

Operation manual



FOX 4th Generation

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 **rosenbauer**

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ORIGINAL OPERATION MANUAL

1 Legal notice

1.1 Copyright

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Information from this manual may not be passed on to or made accessible to third persons, in particular competitors.

1.2 Manufacturer and customer service address

1.2.1 Manufacturer address



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2 Declaration of conformity

2.0.1 Declaration of conformity

According to EC Machinery Directive 2006/42/EC, Annex II, part 1A

Herewith declares

Rosenbauer International AG

Fire fighting technology

A - 4060 Leonding, Paschinger Str. 90

Address: Postbox 176, 4021 Linz, Austria

Telephone: +43 (0)732 / 6794-0

that the

portable fire pump for fire fighting operations

Type

FOX portable fire pump (4th generation)

Serial number

PC116

complies with the following regulations:

- 1) 2006/42/EC - EC Machinery Directive
- 2) 2014/30/EU - Directive on the harmonization of regulations relating to electromagnetic compatibility
- 3) ECE R10 - Electromagnetic compatibility for vehicles

The following harmonized standards (or parts thereof) have been applied:

- 1) EN 14466:2005+A1:2008, ÖNORM EN 14466:2005+A1:2008, DIN EN 14466:2005+A1:2008
- 2) EN 1028-1:2002+A1:2008, EN 1028-2:2002+A1:2008
- 3) EN 55012:2007+A1:2009, EN 61000-6-2:2005, EN 61000-4-2:2009, EN 61000-4-3:2006+A2:2010, EN 61000-4-4:2012, EN 61000-4-6:2014, EN 61000-4-8:2010

3 Introduction

3.1 Preface

This manual is to be read through carefully and all regulations and advice observed before commissioning the product.

Also observe the documents of the corresponding manufacturers supplied in addition to this manual.

All persons who are involved in the operation and maintenance of this product must be properly qualified and must read and carefully follow this manual (see training and qualifications).

The operation manual is to be stored carefully (for later reference).

3.2 Liability and injury

Due to the information in this manual Rosenbauer fundamentally accepts no liability for direct damage or consequential damage, which arise from incorrect operation or maintenance, as well as by unauthorised changes of components or this manual.

The product may only be operated by persons who are familiar with the manual, the product as well as the national laws, guidelines and regulations pertaining to work, safety and accident prevention.

Rosenbauer assumes no responsibility for injury to persons or material damage, which are caused by untrained personnel, also through non-compliance with the regulations regarding work, safety and accident prevention.

If this manual contains a technical error or a typographical error, Rosenbauer reserves the right to make change at any time and without notice.

This manual may contains figures and descriptions, that are not built into the delivered product.

No claims may be made for products that have already been delivered from the information, figures and descriptions in this manual.

For your own safety only use spare parts and accessory products from Rosenbauer. Rosenbauer accepts no liability for the use of other products and the resulting damage!

Check the delivery immediately for transport damage and completeness.

- Faults and damages must be documented in writing immediately.
- Photograph damaged components.
- Send written damage report to the manufacturer - see chapter "Manufacturer and customer service address".

3.3 Identification

Identifying the serial number is important when referring to the manufacturer in regards to spare parts and technical issues.

The serial number of the portable fire pump is located on the operator side, facing away from the area of the engine frame, on the chassis type plate.

P	C	1	1	6	L					
---	---	---	---	---	---	--	--	--	--	--

- ▶ Enter the serial number of the portable fire pump in the table.

3.4 Use of the operation manual

3.4.1 Validity

This manual contains information needed for the operation of the product. This manual contains descriptions of special equipment as well as some abstractions and exemplary illustrations. The actual equipping of your product may therefore differ in part from the descriptions and illustrations.

3.4.2 Key to the symbols

To ensure readability and clarity, various paragraphs and information are structured with symbols.

Meaning of the symbols:

- ▶ Operating instructions. Execute the operating instructions one after the other in the order described.
- ✓ Results of an action.
- Enumerations.
- ⇒ Further information on this topic.



Supplementary information.



Follow the supplementary documentation or supplier's documentation.

Key figures

Texts are illustrated with additional drawings, if required. An image legend is provided below the illustration.

The reference from the text to a position in the illustration is established by a set position number (e.g. S1).

3.4.3 Warnings

The safety information warns the user of risks and informs them how these risks can be avoided.

Safety information stands at the beginning of a chapter before handling instructions from which a dangerous situation can occur. Further safety information is found at the start of this manual.

Safety instructions that must be followed without fail are highlighted as follows:

 **DANGER!**

This symbol warns of an extremely dangerous situation, in which non-observation of the danger warning will lead to death or serious irreversible injury.

 **WARNING!**

This symbol warns of a dangerous situation, in which non-observation of the danger warning can lead to death or serious irreversible injury.

 **CAUTION!**

This symbol warns of a dangerous situation, in which non-observation of the danger warning can lead to slight reversible injury.

NOTICE

This symbol warns of situations, in which non-observation of the warning can lead to material damage.

Additionally, the information in the manual, the technical data and the safety information in the supplier's documentation supplied must be observed.

4 Safety

4.1 Intended use

Improper use of the product can result in personal injury. Additionally, the product or other material assets of value may be damaged.

Rosenbauer can warrant the safety, reliability and performance of its product only if the product is used in accordance with the stipulations in this manual.

Unauthorised changes, unauthorised conversions or improper operation can detract from the intended use and result in personal injury or property damage.

Firefighting products may be used only in a flawless technical condition by qualified personnel for the following purposes:

- Firefighting in conjunction with extinguishing water
- Rescue of people from emergencies
- Implementation of technical assistance
- Pumping of drinking water and fire fighting water (suitable for waste water)
- Operation only under supervision of the product

The firefighting products must not be used:

- not permanently installed in vehicles
- not suitable for use in areas with explosion hazards

Only manufacturer-authorized persons may perform modifications, conversions and repairs. Unauthorised changes, unauthorised conversions or improper use will nullify all manufacturer liability for resulting damages.

4.2 Markings and warning signs

Safe use is only possible, if all necessary information for a safety operation are observed. These informations are especially including safety- and warning instructions.

In addition to the instructions in this operating manual read and observe all the safety- and warning signs affixed to the product.

4.3 Other regulations

This product has been manufactured in accordance with the applicable regulations and the state of the art.

In addition to this manual the relevant national legislation, regulations and directives in the latest version are to be observed (e.g. guidelines for personal protective equipment, road traffic regulations, country-specific training regulations for the fire department, accident prevention guidelines, fire department duty regulations, occupational medicine and technical environmental rules, country legislation for fire and disaster protection).

4.4 Training and qualifications

Operator errors caused by inadequate qualifications can cause serious accidents or endanger the success of the operation. Safe operations can be assured only when operation and consistent maintenance of the product is performed exclusively by specially trained personnel.

Only qualified training by experienced firefighting experts and continuous practice of operating procedures ensure safe operations.

One-time instruction is not sufficient!

The product may only be operated by persons who have successfully completed appropriate firefighting training.

The operator is responsible for defining responsibilities and supervision of personnel as well as for adequate instruction and training according to applicable regulations.

Even during operation, make sure that persons without technical knowledge never operate the product.

Personnel must exhibit physical and mental aptitude. Minors and persons without firefighting training may not operate the product.

Modifications and conversions to the product may be performed only with written authorization from Rosenbauer and must be performed by a manufacturer-authorized person.

4.5 General safety instructions

The following instructions give an overview of how the product is used safely. This general overview will be supplemented by the safety instructions in the individual chapters.

Take note of general danger possibilities that could occur when handling machines.

Use the prescribed personal protective equipment.

Make sure that the product corresponds to the respective valid safety regulations and the local fire departments guidelines and is always operationally ready.

On contact with dangerous chemicals (e.g. dry powder) make sure that the manufacturer's safety datasheets and information is followed.

Dry powder and foam compound can endanger the environment.

- ▶ Do not dispose of dry powder and foam compound in bodies of water or in the sewage system.

Foam compound and dry powder in particular are very corrosive.

- ▶ Carefully clean the product of extinguishing agent residue after every operation.

Should emergencies occur where people are injured, appropriate first aid measures must be taken. If necessary, emergency personnel are to be called to provide professional treatment.

Observe the operation and maintenance manuals of additional products.

Safety

General safety instructions

If you cannot fix faults yourself or repairs could not be carried out by specially trained workshop personnel, Rosenbauer or the nearest Rosenbauer service partner must be contacted immediately.

4.6 List of the safety symbols used

4.6.1 Meaning of the warning signs




	<p>Danger from electricity.</p>
	<p>Impending risk of explosion.</p>
	<p>Impending risk of explosion.</p>
	<p>Risk from oxidising materials.</p>
	<p>Risk of harmful or irritating materials.</p>
	<p>Impending acid burn risk.</p>
	<p>Impending hearing damage.</p>
	<p>Risk of inhalation of toxic vapours.</p>
	<p>Risk from hot fluids and vapours.</p>
	<p>Risk from hot surfaces.</p>

Safety

List of the safety symbols used

	Impending crushing risk.
	Danger from high pressure.
	Threat of environmental contamination.
	Impending shearing risk.
	Threat of shearing.
	Impending risk of tripping.
	Risk of hand injury.

4.6.2 Meaning of the prohibitory signs

	No smoking!
	Handling fire and naked flames forbidden!
	Do not touch or reach in!



Do not stay in the danger area!

4.6.3 Meaning of the caution signs



Use hearing protection.



Wear safety goggles or a safety mask.



Use safety goggles and hearing protection.



Wear a protective helmet.



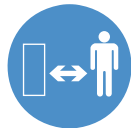
Wear protective gloves.



Wear safety boots.



Wear a protective suit.



Maintain distance.
Special caution.



Observe environmental protection.

4.7 Warnings



DANGER!

Inhalation of toxic exhaust fumes can cause death or serious health damage!

Toxic gases are produced when running a combustion engine. If operation of internal combustion engines in enclosed spaces is absolutely necessary, note the following:

- ▶ Extract the exhaust gases by means of the exhaust gas hose.
 - ▶ Ensure there is adequate ventilation.
-



WARNING!

Danger of injury and accidents!

Danger of injury and accidents due to malfunctioning or improper used safety devices!

- ▶ Do not override safety and protective devices.
 - ▶ Do not manipulate or render safety and protective devices.
 - ▶ Check safety and protective devices for proper function.
-



Personal injuries and damage to property can occur due to a restricted view of movable machine parts.

- ▶ Do not linger in the danger zone.
 - ▶ Follow the training and operation manual.
-

Mortal danger or serious injuries can occur through failure to use protective equipment.

- ▶ Wear protective equipment.
-



Danger of serious injury and damage due to explosion, fire and chemical burns!

When charging vehicle batteries, a highly explosive electrolytic gas mixture (hydrogen and oxygen) is released; it is easily flammable and may release highly acidic battery acid.

- ▶ Wear safety goggles whenever servicing a battery.
- ▶ Follow safety instructions on the outside of the battery.
- ▶ Do not smoke.
- ▶ Avoid fire, open flame and sparks.
- ▶ Avoid sparks when handling cables and electrical devices, and through electrostatic discharge.
- ▶ Do not connect the minus pole of the battery jumper cable near to the discharged battery (generates sparks).
- ▶ Always remove negative battery ground cables first and install them last to avoid sparks.
- ▶ The vehicles must not touch (sparks will occur on connecting the positive poles).
- ▶ Never short-circuit the battery.
- ▶ Ventilate batteries thoroughly before any external start.
- ▶ When connecting the connecting lead, do not bend over the battery.
- ▶ Avoid skin and eye contact with any battery acid that escapes.
- ▶ Keep unauthorized persons clear of the battery.
- ▶ Ensure that the battery voltage matches.
- ▶ Never disconnect the batteries while the engine is running.



Potentially fatal injuries due to the engine taking in flammable gases!

- ▶ Do not operate the engine in areas with a heavy concentration of flammable vapors such as e. g. diesel, gas or propane.
- ▶ When handling flammable liquids and gases, always shut off the engine immediately.



Explosion risk from flammable fuel!

When working on fuel systems the fuel may ignite and cause life-threatening injuries.

- ▶ Do no smoke.
- ▶ Keep fuel away from naked flame.
- ▶ If you are handling fuel keep a fire extinguisher to hand.
- ▶ Use a suitable container to collect the fuel.
- ▶ Remove flowed out fuel prompt and clean affected spot.
- ▶ At a leak in the fuel line, dont start the engine.

Safety

Warnings



Potentially fatal injuries and danger of explosion!

Danger of explosion occurs at operation of the unit in explosive areas..

- ▶ Do not operate the unit in explosive areas.
-



Danger of shearing in the area of the extinguishing equipment!

Body parts can be cut off.

- ▶ Do not linger in the danger zone.
-

Serious injury to persons and damage due to water hammer effect!

If water delivery via a pipe or hose is interrupted abruptly, a pressure impact known as the water hammer effect occurs; this is noticeable as a harsh noise (like a hammer hitting a pipe). This water hammer can cause severe injury when handling fire-fighting equipment, as well as damage to lines, hoses, pumps, valves or other pieces of equipment.

- ▶ Perform adjustments of nozzles, hydrants, valves etc. slowly.
 - ▶ Before opening a discharge outlet, keep a tight hold on the tips and nozzles.
 - ▶ May sure that pressure is released before disconnecting any hose.
 - ▶ In case of danger for persons (e.g. due to a burst hose) immediately reduce the pump speed or close the affected discharge outlet. Switch off the pump system if needed.
-



Danger of crushing and shearing of limbs due to moving or rotating parts!

- ▶ Do not reach into or grasp moving or rotating parts.
 - ▶ Observe a safety distance to the danger zone.
 - ▶ Use protective equipment.
-



Danger of fatal or serious injury from electrical shock!

Water, fire fighting foam and metallic materials conduct electricity.

- ▶ Do not aim turret or nozzle (extinguishing agent jet) toward high voltage power lines or other high voltage electrical circuits.
 - ▶ Keep a safe distance to energized components under all circumstances.
 - ▶ Do not use foam compound while fire fighting in electrical installations.
 - ▶ Do not park vehicles underneath or near overhead power lines, should use caution.
 - ▶ Vehicles with roof structures as e.g. extendable light tower or turrets.
 - ▶ Do not load, unload or use metal ladders in areas where contact may be made with overhead power lines or high voltage electric circuits.
-

Safety clearance of materials conducting electricity to overhead lines

Voltage	Safety clearance
up to 1 kV	1 m (3 ft)
1 kV - 110 kV	3 m (9 ft)
110 kV - 220 kV	4 m (13 ft)
220 kV - 380 kV	5 m (16 ft)

Safety distance for fire fighting operations on low-voltage systems (up to 1 kV)

Extinguishing agent	Safety clearance
C-nozzle with water spray jet	1 m (3 ft)
C-nozzle with dry powder	1 m (3 ft)
C-nozzle with extinguishing gas	1 m (3 ft)
C-nozzle with full water jet	5 m (16 ft)
HD-nozzle with full water jet	5 m (16 ft)

Safety distance for fire fighting operations on high-voltage systems (1 kV - 380 kV)

Extinguishing agent	Safety clearance
C-nozzle with water spray jet	5 m (16 ft)
C-nozzle with dry powder	5 m (16 ft)
C-nozzle with extinguishing gas	5 m (16 ft)
C-nozzle with full water jet	10 m (32 ft)
HD-nozzle with full water jet	10 m (32 ft)
Water turret with water spray jet	10 m (32 ft)
Water turret with full water jet	30 m (98 ft)

CAUTION!

Danger of injury for the operator due to performing action in wrong order!

- ▶ Individual operating instructions must be done in the prescribed order.
-

Danger of crushing or material damage due to moving parts!



Moving components that have not latched into position, or are not at their limit positions, can cause injury to persons or material damage.

- ▶ Only hold compartment doors and steps at suitable points.
 - ▶ Before opening swing-out shelves and swivel reels, fully open the roller shutters in question.
 - ▶ Observe spring and inertia effects when opening and closing compartment doors and the rear step.
 - ▶ Pay attention while closing the seat box cover.
-

Danger of crushing!



Danger of crushing due to pneumatic cylinders and drives.

- ▶ Do not grasp moving parts.
 - ▶ Do not reach into the danger zone.
-

Danger of crushing and shearing of body parts by moving or rotating parts! Danger of injury from being pulled in or being snagged!



Danger of loose clothing or uncovered hair being trapped by moving or rotating parts. Danger of being snagged by items of jewellery. Body parts could be severed.

- ▶ Do not operate the device without guard.
 - ▶ Observe safe distance to the danger area.
 - ▶ Use protective equipment.
-

Injury to persons and damage to property in critical operational conditions!

A delayed reaction to critical operating conditions can cause serious injury and property damage. To immediately be able to respond, the operator must fulfil the following conditions:

- ▶ Always stay within easy reach of the controls.
 - ▶ Control instruments must always remain in the line of vision.
-

Danger of hearing damage from remaining near the running pump for long periods!



- ▶ Use hearing protection.
 - ▶ Do not remain in the danger area.
-



Water under high pressure!

Lingering in front of nozzle discharges could result in serious injuries.

- ▶ Do not linger in front of nozzle discharges.
- ▶ Never aim the nozzle at persons or equipment.
- ▶ Before starting fire fighting, close all cabin doors and windows inside the vehicle.

Injury to persons and material damage due to unexpected releasing of connecting couplings!

- ▶ Before start of operation (pressure), check all connecting couplings with a coupling wrench to ensure tight seating.



Danger of burns due to touching the hot pump system and hot water discharge!

Operating the pump with closed discharge outlets causes the temperature of the pump to rise quickly.

- ▶ Do not operate pump under full load with discharge outlets closed.
- ▶ Do not touch any parts of the hot pump system.
- ▶ Do not linger in the pump system danger zone.



Danger to health due to extinguishing agents!

- ▶ Observe the safety data sheets of the extinguishing agent manufacturer.



Danger to health due to extinguishing agents!

The contamination with extinguishing agents can cause health problems.

- ▶ Observe wind direction, to avoid a inhalation or contamination by extinguishing agent.
- ▶ Wear protective gear.
- ▶ Wear safety goggles.
- ▶ Avoid direct contact with extinguishing agent.
- ▶ If necessary, take first aid measures.



Environmental and health hazard due to lubrication oils!

Lubrication, transmission and hydraulic oils can cause permanent water pollution and endanger fauna and flora of all types.

- ▶ Avoid skin contact with hazardous oils.
- ▶ Avoid ground contact with lubrication oils.
- ▶ Collect used oils sorted by type and recycle.
- ▶ Observe local oil disposal regulations.

Safety

Warnings



Danger of burns due to touching the hot engine and engine components!

- ▶ Do not linger in the danger zone.
 - ▶ Do not touch hot parts of the engine.
 - ▶ Do not touch any parts of the exhaust system.
 - ▶ Wait until all parts have cooled down.
-



Burning hazard from the hot cooling system!

- ▶ Only carry out maintenance work after the portable fire pump has been shut down and the cooling system has cooled down.
-



Danger of injury due to burns!

A short circuit releases powerful currents that can considerably heat up and even melt metals.

- ▶ Use only jump start cables in line with ISO 6722 and NATO connector.
 - ▶ In case of jump start cables with crocodile clips, ensure correct polarity.
 - ▶ Never short-circuit battery poles or the jump start cable.
 - ▶ Avoid unintended connecting of the positive pole and electrically conductive vehicle parts by tools, watches, jewelry etc.
 - ▶ Do not connect the jump-start cable to fuel, hydraulics or brake lines.
-



Danger of burning!

- ▶ Do not grip onto switched-on or recently switched-off search lights.
-

NOTICE**Material damage due to the non-observance of optical or acoustic warning signals!**

- ▶ Monitor all optical and acoustic warning signals, measured value indicators and pilot lamps.
 - ▶ Follow all training and the operating manual.
-

Failure of the engine due to discharged battery!

The battery of the engine slowly discharges despite the ignition being switched off.

- ▶ Check battery charge status regularly (every three months).
 - ▶ Recharge or replace battery with low charge level.
-

Material damage due to cavitation!

With increasing suction lift the pump performance is reduced. Too high suction lifts, very large flow rates and high pump speeds can lead to cavitation in the pump. Cavitation causes extreme local pressure peaks, which can damage the pump. Cavitation of the pump can be recognized by a sharp drop in performance and noises in the pump, which sound as if pebbles are being pumped. Cavitation of the pump must be avoided at all costs, otherwise internal parts of the pump (e.g. impeller) are damaged. If the suction hose is pulled together during external drafting operation, the water column may break off.

- ▶ Only operate pump in external drafting operation with suction strainer and suction filter.
 - ▶ If there is danger of cavitation reduce pump speed, flow rate or suction lift.
 - ▶ Do not operate the pump at high speed and free discharge.
 - ▶ Monitor all display instruments of the pump unit.
 - ▶ Observe the lowering of the water at drafting points.
 - ▶ Use dimensionally stable suction hose for external drafting operation.
-

Material damage due to use of extinguishing agent!

A mixture of dry powder and foam compound concentrate is highly corrosive and difficult to remove.

- ▶ Never mix dry powder and foam compound concentrate.
-

Danger due to water over flow!

Some materials expand and/or increase their weight when saturated with water. Certain materials must not come into contact with water due to the danger of chemical reactions.

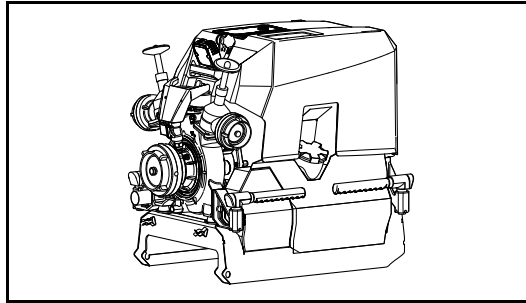
- ▶ In case of danger, immediately stop operation with water.
-

5 Product description

5.1 Portable pump

The portable pump is a mobile extinguishing pump.

The portable pump consists of a water pump, a priming pump, a propulsion engine and a control unit. The portable pump is permanently mounted on a carrying frame.



Portable pump

5.2 Requirements for supply facilities

Water supply

The portable pump must be supplied from a water tank, an open water source, a supply line or a hydrant. An exact description of the water supply takes place in chapter "Operation".

