LAVINA® 13X/13X-HV
User Manual

SUPERABRASIVE

Tech Support Line: 800-987-8403 | www.superabrasive.com | info@superabrasive.us

LAVINA by SUPERABRASIVE

Warranty Registration Card

Complete and submit this form within 30 days from the date of purchase. The registration is invalid without the machine serial number.

Section 1: Customer Information

Customer name

Address | City | State and Zip Code

Phone # | Email

Section 2: Machine Information

LAVINA model | Serial #

Purchase Date | Purchased From (distributor, dealer)

Email: warranty@superabrasive.us / Fax: 706-658-0357
Superabrasive Inc., 9411 Jackson Trail Rd, Hoschton, GA 30548

WARRANTY AND RETURNS

WARRANTY POLICY FOR LAVINA® X MACHINES

A warranty card must be submitted to Superabrasive within 30 days of purchase in order for the foregoing warranty to apply.

You can either mail a hard copy of the warranty card or submit it electronically - see page 2.
Superabrasive warrants, from the time of delivery and receipt by the original customer, new and unused products sold by Superabrasive or Superabrasive-appointed distributors or dealers. Goods shall be free from defects in materials and workmanship. Superabrasive or a Superabrasive-appointed repair facility shall either replace or repair any defects in the Goods resulting from faulty design, materials, or workmanship. Products repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period, or ninety (90) days from date of the repair or shipment of the replacement, whichever is longer. Spare parts for repair will be either new or equivalent to new.

Warranty period shall be 2 years from the time of delivery and receipt by the original customer, or 600 operating hours on the machine - whichever occurs first. Superabrasive will cover the shipping charges for the transportation of the machine to Superabrasive (or an approved repair facility) and back to the customer (within the contiguous 48 United States) in the event that the damage occurs and is reported within 200 operating hours .Shipping charges, if covered by Superabrasive, must be agreed upon in advance and approved by Superabrasive. Thereafter, the customer will have to cover the shipping charges to Superabrasive and back. Superabrasive will not warranty Goods after a period of 2 years from the time of delivery and receipt by the original customer, or 600 operating hours on the machine - whichever occurs first.
Superabrasive shall not be liable for any defects that are caused by circumstances that occur after the Goods have been delivered and whilst the Goods are in the possession of the purchaser. Furthermore, the warranty does not include normal wear and tear or deterioration. Wear parts are not warranted. Superabrasive is not liable for defects arising out of use of non-OEM parts.

The Warranty is void if the purchaser has not followed the maintenance plan stipulated by the machine's manual and warranty card. The warranty is void if the purchaser repairs said Goods himself, or if repairs are conducted by a repair facility that is not approved by Superabrasive. Superabrasive's liability does not cover defects which are caused by faulty maintenance, incorrect operation, faulty repair by the purchaser, or by alterations conducted without Superabrasive's prior written consent. The same applies to any alterations of the Goods or services performed by another party other than Superabrasive, a Superabrasive-appointed distributor, or a Superabrasive-approved repair facility. The warranty is not applicable on a defect that arises due to tools or parts that are not original to Superabrasive. Replaced defective parts shall be placed at Superabrasive's disposal and shall become property of Superabrasive. If such defective parts are replaced
within the warranty period, the shipping charges will be covered by Superabrasive. In warranty complaint cases, when no defects are found for which Superabrasive is liable, Superabrasive shall be entitled to compensation for the labor, material cost, and shipping charges, incurred by Superabrasive as as a result of the complaint.

The warranty herein is non-transferable, and only applies to the original owner or purchaser of the machine.

RETURN POLICY FOR LAVINA® X MACHINES

The Lavina® X machines may be returned, subject to the following terms:
In no case, a machine is to be returned to Superabrasive Inc. for credit or repair without prior authorization. Please contact Superabrasive Inc. or your local distributor for an authorization and issuance of a return authorization number. This number along with the serial number of the machine must be included on all packages and correspondence. Machines returned without prior authorization will remain property of the sender and Superabrasive Inc. will not be responsible for them. No machines will be credited after 90 days from the date of invoice.

All returns must be shipped freight prepaid. Returned machines may be exchanged for other equipment or parts of equal dollar value. If machines are not exchanged, they are subject to a fifteen percent (15%) restocking fee.

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1. GENERAL INFORMATION

This owner's manual is intended for the operator of the Lavina® 13X machine, the servicing technician as well as for anyone involved with operating or servicing the machine. We recommend that you read the instructions very carefully and follow them strictly. The manual includes information about assembling, using, handling, adjusting and maintaining your Lavina® 13X floor grinding and polishing machine.

MANUFACTURER

Superabrasive was founded in 1987, as a manufacturer of high quality diamond tools for the stone and concrete industry. Today, Superabrasive is one of the world's leading companies in the production of diamond tools and floor grinding machinery. At Superabrasive, we strive to deliver the very best solutions to our customers, and enable them to work more efficiently.

GENERAL DESCRIPTION

The Lavina® 13X machine is intended for grinding, polishing and buffing concrete, marble, granite, limestone and terrazzo surfaces with diamond tools.
The Lavina® 13X is a one-disc machine.
The Lavina® 13X is intended to grind/polish edges, corners, steps of stairs or difficult to reach surfaces. Additionally, the machine could be used for grinding wood floor surfaces.
For best results, use only tools manufactured or recommended by Superabrasive and its distributors.

⚠ WARNING The Lavina®13X machine is manufactured and fitted for the above-mentioned applications only! Every other use may possess risks to the persons involved.

MACHINE CHARACTERISTICS

The Lavina®13X is made so it can grind/polish surfaces, where bigger machines have difficulties to reach.

MAIN DESIGN

Figure 1.1

Figure 1.2

Figure 1.3

Main Head has 3 fixed working positions – forward, left 45° and right 45° for working close to walls.
The inclination of the main head is adjusted crosswise and lengthwise to 4° (Fig. 1.1)
The halogen spotlight (Fig.1.2) enables the operator to work in darker areas.

⚠ WARNING Existing lighting system does not replace adequate overhead lighting.

The frame The handle on the frame is adjustable in height and allows the operator to work in a correct and safe posture.
The electrical box (fig.1.3) contains the electric switching devices and the inverter**.** The motor feeding cable is on the bottom part of the unit. The **main feeding cable** is connected with a plug and socket on top
The motor is mounted on the base plate. The motor is driving the grinding head with a belt system.

ENVIRONMENTAL CONDITIONS

The temperature range for operating the Lavina®13X outdoors is between 41°F and 86°F or 5°C and 30°C. Never use the Lavina®13X during rain or snow when working outdoors. When working indoors, always operate the machine in well-ventilated areas.

ELECTRICAL CONNECTION

The voltage (Volt) and power (Ampere) are displayed on a label on the electrical control box to avoid any incorrect connection. Refer to these before connecting the power. To avoid electrical shocks, make sure the ground power supply is functioning properly.

VACUUM CONNECTION

A connection for a vacuum dust extractor is located on the handle. The Lavina®13X does not include a vacuum dust extractor. The customer must purchase the vacuum dust extractor separately. The hose of the vacuum extractor must be Ø 50.8 mm and can be glided over the pipe. The vacuum dust extractor must be adapted for floor grinders and have a minimum air displacement of 300m3/h with a negative vacuum of 21 kPa.

TECHNICAL DATA

	Lavina® 13X		**Lavina® 13X-HV**	
Voltage/Hz	**1 ph x 200-240 V 50/60Hz**		**3 ph x 440-480V 50-60Hz**	
Amperage	**Max 16 Amps**		**Max 12 Amps**	
Power	**4 kW**	**5,5 hp**	**4 kW**	**5,5 hp**
Tool holder rpm	**500-800 rpm**		**500-800 rpm**	
Working width	**335 mm**	**13,2”**	**335 mm**	**13,2”**
Tool holder diameter	**335 mm**	**13,2”**	**335 mm**	**13,2”**
Tool diameter	**335 mm**	**13,2”**	**335 mm**	**13,2”**
Weight	**139 kg**	**271 lbs**	**139 kg**	**271 lbs**
Grinding pressure	**33 kg**	**63.9 lbs**	**33 kg**	**63.9 lbs**
Additional weight	**4x5,67 kg**	**4x12.5 lbs**	**4x5,67 kg**	**4x12.5 lbs**
Application	**dry**		**dry**	
Vacuum hose port	**yes**		**yes**	
Option for water			**Option for water**	
- Water tank capacity	**20l**	**5.2gal**	**20l**	**5.2gal**
-Water feed	**with pump front**		**with pump front**	
Cable length	**17.4 m**	**57 ft**	**17.4 m**	**57 ft**
Machine LxWxH	**1208x599.5x917 mm**	**47.6”x23.6” x36.1”**	**1208x599.5x917 mm**	**47.6”x23.6” x36.1”**
Packing LxWxH	**1410x730x1100 mm**	**55.5”x28,7”x43.3”**	**1410x730x1100 mm**	**55.5”x28,7”x43.3”**

VIBRATIONS

The vibrations of the machine are within the limits of directives and harmonized standards from the European Union when the Lavina®13X is operated with the recommended tools and in normal conditions.

SONOROUS EMISSIONS

The sonorous emissions are within the limits of directives and harmonized standards from the European Union when the Lavina® S is operated with the recommended tools and in normal conditions. However, as previously stated, the operator must wear ear protectors.

LABEL DATA

The data on the label provides the correct Voltage and kW (needed for operational purposes);
Weight (needed for transportation purposes); production year and serial number (needed for maintenance purposes).

Customer Service

For customer assistance and technical support call your local distributor or call Superabrasive Inc. at 1-800-987-8403 or visit us at: www.superabrasive.com , where you can download a copy of this manual.

2. SAFETY INSTRUCTION

RECOMMENDED USE ⚠ WARNING

The Lavina®13X machine is designed and manufactured to grind and polish concrete, terrazzo and natural stone floors. It can be used for renovations as well as for polishing. The machine is designed for dry use. Use a vacuum of appropriate size. For more information, please refer to the chapter on handling the vacuum connection.

PROHIBITED USE ⚠ WARNING

The machine MUST NOT be used:

For applications different from the ones stated in the General Description chapter.

For not-suitable materials.

In environments which:

Possess risks of explosion

Possess high concentration of powders or oil substances in the air

Possess risks of fire

Feature inclement conditions.

