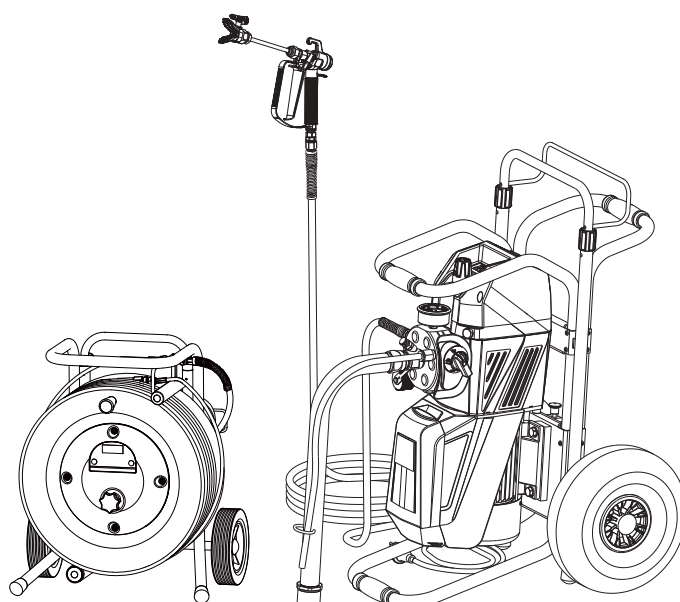
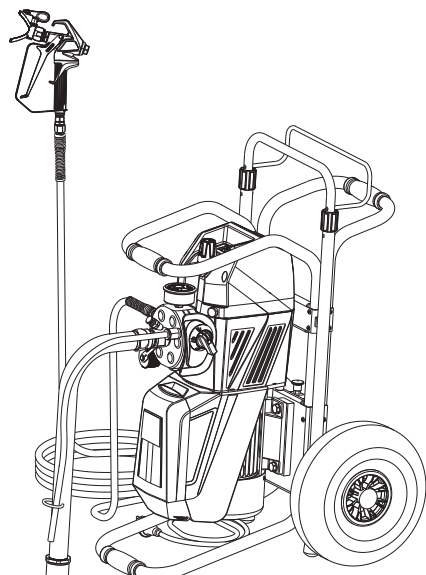
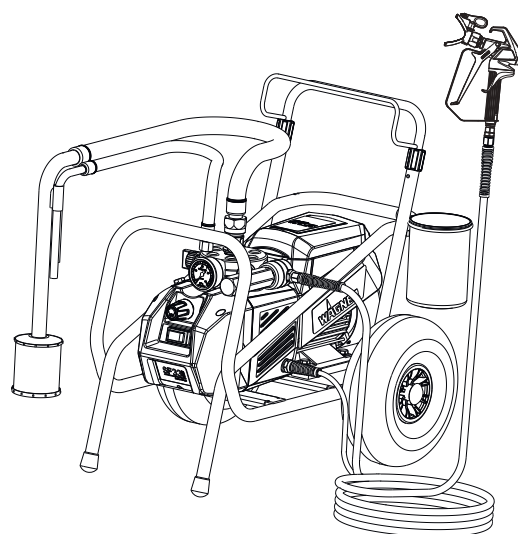
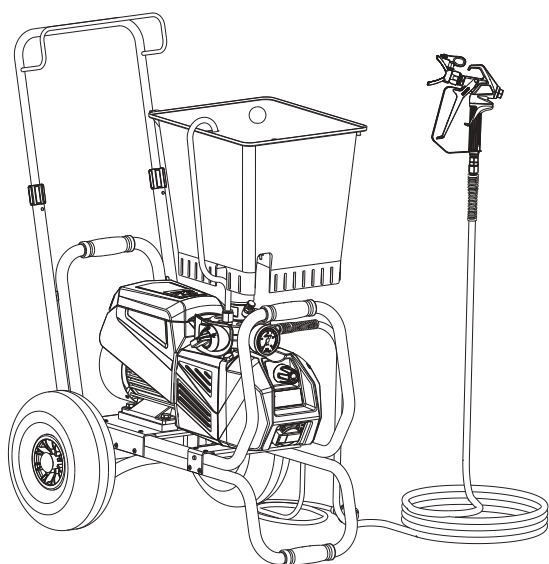
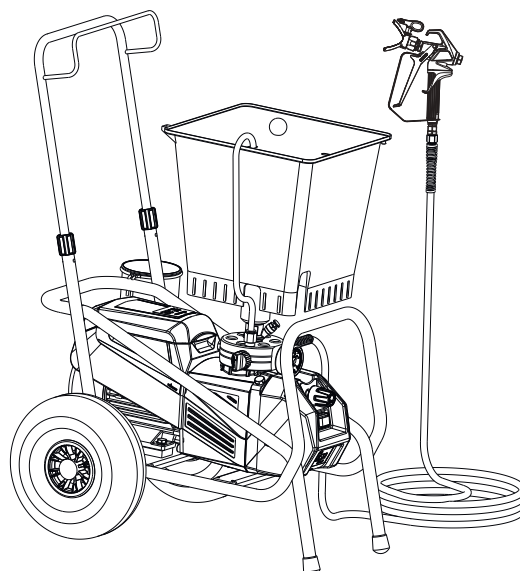


WAGNER

Service manual with electrical
repair instructions for electri-
cally instructed persons of the
J. Wagner GmbH


Super Finish 33 PLUS
Super Finish 33 Pro
Nespray Pro



WARNING!

Attention, danger of injury by injection!

Airless units develop extremely high spray pressures.

	 <p>Danger</p>
<p>①</p>	<p>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.</p> <p>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.</p>
<p>②</p>	<p>The following points are to be observed in accordance with the operating manual before every start-up:</p> <ol style="list-style-type: none">1. Faulty units may not be used.2. Secure a Wagner spray gun with the securing lever at the trigger guard.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.
<p>③</p>	<p>Instructions for regular cleaning and maintenance of the unit are to be observed strictly.</p> <p>Observe the following rules before any work on the unit and at every working break:</p> <ol style="list-style-type: none">1. Relieve the pressure from the spray gun and high-pressure hose.2. Secure a Wagner spray gun with the securing lever at the trigger guard3. Switch the unit off.

Ensure safety!


1 SAFETY REGULATIONS FOR AIRLESS SPRAYING

All local safety regulations in force must be observed. The following sources are just a sample of those containing safety requirements for Airless spraying.


- a) The European Standard „Spray equipment for coating materials – safety regulations„ (EN 1953).

The following safety regulations are to be observed in order to ensure safe handling of the Airless high-pressure spraying unit.


1.1 FLASH POINT

 Danger	<p>Only spray coating materials with a flash point of 21 °C or higher. The flash point is the lowest temperature at which vapors develop from the coating material. These vapors are sufficient to form an inflammable mixture over the air above the coating material.</p>
---	---



1.2 EXPLOSION PROTECTION

 Danger	<p>Do not use the unit in work places which are covered by the explosion protection regulations. The unit is not designed to be explosion protected. Do not operate the device in explosive areas (zone 0, 1 and 2). Explosive areas are, for example, places where paints are stored and locations in direct proximity to the object being sprayed. Keep the device at least 3 m from the object you are spraying.</p>
---	---

1.3 DANGER OF EXPLOSION AND FIRE FROM SOURCES OF IGNITION DURING SPRAYING WORK

 Danger	<p>There must be no sources of ignition such as, for example, open fires, lit cigarettes, cigars or tobacco pipes, sparks, glowing wires, hot surfaces, etc. in the vicinity.</p>
---	---


1.4 DANGER OF INJURY FROM THE SPRAY JET

 Danger 	<p>Attention, danger of injury by injection! Never point the spray gun at yourself, other persons or animals. Never use the spray gun without spray jet safety guard. The spray jet must not come into contact with any part of the body. In working with Airless spray guns, the high spray pressures arising can cause very dangerous injuries. If contact is made with the spray jet, coating material can be injected into the skin. 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.</p>
---	--

1.5 SECURE SPRAY GUN AGAINST UNINTENDED OPERATION

Always secure the spray gun when mounting or dismounting the tip and in case of interruption to work.

1.6 RECOIL OF SPRAY GUN

 Danger	<p>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.</p>
--	---

1.7 BREATHING EQUIPMENT AS PROTECTION AGAINST SOLVENT VAPORS

Wear breathing equipment during spraying work. A breathing mask is to be made available to the user.

1.8 PREVENTION OF OCCUPATIONAL ILLNESSES

Protective clothing, gloves and possibly skin protection cream are necessary for the protection of the skin.


Observe the regulations of the manufacturer concerning coating materials, solvents and cleaning agents in preparation, processing and cleaning units.




1.9 MAX. OPERATING PRESSURE

The permissible operating pressure for the spray gun, spray gun accessories, unit accessories and high-pressure hose must not fall short of the maximum operating pressure of 25 MPa (250 bar or 3625 psi).


1.10 HIGH-PRESSURE HOSE

 Danger	<p>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.</p>
--	--

- 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.

	<p>Only use WAGNER original-high-pressure hoses in order to ensure functionality, safety and durability.</p>
---	--

1.11 ELECTROSTATIC CHARGING (FORMATION OF SPARKS OR FLAMES)

 Danger	<p>Electrostatic charging of the unit may occur during spraying due to the flow speed of the coating material. These can cause sparks and flames upon discharge. The unit must therefore always be earthed via the electrical system. The unit must be connected to an appropriately-grounded safety outlet.</p>
--	--

An electrostatic charging of spray guns and the high-pressure hose is discharged through the high-pressure hose. For this reason the electric resistance between the connections of the high-pressure hose must be equal to or lower than 1 MΩ.

1.12 USE OF UNITS ON BUILDING SITES AND WORKSHOPS

The unit may only be connected to the mains network via a special feeding point with a residual-current device with INF ≤ 30 mA. An upstream circuit breaker (fuse) with 16 A (B or C characteristics) is required.

1.13 SOCKET AT THE UNIT (ONLY SF33 PLUS)

Do not load the socket with more than 1200 Watt. Unroll any connected cable drum completely.

1.14 VENTILATION WHEN SPRAYING IN ROOMS

Adequate ventilation to ensure removal of the solvent vapors has to be ensured.


1.15 SUCTION INSTALLATIONS

The are to be provided by the unit user in accordance with the corresponding local regulations.


1.16 EARTHING OF THE OBJECT

The object to be coated must be earthed. (Building walls are usually earthed naturally)

1.17 CLEANING THE UNIT WITH SOLVENTS

 Danger	<p>When cleaning the unit with solvents, the solvent should never be sprayed or pumped back into a container with a small opening (bunghole). An explosive gas/air mixture can arise. Only use an earthed container made from metal.</p>
--	--

1.18 CLEANING THE UNIT

 Danger	<p>Danger of short-circuits caused by water ingression! Never spray down the unit with high-pressure or high-pressure steam cleaners.</p>
--	---

1.19 WORK OR REPAIRS AT THE ELECTRICAL EQUIPMENT

These may only be carried out by a skilled electrician. No liability is assumed for incorrect installation.

1.20 WORK AT ELECTRICAL COMPONENTS

Unplug the power plug from the outlet before carrying out any repair work.


2 TECHNICAL DATA

	Super Finish 33 Plus (Type: D701C)	Super Finish 33 Pro (Type: D702C)	Nespray Pro (Type: D703C)
Voltage :	230 Volt ~, 50 Hz		
Fuses :	16 A träge		
Voltage on multifunction switch:	24 V	-	24 V
Unit connecting line :	6 m lang, 3x1.5 mm ²		
Max. current consumption unit : heating hose :	10.7 A		7.7 A 5.2 A
Degree of protection :	IP 54		
Rated input of unit : heating hose :	2.2 kW		1.7 kW 1.1 kW
Max. operating pressure :	25 MPa (250 bar)		20 MPa (200 bar)
Max. volume flow :	4.3 l/min		
Volume flow at 12 MPa (120 bar) with water :	3.8 l/min		
Max. temperature of the coating material :	43 °C		
Heating of the coating material to :	-	-	40 °C (standard)
Max. nozzle size:	0.033 inch (Zoll) – 0.84 mm		D319
Max. viscosity :	25,000 mPas		
Empty weight pump heating hose drum	50 kg -	44 kg -	51 kg 18,3 kg
Hydraulic oil filling quantity :	1,1 l, Divinol HVI 15	1,0 l, Divinol HVI 15	1,1 l, Divinol HVI 15
Max. tyre pressure:	0.2 MPa (2 bar), 1.5 bar recommended		
Plug connection on device: max. connection	230 Volt ~, 50 Hz 1200 Watt	-	230 Volt ~, 50 Hz 1200 Watt
Max. vibration at the spraygun :	lower than 2.5 m/s ²		
Max. sound pressure level:	76 dB (A)*		

*Messort: Abstand 1m seitlich vom Gerät und 1,60m über dem Boden, 12 MPa (120bar) Betriebsdruck, schallharter Boden

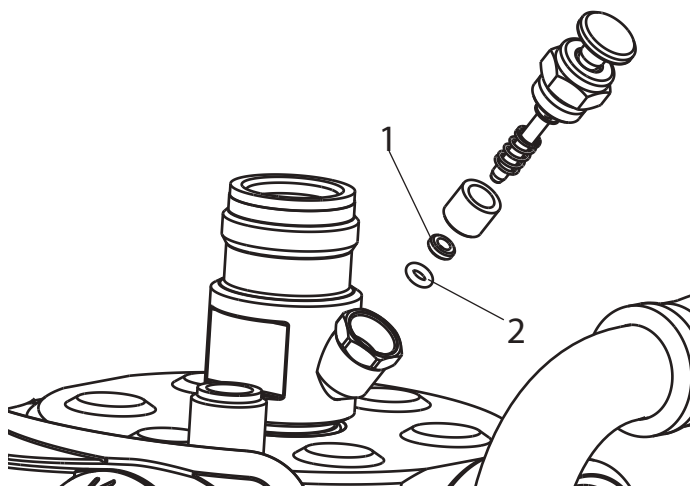


3 REPAIRS AT THE UNIT

 Danger	<p>Switch the unit off. Before all repair work: Unplug the power plug from the outlet.</p>
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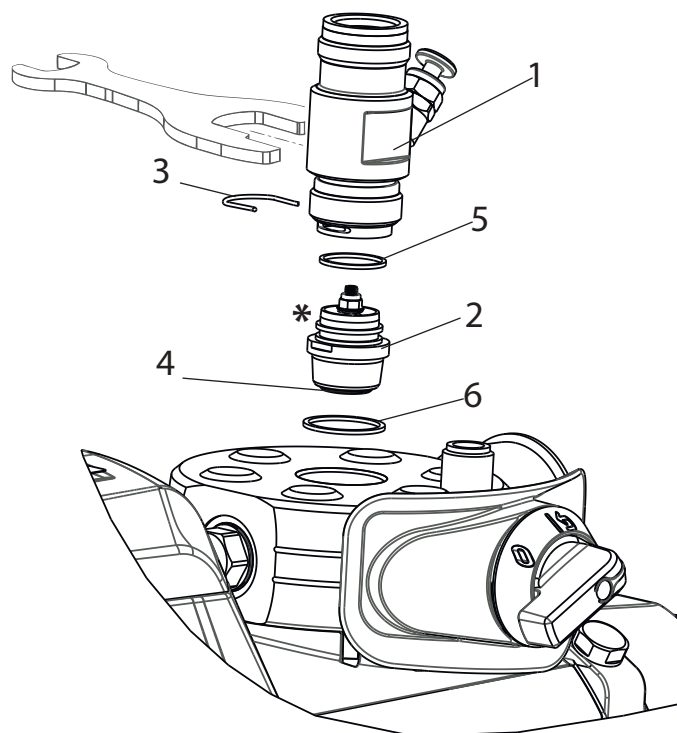
3.1 INLET VALVE PUSHER

1. Use a 17 mm spanner to screw out the inlet valve button.
2. Replace the wiper (1) and O-ring (2).




3.2 INLET VALVE

1. Place the enclosed 30 mm wrench on the trigger housing (1).
2. Loosen the trigger housing (1) with light blows of a hammer on the end of the wrench.
3. Screw out the trigger housing with the inlet valve (2) from the paint section.
4. Pull of the clasp (3) using the enclosed screwdriver.
5. Place the enclosed 30 mm wrench on the inlet valve (2). Turn out the inlet valve carefully.
6. Clean the valve seat (4) with a cleaning agent and brush (ensure that no brush hairs are left behind).
7. Clean the seals (5, 6) and check for damage. Replace, if necessary.
8. Check all the valve parts for damage. In case of visible wear replace the inlet valve.