5.3 Identification

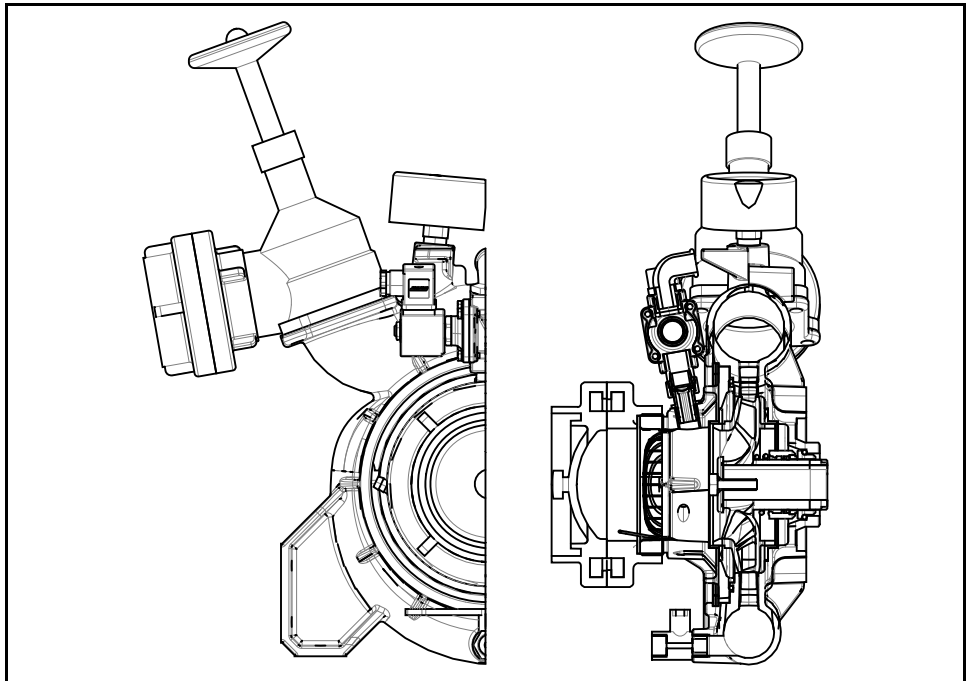
Assignment of the Rosenbauer identification to the standard identification.

Rosenbauer identification	Standard identification acc. to EN1028
FOX portable pump 4th generation	PFPN 10 - 1000 PFPN 10 - 1500

5.4 Pump unit

5.4.1 Water pump

Normal pressure pump



Normal pressure pump

The water pump is a single stage normal pressure pump. The water pump consists of the pump housing, the impeller, the pump shaft, the diffuser and the shaft seal. The diffuser is built-in in the pump housing.

Functionality

The water pours through the suction inlet and is entered by the impeller. The water is deflected by 90° and discharges out of the impeller vertically to the pump shaft.

The conversion from speed to pressure occurs in the diffuser.

The discharge height of the water pump is calculated as the sum of the following indicators:

- Water pressure gauge
- Water vacuum gauge

Product description

Pump unit

Mechanical overheat protection

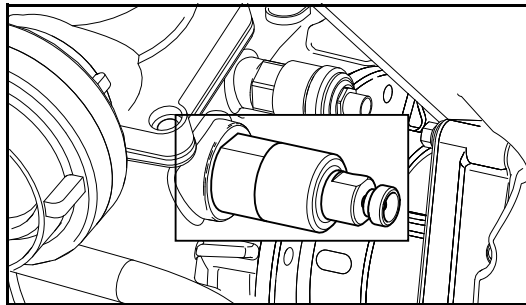


CAUTION!

Danger of burns due to touching the hot pump system and hot water discharge!

Operating the pump with closed discharge outlets causes the temperature of the pump to rise quickly.

- ▶ Do not operate pump under full load with discharge outlets closed.
 - ▶ Do not touch any parts of the hot pump system.
 - ▶ Do not linger in the pump system danger zone.
-

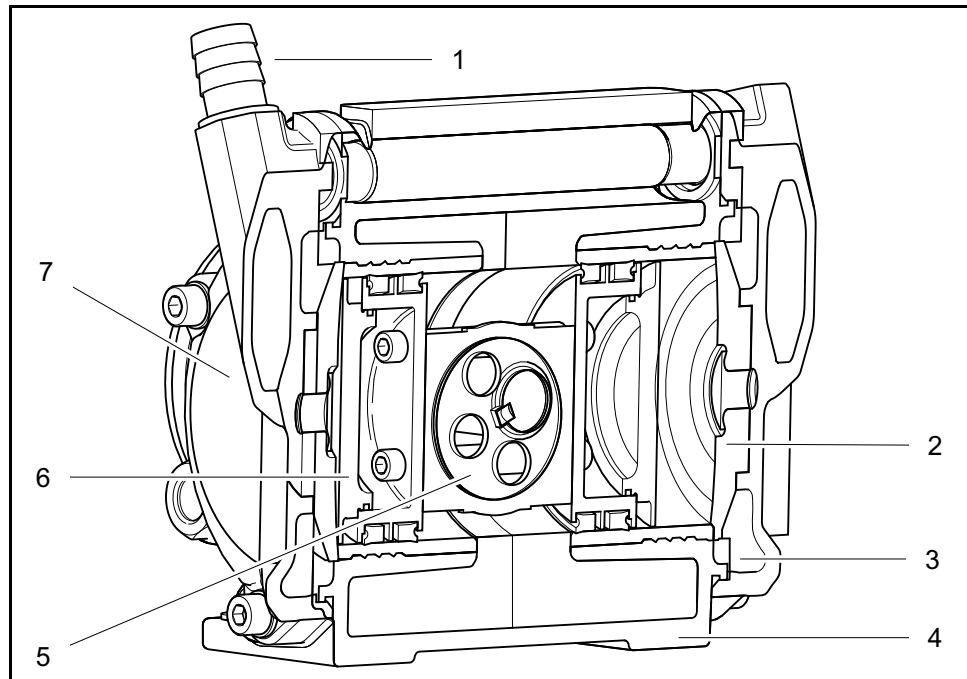


Mechanical overheat protection

The mechanical overheat protection consists of a thermal element. The thermal element opens at an extinguishing water temperature of approx. 60 °C and closes again at around 55 °C. Thus excluding overheating of the pump. When the valve is open the warm water flows through a hose into the open.

5.4.2 Priming pump

210E priming pump



210E priming pump

- | | |
|---|----------------------|
| 1 | Suction line |
| 2 | Pressure valve plate |
| 3 | Exhaust line |
| 4 | Priming pump housing |
| 5 | Eccentric |
| 6 | Suction valve plate |
| 7 | Valve cover |

Water pumps are not self-priming pumps, so the required vacuum is created by a priming pump.

The priming pump is driven by a v-belt. The priming pump is a double-acting piston pump.

Functionality

When the priming pump is activated, the solenoid valve in the suction line opens.

The priming pump is driven via the pump shaft. The rotating eccentric sets the piston in a back and forth movement.

During the priming process a vacuum is produced. During the exhaust process a excess pressure is produced.

The suction process sucks the air out of the water pump and the suction hoses and forces water into the water pump.

If water is expelled at the priming pump, the solenoid valve in the suction line closes. The priming pump is deactivated. The priming procedure is completed.

Product description

Propulsion engine

Automatic priming

In the case of the automatic priming system, the priming pump is automatically activated when the water column is interrupted.

Prerequisite:

⇒ The priming pump must remain selected in the background.

Functionality

The priming pump is activated and priming process started. If water is expelled at the priming pump, the priming pump is deactivated. The priming procedure is completed.

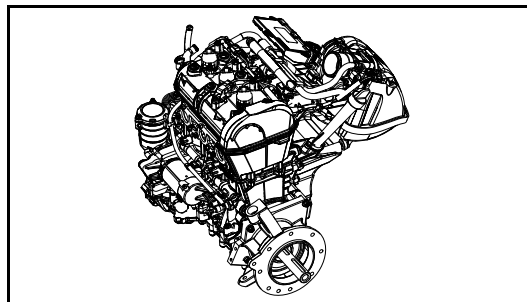
When the water column breaks, the priming process will be repeated automatically.

5.5 Propulsion engine

5.5.1 Propulsion engine

The propulsion engine of the portable pump is a petrol engine. The propulsion engine is a water-cooled alloy engine.

The propulsion motor is cooled via a closed cooling circuit by means of a water/water and a water/air heat exchanger with electric fan.



Propulsion engine

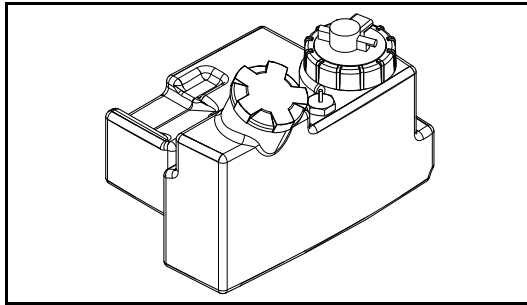
5.5.2 Fuel tank

The fuel tank is made of fuel-resistant plastic.

The fuel tank is positioned beneath the propulsion engine, so that no fuel can run onto the hot engine when refuelling.

For extra safety, the fuel tank is equipped with a safety cap. When the safety cap is opened, air first flows into the fuel tank so that there is pressure equalisation between the fuel tank and the environment.

For safety reasons, there is no drain cock on the underside of the fuel tank. This prevents the fuel tank from leaking in the event of damage, e.g. off-road. The fuel tank is fully drained by pumping dry.

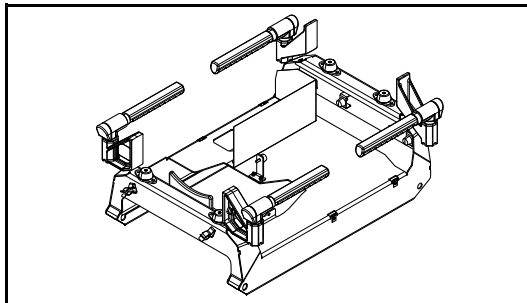


Fuel tank

5.6 Carrying frame

The portable pump is mounted on the carrying frame by four elastic rubber-metal bearings.

Four swivelling carrying handles are integrated in the carrying frame.



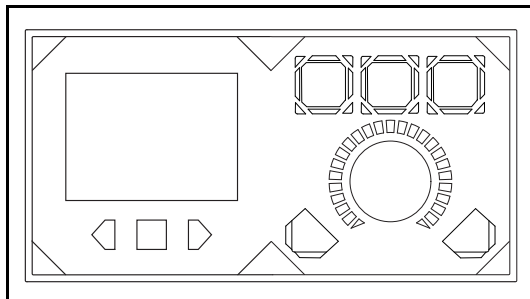
Carrying frame

Product description

Rosenbauer Body Components Logic Control System (RBC LCS)

5.7 Rosenbauer Body Components Logic Control System (RBC LCS)

5.7.1 RBC LCS Compact



RBC LCS Compact

The RBC LCS Compact consists of:

- RBC LCS display 3.5" (left)
- RBC LCS Digipot (right)

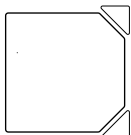
The display shows the operating personnel the main status information.

The display is equipped with function switches. The left and right function switches scroll through the screen pages. The middle function switch confirms error messages.

The RBC LCS Digipot is equipped with function switches and a governor.

5.7.2 Operating elements

Function switch



The function switch controls a programmed function. The status LED on the edge of the function switch shows the status of the associated function.

Colour definition of the Status LED:

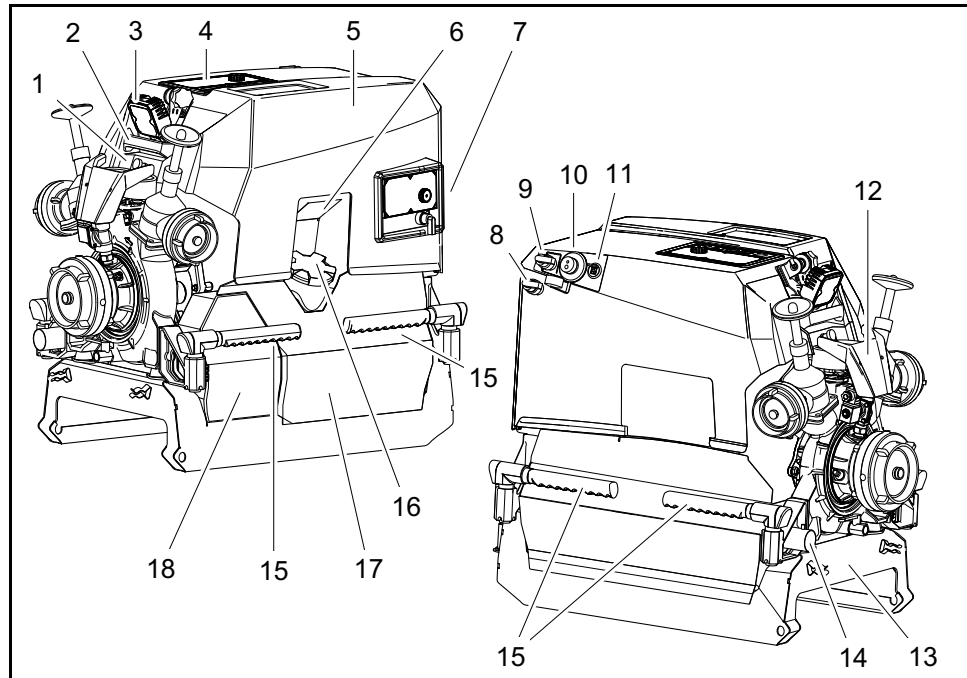
- Red: an error is present. Function cannot be executed.
- Orange: function is preselected.
- Flashing green: function has been requested.
- Green: function is active.

The operator is advised of its function by targeted labelling of the function switch (colour and icon).

⇒ Refer to corresponding chapter in this operation manual.

6 Technical description

6.1 Components

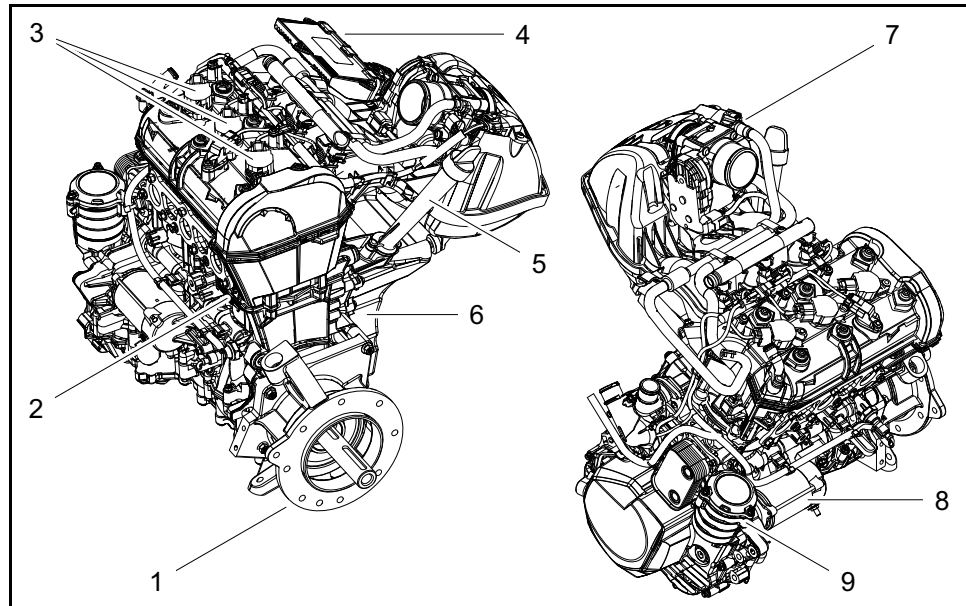


Portable pump components

- | | |
|----|---|
| 1 | Engine cover lock assembly |
| 2 | Engine cover handle |
| 3 | Working light |
| 4 | LCS control panel pump operator's panel |
| 5 | Engine cover |
| 6 | Fuel tank cap lighting |
| 7 | Side LCS control panel pump operator's panel (optional) |
| 8 | Rosenbauer LED lighting system socket |
| 9 | FireCan socket |
| 10 | Charging socket |
| 11 | USB charging socket |
| 12 | Front cover |
| 13 | Carrying frame lighting |
| 14 | Exhaust gas hose connection |
| 15 | Carrying handle of the carrying frame |
| 16 | Fuel tank cap |
| 17 | Fuel tank |
| 18 | Battery box |

Technical description

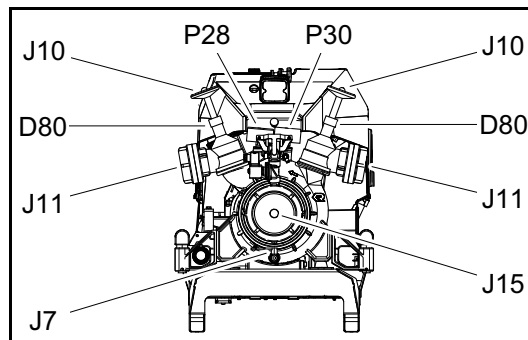
Connections



Propulsion engine components

- 1 Water pump flange
- 2 Propulsion engine type plate
- 3 Ignition coil
- 4 Engine control device
- 5 Engine oil dipstick
- 6 Engine oil tank
- 7 Pressure and temperature sensor
- 8 Electrical starting device
- 9 Oil filter housing



6.2 Connections



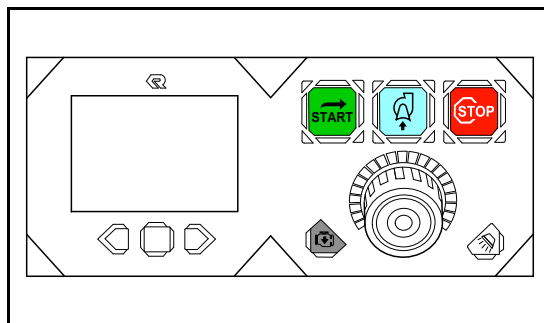
Connections for the water supply

- P28 Water pressure gauge
- P30 Water vacuum gauge
- J10 Screw down valve for normal pressure outlet
- D80 Spindle limitation for screw down valve (pressure relief device)
- J11 Normal pressure outlet
- J15 Water external drafting connector
- J7 Pump drainage valve






6.3 Indicators

Symbol	Name	Functional description
	Water pressure gauge	The pressure gauge shows the pump pressure of the water pump.
	Water pressure/vacuum gauge	The water pressure/vacuum gauge shows the overpressure or vacuum in the suction part of the water pump.

6.4 LCS operation panel







6.4.1 Function switches

Symbol	Name	Functional description
	Scroll back one screen page	The switch allows you to scroll back one screen page. For settings the entry field can be moved to the left or back line by line.
	Confirm message	A message or selection can be confirmed with the switch.
	Scroll forward one screen page	The switch allows you to scroll forward one screen page. For settings the entry field can be moved to the right or forwards line by line.
	Propulsion engine start	The switch switches on the ignition and starts the propulsion engine.
	Stop propulsion engine	The switch stops the propulsion engine and switches off the ignition.

Technical description

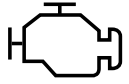

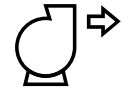
LCS operation panel

Symbol	Name	Functional description
	Priming pump	The switch activates and deactivates the priming pump.
	Governor	The speed is regulated with the governor and this adjusts the water pump pressure.
	Idling speed	The switch adjusts the engine speed to idling and reduces the pump pressure accordingly.
	Lighting	The switch activates and deactivates the lighting of the portable pump. The switch has four switching positions: <ul style="list-style-type: none"> • Working lights and fuel tank cap lighting active • Carrying frame lighting active • All lighting active • All lighting inactive

6.4.2 Screen

Pump



Symbol	Name	Functional description
	Propulsion engine speed	The indicator shows the current speed of the propulsion engine.
	Water pump intake pressure	The indicator shows the current intake pressure at the water pump.
	Pump pressure of the water pump	The indicator shows the current pump pressure of the water pump.

Fuel



Symbol	Name	Functional description
	Propulsion engine fuel tank	The indicator shows the current fuel tank fill level of the propulsion engine.
	Coolant temperature	The indicator shows the current temperature of the coolant of the propulsion engine.
	Propulsion engine battery voltage	The indicator shows the current battery voltage of the propulsion engine.

Informations



Symbol	Name	Functional description
	Fuel consumption	The indicator shows the current fuel consumption.
	Fuel reserve remaining time	The display shows the remaining time until the fuel reserve is reached.
	Intake air temperature	The indicator shows the current intake air temperature of the propulsion engine.


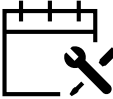
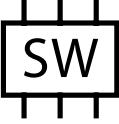
Operating hours





Symbol	Name	Functional description
	Propulsion engine operating hours	The indicator shows the current operating hours of the propulsion engine.
	Priming pump operating hours	The indicator shows the current operating hours of the priming pump.




Technical description

LCS operation panel

Symbol	Name	Functional description
	Service interval operating hours	The indicator shows the operating hours until the next service.
	Service interval date	The indicator shows the date of the next service.
	Software version	The indicator shows the current software version.

Pilot lamps


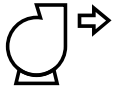
Symbol	Name	Functional description
	Pump pressure governor	<p>The control displays the condition of the pump pressure governor.</p> <p>The pilot lamp has three switching conditions:</p> <ul style="list-style-type: none"> • Green: pump pressure governor active • Orange: actual pump pressure deviates from target pump pressure • Grey: pump pressure governor inactive
	Priming pump	<p>The control shows the status of the priming pump and the priming process.</p> <p>The pilot lamp has three switching conditions:</p> <ul style="list-style-type: none"> • Green: priming process successfully ended, automatic mode active • Orange: priming process being carried out • Grey: priming pump inactive

Symbol	Name	Functional description
	Intake pressure monitoring system	<p>The control displays the status of the intake pressure monitoring system.</p> <p>The pilot lamp has three switching conditions:</p> <ul style="list-style-type: none"> • Green: intake pressure monitoring system active • Orange: intake pressure under 1.5 bar (21 psi) outlet pressure is reduced • Grey: intake pressure monitoring system inactive
	Lighting	<p>The control indicates the status of the lighting.</p> <p>The pilot lamp has two switching positions:</p> <ul style="list-style-type: none"> • Green: lighting active • Grey: lighting inactive
	Power outlet	<p>The control shows the condition of the power outlets.</p> <p>Current is only delivered when the engine is running and the battery voltage is >11.5 V.</p> <p>The pilot lamp has two switching positions:</p> <ul style="list-style-type: none"> • Green: electricity is delivered to the power outlets • Grey: power outlets inactive

Optional

Pump



Symbol	Name	Functional description
	Water pump intake pressure	The indicator shows the current intake pressure at the water pump.
	Pump pressure of the water pump	The indicator shows the current pump pressure of the water pump.

Technical description

Optional equipment

6.5 Optional equipment

6.5.1 Tool kit

The tool kit is equipped with the most important tools for the portable pump.

Scope of delivery

- Tool bag
- TORX TX20 angle screwdriver
- TORX TX30 angle screwdriver
- Spark plugs applicator 5/8 square 16 mm
- 3 pcs. spark plugs
- Oil drain hose M22 x 1.5

6.5.2 Exhaust gas hose



⚠ DANGER!

Inhalation of toxic exhaust fumes can cause death or serious health damage!

