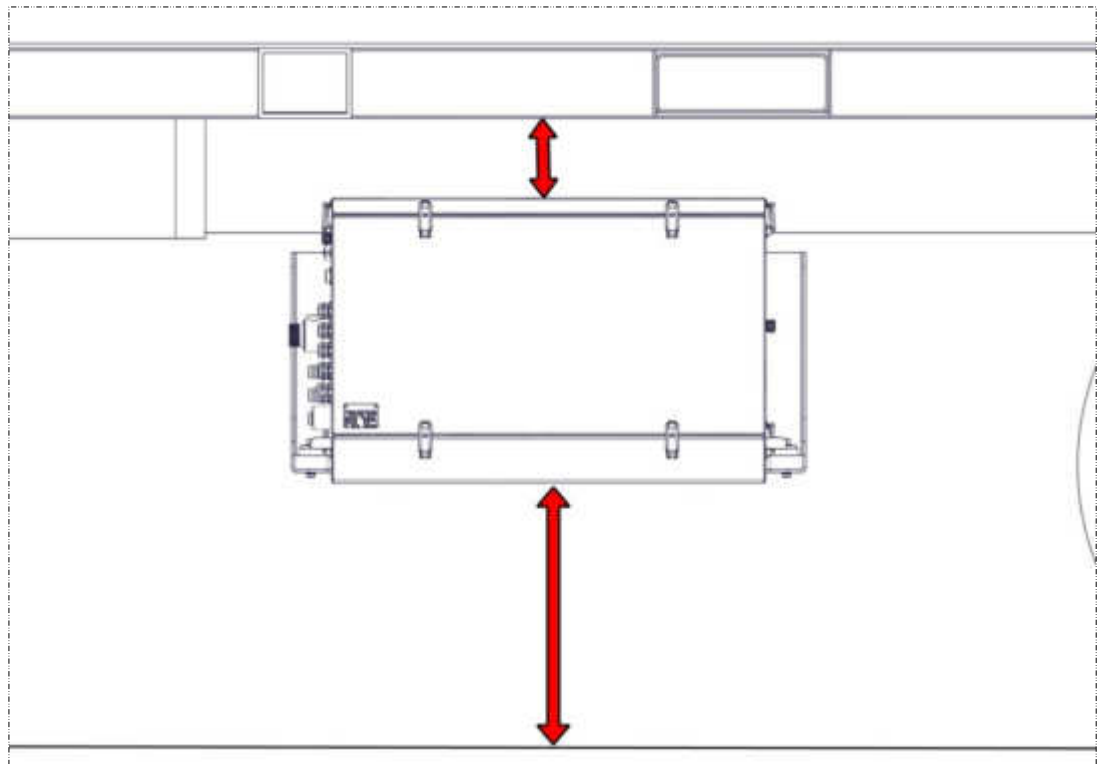
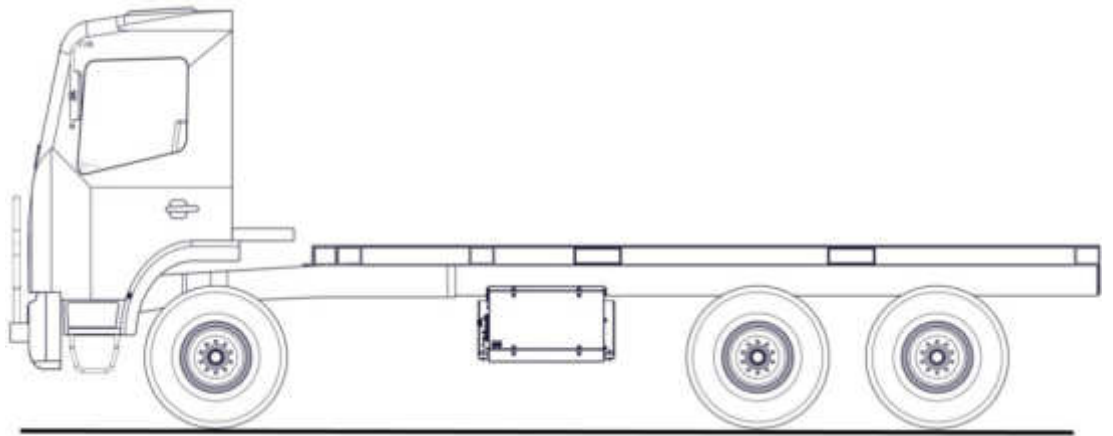


The generator has been supplied with a machine frame with vibration metal elements. These preventing vibration noises to be transmitted to the vehicle.



	Camino 10	Camino 15	Camino 20
Length A	935 mm	1018 mm	1101 mm
Width B	592 mm	592 mm	592 mm
Hight C	470 mm	470 mm	470 mm

6.4.1 Notes for installation



A minimum distance of 50 mm from the capsule lid to the vehicle chassis must be observed.



Minimum distances to the ground and / or road surface as well as to curbs may vary depending on the position to the vehicle axis. These should be clarified with vehicle manufacturer.

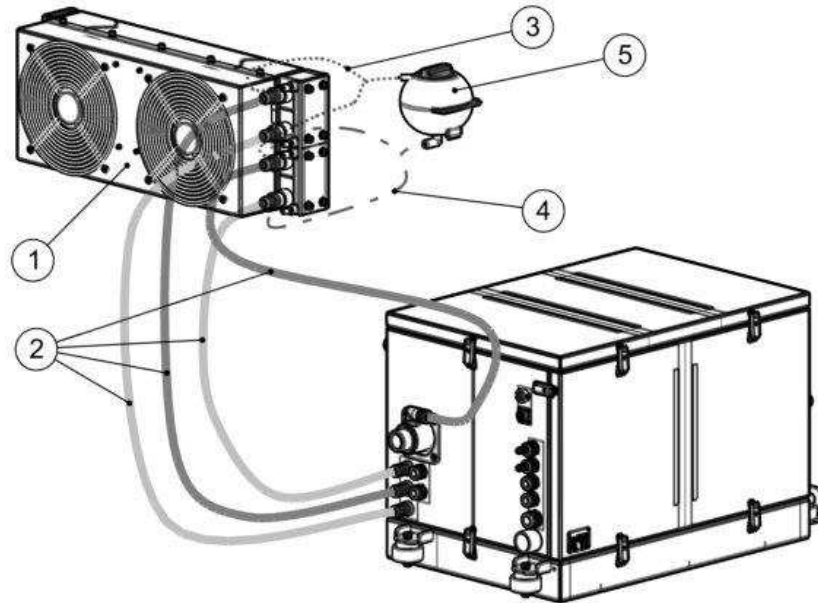
6.5 Installation of the cooling system



Install and mount hoses with a sufficiently large radius. Select the place of installation so that sufficient cooling air can flow through.

The complete cooler unit is pre-assembled.

- The maximum distance between the generator and the cooler unit should not exceed 5 m!
- Height difference max. 3 m above and below the generator.



Components and materials:

- 1 Cooling unit (1)
- 2 Cooler hose Ø 25 with hose clips Ø 16-27
- 3 Cooler hose Ø 8 with hose clips Ø 8-12
- 4 Cooler hose Ø 15 with hose clips Ø 12-22
- 5 expansion vessel



Use pressure and suction resistant hoses for temperature up to 100°C only, refer also to **SET accessories**.

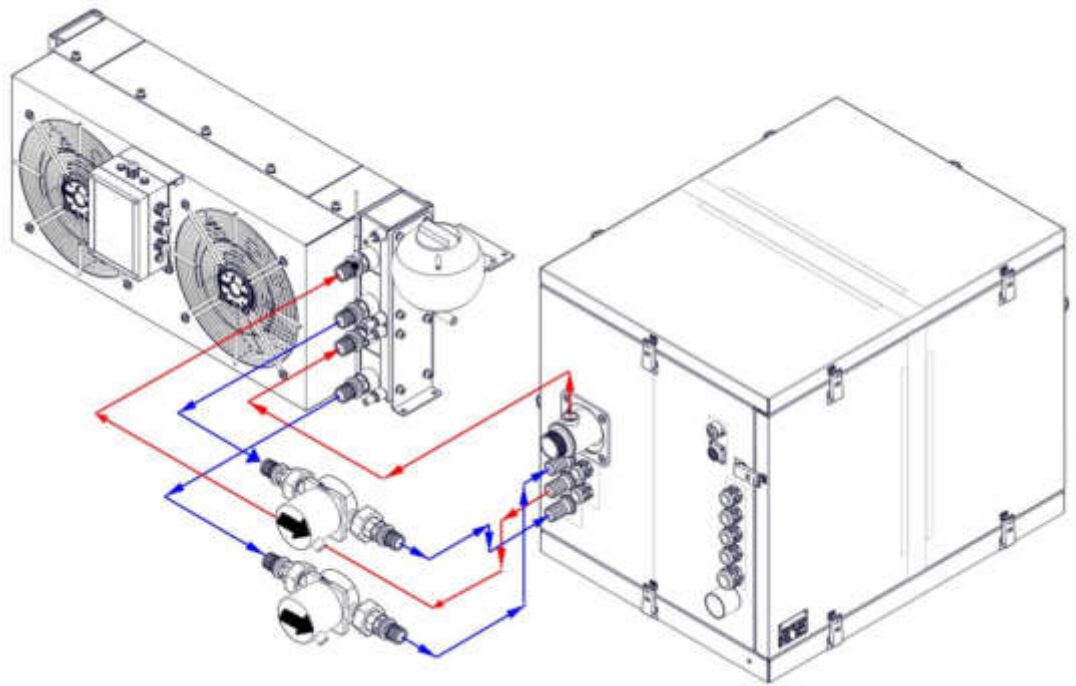


Ensure that the axial fan in the cooling unit is supplied with enough fresh air. Inadequate cooling can cause the engine to shut down due to overheating.

- Exhaust air opening = cooler size*.
- The fresh air opening for the axial ventilator must be at least 1.2 times the area of the exhaust air opening.
- If linings are installed in front of the exhaust air and fresh air openings (e.g. louvres), make sure the cooling air can flow without hindrance. Increase the exhaust air opening, if necessary.

* (refer also to dimensional sheet and technical data)

6.5.1 Conveying direction of the coolant



from	via	to
Generator cooler	Coolant pump	Generator supply line
Generator return line	Hose	Generator cooler
Engine cooler	Coolant pump	Engine supply line
Engine return line	Hose	Engine cooler



Attention!
Necessarily note the pump position and speed level 3 when mounting the cooling water pumps.

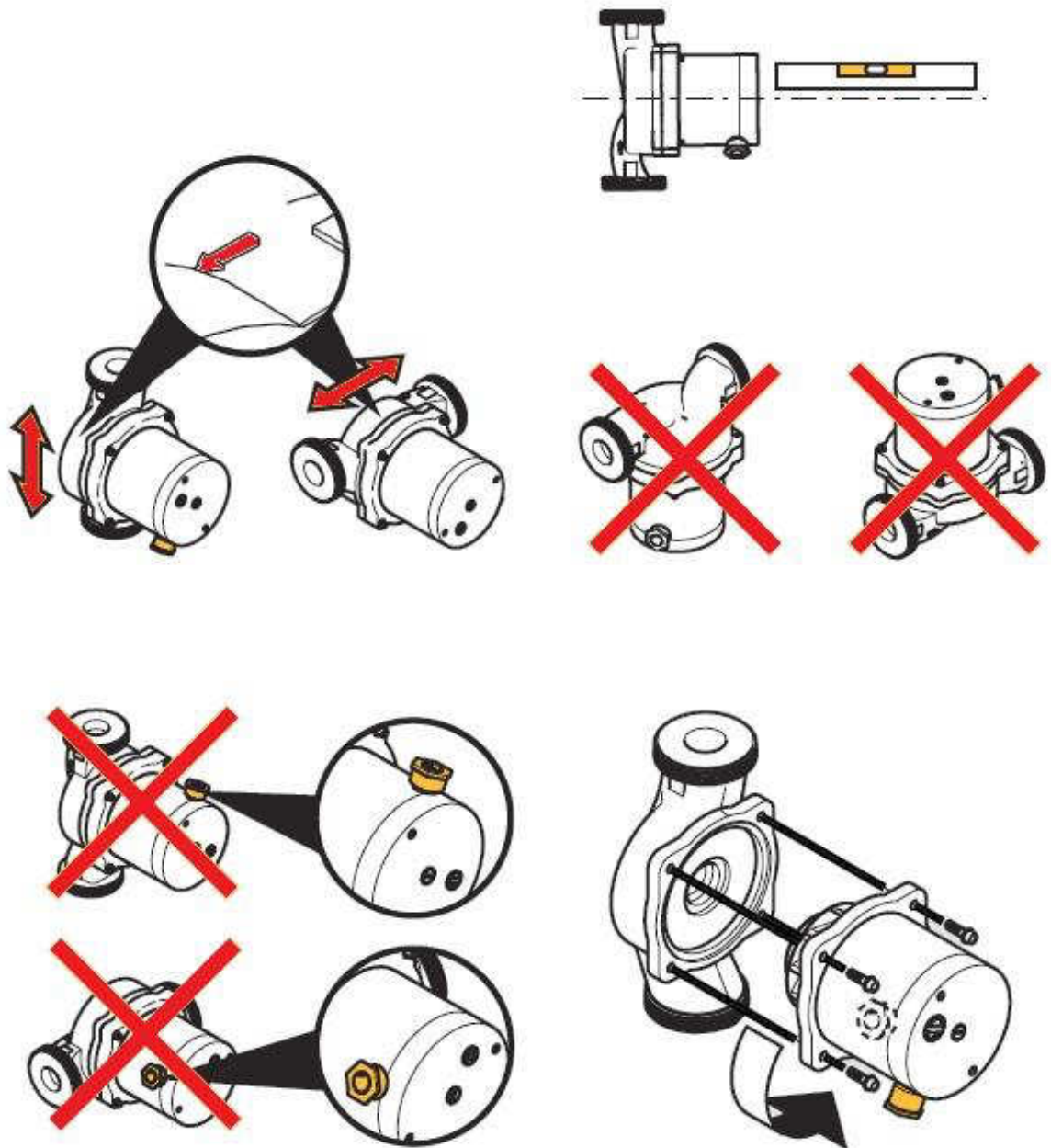
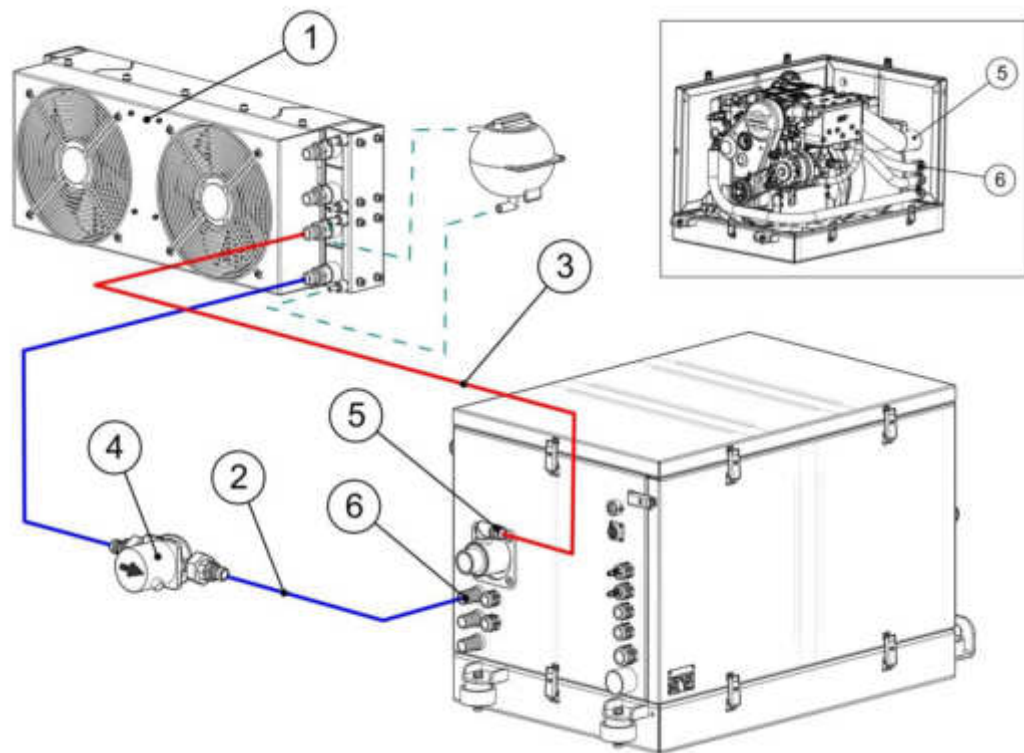


Figure: Pump installation

6.5.2 Piping at the cooling circuit „generator“



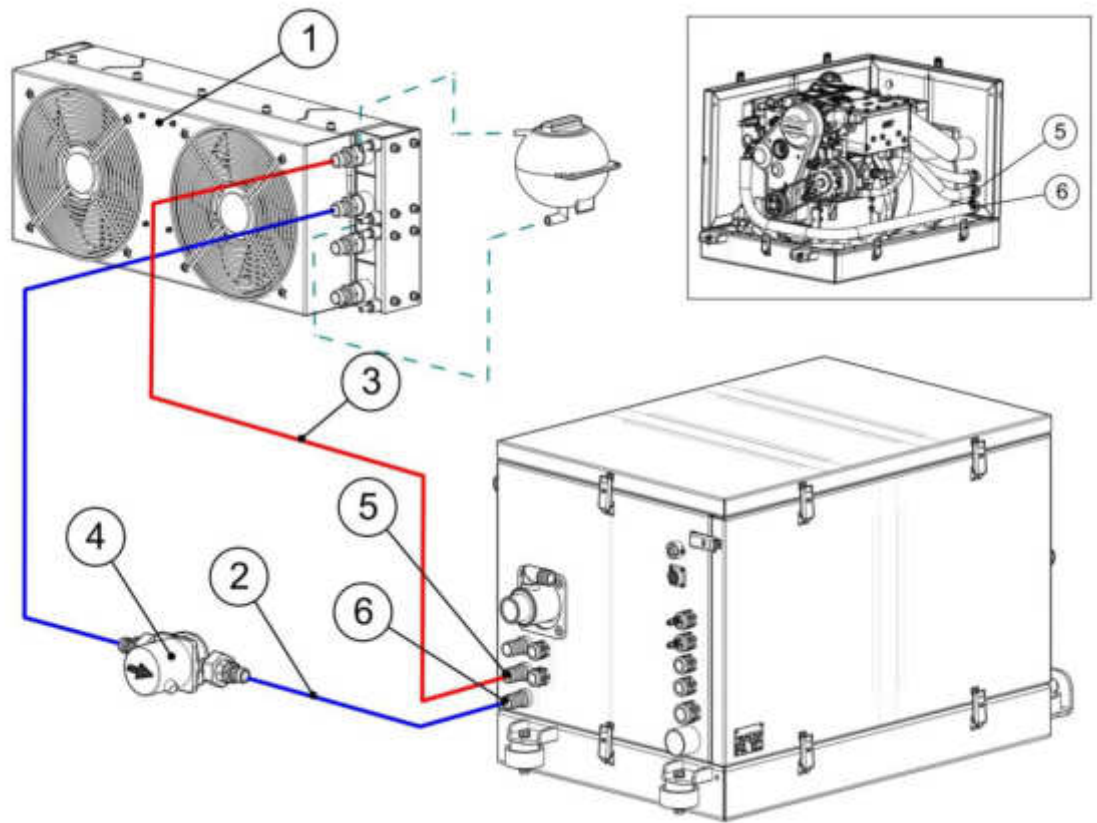
Generator and exhaust gas cooling is operated via the closed generator cooling circuit with supply and return lines by means of a coolant pump.

- Mount the coolant pump (4) at the supply line (2) of the cooler (1). From the coolant pump to the supply socket (6) use hoses* and/or pipelines. Observe the position of installation of the coolant pump (refer to figure).
- Connect the piping of the return line (3) directly to the cooler. Connect the return line connection (5) at the **SET Camino Generator** housing to the cooler via hoses* and/or pipelines.



Hose connections (2 + 3) must be mounted with pressure and suction resistant coolant hose (Ø 25) and hose ends need to be fixed with suitable clips.

6.5.3 Piping at the cooling circuit „drive engine“



Engine cooling is operated via the closed engine cooling circuit with supply and return lines by means of a coolant pump.

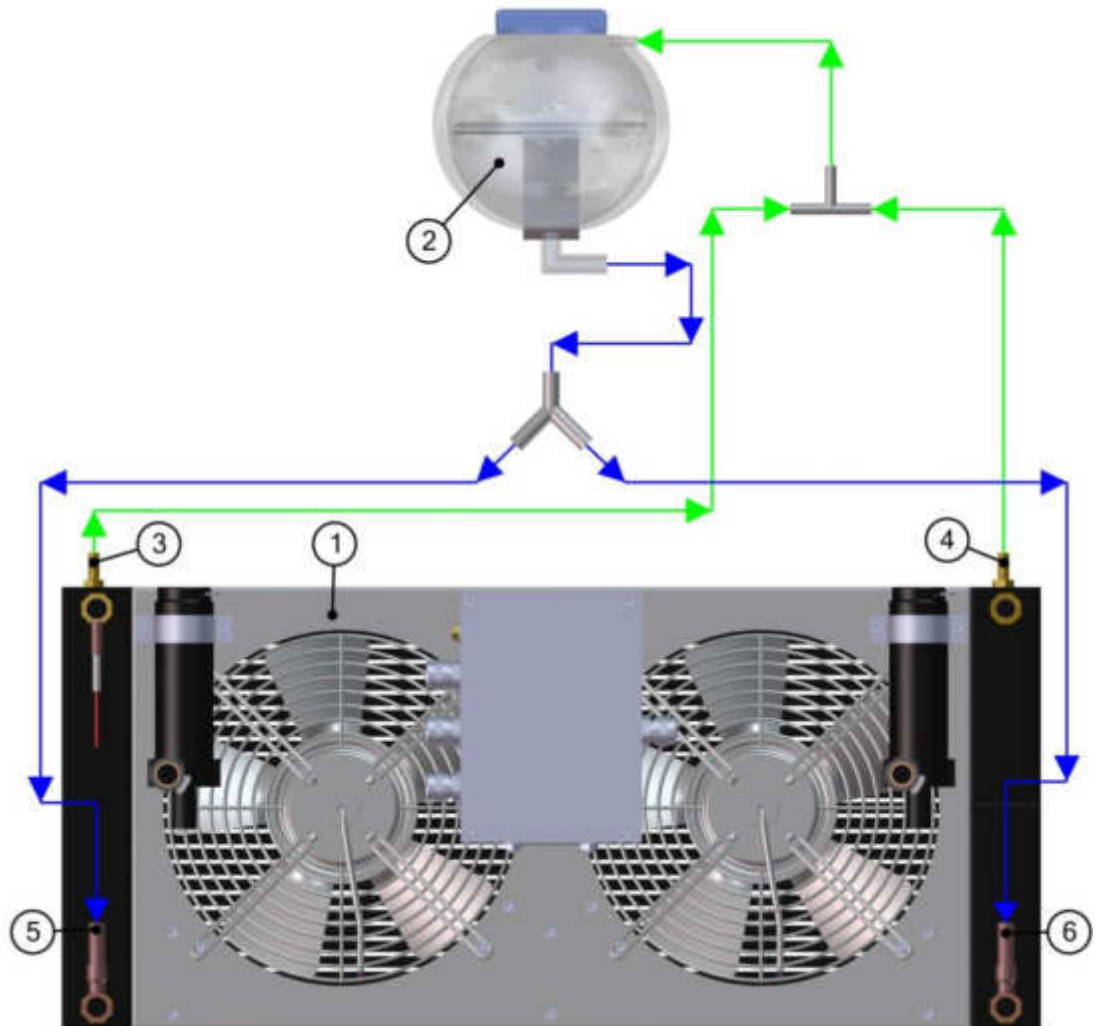
- Mount the coolant pump (4) at the supply line (2) of the cooler (1). From the coolant pump to the supply socket (6) use hoses* and/or pipelines. Observe the position of installation of the coolant pump (refer to figure).
- Connect the piping of the return line (3) directly to the cooler. Connect the supply line connection (5) at the SET Camino Generator housing to the cooler via hoses and/or pipelines.



Hose connections (2 + 3) must be mounted with pressure and suction resistant coolant hose (Ø 25) and hose ends need to be fixed with suitable clips.

6.5.4 Piping „expansion vessel“

Position the expansion vessel (2) on top of the highest point of the whole cooling system at a readily accessible/visible place. Attach the expansion vessel at the cooler unit (1) as shown in the figure. It is used to top up and (visually) check the coolant daily.



Connect the hose 8 mm and the return line hose 15 mm at the connections of the generator/engine cooler and expansion vessel provided for this purpose.

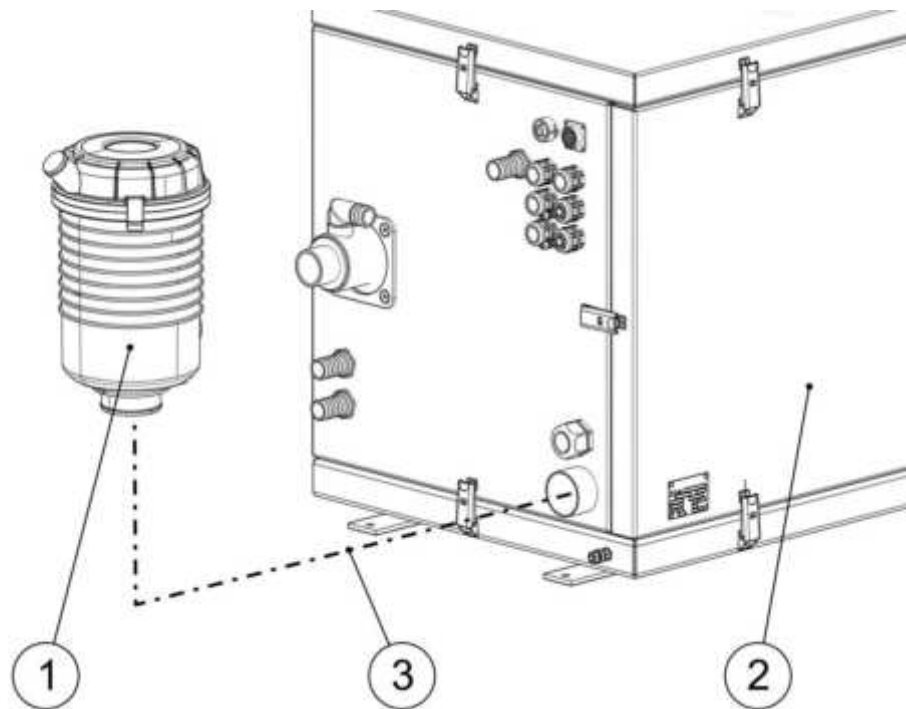
The cooling water supply hoses Ø 15 mm can be connected to the appropriate connections (5 + 6) of the generator / engine cooler (1) and the expansion vessel (2).

The vent hoses Ø 8 mm are connected to the appropriate connections (3 + 4) of the generator / engine cooler (1) and the expansion vessel (2).



Hose connections must be mounted with pressure and suction resistant coolant hose (Ø 15 / Ø 8) and hose ends need to be fixed with suitable clips.

6.6 Installation of external air filter (optional)



The installation of the external air filter * (1) shall be elected at a well-ventilated with dry air location near the **SET Camino Generator**.

Connect the external air filter* at the socket of the **SET Camino Generator** housing (2) via hoses and/or pipes (3).

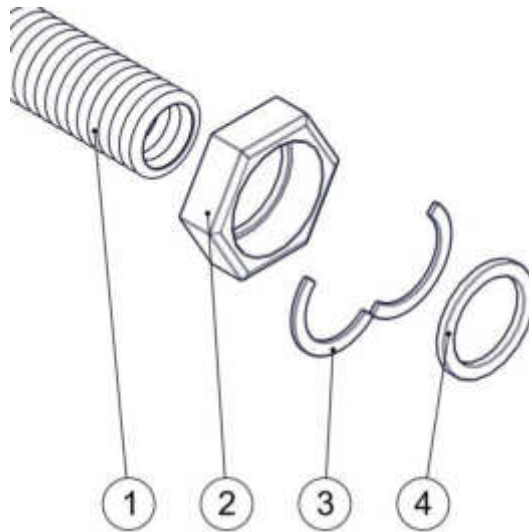


Install the hose lines and/or piping without kinks. Mount the hose ends by means of the enclosed clips. The air filter must not come in contact with road dirt.

* The external air filter is not included in the scope of supplies and should be ordered separately, if necessary. The required hose length should also be defined then.

6.7 Installation of the exhaust gas system

6.7.1 Preparing the exhaust hose



- 1 Ring wave tube DN32
- 2 Coupling nut DN32
- 3 Clamping ring DN32
- 4 Gasket ring DN32



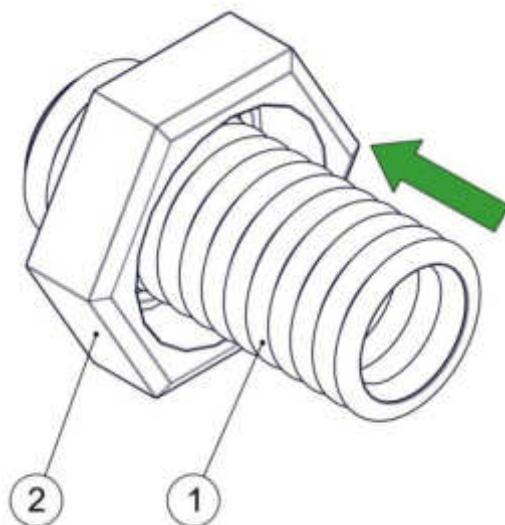
Be careful when working with high-speed tools.



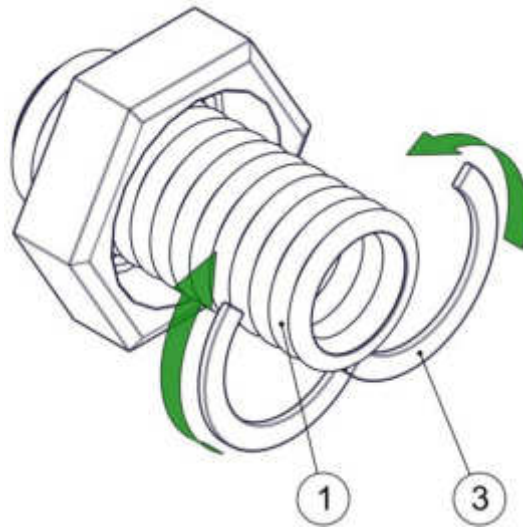
Protect eyes from flying sparks.



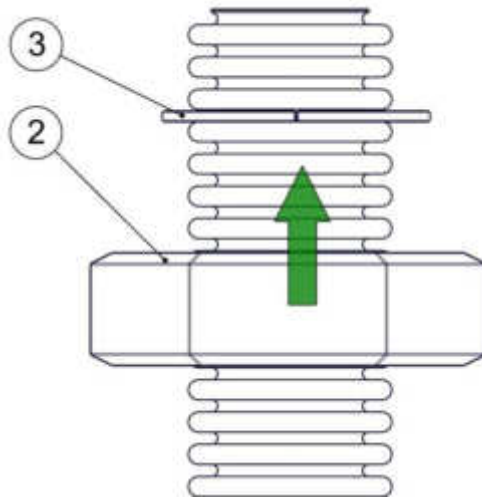
Use gloves.



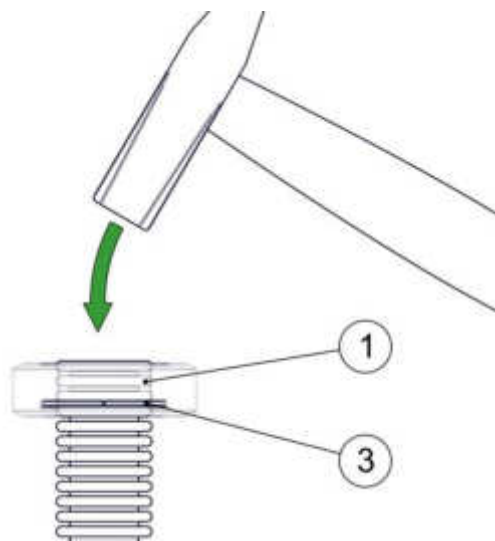
Lead nut (item 2) on the exhaust hose (item 1).



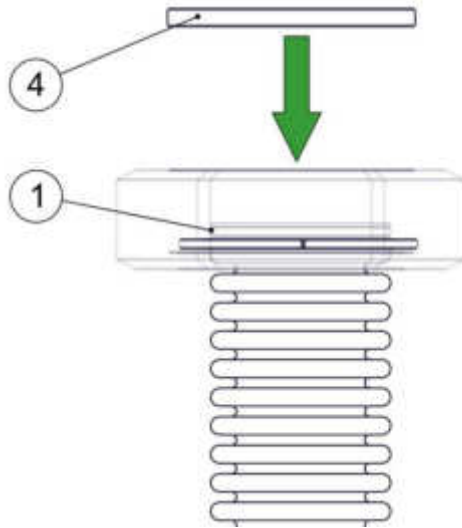
Attach clamping ring (item 3) on 3rd ring in the exhaust hose (item 1).



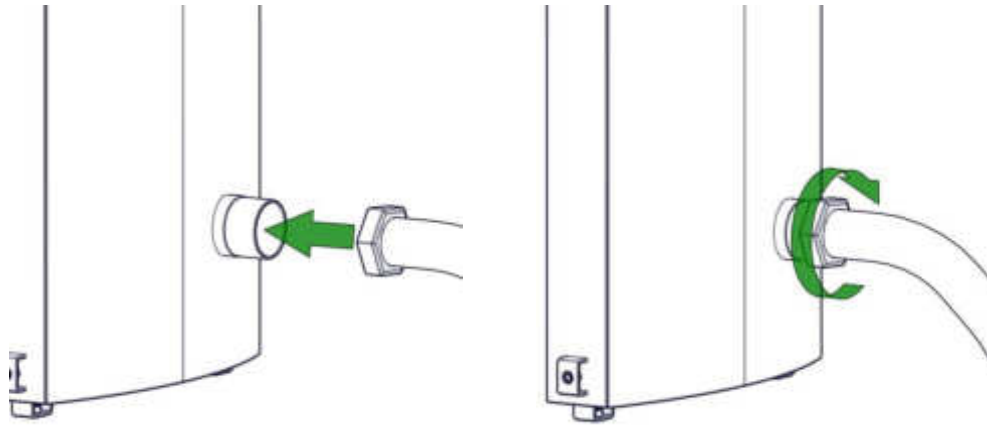
Lead nut (item 2) until it's stopped by the clamp ring (item 3).



Compress the top 3 rings in the exhaust hose (item 1) and fix the clamp ring (item 3).



Replace the gasket ring (item 4) to the exhaust hose (item 1).



Place the exhaust hose to threaded sleeve.
Screw on the coupling nut clockwise onto the threaded sleeve.

6.7.2 Installation of the exhaust gas system

The **place of installation** of the exhaust gas silencer (1) with exhaust gas line (3) at the **SET Camino Generator** is already defined in the order.

