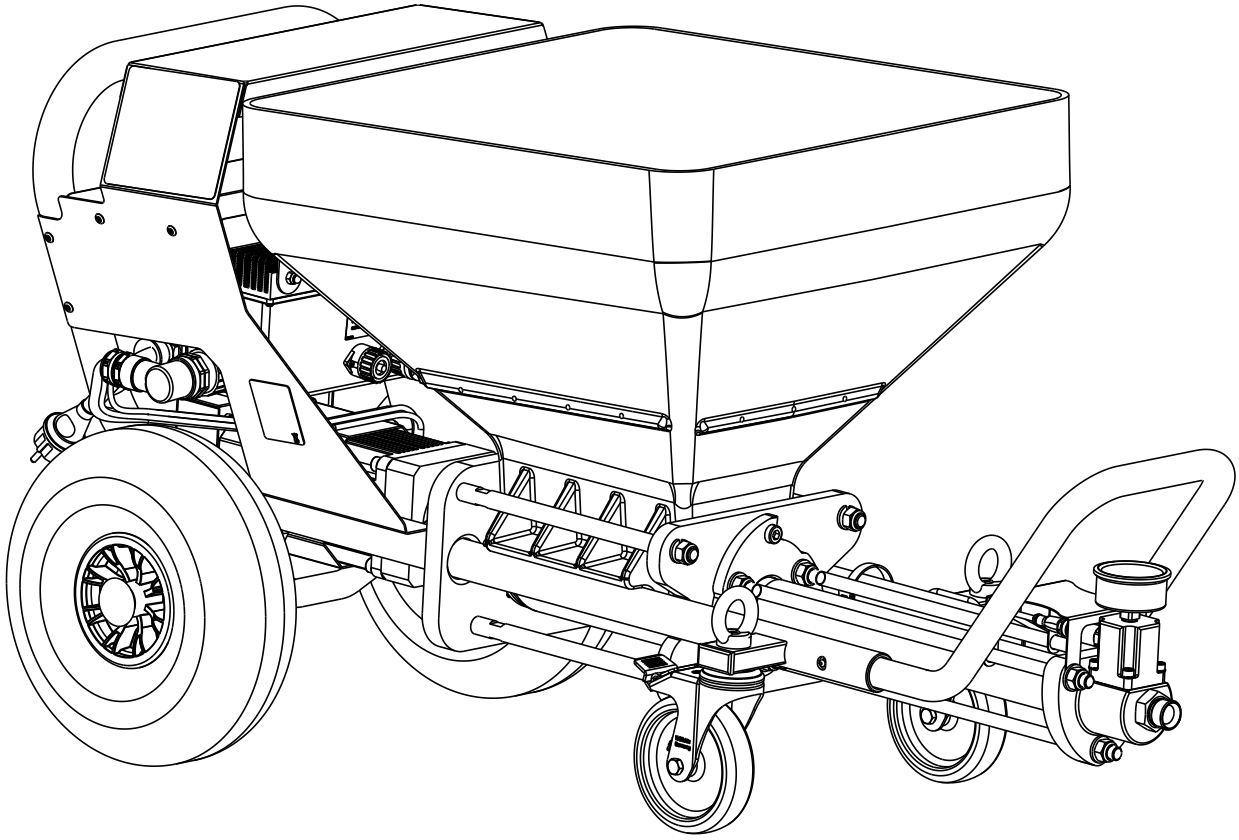
WAGNER

Service manual
with electrical repair instructions
for electrically instructed persons
of the J. Wagner GmbH

PC HP 30



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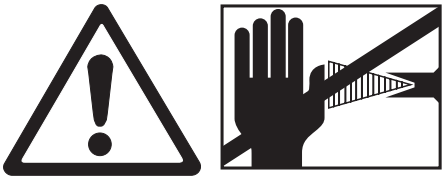
WARNING!

Attention, danger of injury by injection!

Unit develops extremely high spray pressures.

	 Danger
1	Never bring fingers, hands or other body parts into contact with the spray jet! Never point the spray gun at yourself, other persons or animals. Never use the spray gun without spray jet safety guard. Do not treat a spray injury as a harmless cut. In case of injury to the skin by coating material or solvents, consult a doctor for quick and correct treatment. Inform the doctor about the coating material or solvent used.
2	**The following points are to be observed in accordance with the operating manual before every start-up:** 1. Faulty units may not be used. 2. Secure a Wagner spray gun. 3. Ensure earthing. 4. Check the permissible operating pressure of the high-pressure hose and spray gun. 5. Check all the connecting parts for leaks.
3	**Instructions for regular cleaning and maintenance of the unit are to be observed strictly.** **Observe the following rules before any work on the unit and at every working break:** 1. Relieve the pressure from the spray gun and high-pressure hose. 2. Secure a Wagner spray gun. 3. Switch the unit off.

Ensure safety!

Contents

SERVICE MANUAL

ELECTRICAL REPAIR INSTRUCTIONS

1 SAFETY REGULATIONS

The following sources are just a sample of those containing safety requirements for mortar conveyors:

a) EN 12001, Conveying, spraying and placing machines for concrete and mortar - Safety requirements

All local safety regulations in force must be observed.

The following specifications are to be observed in particular to handle machines safely:

Usage of the machine

The PlastCoat HP 30 may only be used to process the coating materials described on page 29. **Any other usage is not allowed.**
Proper usage also includes the observance of the operating manual and the observance of the inspection and maintenance conditions. Always keep the operating manual on hand at the point of use of the machine.
The PlastCoat HP 30 may only be operated with a manometer.
Only the mortar hose specified by the manufacturer may be used.
Use only marked mortar hoses with at least 120 bars operating pressure.
The machine is intended exclusively for commercial use by professionals.

Protection of persons

In order to protect eyes, skin and the respiratory organs: **Wear safety goggles, protective clothing, gloves, possibly use protective skin cream and respiratory equipment**. Do not decouple the high pressure hose as long as it is under pressure. Watch the manometer! Wear safety goggles! Do not point the spray gun at persons!
In order to protect your ears **wear ear protection.**
Wear safety shoes when transporting the machine or working with it.
People not needed to assist with machine installation, assembly or operation, must keep away from the machine.
Always secure the spray gun when fitting or dismantling the nozzle and if temporarily stopping work.

	When using a high operating pressure, pulling the trigger guard can effect a recoil force up to 15 N. If you are not prepared for this, your hand can be thrust backwards or your balance lost. This can lead to injury.

The PC HP 30 is equipped with an EMERGENCY STOP switch for emergencies.

Breathing masks

Make a breathing mask available to the processor in order to protect against mineral dust.

Connection to the mains network only via a special feeding point, for example via a distribution board for construction sites, with residual current protective device with INF ≤ 30 mA.

	**Risk of injury from escaping material. Before switching on, always check that the trigger guard on the spray gun is secured. Secure the trigger guard whenever work is interrupted.**

	**Never operate the machine if the rotor is exposed or if the container has been removed. Do not reach into the rotor when it is moving. Risk of crushing. Caution if you have long hair. Only wear close-fitting clothes at work. Do not insert objects or body parts through the protective grid. Risk of crushing when folding in the handles, assembling the pump unit and connecting the mortar hose.**

Cleaning and maintenance

Never decouple high pressure hose or disassemble machine when under pressure. Note pressure reading on pressure gauge.
When performing maintenance work, always switch off machine, disconnect mains plug and ensure it cannot be plugged back in by mistake.
Do not spray down the motor and control unit of the machine with a water-jet, high-pressure cleaner or high-pressure steam cleaner. Danger of short-circuits caused by water ingressing.

Electrical equipment

Work on the machine's electrical equipment may be carried out only by a qualified electrician. The electrical equipment is to be checked regularly. Eliminate faults such as loose connections or scorched cables.

Keep the stickers and notices on the machine clean and legible.

⚠	**Whenever the machine is automatically brought to a standstill or during power failure, immediately move the selector switch to "0" to prevent the machine starting back up again unintentionally. There is a danger of injury.**

High Pressure Hose

⚠ Danger	Attention, danger of injury by injection! Wear and tear and kinks as well as usage that is not appropriate to the purpose of the device can cause leakages to form in the high-pressure hose. Liquid can be injected into the skin through a leakage.

