Fischer Panda

Panda 6000i PMS

Super silent technology

230V 50Hz 6kW

Fischer Panda GmbH

16.1.09
Panda_6000i_System_eng_s01835.book.R01

Revision

	Document
Akcuell:	Panda_6000i_System_eng_s01835.book.R01_16.1.09
Replace	

Revision	**Page**

Table of contents

Table of contents

Table of contents

Table of contents

A. Panda 6000i system

A.1 Components

1. Panda 6000i PMS Generator

Permanent-Magnet-Generator

Art. no. C10060BX1SV01

Manual see “Part 1: Generator Manual” on page 9.

Fig. A.1-1: Panda 6000i generator

2. Panel Panda iControl with electronic board at the generator

Art no. 21.02.02.011H (Panel)

Art no. 21.02.01.005H (electronic board)

Manual see “Part 2: Panel Panda iControl Manual” on page 79.

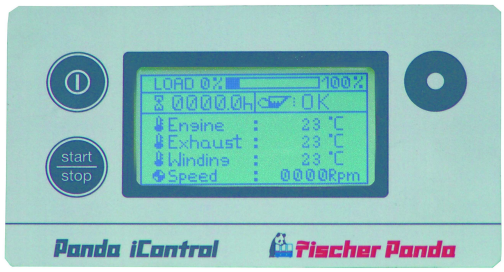


Fig. A.1-2: iControl panel

3. Panda PMGi 6000 Inverter AC/AC 6kW 230V / 50Hz

Art. no. 21.07.03.008P

Manual see “Part 3: PMGi 6000 inverter Manual” on page 93.

Fig. A.1-3: PMGi 6000 inverter

A.2 Range of operation

Reliable power supply on sailing boats.

A.2.1 Main features of the Panda 6000i

- Extremely high starting capacity, perfect for a Bauer junior II compressor or air conditioner!
- 230V / 50Hz 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 6000i

Part 1: Generator Manual

Panda 6000i PMS

230V/50Hz 6kW

Fischer Panda GmbH

Current revision status

	Document
Actual:	Panda 6000i generator_s01835_eng.R01_16.1.09
Replace:	

Revision	**Page**

since 1977	since 1978	since 1988	since 1988	since 1988
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

Safety Precautions

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.

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.

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.

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.

General safety references for the enterprise of a generator.

With all energized systems, with which the current is more than 50 Ampère, special safety precautions must be made, in order to protect the environment of the components against fire.

It is to be ensured absolutely that at the battery a main switch in well accessible place is accommodated, so that with danger of the main switches can be separated immediately. The main switch must be however also directly at the battery installed. If this place is not well accessible, a power relay must be used instead of the main switch which can be served manually, which can be served then if necessary from different places. The switches for the power relay are to mark accordingly as main switches DC battery "with danger switch off!".

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.

Technical Support by Internet: info@fischerpanda.de

Intentionally Blank

B. Panda 6000i PMS generator

B.1 Type plate at the generator

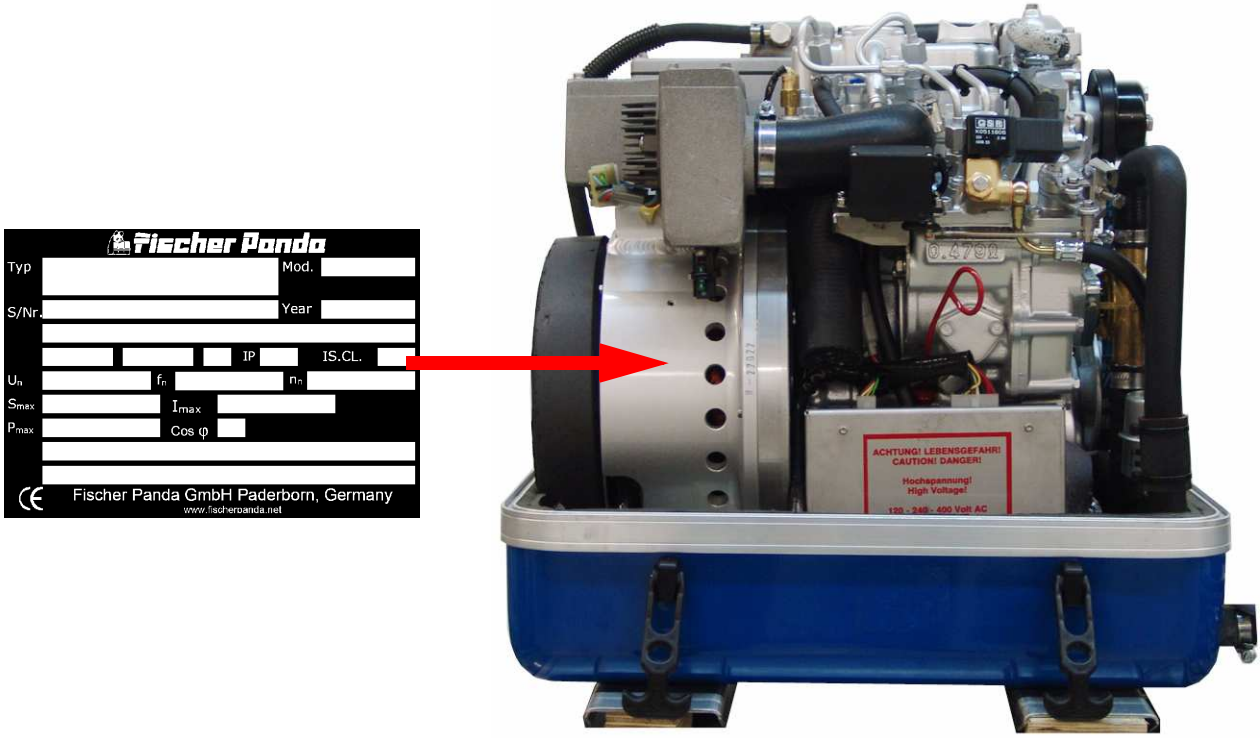


Fig. B.1-1: Type plate

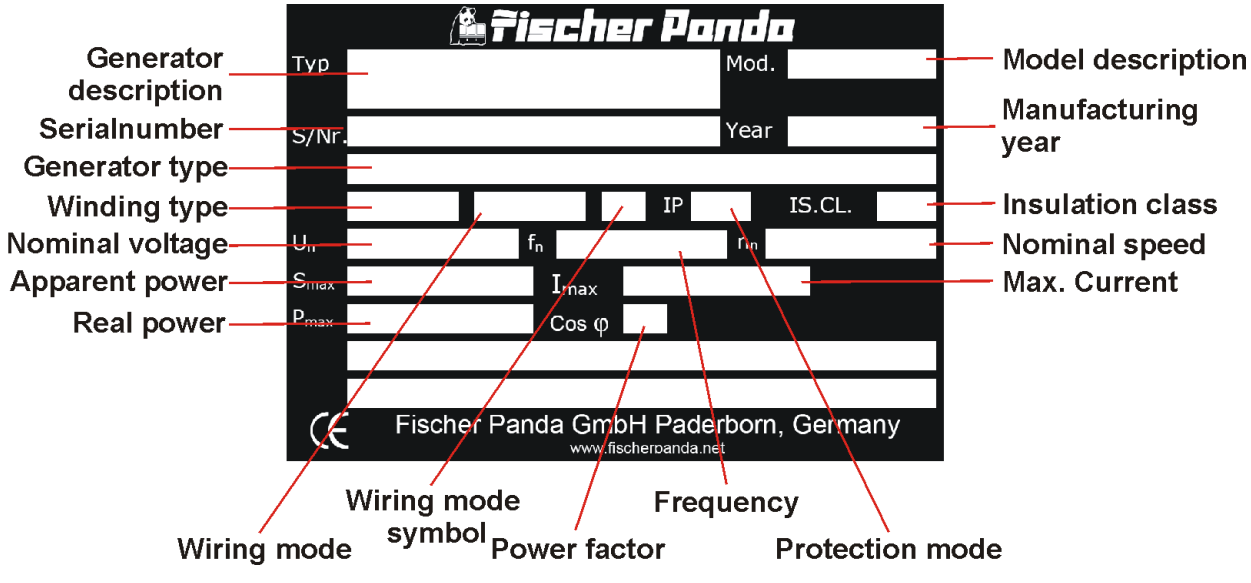
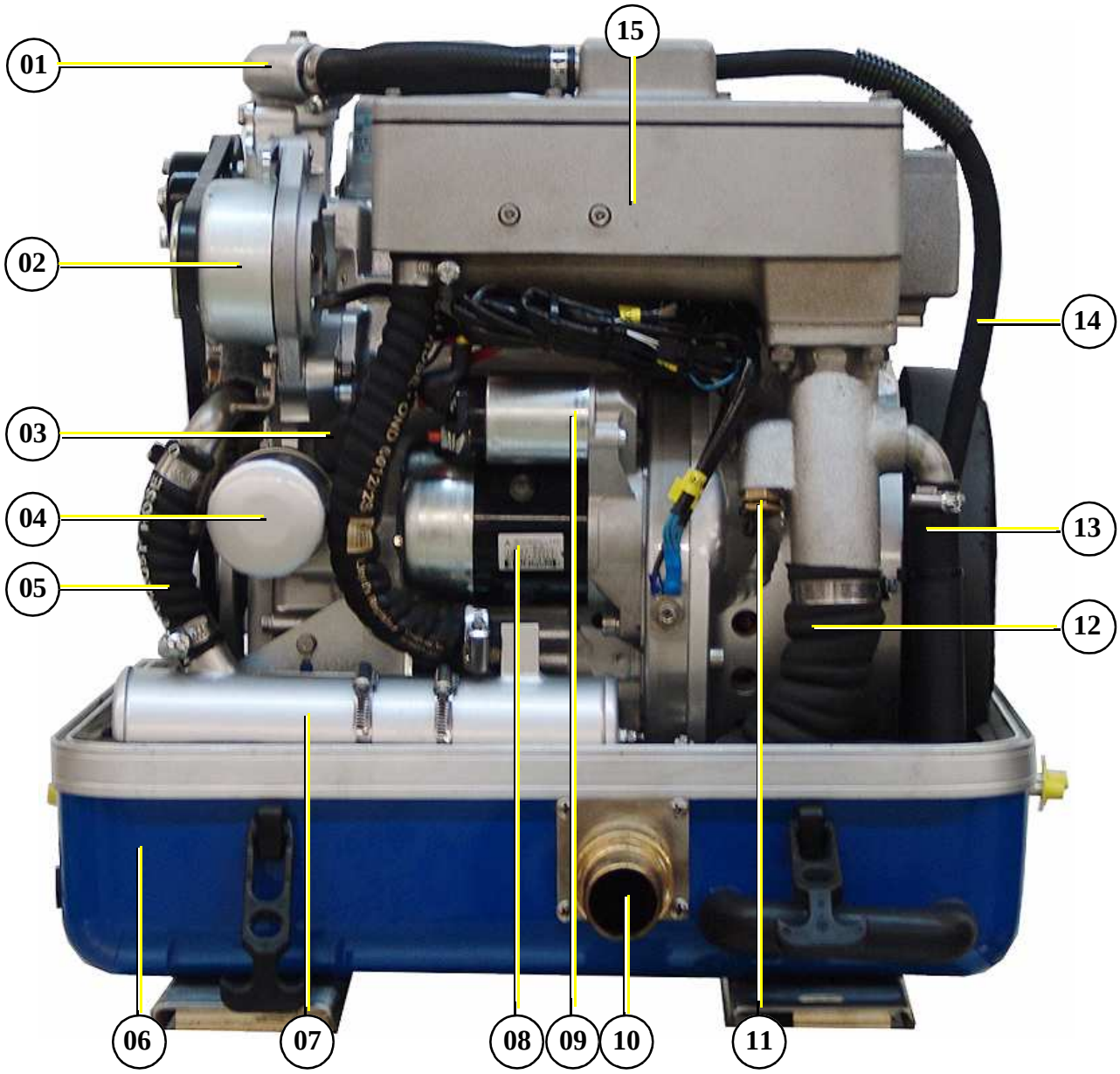


Fig. B.1-2: Discription type plate

B.2 Description of the generator

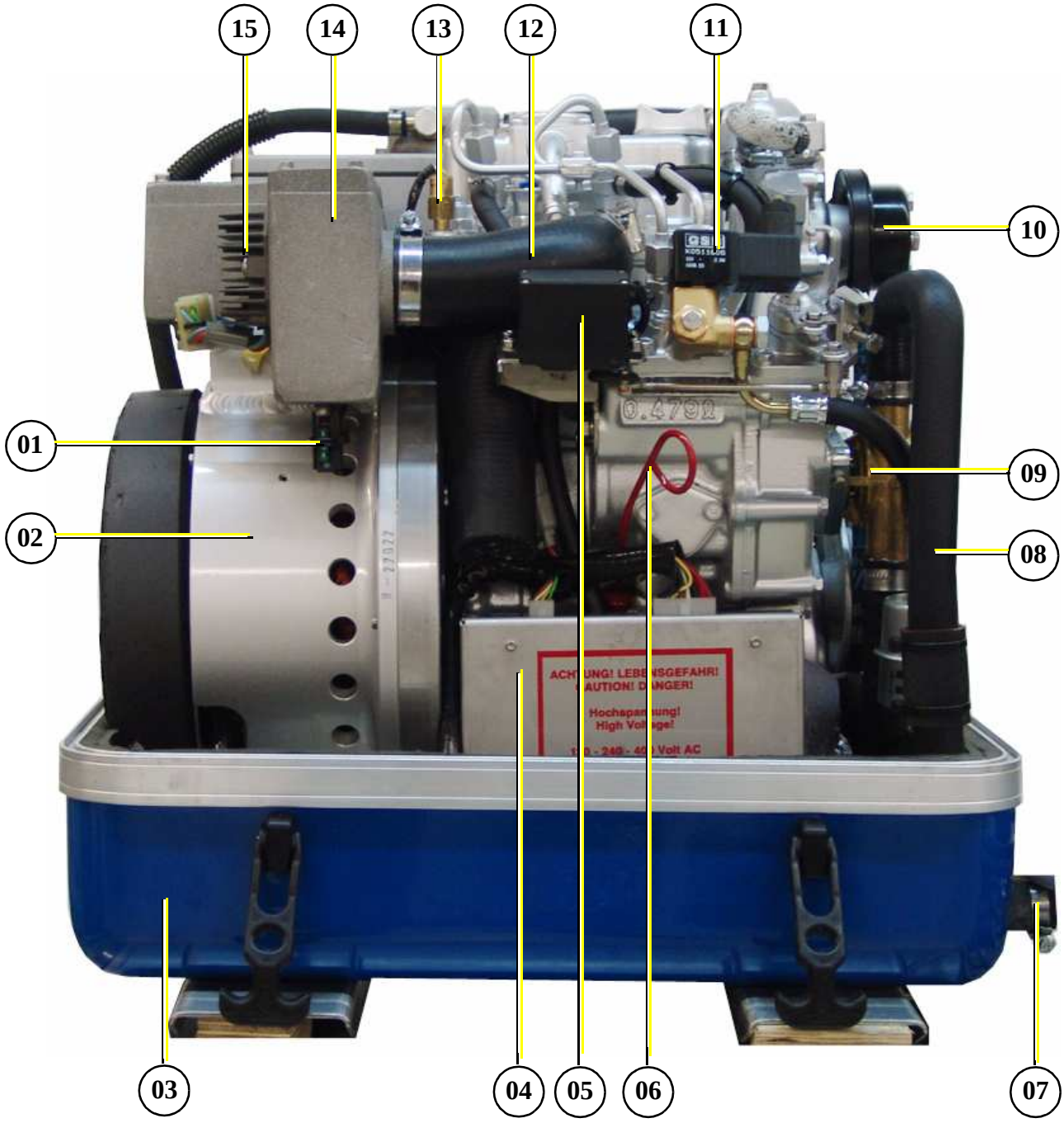
B.2.1 Right side view



01) Thermostat housing
02) DC-alternator 12V
03) Oil pressure switch
04) Oil filter
05) Cooling water pipe, heat exchanger - water pump
06) Sound cover base part
07) Heat exchanger
08) Starter motor
09) Solenoid switch for starter motor
10) Exhaust outlet
11) Thermosensor
12) Exhaust hose
13) Raw water injection pipe
14) Ventilation pipe to external expansion tank
15) Watercooled exhaust elbow

Fig. B.2.1-1: Right side view

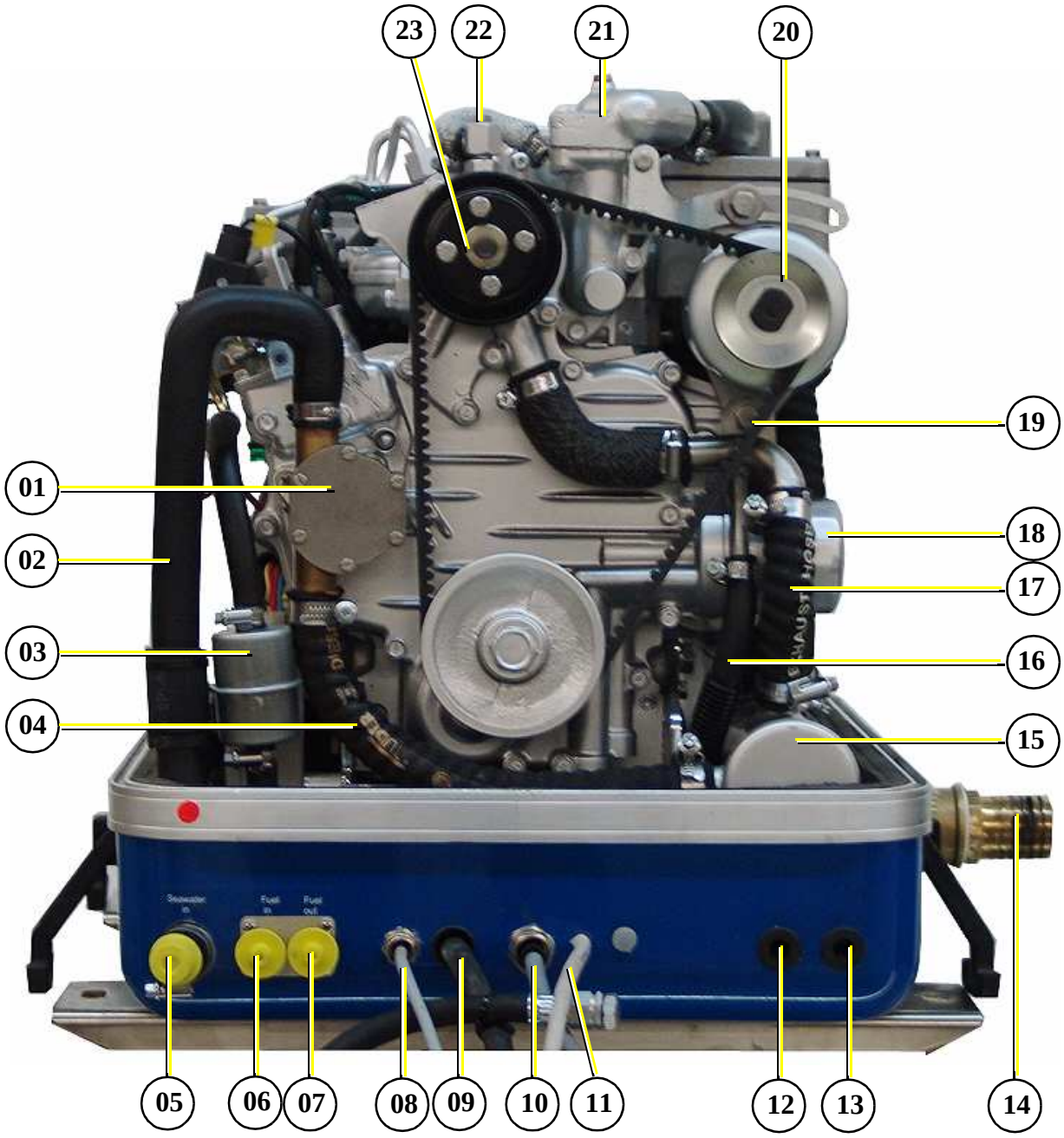
B.2.2 Left side view



01) Electrical fuse 30A for starter motor
02) Generator housing with coil
03) Sound cover base part
04) Housing with iControl electronic board (DO NOT OPEN)
05) Actuator
06) Oil dipstick
07) Raw water intake
08) Raw water intake pipe
09) Raw water pump
10) Pulley for internal cooling water pump
11) Fuel solenoid switch
12) Suction hose, air suction housing - induction elbow
13) Thermoswitch cylinder head
14) Air suction housing
15) Charge controller for DC-alternator