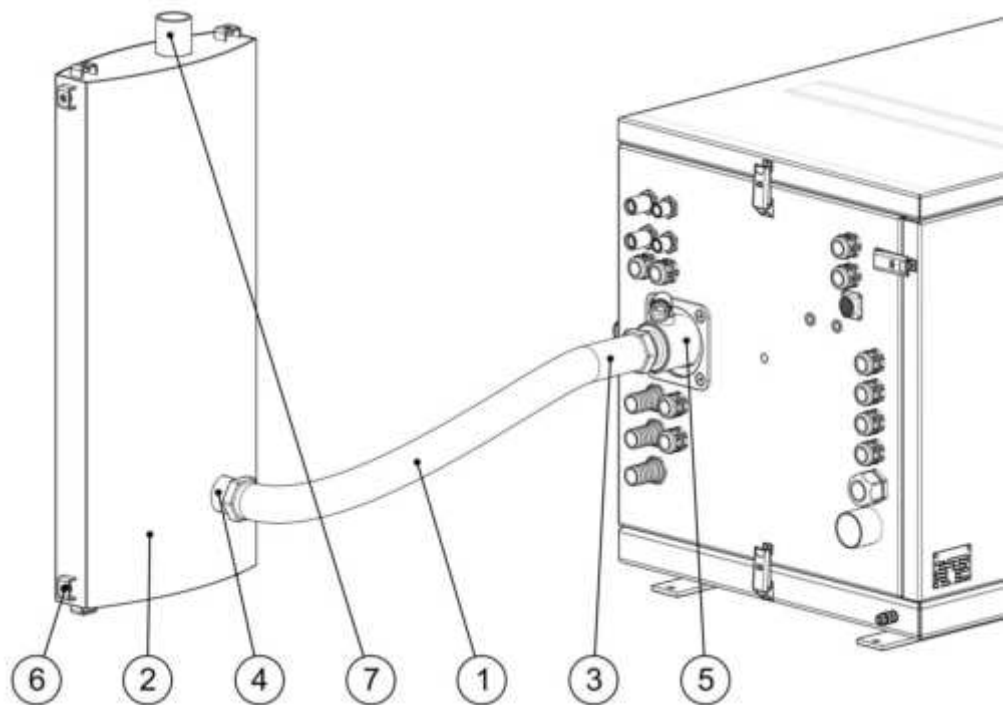


Exhaust gases shall not be taken in by the cooler unit or the air filter. Mount the exhaust gas outlet as far as possible from the cooler unit and the intake slots.

The exhaust gas line* should be mounted with one bend only. Any additional bend will cause additional exhaust gas noises. Vibration and temperature bridges to the vehicle bottom are avoided by vibration elements (2).

If necessary, the inlet and outlet openings of the silencer can be exchanged.

* The exhaust gas silencer is included in the scope of supplies. However, the exhaust line must be ordered specifically depending on the installation requirements. (refer to specific **SET** installation rules, if necessary).

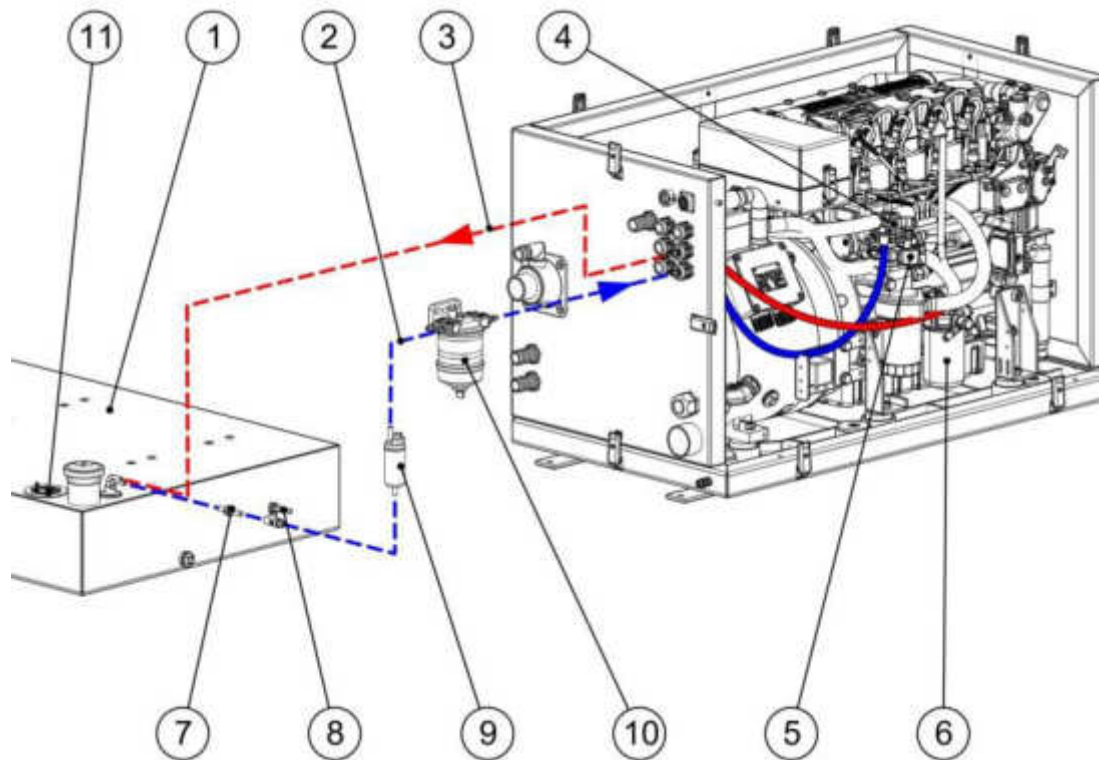


1. Define and mark the place of installation, drill a through-hole (Ø 70 mm) f.e. in the vehicle bottom, etc.
2. Mount the exhaust gas silencer (1) with the vibration elements (2) to the bottom.
3. Mount the exhaust gas line (3) to the exhaust gas silencer (1) and to the exhaust gas socket (4) of the **SET Camino Generator** housing.
4. Seal the through hole between the vehicle bottom and exhaust gas line by means of a steel plate.
5. Wrap the enclosed ceramic tape and then wire around the exhaust gas pipe. The ceramic tape protects from burns and vehicle fire.
6. Exhaust gas noise can be reduced further if the outlet (5) of the exhaust gas silencer is extended.

6.8 Installation of the fuel system

Installation of the fuel system can be adapted to the local conditions. Follow the specifically described specification when operating via the vehicle's fuel supply system.

The separately working fuel supply system consists of the following:



- | | |
|--------------------|--------------------------------------|
| 5 Fuel tank | 11 Non-return valve* |
| 6 Supply line | 12 Shut-off cock* |
| 7 Return line | 13 Electrical fuel delivery pump |
| 8 Manual fuel pump | 14 Water separator with fine filter* |
| 9 Solenoid valve | 15 Fuel level indicator |
| 10 Fuel filter | |

* not required in any case



If a Diesel tank is used which was not delivered with the system, use a design approved Diesel tank type. If using a common Diesel fuel tank with the main engine, install an independent connection for the generator with foot-operated valve and ball valve.



All components and hoses used must be suitable for Diesel fuel. Install hose lines at a fire-resistant base.



All metal components and lines of the fuel system must be connected with each other via an equipotential bonding system.

6.8.1 Installation of the separate fuel supply system

Mount the fuel tank (1) so that the low level is on top of the generator. Fuel supply through the descending lines by gravity is ensured in this way. Install the electrical fuel delivery pump at a distance of min. 2.5 m and/or a height of min. 0.5 m.



Installation must be carried out by specialists qualified / trained by **SET** only.



The fuel lines led out of the soundproofing hood of the generator are marked (supply line \Rightarrow) and return line (\Leftarrow). Install the connections accordingly.



SMOKING PROHIBITED



FIRE PROHIBITED

7. Define place of installation and drill the mounting and/or through holes.
 8. Attach the fuel tank* (1).
 9. Connect the return line (2) directly to the connection line (3) of the **SET Camino Generator**.
 10. Connect the supply line (4) via Diesel free pipelines/fuel hose NW8 and
 - non-return valve* (5) (prevents the fuel from returning and thus draining of the supply line)
 - shut-off valve $\frac{1}{4}$ " * (6)
 - electrical fuel delivery pump* (7) (to be mounted close to the Diesel tank)
 - water separator* (8) direct downstream of the electrical fuel delivery pump. Leave sufficient space for filter replacement/cleaning (from **SET accessories**).
- to the connection line (9) of the **SET Camino Generator**.

* (refer also to the documents of sub-suppliers)



The end of the return line need to end slightly above the tank bottom. Thus the line end is always filled with fuel and the lines are prevented from draining.



Prior to start up and on completion of assembly check the whole fuel system for leaks.

6.8.2 Connection of the electrical fuel delivery pump

Appropriate connection lines are led out of the soundproofing hood of the **SET Camino Generator** for the connection of the electrical fuel delivery pump.



The electrical fuel delivery pump is operated with 12V and connected directly at the cables which are lead out of the generator and which are provided with fuses. The fuel delivery pump must be connected electrically only by specialised electricians. Risk of short circuit and fire in case of improper connection.

7 Electrical installation



The electrical system must be installed only by specialised electricians with due consideration given to the rules of electrical engineering.

Electrical installation protective measures/Safety



Follow the protective measures when installing the electrical system!

Protective measures:



A residual current protective system for the electrical installation of the **SET Camino Generator** is mandatory for the safety in the vehicle and near electrical devices and the operator.

It's basic function is to prevent dangerous voltages at conductive components of electrical means which might be touched.

Use of highly sensitive residual current circuit-breakers provides also two other protective functions:



They protect man and animals even in case of direct contacting live components and prevent fire due to electrical causes.

Notes

1. Provide a protective conductor when installing the generator!
2. Earthen the generator by a protective conductor up to the connection terminal of the consumer!
3. Residual current circuit-breakers (FI circuit-breaker = 0.03 A) is required in compliance with the regulations of the manufacturer's country. This requires equipotential bonding from the generator output to the vehicle structure.
4. The regulations of other countries may prescribe other protective measures. Follow the protective measures specified for that country when installing the generator.
5. The company installing the system is liable in case of non-compliance.
6. Mount the capacitor housing close to the generator.

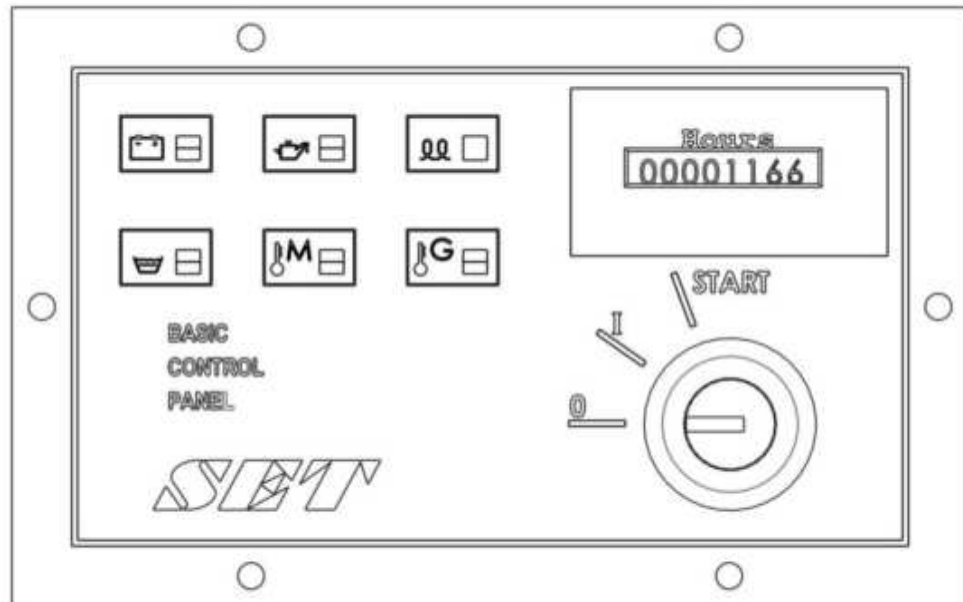


Capacitors can withstand a maximum ambient temperature of 70°C. Prevent heat accumulation in the room. Ensure that the air freely can flow outward.

7.1 Installation of control panel



The control panel is a sensitive electronic unit.
Please handle with care.



Sequence of installation of the control panel

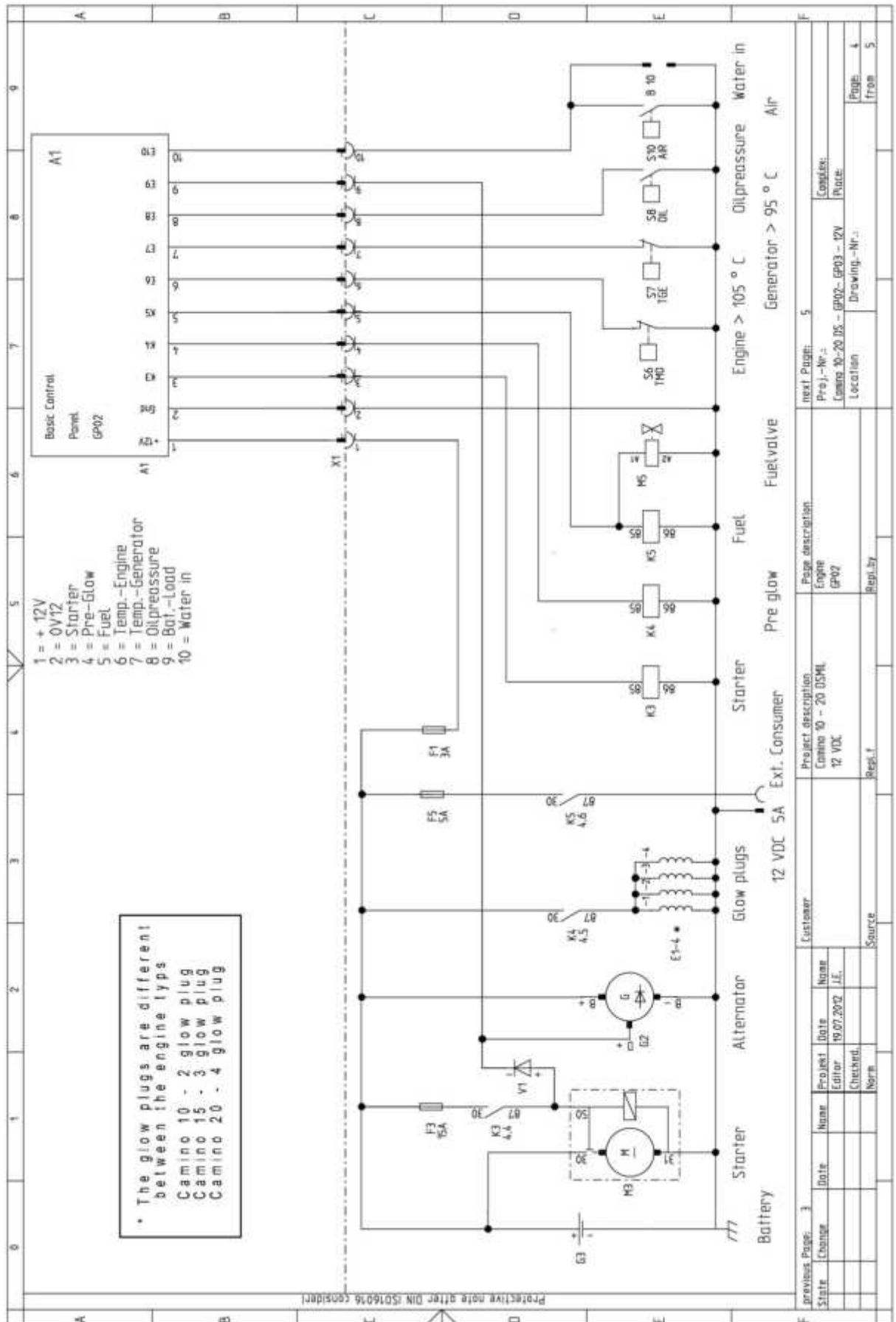
1. Install the control panel at a properly visible place.
2. Remove the control panel from the packing.
3. Make the recess for the control panel.
4. Install the supplied 10-core control cable (length 5 m) from the recess to the generator.
5. The control cable is connected at the terminal block of the control panel. (The cores of the control cable are numbered).
6. Connect the plug of the control cable so that it is not distorted and the poles are not confused.



The terminals of the control panel are mounted directly at the circuit board. Use a suitable screw driver in order to protect the sensitive screws from over-tightening.

A socket for the connection of the control cable is provided in the soundproofing hood of the generator.

7.2 Circuit diagram control-panel



7.3 Connection of main capacitor and main distributor

Connect the capacitor housing – which has been connected to the generator at the manufacturers – to the main distributor in the vehicle.

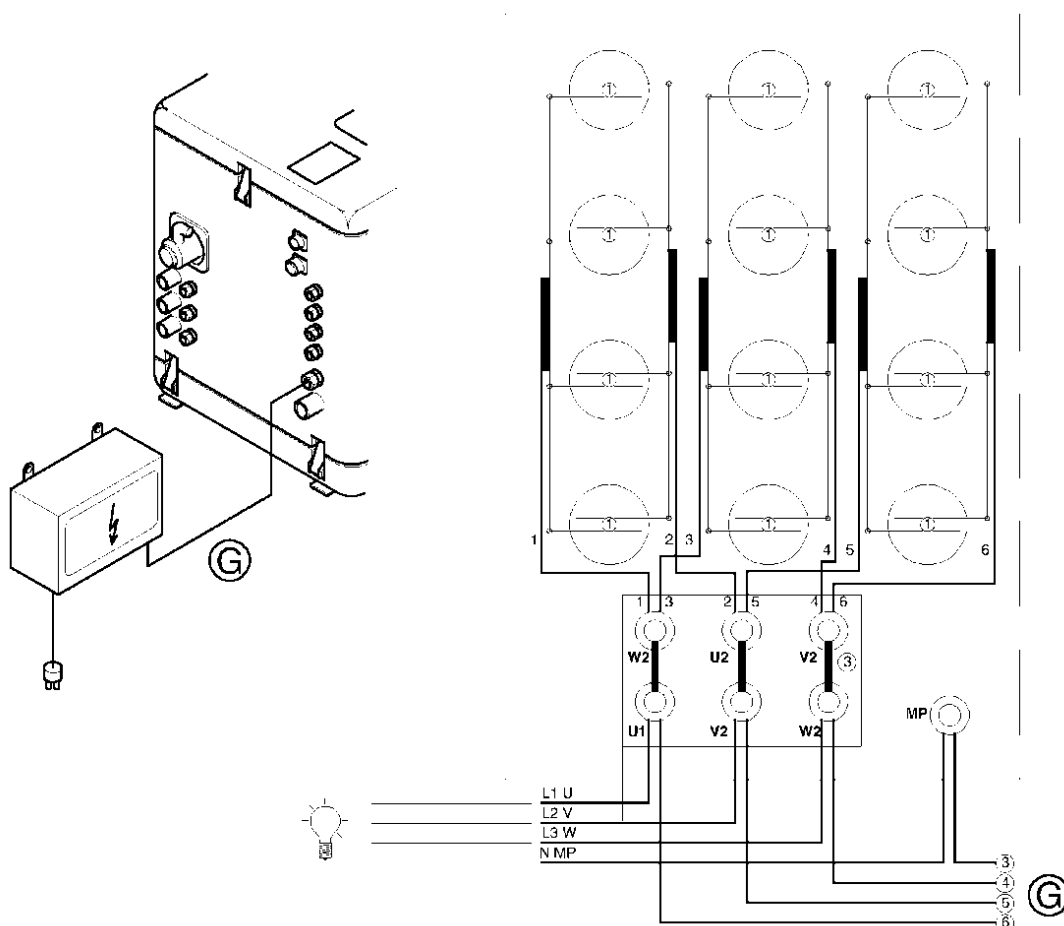


Do not start the generator unless the electrical installation has been completed and tested.



Mount the capacitors so that sufficient line length remains to insert the cable in the soundproofing hood. The cable shall not be affected mechanically by vibrations of the generator.

- Install an intermediate distributor, if necessary.
- Avoid rubbing point when installing.
- Install cables at a fire resistant base or in cable conduits.



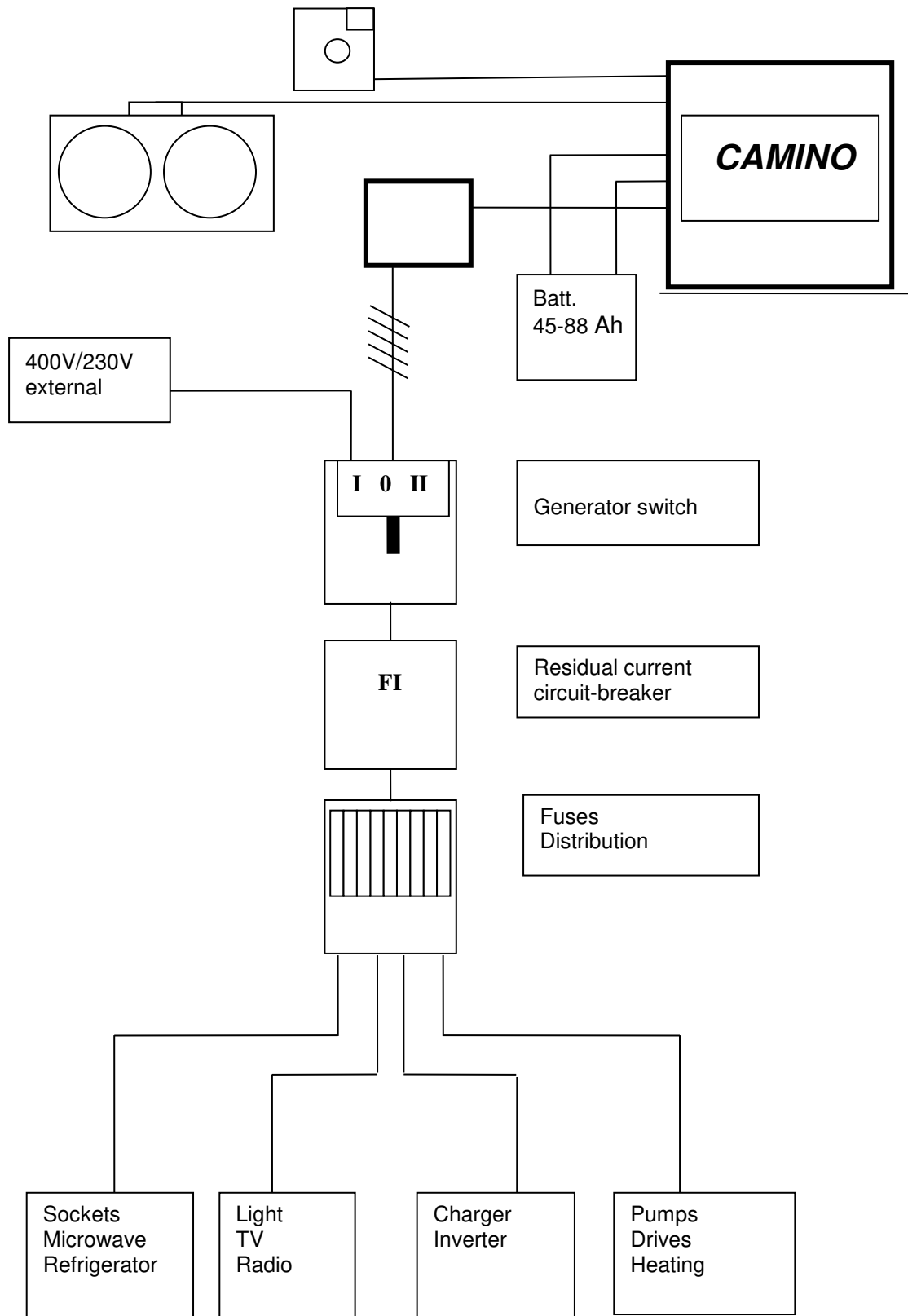
7.4 Installation of generator safeguards



If the generator is operated with automatic options, install also a generator safeguard. All live lines are separated then. The generator safeguard can also be combined with delayed pull-up.

7.5 Electrical system of the vehicle

Wiring diagram for the 230V/400V 50 Hz wiring from the generator to the electrical system of the vehicle.



7.6 Connection for additional 12V / 24V consumer

One additional 12V / 24V consumer secured with a maximum of 7,5A can be connected at the existing connection line.

The required fuse is installed in the electronic box.

- The connection lines are marked plus (+) and minus (-).
- Connect plus (+) and minus (-) of the electrical fuel pump with the connection line.



The additional consumer operates at 12V / 24V and must be connected directly to the hedged cable which leads out of the generator. The consumer should be connected by specialised electricians only. Risk of short circuit and fire in case of improper connection!

7.7 Mounting and installation of the starter battery

The 12V / 24V starter battery (> 45A < 88Ah) is charged continuously during the operation of the **SET Camino Generator**. It needs to be mounted and fixed near the pole cables (3 + 4).

If installation is not possible within reach, special lines* with larger cross-section must be used.



If cable cross-section is too small, it may cause fire and malfunction when starting the generator.

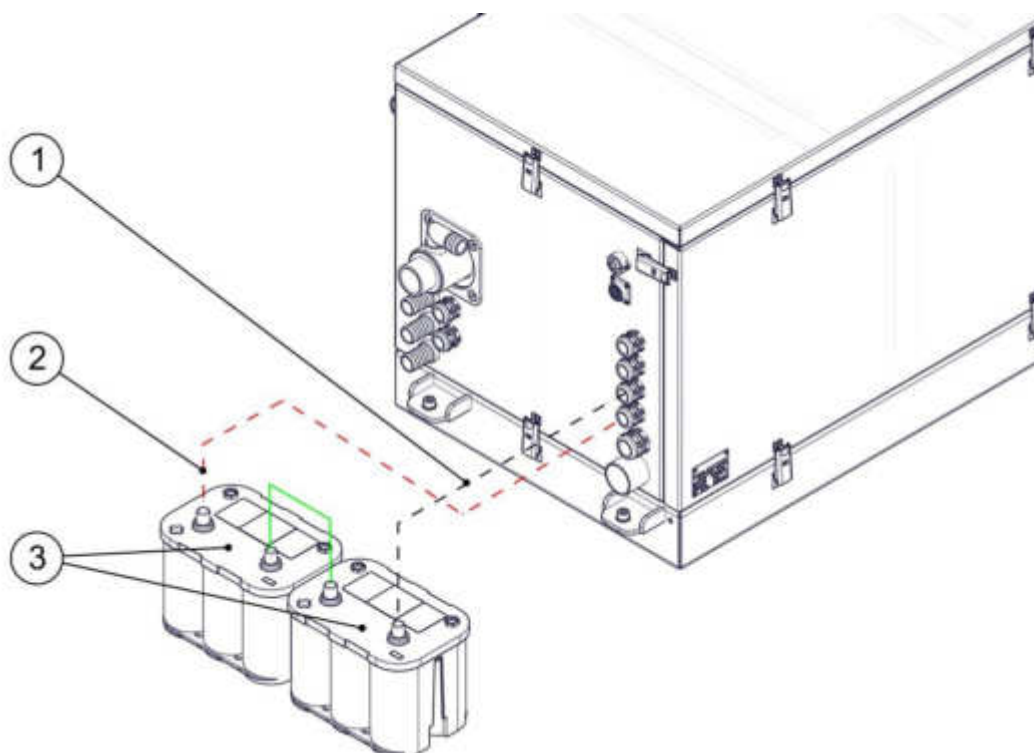
Protective battery housings* (not shown) protect you and your vehicle and are recommended as:

- Protection from moisture
- Protection from mechanical damage
- Protection from leaking electrolyte



The **SET Camino Generator** must have its own starter battery to start the driving engine. No other power consumers may be connected with that battery.

Insert/mount the battery connection cables (1 + 2) which are lead out of the **SET Camino Generator** and earth direct at the relevant pole terminals of the starter batteries (3).



* (refer to **SET** accessories)

General notes for installing the starter battery



Batteries will self-discharge and must therefore be maintained and serviced. The higher the quality of the battery, the lower the factor of the self-discharge.

- Install the battery at a suitable place only.
- Attach the battery / battery-protection container* shock-proof and tilt-proof.
- Install the battery cable – according to the cable length – at a fire resistant base or in an appropriate cable duct.
- During installation make sure that the pole shoes of the lead out cable ends can be connected with the relevant poles of the battery.



Never connect any battery before complete assembling of generator systems is done.

8 Initial start-up

On completion of assembly and installation of the **SET Camino Generator** follow the steps below in any case for initial start-up:

Check in the given order:

1. Check the whole mechanical and electrical installation.
2. Check Diesel fuel level in tank, top up, if necessary.
3. Open shut-off cock at Diesel tank.
4. Check fuel system for leaks.
5. Ensure fresh air supply at cooler unit.
6. Check coolant level in cooler unit, top up, if necessary.
7. Check oil level of engine, top up, if necessary.
8. Plug of cooler ventilator connected.
9. Key-operated switch at control panel in „0“ position.
10. Plug of control line connected.
11. Connect starter battery (observe correct polarity).
12. Turn mains/generator switch to „0“
(generator must not start with load)
13. Switch off all additional consumers
(for installations only without generator safeguard).
14. Start the **SET Camino Generator**.

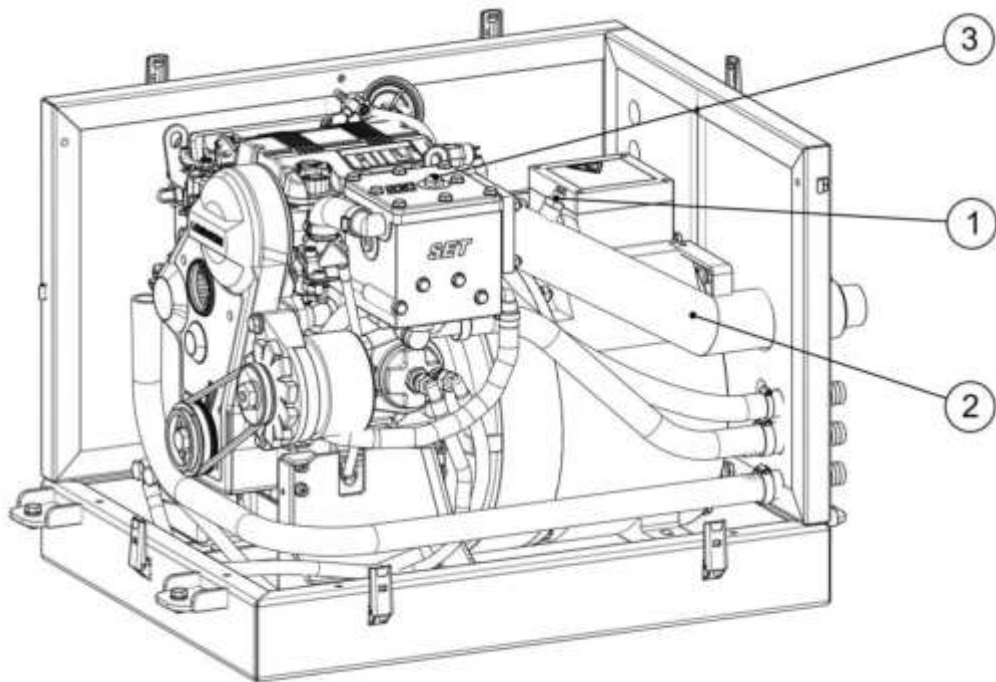


When connecting the battery observe the correct polarity. The cables led out of the **SET Camino Generator** are marked (+) and (-). Connect the cables according to the battery.

8.1 Coolant filling

Prior to starting the **SET Camino Generator** fill cooler:

1. Unscrew the cap from the expansion vessel.
2. Fill coolant in the expansion vessel until coolant becomes visible.
3. Engine Circuit: Bleed at the water-cooled exhaust collector at the vent screw (3).
4. Alternator Circuit: Bleed at the water-cooled exhaust manifold (2) at the temperature switch (1).
5. Close the cap of expansion vessel.
6. If necessary, ventilate cooling circuits directly downstream the pumps.



If the first start was not successful turn control panel to „OFF“ and wait for approx. 5 sec. Try starting again.

After filling

1. Start the **SET Camino Generator**.
2. Top up coolant in the expansion vessel.
3. Check the cooler ventilator for proper operation.



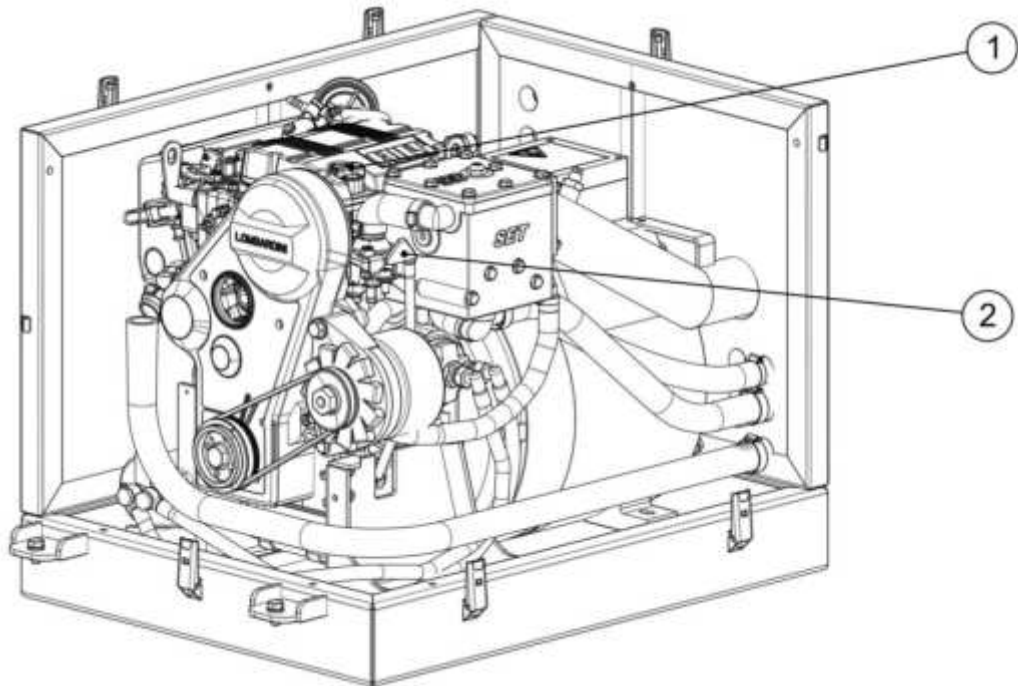
Look for leaks (re-tighten hose clips).



Fill in the generator system exclusively with antifreeze approved from **SET**. Since the system has many aluminium parts installed, silicate-free antifreeze must be used. Silicates are salts that for longer periods can cause damage to seals and aluminium parts.

8.2 Oil filling “engine”

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



Filling engine:

1. Remove oil filler cap (1).
2. Fill up the engine with fresh oil and check the oil level on the marker at the dipstick (2) (should be between the min. and max. mark).
3. Mount the oil filler cap.

Recommended oil grade:

AE 15W-40 multi-range or equivalent oil brand (please also refer to information of engine manufacturer in Annex).

9 Operation

General

The operation of the generator is simple and requires no specific technical demands on the operating personnel.

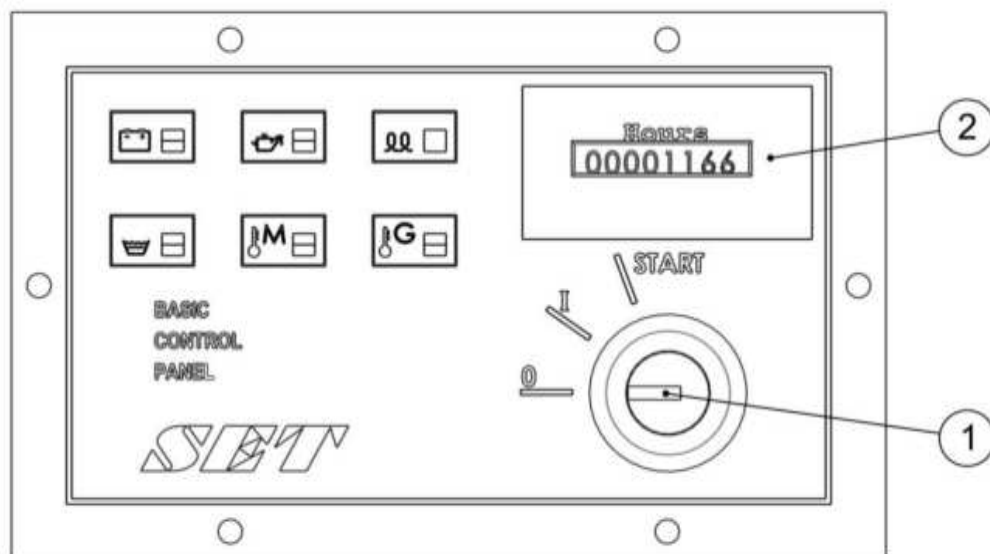
However, you should follow some basic pointers:

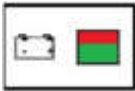





- The **SET Camino Generator** is installed in a soundproofing hood and cannot be heard under certain circumstances.
- Hence observe the displays of the control panel during operation.
- Check the coolant level in the expansion vessel on top of the cooler unit.

