# Operating manual

## Mixing pump RITMO XL FC-230/400V

## Part 2 Overview, operation and service


| | |
|---|---|
| Item no. of the operating manual: | 00235201 |
| RITMO XL FC-230/400V, 1/3 Ph, 50 Hz | Item no.: 00197821 |
| RITMO XL FC-230/400V, 1/3 Ph, 50 Hz geothermal energy | Item no.: 00231496 |
| RITMO XL FC-230/400V, 1/3 Ph, 50 Hz with ZARGOMAT pro | Item no.: 00235811 |

CE

**Read the operating manual prior to starting any work!**

# About us


| | |
|---|---|
| Publisher | Knauf PFT GmbH & Co. KG<br>Postfach 60 ▪ 97343 Iphofen<br>Einersheimer Straße 53 ▪ 97346 Iphofen<br>Germany |
| Document name | 00235201_1.0_GB<br>Translation of the original operating manual (DE) |
| Date of first issue | 10.2022 |
| Date of change | |

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# 1 General information

## 1.1 Information regarding the operating manual

- This operating manual provides important information and instructions on the correct use of the machine. A prerequisite for safe working is the observance of all stated safety guidelines and instructions.
- Furthermore, the local accident prevention guidelines and general safety instructions for the application area of the device are to be adhered to.
- Read the operating manual thoroughly before starting any work! It is a part of the product and has to be kept near the device and easily accessible to the personnel at all times.
- If the device is given to third parties, also include the operating manual.
- The figures in this manual are for presentation purposes of facts, not necessarily to scale and may slightly differ from the actual model of the device.

## 1.2 Division

The operating manual is divided into 2 books:

- Part 1 Safety/drinking water protection

General safety instructions mixing pumps/conveying pumps

Item no.: 00172709

- Part 2 Overview, operation and service (this manual).

**⚠ WARNING**

**Danger of injury due to incorrect operation!**

Improper operation may lead to serious damage to persons and property.

- To ensure safe and proper operation of the machine, all parts of the operating manual must be read before starting work; all parts together are considered to be a single operating manual.

## 1.3 Display of safety and warning notices

In this manual, safety and warning notices are used in conjunction with signal words to raise safety awareness, indicate degrees of danger and explain safety measures.

Such safety and warning information may also be attached to the product in the form of signs, stamps or stickers.

# General information

Structure of the safety and warning notices

All safety and warning notices consist of:

- The danger sign and signal word
- Information on the nature of the hazard
- Information on the source of the hazard
- Information on possible consequences of disregarding the hazard
- Measures to avert the hazard

| Danger sign | Signal word | Significance |
|---|---|---|
|  | Danger | Death or serious injury will occur if you do not take the precautions described. |
|  | Warning | Death or serious injury may occur if you do not take the precautions described. |
|  | Caution | Minor injury may occur if you do not take the precautions described. |
|  | Note | Property damage may occur if you do not take the precautions described. |
|  | Tip | An important piece of information about the product or the particular section of the manual to which special attention is to be drawn. |

## 1.4 Keep the manual for future reference

The operating manual has to be available during the whole service life of the product.

## 1.5 Name plate


*Figure 1: Name plate*

The following details can be found on the name plate:

- Manufacturer
- Type
- Year of manufacture
- Machine number
- Permissible operating pressure

## 1.6 EC Declaration of Conformity

Company: Knauf PFT GmbH & Co. KG
Einersheimer Straße 53
97346 Iphofen
Germany

declares under our sole responsibility that the machine:

**Type of machine:** RITMO XL

**Type of equipment:** Mixing pump

**Serial number:**

**Guaranteed sound power level:** 78 dB

is in conformity with the following CE directives:

– Outdoor Directive (2000/14/EC),
– Machinery Directive (2006/42/EC),
– Electromagnetic Compatibility Directive (2014/30/EU).,

Operative Conformity Assessment according to Outdoor Directive 2000/14/EC:

Internal production control as per article 14 paragraph 2 in connection with annex V.

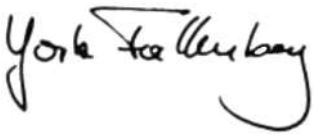
This declaration only refers to the machine in the state in which it has been placed on the market. Parts subsequently added by the user and/or subsequent interventions are not covered. This declaration ceases to be valid if the product is converted or changed without consent.

Person authorised to compile the relevant technical documentation:

– (Dipl. in Industrial Engineering, University of Applied Sciences) Michael Duelli, Einersheimer Straße 53, 97346 Iphofen.

The technical documentation is available from:

– Knauf PFT GmbH & Co. KG, Technical Department, Einersheimer Straße 53, 97346 Iphofen.



| Iphofen | | Dr York Falkenberg<br>Managing Director |
|---|---|---|
| Town/city | Name and signature | Details of signatory |

## 1.7 Quality Control sticker


The following details can be found on the Quality Control sticker:

- CE confirmed as per EU directives
- Serial no / serial number
- Controller / signature
- Date of control

*Figure 2: Quality Control sticker*

## 1.8 Intended use

### 1.8.1 Purpose of fitting block

The fitting block has been designed and constructed only for the intended use described below.

**NOTE**

**Application range!**

Primary use for water and neutral, non-adhesive liquids. Also suitable for air and neutral non-flammable gases.

- Maximum operating pressure (initial pressure) 16 bar.
- After-pressure infinitely adjustable from 1.5 to 6 bar.
- Smallest possible initial pressure 2.5 bar.
- Minimum pressure gradient (initial/after-pressure) 1 bar.
- Maximum media and ambient temperature 75 °C.
- Assembly position as desired, preferable vertical.

### 1.8.2 Purpose of solenoid valve

**NOTE**

**Application range!**

Solenoid valves for liquid and gaseous media, aggressive or neutral, can be used in various temperature and pressure ranges

Type 6213 is a 2/2 way solenoid valve with straight passage, normally closed, with a permanently coupled membrane system. It switches from 0 bar and is universal in use for liquids. A minimum differential pressure of 0.5 bar is necessary for complete opening.

### 1.8.3 Purpose of flowmeter

**NOTE**

**Application range!**

The flowmeter serves for measuring the volume of transparent liquid and gas flows in closed pipes. Optionally, the flowmeter can also be used for flow monitoring.

**⚠ CAUTION**

**Danger due to improper use!**

Any use beyond the specified purpose of use and/or any other form of use of the flowmeter can lead to dangerous situations.

Therefore:

- Only use the flowmeter as intended.
- Always adhere to the usage directives of the material manufacturer.
- Strictly follow all instructions in this operating manual.

We accept no responsibility for damages caused by improper or unauthorised use.

The operator of the device is solely responsible for any damage arising from improper use.

### 1.8.4 Intended purpose of booster pump

**NOTE**

The PFT pressure booster pump only serves for pumping clean water, recommended for water relatively polluted with impurities and chemically non-aggressive liquids. Media with fibrous and abrasive constituents must be avoided.

Its use is subject to the regulations of the local legislation.

### 1.8.5 Purpose of air compressor

The air compressor has been designed and constructed only for the intended use described in this document.

**NOTE**

The air compressor is only intended for generating compressed air and may only be used with connected work devices. Any other use or use beyond what is specified, such as with freely accessible and/or open hoses and pipelines, is deemed to be not for the intended purpose. Connected implements or components are to be designed for the maximum generated pressure of 5.5 bar.

The air compressor is to be used only in technically perfect condition, as well as for its intended use and while taking into account the safety and hazard information in the operating manual!

In particular faults that can impair safety must be rectified immediately before the compressor is put back into operation.

#### 1.8.5.1 Safety devices of air compressor

**⚠ WARNING**

**Danger to life due to non-functioning safety equipment!**

Safety equipment ensures highest level of safety in operation. Even if safety devices make work processes more complicated, they must never be disabled. Safety is only assured when the safety devices are intact.

Therefore:

- Check that the safety devices and functional and correctly installed before starting work.
- Use safety equipment at all times.
- Do not obstruct access to safety systems such as EMERGENCY STOP pushbuttons, emergency off buttons, pull cords etc.

### 1.8.5.2 General setup of the air compressor

The air compressor corresponds to the national and international safety regulations and can therefore also be used in damp rooms or in the open air. Areas with as clean and dry air as possible should be preferred. Make sure that the air compressor can suck in the air unimpeded. This applies in particular when an installation is intended.

The air compressor must be set up so that no hazardous admixtures, such as solvents, vapours, dusts or other harmful substances, can be sucked in. The device should be positioned only in rooms where the hazard of a potentially explosive atmosphere is not given.

### 1.8.5.3 Hot surfaces on the air compressor

General information

**⚠ WARNING**

**Risk of injury due to hot surface!**

Surface temperatures can reach up to 100 °C during operation of the air compressor.

- Therefore, always ensure that the air compressor does not come into contact with exposed body parts during use as well as for some time after use, depending on the temperature.

### 1.8.5.4 Air compressor pressure cut-off

**⚠ WARNING**

**Danger of death due to missing safety equipment!**

We expressly point out that the compressor must not be operated without a pressure switch-off. External pressure switches in machines have to have the same switching cycles as the factory-set pressure switch.

If no pressure switch is positioned upstream, the compressor can be easily retrofitted.

# 2 Technical data

## 2.1 General information

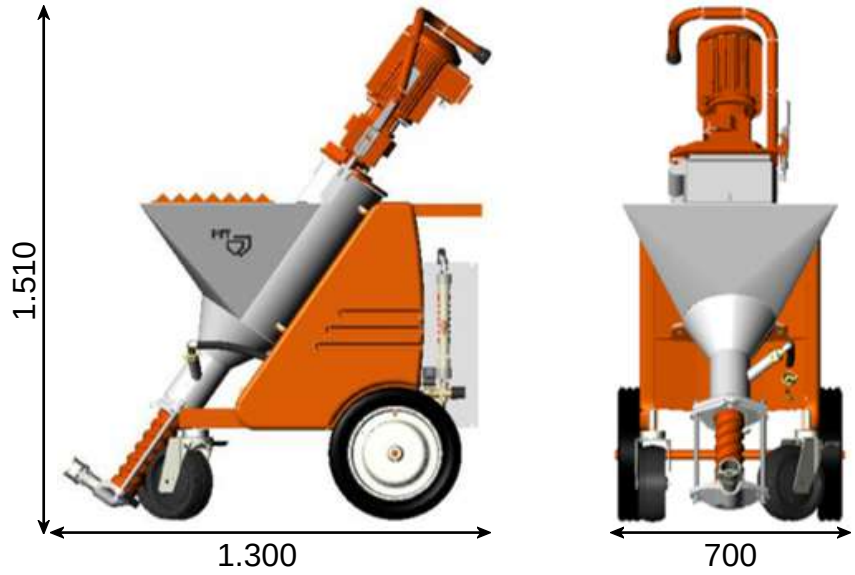



*Figure 3: Dimension sheet in mm*

| Detail | Value | Unit |
|---|---|---|
| Empty weight approx. | 232 | kg |
| Length | 1300 | mm |
| Width | 700 | mm |
| Height | 1510 | mm |

Individual weights

| Detail | Value | Unit |
|---|---|---|
| Pump motor with material hopper and pump | 94 | kg |
| Chassis with compressor | 99 | kg |
| Control box | 24 | kg |

Material hopper dimensions

| Detail | Value | Unit |
|---|---|---|
| Filling height | 950 | mm |
| Material hopper volume | 70 | l |

## 2.2 Power connection

*Figure 4: Water connection*

Water connection

| Detail | Value | Unit |
|---|---|---|
| Operating pressure, minimum | 2.5 | bar |
| Connection | ¾ | inch |

*Figure 5: Motor protection switch*

Electrical details

| | Performance | Setting value | Designation |
|---|---|---|---|
| Pump motor | 6.05 kW | 11 A | Q2 |
| Compressor | 0.5 kW | 3.3 A | Q4 |

## 2.3 Operating conditions

Environment

| Detail | Value | Unit |
|---|---|---|
| Temperature range | 2 - 45 | °C |
| Relative humidity, max. | 80 | % |

Duration

| Detail | Value | Unit |
|---|---|---|
| Max. operating time at a stretch | 8 | hours |

