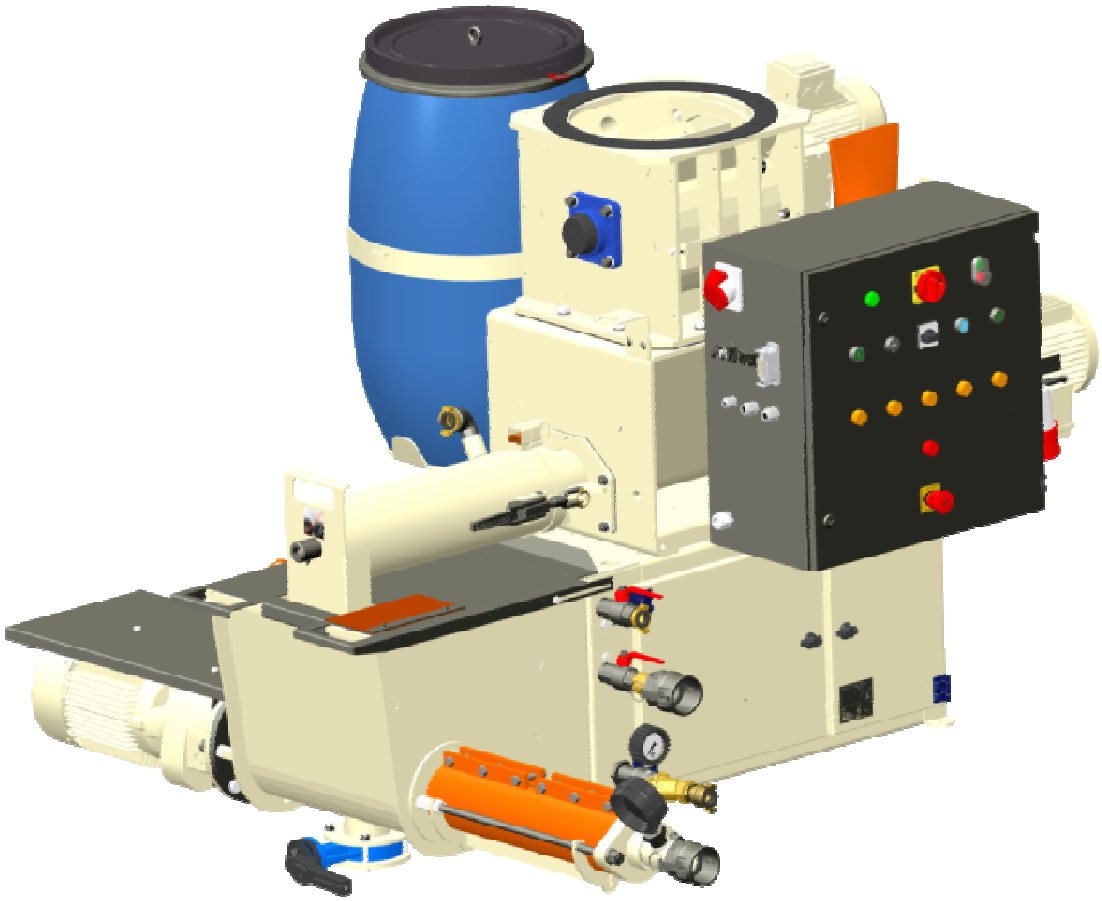
Operating manual

FERRO 100 II
Part 2 Overview – Operation - Spare parts lists
EC Declaration of Conformity



Article number of the operating manual: 00 62 68 00

Article number of the parts list-machine: 00 23 21 39

Article number of the parts list-machine: 00 17 17 05

Article number of the parts list-machine: 00 59 91 16 with water tank complete

CE

Read the operating manual prior to starting any work!

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Table of Contents

Table of Contents

Table of Contents

1 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:	FERRO
Type of equipment:	Mixing pump
Serial number:	
Guaranteed sound power level:	95 dB

is in conformity with the following CE directives:

- Outdoor directive (**2000/14/EC**),
- Machine directive (**2006/42/EC**),
- Electromagnetic Compatibility Directive (**2014/30/EC**).

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,

Place, Date of issue

Name and signature

Dr. York Falkenberg

Managing director

Identification of the signatory

2 Inspection

2.1 Inspection by machine operator

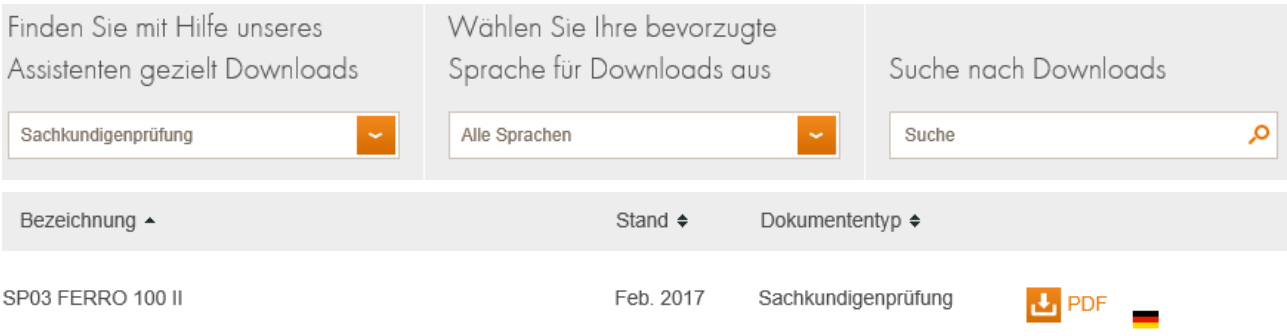
- Prior to each shift, the machine operator has to examine the effectiveness of the control and safety devices as well as the proper fitting of the protection devices.
- The safe working condition of construction machinery has to be checked by the machine operator during operation.
- If the safety devices 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.

3 Periodic inspection

- Construction machinery has to be inspected for their 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.

Inspection recommendations for the annual expert inspection of the FERRO 100 II (which is to be conducted in accordance with BGR 183) can be found in this section.

https://www.pft.net/de/service/downloads/index.php?t=0&p=12&s=0&q=



4 Accessories

For recommended accessories/equipment, see PFT machines and device catalogue or under www.pft.net

5 General information

5.1 Information regarding the operating manual

This operating manual gives important information on handling the device. 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 tool and easily accessible to the personnel at all times.

If the tool 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.

5.2 Keep the manual for future reference

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

5.3 Division

The operating manual is divided into 3 books:

Part 1 (two books)

General safety instructions about horizontal continuous mixer.

Article number: 00 14 63 78

General safety instructions about conveying pumps.

Article number: 00 17 27 09

Part 2 Overview and operation, service and spare parts lists (this volume).

For safe operation of the device all three parts have to be read and observed. Together they form one operating manual.

6 Technical data

6.1 General information

Article number FERRO 100 II	00171705 / 00232139	
Detail	**Value**	**Unit**
Weight	653 / 675	kg
Length	approx. 2110	mm
Total width	approx. 1880	mm
Height until silo connection	approx. 1330	mm

Silo / container connection

Detail	**Value**	**Unit**
Flange connection	D=350	mm

6.2 Power connection

Electrical details

Detail	**Value**	**Unit**
voltage, three-phase current 50 Hz	400	V
Power consumption, max.	30.5	A
Power input	15	kW
CEE connection	5 x 32	A
Fuse protection	At least 3 x 25	A
Connection cable, min.	5 x 6	mm²

Motor protection switch

Figure 1 Motor protection switch

Detail	**Power**	**Setting**	**Designation**
Pump motor	7.5kW	15 A	Q5
Mixing motor	6.05kW	11 A	Q4
Booster pump	0.5kW	1.7 A	Q3
Vibrating unit	0.25kW	0.65A	Q2
Star wheel	0.75kW	1.98A	Q6
Heating	0.38kW	0.95A	Q7

Water connection

Detail	**Value**	**Unit**
Water pressure in running machine	3.0	bar
Connection	3/4	inch

6.3 Operating conditions

Environment

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

Duration

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

6.4 Power values

Pump capacity

Mixer capacity

Detail	Value	Unit
Pump capacity*, approx.	100	l/min
Operating pressure, max.	25	bar
Feed range *, max. at 50mmØ	100	m

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

7 Sound power level

Guaranteed sound power level LWA **95dB (A)**

8 Vibrations

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

9 Quality Control sticker

Fig. 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

10 Dimension sheet

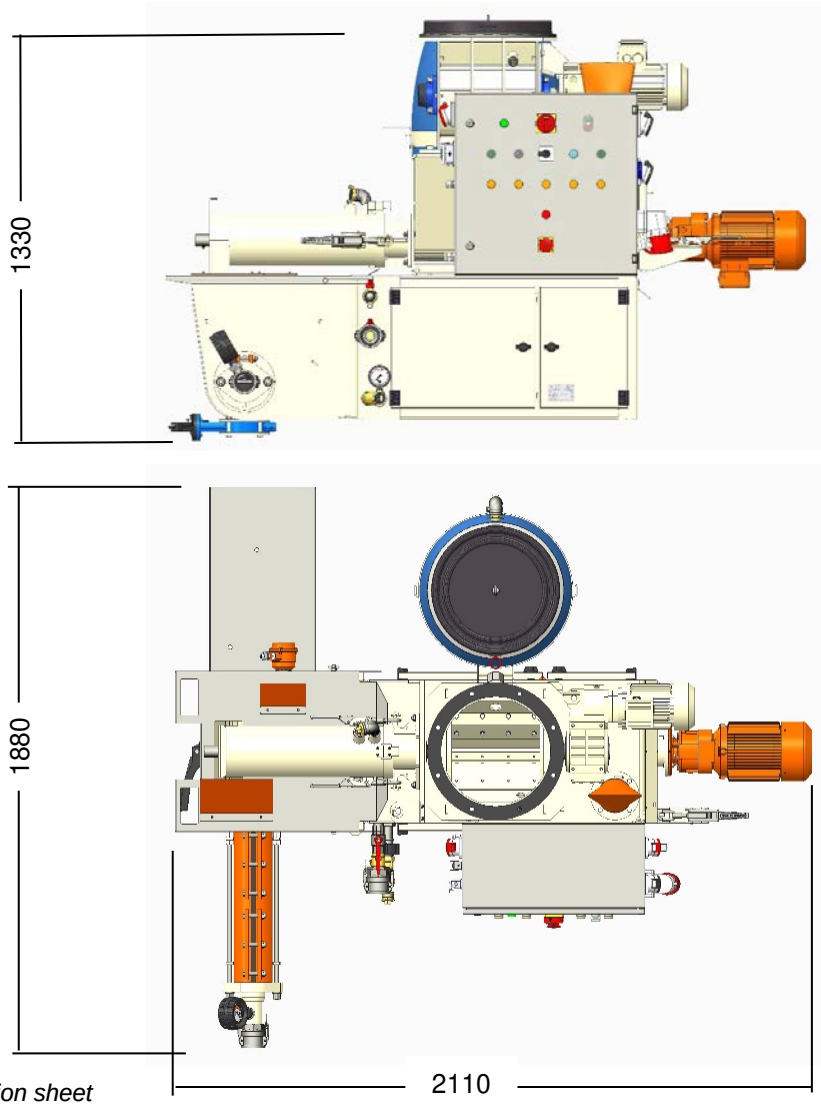


Fig. 3: Dimension sheet

11 Name plate

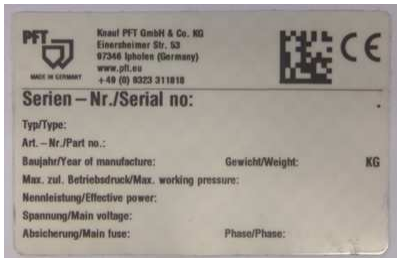


Fig. 4: Name plate

The type plate is located in the control box and includes the following information:

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

12 Overview of article number 00599116

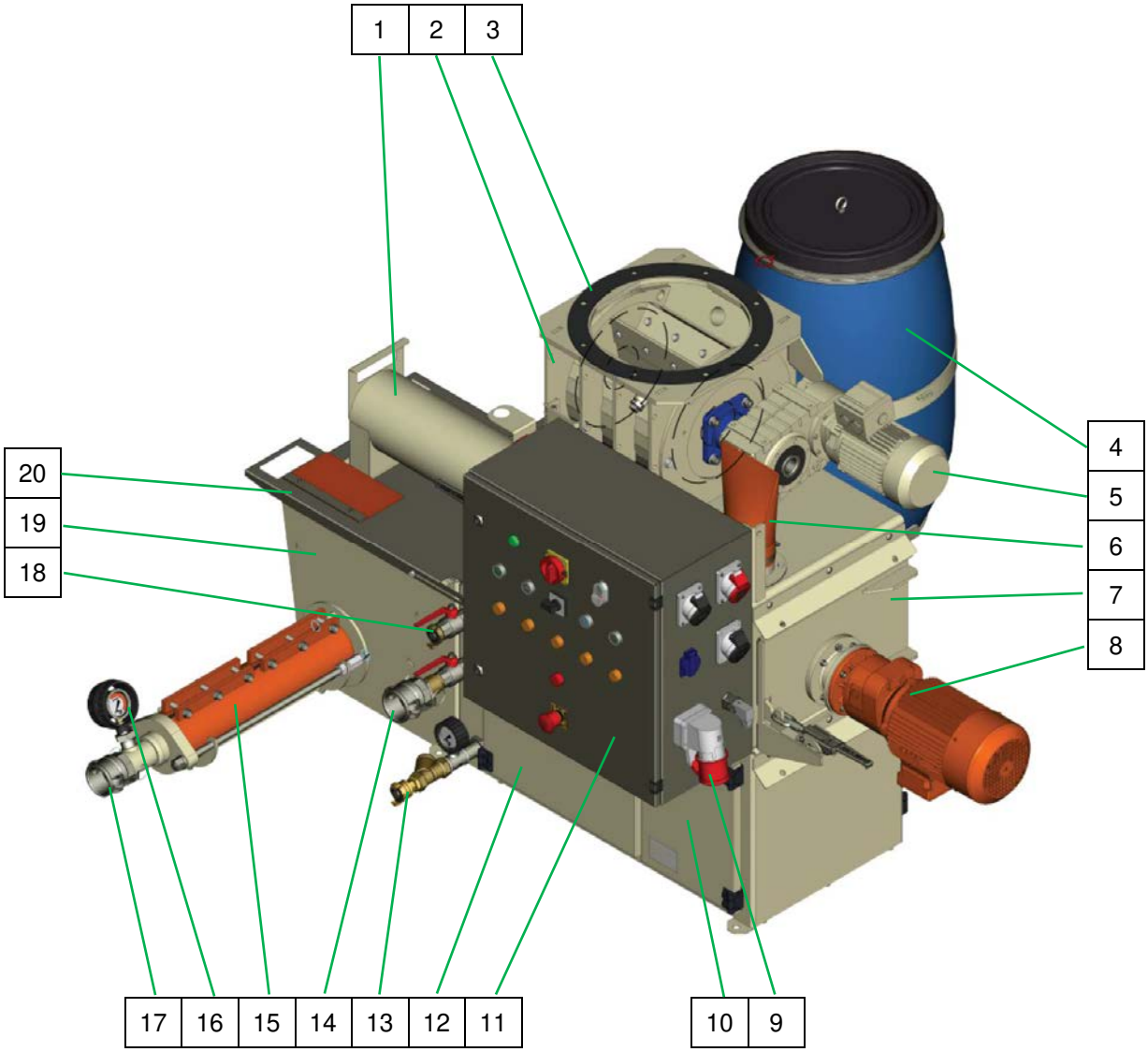


Fig. 5: Table of the assembly groups

1. Mixing tube / mixer
2. Star wheel lock
3. Connection to silo / container
4. Water tank
5. Gear motor for star wheel lock
6. Filter bag / ventilation
7. Swivel-mounted motor flange
8. Gear motor for mixer
9. Connection to main terminal
10. Tool cabinet
11. Control box
12. Water installation cabinet
13. Water inlet from water supply or water tank to the opposite side
14. Connection for cleaning the material hose
15. Pump unit FERRO
16. Mortar manometer
17. Connection to material hose
18. Water extraction
19. Pump container
20. Protection device of pump container

12.1 Overview of article number 00171705

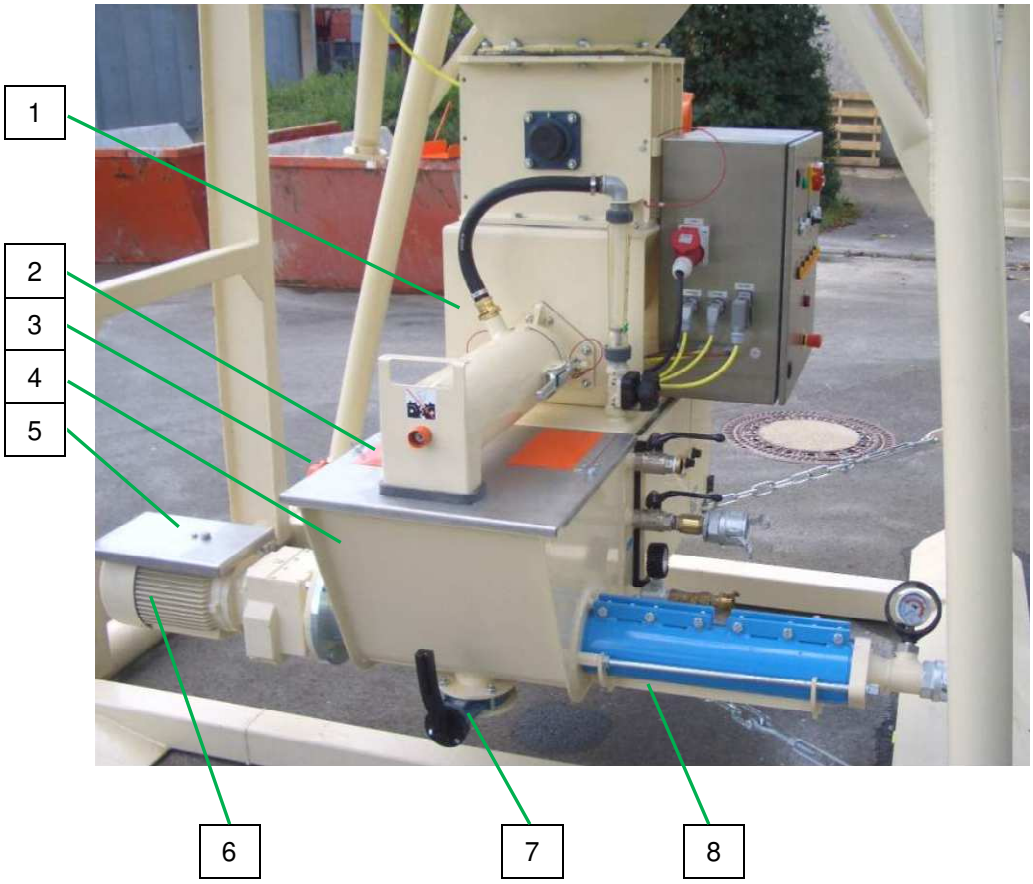


Fig. 6: Table of the assembly groups

1. Material hopper for mixer
2. Cleaning hole / inspection window for wet sensor
3. Wet sensor for pump container
4. Pump material container
5. Dust protection for pump motor
6. Pump motor
7. Butterfly valve / cleaning hole
8. Installation aid for pump switch

13 Description of assemblies

13.1 Assembly unit description control box

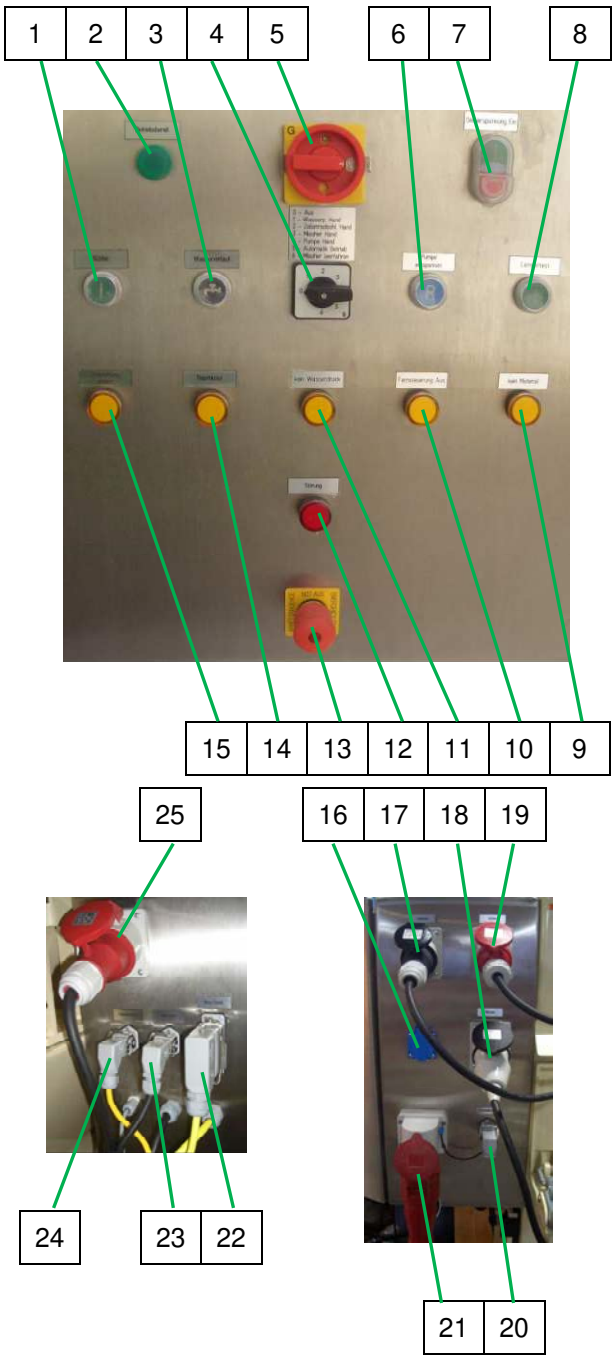


Fig. 7: Assembly unit control box

- Control box

1. Push button for vibrating unit with manual function.
2. Control lamp machine ready for operation.
3. Pushbutton for water inlet.
4. Step switch with six operating modes.
5. Master switch is also emergency-stop switch.
6. Release the pump (reverse operation).
7. Push button for control voltage ON / OFF.
8. Pushbutton for lamp test.
9. Control lamp no material.
10. Control lamp remote control OFF.
11. Control lamp no water pressure.
12. ***Control lamp motor failure.
13. EMERGENCY OFF push button.
14. Control lamp thermistor.
15. Control lamp change direction of rotation.
16. Socket 230V continuous current.
17. Connection to gear motor for star wheel lock.
18. Connection for mixer motor.
19. Connection for the vibrating unit.
20. Connection to the remote control cable.
21. Connection to main terminal.
22. Connection to the wet sensor / sensor in the pump material container.
23. Connection to the thermal sensor of pump motor
24. Connection to dry sensor / dry sensor in the material hopper for the mixer.
25. Connection for pump motor.