Possess electromagnetic radiation.

PREPARATION FOR WORK ⚠ WARNING

Make sure that:

You have closed the work area, so that no person unfamiliar with operating the machine can enter the area

The tool plate and tools are adjusted to the machine properly

There are no missing parts of the machine

The machine is in upright working position

The protection devices are working properly.

The electrical cable is free to move and follow the machine easily. In order to keep the electrical cable from being damaged, no vehicle should cross the zone where electrical cables are situated.

⚠ WARNING

PROTECTION DEVICES

The machine is equipped with several protection devices including the following:

An emergency stop button

A protection skirt and a hood for protecting the tool plates.

These devices protect the operator and/or others persons from potential injuries. Do not remove them. On contrary, before using the machine, please ensure that all protection devices are mounted and function properly.

ARREST FUNCTIONS ⚠ WARNING

Functions of arresting of the machine are following:

Button to stop the motor (category 1)

Emergency button (category 1)

⚠ WARNING

SAFE USE

The Lavina®13X is designed to eliminate all risks correlated with its use. However, it is not possible to eliminate the risks of an eventual accident with the machine. Unskilled or uninstructed operator may cause correlated residual risks. Such risks are:

Position Risks due to operator's incorrect working position

Tangling up Risks due to wearing inappropriate working clothes

Training Risks due to lack of operational training

NOTE: In order to reduce all consequences of the above-mentioned risks, we advise that machine operators will follow the instructions in the manual at all times.

RESIDUAL RISKS ⚠ WARNING

During the normal operating and maintenance cycles, the operator is exposed to few residual risks, which cannot be eliminated due to the nature of the operations.

BEFORE YOU BEGIN ⚠ WARNING

Working area must be clear from any debris or objects.

A first-time operator must always read the manual and pay attention to all safety instructions.

All electric connections and cables must be inspected for potential damages.

Ground wire system of the power supply must be also inspected.

Perform general daily inspections of the machine and inspect the machine before each use.

Always inspect the safety devices:

The emergency break must be clear and working

The tool protector must be working

The machine must be clean

Never operate the machine in the rain!

Confirm that there are no missing parts especially after transportation, repair or maintenance.

OPERATING MACHINE ⚠ WARNING

When operating the Lavina®13X, make certain that there is no one, but you around the machine.

Never leave the machine unattended while working.

The electrical cable must move freely and must be damage-free.

Check if the floor, you work on, is not too uneven. If this is the case, it may damage the machine.

AFTER WORK IS COMPLETED ⚠ WARNING

Clean the machine and its surroundings properly

Unplug the machine and wind up the electrical cable

Store the machine in a safe place

THE WORK AREA ⚠ WARNING

Make certain that people or vehicles do not enter the work area.

Avoid cables and hoses being in the way.

Always check the floor for debris

PERSONAL PROTECTIVE EQUIPMENT (PPE) ⚠ WARNING

Always wear safety shoes when working with the machine.

Always wear ear protectors when working with the machine.

All personnel in the immediate work area must wear safety glasses with side shields.
Always wear safety gloves when changing the tools.
Always wear clothes suitable for the work environment.

OPERATOR

⚠ WARNING

The Lavina®13X machine.
The operator must know the machine's work environment.
Only one operator at a time can work with the machine.
The operator must be properly trained and well instructed prior operating the machine.
The operator must understand all the instructions in this manual.
The operator must understand and interpret all the drawings and designs in manual.
The operator must know all sanitation and safety regulations pertaining to the operation of
The operator must have floor grinding experience.
The operator must know what to do in case of emergency.
The operator must have an adequate technical knowledge and preparation.

3. OPERATION

PRELIMINARY CONTROLS

Inspect the working area as explained in the safety instructions. For dry use connect the vacuum extractor and ensure that the vacuum hose is clear and it will follow the machine easily. Plug in the machine and make sure that the power cord is free to follow the working direction of the Lavina®13X.


Figure 3.1

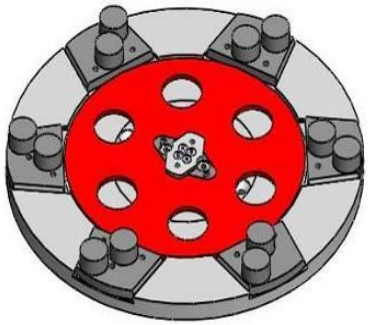


Figure 3.2


Figure 3.3

MOUNTING TOOLS

Mount the tools only after ensuring that there is enough diamond bond material left. Be sure that the plates are always clean before mounting. WARNING: Secure always the"Quickchange" pads with the security plate (Fig.3.1), lock the butterfly completely to 90 degrees with the tool holder key (Fig.3.2). Diamond tools with Velcro are attached on foam plate of 13,2 inch(Fig.3.3). The foam plates are mounted on the key lock (butterfly). Always use the tool holder key (Fig.3.3).

LEVELING AFTER MOUNTING THE TOOL

On top of the base plate is mounted a water level (Fig. 3.4). Designed to establish the good working position of the tools and adjusted by the operator in the different ranges:
Turn left and right on 45° by releasing the screw handle (Fig. 3.4)


Figure 3.4


Figure 3.5


Figure 3.6


Figure 3.7

Tilt crosswise to the left and to the right to 4° - release the screw handle (Fig. 3.5)
Using the handle (Fig 3.6) and guided by the index line and the levelling put the operating part in the desired crosswise position and screw the handle (Fig 3.5)
Using the vertical screw (Fig 3.7) and guided by the leveling adjust the operating part to flat position or find the required lengthwise tilt (forward or backward).

ADJUSTING HANDLE

Figure 3.8

Figure 3.9

Figure 3.10

Take and pull the T hanle (Fig. 3.8 and Fig. 3.9) to unlock the handlebar. Turn the handlebar in the desired direction and find the position where the T handle will lock the handlebar (Fig. 3.10)

TOOL PROTECTING GUARD

The protecting guard has free movement and is self-adjusting according to the height of the tool abrasion and is turning in the range of 45°clockwise or anti clockwise following the wall (Fig 3.11). The height of the brush is adjusted only when using the Foam plate (Fig.4.3). The adjustment is made by unscrewing the bolts on the side of the guard (Fig 3.12) and pulling out the brush to the desired position.

The plastic rolls on the protecting guard serve to protect the wall from damages (Figure 3.11). By moving the roll in the hole (Figure 3.13) can be adjusted the distance of the working tool to the wall.

Figure 3.11

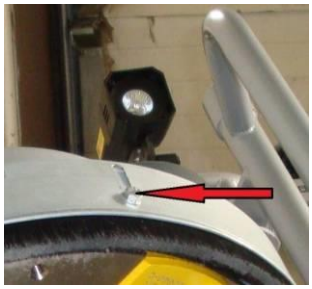


Figure 3.12

Figure 3.13

THE CONTROL BOARD

Figure 3.14

1. **Digital RPM indicator** Indicates the revolution per minute of the grinding plates (not the revolution per minute of the entire unit).
2. **Alarm/Reset button** resets the alarm of the inverter. **Button** lights blue when the inverter goes into alarm mode.
3. **Power led** lights green when the power is on
4. **Emergency button** used in Emergency situations for stopping the motor
5. **Forward/Reverse switch** choose forward for clockwise rotation of the grinding plates or reverse for anti-clockwise rotation of the grinding plates**.** (Recommended) Preferred operating direction is when the switch is on position F. The proper direction of rotation of the motor (anti-clockwise) is indicated by arrow on its cover
6. **Potentiometer** changes the RPM of the grinding plates from 500-800 rpm
7. **Ready OFF/ON switch Turning ON the switch, it lights showing that the machine is in standby mode. Turning OFF the switch, it lights off showing the machine is out of standby mode. After releasing the switch it goes back in central position.**
8. **OFF button** stops motor
9. **RUN button** starts motor

STARTING THE MACHINE

First, follow the directions in chapter Safety Devices and Safety Instructions. Next, pull the emergency stop (Fig. 3.14 4) and turn the ready switch (Fig. 3.14 7) in position ON to put the machine in standby mode to start. Check the potentiometer (Fig. 3.14 6) and ensure that it is set at the working speed. Switch on the vacuum unit. Finally, hold the machine firmly and push the run button (Fig. 3.14 9).

OPERATING THE MACHINE

Work at a constant speed allowing the tools time to work at a speed appropriate for the tools' grit size. Avoid vibrations. Do not stop the Lavina ®13X machine in one spot while the tools are still working because they will leave marks on the floor surface. Check the floor surface periodically to ensure that dust is not accumulating on the surface, also check regularly if your vacuum works properly. In case you use Lavina ®13X as one disc machine for floor maintenance guide the machine in straight lines across the floor, and with each new line overlap a little bit of the previously completed surface.

STOPPING THE MACHINE

The stopping of the machine must be done gradually until the motor stops. Do not stop moving the machine before arresting the Motor, as the tools could damage the surface.
To stop the machine:
1.Push the STOP button (8) .
2.Turn the **OFF/ON** (7) switch in position OFF, this will cut the voltage to the invertor and the green light will turn off.

While working do not turn off directly from the switch READY OFF / ON or from the Emergency Stop, but follow the above mentioned steps 1 and 2.

<u>Use the Emergency button (4) only in emergency</u>. ⚠ WARNING
Remember not to hold the machine in one spot before turning off the motor.

4. TOOLS AND ACCESSORIES

WEIGHTS

Superabrasive offers additional weights for increasing the productivity of the machine (Fig.4.1). Each additional weight weighs about 12,5 lbs or 5,67 kg for 1'' bars (0.83'' H x 8.86'' W x 8.86'' D). Each individual application, type and condition of surface, power capacity of the outlet, etc. will determine the number of weights you can use without tripping a breaker, although with a maximum of four. The weight stacks on to central shaft above the tools around the outer bowl (Fig.4.1).

The additional weight depends on the tools; it is not always possible to add weights. Some tools work too aggressively and the machine can stop.

Figure 4.1

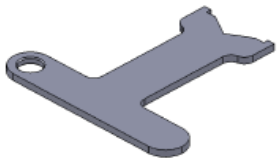


Figure 4.2

TOOL HOLDER KEY

The tool holder key (Fig.4.2) is used for adjusting, mounting and dismounting of the foam plates. Always use the key for mounting.