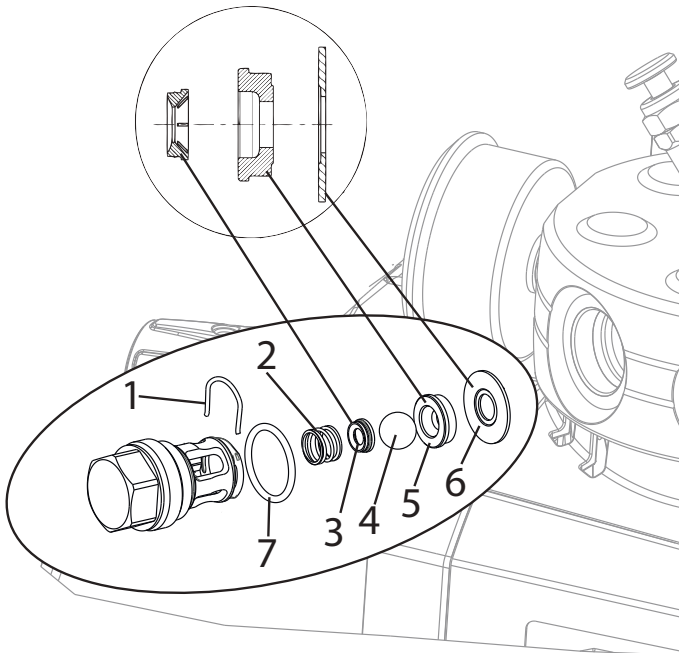
Installation

	<p>Valve lift (*) has to be 2.4 mm (± 0.05 mm).</p>
---	---

1. Insert the inlet valve (2) into the trigger housing (1) and secure with the clasp (3). Ensure that the (black) seal (5) is mounted in the trigger housing.
2. Screw the unit from the trigger housing and the inlet valve into the paint section. The same (black) seal (6) has to be mounted in the paint section.
3. Tighten the trigger housing with with a suitable torque wrench (90 Nm tightening torque).

3.3 OUTLET VALVE

1. Use a 22 mm wrench to screw the outlet valve from the paint section.
2. Carefully pull of the clasp (1) using the enclosed screw-driver. The compression spring (2) presses ball (4) and valve seat (5) out.
3. Clean or replace the components.
4. Check the O-ring (7) for damage.
5. Check the installation position when mounting the spring support ring (3) (clipped onto spring (2)), outlet valve seat (5) and seal (6), refer to figure.
The torque for fitting the outlet valve is 50 Nm.

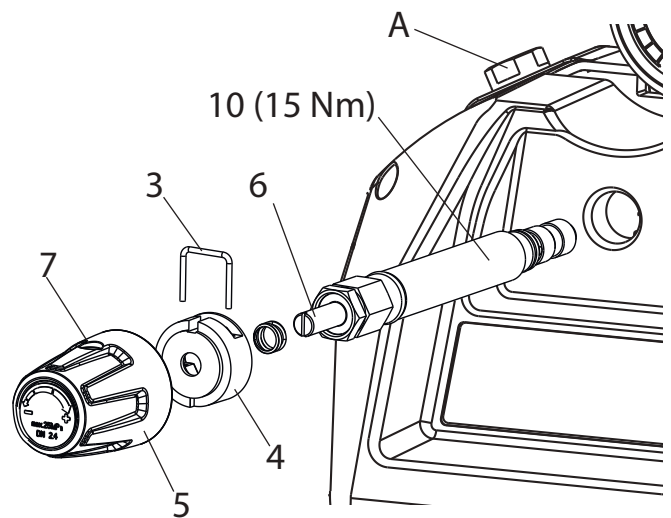


3.4 PRESSURE CONTROL VALVE



To remove the pump, move it to an upright position. Open the oil lock screw (A) to release any excess pressure that has built up in the hydraulic oil housing.

1. Insert regulator (10) and tighten it (approx. 15 Nm).
2. Mount stop sleeve (4) and clamp (3).
3. Turn pressure regulation screw (6) to the left until the spring snaps (pressure = 0).
4. Attach suction system or hopper.
Test medium: water
5. Mount a pressure gauge (0 – 400 bar), an original pressure hose from Wagner and a high pressure airless gun.



SETTING THE MAXIMUM OPERATING PRESSURE (CLOSING PRESSURE)

1. Lock the spray gun.
2. Set multifunction switch to , switch on the machine and let it run for 2-3 minutes for ventilation. Turn the pressure regulation screw (6) slowly until the machine starts to suck in water.
3. Set multifunction switch to and trigger spray gun for ventilating high pressure hose and spray gun. Lock the spray gun .
4. Turn the pressure regulation screw (6) slowly until the pressure gauge shows 250 bar (25 MPa, 3625 psi).
5. Put pressure regulation knob (5) on the pressure regulation screw and fully turn it to the right. Hold it in this position and pre-assemble the pin (7) with a 2.5 mm hexagonal wrench, loosen and tighten again with 1 Nm..
6. Turn pressure regulation knob to the left.
7. Release pressure by pressing the trigger of the the spray gun.
8. Control setting while the gun is locked again (turn pressure control knob to the right again).
9. Seal pin with red sealing wax (1 litre, order no. 9992512).
10. Set multifunction switch to .
11. Machine is ready for operation!



3.5 REPLACING THE POWER CABLE

 Danger	<p>This may only be carried out by a skilled electrician. No liability is assumed for incorrect installation. Switch the unit off.</p> <p>Before all repair work: Unplug the power plug from the outlet.</p>
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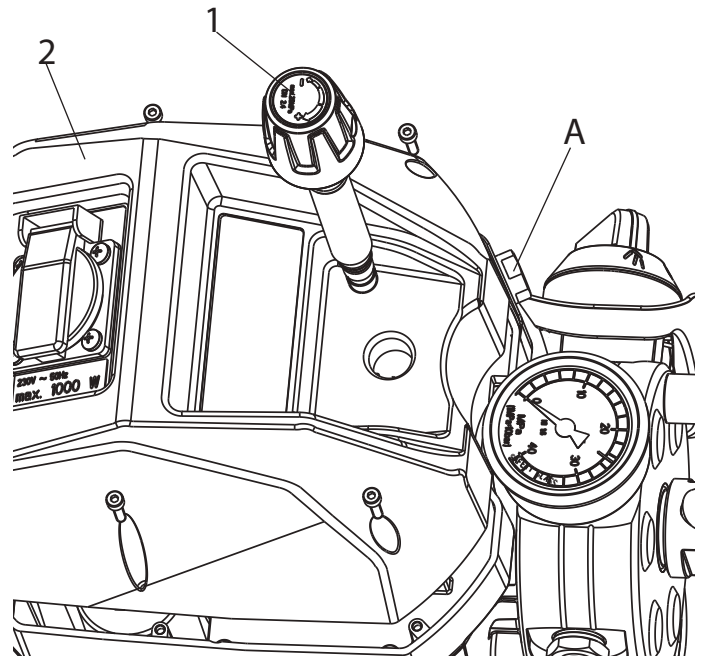
 Danger	<p>Do not dismantle the sealed pressure control valve (1) so as to ensure that the pressure setting is retained.</p>
-------------------	--

	<p>To remove the pump, move it to an upright position. Open the oil lock screw (A) to release any excess pressure that has built up in the hydraulic oil housing.</p>
--	---

1. Completely unscrew the pressure control valve (1) (spanner width 17 mm).
2. Remove the front cover (2) by loosening the 5 screws using an Allen key (SW 3).

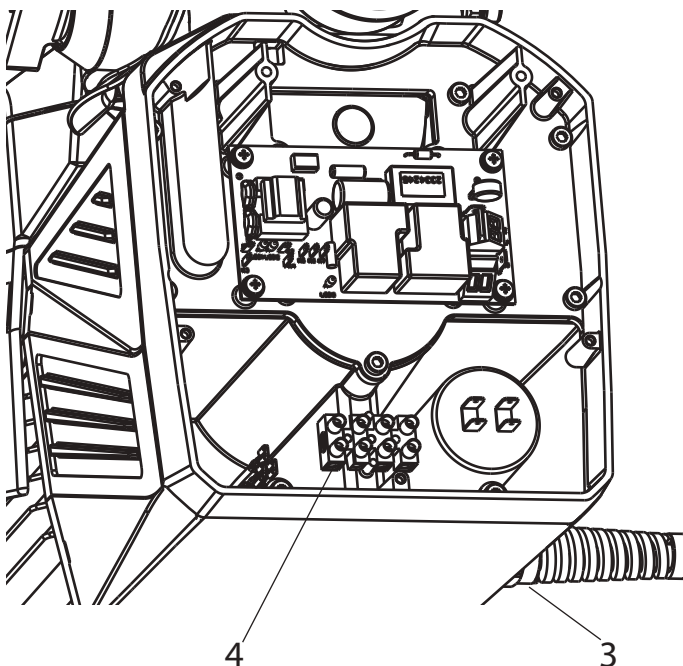
	<p>The fixed part of the cable threaded joint (3) is glued to replace the counter-holding.</p>
--	--

3. Loosen the cable threaded joint (3).
4. Loosen the wires in the mains terminal (4).
5. Replace the unit connecting line.
(only an approved power cable with the designation H07-RNF with a splash-proof plug may be used).

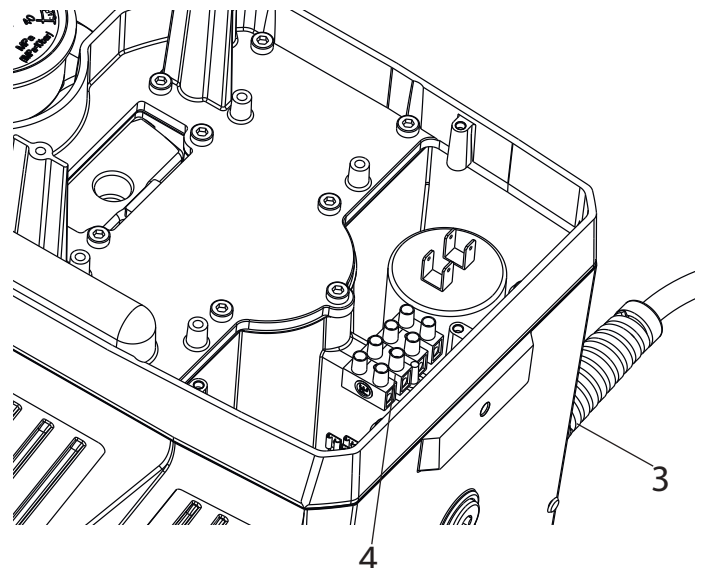


6. Connect the green/yellow wire to the contact with the PE sign (see circuit diagram).
7. Remount the covers carefully (do not squeeze any cables!)
8. Replace the pressure control valve in the housing and screw into position.

Version SF 33 PLUS




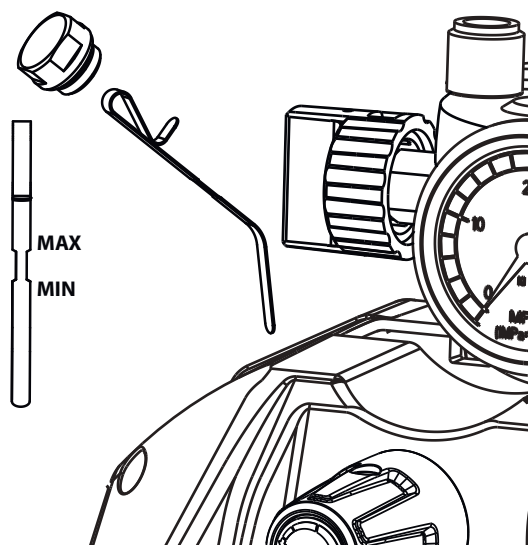
Version SF 33 Pro



3.6 CHECKING THE OIL LEVEL

1. Check oil level in the horizontal set-up.
2. The oil level must be in the middle between MIN and MAX.

	When filling, briefly lift the device (tilt it upwards by approx. 30°) and check again. This will remove any air bubbles that may have formed.
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3.7 TROUBLESHOOTING

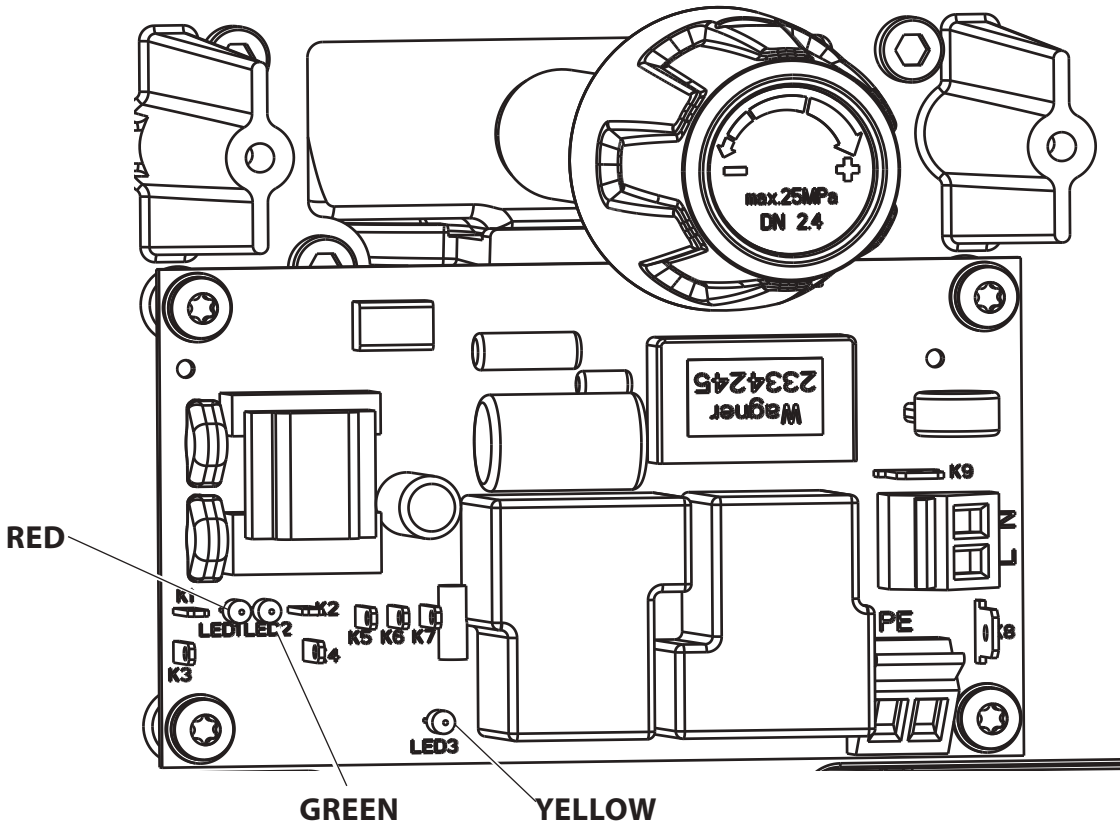
TYPE OF MALFUNCTION	WHAT ELSE?	POSSIBLE CAUSE	MEASURES FOR ELIMINATING THE MALFUNCTION
Unit does not start		Unit fuse has triggered	Let the motor cool down (you can also check the LED on the PCB -> see chapter 3.8)
		Multi-function switch not set back previously to „0“	Set multi-function switch to „0“ and then switch back on
Device triggers mains fuse during start-up	Starting current of the device in cold state is approx. 48A	Mains fuse only 10A or 16A fast circuit breaker	10A fuse not suitable, use cable drum 30m or install service set soft start 2404531 -> see chapter 3.9
Unit runs but makes a strange-noise	Motor runs without load (very silent), unit without function	Gearwheel inside the gearbox is damaged	Replace the gear wheel, including the 8 sleeves, and remove the broken pins in the gear housing.
	Motor produces a loud and high noise	Fan cover vibrates	Tighten the screws of the fan cover
	High-frequency whistling noise from the device	Transmission whistles	Run in for approx. 2h (device under load - spraying pressure with water approx. 200 bar) If no improvement, replace internally geared gearwheel.
Unit can't be ventilated	Ventilation possible in vertical position	Not enough oil	Check/correct oil level (Find reason for oil loss. Particularly check whether oil has run into the gear unit (check shaft seal ring).
Unit does not suck in	Most likely ->	Inlet valve damaged or clogged	Replace or clean inlet valve
		Outlet valve damaged or clogged	Replace or clean outlet valve
	Pump sucks poorly	Valve pusher leaking	Dismantle valve pusher, replace if necessary
	Valve makes no sound	Unit not ventilated	Ventilate unit