9.1 Start-up



Make a visual inspection of the **SET Camino Generator**.

1. Open the housing-hood.
2. Check housing for moisture traces and eliminate leaks, if any.
3. Close and lock the hood-housing.
4. Check fuel system for leaks.
5. Check level of Diesel fuel in tank.
6. Open fuel shut-off valve at tank.
7. Check cooling water system.
8. Check coolant level (expansion vessel) of cooler unit, top up, if necessary.
9. Ensure fresh air supply to cooler unit.
10. Check electrical system.
11. Turn main switch (mains/generator) to position „0“.
12. Switch off all additional consumers (for installations without generator safeguard only).
13. Start the **SET Camino Generator**.




	Display	Function / explanation
1	0 - 1 - Start	Key-operated switch
2	(h)	Sum of accumulated operating hours.
	Green LED Red LED	If battery is charged If the charging process is interrupted
	Green LED Red LED	If the oil pressure is OK if oil pressure is missing (engine switches off automatically)
	LED lights up	As long as the pre-glowing time 15 sec. runs (start is allowed then).
	Green LED Red LED	If the inside of the housing is dry If water is in the soundproofing housing (engine switches off automatically)
	Green LED Red LED	If engine temperature is OK If engine temperature exceeds 90°C (engine switches off automatically)
	Green LED Red LED	If generator temperature is OK If generator temperature exceeds 90°C (engine switches off automatically)


9.2 For initial start proceed as follows

1. Turn key-operated switch to position „1“.
2. The control LED pre-glowing  lights up. Pre-glowing time approx. 15 sec.
3. Pre-glowing LED  expires.
4. Turn key-operated switch to position „**START**“.
Diesel engine of generator starts (start phase < 3-4 sec.).



If the Diesel engine does not start immediately, wait for approx. 5 sec. and repeat starting process.

If the **Red** LED for battery  flashes, the generator does not supply a sufficiently high voltage.

- Battery LED  changes from **Red** to **Green**:
- Diesel engine is reaching its rated speed.
- Generator supplies its rated voltage (400 Volt).
- All monitoring LED`s light **Green**.



Prior to loading the generator by electrical consumers check the coolant level in the expansion vessel.

Now the generator can be loaded with electrical consumers.

Turn the main switch* (mains/generator) to position „2“.

- Connect the consumers (for loading refer to the nameplate).
- Switch off the generator in case of unclear troubles (refer also to operating manual / failure, elimination of failures, repair).



Do not operate the generator continuously in short-time mode but mainly in continuous mode under load (refer also to documents of engine manufacturer).

* (if available)

10 Installation documents of sub-suppliers

- 10.1 Sub-supplier documents - General**
- 10.2 Sub-supplier documents - Engine**
- 10.3 Sub-supplier documents - Generator**
- 10.4 Sub-supplier documents – Electrical/control system**
- 10.5 Sub-supplier documents – Cooling system**
- 10.6 Sub-supplier documents – Tank system***
- 10.7 Sub-supplier documents – External air filter***
- 10.8 Sub-supplier documents – Exhaust gas system**

* (if available)

Documents in Annex

11 Check - Up before installation and start-up

1. Regarding maintenance and care, is the power generator readily accessible?

YES___ NO___ DON'T KNOW___ REMARK_____

2. Is accessory equipment such as cooler, capacitor box, control panel accessible?

YES___ NO___ DON'T KNOW___ REMARK_____

3. Are all add-on pieces of the delivery scope surely fastened?

YES___ NO___ DON'T KNOW___ REMARK_____

4. Are the live parts installed completely splash proofed?

YES___ NO___ DON'T KNOW___ REMARK_____

5. Are all live parts, especially the capacitor box, protected against high temperature loads?

YES___ NO___ DON'T KNOW___ REMARK_____

6. Is the air supply to the intake pipe of the generator at least 2 times as large as the suction port?

YES___ NO___ DON'T KNOW___ REMARK_____

7. Is the air supply in front of the fan of the cooler at least 1.2 times as large as the power surface of the fan?

YES___ NO___ DON'T KNOW___ REMARK_____

8. Is the air drain of the cooler at least as large as the power surface of the cooler?

YES___ NO___ DON'T KNOW___ REMARK_____

9. Is it ensured that the air of the cooler cannot be sucked in by turbulence again (heat short circuit)?

YES___ NO___ DON'T KNOW___ REMARK_____

10. Is it ensured that no exhausts from the sound absorber can be sucked through turbulence again?

YES___ NO___ DON'T KNOW___ REMARK_____

11. Is the sound absorber mounted contact-free?

YES___ NO___ DON'T KNOW___ REMARK_____

12. Is the sound absorber mounted on rubber mounts?

YES___ NO___ DON'T KNOW___ REMARK_____

13. Is the generator able to vibrate freely?

YES___ NO___ DON'T KNOW___ REMARK_____

14. Is the sound absorber able to vibrate freely?

YES___ NO___ DON'T KNOW___ REMARK_____

15. Is the original SET exhaust pipe installed?

YES___ NO___ DON'T KNOW___ REMARK_____

16. Is the exhaust pipe screwed gas-tight and been wrapped in with the original SET ceramic tape?

YES___ NO___ DON'T KNOW___ REMARK_____

17. Is the original exhaust pipe at least 50cm and a maximum of 2.5m long?

YES___ NO___ DON'T KNOW___ REMARK_____

18. Is the original exhaust pipe in allowable arcs relocated (5 times the pipe's outer diameter)?

YES___ NO___ DON'T KNOW___ REMARK_____

19. Is the exhaust pipe protected against contact with flammable materials (safety distance)?

YES___ NO___ DON'T KNOW___ REMARK_____

20. Are the fuel lines placed according to the rules?

YES___ NO___ DON'T KNOW___ REMARK_____

21. Do the supply and return lines nearly reach the lowest point in the fuel tank?

YES___ NO___ DON'T KNOW___ REMARK_____

22. Is the fuel supply line of the tank connected to the designated fuel supply line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

23. Is the fuel return line of the tank connected to the designated fuel return line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

24. Is the supply line of the engine cooler connected to the designated engine cooler supply line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

25. Is the return line of the engine cooler connected to the designated engine cooler return line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

26. Is the supply line of the generator cooler connected to the designated generator cooler supply line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

27. Is the return line of the generator cooler connected to the designated generator cooler return line of the power producer?

YES___ NO___ DON'T KNOW___ REMARK_____

28. Are the coolant pumps mounted correctly in flow direction from the cooler to the engine / generator?

YES___ NO___ DON'T KNOW___ REMARK_____

29. Are the coolant pumps set to level 3?

YES___ NO___ DON'T KNOW___ REMARK_____

30. Are the coolant pumps installed in the correct position (pump motor body lying sideways)?

YES___ NO___ DON'T KNOW___ REMARK_____

31. Are the test screws for venting / turning control accessible at the coolant pumps?

YES___ NO___ DON'T KNOW___ REMARK_____

32. Is the maximum battery capacity 45Ah for Camino 2-8 or 65Ah for Camino 10-30?

YES___ NO___ DON'T KNOW___ REMARK_____

33. Are all connections securely connected?

YES___ NO___ DON'T KNOW___ REMARK_____

34. Are all cables securely attached according to the VDE standard?

YES___ NO___ DON'T KNOW___ REMARK_____

35. Is the control panel easily accessible and visible for the user?

YES___ NO___ DON'T KNOW___ REMARK_____

36. After 2 hours of test run under full load the engine return temperature remains below the max. of 95°C?

YES___ NO___ DON'T KNOW___ REMARK_____

37. After 2 hours of test run under full load the generator return temperature remains below the max. of 75°C?

YES___ NO___ DON'T KNOW___ REMARK_____

38. Is the voltage without load for single phase power generators max. 248V (L1-N) or three-phase power generators max. 428V (L1-L2-L3)?

YES___ NO___ DON'T KNOW___ REMARK_____

39. Is the voltage at full load for single phase power generators min. 207V (L1-N) or three-phase power generators min. 360V (L1-L2-L3)?

YES___ NO___ DON'T KNOW___ REMARK_____

40. Is the frequency without load max. 52.5 cycles per second?

YES___ NO___ DON'T KNOW___ REMARK_____

41. Is the frequency with full load min. 47.5 cycles per second?

YES___ NO___ DON'T KNOW___ REMARK_____

42. Are all water-leading parts, hoses and connections leak-proofed after 2 hours test run under full load?

YES___ NO___ DON'T KNOW___ REMARK_____

43. Are all clips and clamp connections firm after 2 hours test run under full load?

YES___ NO___ DON'T KNOW___ REMARK_____

Personal comments:

Please answer all the questions as precisely as possible and fax to

Dept. Service Hr. Berger Tel. +49 (0)2173-39937-14
Fax +49 (0)2173-39937-21

Quality Management Hr. Ellrich Tel. +49 (0)2173-39937-16
Fax +49 (0)2173-39937-20

Electricity Producer Camino _____
Com. no. see type plate _____
Date of installation _____
Installation company _____
Engineer mechanical _____
Engineer electrical _____

The return of this letter to SET Stange Energietechnik GmbH is compellingly necessary.
With this check-up we guarantee quality assurance in accordance with DIN ISO 9001.
Any remote diagnostics is faster and more secure by our service personnel.

Thank you for your cooperation.

12 SET service hotline

If you need any assistance please don't hesitate to contact our service team:

SET Stromerzeuger GmbH

Götscher Weg 85

D-40764 Langenfeld

Tel. +49 - 2173 – 399 37 14

Fax +49 - 2173 – 399 37 21

e-mail: service@set-zeise.de

www.set-genset.com

SET service hotline:

International +49 - 171 - 140 30 10

13 Service part order blank

Manufacture:



Stromerzeuger GmbH

Götscher Weg 85

D-40764 Langenfeld

Tel.: +49 (0)2173 / 39937-14 • Fax: +49 (0)2173 / 39937-21

e-mail: service@set-zeise.de • www.set-genset.com

Genset type*:

Order-No.*:

Installed from:

Description* / Installation*:

Year of manufacture* /
Operating hours**:

* see rating plate ** see control panel

Pos.	Amount	Description	Assembly / Ident-No.:	Notes

Delivery address:

(exact address please)

Reachable by phone:

Order page...of....

Order date / Sign:

at	from



Operation and Maintenance

Camino 10 / 15 / 20 DSUF



Stange Energietechnik GmbH

Lise Meitner Str. 13A - D-40764 Langenfeld
Tel.: +49 (0)2173 / 39937-0 • Fax: - / 39937-20
e-mail: info@set-zeise.de • www.set-genset.com

Technical notes!

Images and illustrations in this manual may differ due to different engine variants supplied by generators.

The generators of the Camino series reach its ultimate continuous power after about 50 hours.

Never operate the generator without load for long periods. This leads to coking and smoke development.

A Diesel generator is optimally utilized with a load of 80%.

Generators of Camino series are fitted with a water-cooled generator. The out-of-balance (different loads on the phases) can be up to 80%.

The power generators of Camino series are built-generators for mobile applications; a hedge of the performance is to be provided by the installer.

If you have any questions regarding installation or maintenance, please contact us at any time.

Your SET team

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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, containers and other applications.

It is particularly suited due to:

- It's 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 quietly - provided 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

- basic safety instructions
- structure / functions / technical data
- activation / operation
- preventive maintenance and care
- elimination of failures and 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 variants / additional drawings
- construction and installation drawings.

Please read this manual carefully. It includes important information, regulations and safety rules.

2 General safety instructions

2.1 Safety regulations

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 Icons for safety and danger instructions

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



Points out dangerous situations with possible personal injury, as well as possible damage of the power generator.



Danger due to electrical current. Necessary work may only be performed by a qualified electrician.



References to useful advice, explanations and supplements for handling the generator.



The engines of the power unit running at extremely volatile fuels. During refilling or servicing of fuel tanks and containers there is:



SMOKING PROHIBITED



FIRE PROHIBITED

2.1.3 Principles; intended use

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.



Intended use also includes compliance with the operating instructions and compliance with the inspection and maintenance conditions.

2.2 Organisational measures

Store the generator manuals ready to hand at generators place of installation (in the tool drawer or the container provided)!

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 manual must have been read and understood. It will be too late during service. This is particularly applicable for manpower working occasionally at the generator, e.g. during set up or maintenance.

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 instructions 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 works at carrying parts. Any structural modification shall be done by the manufacturer only.

Use original spare parts and manufacturer's accessories! Spare parts and accessories must meet the requirements set by the engine manufacturer. This is guaranteed by using original parts.

Replace all hoses within stipulated and appropriate intervals even if no safety-relevant defects have been detected!

Compliance with pertaining to regular checks / inspections which are prescribed or specified in the operating instructions!

In order to carry out maintenance work appropriate equipment is absolutely necessary!

Get yourself informed about special tools!

Observe fire detection and firefighting facilities!

Inform other persons about location and operation of fire extinguishers!

2.3 Obligations

Work at the generator shall be carried out by reliable personnel only. Check the legal minimum age!

Work on electrical equipment of the generator may only be performed by a qualified electrician in accordance with electro technical regulations. Work on the electrical supply must be carried out from an authorized expert in accordance with DIN VDE regulations and in accordance with the regulations of the relevant country. Regularly check the electrical equipment of the generator.

2.4 Safety instructions for certain operating phases

During individual operating phases observe the specific safety instructions.

2.4.1 Normal operation

Avoid any safety affecting workflow!

Take measures to ensure that the generator is operating in safe and functional condition only!

Operate power generator only if protective devices and safety-related equipment is in place and functioning (such as detachable protective devices, emergency stop devices, sound insulation or suction devices)!

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

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 or remove suction and ventilation devices when running power generator.

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. Regularly check power generator for visible damage! Operating the generator or the controller is allowed by trained personnel only!

The parameters set by the manufacturer are standard settings!

In case of malfunctions all the notes are to be observed (see also section "Fault, trouble shooting, repair"). If the measures listed there do not lead to the elimination of the malfunction, contact the SET Customer Service!

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e-mail: service@set-zeise.de • www.set-stromerzeuger.de

2.4.3 Special work

- Carry out all maintenance and installation work at the generator according to the instructions. 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, must have read and understood the operating manual, particularly the safety instructions.
- Comply all setting, maintenance and inspection work and dates specified in the operating manual, including the data concerning the replacement of components/sub-assemblies! These activities have to be carried out by professionals.
- Observe all switching on/off processes 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 according to the operating manual and the instructions for maintenance!
- In case the generator is switched off completely during maintenance, it must be secured against unexpected reconnection!
- Lock the main command facilities, withdraw the key and keep it!
- Attach a warning plate at the main switch!

2.5 Instructions for specific types of danger

2.5.1 Electrical power

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

When working on high voltage assemblies - after disconnecting the voltage - connect the supply cable to ground and short-circuit the components, f.e. capacitors with a grounding rod!

Regularly check the electrical equipment of the generator.

2.5.2 Gas, dust, steam, smoke

- Carry out welding, burning and grinding work at the generator after having obtained the specific permission only. There can be danger of fire and explosion!
- Prior to carry out welding, burning and grinding work clean the generator and its environment from dust and inflammable materials. Ensure adequate ventilation (danger of explosion)!
- For work in narrow spaces observe national regulations!
- 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

- For repairs and maintenance instruct a specialist workshop authorized by SET only.
- SET will reject all responsibility and liability for any work performed by unauthorized personnel.
- The „General Terms and Conditions of Sale and Supply“ of **SET** are applicable in any case. They are provided to the owner latest upon closing contracts disposal.

Warranty and liability claims for personal and property damage are excluded if they are caused by one or more of the following reasons:

- Improper use of the power generator.
- Incorrect installation, operation, or maintenance of the generator.
- Operating the generator with a proven defect.
- Disregarding the instructions in the operating manual regarding transport, storage, installation, commissioning and maintenance.
- Unauthorized modifications on power generator.
- Inadequate monitoring of plant components which are subject to wear.
- Improper repairs.
- Installation of third party components.
- Catastrophes due to 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

They are for general illustration only and not binding for the construction in detail. Stated dimensions are not binding.

2.6.4 Protected rights

All rights to drawings and other documents and any disposal, exploitation, such as copying and distribution rights remain with SET GmbH, even in the event of industrial property 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 must be properly recognizable and readable by the operator!
- Do not remove any 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.

SET-CAMINO Genset consists of:

- Power generator and engine in silencer capsule
- Capacitor box
- Cooling unit with pumps
- Exhaust gas sound absorber
- Control panel GP02 for installation
- Control cable with plug
- Manual **SET**
- Manual **LDW**
- Installation kit

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 power generator is constructed so that it can withstand all loads occurring at an intended use. 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 230V / 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 / 24V

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

Installed fused in the control module (electronic box)

Fuses: **see wiring diagram**

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 must be installed by specialised electricians only.

3.4.1 Electrical installation of the AC circuit 230V / 400V 50Hz

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

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.
- Therefor a direct earthing of the generator with the vehicle body is required.
- • 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 / 24V

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 5A 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 must be installed by a specialised electrician only. There will be no warranty claims 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. The tank should be large enough, since the fuel is used for cooling the nozzles.

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, piping's 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.



SMOKING PROHIBITED



FIRE PROHIBITED

3.7 Combustion air supply

- The extraction of the combustion air occurs 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 50 mm diameter hose. The length of the hose must not exceed 3 m.
- Mount an external air filter*, if required.

* optional (see **SET accessories**)

3.8 Safety instructions, summary

- Check and maintain the starter battery after a longer interruption of operation.
- 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 with the soundproofing hood closed only.



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 must be carried out by specialised electricians with due consideration given to the applicable regulations only.
- Never start the generator without properly functioning cooling water system.



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



SMOKING PROHIBITED



FIRE PROHIBITED

3.9 Exhaust gas system

- All components used of the exhaust system 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 must be used only.
- The required dimensions must be kept.
- Regularly check the coolant at the expansion vessel.
- 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.



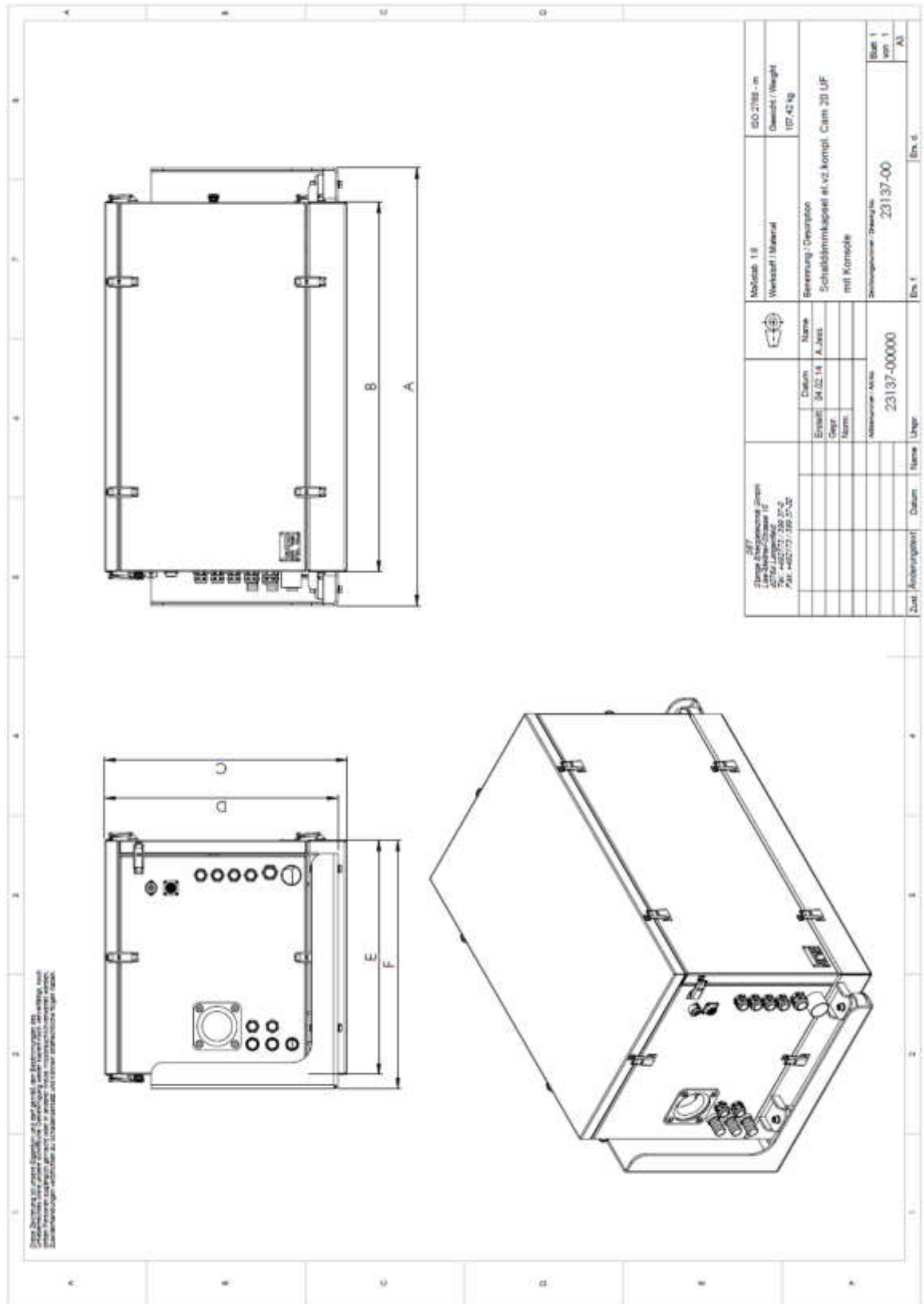
Please note when using blinds to accordingly increase the cooler air exit surface.



The power supply of cooler pump unit is secured with 3 x 4A glass tube fuses in the generator terminal loads.

4 Technical data

4.1 Dimensional sheet „Electricity producer“



4.2 Technical data „Electricity producer“

	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)	56	56	56
Length A incl. console (....mm)	935	1018	1101
Length B excl. console (....mm)	763	846	929
Length C excl. console (....mm)	610	610	610
Length D incl. console (....mm)	587	587	587
Length E excl. console (....mm)	589	589	589
Length F incl. console (....mm)	625	625	625
Vibration damper** outside (shock-proof in any direction)	4	6	6
Vibration damper** inside	4	6	6

- Up to 35°C ambient air
5% output losses / 5°C air temperature rise

Cooler unit: Type: **SET**

4.2.1 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	400 / 230V	400 / 230V	400 / 230V
Frequency (+/- 5%)	50 Hz	50 Hz	50 Hz
Amperage (single-phase operation)	12,8 / 45 A	20 / 45 A	26 / 45 A
Battery charge	12 V - 35 A	12 V - 35 A	12 V - 35 A
Type of protection	IP 54	IP 54	IP 54
Insulation class	"F"	"F"	"F"

- The full performance is achieved only after the break-in period of approximately 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

4.2.2 Technical data „drive engine“

	Camino 10	Camino 15	Camino 20
Drive engine	Lombardini	Lombardini	Lombardini
Cooling	Water	Water	Water
Bore	75 mm	75 mm	75 mm
Stroke	77,6 mm	77,6 mm	77,6 mm
Displacement	686 cm ³	1028 cm ³	1372 cm ³
Rated speed	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Engine output acc. to DIN 6270	9,75 kW	15 kW	20,42 kW
Fuel consumption	280 g/kWh	280 g/kWh	280 g/kWh
Lube oil filling SAE 10 - 40	1,6 l	2,4 l	3,3 l
Coolant filling (water with anti-freezing agent)	8 l	10 l	12 l
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°

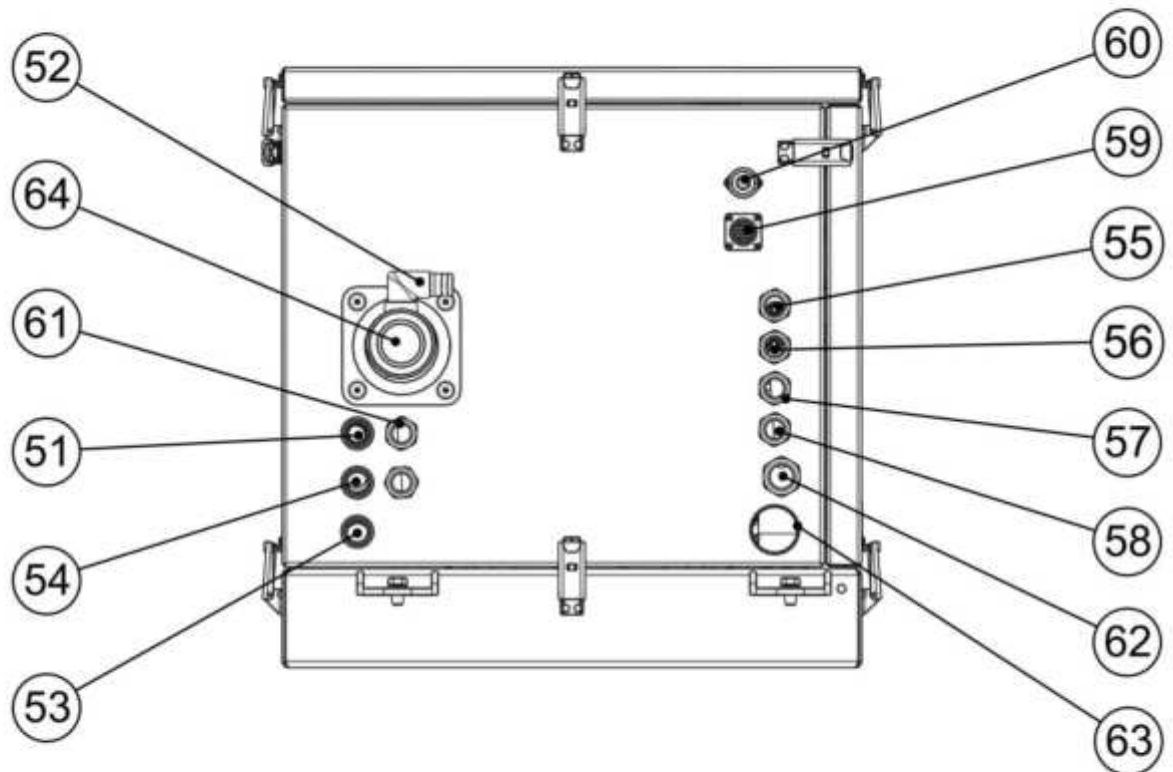
- For charging the starter battery, the alternator provides 12 volts DC voltage.

	Camino 10	Camino 15	Camino 20
Length A	944 mm	944 mm	944 mm
Width B	334 mm	360 mm	360 mm
Height C	347 mm	400 mm	444 mm
Bore distance D	75 mm	80 mm	90 mm
Bore distance E	915 mm	915 mm	915 mm

Cooler versions:

- Depending on the order you can also use various cooler units.
- The design and layout must necessarily be matched from **SET**.

4.4 Overview connection wall



Motor starter battery:

- 58 Connection (plus) 1.0 m lg.
- 57 Ground terminal (minus) lg 0.8 m.

Engine combustion air:

- 63 Port (air filter)

Engine fuel supply:

- 55 Diesel return 0.2 m lg.
- 56 Diesel flow 0.2 m lg.

Engine cooling system:

- 53 Coolant Supply.
- 54 Coolant return

Engine exhaust system:

- 64 exhaust outlet

Power generator control connections:

- 59 Control panel connector
- 60 Cooler unit connection
- 62 Capacitors box, 2.0 m lg. to the GFCI and to consume

Generator cooling system:

- 51 Coolant Supply
- 52 Coolant return

Generator power connections:

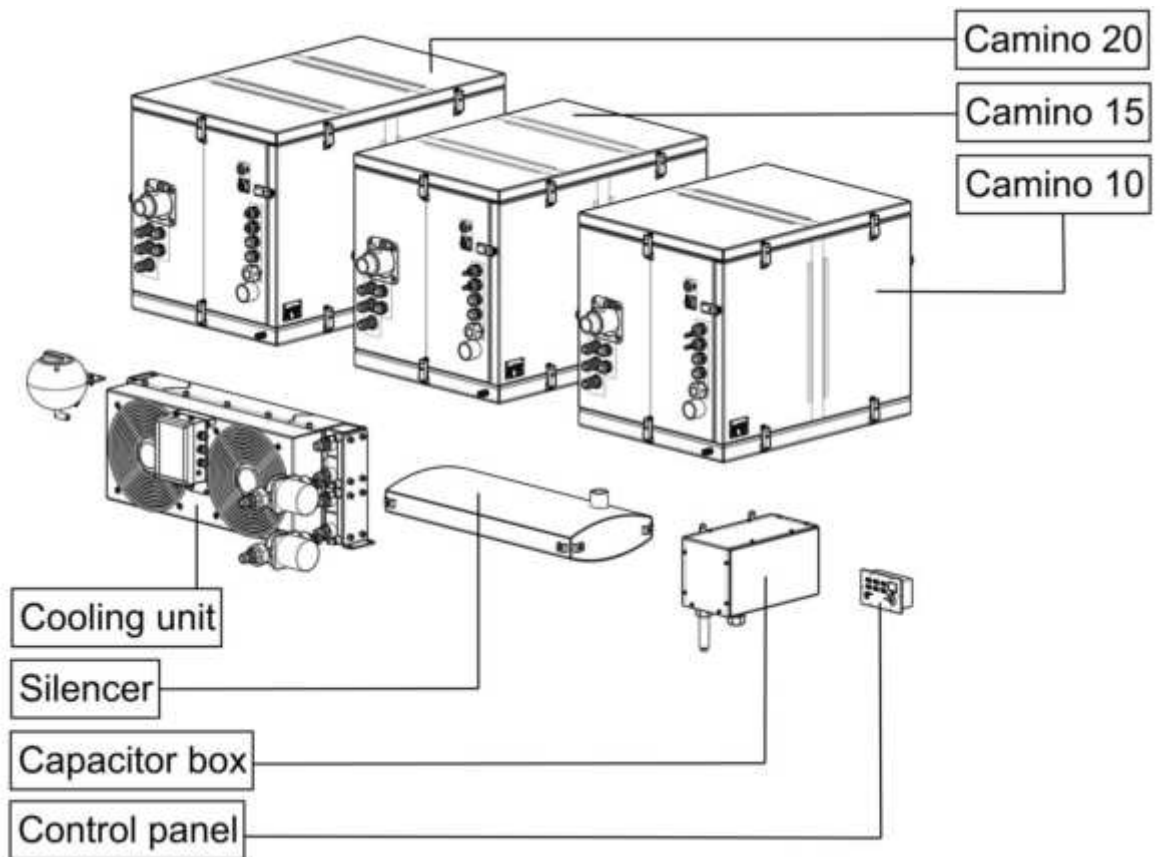
- 61 External consumers 14V / 7,5A



Deviations possible!
Please follow the instructions on the capsule rear wall.

5 Structure and function

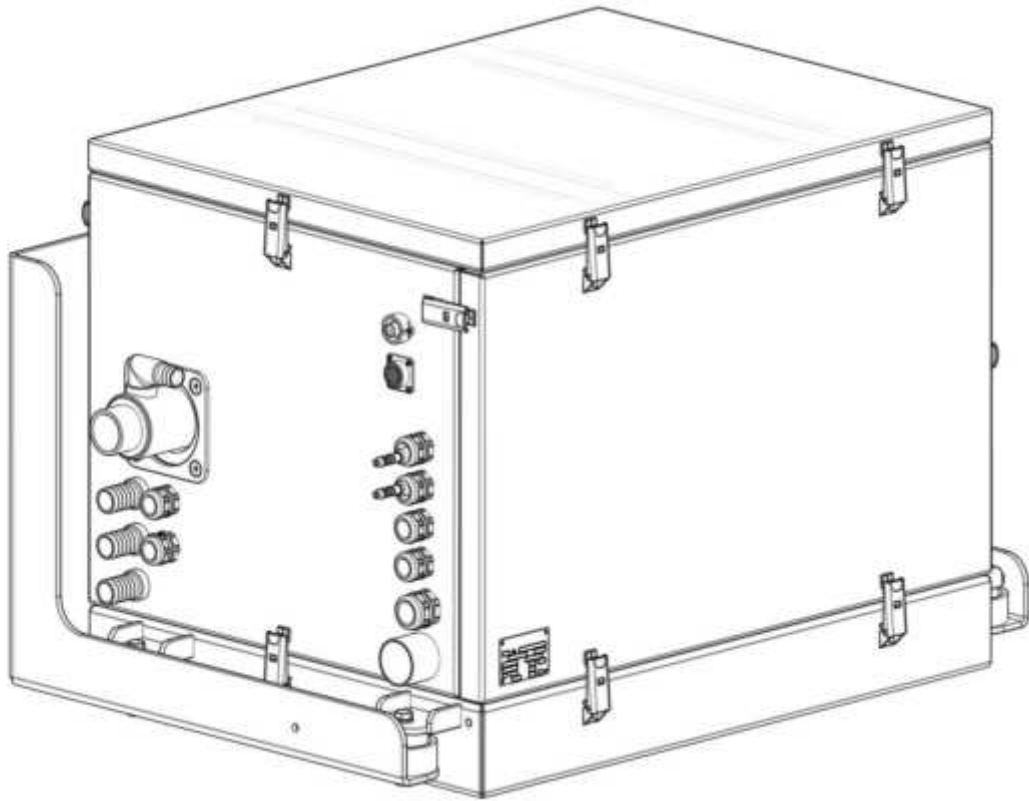
5.1 Main components of SET Camino Generator



5.2 Main components of the power generator

5.2.1 Silencer capsule

Your **SET Camino Generator** is housed by a silencer capsule which minimises the sound level.



The aggregate is suspended to swing freely in the capsule. Additional vibration insulation between the machine frame and the capsule reduces the transmission of structure-borne noise. Together the two measures ensure a low-vibration operation.

