





# Vehicle Generator Manual

Panda 30 CR PVM 27.5 kVA

Fischer Panda No.0038177

400 V 50 Hz

Super silent technology

# Revision status

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## Dear valued customer,

Thank you for deciding to purchase a Fischer Panda generator and for choosing Fischer Panda as your on-board energy partner. Your generator offers you the possibility of generating your own power - wherever you are - making you all the more independent. Not only do you have a Fischer Panda generator on board; you are also supported worldwide by our Fischer Panda team. Please take the time to read this information. We can also assist you with:

**Inspecting the generator installation and guarantee**

Every generator has a world-wide guarantee. As soon as the installation has been completed, you can register your guarantee with your dealer. If you have obtained an extended guarantee, please ensure that this is properly filed and that your dealer has your current address. Please consult your dealer regarding guarantee options, especially when you have purchased a pre-owned generator. Your dealer will be happy to assist and can inform you regarding authorised Fischer Panda dealers world-wide.

**Service and Support**

To ensure that your generator runs faultlessly, regular servicing and maintenance tasks described in the handbook must be carried out. Fischer Panda can supply service kits intended for routine maintenance work. We only supply components of the highest quality and ensure that you receive the CORRECT spares for your generator. Service “Plus” Kits are also available and are ideal for longer cruises, which may last for more than one service interval.

Should you require any assistance, please contact your Fischer Panda dealer. Please do not attempt to carry out repairs yourself, as this can affect your generator guarantee. Your dealer can assist you in finding the nearest Fischer Panda service station. You can also find the nearest service station in our global service network, which is available as a download on our homepage.

**Product registration**

Please take the time to register your Fischer Panda generator on our website under

http://www.fischerpanda.de/mypanda.

By registering, you ensure that you are always informed and up-to-date. You will receive technical upgrades or special information concerning the operation and servicing of your generator. You will also be informed about new Fischer Panda products, which can be particularly helpful should you want to enhance your installation at a later date.

**Fischer Panda quality - certified according to DIN ISO 9001**

## Thank you for purchasing a Fischer Panda generator

## Your Fischer Panda Team

# 2. General instructions and regulations

## 2.1 The cardinal rule is safety!

Warning symbols are used throughout this manual to warn of the risk of personal injury or lethal danger when certain maintenance tasks or operating procedures are performed. Instructions marked in this way must be read and followed carefully.

Can cause acute or chronic health impairments or death even in very small quantities if inhaled, swallowed, or absorbed through the skin.

**WARNING: Hazardous materials**



This warning symbol draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in damage or destruction of equipment.

**Warning! Important information!**



Warning of materials that may ignite in the presence of an ignition source (cigarettes, hot surfaces, sparks, etc.).

**WARNING: Fire hazard**



In the environment described / during the work specified, smoking is prohibited.

**PROHIBITED: No smoking**



Fire and naked flames are ignition sources that must be avoided.

**PROHIBITED: Fire or naked flames prohibited**



The equipment shall not be activated or started up while work is in progress.

**PROHIBITED: Switching on/starting up prohibited**



Touching relevant parts and systems is prohibited..

**PROHIBITED: Do not touch**



An external signal may trigger an automatic start-up.

**DANGER: Autostart**



This danger symbol refers to the danger of electric shock and draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in severe personal injury or loss of life due to electric shock.

**WARNING: Hazardous electric voltage**



General warning of a hazard area

**WARNING: General warning**



Can cause acute or chronic health impairments or death if inhaled or ingested even in very small quantities.

**WARNING: Danger due to inhalation and/or ingestion**



Warning of “live” (energised) parts that may cause electric shock when touched. Especially hazardous for persons with heart problems or pacemakers.

**WARNING: Risk of electric shock when touched**



Danger of injury by being pulled into equipment. Bruising and dismemberment possible. Risk of being pulled in when touching with body part, loose-fitting clothing, scarf, tie, etc.

**WARNING: Danger due to rotating parts**



Warning regarding materials that under certain circumstances, such as heat or ignition sources, may cause explosions.

**WARNING: Explosion hazard**



Warning of hot surfaces and liquids. Risk of being burned/ scalded.

**WARNING: Hot surface**



Warning of substances that cause corrosive harm (chemical burns) when touched. These substances can act as contaminants if introduced into the body.

**WARNING: Danger due to corrosive (astringent) substances, potential contamination of person**



When the system is opened, the pressure can be relieved abruptly, expelling hot gases and fluids. Risk of injury due to parts flying about, burn hazard due to liquids and gases.

**WARNING: System may be pressurised!**



Risk of hearing damage.

**WARNING: Hearing damage**



Warning of magnetic fields

**WARNING: Magnetic field**



Risk of overpressure.

**WARNING: Overpressure**



Wearing appropriately snugly fitting protective clothing offers protection against hazards and can prevent harm to health.

**MANDATORY: Wear snugly fitting clothing (PPE).**



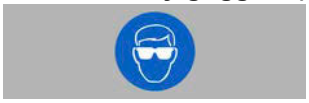
Wear hearing protection to avoid acute and cumulative harm.

**MANDATORY: Wear hearing protection (PPE)**



Wearing safety goggles protects the eyes from injury. Optical spectacles are not a replacement for appropriate safety goggles.

**MANDATORY: Wear safety goggles (PPE)**



Wearing protective gloves protects the hands from hazards such as friction, skin abrasion, puncturing, deep cuts, and contact with hot surfaces.

**MANDATORY: Wear protective gloves (PPE)**



Compliance with the instructions in the manual can avert danger and prevent accidents. This will protect you and the generator.

**MANDATORY: Follow the instructions in the manual.**



Environmental protection protects our environment. For you and for your children.

**MANDATORY: Comply with environmental protection requirements.**



## 2.2 Tools

These symbols are used throughout this manual to show which tools must be used for maintenance or installation purposes.

| | |
|---|---|
|  | Spanners<br>W.A.F X = width across flats of X mm |
|  | Strap wrench for oil filter |
|  | Screwdriver, for slotted head screws and for Phillips head screws |
|  | Multimeter, multimeter with capacitor measuring unit |
|  | Socket wrench set |
|  | Hexagon socket wrench set |

| | |
|---|---|
|  | Clamp-on ammeter (DC for synchronous generators; AC for asynchronous generators) |
|  | Torque wrench |

## 2.3 Customer registration and warranty

Use the advantages of registering your product:

- You will receive a guarantee certificate once your installation data has been checked.
- You will receive additional product information that may be safety-relevant.
- You will receive free upgrades, when necessary.

Further advantages:

By providing full details, the Fischer Panda technicians will be able to offer rapid assistance, as 90 % of break-downs are caused by peripheral faults.

Problems due to installation errors can be recognised in advance.

### 2.3.1 Technical support

Technical support via the Internet: info@fischerpanda.de

### 2.3.2 Caution, important information for start-up!!

1. The commissioning report shall be filled in immediately after initial operation and shall be confirmed by signature.
2. The commissioning report must be received by Fischer Panda GmbH at Paderborn within 4 weeks of initial operation.
3. After receiving the commissioning report, Fischer Panda will make out the official guarantee certificate and send it to the customer.
4. If guarantee claims are made, the document with the guarantee certification must be submitted.

If the above requirements are not or only partly fulfilled, the warranty claim shall become void.

## 2.4 Safety Instructions - safety first!

### 2.4.1 Safe operation



Careful handling of the equipment is the best insurance against an accident. Read the handbook diligently, and make sure you understand it before starting up the equipment. All operators, regardless of their experience level, shall read this handbook and additional pertinent manuals before commissioning the equipment or installing an attachment. The owner shall be responsible for ensuring that all operators receive this information and are instructed on safe handling practices.

### 2.4.2 Observe the safety instructions!

Read and understand this handbook and the safety instructions on the generator before trying to start up and operate the generator. Learn the operating practices and ensure work safety. Familiarise yourself with the equipment and its limits. Keep the generator in good condition.

### 2.4.3 Personal protective clothing

For maintenance and repair work on the equipment, ***do not*** wear loose, torn, or ill-fitting clothing that may catch on protruding parts or come into contact with pulleys, cooling disks, or other rotating parts, which can cause severe injury.

Wear appropriate safety and protective clothing when working.

Do not operate the generator while under the influence of alcohol, medication or drugs.



Do not wear head phones or ear buds while operating, servicing, or repairing the equipment.



### 2.4.4 Cleanliness ensures safety

Keep the generator and its environment clean.



Before cleaning, the generator must be switched off and secured against unintended starting. Keep the generator free from dirt, grease, and waste. Store flammable liquids in suitable containers only and ensure adequate distance to the generator. Check the lines regularly for leakage and eliminate leaks immediately as applicable.

## 2.4.5 Safe handling of fuels and lubricants

Keep fuels and lubricants away from naked fire.



Before filling up the tank and/or applying lubricant, always shut down the generator and secure it against accidental start-up.

Do not smoke and avoid naked flame and sparking near fuels and the generator. Fuel is highly flammable and may explode under certain conditions.

Refuel in well-ventilated open spaces only. If fuel/lubricant has been spilled, eliminate fluids immediately.



Do not mix diesel fuel with petrol or alcohol. Such a mixture can cause fire and will damage the generator.

Use only approved fuel containers and tank systems. Old bottles and canisters are not suitable.

## 2.4.6 Exhaust fumes and fire protection

Engine fumes can be hazardous to your health if they accumulate. Ensure that the generator exhaust fumes are vented appropriately (leak-proof system), and that an adequate fresh air supply is available for the generator and the operator (forced ventilation).



Check the system regularly for leakage and eliminate leaks as applicable.

Exhaust gases and parts containing such fumes are very hot; they may cause burns under certain circumstances. Always keep flammable parts away from the generator and the exhaust system.

To prevent fire, ensure that electrical connections are not short-circuited. Check regularly that all lines and cables are in good condition and that there is no chafing. Bare wires, open chafing spots, frayed insulation, and loose cable connections can cause dangerous electric shocks, short-circuit, and fire.



The generator shall be integrated in the existing fire safety system by the operating company.

### CALIFORNIA

Proposition 65 Warning

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



## 2.4.7 Safety precautions against burns and battery explosions

The generator and its cooling agents and lubricants as well as the fuel can get hot while the generator is operated. Handle hot components with care such as exhaust components, radiators, hoses and the engine block both during operation and after the generator has been switched off.



The cooling system may be pressurised. Open the cooling system only after letting the engine and the coolant cool down. Wear appropriate protective clothing (e.g. safety goggles, gloves).



Prior to operation, ensure that the cooling system is sealed and that all hose clamps are tightened.

The battery represents an explosion hazard, this applies both to the starter battery and the battery block of the AGT generators. While batteries are being charged, a hydrogen-oxygen mixture is generated, which is highly explosive (electrolytic gas).



Do not use or charge batteries if the fluid level is below the MINIMUM marking. The useful life of the battery is significantly reduced, and the risk of explosion increases. Always fill fluid levels to a point between the maximum and minimum levels.

Especially during charging, keep sparks and naked fire away from the batteries. To avoid sparking, ensure that the battery terminals are firmly connected and are not corroded. Use an appropriate terminal grease.



Check the charge level with an adequate voltmeter or acid siphon. A metal object lying over the poles will cause a short circuit, battery damage and a high risk of an explosion.

Do not charge frozen batteries. Warm the batteries to +16 °C (61 °F) before charging.

## 2.4.8 Protect your hands and body from rotating parts!

Always keep the capsule closed while operating the generator.

To check the V-belt tension, always shut down the generator.



Keep your hands and body away from moving parts, such as belt pulleys, fans, V-belts and flywheels. Touching can result in serious injury.

Do not run the engine without the safety devices in place. Prior to start-up, mount all safety devices securely and check for proper attachment and function.

## 2.4.9 Antifreeze and disposal of fluids

Antifreeze contains toxic substances. To prevent injury, wear rubber gloves and wash off any anti-freeze immediately in case of skin contact. Do not mix different anti-freeze agents. The mixture may cause a chemical reaction generating harmful substances. Use only anti-freeze that is approved by Fischer Panda.



Protect the environment. Collect drained fluids (lubricants, anti-freeze, fuel), and dispose of them properly. Observe the local regulations for the respective country. Ensure that no fluids (not even very small quantities) can drain into the soil, sewers, or bodies of water.



### 2.4.10 Implementation of safety inspections and maintenance

Disconnect the battery from the engine before performing service work. Affix a sign to the control panel - both the main and the corresponding slave panel - with the instruction " DO NOT START UP - MAINTENANCE IN PROGRESS" to prevent unintentional start-up.



To prevent sparking due to accidental short-circuiting, always remove the grounding cable (-) first and reconnect it last. Do not start work until the generator and all fluids and exhaust system parts have cooled down.

Use only suitable tools and equipment and familiarise yourself with their method of functioning to prevent secondary damage and/or injury.



Always keep a fire extinguishing unit and a first aid box handy while performing maintenance work.

## 2.5 Warning and instruction signs

Keep warning and instruction signs clean and legible.

Clean the signs with water and soap and dry them with a soft cloth.

Immediately replace damaged or missing warning and instruction signs. This also applies to the installation of spare parts.

### 2.5.1 Special instructions and hazards of generators

The electrical installations may only be carried out by trained and qualified personnel!



**The generator must not be operated with the cover removed.**



If the generator is to be installed without a sound attenuation housing, it must be ensured that all rotating parts (belt pulley, V-belts etc.) are covered and protected so that there is no risk of injury!

If a sound attenuation upgrade is to be manufactured at the place of installation, then well-placed signs must show that the generator can only be switched on with the sound attenuation housing closed.



All service, maintenance, or repair work may only be carried out when the engine is not running.

Electrical voltages above 48 V (in the case of battery chargers, already when greater than 36 V) are always life-threatening. It is therefore mandatory that the rules of the respective regional authority regarding installation and maintenance are complied with. For safety reasons, only an electrician may carry out the installation of the electrical connections of the generator.

### 2.5.1.1 Protective conductor and equipotential bonding:

**Electrical current over 48 V can be deadly. For this reason, systems are grounded with a protective conductor. In conjunction with an RCD (FI switch), the power supply is disconnected in the event of a fault.**

**Appropriate protective measures, such as the RCD, and appropriate fuses must be made available by the customer, to ensure the safe operation of the generator.**

### 2.5.1.2 Protective conductor for Panda AC generators:

The generator is "earthed" as a standard feature (the centre and earth are connected by means of a jumper in the generator terminal box). This is a basic first-level safety measure, which offers protection as long as no other measures are installed. Above all, it is designed for delivery and a test run that may be required.



This earthing (PEN) only functions when all parts of the electrical system are earthed on a common potential. The shunt can be removed if this is necessary for technical reasons and another protective system has been set up instead.

**While the generator is being operated, the full voltage is applied to the AC control box, as well. Therefore, it is essential to ensure that the control box is closed and secured against touch while the generator is running.**



**The battery must always be disconnected if work on the generator or electrical system of the generator is to be performed, so that the generator cannot be started inadvertently.**

### 2.5.1.3 Switch off all loads when working on the generator

All loads must be disconnected prior to working on the generator to avoid damage to the devices. In addition, the semiconductor relays in the AC control box must be disconnected in order to avoid the booster capacitors being activated during set-up. The negative terminal of the battery must be disconnected.

Capacitors are required to run the generator. They have two separate functions:

A) working capacitors

B) booster capacitors

Both groups are located in a separate AC control box.

Capacitors store electrical energy. High voltages may remain across the capacitor contacts even after they have been disconnected from the mains. As a safety precaution, do not touch the contacts. If the capacitors must be replaced or inspected, the contacts shall be short-circuited by connecting an electric conductor to discharge potentially remaining potential differences.

If the generator is switched off normally, the working capacitors are automatically discharged via the winding of the generator. The booster capacitors are discharged by means of internal discharge resistors.

For safety reasons, all capacitors must be discharged through short-circuiting before work is carried out on the AC control box.

### 2.5.1.4 Potential equalisation in Panda AGT DC Generators

For further information specific to your generator, see the chapter installation.

### 2.5.1.5 Safety instructions concerning cables

**Cable types**

It is recommended to use cables that are in compliance with the UL 1426 (BC-5W2) standard with Type 3 (ABYC section E-11).

**Cable cross-section**

The cable shall be selected taking into account the amperage, cable type, and conductor length (from the positive power source connection to the electrical device and back to the negative power source connection).

**Cable installation**

It is recommended to install a self-draining cable conduit classified as V-2 or higher in compliance with UL 94 in the area of the cable guide inside the capsule. Care must be taken that the cable routing is not run next to hot surfaces such as exhaust manifolds or motor oil drain plugs, but rather as free of any causes of friction or crushing as possible.

## 2.5.2 General safety instructions when dealing with batteries

**These instructions shall apply in addition to the instructions of the battery manufacturer:**



- While you are working on the batteries, a second person should be within earshot to help you if necessary.
- Keep water and soap ready in case battery acid is burning your skin.
- Wear eye protection and protective clothing. Do not touch your eyes while handling batteries.
- If acid splashes on your skin or clothing, wash if off with lots of water and soap.



- If acid enters your eyes, rinse them immediately with clean water, until the burning sensation has stopped. Immediately seek medical assistance.
- Do not smoke near the batteries. Avoid naked flames. The area around batteries is a potentially explosive atmosphere.
- Ensure that no tools are dropped on the battery terminals; cover them if necessary.



- Do not wear jewellery or watches on your arms during installation that might short-circuit the battery. Otherwise, there is a risk of skin burns.
- Protect all battery contacts against accidental contact.



- For battery blocks: Use only deep cycle batteries. Starter batteries are not suitable. Lead-acid gel batteries are recommended. They are maintenance-free, deep discharge capable, and do not release gases.
- Never charge a frozen battery.
- Avoid battery short-circuits.
- Ensure proper ventilation of the battery to vent gases that may be released.



- Battery connection terminals must be checked to ensure that they are seated securely before operation.
- Battery leads must be routed carefully and tested for undue heating under load. Check the battery near vibrating components regularly for chafing and insulation defects.



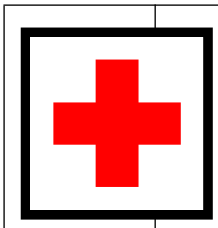
**ATTENTION! For battery charger generators (Fischer Panda AGT-DC)!**



**Prior to installation, verify that the voltage of the battery bank complies with the output voltage of the generator.**

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# 3. In an emergency - First Aid







First aid for accidents involving electric shock

Follow these 5 safety steps if someone is the victim of electrical shock:

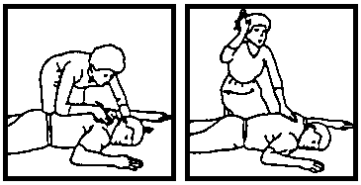
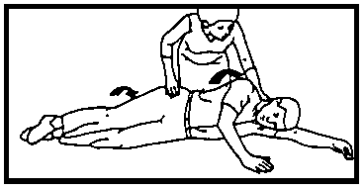
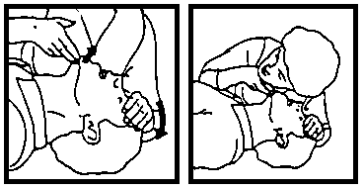
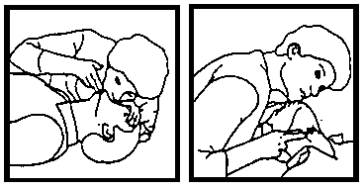
1. Do not try to pull or grab the individual while the generator is running.
2. Shut down the generator immediately.
3. If you cannot turn off the electrical power, pull, push, or lift the person to safety using a wooden pole, rope, or other non-conductive material.
4. Send for help as soon as possible (summon an emergency response physician).
5. Commence the necessary first aid procedures immediately.

## 3.1 When an adult stops breathing

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

**Warning!**



| | | |
|---|---|---|
| 1 Does the person respond?<br>Tap or gently shake victim.<br>Ask, "Are you OK?" |  | 2 Shout, "Help!"<br>Ask bystanders to phone for help. |
| 3 Roll person onto his/her back.<br>Roll casualty towards you by pulling slowly. |  | |
| 4 Open the airway of the casualty.<br>Tilt head back, and lift chin.<br>Shout, "Are you OK?" |  | 5 Check for breathing.<br>Look, listen, and feel for breathing for 3 to 5 seconds. |
| 6 Give 2 full breaths.<br>Keep casualty's head tilted back.<br>Pinch nose shut.<br>Seal your lips tightly around victim's mouth.<br>Give 2 full breaths of 1 to 1½ seconds each. |  | |
| 7 Check for pulse at carotid artery.<br>Feel for pulse for 5 to 10 seconds. |  | 8 Phone EMS for help.<br>Send someone to call an ambulance. |
| 9 Begin resuscitation.<br>Keep casualty's head tilted back.<br>Lift the casualty's chin.<br>Pinch the casualty's nose shut.<br>Give 1 full breath every 5 seconds.<br>Look, listen, and feel for breathing between breaths. |  | 10 Recheck pulse every minute.<br>Keep head tilted back.<br>Feel for pulse for 5 to 10 seconds.<br>If victim has pulse, but is not breathing, continue rescue breathing. If no pulse can be detected, begin CPR. |

# 4. Basics

## 4.1 Proper use

The Fischer Panda diesel generator is intended solely for use as a permanently-installed power generator in (vehicles, trailers and mobile containers) (inland waterway vessels) (seagoing vessels).

## 4.2 Objectives of the manual and declaration of interested parties

This manual serves as the work and operating instructions for the user and operator of Fischer Panda generators.

The handbook serves as a foundation and guide for the installation and servicing of Fischer Panda generators in a manner that complies with legislation and regulation. It does not replace professional judgement and design, nor the modification of the installation to comply with local conditions and national/international regulations. All work must be carried out according to the state of the art.

### 4.2.1 Specialists

**Specialists that are considered to be suitable to work on the mechanical components include qualified motor-vehicle mechanics or persons with equivalent qualifications.**

**Specialists considered to be suitable to work on the electrical systems include qualified electricians, electrical engineering technicians, or persons with equivalent qualifications.**

After the installation, the specialist must instruct the user in the operation and servicing of the generator. He/she must point out the hazards that exist to the user.

### 4.2.2 Users

**The user is considered to be the person who is responsible for operating the generator.**

After installation, the user must be instructed regarding the handling and operation of the generator. This includes, in particular, instruction regarding the hazards that arise while operating, the various operating conditions and training regarding the maintenance of the generator,

The user must read the entire handbook and must take note of the safety instructions and regulations contained therein.

### 4.2.3 Operators

**The operators are considered to be the persons who have been appointed by the owner/user to handle and operate the generator.**

The owner/user must ensure that the operator has read the manual in full and that the appropriate safety instructions and regulations are complied with. The operator must, in accordance with his/her job description, be trained and made technically competent by the user. This is particularly important in the area of servicing.

## 4.3 Scope of supply of the Fischer Panda xGenerator

The scope of delivery of the Fischer Panda generators includes the following parts:

1. Panda xGenerator

*Illustrative example*

*Fig. 4.3-1: Panda xGenerator*




2. Control Panel of the Panda fpControl

*Illustrative example*

*Fig. 4.3-2: fpControl Panel*



3. FP- Bus cable 15 m

*Fig. 4.3-3: FP- Bus cable 15 m*



4. Termination resistor

*Fig. 4.3-4: Termination resistor*



**Fischer Panda manual**

**The Fischer Panda manual comprises the following components:**

*Fig. 4.3-5: Manual*

- Clear plastic folder with general information, guarantee conditions, installation protocol (installation report) and service list.
- Generator handbook with attached handbook for the remote-control panel.
- Spare part catalogue for "Installation & Service Guide".
- Engine manufacturer's handbook
- Circuit diagram of the generator




*Example*

**Optional accessories**

**Optional accessories include, for example:**

- Fuel pump
- Installation kit

## 4.4 Area of application

Permitted as a power supply on vehicles.

## 4.5 Opening the Fischer Panda Transport Box

### 4.5.1 Bolted Fischer Panda Transport Box

1. Loosen the bolts for lid / side-walls
2. Remove the cover
3. Remove the loose accessories
4. Remove the bolts for sidewalls / floor pallet
5. Remove the sidewalls
6. Loosen the equipment lock

### 4.5.2 Fischer Panda Transport Box with metal tab closure

1. Bend open the metal tab closures on the transport box lid.
2. Remove the cover
3. Remove the loose accessories
4. Bend open the metal tab closures on the transport box bottom.
5. Remove the sidewalls
6. Loosen the equipment lock

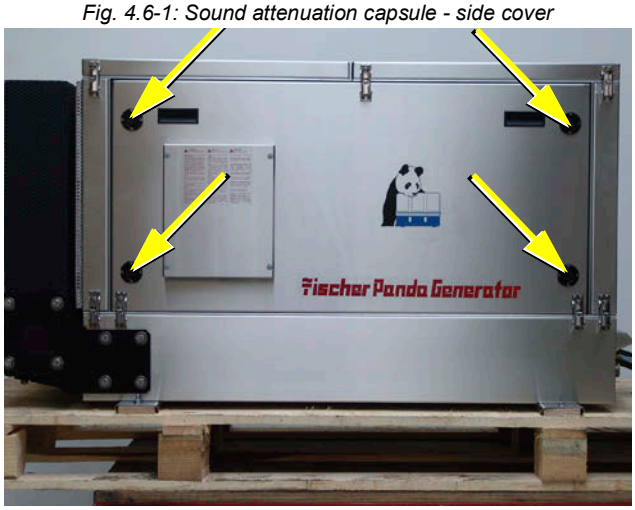
## 4.6 Opening the MPL sound attenuation capsule

**To open the sound attenuation capsule, the closures must be rotated anti-clockwise through approximately 180°. Use a flat-bladed screwdriver for this purpose. Pull the side-walls out using the recessed grips.**



*Illustrative example*

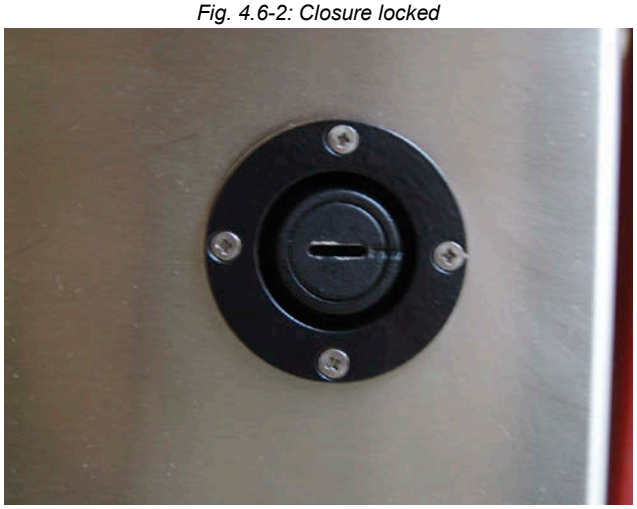
*Fig. 4.6-1: Sound attenuation capsule - side cover*



### Closure locked

*Illustrative example*

*Fig. 4.6-2: Closure locked*



### Closure open

*Illustrative example*

*Fig. 4.6-3: Closure open*



## 4.7 Opening the GFRP sound insulation capsule

### GFRP capsule with latch fasteners

*Illustrative example*

*Fig. 4.7-1: Latch fasteners*



**To open the sound attenuation capsule, the latch fasteners must be pulled in the direction indicated by the arrow, and then lifted off the lower part of the fastener. After all the fasteners have been opened, the upper part of the capsule can be lifted off the lower part.**

*Illustrative example*

*Fig. 4.7-2: Tab fasteners*




## 4.8 Transport and Loading

### 4.8.1 Transporting the generator

- The generator may only be transported in an upright position.
- The Fischer Panda transport box must be used when transporting the generator. The generator shall be securely attached to the bottom of the box.
- A suitable forklift must be used when loading.
- Depending on the means of transportation (e.g. air freight), the generator fluids (coolant, engine oil, fuel) may need to be drained. The corresponding instructions and warnings must be fitted to the transport packaging.

### 4.8.2 Loading the generator.

Appropriate eyebolts should be installed in the threaded holes of the support rails when loading the generator. The load bearing capacity of each ring eye bolt must at least equal the generator weight.

**An adequate lifting yoke shall be used for transport/ loading**

*Fig. 4.8.2-1: Example of lifting yoke*



## 4.9 Special servicing instructions and measures for extended downtime and decommissioning

Preservation and storage must be adapted to the circumstances and storage conditions on site.

**Note:**



**Fischer Panda accepts no liability for damage resulting from incorrect storage and preservation.**

Downtimes are categorised in the following groups:

- Short term downtime (1 to 3 months)
- Medium term downtime / hibernation (3 to 6 months)
- Long term downtime / decommissioning (more than 6 months)

### 4.9.1 Instructions regarding the starter battery during extended downtime

**Starter batteries**

**Note:**



The self-discharge of batteries is a physical and chemical process which cannot be avoided simply by disconnecting the battery.

- For extended downtimes, the battery shall be disconnected from the generator set.
- Charge battery regularly. Observe instructions of the battery manufacturer.

Depending on the battery type, the acid level must be checked before charging and each cell must be topped up to the marking using distilled water as necessary.

Modern starter batteries are typically maintenance-free.

**Deep discharge will damage the battery and can render it unserviceable.**

Keep battery clean and dry. Clean battery poles (+ and -) and terminals regularly and coat with an acid-free and acid-resistant grease. During assembly, ensure good contact of the terminal connections.

General limits for lead-acid batteries:

2.1 V / cell corresponds with full-charged battery (charged).

1.95 V / cell corresponds with drained battery - recharge.

The following applies to a 12 V:

- 11.7 V lower open-circuit voltage (battery drained), recharge battery.
- 12.6 V upper open-circuit voltage (fully-charged battery) - trickle charge fully-charged battery at 13.2V.

The following applies to a 24 V:

- 23.4 V lower open-circuit voltage (battery drained), recharge battery.
- 25.2 V upper open-circuit voltage (fully-charged battery) - trickle charge fully-charged battery at 26.4V.

*These values are based on a battery temperature of 20-25 °C. Take note of the details supplied by the battery manufacturer.*

**Fischer Panda recommends:**

**Note:**



- Install a battery disconnect switch and switch the machine to the Off position. (Cutting the battery circuit.)
- Secure the positive pole of the battery close to the battery.

- Regularly check contacts for corrosion.

### 4.9.2 Measures for short-term downtimes

Short downtime (1 to 3 months)

- Measure battery charge status based on open-circuit voltage.
- During downtime >7 days, disconnect the battery (e.g. main battery switch in the 0-position).
- Check the battery within 2 months and allow the engine to warm up for at least 10 mins.
- Fill the tank to the 100 % level (Full)

### 4.9.3 Measures for medium-term downtimes / hibernation

Medium-term downtimes (3 to 6 months)

#### 4.9.3.1 Surface protection measures:

- Check battery charge status and recharge regularly, roughly every 2 months, as necessary. Observe instructions of the battery manufacturer.
- Check coolant antifreeze level and refill as necessary.

  The antifreeze must not be older than 2 years. The proportion of antifreeze agent should lie between 40 % and 60 %, to ensure corrosion protection in the coolant circuit. Top off coolant if necessary.

  If the coolant has been drained - for example, after mothballing the engine - no water may remain in the engine during the downtime. The control unit must be marked accordingly with a note specifying "NO COOLANT".
- Drain engine oil as specified. Refill engine with preservative oil to the maximum level on the oil dipstick.
- Drain the diesel from the tank and fill up with a mothballing mixture (90 % diesel and 10 % preserving oil (Full level).

**Allow the engine to crank, but do not start it.**

- Dismount V-belt as specified, wrap and store in a dry location. Protect against UV radiation.

**Cover alternator apertures!** **Attention!**

Cleaning fluids and preservatives must not enter the alternator. Risk of destroying the alternator.



- Clean engine as per manufacturer's instructions.
- Spray engine parts and V-belt pulleys with preservative.
- Clean air filter housing and spray with preservative (metal housing only).
- Seal the air intake and exhaust gas openings (e.g. with tape or end caps)

**Before recommissioning, remove preservatives and protective measures!** **Attention!**



#### 4.9.3.2 Measures for removing surface protection after medium term downtimes (3 to 6 months).

- Check battery charge status and recharge if necessary. Observe instructions of the battery manufacturer.
- Check the level of antifreeze protection and the coolant level; top up as required.

- Drain engine oil. Replace oil filter and engine oil as per the specification.
- Remove preservatives from the engine with petroleum spirit.
- Degrease V-belt pulleys and mount V-belt according to instructions. Check V-belt tension!
- If applicable, open the turbocharger oil pressure line and pour clean engine oil into the channel.
- Hold engine stop lever in zero-power position and crank engine manually several times.
- Clean air filter housing with petroleum spirit, check air filter and replace if necessary.
- Remove covers from exhaust aperture and intake apertures.
- Connect the battery. Close battery main switch.
- Hold stop lever on generator motor in neutral position and crank starter for approx. 10 seconds. Then, pause for 10 seconds. Repeat this procedure twice.
- Perform visual check of the generator similar to initial commissioning and start up generator.

### 4.9.4 Measures for long-term downtime / decommissioning

Downtimes (more than 6 months)

#### 4.9.4.1 Surface protection measures:

- Check battery charge status and recharge regularly, roughly every 3 months, as necessary. Observe instructions of the battery manufacturer.
- Check coolant antifreeze level and refill as necessary.

  The antifreeze agent must not be older than 2 years. The proportion of antifreeze agent should lie between 40 % and 60 %, to ensure corrosion protection in the coolant circuit. Top off coolant if necessary.

  If the coolant has been drained - for example, after mothballing the engine - no water may remain in the engine during the downtime. The control unit must be marked accordingly with a note specifying "NO COOLANT".
- Drain engine oil as specified. Refill engine with preservative oil to the maximum level on the oil dipstick.
- Drain the diesel from the tank and fill up with a mothballing mixture (90 % diesel and 10 % preserving oil (Full level).

**Allow the engine to crank, but do not start it.**

- Dismount V-belt as specified, wrap and store in a dry location. Protect against UV radiation.
- Disconnect the battery. Coat terminals with acid-free grease.

**Cover alternator apertures!**

Cleaning fluids and preservatives must not enter the alternator. Risk of destroying the alternator.

**Attention!**



- Clean engine as per manufacturer's instructions.
- Spray engine parts and V-belt pulleys with preservative.
- Clean air filter housing and spray with preservative (metal housing only).
- Spray preservative on intake and exhaust side of exhaust turbocharger (where applicable) and reconnect the lines.
- Remove valve cover and spray inside of valve cover, valve stems, springs, rocker, etc. with preservative oil.
- Remove injection nozzle and coat cylinder surface with preservative oil. Hold stop lever in zero-power position and crank engine manually several times. Screw the injection nozzles, together with fresh seals (if at least 100 hours of operation have elapsed since the last change) back in. Observe torque values.
- Spray the radiator cover and tank cover or radiator cover on the expansion tank lightly with preservative oil and refit.
- Seal the air intake and exhaust gas openings (e.g. with tape or end caps)

**For storage for more than 12 months, the preservation measures shall be checked annually and supplemented as necessary.**

**Note:**



**Before recommissioning, remove preservatives and protective measures!**

**Attention!**



### 4.9.4.2 Measures for removing preservatives after long-term downtime / recommissioning (more than 6 months):

- Check battery charge status and recharge if necessary. Observe instructions of the battery manufacturer.
- Check the level of antifreeze protection and the coolant level; top up as required.
- Drain engine oil. Replace oil filter and oil as per the specification.
- Remove preservatives from the engine with petroleum spirit.
- Degrease V-belt pulleys and mount V-belt according to instructions. Check V-belt tension!
- If applicable, open turbocharger oil pressure line and fill clean engine oil into channel.
- Hold engine stop lever in zero-power position and crank engine manually several times.
- Clean air filter housing with petroleum spirit, check air filter and replace if necessary.
- Remove covers from exhaust aperture and intake apertures.
- Connect the battery. Close battery main switch.
- Hold stop lever on generator motor in neutral position and crank starter for approx. 10 seconds. Then, pause for 10 seconds. Repeat this procedure twice.
- Perform visual check of the generator similar to initial commissioning and start up generator.

**Fischer Panda recommends:**

After long-term downtime, a complete inspection must be performed in accordance with the inspection list.

**Note:**



# EC Declaration of conformity

in accordance with Regulation (EU) 2023/1230 on machinery

| | |
|---|---|
| Manufacturer | Fischer Panda GmbH<br>Otto-Hahn-Straße 40<br>33104 Paderborn |
| Product | Fischer Panda Diesel Generator |
| Product Type | G 00030x PVM CR 400-50-3 M4 |
| Part No. | 0038177 |
| Year of manufacture | 2025- |
| Function description | The Fischer Panda diesel generator is intended solely for use as a permanently-installed power generator in (vehicles, trailers and mobile containers) (inland waterway vessels) (seagoing vessels). |

**We hereby declare that this machine, on the basis of its design and construction and in the version that we have brought to market complies with the fundamental safety and health requirements of the following European and North American directives and regulations:**

| | |
|---|---|
| **(EU) 2016/1628** | Regulation concerning requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery |
| **(EU) 2024/537** | Regulation on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) 517/2014 |
| **(EU) 2019/2144** | Regulation on the type-approval of motor vehicles and motor vehicle trailers and of systems, components and separate technical units for these vehicles with a view to their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/858 and repealing Regulations (EC) No. 78/2009, (EC) No. 79/2009 and (EC) No. 661/2009 and of Regulations (EC) No. 631/2009, (EU) No. 406/2010, (EU) No. 672/2010, (EU) No. 1003/2010, (EU) No. 1005/2010, (EU) No. 1008/2010, (EU) No. 1009/2010, (EU) No. 19/2011, (EU) No. 109/2011, (EU) No. 458/2011, (EU) No. 65/2012, (EU) No. 130/2012, (EU) No. 347/2012, (EU) No. 351/2012, (EU) No. 1230/2012 and (EU) 2015/166 |
| **2014/30/EU** | Directive relating to electromagnetic compatibility |
| **2014/35/EU** | Low-voltage Directive |
| **(EU) 2023/1230** | Regulation on machinery and repealing Directives 2006/42/EC and 73/361/EEC |
| **2005/88/EC** | Amendment to Directive 2000/14/EC concerning the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors |

**This machine complies with the following standards and conventions:**

| | |
|---|---|
| **DIN EN ISO 8528-13:2017-03** | Alternating current generator sets driven by a reciprocating internal combustion engine - Part 13: Safety |
| **DIN EN ISO 12100:2010** | Safety of Machines - general design principles - risk assessment and risk reduction |
| **DIN ISO 6826:2022-05** | Reciprocating internal combustion engines - Fire protection |
| **DIN EN 60034-1:2015-02** | Rotating electrical machines - Part 1 Standard methods for determining losses and efficiency from tests |
| **DIN EN 60204-1:2019-06** | Safety of machines - electrical equipment of machines - Part 1: General requirements |
| **ISO 3046-1:2002-05** | Reciprocating internal combustion engines - Performance - Part 1:<br>Declarations of power, fuel and lubricating oil consumptions, and test methods - Additional requirements for engines for general use |
| **ISO 3046-3:2006-06** | Reciprocating internal combustion engines - Performance - Part 3: Test measurements |
| **ISO 3046-4:2009-12** | Reciprocating internal combustion engines - Performance - Part 4: Governor |
| **ISO 3046-5:2001-12** | Reciprocating internal combustion engines - Performance - Part 5: Torsional vibrations |

| | |
|---|---|
| **ISO 3046-6:2020-02** | Reciprocating internal combustion engines - Performance - Part 6: Over-speed protection |
| **ISO 8178-1:2020-06** | Reciprocating internal combustion engines - Measurement of exhaust emissions - Part 1: Test bench measurement systems for gaseous and particulate emissions |
| **ISO 8178-4:2020-06** | Reciprocating internal combustion engines - Measurement of exhaust emissions - Part 4: Steady-state and transient test cycles for various engine applications |
| **DIN 6280-10:1986-10** | Reciprocating internal combustion engines; generating sets with reciprocating internal combustion engines; small power generating sets; requirements and tests |
| **MARPOL 73/78** | International Convention for the Prevention of Pollution from Ships, 1973 |
| **2011/65/EU** | Restriction of the use of certain hazardous substances in electrical and electronic equipment |

**Emission**

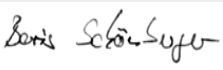
| | |
|---|---|
| **DIN EN 55014-1:2022-12; VDE 0875-14-1:2022-12** | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus |
| **DIN EN 55016-1-2:2019-10; VDE 0876-16-1-2:2019-10** | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus |
| **DIN EN 55016-2-1:2019-11; VDE 0877-16-2-1:2019-11** | Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus |
| **DIN EN 55016-2-3:2020-11; VDE 0877-16-2-3:2020-11** | Requirements for radio interference and immunity measuring apparatus and methods as well as methods of measurement of interference (radio interference) and immunity |
| **DIN EN IEC 61000-6-4:2020-09; VDE 0839-6-4:2020-09** | Electromagnetic Compatibility (EMC) |

**Immunity**

| | |
|---|---|
| **DIN EN 61000-4-2:2009-12; VDE 0847-4-2:2009-12** | Electromagnetic Compatibility (EMC) - Testing and measurement techniques – Electrostatic discharge immunity test |
| **DIN EN 61000-4-3:2021-11; VDE 0847-4-3:2021-11** | Electromagnetic Compatibility (EMC) - Immunity test in respect of high-frequency electromagnetic fields |
| **DIN EN 61000-4-4:2013-04; VDE 04/04/0847:2013-04** | Electromagnetic Compatibility (EMC) - Testing and measurement techniques - Immunity test in respect of electrical fast transients |
| **DIN EN 61000-4-6:2014-08; VDE 06/04/0847:2014-08** | Electromagnetic Compatibility (EMC) - Testing and measurement techniques - Immunity test in respect of conducted interference induced by high-frequency fields |

The person authorized to compile the technical file

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| | |
|---|---|
| Paderborn, _____09.08.2025_____ |  |
| Place, date | Boris Schönberger (General Manager & Technical Director) |
| Paderborn, _____09.05.2025_____ |  |
| Place, date | Roland Ferber (Head of Quality) |

# 6. The Panda Generator

## 6.1 Identification plate on the generator

*Fig. 6.1-1: Identification plate*

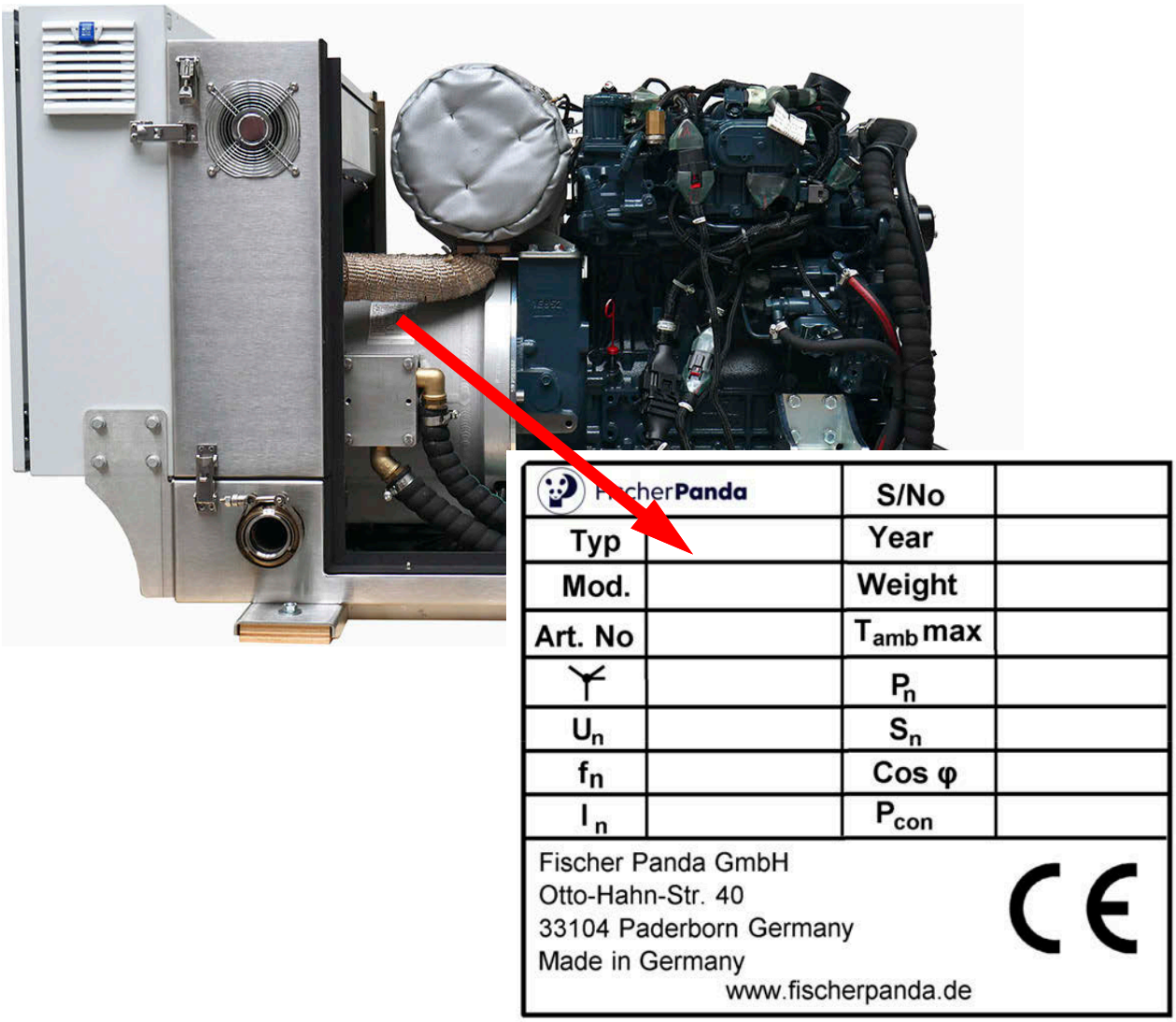
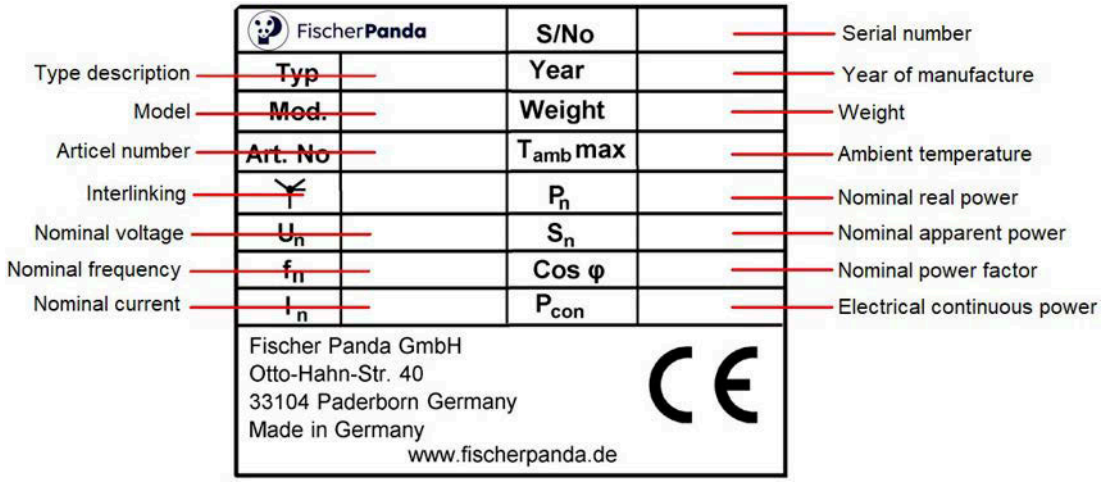