Electrical 230V

| Detail | Value | Unit |
|---|---|---|
| Voltage, alternating current 50 Hz | 230 | V |
| Power consumption, max. | 16 | A |
| Fuse protection, minimum | 1 x 16 | A |
| Pump motor current consumption | 11 | A |
| Power input, max. | 4 | kW |
| Drive pump motor | 6.05 | kW |
| Pump motor speed range | 120 - 400 | Rpm |

## Technical data

Electrical - 400V

| Detail | Value | Unit |
|---|---|---|
| Voltage, three-phase current 50 Hz | 400 | V |
| Power consumption, max. | 32 | A |
| Fuse protection, minimum | 3 x 25 | A |
| Pump motor current consumption | 11 | A |
| Power input, max. | 6 | kW |
| Drive pump motor | 6.05 | kW |
| Pump motor speed range | 400 | Rpm |

## 2.4 Capacity values, pump unit D 4-3

Pump capacity D 4-3

| Detail | Value | Unit |
|---|---|---|
| Pump capacity, approx. | 3.5 - 12 | l/min at 400 rpm |
| Operating pressure, maximum | 30 | bar |
| Maximum grain size | 3 | mm |
| Feed range *, max. with 25 mm Ø | 30 | m |
| Feed range *, max. with 35 mm Ø | 40 | m |

* Reference value depending on conveying height, pump condition and version, mortar quality, composition and consistency

## 2.5 Capacity values, pump unit D 6-2 L

Pump capacity D 6-2 L

| Detail | Value | Unit |
|---|---|---|
| Pump capacity, approx. | 5 - 20 | l/min at 400 rpm |
| Operating pressure, maximum | 20 | bar |
| Maximum grain size | 3 | mm |
| Feed range *, max. with 25 mm Ø | 15 | m |
| Feed range *, max. with 35 mm Ø | 25 | m |

* Reference value depending on conveying height, pump condition and version, mortar quality, composition and consistency

## 2.6 Capacity values, SD 6–3 SLIMLINE pump unit

SD 6–3 SLIMLINE pump output

| Detail | Value | Unit |
|---|---|---|
| Pump capacity, approx. | 20 | l/min at 400 rpm |
| Operating pressure, maximum | 25 | bar |
| Maximum grain size | 2 | mm |
| Feed range *, max. with 25 mm Ø | 20 | m |
| Feed range *, max. with 35 mm Ø | 30 | m |

* Reference value depending on conveying height, pump condition and version, mortar quality, composition and consistency

Compressor output DELTA 2

| Detail | Value | Unit |
|---|---|---|
| Compressor output | 0.180 | Nm³/min |

## 2.7 Sound power level

Guaranteed sound power level $L_{WA}$

- 78 dB(A)

## 2.8 Vibrations

Weighted effective value of acceleration to which the upper body parts are exposed <2.5 m/s²

# 3 Transport, packing and storage

## 3.1 Safety instructions for transport

Improper transport

**NOTE**

**Damage from improper transport!**

Improper transport may cause substantial property damage.

Therefore:

- When unloading the packages on delivery, as well as transport within the company, pay attention and observe the symbols and instruction on the package.
- Use only the specified anchorage points.
- Remove packaging only shortly before the assembly.

Suspended loads

**⚠ WARNING**

**Danger to life from suspended loads!**

When lifting heavy loads, there is danger to life from falling parts or uncontrolled swinging parts.

Therefore:

- Never step under suspended loads.
- Observe the instructions regarding the provided anchorage points.
- Do not attach to projecting machine parts or eyelets of attached components and ensure safe fit of the sling gear.
- Only use approved lifting gear and accessories with a sufficient load-bearing capacity.
- Do not use torn or frayed ropes and belts.
- Do not lay ropes and belts over sharp edges and corners, do not knot or twist.
- When ropes and chains are used in construction operations, the provisions contained in the accident prevention regulation "Load suspension devices in lifting gear operations" (VBG 9a) should be complied with. The following sections contain instructions for scenarios in which ropes and chains are used as lifting means.

## 3.2 Transport inspection

On receipt check the delivery immediately for completeness and transport damage.

In case of externally visible transport damage, proceed as follows:

- Do not accept the delivery or under reserve only.
- Note the extent of damage on the transport documentation or on the delivery note of the carrier.
- Initiate complaint process.

**NOTE**

Report any defect as soon as it is detected. Claims for damages can be asserted only within the valid warranty period.

## 3.3 Packaging

For packaging

The individual packages have to be packed in accordance with the transport conditions to be expected. Only environmentally-friendly materials were used for the packaging.

The packaging should protect the individual components until the assembly from transport damage, corrosion and other damage. Therefore do not destroy the packaging and remove only shortly before the assembly.

Handling packaging materials

If no agreement for the recovery of the packaging has been made, separate materials according to type and size and reuse or recycle.

**NOTE**

**Environmental damage due to incorrect disposal!**

Packaging materials are valuable raw materials and in many cases they can be reused or reconditioned and recycled.

- Dispose of packaging materials in an environmentally-friendly way.
- Observe the applicable local disposal regulations. If required hand over the disposal to a specialist.

# Transport, packing and storage

## 3.4 Closing the motor tilt flange

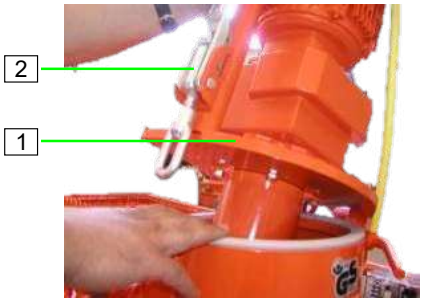



*Figure 6: Closing the motor tilt flange*

**⚠ CAUTION**

**Danger of crushing at the motor tilt flange!**

There is a danger of crushing injuries when closing the motor tilt flange.

- Never reach into the closing range of the motor tilt flange.

1. Close the motor tilt flange (1) and lock with the quick closure (2).

## 3.5 Crane transport


*Figure 7: Attachment points*

Attachment points

Anchor the machine at the anchor points (1) for transport by crane.

Observe the following conditions:

- The crane and lifting equipment have to be designed for the weight of the packages.
- The operator has to be authorised to operate the crane.

Attachment:

1. Anchor the hooks to the crane hooks accordingly.
2. Ensure that the package is straight, possibly observe eccentric centre of gravity.

## 3.6 Transport in individual parts

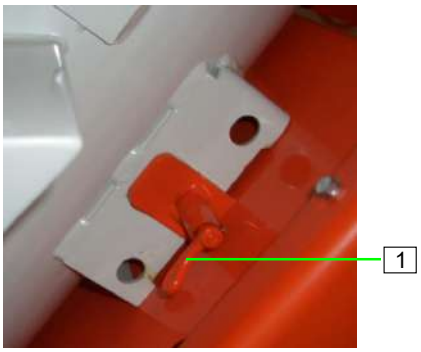



*Figure 8: Opening the rotary bolt*

To make transport easier, disassemble the machine into its individual components. Into the units mixing tube with material hopper and pump, gear motor with tilt flange and chassis.

1. Release cable and hose connections.
2. Open rotary bolt (1).
3. Remove mixing tube with material hopper from the chassis.

## 3.7 Transporting a running machine

**⚠ CAUTION**

**Danger of injury from discharged mortar!**

Injuries to face and eyes can occur.

Therefore:

- Before opening the couplings ensure that there is no more pressure on the hoses (observe display at mortar manometer).

Carry out the following steps before beginning the transport:

1. First unplug the mains cable.
2. Undo all other cable connections, water supply lines and hoses.
3. Remove loose parts during crane transport.
4. Start transport.

# 4 Description

## 4.1 Overview


*Figure 9: Table of the assembly groups*

[1] Motor protection handle
[2] Pump motor
[3] Connection of pump motor
[4] Quick fastener
[5] Slider handle
[6] Plastic side panel
[7] Wheel with steel rim
[8] Water sampling valve
[9] Double stop castor
[10] Compressed air connection for the spray gun
[11] Water inlet
[12] Water supply to mixing tube
[13] Connection for mortar hose
[14] Mortar pressure gauge
[15] Pump unit
[16] Mixing tube with material hopper
[17] Protective grille with sack opener

### 4.1.1 Overview of rear


[1] Air compressor DELTA 2
[2] Water flow meter (water manifold)
[3] Control box

*Figure 10: Overview from behind*

## 4.2 Brief description of RITMO XL FC-230/400V


The new and compact mixing pump RITMO XL with 230V AC or 400V three-phase drive was specially developed for pumping, spraying and applying dry mortar, pasty materials for machine use and much more up to 3 mm grain size.

The pump output can be adjusted by means of a quick pump change depending on the requirements. Pneumatic filling of the RITMO XL is ensured via an optional injection hood in conjunction with an attachment hopper.

The machine consists of portable single components of handy dimensions and light weight that allow fast and convenient transport.

*Figure 11: RITMO XL FC-230/400V*

## 4.3 Fields of application

For pumpable pre-mixed dry mortar such as:

- gypsum plasters
- lime/gypsum plasters
- Cement plasters
- lime plasters
- fango material
- insulation plasters
- filling plasters
- armour and glueing mortar
- floor screed
- Masonry mortar

.... and much more

Flowability / flow characteristics

- *The pump unit D 6–2 L can be used up to 20 bar operating pressure.*
- *The SD 6–3 SLIMLINE pump unit can be used up to 25 bar operating pressure.*
- *The pump unit D 4–3 can be used up to 30 bar operating pressure.*
- *The possible conveying distance depends mainly on the flowability of the material.*
- *If 20, 25 bar or 30 bar operating pressure are exceeded the mortar hose length has to be reduced.*
- *To avoid machine breakdowns and excessive wear on pump motor, mixing shaft and pump, always use original PFT spare parts such as:*
  - *PFT rotors*
  - *PFT stators*
  - *PFT mixing shaft*
  - *PFT mortar hoses*
- *These are compatible with each other and form a constructive unit with the machine.*
- *Non-compliance does not only cause loss of guarantee, but also bad mortar quality is to be expected.*

## 4.4 Description of assemblies

The PFT RITMO XL mixing pump consists of the main components described in the following chapters.

### 4.4.1 Mixing tube with material hopper

- Mixing tube with material hopper, pump unit and pump motor.
- The pump motor with tilt flange can be removed from the mixing tube for transport purposes.

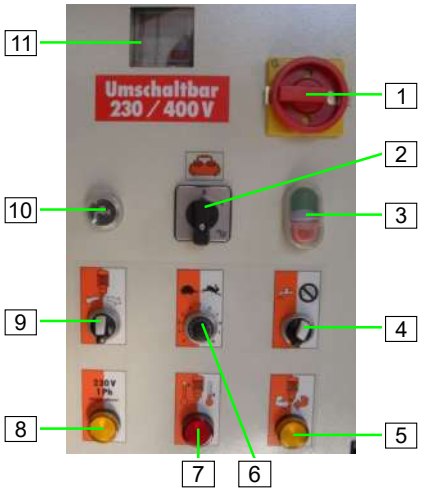
*Figure 12: Material hopper assembly*

### 4.4.2 Chassis with compressor and control box

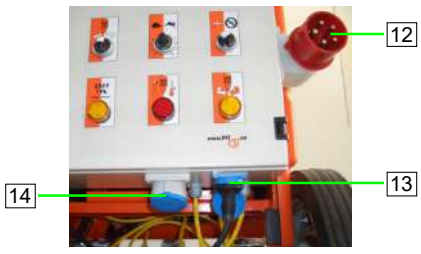
- Chassis with water manifold, control box and compressor.