Item number is A03.00.00.00

FOAM PLATE

Diamond tools with Velcro are mounted on the foam plate 13.5“(Fig.4.3).

The foam plate is mounted on the “QuickChange”System.

Item number is LV-FP-13.5-S

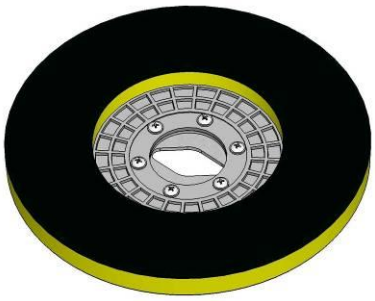


Figure 4.3

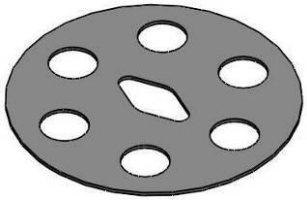


Figure 4.4

SECURITY PLATE FOR QUICKCHANGE PADS

Plate (Fig.4.4) used to ensure the “Quickchange” pads.

Item number is A38.00.02

5. POPULAR TOOLS

RECOMMENDED TOOLS

QuickChange System and Tooling feature extremely fast and convenient tool changes, and a long tool life, providing for great long-term cost savings. The QuickChange pads are produced in four different bonds for super hard, hard, medium and soft concrete, in a variety of grit sizes. They are offered with 1 or 2 buttons or rectangular segments, which allows you to customize the aggressiveness of the cut.

Calibra grinding discs: our popular ceramic bond discs are designed for the removal of difficult scratches and they save you valuable time by eliminating the need for multiple passes with metal tools.
They can be used wet or dry, and are best for hard concrete applications. They are 3-inch, with included Velcro back attachment.

NATO® polishing discs feature a special resin formula designed for both wet and dry applications and a unique design with wide channels allowing for work on a cleaner surface and ensuring a quality polish. Available in 3 and 4 in sizes. They are with Velcro attachment.

V-HARR® Premium Polishing Pads are designed for mechanically polishing and restoring concrete; also ideal for terrazzo and hard stone floors. V-HARR® pads are offered in a wide variety of diameters and grit sizes to accommodate many applications. Dry use is strongly recommended.

Shine Pro® are high quality diamond-integrated pads for floor maintenance. Available in a variety of sizes, they are great for daily use. When used wet, they require only water (no wax or chemicals needed), making them a very environmentally-friendly solution for maintaining floors.

Use Only Superabrasive's Recommended Tools. For More Tooling Options, Visit www.superabrasive.com

6. MAINTENANCE AND INSPECTION

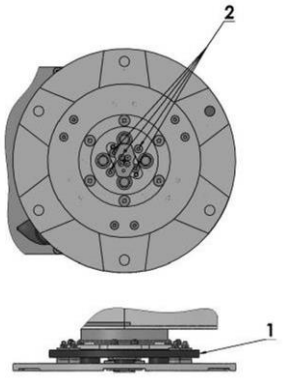


Figure 6.1

CLEANING

Keep your machine clean. Cleaning the machine on a regular basis will help detect and solve potential problems before they cause damage to the machine. Most importantly, check and clean the tool plate connections, power cord and plugs, vacuum hoses.

CHECK DAILY

After operating the Lavina®13X machine, the operator should conduct a visual inspection of the machine. Any defect should be solved immediately. Pay attention to power cords, plugs and vacuum hoses, loose bolt or screws.

Tool holders: Buffers and elastic element are consumables and must be visually checked daily and replaced if needed. See flanges or discs are mounted locked well in place .

The key lock holders should be also checked.

Check the rubber buffers and fixing of the holders. The flange holding the buffers (Fig.6.1 1) and elastic element has to be firmly fixed to the unit. A gap seen there means that there are loose screws fixing the holder. The screws has to be tightened immediately for safety operation. Working with loose screws on the holder could also cause bad damages on the machine.

It is very important to check regularly the screws(Fig.6.1 2),that fix the "Quickchange" holder to the safety part, so that holder will not fly away if the buffers got damaged.“Quickchange” should be clean.

CHECK AND REPLACE AFTER THE FIRST 15 WORKING HOURS

Check the belt tension after 15 hours working with the machine.
For the correct tension, see TROUBLESHOOTING.

CHECK EVERY 200 WORKING HOURS

Every 200 working hours, the operator should inspect all parts of the machine carefully. Most importantly, inspect and clean the tool plate connections, power cord and plugs, vacuum. Check the guard assembly. Make certain the wheels are clean and rotate properly. Inspect the control buttons. If there are defective control parts, they should be replaced immediately. Replace worn vacuum- and water hoses. Carefully inspect the seal rings and bearings of the grinding units, and replace any showing signs of excessive wear.
For more information, refer to chapter troubleshooting below.

CHECK EVERY 500 WORKING HOURS

Besides the checks of 200 working hours, open up the bottom cover like described in chapter “TROUBLE SHOOTING REPLACING BELT Check if sealers, belt and bearings are in good condition, change if needed. Beware by tensioning the belt not to “over tension”; the belt will never regain his original tension.

VACUUM

As stated previously, frequently check hoses and other parts for clogging.

MECHANICAL PARTS

Parts such as the belt, seal rings, cap rings, spiders and buffers and guard assembly are subject to wear and should be replaced as needed.

ELECTRICAL SYSTEM

Dust should not enter the control box as it will destroy the contacts.
Remove (blow out) any dust present.

LAVINA® 13X ELECTRICAL SCHEMES WITH YASKAWA INVERTER 200-240 VOLT

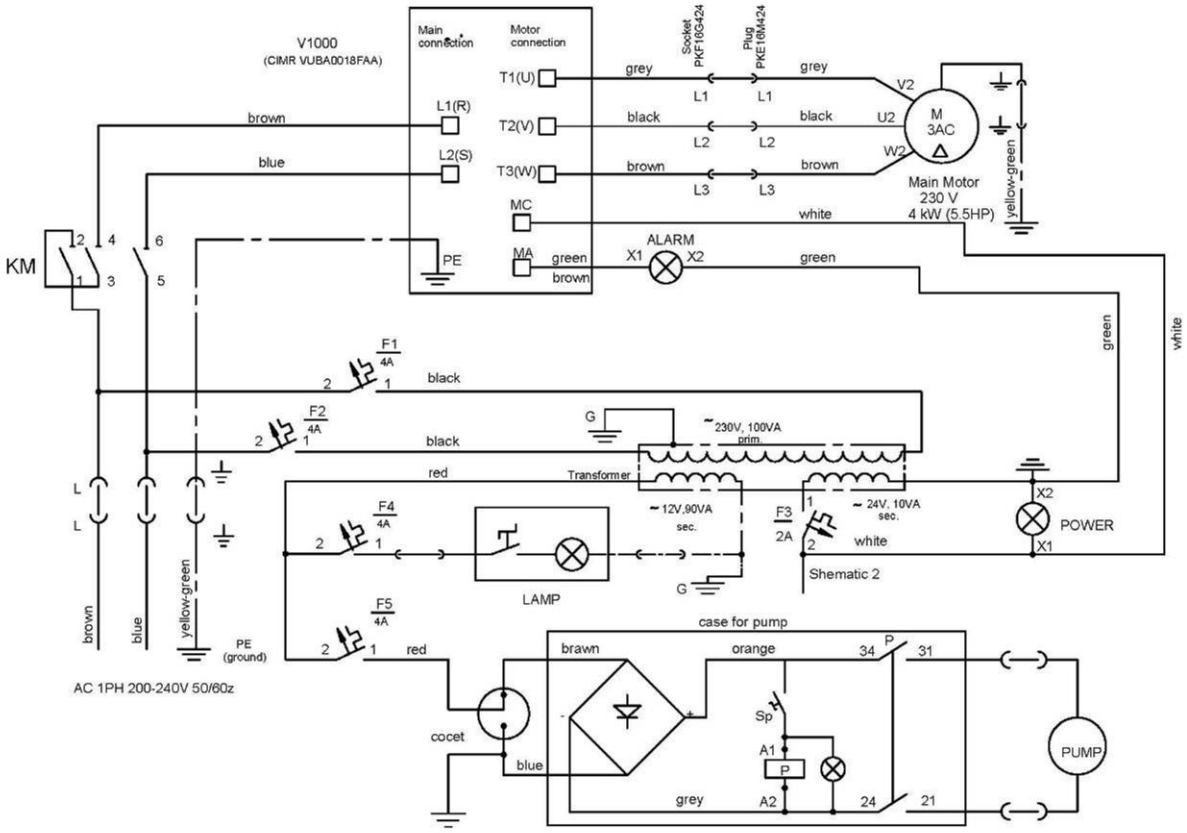
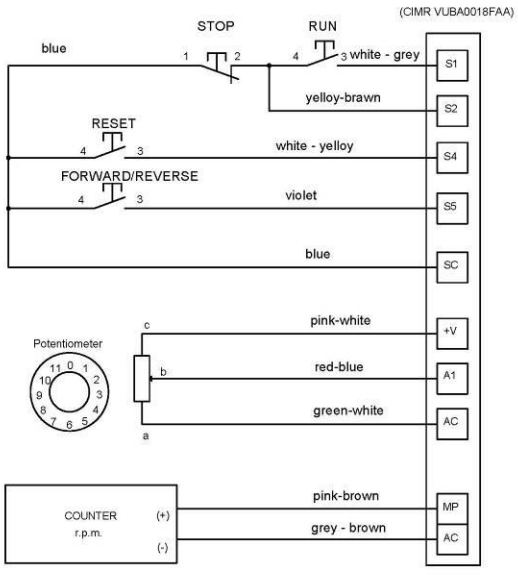
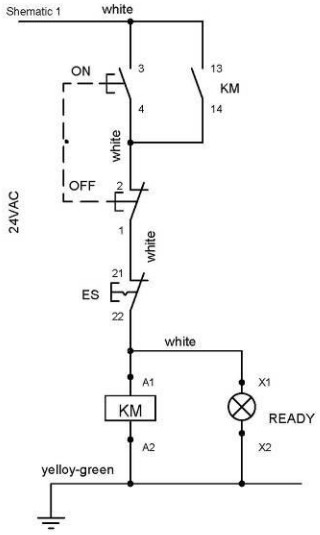