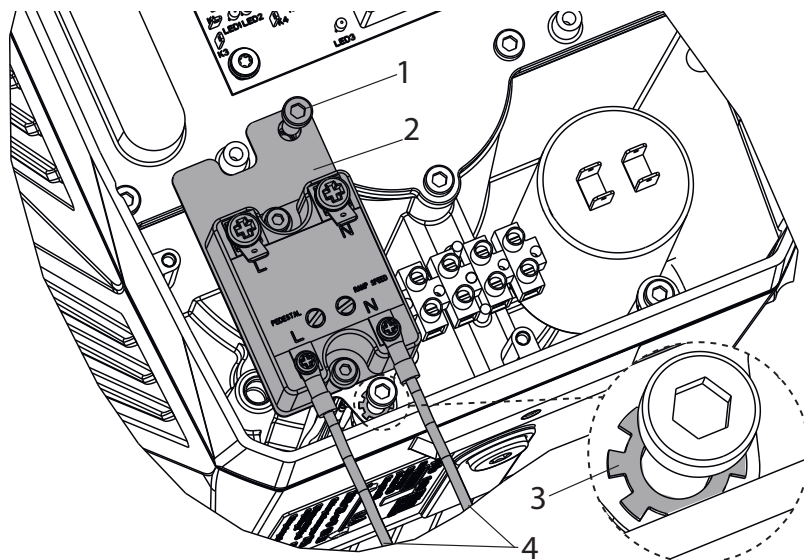
TYPE OF MALFUNCTION	WHAT ELSE?	POSSIBLE CAUSE	MEASURES FOR ELIMINATING THE MALFUNCTION
Delivery rate too low	Most likely ->	Inlet or outlet valve damaged	Check and replace valves
	Material sucked up hardly	Unit is sucking in air	Search for the problem: suction system?, Inlet valve pusher?, Gaskets inside the inlet valve? Red inlet installed?...
		Suction filter clogged	Clean or replace
		Viscosity of the material too high	If necessary, check valve lift for inlet valve 341247 (2.4 mm)
Unit does not generate pressure	Material comes out of the return hose	Relief valve Switch button badly fastened	Tighten screw (spray into switching position), or fit new switching button
Pressure can't be released	Multifunction switch in circulation position -> no material comes out of the return hose	Relief valve Switch button badly fastened	Tighten screw (spray into switching position), or fit new switching button
		Relief valve clogged	Clean or replace relief valve
Unit loses oil		Gasket of front cover defective / Material Unitec 300 possibly problematic	Replace front cover gasket (Klingersil material)
		Blowhole in front cover	Check and replace front cover if necessary.
		O-rings of the insert in the pressure insert leaking	Pumphead disassembly - Replace insert O-rings
		Diaphragm fixation leaks	Replace diaphragm
		Seal between pressure insert and hydr. housing defective/missing	Check and replace
		Pressure insert cracked	Replace (please inform R&D department Markdorf)
Material comes out of the paint head	Material comes out of the inlet valve housing	Sealing ring 341331 missing	Mount sealing ring
		Paint head damaged by backwashing	Replace paint head
		Aluminium paint head (SF33 Pro) cracked	Replace (please inform R&D department Markdorf)
Manometer shows strong pulsation	Device works normally otherwise	Glycerine filling in manometer too low (should be 95% -> approx. 5mm below scale top edge)	Top up with glycerine (if necessary, suck off from old manometer with disposable syringe)

3.8 INDICATORS AT THE ELECTRIC CONSOLE

POS	DESCRIPTION
1	LED red (Indicator for voltage supply - lights up when there is voltage supply)
2	LED green (Indicator for "ready for operation" – lights up when there is voltage supply and the thermal fuse is closed = means temperature of the motor is ok)
3	LED yellow (Indicator for contactor – lights up when contactors are fixed and there is voltage supply for the motor)



3.9 SOFT START CONTROLLER UPGRADE (SERVICE KIT 2404531)

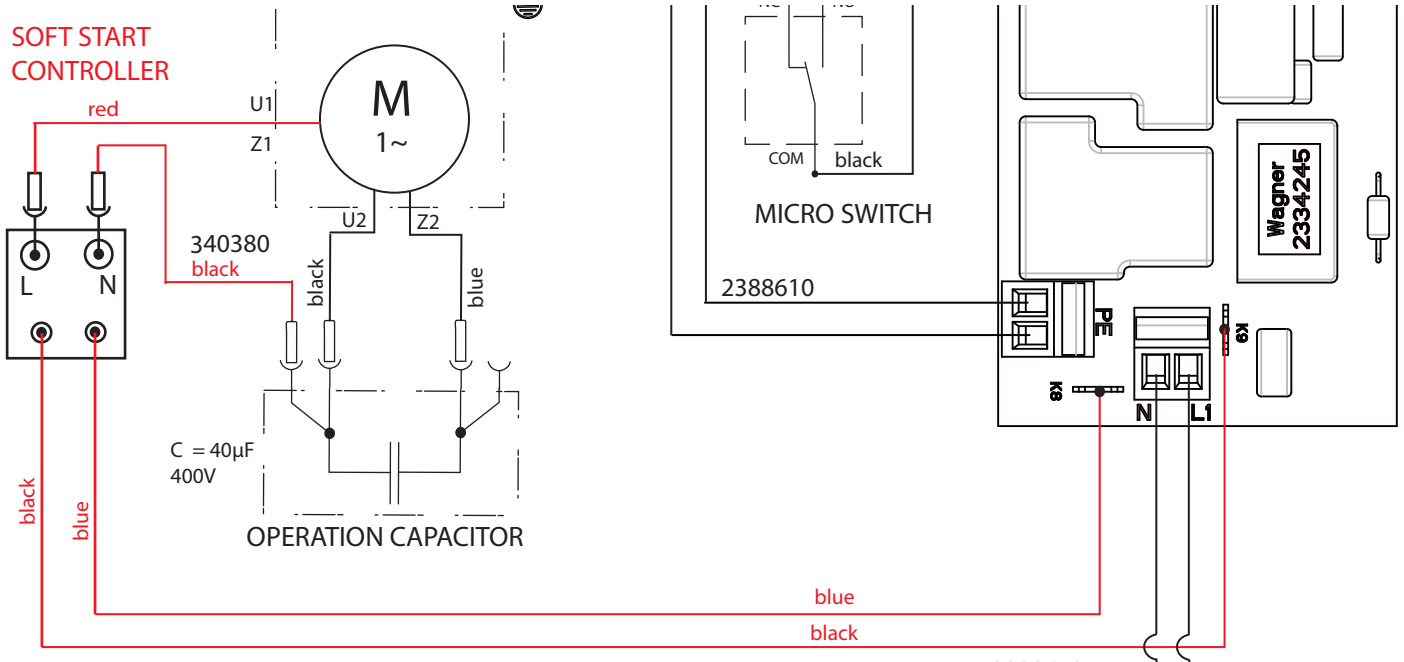


If required, the soft start controller **not** included in the standard configuration of the SF33 can be retrofitted by the service department.

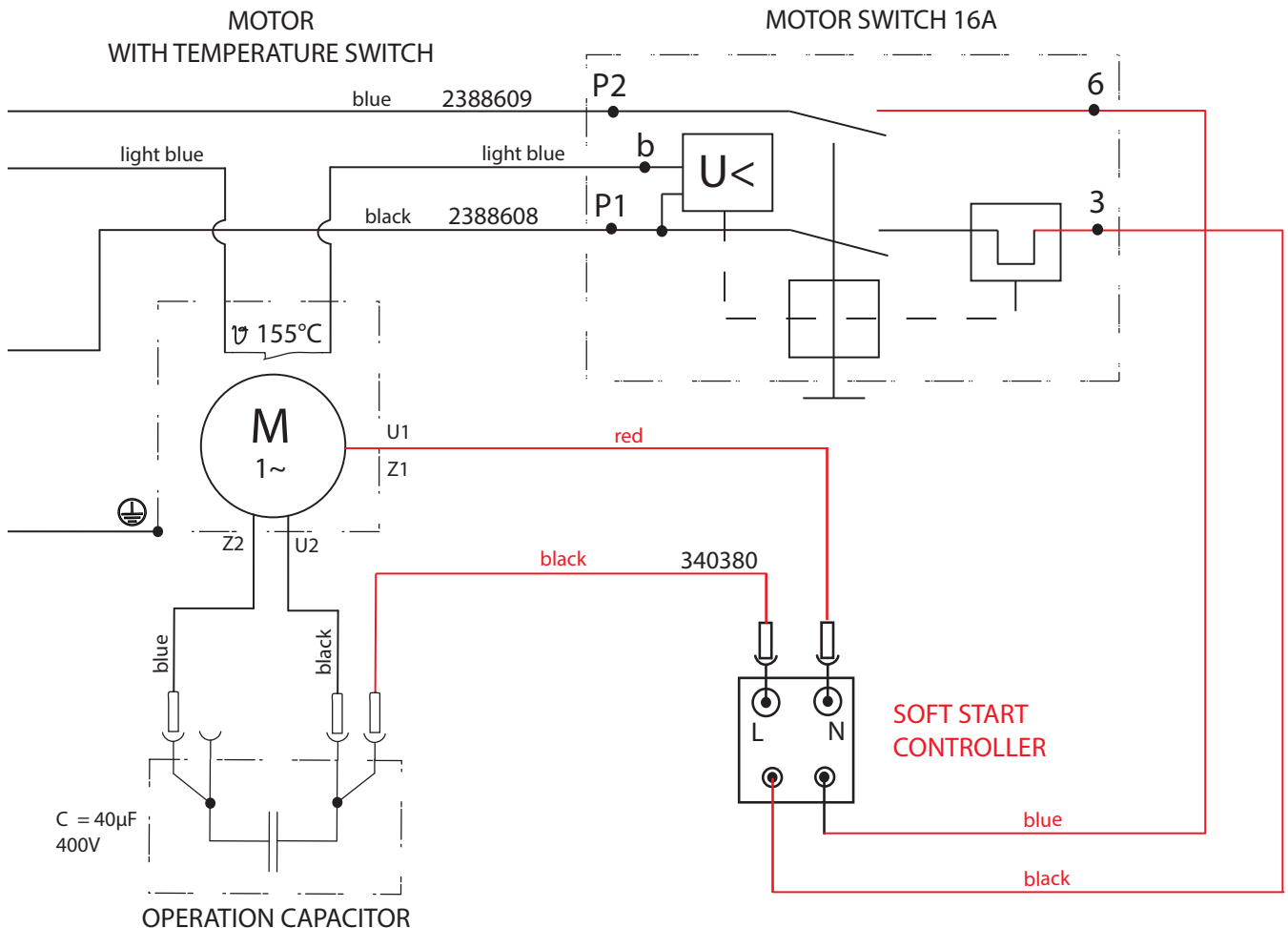
- Lift the board to loosen screw (1).
- Mount the soft start circuit (2).
Attention: Place the toothed washer (3) under the lower screw for earthing (tightening torque 5 Nm).
- Wiring (4) according to the following wiring diagrams (the complete wiring diagrams can be found in the „Electrical Repair Instructions“ at the end of this service manual).



Version SF 33 PLUS / Nespray Pro



Version SF 33 Pro



4 SPARE PARTS

4.1 SPARE PARTS LIST SF 33 PLUS / NESPRAY PRO (TAKEN FROM ENDUSER'S MANUAL)

ITEM	ORDER-NO	DESIGNATION
1	0340 339	Inlet
2	0341 241	Inlet valve trigger
3	0341 336	Clasp
4	0341 247 0341 254	Inlet valve complete (SF33 PLUS) Inlet valve complete (Nespray Pro)
5	0341 255 0341 256	Inlet valve housing compl.(SF33 PLUS)** Inlet valve housing compl.(NesprayPro)**
6	0341 349	Oil cap screw
7	9971 146	O-ring
8	2370 128	Oil measuring stick
9	0344 337	Double socket (SF33 Plus only)
10	9970 103	Sealing ring
11	9970 109	Sealing ring
12	0341 702	Outlet valve, service set
13	0341 246	Outlet valve complete
14	2383 994 9991 953	Pressure gauge (SF33 PLUS) Pressure gauge (Nespray Pro)
15	0261 352	Mains cable H07-RNF 3x 1.5mm ² , 6m long
16	2402 675	Cable threaded joint
17	2386856 2402391	Label SF 33 PLUS Label Nespray Pro
18	2388995	Warning notice
19	9950 242	Seal
20	9950 241	Socket
21	9905 113	Oval head screw 5x10 (4 pc.*)
22	2384 484	Relief valve compl.
23	0341 414	Washer
24	2334 205	Cylinder screw with hex socket (2 pc.*)
25	2384 478	Rotary knob
26	9920 207	Washer
27	9906029	Cylinder screw with hex socket
28	9990 864	Cover cap
29	2386 858 2402 389	Label Wagner (right) Label Nespray Pro (right)
30	9902 225	Oval head screw 3.5x9.5 (4 pc.*)
31	2392 781	Fan cover

ITEM	ORDER-NO	DESIGNATION
32	2383 937	Tool box with lid compl. (incl. items 33, 36, 41)
33	9930 114	Cylindrical pin (2 pc.*)
34	2386 857 2402 390	Label SF 33 PLUS Label Nespray Pro
35	2384 739	Internal compartment, tool box
36	9901 105	Threaded pin (2 pc.*)
37	9900 248	Hexagon bolt with flange (4 pc.*)
38	9995 234	Pressure cap (6 pc.*)
39	2386 859 2402 388	Label Wagner (left) Label Nespray Pro (links)
40	9990 535	Protection cap (6 pc.*)
41	2344 692	Motor gasket
42	9990 865	Dust protective cap

* Order number for 1 piece. Quantities in brackets indicate the total number in the assembly.

** Turn over by approx. 10 Nm, loosen and then tighten to the specified value.



Explanation

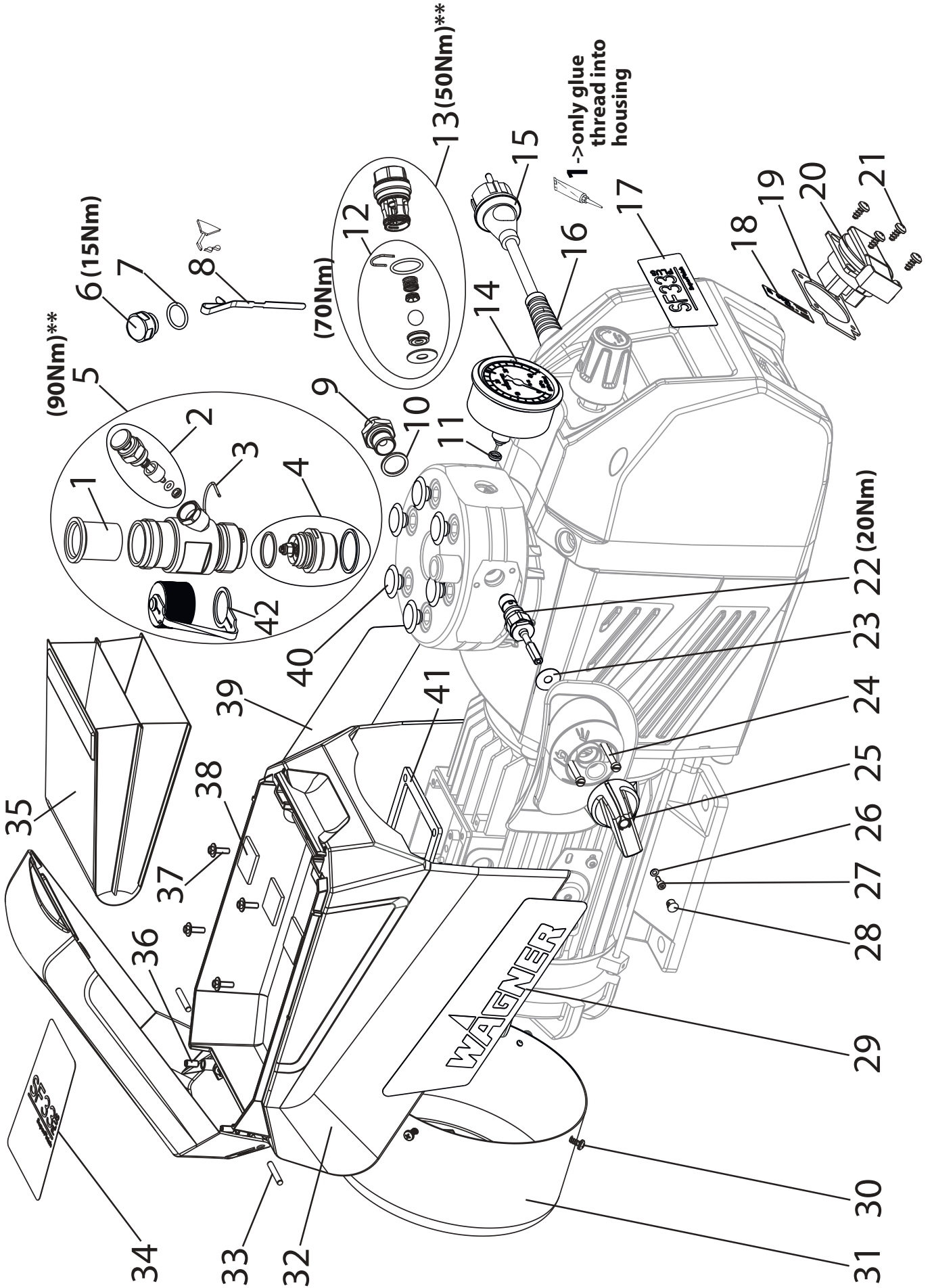
((xNm) indicates torque



1 seal with Loctite 414 (order-no. 3065559)



fill in 1.1 l hydraulic oil (order 21061 = 1 l)