Toxic gases are produced when running a combustion engine. Operation in the immediate vicinity of flammable material and substances is prohibited.

In order to properly discharge hot exhaust gases, use the provided, standardised exhaust hose. An incorrect exhaust gas hose can lead to heat build-up in the unit and thus endanger the operating personnel and the unit. Place the hose outlet outside the working area. Let the exhaust gas hose cool down before dismantling.

Use a maximum of one exhaust gas hose according to DIN 14572. Diameter minimum 50 mm (2 in). Length maximum 1.5 m (59 in).

If no exhaust gas hose is used, then position the unit so that the exhaust gases can be freely discharged from the device.

If operation of internal combustion engines in enclosed spaces is absolutely necessary, note the following:

- ▶ Extract the exhaust gases by means of the exhaust gas hose.
- ▶ Ensure there is adequate ventilation.

The exhaust gas hose, according to DIN 14572, is equipped with 2 wooden handles for operation.

Technical data:

- Length: 1500 mm (59 in)
- Diameter: 50 mm (2 in)



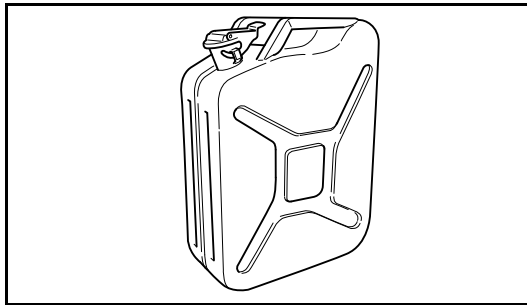
Exhaust gas hose

6.5.3 Refuelling set

Fuel canister

The fuel canister is to be used for refuelling. The fuel canister has a capacity of 20 litres.

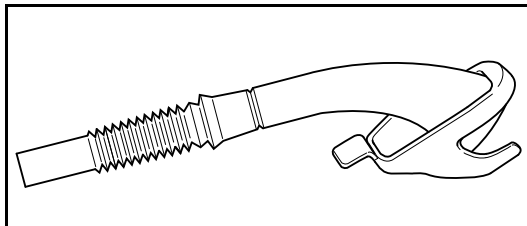
The fuel in the fuel canister must be changed (used up or replaced) at least every six months. The conditions for storage (vibration, high temperature fluctuations) reduce the knock resistance of the fuel.



Fuel canister

Filler neck

The filler neck, which is an attachment for the fuel canister, must always be used when refuelling.



Filler neck

Technical description

Optional equipment

6.5.4 Wheel set

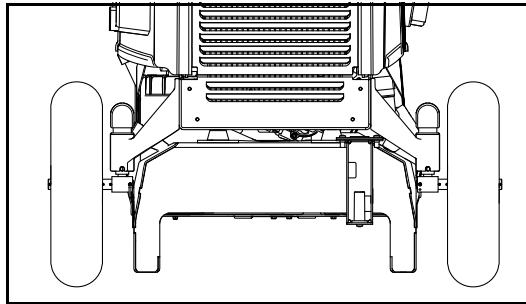


Assembly/disassembly of the wheel set may only be carried out by trained specialist personnel. Take note of general dangers that could occur during assembly/disassembly.

The portable pump can be equipped with a wheel set for manoeuvring and 1-person transport.

Scope of delivery

- 2 pcs. air-filled tyres
- 2 pcs. axle for air-filled tyres
- 2 pcs. axle bearings
- 6 pcs. tension pins
- 2 pcs. clevis pins
- 2 pcs. of cord with a length of 400 mm (15 in)



Wheel set

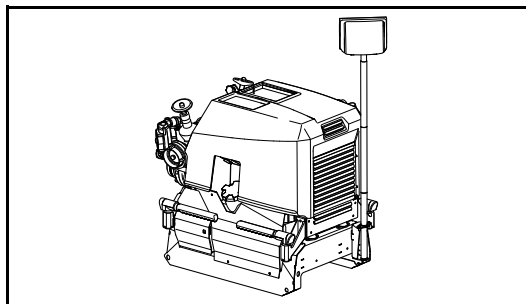
6.5.5 Lighting system frame holder

The Rosenbauer LED lighting system can be attached to the carrying frame by means of an optional frame holder. For fastening at least 2 extension poles of the Rosenbauer LED system are required. The extension poles are not included in the scope of delivery.

To ensure operational safety, the Rosenbauer LED lighting system can only be turned on when the propulsion engine is running and the battery voltage is greater than 11.5 V.

Scope of delivery

- Lighting system frame holder



Portable pump with lighting system frame holder



When using the *lighting system frame holder* the engine cover cannot be opened!



Read/observe the supplementary supplier documentation.

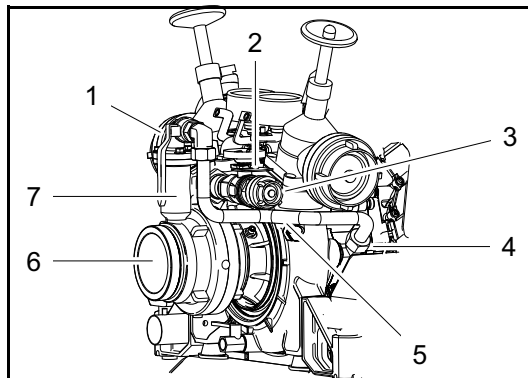
6.5.6 Integrated around-the-pump foam proportioning system

The Rosenbauer integrated around-the-pump foam proportioning system for the portable pump ensures constant foam proportioning at all times.

The proportioning amount is set via a regulating ball valve. The required proportioning quantity can be read off from the desired proportioning rate and the water quantity via a table. The table contains proportioning ratios of 0.1%, 0.5%, 1%, 3%, 6%.

Scope of delivery

- Mixing unit with regulating ball valve incl. scale
- Motive water line with shutoff valve
- Replacement part
- 90° connector to pump housing incl. reducing nipple
- Lock nut
- Table for proportioning quantities



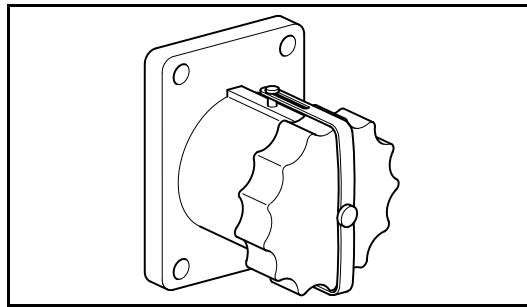
Integrated around-the-pump foam proportioning system components

- | | |
|---|--|
| 1 | Foam induction valve |
| 2 | Regulating ball valve |
| 3 | Foam compound external drafting connection |
| 4 | Pump housing connection |
| 5 | Motive water line |
| 6 | Replacement part |
| 7 | Mixing chamber |

Technical description

Optional equipment

6.5.7 Sockets

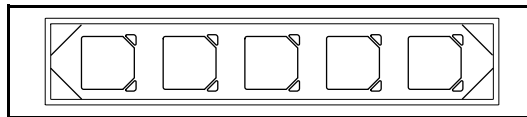


12 volt jump-start socket

⇒ For further information refer to chapter "Battery".

6.5.8 Key panel

RBC LCS Keypad 5



RBC LCS Keypad 5

The RBC LCS Keypad 5 is equipped with 5 function switches.

⇒ Additional programmable special functions can be operated with the key panel.

Function switches

Symbol	Name	Functional description
	Preset pump pressure	The switch sets the engine speed to a predefined value and changes the pump pressure to the selected pump pressure.
	Preset pump pressure	The switch sets the engine speed to a predefined value and changes the pump pressure to the selected pump pressure.
	Training mode	The switch activates the training mode. Preset operating steps are carried out automatically.
	Competition mode	The switch activates the competition mode. Preset operating steps are carried out automatically.
	Quickstart	The switch activates the quickstart. Preset operating steps are carried out automatically.

7 Operation

7.1 Preparation for initial commissioning



The sequence of the described processes is to be maintained without exception!

Before initial start-up, check all operating fluids for correct filling level.

- ▶ Check oil in the priming pump.
 - ⇒ For further information refer to Chapter "Testing and inspection work".
- ▶ Check coolant in the expansion tank of the propulsion engine.
 - ⇒ For further information refer to Chapter "Testing and inspection work".
- ▶ Check engine oil in the propulsion engine.
 - ⇒ For further information refer to Chapter "Testing and inspection work".
- ▶ Check fuel in fuel tank.
 - ⇒ The portable pump is delivered in empty state.
 - ▶ Add fuel before initial start-up.
 - ⇒ For further information refer to Chapter "Refuel".

7.2 Transport

CAUTION!

Risk of injury to operating personnel during transport!

The device may only be transported using the carry handles provided on the base frame. Unfolded handles represent a tripping hazard.

- ▶ Incorrect transport can lead to injuries to the operating personnel and to damage to the device.
- ▶ Fold the unfolded handles after use.

NOTICE

Material damage due to incorrect transport!

Incorrect transport can lead to damage to the device.

- ▶ Do not transport device while in operation.
- ▶ Only transport the device when the propulsion engine has come to a standstill.
- ▶ Do not operate device with transport damage.
- ▶ Allow the device to cool down after operation in order to dissipate any radiant heat on the carrying handles, depending on the operating time.
- ▶ Only transport the device in the holders provided for this purpose in the vehicle or by tying it down appropriately.

7.2.1 Manual transport



Always transport the portable pump with 4 persons and lift it from the knees to avoid damage to the spine.

Carrying over long distances can lead to excessive strain.

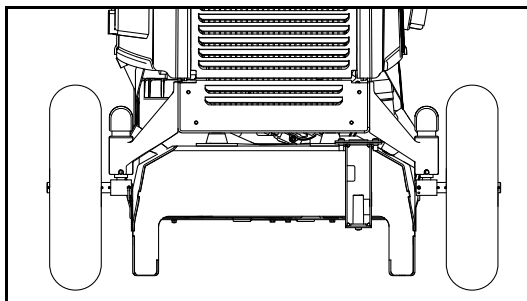
Portable pump may not be transported while in operation.

Allow the portable pump to cool down after operation in order to dissipate any radiant heat on the carrying handles, depending on the operating time.

- ⇒ 4 people are required to carry the portable pump.
- ▶ Swivel out the carrying handles of the portable pump.
 - ▶ Push down the carrying handles and turn into the desired position.
 - ⇒ The carrying handles can be positioned both longitudinally and transversely to the portable pump.
- ▶ Transport portable pump on the carrying handles.
- ▶ Lift portable pump to transport.
 - ▶ Do not pull the portable pump along the ground.
- ✓ Portable pump can be transported.
- ▶ Swivel the carrying handles of the portable pump back in after transporting.
 - ▶ Push the carrying handles down and swivel in.

7.2.2 Transport with the aid of wheel set (optional)

The portable pump can be equipped with a wheel set for manoeuvring and 1-person transport.



Wheel set



Assembly/disassembly of the wheel set may only be carried out by trained specialist personnel. Take note of general dangers that could occur during assembly/disassembly.

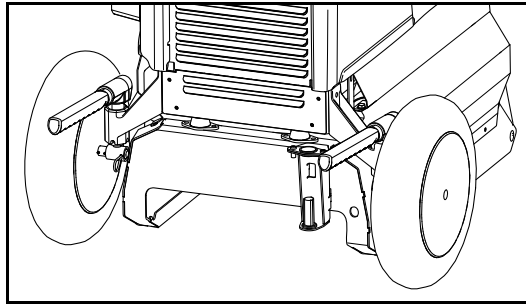
Mounting wheel set

Mounting axle bearing

- ▶ Use a suitable tool.
- ▶ Push carrying handles down against spring tension on cooler side.
- ▶ Knock out the two tension pins.
- ▶ Push the carrying handles down.
- ▶ Insert axle bearing and knock both tension pins back in.
 - ⇒ The hole for the clevis pin in the axle bearing points outwards when the carrying handle is swivelled in.
 - ⇒ The slot of the tension pin must be offset by approx. 180°.
- ✓ The axle bearing is mounted.

Mount wheels

- ▶ Swivel out carrying handle on cooler side by 180°.
- ▶ Insert wheel with axle into axle bearing.
- ▶ Secure wheel with clevis pin.
 - ⇒ Tie clevis pin to carrying frame with cord at a suitable position.
- ✓ The wheels are mounted.
- ✓ The portable pump can be transported with a wheel set.



Mount wheel set

Transporting portable pump

- ▶ Swivel out the carrying handles of the portable pump.
 - ▶ Push down the carrying handles and turn into the direction of travel.
- ▶ Lift portable pump on the carrying handles.
- ▶ Lift the portable pump so far that the portable is on the wheels.
- ✓ Portable pump can be moved by 1 person.
- ▶ Swivel the carrying handles of the portable pump back in after transporting.
 - ▶ Push the carrying handles down and swivel in.



Additional operating personnel are required to move on inclined passages and slopes.

Disassemble wheel set

- ▶ The disassembly of the wheel set takes place in reverse order to the assembly.
- ✓ The wheels are disassembled.
- ▶ The axle bearing can remain mounted on the portable pump.
- ✓ The wheel set is disassembled.
- ✓ The portable pump can be transported with the carrying handles.

7.3 Monitoring during operation

All operating elements must always be within reach of the operating personnel.

- ▶ During operation, constantly monitor the displays and warnings on the operating elements.
- ▶ Continuously monitor critical operating states and fill levels of the operating materials.

When a danger, a warning signal or an indication occurs on the operating element:

- ▶ The operating personnel must take initiate appropriate measures to avoid damage.
- ▶ If abnormal noises occur shut down the device, if possible, to prevent damage.



The highest pressure of the water pump, read from the pressure gauge, is 17 bar (246 psi). The maximum feed pressure (supply pressure), read on the pressure vacuum gauge, is 17 bar (246 psi).

The supply pressure, read on the pressure vacuum gauge, must not drop below 1 to 2 bar (15 to 30 psi), otherwise a cross-sectional constriction of the hose will occur and the water supply will be interrupted.

If the limit pressure of 17 bar (246 psi) is exceeded during operation, the portable pump automatically reduces the engine speed and thus the pump pressure. The discharge pressure is limited to maximum 17 bar (246 psi). This prevents the hose from bursting. If the discharge pressure drops again, the speed is again increased automatically.

Due to the electronic control, it is possible to exceed the limit pressure for a short time.

7.4 Preparation for startup



The sequence of the described processes is to be maintained without exception!

Before each start-up it should be checked that all operating materials (oil etc.) are full.

- ▶ Carry out complete visual checks.
- ▶ Check all relevant indicators and instruments for function and condition.
- ▶ Fill the fuel tank.
 - ⇒ For further information refer to Chapter "Refuel".
- ▶ Check the cleanliness of the suction filter in the *External drafting water* connection.
- ▶ Wear personal protection equipment.
 - ⇒ For further information refer to Chapter "Service and cleaning".

Operation

Position the portable pump

7.5 Position the portable pump

- ▶ Ensure that the portable pump is on a secure footing.
- ▶ Do not position the portable pump on a combustible surface or near combustible materials (wood, leaves, hay, dry grass, etc.).
- ▶ Note the maximum inclination of the portable pump.
 - Maximum 35° in the direction of the suction inlet and operating personnel
 - Maximal 15° in direction of radiator and exhaust side
- ▶ When operating the portable pump on unstable ground and in a tilted position, the portable pump must be secured against slipping away and tipping over.
- ✓ The portable pump has been positioned.



The maximum inclination of the portable pump only applies when the oil is filled to the maximum level.

If water is not discharged when the water pump is running, the water in the pump and the water pump itself heats up. This can be prevented by regular water discharge.

Do not use the portable pump in potentially explosive atmospheres!

7.6 Operation



DANGER!

Inhalation of toxic exhaust fumes can cause death or serious health damage!

Toxic gases are produced when running a combustion engine. Operation in the immediate vicinity of flammable material and substances is prohibited.

In order to properly discharge hot exhaust gases, use the provided, standardised exhaust hose. An incorrect exhaust gas hose can lead to heat build-up in the unit and thus endanger the operating personnel and the unit. Place the hose outlet outside the working area. Let the exhaust gas hose cool down before dismantling.

Use a maximum of one exhaust gas hose according to DIN 14572. Diameter minimum 50 mm (2 in). Length maximum 1.5 m (59 in).

If no exhaust gas hose is used, then position the unit so that the exhaust gases can be freely discharged from the device.

If operation of internal combustion engines in enclosed spaces is absolutely necessary, note the following:

- ▶ Extract the exhaust gases by means of the exhaust gas hose.
 - ▶ Ensure there is adequate ventilation.
-



WARNING!

Potentially fatal injuries due to the engine taking in flammable gases!

- ▶ Do not operate the engine in areas with a heavy concentration of flammable vapors such as e. g. diesel, gas or propane.
- ▶ When handling flammable liquids and gases, always shut off the engine immediately.



Fire and explosion risk from flammable fuel!

When working on fuel systems the fuel may ignite and cause life-threatening injuries.

- ▶ Smoking, naked lights and fire are prohibited in the immediate vicinity of the portable pump.
- ▶ Keep fuel away from naked flame.
- ▶ When handling fuel, have an operational, suitable fire extinguisher (fire classes A and B) ready. Minimum size of the fire extinguisher 5 kg (11 lbs).
- ▶ Use a suitable container to collect the fuel.
- ▶ Immediately remove leaked fuel and clean affected areas.
- ▶ Spilled or overflowing fuel can cause a dangerous explosive atmosphere in the surrounding area and above the affected area.
- ▶ If there is leak in the fuel line, do not start the engine.
- ▶ When (re)fuelling with the fuel canister always use the filler neck. Securely lock the filler neck on the fuel canister.
- ▶ If there is damage in the area of the fuel tank, the refuelling set, the cover and the air cooler (fan), refuelling during operation is prohibited.



Danger of shearing in the area of the extinguishing equipment!

Body parts can be cut off.

- ▶ Do not linger in the danger zone.



Mortal danger or serious injuries can arise through failure to use protective equipment.

- ▶ Wear protective equipment.

NOTICE

Damage to the pump from running dry!

Dry running of the pump leads to damage through friction and increased wear on the pump and the pump shaft seals.

- ▶ Supply the pump with enough extinguishing agent.
- ▶ Avoid long dry running of the pump (max. 3 minutes).

7.6.1 Control portable pump in critical operating conditions

NOTICE

Unplanned event

The portable pump can be controlled at all times, even in critical operating states (e.g. burst hose). The approach depends on the situation and is the operating personnel's responsibility.

Variant 1:



- ▶ Actuate *Idling speed* function switch.
 - ✓ The engine speed is then automatically reduced to approx. 1700 min⁻¹.
- ▶ Close pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
 - ⇒ Engine cooling is maintained due to the water/air cooler.

Variant 2:



- ▶ Actuate *Stop propulsion engine* function switch.
 - ✓ The portable pump is stopped immediately.
 - ⇒ Engine cooling is interrupted.

7.6.2 Start portable pump

- ▶ Position the portable pump.
 - ⇒ Refer to chapter "Position the portable pump".



The portable pump may only be operated with engine cover closed.

Switch on control unit



- ▶ Briefly actuate *Start propulsion engine* function switch.
 - ✓ The control unit is activated.
 - ✓ Screen of the control unit is illuminated.
 - ✓ Working light is activated.

Switch on ignition



- ▶ Briefly actuate *Start propulsion engine* function switch.
 - ✓ The ignition is switched on.

Start propulsion engine

Start propulsion engine with ignition switched on:



- ▶ Briefly actuate *Start propulsion engine* function switch.
 - ✓ The propulsion engine is started.

Start propulsion engine with ignition switched off:



- ▶ Actuate *Start propulsion engine* function switch for approx. 5 seconds.
- ✓ The propulsion engine is started.
- ⇒ A speed change can only be made with an operational control unit.

Start propulsion engine with control unit switched off:



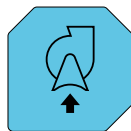
- ▶ Actuate *Start propulsion engine* function switch for approx. 5 seconds.
- ✓ The propulsion engine is started.
- ⇒ A speed change can only be made with an operational control unit.

Start propulsion engine with defective control unit

- ⇒ Depending on the defect in the control unit the propulsion can be started.



- ▶ Actuate *Start propulsion engine* function switch for approx. 5 seconds.
- ✓ The propulsion engine is started.
- ✓ The engine speed is preset to 3500 min⁻¹.
- ⇒ A speed change cannot be made in this mode.



- ▶ Actuate Priming pump function switch, to activate/deactivate the priming pump.
- ✓ The priming pump is activated/deactivated.
- ⇒ Automatic monitoring and operation of the priming pump cannot be carried out in this mode.



Immediately rectify any faults, to ensure the safety and operational readiness.

Operation

Operation

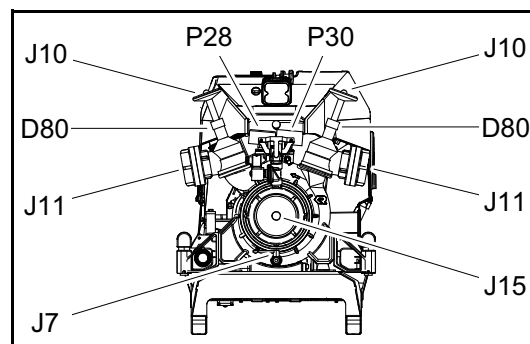
7.6.3 Adjust water pump pressure

The pump pressure will be varied with the governor.



- ▶ Turn *Governor* function switch clockwise, to increase the pump pressure.
- ▶ Turn *Governor* function switch counter clockwise, to decrease the pump pressure.
- ✓ LEDs are placed all round the governor, which illuminate or go out in succession if the pump pressure is changed.
- ✓ The governor illuminates white and the adjusted pump pressure is built up.

7.6.4 Connections



Connections for the water supply

P28	Water pressure gauge
P30	Water vacuum gauge
J10	Screw down valve for normal pressure outlet
D80	Spindle limitation for screw down valve (pressure relief device)
J11	Normal pressure outlet
J15	Water external drafting connector
J7	Pump drainage valve

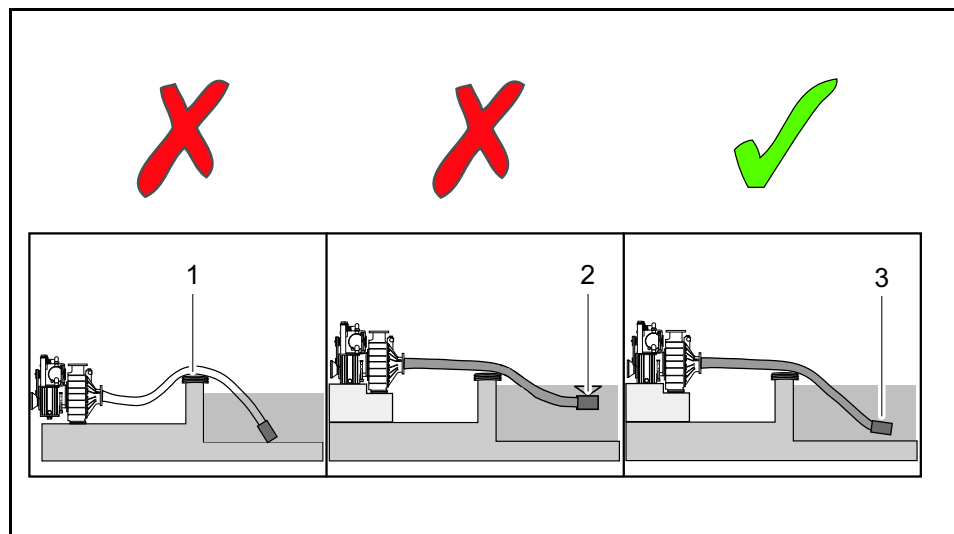
7.6.5 External drafting/priming

NOTICE

Material damage due to cavitation!