- High-pressure hoses must be checked thoroughly before they are used.
- Replace any damaged high-pressure hose immediately.
- Never repair defective high-pressure hoses yourself!
- Avoid sharp bends and folds: the smallest bending radius is about 20 cm.
- Do **not drive over** the high-pressure hose. Protect against sharp objects and edges.
- Never pull on the high-pressure hose to move the device.
- Do not twist the high-pressure hose.
- Do not put the high-pressure hose into solvents. Use only a wet cloth to wipe down the outside of the hose.
- Lay the high-pressure hose in such a way as to ensure that it cannot be tripped over.

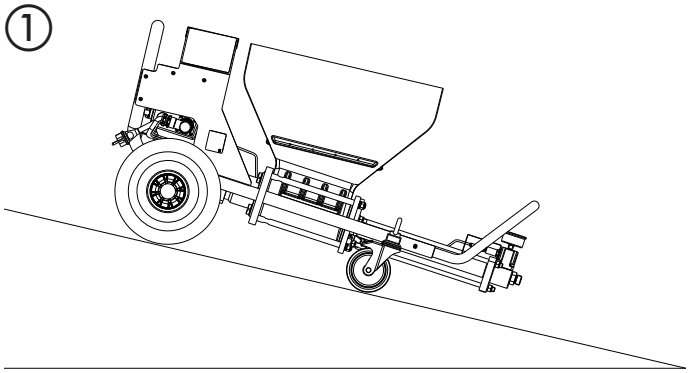
i	Only use WAGNER original-high-pressure hoses in order to ensure functionality, safety and durability.

i	The risk of damage rises with the age of the high-pressure hose. Wagner recommends replacing high-pressure hoses after 6 years.

Setup on an uneven surface

The machine must be installed as shown in the diagram below to prevent it slipping (outlet unit pointing downwards). Block front wheels with brakes.

①



2 IMPORTANT INFORMATION ON PRODUCT LIABILITY

An EU directive valid since 01.01.1990 specifies that the manufacturer is only liable for his products if all the parts originate from the manufactured or are approved by him, and if the units are mounted and operated properly. If accessories or spare parts from third parties are used, liability can be partially or completely inapplicable. In extreme cases the responsible authorities can prohibit the use of the entire unit (German industrial employer's liability insurance association and factory inspectorate).
With original WAGNER accessories and spare parts, compliance with all safety regulations is guaranteed.

3 TECHNICAL DATA

	PlastCoat HP 30
Voltage:	230 V~, 50/60 Hz
Fusing:	16 A time-lag
Device supply cable:	5 m long, 3 x 2.5 mm^2
Motor output P_1:	2.3 kW
Max. convey capacity (water):	6.8 l/min
Max. convey capacity (Airless dispersion spray putty):	10 kg/min *
Max. operating pressure:	12.0 MPa (120 bar)
Dimensions L x W x H:	1220 x 550 x 620 mm
Container capacity:	50 l
Weight:	72 kg
Max. tyre pressure:	2.5 bar
Degree of protection:	IP 54
Max. sound pressure level:	70 dB (A)**
Max. high pressure hose length:	20 m (and 2.5 m hose whip), 10 m recommended
Max. delivery height:	20 m

* Measured in accordance with VDMA 24284

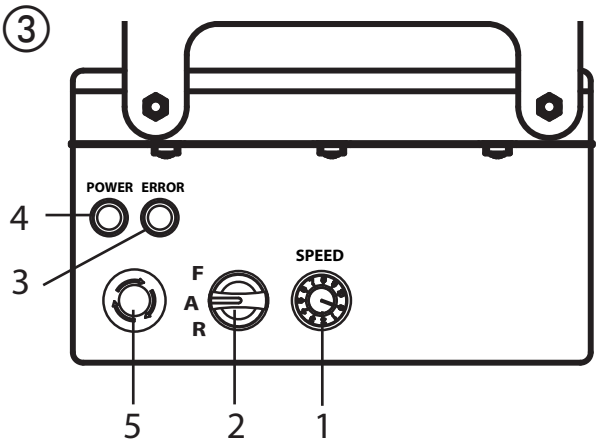
**Place of measurement: 1 m distance from unit and 1.60 m above reverberant floor.

4 REQUIRED TOOLS AND AUXILIARY MATERIAL

Designation	Order no.
Centering tool	2400019
PlastGuard longlasting (5000ml)	2399960
Loctite 243	9992511

5 OPERATING ELEMENTS AND DISPLAYS ON DEVICE

1 Pressure regulator (Step 0-10)
2 Selector switch for operating mode
3 Indicator light (Error)
4 Operating light (Power)
5 EMERGENCY STOP switch

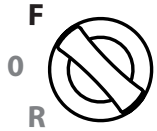
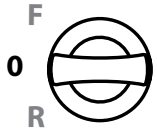
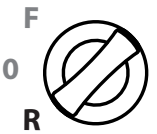


The pressure can be adjusted using the pressure regulator (Fig. 3, 1):

0	Pump switched off
1-4 (yellow area, 25 bar)	Setting for pre-filling and cleaning
5-10 (green area, 26-120 bar)	Setting of the required working pressure (max. 120 bar)

i	The corresponding colour areas and exact pressure are displayed on the pressure gauge.

The selector switch (Fig. 3, 2) offers the following modes:

	"F" position = Forward/Feed Basic setting for working The pump is switched on and off by pulling and releasing the trigger guard on the gun.
	„0" position = No activity The machine is ready for operation but the pump is not yet running.
	"R" position = reverse gear This setting is required for: • relieving pressure on the high pressure hose

5.1 ERROR CODES

	The number of flashes of the red control light is an error code. Several error codes can occur simultaneously and are displayed one after the other. Therefore observe the error display until the number of flashes is repeated.

NUMBER OF FLASHES	MEANING	MEASURES TO REMEDY THE FAULT
1	Overheating warning	Check ventilation (e.g. ventilation slits)
2	Overheating	Eliminate cause of overheating and allow the unit to cool down for approx. 5 minuteskühlen lassen
3	Motor overloaded	Check if motor/rotor is blocked. If there is no blockage and the unit does not start, replace the motor.
4	Overvoltage (more than 250 Volt)	Ensure sufficient supply.
5	Undervoltage (less than 85 volts)	Ensure sufficient supply.
6 oder 7	EMERGENCY STOP activated or CPU defective	Press EMERGENCY STOP and unlock by turning. Set the machine briefly to 0 and then to F. If the machine cannot be started, replace the defective controller.
8	Motor overloaded	Check if motor/rotor is blocked. Check connection cable between motor and controller. If problem not solved replace defective motor.
9	Malfunction pressure sensor	Check pressure sensor and connection cable between pressure sensor and controller. Replace if necessary.
10	Controller overloaded	Check if motor/rotor is blocked. Voltage too low (for generator operation deactivate standby function). If problem not solved, replace defective controller.

6 REPLACE THE STATOR AND ROTOR

⚠	**Machine must be depressurised.** **If necessary, set the selector switch briefly to "R" (reverse).** **Watch the manometer –> 0 bar.** **Wear safety goggles.**

⚠	**Disassembly may only be carried out by the person who controls the machine.** **Never operate machine with an exposed rotor.** **Do not reach into the rotor when it is moving. Risk of crushing.** **Caution if you have long hair. Only wear close-fitting clothes at work.**

- Move selector switch (fig. 9, 1) to "0" and set pressure regulator (2) to „0".
- **Disconnect mains plug.**
- Disconnect the control cable (Fig. 10, 1) on the pump unit.
- Loosen the 3 nuts (Fig. 11, 3) on the outlet unit (4) and separate the outlet unit from the old stator (5).
- Lift the feed helix (Fig. 12, 6) with the hook tool (7) and suspend the old rotor / stator combination (5).
- Lift the feed helix (Fig. 12, 6) with the hook tool (7), insert the new rotor / stator combination (5) and suspend it in the feed helix.
- Reinsert the outlet unit and secure in place with the 3 screws.
- Connect the control cable.

