Fischer Panda

Panda 4000i PMS

Super silent technology

230V 50Hz 4kW

Fischer Panda GmbH

7.4.09

Panda_4000i_PMS_Book_eng.R04

Revision

	Document
Akcuell:	Panda_4000i_PMS_Book_eng.R04_7.4.09
Replace	Panda_4000i_PMS_Book_eng.R03

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A. Panda 4000i

A.1 Components

1. Panda 4000i Generator

Permanent-Magnet-Generator

Art Nr. C10040BX1SV01

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Fig. A.1-1: Panda 4000i generator

2. Panel Panda iControl with electronic board at the generator

Art Nr. 21.02.02.011H (Panel)

Art Nr. 21.02.01.005H (electronic board)

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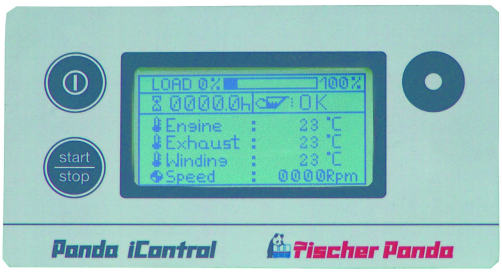

Fig. A.1-2: iControl

3. Panda PMGi 4000 Inverter AC/AC 3,5 kW 230 V / 50 Hz

Art Nr. 21.07.03.003H

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Fig. A.1-3: PMGi 4000

A.2 Range of operation

Reliable power supply on sailing boats

A.2.1 Main features of the Panda 4000i

- Extremely high starting capacity, perfect for a Bauer junior 2.2kW compressor!
- 230 V / 50 Hz system for all your domestic appliances!
- Compact and light, takes up less space!
- Super silent sound insulation capsule!
- Graphical Display, easy to operate!
- Option for reduce speed at lower loads, saves fuel!
- Pure sinus wave, higher frequency and voltage stability!
- Optimized engine rpm (2800 rpm) for a long generator life!

Panda 4000i

Part 1: Generator Manual

Panda 4000i PMS

230V/50Hz 4kW

Fischer Panda GmbH

Current revision status

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Icemaster GmbH	**Fischer Marine Generators**	**Conclusion Fischer - Icemaster GmbH**	**100 % water cooled Panda generators**	**Panda Vehicle Generators**

Fischer Panda

FISCHER GENERATORS have been manufactured since 1978 and are a well-known brand for first class diesel generators with especially effective sound-insulation. Fischer has been one of the leading manufacturers in respect of quality and know-how during this period.

FISCHER, as the worldwide manufacturer of modern marine diesel generators, developed the Sailor-Silent series for example and produced a GPR sound-insulated capsule as early as 1979 and the basis for new generator technology.

The companies Fischer and Icemaster amalgamated under the direction of Icemaster in 1988, in order to concentrate on the development of new products. Production was moved to Paderborn.

The amalgamation of the two qualified companies led to the development of a complete new programme within a short space of time. The generator sets developed at that time set new technological standards worldwide.

The generators became more efficient and powerful than other generators in the same nominal performance range, because of the improved cooling. Panda generator demonstrated its superiority in several tests by renowned institutes and magazines during the past years. The patented VCS (voltage Control System) means it can meet all demands including motor speed. The start-booster (ASB) means Panda generators meet the highest demands in respect of voltage stability and starting values A Panda generator, with the same drive motor, produces 15 % more effective output than the majority of conventional generators. This superiority in efficiency also ensures a fuel saving to the same extent.

The 100 % water-cooled Panda generators are currently manufactured in the performance range from 2 to 100 kW in various versions. Fast running motors are preferred for performances up to approx. 30 kW (nominal speed 3.000 rpm). The heavier slow runners are preferred for the higher range. The fast running generators have proved themselves many times for many uses, that they meet the demands in quality of yachts and vehicles, and offer space and weight saving of 50 % compared to slow running generators.

In addition to the Panda series, Fischer Panda also supply the super compact high-tech sound-insulated battery charging generators from the DC/AC Panda AGT series, which is a very interesting solution for the production of mobile power.

The new HTG-alternators ensure that a charging rate of 285 amps is achieved that was scarcely thought possible for this compact construction. This alternator replaces a separate shipboard generators (constant 230 volts AC with up to 3500 kW from the main machine)

Safety first

These symbols are used throughout this manual and on labels on the maschine itself to warn of the possibility of personal injutry. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use unit.	
	This danger symbol refers to toxic danger and draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in severe personal injury or loss of life.
	This danger symbol refers to electric danger and draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in electrical shock which will result in severe personal injury or loss of life.
	This danger symbol refers to electric danger and draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in electrical shock which will result in severe personal injury or loss of life.
	This warning symbol draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in damage or destruction of equipment, severe personal injury or loss of life.
	This warning symbol draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in damage or destruction of equipment

Tools

This symbols are used throughout this manual to show which tool must be used at maintenance or installation.	
	Spanners X = number of spanner
	Hook wrench for oil filter
	Screw driver, for slotted head screws and for recessed head screws
	Multimeter, multimeter with capacitor measuring
	Infrared temperature mesuring pistol
	Current clamp (DC for synchron generators; AC for asynchron generators)

	Socket wrench set
	Hexagon wrench keys

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.

Attention, Important Directions regarding Operation!

1. The installation certificate must be completed when taken into use, and certified by a signature.
2. The installation certificate must be despatched within two weeks of use to Fischer Panda.
3. The official guaranty confirmation will be completed by Fischer Panda after receipt and sent to the customer.
4. A guaranty must be shown to make any claims.

Claims against the guaranty will not be accepted of the above said instructions are not, or only partially, carried out.

Manufacturer declaration in terms of the machine guideline 98/37/EG .

The generator is in such a way developed that all assembly groups correspond to the CE guidelines. If machine guideline 98/37/EG is applicable, then it is forbidden to bring the generator into operation until it has been determined that the system into which the generator is to be installed in also corresponds to the regulations of the machine guideline 98/37/EG. This concerns among other things the exhaust system, cooling system and the electrical installation.

The evaluation of the "protection against contact" can only be accomplished in connection with the respective system. Likewise among other things responsibility for correct electrical connections, a safe ground wire connection, foreign body and humidity protection, protection against humidity due to excessive condensation as well as the overheating through appropriate and inappropriate use in its installed state on the respective machine lies within the responsibility of those who undertake installation of the generator in the system.

Use the advantages of the customer registration:

- Thus you receive extended product information, which are sometimes safety-relevant
- You receive free upgrades, if necessary

Further advantages:

With your full information, the Fischer Panda technicians can give you fast assistance, since 90 % of the disturbances result from errors in the periphery.

Problems according to errors in the installation can be recognized in advance.

Technical Support by Internet: info@fischerpanda.de

Safety Precautions

The electrical Installations may only be carried out by trained and examined personnel!

The generator may not be taken into use with the cover removed.

The rotating parts (belt-pulley, belts, etc) must be covered and protected so that there is no danger to life and body! If a sound insulation cover must be produced at the place of installation, then well-placed signs must show that the generator can only be switched on with a closed capsule.
All servicing-, maintenance or repair work may only be carried out, when the motor is not running.

Electrical power: DANGER TO LIFE!

Electrical voltages above 48 volts (battery chargers greater than 36 volts) are always dangerous to life). The rules of the respective regional authority must be adhered to. Only an electrician may carry out installation of the electrical connections for safety reasons.

ATTENTION!

Do not connect the minus pole of the starter battery to the ground of the boat because of galvanic reason.

CAUTION!

Contact of the electrical contacts may be DANGER TO LIFE!

The PMGi cable must be secured at the generator and at the PMGi with appropriate safety devices.

The generator is also included into the CO_2 - fire-extinguishing system.

Fire protection measures

All construction units in the environment of energized parts, which carry more than 50 Amp., must be fire protection-moderately secured.

All junction points at the energized parts must be examined on heating up regularly (infrared thermometers).

Safety Instrictions for handling batteries

These instructions must be noticed additionally to the instructions of the battery manufacturer:

- If the batteries are working, someone should be in your near area to help you in a case of emergency.
- Water and soap must be hold ready if battery acid corrode your skin.
- Wear eye protection and protective clothing. During working with the batteries don´t touch the eyes.
- If you got an acid splash on your skin or clothing, wash it out with much water and soap.
- If you got acid in your eyes, rinse them immediately with clear water until no cauterization is noticeable. Visit a doctor immediately.
- Don´t smoke in the area of the batteries. Avoid open fires. In the area of batteries there is a danger of explosions.
- Pay attention that no tools will fall on the battery poles, if necessary cover them up.
- During the installation, don´t wear a wrist watch or arm jewels, under these circumstances you can create a battery short-circuit. Skin burnings could be the result.
- Protect every battery contact against unintentional touch.
- Use only cyclical profoundly dischargeable batteries. Starter batteries are not appropriate. Lead-gel batteries are commended. They are maintenance-free, profoundly dischargeable and produce no gas.
- Do not charge a frozen battery.
- Avoid a battery short-curcuit.
- Take care that the battery is good ventilated in order to drain off developing gas.
- The battery connection terminals must be checked for tightness before operating.
- The battery connection cable must be mounted carefully. Check for incorrect heating at operation with load. The vibrating devices must be checked regulary for scour points and flaw in the isolation.

Blank



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

WHEN AN ADULT STOPS BREATHING

WARNING

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

1 Does the Person Respond?

Tap or gently shake victim.

Shout, "Are you OK?"

2 Shout, "Help!"

Call people who can phone for help.

3 Roll Person onto Back.

Roll victim toward you by pulling slowly.

4 Open Airway.

Tilt head back, and lift chin.

Shout, "Are you OK?"

5 Check for Breathing.

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

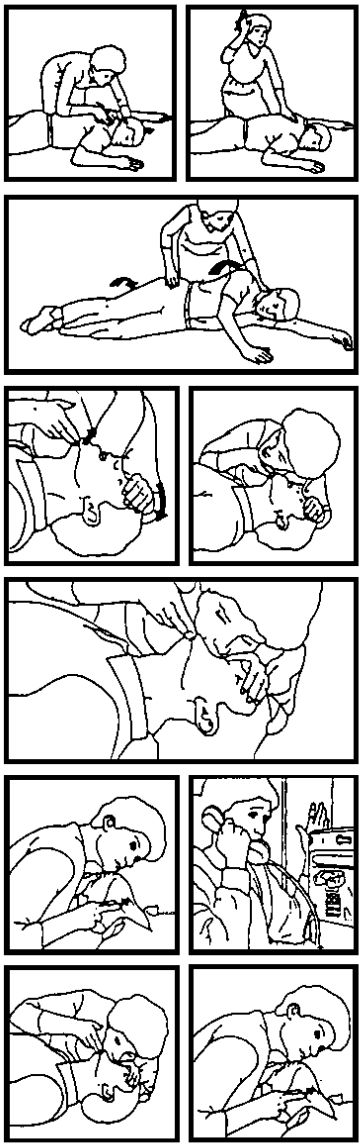
6 Give 2 Full Breaths.

Keep head tilted back.

Pinch nose shut.

Seal your lips tight around victim's mouth.

Give 2 full breaths for 1 to 1½ seconds each.



7 Check for Pulse at side of Neck.

Feel for pulse for 5 to 10 seconds.

8 Phone EMS for Help.

Send someone to call an ambulance.

9 Begin Rescue Breathing.

Keep head tilted back.

Lift chin.

Pinch nose shut.

Give 1 full breath every 5 seconds.

Look, listen, and feel for breathing between breaths.

10 Recheck Pulse Every Minute.

Keep head tilted back.

Feel for pulse for 5 to 10 seconds.

If victim has pulse, not breathing, continue rescue breathing. If no pulse, begin CPR.

B. 7 Panda 4000i PMS generator

B.1 Type plate at the generator

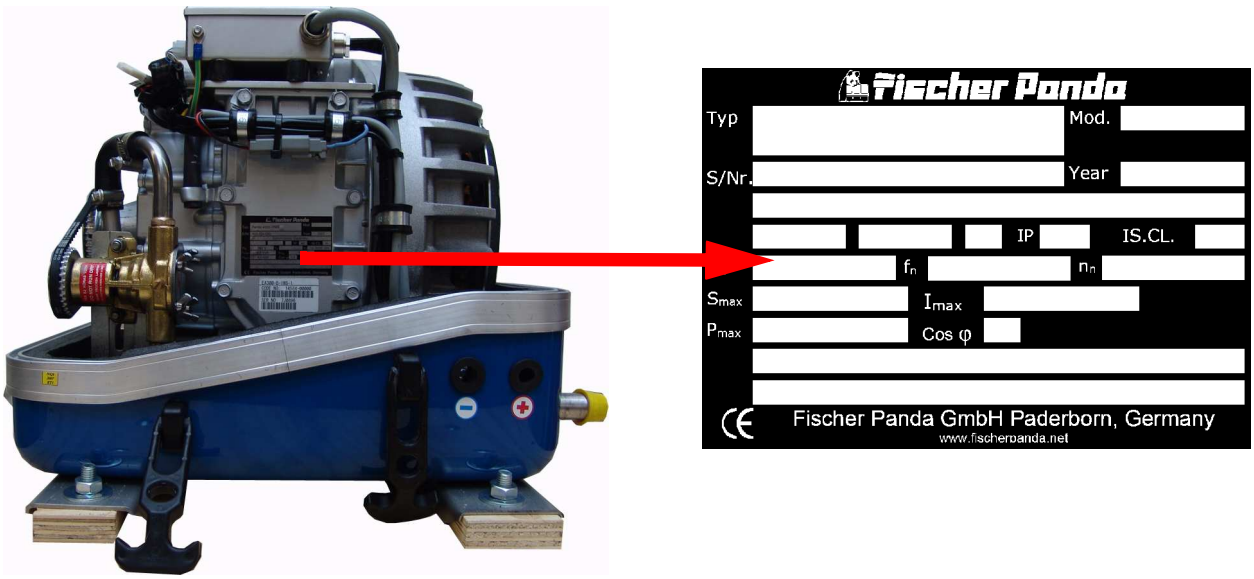


Fig. B.1-1: Type plate

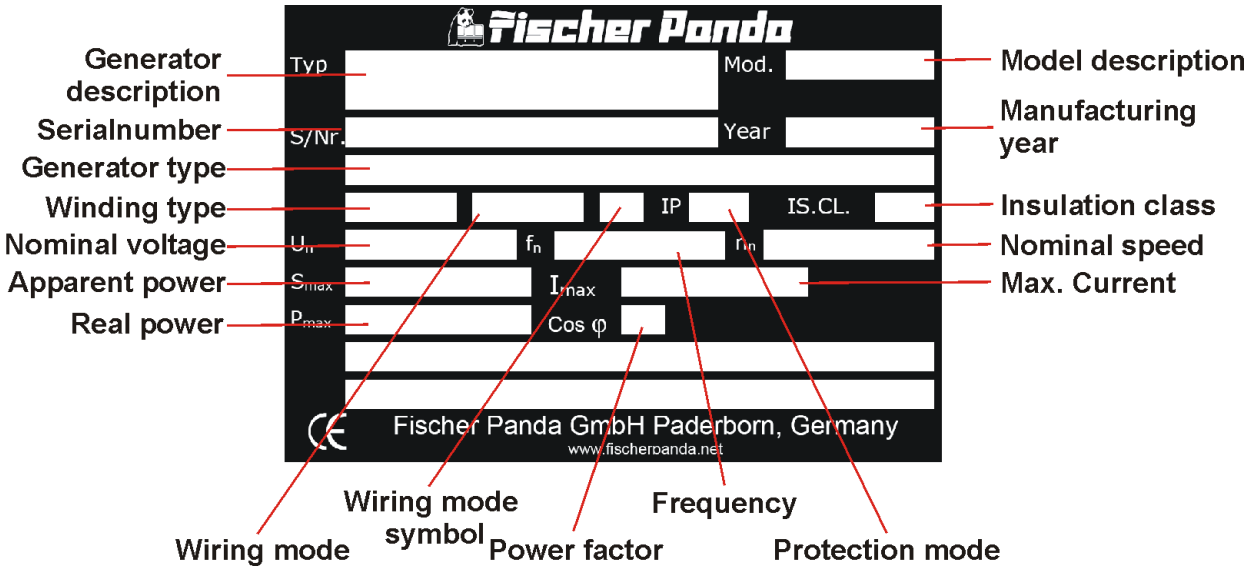
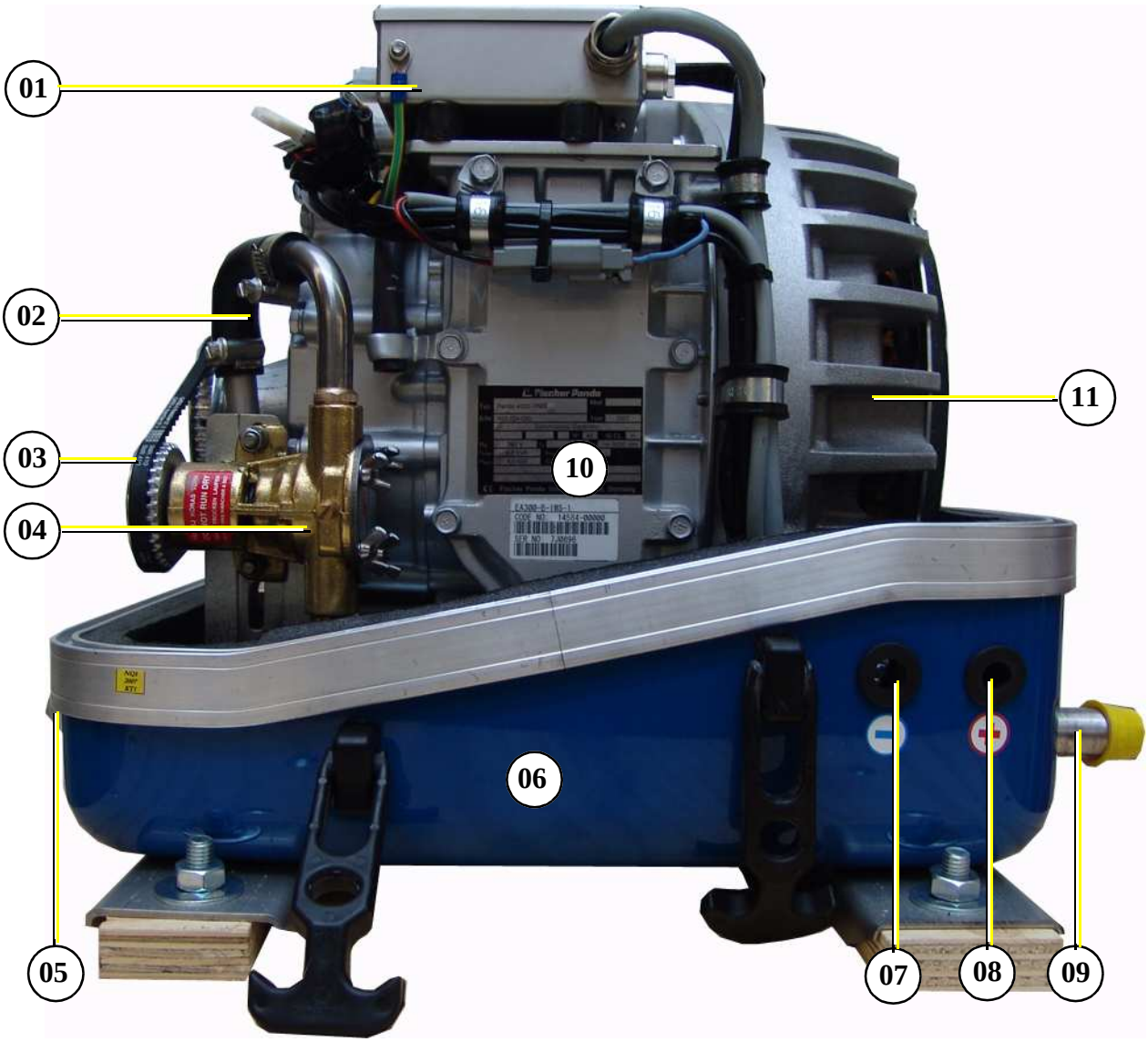


Fig. B.1-2: Discription type plate

B.2 Description of the Generator

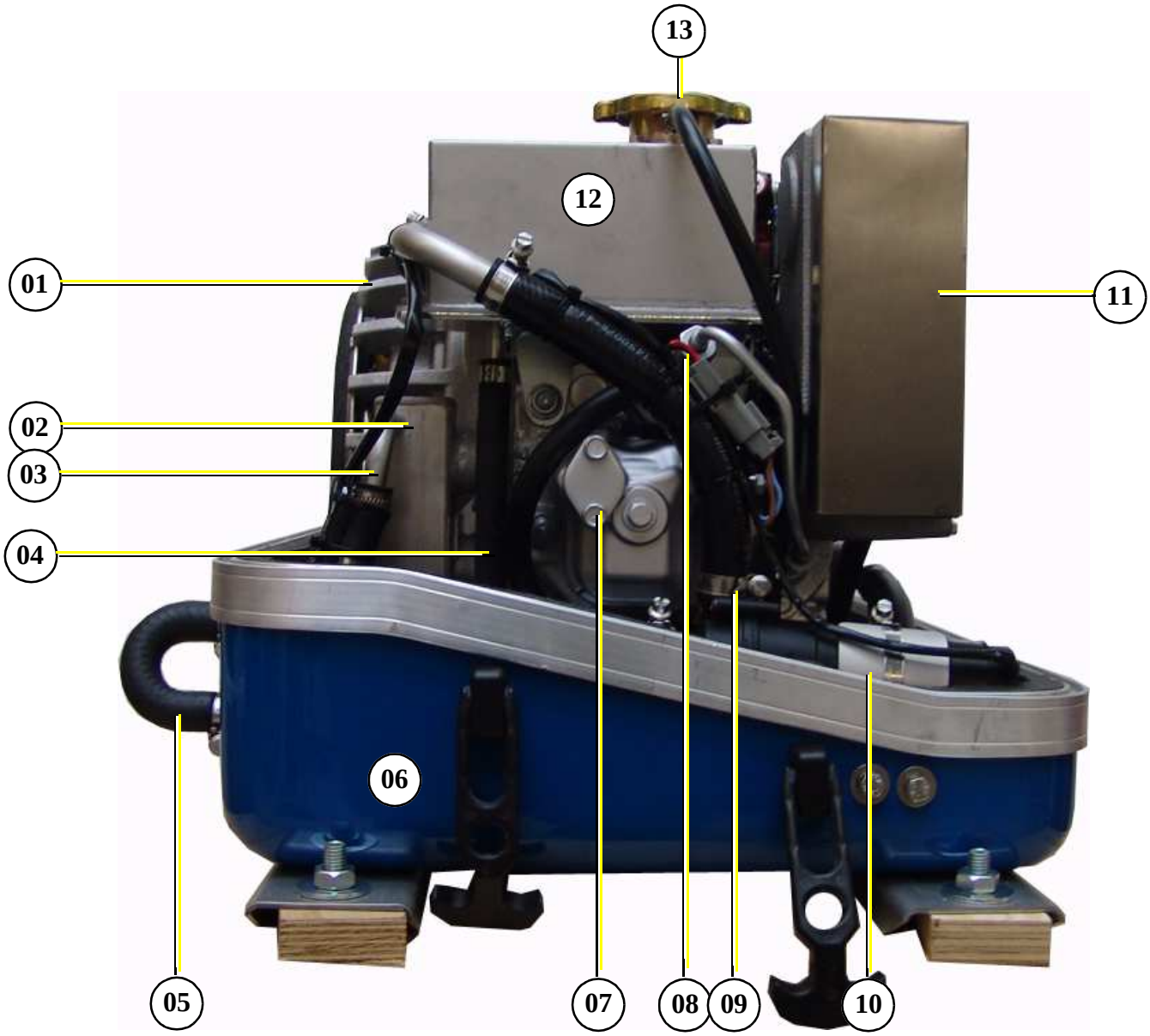
B.2.1 Right Side View



01) Housing with iControl electronic board (DO NOT OPEN)
02) Coolant pipe, raw water pump - heat exchanger
03) Toothed belt
04) Raw water pump
05) Oil drain hose
06) Sound cover base part
07) Passage for battery cable (+)
08) Passage for batterie cable (-)
09) Raw water inlet
10) Engine Kubota EA300
11) Generator housing with coil

Fig. B.2.1-1: Right side view

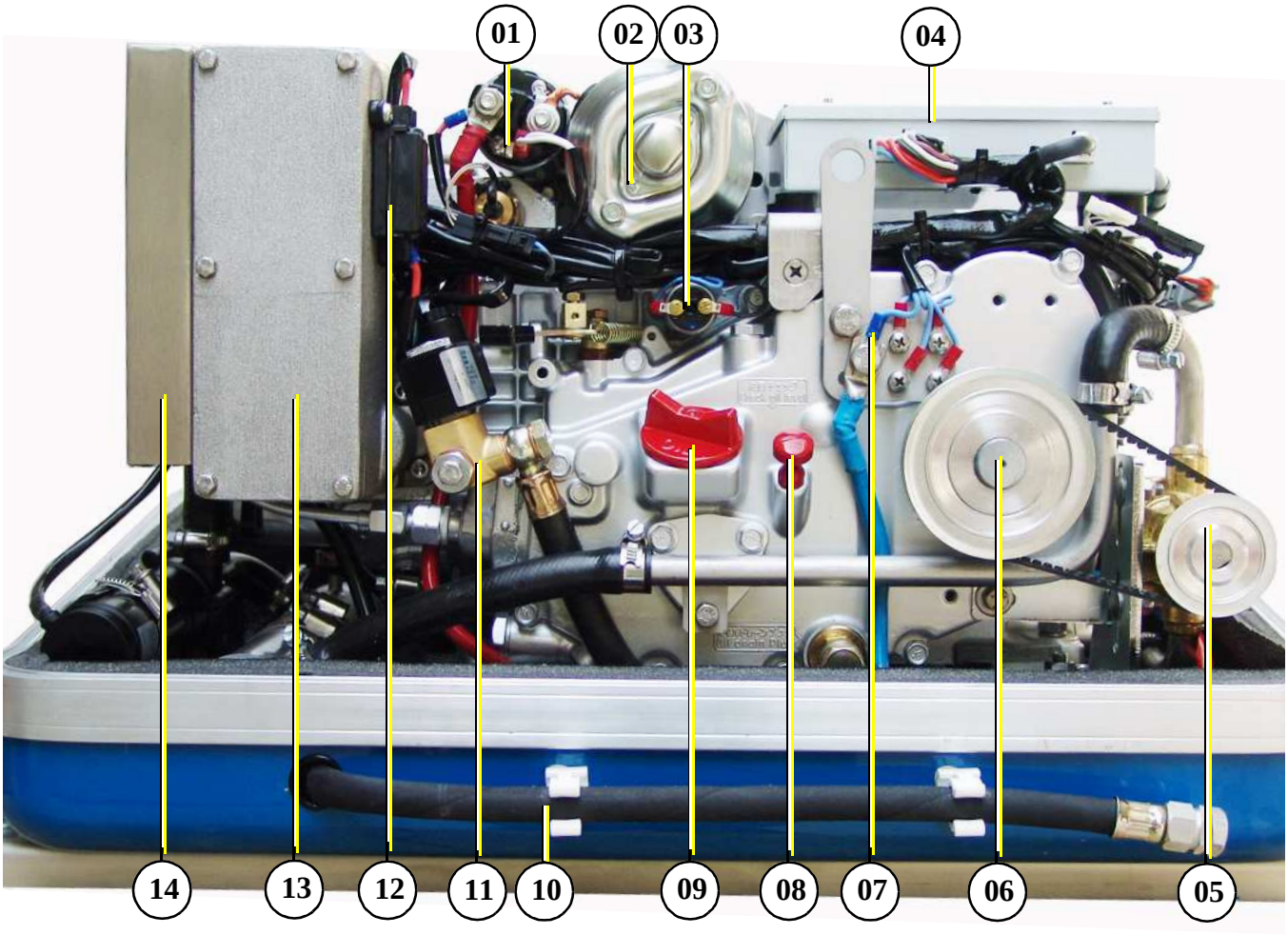
B.2.2 Left Side View



01) Generator housing with coil
02) Water-cooled exhaust elbow
03) Raw water injection pipe
04) Coolant pipe, water tank - heat exchanger
05) Connection external ventilation valve
06) Sound cover base part
07) Engine Kubota EA300
08) Injection nozzle
09) Coolant pipe, water pump - engine
10) Coolant water pump
11) Suction port at air suction housing
12) Cooling water tank
13) Cooling water filler neck