**** If the control lamp lights up or flashes red, the control voltage must be switched off or restarted.

13.2 Water supply heated Art. no. 00186555

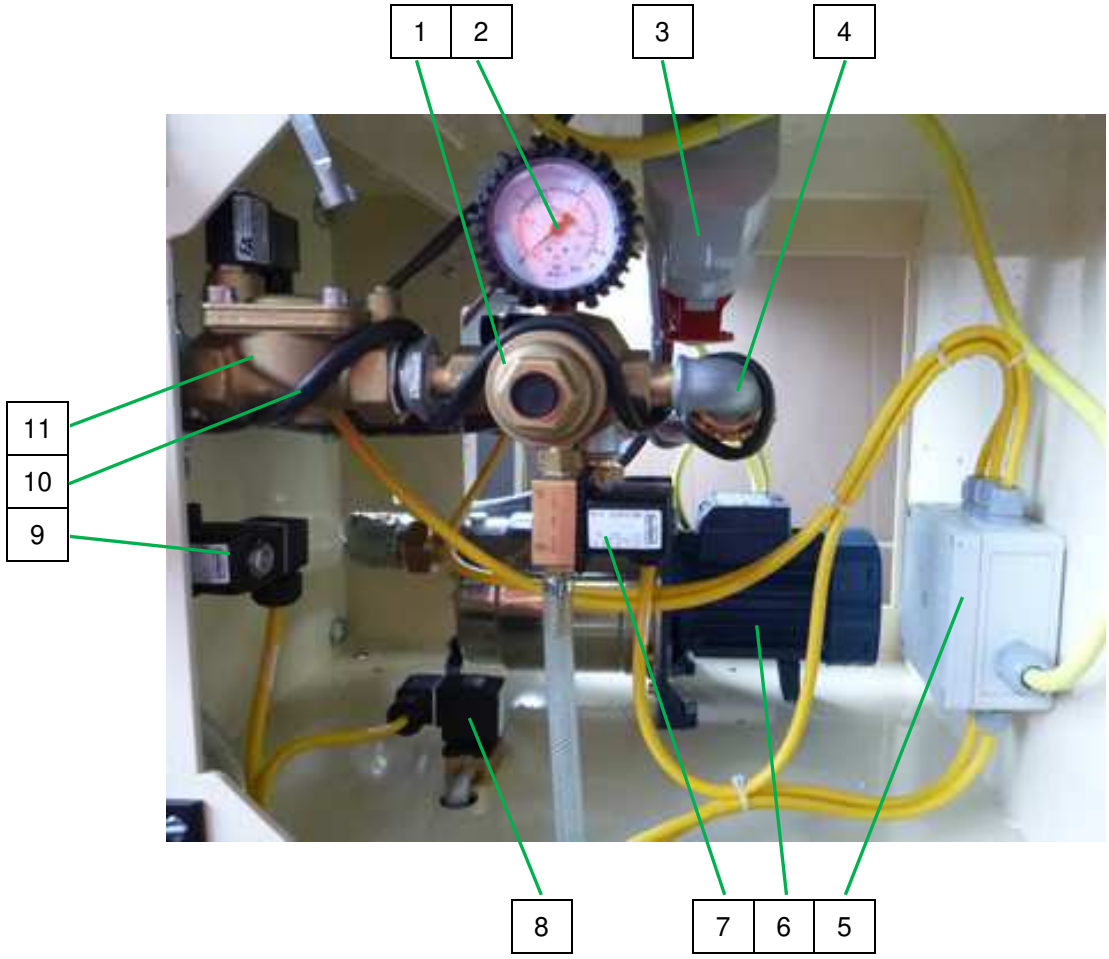


Fig. 8: Water supply assembly

1. Pressure reducer
2. Manometer for hydraulic pressure of the booster pump
3. Power connection of the booster pump
4. Water from booster pump to the pressure reducer / water flow meter
5. Distributor of power connection of solenoid valves
6. Booster pump
7. Solenoid valve drainage
8. Solenoid valve drainage
9. Solenoid valve drainage
10. Heater for water manifold
11. Solenoid valve water

13.3 Water supply heated Art. no. 00186555

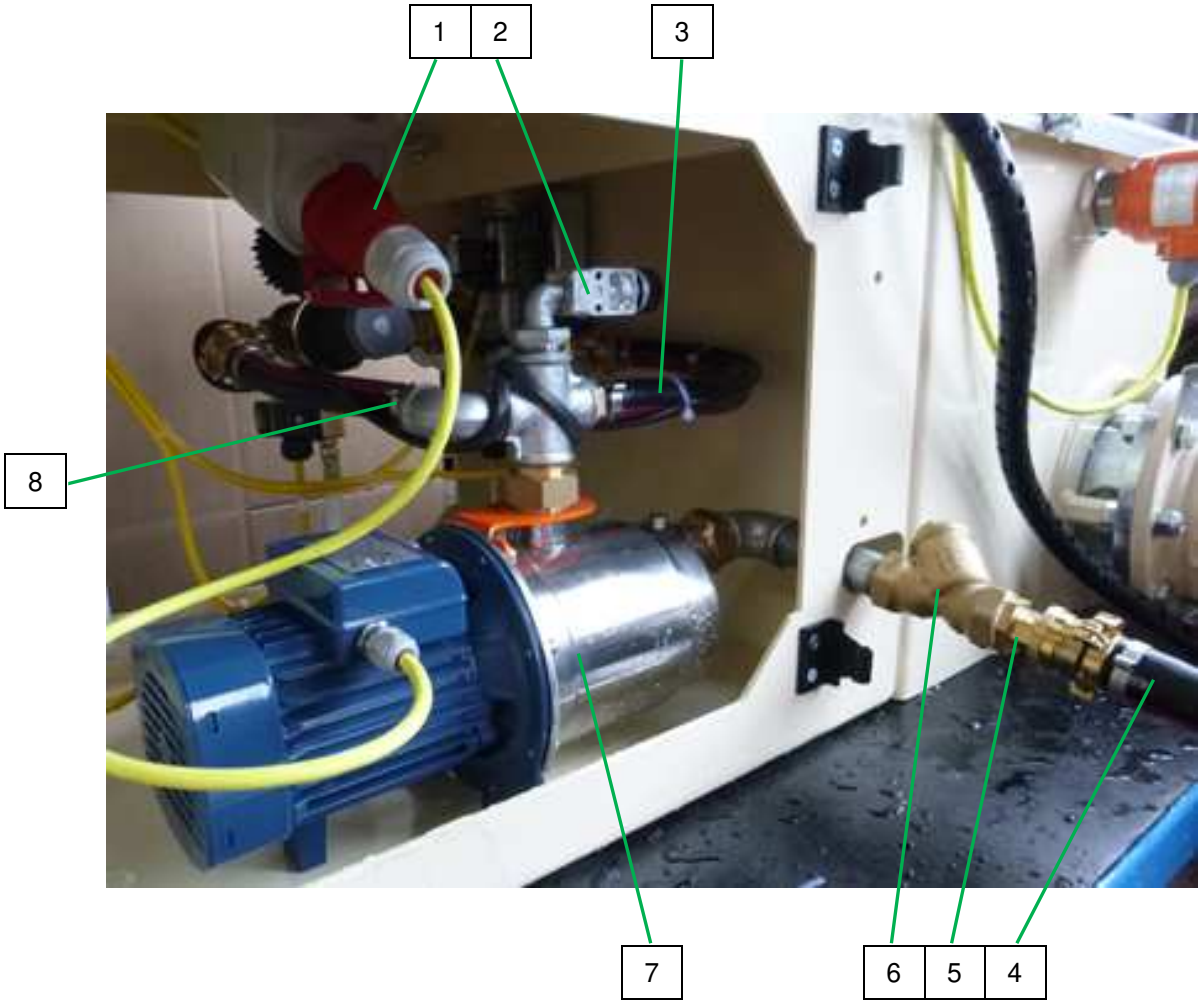


Fig. 9: Water supply assembly

1. Power connection of the booster pump
2. Pressure switch
3. Water hose from booster pump to the distributor of water extraction / hose cleaning
4. Water hose from network or water tank
5. Water inlet from network or water tank
6. Water inlet filter
7. Booster pump
8. Water from booster pump to the pressure reducer / water flow meter

13.4 Water supply heated Art. no. 00232147

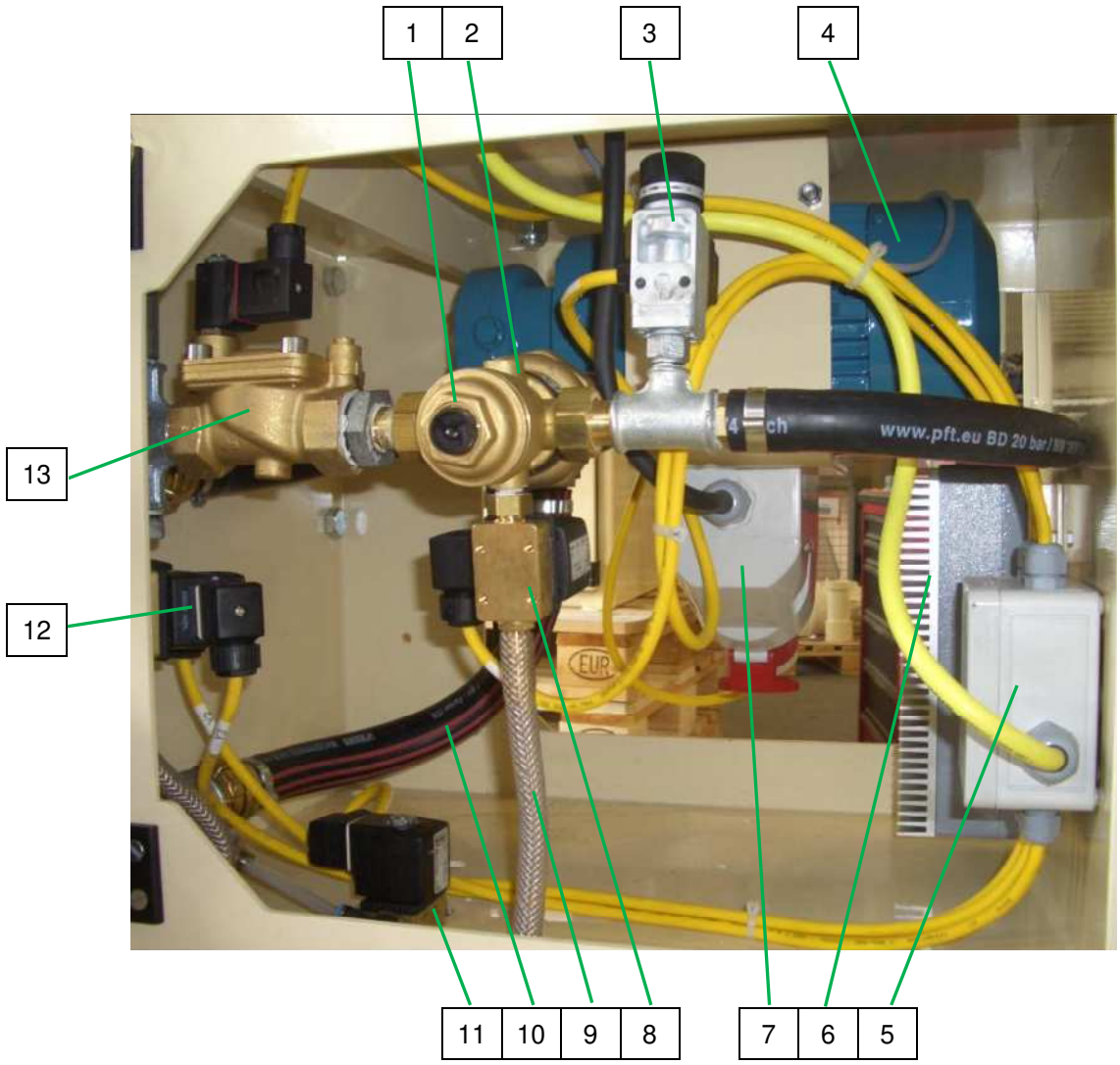


Fig. 10: Water supply assembly

1. Strainer chamber for pressure reducer
2. Pressure reducer
3. Pressure switch
4. Booster pump
5. Distributor of power connection of solenoid valves
6. Heater for water manifold
7. Power connection of the booster pump
8. Solenoid valve drainage
9. Drainage tube for solenoid valve
10. Water hose from water inlet to the booster pump
11. Solenoid valve drainage
12. Solenoid valve drainage
13. Solenoid valve water

14 Operating modes of selector switch

Fig. 11: Selector switch position “0”

<u>Main switch “ON”, control voltage “ON”, Selector switch position “0”,:</u>

Machine is ready for operation, green control lamp lights up.

By pressing the water supply button, the water pump starts (for adjusting the needle valve of water flow meter).

By pressing the vibrating unit button, the vibrating unit starts (to fill the star wheel lock).

The control lamps are checked by pressing the lamp test button.

Fig. 12: Selector switch water pump

<u>Main switch “ON”, control voltage “ON”, Selector switch water pump “Manual”:</u>

Water pump is in operation.

For cleaning the hoses or for water extraction by water extraction valve.

The water quantity evident on the sight glass of the water flow meter at the needle valve can be adjusted.

Fig. 13: Selector switch star wheel lock

<u>Main switch “ON”, control voltage “ON”, Selector switch star wheel lock “Manual”:</u>

Star wheel lock is in operation.

For emptying the star wheel lock.

For initial filling of the mixer material container until the dry sensor reacts.

Operating modes of selector switch

Fig. 14: Selector switch mixer

Fig. 15: Selector switch pump motor

Fig. 16: Selector switch automatic

Fig. 17: Run selector switch mixer empty

Main switch “ON”, control voltage “ON”, Selector switch mixer “Manual”:

Mixer is in operation.

Mixer is operated separately for filling the pump container.

Mixer and booster pump run on manual operation.

The mixer is switched off at full indication using the level sensor in the pump material container.

Main switch “ON”, control voltage “ON”, Selector switch pump “Manual”:

Pump motor is in operation.

Pump motor is operated separately to empty the pump motor container.

NOTE!

Never let the pump run dry.

Main switch “ON”, control voltage “ON”, Selector switch automatic mode:

1. Machine runs in automatic mode.
2. Star wheel lock fills the mixer automatically.
3. the mixer motor starts automatically at the full indication of the dry sensor.
4. the pump motor starts automatically at the full indication of the wet sensor in the pump material container.

NOTE!

Water factor must be set at prescribed value.

Main switch “ON”, control voltage “ON”, run Selector switch mixer empty:

At the end of work, shift the selector switch to pos.6.

Due to the follow-up time of 25 sec., approx. 50 litres of screed are pumped out of the machine.

The dry area of the mixer is emptied to 90%.

This function considerably eases the cleaning.

15 Functional description – work flow

The machine combination PFT **FERRO 100 II** is a continuously working mixing and conveying pump for processing floating screed.

Adhere to the usage directives of the material manufacturer.

The machine combination **PFT FERRO 100 II** is in use, ready for connection under a silo / container.

The material reaches in the collection tank of the conveying pump by a horizontal mixer equipped with its own drive after addition of water in mixing tube and is forwarded from there at up to 120 l/min to processing plant. The central control box with programmable logic control (PLC) regulates the interplay of the components in the automatic mode.

For the run-in of the system and even the cleaning after finishing the work, all functions can also be controlled manually at the control box.

For a more secure functioning of the system, an appropriate water pressure is necessary. With the integrated booster pump, even an external supply from a collection tank (water tank) is possible if the water quantity is not adequate. The pressure switch built-in the water supply switches off the machine in the event of very low pressure to avoid malfunctioning of the system.

15.1 Basic equipment

Depending on the construction site and application, the basic equipment of the mixing and pump unit consists of the following components:

- Tool cabinet
- Water installation cabinet
- Control box FERRO 100 II
- Star wheel lock with gear motor
- Central body of FERRO 100 II with mixing tube and gear motor
- Capacitive level sensor, dry material sensor
- Pump container with pump shaft and gear motor

15.2 Safety rules

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

16 Transport, packing and storage

16.1 Safety instruction for transport

Improper transport

ATTENTION!
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 fix at projecting machine parts or eyelets of attached components and ensure safe fit of the sling gear.
- Use only approved lifting gear and sling gear with sufficient lifting capacity.
- When ropes and chains are used in construction operations, the provisions contained in the ‘Load suspension devices in lifting gear operations’ (VBG 9a) accident prevention regulation should be complied with. The following sections contain instructions for scenarios in which ropes and chains are used as lifting means.

16.2 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.

Anchor points

Fig. 18: Crane transport

Anchor the machine at the anchor points for transport by crane.

Observe the following conditions:

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

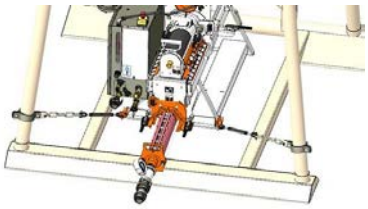
Attachment:

Anchor the hooks to both crane hooks accordingly.

Ensure that the package is straight, possibly observe eccentric centre of gravity.

In case of transport by crane, remove the loose parts.

16.3 Transport safety



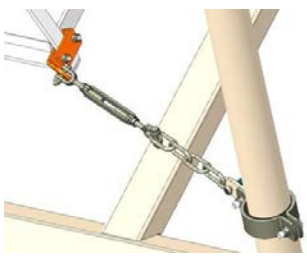


Fig. 19: Transport safety

Important!

Risk of injury due to unsecured load!

Before starting transport, make sure that:

- the machine is fixed to the silo by the chains..
- none of the chains, clamps or screws are damaged.
- all chains are evenly tensioned.