Figure 6.3





LAVINA® 13X ELECTRICAL SCHEMES YASKAWA CONNECTION MAIN CIRCUIT TERMINALS

The motor is connected in “Delta” (triangle) 230 Volt, reminder for the wire connection of the motor

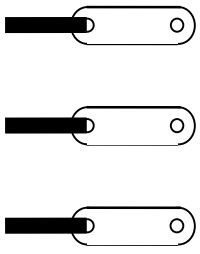
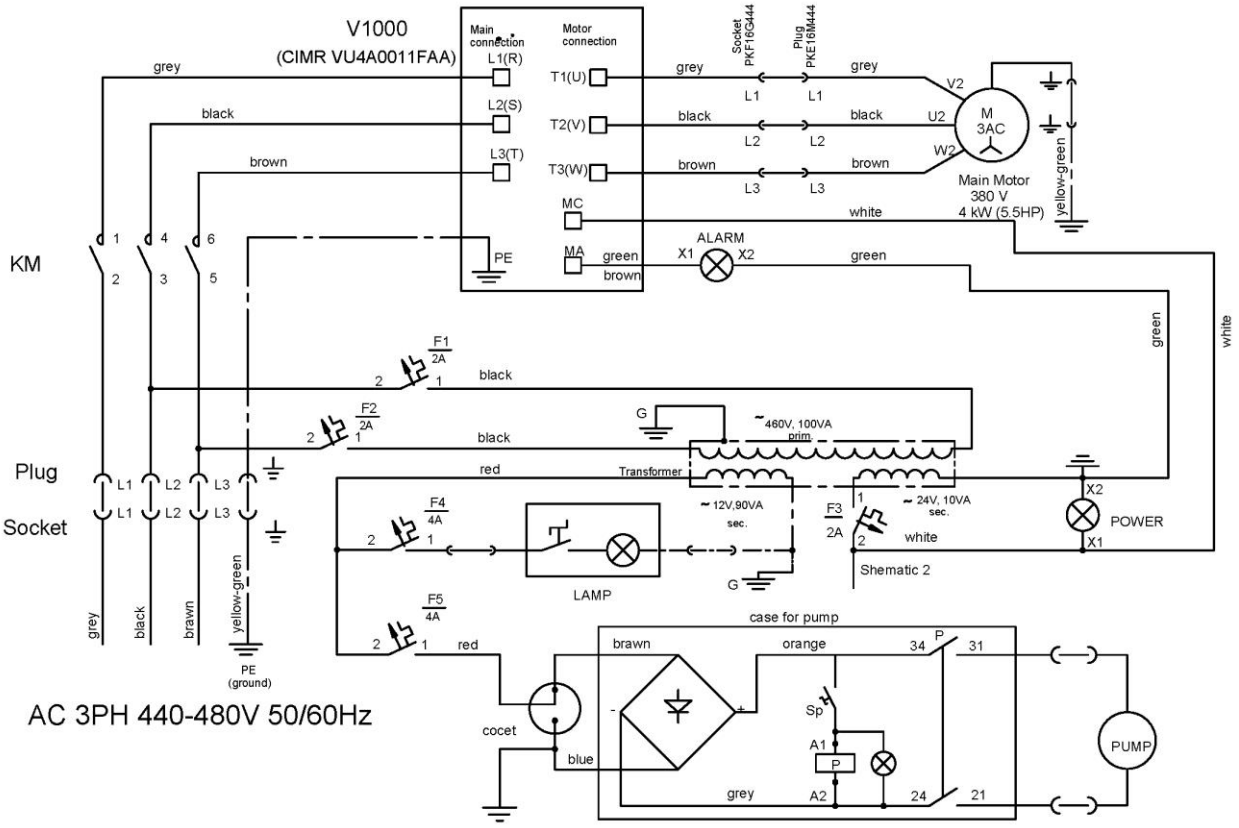
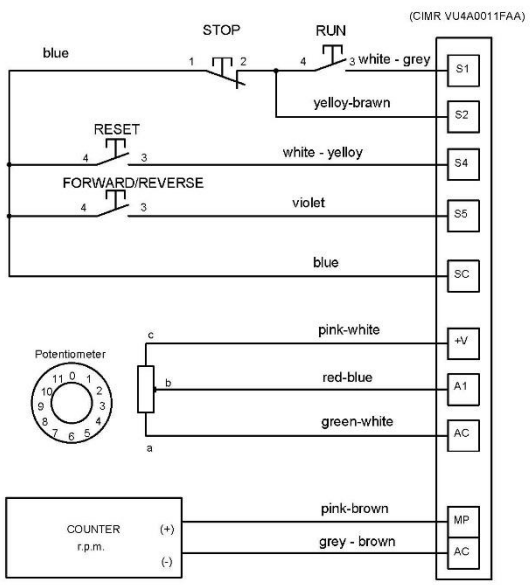


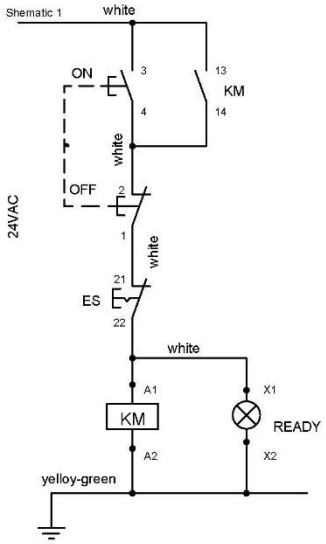
Figure 6.4

LAVINA® 13X-HV ELECTRICAL SCHEMES WITH YASKAWA INVERTER 440-480 VOLT

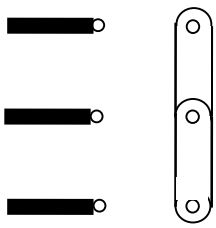


LAVINA® 13X-HV ELECTRICAL SCHEMES YASKAWA CONNECTION MAIN CIRCUIT TERMINALS





The motor is connected in “Star” 380 Volt,
reminder for the wire connection of the motor.



7. TROUBLESHOOTING

INDEX OF PROBLEMS AND SOLUTIONS

7.1 REPLACING POWER CORD AND PLUGS

When replacing the power cord or plugs always use cords and plugs with specifications as the original ones.

Never use lower quality or different type cord and plugs.

In addition, take into consideration the distance of the appliance from the electrical source. The greater the distance, the greater the resistance and the less current that will be available at the other end; there will be a voltage drop and the inverter will sign alarm mode. This can also happen if several machines are working on the same line or when the generator is underrated. In general our standard power cable can be doubled in length; if longer lengths are needed you have to replace all the cables with bigger gage rated cables for the length and amperage.

7.2 DISMOUNTING TOOL HOLDER TO CHANGING V-RINGS AND FELT-RINGS

Figure 7.2.1

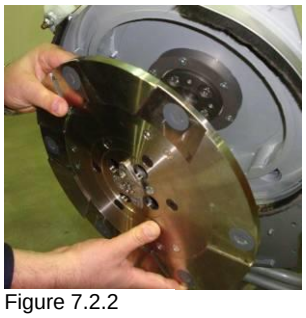


Figure 7.2.2

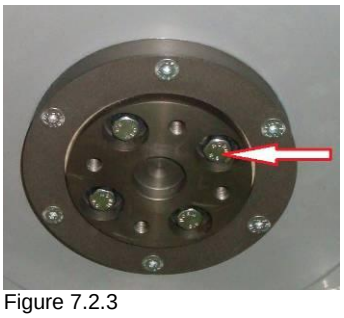


Figure 7.2.3

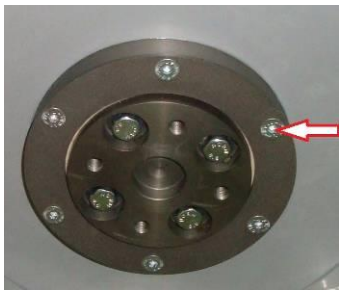


Figure 7.2.4

Figure 7.2.5

Figure 7.2.6

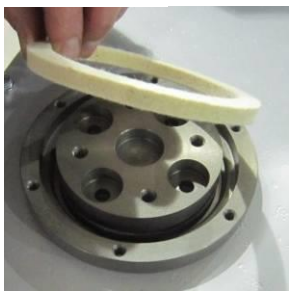


Figure 7.2.7

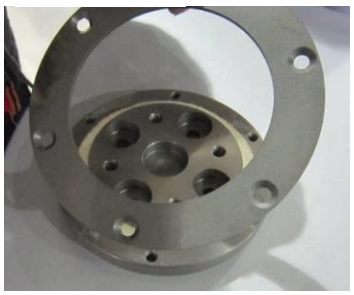


Figure 7.2.8

To check or replace the buffers and the elastic elements , the tool holders have to be dismounted.

You will need deep metric socket 13mm with outside diameter not more than 3/4in to unscrew the four bolts (Fig.7.2.1) and remove the holder (Fig.7.2.2)

When the tool holder is dismounted, you can change the sealers (V-Ring and Felt-Ring).

By loosening four Hex cap flange bolts (Fig.7.2.3) the adaptor comes loose. Unscrew the six screws of the cap (Fig.7.2.4) holding the felt-ring. Take out the Felt-Ring, adaptor and V-Ring.

Mount the V-Ring with the smallest lip of the V to inside (Fig.7.2.5) just push the V-Ring so the top is on the same level as the pulley top (Fig.7.2.6). Then take the adaptor and push the V-Ring down with the adaptor (Fig.7.2.7). The lowest lip of the V-Ring should only barely touch its gliding surface; also never push the V-Ring down with fingers. Mount the adaptor and the Felt-Ring on top (Fig.7.2.7). Close the sealers with the cap (Fig.7.2.8) and screw the bolts. Always use the original bolts.

7.3 DISASSEMBLING AND MOUNTING TOOL HOLDER TO CHANGE BUFFERS AND ELASTIC ELEMENT

When the TOOL HOLDER is disassembled you can change defective parts – elastic element, buffers, etc.

Lift the locking pin (Fig.7.3.1) to dismount the retaining washer (Fig.7.3.2). Take out the screws on the buffers and the nuts of the elastic element (Fig.7.3.3;Fig.7.3.4). Remove the elastic element from the QC plate (Fig.7.3.5). While the holder is dismounted (Fig.7.3.6;Fig.7.3.7) clean the parts and replace the defective with new ones. Assemble the holder with new buffers with new screws and new elastic element. Put the retaining washer (Fig.7.3.8) and push the locking pin (Fig.7.3.9). This will prevent the fall of the washer when mounting the holder on the machine.