Fig. B.2.2-1: Left side view

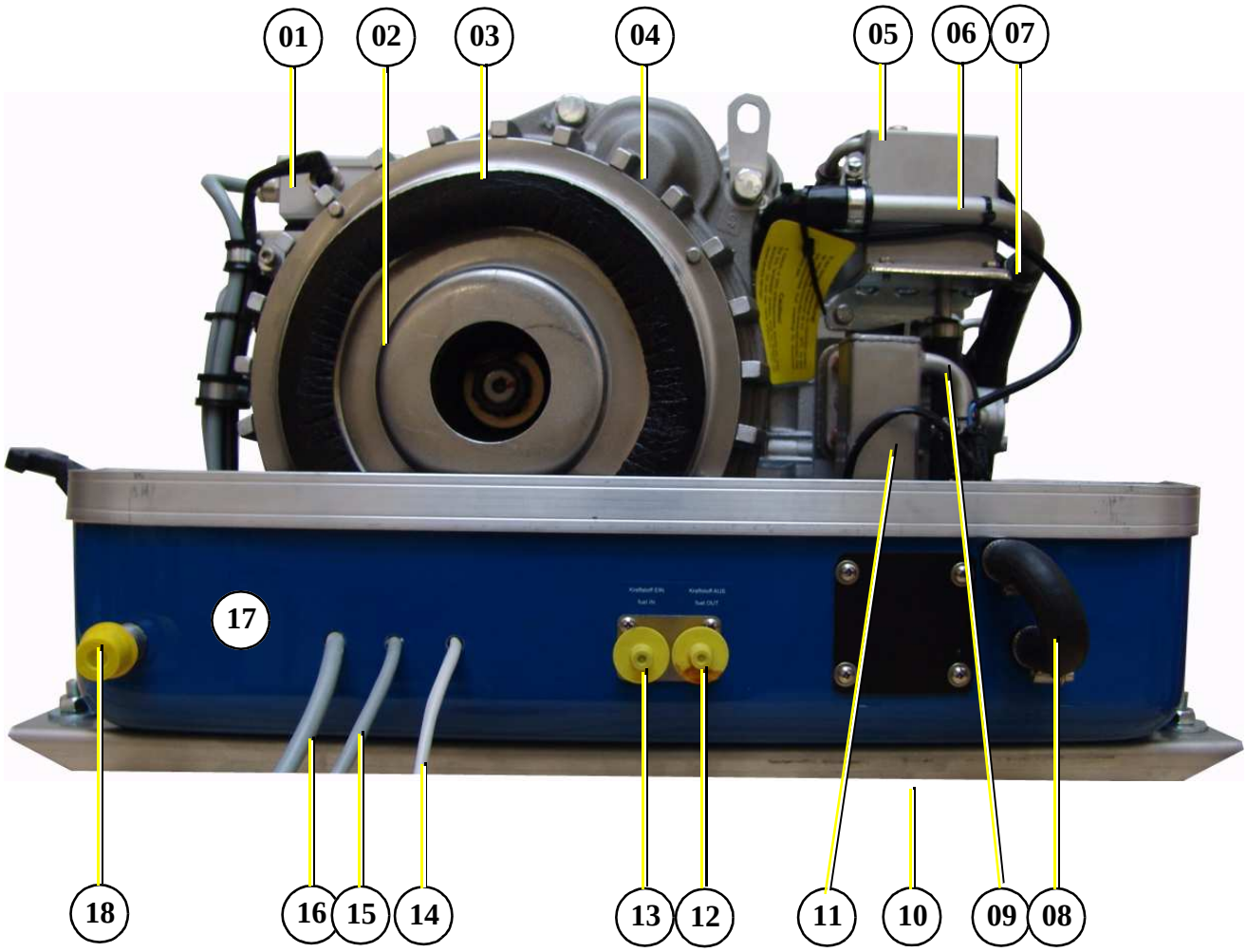
B.2.3 Front View



01) Solenoid switch for starter motor
02) Starter motor
03) Oil pressure switch
04) Housing with iControl electronic board „DO NOT OPEN“
05) Raw water pump
06) Pulley
07) Ground connection terminal
08) Oil dipstick
09) Engine oil filler neck
10) Oil drain hose
11) Fuel solenoid valve
12) Fuse 30A
13) Air suction housing with air filter inlet
14) Suction port

Fig. B.2.3-1: Front side view

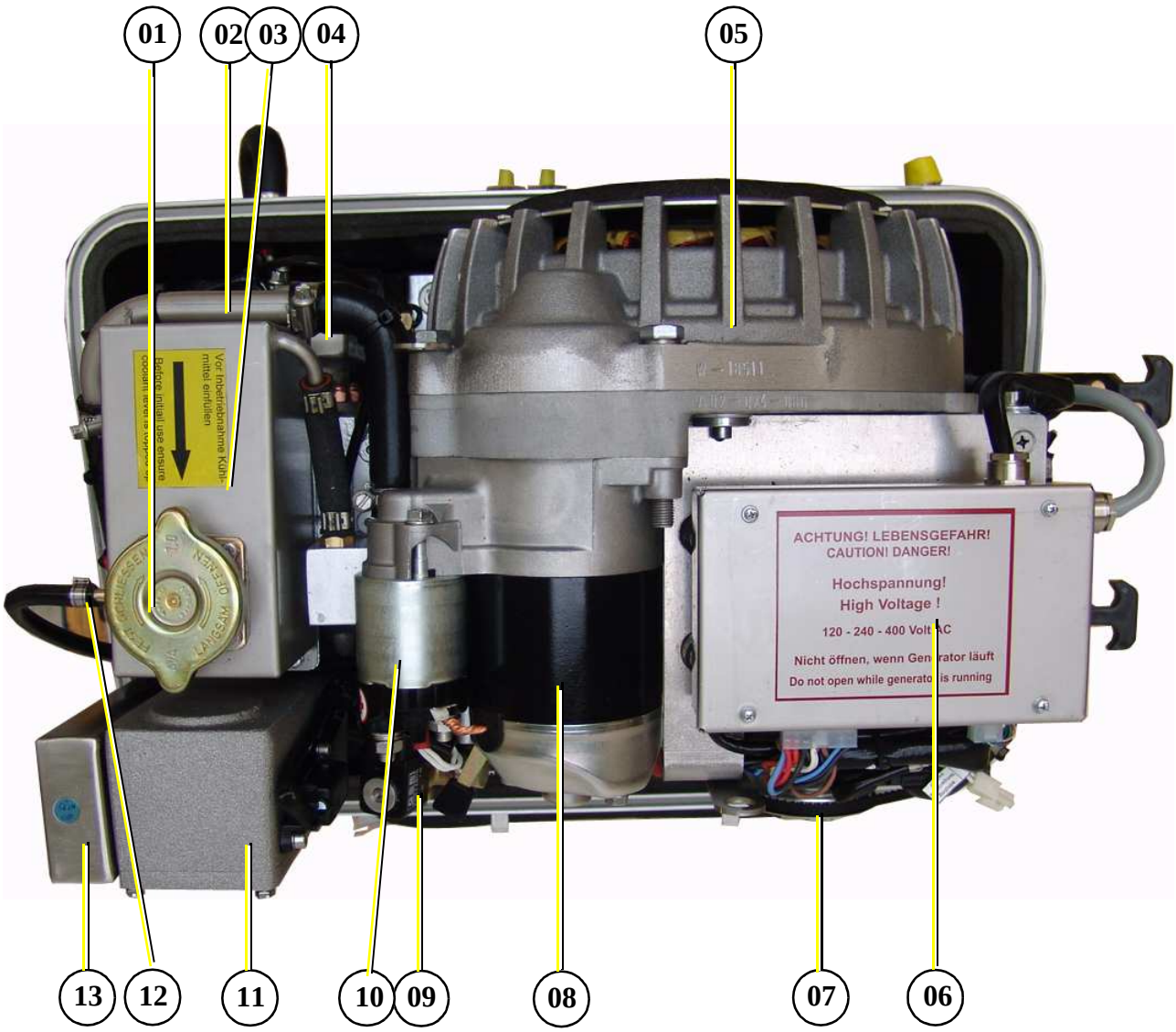
B.2.4 Back View



01) Housing with iControl electronic board „DO NOT OPEN“
02) Generator front cover
03) Generator housing with coil
04) Starter motor
05) Cooling water filler neck
06) Cooling water tank
07) Coolant pipe, water pump - engine
08) Connection external ventilation valve
09) Raw water injection nozzle
10) Exhaust outlet (through capsul bottem)
11) Exhaust elbow
12) Connection for fuel OUT
13) Connection for fuel IN
14) Cable for fuel pump
15) Cable for iControl
16) Cable for PMGi
17) Sound cover base part
18) Raw water inlet

Fig. B.2.4-1: Back side view

B.2.5 View from Above



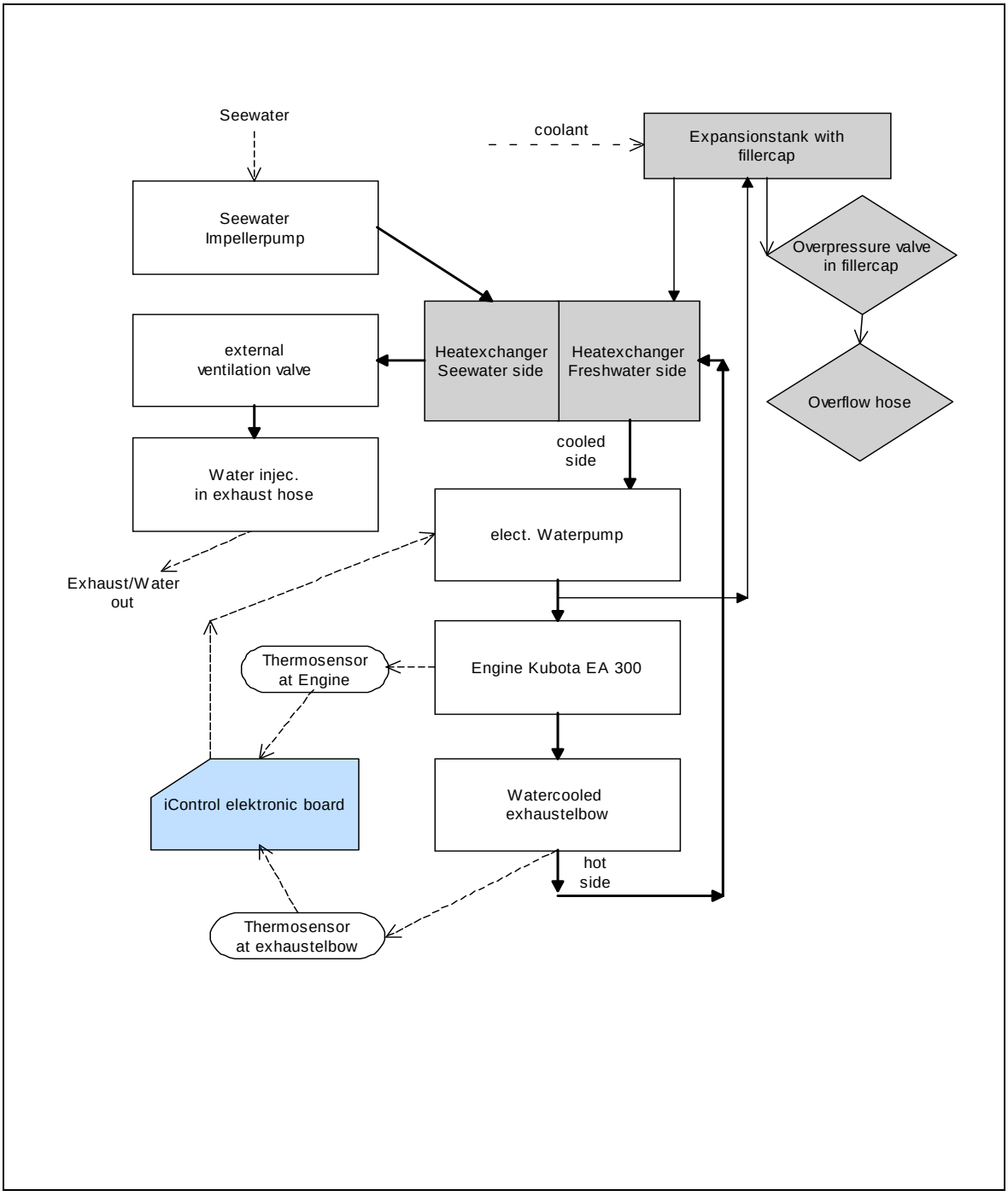
01) Cooling water filler neck
02) Connection external ventilation valve
03) Cooling water tank
04) Exhaust out (through capsul bottem)
05) Generator housing with coil
06) iControl electronic board under cover „DO NOT OPEN“
07) Pulley
08) Starter motor
09) Fuel solenoid valve
10) Solenoid switch for starter motor
11) Air suction housing with air filter inlet
12) Coolant overflow hose
13) Suction port

Fig. B.2.5-1: Top side view

B.3 Details of function units

B.3.1 Remote control panel - see iControl manual

B.3.2 Components of the Cooling System (Raw Water)



Raw water inlet

The diagram shows the supply pipes for the generator. The connection neck for the raw water connection is shown on the left hand side. The cross-section of the intake pipe should be nominally larger than the generator connection.

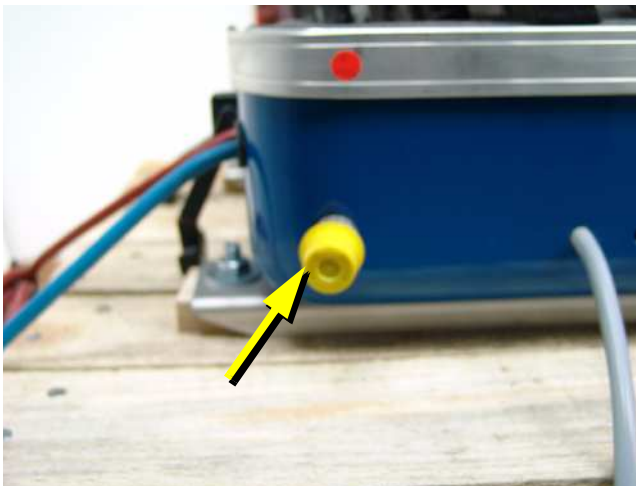


Fig. B.3.2-1: Raw water inlet

Raw water impeller pump

The raw water pump is fitted with a rubber impeller. This pump is self-inductive. If, for example, you forget to open the sea valve, then you must expect the impeller to be destroyed after a short period of time. It is recommended to store several impellers on board as spare parts.

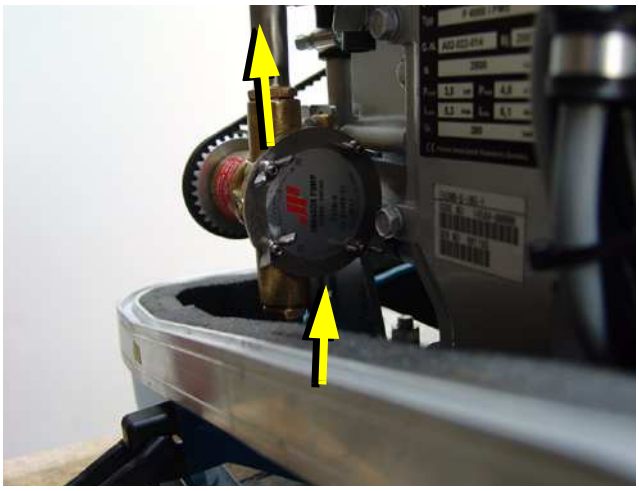


Fig. B.3.2-2: Raw water pump

Heat exchanger

Separates the raw water system from the fresh water system, so that the generator components do not have contact with the seawater circulation system. The seawater is fed direct to the exhaust connection piece at the heat exchanger outlet.

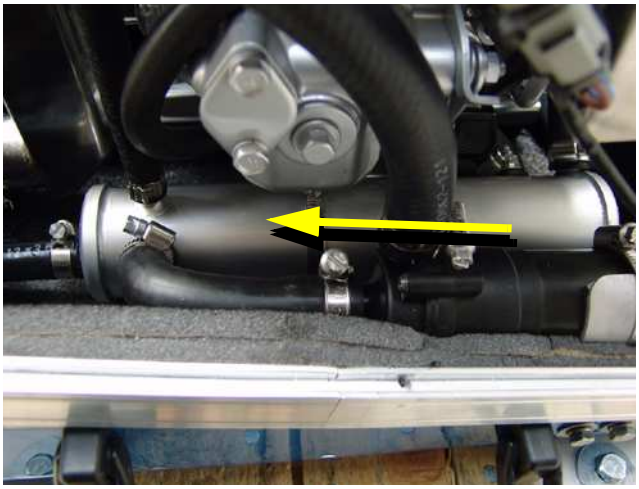


Fig. B.3.2-3: Heat exchanger

Ventilation valve

A siphon must be installed if the generator sinks below the water line because of the rocking of the boat, even if it is only for a short period of time. A hose pipe on the generator casing has been produced for this. Both connecting pieces are bridged by a formed piece of hose.

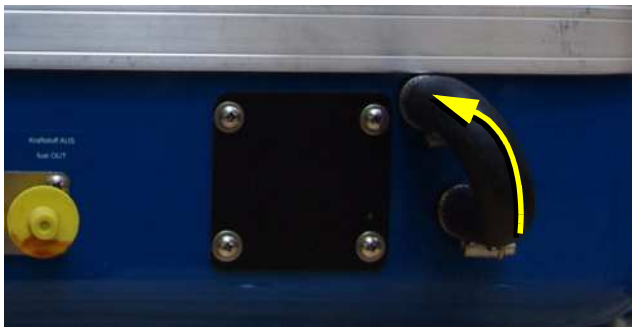


Fig. B.3.2-4: Ventilation valve

Cooling water injector nozzle

The injection point for the marine generator water-cooled exhaust system is situated at the exhaust connection pieces The exhaust connections must be regularly checked for signs of corrosion.

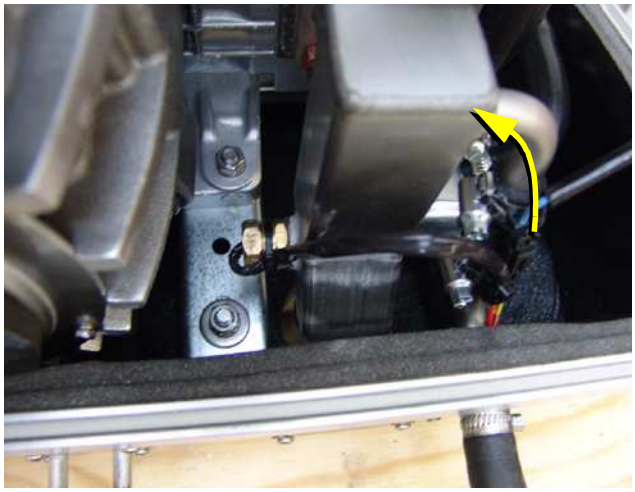
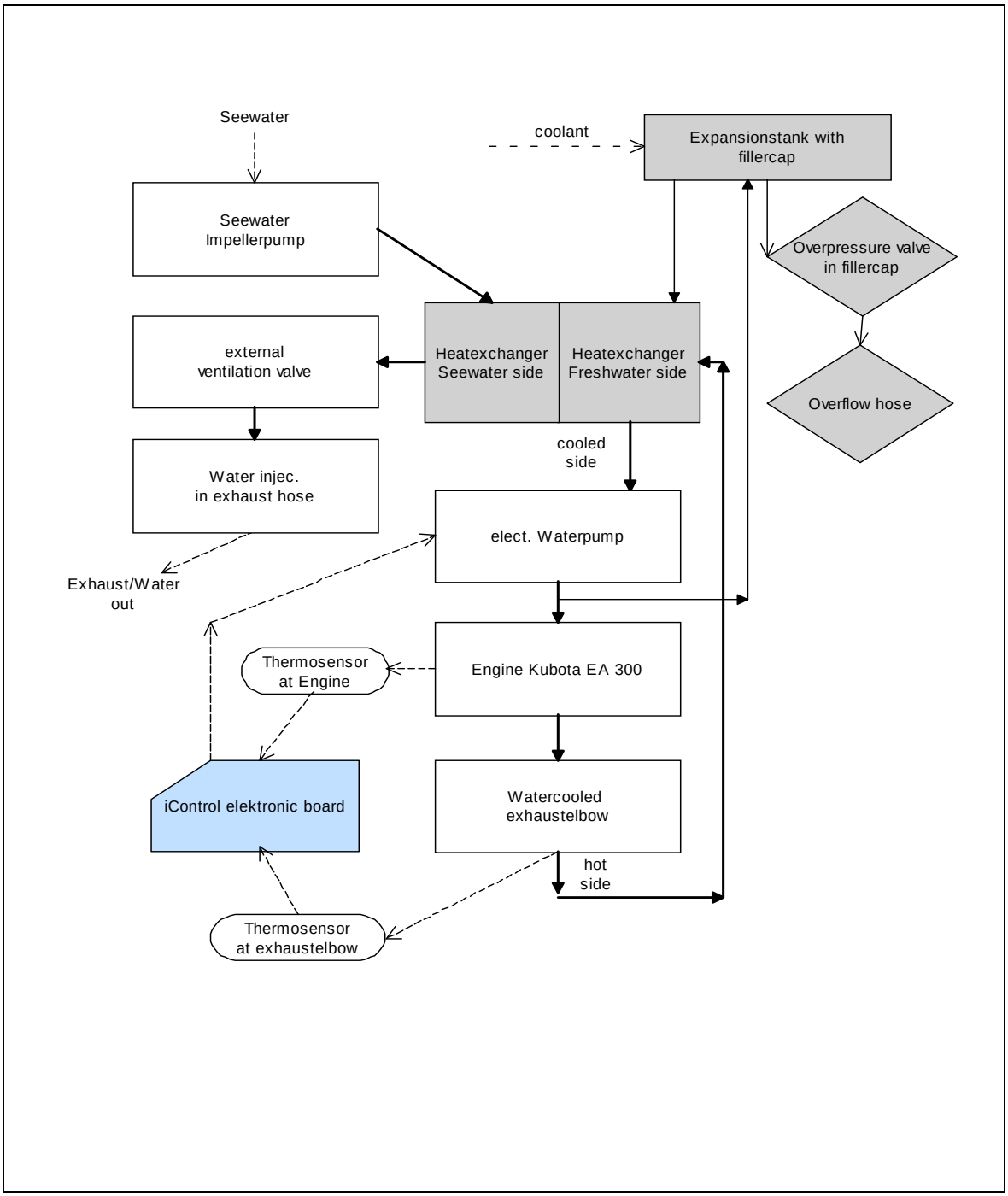


Fig. B.3.2-5: Cooling water injector nozzle

B.3.3 Components of the Cooling System (Fresh Water)



Cooling water filler neck

The cooling water filler neck is situated at the cooling water tank and only used, when the generator is initially started. Since the generator is normally already filled with cooling water, these components are only by the user, if repairs are to be carried out.

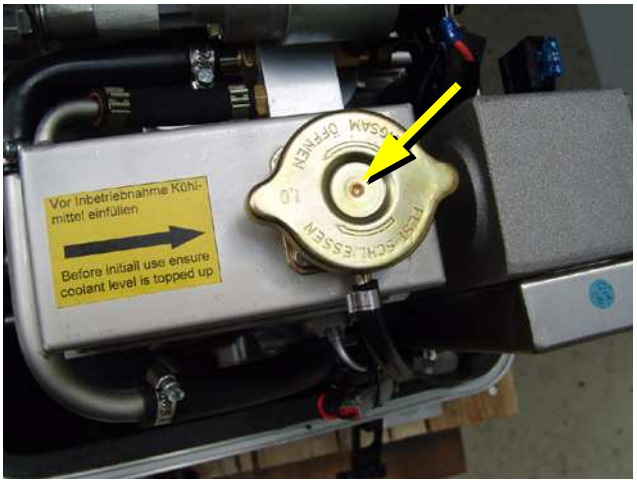


Fig. B.3.3-1: Cooling water filler neck

Freshwater backflow

The cooling water is fed to the heat exchanger from the cooling water tank by means of the pipe shown in the figure.

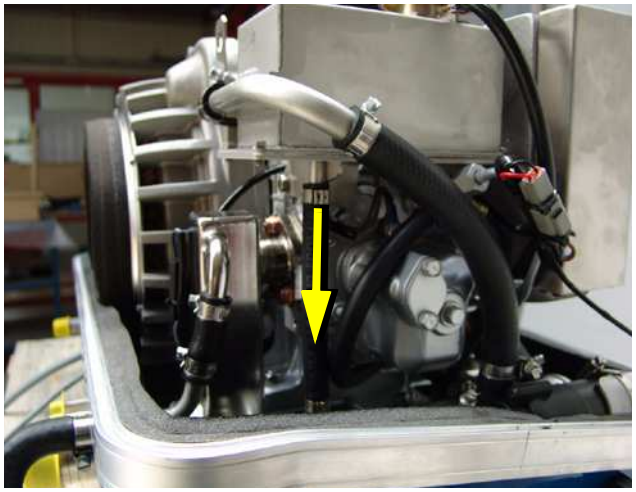


Fig. B.3.3-2: Freshwater backflow

Heat exchanger

Separates the raw water system from the fresh water system.

