

AS20

ORDER #86000

20" Automatic Scrubber

FEATURES

- 8 Gallon Solution Capacity
- 9 Gallon Recovery Capacity
- Curved Squeegee Assembly
- "Quick Change" Squeegee Blades
- Float Shut-off
- Hands Free Pad Driver Installation

The Betco 20" Automatic Floor Scrubber offers an 8 Gallon Solution tank and a 9 Gallon Recovery tank. The brush pressure is 70 lbs. to give big machine performance in a compact unit. The 20" width will allow you to clean up to 17,000 sq. ft. per hour. A pad holder comes standard with the machine.

WARRANTY

Tank: 10 Year

Other components: 3 Year*

*Please refer to Betco Equipment Price/Product Guide for complete equipment warranty information.



SPECIFICATIONS

- Volts: 24 Volt System
- Solution Tank: 8 Gallon
- Recovery Tank: 9 Gallon
- Brush Pressure: 70 lbs.
- Run Time: Approx. 3.5 hrs.
- Waterlift: 56"
- Weight w/o Batteries: 139 lbs.
- Dimensions:
 - Length: 48", Width: 20"
 - Height: 33", Squeegee width: 35"

APPLICATIONS

- General Cleaning
- Stripping
- Heavy Duty Scrubbing

OPTIONS

Nylon Brush #86301

Grit Brush #86302

Charger #86201

Battery (2) #86276

Authorized Betco Distributor:

Better Solutions Come From...



1001 Brown Avenue • P.O. Box 3127 • Toledo, Ohio 43607-0127

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AS20 20" Automatic Scrubber

Operator's Manual

Order #86000



Better Resources. Better Results.
BETCO®

DIMENSIONS

AS 20 AUTOMATIC

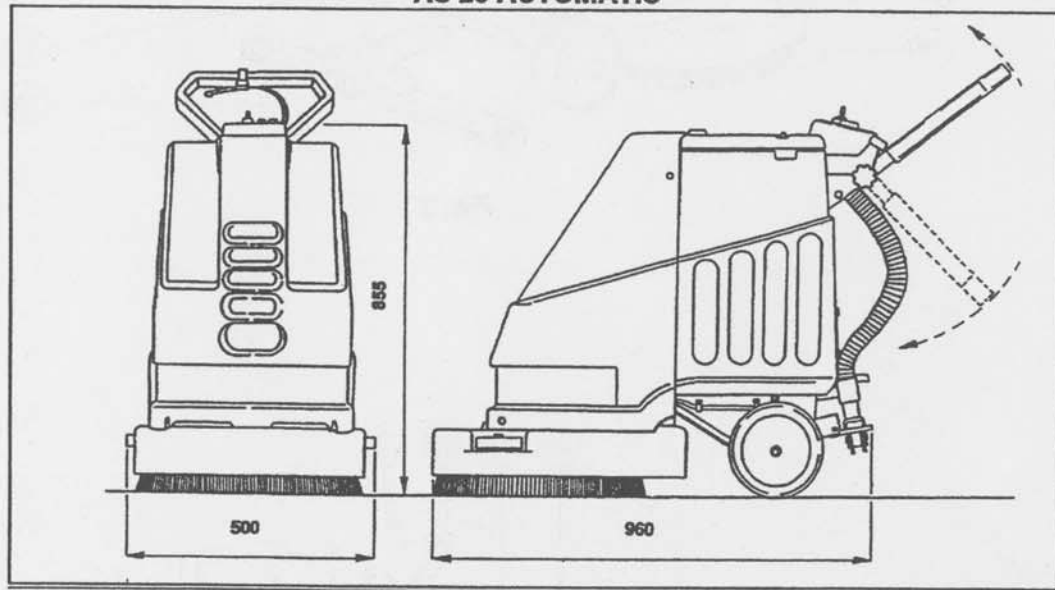


Fig. 1

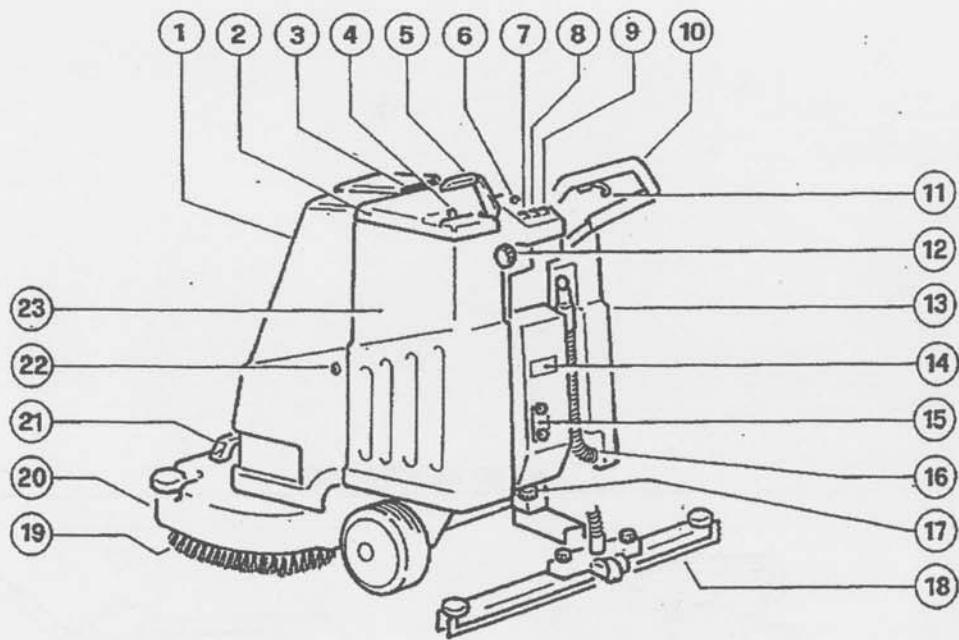


Fig. 2

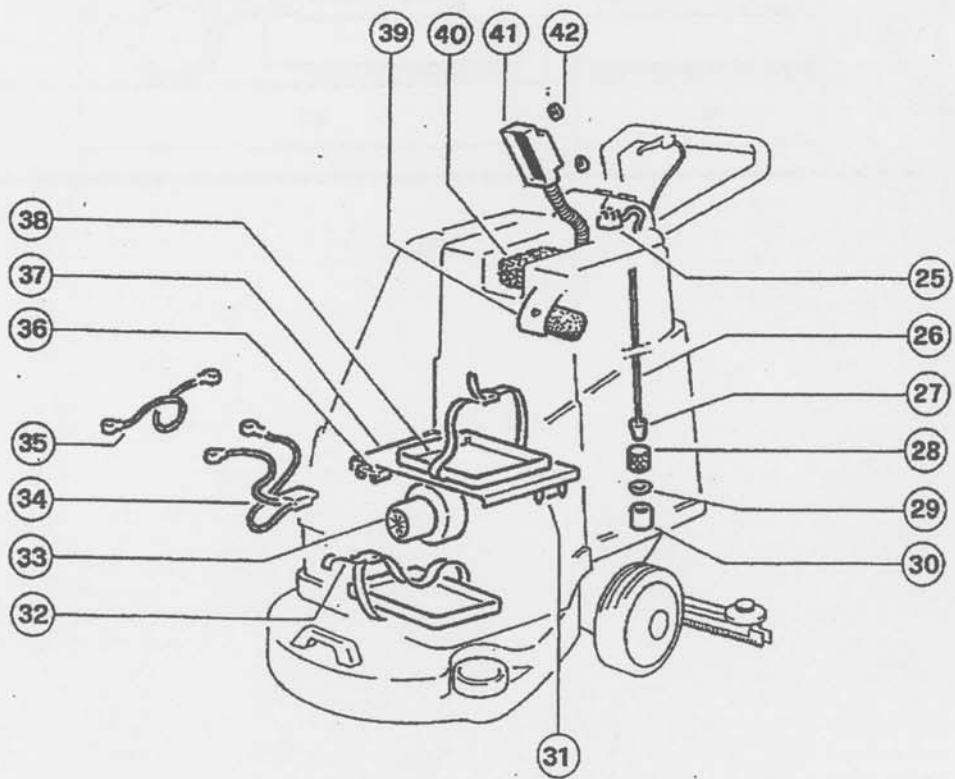


Fig. 3

2. SAFETY PRECAUTIONS

Read this manual carefully before using the floor cleaner. The machine must not be operated by untrained or unauthorized personnel.

Ensure that the sockets used to power the mains-operated models or battery chargers are suitably earthed and that they are protected by magnetothermal and differential switches.

This automatic scrubber shall be grounded while in use to protect the operator from electric shock. The cable machine is provided with a three-conductor cable and a three-contact grounding type attachment plug to fit the proper grounding type receptacle. The green and yellow conductor in the cord is the grounding wire. Never connect this wire to the other than the grounding pin of the attachment plug.

Look at the series plate to see the voltage for which the cable machine is built: if this machine is for use on a nominal 120-Volt circuit it has a grounding plug that resembles the plug illustrated in figure A. Make sure that the machine is connected to an outlet having the same configuration as the plug. No adapter should be used with this machine.

If this machine is provided with an attachment plug as shown in figure B, it is intended for use on a nominal 240 Volt circuit. No adapter is available for this plug.

Ensure that the electrical characteristics of the machine (voltage, frequency, power absorbed), shown on the rating plate, correspond to those of the power distribution system.

Move the machine carefully on slopes and ramps. Do not reverse on slopes. Never park the machine on a slope.

This machine must be used only on slopes with a gradient of less than 2%.

The cleaner must not be used on public highways.

The machine can cause explosions if used in the vicinity of inflammable materials or vapours (fuel, solvents etc.). It must therefore not be used to suck up inflammable liquids, even if diluted.

Do not use in the presence of harmful dust.

Repairs must be carried out by specialist personnel only.

All maintenance operations must be carried out only after disconnecting the machine from the mains (always unplug). In the battery-operated version, disconnect the battery connector.

When using, be careful of other people and in particular children in the area. Do not leave the machine unattended with the plug connected.

To ensure correct operation of the machine, use non-foaming detergents.

Maintenance operations on the electric plant and all operations not mentioned in the followings must be done only by specialized persons.

Safety precautions for cable models

During use, avoid squashing or ripping the mains cable.

Periodically check the mains cable to ensure that it has not been damaged. If damaged, the machine cannot be used.

If you have to replace the cable, plug or terminals, secure the electrical connections and cable strap (fig. 3, N°. 25) so that the cable cannot be ripped. Carefully refit the electrical boxes to ensure operator safety.

Safety precautions for battery models

For battery maintenance and recharging, carefully follow the specific instructions given in this manual.



Fig. A

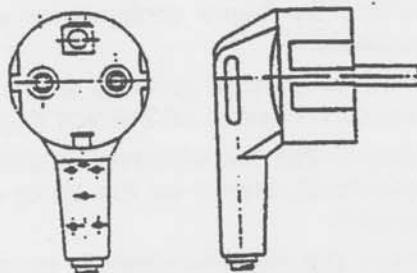


Fig. B

3. GENERAL INFORMATION

3.3 Machine identification

This operating and service manual applies to models of single-brush floor cleaners. The machine identification plate is affixed to the electrical box in position N°. 14, fig. 2.

3.2 General description

This floor cleaner has been designed to wash and dry smooth, even floors free from obstructions. It is available in battery or mains-operated versions to satisfy all requirements.

The cleaner distributes a suitable amount of detergent over the floor and brushes it to remove the dirt. By using specific detergents or by fitting brushes made of different fibres or abrasive disks, the machine can be adapted to a wide range of floor and dirt types.

A liquid suction system incorporated in the cleaner provides for perfect floor drying.

The main parts of the machine are as follows (reference fig. 2):

- the detergent solution tank (N°. 23) which contains and transports the mixture of clean water and detergent;
- the recovery tank (N°. 13), used to collect the dirty water sucked up from the floor during washing;
- the squeegee (N°. 18), which wipes and therefore dries the floor, sucking up the dirty water;
- the brush (N°. 19).

3.3 Applications

Washing and drying of smooth and moderately rough floors.

Polishing.

3.4 Detergents to be use

This machine has been studied to work with specific detergents for scrubbers.

It is particularly recommended:

- to always dissolve detergents following the instruction given by detergent supplier;
- to employ only no-foam detergents;
- to never use sodium-hypochlorite or other oxidizers specially in high concentration;
- to never use solvents and hydrocarbons.

4. PREPARING THE MACHINE

4.1 Lifting and transporting the machine in its packaging

The machine is packed on a wooden pallet and can be moved by fork lift. Handle carefully, avoiding knocks, and do not overturn.

4.2 Checks on delivery

When the transporter delivers the machine, carefully check the state of the packaging and ensure that the machine is intact. If it is damaged, inform the transporter but accept the delivery, reserving the right to submit a written claim for compensation for damages.