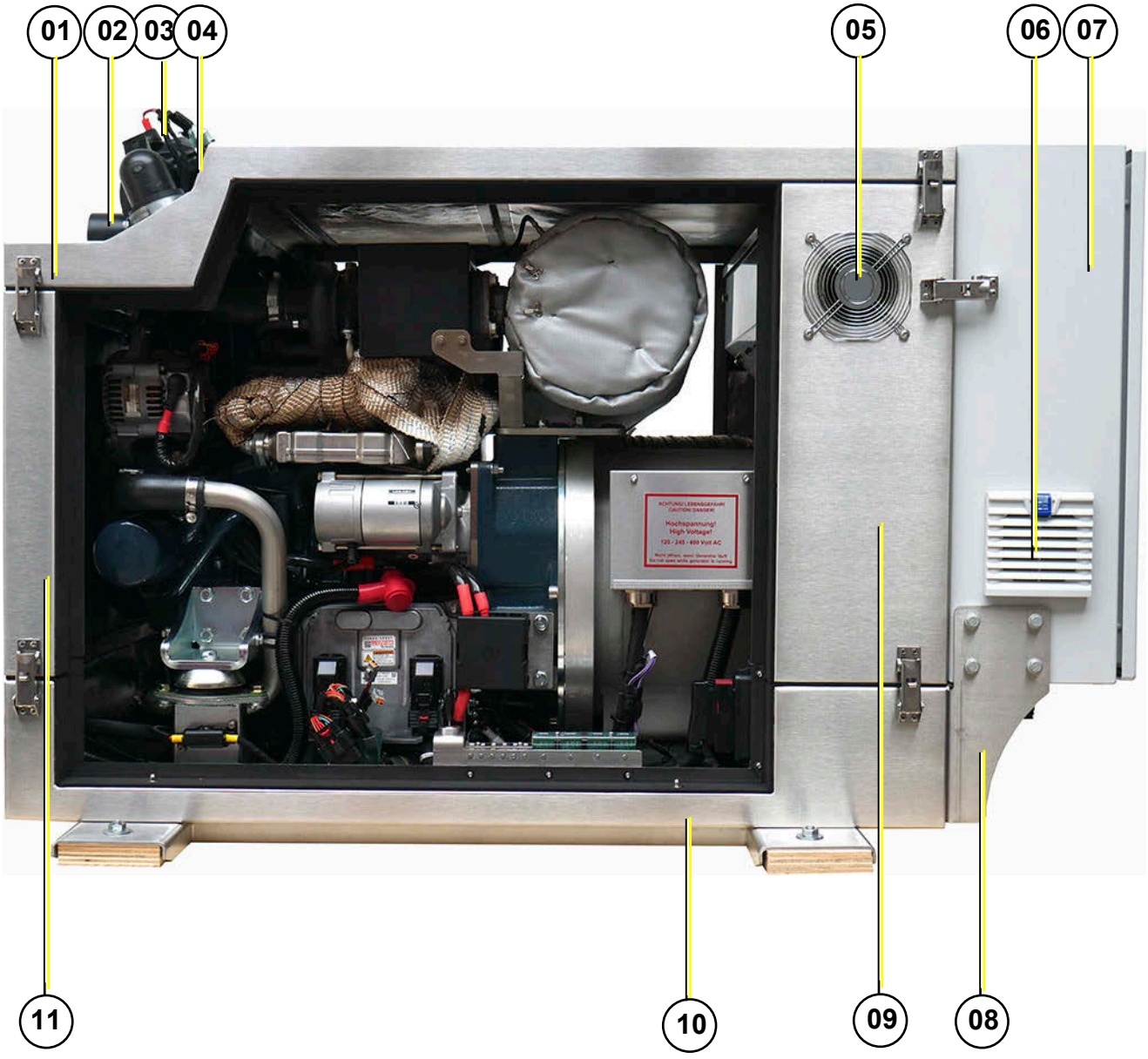

*Fig. 6.1-2: Type plate description*



## 6.1.1 Detail views of the assemblies on the generator

## 6.1.2 Right-hand side view

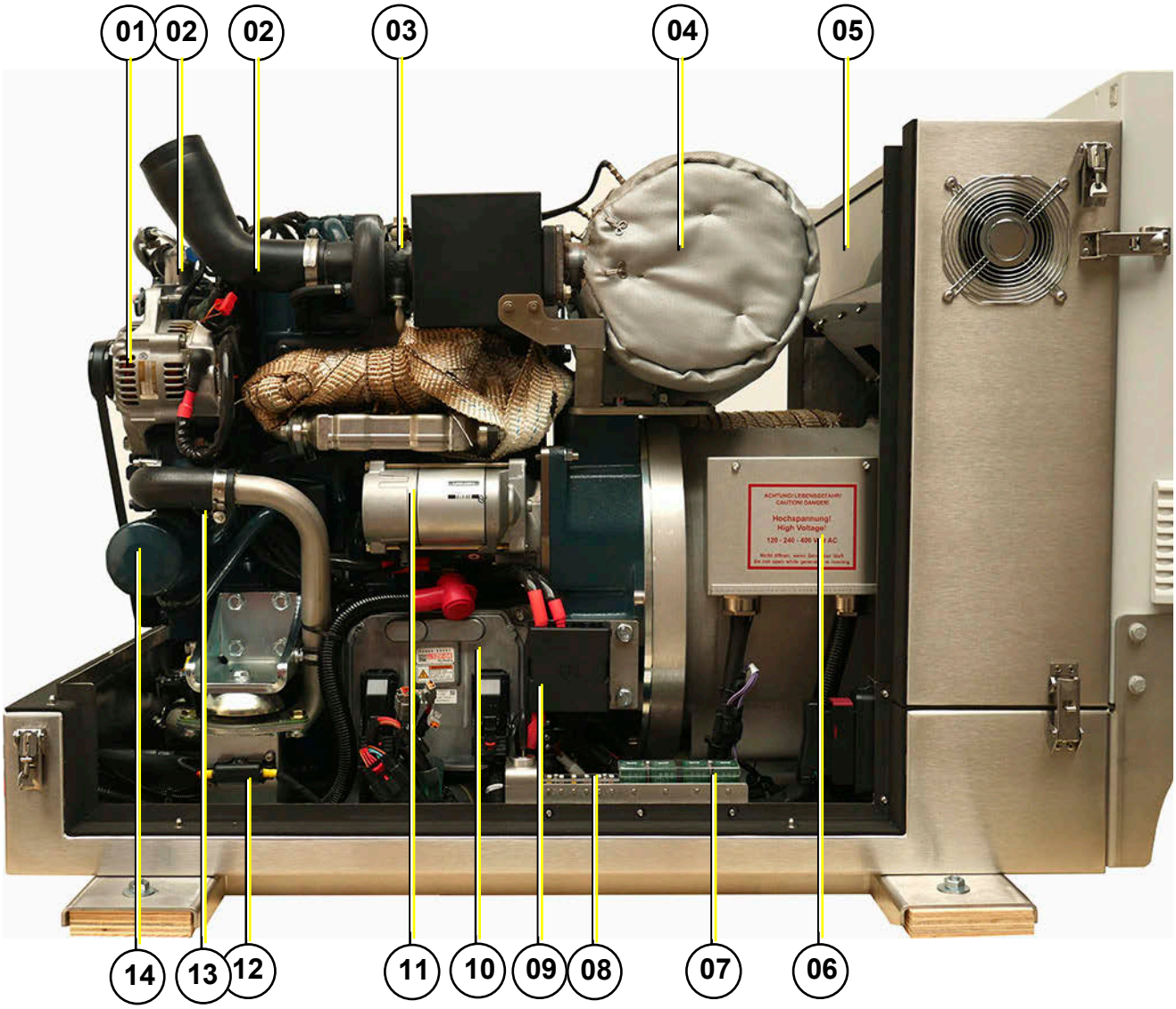
*Fig. 6.1.2-1: Right-hand side view*




01. Sound insulation capsule, upper part
02. Air inlet air filter
03. Air filter low pressure switch
04. Air filter housing with air filter cartridge
05. Air inlet for capsule cooling
06. Control cabinet fan with filter
07. Control cabinet
08. Bracket for control cabinet
09. Sound attenuation capsule, rear part
10. Sound attenuation capsule, lower part
11. Sound attenuation capsule, front

## 6.1.3 Right-hand side view of the generator

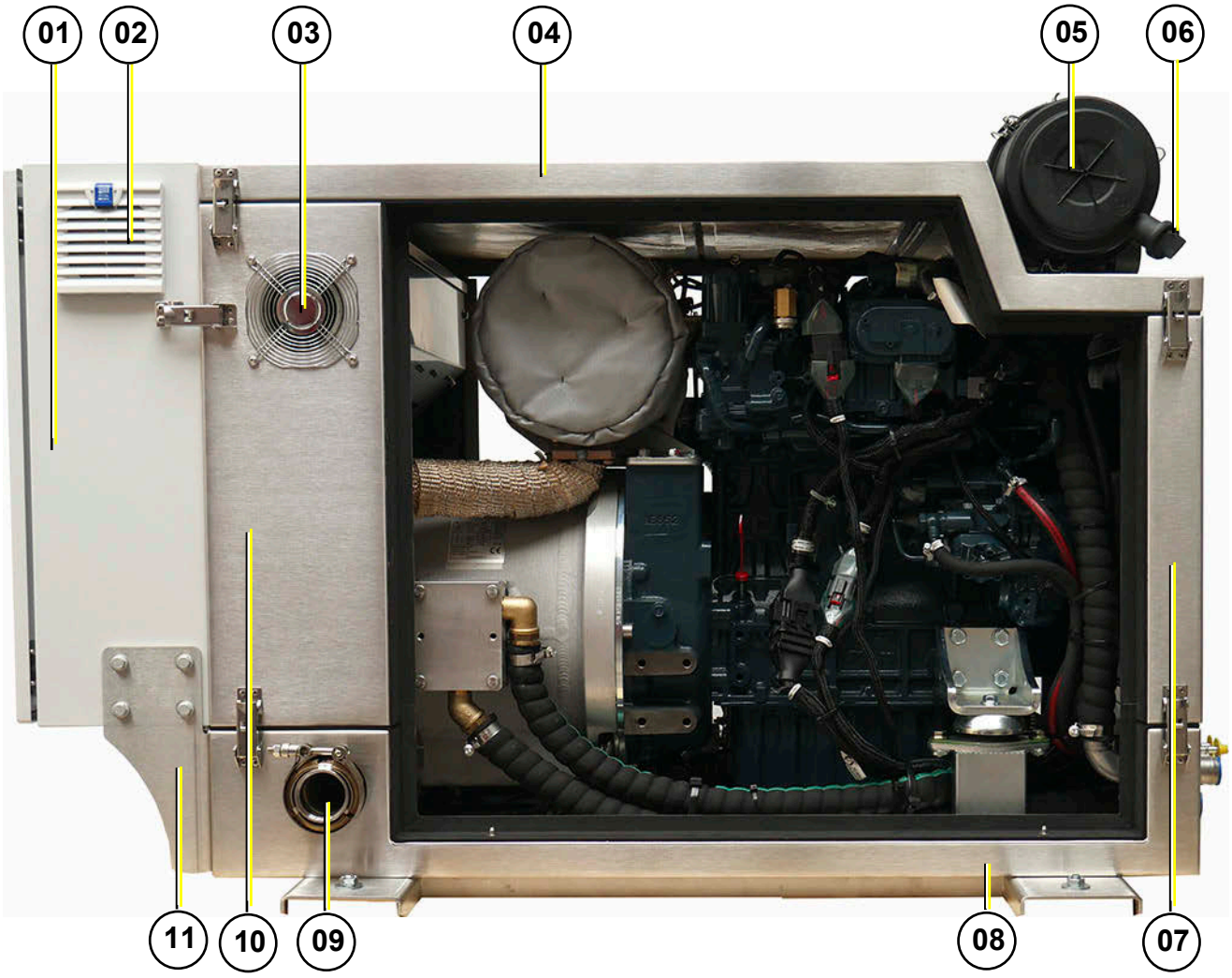
*Fig. 6.1.3-1: Right-hand side view – Generator*




| | | | |
|---|---|---|---|
| 01. | Generator | 08 | DC electric fuses |
| 02. | Air intake hose from air filter to air intake manifold | 09. | DC fuses |
| 03. | Turbocharger | 10. | Engine ECU |
| 04. | Exhaust gas recirculation | 11. | Electric starter |
| 05 | Radial fan for capsule cooling | 12. | DC fuse |
| 06. | Generator termination box | 13. | Oil pressure sensor |
| 07. | Relays | 14. | Oil filter |

## 6.1.4 Left-hand side view

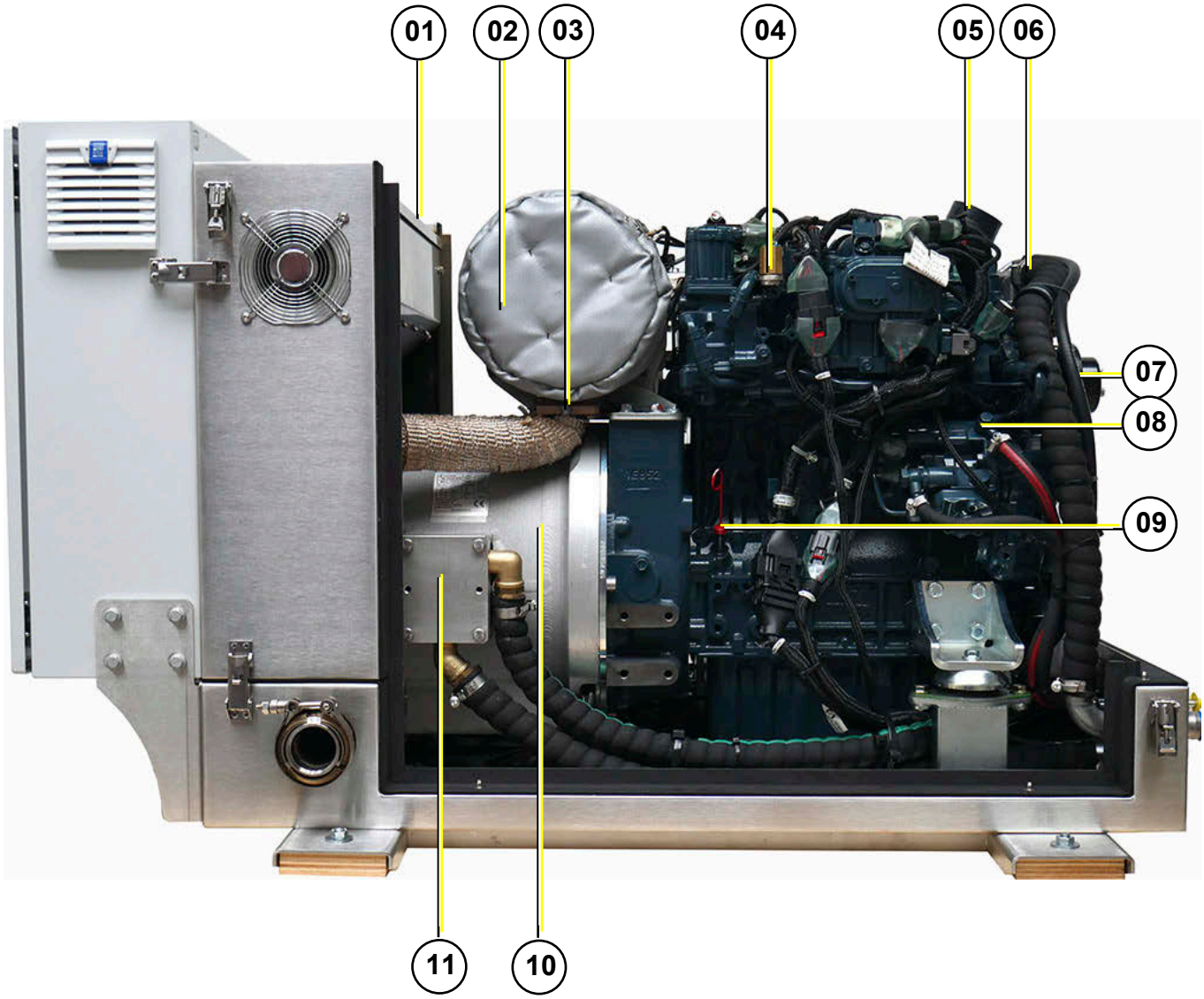
*Fig. 6.1.4-1: Left-hand side view*




01. Control cabinet
02. Control cabinet fan with filter
03. Air inlet for radial fan for capsule cooling
04. Sound attenuation capsule, upper part
05. Air filter housing with air filter cartridge
06. Dirt discharge for the air filter housing
07. Sound attenuation capsule, front
08. Sound attenuation capsule, lower part
09. Exhaust outlet
10. Sound attenuation capsule, rear part
11. Bracket for control cabinet

## 6.1.5 Left-hand side view of the generator

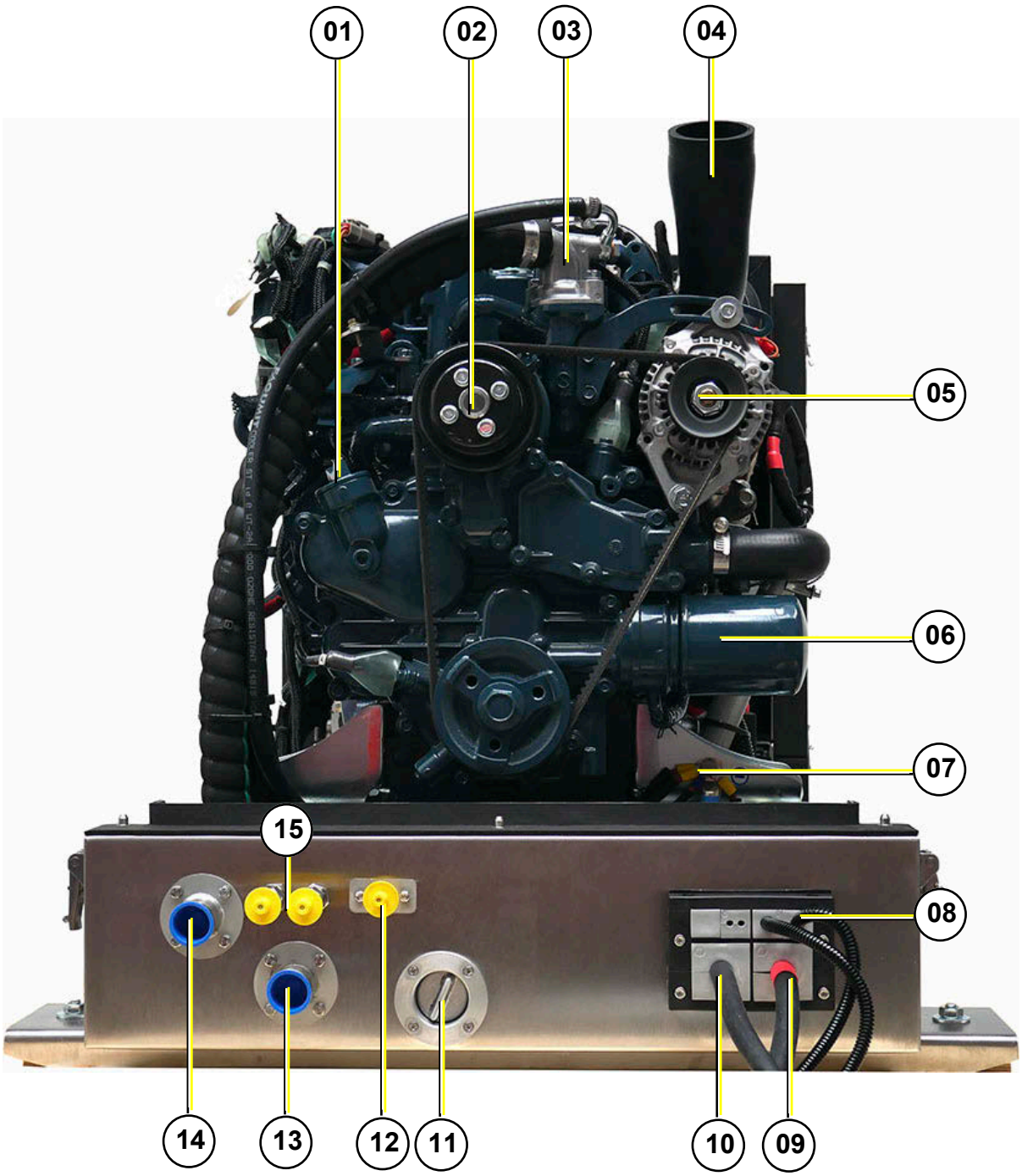
*Fig. 6.1.5-1: Left-hand side view – Generator*




01. Radial fan for capsule cooling
02. Exhaust gas recirculation
03. Measuring point for exhaust back pressure
04. Temp. sensor for capsule internal temperature
05. Air intake hose from air filter to air intake manifold
06. Thermostat housing
07. Internal cooling water pump
08. High-pressure fuel pump
09. Oil dipstick
10. Generator housing with winding
11. Coolant connection block

## 6.1.6 Front view of the generator

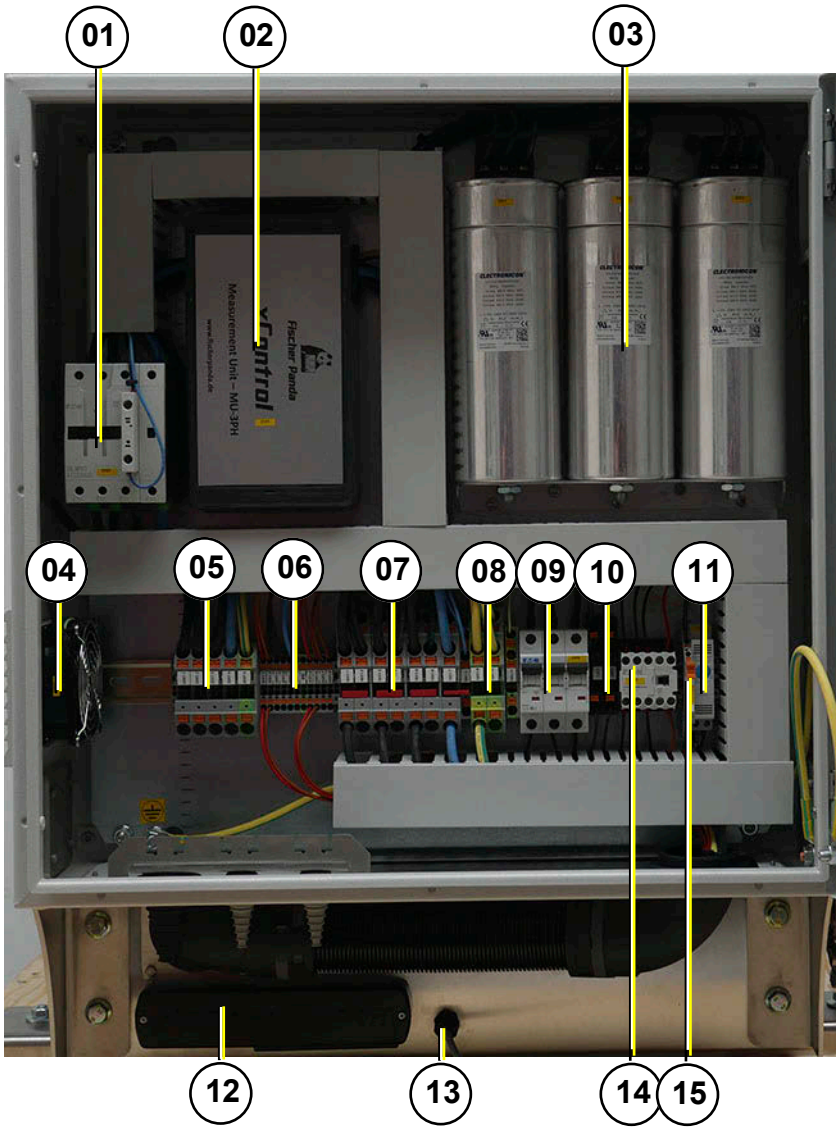
*Fig. 6.1.6-1: Front view – Generator*




01. Oil filler neck
02. Belt pulley for internal water pump
03. Thermostat housing with temp. sensor
04. Air intake hose for air filter - turbocharger
05. Alternator
06. Oil filter
07. Earth connection point, generator foot
08. Main power cable for ECU to starter battery
09. Cable for starter battery – positive
10. Cable for starter battery – negative
11. Feedthrough for oil drain hose
12. Vent line to the expansion tank in the radiator
13. Coolant return (to radiator - hot side)
14. Coolant flow (from radiator - cold side)
15. Fuel flow and fuel return

## 6.1.7 Rear view of the generator (control cabinet)

*Fig. 6.1.7-1: Rear view – Generator (control cabinet)*




| | | | |
|---|---|---|---|
| 01 | 3-phase contactor | 09. | 3-phase MCB |
| 02 | 3-phase measuring module | 10. | Fuses (visible fuse) |
| 03 | 3-phase capacitors | 11. | Thermostat for control cabinet fan |
| 04. | Control cabinet fan | 12. | FP Control rail (customer connection) |
| 05. | Connection terminals (customer connection) | 13. | Connection cable for fan |
| 06. | Electric terminals | 14. | Power contactor |
| 07. | Generator load terminals | 15. | Relays |
| 08. | PE – Generator | | |

### 6.1.8 Versions of air filter attachment

*Fig. 6.1.8-1: Air intake – top*

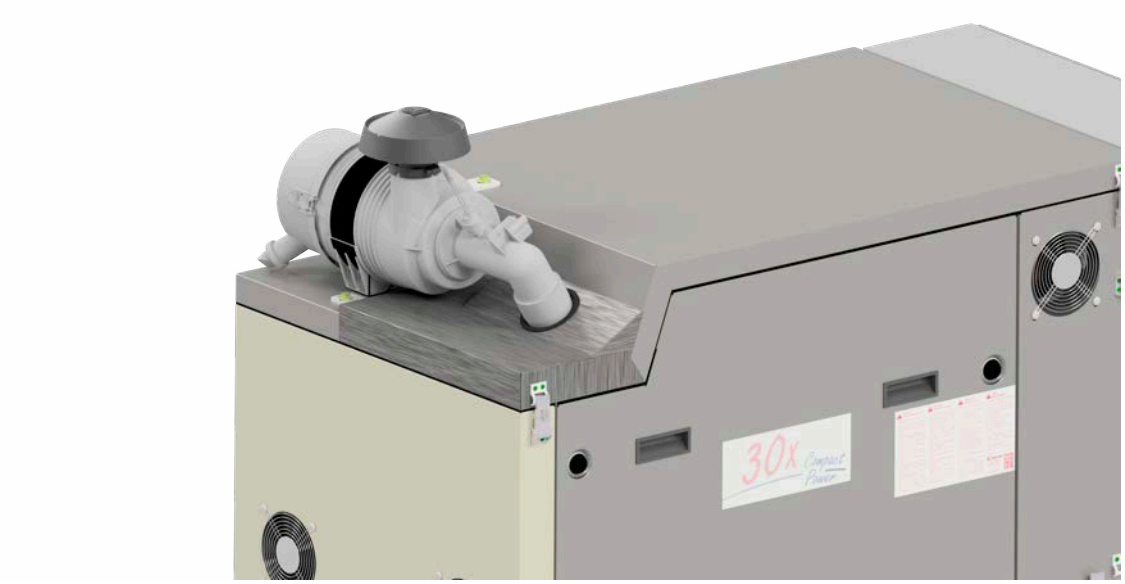
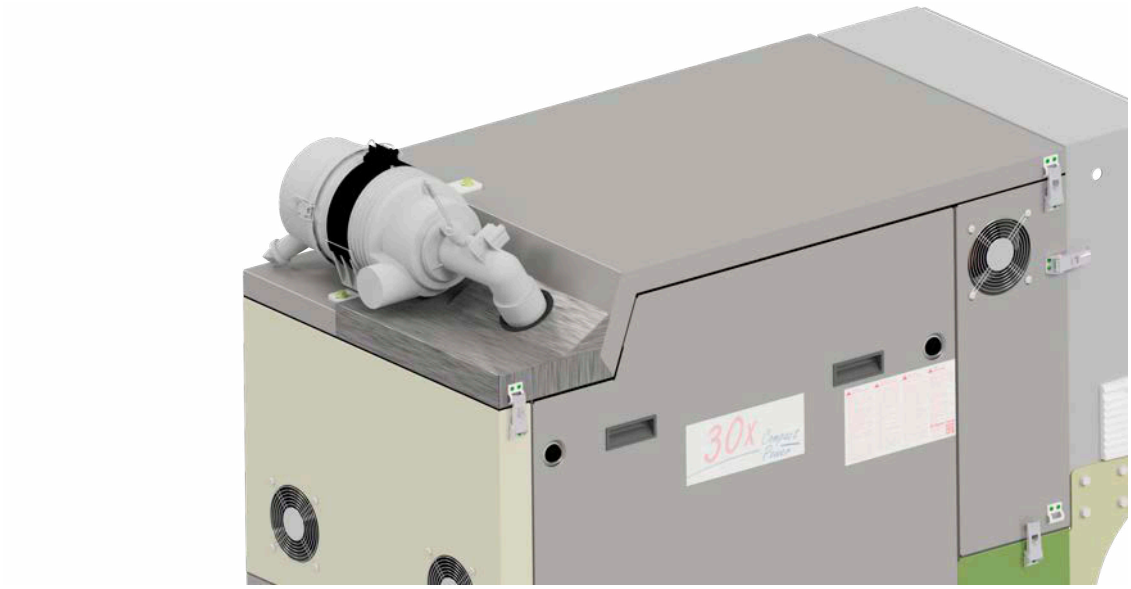



*Fig. 6.1.8-2: Air intake – front*




## 6.2 Detail views of the assemblies on the generator

### 6.2.1 fpControl Panel

The remote control panel is equipped with various monitoring functions, which increase the functionality and operational safety of the generator. Various areas of the generator are monitored by sensors that trigger an alarm on the remote control panel and that can shut the generator down as soon as a fault is detected.

*Fig. 6.2-1: fpControl CP-G – front*




*Fig. 6.2.1-2: fpControl CP-G – rear*



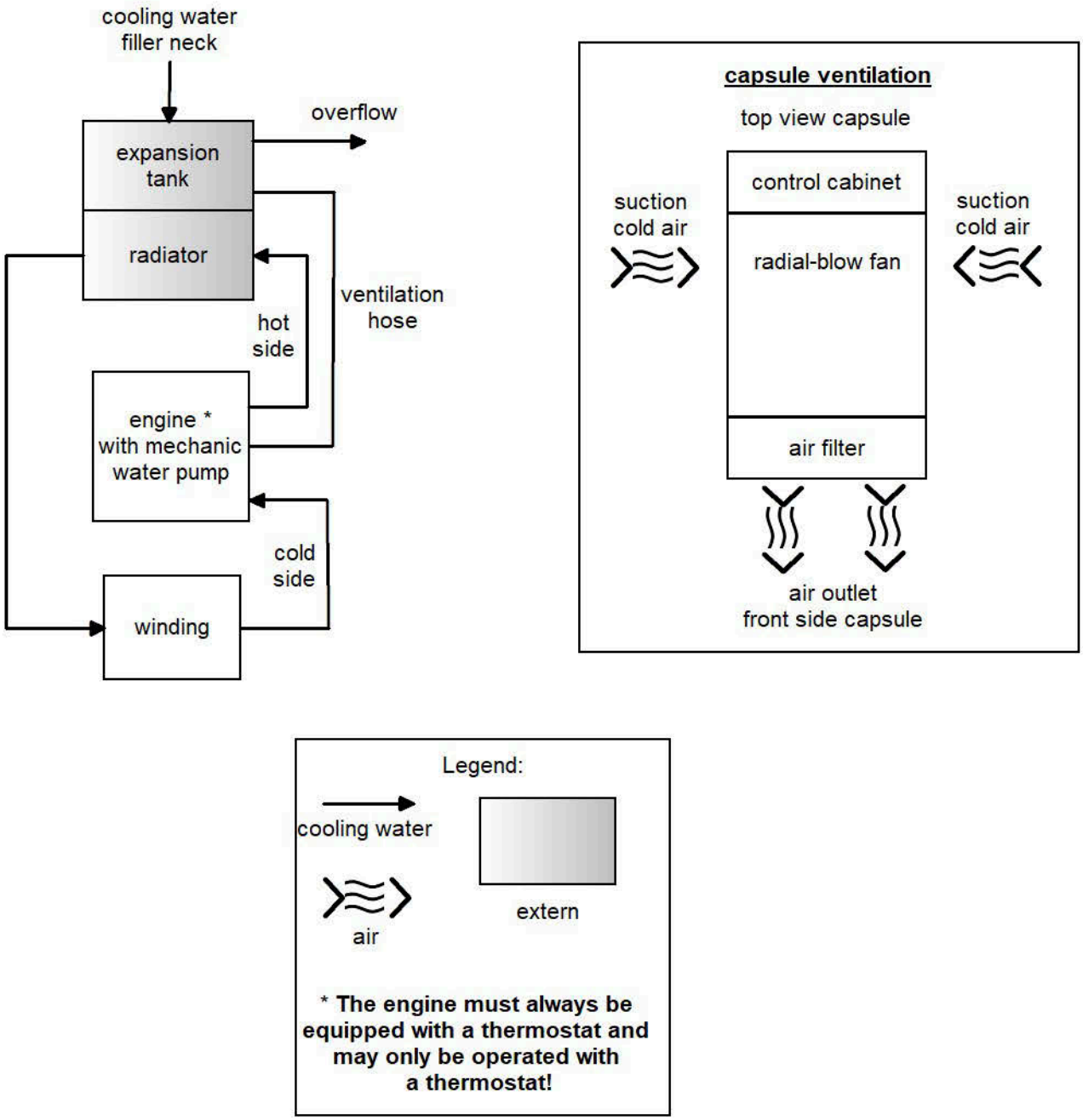

**For further information, see the data sheet/manual of the fpControl!**

**Note!**



## 6.2.2 Components of the cooling system

*Fig. 6.2.2-1: Cooling water system*

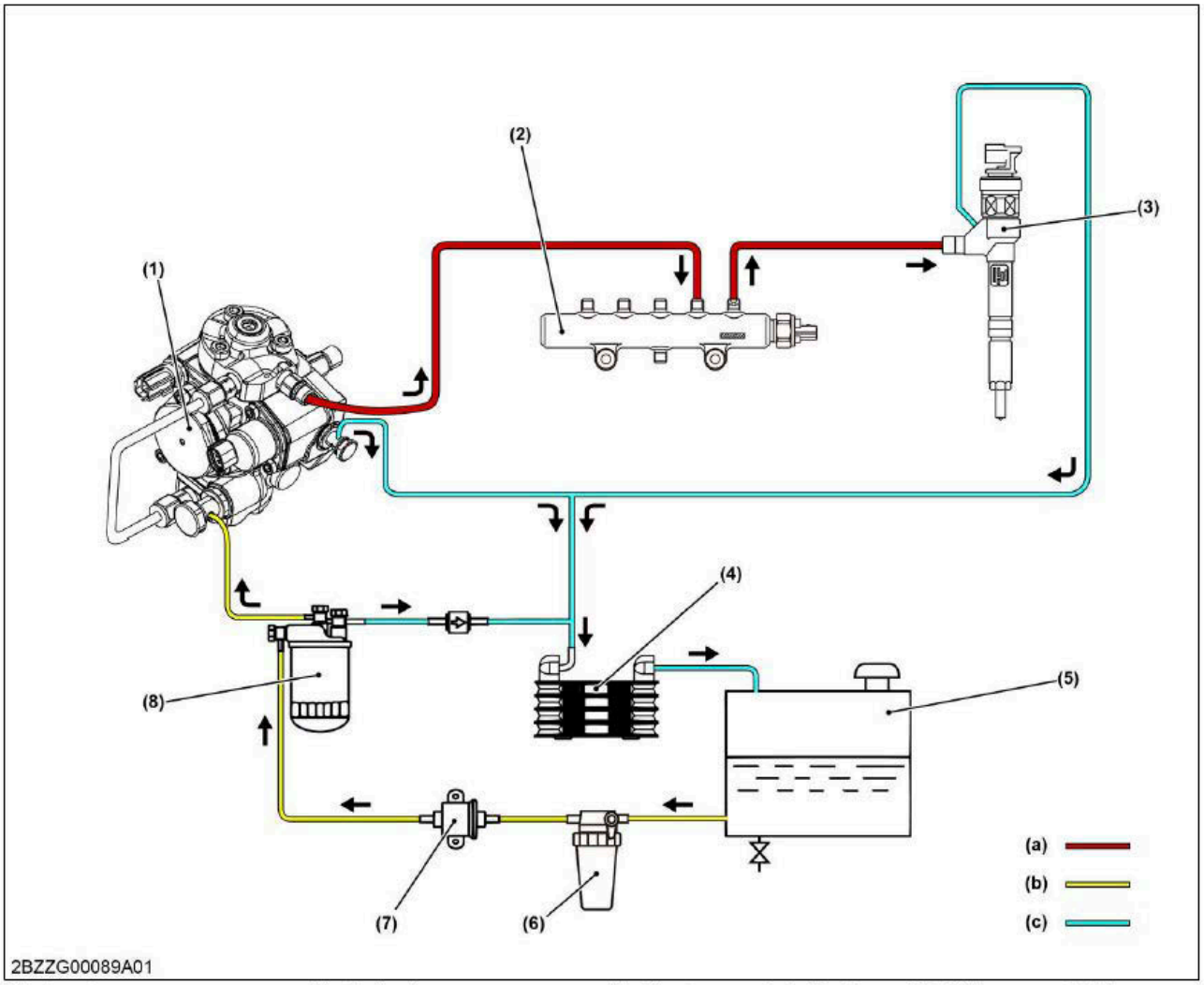


## 6.2.3 Components of the fuel system

*Fig. 6.2.3-1: Fuel system*

### 1.4 Structure of common rail system (CRS) engine

The common rail system is made up of a supply pump (1), injector (3) and rail (2).




(1) Supply pump
(2) Rail
(3) Injector
(4) Fuel cooler
(5) Fuel tank
(6) Water separator
(7) Electromagnetic fuel feed pump
(8) Fuel filter
(A) High pressure fuel flow
(B) Low pressure fuel flow
(C) Return fuel flow

## 6.2.4 Components of the combustion air and exhaust system

*Fig. 6.2.4-1: Combustion air and exhaust system*

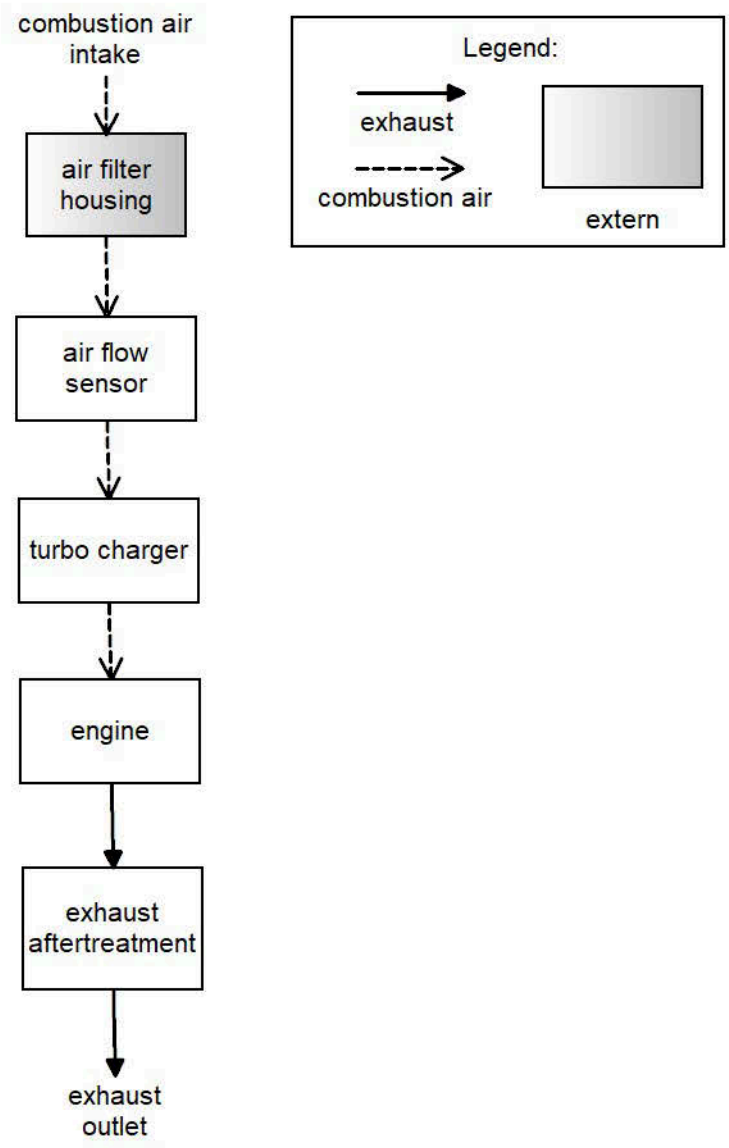
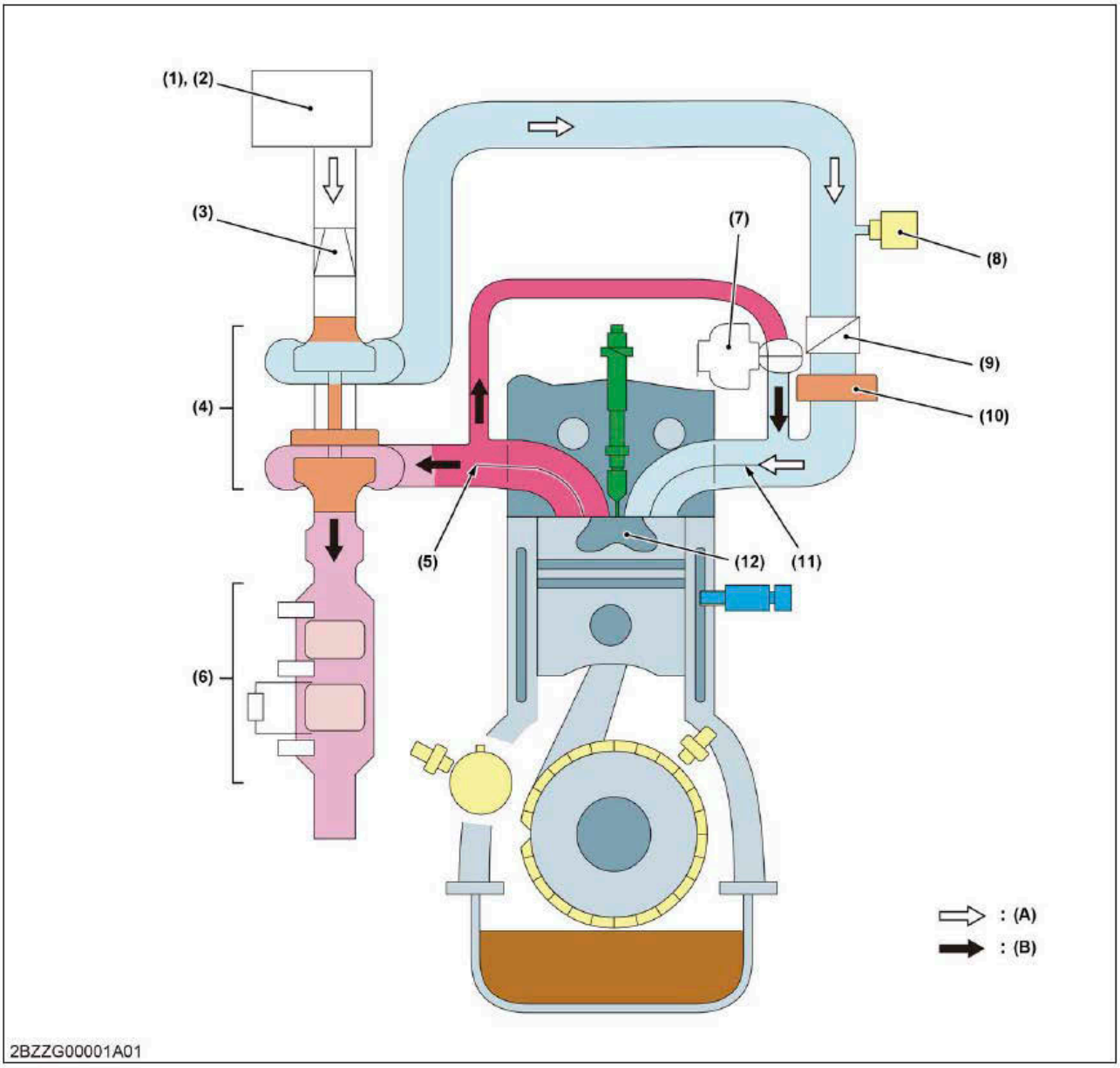


*Fig. 6.2.4-2: Combustion air and exhaust system*

## 4.1 Structure of intake and exhaust system

The intake and exhaust system is made up of intake system and exhaust system components.