With increasing suction lift the pump performance is reduced. Too high suction lifts, very large flow rates and high pump speeds can lead to cavitation in the pump. Cavitation causes extreme local pressure peaks, which can damage the pump. Cavitation of the pump can be recognized by a sharp drop in performance and noises in the pump, which sound as if pebbles are being pumped. Cavitation of the pump must be avoided at all costs, otherwise internal parts of the pump (e.g. impeller) are damaged. If the suction hose is pulled together during external drafting operation, the water column may break off.

- ▶ Only operate pump in external drafting operation with suction strainer and suction filter.
- ▶ If there is danger of cavitation reduce pump speed, flow rate or suction lift.
- ▶ Do not operate the pump at high speed and free discharge.
- ▶ Monitor all display instruments of the pump unit.
- ▶ Observe the lowering of the water at drafting points.
- ▶ Use dimensionally stable suction hose for external drafting operation.



Position of drafting hose during external drafting

- 1 Air in hose
- 2 Vortex
- 3 Correct position of the suction hose



The suction hose with suction strainer should be at least 20 cm (10 ") under water. Do not place the suction hose in mud or sand. Contaminants shorten the service life of the pump unit!



The highest pressure of the water pump, read from the pressure gauge, is 17 bar (246 psi). The maximum feed pressure (supply pressure), read on the pressure vacuum gauge, is 17 bar (246 psi).

The supply pressure, read on the pressure vacuum gauge, must not drop below 1 to 2 bar (15 to 30 psi), otherwise a cross-sectional constriction of the hose will occur and the water supply will be interrupted.

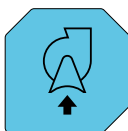
If the limit pressure of 17 bar (246 psi) is exceeded during operation, the portable pump automatically reduces the engine speed and thus the pump pressure. The discharge pressure is limited to maximum 17 bar (246 psi). This prevents the hose from bursting. If the discharge pressure drops again, the speed is again increased automatically.

Due to the electronic control, it is possible to exceed the limit pressure for a short time.

External drafting

Activate external drafting

- ▶ Position the portable pump.
 - ⇒ Refer to chapter "Position the portable pump".
- ▶ Close *drain valve*.
- ▶ Close pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Connect pressure hoses to the pressure outlets.
- ▶ Connect pressure hoses to the *external drafting water* connection.
 - ⇒ Note the drop in water level at the drafting point.
- ▶ Switch on portable pump.
 - ⇒ Refer to chapter "Start portable pump".
- ▶ Actuate the *Priming pump* function switch to ventilate the portable pump and the suction pipe.
 - ✓ Priming pump is activated.
 - ⇒ The priming process is automatically completed at a pump pressure of approx. 1.5 bar (21 psi).
 - ⇒ If the function switch remains activated, the priming pump is automatically reactivated if the water column breaks or the pump pressure is below 1.5 bar (21 psi).
 - ⇒ If the priming process takes longer than 30 seconds, the priming process is automatically deactivated and a message appears on the screen.
 - ✓ Priming pump is activated.
 - ✓ External drafting operation is started.
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Set pump pressure to desired value.
 - ⇒ Refer to chapter "Adjust water pump pressure".



Deactivate external drafting

- ▶ Set the pump to idling speed.
 - ⇒ Refer to chapter "Adjust water pump pressure".
- ▶ Close pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Stop water supply.
- ▶ Disconnect suction and pressure hoses.
- ✓ The external drafting process is completed.

7.6.6 Supply operation/hydrant operation



The highest pressure of the water pump, read from the pressure gauge, is 17 bar (246 psi). The maximum feed pressure (supply pressure), read on the pressure vacuum gauge, is 17 bar (246 psi).

The supply pressure, read on the pressure vacuum gauge, must not drop below 1 to 2 bar (15 to 30 psi), otherwise a cross-sectional constriction of the hose will occur and the water supply will be interrupted.

If the limit pressure of 17 bar (246 psi) is exceeded during operation, the portable pump automatically reduces the engine speed and thus the pump pressure. The discharge pressure is limited to maximum 17 bar (246 psi). This prevents the hose from bursting. If the discharge pressure drops again, the speed is again increased automatically.

Due to the electronic control, it is possible to exceed the limit pressure for a short time.

Supply operation

NOTICE

Damage to the pump in the event of use with waste water!

Waste water can damage the pump unit through deposits.

- ▶ Before connecting the pressure hoses to hydrants, open them and allow water to escape until only clean water flows out.

- ▶ Position the portable pump.
 - ⇒ Refer to chapter "Position the portable pump".
- ▶ Connect pressure hoses to the pressure outlets.
- ▶ Connect pressure hoses from the hydrant or the supply line to the *external drafting water* connection.
- ▶ Open at least one pressure outlet, to remove pressure peaks.
- ▶ Slowly open hydrant valve.
- ▶ When the water reaches the pump, switch on portable pump.
 - ⇒ Refer to chapter "Start portable pump".
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Set pump pressure to desired value.
 - ⇒ Refer to chapter "Adjust water pump pressure".

Supply operation with intake pressure monitoring system (optional)

NOTICE

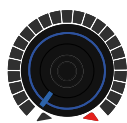
Damage to the pump in the event of use with waste water!

Waste water can damage the pump unit through deposits.

- ▶ Before connecting the pressure hoses to hydrants, open them and allow water to escape until only clean water flows out.

- ▶ Position the portable pump.
 - ⇒ Refer to chapter "Position the portable pump".
- ▶ Connect pressure hoses to the pressure outlets.
- ▶ Connect pressure hoses from the hydrant or the supply line to the *external drafting water* connection.
- ▶ Open at least one pressure outlet, to remove pressure peaks.
- ▶ Slowly open hydrant valve.
- ▶ When the water reaches the pump, switch on portable pump.
 - ⇒ Refer to chapter "Start portable pump".
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Set pump pressure to desired value.
 - ⇒ Refer to chapter "Adjust water pump pressure".

Activate intake pressure monitoring system



- ▶ Actuate caps lock key in the middle of the *governor*, to activate the automatic pump pressure governor.
- ✓ The governor illuminates blue.
- ✓ The intake pressure monitoring system is activated.
 - ✓ As soon as an intake pressure of 1.5 bar (21 psi) is reached the intake pressure monitoring system is active.
- ▶ If the intake pressure falls back below 1.5 bar (21 psi) the intake pressure monitoring system reduces the discharge pressure.
 - ⇒ The discharge pressure is reduced until the intake pressure rises above 1.5 bar (21 psi) again.
- ▶ If the intake pressure suddenly drops below 0 bar (0 psi), the automatic pump pressure governor and the intake pressure monitoring system are deactivated.
 - ⇒ Deactivation takes place time-delayed.
 - ▶ The water pump pressure must be controlled manually.
- ▶ The automatic pump pressure governor and the intake pressure monitoring system must then be reactivated.

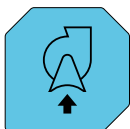
7.6.7 Bilge operation

NOTICE

Material damage due to cavitation!

With increasing suction lift the pump performance is reduced. Too high suction lifts, very large flow rates and high pump speeds can lead to cavitation in the pump. Cavitation causes extreme local pressure peaks, which can damage the pump. Cavitation of the pump can be recognized by a sharp drop in performance and noises in the pump, which sound as if pebbles are being pumped. Cavitation of the pump must be avoided at all costs, otherwise internal parts of the pump (e.g. impeller) are damaged. If the suction hose is pulled together during external drafting operation, the water column may break off.

- ▶ Only operate pump in external drafting operation with suction strainer and suction filter.
- ▶ If there is danger of cavitation reduce pump speed, flow rate or suction lift.
- ▶ Do not operate the pump at high speed and free discharge.
- ▶ Monitor all display instruments of the pump unit.
- ▶ Observe the lowering of the water at drafting points.
- ▶ Use dimensionally stable suction hose for external drafting operation.



- ▶ Operate portable pump as described in chapter "External drafting/priming".
- ▶ As soon as water is discharged, deactivate the priming pump.
 - ▶ Actuate *Priming pump* function switch, to deactivate the priming pump.
 - ✓ The priming pump is deactivated.
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Set pump pressure to desired value.
 - ⇒ Refer to chapter "Adjust water pump pressure".
- ✓ The portable pump is operated in bilge operation.

7.6.8 Open/close discharge pipes

Open manual pressure outlet

- ▶ Open the pressure outlet valve to open the desired pressure outlet.
- ✓ Corresponding pressure outlet is opened.

Close manual pressure outlet

- ▶ Close the pressure outlet valve to close the desired pressure outlet.
- ✓ Corresponding pressure outlet is closed.

7.6.9 Stop propulsion engine



At high ambient temperatures (> 35°C) and an engine temperature of above 95°C allow the propulsion engine to cool down before switching it off in operation.

Operate the portable pump at approx. 2000-2500 min⁻¹ in suction state for approx. 3-5 minutes, to regulate the engine temperature at approx. 85°C.



- ▶ Adjust the propulsion engine to idling speed.
 - ⇒ Refer to chapter "Adjust water pump pressure".
 - ⇒ Observe engine temperature.
- ▶ Actuate *Stop propulsion engine* function switch.
- ✓ Propulsion engine is stopped.
- ✓ The screen remains active for about 2 minutes.
- ✓ After approx. 10 minutes the whole control unit is deactivated.
- ▶ Stop water supply.
 - ▶ Close the supply line.
or
 - ▶ Close the hydrant valve.
- ▶ Disconnect suction and pressure hoses.
- ▶ Reduce pressure in the risers.
 - ⇒ First disconnect the suction hoses, then release the pressure from the risers.
 - ▶ Open pressure outlets.
 - ▶ Pull out the *spindle limitation for screw down valve (pressure relief device)*.
 - ▶ Open pressure outlets up to the stopper.
 - ✓ Pressure is released via the pump and the *water external drafting* connection.
- ▶ Flush and drain the entire pump unit.
 - ⇒ Refer to chapter "Flush".
- ▶ Prepare the portable pump for its next deployment.



The maximum pressure for suction hoses is 3 bar.

7.6.10 Flush



A thorough flushing is to be carried out after each foam operation as well as after each operation with sea or dirty water.

To ensure faultless functionality of the pump unit the whole pump unit must be flushed.

After the flushing procedure the entire pump system must be drained.

Flush portable pump

- ▶ Activate portable pump.
 - ⇒ Refer to chapter "Start portable pump".
- ▶ Operate the portable pump at idling speed.
 - ⇒ Refer to chapter "Adjust water pump pressure".
- ▶ Operate the portable pump with pure water.
- ▶ Operate pump unit as described in the corresponding chapter.
 - "External drafting/priming"
 - "Supply operation/hydrant operation"
- ▶ Open pressure outlets up to the stopper.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Flush portable pump until only pure water is discharged.
- ✓ The portable pump has been flushed.

7.6.11 Drain



In order to protect technical fire fighting components against corrosion and frost damage, in winter operation (temperatures around and below 0° C) it is necessary to ensure especially careful drainage.

To maintain the functionality of the fire fighting superstructure appropriate supplementary precautions have to be taken in winter, e. g. put water tank heating into operation, park vehicle in frost-proof areas.

Drain portable pump

- ▶ Open all pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Open *Drain pump* valve.
- ▶ Perform the drain procedure until no more water is discharged, to drain the entire pump unit.
- ▶ Close the *Drain pump* valve.
- ▶ Close all pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ✓ The drainage procedure is completed.

Drain the screw-down valves

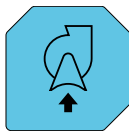
Open the valves beyond the spindle limit.

- ▶ Pull spindle limit and open valves to the stop.
- ✓ The valves are fully open.
- ✓ The water held inside is automatically expelled.
- ▶ Re-close the valves.
- ✓ The screw-down valves are drained.
- ▶ Open the screw-down valves half a revolution in order to relieve the seals.

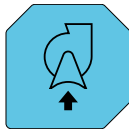
Suck priming pump dry

The priming pump may only be sucked dry after the complete drainage of the pump unit.

- ▶ Open *drain pump* valve in order to produce no negative pressure in the pump unit.
- ▶ Adjust the engine speed to a higher idling speed.
 - ⇒ Higher idling speed 2000 min⁻¹.



- ▶ Actuate and hold the *Priming pump* function switch, to activate the priming pump.
- ✓ The priming pump will be sucked dry.
 - ▶ Suck priming pump dry for approx. 30 seconds.

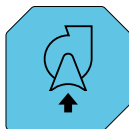


- ▶ Actuate *Priming pump* function switch, to deactivate the priming pump.
- ✓ The priming pump is sucked dry.
- ▶ After the dry suction all valves must be closed and the blank caps connected.

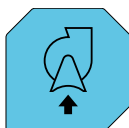
Leak testing

The leak testing should be done every 3 months, after a complete drainage of the portable pump.

- ▶ Close all valves of the pump unit.
- ▶ Close the *water external drafting* connection with blank cap.
 - ⇒ When checking suction hoses, connect them and close the end with a blank cap.



- ▶ Actuate *Priming pump* function switch, to activate the priming pump.
- ▶ Run the priming pump until a vacuum of approx. 0.8 bar (11.6 psi) has built up.



- ▶ Actuate *Priming pump* function switch, to deactivate the priming pump.
- ▶ The pump is tight enough, if the vacuum does not drop more than 0.1 bar (1.5 psi) within one minute.
 - ⇒ If 0.8 bar (11.6 psi) cannot be reached, the pump should be pressure tested. A pressure of 3-6 bar (44-87 psi) connected to the suction inlet is sufficient.
- ✓ The leak check is carried out.
- ▶ Release vacuum after the leak check.
 - ▶ Briefly open pressure outlet or drain.

Operation

Operation

7.6.12 Activate/deactivate lighting

Activate lighting



- ▶ Actuate *Lighting* function switch, to activate the lighting.
 - First actuation: working lights and fuel tank cap lighting are activated.
 - Second actuation: carrying frame lighting is activated.
 - Third actuation: the whole lighting of the portable pump is activated.
- ✓ The corresponding lighting of the portable pump is activated.

Deactivate lighting



- ▶ Actuate *Lighting* function switch again, to deactivate the lighting.
- ✓ The lighting of the portable pump is deactivated.

7.7 Refuel



To perform a safe refuelling operation, it is essential to comply with all safety measures.



Always use freshly filled fuel during performance checks to avoid loss of performance.



WARNING!

Fire and explosion risk from flammable fuel!

When working on fuel systems the fuel may ignite and cause life-threatening injuries.

- ▶ Smoking, naked lights and fire are prohibited in the immediate vicinity of the portable pump.
- ▶ Keep fuel away from naked flame.
- ▶ When handling fuel, have an operational, suitable fire extinguisher (fire classes A and B) ready. Minimum size of the fire extinguisher 5 kg (11 lbs).
- ▶ Use a suitable container to collect the fuel.
- ▶ Immediately remove leaked fuel and clean affected areas.
- ▶ Spilled or overflowing fuel can cause a dangerous explosive atmosphere in the surrounding area and above the affected area.
- ▶ If there is leak in the fuel line, do not start the engine.
- ▶ When (re)fuelling with the fuel canister always use the filler neck. Securely lock the filler neck on the fuel canister.
- ▶ If there is damage in the area of the fuel tank, the refuelling set, the cover and the air cooler (fan), refuelling during operation is prohibited.



CAUTION!

Environmental and health hazard due to fuels!

Fuels can permanently pollute water bodies and endanger living organisms and plants of all kinds.

- ▶ Avoid skin contact with fuel.
- ▶ Do not inhale fuel fumes.
- ▶ Avoid soil contact with fuels.
- ▶ Collect leaked or spilled fuel with a suitable binding agent and dispose of it in an environmentally friendly manner.
- ▶ Observe the local disposal regulations.

NOTICE

Engine damage from the wrong fuel!

- ▶ Only refuel with the appropriate approved fuel.
- ▶ Observe pictograms on the fuel tank and product.

Material damage due to the limited storage life of fuel!

Due to the limited storage life of fuel, material damage can occur if fuel is stored for too long. Use up or replace the fuel within six months.

- ▶ If stored for too long, deposits (sediments and precipitates) may form in the fuel.
- ▶ The conditions for storage (vibration, high temperature fluctuations) reduce the knock resistance of the fuel.

Material damage due to fuel contamination!

Fuel contamination can lead to material damage. When changing fuel types, ensure that there is no mixing of different fuel types.

- ▶ Use up existing fuel in the fuel tank or siphon it off with a suitable pump.

7.7.1 Permissible fuel

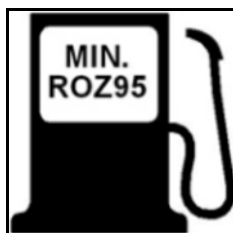
NOTICE

Engine damage from the wrong fuel!

- ▶ Only refuel with the appropriate approved fuel.
- ▶ Observe pictograms on the fuel tank and product.
- ▶ Only refuel the portable pump with the appropriate approved fuel.

The following fuel types are approved for the portable pump:

- Premium petrol min. ROZ 95
- E10
- Aspen four-stroke petrol



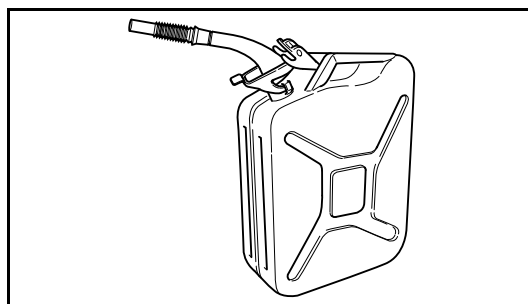
7.7.2 Refueling with propulsion engine running

Before refuelling

- ▶ Make sure that the portable pump must be refuelled, e.g. observe the fuel warning light.
- ▶ Check the area and clear space, if required.
 - ⇒ A free space for the escape route must be provided.
 - ⇒ It must be possible to leave the danger zone unhindered and safely.
- ▶ Refuelling is prohibited if an ignition source is present.
 - ⇒ Observe horizontal and vertical radius of 0.5 m to the opening of the fuel tank cap.
- ▶ When handling fuel, have an operational, suitable fire extinguisher (fire classes A and B) ready. Minimum size of the fire extinguisher 5 kg (11 lbs).
- ▶ Use refuelling set.
 - ▶ Securely lock the filler neck on the fuel canister.
- ▶ Ensure there is adequate lighting.
- ▶ Angle of inclination of the portable pump to be refuelled to the horizontal plane must be less than 15°.
- ▶ The engine cover must be closed.
 - ⇒ The air flow blows dangerous fumes away from hot spots.
- ▶ 2 trained persons are required for the refuelling procedure.
 - ▶ One person is responsible for carrying out the refuelling procedure.
 - ▶ A second person must be present during the refuelling process to assist in case of emergency.

(Re)fuelling process

- ▶ Prepare refuelling set.
 - ▶ Open fuel canister.
 - ▶ Correctly mount the filler neck on the fuel canister.
 - ▶ Securely lock the filler neck on the fuel canister.



Filler neck mounted on the fuel canister

- ▶ Make sure that no environmental disturbances are to be expected.
- ▶ Ensure a secure footing during refuelling, e.g. avoid spills, hot surfaces, propulsion engine.
- ▶ Open *fuel tank cap*.

Operation

Refuel

- ▶ Put fuel into the fuel tank with the refuelling set.
 - ▶ Do not overfill the fuel tank!
- ▶ Put down the fuel canister.
 - ▶ Remove filler neck.
 - ▶ Close fuel canister.
- ▶ Close *fuel tank cap*.
- ▶ Adjust propulsion engine to desired speed.
- ✓ Portable pump has been refuelled.

After refuelling

- ▶ Store fuel canisters at a safe distance from the portable pump.

7.8 Options

7.8.1 Pump pressure regulator

Activate automatic pump pressure governor

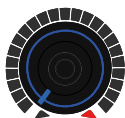
If the automatic pump pressure governor is active, the pump pressure remains constant, independent of the amount of water discharge.



- ▶ Turn *Governor* function switch clockwise, to increase the pump pressure.

- ▶ Turn *Governor* function switch counter clockwise, to decrease the pump pressure.

- ✓ The set pump pressure is built up.



- ▶ Actuate caps lock key in the middle of the *Governor*, to activate the automatic pump pressure governor.

- ✓ The governor illuminates blue.

- ✓ The pump pressure remains constant, independent of the amount of water discharged.

- ✓ The actual pump pressure and the adjusted pump pressure are shown.

Set predefined pump pressure

A predefined pump pressure can be set which remains constant independent of the amount of water extracted.



- ▶ Actuate caps lock key in the middle of the *governor*, to activate the automatic pump pressure governor.

- ✓ The governor illuminates blue.

- ▶ Actuate corresponding *Preset pump pressure* function switch to select one of the predefined pump pressures.

- ✓ The status LED of the function switch is illuminated.

- ✓ The set pump pressure is built up.

- ✓ The pump pressure remains constant, independent of the amount of water discharged.

7.8.2 Quickstart

- ⇒ With the *Quickstart* function several operating steps are carried out with one push of a button.

- ⇒ The control unit of the portable pump must be activated.

With ignition switched on:



- ▶ Press the *Quickstart* function switch.

- ✓ The propulsion engine is started.

- ✓ Priming pump is activated.

- ✓ Once the priming process is finished the pump pressure governor is activated.

- ✓ The pump pressure governor is set to 4 bar (58 psi).

Operation

Options

With propulsion engine running:



- ▶ Press the *Quickstart* function switch.
- ✓ Priming pump is activated.
- ✓ Once the priming process is finished the pump pressure governor is activated.
- ✓ The pump pressure governor is set to 4 bar (58 psi).

7.8.3 Training mode/competition mode - Variant 1

- ⇒ With the *Training mode* and *competition mode* function several operating steps are carried out with one push of a button.
- ⇒ The control unit of the portable pump must be activated.

Training mode



- ▶ Briefly actuate the *Start propulsion engine* function switch to activate the control unit.
 - ✓ Control unit is activated.