*Figure 13: Chassis assembly*

### 4.4.3 Control box




[1] Main reversing switch is also emergency-stop switch
[2] Selector switch, compressor "ON / OFF"
[3] Pushbutton for control voltage "ON/ OFF"
[4] Selector switch for operation with water (as mixing pump), without water (only as pump)
[5] Yellow control lamp, change the direction of rotation
[6] Potentiometer for motor speed / material volume
[7] Red control lamp, motor protection switch activated
[8] Yellow control lamp, operation 230V
[9] Pump motor selector switch
[10] Water supply button
[11] Sight glass for frequency converter




[12] Main power connection 400V or with adapter main power connection 230V
[13] Safety socket for air compressor connection
[14] CEE mounted socket for connection of delivery hood

*Figure 14: Assembly unit control box*

# Description

## 4.4.4 Air compressor

- Air compressor DELTA 2 230V with pressure switch-off

*Figure 15: Air compressor*

### 4.4.4.1 Dry running air compressor

Runs completely without oil

Benefits:

High operational life, no downtime due to wear, like e.g. for a membrane compressor, as the wear of the sleeves and piston seals has a linear basis. The use of high-quality components lets the compressor reach high durability. Safety on multiple levels by virtue of a robust aluminium casing and sophisticated filter system. Changing filter insert for motor cooling air, easy access from the outside and easy replacement. The actual intake air for the compressor is taken in via two internal intake filters with silencer function.

## 4.4.5 Mortar pressure gauge

*Figure 16: Mortar pressure gauge*

PFT mortar pressure gauge

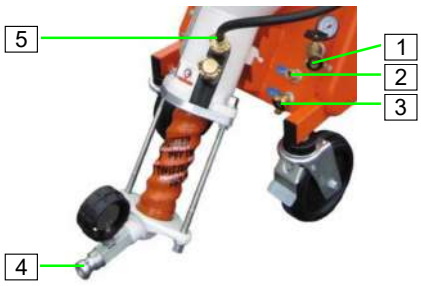
**⚠ CAUTION**

The use of a mortar pressure gauge is recommended for safety-related reasons.

Some advantages of the mortar pressure gauge:

- Exact adjustment of the correct mortar consistency.
- Constant control of the right conveying pressure.
- Early detection of clogging or overload of the pump motor.
- Relieving pressure.
- Durability of pump components
- Is a major contribution to the safety of the operators.

## 4.5 Connections of water and air




[1] Water sampling valve
[2] Connection air to spray gun
[3] Connection water supply from mains
[4] Mortar hose connection on mortar pressure gauge
[5] Water connection from water manifold to mixing tube

*Figure 17: Connections*

## 4.6 Operating modes


*Figure 18: Air compressor selector switch*

### Air compressor selector switch

The air compressor can be operated in two different operating modes:

Switch position "0":

- The air compressor is switched off.

  → For pumping screed

Switch position "1":

- The air compressor is switched on. As soon as the compressor has built up pressure in the pipeline system, it switches off using the pressure switch-off.

  → For spraying plasters with compressed air

*Figure 19: Pump motor selector switch*

### Pump motor selector switch

The pump motor has three operating modes:

Switch position "0":

- The machine is switched off.

Switch position "right" (latching):

- The machine starts up when the power supply is correctly and completely switched on.

Switch position "left" (spring return):

- The pump motor goes into reverse, thereby relieving the pump and locking other functions.

# Description

*Figure 20: Water selector switch*

Water selector switch

The RITMO can be used for two application areas:

Switch position "right" (latching):

- The machine is operated without water.

  → Can be used as a feed pump

Switch position "left" (latching):

- The machine is operated with water.

  → Use as mixing pump

## 4.7 Voltage 230V/400V changing

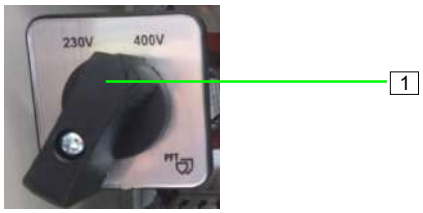



*Figure 21: Change voltage*

Voltage change-over switch (1) 230V, 1 phase or 400V, 3 phase is located in the control cabinet

- Delivery state position of voltage selector to 400V

Change voltage:

1. Turn the main switch to position "0".
2. Open the control cabinet door.
3. Switch the voltage switch (1) to 230V or 400V.
4. Close the control cabinet door.
5. Turn the main reversing switch to position "I".
6. Press the green pushbutton control voltage "ON".

## 4.8 Pressure booster pump

The PFT pressure booster pump is used predominantly as a high-pressure pump for intermediate connection at the mortar mixer when the water pressure is too low. It can also be used as a primer pump for drawing liquids from containers, for emptying small tanks and ponds, for pumping water out of cellars and for irrigation.

The water supply is automatically ensured from a water tank by the PFT pressure booster pump for the constant water supply to the PFT machine engineering.

A flow pressure of at least 2.5 bar with the machine in operation on the construction side is guaranteed by means of suction from the water reservoir.

*Figure 22: Pressure booster pump*

## Configuration example

Item no. of pressure booster pump AV1000/1 230V: 00497368

## Accessories


*Figure 23: Water barrel 120 l*

Item no. 00136619

*Figure 24: Suction strainer with stainless steel filter screen, suction hose 1", 2.5 m*

## 4.9 Accessories

ROTOMIX D pumps cpl. with size 35 coupling

- Item no. 20118000
- Agitator for better decomposition and mixing of the material.
- Direct drive via tang of the rotor.
- Contents approx. 1.2 l.
- More even consistency.
- Exchangeable mixing paddle.
- Agitator can be opened for cleaning.

ROTOQUIRL II cpl. with size 35 coupling

- Item no. 20118400
- Agitator for better decomposition and mixing of the material.
- Direct drive via tang of the rotor.
- Contents approx. 4.2 l.
- More even consistency.
- Exchangeable mixing paddle.
- Agitator can be opened for cleaning.

Extension hopper/hopper attachment - 140 litres for RITMO XL

- Item no. 00201870

PFT injection hood E1

- Item no. 20600213

The PFT injection hood is used for feeding dry material to the mixing pump using the PFT SILOMAT pneumatic conveying system.

Can only be used in conjunction with the extension hopper.

Delivery hood RITMO XL

- Item no. 00201620

Adapter cable of RITMO XL, reversible safety socket/coupling 32A, 5-pin (400 V, 3 Ph)

- Item no. 00226538

Extension cable 5 x 4 mm², RED 5-32 A – 25 m (400 V, 3 Ph)

- Item no. 20423920

Extension cable 5 x 4 mm², RED 5-32 A – 50 m (400 V, 3 Ph)

- Item no. 20423900

You can find further accessories on the internet at www.pft.net or from your PFT construction machinery dealer.

# 5 Operation

## 5.1 Safety

Personal protective equipment

The following protective equipment has to be worn for all operative work:

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

*Further protective equipment that is to be worn during particular jobs will be pointed out separately in the warning instructions of this chapter.*

Basic information

**⚠ WARNING**

**Danger of injury due to incorrect operation!**

Improper operation may lead to serious damage to persons or property.

Therefore:

- Carry out all operating steps according to the instructions in this user manual.
- Prior to starting your work, ensure that all components are complete and undamaged.
- Prior to starting your work, ensure that all covers and protection devices are installed and work as intended.
- Never operate the machine with defective components and protective devices.
- Never disable protective devices during operation.
- Ensure order and cleanliness in the work area! Loose components and tools on top of one another or lying about pose potential accident risks.
- Increased noise level may cause permanent hearing deficiencies. At close range of the machine 78 dB(A) can be exceeded due to operational conditions. Close range is a distance of less than 5 metres to the machine.

### 5.1.1 Safety rules

**⚠ CAUTION**

Observe the regional safety rules for mortar conveyors and mortar guns!

### 5.1.2 Monitoring the machine

**⚠ WARNING**

**Access by unauthorised persons!**

- The machine may only be operated when monitored.

### 5.1.3 Hazardous dusts

*Figure 25: Dust protection*

**⚠ WARNING**

**Danger of damage to health!**

In the long term, inhaled dust can lead to lung damage or have other adverse health effects.

- Use suitable face protection.

**NOTE**

The machine operator or the person working in the dusty area always has to wear a dust protection mask when filling the machine!

The rules of the Committee on Dangerous Substances (AGS) can be found under Technical Rules for Dangerous Substances (TRGS 559).

### 5.1.4 Mortar pressure gauge

*Figure 26: Mortar pressure gauge*

**⚠ WARNING**

**Operating pressure too high!**

Machine parts can open in an uncontrolled manner and injure the operator.

- Do not operate the machine without mortar pressure gauge.
- Only use mortar hoses with a permissible operating pressure of at least 40 bar.
- The burst pressure of the mortar hose must reach at least 2.5 times the value of the operating pressure.

## 5.2 Inspection by machine operator

- Prior to each shift, the machine operator has to examine the effectiveness of the control and safety devices, as well as the proper fitting of the protection devices.
- The safe working condition of construction machinery has to be checked by the machine operator during operation.
- If the safety devices show any defects or if any other defects are detected that compromise a safe operation, the supervisor has to be informed immediately.
- In case of defects that cause harm to persons, the operation of the construction machine has to be stopped to eliminate the defects.

## 5.3 Preparing the machine

Prior to operating the machine carry out the following steps for preparing the machine:

### 5.3.1 Risk of injury due to rotating mixing shaft


**⚠ WARNING**

**Rotating mixing shaft!**

Risk of injury when reaching into the material hopper.

- The protective grille (1) should not be removed during operation or while preparing the machine.
- Never reach into the running machine.

*Figure 27: Grille cover*

### 5.3.2 Positioning machine

1. Lock the lockable castor prior to operating the machine.
2. Put up the machine on a stable, even surface and secure against unwanted movements:

- Do not tilt or roll the machine away.
- Place the machine where it cannot be hit by any falling objects.
- The controls must be freely accessible.
- Maintain a clearance of approx. 1.5 metres around the machine.

*Figure 28: Lockable castor*

## 5.3.3 Connecting the power supply

### 5.3.3.1 Connecting the power supply 230V


*Figure 29: Connecting the adapter cable*

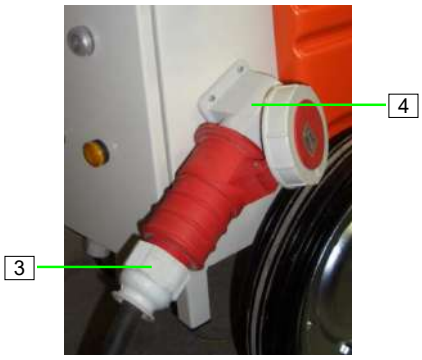



*Figure 30: Connecting the power supply*

*Figure 31: Image showing example of impermissible connection variant*

1. Only connect adapter cable (1) to the 230V AC network (2).
2. Connect the adapter cable with a permissible extension cable (3) *(see accessories)* and connect the machine (4) to the mains power supply.

**⚠ DANGER**

**Danger to life from electric current!**

The electrical connection must be fused correctly:

- Only connect the machine to a power source with permissible 30 mA circuit breaker (RCD) of type B that is sensitive to all currents that are required for the operation of frequency converters.

**NOTE**

To ensure trouble-free operation of the machine, make sure that the adapter cable is connected on the mains side and not on the machine side.

**NOTE**

Check extension cables and adapters for damage and ensure function before starting work or at regular intervals. (DGUV & VDE 701/702)

*Benefits:*

- *The motor speed can be controlled via the potentiometer.*

*Disadvantage:*

- *As the machine is controlled via the frequency converter, the pump motor no longer reaches its full capacity (maximum 4 kW).*

**⚠ WARNING**

**Do not use cable drums!**

If the adapter cable is used, the specified cross-section must be strictly adhered to. Working with cable drums is not permitted; likewise it is not permissible to connect the adapter cable to the main power connection of the machine.

### 5.3.3.2 Connecting the power supply 400V

*Figure 32: Connecting the power supply*

1. Connect machine to three-phase network 400V.

**⚠ DANGER**

**Danger to life from electric current!**

The electrical connection must be fused correctly:

- Only connect the machine to a power source with an approved RCD (residual current device) of type A (30 mA).