(1) Pre-cleaner
(2) Air cleaner
(3) Airflow sensor
(4) Turbocharger
(5) Exhaust manifold
(6) Aftertreatment unit (DPF)
(7) EGR valve
(8) TMAP sensor
(9) Intake throttle valve
(10) Intake air heater
(11) Intake manifold
(12) Combustion chamber
(A) Intake air flow
(B) Exhaust gas flow

### 6.2.4.1 Exhaust gas aftertreatment

The Panda 30x CR PVM generator is equipped with a diesel engine with exhaust gas aftertreatment and thus complies with the EU Stage V emission standard and EPA/CARB Tier 4. The diesel engine that is installed is a modern machine with common-rail technology, turbocharging, exhaust gas recirculation as well as oxidation catalytic converter (DOC) and diesel particulate filter (DPF).

If the engine is operated without a load or continuously with only a light load, the exhaust gas aftertreatment system begins to clog. This results in the engine then initiating regeneration of the diesel particulate filter. In this process, the exhaust gas temperature is increased by changing the injection behaviour, to allow the DPF to burn clean. Should this no longer produce the desired result after a few regeneration attempts, the engine prompts parked regeneration. This must be performed by the authorised Fischer Panda Service department by means of a diagnostic tool. When

operating with the specified continuous load, the exhaust gas temperature is so high that regeneration is not yet required, as the particulate matter burns cleanly in the DPF.

This generator is equipped with NCD and PCD error messaging. These error messages refer to the exhaust gas aftertreatment system. They are described in greater detail in the engine manual and it is essential that they are rectified.

Note:

Do not switch the engine off during regeneration, if possible. Regeneration is indicated by means of a pictogram in the display.

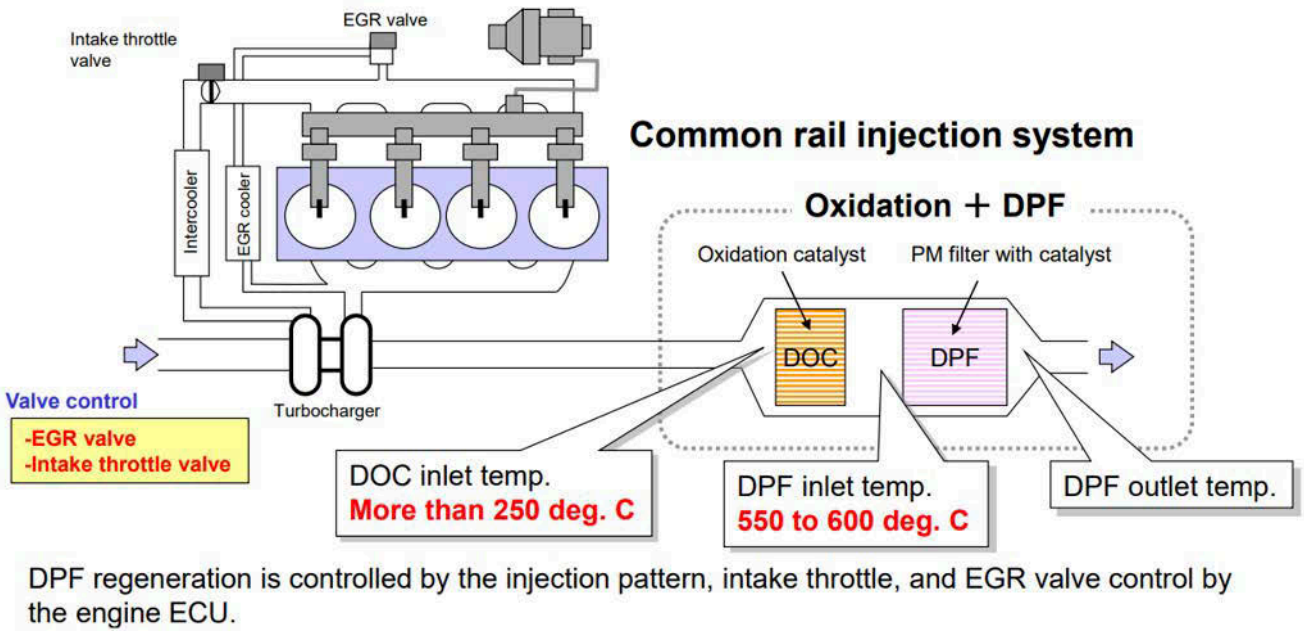
**High exhaust gas temperatures arise under full load and during regeneration!**

**Warning:**



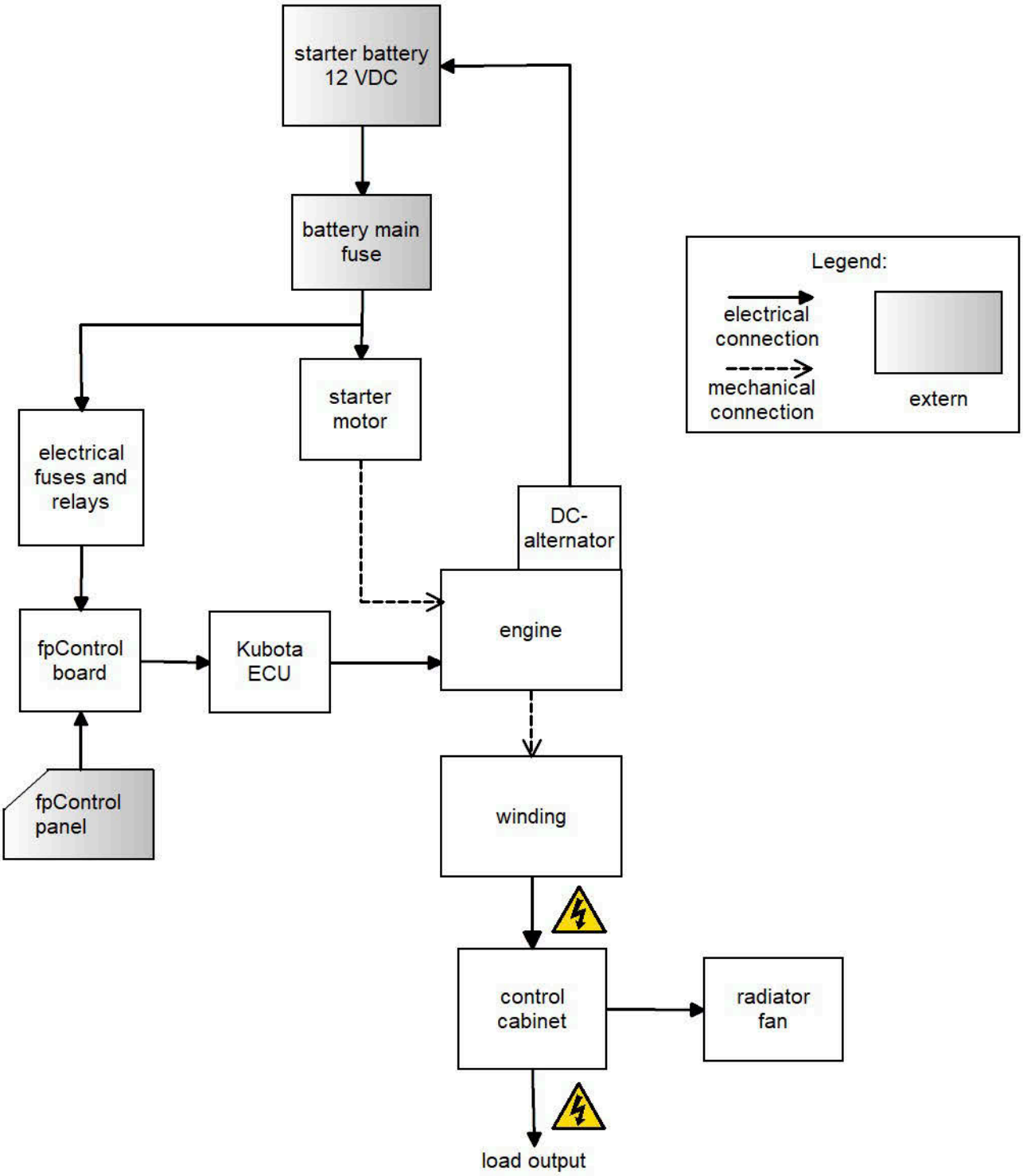
**Before operating, ensure that no flammable material is close to the generator and its exhaust system.**

*Fig. 6.2-1: Exhaust gas aftertreatment*



## 6.2.5 Components of the electrical system

*Fig. 6.2.5-1: Electrical system*



## 6.2.6 Components of the lubrication system

*Fig. 6.2.6-1: Lubrication system*

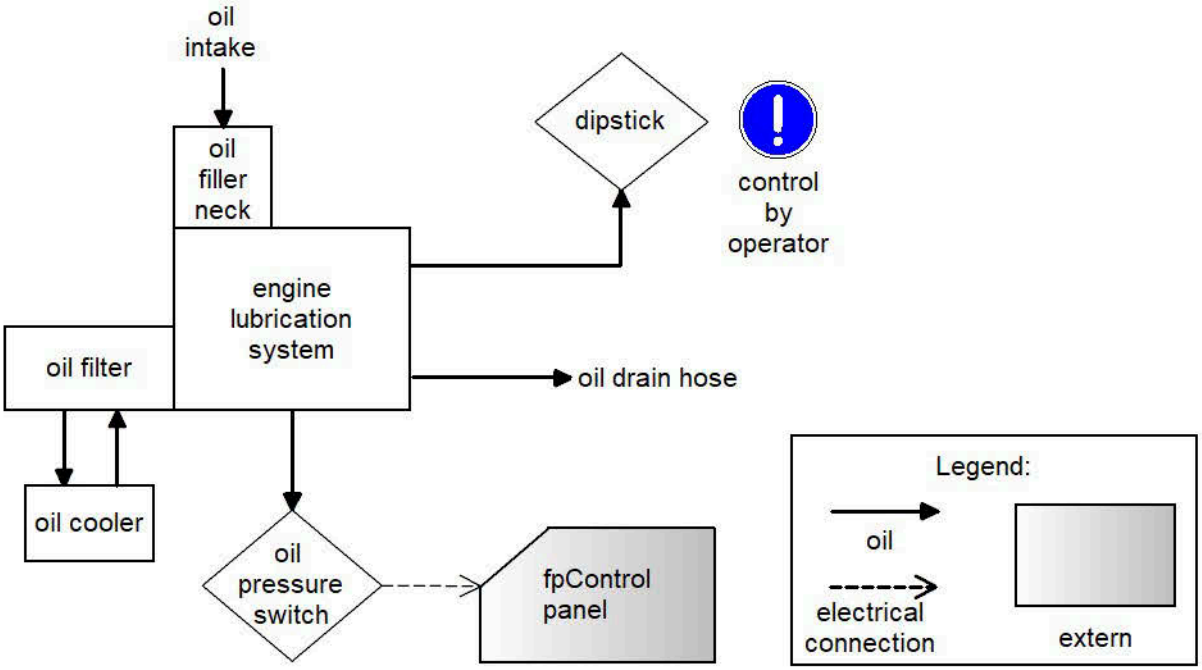
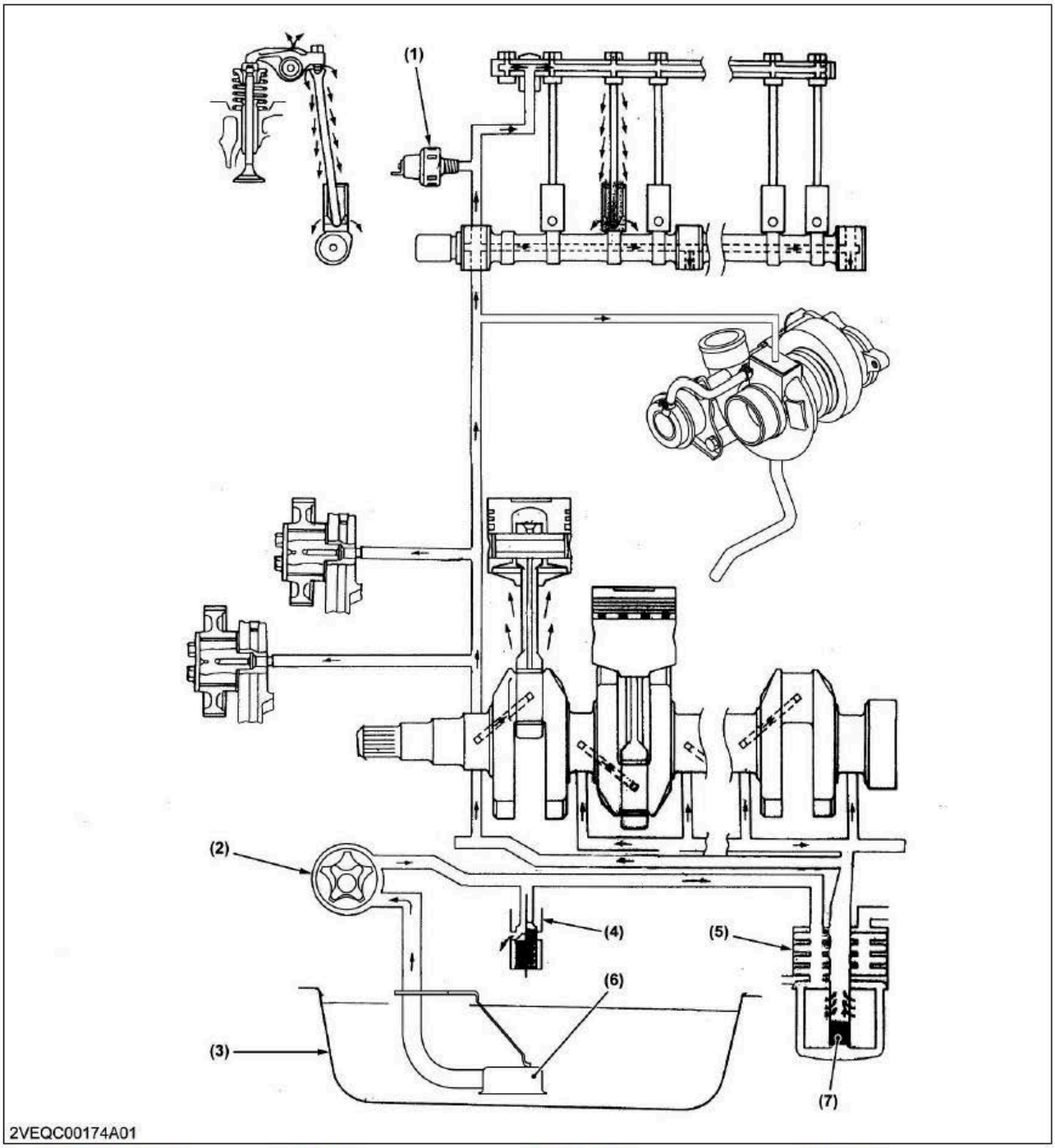


*Fig. 6.2.6-2: Lubrication system*

## 1.5 Structure of lubricating system

The lubrication system is made up of an oil pump and oil filter and the like.




(1) Oil pressure switch
(2) Oil pump
(3) Oil pan
(4) Relief valve
(5) Oil cooler
(6) Oil strainer
(7) Oil filter



Intentionally left blank

# 7. Installation instructions

**All connections (hoses, wires etc.) and installation instructions are designed and suited for “standard” installation situations.**

**Attention!**



In situations where Fischer Panda has no detailed information concerning certain installation requirements (such as vehicle specifications, maximum vehicle speed -and all other conditions concerning special operating situations) the installation instructions should be used as an example guide only.

The installation must be undertaken by an appropriately qualified/trained person and should be adapted in accordance with the statutory provisions of the state/country and and the specific situation.

Damages caused by faulty or incorrect installation are not covered by the warranty.

## 7.1 Personal requirements

The described installation must be done by a technically-trained person or a Fischer Panda service point.

### 7.1.1 Hazard warning regarding the installation

**see “Safety Instructions - safety first!” on page 16.**

**Note!**



*Ensure compliance with the general safety instructions at the beginning of this manual.*

**Deadly danger! Working on a running generator can result in severe injury.**

**Danger! Autostart**



The generator can be equipped with an Autostart device. This means that an external signal may trigger an automatic start-up. In order to prevent an accidental generator start-up, the starter battery must be disconnected before commencing work on the generator.

**Improper installation can result in severe personal harm and damage to property.**

**Warning! Risk of injury**



- Always undertake installation work when the generator is switched off.
- Ensure there is sufficient installation clearance before start working.
- Ensure tidiness and cleanliness at the workplace. Components and tools that are loosely stacked or lying around can result in accidents.
- Perform maintenance work only with standard tools or special tools as customarily used in the trade. The use of incorrect or damaged tools may result in injuries.

**Oil and fuel vapours can ignite upon contact with ignition sources. Therefore:**

- Naked flames are not permitted when working on the generator.
- Do not smoke.
- Remove any oil and fuel residue from the generator and floor.

**Warning! Fire hazard**



**Contact with engine oil, anti-freeze agents and fuel may cause harm to health. Therefore:**

- Avoid skin contact with engine oil, fuel and anti-freeze.
- Remove splashed oil and fuel as well as anti-freeze from the skin immediately.
- Do not inhale oil and fuel vapours.

**Danger! Risk of poisoning**



**Lethal danger. Improper handling, operation, installation and maintenance may lead to severe injuries and material damage.**

*Electrical voltages in excess of 48 V (in the case of battery chargers, already when greater than 36 V) are always life-threatening. The rules of the respective regional authority must be adhered to. For safety reasons, only an electrician may install the electrical connections.*

**Attention! Lethal danger - High voltage**



**Generator, oil and anti-freeze may be hot during and after use. Risk of severe burns.**

**Warning! Hot surface/material**



**Batteries contain dilute sulphuric acid and bases**

Improper handling can cause batteries to heat up and burst. Dilute sulphuric acid / base may escape. Unfavourable conditions may result in the risk of an explosion

*Adhere to the instructions of your battery manufacturer.*

**Warning!**



**Personal protective equipment is required during installation/maintenance to minimize the health hazards.**

- Protective clothing
- Safety boots
- Protective gloves
- Hearing protection
- Safety goggles

**Instruction! Personal protective equipment required.**



**All loads must be disconnected prior to working on the generator to avoid damage to the devices.**

**Attention! Switch off all loads**



## 7.2 Environmental protection

**National exhaust emission regulations must be verified with engine specification.**

**Engine fluids/batteries are harmful to the environment.**

Collect engine fluids that have leaked and dispose of them properly.

Dispose of batteries in the appropriate manner.

**Environmental protection!**



## 7.3 Acceptance

**Once the installation is complete, acceptance by Fischer Panda GmbH or by persons authorised by Fischer Panda GmbH is mandatory!**



## 7.4 Placement

### 7.4.1 Preliminary remarks

- There must be an adequate supply of fresh air for combustion.
- It must be ensured that there is an adequate cooling and combustion air flow from below and the sides.
- The generator may only be opened by qualified specialists.
- The generator may only be operated by authorised personnel.

### 7.4.2 Installation location and base

Since Panda generators have extremely compact dimensions, they can be installed in cramped locations; they are therefore often installed in places that are difficult to access. Please consider that even an almost maintenance-free generator must still be adequately accessible, at least at the front (drive belt, water pump) and the service-side (actuator, dipstick), as it remains, for example, necessary to check the oil level regularly in spite of the automatic oil-pressure sensor.

The generator should not be placed in close proximity to light walls or floors, which can have resonance vibrations because of transmitted noise. If this is unavoidable, then it is recommended that this surface be lined with layer of heavy material, which will change the mass and thus the resonance behaviour.

Avoid mounting the generator on a smooth surface with little mass (e.g. plywood). In the worst case, this acts as an amplifier of airborne sounds. An improvement can be achieved by reinforcing these surfaces with ribs. In addition, openings should also be sawn to interrupt these surfaces. Lining the surrounding walls with a heavy layer (i.e lead) and foam offer additional improvement to the conditions.

As the engine draws induction air through openings in the capsule, they may not be covered. There must be adequate free space between the openings and the nearest wall in order to assure the flow of air (at least 12 mm (½“)).

The generator draws air from the surrounding engine room. It must therefore be ensured that sufficient ventilation openings are present, so that the generator cannot overheat.

The following data are applicable to the output of the generator:

Ambient temperature: 20 °C

Air pressure: 1 000 mbar (100 m above mean sea level)

Rel. humidity: 30 % at ambient temperature

Fuel temperature: up to 20 °C

Deviations from this data, e.g. an ambient temperature of 40 °C due to installation in an engine room/vehicle with inadequate ventilation, lead to a change in the output (derating).

### 7.4.3 Advice for optimal sound insulation

**The appropriate base consists of a sturdy plate, to which the generator is fastened by means of vibration dampers. It must be possible for induction air to be drawn in unhindered. Appropriate vibration dampers of various Shore hardnesses can be obtained from Fischer Panda.**

*Fischer Panda recommends shear-resistant vibration dampers*

**Vibration damper**

*Illustrative example*

*Fig. 7.4.3-1: Vibration damper*



**Vibration damper, shear-resistant**

*Illustrative example*

*Fig. 7.4.3-2: Vibration damper, shear-resistant*



## 7.5 Intake air filter as source of noise

An external intake air filter (not included in the scope of supply) must always be used if the generator is to be operated in a dusty environment. This filter is connected to a nozzle on the generator housing by means of a hose. The filter can be a significant source of noise. If this is the case, an intake air noise suppressor of the appropriate nominal diameter must be ordered from Fischer Panda. This takes the form of a cylinder that occupies a relatively significant space (overall length approx. 700 mm, diameter 100 mm).

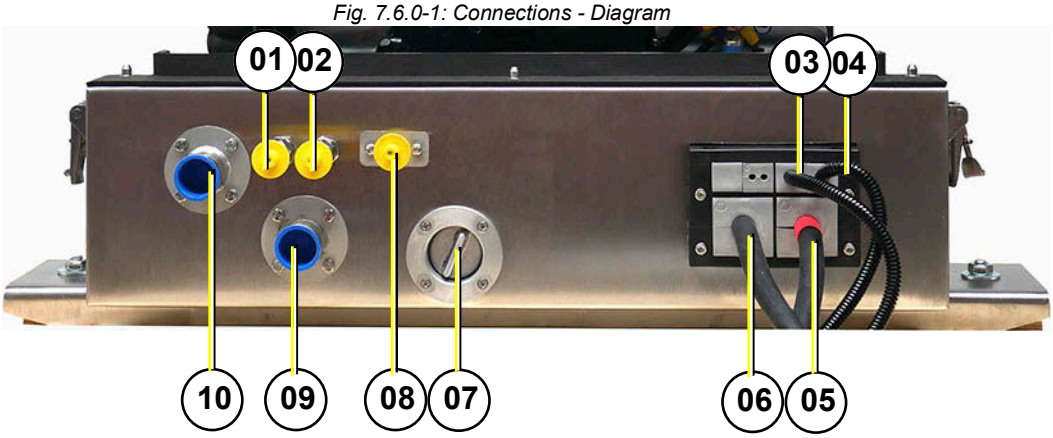
## 7.6 Connections

The location of the connections may vary according to the generator. The appropriate cables and connection points are identified on the generator.

**It is imperative that the electrical connections are laid out and implemented according to the applicable regulations. This also applies to the cable materials in use. The cable approved only for "protected" laying (e.g. in a conduit) at a temperature up to a max. of 70 °C (160 °F). The on-board circuit must also be fitted with all**

**the necessary fuses.**

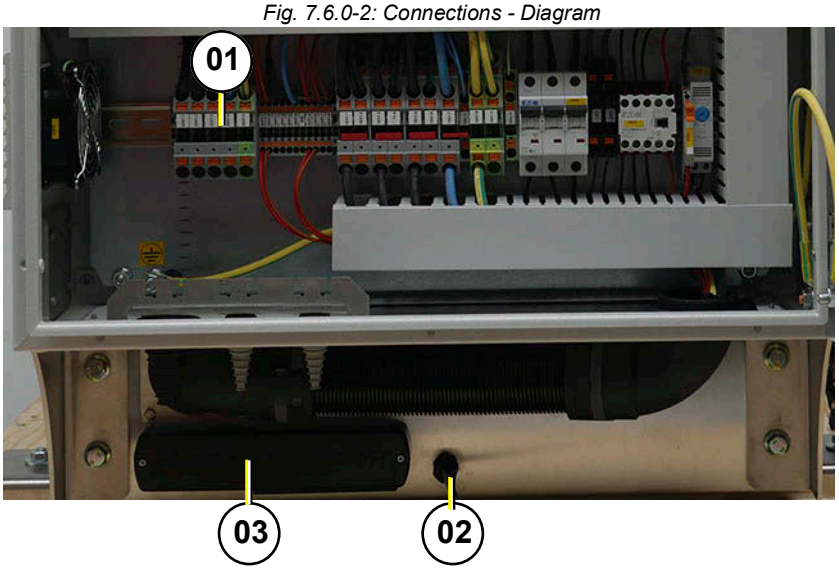
*Fig. 7.6.0-1: Connections - Diagram*




01. Fuel flow connection
02. Fuel return connection
03.+04. ECU harness
05. Cable for starter battery – positive (+)
06. Cable for starter battery – negative (-)
07. Feedthrough for oil drain hose
08. Cooling circuit vent line
09. Coolant return (to radiator - hot side)
10. Coolant flow (from radiator - cold side)

.

*Fig. 7.6.0-2: Connections - Diagram*




01. 01.Load output
02. Outlet for radiator fan
03. FP control terminal block

## 7.7 Installing the fuel system

### 7.7.1 The following items must be installed:

- Fuel pre-filter with water separator (not included in the scope of supply)
- External fuel pump
- Fine fuel filter

- Non-return valve (not included in the scope of supply)
- Non-pressurised return line to tank

The external electric fuel pump should be installed as close to the tank as possible.

**Electric fuel pump**

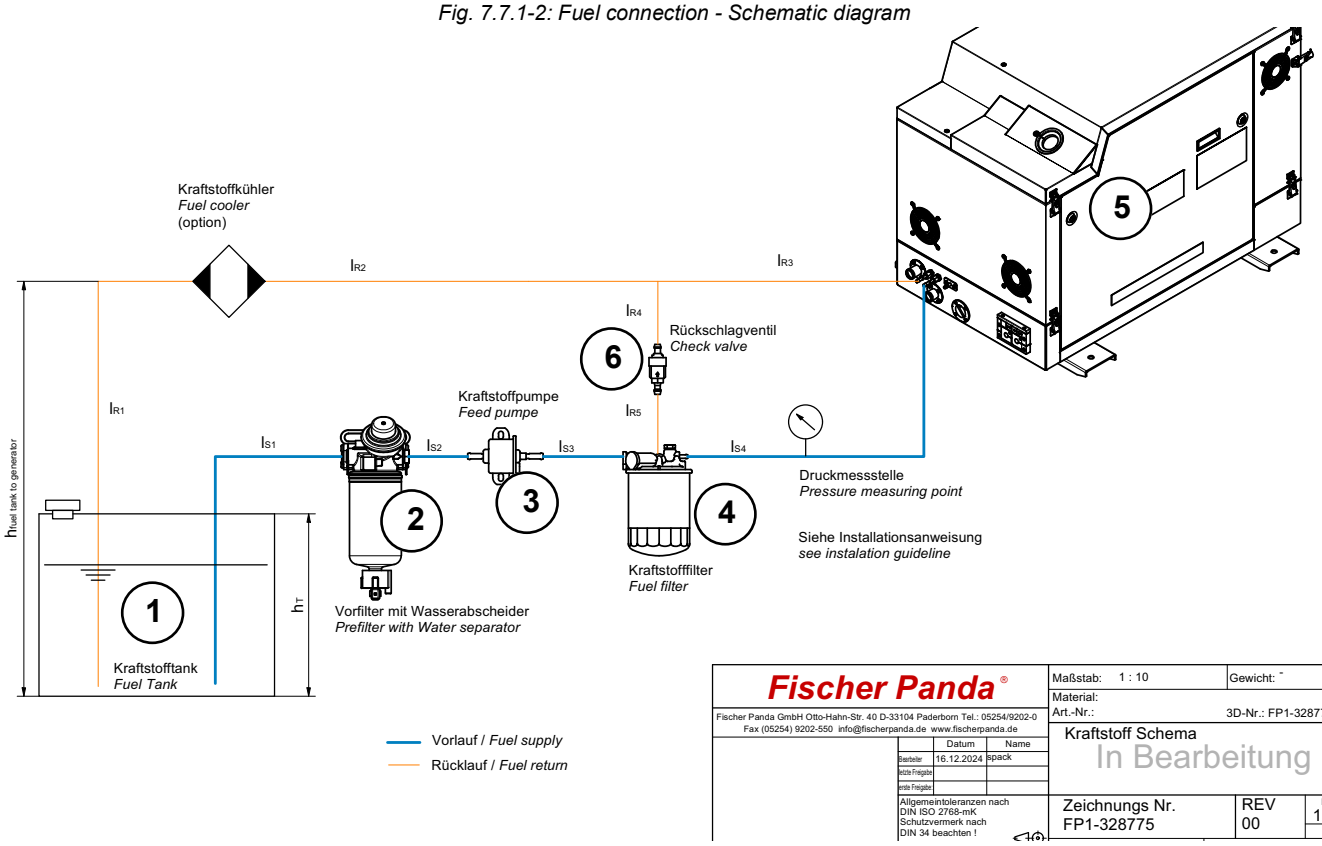
Normally, an electric fuel pump (DC) is supplied together with the Fischer Panda generator. The fuel pump must be installed close to the tank. The electrical connection is prepared on the generator.

*Some generators (e.g. Deutz engines) have an internal fuel pump that is powered by the engine. In the case of these generators, an electrical fuel pump is optional.*

*Fig. 7.7.1-1: Electric fuel pump*



*Fig. 7.7.1-2: Fuel connection - Schematic diagram*




1. Fuel tank
2. External fuel filter with water separator
3. External fuel pump
4. Fuel filter
5. Generator
6. Non-return valve

## 7.7.2 Connecting the fuel line to the tank

**Generally, fuel supply and return lines must be connected to the diesel tank by means of a suitable fuel suction fitting.**

**Note:**



**Lead the return fuel line connection to the day tank down to the floor**

If the generator is installed higher than the tank, the return line connected to the tank must be dropped to the same

depth in the tank as the suction line, in order to prevent fuel running back into the tank after the generator has been switched off, which can lead to significant difficulties when re-starting after the generator has been switched off for an extended period.

**Non-return valve in the suction line**

If the return line cannot similarly be immersed in the tank as an immersion tube, a non-return valve should definitely be fitted to the suction line, in order to prevent the fuel from flowing back after the generator has been switched off.

The Panda generator is self-bleeding. The instructions for "Bleeding Air from the Fuel System" should, however, be followed after commissioning or after lengthy downtime.

**Non-return valve for the fuel return line**

**Attention!**



If the fuel tank should be installed above the level of the generator (e.g. day tank), then a non-return valve must be installed on the fuel return line to ensure that no fuel is fed into the injection pump via the return line.

## 7.7.3 Position of the pre-filter with water separator

**In addition to the standard fine filter, a pre-filter with water separator must be installed in the fuel system line outside of the sound insulation capsule.**

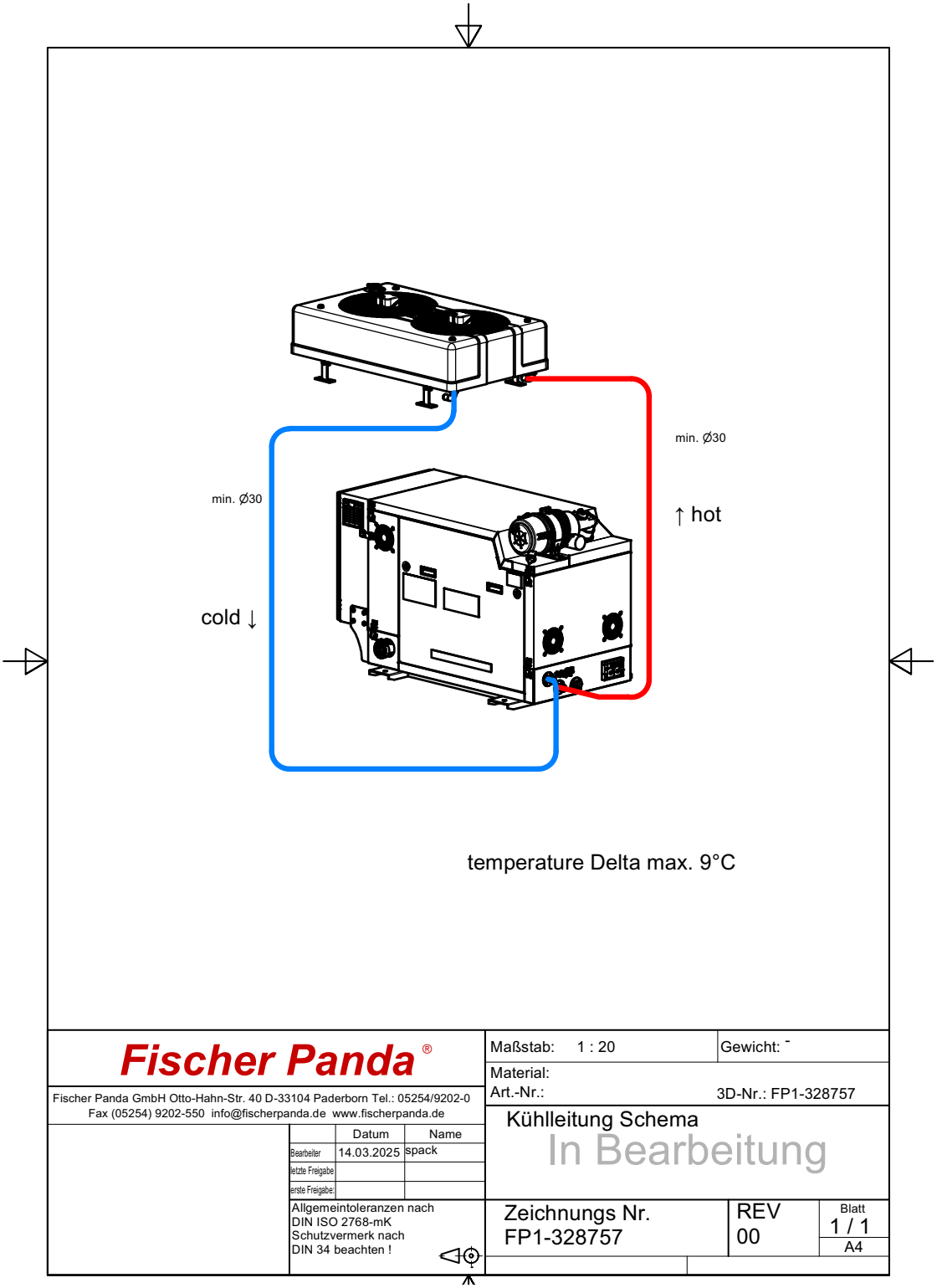
*Illustrative example*

*Fig. 7.7.3-1: Original Kubota pre-filter with water separator*



## 7.8 Cooling system installation

*Fig. 7.8-1: Cooling system installation*




## 7.9 Venting the fuel system

Basically, the fuel system is self-venting, meaning that only the electrical starter needs to be operated and the fuel system will then be vented automatically by operation of the fuel pump after some time. It is nevertheless essential to bleed the system as follows prior to the first operation (as all hoses are empty):

1. Switch the control panel on.
2. Set the output for the fuel pump in the sub-menu of the control panel to “on” (Value = 1). The electric fuel pump must run audibly. After approx. 3 - 4 minutes of continuous activation of the fuel pump, the bleed screw is loosened on the high-pressure pump (see illustration). The fuel pump continues to run while the screw is being opened. A large piece of cloth or absorbent tissue must be placed under the connection to prevent escaping fuel from running into the capsule. If the fuel escapes without air bubbles, then the bleed screw can be closed. Reset the output for the fuel pump in the sub-menu of the control panel (Value = 0).

If it is present: actuate the mechanical fuel pump by means of the hand lever when priming the electric primer pump.

**Important**

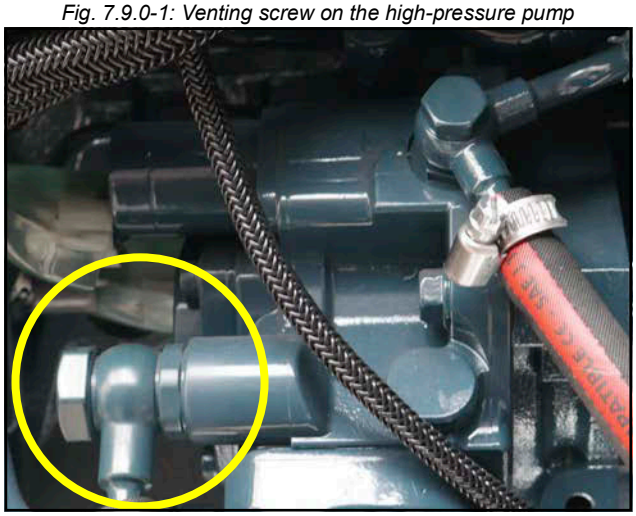


3. The engine can now be started by pressing the starter button. The engine should start after a short while. If this does not occur, then one of the union nuts on the injector line must be loosened and the start-up attempt must be repeated. Re-tighten the union nuts after successfully starting.

**Venting screw on the high-pressure pump**

*Illustrative example*

*Fig. 7.9.0-1: Venting screw on the high-pressure pump*



## 7.10 Installation of the cooling system

### 7.10.1 The cooling system / general instructions

The Fischer Panda vehicle generator is supplied without a radiator, with the exception of generators with permanently installed radiators such as the PVK-UK or PSC series.

Depending on the purpose and installation situation, a wide variety of Fischer Panda radiators are available for the optimum customisation of the system. Operation with a commercially available vehicle radiator is possible. The corresponding dimensioning must be implemented by the installer.

**For generators with a permanently installed radiator (e.g. PVK-UK series), the radiator dimensioning and the installation are not necessary.**

**Note:**



## 7.11 Radiator baseplate

The radiator baseplate shall be dimensioned in accordance with the purpose. The corresponding checks and entries in the vehicle papers shall be implemented by the operator.

## 7.11.1 Determining the size of the radiator

The size of the radiator must be dimensioned in accordance with the total thermal load, the operating conditions, and the installation situation.

**In principle, the thermal load of the generator equals 1.8 times the electrical rated power (1.8 times with a water-cooled silencer, 1.2 times with a dry silencer) in kW. This means that for example, a Panda 12000 PVMV-N generator with a rated power of 10 kW has a thermal load of 18 kW.**

**Note:**



**The radiator must always be dimensioned taking into account a safety margin adjusted for the operating conditions. Undersized radiators will result in an emergency shut-down. This may damage other equipment that is connected to them.**

**Warning: Include safety margin in the calculation.**



## 7.11.2 Radiator design

The radiator consists of 3 main components:

1. Radiator. Depending on the version, includes an integrated expansion tank or an external expansion tank.
2. Fan. Depending on the generator, as a DC fan (e.g. 12 V-24 V) or as an AC fan (e.g. 230 V 50 Hz) with respective input voltage.
3. Cover (optional).

### 7.11.2.1 Roof installation

**Please note:**

- Minimum distance to vehicle roof: 100 mm.
- Minimum distance to next vertical wall: 1/2 radiator width.
- Min. distance to exhaust outlet (heat and dirt source): 500 mm.
- The max. permissible vehicle height must not be exceeded.
- Install warnings stating new vehicle height inside driver's cab.
- While operating, a distance of at least 3 metres in the direction of the exhaust flow must be kept unobstructed.

*Fig. 7.11.2.1-1: Schematic: radiator, roof installation*

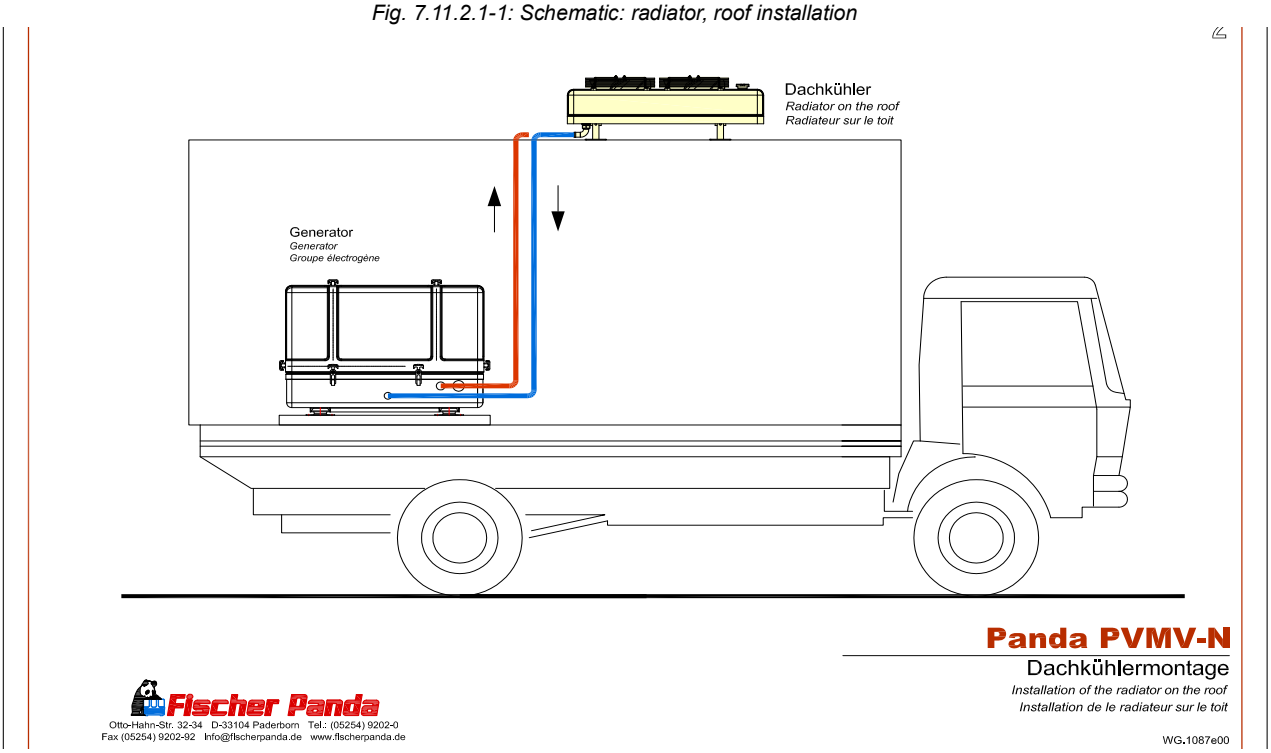
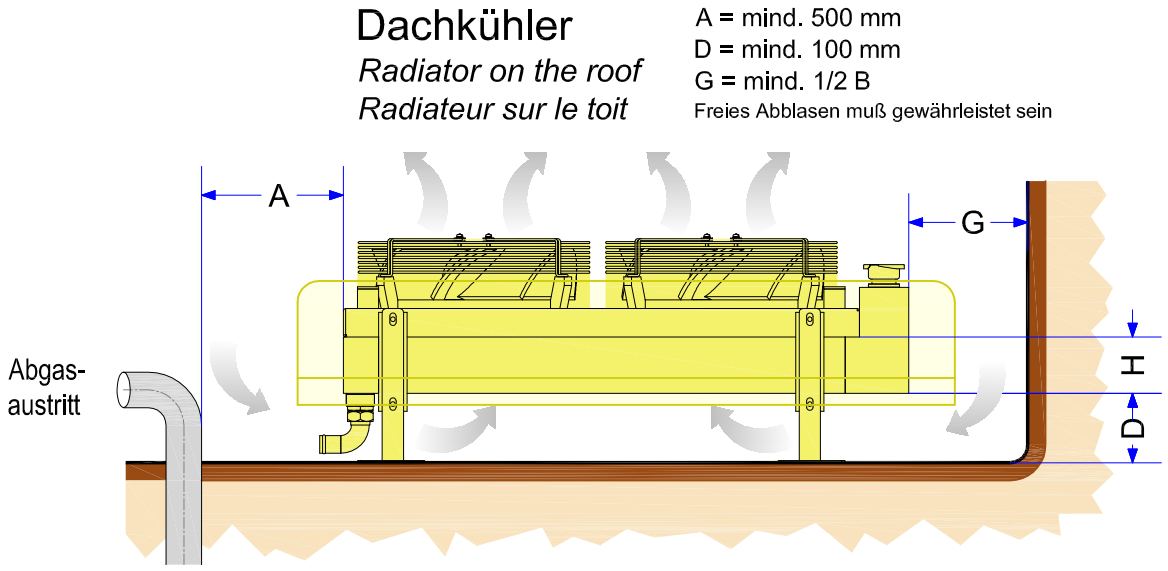



*Fig. 7.11.2.1-2: Schematic: radiator, roof installation*




## 7.11.2.2 Installation on the vehicle wall

**Please note:**

- Minimum distance to vehicle wall: 100 mm.
- Min. distance to gas exhaust (heat and dirt source): 500 mm.
- The max. permissible vehicle length or width must not be exceeded.
- During operation, the exhaust flow must be uninhibited for at least 3 metres.

