



# Operating manual

**ZP 3 M delivery pump**

**Part 2 Overview, operation and service**



Item no. of the operating manual:

00544586



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

**This operating manual applies to the following items:**

ZP 3 M FC-400V, 3 Ph, 50 Hz, 4 kW without accessories	Item no. 00531449
ZP 3 M FC-230V, 1 Ph, 50 Hz, 4 kW without accessories	Item no. 00531450
ZP 3 M pole-changing, 400 V, 3 Ph, 50 Hz, 3,7 kW without accessories	Item no. 00531452
ZP 3 M FC-230V, 1 Ph, 50 Hz, 4 kW with accessories	Item no. 00542526
ZP 3 M FC-400V, 3 Ph, 50 Hz, 4 kW with accessories	Item no. 00542527
ZP 3 M pole-changing, 400 V, 3 Ph, 50 Hz, 3,7 kW with accessories	Item no. 00542528
ZP 3 M FC-400V, 3 Ph, 50 Hz, 4 kW screed without accessories	Item no. 00543560
ZP 3 M FC-400V, 3 Ph, 50 Hz, WILCOWA	Item no. 00550671
ZP 3 M FC-400V, 3 Ph, 50 Hz, 4 kW with vibrating screen and accessories	Item no. 00594140
ZP 3 M, 230 V, 3 Ph, 60 Hz, 4,5 kW RAL1006	Item no. 00617978



## About us

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## General information



### 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.



### Structure of the safety and warning notices

All safety and warning notices consist of:

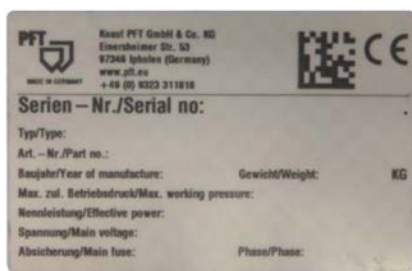
- The danger sign and signal word
- Information on the nature of the hazard
- Information on the source of the hazard
- Information on possible consequences of disregarding the hazard
- Measures to avert the hazard

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



The following details can be found on the name plate:

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

Figure 1: Name plate

## General information



## 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:** ZP 3 M

**Type of equipment:** Delivery pump

**Serial number:**

**Guaranteed sound power level:** 95 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  
 Managing Director

Town/city

Name and signature

Details of signatory





## 1.7 Quality Control sticker



Figure 2: 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

## 1.8 Intended use

### 1.8.1 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.

## 1.8.2 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 are 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.

## 1.8.3 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.

## 1.8.4 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.



## 2 Technical data

### 2.1 General information

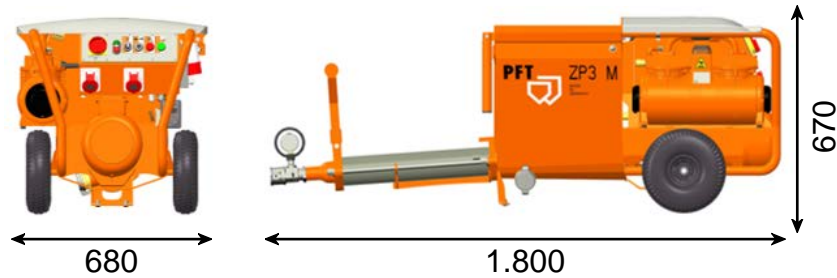


Figure 3: Dimension sheet in mm

Detail	Value	Unit
Empty weight approx.	155 - 253	kg
Length	1,800	mm
Width	680	mm
Height	670	mm

#### Material hopper dimensions

Detail	Value	Unit
Filling height	640	mm
Material hopper volume	85	l

### 2.2 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

**Technical data****2.2.1 Operating conditions FC-230V 50Hz**

Electrics FC-230V 50Hz

Detail	Value	Unit
Voltage, alternating current 50 Hz	230	V
Power consumption, max.	16	A
Fuse protection, minimum	16	A
Pump motor current consumption	13.9	A
Pump motor speed range	40 - 190	Rpm
Power input, max.	5	kW
Drive pump motor	4	kW
Air compressor *	0.9	kW
Vibrating unit *	0.045	kW

\* Optional accessories

**2.2.2 Operating conditions 230V 60Hz**

Electrics 230V 60Hz

Detail	Value	Unit
Voltage, alternating current 60 Hz	230	V
Power consumption, max.	15.5	A
Fuse protection, minimum	16	A
Pump motor current consumption	15.5	A
Pump motor speed range	144	Rpm
Power input, max.	4.5	kW
Drive pump motor	4.5	kW



### 2.2.3 Operating conditions FC-400V

#### Electrics FC-400V

Detail	Value	Unit
Voltage, three-phase current 50 Hz	400	V
Power consumption, max.	16	A
Fuse protection, minimum	16	A
Pump motor current consumption	8.5	A
Pump motor speed range	40 - 190	Rpm
Power input, max.	5	kW
Drive pump motor	4	kW
Air compressor *	0.9	kW
Vibrating unit *	0.045	kW

\* Optional accessories

### 2.2.4 Operating conditions 400V pole-changing

#### Electrics 400V pole-changing

Detail	Value	Unit
Voltage, three-phase current 50 Hz	400	V
Power consumption, max.	16	A
Fuse protection, minimum	16	A
Pump motor current consumption	7.9/9.6	A
Pump motor speed range	106/215	Rpm
Drive pump motor	3.7/4.4	kW
Air compressor *	0.9	kW
Vibrating unit *	0.045	kW

\* Optional accessories

## 2.3 Performance values pump unit 2L6 RENDER STAR

#### Pump performance 2L6 RENDER STAR

Detail	Value	Unit
Delivery rate infinitely adjustable	8 - 33	l/min
Operating pressure, maximum	20	bar
Maximum grain size	6	mm
Delivery distance *, maximum with 35 mm Ø	60	m

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

**Technical data**Compressor output DELTA 2

Detail	Value	Unit
Compressor output	0.180	Nm <sup>3</sup> /min

Compressor output for COMP  
M-250

Detail	Value	Unit
Compressor output	0.250	Nm <sup>3</sup> /min

**2.4 EMC test**

The machine has been EMC tested and complies with the strict requirements of EMC Directive filter class B.

The control box is equipped with a network filter.

**2.5 Sound power level**

Guaranteed sound power level  $L_{WA}$

■ 95 dB(A)

**2.6 Vibrations**

Weighted effective value of acceleration to which the upper body parts are exposed  $<2.5 \text{ m/s}^2$



### 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.

## Transport, packing and storage



### 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.





## 3.4 Transport



Figure 4: Transport without pump unit



The pump unit can be disassembled in order to make it easier to transport the machine.

## 3.5 Crane transport



Figure 5: Attachment points

### Attachment points

For transport by crane, attach the machine to the stop eyelets (1) and attach round slings in the area of the brackets (2).

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 by car or truck

### ⚠ CAUTION



#### Risk injury due to unsecured load!

All persons involved in the loading are responsible for securing the load properly during road transport. The relevant vehicle driver is responsible for the operational loading.