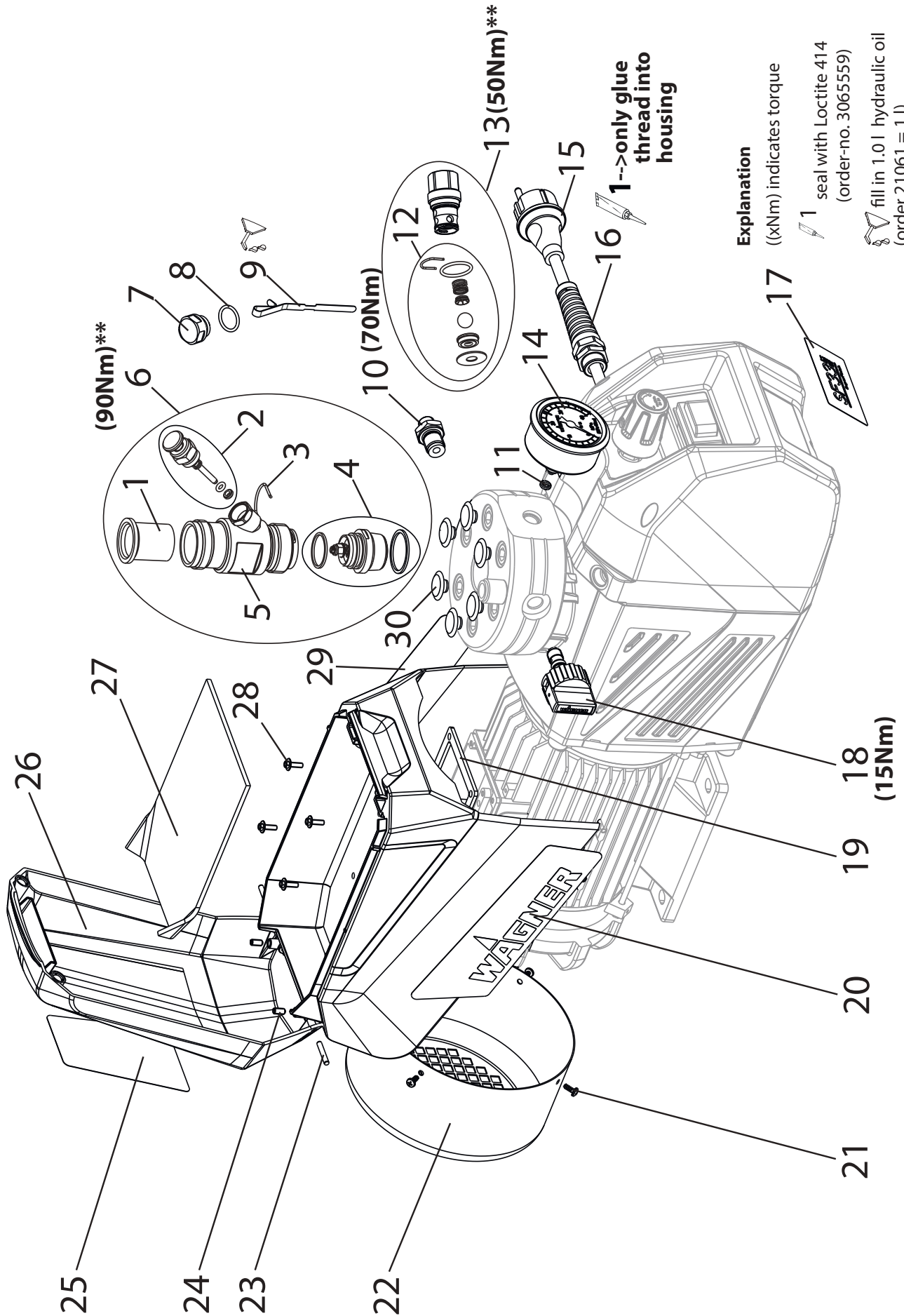


4.2 SPARE PARTS LIST SF 33 PRO (TAKEN FROM ENDUSER'S MANUAL)

ITEM	ORDER-NO	DESIGNATION
1	0340 339	Inlet
2	2337 033	Inlet valve trigger
3	0341 336	Clasp
4	0341 247	Inlet valve complete
5	2334 383	Inlet valve housing
6	2385 577	Inlet valve housing compl.
7	0341 349	Oil cap screw
8	9971 146	O-ring
9	2370 128	Oil measuring stick
10	0344 336	Double socket
11	9970 109	Sealing ring
12	0341 702	Outlet valve, service set
13	2342 946	Outlet valve complete
14	2383 994	Pressure gauge
15	0261 352	Mains cable H07-RNF 3x 1.5mm ² , 6m long
16	2402 675	Cable threaded joint
17	2386 850	Label SF 33 Pro
18	0169 248	Relief valve compl.
19	2344 692	Motor gasket
20	2386 858	Label (right)
21	9902 225	Oval head screw 3.5x9.5 (4 pc.*)
22	2392 781	Fan cover
23	9930 114	Cylindrical pin (2 pc.*)
24	9901 105	Threaded pin (2 pc.*)
25	2386 860	Label SF 33 Pro
26	2383 937	Tool box with lid compl. (incl. items 19, 23, 24)
27	2392 813	Anti-slip mat
28	9900 248	Hexagon bolt with flange (4 pc.*)
29	2386 859	Label (left)
30	9990 535	Protection cap (6 pc.*)

* Order number for 1 piece. Quantities in brackets indicate the total number in the assembly.

** Turn over by approx. 10 Nm, loosen and then tighten to the specified value.



Explanation

(xNm) indicates torque

1 seal with Loctite 414 (order-no. 3065559)

fill in 1.0 l hydraulic oil (order 21061 = 1 l)

4.3 ADDITIONAL SPARE PARTS SF 33 PLUS/PRO (SERVICE ONLY)

ITEM	ORDER-NO*	DESIGNATION	QUANTITY**
1	9990535	Protective cap	6
2	2359803	Cylinder head screw M12x60	6
3	9920204	Washer 13	6
4	2318934	Dust cover	1
5	2405098	Diaphragm SF-33 assy.	1
6	2367511	Insert	1
7	2368784	O-ring (46x2)	1
8	2337803	O-ring (21.95x1.78)	1
9	34357	Pressure spring	1
10	341311	Piston D25	1
11	9907079	Cylinder head screw M8x30	4
12	9920102	Washer 8.4	4
13	2384951	Pressure insert	1
14	2383771	Regulator assy. SF-33	1
15	10861	Pressure spring	1
16	10858	Clip	1
17	10859	Stop sleeve	1
18	2369490	Pressure control knob assy.	1
19	2385357	Label, pressure control valve	1
20	2405099	Pressure control valve SF-33 assy.	1
21	3051678	O-ring (9x3)	1
22	2396020	Seal (Cu)	1
23	2370116	Sleeve, rubber	1
24	2367512	Liner D25 ***	1
25	2368784	O-ring (39x3)	1
26	2401952	Seal	1
27	2374597	Cover	1
28	344323	Fitting M20x2	1
29	2390396	Paint head assy. SF-33 Plus (incl. item 28)	1
	2390422	Paint head assy. SF-33 Pro (incl. item 28)	1
Service kits			
	2400487	Sealing-Set (consisting of item 7, 8, 21, 23, 25)	
	2385009	Pressure insert assy. (bestehend aus item 13, 22, 24, 25)	



To remove the pump, move it to an upright position. Open the oil lock screw to release any excess pressure that has built up in the hydraulic oil housing.

* Order number for 1 piece

** Quantity in the complete assembly

*** Turn to approx. 100 Nm, loosen and tighten to 90 Nm. Check piston mobility.

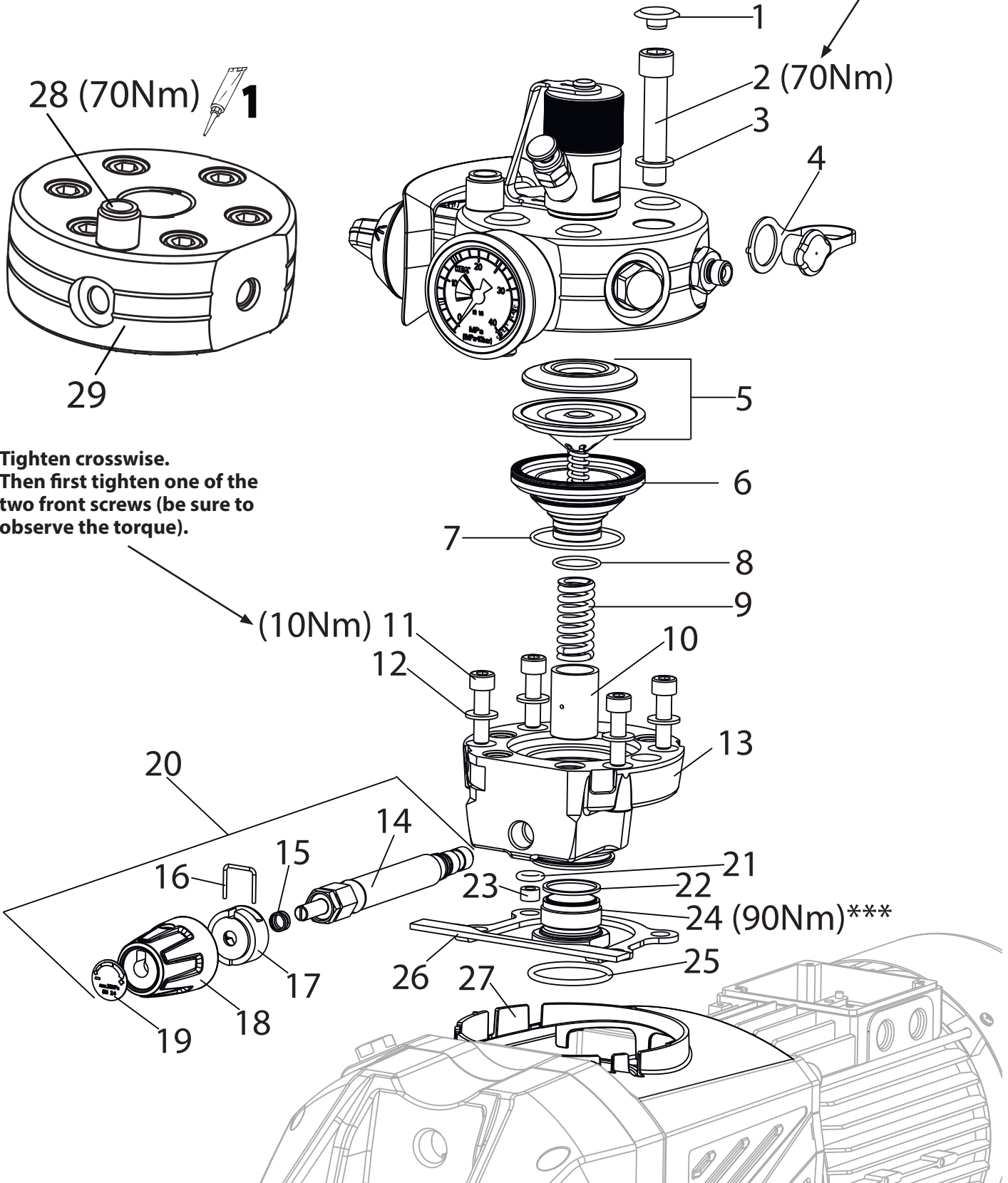


Explanation

(xNm) indicates torque

1 seal with UHU-Plus 2K (order-no.

Tighten carefully cross-wise to avoid tilting pos. 6 (do not damage O-rings).



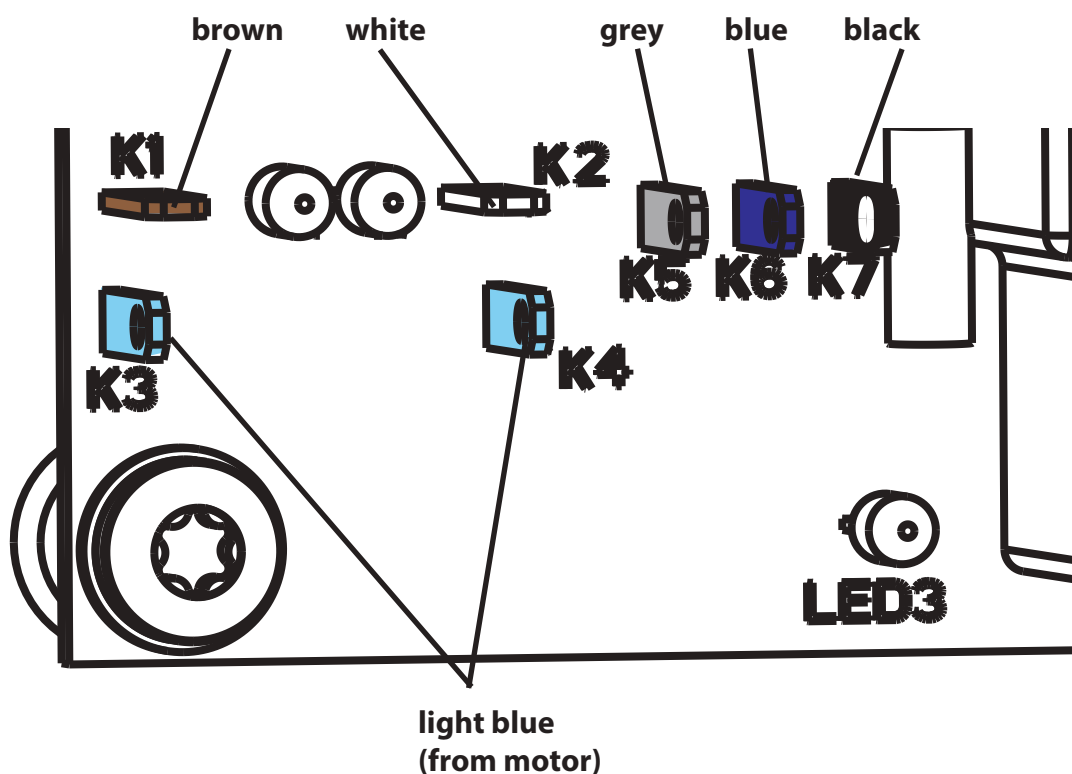
Tighten crosswise. Then first tighten one of the two front screws (be sure to observe the torque).

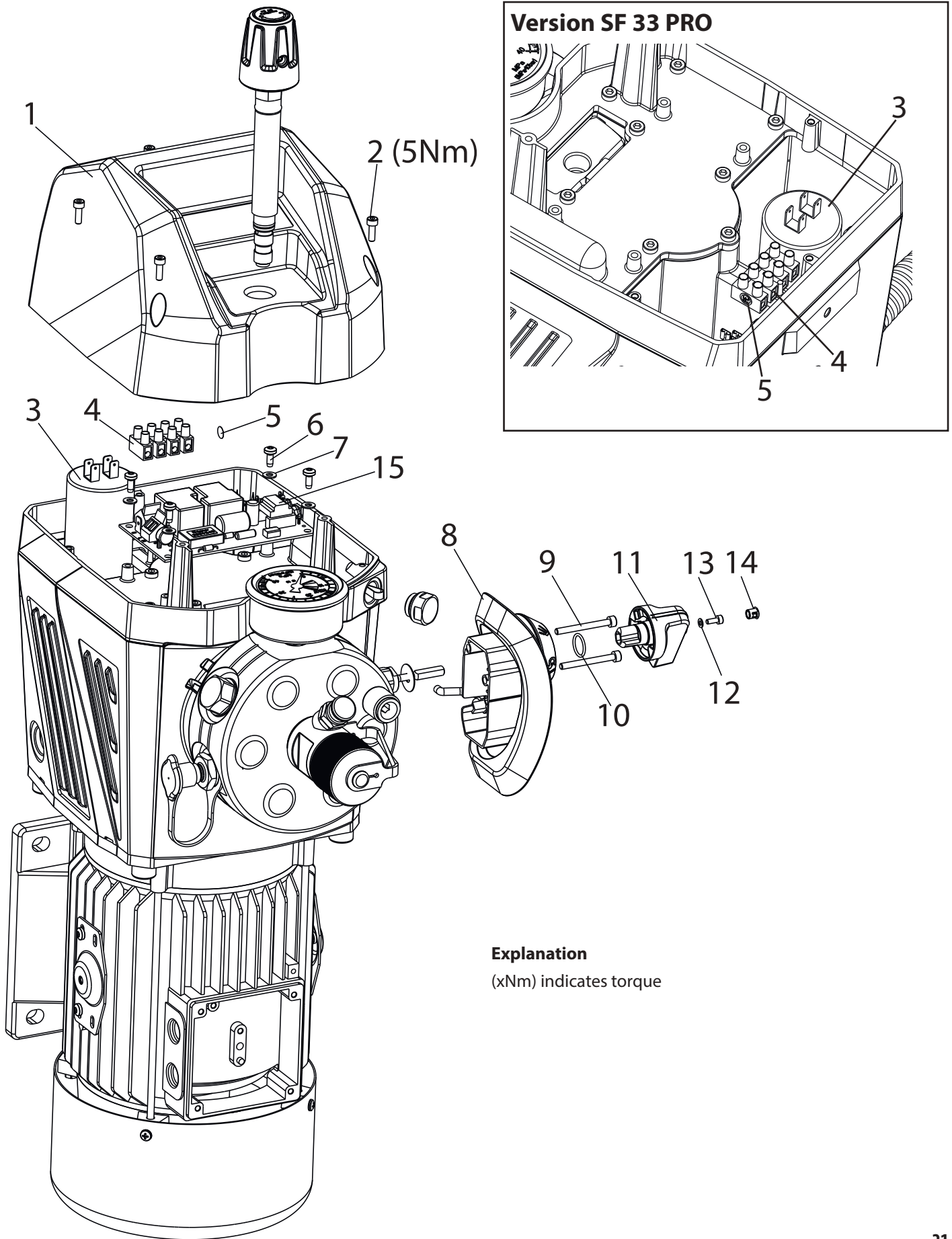
ITEM	ORDER-N0*	DESIGNATION	QUANTITY**
1	2390385 2390424	Front cover SF 33 PLUS assy. Front cover SF 33 PRO assy.	1 1
2	9900353	Cylinder head screw M4x12	5
3	9952820	Capacitor 40μF/475V	1
4	9950244	Terminal strip	1
5	9950239	PE-label	1
6	2315382	Lens head screw M4x10	4
7	9920130	Washer	4
8	2383936	Multi function switch assy. (SF 33 PLUS)	1
9	2334205	Cylinder head screw M4x40	2
10	9971197	O-ring 13x1.5	1
11	2384478	Control knob	1
12	9920207	Washer 3.2	1
13	9906029	Cylinder head screw M3x8	1
14	9990864	Cover	1
15	2334245	Electric circuit board, motor	1