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



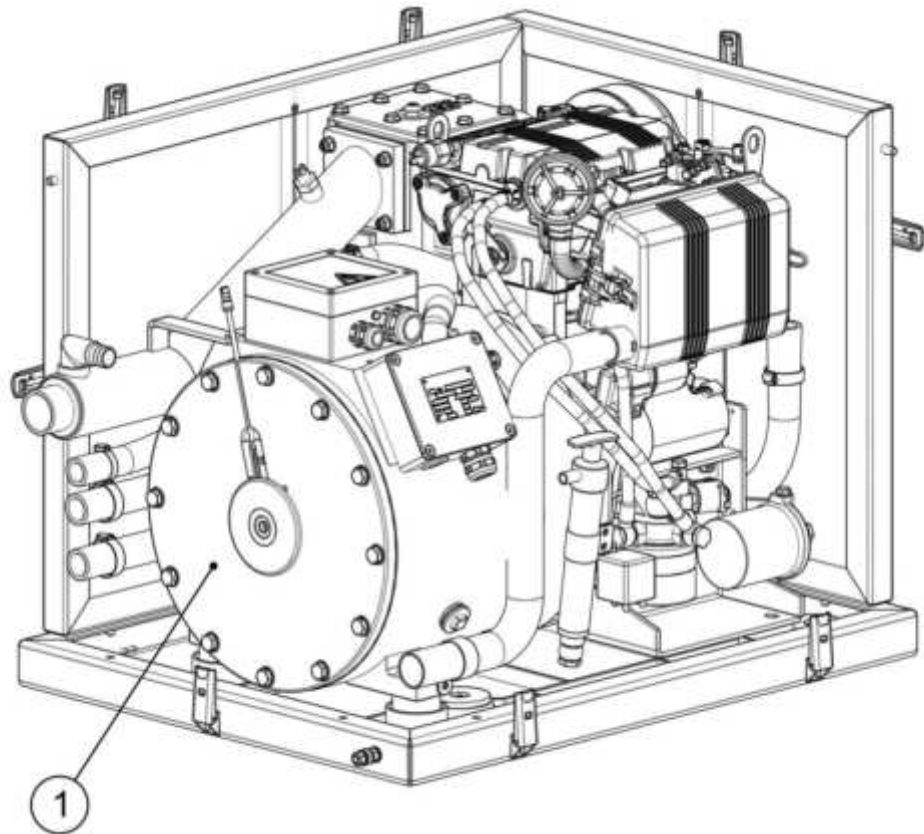
Prepare the generator at a suitable ground. The transmission of structure-borne sound is reduced even more, if ground for fixing the power generator is more massive.



The silencer capsule must not be damaged during installation of the generator (please refer also to the installation and start-up manual).

- Consider sufficient space during the assembly of the generator for removing capsules top parts and installing connections.

5.2.2 Generator



The housing of the generator (1) is casted as hollow wall and is made of aluminium. It is cooled by the external cooler by coolant pump.

The winding of the generator consists of high-quality copper wire. The isolation corresponds to the insulation class "F" (high temperature resistance, high short-circuit security and tropicalised). The winding is encapsulated for not getting in contact with the cooling system.

The generator is a maintenance-free, brushless induction generator of degree of protection „IP54“.



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

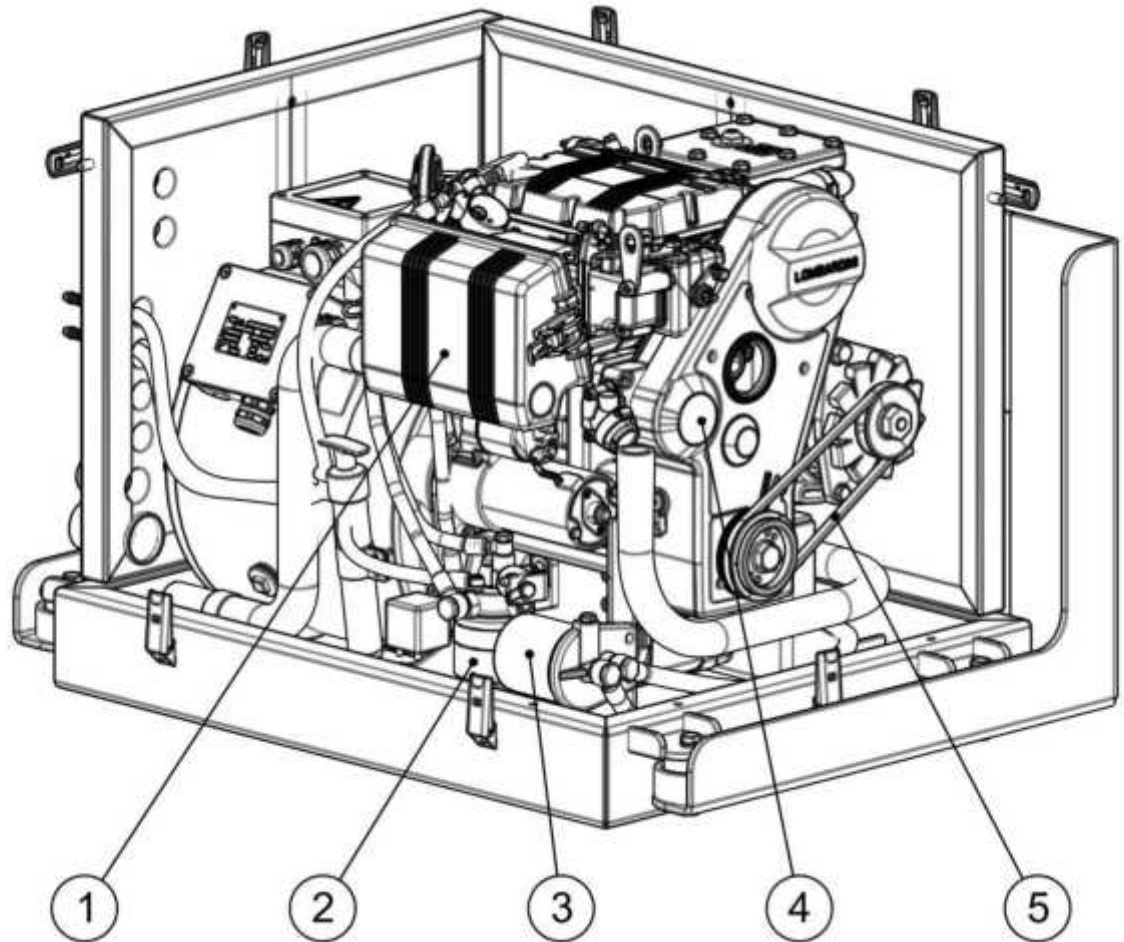
The generator creates a voltage of:

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

(please refer also to chapter *Technical data „Generator“*)

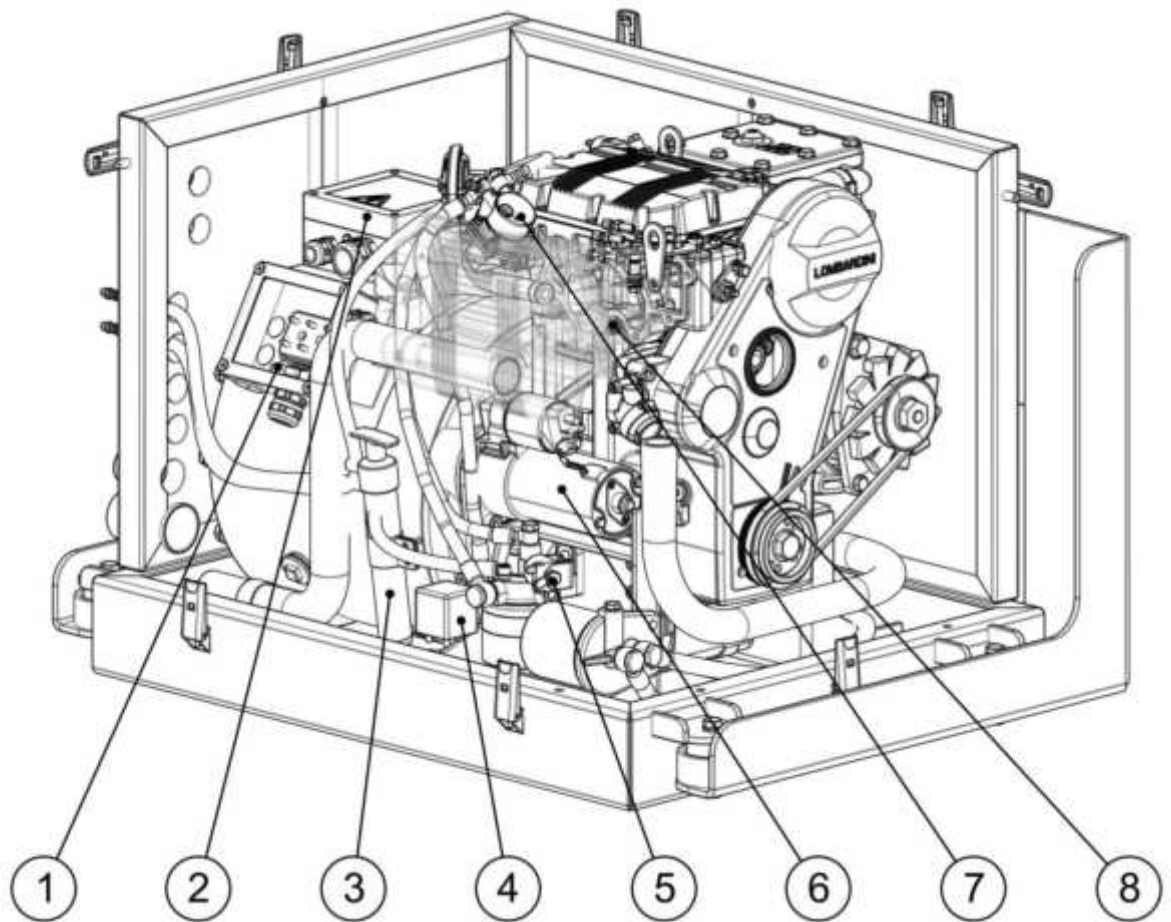
5.2.3 Diesel engine maintenance parts

The drive engine of your **SET Camino Generator** is a four-stroke Diesel engine with closed cooling circuit.



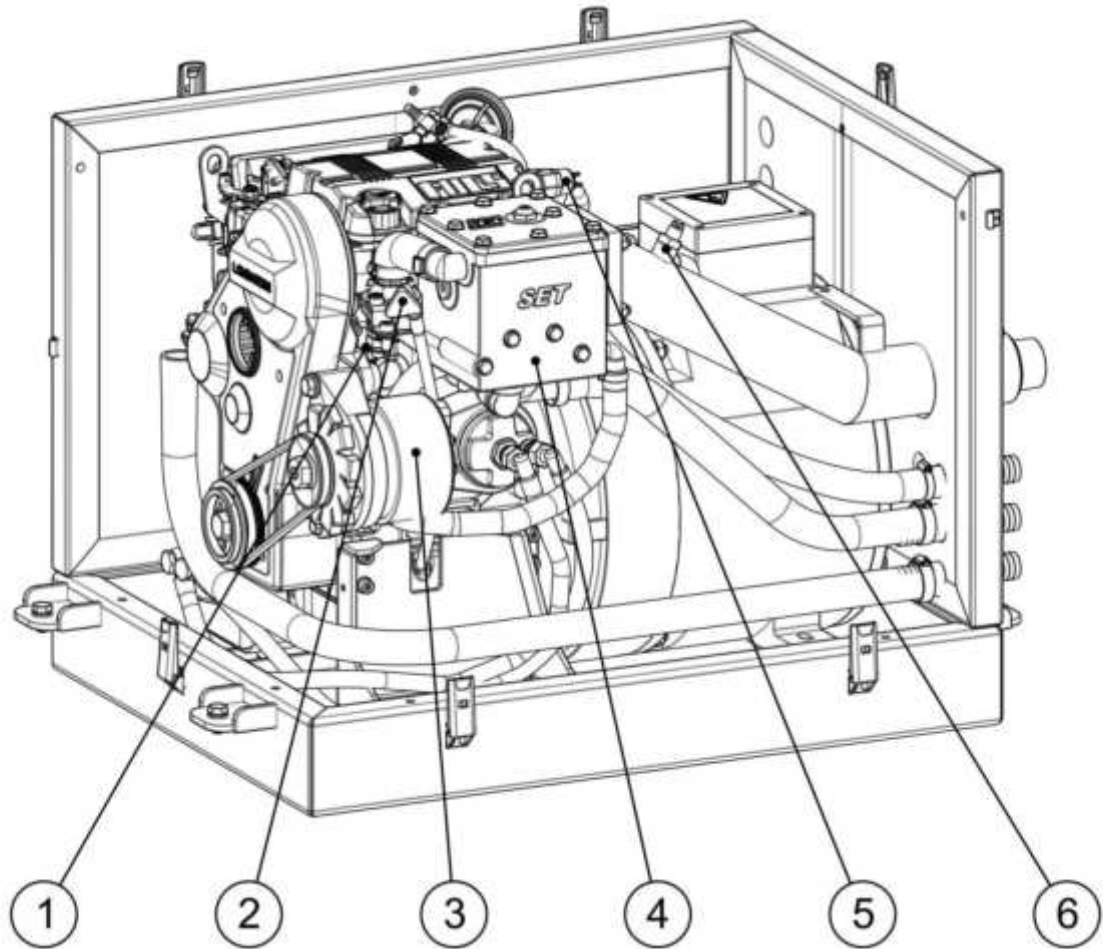
- 1 Air filter
- 2 Fuel filter
- 3 Oil filter
- 4 Toothed belt and tensioning pulley (behind cover)
- 5 V-belt for alternator

5.2.4 Diesel engine spare parts



- 1 visible type fuse round 4A for cooling unit
- 2 electronic box (and wire harness)
- 3 manual oil pump
- 4 time relay
- 5 shut off stroke solenoid
- 6 starter 12V
- 7 manual fuel pump
- 8 engine glow plug

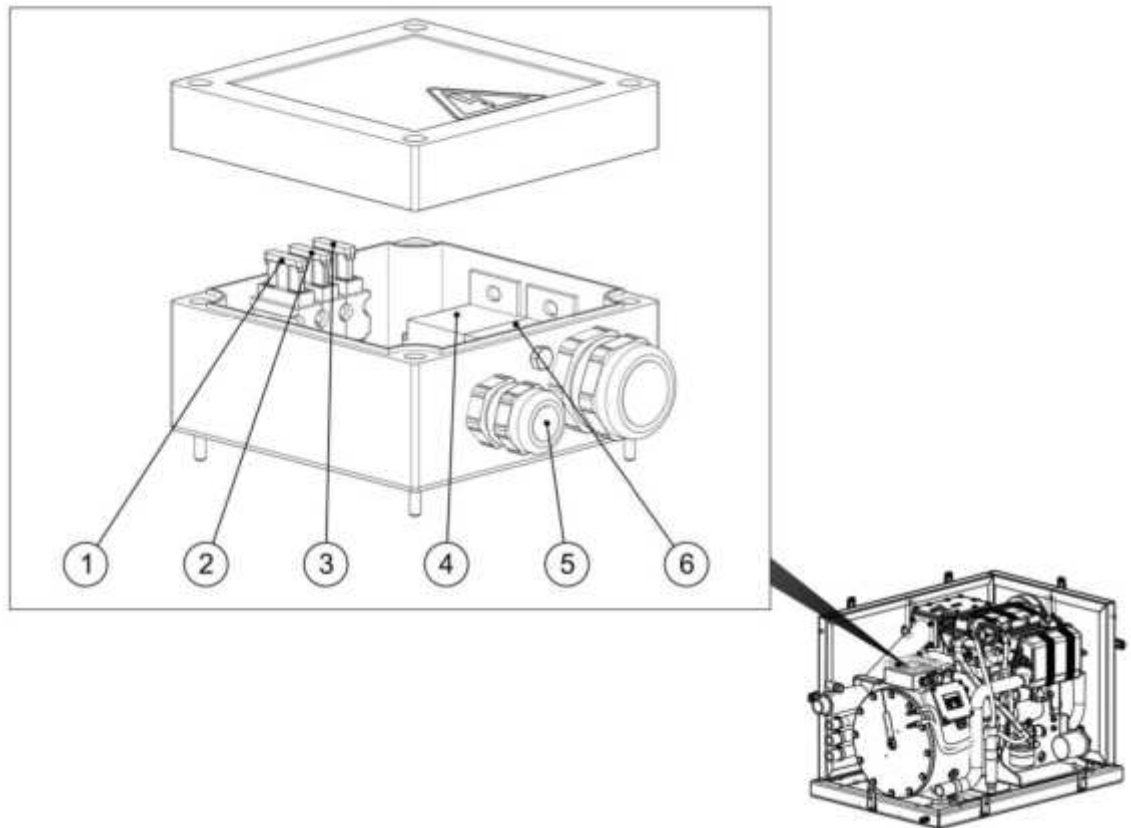
5.2.4 Diesel engine spare parts



- 1 engine temperature switch 98°C – 84°C
- 2 dip stick
- 3 alternator 12V
- 4 exhaust collector
- 5 oil pressure switch 1,5 bars
- 6 generator temperature switch 98°C – 84°C

5.2.5 Electronic box (control module)

The control of your **SET Camino Generator** is housed in an "electronic box" (1) to protect it against environmental influences.



1	Fuse	15A	Starter motor
2	Fuse	7,5A	External consumers
3	Fuse	3A	Control panel
4	Relay	12V, 30A	External consumers
5	Connection to control panel		
6	Relay	12V, 30A	Starter motor

6 How to handle the power generator



Any alteration to the original state of the diesel engine and supplied items is not permitted. At any violation the warranty expires!

The full power of the diesel engine will be achieved after a warm-up time of approximately 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:

- professionally and regularly perform repair, maintenance and testing on diesel engine.
- avoid long idling phases of the engine.
This produces coking of piston and cylinder head.
- regularly replace filter for oil, air and fuel.
(please refer to [Regular maintenance](#))



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

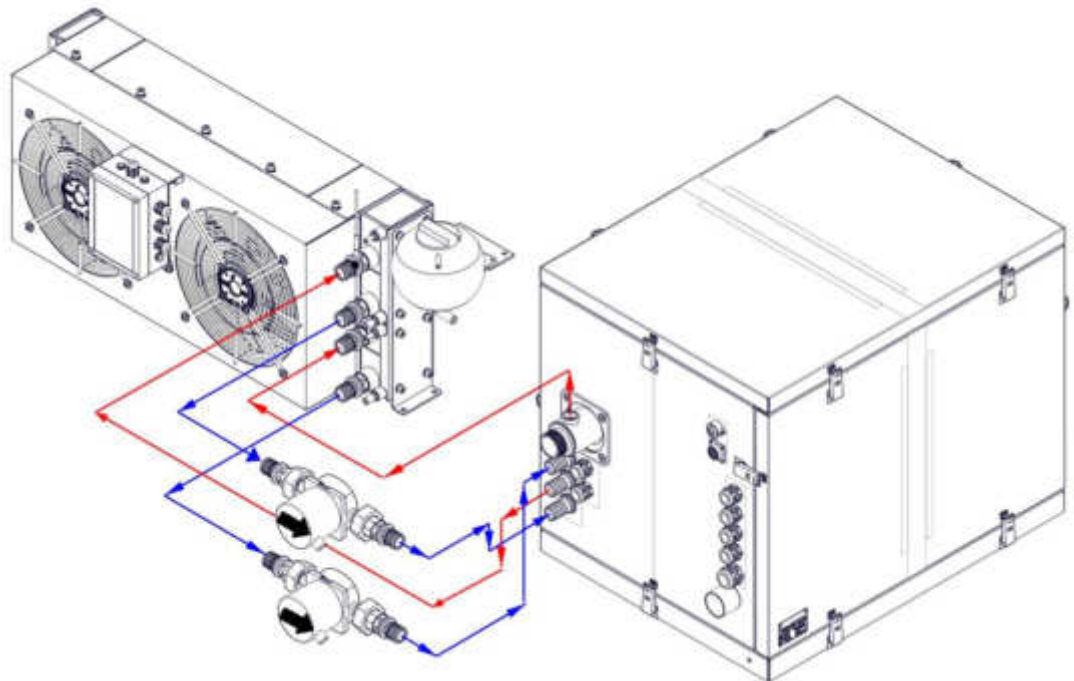
Engine, generator and exhaust system are water-cooled and be kept permanently at optimum working temperature by two integrated cooling circuits.



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

6.1 Cooling system

The whole cooling circuit consists of two, mutually independently controlled circuits, one cooling circuit for the engine cooling and one for the generator cooling.



The closed cooling system consists of the external cooler with two separate cooling circuits. The axial fans are supplied with voltage by the generator. The control of the cooling unit is connected via cable with plug.

Engine cooling

- Engine cooling circuit – supply line (blue)
- Engine cooling circuit – return line (red)

Generator cooling

- Generator cooling circuit – supply line (blue)
- Generator cooling circuit – return line (red)



Open shutters only when the engine is cooled down.
Risk of scalding!



Caution: risk of injury!
Axial ventilator is running independently of the engine! Disconnect the connection line plug prior to working at the cooler.

(please refer also to [Overview connection wall](#))



Caution!

Necessarily note the pumps direction when installing the cooling water pumps, the location of their electrical connections and to set pump speed level 3.

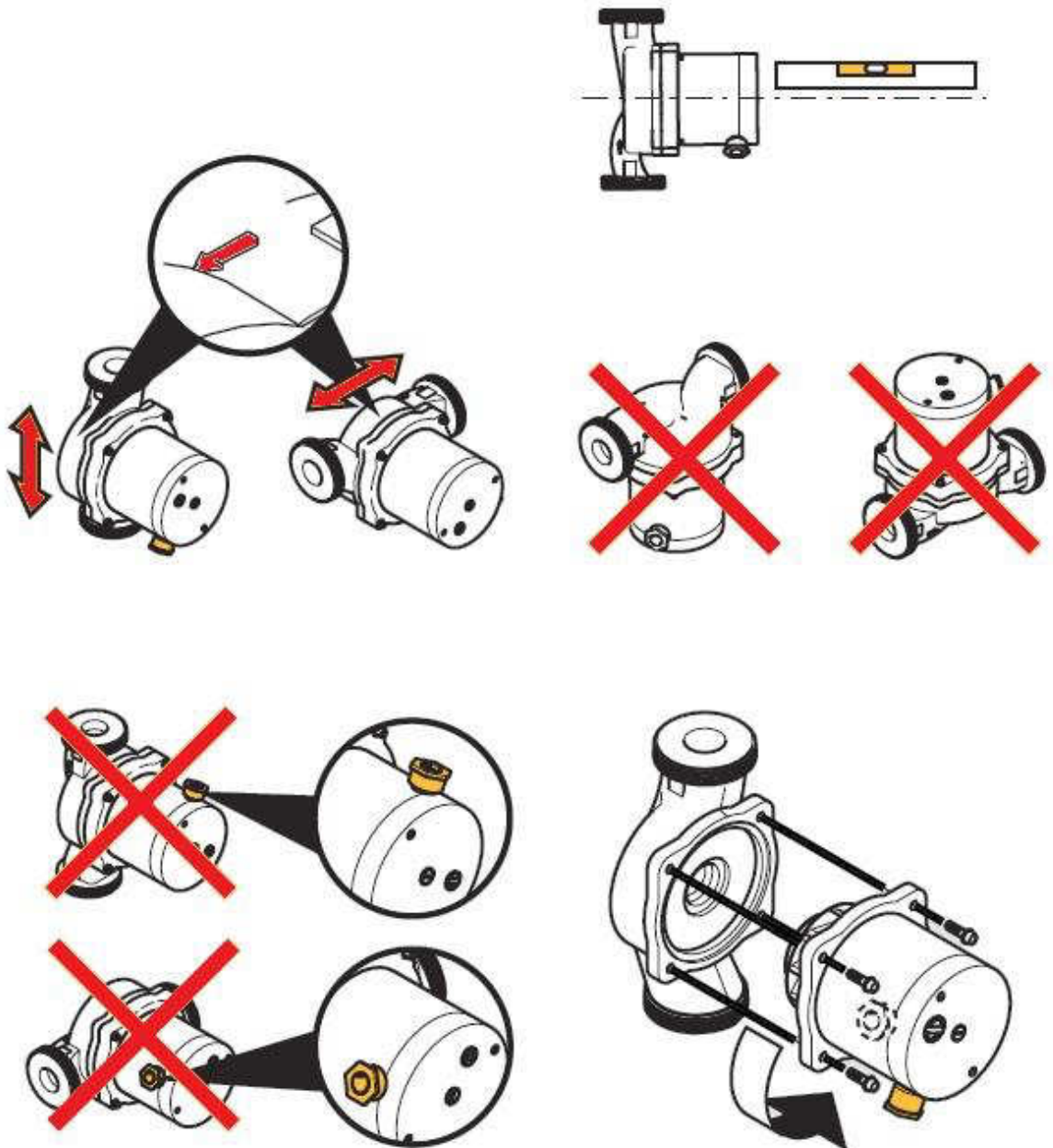
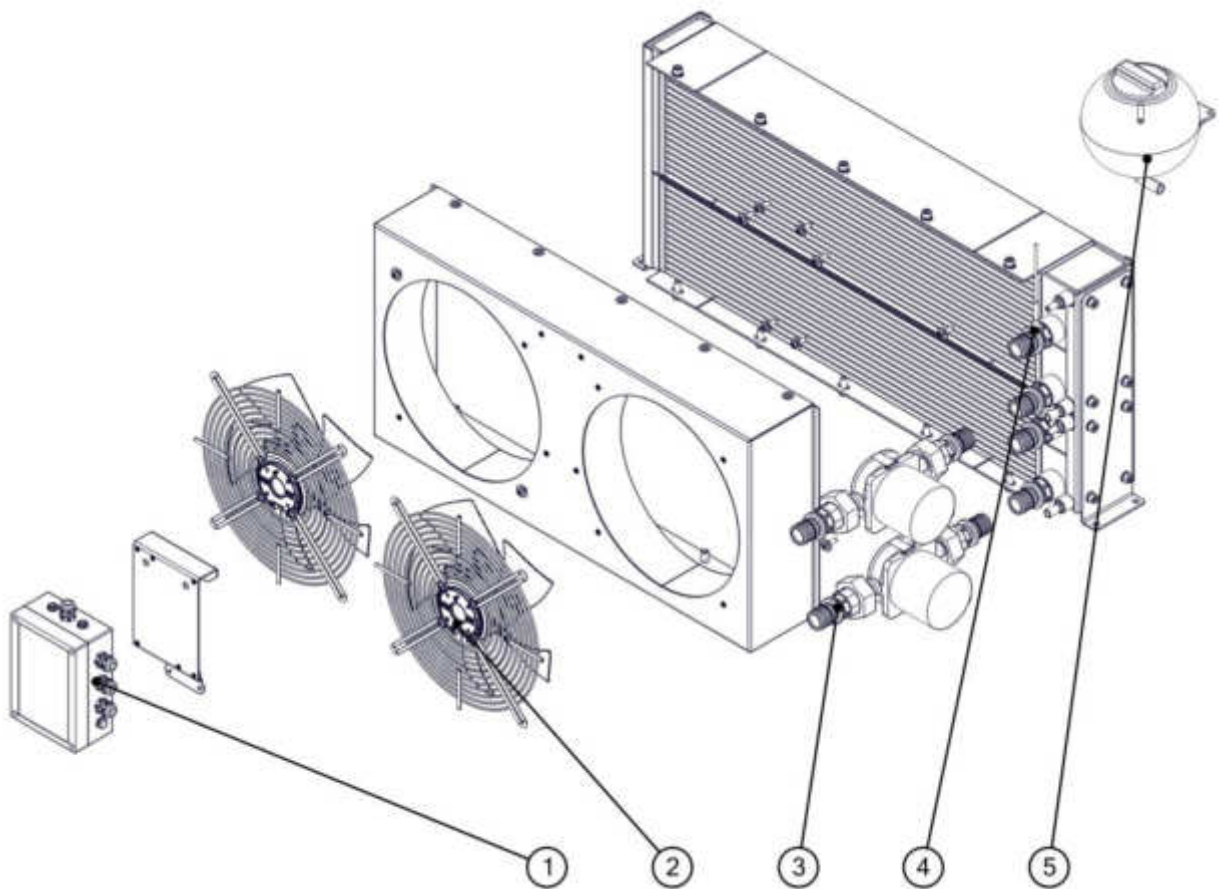


Figure: Pump installation

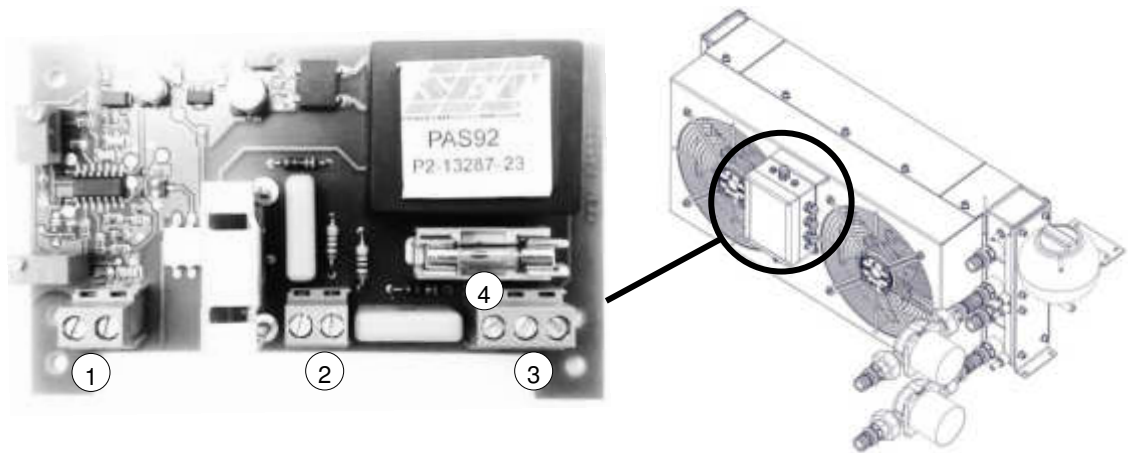
6.1.1 Cooling unit with axial fan



- 1 Fan control
- 2 Fan
- 3 Cooling water pump
- 4 Temperature sensor
- 5 Expansion vessel

6.1.2 Fan control

The fan control regulates the speed of the fans depending on the coolant temperature in the engine cycle. The sensor is located in the return of the motor circuit. The fan speed is adjusted via a potentiometer (1) (control range 165 - 240V setting value).



- 1 Voltage output temperature sensor
- 2 Voltage output fan
- 3 Voltage input generator
- 4 Fuse T4L

If the fuse is defective (4) the complete fan control is inoperative.

Measures:

Check fuses / replace if necessary

Switch off generator; otherwise there is a danger of overheating the generator. A forced shutdown occurs after a short time via the temperature switch on the motor or generator circuit.

PTC sensor

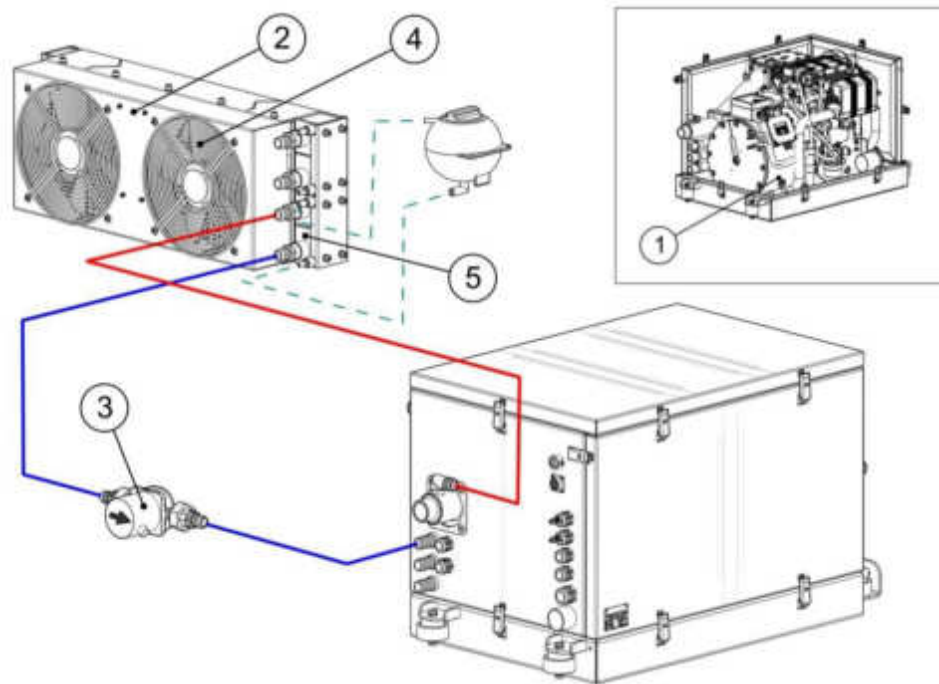
With a defective sensor the fans switch to full speed, so that the cooling of the generator is preserved.

Measures:

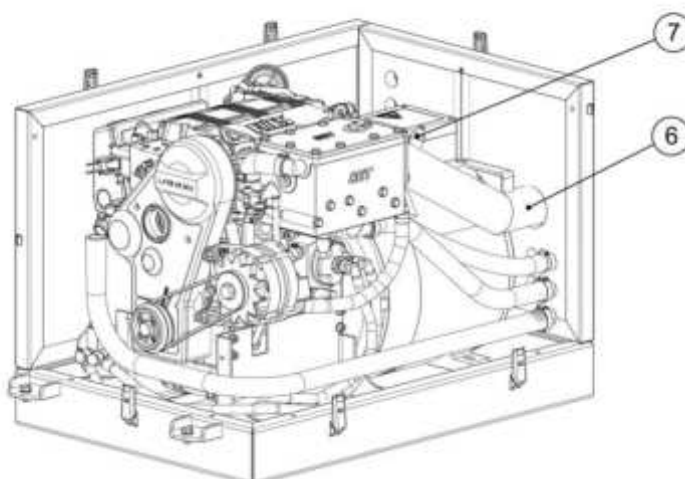
Measure sensor and replace if necessary.

(for additional information see chapter [Circuit diagrams](#))

6.1.3 Cooling circuit for generator



The generator cooling system of the **SET Camino Generator** is a closed circuit, which continuously cools the generator via the coolant pump (4). The axial ventilator in the cooler (1) provides the correct coolant temperature. The generator cooling is controlled by thermostat (7) and the **SET Camino Generator** control unit. The permanent cooling of the generator circuit ensures optimum cooling temperatures at ambient temperatures from -15° to +35° C. For extreme temperatures **SET** optionally provides specific cooler.

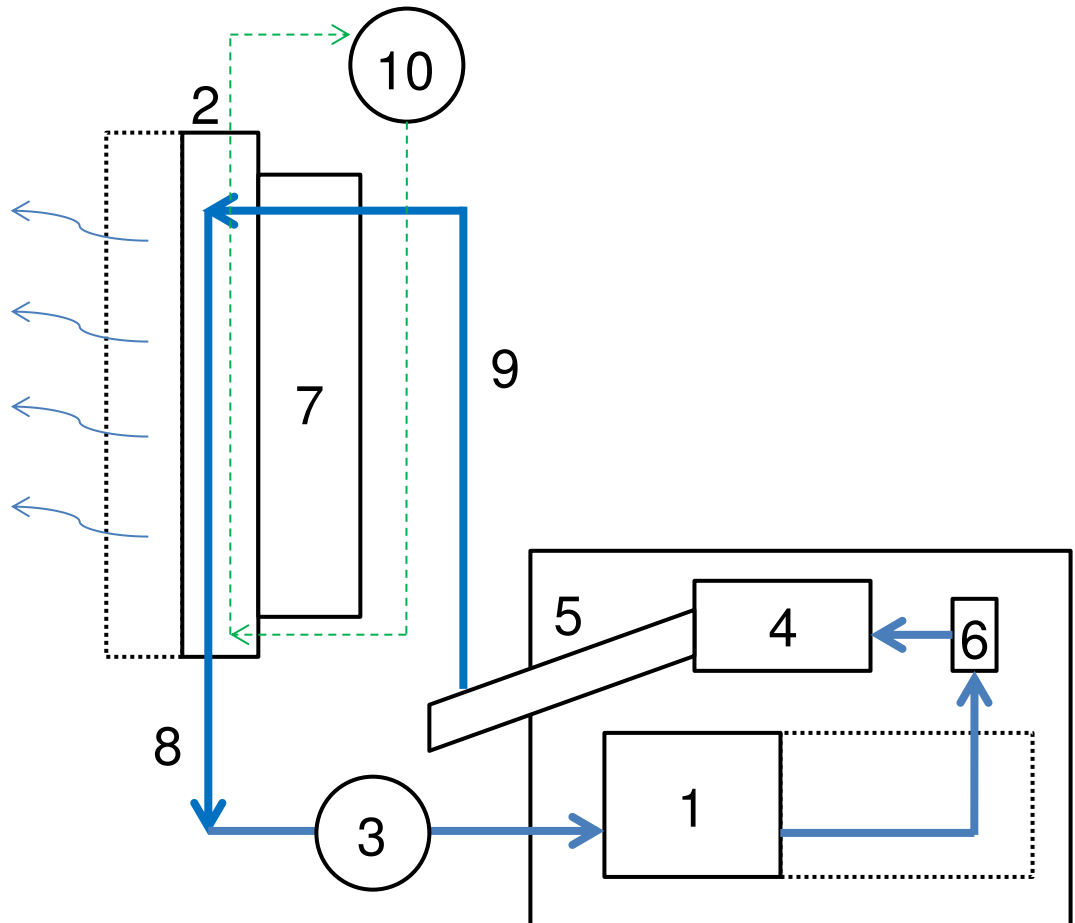


The water-cooled exhaust manifold (5) reduces generated radiation heat. Additionally engine noises are soundproofed. The temperature transmitter (7) at the exhaust gas pipe protects the generator from overheating if the coolant pump (4) fails or the cooler unit is out of operation

(Images may vary depending on model variant and engine type.)