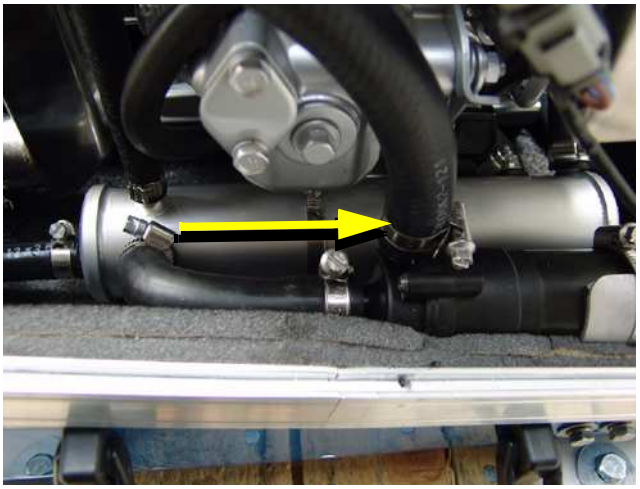


Fig. B.3.3-3: Heat exchanger

Internal cooling water pump

The electric cooling water pump (see arrow) aids the circulation of the internal freshwater system.

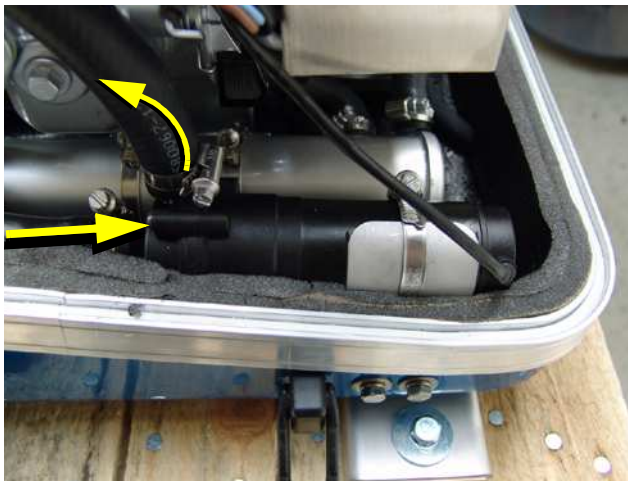


Fig. B.3.3-4: Internal cooling water pump

Coolant pipe, cooling water pump - engine

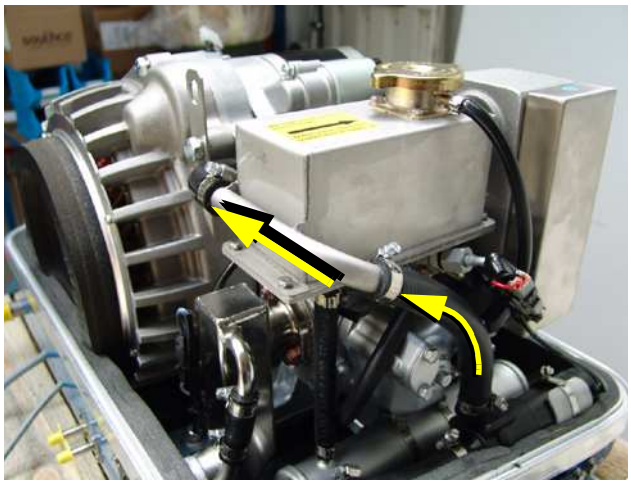


Fig. B.3.3-5: Coolant pipe

Coolant connection at the engine (in)

Water intake to the engine

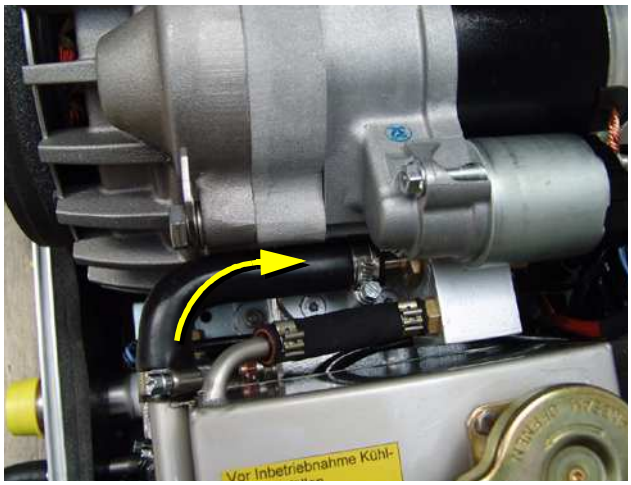


Fig. B.3.3-6: Cooant connection block at the engine

Coolant connection at the engine (out)

Water outtake of the engine to the heat exchanger

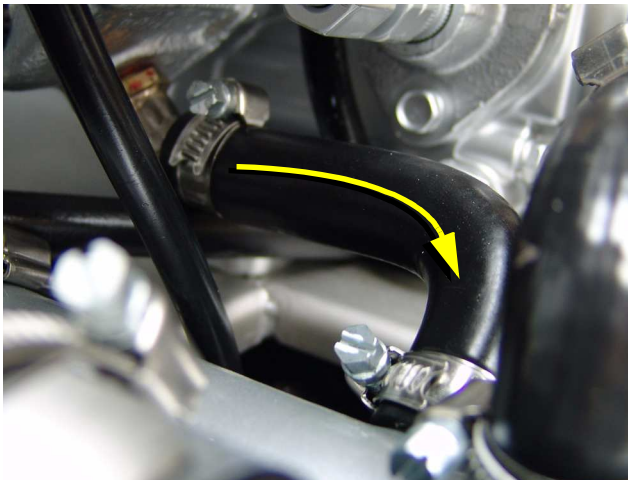


Fig. B.3.3-7: Cooantn connection block engine

Ventilation pipe

The ventilation pipe to the water tank.

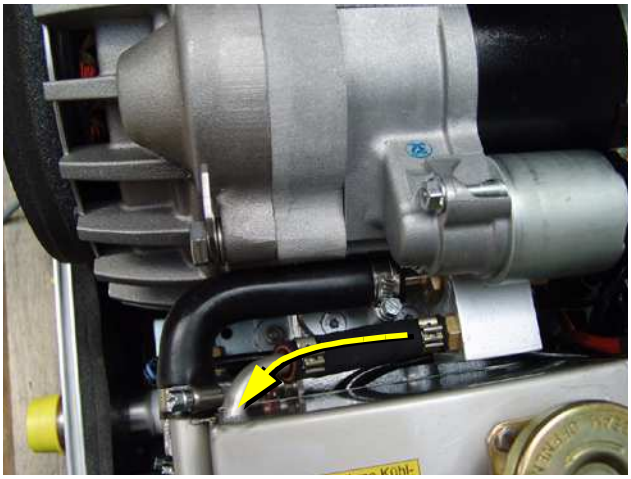


Fig. B.3.3-8: Ventilation pipe

Overflow hose

The overflow hose goes out through the sound cover base

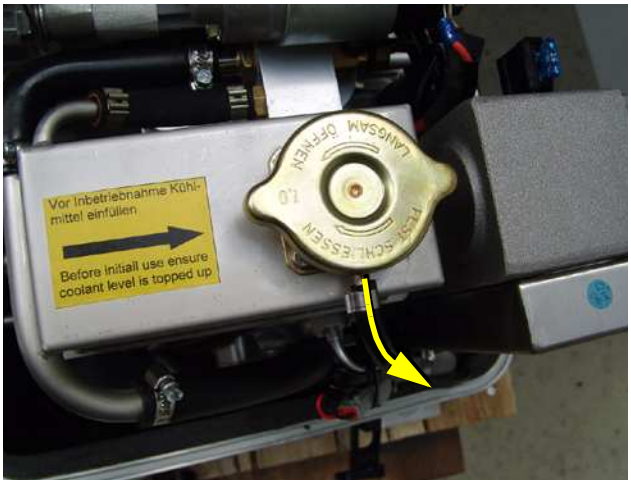
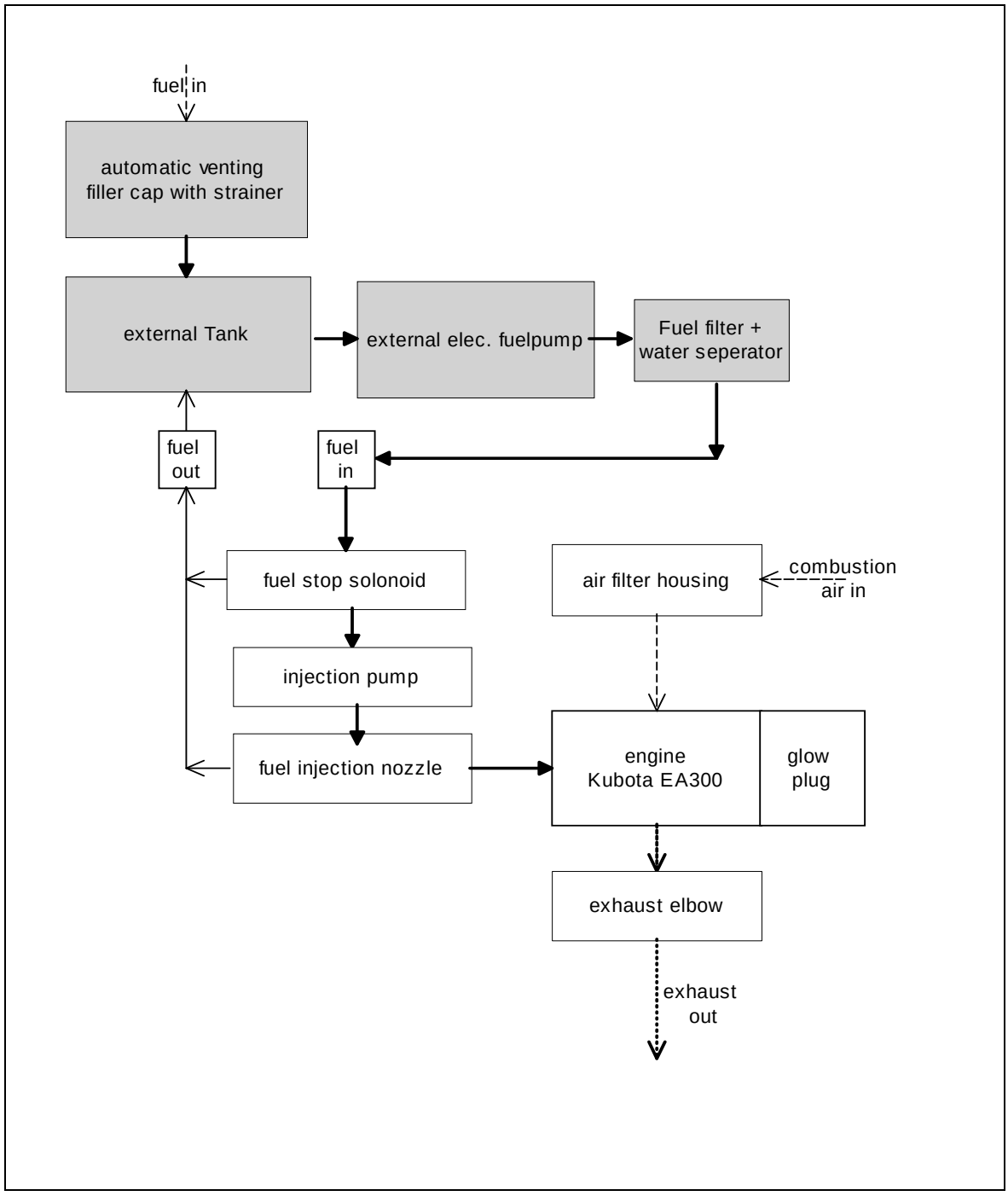


Fig. B.3.3-9: Ventilation pipe

B.3.4 Components of the Fuel System



External fuel pump

The Panda generator is supplied with an external electrical fuel pump (12 V of DC).

The fuel pump must always be installed close to the tank. The electrical connections with the appropriate connection cable are pre-installed at the generator.

The installation of a second pipe is sometimes reasonable, since the suction height and the supply pressure are limited.

Fig. B.3.4-1: External fuel pump

Connecting pieces for the fuel pipe

1. Fuel intake
2. Fuel backflow

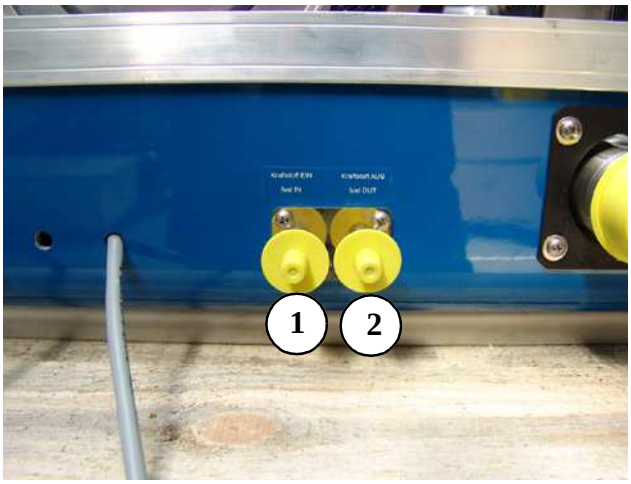


Fig. B.3.4-2: Fuel connections

Fuel solenoid valve

The fuel solenoid valve opens automatically if „START“ is pressed on the iControl panel. The solenoid closes, if the generator is switched to „OFF“ position.

It takes a few seconds before the generator stops. If the generator does not start or does not run smoothly (i.e. stutters), or does not attain full speed, then the cause is fore-mostly the solenoid.

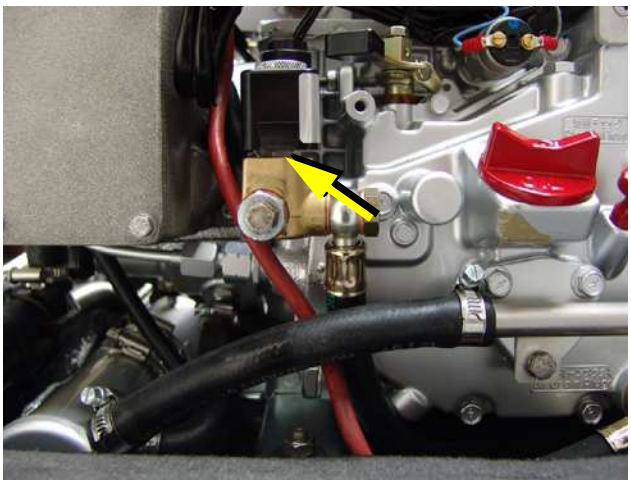


Fig. B.3.4-3: Fuel solenoid valve

Injection nozzle

If the engine does not start after the ventilation, the fuel injection line must be deaerated.

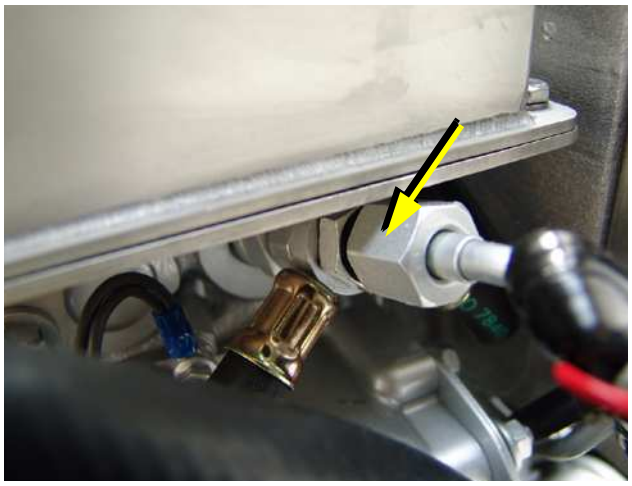


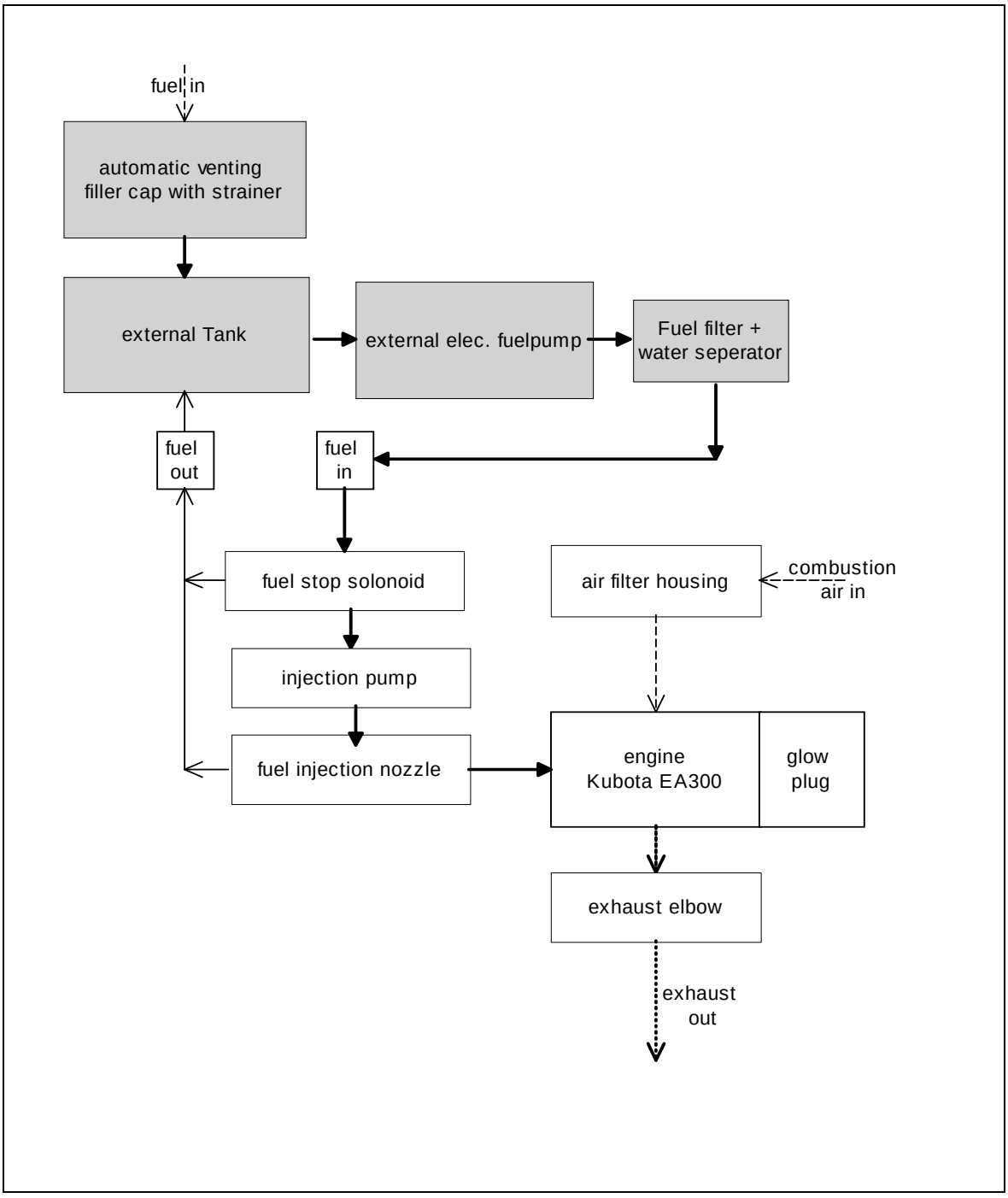
Fig. B.3.4-4: Injection nozzle

Glow plug

The glow plugs serve the pre-chamber for the heating with cold start. The glow device must be operated, if the temperature of the generator is below 16 °C. This is practically the case with each start. The glow device and starter button are set so that neither may be used at the same time.

Fig. B.3.4-5: Glow plug

B.3.5 Components of Combustion Air



Air suction openings at the sound insulated capsule

The sound cover for the marine generator is normally provided at the lower surface with drillings, through which the combustion air can inflow.

It must be consistently paid attention that the generator is installed in such a way that no water can enter from below in close proximity to these air openings. (Minimum distance 150 mm).

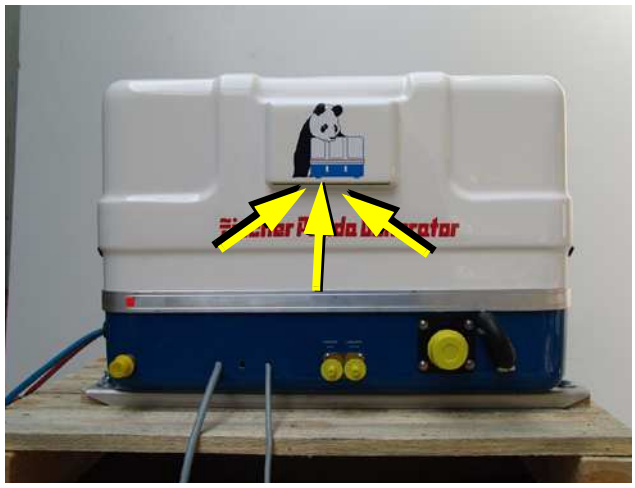


Fig. B.3.5-1: Combustion air intake

Air suction housing

If the cover is removed, the inside of the air suction housing becomes visible. In these air suction housings is a filter element. It should be checked once in a while.

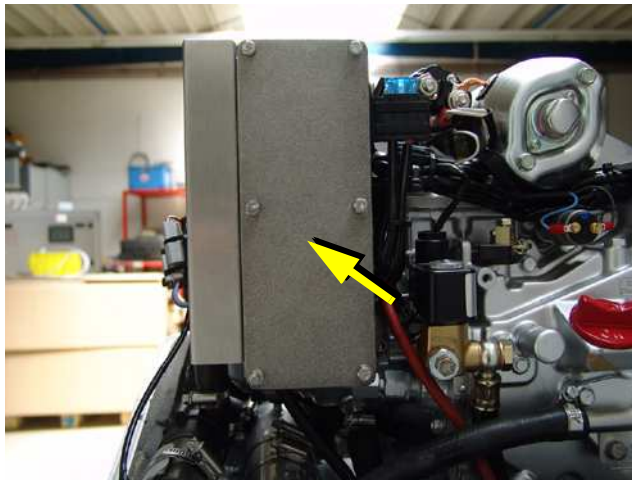


Fig. B.3.5-2: Air suction housing

Air suction housing with air filter set

The figure shows the air filter element in the air suction housing. An check is advisable once in a while.

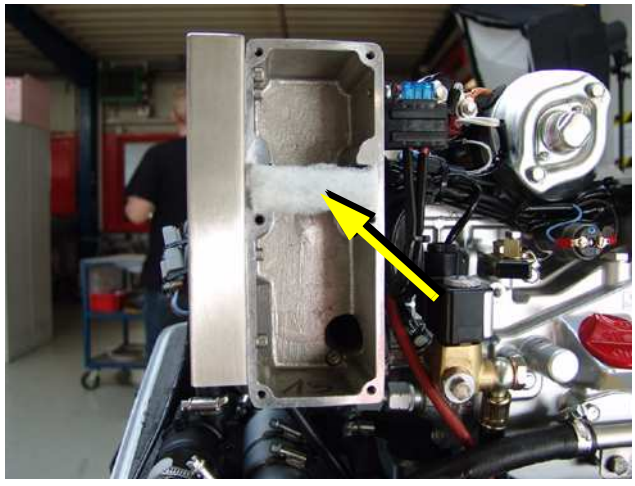


Fig. B.3.5-3: Air filter set

Exhaust elbow

After the combustion air was led through the engine it occurs into the water-cooled exhaust elbow. On the top side the pipe union for the internal raw water circle is to be seen.

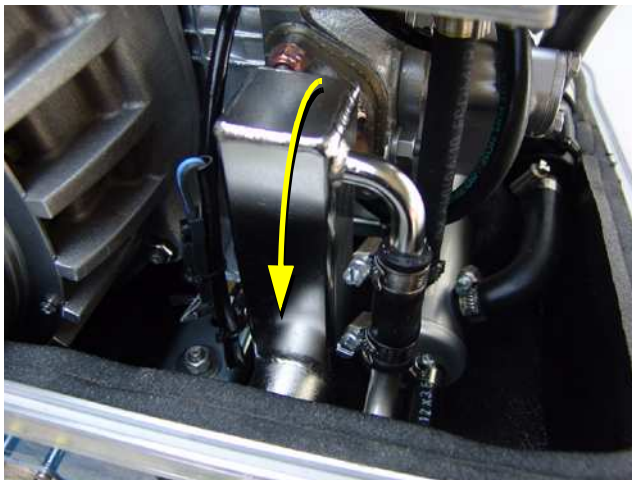


Fig. B.3.5-4: Exhaust elbow

Exhaust outlet (through capsul bottem)

Connection for the the exhaust pipe with the water lock.