4.3 Unpacking

Remove the machine from its packing as follows:

- cut and remove the plastic straps using scissors or nippers;
- lift and remove the carton;
- remove the squeegee (fig. 2, N°. 18) and brush (fig. 2, N°. 19) from their packaging;
- operate the squeegee lifting lever (fig. 2, N°. 5) and remove the tank cover (fig. 2, N°. 2), eliminating the sheet protecting the control panel;
- take out the envelope inside the dirty water tank (fig. 2, N°. 13) and the one attached to the handgrip (fig. 2, N°. 10) and check the contents:

envelope 1 (in the dirty water tank):

- testing check-list;
- warranty form;
- operating and service manual;

envelope 2 (attached to the handgrip):

- 2 knobs (fig. 2, N°. 12) for fixing the handgrip (fig. 2, N°. 10);
- 1 battery charger connector (only battery-operated model);

- take the two knobs out of the second envelope, raise the handgrip (fig. 2, N°. 10) until the two threaded holes correspond to two of the four slots in the upright and secure, tightening the knobs from the outside;
- remove the bonnet (only for the battery-operated model, fig. 2, N°. 1), holding it by means of the grip (fig. 2, N°. 3) and lifting it up;
- remove the battery wiring and jumper with terminals (only for the battery-operated model, fig. 3 - N°. 34 e N°. 35);
- according to the model cut and remove the plastic straps fixing the machine to the pallet using scissors or nippers, otherwise using spanners for unscrew the bolts on the brackets connecting the machine chassis to the pallet;
- raise the machine by means of the front handle (fig. 2, N°. 21) and handgrip (fig. 2, N°. 10) and remove it from the pallet;
- dispose of the packing cartons, pallet, steel brackets, bracket retaining bolts and plastic sheet, using differentiated waste bins if available.

4.4 Fitting the squeegee

The squeegee (fig. 2, N°. 18) is the prime drying agent. To fit it on the machine, stand behind the handgrip with the squeegee blades facing down and the wheel (fig. 4, N°. 50) in the position shown in figure 4. Check that the squeegee support (fig. 4, N°. 47) is raised (if not, raise it by pulling back the squeegee lever fig. 2, N°. 5), loosen the two knobs (fig. 4, N°. 48) in the middle of the squeegee and slide it into the support. Secure the squeegee by tightening the two knobs.

4.5 Electrical and earth connection (mains-operated model)

The rating plate (fig. 2, N°. 14) gives the electrical characteristics of the machine. Ensure that the frequency and power correspond to those of the power distribution system. As regards voltage, the models with rating plate indicating 230 V can be used for voltages of 220, 230 or 240 V. The same applies to the models with 115 V rating: they can be used at 110, 115 and 120 V. The frequency specified on the plate must, however, always be identical to the mains frequency.

Check that the electrical system is provided with a suitable earth line and that the sockets (and any adapters used) do not interrupt the earth leads.

FAILURE TO OBSERVE THESE DIRECTIONS CAN RESULT IN SERIOUS DAMAGE TO PERSONS AND THINGS AND LAPSE OF THE WARRANTY.

4.6 Preparing the battery charger (battery-operated model)

If you wish to use a battery charger not supplied with the machine, it must be fitted with the connector sent with the machine in envelope 2 (see "Unpacking" paragraph).

To fit the connector:

- remove approximately 13 mm of protective sheathing from the two red and black battery charger cables;
- crimp the connector pin terminals on the cables;
- following the instructions enclosed with the connector, fit the cables with pin terminals into the semi-circular connector housings observing the polarity: red cable +, black cable -.

4.7 Installing the batteries (battery-operated model)

This machine has been designed to use two 12 V batteries with a maximum weight of 2x26 kg and a capacity of 120 Ah (20h). The use of heavier batteries can seriously affect manoeuvrability and overheat the brush motor. Lighter, lower capacity batteries, on the other hand, will require recharging more often.

If the machine is delivered with **dry batteries**, they must be charged as follows before installation:

- after removing the caps, fill all the elements with the correct sulphuric acid solution for batteries with specific gravity 1,240 (28° Bé), at a temperature of 30° C, until the plates are fully covered (fill each element in two stages at least);
- leave to rest for 3-4 hours to give the plates time to absorb the electrolyte;
- check that the level of the liquid is still above the plates and if not, top up with the sulphuric acid solution;
- close the caps;
- instal the batteries in the machine (following the procedure below for tubular armoured batteries);
- recharge for at least 2-3 hours with an automatic 24V 20A battery charger before using the machine.

If the machine is supplied with **tubular armoured batteries**, instal them following the instructions below:

- if the bonnet (fig. 2, N°. 1) is fitted on the machine, remove it by gripping and lifting at the point shown in figure 2, N°. 3;
- on the upper battery support (fig. 3, N°. 37), at the side of the upper battery plate (fig. 3, n° 38), there is a label showing the layout of the batteries and cables: the battery on the top plate must have the + and - poles facing the tanks, whereas the ones on the lower plate must face away from the tanks;
- open the fastening of the lower battery holder belt (fig. 3, N°. 32) and adjust so that its ends face the side opposite the suction motor (fig. 3, N°. 33) (i.e. the left side of the machine) to prevent them obstructing the battery plate;
- position the battery as shown on the label for the lower plate and fit it on the lower plate;
- wrap the belt around the battery, inserting the free end into the fastening, and tighten to lock;
- repeat the procedure for the upper battery making sure that you observe the position shown by the label;
- referring to the cable layout shown on the label, connect the terminals of the battery wiring (fig. 3, N°. 34) and of the jumper with terminals (fig. 3, N°. 35) to the battery poles (be careful only to fit terminals marked with the symbol + on the positive poles). Position the cables as shown in the label, tightening the terminal fixing bolts with a 10 mm spanner and coat the terminals with vaseline. Check that all the switches on the control panel are set to 0 (off) and connect the battery wiring connector to the one on the machine on the battery support over the vacuum motor;
- use the machine according to the instructions given below until the battery flat light starts to blink, indicating that the battery needs recharging.

5. USING THE MACHINE

5.1 Description of the controls

Electrical controls and indicator lights on the control panel:

- **POWER INDICATOR LIGHT** (fig. 2, N°. 6; only mains-operated model): light indicating that the machine cable is connected to the mains;
- **BATTERY CHARGE CONTROL LIGHT** (fig. 2, N°. 6; only battery-operated model) with three different modes:
 - off: the battery is disconnected or all the switches are set to 0 (off);
 - blinking: the batteries are flat and must be immediately recharged - if you continue working, the batteries may be permanently damaged;
 - on: battery charged;
- **BRUSH SWITCH** (fig. 2, N°. 7): enables (I) and disables (O) the brush motor;
- **SUCTION MOTOR SWITCH** (fig. 2, N°. 8): switches the suction motor on and off;

Other controls:

- **BRUSH CONTROL LEVER** (fig. 2, N°. 11): located on the handgrip, it drives the motor which rotates the brush and moves the machine forward; the cleaner is provided with a special mechanical traction device by means of which the friction between brush and floor is used to generate forward thrust;
- **SQUEEGEE LEVER** (fig. 2, N°. 5): located on the left side of the column and enables the operator to raise (if pulled back) and lower (if pushed forward) the squeegee;
- **TAP CONTROL SLIDER** (fig. 2, N°. 4): located above the tanks on the left side of the machine, it permits continuous regulation of the flow of detergent solution from 0 to approximately 3 l/min;
- **SQUEEGEE ANGLE ADJUSTMENT KNOB** (fig. 4, N°. 46): located on the squeegee arm, it permits vertical adjustment of the squeegee angle;
- **SQUEEGEE HANDLE** (fig. 4, N°. 45): located above the squeegee arm, it permits regulation of the pressure exerted by the squeegee on the floor;
- **SPEED REGULATION KNOB** (fig. 2, N°. 17): permits slight adjustments in forward speed and correction of any tendencies to deviate sideways.

5.2 Adjusting the squeegee

The squeegee is provided with two adjustments so that it can be adapted to all types of surface:

- angle: adjusted by rotating the appropriate knob (fig. 4, N°. 46);
- pressure: adjusted by moving the spring working point via the appropriate handle (fig. 4, N°. 45); minimum pressure corresponds to the highest working point.

Combined adjustment of angle and pressure will provide perfect drying. For effective adjustment, the rubber sheet at the rear must be bent back slightly when the machine is moved forwards.

5.3 Adjusting the handgrip

To suit all heights, the handgrip can be adjusted to two positions as follows:

- unscrew the two fixing knobs (fig. 2, N°. 12);
- raise (or lower) the handgrip (fig. 2, N°. 10) until the slots on the upright coincide with the threaded holes on the handgrip;
- fit and tighten the knobs.

5.4 Discharging the dirty water

To empty the tank:

- position the machine over a drain hole;
- remove the tank lid (fig. 2, N°. 2);
- pull out the discharge pipe (fig. 2, N°. 16);
- holding the end of the pipe as high as possible, remove the cap;
- gradually lower the end of the pipe, regulating the flow according to its height from the ground;
- check the amount of residual dirt in the tank and flush out if necessary;
- once the contents of the tank have been fully discharged, refit the cap and reposition the pipe;
- replace the tank lid, checking that it is perfectly closed.

5.5 Discharging the clean water

To empty the tank:

- position the machine over a drain hole;
- pull out the discharge pipe (fig. 2, N°. 16);
- holding the end of the pipe as high as possible, remove the cap;
- gradually lower the end of the pipe, regulating the flow according to its height from the ground;
- once the contents of the tank have been fully discharged, refit the cap and reposition the pipe.

5.6 Fitting and dismantling the bonnet

To remove the bonnet (battery-operated model fig. 2, N°. 1):

- grip at the point shown in fig. 2, N°. 3 and lift up to remove.

To fit the bonnet (battery-operated model):

- align the bonnet with the tanks;
- lower it and press down to click into place.

To remove and refit the bonnet (mains-operated model):

- unscrew the two fixing screws (fig. 2, N°. 22) using a 4 mm Allen key and remove the bonnet (fig. 2, N°. 1). Refit, tightening the screws.

5.7 Moving the machine

To move the machine:

- remove the brush (or pad drive) following the instructions in the paragraph below;
- raise the squeegee;
- raise the front part of the machine by pressing down on the handgrip;
- push forward.

5.8 Fitting and changing the brush/pad drive

To fit the brush (fig. 2, N°. 19), rest it on the floor in front of the machine, stand behind and press on the handgrip in order to raise the front part, push the machine forward (maintaining the pressure on the handgrip) and line up the brush hub (fig. 2, N°. 20) with the brush. Rest the machine on the brush. Rapidly operate the brush control lever a few times: the brush will automatically screw onto the hub.

If this operation is not successful, realign the brush and repeat the above operations.

To use an abrasive disk, fit it on the pad drive and carry out the above operations.

To **remove** the brush (or pad drive) follow one of the following procedures:

- a) raise the front part of the machine by pressing the handgrip down and repeatedly operate the brush control lever in rapid succession. This will release the brush (or pad drive) which will fall to the ground;
- b) push the machine forward, press down on the handgrip to slowly raise the front while continuing to push the cleaner forward. The brush (or pad drive) will come off as it grazes the floor.

5.9 Preparing the machine for work

- For the battery-operated model, recharge the batteries if necessary;
- lift and remove the tank cover (fig. 2, N°. 2);
- empty the recovery tank (fig. 2, N°. 13) if necessary, following the procedure already described;
- check that the tap control slider (fig. 2, N°. 4) is in the closed position (i.e. positioned at the extreme left of the machine);
- pour clean water and detergent in the right concentration into the solution tank (fig. 2, N°. 23) leaving a gap of at least 5 cm between the surface of the liquid and the tank inlet;
- refit the tank cover (fig. 2, N°. 2).

5.10 Work

Once you have prepared the machine with the mains cable connected to the power socket (or with the batteries charged and the battery wiring connector (fig. 3, N°. 34) connected to the cleaner (fig. 3, N°. 36)), with the detergent solution tank (fig. 2, N°. 23) full and with the brush fitted:

- set the brush switch (fig. 2, N°. 7) to position I;
- set the suction motor switch (fig. 2, N°. 4) to position I: the suction unit will start up;
- push the squeegee lever forward (fig. 2, N°. 8): the squeegee will touch the floor;
- move the tap control slider (fig. 2, N°. 4) to the right: the tap will open, allowing the detergent solution to flow to the brush;
- pull the brush control lever (fig. 2, N°. 11): the brush (or pad drive) will rotate, washing the floor and exerting a thrust that will move the machine forward;
- guide the machine over the floor to be washed;
- adjust the squeegee and the flow of detergent solution as required via the controls (fig. 4, N°. 45 and N°. 46; fig. 2, N°. 4);
- for the battery-operated version, monitor the battery charge control light (fig. 2, N°. 6) which must always be on during work. When the light begins to blink, the batteries are low and you must stop immediately to recharge them. Continuing to wash with the light blinking can lead to permanent battery damage;
- monitor washing performance and replace the detergent solution when it has run out;
- do not stand still with the suction unit on and the detergent solution tap (fig. 2, N°. 4) open;
- every time you fill the detergent tank (fig. 2, N°. 23), always empty the recovery tank (fig. 2, N°. 13).