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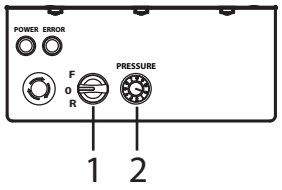

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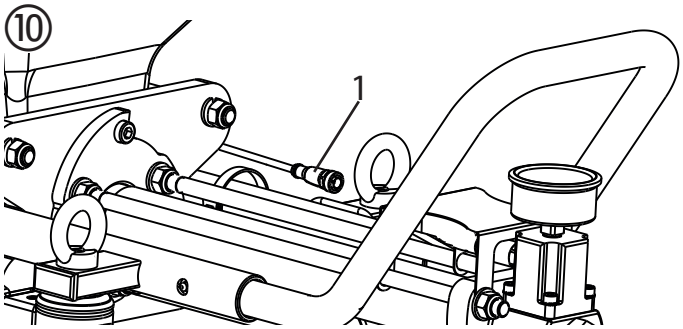

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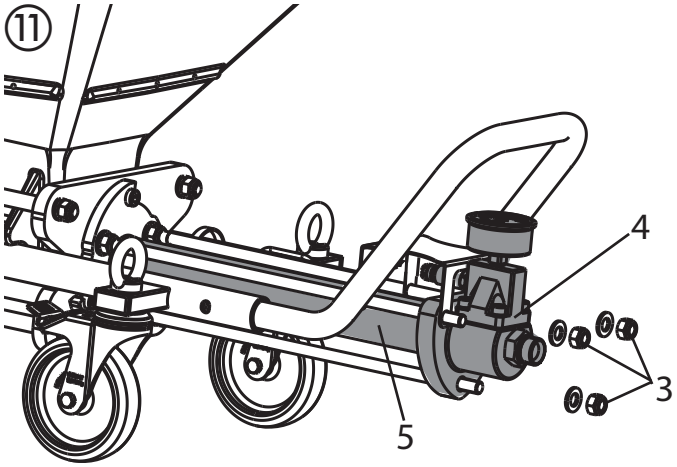

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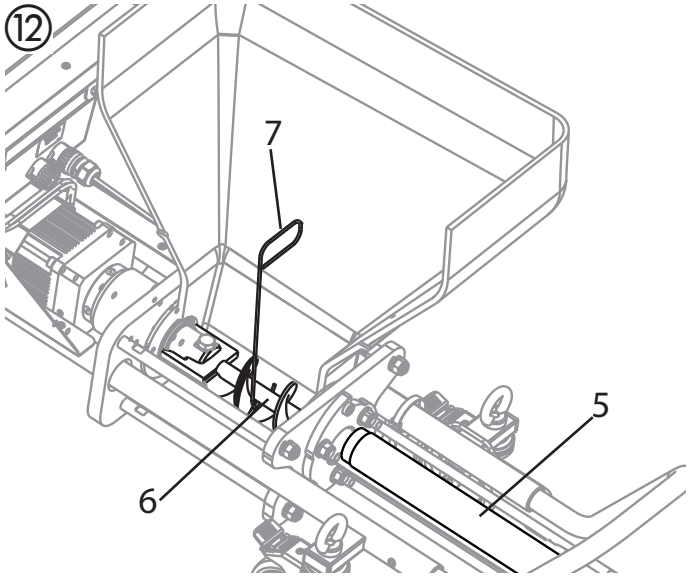

6.1 SHAFT SEAL

i	Check the seals on the PC HP 30 every month. The shaft sealing ring should be replaced after every approximately 500 operating hours.

- Move selector switch (fig. 13, 1) to "0" and set pressure regulator (2) to „0".
- **Disconnect mains plug.**
- Disconnect the control cable (Fig. 14, 1) on the pump unit.
- Loosen the 3 screws (Fig. 14, 2) on the fastening plate with a size 8 Allen key so that the pump unit can be rotated.
- Rotate and pull the pump unit out. (Fig. 15)
- Remove the 4 nuts (Fig. 15, 3) on the stay bolts using a wrench (19 mm).
- Remove the retaining plate (Fig. 16, 4) and seal (5).
- Check the seal (5) and replace if necessary.
- Push in the pins (6) on both sides and pull out the protective bars (7).
- Remove the container (8).
- Clean the shaft seal (9).

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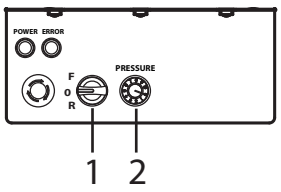

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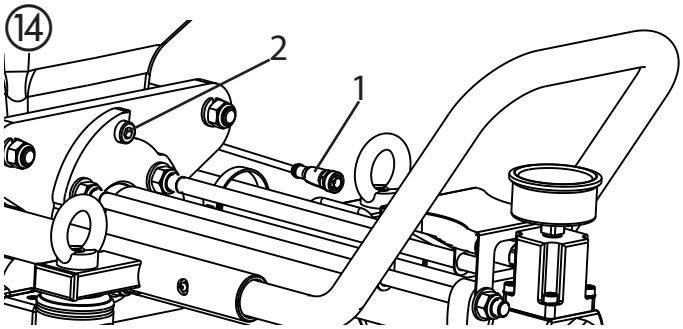

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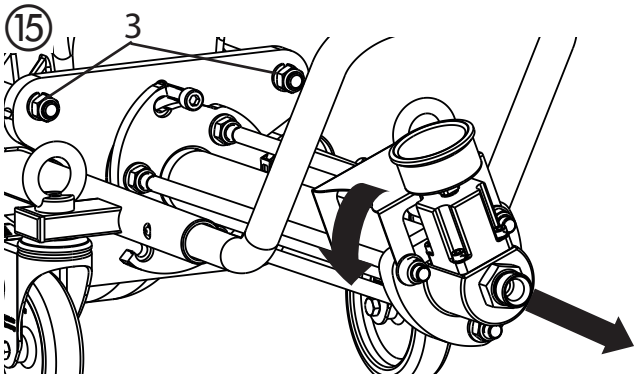

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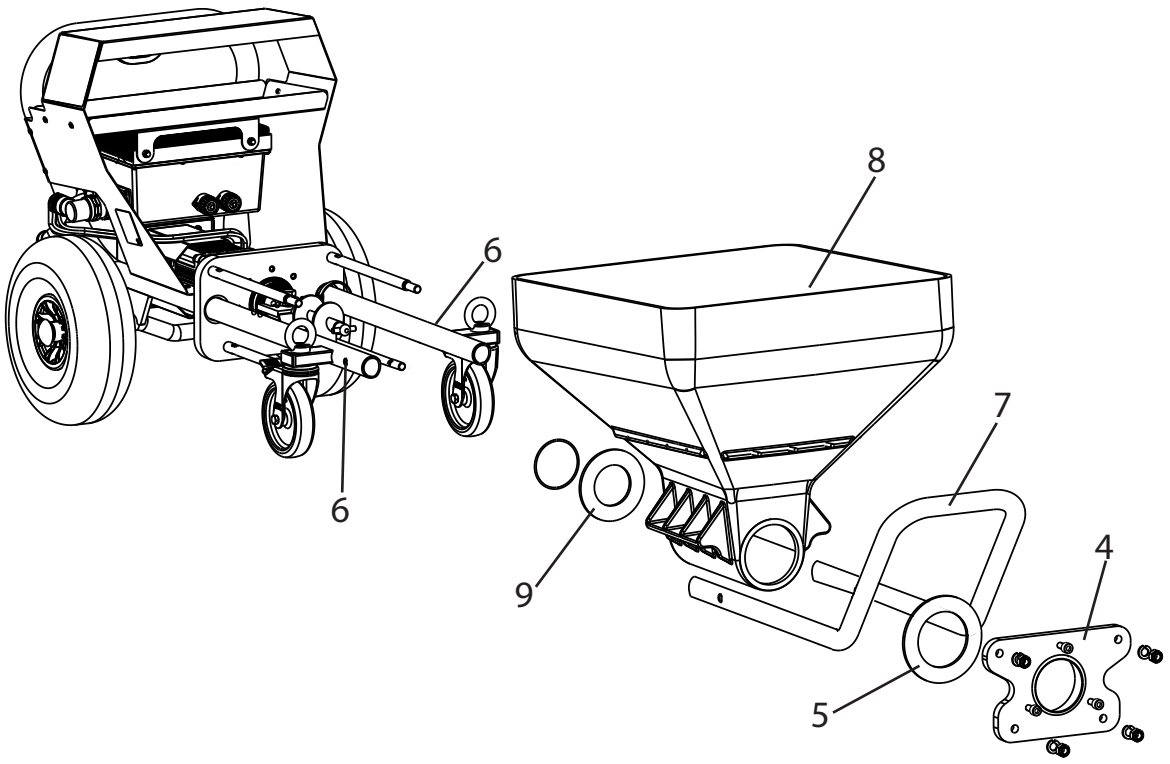
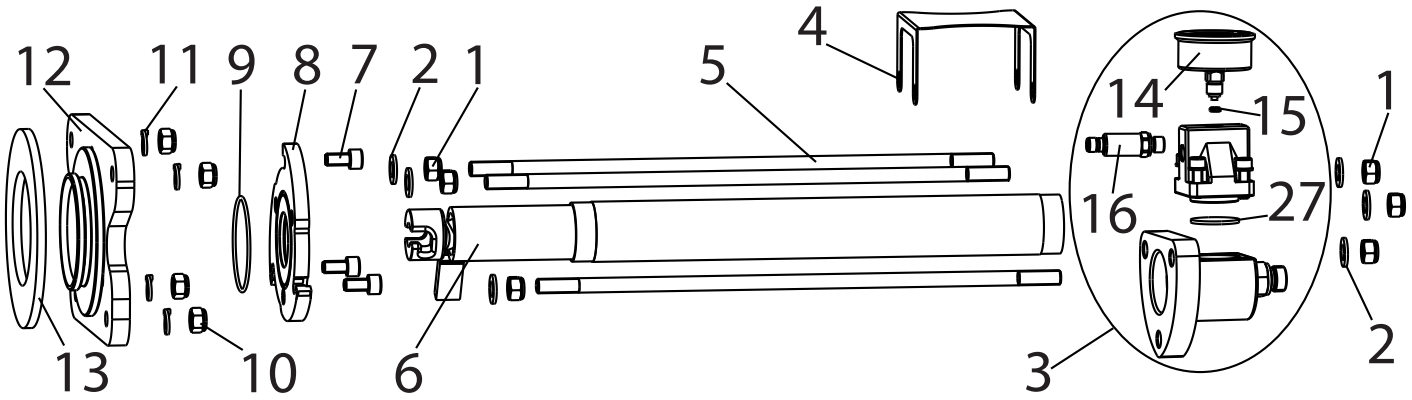