*Fig. 7.11.2.2-1: Schematic: radiator, vehicle wall installation*

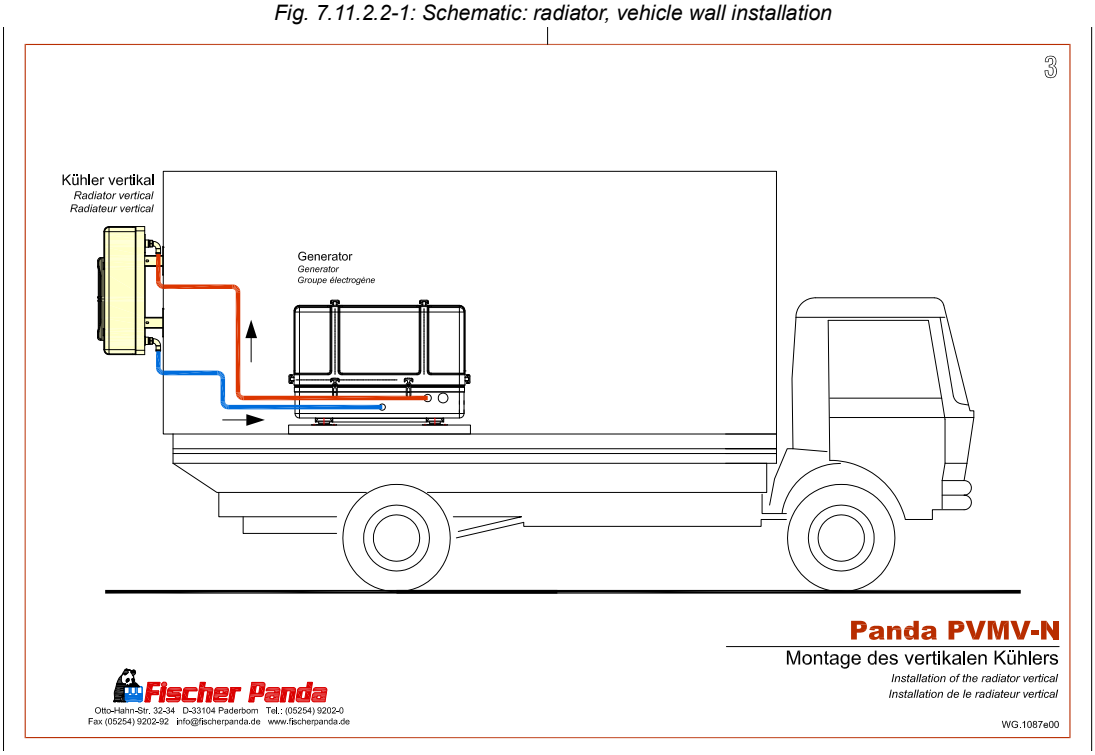
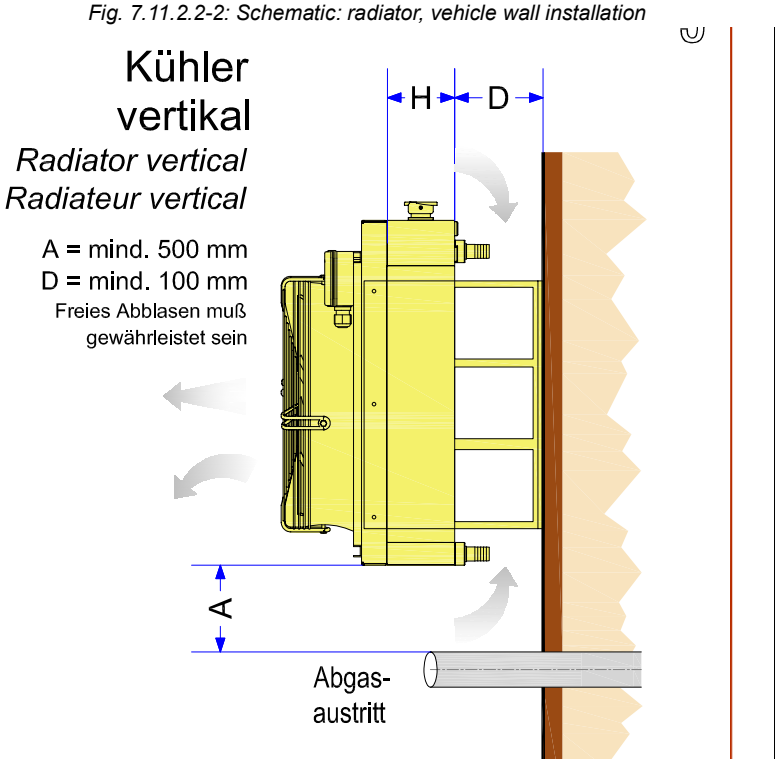



*Fig. 7.11.2.2-2: Schematic: radiator, vehicle wall installation*




## 7.11.2.3 Installation location for radiator in the vehicle wall or cabin wall

A cabin installation is achieved if the set-up location is freely accessible during operation and serves as a working space, if applicable.

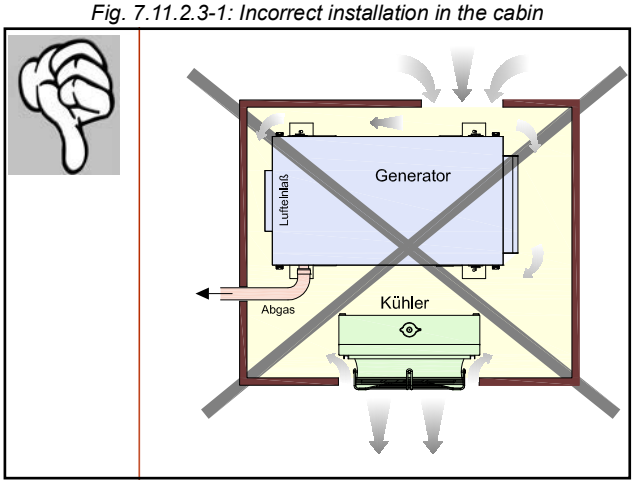
**Please note:**

- If persons are present in the set-up space during operation, a safety circuit must ensure that the air intake is opened.

### Incorrect installation in the cabin

- Air intake too narrow
- Generator air intake too close to the wall
- Hot air can be taken in next to the radiator
- Exhaust gas line not insulated, heats up combustion air

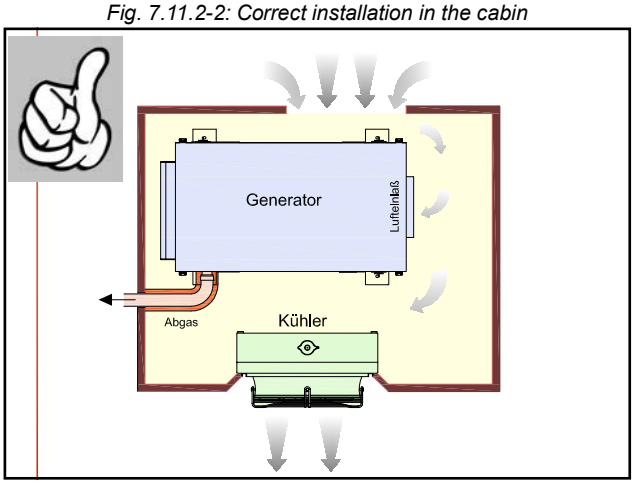
*Fig. 7.11.2.3-1: Incorrect installation in the cabin*




### Correct installation in the cabin

- Air intake is min. radiator size (safety grating and decorative grille must be taken into account)
- Uninhibited air intake for generator
- Exhaust flow direction of radiator is shielded and air exhaust enlarged (safety grating and decorative grille were taken into account)
- Exhaust line insulated

*Fig. 7.11.2-2: Correct installation in the cabin*



## 7.11.2.4 Installation location for radiator in a tunnel

A tunnel installation is implemented if the set-up location is separated from the vehicle cab by constructive measures.

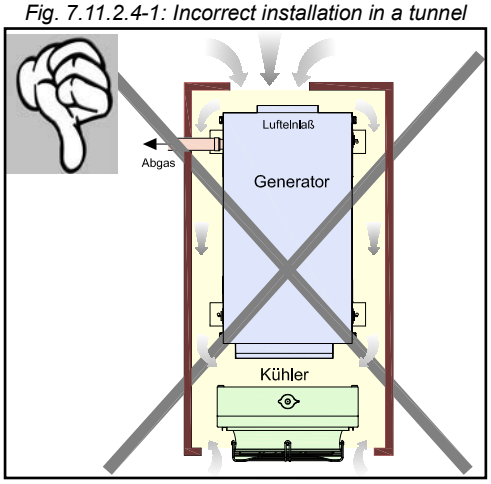
**Please note:**

- The total of the air intakes must be at least equal to the radiator width
- The total of the cross-sections of the air ducts incl. lateral air intake must be at least equal to the radiator width
- The distance between generator and radiator must equal at least 1/2 the radiator width
- Lateral air supply between generator and radiator can be designed on the side, above, or below

**Incorrect installation in a tunnel**

- Air intake too narrow
- Generator air intake too close to the wall
- Hot air can be taken in next to the radiator
- Exhaust gas line not insulated, heats up combustion air

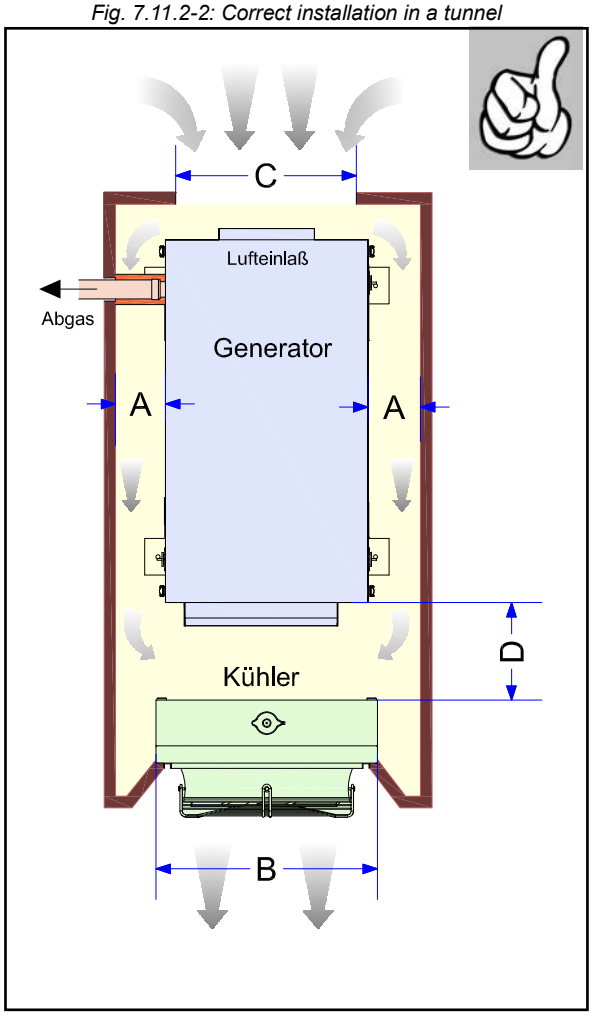
*Fig. 7.11.2.4-1: Incorrect installation in a tunnel*




**Correct installation in a tunnel**

- Air intake (C) is min. radiator size (B) (safety grating and decorative grille must be taken into account)
- Total of air intakes (A) equals min. the radiator size (B)
- Uninhibited air intake for generator
- Exhaust flow direction of radiator is shielded and air exhaust enlarged (safety grating and decorative grille were taken into account)
- Exhaust line insulated

*Fig. 7.11.2-2: Correct installation in a tunnel*



### 7.11.3 Coolant hoses

- The diameter of the coolant hoses must be equal to or greater than the diameter of the generator connections.
- A vacuum-tight and temperature resistant hose (min. 120  C) must be used.
- The hoses must be pressure resistant under vacuum conditions.
- Depending on the application location, the hoses must be UV-resistant.
- The hoses must be weather resistant and chemical resistant (resistant to oil, etc.).
- The bending radii of the hose type shall be taken into account.
- The hoses must have a general operating permit (ABE) / approval certificate.

### 7.11.4 Connection of the external radiator

*See section 7.13, “Installation schematic diagram,” on page 72.*

### 7.11.5 Installation of a coolant temperature indicator

Where sensitive systems are installed (e.g. in television transmission vehicles, rescue vehicles, or other vehicles with sensitive metro-logical installations) a remote indicator for coolant temperatures should be installed. It is, however, highly recommended to install two indicator instruments:

1. coolant feed line (cold side)
2. coolant return line (hot side)

The exact location of the measuring unit is not important, here.

**A corresponding indicator kit can be procured from Fischer Panda.**

**Note:**



For retrofitting purposes, Fischer Panda T-fittings are available for hose elements in which the temperature sensors are then installed.

### 7.11.6 Permissible coolant temperatures

- The radiator must be dimensioned such that the feed line to the generator (cold side) does not get hotter than 70 °C during normal operation. The coolant feed line must be connected to the coolant pump.
- The coolant volume flow must be dimensioned such that the temperature difference between engine inflow (coolant pump) and engine outflow (exhaust manifold) is no greater than 12 K under full load.

To ensure this, the coolant hoses shall be routed without kinks or sharp bends. Resistance, e.g. due to narrowed points in transition pieces or shut-off valves, shall be avoided.

**Note:**



### 7.11.7 Coolant pump

- The generator is equipped with a normally suctioning (not self-priming) coolant pump.
- The coolant pump is designed so that a max. distance of 5 m between pump and radiator is possible.

If the necessary coolant volume flow is not achieved (e.g. due to a special installation situation), an external coolant pump with the corresponding output must be installed in the coolant circuit to increase the coolant volume flow.

**Note:**



**The pressure in the coolant circuit may not exceed 0.7 bar!**

**Warning:**



**Required coolant volume flow:**

*Fig. 7.11.7-1: Coolant flow rate*

| Generator model | Coolant flow rate |
|---|---|
| Panda 4500 | min. approx. 10 L/min |
| Panda 8000 - 10000 | approx. 16 to 22 L/min |
| Panda 12000 - 15000 | approx. 24 to 28 L/min |
| Panda 18 - 24 | approx. 32 to 38 L/min |
| Panda 30 - 32 | approx. 40 to 45 L/min |
| Panda 42 - 65 | approx. 50 to 60 L/min |

## 7.11.8 Radiator fan

Radiator fans are wearing parts. To ensure a long service life, there must be no objects impairing or blocking the free movement of the fan while operating. Such objects include:

- Snow
- Ice
- Leaves
- Branches
- Increased air resistance due to dirty radiator

## 7.11.9 Anti-freeze and corrosion protection

At the factory, the coolant is adjusted to a 50 % concentration of G48 anti-freeze solution (approx. -40 °C). If lower temperatures are possible during transport or storage, the coolant filling must be drained or adjusted for the lower temperatures.

After draining the coolant, the system must be blown dry with compressed air at 0.5 bar. This will ensure that the system is complete drained.

The anti-freeze agent also serves to protect the system against corrosion. The anti-freeze concentration in the coolant must not drop below 30 %.

## 7.11.10 Logging the temperature values during initial start-up

It is mandatory to measure the temperature values of the circulating coolant in the circuit after installing the generator for the initial start up. Two remote thermometers must be used for this purpose. One connection must be mounted to the coolant feed line to the engine, the second one on the coolant out-feed. The generator must then be loaded with min. 75 % of the rated power after a brief warm-up phase. The circulation of the coolant must be checked. The values must fall within the following limits:

1. Coolant feed line max. 70 °C in permanent operation mode at maximum load
2. Coolant return line max. 85 °C in permanent operation

mode.

3. Differential of the two values: This item is of particular importance and provides information on the circulation of the coolant. The difference should be max. 17 K for a coolant water system with an integrated water-cooled muffler. It should, however, typically be between 10 and 12 K.

If the difference is greater than 15 K, the coolant circulation is not sufficient. The water circulation must then be increased. This can be solved by e.g. improving the line routing, or by reducing the belt pulley diameter. It is absolutely necessary to measure the output of the cooling system after installing the generator. The values given above shall be considered maximum permissible values. They apply to operation in increased temperatures, as well. In permanent operation mode at external temperatures around 20 °C, the values must fall near the lower limit of the tolerance.

**Each manual includes installation certificates, which must be filled in after installation and returned to the manufacturer (copy).**

**Returning the installation certificates and commissioning logs is an important component of the warranty conditions.**

**Note:**



## 7.12 Custom installations

The effects on the warranty must be agreed on a case-by-case basis with Fischer Panda.

### 7.12.1 External heat exchangers

External heat exchangers shall be installed as per the specifications of the respective manufacturers.

### 7.12.2 External engine pre-heater

The external engine pre-heater must be installed as per the manufacturer's instructions.

This applies to:

- electrical pre-heater systems (e.g. Defa),
- diesel-operated pre-heater systems,
- petrol-operated pre-heater systems.

### 7.12.3 Keel cooling

The keel cooling system shall be dimensioned and installed as per the manufacturer's instructions.

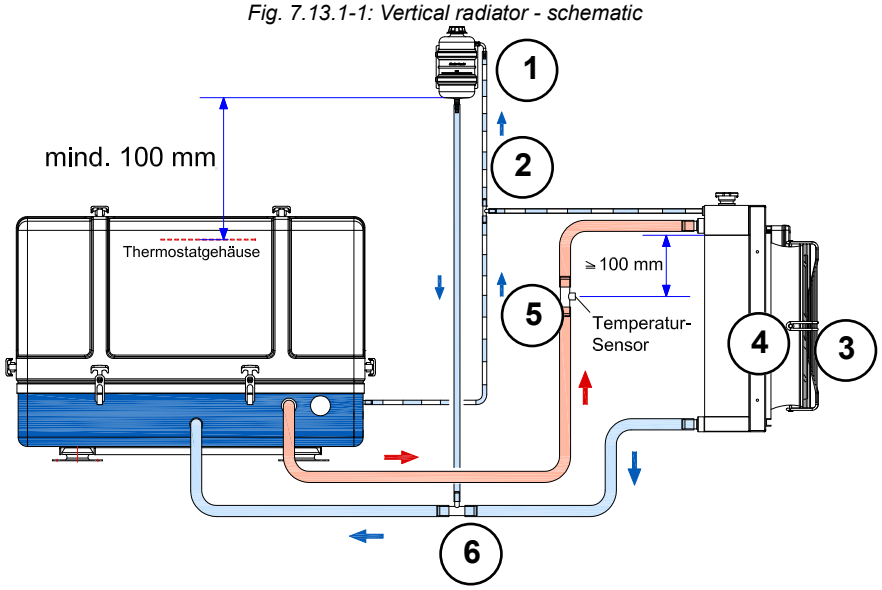
## 7.13 Installation schematic diagram

**In the case of generators with xControl, the ECU measures the coolant temperature at the exhaust manifold. The external temperature switch/sensor in the coolant line are not required for these generators.**

**Note:**

### 7.13.1 Installation for vertical radiator installation

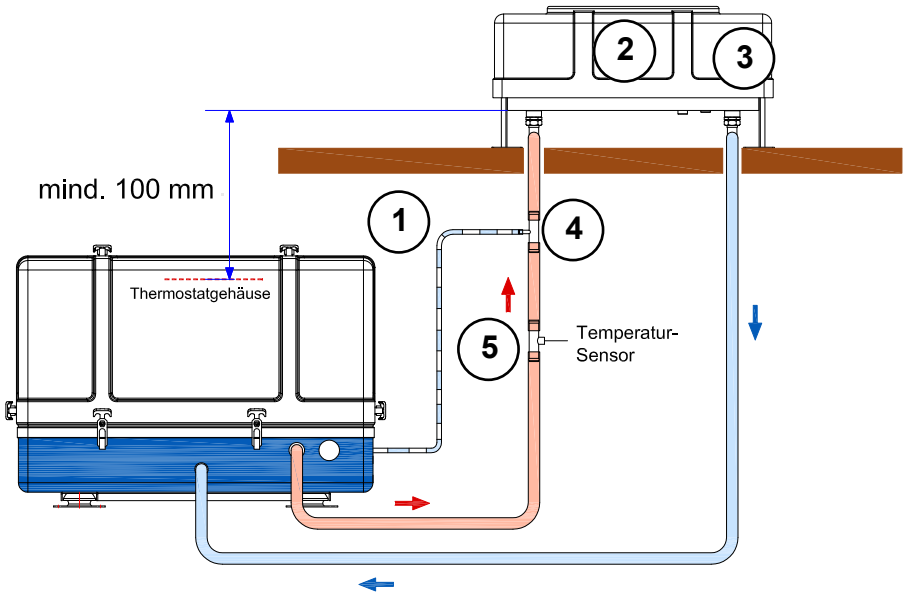
*Fig. 7.13.1-1: Vertical radiator - schematic*




01. Coolant expansion tank
02. Engine vent line
03. Fan for radiator
04. Radiator
05. T-fitting with connection for thermal switch/sensor for external fan controller
06. T-fitting

## 7.13.2 Installation schematic for roof mounted radiator with expansion tank

*Fig. 7.13.2-1: Roof-mounted radiator - schematic*

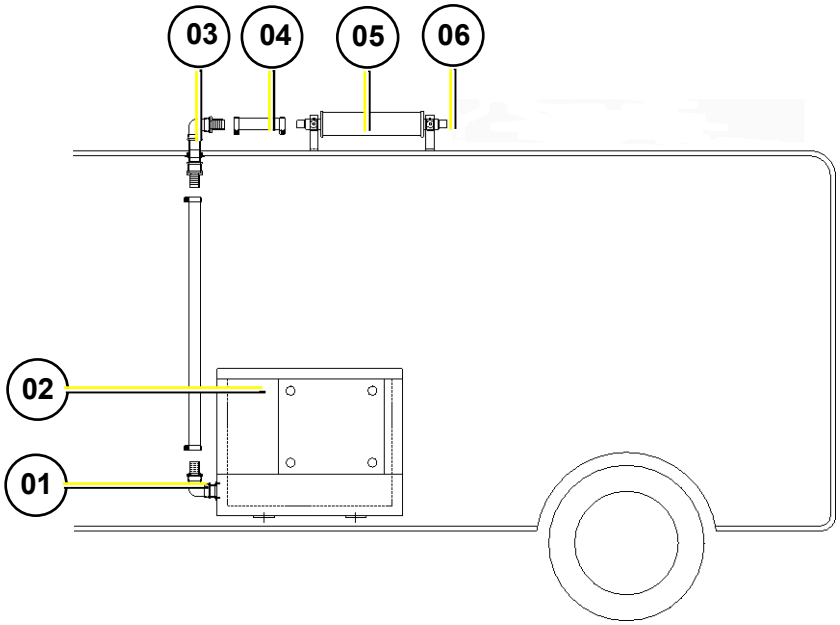



1. Engine vent line
2. Radiator (horizontal)
3. Coolant expansion tank (integrated)
4. T-fitting for bleed line
5. T-fitting with connection for thermal switch/sensor for external fan control

# 7.14 Exhaust system installation

## 7.14.1 Exhaust manifold for rooftop outlet

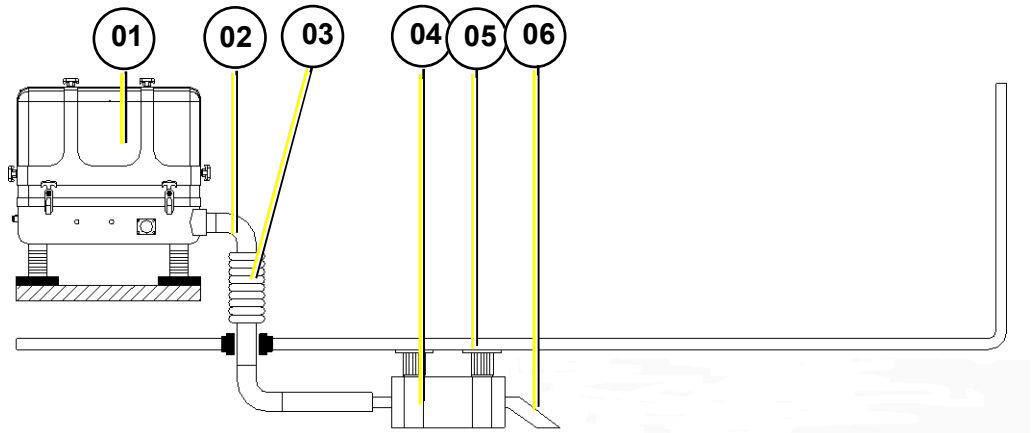
*Fig. 7.14.1-1: Roof-mounted exhaust installation - Schematic diagram*




01. Exhaust manifold
02. Generator
03. Roof duct with elbow
04. Compensator (optional)
05. External silencer (optional)
06. End pipe

## 7.14.2 Exhaust manifold for installation beneath the vehicle

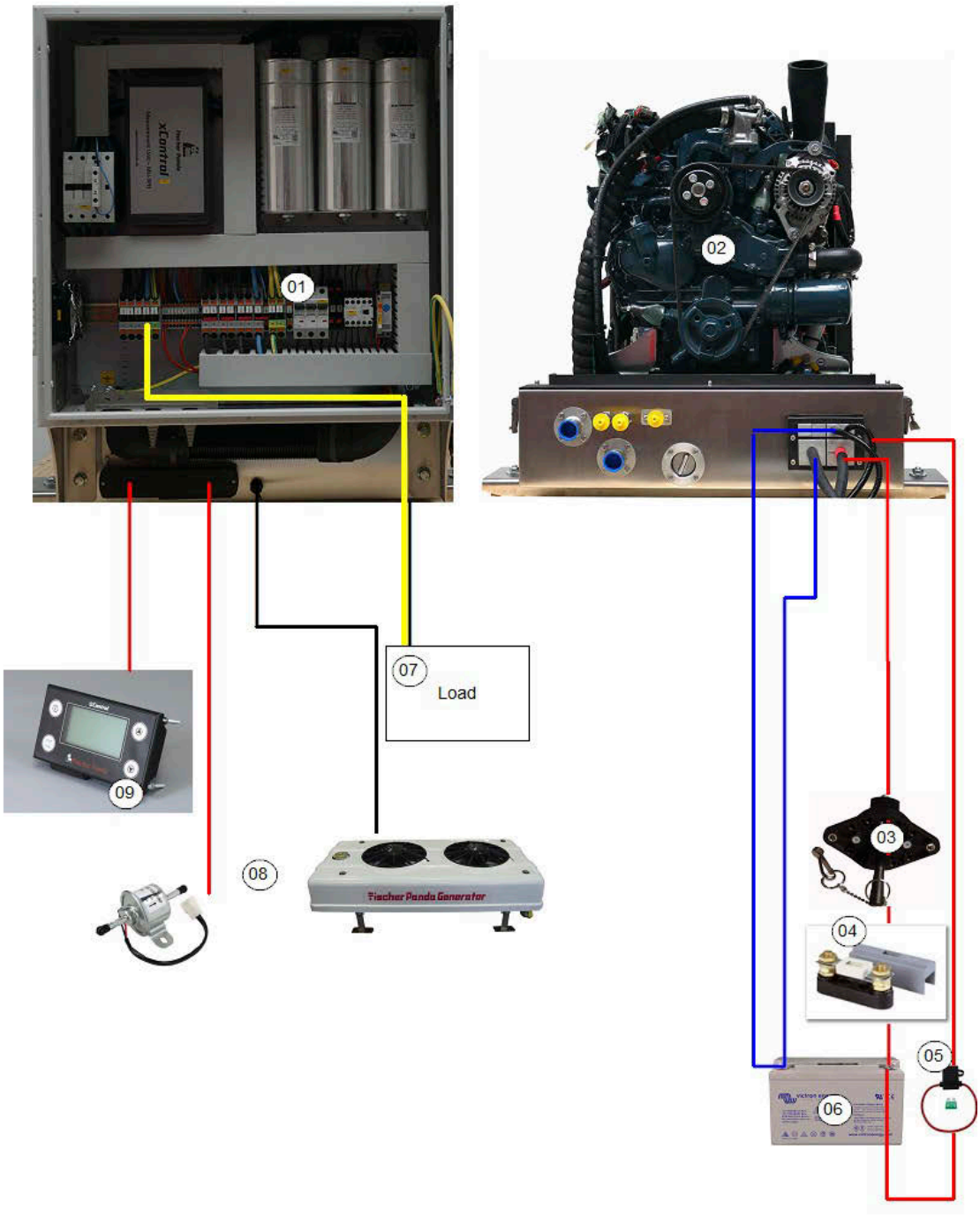
*Fig. 7.14.2-1: Under-floor exhaust installation - Schematic diagram*




01. Generator
02. Exhaust manifold
03. Compensator (optional)
04. External silencer (optional)
05. Vibration damper
06. End pipe

## 7.14.3 Connection of electrical components

*Fig. 7.14.3-1: Electrical connection - Diagram*




01. Control cabinet on the generator
02. Generator
03. Main battery switch
04. DC fuse
05. Automotive DC fuse
06. Starter battery control cabinet
07. Customer-provided control cabinet
08. Fuel pump
09. fpControl remote control panel

## 7.14.4 Installing the generator DC system

## 7.14.5 General safety instructions when dealing with batteries

**Take note of the instructions and installation guidelines of the battery manufacturer.**

**Attention!**



Only use batteries that are approved by the battery manufacturer for this application.

These instructions shall apply in addition to the instructions of the battery manufacturer:

- While you are working on the batteries, a second person should be within earshot to help you if necessary.
- Keep water and soap ready in case battery acid is burning your skin.
- Wear eye protection and protective clothing. Do not touch your eyes while handling batteries.
- If acid splashes on your skin or clothing, wash if off with lots of water and soap.
- If acid enters your eyes, rinse them immediately with clean water, until the burning sensation has stopped. Immediately seek medical assistance.
- Do not smoke near the batteries. Avoid naked flames. The area around batteries is a potentially explosive atmosphere.
- Ensure that no tools are dropped on the battery terminals; cover them as necessary.
- Do not wear jewellery or watches on your arms during installation that might short-circuit the battery. Otherwise, there is a risk of skin burns.
- Protect all battery contacts against accidental contact.
- For battery blocks: Use only deep cycle batteries. Starter batteries are not suitable. Lead-acid gel batteries are recommended. They are maintenance-free, cycle stable, and do not release gases.
- Never charge a frozen battery.
- Avoid battery short-circuits.
- Ensure proper ventilation of the battery to vent gases that may be released.
- Battery connection terminals must be checked for proper seating before operation.
- Battery leads must be routed carefully and tested for undue heating under load. Check the battery near vibrating components regularly for chafing and insulation defects.

## 7.14.6 Installation of the starter battery lines

**Observe the regulations "ABYC regulation E11 AC and DC electrical systems on boats“ and/or EN ISO 10133:2000 "Small craft -- Electrical systems -- Extra-low-voltage d.c. installations" as applicable!**

**Attention!**



- The battery compartment and the corresponding installation shall be dimensioned adequately.
- The batteries can be separated mechanically or with an adequate power relay.
- Install a fuse of the appropriate rating in the positive lead of the starter battery as close as possible to the battery,

but no further than 300 mm (12 inches) from the battery.

- The battery cable must be protected against chafing by a protective conduit/sleeve.
- Use self-extinguishing and fireproof cable suitable for temperatures up to 90 °C, 195 °F.
- Install the battery cables in such a way that the insulation cannot be removed by chafing or other mechanical stresses.
- The battery terminals must be protected against accidental short-circuiting.
- Inside the Fischer Panda generator capsule, the positive battery cable must be routed so that it is protected from heat and vibrations by means of an adequate conduit/protective sleeve. It must be routed so that it does not touch parts that rotate or become hot during operation, such as belt pulleys, exhaust manifolds, exhaust pipes and the engine itself. Do not over-tighten the cable, as this may damage it.
- After completing the installation, perform a test run of the generator and check the battery cable installation during and after the test run. Implement corrections as necessary.

## 7.14.7 Connecting the starter battery

**As a rule, Panda generators, from the Panda 6000 upwards, have a built-in alternator/dynamo to charge the starter battery. For generators without an alternator/ dynamo, the starter battery must be charged by an external charger.**

**Note:**



To avoid large voltage losses, the battery must be installed as close as possible to the generator. The positive terminal of the battery is connected to the red cable, the negative terminal is connected to the blue cable.

**It must be ensured that the cables are connected first to the generator and then to the battery.**

**Warning Check the connection sequence**



Use the battery capacity recommended by the engine manufacturer.

**Prior to installation, verify that the voltage of the starter battery complies with the start-up system voltage.**

e.g. 12 V starter battery for 12 V start-up system

e.g. 24 V starter battery for 24 V starter system (e.g. 2 x 12 V in series)

Too high a starter battery voltage can destroy parts of the generator!

**For battery charger generators (Fischer Panda AGT-DC):**

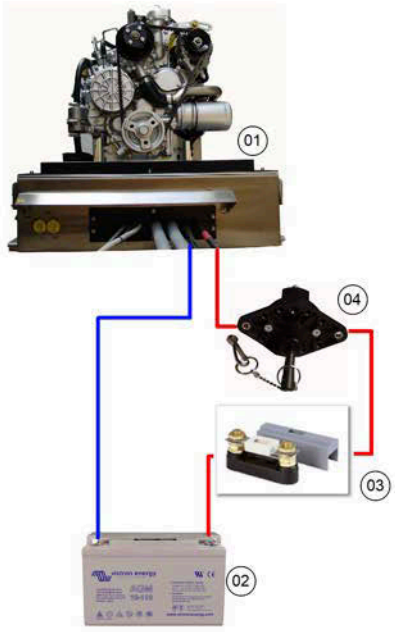
**Prior to installation, verify that the voltage of the battery bank complies with the output voltage of the generator.**

A separate starter battery must be installed for the generator alone. The generator is then independent of the remaining battery set. This enables you to start the gen-set at any time with its own starter battery even if the other batteries are empty as a result of the electrical system being discharged.. At the same time, the separate starter battery has the advantage of the generator, together with its electrical system, being galvanically isolated from the complete remaining DC system. i.e. minus pole (-) is not connected electrically to earth/ground. The generator is then earth/ground free with respect to the grid..

**Panda 30 CR PVM Battery connector lead min. 70 mm² max. 3.5 m cable length in a single cable run.**

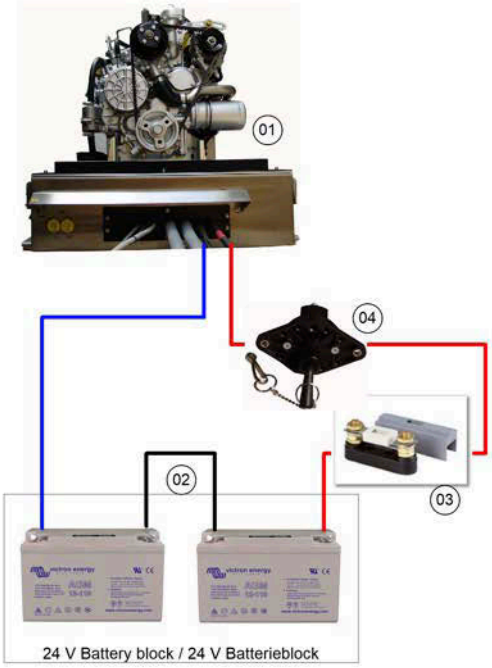
**Attention!**

*Fig. 7.14.7-1: Starter battery connection 12 V - Diagram*



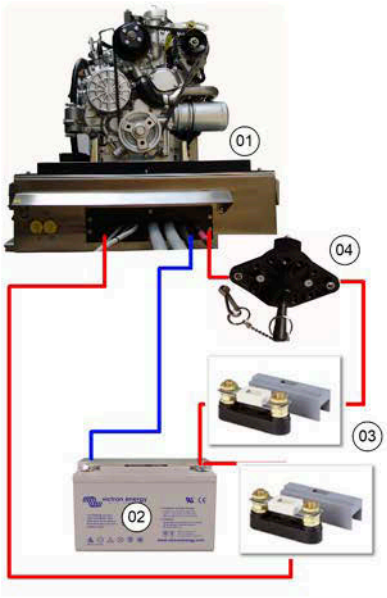

01. Generator
02. DC starter battery
03. Battery fuse
04. Main battery switch

*Fig. 7.14.7-2: Starter battery connection 24 V- configuration*




01. Generator
02. DC starter battery
03. Battery fuse
04. Main battery switch

*Fig. 7.14.7-3: Starter batteryconnection 12 V diagram* with seperate power connection for the ECU




01. Generator
02. DC starter battery
03. Battery fuse
04. Main battery switch

**Fischer Panda generators are equipped with a self-contained starter. The connecting leads between the battery and the DC system must match the current demand of the starter.**

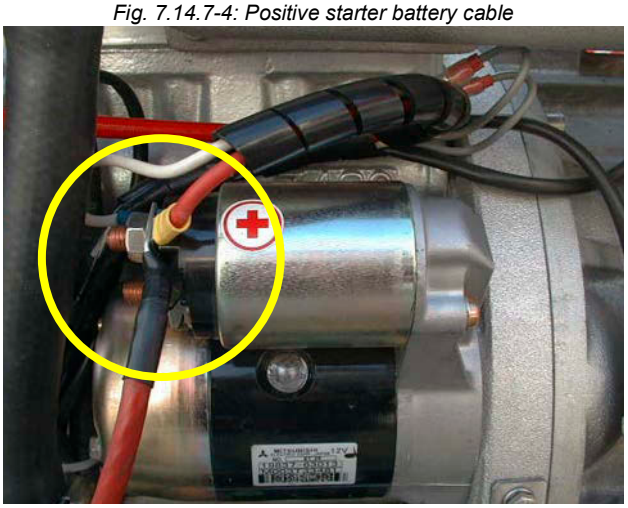
The positive (+) cable of the battery is connected directly to the solenoid switch of the starter.

1. Solenoid switch for starter motor

2. Electric starter

*Illustrative example*

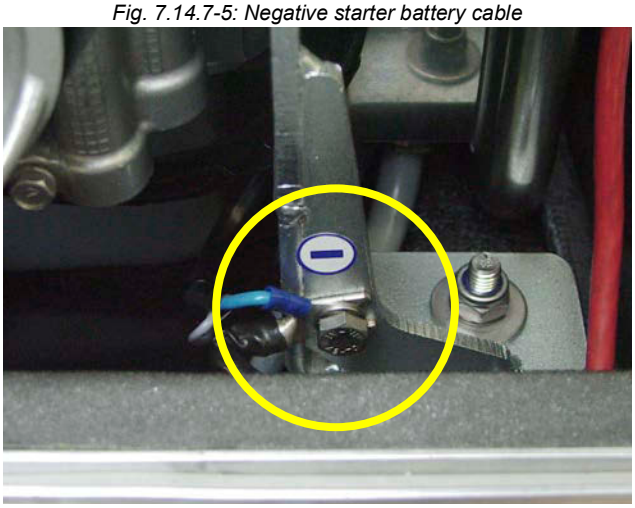
*Fig. 7.14.7-4: Positive starter battery cable*



**The negative (-) cable of the battery is connected to the motor foot.**

*Illustrative example*

*Fig. 7.14.7-5: Negative starter battery cable*



## 7.15 Starting aids for use in the case of high starting current (booster) – not present in all models

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

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

### 7.15.1 Electrical fuse

It is absolutely essential to protect the individual installation circuits in the on-board electrical distribution system properly. The generator should, however, also have its own input fuse. This fuse should be designed so that the rated current of the generator cannot be exceeded by more than 25 % on each of the individual phases.

Data for generators with a power output greater than 30 kW should be obtained from the manufacturer on request!

The fuses must be of the slow-blow type. A 3-phase motor protection circuit breaker must be installed to protect each of the electrical motors.

### 7.15.2 Required cable cross-sections:

The following recommended electrical cable cross-sections are the minimum required for a proper installation (see section 11.4, “Cable cross section,” on page 119).

### 7.15.3 Terminal assignment on the electrical circuit diagrams and terminal designations on the devices indicated by stickers and other labelling

The possibility always exists of circuit diagrams having been mixed up or of individual components not matching up on all devices in terms of terminal assignment.

The installer should therefore measure all electrical cables. This applies in particular to the L1/ L2/L3/L1'/N terminal assignment for the 60 Hz (120 V) version. In all cases, errors regarding this labelling on the circuit diagrams and on the terminal blocks are excepted. The installer is therefore obliged to check whether the housing of the generator has zero potential to earth before commissioning. Until this test has been performed, all other components associated with the electrical installation must be disconnected. When the generator is commissioned, this test must then also be performed with all electrical components that are installed. To do so, the housing must be tested against earth in each case, to ensure that there is no voltage present on the housing of the individual load.

## 7.16 Voltage monitor - Supplementary equipment

In the case of an engine-powered generator, one must always count on control of the engine speed monitor being lost due to faults on the control system of the diesel engine. In this case, the diesel engine may speed up without being limited and generate a voltage that is significantly greater than is permissible for the electrical loads. Under certain circumstances, this can destroy very expensive equipment components. It is therefore essential for a solid installation that a voltage monitor with an isolation relay is used to protect the electrical loads in the network.. The associated accessory components are available from Fischer Panda.

In the case of a twin combi-generator, the voltage monitor should make provision for both output stages (single-phase alternating current and three-phase current).

A voltage monitoring system is integrated into various Fischer Panda generators. This voltage monitor, however, only functions on the diesel engine. If the rated voltage is exceed by approx. 15 %, this voltage monitor is activated, which in turn switches the diesel engine off. As this is, however, only possible after a delay of some seconds, consumers may already be damaged in the meanwhile. The only safe method to protect electric devices is the

installation of an external voltage monitor with a cut-off relay.

We expressly recommend this measure and would like to point out the manufacturer of the generator accepts no liability for any damage to external devices that arises from overvoltage.

Protect your valuable devices by means of external voltage monitoring!

### 7.16.1 Additional note regarding the recommendation of “external, electric voltage monitoring”

In the case of diesel engines, one must always take into account that a diesel engine may, under specific circumstances, run away uncontrollably. This then the case if engine oil enters the air intake due to damage to the system. In the case of many engines, this can take place via the crankcase ventilation system. Piston damage could, for example, result in excess oil being pushed into the breather by overpresssure in the crankcase, so that oil then enters the intake. The engine can no longer shut itself down. Usually this also results in damage to the engine. It would, however, be disastrous if this engine damage is at the same time combined with the destruction of of all the electrical consumers that are switched on at this point in time, as the uncontrolled running away of the diesel engine also results in an extreme increase in voltage. Such damage can only be prevented by an external voltage monitor.

## 7.17 Checking the oil level

The oil level must be checked and topped up if necessary as described in the chapter on Maintenance.

## 7.18 Topping up and bleeding the coolant circuit

The coolant circuit must be topped up and bled as described in the chapter on Maintenance.

## 7.19 Bleeding the fuel system

The fuel system must be bled as described in the chapter on Maintenance.