### 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 - ZP 3 M

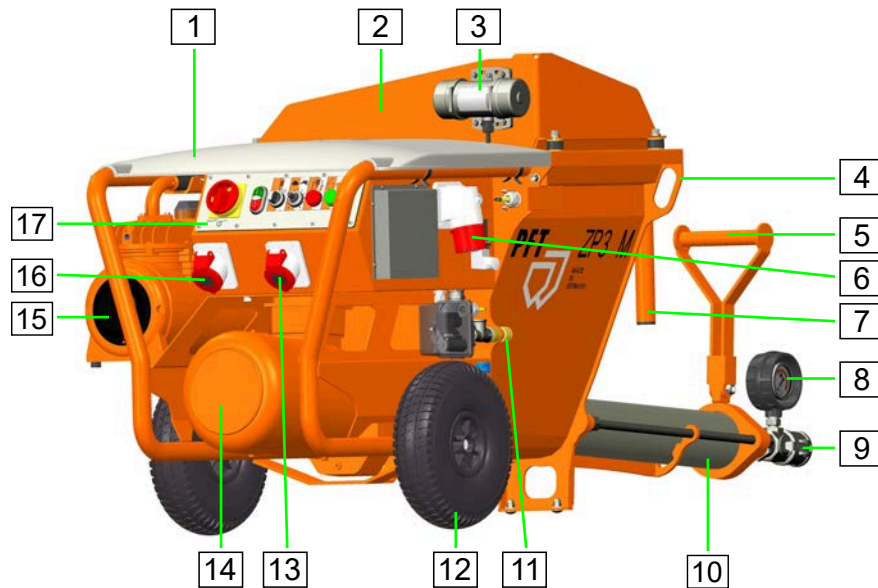


Figure 6: Table of the assembly groups

[1] Plastic cover	[2] Impact screen (accessory)
[3] Vibrating unit (accessory)	[4] Crane eyes
[5] Hinged handle	[6] Main terminal
[7] Carrying handle	[8] Mortar pressure gauge
[9] Connection for mortar hose	[10] Pump unit
[11] Compressed air connection for the spray gun	[12] Puncture-proof tyre
[13] CEE mounted socket for connection of vibrating unit	[14] Pump motor
[15] Air compressor (accessory)	[16] CEE mounted socket for connection of air compressor
[17] Control cabinet	

### 4.2 Functional description ZP 3 M

The delivery pump PFT ZP 3 M is characterised by its compact design, low weight and optimum delivery of almost all materials. The ZP 3 M is used for processing building site mixtures, screed mortar and cement plasters. The conveying output can be steplessly adapted to the material requirements. The delivery pump has an integrated pressure control for the compressor and has a remote control for switching on and off.

The machine is made up of portable components, which facilitate speedy and convenient transport when the dimensions are manageable and the weight is at a low level.

The feed pump can be fed in a universal manner. Consequently, it can be fed from buckets, horizontal mixers, pug mill mixers or concrete mixers. Fluid, pumpable and solvent-free materials up to a maximum of 6 mm granulation can be pumped, grouted and sprayed.

## Description



### 4.3 Fields of application



Figure 7: ZP 3 M and MULTIMIX

For fields of application such as:

- Building site mixture
- Screed mortar
- Cement plaster
- Lime-cement render
- Adhesive mortar
- Frame grouting mortar
- Loam plaster, dry
- Loam plaster, earth-moist
- Masonry mortar
- Fire protection mortar
- Concrete restoration mortar
- Floor screed 35 l
- Thin screed
- Floor fillers
- Building site mixture

#### Flowability / flow characteristics



- *The 2L6 RENDER STAR pump can be used with an operating pressure of up to 20 bar.*
- *The possible conveying distance depends mainly on the flowability of the material.*
- *Runny materials, fillers, paints etc. have good flow characteristics.*
- *If 20 bar operating pressure are exceeded the mortar hose length has to be reduced.*
- *In order to avoid machine faults and increased wear of the pump motor, pump shaft and the pump itself, only original PFT spare parts must be used, such as:*
  - *PFT rotors*
  - *PFT stators*
  - *PFT pump shafts*
  - *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 ZP 3 M delivery pump consists of the main components described in the following chapters.

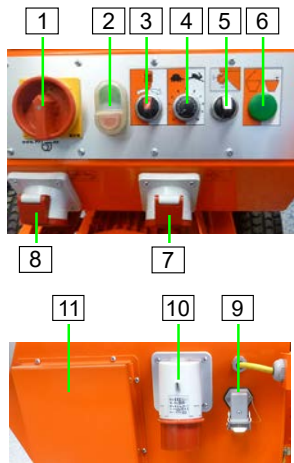
#### 4.4.1 Material hopper

- Material hopper with frame, gear motor and protective grille



Figure 8: Material hopper assembly

#### 4.4.2 Control cabinet item no. 00531100



Control cabinet ZP 3 M FC-400V

- [1] The master switch is also the emergency-stop switch
- [2] Pushbutton for control voltage "ON/ OFF"
- [3] Pump motor selector switch
- [4] Potentiometer for motor speed / material volume
- [5] Selector switch Vibrating unit "ON / OFF"
- [6] Green control lamp, safety sensor protective grille
- [7] CEE mounted socket for connection of vibrating unit
- [8] CEE mounted socket for connection of air compressor
- [9] Dummy connector / connection for remote control
- [10] Main terminal
- [11] Cover cap of the filter for frequency converter

Figure 9: Assembly unit control cabinet

## Description



### 4.4.3 Control cabinet item no. 00531101

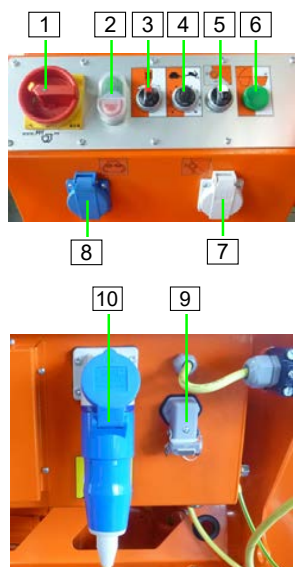


Figure 10: Assembly unit control cabinet

#### Control cabinet ZP 3 M FC-230V

- [1] The master switch is also the emergency-stop switch
- [2] Pushbutton for control voltage "ON/ OFF"
- [3] Pump motor selector switch
- [4] Potentiometer for motor speed / material volume
- [5] Selector switch Vibrating unit "ON / OFF"
- [6] Green control lamp, safety sensor protective grille
- [7] Safety socket for vibrating unit connection
- [8] Safety socket for air compressor connection
- [9] Dummy connector / connection for remote control
- [10] Main terminal

### 4.4.4 Control cabinet item no. 00531102

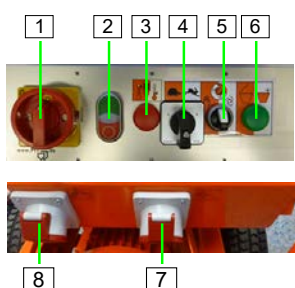


Figure 11: Assembly unit control cabinet

#### 400V control cabinet, pole-changing

- [1] Main reversing switch is also emergency-stop switch
- [2] Pushbutton for control voltage "ON/ OFF"
- [3] Red control lamp, motor protection switch activated
- [4] Pump motor selector switch for motor speed
- [5] Vibration selector switch "manual-0-automatic"
- [6] Green control lamp, safety sensor protective grille
- [7] CEE mounted socket for connection of vibrating unit
- [8] CEE mounted socket for connection of air compressor