7 SPARE PARTS LIST FOR PLASTCOAT HP 30

ITEM	ORDER NO.	DESIGNATION
1	9910205	Hexagon nut
2	9920107	Washer
3	2395995	Outlet unit assy.
4	2384714	Safety panel
5	2384095	Connecting rod
6	2395996	Stator and rotor
7	K108.03	Cylinder head screw
8	2384092	Stator retaining plate

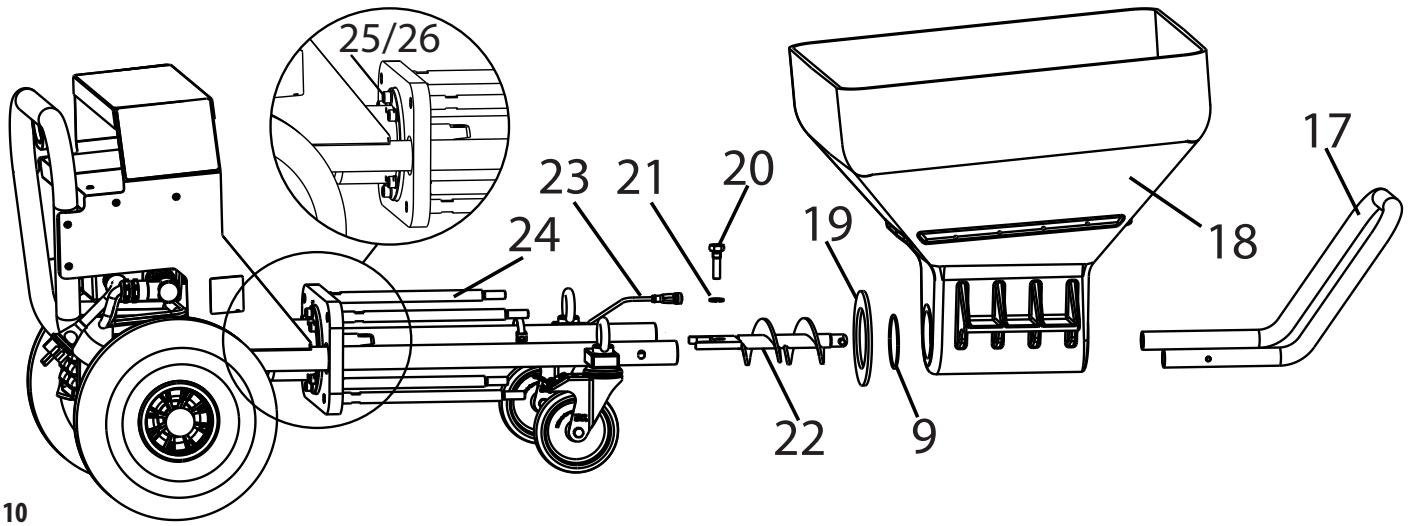
ITEM	ORDER NO.	DESIGNATION
9	9974118	O-ring
10	9910205	Hexagon nut
11	9921514	Spring washer
12	2383705	Stator mounting plate
13	2360707	Rubber seal
14	2390753	Pressure gauge
15	9970109	Sealing ring for pressure gauge
16	2384703	Pressure sensor



ITEM	ORDER NO.	DESIGNATION
17	2388748	Protective handle
18	2436478	Receptacle
19	2360706	Shaft sealing ring
20	348324	Screw
21	9921518	Spring washer
22	2383763	Feeder shaft

ITEM	ORDER NO.	DESIGNATION
23	2384771	Pressure sensor control cable
24	2383717	Spacer
25	9921501	Spring washer
26	9900313	Cylinder head screw
27	2353489	Diaphragm*

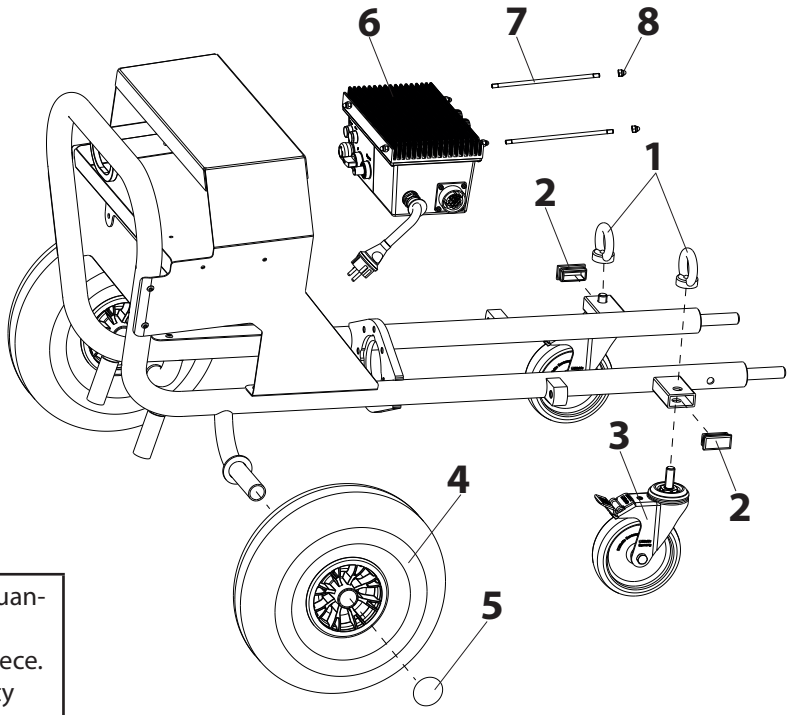
*** When replacing, use hydraulic oil Divinol HVI ISO 15 (order no. 322912, 250 ml)**

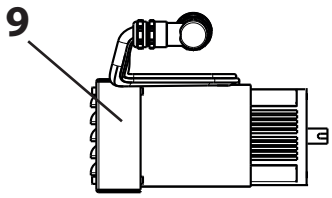


7.1 SPARE PARTS LIST FRAME

ITEM	ORDER NO.	DESIGNATION
1	3142039	Ring nut M12 (2)
2	3069013	Square head plug (2)
3	2367604	Guide pulley (2)
4	348349	Wheel (2)
5	9994902	Wheel cap (2)
6	2384207	Controler (incl. labels)
7	2310491	Connecting bolt (2)
8	9910708	Cap nut (4)
9	2373605	Motor assy.

i	The number in brackets gives the total quantity of a component in the assembly. The order number corresponds to one piece. Therefore, please also specify the quantity that you require when ordering.