*The machine can be switched to 230V, 1 phase and operated, although it is connected to a 400V, 3 phase supply.*

*Benefits:*

- *The motor speed can be controlled via the potentiometer.*

*Disadvantage:*

- *As the machine is controlled via the frequency converter, the pump motor no longer reaches its full capacity (maximum 4 kW).*

### 5.3.3.3 Connecting the individual connectors

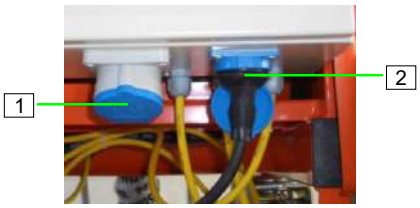



*Figure 33: Power connections*

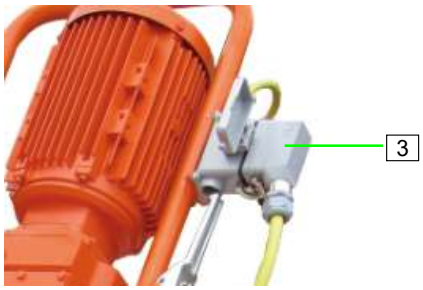



*Figure 34: Connecting the motor connecting cable*

**⚠ WARNING**

**Danger to life from rotating parts!**

Improper operation may lead to serious damage to persons or property.

- The respective drive (motors) must be operated only with the control box of the machine.

1. Connect the power supply for the delivery hood (1).
2. Connect the power supply for the air compressor (2).
3. Connect motor connecting cable (3) to pump motor.

### 5.3.4 Checking the strainer screen

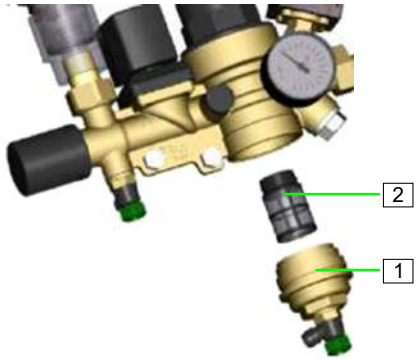



*Figure 35: Checking the strainer screen*

1. Unscrew the brass screen cup (1) with outlet tap from the pressure reducer.
2. Check whether the strainer screen (2) in the pressure reducer is clean.

   Screen for pressure reducer:

   - Item no. 20156000
3. Screw on brass screen cup (1) again.
4. Close all water outlet taps.

### 5.3.5 Connecting the water supply


*Figure 36: Connecting the water*

1. Check whether the water inlet screen in the water inlet (1) is clean.
2. Clean and vent the water hose from the water supply.
3. Connect the water hose to the water inlet (1).
4. Remove the water hose (2) from the mixing tube.
5. Open the water tap of the water supply line.

**NOTE**

Use only clean water free of solids. The minimum pressure is 2.5 bar when the machine is running.

- Observe the Drinking Water Protection Ordinance in Part 1

**NOTE**

Never let the pump run dry as this reduces the service life of the pump.

## Operation

### 5.3.5.1 Connection of water from water tank


*Figure 37: Pressure booster pump*

*Figure 38: Suction strainer complete with filter screen*

- Item no. of pressure booster pump AV1000/1 (1): 00493686
- The connected pressure booster pump ensures the required water pressure of at least 2.5 bar.

**NOTE**

When working with water from the barrel, the inlet strainer must be fitted with a filter screen (item no. 00136619)

(Bleed the booster pump)

**NOTE**

The booster pump must not run dry to avoid any damage!

## 5.3.6 Switching on the machine

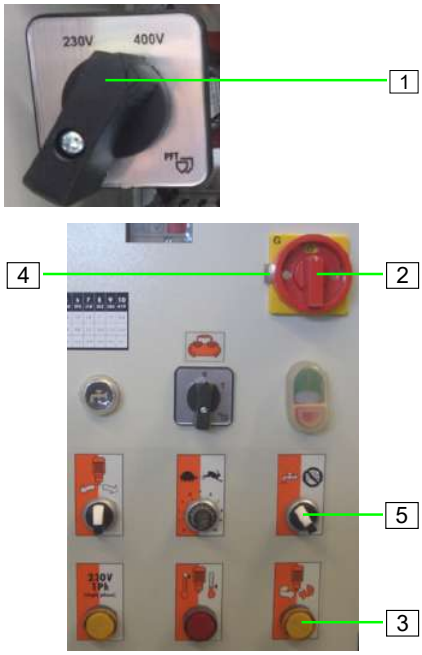



*Figure 39: Switching on the machine*

1. Select voltage 230V (alternating current) or 400V (three-phase current) (1).

   Voltage 230V:

   - The speed of the pump motor can be changed via the potentiometer.

   Voltage 400V:

   - The speed of the pump motor cannot be changed (fixed speed).
2. Turn the main reversing switch (2) to position "I".
3. If the yellow control lamp (3) "Change direction of rotation" lights up, the direction of rotation must be changed on the main reversing switch.
4. Turn the main reversing switch (2) to position "0".
5. Push the metal bracket (4) in the opposite direction.
6. Turn the main reversing switch (2) to position "I".
7. Turn the water selector switch (5) to the left to the "with water" position.

**NOTE**

The machine only starts up if the yellow control lamp (3) does not light up.

### 5.3.6.1 Setting the water quantity

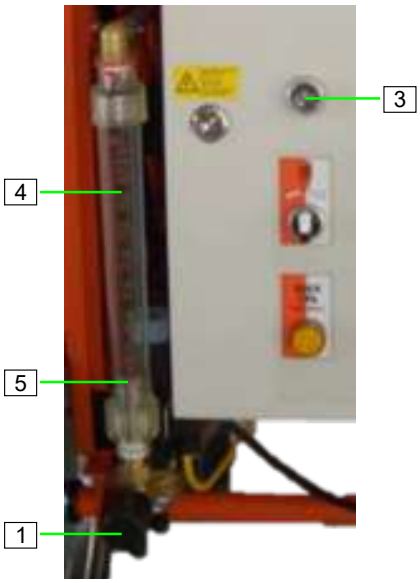



*Figure 40: Setting the water quantity*

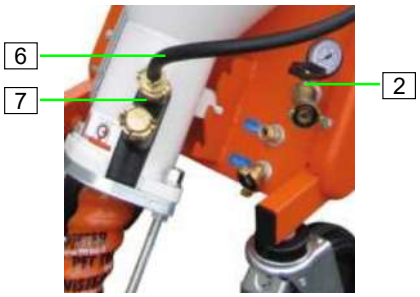



*Figure 41: Water sampling valve*

1. Close needle valve (1) completely.
2. Open water sampling valve (2) until the water emerges without bubbles, then close again.
3. Press the water supply button (3) to adjust the water quantity.
4. Press and hold the water supply button (3) until no more air bubbles can be seen in the water flowmeter (4).
5. Adjust the expected water quantity at the needle valve (1), which can be seen at the cone (5) in the sight glass of the water flowmeter (4).

**NOTE**

Observe the specifications of the material manufacturer when setting the water factor.

*Every interruption to the spraying process causes a slight irregularity in the consistency of the material. This irregularity normalises by itself as soon as the machine has been working for a short while.*

*Therefore it is important not to change the water quantity for each irregularity. Wait until the consistency of the material has set again.*

6. Connect water hose (6) to the water inlet (7) of the rubber mixing zone.

### 5.3.6.2 Watering the mixing zone

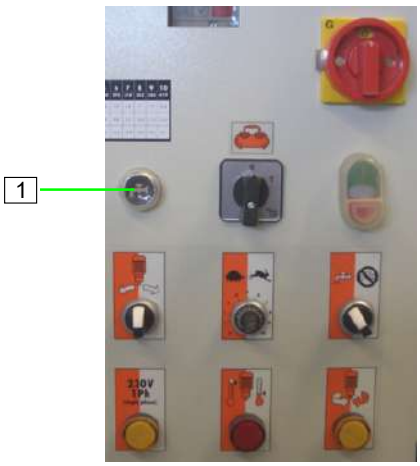



*Figure 42: Watering the mixing zone*

**NOTE**

The pump must generally be flushed with water. Flushing with water makes it easier for the pump to start up.

1. Keep the water flow button (1) pressed for approx. 2 seconds until the head of the rotor is covered with water.

## 5.3.7 Mortar hoses

### 5.3.7.1 Preparing the mortar hoses

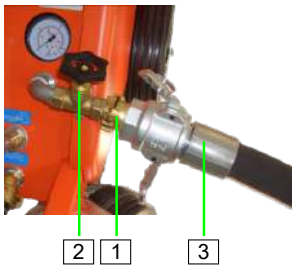



*Figure 43: Preparing the mortar hose*

1. Connect the cleaner coupling (1) at the water extraction valve (2).
2. Connect the mortar hose (3) to the cleaner coupling (2).
3. Open the water sampling valve (2) and water the mortar hose (3).
4. Remove mortar hose and cleaner coupling again and disconnect from each other.
5. Remove all the water from the mortar hose.
6. Pre-lubricate the mortar hose with about 2 litres of wallpaper paste.
7. The wallpaper paste is mixed through the mortar hose with the first mixing.

**⚠ WARNING**

The mix could burst out under pressure and result in serious injuries, especially injuries to the eyes.

Hoses that tear off can lash wildly and injure those standing nearby!

- Never loosen the hose couplings as long as there is pressure on the mortar hoses (check mortar pressure gauge)!

### 5.3.7.2 Connecting the mortar hose

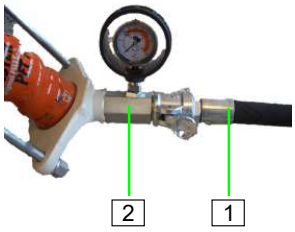


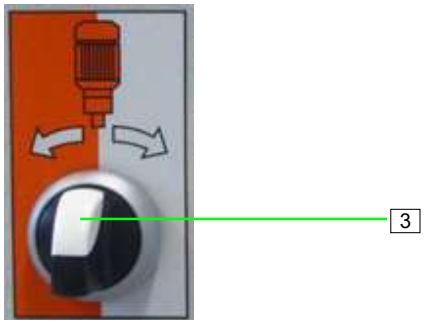

*Figure 44: Connecting the mortar hose*

1. Connect the mortar hose (1) to the mortar pressure gauge (2).

**NOTE**

Ensure clean and correct connection and tightness of the couplings! Dirty couplings and rubber seals are not watertight, and water might leak under pressure inevitably leading to blockages.

2. Lay mortar hoses with a radius large enough so that the hoses do not kink.
3. Carefully secure risers so that they do not tear away from their own weight.

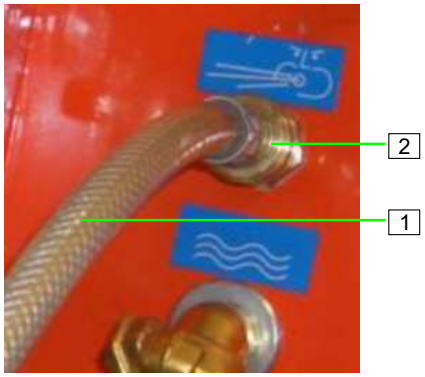



4. Turn the pump motor selector switch (3) to "right" position.
5. Allow the machine to run until all the wallpaper paste has emerged from the end of the mortar hose.
6. Collect the wallpaper paste in suitable container and dispose of as per regulations.
7. Turn the pump motor selector switch (3) to the "0" position.

*Figure 45: Switching on*

## 5.3.8 Compressed air supply

### 5.3.8.1 Connecting the air hose



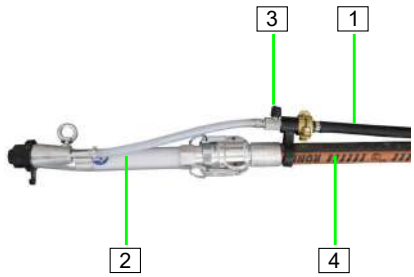

1. Connect compressed air hose (1) at the air manifold (2).

**⚠ WARNING**

- Never undo hose couplings while the compressed air hose is pressurised.

*Figure 46: Connecting the air hose*

### 5.3.8.2 Connecting the spray gun




1. Connect compressed air hose (1) to the spray gun (2).
2. Make sure that the air tap (3) on the spray gun is closed.
3. Connect spray gun (2) to the mortar hose (4).