- ▶ Press the *Training mode* function switch.
 - ✓ Training mode is preselected.
 - ✓ The status LED flashes red.



- ▶ Actuate the *Stop propulsion engine* function switch to deactivate the control unit.
 - ✓ Control unit is deactivated.
 - ✓ Display remains activated.
 - ✓ Status LED illuminates red.



- ▶ Actuate *Start propulsion engine* function switch.
 - ✓ The training mode is activated.
 - ✓ The following operating steps are carried out automatically.
 - The propulsion engine is started.
 - Priming pump is activated.
 - If priming procedure is completed the speed is increased.







- ▶ Adjust the output pump pressure via the *Governor* function switch.
 - ⇒ Refer to chapter "Adjust water pump pressure".Or
- ▶ Adjust the output pump pressure via the automatic pump pressure governor.
 - ⇒ Refer to chapter "Pump pressure regulator".

Competition mode







- ▶ Briefly actuate the *Start propulsion engine* function switch to activate the control unit.
 - ✓ Control unit is activated.

- 
 - ▶ Press the *Competition mode* function switch.
 - ✓ Competition mode is preselected.
 - ✓ The status LED flashes red.
- 
 - ▶ Actuate the *Stop propulsion engine* function switch to deactivate the control unit.
 - ✓ Control unit is deactivated.
 - ✓ Display is deactivated.
 - ✓ Status LED illuminates red.
- 
 - ▶ Actuate *Start propulsion engine* function switch.
 - ✓ Competition mode is activated.
 - ✓ The following operating steps are carried out automatically and in the quickest possible time.
 - The propulsion engine is started.
 - Priming pump is activated.
 - If priming procedure is completed the speed is increased.
- 
 - ▶ Adjust the output pump pressure via the *Governor* function switch.
 - ⇒ Refer to chapter "Adjust water pump pressure".
 - Or
 - ▶ Adjust the output pump pressure via the automatic pump pressure governor.
 - ⇒ Refer to chapter "Pump pressure regulator".

7.8.4 Training mode/competition mode Variant 2

- ⇒ With the *Training mode* and *competition mode* function several operating steps are carried out with one push of a button.
- ⇒ The propulsion engine of the portable pump must be started.

Training mode

- 
 - ▶ Actuate *Start propulsion engine* function switch to start the propulsion engine.
 - ✓ Propulsion engine is started.
- 
 - ▶ Press the *Training mode* function switch.
 - ✓ Training mode is preselected.
 - ✓ The status LED flashes red.
- 
 - ▶ Actuate *Start propulsion engine* function switch.
 - ✓ The training mode is activated.
 - ✓ The following operating steps are carried out automatically.
 - Priming pump is activated.
 - If priming procedure is completed the speed is increased.
- 
 - ▶ Adjust the output pump pressure via the *Governor* function switch.
 - ⇒ Refer to chapter "Adjust water pump pressure".
 - Or

Operation

Options

- ▶ Adjust the output pump pressure via the automatic pump pressure governor.
 - ⇒ Refer to chapter "Pump pressure regulator".

Competition mode



- ▶ Actuate *Start propulsion engine* function switch to start the propulsion engine.
 - ✓ Propulsion engine is started.



- ▶ Press the *Competition mode* function switch.
 - ✓ Competition mode is preselected.
 - ✓ The status LED flashes red.



- ▶ Actuate *Start propulsion engine* function switch.
 - ✓ Competition mode is activated.
 - ✓ The following operating steps are carried out automatically and in the quickest possible time.
 - Priming pump is activated.
 - If priming procedure is completed the speed is increased.

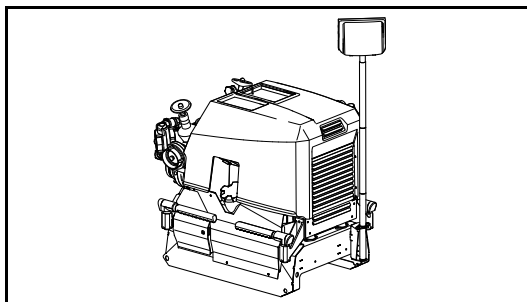


- ▶ Adjust the output pump pressure via the *Governor* function switch.
 - ⇒ Refer to chapter "Adjust water pump pressure".Or
 - ▶ Adjust the output pump pressure via the automatic pump pressure governor.
 - ⇒ Refer to chapter "Pump pressure regulator".

7.8.5 Mount lighting system frame holder

To ensure operational safety, the Rosenbauer LED lighting system can only be turned on when the propulsion engine is running and the battery voltage is greater than 11.5 V.

- ▶ Fix the frame holder to both rear slots on the carrying frame by suspending the straps.
 - ✓ Frame holder is mounted.
- ▶ Insert the extension poles of the Rosenbauer LED lighting system into the frame holder.
 - ⇒ For fastening at least 2 extension poles of the Rosenbauer LED system are required.
 - ▶ The extensions are individually locked by twisting, to prevent accidental loosening or the lighting head falling down.
- ▶ Mount the lighting head on the extension poles.
- ▶ Connect the cable to the *Rosenbauer LED lighting system* socket.
 - ✓ Rosenbauer LED lighting system can be operated.



Portable pump with lighting system frame holder

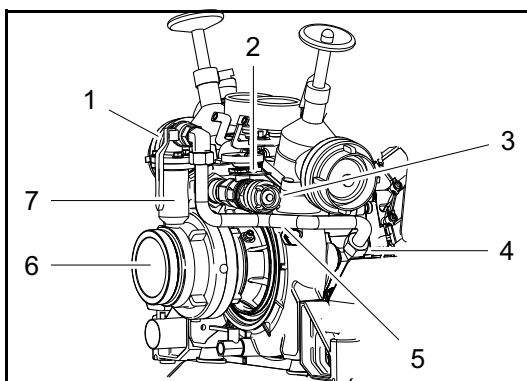


When using the *lighting system frame holder* the engine cover cannot be opened!



Read/observe the supplementary supplier documentation.

7.8.6 Around-the-pump foam proportioning system



Integrated around-the-pump foam proportioning system components

- 1 Foam induction valve
- 2 Regulating ball valve
- 3 Foam compound external drafting connection
- 4 Pump housing connection
- 5 Motive water line
- 6 Replacement part
- 7 Mixing chamber

Mount integrated around-the-pump foam proportioning system



Mounting of the integrated around-the-pump foam proportioning system may only be carried out by trained specialist personnel. Take note of general dangers that could occur during assembly.

Preparation

- ▶ Dismantle *front cover*.
 - ▶ Release two *front cover screws*.
 - ▶ Take off the front cover.
- ▶ Dismantle *battery box*.
 - ▶ Disconnect battery and take it out.
 - ⇒ In avoid sparks first disconnect the cable from the earth terminal. And then the cable from the positive terminal.
- ▶ Release fastening screws on the battery box floor and remove *battery box*.
- ▶ Dismantle locking screw on *pump housing* connection.
- ▶ Dismantle fixed coupling on the *external water drafting* connection.

Mount integrated around-the-pump foam proportioning system

- ⇒ Use suitable sealant, e.g. Loctite 542, Loctite 638, during assembly.
- ▶ Grease seal from *replacement part*.
- ▶ Mount replacement part on the *external water drafting* connection.
 - ⇒ During installation ensure that the position of the *mixing chamber* is aligned vertically to the portable pump.
 - ▶ Align the *replacement part* and the *mixing chamber* vertically to the portable pump.
 - ▶ After aligning, secure the *replacement part* against twisting with the grub screw.
- ▶ Clean the female thread on pump housing, 90° connector and reducing nipple with a grease-free cleaner.
- ▶ Seal reducing nipple to *pump housing* connection with suitable sealant.
- ▶ Screw the 90° connection into the reducing nipple.
 - ⇒ Note the required space for the battery box.
- ▶ Screw 90° connector onto *foam induction valve*.
 - ⇒ Note the required space for the battery box.
- ▶ Screw on *motive water line* with union nuts.
 - ⇒ Mark the position of the 90° connector with the aid of a pin.
- ▶ Take the *motive water line* off again.
- ▶ Seal both 90° connectors with suitable sealant at the marked points on the *motive water line*.
- ▶ Seal *regulating ball valve* and double nipple to *mixing chamber* connector with suitable sealant.
 - ⇒ The scale on the *regulating ball valve* should be in the horizontal position.
- ▶ Mount *motive water line*.
- ▶ Mount fixed coupling onto the *replacement part*.
- ▶ Remount *front cover* and *battery box*.
 - ▶ Secure battery again and clamp on the cable.
 - ⇒ In order to avoid sparks first connect the cable from the plus terminal of the battery. And then connect the cable from the earth terminal.

- ✓ Integrated around-the-pump foam proportioning system is mounted.



Leaks during mounting affect the functionality of the integrated around-the-pump foam proportioning system and the portable pump.

Dismantle integrated around-the-pump foam proportioning system

- ▶ The disassembly of the integrated around-the-pump foam proportioning system takes place in reverse order to the assembly.
- ▶ A lock nut is mounted on the *pump housing* connector to close the connector.
- ✓ Integrated around-the-pump foam proportioning system is disassembled.

Operate integrated around-the-pump foam proportioning system

Preparation for startup

- ▶ Before startup determine the required water discharge quantity, e.g. 1 or 4 nozzles.
- ▶ Find out the required proportioning ratio of the foam compound and its viscosity.
 - ⇒ For further information, see the foam compound manufacturer's instructions.



The integrated around-the-pump foam proportioning system does not work for pressure inlets (supply/hydrant operation).

When operating the integrated around-the-pump foam proportioning system note the following points:

- ⇒ The maximum foam compound suction lift is 2 m.
 - ⇒ Loss 3.5 l/min (0.92 gpm) per 1 m increase in suction lift.
- ⇒ The *regulating ball valve* and the *foam induction valve* must be closed for the priming process on the portable pump.
- ⇒ For low proportioning quantities up to approx. 2 l/min (0.5 gmp), it is recommended to accelerate the priming process.
 - ⇒ Position the *regulating ball valve* at 6-10 l/min (1.5-2.6 gpm) for approx. 2 seconds.
 - ⇒ The priming process of the foam compound lines is accelerated.

- ⇒ Before the content in the external foam compound tank is completely used up, close the *regulating ball valve*.
 - ⇒ This prevents air from being sucked in.
 - ⇒ Suction air leads to breakage of the water column in the portable pump.
 - ⇒ Replace the external foam compound storage tank with closed *regulating ball valve*.
 - ⇒ Then position the *regulating ball valve* again at the desired setting.
- ⇒ The table on the portable pump and the scale on the *regulating ball valve* are designed for a pump outlet pressure of ≥ 6 bar (1.5 gpm) and a foam compound viscosity of 60 cSt.
 - ⇒ With a higher foam compound viscosity (250 cSt) the *regulating ball valve* has to be set to the next highest graduation mark to reach the desired proportioning quantity.
- ⇒ The proportioning accuracy is within international standards.
- ⇒ If the discharge of a water/foam compound mixture is stopped at the portable pump, the *regulating ball valve* and the *foam induction valve* must also be closed.

Operation with external foam compound container

- ▶ The *foam induction valve* and *regulating ball valve* must be closed.
- ▶ Connect suction and pressure hoses to the portable pump.
- ▶ Provide pressure hoses with suitable nozzles.
- ▶ Operate portable pump as described in the corresponding chapters.
 - "External drafting/priming".
- ▶ Connect foam compound suction hose to the *Foam external drafting* connector and put free end into the foam compound tank.
- ▶ Adjust pump pressure to at least 6 bar (1.5 gpm).
 - ⇒ Refer to chapter "Adjust water pump pressure".
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Open *foam induction valve*.
- ▶ Set *regulating ball valve* according to water discharge quantity desired.
 - ⇒ If the water discharge changes during the operation the *regulating ball valve* must be adjusted to the conditions.
- ✓ A water/foam compound mixture is discharged from the portable pump with the set proportioning ratio.



The system is to be flushed after every foam operation. Refer to chapter "Flush".

Finish operation with external foam compound container

- ▶ Close *regulating ball valve*.
- ▶ Close *foam induction valve*.

- ▶ Close pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Stop propulsion engine.
 - ⇒ Refer to chapter "Stop propulsion engine".
- ✓ Operation with the external foam compound container has finished.

Flush integrated around-the-pump foam proportioning system

- ▶ The *foam induction valve* and *regulating ball valve* must be closed.
- ▶ Connect suction and pressure hoses to the portable pump.
- ▶ Operate portable pump as described in the corresponding chapters.
 - "External drafting/priming".
- ▶ Connect foam compound suction hose to the *foam compound external drafting* connector and put the open end into a container with clean water.
- ▶ Increase pump pressure.
 - ⇒ Refer to chapter "Adjust water pump pressure".
- ▶ Fully open *foam induction valve* and *regulating ball valve*.
- ▶ Open pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Flush until clean water comes out of all pressure outlets.
- ▶ Close *foam induction valve* and *regulating ball valve*.
- ▶ Close pressure outlets.
 - ⇒ Refer to chapter "Open/close discharge pipes".
- ▶ Stop propulsion engine.
 - ⇒ Refer to chapter "Stop propulsion engine".
- ✓ The flushing procedure is completed.

8 Service and cleaning

Rosenbauer Original Service


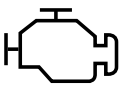
- ▶ In order to guarantee safe operation and to extend the service life of the product all prescribed service intervals should be kept.
 - ⇒ Only technology which is regularly maintained by specialists can meet the high demands.

Rosenbauer service partners will gladly provide you with comprehensive advice about inspections and Service PLUS, as well as about the exact scope and costs of testing and maintenance work.

- ⇒ Further information is also available on the homepage, www.rosenbauer.com.

8.1 Service plan

8.1.1 Oil and filter change


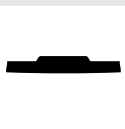

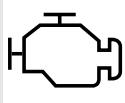
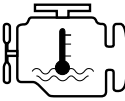
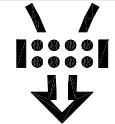
Symbol	Work specification	Monthly	Semi-annually	Annually	After 10 Operating hours	After 50 Operating hours	Every 2 years	After 100 Operating hours	Operator	Authorised Specialist personnel
	Priming pump ^a			•		•				•
	Propulsion engine ^b			•	• ^c	•				•

a. Whichever comes first

b. Whichever comes first

c. One-off oil change after the first 10 operating hours


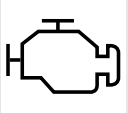
8.1.2 Testing and inspection work

Symbol	Work specification	Daily	Monthly	Every six months	Annual	After 50 operating hours	Every two years	After 100 operating hours	Operator	Authorized Experts
	Check oil level of the priming pump		•						•	•
	Valve plates of the priming pump				•					•
	V-belt of the priming pump				•				•	
	Check engine oil level		•						•	•
	Check coolant of the propulsion engine				•	•			•	•
	Check air filter				•	•			•	•


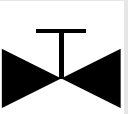
Service and cleaning

Service plan

8.1.3 Checking for signs of oil leakage

Symbol	Work specification	Daily	Monthly	Every six months	Annual	After 50 operating hours	Every two years	After 100 operating hours	Operator	Authorized Experts
	Priming pump		•						•	•
	Propulsion engine		•						•	•

8.1.4 Lubrication service

Symbol	Work specification	Daily	Monthly	Every six months	Annual	After 50 operating hours	Every two years	After 100 operating hours	Operator	Authorized Experts
	Carrying handles				•				•	
	Spindle of the pressure valve			•					•	

8.2 Lubrication table

Description	Medium	Dosing	Unit
Priming pump	Engine oil SAE 30	0.65 (0.17)	Litres (gallons)
	Engine oil 15W40		
	API/SF		
	MIL-L-46152 B		
	Ford M2C-9011		
Propulsion engine	GM 6048 M	2-2.5 (0.52-0.66)	Litres (gallons)
	5W40 engine oil - fully synthetic 4-stroke engine oil ^a		
Expansion tank for coolant	VOLVO VCS coolant (initial filling)	3.5 (0.92)	Litres (gallons)
	OAT based, NAP-free		
	VW TL 774D/F (G12+)		
	VW TL 774G (G12++)		
	OMV Coolant SF		
Carrying handles	CARIX Premium Long Life		
Shaft of the pressure valves	Multi-purpose grease according NLGI II		

a. or equivalent engine oil with SM or SN API classification

8.3 Torque tables



The bolting (under screw head and on thread) must not be oiled under any circumstances and tighten invariable by using a torque wench.

Tightening torques acc. to DIN 13-1 are to be complied with.



In particular the connecting elements are to be checked.

8.4 Open/close engine cover



CAUTION!

Risk of crushing!

Danger of crushing and entrapment with the movable engine cover.

- ▶ Only touch the engine cover in a suitable place.
- ▶ Use protective equipment.
- ▶ Do not reach into the danger area.
- ▶ Move the cover carefully and with caution.



Danger of burning!

- ▶ Do not grip onto switched-on or recently switched-off search lights.

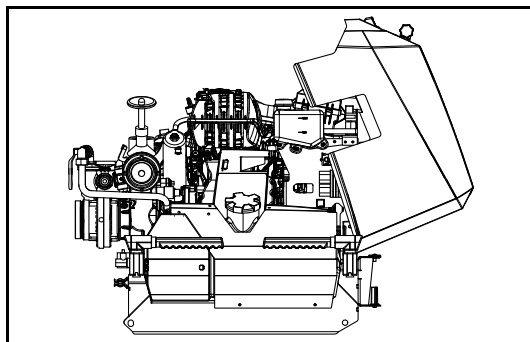
- ⇒ The engine cover can be opened for inspection, maintenance and repair work.
- ⇒ The engine cover must be closed for operation.

8.4.1 Open the engine cover



During operation, opening the engine cover is prohibited.

- ▶ Ensure sufficient space behind and above the portable pump.
- ▶ Place the *working light* vertically.
- ▶ Pull and release the *engine cover lock assembly*.
- ▶ Lift and tilt the *engine cover* with the handle.
- ✓ The engine cover is open.



Engine cover open

8.4.2 Close engine cover

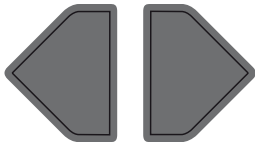
- ▶ Hold and lower the *engine cover* with the handle.
- ▶ Make sure that it is properly locked.
- ✓ The engine cover is closed.

8.5 Service menu

8.5.1 Call up/exit service menu

- ⇒ The service menu can be called up via the *Operating hours* screen page.
- ⇒ The language of the service menu is set to *English* and cannot be adjusted.

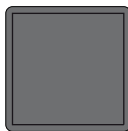
Call up service menu



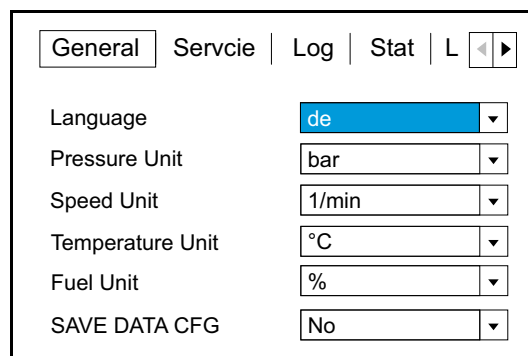
- ▶ Actuate *Scroll back screen page* or *Scroll forward screen page* function switch to display the *operating hours* screen page.
 - ✓ *Operating hours* screen page appears on the display.



Operating hours screen page

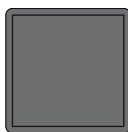


- ▶ Actuate the *Confirm message* function switch for approx. 20 seconds.
 - ✓ The service menu appears in the screen.
 - ✓ The *General* service submenu is automatically selected when calling up the service menu.



Service menu - General service submenu

Exit service menu








- ▶ Actuate the *Confirm message* function switch for approx. 20 seconds.
 - ✓ The service menu is exited.
 - ✓ Changed settings are not automatically saved.

8.5.2 Set display language


- ⇒ Pre-programmed display languages can be set in the service menu.
- ⇒ Furthermore, the option *No text (xx)* can also be set.
- ▶ Call up service menu.
 - ⇒ Refer to chapter "Call up/exit service menu".
- ▶ Select the *General* service submenu.
 - ✓ The *General* service submenu is automatically selected when calling up the service menu.

Service and cleaning

Service menu


- 
 - ▶ Actuate the *Confirm message* function switch to select the *Language* setting.
- 

 - ▶ Actuate the *Scroll back screen page* or *Scroll forward screen page* function switch to select the desired display language.
- 
 - ▶ Actuate the *Confirm message* function switch to select the *SAVE DATA TO CFG* setting.
- 
 - ▶ Actuate *Scroll forward screen page* function switch, to select the *Yes* setting.
 - ✓ The changed settings are automatically saved.
 - ✓ The display language is set.
 - ✓ The settings are saved.
 - ✓ The service menu is closed.
 - ✓ The control unit is restarted.

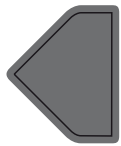


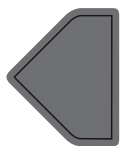

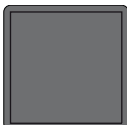
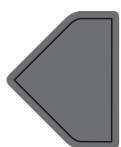

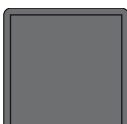

8.5.3 Set service interval

- ⇒ In the service menu the *Service interval date* and the *service interval operating hours* can be set.
- ⇒ The *Service interval date* shows the date of the next service.
- ⇒ The *service interval operating hours* shows the operating hours until the next service.
- ▶ Call up service menu.
 - ⇒ Refer to chapter "Call up service menu".
- 
 - ▶ Select the *Service* service submenu.
 - ✓ Actuate *Scroll forward screen page* function switch, until the *Service* service submenu is selected.
 - ✓ The *Service* service submenu appears on the screen.

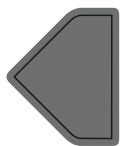

General	Service	Log	Stat	L	◀▶
Month	May				▼
Year	2022				▼
Operating Hour	32				▲▼
SAVE DATA CFG	No				▼

General service submenu

- 
 - ▶ Actuate the *Confirm message* function switch to select the *Month* setting.

- 

 - ▶ Actuate the *Scroll back screen page* or *Scroll forward screen page* function switch to select the desired month.
- 
 - ▶ Actuate the *Confirm message* function switch to select the *Year* setting.
- 

 - ▶ Actuate the *Scroll back screen page* or *Scroll forward screen page* function switch to select the desired year.
- 
 - ▶ Actuate the *Confirm message* function switch to select the *Operating Hour* setting.
- 

 - ▶ Actuate the *Scroll back screen page* or *Scroll forward screen page* function switch to select the number of desired operating hours.
- 
 - ▶ Actuate the *Confirm message* function switch to select the *SAVE DATA TO CFG* setting.
- 
 - ▶ Actuate *Scroll forward screen page* function switch, to select the *Yes* setting.
 - ✓ The changed settings are automatically saved.
 - ✓ The *Service interval date* is set.
 - ✓ The *Service interval operating hours* is set.
 - ✓ The settings are saved.
 - ✓ The service menu is closed.
 - ✓ The control unit is restarted.