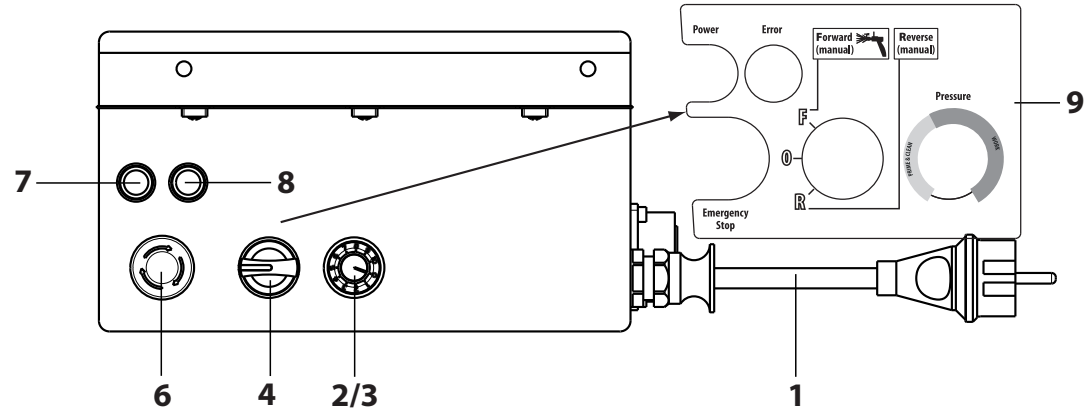


8 SPARE PARTS LIST CONTROLER

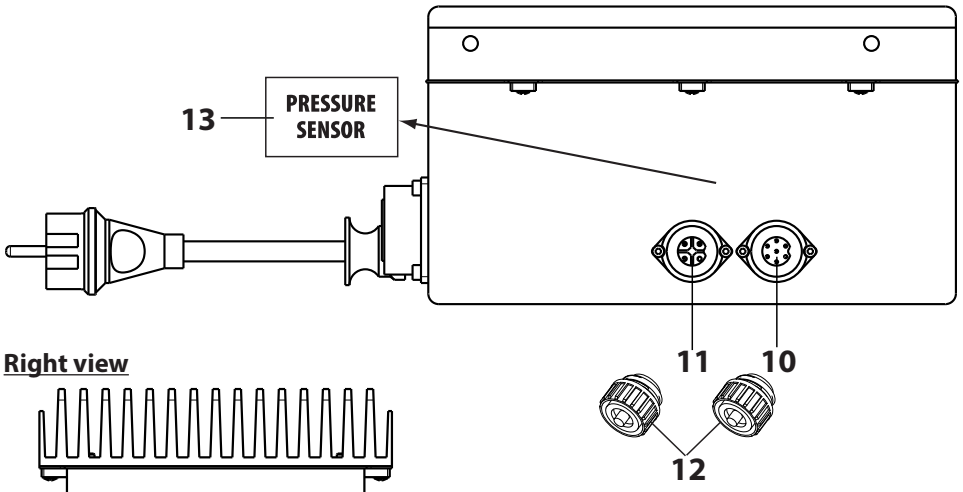
ITEM	ORDER NO.	DESIGNATION
1	2362391 2365766	Mains cable assy. (EU) Mains cable assy. (China)
2	2362393 2308410	Potentiometer assy.
3	2315 462	Control knob for potentiometer
4	2315416 2308475	Switch
6	2313 743	Emergency stop switch
7	2313 481	Signal lamp (green)

ITEM	ORDER NO.	DESIGNATION
8	2313 482	Signal lamp (red)
9	2392 440	Adhesive label (front)
10	2313 485	Coupler plug six-pole
11	2313 486	Coupler plug three-pole
12	2311 685	Cap
13	2392 441	Adhesive label (back)
14	2313 823	Female receptacle

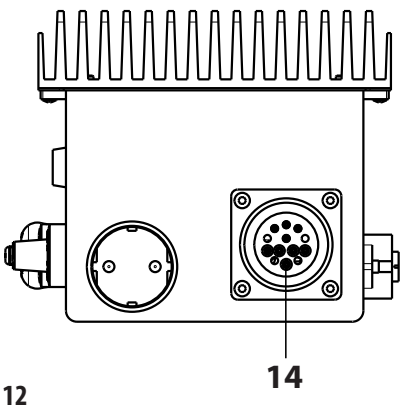
Front view



Back view



Right view



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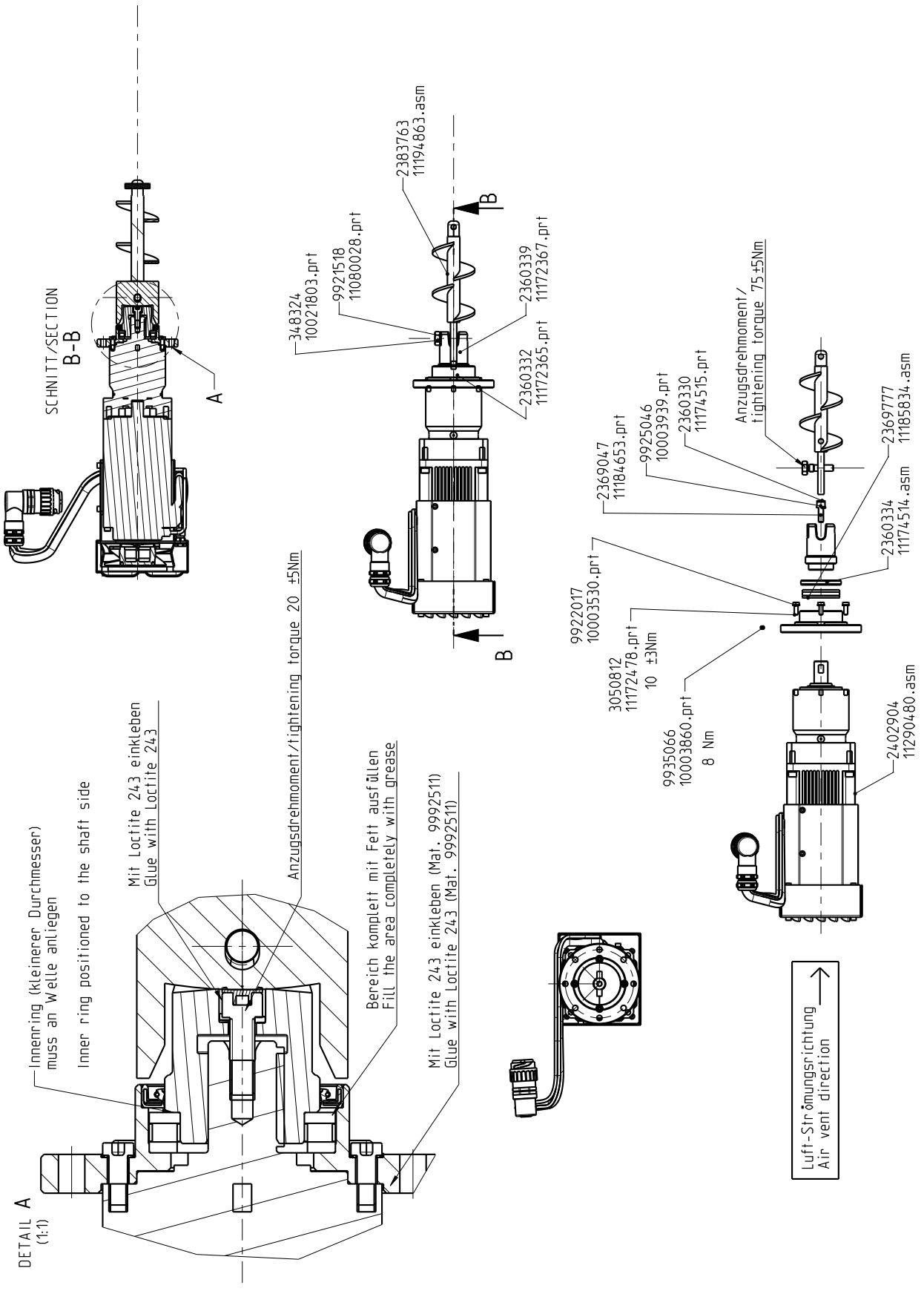
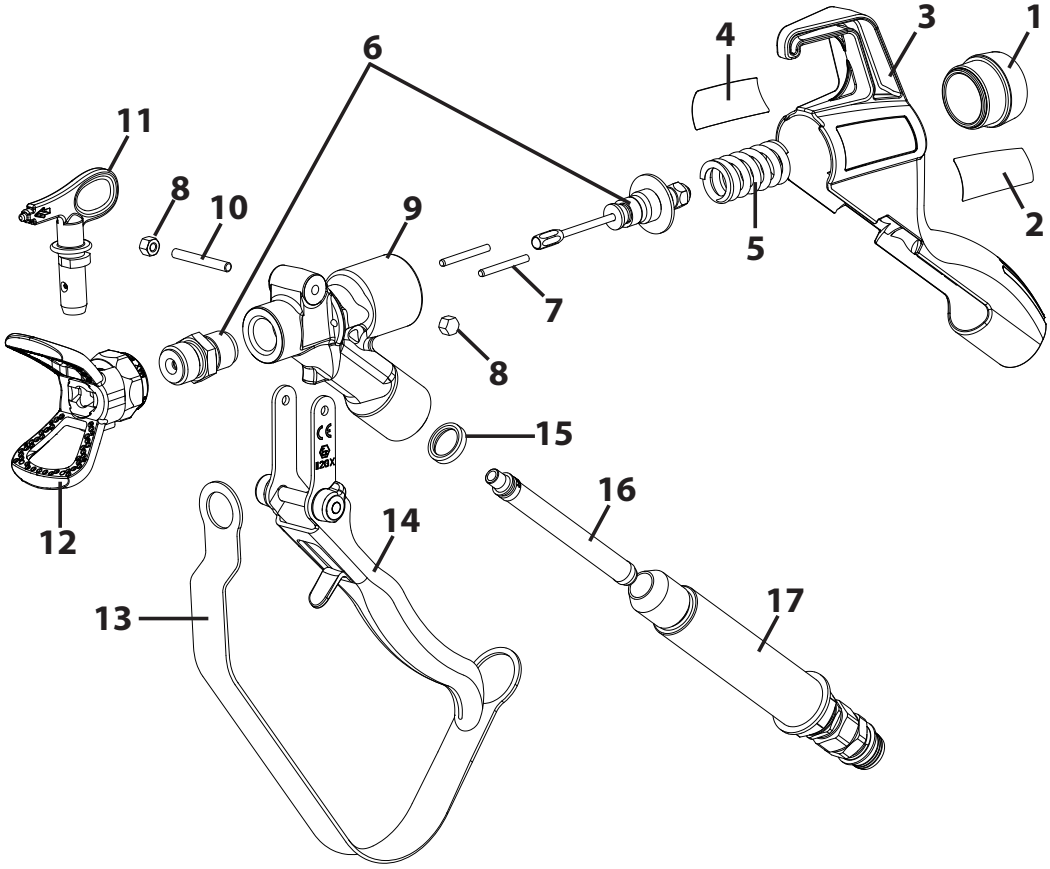
9 DRIVE ASSEMBLY PLAST COAT HP 30