#### 4.4.5 Control cabinet item no. 00617410

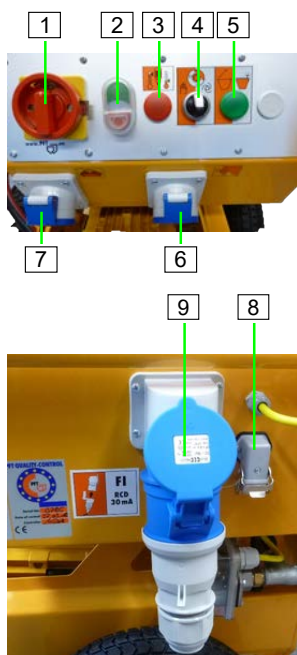


Figure 12: Assembly unit control cabinet

##### Control cabinet ZP 3 M 230V 60Hz

- [1] Main reversing switch is also emergency-stop switch
- [2] Pushbutton for control voltage "ON/ OFF"
- [3] Red control lamp, motor protection switch activated
- [4] Vibration selector switch "manual-0-automatic"
- [5] Green control lamp, safety sensor protective grille
- [6] CEE mounted socket for connection of vibrating unit
- [7] CEE mounted socket for connection of air compressor
- [8] Dummy connector / connection for remote control
- [9] Main terminal

#### 4.4.6 Pump unit



Figure 13: Pump unit assembly

- Pump unit 2L6 RENDER STAR for ZP 3 M

#### 4.4.7 Vibrating screen



Figure 14: Vibrating screen

##### Vibration screen for ZP 3 M

Vibrating screen for retrofitting for ZP 3 M, 230 V

- Item no. 00541174

Vibrating screen for retrofitting for ZP 3 M, 400V

- Item no. 00530899

## Description



### 4.4.8 Air compressor



Figure 15: Air compressor 230V

Air compressor COMP P-200, 230 V, 1 Ph, 50 Hz with pressure switch-off

- Item no. 00196221



Figure 16: Air compressor 400V

Air compressor COMP M-250, 400 V, 3 Ph, 50 Hz with pressure control

- Item no. 00414866

### 4.4.9 Mortar pressure gauge



Figure 17: 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 Operating modes



Figure 18: Pump motor selector switch

### Pump motor selector switch

The pump motor has three operating modes:

Switch position "0":

- The machine is switched off.

"Right" selector switch position (latching) for D and R pumps:

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

"Left" selector switch position (latching) for 2L6 pumps:

- The pump motor runs backwards, thus the pump is relaxed.



Figure 19: Pump motor selector switch

### Selector switch pump motor ZP 3 M pole-changing

The pump motor can be operated at two different rotational speeds:

Switch position "0":

- The pump motor is switched off.

Switch position left:

- The pump motor has a speed of 106 rpm.

Switch position right:

- The pump motor has a speed of 215 rpm.

### NOTE



Always switch off the control voltage first and then operate the selector switch to change the speed. Then switch the control voltage on again.



Figure 20: Selector switch - Vibrating unit

### Selector switch - Vibrating unit

The vibrating unit can be operated in three different operating modes:

Switch position "0":

- The vibrating unit is switched off.

Switch position "right" (latching):

- The vibrating unit is in operation - Impulse / Break.

Switch position "left" (spring return)

- The vibrator runs continuously as long as the selector switch is actuated.

## Description



Figure 21: Selector switch - Vibrating unit

### Selector switch - Vibrating unit

The vibrating unit can be operated in three different operating modes:

Switch position "0":

- The vibrating unit is switched off.

Switch position "Automatic" (right):

- The vibrating unit runs on automatic, pulse/pause with the pump motor.

Switch position "Manual" (left):

- In the "Manual" position, the vibrating unit runs in continuous operation as long as the selector switch is held in this position.



Figure 22: Potentiometer

### Potentiometer

Potentiometer for motor speed/material volume:

- Turning the potentiometer to the right to a higher number increases the motor speed and thus the delivery rate/material volume.

## 4.6 Accessories



Extension cable 3 x 2.5 mm², BLU 3-16 A | BLA 2-16 A - 25 m

- Item no. 20423420



Extension cable 5 x 2.5 mm², RED 5-16 A – 25 m (400 V, 3 Ph)

- Item no. 20423360



## Description



Remote control cable with switch - 25 m

■ Item no. 20456929



Water hose/air hose DN12 Geka | Geka - 5 m

■ Item no. 20211100



Spray nozzle DN19 (3/4") Geka

■ Item no. 20215700



Rinsing hose DN10 Geka - 11 m

■ Item no. 00113856



Vibrating screen for retrofitting for ZP 3 M, 230 V complete

■ Item no. 00541174

## Description



Vibrating screen for retrofitting for ZP 3 M, 400 V complete

- Item no. 00530899



Air compressor COMP P-200, 230 V, 1 Ph, 50 Hz with pressure switch-off

- Item no. 00196221



Air compressor COMP M-250, 400 V, 3 Ph, 50 Hz with pressure control for G 4 (from 2013)

- Item no. 00414866

### Necessary accessories for conversion to D-pump

- 00538068 Pressure flange of D-pump 1 1/4" external thread for ZP 3 M
- 00007899 Stator TWISTER D 6-3 PIN, clockwise
- 00237908 Rotor D 6-3, clockwise
- 00538072 Suction flange use - D-pump ZP 3 M - galvanised
- 00281996 Tie rod of D-/R-pump 330 mm, thread 100 mm
- 20209921 Collar nut M16
- 20200790 Coupling 35M-part 1 1/4" IG with gasket
- 00206547 Pump shaft SWING L
- 20104230 O-ring gasket for suction flange
- 00102228 Mortar pressure gauge DN35 V-part | DN35 female part



---

**Necessary accessories for conversion to R-pump**

- 00476608 Pressure flange of R-pump 2" external thread, carrying handle
- 00099089 Pressure gauge ZP 3 XL
- 00101860 Sliding handle ZP 3 XL
- 00102660 Square tube 40 x 40 x 3 x 50 long
- 20114851 Rotor R 7-2,5, clockwise
- 20116350 Stator R 7-2.5, clockwise
- 00526014 Clamp of D-pump, galvanised
- 00281996 Tie rod of D-/R-pump 330 mm, thread 100 mm
- 20209921 Collar nut M16
- 00538146 Pump shaft ZP 3 M for R-pump

You can find further accessories on the internet at [www.pft.net](http://www.pft.net) or from your PFT construction machinery dealer.

## Operation



## 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 guards.
- 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 95 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 23: 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 Safety system

### 5.1.4.1 Position switch on the protective grille



Figure 24: Position switch

### NOTE



The protective grille of the ZP 3 features a position switch (1), which deactivates the machine as soon as the protective grille is opened.

1. If the protective grille is opened while the machine is running, the machine switches off via the position switch (1).
2. The machine must then be restarted.