6.1.4 Circuit scheme generator cooling

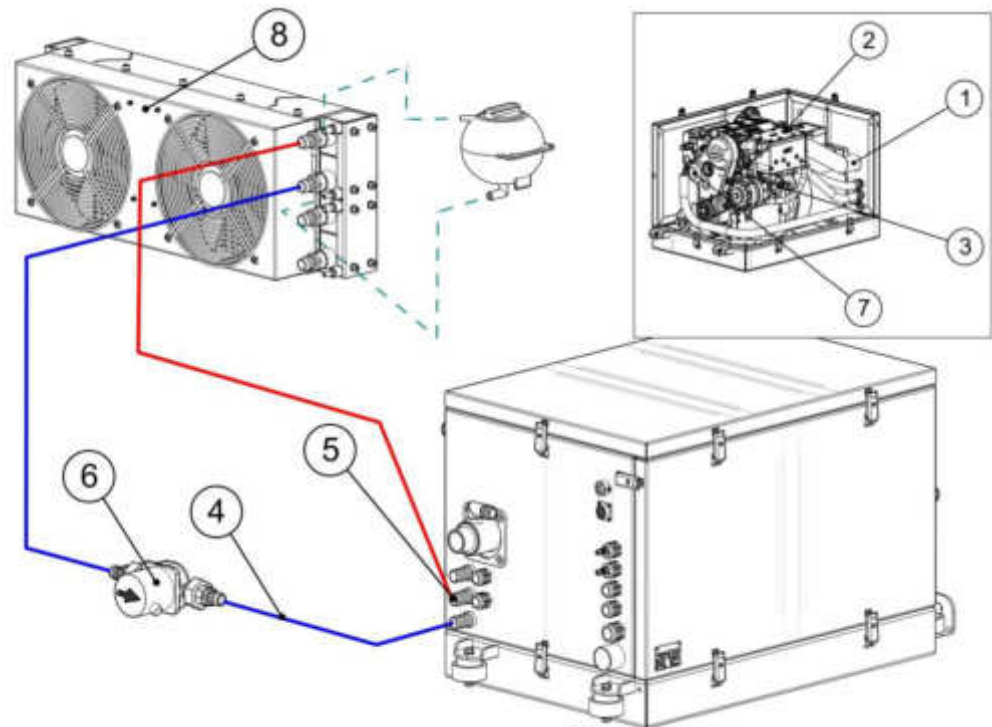
- The coolant (mixture of water and anti-freezing agent) is pumped by the generator pump (3) through the generator (1), oil cooler (6), the water-cooled exhaust manifold (4) and the water-cooled exhaust gas pipe (5) and cooled down in the generator cooler (2).
- The axial fans and the circulation pump run continuously while the supply plug is connected to the existing socket on the capsule rear wall.



- 1 Generator
- 2 Generator cooler
- 3 Generator pump
- 4 Water-cooled exhaust manifold
- 5 Water-cooled exhaust collector
- 6 Oil cooler
- 7 Axial fan
- 8 Generator cooling circuit – supply line
- 9 Generator cooling circuit – return line
- 10 Expansion vessel

6.1.5 Cooling circuit for Diesel engine

The coolant (mixture of water and anti-freezing agent) is pumped through the engine via the coolant pump (4) and cooled down in the engine cooler.



- 1 Water-cooled exhaust manifold
- 2 Vent screw
- 3 Thermostat
- 4 Engine cooling circuit – supply line
- 5 Engine cooling circuit – return line
- 6 Coolant pump
- 7 Circulation pump
- 8 Cooling unit

The engine cooling system is a closed circuit filled with coolant, which continuously cools the engine (please refer also to chapter [Technical data „drive engine“](#)).

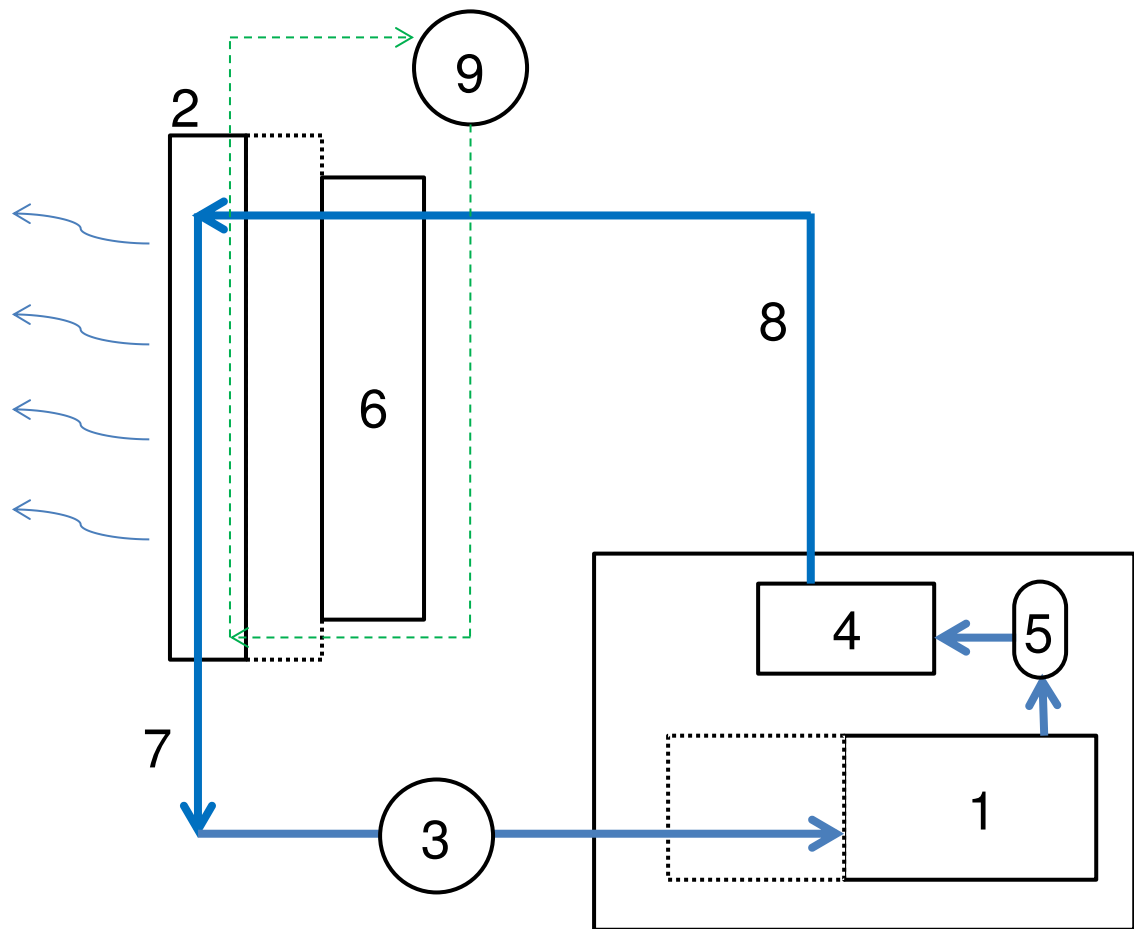


Open closing plug only when engine is cooled down and before start-up.
Risk of scalding!

The thermostat (9) regulates the coolant circulation in dependence on the engine temperature.

(Images may vary depending on model variant and engine type.)

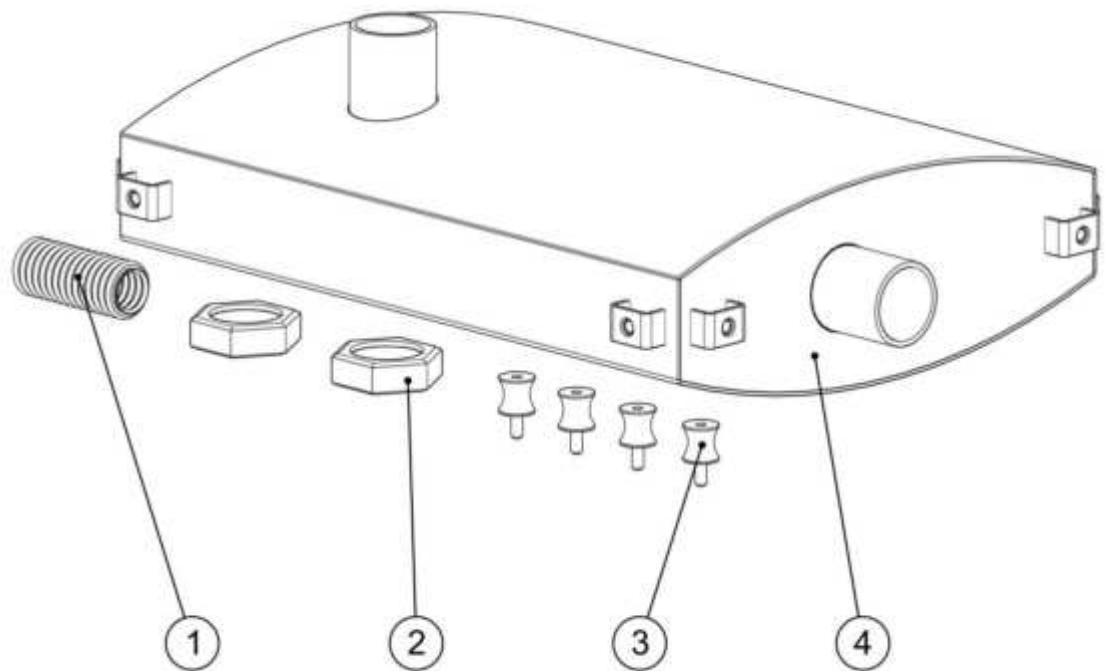
Circuit scheme engine cooling



- 1 Engine
- 2 Engine cooler
- 3 Engine coolant pump
- 4 Water-cooled exhaust collector
- 5 Thermostat
- 6 Axial fan
- 7 Engine cooling circuit – supply line
- 8 Engine cooling circuit – return line
- 9 Expansion vessel

(Images may vary depending on model variant and engine type.)

6.2 Exhaust silencer



- 1 Flexible exhaust pipe
- 2 Union nut
- 3 Cylindrical bearings waisted
- 4 Exhaust sound absorber

From the engine exhaust manifold, the cooled down exhaust gas is passed through the flexible exhaust pipe (1) and then into the engines silencer (2). The exhaust pipe is insulated with a ceramic tape. The **SET** silencer reduces the exhaust gas noise at the outlet of the silencer below the noise level of 54 dB (A). The silencer is included in the scope of supplies.

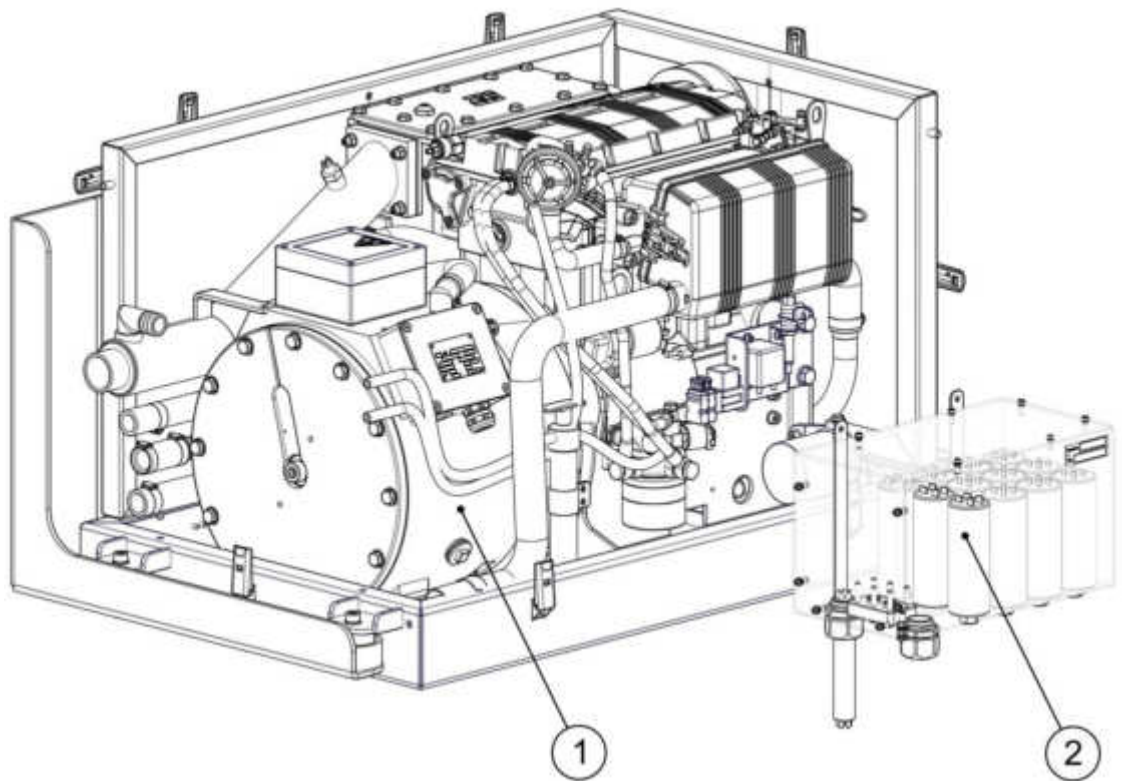
Order the exhaust gas line/ceramic tape and the vibration absorber as accessories from SET.

On request, the exhaust outlet can optionally be extended up to 2m.

Exhaust pipe and / or exhaust hose can be ordered as accessories from **SET**.

6.3 Capacitors

The active part of the generator (1) includes the capacitors (2). They are firmly connected with each other (and factory-wired).



The condenser housing accommodates three capacitor groups (to excite the generator). The capacitors inside are carrying the same voltage as the generator.



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



Operate consumers only with protective switch and safety cut-out!
Danger to life!

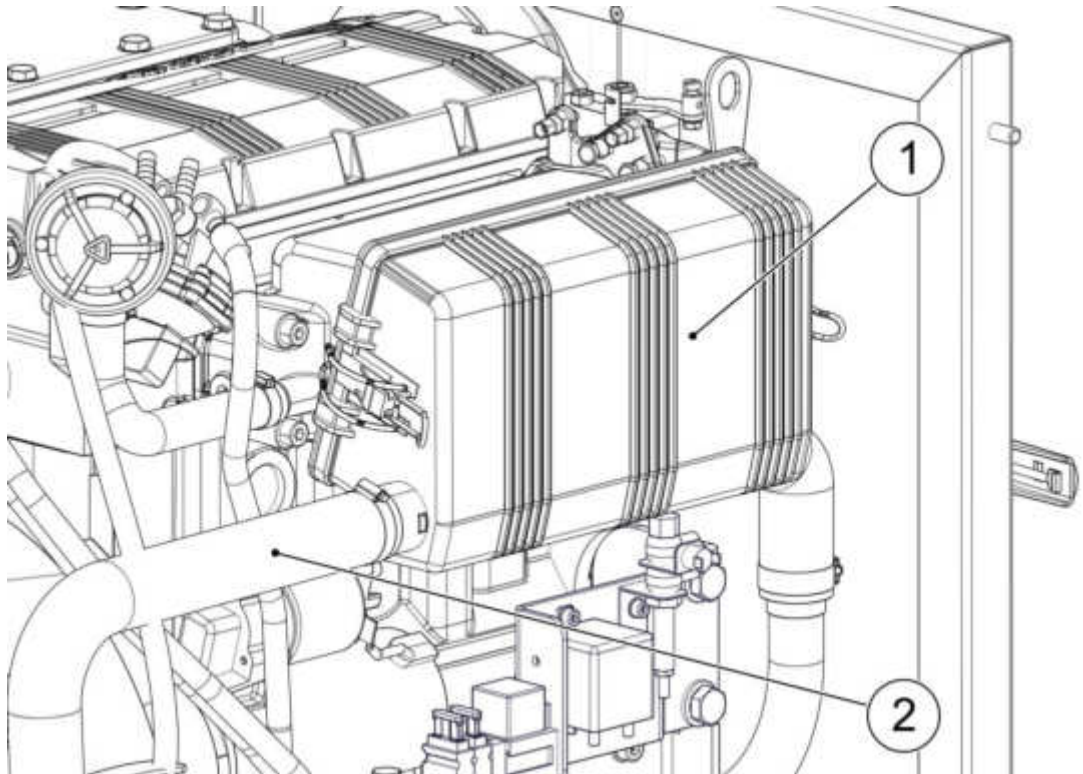
The consumer power is connected to the terminal board inside the capacitor box and must be protected by the customer in accordance with the generator output.

(Images may vary depending on model variant and engine type.)

6.4 Air filter

At the engine there is an air filter element (behind the covers 1) which frees the aspirated combustion air from dust. This must be reviewed / changed in accordance with the maintenance plan (refer also to [Regular maintenance](#)).

An air intake (2) directs the combustion air from the lower part of the sound cover to the air filter.

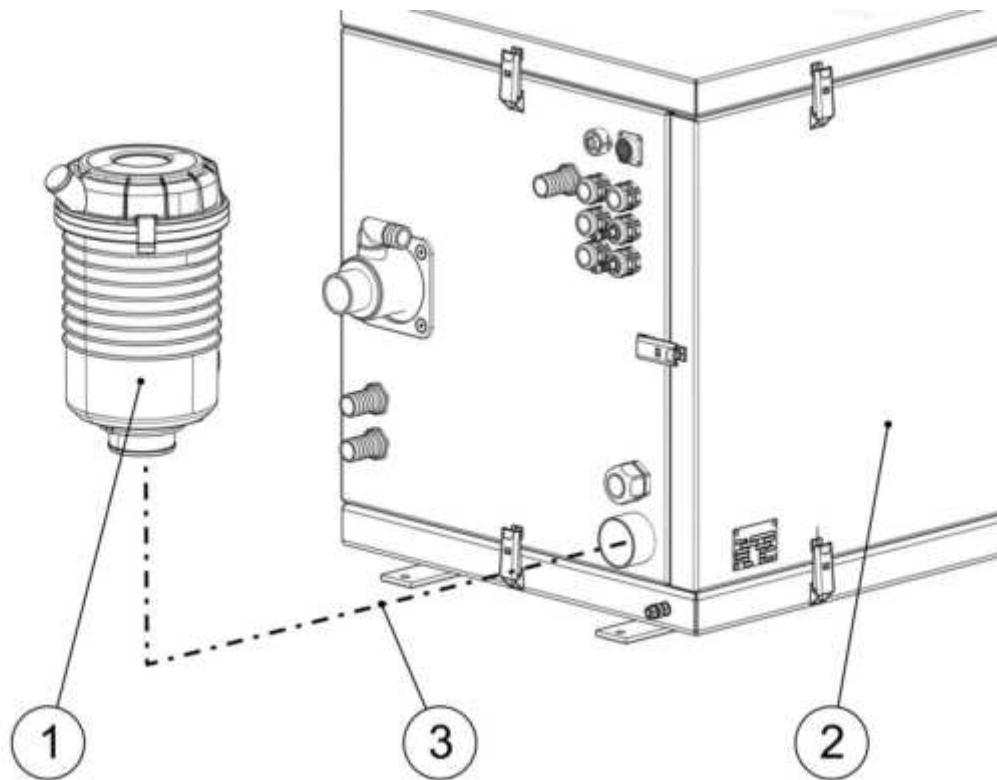


If the air flow in the air filter is disturbed:

- the intake port produces an increasing negative pressure.
- the engine monitoring switches off the motor engine.
- the disturbance will be shown at the control-panel.
- the air filter element needs to be replaced.

(see chapter [Engine air filter change](#))

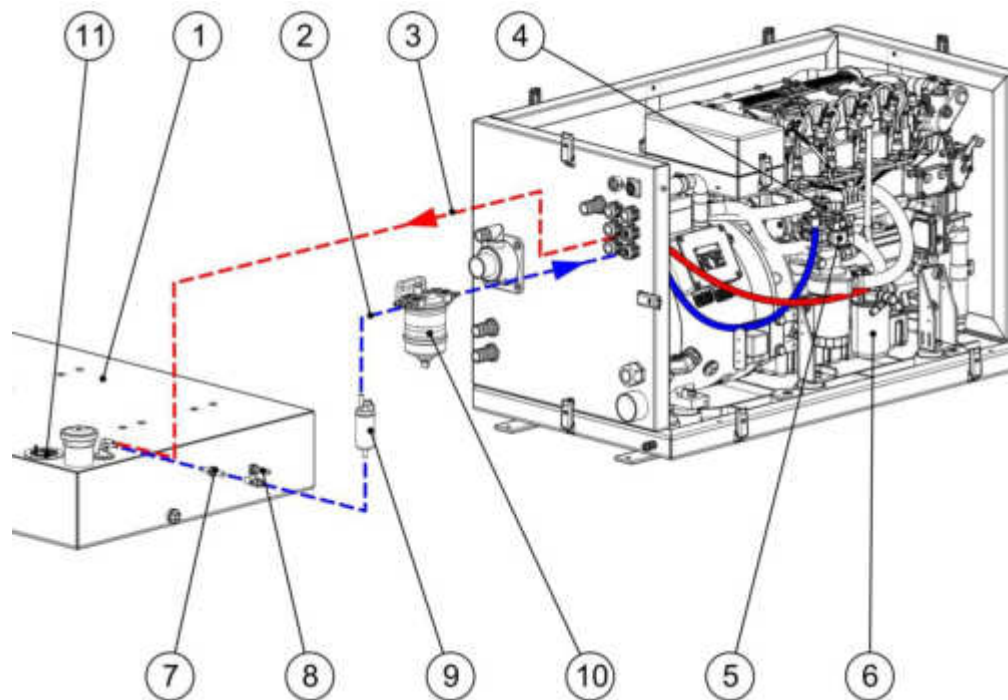
6.4.1 External air filter (optional)



The external air filter (1) protects (if available) all units in the capsule interior from contamination. The external air filter should also be examined / changed in accordance with the maintenance schedule. It is connected to the capsule housing (2) with the hose (3)

(refer also to [Regular maintenance](#))

6.5 Fuel system



Assemblies:

- 1 Fuel tank
- 2 Fuel supply line
- 3 Fuel return line
- 4 Injection pump
- 5 Solenoid valve
- 6 Fuel filter

Additional assemblies:

- 7 Return valve *
- 8 Shut-off valve *
- 9 Electrical fuel delivery pump
- 10 Fuel preliminary filter * with water separator*
- 11 Level indicator
- * (if available)



The laying of fuel lines may only be performed by experienced professionals (please refer to the chapter "Installation of the fuel system" from **Installation and start-up** manual).



The motors of the supply unit are working with extreme volatile fuels. During filling or maintaining of fuel tanks and containers is:



SMOKING PROHIBITED



FIRE PROHIBITED.

(Images may vary depending on model variant and engine type.)

Fuel tank (1)

If the generator is connected with its supply and return lines to the existing diesel fuel tank, a separate connection must be installed on each line (please refer to the chapter "Installation of the fuel system" from **Installation and start-up** manual).

Fuel supply line (2)

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



The laying of fuel lines may only be performed by experienced professionals.



Connection point at the generator is the led out fuel hose with the label "Diesel supply line".

Return line (3)

The excess diesel fuel is returned through the return line to the fuel tank.

The return line is depressurized.



The laying of fuel lines may only be performed by experienced professionals.

Injection pump (4)

- 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.

Key-operated switches at the control panel are used to control the 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).



At the same time the key is turned to „START“ a start command is given to the starter of the generator also.



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

Solenoid valve (5)

A solenoid interrupts the fuel supply to the engine when disturbances.

Fuel filter (6)

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.



Depending on the degree of pollution of the fuel filter the engine performance may degrade (replace coarse fuel filter).

Return valve (7)*

We recommend the installation of a return valve between the tank and shut-off valve. At prolonged shutdown the return valve prevents fuel from running back to the tank and supply pipe runs empty.

Shut-off valve (8)*

When working on the power generators as well as prolonged downtime, the fuel system has to be shut off; there for a fuel shut-off valve needs to be installed in the fuel supply line.

Electrical fuel delivery pump (9) *

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



The connections for the 24V / 12V fuel pump are already available at the **SET CAMINO Generator** set.

Mount the pump directly to the tank so that the fuel line is run from the tank as a "pressure line" (please refer to the chapter "Installation of the fuel system" from **Installation and start-up** manual).



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

Fuel preliminary filter (10)*, (Fine filter)

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

- Motor filter is considerably relieved.
- Condensation does not enter the fuel cycle.



Use only filter cartridges for Diesel fuel.

Water separator (10)*

Water with dirt particles is separated in the water separator; heavier particles are sinking down to the bottom.



Water in diesel fuel is the cause of many disorders.
Water is a means of transport for dirt and rust particles.
The cleaning of the water separator should therefore be carried out at least once a month.

Sensor for diesel*

A special sensor has been designed for level measurement of fuel tanks in metal or plastic execution. It will be mounted on top of the tank.

The measuring electrode is easily to cut to the height of the tank and the precise calibration is performed by pressing a button separately for "empty" and "full" states.

Functional and safety notice: The sensor is exclusively designed for use with diesel fuel. Other combustible or explosive media, as well as water and hydrous media are not allowed.

* (if available)

6.5.1 FUEL SPECIFICATION

- The fuel should be purchased in small quantities and stored in clean containers. The use of purified fuel prevents the clogging of the injectors.
- The fuel tank should not be filled completely. The expansion of the fuel should be possible. Fuel spills during refuelling must be removed immediately.
- The fuel should never be stored in galvanized containers. A chemical reaction between fuel and galvanized coating produces flaking which quickly leads to clogging of the filter and damages of injection pump or nozzle.
- High sulphur content may cause engine wear. In countries where only diesel with high sulphur content is available, it is recommended to use high alkaline lubricating oil or exchange the oil recommended by manufacturer more frequently.

Countries providing diesel normally with low sulphur content are:
Europe, North America and Australia.

PRESCRIBED OILS

Low sulphur fuel API CF4 - CG4

High sulphur fuel API CF

FUEL TYP

To ensure optimum performance, only new and clean commercial diesel fuel should be used. All diesel fuels that are corresponding to the ASTM D975 - 1D or 2D, EN590 specifications, or equivalent are suitable for this engine.

FUELS FOR LOW TEMPERATURES

Special winter fuels may be used for engine operation at temperatures below 0°C. These fuels reduce the formation of paraffin in diesel at low temperatures. Diesel paraffin formations result in clogging of the fuel filter and interruption of the fuel flow.

The fuels can be split as follows:

- Summer fuels to 0°C
- Winter fuels to -10°C
- Alpine winter fuels to -20°C
- Arctic winter fuels to -30°C

BIODIESEL FUEL

Fuels that contain less than 20% methyl acetate or B20 are suitable for use in this engine. Biodiesel fuels that meet the BQ-9000, EN 14214 specifications or equivalent are recommended. Plant oils are not allowed at all to be used as a biofuel for this engine. Any failures that are attributable to the use of other than recommended fuels will not be covered by the warranty.

AVIATION FUEL

The only aviation fuels, which may be used in this engine, are: JP5, JP4, JP8 and Jet-A, (if 5% oil is added).



CAUTION

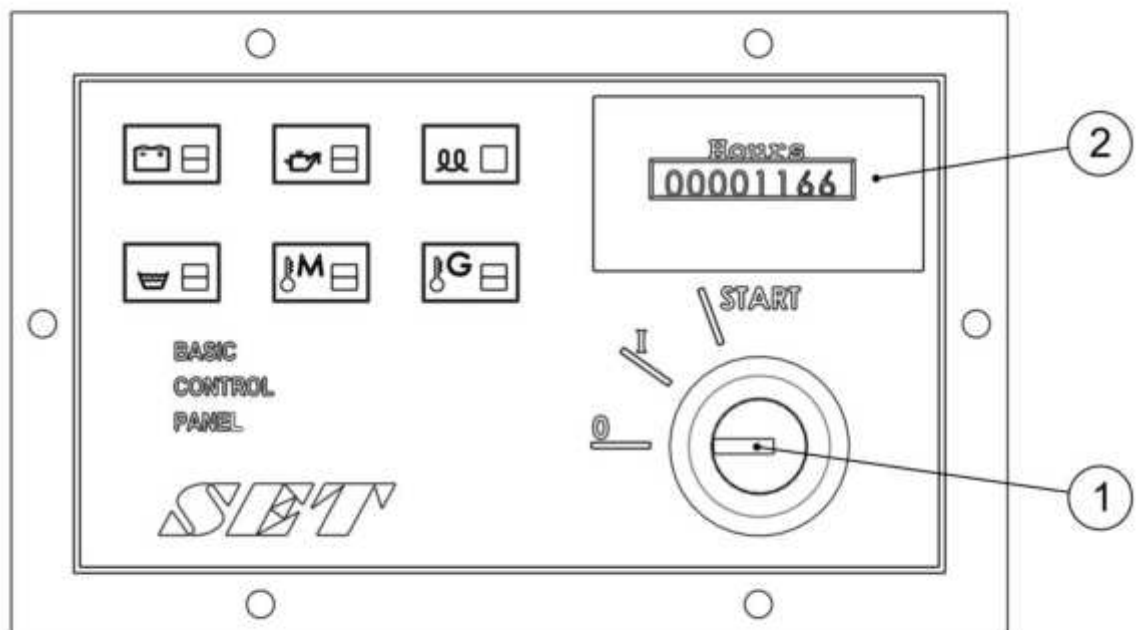
The injection system consists of high-precision components and can already be affected in their functioning by smallest dirt particles.

7 Operation

7.1 Control panel GP02

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

The clearly structured user interface ensures easy operation of the **SET Camino Generator**



Function descriptions:

Operating hour meter (2)

Key-operated switch... (1)

0 OFF

1 ON

Start Skips preheating time (15 Sec.).

Battery charge display...



lights GREEN as long as the charging process is running



lights RED in case of charging failure
lights RED at standstill of the unit

Oil pressure indicator...



lights GREEN if oil level is sufficient

lights GREEN if required oil pressure is built up.
The lubrication required is ensured with the engine running.



lights RED if engine is switched off



lights RED if oil pressure is not sufficient.

Pre-glowing indicator...



Lights for 15 seconds, then turn key-operated switch (3) to „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 numbers of starts and thus wear.

Leakage- / low pressure indicator... (blink warning)



lights GREEN if the silencer capsule is dry (no leakage)



lights RED if the pressure in the capsule is low. Engine switches off.
(eliminate pollution or clogging)



lights RED if leakage inside the capsule is indicated. Engine switches off
(refer to [Fault analysis and corrective actions](#))

Engine temperature indicator...



lights GREEN if engine is within the normal temperature range



lights RED if engine temperature exceeds 90°C.

Generator temperature indicator...



lights GREEN if generator is within the normal temperature range

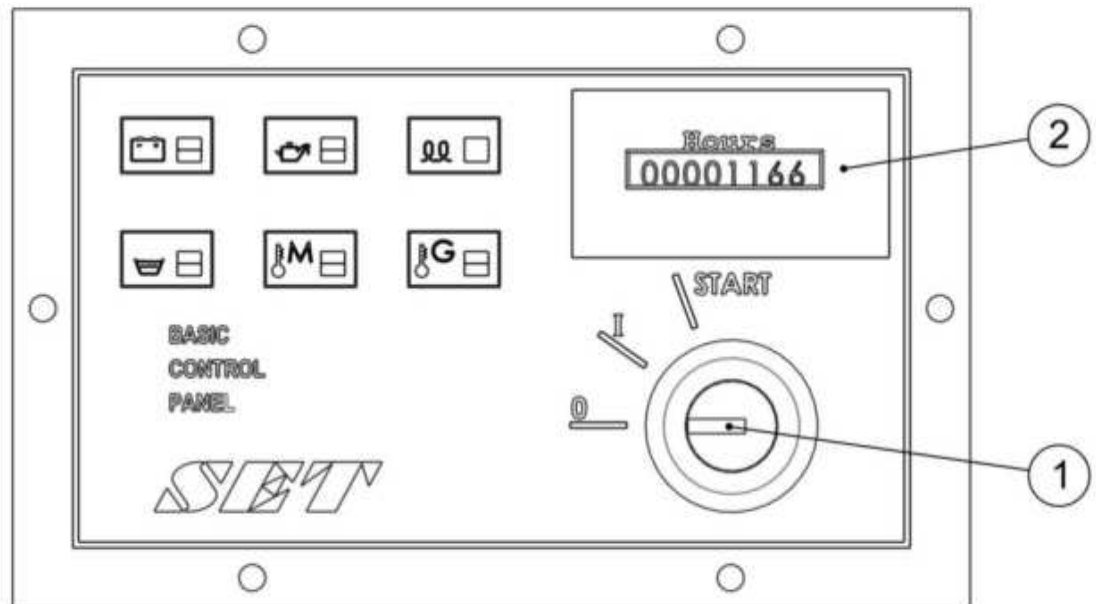


lights RED if generator temperature exceeds 90°C. Engine switches off
(refer to [Fault analysis and corrective actions](#))

7.2 Engine start with pre-glowing

Before each start of the engine, pre-heating takes place. The glow plug system is fitted as standard.

If start process fails at manual operations it is mandatory to turn key-operated switch to „0“ and wait at least 5 seconds before trying to start again.



Procedure for engine start

1. Turn key-operated switch (2) to position „1“.



Preheating indicator lights up for 15 seconds.

2. Then turn key-operated switch to position „**START**“ until engine is operating (max. 20 seconds).
3. If start fails turn key-operated switch to position „0“.
4. Wait for approx. 5 seconds.
5. Repeat starting.

8 Maintenance and care - intervals

The engine maintenance times given are maximum permissible job times. Depending on the usage circumstances, shorter maintenance times may be necessary.



Any working on electrical installations have to be carried out by an electrician.



Start the **SET Camino Generator** only after all components are tested and the protective housing is closed.



Irrespective of the maintenance intervals, the entire system must be inspected regularly and any damaged parts must be repaired or replaced immediately.



When misconduct there is a risk of personal injury, e.g. squeezing, scalding by hot coolant, burning on hot components, poisoning by gases.



When using an oil bypass flow filter the oil change is necessary after 1000 operating hours latest. The bypass oil cartridge needs to be changed every 500 hours.



Regularly check the coolant concentrate and replace it every 2 years. Use silicate-free coolant only!



The general overhaul of the system is generally due in case of continuous use after 3000 operating hours. In the case of minor or variable use, it must be carried out every 2 years at the latest.