*Figure 47: Spray gun*

### 5.3.8.3 Switching on the air compressor

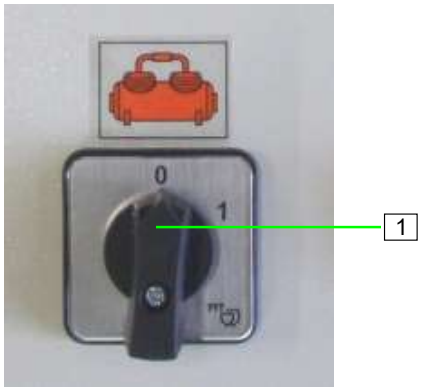



*Figure 48: Switching on the air compressor*

1. Turn the air compressor selector switch (1) to the "1" position.

*It is also possible to operate the machine without compressed air, e.g. for pumping screed. To do this, switch off the compressor at the selector switch and operate the machine without the sprayer.*

*Connect the remote control cable and use it to switch the machine on/off.*

### 5.3.9 Feeding dry material to the machine


*Figure 49: Bagged goods*

*Figure 50: Delivery hood*

Loading with bagged goods

Depending on the equipment, the machine can be fed with bagged goods, with the delivery hood or the injection hood.

**⚠ CAUTION**

**Danger of injury at the sack opener!**

The sharp edges of the sack opener pose a risk of injury.

- Wear safety gloves.

*For initial filling with bagged material slowly pour half of the first bag into the material hopper!*

Feeding with delivery hood

- Item no. 00201620

**⚠ WARNING**

- Do not open the delivery hood during the operation of the machine.
- Before opening, turn off the master switch/main reversing switch and interrupt the power supply.

**NOTE**

First feed material to the mixing pump RITMO XL. Pull the dummy connector or switch off the machine using pressure control air. Start your work only when the level sensor indicates full.

# Operation

*Figure 51: Injection hood*

Feeding with injection hood

- Item no. 20600213
- Mount the injection hood on the adapter fastening for injection hood RITMO XL item no. 00201619.
- Ensure a tight connection.

**⚠ WARNING**

- Do not open the machine during pneumatic conveying.
- Before opening, turn off the master switch/main reversing switch and interrupt the power supply.

## 5.3.10 Booster pump (accessories)

Electrical system

**⚠ WARNING**

**Danger due to electrical voltage!**

Connect the pump only to plug sockets with PE contact. For increased safety we recommend an RCD with a GFCI switch with a rated residual current of 30 mA for the circuit to which the pump will be connected. This applies in particular for installation close to water tanks, ponds, etc.

Line connection

**NOTE**

Ensure that the suction line or intake line is connected at the marked position.

If the pump is operated in suction mode, ensure that the suction line is kept as short as possible.

### 5.3.10.1 Initial start-up booster pump


*Figure 52: Filling the pump*

Fill the PFT pressure booster pump with water prior to initial start-up to let the air escape from the pump housing.

- Fill water through the water inlet (1).
- Check the strainer at the water inlet (1).

Do not fill too quickly so that the air has time to completely escape from the housing.

It is best if the suction flange is also filled at that time.

### 5.3.10.2 Putting the pressure booster pump into operation

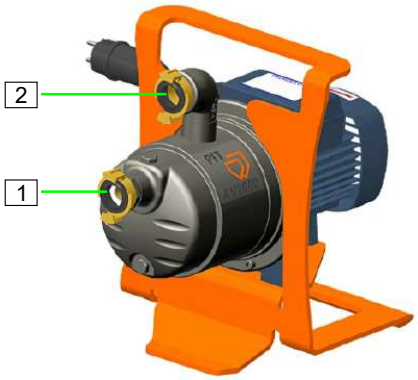



*Figure 53: Connecting the pump*

The following instructions have to be observed before operating the pump.

The pump has to be installed in a horizontal position.

Before start-up both the suction line has to be connected to position 1 and the pressure line to position 2.

It is important that the lines are of adequate dimensions:

- At least 1" for the suction line
- At least ¾" for the pressure line

Make sure that the hose is completely airtight and immersed in the liquid to be pumped, to avoid air being sucked in.


*Figure 54: Suction strainer with filter screen item no. 00136619*

The end of the suction line (3) has to be equipped with a suction strainer with filter screen and built-in non-return valve.

We recommend an additional filter for fine particles in the suction line.

*The flow rate of the pump decreases with increasing length of the suction line. Connect the booster pump as close as possible to the water sampling point (pressure is better than suction).*

If all these points have been observed the pump can be switched on. Depending on the length of the suction line, the suction time can be up to a few seconds.

If the pump is still not delivering after a short time, this may have one of the following causes:

- There is still air in the pump and this has to be completely vented again.
- The suction line has a leak and the pump draws air.
- The suction-side screen is clogged.
- There is a kink in the suction hose.
- The maximum suction head is exceeded.

**NOTE**

The booster pump must not run dry to avoid any damage!

## 5.4 Shutdown in case of emergency

Shutdown in case of emergency

In dangerous situations, machine movements have to be stopped as quickly as possible, and the power supply has to be disconnected.

In case of danger proceed as follows:

1. Switch off the main reversing switch immediately.
2. Secure the main switch against reactivation.
3. Inform responsible person at the operational site.
4. If necessary call for medical assistance and fire brigade.
5. Recover persons from the danger zone, initiate First Aid measures.
6. Keep access routes free for emergency vehicles.
7. If the severity of the emergency permits, inform the competent authorities.
8. Assign specialised personnel with the troubleshooting.

After the rescue operations

**⚠ WARNING**

**Danger to life from premature reactivation!**

On reactivation there is danger to life for all persons in the danger zone.

- Ensure that the danger zone is clear before switching the machine back on.
- Check the system before reactivation and ensure that all safety equipment is installed and functional.

9. Check the system before reactivation and ensure that all safety equipment is installed and functional.

## 5.5 Putting the machine into operation

### 5.5.1 Checking the mortar consistency

*Figure 55: Consistency inspection tube*

1. Connect consistency inspection tube to the mortar pressure gauge.
2. Place a bucket or tray below the consistency inspection tube.

Mortar consistency inspection tube 25M

- Item no. 20104301

## 5.5.2 Feeding material to the machine

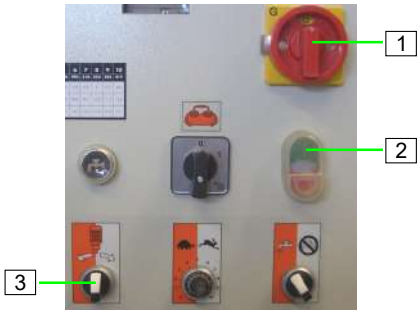



*Figure 56: Switching on the machine*

1. Turn the main reversing switch (1) to position "I".
2. Press the green pushbutton (2) control voltage "ON".
3. Empty the bagged material into the material hopper.

*For initial filling with bagged material slowly pour half of the first bag into the material hopper!*

4. Turn the pump motor selector switch (3) to "right" position.

✓ The machine starts.


*Figure 57: Checking the consistency*

5. Check mortar consistency at consistency inspection tube (4).
6. Turn the pump motor selector switch (3) to the "0" position.

✓ The machine stops.

7. Remove consistency inspection tube (4) and clean.

## 5.6 Remote control


*Figure 58: Remote control*

Working with the remote control

1. Remove dummy plug (1) from control box.
2. Connect remote control.
3. The RITMO can be switched on or off via the remote control.

## 5.7 Applying mortar

**⚠ WARNING**

**Danger of injury from discharged mortar!**

Discharged mortar may lead to injuries to eyes and face.

- Never look into the spray gun.
- Always wear protective goggles.
- Always position yourself in such a way that you are not hit by the mortar being discharged.

*The possible conveying distance depends mainly on the flowability of the mortar. Heavy, sharp-edged mortar has poor flow characteristics. Runny materials have good flow characteristics.*

*If 30, 25 or 20 bar operating pressure is exceeded, thicker mortar hoses have to be used.*

### 5.7.1 Opening the air tap on the spray gun

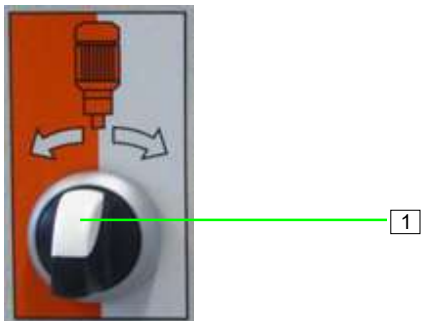



*Figure 59: Switching on*

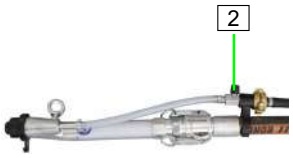



*Figure 60: Opening the air tap*

1. Turn the pump motor selector switch (1) to "right" position.
2. Point the spray gun toward the wall to be plastered.
3. Ensure that nobody is in the discharge area of the mortar.
4. Open the air tap (2) on the spray gun.
5. The machine will start-up automatically via the pressure switch-off and the mortar emerges.

*The correct mortar consistency is reached, if the material mixes on the surface to be sprayed (we recommend application on wall surfaces from top to bottom). Uniform mixing and spraying cannot be ensured if the amount of water is insufficient. This can clog the hoses and the pumping components are then subjected to greater wear.*

## 5.8 Interruption of work

**NOTE**

Always observe the setting time of the material to be processed:

Clean the system and mortar hoses depending on the setting time of the material and the length of the interruption (pay attention to outside temperature).

The guidelines of the material manufacturers have to be observed regarding breaks.


*Figure 61: Closing the air tap*

1. Close the air tap (1) if you interrupt your work for a short while.

✓ The machine stops.

By opening the air tap (1), the machine will start running again.

### 5.8.1 In case of longer interruption of work / break

**NOTE**

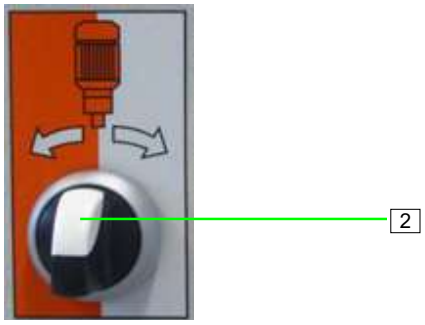
Always observe the setting time of the material to be processed:

Clean the system and mortar hoses depending on the setting time of the material and the length of the interruption (pay attention to outside temperature).

The guidelines of the material manufacturers have to be observed regarding breaks.


*Figure 62: Closing the air tap*

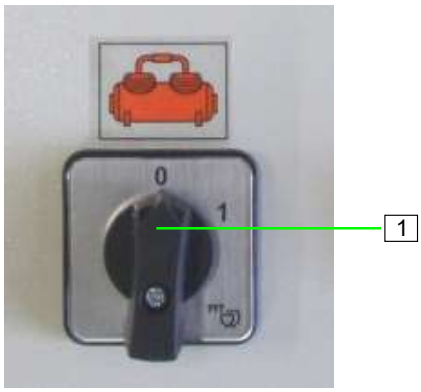
1. Close the air tap (1) if the work is interrupted for an extended period of time.




2. Turn the pump motor selector switch (2) to the "0" position.

*Figure 63: Switching off the machine*

## 5.9 Switching off the air compressor




1. Turn the air compressor selector switch (1) to the "0" position.
2. Open air tap on the spray gun so that the residual pressure can escape.

**⚠ WARNING**

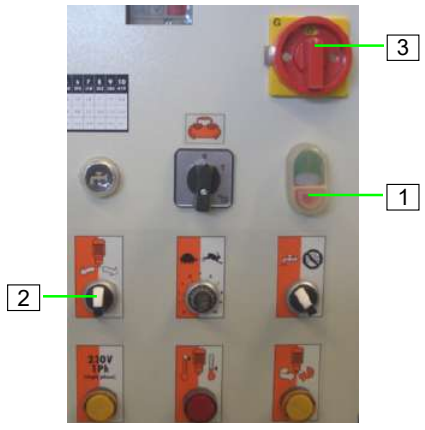
**Danger of injury from discharged mortar!**

Discharged mortar may lead to injuries to eyes and face.

- Beware of residual pressure.

*Figure 64: Switching off the air compressor*

## 5.10 Switching off the machine




1. Switch off the machine by pressing the red pushbutton (1) control voltage "OFF".
2. Turn the pump motor selector switch (2) to the "0" position.
3. Turn the main reversing switch (3) to position "0".