## Operation

### 5.1.5 Mortar pressure gauge



Figure 25: 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 pump shaft

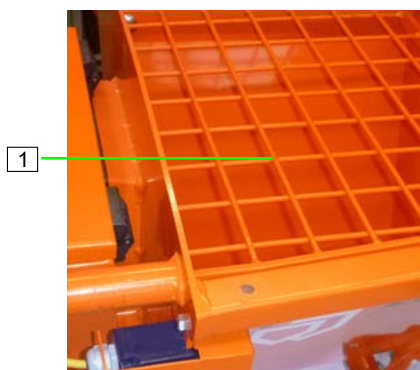


Figure 26: Grille cover

#### ⚠ WARNING



#### Rotating pump shaft!

Risk of injury when reaching into the material hopper.

- During machine preparation and operation, the grille cover (1) must not be removed, and the end switch must not be manipulated.
- Never reach into the running machine.



### 5.3.2 Setting up the machine



Figure 27: Positioning machine

1. Install the machine on stable and even ground and secure it against accidental movements.
  2. If necessary, place an underlay under the support foot (1) to ensure the machine cannot subside during operation.
- 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.

### 5.3.3 Connecting the power supply

#### 5.3.3.1 Connecting the power supply 230V



Figure 28: Connect power supply

1. Only connect the machine to a 230 V AC network.

#### 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.

#### 5.3.3.1.1 Connect individual 230V connectors



Figure 29: Power connections

#### 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 power supply for air compressor (1) (accessories).
2. Connect power supply for vibrating unit (2) (accessories).

## Operation

### 5.3.3.2 Connecting the power supply 230V 60Hz



Figure 30: Connect power supply

1. Only connect machine to three-phase current with 230V.

#### **⚠ 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).

#### 5.3.3.2.1 Connect individual connectors 230V 60Hz



Figure 31: Power connections

#### **⚠ 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 power supply for air compressor (1) (accessories).
2. Connect power supply for vibrating unit (2) (accessories).

### 5.3.3.3 Connecting the power supply 400V



Figure 32: Connecting the power supply

Control cabinet FC-400V

1. Only connect the machine to three-phase current with 400V.

#### **⚠ 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.



Figure 33: Connecting the power supply

#### 400V control cabinet, pole-changing

1. Only connect the machine to three-phase current with 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).

### 5.3.3.3.1 Connect individual 400V connectors



Figure 34: Power connections

#### **⚠ 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 power supply for air compressor (1) (accessories).
2. Connect power supply for vibrating unit (2) (accessories).

### 5.3.4 Checking the direction of rotation

#### **NOTE**



Fill the material hopper with approx. 3 litres of water so that the pump does not run dry during start-up.



Figure 35: Direction of rotation left

#### Direction of rotation of 2L6 pump unit

1. Check the direction of rotation of the pump shaft.
2. When seen from the mortar pressure gauge, the 2L6 pump unit rotates towards the left.

## Operation

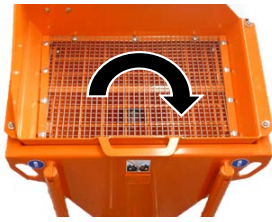


Figure 36: Direction of rotation right

### Direction of rotation for D and R pumps

1. Check the direction of rotation of the pump shaft.
2. When seen from the mortar pressure gauge, the D and R pumps rotate towards the right.

### NOTE



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

### 5.3.4.1 Switching on the machine



Figure 37: Switching on the machine

#### ZP 3 M FC-230 & FC-400V

1. Turn the main switch (1) to "ON".
2. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
3. Turn the pump motor selector switch (4) to "right" position.
4. If direction of rotation is incorrect, set pump motor selector switch (4) to "left" position.

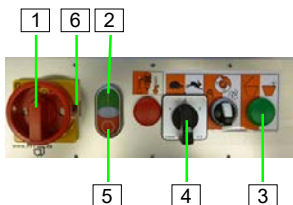


Figure 38: Switching on the machine

#### ZP 3 M 400V pole-changing

1. Turn the main reversing switch to position "I".
2. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
3. Set pump motor selector switch (4) to desired position.
4. If direction of rotation is incorrect, switch off machine by pressing red push button (5) control voltage "OFF".
5. Turn the main reversing switch (1) to position "0".
6. Push the metal bracket (6) in the opposite direction.
7. Turn the main reversing switch (1) to position "I".
8. Switch the machine on by pressing the green push button (2) control voltage "ON" and check the direction of rotation again.

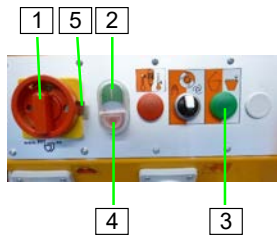


Figure 39: Switching on the machine

## ZP 3 M 230V 60Hz

1. Turn the main reversing switch to position "I".
2. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
3. If direction of rotation is incorrect, switch off machine by pressing red push button (4) control voltage "OFF".
4. Turn the main reversing switch (1) to position "0".
5. Push the metal bracket (5) in the opposite direction.
6. Turn the main reversing switch (1) to position "I".
7. Switch the machine on by pressing the green push button (2) control voltage "ON" and check the direction of rotation again.

### 5.3.5 Mortar hoses

#### 5.3.5.1 Preparing the mortar hoses

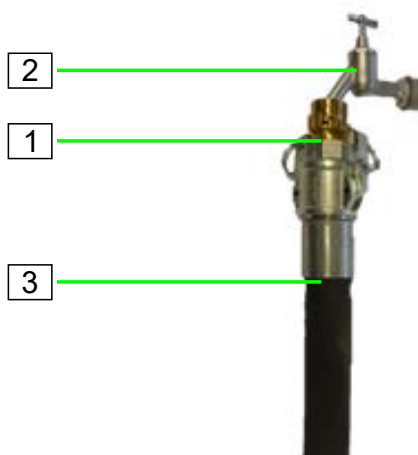


Figure 40: Preparing the mortar hoses

1. Connect the cleaner coupling (1) to the water tap (2).
2. Connect the mortar hose (3) to the cleaner coupling (1).
3. Open the water tap (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)!

## Operation

### 5.3.5.2 Connecting the mortar hose

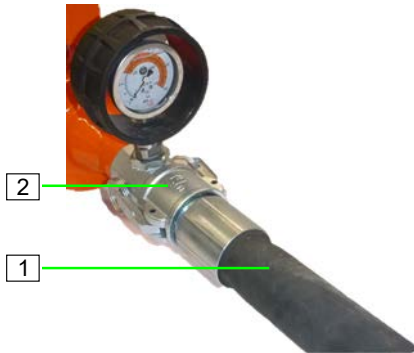


Figure 41: Connecting the mortar hose

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.

#### NOTE



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

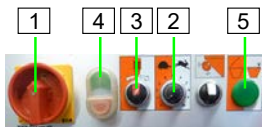


Figure 42: Switching on

#### ZP 3 M FC-230 & FC-400V

1. Turn the main switch (1) to "ON".
2. Turn potentiometer (2) for motor speed / material volume to position 5 (readjust as required).
3. Turn pump motor selector switch (3) to "right" or "left" position.
4. Switch the machine on by pressing the green pushbutton (4) control voltage "ON".
- ✓ Green control lamp (5) must light up.
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.