Note: if the brush control lever (fig. 2, N°. 11) is operated intermittently for a prolonged period, the brush motor may overheat consequently damaging the motor. In addition, in the mains-operated version the motor needs 2-3 seconds' rest in order to start up again without straining.

You should therefore use the lever in this way only when necessary, for example when moving round obstacles:

5.11 End of work

- Let the vacuum motor work for 2 minutes with the tank cover open to be sure the vacuum motor itself is well dry;
- check that the tap control slider (fig. 2, N°. 4) is in the closed position (i.e. positioned at the extreme left of the machine);
- remove the brush (or pad drive) to avoid permanent deformation;
- lift the squeegee from the ground (control fig. 2, N°. 5) to avoid continuous pressure deforming the drying blades and therefore affecting performance;
- empty and clean the recovery tank;
- unplug, or recharge the batteries according to the model.

5.12 How to get the most out of your floor cleaner

When removing particularly stubborn dirt, washing and drying can be performed in two separate stages:

- **prewashing:** open the water tap and begin washing with the suction unit off and squeegee raised, going over the dirtiest points several times. This gives the detergent time to act and the brush time to perform efficiently;
- **drying:** lower the squeegee, start the suction unit motor and go over the same area again.

This ensures thorough washing and will considerably reduce subsequent routine cleaning.

For easy use and maximum efficiency, you are advised to work in straight lines as far as possible, going over any areas that cannot be reached with the cleaner at the end, using a mop or cloth.

6. ORDINARY MAINTENANCE

6.1 General

To avoid damage to persons and the cleaner itself, always disconnect the power supply cable (in the mains-operated model) or the battery connector before carrying out any maintenance operations. The power supply cable of the battery charger, if incorporated, must also be disconnected from the mains.

Maintenance operations on the electric plant and all operations not mentioned in the followings must be done only by specialized persons.

6.2 Servicing and recharging the batteries (only battery-operated model)

To charge the **lead batteries** with liquid electrolyte, proceed as follows:

- move the cleaner to a well ventilated area (the batteries release inflammable vapours: before opening the caps, always move to a well ventilated area away from fires, sparks, lit cigarettes etc.);
- remove the bonnet (fig. 2, N° 1);
- remove the battery caps and check that the electrolyte covers the plates; if not, top up with distilled water;
- disconnect the battery wiring connector (fig. 3, N° 34) from the one fixed to the cleaner chassis and connect it to the battery charger socket. (**Caution:** DO NOT connect the battery charger to the fixed connector on the cleaner chassis);
- recharge, regulating the battery charger according to the instructions;
- once the batteries are charged, check with a densimeter. If one or more elements are flat according to the densimeter (whereas the adjacent elements are perfectly charged) it is a sign that the battery is damaged and must therefore be replaced;
- close the caps again, reconnect the battery wiring to the machine and replace the bonnet.

If the machine requires **gelatine batteries**, follow the instructions below:

- remove the bonnet;
- disconnect the battery wiring connector from the one fixed to the cleaner chassis and connect it to the battery charger socket. (**Caution:** DO NOT connect the battery charger to the connector fixed to the cleaner chassis);
- only use a battery charger specifically designed for gelatine batteries; recharge, regulating it according to the instructions;
- reconnect the battery wiring to the machine and replace the bonnet.

6.3 Cleaning the suction unit filter

- Remove the tank cover (fig. 2, N° 2);
- unscrew the knobs (fig. 3, N° 42) and remove the filter box (fig. 3, N° 41) and filter (fig. 3, N° 40);
- clean the filter under running water, leave to dry and refit everything.

6.4 Cleaning the detergent solution tap

To eliminate any scale that may prevent perfect closure of the tap, follow the instructions below:

- remove the tank cover (fig. 2, N°. 2) and completely empty the detergent solution tank (fig. 2, N°. 23);
- slide your hand inside the detergent solution tank; grip the solution rod (fig. 3, N°. 26) and pull up to disengage it from the tap body (fig. 3, N°. 30);
- pull out the solution filter (fig. 3, N°. 28) and clean it;
- clean the tap body (fig. 3, N°. 30) and shutter (fig. 3, N°. 27) using a cloth soaked in detergent;
- refit the filter;
- replace the shutter, pulling the solution rod up again.

6.5 General cleaning

When cleaning the machine, always bear the following in mind:

- avoid using hydrocleaners: water could seep into the electrical boxes or motors consequently damaging them or causing a short circuit;
- do not use steam as the heat will deform the plastic parts (casings and tanks) and make the nylon wheel bearings unserviceable;
- do not use solvents or hydrocarbons: you could damage the casings or rubber parts.

6.6 Replacing the squeegee blades

The job of the squeegee blades is to scrape the film of water and detergent from the floor thus permitting perfect drying. With use, continuous friction will blunt and crack the sharp edge in contact with the floor, affecting drying efficiency and thus requiring replacement of the blade.

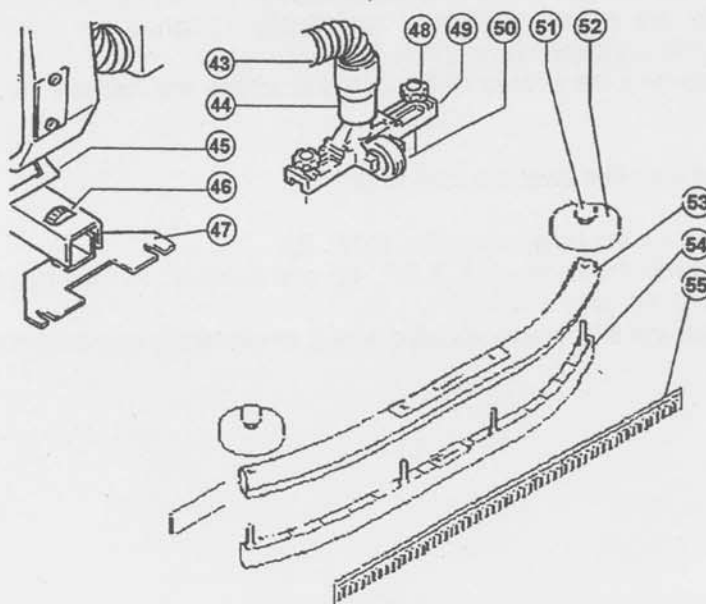


Fig. 4

Each squeegee is fitted with two blades, only one of which will be subject to wear. Initially therefore, when one blade is worn, simply swap them round and then when the second one is worn, replace them both.

Swapping the blades (for references see fig. 4):

- remove the squeegee from its support (N°. 47), sliding out the coupling (N°. 44) of the suction pipe and loosening the two knobs (N°. 48);
- completely unscrew the two knobs (N°. 48) and disconnect the squeegee inlet (N°. 49) from the squeegee profile (N°. 53); rotate the inlet by 180° with respect to the profile and refit on the profile;
- refit the squeegee on its support (N°. 47), ensuring that the wheel (N°. 50) is positioned at the back with respect to the cleaner. Tighten the two knobs (N°. 48) and connect the coupling (N°. 44).

Replacing the blades (for references see figure 4):

- remove the squeegee from its support (N°. 47), completely unscrewing the two knobs (N°. 48), slide out the coupling (N°. 44) of the suction pipe and disconnect the squeegee inlet (N°. 49) from the squeegee profile (N°. 53);
- unscrew the two knobs (N°. 51) and remove the wheels (N°. 52);
- turn the squeegee over and press the protruding threaded pins down to release the insert (N°. 54);
- remove the worn blades (N°. 55) and replace them with the new ones, inserting the protruding tooth into the profile housing (N°. 53); check that the teeth of both blades are perfectly positioned in the profile;
- refit the insert (N°. 54), the wheels (N°. 52), the inlet (N°. 49) and knobs (N°. 51);
- refit the squeegee on its support (N°. 47), ensuring that the wheel (N°. 50) is positioned at the back with respect to the cleaner. Tighten the two knobs (N°. 48) and connect the coupling (N°. 44).

6.7 Replacing the fuses (battery-operated model)

To replace the fuses in the back of the machine:

- remove the fuse cover (fig. 2, N°. 15);
- using the tweezers provided with the machine, remove the blown fuses and replace them with new ones with the same amperage;
- close the fuse cover.

The 60 A (fig. 3, N°. 31) fuse that protects the brush motor is located at the front of the machine above the brush motor.

To remove it:

- raise the bonnet;
- remove the fuse by unscrewing the retaining screws;
- fit a new fuse and replace the bonnet.

If a fuse continues to blow, the fault in the wiring, in the electronic cards or in the motors must be identified and repaired; have the machine checked by qualified personnel.

6.8 Periodical lubrication

This cleaner does not require any periodical lubrication.

6.9 Routine maintenance: daily operations

Every day, at the end of work, carry out the following operations:

- check that the overflow valve (fig. 3, N° 39) is working correctly;
- check that the recovery tank (fig. 2, N° 13) is not encrusted with dirt; if so, clean it;
- clean the suction motor filter (fig. 3, N° 40);
- check that the filter (fig. 3, N° 28) of the detergent solution tanks clean;
- clean the squeegee blades (fig. 2, N° 18) checking that they are not excessively worn and that they have not been torn;
- recharge the batteries following the procedure previously described (only battery-operated model).

6.10 Routine maintenance: weekly operations

- Check that the squeegee suction hole is not clogged; remove any encrusted dirt if necessary;
- clean the suction pipe (fig. 4, N° 43);
- check the level of electrolyte in the batteries and top up with distilled water if necessary (only battery-operated model).

6.11 Routine maintenance: six-monthly operations

- Have the electrical system checked by qualified personnel.

6.12 Preparing for prolonged periods of inactivity

If the machine is not going to be used for a long period, proceed as follows:

- dismantle the squeegee (fig. 2, N° 18), wash it and pack in a plastic envelope or sheet;
- remove the brush (or pad drive);
- empty and thoroughly clean both tanks (fig. 2, N° 13 and N° 23);
- completely recharge the batteries before storing them in the warehouse with the battery wiring connector (fig. 3, N° 34) disconnected from the connector on the machine. Recharge periodically (at least once every two months).

7. HOW TO ORDER SPARE PARTS

To enable our servicing department to correctly identify the spare parts required, and therefore to provide an efficient service at all times, the following information must ALWAYS be provided:

- machine model;
- serial number (see rating plate fig. 2, N° 14);
- spare parts table showing the part and reference number;
- part code;
- quantity required.

For replacement under warranty, a brief description of the fault must also be enclosed with the order.

8. TROUBLESHOOTING

Fault	Cause	Remedy
The solution does not flow out	* The solution tank (fig. 2, N°. 23) is empty	* Fill it
	* The solution filter (fig. 3, N°. 28) or pipes are obstructed	* Clean the filter and remove the obstruction in the pipes
	* The tap is damaged	* Repair or replace the tap
The flow of solution does not stop when the tap is closed	* The tap remains open because it is damaged or very dirty	* Clean or repair the tap, checking that it closes properly
The squeegee does not suck up the dirt	* The overflow valve (fig. 3, N°. 39) is closed	* Free the overflow valve
	* The dirty water tank (fig. 2, N°. 13) is full	* Empty the tank to release the overflow valve
	* There is an obstruction in the suction pipe (fig. 4, N°. 43)	* Unclog the pipe
	* The suction pipe is not connected to the squeegee	* Connect the pipe
	* The suction motor does not work	* Check the fuse (battery-operated version) and motor connections. If necessary, replace the motor
The squeegee leaves traces of dirty liquid on the floor	* The squeegee angle and/or pressure are not correctly adjusted	* Adjust the squeegee following the instructions
	* The blade edge in contact with the floor is worn	* Replace the blade
	* The squeegee or pipe is clogged or damaged	* Unclog and repair the damage
The batteries run flat sooner than expected	* The poles and terminals of the batteries are dirty and oxidized	* Clean and grease the poles and terminals and recharge the batteries
	* The level of electrolyte is too low	* Add distilled water, topping up each element according to the instructions
	* The battery charger does not work	* See battery charger instructions
	* The densimeter test reveals significant differences between various elements in the same battery	* The battery is damaged and must be replaced

Fault	Cause	Remedy
The machine does not clean evenly	* The brush or abrasive disk is worn	* Replace
The machine runs too fast or does not move at all and tends to pull to one side	* The brush pressure must be adjusted	* Adjust the brush pressure via the speed regulation knob (fig. 2, N°. 17)
The brush motor has trouble starting (only mains-operated model)	* You are working with a dry brush on a very rough floor	* Open the detergent solution tap
	* You are working with extension leads with inadequate section or the voltage is significantly lower than the value specified on the machine rating plate (15% less)	* Avoid using inadequate extension leads, increase the section to minimum mm, use sockets with higher voltage
	* One or both of the capacitors has developed a fault	* To be controlled by specialized persons
	* The centrifugal earth protection is faulty	* To be controlled by specialized persons
The brush motor does not work	* The brush switch (fig. 2, N°. 7) is set to 0 (off)	* Turn the brush switch on
	* The fuse F1 (services) has blown (only battery-operated model)	* Replace the fuse
	* The motor thermal protection has cut in (only for battery-operated model)	* Leave the machine to cool down for at least 45'
	* The F7 brush motor fuse has blown (only for battery-operated model)	* Replace the 60A fuse (fig. 4, N°. 31) above the brush motor
	* Both capacitors are faulty (only mains-operated model)	* To be controlled by specialized persons
	* The motor is faulty	* To be controlled by specialized persons