10 SPARE PARTS LIST AG-19



Item	Part #	Description
1	0335301 2339659	Cap (250 bar) Cap (530 bar)
2	2343936	Label (right)
3	2332588	Handle recess
4	2343935	Label (left)
5	2344878 0347335	Pressure spring (250 bar) Pressure spring (530 bar)
6	2347489 2348175	Service Kit (F thread) Service Kit (G thread)
7	2332598	Cylinder pin
8	9910403	Cap nut
9	2343066 2343158	Gun housing 250 bar Gun housing 530 bar
10	2343085	Bolt
11	0553xxx 0559xxx	Tip (250 bar) Tip (530 bar)

Item	Part #	Description
12	 0289391 0289390 0289396 0289395	Tip guard 250 bar, F thread 250 bar, G thread 530 bar, F thread 530 bar, G thread
13	2332605	Guard rail
14	2333189	Trigger, cpl.
15	0043303	Grip seal
16	0034377 0097024 0089323 0097025	Gun filter (white, 1 pc.) Gun filter (white, 10 pc.) Gun filter (green, 1 pc.) Gun filter (green, 10 pc.)
17	2347490 2347492	Threaded connection, cpl (250 bar) Threaded connection, cpl (530 bar)

1 BASIC PRINCIPLES

1.1 ELECTRICALLY INSTRUCTED PERSON

In order to carry out work on electrical systems and equipment, a person must at least have training as an electrically instructed person.

However, an electrically instructed person is not authorised to autonomously set up, modify or repair electrical systems and equipment. Such tasks may only be performed under the direction and supervision of a skilled electrician.

The electrically instructed person must be trained on all systems and equipment. This training is carried out by the senior skilled electrician, who highlights the hazards and special features. The senior skilled electrician also ensures that the requirements and guidelines in respect of UVV, VDE and EN standards have been complied with.

All electrically instructed persons must receiving training at least once a year on the hazards, safe handling and correct conduct in relation to electrical systems.

Documents and work instructions must also be made available to electrically instructed persons. These must relate to the exact machine type and indicate potential hazards and special features. The work instructions must include safe and correct replacement of a connecting cable, for example.

1.2 SKILLED ELECTRICIAN FOR DEFINED TASKS

In order to autonomously carry out work on electrical systems and equipment, a person must have training as a skilled electrician for defined tasks.

However, the skilled electrician for defined tasks must also, like the electrically instructed person, be trained on all systems and equipment. This training is carried out by the senior skilled electrician, who highlights the hazards and special features. The senior skilled electrician also ensures that the requirements and guidelines in respect of UVV, VDE and EN standards have been complied with.
It is also necessary for a responsible skilled electrician to assume professional responsibility.

1.3 LEGAL FOUNDATIONS

Once a system and its equipment has been repaired, modified or set up, it must not constitute any hazard for users and their environment. To ensure that safety can still be guaranteed, an annual inspection is required for mobile systems and equipment.

1.4 WHICH TESTS MUST BE PERFORMED

A test in accordance with the guidelines of BGV A3 **must** be performed and verified. This test must be performed on all electrical equipment, even if "only" a mechanical repair has been carried out.

Contents of BGV A3: The test as per BGV A3 is divided into a visual and a metrological test.

Visual inspection:	- Protective conductors (protection class I)
	- Insulating parts
	- Housing
	- Connecting cables
	- Typeplate
	- Machine-specific components
Metrological test:	- Short-circuit test
	- Protective conductor resistance (RSL)
	- Equivalent leakage current (IEA)
	- Insulation resistance (Riso)
	- Functional test

Attention! If one of the above-specified criteria cannot be fulfilled, then the test is **considered a failure.**
If the customer refuses the necessary repair, he must be informed in writing to this effect. Clear reference must be made to the fact that safe operation of the system cannot be assured. This must be counter-signed by the operating company.
You must fulfil this obligation as you, as an expert, will be required to produce evidence in the event of damage.

1.5 FIVE SAFETY RULES

The Five Safety Rules are more than just rules. They are the precondition for working on electrical systems and appliances. Please take these rules seriously - they are essential for your safety.

Isolation

Isolation means all-pole disconnection of a system from live parts.
All live cables must be disconnected at all poles at the place of work before starting work. This can be done by means of main switches, expert removal of fuses, disconnection of plug connectors etc.

Protecting against restarting

In order to prevent inadvertent restarting of a system on which work is being carried out, restarting must be prevented reliably and safely. For example the unscrewed fuse elements can be replaced with lockable disabling elements or circuit-breakers can be masked with adhesive film. A "Please do not switch on - work in progress" sign can also be affixed. For appliances which are connected to the network by a plug connector, it is sufficient to store the unplugged connector on the machine in such a way that it cannot be mixed up with another connector. In addition, the connector must always be kept in the worker's immediate vicinity.

Verification of safe isolation from the supply

Verification of safe isolation from the supply in low-voltage networks, i.e. systems with operating voltages below 1000 V, must only be carried out using devices or equipment suitable for this purpose. A two-pole measuring instrument must be used. The voltage detectors used must comply with the respective rated voltage and must be tested before and after verification of safe isolation from the supply. I.e. the function of the detectors must be tested on a reliable live source.