Fig. B.2.2-1: Left side view

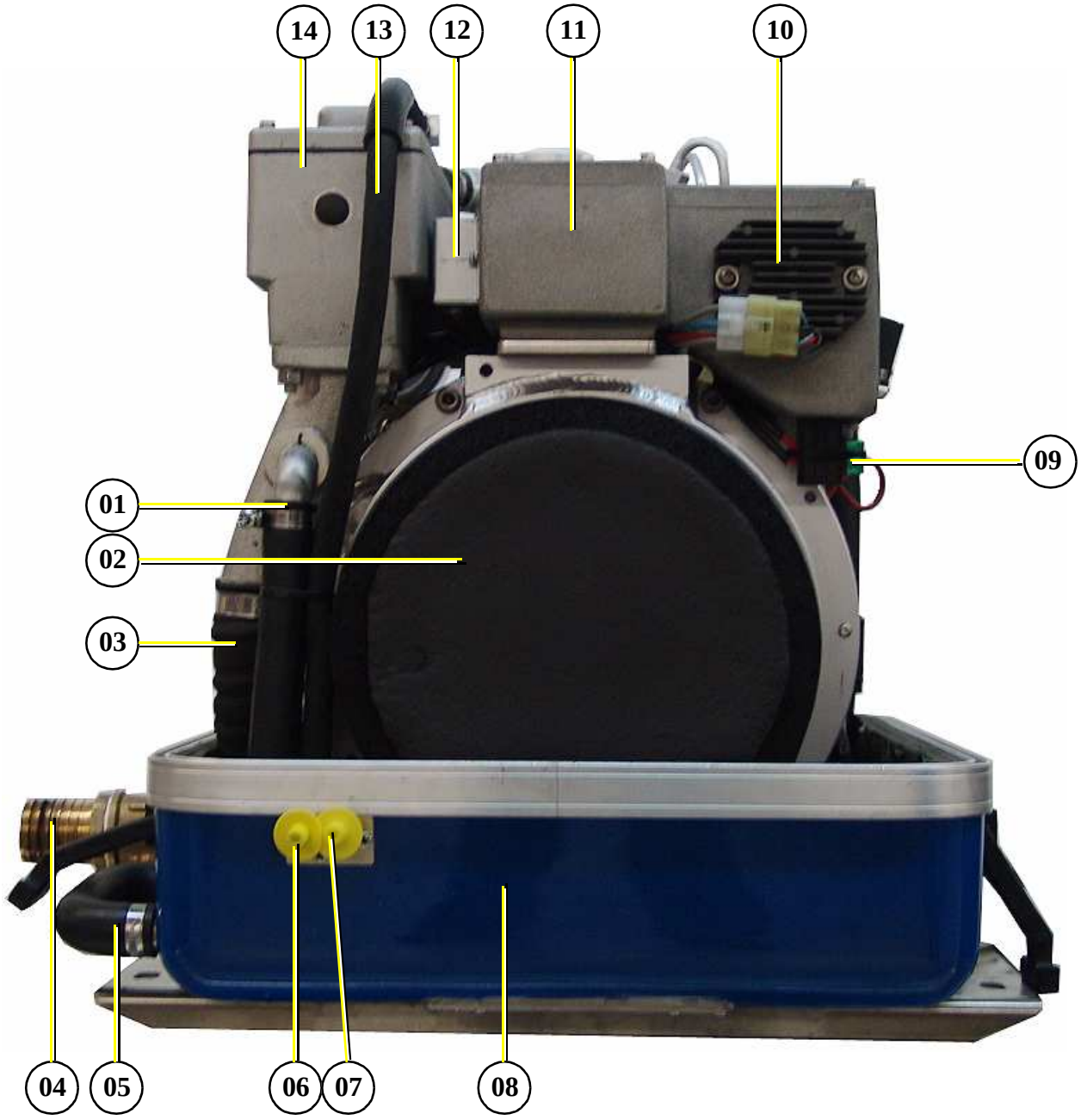
B.2.3 Front view



01) Raw water pump
02) Raw water intake hose
03) Fuel filter
04) Raw water hose, raw water pump - heat exchanger
05) Raw water intake
06) Fuel IN
07) Fuel OUT
08) Cable for fuel pump
09) Oil drain hose
10) Cable for generator output AC out
11) Cable for iControl panel
12) Passage for starter battery cable (-)
13) Passage for starter battery cable (+)
14) Exhaust outlet
15) Heat exchanger
16) Injection pipe from external expansion tank
17) Cooling water pipe, heat exchanger - water pump
18) Oil filter
19) V-belt
20) DC-alternator 12V
21) Thermostat housing
22) Ventilation screw internal cooling water pump
23) Pulley for internal cooling water pump

Fig. B.2.3-1: Front view

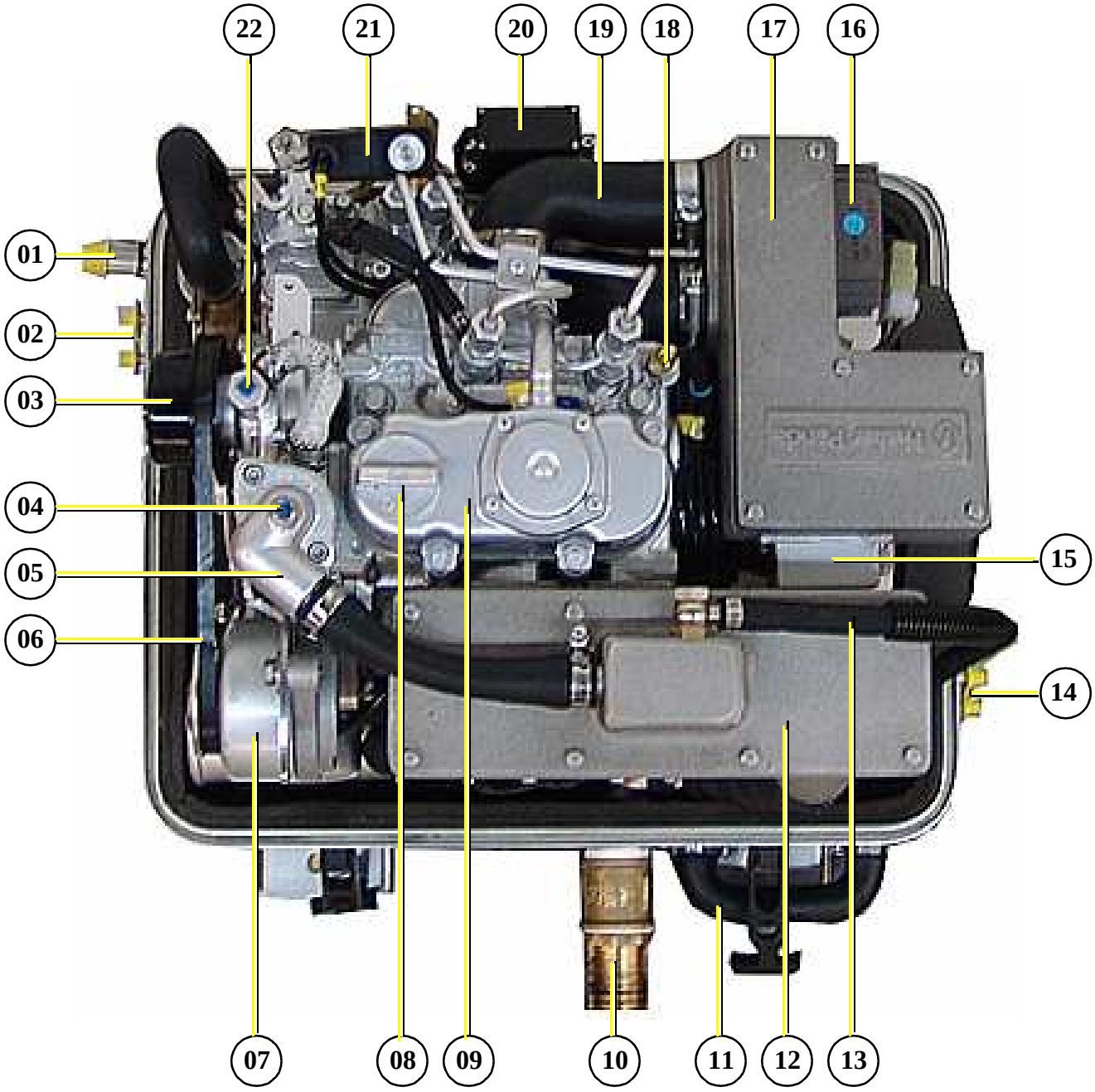
B.2.4 Back view



01) Raw water injection pipe
02) Generator front cover
03) Exhaust hose
04) Exhaust outlet
05) Connection for external ventilation valve
06) Connection from external expansion tank
07) Connection to external expansion tank
08) Sound cover base part
09) Electrical fuse 30A for starter motor
10) Charge controller for DC-alternator
11) Air suction housing
12) Actuator power modul
13) Ventilation pipe to external expansion tank
14) Watercooled exhaust elbow

Fig. B.2.4-1: Back view

B.2.5 View from above



01) Raw water intake
02) Fuel connections
03) Pulley for internal cooling water pump
04) Ventilation screw thermostat housing
05) Thermostat housing
06) V-belt
07) DC-alternator 12V
08) Oil filler neck with cap
09) Valve cover
10) Exhaust outlet
11) Connection for external ventilation valve
12) Watercooled exhaust elbow
13) Ventilation pipe to external expansion tank
14) Connections external expansion tank
15) Actuator power modul
16) Charge controller for DC-alternator
17) Air suction housing
18) Thermoswitch cylinder head
19) Suction hose, air suction housing - induction elbow
20) Actuator
21) Fuel solenoid valve
22) Ventilation screw internal cooling water pump

Fig. B.2.5-1: View from above

B.3 Details of function units

B.3.1 Remote control panel - See Panda iControl manual

B.3.2 Components of the cooling system (raw- and freshwater)