16.4 Transport by car or truck

DANGER!
Danger of injury by unsecured loads!
In case of road transport, all persons involved in the loading process are responsible for the proper securing of the load. The responsible driver is in charge of the operational loading.

16.5 Transport

Fig. 19: Truck transport

NOTE!

Truck transport:

Ensure the following before every ride:

- *That the chains between machine and silo are stretched and not damaged.*
- *Lock control box door.*
- *Connect the water hose to the mixing tube.*
- *Secure lose parts, or remove them.*
- *Pump material container must be completely empty and clean.*
- *Check for loose screws or nuts.*
- Check the tension belt on the water tank for cracks or damage.

NOTE!

Transport only with empty water tank and without material in the machine.

Fig. 20: Pump unit

Check the tie rods for strength.

16.6 Transport of already running machine

DANGER!
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).

1. Carry out the following steps before beginning the transport:
2. First unplug the mains cable.
3. Unplug all other cable connections and water hoses.
4. Start transport.
5. In case of transport by crane, remove the loose parts.

17 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.

ATTENTION!
Environmental damage due to wrong disposal!

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

Therefore:

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

18 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

NOTE!

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

Set up silo with Ferro

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 covers and protection devices are installed and work as intended.
- Never deactivate protection 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.

19 Set up silo with Ferro

Fig. 21: Set up silo

DANGER!
Danger of accident due to tilting silo!

Set up the silo / container with the machine in a stable position on a flat and firmly secured surface.

It must be ensured that the ground cannot yield due to the load on the silo and that the silo can therefore not tip over.

Set up the machine in such a way that it cannot be hit by falling objects.

The operating elements have to be freely accessible.

20 EMERGENCY OFF push button

Fig. 22: EMERGENCY OFF push button

NOTE!

Every day before starting work, check the EMERGENCY STOP push button.

- *Activate main switch.*
- *Control voltage “ON”.*
- *Activate EMERGENCY OFF push button.*

The control voltage is switched off by pressing the EMERGENCY STOP push button!

21 Preparation

21.1 Connection of power supply

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

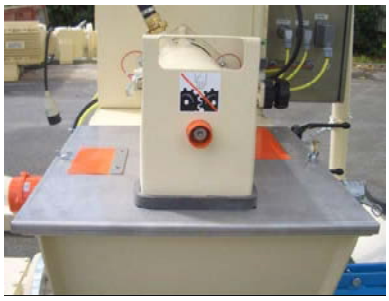


Fig. 23: Risk of injury

DANGER!
Rotating pump shaft!

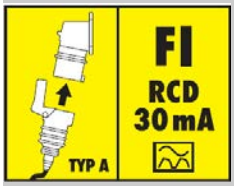
Risk of injury while reaching into the pump material container.

Therefore:

- During machine preparation and operation, the protection device must not be removed.
- Never reach into the running machine.

Fig. 24: Connect the power

Connect power to the 400 V construction site distribution box and the control box of the machine.



DANGER!
Danger to life from electric current!

The connection line has to be fused properly:

Connect the machine only to a power source with permissible RCCB (30 mA) RCD (residual current operated device) type A.

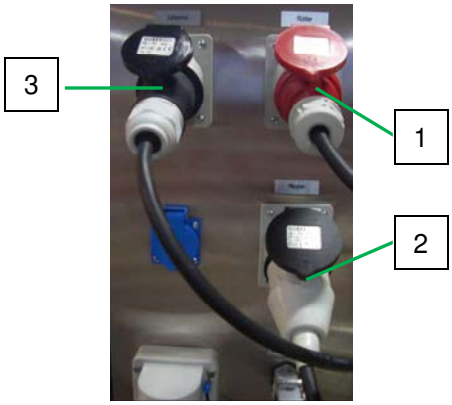


Fig. 25: Connect vibrating unit, mixer motor and star wheel

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.
- Using other or external power sources is forbidden for safety reasons.

- Connect the power supply for the vibrating unit (1).
- Connect the power supply for mixer motor (2).
- Connect the power supply for star wheel (star wheel lock) (3).

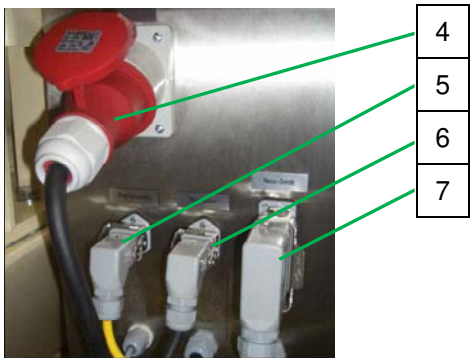


Fig. 26: Check the connections

All the connections should be made or checked before commissioning:

- Connect the power supply for pump motor (4).
- Connection dry sensor (5)
- Connection thermistor (6)
- Connection wet sensor (7)

Fig. 27: Connecting remote control

To set the water factor and the machine, use the dummy connector (8).

21.2 Connecting the water supply

Fig. 28: Water connection

- Connect to water supply with 3/4” hose.
- The water supply line must first be rinsed to vent the hose line and to clean it of contaminations.
- Connect the water hose to the water inlet (1).
- If the flow pressure is not adequate (at least 2.5 bar in running machine), either a second supply can be put in or it can be operated using a collection tank (water tank).

21.3 Connecting the water supply to the water tank

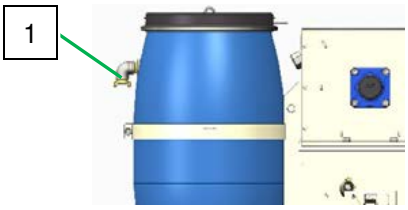


Fig. 29: Water tank

- Connect the water hose to the water tank (1).

21.4 Pre-setting the water flow rate

Fig. 30: Remove the water hose

Remove the water hose (1) from the mixing tube.

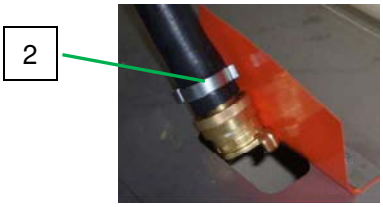


Fig. 31: Water hose

Put the water hose (2) from the mixing tube in the pump container.

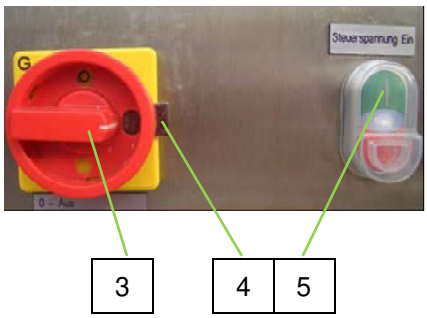


Fig. 32: Pre-setting

Set the main reversing switch (3) to ‘I’.

If the yellow control lamp “Change direction of rotation” lights up, the direction of rotation at the main switch must be changed.

If the direction of rotation is wrong, the following steps must be carried out:

The main switch is arrested in the zero position by pushing the selector membrane (4) to the left or right in a pre-setting. In this way, the direction of rotation is selected. If the switch is to the left, it can be switched back to zero, but is blocked for the right position.

Press the green push button operation ON / OFF (5).

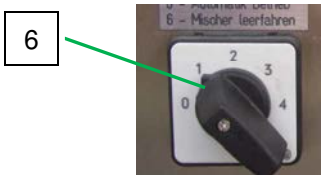


Fig. 33: Selector switch water pump

Water supply button

Switch the selector switch (6) to the stage “1”.

Press the water supply button (7).

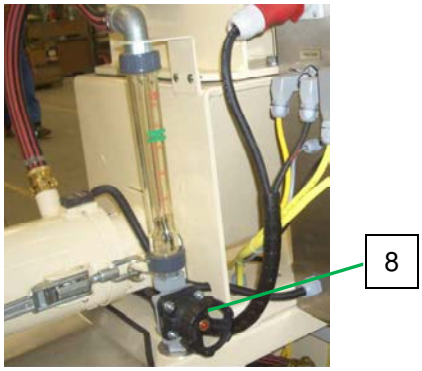


Fig. 34: Diaphragm valve

Simultaneously adjust the expected amount of water at the diaphragm valve (8).

The specifications of the material manufacturer must be observed here.

Subsequently turn the step switch to position “0” again.

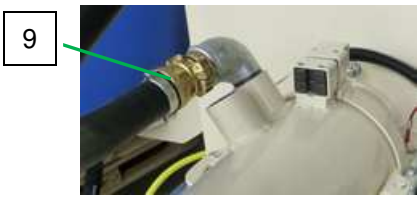


Fig. 35: Connecting the water hose

Take the water hose (9) out of the pump container and reconnect it to mixer tube.

Fig. 36: Press button ON / OFF

NOTE!

Before switching over from step switch to other operating modes, the control voltage must be switched off through the push button operation “ON” / “OFF” (11). After the switchover of the step switch, switch on the control voltage again via the push button.

Fig. 37: Selector switch “Manual pump”

Turn the selector switch to position “4” (Manual pump).

Empty the pump container till a little residual water remains.

NOTE!

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

22 Mortar manometer

Fig. 38: Mortar manometer

DANGER!
Operating pressure too high!

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

Therefore:

- Do not operate the machine without mortar pressure gauge.
- Use only 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.

22.1 Connect material hose

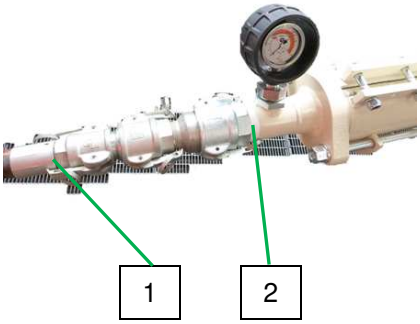


Fig. 39: Connect material hose

Pour approximately two litres of lime sludge into the material hose.

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

Lay material hoses in large radius so that no kinks form in the hoses.

Attach risers carefully in order to prevent them from tearing off under their own weight.

DANGER!

Torn off hoses can beat about and injure bystanders!

Fig. 40: Mortar manometer

DANGER!

Never loosen the hose couplings as long as there is pressure on the material hoses (check mortar manometer)! The mix could burst out under pressure and result in serious injuries, especially injuries to the eyes.

Fig. 41: Clean coupling connections

NOTE!

Ensure clean and correct connection of the couplings!

NOTE!

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

If 25 bar operating pressure are exceeded the mortar hose length must be reduced.

22.2 Drain water from pump container

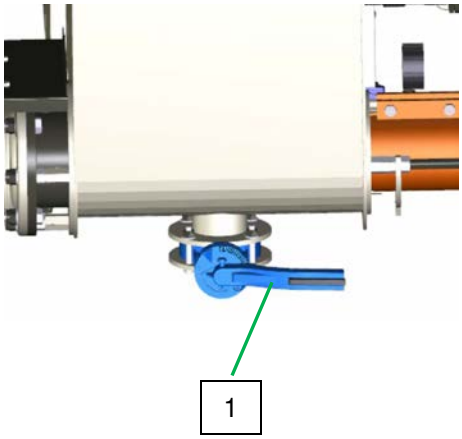


Fig. 42: Open cleaning hole

Open cleaning hole and drain the residual water from the pump container.

Only allow so much water into the pump container that the pump does not run dry during the initial operation.

23 Putting FERRO II into service

23.1 Risk of injury from discharged mortar

DANGER!
Danger of injury from discharged mortar!
Discharged mortar may lead to injuries to eyes and face.
Therefore:
– Never look into the hose end.
– Always wear protective goggles.
– Always position yourself in such a way that you are not hit by the mortar being discharged.

23.2 Automatic mode

Fig. 43: Automatic mode

Selector switch (1) to position “5” (automatic mode).

The control of the system runs in automatic operation in this switch position “Automatic mode”.

Star wheel lock starts, while the vibrating unit simultaneously goes into operation.

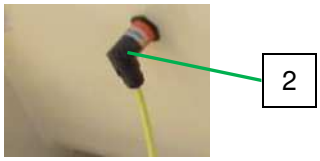


Fig. 44: Dry-sensor

The material level in the material hopper of the horizontal mixer is monitored by the dry sensor (2).

Upon full indication, the dry sensor switches off the star wheel lock.

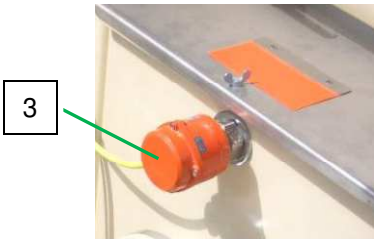


Fig. 45: Wet sensor

The material level in the material hopper of the pump container is monitored by a wet sensor (3).

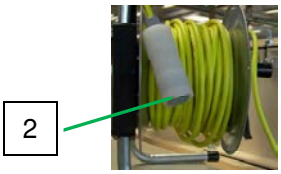
NOTE!

In order to ensure the functioning of the sensor, pay attention to the cleanliness of the sensor rod. We recommend cleaning every 3-4 hours.

23.3 Remote control

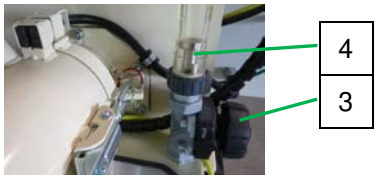
Disconnect the dummy connector (1) from the control box and insert the cable from the cable drum using the remote control.

Fig. 46: Connecting the remote control



The automatic mode can be switched on or off with the push button (2) on the remote control.

Fig. 47: Remote control



For optimal consistency in the mortar outlet, the addition of water by adjusting the amount of water on the diaphragm valve (3) can be corrected, if necessary. The amount of water is evident on the floater (4) of water flow meter.

Fig. 48: Correction of consistency

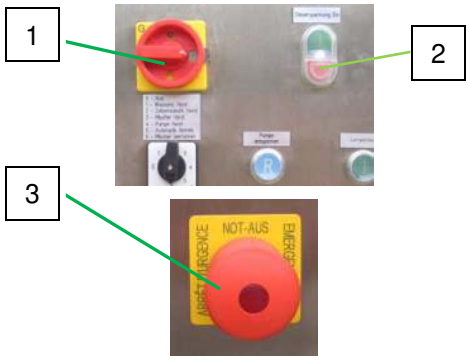
23.4 Lamp test

Fig. 49: Lamp test

NOTE!

Please press the push button “lamp test” (1) at least once per shift to check the function of the signal lamps. Faulty operation of the system can thus be prevented.

24 EMERGENCY STOP situation, end of work or interruption of work



The machine can be switched off via remote control, main reversing switch (1) or with the push button "OFF" control voltage (2) ON / OFF.

The EMERGENCY OFF (3) button is to be pressed in emergency situations.

Fig. 50: Switching off

NOTE!

After the end of work, the power supply and the water supply must be disconnected from the machine.

25 Shutdown in case of emergency

Shutdown in case of emergency

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

Fig. 51: Stopping

In case of danger proceed as follows:

1. Turn the main switch or the main reversing switch to position '**0**'.
2. Secure the main switch or main reversing switch against start-up using a lock.
3. Inform responsible person at the operational site.
4. If necessary, call for medical assistance and a fire brigade.
5. Recover persons from the danger zone, initiate First Aid measures.
6. Keep access routes free for emergency vehicles.

After the rescue operations

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.

- Before reactivation ensure that there are no persons in the danger zone anymore.

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

26 Work on troubleshooting

26.1 Reaction in the event of faults

Reaction in the event of faults

The following strictly applies:

1. In the event of faults presenting immediate danger to persons or property, activate the emergency OFF function immediately.
2. Determine cause for 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.

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

26.2 Fault displays

Fault displays

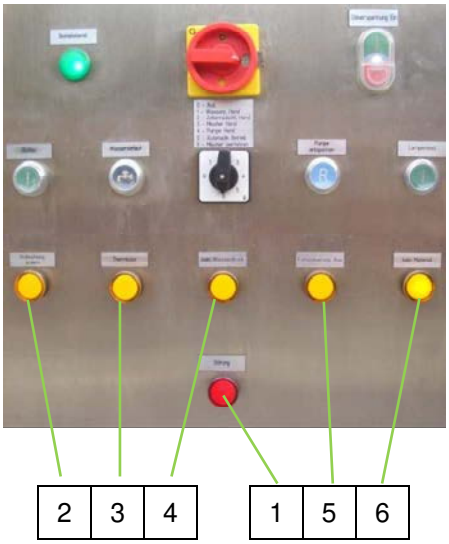


Fig. 52: Fault displays

The following installation indicates faults:

Pos.	Light signal	Description
1	Control lamp red	Lights up when the motor protection switch has been triggered. Check motor protection switch Q1 –
1	Control lamp blinks red	If the limit switch is faulty or if the mixing tube has been removed.
2	Control lamp yellow	Control lamp change direction of
3	Control lamp yellow	Control lamp thermistor
4	Control lamp yellow	Control lamp no water pressure
5	Control lamp yellow	Control lamp remote control OFF
6	Control lamp yellow	Control lamp no material

NOTE!
Phase control lamp (7) green (ready for operation):
If there is a phase error in the power supply, this lamp will not light and the machine will not be switched on.

26.3 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.

In the event of faults that cannot be rectified by means of the following notes, kindly contact the dealer.

26.4 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 the electrical system must, in principle, be carried out only by electricians.

Personal protective equipment

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

- Protective clothing
- Protective goggles
- Protective gloves

26.5 Table of faults

Fault	Possible cause	Troubleshooting	Rectification by
Water Machine does not start: Control lamp “no water pressure”	No water	Pressure switch or solenoid valve defective	Service engineer
	Water pressure too low - manometer shows less than 2 bar	Check water supply line, clean water inlet filter , supply line cross section at least ¾ inch.	Operator
	Water pressure too low	Check water supply line. Lay additional supply line. Water container as buffer.	Operator
Machine does not start: **Current**	Main switch not activated	Activate main switch	Operator
	Power supply not in order	Repair power supply	Service engineer
	Protection switch was triggered	Reset RCCB	Service engineer
	Motor protection switch triggered	Turn motor protection switch in control box to position 1	Service engineer
	“Operating button On” not	Press “Operating button On”	Operator
	“Manual/automatic selector switch was not in the middle position while switching on.	Bring the selector switch in the middle position and switch on the control again.	Operator
	Control lamp “Change direction of rotation” lights up or is always lit up	Change the direction of rotation at the main switch. Check fuse or supply line	Operator
	Micro fuses on the transformer	Replace micro fuses	Service engineer
Machine does not start	Too much dried material in the material hopper. Possible tunnel formation	**Caution:** Main switch **OFF** - Disconnect the main power cable. Empty the material hopper up to half of its capacity. Re-start machine.	Operator
	Hardened material clogs up the pump unit (rotor/stator)	**Caution:** Main switch **OFF** - Disconnect the main power cable. Disassemble, clean and re-install the pump.	Operator
	Excessively dry material in pump part	**Caution:** Main switch **OFF** - Disconnect the main power cable. Clean the material hopper	Operator
Machine does not start: **“No Material”**	Control is on “Run machine on empty”	Bring switch “Run machine on empty” to zero position	Operator
	Machine is started up with “Mixer container empty”	Set manual/automatic selector switch to manual mode; press the vibrating unit button until the control	Operator
	Dry material sensor faulty	Replace dry material sensor	Operator

Work on troubleshooting

Fault	Possible cause	Troubleshooting	Rectification by
Control lamp **“thermistor”**	Overheating of pump motor	Shorten mortar hose or increase the cross section; let the pump motor cool down	Operator
	Pump motor defective	Exchange pump motor	Service engineer
Remote control off	Plug of the remote control cable not inserted properly.	Check the proper fit of the plug	Operator
	Remote control cable defective	Repair or replace remote control cable	Operator
		Work with dummy connector without the option of remote control	
Mixing motor does not start in automatic mode	Plug of the capacitive wet sensor not inserted properly	Check the proper fit of the plug	Operator
	Wet sensor defective	Replace component	Service engineer
	Wet sensor contaminated	Remove the material sticking to the sensor	Operator
Mixer motor remains in automatic mode, although pump hopper is not yet filled	Safety time stored in the PLC for filling the pump hopper has expired	Briefly position the manual/automatic switch at zero and turn back on “Automatic”	Operator
		In case of repeated failure, check the flow rate of the mixer	Operator
	Defective capacitive wet sensor	Replace defective component	Service engineer
Solenoid valve does not open	Solenoid valve contaminated	Dismount solenoid valve and clean	Service engineer
	Solenoid valve defective	Change solenoid valve	Service engineer
Water is running on in mixer standby	Solenoid valve contaminated	Dismount solenoid valve and clean	Service engineer
Pump motor does not switch on in automatic mode	Wet sensor contaminated	Remove the material sticking to the float gauge	Operator
	Defective wet sensor	Replace defective component	Service engineer
	Mechanical blockage of system parts	Check pump shaft Check rotor and spiral casing, change the direction of rotation briefly if required.	Operator
	Overheating/overloading of pump motor	Shorten mortar hose or increase the cross section	Operator
	Pump motor defective	Exchange pump motor	Service engineer

Work on troubleshooting

Fault	Possible cause	Troubleshooting	Rectification by
Water is not flowing.	Solenoid valve (hole in membrane blocked)	Clean solenoid valve	Service engineer
Flow meter does not display water quantity.	Solenoid coil defective	Change solenoid coil	Service engineer
	Pressure reducing valve closed	Open pressure reducing valve	Operator
	Needle valve closed	Open needle valve	Operator
	Cable to solenoid valve defective	Replace cable to solenoid valve	Service engineer
Programme does not start	Micro fuse on the transformer	Replace micro fuse	Service engineer
	Level indicator, manual-0-automatic switch faulty	Check parts and replace them if necessary	Service engineer
	Defective requirement	Check parts and replace them if	Service engineer
	Manual/automatic selector switch is on “manual”	Bring selector switch to the middle position	Operator
	Remote control drawn	Put on dummy connector	Operator
	Conveyor line blocked	See Removal of blockages in the hose	Operator
	PLC-control program sequence	Check the programme sequence	Service engineer
Very less material in the machine	Material does not flow from the	Connect vibrating unit	Operator
	Level sensor	Clean level sensor	Operator
Pump does not start	Pump motor defective	Replace the pump motor	Service engineer
	Connection cable defective	Change connection cable	Service engineer
Consistency variation “Thick-thin”	Water safety switch set incorrectly or defective	Adjust or replace water safety switch	Service engineer
	Pressure reducer set incorrectly	Adjust pressure reducer	Service engineer
	Rotor/stator is worn out	Replace rotor/stator	Service engineer
	Clamp stretched too loosely	Retension clamp	Service engineer
	KPS 1 sensor is contaminated	Cleaning sensor	Operator
	Too little water	Water tank as intermediate buffer	Operator
	Water inlet filter contaminated	Clean or replace filter	Operator
Mixer does not start	Excessively pressed in / hardened material in mixing tube	Open and clean mixing tube	Operator
	Wet or hardened material in the dosing zone	Open and clean dosing zone	Operator
Control lamp red, fault lights up	Overload due to the pump getting blocked with dry material	Run the machine in backward mode, remove pump and clean it	Operator

26.6 Transport is at a standstill / Blockage

Clogging might form in the feed hoses for several reasons. This means that the material to be conveyed remains stuck in the feed hoses and cannot be pumped to the hose ends.