* Order number for 1 piece

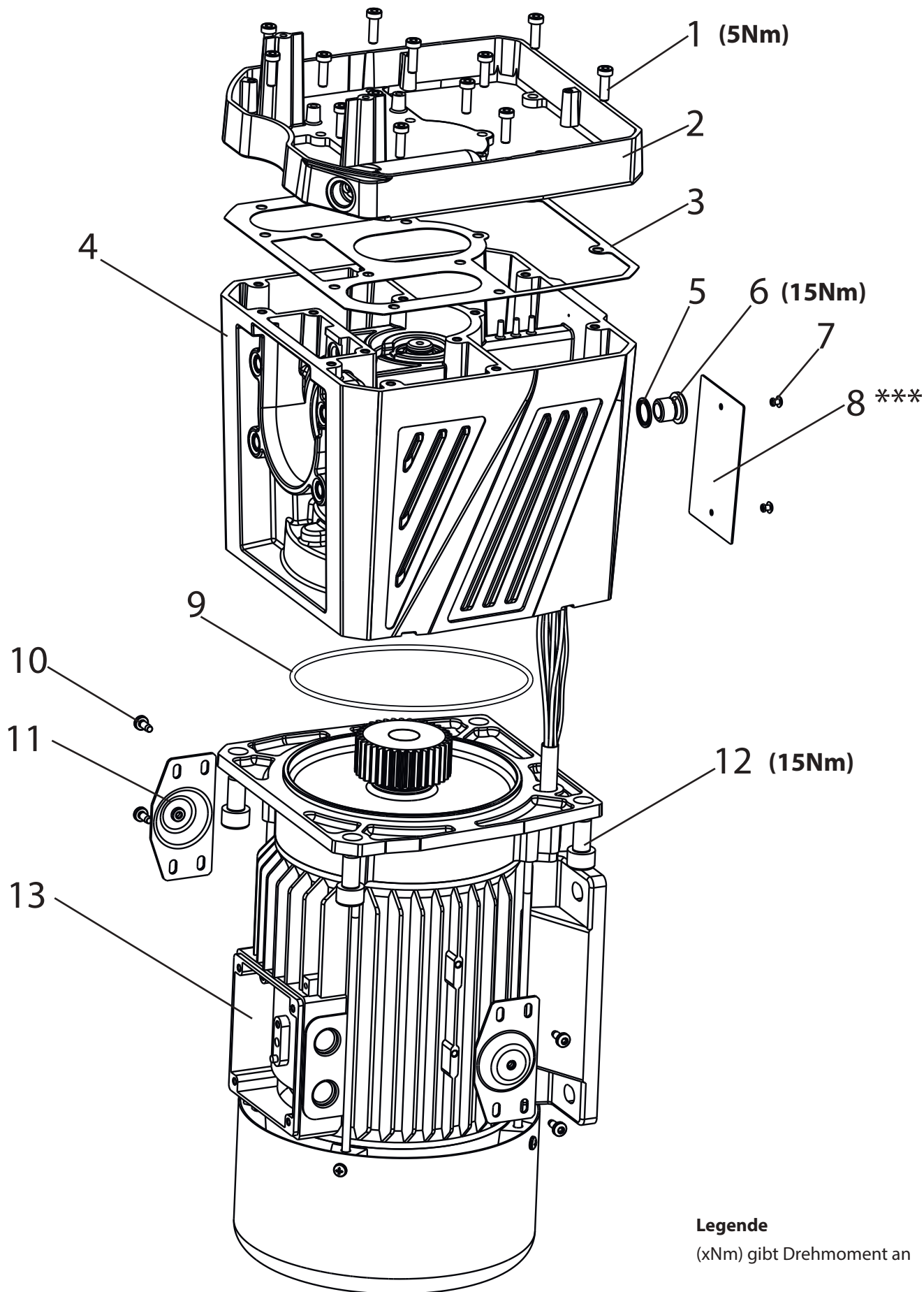
** Quantity in the complete assembly

Connecting the wires of the multifunction switch (item 8)





Explanation
(xNm) indicates torque





ITEM	ORDER-NO*	DESIGNATION	QUANTITY**
1	9902105	Cylinder head screw M5x16	13
2	2367474	Cover	1
3	2367485	Sealing	1
4	2367472	Hydraulic housing	1
5	9970210	U-Seal	1
6	9904307	Locking screw	1
7	2304271	Blind rivet	2
8	2388919	Rating label SF 33 Plus ***	1
	2400238	Rating label SF 33 Pro ***	1
	2403078	Rating label Nespray Pro ***	1
9	2368785	O-ring 144x3	1
10	2315382	Oval head screw M4x10	4
11	2334046	Connecting plate	2
12	9900330	Cylinder head screw M10x20	4
13	2367479	Electric motor assy. 230V/50Hz	1

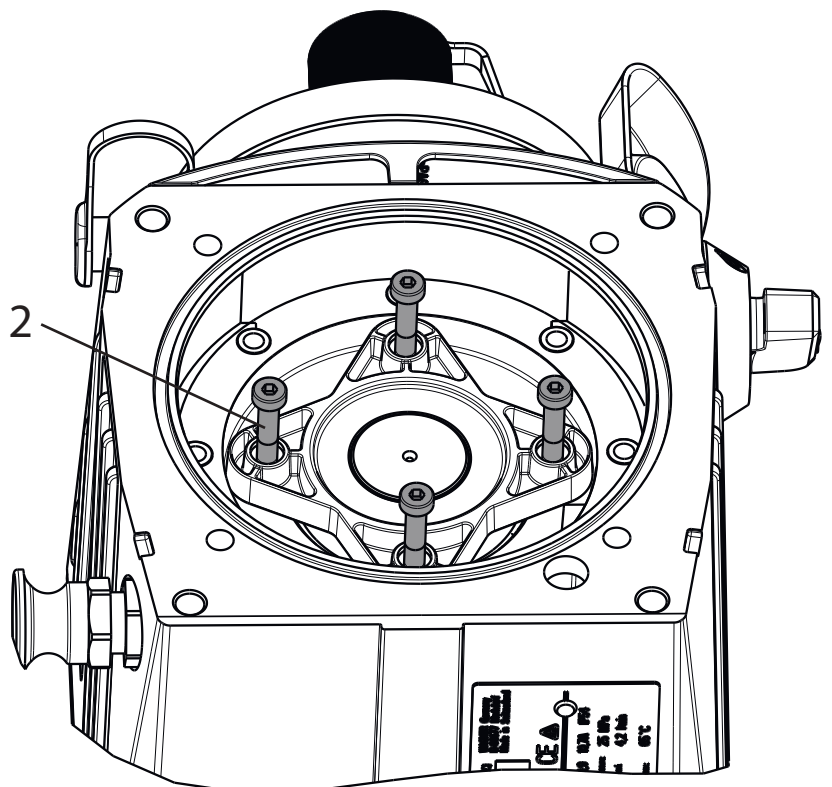
* Order number for 1 piece

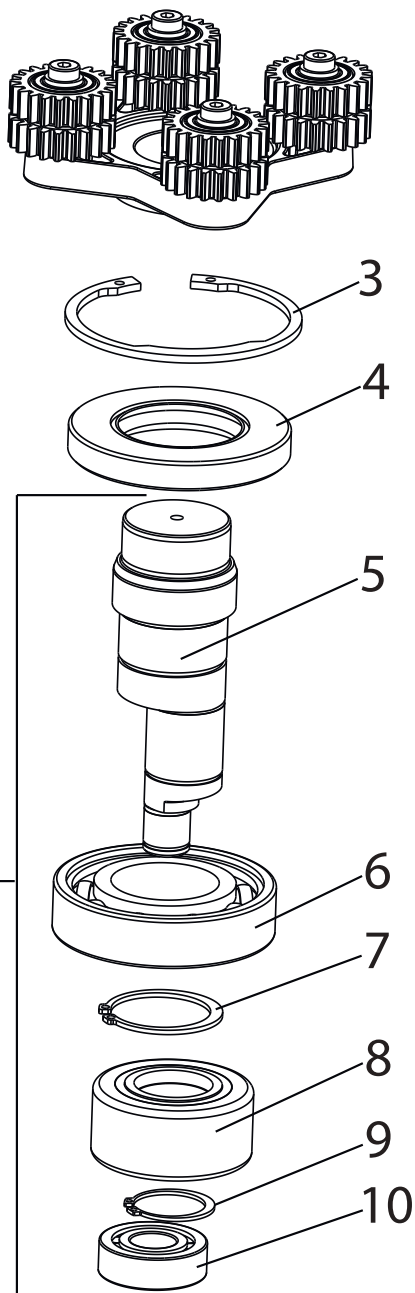
** Quantity in the complete assembly

*** Keep record when changing the serial number

Insert 4 screws M6x40 (e.g. 9900336) to push the planet carrier off the eccentric shaft (tighten the screws evenly crosswise).

Attention: Planet carrier will be damaged and must be replaced.



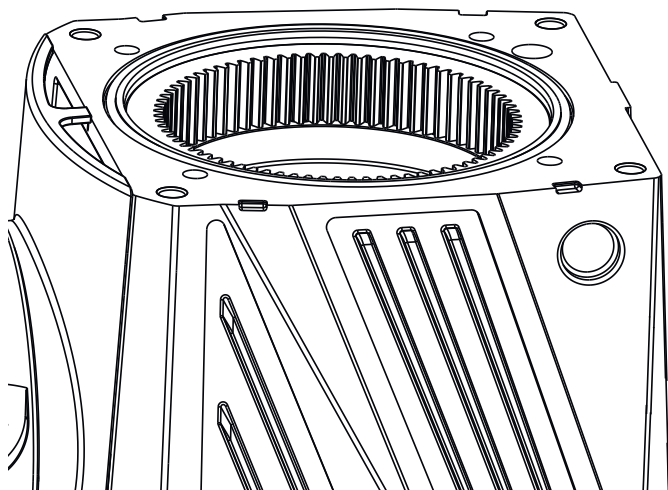


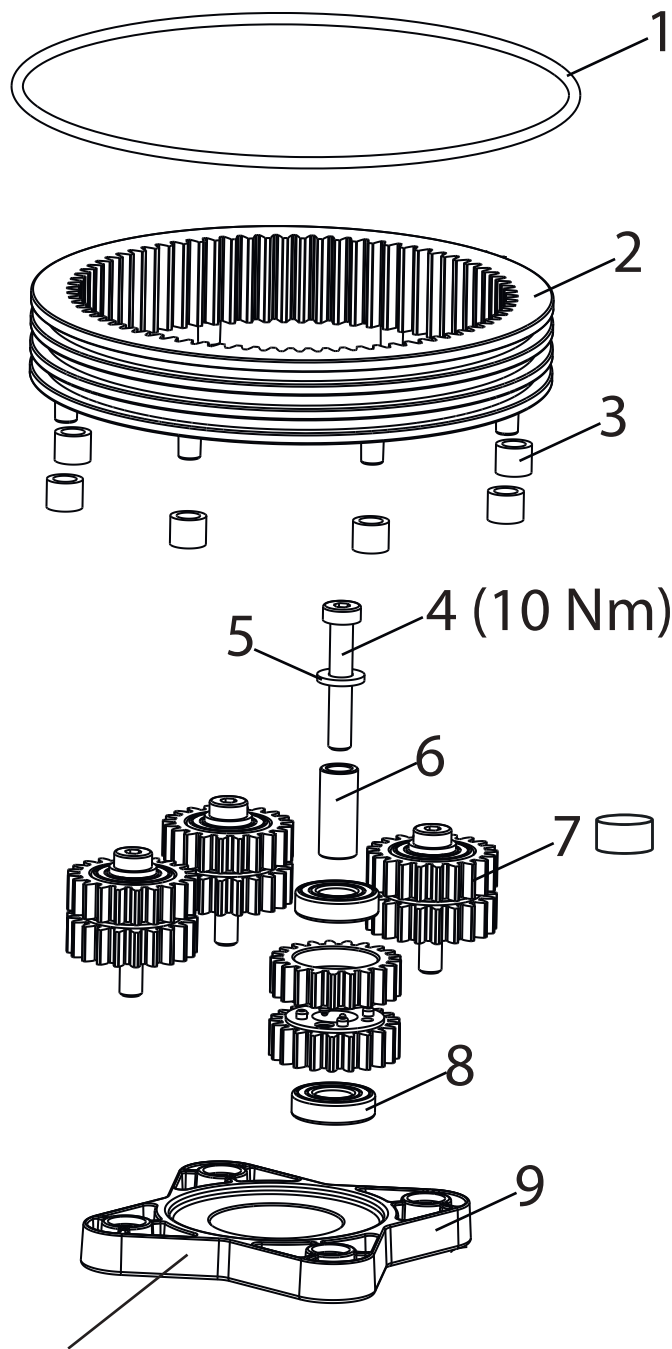
ITEM	ORDER-NO*	DESIGNATION	QUANTITY**
1	9900330	Screw M10x20	4
2	9900336	Cylinder head screw M6x40***	-
3	3056464	Locking ring	1
4	9970532	Shaft seal	1
5	2333811	Eccentric shaft	1
6	9960151	Groove ball bearing	1
7	9922518	Locking ring	1
8	9960431	Roller bearing	1
9	9922506	Locking ring	1
10	9960432	Cylinder roller bearing	1
11	2382951	Eccentric shaft assy.	1

* Order number for 1 piece

** Quantity in the complete assembly

*** Only required for dismantling the planet carrier





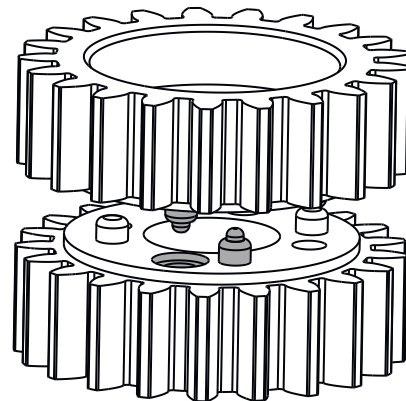
Mounting by heating to min. 200°C and using Loctite 270 (order no. 9992528) or 648 (order no. 9992804)

Explanation

Quantity in the complete assembly

 lubricate with 40-50 g gear grease

Watch your step!
The pin with point must be inserted into the hole with countersink.