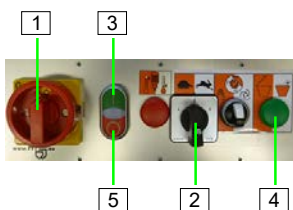


Figure 43: Switching on

#### ZP 3 M 400V pole-changing

1. Turn the main reversing switch (1) to position "I".
2. Set pump motor selector switch (2) to desired position.
3. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
- ✓ Green control lamp (4) must light up.
4. Allow the machine to run until all the wallpaper paste has emerged from the end of the mortar hose.
5. Collect the wallpaper paste in suitable container and dispose of as per regulations.
6. Switch off the machine by pressing the red pushbutton (5) control voltage "OFF".

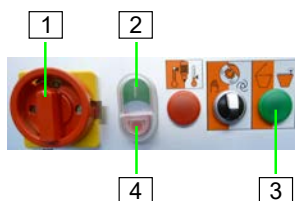


Figure 44: Switching on

## ZP 3 M 230V 60Hz

1. Turn the main reversing switch (1) to position "I".
2. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
3. Allow the machine to run until all the wallpaper paste has emerged from the end of the mortar hose.
4. Collect the wallpaper paste in suitable container and dispose of as per regulations.
5. Switch off the machine by pressing the red pushbutton (4) control voltage "OFF".

### 5.3.6 Drain residual water



Figure 45: Opening the cleaning nozzles

1. Remove the cover (1) from the cleaning nozzle and drain the residual water from the material container.
2. Screw on the cover (1).

### 5.3.7 Compressed air supply

#### 5.3.7.1 Connecting the air hose

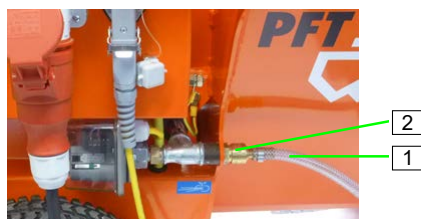


Figure 46: Connecting the air hose

1. Connect compressed air hose (1) to air manifold (2).

#### ⚠ WARNING



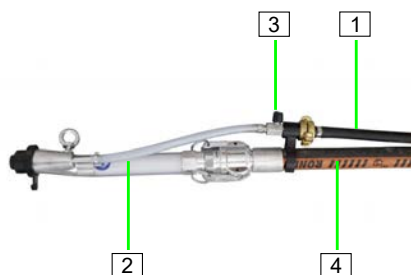
- Never undo hose couplings while the compressed air hose is pressurised.



## Operation



### 5.3.7.2 Connecting the spray gun



1. Connect air hose (1) to 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

### 5.3.7.3 Switching on the air compressor



1. Switch on the air compressor using the green toggle switch (1).
2. As soon as the air compressor has built up pressure in the pipeline system, it switches off using the pressure switch-off.

Figure 48: Switching on the air compressor

### 5.3.7.4 Switching on the air compressor



1. Switch on the air compressor using the black switch (1).
2. As soon as the air compressor has built up pressure in the pipeline system, it switches off using the pressure switch-off.

Figure 49: Switching on the air compressor





### 5.3.8 Feeding material to the machine



Figure 50: Feed the ZP 3 M with the material

1. Feed the ZP 3 M with the material using a continuous mixer, forced action mixer or truck mixer.

#### NOTE



Formation of tunnels:

Due to the material's physical properties, the material can partially adhere to the sides of the material hopper, resulting in the formation of tunnels. The mortar level in the material hopper should not be higher than absolutely necessary.

## 5.4 Shutdown in case of emergency



#### Shut down ZP 3 M FC-230V & FC-400V

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 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.

#### ⚠ 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.



### Shut down ZP 3 M 60Hz & pole-changing

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.

### **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



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

Consistency checking tube 35 male part

- Item no. 20104310

Figure 51: Consistency inspection tube

### 5.5.2 Feeding material to the machine

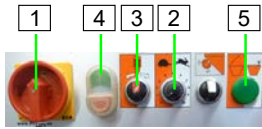


Figure 52: Switching on the machine

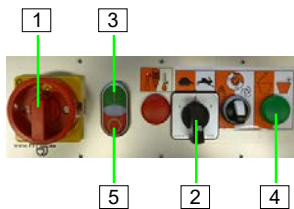


Figure 53: Switching on the machine

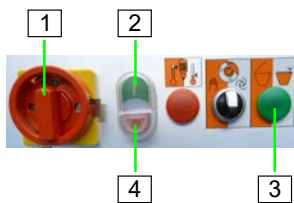


Figure 54: Switching on the machine

#### ZP 3 M FC-230 & FC-400V

1. Turn the main switch (1) to "ON".
2. Turn potentiometer (2) for motor speed / material volume to position 5 (readjust as required).
3. Turn pump motor selector switch (3) to "right" or "left" position.
4. Switch the machine on by pressing the green push button (4) control voltage "ON".
- ✓ Green control lamp (5) must light up.
5. Check mortar consistency at the consistency inspection tube.
6. Turn the pump motor selector switch (3) to the "0" position.
7. Remove consistency checking tube and clean it.

#### ZP 3 M 400V pole-changing

1. Turn the main reversing switch (1) to position "I".
2. Set pump motor selector switch (2) to desired position.
3. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
- ✓ Green control lamp (4) must light up.
4. Check mortar consistency at the consistency inspection tube.
5. Switch off the machine by pressing the red pushbutton (5) control voltage "OFF".
6. Remove consistency checking tube and clean it.

#### ZP 3 M 230V 60Hz

1. Turn the main reversing switch (1) to position "I".
2. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
3. Check mortar consistency at the consistency inspection tube.
4. Switch off the machine by pressing the red pushbutton (4) control voltage "OFF".
5. Remove consistency checking tube and clean it.

## Operation



### 5.6 Remote control

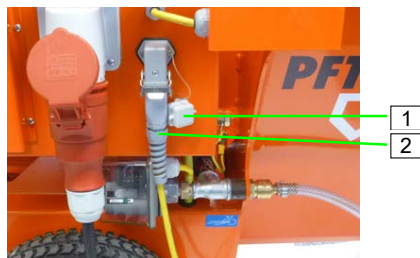


Figure 55: Remote control

#### Working with the remote control

1. Remove dummy plug (1) from control cabinet.
2. Connect remote control (2).
3. The ZP 3 can be switched on and 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. Fluid materials have good flow characteristics.*

*If an operating pressure of 20 bar is exceeded, the hose length must be shortened or the hose thickness increased.*

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



Figure 56: Switching on

#### ZP 3 M FC-230 & FC-400V

1. Turn pump motor selector switch (1) to "right" or "left" position.



Figure 57: Switching on

#### ZP 3 M 400V pole-changing

1. Set pump motor selector switch (1) to desired position.



Figure 58: Switching on

## ZP 3 M 230V 60Hz

1. Switch the machine on by pressing the green pushbutton (1) control voltage "ON".



Figure 59: Opening the air tap

## Opening the air tap

2. Point the spray gun toward the wall to be plastered.
3. Check that no-one is in the spray gun range.
4. Open the air tap (2) on the spray gun.
5. The machine starts automatically via the pressure switch-off and mortar emerges at the spray gun.



*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).*

## 5.8 Pump screed or masonry mortar

### NOTE



When masonry mortar or screed is pumped, the machine is operated without the air compressor and spraying gun.

The machine is then switched on and off via an optional remote control cable.