26.7 Removal of clogging in hoses / Signs of blockages

- Implementation by operator:
- 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 material hose,
- no material discharge at the hose end.

26.8 Causes for this could be:

- Highly worn mortar hoses,
- work interruptions,
- badly greased mortar hoses,
- residual water in material hose,
- clogging of the pressure flange,
- strong tapering at the couplings,
- kink in material hose,
- Poorly pumpable and separated materials.

26.9 Prior damage of the material hose

NOTE!

Should the pressure in the material hose exceed 60 bar only for a short term 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.

26.10 Change direction of rotation of the pump motor in case of blocked hoses

Fig. 53: Switching off

DANGER!
Danger from discharged material!

Never loosen the hose couplings as long as the pressure head is reduced! 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 to position themselves in such a way that they cannot be hit by discharged material. Other persons have to clear the area.

Turn the main switch to position “0”.

Fig. 54: Mortar manometer

DANGER!
Overpressure on the machine!

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

– Open the mortar hoses only when the pressure has dropped to "0" bar.

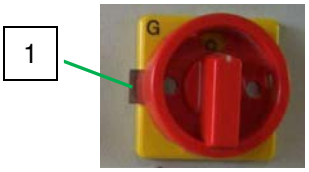


Fig. 55: Change direction of rotation

The main reversing switch is arrested in the zero position by pushing the selector membrane (1) to the left in a pre-setting and the direction of rotation is thus selected.

If the switch is to the left, it can be switched back to zero, but is blocked for the right position.

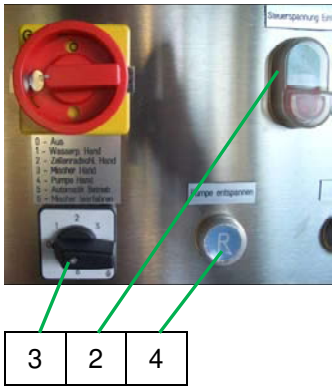


Fig. 56: Change direction of rotation

Press the green push button operation “ON” (2).

Press selector switch (3) to “0” position (OFF).

Press and hold the push button (4) (relax the pump), (pump runs backwards) until the pressure on the mortar manometer drops to "0" bar.

Remove the blockage by briefly pumping back and re-conveying.

If necessary, repeat the process several times.

Turn the selector switch (3) to position “5” (automatic mode).

Change the direction of rotation again at the main reversing switch.

Start the machine.

26.11 Detach coupling connections

Fig. 57: Loosen coupling

If the blockage cannot be released:

Cover coupling connections with tear-proof film.

Loosen cam leaver and hose connections.

NOTE!

Clean material hoses immediately.

Dislodge the blockage by tapping or shaking at the place where the blockage is located.

If necessary, rinse the material hoses with a water hose and then slurry again.

26.12 Interruption in conveying

NOTE!

Avoid production interruptions as much as possible.

27 Rest

Fig. 58: Switching off

NOTE!

Always *pay attention to* the setting time of the material to be processed and the *external temperatures.*

The machine can be switched off via remote control, main reversing switch control voltage ON / OFF or with the main switch.

Clean the system and material hoses depending on the setting time of the material.

28 Cleaning

28.1 Run the machine empty

Fig. 59: Run the machine empty

The machine has to be cleaned daily.

In addition, before end of work:

Turn the selector switch (1) to position “6” (empty the mixer).

Star wheel lock and vibrating unit stop.

The mixer conveys material in the pump container till the pilot lamp “No Material” lights up.

The machine shuts down after 25 seconds.

NOTE!

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

28.2 Remove the material hoses

Fig. 60: Mortar pressure to "0"

Check the mortar pressure gauge if the mortar pressure has lowered to "0".

If necessary, change the direction of rotation of the pump motor and let the pump run backwards for a short time. See chapter 10.10

DANGER!
Overpressure on the machine!

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

Therefore:

– Open the mortar hoses only when the pressure has dropped to "0" bar.

Fig. 61: Sponge ball

Disconnect material hose from pressure flange.

NOTE!

The mortar hoses must be cleaned immediately.

Press the sponge ball into the mortar hose.

Fig. 62: Remove the material hoses

Connect the hose with inserted sponge ball to the cleaning nozzle.

28.3 Clean material hoses immediately

Fig. 63: Clean hoses

Turn the selector switch to position “1” (Manual water pump).

Open the tap on the cleaning nozzle until the sponge ball emerges at the end of the hose (the remaining material in the hose can still be used).

Repeat this process until the hoses are clean.

29 Cleaning the mixer

29.1 Safety shutdown at the mixing tube

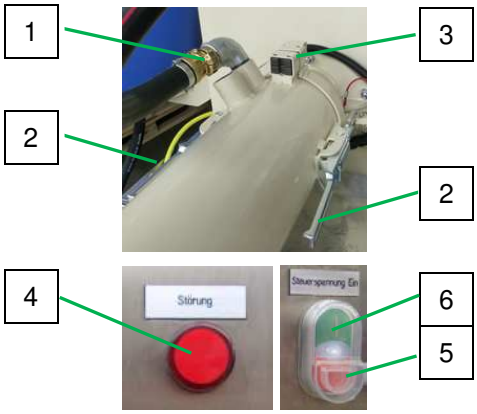


Fig. 64: Cleaning the mixer

Remove the water hose (1) from the mixing tube.

Release quick fasteners (2) and remove mixing tube.

Pull the mixing shaft out of the mixing tube and clean parts.

NOTE!

Safety shutdown (3).

If the mixing tube is removed, the booster pump is in operation only for cleaning purposes of the machine.

If the control lamp flashes red, the control voltage must be switched off (5) or restarted (6).

Fig. 65: Cleaning the pump container

NOTE!

Do not clean dry section with water.

Do not clean FERRO II with a steam jet or high-pressure cleaner.

Connections and gaskets will be damaged because of this.

30 Cleaning the machine and pump container

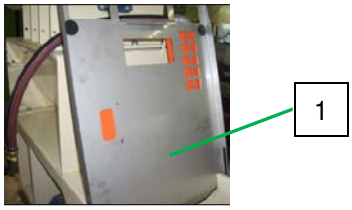


Fig. 66: Cleaning the pump container

Fold up the cover (1) of the pump container.

At the same time, this also acts as a protective cover for the dry zone.

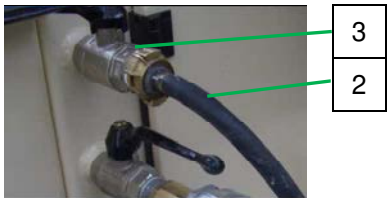


Fig. 67: Connecting the water hose

Connect the water hose (2) to the water extraction valve (3).

Cleaning the machine and pump container

Fig. 68: Cleaning the pump container

Use water jet to free the machine and pump material container from adhering residual floating screed.

Fig. 69: Cleaning nozzles

Open the butterfly valve and drain off remaining water.

Close the butterfly valve and partially fill the pump material container with water.

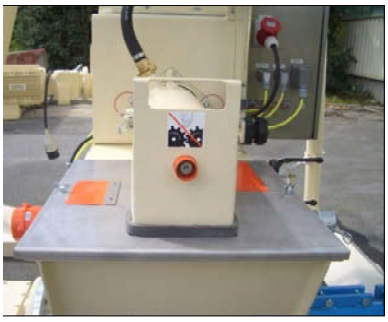


Fig. 70: Installing mixing tube

Mount mixing tube on the dry material container.

NOTE!

While installing the parts, ensure that they are clean and dry.

Pay attention to the correct fit of metering and mixing shaft.

Always keep the quick closures and gaskets clean. Grease the bearing journal and connecting pieces of the mixing shaft.

Fig. 71: Emptying the pump container

Turn the selector switch to position “4” (Manual pump).

Pump residual water out of the pump container.

Open the butterfly valve again and drain the residual water.

Subsequently, allow the pump to run dry for 2-3 seconds to drain residual water from the pump.

NOTE!

After the end of work, the power supply and the water supply must be disconnected from the machine.

31 Action in case of power failure

Fig. 72: ON/OFF switch

NOTE!

The FERRO II is equipped with a restart interlock. In case of a power cut, the system must be restarted by pressing the push button control voltage ON/OFF.

NOTE!

The mortar hoses must be cleaned immediately.

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

32 Measures to be taken in case of water outage

NOTE!

Water can be supplied to the machine from a container by means of suction strainer (article number 00 00 69 09).

33 Measures in case of risk of frost

33.1 Remove the water hose

Fig. 73: Remove the water hose

Disconnect the water hose from the water manifold or from the water tank.

Disconnect the water hose form the mixing tube.

Fig. 74: Empty water tank

- Empty water tank.

NOTE!

In case of a currentless machine, the solenoid valves of the water supply automatically open and the water can run off, so that there is no more water in the water supply when there is a risk of frost.

As soon as the machine is supplied with power, the solenoid valves close again.

34 Maintenance

Basic information

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

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

Therefore:

– Prior to starting the works ensure that there is enough space to carry out the works.
– Ensure order and safety at the assembly site! Loose components and tools on top of one another or lying about pose potential accident risks.
– f components were removed, ensure proper assembly and put back all fastening elements.

Electrical system

DANGER!
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.

Fig. 75: Remove connection cable

Secure against restarting

DANGER!
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 energy supplies before starting any work and secure against restarting.

NOTE!

Maintenance of the FERRO II is limited to a few checks. Thorough cleaning after use is the most important maintenance.

Mixing tube / mixer / outlet / pump container / pump:

Regular check on caking.

34.1 Adjust pump

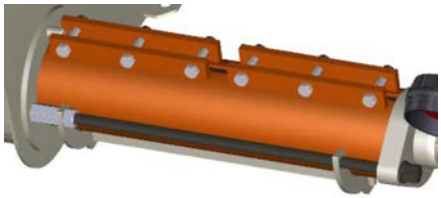


Fig. 76: Stator can be retightened

The FERRO II is equipped with a stator that can be retensioned.

If the pumping pressure decreases, the stator can be adjusted.

The supply pressure is approx. 20 – 25 bar.

Do not adjust the pump during operation.

The lesser the voltage of the spiral casing, the lesser is the wear of the spiral pump.

34.2 Change pump

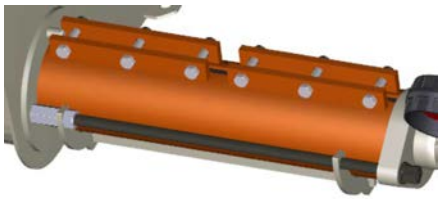


Fig. 77: Change pump

Pump parts that do not achieve the required pumping pressure when clamped, have to be replaced.

When changing the pump, it has to be ensured that:

- all screws of the clamp are tightened uniformly.
- the tie rod screws for rubber stators must not be tightened too much and the sheath end in the flanges must be positioned flush and centred.

NOTE!

Only store assembled pump (rotor in stator) for a few days as rotor and stator can get connected inseparably in case of prolonged storage.

34.3 Tightening torque of tie rod screws

34.3.1 Do not load the pump unit

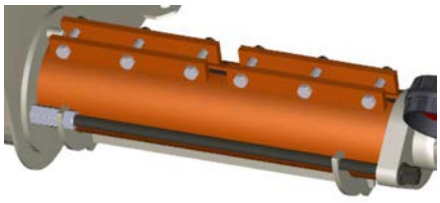


Fig. 78: Tightening torque

NOTE!

Tighten the tie rod screws of the pump unit with a torque of 98 Newton metres.

NOTE!

Do not load pump unit with heavy objects.

Do not stand on the pump unit.

34.4 Replace the pump motor

Fig. 79: Threaded bolts

NOTE!

When changing the pump motor, always replace the threaded bolts and safety nuts.

Screw in the threaded bolt up to the stop.

Threaded bolts M16x100 Article number 00614395.

Safety nuts M16 Article number 20207300

34.5 Do not load pump motor

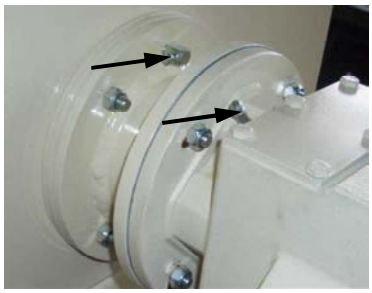
Fig. 80: Pump motor

NOTE!

Do not load pump motor with heavy objects.

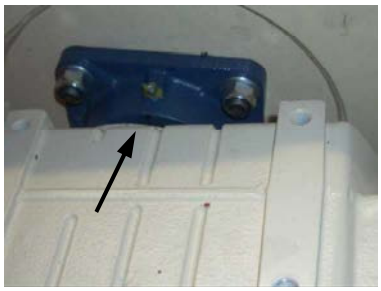
Do not stand on the pump motor.

34.6 Lubrication during maintenance



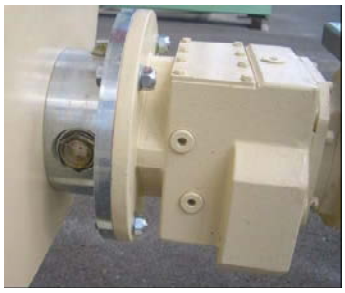
Lubrication:
Mixer motor and grease retainer unit
Lubrication with standard lubricating grease

Fig. 81: Lubrication



Lubrication:
Star wheel lock

Fig. 82: Lubrication



Weekly check at the inspection glass of the seal unit.
Top up seal unit with commercially available gear grease.

Fig. 83: Greasing status

34.7 Cleaning filters

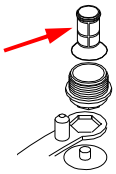


Fig. 84: Water inlet filter for pressure reducer

Clean the water inlet filter in the pressure reducer at least every two weeks, replace if necessary.
Screen for pressure reducer: Article number 20156000

Check the water inlet filter in water inlet daily.

Filter insert ES 30-1" A: Article number 20152011

Fig. 85: Water inlet filter

Electrical system

DANGER!
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.

34.8 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.
- Lubricants must not be mixed. This is especially true for mineral and synthetic lubricants. When using synthetic lubricants, attention must be paid to the compatibility with sealing ring materials. Overfilling the helical gear units can lead to intolerable heat.

34.9 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.

35 Refilling the silo

NOTE!

The silo can be refilled during operation.

36 Disassembly

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

36.1 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 at 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 fall over.
– In case of doubt, consult the dealer.

Electrical system

DANGER!
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:

– Prior to beginning the disassembly, switch off the power supply and finally disconnect it.

36.2 Disassembly

Clean the device for phasing out and disassemble under observance of applicable health and safety rules as well as environmental regulations.

Prior to starting the disassembly:

- Switch off device and secure against restarting.
- Physically separate the complete energy supply to the device, discharge stored residual power.
- Remove operating supplies as well as remaining processing materials and dispose of in an environment-friendly way.

37 Disposal

If no agreement for the recovery or the disposal was made, recycle the disassembled components:

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

ATTENTION!
Environmental damage in case of incorrect disposal!

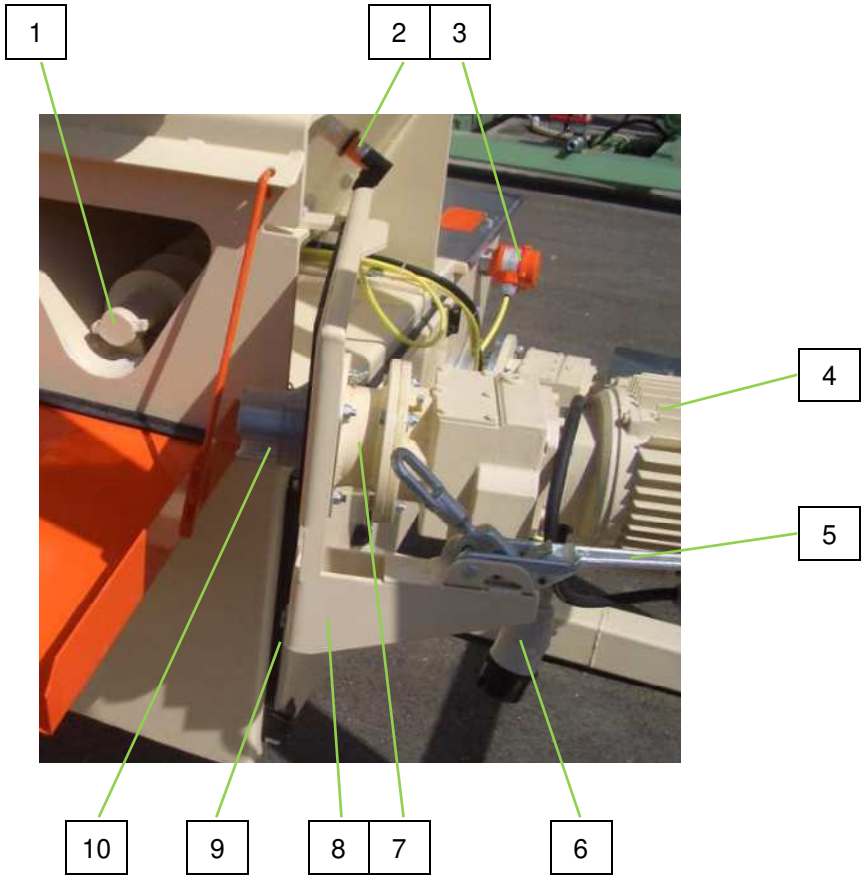
Waste from electronic and electrical equipment, electronic components, lubricants and other auxiliary materials are subject to hazardous waste treatment and must be disposed of by specialised companies only!

The local authority or special waste management operators can supply information on environmentally-friendly disposal.