8.1 One-time maintenance

Maintenance work after the first 50 operating hours (=oh) for new and overhauled engines are listed below:

After first 50 oh	Replace lube oil and oil filter	For new or reconditioned engines only
	Check coolant	Check coolant additive concentration (only when the engine is cold!) and re-fill if necessary
	Check intake air filter	Clean filter cartridge if necessary
	Check fuel hoses	In case of leakages arrange repair by service
	Check engine tightness	In case of leakages arrange repair by service
	Check threaded connections	Retighten nuts and bolts (but never tighten cylinder head nuts!)
	Check fixings, hose connections / clamps	If necessary, re-tighten

8.2 Regular maintenance

Strictly perform these checks or the described maintenance work in the given intervals, before running the equipment:

Daily visual inspection	Check lube oil level	Re-fill if necessary
	Check coolant	Check coolant level and colour (only when the engine is cold!). Re-fill if necessary
	Check cooling unit	Remove impurities and clean radiator fins if necessary
	Check suction / dry air filter	Clean or renew filter cartridge if necessary
	Check suction area	Clean if necessary
	Check fuel hoses	Replace if necessary
	Check engine tightness	In case of leakages arrange repair by service
	Check electric cables	In case of damage replace by service
Every 250 oh	Change lube oil and oil filter cartridge	Renew at least once a year and check tightness after change
	Renew fuel filter cartridge	Vent the fuel system after change
	Check air cleaner element	Clean the element with compressed air or replace if damaged.
	Clean radiator	Clean radiator fins at least once a year with pressurized air in opposite direction of fan's air flow
	Check fuel pre-filter*	Change filter insert
Every 500 oh	Check valve clearance	Adjust if necessary (when engine is cold). Replace the valve cover seal every time!
	Check glow plugs	Replace if necessary
	Check capacitors	Test voltage on each capacitor individually with a meter
	Check V-belt	If necessary, re-tighten or renew Only check after having removed the positive battery cable to prevent accidental short-circuits!
Every 1000 oh	Renew V-belt	Renew in any case at least every 2 years! Check the belt tension after 15 minutes running time
	Replace fuel pipes	In case of low use renew at least every 2 years
	Change fuel pump	Check tightness after change
	Change capacitors	In any case renew capacitors once a year.
	Check coolant pump	Check the flow of the pump and replace if necessary. After a change, the cooling circuits must be vented

Every 2000 oh	Renew coolant	Use recommended coolant (mixture of 60 % water and 40 % anti-freezing, silicate-free agent).
	Check alternator	Repair or replace if necessary
	Check starter	Repair or replace if necessary
	Check coolant hoses	In case of leakages arrange repair by service
	Check engine bearing	Renew cylinder bearings in case of damage
After 2500 oh	Renew timing belt and tension pulley	Once removed, the timing belt must be replaced, regardless of the maintenance schedule. If engine use is infrequent, replace timing belt every 4 years.

* if any

8.3 Hints for maintenance

Repair and maintenance work on the **SET Camino Generator** may only be carried out by trained and authorized personnel in compliance with the safety instructions and the accident prevention rules!

Regularly check the **SET Camino Generator** and inform the person in charge, when repair and maintenance are necessary.

The performance and reliability of the generator depends on regular maintenance and care.

Before repair and maintenance

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

While working use proper tools, and replace worn parts, screws, nuts, etc. with original spare parts only. Carefully mark components and piping before disassembling.

After repair and maintenance

- remount the protection devices.
- remove all tools and the machine parts being replaced.
- remove oil / grease residues from machine parts.
- perform visual inspection.
- Insert the key and start the generator.
- Check if generator is operating correctly, fix any defects and start the system.

8.3.1 Safe maintenance of technical facilities

Observe all adjustment, maintenance and inspection activities and dates including information for exchange of parts / equipment as prescribed in operating instructions. These activities must be carried out by qualified personnel only.

Before doing any work on the generator note the switching on and off in accordance with the operating manual and instructions for maintenance work!

Expedients

- For exchange, single components and subassemblies must be fastened carefully and safe at the lifting gear, so there is no danger. Use only suitable and technically faultless lifting gear and load suspension devices with sufficient carrying capacity!
- Use safety ladders and platforms during assembly work above body height. Do not use any machine parts as a climbing aid! Wear fall protections during maintenance work at greater heights. Keep all entrances, handles, steps, handrails, platforms, ladders free from dirt!

At the start of work

- Inform operator before start of implementation and maintenance or appoint an invigilator!
- If necessary protect maintenance area!
- If the generator is switched off completely during maintenance and repair work, it must be secured against unexpected reconnection:
 - Close main control devices and remove the key and / or
 - attach warning sign at the main switch.

At the end of work

- Always tighten screw connections which are loosen during maintenance and repair work!
- If disassembly of safety devices is required during setup, maintenance / repair, the reassembly and verification of the safety devices must be carried out immediately after completion of the maintenance and repair work!
- Ensure safe and environmentally friendly disposal of operating and auxiliary materials as well as replacement parts!

Cleaning works

- Clean the generator, and especially connections and fittings at the beginning of the maintenance / repair from oil or care products! Do not use any aggressive cleaning agents! Use lint-free cleaning cloths!
- **SET Camino Generator** must not be cleaned with water, steam jet (high-pressure cleaners)!
- Completely remove covers / seals after cleaning (if previously installed)!
- After cleaning check all coolant lines for leaks, loose connections, chafe marks and damage! Immediately remedy identified deficiencies!
-

8.3.2 Secure maintenance of electrical equipment

Requirements for the maintenance personnel

Only qualified electricians - who due to their professional training, experience and instruction, have knowledge of relevant standards, provisions and accident prevention regulations (as defined for professionals in DIN VDE 0105 and IEC 364) - are allowed to work on the electrical system of the generator.

The person responsible for the safety of the plant must have qualified electricians entitle to carry out the required work and activities. Furthermore, he must evaluate the work assigned, recognize possible dangers and work in compliance with the applicable regulations:

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



5 safety rules that must be observed during maintenance of electrical components:

1. Turn off main switch.
2. Lock the main switch and secure against inadvertent switching on.
3. Check if voltage is dead.
4. Connect to earth and short-circuiting.
5. Covering adjacent live parts.

8.3.3 Safety devices



Never repair or bypass fuses. Use original fuses with prescribed amperage only, like mentioned in schematic diagram!

In case of faults in the electrical power supply switch off generator immediately!

Electrical equipment

- Regularly inspect / examine the electrical equipment of the generator. Defects such as loose connections or scorched cables must be rectified immediately.
- Immediately repair defects on electrical systems, modules and resources. Is there an acute danger until repairing, do not use the plant, assembly or the resource at all.
- Use voltage-insulated tools only!

At the start of work

- Machine and plant parts on which inspection, maintenance and repair work be carried out must be switched off, if required.
- First power check de-energized parts then connect to earth and short-circuit as well as isolate adjacent live parts!
- When working on live parts definitely call a second person who can press the main switch to disconnect the power, in case of emergency!

8.4 Checking the oil level

Check the engine oil level using dip stick (1) before each start of the **SET Camino Generator**.



Control oil level only if the engine is stopped and generator is in a horizontal position.

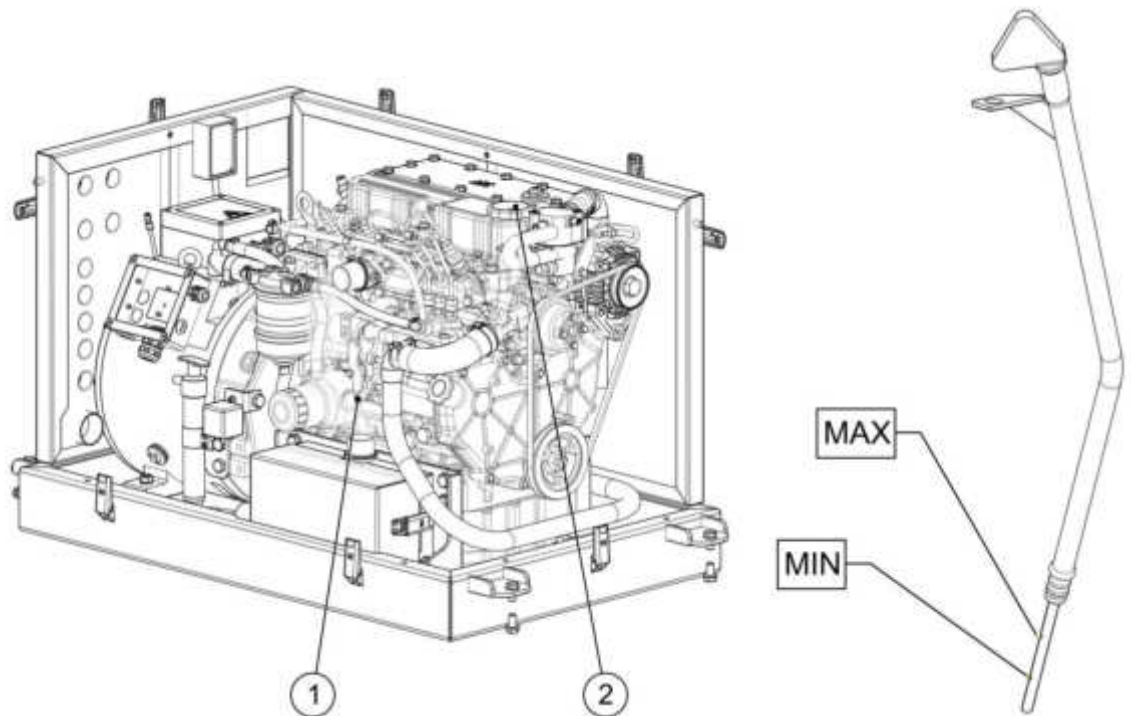
In order to maintain the performance of the engine comply with oil change intervals:

- 50 operating hours after the first commissioning.
- Every 250 operating hours but at least once a year.

(please refer to [Regular maintenance](#))



In order to obtain the operational reliability, the engine oil must be changed twice a year, even at low operating hours.



Checking oil level

1. Remove the acoustic enclosure.
2. Pull out oil level dip stick (1).
3. Wipe the dip stick and reinsert.
4. Pull out dip stick again and check oil level (needs to be between the min.- and max.-markers).
5. Refill missing oil quantity.

(Images may vary depending on model variant and engine type.)

Recommended oil:

AE 15W-40 Multigrade oil or equivalent brand oil

Suitable quality of the engine oil (standard values)

Summer tropics **SAE 10 W / 60**

Central European Summer **SAE 15 W / 40**

Winter to -10° C **SAE 5 W / 30**

Winter to -30° C **SAE 0 W / 30**

(see also information of the motor manufacturer in the appendix).

8.4.1 Oil specification

To facilitate run-in all motors are supplied with a lubricating oil first filling, which must be replaced after 100 hours of operation. Afterwards, the oil change is carried out according to the instructions in "Oil and filter change intervals".

The temperatures mentioned in tables are ambient temperatures at the time of starting the engine. If single-grade oils are filled and the operating temperatures are considerably higher than the tempering temperature, oil with higher viscosity must be selected in case that the engine starts satisfactorily. However, the problem can be solved with Multigrade oils.

Where the constant oil change to adapt to the ambient temperature is no practical solution, suitable Multigrade oil is recommended to ensure sufficient performance during tempering at the lowest temperatures.

Engines of the series "alpha" must be operated with high-performance lubricating oils, meeting at least the requirements of the following standards:

- API CC MIL-L-46152B
- DEF2102D MIL-L-2104B

Normal mineral oils or oils, whose detergency is below the specified value are not suitable.



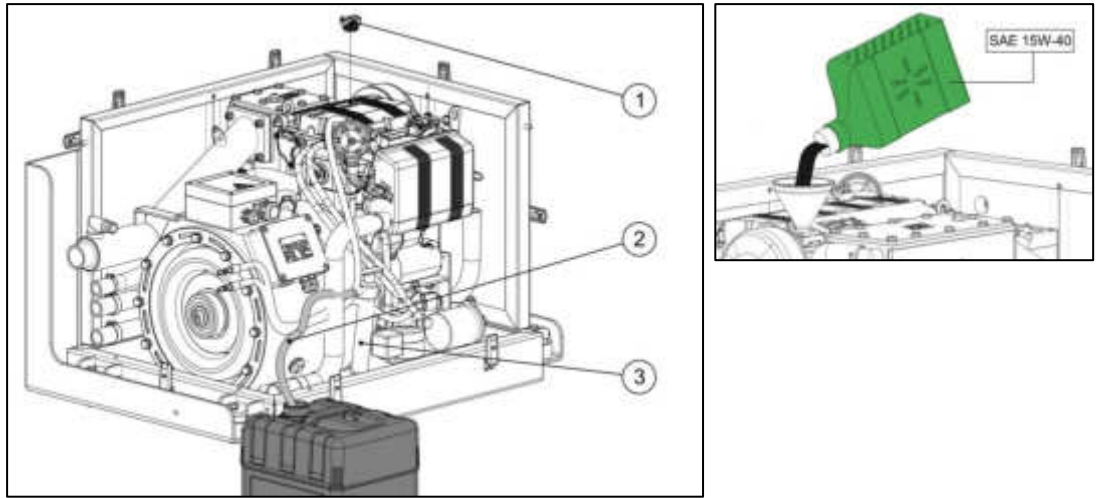
Oils of API CD, API CE, API CF-4 or MIL-L2104C/D/E can prevent the run-in of new or overhauled engines and therefor are not suitable for engines with low utilization rate.

8.4.2 Oil viscosity

Temperaturbereich / temperature range																								
-	-	-	-	-	-	-	-	0	+	+	+	+	+	+	+	+	+	+	+					
40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50						
				SAE 10W*																				
							SAE 20W*																	
								SAE 30*																
											SAE 40*													
				SAE 10W-30**																				
				SAE 10W-40**																				
				SAE 10W-60**																				
					SAE 15W-40**																			
					SAE 15W-40**																			
					SAE 20W-60**																			
				SAE 5W-30***																				
				SAE 5W-40***																				
			SAE 0W-30***																					

SAE 15W-40*	SAE 15W-40**	SAE 5W-30***
	SAE 20W-60**	SAE 0W-30***
Mineralölbasis	Halbsynthetische Basis	Synthetische Basis
Mineral base	Semi-synthetic base	Synthetic base

8.4.3 Oil replacement*



Change the oil of the operation warm engine as follows:

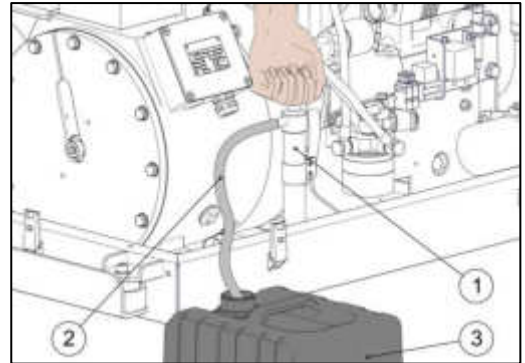
1. Remove oil filler cover (1).
2. Remove the protective plug at the drain end of the oil change pump (3).
3. Mount the hose (2) (oil-resistant) onto the connection piece of the oil change pump.
4. Insert hose end into used oil tank.
5. Pump off used oil.*
6. Carefully close the used oil tank.
7. Remount 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. Remount 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](#))

8.4.4 Pumping off used oil

A hand pump (1) is installed in order to facilitate oil change and to prevent the oil from penetrating the soundproofing housing of the **SET Camino Generator**.

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



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.

8.4.5 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).



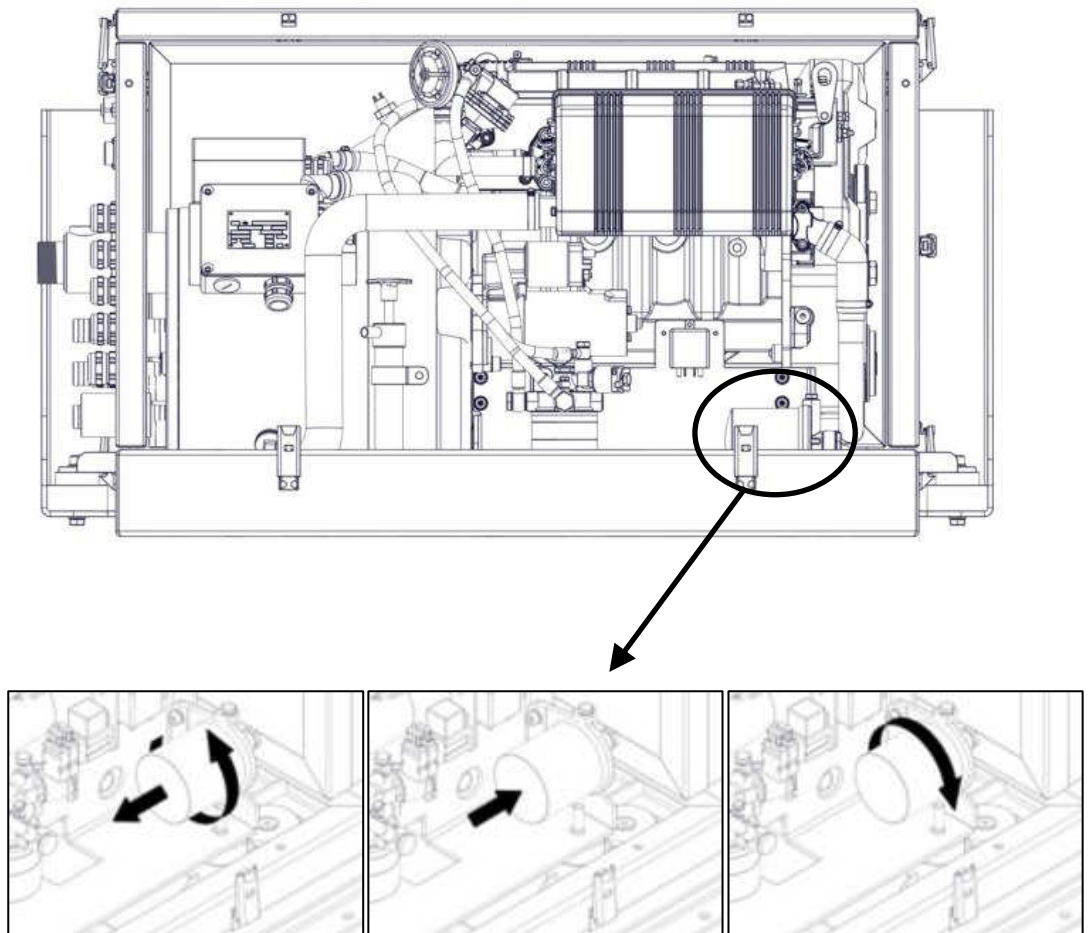
When storing the generator, note the preservation requirements of the engine manufacturer. When using silicate antifreeze, the generator should regularly be operating for about 1 hour at least every 2 month.

8.4.6 Oil filter replacement



When working on the generator, the starter battery must be disconnected.
Risk of injury, fire hazard due to short circuit!

Replace the oil filter (1) every 250 operating hours but at least once a year (refer also to [Regular maintenance](#)).



Oil filter replacement:

1. Open soundproofing hood.
2. Remove the side walls.
3. Place clean rags under the oil filter.
4. Loosen the oil filter with the oil filter wrench (counter-clockwise) and unscrew.
5. Clean the engine block with a cloth.
6. Apply a slight film of clean oil to the sealing face of the new filter.
7. Screw in the new oil filter by hand.
8. Tighten oil filter with the oil filter wrench.
9. Remove oil residues.

8.5 Maintenance of cooling system

8.5.1 Coolant check

The coolant is monitored by means visually inspect the expansion tank (minimum / maximum) exclusively in cold power generators. The automatic temperature monitoring reports any malfunction in the temperature range on the control panel



The coolant must be changed at the latest after 2 years, since the coolant is aging and thereafter the frost resistance is no longer guaranteed.



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



Disconnect the starter battery before working on the power generator. Risk of injury, fire hazard due to short circuit



Fill in the generator system exclusively with antifreeze approved from **SET**. Since the system has many aluminium parts installed, silicate-free antifreeze must be used. Silicates are salts that for longer periods can cause damage to seals and aluminium parts



Let engine cool down.
Upon opening of the cooling system there is a risk of scalding by hot coolant. Collect the coolant and dispose it according to the relevant regulations.

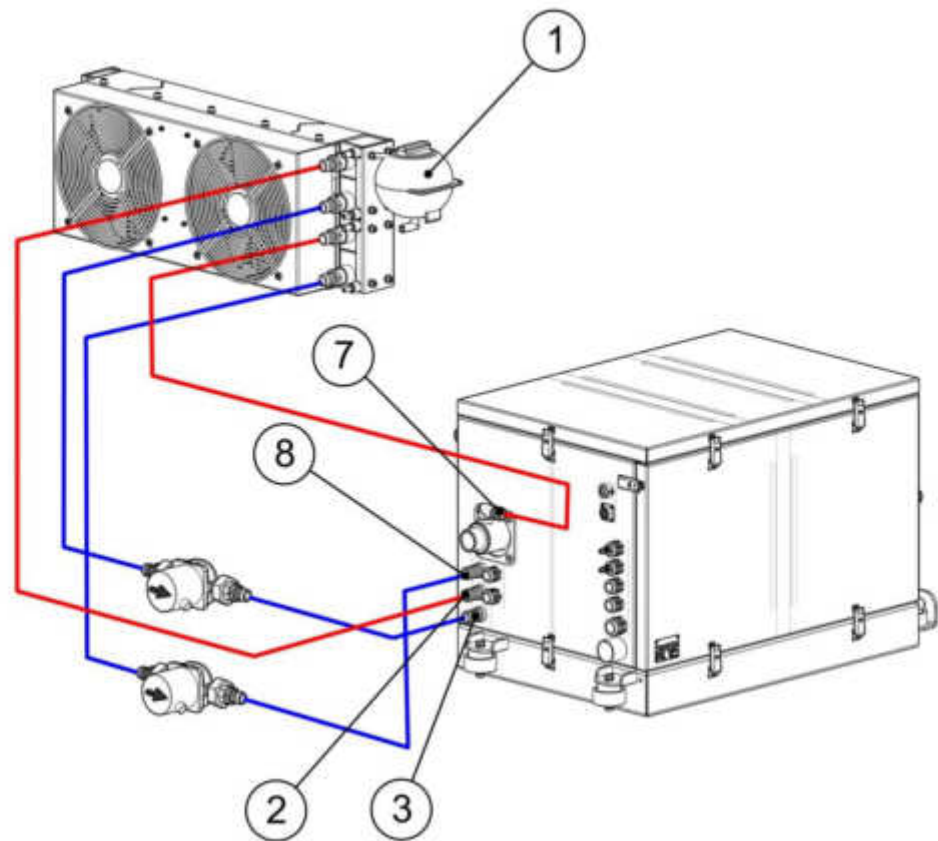


The whole cooling circuit consists of two, mutually independently controlled circuits, one cooling circuit for the engine cooling and one for the generator cooling. The replacing of the coolant is identical for both cooling circuits.



Frequent refilling the coolant indicates leaks in the system, remove leaks.

8.5.2 Change coolant

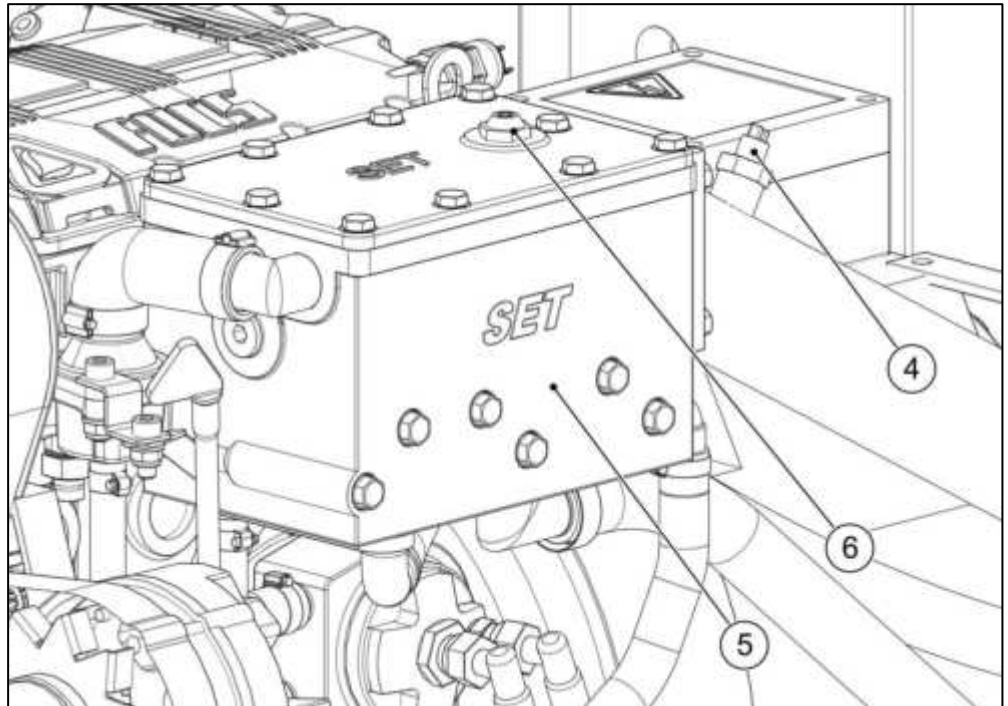


Draining the coolant from the cooling circuit:

1. Open expansion vessel (1).
2. Loosen the coolant hose connectors (2 + 3 for engine circuit; 7 + 8 for generator circuit) in succession from the capsule.
3. Drain coolant and collect in suitable container.
4. Link the coolant hose connectors (2 + 3; 7 + 8) with the capsule.

Filling the cooling system:

1. Fill coolant (mixture of 60 % water and 40 % anti-freezing agent) into the expansion vessel (1).
2. Unscrew bleed valve (6) from water-cooled exhaust collector (5) and fill with coolant also.
3. Close bleed valve (6) and expansion vessel (1).


**Bleeding the cooling system:**

1. Start the engine and let it warm up.
2. Bleeding the cooling system for the engine is carried out by loosening the bleed valve (6) on the water cooled exhaust collector (5) and bleeding the cooling system for the generator by loosen the temperature switch (4) on the water cooled exhaust manifold.
3. Close the bleed valve (6) and the temperature switch (4).
4. Check cooling water level in expansion vessel (1) and bleed again, if necessary.

8.6 Engine air filter change

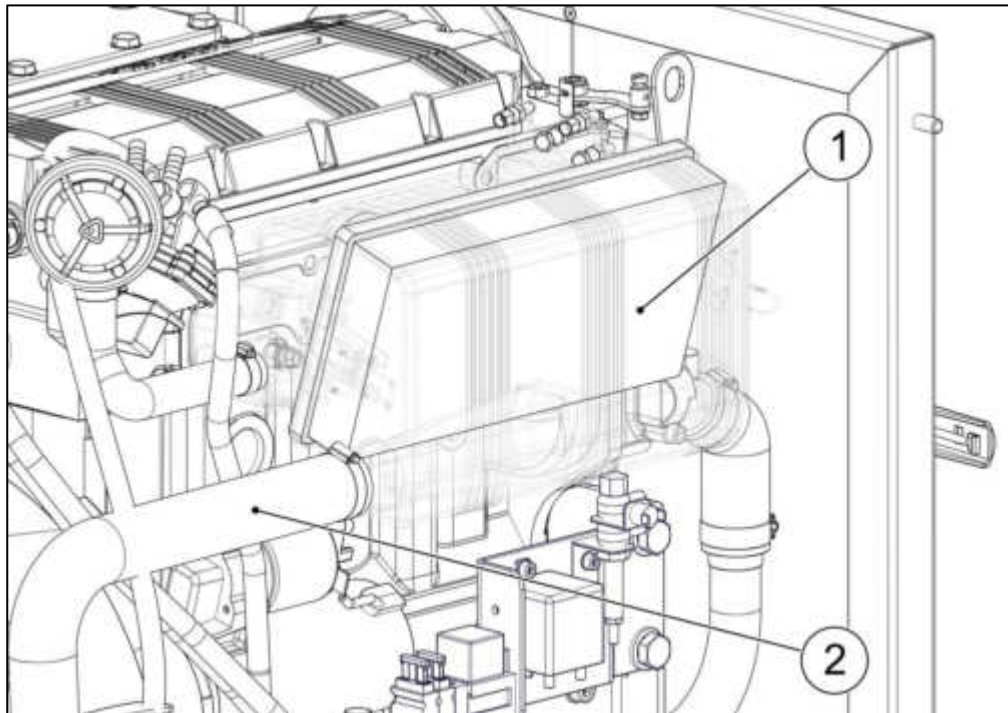
The **SET Camino Generator** is fitted with an engine air filter (1) which frees the combustion air from dust.

The engine air filter is mounted on the engine within the silencer capsule. An under-pressure switch is mounted at the air filter housing to monitor the air filter.

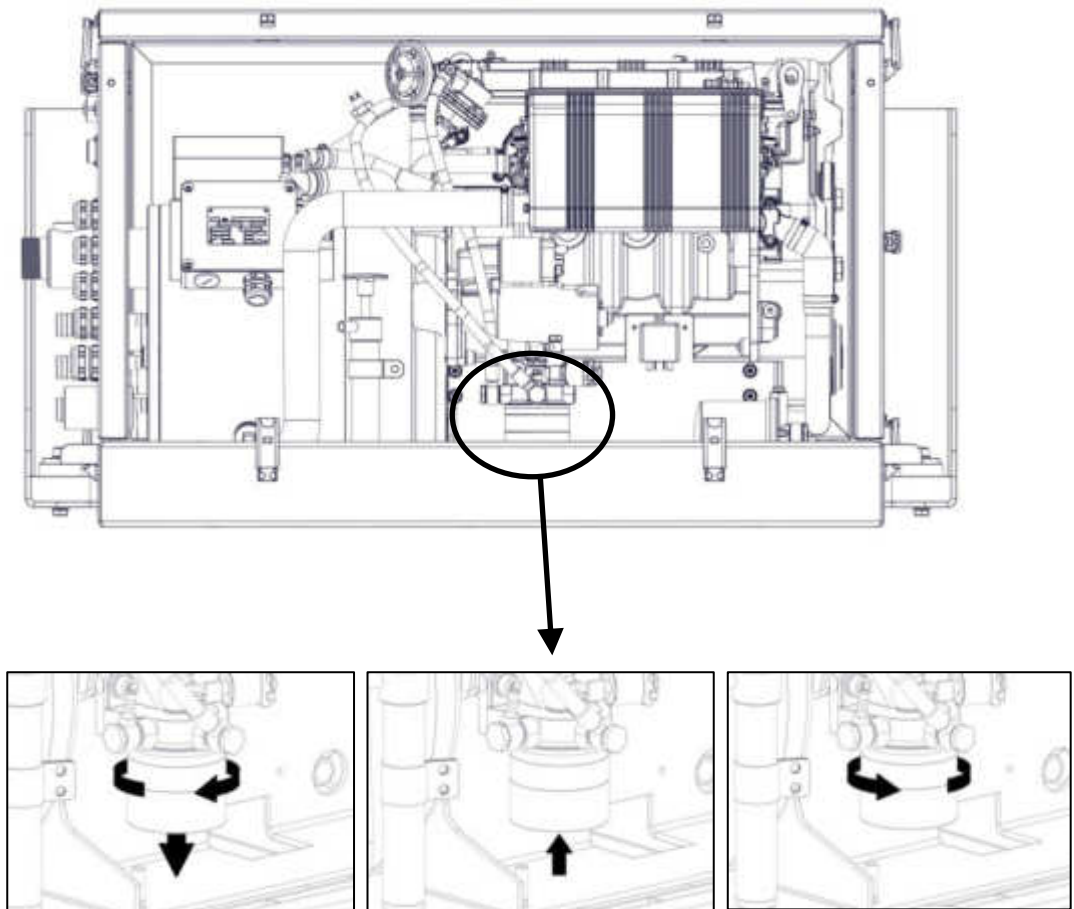
As soon as it responds, the LED  lights red at the control panel. Replace the air filter elements if clogged.

Replace the air filter as follows:

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



8.7 Fuel filter replacement



If the fuel system of the generator is connected directly to the tank of the vehicle, the vehicle fuel filter must be changed every 250 operating hours.



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

Replace fuel filter as follows:

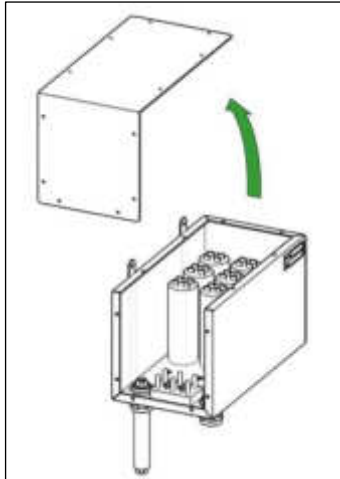
1. Close fuel cock (if available).
1. Remove the screw from clamp.
2. Remove fuel filter (if necessary using a commercially available tool).
3. Collect fuel (by placing a rag beneath).
4. Insert new fuel filter cartridge.
5. Dispose used filter and rag according to environmental standards!
6. Open the fuel cock and check hoses for leaks.

8.8 Checking capacitors

The output voltage of the generator is idle ~ 425V phase-phase or 245V phase-to-neutral.

If the voltage decreases the capacitors must be checked and possibly changed.

Capacitors are subject to wear.

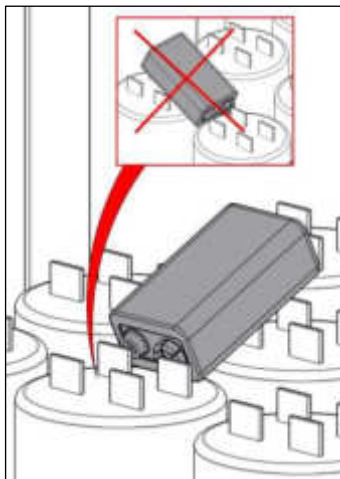


ATTENTION!

Switch off generator and secure against reconnection before testing the capacitors.

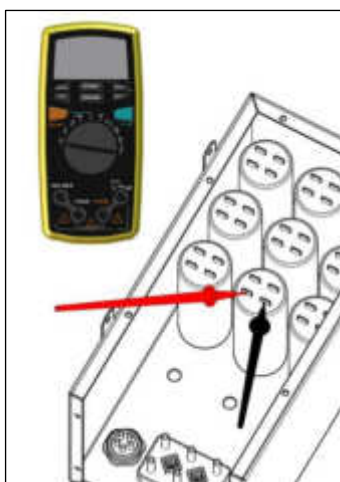
Open the capacitor box and disconnect the plugs of all capacitors (mark the cables).

After measuring (see figures 2+3) connect plugs again. Separately check each capacitor!



Connect a 9V battery shortly to the contacts.

ATTENTION, the capacitor now is loaded; do not touch the contacts again!



Measure the voltage with a multimeter.

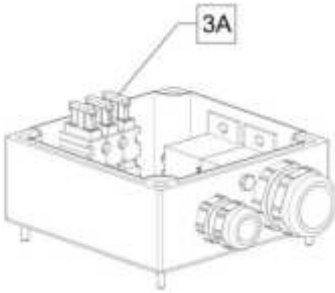

If the voltage drops rapidly (9 – 8 – 7 – 6 - 5V) or the reading is less than 9V, the capacitor is damaged and needs to be changed.

If the voltage drops slowly (9.0 - 8,9 - 8,8 - 8,7 - 8,6V), the capacitor is working well.