*Figure 65: Switching off the machine*

## 5.11 Action in case of power failure

*Figure 66: Turn the main reversing switch to the "0" position*

Turn the main reversing switch to the "0" position

1. Close the air tap on spray gun.
2. Turn the main reversing switch to position "0".
3. Switch off air compressor.
4. Have the power supply connection checked by an expert.

### 5.11.1 Discharging mortar pressure

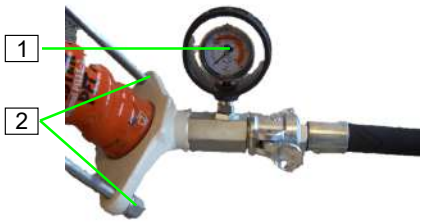



*Figure 67: Check and relieve the mortar pressure*

**⚠ WARNING**

**Overpressure on the machine!**

When opening machine parts they can open in an uncontrolled manner and injure the operator.

- Only open the mortar hoses if the mortar pressure gauge (1) indicates the pressure has fallen to "0 bar".

**⚠ WARNING**

**Danger of injury from discharged mortar!**

Discharged mortar may lead to injuries to eyes and face.

- Never look into the spray gun.
- Always wear protective goggles.
- Always position yourself in such a way that you are not hit by the mortar being discharged.

1. Open air tap on the spray gun.
2. Check the mortar pressure gauge (1) if the mortar pressure has fallen to "0 bar". If necessary, discharge any mortar pressure by unscrewing the nuts (2) slightly. When doing so, cover the work area with tear-proof film.
3. Tighten nuts (2) again.

## 5.11.2 Switching on the machine again after a power failure

**NOTE**

The machine is equipped with a restart interlock. In case of a power failure, this must be started as follows.

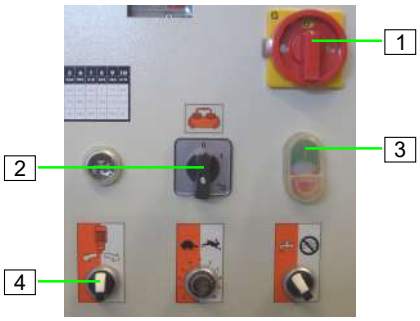



*Figure 68: Switching on the machine after a power failure*

1. Close the air tap on spray gun.
2. Turn the main reversing switch (1) to position "I".
3. Turn the air compressor selector switch (2) to the "1" position.
4. Press the green pushbutton (3) control voltage "ON".
5. Turn the pump motor selector switch (4) to "right" position.
6. The machine starts again as soon as the air tap on the spray gun is also re-opened.

**NOTE**

In case of a longer power cut, the machine and the mortar hoses have to be cleaned immediately.

## 5.12 Measures in case of risk of frost

**⚠ CAUTION**

**Damage by frost!**

Water that expands on freezing inside the component can cause serious damage.

Therefore:

- Only install dry parts.

Carry out the following steps when the pump is not operating and there is a danger of frost.


*Figure 69: Disconnect water supply*

1. Close external water supply.
2. Disconnect the water hose (1) from the water inlet.
3. Disconnect the water hose (2) from the mixing tube.
4. Open the water sampling valve (3).


*Figure 70: Removing the mixing shaft*

5. Take mixing shaft (4) out of the mixing tube.

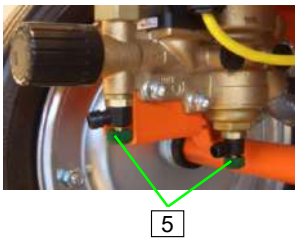



*Figure 71: Opening the outlet taps*

6. Open outlet taps (5) on the fitting block.
7. Allow water to drain off and close outlet taps again.

**NOTE**

Make sure that the water fully flows out of the water manifold.

## 5.12.1 Blowing the water manifold dry

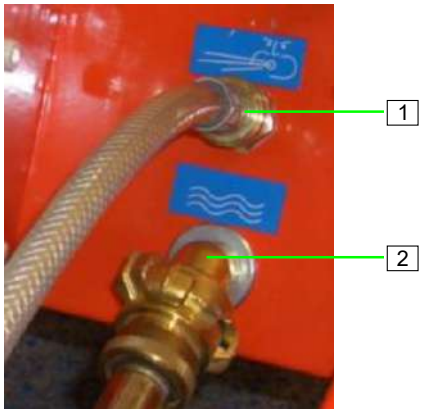



*Figure 72: Connecting the air hose*

1. Connect air hose with Geka coupling and EWO coupling to the compressed air flange (1) and to the water inlet (2).


*Figure 73: Blowing the water manifold dry*

2. Turn the main reversing switch (3) to position "I".
3. Press the green pushbutton (4) control voltage "ON".
4. Turn the air compressor selector switch (5) to the "1" position.
5. Press and hold the water supply button (6) for approx. 10 seconds.
6. The water is now blown out of the manifold with compressed air.
7. Open all outlet taps and blow out with compressed air again.
8. Turn the air compressor selector switch (5) to the "0" position.
9. Turn the main reversing switch (3) to position "0".

**NOTE**

Make sure that the water fully flows out of the water manifold.

## 5.13 Ending work / cleaning the machine

### 5.13.1 Cleaning

- Clean the machine daily at the end of work and in case of extended breaks.

**NOTE**

**Water can enter sensitive machine parts!**

- Before cleaning the machine cover all openings in which no water must enter for safety and functional reasons (e.g.: electric motors and control cabinets).
- Remover the covers completely after cleaning.

### 5.13.2 Secure against restarting

**⚠ WARNING**

**Danger to life from unauthorised restarting!**

When working with the machine there is the risk that the energy supply is switched on without authorisation. This poses a danger to life for the persons in danger area.

- Before starting work, switch off all electrical power supplies and secure them against being switched back on again.
- If the protective covers are removed for cleaning purposes, it is essential that they be properly reattached when work is finished.

## 5.13.3 Disconnecting and cleaning the mortar hose

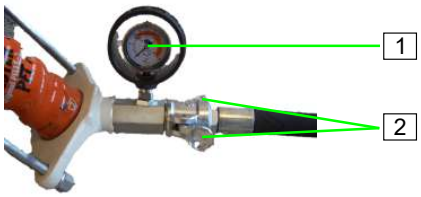



*Figure 74: Disconnecting the water hose*

Disconnecting the water hose

1. Check the mortar pressure gauge (1) to determine whether the mortar pressure has fallen to "0 bar".

**⚠ WARNING**

**Overpressure on the machine!**

When opening machine parts they can open in an uncontrolled manner and injure the operator.

- Only open the machine if the pressure has fallen to 0 bar.

2. Loosen the cam lever (2) and decouple the mortar hose from the mortar pressure gauge.

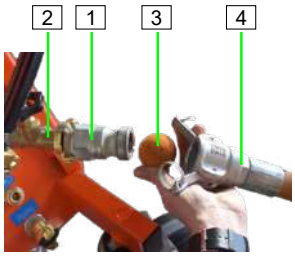



*Figure 75: Cleaning the mortar hose*

Cleaning the mortar hose

**NOTE**

The mortar hoses and spray gun must be cleaned immediately at the end of work.

1. Connect the cleaner coupling (1) at the water extraction valve (2).
2. Press the water saturated sponge ball (3) into the mortar hose (4).
3. Connect mortar hose (4) with the sponge ball to the cleaner coupling (1).


*Figure 76: Cleaning the spray gun*

4. Remove fine plaster nozzle (5) from the spray gun.
5. Undo eye bolt (6) and pull air nozzle tube (7) out of the spray head.
6. Open the water extraction valve until the sponge ball exits the spray gun.
7. Repeat this procedure several times in case of heavy soiling.
8. For different hose diameters, the mortar hoses should be cleaned separately with the appropriate sponge balls.
9. Hose down spray gun with water jet.
10. Knock free air nozzle tube (7) with mandrel.
11. Switch on compressor and blow air nozzle tube free.
12. Reassemble spray gun.

## 5.13.4 Connecting the water hose

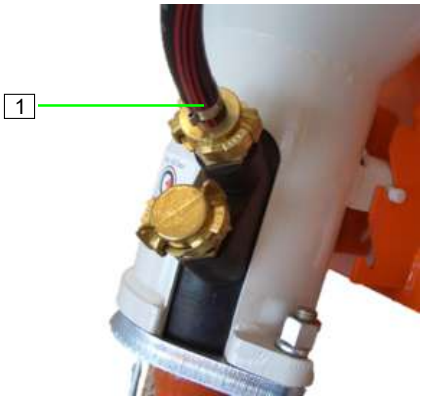



*Figure 77: Connecting the water hose*

1. Connect the water hose (1) to the mixing tube.

## 5.13.5 Cleaning the mixing tube

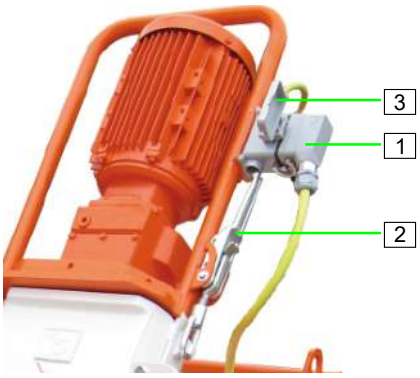



*Figure 78: Opening the motor tilt flange*

**NOTE**

There must not be any more material in the material hopper or mixing tube. The protective grille must not be removed during cleaning work.

1. Pull out 10-pole connector plug (1).
2. Open the quick closure (2) at the motor tilt flange and tilt the motor.

**NOTE**

During cleaning activities and transport of the motor, the socket housing must be closed with a protective cover (3) (protection from moisture).

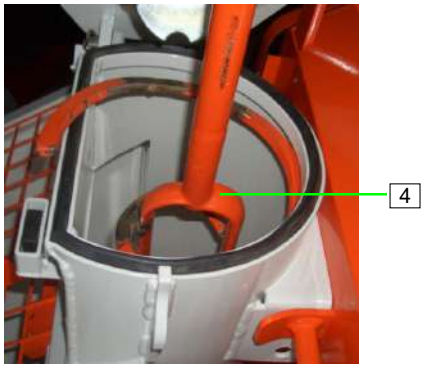



*Figure 79: Removing the mixing shaft*

3. Remove the mixing shaft (4) and clean it.
4. Clean the mixing zone with a spatula.

### 5.13.5.1 Inserting the mixing tube cleaner

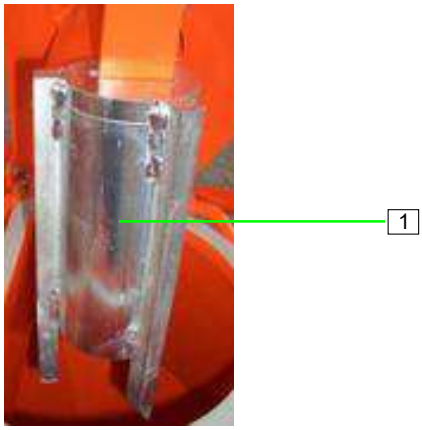



*Figure 80: Inserting the mixing tube cleaner*

1. Remove the mixing tube cleaner (1) and cleaner shaft from the holding device and insert them into the mixing tube.

*Insert the mixing tube cleaner (1) into the mixing tube with the scrapers pointing downward.*


*Figure 81: Cleaner shaft seat*

**NOTE**

When inserting the cleaner shaft make sure that the cleaner shaft (2) engages in the head of the rotor (3) and when closing the motor tilt flange that it correctly engages in the coupling claw (4).

# Operation


*Figure 82: Closing the motor tilt flange*


*Figure 83: Cleaning the mixing tube*

Cleaning the mixing tube

**⚠ CAUTION**

**Danger of crushing at the motor tilt flange!**

There is a danger of crushing injuries when closing the motor tilt flange.

- Never reach into the closing range of the motor tilt flange.

1. Close motor tilt flange with gear motor (1).
2. Close quick fastener (2).
3. Insert 10-pole connector plug.
4. Turn the main reversing switch (3) to position "I".
5. Press the green pushbutton (4) control voltage "ON".
6. Turn the pump motor selector switch (5) to "right" position.

✓ The machine starts.

7. Allow the machine to run for approx. 5 - 10 seconds until the mixing tube is cleaned.
8. Turn the pump motor selector switch (5) to the "0" position.