## 7.20 Isolation test

**Once the electrical system installation is complete and before commissioning and before handing the generator over to the customer, an insulation test must be performed as follows:**

**ATTENTION!**



1. Switch off all electrical loads.
2. Start the generator.
3. Using a voltmeter (set to Volt/AC), the voltage between:

   a) the generator housing and AC control box

   b) the generator housing and ground

   is measured. The measured voltage must not exceed 50 mV (millivolts).
4. Once the safety systems have been installed, they must be checked. If an RCD (earth leakage circuit breaker) has been installed, it must also be tested, in order to ensure that it is functioning properly. This takes place by measuring the phases with respect to each other and ground. An additional fourth phase (L1’) must be checked in the case of generators with a DVS winding.
5. If the generator is protected by a ground connection, then ALL electrical devices must also be connected to this "common" ground (usually ground contacts are attached to the devices' metallic housings).

The electrical system installation must also comply with the hook-up requirements of the shore current grid. Generally, it must be assumed that these requirements will only be satisfied by a safety measure that incorporates an RCD (earth leakage circuit breaker). This should comply with the national regulations of the respective region in which the system is connected to the shore power. The RCD (earth leakage circuit breaker) must comply with the requirements of the installation environment in terms of its trip current.

## 7.21 Start-up

After completing the installation, commissioning must take place.

For this purpose, the start-up log is processed and completed by the specialist who installs the equipment. The completed log shall be handed over to the operating company.

The owner/operator shall be instructed regarding the operation, maintenance and hazards of the generator. This includes the service procedures and hazards stated in the handbook, as well as other matters relating to the specific installation and the connected components.

**The original start-up log of the generator must be sent to Fischer Panda to obtain the full warranty. Make sure that you retain a copy for your records.**

**Note:**



# 8. Generator Operating Instructions

## 8.1 Personnel

The generator may only be started up by authorised and instructed personnel. The operator shall read the manual in its entirety before starting up the equipment and shall familiarise themselves with the hazards and safety precautions. This applies to both the generator itself and external equipment, attachment parts, and auxiliary units.

### 8.1.1 Safety instructions regarding operation

**Ensure compliance with the general safety instructions at the beginning of this handbook.**

**Note!**



**LETHAL DANGER! Improper operation can result in severe personal harm and material damage.**

The generator can be equipped with an Autostart device. This means that the generator can be started by means of an external signal.

The battery bank must always be disconnected (negative terminal first, then the positive terminal) if work on the generator or electrical system of the generator is to be performed, so that the generator cannot be started inadvertently.

**Warning! Autostart**



**Rotating parts! Improper operation can result in severe personal harm and material damage.**

The generator must not be operated with the cover removed.

If operation with the cover removed is necessary during a test run, particular caution is required. Never perform these tasks when alone!

**Caution! Danger to life and limb**



**Lethal danger. Improper control, installation, maintenance and improper operation may lead to severe personal injuries or material damage.**

Electric voltages of more than 48V are potentially lethal in any situation. The rules of the respective regional authority must be adhered to during installation. For safety reasons, only an electrician may carry out the installation of the electrical connections of the generator.

**Attention! Lethal danger - High voltage**



## 8.2 General instructions regarding operation

### 8.2.1 Operating at reduced load and idling

If a combustion engine is operated at a reduced load such as 25-30 % of its nominal power, carbon may build up in the generator, creating a cause for concern. This mode of operation results in increased oil consumption and oil

escaping from the intake and exhaust manifolds. To a certain extent, this also arises on generators in Standby mode.

#### 8.2.1.1 Reasons for carbon building up in the generator

The cylinders do not achieve their normal operating temperature and optimal fuel combustion thus cannot be assured. In addition, oil carbon builds up on the valves, the pistons and the exhaust system (carbon buildup). Unburned fuel is dissolved in the lubrication oil and contaminates it.

#### 8.2.1.2 In order to avoid generator sooting, take note of the following items:

Operation at low load should be kept as brief as possible.

In order to burn the carbon deposits in the exhaust system, the generator should run at full load for at least 4 hours within a period of 50 hours of operation, If necessary, a dummy load must be connected for this purpose. This should be increased slowly from 30 % to 100 % within a period of 3 hours and then be maintained at 100 % for one hour.

### 8.2.2 Load placed on the engine in continuous use and overloading

Kindly ensure that the generator is not overloaded. Overloading of the generator occurs when the electrical load is greater than that which can be delivered by the generator. This will damage the engine in the long run. Overloading can lead to the generator running unevenly and roughly, excessive fuel and oil consumption and deterioration of emission values.

In the interests of the engine’s long service life, a continuous load should be calculated as 70 % - 80% of the nominal load. Continuous use is understood to be uninterrupted operation of the generator for many hours. It poses no problem for the engine to deliver the full nominal output for 2--3 hours.

The overall design of the Fischer Panda generator ensures that even when operated at full load under extreme conditions, overheating of the engine will not occur. It must, however, be taken into account that when the engine is operated at full load, the exhaust emissions (soot formation) will deteriorate.

### 8.2.3 Protection conductor

The generator is "earthed" as a standard feature (the centre and earth are connected by means of a jumper in the generator terminal box). This is a basic first-level safety measure, which offers protection as long as no other measures are installed. Above all, it is designed for delivery and a possible test run.

This earthing (PEN) only functions when all parts of the electrical system are earthed on a common potential. The shunt can be removed if this is necessary for technical reasons and another protective system has been set up instead.

While the generator is being operated, the full voltage of 120/230 V or 230/400 V is applied to the AC control box, as well. Therefore, it is essential to ensure that the control box is closed and secured against touch while the generator is running.

The battery bank must always be disconnected if work on the generator or electrical system of the generator is to be performed, so that the generator cannot be started inadvertently.

### 8.2.4 Operational monitoring system on the Fischer Panda Generator

Fischer Panda generators are equipped with multiple sensors/temperature switches for operational monitoring. In addition, the combustion engine has an oil pressure switch, which is switched off as soon as the oil pressure drops below a specific value.

### 8.2.5 Instructions for capacitors - not present in all models

**Electric voltage - LETHAL DANGER!** **Warning!**

Do not touch contact terminals on the capacitors!



Capacitors are required to operate the generator. They form two separate assemblies:

A) The working capacitors

B) The booster capacitors

Both groups are located in the separate AC control box (on the generator in the case of certain models).

Capacitors store electrical energy. High voltages may remain across the capacitor contacts even after they have been disconnected from the mains. As a safety precaution, do not touch the contacts.

If the capacitors must be replaced or inspected, the contacts shall be short-circuited by connecting an electric conductor to discharge potentially remaining potential differences.

If the generator is switched off normally, the working capacitors are automatically discharged via the winding of the generator. The booster capacitors are discharged by means of internal discharge resistors.

For safety reasons, all capacitors must be discharged through short-circuiting before work is carried out on the AC control box.

## 8.3 Checks before starting - see the Remote Control Panel data sheet

**The notes and instructions in the Remote Control Panel data sheet must be complied with.** **Note!**



*Ensure compliance with the general safety instructions at the beginning of this manual.*

## 8.4 Starting the generator - see Remote Control Panel data sheet

**The notes and instructions in the Remote Control Panel data sheet must be complied with.** **Note!**



*Ensure compliance with the general safety instructions at the beginning of this manual.*

## 8.5 Switching off the generator - see separate Remote Control Panel data sheet

**The notes and instructions in the Remote Control Panel data sheet must be complied with.** **Note!**



*Ensure compliance with the general safety instructions at the beginning of this manual.*

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# 9. Maintenance Instructions

**Due to emission control legislation, engine maintenance must be performed in accordance with the specification of the engine manufacturer.**

**In addition to this maintenance, the following maintenance work is to be performed on the generator.**

## 9.1 Personnel

The maintenance work described here can be performed by the operator unless otherwise labelled.

Further maintenance work may only be performed by specially trained technical personnel or by authorised workshops (Fischer Panda Service Points). This applies in particular to valve adjustments, work on the diesel injection system, and to engine repairs.

**The tasks described here can be seen as a guide. As the precise installation and storage conditions are not known to Fischer Panda, the work instructions and materials must be adapted by a qualified specialist on site. Damage due to improper maintenance/repair is not covered by the guarantee.**

**ATTENTION!**



### 9.1.1 Hazard warnings for maintenance

**Ensure compliance with the general safety instructions at the beginning of this handbook.**

**NOTE!**



**LETHAL DANGER! - Improper operation can cause harm to health and result in death.**

The battery bank must always be disconnected (negative terminal first, then the positive terminal) if work on the generator or electrical system of the generator is to be performed, so that the generator cannot be started inadvertently.

**WARNING! Autostart**



**Improper maintenance can result in severe personal harm and material damage. Therefore:**

- Maintenance work must only be performed when the engine is switched off.
- Before commencing work, ensure that there is sufficient freedom of movement for installation work.
- Take care the the workplace is neat and clean! Components and tools that are loosely stacked or lying around can result in accidents.
- Perform maintenance work only with standard tools or special tools as customarily used in the trade. The use of incorrect or damaged tools may result in injuries.

**ATTENTION! Risk of injury**



**Oil and fuel vapours can ignite upon contact with ignition sources. Therefore:**

- Ensure that there are no open flames while working on the engine.
- No smoking.
- Remove oil and fuel residue from the engine and the floor.

**WARNING! Fire hazard**



**Contact with engine oil, fuel, and anti-freeze agents can cause impaired health. Therefore:**

- Avoid skin contact with engine oil, fuel and anti-freeze.
- Remove splashed oil and anti-freeze from the skin immediately.
- Do not inhale oil and fuel vapours.

**CAUTION! Risk of poisoning**



**Electric voltage - LETHAL DANGER! - Improper operation can cause harm to health and result in death.**

Electric voltages of more than 48V are potentially lethal in any situation. The rules of the respective regional authority must be adhered to during installation. For safety reasons, only an electrician may carry out the installation of the electrical connections of the generator.

**WARNING! Electrical voltage**



**Generator and coolant may be hot during and after use.**

Excess pressure may develop in the cooling system when operating.

**ATTENTION! Risk of injury!**



**Personal protective equipment must be worn when performing maintenance work. This consists of:**

- Snugly-fitting protective clothing
- Safety shoes
- Protective gloves
- Goggles, if required

**ATTENTION! Protective equipment required**



**All loads must be disconnected prior to working on the generator to avoid damage to the devices.**

**ATTENTION! Switch off all loads**



**Batteries contain corrosive acids and alkalis.**

Improper handling can cause the batteries to heat up and burst. Corrosive acid/lye may leak. Under unfavourable conditions, an explosion may result.

*Adhere to the instructions of your battery manufacturer.*

**WARNING!**



### 9.1.2 Disposal of engine fluids

**Engine fluids are harmful to the environment.**

Collect and properly dispose of engine fluids that have been drained off!

**Protect the environment.**



## 9.2 General maintenance instructions

**Maintenance intervals can be found in the "General Information for Vehicle/Marine Generators" that accompanies this manual.**

**NOTE: Service intervals**



**Check before each start-up (or once daily)**

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

**Once a month**

- Grease/oil the actuator trapezoid thread spindle (where applicable).

### 9.2.1 Checking hose elements and rubber parts in the noise attenuation capsule

Check that all hoses and hose connectors are in good condition. The rubber hoses are very sensitive to environmental influences. They can deteriorate quickly in environments with dry air, light oil or fuel fumes, and increased temperatures. The hoses must be checked regularly for elasticity. There are operating situations that will require hoses to be exchanged once a year.

## 9.3 Securing the generator to prevent it from being switched on unintentionally

Disconnect the starter battery from the generator by disconnecting the starter battery contacts or opening the battery disconnection switch (if installed).

## 9.4 Key-operated switch / Service switch

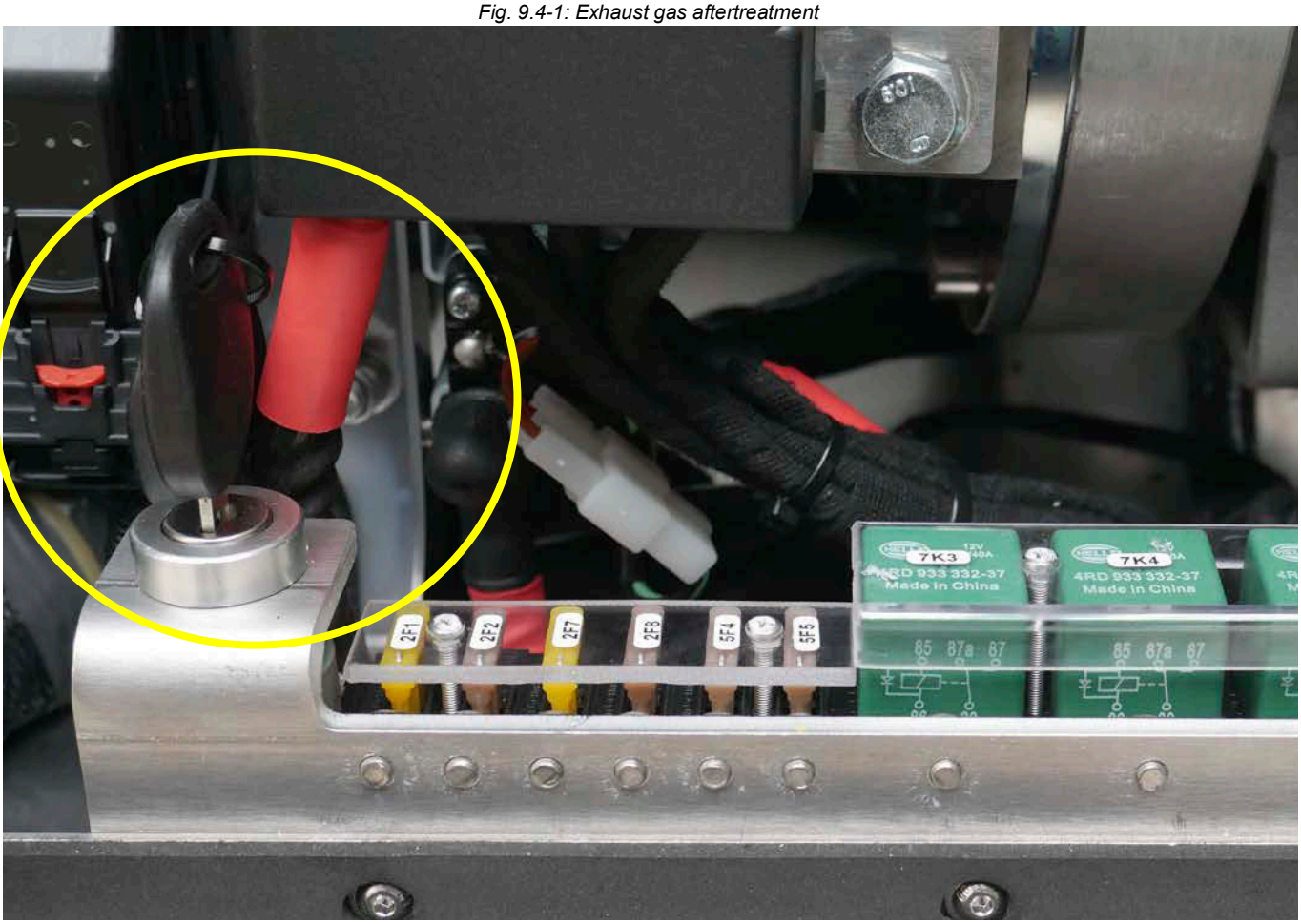
The key-operated switch inside the capsule is a service switch. This enables the engine to be started and set to idle independently of the generator control system. This enables, among other things, the error memory of the engine controller to be read out independently of the generator control system. Actuation of this key-operated switch is reserved for use by authorised service personnel of Fischer Panda GmbH or the authorised Kubota industrial engine service department. The key-operated switch may not be used while the generator is being operated or while the engine is being controlled by means of FP control. The key of this switch must therefore be pulled out by the owner and stored in a separate place (e.g. with the manual and service documents.

**Actuation of this key-operated switch is reserved for use by authorised service personnel of Fischer Panda GmbH or the authorised Kubota industrial engine service department.**

**Warning:**



*Fig. 9.4-1: Exhaust gas aftertreatment*




## 9.5 De-aerating (bleeding) the coolant circuit of the vehicle version

| | |
|---|---|
| Tool required / spare part / material | Spanner set / absorbent cloth, coolant |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



**Cooling system may be subject to pressure.**

**ATTENTION!**



If the coolant is drained, or if air has entered the cooling system for another reason, it is necessary to thoroughly de-aerate (bleed) the cooling system. This air bleeding procedure must be repeated several times:

1. Place the generator on a level surface.
2. Open the generator capsule.

3. Open the de-aerating screw on the thermostat housing.




A large piece of cloth or absorbent tissue should be placed under the connection to prevent escaping coolant from running into the capsule.

*Illustrative example*

*Fig. 9.5-1: Thermostat housing de-aeration screw*




4. Open the bleed screw on the exhaust manifold..




A large piece of cloth or absorbent tissue should be placed under the connection to prevent escaping coolant from running into the capsule.

*Illustrative example*

*Fig. 9.5-2: De-aerating (bleed) screw of the exhaust manifold*



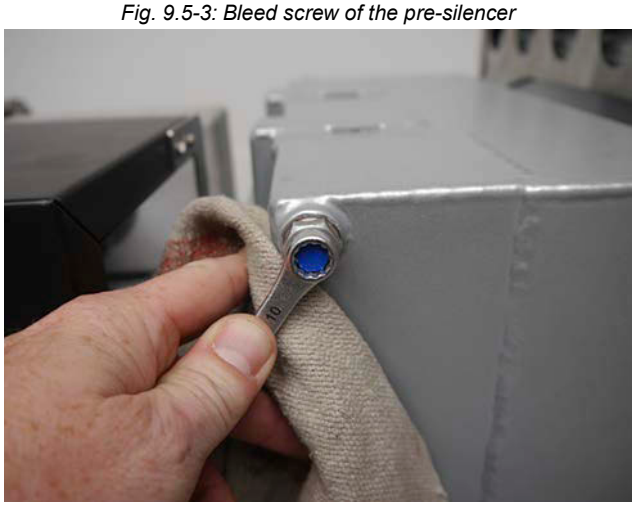

5. Open the bleed screw on the water-cooled pre-silencer (only in the case of vehicle versions).




A large piece of cloth or absorbent tissue should be placed under the connection to prevent escaping coolant from running into the capsule.

*Illustrative example*

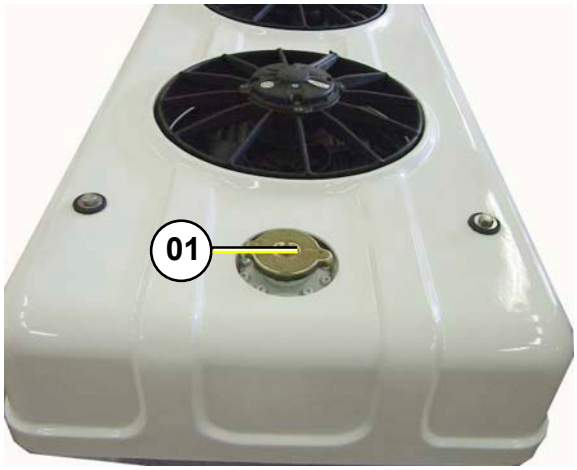
*Fig. 9.5-3: Bleed screw of the pre-silencer*



6. Pour coolant into the coolant filler neck at the radiator fan up to the maximum (01).
7. If the coolant level no longer drops (when the coolant is cold, the coolant must cover the plate in the exhaust elbow), close the the coolant screw plugs and then start the generator.
8. Allow the generator to run for a maximum of 60 seconds.
9. 1.Shut down the generator.

*Illustrative example*

*Fig. 9.5-4: Radiator fan*




10. Re-open the coolant filler neck and open the de-aerating screws simultaneously.
11. Top up again with coolant.

*Illustrative example*

*Fig. 9.5-5: Coolant filler neck*



12. Repeat this procedure several times.
13. When the coolant level ceases to change, the generator can be started and run for 5 minutes. After that, de-aeration must be repeated two to three times.
14. It is advisable to repeat the air bleeding process after a few days to ensure that any air bubbles that may have remained in the system are definitely removed.
15. Remove any coolant water drops and splashes from the generator and surrounding area.
16. Close the generator capsule.

### 9.5.1 Checking the coolant hoses

1. Remove the side walls from the generator as far as possible, and check the hoses visually while pinching them with the hand.
2. In the case of small leaks, tighten the hose clamps.
3. If a hose is brittle or defective, it must be replaced.
4. Depending on the operation and requirements, replace the hose clamps every 2 - 5 years.
5. Close the generator capsule.

## 9.6 Oil change intervals

To avoid damage to the engine, compliance with the specified oil change intervals of the engine manufacturer is mandatory!

See the general information regarding vehicle/marine generators for the appropriate intervals.

*Oil quality and oil volume:*

*See section 11.1, “Engine oil specification,” on page 119 and section 11.5, “Technical data of the engine,” on page 119.*

## 9.6.1 Checking and topping up the engine oil level

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



**Generator and engine may be hot during and after use.**

**ATTENTION: Risk of being burned;**



### 9.6.1.1 Checking the oil level

| | |
|---|---|
| Tool required / spare part / material | Absorbent cloth, cleaning cloths |

The generator must be level.

- in the case of vehicle generators: Place the carrier vehicle on a level surface.
- in the case of PSC generators: Place the generator on a level surface.
- in the case of marine generators: Measure the oil level, /then travel.

Run the generator for approx. 10 minutes to ensure that the engine is warm. Wait 3 minutes, so that the oil can flow back into the sump.

- Secure the generator to prevent it from being started unintentionally.
- Open the generator capsule.
- Withdraw the dipstick from the the guide.
- Wipe the dipstick clean.
- Re-insert the dipstick in the guide and wait 10 seconds.
- Withdraw the dipstick from the guide and check the oil level at the lower end.

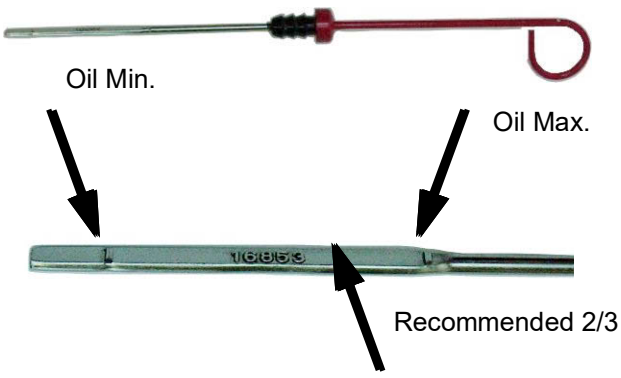
**Oil dipstick**

The oil level must be checked by means of the oil dipstick. The prescribed level may not exceed the "Max."marking.

*We recommend a 2/3 oil level.*

*Illustrative example*

*Fig. 9.6.1.1-1: Oil dipstick - example*



**Oil dipstick of the EA 300 engine**

The oil level must be checked by means of the oil dipstick.
The prescribed level may not exceed the "Max."marking.

*We recommend a 2/3 oil level.*

*Illustrative example*

*Fig. 9.6.1.1-2: Illustrative example Oil dipstick*




If the oil level is below 1/3 of the distance between the minimum and maximum markings, oil should be added.

Fischer Panda recommends an oil level 2/3 of the distance between the minimum and maximum markings.

If the oil level lies below the MIN marking, check in the service handbook or on the oil-change sticker how many operating hours have elapsed since the last oil change.

- If the oil level lies below the minimum marking after less than 50 h, there may be a technical problem. We recommend that you consult a workshop or a Fischer Panda service station.
- - if the oil is at all turbid or even "creamy", then coolant has possibly mixed with the oil. Consult a workshop or a Fischer Panda service station immediately.

## 9.6.1.2 Topping up oil

| Tool required / spare part / material | Engine oil |
|---|---|

1. Check the oil level as described under “Checking the oil level” auf Seite 93.
2. Withdraw the oil dipstick from the guide.
3. Open the oil filler cap.
4. Top up the oil (approx. 1/2 litre) and wait for approx. 2 min., so that it can flow into the sump.
5. Wipe the dipstick clean and replace in the guide.
6. Withdraw the dipstick from the guide and check the oil level. Siehe “Checking the oil level” auf Seite 93.

If the oil level is still too low (below 2/3), repeat Steps 4-6.

## 9.6.1.3 After checking the oil and topping up

- Replace the dipstick in the guide.
- Close the oil filler cap.
- Remove any oil drops and splashes from the generator and surrounding area.
- Close the generator capsule.
- Remove the securing device that prevents an unintended start-up of the generator.

## 9.6.2 Changing the engine oil and the oil filter

| | |
|---|---|
| Tool required / spare part / material | Spanner set, filter strap wrench / new oil filter, oil drain plug seal / suitable container to collect the engine oil, oil-resistant pad, absorbent cloth, engine oil |

The generator must be level.

- in the case of vehicle generators: Place the carrier vehicle on a level surface.
- in the case of PSC generators: Place the generator on a level surface.
- in the case of marine generators: Change the oil when the vessel is not listing or is travelling.

Run the generator for approx. 10 minutes to ensure that and that the engine is warm. Wait 3 minutes, so that the oil can flow back into the sump.

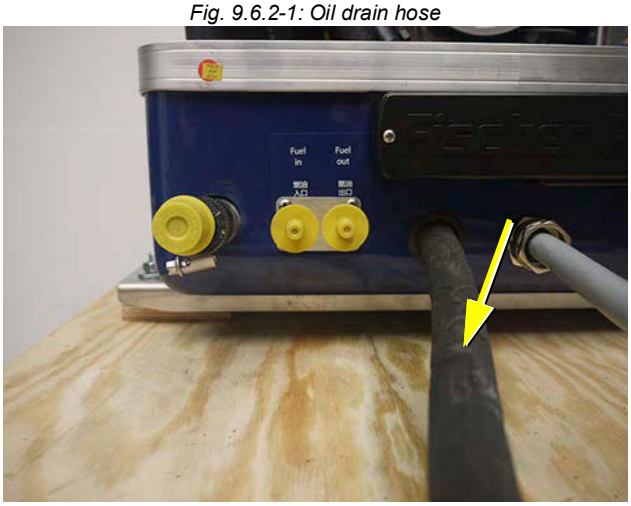
1. Preparing the generator.

   - Secure the generator to prevent it from being started unintentionally.

   - Open the generator capsule.

   - In the case of generators with an external oil drainage hose: Release the oil drain hose from the mounting.

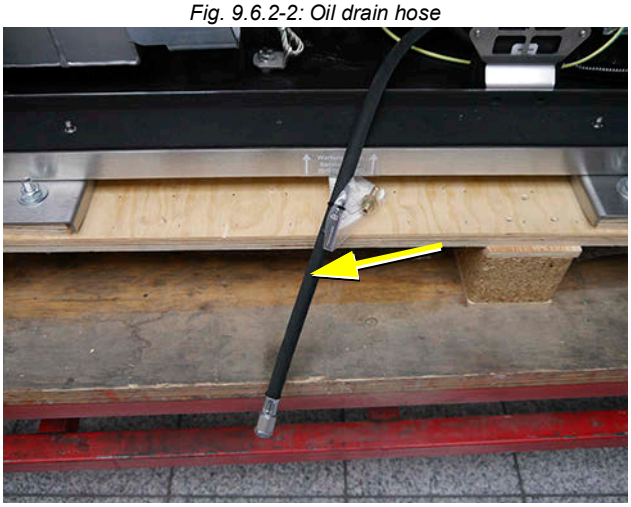
*Fig. 9.6.2-1: Oil drain hose*




   - In the case of generators with an internal oil drain hose: Remove the side wall of the capsule. The oil drain hose lies on the floor of the capsule. Guide the hose to the outside.

*Illustrative example*

*Fig. 9.6.2-2: Oil drain hose*



- Optional in the case of generators with an internal oil drain hose: Open the feed-through for the oil drain hose (turn anti-clockwise) Pull out the closure with the oil drain hose.
  Place an oil-proof pan under the location of the oil drain hose and have the collecting receptacle ready.

*Illustrative example*

*Fig. 9.6.2-3: Capsule feed-through*



2. Open the oil filler cap

   Unscrew the oil filler cap. This is necessary as otherwise a vacuum develops and the oil cannot drain completely.

*Illustrative example*

*Fig. 9.6.2-4: Oil filler cap*



3. Open the oil drain plug.

   Unscrew the oil drain plug from the oil drain hose with the aid of an open-end spanner (turn anti-clockwise). Use a second spanner to lock it off. Please take care that this is done over an oil pan.




*Illustrative example*

*Fig. 9.6.2-5: Oil drain plug*



4. Drain the old oil.

   Allow all the oil to drain out of the engine. This can take some minutes.

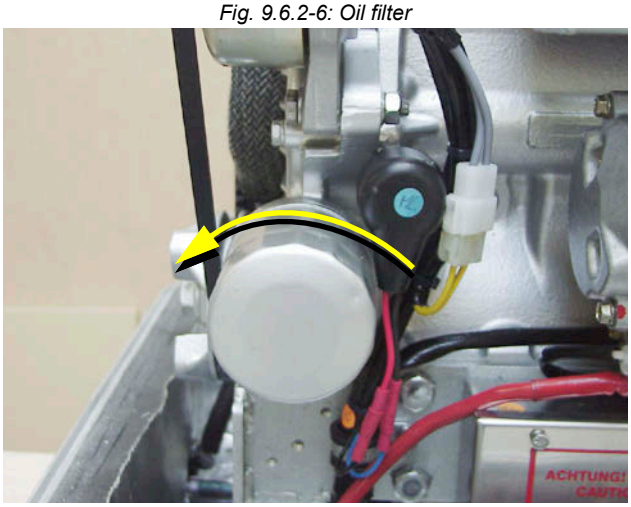
5. Remove the old oil filter / clean the oil sieve

   Loosen the filter by turning the filter wrench anti-clockwise. The filter may be full of oil. Take care not to spill and avoid contact with the skin.



*Illustrative example*

*Fig. 9.6.2-6: Oil filter*

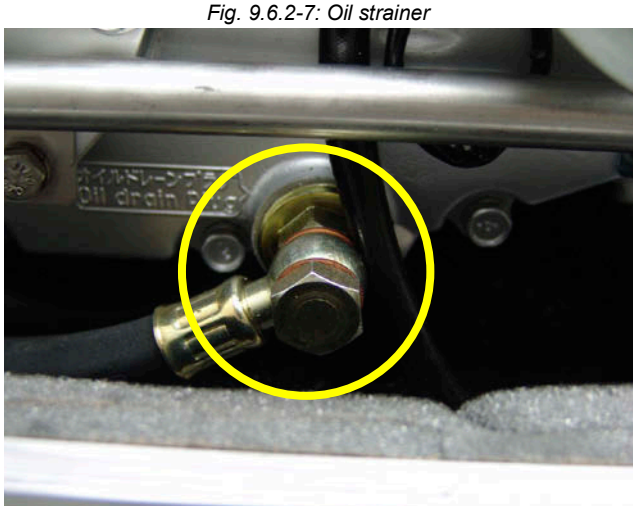


**Oil strainer in the case of generators with EA300 engines**

Follow the instructions in the engine manual.

*Illustrative example*

*Fig. 9.6.2-7: Oil strainer*



6. Prepare a new filter.

   Clean the filter holder of the engine and wipe a thin layer of oil on the seal of the new filter.

*Fig. 9.6.2-8: Oil filler sealing ring*



7. Install new filter.

   Carefully screw in the new filter by hand. It must not be fastened tightly. Screw the oil drain plug back in and tighten with a spanner. Use a new seal for the oil drain plug.

8. Top up oil (Volume of oil: see Annex)

   Use a funnel to pour the oil into the engine. Check the oil level with the dipstick once two litres have been poured in.

9. Check the correct oil level. See section 9.6.1.1, “Checking the oil level,” on page 93

   When the correct level has been reached, replace the oil filler cap. Let the engine run for 10 minutes and then shut it down. After a few minutes, check the oil level once again with the dipstick. If it is still too low, add oil.

10. Clean up.

Wipe all oil splashes from the generator and check that the oil drain plug is not leaking.

### 9.6.2.1 After the oil change

- Replace the dipstick in the guide.
- Close the oil filler cap.
- Remove any oil drops and splashes from the generator and surrounding area.
- Close the generator capsule.
- Remove the securing device that prevents an unintended start-up of the generator.
- Dispose of the used oil and filter properly.

**Old oil is very toxic and may not be disposed of together with household refuse. It is forbidden to dispose of old oil in the sewage system. Ensure that used oil is disposed of correctly (e.g. the place where the oil was purchased, or a local recycling centre).**

**ATTENTION!**



## 9.7 Bleeding the fuel system

| | |
|---|---|
| Tool required / spare part / material | Spanner set / absorbent cloth |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



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

**Generators with an iControl/xControl/fpControl control system do not require a failure bypass switch. In the case of these generators the fuel pump can be switched on by means of a control panel function. See the iControl2/xControl/fpControl manual.**

**ATTENTION!**

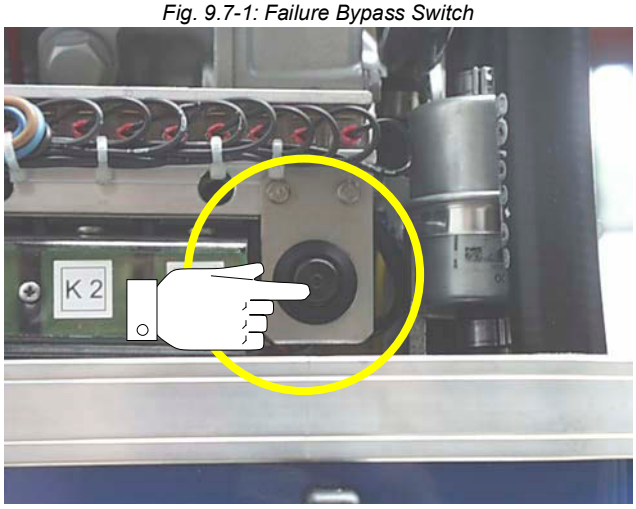


1. Place the generator on a level surface.
2. Open the generator capsule.
3. Set the main switch of the control panel to “ON”. The function elements must light up.

4. Press and hold the failure bypass switch. The electric fuel pump must run audibly. Moving the failure bypass switch will result in the sound of the solenoid valve on the generator switching on and off being audible (if the upper part of the capsule is removed).

*Illustrative example*

*Fig. 9.7-1: Failure Bypass Switch*

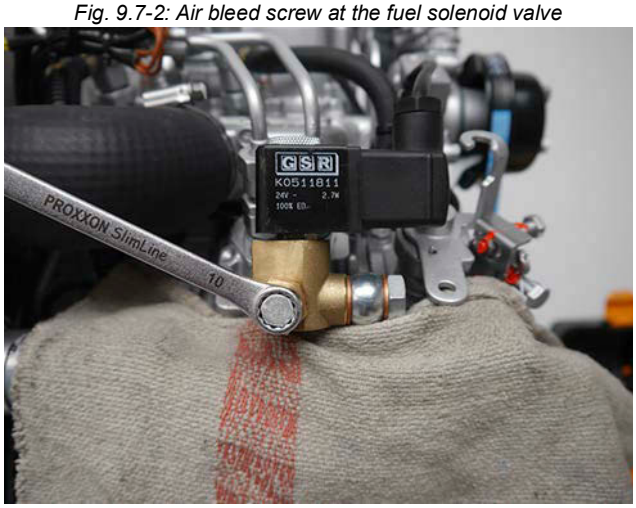



5. If the fuel pump is run for approx 3 - 4 minutes by pressing the failure bypass switch, the bleed screw located at the fuel solenoid valve will be released (see illustration). The button must be pressed continuously whilst opening the screw. A large piece of cloth or absorbent tissue must be placed under the connection to prevent escaping fuel from running into the capsule. If the fuel escapes without air bubbles, then the bleed screw can be closed. Only then may the failure bypass button be released.




*Illustrative example*

*Fig. 9.7-2: Air bleed screw at the fuel solenoid valve*




6. Press the 'start' button (to start the engine).

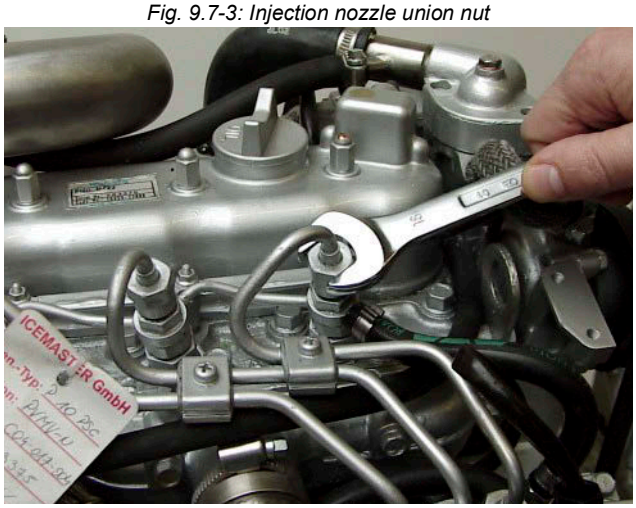
   The electric starter may only be used for a maximum of 60 seconds at a time. Thereafter, a pause of at least 60 seconds is required. Repeat this process. The fuel pump now runs. Check whether there are any leaks on the de-aerating screw on the fuel filter and the injection pump.

7. If this does not occur, then one of the union nuts on the injector jet must be loosened and the start-up attempt must be repeated. Re-tighten the union nuts after successfully starting.




*Illustrative example*

*Fig. 9.7-3: Injection nozzle union nut*

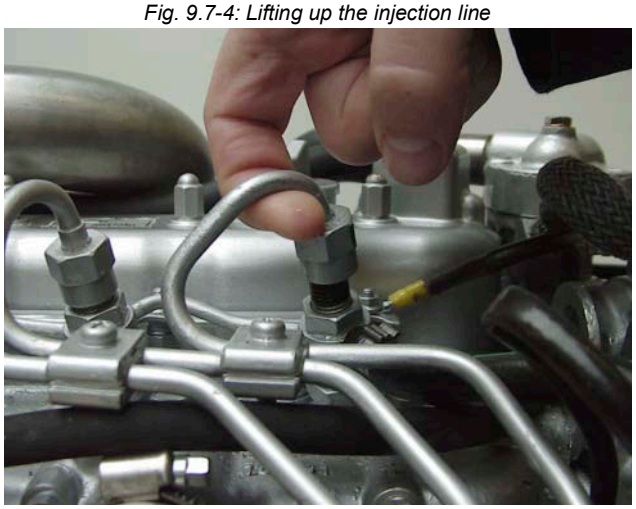


8. The injection line must be lifted up a few millimetres.
9. Start the engine and, once fuel without air bubbles escapes, close the union nut again.
10. Start the engine and check to ensure that it runs flawlessly.

*Illustrative example*

11. Press the 'off' button (to switch off)
12. Main switch of the control panel "OFF".
13. Remove any fuel drops and splashes from the generator and surrounding area.
14. Close the generator capsule.

*Fig. 9.7-4: Lifting up the injection line*



## 9.7.1 Exchanging the fuel filter

| | |
|---|---|
| Tool required / spare part / material | Spanner set, pliers set/ filter element / container, toggle clamp, absorbent cloth |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



The need to exchange the filter depends on the contamination of the fuel, but should in any event be done at least once every 150 hours of operation.

1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started unintentionally.
3. Open the generator capsule.
4. The fuel line must be clamped before exchanging the filter.



5. Remove the cable tie from the fuel filter.



A large piece of cloth or absorbent tissue must be placed under the fuel filter to prevent escaping fuel from running into the capsule.

*Illustrative example*

*Fig. 9.7.1-1: Fuel filter*

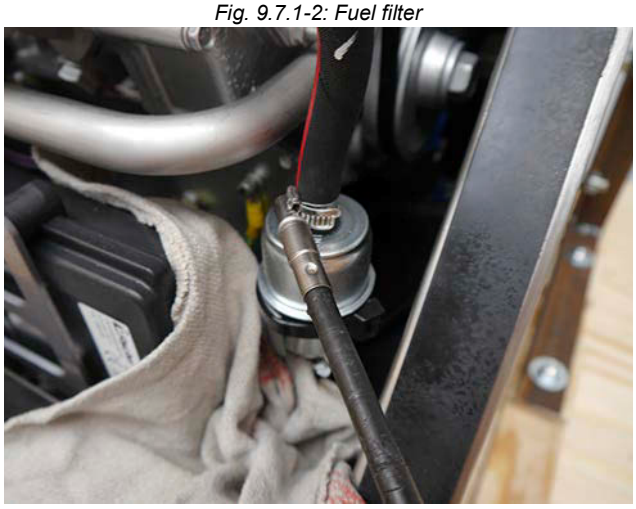


6. Loosen the hose clamp and remove the fuel hose.



*Illustrative example*

*Fig. 9.7.1-2: Fuel filter*



7. Loosen the hose clamp and remove the fuel hose.



*Illustrative example*

*Fig. 9.7.1-3: Fuel filter*



8. Reassemble in reverse order. The arrow on the filter housing indicates the direction of the fuel flow. A clogged filter results in the decreased power output of the generator.



*Illustrative example*

*Fig. 9.7.1-4: Fuel filter*



9. Remove hose clip.
10. Remove any fuel drops and splashes from the generator and surrounding area.
11. Remove the securing device that prevents an unintended start-up of the generator.
12. Bleeding the fuel system, see section 9.7, “Bleeding the fuel system,” on page 98.
13. Close the generator capsule.

## 9.7.1.1 Optional fuel filter with sight glass

| | |
|---|---|
| Tool required / spare part / material | Filter element / container, toggle clamp, absorbent cloth |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started unintentionally.
3. Open the generator capsule.
4. The fuel line must be clamped before exchanging the filter.



Filter changes depend on the contamination of the fuel, but should be done at least once every 150 hours of operation.

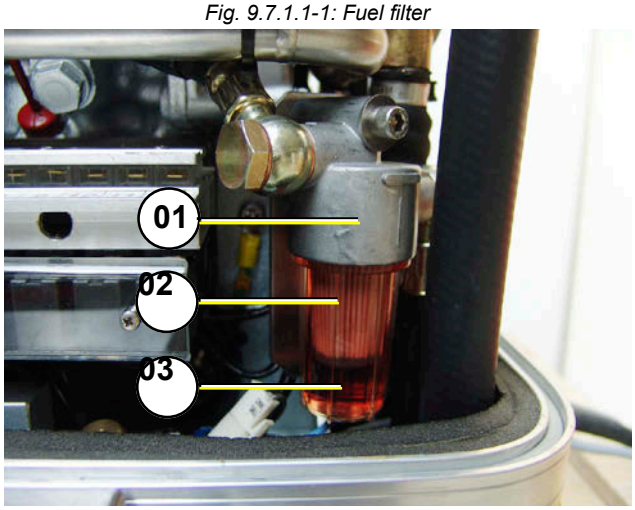
01. Fuel filter housing

02. Fuel filter cartridge

03. Sight glass

*Illustrative example*

*Fig. 9.7.1.1-1: Fuel filter*




5. Unscrew the sight glass housing from the fitting (anti-clockwise).

   A large piece of cloth or absorbent tissue must be placed under the fuel filter to prevent escaping fuel from running into the capsule.

*Illustrative example*

6. Drain the sight glass.

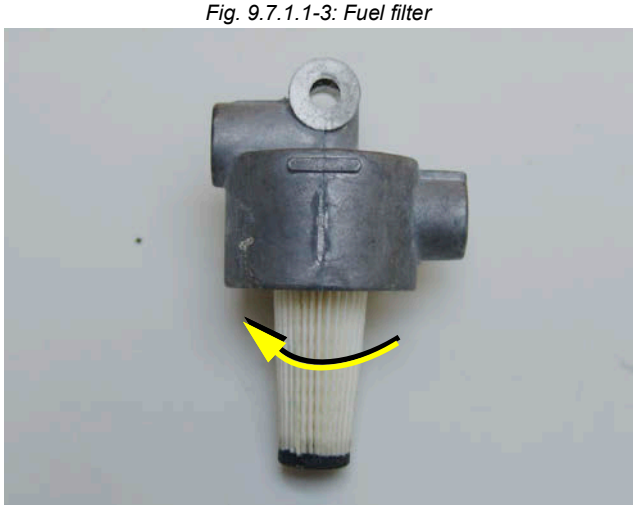
*Fig. 9.7.1.1-2: Fuel filter*



7. Unscrew the filter element from the fitting (anti-clockwise).

*Illustrative example*

*Fig. 9.7.1.1-3: Fuel filter*



8. Thread the new filter element into the fitting.
9. Grease the O-ring of the sight glass with a temperature-resistant grease (specification: Anti-Seize) and thread the sight glass into the fitting (right-hand thread).

*Illustrative example*

*Fig. 9.7.1.1-4: Fuel filter*



10. Remove hose clip.
11. Remove any fuel drops and splashes from the generator and surrounding area.
12. Remove the securing device that prevents an unintended start-up of the generator.
13. Bleeding the fuel system, see section 9.7, “Bleeding the fuel system,” on page 98.
14. Close the generator capsule.