ITEM	ORDER-NO*	DESIGNATION	QUANTITY**
1	2368785	O-ring 144x3	1
2	2367910	Gearwheel, internally geared	1
3	2400178	Sleeve	6
4	2389827	Cylinder head screw M6x35	4
5	9920304	Washer 6	4
6	2367486	Fitting	4
7	2367909	Gearwheel 21Z	8
8	2367484	Groove ball bearing	8
9	2367482	Planet carrier 4-fold	1

Service kits

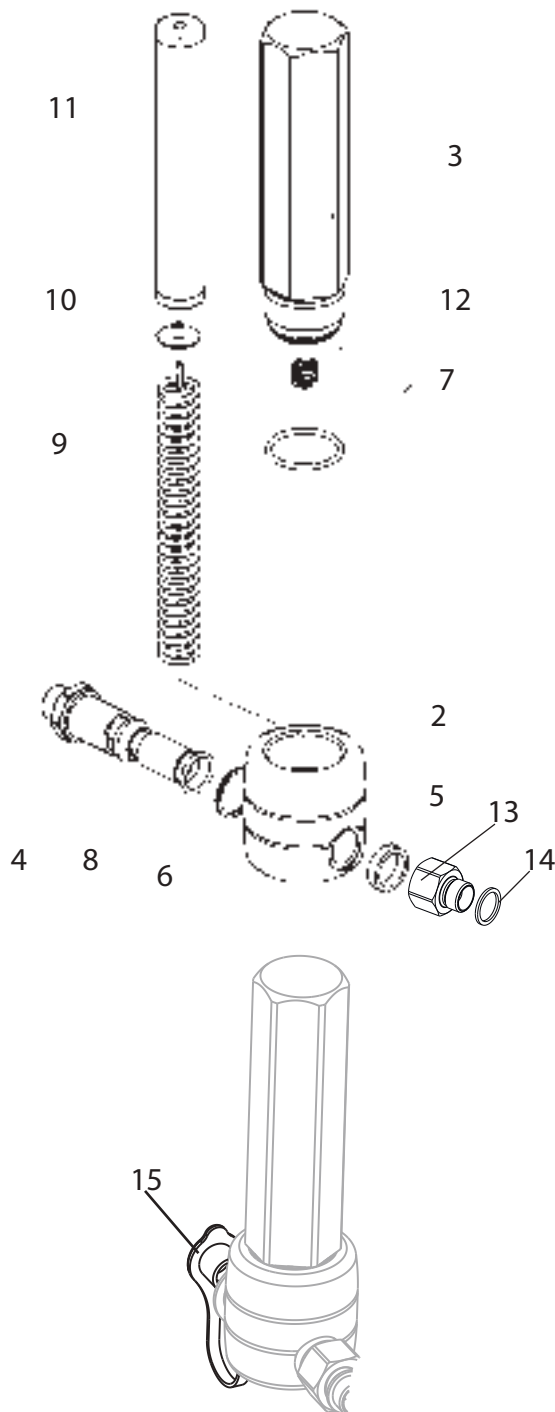
	2400486	Small parts gearbox SF33 (consisting of item 1, 3, 4, 5)	
	2400485	Planetary wheel assy. (set of 4) (consisting of item 6, 7, 8)	

* Order number for 1 piece

** Quantity in the complete assembly

4.4 SPARE PARTS LIST HIGH-PRESSURE FILTER

ITEM	ORDER NO.	DESIGNATION
1	2399 672	High-pressure filter HF- 01 compl.
2	0097 301	Filter block
3	0097 302	Filter housing
4	0097 306	Hollow screw
5	0097 304	Seal ring
6	9970 110	Seal ring
7	9974 027	O-ring 30x2 (PTFE)
8	9971 401	O-ring 16x2 (PTFE)
9	0508 749	Bearing spring
10	0508 603	Bearing ring
11	0508 748	Filter insert 60 meshes
	0508 450	Optional: Filter insert 100 meshes
	0508 449	Filter insert 30 meshes
12	9994 245	Pressure spring
13	2399 670	Screw-in connector
14	9970 103	Sealing ring
15	2318 934	Dust protective cap



Spare parts diagram high-pressure filter



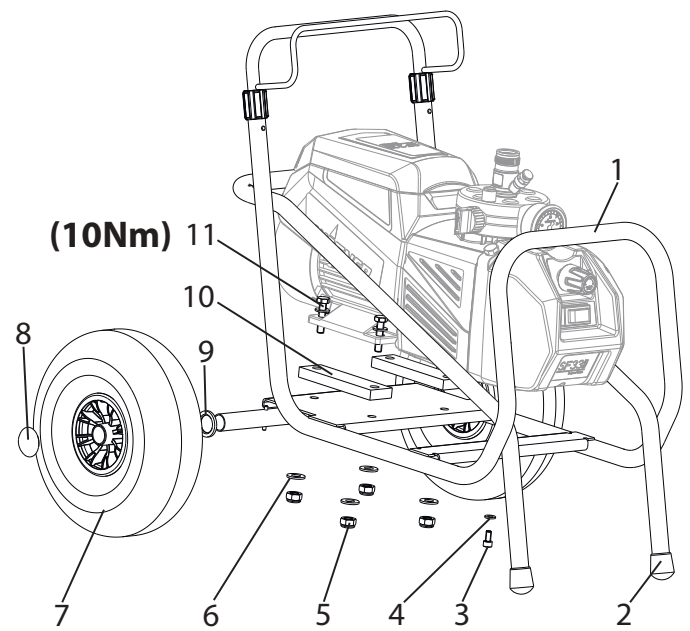
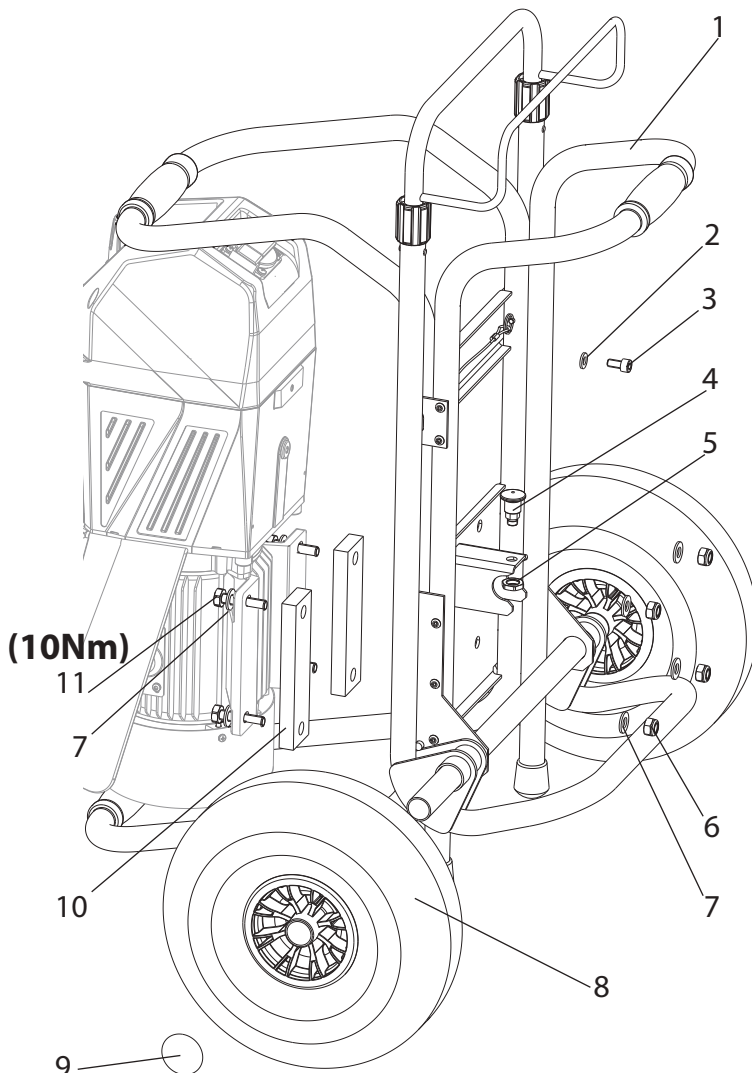
4.5 ESPARE PARTS LIST TROLLEY

a) SF 33 PLUS / Nespray Pro

ITEM	ORDER NO.	DESIGNATION
1	2374 620	Trolley assy. (incl. pos. 2-11)
2	9920 103	Washer
3	9900 346	Cylinder screw with hex socket
4	2391 797	Mini screen
5	2384 267	Hexagon nut M10x1
6	9913 011	Hexagon nut
7	9920 106	Washer A 10.5
8	0348 349	Wheel
9	9994 902	Wheel cap
10	2384 275	Damping plate
11	9900 247	Hexagon screw

b) SF 33 PRO

ITEM	ORDER NO.	DESIGNATION
1	2382 970	Trolley assy. (incl. pos. 2-11)
2	9990 866	Rubber cap
3	9900 346	Cylinder screw with hex socket
4	9920 103	Washer A 6,4
5	9913 011	Hexagon nut
6	9920 106	Washer A 10,5
7	0348 349	Wheel
8	9994 902	Wheel cap
9	9920 701	Washer
10	2384 275	Damping plate
11	9900 247	Hexagon screw

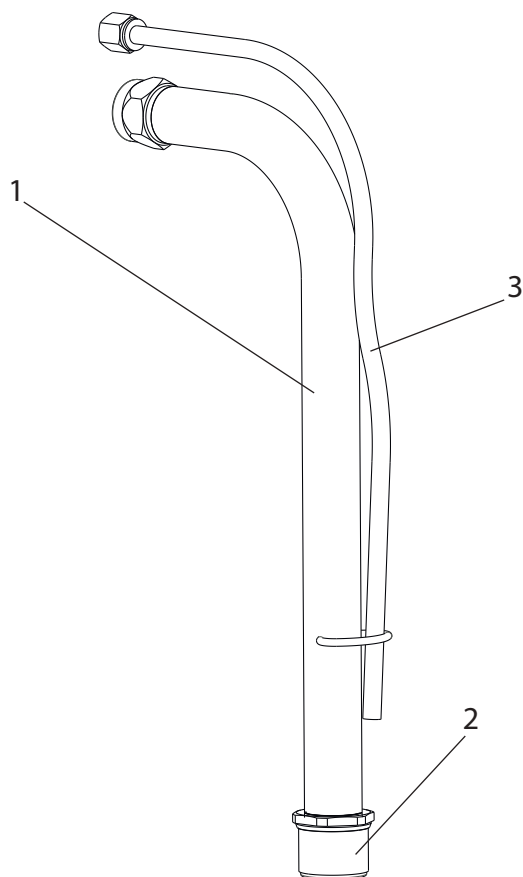


Explanation

(xNm) indicates torque

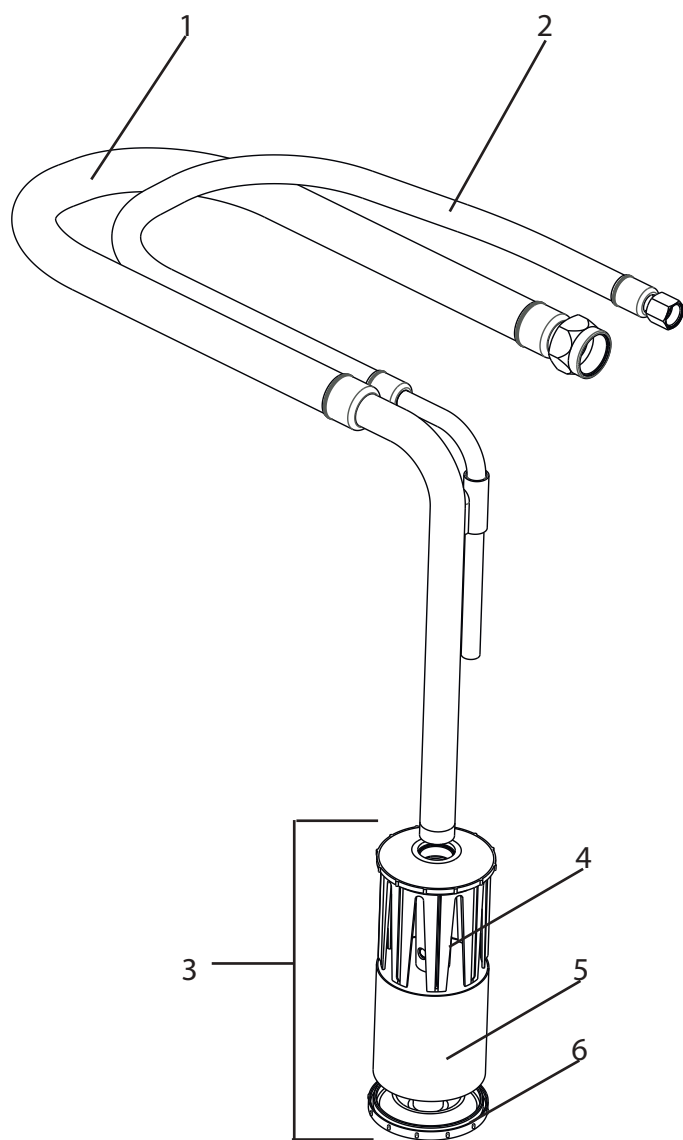
4.6 SPARE PARTS LIST SUCTION SYSTEM (RIGID)

ITEM	ORDER NO.	DESIGNATION
1	2370 310	Suction system assy. (incl. pos. 2-3)
2	0253 244	Filter, mesh width 1,2 mm
3	0253 211	Return tube



4.7 SPARE PARTS LIST SUCTION SYSTEM (FLEXIBLE)

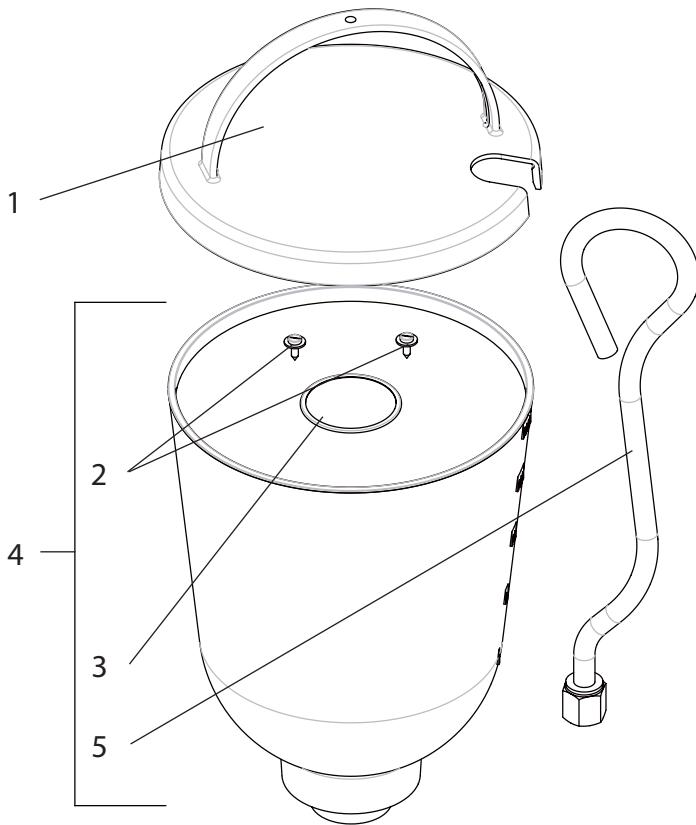
ITEM	ORDER NO.	DESIGNATION
	0034 630	Suction system assy.
1	0034 607	Suction hose compl.
2	0034 633	Return tube compl.
3	0036 580	Filter basket compl.
4	0036 586	Filtersieb
5	0036 581	Filter sieve
6	0036 582	Filter basket base





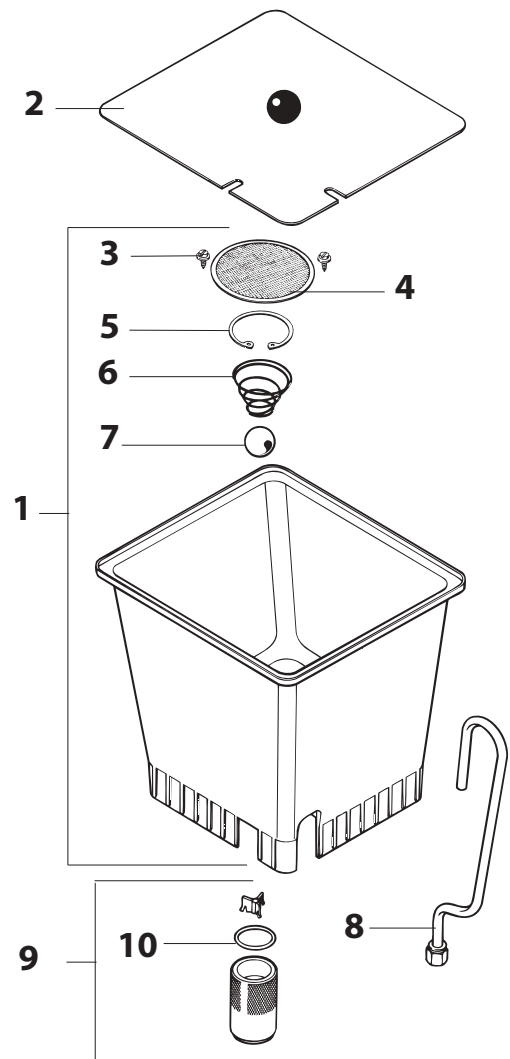
4.8 SPARE PARTS LIST HOPPER (5 LITRES)

ITEM	ORDER-NO	DESIGNATION
-	0341 265	Hopper 5 litres, assy
1	0340 901	Cover
2	9902 306	Sheet metal screw 3,9x13 (2)
3	0037 607	Filter disk, mesh width 0,8 mm
	0003 756	Optional: Filter disk, mesh width 0,4 mm
4	0340 904	Hopper
5	0340 908	Return ube