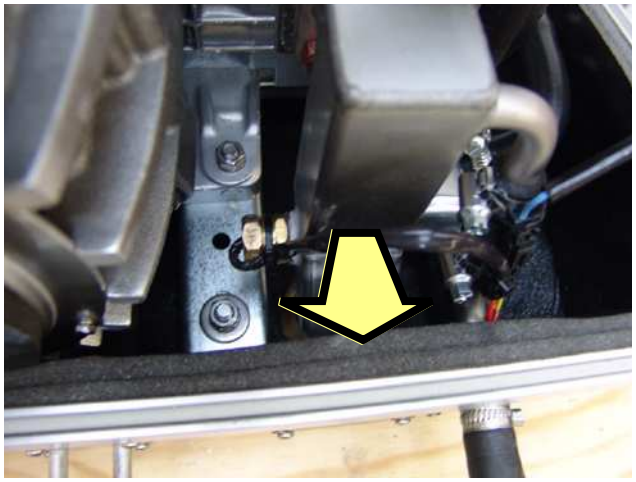
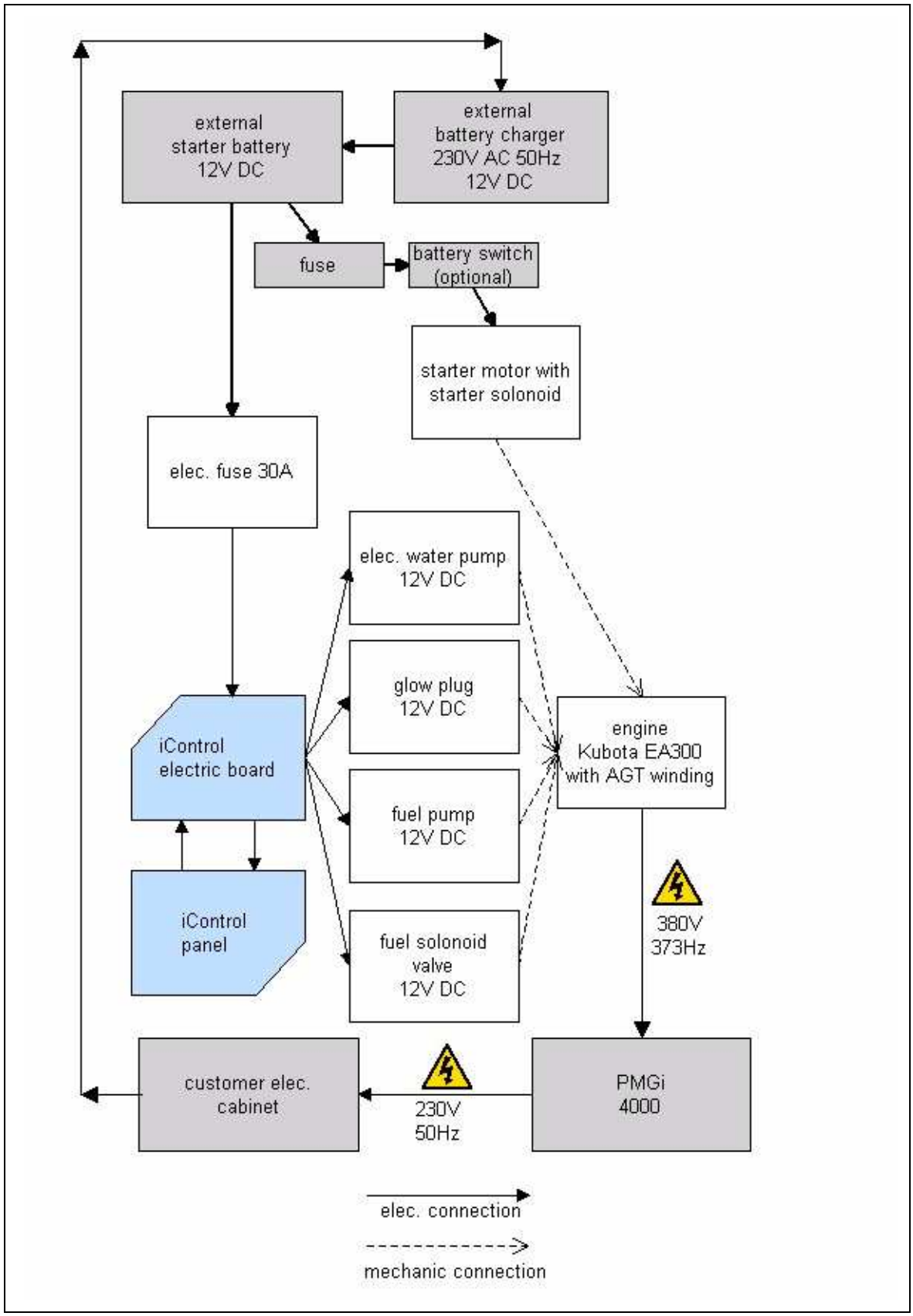


Fig. B.3.5-5: Exhaust outlet

B.3.6 Components of the Electrical System



Passage for battery cable

The battery cables of the starter battery must be laid through this passage to the clamps

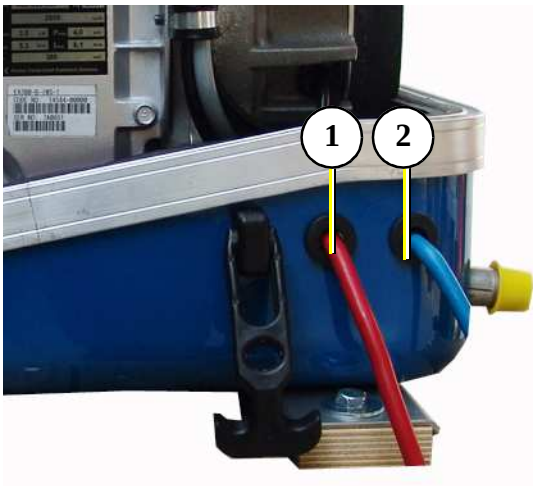


Fig. B.3.6-1: Passage

Clamps for battery cable

1. Clamp (-) for battery cable (-)

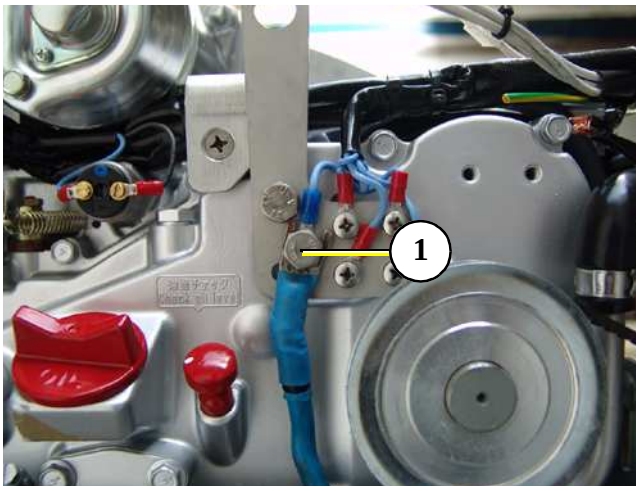


Fig. B.3.6-2: Connections battery cable

Clamps for battery cable

1. Clamp (+) for battery cable (+).

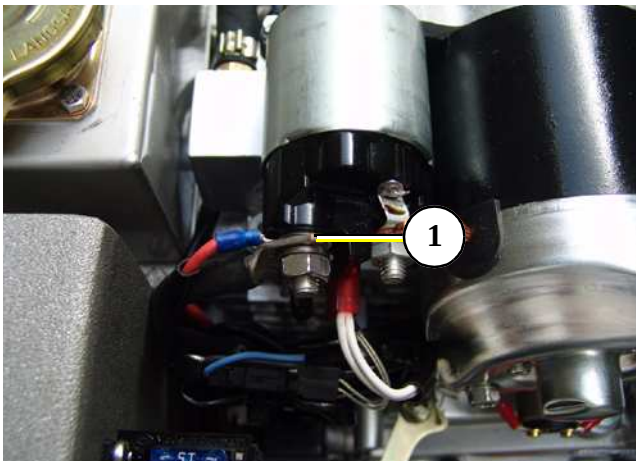


Fig. B.3.6-3: Connections battery cable

Electrical connections for control

All remaining cables for the electrical connection are located at the front end of the generator, depending upon type. See here:

1. Connection cable to the PGMi
2. Connecttion cable to the iControl
3. Connection cable to the fuel pump

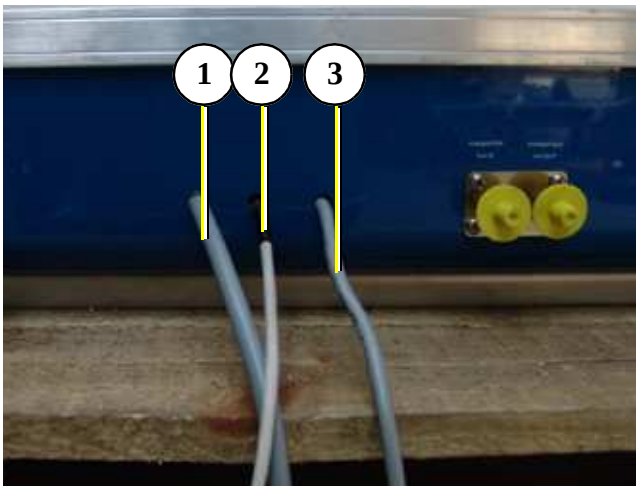


Fig. B.3.6-4: Electrical connections

Starter motor

1. Starter motor and
2. Solenoid switch

The diesel engine is started electrically. The electrical starter with the solenoid switch is located on the top of the engine.

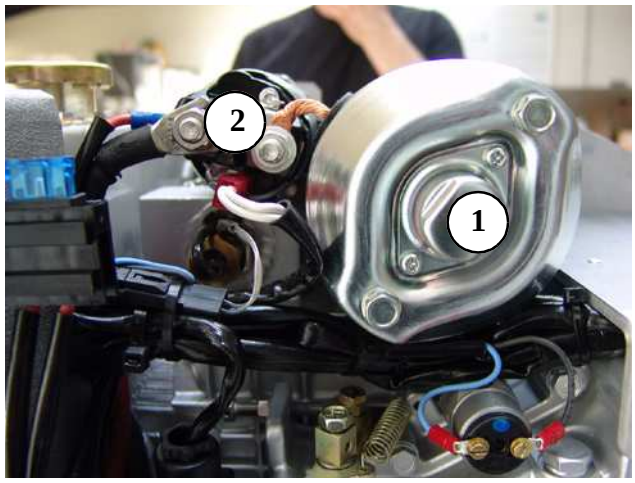


Fig. B.3.6-5: Starter motor

Fuse for the electric 12 V system

F1. Fuse 30 A

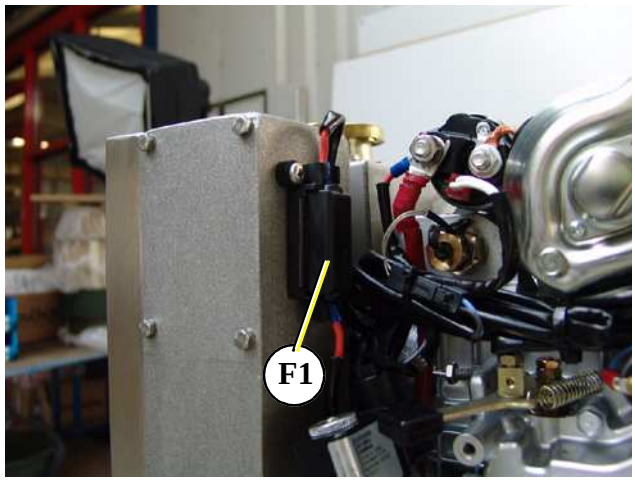
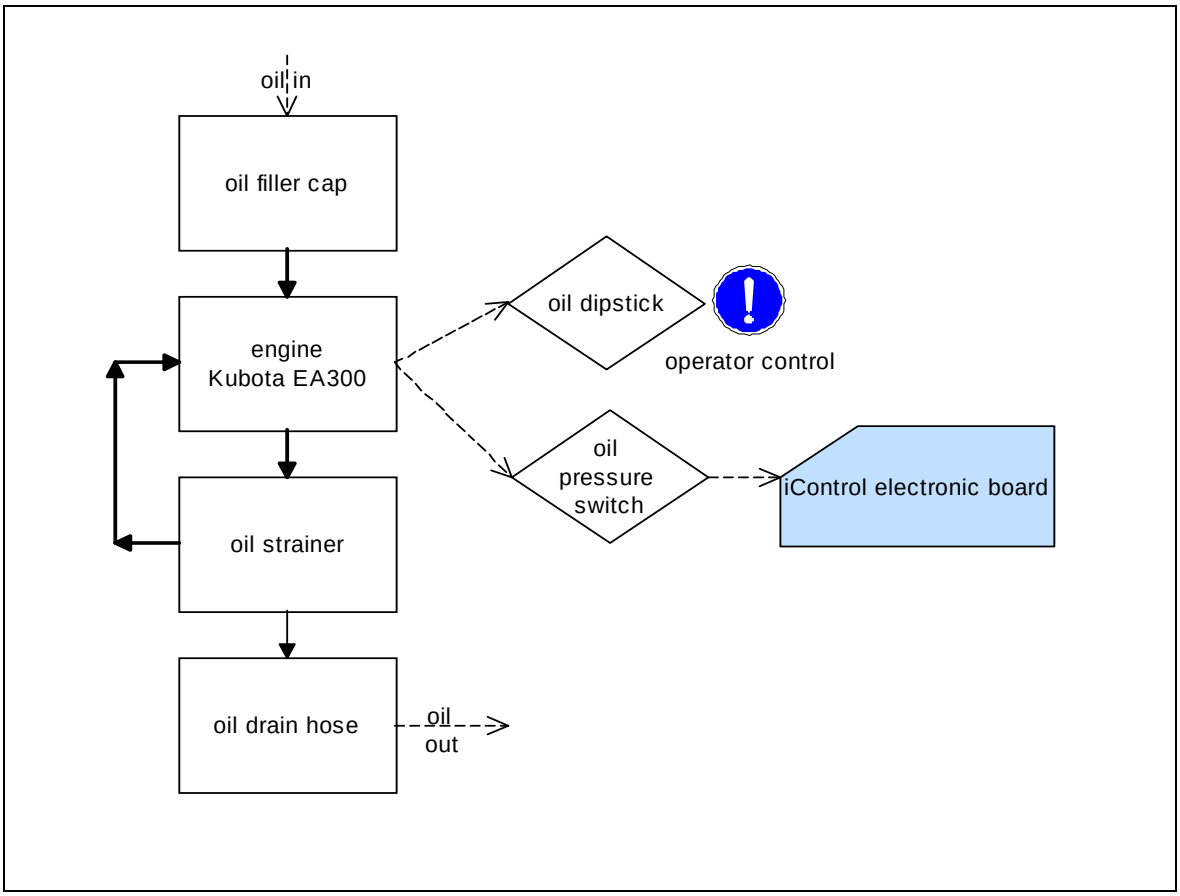


Fig. B.3.6-6: Fuse

B.3.7 Components of the Oil Circuit



Oil filler neck with cap

Please pay attention that the filler necks are always well locked after filling in engine oil.

Consider also the references to the engine oil specification.

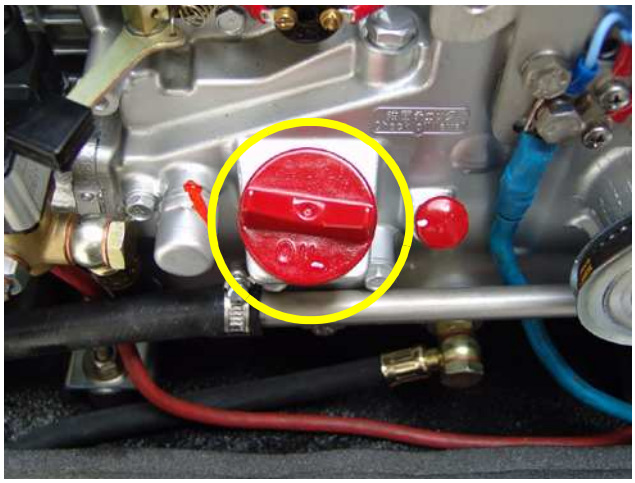


Fig. B.3.7-1: Oil filler neck

Oil dipstick

At the dipstick the permissible level is indicated by the markings "maximum" and "minimum". The engine oil should be never filled up beyond the maximum conditions.

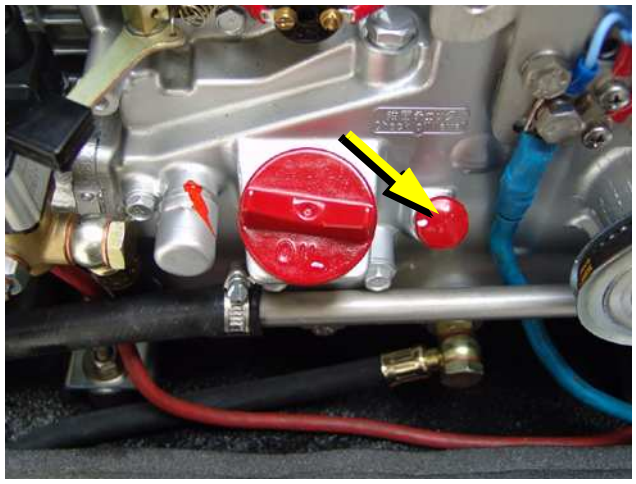


Fig. B.3.7-2: Oil dipstick

Oil strainer

The oil strainer should be cleaned every 500 operating hours.

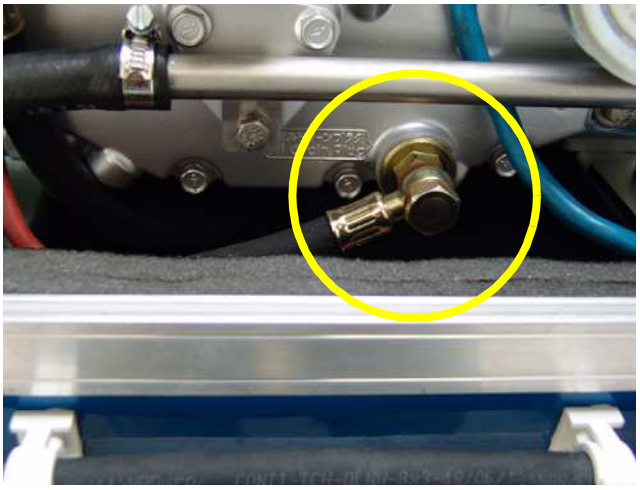


Fig. B.3.7-3: Oil srtainer

Oil drain hose

The Panda generator is equipped so that the engine oil can be drained by means of a hose. The generator should be installed in such a way, that a collecting basin can be placed deeply enough. If this is not possible, an electrical oil drain pump must be installed.

Note: Lubricating oil should be drained in warm condition!

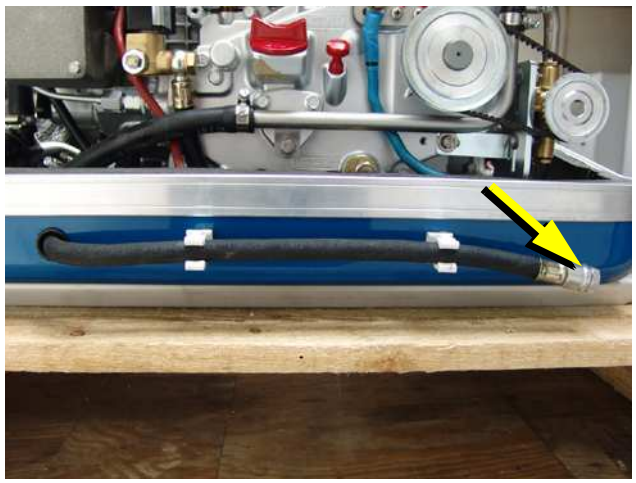


Fig. B.3.7-4: Oil drain hose

B.3.8 Sensors and switches for operating surveillance

Thermo-switch at engine

The thermo-switch at the engine is used for monitoring the engine temperature.

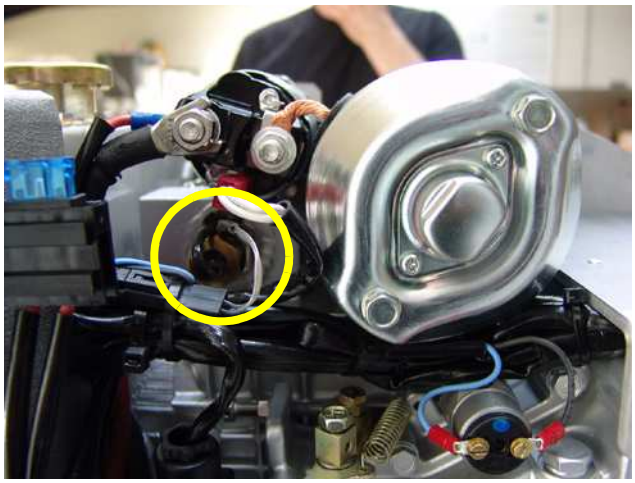


Fig. B.3.8-1: Thermo.switch at engine

Thermo-switch at exhaust connection

If the impeller pump drops out and deliveres no more seawater, the exhaust connection becomes extremely hot.

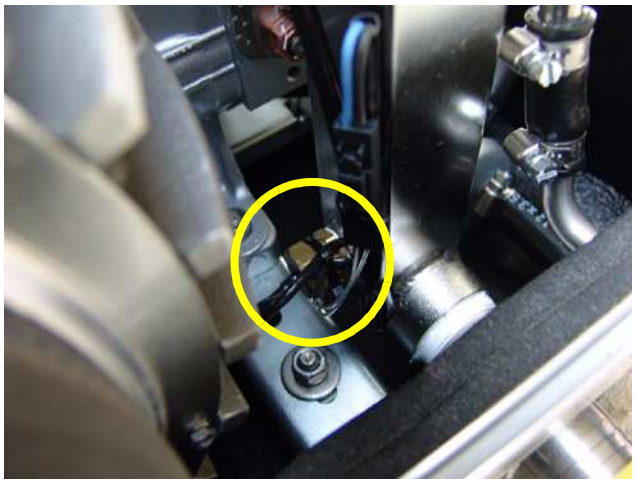


Fig. B.3.8-2: Thermo-switch at exhaust connection

Thermo-switch coil

One thermo sensor is located in the stator winding

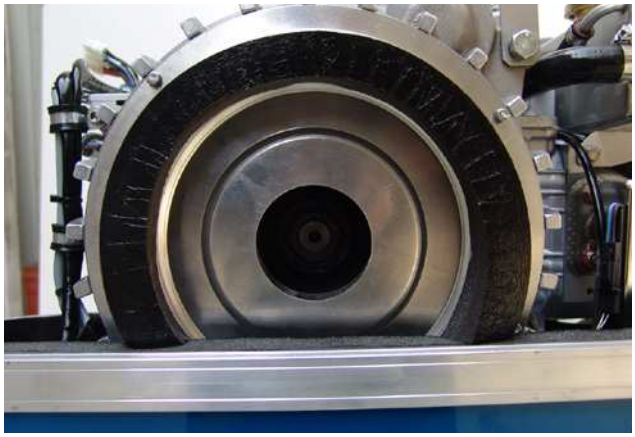


Fig. B.3.8-3: Thermo-switch coil

Oil pressure switch

In order to be able to monitore the lubricating oil system, an oil pressure switch is built into the system.

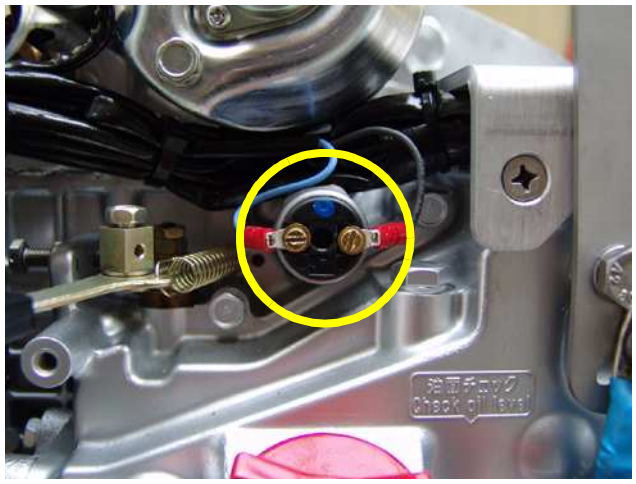


Fig. B.3.8-4: Oil pressure switch

B.3.9 External Components

Panel iControl

Fig. B.3.9-1: iControl

Electronic board for iControl mounted at the generator.

For description please see „Panel Manual“

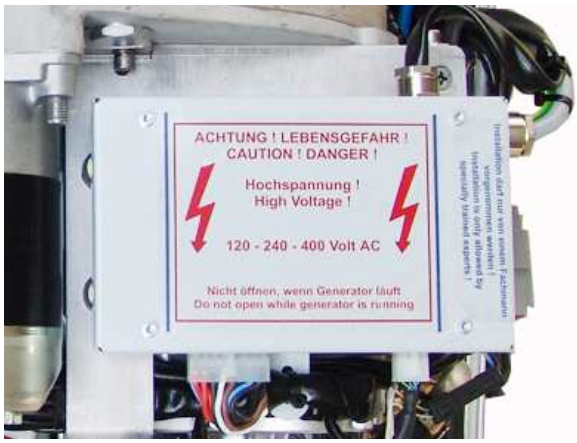


Fig. B.3.9-2: Electronic board

PMGi 4000

The „inverter“ of the Panda 4000i

Fig. B.3.9-3: PMHGi 4000

B.4 Operation Instructions - see separate control panel manual

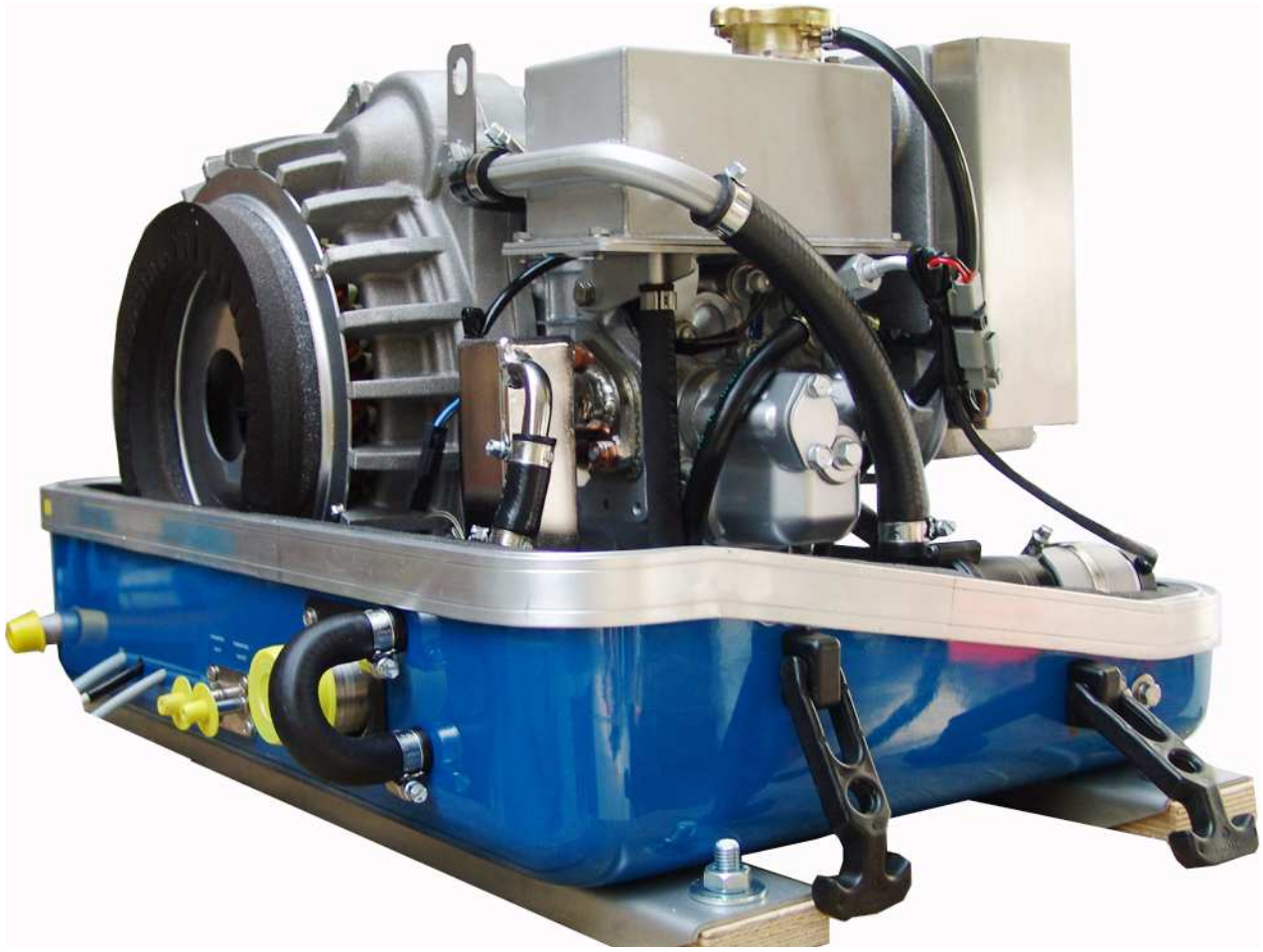
B.4.1 Daily routine checks before starting - See iControl manual.