9 Fault analysis and corrective actions

9.1 The engine does not start

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

MALFUNCTION	POSSIBLE CAUSES	REMEDY
Engine does not rotate during start.	<p>Battery voltage insufficient.</p> <p>Fuse in electrical box has responded.</p>  <p>Magnetic switch will not indent. <i>(Possibly have a second person checking the mechanical noise of indenting).</i></p> <p>Failure in starter circuit.</p>	<p>Check cable connection of battery poles for tight seat.</p> <p>Replace fuse 3A for control panel.</p>  <p>Work on electrical systems or equipment must be performed by a qualified electrician only in accordance with electro technical rules.</p> <p>Check cable connections at starter.</p> <p>Check cable from battery to starter.</p>
Engine runs with cranking speed but does not start.	<p>Fuel shortage.</p> <p>Fuel solenoid valve does not open.</p> <p>Fuel filter is clogged.</p> <p>Fuel pump does not deliver.</p> <p>Fuse of external consumer has responded.</p>	<p>Check Diesel level in tank.</p> <p>Check if fuel 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>








9.2 Engine starts but runs irregularly or dies






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

MALFUNCTION	POSSIBLE CAUSES	REMEDY
Engine starts but runs irregularly or dies	Fuel supply interrupted.	Have fuel solenoid valve inspected.
Fuel supply fails.	Fuel prefilter at tank is clogged. Coarse filter at engine clogged. Air in piping. Pump is damaged.	Check filter, clean or replace, if necessary. Check filter, clean or replace, if necessary. Bleed. Replace fuel pump.
Disturbed air intake.	Fresh air supply: Air intake line clogged.	Check air suction line between silencer and air intake (e. g. hose kinked).
Engine produces black smoke	Insufficient air supply. Injection pump or injection nozzle defective. Unit is overloaded. Valve clearance incorrect.	Check air suction line between silencer and air intake socket. Have injection pump checked in specialised workshop, clean injection nozzle. Reduce the number of connected consumers. Let valve clearance adjust according to the instructions of the engine manufacturer.
Fans / pumps not running	Fuse in terminal box is defective. Short circuit in the system.	Replace fuse. Eliminate short circuit.

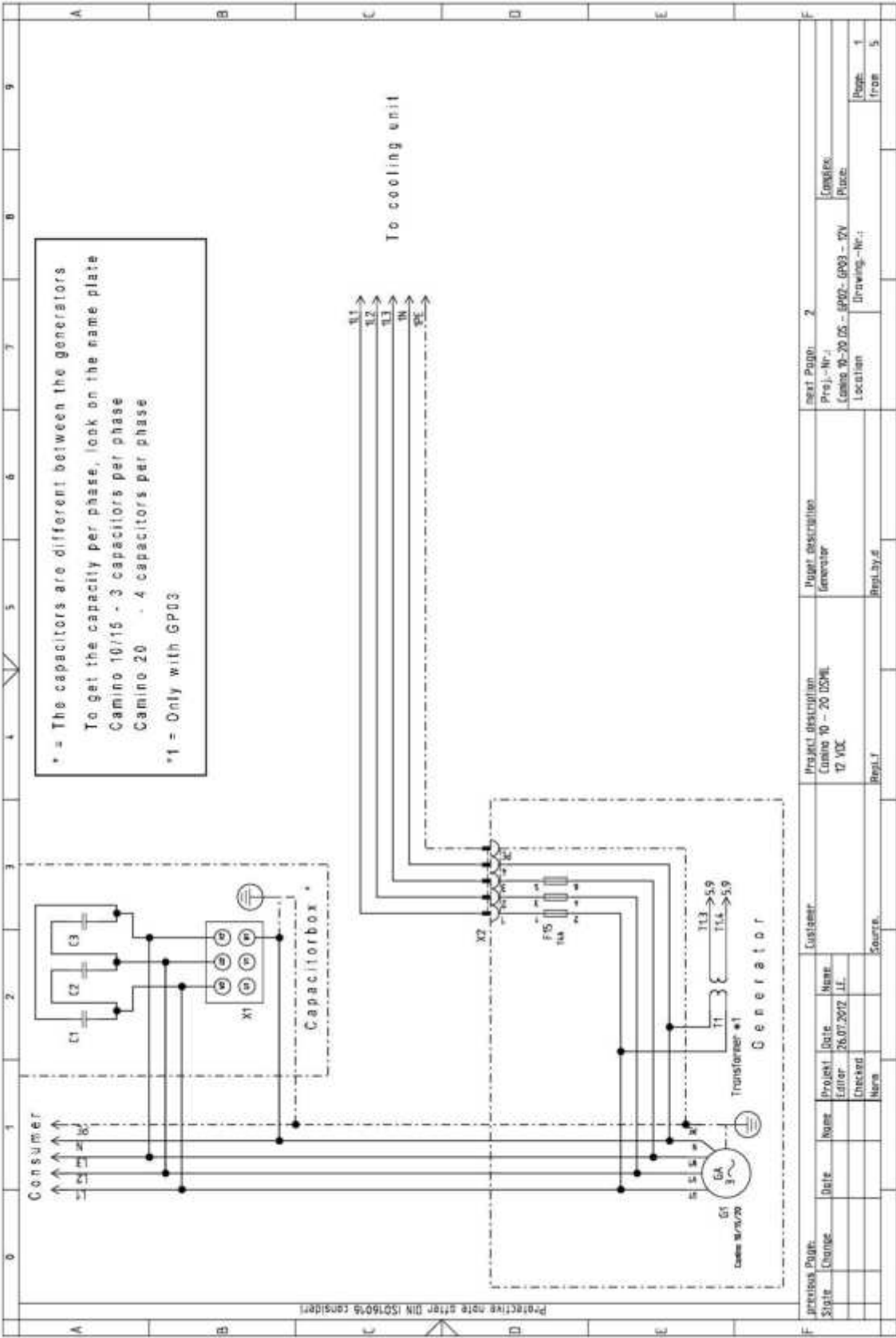
9.3 Fault display via control panel

Engine stops, at least one lamp on the control panel will turn RED.

	MALFUNCTION	POSSIBLE CAUSES	REMEDY
	LED oil pressure indicator lights RED	Oil pressure low. Oil pressure switch responds.	Check oil level, top up if necessary.
	LED-G temperature indicator lights RED	Coolant level low Generator pump not running. Exhaust pipe too hot. Temperature switch responds. Cooling fan not running.	Check whether the expansion vessel is filled with coolant, top up if necessary. Check pump. Check cooling unit.
	LED-M temperature indicator lights RED	Engine too hot because cooling water flow disturbed. Engine pump does not work, temperature switch responds. Cooling fan not running.	Check whether the expansion vessel is filled with coolant, top up if necessary. Check pump. Check cooling unit.
 	LED-M+G temperature indicators lighting RED	Generator too hot because cooling water flow disturbed. Temperature too high in expansion vessel. Temperature switch responds.	Check if the electric pump of the cooling unit is continuously running.
 	LED-M+G temperature indicators lighting RED Overspeed	Generator too hot because cooling water flow disturbed. Cooling fan defective. Cooling fan clogged. Temperature switch on. Engine speed has been displaced upwards. Overvoltage limit exceeded.	Replace cooling fan. Clean cooling fan. Adjust engine speed.

	LED leakage indicator lights RED	Flooding in the capsule. Hose rupture and leakage of coolant into capsule interior.	Eliminate leaks.
	LED leakage indicator lights RED	Air filter clogged.	Change air filter element. Press the red button.
	LED-G temperature indicator lights RED	Generator overheated. Temperature switch responds.	Check cooling circuit of the generator. With the unit running watch the cooling unit opening. Detect circulation.
	Generator supplies no voltage.	The generator has been started with consumers switched on.	Switch off all consumers and wait until the voltage is back again (approx. 3 sec).
	Generator is running, voltage too low.	Distribution of vehicle-installation is not switched on (GFCI, circuit breakers). Too much consumers connected. Capacitor defective. Engine speed low.	Switch on GFCI and / or circuit breakers. Reduce consumers. Check capacitors. Adjust engine speed.
	Generator voltage high.	Engine speed high.	Adjust engine speed.
 WARNING - ELECTRICITY The generator outputs a voltage of 400V / 230V 50Hz AC. This is a life-threatening voltage for humans. Only a qualified electrician with the necessary resources can identify and resolve a fault in the electrical system.			
	LED battery indicator does not change from RED to GREEN.	Alternator defective.	Check fuse F1. Check alternator.

11 **Circuit diagrams**











12 SET service hotline

If you need any assistance please don't hesitate to contact our service team:

SET Stromerzeuger GmbH

Götscher Weg 85

D-40764 Langenfeld

Tel. +49 - 2173 – 399 37 14

Fax +49 - 2173 – 399 37 21

e-mail: service@set-zeise.de

www.set-genset.com

SET service hotline:

International +49 - 171 - 140 30 10

13 Service part order blank

Manufacture:



Stromerzeuger GmbH

Götscher Weg 85

D-40764 Langenfeld

Tel.: +49 (0)2173 / 39937-14 • Fax: +49 (0)2173 / 39937-21

e-mail: service@set-zeise.de • www.set-genset.com

Genset type*:

Order-No.*:

Installed from:

Description* / Installation*:

Year of manufacture* /
Operating hours**:

* see rating plate ** see control panel

Pos.	Amount	Description	Assembly / Ident-No.:	Notes

Delivery address:

(exact address please)

Reachable by phone:

Order page...of....

Order date / Sign:

at	from



Ersatzteilekatalog spare parts list

CAMINO 10 / 15 / 20 DSUF



Stange Energietechnik GmbH

Lise Meitner Str. 13A - D-40764 Langenfeld
Tel.: +49 (0)2173 / 39937-0 • Fax: - / 39937-20
e-mail: info@set-zeise.de • www.set-genset.com

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One-time maintenance

Maintenance work after the first 50 operating hours (=oh) for new and overhauled engines are listed below:

Replace lube oil and oil filter	For new or reconditioned engines only
Check coolant	Check coolant additive concentration (only when the engine is cold!) and re-fill if necessary
Check intake air filter	Clean filter cartridge if necessary
Check fuel hoses	In case of leakages arrange repair by service
Check engine tightness	In case of leakages arrange repair by service
Check threaded connections	Retighten nuts and bolts (but never tighten cylinder head nuts!)
Check fixings, hose connections / clamps	If necessary, re-tighten

Regular maintenance

Strictly perform these checks or the described maintenance work in the given intervals, before running the equipment:

Daily visual inspection	Check lube oil level	Re-fill if necessary
	Check coolant	Check coolant level and colour (only when the engine is cold!). Re-fill if necessary
	Check cooling unit	Remove impurities and clean radiator fins if necessary
	Check suction / dry air filter	Clean or renew filter cartridge if necessary
	Check suction area	Clean if necessary
	Check fuel hoses	Replace if necessary
	Check engine tightness	In case of leakages arrange repair by service
	Check electric cables	In case of damage replace by service
Every 250 oh	Change lube oil and oil filter cartridge	Renew at least once a year and check tightness after change
	Renew fuel filter cartridge	Vent the fuel system after change
	Check air cleaner element	Clean the element with compressed air or replace if damaged.
	Clean radiator	Clean radiator fins at least once a year with pressurized air in opposite direction of fan's air flow
	Check fuel pre-filter*	Change filter insert

Every 500 oh	Check valve clearance	Adjust if necessary (when engine is cold). Replace the valve cover seal every time!
	Check glow plugs	Replace if necessary
	Check capacitors	Test voltage on each capacitor individually with a meter
	Check V-belt	If necessary, re-tighten or renew Only check after having removed the positive battery cable to prevent accidental short-circuits!
Every 1000 oh	Renew V-belt	Renew in any case at least every 2 years! Check the belt tension after 15 minutes running time
	Replace fuel pipes	In case of low use renew at least every 2 years
	Change fuel pump	Check tightness after change
	Change capacitors	In any case renew capacitors once a year.
	Check coolant pump	Check the flow of the pump and replace if necessary. After a change, the cooling circuits must be vented
Every 2000 oh	Renew coolant	Use recommended coolant (mixture of 60 % water and 40 % anti-freezing, silicate-free agent).
	Check alternator	Repair or replace if necessary
	Check starter	Repair or replace if necessary
	Check coolant hoses	In case of leakages arrange repair by service
	Check engine bearing	Renew cylinder bearings in case of damage
After 2500 oh	Renew timing belt and tension pulley	Once removed, the timing belt must be replaced, regardless of the maintenance schedule. If engine use is infrequent, replace timing belt every 4 years.

* if any

Füllstofftabelle – list of fillers

Füllmedium Fill in medium	Spezifizierung Specification	Menge / Quantity		
		Camino 10	Camino 15	Camino 20
Motoröl Engine oil	Sommer Tropen SAE 10 W / 60 Sommer SAE 15 W 40 Winter bis -10°C SAE 5 W / 30 Winter bis -25°C SAE 0 W 30	1,3 L	2,4 L	3,2 L
Kühlflüssigkeit Coolant	Silikatfreier (rot) Frostschutz Mischungsverhältnis der Einsatztemperatur angepasst Silicate free (red) antifreeze Mixing ratio adjusted to ambient temperature	8 L	10 L	12 L

WICHTIG!

**Alle Werte sind ca.-Angaben.
Zur genauen Dosierung bitte Füllstandsanzeige
und / oder Peilstab-Markierung beachten.**

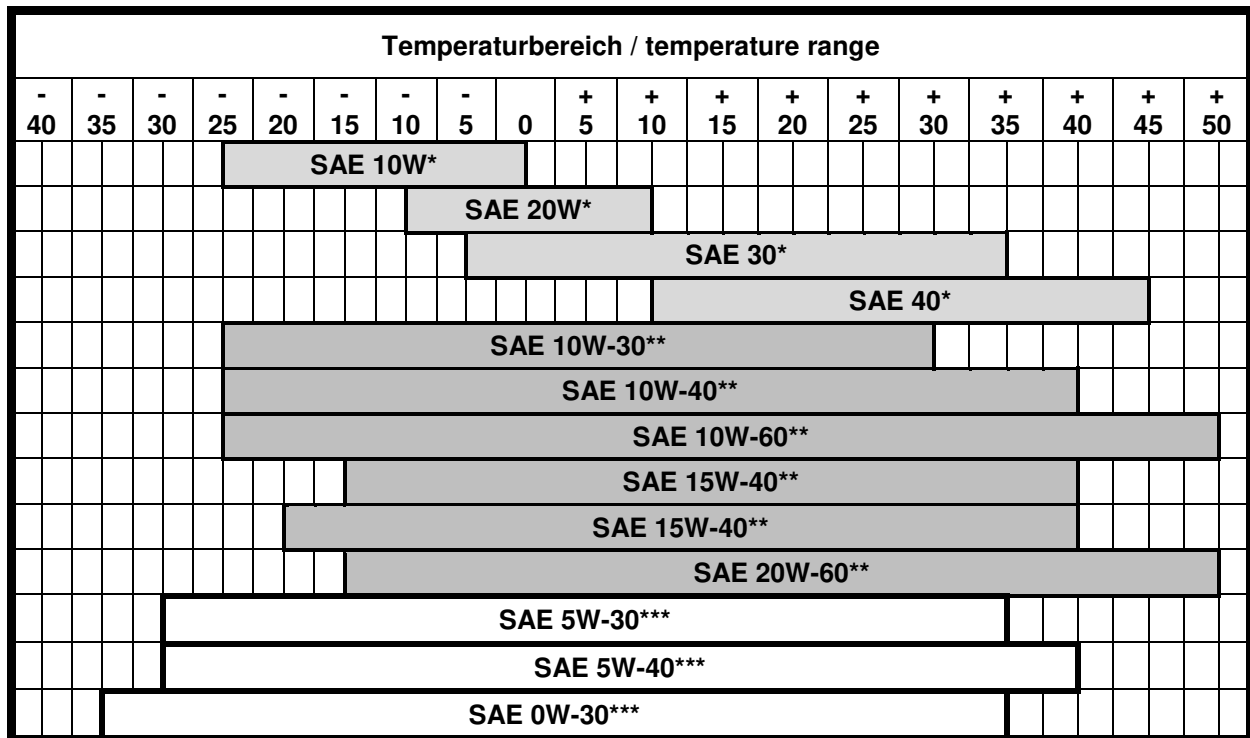
IMPORTANT!

**All values are approximate values.
For accurate dosing please note fill level indicator
and / or dipstick mark.**

**Verwenden Sie stets Öl mit einer für die jeweilige Einsatztemperatur
am besten geeigneten Viskosität. Als Hilfe dient Ihnen die Tabelle
auf der nächsten Seite.**

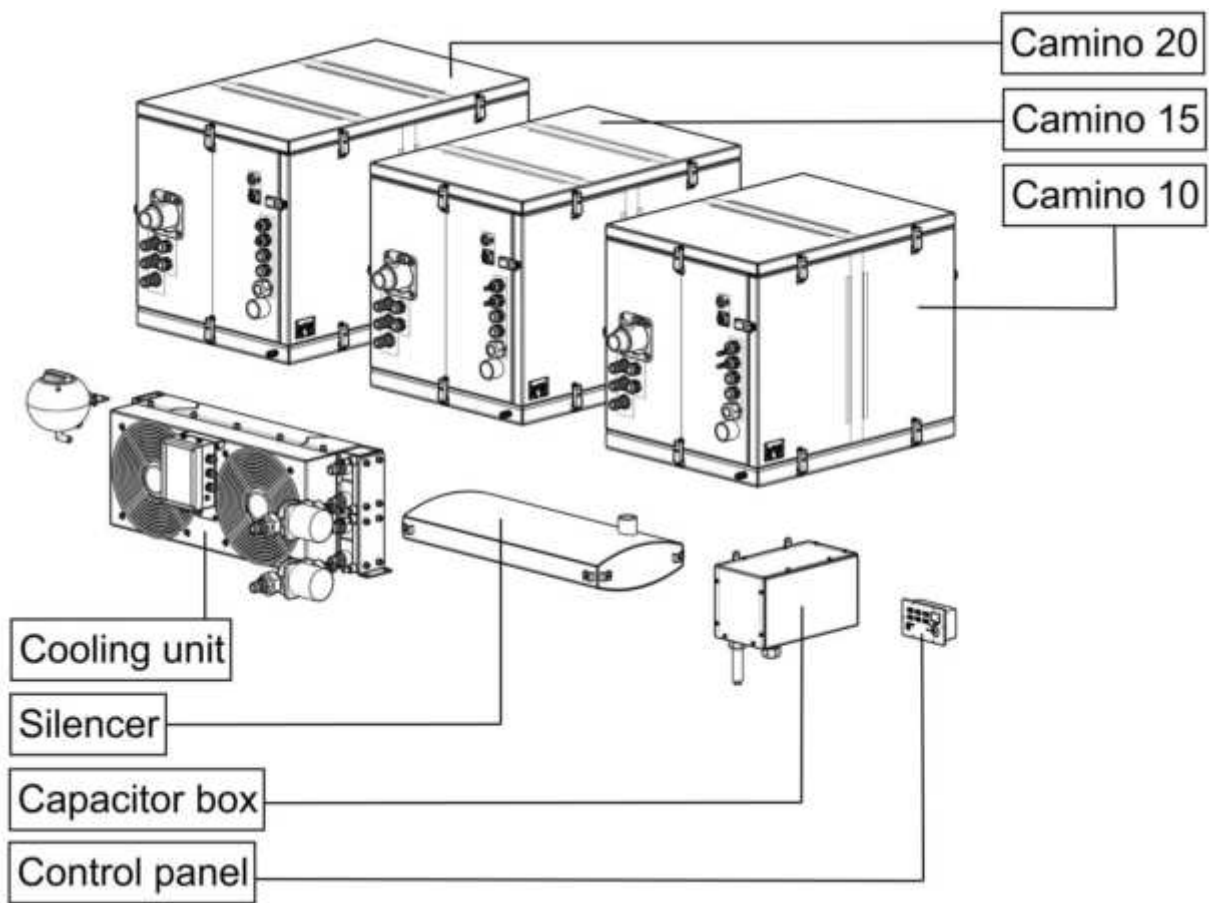
**Always use oil with the most suitable viscosity for the operation
temperature. For assistance use the table on the next page.**

SAE Viskositätsklasse – viscosity grades

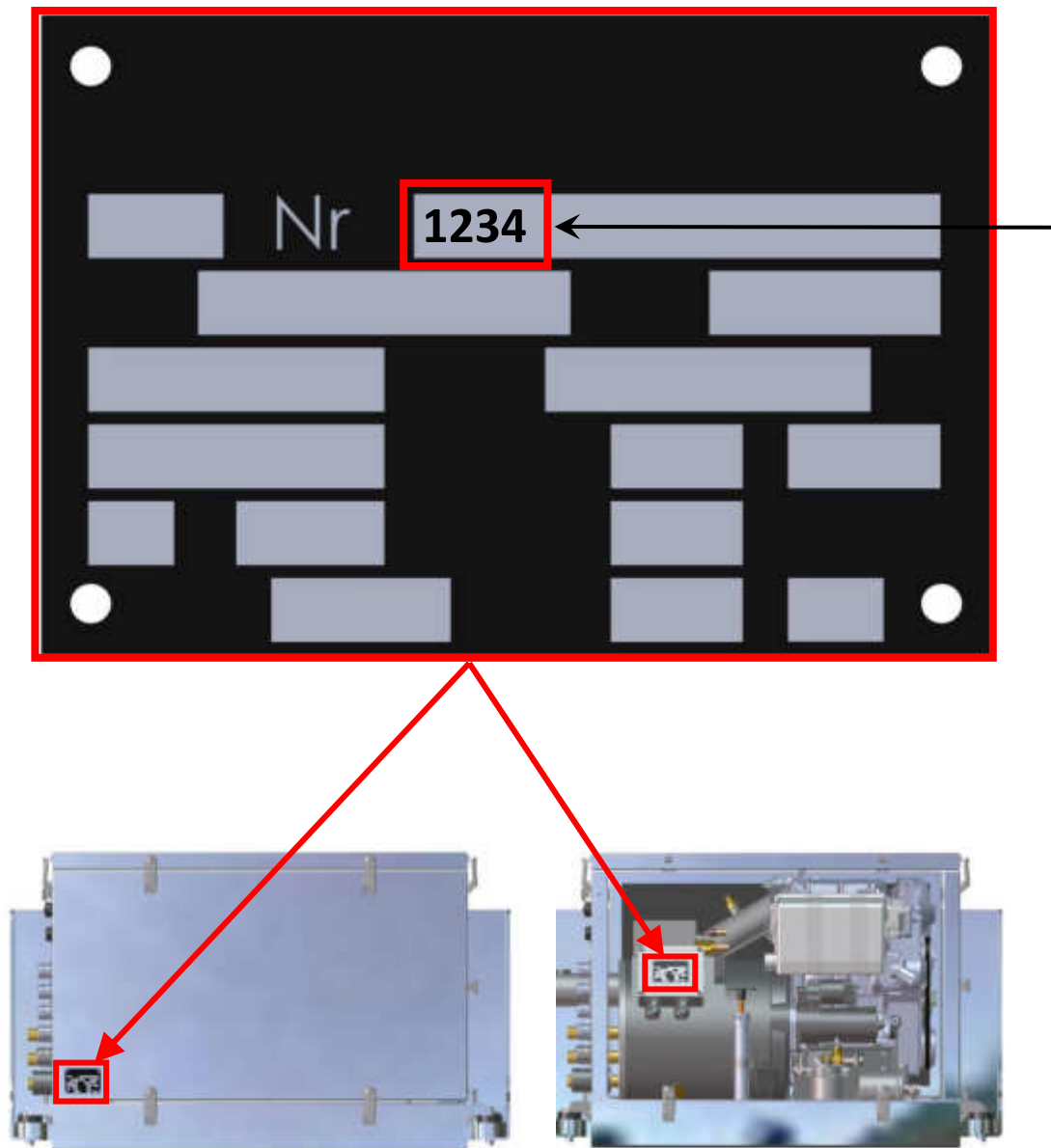


SAE 15W-40*	SAE 15W-40**	SAE 5W-30***
	SAE 20W-60**	SAE 0W-30***
Mineralölbasis	Halbsynthetische Basis	Synthetische Basis
Mineral base	Semi-synthetic base	Synthetic base

Model-Übersicht – model overview



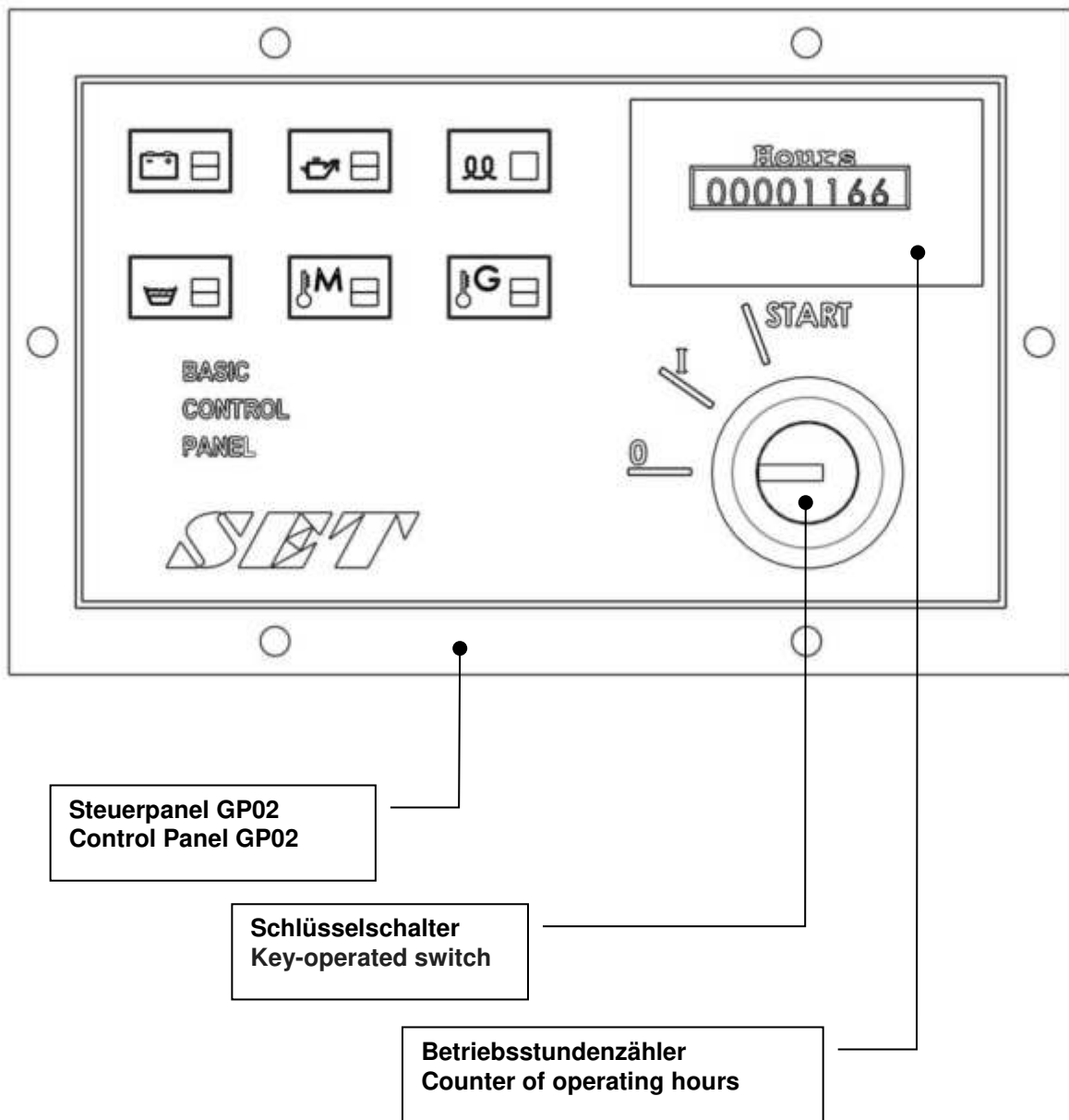
Position Typenschild – position of rating plate



Die 4-stellige Kommissionsnummer finden Sie auf einem der Typenschilder.

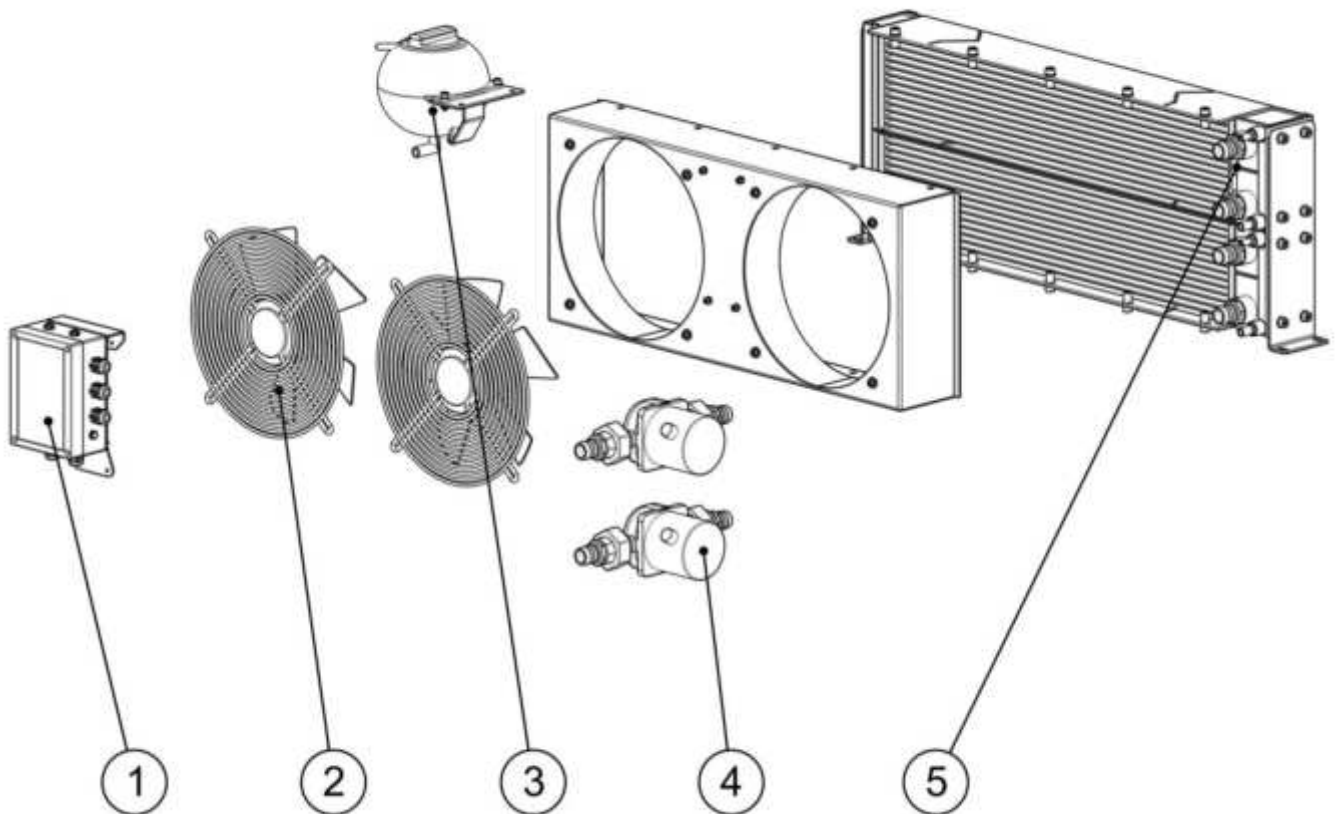
Please find the 4-digit commission number at the type signs.

Steuerpanel – control panel



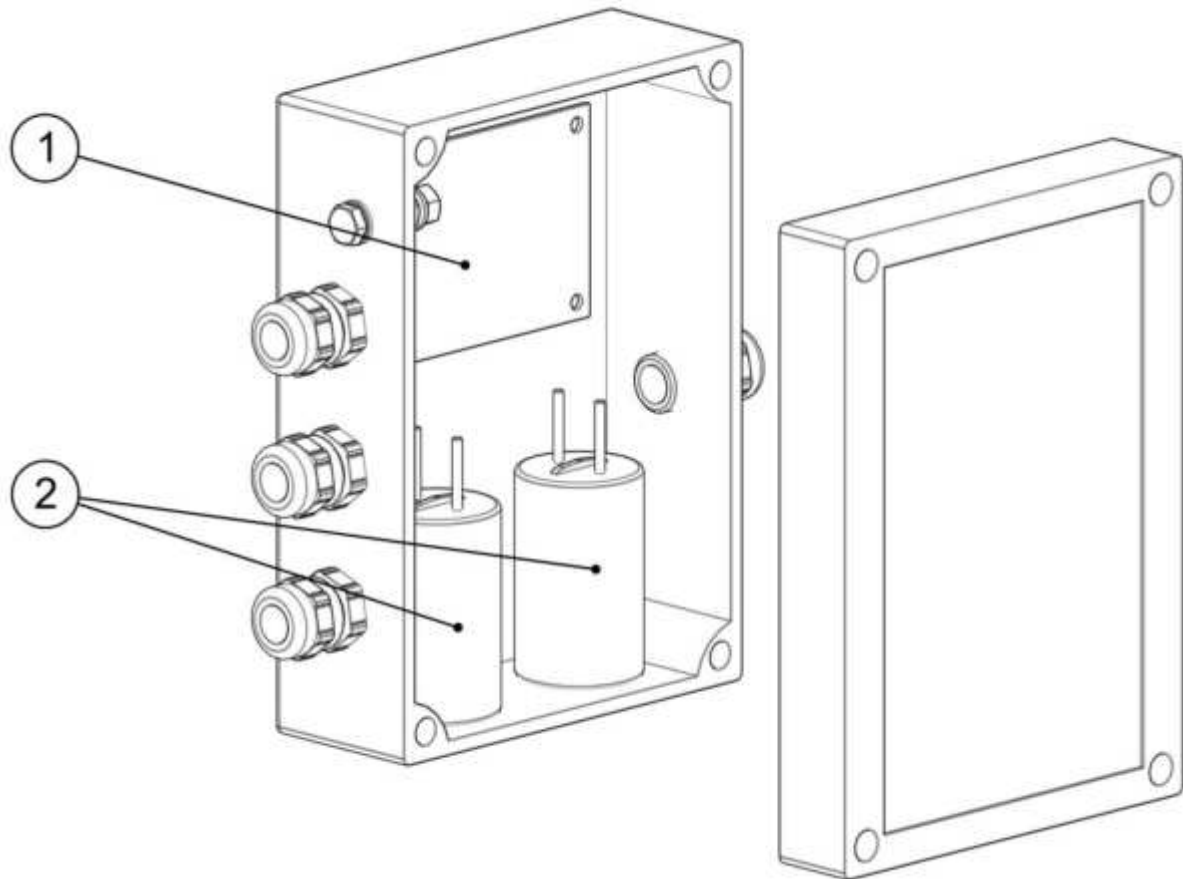
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. article no.
1	1	Steuerpanel GP02 12V - control panel GP02 12V	26012

Kühlereinheit – cooling unit



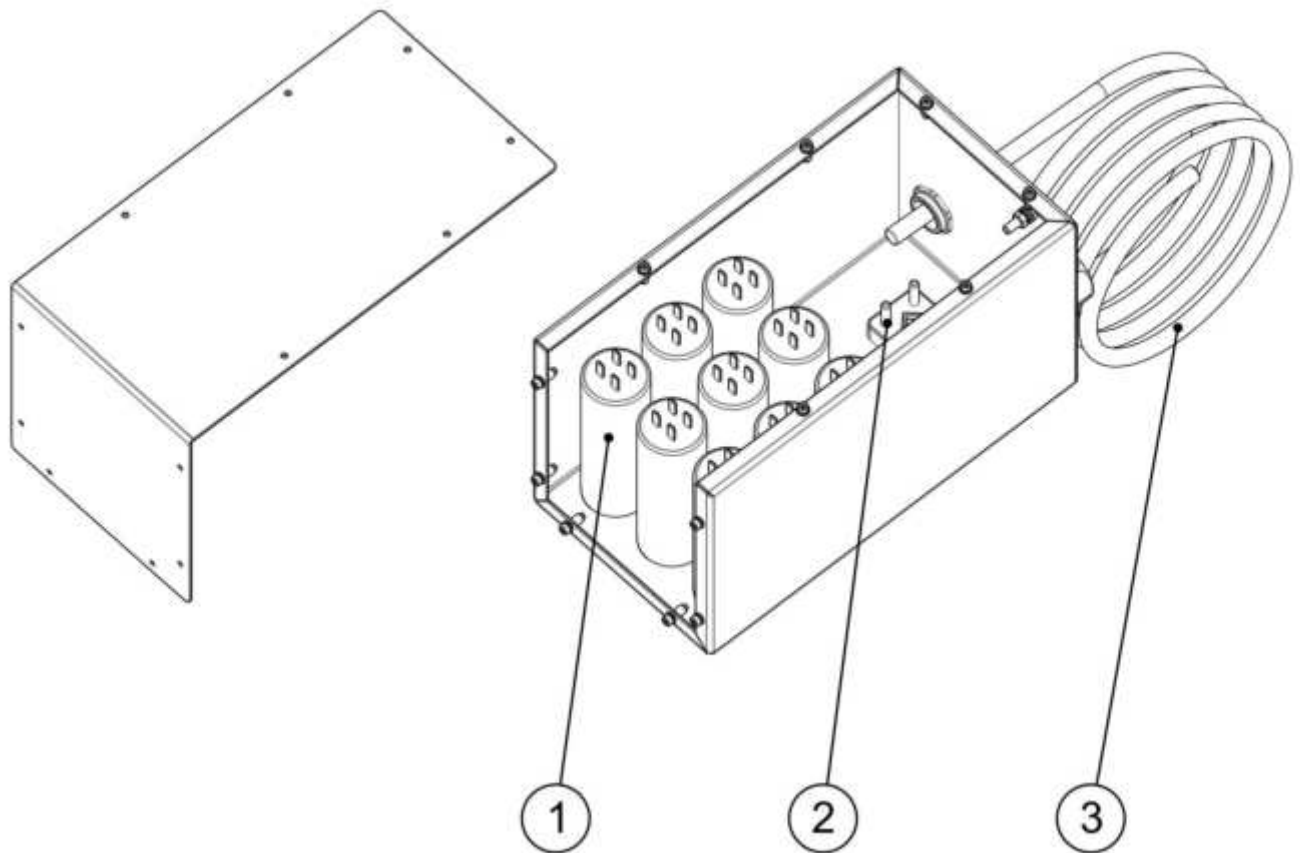
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Lüftersteuerung PAS 92 kompl. - fan control PAS 92 compl.	26018-01	26018-01	26018-01
2	1	Lüfter 300 mm - fan 300 mm	35000-17	35000-17	35000-17
3	1	Ausgleichsbehälter m. Deckel - expansion tank with cover	34101-03	34101-03	34101-03
4	1	Kühlwasserpumpe - cooling water pump	35105-01	35105-01	35105-01
5	1	Temperaturfühler – temperature sensor	36017-03	36017-03	36017-03

Lüftersteuerung – fan control



Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Platine Lüftersteuerung PAS 92 - board fan control PAS 92	26018	26018	26018
2	1	Kondensator 8 μ F – capacitor 8 μ F	36305-04	36305-04	36305-04

Kondensatorkasten – capacitor box



WICHTIG!