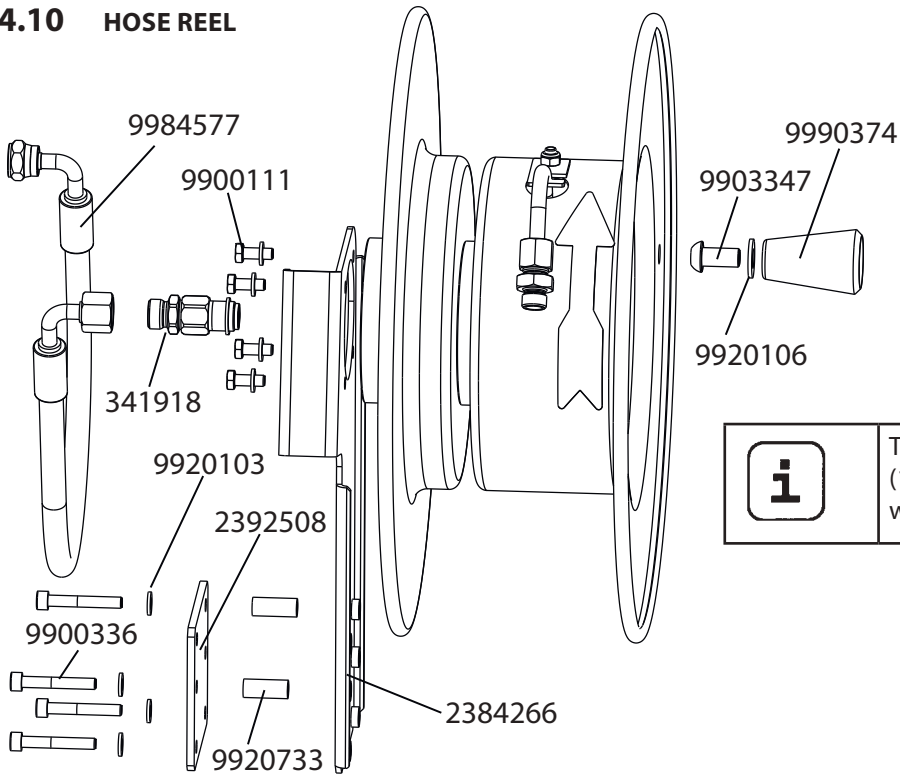


4.9 SPARE PARTS LIST HOPPER (20 LITRES)

ITEM	ORDER-NO	DESIGNATION
-	0341 266	Hopper 20 litres, assy
1	0097 269	Hopper without cover
2	0097 270	Cover
3	9902 306	Sheet metal screw 3,9x13 (2)
4	0097 521	Filter disk, mesh width 0,8 mm
5	9922 609	Securing ring 37 x 1.5
6	0037 776	Pressure spring
7	9941 509	Ball 30
8	0097 295	Return tube
9	0097 271	Container adapter, assy
10	9971 065	O-ring 44 x 3

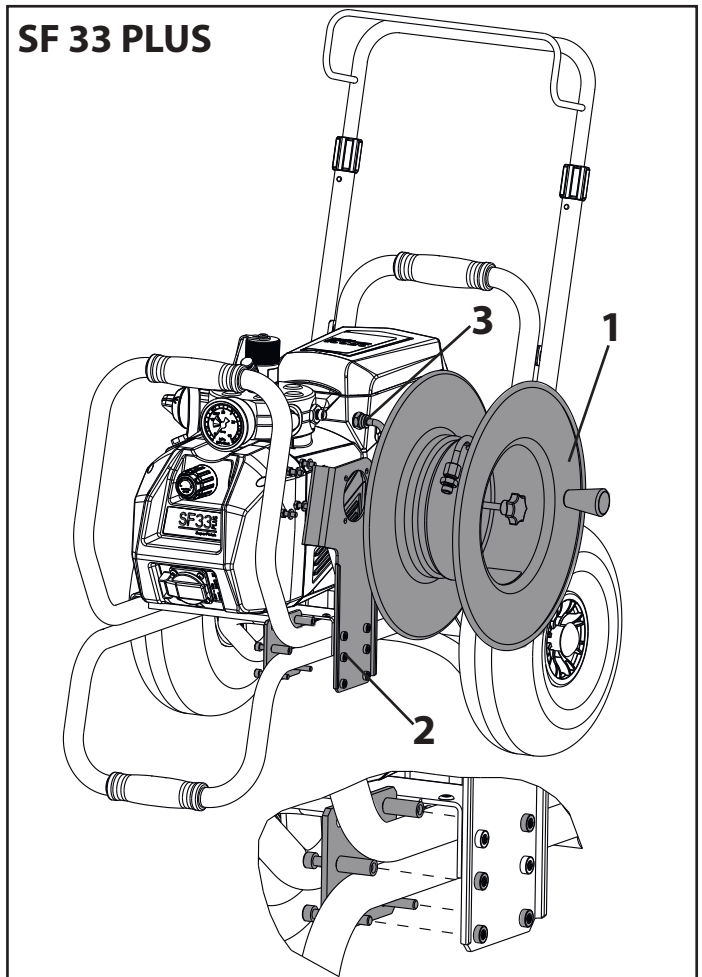
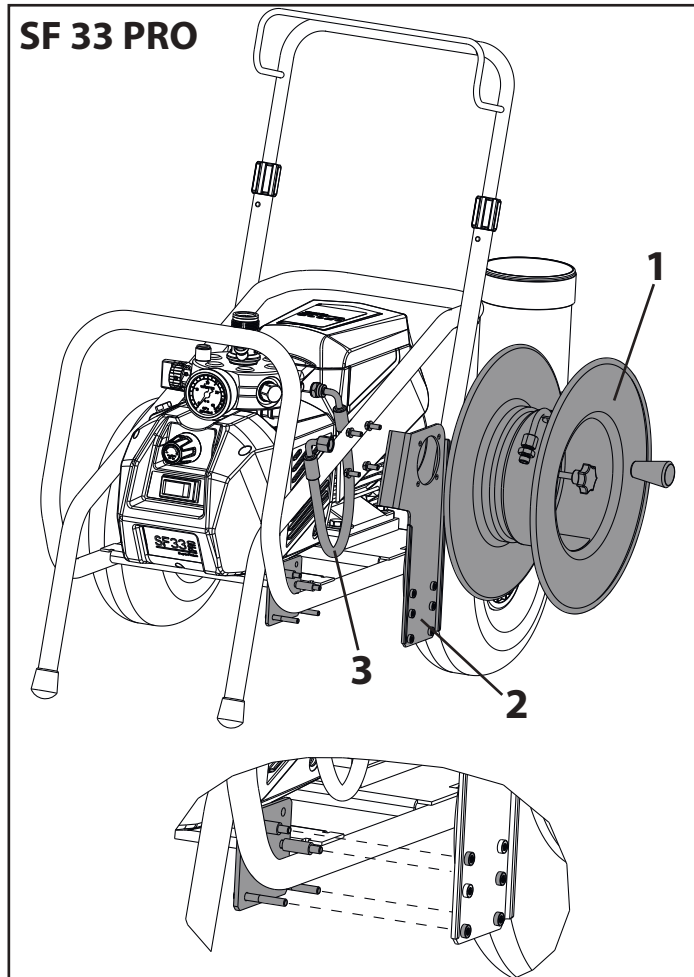


4.10 HOSE REEL



	<p>The hose reel is suitable for max. 30 m hose (1/4 NPSM). Single hoses can be connected with the adapter 34038.</p>
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Screw the hose reel (1) with holder (2) onto the frame (note the positioning of the screws). Using the connecting hose (3), connect the hose reel to the device's hose connection.





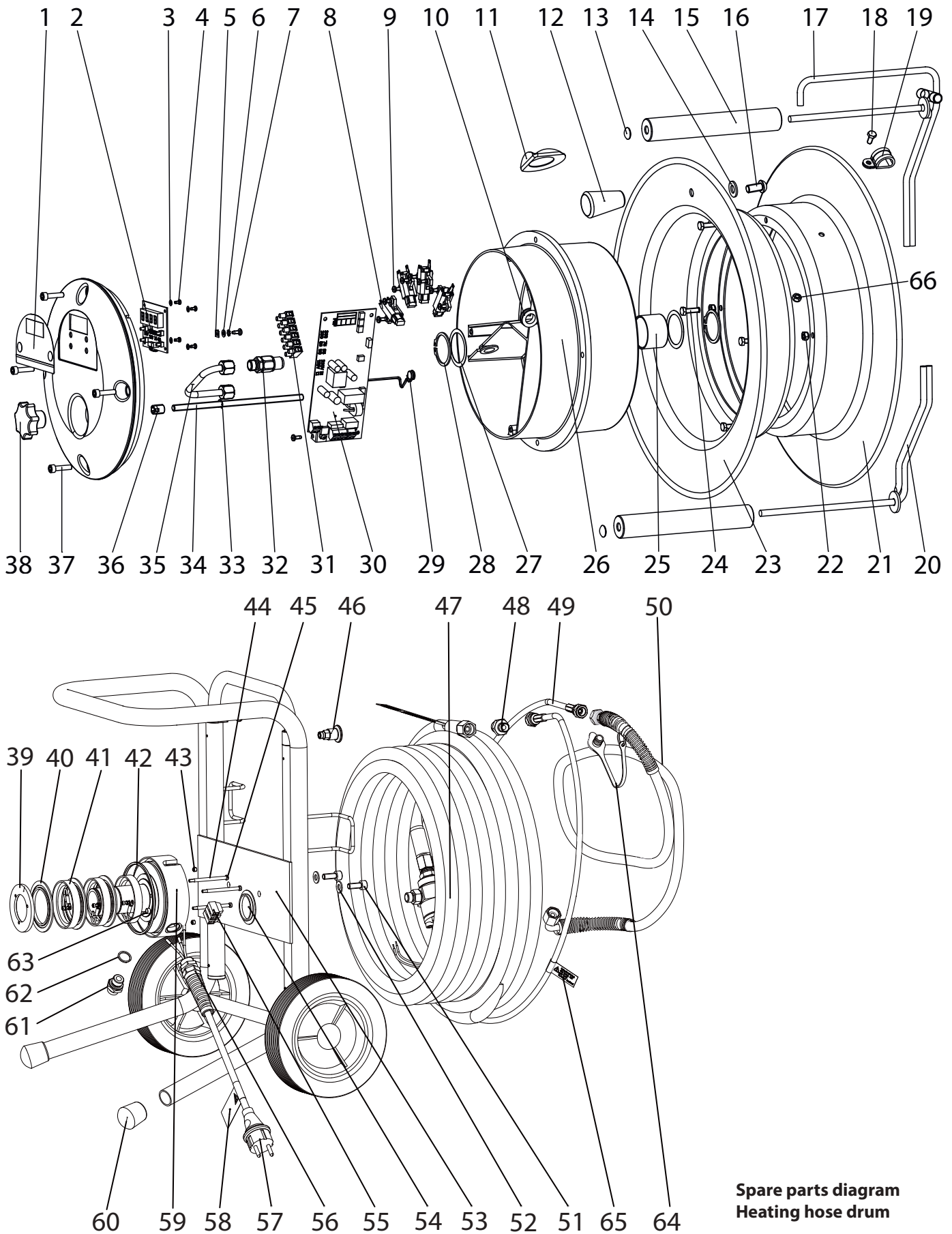
4.11 SPARE PARTS LIST OF HEATING HOSE DRUM

POS.	ORTDER-NO	DESIGNATION
	2320 434	Front cover assy. (pos. 2-7,33,34,36,38)
1	2404 611	Display
2	2307 584	Control panel heat controller
3	9920 123	Washer A3.2 DIN 126 (PA)(4)
4	9903 343	Thread-forming screw M3x6 DIN 7500 (4)
5	2309 735	Insert tongue
6	9920 104	Washer A4.2 DIN 125 (4)
7	9922 101	External tooth lock washer
8	2311 139	Carbon brush (4)
9	9903 322	Thread-forming screw M4x10 DIN 7500 (14)
10	9955 041	Cable bushing (2)
11	2312 445	Gasket
12	9990 374	Handle M10
13	2312 295	Cap (2)
14	9920 106	Washer A10.5 DIN 125
15	2312 297	Roller (2)
16	9903 347	Oval head screw M10x20
17	2311 258	Hose guide
	2315 901	Hose guide assy. (pos. 13,15,17)
18	9900 106	Hexagon head screw M6x12 DIN933
19	9990 232	Pipe clip
20	2312 296	Roller guide
	2316 034	Roller guide assy. (pos. 13,15,20)
21	2311 168	Rear reel shell
22	9910 204	Hexagon nut M6 DIN985(5)
23	2311 167	Front reel shell
24	9900 108	Hexagon head screw M6x20 DIN933 (4)
25	9994 962	Plain bearing
26	2311 002	Reel housing
27	9920 614	Shim ring (2)
28	9922 535	Circlip (2)
29	2311 171	Overheating control
30	2307 585	Heat controller for 230V control unit
31	2306 244	Terminal strip (6-way)
32	2311 150	Swivel joint assy.
33	9921 902	Retaining washer D6 DIN 6799
34	2311 153	Threaded rod

POS.	ORTDER-NO	DESIGNATION
35	2311 148	Tube assy.
36	9901 319	Threaded insert
37	9906 003	Thread-forming screw M6x25 DIN 7500 (4)
38	2312 233	Star grip
39	2311 144	End ring
40	2311 143	Insulating ferrule (3)
41	2311 142	Slip ring (3)
42	2309 732	Felt sealing strip
43	9901 114	Setscrew M5x6 DIN 916 (2)
44	2309 733	Heatshrink sleeving (3)
45	9900 743	Socket head cap screw M4x60 DIN 84 A (3)
46	0252 455	Mini raster
47	2311 657	Heating hose assy.
48	0367 561	Double-ended union
49	9984 458	Hose whip
50	9984 590	Hose whip assy.
51	9900 318	Socket head cap screw M8x20 DIN 912 (2)
52	9920 102	Washer (2)
53	2311 248	Hose reel complete
54	2312 294	Cap
55	9950 212	Terminal strip (3-way)
56	9952 685	Cable coupling with antikink spiral
57	0261 352	Power cord assy.
58	0344 425	Power cable adhesive label
59	2311 145	Bearing
	2315 770	Bearing assy. (pos. 39-45,54-59,61-63)
60	9990 866	Rubber cap (2)
61	0341 350	Double-ended union
62	9970 103	Sealing ring
63	2309 734	Heatshrink sleeving
64	2320 474	Protective cap
65	2320 459	Hose whip adhesive label
66	2404657	Spacer sleeve (8)



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.

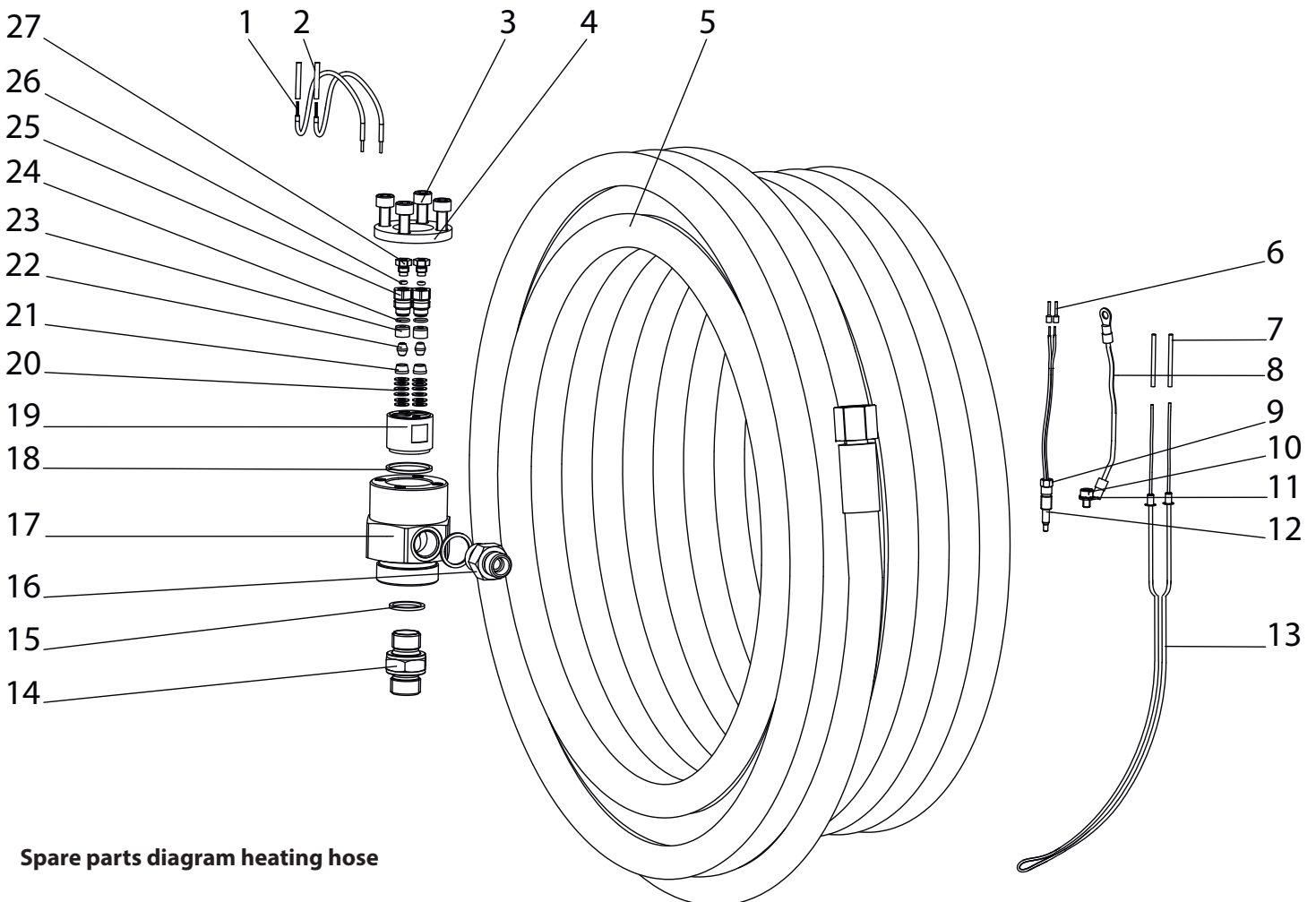


Spare parts diagram
Heating hose drum

4.12 SPARE PARTS LIST HEATING HOSE 2311657

POS.	ORTDER-NO	DESIGNATION
1	2312 111	Wire brown (2)
2	2313 390	Ferrule (2)
3	9900 325	Socket head cap screw M6x16 DIN 912 (4)
4	2311 137	Pressure plate
5	9984 515	HP Hose DN10-30m
6	3054 990	Wire end ferrule (2)
7	2312 199	Flexible insulating tubing (2)
8	2312 110	Wire green/yellow
9	2311 136	Sensor screw connection
10	9900 392	Socket head cap screw M4x6 DIN 912 (4)
11	9922 101	External tooth lock washer A4,3 DIN6797
12	2308 061	NTC Temperature sensor
13	2312 115	Heating wire

POS.	ORTDER-NO	DESIGNATION
14	2308 887	Double-ended union
15	9970 103	Sealing ring (2)
16	0341 464	Hose connector
17	2311 135	Material conveying housing
18	0341 331	Sealing ring
19	2311 134	Wire feed through
20	9923 513	Disc spring (12)
21	0335 320	Thrust peace (2)
22	2309 790	Collar seal (2)
23	0149 397	Packing (2)
24	9971 003	O-ring (2)
25	0344 431	Screwing (2)
26	9971 189	O-ring (2)
27	0344 432	Screwing (2)



Spare parts diagram heating hose



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 receive 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
K Ω	R	Electric resistance in kilohms
M Ω	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 I_n is the rated value for a system, a power circuit or electrical equipment.