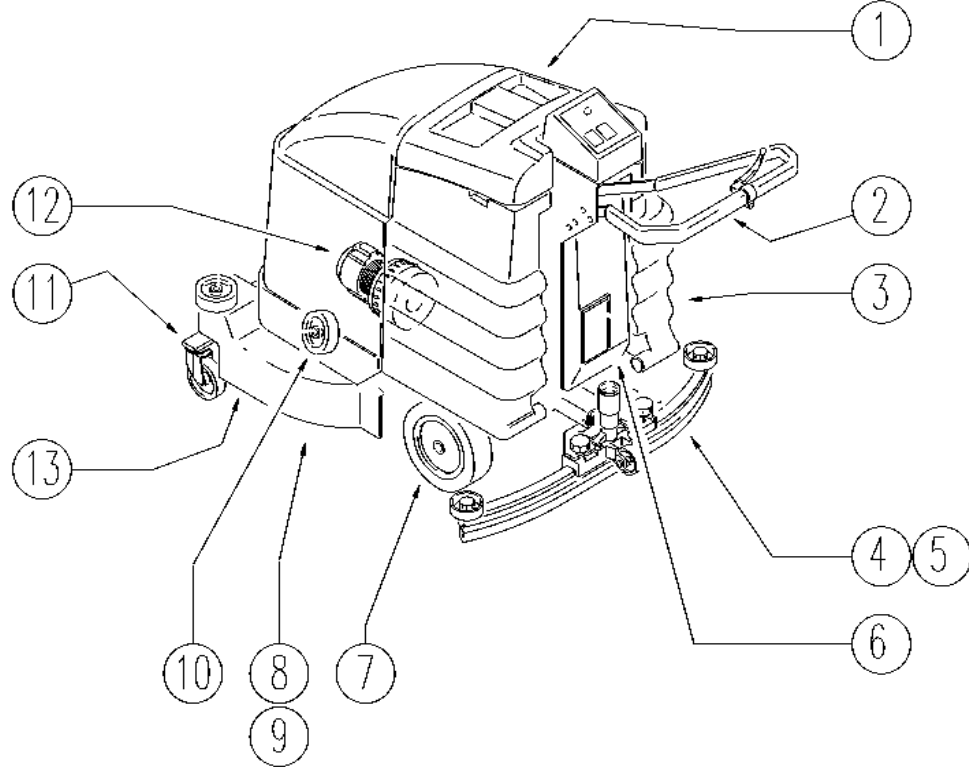
AS20 20" Automatic Scrubber

Parts Schematic

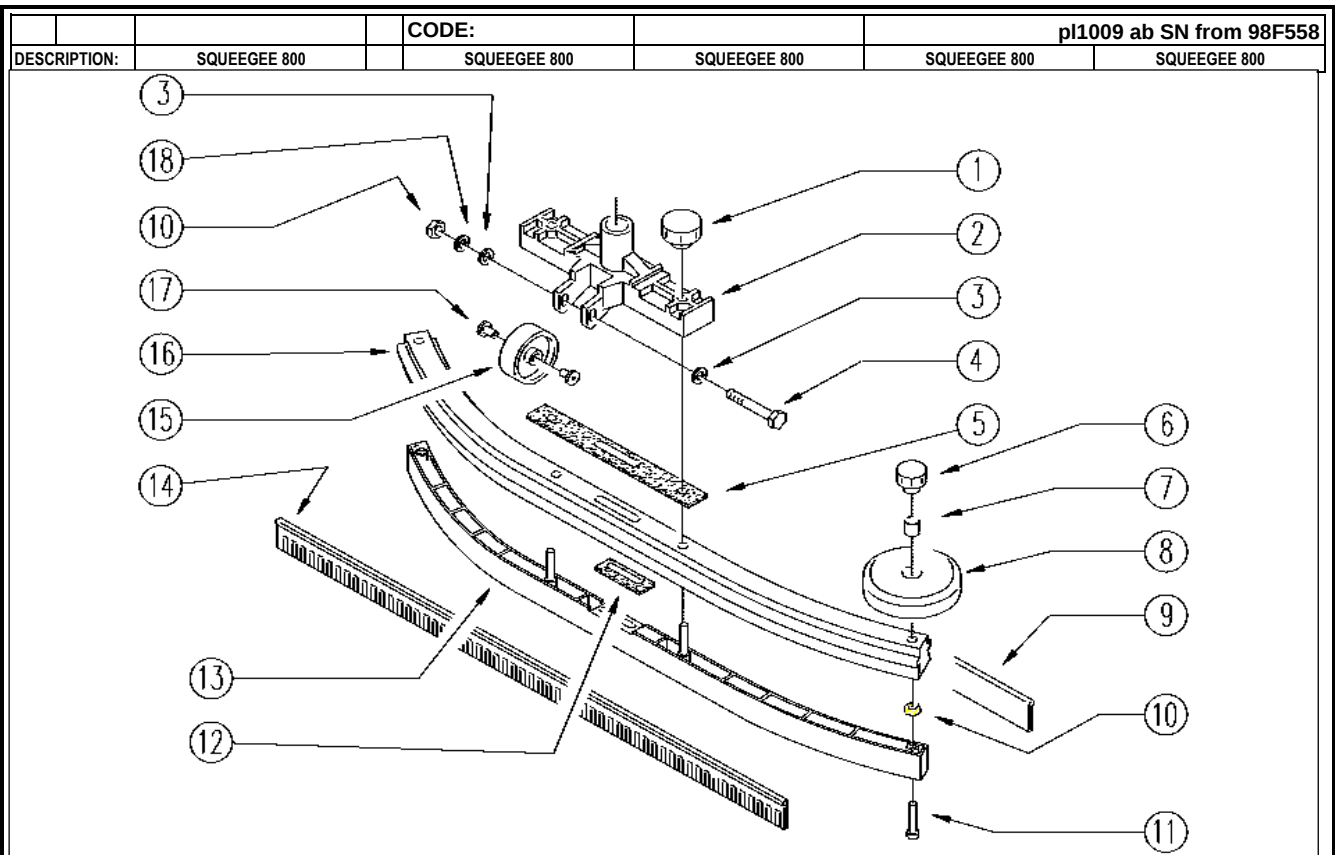
Item #86000



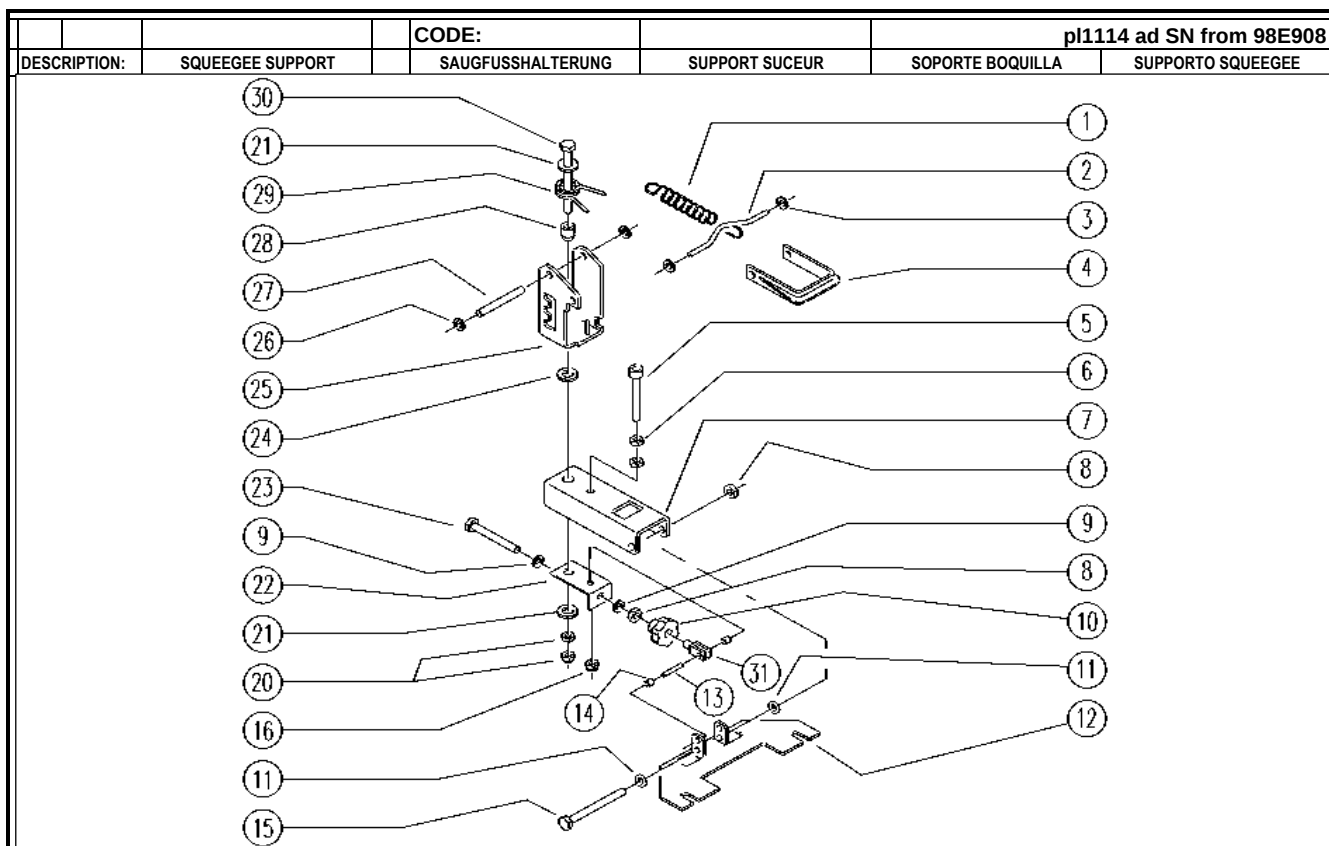
			CODE:		PF02216BC-2 ab SN from 98L10
DESCRIPTION:					



REF.	CODE	DESCRIPTION	QT
1	PL1195WS	TANK-HOOD	
2	PL1197WS	HANDGRIP UNIT	
3	PL1199K	TANK	
4	PL1009	SQUEEGEE 800	
5	PL1114	SQUEEGEE SUPPORT	
6	PL1201	ELECTRIC UNIT	
7	PL1202WS	FRAME	
8	PL1156	AXLE-PULLEY	
9	PL1161K	MOTOR	
10	PL1163	SMALL WHEEL	
11	PL1204BC	SMALL WHEEL	
12	PL1154	SUCTION	
13	PL1236	CONVEYOR, DRIVER	
13	PL1278	BRUSHES ø500	
/	PL1206BC	EXTERNAL PARTS	
	WD27020	ELEC. WIRING DIAGRAM	