✓ The machine stops.

9. Press the red pushbutton (6) control voltage "OFF".
10. Pull out 10-pole connector plug.
11. Open the quick closure (2) and tilt the motor.
12. Remove the mixing tube cleaner with cleaner shaft from the mixing tube and place it in the holding device.

## 5.13.5.2 Cleaning the rubber mixing zone

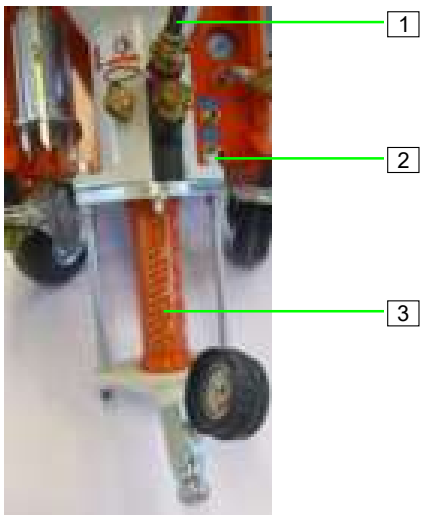



*Figure 84: Removing the pump unit*

1. Remove the water hose (1) from the mixing tube.
2. Loosen the nuts (2) on both sides.
3. Remove pump unit (3) with pressure flange and mortar pressure gauge and clean.

*Figure 85: Cleaning the rubber mixing zone*

4. Pull rubber mixing zone out of the material hopper and clean.
5. Reinsert or mount rubber mixing zone and pump unit after cleaning.
6. Ensure that the parts fit correctly.

**NOTE**

Only store assembled pumps (rotor in stator) for a few days, since longer storage may cause the rotor and stator to become inseparably joined.

**NOTE**

It is essential to spray the pump (rotor in stator) with assembly spray before assembly, as otherwise the break-away torque required for the pump motor is too high.

- Assembly spray for PFT rotor/stator item no. 00588821

### 5.13.5.3 Inserting the mixing shaft

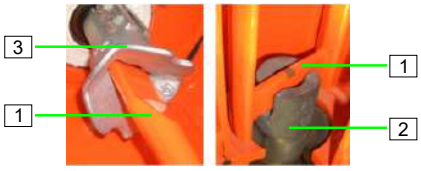



*Figure 86: Inserting the mixing shaft*

1. Insert mixing shaft (1) and ensure correct positioning at the rotor (2).
2. When closing the tilt flange ensure that the mixing shaft (1) engages properly into the drive dog (3).
3. Close the quick closure.

### 5.13.6 Cleaning the material hopper

*The inside of the material hopper can be cleaned with a water hose after having been emptied completely.*

## 5.14 Reaction in the event of faults

Reaction in the event of faults

The following applies as a general rule:

1. In the event of faults presenting immediate danger to persons or property, activate the emergency OFF function immediately.
2. Determine cause of the fault.
3. If the rectification of faults requires works in the danger zone, switch off the system and secure against restarting.
4. Inform the manager on site immediately about the fault.
5. Depending on the type of fault, commission authorised skilled personnel or rectify the fault yourself.

*The following fault table gives information on who is authorised to rectify the fault.*

# Operation

## 5.14.1 Safety

Personnel

- The work for rectification of faults described here can be carried out by the operator, unless marked otherwise.
- Some works must be carried out only by specially trained skilled personnel or exclusively by the manufacturer. Information on this can be found in the description of the individual faults.
- Work on electrical systems must always only be carried out by qualified electricians.

Personal protective equipment

The following protective equipment has to be worn for all maintenance work:

- Protective clothing
- Protective goggles
- Protective gloves
- Safety shoes

## 5.14.2 Faults

The following chapter describes possible causes for faults and the activities carried out for their rectification.

In case faults occur frequently, shorten the maintenance intervals in accordance with the actual load.

Contact your dealer if malfunctions occur that cannot be solved using this manual.

## 5.14.3 Fault displays


*Figure 87: Fault displays*

The following installation indicates faults:

| Pos. | Light signal | Description |
|---|---|---|
| 1 | Red control lamp | Lights up on motor protection switch fault.<br>→ Check the motor protection switch |
| 2 | Yellow control lamp | Lights up if the motor's direction of rotation is wrong.<br>→ Change direction of rotation |

### 5.14.4 Table of faults

| Fault | Possible cause | Troubleshooting | Rectification by |
|---|---|---|---|
| Machine does not start water | Water pressure too low | Check the water supply, clean the strainer screen | Operator/ Service technician |
| | Pressure gauge shows less than 2.2 bar | Connect booster pump | Service technician |
| Machine does not start current | Power supply not in order | Repair power supply | Service technician |
| | Main switch/main reversing switch not switched on | Switch on main switch/main reversing switch | Operator |
| | RCD was triggered | Reset RCD | Service technician |
| | Yellow control lamp, fault direction of rotation lights up | Push the metal bracket at the main switch in the opposite direction | Operator |
| | Motor protection switch triggered | Turn motor protection switch in control box to position 1 | Service technician |
| | Pushbutton for control voltage "ON" is not pressed | Press pushbutton for control voltage "ON" | Operator |
| | Contactor defective | Change contactor | Service technician |
| | Fuse defective | Change fuse | Service technician |
| Machine does not start air | Insufficient drop in pressure in the remote control due to blocked air duct or air nozzle pipe | Clean blocked air duct or air nozzle pipe | Operator |
| | Air safety switch is obstructed | Adjust the air safety switch | Service technician |
| | Air compressor not switched on | Switching on the air compressor | Operator |
| Machine does not start material | Too much thickened material in hopper or mixing section | Empty half of the hopper and start again | Operator |
| | Excessively dry material in pump part | Allow the machine to run backwards, otherwise remove pump and clean it | Operator |
| | Level sensor triggered | Deactivate level sensor or top up material | Operator |
| Water not flowing (flowmeter does not display anything) | Solenoid valve (hole in membrane blocked) | Clean solenoid valve | Service technician |
| | Solenoid coil defective | Change solenoid coil | Service technician |
| | Pressure reducing valve closed | Open pressure reducing valve | Operator |
| | Water inlet at mixing tube blocked | Clean water inlet at mixing tube | Operator |
| | Needle valve closed | Open needle valve | Operator |
| | Cable to solenoid valve defective | Replace cable to solenoid valve | Service technician |

## Operation

| Fault | Possible cause | Troubleshooting | Rectification by |
|---|---|---|---|
| Pump motor will not start | Pump motor defective | Replace pump motor | Service technician |
| | Connection cable defective | Change connection cable | Service technician |
| | Plug or mounted socket defective | Replace plug or mounted socket | Service technician |
| | Motor protection switch defective or triggered | Replace or reset motor protection switch | Service technician |
| Machine stops after a short while | Strainer screen is dirty | Clean or replace filter | Operator |
| | Filter of pressure relieve device contaminated | Clean or replace filter | Operator |
| | Hose connection or water supply line too small | Enlarge hose connection or water supply line | Operator |
| | Water inlet pipe too long or inlet pressure too low | If necessary, connect additional water pressure booster pump. | Service technician |
| | Booster pump not switched on | Switch on booster pump | Operator |
| Machine does not switch off | Air pressure safety switch set incorrectly or defective | Set or replace air pressure safety switch | Service technician |
| | Compressed air hose or gaskets defective | Replace compressed air hose, replace gaskets or check compressor | Service technician |
| | Air tap on spray gun defective | Replacing the air tap | Service technician |
| | Power provided by compressor is too low. | Check compressor | Service technician |
| | Air duct is not connected to the compressor | Connect air supply to compressor | Operator |
| Mortar flow "thick-thin" | Too little water | Increase the water quantity by 10 % for approx. ½ minute and then turn down slowly | Operator |
| | Water safety switch set incorrectly or defective | Set or replace water pressure safety switch | Service technician |
| | Mixing shaft defective; no original PFT mixing shaft | Replace mixing shaft with an original PFT mixing shaft | Operator |
| | Pressure reducer set incorrectly or defective | Adjust or replace pressure reducer | Service technician |
| | Rotor worn or defective | Replace rotor | Service technician |
| | Stator worn or clamped too loosely | Replace stator or re-tighten clamp | Service technician |
| | Clamping bracket defective (oval) | Replace clamping bracket | Service technician |
| | Inner wall of mortar hose defective | Replace mortar hose | Operator |

| Fault | Possible cause | Troubleshooting | Rectification by |
|---|---|---|---|
| | Rotor too deep in pressure flange | Replace pressure flange | Service technician |
| | No original PFT spare parts | Use original PFT spare parts | Service technician |
| No mortar flow (air bubbles) | Poor mixing in mixing tube | Add more water | Operator |
| | Mortar clogs and narrows mixing tube inlet | Add more water or clean/replace mixing shaft | Operator |
| | Mixing shaft defective | Replace mixing shaft | Operator |
| | Material in mixing tube has become wet | Empty mixing shaft, dry and begin again | Operator |
| | Driving dog defective | Replace driving dog | Service technician |
| During operation water rises in the mixing tube | Backpressure in mortar hose higher than pump pressure | Retighten or replace stator | Service technician |
| | Rotor or stator worn | Replace rotor or stator | Service technician |
| | Hose blockage due to mortar being too thick (high pressure due to low water factor) | Remedy hose blockage, increase water factor | Service technician |
| Red control lamp, fault lights up | Overload due to the pump getting blocked with dry material | Allow the machine to run backwards, otherwise remove pump and clean it | Service technician |
| | Overload due to low water volume | Increase water feed on start-up | Operator |
| | Motor protection switch pump motor triggered | Switch the motor protection switch on again | Service technician |
| | Overload due to compacted material in mixing tube | Clean mixing tube<br>Switch the motor protection switch on again | Service technician |

## 5.14.5 Hose blockages

Indications

Blockages can occur in the pressure flange or in the mortar hoses.

Indications are:

- Rapidly increasing pressure head
- Blockage of pump
- Running difficulties or blockage of the pump motor
- Expansion and turning of the mortar hose
- No material leakage at the hose ends

Possible causes:

- Heavily worn mortar hoses
- Badly greased mortar hoses
- Residual water in mortar hose
- Clogging of the pressure flange
- Severe restriction at the couplings
- Kink in the mortar hose
- Leaks at the couplings
- Poorly pumping and separated materials

Earlier damage to the mortar hose

*Should the pressure in the mortar hose exceed 60 bar in the event of a machine failure due to material clogging, replacement of the mortar hose is recommended as there might be damage in the hose that is not externally visible.*

## 5.14.6 Removal of clogging in hoses

**⚠ WARNING**

**Danger from discharged material!**

Never detach hose couplings if the feed pressure has not been fully released! Material to be conveyed can be discharged under pressure and cause injuries particularly to the eyes.

Persons commissioned with the cleaning of clogged hoses have to wear personal protective equipment (protective goggles, gloves) for safety reasons, and must position themselves in such a way that they cannot be hit by discharged material. Other persons have to clear the area.

### 5.14.6.1 Let the pump run backwards


*Figure 88: Reverse operation*

1. Turn the air compressor selector switch (1) to the "0" position.
2. Turn the main reversing switch (2) to position "I".
3. Press the green pushbutton (3) control voltage "ON".
4. Switch selector switch of the pump motor (4) to the "left" position, until the pressure at the mortar pressure gauge has dropped to "0 bar".
5. Turn the main reversing switch (2) to position "0".

## 5.14.6.2 Blockage cannot be cleared

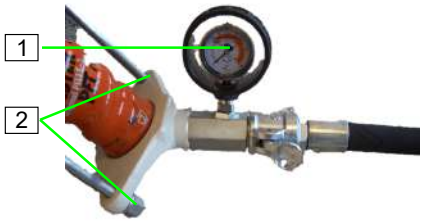



*Figure 89: Check and relieve the mortar pressure*

**⚠ WARNING**

**Overpressure on the machine!**

When opening machine parts they can open in an uncontrolled manner and injure the operator.

- Only open the mortar hoses if the mortar pressure gauge (1) indicates the pressure has fallen to "0 bar".

**⚠ WARNING**

**Danger of injury from discharged mortar!**

Discharged mortar may lead to injuries to eyes and face.