B.4.2 Starting Generator - See iControl manual.

B.4.3 Stopping the Generator - See iControl manual.

Fischer Panda special equipment

A. Panda 4000i with optional actuator



A.1 Cleaning and replacement of parts at the generator

The battery must always be disconnected, if work on the generator or electrical system is to be carried out, so that the generator cannot be unintentionally started.

Note the safety instruction in the generator manual.

Attention!!! Parts of the generator and the cooling water may be hot after operation !!!DANGER!!!

A.2 General informations

These Instruction has additional information to the manual of the Generator.

Pay attention to these pages! This Instruction has a higher priority than the manual.

A.3 Model changes overview

Generator can run in continuance or actuator controlled mode

Actuator at 4000i generator

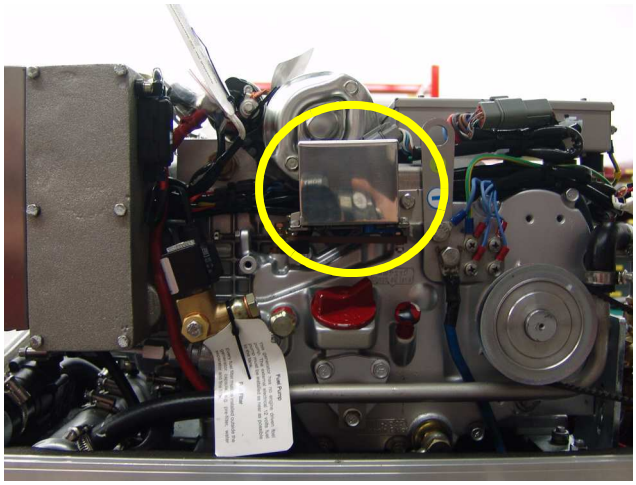


Fig. A.3-1: Actuator

A.4 Operation

The generator has two operation modes

-Low (Continuance) mode : the generator run at 2850 rpm

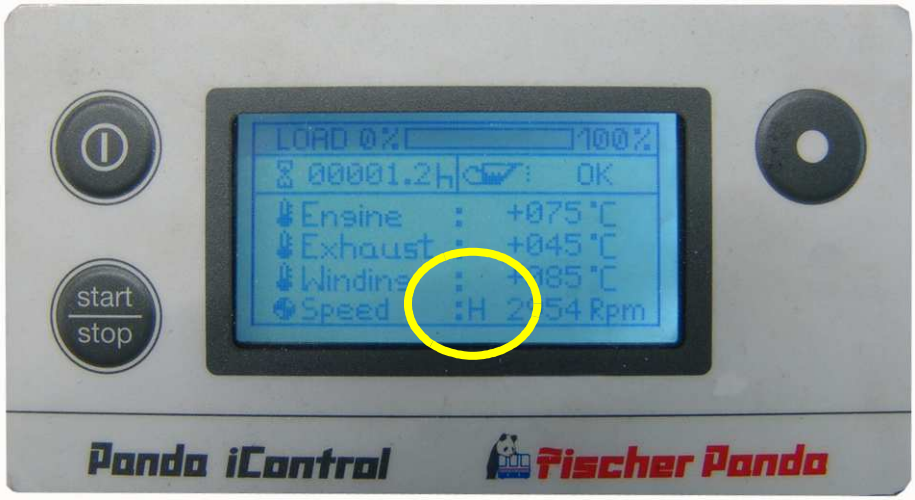
-High (Actuator controlled) mode : The generator run between 2200 rpm up to 2900 rpm

To switch between the two modes press the „Enter button“ of the iControl panel while the generator is running.

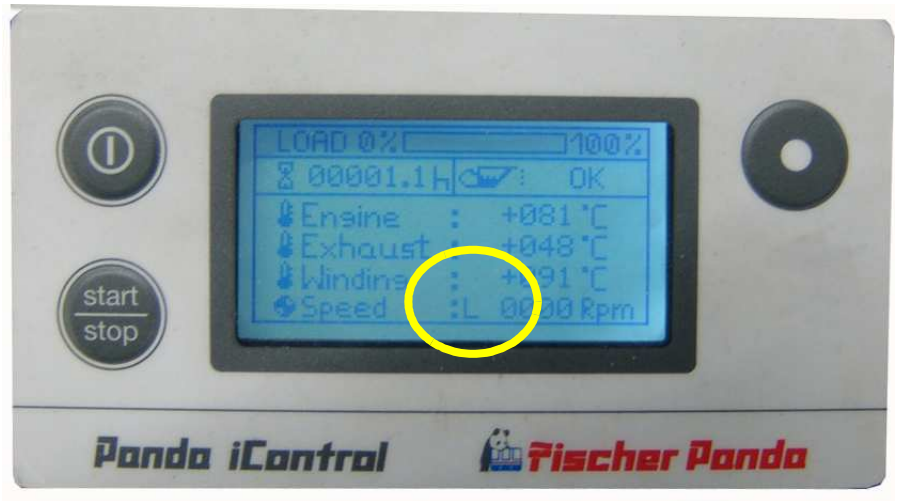
Please note: The generator will start in the mode of last operation

To use this option the iControl panel must be version 1.0.1 or higher

A.4.1 Display in high mode



A.4.2 Display in low mode



A.4.3 Actuator (sample picture)

C. Generator Installation Instructions

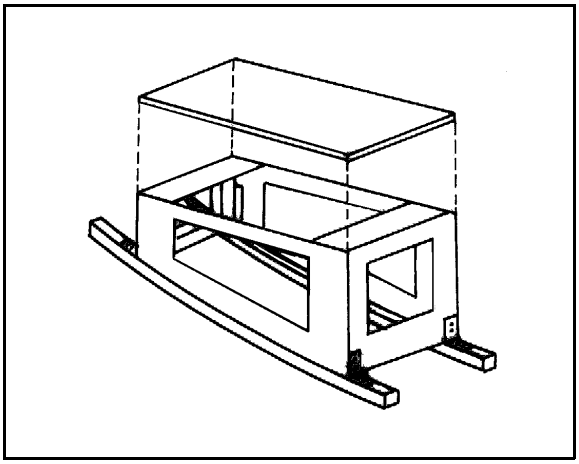
C.1 Placement

C.1.1 Placement and Basemount

Since Panda generators have extremely compact dimensions, they can be installed in tight locations. Attempts are sometimes made to install them in almost inaccessible places. Please consider that even almost maintenance-free machinery must still remain accessible at least at the front (drive belt, water pump) and the service-side (actuator, dipstick). Please also note that in spite of the automatic oil-pressure sensor it is still essential that the oil level has to be checked regularly.

C.1.2 Notice for optimal sound insulation

The generator should not be placed in the proximity of light walls or floors, which can have resonance vibrations because of airborne sounds. If this should be unavoidable, then it is recommended that this surface is lined with 1 mm lead foil, which will change the mass and the vibration behaviour.



You should avoid fixing the generator on a slippery surface with little mass (i.e.). This acts as an amplifier of airborne sounds in the most unreasonable case. An improvement can be achieved by reinforcing these surfaces with ribs. In addition, the breakthroughs, which interrupt these surfaces, should be sawed off. The lining of the surrounding walls with a heavy layer (i.e lead) and foam additionally improve the conditions.

Fig. C.1.2-1: Convenient base

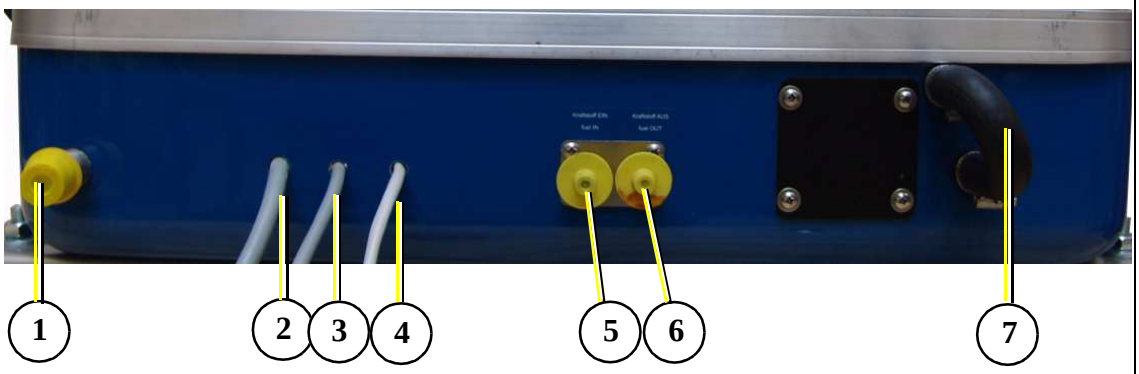
C.2 Generator Connections - Scheme

All electrical connections, cable types and sizes must comply to the appropriate regulations. The cables delivered have to be protected. They are rated for ambient temperatures up to 70 °C (160 °F). If the cables are required to meet higher temperature requirements, they must be run through conduits.

After installation, the persons protective devices must be build in and checked regarding the domestic laws and regulations.

C.2.1 Connections Panda 4000i

ATTENTION! Before working on the system read the section “Safety Precautions” on Page 12.



1. Raw water intake
2. Cable PGMi
3. Cable iControl
4. Cable for fuel pump
5. Connection fuel IN
6. Connection fuel OUT
7. Connection external ventilation valve

Fig. C.2.1-1: Connection AGT 4000 12V

Passage for starter battery cable

The battery cables of the starter battery must be laid through this passage to the clamps

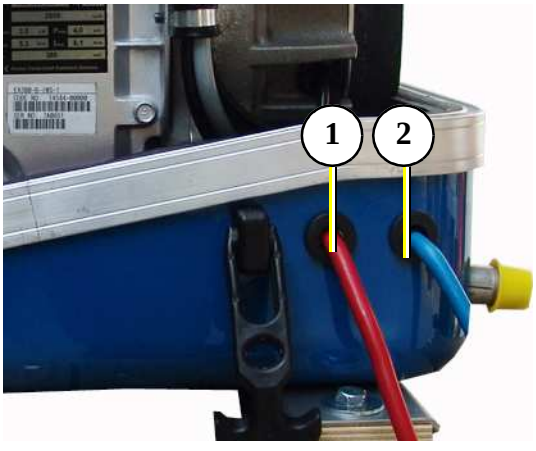


Fig. C.2.1-2: Passage

C.3 Cooling System Installation - Raw water

C.3.1 General References

The generator should have its own raw water (coolant water) inlet and should not be connected to any other engine systems. Ensure that the following installation instructions are complied with:

Avoid galvanic corrosion

For the avoidance of galvanic corrosion the chapter "Service instruction for marine aggregates (corrosion protection)“ is to be considered.

C.3.2 Installation of the thru-vessel fitting in Yachts

It is good practice for yachts to use a hull inlet fitting with an integrated strainer. The thru-vessel fitting (raw water intake) is often mounted against the sailing direction to induce more water intake for cooling.

For Panda generators, the thru-vessel inlet should NOT point in the sailing direction! When sailing at higher speeds more water will be forced into the inlet than what the pump can handle and your generator will overflood!

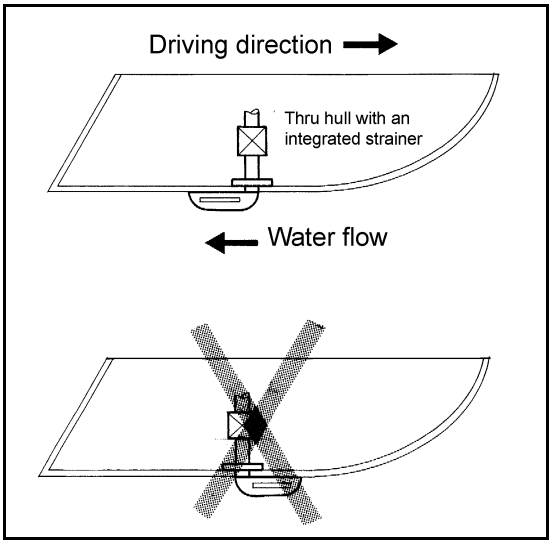


Fig. C.3.2-1: Thru-vessel fitting

C.3.3 Quality of the raw water sucking in line

In order to keep the suction resistance in the line at a minimum, the raw water intake system (i.e. sea cock, thru-hull fitting, inlet filter, etc.) must have an inner diameter of at least 1" (25mm).

This applies also to installation components such as thru-hull fitting, sea cock, raw water filter etc. The intake suction line should be kept as short as possible. Install the raw water inlet in close proximity to the genset.

After start-up the cooling water quantity must be measured (e.g. by catching at the exhaust). The flow rate, as well as the necessary cross section of the cooling water pipe take from Table 1, “Diameter of conduits,” on page 73.

C.3.4 Installation above waterline

The Panda is equipped with a direct drive water intake pump mounted directly on the motor. Since the intake pump is an impeller pump there are wearing parts which are likely to require replacement after a period of time. Ensure that the genset is installed so that the intake pump can be easily accessed. If this is not possible, an external intake pump could be installed in an easily accessible location.

If the generator is installed above the waterline, it is possible that the impeller will wear out faster, because after starting, the pump runs dry for some seconds.

The seawater hose should form a loop as near as possible to the seawater inlet of the generator (see picture below). This ensures the pump only sucks in air for a short time. The impeller pump will be lubricated by seawater and the impeller life span will be increased.

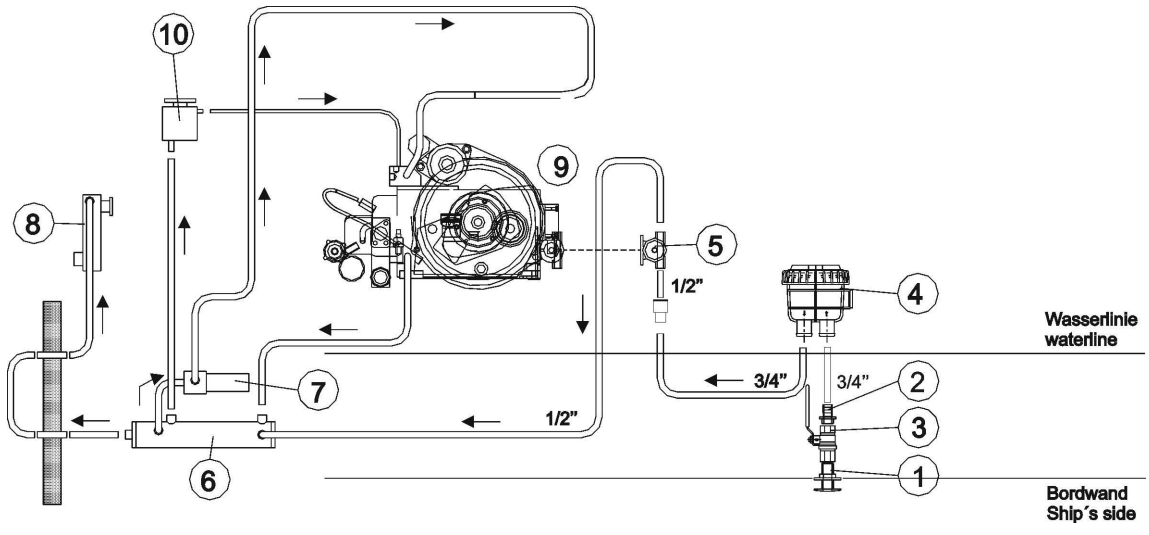
By the installation of a check valve in the sea water inlet line, which is under the waterline, this problem can be restricted.

The impeller pump will remain intact longer, if an electrical booster pump is installed, and is strongly recommended in order to preserve the impeller pump.

NOTE:

Never change the impeller for many years, without exchanging the old pump sealing ring. If the sealing ring is defective within the pump, seawater runs into the sound insulated capsule of the generator. A repair is then very expensive.

Replacement impeller and also a spare pump should always be on board. The old pump can be sent back to Fischer Panda, where it is then economically overhauled completely.



1) Hull inlet
2) Reducer
3) Water cock
4) Raw water filter
5) Raw water pump
6) Heat exchanger
7) Electric water pump
8) Raw water injection into exhaust
9) Engine
10) Water tank

Fig. C.3.4-1: Installation example

C.3.5 Installation below waterline

If the generator can not be attached at least 600 mm over the waterline, a vent valve must be installed into the seawater line. With location beside the "midship line" a possible heeling must be considered! The water hose for the external vent valve at the back of the sound insulated capsule splits on the pressure side of the pump and at both ends in each case extended with a connecting nipple by a hose end. Both hose ends must be led out outside of the sound insulated capsule to one point, if possible 600 mm over the waterline in the midship line. The valve is connected at the highest place with the two hose ends. If the valve is blocked, the cooling water pipe cannot be ventilated after the stop of the generator, the water column is not interrupted and the water can penetrate into the combustion chamber of the engine. This leads to the destruction of the engine!

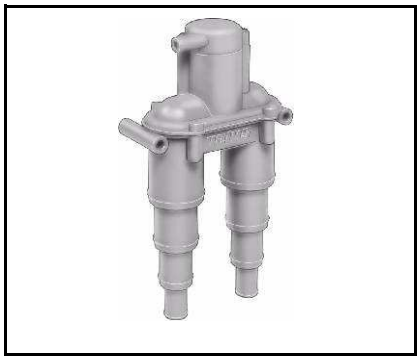
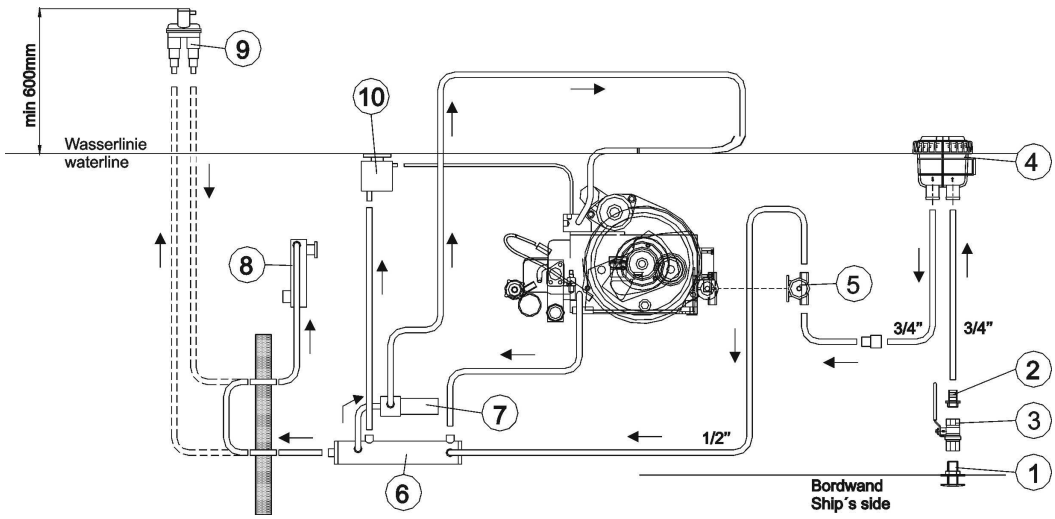


Fig. C.3.5-1: Ventilation valve



1) Hull inlet
2) Reducer
3) Water cock
4) Raw water filter
5) Raw water pump
6) Heat exchanger
7) Electric water pump
8) Raw water injection into exhaust
9) External ventilation valve
10) Water tank

Fig. C.3.5-2: Installation example

The tube bend must be removed. Now the two ends are extended in each case with a hose and attached at a value of approx. 600 mm over the waterline with a ventilation valve.

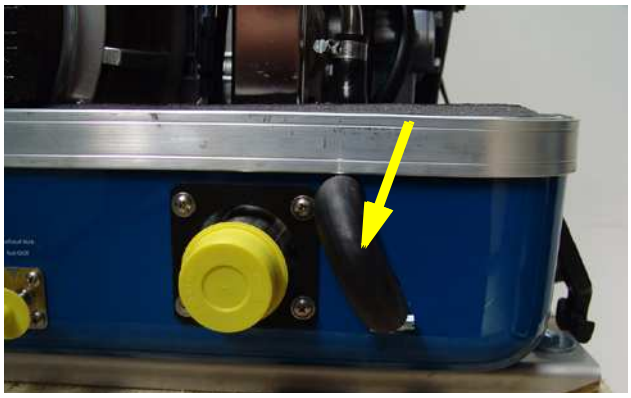


Fig. C.3.5-3: Tube bend for ventilation valve

C.4 The Freshwater - Coolant Circuit

C.4.1 De-aerating at the first filling of the internal cooling water circuit

1. For the preparation of filling the following steps are to be undertaken:

a. Open the cooling water cap on the cooling water tank.

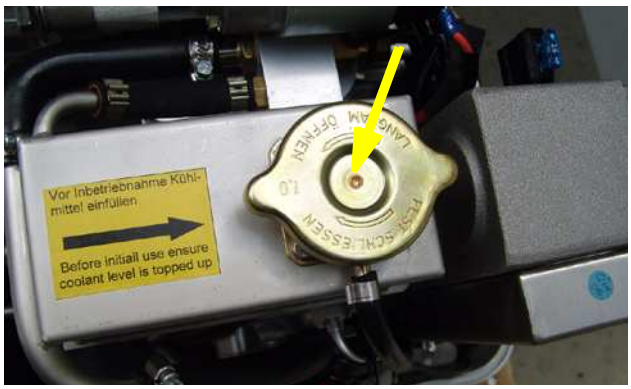


Fig. C.4.1-1: Cooling water filler neck

2. Filling the cooling water circle

a. Fill in the prepared mixture (cooling water with anti-freeze protection according to the intended mixture) at the filler neck at the cooling water tank slowly so long, until cooling water reach the max. level at the neck.

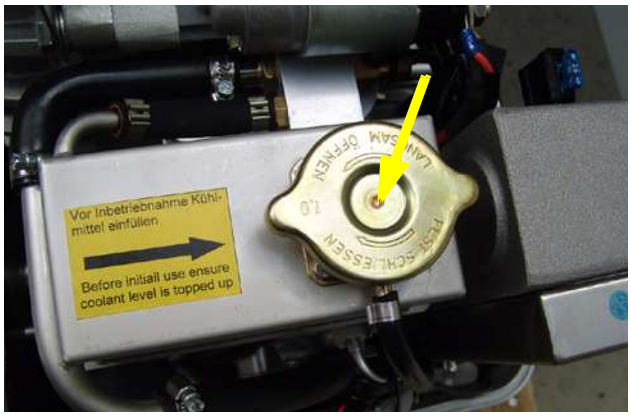


Fig. C.4.1-2: Cooling water filler neck

Anti-freeze

In the interest of safety, the freezing point of the closed circuit coolant should be **checked on a regular basis**. Be sure that the coolant/antifreeze mixture is good for at least -15℃ (5℉) and if it is possible that your genset experiences lower temperatures, for example during storage or transportation, then the entire cooling system should be drained and purged. To purge the cooling system, compressed air at about 0.5 bar (7.5 psi) is sufficient.

Electric cooling water pump

Connect the cooling water pump to an external 12 V power supply and start the pump. Refill the the cooling water at the filler neck while the pump runs.

3. De-aerating

The cooling water circuit of the generator is self de-aerating.

ATTENTION! During the de-aerating process it must be checked again and again if the cooling water is indeed circulating. If air bubbles established in the internal cooling water pump, it could be, that the cooling water circuit is not circulate. Then the generator would be warming very fast and switched off by overheating.

C.5 Watercooled Exhaust System

By injecting the outlet raw water into the exhaust manifold, the exhaust gases are cooled and the noise emissions from the exhaust system are reduced.

C.5.1 Installation of the standard exhaust system

The generator exhaust system must remain completely independent and separate from the exhaust system of any other unit(s) on board. The exhaust hose has an inner diameter of 40 mm (1.6") (Panda 14000 and above approx. 50 mm). The water lock must be installed at the lowest point of the exhaust system. An optional noise insulated water lock can also be installed. The exhaust hose descends from the capsule to the water lock. Then the hose rises via the "goose neck" to the silencer (see drawing). The goose neck must be vertical and sit preferably along the ship's keel centre line. The exhaust system must be installed so that the back pressure inside the exhaust does not exceed 0.4 bar (6 psi) and total length does not exceed 6 m (20 ft.).

Exhaust diameter see “Diameter of conduits” on Page 73.

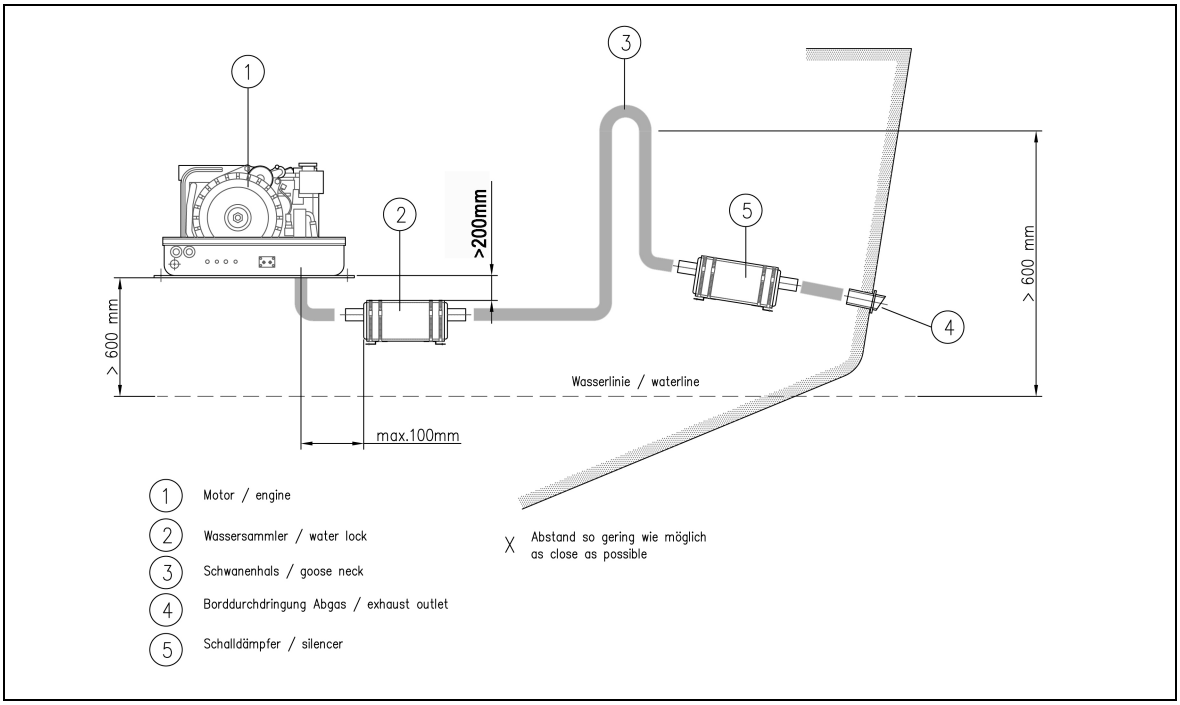


Fig. C.5.1-1: Installation example

C.5.2 Exhaust / water separator

The exhaust/water separator

In order to reduce the noise level of the generator unit to a minimum, an optional exhaust outlet muffler can be mounted next to the thru-hull fitting. Additionally there is a component at ICEMA-STER, which acts as both an "exhaust goose neck", and water separator. With this "exhaust/ water separator" the cooling water is derived over a separate pipe. The exhaust noises emanating from the exterior of the yacht are strongly decreased. Particularly the "water splash".