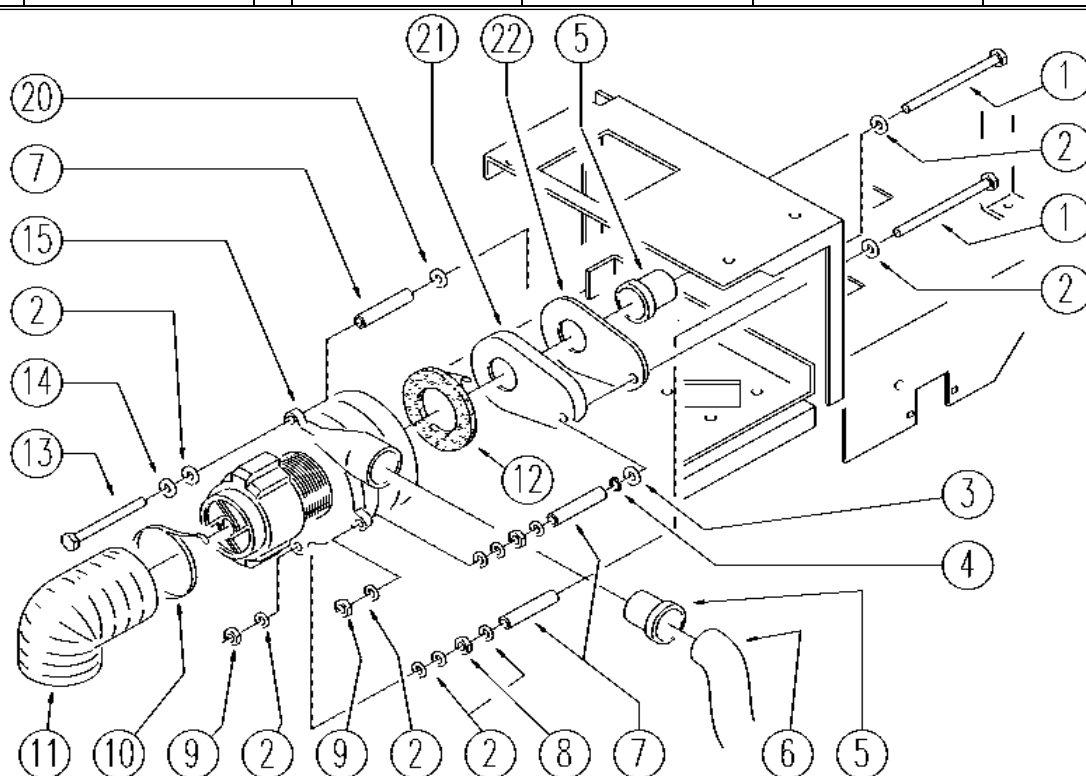


CODE	DESCRIPTION	QT
GR1503	SQUEEGEE UNIT	
1 E89458	Squeegee Knob	2
2 E89511	Suction Point for AS20	1
3 E86427	Washer for AS20	2
4 E86499	Hex Bolt M6x55 SS	1
5 E86959	Gasket	1
6 E86850	Knob	2
7 E86452	AS20 Spacer	2
8 E86451	AS20 Wheel	2
9 E86303	AS20 Front Curved Squeegee	1
10 E86873	Nut	3
11 E86435	AS20 Battery Cable Screw	2
12 E89457	Gasket	1
13 E86488	AS20 Insert	1
14 E86304	AS20 Rear Curved Squeegee	1
15 E86406	Wheel D 60	1
16 E87800	Complete Squeegee for WS20/24	1
17 E86498	Wheel Bushing	2
18 E86716	Cham Washer	1



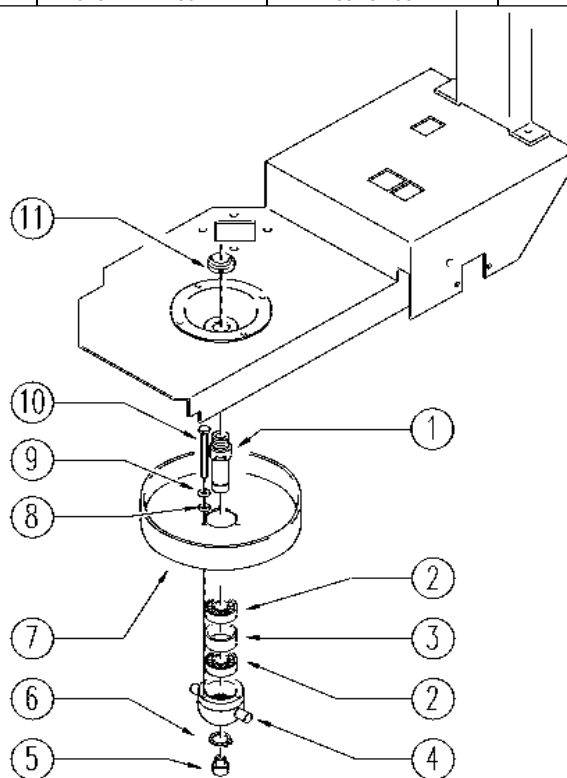
REF.	CODE	DESCRIPTION	QT
1	E86455	AS20 Spring	1
2	E86887	Squeegee Spring Coupler	1
3	E86880	Grooveless Shaft Washer	2
4	E86865	Squeegee Handle	1
5	E86871	Screw	1
6	E86873	Nut	2
7	SL0951	ARM	1
8	E86853	Nyloc Hex Nut, M8 Zinc	2
9	E86879	Washer	2
10	E86867	Squeegee Knob WS20/24 FS28	1
11	E86881	Washer	2
12	SL0951	PLATE	1
13	E86861	Pin	1
14	E86884	Spacer	1
15	E89220	Screw	1
16	E86875	Self-Locking Nut	1
20	E86876	Nut	2
21	E86878	Washer	2
22	E86888	Support Tilt Squeegee, Strong	1
23	E86870	Screw	1
24	E86883	Washer, Squeegee	1
25	SL0951	BRACKET	1
26	E86875	Self-Locking Nut	2
27	E86860	Squeegee Pin	1
28	E86882	bushing	1
29	E86440	AS20 Spring	1
30	E86486	Screw TE M8-45	1
31	E86672	Fork for AS24/28	1

			CODE:		pl1154 aa SN from 98E905	
DESCRIPTION:	SUCTION		ANSAUGUNG	ASPIRATION / SUCCION	SUCCIÓN	ASPIRAZIONE 24V

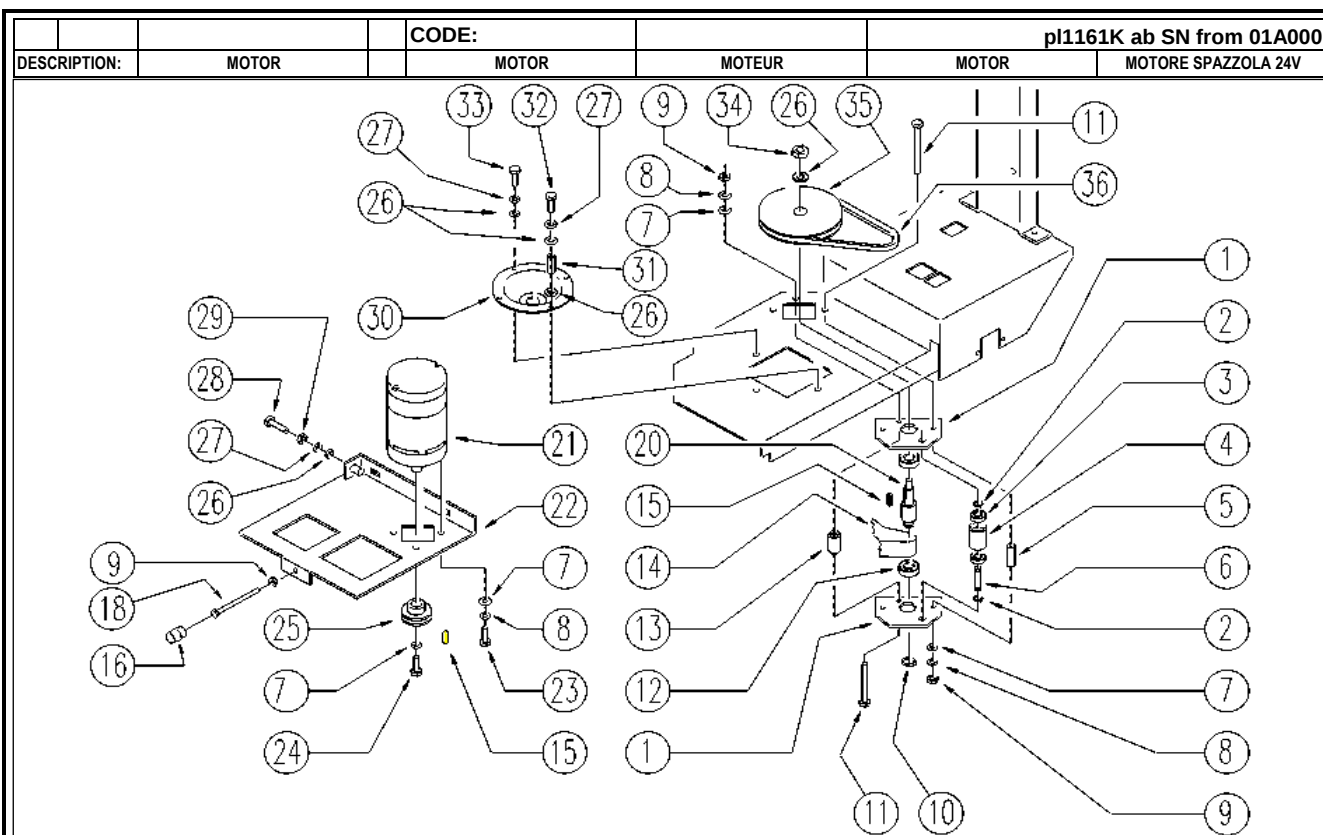


REF.	CODE	DESCRIPTION	QT
1	SL04282	SCREW	2
2	E86427	Washer for AS20	11
3	SL06030	WASHER	1
4	E89408	Stop Ring	1
5	E86449	AS20 Bushing for Vac Motor	2
6	E86470	18" Hose	1
7	SL07290	BEARING	3
8	E86873	Nut	2
9	E86875	Self-Locking Nut	2
10	E86460	Cable tie 12"	1
11	E86485	Hose D80-270 mm	1
12	E86403	Gasket for Vacuum Motor	1
13	SL04247	SCREW	1
14	E86716	Cham Washer	1
15	E86400	Vacuum Motor	1
20	E86879	Washer	1
21	E89161	Suction conveyor	1
22	E86405	Conveyor Gasket	1

			CODE:		pl1156 aa SN from 98E905	
DESCRIPTION:	AXLE-PULLEY		ACHSE-RIEMENSCHLEIBE	ESSIEU-POULIE	EJE-POLEA	ASSE PULEGGIA

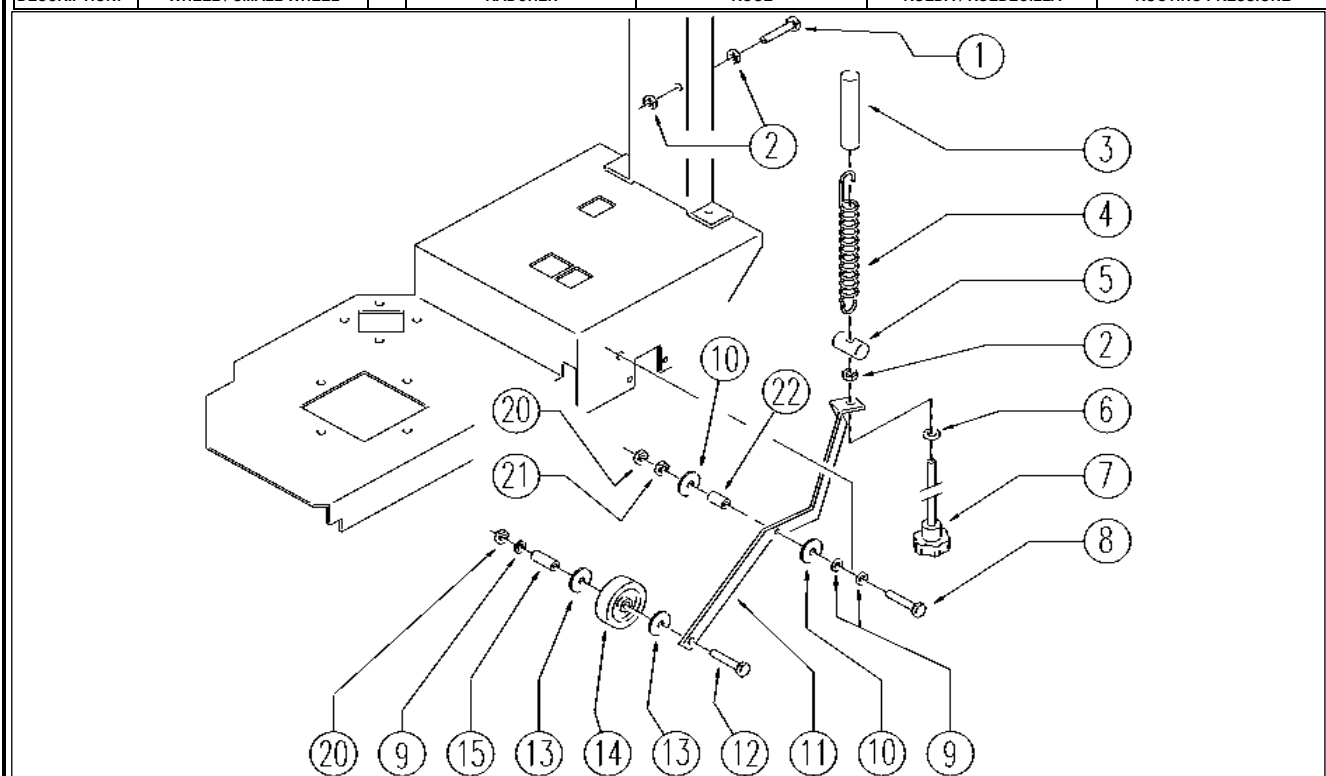


REF.	CODE	DESCRIPTION	QT
1	E86534	Pin	1
2	E86409	Bearing, 6005 2RS	2
3	E86533	Bearing spacer	1
4	E86532	Conveyor	1
5	E86469	AS20 Cap	1
6	E86812	Seegeer	1
7	E86724	Pulley, pipe	1
8	E86716	Cham Washer	3
9	E86427	Washer for AS20	3
10	E86737	Screw	3
11	E86468	AS20 Nut	1