- Never look into the spray gun.
- Always wear protective goggles.
- Always position yourself in such a way that you are not hit by the mortar being discharged.

1. Undo both nuts (2) on the pressure flange slightly to ensure the residual pressure can escape.
2. As soon as the pressure is down to "0 bar", tighten the nuts (2) again.


*Figure 90: Detaching the coupling*

**NOTE**

Clean mortar hoses immediately

3. Cover coupling connections with tear-proof film.
4. Release cam lever (3) and hose connections.
5. Remove blockage by tapping or shaking at the point of the blockage.
6. If necessary, insert a flushing hose into the mortar hose and flush out the mortar.
   - PFT flushing hose item no. 00113856

### 5.14.6.3 Switching on the machine after removing a blockage

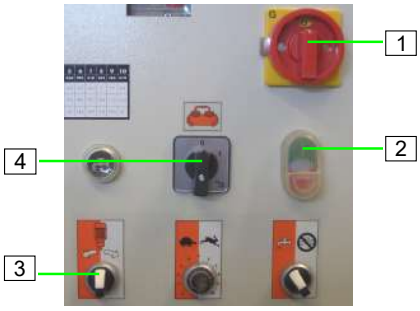



*Figure 91: Switching on the machine again*

1. Turn the main reversing switch (1) to position "I".
2. Press the green pushbutton (2) control voltage "ON".
3. Turn the pump motor selector switch (3) to "right" position.
4. Let the machine run for a short while without mortar hoses.
5. As soon as material flows out of the pressure flange, switch the pump motor selector switch (3) to the "0" position.
6. Apply wallpaper paste to the cleaned mortar hoses and connect to the machine and spray gun.
7. Turn the air compressor selector switch (4) to the "1" position.
8. Turn the pump motor selector switch (3) to "right" position.
9. The machine starts again as soon as the air tap on the spray gun is re-opened.

# 6 Maintenance

## 6.1 Safety

Personnel

- The maintenance works described here can be carried out by the operator, unless marked otherwise.
- Some maintenance work must only be carried out by specially trained technical personnel or exclusively by the manufacturer.
- Work on electrical systems must always only be carried out by qualified electricians.

Basic information

**⚠ WARNING**

**Risk of injury due to improperly carried out maintenance work!**

Improper maintenance can lead to severe injuries or considerable property damage.

- Prior to starting the works ensure that there is enough space to carry out the works.
- Ensure order and safety at the assembly site! Unattached components or tools left lying around or stacked on one another can cause accidents.
- If components have been previously removed, ensure that they are mounted again correctly, reattach all fastening elements and adhere to the specified screw tightening torques.

Electrical system

**⚠ DANGER**

**Danger to life from electric current!**

Contact with live components can lead to death or serious injury. Live electrical components can move uncontrollably and cause serious injury.

- Switch off the energy supply before starting any work and secure against restarting.

### 6.1.1 Remove connection cable

*Figure 92: Remove connection cable*

Electrical system

**⚠ WARNING**

**Danger to life from electric current!**

There is danger to life if you come in contact with live parts. Activated electrical components can carry out uncontrolled movements and cause serious injuries.

Therefore:

- Switch off the energy supply before starting any work and secure against restarting.
- Disconnect the power supply by removing the connection cable.

Secure against restarting

**⚠ WARNING**

**Danger to life from unauthorised restarting!**

When working with the tool, there is the risk that the energy supply is switched on without authorisation. This poses a danger to life for the persons in danger area.

Therefore:

- Switch off all power supplies before starting any work and secure against restarting.

## 6.2 Environmental protection

Environmental protection

Observe the following notes on environmental protection when carrying out maintenance works:

- Remove the discharged, exhausted or surplus grease at all greasing points that are lubricated manually and dispose of in accordance with the local applicable regulations.
- Collect used oil in suitable containers and dispose of it according to the applicable local regulations.

## 6.3 Maintenance plan

The following paragraphs describe the maintenance works required for an optimal and trouble-free operation.

In the event that increased wear is detected during regular checks, the required maintenance intervals have to be shortened according to the actual signs of wear.

Should you have any queries regarding maintenance works and intervals contact the manufacturer, see back page for service address.

*The maintenance is limited to a few checks.*

*Thorough cleaning after use is the most important maintenance.*

| Interval | Maintenance work | To be carried out by |
|---|---|---|
| Daily | Clean/renew the strainer screen in the water inlet. | Operator |
| Monthly | Clean/replace filter of compressor. | Service technician |
| Monthly | Clean/replace the strainer screen in the pressure reducer. | Service technician |

## 6.4 Maintenance work

In the event that increased wear is detected during regular checks, the required maintenance intervals have to be shortened according to the actual signs of wear.

Should you have any queries regarding maintenance works and intervals contact the manufacturer, see back page for service address.

### 6.4.1 Implementation by a service technician

*A service technician is responsible for the assembly and commissioning of machines. In addition, service technicians carry out maintenance and repair work. If work is required on the control box or on other electrical parts, the service technician must have completed vocational training as an electrician.*

## 6.4.2 Air filter compressor

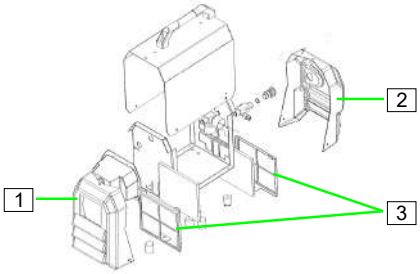



*Figure 93: Cleaning the filter*

Implementation by a service technician

1. Unscrew the covers (1 & 2).
2. Remove the filter frame (3).
3. Blow through the filter frame from the inside to the outside or tap it.
4. Replace the filter in case of heavy contamination.
5. Insert filter frame and screw on covers (1 & 2).

## 6.4.3 Strainer screen in the water inlet

*Figure 94: Strainer screen in the water inlet*

Implementation by operator.

1. Remove the strainer screen from the Geka coupling.
2. Clean the strainer screen.
3. Replace the screen if dirt is severe.
4. Reinsert strainer screen.

   Screen for Geka coupling:
   - Item no. 20152000

## 6.4.4 Strainer screen in pressure reducer

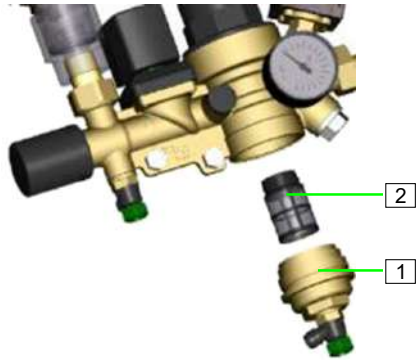


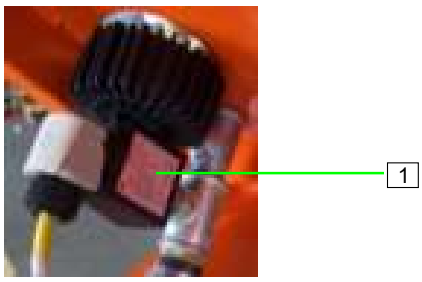

*Figure 95: Strainer screen*

Implementation by a service technician

1. Remove the closure cap (1) from the pressure reducer.
2. Take out the strainer screen (2) and clean (monthly).
3. Replace the strainer screen if dirt is severe.
4. Insert strainer screen and screw on the closure cap.

   Screen for pressure reducer:
   - Item no. 20156000

### 6.4.5 Setting value pressure switch water




| Pressure switch water (1) | Machine switches "ON" | Machine switches "OFF" |
|---|---|---|
| Water | 2.2 bar | 1.9 bar |

*Figure 96: Pressure switch water*

### 6.4.6 Setting value pressure switch air


| Pressure switch air (1) | Machine switches "ON" | Machine switches "OFF" |
|---|---|---|
| Air | 0.9 bar | 1.2 bar |

*Figure 97: Pressure switch air*

### 6.4.7 Setting value pressure switch air compressor

| | Air compressor switches "ON" | Air compressor switches "OFF" |
|---|---|---|
| Compressor | 2.4 bar | 3.2 bar |

*Figure 98: Air compressor pressure cut-off*

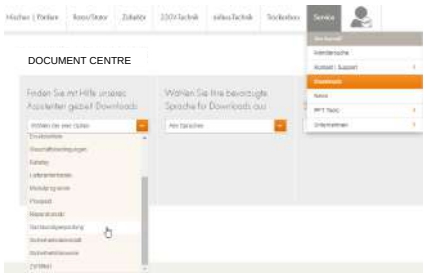
## 6.5 Actions after completed maintenance

After finishing the maintenance works and prior to switching on the machine, the following steps have to be carried out:

1. Check all previously loosened screw connections for secure fit.
2. Check if all previously removed safety systems and covers are properly reinstalled.
3. Ensure that all tools, materials and other equipment used have been removed from the work area.
4. Clean the work area and remove any spilled materials such as liquids, processing material or similar.
5. Ensure that all safety systems of the installation work perfectly.

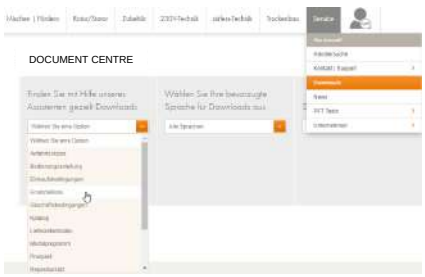
## 6.6 Periodic inspection/expert inspection

- Construction machinery has to be inspected for safe working condition in accordance with the operating conditions and the operational requirements as needed, however at least once a year by an expert.
- Pressure vessels have to undergo the prescribed expert inspections.
- The inspection results have to be documented and kept at least until the next inspection.




- The documents for the expert inspection can be found on the internet at www.pft.net.
- Open the Document Centre under Service → Downloads.
- In this area, select the expert inspection category to access all relevant inspection documents.

## 6.7 Spare parts lists




The spare parts lists for the machine can be found on the Internet at www.pft.net.

- Open the Document Centre under Service → Downloads.
- In this area, select the spare parts list category.
- In addition, select the machine you are looking for.

## 6.7.1 Accessories


Recommended accessories/equipment can be found in the PFT machine and equipment catalogue or under www.pft.net

# 7 Disassembly

After the useful service life has been reached, the device has to be dismantled and disposed of in an environment-friendly manner.

## 7.1 Safety

Personnel

- Disassembly must be carried out by specially trained technical personnel only.
- Work on the electrical system must be carried out by qualified electricians only.

Basic information

**⚠ WARNING**

**Risk of injury in case of improper disassembly!**

Stored residual energies, sharp components, points or edges at and inside the device or on the required tools might cause injuries.

Therefore:

- Prior to starting the works ensure that there is sufficient space.
- Carefully handle components with sharp edges.
- Ensure order and cleanliness at the working place! Loose components and tools on top of one another or lying about pose potential accident risks.
- Dismantle components correctly. Pay attention to partly high dead weight of the components. If required, use lifting equipment.
- Secure components that they do not fall down or topple over.
- In case of doubt, consult the dealer.

Electrical system

**⚠ DANGER**

**Danger to life from electric current!**

Contact with live components can lead to death or serious injury. Activated electrical components can carry out uncontrolled movements and cause serious injuries.

Therefore:

- Prior to beginning the disassembly, switch off the power supply and fully disconnect it.

## 7.2 Disassembly

When decommissioning, clean the device and dismantle it according to the applicable work safety and environmental protection regulations.

Prior to starting the disassembly:

- Switch off device and secure against restarting.
- Disconnect the entire energy supply from the machine and discharge the residual energy.
- Remove operating and auxiliary materials as well as residual processing materials and dispose of them in an environmentally sound manner.

# 8 Disposal

Provided no return or disposal agreements have been made, recycle the disassembled parts:

- Scrap metals.
- Recycle plastic elements.
- Dispose of remaining components, sorted according to the type of material.

**NOTE**

**Environmental damage due to incorrect disposal!**

- Electrical scrap and components, lubricants and other process materials are subject to special guidelines and may only be disposed of by approved waste disposal specialists!

*Local authorities and waste disposal specialists can provide more details on the correct disposal of materials.*

# Disposal

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