Figure 7.3.1


Figure 7.3.2


Figure 7.3.3

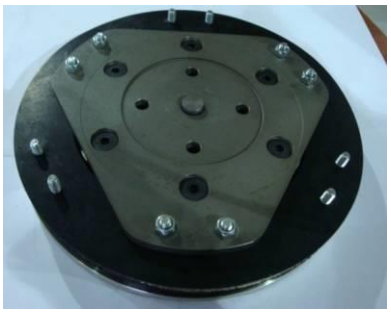


Figure 7.3.4


Figure 7.3.5


Figure 7.3.6


Figure 7.3.7


Figure 7.3.8

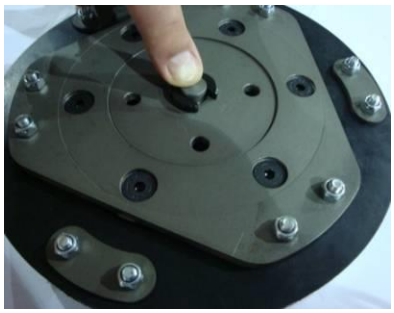


Figure 7.3.9

Make sure the four bolts holding the adaptor (Fig.7.3.12) are reliably tighten. Mount the holder on the machine using the same socket as mentioned in 7.2 (Fig.7.3.10;Fig.7.3.11). The retaining washer fits into the central hole C of adaptor and the four bolts into the thread holes T (Fig.7.3.12). The holder is centered on the outside diameter of the adaptor. Ensure the connection of the holder on the forehead of the adaptor and then tight evenly the four bolts. Tightening force of the bolts has to be 22...25N.m(16...18 ft/lbs). Mounting the holder without retaining washer (Fig.7.3.2) is **INADMISSIBLE** because the security system preventing the separation of part of the holder in case of broken buffers and elastic element will not function!
You can change the butterfly of the holder without dismounting the holder of the machine.


Figure 7.3.10

Figure 7.3.11

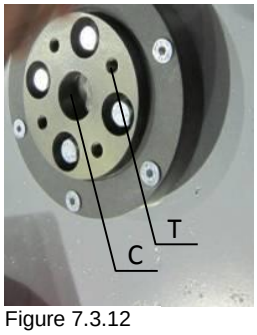


Figure 7.3.12

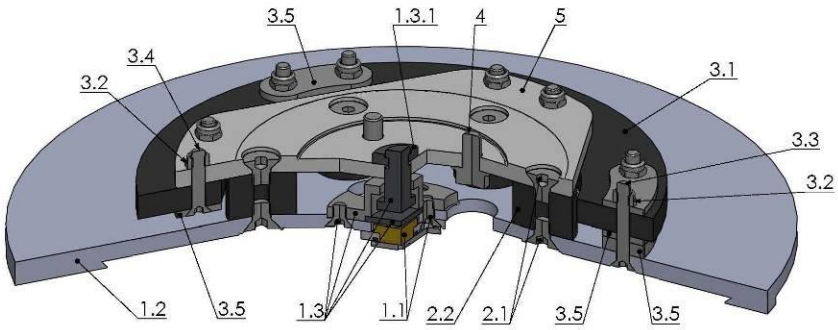


Figure 7.3.13

Fig.7.3.13 is 3-d section view of the holder, showing its parts. The numbering is the same as in Spare parts.

7.4 TENSIONING THE BELTS

PLEASE MAKE SURE YOU CHECK THE TENSION OF THE BELT AFTER THE FIRST 15 HOURS OF OPERATION
If the operator notices, the grinding spindle is turning irregular or noisy or in the worse case, the grinding spindle does not turn although the motor turns. It is recommended to check the belts.
ATTENTION: NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DISTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION


Figure 7.4.1


Figure 7.4.2


Figure 7.4.3

Remove the revision cover (Figure 7.4.1) and turn the screw (Figure 7.4.3) clockwise to tight the belt. The tightening force of one belt is 173 N measured by OPTIKRIK 1 **(** Figure 7.4.2) **.**

7.5 CHANGING THE BELT


Figure 7.5.1

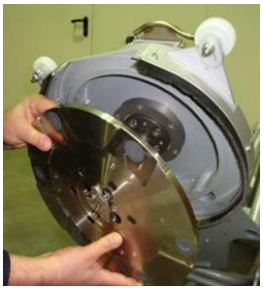


Figure 7.5.2


Figure 7.5.3


Figure 7.5.4


Figure 7.5.5


Figure 7.5.6

Loosen the screws on the working plate (Figure 7.5.1) and remove it from the working part (Figure 7.5.2). Release the sucker using the screws on its inside peripheral part (Figure 7.5.3) and remove it along with the removable guard. Remove the V-Ring and Felt-Ring as described in 7.2 . Remove the front cover by loosening the screws (Figure 7.5.4) and the revision cover by loosening the screws (Figure 7.5.5). By the tightening bolt (Figure 7.5.6) move the motor forward and release the two belts. Put the new belts and tighten them. The Static Belt Tension should be 225 N with a new belt, only 173 N with a used one. It is recommended to use an OPTIKRIK 1 Tension Gauge. The assembly is made in reverse order.

7.6 MOTOR CONNECTION

In case of changing the motor, please check the cable connection to your motor (Fig.7.6.1 and Fig.7.6.2).

Lavina 13X

The motor is connected in “Delta” (Triangle) 230 Volt, reminder for the wire connection of the motor.

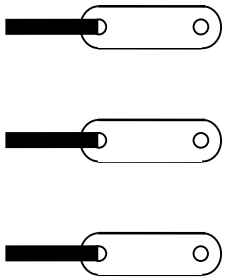


Figure 7.6.1

Lavina 13X-HV

The motor is connected in “Star” 380 Volt, reminder for the wire connection of the motor.

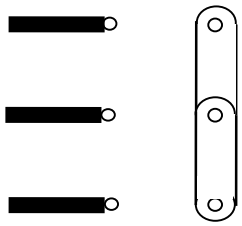


Figure 7.6.2

7.7 FAULT DIAGNOSIS INVERTER YASKAWA V1000

Pages are referring to

Yaskawa Electric SIEP C710606 18A YASKAWA AC Drive – V1000 Technical Manual

◆ Types of Alarms, Faults, and Errors

Check the LED operator for information about possible faults if the drive or motor fails to operate. *Refer to Using the Digital LED Operator on page 70*.

If problems occur that are not covered in this manual, contact the nearest Yaskawa representative with the following information:

- Drive model
- Software version
- Date of purchase
- Description of the problem

Table 6.4 contains descriptions of the various types of alarms, faults, and errors that may occur while operating the drive.

Contact Yaskawa in the event of drive failure.

Table 6.4 Types of Alarms, Faults, and Errors

Type	Drive Responses to Alarms, Faults, and Errors
Faults	When the drive detects a fault: • The digital operator displays text that indicates the specific fault and the ALM indicator LED remains lit until the fault is reset. • The fault interrupts drive output and the motor coasts to a stop. • Depending on the setting, the drive and motor may stop via different methods than listed. • If a digital output is programmed for fault output (H2-☐☐ = E), it will close if a fault occurs. • When the drive detects a fault, it will remain inoperable until that fault has been reset. *Refer to Fault Reset Methods on page 264*.
Minor Faults and Alarms	When the drive detects an alarm or a minor fault: • The digital operator displays text that indicates the specific alarm or minor fault and the ALM indicator LED flashes. • The motor does not stop. • One of the multi-function contact outputs closes if set to be tripped by a minor fault (H2-☐☐ = 10), but not by an alarm. • The digital operator displays text indicating a specific alarm and ALM indicator LED flashes. • Remove the cause of an alarm or minor fault to automatically reset.
Operation Errors	When parameter settings conflict with one another or do not match hardware settings (such as with an option card), it results in an operation error. When the drive detects an operation error: • The digital operator displays text that indicates the specific error. • Multi-function contact outputs do not operate. • When the drive detects an operation error, it will not operate the motor until the error has been reset. Correct the settings that caused the operation error to reset.
Tuning Errors	Tuning errors occur while performing Auto-Tuning. When the drive detects a tuning error: • The digital operator displays text indicating the specific error. • Multi-function contact outputs do not operate. • Motor coasts to stop. • Remove the cause of the error and repeat the Auto-Tuning process.

◆ Alarm and Error Displays

■ Faults

When the drive detects a fault, the ALM indicator LEDs remain lit without flashing. If the LEDs flash, the drive has detected a minor fault or alarm. *Refer to Minor Faults and Alarms on page 240* for more information. An overvoltage situation trips both faults and minor faults, therefore it is important to note whether the LEDs remain lit or if the LEDs flash.