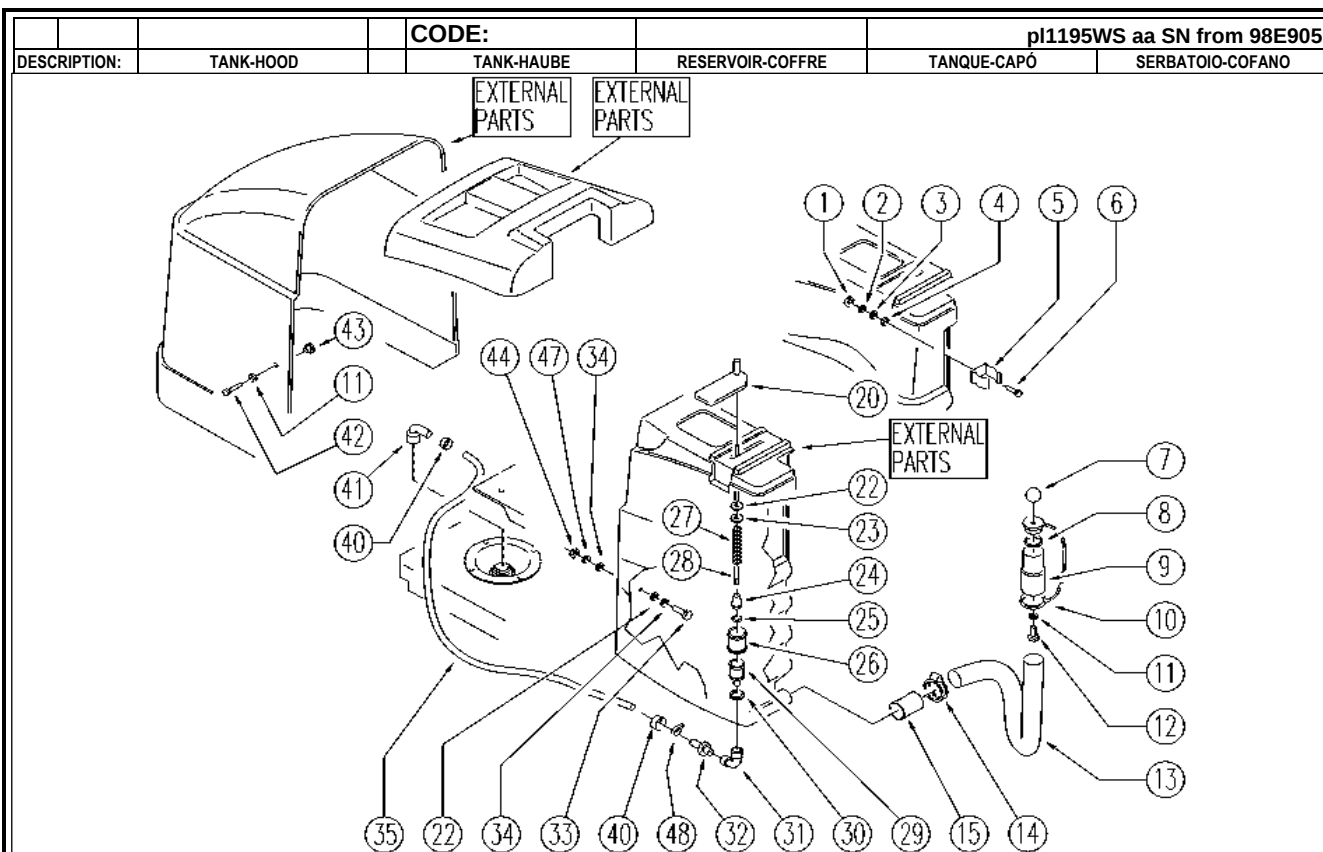


REF.	CODE	DESCRIPTION	QT
1	E86994	Plaque	2
2	E89408	Stop Ring	2
3	E86667	Bearing, 6001 2RS	2
4	E86727	Neutral Pulley	1
5	E89485	Spacer	2
6	E86666	AS28 Pin	1
7	E86427	Washer for AS20	8
8	E86716	Cham Washer	7
9	E86873	Nut	4
10	E86537	Ring	1
11	E86499	Hex Bolt M6x55 SS	3
12	E83310	Bearing, 6203 2RS	2
13	E86995	Spacer WS20/24	1
14	E86414	Belt	1
15	E86536	Key	2
16	SL2001	FOOT / PIN	1
18	SL0414	SCREW	1
20	E86535	Shaft	1
21	E86608	Brush Motor	1
22	SL0958	SUPPORT	1
23	E86737	Screw	4
24	E86737	Screw	1
25	E87871	Pulley	1
26	E86879	Washer	7
27	E89183	Washer	5
28	E86870	Screw	1
29	E86876	Nut	1
30	E86725	Flange, WS20	1
31	SL0719	BEARING	1
32	E86542	Screw AS20	1
33	E89182	Screw	3
34	E86853	Nyloc Hex Nut, M8 Zinc	1
35	E89409	Pulley Type Z DP150	1
36	E86471	Belt	1

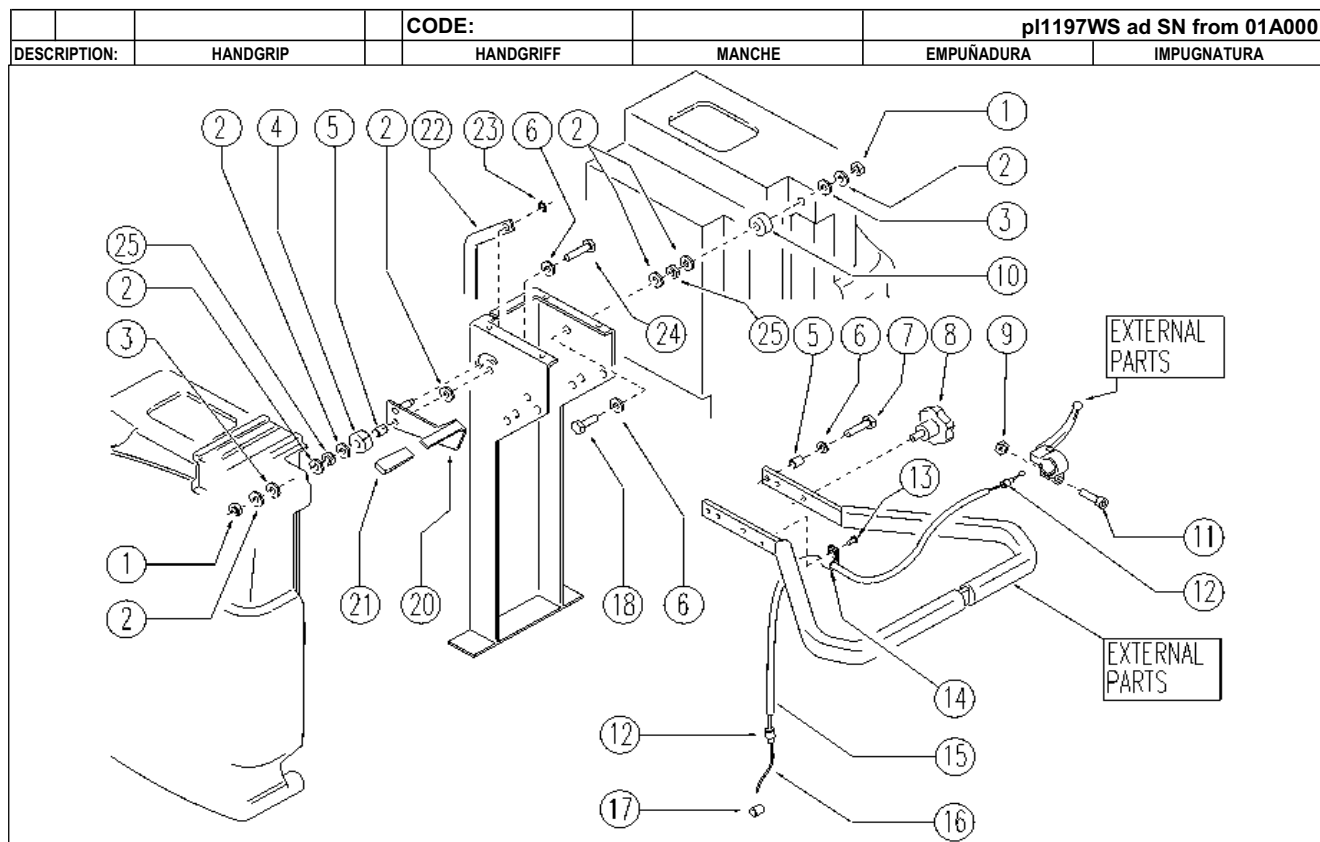
			CODE:		pl1163 aa SN from 98E905	
DESCRIPTION:	WHEEL / SMALL WHEEL		RÄDCHEN	ROUE	RUEDA / RUEDECILLA	RUOTINO PRESSIONE



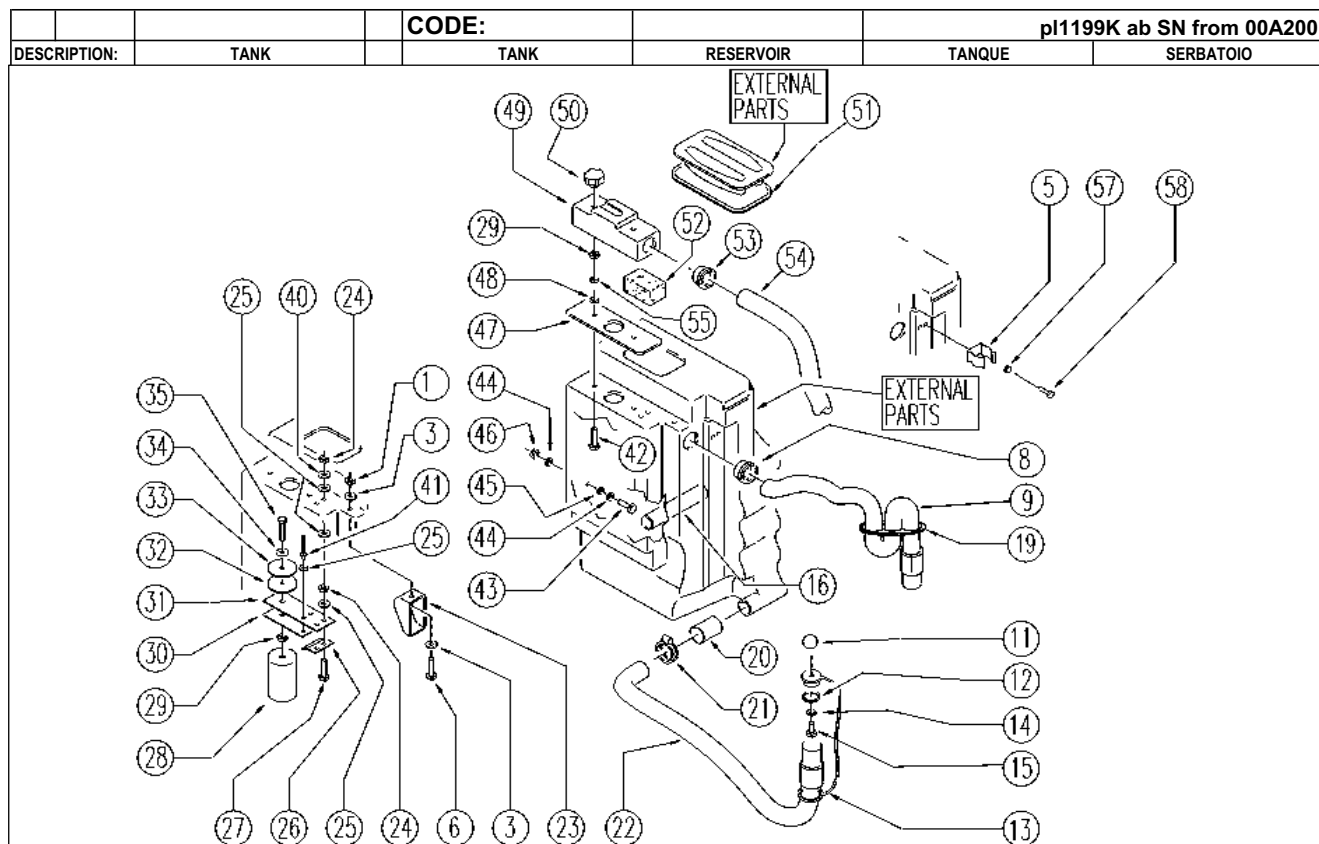
REF.	CODE	DESCRIPTION	QT
1	E89486	Screw	1
2	E86873	Nut	3
3	MP19201	SHEATH	1
4	E86455	AS20 Spring	1
5	SL07199	SPRING COUPLING	1
6	E86758	Washer	1
7	SL20047	KNOB (o HANDWHEEL)	1
8	E89464	Screw	1
9	E86879	Washer	3
10	SL06053	WASHER	2
11	SL09589	LEVER	1
12	E86870	Screw	1
13	SL08024-1	WASHER	2
14	SL08024-3	WHEEL / SMALL WHEEL	1
15	SL08024-2	PIN	1
20	E86853	Nyloc Hex Nut, M8 Zinc	2
21	E86876	Nut	1
22	E87774	Bushing AS20	1