8.5.4 Detailed information on engine faults

- ⇒ In the service submenu *Log*, detailed information on engine faults can be displayed.
- ▶ Call up service menu.
 - ⇒ Refer to chapter "Call up/exit service menu".
- 

 - ▶ Actuate the *Scroll back screen page* or *Scroll forward screen page* function switch to select the *Log* service submenu.
 - ✓ The *Log* service submenu is displayed.
 - ✓ The engine error that has occurred is displayed as a P code.
 - ⇒ For further information refer to Chapter "Detailed information on engine faults".

8.6 Maintenance work

Maintenance work involves tasks that can be performed by properly trained fire department personnel.

This work must be carried out regularly, especially after each use, to ensure optimum condition of the product.

- ▶ Keep the safety and warning signs clean and legible.
 - ▶ Replace missing or damaged signs.

8.6.1 Clean device

NOTICE

Damage to the device from dry powder!

Dry powder is a strong oxidant in combination with moisture and can cause severe corrosion on galvanically treated surfaces such as zinc plating, as well as on bare aluminium, brass and bronze components. Washing off with water can significantly accelerate the corrosion on the device.

- ▶ Be sure to remove dry powder dry and thoroughly.
 - ▶ Do not wash off dry powder from surfaces with water.
 - ▶ Store dry powder dry.
-

NOTICE

Surface damage from using wrong cleaning agent!

Aggressive cleaning agents can corrode surfaces, coatings and plastic parts. Abrasive particles cause scratches.

- ▶ Do not use aggressive cleaning agents containing benzene, acetone or plasticizer.
 - ▶ Do not use household soap or detergents to clean the device.
 - ▶ Do not use cleaning agents to clean the control panel, console or display instruments.
 - ▶ Do not use dry cloths to remove dirt from the device paint.
 - ▶ Do not wash freshly glued equipment and vehicles for the first 48 hours after gluing.
-

Wash the exterior of the device

- ⇒ Wash the device exterior regularly and clean it of heavy contamination.
- ⇒ Wash the device exterior with cold or lukewarm water.
- ⇒ Only use products suitable for car cleaning for washing the device.
- ⇒ Do not use running water to clean the product.
- ▶ Wash off dried contamination, do not scrape off.
- ▶ Wash away coarse contamination with a water and a sponge.
 - ▶ Do not direct a water jet straight at the device.

- ▶ Clean the device with a suitable sponge or brush.
 - ⇒ Check the products for contamination before use to avoid surface damage.
- ▶ In addition, use a tested car wash detergent to remove road dirt.
 - ⇒ Do not use household soap or detergent.
- ▶ Rub the device dry with a chamois leather or a suitable cloth.
 - ⇒ Check the products for contamination before use to avoid surface damage.
- ▶ Wipe off tar or asphalt spots with a tar cleaner and a soft cloth.
- ✓ The exterior of the device has been cleaned.

Washing the exterior of the device with a high pressure cleaner

NOTICE

Damage to the components through cleaning with high pressure cleaner!

Pressurised water from high pressure cleaners can damage components on the product.

- ▶ Do not use high-pressure cleaners to clean the product!

Cleaning with a high pressure cleaner is not permitted.

Clean fittings and LCS control panels

- ⇒ Do not use running water for cleaning the fittings and the LCS control panels.
 - ⇒ Splash water can damage electrical components.
- ⇒ Do not use solvents.
- ▶ Clean fittings and LCS control panels with damp cloths.
- ✓ Fittings and LCS control panels have been cleaned.

8.6.2 Maintenance and cleaning of 3M Scotchcal™ and Controltac™ films

NOTICE

Do not wash devices and vehicles that are freshly glued within the first 48 hours!

Cleaning agent

Lettering and logos made of Scotchcal and Controltac films can be cleaned with commercially available cleaning agents for car care, as long as they do not contain abrasive additives or organic solvents.

Cleaning process

- ⇒ See "Clean device".

Cleaning in car wash facilities

Scotchcal and Controltac films are car wash resistant.

Service and cleaning

Maintenance work

8.6.3 Dry vehicle and equipment

Load only dried equipment into the vehicle, to conserve the service life of the equipment and the vehicle.

- ▶ Let the equipment and device dry before loading.
- ▶ Open compartments of the vehicle in the vehicle garage.

8.7 Testing and inspection work

WARNING!

Risk of accident and injury!

Damage to the product, as well as equipment that has not been properly repaired, can cause serious accidents or jeopardise the success of the operation.

- ▶ Any damage which occurs must be repaired before reuse.

Assessment and inspection work may only be carried out by correspondingly trained fire-fighting personnel, who are familiar with the product.

The work must be carried out regularly, especially after each use, to ensure optimum operational safety of the product.

All components, locks and fittings of holding and storage systems have to be checked if they are in a good condition and verify safe storage. Any deviation, damage or defect must be corrected immediately or repaired.



Observe the operation manuals of the individual subcomponents and engine manufacturers!

8.7.1 Portable pump

- ▶ Check the entire portable pump for corrosion, damage or other defects.
 - ▶ If there is damage to the fuel tank cap lighting, the fuel tank cap and in the area of the fuel tank filler neck, further operation or commissioning is prohibited.
- ▶ Put the portable pump into operation and check for proper functioning.
- ▶ Check the operation and status of all valves, instruments and gauges.
- ▶ Check the cleanliness of the suction filter in the suction hose.
- ▶ Check the cleanliness of the suction filter in the *External drafting water connection*.
- ▶ Check the tight fit of the suction filter in the *External drafting water connection*.
 - ▶ If the suction filter is fitted loosely, it must be reinserted and checked for tight fit again.
- ▶ Check cleanliness of the strainers in the supply line.

8.7.2 Pump unit

V-belt of the priming pump

- ▶ Check the V-belt annually for mechanical damage and unusual wear.
- ▶ Avoid contamination of the V-belts and V-belt pulleys caused by oil or grease.
 - ▶ Clean fouled V-belts and V-belt pulleys.

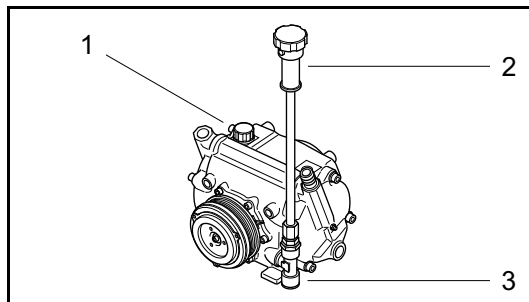
Service and cleaning

Testing and inspection work



Dirty V-belts or V-belt pulleys reduce the power or interrupt the power transmission.

Priming pump



Priming pump

- | | |
|---|-----------------|
| 1 | Oil filler plug |
| 2 | Oil dipstick |
| 3 | Oil drain plug |

All moving parts of the priming pump are oil bath lubricated.

Checking the oil level

Check the oil level of the priming pump with the oil dipstick.

- ⇒ After the last operation of the priming pump, wait at least 5 minutes before the oil level check.
- ▶ Remove the oil dipstick and wipe it clean.
- ▶ Screw in oil dipstick and tighten.
 - ⇒ Only insert the oil dipstick to measure the oil level, do not screw in.
- ▶ Remove the oil dipstick again, check the oil level of the priming pump with the oil dipstick.
 - ⇒ The oil level must be between the top and bottom markings.
- ▶ If the oil level is too low, add oil.
 - ⇒ Refer to chapter "Change the priming pump oil".

Check mechanical overheat protection

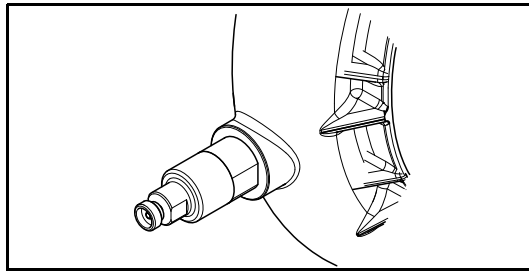


CAUTION!

Danger of burns due to touching the hot pump system and hot water discharge!

Operating the pump with closed discharge outlets causes the temperature of the pump to rise quickly.

- ▶ Do not operate pump under full load with discharge outlets closed.
- ▶ Do not touch any parts of the hot pump system.
- ▶ Do not linger in the pump system danger zone.



Mechanical overheating protection

- ▶ Put the water pump into operation.
- ▶ Pull knurled screw until water flows out of the hose.
- ▶ Release knurled screw.
 - ✓ The mechanical overheating protection must close and tighten independently.
- ✓ The overheating protection works.

8.7.3 Propulsion engine

Hose lines

All hose lines, especially fuel lines, are to be checked at least once a year for obvious defects in the course of a visual check.

Note the following criteria when checking hose lines:

- ▶ Check whether there is damage to the hose lines external layer like chafing, cuts, or cracks.
- ▶ Check brittleness of the outer layer or cracks in the hose material.
- ▶ Check hose lines for deformation, e.g. layers separating, bubbles, signs of crushing, kinks.
 - ▶ Check hose lines in depressurised and pressurised condition.
- ▶ Check the hose lines for leaks.
- ▶ Should there be a defect, or the suspicion of a defect, the affected line is to be replaced immediately.

Check engine oil level

NOTICE

Engine damage from dirt, wrong oil level or oil pressure!

The engine can be damaged from an incorrect engine oil level or oil pressure, or when dirt gets into the engine.

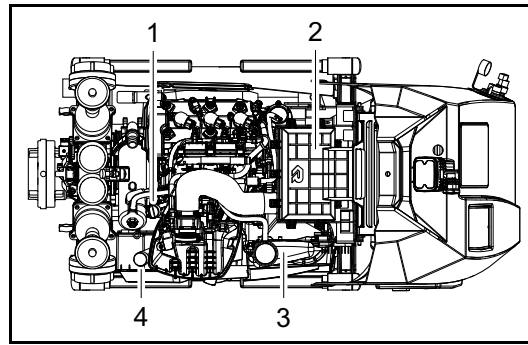
- ▶ Check that the oil level is between the top and bottom markings on the oil dipstick. If necessary, immediately correct oil level.
- ▶ If the *Engine oil pressure* pilot lamp is active, stop the vehicle immediately and switch off the engine.
- ▶ Make sure that no dirt gets into the engine when checking the oil level.

⇒ The engine of the portable pump is delivered filled with engine oil from the factory.

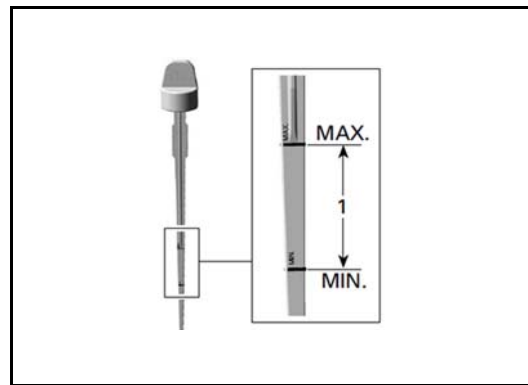
- ▶ Check for oil loss before startup and then check the engine oil level.

Service and cleaning

Testing and inspection work



- 1 Engine oil dipstick
- 2 Air filter
- 3 Coolant expansion tank of the propulsion engine
- 4 Priming pump oil dipstick



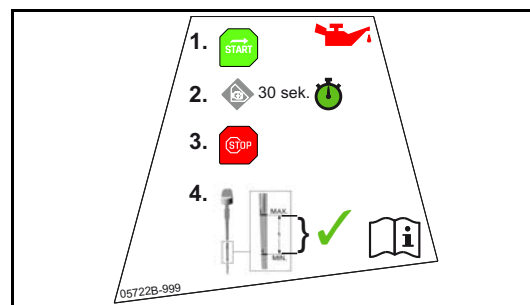
Oil dipstick with marking

The correct engine oil level is determined in two stages.

- ▶ Check engine oil level in cool condition.
 - ⇒ It is checked whether there is enough engine oil for a test at operating temperature.
- ▶ Check engine oil level at operating temperature of the engine.
 - ⇒ The precise engine oil level is checked.

Check engine oil level in cool condition

- ⇒ The work steps corresponds to the sticker on the portable pump.
- ⇒ The sticker is located next to the engine oil dipstick.



Sticker on the portable pump

- ▶ Position the portable pump on a flat, even surface.
- ▶ Start propulsion engine.

- ▶ Run the propulsion engine at idling speed for at least 30 seconds.
- ▶ Stop propulsion engine.
- ▶ Remove the engine oil dipstick and wipe it clean.
- ▶ Replace engine oil dipstick and tighten.
- ▶ Remove the engine oil dipstick again.
- ▶ Check engine oil level.
 - ⇒ The engine oil level must be between the top and bottom markings.
- ✓ If the engine oil level is between the two marks, the engine oil level can be checked accurately at operating temperature.
- ✓ If the engine oil level is below the lower mark or no oil is indicated, check again when cold.

Check engine oil level again:

- ▶ Start propulsion engine.
- ▶ Run the propulsion engine at idling speed for another 60 seconds.
- ▶ Stop propulsion engine.
- ▶ Check engine oil level again.
 - ⇒ The engine oil level must be between the top and bottom markings.
- ✓ If no engine oil is shown for the second measurement an engine oil change is recommended.
 - ⇒ Refer to chapter "Replace engine oil and oil filter".
- ✓ If the engine oil level is below the lower marking, add approx. 200 ml (0.05 gal) recommended engine oil.
 - ⇒ Refer to chapter "Lubrication table".
 - ⇒ The oil quantity between the top and bottom markings is approx 500 ml (0.13 gal).
 - ⇒ Do not overfill the engine oil.
- ▶ Restart the propulsion engine and run at idling speed for another 60 seconds.
- ▶ Check engine oil level.
 - ⇒ The engine oil level must be between the top and bottom markings.
- ✓ The propulsion engine is ready for operation.

Check engine oil level at operating temperature of the propulsion engine

Once the propulsion engine is at operating temperature, the exact engine oil level can be checked.

- ▶ Start propulsion engine and bring up to operating temperature approx. 77 - 80 °C (170 - 176 °F).
 - ⇒ The engine temperature can be read on the display.
- ▶ Stop propulsion engine.
- ▶ Check engine oil level immediately after stopping.
- ▶ Remove the engine oil dipstick and wipe it clean.
- ▶ Replace engine oil dipstick and tighten.

Service and cleaning

Testing and inspection work

- ▶ Remove the engine oil dipstick again.
- ▶ Check engine oil level.
 - ⇒ The engine oil level must be just below the top marking.
- ▶ If the engine oil level is too low, add oil
 - ⇒ Refer to chapter "Lubrication table".
 - ⇒ The oil quantity between the top and bottom markings is approx 500 ml (0.13 gal).
- ✓ The engine oil level has been checked.

Coolant of the propulsion engine



CAUTION!

Burning hazard from the hot cooling system!

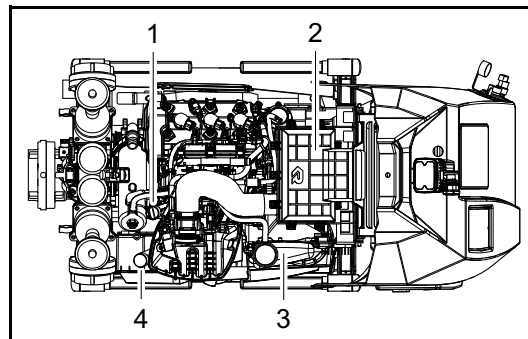
- ▶ Only carry out maintenance work after the portable fire pump has been shut down and the cooling system has cooled down.
-

NOTICE

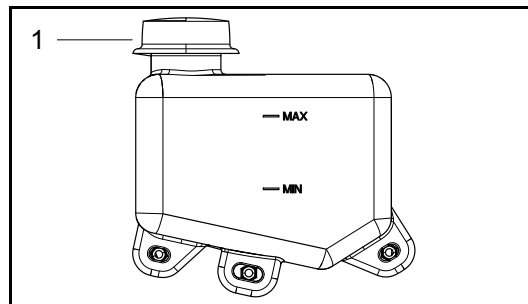
Engine damage due to poor cooling!

Prohibited liquids lead to poor cooling and cause engine damage.

- ▶ Do not use water to top up.
 - ▶ Only use recommended and approved coolant.
-



- 1 Engine oil dipstick
- 2 Air filter
- 3 Coolant expansion tank of the propulsion engine
- 4 Priming pump oil dipstick



Coolant expansion tank of the propulsion engine

- 1 Pressure cap of the expansion tank

Check coolant

- ⇒ The propulsion engine coolant must be checked at room temperature.
- ▶ Open *pressure cap* of the expansion tank.
- ▶ Check coolant.
 - ⇒ The coolant level must be between the top and bottom markings.
- ▶ If the coolant level is too low, add coolant.
 - ⇒ Refer to chapter "Replace coolant".
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".



Coolants may not be mixed together.

- ✓ The coolant has been checked.

Check temperature resistance

- ▶ Open *pressure cap* of the expansion tank.
- ▶ Check temperature resistance with a *coolant tester*.
 - ⇒ The temperature resistance should be at least -20 °C.
- ▶ If the temperature resistance is too low, change the coolant.
 - ⇒ Refer to chapter "Replace coolant".
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".
- ✓ The temperature resistance has been checked.

Replace air filter

Replace the air filter of the portable pump depending on the degree of contamination, or every 5 years at the latest.

- ⇒ Check the air filter annually for contamination.
- ⇒ If necessary, change the air filter sooner when working with particularly dusty conditions, depending on how dirty it is.
- ▶ Position the portable pump on a flat, even surface.
- ▶ Open the engine cover.
 - ⇒ Refer to chapter "Open the engine cover".
- ▶ Remove all the fastening screws on the air filter cover.

Service and cleaning

Testing and inspection work

- ▶ Remove air filter cover.
- ▶ Remove air filter.
 - ⇒ Observe the local disposal regulations.
- ▶ Insert a new air filter.
- ▶ Place the air filter cover on top.
- ▶ Mount all the fastening screws on the air filter cover.
 - ▶ Tighten the fastening screws by hand.
- ▶ Close engine cover.
 - ⇒ Refer to chapter "Close engine cover".
- ✓ The air filter has been changed.

Pressure sensors

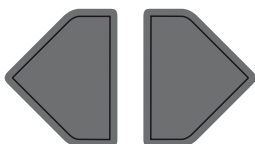
- ⇒ The installed pressure sensors are absolute pressure sensors.
- ⇒ Absolute pressure sensors are subject to fluctuations in the atmosphere air pressure (height difference, weather conditions etc.).



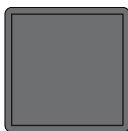
Before calibrating the pressure sensors, make sure that the water pump is in a depressurised state.

Calibrate pressure sensors

- ⇒ The pressure sensors can be calibrated to the ambient pressure.
- ▶ Release the pressure in the water pump.
 - ▶ Open *Drain pump* valve.
 - ▶ Open *valves for normal pressure outlet*.
 - ▶ Do not start the propulsion engine.
- ▶ Actuate *Scroll back screen page* or *Scroll forward screen page* function switch to display the *Pump* screen page.
 - ✓ *Pump* screen page appears on the display.



Pump screen page



- ▶ Actuate the *Confirm message* function switch for approx. 6 seconds to calibrate the pressure sensors.
- ✓ The pressure sensors are calibrated to the ambient pressure.

8.7.4 Electrics

Fuses and relays

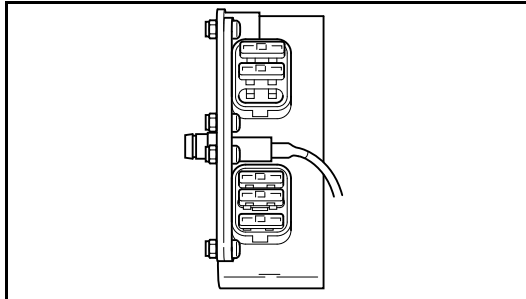
- ⇒ The electrical circuits on the electrical unit of the portable pump are secured with fuses and glass tube fuses.
- ⇒ The fuses are located on the side facing away from the operator behind the air filter box.
- ⇒ The relay is located on the operator side, behind the air filter box.



Before replacing a burnt out fuse, check the cause of the defect.

Do not repair defective fuses and relays - fire risk.

Only use prescribed fuses and relays.



Fuses

Fuse allocation

1st fuse holder

⇒ The fuses are designed as safety fuses.

- Charging F3-1/10A: charging socket, FireCan, Rosenbauer LED lighting system
- Operating F3-3/10 A: control unit RBC LCS
- Main fuse F3-5/10 A: supply for the main relay, supply for the second fuse holder

2nd fuse holder

⇒ The fuses are designed as safety fuses.

- Pressure sensors F1-1/10 A: intake pressure sensor, output pressure sensor, additional keypad RBC Keypad
- Cooling fan F1-3/15 A: cooling fan
- Controller F1-5/10 A: engine control device, propulsion engine, fuel pump

Fuel tank cap lighting

⇒ The fuses are designed as glass tube fuses.

- Fuel tank cap lighting

Relay allocation

- K319: cooling fan relay
- K8: main relay
- KRLS: Rosenbauer LED lighting system relay

Service and cleaning

Service work

8.8 Service work

Service work is work that may only be carried out by specially authorised expert personnel.

This work is to be carried out or allowed to be carried out in accordance with the manufacturer's regulations.



Maintain service intervals, as well as officially prescribed testing schedules and create written records for them.



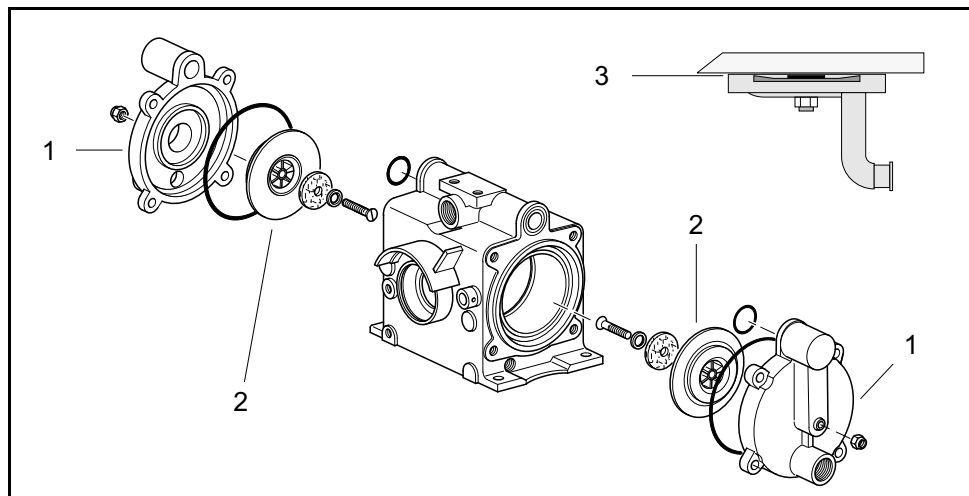
Observe the operation manuals of the individual items of equipment and devices!