LED Operator Display		Name	Page
bUS	bUS	Option Communication Error	*242*
CE	CE	MEMOBUS/Modbus Communication Error	*242*
CF	CF	Control Fault	*242*
CoF	CoF	Current Offset Fault	*242*
CPF02	CPF02	A/D Conversion Error	*242*
CPF03	CPF03	PWM Data Fault	*243*
CPF06	CPF06	Drive specification mismatch during Terminal Board or Control Board replacement	*243*
CPF07	CPF07	Terminal Board Communication Fault	*243*

LED Operator Display		Name	Page
CPF08	CPF08	EEPROM Serial Communications Fault	*243*
CPF11	CPF11	RAM Fault	*243*
CPF12	CPF12	FLASH Memory Fault	*243*
CPF13	CPF13	Watchdog Circuit Exception	*243*
CPF14	CPF14	Control Circuit Fault	*243*
CPF16	CPF16	Clock Fault	*243*
CPF17	CPF17	Timing Fault	*243*
CPF18	CPF18	Control Circuit Fault	*243*
CPF19	CPF19	Control Circuit Fault	*244*

LED Operator Display		Name	Page
CPF20 or CPF21	CPF20or CPF21	RAM Fault	244
		FLASH Memory Fault	244
		Watchdog Circuit Exception	244
		Clock Fault	244
oH3	oH3	Motor Overheat 1 (PTC input)	247
oH4	oH4	Motor Overheat 2 (PTC input)	248
oL1	oL1	Motor Overload	248
oL2	oL2	Drive Overload	248
oL3	oL3	Overtorque Detection 1	249
oL4	oL4	Overtorque Detection 2	249
oL5	oL5	Mechanical Weakening Detection 1	249
oL7	oL7	High Slip Braking oL	249
oPr	oPr	Operator Connection Fault	249
CPF22	CPF22	A/D Conversion Error	244
CPF23	CPF23	PWM Feedback Data Fault	244
CPF24	CPF24	Drive Capacity Signal Fault	244
dEv	dEv	Excessive Speed Deviation (for Simple V/f with PG)	244
EF0	EF0	Option Card External Fault	244
EF1 to EF7	EF1 to EF7	External Fault (input terminal S1 to S7)	244
FbH	FbH	Excessive PID Feedback	245
FbL	FbL	PID Feedback Loss	245

LED Operator Display		Name	Page
GF	GF	Ground Fault	245
LF	LF	Output Phase Loss	245
LF2	LF2	Output Open Phase	246
oC	oC	Overcurrent	246
oFA00	oFA00	Option Card Fault (port A)	246
oH	oH	Heatsink Overheat	247
oH1	oH1	Heatsink Overheat	247
PGo	PGo	PG Disconnect (for Simple V/f with PG)	250
rH	rH	Dynamic Braking Resistor	251
rr	rr	Dynamic Braking Transistor	251
SEr	SEr	Too Many Speed Search Restarts	251
STO	STO	Pull-Out Detection	251
UL3	UL3	Undertorque Detection 1	251
UL4	UL4	Undertorque Detection 2	251
UL5	UL5	Mechanical Weakening Detection 2	251
Uv1	Uv1	Undervoltage	252
Uv2	Uv2	Control Power Supply Undervoltage	252
Uv3	Uv3	Soft Charge Circuit Fault	252
oS	oS	Overspeed (for Simple V/f with PG)	249
ov	ov	Overvoltage	249
PF	PF	Input Phase Loss	250

Note: If faults CPF11 through CPF19 occur, the LED operator will display CPF00 or CPF11.

■ Minor Faults and Alarms

When a minor fault or alarm occurs, the ALM LED flashes and the text display shows an alarm code. A fault has occurred if the text remains lit and does not flash. *Refer to Alarm Detection on page 253*. An overvoltage situation, for example, can trigger both faults and minor faults. It is therefore important to note whether the LEDs remain lit or if the LEDs flash.

Table 6.5 Minor Fault and Alarm Displays

LED Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
bb	bb	Drive Baseblock	No output	253
bUS	bUS	Option Card Communications Error	YES	253
CALL	CALL	Serial Communication Transmission Error	YES	253
CE	CE	MEMOBUS/Modbus Communication Error	YES	253
CrSt	CrSt	Can Not Reset	YES	253
dEv	dEv	Excessive Speed Deviation (for Simple V/f with PG)	YES	254
dnE	dnE	Drive Disabled	YES	254
EF	EF	Run Command Input Error	YES	254
EF0	EF0	Option Card External Fault	YES	254
EF1 to EF7	EF1 to EF7	External Fault (input terminal S1 to S7)	YES	255
FbH	FbH	Excessive PID Feedback	YES	255
FbL	FbL	PID Feedback Loss	YES	255
Hbb	Hbb	Safe Disable Signal Input	YES	255
HbbF	HbbF	Safe Disable Signal Input	YES	255
SE	SE	MEMOBUS/Modbus Test Mode Fault	YES	—
oL5	oL5	Mechanical Weakening Detection 1	YES	249
UL5	UL5	Mechanical Weakening Detection 2	YES	251
dWAL	dWAL	DriveWorksEZ Alarm	YES	244
HCA	HCA	Current Alarm	YES	256
oH	oH	Heatsink Overheat	YES	256
oH2	oH2	Drive Overheat	YES	256
oH3	oH3	Motor Overheat	YES	256
oL3	oL3	Overtorque 1	YES	256
oL4	oL4	Overtorque 2	YES	257
oS	oS	Overspeed (for Simple V/f with PG)	YES	257

LED Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
ov	ov	Overvoltage	YES	257
PASS	PASS	MEMOBUS/Modbus Test Mode Complete	No output	257
PGo	PGo	PG Disconnect (for Simple V/f with PG)	YES	257
rUn	rUn	During Run 2, Motor Switch Command Input	YES	258
rUnC	rUnC	Run Command Reset	YES	258
UL3	UL3	Undertorque 1	YES	258
UL4	UL4	Undertorque 2	YES	258
Uv	Uv	Undervoltage	YES	258

■ Operation Errors

Table 6.6 Operation Error Displays

LED Operator Display		Name	Page
oPE01	oPE01	Drive Unit Setting Error	259
oPE02	oPE02	Parameter Setting Range Error	259
oPE03	oPE03	Multi-Function Input Setting Error	259
oPE04	oPE04	Terminal Board Mismatch Error	260
oPE05	oPE05	Run Command Selection Error	260
oPE07	oPE07	Multi-Function Analog Input Selection Error	260

LED Operator Display		Name	Page
oPE08	oPE08	Parameter Selection Error	260
oPE09	oPE09	PID Control Selection Error	260
oPE10	oPE10	V/f Data Setting Error	261
oPE11	oPE11	Carrier Frequency Setting Error	261
oPE13	oPE13	Pulse Train Monitor Selection Error	261

8. DISPOSAL

If your machine after time is not usable or needs to be replaced, send the machine back to Superabrasive or a local distributor, where a professional disposal complying with the environment laws and directives is guaranteed.

9. MANUFACTURER'S CONTACTS

If you need to contact Superabrasive Inc. with technical support questions, below is the contact information.

Address;9411 Jackson Trail Road, Hoshton GA 30548, USA

Email: info@superabrasive.us

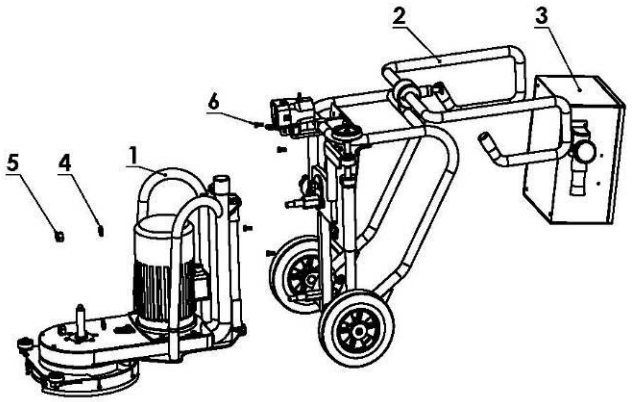
Tel.: 706 658 1122

Fax: 706 658 0357

Website: www.superabrasive.com

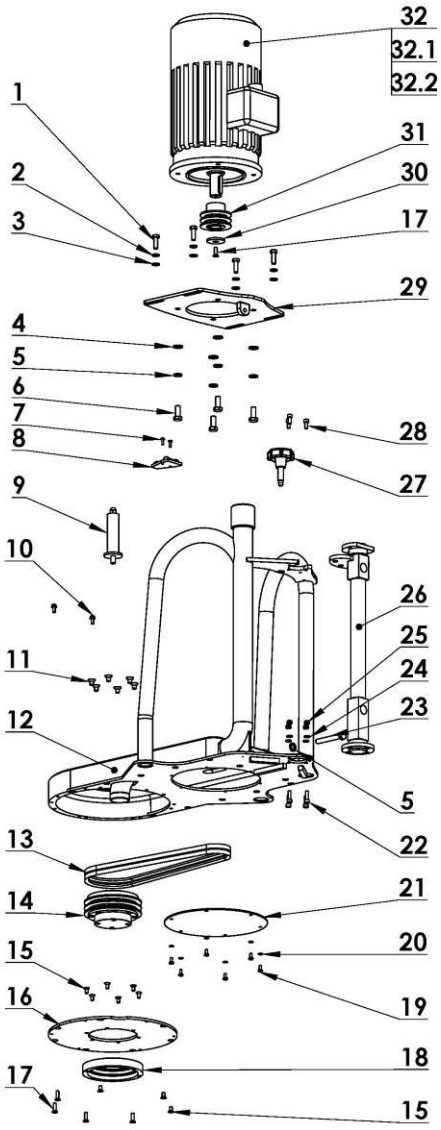
10. SPARE PARTS

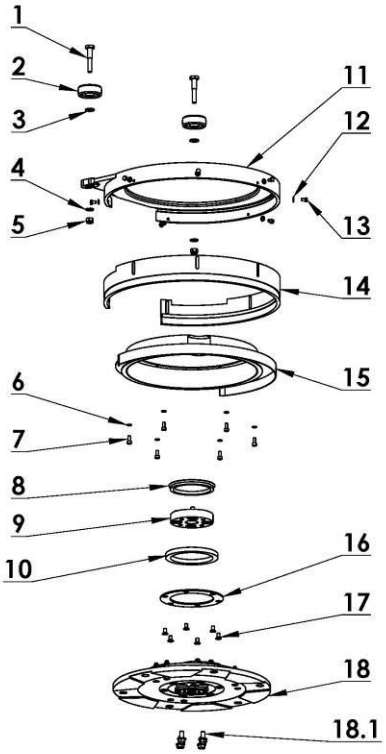
ASSEMBLY AND PARTS SPECIFICATIONS



1. LAVINA®13X GENERAL PARTS			
No.	**Item No.**	**Description**	**Pcs.**
1	L13X.10.00.00	Main Head	1
2	L13X.20.00.00	Carriage	1
3	L13X.30.00.00	Electric Cabinet	1
4	M16DIN125A	Washer	2
5	M16DIN982	Self Locking Nut	2
6	M8x20DIN6921	Bolt	4