## 5.9 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.

## Operation

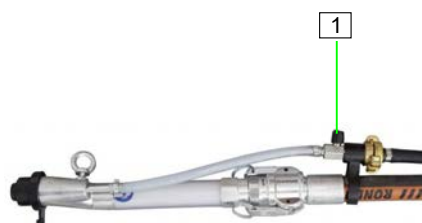


Figure 60: Closing the air tap

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.

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

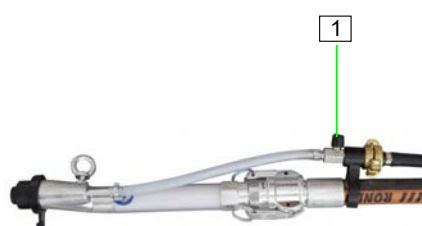


Figure 61: Closing the air tap

ZP 3 M FC-230 & FC-400V

#### 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.

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.

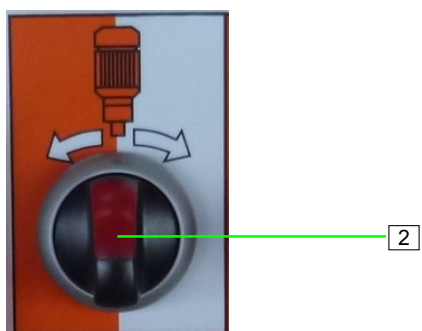


Figure 62: Switching off the machine

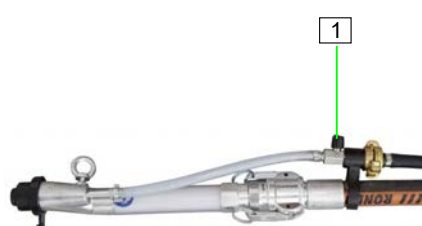


Figure 63: Closing the air tap

ZP 3 M 60Hz & pole-changing

#### 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.

1. Close the air tap (1) if the work is interrupted for a longer period of time.
2. Switch off the machine by pressing the red pushbutton (2) control voltage "OFF".

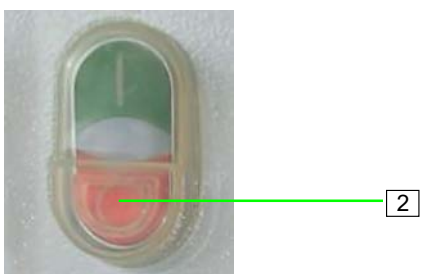


Figure 64: Switching off the machine

## 5.10 Switching off the air compressor



Figure 65: Switching off the air compressor

1. Switch off the air compressor using the green toggle switch (1).
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.

## 5.11 Switching off the air compressor



Figure 66: Switching off the air compressor

1. Switch off the air compressor at the red switch (1).
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.

## 5.12 Switching off the machine

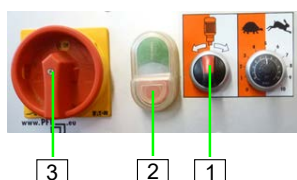


Figure 67: Switching off the machine

### ZP 3 M FC-230 & FC-400V

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

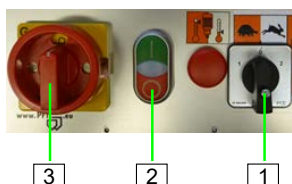


Figure 68: Switching off the machine

### ZP 3 M 400V pole-changing

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



## Operation

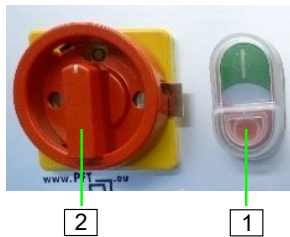


Figure 69: Switching off the machine

### ZP 3 M 230V 60Hz

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

## 5.13 Action in case of power failure



Figure 70: Turn main switch to the "OFF" position

### ZP 3 M FC-230V & FC-400V

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



Figure 71: Turn the main reversing switch to the "0" position

### ZP 3 M 60Hz & pole-changing

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.



### 5.13.1 Discharging mortar pressure

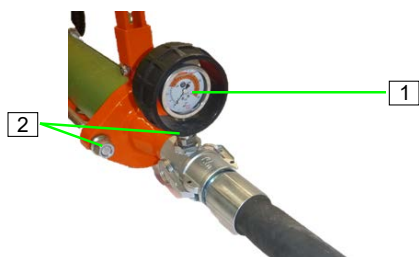


Figure 72: Check and relieve the mortar pressure

#### ⚠ 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.

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

#### NOTE



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

#### NOTE



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

## Operation

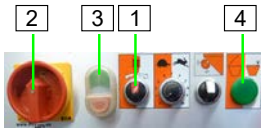


Figure 73: Switching on the machine after a power failure

### ZP 3 M FC-230 & FC-400V

1. Turn the pump motor selector switch (1) to the "0" position.
2. Close the air tap on spray gun.
3. Turn the main switch (2) to "ON".
4. Switch on the compressor.
5. Turn pump motor selector switch (1) to "right" or "left" position.
6. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
- ✓ Green control lamp (4) must light up.
7. The machine starts again as soon as the air tap on the spray gun is re-opened.

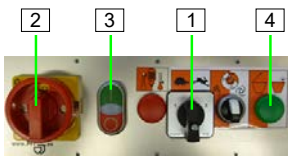


Figure 74: Switching on the machine after a power failure

### ZP 3 M 400V pole-changing

1. Turn the pump motor selector switch (1) to the "0" position.
2. Close the air tap on spray gun.
3. Turn the main reversing switch (2) to position "I".
4. Switch on the compressor.
5. Set pump motor selector switch (1) to desired position.
6. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
- ✓ Green control lamp (4) must light up.
7. The machine starts again as soon as the air tap on the spray gun is re-opened.



Figure 75: Switching on the machine after a power failure

### ZP 3 M 230V 60Hz

1. Close the air tap on spray gun.
2. Turn the main reversing switch (1) to position "I".
3. Switch on the compressor.
4. Switch the machine on by pressing the green pushbutton (2) control voltage "ON".
- ✓ Green control lamp (3) must light up.
5. The machine starts again as soon as the air tap at the spray gun is re-opened.

## 5.14 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.

## 5.15 Ending work / cleaning the machine

### 5.15.1 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).
- Remove the covers completely after cleaning.

### 5.15.2 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.

### 5.15.3 Running the machine empty

#### ⚠ WARNING



#### Danger of injury from discharged mortar!

Discharged mortar may lead to injuries to eyes and face.

- Beware of residual pressure.

The machine must be cleaned daily after work and before prolonged pauses:

## Operation

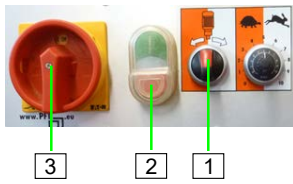


Figure 76: Running the machine empty

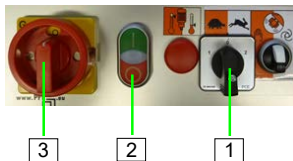


Figure 77: Running the machine empty



Figure 78: Running the machine empty

### ZP 3 M FC-230 & FC-400V

1. Run the material hopper empty except for a small amount of residue.
2. Turn the pump motor selector switch (1) to the "0" position.
3. Switch off the machine by pressing the red pushbutton (2) control voltage "OFF".
4. Turn the main switch (3) to "OFF".
5. Switch off air compressor.
6. Open air tap on the spray gun.