## 9.8 Replacing the air filter

| | |
|---|---|
| Tool required / spare part / material | Socket spanner set / filter element / absorbent cloth, compressed air |

**Generator and engine may be hot during and after use.**

**ATTENTION: Risk of being burned!**



**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**

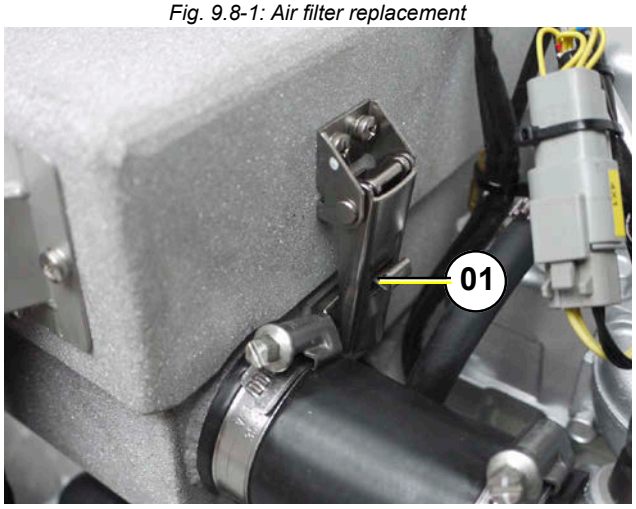


1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.
4. Open the closure on the right-hand side of the air intake housing.

   01. Closure

*Illustrative example*

*Fig. 9.8-1: Air filter replacement*

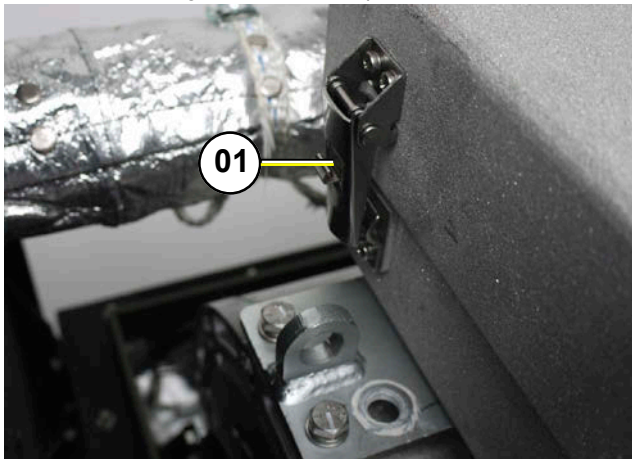



5. Open the closure on the left-hand side of the air intake housing.

   01. Closure

*Illustrative example*

*Fig. 9.8-2: Air filter replacement*



6. The lid of the housing can also be secured by means of 4 hex socket screws as an option. Loosen the screws on the housing lid by means of a 5 mm Allen key.



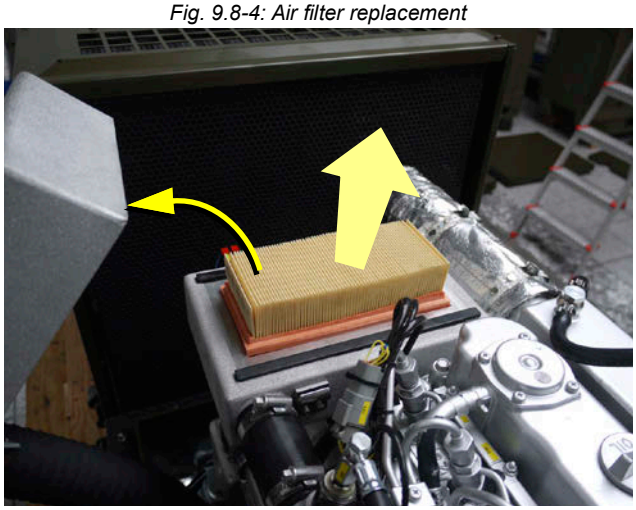
*Fig. 9.8-3: Air filter replacement*



7. Lift up the housing cover and pull it backwards.
8. Remove the filter element.
9. Clean the filter element by blowing it out with dry, compressed air (max. 5 bar) or replace the filter element after one year at the latest.

*Illustrative example*

*Fig. 9.8-4: Air filter replacement*



10. Re-install in reverse order.
11. Close the generator capsule.
12. Remove the securing device that prevents an unintended start-up of the generator.

## 9.8.1 Exchanging the air filter of the cyclone filter

| | |
|---|---|
| Tool required / spare part / material | Screwdriver set / filter element / absorbent cloth, compressed air |

**Generator and engine may be hot during and after use.**

**ATTENTION: Risk of being burned!**



**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.

If the rear element of the air filter housing is easily accessible, the procedure can be started at No 6.

4. Loosen the clamping ring by means of a screwdriver. Set the screwdriver blade between the clamping ring and the latch and lever the clamping ring upwards.



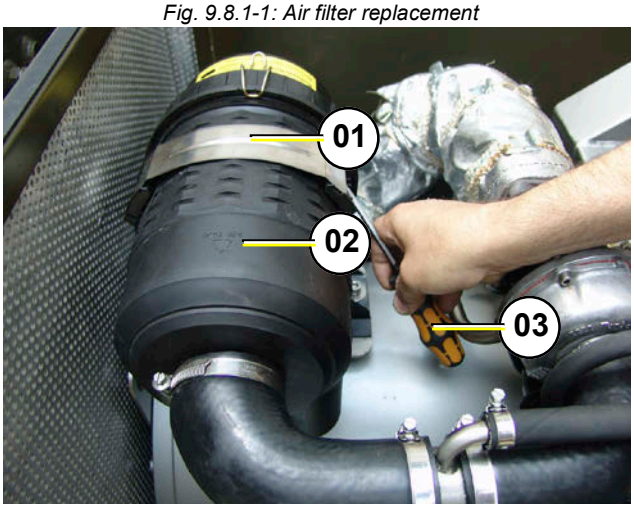
01. Clamping ring

02. Air filter housing

03. Screwdriver

*Illustrative example*

*Fig. 9.8.1-1: Air filter replacement*

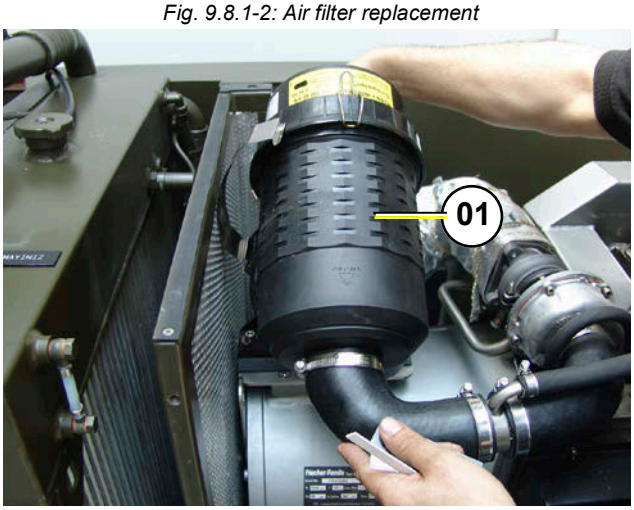



5. Remove the air filter housing.

01. Air filter housing

*Illustrative example*

*Fig. 9.8.1-2: Air filter replacement*



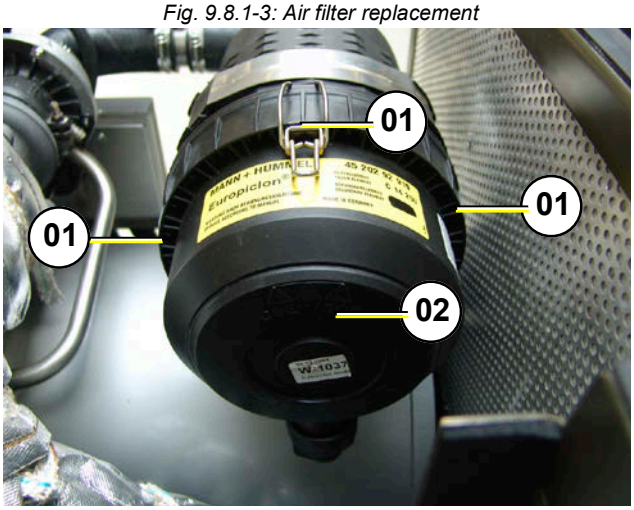

6. Loosen the three retaining clips of the filter housing and remove the rear element.

01. Retaining clip

02. Rear element

*Illustrative example*

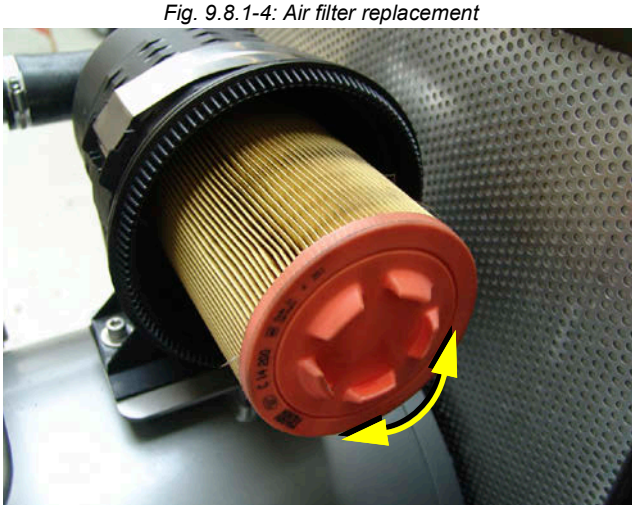
*Fig. 9.8.1-3: Air filter replacement*



7. Remove the filter element from the internal support tube completely by turning it slightly.

*Illustrative example*

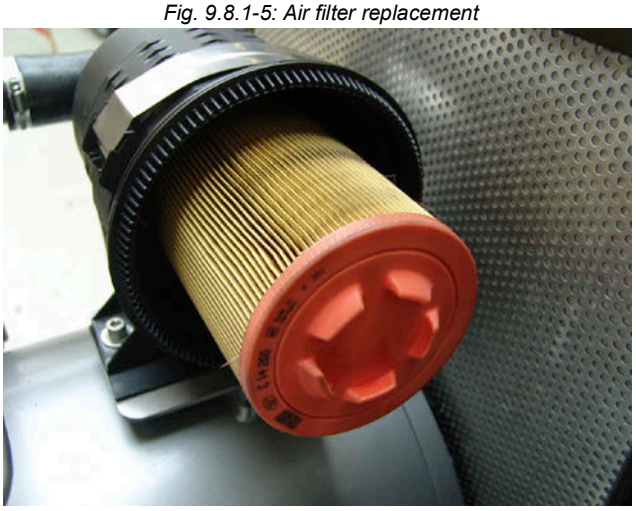
*Fig. 9.8.1-4: Air filter replacement*



8. Clean the filter element by blowing it out with dry, compressed air (max. 5 bar) or replace the filter element after 2 years at the latest.

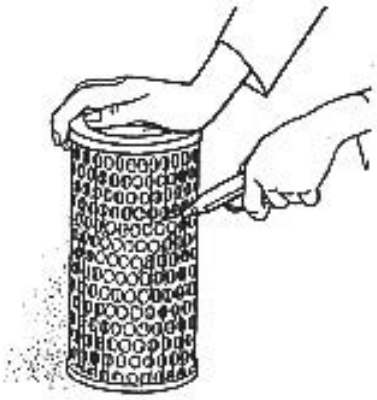
*Illustrative example*

*Fig. 9.8.1-5: Air filter replacement*



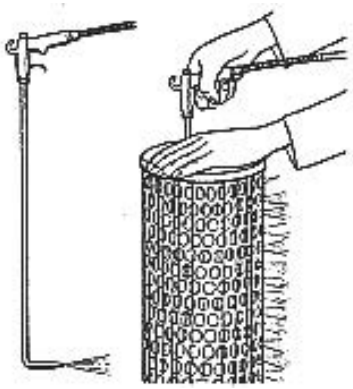
9. Blow the filter cartridge out towards the folds. Maximum pressure: max. 5 bar.

*Fig. 9.8.1-6: Clean air filter*



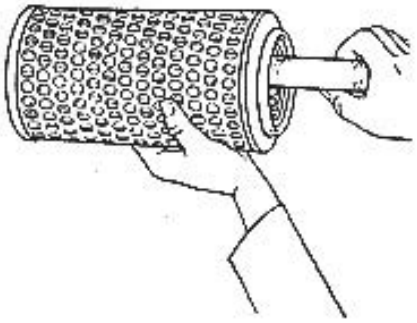
10. Blow the filter cartridge out from the inside.

*Fig. 9.8.1-7: Clean air filter*



11. Check the filter cartridge for damage with a flashlight.
12. Re-install in reverse order.
13. Close the generator capsule.
14. Remove the securing device that prevents an unintended start-up of the generator.

*Fig. 9.8.1-8: Clean air filter*



## 9.8.2 Exchanging the air filter pad (for marine use only)

| | |
|---|---|
| Tool required / spare part / material | Spanner set / filter pad / absorbent cloth |

**Generator and engine may be hot during and after use.**

**ATTENTION: Risk of being burned!**



**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



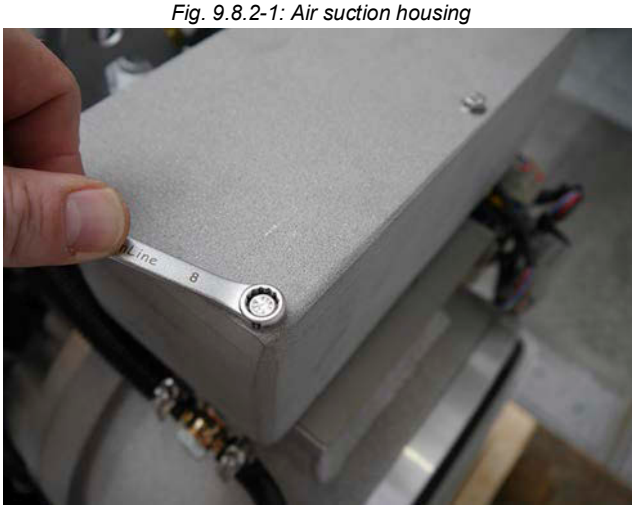
1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.

4. Open the air suction housing by loosening the six screws on the housing cover.




*Illustrative example*

*Fig. 9.8.2-1: Air suction housing*



5. Exchange the air filter pad.
6. Next, close the air suction housing again.

*Illustrative example*

*Fig. 9.8.2-2: Opened air suction housing*



7. Re-install in reverse order.
8. Close the generator capsule.
9. Remove the securing device that prevents an unintended start-up of the generator.

## 9.8.3 Exchanging the air filter pad via the quick-release holder (for marine use only)

| | |
|---|---|
| Tool required / spare part / material | Filter pad / absorbent cloth |

**Generator and engine may be hot during and after use.**

**ATTENTION: Risk of being burned!**



**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**



1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.

4. Air filter housing with a quick-change holder.

*Illustrative example*

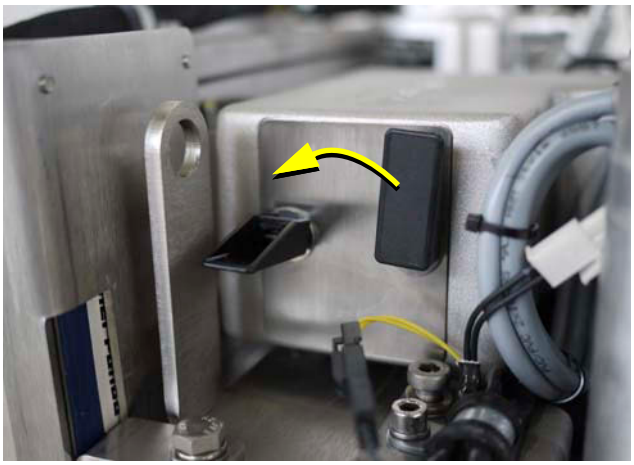
*Fig. 9.8.3-1: Air filter with a quick-change fitting*




5. Tilt the 2 holders through 90°.

*Illustrative example*

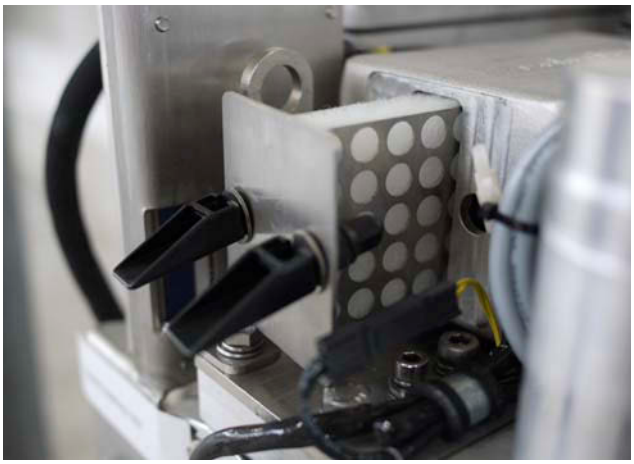
*Fig. 9.8.3-2: Air filter with a quick-change fitting*



6. Remove the filter pad holder.

*Illustrative example*

*Fig. 9.8.3-3: Air filter with a quick-change fitting*

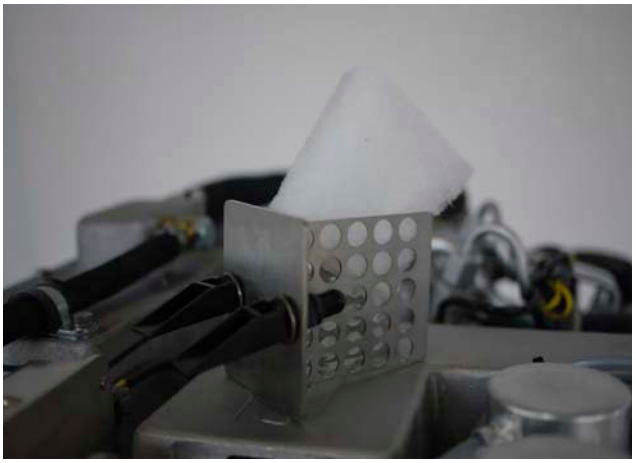


7. Exchange the air filter pad.

*Illustrative example*

8. Re-install in reverse order.
9. Close the generator capsule.
10. Remove the securing device that prevents an unintended start-up of the generator.

*Fig. 9.8.3-4: Air filter with a quick-change fitting*



## 9.9 Replacing the operating current relays

| | |
|---|---|
| Tool required / spare part / material | Screwdriver set / relays |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**

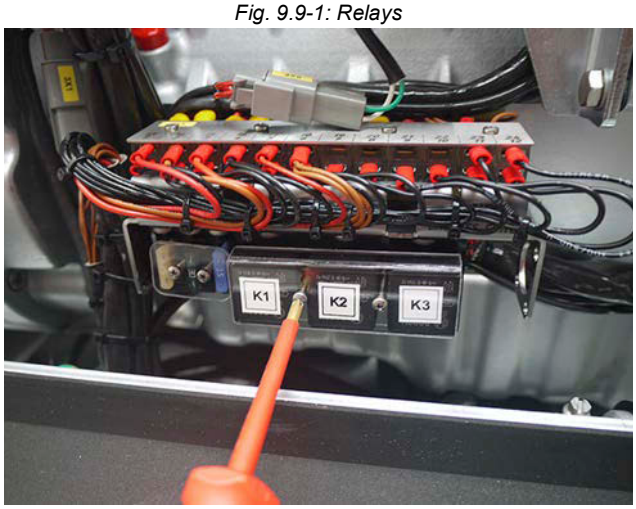


1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.
4. Remove the two fixing screws of the plastic cover by using a Size 0 or 1 Phillips screwdriver.



*Illustrative example*

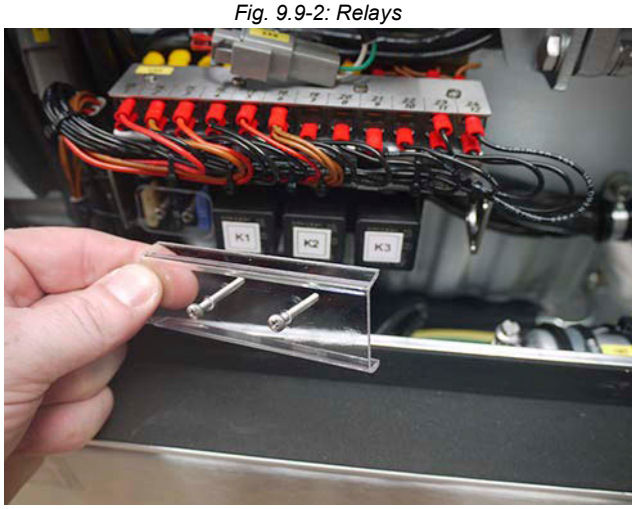
*Fig. 9.9-1: Relays*



5. Remove the plastic cover.

*Illustrative example*

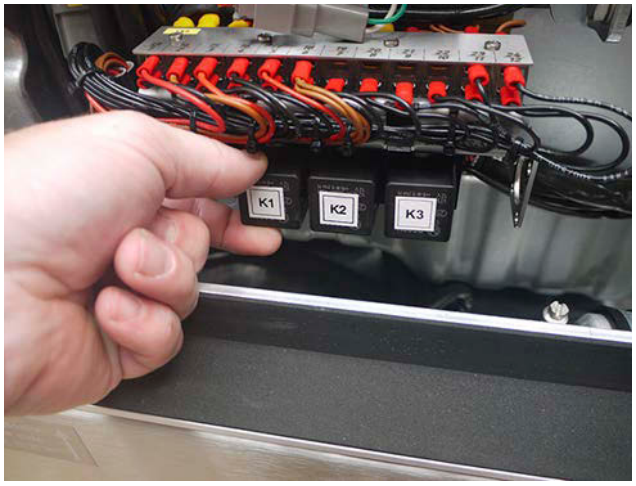
*Fig. 9.9-2: Relays*




6. Pull relay from the socket and replace with new relay.
7. To reinstall, reverse the order of steps.
8. Close the generator capsule.
9. Remove the securing device that prevents an unintended start-up of the generator.

*Illustrative example*

*Fig. 9.9-3: Relays*



## 9.10 Replacing the fuses

| | |
|---|---|
| Tool required / spare part / material | Screwdriver set / blade-type fuses |

**Please wear personal protective equipment (gloves, protective goggles, safety clothing and safety shoes)**

**ATTENTION!**

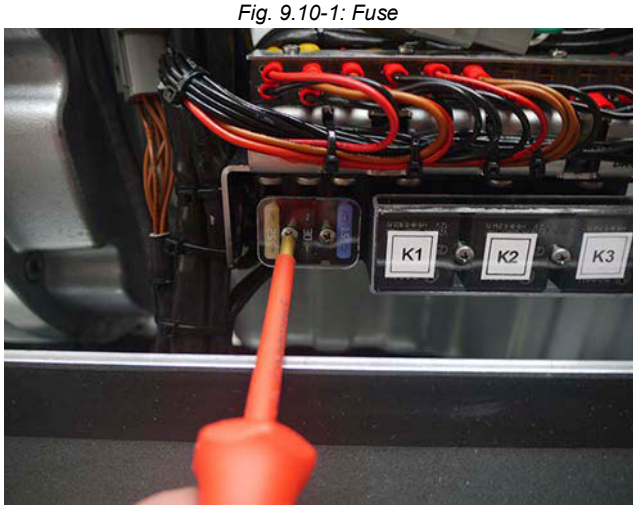


1. Place the generator on a level surface.
2. Secure the generator to prevent it from being started up unintentionally..
3. Open the generator capsule.
4. Remove the two fixing screws of the plastic cover by using a Size 0 or 1 Phillips screwdriver.



*Illustrative example*

*Fig. 9.10-1: Fuse*




5. Remove the plastic cover.

*Illustrative example*

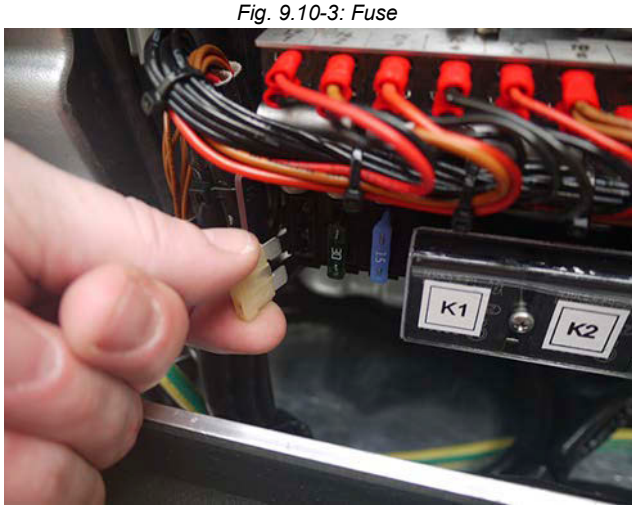
*Fig. 9.10-2: Fuse*



6. Pull the fuse from the socket and replace with a new one.
7. To reinstall, reverse the order of steps.
8. Close the generator capsule.
9. Remove the securing device that prevents an unintended start-up of the generator.

*Illustrative example*

*Fig. 9.10-3: Fuse*



# 10. Generator Faults and Errors

## 10.1 Personnel

The work described here can be performed by the operator unless otherwise indicated.

Further maintenance work may only be performed by specially trained technical personnel or by authorised workshops (Fischer Panda Service Points). This applies in particular to work on the valve settings, diesel injection system, and when repairing the engine.

### 10.1.1 Hazard warnings for repair

**Ensure compliance with the general safety instructions at the beginning of this handbook.**

**Note!**



**LETHAL DANGER! - Improper operation can cause harm to health and result in death.**

**The battery bank must always be disconnected (negative terminal first, then the positive terminal) if work on the generator or electrical system of the generator is to be performed, so that the generator cannot be started inadvertently.**

**Warning! Autostart**



**Improper maintenance can result in severe personal harm and material damage. Therefore:**

- Maintenance work must only be performed when the engine is switched off.
- Before commencing work, ensure that there is sufficient freedom of movement for installation work.
- Take care the the workplace is neat and clean! Components and tools that are loosely stacked or lying around can result in accidents.
- Perform maintenance work only with standard tools or special tools as customarily used in the trade. The use of incorrect or damaged tools may result in injuries.

**Attention! Risk of injury**



**Oil and fuel vapours can ignite upon contact with ignition sources. Therefore:**

- Ensure that there are no open flames while working on the engine.
- No smoking.
- Remove oil and fuel residue from the engine and the floor.

**Warning! Fire hazard**



**Contact with engine oil, fuel, and anti-freeze agents can cause impaired health. Therefore:**

- Avoid skin contact with engine oil, fuel and anti-freeze.
- Remove splashed oil and anti-freeze from the skin immediately.

**Caution! Risk of poisoning**



- Do not inhale oil and fuel vapours.

**Electric voltage - LETHAL DANGER! - Improper operation can cause harm to health and result in death.**

**Electric voltages of more than 48 V are potentially lethal in any situation. The rules of the respective regional authority must be complied with during installation. For safety reasons, only an electrician may carry out the installation of the electrical connections of the generator.**

**Warning! Electrical voltage**



**Generator and coolant may be hot during and after use.**

**Excess pressure may develop in the cooling system when operating.**

**Attention! Risk of injury!**



**Personal protective equipment must be worn when performing maintenance work. This consists of:**

**Attention! Protective equipment required**



- Snugly-fitting protective clothing
- Safety shoes
- Protective gloves
- Goggles, if required

**All loads must be disconnected prior to working on the generator to avoid damage to the devices.**

**Attention! Switch off all loads**



## 10.2 Tools and measuring instruments

**In order for you to be able to deal with faults while travelling, the following tools and measuring instruments should belong to the equipment kept on board:**

- Multimeter for voltage (AC), frequency and resistance
- Measuring instrument for inductance
- Measuring instrument for capacity
- Current absorbing clamps
- Thermometer (an infra-red thermometer is ideal)
- Pliers for squeezing

## 10.3 Overloading the generator

Kindly ensure that the engine is not overloaded. This must be taken into account, especially with regards to multi-power units. In this case, the extra load including the electrical output may be considerably greater than the drive performance of the engine, which can eventually lead to a damaged engine. In addition, the exhaust gases are contaminated with soot (environment)

The full nominal performance of the generator is primarily for short term use. It is, however, required to start electric motors or to enable special starting procedures to be implemented.

In the interests of a long service life, a continuous load should be calculated as 80 % of the nominal load.

This should be taken into consideration when switching the devices on. Above all, this calculation also ensures that the engine has an extended service life. (Continuous use is understood to be uninterrupted operation of the generator for many hours). It poses no problem for the engine to be run occasionally for 2-3 hours at full nominal load. The overall design of the Panda Generator ensures that even when operated continuously under extreme conditions, overheating of the engine will not occur. In principle, it must also be taken into account that when the engine is operated at full load, the exhaust emissions (soot formation) will deteriorate.

### 10.3.1 Effects of short-circuiting and overloading on the generator

It is practically impossible for the generator to be damaged by a short-circuit and overload. Both a short-circuit and overload cause the generator to stop generating electricity. The generator stops generating electricity and the voltage fails. This condition is immediately reversed if the short-circuit is eliminated or the overload is switched off.

### 10.3.2 Overload during operation with electric motors

With the operation of electric motors, it must be considered that these machines draw a starting current that is much higher than their rated output (six to tenfold).

If the power of the generator is not sufficient for the motor, the voltage in the generator breaks down after switching on the motor. In the case of specific start-up problems, the manufacturer can give recommendations for remedying the situation (e.g. booster capacitors, soft start-up circuits, or a specially developed starter unit for electric motors).

Professional adjustment of the motors can increase the system efficiency by up to 50 % and the starting current by up to 100 %. If the inductive load (electrical motors etc.) exceeds 20 % of the rated generator rated output, compensation is required (in this regard, see also: "Special information regarding operation of the generator with inductive load".

### 10.3.3 Monitoring the generator voltage

**Prior to installation or adaptation: see “Safety Instructions - safety first!” on page 16.**

**Attention!**



In the event of a high load or overload, the voltage may drop to 190 V (95 V in the 60 Hz version) and to a certain extent even lower. Under certain circumstances, this may become critical for specific devices (e.g. for electric motors, cooling compressors and possibly also for electronic devices). Take care that the voltage is adequate for these loads. This can be monitored by a voltmeter.

The voltmeter should be always installed downstream of the generator/shore power selector switch, so that the appropriate voltage of each voltage source is displayed. No further voltmeter is therefore provided for the generator.

If additional consumers are switched on, the voltage must be checked on the voltmeter in each case. Sensitive devices must remain switched off as long as the voltage is below the critical value.

Under certain circumstances the generator may produce an overvoltage. In particular, this arises if the number of revolutions (speed) of the generator is changed (increased). The speed may therefore only changed with the aid of a tachometer and/or voltmeter.

If sensitive and/or valuable devices are used, which are to be protected against this risk, automatic overvoltage protection must be installed. (voltage monitor with cut-off).

### 10.3.4 Automatic shut-down in the event of under/over-voltage

If air conditioning units or other valuable equipment of this type is installed, a relay should be installed for automatic voltage monitoring. This relay shuts down the entire power distribution grid automatically and switches the grid back on automatically when the intended voltage is reached. Such a relay ensures that no damage to the loads or systems may result due to undervoltage.

Such a voltage measuring relay with a contactor can be obtained from a specialist supplier or ordered as a ready-to-use unit from your PANDA dealer.

The voltage monitor also enables the power distribution grid to be switched off automatically and in good time when the generator is stopped.

## 10.4 Engine Starting Problems

### 10.4.1 Damage to starter motor

The starter is fitted with a free-wheel or axial rotating spring cog. This prevents the starter from being driven externally by the engine, if the engine speed increases after the starting process. If the starter button is pressed for too long after the starting process, the free-wheel is activated externally due to the higher speed. This causes very high loads that result in failure of the springs or damage to the rolling elements or helical gears within a very brief period of time. This causes the complete destruction of the starter.

**It is important that every person who operates the generator is informed of this situation, as pressing the starter button for too long is practically the only serious handling error that can be made on board.**

### 10.4.2 Clogged fuel filter

If the fuel filter is contaminated, the filter element must be exchanged.

# 11. Annex

## 11.1 Engine oil specification

See Kubota engine manual!

## 11.2 Fuel specification

See Kubota engine manual!

## 11.3 Cooling water specification

Fischer Panda recommends the product: GLYSANTIN® G30® “free of silicate”.

Since the specific application benefits of GLYSANTIN® G30® are only achieved when used alone, mixing with other GLYSANTIN® coolants or products from other manufacturers is not recommended!

Before filling the cooling circuit (initial and refilling), GLYSANTIN® G30® should be mixed with distilled, demineralized water and used at a concentration of 30 to a maximum of 60 vol%.

Fischer Panda recommends 50:50 mixture.

## 11.4 Cable cross section

| Length | 1 - 3 m | 4 - 6 m | 7 - 10 m | 11 - 15 m | 16 - 20 m |
|---|---|---|---|---|---|
| **16 mm²** | 70 A | 63 A | 55 A | 48 A | 42 A |
| **25 mm²** | 112 A | 100 A | 88 A | 75 A | 63 A |
| **35 mm²** | 145 A | 130 A | 110 A | 100 A | 90 A |
| **50 mm²** | 225 A | 200 A | 175 A | 150 A | 125 A |
| **70 mm²** | 275 A | 250 A | 225 A | 195 A | 170 A |
| **95 mm²** | 340 A | 300 A | 280 A | 260 A | 220 A |

## 11.5 Technical data of the engine

See Kubota engine manual!

## 11.6 Technical data of the generator

| | |
|---|---|
| Type designation | Panda 30x CR |
| Model | PVM |
| Part number | 0038177 |
| Interconnection |  |
| Rated output | 400 V |
| Rated frequency | 50 Hz |
| Rated current | 36,8 A |
| Year of manufacture | 2025 |
| Weight | 553 kg |
| Ambient temperature | 40 °C |
| Rated output | 27,5 kW |
| Nominal apparent power | 27,5 kVA |
| Rated power factor | 1 |
| Continuous electrical output | 25 kW |
| | |
| IP Protection class | IP44 |

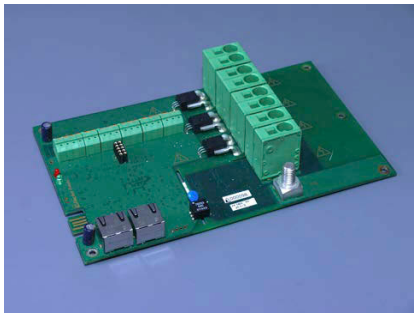


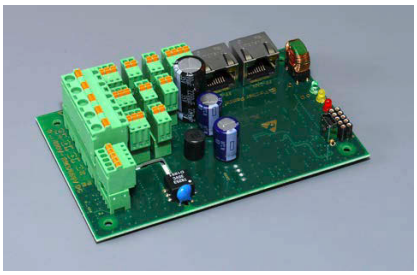












# Panda fpControl Manual

# Current revision status

| | Document |
|---|---|
| **Current:** | fpControl_eng.R02_22.7.25 |
| **Replaces:** | |

| Revision | Page |
|---|---|
| R02 new design | |
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| | |
| | |
| | |

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# 11. Panda fpControl Safety Instructions

## 11.1 Personnel

The settings described here can be performed by the operator unless highlighted differently.

The installation should be implemented by specially trained technical personnel or by authorised workshops (Fischer Panda Service Points), only.

## 11.2 Safety instructions

**Adhere to the safety instructions in the Fischer Panda generator manual.**

*If these instructions are not to hand, they can be requested from Fischer Panda GmbH, 33104 Paderborn, Germany.*

**Note!**



**An external signal may trigger an automatic start-up.**

**Warning! Autostart**



**The generator must not be operated with the cover removed.**

**Warning!**



If the generator is to be installed without a sound insulation capsule, it must be ensured that all rotating parts (belt pulley, belts etc.) are covered and protected so that there is no danger to life and body!

All service, maintenance, or repair work may only be carried out when the unit is not running.

**Electric voltage - Deadly Danger!**

**Warning! Electrical voltage**



Electric voltages of more than 48 V are potentially lethal in any situation. The rules of the respective regional authority must be adhered to for installation and maintenance.

For safety reasons, only an electrician may carry out the installation of the electrical connections of the generator.

**Disconnect battery before working on the generator**

**Attention!**



The battery must always be disconnected (first the negative terminal, then the positive terminal) if work on the generator or electrical system is to be performed, so that the generator cannot be started inadvertently.

This applies in particular to systems with an automatic start-up function. The automatic startup function shall be deactivated before starting work.

*The flooding valve must be closed. (For PMS version only.)*

**Also observe the safety instructions for the other components of your system.**

**Note!**



## 11.3 Function description

The fpControl system is intended for the operation, monitoring and control of piston-powered generators.

## 11.4 Proper use

Intended exclusively for use with Fischer Panda generators, the proper use of which arises from the declaration of conformity of the complete machine.

# 12. Panda fpControl

## 12.1 Components of the fpControl

### 12.1.1 fpControl - CP-G

(**C**ontrol **P**anel – **G**enerator)

**Display and Control Element of the fpControl**

The fpControl CP-G is the display and control element

Power is supplied via the bus cable. Multiple control elements can be installed in a single system.

*Fig. 12.1.1-1: Control Panel - Generator*




#### 12.1.1.1 Environmental specifications, physical data of the fpControl CP-G

| | |
|---|---|
| **Storage temperature** | -10 °C – +60 °C |
| **Operating temperature** | -20 °C – +50 °C |
| **Supply voltage** | 12 V or 24 V, automotive (12–13.5 V or 24–28 V) |
| **Rated current consumption** | < 21 mA @ 12 V (without display heating)<br>< 18 mA @ 24 V (without display heating) |
| **Max. current consumption** | 120 mA (with display heating) |
| **Current consumption in Standby mode / Off** | 0 A |
| **Housing** | ABS plastic |
| **Protection class** | IP30 (RJ45 plug plugged in) |
| **Overall dimensions** | 120 x 65 x 35 mm (L x B x H),<br>Cutout: 109.2 x 54.5 mm |
| **Weight** | 0.11 kg |
| **FP part number** | 0029338 |
| **Circuit board** | FP1403 |

## 12.1.2 fpControl - GC-S

(**G**enerator **C**ontrol - **S**ervo)

**Main module of the fpControl.**

*Fig. 12.1.2-1: Generator Control - Servo*




**The module contains the control electronics.**

The fpControl GC-S is usually installed in the generator capsule.

The fpControl GC-S takes over the monitoring and control of the diesel engine of the Fischer Panda generator, as well as the control of the output voltage and frequency of the generator.

The fpControl GC-S is suitable for 12 V and 24 V starting systems. The connected actuators are supplied with power via switching outputs with input voltage.

*Current measurement is single-phase and can be done directly. A voltage sensor is not necessary. Current measurement takes place via an external current sensor. An additional three-phase module can be used for 3-phase generators.*

### 12.1.2.1 Environmental specifications, physical data of the fpControl GC-S

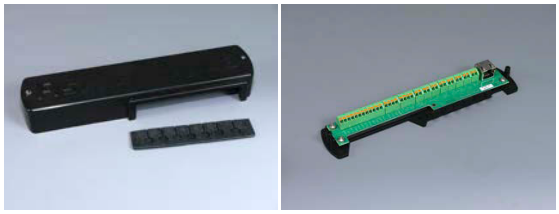
| | |
|---|---|
| **Ambient temperature** | -40 °C – +125 °C (max.) |
| **Operating temperature** | 90 °C |
| **Supply voltage** | 12 V or 24 V, automotive (12–13.5 V or 24–28 V) |
| **Rated current consumption** | < 66 mA @ 12 V<br>< 77 mA @ 24 V |
| **Housing** | Automotive, PBT GF30 |
| **Protection class** | IP65 |
| **Overall dimensions** | 117 mm x 136 mm (inkl. plug) |
| **Weight** | 0.25 kg |
| **FP part number** | 0029554 |
| **Circuit board** | FP1704 |

## 12.1.3 fpControl - CB-G

(**C**onnection **B**ox - **G**enerator)

**The fpControl CB-G is usually installed in the generator capsule (externally).**

*Fig. 12.1.3-1: Connection Box - Generator*



The fpControl CB-G is the external terminal block for the fpControl generator.

The control element and the fuel pump are connected here. Emergency stop devices, auto-start devices, load relays and boosters can be connected as options.

**Only qualified electricians may perform work on the fpControl CB-G.**

**Note!**



### 12.1.3.1 fpControl CB-G connections

| | |
|---|---|
| **1 x RJ45** | Control Panel/fpCAN |
| **1 x 2-pole Phoenix contact socket** | Boost relay/Inverter power supply |
| **1 x 2-pole Phoenix contact socket** | Multifunction output 1 A) |
| **1 x 2-pole Phoenix contact socket** | Multifunction output 5 A) |
| **1 x 2-pole Phoenix contact socket** | Powerline relay |
| **1 x 2-pole Phoenix contact socket** | Automatic start-up contact |
| **1 x 2-pole Phoenix contact socket** | Emergency-stop |
| **1 x 2-pole Phoenix contact socket** | Fuel pump (5 A) |
| **1 x 2-pole Phoenix contact socket** | Water pump/Fan (5 A) |
| **1 x 4-pole Phoenix contact socket** | Alternative for the fpCAN |
| **1 x 4-pole Phoenix contact socket** | Boost relay<br>Universal output 1<br>Universal output 2 |
| **1 x 12-pole Phoenix contact socket** | Digital output - Water pump/Fan<br>Digital output - Fuel pump<br>Emergency-stop<br>Automatic start-up contact<br>Wake-up line<br>CAN-High<br>CAN-Low<br>Bus voltage<br>GND |

### 12.1.3.2 Environmental specifications, physical data of the fpControl CB-G

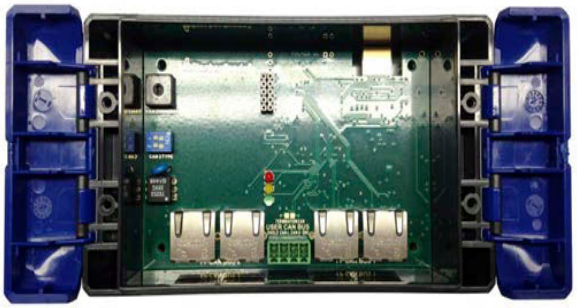
| | |
|---|---|
| **Storage temperature** | -40 °C – +125 °C |
| **Operating temperature** | -20 °C – +100 °C |
| **Supply voltage** | without own power supply |
| **Rated current consumption** | -- |
| **Housing** | Plastic |
| **Protection class** | IP12 |
| **Overall dimensions** | 216.9 x 50.1 x 29.6 mm (L x B x H) |
| **Weight** | 0.13 kg |
| **FP part number** | 0000306 |
| **Circuit board** | FP1801 |

## 12.1.4 fpControl CAN Interface - SAE J1939 (fpControl CI-SAE J1939)

The »fpControl CAN Interface - SAE J1939« manages the communication between the »fpCAN« and an external SAE J1939-CAN-BUS. The interface protects the the internal »fpCAN« by filtering the data of the external CAN-Bus. The internal and external CAN-Bus are galvanically isolated. The fpControl CI-SAE J1939 is supplied with power via the fpCAN.

*Figure: »fpControl CAN Interface - SAE J1939« (fpControl CI-SAE J1939), Illustration shows an older hardware status*

*Fig. 12.1.4-1: fpControl CAN Interface - SAE J1939*



## 12.1.4.1 fpControl CI-SAE J1939 connections

| | |
|---|---|
| **2 x RJ45** | Power supply and internal fpCAN<br>(FP CAN BUS 1) |
| **2 x RJ45** | external fpCAN (FP CAN BUS 2) |
| **1 x 4-pole Phoenix contact socket** | Alternative for the external fpCAN<br>(USER CAN BUS) |

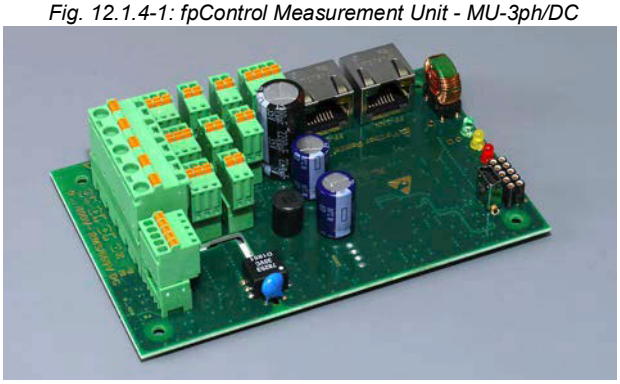
## 12.1.4.2 Environmental specifications, physical data of the fpControl CI-SAE J1939

| | |
|---|---|
| **Storage temperature** | -30 °C – +60 °C |
| **Operating temperature** | -20 °C – +50 °C |
| **Supply voltage** | 12 V or 24 V, automotive (12–13.5 V or 24–28 V) |
| **Rated current consumption** | < 32 mA @ 12 V<br>< 17 mA @ 24 V |
| **Housing** | ABS plastic |
| **Protection class** | IP30 |
| **Overall dimensions** | 151 x 80 x 60 mm (L x B x H) |
| **Weight** | 0.25 kg |
| **FP part number** | 0006107 |
| **Circuit board** | FP1409 |

## 12.1.4.3 fpControl Measurement Unit - MU-3ph/DC (fpControl MU-3ph/DC)

The fpControl Measurement Unit - MU-3ph/DC« is used for AC and DC generators. On AC generators, the module measures the 3-phase AC voltage up to 400 V and three times the AC current by means of an external sensor. When used on DC generators, the module measures the 2-phase DC voltage in a range from 12 V to 600 V and twice the DC current by means of an external sensor.