The water flow on the exhaust/water separator unit has an inner diameter (ID) of 30 mm. If the path from the water separator to the sea water outlet is very short, the hose can be further reduced to 1" (25 mm) ID.

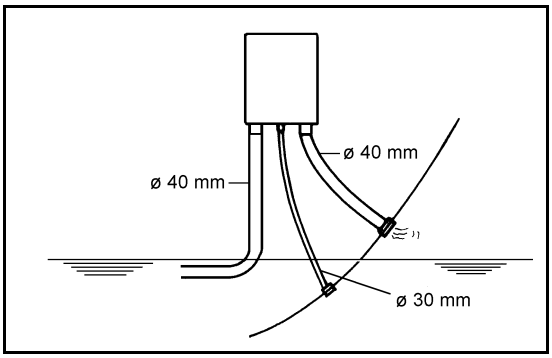


Fig. C.5.2-1: Exhaust/water separator

1. Raw water outlet ø 30 mm
2. Hose connection ø 30 mm
3. Reducer 30/20 mm (if required)
4. Hose for hull inlet
5. Hose connector
6. Sea cock
7. Hull outlet
8. Hose clamps

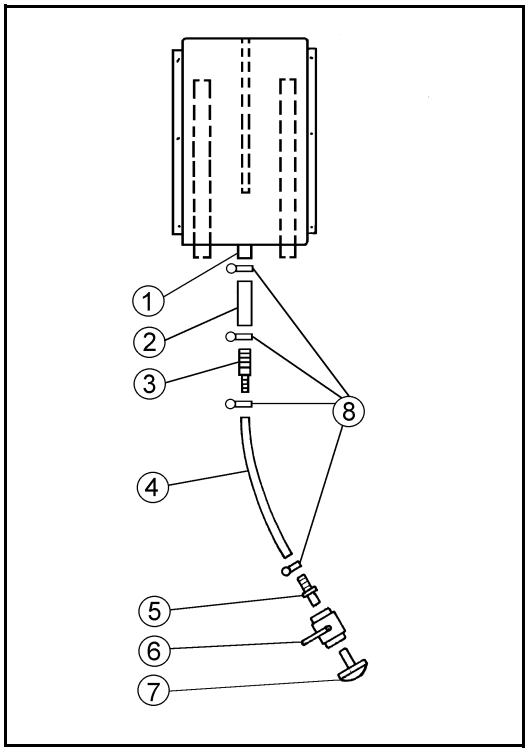


Fig. C.5.2-2: Exhaust/water separator

C.5.3 Installation exhaust/water separator

If the exhaust/water separator was sufficiently highly installed, a goose neck is no longer necessary. The exhaust/water separator fulfills the same function. If the "Supersilent" exhaust system were installed correctly, the generator will not disturb your boat neighbour. The exhaust noise should be nearly inaudible. The best result is reached, if the hose line, which derive the cooling water, is relocate on a short way "falling" directly to the outlet and this outlet is under the waterline.

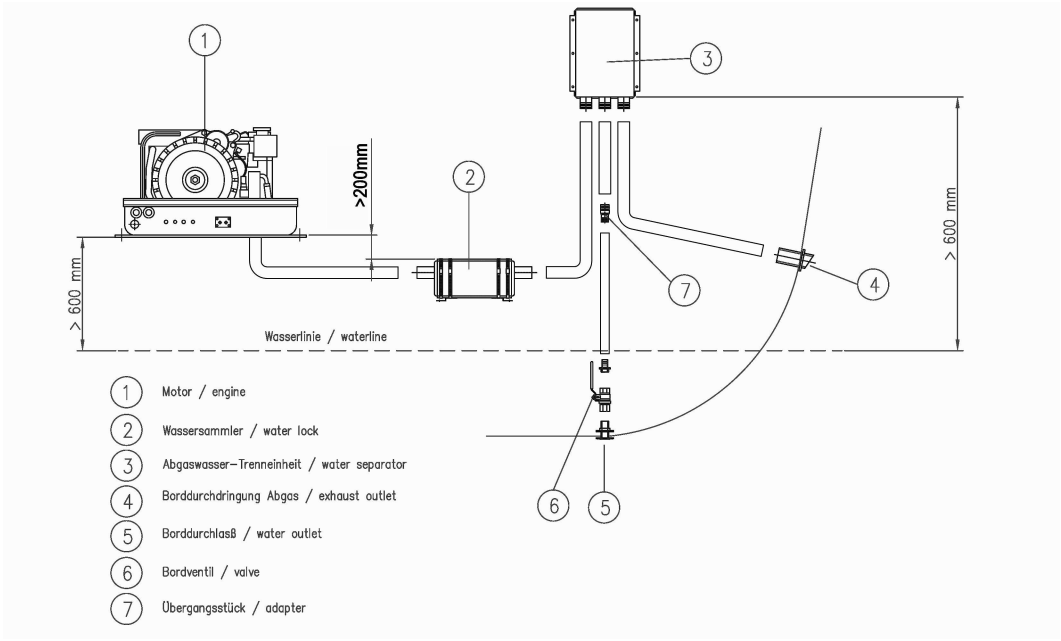


Fig. C.5.3-1: Installation example

If the thru-hull exhaust outlet has to be mounted far from the generator, an exhaust-water separator must definitely be installed. The sea water from the separator must then run along the shortest possible path is the thru-hull outlet. For such long exhaust routes, the exhaust hose diameter should also be increased from NW 40 mm to NW 50 mm in order to reduce the back-pressure. The exhaust may have a length of over 10 m (32 ft.), if the exhaust hose diameter is increased to 50 mm. An additional outlet exhaust muffler close to the hull outlet will help further to reduce noise emissions.

C.6 Fuel System Installation

C.6.1 General References

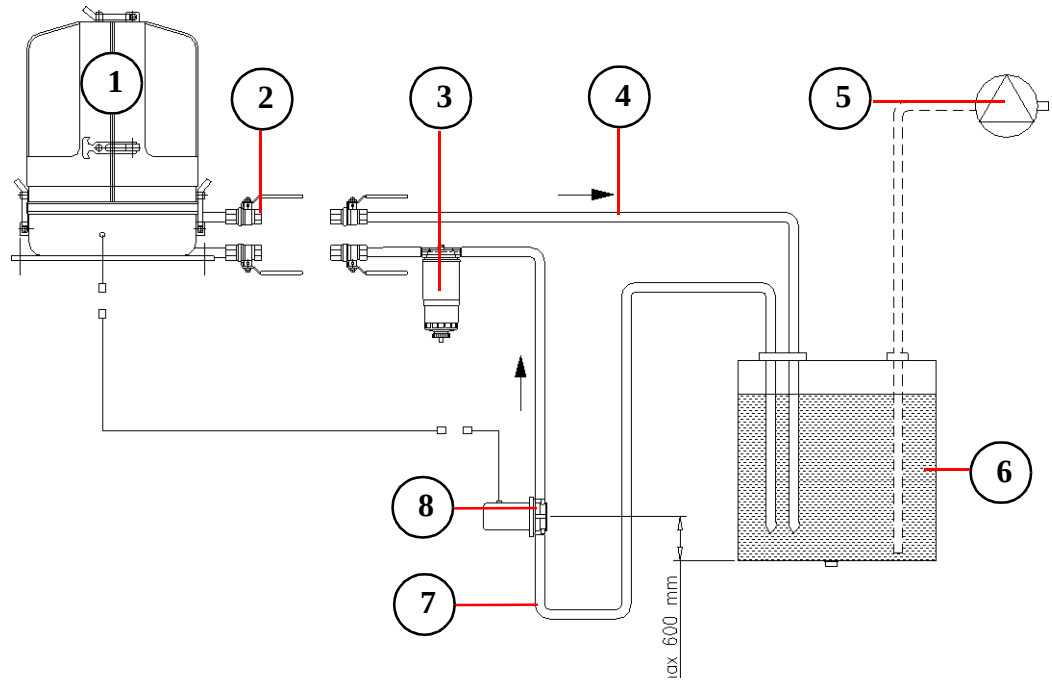
Additionally to the standard fine filter a pre-filter with water separator must be installed outside of the sound insulation capsule in easily accessible places in the fuel system line between the tank intake fuel pump and the diesel motor´s fuel pump (is not included in the delivery).

The forward and return fuel flow pipes must be connected to the diesel tank. Do not conenct the generator fuel supply lines with any other fuel lines in other diesel systems.

The following items need to be installed:

- Fuel supply pump (12V-DC)
- Pre-filter with water separator (not part of the delivery)
- Fine particle fuel filter
- Return fuel line to fuel tank (unpressurized)

The fuel supply pump should be installed to the fuel tank as close as possible. The electric cable for the fuel pump is already installed at the generator (length 5 m).



1. Generator
2. Fuel stop cock
3. Fuel filter
4. Fuel return pipe
5. Condensation water suction pump
6. Fuel tank
7. Fuel supply pipe
8. Electrical fuel pump (12V-DC)

Fig. C.6.1-1: Example for fuel installation

C.6.2 The electrical fuel pump

Electrical fuel pump

With the Panda generator is usually supplied an external, electrical fuel pump (12 V DC). The fuel pump must be installed close to the fuel tank. The electrical connections with the provided cable (5 m) are pre-installed.

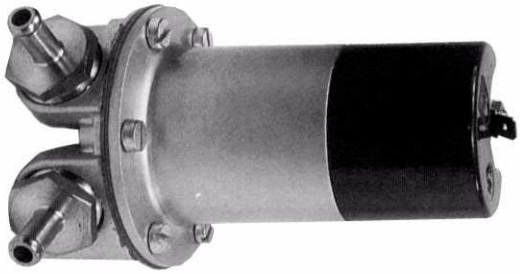


Fig. C.6.2-1: Electrical fuel pump

- Suction hight of the pump: max. 1,2 m at 02, bar
- Diameter of fuel lines: “Diameter of conduits” on Page 73

C.6.3 Connection of the fuel lines at the tank

Lead the return fuel pipe connected to the day tank to the floor

The return pipe connected to the tank must be dropped to the same depth as the suction pipe, if the generator is mounted higher than the tank, in order to prevent fuel running back into the tank after the motor has been switched off, which can lead to enormous problems, if the generator is switched off for a long period.

Non-return Valve in the Suction Pipe

A non-return valve must be fitted to the suction pipe, which prevents the fuel flowing back after the generator has been switched off, if it is not possible to use the return flow pipe as a submerge pipe placed in the tank. The instructions "Bleeding Air from the Fuel System" must be read after initial operation or after it has stood still for a long period, in order to preserve the starter battery.

ATTENTION! Non-return valve for the fuel return pipe

If the fuel tank should be installed over the level of the generator (e.g. daily tank), then a non-return valve must be installed into the fuel return pipe to guarantee that through the return pipe no fuel is led into the injection pump.

C.6.4 Position of the pre-filter with water separator

Additionally to the standard fine filter a pre-filter with water separator must be installed outside of the sound insulation capsule in the fuel system line (is not included in delivery).

Fig. C.6.4-1: External fuel filter

C.7 Generator DC System-Installation

C.7.1 Connection of the 12 V starter battery

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

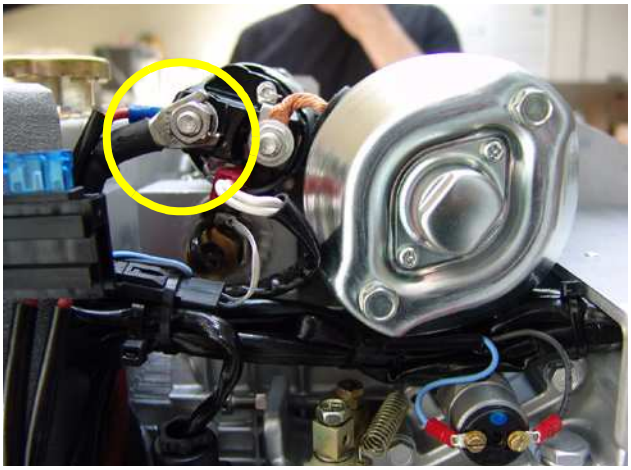


Fig. C.7.1-1: Connection starter battery

The negative (-) battery cable is connected to the engine.

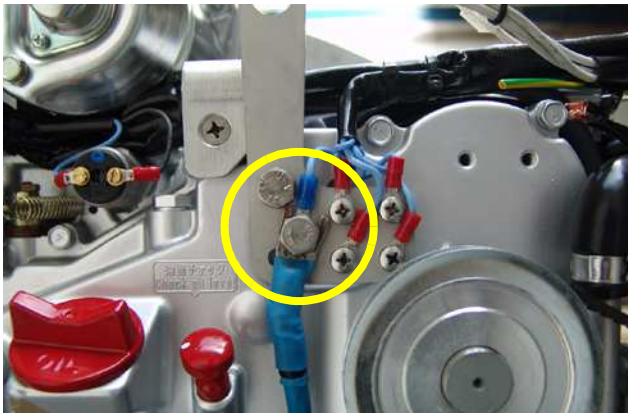


Fig. C.7.1-2: Connection starter battery

C.7.2 Fuse

F1: Fuse 30 A for DC system

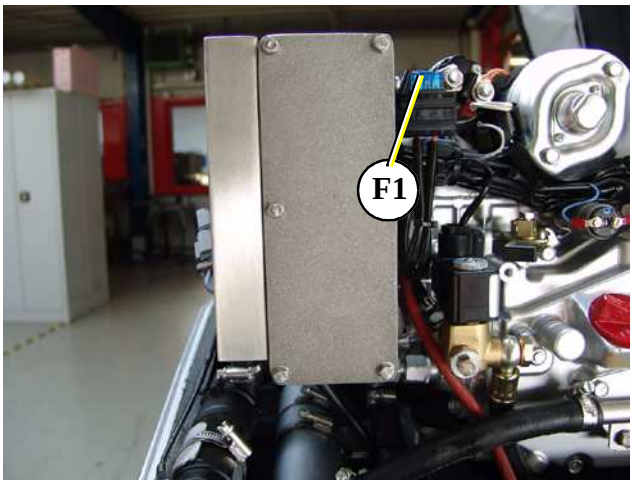


Fig. C.7.2-1: Terminal block AGT 4000 12V

C.7.3 Installation of the iControl panel - See iControl Manual

C.8 Generator Electric-System-Installation

ATTENTION! Before the electrical system is installed, READ the “Safety Precautions” on Page 12 of this manual FIRST! Be sure that all electrical installations (including all safety systems) comply with all required regulations of the regional authorities. This includes lightnening conductor, personal protection switch etc.

All electrical safety installations have to be made on board.

Required cable cross-sections

The following recommended electrical cable dimensions (cross sections) are the minimum required sizes for a safe installation *(see “nominal wire cross-section” on Page 73).*

D. Generator Failure

D.1 Tools and measuring instruments

In order to be able to manage disturbances while driving, following tools and measuring instruments should belong to the equipment on board:

- Multimeter for voltage (AC), frequency and resistance
- Measuring instrument for inductance
- Measuring instrument for capacity
- Current absorbing clamps
- Thermometer (ideal is a infrared thermometer)
- Pressure device (pincer) für coolant circuit

D.2 Overloading the Generator

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

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

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

Keep PEAK LOADING demand in mind when switching on electrical devices (esp. fridge compressors, electric motors, battery chargers, kettles, etc.) which are fed by the generator. Careful "powering up" (gradual loading) of the electrical demand on the generator will help prolong the life of your genset! The genset can be run for several hours at partial load (i.e. 2/3 of rated power), however it is not advised that it is run for more than 2-3 hours at full load. The Panda is designed so as not to overheat even under extreme conditions. Note: The exhaust gas will become sooty during peak-load operation.

Effects of Short Circuiting and Overloading on the Generator

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

D.2.1 Low Generator-Output Voltage

ATTENTION! Before working on the System read the section “Safety Precautions” on Page 12.

If the produced alternating voltage is too low, switch the load off, in order to relieve the generator. Mostly the problem already solved. If the output voltage is still too low, even if all load is switched off, the generator runs without load, you can assume one or more condensers are defective.

D.3 Starting Problems

D.3.1 De-aerating the fuel system

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

1. Put a container under the fuel return pipe to catch running out fuel to catch.
2. Take off the plug at the solenoid of the starter motor.
3. Switch the panel „ON“.
4. Press „START“-button. The fuel pump runs audible.
5. Switch the panel „OFF“.
6. Switch the panel „ON“.
7. Press again the „START“-button.

This procedure must be repeated several times, until fuel (nonporously) withdraws perfectly at the fuel return pipe.

8. Switch the panel „OFF“.
9. Attach the plug at the solenoid of the starter motor.

D.3.2 Fuel Solenoid Valve

For start problems the possibility of an error exists with the solenoid for engine stop or fuel solenoid valve, which both effect affect simultaneous on the fuel system.

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

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

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

Fuel solenoid valve

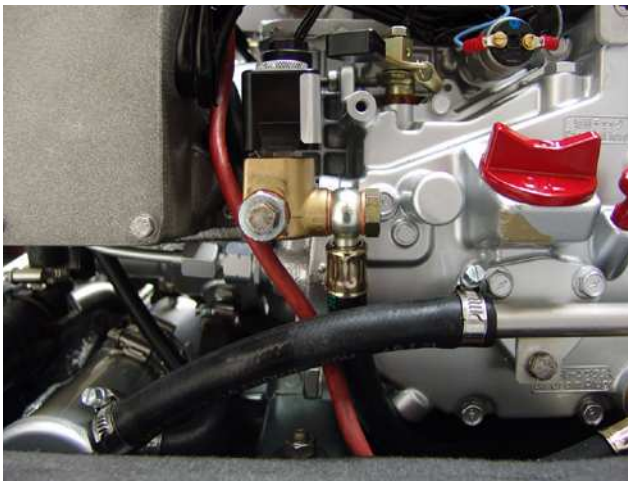


Fig. D.3-1: Fuel solenoid valve

D.4 Troubleshooting Table

For troubleshooting see “Trouble shooting” on Page 74.

E. Generator Maintenance Instructions

E.1 General maintenance instructions

E.1.1 Checks before starting

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

Maintenance see Table F.4, “Inspection checklist for services,” on Page 78.

E.1.2 Hose elements and rubber formed component in the sound cover

Check all hoses and hose connections for good condition. The rubber hoses are very sensitive to enviromental influences. They can season fast with dry air, in which environment of muted oil and fuel steams and increased temperature. The hoses must be checked regularly for elasticity. There are operating situations, at which the hoses must be renewed once in the year.

Additionally to usual tasks of maintenance (oil level check, oil filter control etc.) further maintenance activities are to be accomplished for marine aggregates.

E.2 Oil circuit maintenance

The first oil change is to be accomplished after a period of operation from 35 to 50 hours. Afterwards the oil is to be changed after 100 hours. For this the oil SAE30 for temperatures over 20℃ and SAE20 for temperatures between 5℃ and 20℃ is to be used. At temperatures under 5℃ oil of the viscosity SAE10W or 10W-30 is prescribed.

Type and amount of required oil see:Table F.5, “Engine oil,” on Page 79 and Table F.2, “Technical Data Engine,” on Page 77.

E.3 Execution of an oil change

Oil drain hose

For the oil change an oil drain hose is lead through the sound cover.

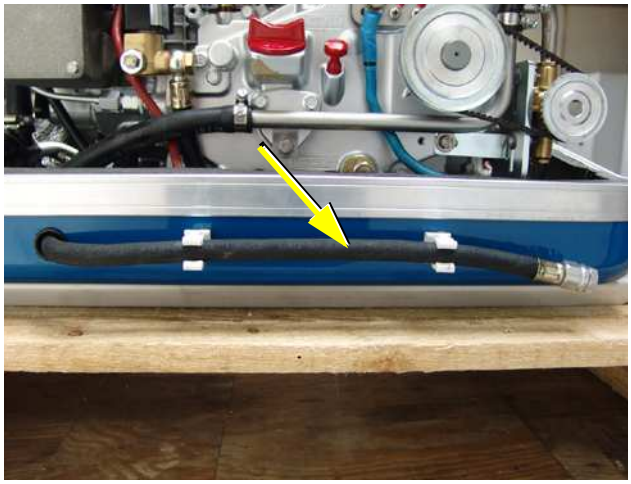


Fig. E.3-1: Oil drain hose

Oil drain screw

The oil can be discharged by opening the oil drain screw. For countering use a second wrench.

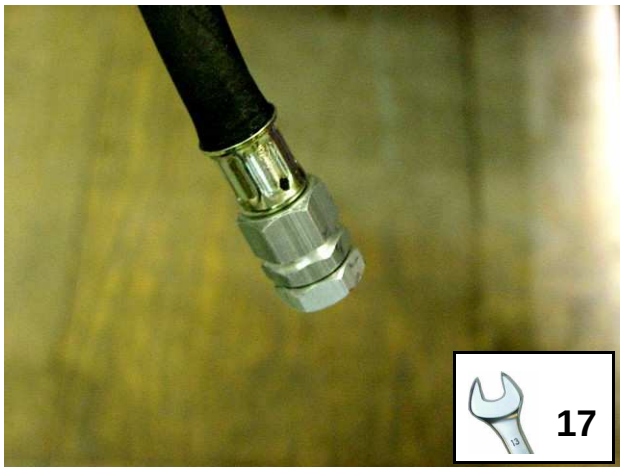


Fig. E.3-2: Oil drain screw

Oil drain pump

If discharging of the oil is not possible, we recommend the employment of a hand pump, which can be attached to the oil drain hose.

Afterwards the oil drain screw is closed again.

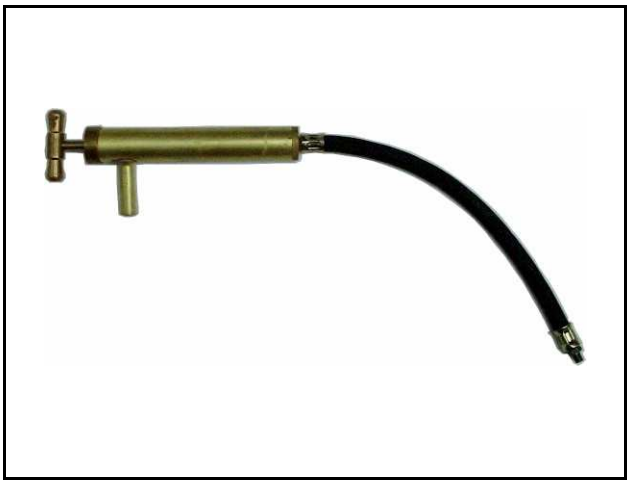


Fig. E.3-3: Oil drain pump

Oil strainer

The oil strainer must be cleaned every 500 opeatiing hours.

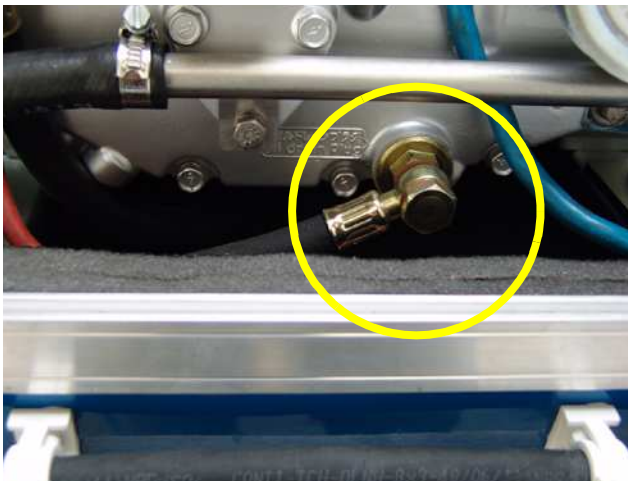


Fig. E.3-4: Oil strainer

Open the oil filler neck

After opening the cap of the oil filler neck the new oil is refilled.

Please wait instant, before measure the oil level, the oil must set off in the sump.

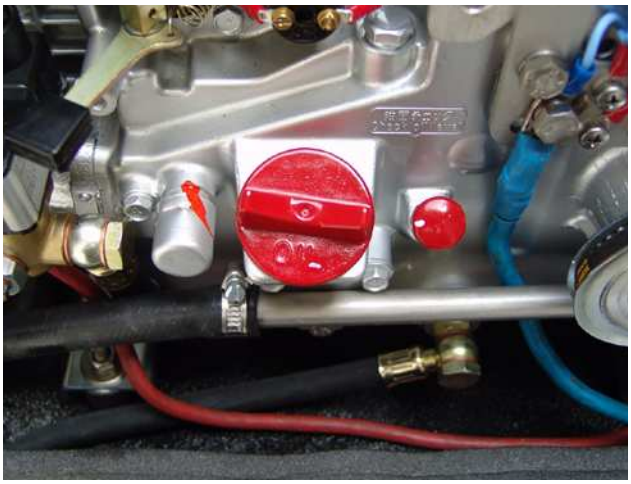


Fig. E.3-5: Oil filler neck

Oil dip stick

With the help of the engine oil dipstick the oil level is to examined. The prescribed filling level may not exceed the „Max“ marking.

We recommend 2/3 oil level.

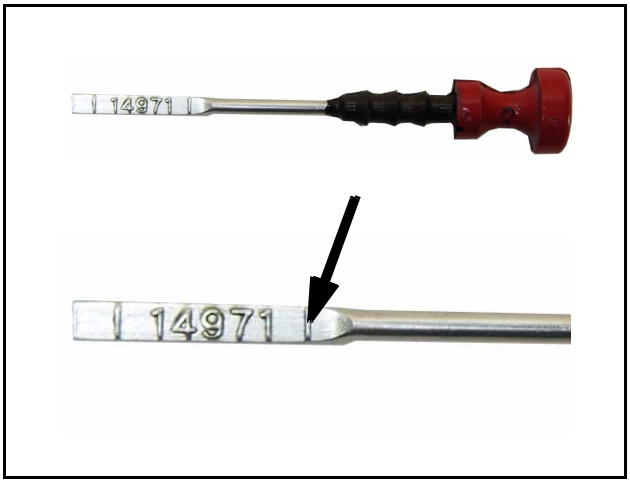


Fig. E.3-6: Oil dip stick

E.4 Checking the water separator in the fuel supply

The pre-filter with water separator has a cock at its lower surface, with this cock the downward sunk water can be discharged.

This is simply possible, water is heavier due to its density than the Diesel.