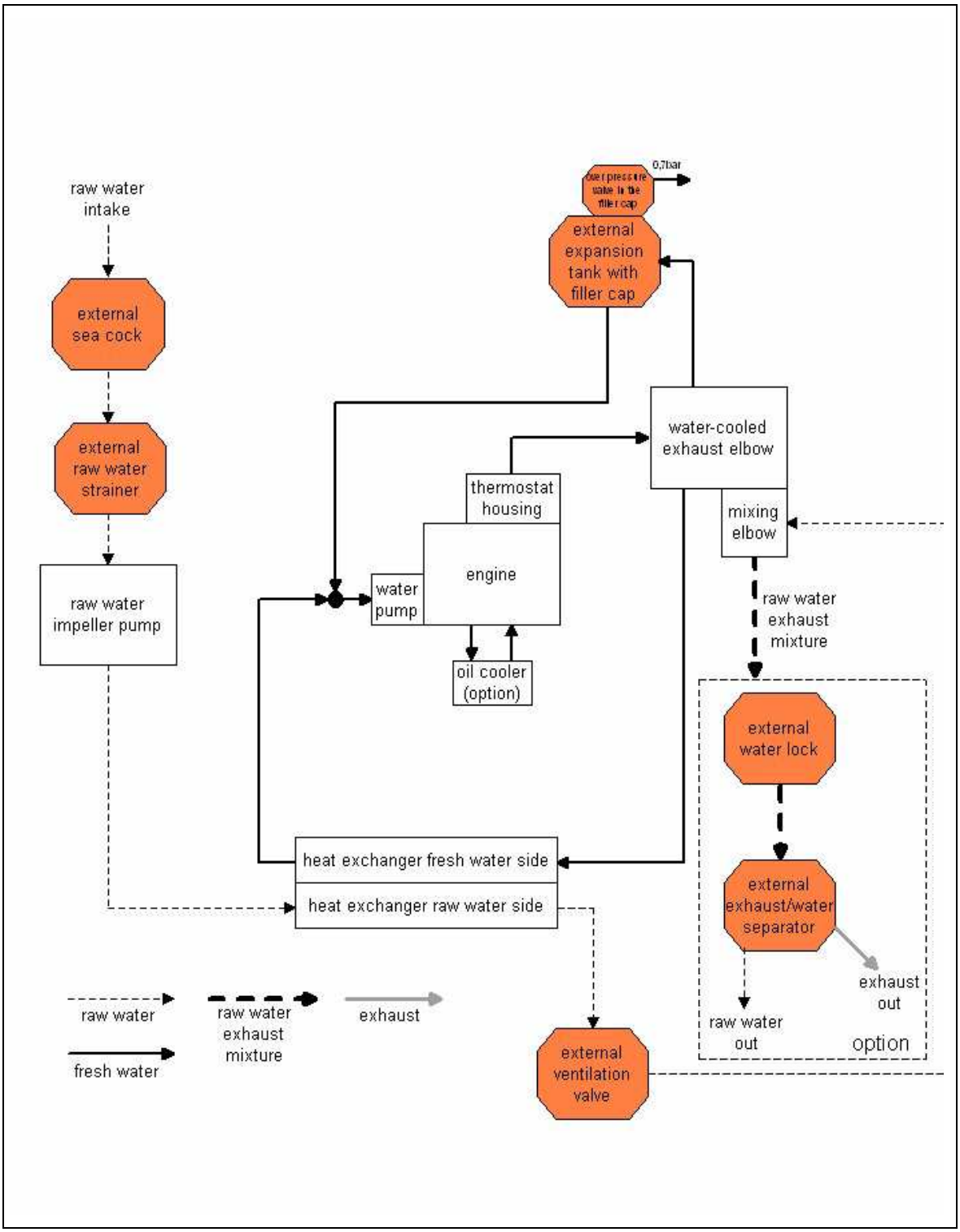


Fig. B.3.2-1: Cooling system

B.3.3 Components of the fuel, air intake and exhaust system

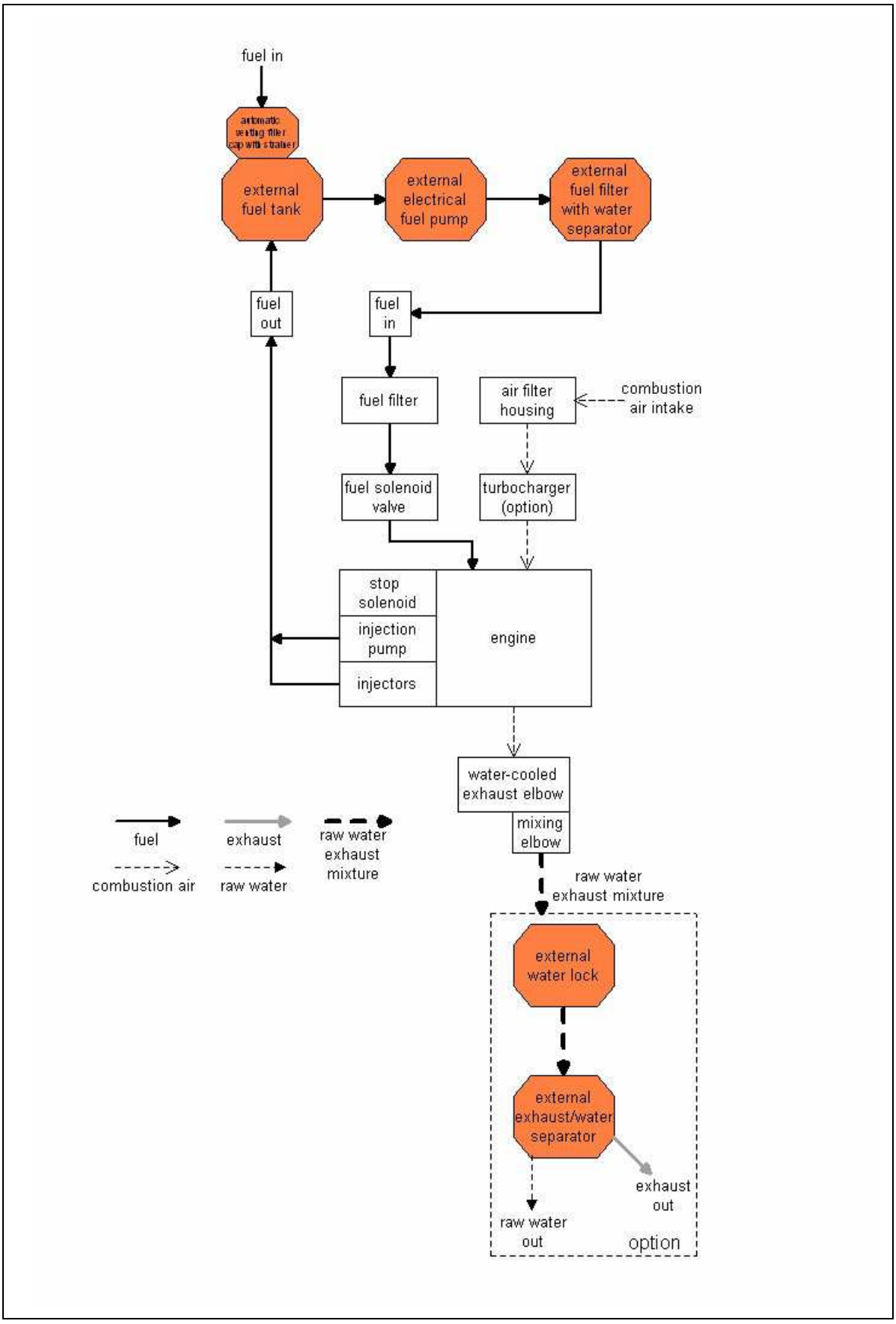


Fig. B.3.3-1: Fuel, air intake and exhaust system

B.3.4 Components of the electrical system

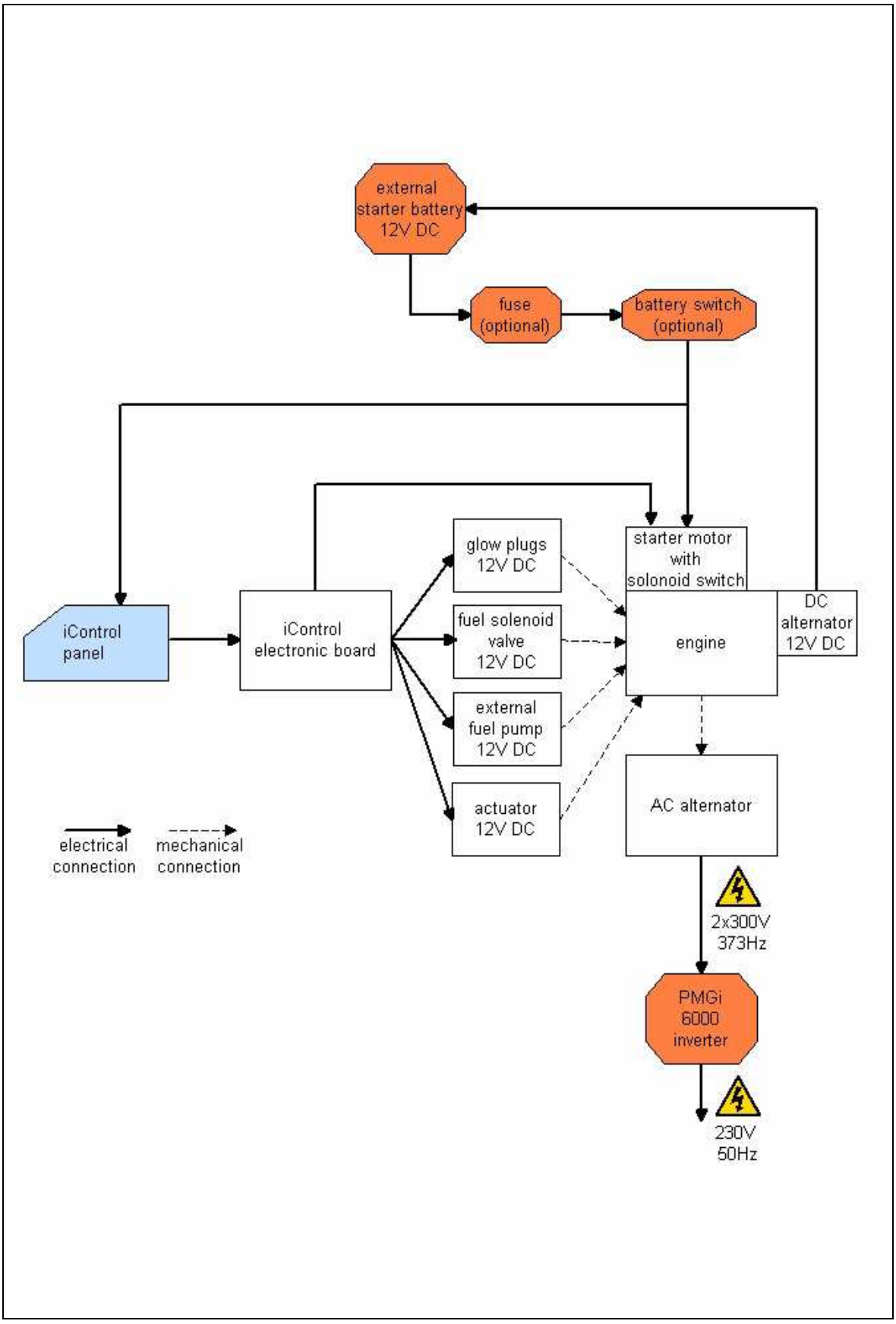


Fig. B.3.4-1: Electrical system

B.3.5 Components of the lubrication system

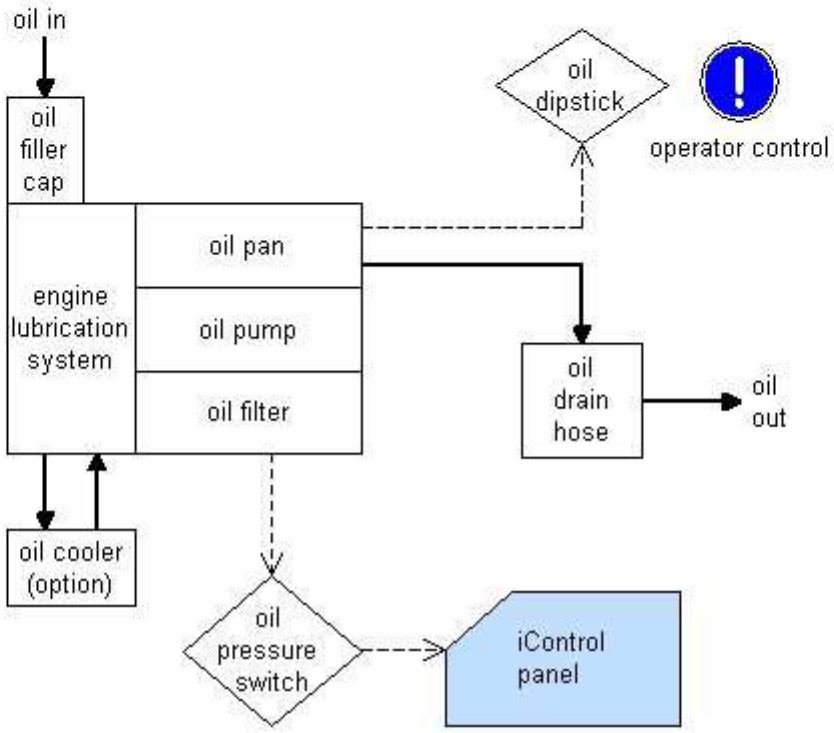


Fig. B.3.5-1: Lubrication system

B.3.6 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.3.6-1: Thermo.switch at engine

Thermo-sensor at exhaust connection

If the impeller pump drops out and delivers no more raw water, the exhaust connection becomes extremely hot.

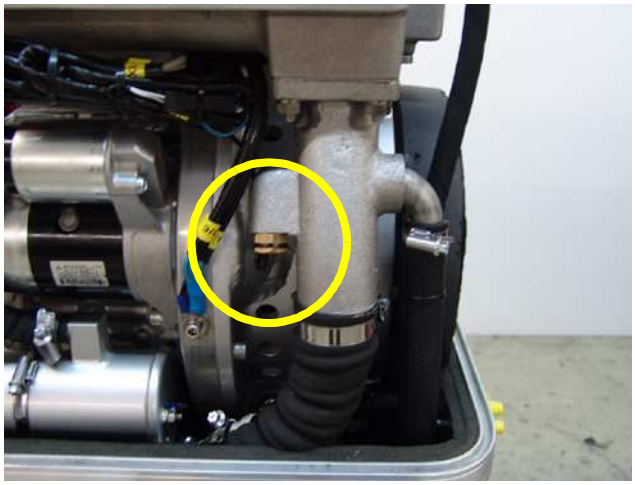


Fig. B.3.6-2: Thermo-sensor at exhaust connection

Thermo-switch coil

One thermo sensor is located in the stator winding

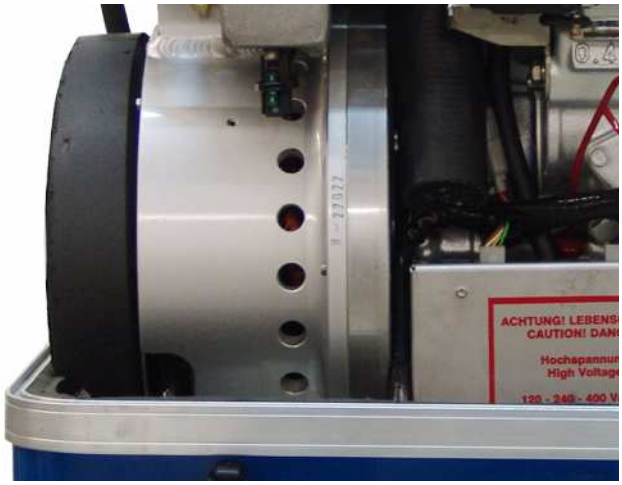


Fig. B.3.6-3: Thermo-switch coil

Oil pressure switch

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

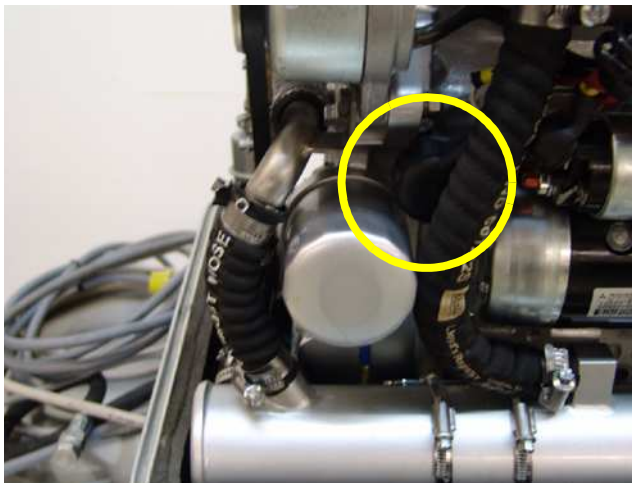


Fig. B.3.6-4: Oil pressure switch

B.4 Operation instructions - See Panda iControl panel manual

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

B.4.2 Starting generator - See Panda iControl manual

B.4.3 Stopping the generator - See Panda iControl manual

C. Installation Instructions

C.1 Placement

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.

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.

The generator sucks its air from the surrounding engine room. Therefore it must be ensured that sufficient ventilation openings are present, so that the generator cannot overheat.

High temperature of the intake air decline the power of the generator and increases the coolant temperature. Air temperatures of more than 40℃ red uce the power by 2% per temperature rise of 5℃. In order to keep these effects as small as possible, the temperature in the engine room should not be higher than 15℃ in relation to the o utside temperature.

C.1.1 Advice for optimal sound insulation

The convenient base consists of a stable framework, on which the generator is fastened by means of shock-mounts.

Since the aggregate is "free" downward, the combustion air can be sucked in unhindered.

In addition are void the vibrations, which would arise with a closed soil.

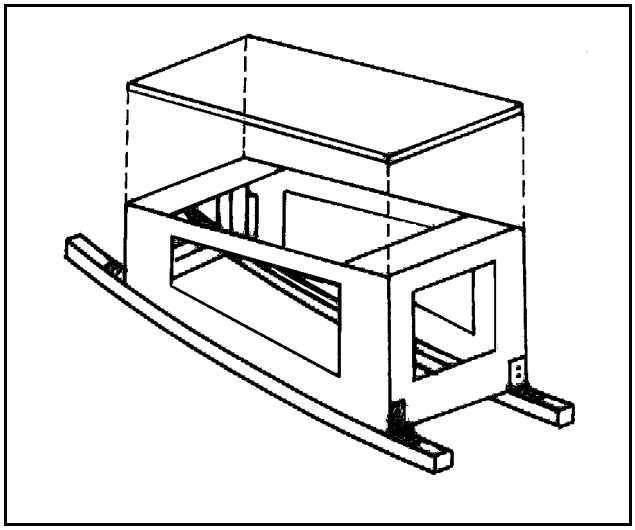


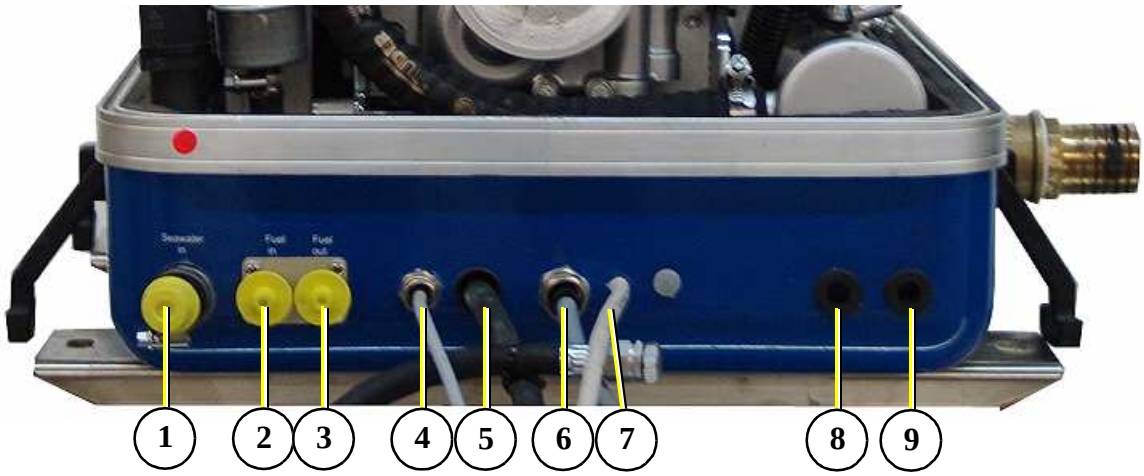
Fig. C.1.1-1: Generator base

C.2 Generator connections

Connect all electrical wires within the capsule tightly to the motor and the generator. This is also the case for fuel lines and cooling water lines.

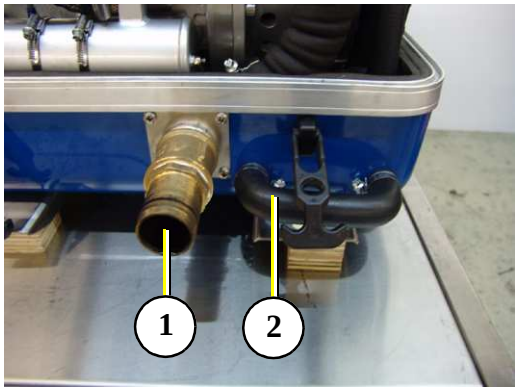
The electrical connections MUST be carried out according to the respective valid regulations. This also concerns used cable materials. The cable supplied is meant for laying "protected" (i.e. in pipe) at a temperature up to a max of. 70℃ (160℉). The on-board circuit must also be fitted with all essential fuses.

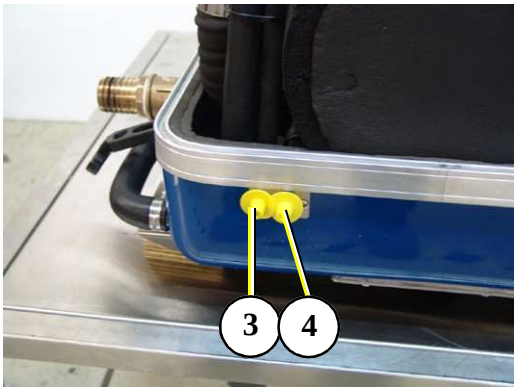
ATTENTION! Before working (installation) on the System read the section „Safety Instructions“ in this Manual.



1. Raw water inltake
2. Fuel supply (in)
3. Fuel return line (out)
4. Cable for fuel pump
5. Motor oil drain hose
6. Cable for generator output AC out
7. Cable for iControl panel
8. Passage for starter battery cable (-)
9. Passage for starter battery cable (+)

Fig. C.2-1: Generator connections





1. Exhaust outlet
2. Connection external ventilation valve
3. Connection from external expansion tank
4. Connection to external expansion tank

Fig. C.2-2: Generator connections

C.3 Cooling system installation - Raw water

C.3.1 General information

The genset 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:

For the avoidance of galvanic corrosion, refer to the chapter "Service instruction for marine generators (corrosion protection)".

C.3.2 Installation of the thru hull fitting in yachts

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

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

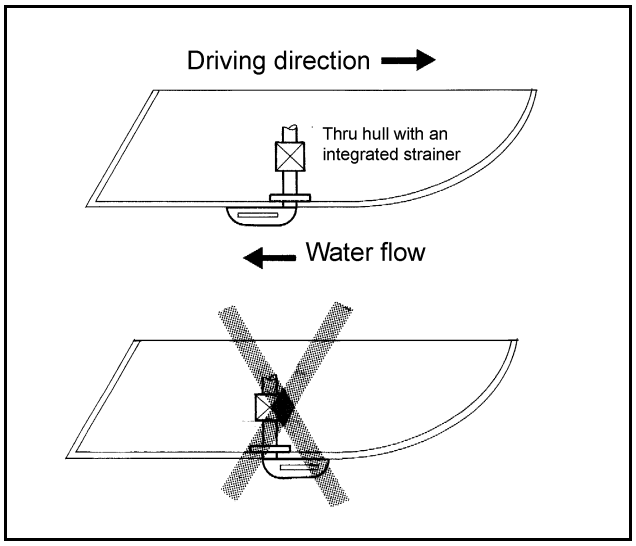


Fig. C.3.2-1: Position of the thru hull fitting

C.3.3 Quality of the raw water sucking in line

n 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" (25 mm).

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 see section F.2, “Technical data,” on page 74.

C.3.4 Generator 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 raw water hose should form a loop as near as possible to the raw water 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 raw water and the impeller life span will be increased.

By the installation of a check valve in the raw 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. If the sealing ring is defective within the pump, raw water runs into the sound cover of the genset. 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.

1. Raw water filter
2. Water cock
3. Thru hull

Make certain that the raw water filter lies above the water level, otherwise with cleaning water can penetrate by the thru hull. An external pre-pump can relieve the impeller.

An external pre-pump can relieve the impeller.

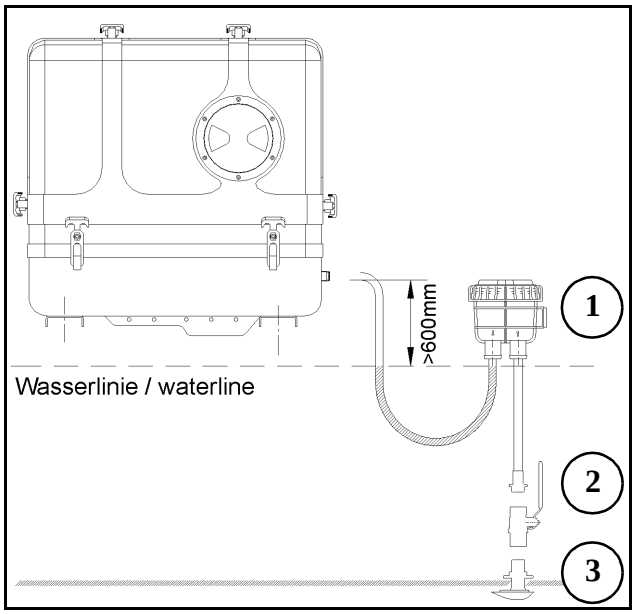


Fig. C.3.4-1: Raw water filter

C.3.5 Generator installation below waterline

If the generator cannot be attached at least 600 mm above the waterline, a vent valve must be installed at the raw water line.

Possible heeling must be taken into consideration if installed at the "mid-ship line"!

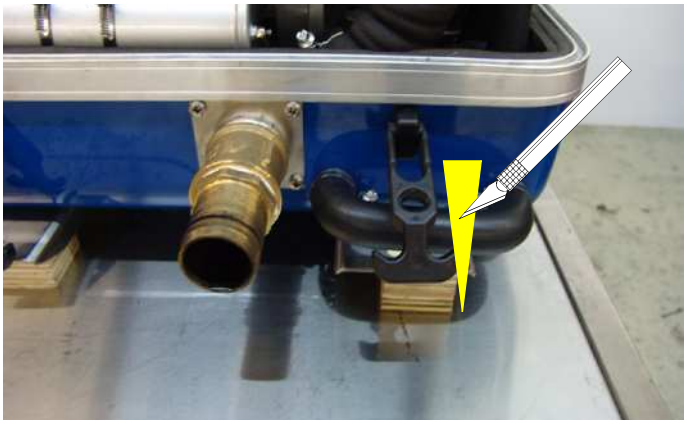
The water hose for the external vent valve is located at the back of the sound insulated cover. This hose is split in the middle and extended respectively at each end by an additional hose and a connecting nipple. Both hose ends must be led outside of the sound cover to one point, if possible 600 mm over the waterline in the mid-ship line. The valve is connected at the highest place to the two hose ends.

Note: The vent valve must be installed directly behind the water pump.

If the water pump ceases, the valve spring ensures that air can enter and therefore, a syphon effect is avoided.

The de-aeration valve must be regularly controlled. If the water pump stops, the valve spring ensures that air enters. It must be opened, cleaned and greased.

Fig. C.3.5-1: Vent valve



Cut the hose for the external vent valve....

Fig. C.1: Connection vent valve

...and bend it upwards.

Both hose ends must be led out outside of the sound cover to one point, if possible 600 mm over the waterline at the mid-ships line. The valve is connected at the highest place with the two hose ends.