### ZP 3 M 400V pole-changing

1. Run the material hopper empty except for a small amount of residue.
2. Turn the pump motor selector switch (1) to the "0" position.
3. Switch off the machine by pressing the red pushbutton (2) control voltage "OFF".
4. Turn the main reversing switch (3) to position "0".
5. Switch off air compressor.
6. Open air tap on the spray gun.

### ZP 3 M 230V 60Hz

1. Run the material hopper empty except for a small amount of residue.
2. Switch off the machine by pressing the red pushbutton (1) control voltage "OFF".
3. Turn the main reversing switch (2) to position "0".
4. Switch off air compressor.
5. Open air tap on the spray gun.

## 5.15.4 Disconnecting and cleaning the mortar hose

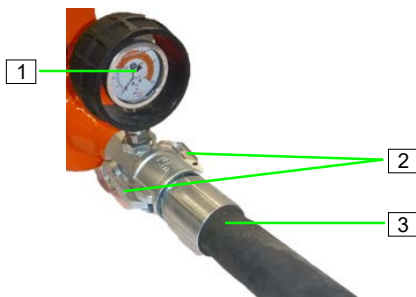


Figure 79: Disconnecting the water hose

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. Release cam lever (2) and uncouple mortar hose (3) from the mortar pressure gauge.
3. De-couple the air hose from the spraying gun.

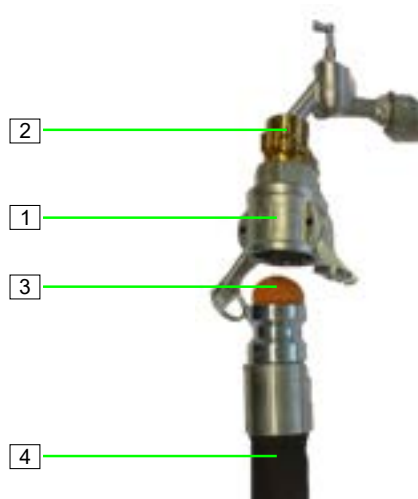


Figure 80: Cleaning the mortar hose



Figure 81: Cleaning the spray gun

## 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) to the water tap (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).

4. Remove the fine plaster spraying nozzle (5) from the spraying gun.
5. Undo eye bolt (6) and pull air nozzle tube (7) out of the spray head.
6. Open the water tap until the sponge ball emerges at the end of the spraying gun.
7. Repeat this procedure several times in case of heavy soiling.
8. In case of different hose diameters, the mortar hoses have to be cleaned separately with the matching 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.

### 5.15.5 Cleaning the material hopper



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

## Operation



### 5.15.6 Drain residual water



Figure 82: Opening the cleaning nozzles

1. Remove the cover from the cleaning nozzle (1) and let the residual material drain off.
2. Clean the protective grille and material hopper with a water jet.
3. Close the cover (1) again.
4. Fill material hopper with water and switch on the machine so that the pump is rinsed with water.
5. Remove the cover (1) again and drain the remaining water completely.
6. Then close the cover (1) again.

#### NOTE



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

### 5.15.7 Cleaning the pump

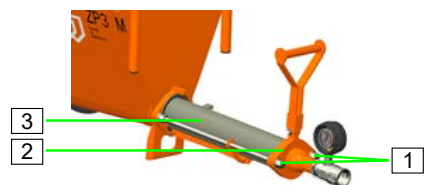


Figure 83: Remove the pump

1. Loosen the nuts (1) slightly, so that any residual pressure can escape completely.
2. Then loosen the nuts (1) completely.
3. Remove pressure flange (2) and clean.
4. Remove and clean the pump unit (3).
5. Mount the pump unit (3), refit the pressure flange (2) and tighten the nuts (1) again.

#### ⚠ CAUTION



#### Danger of crushing by the pump unit!

Note the weight of the pump unit when removing and installing it.

## 5.16 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.*

### 5.16.1 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

### 5.16.2 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.

### 5.16.3 Fault displays

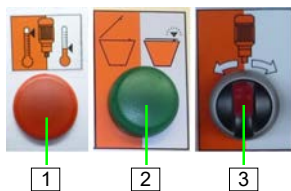


Figure 84: Fault displays

The following installation indicates faults:

Pos.	Light signal	Description
1	Red control lamp	Lights up on motor protection switch fault. → Check the motor protection switch
2	Green control lamp	Only lights up when protective grille is closed
3	Red control lamp	Fault in frequency converter





### 5.16.4 Table of faults

Fault	Possible cause	Troubleshooting	Rectification by
Machine does not start current	Power supply not in order	Repair power supply	Service technician
	Main switch/main reversing switch not activated	Activate main switch/main reversing switch	Operator
	RCD was triggered	Reset RCD	Service technician
	Motor protection switch triggered	Turn motor protection switch in control box to position	Service technician
	Contactor defective	Change contactor	Service technician
	Dummy plug missing	Insert the dummy plug	Operator
	Fuse defective	Replace fuse	Service technician
	Position switch on the protective grille	Close the protective grille, check the switch	Service technician
Machine does not start material	Too much dry material in the material hopper, possibly resulting in tunnel formation	Clean material hopper and restart machine	Operator
	Hardened material clogs up the pump unit (rotor/stator)	Disassemble, clean and re-install the pump	Operator
	Excessively dry material in pump part	Cleaning the material hopper	Operator
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
	Air pressure safety switch set incorrectly or defective	Set or replace air pressure safety switch	Service technician
Pump motor will not start	Pump motor defective	Replace the pump motor	Service technician
	Connection cable defective	Change connection cable	Service technician
	Rotor worn or defective	Replace rotor	Service technician
	Stator worn or clamped too loosely	Replace stator or re-tighten clamp	Service technician
	No original PFT spare parts	Use original PFT spare parts	Service technician
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

## Operation



Fault	Possible cause	Troubleshooting	Rectification by
	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"	Rotor worn or defective	Replace rotor	Service technician
	Stator worn	Replace stator	Service technician
	Inner wall of mortar hose defective	Replace mortar hose	Operator
	Rotor too deep in pressure flange	Replace pressure flange	Service technician
	No original PFT spare parts	Use original PFT spare parts	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	Operator

### 5.16.5 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.*

## 5.16.6 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.

### 5.16.6.1 Let the pump run backwards

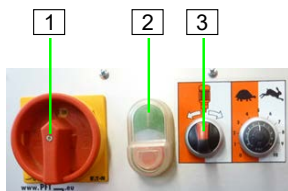


Figure 85: Reverse operation

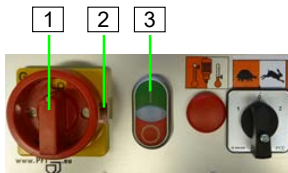


Figure 86: Reverse operation

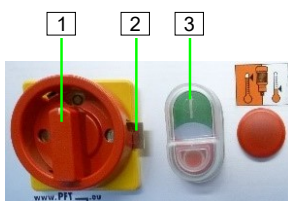


Figure 87: Reverse operation

#### ZP 3 M FC-230 & FC-400V

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

#### ZP 3 M 400V pole-changing

1. Turn the main reversing switch (1) to position "0".
2. Push the metal bracket (2) in the opposite direction.
3. Turn the main reversing switch (1) to position "I".
4. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
5. Allow the machine to run until the pressure at the mortar pressure gauge has dropped to "0 bar".
6. Turn the main reversing switch (1) to position "0".