Fig. E.4-1: External fuel filter

E.4.1 De-aerating the fuel system

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

1. Put a container under the fuel return pipe to catch running out fuel to catch.

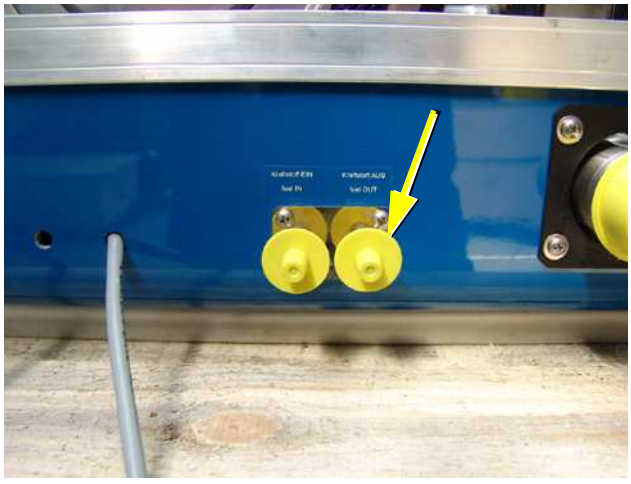


Fig. E.4.1-1: Fuel return pippe

2. Take off the plug at the solenoid of the starter motor.

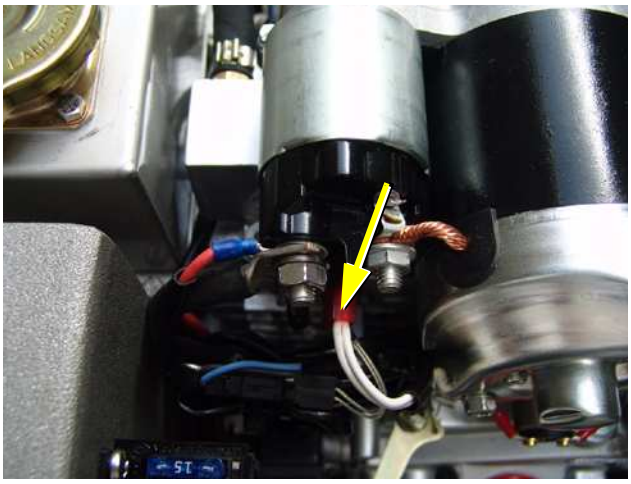


Fig. E.4.1-2: Starter motor

3. Switch the panel „ON“.

4. Press „START“-button. The fuel pump runs audible.
5. Switch the panel „OFF“.
6. Switch the panel „ON“.
7. Press again the „START“-button.

This procedure must be repeated several times, until fuel (nonporously) withdraws perfectly at the fuel return pipe.

8. Switch the panel „OFF“.
9. Attach the plug at the solenoid of the starter motor.

Fig. E.4.1-3: iControl

E.4.2 Replacement of the air filter

Open the air suctin housing by loosen the six hexagon head screws on the frame cover.

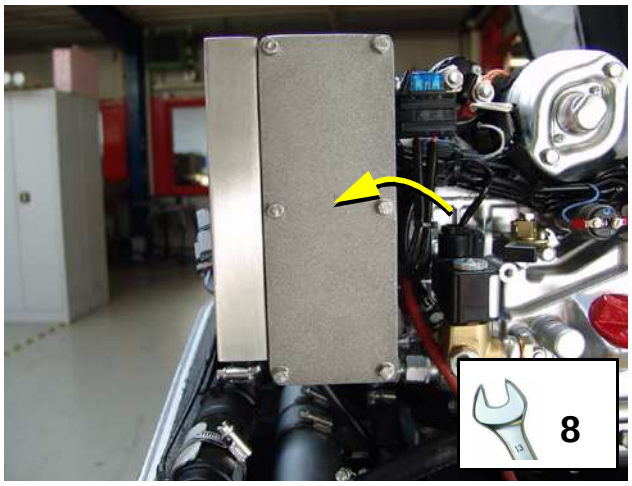


Fig. E.4.2-1: Air filter

Change the air filter mat and close the cover again.

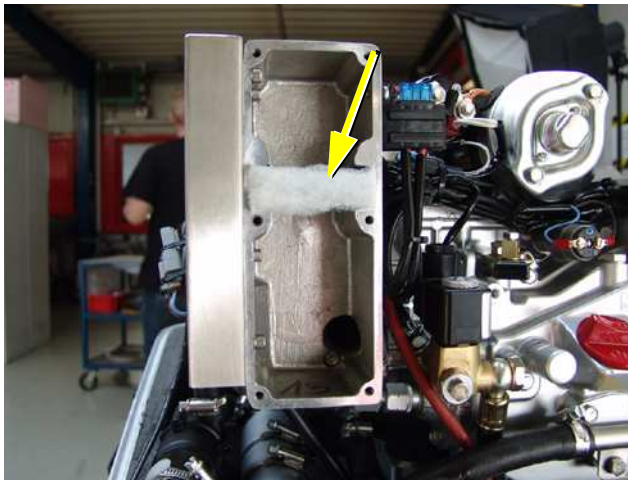


Fig. E.4.2-2: Air filter mat

E.5 De-aerating of the coolant circuit / freshwater

The Panda 4000i PMS is self de-aerating.

E.6 The raw water circuit

E.6.1 Clean raw water filter

The raw water filter should be released regularly from arrears. In each case the water cock must be closed before. It is mostly sufficient to beat the filter punnet.

If water should seep through the cover of the raw water filter, this may be sealed in no case with adhesive or sealant. Rather must be searched for the cause for the leakage. In the simplest case the sealing ring between caps and filter holders must be exchanged.

Fig. E.6.1-1: Raw water filter

E.6.2 Causes with frequent impeller waste

The impeller of the cooling water pump must be regarded as wearing part. The life span of the impeller can be extremely different and exclusively depends on the operating conditions. The cooling water pumps of the PANDA generators are laid out in such a way that the number of revolutions of the pump lies low compared with other aggregates. This is for the life span of the pump a positive effect.

Unfavorably affects the life span of the impeller, if the cooling water sucking in way is relatively long or the supply is handicapped, so that the cooling water sucking in range develops a negative pressure. This can reduce first of all the power of the cooling water pump extremely that the wings of the impeller are exposed to very strong loads. This can shorten the life span extremely.

Further the operation of the impeller pump loaded in waters with a high portion of suspended matters. The use of the impeller pump is particularly critical in coral waterbodies. Cases are well-known, which a impeller pump had so strongly run after 100 hours already that the lip seal on the wave was ground in. In these cases sharp crystal parts of the coral sand assess in the rubber seal and affect like an abrasive the high-grade steel shank of the impeller pump.

If the generator were mounted over the water level it is particularly unfavorable for the impeller pump. After the first start some seconds will pass by, until the impeller can suck in cooling water. This short unlubricated operation time damages the impeller. The increased wear can lead after short time to the loss. (see special notes: "Effects on the impeller pump, if the generator is mounted over the waterline").

E.6.3 Replacement of the impeller

Close the raw water stop cock.

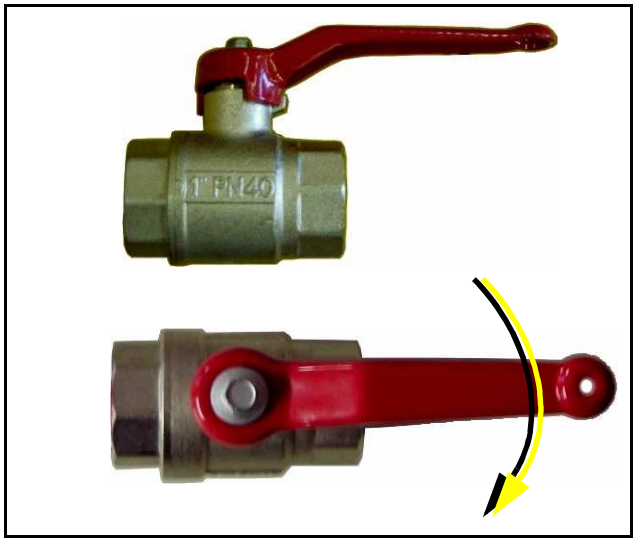


Fig. E.6.3-1: Raw water stop cock

Raw water pump on the front side of the genset.

Fig. E.6.3-2: Raw water pump

Remove the cover of the raw water pump by loosen the wing screws from the housing.

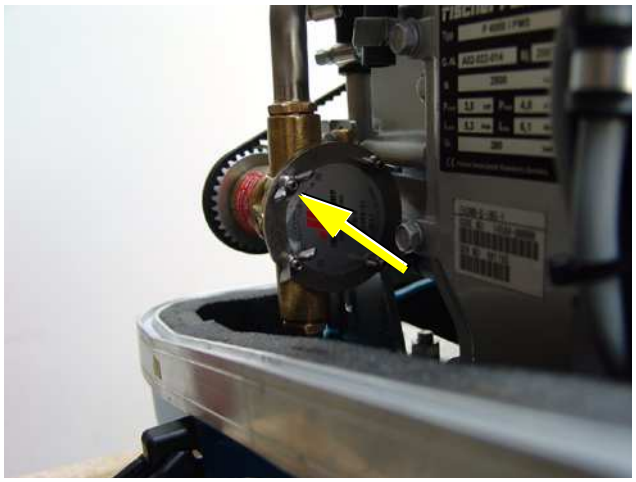
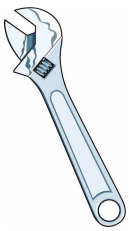


Fig. E.6.3-3: Raw water pump



Pull to the impeller with a multigrip pliers of the wave.

Mark the impeller, to make sure that these is used in the correct position at re-installation.

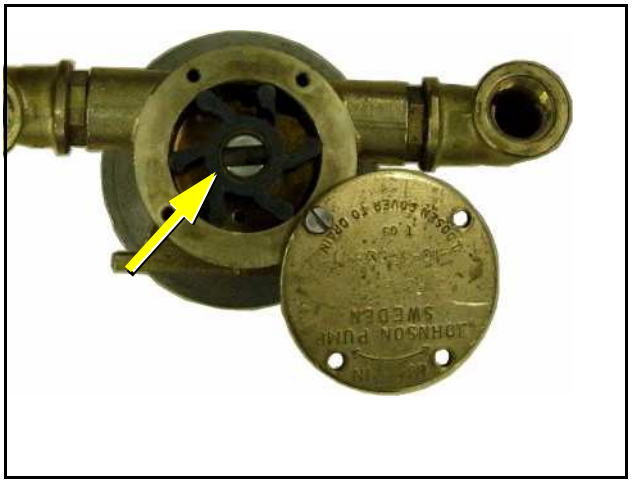


Fig. E.6.3-4: Impeller

Check to the impeller for damage and replace it if necessary.

Before the reinsertion into the housing the impeller should have been lubricated with glycerin or with a non-mineral oil based lubricant e.g. silicone spray.

Fig. E.6.3-5: Impeller

The impeller is attached to the pump wave (if the old impeller is used, pay attention to the before attached marking).

Fastening the cover and use a new seal.

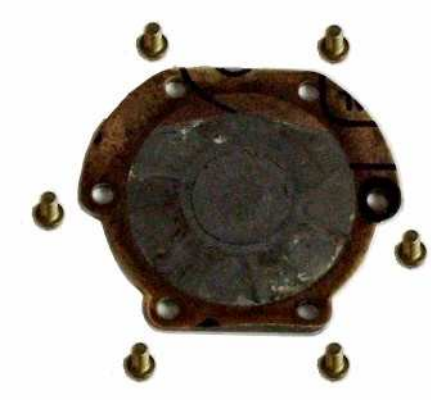


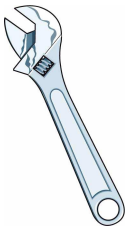
Fig. E.6.3-6: Impeller seal

Remind the customer

- to run the generator only with closed capsule.
- not to run the generator unattended
- to ask for regular service

E.7 Conservation at longer operation interruption

E.7.1 Measures on preparation of the winter storage



1. Rinse raw water circuit with an anti-freeze solution, even if this contains a corrosion protection means. The raw water inlet must be removed at the water cock. Over a hose connector the anti-freeze protection mixture is to be sucked in from a container. The leaked cooling water with the exhaust is to be led back into the sucking in container. The circuit must be kept upright some minutes to guaranteed that the anti-freeze protection mixture reaches all ranges of the cooling system.
2. The concentration of the anti-freeze mixture in the internal cooling circuit must be checked with a suitable measuring instrument. The concentration must be furnished according to the lowest temperatures which can be expected.
3. Clean raw water filter and check seal.
4. Check water cock for practicability. And spray with a corrosion protection oil from the inside or lubricate with acidless grease.
5. Check all hoses and hose connectors for good condition. The rubber hoses are very sensitive to enviromental influences. They can age fast with dry air, in environment of light oil and fuel steams and increased temperature. The hoses must be checked regularly for elasticity. There are operating situations, which the hoses must be renewed once in the year.
6. Check the hose connectors at all raw water valves doubly and if possible protect them with double hose clamps.
7. Dismount the impeller of the cooling water pump and check for wear. The impeller may not remain in the pump. It must be greased with vaseline and be kept at a dark place. It can be reintragrated in the spring again into the pump, if it is in good condition. The impeller is a wearing part, it is recommended to renew it always in the spring, independently how many operating hours the aggregate ran.
8. Control of the vent valve at the raw water inlet. If the generator is installed below the waterline, always a vent valve is necessary. The vent valve must be checked also during the season regularly. In the winter storage the vent valve should always be disassembled, checked and greased. Hardens or got parts dirty are to be replaced.
9. Check water lock: If the generator were rinsed with an anti-freeze mixture, the antifreeze mixture can leave in the water lock. If the generator were rinsed with fresh water, the water in the water lock must be drained. Otherwise the danger exists that the collector is blown up and destroyed by ice.
10. Check the exhaust/water separator on leakage and if the hose connectors at the lower surface of the separation unit are in normal condition. (with extremely sulfureous fuels it is possible that also high-grade steel tube ends are attacked.)
11. Check all construction units at the generator inside the sound cover for leakages. If there are traces of humidity in the sound cover, the cover must be dried. Further the cause for the wetness must be surched and eliminated.
12. During the winter storage the upper section of the sound cover must be taken off, in order to avoid condensed moisture formation, if traces of humidity remain in the sound cover inside casing by leakages in the raw water circuit.

E.7.1 Measures on preparation of the winter storage

13. The generator housing and the housing of the engine should be sprayed with a corrosion protection oil before the winter storage. This procedure is recommended also in the season. This procedure can avoid that arising and humidity marks on the surface of the aluminum construction units be noticed too late.
14. Disconnect the starter battery (positive and negative pole).
15. Lubricate the spindle for the number of revolutions adjustment device with a special lubricant (Antiseize grease).
16. Use of a air dehumidifier. The best way to protect a yacht in the winter storage against damage by humidity is, to places a air dehumidifier inside the ship and locks all hatches. The devices have a hygrometer, which switches the device off, if the humidity is under the adjusted value. There is no better method, in order to protect pads, cable, electronics, wood, engines etc. optimally against any rotting by humidity.

E.7.2 Initiation at spring

- Before the first start turn the engine once with the hand, in order to eliminate necessary existing corrosion beginnings in the bushing. If necessarily carry out normal engine inspection.
- Change engine oil and engine oil filters.
- Reintegrate the impeller of the cooling water pump and check pump for leakage.
- Charge starter battery of the generator, connect cables and check battery voltage.
- Start generator and check the basic adjustments of the generator such as voltage, speed regulation etc..
- Check all switching off devices for function by operational procedures.

Fischer Panda does not take over adhesion for possible damages!

F. Generator Tables

Tabelle 1: Diameter of conduits

Generator type	Ø Cooling water pipe		Ø Exhaust hose [mm]	Ø Fuel hose	
	Fresh water [mm]	Raw water [mm]		Supply [mm]	Return [mm]
Panda 4000i PMS	20	20	30	8	8

Tabelle 2: Technical Data

Type	Nominal power [kW]	Continuous power [kW]
Panda 4000i PMS	4	3,2

Tabelle 3: Cable cross-section

Wiring for vehicle. single phase, not tin-plated, PVC-isolated.		
nominal wire cross-section [mm²]	**allowed continuous current (reference point) [a]**	
	at +30℃ [A]	**at +50℃ [A]**
1	19	13,5
1,5	24	17,0
2,5	32	22,7
4	42	29,8
6	54	38,3
10	73	51,8
16	98	69,6
25	129	91,6
35	158	112
50	198	140
70	245	174
95	292	207
120	344	244

a. DIN VDE 0298, part 4.

F.1 Trouble shooting

GENERATOR OUTPUT VOLTAGE TOO LOW If the generator delivers less than 24V current ("undervoltage"), there can be various reasons for this:	
Cause	**Solution**
PGMi is overloaded.	Reduce the electrical load. (Switch off load)
Motor is not reaching the rated rpm.	Refer to "motor faults" section.

MOTOR DOES NOT TURN OVER WHEN STARTING	
Cause	**Solution**
Battery main switch is switched off.	Check the position of the battery main switch, if necessary switch on..
Battery voltage not sufficient.	Check that connection is firm and whether corrosion has occurred..
Starting current fault.	The voltage of full batteries fall to a maximum of 11V. The wiring is severed if the voltage does not drop. The battery is discharged if the voltage drops further.

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

MOTOR DOES NOT TURN OVER AT THE NORMAL SPEED DURING THE STARTING PROCESS	
Cause	**Solution**
Starter battery voltage insufficient.	Check battery.
Damaged bearing(s) piston (seized).	Repairs need to be carried out by Kubota-Service. (refer to Kubota motor-manual)
Cooling water in combustion chamber.	1. Turn generator "OFF" at control panel. 2. Remove the glow plug (see Kubota-manual). 3. Rotate the motor by hand carefully. 4. Check if there is water in the oil and change both oil and filter if necessary. 5. Determine cause for excess water in the combustion chamber. The excess water can be caused by a defective air vent in the cooling water system, which should be checked and cleaned, or replaced if faulty.

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

DROP IN THE SPEED OF THE MOTOR	
Cause	**Solution**
Too much oil.	Drain oil.
Lack of fuel.	Check fuel supply system: - fuel filter, renew if necessary - check fuel pump - check fuel lines (bleed if necessary)
Lack of intake air.	Check air intake paths. Check and clean air filter (and intake muffler if installed).
Generator overloaded by too many load.	Reduce the electrical load (switch off load).
Defective generator (windings, bearings, or other).	Generator must be sent to manufacturer for repair of damaged bearings or winding.
Damaged engine.	Repair of bearing damage, etc., by Kubota-Service.

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

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

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

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

F.2 Technical Data Engine

	Panda 4000i PMS
Type	EA 300
Govenour	--
Cylinder	1
Bore	75mm
Stroke	70mm
Stroke volume	309cm^3
max. Power (DIN 6270-NB) at 3000rpm	5,1kW
Rated speed	3000rpm
Idle speed running [a]	2900rpm
Valve clearance (engine cold)	0,16 - 0,20mm
Cylinder head torque	58,8 - 63,7Nm
Lubrication oil capacity	1,3l
Fuel consumption [b]	approx. 0,42 - 1,12 l

a. progressive speed by VCS
b. 0,35l/kW electrical power, the randomized values between 30% and 80% of the nominal power

F.3 Types of coil

HP3 delta connection

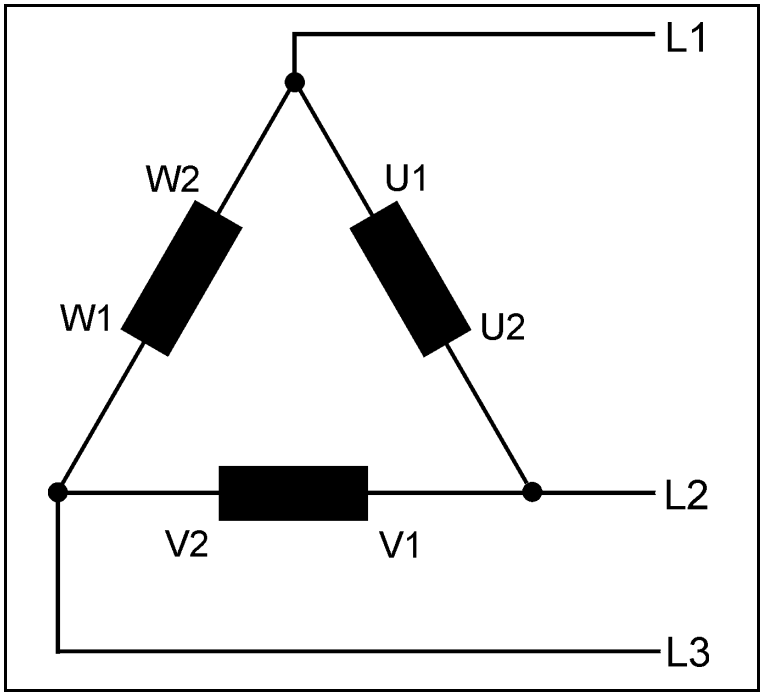


Fig. F.1: HP3 delta connection

F.4 Inspection checklist for services

Inspection-Category			
A	Installation check	D	100 h
		E	500 h
B	daily	F	1000 h
C	35 - 50 h	G	5000 h

Inspection work			
1)	check	4)	change
2)	measure	5)	sealing
3)	clean	6)	check isolation

	Inspection-Category							Inspection work
	A	B	C	D	E	F	G	
01.	5)	5)	5)	5)	5)	5)	4)	coolant water hoses
02.	1)	1)	1)	1)	1)	4)	4)	raw water pump (impeller)
03.	1)	1)	3)	3)	3)	3)	3)	water separator / fuel pre-filter
04.	1)	1)	4)	4)	4)	4)	4)	engine oil
05.					3)	3)		oil strainer
06.	1)	1)	1)	4)	4)	4)	4)	air filter
07.	1)	1)	1)	1)	1)	1)	1)	fuel lines (leaks)
08.	1)	1)	1)	4)	4)	4)	4)	fine particle fuel filter
09.	1)		1)		1)	1)	1)	valve clearance
10.	1)	1)	4)	5)	4)	4)	4)	valve cover gasket
11.			1)		1)	1)	1)	coolant therm (sensor)

12.			1)		1)	1)	1)	exhaust temp sensor
13.			1)		1)	1)	1)	oil pressure sensor
14.		1)	1)	1)	1)	1)	1)	belt tension
15.	1)	1)	1)	1)	4)	4)	4)	"V" belts
16.						1)	1)	Thermostat
17.	1)	1)	1)	1)	1)	1)	1)	generator & engine screws
18.	1)	1)	1)	1)	1)	1)	1)	unit's base mount screws
19.	6)	6)	6)	6)	6)	6)	6)	check electrical cables
20.	1)	1)	1)	1)	1)	1)	1)	motor reinforced mountings
21.	1)	1)	1)	1)	1)	1)	1)	actuator mounting
22.	1)	1)	1)	1)	1)	1)	1)	starter motor mounting screws
23.	1)	1)	1)	1)	1)	1)	1)	screws generator-engine
24.	2)		2)	2)	2)	2)	2)	input temp of coolant under load
25.	2)		2)	2)	2)	2)	2)	outlet temp of coolant under load
26.						4)	4)	generator rotor bearing
27.			1)	1)	1)	1)	1)	signs of corrosion to generator
28.	1)		1)	1)	1)	1)	1)	VCS function test
29.	2)		2)	2)	2)	2)	2)	voltage without load
30.	2)		2)	2)	2)	2)	2)	voltage under load
31.	2)		2)	2)	2)	2)	2)	current under load
32.	2)		2)	2)	2)	2)	2)	engine speed (rpm)
33.						1)	4)	injector test
34.						1)	1)	compression
35.	1)	1)	1)	1)	1)	1)	1)	hose clips
36.	1)	1)	1)	1)	1)	1)	1)	recifier
37.	1)	1)	1)	1)	1)	1)	1)	test cable with temperature tester

F.5 Engine oil

Engine oil classification

Operating range:

The operating range of an engine oil is determined by SAE class. "SAE" is for the union of American engineers (Society of Automotives Engineers). The SAE class of an engine oil only informs over the viscosity of the oil (larger number = more viscous, lower number = more highly liquidly) e.g. to 0W, 10W, 15W, 20, 30, 40. The first number shows the liquid of cold weather, the second number refers to the fluidity with heat. Complete yearly oils have usually SAE 10W-40, SAE 15W-40 etc.

Quality of oil:

The quality of an engine oil is specified by the API standard ("American Petroleum Institutes"). The API designation is to be found on each engine oil bundle. The first letter is always a C.

API C for diesel engines

The second letter is for the quality of the oil. The more highly the letter in the alphabet, the better the C für Dieselmotoren.

Examples for diesel engine oil:

API CG Engine oil for highest demands, turbo-tested!

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

F.6 Coolant specifications

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

Fischer Panda recommend to use the product: GLYSANTIN PROTECT PLUS/G 48.