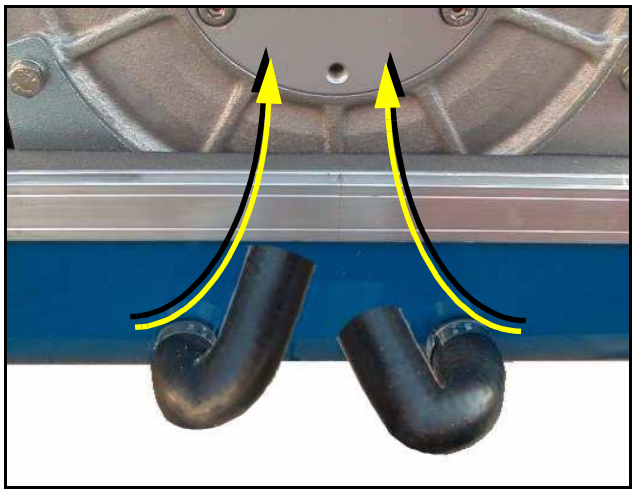
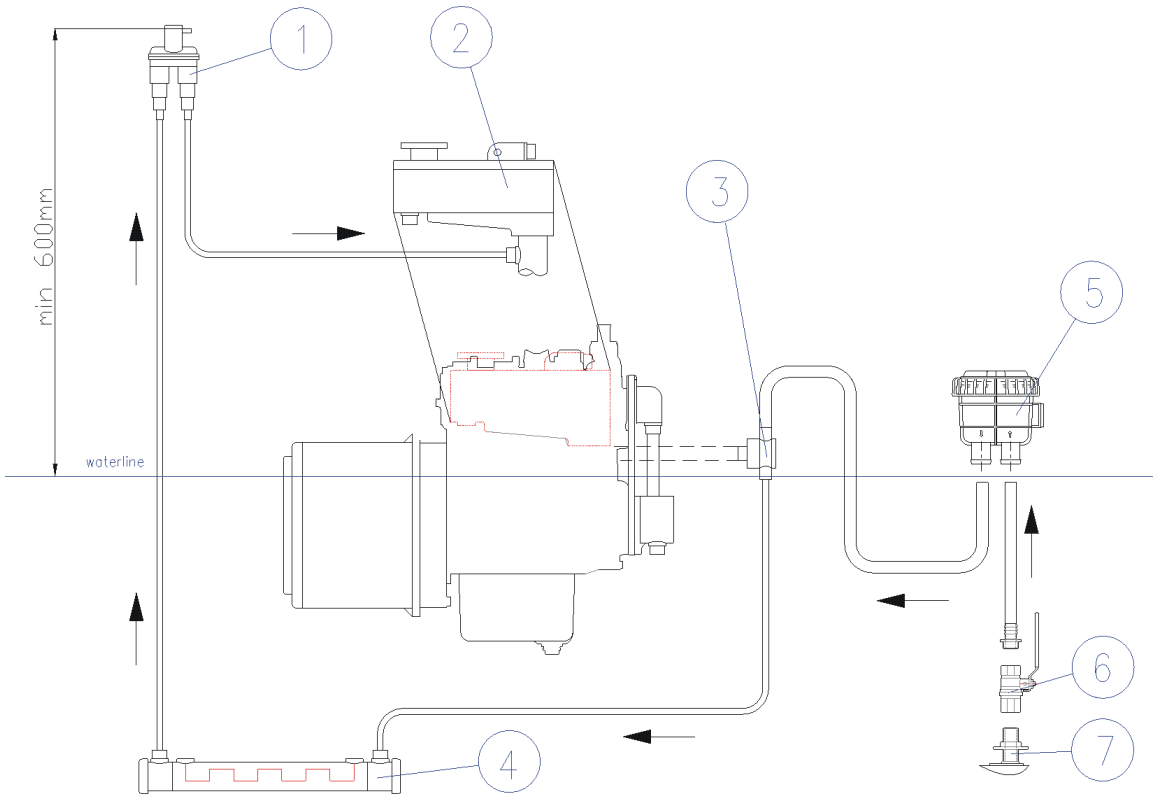


Fig. C.3.5-2: Connection vent valve

C.3.6 Indirect cooling of the genset housing (by the heat exchanger)



1. Ventilation valve
2. Exhaust elbow
3. Raw water pump (Raw water impeller pump)
4. Heat exchanger
5. Raw water filter
6. Water cock
7. Hull inlet

Fig. C.3.6-1: Installation scheme indirect cooling of the genset housing

C.4 The freshwater coolant circuit

C.4.1 Position of the external cooling water expansion tank

Position of the external cooling water expansion tank

The Panda generator is normally supplied with an additional, external cooling water expansion tank. This tank must be installed in such a way that its lower edge is at least 500 mm more highly arranged than the upper edge of the sound cover.

If this 500 mm should be fallen below, i.e. the cooling water expansion tank is lower installed, very large problems can occur with filling and ventilating. Extend and displace the hose lines to the outside or possibly even up to the deck.

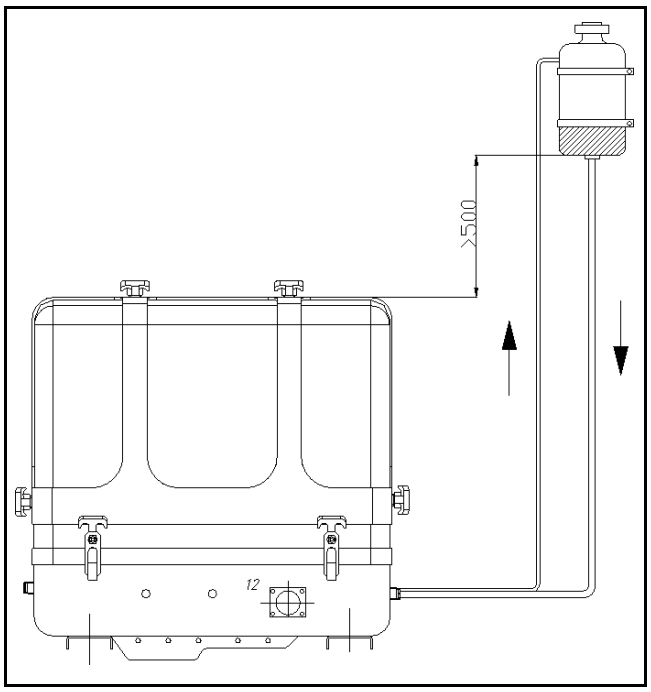


Fig. C.4.1-1: Position of the external cooling water expansion tank

ATTENTION! The external cooling water expansion tank may be filled only up to the lower edge of the lower tension tape (see note "max") in the maximum filling level in cold condition.

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 °F) and if i t 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.

C.4.2 Pressure test for controlling the cooling water circuit

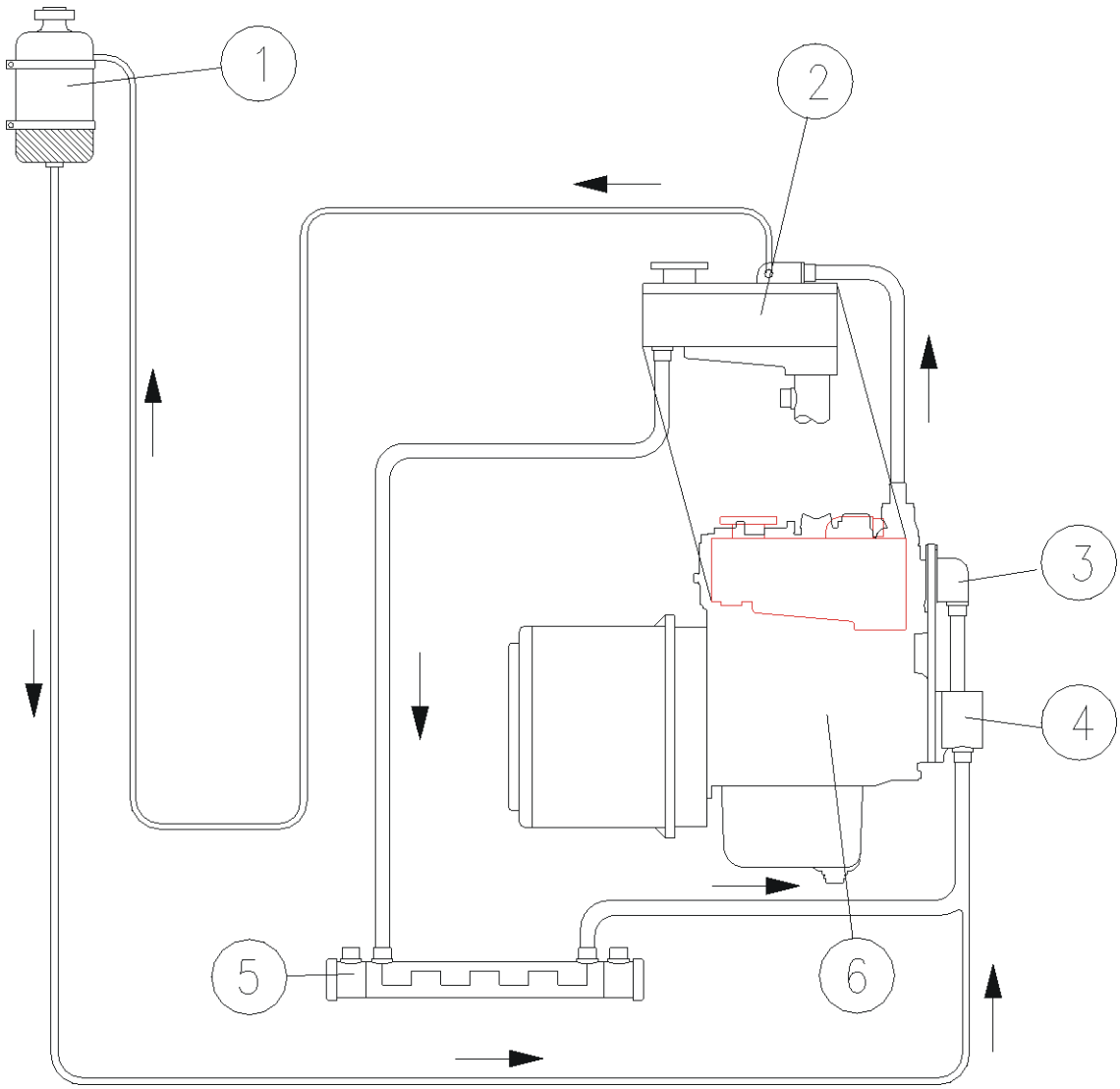
Check if a temperature difference exists between cooling water in-flow and cooling water return flow by use of the hand.

Feel the cooling water in-flow line at the internal cooling water pump.

Feel the cooling water return pipe either at the outlet of the water-cooled exhaust elbow union or at the side, where this pipe exits at the heat exchanger.

The temperature difference between in-flow and return should be approx 10 degrees.

C.4.3 Scheme for freshwater circuit at two circuit cooling system



1. Expansion Tank
2. Exhaust Manifold
3. Thermostat Housing
4. Freshwater pump
5. Heat Exchanger
6. Engine

Fig. C.4.3-1: Scheme for freshwater circuit at two circuit cooling system

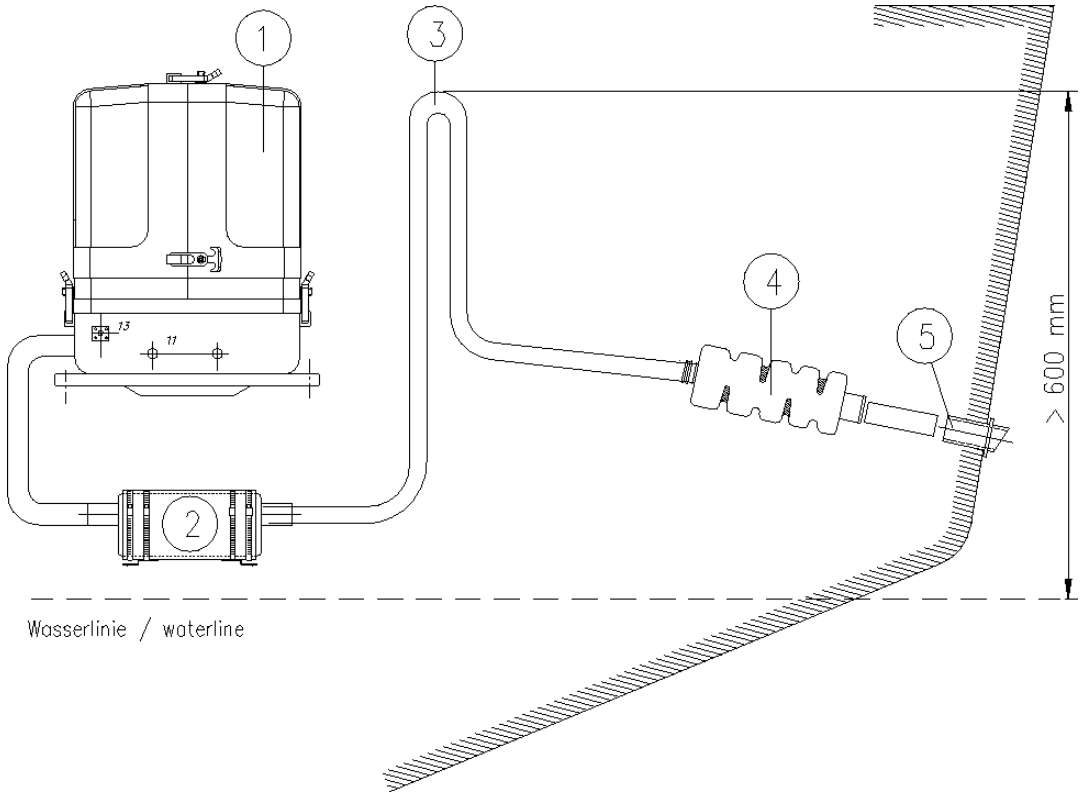
C.5 Water-cooled exhaust system

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 30 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 section F.2, “Technical data,” on page 74.



1. Generator
2. Water lock
3. Goose neck
4. Silencer
5. Hull outlet

Fig. C.5.1-1: Installation scheme standard exhaust system

C.5.2 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 Fischer Panda, 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 raw water outlet is very short, the hose can be further reduced to 1" (25mm) ID.

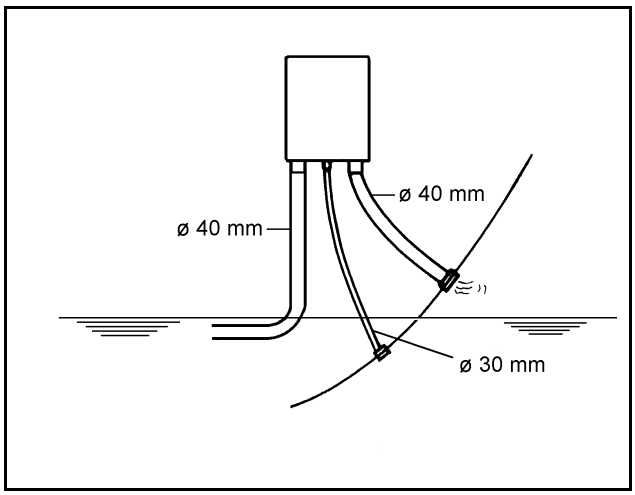


Fig. C.5.2-1: Water flow exhaust water separator

1. Raw water outlet ø 30mm
2. Hose connector ø 30mm
3. Reduder 30/20mm (if required)
4. Hose
5. Hose connector
6. Sea cock
7. Hull outlet
8. Hose Clips

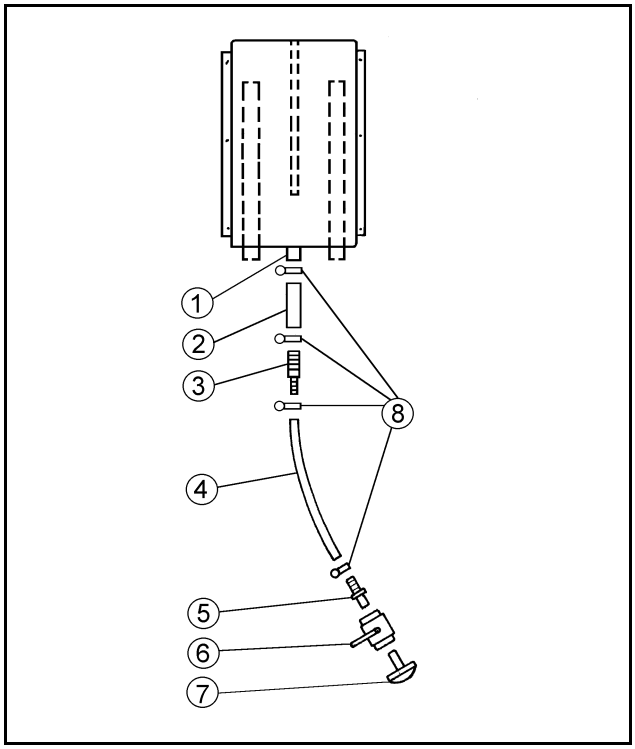
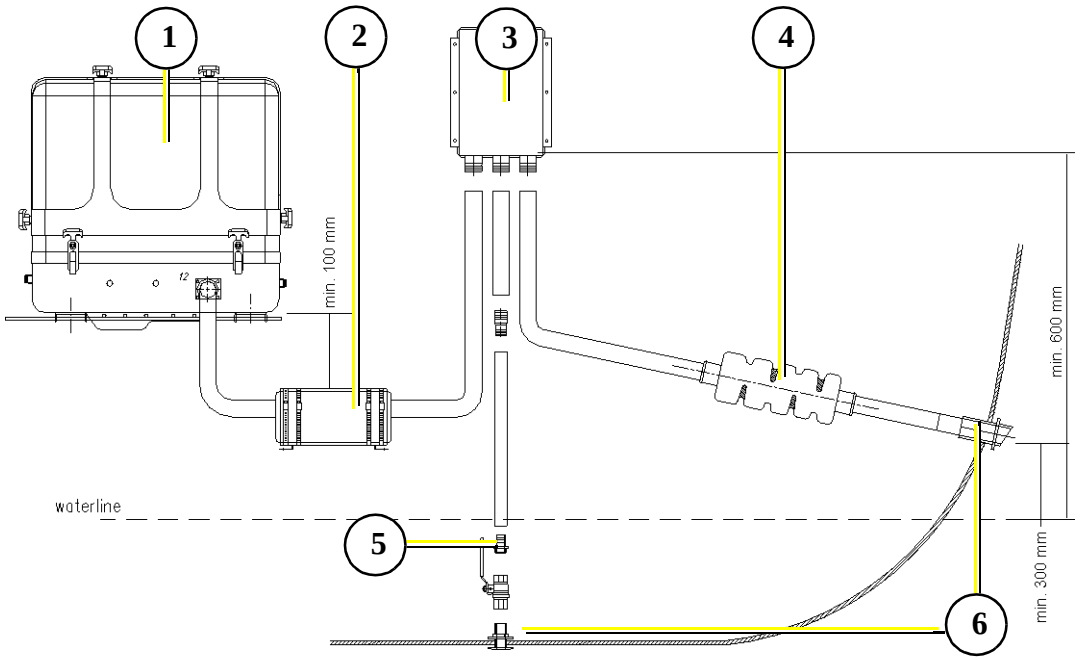


Fig. C.5.2-2: Exhaust water separator

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 fulfils the same function. If the "Super silent" 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.

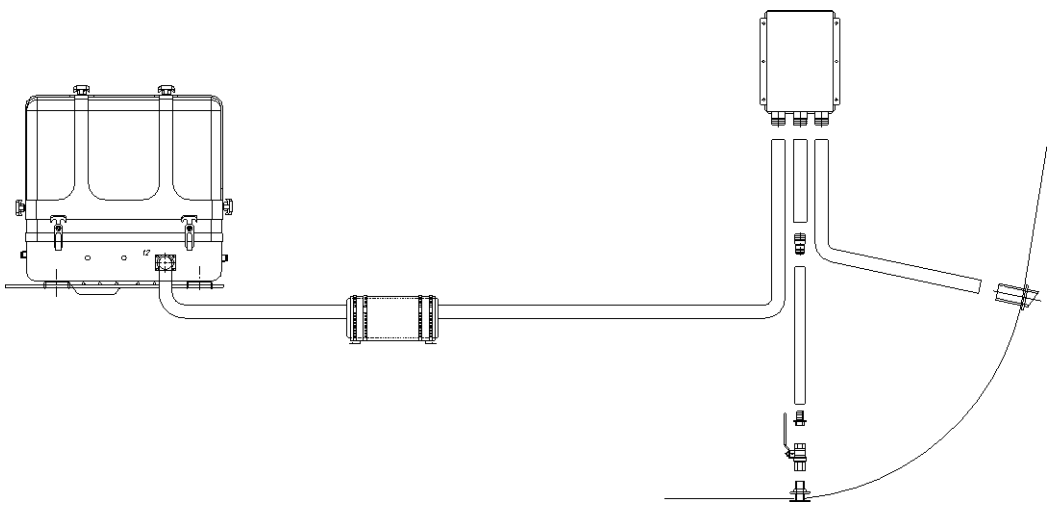


1. Generator
2. Silencer / Water lock
3. Exhaust-Water-Separator
4. Silencer
5. Sea cock
6. Hull outlet

Fig. C.5.3-1: Installation scheme exhaust-water-separator

If the thru-hull exhaust outlet has to be mounted far from the generator, an exhaust-water separator must definitely be installed. The raw 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 NW40mm to NW50mm in order to reduce the back-pressure. The exhaust may have a length of over 10m (32 ft.) if the exhaust hose diameter is increased to 50mm. An additional outlet exhaust muffler close to the hull outlet will help further to reduce noise emissions.