#### ZP 3 M 230V 60Hz

1. Turn the main reversing switch (1) to position "0".
2. Push the metal bracket (2) in the opposite direction.
3. Turn the main reversing switch (1) to position "I".
4. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
5. Allow the machine to run until the pressure at the mortar pressure gauge has dropped to "0 bar".
6. Turn the main reversing switch (1) to position "0".

### 5.16.6.2 Blockage cannot be cleared

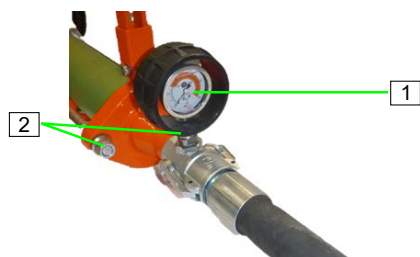


Figure 88: Check and relieve the mortar pressure

#### ⚠ 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 89: 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

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

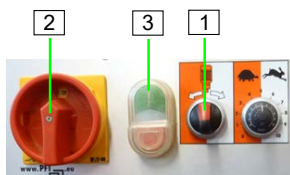


Figure 90: Switching on the machine again

#### ZP 3 M FC-230 & FC-400V

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

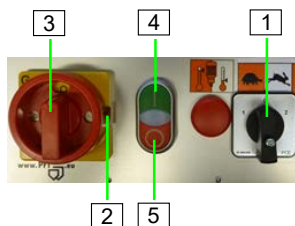


Figure 91: Switching on the machine again

#### ZP 3 M 400V pole-changing

1. Turn the pump motor selector switch (1) to the "0" position.
2. Push the metal bracket (2) in the opposite direction.
3. Close the air tap on spray gun.
4. Turn the main reversing switch (3) to position "I".
5. Press the green pushbutton (4) control voltage "ON".
6. Switch on the compressor.
7. Set pump motor selector switch (1) to desired position.
8. Let the machine run for a short while without mortar hoses.
9. As soon as material emerges from the pressure flange, press the red pushbutton (5) control voltage "OFF".
10. Apply wallpaper paste to the cleaned mortar hoses and connect to the machine and spray gun.
11. Switch the machine on by pressing the green pushbutton (4) control voltage "ON".
12. The machine starts again as soon as the air tap at the spray gun is re-opened.

## Operation

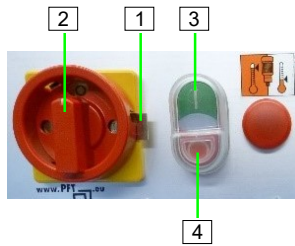


Figure 92: Switching on the machine again

### ZP 3 M 230V 60Hz

1. Push the metal bracket (1) in the opposite direction.
2. Turn the main reversing switch (2) to position "I".
3. Switch on the compressor.
4. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
5. Let the machine run for a short while without mortar hoses.
6. As soon as material emerges from the pressure flange, press the red pushbutton (4) control voltage "OFF".
7. Apply wallpaper paste to the cleaned mortar hoses and connect to the machine and spray gun.
8. Switch the machine on by pressing the green pushbutton (3) control voltage "ON".
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 93: 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	Visual and functional inspection of all safety installations.	Operator
	Check all parts subject to wear.	Operator
	Check mortar hoses and couplings.	Operator
	Visual inspection of the electrical cables.	Operator
Monthly	Clean/replace filter of compressor.	Service technician
Yearly	Check screw connections.	Service technician
	Clean the filter of the frequency converter.	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.*

## Maintenance



### 6.4.2 Air filter compressor

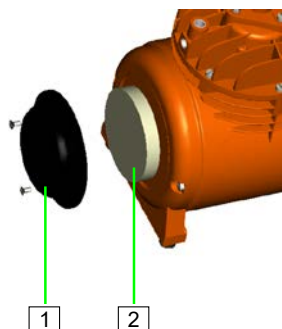


Figure 94: Filter of the compressor

Implementation by a service technician

1. Remove filter cover (1).
2. Take out the filter (2).
3. Blow through the filter from the inside to the outside or tap it.
4. Replace the filter in case of heavy contamination.
5. Insert the filter (2) with the solid side of the filter pointing inwards.
6. Re-attach the filter cover (1).



Opening of the filter cover is at the bottom.

### 6.4.3 Setting value pressure switch air compressor



Figure 95: Pressure switch air compressor

	Air compressor switches "ON"	Air compressor switches "OFF"
Compressor	2.5 bar	3.1 bar

### 6.4.4 Safety valve air compressor



Figure 96: Safety valve

1. Check, if the safety valve at the air compressor opens against a completely closed air circuit at 4.0 bar.

### 6.4.5 Clean the filter cartridge for the frequency converter

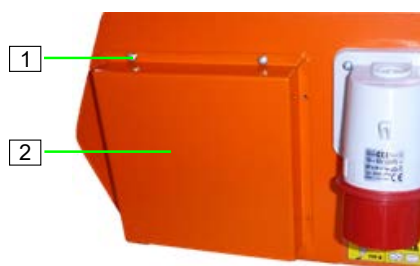
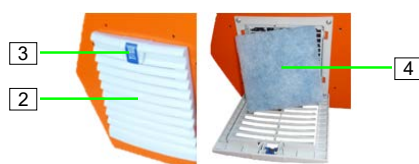


Figure 97: Protective cap for filter

Implementation by a service technician

Clean the filter insert of the frequency converter annually:

1. Remove all screws (1).
2. Remove the protective cap (2) for the exit filter.



3. Open the exit filter (2) at the blue cap (3).
4. Remove and clean the filter mat (4).
5. Insert the cleaned filter mat (4) and close the exit filter.
6. Screw protective cover (2) back on.

Figure 98: Clean filter mat

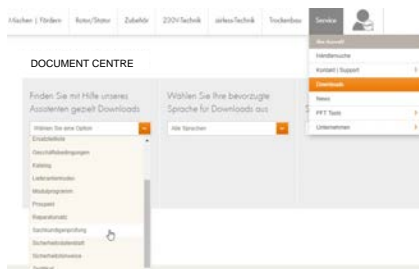
## 6.5 Actions after completed maintenance

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

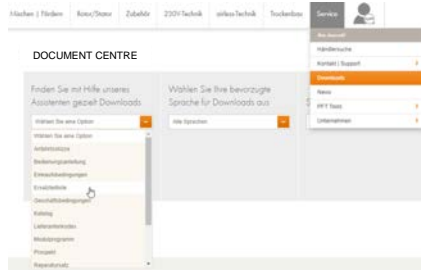
1. Check all previously loosened screw connections for secure fit.
2. Check if all previously removed safety systems and covers are properly reinstalled.
3. Ensure that all tools, materials and other equipment used have been removed from the work area.
4. Clean the work area and remove any spilled materials 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](http://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](http://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](http://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.*

PFT - ALWAYS AT YOUR SITE



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