REF.	CODE	DESCRIPTION	QT
1	E86749	Nut M5 UNI 5588	2
2	SL06037	WASHER	2
3	E86750	Washer D5 UNI 6591 NOXA2 Plane	2
4	E87876	Gasket WS20/24 FS28/32	2
5	SL13014	DUCT LOCK	1
6	E86748	Screw TE M5-16 UNI 5739 INOX A2	2
7	E86459	AS20 Knob	1
8	E86689	AS28 Gasket	1
9	E86849	Sleeve	1
10	SL14237	CAP	1
11	E86427	Washer for AS20	3
12	E86475	AS20 Screw TE M. 6-20	1
13	E86470	1/8" Hose	1
14	E86480	Double Wire Clamp	1
15	E86476	AS20 Membrane Valve - Polyr.	1
20	SL17140	LEVER / CURSOR	1
22	E86718	AS20 Washer	2
23	E86758	Washer	1
24	E86722	AS20 Shutter	1
25	E86484	OR Valve Gasket	1
26	E86483	Suction Filter D28	1
27	E86721	AS20 Spring	1
28	E86720	AS20 Rod	1
29	E86482	Faucet Assembly F450-530	1
30	E86481	Anti-Oil Gasket	1
31	E87806	Elbow AS20	1
32	E86752	Coupling 10 x 3-8 M	1
33	SL04145	SCREW	1
34	E86878	Washer	1
35	SL19240	HOSE	1
40	E86751	Clamp 10-16	2
41	E86638	Union Elbow	1
42	E86426	Screw for AS20	2
43	E86428	Bushing for AS20	2
44	E86853	Nyloc Hex Nut, M8 Zinc	1
47	E89183	Washer	1
48	SL14150	CLAMP	1

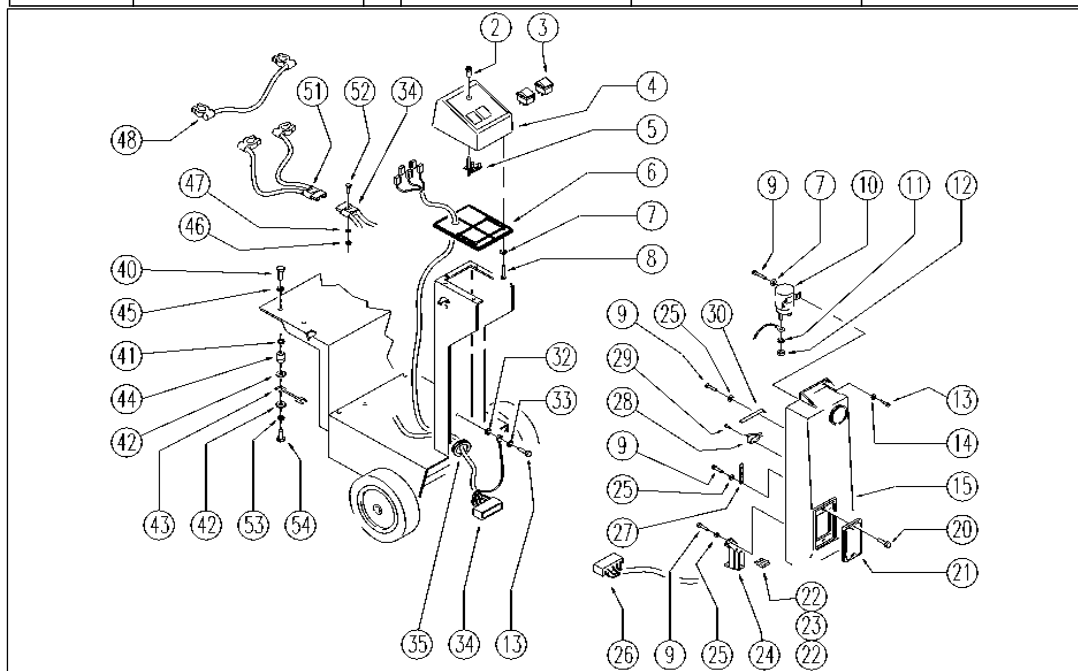


REF.	CODE	DESCRIPTION	QT
1	E86853	Nylor Hex Nut, M8 Zinc	2
2	E86878	Washer	7
3	E86718	AS20 Washer	2
4	E86745	Bushing	1
5	E86453	AS20 Bushing	3
6	E86879	Washer	4
7	E86454	AS20 Screw	2
8	E86674	AS28 Knob	2
9	SL05057	NUT	1
10	SL07209	SPACER	1
11	SL04063	SCREW	1
12	SL14116	BUSHING	2
13	E86336	M4 - 10 Phil Pan Head Screw	1
14	SL14146	EYELET	1
15	E86747	Spiral Sheath D.6/520 mm	1
16	SL14143	CABLE	1
17	E86990	Terminal D.5,5-2 L7 with Dowel	1
18	E86869	Screw	1
20	SL09410	LEVER	1
21	E86450	Tank Support Handle	1
22	E86477	AS20 Tie Rod SQ/ECO 450-530 BT	1
23	E86875	Self-Locking Nut	1
24	E86486	Screw TE M8-45	1
25	E86853	Nylor Hex Nut, M8 Zinc	2

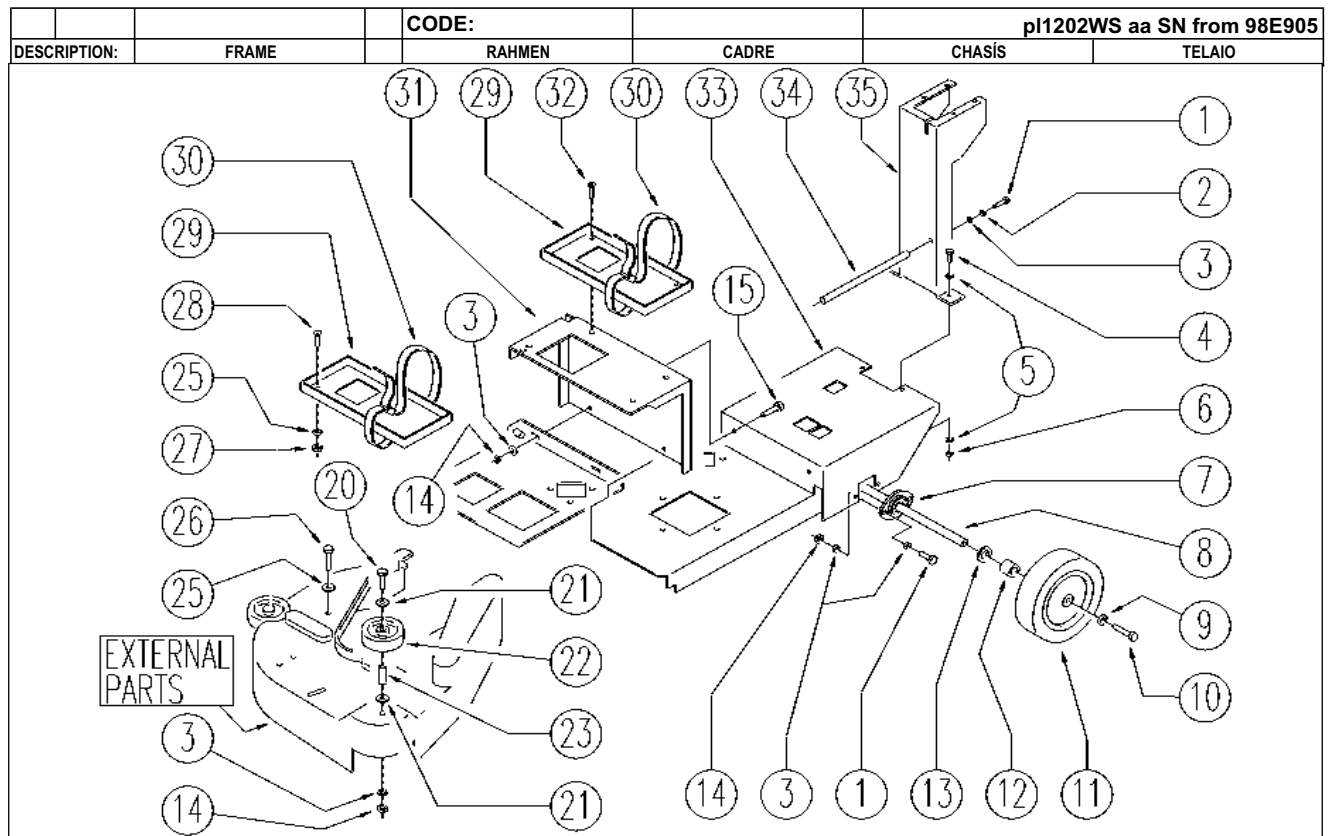


REF.	CODE	DESCRIPTION	QT
1	E86749	Nut M5 UNI 5588	1
3	E86750	Washer D5 UNI 6591 NOXA2 Plane	2
5	SL13014	DUCT LOCK	1
6	E86748	Screw TE M5-16 UNI 5739 INOX A2	1
8	E86474	AS20 Tank Bushing	1
9	SL19113	HOSE	1
11	E86459	AS20 Knob	1
12	E86689	AS28 Gasket	1
13	SL14237	CAP	1
14	E86427	Washer for AS20	3
15	E86475	AS20 Screw TE M. 6-20	1
16	SL07120	CROSS	1
19	E86759	Plaque	1
20	E86476	AS20 Membrane Valve - Polyur.	1
21	E86480	Double Wire Clamp	1
22	E86523	Hose Foreman28	1
23	SL17155	BAFFLE PLATE	1
24	E86735	Nut	4
25	E89118	Washer	4
26	E89170	Bracket	1
27	E89169	Screw	2
28	E86417	Styrofoam Float	1
29	E86873	Nut	3
30	SL09364	PLATE	1
31	E89166	Rubber shim	1
32	E89167	Plug	1
33	E89168	Cap	1
34	E86719	AS20 Washer	1
35	E89171	Screw	1
40	E86769	Washer	2
41	SL14006	RIVET	2
42	E86473	AS20 Screw TE M.6-70	2
43	SL04145	SCREW	1
44	E86878	Washer	1
45	E86718	AS20 Washer	2
46	E86853	Nyloc Hex Nut, M8 Zinc	2
47	E86438	AS20 Gasket	1
48	E86719	AS20 Washer	2
49	E86441	AS20 Filter Box	1
50	SL20006	KNOB (o HANDWHEEL)	2
51	E86446	AS20 Gasket	1
52	E86404	Tank Filter	1
53	E86449	AS20 Bushing for Vac Motor	1
54	E86478	Hose D34-750mm	1
55	E86716	Cham Washer	1
57	E88220	Washer	2
58	SL04213	SCREW	2