*Fig. 12.1.4-1: fpControl Measurement Unit - MU-3ph/DC*



### 12.1.4.4 fpControl MU-3ph/DC connections

| | |
|---|---|
| **2 x RJ45** | Power supply and fpCAN |
| **1 x 4-pole Phoenix contact socket** | Alternative for the external FP Bus (USER CAN BUS) |
| **1 x 5-pole Phoenix contact socket** | **AC:** Voltage measurement L1, L2, L3 and N (0 … 400 V~ RMS) and PE **or** **DC:** 3 x (+), 1 x (-), 1 x PE (669 V DC) |
| **1 x 3-pole Phoenix contact socket** | external transformer L1 |
| **1 x 3-pole Phoenix contact socket** | external transformer L2 |
| **1 x 3-pole Phoenix contact socket** | external transformer L3 |
| **1 x 5-pole Phoenix contact socket** | Voltage measurement (0 … 69 V DC) 3 x (+), 1 x (-), 1 x PE |
| **3 x 2-pole Phoenix contact socket** | Temperature sensor |
| **1 x 2-pole Phoenix contact socket** | Boost |
| **1 x 2-pole Phoenix contact socket** | AUX |

### 12.1.4.5 Environmental specifications, physical data of the fpControl MU-3ph/DC

| | |
|---|---|
| **Storage temperature** | -30 °C – +60 °C |
| **Operating temperature** | -20 °C – +50 °C |
| **Supply voltage** | 12 V or 24 V, automotive (12–13.5 V or 24–28 V) |
| **Rated current consumption** | < 139 mA @ 12 V<br>< 91 mA @ 24 V |
| **Housing** | -- |
| **Protection class** | IP30 |
| **Overall dimensions** | 114 mm x 72.5 mm (L x B) (circuit board) |
| **Weight** | 0.094 kg (circuit board) |
| **FP part number** | 0029859 |
| **Circuit board** | FP1901 |

## 12.1.5 fpControl Measurement Unit - MM-3 (fpControl MM-3)

The »fpControl Measurement Unit - MU-MM-3/DC« is used for AC generators. The module measures the 3-phase AC voltage and three times the AC current. Current measurement is performed by the module directly by means of three internal current sensors. The measuring range is 65 A per phase. Higher currents can be measured by means of optional external current sensors.

*Fig. 12.1.5-1: fpControl Measurement Unit - MM-3 (fpControl MM-3)*

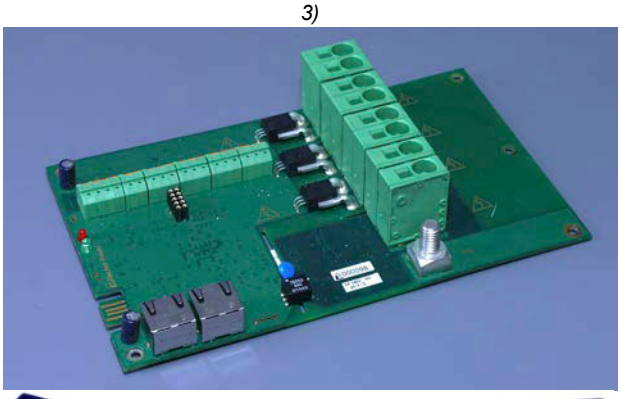


*Figure: »fpControl Measurement Unit - MM-3« (fpControl MM-3) - Circuit board*

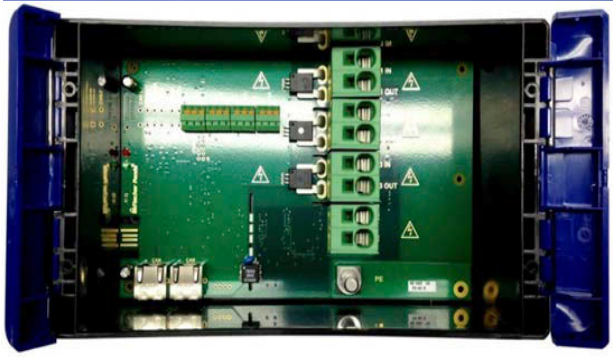


*Figure: »fpControl Measurement Unit - MM-3« (fpControl MM-3) in housing*

## fpControl MM-3 connections

| | |
|---|---|
| **2 x RJ45** | Power supply and fpCAN |
| **1 x 4-pole Phoenix contact socket** | Alternative for the external FP Bus (USER CAN BUS) |
| **1 x 3-pole Phoenix contact socket** | external transformer N |
| **1 x 3-pole Phoenix contact socket** | external transformer L1 |
| **1 x 3-pole Phoenix contact socket** | external transformer L2 |
| **1 x 3-pole Phoenix contact socket** | external transformer L3 |
| **1 x 2-pole Phoenix contact socket** | Voltage measurement / internal transformer L1, max. 65 A |
| **1 x 2-pole Phoenix contact socket** | Voltage measurement / internal transformer L2, max. 65 A |
| **1 x 2-pole Phoenix contact socket** | Voltage measurement / internal transformer L3, max. 65 A |
| **2 x 1-pole Phoenix contact socket** | N |
| **1 x 1-pole Phoenix contact socket** | PE |

### 12.1.5.1 Environmental specifications, physical data of the fpControl MM-3

| | |
|---|---|
| **Storage temperature** | -30 °C – +60 °C |
| **Operating temperature** | -20 °C – +50 °C |
| **Supply voltage** | 12 V or 24 V, automotive (12–13.5 V or 24–28 V) |
| **Rated current consumption** | < 71 mA @ 12 V<br>< 36 mA @ 24 V |
| **Housing** | ABS plastic |
| **Protection class** | IP30 |
| **Overall dimensions** | 151 x 80 x 60 mm (L x B x H) |
| **Weight** | 0.212 kg (circuit board, fitted) |
| **FP part number** | 0023600 (Circuit board FP1405 V7) |
| **Circuit board** | FP1405 |

# 12.2 Installation

## 12.2.1 Installation of the Electronic Control Unit (ECU) fpControl - GC-S

The ECU fpControl - GC-S is pre-installed. The ECU can be exchanged easily. All connections are mechanically coded and prevent the risk of confusion.

## 12.2.2 Installation of the Connection Box fpControl - CB-G

The connection box is pre-installed. External components are connected in accordance with the installation manual and the circuit diagram of the fpControl generator.

## 12.2.3 Installation of the fpControl - CP-G

The fpContol - CP-G is a CAN Bus module. All Fischer Panda CAN bus modules have two RJ45 ports. One for connection to the module on the CAN bus, the second to relay the CAN bus. The last module on the CAN bus must have a terminating resistor in the RJ45 port.

Connection by means of the Fischer Panda bus cable is mandatory.

Fig. 12.2-1: fpControl CP-G rear




Fig. 12.2-2: Connection Diagram

## 12.3 Operation

The fpControl is operated by means of the fpControl CP-G panel.

Fig. 12.3-1: fpControl CP-G front with buttons



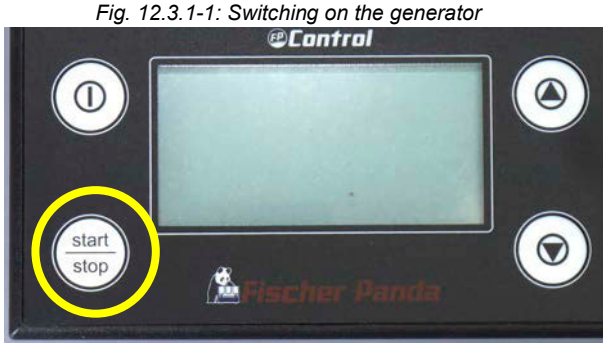

### 12.3.1 Switching on the generator

**Press the "ON/OFF" button to switch on the control system of the generator.**

The fpControl Generator thereby switches to "Standby Mode".

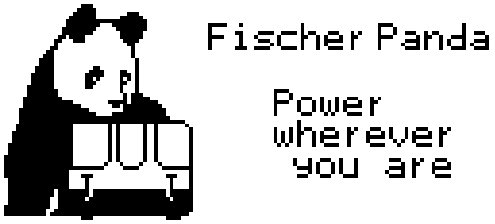
**If automatic starting is activated at the menu, the generator can henceforth be started by means of an external signal.**

Fig. 12.3.1-1: Switching on the generator



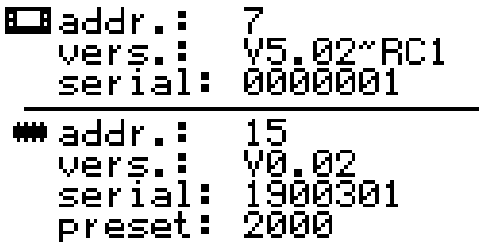

The CP-G Panel displays the home page for two seconds.

Fig. 12.3.1-2: Home Page



The CP-G then displays the address page for one second.

*Fig. 12.3.1-3: Address Page*

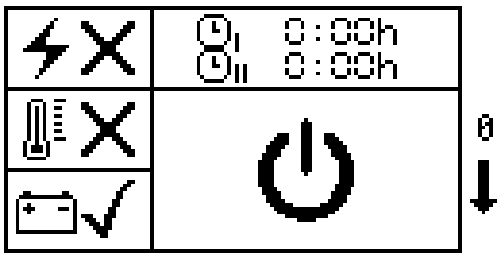



At the end of the power-on routine, the CP-G displays the first overview page.

The language as well as the display mode can be set in the menu.

Overview Page 1 is the same in all display modes/languages.

*Fig. 12.3.1-4: Overview Page 1*




### 12.3.1.1 Overview page with Autostart activated

**Deadly danger! - The generator can be equipped with an Autostart function. This means that the generator is started by an external signal. In order to prevent an inadvertent start-up, the starter battery must be disconnected before work on the generator may commence.**

**Warning! Autostart**



**The “Autostart” also remains active, if the fpControl CP-G is switched off and on again.**

If a fault should arise when the generator is started or is already operating, it is stopped and the Autostart is set to "off".

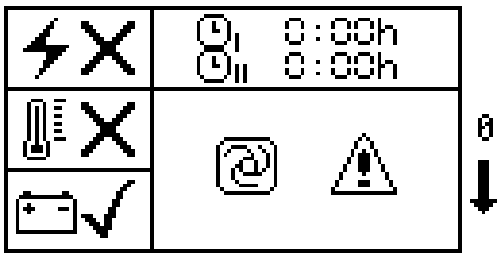
If the generator is operated by Autostart and is stopped manually, the Autostart is set to "off".

Once the system has been switched off and then on again, the Autostart is active once more.

The first overview page shows if the Autostart is active.

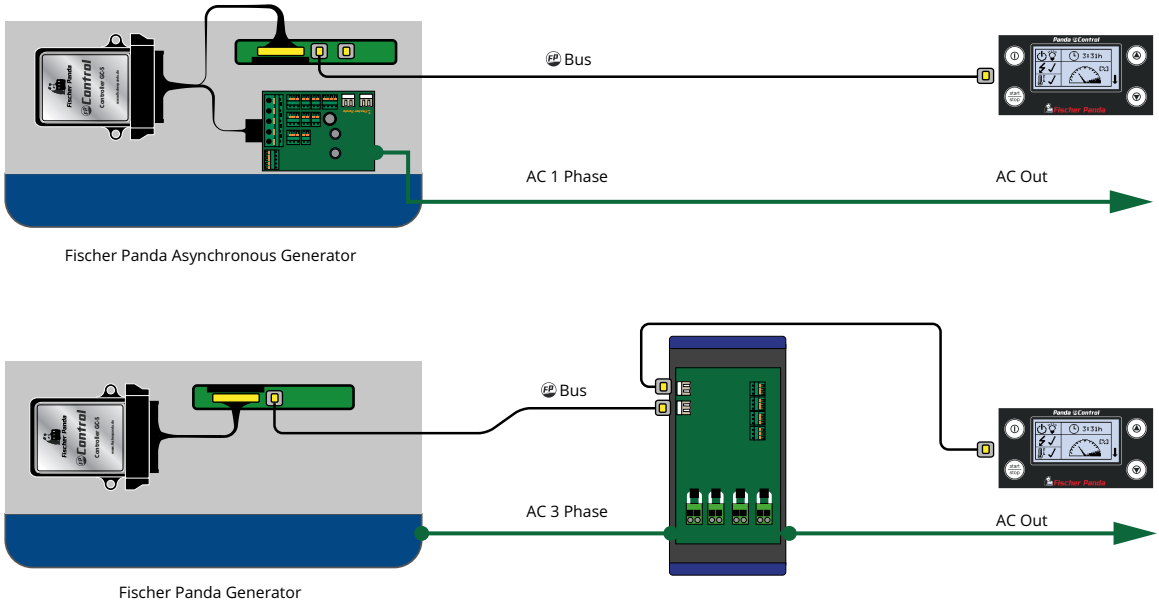
*Fig. 12.3.1-1: Overview Page 1 with Autostart*

Overview Page 1 with Autostart function activated.



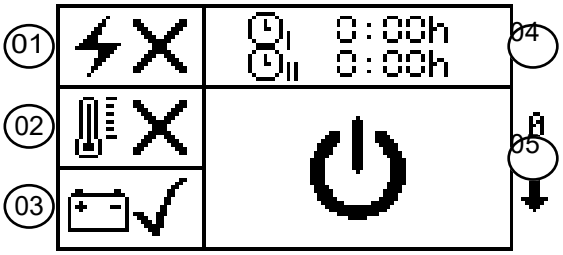
## 12.3.2 The fpControl VCS overview pages

The display mode/language of the display can be set in the menu.




**Overview Page 1:**

*Fig. 12.3.2-1: Overview Page 1 – Symbols*




01. Generator Status (on/off)

02. AC OK

03. Temperature of the generator (OK/Error)

04. Operating hours of the generator (I. Total operating hours, II Operating hours since service)

05. Info screen

Overview Page 1 is the same in all languages.

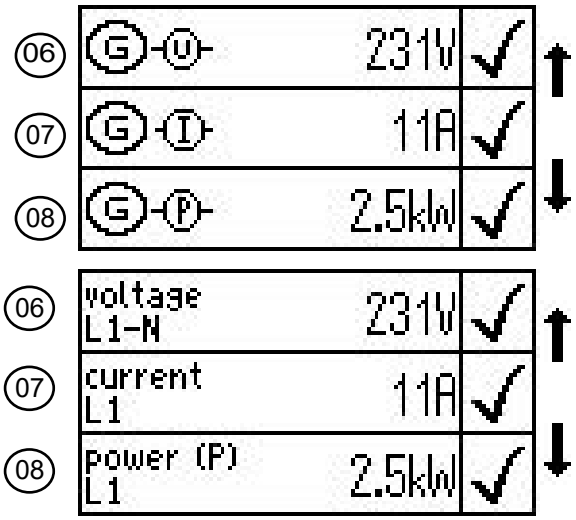
**Overview Page 2 (Generator):**

06. Output voltage [V]

07. Generator current [A]

08. Generator active power [kW]

*Fig. 12.3.2-2: Overview Page 2 Symbols/English*

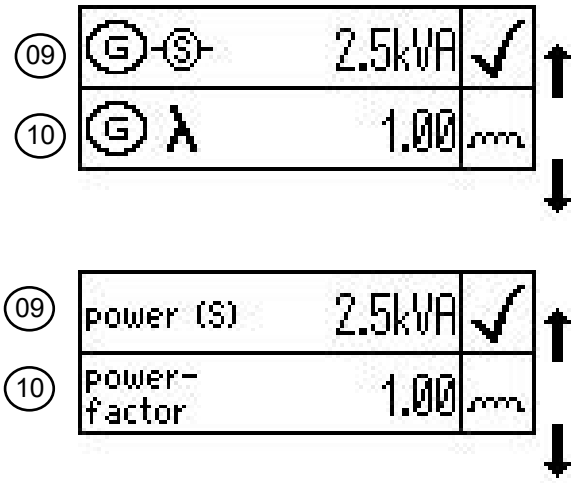



**Overview Page 3 (Generator):**

09. Generator apparent power [kVA]

10. Power Factor

*Fig. 12.3.2-3: Overview Page 2 Symbols/English*

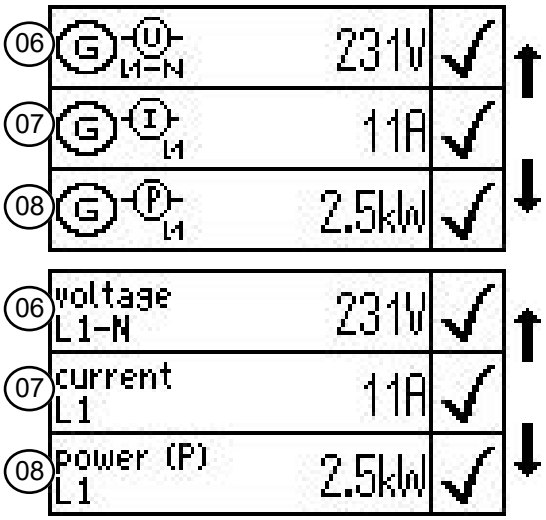



**In the case of 3-phase generators, the voltage, the current and the electrical power are shown on separate pages. Each page shows the value of one of the three phases one below the other.**

**Note:**

**Example of the voltage display of a 3-phase generator.**

*Fig. 12.3.2-4: Voltage display 3-P Symbols/English/*



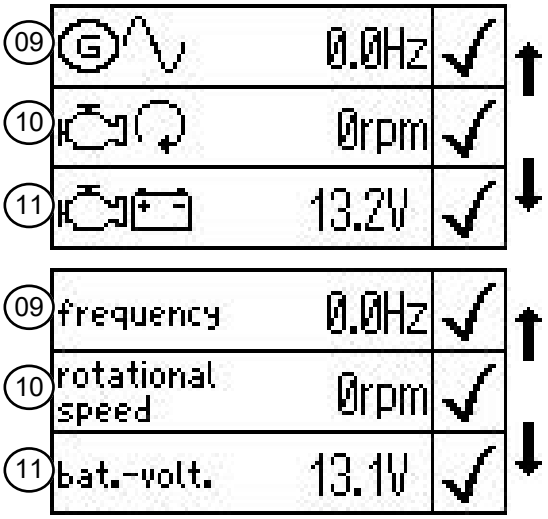
**Overview Page 4:**

09. Frequency of the generator [Hz]

10. Generator speed (r.p.m.)

11. Voltage of the starter battery [V]

*Fig. 12.3.2-5: Overview Page 3 Symbols/English*



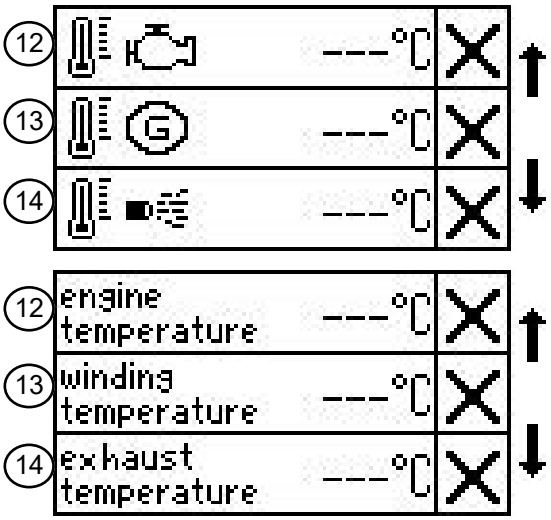

**Overview Page 4:**

12. Temperature of the cylinder head

13. Temperature of the generator winding

14. Temperature at exhaust manifold

*Fig. 12.3.2-6: Overview Page 4 Symbols/English*




**If the information pages of optional components (e.g. fuel gauge, oil pressure) are available, then these pages are inserted after Overview Page 4.**

**Whether these pages are displayed automatically, always or not at all can be set in the Panel menu.**

**Note!**

**Final Overview Page:**

*Fig. 12.3.2-7: Final overview page*

Proceed to this menu by pressing the Start/Stop - Enter key

Overview Page 5 is the same in all display modes/languages.



## 12.3.3 The fpControl AGT overview pages

The display mode/language of the display can be set in the menu.

**The battery-specific charging parameters are set by the Fischer Panda Service Point.**

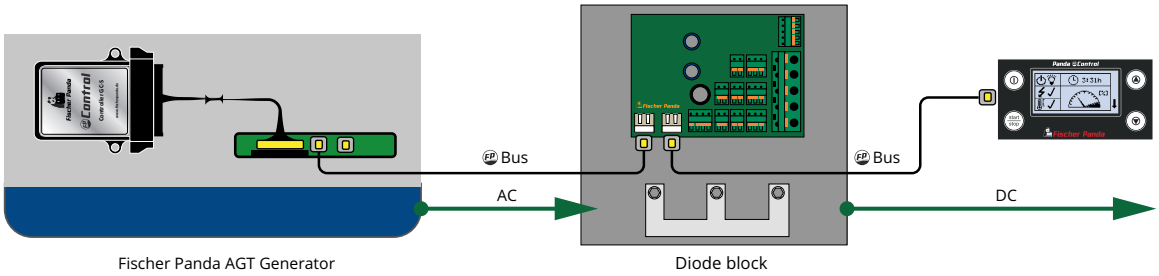
**When exchanging a battery, this must be checked and adjusted accordingly.**

*Incorrect setting of the charging parameters may result in the battery being damaged or destroyed. The specifications of the battery manufacturer must be adhered to.*

**Warning:**

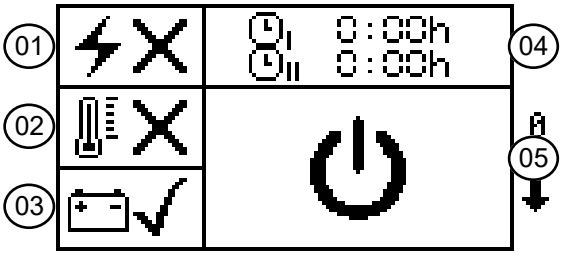


.




**Overview Page 1:**

*Fig. 12.3-1: Symbols used - Overview Page 1*




01. Generator Status (on/off)

02. AC OK

03. Temperature of the generator (OK/Error)

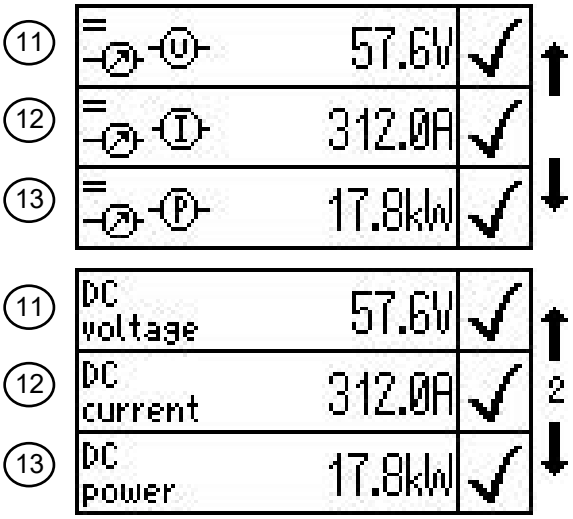
04. Operating hours of the generator

05. Info screen

Overview Page 1 is the same in all languages.

**Overview Page 2:**

*Fig. 12.3.3-2: Overview Page 2 Symbols/English*




11. DC voltage [V]

12. DC current [A]

13. DC output [kW]

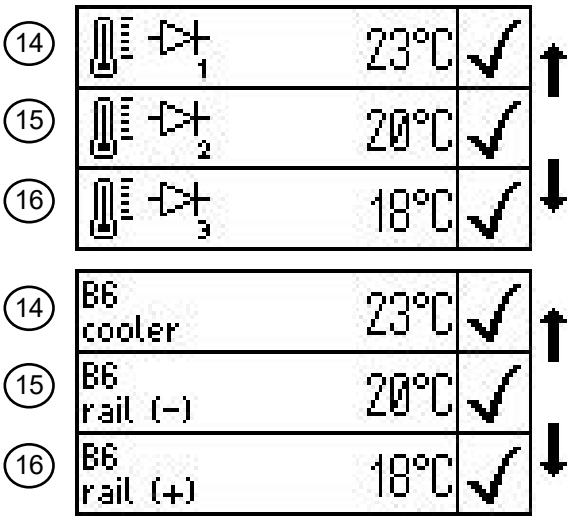
**Overview Page 3:**

14. Temperature of the diode plate fan

15. Temperature of the diode plate busbar (-)

16. Temperature of the diode plate busbar (+)

*Fig. 12.3.3-3: Overview Page 3 Symbols/English*



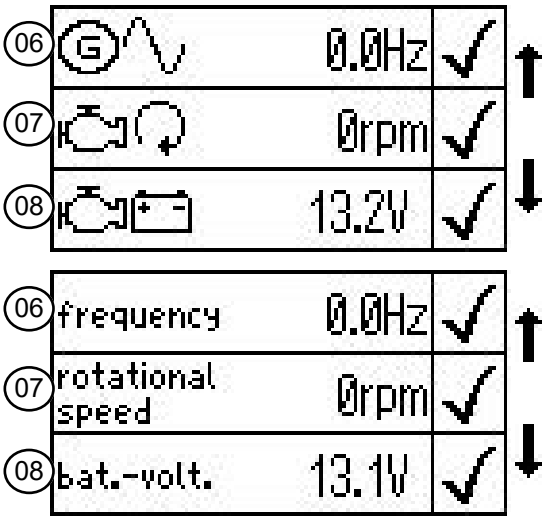

**Overview Page 4:**

06. Frequency of the generator [Hz]

07. Generator speed (r.p.m.)

08. Voltage of the starter battery [V]

*Fig. 12.3.3-4: Overview Page 4 Symbols/English*



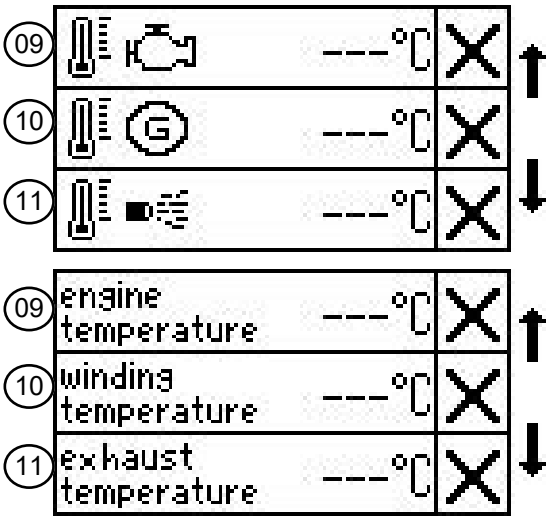

**Overview Page 5:**

09. Temperature of the cylinder head

10. Temperature of the generator winding

11. Temperature at exhaust manifold

*Fig. 12.3.3-5: Overview Page 5 Symbols/English*




**If the information pages of optional components (e.g. fuel gauge, oil pressure) are available, then these pages are inserted after Overview Page 4.**

**Note!**

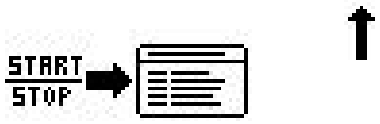
**Whether these pages are displayed automatically, always or not at all can be set in the Panel menu.**

**Final Overview Page:**

*Fig. 12.3.3-6: Final overview page*

Proceed to this menu by pressing the Start/Stop - Enter key

Overview Page 5 is the same in all display modes/languages.




### 12.3.3.1 Battery guard

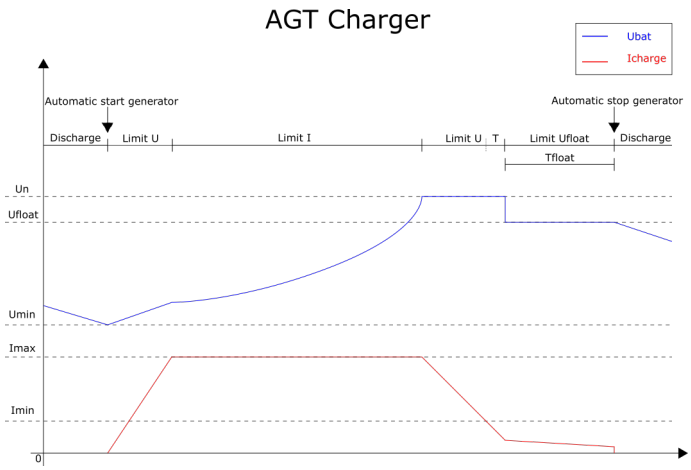
Generator must be in Standby mode (remote control panel switched on; generator off)

When the battery monitor is activated in the Service menu, the generator starts automatically as soon as the connected battery bank has reached the set minimum voltage. After the charging process (UIU) has ended, the generator switches off (back to Standby).

Activation of the battery monitor as well as the storage of individual parameters for UIU charging/the connected battery bank are performed by your Fischer Panda Service Point.

### 12.3.3.2 Functional description of the UIU charging process

*Fig. 12.3.3.2-1: UIU charging curve of AGT-DC generator with FP Control*




The UIU charging process: **linearly increasing voltage – constant current – constant voltage**

When the battery voltage has reached its minimal value $\mathbf{U_{min}}$ when discharging, the battery charger starts automatically, if the battery guard is activated. The UIU charging process begins:

| | |
|---|---|
| **Phase »Limit U«:** | In the first phase, charging takes place with linearly increasing voltage This phase continues until the charging current has reached its maximum value $\mathbf{I_{max}}$. |
| **Phase »Limit I«:** | In the second phase, charging takes place at **constant current**. In this phase, the maximum charging current $\mathbf{I_{max}}$ flows to the battery. |
| **Phase »Limit U«** | In the third phase, charging takes place at **constant voltage** $\mathbf{U_n}$ (absorption voltage). During this phase, the charging current drops to its minimum value $\mathbf{I_{min}}$. |
| **Phase »T«** | Once the charging current has reached its minimum value $\mathbf{I_{min}}$, the battery voltage is maintained at the **Un** (absorption voltage) value throughout a hysteresis time **T**. The charging current continues to decrease during hysteresis. |
| **Phase »Limit Ufloat«** | After hysteresis the battery charger switches from loading at constant voltage $\mathbf{U_n}$ to float voltage $\mathbf{U_{float}}$, thus ensuring that the fully charged condition of the battery is maintained throughout $\mathbf{T_{float}}$. |

Once the float time $T_{float}$ has elapsed, the generator stops automatically.

### Parameters of the charging curve

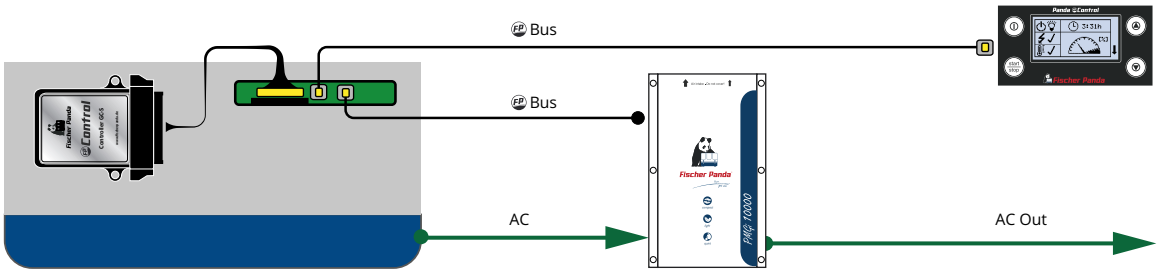
| Parameter | Meaning | Corresponding menu item in "battery charger" |
|---|---|---|
| $U_{min}$ | Battery voltage at which the battery charging generator is started automatically. | **min. voltage [V]** |
| $U_n$ | Constant charging voltage (absorption voltage), until the charging current has dropped to the minimum value $I_{min}$. | **absorption-voltage [V]** |
| $U_{float}$ | Once the battery has been charged, the float voltage ensures that the fully charged condition of the battery is maintained throughout the float time $T_{float}$. | **float-voltage [V]** |
| $I_{min}$ | If the minimum charging current is not achieved, the battery is fully charged. At this point in time, hysteresis **T** begins and continues until switching to the float voltage $U_{float}$. | **min. current [A]** |
| $I_{max}$ | Maximum charging current flowing to the battery. | **max. current [A]** |
| **T** | Once this time has elapsed, the system switches over to the float voltage $U_{float}$. | **hysteresis [ms]** |
| | “On” – Battery guard is activated, automatic generator start/stop is active. The generator is started automatically if the battery voltage drops below the minimum $U_{min}$.<br>“Off” – Battery guard is deactivated, automatic generator start/stop is deactivated. | **battery guard [On/Off]** |
| $T_{float}$ | Once the float time has elapsed, the generator is stopped automatically if the battery guard is activated. | **float-timeout [min]** |

**The graphic display of the UIU charging curve displays the basic principle and symbolises the functionality.** **Note!**



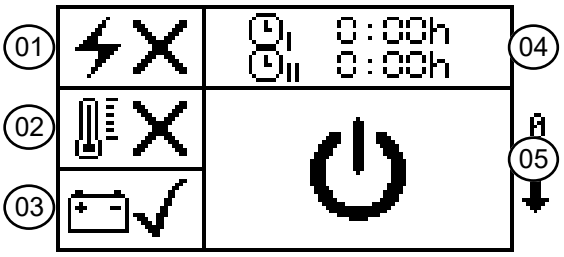
## 12.3.4 The fpControl Inverter overview pages

The display mode/language of the display can be set in the menu.




**Overview Page 1:**

*Fig. 12.3.4-1: Overview Page 1 – Symbols*




01. Generator Status (on/off)

02. AC OK

03. Temperature of the generator (OK/Error)

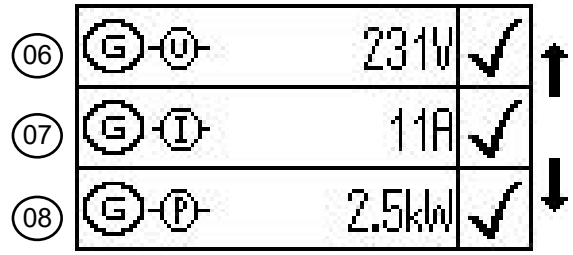
04. Operating hours of the generator

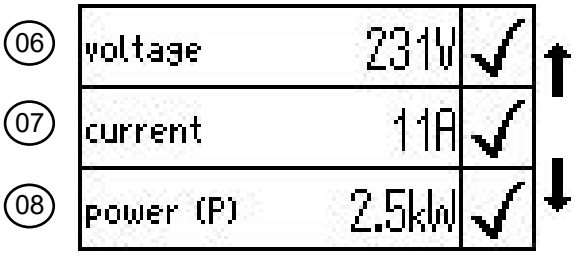
05. Info screen

Overview Page 1 is the same in all languages.

**Overview Page 2 (Generator):**

*Fig. 12.3.4-2: Overview Page 2 Symbols/English*




06. Output voltage [V]

07. Generator current [A]

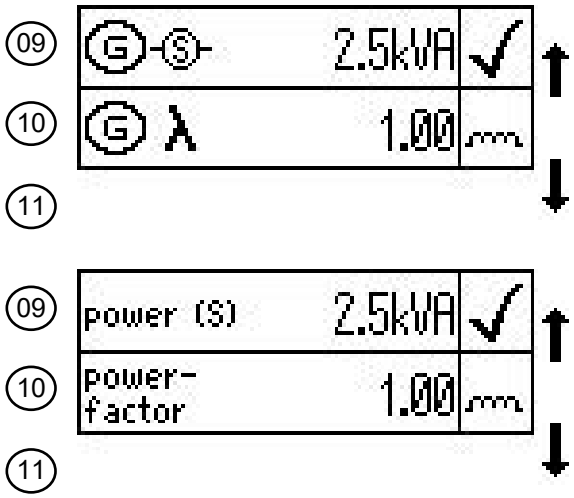
08. Generator apparent power [kVA]

**Overview Page 3:**

09. Generator apparent power [kVA]

10. Power Factor

*Fig. 12.3.4-3: Overview Page 3 Symbols/English*

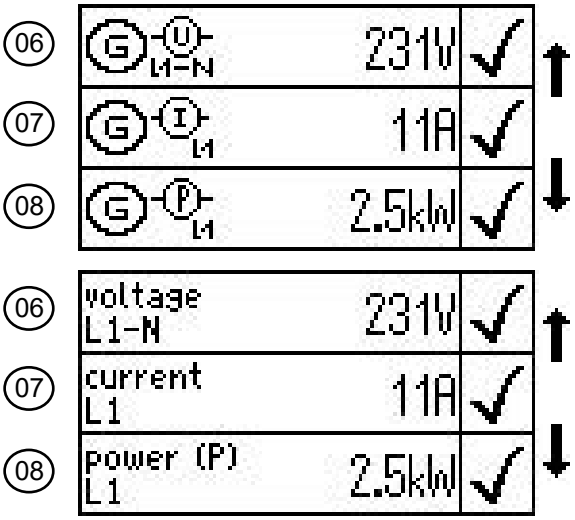



**In the case of 3-phase generators, the voltage, the current and the electrical power are shown on separate pages. Each page shows the value of one of the three phases one below the other.**

**Note:**

**Example of the voltage display of a 3-phase generator.**

*Fig. 12.3.4-4: Voltage display 3-P Symbols/English/*



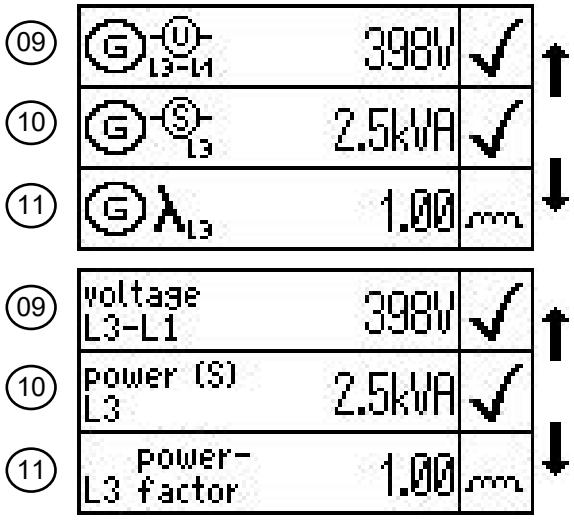

**Overview Page 3:**

09. Phase/Phase voltage

10. Generator apparent power [kVA]

11. Power Factor

*Fig. 12.3.4-5: Overview Page 3 Symbols/English*



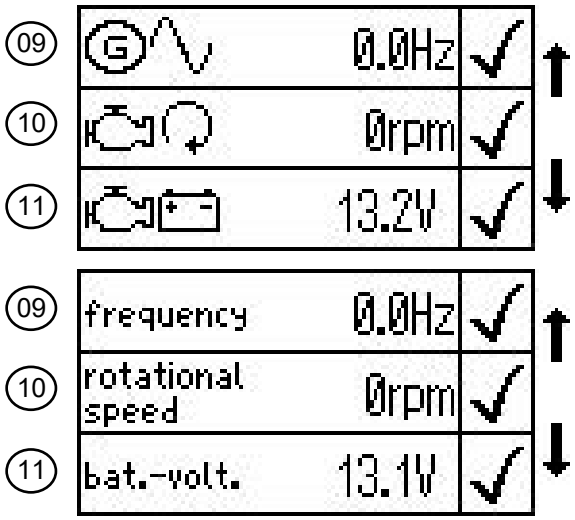
**Overview Page 4:**

09. Frequency of the generator [Hz]

10. Generator speed (r.p.m.)

11. Voltage of the starter battery [V]

*Fig. 12.3.4-6: Overview Page 4 Symbols/English*



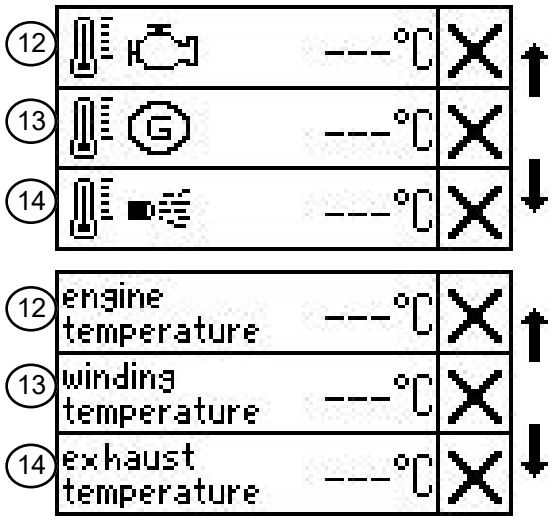

**Overview Page 5:**

12. Temperature of the cylinder head

13. Temperature of the generator winding

14. Temperature at exhaust manifold

*Fig. 12.3.4-7: Overview Page 5 Symbols/English*



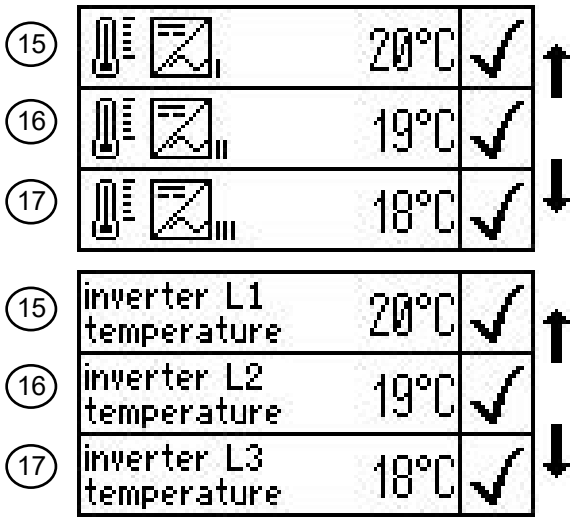

**Overview Page 6:**

15. Inverter Temperature L1

16. Inverter Temperature L2

17. Inverter Temperature L3

*Fig. 12.3.4-8: Overview Page 6 Symbols/English*




If the information pages of optional components (e.g. fuel gauge, oil pressure) are available, then these pages are inserted after Overview Page 4.

**Note!:**

Whether these pages are displayed automatically, always or not at all can be set in the Panel menu.

**Final Overview Page:**

*Fig. 12.3.4-9: Final overview page*

Proceed to this menu by pressing the Start/Stop - Enter key

Overview Page 5 is the same in all display modes/languages.



## 12.4 Starting up the generator.

### 12.4.1 Preparations for starting up / Checks (daily) for marine version

1. Oil level check (ideal level: 2/3 Max).

   The level should be about 2/3 of the maximum level when the engine is cold.

   Furthermore, if installed, the oil level of the oil-cooled bearing must be checked before each start - see sight glass on generator front cover!.

2. Check coolant level.

   The external expansion tank should be filled to 1/3 in a cold state. It is very important that there is sufficient volume for expansion of the coolant.

3. Check if the raw water intake valve is open.

   For safety reasons, the raw water intake valve must be shut after the generator has been switched off. It should be re-opened before starting the generator.

4. Check raw water filter.

   The raw water filter must be regularly checked and cleaned. If the raw water intake is restricted by detached residue, this increases wear on the impeller.

5. Visual inspection

   Control fixing bolts, check hose connectors for leaks, check electrical connections. Check electrical lines for damage/chafing.

6. Switch off loads.

   The generator should only be started without a load.

7. Open fuel valve, if installed.
8. Close main battery switch (switch on).

### 12.4.2 Preparations for starting up / Checks (daily) for vehicle version

1. Oil level check (ideal level: 2/3 Max).

   The level should be about 2/3 of the maximum level when the engine is cold.

   Furthermore, if installed, the oil level of the oil-cooled bearing must be checked before each start - see sight glass on generator front cover!.

2. Check cooling water level.

   The external expansion tank should be at 1/3 in a cold state. It is very important that there is sufficient volume available for expansion of the cooling water.

3. Visual inspection

   Control fixing bolts, check hose connectors for leaks, check electrical connections. Check electrical lines for damage/chafing.

4. Switch off loads.

   The generator should only be started without a load.

5. Open fuel valve, if installed.
6. Close main battery switch (switch on).
7. Open the raw water intake valve (only in the case of Fischer Panda Marine generators)

## 12.4.3 Starting up the generator

**Deadly danger! - The generator can be equipped with an Autostart function. This means that the generator is started by an external signal. In order to prevent an inadvertent start-up, the starter battery must be disconnected before work on the generator may commence.**

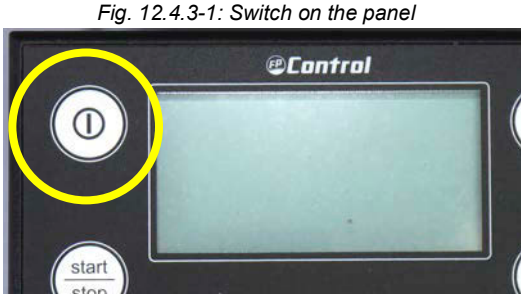
**Warning! Automatic start-up**



1. Switch on the fpControl CP-G

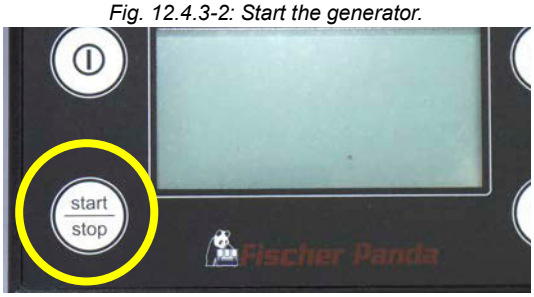
   The remote control panel is started by pressing the On/Off button. The On/Off button must be pressed until the Home page is displayed.