Earthing and short-circuiting

After ensuring safe isolation from the supply, the conductors and earthing must be connected together with short-circuit-proof earthing and shorting jumpers. With this measure, the upstream overcurrent protective devices trigger and the system is immediately isolated in the event of inadvertent restoration of power. It should be noted that earthing is carried out first, then short-circuiting.

Cover or shield any adjacent live parts.

Often inadmissible approach to adjacent live system parts cannot be easily prevented. In such cases these system parts must be protected against accidental contact by permanent and securely fitted insulating covers.

1.6 CATEGORISATION OF PROTECTION CLASSES

Legal basis
In electrical engineering, protection classes enable the categorisation and identification of electrical equipment (for example, devices and installation components) in relation to the existing safety measures for protection against electric shock.
The protection classes are defined for all electrical equipment in DIN EN 61140 (VDE 0140-1).
A distinction is made between four protection classes for electrical equipment. Symbols are provided in order to identify equipment with the relevant protection class. These symbols are defined in IEC 60417. The use of safety precautions in the different classes of electrical equipment is described in DIN EN 61140 (VDE 0140-1):2007-03, section 7.

Protection class 0
There is no special protection against electric shock in addition to the basic insulation. Connection to the protective conductor system is not possible. Appliances with this protection class are not permitted in Germany and Austria. This protection class will not be included in any international standards in future. There is no symbol for protection class 0.

Protection class I 

All electrically conductive housing parts of the equipment are connected to the protective conductor system of the fixed electrical installation, which is at earth potential. Mobile appliances in protection class I have a plug connector with a protective conductor contact or an earthing pin plug. These must be executed so that the protective conductor connection is established as the first connection on plugging in. It must also be ensured that in the event of damage the protective conductor connection is disconnected last. The connecting cable entry into the appliance must be mechanically strain-relieved

Protection class II 

Equipment in protection class II has reinforced or double insulation around live parts, so that no conductive parts can be live even in fault conditions. This is also referred to as total insulation. Appliances in protection class II do not have a protective conductor contact.

Protection class III 

Appliances in protection class III operate with safety extra-low voltage (SELV).
Safety extra-low voltage means voltages that do not exceed 50 V AC (alternating voltage) or 120 V DC (direct voltage). This voltage must be generated by a safety transformer as per DIN VDE 0570-2-6 or EN 61558-2-6 for a mains-operated appliance.
Safety extra-low voltage taken from batteries or accumulators belongs to protection class III without the need for further measures.

1.7 EXPLANATION OF ELECTRIC VARIABLES AND COMPONENTS

Dimensional unit	Arithmetic unit	Explanation
A	I	Electric current in ampere
V	U	Electric voltage in volts
KV	U	Electric voltage in kilo-volts
VA	S	Apparent electric power
W	P	Electric power in watts
KW	P	Electric power in kilowatts
KWh	P	Electric power in kilowatt hours
Ω	R	Electric resistance in ohms
KΩ	R	Electric resistance in kiloohms
MΩ	R	Electric resistance in megaohms

Designation	Explanation
L1	External conductor
L2	External conductor
L3	External conductor
N	Neutral conductor
PE	Protective conductor
3~	Threephase AC voltage

1.8 EXPLANATION OF ELECTRICAL TERMS

Rated current
The rated current In is the rated value for a system, a power circuit or electrical equipment.

Operating current
The operating current Ib is the current that must flow during uninterrupted operation.

Overcurrent
Overcurrent is any current that exceeds the permissible current loading.
Overcurrent is the generic term.
Overload current is an overcurrent that occurs in an electrically fault-free power circuit.
Short-circuit current is an overcurrent that can occur due to an error.

Operating voltage
The operating voltage is the voltage present between the conductors during full function.

External conductor
External conductors are live conductors.

Neutral conductor
A neutral conductor is connected to the neutral point and star point, and is capable of contributing to the transmission of electrical energy.

Protective conductor
A protective conductor is necessary for certain protective measures against shock currents, in order to establish an electrical connection to one of the following parts.
- exposed conductive part of the electrical equipment
- external conductive parts
- earth electrodes, equipotential bonding

Earth fault
An earth fault is an electrical connection between an external conductor or neutral conductor to the protective conductor.

Interwinding fault
An interwinding fault is a short in a winding of the motor. This winding has a different resistance to the other windings.

PEN conductor
A PEN conductor is an earthed conductor which performs the function of protective conductor and neutral conductor simultaneously.

Active part (of an electrical system)
An active part is a live part of an electrical system or device (e.g. fuses, terminals, switches, capacitors, etc.) through which current flows during normal operation

Emergency switch, emergency stop
This switch is identified by its colouring (red on yellow) and serves to stop hazardous states or hazardous movements. The emergency switch does not serve for switching during normal operation or isolation in accordance with the Five Safety Rules (1.5).

Isolation
This is the disconnection of a system or its equipment from all sources.

Basic insulation
This is the insulation of active parts during normal operation to protect against direct contact.

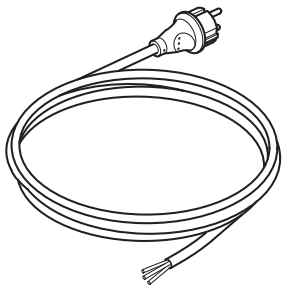
Direct contact
This is direct contact between an active part of an electrical system (an external conductor/phase) and the human body in normal operation.

Indirect contact
This is indirect contact between an active part and the human body due to an existing insulation fault. The housing of an electrical device which is not live under normal conditions is contacted (fault).

2 FUNCTIONAL TEST WORK INSTRUCTION

2.1 FUNCTIONAL TEST OF CORD SET

1. Ensure safe isolation from the supply before commencing work.
2. A multimeter or test buzzer should be used for testing. The function should be checked first of all.
3. Attach a measuring lead to one of the two pins on the connector.
4. Attach the second measuring lead to one of the device terminals N (blue) or L1 (brown). If no tone is audible or if the measuring device indicates an infinitely high resistance, the measuring lead must be attached to the other terminal, as it is not possible to tell to which pin the respective wire is connected on the earthing pin plug. If a tone is now audible or if the measuring device actuates, this wire is ok. Move the connecting cable in order to rule out a defective contact; if no interruption is discernible, this wire is ok. Repeat with the other wire N (blue) or L1 (brown).
5. Repeat point four in order to verify the functionality of the protective conductor (green/yellow). This is only necessary for equipment class I. See chapter 4.3
6. If an interruption or defective contact is found in one of the wires, then the wire is defective.
7. The defective component must be made inoperative in order to prevent further use.

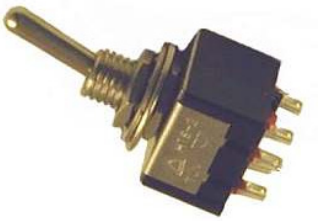


2.2 FUNCTIONAL TEST OF THE CAPACITOR

1. Ensure safe isolation from the supply before commencing work.
2. An insulation resistance tester (e.g. Metriso 500) must be used for the measurement.
3. The capacitor must be electrically isolated from the device. To do this, disconnect the plug connector on the capacitor.
4. Set the measuring device (Metriso 500) to measuring range III.
5. Connect the two test probes of the measuring device to the two terminal lugs on the capacitor.
6. To start the measurement, press the test button on the handle.
7. The measuring device deflects fully, then after approx. 20 sec. the pointer begins to wander to the left. The measurement is only complete when the pointer has moved all the way to the left (zero deflection).
8. Now disconnect the measuring device from the capacitor and switch to the Volt (V=) position.
9. After approx. two minutes, reconnect the test probes to the capacitor (point 5). The display begins to wander from right (full deflection) to left (zero deflection).
10. If a deviation is found at point seven, for instance if the pointer remains at full deflection (right) or zero deflection (left) for more than a minute, then this capacitor is defective.
11. The defective component must be made inoperative in order to prevent further use.

2.3 FUNCTIONAL TEST OF SWITCHES/BUTTONS

1. Ensure safe isolation from the supply before commencing work.
2. A multimeter or test buzzer should be used for testing. The function should be checked first of all.
3. First disconnect all electrical connections at the switch or button.
4. With the switch in the 0 position, all of the switch connections must be checked against each other. If a continuity is found, the switch is defective.
5 In position I of the switch the superimposed switch connections must have continuity. If no continuity is found, the switch is defective.
6. The defective component must be made inoperative in order to prevent further use.