Spare parts drawing, spare parts list

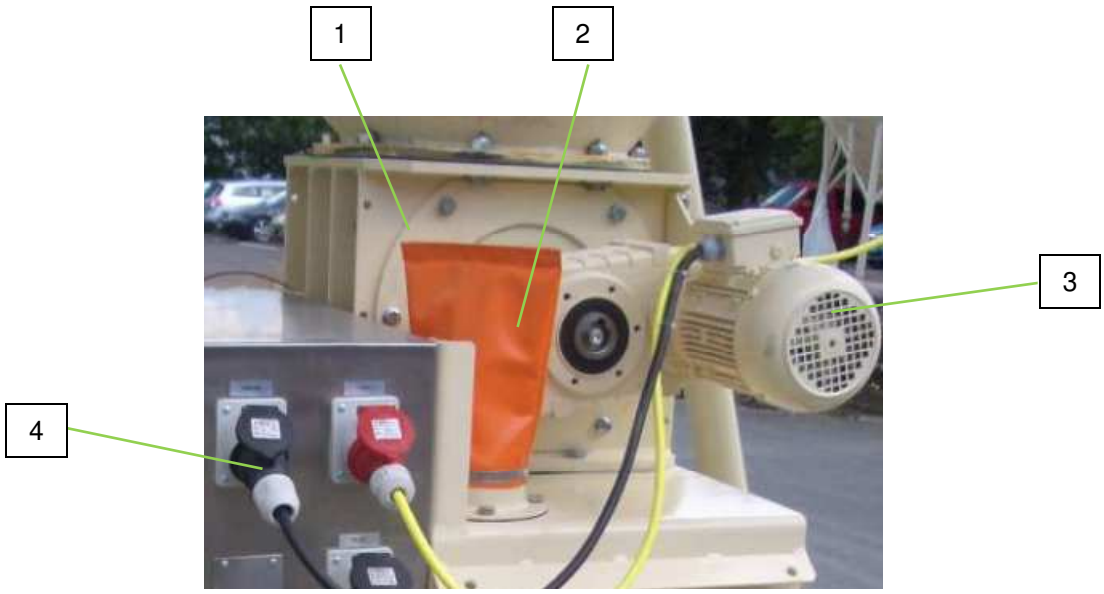
38 Spare parts drawing, spare parts list

38.1 Mixer motor / dosing shaft



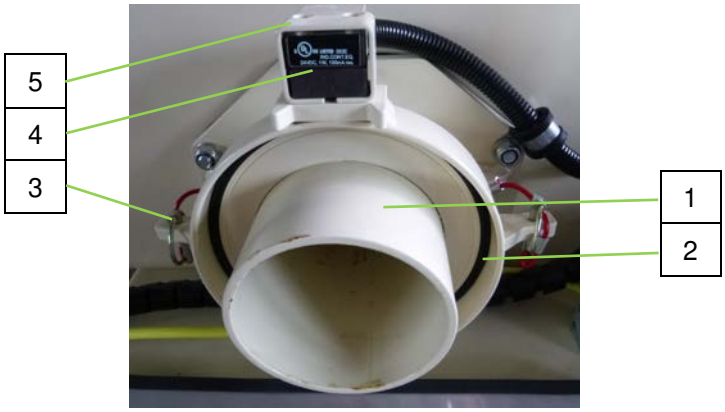
Pos.	Quantity	Art. no.	Name
1	1	00193318	Dosing shaft FERRO 100 II RAL1015 **manufactured on or before 07.2016**
	1	00551148	Dosing shaft FERRO 100 II half-shell RAL1015 **manufactured from 08.2016 onwards**
2	1	00022257	Dry material sensor complete FERRO II
3	1	00216381	Level sensor KPS1 1.5 m 90, long control plug, 10-pin
	2	00214853	Washer polyethylene 30x36x1.0 mm
4	1	00083456	Gear motor ZF38 5.5kW 400U RAL1015 **manufactured on or before 07.2016**
	1	00655969	Gear motor 6.05 kW, 292 rpm, SK25 **manufactured from 08.2016 onwards**
5	1	20100801	Quick release fastener with locking device M14
6	1	00201383	Motor connection cable 0.85m CEE plug 5x16A black
7	1	00550935	Housing for engine sealing closed RAL1015
8	1	00186600	Swivel-mounted motor flange FERRO 100 II RAL9015
9	1	00193350	Gasket 350x280x6mm FERRO 100 II
10	1	00193567	Hauling bracket HM/FERRO 100 II, galvanised

38.2 Star wheel lock FERRO II complete



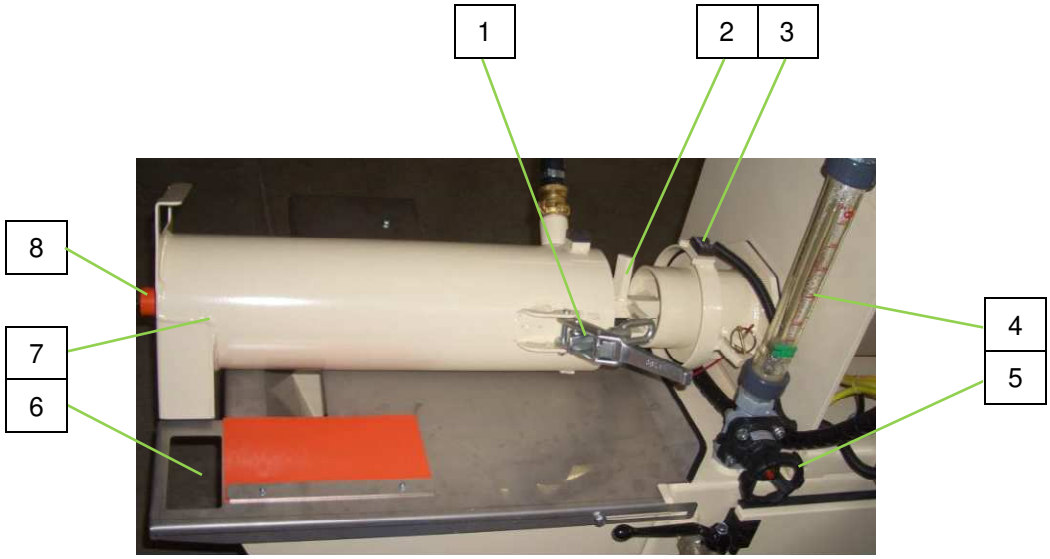
Pos.	Quantity	Art. no.	Name
1	1	00035135	Star wheel lock FERRO II complete RAL1015
2	1	00008640	Rain cover, filters and hose clamps for CMP and delivery hood
3	1	00731306	Gear motor 0.75 kW, 11 U/min, 400 V RAL1015
4	1	00037560	Motor connection cable 1.25 m CEE 4 x 16A

38.3 Dosing tube FERRO II



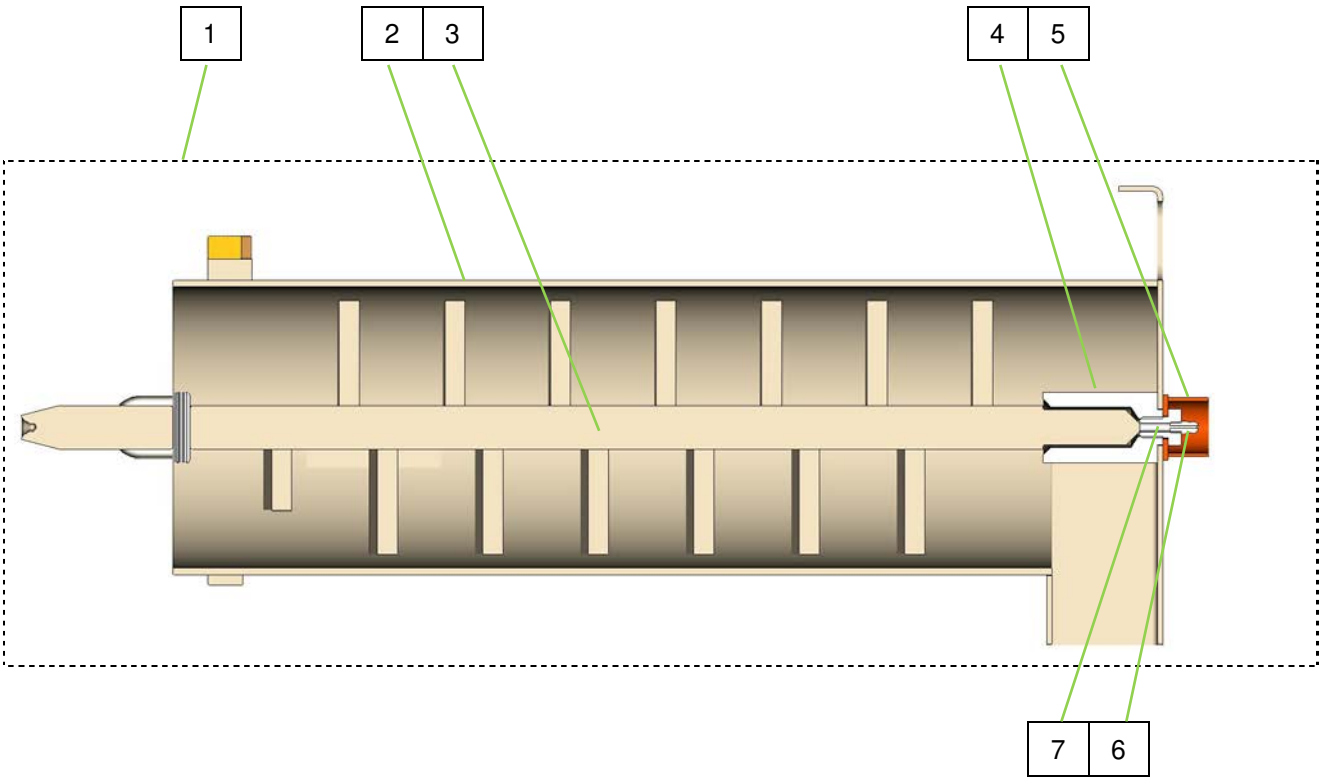
Pos.	Quantity	Art. no.	Name
1	1	00193305	Dosing tube FERRO 100 II RAL1015
2	1	00023668	O-ring 158 x 6
3	2	20101010	Lynch pin D 4.5 with ring
4	1	00186391	Magnet-actuated safety sensor, 2 openers / 1 closer (BNS250)
5	1	00466828	Protection for magnetic switch RAL1015

38.4 Mixing tube FERRO II



Pos.	Quantity	Art. no.	Name
1	2	20100801	Quick release fastener with locking device M14
2	1	00551154	Mixing shaft FERRO 100 II long half-shell RAL1015
3	1	00186391	Magnetic/ safety sensor 2Ö/1S
	1	00057992	Magnetic actuator for safety sensor
4	1	20185001	Water flow meter 250-2500 l/h cmpl.
5	1	20171741	Diaphragm valve 1"
6	1	00206113	Protection grille FERRO 100 II VA lowered
7	1	00222137	Mixing tube FERRO 100 II round RAL1015
8	1	00219318	External warehouse mixing tube FERRO 100 II, galvanised

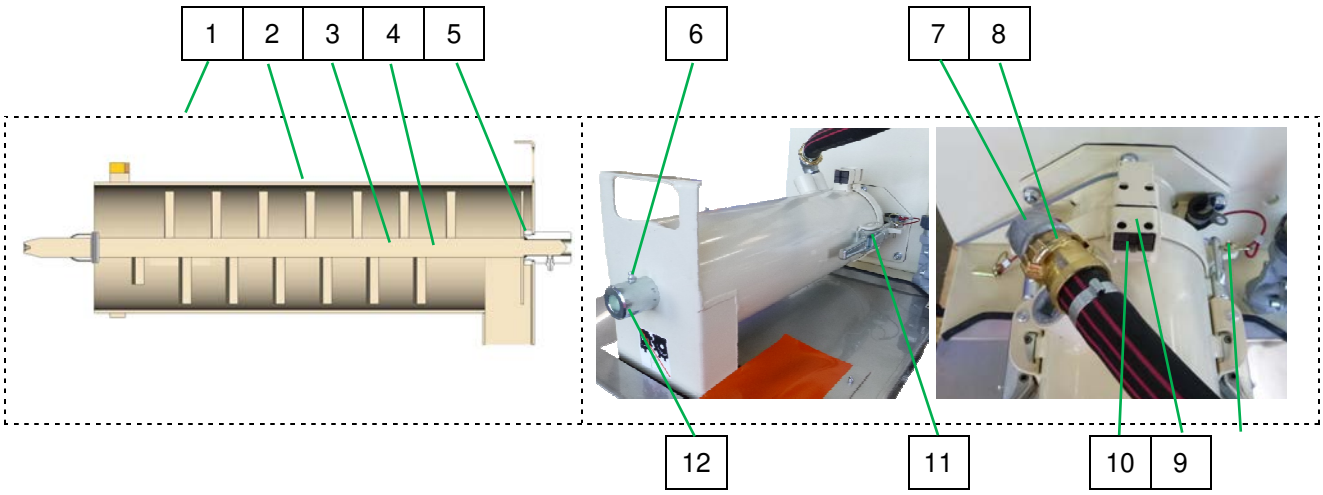
38.5 Mixing tube FERRO II “ALT”



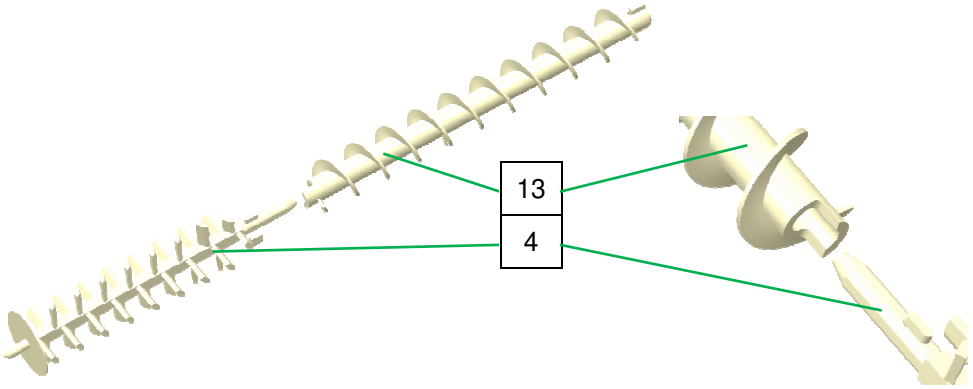
Pos.	Quantity	Art. no.	Name
1	1	00193708	Mixing tube FERRO 100 II RAL1015 complete
2	1	00193357	Mixing tube FERRO 100 II RAL1015
3	1	00193402	Mixing shaft FERRO 100 II RAL1015
4	1	00069797	Bearing bush HM 5 OCTAGON, galvanised
5	1	00069795	Protective sleeve for lubricating nipple RAL2004
6	1	00255463	Lubricating nipple M 6 x 1.0
7	1	00068887	Hexagon screw M12 x 16 with hole M6

Spare parts drawing, spare parts list

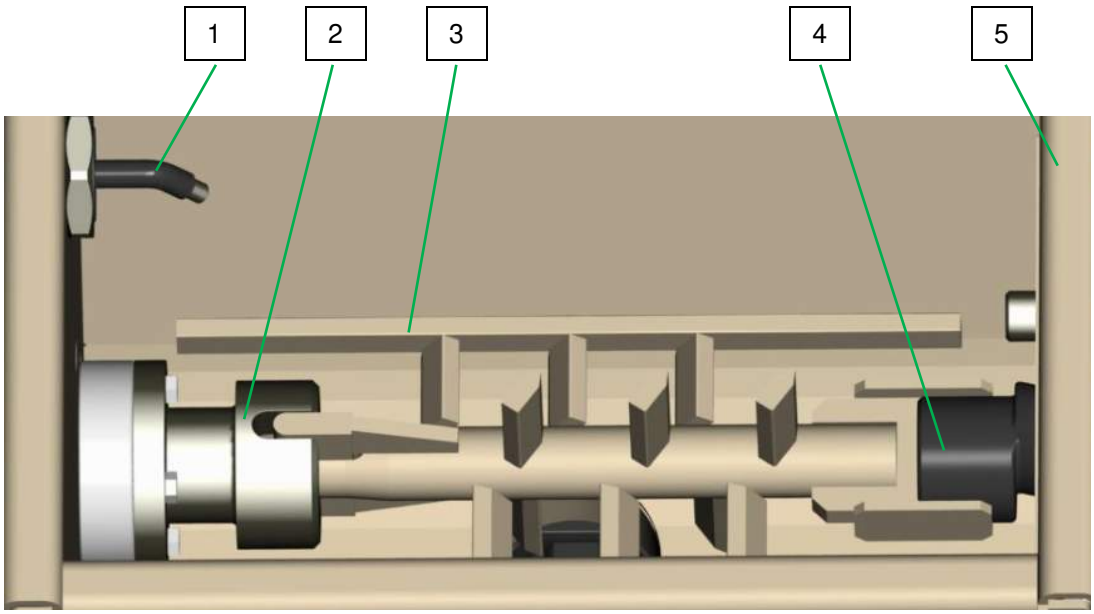
38.6 Mixing tube FERRO II “NEW”



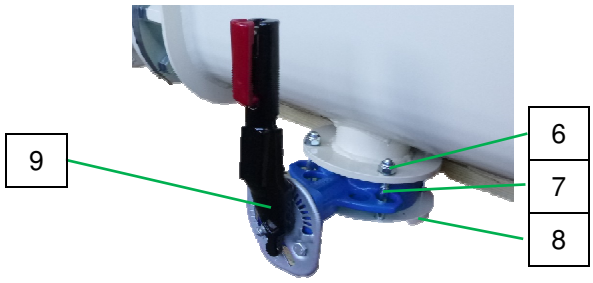
Pos.	Quantity	Art. no.	Name
1	1	00193708	Mixing tube FERRO 100 II RAL1015 complete
2	1	00222137	Mixing tube FERRO 100 II round RAL1015
3	1	00222145	Mixing shaft FERRO 100 II long RAL1015 **manufactured on or before 07.2016**
4	1	00551154	Mixing shaft FERRO 100 II long half-shell RAL1015 **manufactured on or before 08.2016**
5	1	00080861	Tube nut G 1"
6	1	00035571	Lubricating nipple M 8
7	1	20203620	Angle 1" internal thread-external thread, galvanised
8	1	20200800	Geka coupling 1" external thread
9	1	00472315	Protection for magnet RAL1015
10	1	00057992	Magnetic actuator for safety sensor
11	2	20100801	Quick release fastener with locking device M14
12	1	00219318	External warehouse mixing tube FERRO 100 II, galvanised
13	1	00551148	Dosing shaft FERRO 100 II half-shell RAL1015 manufactured from 08.2016