The generator will not disturb your boat neighbours, if the "Super silent Exhaust System has been correctly installed. The exhaust noise should be almost inaudible.



Example of an unfavourable installation:

- Water lock not far enough below the highest level of the generator
- Distance water lock to exhaust/water separator too large

Fig. C.5.3-2: Expample for an unfavourable installation

C.6 Installation of the fuel system

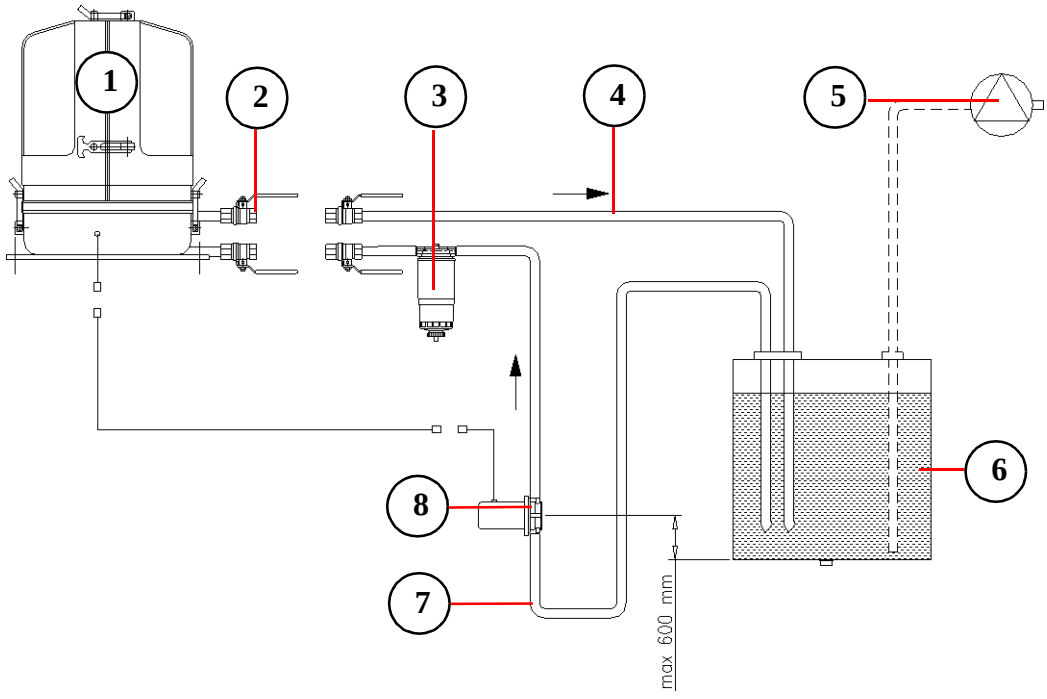
C.6.1 General references

Inside the generator capsule itself, there is the fuel filter installed (exception: Panda 4200 and 4500). Additional fuel filters (with water separator) must be mounted outside the capsule in easily accessible places in the fuel lines between the tank intake fuel pump and the diesel motor's fuel pump.

Generally forward and return fuel flow pipes must be mounted to the diesel tanks. Do not connect the generator fuel supply lines with any other fuel lines of other diesel systems.

- The following items need to be installed:
- Fuel supply pump (12VDC)
- 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 mounted as close to the fuel tank as possible. The electric cable for the fuel pump is already installed on the generator (length 5 m).



1. Generator
2. Fuel stopcock
3. Fuel filter with water separator
4. Fuel return
5. Condensation water suction pump (option)
6. Fuel tank
7. Fuel supply
8. Electrical fuel pump (12V-DC)

Fig. C.6.1-1: Installation scheme fuel system

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 at the fuel tank. The electrical connections are pre-loaded at the generator with the lead planned.

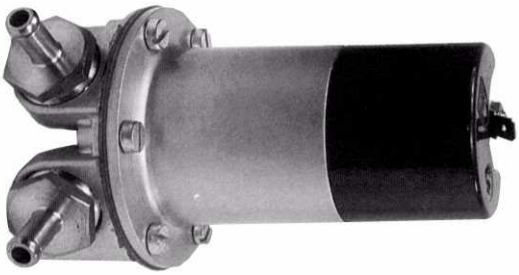


Fig. C.6.2-1: Electrical fuel pump

- Suction hight of the pump: max. 1,2 m at 02, bar
- Diameter of fuel lines: section F.2, “Technical data,” on page 74.

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 (not included in the delivery).

Fig. C.6.4-1: Pre-Filter with water separator

C.7 Generator 12VDC system installation

The Panda generators have their own dynamo to charge a 12V starter battery.

It is recommended to install an additional starter battery for the generator.

The generator is then independent from the remaining battery set. This enables you to start the genset at any time with its own starter battery even if the other batteries are discharged. A further advantage of a separate starter battery is that it isolates the generator's electric system from the rest of the boat's DC system, i.e. minus pole (-) is not connected electrically to Earth/Ground.

The generator is then Earth/Ground free.

C.7.1 Connection of the 12V starter battery

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

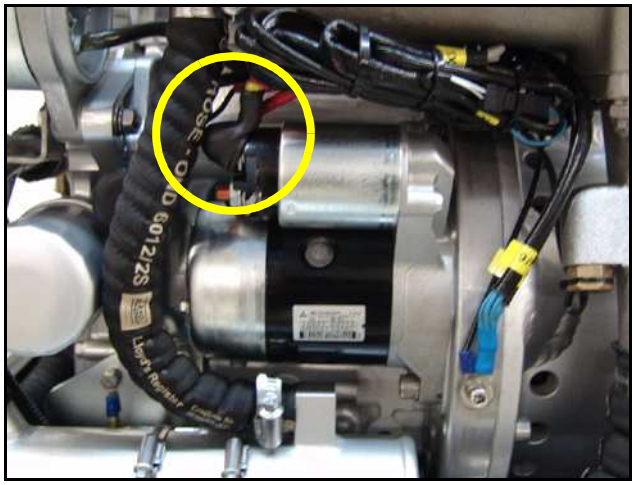


Fig. C.7.1-1: Positive battery cable

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

Note! The battery negative pole may not be connected with the boat ground or with the protective grounding of the installation!

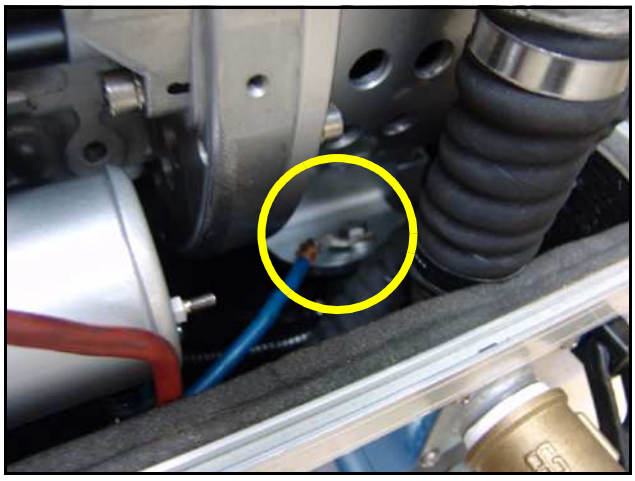


Fig. C.7.1-2: Negative battery cable

C.7.2 Connection of the remote control panel - See Panda iControl panel manual

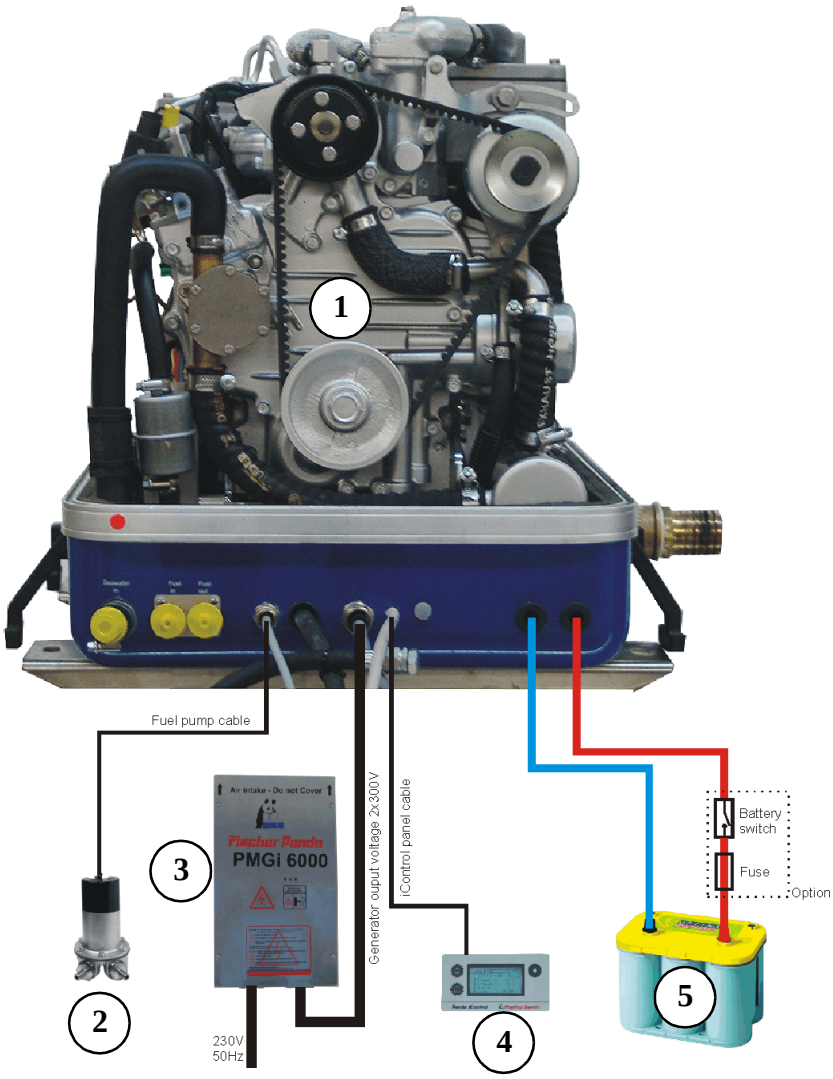
C.8 Generator AC system installation

ATTENTION! Before the electrical system is installed, READ the SAFETY INSTRUCTIONS 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 lightening 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 section F.2, “Technical data,” on page 74)



1. Generator
2. Electrical fuel pump 12VDC
3. PMGi 6000 inverter
4. iControl panel
5. Starter battery 12VDC

Fig. C.2: Electrical installation - example

C.8.1 Installation PMGi inverter - See separat PMGi 6000 inverter manual

D. Generator Failure

ATTENTION! Before working on the System read the section , “Safety Precautions,” on page 15.

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 15.

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 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

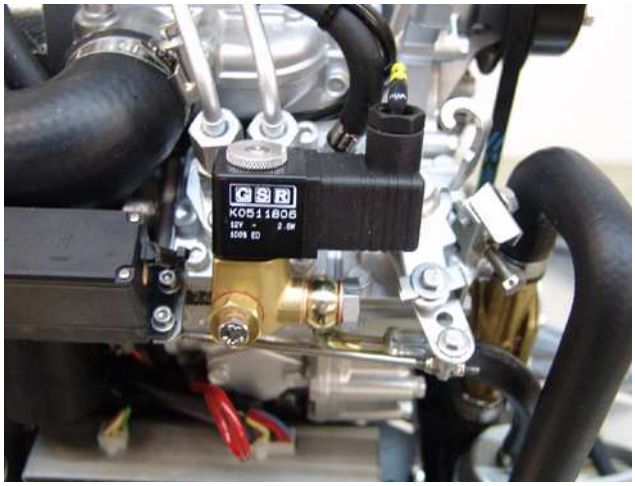


Fig. D.3.1-1: Fuel solenoid valve

D.3.2 Dirty fuel filter

If the fuel filter is dirty change the filter element.

For replacing the filter element see section C.3.1, “Replacing fuel filter” on page 79.

1. Fuel filter element

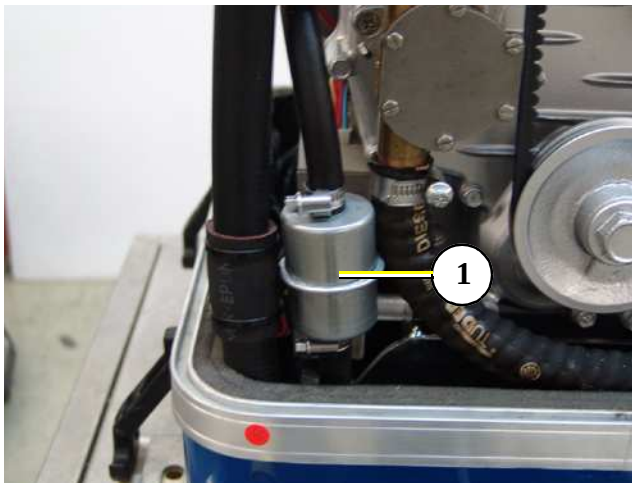


Fig. D.3.2-1: Fuel filter

D.4 Troubleshooting table

For troubleshooting see section F.1, “Troubleshooting” on page 71.

Intentionally Blank

E. Maintenance Instructions

ATTENTION! Before working on the System read the section , “Safety Precautions,” on Page 15.

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

Once a month

- Grease/oil the servo motor - Trapezoid thread-Spindle

Maintenance invervals see „Genrael informations for PMS-Generators“.

E.1.2 Check of hoses and rubber parts in the sound insulated capsule

Check all hoses and hose connections for good condition. The rubber hoses are very sensitive to environmental influences. They wear quickly in an environment of dry air, oil and fuel vapours, and high temperatures. The hoses must be checked regularly for elasticity. There are operating situations, when hoses must be renewed once a year.

Additionally to usual tasks of maintenance (oil level check, oil filter control etc.) further maintenance activities are to be accomplished for marine generators, such as control of the sacrificial anode (cooling water connection block) and the front seal cover at the generator.

E.2 Oil change intervals

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 150 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.

For fill-up capacity see section F.2, “Technical data,” on Page 74.

E.2.1 Execution of an oil change

Oil drain hose

For the oil change an oil drain hose is fed through the sound insulation capsule.

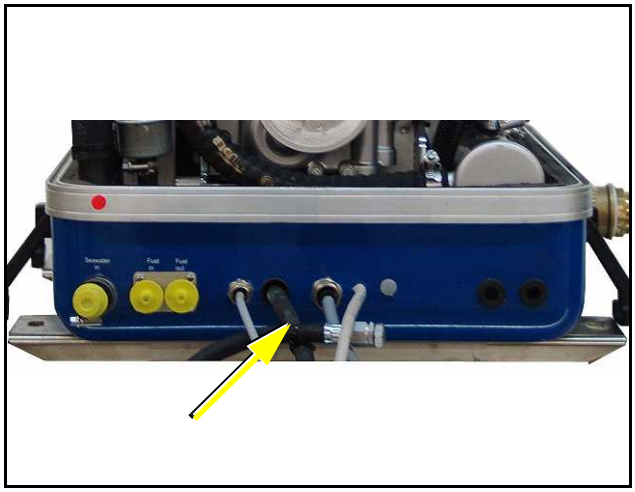


Fig. E.2.1-1: Oil drain hose

Oil Drain Screw

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

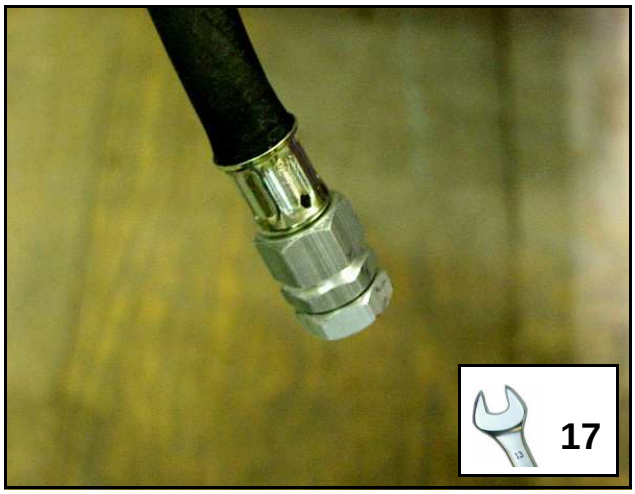


Fig. E.2.1-2: Oiil drain screw

Oil Drain Pump

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

Close the oil drain screw.

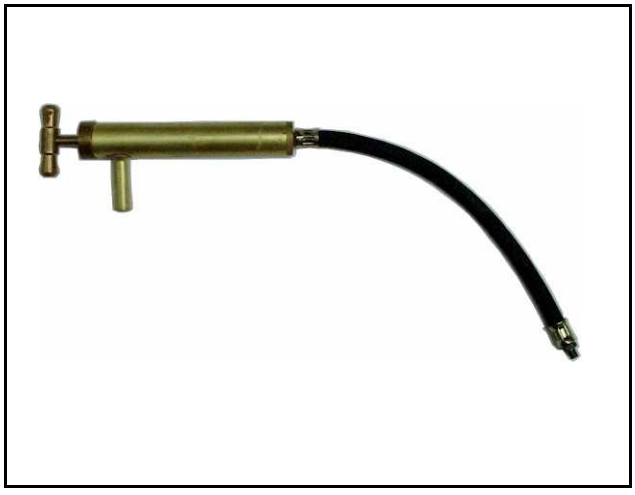


Fig. E.2.1-3: Oil drain pump

Oil Filter Change

The oil filter can be loosened by means of an oil filter strap.

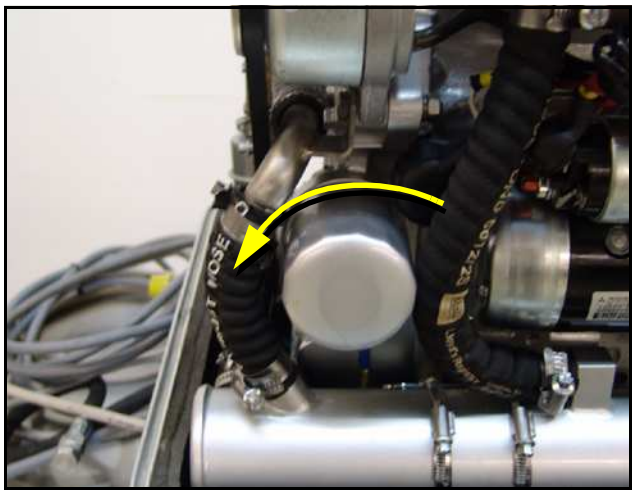


Fig. E.2.1-4: Oil filter change

Oil filter gasket

The gasket should be coated with oil before inserting the new oil filter.

Tighten the oil filter by hand only.

Fig. E.2.1-5: Oil filter gasket

Refill Oil

New oil is poured in, after opening the cap of the oil filler neck. Please wait a moment, before measuring the oil level; the oil must first settle in the sump.