NOTICE

Neglecting these recommendations will result in loss of warranty.

8.8.1 Pump unit

Check valve plates of the priming pump



- 1 Valve cover
- 2 Valve plate
- 3 Gap

To guarantee the functionality of the priming pump, the valve plates must be checked.

- ▶ Check valve plates for dirt and damage in case of reduced suction capacity.
- ▶ Replace valve plates if damaged.
- ⇒ To do so it is necessary to dismantle the priming pump.

Remove valve cover

- ⇒ The removal of the valve cover has to be done on both sides.
- ▶ Loosen the nuts of the valve cover and remove valve cover left and right.

Check valve plates

- ▶ Check inlet valve plates for dirt and damages.
- ▶ Check outlet valve plates for dirt and damages.

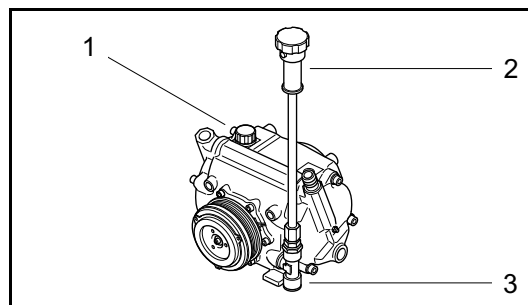
Install valve cover

- ⇒ The installation of the valve cover is to be done on both sides.
- ▶ Mount inlet and outlet valve plates together with the valve cover.
- ▶ Install both valve covers, left and right.
- ▶ Secure screws with Loctite 542.

Check valve plates after the installation

- ▶ Place steel ruler on the top of the valve cover. The ruler must be applied on both sides of the cover.
- ▶ There must be a gap between the ruler and the mounting part, in the middle.

Change the priming pump oil



Priming pump

- | | |
|---|-----------------|
| 1 | Oil filler plug |
| 2 | Oil dipstick |
| 3 | Oil drain plug |

Drain the oil

- ▶ Make the pump compartment accessible.
- ▶ Place a suitable container underneath the oil drain plug of the priming pump.
- ▶ Open oil drain plug.
- ▶ Drain the oil.
 - ▶ Collect the used oil.
- ✓ The oil has been drained.
- ▶ Close oil drain plug.
- ▶ Dispose old oil properly.



Observe the local regulations for oil disposal.

Service and cleaning

Service work

Top up oil

- ▶ Open oil filler plug
- ▶ Add oil using a suitable funnel and wait until it has run down.
 - ⇒ Oil quality and oil filling quantity, refer to chapter "Lubrication table".
- ▶ Check that the oil level is between the lower and upper markings.
 - ▶ If the oil level is too low, add oil.
 - ▶ Pour in oil up to the upper marking.
- ▶ Close oil filler plug.
- ✓ Oil has been changed.
- ▶ Avoid contamination of the V-belts and V-belt pulleys caused by oil or grease.
 - ▶ Clean fouled V-belts and V-belt pulleys.



Dirty V-belts or V-belt pulleys reduce the power or interrupt the power transmission.

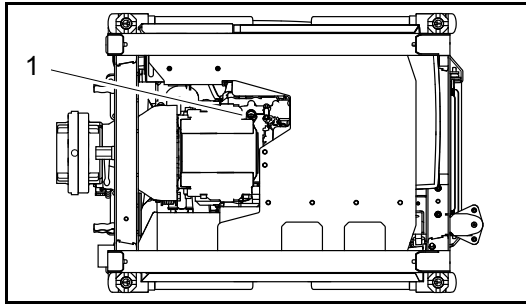
8.8.2 Propulsion engine

Replace engine oil and oil filter



Engine oil and oil filter must always be replaced at the same time.

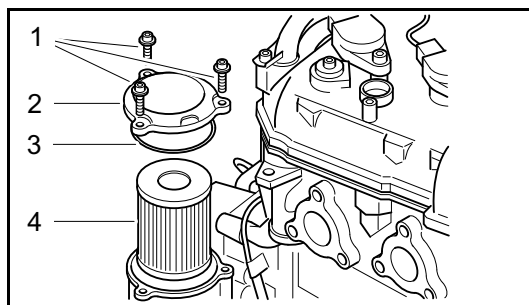
Drain engine oil



View of portable pump from below

- 1 Engine oil drain valve
- ▶ Place the portable pump in a raised position and secure against slipping.
 - ⇒ Recommendation to drain the engine oil better: raise the portable pump approx. 10 cm on the side of the exhaust and place a suitable auxiliary material underneath.
 - ▶ Allow the portable pump to warm up dry for approx. 2 minutes.
 - ▶ Pull out the oil dipstick to ventilate the engine oil pan.
 - ▶ Unscrew sealing cap on *engine oil drain valve*.
 - ▶ Screw a suitable oil drain hose onto the *engine oil drain valve* by approx. 2-3 turns.
 - ▶ Place collection container under the *engine oil drain valve* of the portable pump.
 - ▶ Unscrew the oil drain hose completely.
 - ▶ Drain engine oil.
 - ▶ Collect the used oil.
 - ✓ Engine oil has been drained.
 - ▶ Close oil drain plug.
 - ▶ Dispose old oil properly.
 - ⇒ Observe the local disposal regulations.

Replace oil filter



Oil filter

- | | |
|---|----------------------------------|
| 1 | Oil filter housing fixing screws |
| 2 | Oil filter cover |
| 3 | O-ring |
| 4 | Oil filter |

- ▶ Before the oil filter is changed the used oil must be drained.
 - ⇒ See chapter "Drain engine oil".
- ▶ Open all *Oil filter housing fixing screws*.
- ▶ Remove old *oil filter* and *O-ring*.
 - ✓ The oil filter and the O-ring have been removed.
- ▶ Dispose of old oil filter and O-ring properly.
 - ⇒ Observe the local disposal regulations.
- ▶ Fit the new *O-ring* to the *oil filter cover*.
- ▶ Oil *O-ring* and the sealing lip of the new *oil filter*.
- ▶ Insert new *oil filter* as shown.
- ▶ Mount oil filter cover on the oil filter housing.
 - ⇒ Observe 9 NM tightening torque!
- ✓ The oil filter has been changed.

Add engine oil

- ▶ Unscrew oil dipstick to open the oil filler plug.
- ▶ Add the engine oil with a suitable funnel and wait until the oil has run in.
 - ▶ Add engine oil at the opening of the oil dipstick.
 - ⇒ Oil quality and oil filling quantity, refer to chapter "Lubrication table".
- ▶ Run the portable pump at idling speed for approx. 20 seconds.
- ▶ Check that the oil level is between the lower and upper markings.
 - ▶ If the oil level is too low, add oil.
 - ▶ Pour in engine oil up to the upper marking.
- ▶ Screw in oil dipstick to close the oil filler plug.
- ✓ Oil has been changed.
- ▶ Avoid contamination of the V-belts and V-belt pulleys caused by oil or grease.
 - ▶ Clean fouled V-belts and V-belt pulleys.



Dirty V-belts or V-belt pulleys reduce the power or interrupt the power transmission.

Coolant of the propulsion engine



CAUTION!

Burning hazard from the hot cooling system!

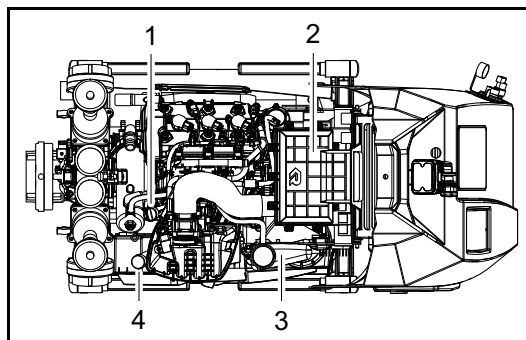
- ▶ Only carry out maintenance work after the portable fire pump has been shut down and the cooling system has cooled down.

NOTICE

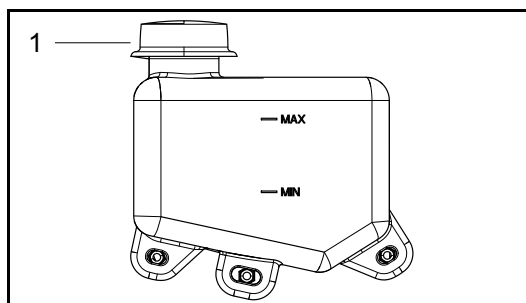
Engine damage due to poor cooling!

Prohibited liquids lead to poor cooling and cause engine damage.

- ▶ Do not use water to top up.
- ▶ Only use recommended and approved coolant.



- 1 Engine oil dipstick
- 2 Air filter
- 3 Coolant expansion tank of the propulsion engine
- 4 Priming pump oil dipstick



Coolant expansion tank of the propulsion engine

- 1 Pressure cap of the expansion tank

Normally no change of propulsion engine coolant is planned.

A change of coolant may become necessary for various reasons. Damage can also cause a significant amount of coolant to leak.

- ⇒ Existing damage to the cooling system or the propulsion engine must be fixed before filling.

Add coolant

- ⇒ Before starting the portable pump for the first time, ensure that the expansion tank has been completely filled with coolant.
 - ⇒ The coolant level must be at the top marking.

If the coolant level is below the bottom marking coolant must be added.

- ▶ Add coolant.
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".
- ▶ Run the portable pump at idling speed.
- ▶ Actuate the Priming pump function switch for max. 3 minutes to manually prime the portable pump.
- ▶ If the coolant level in the expansion tank drops, top up with coolant.
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".



Coolants may not be mixed together.

- ▶ Observe engine temperature.
 - ▶ Engine temperature may not increase above 95° C.
- ▶ If the engine temperature rises above 95° C, shut down portable pump and leave it to cool for 10-15 minutes.
- ▶ Check coolant level in the expansion tank.
 - ⇒ The coolant level must be at the top marking.
- ✓ Coolant has been added.

Replace coolant

- ⇒ Before starting the portable pump for the first time, ensure that at least 1.7 - 1.8 l (0.44 - 0.47 gal) of coolant has been filled.

Add coolant:

- ▶ Add coolant.
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".
- ▶ Run the portable pump at idling speed.
- ▶ Actuate the Priming pump function switch for max. 3 minutes to manually prime the portable pump.
- ▶ If the coolant level in the expansion tank drops, top up with coolant.
 - ⇒ For the corresponding coolant, refer to chapter "Lubrication table".



Coolants may not be mixed together.

- ▶ Observe engine temperature.
 - ▶ Engine temperature may not increase above 95° C.
- ▶ If the engine temperature rises above 95° C, shut down portable pump and leave it to cool for 10-15 minutes.
- ✓ Coolant has been added.
- ▶ Repeat the above procedures for *adding coolant*.
 - ▶ Repeat process until 2.5 - 2.7 l (0.66 - 0.71 gal) of coolant is in the cooling circuit.
 - ▶ If after the third repetition the required quantity is still not in the cooling circuit, contact Rosenbauer customer service or the nearest Rosenbauer service centre immediately.
- ✓ The coolant quantity is 2.5 - 2.7 l (0.66 - 0.71 gal).
- ▶ When the portable pump is primed, increase the speed to approx. 3000-3500 min⁻¹.
- ▶ Add coolant quantity to approx. 3.3 - 3.5 l (0.87 - 0.92 gal).
 - ▶ Observe engine temperature.
- ✓ The coolant has been changed.

Replace spark plugs

The spark plugs on the propulsion engine should be changed every 150 hours of operation or every 3 years, whichever comes first.

The spark plug picture can give details of the ignition settings, as well as status and operating conditions of the propulsion engine.

Spark plugs specification:

- ⇒ Refer to chapter "Propulsion engine".
- ▶ Position the portable pump on a flat, even surface.
- ▶ Open the engine cover.
 - ⇒ Refer to chapter "Open the engine cover".
- ▶ Dismantle the fastening screws on the ignition coil.
 - ▶ Use of a TORX Allen wrench TX30.
- ▶ Carefully pull out ignition coils.
 - ⇒ Store ignition coils in a clean and dust-free location.
- ▶ Remove the spark plugs.
 - ▶ Use of spark plugs applicator 5/8 square 16 mm.
- ▶ Dispose of old spark plugs.
 - ⇒ Observe the local disposal regulations.
- ▶ Mount spark plugs.
 - ▶ Use of spark plugs applicator 5/8 square 16 mm.
 - ⇒ Tightening torque of the spark plugs 13 Nm (+/- 1 Nm).
- ▶ Carefully slide in ignition coils.
- ▶ Mount the fastening screws on the ignition coil.
 - ▶ Use of a TORX Allen wrench TX30.

Service and cleaning

Service work

- ▶ Close engine cover.
 - ⇒ Refer to chapter "Close engine cover".
- ✓ Spark plugs have been changed.

8.8.3 Battery



WARNING!

Danger of serious injury and damage due to chemical burns!

Battery acid can cause severe injury to eyes and skin.

- ▶ Follow safety instructions on the outside of the battery.
- ▶ Wear safety goggles whenever servicing a battery.
- ▶ Avoid skin and eye contact with any battery acid that escapes.
- ▶ Keep unauthorized persons clear of the battery.
- ▶ If contaminated with acid, clean skin with soap and water.
- ▶ If contaminated with acid, rinse mouth or eyes with water, obtain medical attendance.
- ▶ Change contaminated clothing.
- ▶ Replace damaged batteries immediately.
- ▶ If acid has leaked, replace affected electronic components or wiring.

NOTICE

Failure of the engine due to discharged battery!

The battery of the engine slowly discharges despite the ignition being switched off.

- ▶ Check battery charge status regularly (every three months).
- ▶ Recharge or replace battery with low charge level.



Always disconnect batteries in the correct order, first minus terminal (-) then plus terminal (+). Connect batteries in the reverse order, first plus terminal (+) then minus terminal (-).

For batteries connected in series first the minus terminal (-) is to be disconnected which is connected directly to the housing ground. Then the connecting line to second battery and finally the plus terminal (+).

Battery charge retention

The leakage current on the electrical components of the portable pump is approx. 0.5 mA.

Unregulated chargers with manual monitoring (permissible):

Characteristic curve **Application** **Voltage limitation (manual monitoring)**

W	Single charging	max. 14.4 Volts
Wa ^a	Single charging	max. 14.4 Volts

a. Chargers with automatic switch-off by timer or temperature monitoring.

Regulated chargers without additional monitoring (recommended):

Characteristic curve **Application** **Voltage limitation**

IU	Single / collective charging	max. 14.4 Volts
Wu	Single charging	max. 14.4 Volts
Wae	Single charging	max. 14.4 Volts

Reference values for the charging time with regulated chargers up to the switch-off point can be found in the following table.

Guide values for the charging time depending on the battery condition and size of the charger:

Quiescent voltage (Volts) ^a	Charge state (%)	Charging time for charging - devices - nominal current 0.1 x battery - nominal capacity (ampere-hours Ah)
> 12.7	100	-
- 12.5	75	4 hrs
- 12.2	50	7 hrs
- 12	25	11 hrs
- 11.8	0	24 hrs

a. The quiescent voltage only adjusts to a constant value after a few hours. It should therefore not be measured immediately after loading or unloading. In this instance a waiting time of about two hours is needed.

Jump-start socket

Use of the jump-start socket is only permitted with the correct polarity plug and according to the chassis manufacturer's instructions. Ensure the correct voltage.

Principally the standardised starter cable is to be used with the double-sided Nato plug design. If another starter cable is used observe correct polarity.

Do not refuel during jump starting.

8.8.4 General guidelines for handling electronic components

NOTICE

Neglecting these recommendations will result in loss of warranty.

Working on vehicles fitted with electronic devices

Installation and measurement of electronic devices.

- ▶ Ensure power is switched off before working on electrical parts (except when measuring).
 - ▶ Switch off battery main switch (service switch) or disconnect battery.

Vehicles pick up electrostatic charge from the ground. If you are working from the ground, first carry out a potential equalisation.

Remedy:

- ▶ Mount an earthing strap made of conductive rubber on the vehicle.
 - ▶ Connect water filled or wet hose.
 - ▶ Grip conductive vehicle frame parts before touching electrical equipment.
- ⇒ If the technician and electronics are both on the vehicle, no special precautions are necessary.

Drilling, welding and milling work

NOTICE

If ACR-Welding work on chassis or superstructure is done:

- ▶ Disconnect all plugs (connectors) from the electronics.
 - ▶ Ground point as close as possible to the welding point.
-

- ▶ Ensure that the electronics and the plug connector are correspondingly protected against milling and drilling chips etc.

If welding on the vehicle:

- ▶ Disconnect the batteries
- ▶ Connect disconnected plus and minus cable to produce a conductive electrical connection.
- ▶ Connect protective equipment.
- ▶ Always weld with direct current, in the process watch out for the polarity of the electrodes.
- ▶ Earthing point as close as possible to welding point.
- ▶ Do not lay the cable of the welding device parallel to electrical lines on the vehicle.
- ▶ Avoid voltage peaks.
 - ▶ Ensure that the parts to be welded are well fixed to one another, e.g. use earthing clip for fixing.

Painting work or working with chemicals or aggressive substances:

NOTICE

Damage to electronic components

Due to high temperature in a paint box, electronics can be severely damaged.

- ▶ Expose electronics to max. 95 °C (203 °F) for a short period.
 - ▶ Dry time must not exceed 2 hours at 85 °C (185 °F).
-
- ▶ Protect the electronics, contacts and plug connector from paint spray mist and the effect of aggressive substances.

Storing, packing and transporting

Electronics with Housing:

Precautions regarding anti-electrostatic problems are not necessary. To protect them against soiling and climatic effects, a plastic foil must be used when packaging. Sufficient filling material must be used to avoid mechanical damage during shipment of unit.

Printed Cards/chips boards:

Components like printed cards must be properly packed (wrapped) into anti-electrostatic foil. The anti-electrostatic foil is enough to protect them from soiling to. Printed cards are extremely sensitive to mechanical damage. Therefore boxes, sufficient in size, with ample filling material must be used for shipment/transport. Shipment in "Jiffy-Bags" is not permissible. The same recommendations apply when carrying these items in tool boxes etc.

General Requirements:

Maximum permissible limits for storage and transporting are as follows:

Temperature: -40° C to +100° C (-40° F to +212° F)

Humidity: 20% up to 95%

No condensation permissible.

It is essential to store electronic components either packed in protection foil (electronics with housing) or packed in anti-electrostatic foil (printed cards).

8.9 Storage and transport

The portable fire pump and the corresponding installation material must be stored and transported in its packaging. It must be handled carefully and cautiously.

8.9.1 Preserving and storing

If the portable fire pump is not operated for a longer period of time (> 3 months) the following advice must be observed.

- ▶ If there is risk of frost the portable fire pump must be carefully drained and then a dry suction process is to be carried out.
- ▶ Do not shut down or store the portable fire pump in salty (corrosive) ambient air.
- ▶ Drain fuel injection system and fuel tank (deplete or pump away).
- ▶ Thoroughly clean the portable fire pump with moist cloths (use no running water or solvent).
- ▶ For storage without charge retention the battery is to be disconnected. The leakage current on the electrical components of the portable fire pump is approx. 0.5 mA.
 - ⇒ To prevent the generation of sparks, the earthing cable of the battery must always be removed first and connected last.

9 Assembling conditions

9.1 Installation advice



The portable pump was developed in accordance with the standards EN1028 or EN14466.

According to EN11466 the maximum permissible ambient temperature of the portable pump is 35 °C. The propulsion engine output is reduced at higher ambient temperatures. If the intake air temperature rises above 52° C, the propulsion engine output is also reduced (see Information screen page).

Installation of the portable pump in a vehicle does not comply with the EN14466. standard. Additional measures must therefore be observed without which damage to the portable pump and the vehicle may occur

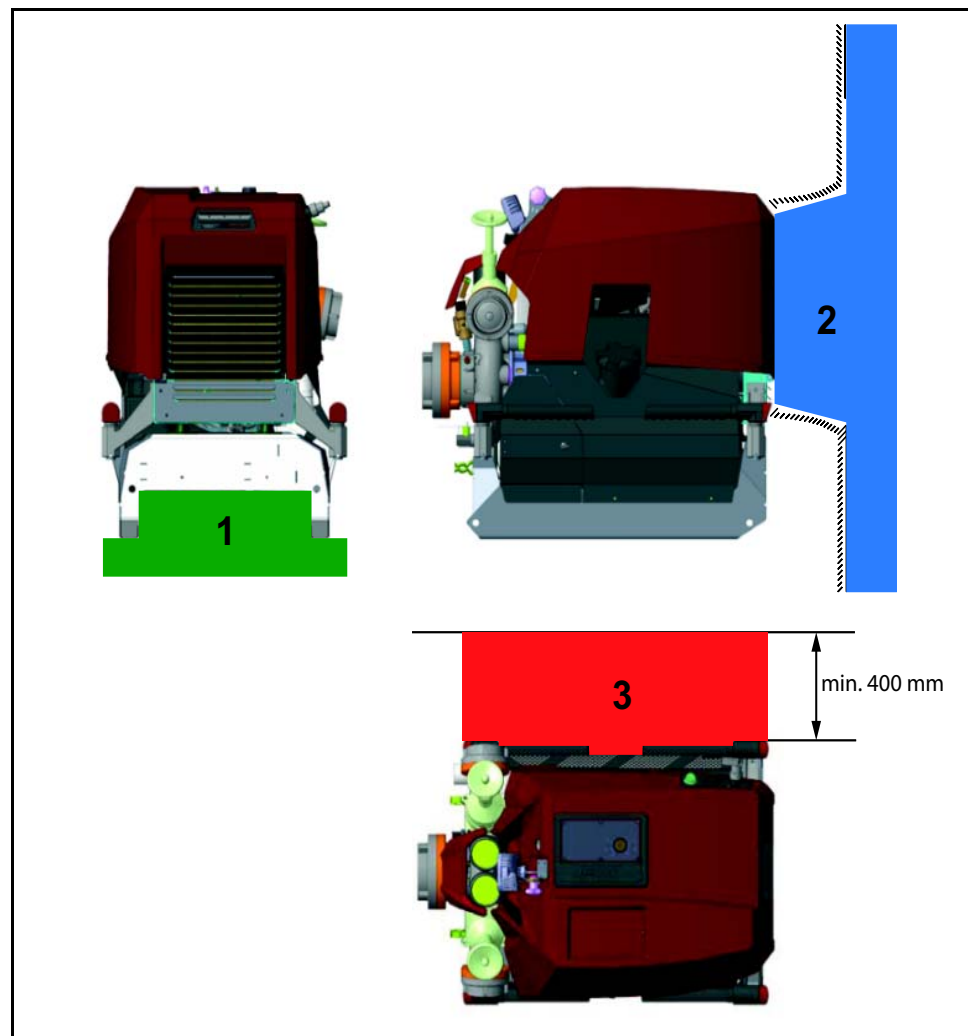
Note the following when selecting the installation position of the portable pump:

- Allow unrestricted access for service work.
- The hot exhaust air flow from the propulsion engine may not be sucked back in.
- The air intake of the engine cooling and the air intake of the propulsion engine must be arranged in such a way that the fan and the propulsion engine can always suck in sufficient fresh air.
 - ⇒ Fresh air must be drawn in over the entire air intake cross-section of the engine cover.
- The air intake cross-sections must be sufficiently large over the entire air flow to avoid a reduction in output due to overheating of the propulsion engine.
- External air inlets must not be relocated, sealed or draw hot air from any other source before commissioning.
- When installing without the fresh air intake described above, a distance of at least 1 m must be maintained between the rear side of the portable pump (air intake opening) and the nearest partition wall.
- The air inlet between the runners of the portable pump may not be displaced or obstructed to allow heat radiation from the exhaust system to escape.
- The exhaust gases must be discharged into the open air via an additional elastically mounted exhaust pipe.
 - ⇒ The exhaust gas temperature can reach up to 800 °C.
 - ⇒ The exhaust pipe, diameter 50 mm (2 in) may not exceed a length of 1500 mm (59 in).
 - ⇒ A reduction of the diameter is not permitted
 - ⇒ A maximum of two 90° bends with a radius of 250 mm (9.84 in) may be used to discharge the exhaust gases.
 - ⇒ When designing the exhaust pipe, there must be no backflow of exhaust gas to the portable pump.
- The suction and discharge lines to the portable pump must be elastically supported.