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

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

F.7 Measurements

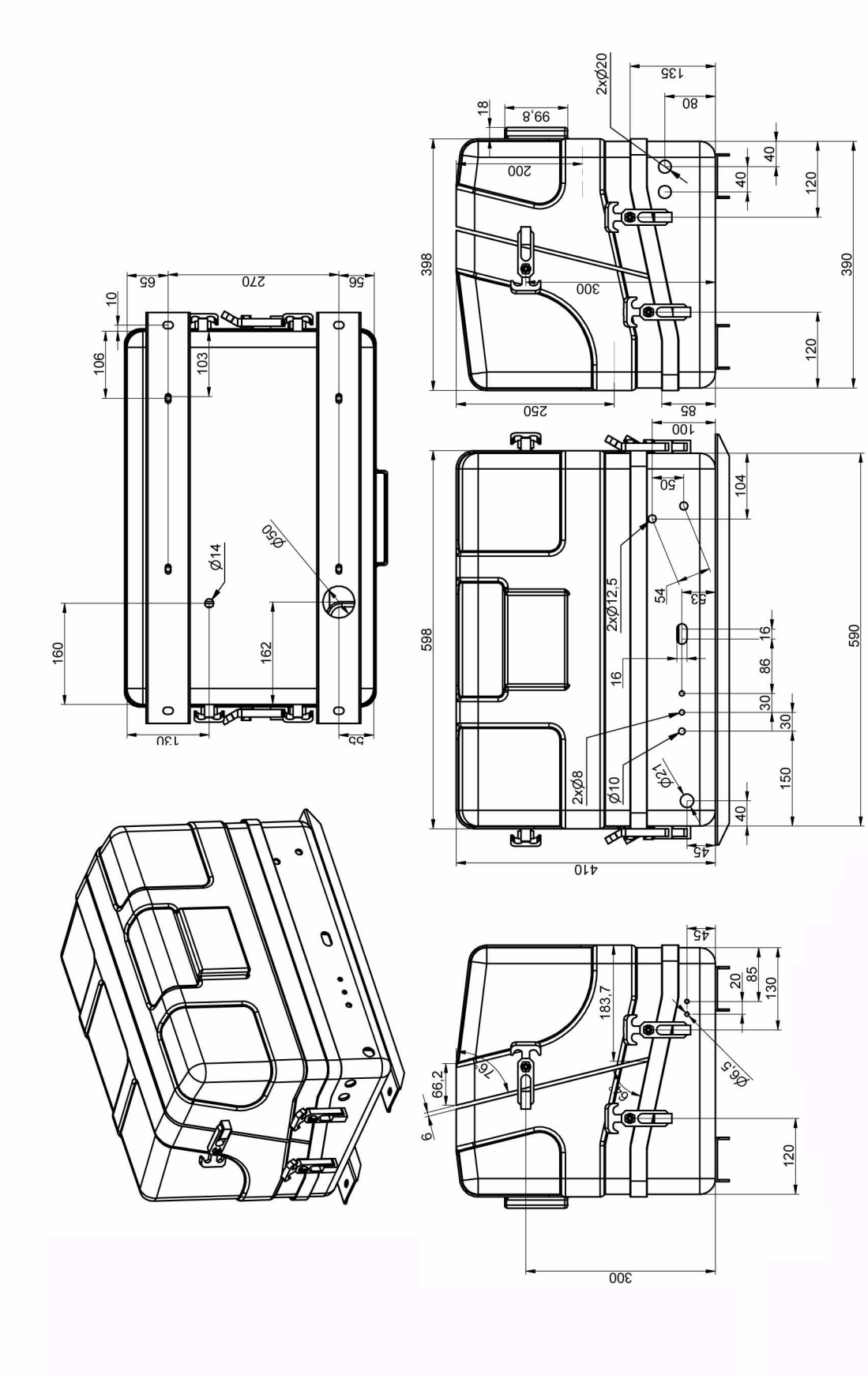


Fig. F.2: Measruremants

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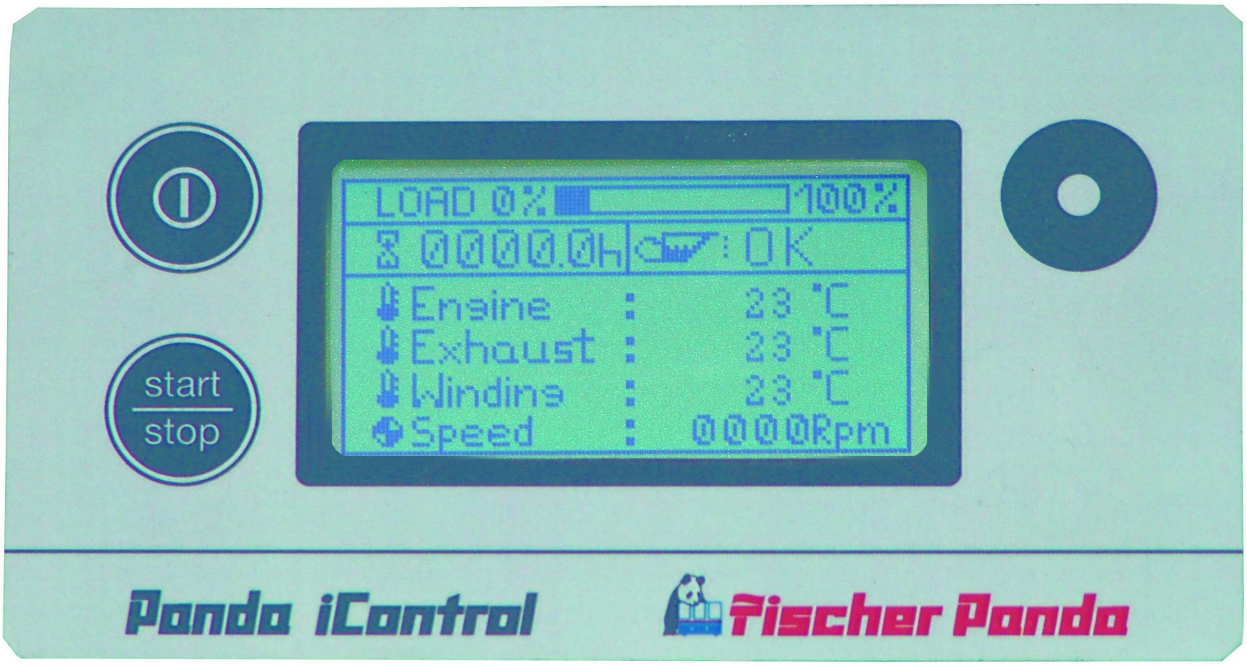
Panda i-series

Part 2: Panel Panda iControl Manual



Panel Panda iControl

Fischer Panda GmbH

iControl_eng.R03 7.4.09

Current revision status

	Document
Actual:	Panda_iControl_eng.R03_7.4.09
Replace:	Panda_iControl_eng.R02

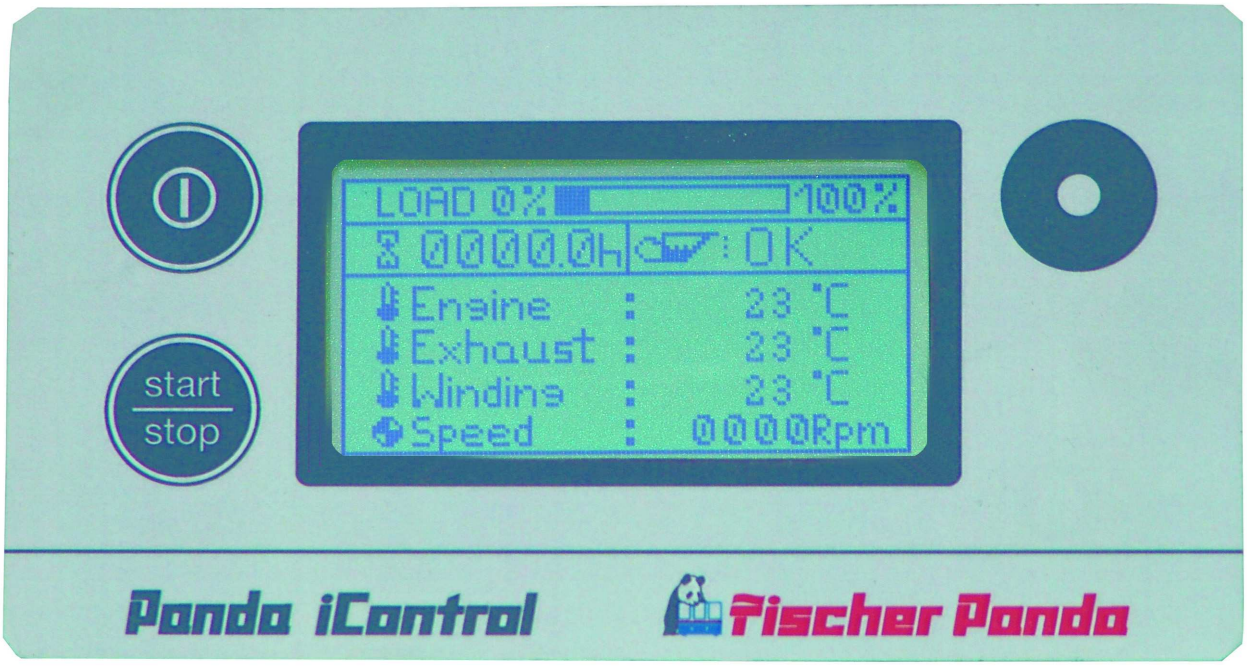
Revision	**Page**
Update the whole manual	
connection to 6000i update	

Fischer Panda Datasheet

A. Panda iControl

Art Nr..	21.02.02.01H
Bez.	Panda iControl

	Document	Hardware	Software
Actual:	R04		
Replace:	R03		



Fischer Panda Datasheet

A.1 Safety instructions

The generator may not be taken into use with the cover removed.

The rotating parts (belt-pulley, belts, etc) must be covered and protected so that there is no danger to life and body!
If a sound insulation cover must be produced at the place of installation, then well-placed signs must show that the generator can only be switched on with a closed capsule.
All servicing-, maintenance or repair work may only be carried out, when the motor is not running.

Electrical power: DANGER TO LIVE!

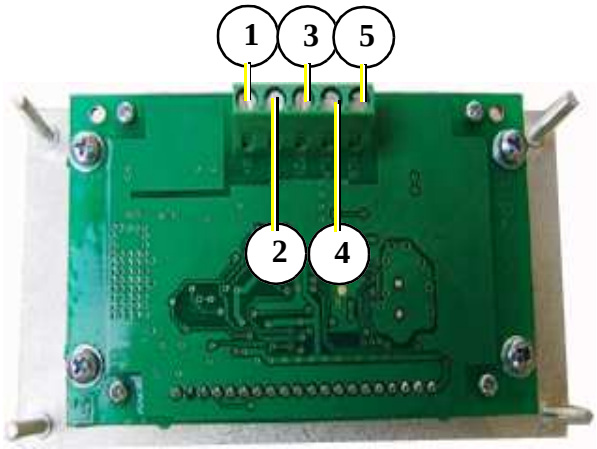
Electrical voltages above 48 volts (battery chargers greater than 36 volts) are always dangerous to life). The rules of the respective regional authority must be adhered to. Only an electrician may carry out installation of the electrical connections for safety reasons.

Before start working at the Panda i-series generator (service, repair ect), diconnect the starter battery (First minus cable, then positive cable), so that the generator cannot be unintentionally started.

A.2 Connection of the iControl

To connect the iConrol use the original prepared cable.

(6 wires shilded)



Terminator	cablecolour 4000i	cablecolour 6000i
1. U+ cablecolour	brown	brown
2. Gnd cablecolour	brown-white	grey
3. RZL cablecolour	green	green
4. D_A cablecolour	blue	white
5. D_B cablecolour	blue-white	yellow
Between clamp RZL(3) und Gnd(2) an automatik start device (Battery monitor) can be connected		

Fig. A.2-1: Connection of the iControl

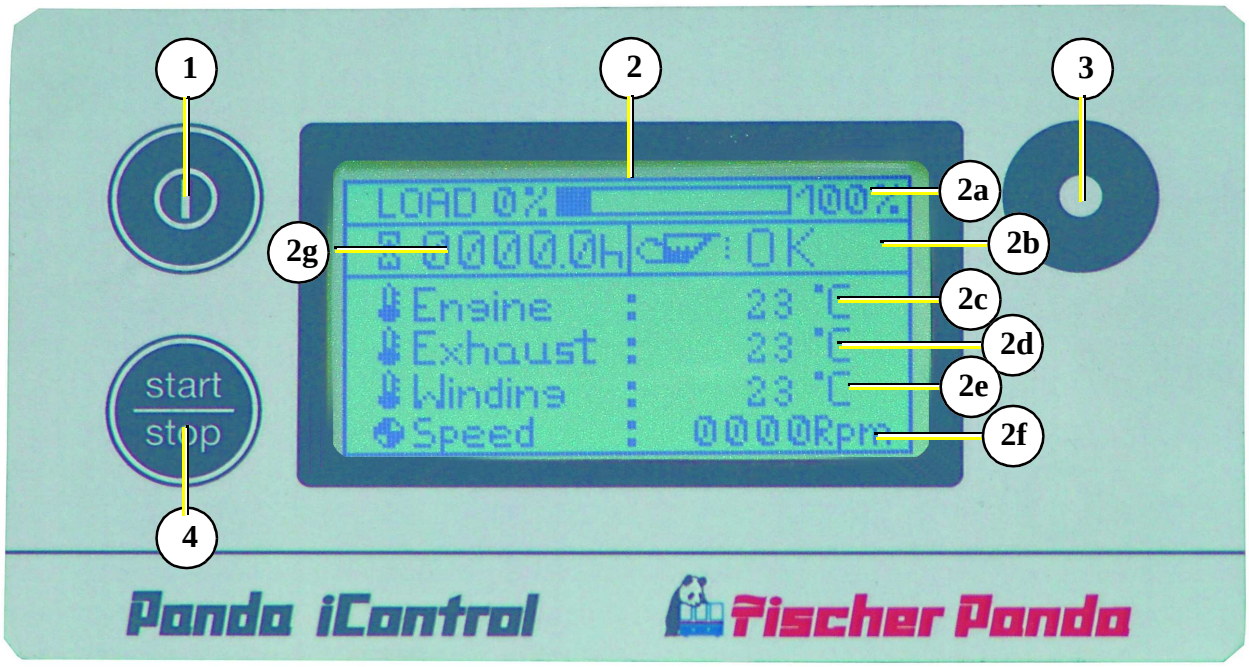
Fischer Panda Datasheet

Note

Regarding to the open electric board the iControl panel has a protectrive class IP00.

Builded in a control board with a siutable seal (f.e. Sikaflex) IP66 can be reached.

A.3 Buttons and display of the iControl



1. Button „on/off“
2. Display
2a. Load indication in %
2b. Oil pressure indication „OK“ oder „Fault“
2c. Engine temp. indication
2d. Exhaust elbow temp. indication
2e. Stator Winding temp. indication
2f. Engine rpm indication
2g. Operation hours
3. Button „enter“
4. Button „start/stop“

Fig. A.3-1: Buttons and diplay of the iControl

Warning! At the Electronic board is an voltage of 450V. Only special trained persons are allowed to open the cover of the Electronic board. !!!DANGER TO LIVE!!!

Fischer Panda Datasheet

A.4 Engine control

The iControl Panel and Electronic Board is for driving the Panda i-series generator. Push the „on/off“ button to start the panel(1). The panel will come up in the „stand by mode“.

„stand by mode“

in the stand by mode the iControl checks the generator

- Display shows welcome screen
- the Led-Light will switch off after 2 min. (energie save)
- push the „enter“ button“ to reset the LED-Light timer
- start the generator with the „start/stop“ button --> „run mode“
- start the generator with the „automatic start“ option --> „run mode“

„run mode“

Generator was started with the “start/stop“ button or with the „automatic start option“

- Display light is on
- Display shows generator data
- stop the generator with the „start/stop“ button --> „standby mode“
- stop the generator with the „automatic start“ option --> „standby mode“

A.5 Operation manual

A.5.1 Daily routine checks before starting

1. Oil Level Control (ideal level: 2/3 of maximum).

AtTTENTION! OIL PRESSURE CONTROL!
True, the diesel motor automatically switches off when there is a lack of oil, but it is very damaging for the motor, if the oil level drops to the lowest limit. Air can be sucked in suddenly when the boat rocks in heavy seas, if the oil level is at a minimum. This affects the grease in the bearings. It is therefore necessary to check the oil level daily before initially running the generator. The oil level must be topped up to the 2/3 of maximum level, if the level drops min. mark.

2. State of Cooling Water.

The external compensation tank should be filled up to a 1/3 level of in a cold state. It is very important that large expansion area remains above the cooling water level.

3. Open Sea Cock for Cooling Water Intake.(if necessary)

For safety reasons, the seacock should be closed after the generator is switched off for a longer time. It should be re-opened before starting the generator.

4. Check Raw water Filter.

The raw water filter must be regularly checked and cleaned. The impeller fatigue increases, if residual affects the raw water intake.

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5. Check all Hose Connections and Hose Clamps are Leakage.
Leaks at hose connections must be immediately repaired, especially the raw water impeller pump. It is certainly possible that the raw water impeller pump will produce leaks, depending upon the situation. (This can be caused by sand particles in the raw water etc.) In this case, immediately exchange the pump, because the dripping water will be sprayed by the belt pulley into the sound insulated casing and can quickly cause corrosion.
6. Check all electrical Lead Terminal Contacts are Firm.
This is especially the case with the temperature switch contacts, which automatically switch off the generator in case of faults. There is only safety if these systems are regularly checked, and these systems will protect the generator, when there is a fault.
7. Check the Motor and Generator Mounting Screws are Tight.
The mounting screws must be checked regularly to ensure the generator is safe. A visual check of these screws must be made, when the oil level is checked.
8. Switch the Land Electricity/Generator Switch to Zero before Starting or Switch Off all the Load.
For the automatic option make shure that the load is connected to the PMGi only, when the nominal output of
9. Check the Automatic Controls Functions and Oil Pressure.
Removing a cable end from the monitoring switch carries out this control test. The generator should then automatically switch off. Please adhere to the inspection timetable (see Checklist in the appendix).

Attention! Make sure that the PMGi is connected with the generator. Never connect or disconnect the PMGi when the generator is running. This will destroy the PMGi. (it may burn or explode)

A.5.2 General

Very low Temperatures

The generator is disigned to start at temperatures up to -20 °C. Please make sure, that the fuel is siutable for your temperature range.

The electronic of the iControl changes the pre-glow time at the generator start according to the actual generator temperature. The normal time at a cold engine is 8 sec. The pre-glow times rises at temperatures below 8 °C and drops (down to 0 sec.) at temperatures over 40℃.

Tips regarding Starter Battery

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

Engine Oil at winter conditions.

Make sure using a siutable engine oil at winter conditions.

Do not use start help sprays or similar.

A.5.3 Long time run of the generator

Make sure the PMGi is not overloaded. The PMGi will switch off in this case.

We recommend to calculate the normal load should be at 80 % of the nominal load of the generator and PMGi. Normel load is in this case the load you need for a very long period. Nearly 100 % of the nominal power of the generator and PMGi can be used for 2-3 hours without any problems.

A.5.4 Start of the generator

1. Open the fuel valve (if necessary)
2. Close the battery switch (if necessary)
3. Push "on/off" button (turn iControl on).

   Panel comes up with „Welcome“ screen
4. Push the „start/stop“ button to switch from „Welcome“ to the „Main“ screen

   Screen switch to „Main“ screen
5. Push „start/stop“ button

   The Engine pre-glow and start. It is not allowed to run the starter motor for more than 10 sec. If the generator does not start within this time, the start is blocked for 20 sec.
   Please check if the fuel is present at the generator, before you try to start the generator again. (and if the fuel is siutable for the temperature range)
6. Switch on the load when the nominal output of 230V / 50Hz is reached at the PMGi. See “Automatic start” on page 81.

ATTENTION: If there is difficulty in starting - close the seacock (Panda Marine Generators only)

If the generator engine does not start immediately and further start attempts are necessary, then the seacock MUST be closed (i.e. for ventilating the fuel lines etc.) The cooling water impeller pump turns automatically and draws cooling water as long as the motor is turning. If the diesel motor is running, the cooling water is blown out by the exhaust system gases. The cooling water cannot be pressed through the exhaust as long as the diesel motor does not run at sufficient speed. This leads to severe motor damage.

Open the seavalve as soon as the generator is started.

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A.5.5 Stop of the generator

1. At higher temperatures (over 25℃) the generator should run 5 min. after the load has been switched off in order to cool down)
2. Push the „start/stop“ button to switch off the generator.
3. Close additional switches (battry, fuel ect.).
4. Push the „on/off“ button to turn off the iControl“.

A.5.6 Automatic start

The iControl has an „automatic start“ option at clamp RZL and Gnd. Close the connection of these clamps to start the generator. Open it to stop the generator.

If you use this option make sure that the load is connected to the PMGi after the output has reached the nominal 230V / 50Hz and not to overload the PMGi (some electronic devices - such like air conditions - need an higher starting current. You may use a relay which connects the load at 230V.

To activate the automatic start:

1. Turn the panel on („on/off“ button)
2. Switch to „Main“ screen („start/stop“ button)
3. Activate automatic start („enter“ button)

To deactivate the automatic start, press the „enter“ button again or switch the panel off with the „on/off“ button

Fig. A.5.6-1: Display automatic start

A.5.7 Additional information

1. The revision of the hard and software is stored in the electronic memory and can be read out by the service technican.
2. If the iControl is in the stand by mode and the battery voltage drops under 12.1V for more than 2 min., the iControl shut the system off to prevent the battery for total discharge.

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A.6 Error warnings

Error warnings are shown in the display. The screen switch from the temperature to „High“.

Following warnigs are displayed

Engine temp.	**> 75 °C**
Exhaust temp.	**> 70 °C**
Winding temp.	**> 120 °C**

Table 1: Warning table

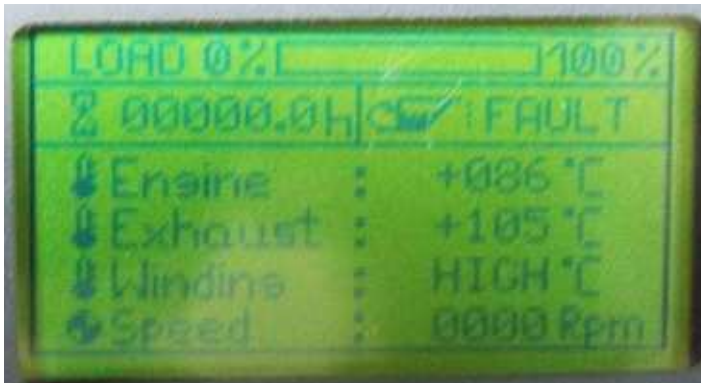
Example for the warning on the display (Winding temp. „HIGH“)   

Fig. A.6-1: Display warning (winding temp „high“) - example

A.7 Errors

The least 5 errors are stored in the electronic memory and can be read out by the service technican..
Push the „enter“ button to quitt errors which has stopped the generator

Unexpected stop	Generator stops during operation or RPM droped under 1100 RPM (Fuel low, overload ect.)
Fault: Oilpress	Oilpressure to low
Fault: Winding	Winding temp. over 135℃
Fault: Exhaust	Exhaust tem over> 75℃ (PMS version) or>100℃(vehicles versions)
Fault: Cyl. Head	Cylinder head temp. over >90℃ (PMS version) or >95℃ (vehicles versions)
Starting Fail	Generator do not start after 10 sec.

Table 2: Fault table

Example for an error display after the generator was stopped.

(Oil Pressure failed)

Fig. A.7-1: Display warning (oil pressure failed) - example

A.8 Electronic board

The iControl panel has an electronic board which is mounted at the Generator. This board controls all generator functions.

The bord is in a box and contains self healing fuses and relais.

For safety reasons it is not allowed to open the box of the electronic board. Inside there are up to450VAC. !!!DANGER TO LIFE.

Only special trained persons are allowed to change the board in case of an error.

A.8.1 Location at the Panda i-series generator

Electronic board at the Panda 4000i PMS.

The location of the electronic board is depended on the generator type and can vary.

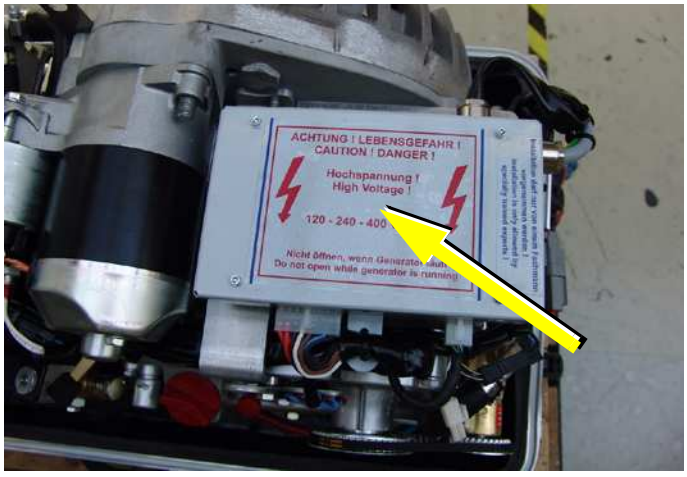


Fig. A.8.1-1: Location of the electronic board

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A.9 Technical data

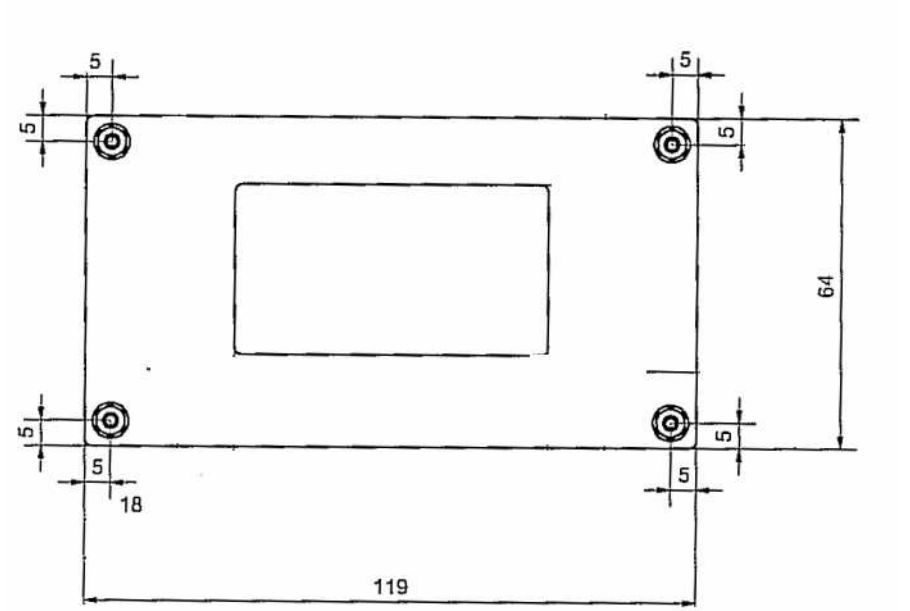
A.9.1 Intended use

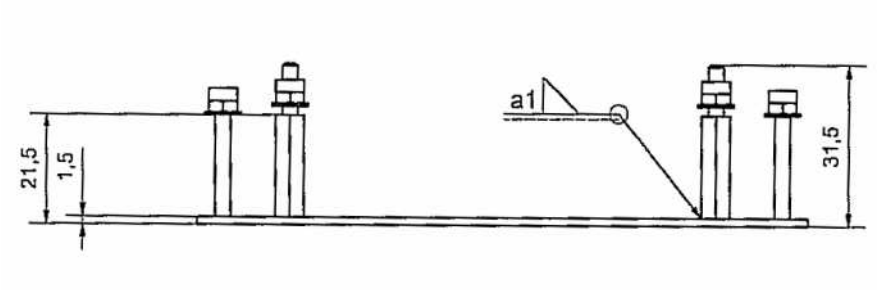
The Panda iControl is a part of the Panda i-series generator. It is not allowed to use the iControl at other generators or applications.

The iControl must be connected with the electronic board at the generator.

Attention! See also the safety instructions in the generator and the PMGi manual. The rules of the respective regional authority must be adhered to. Only an electrician may carry out installation of the electrical connections for safety reasons.

A.9.2 Dimensions





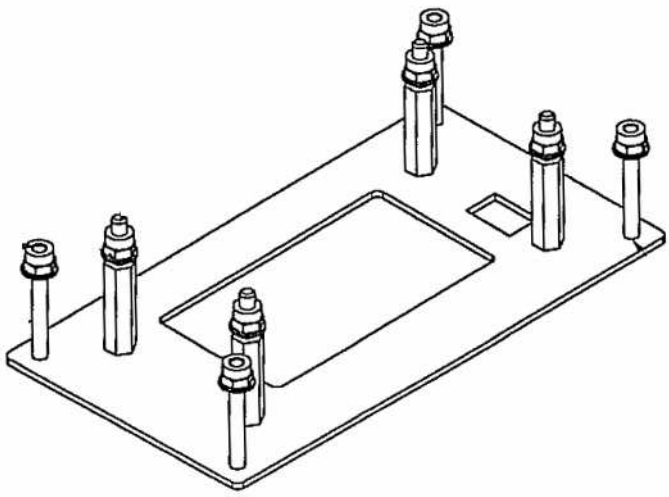


Fig. A.9.2-1: Dimensions

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