Operating current

The operating current I_b 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 chapter 1.5 (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 $\geq 2.0\%$ 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 $\geq 5\Omega$ 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. 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

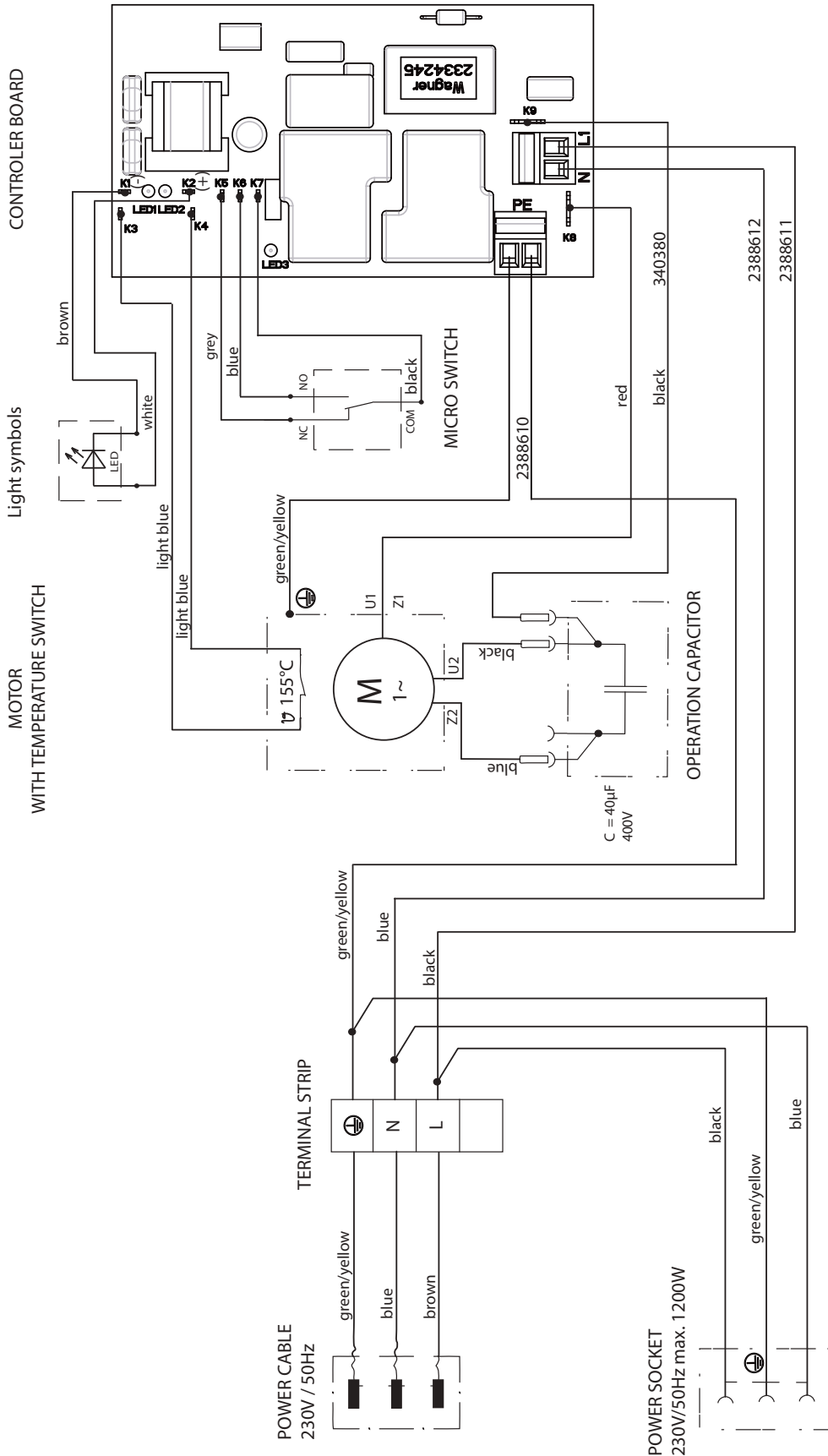


3.8 REPLACING THE AC MOTOR

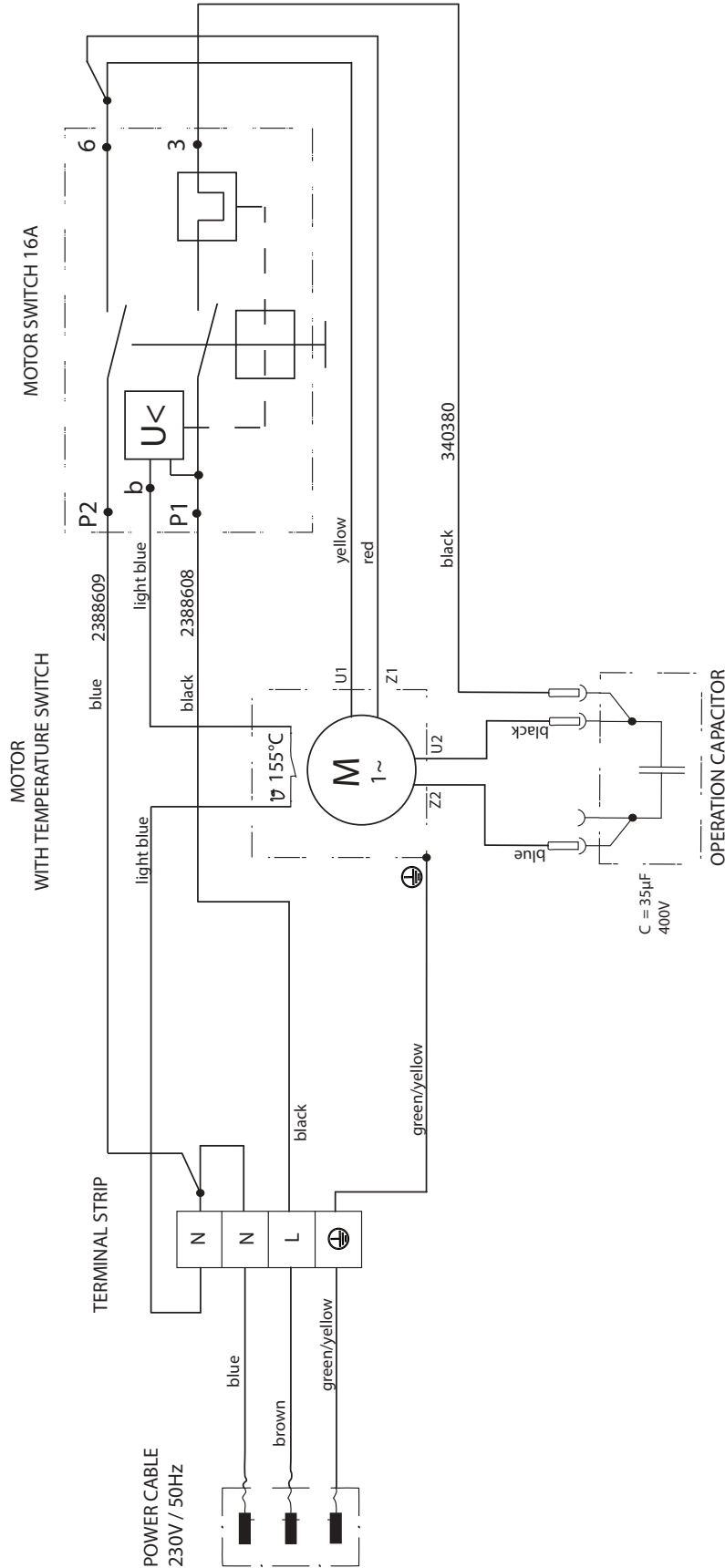
1. Ensure safe isolation from the supply before commencing work.
2. First disconnect the defective motor, noting the exact pin assignment.
3. Now replace the motor.
4. Observe the pin assignment noted in point 2 when connecting the individual wires. Also ensure secure contact when connecting the wires.
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 SUPER FINISH 33 PLUS (STANDARD VERSION)

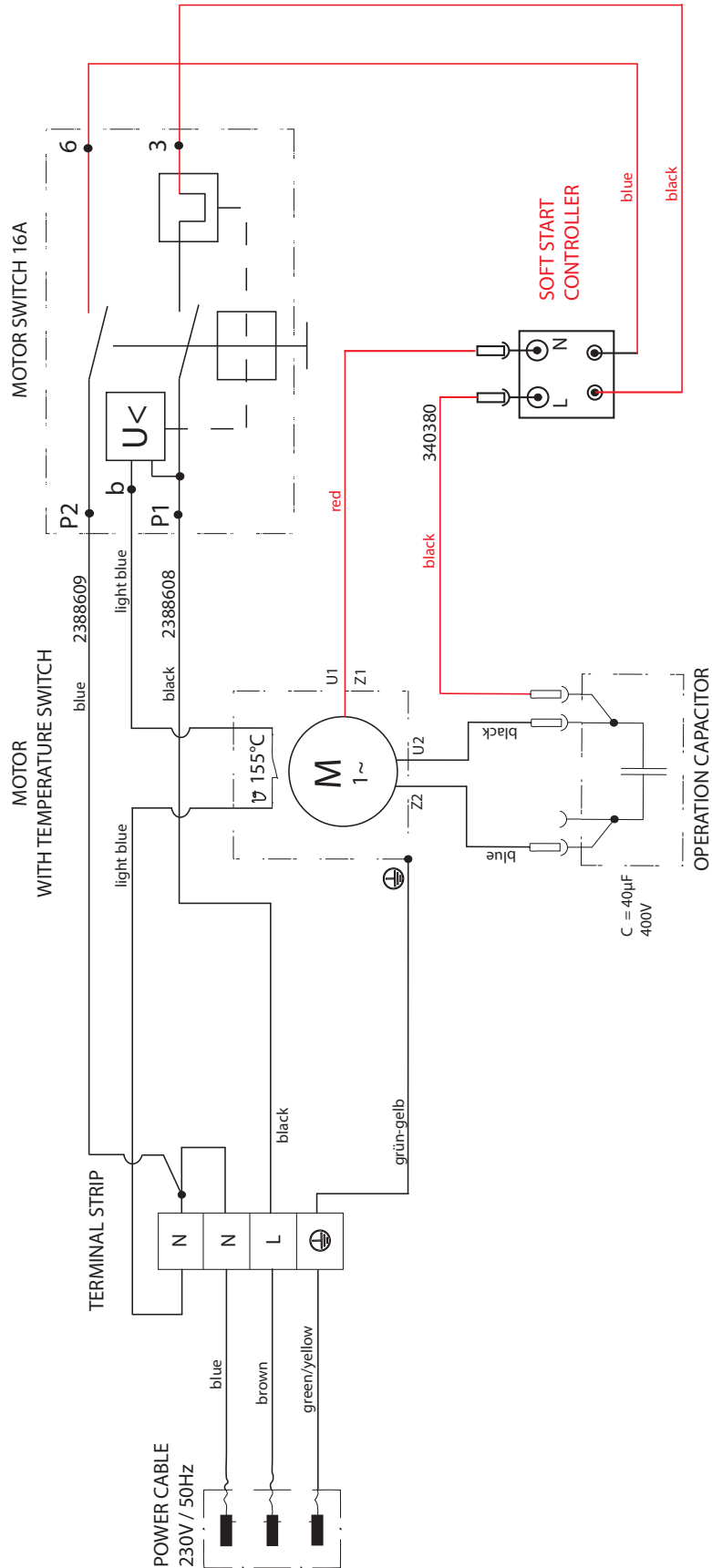


4.2 CONNECTION DIAGRAM SUPER FINISH 33 PRO (STANDARD VERSION)

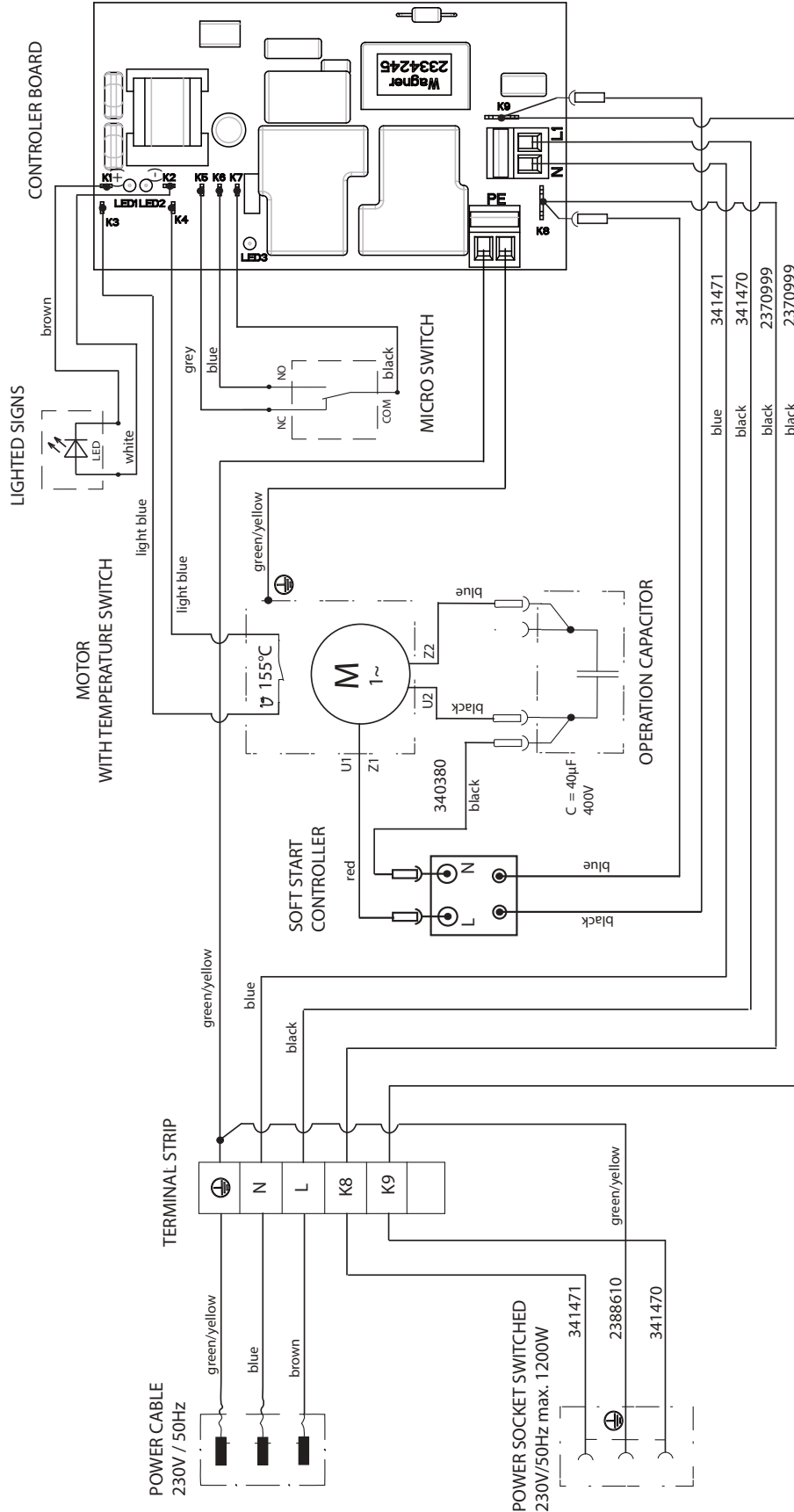




4.2.1 CONNECTION DIAGRAM SUPER FINISH 33 PRO (WITH INTEGRATED SOFT START CONTROLLER)



4.3 CONNECTION DIAGRAM NESPRAY PRO





4.4 CONNECTION DIAGRAM FOR HEATING HOSE DRUM