38.7 Pump container



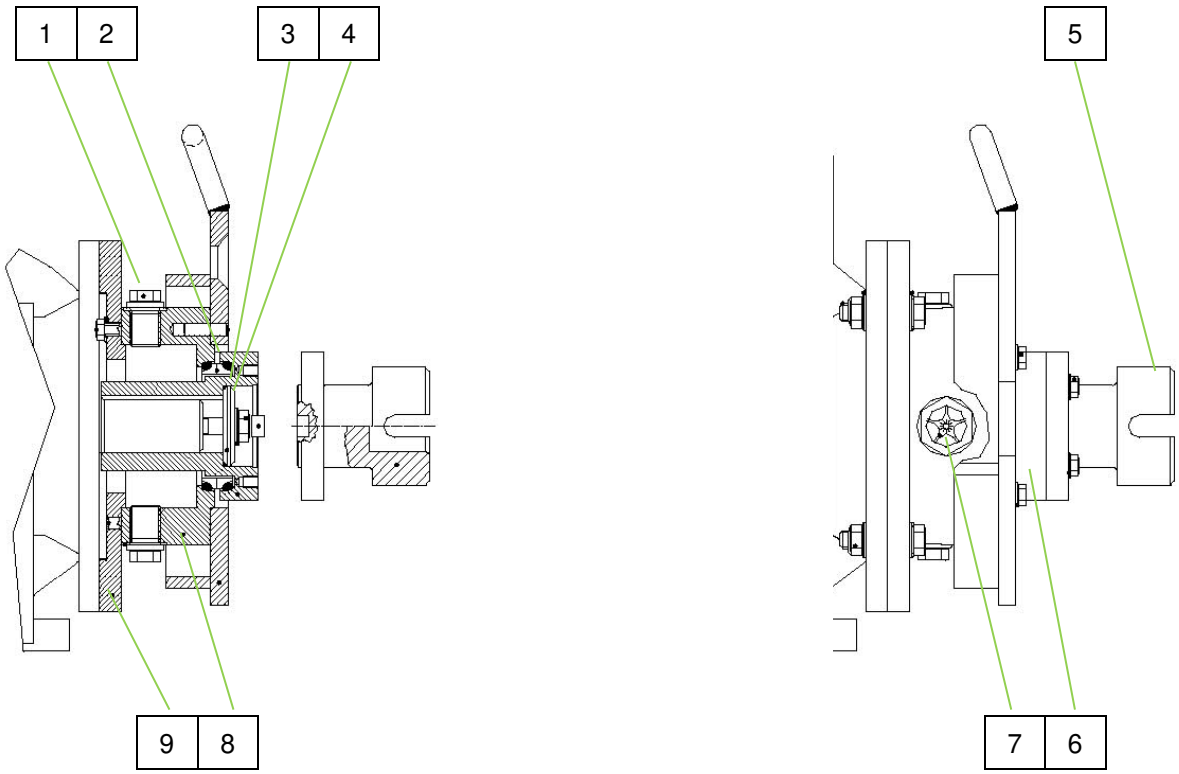
Pos.	Quantity	Art. no.	Name
1	1	00216381	Filllevel sensor KPS1
2		00023886	Hub D = 35 for FERRO II
3	1	00035121	Pump shaft FERRO II RAL1015
4	1	00021025	ROTOR FERRO
5	1	00511614	Pump container FERRO 100 II RAL1015 K-Trans
5	1	00186446	Pump container FERRO 100 II RAL1015 (IT)



Pos.	Quantity	Art. no.	Name
6	4	20207210	Safety nut M10, galvanised (PACKING UNIT = 10 PCS)
7	4	00023218	Hexagonal screw M10 x 80, galvanised
8	1	00035110	Trim ring for cleaning port FERRO II RAL 1015
9	1	00035658	Butterfly valve with leaver

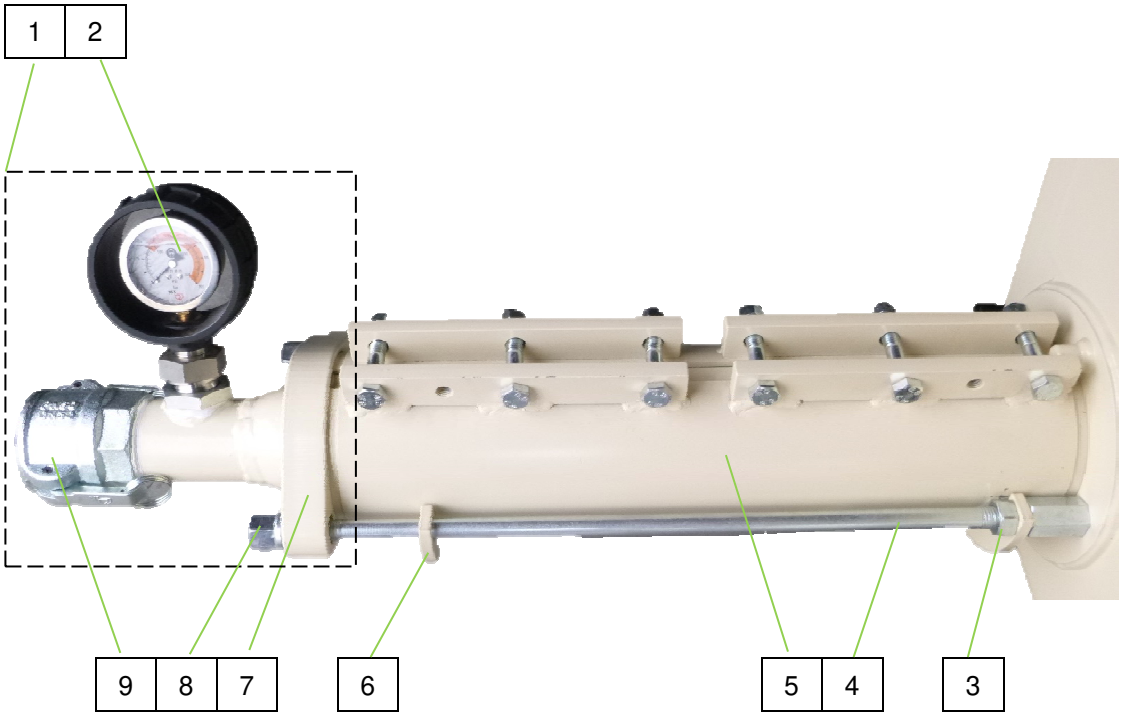
Spare parts drawing, spare parts list

38.8 Oil sealing unit FERRO II



Pos.	Quantity	Art. no.	Name
1	2	20205880	Locking screw 1/2”, galvanised
2	1	20144021	Slide ring gasket (set) oil sealing unit ZP 3
3	1	20144015	O-ring 50 x 2
4	1	20144077	Sealing ring D53.5 x 10.5 T10
5	1	00035128	Adaptor pump FERRO, galvanised
6	1	00023886	Hub D = 35 for FERRO II
7	1	20144012	Oil inspection glass R 1"
8	1	20144027	Sealing housing ZP 3 S/WMP/FERRO, galvanised
9	1	00193315	Adapter flange oil sealing unit FERRO 100 II, galvanised

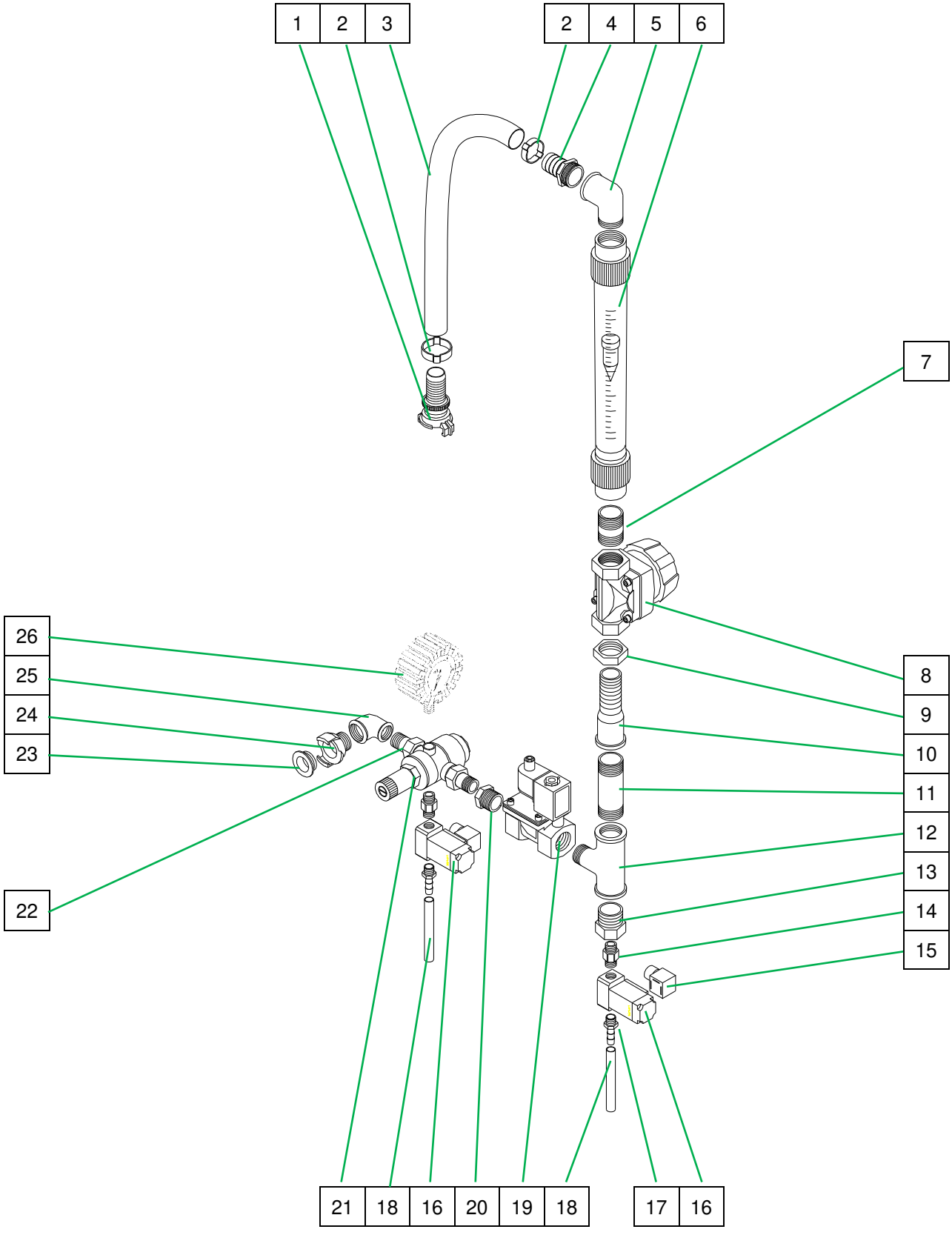
38.9 Pump unit FERRO II



Pos.	Quantity	Art. no.	Name
1	1	00194581	Pressure flange with manometer FERRO II RAL1015 complete
2	1	00099089	Manometer with plastic inlet housing 0-100 bar 1" VA
3	2	20209920	Hex. nut M16, galvanised
4	2	00197917	Tie rods M16 x 550mm, galvanised on both sides M16
5	1	00021024	Stator FERRO
5a	1	00021025	Rotor FERRO
6	1	00193333	Installation aid for pump FERRO 100 II RAL1015
7	1	00194583	Pressure flange T-Pump 2" external thread
8	2	20209921	Collar nut M16, galvanised
9	1	20200780	Coupling 50 M-part 2" internal thread with gasket

Spare parts drawing, spare parts list

38.10 Water supply FERRO 100 II 00186555

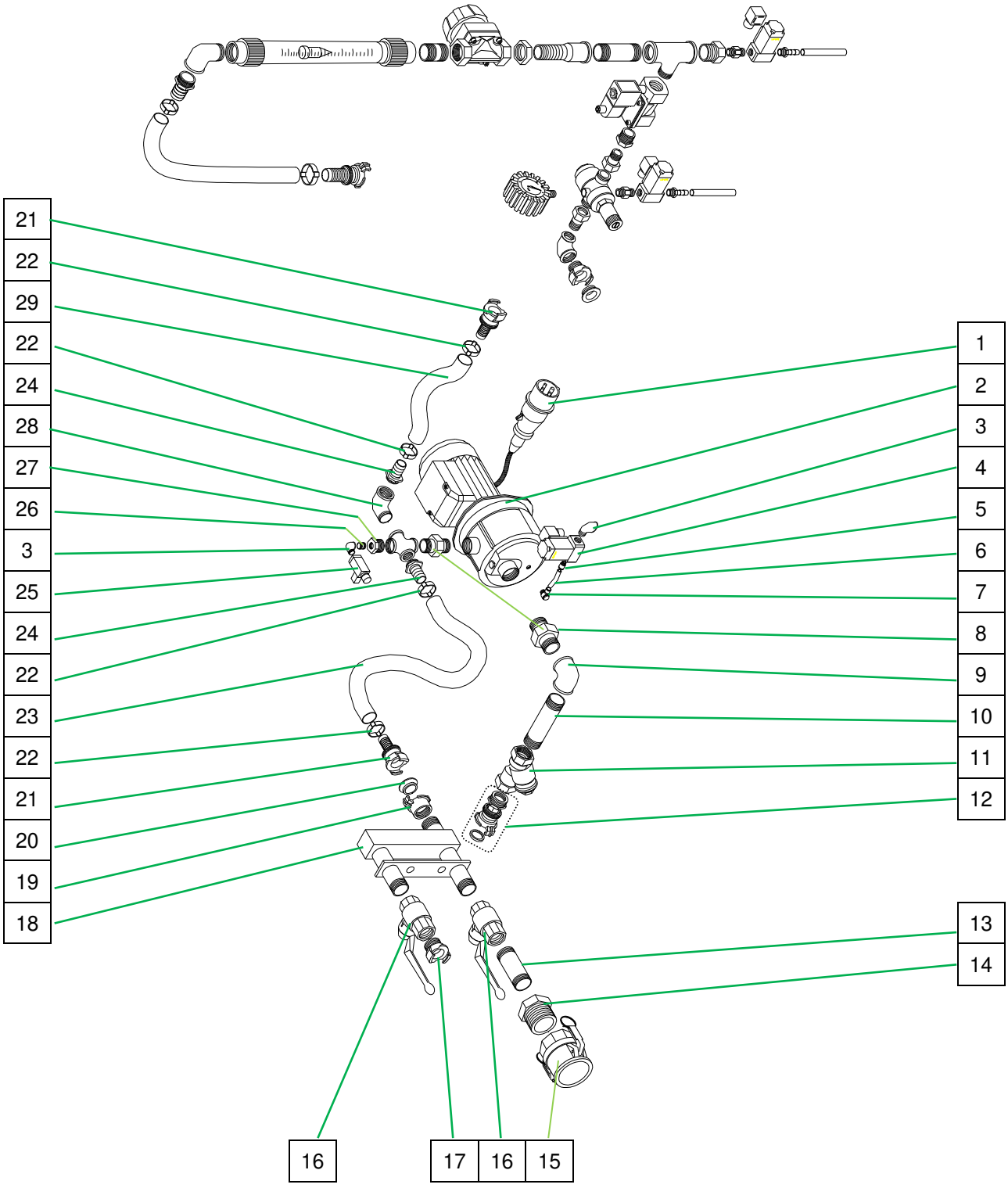


38.11 Spare parts (ET) list Water supply FERRO 100 II 00186555

Pos.	Quantity	Art. no.	Name
1	1	20 20 16 90	High-pressure suction coupling 1" sleeve with gasket
2	2	20 20 29 11	Hose clip 34-37 (PACKING UNIT = 10 PCS)
3	1	00 00 87 04	Water/air hose 1" x 750mm
4	1	20 20 37 70	Hose screw connection 1" AG with sleeve 1"
5	1	20 20 36 20	Angle 1" internal thread-external thread, galvanised
6	1	20 18 50 01	Water flow meter 250-2500 l/h cmpl.
7	1	20 20 33 13	Tube nipple 1" x 30, galvanised
8	1	20 17 17 41	Diaphragm valve 1" type 671
9	2	00 08 08 61	Tube nut G 1"
10	1	00 20 61 96	Long-thread sleeve 1" x 100, galvanised
11	1	00 02 34 90	Double nipple 1" x 100, galvanised
12	1	00 02 26 57	T-piece 1" internal thread 1" external thread 1" internal thread, galvanised
13	1	00 02 36 03	Reduction nipple 1”external thread 1/4”internal thread, galvanised
14	1	20 20 37 12	Screw joint 1/4" external thread, brass, for pressure switch-off
15	2	00 02 20 63	Solenoid valve plug
16	1	00 27 16 32	Solenoid valve 1/4", 42 V with 7 Watt coil
17	2	00 01 02 42	Hose coupling 1/4" external thread sleeve 10mm
18	2	00 04 62 50	Hose section 9 mm x 200mm
19	1	00 68 78 10	Solenoid valve 1", 42 V, 2/2-way AC
20	1	20 20 54 00	Reducing nipple 1" external thread 1/2" internal thread, galvanised
21	1	20 15 52 00	Pressure reducer D06FN 1/2” hole
22	2	20 20 31 07	Flat nipple 1/2" external thread with union nut 3/4” internal thread
23	3	20 20 17 00	Gasket Geka coupling
24	1	20 20 09 00	Geka coupling 1/2" external thread
25	1	20 20 36 11	Angle 1/2" internal thread, galvanised
26	1	20 21 60 00	Manometer 0-16 bar 1/4" below, D = 63 mm

Spare parts drawing, spare parts list

38.12 Water supply FERRO 100 II 00186555

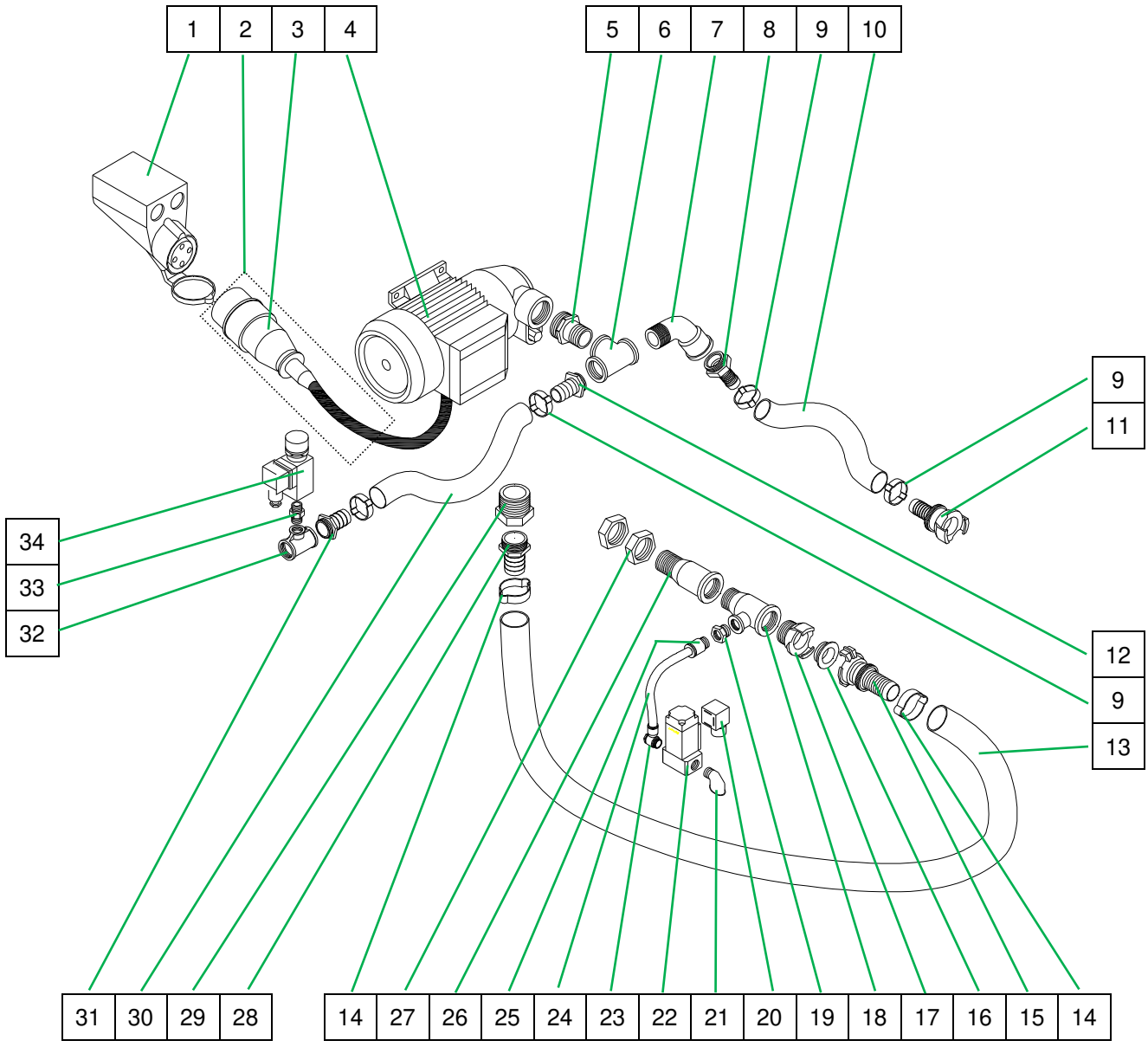


38.13 Spare parts (ET) list Water supply FERRO 100 II 00186555

Pos.	Quantity	Art. no.	Name
1	1	00 09 86 55	Motor connection cable 0.85m water pump 400V
2	1	00 49 18 37	Booster pump AV1000/1 230/400V 50Hz
3	1	20 20 36 50	Angle 1/4" internal thread-external thread, galvanised
4	1	00 27 16 32	Solenoid valve 1/4", 42 V with 7 Watt coil
5	1	00 24 56 79	Plug screw joint/QS - G1/4-8-1
6	1	00 05 51 98	Polyamide hose 8 x 6 x 1, P11/12 running metres
7	1	00 24 56 56	L-plug screw joint QSLV-G1/8-8
8	2	00 00 11 27	Screw joint 1”, brass
9	1	20 20 36 22	Angle 1" internal thread, galvanised
10	1	20 20 32 24	Double nipple 1" x 120, galvanised
11	1	20 15 20 10	Strainer 1" A with screen
12	1	20 20 16 91	Suction high-pressure coupling 1" external thread with gasket
13	1	20 20 33 13	Tube nipple 1" x 30, galvanised
14	1	00 03 61 18	Reduction nipple 2”external thread 1”internal thread, galvanised
15	1	20 20 07 80	Coupling 50 M-part 2" internal thread with gasket
16	2	20 21 51 53	Ball valve 1" IG
17	1	20 20 08 00	Geka coupling 1" external thread
18	1	00 20 16 15	Distributor 3x1”external thread FERRO 100 II, galvanised
19	1	20 20 11 00	Geka coupling 1" internal thread (PACKING UNIT = 10 PCS)
20	1	20 20 17 00	Gasket Geka coupling
21	2	20 20 16 80	High-pressure suction coupling 3/4" sleeve with gasket
22	4	20 20 29 01	Hose clip 28-31
23	1	20 21 36 06	Water hose/air hose 3/4" x 400mm
24	2	20 19 04 41	Hose screw connection 3/4" external thread with sleeve
25	1	00 08 26 79	Pressure switch type BC 0.5 - 3 bar
26	1	20 20 33 14	Tube nipple 1/4" x 20mm, galvanised
27	1	00 02 36 03	Reduction nipple 1”external thread 1/4”internal thread, galvanised
28	1	20 20 36 01	Angle 3/4" internal thread-external thread, galvanised
29	1	00 18 65 45	Water hose/air hose 3/4" x 220mm