Assembling conditions

Installation advice

- In the absence of overheat protection (option), a by-pass line dia. 5 mm (0.2 in) must be provided to the water tank. This serves to prevent the portable pump from overheating when the pressure outlets are closed.
- Nothing may be kept or stored in the area of the exhaust system due to heat radiation
 - ⇒ Sufficient air circulation with fresh air must be provided to prevent heat accumulation on the exhaust side.
 - ⇒ If necessary, an additional fan must be installed to ensure air exchange.
- Maintain sufficient distance to the various lines and hoses of the vehicle and, if necessary, protect them with covers.



Air circulation on the portable pump

- | | |
|---|--|
| 1 | Supply air opening |
| 2 | Fresh air supply |
| 3 | Exhaust air temperature (approx. 350 - 400 °C) |

10 Troubleshooting

10.1 Failure



If problems or repairs can not be clearly identified or solved please contact the customer service department or your Rosenbauer representative.

The following list offers an overview of possible faults. The list is not complete, but in the event of a malfunction it can be helpful in localising and rectifying the fault.

10.1.1 Portable pump

Fault	Cause	Remedy
Pump does not suck	The priming pump is not switched on	Switch on priming pump
	Suction lift too high	Reduce suction lift
	Suction strainer not below water	Place suction strainer below water
	Blocked suction strainer	Clean suction strainer
	Suction hose defective or suction seals poorly inserted or damaged	Insert or replace suction hose gaskets properly
	Blocked suction sieve	Clean suction sieve
	External suction valve closed	Open external suction valve
	Drain cock not closed	Close drain cock
	Pressure valve leaks are caused by foreign bodies or damaged valve seals	Clean pressure valve (rinse with purified water) or change the valve seal
	Torn or oily v-belt	Clean or replace V-belt
Pump suction weak	Input and/or exhaust valves of the priming pump are damaged	Change input and/or exhaust valves
Pump is noisy and vibrates	Suction lift too high	Reduce suction lift
	Pump cavitates	Reduce speed and nozzle diameter; clean suction strainer and suction sieve
Pump has low performance	Blocked suction strainer	Clean suction strainer
	Suction hose defective or suction seals poorly inserted or damaged	Insert or replace suction hose gaskets properly
	Blocked suction sieve	Clean suction sieve
	Engine power weak	Check propulsion engine
	Pressure valve not fully open	Open the pressure valve completely

Troubleshooting

Failure

Fault	Cause	Remedy
Measuring instrument does not display anything	Measure instrument defect	Replace meter
	Plug not connected	Connect plug
	PIN assignment incorrect	Correctly wire PIN assignment

10.1.2 Propulsion engine

Faults	Cause	Remedy
Engine oil circuit	Low engine oil level (from increased consumption / oil leak)	Top up engine oil Check oil consumption max. 0.06 litres /hr Check the propulsion engine for leaks
	Oil filter defective or dirty	Replace oil filter
	Wrong viscosity of the engine oil	Replace engine oil
	Blue smoke	Replace / renew valve shaft seals Replace / renew piston rings
	Oil/water heat exchanger leaky	Replace heat exchanger and / or seal Replace engine oil and coolant

Faults	Cause	Remedy
Cooling circuit	Coolant fluid level too low	Localise leaks and fix them Pressurise the cooling system max. 1.1 bar (15 psi) Add coolant
	Air in cooling system	Check / clean thermostat vent hole Add coolant and ventilate the system
	Thermostat defective (does not open)	Replace thermostat
	Regular engine temperature >92 °C	Check pipe coil of water / heat exchanger for limescale
	Temperature sensor defective	Check resistance and replace is necessary Check electrical harness and repair if necessary
	Radiator cap defective	Check opening pressure 1.1 bar (15 psi), and replace cap if required
	Cooling fan does not run	Air in cooling system (thermostatic switch malfunction) Check voltage supply (fuse, relay, etc.) Check temperature sensor and replace if necessary Replace fan motor if necessary
Propulsion engine dies away / poor idling	Suction system leakage air	Check air filter box and connecting pieces for cracks and replace if necessary
	Spark plug electrode gap too large	Measure electrode gap. If the electrode gap is outside the tolerance, replace spark plugs.

10.1.3 Detailed information on engine faults

The following list offers detailed information on possible faults of the propulsion engine of the portable pump.

This detailed information is displayed in the *Log* service submenu.

Sensor / plug	Error description	PCode
A106/x Harness Inter Connector	Diagnostic fault code for performance level signal error of injector 1	0x202
	Diagnostic fault code for performance level signal error of injector 2	0x201
Camshaft sensor	Propulsion engine position management - camshaft signal 1 fault path	0x340

Troubleshooting

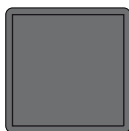
Failure

Sensor / plug	Error description	PCode
Charge controller	Diagnostic Fault code for Ubatt diagnosis Max error	0x563
	Diagnostic Fault code for Ubatt diagnosis Min error	0x562
Injectors	Diagnostic Fault code for performance level Max error of injector 1	0x265
	Diagnostic Fault code for performance level Min error of injector 1	0x264
	Diagnostic Fault code for performance level Max error of injector 2	0x262
	Diagnostic Fault code for performance level Min error of injector 2	0x261
	Diagnostic fault code for performance level signal error of injector 1	0x202
	Diagnostic fault code for performance level signal error of injector 2	0x201
Crankshaft sensor	Crankshaft signal path error	0x335
Pressure sensor suction pipe	Diagnostic Fault Check in Signal Range for Max Check of manifold pressure sensor	0x108
	Diagnostic Fault Check in Signal Range for Min Check of manifold pressure sensor	0x107
	Diagnostic Fault Check for plausibility error of manifold absolute pressure	0x106
	Diagnostic Fault Check for intake air temperature signal - Min Error	0x113
	Diagnostic Fault Check for intake air temperature signal - Max Error	0x112
Main oil gallery sensor	Low oil pressure	0x524
Fuel pump	Diagnostic Fault Check for Powerstage diagnosis of low Pressure Fuel Pump short circuit GND	0x231
	Diagnostic Fault Check for Powerstage diagnosis of low Pressure Fuel Pump short circuit UBatt	0x232

Sensor / plug	Error description	PCode
Control panel	Short circuit to plus of accelerator pedal sensor 1	0x123
	Short circuit to plus of accelerator pedal sensor 2	0x223
	Short circuit to GND of accelerator pedal sensor 1	0x122
	Short circuit to GND of accelerator pedal sensor 2	0x222
Water temperature sensor	Diagnostic Fault Check - Max error of coolant temperature sensor	0x117
	Diagnostic Fault Check - Min error of coolant temperature sensor	0x118
	Diagnostic Fault Check - Plausibility error of coolant temperature sensor	0x116
Throttle valve	First position sensor of engine throttle adjusting device	0x2622
	First position sensor of engine throttle adjusting device	0x2621
	Second position sensor of engine throttle adjusting device	0x212D
	Second position sensor of engine throttle adjusting device	0x212C
	Position sensor of engine throttle adjusting device	0x1620

10.2 Warnings

Warnings in LCS 3.5" display



In the LCS 3.5" display warnings must be consciously acknowledged with the *Confirm message* function switch, to turn off the acoustic alarm or hide the visual illustration.







As soon as the warning has been acknowledged, the warning is stored in the warning memory.

10.2.1 Portable pump

Message	Possible cause	Corrective action
Water pump overheated	Normal pressure pump overheated.	Check water pump. Open pressure outlet or activate cooling circuit.
Cavitation KAV	Flow rate is too high. Suction height is too high. Suction strainer is obstructed.	Reduce pump speed, reduce water flow, reduce suction height. Clean suction strainer.

Troubleshooting

Warnings

Message	Possible cause	Corrective action
Disengage pump!	The pump is still activated. A function can not be started.	Disengage the pump.
Pump cooling has been engaged.	Pump overheated. Too less water flow.	Increase water flow.
Drain valve has been opened.	Pump was drained.	Close drain valve.
Venting not possible.	Priming pump operated too long.	Wait for a short while and then restart the priming pump.
Intake pressure monitoring system	The intake pressure falls below 1.5 bar (21 psi).	The outlet pressure is automatically reduced. The engine speed is then automatically reduced until the intake pressure has risen back to 1.5 bar.
FireCan fault ID	Defect CAN module, plug connection disconnected.	Check plug connection, inform service technician.
Fuel tank level below XX% 	Fuel tank content too low.	Refuel.
Battery voltage too low. 	Battery voltage too low. Fault in the battery charging process.	Shut down propulsion engine and restart. If the error persists, inform the service technician.
Switch on ignition	Switch off ignition.	Switch on the ignition.
Propulsion engine oil pressure too low! 	Engine oil level too low, defect on the propulsion engine.	Check engine oil.
Propulsion engine operating temperature too high! 	Too little coolant, radiator misplaced, drive motor defect. Coolant temperature over 100° C.	Expose the radiator, fill up the cooling water after the propulsion engine has cooled down.
Engine fault! 	An engine fault has occurred. In the service submenu Log, detailed information on engine faults can be displayed.	Shut down propulsion engine. Immediately contact a service workshop.
Service due! 	The operating hours until the next service have been reached. If the date of the next service has been reached, no warning appears.	Contact service workshop and perform service.

11 Disposal

Dispose of all materials and old parts that are produced through the handling and repair of this unit in an environmentally-friendly way.

Disposal of used oil, cooling water and fuels

Used oil, cooling water and fuels are water-polluting substances. Ensure the correct disposal of used oils and fuel.

- ▶ Never pour used oil, cooling water or fuel on the ground, in a body of water, in the sink or down the drain.
- ▶ Carefully collect and dispose of used oil.
- ▶ Observe local regulations.

Disposal of foam compound

Toxic foam compound is hazardous to health!

- ▶ Observe the material safety data sheets of the manufacturer of the foam compound.
- ▶ Do not dispose of foam compounds in bodies of water or in the sewage systems.
- ▶ Observe the manufacturer's disposal information.

Disposal of desiccant inserts, filter cartridges, boxes and inserts

Filter inserts, boxes and cartridges (oil filters, desiccant inserts of the air drier) are considered hazardous waste and must be disposed of properly.

- ▶ Observe local regulations.

Disposal of batteries

Since batteries are a pollutant, they must be disposed of properly.

- ▶ Never dispose of used batteries with household waste!
- ▶ Observe local regulations.

Disposal of metal, rubber, and plastic parts

Improper disposal of metal, rubber and plastic parts will contaminate the environment.

- ▶ Observe local regulations.

Disposal of adhesives, paints and coating materials.

Improper disposal of adhesives, paints and coating materials will contaminate the environment.

- ▶ Observe local regulations.

Disposal of control devices

Control devices are hazardous waste and must be disposed of properly.

- ▶ Observe local regulations.

Technical data

Portable fire pump

12 Technical data

12.1 Portable fire pump

Portable pump

Manufacturer	Rosenbauer International AG
Type	FOX 4th Generation
Standard identification acc. to EN1028	PFPN 10-1000 PFPN 10-1500
Construction guidelines for portable pumps	DIN EN 14466
Dry weight without fluids	approx. 150 kg (331 lbs)
Operating weight with a full tank 20 l (5.3 gal) of fuel	approx. 166 kg (366 lbs)
Dimensions	
Length	approx. 923 mm (36.4 in)
Width	approx. 636 mm (25.1 in)
Height	approx. 845 mm (33.3 in)
Volume	approx. 0.498 m ³
Operating range	-15 °C to +35 °C ambient temperature (EN14466)

12.2 Pump unit

Water pump

Manufacturer	Rosenbauer International AG
Type	Single-stage centrifugal pump
Nominal discharge	1500 l/min (396 gpm)
Nominal supply pressure	10 bar (145 psi)
Geodetic nominal suction height	3 m
Mounting of the pump shaft (extended crank shaft)	Deep groove ball bearings, output-end radial shaft seal
Shaft seal	Axial mechanical shaft seal
Permissible fluids	Fire fighting water or drinking water

Priming pump

Manufacturer and type	Rosenbauer 210E
Material of the housing parts	Light alloy
Operating principle	Dual piston with concentrically arranged valves
Drive type	V-ribbed belt
Actuation mode	Electromagnetic clutch

Priming pump

Lubrication	Oil-bath lubrication
Output of the priming pump	at 3.0 m suction lift - 4 seconds
	at 7.5 m suction lift - 25 seconds
	Measuring conditions acc. to EN 1028

12.3 Foam proportioning system

Approved foam compound

All components of the Rosenbauer foam proportioning systems, e. g.: housing, piping and sealing materials, are resistant in operation to all types of commercially available foam compounds.

In principle all commercially available foam compounds for firefighting can be used with similar hydraulic properties to water.

Any other foam compound only by arrangement with Rosenbauer.

- Pre-mixing systems: foam compound with a kinematic viscosity of < 60 cSt.

12.3.1 Around-the-pump foam proportioning system

Integrated around-the-pump foam proportioning system

Manufacturer and type	Rosenbauer integrated around-the-pump foam proportioning system
Proportioning ratio	0.1 %, 0.5 %, 1 %, 3 % and 6 %
Ensures proportioning volume under the following conditions:	
Viscosity of the foam compound used	up to 60 cSt
Suction lift H_{sgeo} of the foam compound	0.5 m
Min. quantity of foam compound supplied	0.5 l/min (0.13 gpm)
Max. quantity of foam compound supplied	50 l/min (13 gpm)
Proportioning accuracy at a pump pressure of ≥ 8 bar (116 psi)	
Proportioning ratio 0.1 %, 0.5 %, 1 %	± 20 %
Proportioning ratio 3 %, 6%	± 10 %
Length of the portable pump	Increase by 125 mm (4.9 in)
Total weight of the portable pump	Increase by approx. 6 kg (6.6 lbs)

Technical data

Propulsion engine

12.4 Propulsion engine

Propulsion engine

Manufacturer	BRP Rotax
Type	903 ACE
Operation type	Four-stroke petrol engine with electronic injection
Cylinder	3
Valves per cylinder	4
Bore / stroke	74 / 69.7 mm
Cubic capacity	899.3 cc
Output	45 kW at 5200 min ⁻¹ (± 200 min ⁻¹) 48 kW at 5500 min ⁻¹ (± 200 min ⁻¹)
Idling speed	1700 min ⁻¹
Torque	85 NM at 5200 min ⁻¹ (± 200 min ⁻¹)
Engine control	BOSCH ME17
Generator output	420 W
Starter system	12 V 0.8 kW electronic starter with restart lock
Battery	12V / 18 Ah / cold check current 250 A (VARTA Powersports AGM 518902026A514)
Fuel injection	Electronic multiple point petrol injection 46 mm heated single throttle body

Ignition system

Ignition system	Electronic ignition system, ignition programme
Spark plug	
Type	NGK MR7BI-8
Number	3
Electrode gap	0.7 – 0.8 mm (non-adjustable!)

Fuel

Fuel	ROZ 95 Petrol E10 fuel (<= 10% ethanol) Aspen four-stroke
------	---

Fuel

Fuel consumption	
constant 1500 l/min (396 gpm) at 10 bar (145 psi) (5200 min ⁻¹)	approx. 14 l (3.7 gal)
constant 1000 l/min (264 gpm) at 15 bar (217 psi) (6000 min ⁻¹)	approx. 18 l (4.7 gal)

Lubrication system

Lubrication system	Dry sump lubrication with exchangeable paper filter
Oil pump	3 gear pumps (2 x suction pumps and 1 x pressure pump)
Oil pressure at 100° C oil temperature	min. > 0.6 bar (> 8.7 psi) at 1700 min ⁻¹ min. 4.0 bar (58 psi) at 4000 min ⁻¹ max. 6.0 bar (87 psi) at 6000 min ⁻¹
Engine oil	SAE 5W 40 fully synthetic
Engine oil volumes	
during first filling	3.5 l (0.9 gal)
at oil change (oil drain valve)	2 - 2.5 l (0.5 - 0.66 gal)

Engine cooling system

Engine cooling system	Liquid-cooled integrated water pump Two-way thermostat
Coolant	50% water, 50% coolant
Cooling water pressure	max. 1.1 bar (15.9 psi) measured at the expansion tank
Coolant flow with fully open thermostat	min. 40 l/min (1.05 gpm) at 5000 min ⁻¹
Thermostat opening temperature	75 °C

12.5 Noise measurements

Noise level measurement:

- In accordance with EN 14466:2008, Appendix E, applying the basic standards EN ISO 3744 and EN ISO 11203

The highest limit of a value range results from the sum of the following:

- A measured noise value
- The associated uncertainty factor

Technical data

Noise measurements

PFPN 10 - 1000

Measured values

Sound pressure level, $L_{p(ST)}$ based on $20\mu Pa$, at the operating position (dB)	94.9
Uncertainty factor, $K_{p(ST)}$ (dB)	2
Acoustic power emissions, L_{WA} based on $1\mu W$ (dB)	109.4
Uncertainty factor, K_{WA} (dB)	2

PFPN 10 - 1500

Measured values

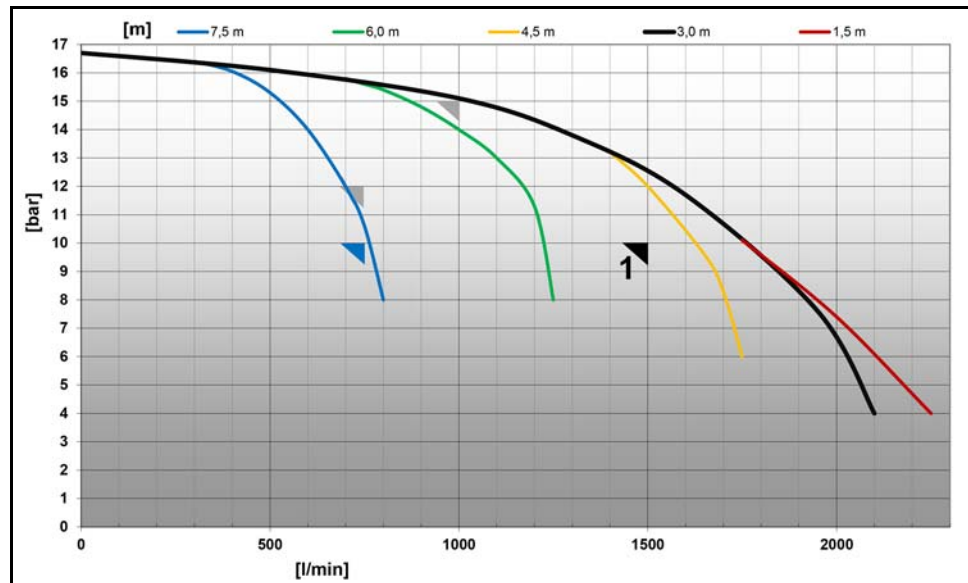
Sound pressure level, $L_{p(ST)}$ based on $20\mu Pa$, at the operating position (dB)	95.8
Uncertainty factor, $K_{p(ST)}$ (dB)	2
Acoustic power emissions, L_{WA} based on $1\mu W$ (dB)	110.3
Uncertainty factor, K_{WA} (dB)	2

15 bar / 1000 l/min

Measured values

Sound pressure level, $L_{p(ST)}$ based on $20\mu Pa$, at the operating position (dB)	100
Uncertainty factor, $K_{p(ST)}$ (dB)	2
Acoustic power emissions, L_{WA} based on $1\mu W$ (dB)	114.5
Uncertainty factor, K_{WA} (dB)	2

12.6 PFPN 10-1500 performance chart



Flow rate performance chart

- 1 Guarantee point according to EN 14466/EN 1028 at 3 m suction lift
- [m] Suction lift
- [bar] Pump pressure
- [l/min] Flow

13 Documentation

Calling up the QR code (QR = Quick Response) provides access to the available documents for the portable pump. The online spare parts catalogue is also available.

FOX 4th Generation (PC116)

<https://link.rosenbauer.com/363359b3-eaef-4ebe-bb91-0c8085a4739d>



14 Index of abbreviations

General abbreviations

i.n.	if necessary
e. g.	for example
approx.	approximately
Etc.	Et cetera
incl.	inclusive
resp.	respectively
acc. to	according to

Abbreviations for units

m	Meter
mm	Millimetres
in	Inch
"	Inch
ft	Feet
min	Minute
s	Second
h	hour
kg	Kilogram
lbs, lb	Pound

Abbreviations for units

l	Litres
gal	gallons
bar	Pressure unit
psi	Pounds per square inch
V	Volt
VDC	DC voltage
A	Ampere
kVA	Kilo volt-ampere
W	Watts
kW	Kilowatts
Hz	Hertz
kN	Kilonewtons
cSt	Centistokes
DN	Diameter nominal
dB	Decibel
°C	Degrees Celsius
°F	Degrees Fahrenheit
l/min	Litres per minute
GPM	Gallons per minute
kg/s	Kilogram per second
lbs/s	Pounds per second
km/h	Kilometres per hour
m/s ²	Metres per second squared
min ⁻¹ , rpm	Revolutions per minute