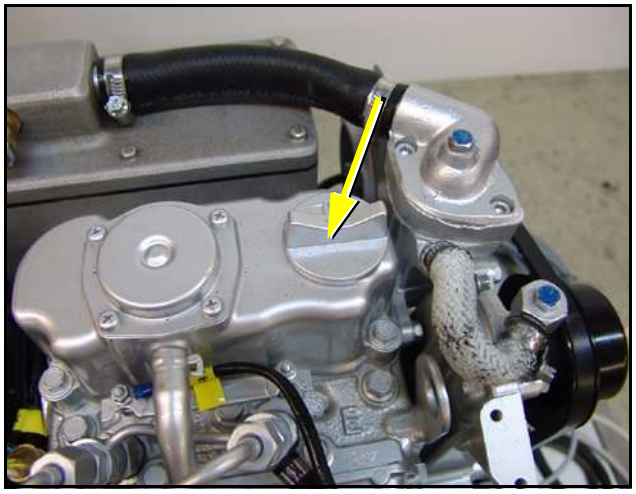


Fig. E.2.1-6: Oil filler neck

Oil Dipstick

The oil level is checked by use of the engine oil dipstick. The prescribed filling level may not exceed the "Max"marking.

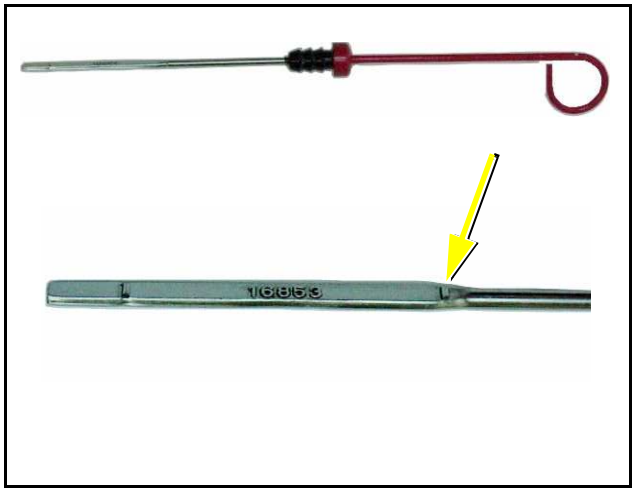


Fig. E.2.1-7: Oil dipstick

E.3 Ventilating the fuel system

Normally, the fuel system is designed to ventilate 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 ventilate the system as follows prior to the first operation (as all hoses are empty):

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

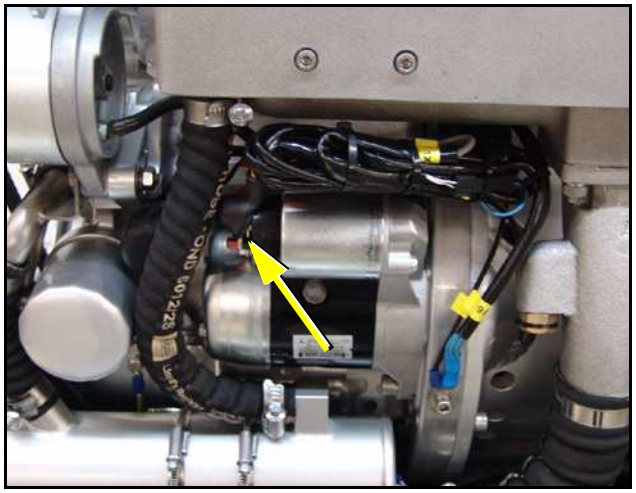


Fig. E.3-1: Starter motor

2. Switch the panel „ON“ (1 = „ON/OFF-button).
3. Press „START“-button (2). The fuel pump runs audible.

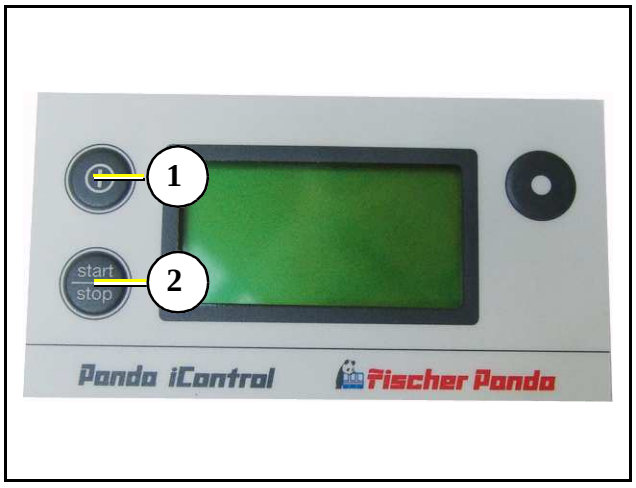


Fig. E.3-2: iControl panel

4. Open the ventilation screw located at the fuel solenoid valve. The „START“ button must continue to be pressed, whilst opening the screw. A large cloth or Kleenex tissue must be laid beneath the connection to prevent escaping fuel running into the capsule. If the fuel runs out without air bubbles, then the ventilation screw can be closed. Only then may the „START“ button be released.
5. Switch the panel „OFF“.

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

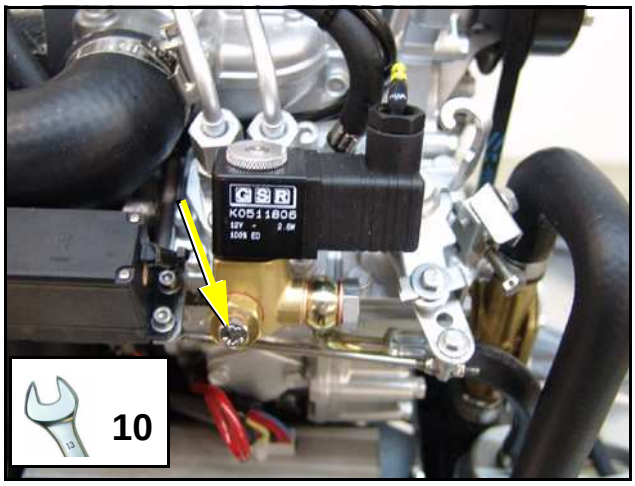


Fig. E.3-3: Ventilation screw at the fuel solenoid valve

6. Pressing the starter button can now start the machine. The machine should start after a short period.
7. If this does not occur, then a connecting nut fitted to the injection line must be loosened and starting procedure repeated. Retighten the washers after successfully starting. The injection line must be raised by several millimetres.
8. Switch main switch "OFF"

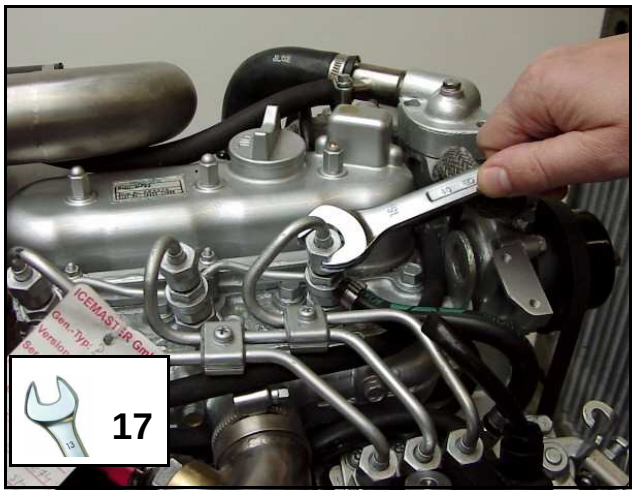


Fig. E.3-4: Injection nozzles

E.3.1 Replace of the fuel filter

Exchanging the filter, depending upon fuel contamination, should take place after 300 operational hours at the very least. The inlet must be clamped, before exchanging the filter.

Remove the hoses from the used filter and fasten them to the new filter. The arrow on the filter housing indicates the direction of the fuel flow. A clogged filter causes a decreased power output of the generator.

Fig. E.3.1-1: Fuel filter

E.3.2 Checking the water separator in the fuel supply

The pre-filter with water separator has a cock underneath, by which means the water can be drained.

This water sinks to the bottom, due to its density. It is heavier than the diesel

Fig. E.3.2-1: Pre-filter with water separator

E.4 Replace the air filter mat

1. Open the air suction housing by loosen the six screws on the housing cover.

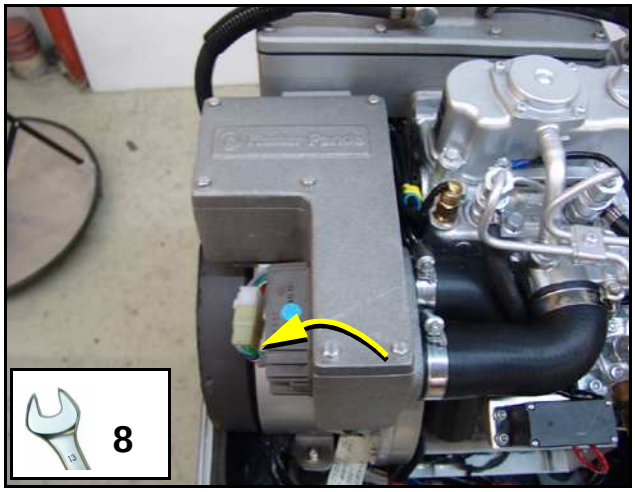


Fig. E.4-1: Air suction housing

2. Change the air filter mat.
3. Close the suction air housing.

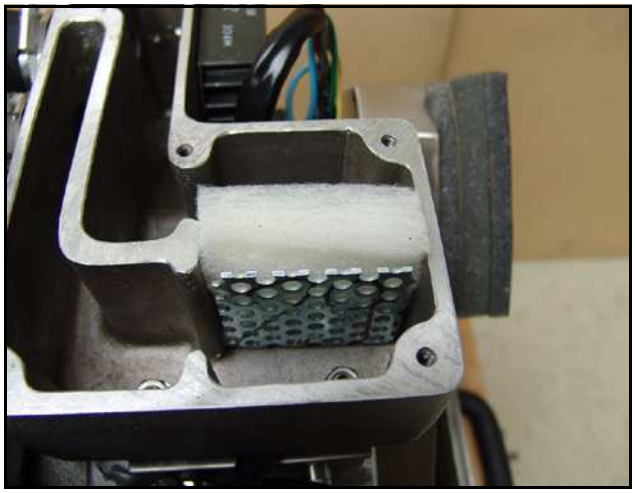


Fig. E.4-2: Opened air suction housing

E.5 Ventilation of the Coolant Circuit / Freshwater

Special notes for the ventilation of the cooling system

If the cooling water is drained, or if other air has entered the cooling system, it is necessary to ventilate the cooling system. This ventilating procedure must be repeated several times:

ATTENTION! The generator must be switched off before opening the ventilating points!

Pay attention that the external coolant expansion tank is connected with the generator by the intended connection point.

Further it should be guaranteed that the expansion tank is attached in sufficient height (600 m) over the level of the generator exhaust elbow union.

Fig. E.5-1: Expansion tank

1. Open the ventilating screw above the cooling water pump casing.

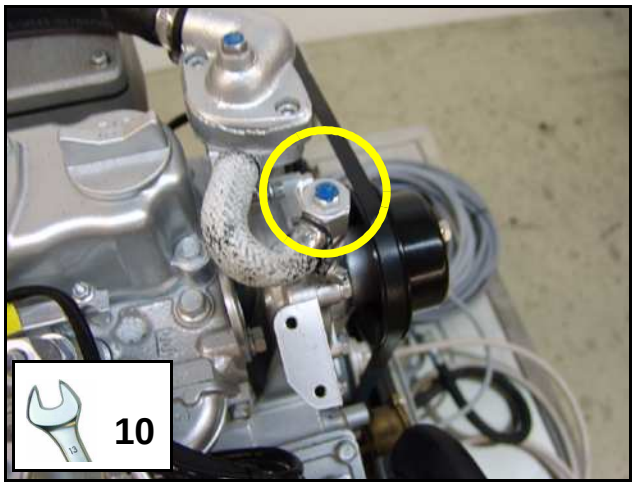


Fig. E.5-2: Ventilating screw

2. Open the ventilating screw on the thermostat casing.

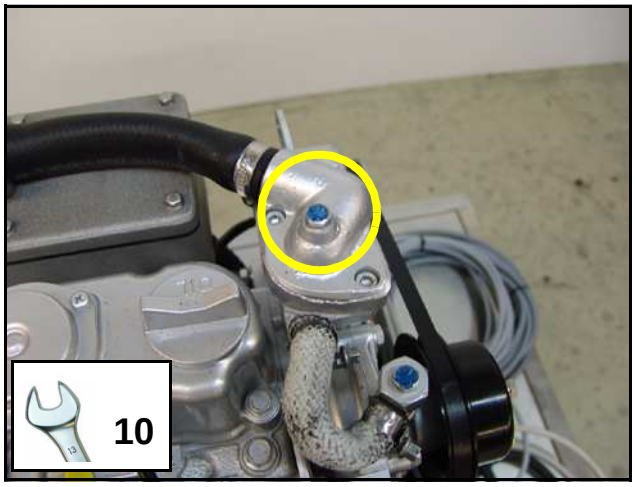


Fig. E.5-3: Ventilating screw on the thermostat housing

3. Now the cooling water is only filled over the external expansion tank. This is connected by 2 hoses with the genset.

The external expansion tank should be filled in the cold condition only up to maximally 20%. It is very important that a large extension space over the cooling water level remains.

Repeat this procedure several times.

If no change of the cooling water level can be determined, the generator is started for 5 minutes.

Afterwards repeat the ventilation two - three times.

It is meaningful to repeat the ventilation procedure also after some days again to guarantee that in the system remained bubbles are removed.

The ventilation screw above the cooling water pump casing may not be opened under any circumstances, whilst the generator is running. Air will be sucked through the opening, if this should happen by mistake. Venting the whole system afterwards is necessary and very difficult.

Fig. E.5-4: Ventilation screw above the cooling water pump casing

E.6 Replace of the v-belt for the internal cooling water pump

The relative high ambient temperature in the closed sound insulated capsule (about 85℃) can be a reason for a reduced lifespan of the v-belts. It is possible that the "softener" in the rubber compound lose their effect after a short operating time because the air in the sound insulated capsule can be relative warm and dry. The v-belt must be controlled at very short time intervals. It may be required to change the v-belt after several weeks because of unfavourable conditions. Therefore, control should be carried out after an interval of 150 operating hours. The v-belt is a wearing part. There should be enough spare v-belts on board. We recommend that you have the respective manual within reach.

1. Loosen the screw on the deflection pulley bracket

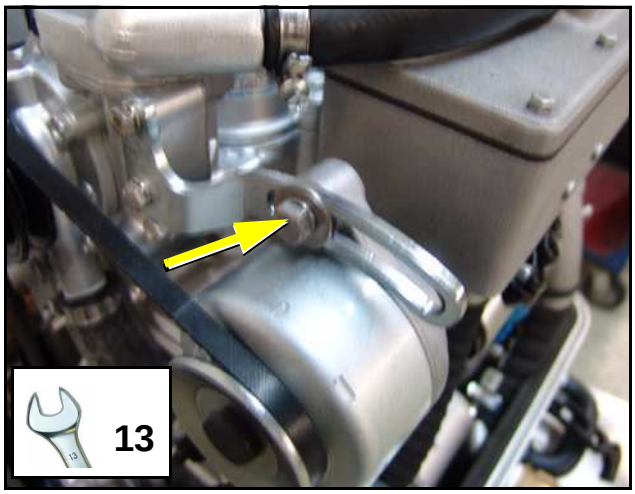


Fig. E.6-1: Screw above the alternator

2. Loosen the screw beneath the alternator

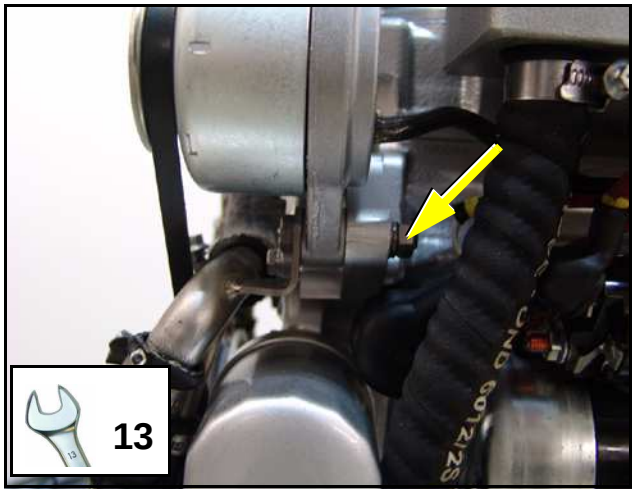


Fig. E.6-2: Screw beneath the alternator

3. Press the alternator in the direction of the thermostat casing.
4. Replace the v-belt.

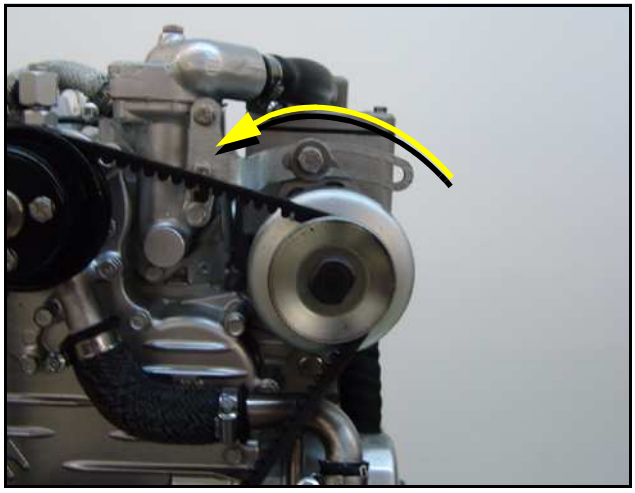


Fig. E.6-3: DC alternator

5. Re-tighten V-belt

   The v-belt should only be tightened to the extent that it can be pushed to the length of a thumb (approx. 10 mm).
6. Re-tighten the screws above and below the alternator.

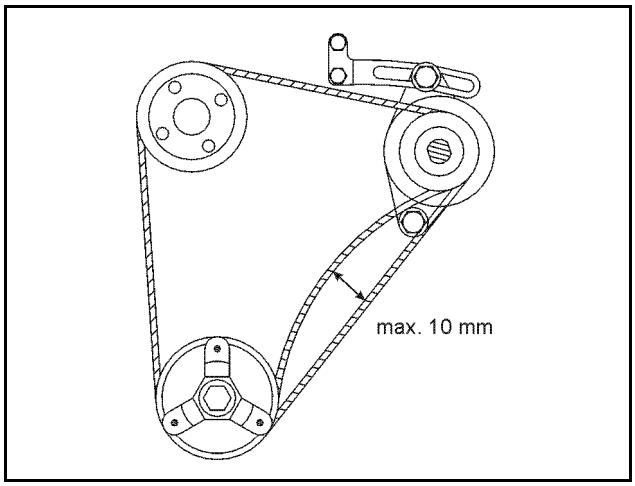


Fig. E.6-4: Drawing v-belt

E.7 The Raw water circuit

E.7.1 Clean raw water filter

Residue should be regularly removed from the seawater filter. The seacock must, in each case, be closed first. It often suffices to merely hit the filter punnet.

If water should seep through the cover of the raw water filter, this may never be sealed with adhesive or sealant. The cause for the leakage must be sought. The sealing ring between caps and filter holders must be exchanged in the simplest cases.

Fig. E.7.1-1: Raw water filter

E.7.2 Reason for frequent impeller wear

1. Unreasonable operating conditions

The Cooling water pump Impeller must be regarded as a wearing part. The life expectancy of an impeller can vary greatly and depends exclusively upon the operating conditions. The PANDA Generator cooling pumps are so designed that the speed of the pump in comparison to other generators is relatively low. This has a positive effect on the life expectancy of the pump.

2. Longer Suction Distance of Cooling Water

If the cooling water suction distance is long, or is blocked, this has a negative effect on the impeller, so that an under-pressure occurs in the cooling water suction area. This can reduce the efficiency of the impeller and place strain on the blades. This can greatly reduce the life expectancy.

3. Operating in contaminated waters

The impeller is placed under great strain in waters with high contamination. The use of the impeller in coral waters is also critical. There are known cases, whereby the impeller was so fatigued after 100 hours use, that the lip seals were grinded away by the shaft. In these cases sharp crystal parts from the coral press into the rubber seals and act as a grinding material on the stainless steel shaft of the impeller pump.

4. Generator mounted above the water level

It is especially disadvantageous for the impeller pump, if the generator is mounted above the water level. This means that a few seconds will pass before the impeller can suck in cooling water. This short dry running period damages the impeller. The increased wear can also lead to a breakdown. (See special instruction: "Effect on the impeller pump, if the generator is mounted above the water line").