Spare parts drawing, spare parts list

38.14 Water supply FERRO 100 II 00232147

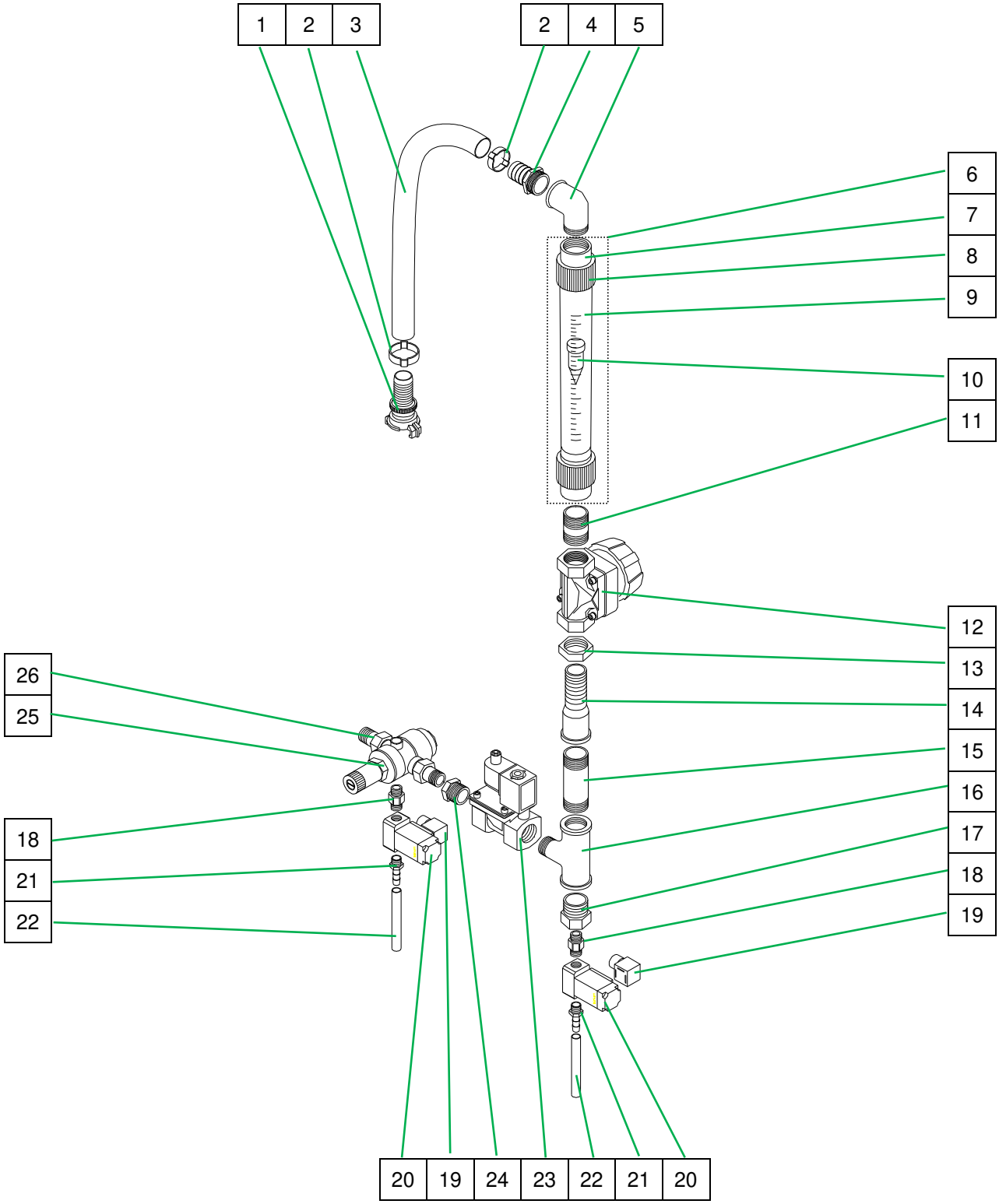


38.15 Spare parts (ET) list Water supply FERRO 100 II 00232147

Pos.	Quantity	Art. no.	Name
1	1	00 02 20 73	CEE socket outlet 4 x 16A 6h, red
2	1	00 09 86 55	Motor connection cable 400 V - 0.85 m
3	1	20 42 79 00	CEE plug 4 x 16A 6h, red
4	1	00 15 13 82	Booster pump 1.1 KW 400 V 50 Hz
5	1	00 00 17 90	Reduced double nipple 1 1/4”external thread - 3/4”external thread,
6	1	20 20 41 22	T-piece 3/4" internal thread, galvanised
7	1	00 03 60 57	Bend 3/4" 45° internal thread-external thread, galvanised
8	1	20 19 04 41	Hose screw connection 3/4" external thread with sleeve
9	4	20 20 29 00	Hose clip 28-31
10	1	20 21 36 06	Water hose/air hose 3/4" x 400mm
11	1	20 20 16 80	High-pressure suction coupling 3/4" sleeve with gasket
12	1	20 19 04 41	Hose screw connection 3/4" external thread sleeve
13	1	00 04 71 31	Water/air hose 1" x 400mm
14	2	20 20 29 10	Hose clip 34-37 (PACKING UNIT=10pieces)
15	1	20 20 16 90	High-pressure suction coupling 1" sleeve with gasket
16	1	20 20 17 00	Gasket of Geka coupling (PACKING UNIT = PCS 50)
17	1	20 20 08 00	Geka coupling 1" external thread (PACKING UNIT = 10 PCS)
18	1	20 20 41 51	T-piece 1" internal thread 1/2" internal thread 1" external thread, galvanised
19	1	20 20 52 00	Reducing nipple 1/2" external thread 1/4" internal thread
20	1	00 20 67 39	Solenoid valve plug cmpl.
21	1	20 20 36 50	Angle 1/4" internal thread-external thread, galvanised
22	1	00 27 16 32	Solenoid valve 1/4", 42 V with 7 Watt coil
23	1	00 23 22 98	L-plug screw joint QSLV-G1/4-8
24	1	00 05 51 98	Polyamide hose 8 x 6 x 1, P11/12 running metres
25	1	00 09 89 57	Straight plug connection 1/4" external thread D = 8
26	1	00 20 61 96	Long-thread sleeve 1" x 100, galvanised
27	1	00 08 08 61	Tube nut G 1"
28	1	20 20 37 70	Hose coupling 1" external thread sleeve 1"
29	1	20 20 55 10	Reducing nipple 1 1/4" external thread 1" internal thread, galvanised
30	1	20 21 36 25	Water hose/air hose DN19 - 900 mm
31	1	20 19 04 42	Hose screw connection 1/2" external thread sleeve 3/4"
32	1	20 20 43 02	T-piece 1/2" internal thread 3/8" internal thread 1/2" internal thread
33	1	20 20 32 83	Hexagonal double nipple 1/4", galvanised
34	1	00 08 26 79	Pressure switch 0.5/3 bar

Spare parts drawing, spare parts list

38.16 Water supply FERRO 100 II 00232147

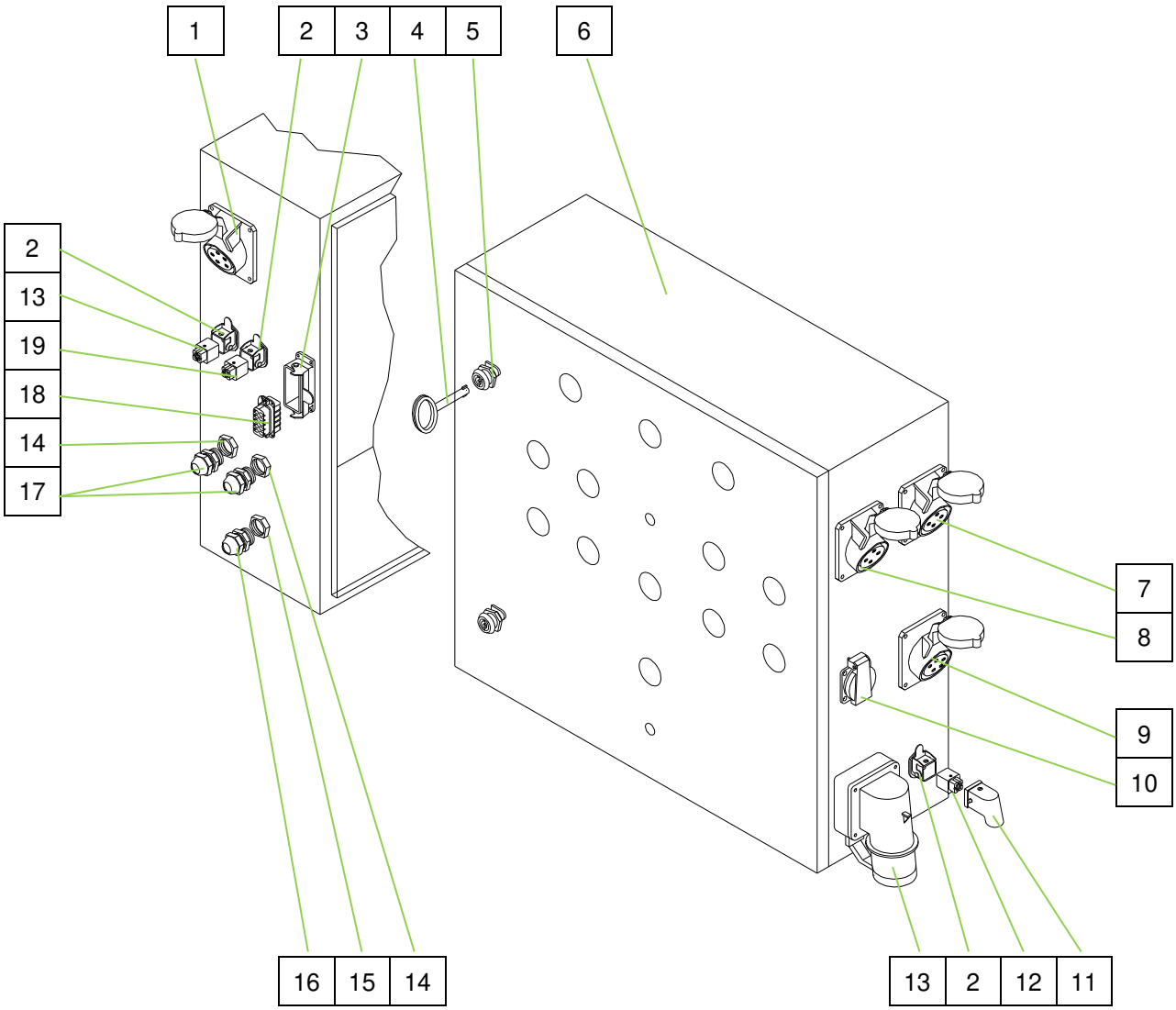


38.17 Spare parts (ET) list Water supply FERRO 100 II 00232147

Pos.	Quantity	Art. no.	Name
1	1	20 20 16 90	High-pressure suction coupling 1" sleeve with gasket
2	2	20 20 29 11	Hose clip 34-37 (PACKING UNIT = 10 PCS)
3	1	00 00 87 04	Water/air hose 1" x 750mm
4	1	20 20 37 70	Hose screw connection 1" AG with sleeve 1"
5	1	20 20 36 20	Angle 1" internal thread-external thread, galvanised
6	1	20 18 50 01	Water flow meter 250-2500 l/h cmpl.
7	2	20 18 46 00	Insert 1"
8	2	20 18 45 10	Union nut 1 1/2" for water flow meter
	2	20 18 43 00	O-ring 32.92x 3.53
9	1	20 18 51 00	Plastic tube 250 - 2,500 l/h
10	1	20 18 42 00	Cone for water flow meter of type 1600, 2500
11	1	20 20 33 13	Tube nipple 1" x 30, galvanised
12	1	20 17 17 41	Diaphragm valve 1" type 671
13	2	00 08 08 61	Tube nut G 1"
14	1	00 20 61 96	Long-thread sleeve 1" x 100, galvanised
15	1	00 02 34 90	Double nipple 1" x 100, galvanised
16	1	00 02 26 57	T-piece 1" internal thread 1" external thread 1" internal thread, galvanised
17	1	00 02 36 03	Reduction nipple 1”external thread 1/4”internal thread, galvanised
18	2	20 20 37 12	Screw joint 1/4" external thread, brass, for pressure switch-off
19	2	00 20 67 39	Solenoid valve plug cmpl.
20	2	00 27 16 32	Solenoid valve 1/4", 42V type 6013B 7 Watt
21	2	00 01 02 42	Hose coupling 1/4" external thread sleeve 10mm
22	2	00 04 62 50	Hose section 9 mm x 200mm
23	1	00 03 61 88	Solenoid valve 1” 42V type "END"
24	1	20 20 54 00	Reducing nipple 1" external thread 1/2" internal thread, galvanised
25	1	20 15 52 00	Pressure reducer D06FN 1/2” hole
26	2	20 20 31 07	Flat nipple 1/2" external thread with union nut 3/4” internal thread

Spare parts drawing, spare parts list

38.18 Control box Art. no. 00178685 / 00208092

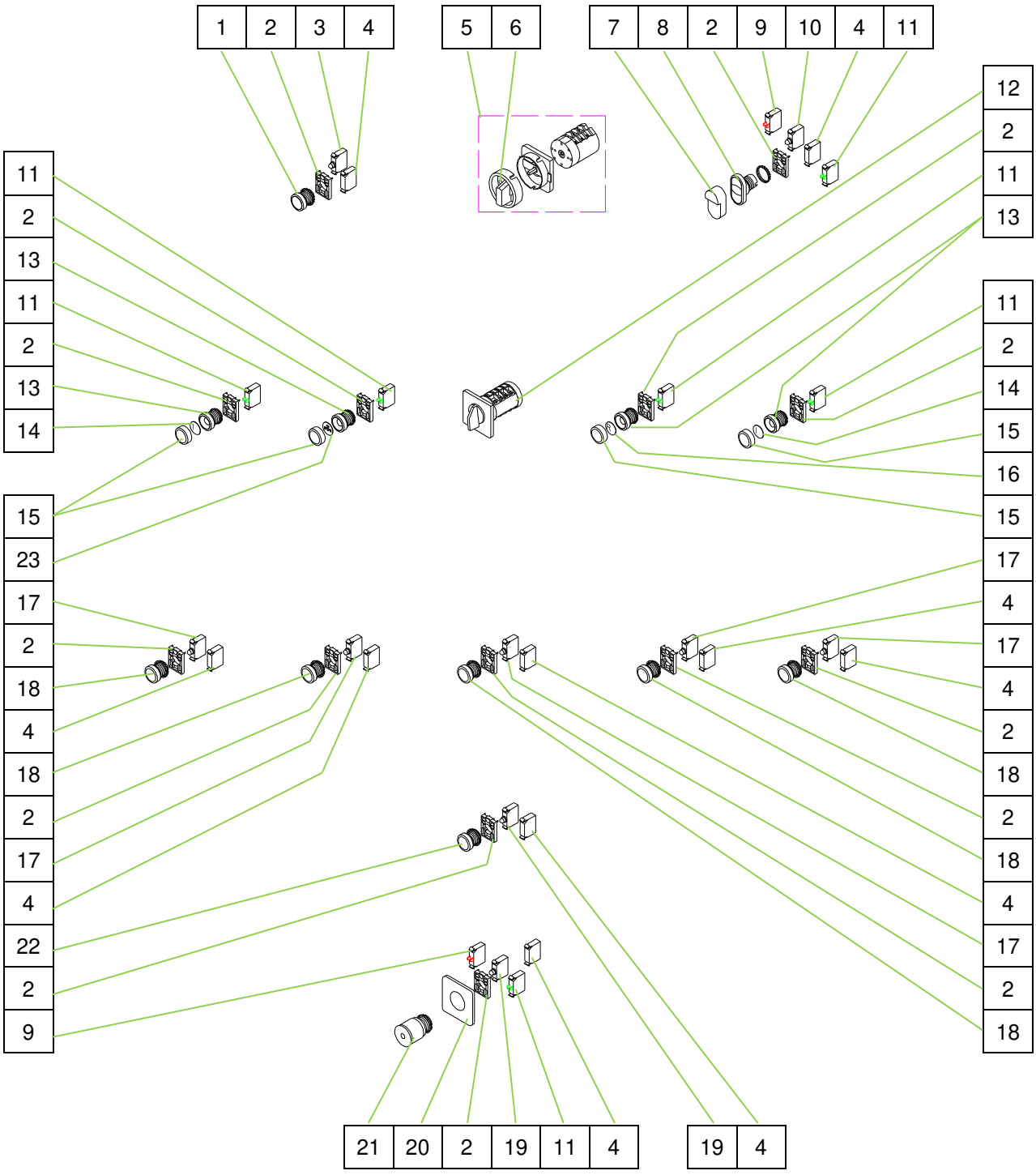


Spare parts drawing, spare parts list

Pos.	Quantit	Art. no.	Name
1	1	00 01 94 16	CEE socket outlet 5 x 16A 6h, red
2	3	20 42 86 04	Socket housing 4/5-pin, HAN 3A/HA 4
3	1	20 42 98 21	Socket housing 10A-pin, HAN 10A
4	1	20 44 45 00	Key for control box
5	2	00 03 62 49	Lock for control box (double bit)
6	1	00 18 62 88	Empty housing with door FERRO II stainless steel
7	1	20 42 66 10	CEE socket outlet 4 x 16A 6h, red
8	1	00 02 20 66	CEE-socket outlet 4 x 16A 7h, black 500 V
9	1	00 02 20 67	CEE panel mounted socket 5 x 16A 7h sw
10	1	20 42 72 00	Schuko socket outlet 16A, blue
11	1	00 10 45 68	Dummy connector, 4-pin, 10A, plastic
12	2	20 42 86 07	Female insert 4 pin, HAN 3A
13	1	00 00 21 29	CEE connection plug 5 x 32A 6h, red, flap lid
14	2	00 04 11 45	Skintop counter nut M 20 x 1.5
15	1	00 04 11 43	Skintop counter nut M 16 x 1.5
16	1	00 04 11 41	Skintop screw connection M 16 x 1.5
17	2	00 04 11 27	Skintop screw connection M 20 x 1.5
18	1	20 42 98 24	Female insert 10 pin, HAN 10A
19	1	20 42 86 03	Female insert 5-pin, HA 4