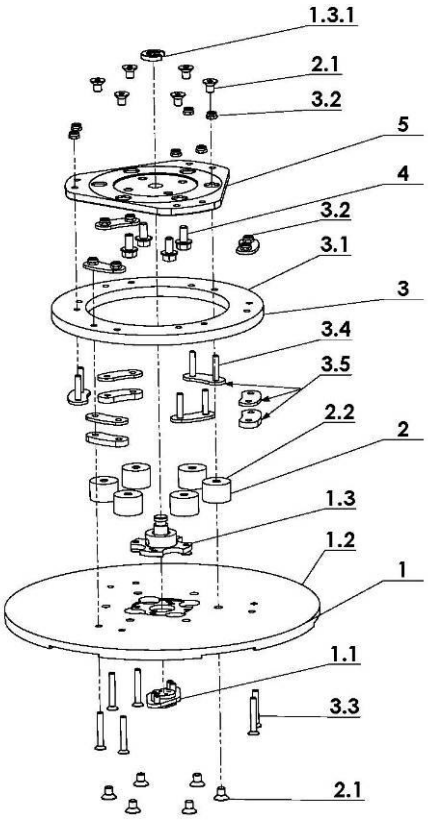
2. LAVINA®13X MAIN HEAD 1			
No.	**Item No.**	**Description**	**Pcs.**
1	M8x25DIN933	Bolt	4
2	M8DIN127B	Spring Washer	4
3	M8DIN125A	Washer	4
4	M10DIN125A	Washer	4
5	M10DIN127B	Spring Washer	5
6	M10x25DIN933	Bolt	4
7	M4x12DIN85A	Screw M4x12	2
8	DWL-K5	Double Water Level	1
9	L13S-10.70.00	Weights Holder	1
10	M5x12DIN6921	Bolt	2
11	M8x12DIN7991-10.9	Screw	6
12	L13S-10.20.00 -SET	Frame SET	1
13	XPZ 887	Belt	2
14	L13X.10.10.00	Driven Bearing	1
15	M6x12DIN7991	Screw	9
16	L13S-10.00.40	Disc Cover	1
17	M6x20DIN7991	Screw	5
18	L25LS-14.00.02	Flange	1
19	M5x10DIN933	Bolt	6
20	M5DIN7980	Spring Washer	6
21	L13S-10.00.20	Cover	1
22	M6x20DIN912	Screw	4
23	M10x70DIN931	Bolt	1
24	M6DIN125A	Washer M6	4
25	M6DIN985	Self Locking Nut	4
26	L13S-10.50.00	Tubular Axle	1
27	L7P-00.00.00.02	Handle M12	1
28	M6x14DIN912	Screw	3
29	L13S-10.30.00	Plate Strain	1
30	L25SPS-00.00.00.15	Front Washer	1
31	L13S-10.00.08	Belt Sheave	1
32	S-131	Electro Motor	1
32.1	L13N-S-10.00.53-01	Fan Cover	1
32.2	L13N-S-10.00.53-02	Fan	1

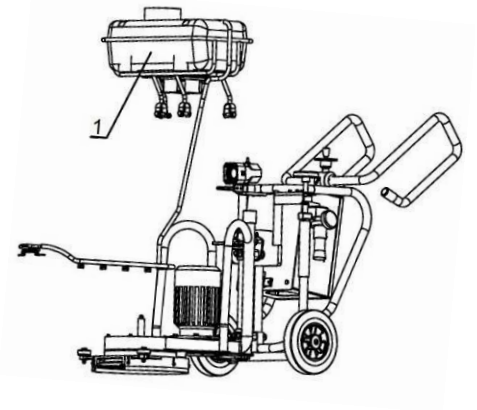




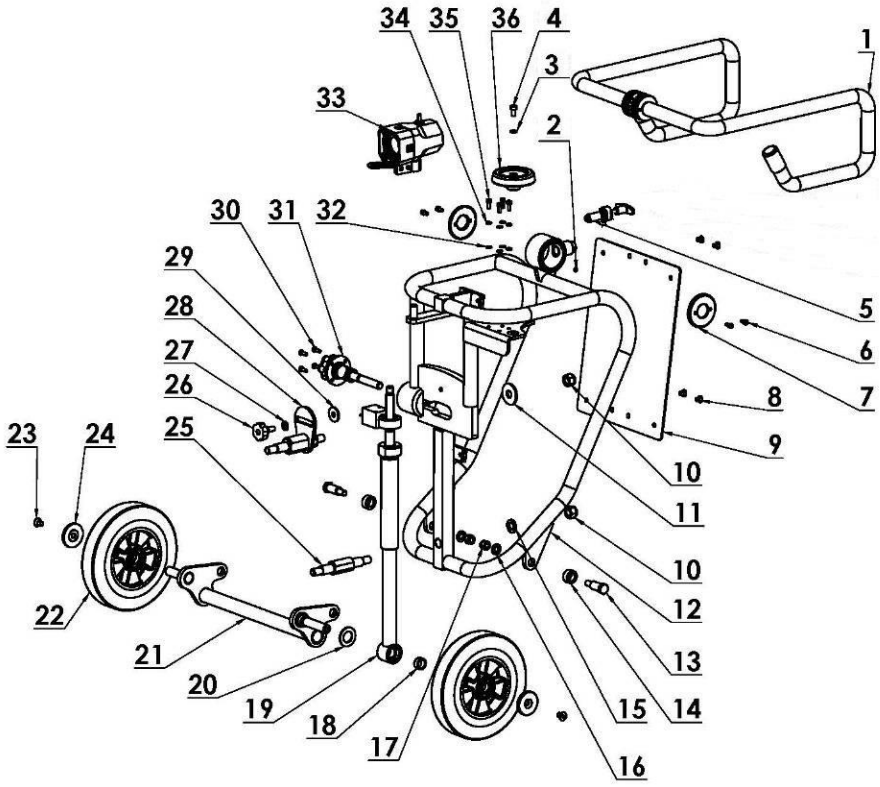
3. LAVINA®13X MAIN HEAD 2			
No.	**Item No.**	**Description**	**Pcs.**
1	L13-S-10.00.22	Axis Roll	2
2	PO 050 19 22 OG	Roll PO	2
3	M8DIN134	Washer	2
4	M8DIN125A	Washer	2
5	M8DIN 982	Self Locking Nut	2
6	M5DIN7980	Spring Washer	6
7	M5x12DIN912	Screw	6
8	TWVA00800	V-Ring Type A	1
9	A42.03.00	Adaptor	1
10	110X90X8.5	Felt Ring	1
11	L13-S-10.00.11	Protecting Disc	1
12	M5DIN125A	Washer	7
13	M5x8DIN933	Bolt	7
14	L13-S-10.00.38	Strip Brush	1
15	L13-S-10.40.00	Succer Cover	1
16	L25LS-14.00.03	Outer Cover	1
17	M6x12DIN7991	Screw	6
18	A43.00.00	Tool Holder A43	1
18.1	M8x16DIN6921	Bolt	4

4. LAVINA®30G-X TOOL HOLDER PARTS					
No.			**Item No.**	**Description**	**Pcs.**
1			A43.10.00	Quick Change Assembly	1
	1.1		A31.12.00	Keylock Set	1
	1.2		A43.11.00	Quick Change plate	1
	1.3		A41.12.00	Security set	1
		1.3.1	A41.00.05	Washer A41	1
2			A25.00.10-K	Buffer with two screw	6
	2.1		M8X12DIN7991	Screw	12
	2.2		A25.00.10	Buffer	6
3			A41.20.03-K	Driving Set A41	1
	3.1		A41.20.03	Elastic Element	1
	3.2		M6DIN985	Self Locking Nut	12
	3.3		M6X40DIN7991	Screw	6
	3.4		M6X30DIN7991	Screw	6
	3.5		A41.21.00	Set of plates	1
4			M8x16DIN6921	Bolt	4
5			A41.20.01	Flange	1





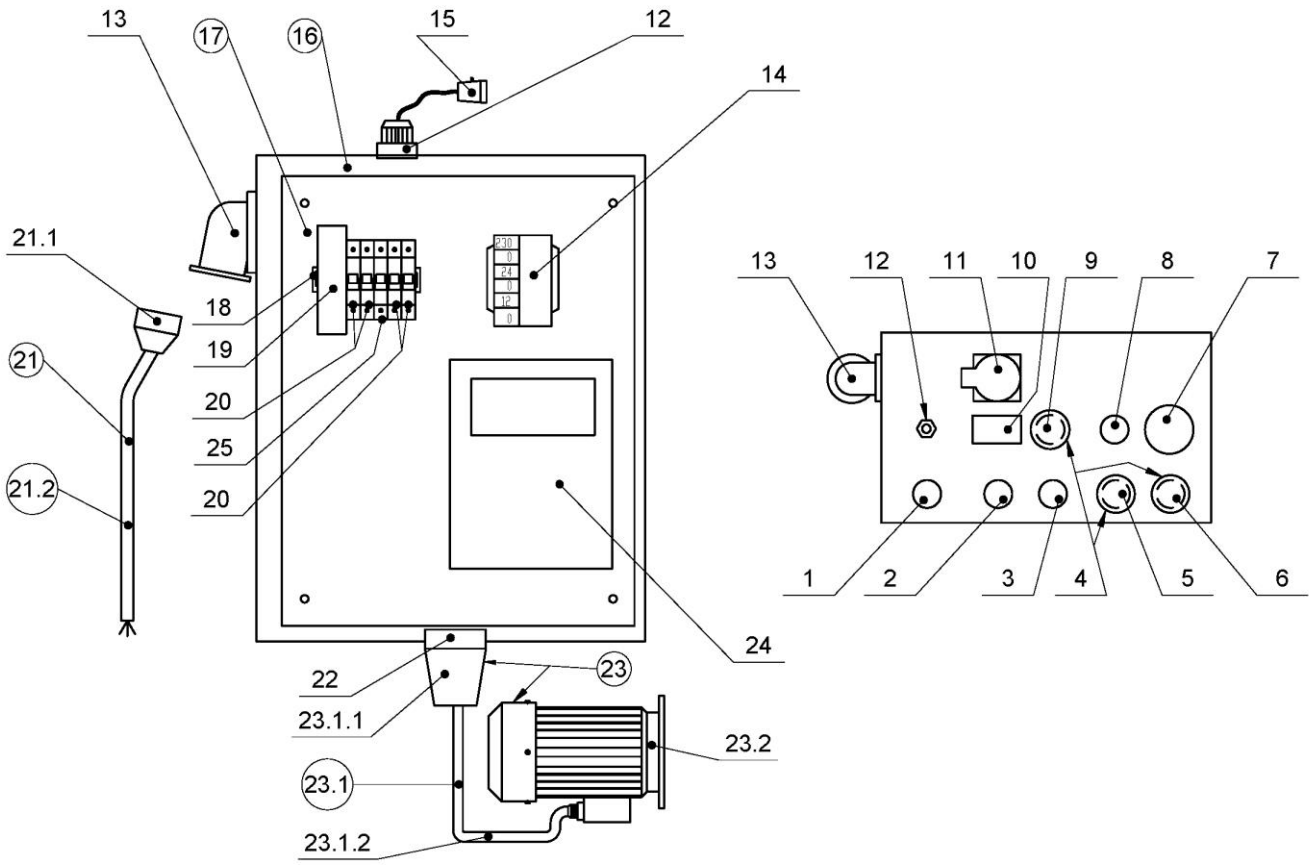
5. LAVINA®13X OPTION FOR WATER			
No.	**Item No.**	**Description**	**Pcs.**
1	L13S-40.00.00	Set Water	1