E.7.3 Replace the impeller

1. Close the raw water valve.

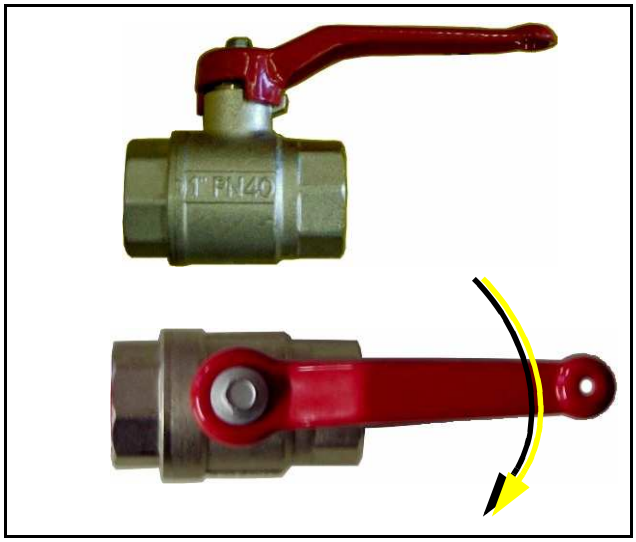


Fig. E.7.3-1: Raw water valve

2. The raw water pump is located on the front side of the genset.

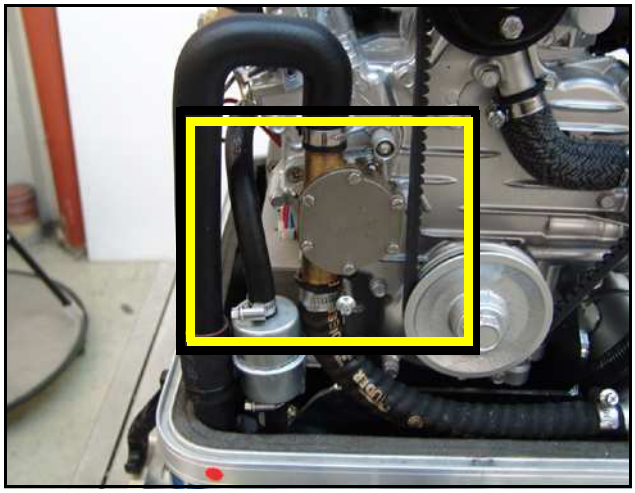


Fig. E.7.3-2: Raw water pump

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

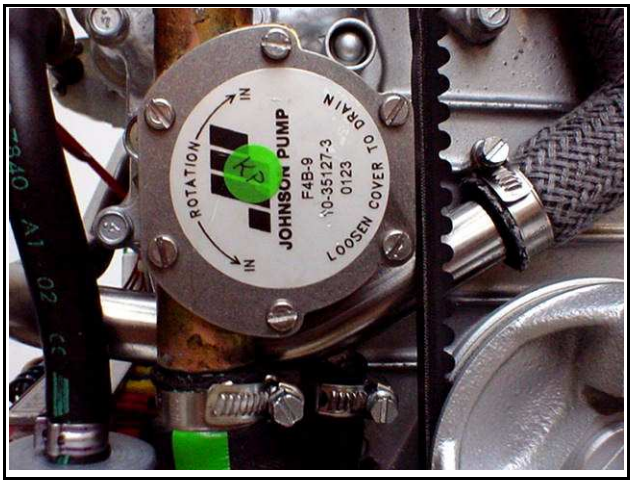
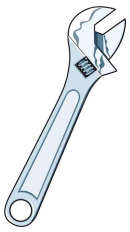


Fig. E.7.3-3: Cover raw water pump



4. Remove the impeller from the shaft by means of multi grip pliers..
5. Mark the impeller, to make sure that it is in the correct position when re-installation is carried out.

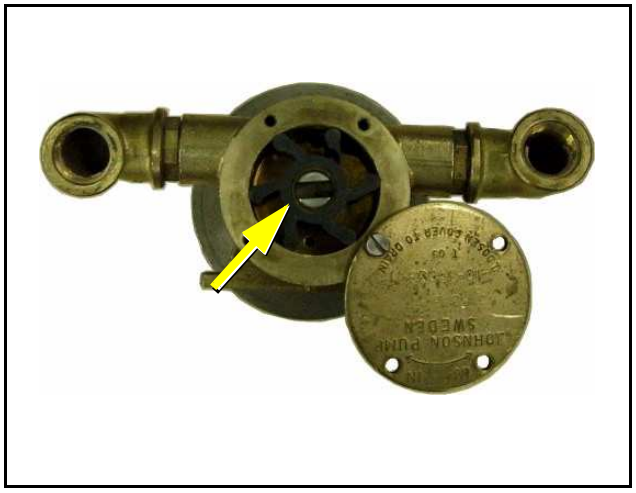


Fig. E.7.3-4: Impeller

6. Check the impeller for damage and replace it if necessary.
7. The impeller should have been lubricated with glycerine or with a non-mineral oil based lubricated e.g. silicone spray, before re-insertion into the housing. Attention: This is very important, because the impeller can quickly be damaged.

Fig. E.7.3-5: Impeller

8. Attach the impeller to the pump shaft (if the old impeller is re-used, initially check the marking).
9. Fastening the cover and use a new seal.

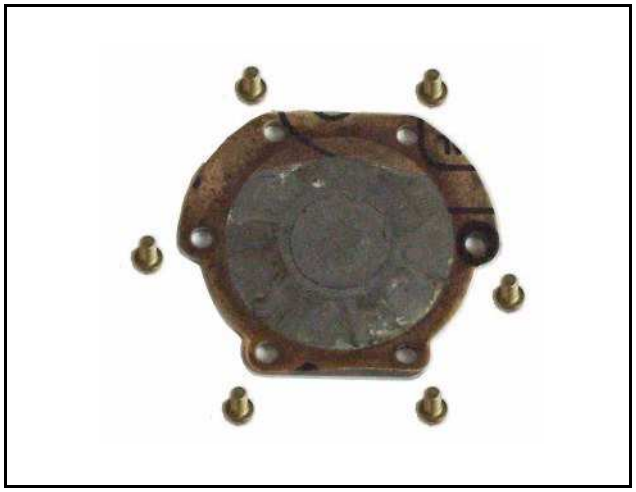
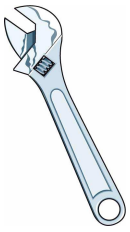


Fig. E.7.3-6: Cover pump shaft

E.8 Conservation of the generator (long operation interruption)

E.8.1 Measures for preparation of winter storage



1. Rinse seawater circuit with an anti-freeze solution, if this contains a corrosion protection solution. The seawater intake must be stopped at the seacock. The anti-freeze protection mixture is to be sucked up from a container by means of a hose connection. The cooling water mixed with the exhaust gases should be fed back to the suction container. The circuit must be kept upright some minutes to ensure the anti-freeze protection mixture reaches all parts of the cooling system.
2. The anti-freeze mixture concentration in the internal cooling circuit must be checked with a suitable measuring instrument. The concentration must be adequate for the lowest expected temperatures.
3. Clean seawater filter and check seal.
4. Check seacock for practicability. And spray with a corrosion protection oil from the inside or lubricate with acid-resistant grease.
5. Check all hoses and hose connectors for good condition. The rubber hoses are very sensitive to environmental influences. They can deteriorate quickly in environments with dry air, light oil, fuel fumes and increased temperatures. The hoses must be checked regularly for elasticity. The hoses must be renewed once in the year in particular operating situations.
6. Doubly check the hose connections at all seawater valves, and if possible protect them with double hose clamps.
7. Dismount the cooling water pump impeller and check for wear. The impeller may not remain in the pump. It must be greased with Vaseline and be kept in a dark place. It can be re-integrated again into the pump, during the spring, if it is in good condition. The impeller is a wearing part, and it is recommended that it is always renewed in the spring, depending upon the number of hours the generator has been running.
8. Control of the vent valve at the seawater inlet. A vent valve is always necessary, if the generator is installed below the waterline. The vent valve must also be regularly checked during the season. The vent valve should always be disassembled, checked and greased during winter storage. Hardened or dirty parts are to be replaced.
9. Check water lock: If the generator were rinsed with an anti-freeze mixture, the anti-freeze mixture can escape from the water lock. If the generator were rinsed with fresh water, the water in the water lock must be drained. Otherwise there is a danger of the collector being destroyed by ice through expansion.
10. Check the exhaust/water separator for leakage and whether the hose connections at the lower surface of the separation unit are in normal condition. (in the case of extremely sulphurous fuels, it is possible that high-grade steel tube ends are attacked.)
11. Check all construction units of the generator inside the sound cover for leakages. If there are traces of humidity in the sound cover, the cover must be dried. Furthermore, the cause for damp must be searched and eliminated.

E.8.1 Measures for preparation of winter storage

12. During the winter storage the upper section of the sound inulated capsule must be taken off, in order to avoid condensed moisture formation, if traces of humidity remain in the sound insulation capsule inside casing by leakages in the seawater circuit.
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. Check cooling water connection block at the generator housing on traces of corrosion and if necessary renew. (Only such traces are to be considered, which refer to clear "blossoming" of the material. If the surface is only grey coated, this is only an indication for the fact that aluminum came into contact with condensed moisture.)
17. 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.8.2 Initiation during spring

- Before starting, turn the engine once with the hand, in order to eliminate the beginnings of existing corrosion to the bushes. 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!

Intentionally Blank

F. Tables

F.1 Troubleshooting

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

F.2.1 Technical data generator

Generator	Panda 6000i PMS
Generator type	PM-Synchronous Generator
Winding type	AGT
Wiring mode	3~
Protection mode	IP 44
Insulation class	H
Nominal voltage	2x300 V
Frequency	373 Hz
Nominal speed	-> 2800 rpm
Max. current	2x5,7 A
Apparent power	6,0 kVA
Real power	6,0 kW
Power factor	1,0

Table 1: Technical data generator

F.2.2 Technical data engine

Model	Kubota Z 482
Type	Vertical, water-cooled, 4-cycle diesel engine
No. cylinders	2
Bore [mm]	67
Stroke [mm]	68
Total displacement [ccm]	479
Combustion chamber	Spherical type (E-TVCS)
SAE NET intermittent (SAE J1349) at 3600rpm [kW]	9,3
SAE NET continuous (SAE J1349) at 3600rpm [kW]	8,1
Maximum bare speed [rpm]	3800
Minumum bare idling speed [rpm]	900 to 1000
Order of firing	1-2
Direction of rotation	Counter-clockwise (viewed from flywheel side)
Injection pump	Bosch MD type mini pump
Injection pressure	13,73 MPa, 1991 psi (140kgf/cm²)
Injection timing (before T.D.C)	20°
Compression ratio	23,5 : 1
Fuel	Diesle fuel No. 2-D
Lubrication (API classification)	above CF grade
Dimension (lengthxwidthxheight) [mm]	351x389x520
Dry weight (BB spec.) [kg]	53,1
Starting system	Cell starter (with glow plug)
Valve clearance (engine cold) [mm]	0,145 to 0,185
Cylinder head cover screw torque [Nm]	37,3 to 42,2
Lubrication oil capacity [l] (oil pan)	2,1(101mm) 2,5l (121mm)
Fuel consumption [a] [l]	0,63 - 1,68
Oil consumption	max. 1% of fuel consumption
Permissible max. permanent tilt of engine	a) 25°acr oss the longitudinal axis b) 20°in the longitudinal direction

Table 2: Technical data engine

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

Generatortype	Ø Cooling water conduit		Ø Exhaust conduit [mm]	Ø Fuel conduit	
	Fresh water [mm]	Raw water [mm]		Supply [mm]	Return [mm]
Panda 6000i PMS	20	20	40	8	8

Table 3: Diameter of conduits

Wiring for vehicles. single phase, not tin-plated, PVC-isolated.		
nominal wire cross-section [mm²]	**allowed continous 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

Table 4: Cable cross-section

a. DIN VDE 0298, part4.

F.3 Engine oil specification

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

Table 5: Engine oil specification

F.4 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

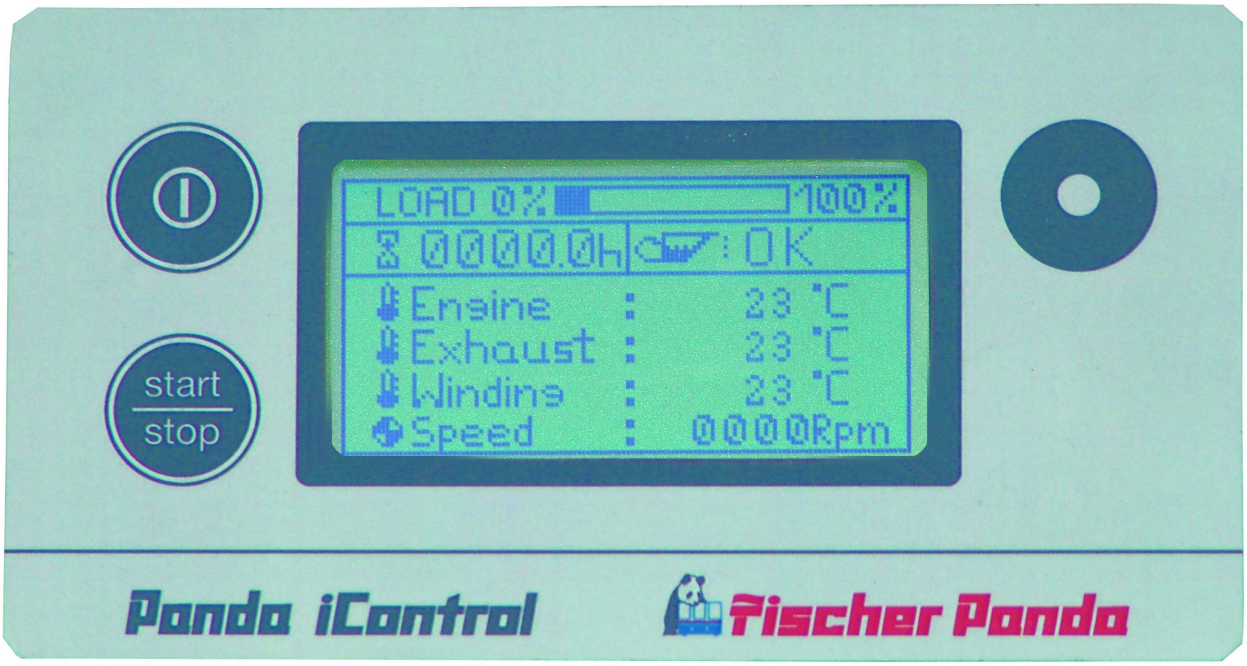
Table 6: Coolant specification

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

Table 7: Mixture ratio

Panda i-series

Part 2: Panel Panda iControl Manual



Panel Panda iControl

Fischer Panda GmbH

16.1.09
iControl_eng.R03

Current revision status

	Document
Actual:	Panda_iControl_eng.R03_16.1.09
Replace:	Panda_iControl_eng.R02

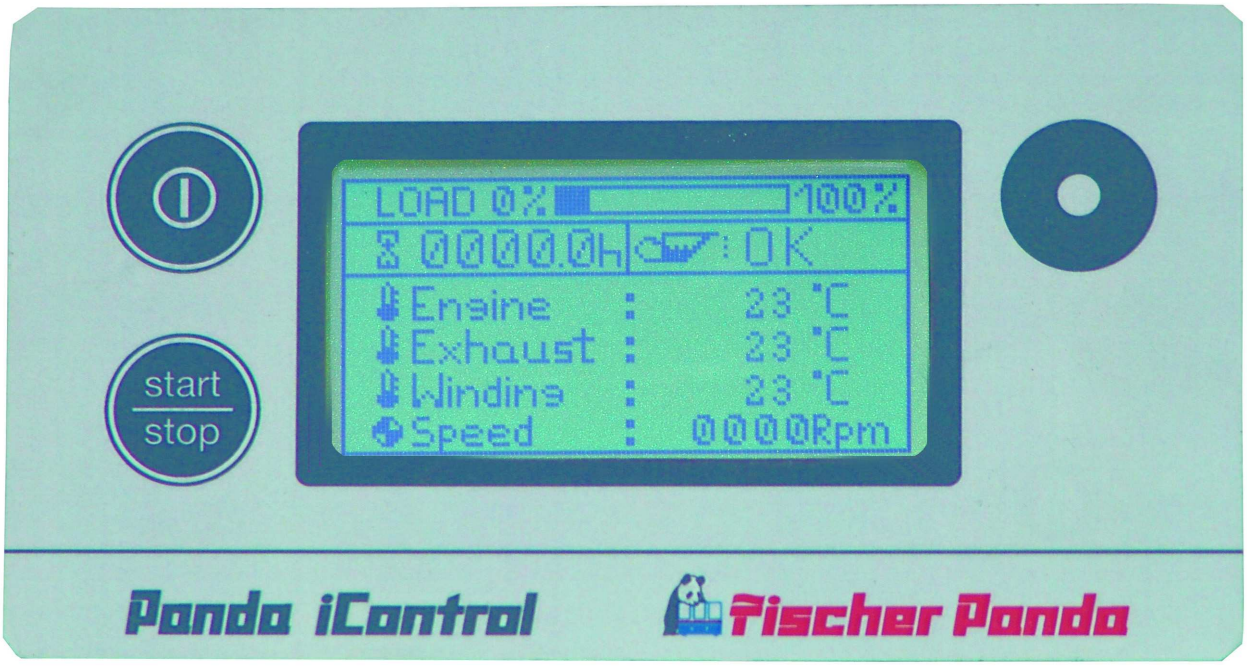
Revision	**Page**
Update the whole manual	
connection to 6000i update	

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!

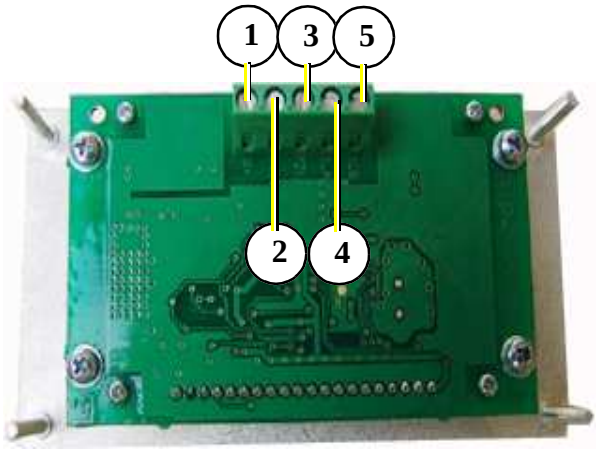
Electrical voltages above 48 volts (battery chargers greater than 36 volts) are always dangerous to life). The rules of the respective regional authority must be adhered to. Only an electrician may carry out installation of the electrical connections for safety reasons.