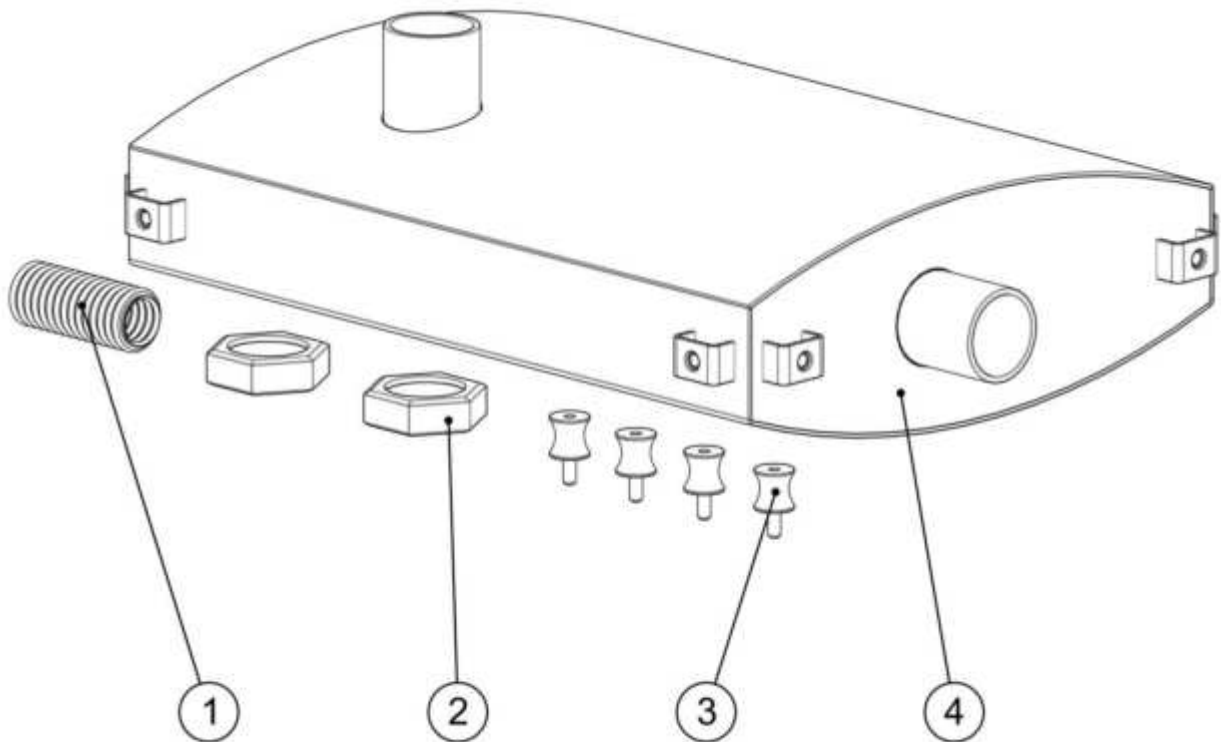
Immer die μF des Kondensators oder die Kommissionsnummer (siehe Typenschild) angeben!

IMPORTANT!

Always specify the μF of capacitor or read commission number (see the rating plate)!

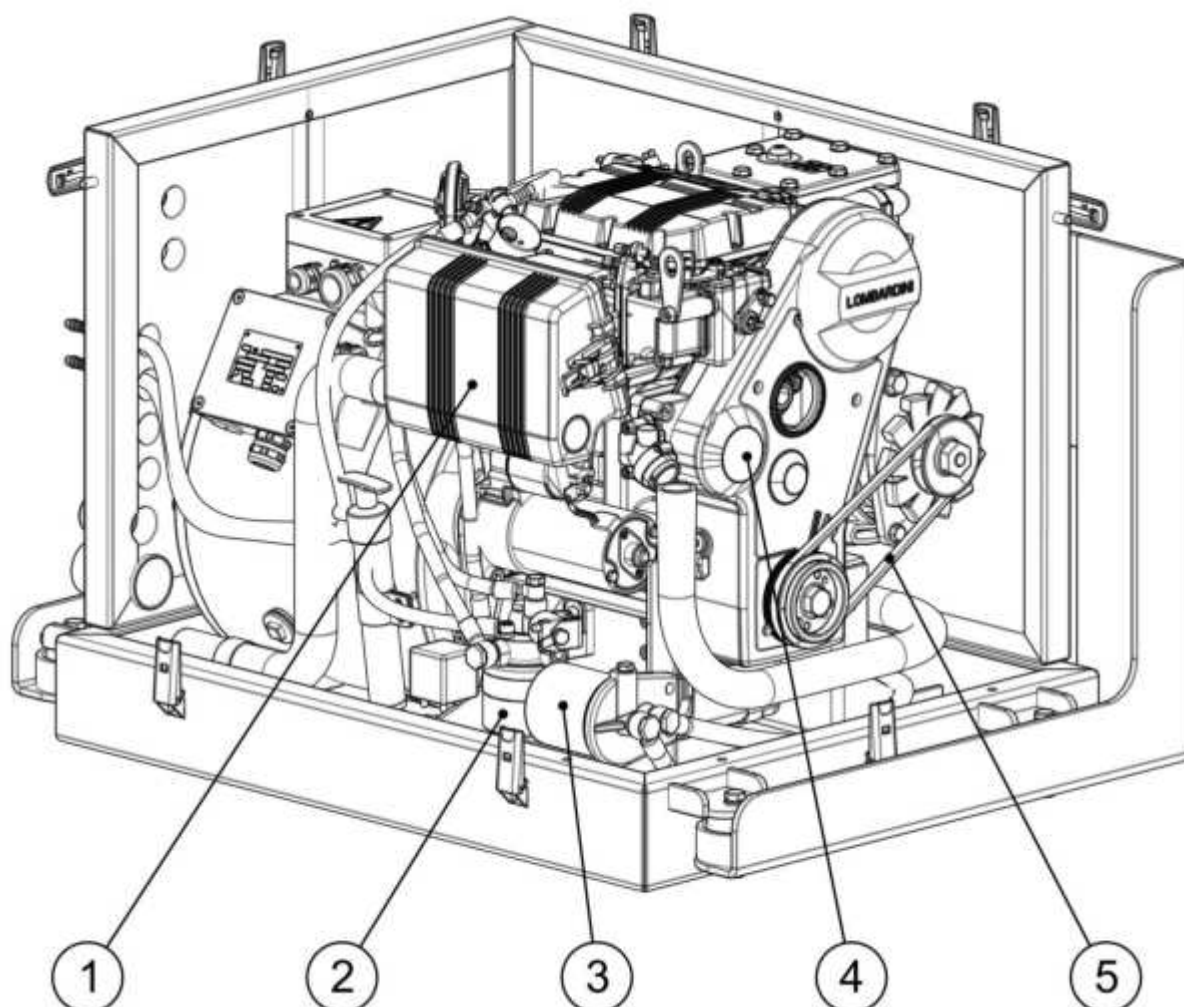
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Kondensator 30 μF – capacitor 30 μF	36301	36301	36301
	1	Kondensator 50 μF – capacitor 50 μF	36302	36302	36302
	1	Kondensator 80 μF – capacitor 80 μF	36304	36304	36304
	1	Kondensator 100 μF – capacitor 100 μF	36303	36303	36303
2	1	Klemmbrett 4 SN – terminal board 4 SN	30101-07	30101-07	30101-07
3	1	Steuerleitung 5x10 mm ² - control lead	10101-14	10101-14	10101-14

Schalldämpfer – silencer



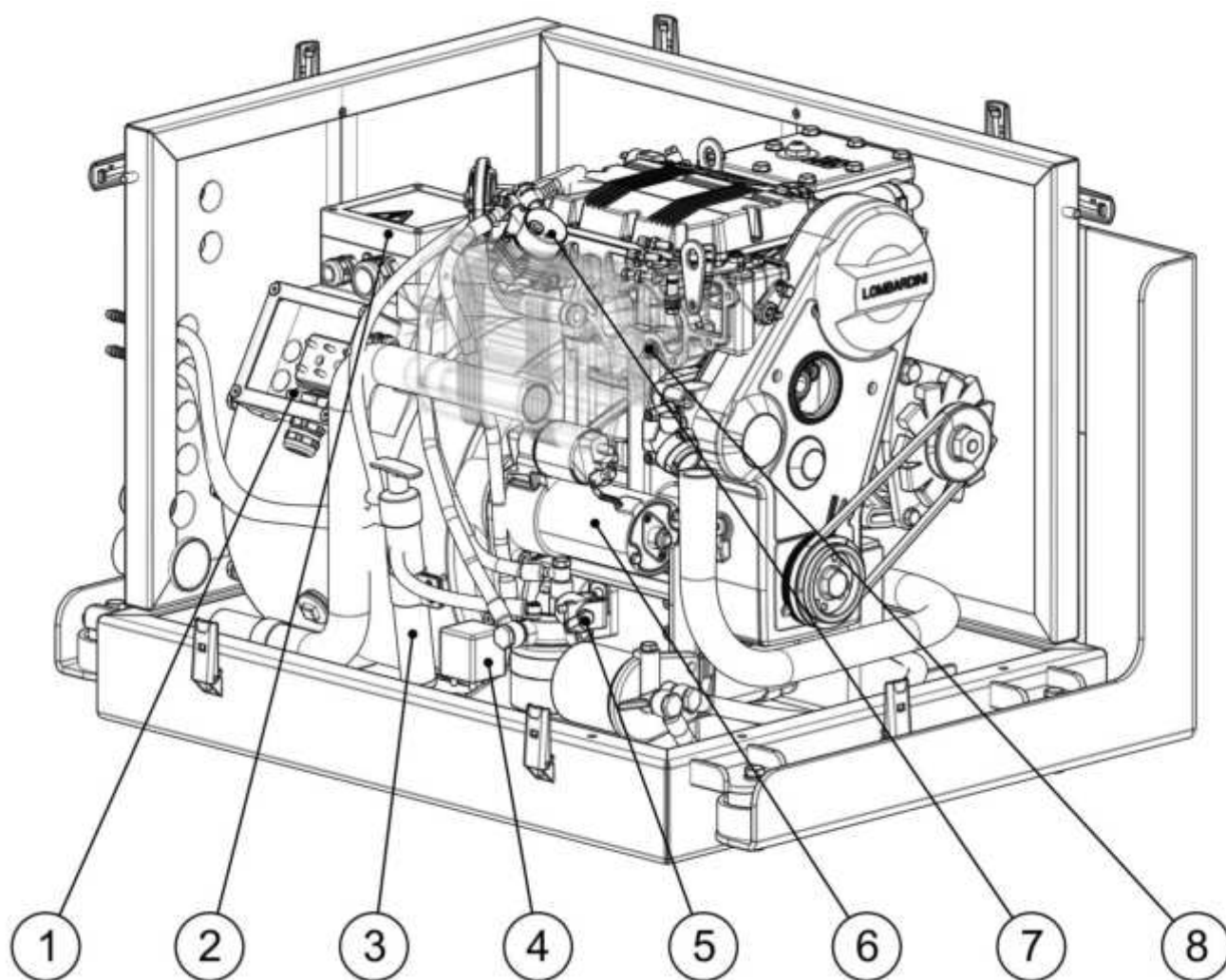
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Abgasschlauch flexibel – exhaust tube flexible	33801	33801	33801
2	1	Überwurfmutter DN32 - union nut DN32	33802-00	33802-00	33802-00
3	1	Zylinderlager tailliert – cylinder bearing	30603-05	30603-05	30603-05
4	1	Schalldämpfer - silencer	43502-02	43502-02	43502-02
	1	Schalldämpfer Unterflur – silencer under floor	43502-02va	43502-02va	43502-02va

Wartungsteile – maintenance parts



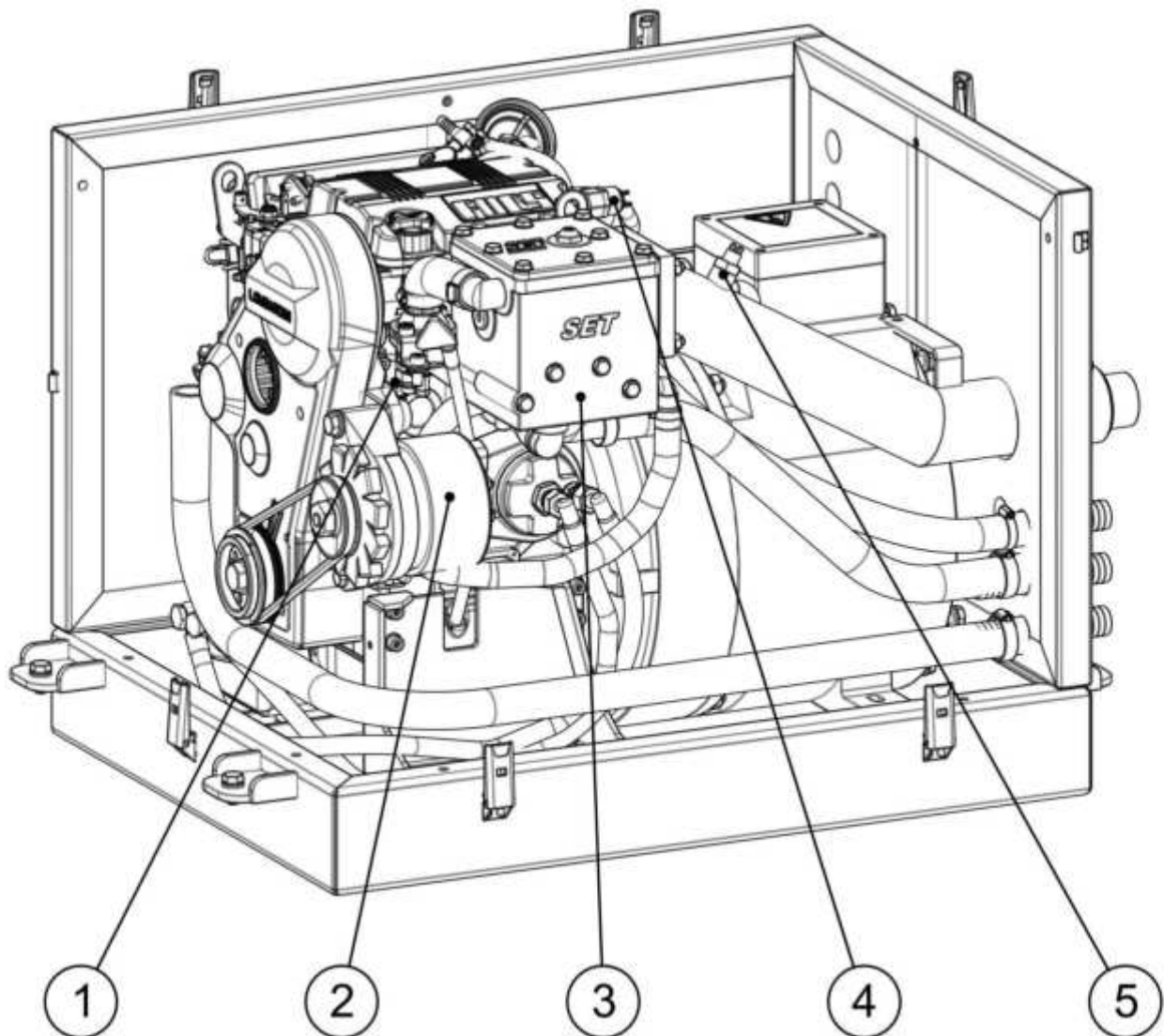
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Luftfiltereinsatz - air filter element	50103	50103	50103
2	1	Kraftstofffilter – fuel filter	50501-02	50501-02	50501-02
3	1	Ölfilter – oil filter	50501-01	50501-00	50501-00
4	1	Zahnriemen mit Spannrolle – toothed belt with tension pulley	50133-05	50133-05	50133-05
5	1	Keilriemen – V-belt	33930-04	33930-04	33930-04

Ersatzteile – spare parts



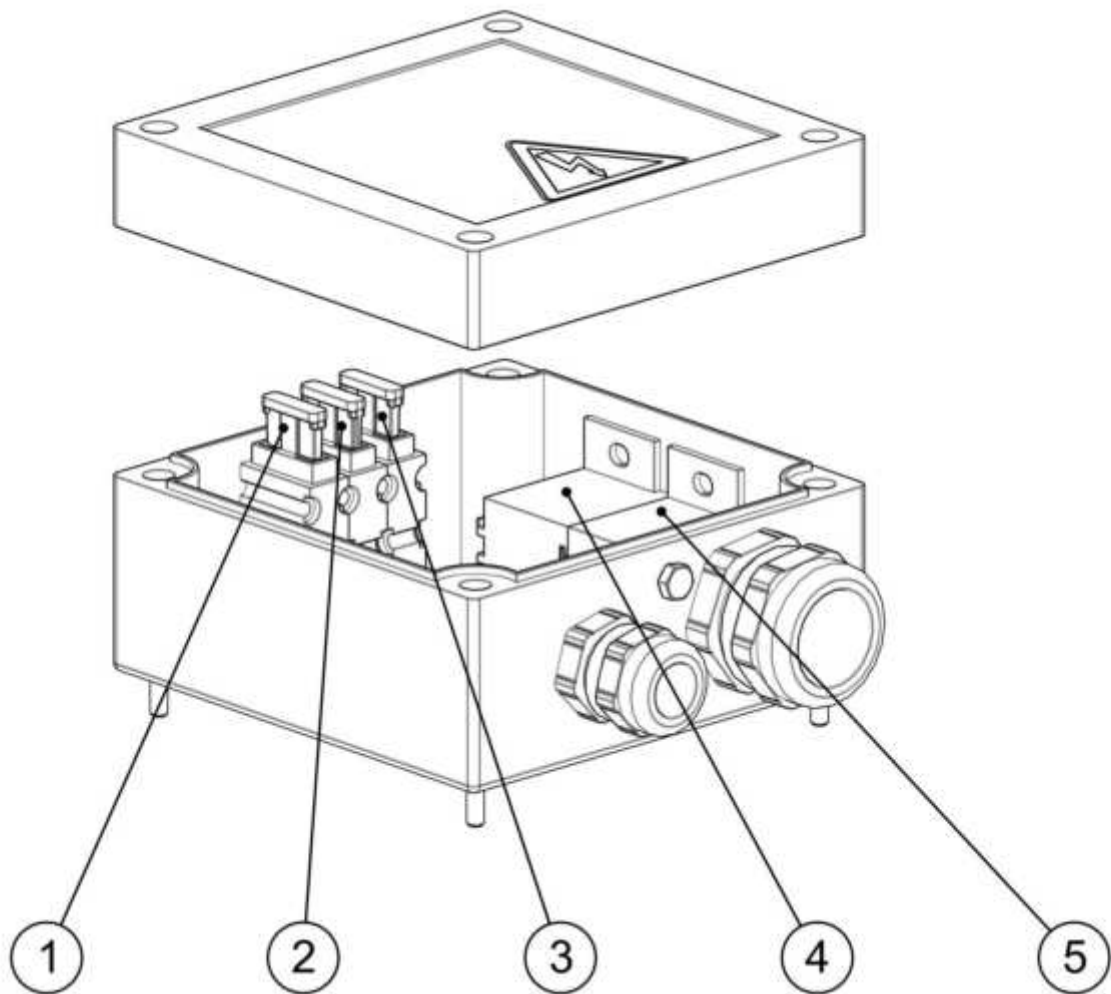
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Glasrohrsicherung T 4A 250V – visible type fuse T 4A 250V	36501-11000	36501-11000	36501-11000
1	1	Kabelbaum 12 V – wire harness 12 V	23708-00000	23708-00000	23708-00000
3	1	Ölabsaugpumpe manuell – oil pump manually	35106	35106	35106
4	1	Relais 12V 100A – relay 12V 100A	34021-01	34021-01	34021-01
5	1	Abstellhubmagnet – shut off stroke solenoid	50145-00	50145-00	50145-00
6	1	Anlasser 1,7 kW 12V – starter 1,7 kW 12V	50715-00	50715-00	50715-00
7	1	Kraftstoffpumpe – fuel pump	50132	50132	50132
8	1	Glühkerze – glow plug	50219-05	50219-05	50219-05

Ersatzteile – spare parts



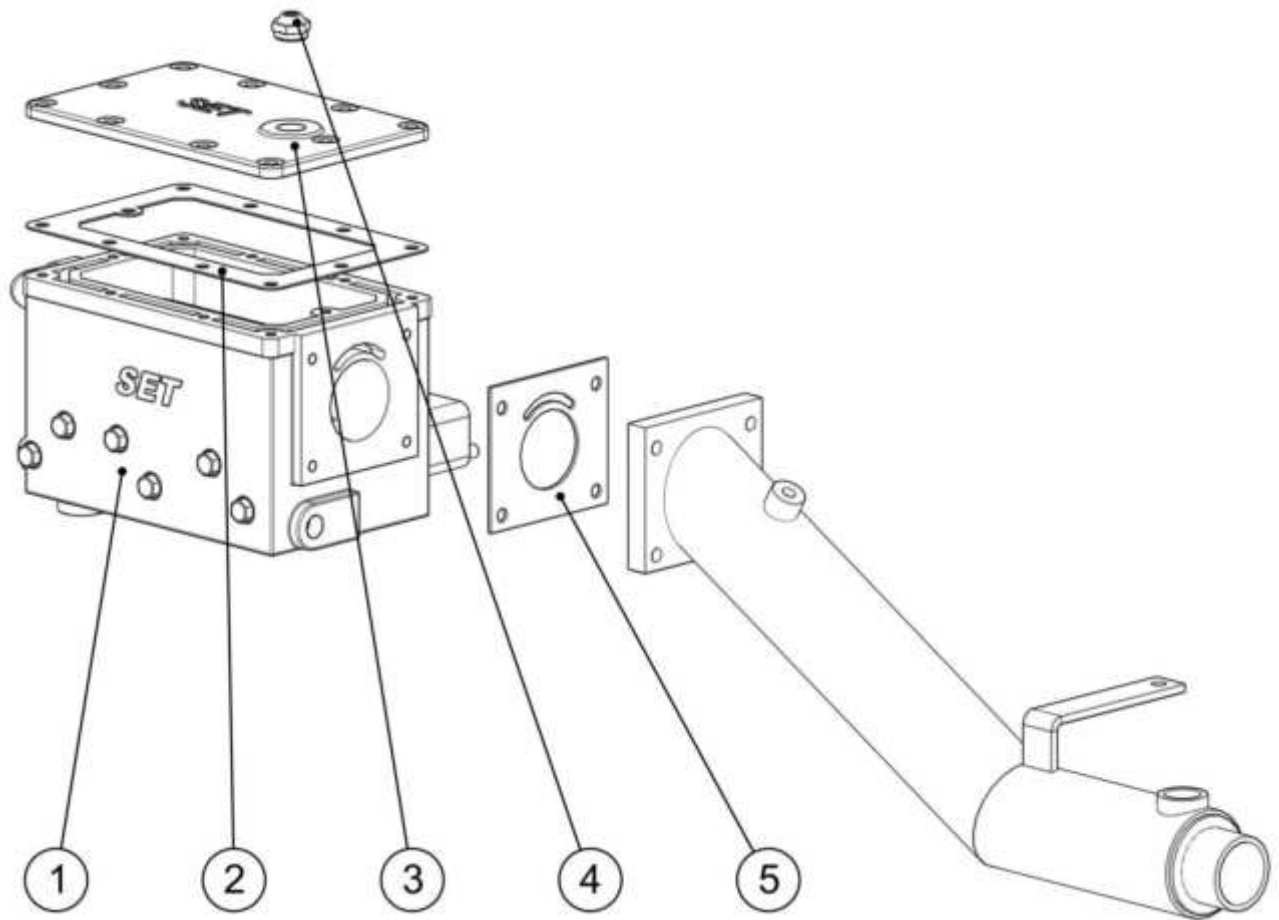
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Temperaturschalter 98-84°C – temperature switch 98-84°C	36401	36401	36401
2	1	Lichtmaschine 45A 12V – alternator 45A 12V	50715-01	50715-01	50715-01
3	1	Abgassammler – exhaust collector	23404	23403	23403-01
4	1	Öldruckschalter 1,5 bar – oil pressure switch 1,5 bars	36405	36405	36405
5	1	Temperaturschalter 98-84°C – temperature switch 98-84°C	36401	36401	36401

Kabelbaum – wiring harness



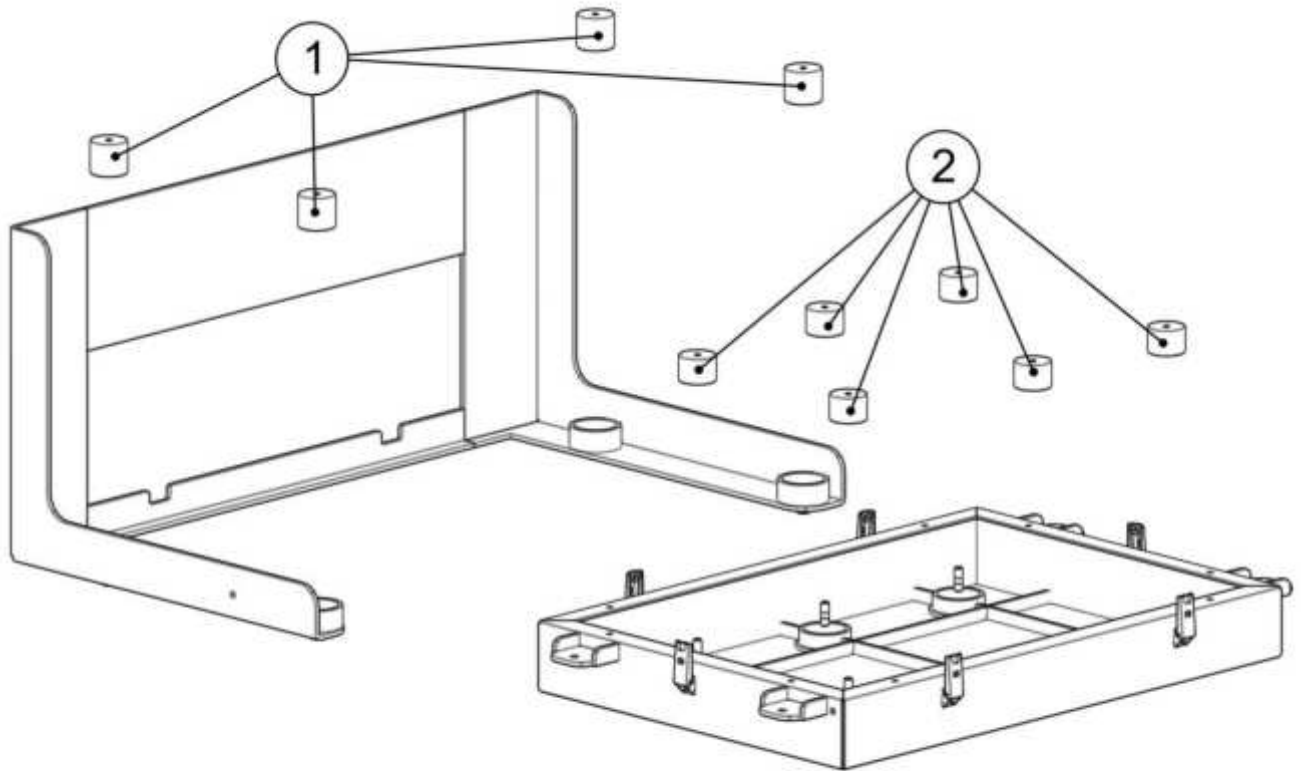
Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Flachsicherung 15A – flat fuse 15A	36521	36521	36521
2	1	Flachsicherung 7,5A – flat fuse 7,5A	36520-01	36520-01	36520-01
3	1	Flachsicherung 3A – flat fuse 3A	36520	36520	36520
4	1	Relais 12V 30A – relay 12V 30A	34020-00	34020-00	34020-00
5	1	Relais 12V 30A – relay 12V 30A	34020-00	34020-00	34020-00

Abgassammler – exhaust collector



Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Abgassammler Grundkörper – exhaust collector body	40616-01	40617-01	40618-01
2	1	Dichtung Abgassammler – gasket exhaust collector	40705	40704	40703
3	1	Abgassammler Deckel – exhaust collector cover	40611-01	40612-01	40613-01
4	1	Entlüftungsventil – bleed valve	33538-01	33538-01	33538-01
5	1	Dichtung Abgasrohr – gasket exhaust pipe	40707-01	40707-01	40707-01

Kapsel-Teile – capsule parts



Pos.	Bestellgröße order size	Beschreibung – description	Artikel-Nr. Camino 10	Artikel-Nr. Camino 15	Artikel-Nr. Camino 20
1	1	Zylinderlager 50x45x70 C Shore – cylinder bearing 50x45x70 C Shore	30607-06	30607-06	30607-06
2	1	Zylinderlager 50x35x40 C Shore – cylinder bearing 50x35x40 C Shore	30611-01	30611-01	30611-01

Optionales Zubehör – optional accessories

Bestellgröße order size	Beschreibung – description	Artikel-Nr. article no.
Meter	Keramikband für Abgasrohr 50x3mm - ceramic tape for exhaust pipe 50x3mm	50901
Stück - item	Externer Luftfilter – external air filter Camino 30	24300-00031
Stück - item	Externer Luftfilter – external air filter Camino 10-25	24300-00034
Stück - item	Traboldfilter	22303-03
Stück - item	Kraftstofffilter Liliput	50705
Liter	Kühlmittel silikatfrei (nur 5l Gebinde) – Coolant silicate-free (5l container only)	10802-02
Liter	Motoröl 15W-40(nur 5l Gebinde) – lubricate oil 15W-40 (5l container only)	10803
Stück - item	Entlüftungsschlüssel – Ventilation key	33538-01001
Kühlschläuche (verschiedene Größen) – coolant hoses (different sizes):		
Meter	Kühlwasserschlauch 7,5x12,5 NW6 Garnumflechtung – coolant hose yarn braiding	33810
Meter	Kühlwasserschlauch 7,5x13,5 NW6 – coolant hose	33805-10
Meter	Kühlwasserschlauch 12,0x19 NW10 – coolant hose	33805-01
Meter	Kühlwasserschlauch 15,0x23 NW13 – coolant hose	33805-02
Meter	Kühlwasserschlauch 18,0x26 NW16 – coolant hose	33805-03
Meter	Kühlwasserschlauch 22,0x30,5 NW20 – coolant hose	33805-06
Meter	Kühlwasserschlauch 22x31 Stahlumflechtung – coolant hose steel braiding	33812-01
Meter	Kühlwasserschlauch Spezial SGX DN25 – coolant hose special	33806-02000
Kraftstofftank (verschiedene Ausführungen) - fuel tank (various designs):		
Stück - item	Kraftstofftank 200 L Wandmontage - fuel tank 200 l wall mounting	23003-32
Stück - item	Kraftstofftank 75 L - fuel tank 75 l	23003-16
Stück - item	Kraftstofftank 105 L Sky Shield – fuel tank 105 l Sky Shield	40030-01401
Stück - item	Kraftstofftank 100 L kompl. – fuel tank 100 l complete	23215-02
Stück - item	Kraftstofftank 80 L – fuel tank 80 l	40080-01402
Stück - item	Kraftstofftank 100 L – fuel tank 100 l	40080-01403
Stück - item	Kraftstofftank 120 L – fuel tank 120 l	40080-01425

Ersatzteil-Bestellformular - service part order blank

Herstelleradresse:
Manufacture:



Stromerzeuger GmbH

Götscher Weg 85
D-40764 Langenfeld
Tel.: +49 (0)2173 / 39937-14 • Fax: +49 (0)2173 / 39937-21
e-mail: service@set-zeise.de • www.set-genset.com

Generatortyp*:
Genset type*:
Kundenbestell-Nr.*:
Order-No.*:
Eingebaut durch:
Installed from:
Benennung*:
Description*:
Baujahr* - Betriebsstunden**:
Year of manufacture* - Power of hours**:

* Siehe Typenschild – see type label

** siehe Kontroll-Panel – see control Panel

Pos.	Stück - Amount	Benennung - Description	Baugruppe - Ident-Nr.:	Bemerkung - Notice

Lieferadresse:
Delivery Address:

Erreichbar unter Telefon:
Within reach on Telephone:

Bestellung von Blatt - Seite
Order from Paper - Side

Bestellt - Unterschrift:
Order at: - Sign:

Am - at	Von - from



Raum für Notizen - notes

[illegible]