	CODE:	pl1201 ac SN from 02J001		
DESCRIPTION:	ELECTRIC UNIT	ELEKTRISCHE GRUPPE	GROUPE ELECTRIQUE	GRUPO ELÉCTRICO

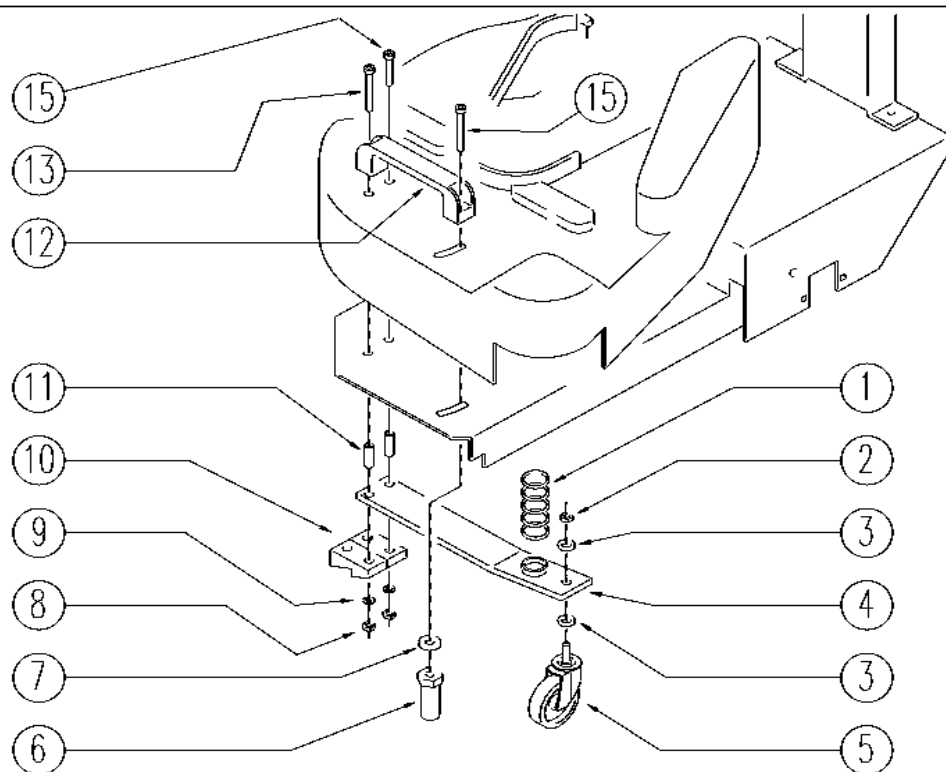


REF.	CODE	DESCRIPTION	QT
2	E86421	Reflector	1
3	E86423	Bipolar Switch	2
4	E86989	Control Panel	1
5	E86496	Circuit Board	1
6	E89226	Control panel base AS20	1
7	E89118	Washer	4
8	SL04177	SCREW	4
9	SL04176	SCREW	4
10	E86420	Relay	1
11	E86702	Cham Washer D8	2
12	E86703	Nut M8	2
13	E86336	M4 - 10 Phil Pan Head Screw	3
14	E86797	Washer	2
15	SL17166	COVER	1
20	E86426	Screw for AS20	2
21	E86543	Fuse Cover for AS20	1
22	E86825	Fuse 5 amp	2
23	E86827	Fuse 25 amp	1
24	SL23894	CONNECTOR	1
25	E88229	Washer	2
26	SL23818	WIRING	1
27	E86512	Spring	1
28	E86422	Micro Switch	1
29	SL04178	SCREW	2
30	E89214	Foil / Lamina	1
32	E86769	Washer	3
33	E86768	Washer	1
34	E86746	Main Wiring 450-B	1
35	E89272	Fairlead cable guide	1
40	E89244	Screw	2
41	E86700	Cham Washer D6	2
42	E86704	Washer D 6-18	4
43	E86643	Fuse 75 amp	1
44	E86386	fuse insulator AS20	2
45	E86707	Cham Washer D10	2
46	E89274	Nut	2
47	E89275	Washer	2
48	E86433	Cable, 6 AWG,	1
51	SL23839	WIRING	1
52	SL04122	SCREW	2
53	E87921	Washer	2
54	SL04180	SCREW	2

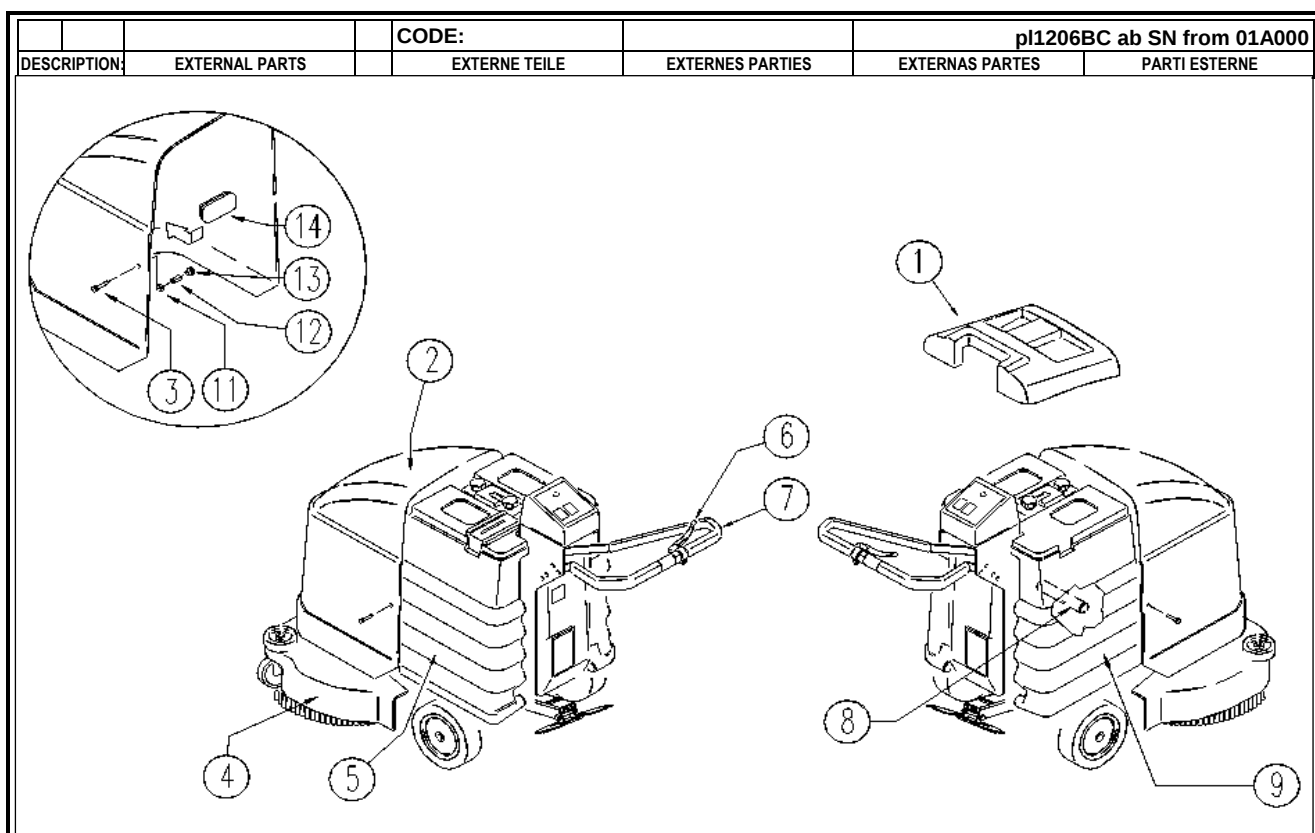


REF.	CODE	DESCRIPTION	QT
1	E89486	Screw	6
2	E86716	Cham Washer	2
3	E86427	Washer for AS20	14
4	SL04145	SCREW	2
5	E86726	Washer	4
6	E86853	Nyloc Hex Nut, M8 Zinc	2
7	E86742	Support	2
8	E86539	AS20 Axle	1
9	E86878	Washer	2
10	E86540	AS20 Screw M8x10	2
11	SL08022	WHEEL / SMALL WHEEL	2
12	E86743	AS20 Bearing	2
13	E86744	AS20 Washer	2
14	E86875	Self-Locking Nut	8
15	SL04216	SCREW	2
20	E86465	AS20 Screw	2
21	E86758	Washer	4
22	E86406	Wheel D 60	2
23	E86683	AS24 Wheel Bushing	2
25	E86448	AS20 Washer	3
26	E89469	M4 - 15 Phil Pan Head Screw	2
27	SL05043	NUT	1
28	E20290	Flat Hd Soc Machine Screw M5x16 SS	1
29	E86458	AS20 Plate	2
30	E86411	Belt for Battery	2
31	SL09587	SUPPORT	1
32	E89451	Screw	2
33	SL09651	BASEMENT	1
34	SL09349	BEARING	1
35	SL09585	UPRIGHT / PILLAR	1

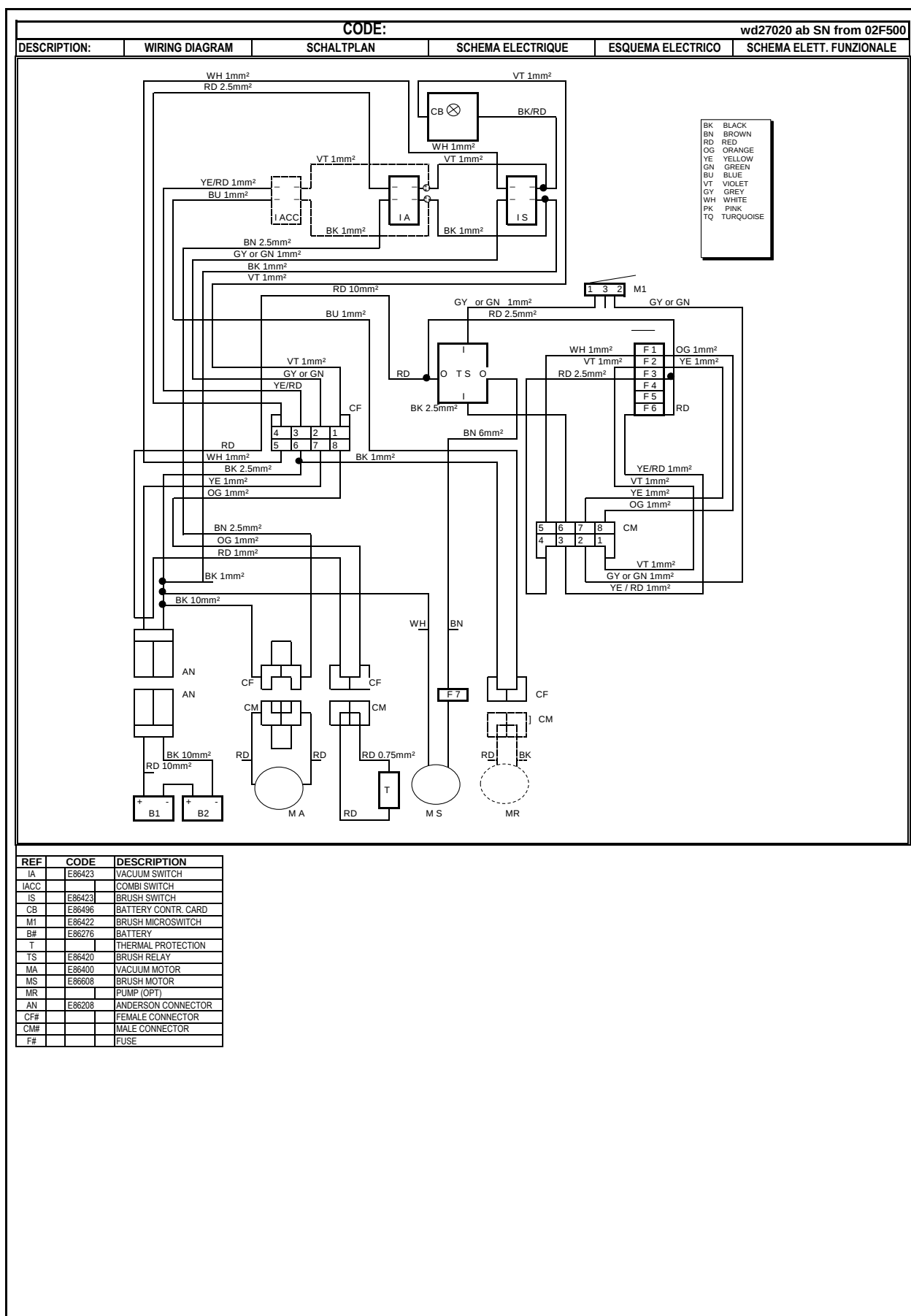
			CODE:		pl1204BC aa SN from 98L000	
DESCRIPTION:	SMALL WHEEL		RÄDCHEN	ROUE	RUEDA / RUEDECILLA	RUOTINO TRASPORTO



REF.	CODE	DESCRIPTION	QT
1	E86756	Spring	1
2	E86489	Nut, M12 Stainless Nylock	1
3	E86490	AS20 Washer	2
4	E86491	AS20 Lever	1
5	E86408	Rotating Wheel	1
6	E86755	Bearing	1
7	E86492	AS20 Washer	1
8	E86853	Nyloc Hex Nut, M8 Zinc	2
9	E86878	Washer	2
10	E86431	Silent Blok for AS20	2
11	E86487	Wheel - Silent Block	2
12	E86467	AS20 Black Handle 224	1
13	E86493	AS20 Screw	2
15	E86494	AS20 Screw	2



REF.	CODE	DESCRIPTION	QT
1	E86437	LID	1
2	E86436	HOOD	1
3	SL0416	SCREW	2
4	E86424	BRUSH COVER	1
5	SL1713	TANK	1
6	E86715	LEVER	1
7	E89263	HANDGRIP	1
8	SL0720	CROSS	1
9	E86328	TANK	1
11	E86463	WASHER	2
12	SL0752	SPACER	2
13	E86428	BUSHING / BUSH	2
14	SL1744	CAP	1



REF	CODE	DESCRIPTION
IA	E86423	VACUUM SWITCH
IACC		COMBI SWITCH
IS	E86423	BRUSH SWITCH
CB	E86496	BATTERY CONTR. CARD
M1	E86422	BRUSH MICROSWITCH
B#	E86276	BATTERY
T		THERMAL PROTECTION
TS	E86420	BRUSH RELAY
MA	E86400	VACUUM MOTOR
MS	E86608	BRUSH MOTOR
MR		PUMP (OPT)
AN	E86208	ANDERSON CONNECTOR
CF#		FEMALE CONNECTOR
CM#		MALE CONNECTOR
F#		FUSE