6. LAVINA®13X CARRIAGE PARTS							
No.	**Item No.**	**Description**	**Pcs.**	**No.**	**Item No.**	**Description**	**Pcs.**
1	L25S-23.10.00	Handle Assembly	1	20	L13S-21.00.07	Washer	1
2	M6X8DIN915	Screw	1	21	L13S-21.10.00	Carnage Frame	1
3	M8DIN433	Washer	1	21**	L13S-21.10.00-1	Carnage Frame	1
4	M8X16DIN912	Screw	1	22	L25G -20.00.04	Wheel	2
5	L25S-23.00.06-K	Locking bit	1	22**	IFP250x50-25x60	Wheel	2
6	M6X12DIN912	Screw	4	23	M10X16DIN7991	Screw	2
7	L25S.23.00.02	Outer cap	2	24	L32D-20.00.03	Cap	2
8	M8X12DIN7991	Screw	4	24**	L25X-20.00.03	Wheel Cap	2
9	L13S-20.00.18	Plate	1	25	L13S-20.00.05	Bottom Axle	1
10	M16 DIN982	Self Locking Nut	2	26	F17840	Knob Bolt	1
11	L13X-20.00.23	Washer	1	27	M10DIN125A	Washer	1
12	L13X-20.10.00	Frame	1	28	L13X-20.20.00	Axle	1
13	L13S-20.00.21	Axle	2	29	M10DIN440R	Washer	1
14	L13S-20.00.23	Washer	2	30	M6X20DIN7991	Screw	4
15	M16DIN125A	Washer	1	31	L13S-20.40.00	Screw Flat	1
16	M12 DIN125A	Washer	2	32	M6 DIN125B	Washer	4
17	M12 DIN982	Self Locking Nut	2	33	L20NS-30.30.00	Lamp Unit Incl. Cable	1
18	L13S-21.00.06	Bush	1	34	M6DIN127B	Spring Washer	4
18**	L13S-21.00.06-1	Bush		35	M6X16DIN912	Screw	4
19	L13S-21.20.00	Connecting Rod	1	36	L13S-20.00.32	Handle	1

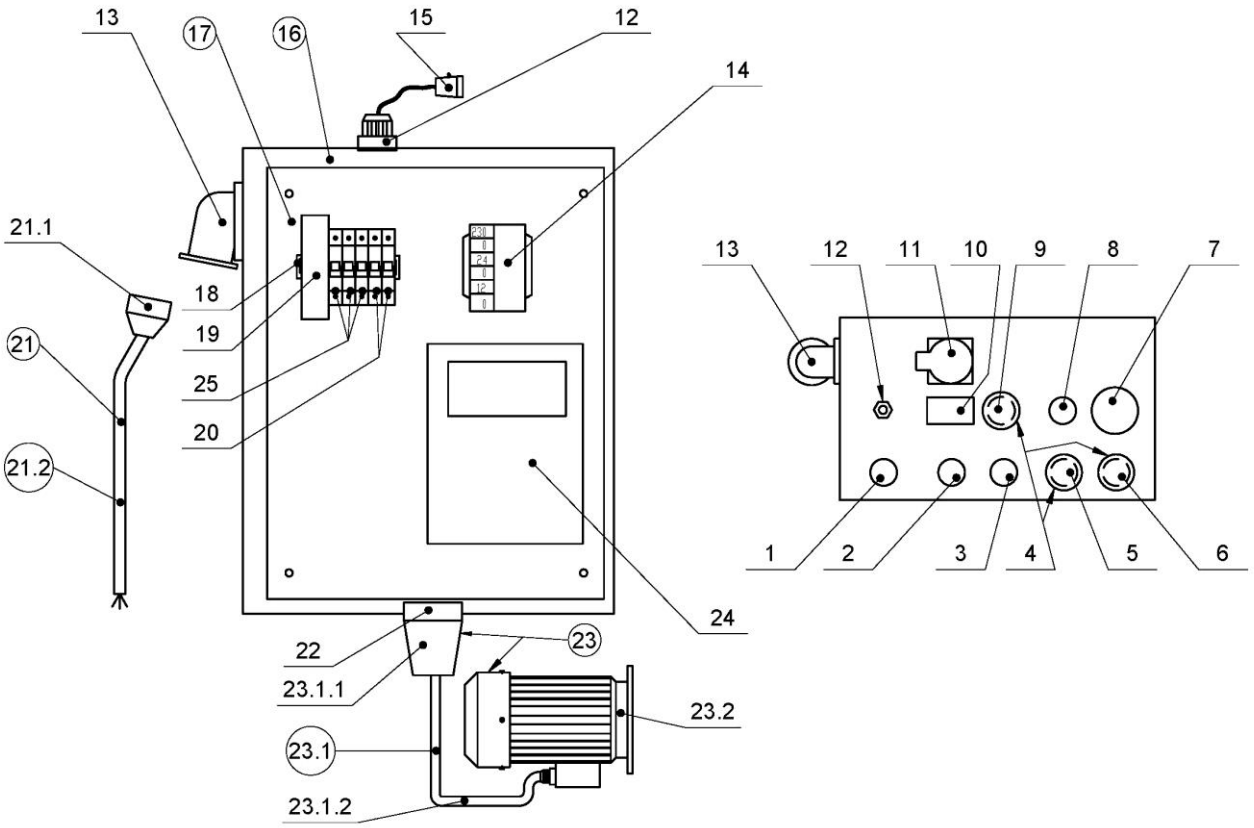
** for machines with serial № 1711L13X2031 and bigger.

7. CONTROL BOX PARTS 200-240 VOLT



7. LAVINA® 13X CONTROL BOX PARTS 200-240 VOLT							
No.	**Item No.**	**Description**	**Pcs.**	**No.**	**Item No.**	**Description**	**Pcs.**
1	L20NS-30.10.11	Switch Button F/R	1	17	L13X-30.11.00	Metal Box Plate	1
2	L20NS-30.10.04	Potentiometer	1	18	L13X-30.11.02	Rail	1
3	L32S-30.10.25	Switch button OFF/ON Led green	1	19	L13X-30.11.01	Contactor	1
4	L20NS-30.10.06	Cap	3	20	L20NS-30.11.01	Circuit Breaker	4
5	L20NS-30.10.07	Off Button	1	21	L20S-30.02.00	Cable with Connector	1
6	L20NS-30.10.08	Run Button	1	21.1	L20S -30.02.01	Connector	1
7	L20NS-30.10.10	Emergency Stop Button	1	21.2	L20S-30.02.02	Cable	1
8	L20NS-30.10.12	Green LED Power	1	22	L20S-30.10.03	Socket	1
9	L13S-30.10.12	Button	1	23	L13NS-30.10.00	Electro Motor Assembly	1
10	L20NS-30.10.15	Revolution counter	1	23.1	L20S-30.20.10	Plug with Cable	1
11	L13S-30.10.23	Panel mounted socket	1	23.1.1	L20S -30.20.11	Plug	1
12	L20NS-30.10.01	Cable Gland	1	23.1.2	L20S-30.20.12	Cable for Electro Motor	1
13	L20S-30.10.02	Plug on Control Board	1	23.2	S131	Electro Motor	1
14	L20NS-30.11.07	Transformer	1	24	L20S-30.11.09	Inverter Yaskawa (V1000)	1
15	L20NS-30.30.00	Lamp Unit Incl.Cable	1	25	L32RSHV-30.00.11	Circuit Breaker	1
16	L13X-30.10.00	Metal Box	1				

8. CONTROL BOX PARTS 440-480 VOLT



8. LAVINA® 13X-HV CONTROL BOX PARTS 440-480 VOLT							
No.	**Item No.**	**Description**	**Pc**	**No.**	**Item No.**	**Description**	**Pcs.**
1	L20NS-30.10.11	Switch Button F/R	1	17	L13XHV-30.11.00	Metal Box Plate	1
2	L20NS-30.10.04	Potentiometer	1	18	L13X-30.11.02	Rail	1
3	L32S-30.10.25	Switch button OFF/ON Led green	1	19	L13X-30.11.01	Contactor	1
4	L20NS-30.10.06	Cap	3	20	L20NS-30.11.01	Circuit Breaker	2
5	L20NS-30.10.07	Off Button	1	21	L13XHV-30.01.00	Cable with Connector	1
6	L20NS-30.10.08	Run Button	1	21.1	L13XHV-30.01.01	Connector	1
7	L20NS-30.10.10	Emergency Stop Button	1	21.2	L13XHV-30.01.02	Cable	1
8	L20NS-30.10.12	Green LED Power	1	22	L20NHVS-30.10.03	Socket	1
9	L13S-30.10.12	Button	1	23	L13XHV-30.20.00	Electro Motor Assembly	1
10	L20NS-30.10.15	Revolution counter	1	23.1	L20NHVS-30.20.10	Plug with Cable	1
11	L13S-30.10.23	Panel mounted socket	1	23.1.1	L20NHVS -30.20.11	Plug	1
12	L20NS-30.10.01	Cable Gland	1	23.1.2	L20NHVS-30.20.12	Cable for Electro Motor	1
13	L20NHVS-30.10.02	Plug on Control Board	1	23.2	S131	Electro Motor	1
14	L20NSHV-30.11.07	Transformer	1	24	L13XHV-30.11.09	Inverter Yaskawa (V1000)	1
15	L20NS-30.30.00	Lamp Unit Incl.Cable	1	25	L32RSHV-30.00.11	Circuit Breaker	3
16	L13XHV-30.10.00	Metal Box	1				