2.4 FUNCTIONAL TEST OF EARTHING CONTACT SOCKET

1. Ensure safe isolation from the supply before commencing work.
2. First perform a visual inspection of the socket for damage.
3 If no mechanical damage is found, work through chapter1.5 (The Five Safety Rules) in the reverse order.
4. A two-pole measuring instrument should be used to check the electrical functionality. If a multimeter is used, it should be set to V~ or VAC.
5. Now check the voltage present between L1 and N. If this is 230 V AC then the voltage between L1 and PE must also be checked.
6. If a deviation is found in point 2 or point 5, there is a defect.
7. The defective component must be made inoperative in order to prevent further use.

2.5 FUNCTIONAL TEST OF THE MOTOR OVERCURRENT PROTECTION SWITCH

1. Ensure safe isolation from the supply before commencing work.
2. First perform a visual inspection of the motor protection switch for damage.
3. A multimeter or test buzzer should be used for testing. The function should be checked first of all.
4. Connect one test probe of the test buzzer to terminal N and the second one to terminal U1/Z1.
5. Now switch the motor overcurrent protection switch on and off two or three times. The buzzing tone sounds when the switch is at one; no buzzing tone should be audible in the OFF position.
6. Now connect the test probes to terminals L1 and U2. Repeat point 5 as a check.
7. If a deviation is found in relation to point 5 or 2, there is a defect.
8. The defective component must be made inoperative in order to prevent further use.

2.6 FUNCTIONAL TEST OF THE THREEPHASE MOTOR

1. Ensure safe isolation from the supply before commencing work.
2. A multimeter should be used for testing; this must be set to ohm (Ω) and tested.
3. In order to obtain a reliable and meaningful measurement, all cables of the motor must be disconnected first of all. Note down the connection plan.
4. In order to determine an interwinding fault, the Y/Δ jumpers must be removed. Note down the connection plan.
5. Measure all motor cables to the housing; if a continuity is found, then the motor has an earth fault and is defective.
6. Measure all three windings individually; they must present the same resistance. If a deviation of ≥ 2.0% is found, the motor has an interwinding fault and is defective.
7. If the motor is equipped with a thermal link, this must be tested for continuity. If no continuity is present or a resistance of ≥ 5Ω is present, the motor is defective.

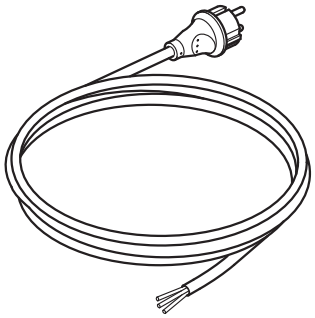
2.7 FUNCTIONAL TEST OF AC MOTOR

1. Ensure safe isolation from the supply before commencing work.
2. A multimeter should be used for testing; this must be set to ohm (Ω) and tested.
3. In order to obtain a reliable and meaningful measurement, all cables of the motor must be disconnected first of all. Note down the connection plan.
4. Measure all cables to the housing; if a continuity is found, then the motor has an earth fault and is defective.
5. Measurement of the individual windings is not possible, as they are internally bridged.
6. If the motor is equipped with a thermal link, this must be tested for continuity. If no continuity is present or if a high resistance is present, the motor is defective.

3 REPAIR WORK INSTRUCTION

3.1 REPLACING A CORD SET

1. Ensure safe isolation from the supply before commencing work.
2. Remove the old cable, noting the contact configuration.
3. Strip new cord set to desired length, taking care not to damage the insulation of the wires.
4. Shorten conductors N (blue) and L1 (brown) by 1.5 cm, to ensure that when there is a tensile load on the cable, the protective conductor (yellow/green) is disconnected from the machine last.
5. Press on the wire end ferrules, to ensure secure contact.
6. Install strain relief in order to prevent the connecting cable from being pulled out. Make sure that the strain relief is not excessively tightened, which could cause the cable to shear off.
7. Ensure secure contact when connecting the individual wires.
8. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality.
9. The defective component must be made inoperative in order to prevent further use.



3.2 REPLACING A 400 V CORD SET

1. Ensure safe isolation from the supply before commencing work.
2. First of all loosen the strain relief until the cable can be freely moved.
3. Disconnect the defective cable, noting the exact pin assignment.
4. Strip the new cable to the desired length, taking care not to damage the insulation of the individual wires.
5. First shorten wires L1, L2, L3 and N by 1.5 cm. This ensures that when there is a tensile load on the cable, the protective conductor (PE) is disconnected last.
6. Now strip the individual wires to the desired length.
7. Now press the wire end ferrules on, making sure that the wires terminate flush with the sleeve and that no individual wires protrude.
8. Now connect the cable in accordance with the pin assignment noted in point 3. Make sure that secure contact is achieved.
9. Now tighten the strain relief - but not too much, as this could cause the cable or an individual wire to shear off.
10. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality. See chapter 1.4

3.3 REPLACING THE CAPACITOR

1. Ensure safe isolation from the supply before commencing work.
2. Remove the wires (plug connector on capacitor).
3. Loosen the fixing nut on the front of the capacitor.
4. Remove the capacitor.
5. Now install and connect the new capacitor in the reverse order.
6. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality. See chapter 1.4.
7. The defective component must be made inoperative in order to prevent further use.

3.4 REPLACING SWITCHES / BUTTONS

1. Ensure safe isolation from the supply before commencing work.
2. Remove the individual wires at the switch, noting the contact configuration.
3. Remove the switch, noting its installation position.
4. Install the new switch.
5. Establish the electrical connection, observing the contact configuration of point 2.
6. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality. See chapter 1.4
7. The defective component must be made inoperative in order to prevent further use.

3.5 REPLACING THE EARTHING CONTACT SOCKET

1. Ensure safe isolation from the supply before commencing work.
2. Loosen the fastening screws and remove the socket from the housing.
3. Loosen and remove all cables at the earthing contact socket, noting the contact configuration.
4. Establish the electrical connection to the new earthing contact socket, ensuring correct and safe contacting.
5. The earthing contact socket can now be re-installed in the housing.
   Pay attention to the installation position of the socket. This must ensure the best possible splash protection, even in operating status.
6. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality.
7. The defective component must be made inoperative in order to prevent further use.

3.6 REPLACING THE MOTOR PROTECTING SWITCH

1. Ensure safe isolation from the supply before commencing work.
2. Mark the individual wires with the relevant terminal designation of the motor protecting switch, in order to prevent mix-up.
3. Now disconnect all electrical connections from the motor protecting switch.
4. The motor protecting switch can now be removed.
5. Now install the new motor protecting switch and restore the electrical connection.
6. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality.
7. In order to prevent further use of the defective motor protecting switch, it must be made unserviceable and disposed of.

3.7 REPLACING THE THREEPHASE MOTOR

1. 1. Ensure safe isolation from the supply before commencing work.
2. First disconnect the defective motor, noting the exact pin assignment.
3. Now replace the motor.
4. Ensure correct positioning of the Y/Δ jumpers on the motor terminal board.
5. Observe the pin assignment noted in point 2 when connecting the individual wires. Make sure that secure contact is achieved.
6. After completing the repair a measurement in accordance with BGV A3 must be carried out.
7. If the direction of rotation of the motor is incorrect, external conductors L1 and L2 and U and V must be swapped over.
8. In order to exclude further use of the defective motor, all wires must be disconnected directly at the motor.
9. After completing the repair a measurement in accordance with BGV A3 must be carried out, in order to ensure electrical safety and functionality See chapter 1.4

3.8 REPLACING THE AC MOTOR

1. Ensure safe isolation from the supply before commencing work.
2. First disconnect the defective motor, noting the exact pin assignment.
3. Now replace the motor.
4. Observe the pin assignment noted in point 2 when connecting the individual wires.Also ensure secure contact when connecting the wires.
5. After completing the repair a measurement in accordance with BGV A3 must be carried out.
6. In order to exclude further use of the defective motor, all wires must be disconnected directly at the motor.

4 MACHINE-SPECIFIC DOCUMENTS

4.1 Connection diagram PC HP 30