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

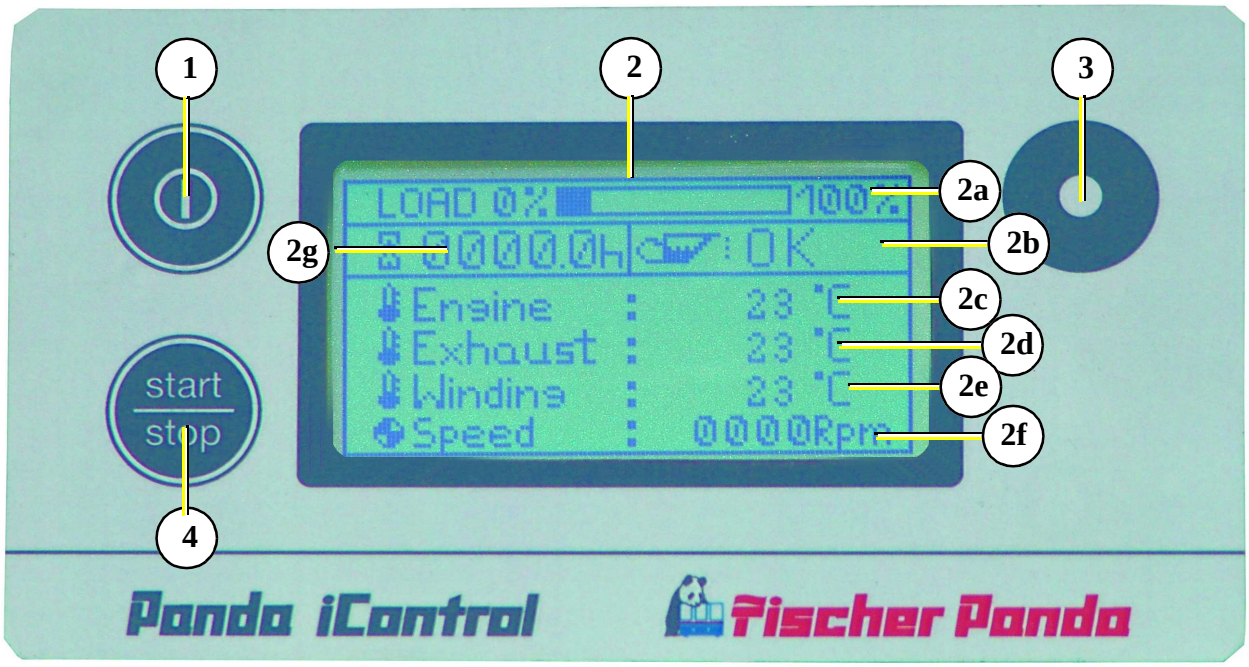
Fischer Panda Datasheet

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.

Fischer Panda Datasheet

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 87.

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.

Fischer Panda Datasheet

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.

Fischer Panda Datasheet

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“)

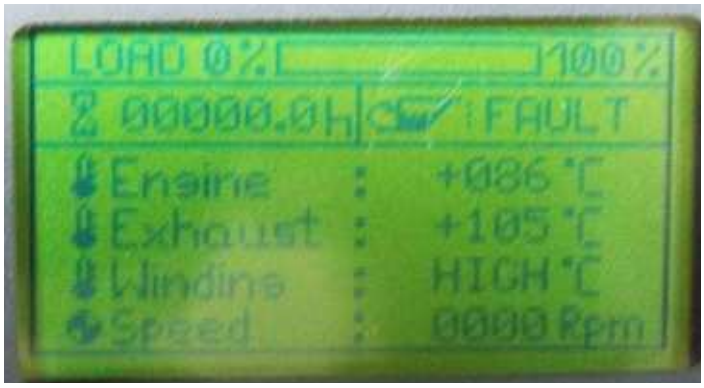


Fig. A.6-1: Display warning (winding temp „high“) - example

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.

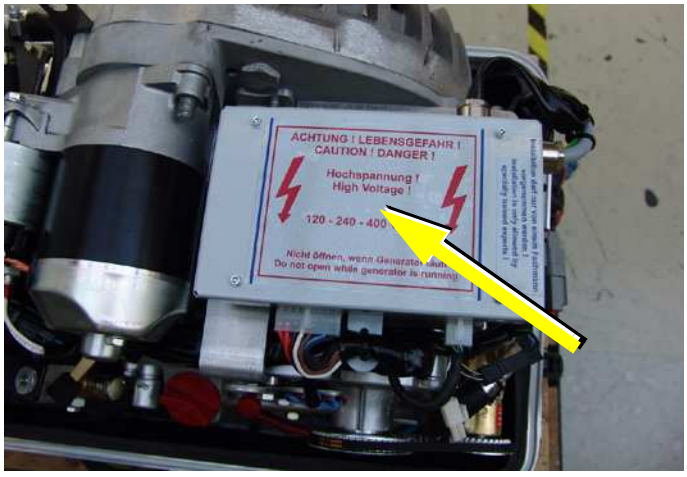


Fig. A.8.1-1: Location of the electronic board

Fischer Panda Datasheet

A.9 Technical data

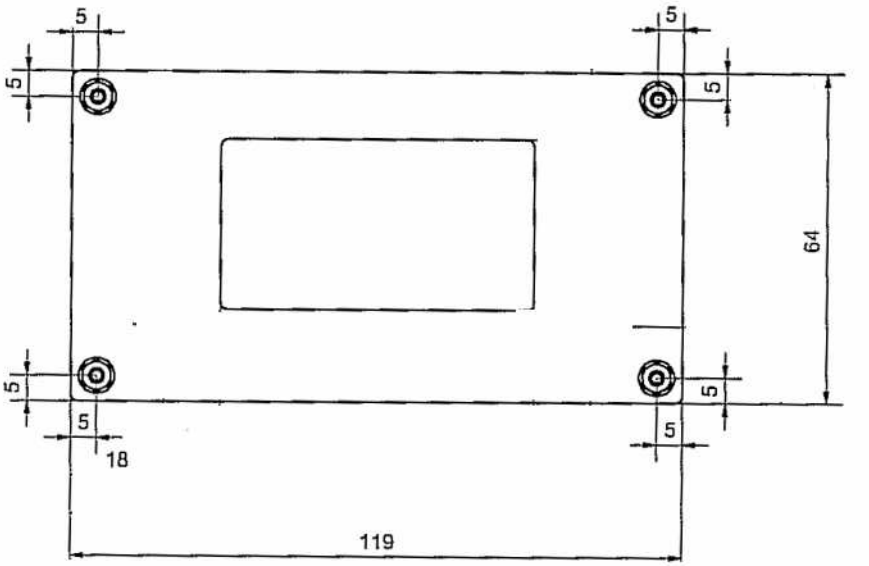
A.9.1 Intended use

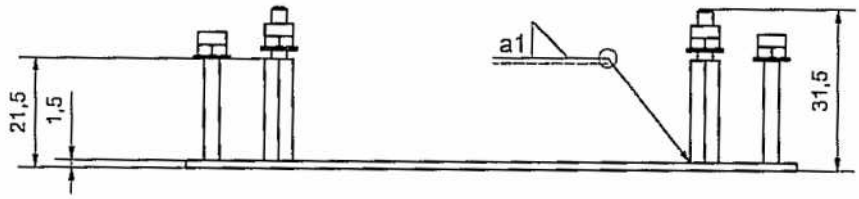
The Panda iControl is a part of the Panda i-series generator. It is not allowed to use the iControl at other generators or applications.

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





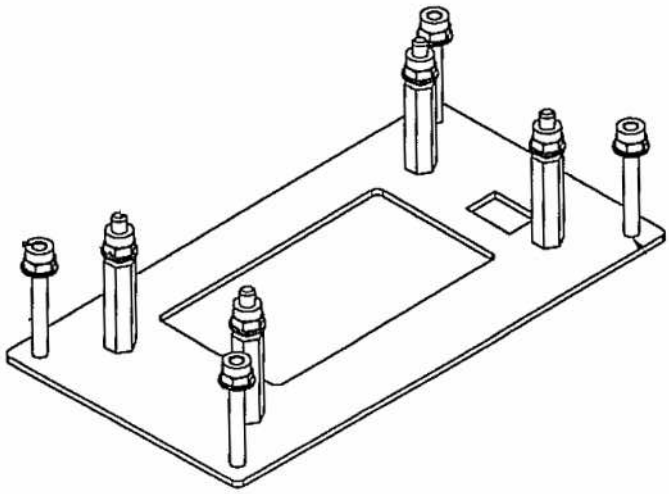


Fig. A.9.2-1: Dimensions

Intentionally Blank

Panda i-series

Part 3: PMGi 6000 inverter Manual

PMGi 6000

Fischer Panda GmbH

Panda_PMGi_6000_eng.R0116.1.09

Current revision status

	Document
Actual:	Panda_PMGi_6000_eng.R01_16.1.09
Replace:	

Revision	**Page**

Fischer Panda Datasheet

A. Panda PMGi 6000

Art Nr..	21.07.03.008P
Bez.	Panda PMGi 6000

	Document	Hardware	Software
Actual:	R01		
Replace:			

Fischer Panda Datasheet

A.1 Safety instruction

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). This avoid unexpected start of the generator.

A.2 Type plate

1. Location of the type plate

Fischer Panda
Power Inverter

Type		PMGI 6000			
Serial Number		08205010			
Year		2008			
Input Voltage	U_{in}	3x 260...480V AC	Power	P_n	6000VA
Input Freq.	F_{in}	250...650Hz	Output Voltage	U_{out}	230V AC
--		--	Output Freq.	F_{out}	50Hz
IP class		30	Current max	I_{max}	27A

CE Fischer Panda GmbH Paderborn, Germany
www.fischerpanda.net

Fig. A.2-1: Type plate

A.3 Front side/connection side

To connect the PMGi 6000 use the prepared cable with t he 4pin plug and connect to socket 3 (PMGi in-450V/ 400Hz)

Connect your termination box with the socket 1. Use a 3pin plug (230V/50Hz AC - PMGi out)

Do not cover the Air out grille (2)

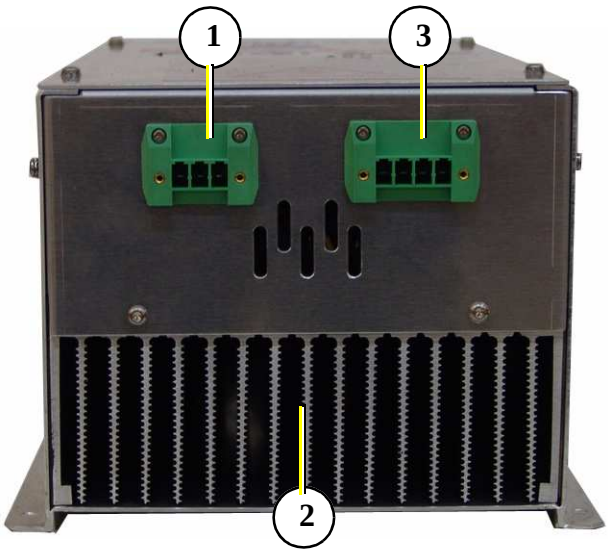


Fig. A.3-1: Connection side

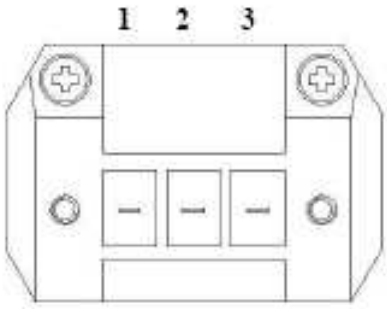
A.3.1 Socket pins of the PMGi 6000

Socket 1 - 230V / 50Hz AC - PMGi out

1. Ground (cabel green/yellow)

2. Neutral (cabel blue)

3. Live (cabel brown)



.Socket 3 - PMGi in

1. Ground

2-4. Phase 1-3

Attention! Connecting one of the three Phase with the earth pin will destroy the PGMi

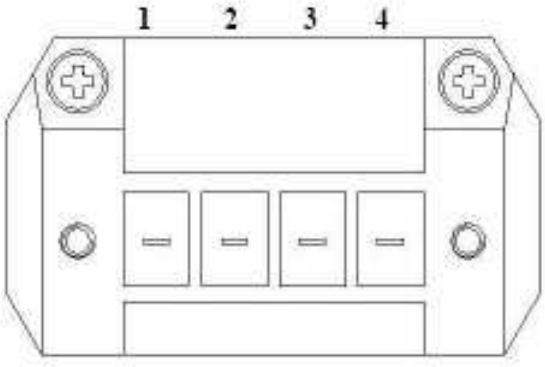
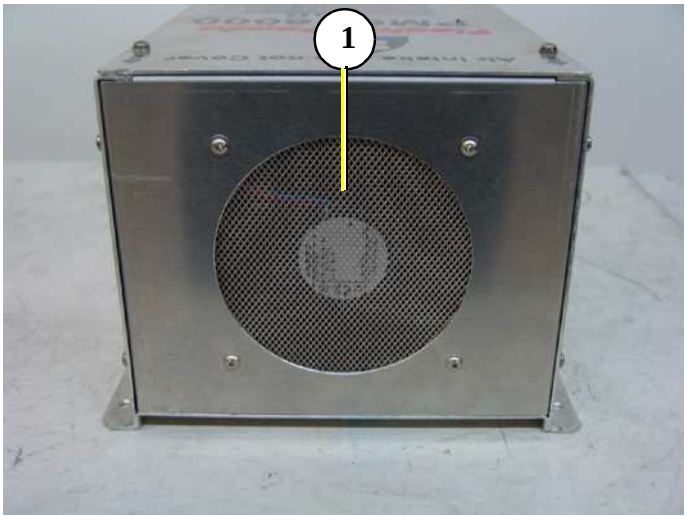


Fig. A.3-1: Sockets

Fischer Panda Datasheet

A.4 Back side - Top side



Inside of the PMGi a fan is mounted. The air holes and air grille should not be covered.

01. Air holes

Fig. A.4-1: Back side

Attention! Inside of the PMGi are up to 550VAC. The cover of the PMGi should only be opened by special trained persons !!! Danger for Live“

Attention!

Make sure that the connection between the generater and the PMGi is secured. Never connect or disconnect the PMGi while the generator is running. This will destroy the PMGi (it may burn or explode).

Fischer Panda Datasheet

A.5 Operation manual

A.5.1 Primary remarks / Winter operation

The PGMi can operate in the range of -20℃ to +40℃ .

A.5.2 Load at the PMGi

Do not overload the PMGi. It will go on error.

A.5.3 Automatic start

The generator can start (depending on the remote control panel) by an external signal (atomatic start)

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 start current). May use a relay which connect the load at 230V.

A.6 Status LED´s

When the PMGi is mounted on the right way, vertical with the lectric connection down. The LED´s from left to right are:

Red - Yellow - Green

LED - Red	Red LED lights together with the green LED for the very first seconds (about 5 sec) after the running of the engine. During this time no output is provided by the PMGi. Red LED starts to blink when an overload condition is reched. During this time the green LED continiues to light. When an overload condition stays for too much time the red LED stops blinking and stays permanently switched on, while the green LED switch off.
LED-Yellow	Yellow LED lights together with the green LED when the output voltage becomes less than the nominal voltage.
LED-Green	Green LED permanently lights alone when the PMGi output is available and it value stays in the spacification

Table 1: Status LED´s

Fischer Panda Datasheet

A.7 Cooling of the PMGi

Inside of the PMGi a fan is mounted.
Do not cover the air holes and grille.
The heat sink and the fan of the PMHGi may become dirty as a consequence of tzhe use of the generator, and so the unit can loose a part of their heat transfer carateristic. Every 6 months it is necessary to visual inspect the heat sinks and clean it with compressed air. At every Generator service the fan of the PMGi should be cleaned by the special trained person.

A.8 Installation of the PMGi

The PMGi must be mounted vertical, with the electrical connection down. So you can read the writing on the PMGi.

The surface where the PMGi is mounted should be smoothed and support the heat transfer. The Air holes and Air grille must be not covered and enough cooling air must be pleasant at any time for the PMGi.

To mount the PMGi use the four fixing holes diameter 6,5mm.

Note! See the safety instruction in your Generator and iControl 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.8.1 Electrical connection.

Only special trained persons are allowed to make the electrical connection.
When an extension cable is required, be sure to use a though rubber sheated flexible and fireproof cable. Limit length of extension cables depends on the voltage drop along the cable. This drop must be less than 2,5% value of the nominal output voltage.
Pay attention to the right pin assignment. See “Socket pins of the PMGi 6000” on page 97.

A.8.2 Installation of the ferrites

Ferrit to clip on the cable

Fig. A.8.2-1: Installation of the ferrites

Ferrit to clip on the cable

cip the ferrit on thr cable which is going from the PMGi to your electrical cabinet. The ferrit should be as close to the PMGi as possible. Secure the ferrit with teh cable straps.

Fig. A.8.2-2: Installation of the ferrites

Ferritring

Fig. A.8.2-3: Installation of the ferrites

Ferritring

Insert the cable comming from the generator about 10cm through the ring.

Turn it back and insert it through again. (second time)

Turn it back and insert it through again. (Third time)

The ferrit should be as close to the PMGi as possible. Secure the ferrit with teh cable straps or heat shrinkable tube.

Mount the plug on the cable.

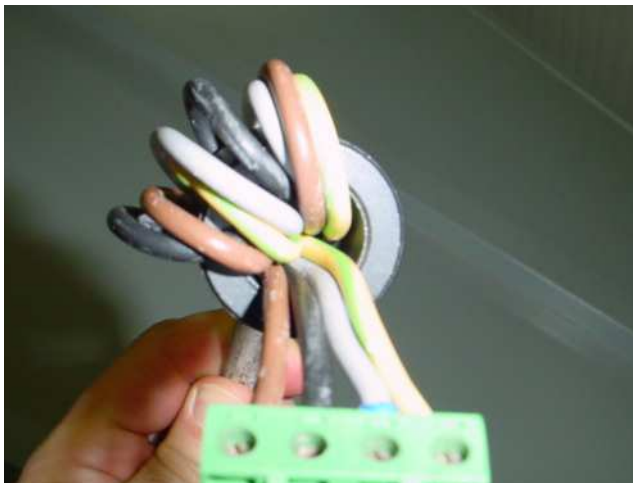


Fig. A.8.2-4: Installation of the ferrites

A.9 Technical Data

A.9.1 General Data

PMGi is part of the Panda i-series generator. It´s not allowed to be used with other generators or aplications.

Storage temperature	**PMGi**	-20℃ to +55℃
Working temperature	**PMGi**	**Minimum: -20℃** **Maximum: +40℃** **Maximale internel temperature of the PMGi: +60℃**

Table 2: General data

A.9.2 Generator Spezifikation

PMG Generator out		**3 phase**
Voltage Phase	**minimum 250V AC**	**Maximum 550V AC**
Frequency	**minimum 250 Hz**	**Maximum 650 Hz**

Table 3: Generator specification

A.9.3 PMGi out

Voltage

Nominal Voltage	**NOV_{AC}**	**230V VAC +/- 5% without load**
Regulation	**R**	**5%**
Stability (short term (30sec))	**D_S**	**5%**
Stability (Long term (4h))	**D_I**	**5%**
Voltage offset	**V_{offset}**	**+-5V -20℃ bis +40℃**
Current	**$Current_{Nominal}$ @230$V_{eff.}$**	**26 A**
	$Current_{Maximum}$@230$V_{eff.}$	**29 A**
Power	**Nominal power**	**6,6 kVA**
	Long term	**6,0 kVA**
Frequency	**Nominal Frequency**	**50 Hz +/-2%**
	Regulation	**4%**
	Stability (short term (30sec))	**3%**
	Stability (Long term (4h))	**3%**

Table 4: PMGi out

A.10 PMGi protections

A.10.1Overload - switch point

Output type	Max. current	Comments
230VAC	30,0A +/- 0.5A	When protection takes place the engine must be switched off and all apliances detached

Table 5: Overload

A.10.2Short circiut

To operate the short circiut protection a fuse must be put in series with the live wire. The minimum requested feature for this fuse are the following.

Rated current	1.2	1.5	2.75	4.0	10.0
26A	>1h	<30min	5ms to 150ms	2ms to 15ms	<2ms

Table 6: Short circuit

A.10.3Under voltage and signal

Output type	Min Voltage	Comments
230VAC	219VAC+/-5%	Yellow LED ON
	190VAC+/-5%	Unit trips without overload
	150VAC+/-5%	Unit trips on overload conditions only
Input	Min Voltage	Comments
	250VAC+/-5%	Yellow LED ON
		Unit trips without overload
		Unit trips on overload conditions only

Table 7: Undervoltage and signal

Fischer Panda Datasheet

A.10.4Overheat

Output type	Max. temperature at cooling plate	Comments
AC	60℃ +/- 5℃	When protection takes place the engin e must be switched off. Detach all the appliances and wait for cooling down of the PGMi

Table 8: Overheat

Note! The electrical Data refer to the system running in accordance with all the limits defined in the „General Specification“ table.

Fischer Panda Datasheet

Intentionally Blank