Spare parts drawing, spare parts list

38.19 Control box Art. no. 00178685 / 00208092

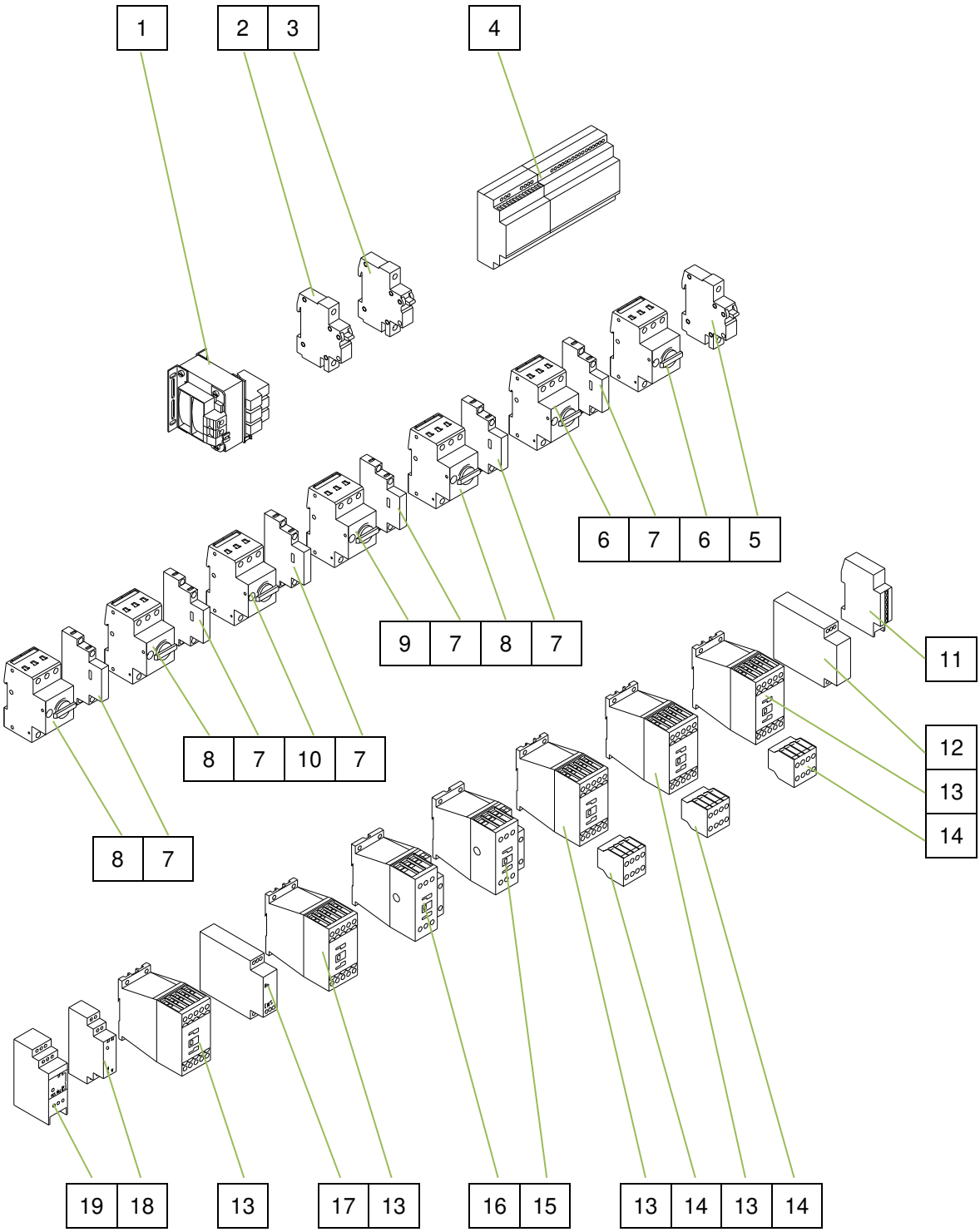


Spare parts drawing, spare parts list

Pos.	Quantit	Art. no.	Name
1	1	00 05 38 73	Transparent lamp insert cover green M22
2	13	00 05 38 34	Fastening adapter for switch elements
3	1	00 05 38 80	Luminous element, green 12-30V
4	9	00 05 38 86	LED - resistor - additional series resistor 42 V
5	1	20 45 52 00	Main switch
6	1	20 45 52 01	Toggle for main reversing switch Art.20455200
7	1	00 05 38 31	Test membrane square for double pushbutton IP 67
8	1	00 05 38 32	Luminous pushbutton ON/OFF M22
9	2	00 05 38 36	Contact element 1 opener M22 EK01
10	6	00 05 38 81	Luminous element white 12-30V
11	6	00 05 38 35	Contact element 1 closer M 22 EK 10
12	1	00 18 63 72	Step switch 0-6 1-pin
13	4	00 05 38 39	Pushbutton without touch plate M22
14	2	00 05 38 40	Touch plate for pushbutton Green / On M22
15	4	00 05 38 30	Test membrane round for push-button IP 67
16	1	00 05 38 43	Touch plate for push button - blue / reset M 22
17	6	00 05 38 81	Luminous element white 12-30V
18	5	00 05 38 74	Transparent lamp insert cover yellow M22
19	2	00 05 38 79	Luminous element, red, 12-30V
20	1	00 18 63 75	Emergency-stop shield in four languages
21	1	00 18 63 74	Emergency-stop button M22, illuminated
22	1	00 05 38 75	Transparent lamp insert cover red M22
23	1	00 05 38 42	Touch plate for pressure switch, black, liquid M22

Spare parts drawing, spare parts list

38.20 Control box article number 00178685 internal

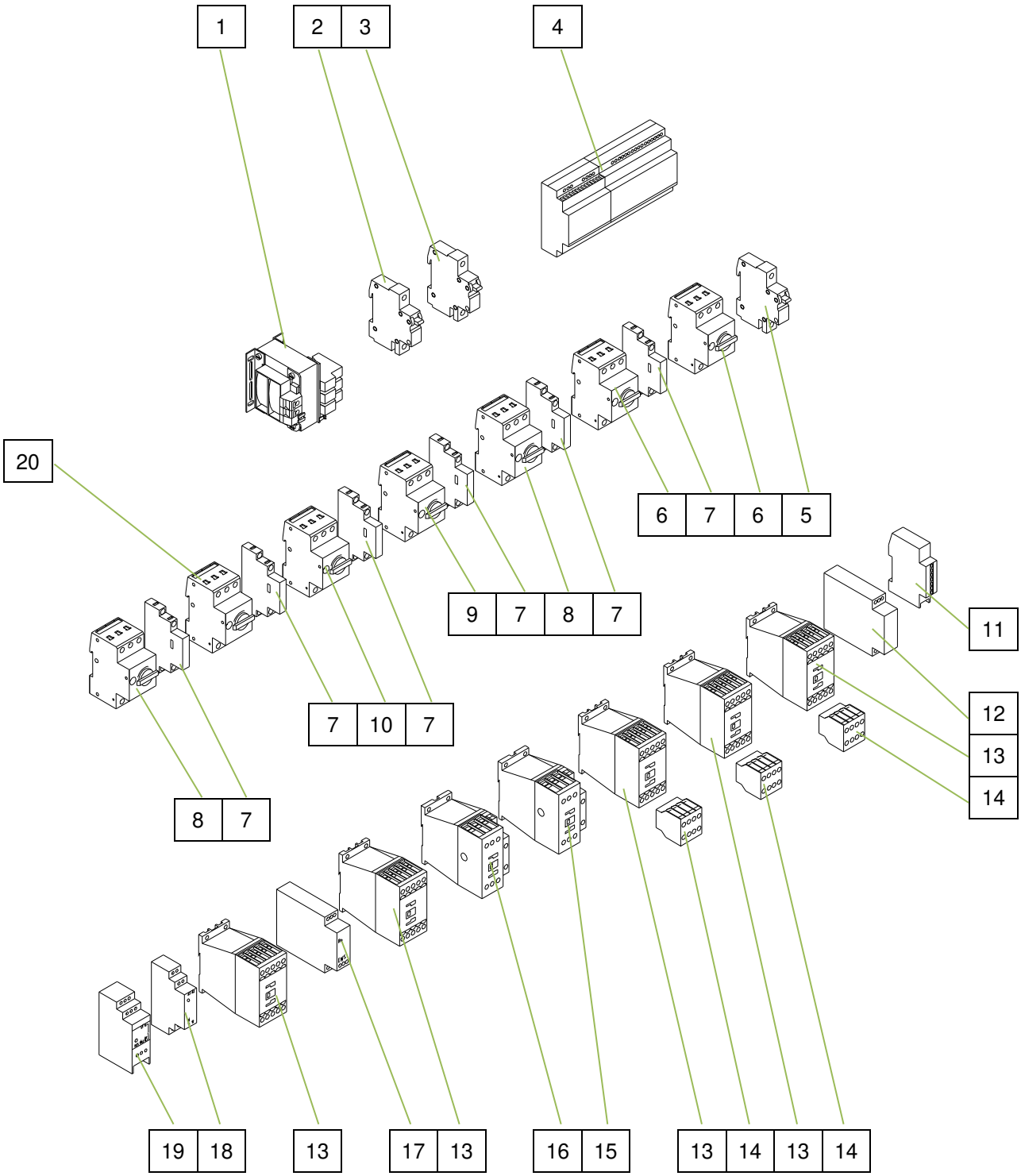


Spare parts drawing, spare parts list

Pos.	Quantity	Art. no.	Name
1	1	00 27 16 33	Control transformer 400V-42V/230V 250 VA (T1)
2	1	00 04 63 79	Miniature circuit breaker C 0.5A, 1-pin
3	1	00 27 24 58	Miniature circuit breaker C 5A, 1-pin
4	1	00 20 74 18	PLC control FERRO 100 II programmed (A1)
5	1	20 41 93 10	Miniature circuit breaker B 16A, 1-pin (F1)
6	2	00 04 25 99	Motor protection switch 0.63-1A PKZM 0-1 (Q9) (Q7)
7	6	00 02 14 01	Auxiliary contactor NHI-11-PKZO
8	3	00 04 26 01	Motor protection switch 1.6-2.5A PKZM 0-2.5 (Q2) (Q3)
9	1	00 04 35 51	Motor protection switch 16-20A PKZM 0-20 (Q5)
10	1	00 04 26 02	Motor protection switch 10-16A PKZM 0-16 (Q4)
11	1	20 45 31 01	Operation-hour counter 42V (P1)
12	1	00 02 21 53	Thermistor protection (K11)
13	5	00 08 42 23	Air-break contactor DIL M9-10 42 V, 50Hz 48 V, 60Hz 4,0 kW (K1) (K3) (K6) (K7) (K8)
14	3	00 08 52 93	Auxiliary switch DILM 32-XHI11 1S / 1Ö
15	1	00 08 42 26	Air-break contactor M25-10 42 V, 50 Hz 48 V, 60 Hz, 11 kW size II (K5)
16	1	00 08 42 25	Air-break contactor DIL M17-10 42 V, 50 Hz 48 V, 60 Hz 7,5 kW size II (K4)
17	1	00 46 26 98	Phase monitoring digitally programmed **Replaces 00137166** (K2)
	1	20 45 27 51	Phase sequence relay 200-500 V Type FPF2 **Changeover from 06.2017**
18	1	20 44 81 20	Coupling relay 42 V 2 changer (K13)
19	1	00 18 63 90	Safety relay 42V (K12)

Spare parts drawing, spare parts list

38.21 Control box Art. no. 00208092 internal

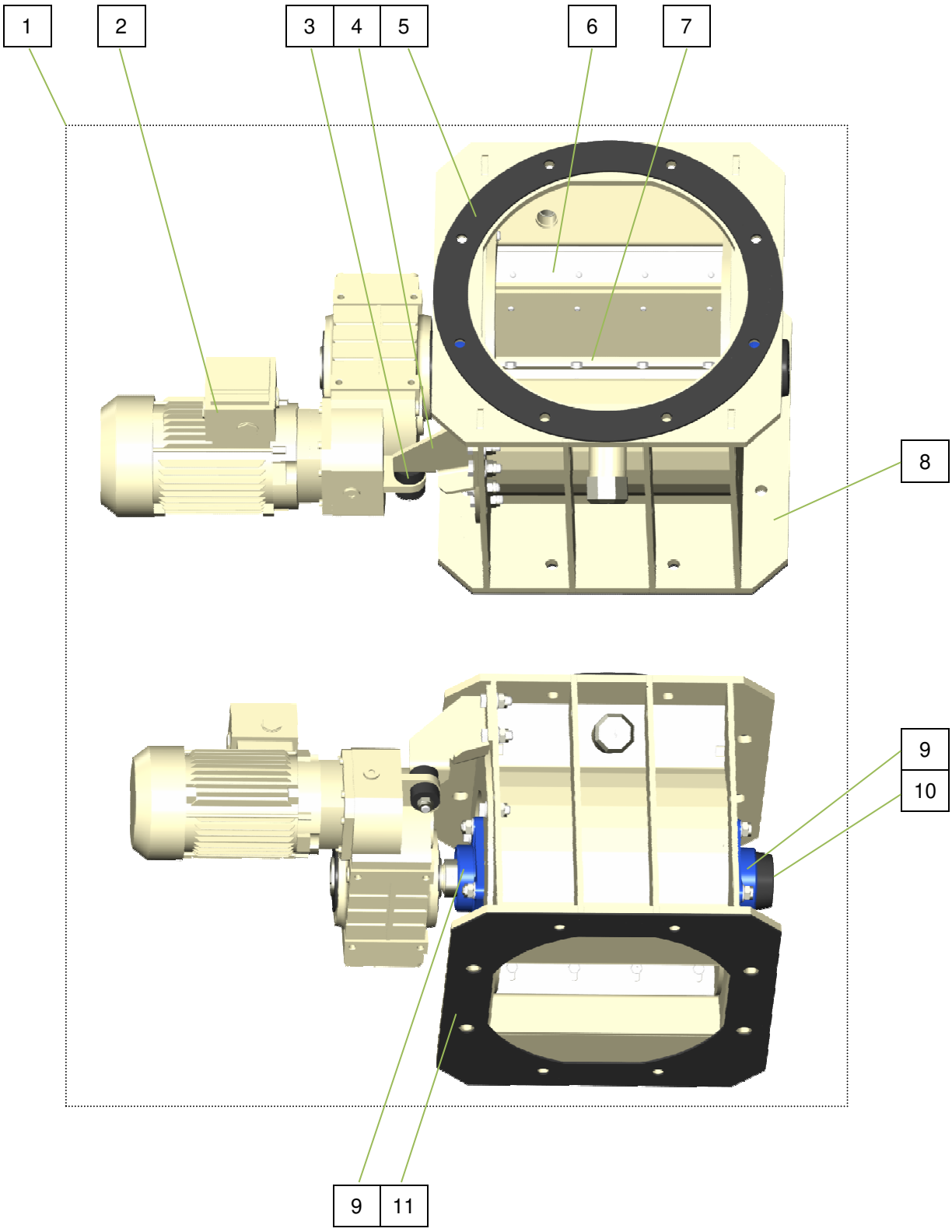


38.22 Control box Art. no. 00208092 internal

Pos.	Quantity	Art. no.	Name
1	1	00 02 21 70	Control transformer 400V-42V/230V 250 VA (T1)
2	1	00 04 63 79	Miniature circuit breaker C 0.5A, 1-pin
3	1	00 08 31 38	Miniature circuit breaker C 4A, 1-pin
4	1	00 20 74 18	PLC control FERRO 100 II programmed (A1)
5	1	20 41 93 10	Miniature circuit breaker B 16A, 1-pin (F1)
6	2	00 04 25 99	Motor protection switch 0.63-1A PKZM 0-1 (Q7) (Q9)
7	6	00 02 14 01	Auxiliary contactor NHI-11-PKZO
8	2	00 04 26 01	Motor protection switch 1.6-2.5A PKZM 0-2.5 (Q2) (Q6)
9	1	00 04 35 51	Motor protection switch 16-20A PKZM 0-20 (Q5)
10	1	00 04 26 02	Motor protection switch 10-16A PKZM 0-16 (Q4)
11	1	20 45 31 01	Operation-hour counter 42 V
12	1	00 02 21 53	Thermistor protection (K11)
13	5	00 23 23 14	Air-break contactor DIL MF8-10 (RAC48) (K1) (K3) (K6) (K7) (K8)
14	3	00 08 52 93	Auxiliary switch DILM 32-XHI11 1S / 1Ö
15	1	00 23 23 13	Air-break contactor DIL MF25-10 (RAC48) (K5)
16	1	00 23 23 11	Air-break contactor DIL MF17-10 (RAC48) (K4)
17	1	00 46 26 98	Phase monitoring digitally programmed **Replaces 00137166** (K2)
	1	20 45 27 51	Phase sequence relay 200-500 V type FPF2 **Changeover from 06.2017** (K2)
18	1	20 44 81 20	Coupling relay 42 V 2 changer (K13)
19	1	00 18 63 90	Safety relay 42V (K12)
20	1	00 04 26 03	Motor protection switch 2.5-4A PKZM 0-4 (Q3)

Spare parts drawing, spare parts list

38.23 Star wheel lock FERRO II complete RAL1015 Article number 00035135



Spare parts drawing, spare parts list

Pos.	Quantity	Art. no.	Name
1	1	00 03 51 35	Star wheel lock FERRO II complete RAL1015
2	1	00 03 90 39	Drive star wheel lock FERRO II, 0.75kW complete with connection cable
3	2	00 03 90 41	Sponge rubber buffer FERRO
4	1	00 26 65 24	Torque supports for star wheel lock for Neudecker & Joliltz gear motor RAL1015
5	1	20 70 63 10	Rubber seal D 450x360x4
6	8	00 03 64 88	Wear plate Rotor Star wheel lock RAL1015
7	1	00 03 51 34	Rotor Star wheel lock FERRO II RAL1015
8	1	00 03 50 68	Casing Star wheel lock FERRO II RAL1015
9	2	00 02 36 78	Y-flange bearing unit
10	1	00 02 36 80	Cover Y-flange bearing
11	1	00 02 38 28	Gasket of star wheel lock 3mm with web

Spare parts drawing, spare parts list

38.24 Water tank cmpl. for FERRO II Trans RAL1015Article number 00513243

Quantity	Art. no.	Name
1	00 51 31 86	Water tank holder for FERRO II trans
1	00 03 57 31	Hex. screw M10 x 65, galvanised
1	20 20 90 10	Washer B 10.5, galvanised
1	20 20 72 10	Safety nut M10, galvanised
8	20 20 90 10	Washer B 10.5, galvanised
4	00 05 10 72	Hexagon screw M10 x 30 A2
4	20 20 72 10	Safety nut M10, galvanised
1	00 51 67 62	Water tank 120L cmpl. for FERRO without
1	00 51 29 72	Float gauge valve MS incl. float gauge cmpl.
2	00 51 63 22	Disc 55x34x1,5 VA
1	20 20 36 22	Angle 1" internal thread, galvanised
1	20 20 08 00	Geka coupling 1" external thread
1	00 51 64 02	Lashing strap with wedge lock
1	20 20 87 01	Hex. screw M 8 x 16, galvanised
2	20 20 93 20	Large diameter washer 8.4 x 25 x 1.5,
1	20 20 37 70	Hose coupling 1" external thread sleeve 1"
1	20 20 16 90	High-pressure suction coupling
1	20 20 72 00	Safety nut M8, galvanised
1	20 20 99 78	Ring screw M8 x 13
1	20 20 72 00	Safety nut M8, galvanised
1	20 20 33 13	Tube nipple 1" x 30
1	00 08 08 61	Tube nut G 1"
1	20 20 36 22	Angle 1" internal thread
1	00 60 70 83	Cover for water tank FERRO
1	00 60 70 82	Clamping ring for cover of water

38.25 Silo mounting

Pos.	Quantity	Art. no.	Name
1	1	00416333	Pipe clamp 2-lug 108 (50 x 8)
2	1	00023837	Rubber sheet 50 x 2 x 320 without web
3	2	00023274	Hex. screw M14 x 55, galvanised
4	4	20209011	Washer B 15, galvanised
5	1	00034742	Connection pieces for tensioning
6	1	00023430	Turnbuckle 1/2" x 6, galvanised (2 forks)
7	1	00023691	Shackles fixed high, 1 tonne, galvanised
8	1	00034741	Chain, straight links 10x66, galvanised
9	2	00023350	Safety nut M14, galvanised

39 Index

Index

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