*Fig. 12.4.3-1: Switch on the panel*




2. Press the Start/Stop - Enter key

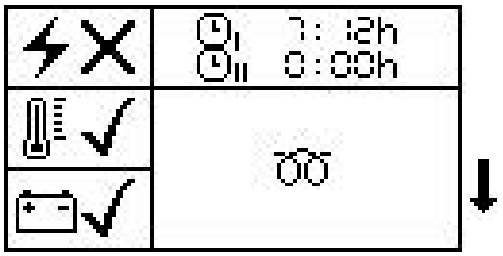
*Fig. 12.4.3-2: Start the generator.*




3. The fpControl preheats the diesel engine.

After preheating, the generator is started by the fpControl system.

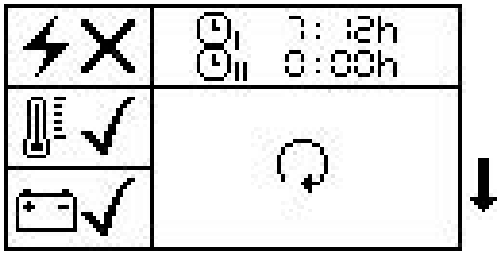
*Fig. 12.4.3-3: Preheating*




4. Starter on.

In order to minimise current consumption, preheating is interrupted briefly when the starter is operated.

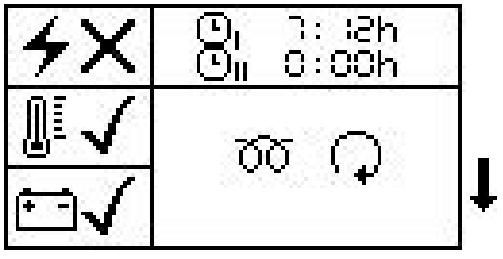
*Fig. 12.4.3-4: Starter*




5. Starter and preheater

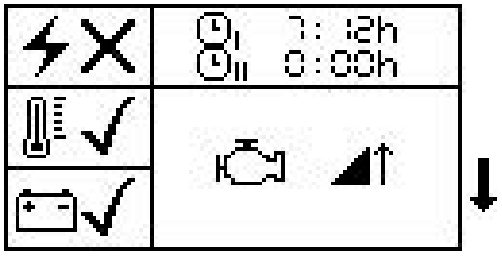
As soon as the high inrush current of the starter has dropped, preheating is switched on again.

*Fig. 12.4.3-5: Preheating*



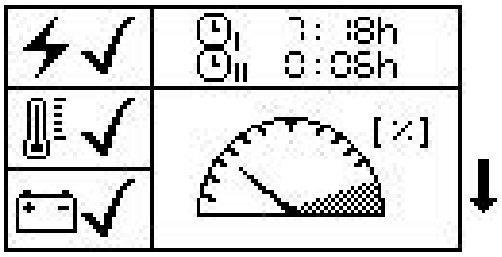
The engine idles for the first few seconds. Thereafter, the fpControl increases the speed to the operating speed and indicates this in the display.

*Fig. 12.4.3-6: Increase revolutions*




As soon as the AC voltage is within limits (e.g. 207 V-253 V at 230 V) (normal operating mode), the consumer can be connected.

*Fig. 12.4.3-7: AC OK*




**Close the raw water intake valve in the event start-up problems (Panda Marine generators only)**

**Attention!**



If multiple attempts to start up are required (e.g. to bleed the fuel lines), then the raw water intake valve must definitely be shut while the attempts are being made. The cooling water impeller turns during the starting process and feeds cooling water. As long as the engine has not started up, the exhaust gas pressure is insufficient to discharge the cooling water that has been introduced. This protracted start-up process would flood the exhaust system with water. This may damage/destroy the generator/engine (genset).

*Re-open the raw water intake valve as soon as the generator has started.*

## 12.4.4 Stopping the generator

1. Switch off loads.
2. Recommendation: With turbo engines and under a load that exceeds 70 % of the rated output, allow the generator temperature to stabilise for at least 5 minutes with load switched off.

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

3. Press "Start/Stop" button (to switch off).

*Fig. 12.4.4-1: Stopping*




**NOTE: Never switch off the main battery until the generator has stopped, shut the fuel valve if necessary!**

**Attention!**



4. Close the raw water intake valve (only in the case of Fischer Panda marine generators)

## 12.5 The Menu

The menu can be accessed from the final overview page.

Switch on the CP-G and scroll down to "Enter Menu" page.

Press the Start/Stop - Enter key to enter the menu.

*Fig. 12.5-1: Menu entry symbols*




### 12.5.1 Main Menu

**You can choose from the following sub-menus in the main menu:**

*Fig. 12.5.1-1: Main Menu*




1. "Panel" sub-menu - The display of the of the panel can be adapted in the "Panel" sub-menu (e.g. brightness, language, etc.).

2. "Generator" sub-menu - All settings related to the generator can be made in the "Generator" sub-menu, e.g. bleeding the fuel pump etc.

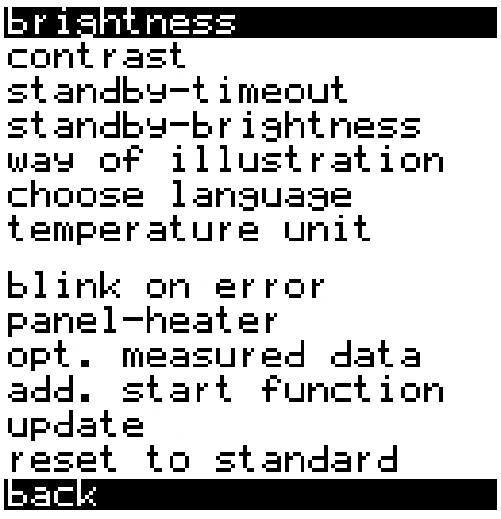
3. The "Service" sub-menu is blocked and can only be accessed by trained personnel and Fischer Panda employees.

4. Back - back to the overview pages

### 12.5.2 Sub-menu: "Panel"

**The following items can be selected in the Panel sub-menu:**

*Fig. 12.5.2-1: Sub-menu: Panel*




1. Lighting

   - changes the brightness of the display in Normal mode.

2. Contrast

   *- changes the contrast of the display.*

3. Standby Time

   *- to set the time until the panel switches to Standby mode.*

4. Standby Lighting

   *- changes the brightness of the display in Standby mode.*

5. Display Mode

*- changes the display mode of the overview pages.*

6. Language selection

   *- changes the language of the panel*

7. Temperature Unit

   *- to set the temperature unit to °C or °F*

8. Audible alarm

   *- to activate the audible alarm in the event of faults*

9. Flashing when faulty

   *- to activate panel flashing in the event of faults*

10. Panel heating

    *- to activate panel heating at temperatures <+10°C*

11. Optional measurement data

    *- to manage the additional information pages, e.g. tank display*

12. Additional start-up functions (only in the case of inverter generators)

    *- Start without inverter/Inverter Softstart*

13. Update

    *- Software update for the panel*

14. Reset to standard

    *- to reset the "Panel" sub-menu to the factory settings*

15. back

    *- Switching from the "Panel" sub-menu to the Main Menu*

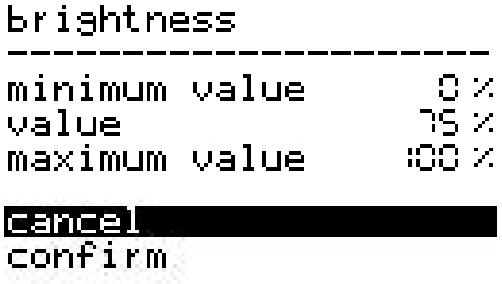
### 12.5.2.1 Setting the illumination of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.1-1: Sub-menu: Illumination*



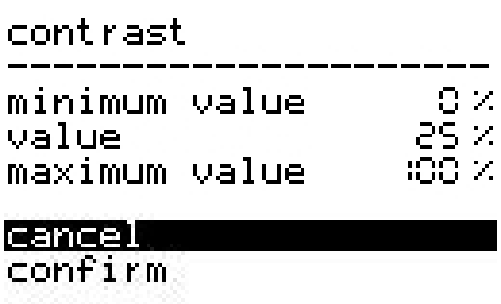
### 12.5.2.2 Setting the contrast of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.2-1: Sub-menu: Contrast*



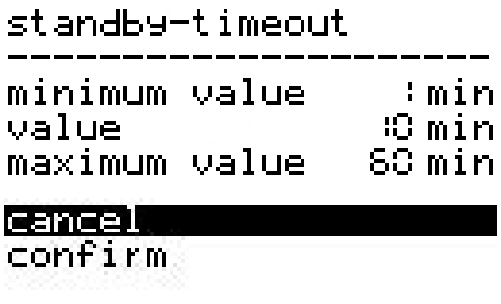

### 12.5.2.3 Setting the standby time of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/ Stop-Enter“ key.**

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.3-1: Sub-menu: Standby Time*



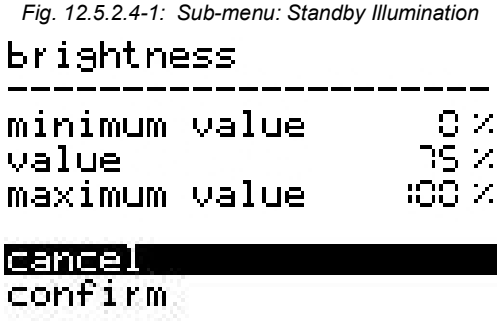

### 12.5.2.4 Setting the standby illumination of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop - Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop - Enter“ key.

*Fig. 12.5.2.4-1: Sub-menu: Standby Illumination*




### 12.5.2.5 Setting the display mode of the CP-G overview page

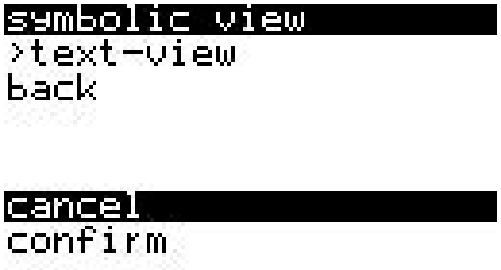
The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**"Symbolic View" or "Text View" can be selected by using the "Step-up"/"Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.**

The "back" item returns you to the "Panel" sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.5-1: Sub-menu: Display Mode*




## 12.5.2.6 Setting the language of the text pages of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**Select the corresponding language by using the "Step-up"/"Step-down" keys and then confirm with the "Start/ Stop-Enter“ key.**

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.6-1: Sub-menu: Language Selection*




## 12.5.2.7 Setting the Temperature Unit

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**"°C“ for "degrees Celsius" or "°F" for "degrees Fahrenheit“ can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/ Stop - Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop - Enter“ key.

*Fig. 12.5.2.7-1: Sub-menu: Temperature Unit*




## 12.5.2.8 Setting the Aural Alarm

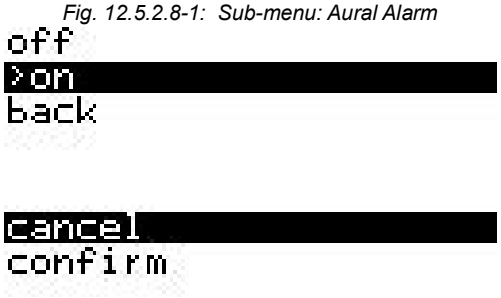
The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**"Off" or "On" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/ Stop-Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.8-1: Sub-menu: Aural Alarm*




## 12.5.2.9 Setting the display to flash in the event of a fault

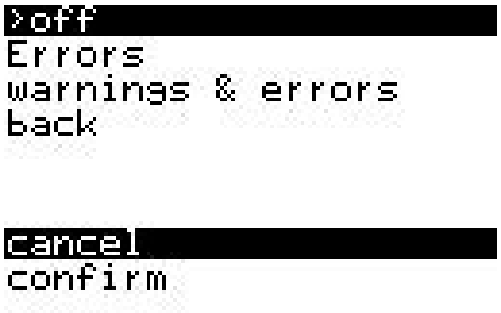
The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**"Off" or "Error" or "Warning and Error" can be selected by using the "Step-up"/"Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.9-1: Sub-menu: Flashing when Faulty*




## 12.5.2.10 Setting the Panel Heating

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**"Off" or "On" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/ Stop-Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop - Enter“ key.

*Fig. 12.5.2.10-1: Sub-menu: Panel Heating*




## 12.5.2.11 Setting the display of the optional measurement data

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

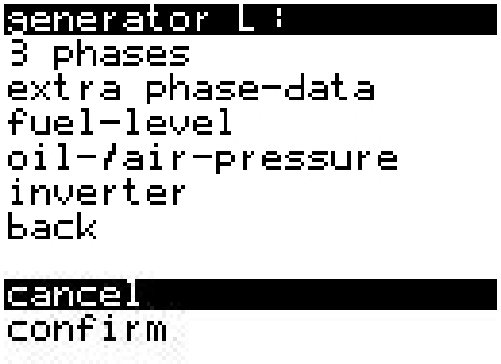
**The desired optional measurement data is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.**

**The desired option is selected by using the "Step-up"/ "Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.11-1: Sub-menu: Optional Measurement Data*




## 12.5.2.12 Supplementary Start-up functions

This menu item is only available in the case of inverter generators

**Note!**



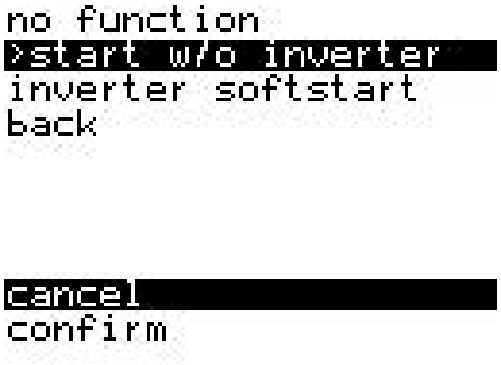
The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

**The desired option is selected by using the "Step-up"/ "Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.**

The "Back" item returns you to the Panel sub-menu.

"Cancel" or "Confirm" can be selected by using the "Step-up"/"Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.12-1: Sub-menu: Supplementary Start-up functions*




## 12.5.2.13 Resetting all values of the Panel sub-menu to default values

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.2.13-1: Resetting all values*




## 12.5.2.14 Return to Main Menu

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

## 12.5.3 Sub-menu: "Generator"

**The following items can be selected in the Generator sub-menu:**

1. Autostart

   *- configuring the Autostart function*

2. Water pump/Fan

   *- setting the optional DC outputs*

3. Switch Outputs

   *- manual switching of the individual digital outputs*

4. Event Memory

   *- displaying the event memory*

5. Display System Devices

   *- displaying the detected system devices*

6. Service performed

   *- resets the service interval*

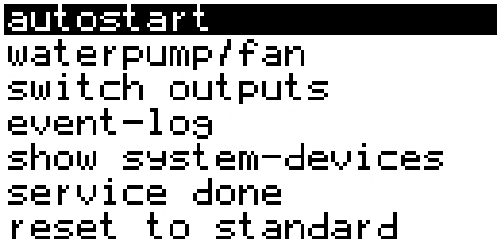
7. Reset to standard

   *- all parameters of the "Generator" sub-menu are reset to the factory settings*

8. back

   *- Switching from the "Generator" sub-menu to the Main Menu*

*Fig. 12.5.3-1: Generator Sub-Menu*




### 12.5.3.1 Setting the Autostart of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

A choice can be made between "Switch on/off" and "Number of start-up attempts" in in the "Autostart" sub-menu.

*Fig. 12.5.3.1-1: Autostart*



**Switching On / Off**

"Off" for deactivated or "On" for activated can be selected by using the "Step-up"/"Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.1-2: Autostart*



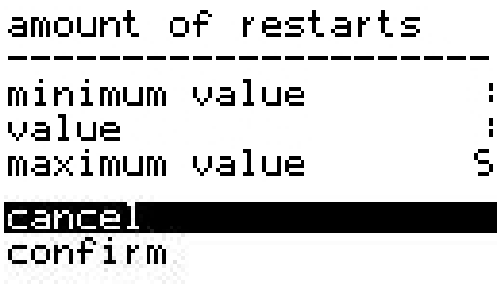

**Number of start-up attempts**

The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*For safety reasons, the number of start-up attempts is limited to one in the case of marine (PMS) generators.*

*Fig. 12.5.3.1-3: Autostart*




**Deadly danger! - The generator can be equipped with an Autostart function. This means that the generator is started by an external signal. In order to prevent an inadvertent start-up, the starter battery must be disconnected before work on the generator may commence.**

**Warning! Automatic start-up.**



**The "Autostart" also remains active if the fpControl CP-G is switched off and then on again.**

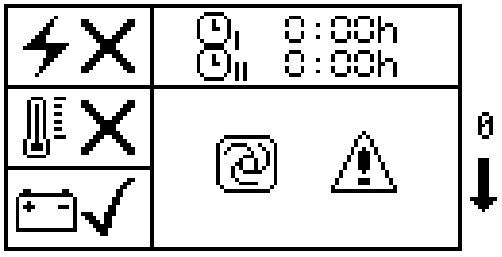
If a fault should arise when the generator is started or is already operating, it is stopped and the Autostart is set to "off".

If the generator is operated by Autostart and is stopped manually, the Autostart is set to "off".

Once the system has been switched off and then on again, the Autostart is active once more.

**The first overview page shows if the Autostart is active.**

*Fig. 12.5.3-4: Overview Page 1 with Autostart*




## 12.5.3.2 Setting the optional water pump/fan DC output of the CP-G

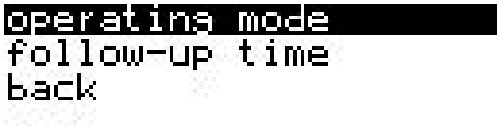
The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

"Operating Mode" or "Follow-up Time" can be selected by using the "Step-up"/"Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

The "Back" item returns you to the "Generator" sub-menu.

Select “cancel” or “confirm” by using the "Step-up"/"Step-down" keys and then confirm with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.2-1: Sub-menu: Optional DC Output*




**Setting the “Operating mode” for the optional DC output (DP) of the CP-G**

An option can be selected by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.2-2: Sub-menu: Operating Mode*

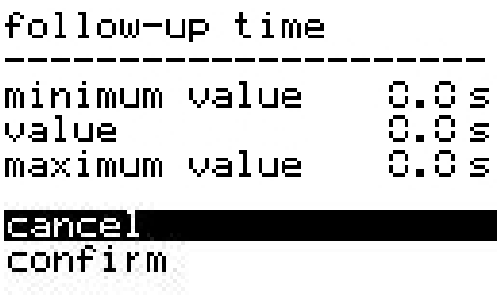



**Setting the follow-up time of the optional DP Output of the CP-G**

The value is changed by using the "Step-up"/"Step-down" keys and the setting is confirmed with the "Start/Stop-Enter“ key.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.2-3: Sub-menu: Follow-up Time*




## 12.5.3.3 Switching the switching outputs of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

Select "Fuel Pump" or "Opt. DC Outputs" by using the "Step-up"/"Step-down" keys and then confirm with the "Start/Stop-Enter“ key.

The "Back" item returns you to the "Generator" sub-menu.

The value of the output can be set to "0" for deactivated or "1" for activated by using the "Step-up"/"Step-down" keys. Confirm with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.3-1: Sub-menu: Switching Outputs*




## 12.5.3.4 Reading out the Event Memory of the CP-G

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

Siehe “Table of Faults” auf Seite 158. Siehe “Description of the symbols” auf Seite 160.

*Fig. 12.5.3.4-1: Event Memory*




One can scroll through the event memory by using the "Step-up"/"Step-down" keys and then return to the Generator menu with the "Start/Stop-Enter“ key.

**By using the QR Code, the relevant fault page of the knowledgebase.fischerpanda.de can be called up via the Internet.**

*To do so, simply scan the QR Code with a smartphone (Internet connection required).*

**Note!**



### 12.5.3.5 Resetting all values of the Generator sub-menu to the default values

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

"Cancel" or "Confirm" can be selected by using the "Step-up"/ "Step-down" keys and then confirmed with the "Start/Stop-Enter“ key.

*Fig. 12.5.3.5-1: Resetting all values*




### 12.5.3.6 Returning the Main Menu

The menu item is selected by using the "Step-up"/"Step-down" keys and confirmed with the "Start/Stop-Enter“ key. The respective menu item opens.

## 12.5.4 Resetting the panel language to the default (English)

1. Press and hold the "Step down" key with the panel switched off.
2. Switch on the panel and hold down the "Step down" key until the first overview screen is displayed.
3. The panel language has now been reset. All other settings are retained.

### 12.5.4.1 How to set the panel language after a reset.

1. Switch on the fpControl Panel CP-G
2. Wait until the first overview screen appears.
3. Scroll to the last overview screen.
4. Press the "Start/Stop-Enter" key to access the menu.
5. Scroll down to the "Panel" menu item.
6. Press the "Start/Stop-Enter" key to access the "Panel" sub-menu.
7. Scroll down to the "Choose language" menu item.
8. Press the Start/Stop-Enter key to access the "Language Selection" sub-menu.
9. Scroll to the desired language and confirm with the "Start/Stop-Enter" key.

10. Scroll down to the "confirm" menu item and press the "Start/Stop-Enter" key.

The menu text is now set to the selected language.

## 12.6 Faults

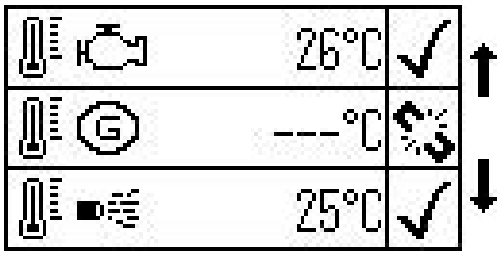
### 12.6.1 Symbols and messages on the display

#### 12.6.1.1 Example of message - "Sensor defective"

**A soon as a defective sensor is detected, the fpControl reports this on the display.**



*Fig. 12.6.1.1-1: Sensor defective*

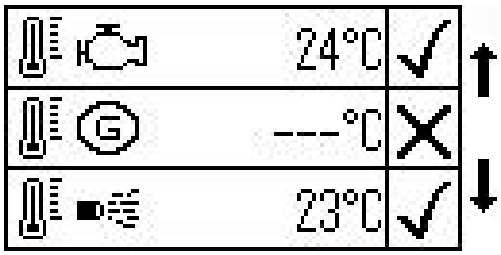



#### 12.6.1.2 Example of message - "Sensor/Cable break"

**If the sensor has failed or the cable is broken, the following report is displayed:**



*Fig. 12.6.1.2-1: Sensor/Cable break*



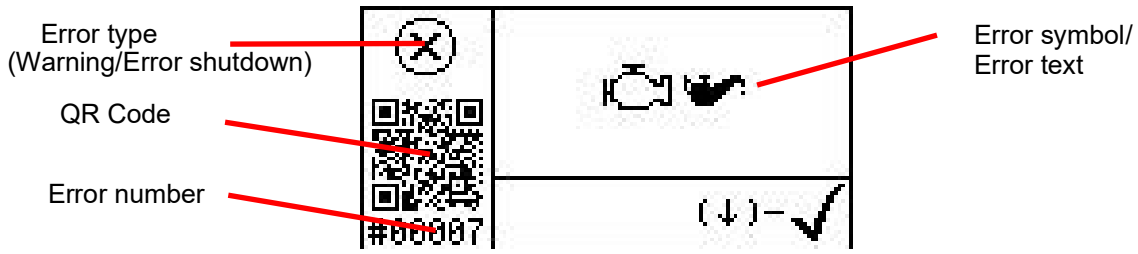

### 12.6.2 Error code

**An error code is displayed if a parameter lies beyond its operating limits.**

See “Table of Faults” on page 158. See “Description of the symbols” on page 160.

*Example: Error No. 7 - Oil pressure too low -Fault led to emergency shutdown*

*Fig. 12.6.2.0-1: Sub-menu: "Event Memory"*




**By using the QR Code, the relevant fault page of the knowledgebase.fischerpanda.de can be called up via the Internet.**

*To do so, simply scan the QR Code with a smartphone (Internet connection required).*

**Note!**



## 12.6.2.1 Table of Faults

See also the "Faults" chapter in the manual of the generator.

**The relevant fault page of the knowledgebase.fischerpanda.de can be called up via the Internet.**

**Note!**



*(Internet connection required).*

*Fig. 12.6-1: Table of faults*

| No. | Description | Basic |
|---|---|---|
| 1 | AC Voltage L1 | AC Voltage L1 is below its lower limit |
| 2 | AC Frequency L1 | AC Frequency L1 is below its lower limit |
| 5 | Emergency-Off | Emergency-off switch is active/has been pressed |
| 7 | Oil pressure | Engine oil pressure is below its lower limit |
| 8 | Cylinder head temperature | Cylinder head temperature sensor not available/Contact open/Cable break |
| 9 | Winding temperature | Winding temperature sensor not available/Contact open/Cable break |
| 10 | Exhaust temperature | Exhaust temperature sensor not available/Contact open/Cable break |
| 11 | Electronics temperature | Temperature sensor for the electronic system (sensor on the fpControl circuit board) not available/defective |
| 13 | Starter motor current | Starter motor not connected/Starter motor defective |
| 14 | Glow plug circuit | One or more glow plugs not connected or defective |
| 16 | Fuel supply | Fuel valve/fuel pump not connected or defective |
| 17 | ETR Stop Solenoid hold | Current at output of the ETR hold coil is below the lower limit |
| 18 | ETR Stop Solenoid pull | Current at output of the ETR pull coil is below the lower limit |
| 19 | Water pump/Fan | Fan/water pump not connected or defective |
| 20 | Current sensor | Current sensor not available/Contact open/Cable break |
| 21 | Boost relay current | Boost relay not connected or defective |
| 25 | Starter battery voltage | Starter battery voltage too low |
| 26 | Engine speed error | Engine speed (r.p.m.) too low |
| 30 | AC Voltage L2 | AC Voltage L2 is below its lower limit |
| 31 | AC Frequency L2 | AC Frequency L2 is below its lower limit |
| 34 | AC Voltage L3 | AC Voltage L3 is below its lower limit |
| 35 | AC Frequency L3 | AC Frequency L3 is below its lower limit |
| 38 | Inverter DC supply | Current at output of the DC supply voltage of the inverter is below the lower limit |
| 39 | Universal Output 1 (1 A) | Electrical load on Universal output 1 is defective/no consumer connected |
| 40 | Universal Output 2 (5A) | Electrical load on Universal output 2 is defective/no consumer connected |
| 41 | AGT DC Voltage 1 | Battery voltage too low |
| 42 | AGT DC Current 1 | Battery current too low |
| 43 | AGT DC Voltage 2 | Total voltage compared to battery voltage too low |
| 44 | AGT DC Current 2 | Sum of battery and load current too low |
| 45 | AGT B6 Radiator | Temperature sensor not available/Contact open/Cable break |
| 46 | AGT B6 Busbar (-) | Temperature sensor not available/Contact open/Cable break |
| 47 | AGT B6 Busbar (+) | Temperature sensor not available/Contact open/Cable break |
| 62 | Fuel temperature | Temperature sensor not available/Contact open/Cable break |
| 63 | Fuel level | The fuel level has reached its lower limit |
| 65 | AC Voltage L1 | AC Voltage L1 is above upper limit |
| 66 | AC Frequency L1 | AC Frequency L1 is above upper limit |
| 67 | AC Current L1 | AC Current L1 is above upper limit |
| 68 | AC Output L1 | AC Output L1 is above upper limit |
| 70 | Servomotor current | Servomotor current is above upper limit |

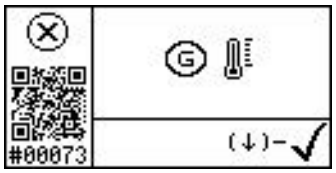
| No. | Description | Basic |
|---|---|---|
| 71 | Oil pressure | Oil pressure is above upper limit |
| 72 | Cylinder head temperature | Temperature of the diesel engine / Cylinder head is above upper limit |
| 73 | Winding temperature | Winding temperature is above upper limit |
| 74 | Exhaust temperature | Exhaust temperature is above upper limit |
| 75 | Electronics temperature | Temperature of electronic system above upper limit |
| 77 | Starter motor output | Current at output of starter motor is above upper limit |
| 78 | Glow plug circuit | Current at output of the glow plugs is above upper limit |
| 79 | Flame-start system | Current at output of flame-start system is above upper limit |
| 80 | Fuel supply | Current at output of the fuel valve / fuel pump / DC generator exciter is above upper limit |
| 81 | Stop Solenoid hold | Current at output of the hold coil of the stop solenoid is above upper limit |
| 82 | Stop Solenoid pull | Current at output of the pull coil of the stop solenoid is above upper limit |
| 83 | Water pump/Fan | Current at output of the water pump/fan is above upper limit |
| 84 | Current sensor supply | Current at output of the current sensor is above upper limit |
| 85 | Boost relay | Boost relay fault |
| 86 | Bus current | Current at the CAN bus is above upper limit |
| 89 | Starter battery voltage | Starter battery voltage is above upper limit |
| 93 | Power output relay | Current at output of load-breaking relay is above upper limit |
| 94 | AC Voltage L2 | AC Voltage L2 is above upper limit |
| 95 | AC Frequency L2 | AC Frequency L2 is above upper limit |
| 96 | AC Current L2 | AC Current L2 is above upper limit |
| 97 | AC Output L2 | AC Output L2 is above upper limit |
| 98 | AC Voltage L3 | AC Voltage L3 is above upper limit |
| 99 | AC Frequency L3 | AC Frequency L3 is above upper limit |
| 100 | AC Current L3 | AC Current L3 is above upper limit |
| 101 | AC Output L3 | AC Output L3 is above upper limit |
| 102 | Inverter DC supply | Current at output of the DC supply of the inverter is above the upper limit |
| 103 | Universal Output 1 (1A) | Current at Universal Output 1 is above upper limit |
| 104 | Universal Output 2 (5A) | Current at Universal Output 2 is above upper limit |
| 105 | AGT DC Voltage 1 | Battery voltage too high |
| 106 | AGT DC Current 1 | Battery current too high |
| 107 | AGT DC Voltage 2 | Total voltage compared to battery voltage too high |
| 108 | AGT DC Current 2 | Sum of battery and load current too high |
| 109 | AGT B6 Radiator | Temperature at heat sink of the B6 bridge too high/Sensor error: Short circuit on temperature sensor |
| 110 | AGT B6 Busbar (-) | Temperature at busbar (-) of the B6 bridge too high/Sensor error: Short circuit on temperature sensor |
| 111 | AGT B6 Busbar (+) | Temperature at busbar (+) of the B6 bridge too high/Sensor error: Short circuit on temperature sensor |
| 126 | Fuel temperature | Fuel temperature too high/Sensor error Short circuit on temperature sensor |
| 130 | CAN communication interrupted | The panel has lost contact with the control system |
| 131 | CAN communication interrupted | The control system has lost contact with the panel |
| 132 | Service interval | Service due |
| 133 | BUS Module lost (3ph measurement) | Communication with the 3-ph Module interrupted |
| 134 | BUS Module lost (DC measurement) | Communication with the AGT Module interrupted |
| 135 | Synchronisation error | Problem with synchronisation of the output voltages of generators switched in parallel. |
| 136 | External motor controller communication | Communication with the external motor controller (ECU) has been interrupted |
| 137 | Air filter | Air filter has generated an error message |
| 138 | Diagnostic message (ECU) | Control device of the diesel engine has transmitted a diagnostic warning |
| 139 | Synchronisation module communication | Communication with the synchronisation module has been interrupted |

| No. | Description | Basic |
|---|---|---|
| 140 | Load distribution | Load balancing error |
| 141 | Synchronisation deactivated | Synchronisation module deactivated |
| 142 | Error message from engine control unit | The diesel engine control unit has generated a Red Stop Lamp Error |
| 148 | Rotary field error | The phases are connected in the incorrect sequence |
| 149 | Fuel level sensor error | Communication with the fuel level sensor has been interrupted |
| 151 | "Watchdog", control system restart | Control system is restarted after a malfunction |
| 152 | Temperature Inverter L1 | Temperature of L1 of the inverter above upper limit |
| 153 | Temperature Inverter L2 | Temperature of L2 of the inverter above upper limit |
| 154 | Temperature Inverter L3 | Temperature of L3 of the inverter above upper limit |
| 155 | Temperature Inverter DC intermediate circuit | Temperature of the DC intermediate circuit of the inverter is above upper limit |
| 157 | Inverter communication | Communication with the inverter has been interrupted |
| 163 | Inverter DC intermediate circuit load | DC intermediate circuit current is above upper limit |
| 164 | Inverter DC intermediate circuit voltage | Inverter DC intermediate circuit voltage too high |
| 167 | No rev analysis/Monitoring | Simulation of the engine speed for start-up without inverter |
| 245 | Factory setting changed | User input in Factory menu |
| 251 | Parameter changed in Admin Level | User input in Admin menu |

## 12.6.2.2 Description of the symbols

*Fig. 12.6-1: Description of the symbols*

| Symbol | Description | | | Symbol | Description | |
|---|---|---|---|---|---|---|
|  | WARNING | | |  | Current | Generator output |
|  | Error shutdown | | |  | Frequency | Generator output |
|  | Faults | No contact | |  | Voltage | Generator output |
|  | Broken | Short circuit | |  | (%)/Load | |
|  | OK | | |  | Generator runs | |
|  | AC Voltage | | |  | Generator off | |
|  | Run-up phase/Over-ride | Generator start-up | |  | Temperature | |
|  | Standby | | |  | Engine | |
|  | Automatic start-up. | | |  | Exhaust system | |
|  | Starter battery | | |  | Winding | |
|  | Operating hours | | |  | Preheating | |

| Symbol | Description | | | Symbol | Description | |
|---|---|---|---|---|---|---|
|  | Oil pressure | | |  | Speed/RPM | |
|  | Self test | | |  | Tank gauge % | |
|  | Apparent power | | |  | Starter turns | |
| Example:<br><br>Error73: Error shutdown due to winding temperature | | | | | | |

## 12.7 Accessories:

**FP Bus Cable (15 m): 34.02.02.131H**

*Fig. 12.7-1: FP Bus Cable (15 m): 34.02.02.131H*



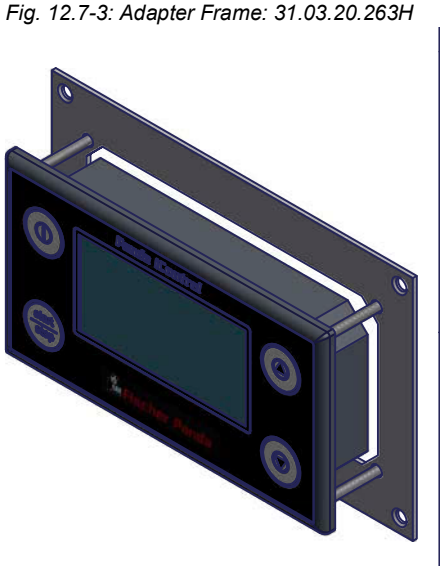
**Terminating resistor:34.02.02.133H**

*Fig. 12.7-2: Terminating resistor:34.02.02.133H*



## Adapter Frame: 31.03.20.263H

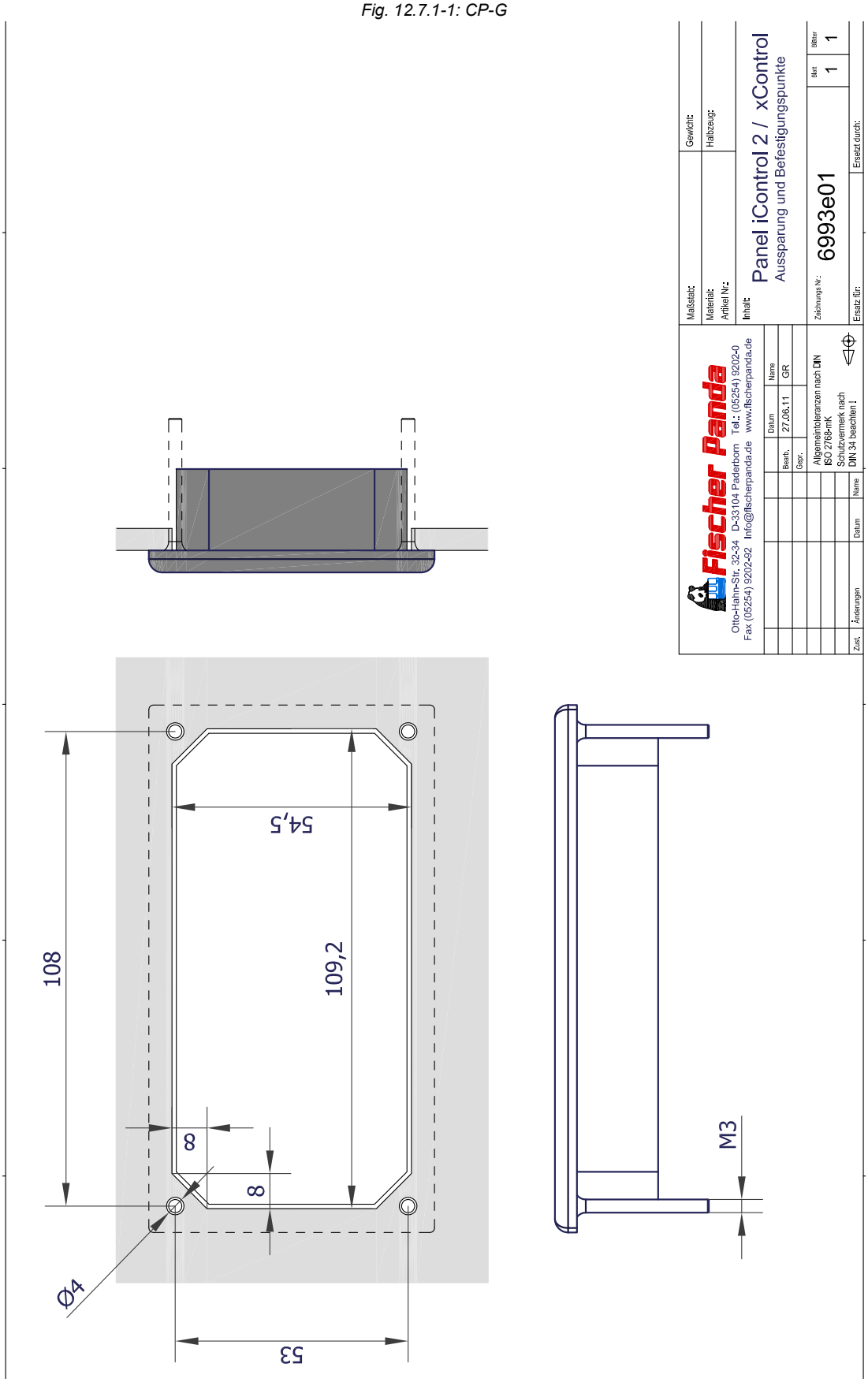
*Fig. 12.7-3: Adapter Frame: 31.03.20.263H*



## xContol CP-G in a Generator Control (P6+) section

## 12.7.1 Dimensional drawing

*Fig. 12.7.1-1: CP-G*





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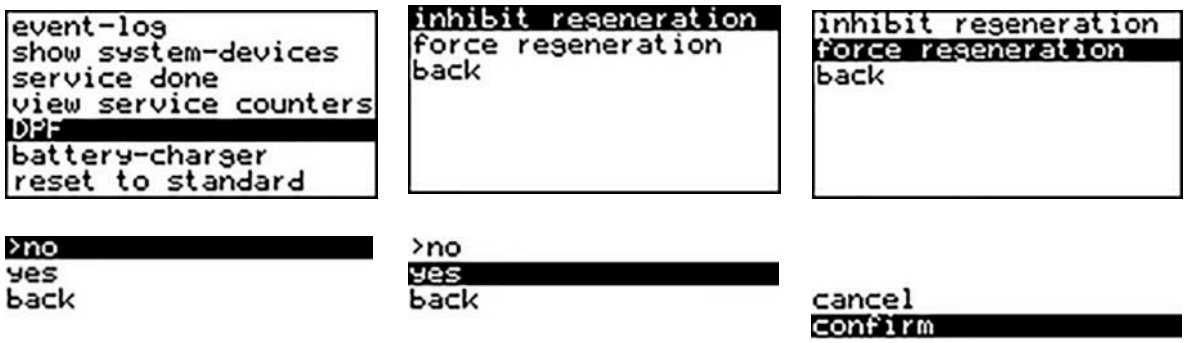
# 1. Parked regeneration of the P30x CR via fpControl

## 1.1 The DPF menu

Calling up: Main Panel Menu > DPF

Here there are options to »inhibit regeneration« and »force regeneration«.

*Fig. 1.1-1: Calling up Regeneration*



## 1.2 Panel displays for parked regeneration via fpControl

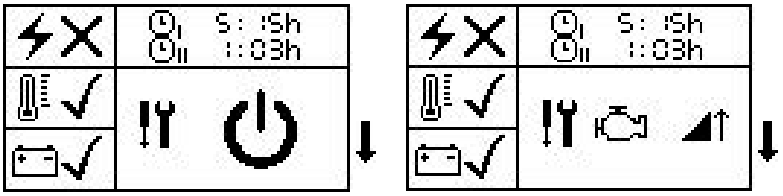
After activation of parked regeneration in the panel menu (force regeneration), the Start page of the fpControl Panel displays a screwdriver/wrench icon (Fig. On left).

The generator must be started by means of the fpControl panel in order to start parked regeneration. Starting parked regeneration requires no errors to be active and the coolant temperature to be > 50 °C.

The fpControl system sets the engine speed to the idle speed of 1 500 RPM.

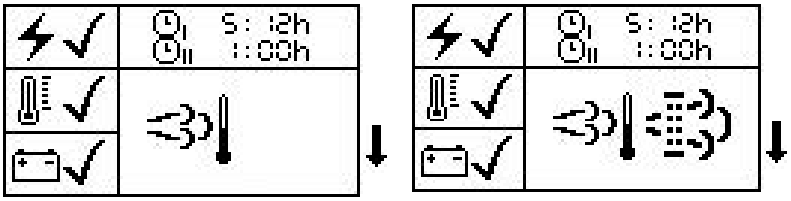
The engine -ECU increases the engine speed in the form of a ramp from idle speed 3 000 RPM (figure on right):

*Fig. 1.2-1: Regeneration panel display*



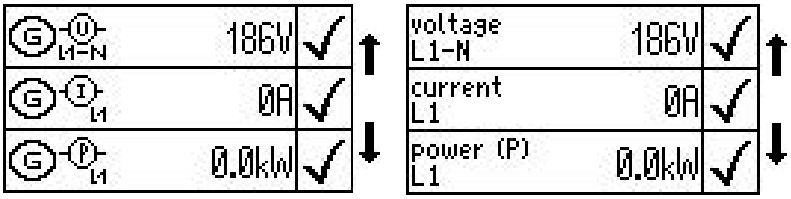

While parked regeneration is active, the Start page displays two icons, of which the right-hand side icon flashes.

*Fig. 1.2-2: Parked regeneration*



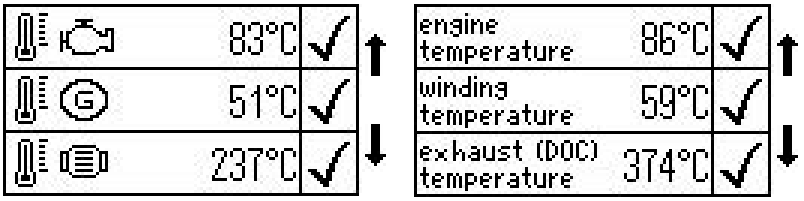

The load is switched off during parked regeneration (U < 230 V, I = 0 A, P = 0.0 kW). The example below shows the panel displays for L1 in Symbol mode (left) and in Text mode (right):

*Fig. 1.2-3: Parked regeneration - Load disconnection*




The increase in temperature at the DPF outlet (Exhaust DOC) during parked regeneration can be tracked on the fp Control panel (panel display in Symbol mode (left), in Text mode (right):

*Fig. 1.2-4: Parked regeneration - Temperature increase*




**WARNING**

The temperature at the DPF outlet (exhaust DOC) can be > 600 °C.

## 1.3 The Warnings

See the Fischer Panda Knowledgebase for descriptions.

*Fig. 1.3-1: Warnings*

| Event Code | Event |
|---|---|
| 125 | Total AC Power high |
| 142 | Red Stop Lamp (RSL) – SPN/FMI Diagnostic Trouble Codes |
| 143 | Amber Warning Lamp (AWL) – SPN/FMI Diagnostic Trouble Codes |
| 144 | Malfunction Indicator Lamp (MIL) – SPN/FMI Diagnostic Trouble Codes |
| 145 | Protect Lamp (PL) – SPN/FMI Diagnostic Trouble Codes |
| 183 | Diesel Particulate Filter Regeneration Inhibited |
| 184 | Diesel Particulate Filter Regeneration Active |
| 185 | Diesel Particulate Filter Regeneration Requested |
| 187 | Diesel Particulate Filter Regeneration done |
| 188 | Removal of DPF system (PCD 1) |
| 189 | Loss of function of DPF system (PCD 2) |
| 190 | Failure of the PCD system (PCD 3) |
| 191 | CAN Bus-line open from EGR (NCD 1) |
| 192 | MAF sensor signal too low (NCD 2) |

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